

**INSTALLATION OPERATION  
AND MAINTENANCE  
WATER COOLED CONSOLE  
HEAT PUMP**

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Division of  
The Weil-McLain Co., Inc.

**Climate  
Master**

Decentralized  
air conditioning systems

**UNPACKING AND INSPECTION**

Each Climate Master Heat Pump has been inspected, tested and operated at the factory by quality control and packed to arrive in good condition. However, rough handling by carrier can cause damage. Equipment is shipped F.O.B. factory with freight allowed over 200 lbs. Therefore claims for damage must be initiated by the receiver against the carrier.

**VISIBLE DAMAGE**

Report evidence of damage to the carrier's agent at once. Request inspection and a report. If the unit has been damaged to the extent that it must be returned to the factory, return via the same carrier, and file the necessary claims against the carrier.

**CONCEALED DAMAGE**

Upon removing the carton, inspect each unit for concealed damage. If damage is found, follow same procedure outlined for visible damage.

**PIPING AND ELECTRIC**

All water and electric connections must be installed in accordance with applicable codes, regulations, and Climate Master's instructions on piping, wiring and fusing.

**WATER PIPING**

Piping may be run either above or below the floor. Where above the floor piping is used (either single or two pipes) it may be concealed within prefabricated chase molding, behind custom field built enclosures or custom field built cabinets. Where piping is run below the floor and stubbed up to the unit, field connections are necessary to connect the supply and return to the factory piped extensions inside the cabinet which includes two hand valves unions and air vent.

For one pipe and two pipe units for above the floor piping the cross over piping within the unit is factory piped including hand valves, air vents and 2" pipe extensions beyond each end of the cabinet for connection along the floor piping.

**CON- DENSATE PIPING**

For below the floor piping, condensate lines must be run and the main pitched at least 1/4" per foot. If flexible hose is used to connect the unit condensate drain to the drain line - make sure the flexible hose is clamped with proper hose clamps to the lines and is not kinked.

For above the floor units, condensate lines through the unit is factory installed and extended to each side of the cabinet. Again, caution should be used in connecting the unit drain pan connector to this line. Pitch becomes limited in above the floor applications and vertical drain lines should be installed after every 8 units in order to properly remove the condensate.

If units are not factory equipped with unions and shut-off valves, they must be field installed so that the unit can be disconnected and removed for service without disrupting the system flow. Use brass fittings for all connections, since factory piping is copper. Use a commercial brand of Teflon ribbon pipe thread sealer to reduce the possibility of system contamination when making pipe thread connections.

For each piping loop install a balancing valve at the beginning or end. For more accurate system balancing also install a flow indicator in each loop and a thermometer in each loop and in the main supply return. Each loop on run out (in case of a one pipe system) should have hand shut-off valves at both supply and return ends with drain connection, so that each loop can be isolated and drained without disrupting flow of the entire system.

**CAUTION:**

For two pipe systems the water inlet and outlet to the condenser is clearly marked. Make sure system supply and return piping is connected accordingly. For one pipe system the unit is marked either Right or Left hand. The hand is determined by facing the unit. If the loop supply water enters the unit from the Right it is R.H. The opposite is L.H.

On two pipe systems flexible hose may be used for connecting the unit water connections to the system supply and return connections such as Parker #801 with brass adapter fittings.

After piping connections have been completed the two hand valves inside the unit should be closed for flushing the system. For two pipe systems shut valves and connect the supply and return connections together on the last unit on the loop for flushing both lines. Flush all water system lines, making certain water is clean. The units will not operate properly if the heat exchanges become fouled with dirt, pipe dope, shavings, etc. Damage can be operated supplying water that is corrosive or impure, or by restricting water flow with foreign matter. Such conditions will void the warranty.

**SYSTEM  
SAFETY  
CONTROL**

The system water supply temperature must be between 60° - 110° cooling and 60° - 95° heating at full flow. Operation with water temperature outside these limits and of low water flow rates can cause poor operation and damage to the conditioner and will void the warranty.

Proper alarm systems should be installed such as a flow or water pressure switch and an immersion type thermostat interlocked with an alarm to signal lack of water flow or water temperature outside the recommended limits.

If water flow is shut off from the conditioner during construction or unoccupancy and freezing is likely to occur or the unit is likely to be subjected to temperatures below freezing, the water must be completely drained from both the units and the system to avoid damage.

If time clocks are used as a part of the temperature control programming the system wherein the system pumps, towers and heaters are shut off as well as the air conditioning units, make sure that the air conditioning units cannot be reset or retimed unless the system pump is operative. In general, it is recommended that system pumps operate continuously, tower and heater left energized and operative on controls. Therefore, if the air conditioning units are programmed off with timed reset, the system will be supplying the proper conditioned water to the system loops.

**CLEANING  
SYSTEM**

For best cleaning results after initial flushing, the valves to the individual heat pumps should be opened and the system filled in the usual manner and add trisodium phosphate in an aqueous solution to the system at the preparation of one pound per fifty gallons of water. After filling the system, water should be brought up to 95° temperature and allowed to circulate for several hours. The system should be drained completely and refilled with fresh water. After this cleaning, flushing and refilling the system should be tested and left on the slightly alkaline side (ph 7.5).

If water conditions are known to be bad, it is advisable to consult a water treatment organization. Caution should be exercised in not adding special treatment of "stop-leak" compounds to the system.

**WIRING**

Line voltage wiring should be provided to each unit in accordance with specifications and applicable electrical codes. The supply voltage must be within plus 10% or minus 5% of nameplate rating on units marked 208/230 volts and plus or minus 10% on units marked 115 volts or 277 volts. Be sure to check nameplate ratings for proper voltage and full load amps. Each unit is provided with a junction box for wiring. Before closing disconnect switch, be sure the "OFF" button is depressed. Units are normally shipped with off button depressed.

## **INSTALL- ATION**

Open the carton at the point of installation being careful not to scratch the surface of the cabinet with tools used to open the carton. The carton should be used to cover and protect the unit against damage after installation is completed and while construction activity continues.

Remove the front panel by grasping the upper edge of the panel and lifting upwards. The combination cabinet and chassis should then be set level on the floor and shimmed where necessary. For two pipe units make sure the pipe stubs out and drains through the floor. Clear all internal parts in the end compartment before setting unit in place. Also check all electrical supply cables to make sure access will be available for wiring into junction box mounted on the cabinet.

Having done the above, the unit should then be fixed permanently to the wall with use of screws, molly bolts, lag screws, etc. through holes provided in the cabinet frame.

### **NOTE:**

The compressors are internally spring mounted and externally isolated. There are no hold downs to be removed.

### **NOTE:**

The unit receives its return air from beneath the front panel, kick plate. If additional flooring or carpeting of more than  $\frac{3}{4}$ " is put down on the rough grade the unit must be raised on an appropriate block so that proper return air area is maintained. Failure to provide the designed return air can cause coil frosting, compressor failure and voiding of warranty. After installation, caution should be exercised in seeing that drapes, desks, files, cabinets, etc. are not placed in front of the unit to obstruct air flow.

When water, drain and electrical connections are finished, make sure that neither piping nor electric cables touch or rattle. Make sure that fittings are tight and that all connections are made properly to supply and return on two-pipe systems and to extend pipes right and left on one-pipe systems. Make sure drain lines are installed and pitched, and connected from the unit drain pan to drain line in manner acceptable by local codes. Make sure air filter is in place. Shut off the two water supply valves.

## **AIR REMOVAL**

After installation is complete and the system has been filled, leak tested, drained, flushed and cleaned and refilled, all the air must be removed before starting the units. Air that is not removed can cause pockets in the condenser coils restricting the flow of water and resulting in damage to the unit. The procedure for venting is as follows:

1. Each unit must be vented starting with the unit closest to the pump.\*  
\* When venting the first time, make sure all off buttons are depressed. At this point the electric power to each unit should have been verified.
2. The main supply lines and loops should be vented first through a manual or automatic vent installed at the highest point in the system.
3. Open each hand valve at the unit and using a screw driver and cup open the vent and collect at least one cup of water or until a steady flow comes through the vent. Close vent and repeat procedure throughout each unit.
4. After each unit has been vented in this manner recheck the system pressure and add additional water as may be necessary.
5. Vent the main supply lines again.

## START-UP PROCEDURE

1. The system flow has been established.
2. The system has been flushed and cleaned and filled.
3. The system and each unit's hand valves have been opened.
4. Each unit and the mains have been vented at least once.
5. Flow rate and balancing has been accomplished with the balancing valves and flow indicators to provide design flow conditions to each loop system. Proper flow rates to the heat pump system is very important since too little flow can cause improper operation and result in damage to the unit.
6. Bring the water temperature up to approximately 90°. Caution - the unit must not be used for temporary heat under any circumstances. It must not be operated on any open piping.
7. Flow and temperature alarm system as described herein has been checked and is operative.
8. The proper voltage to each unit has been verified and necessary electrical protections established.
9. Return to the first unit as outlined in the first venting procedure and proceed throughout as follows:
  - A. Close disconnect switch with "OFF" button depressed.
  - B. Turn the thermostat all the way clockwise to maximum cool position.
  - C. Depress the heat button which will allow the fans to come on with compressor off - if fans do not operate, recheck the power and refer to trouble shooting chart in appendix.
  - D. Now turn the thermostat slowly counter-clockwise to "warmer" until the compressor comes on. Leave in this position and check for heat output.
  - E. In the heat position re-vent the unit for elimination of additional air.
  - F. Allow to run in heat position to verify compressor operation.
  - G. Depress the cool button LO and the compressor will go off and fans continue to run.
  - H. Turn thermostat clockwise until the compressor comes on cooling and let it run in this position to verify cooling.
  - I. After each of these cycles the reversing valve will change position distinguished by a "swoosh" sound.
  - J. If water noise is heard it means there is still air in the system which should be removed.
  - K. By hand you can feed the water inlet and outlet pipes to the condenser and a temperature differential should be felt indicating proper operation.
  - L. If in any of the above procedures the unit malfunctions, refer to the "trouble shooting" chart in the appendix.
  - M. Check for any vibrations, unusual noises or water leaks.
  - N. After being satisfied the unit operates in all positions it should be turned off and the procedure repeated on the next unit until all units have been checked and started.
10. When system is ready for a run, position, all units can now be normally started and set on either heat or cool depending on climatic conditions.
11. Make sure the system controls are operative which control the water temperature such as:
  - A. Controls set to energize heater to prevent water from going below 60°.
  - B. Controls set to energize tower to prevent water from going above 110°.
  - C. Set operating range between 70° to 100°.
12. Again check alarm system on temperature to sound above 110° and below 60° and sound when flow fails.
13. Caution should be used in winter time starting when the room temperature is below 50° since the unit freeze stat safety control will lock out. The unit may have to be started several times on heat until the area is warm and the freeze stat will hold in.

## **MAINTENANCE AND OPERATION**

Filter: The units come equipped with a ½" thick permanent washable filter. During construction this filter will become clogged with construction dust and should be checked and cleaned before units are put into operation. The filter can be cleaned with tap water and shaken free of moisture and installed. During the first 6 months of operation these filters should be checked every 30 days and cleaned if necessary. Thereafter the filter should be checked and cleaned every 3 months. However after the first 6 months and depending on the building conditions the interval of cleaning can be extended to every 6 months or as necessary: Caution: clogged filter can restrict air flow to the coil and cause damage to the unit and result in voiding the warranty. The units should never be operated without the filter in place.

LUBRICATION: The units are equipped with permanently lubricated fan motors. Do not oil initially. The motors do have oil cups and it is recommended that the motor be oiled with SAE #70 oil every 2 years. This can be done by removing the fan cover plate and oiled with a pressure hand oiler.

The hermetic compressors are sealed and require no lubrication.

All other controls - high and low temperature or pressure cut outs, freeze stats, thermostats, switches and valves are sealed items requiring no maintenance. In case of failure they should be replaced.

DRAIN LINES: The condensate drain line can become plugged from time to time and this should be inspected once a year to prevent leakage.

SAFETY CONTROLS: Each unit is equipped with safety controls designed to protect the units which are factory installed. The system controls mentioned herein are additional controls to protect the system.

If the water temperature should be below 60° the low temperature or pressure switch prevent the heat-pump compressor from operating. If the water temperature exceeds 115° the switch will prevent the compressor from operating. If the room ambient temperature drops below 50° the freeze control will prevent the unit from operating.

## **AUXILIARY EQUIPMENT**

The Climate Master Heat Pump system also incorporates other components important to proper system operations - circulating pumps - a heat rejector, such as a cooling tower - and heater such as an electric, oil or gas fired boiler. These items must also be properly maintained and periodically checked because failure or malfunction at any one of these components can cause system difficulty or shut down.

## TROUBLE-SHOOTING CHART

COMPLAINT	POSSIBLE CAUSE	CHECKS & CORRECTIONS
Unit does not run.	Blown fuse.	Check for blown fuses or tripped circuit breaker. Replace fuse or reset circuit breaker.
	Broken or loose wires	Check power connection to the unit and check wall outlet.
	Low voltage	Check voltage. Does it match name plate rated voltage?
	Defective switch	Check if there is power into switch but no continuity through it. Replace switch.
Unit blows fuse.	Undersized fuse	Check fuse size. Replace with proper size fuse.
	Shorted or incorrect unit wiring.	Check and correct unit wiring.
	Shorted capacitor	Check capacitor, if found defective, replace
	Shorted or stuck compressor	Check compressor
	Compressor short cycling	Check compressor
	Compressor starting difficulty	Check voltage
	Dirty or blocked condenser coil	Check and blow out with air if necessary
Blowers run but compressor does not.	Thermostat improperly set	Check thermostat setting
	Defective thermostat.	Check thermostat operation. Replace, if found defective.
	Loose or broken wires	Check unit wiring and wiring connections at switch, thermostat, compressor and capacitor. Replace or repair as necessary.
	Running capacitor defective	Check capacitor. Replace if found defective
	Overload open or defective	Check for overheated compressor or defective overload. Replace overload if found defective
	Compressor motor defective	Replace compressor
	Low voltage	Check voltage
Compressor cycles off and on, blowers running	Low voltage	Check voltage
	Water flow through condenser restricted or stopped	Check condenser coil for restriction or dirt. Clean if required.
	Thermostat feeler bulb not in proper position.	Check bulb for proper location in return air stream. Adjust or relocate if necessary. Bulb should be pitched down towards the capillary.
	Defective or incorrect overload.	Check if overload has tripped. Check compressor temperature. If compressor is not overheated and if amperage is normal and overload trips, change overload.

### TROUBLE - SHOOTING CHART

COMPLAINT	POSSIBLE CAUSE	CHECKS & CORRECTIONS
Unit vibrates or rattles.	Discharge or suction tube hitting metal surface	Bend and adjust for clearance where hitting
	Loose or bent blower	Tighten or replace blower
	Blower motor out of alignment, bent shaft or loose on mounting	Check alignment and tighten mounting. Replace motor if shaft is bent.
Water drips from unit	Unit not level or pitched correctly	Level unit
	Condensate drain line kinked or plugged	clean condensate drain
Noisy blower operation	Blower hitting	Check blower, adjust for clearance.
	Bent blower	Check and replace blower
	Loose blower on shaft	Check and tighten
Unit operates, not cooling properly	Clogged air filter	Check filter. Clean or replace if found too dirty.
	Water flow through condensor restricted or stopped	Check condensor flow
	Defective compressor or refrigerant leak	If compressor runs but the evaporator does not cool, it would indicate either a defective compressor or loss of refrigerant charge.
Evaporator ices over	Clogged air filter	Check filter. Clean or replace if found too dirty.
	Evaporator blower motor tripping off on overload	Check for overheated evaporator blower motor and tripped overload. Replace motor if necessary.
	Unit operating at too low room temperature	If room temperature drops below 65°F. the evaporator may ice over
	Unit operates at too low water temperature	When unit operates when water too cold it may ice over.
Unit will not work on "Heating"	Defective thermostat	If motor works in other positions and thermostat, klixon, etc. are O.K., check switch. Replace if found defective.
	Clogged or dirty filter	Check filter. Clean or replace if found too dirty.
	Thermostat improperly set	Is it below room temperature? Check thermostat setting.
	Defective thermostat	Check thermostat operation. Replace if found defective
	Incorrect wiring	Check for broken, loose or incorrect wires.
	Evaporator motor defective	Check evaporator motor in one of the other switch positions. If it does not work check for open overload. If motor is not overheated replace it.