Marvair®
An ACS Brand

WALL MOUNT HEAT PUMP PRODUCT DATA SHEET

1.5 to 5 Ton Vertical Packaged High Efficiency Wall Mount Heat Pumps

MAH1020H-1024H-1030H-1036H-1042H-1048H-1060H (Single Stage Cooling)
MAH2024H-2030H-2036H-2042H-2048H-2060H (2-Stage Cooling)

General Description

The Marvair® MAH family of wall mounted heat pumps are the ideal HVAC system for a wide variety of applications. The exterior mounting means that no valuable interior space is required. Marvair MAH heat pumps are packaged units – the refrigerant piping and internal wiring are factory assembled and thoroughly tested. All components are readily accessible for easy service and maintenance. The energy efficient operation keeps operating costs to a minimum and makes the Marvair heat pumps ideal problem solvers for a wide variety of applications, including offices, classrooms and telecommunication shelters.

➤ **Marvair Heat Pumps Are Available To Meet Any Budget Or Efficiency Requirement:**

- **MAH Single Stage Models**
  Marvair heat pumps meet all federal efficiency requirements with an Energy Efficiency Ratio (EER) of 11. Single stage Marvair MAH heat pumps are available in cooling capacities of 1½, 2, 2½, 3, 3½, 4 & 5 tons (20,000 to 60,000 BTUH).
- **MAH 2-Stage Models**
  These models feature a 2-stage compressor which can reduce energy costs by more precisely matching the cooling capacity to the heat load with first stage cooling approximately 65% of the total cooling capacity. This results in Energy Efficiency Ratios (EER's) of up to 11.00 and an Integrated Part Load Value (IPLV) of up to 15.00. MAH 2-Stage models are available in cooling capacities of 2, 2½, 3, 3½, 4 & 5 tons (24,000 to 60,000 BTUH).

➤ **Outside Air for Ventilation or Free Cooling**

A full range of accessories and options allows Marvair heat pumps to be optimized for each application. For classrooms, a complete range of ventilation options are available to meet the fresh air requirements of the ASHRAE 62 standard, "Ventilation for Acceptable Indoor Air Quality". Where cooling is required during cool or cold weather, e.g., telecommunications shelters, a factory installed economizer should be used. To insure proper operation and optimum performance, all outside air ventilation packages are non-removable, factory installed and factory calibrated.

➤ **Safety Listed and Energy Certified**

All Marvair heat pumps conform to UL/CSA standard 60335-1 and 60335-2-40 and CAN/CSA C22.2, No. 236-11 Ed.4. For energy efficiency and performance, the units are tested and rated in accordance to the ANSI/AHRI (Air-Conditioning Heating and Refrigeration Institute) Standard 390 (Single Package Vertical Units). All units meet or exceed the efficiency requirements of ANSI/ASHRAE/IESNA 90.1-2022. Marvair heat pumps are commercial units and are not intended for use in residential applications.

MAH1036H

AHRI CERTIFIED® www.ahridirectory.org | CE | c ETL us Intertek | Designed, Engineered & Assembled In the USA

Features and Benefits

Meets DOE Efficiency Requirements

- *All Models 11EER*
- *All Models 3.3 COP*

Next Generation R-454B Refrigerant

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

High Efficiency and Reliability

- *No Wall Mount Heat Pump is More Efficient*
- *Optional Economizer Reduces Energy Usage*
- *High Efficiency Compressor and Lanced Coil Fins*
- *Liquid Line Temperature Monitoring & Control*
- *Suction Line Temperature Monitoring & Control*

Ease of Installation and Service

- *Single Point Power Entry*
- *Built-In Mounting Flanges and Internal Disconnect*
- *Standard Access Valves and Filters, Status LEDs*

Marvair Heat Pump Features

➤ **High Efficiency**

- Scroll compressors are standard on all units.
- Lanced fins and rifled tubing on the indoor & outdoor coils maximize heat transfer.
- Electronically commutated indoor blower motor on all models

➤ **Engineered Reliability with On Board Configuration Menu and Fault Notification.**

- PC board simplifies wiring, consolidates several of the electrical functions in one device.
- High refrigerant pressure switch with lockout relay protects the compressor in the event of insufficient condenser air flow.
- High pressure switch and low pressure sensor with lockout protects refrigerant circuit.
- Time delay for short cycle protection.

➤ **Ease of Installation**

- Sloped top with flashing eliminates need of rain hood.
- Built-in mounting flanges facilitate installation and minimize chance of water leaks.
- Factory installed phase monitor is standard on all 3Ø units and will turn the air conditioner off if power supply is not phased properly.
- Factory installed disconnect on all units, including 460v. models.
- Outside air hood included with each unit.
- Single Point Power Entry Complies with latest edition of U.L. Standard 60335-2-40.

➤ **Rugged Construction**

- Baked on beige finish over galvaneel steel on exterior sheet metal.
- Copper tube, aluminum fin evaporator and condenser coils.
- Corrosion resistant Dacromet® external fasteners.

➤ **Designed for Operation on Generator Power**

- All Marvair single & three phase air conditioners are designed to operate on Generator Power. See *Summary Electrical Ratings* for your specific model

➤ **Ease of Service**

- Control board on-board display indicates fault conditions.
- Refrigerant access valves are standard
- All major components are readily accessible
- Front control panel allows easy access and complies with NEC clearance codes on side by side units.
- Major components accessible from either side.

Options for Outside Air for Ventilation

ASHRAE standard 62 requires 15 cfm of outside air per occupant of a classroom. To meet this requirement, Marvair offers seven ventilation packages for every budget and requirement.

➤ **Configuration "C": Up to 100% Modulating 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 55ºF 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.

Features Designed for Telecommunication applications:
Hydrogen Fault Input: When 24VAC is applied to the Emergency Ventilation (EV) input, the economizer board forces the damper to open 100% for emergency ventilation. The compressor does not operate during Hydrogen Fault/ Emergency Ventilation.

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 CommStat 4 Telecom HVAC Controller, change state to provide feedback to the CommStat 4 to indicate when the HVAC is in economizer mode verses mechanical cooling mode. This feedback allows the CommStat 4 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 "D": Two-Position Motorized Fresh Air Damper w/Pressure Relief Ventilation**

Control Board Logic: The 92589 control board allows the position of the "D" 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: Anytime the indoor blower operates, the damper drives open to the position selected in the control board configuration menu setting 15. When the indoor blower stops operation the motorized damper spring returns to the fully closed position.

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

➤ **Configuration "E": Two-Position Motorized Fresh Air Damper w/Pressure Relief Ventilation & Independent Control**

Control Board/Factory Installed Relay Logic: The 92589 control board 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 control board 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.

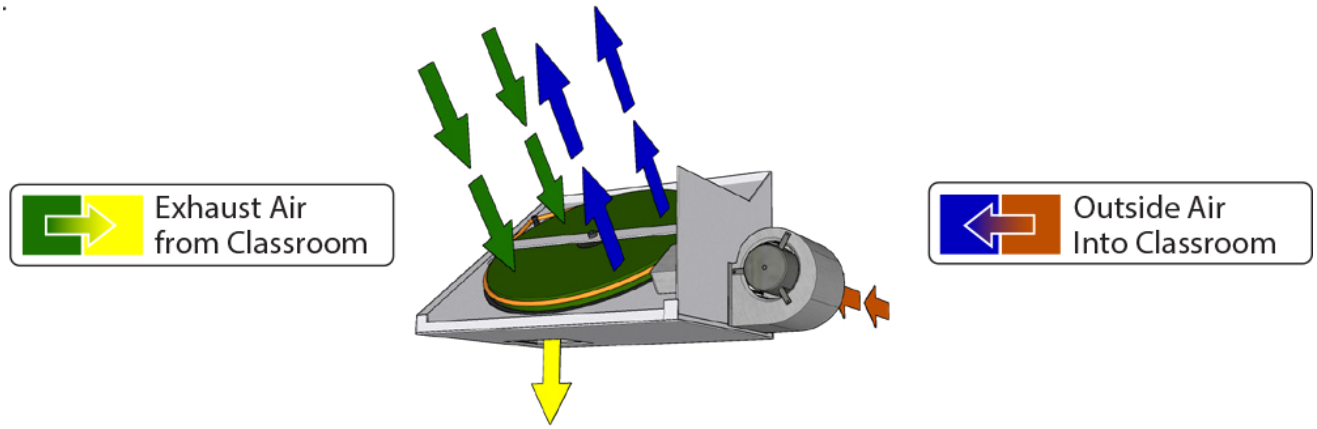
➤ **Configuration "H": GreenWheel® ERV Energy Recovery Ventilator *(Optional only for MAH1030/2030 - MAH1060/2060)***

Allows independent control of the exhaust and intake blowers. When used, the standard speed controller operates the intake blower and the optional second controller, the exhaust blower. Individual blower control allows positive pressurization of the classroom. Field or factory installed.

The Marvair GreenWheel® ERV is a total energy (both sensible and latent) wheel that reduces both construction and operating cost while ventilating the classroom to ASHRAE 62-1999 requirements. The use of the GreenWheel ERV reduces the energy load of the outside air. Exhausting stale, inside air keeps indoor pollutants and harmful gases to a minimum. The Marvair GreenWheel ERV has been tested and certified according to ARI Standard 1060.

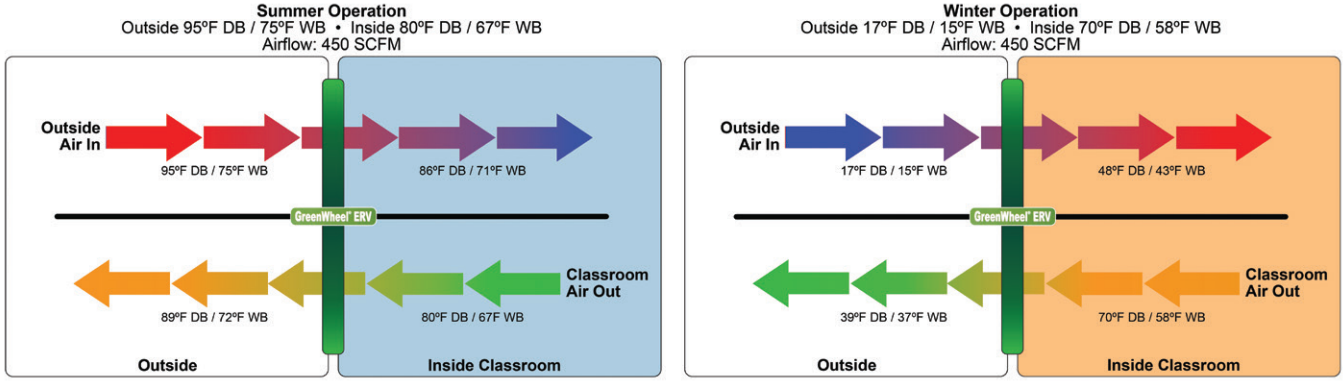
How It Works - During the summer, cool dry air from the classroom is exhausted through the GreenWheel ERV to the outside. As the air passes through the rotating wheel, the desiccant becomes cooler and drier. Simultaneously, hot humid air is being pulled across the rotating wheel. The cool, dry desiccant absorbs moisture and heat from the incoming air. The cooler, drier air is mixed with the return air from the classroom and distributed throughout the room.

In the winter, warm moist air is exhausted through the GreenWheel ERV to the outside. As the air passes through the rotating wheel, the desiccant becomes warmer and absorbs moisture. Simultaneously, cold dry air is being pulled across the rotating wheel. The cold, dry air absorbs heat and moisture from the desiccant. The warmed air is mixed with the return air from the classroom and distributed throughout the room.



Quality Components - The GreenWheel ERV Ventilation package consists of the GreenWheel cassette, an incoming air blower, an exhaust air blower, an air filter for the incoming air and one fan speed controller that controls the speed of both blower motors simultaneously. As an option, a second fan speed controller can be factory installed for independent control of the exhaust air motor and positive pressurization of the classroom. Also, an optional filter on the exhaust air is available on selected models. Please consult your Marvair representative for details. The two

blowers simultaneously pull fresh air from outside and exhaust air from the classroom through the rotating wheel. The air streams are separated by an insulated partition so that the incoming fresh air is not mixed with the exhaust air. Two variable speed blowers ensure that up to 450 CFM of outside air can be brought into the room and the indoor air is properly exhausted. Variable speed blowers permit that the desired quantity of outside air is delivered into the room. Optional independent exhaust air blower control allows positive pressurization of the classroom, i.e., more outside air can be introduced through the GreenWheel ERV than is exhausted.



GreenWheel® 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	2,900	1,100	4,000	2,900	6,400	9,300
250	3,100	1,200	4,300	3,100	6,900	10,000
325	3,700	1,400	5,100	3,700	8,100	11,800
400	4,200	1,500	5,700	4,200	9,100	13,300
450	4,500	1,600	6,100	4,500	9,700	14,200

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	2800	3600	6400	900	2800	2700	1900	200	2100
250	3000	3800	6800	1000	3000	4000	2000	200	2200
325	3600	4500	8100	1200	3500	4700	2400	200	2600
400	4100	4900	9000	1400	3800	5200	2700	300	3000
450	4300	5200	9500	1400	4000	5400	2900	300	3200

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	5600	3300	8900	9300	4900	14200	13000	5700	18700
250	6000	3600	9600	10000	5300	15300	14000	6100	14100
325	7200	4200	11400	12000	6200	18200	16700	7100	23800
400	8100	4600	12700	13500	6800	20300	18900	7900	26800
450	8600	4800	13400	14400	7100	21500	20100	8200	28300

*SCFM = Standard Cubic Feet per Minute
For performance of the GreenWheel® ERV at conditions other than those shown, please contact your Marvair® representative or the factory.

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

➤ **Configuration "N": Barometric Fresh Air Damper *(Standard)***
Barometric damper capable of up to 15% of rated airflow of outside air; field adjustable, no pressure relief.

➤ **Configuration "T": Title 24 Compliant Economizer & Controls**
California Title 24 compliant economizer and associated controls.

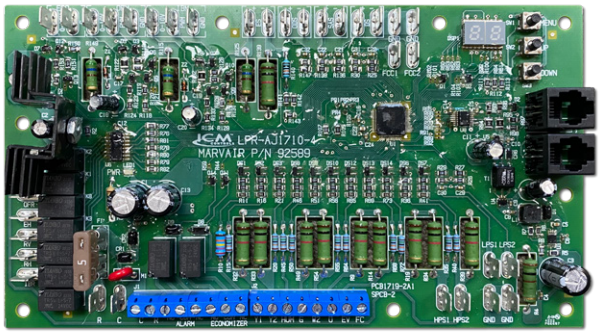
Heat Pump PC Board

➤ Electronic Control Board

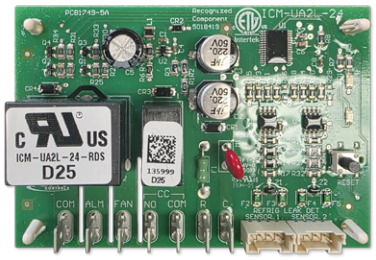
The exclusive Printed Circuit Board (PCB) in base model Marvair heat pumps sets the standard for the industry in terms of flexibility, reliability, and performance. This UL certified component is engineered to optimize Heating, Cooling and Dehumidification operation while communicating valuable information to the end user.

Special Features Include:

- Improved HVAC System Reliability (Built In Sequence / Timer Functionality And Simplified Wiring)
- On Board Configuration Menu With Adjustments Of Various Functions and Setpoints
- 2-Stage Compressor Operation
- Independent Indoor Blower Speed Adjustments For 1st Stage Cooling, 2nd Stage Cooling, Electric Heat And Dehumidification (Optimize Latent and Sensible Capacity)
- Built-In Remote Communication (Monitor and Control Via MODBUS Qty. 2 RJ11 Ports)
- Alarm Status and Fault Display(Drastically Reduces Troubleshooting Time and System Downtime)
- Sensors To Monitor Refrigerant Temperature Of The Low Pressure Circuit and Liquid Line Circuit
- Economizer Control With Adjustments For Both Enthalpy Or Dry Bulb Sensor
- Economizer Status Output Contacts
- Emergency Ventilation Control (Systems Equipped with Ventilation Package)
- Forced Cooling (Overrides Economizer Operation)
- Dehumidification Control (Systems Equipped With Electric Reheat Or Hot Gas Reheat Dehumidification)
- Lockout Contacts (Normally Open Or Normally Closed)
- Alarms Communicated Via MODBUS



➤ Refrigerant Mitigation Board



All models in this manual are equipped with a R454B refrigerant leak detection system. Once the unit is installed it must be powered, at all times, except for service. During normal operation the leak detection system has no impact on the operation of the unit, however upon detection of R-454B refrigerant all operations are stopped except for the indoor blower. The unit will then re-circulate air in the room for a minimum of 5 minutes. Once the 5 minutes have expired and the concentration of the refrigerant is below 8 percent of the Lower Flammability Limit (LFL) the unit will be allowed to operate as normal. If the concentration of the refrigerant remains above 8 percent of the LFL the unit will remain in re-circulation mode.

To verify actuation of mitigation simply remove the sensor from the mitigation control board and the system should stop all operation except for the indoor blower. There is no need to calibrate or service the sensor. The sensor will provide an alarm upon failure or end of life. The sensor must be replaced with an identical sensor, or a manufacturer approved alternative.

Protection of the Refrigerant Components

➤ High Refrigerant Pressure Switch

The high pressure switch is located on the liquid line. It is electrically connected to the PC board and will turn the compressor off if the pressure rises above the set point twice on the same call for cooling or heat-pump heating. This protects the compressor if airflow is significantly reduced or lost through the coil performing the condenser function.

➤ Low Pressure Sensor

The loss of charge low pressure sensor is located on the common suction line. It is electrically connected to the PC board and will turn the compressor off if the pressure drops below the set point twice on the same call for cooling or heat-pump heating. This protects the compressor if airflow is significantly reduced or lost through the coil performing the evaporator function or there is a loss of refrigerant.

Marvair MAH Heat Pump Options

Marvair® options can be used to provide optimum performance over a full range of operating conditions.

➤ **Adjustable Outdoor Thermostat**
Will not allow electric resistance heat to be energized unless the outdoor temperature is below the desired set point. Field or factory installed. Available on all MAH units.

➤ **Energy Management System (EMS) Relay Kit**
Relay to control the unit. Available in 24, 120 or 240 VAC. Field or factory installed.

➤ **Electric Reheat**
Control provides simultaneous operation of compressor when in cooling mode and the electric elements to provide dehumidification without over cooling the room. The electric element (kW) must be properly sized for each model for proper operation. Factory installed. Available on all MAH units. Consult factory for details.

➤ **Cabinet Color**
Marvair heat pumps are available in six different cabinet colors. The standard colors are Marvair® beige, white, gray and Carlsbad Canyon (brown). The standard cabinet's sides, top and front panels are constructed of 20 gauge painted steel. Contact your Marvair representative for color chips. Custom colors are also available; contact Marvair for details.

Two stainless steel cabinet constructions are available:

Stainless Steel Exterior (Option "5"): This option replaces all standard exterior painted surfaces with stainless steel. This option also replaces the standard unpainted compressor base of the unit and exterior cabinet screws with stainless steel. No other standard construction surfaces are stainless steel in this option, unless listed in this description. Back panel is not stainless steel with this option. This option is designed to give a more economical alternative to full stainless steel, and still offer an enhanced level of protection. For further corrosion protection, please see our "A" offering at full stainless on all metal components.

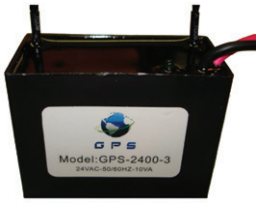
Stainless Steel Unit (Option "A"): This option replaces all interior and exterior steel sheet metal parts with stainless steel. All galvanized and painted steel surfaces found in the standard unit are stainless steel with this option. All cabinet screws are stainless steel. No other standard construction surfaces are stainless steel, unless listed in this description. This option is designed to give our most robust protection against steel corrosion.

➤ **Extended Warranty**
A first-year labor (Silver), and a two-year labor (Gold) are available. See www.marvair.com for optional warranty details.

➤ **Compressor Sound Jackets**
Reduces sound of compressor.

➤ **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.



Cold Plasma Air Purifier

Special Application Packages and Coil Coatings

➤ **Protective Coating Packages**
Typically, only non-economizer units are used in corrosive environments, but all Marvair air conditioner are available with corrosion protection. Two corrosion protection packages are offered - one for the condenser section (Coastal Environmental Package) and the other for the entire unit (Coat-All Package).

The Coastal Environmental Package includes:
- Corrosion resistant fasteners
- Sealed or partially sealed condenser fan motor
- Protective coating applied to all exposed internal copper and metal in the condenser section
- Protective coating on the condenser coil (Luvata Insitu®) contains ES2 (embedded stainless steel pigment) technology.

The Coat all Package includes all of the above, plus:
- Protective coating on the evaporator coil (Luvata Insitu®) contains ES2 (embedded stainless steel pigment) technology
- Protective coating on exterior and interior components and sheet metal.
  Note 1: The insulated internal sheet metal and the internal control box are not coated.
  Note 2: The corrosion prevention coating can not be applied to stainless steel.

➤ Protective Coil Coatings

The Condenser Coil or the Evaporator Coil or Both can be coated. Coating the Evaporator Coil in not common. For harsh conditions, e.g., power plants, paper mills or sites where the unit will be exposed to salt water, the coils should be protected by a protective coating.

Note: Cooling capacity may be reduced by up to 5% on units with coated coils.

Accessories

➤ Thermostats for Single Stage and 2-Stage Heat Pumps

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

➤ Grilles

Description	Size	Marvair P/N
For the MAH1020H/1024H & MAH2024H		
Double Deflection, Aluminum Supply Grille	20" x 8" (509mm x 203mm)	80674
Aluminum Return Grille	20" x 12" (509mm x 305mm)	80677
Return Filter Grille	20" x 12" (509mm x 305mm)	80671
For the MAH1030H/1036H & MAH2030H/2036H		
Double Deflection, Aluminum Supply Grille	28" x 8" (711mm x 203mm)	80675
Aluminum Return Grille	28" x 14" (711mm x 356mm)	80678
Return Filter Grille*	28" x 14" (711mm x 356mm	80672
For the MAH1042H/1048H/1060H & MAH2042H/2048H/2060H		
Double Deflection, Aluminum Supply Grille	30" x 10" (762mm x 254mm)	80676
Aluminum Return Grille	30" x 16" (762mm x 406mm)	80679
Return Filter Grille	30" x 16" (762mm x 406mm)	80673

Note: Return filter grilles should be used when the 2" (51mm) filter in the MAH unit is not accessible from the exterior of the building. Filter used in the return filter grille is a 1" (25mm) thick filter. The return filter grille is not recommended for use with the MAH heat pumps with economizers.

EER Comparison by Model

Nominal Cooling Capacity (BTUH)	Basic Model	EER
20,000	MAH1020H	11.00
24,000	MAH1024H	11.00
	MAH2024H	11.00
30,000	MAH1030H	11.00
	MAH2030H	11.00
36,000	MAH1036H	11.00
	MAH2036H	11.00

Nominal Cooling Capacity (BTUH)	Basic Model	EER
42,000	MAH1042H	11.00
	MAH2042H	11.00
48,000	MAH1048H	11.00
	MAH2048H	11.00
60,000	MAH1060H	11.00
	MAH2060H	11.00

Air Flow (Cubic Feet per Minute)

Model Number	External Static Pressure (Wet Coil)					
	0	0.1	0.2	0.3	0.4	0.5
MAH1020H	875	800	730	650	590	520
MAH1024H/2024H	900	850	775	700	640	560
MAH1030H/2030H	1,245	1,185	1,115	1,025	955	845
MAH1036H/2036H	1,295	1,235	1,165	1,075	1,005	895
MAH1042H/2042H	1,550	1,400	1,270	1,175	1,090	1,000
MAH1048H/2048H	1,930	1,780	1,690	1,600	1,500	1,420
MAH1060H/2060H	1,990	1,890	1,775	1,650	1,550	1,475

Air flow ratings of 208-230v. Units are at 230v. Air flow ratings of 480 v. units are at 460 volts. Operation of units at a different voltage from the rating point will affect air flow.

Room Size Limitations

	MAH1020H	MAH1024H	MAH1030H	MAH1036H	MAH1042H	MAH1048H	MAH1060H
Minimum Room Size (ft²)	108.0	108.0	109.8	117.8	137.5	157.1	180.6
Minimum Supply Height (ft)	6.9	6.9	6.9	6.9	6.9	6.9	6.9
		MAH2024H	**MAH2030H**	**MAH2036H**	**MAH2042H**	**MAH2048H**	**MAH2060H**
Minimum Room Size (ft²)		117.8	117.8	147.5	137.5	157.1	180.6
Minimum Supply Height (ft)		6.9	6.9	6.9	6.9	6.9	6.9

Marvair Heat Pump Model Identification

Example	**M**	**A**	**H**	**1**	**0**	**3**	**6**	**H**	**A**	**0**	**5**	**0**	**C**	**+**	**H**	**+**	**+**	**1**	**E**	**A**	**+**	**A**	**3**	**1**	**+**	**+**	**+**	**+**	**+**	**+**
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	**M** = Marvair Wall Mount **S** = Stock Unit
2	Energy Efficiency Ratio (EER)	**A** = 11
3	Refrigerant Type	**H** = R-454B
4	Compressor Type/Quantity	**1** = Single Stage Compressor **2** = 2-Stage Compressor (024 – 060 Only)
5 **6** **7**	Unit Capacity/Nominal Cooling (BTUH)	**020** = 20,000 | **042** = 42,000 **024** = 24,000 | **048** = 48,000 **030** = 30,000 | **060** = 60,000 **036** = 36,000
8	System Type	**H** = Heat Pump
9	Power Supply (Volts-Hz-Phase)	**A** = 208/230-60-1 | **D** = 460-60-3 **C** = 208/230-60-3
10 **11** **12**	Heat Designation @ Rated Voltage	**000** = No Heat | **090** = 9KW **040** = 4KW | **100** = 10KW **050** = 5KW | **120** = 12KW **060** = 6KW | **150** = 15KW **080** = 8KW
13	Ventilation Configuration	**A** = Solid Front Door **C** = Economizer **D** = Motorized Damper w/Pressure Relief **E** = Motorized Damper w/Pressure Relief & Independent Motorized Damper Control **F** = No Free Cooling, 100% Emergency Ventilation Only w/Independent Control **H** = GreenWheel® ERV **N** = Barometric Damper w/15% OSA **T** = Title 24 Compliant Economizer & Controls **+** = None **$** = Special
14	Dehumidification	**G** = Hot Gas Reheat **R** = Electric Reheat **+** = None **$** = Special
15	Controls	**A** = Power Fail Alarm w/Additional Lockouts **C** = 24V EMS Relay Kit **H** = Factory Installed PLC **+** = Printed Circuit Board (STD) **$** = Special
16	Operating Condition	**D** = Desert Duty **F** = Desert Duty w/Hard Start **V** = Hard Start w/Low Ambient & CCH & EFS **Z** = Low Ambient w/CCH & EFS (STD) **+** = None **$** = Special
17	Indoor Air Quality Features	**A** = UV Light **D** = Dry Bulb Sensor **E** = Dry Bulb Sensor w/Dirty Filter **G** = Dirty Filter Sensor **K** = Bi-Polar Ionization **+** = None **$** = Special
18	Air Flow	**1** = Top Supply/Center Return (STD) **$** = Special
19	Compressor Location	**D** = Left Hand - All 3½ to 5 ton units **E** = Right Hand - All 1½ to 3 ton units
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 **W** = Aluminum Washable **+** = None **$** = Special
21	Corrosion Protection	**A** = Condenser Coil Only **C** = Evaporator Coil Only **D** = Both Coils Condenser & Evaporator **E** = All Coils Cond/Evap/Reheat **F** = Coat All **G** = Coastal Package & Evaporator Coil **K** = Coastal Package **+** = None **$** = Special
22 **23**	Engineering Revision Level	**A3** **D3**
24	Cabinet Color	**1** = Marvair Beige (STD) **2** = Gray (STD) **3** = Carlsbad Canyon (STD) **4** = White (STD) **5** = Stainless Steel Exterior **A** = Stainless Steel - Unit **$** = Custom Color (Powder Coat)
25	Sound Attenuation	**2** = Compressor Blanket **+** = None
26	Security Option	**A** = Lockable Access Plate/Tamper Proof **+** = None **$** = Special
27	Fastener/Drain Pan Option	**A** = Stainless Steel Fasteners **C** = Stainless Steel Drain Pan **D** = Stainless Steel Fasteners & Drain Pan **+** = None **$** = Special
28	Miscellaneous	**+** = None **$** = Special
29	Unused	**+** = 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.

Marvair MAH Single Stage Heat Pump Certified Ratings & Performance

Efficiency and Capacity Ratings at ANSI/AHRI Standard 390 - MAH Heat Pumps

Model Number	MAH1020H	MAH1024H			MAH1030H			MAH1036H			MAH1042H			MAH1048H			MAH1060H		
	A	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D
Cooling BTUH[1]	20,000	24,000			29,000			35,000			42,000			46,000			57,000		
EER[2]	11.00	11.00			11.00			11.00			11.00			11.00			11.00		
High Temperature Heating[3]	20,000	24,000			27,000			30,000			34,000			42,000			51,000		
High Temperature COP[4]	3.3	3.3			3.3			3.3			3.3			3.3			3.3		
Rated Air Flow (CFM[5])	800	820			1,150			1,200			1,350			1,700			1,750		

[1]Cooling is rated at 95°F (35°C) outdoor and 80°F DB/67°F WB (26.5°C DB/19.5°C WB) return air.
[2]EER = Energy Efficiency Ratio
[3]High Temperature Heating & COP are rated at 47°F DB/43°WB (8.3°C DB/6.1°C WB) outdoor and 70°F (21.1°C) return air.
[4]COP = Coefficient of Performance
[5]CFM = Cubic Feet per Minute

Ratings are with no outside air. Performance will be affected by altitude. 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 @ 95ºF (35ºC) Outside Air DB - MAH Heat Pumps

Model Number	MAH1020H	MAH1024H			MAH1030H			MAH1036H			MAH1042H			MAH1048H			MAH1060H		
	A	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D
Total Capacity	20,000	24,000			29,000			35,000			42,000			46,000			57,000		
Sensible Heat Ratio	0.80	0.80			0.70			0.70			0.70			0.70			0.60		
Sensible Capacity	15,000	18,600			21,500			24,500			27,400			31,000			36,900		
Rated Air Flow (CFM[1])	800	820			1,150			1,200			1,350			1,700			1,750		

[1]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 - MAH Heat Pumps

Model Number	Outdoor Temperature											
	75ºF/24ºC	80ºF/26.5ºC	85ºF/29ºC	90ºF/32ºC	95ºF/35ºC	100ºF/38ºC	105ºF/40.5ºC	110ºF/43.3ºC	115ºF/46ºC	120ºF/49ºC	125ºF/52ºC	130ºF/54ºC
MAH1020H	23,200	22,400	21,600	20,800	20,000	19,200	18,400	17,600	17,200	16,840	16,480	16,120
MAH1024H	27,840	26,880	25,920	24,960	24,000	23,040	22,080	21,120	20,640	20,208	19,776	19,344
MAH1030H	33,640	32,480	31,320	30,160	29,000	27,840	26,680	25,520	24,940	24,418	23,896	23,374
MAH1036H	40,600	39,200	37,800	36,400	35,000	33,600	32,200	30,800	30,100	29,470	28,840	28,210
MAH1042H	48,720	47,040	45,360	43,680	42,000	40,320	38,640	36,960	36,120	35,364	34,608	33,852
MAH1048H	53,360	51,520	49,680	47,840	46,000	44,160	42,320	40,480	39,560	38,732	37,904	37,076
MAH1060H	66,120	63,840	61,560	59,280	57,000	54,720	52,440	50,160	49,020	47,994	46,968	45,942

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 - MAH Heat Pumps

Model Number	Outdoor Temperature								
	10ºF/-12.2ºC	17ºF/-8.3ºC	20ºF/-6.7ºC	30ºF/-1.1ºC	40ºF/4.4ºC	47ºF/8.3ºC	50ºF/10ºC	60ºF/15.6ºC	70ºF/21.1ºC
MAH1020H	10,766	11,333	12,200	15,233	17,833	20,000	20,600	21,500	22,500
MAH1024H	11,560	13,600	14,640	18,280	21,400	24,000	24,720	25,800	27,000
MAH1030H	15,130	17,800	18,720	21,940	24,700	27,000	27,810	29,025	30,375
MAH1036H	15,810	18,600	19,740	23,730	27,150	30,000	30,900	32,250	33,750
MAH1042H	18,700	22,000	23,340	28,030	32,050	35,400	36,462	38,055	39,825
MAH1048H	20,400	24,000	25,800	32,100	37,500	42,000	43,260	45,150	47,250
MAH1060H	22,900	27,000	29,300	37,500	44,600	51,000	51,900	54,300	61,100

Based upon ANSI/AHRI std. 390 return air conditions of 70°F DB (21.1°C DB). Return air at rated air flow.

Electrical Characteristics - Compressor, Fan, Ventilation & Blower Motors
MAH Heat Pumps with Single Stage Compressor

Basic Model	Compressor				Outdoor Fan Motor				Indoor Blower Motor				Ventilation GreenWheel AMPS		
	Type	Volts-Hz-Ph	RLA[1]	LRA[2]	Volts-Hz-PH	RPM[3]	FLA[4]	HP[5]	Volts-Hz-PH	RPM[3]	FLA[4]	HP[5]	OAM[6]	EXM[7]	WD[8]
MAH1020HA	Scroll	208/230-60-1	10.3	60.2	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	2.8	1/3			
MAH1024HA		208/230-60-1	11.9	67.8	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	2.8	1/3	1.0	1.0	0.2
MAH1030HA		208/230-60-1	13.5	82.5	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	4.1	1/2	1.0	1.0	0.2
MAH1036HA		208/230-60-1	14.7	109.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1042HA		208/230-60-1	18.6	123.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1048HA		208/230-60-1	22.4	126.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1060HA		208/230-60-1	25.6	155.0	208/230-60-1	1200	6.3	3/4	208/230-60-1	1050	6.0	3/4	1.0	1.0	0.2
MAH1024HC	Scroll	208/230-60-3	8.3	67.7	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	2.8	1/3			
MAH1030HC		208/230-60-3	12.8	97.5	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	4.1	1/2	1.0	1.0	0.2
MAH1036HC		208/230-60-3	12.2	102.8	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	4.1	1/2	1.0	1.0	0.2
MAH1042HC		208/230-60-3	12.8	102.8	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1048HC		208/230-60-3	12.8	120.4	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1060HC		208/230-60-3	18.6	155.0	208/230-60-1	1200	6.3	3/4	208/230-60-1	1050	6.0	3/4	1.0	1.0	0.2
MAH1024HD	Scroll	460-60-3	5.1	38.1	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	2.8	1/3			
MAH1030HD		460-60-3	5.1	44.3	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	4.1	1/2	1.0	1.0	0.2
MAH1036HD		460-60-3	5.8	50.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	4.1	1/2	1.0	1.0	0.2
MAH1042HD		460-60-3	5.8	50.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1048HD		460-60-3	6.0	49.4	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1060HD		460-60-3	8.3	58.1	208/230-60-1	1200	6.3	3/4	208/230-60-1	1050	6.0	3/4	1.0	1.0	0.2
MAH1024HZ	Scroll	575-60-3	3.8	27.7	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	2.8	1/3			
MAH1030HZ		575-60-3	4.5	27.1	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	4.1	1/2	1.0	1.0	0.2
MAH1036HZ		575-60-3	4.5	41.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1200	4.1	1/2	1.0	1.0	0.2
MAH1042HZ		575-60-3	5.1	41.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1048HZ		575-60-3	5.8	41.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH1060HZ		575-60-3	7.7	47.8	208/230-60-1	1200	6.3	3/4	208/230-60-1	1050	6.0	3/4	1.0	1.0	0.2

[1]RLA = Rated Load Amps
[2]LRA = Locked Rotor Amps
[3]RPM = Revolutions per Minute
[4]FLA = Full Load Amps
[5]HP = Horsepower
[6]OAM = Outside Air Mover
[7]EXM = Exhaust Air Mover
[8]WD = Wheel Drive Motor
The 460 volt units have a step down transformer for the 230 volt motors.

MAH Heat Pumps Summary Electrical Ratings (Wire and HACR Circuit Breaker Sizing) - Ventilation Configuration:

C: Economizer, Outside Air with Pressure Relief
D: Motorized 2-Position Damper, up to 450 cfm of Outside Air w/Pressure Relief
E: Motorized Damper w/Pressure Relief & Independent Motorized Damper Control
N: Barometric Damper, up to 15% Outside Air
T: Title 24 Compliant Economizer & Controls

Electric Heat		000 = None		040 = 4 kw		050 = 5 kw		060 = 6 kw		080 = 8 kw		090 = 9 kw		100 = 10 kw		120 = 12 kw		150 = 15 kw	
Basic Model	Volts-Hz-Ph	SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]	
		MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]
MAH1020HA	208/230-60-1	19.2	25	40.0	45	45.2	50	50.4	60	60.8	70			71.3	80				
MAH1024HA	208/230-60-1	21.2	30	42.0	45	47.2	50	52.4	60	62.8	70			73.3	80				
MAH1030HA	208/230-60-1	24.5	35	45.3	50	50.5	60	55.7	60	66.1	70			76.6	80	87.0	90	102.6	110
MAH1036HA	208/230-60-1	26.0	40	46.8	50	52.0	60	57.2	60	67.6	70			78.1	80	88.5	90	104.1	110
MAH1042HA	208/230-60-1	32.7	50	53.5	60	58.7	70							84.7	90	95.2	100	110.8	125
MAH1048HA	208/230-60-1	37.4	50	58.2	70	63.4	80							89.5	100	99.9	100	115.5	125
MAH1060HA	208/230-60-1	44.3	60	65.1	80	70.3	90							96.4	110	106.8	110	122.4	125
MAH1024HC	208/230-60-3	16.7	20					34.7	35			43.7	45			52.8	60	61.8	70
MAH1030HC	208/230-60-3	23.6	35					41.6	50			50.7	60			59.7	60	68.7	70
MAH1036HC	208/230-60-3	22.9	35					40.9	45			49.9	50			58.9	60	68.0	70
MAH1042HC	208/230-60-3	25.4	35					43.4	50			52.5	60			61.5	70	70.5	80
MAH1048HC	208/230-60-3	25.4	35					43.4	50			52.5	60			61.5	70	70.5	80
MAH1060HC	208/230-60-3	35.6	50					53.6	60			62.6	70			71.6	80	80.7	90
MAH1024HD	460-60-3	9.5	15					18.5	20			23.1	25			27.6	30	32.1	35
MAH1030HD	460-60-3	10.2	15					19.2	20			23.7	25			28.2	30	32.7	35
MAH1036HD	460-60-3	11.1	15					20.1	25			24.6	25			29.1	30	33.6	35
MAH1042HD	460-60-3	12.0	15					21.0	25			25.5	30			30.0	30	34.5	35
MAH1048HD	460-60-3	12.2	15					21.2	25			25.7	30			30.2	35	34.8	35
MAH1060HD	460-60-3	16.5	20					25.5	30			30.1	35			34.6	35	39.1	40
MAH1024HZ	575-60-3	7.3	15					14.8	15			18.6	20			22.3	25	26.1	30
MAH1030HZ	575-60-3	8.7	15					16.2	20			20.0	20			23.7	25	27.5	30
MAH1036HZ	575-60-3	8.7	15					16.2	20			20.0	20			23.7	25	27.5	30
MAH1042HZ	575-60-3	10.1	15					17.7	20			21.4	25			25.2	30	29.0	30
MAH1048HZ	575-60-3	11.0	15					18.5	20			22.3	25			26.1	30	29.8	30
MAH1060HZ	575-60-3	14.5	20					22.1	25			25.8	30			29.6	30	33.4	35

S-Circuit - The user can move a pin on the board to control whether the electric heat will operate simultaneously with the compressor (S Circuit – NO) or will not run simultaneously with the compressor (S Circuit – Yes).

[1]MCA = Minimum Circuit Ampacity (Wiring Size Amps) [2]MFS = Maximum Fuse or HACR Breaker Size [3]SPPE = Single Point Power Entry
[4]Top Supply/Center Return [5]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.

Unit Load Amps (Heating) - MAH Heat Pumps with Ventilation Configurations:

C: Economizer, Outside Air with Pressure Relief
D: Motorized 2-Position Damper, up to 450 cfm of Outside Air w/Pressure Relief
E: Motorized Damper w/Pressure Relief & Independent Motorized Damper Control
N: Barometric Damper, up to 15% Outside Air
T: Title 24 Compliant Economizer & Controls

Basic Model Number	Volts-Hz-Ph	Current Amps		LOAD OF RESISTIVE HEATING - ELEMENTS ONLY (AMPS) *(1) ALL HEATING ELEMENTS ARE ON A SEPARATE CIRCUIT* **(2) SHADED VALUES (12 & 15 kW) UTILIZE TWO CIRCUITS**								TOTAL MAXIMUM HEATING AMPS *INCLUDES AMPS FROM MOTOR(S) THAT ARE LOCATED ON AN ELECTRICAL CIRCUIT THAT DOES NOT HAVE HEATERS*							
		HP[1]	IBM[2]	4 kW	5 kW	6 kW	8 kW	9 kW	10 kW	12 kW	15 kW	4 kW	5 kW	6 kW	8 kW	9 kW	10 kW	12 kW	15 kW
MAH1020HA	208/230-60-1	16.6	2.8	16.7	20.8	25.0	33.3		41.7			19.5	23.6	27.8	36.1		44.5		
MAH1024HA	208/230-60-1	18.2	2.8	16.7	20.8	25.0	33.3		41.7			19.5	23.6	27.8	36.1		44.5		
MAH1030HA	208/230-60-1	21.1	4.1	16.7	20.8	25.0	33.3		41.7	**50.0**	**62.5**	20.8	24.9	29.1	37.4		45.8	**54.1**	**66.6**
MAH1036HA	208/230-60-1	22.3	4.1	16.7	20.8	25.0	33.3		41.7	**50.0**	**62.5**	20.8	24.9	29.1	37.4		45.8	**54.1**	**66.6**
MAH1042HA	208/230-60-1	28.0	4.1	16.7	20.8	25.0	33.3		41.7	**50.0**	**62.5**	20.8	24.9	29.1	37.4		45.8	**54.1**	**66.6**
MAH1048HA	208/230-60-1	31.8	4.1	16.7	20.8				41.7	**50.0**	**62.5**	20.8	24.9				45.8	**54.1**	**66.6**
MAH1060HA	208/230-60-1	37.9	6.0	16.7	20.8				41.7	**50.0**	**62.5**	22.7	26.8				47.7	**56.0**	**68.5**
MAH1024HC	208/230-60-3	14.6	2.8	9.6	12.0				24.1	28.9	36.1	12.4	14.8				26.9	31.7	38.9
MAH1030HC	208/230-60-3	20.4	4.1			14.4		21.7		28.9	36.1			18.5		25.8		33.0	40.2
MAH1036HC	208/230-60-3	19.8	4.1			14.4		21.7		28.9	36.1			18.5		25.8		33.0	40.2
MAH1042HC	208/230-60-3	22.2	4.1			14.4		21.7		28.9	36.1			18.5		25.8		33.0	40.2
MAH1048HC	208/230-60-3	22.2	4.1			14.4		21.7		28.9	36.1			18.5		25.8		33.0	40.2
MAH1060HC	208/230-60-3	30.9	6.0			14.4		21.7		28.9	36.1			20.4		27.7		34.9	42.1
MAH1024HD	460-60-3	8.3	1.4			7.2		10.8		14.4	18.0			8.6		12.2		15.8	19.4
MAH1030HD	460-60-3	8.9	2.1			7.2		10.8		14.4	18.0			9.3		12.9		16.5	20.1
MAH1036HD	460-60-3	9.6	2.1			7.2		10.8		14.4	18.0			9.3		12.9		16.5	20.1
MAH1042HD	460-60-3	10.5	2.1			7.2		10.8		14.4	18.0			9.3		12.9		16.5	20.1
MAH1048HD	460-60-3	10.7	2.1			7.2		10.8		14.4	18.0			9.3		12.9		16.5	20.1
MAH1060HD	460-60-3	14.5	3.0			7.2		10.8		14.4	18.0			10.2		13.8		17.4	21.0
MAH1024HZ	575-60-3	6.3	1.1			6.0		9.0		12.0	15.1			7.1		10.1		13.1	16.2
MAH1030HZ	575-60-3	7.5	1.6			6.0		9.0		12.0	15.1			7.6		10.6		13.6	16.7
MAH1036HZ	575-60-3	7.5	1.6			6.0		9.0		12.0	15.1			7.6		10.6		13.6	16.7
MAH1042HZ	575-60-3	8.9	1.6			6.0		9.0		12.0	15.1			7.6		10.6		13.6	16.7
MAH1048HZ	575-60-3	9.6	1.6			6.0		9.0		12.0	15.1			7.6		10.6		13.6	16.7
MAH1060HZ	575-60-3	12.6	2.4			6.0		9.0		12.0	15.1			8.4		11.4		14.4	17.5

[1]HP = Heat Pump Unit Amps (includes Indoor Motor amps) [2]IBM = Indoor Blower Motor

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.

Total heating amps for single phase units with two circuits (#1 and #2) includes both circuits. Total heating and cooling amps includes all motors. Three phase models contain single phase motor loads. Values shown are maximum phase loads. Loads are not equally balanced on each phase.

Marvair MAH 2-Stage Heat Pump Certified Ratings & Performance

Efficiency and Capacity Ratings at ANSI/AHRI Standard 390 - MAH Heat Pumps

Model Number	MAH2024H			MAH2030H			MAH2036H			MAH2042H			MAH2048H			MAH2060H		
	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D
Cooling BTUH[1]	20,600			29,000			33,000			40,000			46,000			56,000		
EER[2]	11			11			11			11			11			11		
IPLV[3]	14.3			15.5			14.3			14.3			14			14.8		
High Temperature Heating[4]	21,000			25,000			29,000			35,400			42,000			50,500		
High Temperature COP[5]	3.3			3.3			3.3			3.3			3.3			3.3		
Rated Indoor Air Flow (CFM[6])	950			1,050			1,180			1,350			1,700			1,750		

[1]Cooling is rated at 95°F (35°C) outdoor and 80°F DB/67°F WB (26.5°C DB/19.5°C WB) return air.
[2]EER = Energy Efficiency Ratio
[3]IPLV = Integrated Part Load Value
[4]High Temperature Heating & COP are rated at 47°F DB/43°F WB (8.3°C DB/6.1°C WB) outdoor and 70°F (21.1°C) return air.
[5]COP = Coefficient of Performance
[6]CFM = Cubic Feet per Minute
Ratings are with no outside air. Performance will be affected by altitude. Ratings are at 230 volts for 208/230 volt units ("A" & "C" models) and 460 volts for "D" models. Operation of units at different voltage from that of the rating point will affect performance and air flow.

Sensible Total Heat Ratio @ 95ºF (35ºC) Outside Air DB - MAH Heat Pumps

Model Number	MAH2024H			MAH2030H			MAH2036H			MAH2042H			MAH2048H			MAH2060H		
	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D	A	C	D
Total Capacity	20,600			29,000			33,000			40,000			46,000			56,000		
Sensible Heat Ratio	0.80			0.70			0.70			0.70			0.70			0.70		
Sensible Capacity	16,500			20,300			23,100			27,200			31,000			39,200		
Rated Air Flow (CFM[1])	950			1,050			1,180			1,350			1,700			1,750		

[1]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 - MAH Heat Pumps

Model Number	Outdoor Temperature											
	75ºF/24ºC	80ºF/26.5ºC	85ºF/29ºC	90ºF/32ºC	95ºF/35ºC	100ºF/38ºC	105ºF/40.5ºC	110ºF/43.3ºC	115ºF/46ºC	120ºF/49ºC	125ºF/52ºC	130ºF/54ºC
MAH2024H	23,896	23,072	22,484	21,424	20,600	19,776	18,952	18,128	17,716	16,480	15,656	14,832
MAH2030H	33,640	32,480	31,320	30,160	29,000	27,840	26,680	25,520	24,940	23,200	22,040	20,880
MAH2036H	39,440	38,080	36,720	35,360	34,000	32,640	31,280	29,920	29,240	27,200	25,840	24,480
MAH2042H	46,400	44,800	43,200	41,600	40,000	38,400	36,800	35,200	34,400	32,000	30,400	28,800
MAH2048H	53,360	51,520	49,680	47,840	46,000	44,160	42,320	40,480	39,560	36,800	34,960	33,120
MAH2060H	64,900	62,700	60,500	58,200	56,000	53,700	51,500	49,300	48,100	44,800	42,600	40,300

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 - MAH Heat Pumps

Model Number	Outdoor Temperature								
	10ºF/-12.2ºC	17ºF/-8.3ºC	20ºF/-6.7ºC	30ºF/-1.1ºC	40ºF/4.4ºC	47ºF/8.3ºC	50ºF/10ºC	60ºF/15.6ºC	70ºF/21.1ºC
MAH2024H	11,560	13,600	14,340	16,930	19,150	21,000	21,630	22,575	23,625
MAH2030H	15,130	17,800	18,520	21,040	23,200	25,000	25,750	26,875	28,125
MAH2036H	15,810	18,600	19,740	23,730	27,150	30,000	30,900	32,250	33,750
MAH2042H	18,700	22,000	23,340	28,030	32,050	35,400	36,462	38,055	39,825
MAH2048H	20,400	24,000	25,800	32,100	37,500	42,000	43,260	45,150	47,250
MAH2060H	29,500	34,700	36,300	41,800	46,500	50,500	51,900	54,300	56,800

Based upon ANSI/AHRI std. 390 return air conditions of 70°F DB (21.1°C DB). Return air at rated air flow.

Electrical Characteristics - Compressor, Fan, Ventilation & Blower Motors
MAH Heat Pumps with 2-Stage Compressor

Basic Model	Compressor				Outdoor Fan Motor				Indoor Blower Motor				Ventilation GreenWheel AMPS		
	Type	Volts-Hz-Ph	RLA[1]	LRA[2]	Volts-Hz-PH	RPM[3]	FLA[4]	HP[5]	Volts-Hz-PH	RPM[3]	FLA[4]	HP[5]	OAM[6]	EXM[7]	WD[8]
MAH2024HA	Scroll	208/230-60-1	10.3	62.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	2.8	1/3	1.0	1.0	0.2
MAH2030HA		208/230-60-1	14.6	90.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2036HA		208/230-60-1	14.6	90.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2042HA		208/230-60-1	18.2	106.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2048HA		208/230-60-1	18.3	138.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2060HA		208/230-60-1	25.2	147.3	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	6.0	3/4	1.0	1.0	0.2
MAH2024HC	Scroll	208/230-60-3	6.3	56.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	2.8	1/3	1.0	1.0	0.2
MAH2030HC		208/230-60-3	7.9	66.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2036HC		208/230-60-3	9.9	82.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2042HC		208/230-60-3	11.5	114.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2048HC		208/230-60-3	11.9	112.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2060HC		208/230-60-3	13.8	150.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	6.0	3/4	1.0	1.0	0.2
MAH2024HD	Scroll	460-60-3	3.8	29.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	2.8	1/3	1.0	1.0	0.2
MAH2030HD		460-60-3	4.8	39.0	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2036HD		460-60-3	4.8	44.3	208/230-60-1	1200	3.5	1/3	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2042HD		460-60-3	6.5	56.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2048HD		460-60-3	6.8	61.8	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	4.1	1/2	1.0	1.0	0.2
MAH2060HD		460-60-3	6.9	58.0	208/230-60-1	1200	5.3	1/2	208/230-60-1	1050	6.0	3/4	1.0	1.0	0.2

[1]RLA = Rated Load Amps [2]LRA = Locked Rotor Amps [3]RPM = Revolutions per Minute [4]FLA = Full Load Amps
[5]HP = Horsepower [6]OAM = Outside Air Mover [7]EXM = Exhaust Air Mover [8]WD = Wheel Drive Motor
The 460 volt units have a step down transformer for the 230 volt motors.

MAH Heat Pumps Summary Electrical Ratings (Wire and HACR Circuit Breaker Sizing) - Ventilation Configuration:

C: Economizer, Outside air with Pressure Relief
D: Motorized 2-Position Damper, up to 450 cfm of outside air w/Pressure Relief
E: Motorized Damper w/Pressure Relief & Independent Motorized Damper Control
N: Barometric Damper, up to 15% outside air
T: Title 24 Compliant Economizer & Controls

Electric Heat		000 = None		040 = 4 kw		050 = 5 kw		060 = 6 kw		080 = 8 kw		090 = 9 kw		100 = 10 kw		120 = 12 kw		150 = 15 kw	
Basic Model	Volts-Hz-Ph	SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]		SPPE[3]	
		MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]	MCA[1]	MFS[2]
MAH2024HA	208/230-60-1	19.2	25	40.0	45	45.2	50	50.4	60	60.8	70			71.3	80				
MAH2030HA	208/230-60-1	25.9	40	46.7	50	51.9	60	57.1	60	67.5	70			77.9	80				
MAH2036HA	208/230-60-1	25.9	40	46.7	50	51.9	60	57.1	60	67.5	70			77.9	80				
MAH2042HA	208/230-60-1	32.2	50	53.0	60	58.2	70	63.4	70	73.8	80			84.2	90	94.7	100	110.3	125
MAH2048HA	208/230-60-1	32.3	50	53.1	60	58.3	70	63.5	70	73.9	80			84.4	90	94.8	100	110.4	125
MAH2060HA	208/230-60-1	42.8	60	63.6	80	68.8	80	74.1	90	84.5	100			94.9	100	105.3	110	120.9	125
MAH2024HC	208/230-60-3	14.2	20					32.2	35			41.2	45			50.3	60	59.3	60
MAH2030HC	208/230-60-3	17.5	25					35.5	40			44.5	45			53.6	60	62.6	70
MAH2036HC	208/230-60-3	20.0	25					38.0	40			47.0	50			56.1	60	65.1	70
MAH2042HC	208/230-60-3	23.8	35					41.8	45			50.8	60			59.9	60	68.9	70
MAH2048HC	208/230-60-3	24.3	35					42.3	50			51.3	60			60.4	70	69.4	70
MAH2060HC	208/230-60-3	28.6	40					46.6	50			55.6	60			64.6	70	73.7	80
MAH2024HD	460-60-3	7.9	15					16.9	20			21.4	25			25.9	30	30.5	35
MAH2030HD	460-60-3	9.8	15					18.8	20			23.3	25			27.8	30	32.4	35
MAH2036HD	460-60-3	9.8	15					18.8	20			23.3	25			27.8	30	32.4	35
MAH2042HD	460-60-3	12.8	15					21.8	25			26.4	30			30.9	35	35.4	40
MAH2048HD	460-60-3	13.2	15					22.2	25			26.7	30			31.2	35	35.8	40
MAH2060HD	460-60-3	14.3	20					23.3	25			27.8	30			32.3	35	36.8	40

S-Circuit - The user can move a pin on the board to control whether the electric heat will operate simultaneously with the compressor (S Circuit – NO) or will not run simultaneously with the compressor (S Circuit – Yes).

[1]MCA = Minimum Circuit Ampacity (Wiring Size Amps) [2]MFS = Maximum Fuse or HACR Breaker Size [3]SPPE = Single Point Power Entry

[4]Top Supply/Center Return [5]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.

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.

Unit Load Amps (Heating) - MAH Heat Pumps with Ventilation Configurations:

C: Economizer, Outside Air with Pressure Relief
D: Motorized 2-Position Damper, up to 450 cfm of Outside Air w/Pressure Relief
E: Motorized Damper w/Pressure Relief & Independent Motorized Damper Control
N: Barometric Damper, up to 15% Outside Air
T: Title 24 Compliant Economizer & Controls

Basic Model	Volts-Hz-Ph	Current Amps		LOAD OF RESISTIVE HEATING - ELEMENTS ONLY (AMPS (1) ALL HEATING ELEMENTS ARE ON A SEPARATE CIRCUIT (2) SHADED VALUES (12 & 15 kW) UTILIZE TWO CIRCUITS								TOTAL MAXIMUM HEATING AMPS INCLUDES AMPS FROM MOTOR(S) THAT ARE LOCATED ON AN ELECTRICAL CIRCUIT THAT DOES NOT HAVE HEATERS							
		HP[1]	IBM[2]	4 kW	5 kW	6 kW	8 kW	9 kW	10 kW	12 kW	15 kW	4 kW	5 kW	6 kW	8 kW	9 kW	10 kW	12 kW	15 kW
MAH2024HA	208/230-60-1	16.6	2.8	16.7	20.8	25.0	33.3		41.7			19.5	23.6	27.8	36.1		44.5		
MAH2030HA	208/230-60-1	22.2	4.1	16.7	20.8	25.0	33.3		41.7			20.8	24.9	29.1	37.4		45.8		
MAH2036HA	208/230-60-1	22.2	4.1	16.7	20.8	25.0	33.3		41.7			20.8	24.9	29.1	37.4		45.8		
MAH2042HA	208/230-60-1	27.6	4.1	16.7	20.8	25.0	33.3		41.7	50.0	62.5	20.8	24.9	29.1	37.4		45.8	54.1	66.6
MAH2048HA	208/230-60-1	27.7	4.1	16.7	20.8	25.0	33.3		41.7	**50.0**	**62.5**	20.8	24.9	29.1	37.4		45.8	**54.1**	**66.6**
MAH2060HA	208/230-60-1	36.5	6.0	16.7	20.8	25.0	33.3		41.7	**50.0**	**62.5**	22.7	26.8	31.0	39.3		47.7	**56.0**	**68.5**
MAH2024HC	208/230-60-3	12.6	2.8			14.4		21.7		28.9	36.1			17.2		24.5		31.7	38.9
MAH2030HC	208/230-60-3	15.5	4.1			14.4		21.7		28.9	36.1			18.5		25.8		33.0	40.2
MAH2036HC	208/230-60-3	17.5	4.1			14.4		21.7		28.9	36.1			18.5		25.8		33.0	40.2
MAH2042HC	208/230-60-3	20.9	4.1			14.4		21.7		28.9	36.1			18.5		25.8		33.0	40.2
MAH2048HC	208/230-60-3	21.3	4.1			14.4		21.7		28.9	36.1			18.5		25.8		33.0	40.2
MAH2060HC	208/230-60-3	25.1	6.0			14.4		21.7		28.9	36.1			20.4		27.7		34.9	42.1
MAH2024HD	460-60-3	7.0	1.4			7.2		10.8		14.4	18.0			8.6		12.2		15.8	19.4
MAH2030HD	460-60-3	8.6	2.1			7.2		10.8		14.4	18.0			9.3		12.9		16.5	20.1
MAH2036HD	460-60-3	8.6	2.1			7.2		10.8		14.4	18.0			9.3		12.9		16.5	20.1
MAH2042HD	460-60-3	11.2	2.1			7.2		10.8		14.4	18.0			9.3		12.9		16.5	20.1
MAH2048HD	460-60-3	11.5	2.1			7.2		10.8		14.4	18.0			9.3		12.9		16.5	20.1
MAH2060HD	460-60-3	12.6	3.0			7.2		10.8		14.4	18.0			10.2		13.8		17.4	21.0

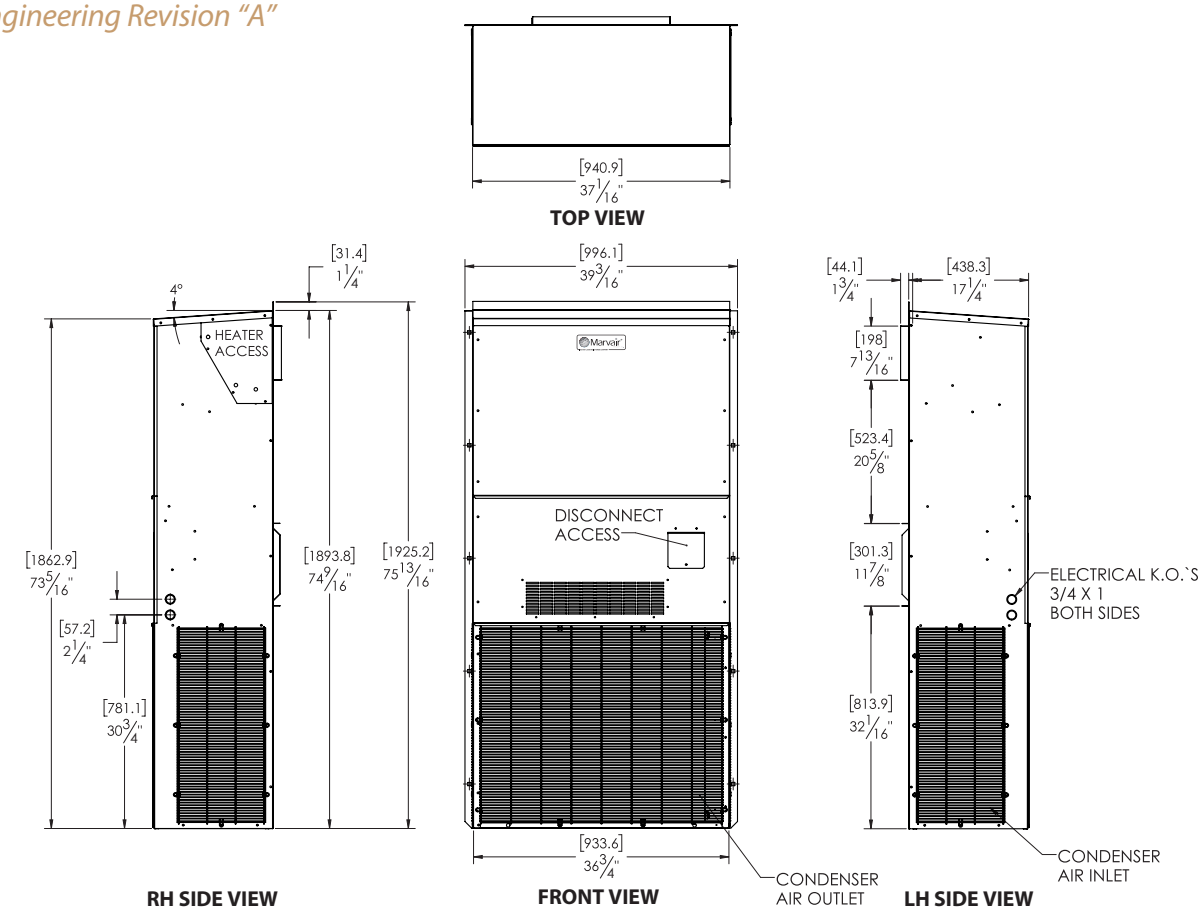
[1]HP = Heat Pump Unit Amps (includes Indoor Motor amps) [2]IBM = Indoor Blower Motor

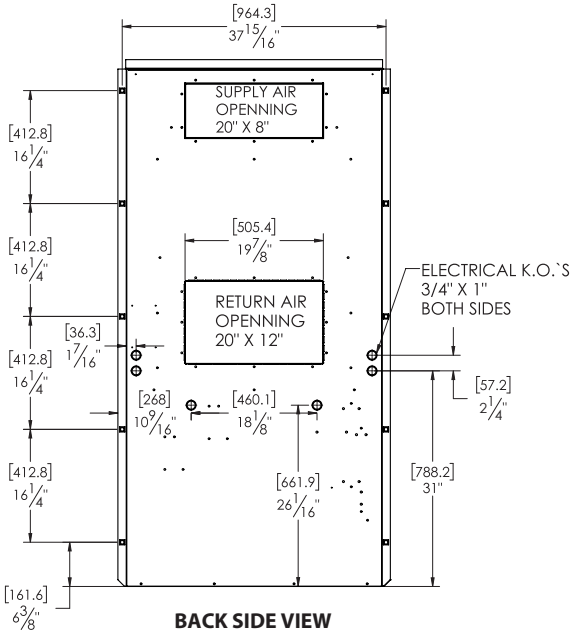
Heating kW is rated at 240 volts on the 208-230v. (HPA & HPC) models. Derate heater output by 25% for operation at 208 volts. Heating kW is rated at 480 volts on the HPD models.

Total heating amps for single phase units with two circuits (#1 and #2) includes both circuits. Total heating and cooling amps includes all motors. Three phase models contain single phase motor loads. Values shown are maximum phase loads. Loads are not equally balanced on each phase.

Dimensional Data: MAH1020H/1024H & MAH2024H

Engineering Revision "A"





Installation Weight

MAH1020H/1024H & MAH2024H	Base	w/Economizer	w/3 Phase	w/Economizer & 3 Phase	Max Shipping
Pounds	337	357	356	376	419
Kilograms	153	162	161	171	190

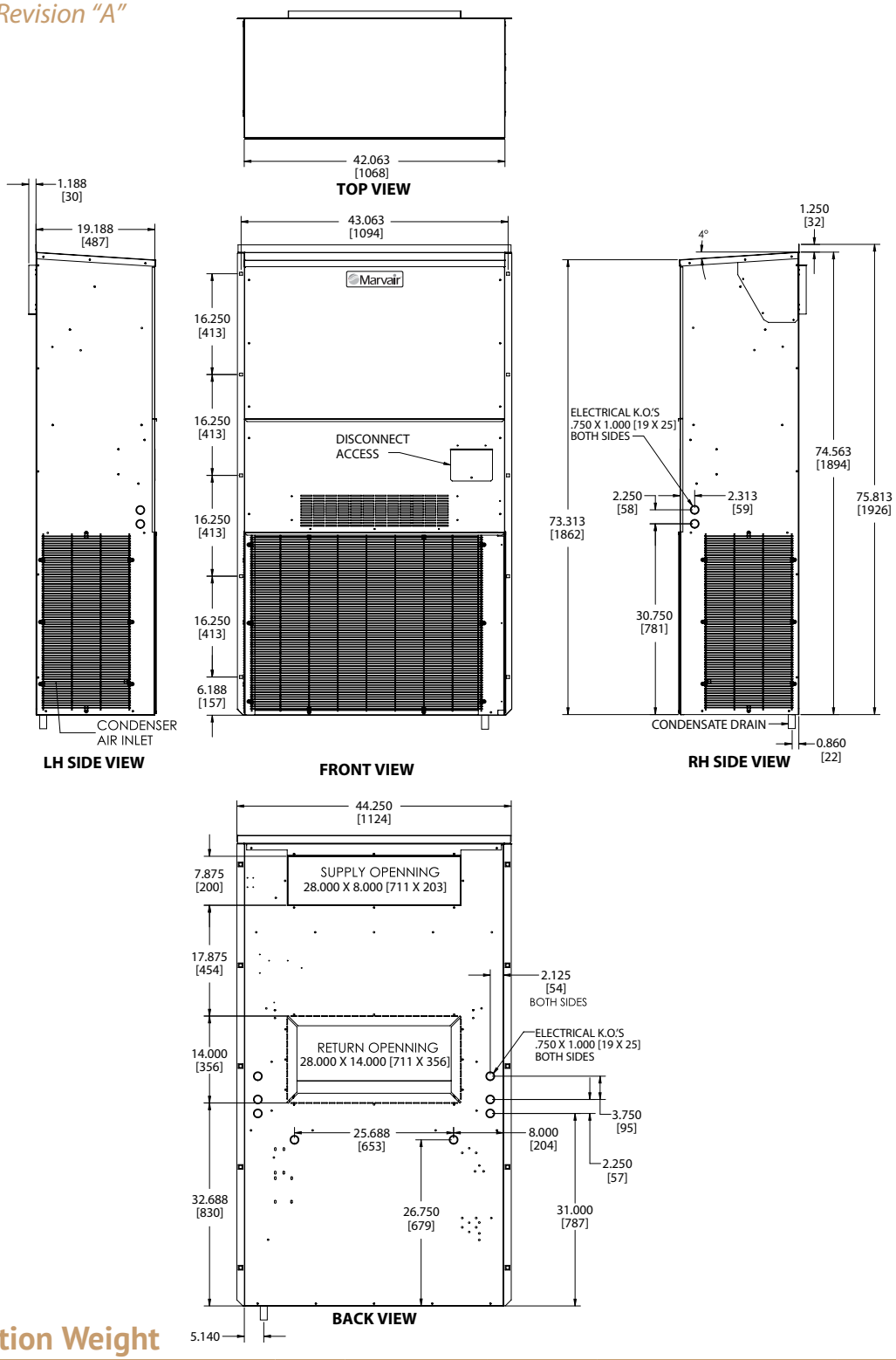
Filter Size

MAH1020H/1024H & MAH2024H	INCHES	MILLIMETERS	PART NUMBER	FILTERS PER UNIT	MERV RATING
RETURN AIR FILTER	16 x 25 x 2	406 x 635 x 51	80137	1	8 (STD)

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

Dimensional Data: MAH1030H/1036H & MAH2030H/2036H

Engineering Revision "A"



Installation Weight

MAH1030H/1036H & MAH2030H/2036H	Base	w/Economizer	w/3 Phase	w/Economizer & 3 Phase	Max Shipping
Pounds	397	419	416	438	470
Kilograms	180	190	189	199	213

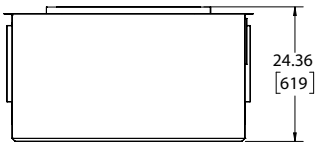
Filter Size

MAH1030H/1036H & MAH2030H/2036H	INCHES	MILLIMETERS	PART NUMBER	FILTERS PER UNIT	MERV RATING
RETURN AIR FILTER	18 x 30 x 2	457 x 762 x 51	93184	1	8 (STD)

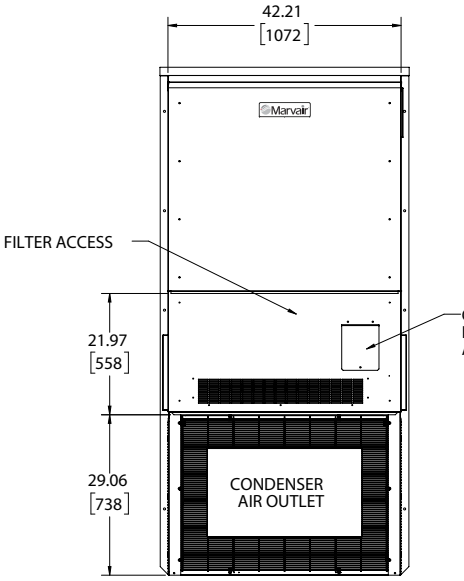
Note: All overall outside dimensions are given with +/- .250" (6mm) tolerance.

Dimensional Data: MAH1042H/1048H & MAH2042H/2048H

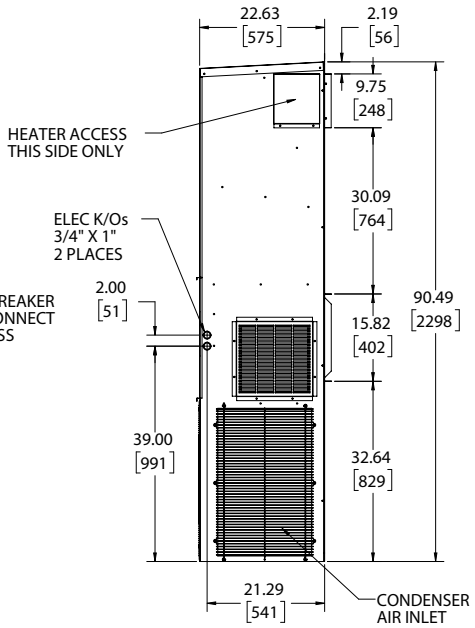
Engineering Revision "D"



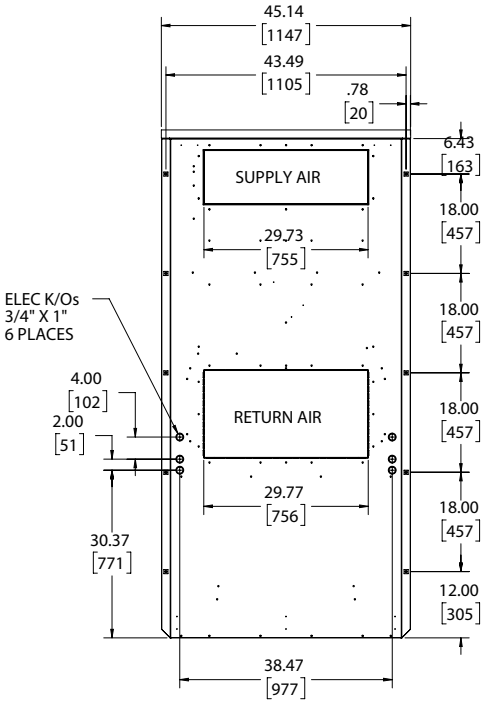
TOP VIEW



FRONT VIEW



RIGHT VIEW



REAR VIEW

Installation Weight

MAH1042H/MAH1048H & MAH2042H MAH2048H	Base	w/Economizer	w/3 Phase	w/Economizer & 3 Phase	Max Shipping
Pounds	469	492	522	545	571
Kilograms	213	223	237	247	259

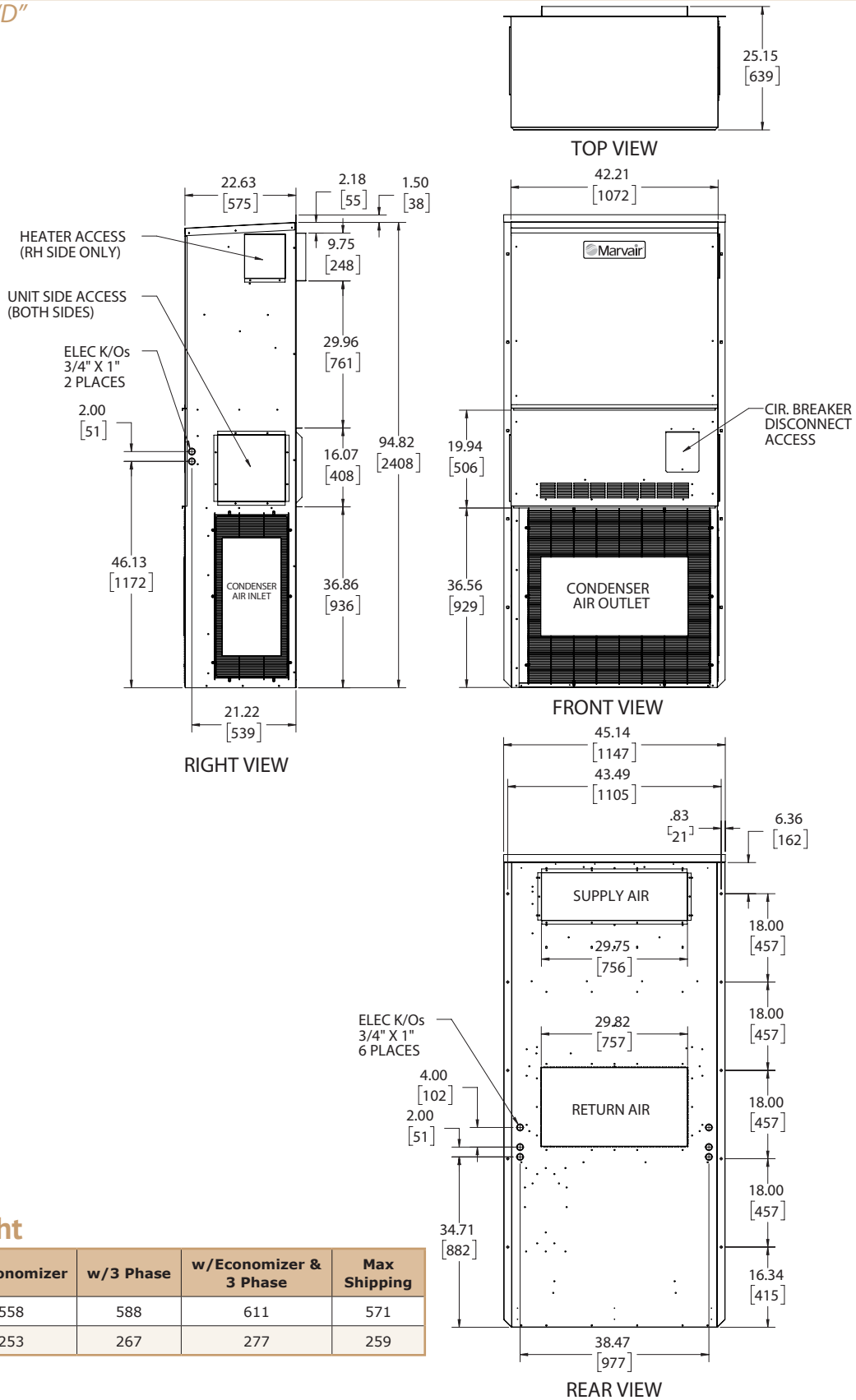
Filter Size

MAH1042H/1048H MAH2042H/2048H	INCHES	MILLIMETERS	PART NUMBER	FILTERS PER UNIT	MERV RATING
RETURN AIR FILTER	36½ x 22 x 2	927 x 559 x 51	80162	1	8 (STD)

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

Dimensional Data: MAH1060H & MAH2060H

Engineering Revision "D"



Installation Weight

MAH1060H MAH2060H	Base	w/Economizer	w/3 Phase	w/Economizer & 3 Phase	Max Shipping
Pounds	535	558	588	611	571
Kilograms	243	253	267	277	259

Filter Size

MAH1060H MAH2060H	INCHES	MILLIMETERS	PART NUMBER	FILTERS PER UNIT	MERV RATING
RETURN AIR FILTER	36½ x 22 x 2	927 x 559 x 51	80162	1	8 (STD)

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

Notes

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Please consult the Marvair® website at 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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