



OMEGA VSHY SERIES
Product Guide
VERTICAL STACKED
Hybrid Heating & Cooling

MODEL: VSHY

HIGH EFFICIENCY

DEV. G

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OMEGA Heat Pumps
 3325A Orlando Dr.
 Mississauga, ON, L4V 1C5
 T. 905.670.2269
 omega-heatpump.com
 omega@omega-heatpump.com

Omega has a policy of continuous product improvement and reserves the right to change design specifications without notice.



1. GENERAL DESIGN

1.1 Product Overview

All Omega Vertical Stack Hybrid Cooling & Heating units are engineered for quiet and reliable year round operation.

Reliability

Omega water-source heating and cooling systems provide reliable year round heating and cooling operation. Each unit features Omega's microprocessor controller for ensuring reliable, safe, and energy efficient heating and cooling comfort.

Serviceability

Omega VSHY units feature a slide out chassis and a blower assembly which are easily accessible through the front return air panel. For servicing or repairs, a spare replacement chassis can be temporarily swapped in allowing for uninterrupted operation.

Energy Efficient

A hybrid system can transfer energy to different zones in a building. During moderate weather, solar heat gain on the south side of a building may require cooling while the north side requires heating. Waste heat from cooling zone is injected back into the loop system into heating zones. Fresh air introduction can be done with optional fresh air duct snorkel located at the top of the unit and ducted to a remote field supplied ERV unit.

Customizable

Omega units can be customized to meet the specific requirements of any project. Some options include: choice of supply discharge air locations and sizes, ERV port and fresh air duct locations, and remote thermostat control.

Two Phase Installation

The equipment is shipped to site in two stages for integration with the phases of construction. This avoids potential issues with storage, and on-site damage and allows mechanical units to be installed in acceptable environmental conditions.

Phase 1

- During the initial stages of construction, the cabinets are installed. As construction progresses, they become part of the interior wall structure.

Phase 2

- The hybrid chassis is shipped as required and installed into the cabinet after riser loop commissioning and majority of construction is completed. Riser loop must be cleaned and flushed and chemically treated prior to installing chassis units.

Testing & Quality

To maintain the highest level of quality control, each hybrid chassis is factory charged and tested before being shipped to the job site. The chassis production and testing line features a computer controlled 6-step quality control (QC) system to ensure that every stage of chassis production is tested and re-tested. Units are performance tested in Omega's state-of-the-art in-house test facility to ensure unit performance and reliability meets or exceeds industry standards. Each unit is ETL listed.



1.2 Key Features

Energy Efficient Design

- High efficiency compressors and blower motors
- Optimized air-coil circuiting of refrigerant coils
- Refrigerant metering thermal expansion valves
- Low pressure drop water coaxial coils
- Energy Efficiency Ratio (EER) exceeds ASHRAE 90.1

Quiet Operation

- High density sound insulated cabinet
- Noise attenuating return air panels
- Double isolated chassis base
- Compressor mounted on vibration isolators

Space Considerations

- Quiet operation
- Fire and mould resistant insulation
- Heavy duty cabinet construction
- Architectural supply grilles and return air panels
- Durable, long life gasketing on chassis
- Convenient room side, front access to the air filter
- Choice of discharge air opening configurations
- Riser mounting location flexibility

Acoustical Design Features—Standard Silver Series

- 1 inch high density sound insulation throughout
- Double isolated chassis base to isolate the refrigeration chassis from the cabinet
- Compressor elastomeric isolation mounts
- Unit base with closed cell foam isolation pads
- Optimized design of refrigerant piping for reduced compressor noise

Gold Series: Enhanced Acoustic Package

- Adds a flexible canvas duct connection between the base cabinet and discharge plenum prevents noise transmission to the supply discharge ducts and grilles.

▪

Reliability

- Factory tested and charged with R-410A
- Industry leading rotary and scroll compressors
- Modern components and microprocessor controlled safety protection devices

Environment

- Eco-friendly refrigerant (R-410A)
- Recyclable materials used in unit construction
- Energy efficient fan motors
- High-efficient DX and water coils

Service

- Slide-out chassis for easy removal and servicing
- Simple LED diagnostics on control board
- Plug-n-play Web browser for advanced diagnostics
- Test-mode and data logging for precise troubleshooting
- All control components are in one location
- Plug-n-play harnesses
- Capacitor in front of unit
- Easy disconnecting water connections
- Refrigerant service access ports

Certification

All Omega products are listed by ETL (Intertek) Omega products conform to UL STD 1995 And certified to CSA C22.2 NO. 236.





2. PRODUCT DETAILS

2.1 Standard & Optional Features

STANDARD FEATURES

Cabinet

The 20 gauge galvanized sheet metal cabinet is designed for structural rigidity, installation flexibility, and serviceability. Cabinet interior is lined with 1" thick acoustic, thermal, mould and fire resistant insulation rated to meet NFPA 90.

Hybrid Chassis

High-efficiency hybrid chassis exceeds ASHRAE 90.1 standards for EER operating efficiency. Large heat exchanger surface areas provide maximum efficiency and increase reliability

Hybrid Coil

The integrated hydronic and refrigeration air coils are multi-row with copper tubes and enhanced aluminum fins. Coil fins are mechanically bonded to the tubes. The coils are fully cased with a handy grip point for chassis removal.

Control Panel with Advanced Microprocessor

All controls and contactors are mounted in the electrical box connected with quick connect plugs. Each unit features an advanced microprocessor controller. Unit comes with four standard temperature sensors: entering and leaving water temperature sensors (WLST & WLDT), suction freeze-stat sensor (RST), and leaving air temperature (LAT) sensor. All controls are accessible from the front of the unit for easy service and troubleshooting. Controller features an ethernet port for quick web based access to advanced system diagnostics, data logging and parameters setpoints.

Blower Fan

A centrifugal forward curved double width double inlet (DWDI) blower with a direct drive motor assembly with easy removal and servicing provides air delivery.

ECM Fan Motor

High-efficient EC motors (ECM) are standard for improved fan operating efficiency and fan performance across a wider operating range over traditional PSC motors.

Field Selectable Supply Air Discharge

Cabinets feature our standard "Knockout" style supply discharge openings for field selectable supply air openings in Left, Right, Front, Back, and/or Top configurations.

Compressors

High efficient R-410A compressors are standard, rotary type 1/2 to 1.5 Ton (VSHP 020-060) and scroll type 2 to 3 Ton (VSHP 080-120). Compressors are mounted to the chassis frame with elastomer vibration isolators to minimize vibration transmission. Additionally the compressor chassis is mounted on a double isolated base for enhanced noise attenuation to prevent vibration transmission into the occupied space.

Coax-Coil

The high efficient water to refrigerant coaxial coil is tube in tube with a convoluted inner copper tube design. The coaxial coil is selected for minimum water pressure drop and low fouling characteristics.

Stainless Steel Drain Pan

Standard stainless steel drain pan provides corrosion resistance. Drain pan is positively sloped, externally insulated with a 7/8 inch O.D. connection and factory mounted p-trap condensate hose.

Auto Shut-Off Control Valve

Factory installed 2-way automatic shut-off control valves control water flow direction depending on cooling or heating demand. The control valves minimize water pressure drop across water circuit. Water flow shall be directed through either the coaxial condenser coil during a call for cooling, or through hydronic heating coil during a call for heating This reduces pumping loads and power consumption in variable speed or staged pumping applications.

Thermostatic Expansion Valve (TXV)

All units come with a bi-flow thermostatic expansion valve (TXV). TXV is precision machined brass assembly providing precise refrigerant flow metering.

Air Filter

Unit comes standard with a 1-inch disposable MERV 8 media filter.



OPTIONAL FEATURES

Gold Series Cabinet

Cabinet comes in two sections to minimize noise transmission into duct system. The lower section includes all components, chassis, and risers. The upper section is an acoustic supply discharge plenum lined with 1 inch thick acoustic insulation. The plenum is connected to lower cabinet using a flexible duct connector for noise attenuation.

Automatic Balancing Valve

Optional automatic balancing valves are factory installed for automatically limiting water flow through the unit to the nominal rated flow rate by providing constant flow ($\pm 10\%$ of rated GPM) over a large differential pressure range of 2-80 psig (3-80 psig for VSHP 080 to 120 units).

Condensate Overflow Switch (COFS)

Condensate overflow switch (float switch or electronic) is mounted to the unit drain pan for detecting overflow conditions such as a clogged condensate drain. If condensate switch is tripped compressor operation is stopped.

Epoxy Coated Hybrid Air Coil

Air coils are epoxy coated to aid in the prevention against premature corrosion from environmental factors. Epoxy coating meets 1000 hours of salt spray ASTM B117 protection.

Cupro-Nickel Coaxial Condenser

Copper nickel alloy coaxial condensers provide enhancement protection against cavitation and corrosion where loop water quality contamination may occur.

Y-Strainer

Optional 20 mesh y-strainer installed on the water circuit.

Fresh Outside Air

Fresh Outside Air Duct take-off is installed at the top of the cabinet for providing fresh air into the occupied space through a field provided remote mounted ERV. Low fan speed G1 terminal is replaced with Omega's "Whisper Mode" ultra-low fan speed for continuous fan-on operation.

Return Air Panel

Omega offers 2 styles of return air panels. **Acoustic** panel, stamped blade style, is designed as a narrow, removable panel making it ideal for space constrained installations. **Perimeter**, enhanced aesthetic, is a noise attenuating insulated swing door style panel. Both are easily removed to access the air filter, chassis, blower and all controls.

- Perimeter Air Panel is available with optional ADA surface mounted thermostat
- Return Air Panels are available with optional locking panels.

Supply, Return & Condensate Risers

Risers are available in Type M and Type L copper. Factory supplied risers come standard with manual shut-off isolation ball valves soldered to the riser tee. Risers can be ordered swaged or as straight pipe.

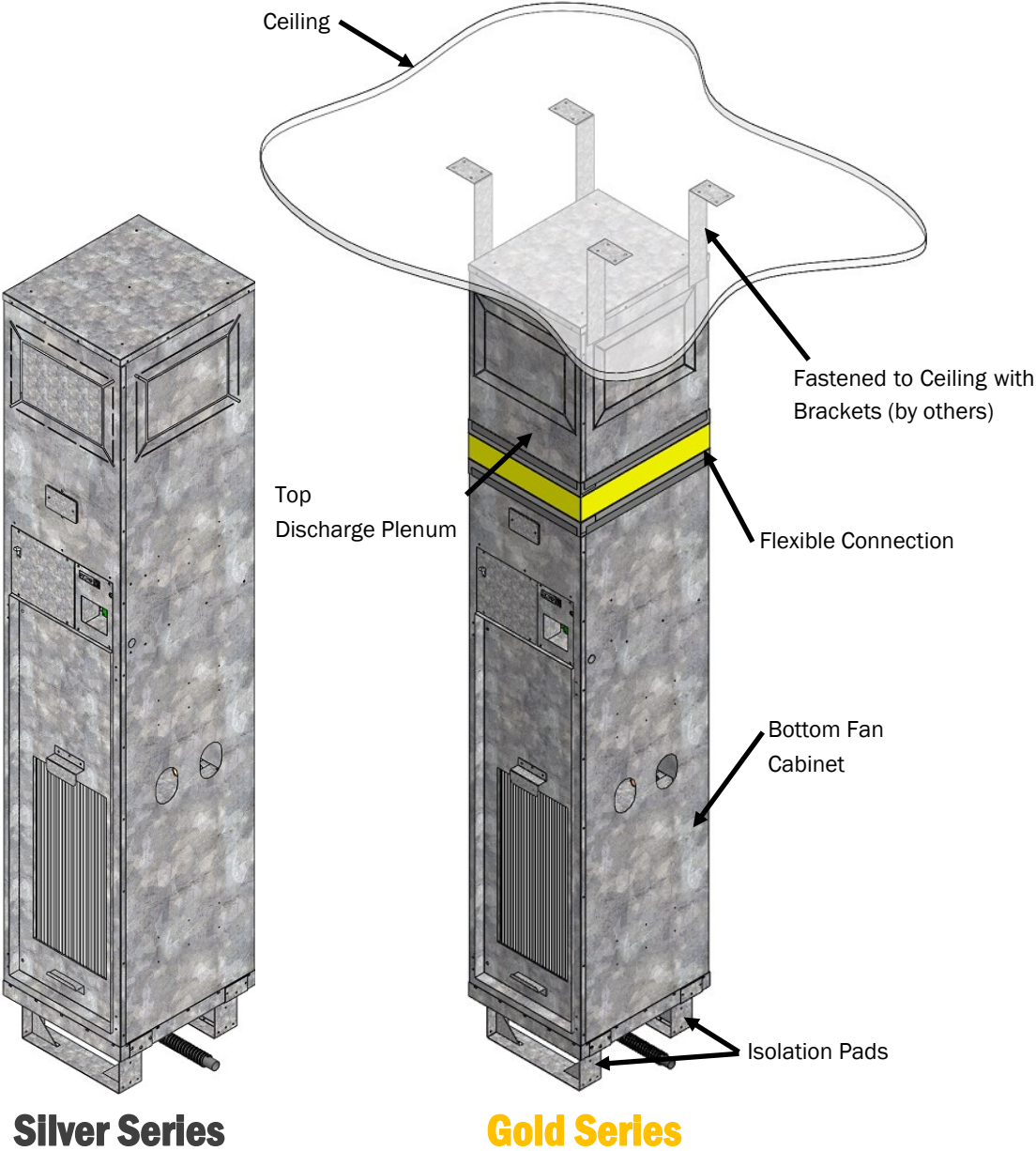
MERV 13 Air Filter

Unit comes with a low pressure drop 2-inch MERV 13 disposable media filter for superior air filtration and performance.



2.2 Cabinet Types—Silver & Gold Series

Omega offers two distinct cabinet options for VSHY units: the Silver and optional Gold series (see below). Silver series is the Omega standard product built as a free standing design. The optional Gold series cabinet includes a factory built-in canvas flex duct collar between the base chassis/blower section and upper discharge plenum. The upper discharge plenum is field mounted to the ceiling structure creating a non-rigid, acoustically isolated connection between the discharge plenum and the cabinet compressor and blower base section.

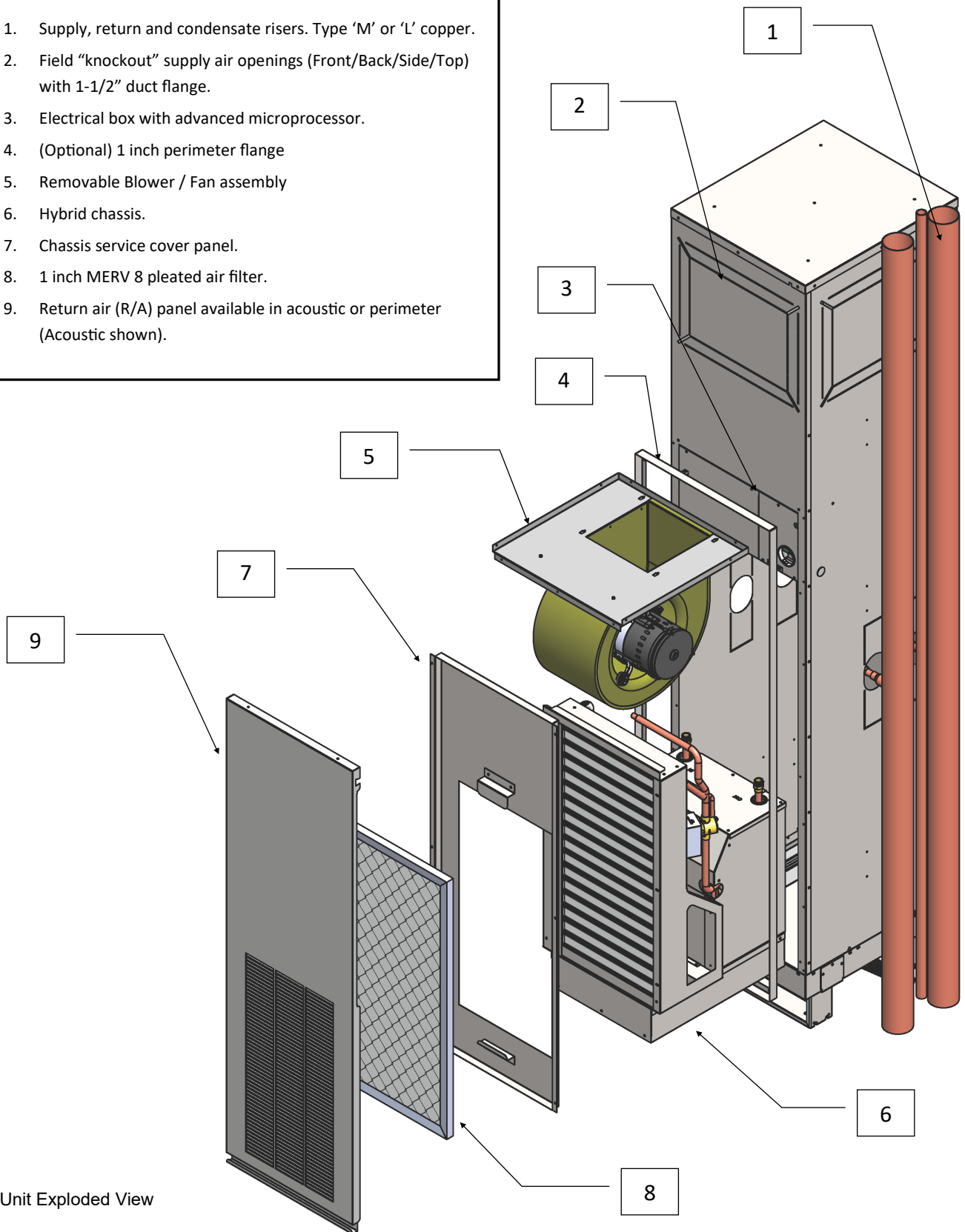


Silver and Gold Series Cabinets



2.3 Assembly View

1. Supply, return and condensate risers. Type 'M' or 'L' copper.
2. Field "knockout" supply air openings (Front/Back/Side/Top) with 1-1/2" duct flange.
3. Electrical box with advanced microprocessor.
4. (Optional) 1 inch perimeter flange
5. Removable Blower / Fan assembly
6. Hybrid chassis.
7. Chassis service cover panel.
8. 1 inch MERV 8 pleated air filter.
9. Return air (R/A) panel available in acoustic or perimeter (Acoustic shown).



Unit Exploded View



2.4 Noise Attenuation Features

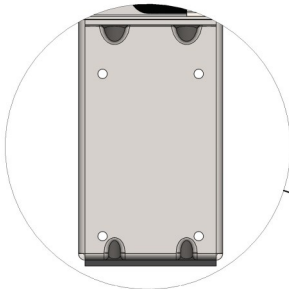
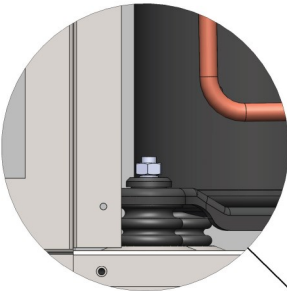
Omega Heat Pump units offer up to 5 separate methods of vibrational isolation (Shown below).

Flex Duct Isolator

Units with the optional **Gold Series** option feature a factory installed flexible canvas duct collar for added noise and vibration isolation.

Compressor Mounts

All compressors are mounted to the chassis using vibration dampening inserts.

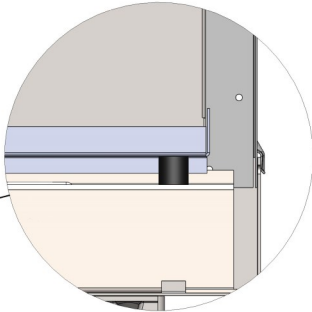
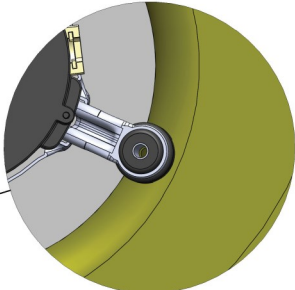


Unit Foot Insulation

1/4" closed cell foam pads are factory installed under the cabinet base to isolate the unit from the floor surface.

Motor Mount Isolators

Motors are attached to the blower housings with rubber isolation fasteners which reduces the vibration produced by the rotating fan assembly.



Vibrational Rail

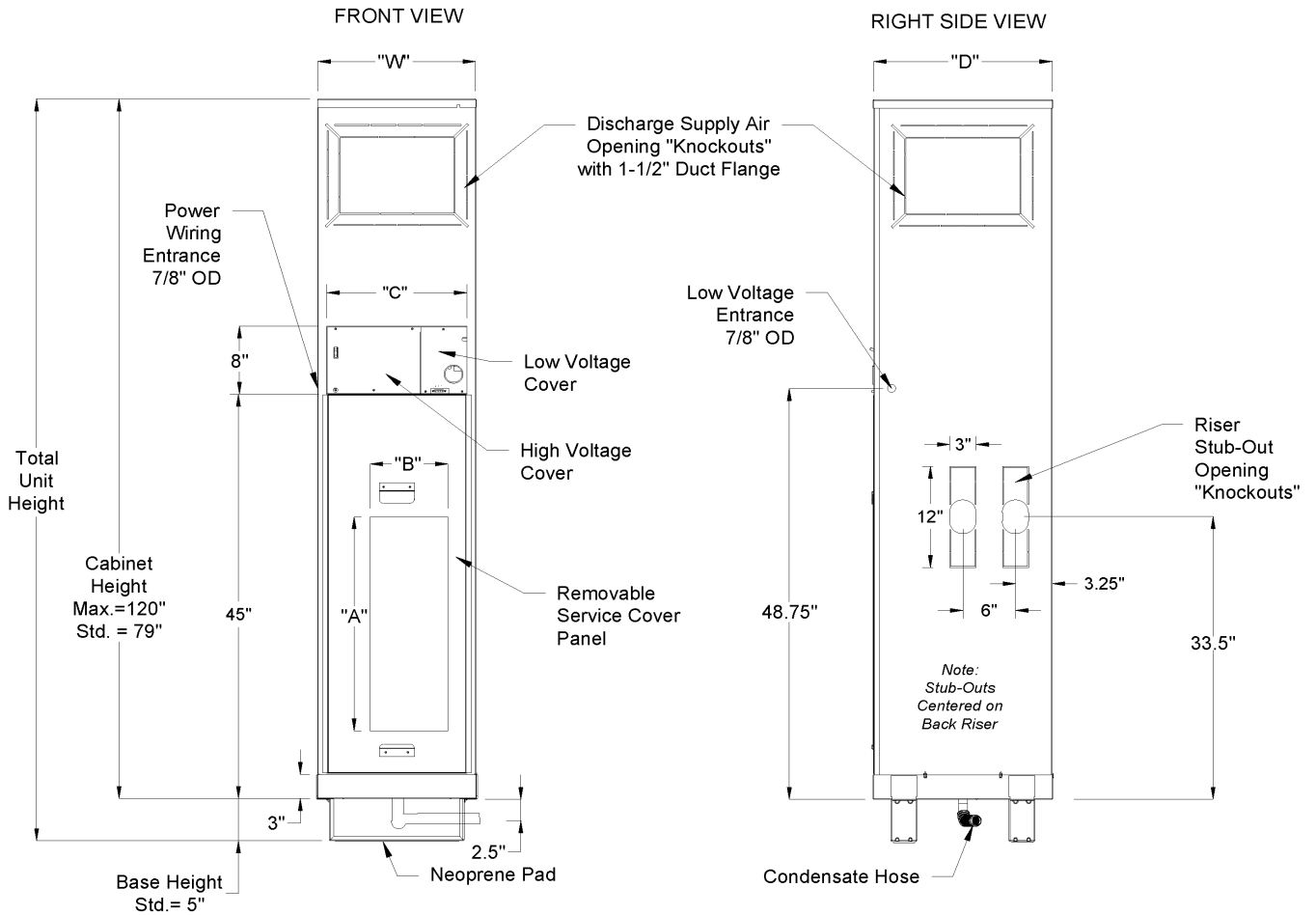
The refrigeration chassis is mounted on a double isolated base with rubberized dampeners to isolate the chassis from the cabinet to minimize noise vibrations.

Vibration and Noise Dampening Features



3. CABINET DIMENSIONS & SUPPLY DISCHARGES

3.1 Standard Silver Series Cabinet



Silver Series Dimensional Drawing

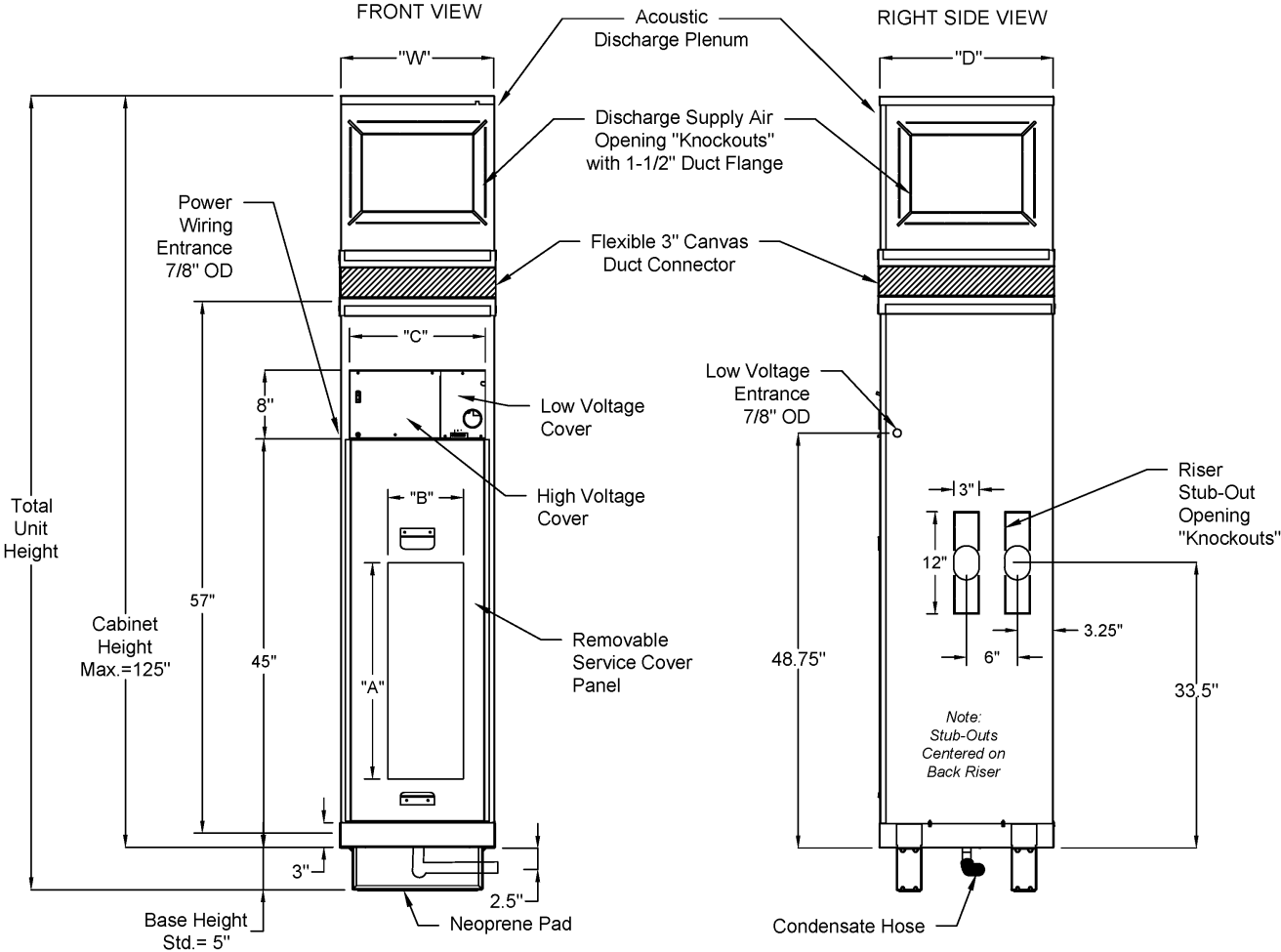
(Drawing not to scale, dimensions are subject to change)

Table 1 VSHY Cabinet Dimensions (Silver & Gold Series)

Model	Cabinet Size	Dimensions (in)			VSHP Supply Discharge Opening (W X H) inches	
		"W"	"D"	"C"	Horizontal	Top
VSHY 020	X	16	17.5	14	14 x 8	12 x 12
VSHY 030					14 x 8	12 x 12
VSHY 040					14 x 10	12 x 12
VSHY 050	Y	18	20.5	16	16 x 12	14 x 12
VSHY 060					16 x 12	14 x 12
VSHY 080	Z	22	24.5	20	18 x 14	14 x 14
VSHY 100					18 x 16	16 x 14
VSHY 120					18 x 16	16 x 16



3.2 Optional Gold Series Cabinet with Acoustic Plenum



Gold Series Dimensional Drawing

(Drawing not to scale, dimensions are subject to change)

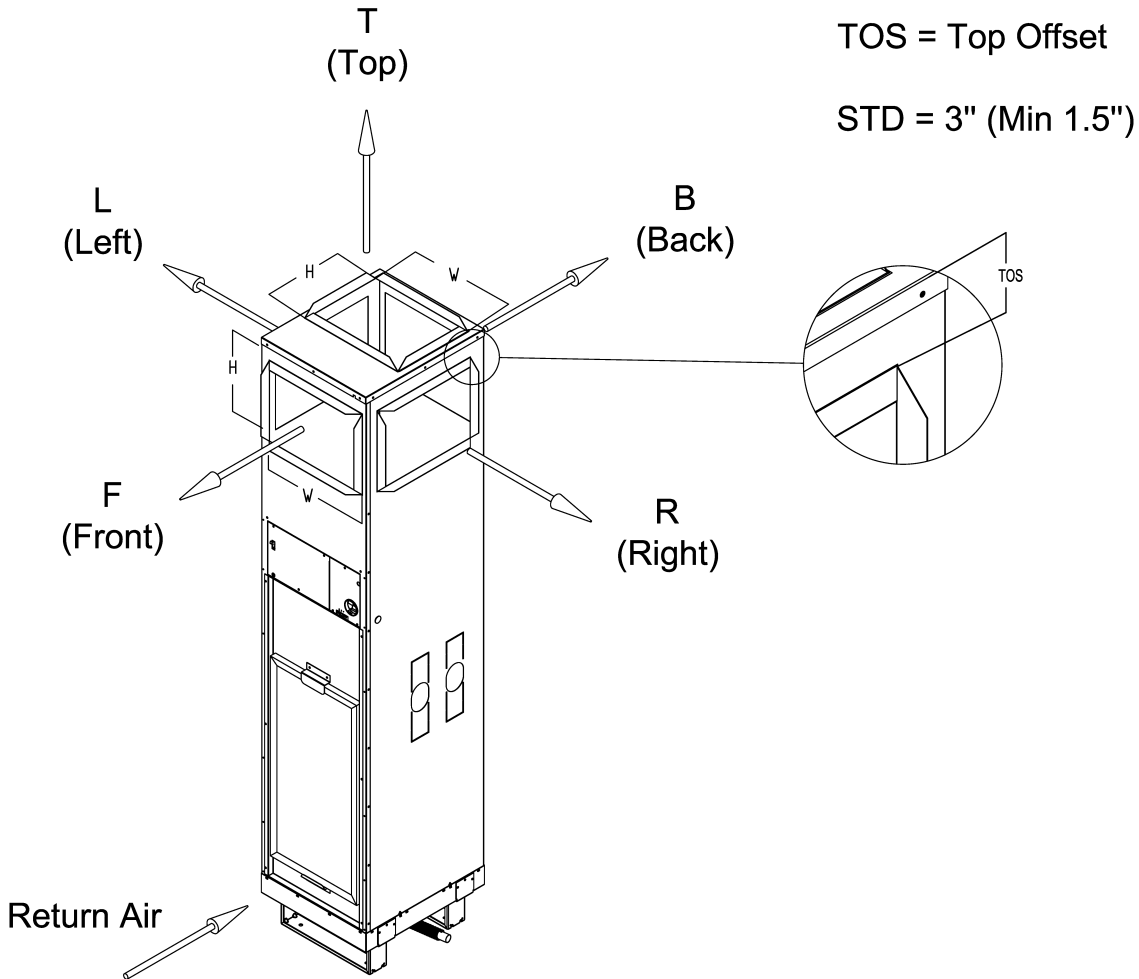
Model	Cabinet Size	Dimensions (in)			Minimum Cabinet Height (in)	
		"W"	"D"	"C"	Silver Series*	Gold Series
VSHY 020	X	16	17.5	14	60 / 72	80
VSHY 030						
VSHY 040						
VSHY 050	Y	18	20.5	16	60 / 74	82
VSHY 060						
VSHY 080	Z	22	24.5	20	60 / 74	86
VSHY 100						
VSHY 120						

* 60in without horizontal (side) discharges



3.3 Supply Discharge Openings

Units comes with standard “Knockout” style discharge openings on top and all sides for field configuration. This allows for custom discharge configurations based on site requirements.



Standard “Knockout” Style Openings

Table 2 Supply Air Opening Sizes

Model	VSHY Supply Discharge Opening (W X H) inches							
	020	030	040	050	060	080	100	120
Horizontal	14 x 8	14 x 8	14 x 10	16 x 12	16 x 12	18 x 14	18 x 16	18 x 16
Top	12 x 12	12 x 12	12 x 12	14 x 12	14 x 12	14 x 14	16 x 14	16 x 16

Notes:

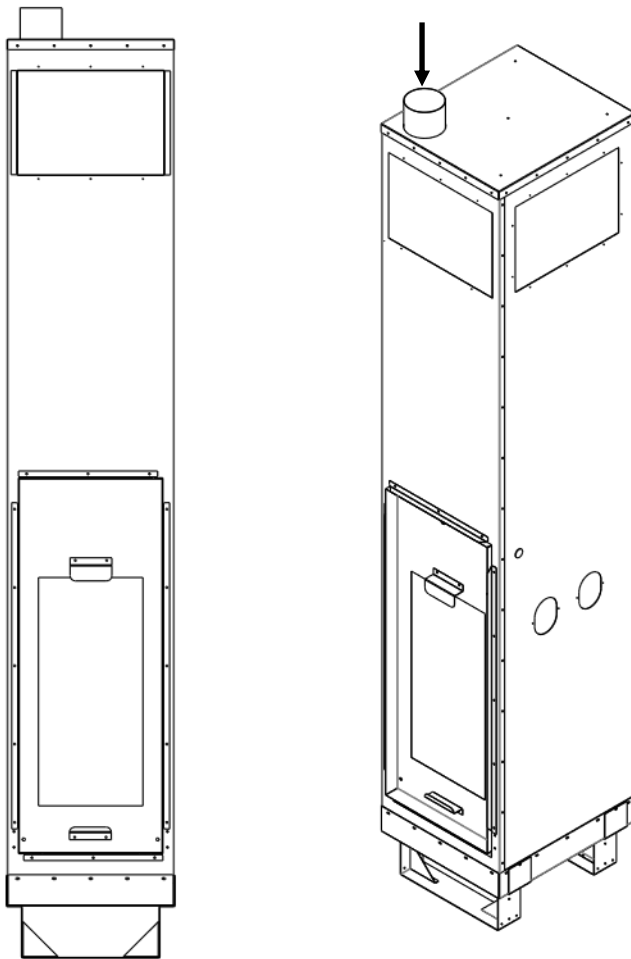
- Unit comes standard with field “knockout” style discharge openings on all sides. Discharge flanges are 1-1/2 inches.
- Line of Site Baffles (LOSBS) are available where two or more horizontal discharge (Front, Left, Right and/or Back) openings are specified.
- All handing's determined by facing return air opening
- Top Discharge is centered left and right, and offset 2 inches from the back.



3.4 Optional Fresh Outside Air Duct

Optional built-in Fresh Air Duct is suited for applications where the Energy Recovery Ventilator (ERV) unit is field supplied and remote mounted. The factory installed 4" OD fresh air intake accepts fresh air connection from a remote mounted ERV. Refer to Section 3.5 to see different configurations available for location of fresh outside air duct.

OA - 4" OD Fresh Outside Air Intake
(Front Left Opening Shown)



Note: Handing is referenced by facing the unit return air opening (front).

Optional Fresh Outside Air Duct

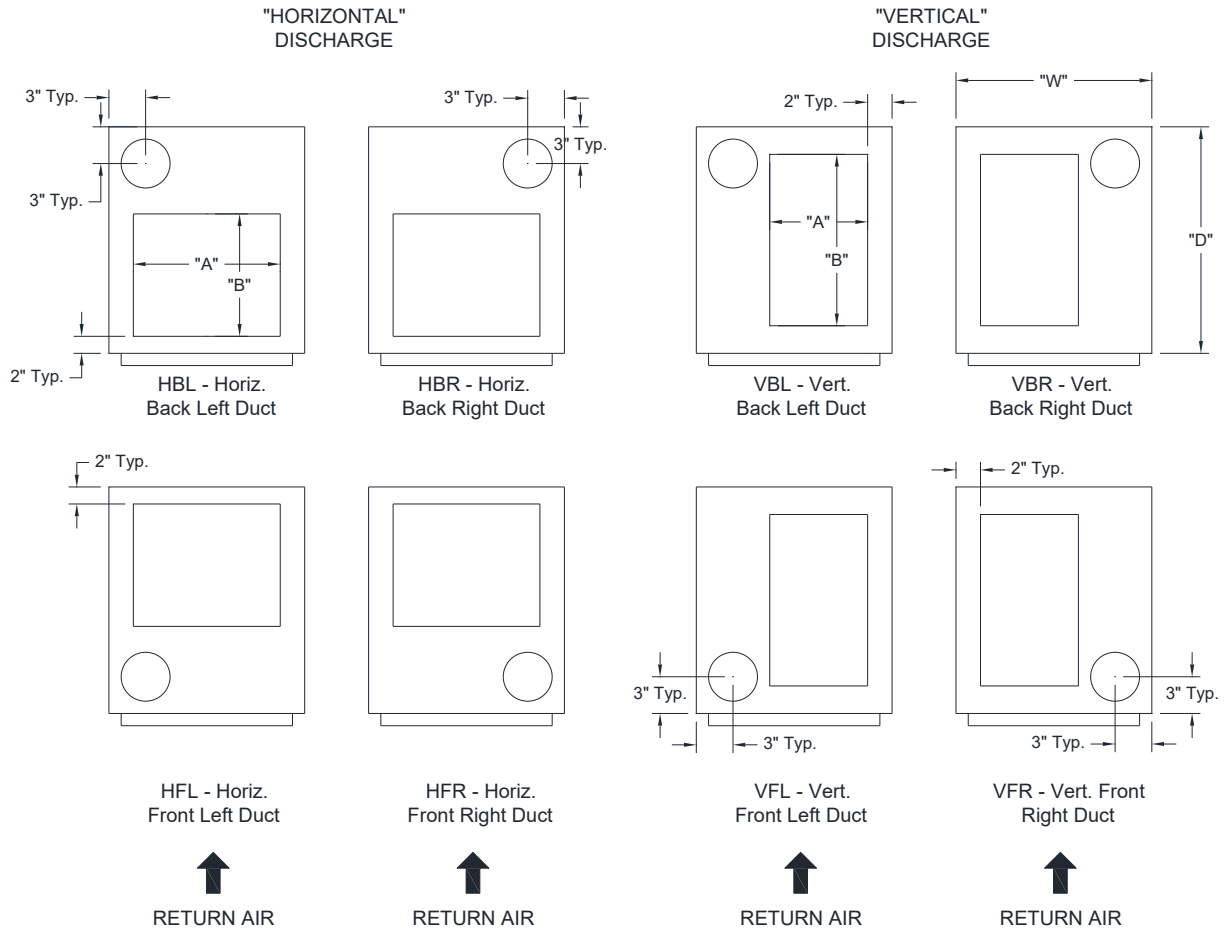
CAUTION

The introduction of cold conditioned outside air from a remote energy recovery ventilation device into the heat pump cabinet can result in potential freezing and bursting of mechanical components carrying water in the heat pump. Designer should take care to treat these considerations accordingly (e.g. utilize water glycol treatment or ensure ERV tempers Outside Air sufficiently above freezing point before entering the unit).



3.5 Top Supply Discharge Openings with Optional Fresh Outside Air Duct

Top discharge for VSHP cabinet with Fresh Outside Air duct is available in two orientations: “Horizontal” and “Vertical”. Each orientation contains four possible configuration options for fresh air duct location. Discharge openings are field “knockout” style with 1.5” duct flange.



Supply Air Opening Sizes with OA in Horizontal & Vertical Configurations

Table 3 Supply Air Opening Sizes w/ Fresh Air

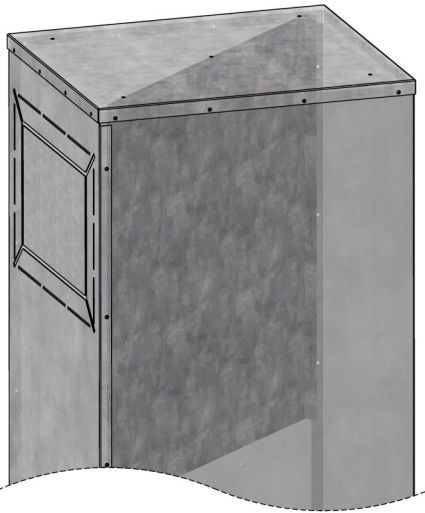
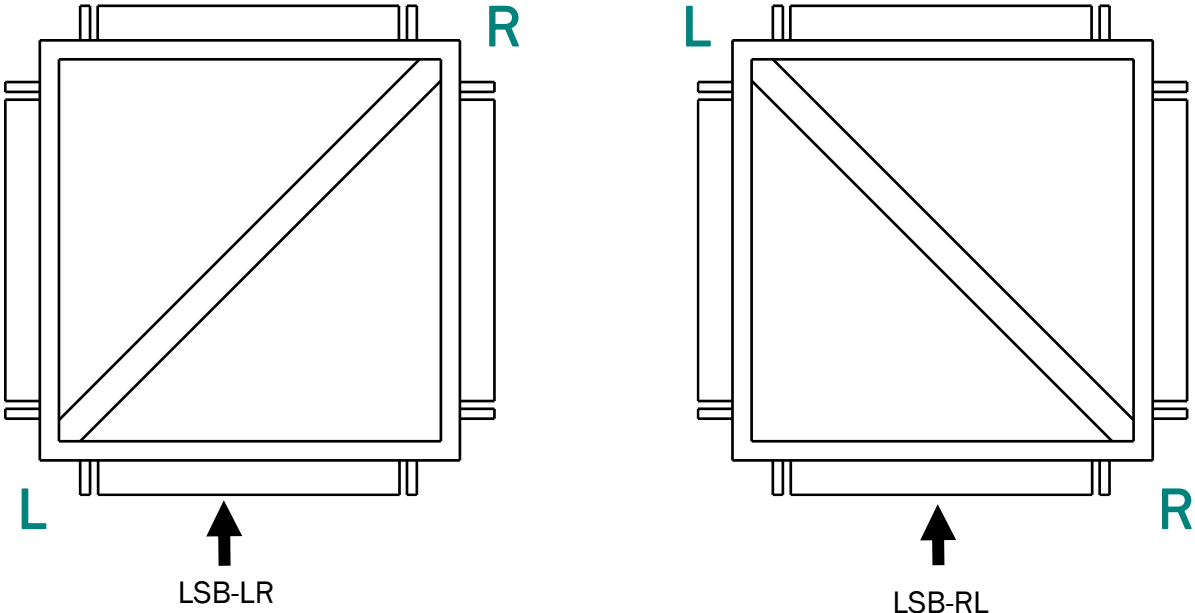
Model	Cabinet Size	Dimensions (in)		Top Supply Opening w/ Fresh Air Duct (A x B) inches	
		"W"	"D"	"Horizontal"	"Vertical"
VSHY 020	X	16	17.5	12 x 8	8 x 12
VSHY 030				12 x 8	8 x 12
VSHY 040				12 x 8	8 x 12
VSHY 050	Y	18	20.5	14 x 12	10 x 16
VSHY 060				14 x 12	10 x 16
VSHY 080	Z	22	24.5	14 x 14	14 x 14
VSHY 100				16 x 14	14 x 18
VSHY 120				16 x 16	14 x 18



3.6 Line of Sight Baffle

Optional Line of Sight Baffles (LOSB) can be supplied inside discharge plenums on units with (2) two or more horizontal discharge openings. The LOSB provide occupant privacy between adjacent rooms. Two configurations (LSB-LR or LSB-RL) of LOSB are available based on the unit discharge arrangement. **LOSB is not available with optional Fresh Outside Air Duct intake.**

TOP VIEW

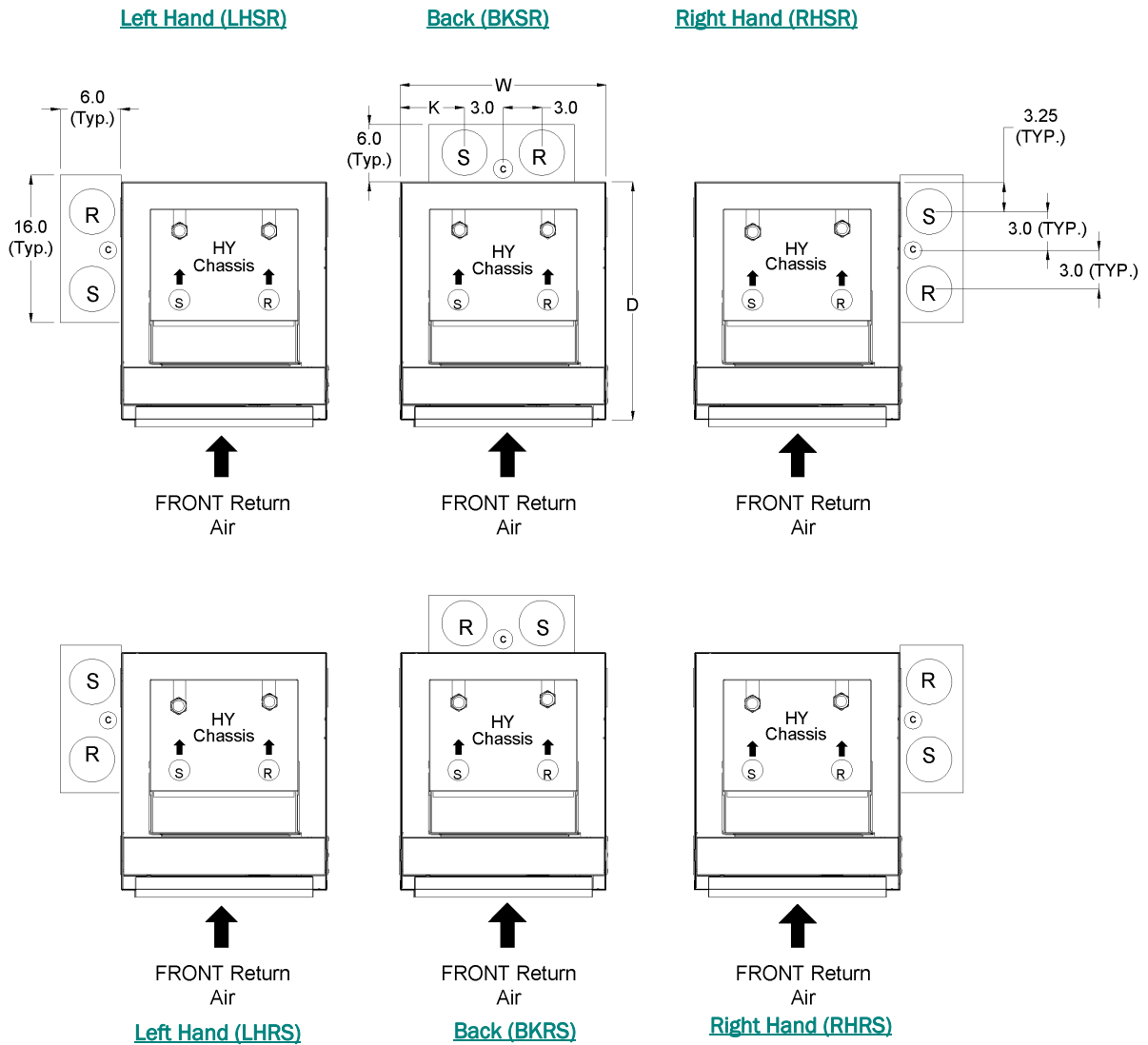


Line of Sight Baffle Configurations



4. RISERS & HOSE KITS

4.1 Riser Handling Conventions (Top View)



Riser Handling Configurations

Table 4 VSHY Cabinet Riser Dimensions

Unit Size	Cabinet Size	W	D	"K" (in)
020, 030, 040	X	16	17.5	5
050, 060	Y	18	20.5	6
080, 100, 120	Z	22	24.5	8

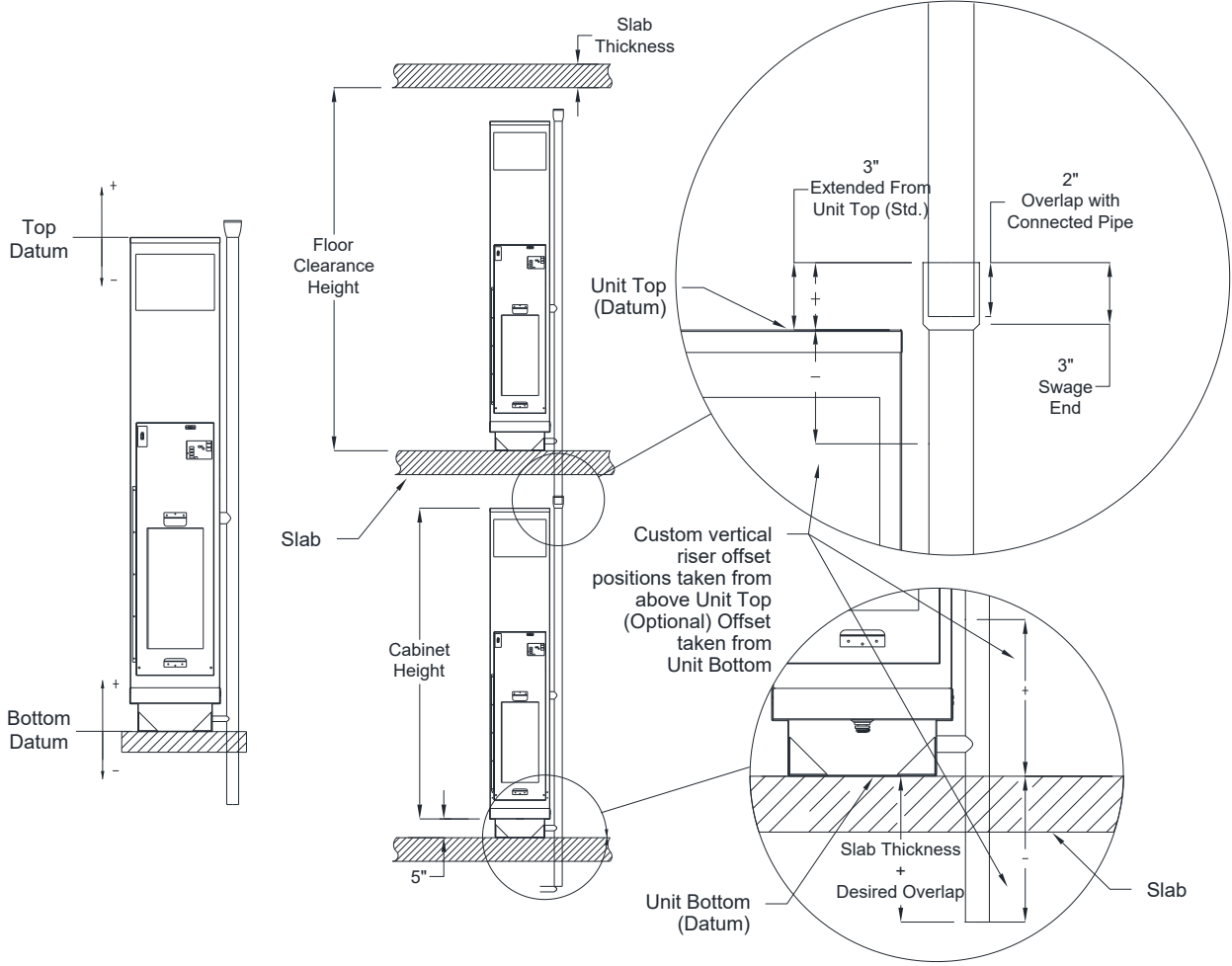
S = Supply Riser
 C = Condensate Riser
 R = Return Riser

Notes:

- As viewed from top, risers can be order in either SR configuration (supply, condensate, return) or RS (return, condensate, supply).
- Optional risers come in Type M or L copper . Risers can be ordered from factory with 3-inch deep swage.
- Riser transition pieces are field provided when joining dissimilar riser sizes. Contact factory for specials requests.
- Risers available in sizes 3/4" to 3". Consult factory for larger sizes.
- All riser handling determined by facing front of the unit (return air opening).
- Riser chase dimensions are typical. Sleeving and risers covers are not provided.



4.2 Riser Sizing Reference



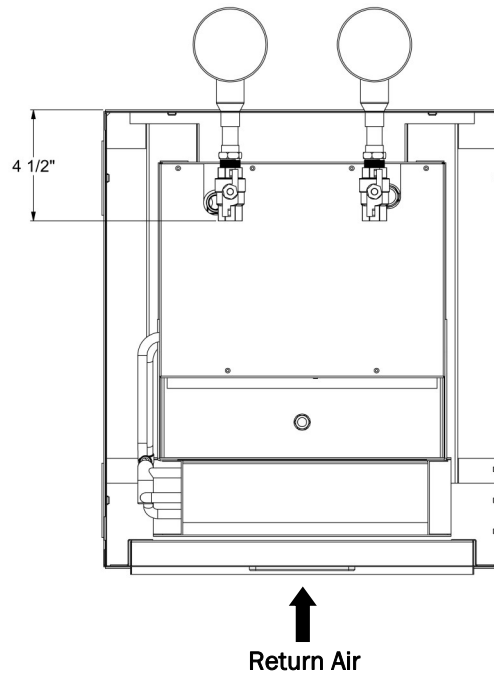
Riser Length Reference Measurements

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 unit (floor).
- Risers can be ordered with 3-inch deep swage.
- Risers 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.
- Extension tailpieces or riser transitions pieces for joining dissimilar piping sizes are field provided. Contact factory for special requests.
- Risers available in Type L and Type M copper.
- Condensate riser are available with optional 3/8-inch closed cell insulation.
- Optional closed cell insulation on supply and return risers is available.



4.3 Riser Stub-Outs



Riser Stub Distance from Cabinet Wall - Typical Back Riser

4.4 Hose Kit Details

Table 5 Hose Kit Sizes

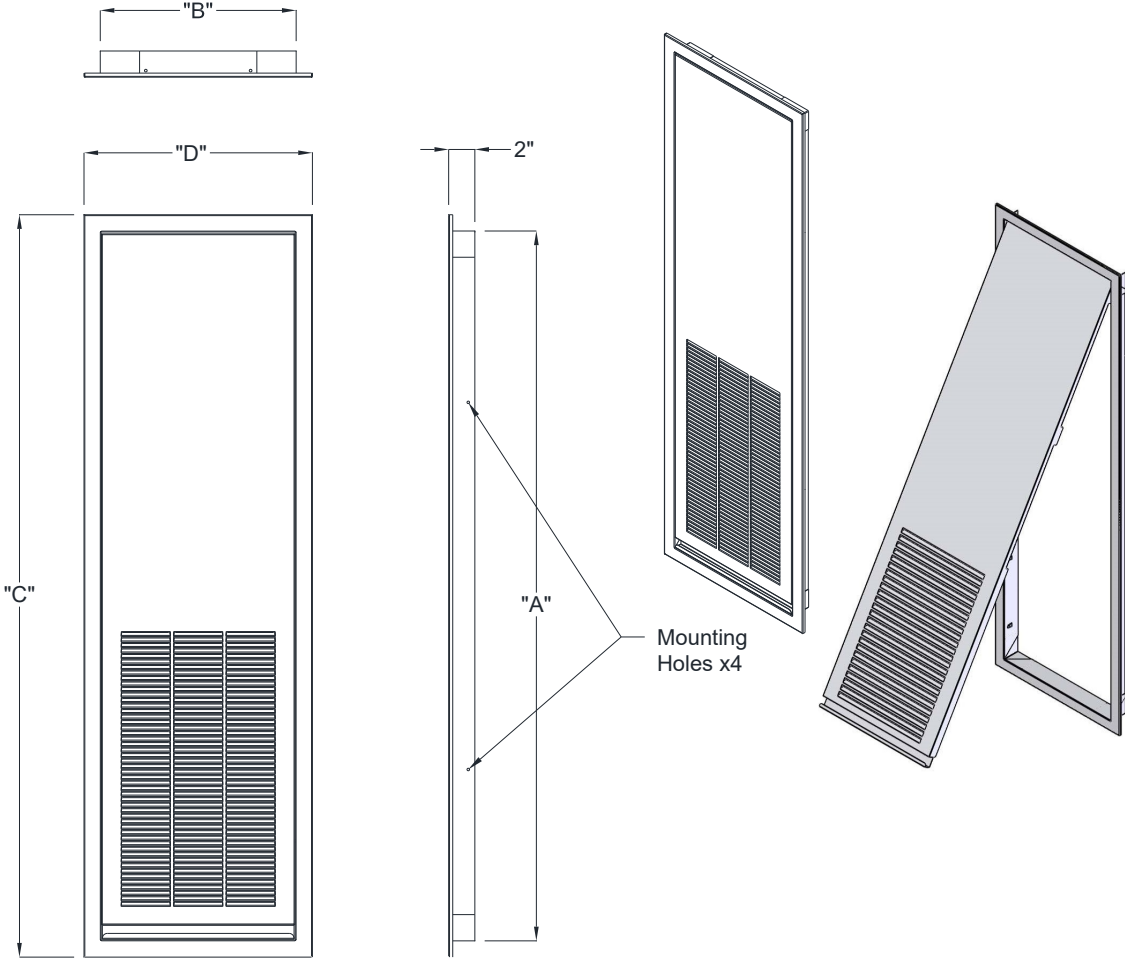
Model	Hose Kit	
	Size (in)	Length (in)
VSHY 020	1/2	24
VSHY 030	1/2	24
VSHY 040	1/2	24
VSHY 050	1/2	24
VSHY 060	1/2	24
VSHY 080	3/4	30
VSHY 100	3/4	30
VSHY 120	3/4	30

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



5. RETURN AIR PANELS

5.1 Acoustic Front Return Air Panel



Acoustic Panel Dimensional Drawings

Table 6 Acoustic Panel Sizes

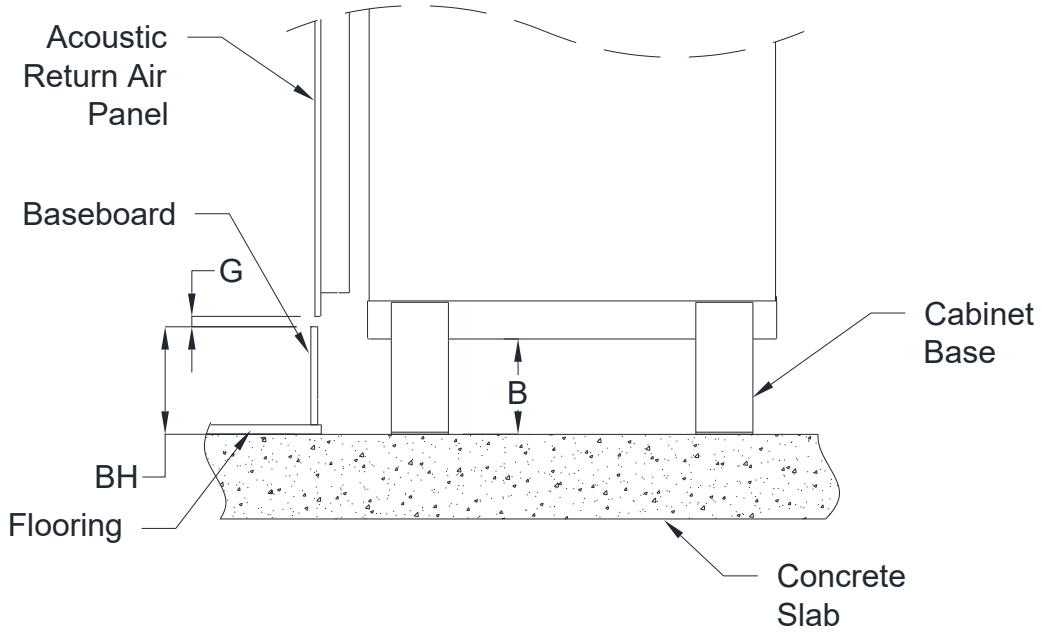
Model	Cabinet Size	Acoustic RA Panel Dimensions (inches)			
		A	B	C	D
VSHY 020	X	54	15 1/4	56 1/2	17 5/8
VSHY 030					
VSHY 040					
VSHY 050	Y	54	17 1/4	56 1/2	19 5/8
VSHY 060					
VSHY 080	Z	54	21 1/4	56 1/2	23 5/8
VSHY 100					
VSHY 120					

Notes:

- Panel is lined with acoustic insulation for enhanced sound attenuation.
- Return air panel supplied in powder coat white finish.



5.2 Acoustic Panel Cabinet Base Height Calculation



Acoustic Panel Cabinet Base Height Calculation

Acoustic Panel Cabinet Base Height Calculation:

BH = Baseboard Height + Finish Floor Height*

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

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

B = BH + G - 1.5"

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

Example:

If using a 5" baseboard, with 1" Finished Flooring height, and 0.5" gap:

$B = (5" + 1") + (0.5") - 1.5"$

$B = 5"$

Therefore a 5" Cabinet Base is required.

Example: Baseboard to Base Height Table

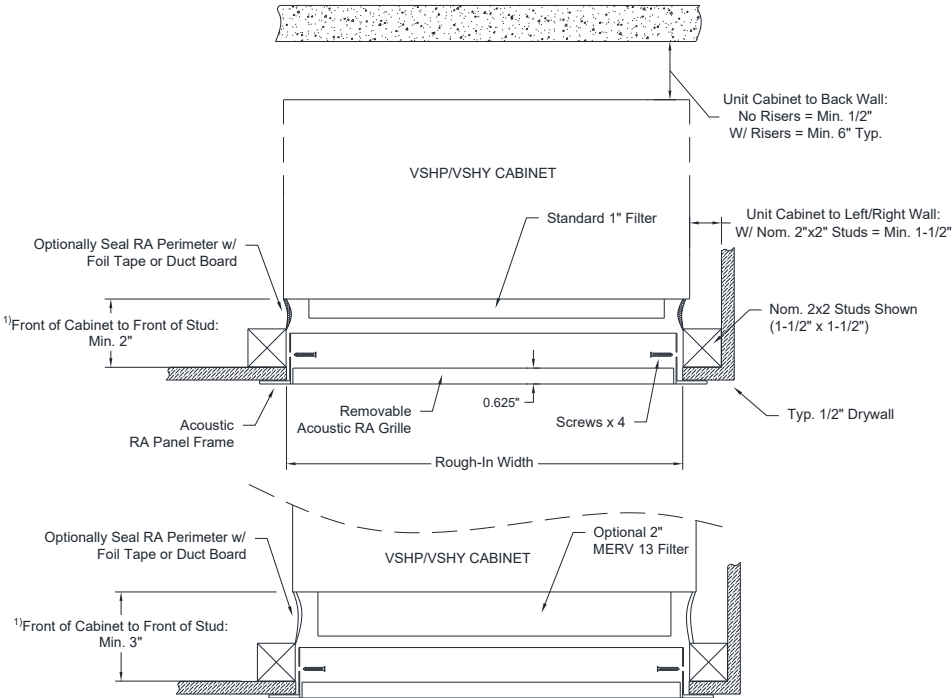
Baseboard Height*	Cabinet Base Height
Up to 5"	5"
>5" to 6"	6"
>6" to 7"	7"
>7" to 8"	8"

*Includes 1" Total Flooring

*Using gap G= 0.5" (from top of baseboard to return panel flange)



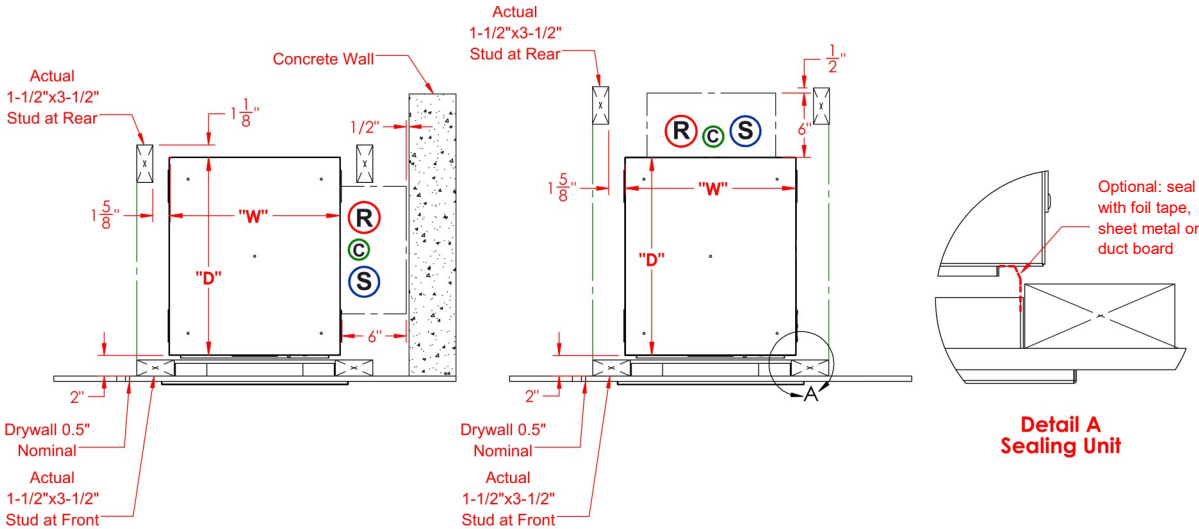
5.3 Acoustic Front R/A Panel Furring Details



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

Notes:

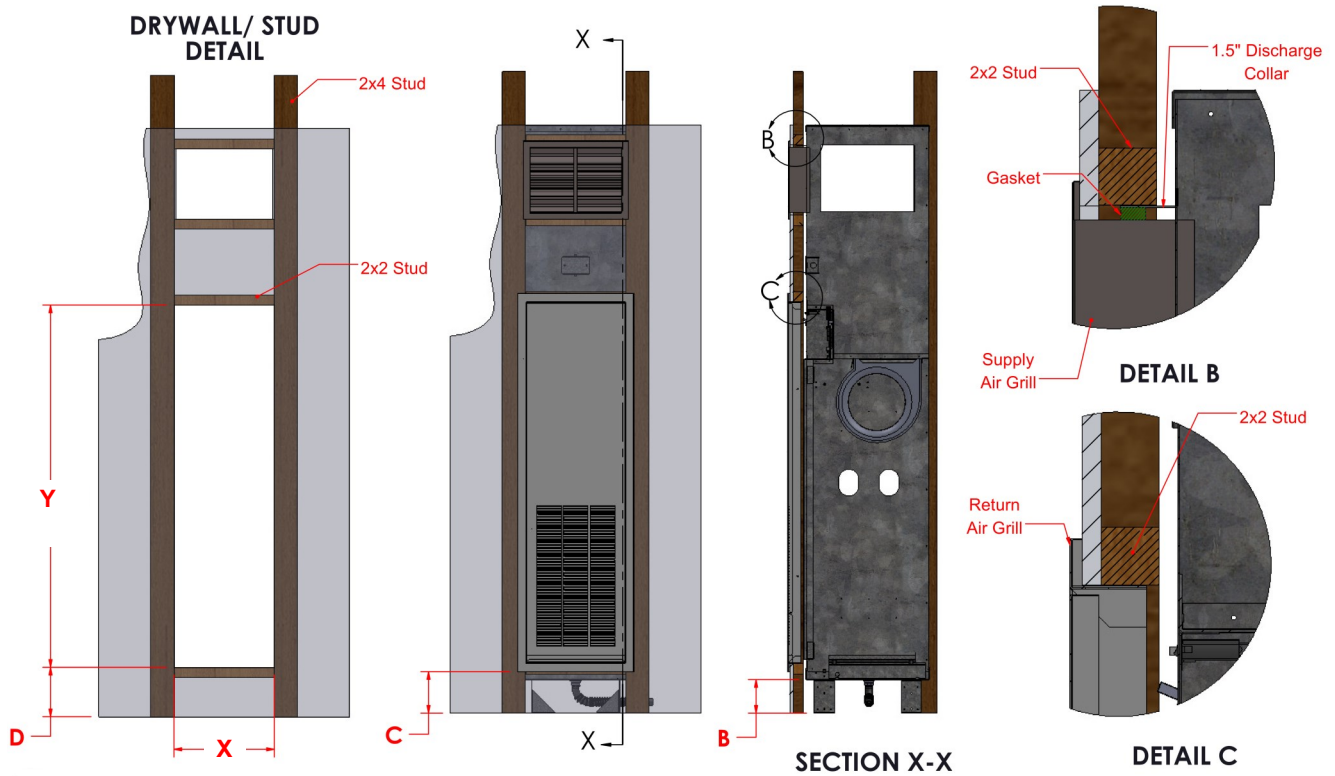
- 1) Provide 2" from framing stud to cabinet. With optional 2-inch MERV 13 filter provide 3" from front of stud or min 1-1/2" from back of stud to cabinet. With optional 1-1/2" flange, provide gap min. 1/2" from stud to flange.
- 2) Return air panel should be centered in front of the unit return air opening.
- 3) With rear/side risers, allow for min. 6" typical clearance at the rear/side of the units.
- 4) For additional sound attenuation insulate the closet cavity with plenum rated acoustical insulation.



Acoustic Panel — Typ. 2x4 Framing Plan View w/ 1-in Filter



5.3 Acoustic Front R/A Panel Furring Details (Cont'd)



Acoustic Panel Furring Detail—Front & Side View

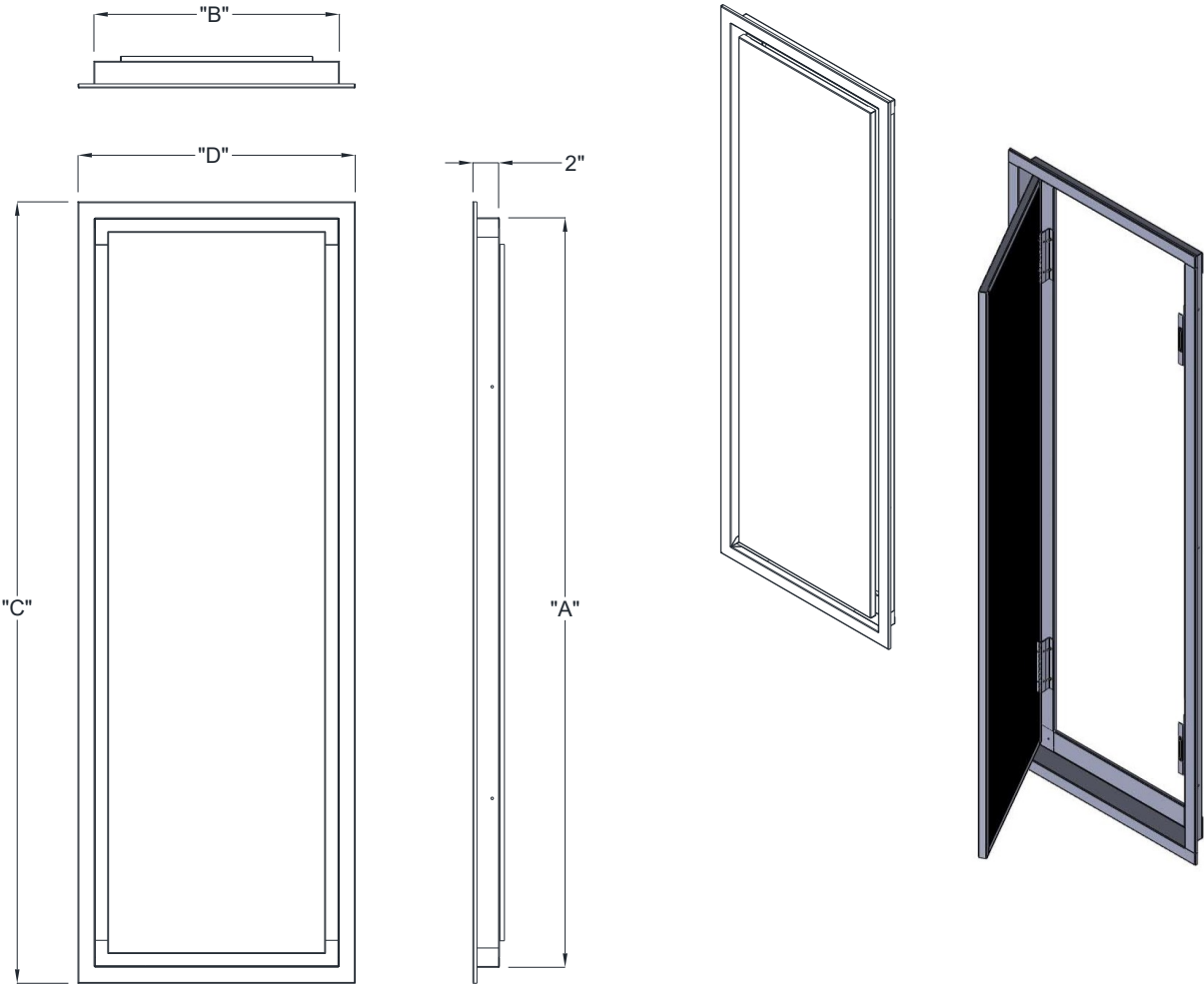
- B** = Cabinet Base Height (Min 5", increases in 1" increments)
- C** = Flange Height Above Floor (B + 1.25")
- D** = Rough-In Height Above Floor (B + 2.5")

Table 7 Acoustic Panel Rough-In Dimensions

Model	Cabinet Size	Cabinet Dimensions (in)		Rough-In (in)	
		W	D	"X"	"Y"
VSHY 020	X	16	17 1/2	15 3/4	54 1/2
VSHY 030					
VSHY 040					
VSHY 050	Y	18	20 1/2	17 3/4	54 1/2
VSHY 060					
VSHY 080	Z	22	24 1/2	21 3/4	54 1/2
VSHY 100					
VSHY 120					



5.4 Perimeter Front Return Air Panel



Perimeter Panel Dimensional Drawing

Table 8 Perimeter Panel Sizes

Model	Cabinet Size	Perimeter RA Panel Dimensions (inches)			
		A	B	C	D
VSHP 020	X	58 1/4	19 1/8	60 3/4	21 5/8
VSHP 030					
VSHP 040					
VSHP 050	Y	58 1/4	21 1/8	60 3/4	23 5/8
VSHP 060					
VSHP 080	Z	58 1/4	25 1/8	60 3/4	27 5/8
VSHP 100					
VSHP 120					

Notes:

- Return Panel interior is lined with 1/2 inch acoustic insulation for enhanced sound attenuation.
- Return air panel supplied in standard powder coat white finish.



5.5 Perimeter Panel Cabinet Base Height Calculation

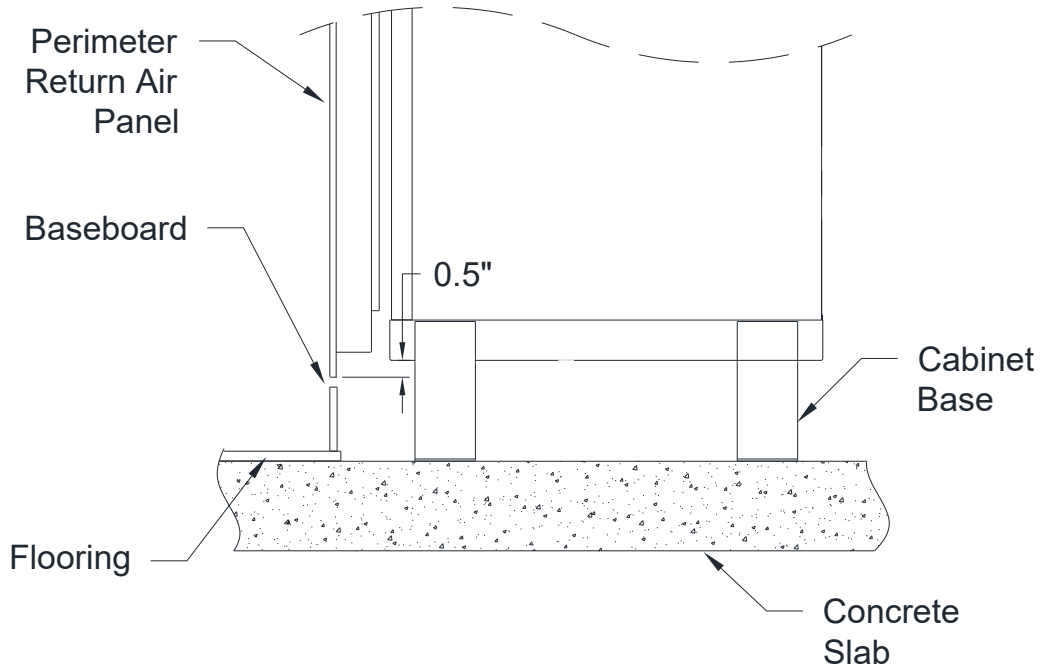


Figure 19 Perimeter Panel Cabinet Base Height Calculation

Perimeter Panel Cabinet Base Height Calculation:

BH = Baseboard Height + Finish Floor Height*

G = Gap (min 0.5")

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

$B = BH + G + 0.5"$

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

Example:

If using a 5" baseboard, with 1" Finished Flooring height, and 0.5" gap:

$B = (5" + 1") + (0.5") + 0.5"$

$B = 7"$

Therefore a 7" Cabinet Base is required.

Example: Baseboard to Base Height Table

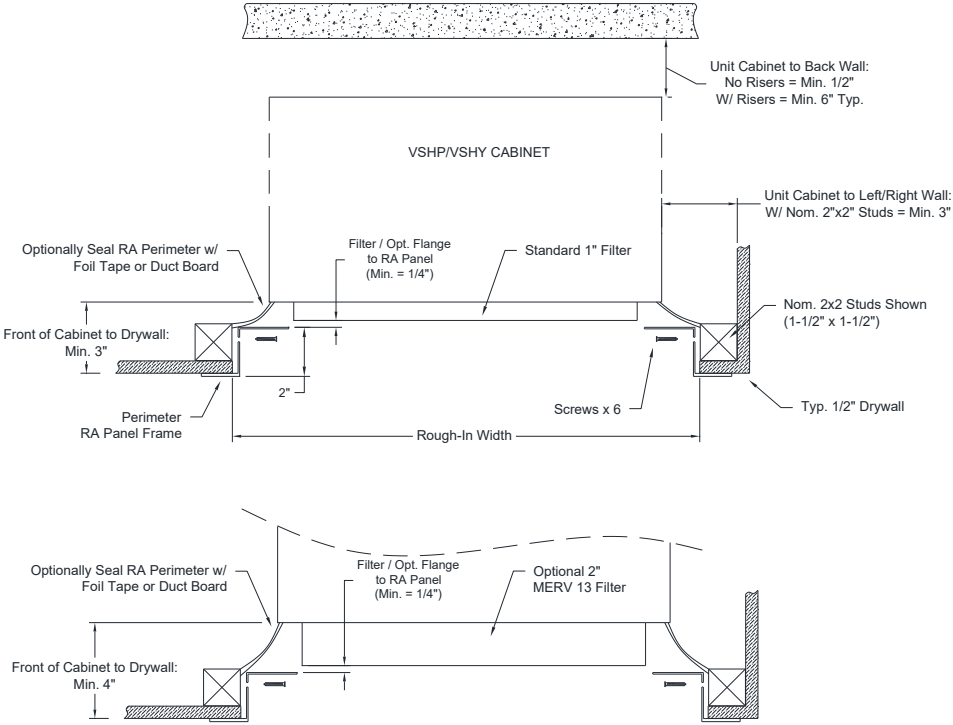
Baseboard Height*	Cabinet Base Height
Up to 3"	5"
>3" to 4"	6"
>4" to 5"	7"
>5" to 6"	8"

*Includes 1" Total Flooring

*Using gap G= 0.5" (from top of baseboard to return panel flange)



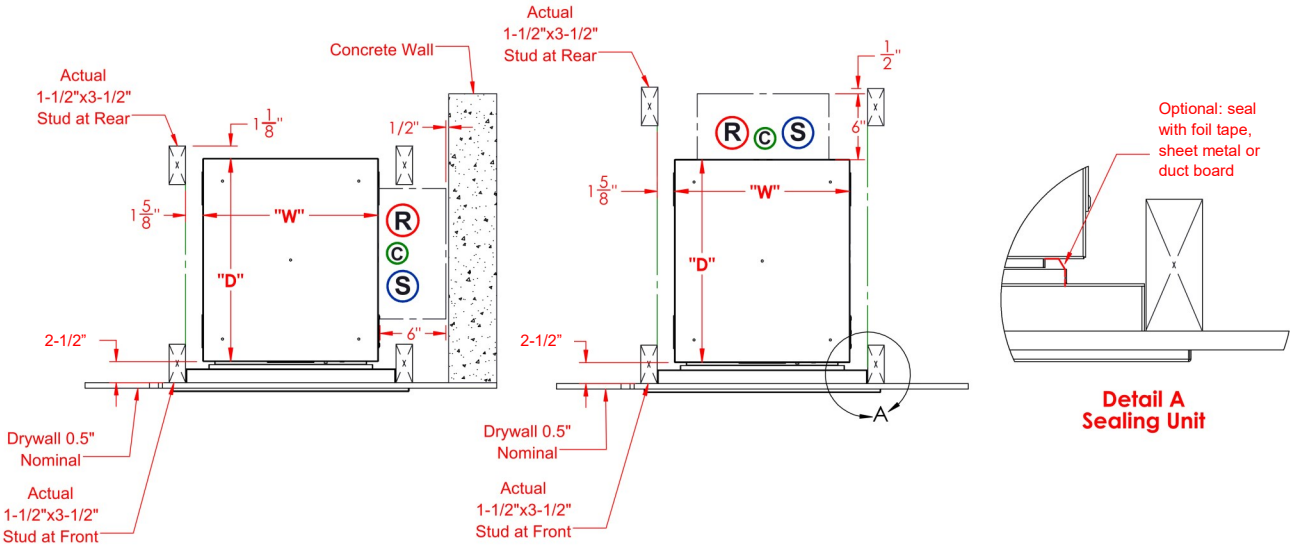
5.6 Perimeter Front R/A Panel Furring Details



Perimeter Panel Furring Drawing—Typ. 2x2 Framing Plan View

Notes:

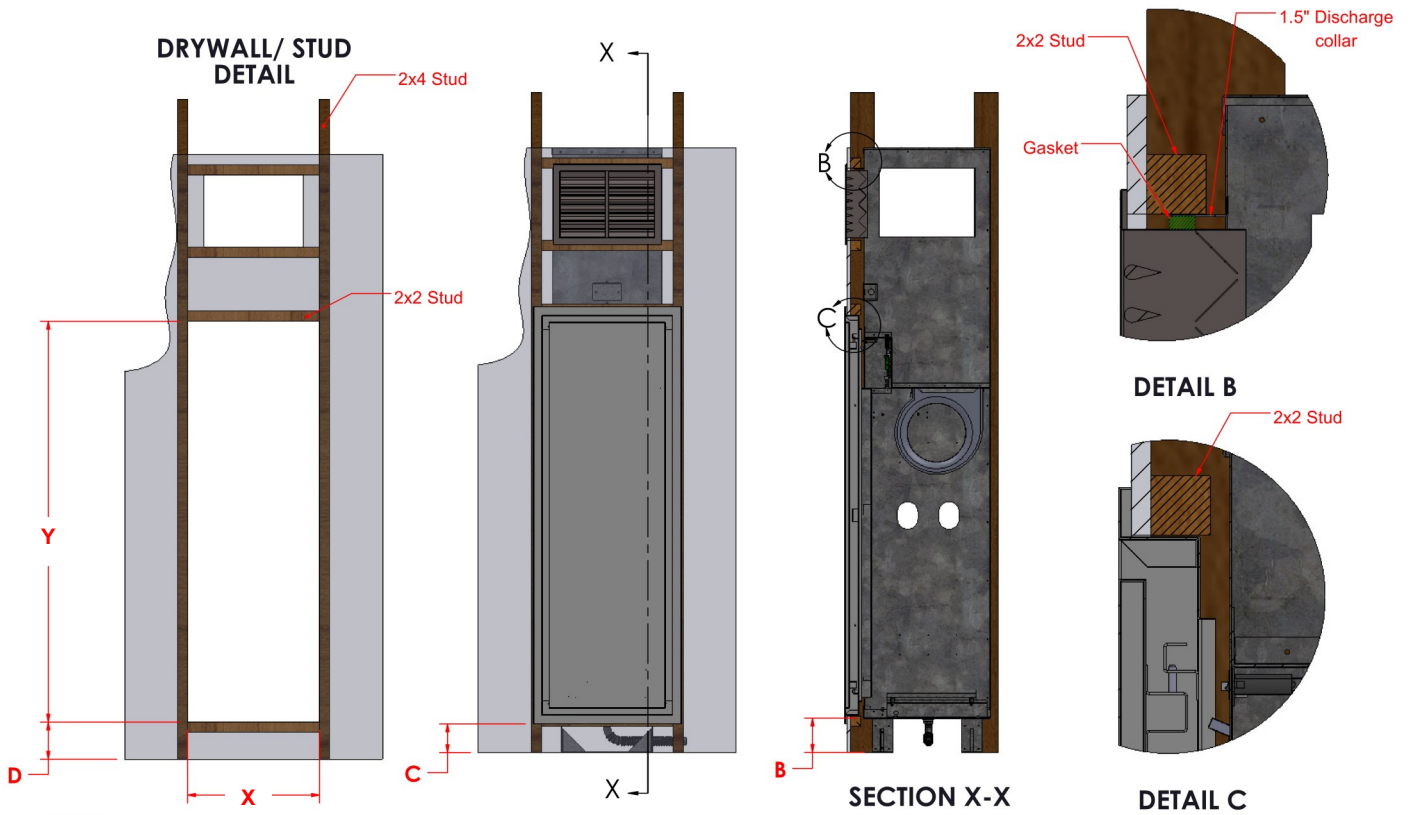
- 1) Provide gap of 3" from framing finished drywall to cabinet. With optional 2-inch MERV 13 filter provide 4" from finished drywall to cabinet. With optional flange, provide gap min. 1/4" from RA Panel to flange.
- 2) Return air panel should be centered in front of the unit return air opening.
- 3) With rear/side risers, allow for min. 6" typical clearance at the rear/side of the units.
- 4) For additional sound attenuation insulate the closet cavity with plenum rated acoustical insulation.



Perimeter Panel — Typ. 2x4 Framing Plan View



5.6 Perimeter Front R/A Panel Furring Details (Cont'd)



Perimeter Panel Vertical Furring Drawing

- B** = Cabinet Base Height (Min 5", increases in 1" increments)
- C** = Flange Height Above Floor (B - 0.5")
- D** = Rough-In Height Above Floor (B + 0.625")

Table 9 Perimeter Panel Rough-In Dimensions

Model	Cabinet Size	Cabinet Dimensions (in)		Rough-In (in)	
		W	D	"X"	"Y"
VSHY 020	X	16	17 1/2	19 1/2	58 3/4
VSHY 030					
VSHY 040					
VSHY 050	Y	18	20 1/2	21 1/2	58 3/4
VSHY 060					
VSHY 080	Z	22	24 1/2	25 1/2	58 3/4
VSHY 100					
VSHY 120					



6. PERFORMANCE & ELECTRICAL DATA

6.1 Performance Data

Unit Model	Refrig.	Air Flow (CFM)	Heating (105F EWT)				Cooling (86F EWT)				
			Water Flow (GPM)	*WPD (FT)	LWT (°F)	¹ Capacity (BTUH)	³ Capacity (BTUH)	Watt	EER	Water Flow (GPM)	⁴ WPD (FT)
VSHY 020	R-410A	200	1.5	2.8	96.1	6,700	5,800	475	12.2	1.5	3.3
VSHY 030	R-410A	350	2.25	5.8	95.6	10,500	8,900	710	12.5	2.6	11.0
VSHY 040	R-410A	460	3.0	5.0	96.3	12,900	11,600	845	13.7	3.5	11.1
VSHY 050	R-410A	530	3.5	5.5	95.8	16,000	15,100	975	15.5	4.0	14.3
VSHY 060	R-410A	630	4.5	8.8	96.7	18,600	17,900	1235	14.5	5.1	20.2
VSHY 080	R-410A	820	6.0	6.3	97.1	23,600	22,000	1655	13.3	6.7	10.2
VSHY 100	R-410A	1010	7.5	7.4	97.5	28,000	26,400	2030	13.0	7.9	14.2
VSHY 120	R-410A	1200	9.0	10.6	97.9	31,800	36,000	2810	12.8	9.0	18.4

* Water pressure drop (WPD) through Hydronic coil only. Does not include PD system piping, valves or hoses.

1 Based on 70F EAT. Heating performance does not include fan motor heat.

2 Nominal capacity performance based on ARI/ISO 13256-1 Water Loop conditions at 86F EWT Cooling.

3 Cooling performance shown is for 80.6F DB and 66.2F WB entering air.

4 Water pressure drop (WPD) through Coaxial Condenser coil. Does not include PD system piping, valves or hoses.

Hybrid heat option available only on units with ECM.

6.2 Electrical Data (ECM Fan)

Model	Supply Voltage	Compressor			Blower		Total Unit FLA	MCA	MaxFuse/ Circuit Breaker
		Qty	RLA	LRA	HP	FLA			
VSHY 020	208-230/1/60	1	@ 3.0	15.0	1/4	1.0	4.0	4.8	15
VSHY 030	208-230/1/60	1	@ 3.7	22.0	1/4	1.1	4.8	5.7	15
VSHY 040	208-230/1/60	1	@ 4.7	25.0	1/4	1.2	5.9	7.1	15
VSHY 050	208-230/1/60	1	@ 5.6	29.0	1/3	2.1	7.7	9.1	15
VSHY 060	208-230/1/60	1	@ 7.4	33.0	1/3	2.6	10.0	11.9	15
VSHY 080	208-230/1/60	1	@ 10.9	62.9	1/2	2.8	13.7	16.4	25
VSHY 100	208-230/1/60	1	@ 13.5	72.5	1/2	4.2	17.7	21.1	30
VSHY 120	208-230/1/60	1	@ 15.4	83.9	1/2	4.2	19.6	23.5	35

Minimum voltage 200 V. Operating voltage 208-230 V, single phase

Adhere to all applicable electrical codes

RLA - Rated load amps

LRA - Locked rotor amps

FLA - Full load amps



6.3 Expanded Heating Performance Table

Unit Model	Air Flow CFM	Water Flow GPM	90F EWT		100F EWT		105F EWT		110F EWT		120F EWT	
			LWT (°F)	Capacity (BTUH)	LWT (°F)	Capacity (BTUH)	LWT (°F)	Capacity (BTUH)	LWT (°F)	Capacity (BTUH)	LWT (°F)	Capacity (BTUH)
VSHY020	200	1.00	83.5	3,249	90.1	4,933	93.3	5,793	96.5	6,660	103.0	8,411
		1.25	84.4	3,494	91.5	5,298	95.0	6,209	98.5	7,124	105.5	8,966
		1.50	85.1	3,662	92.6	5,534	96.3	6,478	100	7,425	107.4	9,310
		1.75	85.7	3,776	93.4	5,690	97.3	6,645	101.2	7,602	109.0	9,518
		2.00	86.1	3,850	94.2	5,786	98.2	6,756	102.2	7,728	110.2	9,674
VSHY030	350	1.25	82.4	4,753	88.3	7,247	91.3	8,514	94.2	9,790	100.0	12,370
		1.75	83.8	5,422	90.5	8,206	93.9	9,590	97.3	10,978	104.1	13,763
		2.00	84.4	5,616	91.5	8,454	95.0	9,878	98.6	11,307	105.7	14,172
		2.25	84.9	5,750	92.2	8,654	95.9	10,111	99.6	11,572	107.0	14,502
		2.50	85.3	5,860	92.9	8,818	96.7	10,303	100.5	11,790	108.0	14,773
VSHY040	460	1.50	82.6	5,504	88.6	8,505	91.5	10,046	94.4	11,610	99.4	15,287
		2.00	83.5	6,413	89.9	10,063	93.1	11,802	96.3	13,552	102.7	17,053
		2.50	84.3	7,109	91.4	10,700	94.7	12,499	98.4	14,301	105.5	17,914
		3.00	85.1	7,359	92.6	11,066	96.3	12,925	100	14,787	107.5	18,519
		3.50	85.7	7,541	93.5	11,338	97.4	13,241	101.3	15,147	109.0	18,967
VSHY050	530	2.25	83.2	7,657	89.5	11,671	92.7	13,701	95.9	15,748	102.1	19,880
		2.75	84.0	8,246	90.8	12,506	94.2	14,655	97.7	16,776	104.5	21,035
		3.25	84.7	8,634	91.9	12,998	95.6	15,190	99.2	17,386	106.4	21,794
		3.50	85.0	8,760	92.4	13,186	96.1	15,407	99.8	17,634	107.2	22,102
		4.00	85.5	8,970	93.2	13,497	97.0	15,770	100.9	18,047	108.6	22,615
VSHPY060	630	2.50	83.0	8,706	89.3	13,250	92.4	15,551	95.6	17,871	101.8	22,516
		3.25	84.1	9,534	91.1	14,359	94.6	16,784	98.1	19,215	105.0	24,096
		4.00	85.0	9,963	92.4	15,000	96.2	17,529	99.9	20,065	107.3	25,153
		4.50	85.4	10,181	93.1	15,324	97.0	17,906	100.8	20,494	108.4	25,686
		5.00	85.8	10,360	93.7	15,591	97.6	18,216	101.6	20,847	109.4	26,124
VSHY080	820	3.50	83.9	10,687	90.5	16,556	93.7	19,577	96.5	23,463	102.8	29,710
		4.00	84.2	11,482	90.8	18,254	94.2	21,439	97.6	24,648	104.2	31,122
		5.00	84.8	12,892	92.1	19,542	95.8	22,874	99.4	26,175	106.7	32,794
		6.00	85.5	13,433	93.2	20,203	97.1	23,599	100.9	27,001	108.6	33,822
		7.00	86.1	13,743	94.0	20,666	98.0	24,137	102	27,613	110.0	34,582
VSHY100	1000	4.00	84.4	11,203	91.4	17,139	94.8	20,318	98.1	23,618	104.6	30,429
		5.50	85.2	13,158	92.6	20,307	96.2	23,932	99.9	27,598	107.1	35,047
		6.50	85.6	14,143	93.3	21,617	97.1	25,421	100.9	29,263	108.5	36,859
		7.50	86.0	14,838	93.9	22,542	97.9	26,369	101.9	30,212	104.5	37,938
		8.00	86.2	15,119	94.2	22,821	98.3	26,692	102.7	30,910	110.3	38,393
VSHPY120	1200	4.50	84.4	12,634	91.2	19,707	94.5	23,393	97.8	27,167	104.3	34,796
		6.00	85.0	14,877	92.3	22,899	95.9	26,976	99.5	31,107	106.7	39,499
		7.00	85.4	15,894	93.0	24,285	96.8	28,561	100.6	32,740	108.1	41,145
		8.00	85.8	16,641	93.7	25,144	97.6	29,419	101.5	33,713	109.3	42,352
		9.00	86.2	17,064	94.2	25,747	98.2	30,119	102.3	34,509	110.3	43,338



6.4 Expanded Fan Data Table - ECM

Model	EC Motor Speed	External Static Pressure Option	Min. 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
020	WHISPER* MODE	N/A	N/A	N/A	210	195	180	160	145	130	115	100	75	55	-	-	-
	LOW	LOW ESP	150	200	250	240	225	210	200	185	150	-	-	-	-	-	-
	MED				-	-	255	240	225	215	200	190	175	165	150	-	-
	MED	HIGH ESP			-	-	255	240	225	215	200	190	175	165	150	-	-
	HIGH				-	-	-	-	260	240	230	220	210	195	185	175	165
WHISPER* MODE	N/A				N/A	N/A	225	210	195	175	160	145	130	115	100	85	70
LOW	LOW ESP	220	350	315	305	295	285	275	265	250	240	225	-	-	-	-	
MED				350	340	335	325	315	305	295	285	275	265	255	245	235	
MED	HIGH ESP			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	
WHISPER* MODE				N/A	N/A	N/A	250	230	225	205	180	160	145	125	110	90	75
LOW	LOW ESP	300	460	410	400	390	380	370	365	350	340	330	325	310	300	-	
MED				460	450	445	440	430	425	415	405	395	385	375	365	355	
MED	HIGH ESP			460	450	445	440	430	425	415	405	395	385	375	365	355	
HIGH				-	-	-	-	470	465	455	445	435	430	420	410	400	
WHISPER* MODE				N/A	N/A	N/A	450	430	410	390	370	350	320	300	270	250	220
LOW	LOW ESP	375	530	520	510	490	470	450	430	410	390	375	-	-	-	-	
MED				-	-	550	540	520	505	485	470	450	430	410	390	375	
MED	HIGH ESP			-	-	550	540	520	505	485	470	450	430	410	390	375	
HIGH				-	-	-	-	-	-	555	540	525	510	490	475	460	
WHISPER* MODE				N/A	N/A	N/A	450	430	410	390	370	350	320	300	270	250	220
LOW	LOW ESP	450	630	580	565	550	540	520	505	485	470	450	-	-	-	-	
MED				640	620	610	595	580	565	555	540	525	510	490	475	460	
MED	HIGH ESP			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	
WHISPER* MODE				N/A	N/A	N/A	620	580	560	520	480	440	410	380	340	300	260
LOW	LOW ESP	600	820	800	760	740	720	695	660	640	620	-	-	-	-	-	
MED				880	860	840	820	800	780	750	720	700	670	650	625	600	
MED	HIGH ESP			880	860	840	820	800	780	750	720	700	670	650	625	600	
HIGH				-	-	-	-	895	880	860	820	805	795	780	770	760	
WHISPER* MODE				N/A	N/A	N/A	620	580	560	520	480	440	410	380	340	300	260
LOW	LOW ESP	750	1010	960	940	920	890	860	840	820	800	775	750	-	-	-	
MED				1080	1060	1040	1010	990	970	950	930	900	880	860	840	820	
MED	HIGH ESP			1080	1060	1040	1010	990	970	950	930	900	880	860	840	820	
HIGH				-	-	-	-	1110	1090	1070	1060	1040	1020	990	980	960	
WHISPER* MODE				N/A	N/A	N/A	620	580	560	520	480	440	410	380	340	300	260
LOW	LOW ESP	900	1200	1120	1100	1090	1070	1050	1025	1010	990	970	940	920	-	-	
MED				1230	1200	1185	1170	1150	1130	1110	1095	1080	1055	1040	1020	1000	
MED	HIGH ESP			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	
WHISPER* MODE				N/A	N/A	N/A	620	580	560	520	480	440	410	380	340	300	260

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 MERV8 air filters.
 *Optional "Whisper" mode is Fan On, Compressor Off mode for constant fresh air circulation. LOW Fan Speed tap is not available in Whisper mode.



6.5 Physical Data

Model Series	VSHY020	VSHY030	VSHY040	VSHY050	VSHY060	VSHY080	VSHY100	VSHY120
Nominal Cooling (Ton) ¹	0.50	0.75	1.0	1.25	1.50	2.0	2.5	3.0
Compressor-Type	High Efficiency Rotary					High Efficiency Scroll		
Air Coil-Type	Enhanced Copper tubes, Enhanced Aluminum Fins							
Face Area(sq ft)	1.46	1.46	1.46	2.30	2.30	2.81	3.10	3.10
Water Coil-Type	High Efficiency Co-Axial							
Hose Size (in)	1/2"					3/4"		
Water Connections	1/2" NPSM					3/4" NPSM		
Drain Connection Size	7/8" ID (Standard)							
Standard Blower / Motor	DWDI Forward-Curved Centrifugal / Direct-Drive							
Diameter x Width (in)	9x4T	9x4T	9x4T	9x6	9x6	10X7T	10X7	10X7
Motor Type	ECM	ECM	ECM	ECM	ECM	ECM	ECM	ECM
Motor HP/Speeds	0.25/3	0.25/3	0.25/3	0.25/3	0.33/3	0.5/3	0.50/3	0.50/3
Standard 1" Filter MERV8	1-14x25x1			1-16x30x1		1-20x30x1		
Optional 2" Filter MERV13	1-14x25x2			1-16x30x2		1-20x30x2		
VSHY Chassis Weight (lb)	65	72	77	105	110	150	165	175

NOTE:
1) Nominal Capacity calculated in accordance with ARI / ISO Standard 13256-1 for Water Loop Application

6.6 Design 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	85°F

Fluid Limits	Standard Range	
	Cooling	Heating
Std. Entering Water Temperature (EWT)	85°F	105°F
Min. Entering Water Temperature (EWT)	50°F	90°F
Max. Entering Water Temperature (EWT)	120°F	120°F

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

Fluid GPM Limits	
Min. GPM/Ton	2
Design GPM/Ton	3
Max. GPM/Ton	4

CAUTION

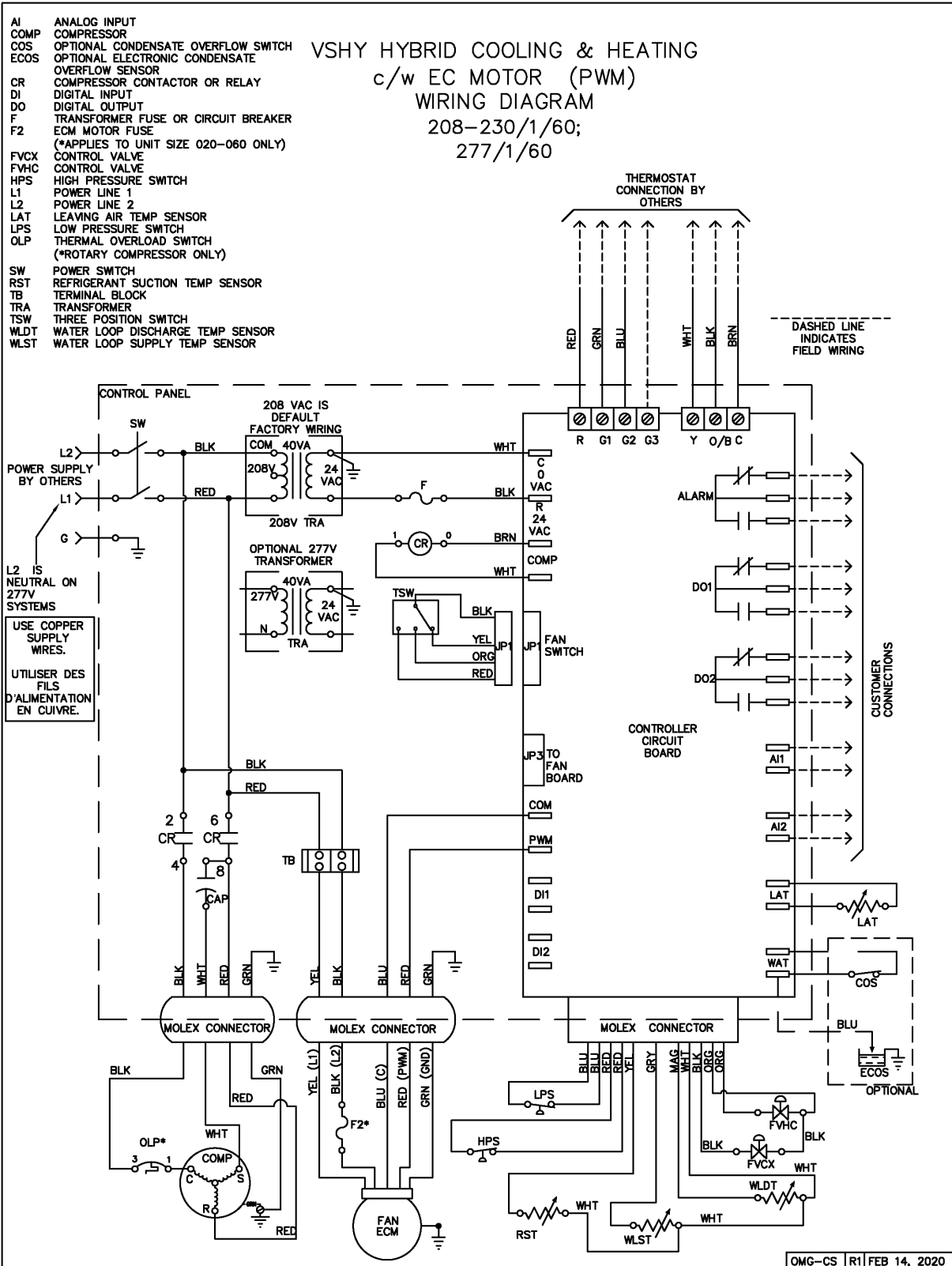
Design limits can not be combined. Combining maximum or minimum limits is not allowed. This could exceed the operation and design limits of the unit.

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



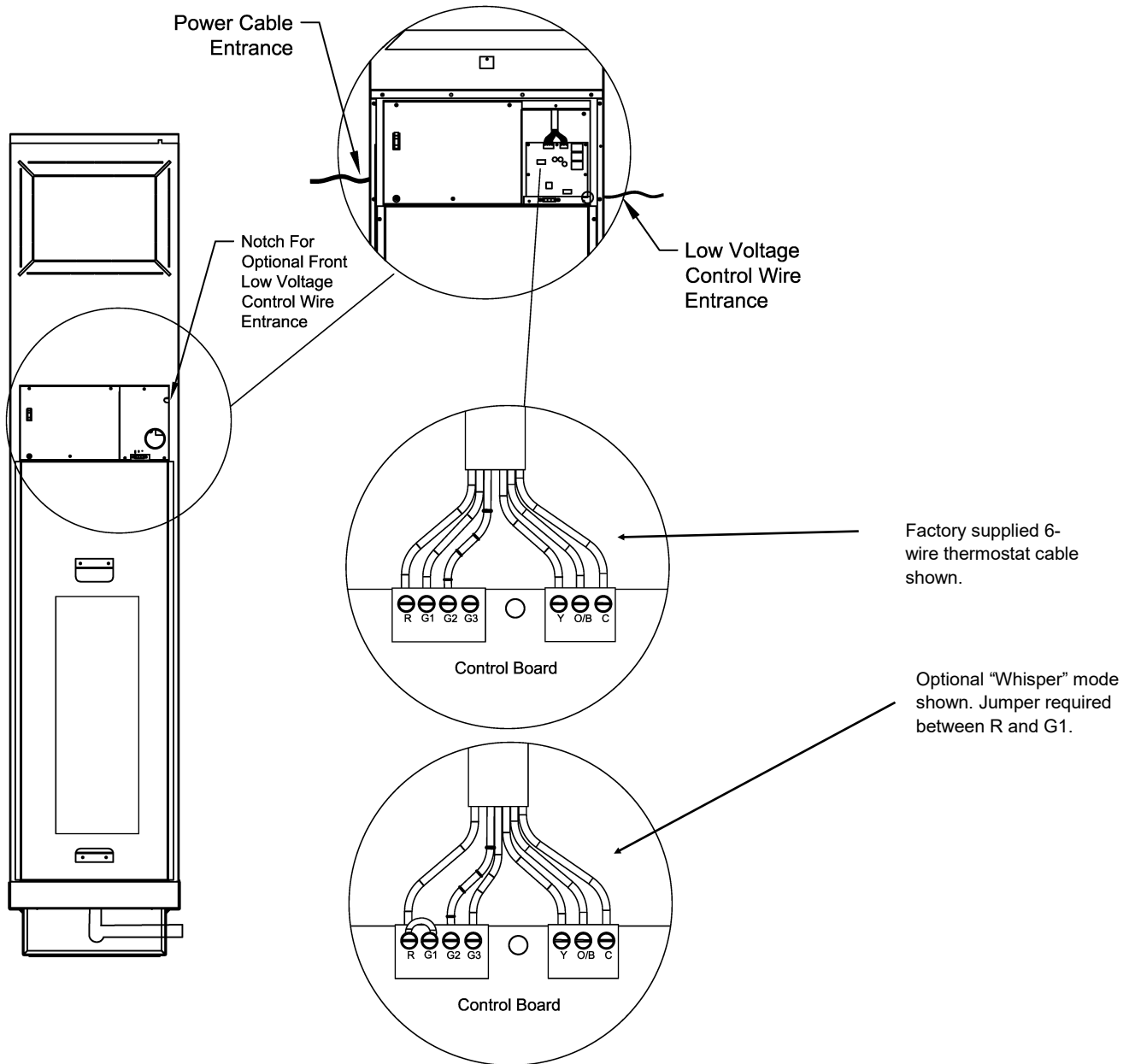
7. ELECTRICAL SCHEMATICS & CONTROL WIRING

7.1 Wiring Diagram - Standard ECM (208-230/277V/1Ph/60Hz)





7.2 Thermostat Wiring Details



Note: Factory supplied 6-wire 24 inch thermostat cable coiled up in low-voltage compartment of electrical box for field wiring to thermostat. Basic single speed thermostats require minimum 4-wire low voltage control wire harness when common is not required.

Thermostat Connection Detail:

R = 24VAC
G1 = Low Fan Speed
G2 = Med Fan Speed
G3 = High Fan Speed
Y = Compressor On (Cooling)
O/B = Heating
C = Common (Optional)

Thermostat with Whisper Mode:

R = 24VAC
G1 = Whisper Mode (Continuous Fan On)
G2 = Med Fan Speed
G3 = High Fan Speed
Y = Compressor On (Cooling)
O/B = Heating
C = Common (Optional)



8. SPECIFICATIONS

1 GENERAL

Install Vertical Stacked Hybrid Omega VSHY Series as indicated on the plans and capacities listed in the schedule and specifications.

Each unit shall be factory tested and ship factory-charged with R-410A refrigerant. All units from 1/2 to 3 Tons shall be tested and certified by ASHRAE/ANSI/AHRI/ ISO 13256-1 and ETL listed for United States and Canada. Each unit shall have factory affixed label showing ASHRAE/ANSI/AHRI/ISO and ETL logos. Cabinets and refrigeration chassis shall be factory wired and pre-piped.

2 CABINET

2.1 The vertical stacked hybrid units shall be **Omega VSHY Series**. Units shall provide scheduled capacities at the ampacity and voltage specified. Specified airflow shall be at the scheduled external static pressure and shall include the effects of a wet coil and clean filter.

2.2 The cabinet shall be 20-gauge galvanized steel with riveted internal components for rigidity. Cabinet shall have internal surfaces insulated with 1 inch thick, 3.5 lbs. high-density, mould resistant, thermal and acoustic insulation. Insulation shall meet NFPA 90, UL-181, and ASTM-C1071 standards and insulation shall have a flame spread of less than 25, and a smoke developed classification of less than 50 per ASTM E-84 and UL 723.

The unit shall be a single cabinet construction. Contractor shall be responsible for isolating the supply duct and supply grille from the cabinet.

(Optional GOLD Series) The cabinet shall be sectionalized for acoustic and installation purposes. The lower section shall include the risers, blower and fan motor assembly, all controls, and removable refrigeration chassis. The upper section shall be an acoustic discharge plenum lined with 1 inch thick, 3.5 lbs. high-density, mould resistant, thermal and acoustic insulation. Final cabinet height shall be coordinated with the installing contractor and architect. The discharge plenum shall be designed to be fastened to the underside of the concrete slab with field cut "Knockout" discharge openings. Rigid connections will not be accepted. A factory supplied flexible canvas connection shall be provided between the upper and lower sections. Heat pump manufacturer shall factory attach flexible connection to the plenum section.

2.3 (Optional) Provide optional line of site baffles (LOSb) on all units with multiple unit outlets.

2.4 Physical dimensions of each unit shall be accommodated within furring / ceiling-slab spaces provided as shown on the architectural drawings

2.5 Provide a minimum 5" (optional 6", 7" and 8") high stand factory installed to the bottom of the sheet metal cabinet to elevate the unit 5" above the floor.

2.4 A removable inner chassis service panel allowing service access to the fan and compressor compartment shall be provided with each unit.

2.5 The drain pan shall be 16-gauge stainless steel. The drain pan shall come an optional condensate overflow switch. The drain pan outlet shall be readily accessible for cleaning with a 7/8 inch OD copper drain connection. Unit shall be provided with a flexible p-trap condensate hose for connection to the condensate riser.

2.6 Factory installed supply and return risers shall be (Type L) (Type M) copper, with (factory) (field) mounted shut-off ball valves on each supply and return riser. Valves shall be brass and rated for 400 psig. A (Type M/DWV) condensate riser shall be (factory) (field) installed. Risers sizes shall be installed according to building plans.

2.7 Risers shall have a (field) (factory) provided 3 inch deep swage. Transition pieces shall be field supplied.

2.8 Unit cabinet shall come with supply discharge opening "knockouts". An optional noise attenuating insulated privacy air baffle (LOSb) shall be provided for horizontal supply discharge openings. All cabinet discharge openings shall include 1-1/2 inch drywall flange around the full opening perimeter.

2.9 Supply ducts shall not be rigidly attached to the cabinet and shall be acoustically isolated from cabinet using flexible canvas connections. Contractor shall install flex connection on all discharge openings. There shall be no rigid connection to supply-air discharge grilles or supply ducts except on Gold Series units designed with split casing.

2.10 Each unit shall have an (Acoustic) (Perimeter) return air panel. The panels shall be insulated with 1/2 inch thick, lined fiberglass insulation. The panel shall be easily removable without tools to allow access to the filter, chassis compartment and service disconnect switch.

2.11 (Optional) Unit shall have an optional Fresh Outside Air Duct intake located at the top of the unit for introducing fresh outside air into the unit.

2.12 Each unit shall be (field) (factory) supplied with double deflection supply grilles as shown on the plans. (Field) (Factory) provide opposed blade balancing dampers on units with multiple outlets as indicated on the plans.

2.13 Provide each unit with 1-inch thick MERV 8 pleated filters.

2.14 (Optional) Provide each unit with 2-inch thick MERV 13 pleated filters.

2.15 (Optional) Perimeter Return Air Panels shall have provision for a unit mounted thermostat to meet ADA requirements. Thermostat cable shall use a plug connector.

3 FAN & BLOWER

3.1 Each unit shall include a factory mounted forward curved, double inlet double width centrifugal direct drive fan and motor assembly with internal overload protection. The blower fan



SPECIFICATIONS (CONT'D)

assembly shall be positioned horizontally from a sheet metal blower deck. Single inlet fans are not accepted.

3.2 Units shall be supplied with a 3 speed ECM fan motor. Fan motors speeds shall be field selectable using unit mounted 3-speed fan switch or by wiring thermostat to required fan speed terminals.

4 REFRIGERATION CHASSIS

4.1. Chassis shall be rated up to 400psig working pressure for the water side circuit. Provide high temperature and pressure rated water hoses for connection of the risers to the chassis. The hoses supplied shall be constructed with an inner core of rubber, a stainless-steel metal braid, and rubber outer covering. Fittings shall be brass construction.

4.2. The compressor chassis shall be mounted and vibrationally isolated on 12-gauge slide rails using a double isolated base. Compressor shall have an acoustical enclosure ensuring compressor noise is isolated from air stream. Provide plug type electrical connections for chassis control and power connections allowing for easy removal of the chassis from the front of the cabinet.

4.3 The refrigeration circuit shall have two service valves, for measuring high and low refrigerant pressure, in the chassis compartment enclosure. The refrigerant circuit shall contain a thermal expansion valve (TXV) refrigerant metering device.

4.4 Chassis shall employ two 2-way valves mounted in the chassis compartment to minimize water pressure drop across water circuit. Water flow shall be directed through either the coaxial condenser coil during a call for cooling, or through hydronic heating coil during a call for heating. During a no demand situation, controls valves can be closed to reduce pumping power requirements. Units with 3-way valves are not accepted.

4.5 The hydronic heating coil shall be integral to the refrigeration coil. Units with separate heating and cooling coils are not accepted. Integrated hybrid coil shall minimize air pressure drop and maintain efficient fan performance. The Air side coils shall have copper tubes mechanically bonded to aluminum fins. Coils shall be sized to meet scheduled performance for cooling and heating.

4.6 Compressor shall be hermetically sealed type with internal thermal overload protection. Compressor shall be mounted on rubber vibration isolators.

4.7 Water side condenser heat exchanger shall be coaxial type with steel outer tube and copper inner tube. Condenser shall be rated at 500 psig water side and 650 psig refrigerant side.

4.8 (Optional) The chassis shall employ optional autoflow balancing valve mounted in the chassis compartment to maintain specified unit water flow rate over 2-80 psig differential water pressure. Auto flow balancing valve shall be field serviceable.

4.9 (Optional) The chassis hybrid air coil shall be Epoxy coated to aid in the prevention of premature formicary corrosion. The polymer coating shall meet minimum 1000 hours of Salt Spray ASTM B117 protection and NSF-51 certified for food splash zone

applications.

5 CONTROLS

5.1 Each unit shall be factory wired with all necessary controls. Each unit shall come standard with a microprocessor controller mounted in the electrical box. Electrical box shall contain compressor and fan motor contactor, 24 volt control power transformer, terminal block for low voltage field wiring connection, and terminal block for main power electrical connection, unit mounted service disconnect switch.

5.2 The operating and safety controls shall be monitored by the microprocessor controller. Sensor parameters and timers shall be field adjustable to meet site conditions. Controller shall have the following safety switches and sensors:

- Low Pressure Safety Switch
- High Pressure Safety Switch
- Entering Water Temperature sensor
- Leaving Water Temperature sensor
- Suction line freeze-stat temperature sensor
- Supply Air Temperature sensor
- (Optional) Condensate Overflow sensor
- Compressor Anti-Short Cycle timer
- Water Valve open and Closed timer
- Low-pressure bypass timer
- Random wait time on unit power up
- Fan-On and Fan-Off timer

5.3 Microprocessor controller shall have a web browser based test and diagnostic capability for displaying and logging water temperatures and any fault conditions for troubleshooting on site.

5.4 Microprocessor board shall have a field selectable setting for use of either unit mounted 3-speed fan selection switch or fan speed selection by thermostat. Units shall have optional ultra low fan speed "Whisper Mode" for silent air circulation there is no call for cooling or heating. Whisper mode shall be selected with optional fresh air snorkel.

5.5 Electrical box shall have a factory mounted 3-speed selector switch.

5.6 ECM fan speed % torque settings are field configurable using the imbedded Web based interface to meet site static requirements.

5.7 Thermostats shall be remote mounted. Thermostat leads shall be field wired into the control board terminals. Thermostats shall be 24VAC for cooling and heating operation and either:

(A) Manual changeover, non-programmable. Sub base shall have system "Heat-Off-Cool" and fan "On-Auto" switches.

(B) Manual changeover, 7-day programmable. Sub base shall have system "Heat-Off-Cool" and fan "On-Auto" switches.



(C) Auto Changeover, programmable with LED display. Thermostat shall have system “On-Off”, temperature “Heat-Auto-Cool” and fan “On-Auto” switches.

5.8 (Optional) Units shall come with a SmartOne compatible RS-485 communication add-on board and remote temperature sensor.

6 TESTING & WARRANTY

6.1 Each chassis unit shall be factory tested using a multi-step computer controlled testing equipment to prevent operator error during factory testing.

6.2 Warranty shall be for parts, 1 year not to exceed 18 months from date of shipment. (Optional) Provide 5 year compressor replacement parts warranty only.

7 EXECUTION

7.1 Units shall be installed neat and level on isolation pads, supplied by heat pump manufacturer, and secured to floor.

7.2 Flush the system per manufacturer instructions before connecting chassis. Contractor shall join supply and return riser flexible hoses together in each cabinet for flushing purposes.

7.3 Installing contractor shall install risers and install riser transition piece connections where riser sizes change.

7.4 The hoses shall be installed in the field by the contractor. The flare fittings on the hoses shall be connected according to industry standard (Finger tighten then tighten with wrench while always using back-up wrench).

7.5 (Optional): Contractor shall make provisions for connecting fresh air duct to the optional fresh outside air duct intake located at the top of the unit cabinet.

7.6 (Add for Gold Units) Discharge plenum shall be fastened to the underside of the concrete slab for noise attenuation using appropriate industry accepted mounting practices.

7.7 Flush the system per manufacturer instructions before connecting chassis. The riser system shall be flushed, cleaned and commissioned before connecting chassis units to the riser system.

7.8 Contractor shall provide duct and grille canvas connections on all single piece (Silver Series) units.

7.9 Start-up of units shall be supervised by trained representatives of the equipment manufacturer.

OMEGA Heat Pumps
3325A Orlando Dr.
Mississauga, ON, L4V 1C5
T. 905.670.2269
omega-heatpump.com
omega@omega-heatpump.com

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