

### Scholar 2.0 Heat Pumps & Air Conditioners: Models VDA2024-2036-2040 & VAA2030-2048-2060 2 to 5 Ton Cooling Capacity with 2-Stage Compressors



Scholar 2.0

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#### GENERAL DESCRIPTION

The Next Generation Scholar 2.0 VDA and VAA heat pumps and air conditioners are modular 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 GreenCube® ERV, to a ventilation 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 2.0 heat pumps and air conditioners are available in cooling capacities from 2 to 5 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 comply with UL standard 1995, 4th edition and CAN/CSA C22.2, No. 236-11 Ed.4 and listed by ETL.

#### Features and Benefits

##### Ease of Installation

- Modular construction for ease of upper floor installs
- ERV plate with no moving parts
- Air box height clears window sills
- Can be installed as free blow or ducted
- No clearance needed for corner installation
- Internal Electric Heat

##### R-410A Refrigerant

- Efficient Heat Release
- 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

##### GreenCube® Energy Recovery Ventilators (ERV)

- Removes Both Moisture and Heat from the Incoming Air Stream
- Optimized for Hot Gas Reheat

## SCHOLAR 2.0 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 2.0 builds on this history with unique design innovations and features.

### ➤ Exceeds DOE Efficiency Requirements

All Scholar 2.0 models are at least 11EER and 3.3 COP.

### ➤ Modular Construction for Ease of Installation

The upper module consists of a packaged air conditioner or heat pump while the lower module houses the ventilation section. These modules can be easily separated to reduce the height of the unit to fit through doors and inside elevators. This also reduces the weight that must be moved into position and eliminates the need to tilt the unit onto its side.

The Scholar 2.0 offers flexible installation options, including corner installs with no clearance requirement.

### ➤ Quiet Operation for a Better Learning Environment

The Scholar 2.0 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 2.0 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-410A 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 R-410A refrigerant. The heavy duty scroll compressor is quieter and operates with less damaging vibration than older compressors that operate on R-22. Since R-410A can absorb and release heat more efficiently than R-22, compressors with R-410A run cooler than R-22 systems, reducing the risk of burnout due to overheating.

### ➤ 2-Stage Compressor

Scholar 2.0 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.

### ➤ GreenCube® Energy Recovery Ventilator (ERV)

The optional GreenCube® ERV is a total energy recovery ventilator, removing both moisture and heat from the incoming air stream. With an outdoor wet bulb of 74°F and an indoor dry bulb of 72°F and 450 cfm of outside air, the GreenCube will remove 8 pints per hour of moisture from the incoming fresh air stream.

For optimum control of the humidity, the GreenCube® ERV should be used in conjunction with Hot Gas Reheat. This complete, factory assembled optional coil and controls economically maintains the temperature and humidity in the classroom.



## LOW NOISE AND HIGH EFFICIENCY FEATURES



The Scholar 2.0 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 2.0 to have such quiet operation, contribute to its high efficiency.

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

Scholar 2.0 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.

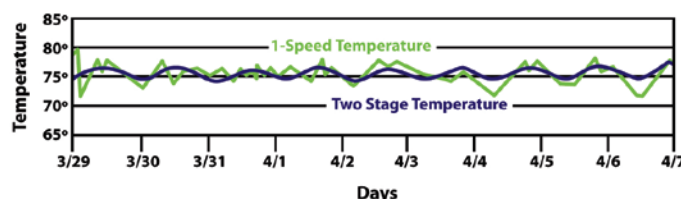


EC Motor

### ► 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 2.0 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 2.0 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 2.0 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. The bottom of the outdoor air box is adjustable from 24" to 33" from the base of the unit, enabling it to clear the sills of windows. For existing schools this greatly facilitates installation since expensive structural changes to exterior walls are not required. By having the fresh air intake three feet above grade, stagnant, moisture laden air is not introduced into the classroom.

Scholar 2.0 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 2.0 units.

Scholar 2.0 units are available with a full range of accessories for customizing the installation including, base stands, decorative trim panels, and outdoor louvers.

The Scholar 2.0 is shipped with the outdoor air box not installed and is designed to be quickly installed in the field. This allows Scholar 2.0 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 2.0 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. A corrosion-resistant stainless steel drain pan is standard in all Scholar units. 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 are standard.

## DEHUMIDIFICATION OPTIONS

### ► Reheat Dehumidification

Scholar 2.0 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 GreenCube® 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 GreenCube® 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 2.0™ 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 2.0 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.....S/03249-GY

Installed above the indoor air blowers inside the plenum. Hot water coil capacities for the Scholar 2.0™ 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 2.0 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.

## A MARVAIR® FIRST – FACTORY INSTALLED ECONOMIZER

Marvair Scholar 2.0 air conditioners and heat pumps have been the industry standard since their introduction. Tens of thousands of Marvair Scholar classroom units are in operation.

*Here's how the economizer works:* On a signal from the wall mounted indoor thermostat that cooling is required, either mechanical cooling with the compressor or free cooling with the optional economizer is provided. A factory installed



enthalpy controller determines whether the outside air is sufficiently cool and dry to be used for cooling. If suitable, the compressor is locked out and the economizer damper opens to bring in outside air. Integral pressure relief allows the interior air to exit the classroom, permitting outside air to enter the classroom. The temperature at which the economizer opens is adjustable from 63°F (17°C) at 50% Relative Humidity to 73°F (23°C) at 50% Relative Humidity.

After the enthalpy control has activated and outside air is being brought into the building, the mixed air sensor measures the temperature of the air entering the indoor blower and then modulates the economizer damper to mix the right proportion of cool outside air with warm indoor air to maintain 50-63°F (10 - 17°C) air being delivered to the building. This prevents shocking the electronic components with cold outside air. The compressor is not permitted to operate when the economizer is functioning.

If the outside air becomes too hot or humid, the economizer damper closes completely, or to a field selectable minimum open position, and mechanical cooling is activated.

## VENTILATION OPTIONS

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

No ventilation. No introduction of outside air.

### ► Configuration “C”: Economizer

The economizer reduces the cost of air conditioning by using outside air when acceptable to cool the room (Free Cooling). The factory installed Marvair® economizer has integral pressure relief.

**Control Board Logic:** Upon a “Call for Cooling”, the economizer control board calculates whether the HVAC operates in economizer mode or mechanical cooling mode based on outdoor temperature (dry bulb) or temperature/humidity (enthalpy). When outdoor conditions are favorable for economizer cooling, the damper drives open and modulates to maintain a 55°F mixed air temperature through the supply grille. When outdoor conditions are not favorable for economizer cooling, the economizer damper remains closed, and the HVAC unit will operate in mechanical cooling mode.

**Forced Mechanical Cooling:** When 24VAC is applied to the FC input of the economizer board, the economizer damper is forced closed, and the HVAC will operate in mechanical cooling mode. This is considered as economizer override in the event economizer cooling is not sufficient for the heat load. Thermostat must provide the fan “G” signal to HVAC to activate the indoor blower.

**Economizer Status:** The economizer board has contacts that when used with the Marvair MAR8000 HVAC Controller, change state to provide feedback to the MAR8000 to indicate when the HVAC is in economizer mode versus mechanical cooling mode. This feedback allows the controller to initiate the forced cooling feature to override economizer cooling and force mechanical cooling.

When used with minimum position potentiometer (optional), the Marvair® economizer can meet requirements of ASHRAE Std. 62.

### ► 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).

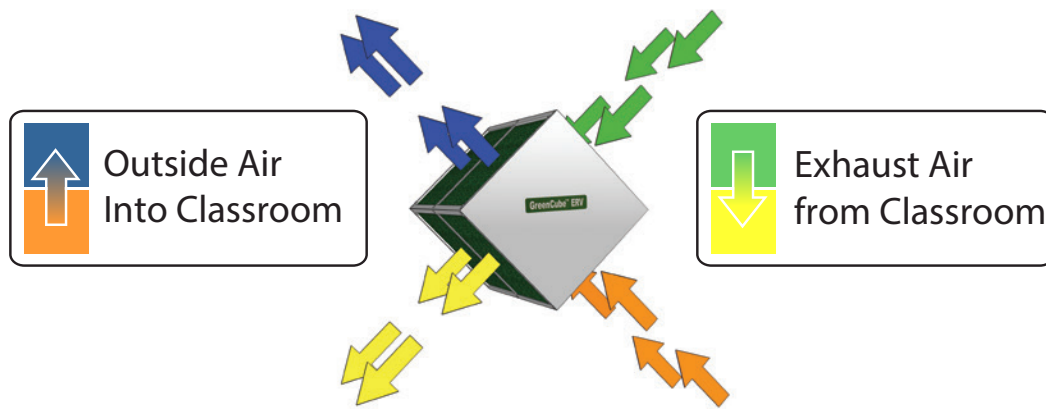
**Note:** This circuit does not interrupt the compressor or heater operation.

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

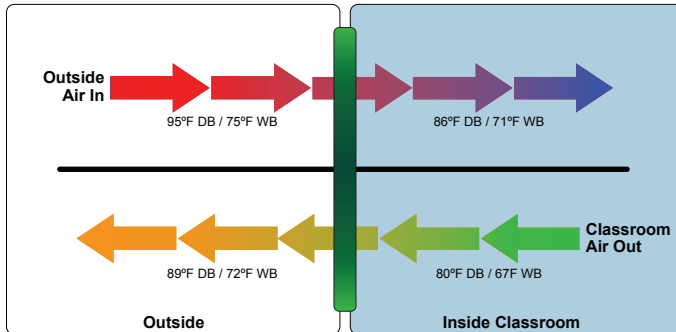
Manually adjustable to a fixed position (non-motorized damper), with a maximum of 450 cfm. Includes a fresh air filter, fresh air intake blower, fan speed controller and pressure relief.

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

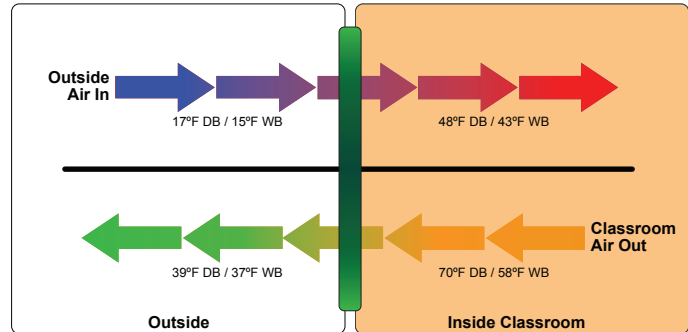
The Marvair GreenCube ERV is an enthalpy plate heat exchanger that transfers both sensible and latent energies between outgoing and incoming air streams in a cross flow arrangement with virtually no cross-contamination of air streams. Except for two air movers, it has no moving parts. The media is impregnated 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.

## THERMOSTAT/CONTROLLERS

### ► Thermostats and Controllers for Marvair Scholar Heat Pumps and Air Conditioners

See the *Marvair Thermostats and Controllers Product Data Sheet* for the thermostats and controllers for use with Marvair Scholar heat pumps and air conditioners.

## SCHOLAR 2.0 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 Programmable Logic Controller. 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 2.0™ 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 GreenCube® 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 2.0 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 2.0™ 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 2.0 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 2.0 is available with corrosion protection coatings for the condenser and evaporator coils.



Cold Plasma Air Purifier



## MODEL IDENTIFICATION

Example	V	D	A	2	0	4	8	A	D	0	5	0	Q	G	+	+	+	1	E	A	+	A	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	A = R-410a
4	Compressor Type/Quantity	2 = Staged/Step
5	Unit Capacity/Nominal Cooling (BTUH)	024 = 24,000    040 = 40,000 030 = 30,000    048 = 48,000 036 = 36,000    060 = 60,000
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 C = Economizer 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	F = PLC w/Summed Alarms G = PLC w/Summed Alarms & Factory Installed T-Stat H = PLC w/BACnet J = PLC w/BACnet & Factory Installed T Stat + = 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) Y = Low Ambient w/CCH Z = Low Ambient w/CCH & EFS 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	B1
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 Wall Sleeve (STD) / = Offset Wall Sleeve + = 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 2.0 VAA/VDA HEAT PUMPS WITH 2-STAGE COMPRESSOR



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

Model Number	VDA2024H			VAA2030H			VDA2036H			VDA2040H			VAA2048H			VAA2060H		
	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D
Cooling BTUH <sup>1</sup> - 2nd Stage	22,200			27,000			34,400			42,000			45,000			56,000		
EER <sup>2</sup> - 2nd Stage	12.00			11.00			12.00			12.00			11.50			11.00		
Integrated Part Load Value <sup>3</sup>	15.5			14.0			15.5			16.0			15.5			14.2		
High Temperature Heating <sup>4</sup>	20,400			25,000			26,600			34,400			36,000			50,000		
High Temperature COP <sup>5</sup>	3.30			3.30			3.30			3.30			3.30			3.30		
Rated Indoor Air Flow (CFM <sup>6,7</sup> )	950			1,000			1,300			1,500			1,600			1,800		
Rated Outdoor Air Flow <sup>7</sup>	2,800			2,800			2,800			2,800			2,800			3,000		

<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	VDA2024H			VAA2030H			VDA2036H			VDA2040H			VAA2048H			VAA2060H		
	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D
Total Capacity	22,200			27,000			34,400			42,000			45,000			56,000		
Sensible Heat Ratio	0.77			0.78			0.75			0.75			0.74			0.68		
Sensible Capacity	17,200			21,000			25,800			31,500			33,300			38,300		
Rated Air Flow (CFM <sup>1</sup> )	950			1,000			1,300			1,500			1,600			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	
VDA2024H	25,752	24,864	23,976	23,088	22,200	20,935	20,424	19,536	19,092	
VAA2030H	31,320	30,240	29,160	28,080	27,000	25,920	24,840	23,760	23,220	
VDA2036H	39,904	38,528	37,152	35,776	34,400	33,024	31,648	30,272	29,584	
VDA2040H	48,720	47,040	45,360	43,680	42,000	40,320	38,640	36,960	36,120	
VAA2048H	52,200	50,400	48,600	46,800	45,000	43,200	41,400	39,600	38,700	
VAA2060H	64,960	62,720	60,480	58,240	56,000	53,760	51,520	49,280	48,160	

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
VDA2024H	8,571	9,796	11,053	12,245	13,469	14,694	15,918	17,143	18,367	19,591	20,400	20,816	22,040	23,265
VAA2030H	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
VDA2036H	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
VDA2040H	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
VAA2048H	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
VAA2060H	21,420	24,480	27,540	30,600	33,660	36,720	39,780	42,840	45,900	48,960	51,000	52,020	55,080	58,140

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

## Electrical Characteristics - Compressor, Fan, Ventilation & Blower Motors - VAA/VDA Heat Pumps

Model Number	COMPRESSOR			OTHER MOTORS	OUTDOOR FAN			INDOOR BLOWER (ECM)			ENERGY RECOVERY VENTILATOR	
											GREENCUBE™	
	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>	AMPS	
											OAM <sup>6</sup>	EXM <sup>7</sup>
VDA2024HA	208/230-60-1	11.7	58.3	208/230-60-1	1200	5.3	1/2	1500	2.5	1/2	1.40	0.35
VAA2030HA	208/230-60-1	13.0	73.0	208/230-60-1	1200	5.3	1/2	1500	2.5	1/2	1.40	0.35
VDA2036HA	208/230-60-1	15.2	83.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VDA2040HA	208/230-60-1	17.9	96.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VAA2048HA	208/230-60-1	21.1	104.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VAA2060HA	208/230-60-1	27.1	152.9	208/230-60-1	1200	3.5	1/3	1500	6.0	3/4	1.40	0.35
VDA2024HC	208/230-60-3	6.5	55.0	208/230-60-1	1200	5.3	1/2	1500	2.8	1/2	1.40	0.35
VAA2030HC	208/230-60-3	8.6	58.0	208/230-60-1	1200	5.3	1/2	1500	2.8	1/2	1.40	0.35
VDA2036HC	208/230-60-3	11.6	73.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VDA2040HC	208/230-60-3	14.1	88.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VAA2048HC	208/230-60-3	14.0	83.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VAA2060HC	208/230-60-3	16.5	110.0	208/230-60-1	1200	3.5	1/3	1500	6.0	3/4	1.40	0.35
VDA2024HD	460-60-3	3.5	28.0	208/230-60-1	1200	5.3	1/2	1500	2.8	1/2	1.40	0.35
VAA2030HD	460-60-3	4.3	28.0	208/230-60-1	1200	5.3	1/2	1500	2.8	1/2	1.40	0.35
VDA2036HD	460-60-3	5.7	38.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VDA2040HD	460-60-3	6.2	44.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VAA2048HD	460-60-3	6.4	41.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35
VAA2060HD	460-60-3	7.3	52.0	208/230-60-1	1200	3.5	1/3	1500	6.0	3/4	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) - VAA/VDA 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 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>
VDA2024HA	208/230-60-1	22.4	30	48.5	50			64.1	70			74.5	80				
VAA2030HA	208/230-60-1	24.1	35	50.1	60			65.7	70			76.1	80				
VDA2036HA	208/230-60-1	29.3	40	55.3	60			71.0	80			81.4	90				
VDA2040HA	208/230-60-1	32.7	50	58.7	70			74.3	80			84.8	90				
VAA2048HA	208/230-60-1	36.7	50	62.7	70			78.3	90			88.8	90				
VAA2060HA	208/230-60-1	43.4	70	69.4	90			85.0	100			95.5	110				
VDA2024HC	208/230-60-3	16.2	20			34.3	35			43.3	45			52.3	60	61.3	70
VAA2030HC	208/230-60-3	18.9	25			36.9	40			45.9	50			54.9	60	64.0	70
VDA2036HC	208/230-60-3	24.8	35			42.8	50			51.9	60			60.9	70	69.9	70
VDA2040HC	208/230-60-3	27.9	40			46.0	50			55.0	60			64.0	70	73.0	80
VAA2048HC	208/230-60-3	27.8	40			45.8	50			54.9	60			63.9	70	72.9	80
VAA2060HC	208/230-60-3	30.1	45			48.2	60			57.2	60			66.2	70	75.2	80
VDA2024HD	460-60-3	8.4	15			17.4	20			22.0	25			26.5	30	31.0	35
VAA2030HD	460-60-3	9.4	15			18.4	20			23.0	25			27.5	30	32.0	35
VDA2036HD	460-60-3	12.3	15			21.3	25			25.8	30			30.3	35	34.8	35
VDA2040HD	460-60-3	12.9	15			21.9	25			26.4	30			30.9	35	35.5	40
VAA2048HD	460-60-3	13.2	15			22.2	25			26.7	30			31.2	35	35.7	40
VAA2060HD	460-60-3	13.9	20			22.9	25			27.4	30			31.9	35	36.4	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.

## Summary Electrical Ratings (Wire and Circuit Breaker Sizing) – VAA/VDA 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>
VDA2024HA	208/230-60-1	24.2	35	50.2	60			65.8	70			76.3	80				
VAA2030HA	208/230-60-1	25.8	35	51.8	60			67.5	70			77.9	80				
VDA2036HA	208/230-60-1	31.1	45	57.1	60			72.7	80			83.1	90				
VDA2040HA	208/230-60-1	34.4	50	60.5	70			76.1	80			86.5	90				
VAA2048HA	208/230-60-1	38.4	50	64.5	80			80.1	90			90.5	100				
VAA2060HA	208/230-60-1	45.1	70	71.2	90			86.8	100			97.2	110				
VDA2024HC	208/230-60-3	18.0	20			36.0	40			45.0	50			54.1	60	63.1	70
VAA2030HC	208/230-60-3	20.6	25			38.6	40			47.7	50			56.7	60	65.7	70
VDA2036HC	208/230-60-3	26.6	35			44.6	50			53.6	60			62.6	70	71.7	80
VDA2040HC	208/230-60-3	29.7	40			47.7	50			56.7	60			65.8	70	74.8	80
VAA2048HC	208/230-60-3	29.6	40			47.6	50			56.6	60			65.6	70	74.7	80
VAA2060HC	208/230-60-3	31.9	45			49.9	60			58.9	70			68.0	70	77.0	80
VDA2024HD	460-60-3	9.3	15			18.3	20			22.8	25			27.3	30	31.9	35
VAA2030HD	460-60-3	10.3	15			19.3	20			23.8	25			28.3	30	32.9	35
VDA2036HD	460-60-3	13.2	15			22.2	25			26.7	30			31.2	35	35.7	40
VDA2040HD	460-60-3	13.8	15			22.8	25			27.3	30			31.8	35	36.3	40
VAA2048HD	460-60-3	14.0	20			23.0	25			27.6	30			32.1	35	36.6	40
VAA2060HD	460-60-3	14.8	20			23.8	25			28.3	30			32.8	35	37.3	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) - VAA/VDA Heat Pumps

Electric Heat				Heat Pumps¹ (Amps)		Load Of Resistive Heating Element							Total Maximum Heating² ( 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
VDA2024HA	11.7	2.5	5.3	19.5	21.3	20.8		33.3		41.7			40.3		52.8		61.2			42.1		54.6		62.9		
VAA2030HA	13	2.5	5.3	20.8	22.6	20.8		33.3		41.7			41.6		54.1		62.5			43.4		55.9		64.2		
VDA2036HA	15.2	5.0	5.3	25.5	27.3	20.8		33.3		41.7			46.3		58.8		67.2			48.1		60.6		68.9		
VDA2040HA	17.9	5.0	5.3	28.2	30.0	20.8		33.3		41.7			49.0		61.5		69.9			50.8		63.3		71.6		
VAA2048HA	21.1	5.0	5.3	31.4	33.2	20.8		33.3		41.7			52.2		64.7		73.1			54.0		66.5		74.8		
VAA2060HA	27.1	6.0	3.5	36.6	38.4	20.8		33.3		41.7			57.4		69.9		78.3			59.2		71.7		80.0		
VDA2024HC	6.5	2.8	5.3	14.6	16.4		14.4		21.7		28.9	36.1		29.0		36.3		43.5	50.7		30.8		38.0		45.2	52.4
VAA2030HC	8.6	2.8	5.3	16.7	18.5		14.4		21.7		28.9	36.1		31.1		38.4		45.6	52.8		32.9		40.1		47.3	54.5
VDA2036HC	11.6	5.0	5.3	21.9	23.7		14.4		21.7		28.9	36.1		36.3		43.6		50.8	58.0		38.1		45.3		52.5	59.7
VDA2040HC	14.1	5.0	5.3	24.4	26.2		14.4		21.7		28.9	36.1		38.8		46.1		53.3	60.5		40.6		47.8		55.0	62.2
VAA2048HC	14	5.0	5.3	24.3	26.1		14.4		21.7		28.9	36.1		38.7		46.0		53.2	60.4		40.5		47.7		54.9	62.1
VAA2060HC	16.5	6.0	3.5	26.0	27.8		14.4		21.7		28.9	36.1		40.4		47.7		54.9	62.1		42.2		49.4		56.6	63.8
VDA2024HD	3.5	1.4	2.7	7.6	8.4		7.2		10.8		14.4	18.0		14.8		18.4		22.0	25.6		15.6		19.3		22.9	26.5
VAA2030HD	4.3	1.4	2.7	8.4	9.2		7.2		10.8		14.4	18.0		15.6		19.2		22.8	26.4		16.4		20.1		23.7	27.3
VDA2036HD	5.7	2.5	2.7	10.9	11.7		7.2		10.8		14.4	18.0		18.1		21.7		25.3	28.9		18.9		22.6		26.2	29.8
VDA2040HD	6.2	2.5	2.7	11.4	12.2		7.2		10.8		14.4	18.0		18.6		22.2		25.8	29.4		19.4		23.1		26.7	30.3
VAA2048HD	6.4	2.5	2.7	11.6	12.4		7.2		10.8		14.4	18.0		18.8		22.4		26.0	29.6		19.6		23.3		26.9	30.5
VAA2060HD	7.3	3.0	1.8	12.1	12.9		7.2		10.8		14.4	18.0		19.3		22.9		26.5	30.1		20.1		23.8		27.4	31.0

<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 2.0 VAA/VDA AIR CONDITIONERS WITH 2-STAGE COMPRESSOR



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

Model Number	VDA2024A			VAA2030A			VDA2036A			VDA2040A			VAA2048A			VAA2060A		
	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D
Cooling BTUH <sup>1</sup> - 2nd Stage	22,200			27,000			34,400			42,000			45,000			56,000		
EER <sup>2</sup> - 2nd Stage	12			11			12			12			11.5			11		
Integrated Part Load Value <sup>3</sup>	15.5			14			15.5			16			15.5			14.2		
Rated Indoor Air Flow (CFM <sup>4</sup> )	950			1,000			1,300			1,500			1,600			1,600		
Rated Outdoor Air Flow <sup>5</sup>	2,800			2,800			2,800			2,800			2,800			3,000		
<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	VDA2024A			VAA2030A			VDA2036A			VDA2040A			VAA2048A			VAA2060A		
	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D
Total Capacity	22,200			27,000			34,400			42,000			45,000			56,000		
Sensible Heat Ratio	0.77			0.78			0.75			0.75			0.74			0.68		
Sensible Capacity	17,200			21,000			25,800			31,500			33,300			38,300		
Rated Air Flow (CFM¹)	950			1,000			1,300			1,500			1,600			1,600		
¹CFM=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
VDA2024A	25,752	24,864	23,976	23,088	22,200	20,935	20,424	19,536	19,092
VAA2030A	31,320	30,240	29,160	28,080	27,000	25,920	24,840	23,760	23,220
VDA2036A	39,904	38,528	37,152	35,776	34,400	33,024	31,648	30,272	29,584
VDA2040A	48,720	47,040	45,360	43,680	42,000	40,320	38,640	36,960	36,120
VAA2048A	52,200	50,400	48,600	46,800	45,000	43,200	41,400	39,600	38,700
VAA2060A	64,960	62,720	60,480	58,240	56,000	53,760	51,520	49,280	48,160
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.									



## Electrical Characteristics - Compressor, Fan, Ventilation & Blower Motors - VAA/VDA Air Conditioners

Model Number	COMPRESSOR			OTHER MOTORS	OUTDOOR FAN			INDOOR BLOWER (ECM)			ENERGY RECOVERY VENTILATOR		
											GREENCUBE™		
	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>	AMPS	
												OAM <sup>6</sup>	EXM <sup>7</sup>
VDA2024AA	208/230-60-1	11.7	58.3	208/230-60-1	1200	5.3	1/2	1500	2.5	1/2	1.40	0.35	
VAA2030AA	208/230-60-1	13.0	73.0	208/230-60-1	1200	5.3	1/2	1500	2.5	1/2	1.40	0.35	
VDA2036AA	208/230-60-1	15.2	83.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35	
VDA2040AA	208/230-60-1	17.9	96.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35	
VAA2048AA	208/230-60-1	21.1	104.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35	
VAA2060AA	208/230-60-1	27.1	152.9	208/230-60-1	1200	3.5	1/3	1500	6.0	3/4	1.40	0.35	
VDA2024AC	208/230-60-3	6.5	55.0	208/230-60-1	1200	5.3	1/2	1500	2.8	1/2	1.40	0.35	
VAA2030AC	208/230-60-3	8.6	58.0	208/230-60-1	1200	5.3	1/2	1500	2.8	1/2	1.40	0.35	
VDA2036AC	208/230-60-3	11.6	73.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35	
VDA2040AC	208/230-60-3	14.1	88.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35	
VAA2048AC	208/230-60-3	14.0	83.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35	
VAA2060AC	208/230-60-3	16.5	110.0	208/230-60-1	1200	3.5	1/3	1500	6.0	3/4	1.40	0.35	
VDA2024AD	460-60-3	3.5	28.0	208/230-60-1	1200	5.3	1/2	1500	2.8	1/2	1.40	0.35	
VAA2030AD	460-60-3	4.3	28.0	208/230-60-1	1200	5.3	1/2	1500	2.8	1/2	1.40	0.35	
VDA2036AD	460-60-3	5.7	38.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35	
VDA2040AD	460-60-3	6.2	44.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35	
VAA2048AD	460-60-3	6.4	41.0	208/230-60-1	1200	5.3	1/2	1500	5.0	1/2	1.40	0.35	
VAA2060AD	460-60-3	7.3	52.0	208/230-60-1	1200	3.5	1/3	1500	6.0	3/4	1.40	0.35	

<sup>1</sup>RLA = Rated Load Amps

<sup>5</sup>HP = Horsepower

<sup>2</sup>LRA = Locked Rotor Amps

<sup>6</sup>OAM - Outside Air Motor

<sup>3</sup>RPM = Revolutions per Minute

<sup>7</sup>EXM-Exhaust Air Motor

<sup>4</sup>FLA = Full Load Amps

The 460 volt units have a step down transformer for the 230 volt motors.

## Summary Electrical Ratings (Wire and Circuit Breaker Sizing) - VAA/VDA 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>
VDA2024AA	208/230-60-1	22.4	30	28.5	30			44.2	45			54.6	60				
VAA2030AA	208/230-60-1	24.1	35	28.5	35			44.2	45			54.6	60				
VDA2036AA	208/230-60-1	29.3	40	31.0	40			46.7	50			57.1	60				
VDA2040AA	208/230-60-1	32.7	50	32.7	50			46.7	50			57.1	60				
VAA2048AA	208/230-60-1	36.7	50	36.7	50			46.7	50			57.1	60				
VAA2060AA	208/230-60-1	43.4	70	43.4	70			47.7	70			58.1	70				
VDA2024AC	208/230-60-3	16.2	20			20.8	25			29.9	30			38.9	40	47.9	50
VAA2030AC	208/230-60-3	18.9	25			20.8	25			29.9	30			38.9	40	47.9	50
VDA2036AC	208/230-60-3	24.8	35			24.8	35			32.1	35			41.1	45	50.1	60
VDA2040AC	208/230-60-3	27.9	40			27.9	40			32.1	40			41.1	45	50.1	60
VAA2048AC	208/230-60-3	27.8	40			27.8	40			32.1	40			41.1	45	50.1	60
VAA2060AC	208/230-60-3	30.1	45			30.1	45			33.1	45			42.1	45	51.1	60
VDA2024AD	460-60-3	8.4	15			10.4	15			14.9	15			19.4	20	24.0	25
VAA2030AD	460-60-3	9.4	15			10.4	15			14.9	15			19.4	20	24.0	25
VDA2036AD	460-60-3	12.3	15			12.3	15			16.0	20			20.5	25	25.1	30
VDA2040AD	460-60-3	12.9	15			12.9	15			16.0	20			20.5	25	25.1	30
VAA2048AD	460-60-3	13.2	15			13.2	15			16.0	20			20.5	25	25.1	30
VAA2060AD	460-60-3	13.9	20			13.9	20			16.5	20			21.0	25	25.6	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.

# Summary Electrical Ratings (Wire and Circuit Breaker Sizing) – VAA/VDA 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>
VDA2024AA	208/230-60-1	24.2	35	28.5	35			44.2	45			54.6	60				
VAA2030AA	208/230-60-1	25.8	35	28.5	35			44.2	45			54.6	60				
VDA2036AA	208/230-60-1	31.1	45	31.1	45			46.7	50			57.1	60				
VDA2040AA	208/230-60-1	34.4	50	34.4	50			46.7	50			57.1	60				
VAA2048AA	208/230-60-1	38.4	50	38.4	50			46.7	50			57.1	60				
VAA2060AA	208/230-60-1	45.1	70	45.1	70			47.7	70			58.1	70				
VDA2024AC	208/230-60-3	18.0	20			20.8	25			29.9	30			38.9	40	47.9	50
VAA2030AC	208/230-60-3	20.6	25			20.8	25			29.9	30			38.9	40	47.9	50
VDA2036AC	208/230-60-3	26.6	35			26.6	35			32.1	35			41.1	45	50.1	60
VDA2040AC	208/230-60-3	29.7	40			29.7	40			32.1	40			41.1	45	50.1	60
VAA2048AC	208/230-60-3	29.6	40			29.6	40			32.1	40			41.1	45	50.1	60
VAA2060AC	208/230-60-3	31.9	45			31.9	45			33.1	45			42.1	45	51.1	60
VDA2024AD	460-60-3	9.3	15			10.4	15			14.9	15			19.4	20	24.0	25
VAA2030AD	460-60-3	10.3	15			10.4	15			14.9	15			19.4	20	24.0	25
VDA2036AD	460-60-3	13.2	15			13.2	15			16.0	20			20.5	25	25.1	30
VDA2040AD	460-60-3	13.8	15			13.8	15			16.0	20			20.5	25	25.1	30
VAA2048AD	460-60-3	14.0	20			14.0	20			16.0	20			20.5	25	25.1	30
VAA2060AD	460-60-3	14.8	20			14.8	20			16.5	20			21.0	25	25.6	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) - VAA/VDA Air Conditioners

Electric Heat				Heat Pumps¹ (Amps)		Load Of Resistive Heating Element							Total Maximum Heating² ( 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
VDA2024AA	11.7	2.5	5.3	19.5	21.3	20.8		33.3		41.7			40.3		52.8		61.2			42.1		54.6		62.9		
VAA2030AA	13	2.5	5.3	20.8	22.6	20.8		33.3		41.7			41.6		54.1		62.5			43.4		55.9		64.2		
VDA2036AA	15.2	5.0	5.3	25.5	27.3	20.8		33.3		41.7			46.3		58.8		67.2			48.1		60.6		68.9		
VDA2040AA	17.9	5.0	5.3	28.2	30.0	20.8		33.3		41.7			49.0		61.5		69.9			50.8		63.3		71.6		
VDA2048AA	21.1	5.0	5.3	31.4	33.2	20.8		33.3		41.7			52.2		64.7		73.1			54.0		66.5		74.8		
VDA2060AA	27.1	6.0	3.5	36.6	38.4	20.8		33.3		41.7			57.4		69.9		78.3			59.2		71.7		80.0		
VDA2024AC	6.5	2.8	5.3	14.6	16.4		14.4		21.7		28.9	36.1		29.0		36.3		43.5	50.7		30.8		38.0		45.2	52.4
VAA2030AC	8.6	2.8	5.3	16.7	18.5		14.4		21.7		28.9	36.1		31.1		38.4		45.6	52.8		32.9		40.1		47.3	54.5
VDA2036AC	11.6	5.0	5.3	21.9	23.7		14.4		21.7		28.9	36.1		36.3		43.6		50.8	58.0		38.1		45.3		52.5	59.7
VDA2040AC	14.1	5.0	5.3	24.4	26.2		14.4		21.7		28.9	36.1		38.8		46.1		53.3	60.5		40.6		47.8		55.0	62.2
VDA2048AC	14	5.0	5.3	24.3	26.1		14.4		21.7		28.9	36.1		38.7		46.0		53.2	60.4		40.5		47.7		54.9	62.1
VDA2060AC	16.5	6.0	3.5	26.0	27.8		14.4		21.7		28.9	36.1		40.4		47.7		54.9	62.1		42.2		49.4		56.6	63.8
VDA2024AD	3.5	1.4	2.7	7.6	8.4		7.2		10.8		14.4	18.0		14.8		18.4		22.0	25.6		15.6		19.3		22.9	26.5
VAA2030AD	4.3	1.4	2.7	8.4	9.2		7.2		10.8		14.4	18.0		15.6		19.2		22.8	26.4		16.4		20.1		23.7	27.3
VDA2036AD	5.7	2.5	2.7	10.9	11.7		7.2		10.8		14.4	18.0		18.1		21.7		25.3	28.9		18.9		22.6		26.2	29.8
VDA2040AD	6.2	2.5	2.7	11.4	12.2		7.2		10.8		14.4	18.0		18.6		22.2		25.8	29.4		19.4		23.1		26.7	30.3
VDA2048AD	6.4	2.5	2.7	11.6	12.4		7.2		10.8		14.4	18.0		18.8		22.4		26.0	29.6		19.6		23.3		26.9	30.5
VDA2060AD	7.3	3.0	1.8	12.1	12.9		7.2		10.8		14.4	18.0		19.3		22.9		26.5	30.1		20.1		23.8		27.4	31.0

<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
VDA2024 (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	152.0	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
VAA2030	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
VDA2036	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
VDA2040	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	162.0	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
VAA2048	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
VAA2060	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 2.0 Model VDA2024H/VDA2024A 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	72.0	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 2.0 Model VAA2030H/VAA2030A 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 2.0 Model VDA2036H/VDA2036A 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 2.0 Model VDA2040H/VDA2040A 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	22.0	21.1	Cooling
75 / 68	70	75	23,214	0	23,214	1300	74.1	22.0	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 2.0 Model VAA2048H/VAA2048A 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 2.0 Model VAA2060H/VAA2060A 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

VDA2024	Base	w/Greencube	460V	w/GreenCube & 460V
Pounds	1020	1070	1045	1095

VAA2030	Base	w/Greencube	460V	w/GreenCube & 460V
Pounds	1020	1070	1045	1095

VDA2036	Base	w/Greencube	460V	w/GreenCube & 460V
Pounds	1020	1070	1045	1095

VDA2040	Base	w/Greencube	460V	w/GreenCube & 460V
Pounds	1030	1080	1055	1105

VAA2048	Base	w/Greencube	460V	w/GreenCube & 460V
Pounds	1045	1095	1070	1120

VAA2060	Base	w/Greencube	460V	w/GreenCube & 460V
Pounds	1060	1110	1085	1135

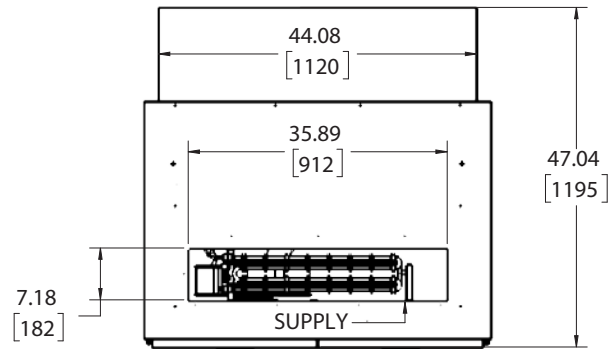
## Air Filters

	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.				

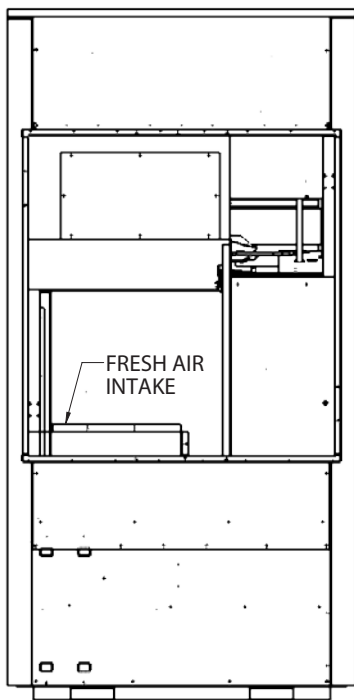


# DIMENSIONAL DATA FOR VDA2024/2036/2040 & VAA2030/2048/2060

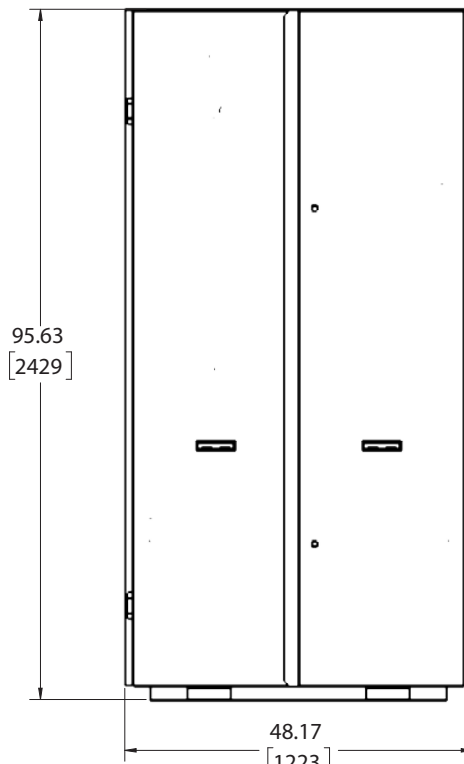
ENGINEERING REVISION "B"



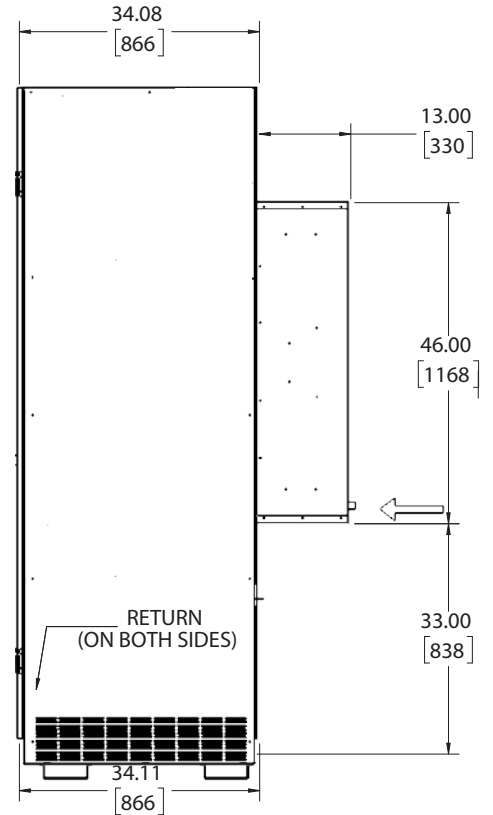
TOP VIEW



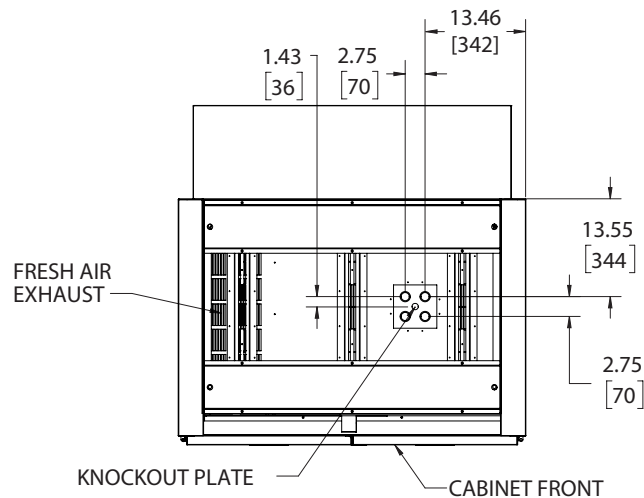
REAR VIEW



FRONT VIEW



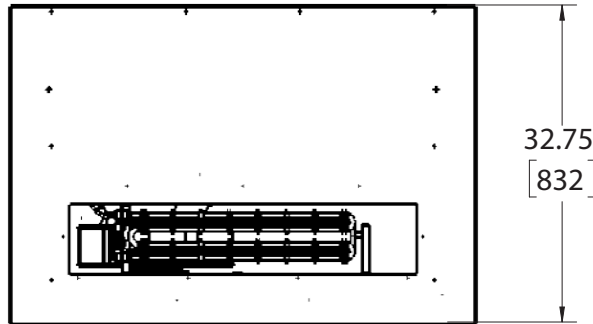
RIGHT VIEW



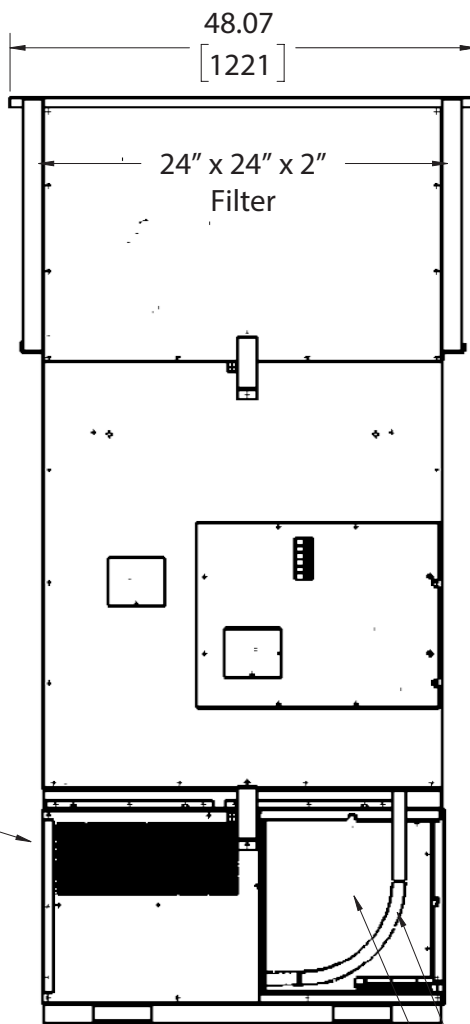
BOTTOM VIEW

**DIMENSIONAL DATA FOR VDA2024/2036/2040 & VAA2030/2048/2060 w/SIDE PANELS REMOVED**

ENGINEERING REVISION "B"

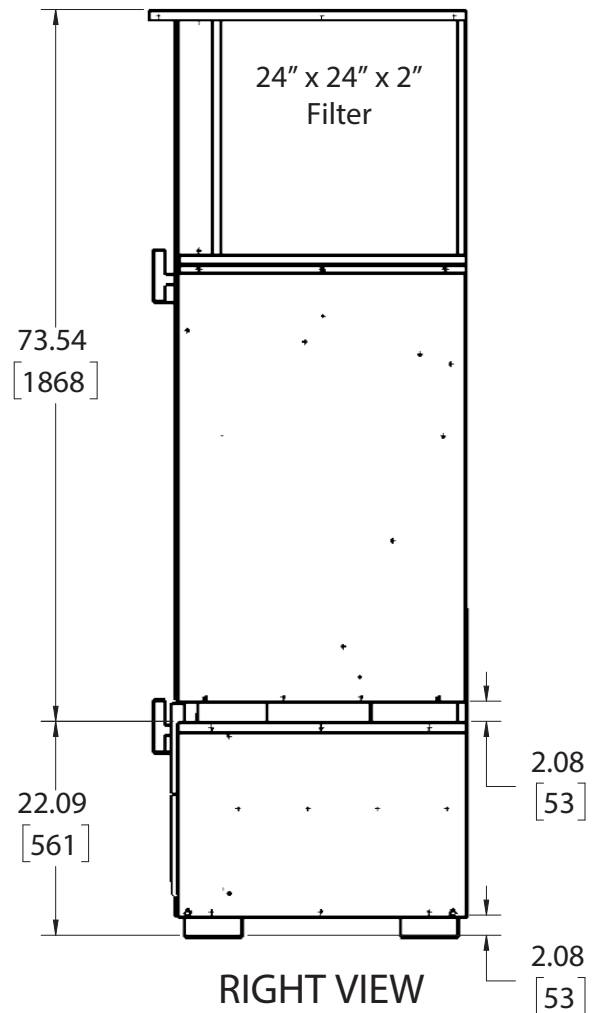


TOP VIEW



INTAKE MOTOR  
LOCATED  
BEHIND THIS  
PANEL

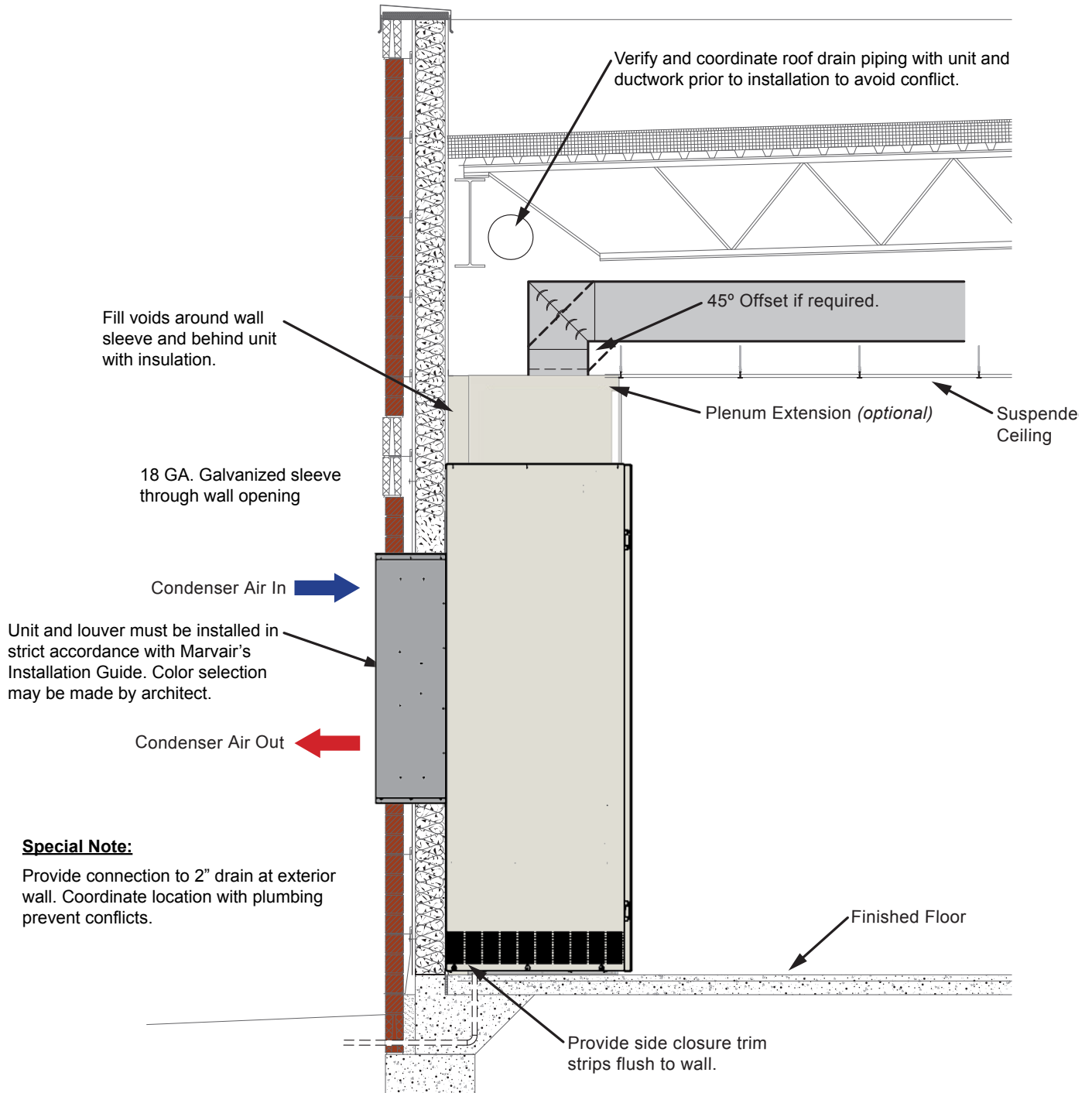
FRONT VIEW



RIGHT VIEW

CONDENSATE DRAIN  
GREENCUBE (IF REQUESTED),  
FRESH AIR FILTERS, AND EXHAUST MOTOR  
LOCATED BEHIND THIS PANEL

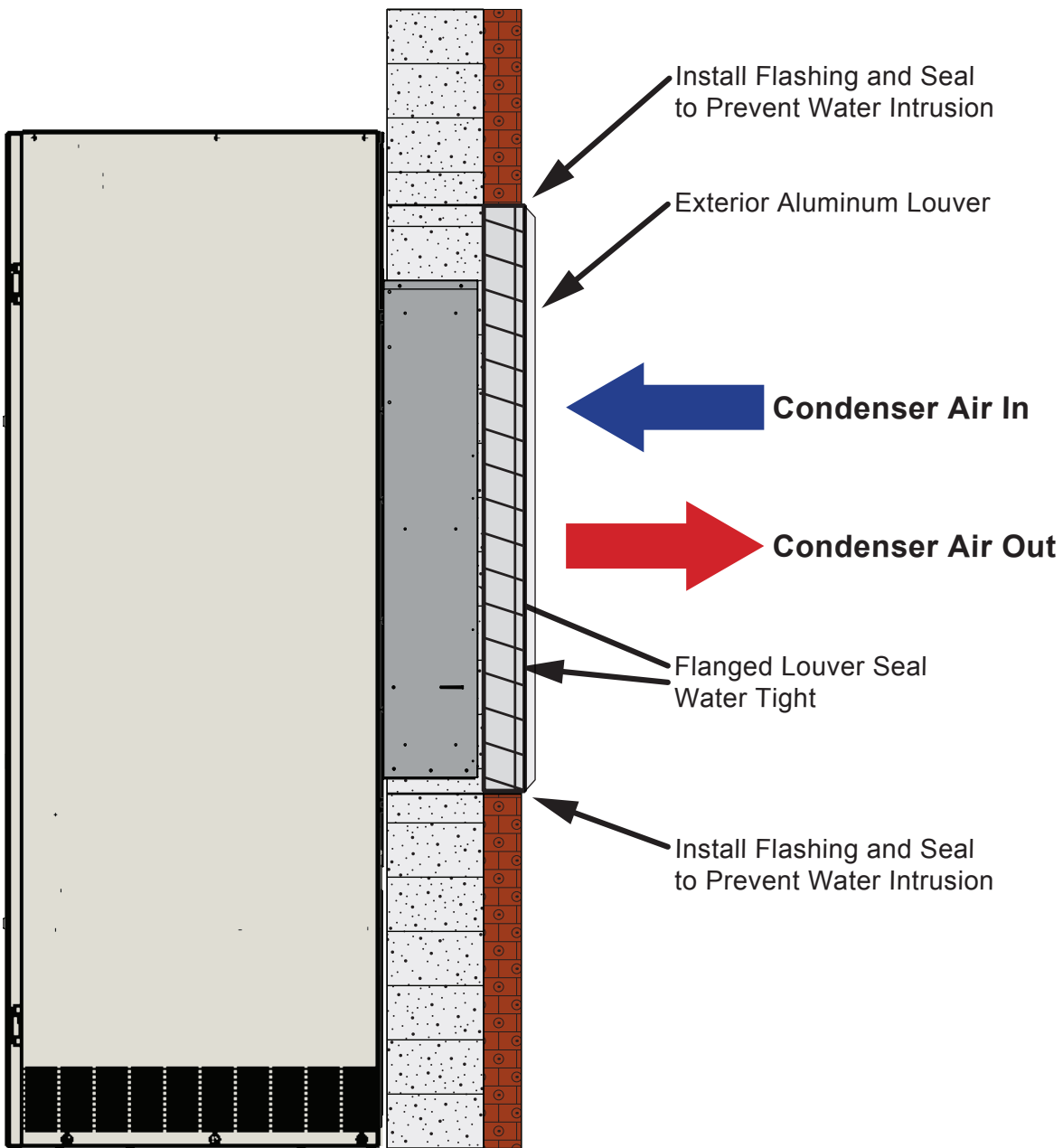
## TYPICAL INSTALLATION DETAIL



### **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.

## WALL MOUNTED LOUVER DETAIL



## FIELD INSTALLED ACCESSORIES

**Note:** Color must be specified when ordering certain accessories. “-XXX” in the Part Number indicates color.

100 = Marvair Beige | 200 = Gray | 400 = White

### ► Trim Piece

The trim piece provides a color coordinated panel between the cabinet and the wall and is used to conceal a gap when the Scholar unit with the minimum depth Wall Sleeve is deeper than 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. Each Scholar unit requires two (2) Trim Pieces.

Description	Part Number	Description	Part Number
8” Trim Piece Kit.....	M/04054-XXX	15” Trim Piece Kit.....	M/04057-XXX
9” Trim Piece Kit.....	M/04055-XXX	18” Trim Piece Kit.....	M/04058-XXX
12” Trim Piece Kit.....	M/04056-XXX	21” Trim Piece Kit.....	M/04059-XXX

### ► Base Stand

A Base Stand matches the Scholar 2.0 cabinet and raises it off the floor to align the wall sleeve to different window sill heights. The Base Stand is available in several colors to match the color of the unit.

Description	Part Number
2” Base Stand .....	S/12948-XXX
3” Base Stand .....	S/13101-XXX
4” Base Stand .....	S/12903-XXX
5” Base Stand .....	S/13029-XXX
6” Base Stand .....	S/13147-XXX
7” Base Stand .....	S/13252-XXX
8” Base Stand .....	S/13102-XXX
9” Base Stand .....	S/13253-XXX
10” Base Stand.....	S/13185-XXX
12” Base Stand.....	S/12942-XXX
13” Base Stand.....	S/13254-XXX
14” Base Stand.....	S/13103-XXX
15” Base Stand.....	S/13104-XXX

### ► Wall Sleeve

Sheet metal panel assembly to transition from Scholar unit and outdoor louver.

Description	Part Number
46”H x 36”W x 13”D (Center) .....	S/12893
36”H x 36”W x 13”D (Offset LH/RH).....	S/12895
46”H x 38”W x 13”D .....	S/12936
46”H x 42”W x 13”D .....	S/12941
44”H x 44”W x 13”D .....	S/12877

### ► Plenum Options

**Freeblow Plenum:** Mounts to the top of the Scholar unit to direct airflow into the classroom when a ducted installation is not required. 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 2.0 units with no heat or electric resistance heat.

Description	Part Number
10” Freeblow Plenum.....	S/13112-XXX
10.5” Freeblow Plenum (Insulated).....	S/12868-XXX
10.5” Freeblow Plenum (Standard).....	S/13034-XXX
12.5” Freeblow Plenum (Insulated).....	S/12889-XXX
12.5” Freeblow Plenum (Standard).....	S/12904-XXX

### ► Base Stand Trim Kit

The decorative Base Stand Trim kit matches the Scholar 2.0 cabinet and is included when an 8” or taller Base Stand is required to match the existing window sill height.

Description	Part Number
8” Base Stand Trim Kit .....	S/13153-XXX
9” Base Stand Trim Kit .....	S/13250-XXX
10” Base Stand Trim Kit.....	S/13186-XXX
12” Base Stand Trim Kit.....	S/13152-XXX
13” Base Stand Trim Kit.....	S/13251-XXX
14” Base Stand Trim Kit.....	S/13151-XXX
15” Base Stand Trim Kit.....	S/13150-XXX

### ► Outdoor Louver

Aluminum louver for covering the outside wall opening. Available in dark bronze or clear anodized. Exterior louver includes 1/2” x 1/2” bird screen.

Description	Part Number
Outdoor Louver .....	93206

**Ducted Plenum:** Allows for easy installation of duct work using a flanged rectangular opening on the top of the plenum.

Description	Part Number
10.5” Ducted Plenum.....	S/12868-XXX
12.5” Ducted Plenum.....	S/12890-XXX



### ► Freeblow Plenum 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.

Description	Part Number
10" Freeblow Plenum Supply Grilles.....	S/13084

### ► Freeblow Plenum Extender

A Freeblow Plenum Extender is used when the Scholar unit and Freeblow Plenum combination doesn't reach the ceiling height of the classroom and a "column" floor to ceiling appearance is desired.

Description	Part Number
2" Freeblow Plenum Extender .....	S/13016-XXX
5" Freeblow Plenum Extender .....	S/13038-XXX
6" Freeblow Plenum Extender .....	S/13017-XXX
7" Freeblow Plenum Extender .....	S/13039-XXX
8.5" Freeblow Plenum Extender.....	S/13018-XXX
10" Freeblow Plenum Extender.....	S/13019-XXX
12" Freeblow Plenum Extender.....	S/13192-XXX
14" Freeblow Plenum Extender.....	S/13020-XXX
16" Freeblow Plenum Extender.....	S/13030-XXX
20" Freeblow Plenum Extender.....	S/13021-XXX
24" Freeblow Plenum Extender.....	S/13216-XXX
26" Freeblow Plenum Extender.....	S/13217-XXX
35" Freeblow Plenum Extender.....	S/13022-XXX
40" Freeblow Plenum Extender.....	S/13249-XXX

### ► Scholar Unit Extender

A Scholar Unit Extender is used to conceal ducting when the Scholar unit doesn't reach the ceiling height of the classroom in a ducted installation.

Description	Part Number
8" Scholar Unit Extender .....	S/13105-XXX
10" Scholar Unit Extender.....	S/13106-XXX
12" Scholar Unit Extender.....	S/13107-XXX
13" Scholar Unit Extender.....	S/13243-XXX
14" Scholar Unit Extender.....	S/13108-XXX
15" Scholar Unit Extender.....	S/13244-XXX
16" Scholar Unit Extender.....	S/13109-XXX
18" Scholar Unit Extender.....	S/13245-XXX
20" Scholar Unit Extender.....	S/13246-XXX
22" Scholar Unit Extender.....	S/13247-XXX
23" Scholar Unit Extender.....	S/13248-XXX

### ► Dry Erase Board

Self adhesive dry erase board measures 3'H x 4'W and provides an excellent surface for displaying student art or important announcements.

Description	Part Number
Dry Erase Board.....	03867



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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