

A D I R O N D A C K ▲ A I R E

Cold Point Corporation, Rome, New York 13440 Phone (315)339-2331 Fax (315)339-2358 Web: [www.COLDPOINTCORP.com](http://www.COLDPOINTCORP.com)



### **Water Source Replacement Unit**

## Installation Operation and Maintenance

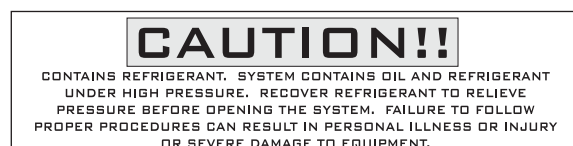


Thank You for choosing COLD POINT products! We have designed and manufactured this unit to be safe and trouble free. As the installer of this unit, you play a major role in assuring it's intended performance and customer satisfaction. The important information provided here will help you install the unit correctly and eliminate call-backs. If you are in need of assistance that is not available or provided by your local installer/contractor feel free to write, call, fax or e-mail us at:

**Cold Point Corp.**  
**7500 Cold Point Dr.**  
**Rome, NY 13440**  
**Phone: 315.339.2331**  
**Fax: 315.339.2358**  
**e-mail: [info@coldpointcorp.com](mailto:info@coldpointcorp.com)**

**Retain this manual for future reference. A copy should be left on premises with the maintenance and/or administrative department at the property.**  
**‘WPV’ PRODUCT DESCRIPTION:**

**Adirondack-Aire ‘WPV’ Series** is a direct replacement for **Command-Aire ‘WPV’** and **Trane ‘WPR’** series vertical stacked water source heat pump **chassis**. The chassis is a part of a complete system, which consists of the chassis, blower section, control box, and furred-in room cabinet with risers. The chassis contains the compressor, air heat exchanger, water heat exchanger, and refrigerant circuit control and safety components. The ‘WPV’ is **dimensionally identical** to the original for a fast, easy, and trouble free installation. Proven technology, quality components, careful design and testing, and the latest in reliability and efficiency advances assure long life, user satisfaction, and lower energy cost! Consider the extensive list of standard features which includes: **powder painted drain pan**, refrigerant circuit **access ports**, **air filter**, **pull handle**, **thermostatic expansion valve**, evaporator **freeze protection**, water coil **freezestat**, **high-pressure** over protection, and **lockout circuit**..... and **Adirondack-Aire** is the replacement solution the competition can't match. **Cold Point Corp.** backs the ‘WPV’ with a customer friendly **one-year parts and labor warranty** and **five-year compressor warranty**, (see *Warranty* document for details).



### 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 callbacks.

**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 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* WPV 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 WPV 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 WPV 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.

### 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 AIFLOW!** The new Adirondack//Aire 'WPV' chassis is designed to work with the original unit blower. Over time however, blower/airflow performance will deteriorate due to dirt accumulation in the blower, 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* WPV 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.

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.

### OPERATING LIMITS

	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

### 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 Remote Thermostats:

The *Adirondack//Aire* WPV replacement chassis uses the same operating logic as the original and is designed to work with the existing blower, controls and thermostat. 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.

### Lock-Out Circuit:

Remote thermostat operated units are equipped with a Lock-out circuit for added protection. An active Lock-out circuit is due to high pressure or low water temperature/ low water flow rate. The system requires re-setting by turning the main power off then on at the circuit breaker or shutting off the 24V power supply. This will re-set the unit operation. A Lock-out condition is an indicator of a system problem and requires follow up service.

### 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 according 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 is the wheel 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 there 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.

### WPV 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 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.

### **WPV Heating Operation:**

WPV 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 de-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. The blower and compressor operation should be smooth with no frost observed in the refrigerant circuit.

### **Boilerless System:**

Boilerless systems (systems in-which the building does NOT have a boiler as part of the closed loop water system) operate as a standard/ normal WSHP until the water temp. falls below 57° F. At that point the C/O T'stat will shut down the heat pump operation and energize the electric heating elements (above the chassis). Heating requirements are maintained with the electric heaters until the water loop temp. recovers to 67° F.

### **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.

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 sprayer 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 ductwork. 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.

- \_\_\_ Unit Model No
- \_\_\_ Unit Serial number
- \_\_\_ Name of Job or Installation
- \_\_\_ Your Name
- \_\_\_ Your Company's Name
- \_\_\_ Your Company's Address
- \_\_\_ Your Company's Phone, Fax, and e-mail
- \_\_\_ Room Temperature -DB/WB
- \_\_\_ Entering Water Temperature
- \_\_\_ Leaving Water Temperature
- \_\_\_ Suction Pressure
- \_\_\_ Discharge pressure
- \_\_\_ Suction Superheat
- \_\_\_ Voltage @ contactor
- \_\_\_ Amp Reading (clamp-on)
- \_\_\_ Your Diagnosis or Question



## ***All Product Limited Warranty***

*Cold Point Corporation* warrants to the purchase/owner, that all products will be free from defects in material and workmanship under the normal use and maintenance.

### **The warranty coverage period:**

**From the date of original installation:** Twelve, (12) months for all components, and sixty, (60) months on unit compressors.

**Or**

**From the date of original sale:** Fifteen, (15) months for all components and Sixty-three, (63) months on unit compressor from the date of original sale.

**whichever comes first.**

### **What we will cover:**

**PARTS:** *Cold Point Corp.* will replace any defective part with a new or rebuilt part at no charge. The replacement part then assumes the remaining portion of the warranty.

**LABOR:** Repair of defective units for the 12 month/ 15 month warranty coverage period. Labor will be reimbursed only in accordance with Cold Point Labor Allowance Policy Bulletin #PB001A. See Policy Bulletin for details.

### **How:**

**PARTS:** Replacement parts, except for compressors, will be provided at no charge upon receipt of an order. Failed compressor replacements must be authorized and returned to *Cold Point Corp.* Replacement compressors will be billed when shipped and credited upon receipt and inspection by *Cold Point Corp.* See Return Material Authorization Policy Bulletin #PB002 for details.

**LABOR:** *Cold Point Corp.* service department must be contacted for authorization of labor coverage prior to performing service work. Failure to do so will void the labor warranty.

### **What we do not cover:**

shipping, or handling of defective units.

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, wind, fires, lightning, accidents, corrosive atmosphere, or other conditions beyond the control of *Cold Point Corp.*

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 the product.

**Limit 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 *Cold Point Corp.* including any statement made by any individual which shall be of no effect.

For Service, repair, or assistance:

- 1.) Contact the installer
- 2.) Call the nearest distributor
- 3.) Call, write, or e-mail:

*Cold Point Corp.*  
7500 Cold Point Dr.  
Rome, NY 13440  
Phone: 315.339.2331  
Fax: 315.339.2358  
Web: [www.coldpointcorp.com](http://www.coldpointcorp.com)

\_\_\_\_\_

Serial number \_\_\_\_\_

Phone No. \_\_\_\_\_

[illegible]

This image shows a full page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook paper. There are no margins, text, or other markings on the page.



## 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 compressor windings	Replace
	X	X	Safety limit switches open	Check cause/replace or repair
Blower and compressor runs but does not Cool/ Heat effectively	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	Debris 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
	X	X	Inadequate air flow	Check, clean blower and coil
Low suction pressure	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
	X		Inadequate GPM	Increase
Freezestat open	X		Inadequate GPM	Increase
	X		Water too cold	Increase
		X	Defective	Replace

\* To change freezestat to 20 F you must have a heat transfer fluid with protection to 20 F