



VHC series

Water Source Replacement Unit

INSTALLATION, OPERATION & MAINTENANCE MANUAL



Attentions, Cautions, and Warnings

Safety

Warnings, cautions, and notices are present throughout this manual. Read this information carefully before performing any installation, service, or troubleshooting of the equipment.

WARNING: Indicates a potentially hazardous situation, which if not avoided could result in death or serious injury.

CAUTION: Indicates a potentially hazardous situation or an unsafe practice, which if not avoided could result in minor or moderate injury or product or property damage.

NOTICE: Notification of installation, operation, or maintenance information, which is important, but which is not hazard-related

 WARNING	
	Disconnect power supply(ies) before servicing. Refer servicing to qualified service personnel. Electric shock hazard. May result in injury or death!

 WARNING	
To avoid the release of refrigerant into the atmosphere, the refrigerant circuit of this unit must be serviced only by technicians who meet local, state, and federal proficiency requirements.	

 WARNING	
The installation of water-source heat pumps and all associated components, parts, and accessories which make up the installation shall be in accordance with the regulations of ALL authorities having jurisdiction and MUST conform to all applicable codes. It is the responsibility of the installing contractor to determine and comply with ALL applicable codes and regulations.	

 WARNING	
The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).	

 WARNING	
Be aware that refrigerants may not contain odor.	

 WARNING	
If unit connected via an air duct system to one or more rooms with R-454B is installed in a room with an area less than Amin or has an Effective Dispersal Volume less than minimum, that room shall be without continuously operating open flames or other POTENTIAL IGNITION SOURCES. A flame-producing device may be installed in the same space if the device is provided with an effective flame arrest.	

 WARNING	
All refrigerant discharged from this unit must be recovered WITHOUT EXCEPTION. Technicians must follow industry accepted guidelines and all local, state, and federal statutes for the recovery and disposal of refrigerants. If a compressor is removed from this unit, refrigerant circuit oil will remain in the compressor. To avoid leakage of compressor oil, refrigerant lines of the compressor must be sealed after it is removed.	

 WARNING	
This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.	

 WARNING	
An unventilated area where the appliance using FLAMMABLE REFRIGERANTS is installed shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard.	

 WARNING	
Only auxiliary electric heaters approved by Cold Point shall be installed in connecting ductwork. The installation of any other auxiliary devices is beyond Cold Point's responsibility.	

 WARNING	
Children being supervised are NOT to play with the appliance.	

 WARNING	
Do not pierce or burn.	

 WARNING	
Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.	

 WARNING	
Sealed electrical components shall be replaced.	

Attentions, Cautions, and Warnings

! CAUTION

DO NOT store or install units in corrosive environments or in locations subject to temperature or humidity extremes (e.g., attics, garages, rooftops, etc.). Corrosive conditions and high temperature or humidity can significantly reduce performance, reliability, and service life. Always move and store units in an upright position. Tilting units on their sides will cause equipment damage.

! CAUTION

CUT HAZARD - Failure to follow this caution may result in personal injury. Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing, safety glasses and gloves when handling parts and servicing air conditioners and heat pumps.

! CAUTION

To avoid equipment damage, DO NOT use these units as a source of heating or cooling during the construction process. The mechanical components and filters can quickly become clogged with construction dirt and debris, which may cause system damage and void product warranty.

! CAUTION

All three phase scroll compressors must have direction of rotation verified at startup. Verification is achieved by checking compressor Amp draw. Amp draw will be substantially lower compared to nameplate values. Additionally, reverse rotation results in an elevated sound level compared to correct rotation. Reverse rotation will result in compressor internal overload trip within several minutes. Verify compressor type before proceeding.

! CAUTION

Units with a factory SUPPLY CORD and a plug, or with the optional unit disconnect, provides full disconnection under overvoltage from the supply mains. Where factory disconnect is NOT provided, the means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules and local codes.

! CAUTION

Non-duct connected appliances containing A2L refrigerants with the supply and return air openings in the conditional space may have the body of the appliance may be installed in open areas such as false ceilings not being used as return air plenums, as long as the conditioned air does not directly communicate with the air of the false ceiling.

! CAUTION

For duct connected appliances containing A2L refrigerants, false ceilings or drop ceilings may be used as a return air plenum if a REFRIGERANT DETECTION SYSTEM is provided in the appliance and any external connections are also provided with a sensor immediately below the return air plenum duct joint.

! NOTICE

Servicing shall be performed only as recommended by the manufacturer.

! NOTICE

For Installation Only in Locations Not Accessible to the General Public

General Information

Inspection:

Upon receiving your equipment, carefully check the shipment against the bill of lading. Make sure you have received all units. Inspect each unit and its packaging for any damage. **Ensure that the carrier completes a common carrier inspection report, noting any shortages or damages on all copies of the freight bill. Any concealed damage not previously noted must be reported to the carrier within 10 days of receipt of shipment. The freight company can deny the claim without recourse if not filed within 10 days.**

NOTE: It is the responsibility of the purchaser to file all damage claims with the carrier within 10 days of shipment.

Storage:

Equipment should be stored in its original packaging in a clean, dry location. Units should be in an upright position at all times. Units may NOT be stacked.

Unit Protection:

Units on a job site should be covered with either the original packaging or an equivalent covering. Cap all open ends of pipes stored on the job site. In locations where painting, plastering, or spraying remains unfinished, it is essential to implement all required measures to prevent physical damage to the units and to avoid contamination from external materials. Such damage and contamination can hinder proper system startup and lead to expensive cleaning of the equipment.

Prior to the installation of any system components, it is important to inspect all pipes, fittings, and valves. Ensure that any dirt or debris present on or within these components is removed.

Pre-installation:

Each unit has instructions for installation, operation, and maintenance. Prior to starting the unit, it is important to review all manuals and familiarize yourself with the unit's functions. Additionally, perform a thorough system check before commencing operation.

Preparation of Units for Installation:

1. Verify Unit Shipment: Confirm that the electrical specifications on the unit's nameplate match the

ordering and shipping documentation to ensure the correct unit has been delivered.

2. Protect the Cabinet: Maintain the cabinet's protection by keeping it covered with the original packaging until the installation is finalized and all related tasks.

3. Check Refrigerant Tubing: Ensure that the refrigerant tubing is free from kinks or dents and that it does not come into contact with other components of the unit.

4. Examine Electrical Connections: Inspect all electrical connections to ensure they are clean and securely fastened at the terminals.

5. Locate Accessories: Identify and confirm the presence of any hangers, or other accessory kits that were factory installed as ordered.

Safety Checks:

Before commencing any work on systems that utilize FLAMMABLE REFRIGERANTS, it is essential to conduct safety checks to reduce the potential for ignition. These precautions must be taken prior to any repairs on the REFRIGERATING SYSTEM.

Work Procedure:

Tasks will be executed following a regulated process to reduce the likelihood of flammable gases or vapors being present during the execution of the work.

General Work Area:

All maintenance personnel and those present in the vicinity must be informed about the nature of the activities being performed. Work within confined spaces should be avoided whenever possible.

Checking for Presence of Refrigerant:

Prior to and throughout the duration of the work, the area must be examined with a suitable refrigerant detector to ensure that technicians are aware of any potentially toxic or flammable environments. It is essential that the leak detection equipment used is appropriate for all relevant refrigerants, meaning it should be non-sparking, properly sealed, or intrinsically safe.

General Information

Presence of Fire Extinguisher:

In the event that hot work is to be performed on refrigeration equipment or related components, appropriate fire extinguishing devices must be readily accessible. A dry powder or CO2 fire extinguisher should be located near the charging area.

No Ignition Sources:

Individuals involved in work related to a REFRIGERATION SYSTEM that necessitates exposing any piping must refrain from using any ignition sources that could pose a fire or explosion risk. All potential ignition sources, such as smoking, should be kept at a safe distance from areas of installation, repair, removal, or disposal where refrigerant may be released into the environment. Before commencing work, a thorough assessment of the area surrounding the equipment must be conducted to ensure there are no flammable hazards or ignition risks. "No Smoking" signs should be prominently displayed.

Ventilated Area:

Ensure that the work area is either outdoors or sufficiently ventilated prior to breaking into the system or performing any hot work. Ventilation should be maintained throughout the duration of the work to safely disperse any released refrigerant and, if possible, vent it externally into the atmosphere.

Checks to the Refrigeration Equipment:

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

- The actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
- The ventilation machinery and outlets are operating adequately and are not obstructed;
- If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;

- Refrigerant piping or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

Checks to Electrical Devices:

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

- Capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- That no live electrical components and wiring are exposed while charging, recovering, or purging the system;
- That there is continuity of earth bonding.

General Information

Repair to intrinsically safe components:

Intrinsically safe components must be replaced.

Cabling:

Ensure that the cabling is protected from wear, corrosion, excessive pressure, vibrations, sharp edges, and any other detrimental environmental factors. This assessment should also consider the impacts of aging and ongoing vibrations from equipment such as compressors or fans.

Required Area For Installation:

The minimum area of the installation space (A_{min}) or the minimum area of the conditioned space (T_{amin}) must be adjusted based on the unit's altitude. This adjustment is done by multiplying A_{min} or T_{amin} by the relevant altitude adjustment factor (AF) corresponding to the building's ground-level altitude (H_{alt}) in either feet or meters, as detailed in Table 1.

Note: You can use Imperial or Metric measurements to calculate A_{min} or T_{amin} .

Table 1: Altitude Adjustment

Halt ft (m)	AF
0 (0)	1.00
656 (200)	1.00
1,312 (400)	1.00
1,968 (600)	1.00
2,624 (800)	1.02
3,280 (1,000)	1.05
3,937 (1,200)	1.07
4,593 (1,400)	1.10
5,249 (1,600)	1.12
5,905 (1,800)	1.15
6,561 (2,000)	1.18
7,217 (2,200)	1.21
7,874 (2,400)	1.25
8,530 (2,600)	1.28
9,186 (2,800)	1.32
9,842 (3,000)	1.36
10,498 (3,200)	1.40

Refrigerant System Servicing

Refrigerant System

To ensure the integrity of the sealed circuit, avoid installing service gauges unless the unit's performance is abnormal. Before servicing the refrigerant circuit, confirm that the air and water flow rates are within acceptable limits.

Removal and Evacuation:

When accessing the refrigerant circuit for repairs or other purposes, standard procedures should be followed. However, for flammable refrigerants, it is crucial to adhere to best practices due to the associated flammability risks. The following protocol must be observed:

- Safely extract the refrigerant in accordance with local and national regulations.

- Evacuate the system.
- Purge the circuit with inert gas.
- Evacuate again.
- Continuously flush or purge with inert gas while using flame to open the circuit.
- Open the circuit.

Refrigerant should be recovered into the appropriate recovery cylinders if venting is prohibited by local and national regulations. For appliances utilizing flammable refrigerants, the system must be purged with oxygen-free nitrogen to ensure safety. This purging process may require repetition. It is important

Refrigerant System Servicing

to avoid using compressed air or oxygen for purging refrigerant systems.

For appliances with flammable refrigerants, the purging process involves breaking the vacuum with oxygen-free nitrogen, filling until the desired working pressure is reached, venting to the atmosphere, and then optionally pulling down to a vacuum. This procedure should be repeated until no refrigerant remains in the system (optional for FLAMMABLE REFRIGERANTS). After the final oxygen-free nitrogen charge, the system should be vented to atmospheric pressure to facilitate work.

Ensure that the outlet for the vacuum pump is positioned away from any potential ignition sources and that adequate ventilation is provided.

Charging Procedures:

Before recharging the system, it must be pressure-tested using the appropriate purging gas. In addition to standard charging protocols, the following guidelines must be observed:

- Prevent contamination of different refrigerants when using charging equipment.
- Keep hoses or lines as short as possible to limit the amount of refrigerant they contain.
- Maintain cylinders in the correct position according to provided instructions.
- Verify that the refrigeration system is properly grounded before charging with refrigerant.
- Label the system upon completion of charging (if not already labeled).
- Exercise extreme caution to avoid overfilling the REFRIGERATION SYSTEM.

A leak test should be conducted after charging but before commissioning. A follow-up leak test should be performed before leaving the site.

Leak Detection:

Under no circumstances should potential ignition sources be used to search for or detect refrigerant leaks. Halide torches or any detectors that utilize an open flame are prohibited.

The following leak detection methods are acceptable for all refrigerant systems:

Electronic leak detectors can be employed to locate refrigerant leaks; however, for FLAMMABLE REFRIGERANTS, the sensitivity of the equipment may be insufficient or may require recalibration. (Detection equipment should be calibrated in a refrigerant-free environment.)

Ensure that the detector does not pose a risk of ignition and is appropriate for the specific refrigerant in use. Leak detection devices should be calibrated to the refrigerant and set to a certain percentage of its lower flammability limit, confirming that the gas concentration does not exceed 25%.

While leak detection fluids are generally compatible with most refrigerants, it is important to avoid detergents containing chlorine, as chlorine can react adversely with the refrigerant and lead to corrosion of copper piping.

NOTE:

Common leak detection methods include:

- Bubble method
- Fluorescent method agents

If a leak is suspected, all open flames must be eliminated or extinguished. In cases where a refrigerant leak necessitates brazing, all refrigerant must be recovered from the system or isolated using shut-off valves in sections of the system away from the leak. The recovery of refrigerant should follow the guidelines outlined in the Removal and Evacuation section.

Recovery:

When removing refrigerant from a system, either servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant. (i.e.

Refrigerant System Servicing

special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Decommissioning:

Prior to initiating decommissioning, it is crucial for the technician to thoroughly understand the equipment and its specifications. Safe recovery of all refrigerants is strongly advised. Before commencing the procedure, an oil and refrigerant sample should be collected for potential analysis prior to reusing the recovered refrigerant. It is vital to ensure that electrical power is accessible before starting the task.

1. Familiarize yourself with the equipment and its functionality.
2. Electrically isolate the system.
3. Before proceeding, confirm that:
 - Mechanical handling equipment is available, if necessary, for managing refrigerant cylinders.

- All personal protective equipment is accessible and utilized properly.
- The recovery process is overseen at all times by a qualified individual.
- Recovery equipment and cylinders comply with relevant standards.

4. If feasible, pump down the refrigerant system.
5. If pumping down is not an option, create a manifold to facilitate refrigerant removal from various sections of the system.
6. Ensure that the cylinder is placed on scales before recovery begins.
7. Activate the recovery machine and follow the provided instructions.
8. Avoid overfilling cylinders (do not exceed 80% liquid volume charge).
9. Do not surpass the cylinder's maximum working pressure, even momentarily.
10. Once the cylinders are appropriately filled and the recovery process is complete, promptly remove the cylinders and equipment from the site, ensuring all isolation valves on the equipment are closed.
11. Recovered refrigerant must not be reintroduced into another refrigerating system unless it has undergone thorough cleaning and inspection.

Labeling:

Upon decommissioning, the equipment must be labeled to indicate it has been decommissioned and emptied of refrigerant. The label should include a date and the technician's signature.

OPERATING LIMITS

Model	Minimum serviceable area (ft2)
VHC-09	11.7
VHC-12	16.6
VHC-15	14.1
VHC-18	22.1
VHC-21	22.9
VHC-24	23.8
VHC-30	24.0
VHC-36	27.6

	Cooling	Heating	Cold Start
Min. Ambient Air	65	60	40
Min. EWT	60	60	--
Max. Ambient Air	95/78	85	--
Max. EWT	100	90	80
GPM/TON	Normal = 3.0 Max = 4.2 Min = 1.5		
Working Water Pressure	Max = 300psi Min = 125psi		

Thank You for choosing *Adirondack-Aire* products. Our goal is to make sure you remain pleased with your decision to purchase an *Adirondack-Aire* product. If you are in need of assistance that is not available or provided by your local installer/contractor feel free to give us a call, write us, Fax, or e-mail us at:

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PRODUCT DESCRIPTIONS:

MODEL VHC WATER SOURCE HEAT PUMP

The model VHC vertical stacked water source heat pumps are decentralized zone, module, or individual room terminals, containing a complete refrigeration circuit, with a reversing valve, capable of providing heating or cooling in any zone, at any time.

A system of VHC heat pumps is field connected to a simple two pipe, closed loop, supply and return water circuit, and a condensate drain.

Compatibility:

This *Adirondack-Aire* model was designed to be direct replacements for Daikin 'WVHC/WVHW' vertical stacked water source heat pump chassis. The *Adirondack-Aire* unit is dimensionally identical to the original and has the same locations for water, drain, and electrical connector. Before installation, check the nameplates of the old and new unit's capacity and voltage to be sure the proper replacement is being installed. The EC motor blower assembly needs to be replaced.

Installer - General Information

We have designed and manufactured this unit to be safe and trouble free. As the installer of this unit, you play a major role in assuring it's intended performance and customer satisfaction. The important information provided here will help you install the unit correctly and eliminate call backs.

ATTENTION! Please read these instructions carefully and completely before attempting installation. Unit should be installed by qualified service personnel only. To prevent personal injury and/or death, ensure that all power is disconnected before servicing.

IMPORTANT! Alterations and replacement parts: Altering the product or replacing parts with non authorized factory parts will void the factory warranty and may result in adverse operational performance and/or a possible hazardous safety condition to service personnel and occupants. If you are in doubt as to how to service this unit or where to find factory replacement parts, call *Adirondack-Aire* at 315.339.2331 for assistance.

These instructions give information relative to *Adirondack-Aire's* VHC replacement water source chassis. Local codes, if different from these instructions, must be followed and supplement or supersede these instructions. Mounting hardware, water connection adapters, drain fittings, etc. are not provided with the new unit. Set aside these items during removal of the old unit and reuse them to install the new unit.

Unpacking and Inspection:

The VHC is shipped completely assembled and in it's own package. All goods are inspected at the factory and released to the Freight Company in good condition. When received at the site, a visual inspection of all packages should be made immediately. Any evidence of rough handling or

apparent damage should be noted on the delivery receipt and the material inspected in the presence of the carrier's representative. If damage is found a claim should be filed with the freight company immediately.

Job Site Storage:

These units are intended for indoor use only. To protect the unit from damage due to the elements and prevent it from possibly becoming a contaminant source for IAQ problems, the unit should be stored indoors. If indoors storage is not possible, the following provisions must be met:

- 1). Place the unit on a dry surface or raise off the ground to assure adequate air circulation beneath the unit and to assure that no portion of the unit contact standing water at any time.
- 2). Cover the unit with a water repellent tarp to protect them from the elements.
- 3). Make provisions for continuous venting of the covered unit to prevent moisture from condensing on the unit surfaces.

Removal of Old Chassis:

- 1). Shut off all power first! Failure to shut off power supplies can result in electric shock and death!**
- 2). Remove the return air panel that provides access to the VHC chassis.
- 3). Disconnect the chassis power supply quick connect plug at the control.
- 4). Shut off water valves to isolate the unit from the water loop and disconnect the water connections at the unit connection points. Take note of, and record, the valve position so that the same settings may be used when the new unit is installed. Tag water inlet and outlet to be certain they are connected to the new unit properly. Disconnect the drain connection (if required). Pipes should be capped until the new unit is in place and ready to be connected to the system.
- 5). Carefully remove the old chassis from the cabinet. Dispose of properly.

Model	Weight
VHC-09	85 lbs
VHC-12	87 lbs
VHC-15	95 lbs
VHC-18	110 lbs
VHC-21	128 lbs
VHC-24	146 lbs
VHC-30	160 lbs
VHC-36	175 lbs

Before Installing the New Chassis:

1). Electrical Wiring:

WARNING: To prevent personal injury and/or death, ensure that all power is disconnected before servicing. All electrical connections and wiring should be installed by qualified electricians only and conform to the national electrical code and all local codes having jurisdiction. It is the personal responsibility of the customer to retain said electrician conformance with the latest edition of the national electrical code and/or local codes having jurisdiction.

Use only recommended wiring ampacity as specified on the unit nameplate and install a single outlet branch circuit. All wiring must comply with all local and national codes.

2). **IMPORTANT MINIMUM AIRFLOW!** The new *Adirondack-Aire* VHC chassis is designed to work with the original cabinet. Over time, performance will deteriorate due to dirt accumulation in the cabinet, ducts, registers, etc., Loose insulation, air leaks, and/or weak or worn motors. **ANY AIRFLOW DEFICIENCIES MUST BE BROUGHT TO STANDARD BEFORE THE NEW UNIT IS PUT INTO SERVICE!** Confirm that the minimum airflow delivery is provided using a velometer or other precision airflow-measuring device. Be sure the filter and all panels are in place and that supply registers are open before taking readings. Failure to meet the minimums specified will result in performance and reliability problems and **VOID THE WARRANTY.**

3). Fuse/Circuit Breaker:

Use type and size fuse as indicated on the rating plate of the unit or use HACR type circuit breaker.

4). Grounding:

WARNING: To prevent possible property damage, personal injury or death the unit must be used on a grounded power supply only.

5). *Adirondack-Aire* VHC units are rated for 208/230V power supply circuits. Unit performance and life depends on a supply voltage that is maintained between 197V and 253V. Inadequate wiring and/or improper electrical supply will likely result in failure of the compressor and other electrical components and voids the warranty. Units rated for 265V must be maintained between 238V minimum and 292V maximum.

Rated Voltage	Min Volts	Max Volts
208	197	253
230	197	253
265	239	292
277	239	292

6). Inspect the cabinet and duct work and take this opportunity to fix any damaged, broken, or bent parts. Permanently block off any air leaks in the cabinet, especially leaks that will by-pass the chassis coil.

7). Check the drain line for cuts, kinks or blockage. Repair or replace as necessary.

8). Clean dust and dirt from the return air panel.

Water Loop Piping:

1). The performance and reliability of the new *Adirondack-Aire* unit depends on proper water flow rate and water quality. Inadequate water flow rate and/or poor water quality or contamination will result in poor performance and may shorten unit life. Failure to provide adequate flow and properly maintained water quality may void the new unit Limited Warranty.

2). **General:** Waterlines must be installed in accordance with local and national codes. Care must be taken by the installing contractor to prevent dirt or foreign matter from entering the pipes or piping components during construction/installation. The water lines should be routed so as not to interfere with access to the unit or filter removal. The use of a 2 or 3 foot flexible hose with a swivel type fitting may simplify the connections and prevent vibration. It is recommended, at minimum, that a combination balancing and close-off (ball) valve be installed at

the return and a gate or ball valve be installed at the supply. The return valve can be adjusted to obtain the proper water flow.

Installing the New Chassis:

1). Carefully move the new chassis into position in the cabinet. Support wiring, water lines, and drain lines so that they are clear and not susceptible to damage as the chassis is moved into position.

2). Connect water lines to the water connection points on the new unit, being careful to connect water inlet and outlet properly. If pipe thread fittings are used, use Teflon thread tape or pipe dope. When tightening the water connections and drain at the unit use a wrench to **support the fittings**. Open the water valves to the water loop and set them in the original position as recorded during removal of the old unit.

Check for leaks!

3). Connect the power supply pigtail/ quick connect at the control/power connection. Be sure all wiring is in accordance with the requirements outlined above.

4). Replace all unit panels.

5). Turn on the power at the source.

Use of new Remote Thermostats:

The *Adirondack-Aire* VHC replacement chassis uses the same operating logic as the original. If you are upgrading to a new thermostat be sure to use a thermostat that has the same signal logic as the original. Proper temperature control and unit operation depends on proper thermostat selection and location. Refer to the thermostat manufacturer's installation instructions for specific recommendations. Good practice is to avoid outside walls, locations where the sun may shine directly on the thermostat, and locations where the air from supply registers or unit outlets blow on the thermostat. Also avoid locations where the thermostat could be jarred by a closing door. *Adirondack-Aire's* VHC chassis requires the 'B' signal from the thermostat to operate the reversing valve normal operation is in a de-energized cooling mode. ***Should your unit operate in heating when the thermostat is calling for cooling move the 'O' connection at the thermostat to 'B'.**

Pre-Start Quick Check List:

- Before proceeding with the start-up of individual units, the following should be verified:
- Has the water loop system been flushed and cleaned of construction debris?
- Is the water flow established and circulating through all units?
- Has the water loop system been balanced to design flow rates?
- Is the water temperature within normal operation range?
- Has heat transfer fluid been added in the proper mix to prevent freezing in closed systems that could, under any condition, fall below the freezing point during either the heat pump operating cycle or the down cycle? The heat transfer fluid must have extended range capability (down to 20 F). A low temperature (20 F) freeze-stat must also be used if units are to be operated under these conditions.
- Is the unit properly sized, located, and level with proper clearances?
- Is the filter in place and the correct size.
- Is the wiring properly sized and run in accordance with the unit wiring diagram?
- Are all wiring connections tight including those in unit and compressor electrical boxes?
- Has the unit been properly grounded and fused with the recommended fuse size?
- Have the air conditioning systems been checked at the service ports for charge and leak tested if necessary?
- Does the indoor blower turn freely without rubbing and are they tight on the shafts?
- Has all work been done in accordance with applicable local and national codes?
- Are all covers and access panels in place to prevent air loss and safety hazards?

WARNING: Bodily injury can result from high voltage electrical components. If operating checks must be performed with the unit operating, it is the technician's responsibility to recognize these hazards and proceed safely. Failure to do so could result in severe personal injury or death due to electrical shock or contact with moving parts.

Important: Unit should not be operated in construction phase until dry wall is complete. The coil will foul and warranty will be void.

To Operate:

Operation of the unit is automatic and will provide cooling and heating depending on the settings of the thermostat.

VHC Models - Cooling Operation:

- 1). Set the switch on the wall thermostat or unit control panel to the 'cool' position.
- 2). Set the desired temperature you want to maintain by moving the temperature setting lever or dial on the thermostat. If the room is warmer than the setting, the unit will turn on and begin to blow cool air after a few minutes. Note that a warm humid room or building may take several hours of continuous operation to cool to the thermostat set point the first time. Once the set temperature is reached the unit will cycle on and off.
- 3). Set the 'Fan' switch on the thermostat to 'auto' if you want the fan to run only when cooling is needed or to 'on' if you want continuous air circulation. The 'on' setting of the fan generally provides better temperature control by eliminating stagnant air.
- 4). Check unit operation. It should be supplying cool air to the conditioning space. The reversing valve will be de-energized; water leaving the heat exchanger should be warmer than the entering water temperature (approximately 9-12 F rise); blower operation should be smooth; compressor and blower amps should be within data plate ratings; the suction line should be cool with no frost observed in the refrigerant circuit.
- 5). For energy conservation reasons you may want to set your thermostat at a higher temperature when you are away. Do not raise the temperature setting by more than 5 degrees. Changing the temperature

by more than 5 degrees or shutting the unit 'off' can actually cost more than leaving the setting at a constant temperature.

6). **IMPORTANT!** Wait at least 3 minutes after turning the air conditioner off before trying to restart it. This gives the unit the time needed to stabilize before restarting. Failure to do so may cause unit damage and failure.

7). A properly installed and sized unit will not cycle more than 10 times per hour. If you notice more frequent starts call your service contractor.

VHC Heating Operation:

VHC Series Heat pumps are designed to also provide heating. Setting the switch or thermostat or control panel to the 'Heat' position and setting the desired temperature activates heating operation. When heating, the 'Auto' fan position is recommended. Adjust the temperature set point above room temperature. The reversing valve should be energized. Warm air should blow from the registers. A water temperature decrease of approximately 5-9°F leaving the heat exchanger should be noted. The blower and compressor operation should be smooth with no frost observed in the refrigerant circuit.

Final Inspection:

Do a final visual inspection of the entire installation and complete any final details and clean up.

Maintenance

Unit performance is maintained at optimum level and maintenance of the unit simplified by implementing the following preventive measures.

- 1). The heat pump is furnished with a permanent, cleanable or a fiberglass throwaway type air filter. The unit should not be operated without this filter installed.
- 2). Filters should be inspected at least every three months, and replaced or cleaned when dirty. Unit operation becomes very inefficient with dirty filters. Unit warranty is void if filters are not maintained properly.
- 3). Condensate drains can pick up lint and dirt, especially with dirty filters. Inspect, and if dirty, clean the condensate drain pan twice a year to avoid the possibility of overflow (see section "Inspecting and

Cleaning Drain Pans).

4). Microbial growth can occur in water source heat pumps anywhere in the air stream where moisture exists. ASHRAE standards 62-89 recommends that these surfaces be inspected and cleaned to limit contamination. This typically includes surfaces beginning at the finned coil, drain pan, insulation, and fan/blowers.

5). It is important to check the cleanliness of the water-to-refrigerant heat exchanger. Should it become contaminated with dirt and scaling as a result of poor water quality treatment. The heat exchanger will have to be back-flushed and cleaned with a chemical that will remove the scale. This service should be performed by an experienced service technician.

6). A strainer (20 mesh or greater) may be used to keep debris from entering the system and to help ensure a clean system. This is highly recommended on open well and open tower systems.

7). Check the tightness of the various wiring connections within the control panel.

8). The direct-drive blower motors (if equipped) have permanently sealed lubricated bearings and do not require periodic oiling. Life of the bearings may however be extended by adding a few drops of 20W non-detergent oil through the oil ports twice a year. Do NOT over oil.

Inspecting and Cleaning Drain Pans

Note: Standing water in drain pans can promote microbial growth (mold) which may cause unpleasant odors and serious health related indoor air quality problems. **If microbial growth is found, it must be removed immediately and the unit must be properly cleaned and sanitized.** The condensate drain pan and drain line must be checked to ensure that the condensate is draining freely. This inspection should occur a minimum of every six months or more often if necessary. **If evidence of standing water or condensate overflow is found steps should be taken to identify and repair the cause immediately.** Refer to the troubleshooting section of this manual for possible cause and solutions. If microbial growth in the drain pan is observed, it should be cleaned and removed immediately. Drain pans should be cleaned using the following procedure:

1). **Disconnect all electrical power to the unit.**

2). Wear the appropriate personal protective equipment.

3). Remove all standing water.

4). Use a scraper or other tool to remove any solid matter. Remove solid matter with a vacuum device that utilizes High Efficiency Particulate Arrestance (HEPA) filters.

5). Thoroughly clean the contaminated areas with a mild bleach and water solution or an EPA approved sanitizer specifically designed for HVAC use. Carefully follow the sanitizer manufacturer's instructions regarding this product.

6). Immediately rinse the drain pan thoroughly with fresh water to prevent potential corrosion from the cleaning solution, the drain pan and drain line components.

7). Determine and correct the cause of the microbial contamination.

8). Be careful that the contaminated material does not come into contact with other areas of the unit or building. Properly dispose of all contaminated materials and used cleaning solution. Store unused solutions according to solution manufacture's directions.

9). Allow the unit to dry thoroughly before putting the system back into service.

Inspecting and Cleaning Finned Coils:

Coils become externally fouled as a result of normal operation. Dirt on the surface of the coil reduces it's ability to transfer heat which can result in comfort problems, increased resistance to airflow and result in increased operating energy costs. If the dirt on the surface of the coil becomes wet, such as commonly occurs with cooling coils, microbial growth can result which may cause unpleasant odors and serious health related indoor air quality problems. Coils should be inspected at least every six months or more often as necessary. The frequency of the required inspection/cleaning is dependent on the operating hours of the system, filter maintenance and efficiency, and dirt load. The following is the suggested method of cleaning coils:

- 1). **Disconnect all electrical power to the unit.**
- 2). Wear the appropriate personal protective equipment.
- 3). Gain access to the coil section of the unit (both sides).
- 4). Using a soft brush, remove loose debris from both sides of the coil.
- 5). Mix a high quality coil cleaning detergent with water according to the manufacturers instructions. If the detergent is strongly alkaline after mixing (8.5 pH or higher), it must contain a corrosion inhibitor. Carefully follow the cleaning solution manufacturers instructions regarding the use of the product.
- 6). Placed the mixed solution in a pump sprayer or high pressure sprayer. If a high pressure spryer is used, note the following:
 - A. Maintain a minimum nozzle spray angle of 15 degrees.
 - B. Spray perpendicular to the coil face.
 - C. Protect other areas of the air handler and internal controls from contact with moisture or the cleaning solution.
 - D. Keep the nozzle at least 6 inches from the coil.
 - E. Do NOT exceed 600psi.
- 7). Spray the leaving air side of the coil first, then the entering air side. Use a block-off to prevent spray from going through the coil and into a dry section of the unit and/or system duct-work. Carefully follow the cleaning solution manufacturers usage instructions.
- 8). Thoroughly rinse both sides of the coil and the drain pan with cool, clean water.
- 9). Repeat steps 7 and 8 as necessary.
- 10). Straighten any coil fins that may have been damaged during the cleaning process. Use a fin comb.
- 11). Confirm that the drain line remains open following the cleaning process.
- 12). Replace all panels and parts. Restore electrical power to the unit.
- 13). Allow the unit to dry before putting unit back in service.
- 14). Be careful that the contaminated material does not come into contact with other areas of her unit or building. Properly dispose of all contaminated materials and used cleaning solution. Store unused solutions according to solution manufacturer's directions.

Before Calling for Factory Assistance

A call to the factory is sometimes necessary for technical support or service/troubleshooting. We are happy to help! Before calling please gather and record the following information so that we are best able to help.

Cold Point Corp.
510 Henry Street
Rome, NY 13441
Phone: 315.339.2331
Fax: 315.339.2358
e-mail: info@coldpointcorp.com

Records:

Date of Installation _____

Model number _____

Serial number _____

Installing Contractor _____

Address _____

Phone No. _____

Service/Maintenance

Date	Work Performed	BY
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Notes: _____

TROUBLESHOOTING CHART

The troubleshooting chart that follows is provided to serve as an aid for identifying malfunctions that may occur. Within the chart are three columns.

1. The **Problems** column describes what the unit is doing.
2. The **Cause** column identifies the most likely sources of the problem.
3. The **Correction** column describes what should be done to correct the problem.

Problem	Heating	Cooling	Cause	Correction
No response to any thermostat setting	X	X	Main power off	Check fuses
	X	X	Defective control transformer	Replace
	X	X	Broken or loose connection	Repair
	X	X	Defective thermostat	Replace
Unit short cycles	X	X	Thermostat or sensor improperly located	Relocate
Blower runs but compressor does not	X	X	Defective compressor overload	Replace (if external)
	X	X	Defective compressor contactor	Replace
	X	X	Supply voltage too low	Correct
	X	X	Defective compressor capacitor	Replace
	X	X	Defective windings	Replace
	X	X	Limit switches open	Check cause/replace or repair
Blower and compressor run but does not cool or heat properly	X	X	Dirty filter	Replace/clean
	X	X	Blower RPM too low (PSC motor only)	Correct
	X	X	Conditioned air loss due to ductwork leak	Repair leaks
		X	Introduction of excessively hot return air	Correct
	X		Introduction of excessively cold return air	Correct
	X	X	Low on refrigerant charge	Locate leak, repair & recharge
	X	X	Restricted metering device	Replace
	X	X	Defective reversing valve	Check/replace
	X	X	Thermostat improperly located	Relocate
	X	X	Unit undersized	Recalculate heat gains/losses
	X	X	Inadequate water flow	Increase GPM
	X	X	Scaling in coil	Clean or replace
		X	Water too hot	Decrease water temperature
X		Water too cold	Increase water temperature	
High pressure switch open		X	Inadequate GPM	Increase
		X	Water too hot	Decrease temperature
	X		Inadequate air flow	Check, clean blower and coil
	X		Dirty filter	Clean/replace
	X	X	Overcharged with refrigerant	Decrease charge
	X	X	Defective pressure switch	Check/replace
High head pressure	X	X	Trash in chiller	Backflush
		X	Low water flow	Increase GPM
	X		Overcharge of refrigerant	Decrease charge
	X	X	Non-condensable in system	Evacuate and recharge
	X	X	Water too hot	Decrease temperature
	X	X	Dirty Filter	Clean/replace
Low suction pressure	X	X	Inadequate air flow	Check, clean blower and coil
	X	X	Undercharged	Locate leak, repair & recharge
	X	X	Restricted metering device	Repair/replace
		X	Inadequate air flow	Check, clean blower and coil
		X	Dirty filter	Clean/replace
Freezestat open	X		Inadequate GPM	Increase
	X		Inadequate GPM	Increase
		X	Water too cold	Increase
		X	Defective	Replace