

### Scholar QR Heat Pumps & Air Conditioners: Models VDH2036, VDH2040 & VAH2030, VDH2048 2.5 to 4 Ton Cooling Capacity with 2-Stage Compressors



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#### GENERAL DESCRIPTION

The Next Generation Scholar QR VDH and VAH heat pumps and air conditioners are advanced HVAC systems designed to provide heating, cooling, and outside fresh air for school classrooms. The units are installed in the classroom against an exterior wall. The vertical configuration minimizes the floor space occupied by the HVAC unit. This unique design makes it ideal for both new schools and for renovation of existing classrooms.

A full range of ventilation options – from the ERV, to a mechanical damper - are offered to meet any climate or budget. A wide selection of architectural louvers provides the designer with unlimited styles and configurations to compliment the exterior of the school. (For a complete description of the architectural louvers, please refer to the Marvair brochure entitled, "Architectural Extruded Aluminum Louvers.") Marvair offers a full range of thermostats to meet virtually every requirement. The unit can be controlled by a wall mounted thermostat, an internal thermostat or interfaced with a energy management system.

Scholar QR heat pumps and air conditioners are available in cooling capacities from 2.5 to 4 tons with a 2-stage compressor (cooling only) as standard. Electric resistance or hot water is available as primary heat on the air conditioners and as second stage heat on the heat pump. All sizes are available for operation on 208/230 V. 1Ø or 3Ø and 460 V. 3Ø electrical supply. All models conform to UL/CSA standard 60335-1 and 60335-2-40 and CAN/CSA C22.2, No. 236-11 Ed.4 and listed by ETL.

#### Features and Benefits

##### Ease of Installation

- Designed for ease of upper floor installations
- Air box height adjustable 1" - 3" from floor
- Air box height clears window sills
- Can be installed as free blow or ducted
- No clearance needed for corner installation
- Levelling feet provide adjustable height from floor

##### Next Generation R-454B Refrigerant

- 78% Lower GWP than R-410A
- Non-Ozone Depleting Refrigerant
- Synthetic Lubricant
- Reduced Compressor Wear

##### Rugged Cabinet Construction

- Optional Double-Wall Cabinet constructed of 16 gauge galvanized steel
- Hinged doors with optional tamper resistant locks
- Non-Corrosive drain pans



## SCHOLAR QR ADVANTAGES

Since their introduction in 1991, Scholar heat pumps and air conditioners have been the undisputed leader in interior, self-contained classroom HVAC systems. Students in tens of thousands of classrooms across the USA have benefited from the environment provided by Scholar heat pumps and air conditioners.

The Next Generation Scholar QR builds on this history with unique design innovations and features.

### ➤ Exceeds DOE Efficiency Requirements

All Scholar QR models are at least 11EER and 3.3 COP.

### ➤ Ease of Installation

The Scholar QR offers flexible installation options, including corner installs with no clearance requirement.

### ➤ Quiet Operation for a Better Learning Environment

The Scholar QR meets and exceeds ANSI/ASHRAE Noise Criteria. A high efficiency axial fan moves air silently through the condenser coils. Specially designed interior panels absorb sound. A low vibration, scroll compressor insures quiet operation as well as energy efficiency. The indoor air mover utilizes a revolutionary electronically commutated motor (ECM). This motor consumes a minimum of power with whisper quiet operation. Throughout this Data Sheet features, options and components that minimize sound levels are designated by the "Quiet Zone" logo.

### ➤ High efficiency means lower operating costs

The latest in scroll compressor technology with ultra high efficiency indoor and outdoor air movers, generous lanced fin with rifled tube evaporator and condenser coils combine for Integrated Part Load Values (IPLV's) of up to 14.5.

### ➤ Humidity Control

The control of humidity is essential for a positive learning environment. Scholar QR heat pumps and air conditioners actively control humidity with both standard controls and several optional accessories for schools where control of humidity is an everyday concern. The electronically commutated motor optimizes moisture removal by automatically controlling the air flow across the indoor coil. Unconditioned outdoor air for ventilation is not brought directly into the classroom. Ventilation air first passes through the indoor coil to temper the air and remove moisture. It then is mixed with classroom air before being introduced into the classroom.

### ➤ Scroll Compressor and R-454B Refrigerant

The heart of every air conditioner or heat pump is the compressor and the Scholar 2.0 utilizes a scroll compressor specifically designed to use next generation R-454B refrigerant. The heavy duty scroll compressor is quieter and operates with less damaging vibration than older compressors that operate on R-410A. Since R-454B can absorb and release heat more efficiently, they run cooler reducing the risk of burnout due to overheating.

### ➤ 2-Stage Compressor

Scholar QR heat pumps and air conditioners come standard with a 2-stage compressor with a first stage capacity of 65% of the total capacity. The 2-stage compressor provides better comfort and improved energy efficiency compared to many older, single stage compressors.



## LOW NOISE AND HIGH EFFICIENCY FEATURES

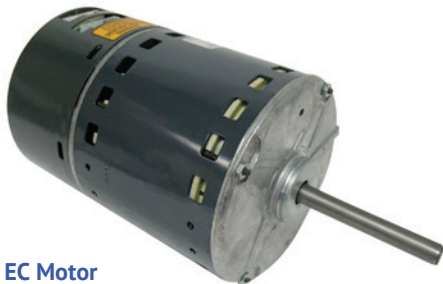


The Scholar QR was designed from the onset for unsurpassed quiet operation and high efficiency. With the proper installation, sound levels of 45 dBA or less with a freeblow plenum can be obtained. With duct, sound levels can be greatly reduced. In addition, many of the same components that enable the Scholar QR to have such quiet operation, contribute to its high efficiency.

### ► Electronically Commutated (EC) Indoor Air Mover Motor

Scholar QR heat pumps and air conditioners use an Electronically Commutated (EC) motor for the indoor air mover and provides a number of advantages over conventional induction motors.

- **Constant Torque** Factory set, but can be adjusted in the field to compensate for high static filters, grilles or duct work. At a given torque setting, the EC motor has a lower drop in air flow with increasing static compared to a conventional PSC motor.
- **Quiet** The three phase brushless DC motor construction results in a very low torque ripple and the rotor construction effectively eliminates noise transmission through the shaft. Unlike a conventional induction motor that repeatedly cycles on & off, the EC motor is always powered, but cycled through an external low control voltage programmed to slowly ramp up to speed, eliminating the abrupt sound at start-up.
- **Ultra-High Efficiency** On constant fan speed, the motor consumes 60-80 watts compared to 400 watts for an induction motor.
- **Reliable** The motor's electronics are mounted on a potted single board design less susceptible to damage from moisture.

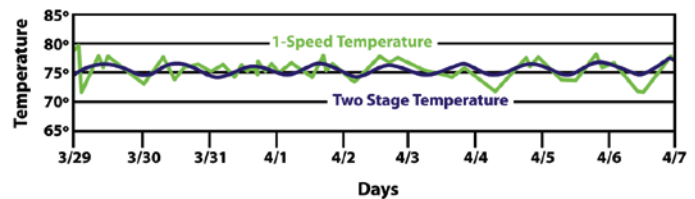


EC Motor

### ► 2-Stage Compressor

A two stage compressor offers better comfort and improved overall energy efficiency. The second stage is only functional in the cooling mode. Heating and dehumidification are single stage.

- **Better Comfort.** The two stage compressor is able to maintain more precise temperature and relative humidity levels. During mild days, the first stage can satisfy the load, minimizing temperature fluctuations providing steady, even comfort.
- **Energy Efficiency.** The Scholar QR heat pump with the two stage high efficiency compressor can provide significant energy savings compared to older, less efficient systems.



- **Hot Gas Reheat** for humidity control. The outside air requirements of classrooms require a special emphasis on control of humidity. The Scholar QR with hot gas reheat and the two speed compressor provide a comprehensive, yet affordable solution. It is a complete factory assembled unit designed to provide dehumidification of fresh air and room air. See page 5 for a complete description of Hot Gas Reheat for dehumidification.





## EASE OF INSTALLATION

Scholar QR heat pumps and air conditioners are installed in the classroom against an exterior wall. The outdoor air box slides into an opening in the exterior wall. The outdoor air box provides for the ingress and egress of the condenser air as well as the intake and exhaust for the ventilation air.

Scholar QR heat pumps and air conditioners can be installed as a free blow or ducted system. Free blow and ducted plenums are built in various heights to match the color and appearance of Scholar QR units.

Scholar QR units are available with a full range of accessories for customizing the installation including, base stands, decorative trim panels, and outdoor louvers.

The Scholar QR is shipped with the outdoor air box not installed and is designed to be quickly installed in the field. This allows Scholar QR heat pumps and air conditioners to fit comfortably through a three foot wide door.

## SERVICE AND MAINTENANCE

All service and maintenance is performed from the front or side of the unit – there is no need to slide the unit away from the wall. The heavy duty hinged front panels open 180° to facilitate access to parts, air filters and controls. Both the indoor and outdoor coils are easily accessible for cleaning.

## RUGGED CABINET CONSTRUCTION

The Scholar QR internal structural is comprised of 16 gage galvanized steel and the exterior cabinet is constructed of 20 gage galvanized steel with a mark and scratch resistant polyester finish. Grey is the standard cabinet color, but other colors are available.

The hinged doors permit easy access to the filters and components for service and maintenance. Tamper resistant locks which require a special tool may be ordered as an option.

## FIELD INSTALLED ACCESSORIES



### ► Trim Piece

The trim piece provides a color coordinated panel between the cabinet and the wall. Built in the same color as the cabinet and in various widths. Trim pieces provide a finished appearance and cover any space between the back of the cabinet and the wall.



### ► Base Stand

A base (with other heights available) matches the Scholar QR cabinet and raises it off the floor to accommodate different window sill heights. The base stand is available in several colors to match the color of the unit, along with decorative trim panels.



## LOUVER AND COLLAR OPTIONS

See the brochure, *Architectural Extruded Aluminum Louvers*, for complete description of the various styles and configurations of louvers.

### ► Louver/Collar Assembly

Aluminum louver and collar, pre-assembled at the factory to cover outside wall opening. The louver with 2" collar assembly is to be used when the louver is flush with the outside wall and is the preferred method of filling and sealing the outside wall. Standard colors are dark bronze or clear anodized. Exterior louver includes 1/2" x 1/2" bird screen. Note: Louvers are available in a variety of styles to meet architectural needs and various colors for aesthetic considerations. Contact your Marvair® representative for custom louvers.

### ► Louver Collar

Aluminum louver collar to enclose the louver and provide finished appearance over wall opening. Fits flush with outer wall surface. Available in dark bronze or clear anodized. Normally used when wall depth is less than 14" and louver is not flush with the outside wall.

### ► Louver

Aluminum louver for covering the outside wall opening. Available in dark bronze or clear anodized. Used with collar when louver is not flush with the outside wall. Exterior louver includes 1/2" x 1/2" bird screen.

### ► 4" Hurricane Louver

Miami-Dade approved, hurricane-resistant aluminum louvers with stationary drainable blades. These louvers are designed to protect the outside opening in building exterior walls from water penetration during high winds and rain.



## AIR DISTRIBUTION OPTIONS

### ► Freeblow Air Distribution

Provided with the freeblow plenum. The front grille has individually adjustable louvers which provide a full range of airflow direction. Two side supply grilles with louvers enhance the air flow in the classroom. All grilles have a clear brushed aluminum finish to be used with Scholar QR units with no heat or electric resistance heat. The standard plenum is 12-1/2". Minimum available plenum is 8".

### ► Supply Grilles

The frame and blades are 6063 extruded aluminum alloy with a 2000-R1 satin anodized finish. To eliminate corrosion and vibration, the frame is separated from the blade with injection molded bushings. All blades are air foil in design and are individually adjustable. A specially engineered channel on the outside of the frame holds an extruded flexible vinyl bulb gasket that produces a positive air seal at the mounting surface.

### ► Ducted Air Distribution

Provided with the ducted plenum. The standard plenum is 12-1/2" high. Minimum available plenum is 8" high. Duct can be easily installed to the flanged rectangular opening on the top. The tables on page 12 and 17 show the cfm for the various units.

### ► Plenum Extenders

In order to provide a finished appearance, plenum extenders may be ordered. The plenum extender rests on top of the either the free blow or ducted plenum and may be ordered in various heights in 1" increments.



## DEHUMIDIFICATION OPTIONS

### ► Reheat Dehumidification

Scholar QR heat pumps and air conditioners with hot gas reheat are complete factory assembled units designed to provide dehumidification of fresh air and room air. Hot gas reheat can be used with the single stage or two stage compressor and with any supplemental heat and the ERV or motorized damper ventilation options. Hot gas reheat is controlled by an external humidity controller or BAS control. For optimum performance, hot gas reheat should be used in conjunction with the ERV. When used with the motorized damper, hot gas reheat alone may not maintain satisfactory control of the humidity in the classroom over all outdoor conditions.

A pulsing reheat valve maintains a constant discharge temperature during reheat operation. This temperature can be adjusted after installation.

*Operation* - If the humidity rises above the set point on the dehumidistat and the temperature in the classroom is satisfied, both mechanical cooling and the HGR coil operate to temper the air and lower the humidity. If the temperature in the classroom rises above (or falls below) the set point of the thermostat and the unit is operating in the dehumidification mode, the call for cooling (or heating) will override the call for dehumidification and the reheat coil is disengaged until the thermostat is satisfied. This assures the environment temperature is maintained as first priority and humidity control is second. Note: Scholar QR™ units with the hot gas reheat coil require a dehumidistat for proper operation. (See Optional Controls.)

## HEAT OPTIONS

All heat options are available for the Scholar QR heat pumps and air conditioners. Electric resistance or hot water heat is used as heat on air conditioners and to supplement, where required, the heat pump cycle.

### ► Electric Resistance Heat

Installs above the indoor air blowers inside the cabinet and is an integral part of the packaged unit. Refer to Model Identification table for available heat options.

### ► Hot Water Heat

Installed above the indoor air blowers inside the plenum. Hot water coil capacities for the Scholar QR™ models are shown in the Hot Water Output data table. Hot water heat is factory installed in the freeblow or the ducted plenums. Hot water heat is plumbed from the top right side of the plenum. As a standard safety feature, each hot water coil has a protective 24 volt thermostat embedded within it to shut off air flow across the coil if the coil temperature drops to 32°F. The hot water plenum is 12-1/2" high.

## CABINET CONSTRUCTION OPTIONS

### ► Coastal Installations

For installation in coastal areas where salt corrosion may be a problem, the Scholar QR heat pumps and air conditioners may be ordered with a stainless steel drain pan for the indoor coil and a corrosion resistant coating on the outdoor coils.

### ► Tamper Resistant Door Latches

Requires special access tool to open the front doors.

## VENTILATION OPTIONS

### ► Configuration "A": Blank-Off Plate (*standard on all Ventilation Configurations*)

No ventilation. No introduction of outside air.

### ► Configuration "E": Motorized Fresh Air Damper w/Pressure Relief & Independent Control

The PLC allows the position of the "E" damper to be set for desired outside air intake from fully closed to fully open. Setting 15 of the control board configuration menu allows the user to set the position from 20 (2VDC / Closed) to 100 (10VDC 100% open). The damper position can be adjusted in 1VDC increments to any position from closed to 100% open as required.

*Operation:* Upon a "Call for Motorized damper" via a 24V signal from an external user-installed device, the motorized damper opens to the position selected in the PLC configuration menu setting 15 and the indoor blower operates. A 24VAC signal {sourced from LVTB 24VAC "R" and supplied through a user-provided Normally Open (NO) contact} activates (opens) the Motorized Damper and connected Relief Damper. When the 24VAC signal is removed, the motorized damper spring returns to the fully closed position and the indoor blower stops operation. The motorized damper Does NOT open when there is a call for the indoor fan (G).

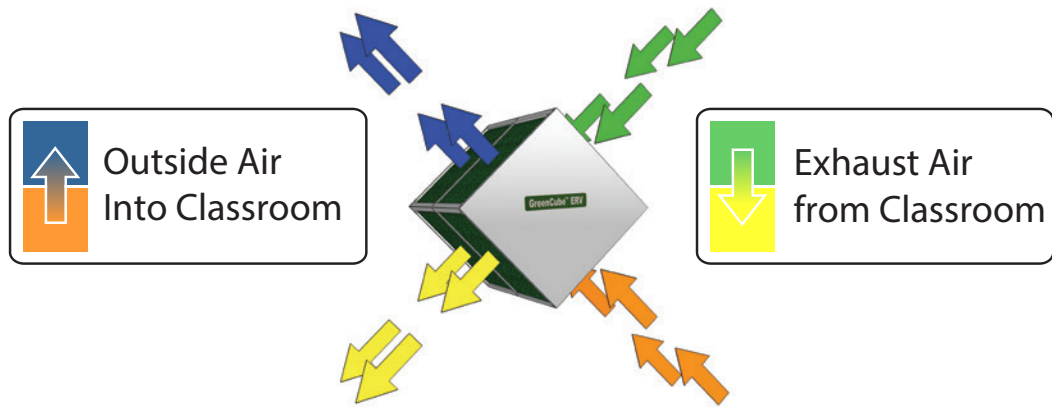
**Note:** This circuit does not interrupt the compressor or heater operation.

### ► Configuration "N": Manual Fresh Air Damper with Pressure Relief Ventilation (*Standard*)

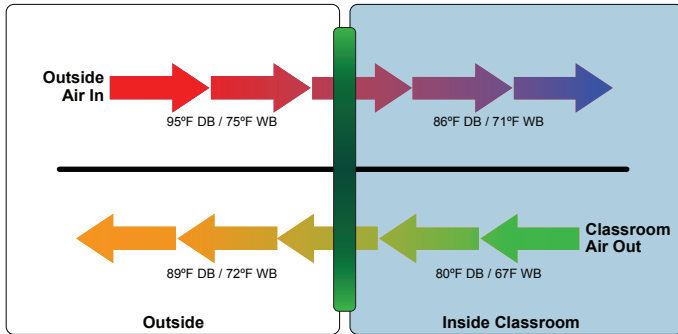
Manually adjustable to a fixed position (non-motorized damper), with a maximum of 450 cfm. Includes a fresh air filter, fresh air intake blower, fan speed controller and pressure relief.

### ► Configuration "Q": GreenCube® ERV Ventilation (*Optional*)

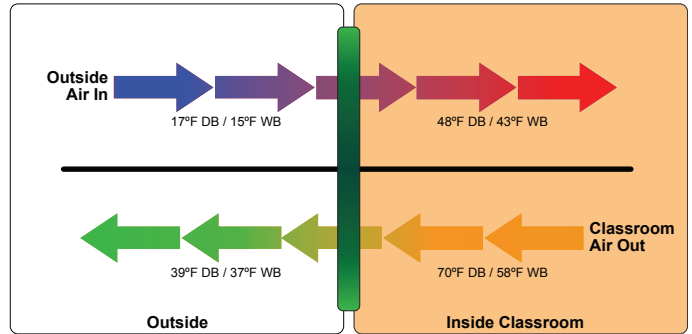
The Marvair GreenCube ERV is an enthalpy plate heat exchanger that transfers both sensible and latent energies between outgoing and incoming air streams in a cross flow arrangement with virtually no cross-contamination of air streams. Except for two air movers, it has no moving parts. The media is impregnated with a polymeric desiccant that exchanges water by direct vapor transfer using molecular transport without the need of condensation. In addition, the desiccant is a bactericide. Two MERV 6 type filters are used on both sides of the enthalpy core. The fresh air and exhaust motors have independent speed controllers to permit each of the motors to be regulated independently.



**Summer Operation**  
 Outside 95°F DB / 75°F WB • Inside 80°F DB / 67°F WB  
 Airflow: 450 SCFM



**Winter Operation**  
 Outside 17°F DB / 15°F WB • Inside 70°F DB / 58°F WB  
 Airflow: 450 SCFM



**GreenCube Energy Recovery Ventilator Performance**

SCFM* of Outside Air	Energy Conserved, BTUH					
	95° DB/73° WB Outside 80° DB/67° WB Inside			95° DB/80° WB Outside 80° DB/67° WB Inside		
	Sensible	Latent	Total	Sensible	Latent	Total
225	-2674	-823	-3497	-2674	-4790	-7463
250	-2952	-894	-3846	-2951	-5196	-8148
325	-3766	-1086	-4853	-3766	-6286	-10051
400	-4560	-1255	-5815	-4559	-7227	-11786
450	-5081	-1357	-6438	-5080	-7794	-12875

SCFM* of Outside Air	Energy Conserved, BTUH								
	90° DB/74° WB Outside 75° DB/64° WB Inside			80° DB/70° WB Outside 75° DB/64° WB Inside			60° DB/54° WB Outside 70° DB/58° WB Inside		
	Sensible	Latent	Total	Sensible	Latent	Total	Sensible	Latent	Total
225	-2575	-2765	-5341	-1035	-1877	-2913	1764	53	1817
250	-2842	-3002	-5844	-1144	-2031	-3175	1949	58	2007
325	-3623	-3641	-7264	-1463	-2437	-3900	2484	74	2558
400	-4384	-4197	-8581	-1775	-2780	-4555	3021	90	3111
450	-4883	-4536	-9418	-1981	-2983	-4964	3369	100	3469

SCFM* of Outside Air	Energy Conserved, BTUH								
	40° DB/36° WB Outside 70° DB/58° WB Inside			20° DB/18° WB Outside 70° DB/58° WB Inside			0° DB/7° WB Outside 70° DB/58° WB Inside		
	Sensible	Latent	Total	Sensible	Latent	Total	Sensible	Latent	Total
225	5288	2934	8222	8804	4365	13169	12314	4835	17149
250	5840	3240	9080	9722	4818	14540	13594	5335	18929
325	7441	4112	11553	12388	6108	18496	17328	6757	24085
400	9052	4921	13972	15066	7302	22368	21064	8070	29134
450	10091	5427	15518	16790	8049	24840	23466	8892	32358

\*SCFM = Standard Cubic Feet per Minute

For performance of the GreenCube ERV at conditions other than those shown, please contact your Marvair® representative or the factory.

## OPTIONAL VENTILATION CONTROLS AND GRILLES

### ► Control Ventilation

A field or factory installed carbon dioxide sensor controls the ventilation damper and only opens the damper when CO<sub>2</sub> levels exceed a specified level. Demand control ventilation saves energy and utility costs by ventilating the classroom based upon occupancy.

### ► Ventilation Exhaust Air Controller

As standard, the motorized fresh air intake with PowerVent and ERV ventilation options are equipped with independent intake and exhaust air blowers. The optional exhaust air blower controller allows positive pressurization of the classroom; i.e., more outside air can be introduced through the ERV than is exhausted.

## THERMOSTAT/CONTROLLERS

### ► Digital A/C Thermostat

*Digital, Seven Day Programmable Thermostat* .....P/N 50123  
1 stage heat, 1 stage cool. 7 day programmable. Fan switch: Auto & On. Auto-changeover. Keypad lockout. Non-volatile program memory. Title 24 compliant - no batteries needed.

### ► Digital Heat Pump Thermostat

*Digital, 7 Day, 5-2 and 5-1-1 Day Programmable Thermostat*.....P/N 50107  
Two stage heat/Two stage cool. Manual or auto changeover. Fan: Auto & On. Permanent retention of setting on power loss. Field adjustable temperature calibration. Adjustable max. setpoint for heating and min. adjustable setpoints for cooling. Adjustable temperature differential. Keypad lockout. Status LED. °F or °C selectable. Title 24 compliant.

*Digital, 7 Day, 2 Occupied & 2 Unoccupied Periods for Each Day of the Week Programmable Thermostat*.....P/N 50248  
Three stage heat/Three stage cool. Manual or auto changeover. Fan: Auto & On. Ten year retention of programming settings and 48 hour clock and day settings on power loss. Adjustable max. setpoint for heating and min. adjustable setpoints for cooling. Adjustable temperature differential. Keypad lockout. Status LED. °F or °C selectable. Optional remote sensors for outdoor air, supply air and humidity. Title 24 compliant.

*Internal Electronic Programmable Heat Pump Thermostat* .....P/N S/02792  
(factory installed) with automatic changeover, has two stages of heating and one stage of cooling and a fan switch. System mode switch has OFF, COOL, AUTO, HEAT, and EM.HT. settings. Fan mode switch has OFF and AUTO settings. This thermostat may be used with systems that have no heat, electric resistance, a hot water coil or a steam coil.

### ► Humidity Controller

*Digital Humidity Controller*.....P/N 51731  
To be used with units with Hot Gas or electric reheat. Programmable dehumidistat, ventilation control. Permanent memory retention of set points. Humidity sensor can be field calibrated. High & low dehumidification set points. Outdoor temperature and humidity sensor included. °F or °C selectable.

### ► MAR8000 Thermostat/Controller

*MAR8000 with Temperature, Humidity and vent Control, BACnet ready with Ethernet port* .....P/N 51738  
*MAR8000 Optional CO2 Sensor* .....P/N 70954

The MAR8000 thermostat/controller is a standalone, self-programming HVAC controller designed to optimize performance of Marvair heat pumps and air conditioners. It can function as an independent controller or used in conjunction with a BACnet network.

With built-in temperature and humidity sensors, motion sensing and an optional CO2 detection sensor, the MAR8000 can control:

- 1 Heating stage / 1 Cooling stage
- 2 Heating stages / 2 Cooling stages
- 3 Heating stages / 2 Cooling stages
- Hot gas dehumidification operation
- An economizer cycle, and
- Marvair's various ventilation options including the Marvair GreenWheel® and/or GreenCube Energy Recovery Ventilator.

#### Features include:

- *Interface:* Touch screen LCD interface.
- *Aesthetics:* Up to ten selectable screen colors.
- *Flexible:* Configurable economizer/scheduler, supports upload of custom standby screen and Lua scripts.
- *Conformity:* Conforms to ASHRAE specifications for Green Building Standards and applicable safety, EMC and radio standards.





- *Protocols:* Wired BACnet MS/TP or wireless BACnet IP, Modbus RTU, wireless Zigbee Pro, BACnet/IP and email notification via Wi-Fi (requires optional Wi-Fi module).
- *Peripherals:* Easy to install Zigbee Pro, CO2 sensor or Wi-Fi plug-in modules.
- *Optional Sensors:* CO2
- *Standard Sensors:* Motion, temperature, relative humidity.
- *Integration:* Wireless connection to Multi-Purpose Manager (MPM).
- *Automatic Demand Response:* Load shedding application for demand response.
- Generate automatic energy savings
- Interchange between °C/°F
- 22 selectable languages

➤ **Thermostat Guards**

*Clear Thermostat Guard with Keylock & Clear Plastic Cover & Base*.....P/N 50092  
For use with 50123 and 50107 thermostats.

*Clear Thermostat Guard with Keylock & Clear Plastic Cover & Base*.....P/N 50119  
For use with 50248 thermostat.

**SCHOLAR QR STANDARD CONTROLS**

➤ **High Pressure and Loss of Charge (HP) or Low Pressure (A/C) Switches**

Includes a lockout relay.

➤ **PLC Controller**

The PLC is a factory installed microprocessor. LED indicator lights show operational status and provide assistance with diagnosis if troubleshooting is ever required. The controller can perform extensive self diagnosis to assess the operational status and indicate a fault when detected. The controller can be programmed remotely or with a removable program storage device. Pertinent statistical data regarding the history of the refrigerant system is also stored.

The controller in the Scholar QR™ heat pumps and air conditioners improves reliability due to a reduction of components and simplification of control panel wiring and can control a Building Automation System (BAS) and various ventilation operations.

➤ **Defrost Control**

Based upon time and temperature. The time interval can be adjustable from 30 to 90 minutes in one minute increments. The control system initiates a defrost cycle only if the outdoor coil temperature is 28°F or below. (heat pump only)

➤ **Anti-short Cycle Timer**

Prevents the compressor's motor windings and starting controls from destructive overheating. The time interval is adjustable from three to eight minutes.

➤ **EMS Control Relay (24V only)**

Provides a 24 VAC coil to control operation from a Building Automation System.

**Note:** An additional EMS control relay can be added when 120 or 240 VAC coils are required.

➤ **Outdoor Thermostat**

Prevents second stage heat (electric or wet heat) from operating above desired outdoor temperature set point and can be set to activate second stage heat while disabling the compressor below desired outdoor temperature. (heat pump only)

➤ **Electric Heat Control**

Controls operation of electric heat and allows either simultaneous or non-simultaneous operation of electric heat and the compressor (heat pump only).

➤ **Ventilation Control**



The fresh air damper with PowerVent and ERV ventilation options are equipped with a Fresh Air Fan Speed Control. The fresh air fan controls the ventilation intake blower together, supplying up to 450 CFM of outside air if/when desired.

➤ **Indoor Blower Fan Speed Controller**

Allows field calibration of the indoor blower to minimize sound levels for specific installations.

➤ **Phase Monitor**

Monitors 3ø power supply and will not allow the unit to operate if the power supply is not properly phased. Not required on 1ø units.

➤ **Condensate Float Switch**

Shuts down the Scholar QR unit in the event of a clogged condensate drain.

## OPTIONAL CONTROLS

### ▶ Dehumidistat

Wall mounted type dehumidification controller controls operation of the hot gas reheat coil for dehumidification. Adjustable dehumidification range. Required for Scholar QR™ heat pumps and air conditioners with hot gas reheat.

## OTHER OPTIONS

### ▶ Condensate Pans and Freeze Protection

To prevent freezing of water in the condensate lines and in the drain pans, this kit should be installed in locales subject to freezing temperatures. The kit includes a heater for the outdoor condensate pan.

### ▶ Anti-Microbial Light

A germicidal UV light destroys toxic bacteria, viruses and mold on the indoor air coil.

### ▶ Cold Plasma Air Purification Device

Installed inside the Scholar QR unit, this device neutralizes odors, kills mold, bacteria and viruses. It also helps to control allergens\*, asthma\*, smoke and airborne particles.

\*These statements are based on customer testimonials and have not been evaluated by the FDA.

### ▶ MERV 11 or 13 Return Air Filters

Factory installed two inch (51 cm) MERV 11 or 13 filters. Ultra high filtration material that removes most airborne mold, spores and dust. Replaces standard MERV 8 return air filters.

### ▶ Protective Coil Coating Packages

The Scholar QR is available with corrosion protection coatings for the condenser and evaporator coils.



Cold Plasma Air Purifier

# MODEL IDENTIFICATION

Example	V	D	H	2	0	4	8	A	D	0	5	0	Q	G	+	+	+	1	E	A	+	C	1	1	2	+	+	+	+	+
Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

1	Unit Designation/Family	V = Marvair Scholar Classroom Unit
2	Energy Efficiency Ratio (EER)	A = 11 EER D = 12 EER
3	Refrigerant Type	H = R-454B
4	Compressor Type/Quantity	2 = Staged/Step
5	Unit Capacity/Nominal Cooling (BTUH)	030 = 30,000    040 = 40,000 036 = 36,000    048 = 48,000
6		
7		
8	System Type	A = Air Conditioner H = Heat Pump
9	Power Supply (Volts-Hz-Phase)	A = 208/230-60-1 C = 208/230-60-3 D = 460-60-3
10	Heat Designation	000 = No Heat    100 = 10KW 050 = 5KW        120 = 12KW
11	@ Rated Voltage	060 = 6KW        150 = 15KW
12	KW = Kilowatt	080 = 8KW        990 = Hot Water Plenum 090 = 9KW
13	Ventilation Configuration	A = No Ventilation E = Adjustable Fresh-Air w/Powered Pressure Relief & Independent Control N = Manually Adjustable Fresh Intake w/ Fresh Air Filter & Adjustable Pressure Relief Q = GreenCube ERV
14	Dehumidification	H = Hot Gas Reheat w/Humidity Control G = Hot Gas Reheat M = Modulating Hot Gas Reheat R = Electric Reheat + = None
15	Controls	H = BACnet w/PLC J = BACnet w/PLC & Factory Installed T Stat M = PLC w/ BacNet & Unit Mounted Network Sensor + = None (Green Board)
16	Operating Condition	A = Evaporator Freeze Sensor (EFS) N = Hard Start P = Hard Start w/Low Ambient & CCH R = Crank Case Heater (CCH) 1 = Low Ambient w/FCC 2 = Low Ambient w/FCC & EFS + = None
17	Indoor Air Quality Features	D = Dry Bulb Sensor E = Dry Bulb Sensor w/Dirty Filter G = Dirty Filter Sensor K = Bi-Polar Ionization + = None

18	Air Flow	1 = Top Supply/Bottom Return C = Top Supply/Front Door Return
19	Compressor Location	E = Right Hand
20	Filter Option	A = 2" Pleated (MERV 8, AC/HP-C) C = 2" Charcoal D = MERV 11 High Filtration Package E = MERV 13 High Filtration Package + = None
21	Corrosion Protection	A = Condenser Coil Only C = Evaporator Coil Only D = Both Coils Condenser & Evaporator K = Coastal Package + = None \$ = Special
22	Engineering Revision Level	C1
23		
24	Cabinet Color	1 = Marvair Beige (STD) 2 = Gray (STD) 3 = Carlsbad Canyon (STD) 4 = White (STD) 9 = Pebble Gray \$ = Custom Color (Powder Coat)
25	Sound Attenuation	2 = Compressor Blanket + = None
26	Security Option	A = Lockable Access Plate/Tamper Proof + = None
27	Fastener/Drain Pan Option	C = Stainless Steel Drain Pan + = None
28	Miscellaneous	% = Center Snout / = Offset Snout + = None \$ = Special
29	Unused	A = Double-Wall Front Doors + = None \$ = Special
30	Special Variation	+ = None \$ = Special Configuration Not Covered by Model Nomenclature

**Note:** Not all options are available with all configurations. Contact your Marvair sales representative for configuration details and feature compatibility.

# SCHOLAR QR VAH/VDH HEAT PUMPS WITH 2-STAGE COMPRESSOR



## Certified Efficiency and Capacity Ratings at ANSI/ARI Standard 390

Model Number	VAH2030H			VDH2036H			VDH2040H			VAH2048H		
	A	C	D	A	C	D	A	C	D	A	C	D
Cooling BTUH <sup>1</sup> - 2nd Stage	27,000			34,400			42,000			45,000		
EER <sup>2</sup> - 2nd Stage	11.00			12.00			12.00			11.50		
Integrated Part Load Value <sup>3</sup>	14.0			15.5			16.0			15.5		
High Temperature Heating <sup>4</sup>	25,000			26,600			34,400			36,000		
High Temperature COP <sup>5</sup>	3.30			3.30			3.30			3.30		
Rated Indoor Air Flow (CFM <sup>6,7</sup> )	1,000			1,300			1,500			1,600		
Rated Outdoor Air Flow <sup>7</sup>	2,800			2,800			2,800			2,800		

<sup>1</sup>Cooling rated at 95°F (35°C) outdoor and 80°F DB/67° WB (26.5°C DB/19.5°C WB) return air. <sup>2</sup>EER=Energy Efficiency Ratio

<sup>3</sup>Integrated Part Load Value is an integrated efficiency measure from 1st and 2nd stage capacity modulation.

<sup>4</sup>High Temperature Heating & 5COP is rated at 47°F DB/43°WB (8.3°C DB/6.1°C WB) outdoor and 70°F (21.1°C) return air.

<sup>5</sup>COP=Coefficient of Performance <sup>6</sup>CFM=Cubic Feet per Minute <sup>7</sup>ECM Motor Set Point

Ratings are at 230 volts for 208/230 volt units ("A" & "C" models) and 460 volts for "D" models. Operation of units at a different voltage from that of the rating point will affect performance and air flow.

## Sensible Total Heat Ratio @ 95°F (35°C) Outside Air DB

Model Number	VAH2030H			VDH2036H			VDH2040H			VAH2048H		
	A	C	D	A	C	D	A	C	D	A	C	D
Total Capacity	27,000			34,400			42,000			45,000		
Sensible Heat Ratio	0.78			0.75			0.75			0.74		
Sensible Capacity	21,000			25,800			31,500			33,300		
Rated Air Flow (CFM <sup>1</sup> )	1,000			1,300			1,500			1,600		

<sup>1</sup>CFM=Cubic Feet per Minute

Sensible Heat Ratios based upon ANSI/AHRI std. 390 outdoor conditions of 95°F (35°C) outdoor and 80°F DB/67°F WB (26.5°C DB/19.5°C WB) return air.

## Cooling Performance (BTUH) at Various Outdoor Temperatures

Model Number	Outdoor Temperature									
	75°F / 24°C	80°F / 26.5°C	85°F / 29°C	90°F / 32°C	95°F / 35°C	100°F / 38°C	105°F / 40.5°C	110°F / 43.3°C	115°F / 46°C	
VAH2030H	31,320	30,240	29,160	28,080	27,000	25,920	24,840	23,760	23,220	
VDH2036H	39,904	38,528	37,152	35,776	34,400	33,024	31,648	30,272	29,584	
VDH2040H	48,720	47,040	45,360	43,680	42,000	40,320	38,640	36,960	36,120	
VAH2048H	52,200	50,400	48,600	46,800	45,000	43,200	41,400	39,600	38,700	

Based upon ANSI/AHRI std. 390 return air conditions of 80°F DB/67°F WB (26.5°C DB/19.5°C WB) return air at rated air flow.

## Heating Performance (BTUH) at Various Outdoor Temperatures

Model Number	Outdoor Temperature													
	0°F/-17.8°C	5°F/-15°C	10°F/-12.2°C	15°F/-9.4°C	20°F/-6.7°C	25°F/-3.9°C	30°F/-1.1°C	35°F/1.7°C	40°F/4.4°C	45°F/7.2°C	47°F/8.3°C	50°F/10°C	55°F/12.8°C	60°F/15.6°C
VAH2030H	10,584	12,096	13,608	15,120	16,632	18,144	19,656	21,168	22,680	24,192	25,000	25,704	27,216	28,728
VDH2036H	11,138	12,730	14,321	15,912	17,503	19,094	20,686	22,277	23,868	25,459	26,600	27,050	28,642	30,233
VDH2040H	14,452	16,517	18,581	20,646	22,711	24,775	26,840	28,904	30,969	33,034	34,400	35,098	37,163	39,227
VAH2048H	15,233	17,410	19,586	21,762	23,938	26,114	28,291	30,467	32,643	34,819	36,000	36,995	39,172	41,348

Based upon AHRI 390 Return Air of 70°F (21.1°C) Dry Bulb / 60°F (15.6°C) Wet Bulb.

## Room Size Limitations

Scholar 2.0 Heat Pumps	VAH2030H	VDH2036H	VDH2040H	VAH2048H
Refrigerant Charge (oz.)	170	200	200	210
Minimum Room Size (ft <sup>2</sup> )	166.9	196.4	196.4	206.2
Minimum Supply Height (ft)	6.9	6.9	6.9	6.9



# Electrical Characteristics - Compressor, Fan, Ventilation & Blower Motors - VAH/VDH Heat Pumps

Model Number	COMPRESSOR			OTHER MOTORS	OUTDOOR FAN			INDOOR BLOWER (ECM)			ENERGY RECOVERY VENTILATOR	
	VOLTS-HZ-PH	RLA <sup>1</sup>	LRA <sup>2</sup>	VOLTS-HZ-PH	RPM <sup>3</sup>	FLA <sup>4</sup>	HP <sup>5</sup>	RPM <sup>3</sup>	FLA <sup>4</sup>	HP <sup>5</sup>	GREENCUBE™	
											AMPS	
											OAM <sup>6</sup>	EXM <sup>7</sup>
VAH2030HA	208/230-60-1	14.6	82.0	208/230-60-1	1200	5.3	1/2	1500	2.5	1/2	1.40	0.35
VDH2036HA	208/230-60-1	14.6	90.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VDH2040HA	208/230-60-1	18.2	106.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VAH2048HA	208/230-60-1	18.3	138.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VAH2030HC	208/230-60-3	TBD	TBD	208/230-60-1	1200	TBD	1/2	1500	TBD	TBD	TBD	TBD
VDH2036HC	208/230-60-3	9.9	82.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VDH2040HC	208/230-60-3	11.5	114.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VAH2048HC	208/230-60-3	11.9	112.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VAH2030HD	460-60-3	TBD	TBD	208/230-60-1	1200	TBD	1/2	1500	TBD	TBD	TBD	TBD
VDH2036HD	460-60-3	4.8	44.3	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VDH2040HD	460-60-3	6.5	56.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VAH2048HD	460-60-3	6.8	61.8	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35

<sup>1</sup>RLA = Rated Load Amps      <sup>2</sup>LRA = Locked Rotor Amps      <sup>3</sup>RPM = Revolutions per Minute      <sup>4</sup>FLA = Full Load Amps  
<sup>5</sup>HP = Horsepower      <sup>6</sup>OAM = Outside Air Motor      <sup>7</sup>EXM=Exhaust Air Motor  
 The 460 volt units have a step down transformer for the 230 volt motors.

## Summary Electrical Ratings (Wire and Circuit Breaker Sizing) - VAH/VDH Heat Pumps with 2-Stage Compressor & Ventilation Configurations - ("C") Economizer ("N") Manually Adjustable Fresh Intake w/Fresh Air Filter & Adjustable Pressure Relief

ELECTRIC HEAT		000 = None		050 = 5 KW		060 = 6.0 KW		080 = 8.0 KW		090 = 9.0 KW		100 = 10 kKWw		120 = 12 KW		150 = 15 KW	
BASIC MODEL	VOLTS-HZ-PH	SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>	
		MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>
VAH2030HA	208/230-60-1	26.1	40	52.1	60			67.7	70			78.1	80				
VDH2036HA	208/230-60-1	28.6	40	54.6	60			70.2	80			80.6	90				
VDH2040HA	208/230-60-1	33.1	50	59.1	70			74.7	80			85.1	90				
VAH2048HA	208/230-60-1	33.2	50	59.2	70			74.8	80			85.3	90				
VAH2030HC	208/230-60-3	TBD	TBD			TBD	TBD			TBD	TBD			TBD	TBD	TBD	TBD
VDH2036HC	208/230-60-3	22.7	30			40.7	45			49.7	50			58.8	60	67.8	70
VDH2040HC	208/230-60-3	24.7	35			42.7	50			51.7	60			60.8	70	69.8	70
VAH2048HC	208/230-60-3	25.2	35			43.2	50			52.2	60			61.3	70	70.3	80
VAH2030HD	460-60-3	TBD	TBD			TBD	TBD			TBD	TBD			TBD	TBD	TBD	TBD
VDH2036HD	460-60-3	11.2	15			20.2	25			24.7	25			29.2	30	33.7	35
VDH2040HD	460-60-3	13.3	15			22.3	25			26.8	30			31.3	35	35.8	40
VAH2048HD	460-60-3	13.7	20			22.7	25			27.2	30			31.7	35	36.2	40

<sup>1</sup>MCA = Minimum Circuit Ampacity (Wiring Size Amps)      <sup>2</sup>MFS = Maximum Fuse or HACR Breaker Size      <sup>3</sup>SPPE = Single Point Power Entry  
<sup>4</sup>Top Supply/Center Return      <sup>5</sup>Center Supply/Top Return  
 MCA & MFS are calculated at 240 volts on the "A" & "C" models. The 480 volts "D" models are calculated at 480 volts. This chart should only be used as a guideline for estimating conductor size and overcurrent protection. For the requirements of specific units, always refer to the data label on the unit.  
 1. MFS (Maximum Fuses Size) value listed is the maximum value as per UL 60335-2-40 calculations for MOCP (branch-circuit conductor sizes in this chart are based on this MOCP). The actual factory installed Overcurrent Protective Device (Circuit Breaker) in the models may be lower than the maximum UL 60335-2-40 allowable MOCP value, but still above the UL 60335-2-40 minimum calculated value or Minimum Circuit Ampacity (MCA) listed.  
 2. The end user shall size conductors based on the Single Point Power Entry (SPPE) - Minimum Circuit Ampacity. The service circuit breaker shall not be sized less than the minimum circuit ampacity associated to Single Point Power Entry value provided. The service circuit breaker shall also not be sized greater than the Maximum Fuse size associated to the Single Point Power Entry Value Provided.  
 3. While this electrical data is presented as a guide, it is important to electrically connect properly sized fuses and conductor wires in accordance with the National Electrical Code and all local codes

## Summary Electrical Ratings (Wire and Circuit Breaker Sizing) – VAH/VDH Heat Pumps with Ventilation Configuration – ("A") No Ventilation ("E") Adjustable Fresh-Air w/Powered Pressure Relief & Independent Control ("Q") GreenCube® Energy Recovery Ventilator

ELECTRIC HEAT		000 = None		050 = 5 KW		060 = 6.0 KW		080 = 8.0 KW		090 = 9.0 KW		100 = 10 KW		120 = 12 KW		150 = 15 KW	
BASIC MODEL	VOLTS-HZ-PH	SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>	
		MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>
VAH2030HA	208/230-60-1	27.8	40	53.8	60			69.5	70			79.9	80				
VDH2036HA	208/230-60-1	30.3	40	56.3	60			72.0	80			82.4	90				
VDH2040HA	208/230-60-1	34.8	50	60.8	70			76.5	80			86.9	90				
VAH2048HA	208/230-60-1	34.9	50	61.0	70			76.6	80			87.0	90				
VAH2030HC	208/230-60-3	TBD	TBD			TBD	TBD			TBD	TBD			TBD	TBD	TBD	TBD
VDH2036HC	208/230-60-3	24.4	30			42.5	45			51.5	60			60.5	70	69.5	70
VDH2040HC	208/230-60-3	26.4	35			44.5	50			53.5	60			62.5	70	71.5	80
VAH2048HC	208/230-60-3	26.9	35			45.0	50			54.0	60			63.0	70	72.0	80
VAH2030HD	460-60-3	TBD	TBD			TBD	TBD			TBD	TBD			TBD	TBD	TBD	TBD
VDH2036HD	460-60-3	12.0	15			21.0	25			25.6	30			30.1	35	34.6	35
VDH2040HD	460-60-3	14.2	20			23.2	25			27.7	30			32.2	35	36.7	40
VAH2048HD	460-60-3	14.5	20			23.5	25			28.1	30			32.6	35	37.1	40

<sup>1</sup>MCA = Minimum Circuit Ampacity (Wiring Size Amps)    <sup>2</sup>MFS = Maximum Fuse or HACR Breaker Size    <sup>3</sup>SPPE = Single Point Power Entry  
MCA & MFS are calculated at 230 volts on the 208-230v. (HPA & HPC) models. The 460 volts HPD models are calculated at 460 volts. This chart should only be used as a guideline for estimating conductor size and overcurrent protection. For the requirements of specific units, always refer to the data label on the unit.

## Unit Load Amps (Heating) - VAH/VDH Heat Pumps

Electric Heat				Heat Pumps <sup>1</sup> (Amps)		Load Of Resistive Heating Element												Total Maximum Heating <sup>2</sup> (Electrical)											
																		Ventilation Configuration "C, N"						Ventilation Configuration "A, E, Q"					
				Ventilation Configuration		Heating Element (KW)												Heating Element (KW)						Heating Element (KW)					
Model	RLA	ID mtr	OTD Mtr	N	A, E, Q	5	6	8	9	10	12	15	5	6	8	9	10	12	15	5	6	8	9	10	12	15			
VAH2030HA	14.6	2.5	5.3	22.4	24.2	20.8		33.3		41.7			41.6		54.1		62.5			43.2		55.7		64.1					
VDH2036HA	14.6	5.0	5.3	24.9	26.7	20.8		33.3		41.7			46.3		58.8		67.2			45.7		58.2		66.6					
VDH2040HA	18.2	5.0	5.3	28.5	30.3	20.8		33.3		41.7			49.0		61.5		69.9			49.3		61.8		70.2					
VAH2048HA	18.3	5.0	5.3	28.6	30.4	20.8		33.3		41.7			52.2		64.7		73.1			49.4		61.9		70.3					
VAH2030HC	TBD	TBD	TBD	TBD	TBD		TBD		TBD		TBD	TBD		31.1		38.4		45.6	52.8		TBD		TBD		TBD	TBD			
VDH2036HC	9.9	5.0	5.3	20.2	22.0		14.4		21.7		28.9	36.1		36.3		43.6		50.8	58.0		34.6		41.9		49.1	56.3			
VDH2040HC	11.5	5.0	5.3	21.8	23.6		14.4		21.7		28.9	36.1		38.8		46.1		53.3	60.5		36.2		43.5		50.7	57.9			
VAH2048HC	11.9	5.0	5.3	22.2	24.0		14.4		21.7		28.9	36.1		38.7		46.0		53.2	60.4		36.6		43.9		51.1	58.3			
VAH2030HD	TBD	TBD	TBD	TBD	TBD		TBD		TBD		TBD	TBD		15.6		19.2		22.8	26.4		TBD		TBD		TBD	TBD			
VDH2036HD	4.8	2.5	2.7	10.0	10.8		7.2		10.8		14.4	18.0		18.1		21.7		25.3	28.9		17.2		20.8		24.4	28.0			
VDH2040HD	6.5	2.5	2.7	11.7	12.5		7.2		10.8		14.4	18.0		18.6		22.2		25.8	29.4		18.9		22.5		26.1	29.7			
VAH2048HD	6.8	2.5	2.7	12.0	12.8		7.2		10.8		14.4	18.0		18.8		22.4		26.0	29.6		19.2		22.8		26.4	30.0			

<sup>1</sup>Heat Pump = Total Heat Pump Unit Amps (Electric Heat is not Operating).  
<sup>2</sup>Total Maximum Heating Amps = Total Amps with the Compressor, Motors and Electric Heat Operating at the same time.  
Heating kW is rated at 240 volts on the 208-230v. (HPA & HPC) models. Derate heater output by 25% for operation at 208 volts. Heating kW is rated at 480 volts on the HPD models. Three phase models contain single phase motor loads. Values shown are maximum phase loads. Loads are not equally balanced on each phase.

# SCHOLAR QR VAH/VDH AIR CONDITIONERS WITH 2-STAGE COMPRESSOR



## Certified Efficiency and Capacity Ratings at ANSI/ARI Standard 390

Model Number	VAH2030A			VDH2036A			VDH2040A			VAH2048A		
	A	C	D	A	C	D	A	C	D	A	C	D
Cooling BTUH <sup>1</sup> - 2nd Stage	27,000			34,400			42,000			45,000		
EER <sup>2</sup> - 2nd Stage	11			12			12			11.5		
Integrated Part Load Value <sup>3</sup>	14			15.5			16			15.5		
Rated Indoor Air Flow (CFM <sup>4</sup> )	1,000			1,300			1,500			1,600		
Rated Outdoor Air Flow <sup>5</sup>	2,800			2,800			2,800			2,800		

<sup>1</sup>Cooling rated at 95°F (35°C) outdoor and 80°F DB/67° WB (26.5°C DB/19.5°C WB) return air. <sup>2</sup>EER=Energy Efficiency Ratio  
<sup>3</sup>Integrated Part Load Value is an integrated efficiency measure from 1st and 2nd stage capacity modulation.  
<sup>4</sup>CFM=Cubic Feet per Minute <sup>5</sup>ECM Motor Set Point  
Ratings are at 230 volts for 208/230 volt units ("A" & "C" models) and 460 volts for "D" models. Operation of units at a different voltage from that of the rating point will affect performance and air flow.

## Sensible Total Heat Ratio @ 95°F (35°C) Outside Air DB

Model Number	VAH2030A			VDH2036A			VDH2040A			VAH2048A		
	A	C	D	A	C	D	A	C	D	A	C	D
Total Capacity	27,000			34,400			42,000			45,000		
Sensible Heat Ratio	0.78			0.75			0.75			0.74		
Sensible Capacity	21,000			25,800			31,500			33,300		
Rated Air Flow (CFM <sup>1</sup> )	1,000			1,300			1,500			1,600		

<sup>1</sup>CFM=Cubic Feet per Minute  
Sensible Heat Ratios based upon ANSI/AHRI std. 390 outdoor conditions of 95°F (35°C) outdoor and 80°F DB/67°F WB (26.5°C DB/19.5°C WB) return air.

## Cooling Performance (BTUH) at Various Outdoor Temperatures

Model Number	Outdoor Temperature									
	75°F / 24°C	80°F / 26.5°C	85°F / 29°C	90°F / 32°C	95°F / 35°C	100°F / 38°C	105°F / 40.5°C	110°F / 43.3°C	115°F / 46°C	
VAH2030A	31,320	30,240	29,160	28,080	27,000	25,920	24,840	23,760	23,220	
VDH2036A	39,904	38,528	37,152	35,776	34,400	33,024	31,648	30,272	29,584	
VDH2040A	48,720	47,040	45,360	43,680	42,000	40,320	38,640	36,960	36,120	
VAH2048A	52,200	50,400	48,600	46,800	45,000	43,200	41,400	39,600	38,700	

Based upon ANSI/AHRI std. 390 return air conditions of 80°F DB/67°F WB (26.5°C DB/19.5°C WB) return air at rated air flow.

## Room Size Limitations

Scholar 2.0 Air Conditioners	VAH2030A	VDH2036A	VDH2040A	VAH2048A
Refrigerant Charge (oz.)	170	200	200	210
Minimum Room Size (ft <sup>2</sup> )	166.9	196.4	196.4	206.2
Minimum Supply Height (ft)	6.9	6.9	6.9	6.9

# Electrical Characteristics - Compressor, Fan, Ventilation & Blower Motors - VAH/VDH Air Conditioners

Model Number	COMPRESSOR			OTHER MOTORS	OUTDOOR FAN			INDOOR BLOWER (ECM)			ENERGY RECOVERY VENTILATOR	
	VOLTS-HZ-PH	RLA <sup>1</sup>	LRA <sup>2</sup>	VOLTS-HZ-PH	RPM <sup>3</sup>	FLA <sup>4</sup>	HP <sup>5</sup>	RPM <sup>3</sup>	FLA <sup>4</sup>	HP <sup>5</sup>	GREENCUBE™	
											AMPS	
											OAM <sup>6</sup>	EXM <sup>7</sup>
VAH2030AA	208/230-60-1	14.6	82.0	208/230-60-1	1200	5.3	1/2	1500	2.5	1/2	1.40	0.35
VDH2036AA	208/230-60-1	14.6	90.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VDH2040AA	208/230-60-1	18.2	106.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VAH2048AA	208/230-60-1	18.3	138.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VAH2030AC	208/230-60-3	TBD	TBD	208/230-60-1	1200	TBD	1/2	1500	TBD	1/2	TBD	TBD
VDH2036AC	208/230-60-3	9.9	82.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VDH2040AC	208/230-60-3	11.5	114.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VAH2048AC	208/230-60-3	11.9	112.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VAH2030AD	460-60-3	TBD	TBD	208/230-60-1	1200	TBD	1/2	1500	TBD	1/2	TBD	TBD
VDH2036AD	460-60-3	4.8	44.3	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VDH2040AD	460-60-3	6.5	56.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VAH2048AD	460-60-3	6.8	61.8	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35

<sup>1</sup>RLA = Rated Load Amps      <sup>2</sup>LRA = Locked Rotor Amps      <sup>3</sup>RPM = Revolutions per Minute      <sup>4</sup>FLA = Full Load Amps  
<sup>5</sup>HP = Horsepower      <sup>6</sup>OAM - Outside Air Motor      <sup>7</sup>EXM-Exhaust Air Motor  
The 460 volt units have a step down transformer for the 230 volt motors.

## Summary Electrical Ratings (Wire and Circuit Breaker Sizing) - VAH/VDH Air Conditioners with 2-Stage Compressor & Ventilation ("C") Economizer ("N") Manually Adjustable Fresh Intake w/Fresh Air Filter & Adjustable Pressure Relief

ELECTRIC HEAT		000 = None		050 = 5 KW		060 = 6.0 KW		080 = 8.0 KW		090 = 9.0 KW		100 = 10 kWw		120 = 12 KW		150 = 15 KW	
BASIC MODEL	VOLTS-HZ-PH	SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>	
		MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>
VAH2030AA	208/230-60-1	26.1	40	28.5	40			44.2	45			54.6	60				
VDH2036AA	208/230-60-1	28.6	40	31.0	40			46.7	50			57.1	60				
VDH2040AA	208/230-60-1	33.1	50	33.1	50			46.7	50			57.1	60				
VAH2048AA	208/230-60-1	33.2	50	33.2	50			46.7	50			57.1	60				
VAH2030AC	208/230-60-3	TBD	TBD			TBD	TBD			TBD	TBD			TBD	TBD	TBD	TBD
VDH2036AC	208/230-60-3	22.7	30			23.0	30			32.1	35			41.1	45	50.1	60
VDH2040AC	208/230-60-3	24.7	35			24.7	35			32.1	35			41.1	45	50.1	60
VAH2048AC	208/230-60-3	25.2	35			25.2	35			32.1	35			41.1	45	50.1	60
VAH2030AD	460-60-3	TBD	TBD			TBD	TBD			TBD	TBD			TBD	TBD	TBD	TBD
VDH2036AD	460-60-3	11.2	15			11.5	15			16.0	20			20.5	25	25.1	30
VDH2040AD	460-60-3	13.3	15			13.3	15			16.0	20			20.5	25	25.1	30
VAH2048AD	460-60-3	13.7	20			13.7	20			16.0	20			20.5	25	25.1	30

<sup>1</sup>MCA = Minimum Circuit Ampacity (Wiring Size Amps)      <sup>2</sup>MFS = Maximum Fuse or HACR Breaker Size      <sup>3</sup>SPPE = Single Point Power Entry  
<sup>4</sup>Top Supply/Center Return      <sup>5</sup>Center Supply/Top Return  
MCA & MFS are calculated at 240 volts on the "A" & "C" models. The 480 volts "D" models are calculated at 480 volts. This chart should only be used as a guideline for estimating conductor size and overcurrent protection. For the requirements of specific units, always refer to the data label on the unit.

- MFS (Maximum Fuses Size) value listed is the maximum value as per UL 60335-2-40 calculations for MOCP (branch-circuit conductor sizes in this chart are based on this MOCP). The actual factory installed Overcurrent Protective Device (Circuit Breaker) in the models may be lower than the maximum UL 60335-2-40 allowable MOCP value, but still above the UL 60335-2-40 minimum calculated value or Minimum Circuit Ampacity (MCA) listed.
- The end user shall size conductors based on the Single Point Power Entry (SPPE) - Minimum Circuit Ampacity. The service circuit breaker shall not be sized less than the minimum circuit ampacity associated to Single Point Power Entry value provided. The service circuit breaker shall also not be sized greater than the Maximum Fuse size associated to the Single Point Power Entry Value Provided.
- While this electrical data is presented as a guide, it is important to electrically connect properly sized fuses and conductor wires in accordance with the National Electrical Code and all local codes



# Summary Electrical Ratings (Wire and Circuit Breaker Sizing) – VAH/VDH Air Conditioners with Ventilation Configuration – (“A”) No Ventilation (“E”) Adjustable Fresh-Air w/Powered Pressure Relief & Independent Control (“Q”) GreenCube® Energy Recovery Ventilator

ELECTRIC HEAT		000 = None		050 = 5 KW		060 = 6.0 KW		080 = 8.0 KW		090 = 9.0 KW		100 = 10 KW		120 = 12 KW		150 = 15 KW	
BASIC MODEL	VOLTS-HZ-PH	SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>		SPPE <sup>3</sup>	
		MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>	MCA <sup>1</sup>	MFS <sup>2</sup>
VAH2030AA	208/230-60-1	27.8	40	28.5	40			44.2	45			54.6	60				
VDH2036AA	208/230-60-1	30.3	40	31.0	40			46.7	50			57.1	60				
VDH2040AA	208/230-60-1	34.8	50	34.8	50			46.7	50			57.1	60				
VAH2048AA	208/230-60-1	34.9	50	34.9	50			46.7	50			57.1	60				
VAH2030AC	208/230-60-3	TBD	TBD			TBD	TBD			TBD	TBD			TBD	TBD	TBD	TBD
VDH2036AC	208/230-60-3	24.4	30			24.4	30			32.1	35			41.1	45	50.1	60
VDH2040AC	208/230-60-3	26.4	35			26.4	35			32.1	35			41.1	45	50.1	60
VAH2048AC	208/230-60-3	26.9	35			26.9	35			32.1	35			41.1	45	50.1	60
VAH2030AD	460-60-3	TBD	TBD			TBD	TBD			TBD	TBD			TBD	TBD	TBD	TBD
VDH2036AD	460-60-3	12.0	15			12.0	15			16.0	20			20.5	25	25.1	30
VDH2040AD	460-60-3	14.2	20			14.2	20			16.0	20			20.5	25	25.1	30
VAH2048AD	460-60-3	14.5	20			14.5	20			16.0	20			20.5	25	25.1	30

<sup>1</sup>MCA = Minimum Circuit Ampacity (Wiring Size Amps)    <sup>2</sup>MFS = Maximum Fuse or HACR Breaker Size    <sup>3</sup>SPPE = Single Point Power Entry  
MCA & MFS are calculated at 230 volts on the 208-230v. (HPA & HPC) models. The 460 volts HPD models are calculated at 460 volts. This chart should only be used as a guideline for estimating conductor size and overcurrent protection. For the requirements of specific units, always refer to the data label on the unit.

## Unit Load Amps (Heating) - VAH/VDH Air Conditioners

Electric Heat				Heat Pumps <sup>1</sup> (Amps)		Load Of Resistive Heating Element										Total Maximum Heating <sup>2</sup> (Electrical)											
																Ventilation Configuration "C, N"						Ventilation Configuration "A, E, Q"					
				Ventilation Configuration		Heating Element (KW)										Heating Element (KW)						Heating Element (KW)					
Model	RLA	ID mtr	OTD Mtr	N	A,E,Q	5	6	8	9	10	12	15	5	6	8	9	10	12	15	5	6	8	9	10	12	15	
VAH2030AA	14.6	2.5	5.3	22.4	24.2	20.8		33.3		41.7			41.6		54.1		62.5			43.2		55.7		64.1			
VDH2036AA	14.6	5.0	5.3	24.9	26.7	20.8		33.3		41.7			46.3		58.8		67.2			45.7		58.2		66.6			
VDH2040AA	18.2	5.0	5.3	28.5	30.3	20.8		33.3		41.7			49.0		61.5		69.9			49.3		61.8		70.2			
VDH2048AA	18.3	5.0	5.3	28.6	30.4	20.8		33.3		41.7			52.2		64.7		73.1			49.4		61.9		70.3			
VAH2030AC	TBD	TBD	TBD	TBD	TBD		TBD		TBD		TBD	TBD		31.1		38.4		45.6	52.8		TBD		TBD		TBD	TBD	
VDH2036AC	9.9	5.0	5.3	20.2	22.0		14.4		21.7		28.9	36.1		36.3		43.6		50.8	58.0		34.6		41.9		49.1	56.3	
VDH2040AC	11.5	5.0	5.3	21.8	23.6		14.4		21.7		28.9	36.1		38.8		46.1		53.3	60.5		36.2		43.5		50.7	57.9	
VDH2048AC	11.9	5.0	5.3	22.2	24.0		14.4		21.7		28.9	36.1		38.7		46.0		53.2	60.4		36.6		43.9		51.1	58.3	
VAH2030AD	TBD	TBD	TBD	TBD	TBD		TBD		TBD		TBD	TBD		15.6		19.2		22.8	26.4		TBD		TBD		TBD	TBD	
VDH2036AD	4.8	2.5	2.7	10.0	10.8		7.2		10.8		14.4	18.0		18.1		21.7		25.3	28.9		17.2		20.8		24.4	28.0	
VDH2040AD	6.5	2.5	2.7	11.7	12.5		7.2		10.8		14.4	18.0		18.6		22.2		25.8	29.4		18.9		22.5		26.1	29.7	
VDH2048AD	6.8	2.5	2.7	12.0	12.8		7.2		10.8		14.4	18.0		18.8		22.4		26.0	29.6		19.2		22.8		26.4	30.0	

<sup>1</sup>Heat Pump = Total Heat Pump Unit Amps (Electric Heat is not Operating).  
<sup>2</sup>Total Maximum Heating Amps = Total Amps with the Compressor, Motors and Electric Heat Operating at the same time.  
Heating kW is rated at 240 volts on the 208-230v. (HPA & HPC) models. Derate heater output by 25% for operation at 208 volts. Heating kW is rated at 480 volts on the HPD models. Three phase models contain single phase motor loads. Values shown are maximum phase loads. Loads are not equally balanced on each phase.

# Hot Water Output - Heat Pumps & Air Conditioners

Model	Entering Air Temperature 70°F DB, 60°F WB		HOT WATER HEAT 180°F Entering Water Temperature - Water Flow (GPM)									
			2	4	6	8	10	12	14	16	18	20
VDH2024 (A/C ONLY)	Indoor Air Flow	(CFM)	800									
	Total Capacity	(Btu/Hr)	44,359	56,790	62,475	65,757	67,900	69,412	70,539	71,413	72,111	72,683
	Leaving Air - DB	(°F)	120.5	134.6	141.1	144.8	147.3	149.0	150.3	151.3	15QR	152.7
	Leaving Air - WB	(°F)	75.1	78.6	80.0	80.9	81.4	81.8	82.1	82.3	82.4	82.6
	Leaving Fluid Temp.	(°F)	134.4	150.8	158.6	163.1	166.1	168.1	169.7	170.8	171.8	172.5
	Fluid Delta T	(°F)	45.6	29.2	21.4	16.9	13.9	11.9	10.3	9.2	8.2	7.5
	Water Press. Drop	(Ft - H <sub>2</sub> O)	0.2	0.6	1.3	1.7	3.7	5.3	7.2	9.3	11.7	14.4
VAH2030	Indoor Air Flow	(CFM)	1,000									
	Total Capacity	(Btu/Hr)	47,529	62,536	69,762	74,030	76,863	78,887	80,408	81,595	82,549	83,333
	Leaving Air - DB	(°F)	113.3	126.9	133.5	137.4	140.0	141.8	143.2	144.3	145.1	145.8
	Leaving Air - WB	(°F)	73.2	76.7	78.3	79.2	79.8	80.2	80.5	80.8	80.9	81.1
	Leaving Fluid Temp.	(°F)	131.2	147.9	156.1	161.0	164.2	166.5	168.2	169.5	170.6	171.4
	Fluid Delta T	(°F)	48.8	32.1	23.9	19.0	15.8	13.5	11.8	10.5	9.4	8.6
	Water Press. Drop	(Ft - H <sub>2</sub> O)	0.2	0.6	1.3	1.7	3.7	5.3	7.2	9.3	11.7	14.4
VDH2036	Indoor Air Flow	(CFM)	1,200									
	Total Capacity	(Btu/Hr)	49,916	67,067	75,662	80,826	84,297	86,800	88,693	90,179	91,378	92,367
	Leaving Air - DB	(°F)	107.9	120.9	127.4	131.3	133.9	135.8	137.3	138.4	139.3	140.1
	Leaving Air - WB	(°F)	71.8	75.2	76.8	77.8	78.4	78.8	79.2	79.4	79.6	79.8
	Leaving Fluid Temp.	(°F)	128.7	145.6	154.1	159.2	162.7	165.1	167.0	168.4	169.6	170.5
	Fluid Delta T	(°F)	51.3	34.4	25.9	20.8	17.3	14.9	13.0	11.6	10.4	9.5
	Water Press. Drop	(Ft - H <sub>2</sub> O)	0.2	0.6	1.3	1.7	3.7	5.3	7.2	9.3	11.7	14.4
VDH2040	Indoor Air Flow	(CFM)	1,300									
	Total Capacity	(Btu/Hr)	50,903	69,001	78,218	83,797	87,569	90,297	92,368	93,977	95,313	96,401
	Leaving Air - DB	(°F)	105.6	118.3	124.8	128.7	131.3	133.2	134.7	135.8	136.7	142.8
	Leaving Air - WB	(°F)	71.2	74.5	76.2	77.1	77.8	78.2	78.6	78.8	79.1	80.4
	Leaving Fluid Temp.	(°F)	127.7	144.6	153.2	158.5	16QR	164.5	166.4	167.9	169.1	171.0
	Fluid Delta T	(°F)	52.3	35.4	26.8	21.5	18.0	15.5	13.6	12.1	10.9	9.0
	Water Press. Drop	(Ft - H <sub>2</sub> O)	0.2	0.6	1.3	1.7	3.7	5.3	7.2	9.3	11.7	14.4
VAH2048	Indoor Air Flow	(CFM)	1,500									
	Total Capacity	(Btu/Hr)	52,575	72,363	82,703	89,070	93,405	96,561	98,969	100,870	102,412	103,688
	Leaving Air - DB	(°F)	101.9	113.9	120.2	124.0	126.7	128.6	130.1	131.2	132.1	132.9
	Leaving Air - WB	(°F)	70.1	73.4	75.0	76.0	76.7	77.1	77.5	77.8	78.0	78.2
	Leaving Fluid Temp.	(°F)	126.0	142.8	151.7	157.1	160.8	163.5	165.5	167.1	168.3	169.4
	Fluid Delta T	(°F)	54.0	37.2	28.3	22.9	19.2	16.5	14.5	12.9	11.7	10.6
	Water Press. Drop	(Ft - H <sub>2</sub> O)	0.2	0.6	1.3	1.7	3.7	5.3	7.2	9.3	11.7	14.4
VAH2060	Indoor Air Flow	(CFM)	1,500									
	Total Capacity	(Btu/Hr)	53,944	75,197	86,539	93,624	98,477	102,031	104,753	106,909	108,663	110,118
	Leaving Air - DB	(°F)	98.9	110.3	116.3	120.1	122.7	124.6	126.1	127.2	128.2	129.0
	Leaving Air - WB	(°F)	69.2	72.4	74.0	75.0	75.7	76.2	76.5	76.8	77.0	77.2
	Leaving Fluid Temp.	(°F)	124.5	141.4	150.4	156.0	159.8	162.5	164.6	166.3	167.6	168.7
	Fluid Delta T	(°F)	55.5	38.6	29.6	24.0	20.2	17.5	15.4	13.7	12.4	11.3
	Water Press. Drop	(Ft - H <sub>2</sub> O)	0.2	0.6	1.3	1.7	3.7	5.3	7.2	9.3	11.7	14.4

# Dehumidification Charts

## Full Capacity Dehumidification - Scholar QR Model VDH2024H/VDH2024A with Hot Gas Reheat

Indoor Conditions Air Entering Indoor Coil		Outdoor Ambient	Capacity (Btu/Hr)			Indoor Air Flow	Indoor Supply Air	Moisture Removed (Approximate)		Operating Mode
DB / WB	% RH	DB	Total	Sensible	Latent	CFM	DB	Lbs / Hr	Pints / Hr	
75 / 62.5	50	75	25,650	21,651	3,999	860	51.2	3.8	3.6	Cooling
75 / 62.5	50	75	3,999	0	3,999	860	7QR	3.8	3.6	Dehumid.
75 / 65.5	60	75	27,102	16,852	10,250	860	54.3	9.7	9.3	Cooling
75 / 65.5	60	75	10,250	0	10,250	860	72.6	9.7	9.3	Dehumid.
75 / 68	70	75	28,332	14,796	13,536	860	56.9	12.8	12.2	Cooling
75 / 68	70	75	13,536	0	13,536	860	72.6	12.8	12.2	Dehumid.
65 / 63	90	75	25,896	11,075	14,821	860	56.8	14.0	13.4	Cooling
65 / 63	90	75	14,821	0	14,821	860	64.2	14.0	13.4	Dehumid.
80 / 67	50	95	24,000	18,110	5,890	860	57.5	5.6	5.4	Cooling
80 / 67	50	95	5,890	0	5,890	860	76.9	5.6	5.4	Dehumid.

## Full Capacity Dehumidification - Scholar QR Model VAH2030H/VAH2030A with Hot Gas Reheat

Indoor Conditions Air Entering Indoor Coil		Outdoor Ambient	Capacity (Btu/Hr)			Indoor Air Flow	Indoor Supply Air	Moisture Removed (Approximate)		Operating Mode
DB / WB	% RH	DB	Total	Sensible	Latent	CFM	DB	Lbs / Hr	Pints / Hr	
75 / 62.5	50	75	30,994	23,698	7,296	1,050	51.7	6.9	6.6	Cooling
75 / 62.5	50	75	7,296	0	7,296	1,050	73.6	6.9	6.6	Dehumid.
75 / 65.5	60	75	32,748	20,687	12,061	1,050	54.8	11.4	10.9	Cooling
75 / 65.5	60	75	12,061	0	12,061	1,050	74.0	11.4	10.9	Dehumid.
75 / 68	70	75	34,235	18,134	16,101	1,050	57.4	15.2	14.6	Cooling
75 / 68	70	75	16,101	0	16,101	1,050	74.2	15.2	14.6	Dehumid.
65 / 63	90	75	31,291	13,485	17,806	1,050	52.3	16.8	16.1	Cooling
65 / 63	90	75	17,806	0	17,806	1,050	64.8	16.8	16.1	Dehumid.
80 / 67	50	95	29,000	21,632	7,368	1,050	57.9	6.3	6.0	Cooling
80 / 67	50	95	7,368	0	7,368	1,050	78.5	6.3	6.0	Dehumid.

## Full Capacity Dehumidification - Scholar QR Model VDH2036H/VDH2036A with Hot Gas Reheat

Indoor Conditions Air Entering Indoor Coil		Outdoor Ambient	Capacity (Btu/Hr)			Indoor Air Flow	Indoor Supply Air	Moisture Removed (Approximate)		Operating Mode
DB / WB	% RH	DB	Total	Sensible	Latent	CFM	DB	Lbs / Hr	Pints / Hr	
75 / 62.5	50	75	37,406	26,904	10,502	1200	51.6	9.9	9.5	Cooling
75 / 62.5	50	75	10,502	0	10,502	1200	72.4	9.9	9.5	Dehumid.
75 / 65.5	60	75	39,524	23,680	15,844	1200	54.7	15.0	14.3	Cooling
75 / 65.5	60	75	15,844	0	15,844	1200	73.0	15.0	14.3	Dehumid.
75 / 68	70	75	41,318	20,411	20,907	1200	57.3	19.7	18.9	Cooling
75 / 68	70	75	20,907	0	20,907	1200	73.0	19.7	18.9	Dehumid.
65 / 63	90	75	37,765	16,028	21,737	1200	57.2	20.5	19.7	Cooling
65 / 63	90	75	21,737	0	21,737	1200	64.6	20.5	19.7	Dehumid.
80 / 67	50	95	35,000	25,148	9,852	1200	57.9	9.3	8.9	Cooling
80 / 67	50	95	9,852	0	9,852	1200	77.3	9.3	8.9	Dehumid.

## Full Capacity Dehumidification - Scholar QR Model VDH2040H/VDH2040A with Hot Gas Reheat

Indoor Conditions Air Entering Indoor Coil		Outdoor Ambient	Capacity (Btu/Hr)			Indoor Air Flow	Indoor Supply Air	Moisture Removed (Approximate)		Operating Mode
DB / WB	% RH	DB	Total	Sensible	Latent	CFM	DB	Lbs / Hr	Pints / Hr	
75 / 62.5	50	75	43,819	32,539	11,280	1300	50.7	10.7	10.2	Cooling
75 / 62.5	50	75	11,280	0	11,280	1300	73.4	10.7	10.2	Dehumid.
75 / 65.5	60	75	46,299	28,561	17,738	1300	53.8	16.8	16.1	Cooling
75 / 65.5	60	75	17,738	0	17,738	1300	73.8	16.8	16.1	Dehumid.
75 / 68	70	75	48,400	25,186	23,214	1300	56.5	2QR	21.1	Cooling
75 / 68	70	75	23,214	0	23,214	1300	74.1	2QR	21.1	Dehumid.
65 / 63	90	75	44,239	19,025	25,214	1300	51.3	23.8	22.9	Cooling
65 / 63	90	75	25,214	0	25,214	1300	67.8	23.8	22.9	Dehumid.
80 / 67	50	95	41,000	30,501	10,499	1300	57.1	9.9	9.5	Cooling
80 / 67	50	95	10,499	0	10,499	1300	78.4	9.9	9.5	Dehumid.

## Full Capacity Dehumidification - Scholar QR Model VAH2048H/VAH2048A with Hot Gas Reheat

Indoor Conditions Air Entering Indoor Coil		Outdoor Ambient	Capacity (Btu/Hr)			Indoor Air Flow	Indoor Supply Air	Moisture Removed (Approximate)		Operating Mode
DB / WB	% RH	DB	Total	Sensible	Latent	CFM	DB	Lbs / Hr	Pints / Hr	
75 / 62.5	50	75	52,369	37,675	14,694	1550	50.7	13.9	13.3	Cooling
75 / 62.5	50	75	14,694	0	14,694	1550	73.3	13.9	13.3	Dehumid.
75 / 65.5	60	75	55,333	33,215	22,118	1550	53.7	20.9	20.0	Cooling
75 / 65.5	60	75	22,118	0	22,118	1550	73.5	20.9	20.0	Dehumid.
75 / 68	70	75	57,845	29,424	28,421	1550	56.3	26.8	25.7	Cooling
75 / 68	70	75	28,421	0	28,421	1550	73.9	26.8	25.7	Dehumid.
65 / 63	90	75	52,871	25,548	27,323	1550	51.2	25.8	24.7	Cooling
65 / 63	90	75	27,323	0	27,323	1550	66.5	25.8	24.7	Dehumid.
80 / 67	50	95	49,000	35,191	13,809	1550	56.9	13.0	12.5	Cooling
80 / 67	50	95	13,809	0	13,809	1550	77.9	13.0	12.5	Dehumid.

## Full Capacity Dehumidification - Scholar QR Model VAH2060H/VAH2060A with Hot Gas Reheat

Indoor Conditions Air Entering Indoor Coil		Outdoor Ambient	Capacity (Btu/Hr)			Indoor Air Flow	Indoor Supply Air	Moisture Removed (Approximate)		Operating Mode
DB / WB	% RH	DB	Total	Sensible	Latent	CFM	DB	Lbs / Hr	Pints / Hr	
75 / 62.5	50	75	61,988	42,727	19,261	1650	50.2	18.2	17.4	Cooling
75 / 62.5	50	75	19,261	0	19,261	1650	74.2	18.2	17.4	Dehumid.
75 / 65.5	60	75	65,497	37,989	27,508	1650	53.2	26.0	24.9	Cooling
75 / 65.5	60	75	27,508	0	27,508	1650	74.5	26.0	24.9	Dehumid.
75 / 68	70	75	68,469	33,954	34,515	1650	55.7	32.6	31.2	Cooling
75 / 68	70	75	34,515	0	34,515	1650	74.8	32.6	31.2	Dehumid.
65 / 63	90	75	62,582	26,627	35,955	1650	51.1	33.9	32.5	Cooling
65 / 63	90	75	35,955	0	35,955	1650	66.0	33.9	32.5	Dehumid.
80 / 67	50	95	58,000	39,659	18,341	1650	56.1	17.3	16.6	Cooling
80 / 67	50	95	18,341	0	18,341	1650	78.4	17.3	16.6	Dehumid.

The Dehumidification Operating Mode is with Hot Gas Reheat.

## Installed Weight

VAH2030	Base	w/Greencube	460V	w/GreenCube & 460V
Pounds	1020	1070	1045	1095
VDH2036	Base	w/Greencube	460V	w/GreenCube & 460V
Pounds	1020	1070	1045	1095
VDH2040	Base	w/Greencube	460V	w/GreenCube & 460V
Pounds	1030	1080	1055	1105
VAH2048	Base	w/Greencube	460V	w/GreenCube & 460V
Pounds	1045	1095	1070	1120

## Air Filters

	Qty per unit	Size	Type	MERV <sup>1</sup> Rating
Return Air Filter	2	Consult Factory	Pleated, disposable	8 <sup>2</sup>
Fresh Air Ventilation Filter	1	Consult Factory	Fiberglass, disposable	N/A
Exhaust Air Ventilation Filter	1	Consult Factory	Fiberglass, disposable	N/A

<sup>1</sup>MERV = Minimum Efficiency Reporting Value  
<sup>2</sup>Optional filters are available with MERV ratings of 11 and 13.

## Sound Data

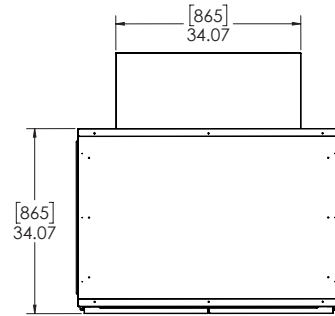
SCHOLAR QR SOUND (dBA)		
Model	ERV OFF	ERV @ 450CFM
VAH2030	35.5	37.5
VDH2036	38.3	40.3
VDH2040	38.8	40.8
VDH2048	39.4	41.4

- All data was collected using a 12" Plenum Box. Free blow.
- dBA @ 10 feet away and 5 feet from ground. Values recorded in Marvair Sound Lab Facility.
- Actual field results may vary with classroom design and construction.
- Integrated values calculated per ANSI/ASA S12.60-2009 / Part 2, Section 5.2.2.1, Table 2 Triple Mode Type 3 HVAC System Duty Cycles: Ventilation 58%, Part Load 25%, Full Load 17%
- Integrated Sound Values are also applicable for use in learning spaces for CHPS and LEED Schools: EQ Prerequisite 3 - Minimum Acoustical Performance, OPTION 1. Using methods prescribed in ANSI S12.60, classrooms must achieve a maximum background noise level of 45 dBA.

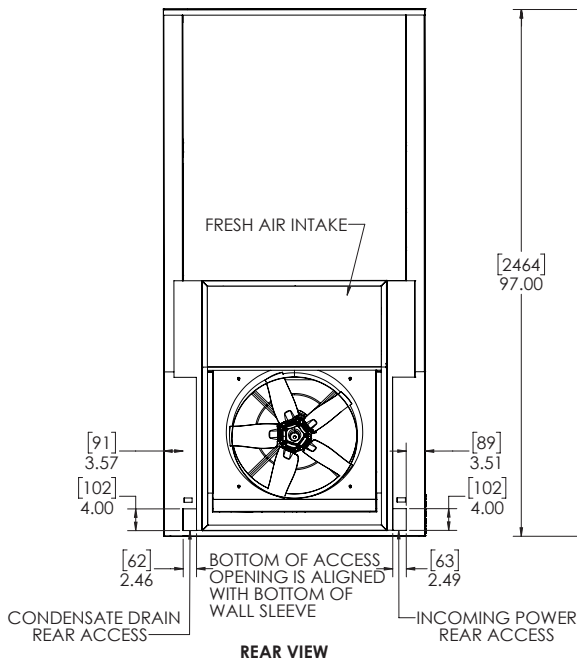


# DIMENSIONAL DATA FOR VDH2036/2040 & VAH2030/2048

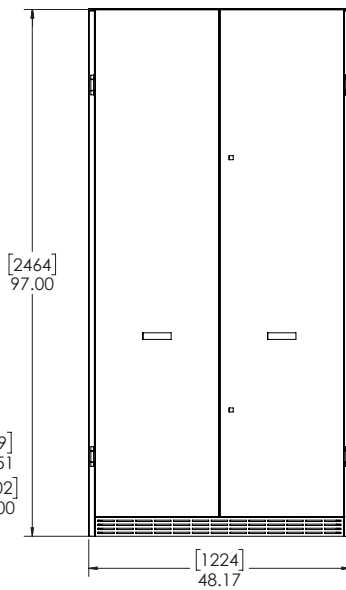
ENGINEERING REVISION "C"



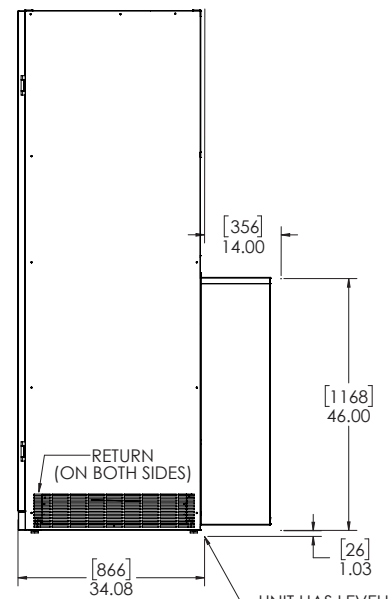
TOP VIEW



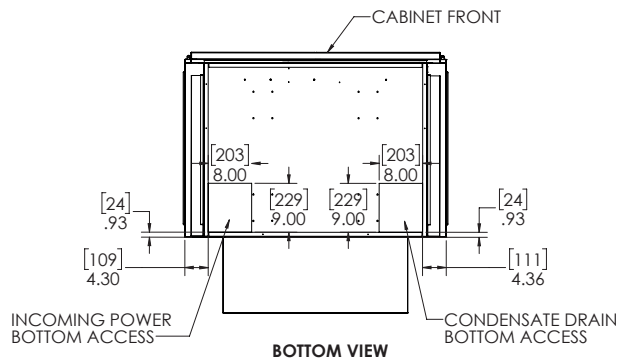
REAR VIEW



FRONT VIEW



RIGHT SIDE VIEW

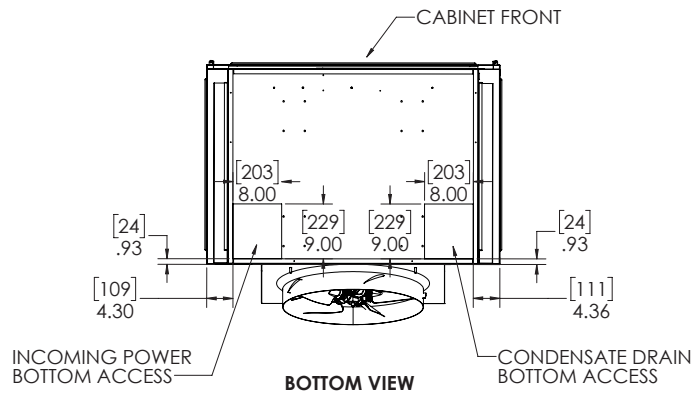
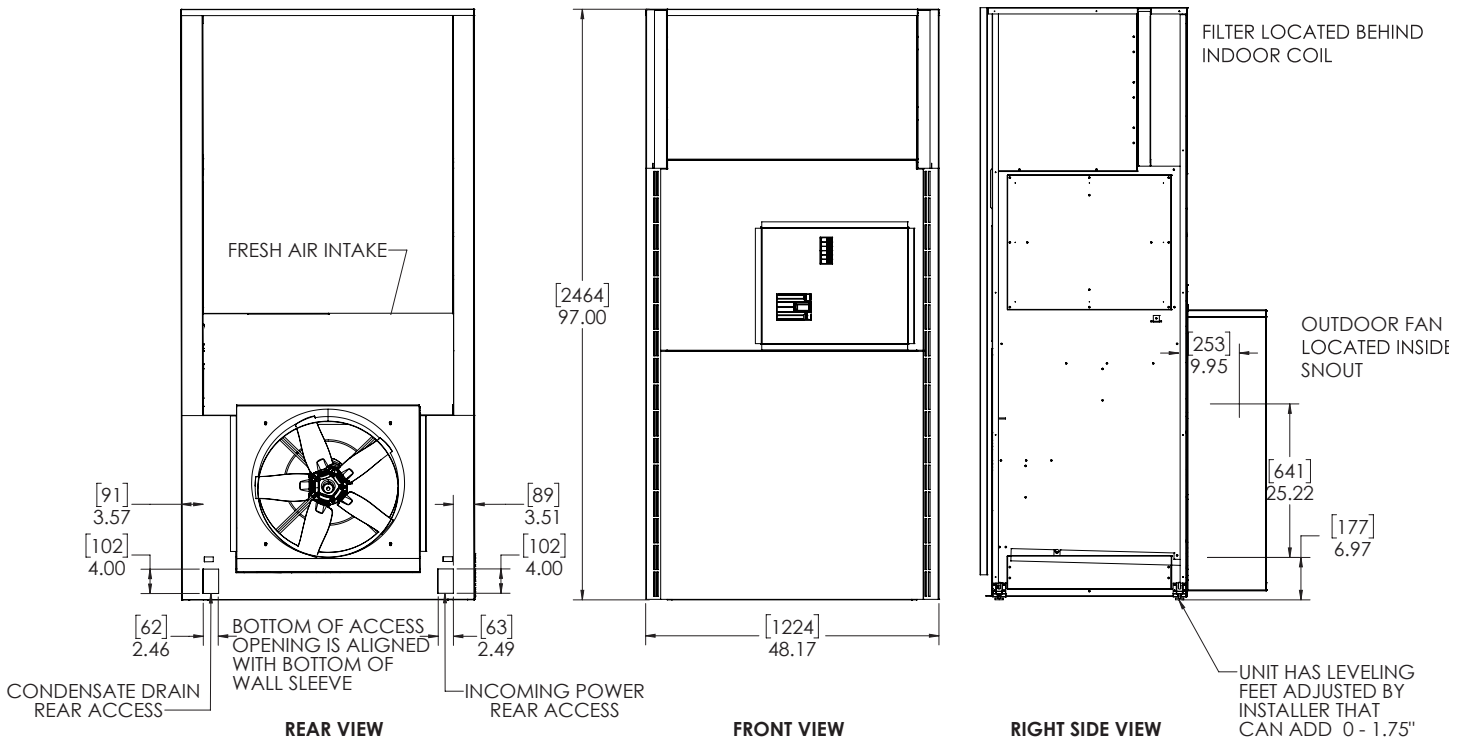
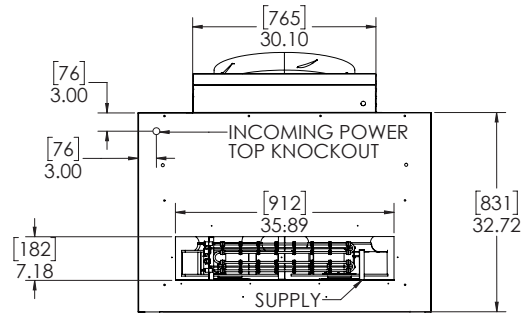


BOTTOM VIEW

**Note:** All overall outside dimensions are given with +/- .250" (6mm) tolerance.

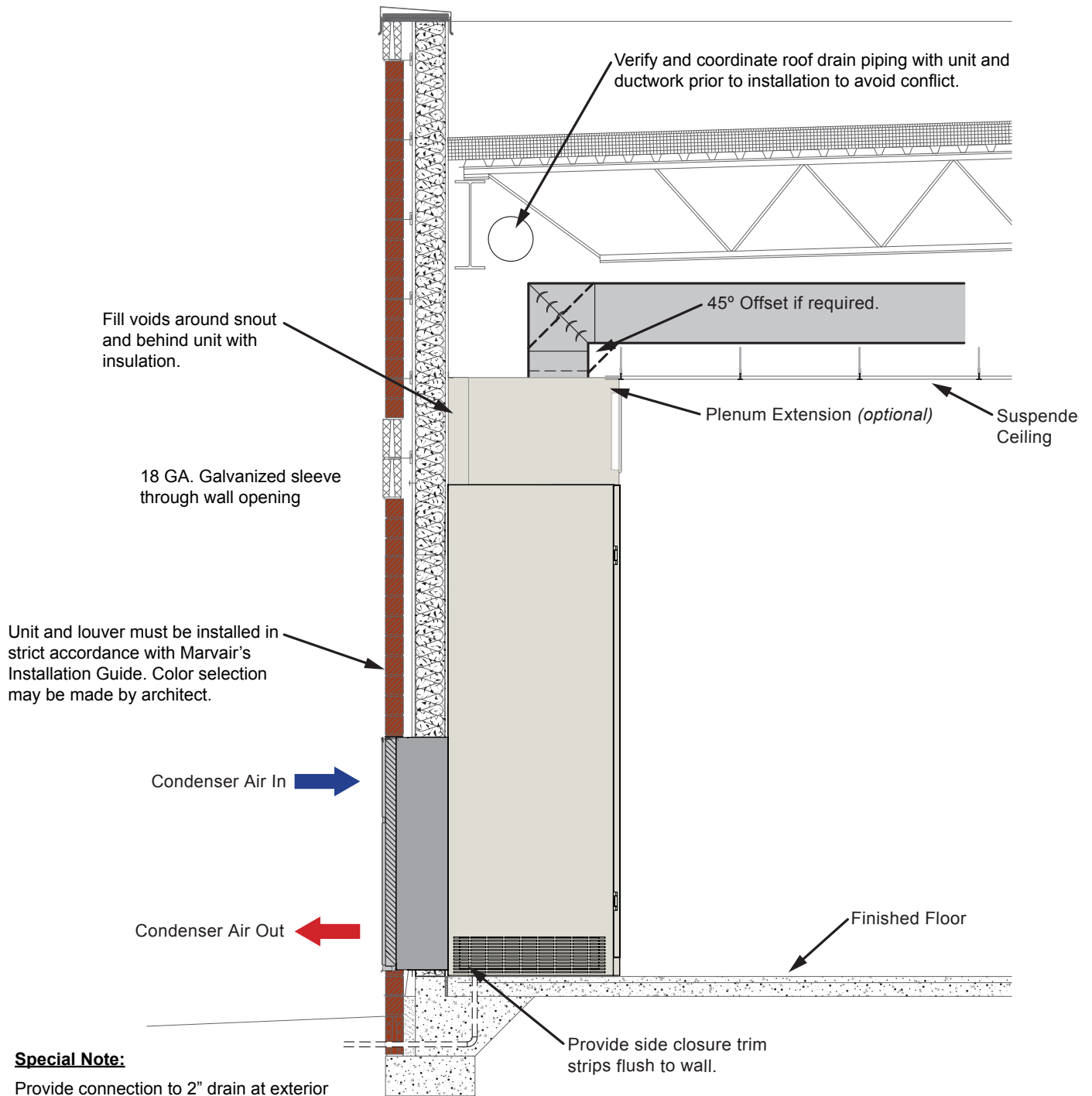
# DIMENSIONAL DATA FOR VDH2036/2040 & VAH2030/2048 w/SIDE PANELS REMOVED

ENGINEERING REVISION "C"



**Note:** All overall outside dimensions are given with +/- .250" (6mm) tolerance.

## TYPICAL INSTALLATION DETAIL



### **Special Note:**

Provide connection to 2" drain at exterior wall. Coordinate location with plumbing prevent conflicts.

### **Note:**

1. Coordinate installation of unit with general contractor for a complete and airtight installation. Caulk unit casing to wall.
2. Installation of the louver must be performed by the mechanical contractor and caulked by the general contractor
3. Provide blank off panel on rear of louver to seal off unused portion of louver.



*Please consult the Marvair® website at [www.marvair.com](http://www.marvair.com) for the latest product literature. Detailed dimensional data is available upon request. A complete warranty statement can be found in each product's Installation/Operation Manual, on our website or by contacting Marvair at 229-273-3636. As part of the Marvair continuous improvement program, specifications are subject to change without notice.*



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