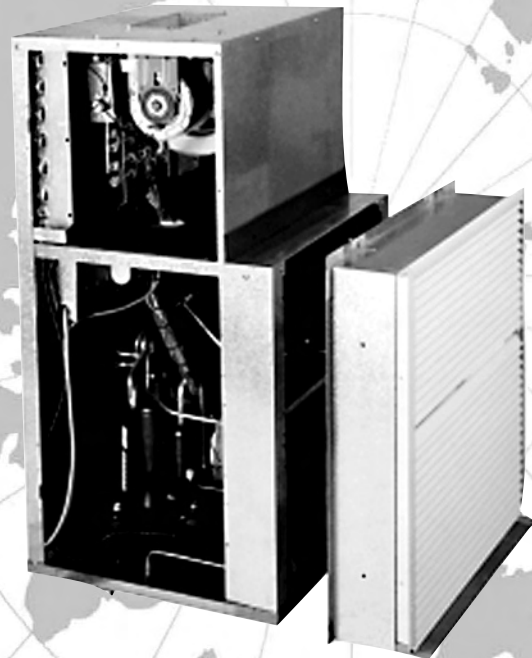


VPAC/VPHP SINGLE PACKAGE VERTICAL AIR CONDITIONER/HEAT PUMP FOR NEW CONSTRUCTION ONLY

Straight Cool/Heat Pump
Nominal Capacities: 9,000-12,000-
15,000-17,000-19,000-24,000 Btuh



VPAC/VPHP

Enviromaster International LLC
5780 Success Dr.
Rome, NY 13440
Email: info@retroaire.com

An **ECR** International Brand
An ISO 9001-2000 Certified Company



P/N# 240004198, Rev. 2.0 [08/07]

VPAC/VPHP SINGLE PACKAGE VERTICAL AIR CONDITIONER/HEAT PUMP

INSTALLATION , OPERATION, AND SPECIFICATION MANUAL

**Shipping Damage MUST be Reported to the Carrier IMMEDIATELY!!!
Examine the exterior. Remove cover and examine compressor and piping for signs of damage.**

This manual is intended as an aid to qualified service personnel for proper installation, operation, and maintenance of the VPAC/VPHP Packaged Terminal Air Conditioner (PTAC). Read these instructions thoroughly and carefully before attempting installation or operation. Failure to follow these instructions may result in improper installation, operation, service, or maintenance, possibly resulting in fire, electrical shock, property damage, personal injury, or death.

TO THE INSTALLER

- (1) Retain this manual and warranty for future reference.
- (2) Before leaving the premises, review this manual to be sure the unit has been installed correctly and run the unit for one complete cycle to make sure it functions properly.

To obtain technical service or warranty assistance during or after the installation of this unit, contact your local representative. Visit our web site www.retroaire.com for a local representative listing. For further assistance call 1-800-228-9364.

When calling for assistance, please have the following information ready:

- Model Number _____
- Serial Number _____
- Date of installation _____

 **Recognize this symbol as an indication of important safety information** 

SAFETY INSTRUCTIONS

- ▲ Read all instructions before using the VPAC/VPHP PTAC. Install or locate this unit only in accordance with these instructions. Use this unit only for its intended use as described in this manual.
- ▲ Check the rating plate on the VPAC/VPHP PTAC before installation to make certain the voltage shown is the same as the electric supply to the unit.
- ▲ The VPAC/VPHP PTAC must be connected only to a properly grounded electrical supply. Do not fail to properly ground this unit.
- ▲ Turn off the electrical supply before servicing the VPAC/VPHP PTAC.
- ▲ Do not use the VPAC/VPHP PTAC if it has damaged wiring, is not working properly, or has been damaged or dropped.

[Save These Instructions]

DANGER

The RetroAire PTAC must:

- ▲ Be connected to a properly grounded electrical supply with the proper voltage as stated on the rating plate.
- ▲ Have proper over current protection (i.e. time- delay fuse/HACR-Breaker) as listed on the Rating Plate.

Failure to follow these instructions can result in a fire, explosion, or electrical shock causing property damage, personal injury, or death.

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INSTALLER RESPONSIBILITIES

This manual has been prepared to acquaint you with the installation, operation and maintenance of this VPAC/ VPHP PTAC and to provide important safety information in these areas.

We urge you to read all of the instructions thoroughly before attempting the installation or operation of this unit. This manual should be kept for future reference.

The manufacturer of this unit will not be liable for any damages caused by failure to comply with the installation and operating instructions outlined in this manual.

A rating plate identifying this VPAC/VPHP PTAC can be found on the unit. When referring to your unit, always have the information listed on the rating plate readily available.

MODIFICATION AND TAMPERING



Tampering with the VPAC/VPHP is dangerous and may result in serious injury or death. Tampering voids all warranties. Do not attempt to modify or change this unit in any way.

IMPORTANT SAFETY FEATURE

Power Cord With Integral Safety Protection

All PTACs rated 250V or less that are cord connected to the power supply are equipped with a power cord with integral safety protection as standard. Providing personal shock protection as well as arcing and fire prevention, the device is designed to sense any damage in the line cord and disconnect power before a fire can occur. Tested in accordance with Underwriters Laboratories, the cord set also offers a unique "passive" operation, meaning the unit does not require resetting if main power is interrupted.

WARNING - A DAMAGED POWER SUPPLY CORD MUST BE REPLACED WITH A NEW CORD FROM THE MANUFACTURER, AND NOT REPAIRED.

Each power cord should be checked before every use. Follow the instructions in the order listed on the device.

WARNING - DO NOT USE THE PRODUCT IF THE UNIT FAILS THE TEST.



Completely read all instructions prior to assembling, installing, operating, or repairing this product. Inspect all parts for damage prior to installation and start-up. The VPAC/VPHP PTAC must be installed ONLY by qualified installation personnel.

PRODUCT DESCRIPTION

The VPAC/VPHP Single Package Vertical Air Conditioner (SPVAC) and Heat Pump (SPVHP) creates new options in layout and space utilization. The VPAC/VPHP offers low cost operation and quiet, comfortable air distribution, especially when used in multi-room suites, apartments, healthcare facilities, and homes.

Framed into a concealed closet enclosure for low operating sound levels, the VPAC/VPHP's vertical discharge vent allows ducting to the top of the room(s) for superior air circulation and distribution. Multiple air supply grilles can distribute air when used with a soffit and intake grilles can be located on either of the two sides of the enclosure.

The VPAC/VPHP offers an economic benefit when used in a multi-room suite by supplying conditioned air to more than one room without the need to install another unit. This is also a design advantage since the second room does not need an exterior wall for a second unit.

Each system is supplied with a ready-to-install wall sleeve and a condenser side air louver. The cabinet is constructed with 20 gauge galvanized steel with a G-90U corrosion resistant rating. The unit is designed with serviceability on three sides (front, left, and right). The insulated top discharge evaporator compartment provides quiet ducted, conditioned air delivery to other room location(s).

AIR SYSTEMS

Motors are thermally protected PSC type. Air stream surfaces are insulated with 1/4 inch fiberglass or 1/8 inch volara. The evaporator fan is a forward curved type directly mounted to the motor shaft. The condenser propeller and slinger ring (for condensate re-evaporation) utilize a blow-thru design for improved efficiency.

IMPORTANT: Consult the factory if an internal condensate drain system will be used. The standard VPAC/VPHP is designed to evaporate condensate by slinging it onto the warm condenser coil.

ELECTRICAL WIRING



Before accessing the control compartment, disconnect power to the unit. Failure to do so could result in serious injury or electrical shock.

ELECTRICAL WIRING *Continued*

All field wiring must be done in accordance to NEC and local codes. Check the unit rating plate for circuit ampacity and breaker or fuse size. Use only HACR type breakers. Select the proper wire for the ampacity rating. If a plug and receptacle are used check the proper fit.

The unit is wired for 230V primary voltage from the factory. The transformer must be rewired by the installer if the jobsite voltage is 208V.

Each vertical stack unit is equipped for a 24V wall thermostat connection. Units are shipped with a twenty foot plenum rated thermostat wire utilizing a quick connect plug to the unit.

STANDARD CONTROLS AND COMPONENTS

- Cooling or heat pump chassis w/high efficiency rotary or reciprocating type compressor
- Indoor/outdoor mounting anodized outdoor louver for field installation (optional colors available)
- Manual fresh air damper (located on service panel below evaporator coil)
- Front mounted control box (unless otherwise specified)
- Microprocessor control board
 - Fan purge: Fan remains on for 60 seconds after heat/cool call is dropped ("Auto" mode only)
 - Universal control board: circuit board can be used in either a straight cool electric, hydronic heat, or cooling/heat pump application.
 - Anti-short cycle compressor protection
 - Random start timer: prevents multiple units from simultaneous start-ups
 - Freeze protection: prevents evaporator freeze ups
 - Low ambient lockout
 - Test operation: allows ease of testing after installation (all timers are eliminated)
 - Compatible with fossil fuel, electric heat, mercury or electronic thermostats
- Temperature sensitive drain pan valve for heating condensate disposal (VPHP only)
- Wall sleeve

OPTIONAL CONTROLS AND COMPONENTS

- Hydronic heat coil
- Electric heat coil
- Painted outdoor air louver
- Wall thermostat (digital or mercury bulb)
- Power disconnect
- EMS management relay
- Casters (for easy maneuverability)
- Return air access panel (standard white or custom colors available)

INSTALLATION FOR NEW CONSTRUCTION

INSPECTION

Carefully check the shipment against the bill of lading. Make sure all chassis, wall sleeves, and louvers (as well as any options) have been received. Inspect each component for damage. The carrier must make proper notation on the delivery receipt of all damage identified and complete a carrier inspection report. Concealed damage must be reported to the carrier within 15 days of the receipt of the shipment.

IMPORTANT: The purchaser must notify the EMI traffic department of all damage and is responsible for filing any necessary claims with the carrier.



Avoid possibility of electric shock and personal injury. Disconnect all power before removing chassis or performing any cleaning, servicing, or maintenance.

Enviromaster International recommends installing the unit before any carpentry work is started for the enclosure. It is very important for proper air flow and sound levels that a minimum clearance of 4" (09-17) or 6" (19-24) between the enclosure and the chassis be maintained. It is also very important that the rough opening in the wall for the wall sleeve and louver be the correct dimension and in the exact position necessary for installation. (Figure 1)

Figure 1

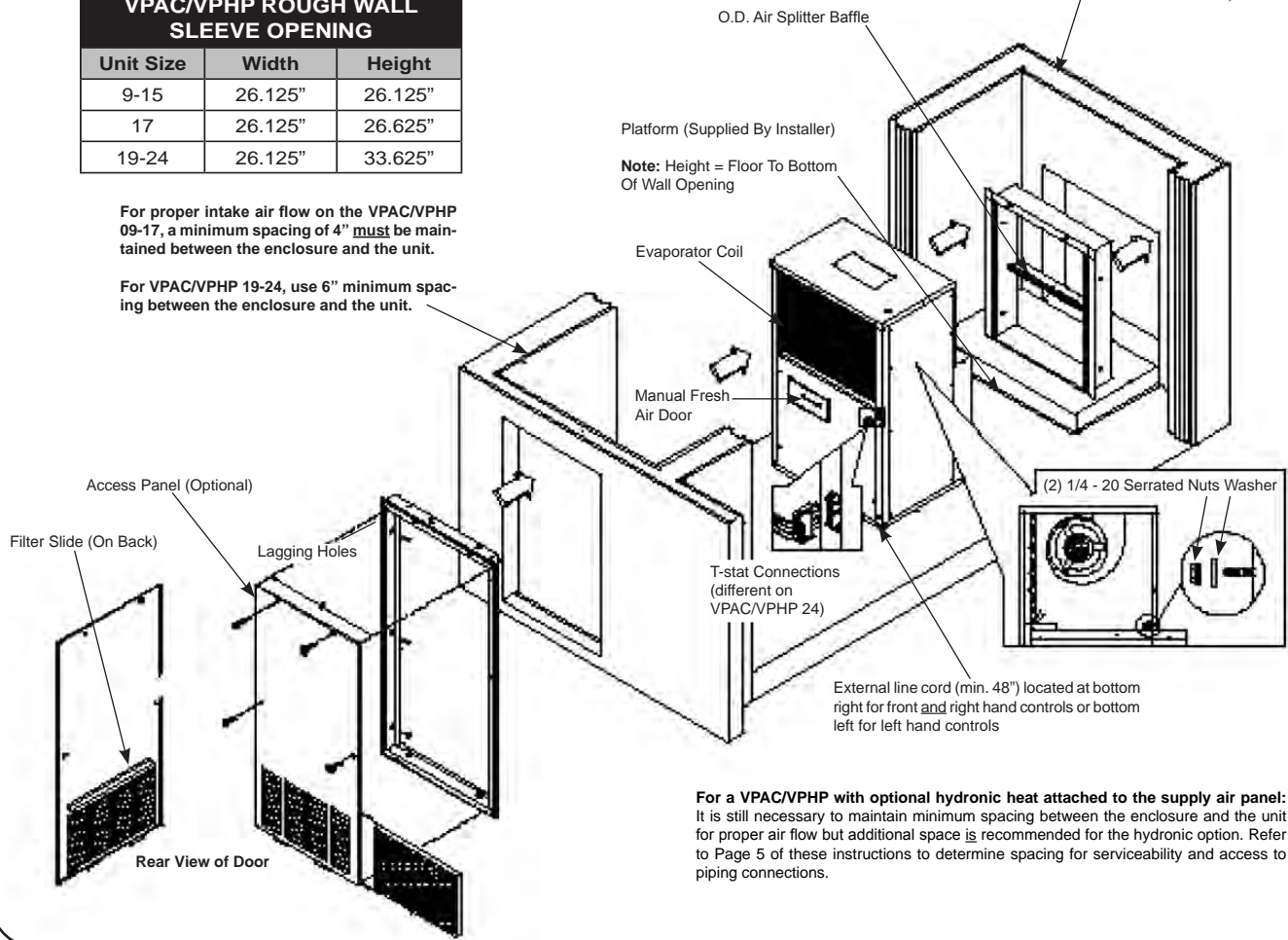
EXPLODED VIEW OF TYPICAL INSTALLATION

VPAC/PHP ROUGH WALL SLEEVE OPENING		
Unit Size	Width	Height
9-15	26.125"	26.125"
17	26.125"	26.625"
19-24	26.125"	33.625"

For proper intake air flow on the VPAC/PHP 09-17, a minimum spacing of 4" must be maintained between the enclosure and the unit.

For VPAC/PHP 19-24, use 6" minimum spacing between the enclosure and the unit.

Minimum overall wall thickness must be at least 5" for straight cool models and 6½" for heat pumps. (Consult factory if minimum wall thickness cannot be met.)

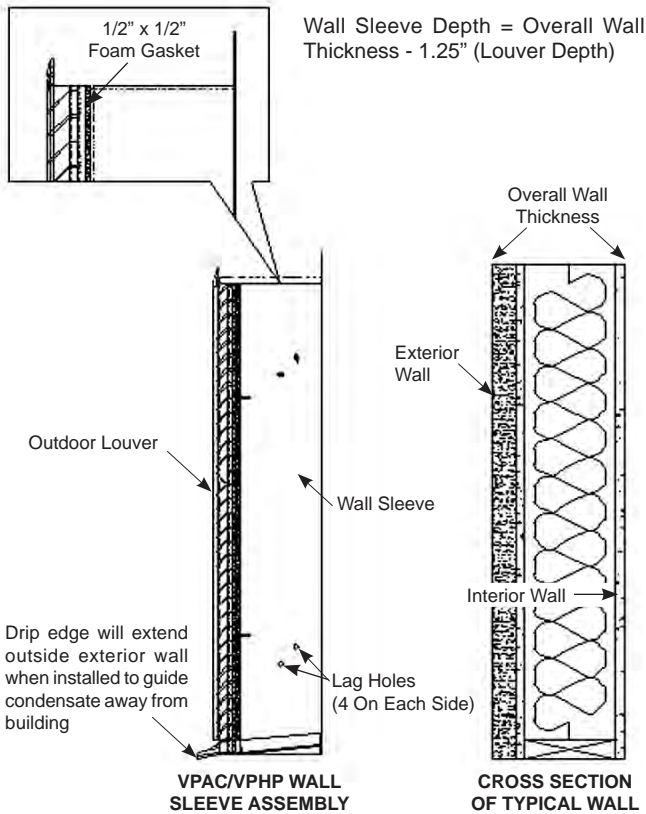


For a VPAC/PHP with optional hydronic heat attached to the supply air panel: It is still necessary to maintain minimum spacing between the enclosure and the unit for proper air flow but additional space is recommended for the hydronic option. Refer to Page 5 of these instructions to determine spacing for serviceability and access to piping connections.

The platform height should be the same level as the bottom of the wall opening or, if casters are used, 1 and 3/16" lower (to accommodate the casters), to allow the chassis to sit level on the platform. Because wall sleeve depths can vary depending on overall wall thickness, it is critical that wall thickness be determined before ordering the wall sleeve (*Figure 2*). Consult factory for available wall sleeve sizes.

Figure 2

DETERMINING WALL SLEEVE DEPTH



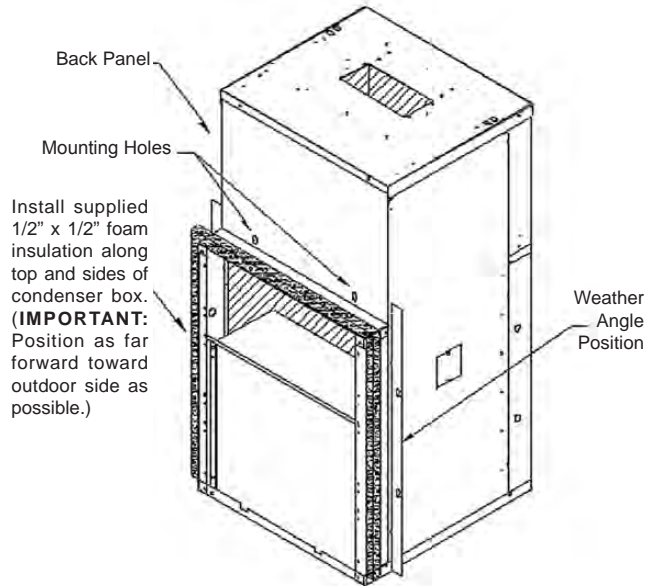
1. Install 1/2" x 1/2" or 1" x 1" foam tape (supplied) to the unit condenser top and sides to seal against the wall sleeve (*Figure 3*).

CAUTION

Before continuing with Step 2, refer to the appropriate control box application for your installation (i.e., front or left/right side control applications.)

Figure 3

INSULATION & WEATHER ANGLES



FRONT CONTROL APPLICATIONS (Standard)

- A. Attach the weather angles to the chassis using the screws provided.
- B. Slide chassis into wall sleeve, assuring that wall sleeve studs align with the holes just above the condenser coil.
- C. Attach left and right weather angles to wall sleeve using the two 1/4-20 nuts provided.

WARNING

In front control applications, do not attempt to attach the back panel of the chassis to the wall sleeve to prevent extreme difficulty in removing the chassis after the enclosure is completed (*Figure 3*).

LEFT/RIGHT SIDE CONTROL APPLICATIONS

- A. Remove applicable side panel from chassis.
- B. Slide chassis into wall sleeve, assuring that wall sleeve studs align with the holes just above the condenser coil.
- C. Attach wall sleeve to back panel of chassis using the two 1/4-20 nuts (*see Figure 1 for detailed illustration and Figure 3 for location of mounting holes*).
- D. Replace side panel on chassis.
- E. Attach applicable weather angle to chassis and wall sleeve using one 1/4-20 nut (provided).

- 2. Install plenum and duct work.
- 3. Plug in the supplied low voltage harness and run it to the wall thermostat as shown in the unit's wire diagram.
- 4. If the unit is equipped with a drain stub in the base pan, connect the drain stub to the building's internal condensate removal system.

If the unit is not equipped with a drain stub, a minimal amount of condensate will, during the heating cycle, run out the wall sleeve, onto the drip edge, and away from the building when the drain pan valve opens. During the cooling cycle, condensate will be funneled to an area near the condensing fan and picked up by the slinger ring. The condensate will be slung against the hot condenser coil to evaporate. Any excess condensate due to rain or humidity will overflow through notches in the rear of the base pan and again run out the wall sleeve, onto the drip edge, and out of the building.

INDOOR MOTOR SPEED TAP SELECTION



Before accessing the control compartment, disconnect power to the unit. Failure to do so could result in serious injury or electrical shock.

For information on indoor motor speed tap selection, please refer to the "Indoor Motor Speed Tap Selection Chart" label attached to the chassis of the VPAC/VPHP (Figure 4).

The motor comes factory wired for the corresponding units as described in the 230V column. Please make speed tap changes as required by job site voltage and/or external static pressure (e.s.p.) Speed tap changes may need to be changed from factory settings and enviromaster international will not be liable for any system problems that could arise if motor speed is not changed to match application.

Figure 4

VPAC/VPHP INDOOR MOTOR SPEED TAP SELECTION CHART

Unit Size	ESP	230V	208V	197V
9	0.1	Red	Red	Red
	0.2	Red	Red	Blu
	0.3	Red	Blu	Blu
12	0.1	Blu	Blu	Blu
	0.2	Blu	Blk	Blk
	0.3	Blu	Blk	Blk
15	0.1	Blk	Blk	Blk
	0.2	Blk	Blk	Blk
	0.3	Blk	Blk	Blk
17-19	0.1	Red	Red	Red
	0.2	Red	Blk	Blk
	0.3	Blk	Blk	Blk
24	0.1	Blk	Blk	Blk
	0.2	Blk	Blk	Blk
	0.3	Blk	Blk	Blk

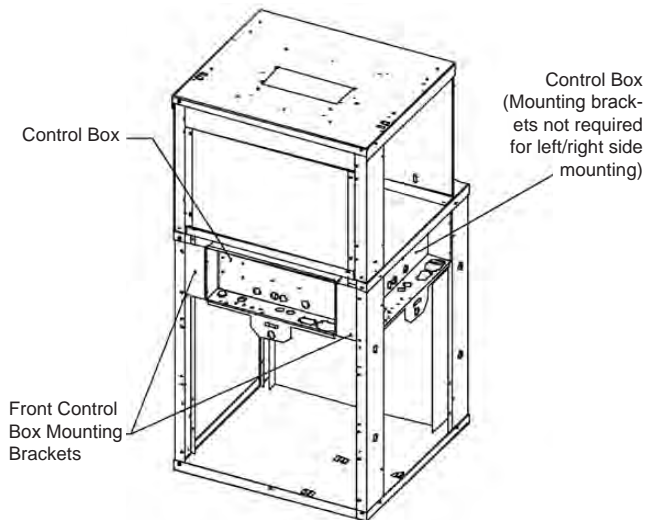
Tap Key - Red (Low) - Blu (Med) - Blk (High)

CONTROL BOX MOUNTING

The VPAC/VPHP control box is factory mounted in the front position unless otherwise specified. On larger capacity units (19-24 only), the control box can be field modified for left or right side applications by removing the four screws that attach it to the front control box mounting brackets and reattaching it to the corner posts using the same four screws. (Figure 5). The control box can be factory mounted for left or right side applications on the smaller capacities (9-17) but it is not recommended for field modification at this time.

Figure 5

VPAC/VPHP 19-24 CONTROL BOX MOUNTING



IMPORTANT: Some wire ties around the main wire harness will need to be cut in order to move the control box from the front position.

HYDRONIC COIL OPTION

The coil package comes with a sheet metal enclosure. An optional 2 or 3 way motorized 24V water valve is available. Verify that the hydronic coil package is either left, right or front aligned, matching the control section alignment of the unit on which it is to be installed.

1. The coil package is centered on top of the VPAC/ VPHP chassis. Make sure it is centered over the fan discharge and that the piping package is in the correct position.

2. Find the two "Z" brackets used to clamp the hydronic enclosure to the chassis top. Mount these brackets to the chassis top using the holes provided. This will allow the chassis to be pulled out for service/maintenance without disturbing the hydronic package.

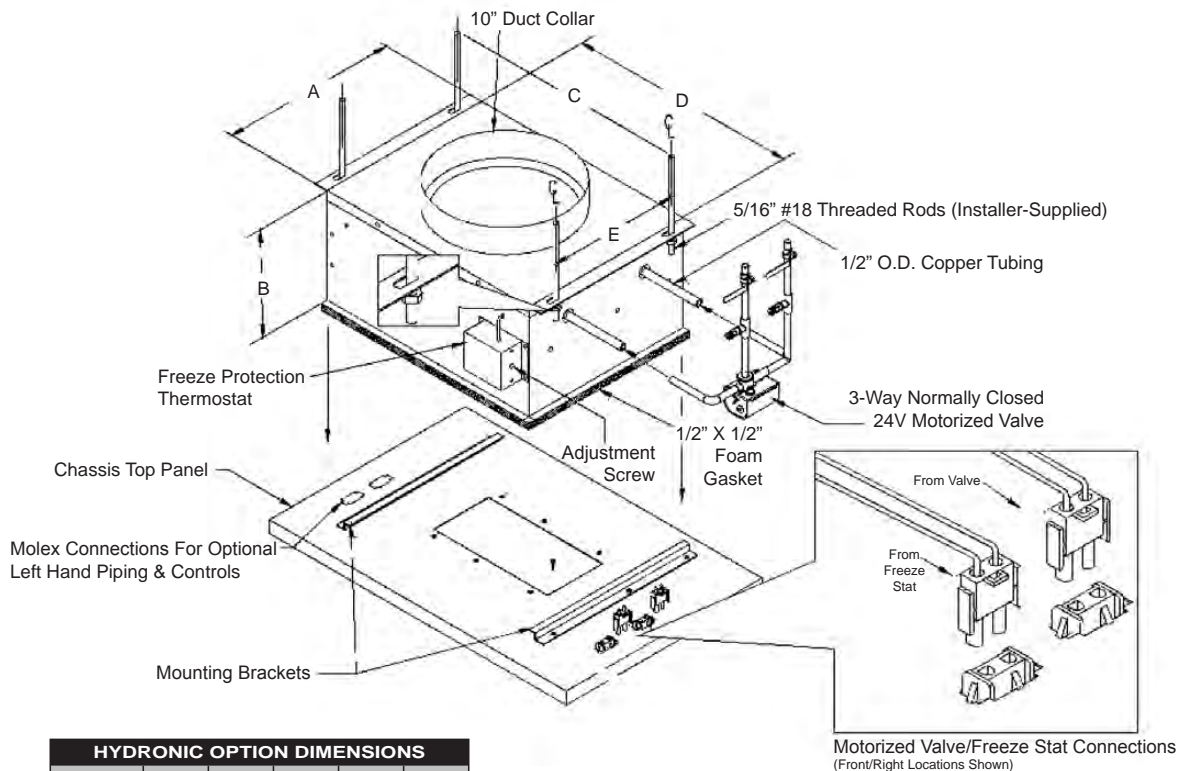
3. Complete the piping of the hydronic package, including field supplied shut off valves and other field supplied items.

4. Put the installer-supplied threaded rods through the slots in the brackets (*Figure 6*), Place a washer and nut on the threaded rod, and tighten the nut to secure it in place. The upper end of the threaded rod should be secured to angle iron or 2" x 4" wood. Make sure that the rods do not interfere with the chassis plenum or duct work. These rods will hold the hydronic package in place when the chassis is removed for maintenance.

IMPORTANT: System duct work is connected to the discharge opening on the duct collar or plenum. A flex collar is advised.

Figure 6

HYDRONIC COIL OPTION
(Front/Right Application Shown)

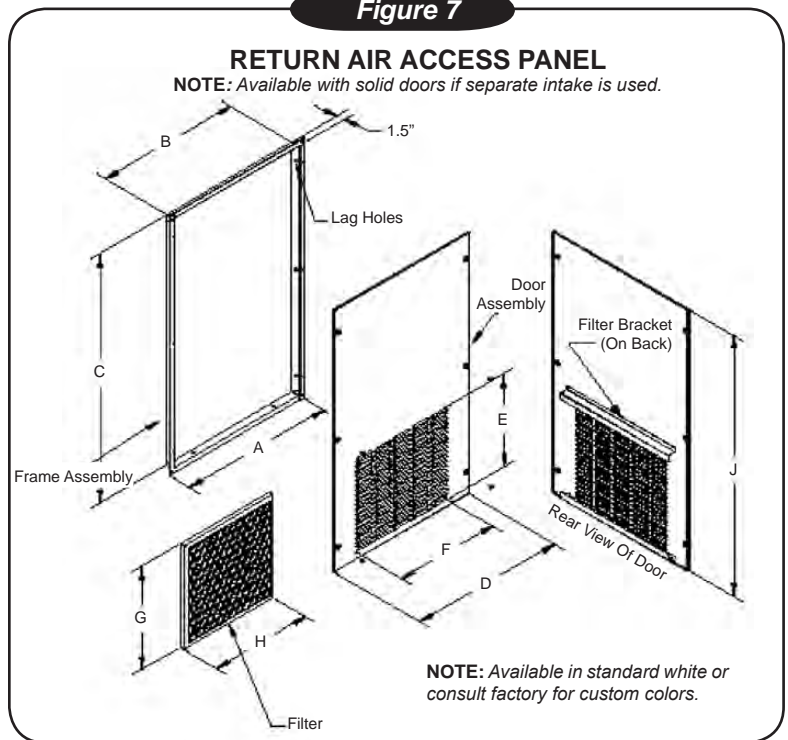


HYDRONIC OPTION DIMENSIONS					
Unit Size	A	B	C	D	E
9-17	13"	8"	18"	17"	10"
19-24	17"	12"	22"	21"	13"

RETURN AIR ACCESS PANEL (With Filter)

Return air access panels are unit capacity specific. Be sure to specify unit capacity and control box location before placing an order. The controls can be on the left, right, or front of the unit. This will also be the side of the enclosure that the unit will be withdrawn from in the event of service or maintenance.

It is necessary to work closely with the other trades to locate the opening for the return air access panel. The return air access panel must be installed with enough room available to remove the unit if necessary. The frame is installed with screws through the lag holes into the frame studs and should be level and plum (*Figure 7*). The return air access panel is set onto the frame and held in place with 6 screws.



FINAL INSPECTION AND START UP



Moving parts can cause injury so exercise caution when testing the unit.

1. Plug or hard wire line voltage power to unit. Refer to unit rating plate for proper voltage and amperage/fuse size.
2. Connect low voltage plug from thermostat to unit.

IMPORTANT: *The outdoor air sheet metal splitter baffle must be in the proper position to prevent recirculation.*

3. Turn power on and check for proper operation.

HEATING: Set the wall thermostat to heat mode. Set the thermostat above the room setting. Allow some time for heat to come from the discharge grilles. Do not operate unit when the panels are removed.

COOLING: Set the wall thermostat to cool mode. Set the thermostat below the room temperature setting and allow time for cool air to come from the discharge grilles. The thermostat can be set at the most desired setting with the selector switch in the heat or cool position.

RETURN AIR ACCESS PANEL DIMENSIONS									
Unit Size	A	B	C	D	E	F	G	H	J
9-17 Std.	29.75"	27.75"	47.75"	30"	17.75"	20.25"	20"	20"	50"
9-17 Hyd.	29.75"	27.75"	59.75"	30"	17.75"	20.25"	20"	20"	62"
19-24 Std.	29.75"	27.75"	59.75"	30"	28"	20.25"	30"	20"	62"

4. With the unit level (or pitched to the outdoors), check condensate removal by pouring water into the base pan, Putting the unit in cooling mode and, with the condenser fan running, seeing if water is picked up by the slinger ring and thrown onto the outdoor coil.
5. Make sure that there is nothing to interfere with the room discharge air or the return air.



Do not operate unit without filter in place or use as a temporary heating/cooling source during construction.

MANUAL FRESH AIR DAMPER

The fresh air manual damper allows the user to move fresh air into the space to be conditioned. The damper handle is located below the evaporator coil on the service panel.

SEQUENCE OF OPERATION

CHOOSING A THERMOSTAT

Enviromaster International offers a thermostat that is compatible with the VPAC/VPHP. This is a single stage cool/heat, mercury bulb thermostat that can be used in all Retroaire™ cooling, heating or heat pump applications. The thermostat has an adjustable set-point range of between 55°F and 95°F. There are two independent, adjustable stops that can limit the heating or cooling range of the thermostat. A non-mercury, electronic thermostat is available if needed. please contact the factory for more information.

SELECTING A COMPATIBLE THERMOSTAT

When selecting a thermostat other than those offered by Enviromaster International, it is important to choose a single stage heat/cool, 24V thermostat. For models 09-17, do not select a thermostat that requires connection to a "C" terminal since these units do not have provisions for connecting to a "C" terminal. Only models 19 and 24 have provisions for connecting a "C" terminal to the unit. If a thermostat without a "C" terminal is used in a models 19 or 24, then it is important to insulate the unused brown "C" low volt wire to prevent it from shorting at the thermostat.

COOLING ONLY WITH ELECTRIC OR HYDRONIC HEAT (VPAC Only)

Select a thermostat that is compatible with a cooling - electric heat system. The thermostat should have "R", "Y", "W" and "G" terminals.

HEAT PUMP WITH ELECTRIC HEAT (VPHP Only)

Select a thermostat that is compatible with a cooling - single stage heat - heat pump system. The thermostat should have "R", "Y", "O" and "G" terminals. Retroaire™ units are single stage heating only. The electric heat and heat pump will not operate simultaneously.

FAN OPERATION

Some thermostats are equipped with an auto/on fan switch. When this switch is placed in the on position the indoor fan will run continuous. When the switch is in the auto position the indoor fan will cycle with the call for heating or cooling.

FAN PURGE (Auto Mode Only)

After the room thermostat has been satisfied, the purge feature allows the indoor fan to remain on for an additional 60 seconds. This increases efficiency by pulling the remaining energy from the unit.

COOLING OPERATION

After connecting the thermostat to the unit place the system switch in cool mode. Adjust the set-point temperature below the room temperature. The compressor and fan motors will start and cooling will begin. Place the set-point temperature above the room temperature. The compressor and condenser fan will stop and the indoor fan will remain on for an additional sixty seconds.

IMPORTANT: *The start of the compressor will not take place until the anti-short/random start time period has elapsed.*

ELECTRIC HEAT OPERATION

Place the thermostat system switch in heat mode. Adjust the set-point temperature above the room temperature. The electric heat will energize along with the indoor fan motor. Heating will continue so long as the set-point remains above room temperature. Next place the set-point temperature below room temperature. The Electric heater will switch off and the indoor fan will remain on for an additional sixty seconds.

HYDRONIC HEAT OPERATION (Optional)

An optional hydronic heat package may be selected in lieu of electric heat. Heating operation is essentially the same as that of units with electric heat. With the thermostat system switch set to heat and the set-point temperature above room temperature, the hydronic valve will open allowing water to flow through the coil. The indoor fan will also switch on and warm air will flow from the unit. Heating will continue so long as the set-point remains above room temperature. Place the set-point temperature below room temperature. The hydronic valve will close and indoor fan will switch off after the sixty-second purge time has elapsed. The hydronic valve is a 24Vac normally open valve. Should power be lost to the unit, the valve will default to the open position.

HYDRONIC COIL FREEZE PROTECTION

The hydronic package is equipped with a thermostat (freeze-stat) that is designed to prevent the hydronic coil from freezing. At 35°F the thermostat will switch open the hot water valve to prevent the coil from freezing. At 50°F the thermostat will reset. If the room thermostat is not calling for heat, the valve will close. The freeze stat is factory pre-set and should never need adjusting. However, if the adjustment screw is tampered with it will be necessary to reset the freeze-stat. To set the freeze stat you will need a medium flat bladed screwdriver. Turn the adjusting screw counter-clockwise until it stops. Then slowly turn the adjusting screw clockwise approximately 1/8 turn until a click is detected. The freeze stat is now set.

SEQUENCE OF OPERATION

HEAT PUMP COOLING OPERATION (VPHP ONLY)

Cooling operation in a heat pump unit is described in “Cooling Operation” above. The unit is equipped with a reversing valve that is energized for cooling and de-energized in heating mode.

HEAT PUMP HEATING OPERATION (VPHP ONLY)

Heat pump units are “Limited Range” equipped with back-up electric resistance heat. Limited range heat pumps are designed to operate when outdoor temperatures are between 75°F and 40°F and with a maximum indoor temperature of 80°F. When the outdoor temperature falls below approximately 40°F the unit will switch from heat pump to electric resistance heat. Electric heat will then remain as the heat source until the outdoor temperatures rise above 50°F. The VPHP is a single-stage heating unit. The electric heat and heat pump will not operate simultaneously.

To operate the unit in heating mode, it must first be connected to an appropriate heat pump thermostat. (See “choosing a thermostat”). Select heat on the thermostat system switch. Then, adjust the set-point temperature above the room temperature. The compressor and fan motors will start and heating will begin. If the outdoor temperature is below approximately 40°F the heat pump system will not operate. Electric heat will then take over the heating demand. Heating will continue so long as the set-point temperature remains above the room temperature. Place the set-point temperature below the room temperature. The heating mode will cease and the indoor fan will remain on for an additional sixty seconds.

IMPORTANT: *The start of the compressor will not take place until the anti-short/random start time period has elapsed.*

EMERGENCY HEAT (VPHP ONLY)



WARNING

Before accessing the control compartment, disconnect power to the unit. Failure to do so could result in serious injury or electrical shock.

Should the heat pump system fail, it is possible to force the control board into electric heat mode. This is a temporary solution until the heat pump system can be repaired. Locate the circuit board in the control section of the unit. Locate the terminals where the outdoor sensor connects to the circuit board. Using a small needle nose type pliers, disconnect one side of the sensor from the circuit board. This will appear to the circuit board as an outdoor coil freeze condition, thereby energizing the electric resistance heater on the call for heat.

THERMOSTATIC DRAIN PAN VALVE (VPHP ONLY)

Heat pump units are equipped with a thermostatic drain valve that will open when outdoor temperatures fall below 50°F. This keeps the base pan free of condensate water where it may otherwise freeze during colder outdoor temperatures. As part of its normal operation, the unit will produce condensate and collect it in the base pan of the unit. There it will be picked up by the condenser fan slinger ring and deposited onto the condenser coil. During the cooling season, this improves the unit's efficiency by maintaining adequate refrigeration system pressures.

CHANGEOVER THERMOSTAT (VPHP Only)

This feature has been replaced by a circuit board however is still used on some units. The changeover thermostat monitors outdoor temperature for efficient heat pump operation. In heating, the thermostat will determine weather to use heat pump or electric resistance heat. When outdoor temperatures fall below approximately 35°F, the changeover thermostat (COT) will switch from heat pump operation to electric resistance heat. Electric heat will remain the primary heat source until outdoor temperature rises above 50°F. The COT is factory pre-set and should never need adjusting. If the adjustment screw is tampered with it will be necessary to reset the freeze-stat. To set the freeze stat you will need a medium flat bladed screwdriver. Turn the adjusting screw counter-clockwise until it stops. Then slowly turn the adjusting screw clockwise approximately 1/8 turn until a click is detected. The freeze stat is now set.

ANTI-SHORT CYCLE TIMER RANDOM START

This feature will prevent compressor short cycling and also prevent multiple units in a single facility from simultaneously starting following a power outage. This delay on break feature ensures that the compressor remains off between cycles until the three-minute time delay period has elapsed, allowing system pressures to equalize before restarting.

The random start feature, initiated after a power failure, will add a random time delay (between 5-120 seconds) to the three-minute anti short cycle time following a power outage. This will stagger the starting of multiple units in a single facility allowing a building to slowly go back on line when power is restored.

INDOOR COIL FREEZE PROTECTION

This feature will prevent the indoor coil from freeze up in the cooling mode. Indoor coil freeze up can occur due to a dirty air filter, low refrigerant charge or low room or outdoor temperatures. This in turn can cause compressor damage. Should a freeze condition be detected, the compressor and condenser fan will be switched off for a minimum of three minutes and until the freeze condition is satisfied. During this time the indoor fan will continue to run to aid in the defrost process.

SEQUENCE OF OPERATION

DISCONNECT SWITCH (Optional)

The disconnect switch ensure that all power to the control box is disconnected for servicing.

MAINTENANCE



DANGER



Before servicing the VPAC/VPHP, disconnect power to the unit. Failure to do so could result in serious injury or electrical shock.

The VPAC/VPHP is designed and constructed for reliability and long life minimal maintenance. Scheduled maintenance inspections should be performed 4 times a year. At the beginning of the cooling season, a complete mechanical cooling check should be performed and periodic minor inspections may be necessary during the cooling season to adjust for variations in climate. At the beginning of the heating season, a complete mechanical heating check should be performed and, again, periodic minor inspections may be necessary to adjust for climatic changes.



WARNING



It is illegal to discharge refrigerant into the atmosphere. Use proper reclaiming methods and equipment when repairing this unit. Service should be performed by a qualified service agency.

1. Disconnect power to the unit.
2. Remove the access panel and do a visual check of the equipment. Look for obvious changes in the unit such as damaged coils or evidence of extended wear on any moving parts. Check for unusual odors or leaks (ex: burnt motor windings, water, or refrigerant) and make sure the base pan is clean.
3. Regular cleaning of the filter is required. Allowing dust to collect on the filter will cause the unit to lose efficiency and eventually malfunction. Check filter once a month.
4. Inspect all electrical connections for frayed wires and poor connections. Terminal ends that are loose will eventually fail, causing a loss of performance or worse.
5. Check fan motors and blower assemblies. Some units may require a drop of light oil to motors and/or bearing assemblies (look for oil cups). Check setscrews and motor mounting hardware, making sure these are tight.

MAINTENANCE *Continued*

6. Centrifugal fan blades and blower cage assemblies must be clean to operate efficiently. Brush and/or vacuum as necessary.

7. Inspect both indoor and outdoor coils. Use a fin comb to straighten out any damaged fins. These coils must be clean for proper operation.

IMPORTANT: Do not use a solvent-based cleaner for this as some solvents produce a noxious odor when you start the fan or electric heat.

8. Look for oil leaks or stains on or around the coil and refrigerant lines. The presence of oil here indicates a potentially serious problem (such as a refrigerant leak).

9. Inspect and clean the drain pan and drain line(s). A good idea here is to use an anti-fungicide tablet to keep the condensate system free from bacterial contaminants.

10. Check the "pitch" of the unit. Over time, the building and equipment may settle, causing a shift in the direction the condensate flows. Ideally, the unit should pitch downwards from front to back to allow for proper drainage.

11. Check weep holes along rear flange of the base pan, making sure they are free of debris.

12. Check seal around the unit. Air leaks may make the conditioned area uncomfortably drafty or produce noises. Visually inspect the foam gasket between the wall and the unit, especially taking note of the separation between the air inlet for the condenser and the condenser coil discharge. These two areas must be sealed off from each other. If you experience poor cooling operation or erratic operation, check for air recirculation at the condenser coil.

13. Replace panels and reconnect the electrical power.

TROUBLESHOOTING

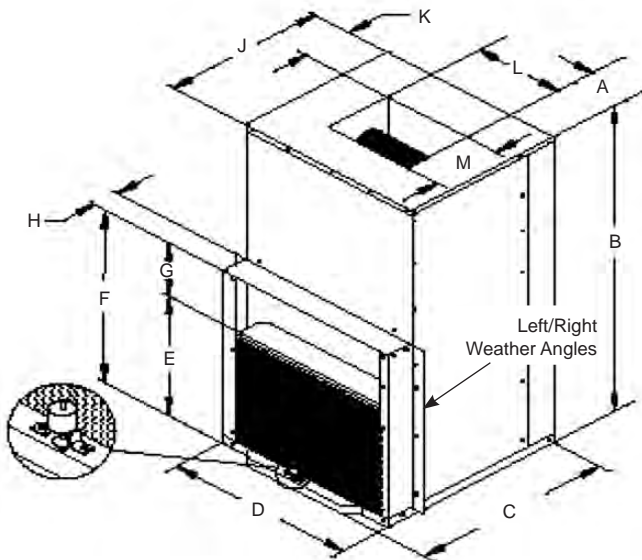
NO HEAT OR COOLING

Check to see if the unit has power and if the thermostat is satisfied. If the thermostat is not satisfied, call your installing contractor or service contractor.

SPECIFICATIONS AND PERFORMANCE

IMPORTANT: Due to ongoing product development, designs, specifications, and performance are subject to change without notice.
Please consult the factory for further information.

Performance Data				
Model	Btuh		Efficiency	
	Cooling (VPAC)	Heating (VPHP)	EER	COP (VPHP)
9	9,000	8,800	9.1	2.8
12	11,500	11,500	8.8	3.1
15	14,600	14,000	8.8	3.0
17	17,800	16,000	8.6	2.7
19	19,200	17,000	10.0	2.8
24	22,700	18,500	9.0	2.7



VPAC/VPH HYDROCOIL SPECIFICATIONS*					
Unit Size	CFM	GPM	H2O Temp	Btuh	PD (Ft/H2O)
9	300	1	180	11,100	1.0
		2		11,200	4.0
		3		11,700	8.7
12	300	1	180	11,500	1.0
		2		13,000	4.0
		3		13,600	8.7
15	400	1	180	12,700	1.0
		2		14,500	4.0
		3		15,300	8.7
17/19	500	2	160	24,115	0.9
		4		28,610	3.3
		6		30,480	7.2
		2	180	29,740	0.9
		4		35,190	3.3
		6		37,440	7.0
24	650	2	160	29,800	0.9
		4		35,650	3.3
		6		38,100	7.2
		2	180	36,750	0.9
		4		43,850	3.3
		6		46,800	7.0

* Air on 70/58°F

VPAC/VPH DIMENSIONS												
Unit Size	A	B	C	D	E	F	G	H	J	K	L	M
9-15	7.625"	40"	21.438"	25"	15"	25"	10"	3.5"	16.5"	5.5"	9.625"	4.125
17	7.625"	40"	21.438"	25"	20.125"	25.5"	5.375"	3.5"	16.5"	5.5"	9.625"	4.125
19	7.688"	50"	26.438"	25"	20.625"	32"	11.375"	3.5"	21.563"	7.125"	9.625"	4.125
24	6.5"	50"	26.438"	25"	20.625"	32"	11.375"	3.5"	21.563"	8.188"	12"	10.375

VPAC/HP 9 - 24 RETROAIRE ELECTRICAL SPECIFICATIONS												
Model Number	VOLTS/HZ/PH	COND FAN		COMPRESSOR		EVAP FAN		TOTAL AMPS	MIN VOLT	M.C.A.	HACR BRKR	LINE CORD
		AMPS	HP	RLA	LRA	AMPS	HP					
9	208/230/60/1	0.72	0.125	4.10	20	0.80	0.07	5.62	197	6.7	15	6-15P
	265/60/1	0.70	0.125	3.35	18	0.67	0.08	4.72	240	5.6	15	H-WIRE
12	208/230/60/1	0.72	0.125	5.10	28	0.80	0.07	6.62	197	7.9	15	6-15P
	265/60/1	0.70	0.125	4.25	26	0.67	0.08	5.62	240	6.7	15	H-WIRE
15	208/230/60/1	0.72	0.125	6.40	35	0.80	0.07	7.92	197	9.6	15	6-15P
	265/60/1	0.70	0.125	5.40	32	0.67	0.08	6.77	240	8.2	15	H-WIRE
17	208/230/60/1	1.20	0.250	7.40	48	1.00	0.15	9.60	197	11.5	15	6-15P
	265/60/1	1.30	0.250	6.50	44	0.67	0.08	8.50	240	10.1	15	H-WIRE
19	208/230/60/1	1.00	0.250	7.40	48	1.00	0.15	9.40	197	11.3	15	6-15P
24	208/230/60/1	1.00	0.250	9.60	60	1.50	0.25	12.10	197	14.5	20	6-20P
	265/60/1	1.20	0.330	8.20	58	1.50	0.25	10.90	240	13.0	20	H-WIRE

SPECIFICATIONS AND PERFORMANCE

VAPC/HP 9/12/15 OPTIONAL ELECTRIC HEAT SPECIFICATIONS								
HEATER NO.	VOLTAGE	WATTS	Btuh	AMPS	TOTAL	MCA	FUSE	CORD
3	208	2454	8400	11.8	12.6	15.5	20	6-20P
	230	3000	10300	13.0	13.8	17.1	20	6-20P
	265	3752	12900	14.2	14.8	18.4	20	H-WIRE
	277	4100	14000	14.8	15.5	19.2	20	H-WIRE
4	208	3271	11200	15.7	16.5	20.5	25	6-30P
	230	4000	13700	17.4	18.2	22.5	25	6-30P
	265	5310	18200	20.0	20.7	25.7	30	H-WIRE
5	208	4089	14000	19.7	20.5	25.4	30	6-30P
	230	5000	17100	21.7	22.5	28.0	30	6-30P

VPAC/HP - 17/19 OPTIONAL ELECTRIC HEAT SPECIFICATIONS								
HEATER NO.	VOLTAGE	WATTS	Btuh	AMPS	TOTAL	MCA	FUSE	CORD
3	208	2454	8400	11.8	12.8	15.7	20.0	6-20P
	230	3000	10300	13.0	14.0	17.3	20.0	6-20P
	265	3752	12900	14.2	14.8	18.4	20.0	H-WIRE
	277	4100	14000	14.8	15.5	19.2	20.0	H-WIRE
4	208	3271	11200	15.7	16.7	20.7	25.0	6-30P
	230	4000	13700	17.4	18.4	22.7	25.0	6-30P
	265	5310	18200	20.0	20.7	25.7	30.0	H-WIRE
5	208	4089	14000	19.7	20.7	25.6	30.0	6-30P
	230	5000	17100	21.7	22.7	28.2	30.0	6-30P
	277	5000	17000	18.1	18.7	23.2	25.0	7-30P

VPAC/HP - 19 OPTIONAL ELECTRIC HEAT SPECIFICATIONS								
HEATER NO.	VOLTAGE	WATTS	Btuh	AMPS	TOTAL	MCA	FUSE	CORD
7	208	5725	19600	27.5	28.5	35.4	40.0	H-WIRE
	230	7000	23900	30.4	31.4	39.0	40.0	H-WIRE

VPAC/HP 24 OPTIONAL ELECTRIC HEAT SPECIFICATIONS								
HEATER NO.	VOLTAGE	WATTS	Btuh	AMPS	TOTAL	MCA	FUSE	CORD
3	208	2454	8400	11.8	13.3	16.2	20	6-20P
	230	3000	10300	13.0	14.5	17.8	20	6-20P
	265	3752	12900	14.2	15.7	19.2	20	H-WIRE
	277	4100	14000	14.8	16.3	20.0	25	H-WIRE
4	208	3271	11200	15.7	17.2	21.2	25	6-30P
	230	4000	13700	17.4	18.9	23.2	25	6-30P
	265	5310	18200	20.0	21.5	26.5	30	H-WIRE
5	208	4089	14000	19.7	21.2	26.1	30	6-30P
	230	5000	17100	21.7	23.2	28.7	30	6-30P
7	208	5725	19600	27.5	29.0	35.9	40	H-WIRE
	230	7000	23900	30.4	31.9	39.5	40	H-WIRE
	265	6635	22700	25.0	26.5	32.8	35	H-WIRE
	277	7250	24800	26.2	27.7	34.2	35	H-WIRE
10	208	8178	28000	39.3	40.8	50.6	60	H-WIRE
	230	10000	34200	43.5	45.0	55.8	60	H-WIRE
	265	9152	31300	34.5	36.0	44.7	50	H-WIRE
	277	10000	34200	36.1	37.6	46.6	50	H-WIRE

NEMA Specifications Non-Locking/Receptacles									
VOLTAGE	125V			250V			265V		
	15(A)	20(A)		15(A)	20(A)	30(A)	15(A)	20(A)	30(A)
PLUG									
RECEPTACLE									
	5-15 P	5-20 P		6-15 P	6-20 P	6-30 P	7-15 P	7-20 P	7-30 P
	5-15 R	5-20 R		6-15 R	6-20 R	6-30 R	7-15 R	7-20 R	7-30 R

Rated in accordance with ARI Standard 390



ARI Standard
390 SPVAC



ARI Standard
390 SPVHP



ALL PRODUCT LIMITED WARRANTY

Enviromaster International LLC (EMI) warrants to the purchaser/owner that EMI products will be free from defects in material and workmanship under the normal use and maintenance for a period of twelve months for all components and sixty months on unit compressors from date of the original installation, or fifteen months for all components and sixty-three months on unit compressors from the date of original sale, whichever comes first.

WHAT WE WILL COVER

EMI will replace any defective part returned to EMI's approved service organization with a new or rebuilt part at no charge. The replacement part assumes that unused portion of this warranty.

WHAT WE DON'T COVER

THIS WARRANTY DOES NOT INCLUDE LABOR or other costs incurred for repairing, removing, installing, shipping, servicing, or handling of either defective or replacement parts.

EMI IS NOT RESPONSIBLE FOR

- Normal maintenance.
- Damage or repairs required as a consequence of faulty installation or application by others.
- Failure to start due to voltage conditions, blown fuses, open circuit breakers, or other damages due to the inadequacy or interruption of electrical service.
- Damage or repairs needed as a consequence of any misapplication, abuse, improper servicing, unauthorized alteration, or improper operation.
- Damage as a result of floods, winds, fires, lightening, accidents, corrosive atmosphere, or other conditions beyond the control of EMI.
- Parts not supplied or designated by EMI.
- Products installed outside the United States or Canada.
- Any damages to person or property of whatever kind, direct or indirect, special or consequential, whether resulting from use or loss of use of the product.

LIMITATION OF WARRANTIES

This warranty is exclusive and in lieu of any implied warranties of merchantability and fitness for a particular purpose and all other warranties express or implied. The remedies provided for in this warranty are exclusive and shall constitute the only liabilities on the part of EMI including any statements made by any individual which shall be of no effect.

FOR SERVICE OR REPAIR:

- Contact the installer of the unit
- Contact the nearest distributor
- Call or write:


An **ECR International Brand**
ENVIROMASTER INTERNATIONAL LLC
5780 Success Drive, Rome, NY 13440
Email: info@retroaire.com
Web: <http://www.retroaire.com>

