



The Whalen Company

P.O. Box 1390 • Easton, Maryland 21601 • Tel. 410.822.9200 • Fax 410.822.8926 • www.whalencompany.com

WCS Series **Console Water Source Heat Pump Unit** Installation Operation and Maintenance



Thank You for choosing The Whalen Company's products. Our goal is to make sure you remain pleased with your decision to purchase a Whalen Company 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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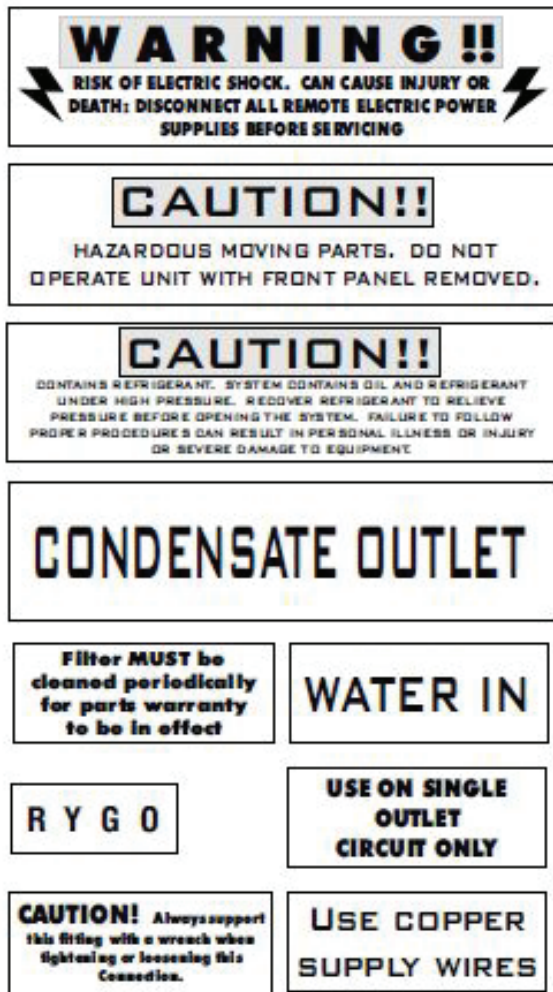
PRODUCT DESCRIPTIONS:

MODEL WCS CONSOLE WATER SOURCE HEAT PUMP

The Whalen Company 'WCS' series is used for renovation or new construction console water source heat pump projects. These console units are offered as chassis only to work with the existing or custom cabinets or with cabinet for a complete upgrade. The chassis contains the compressor, air heat exchanger, water heat exchanger, evaporator fan and motor, and control and safety components. The room cabinet is powder painted furniture grade steel construction with extruded aluminum grille and control door. The 'WCS' series has two chassis sizes, small (models 10 & 13), and large (models 15 & 19). The chassis is field adaptable to either LH or RH applications. Water, drain and electrical connections line right up to the original installation.

Before Installation:

Before beginning work check the nameplates of the old and new units to confirm that the new unit's capacity and voltage are compatible with the original installation.



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.

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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 The Whalen Company at 315.339.2331 for assistance

These instructions give information relative to The Whalen Company's WCS water source units. 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 or field supply them to install the new unit.

Unpacking and Inspection:

The WCS is shipped completely assembled and banded and stretch wrapped to a skid. 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 Unit:

- 1). **Shut off all power first! Failure to shut off power supply can result in electrical shock and death!**
- 2). Remove the room cabinet by removing the mounting screws at the 'kick-plate'. Lift the cabinet and pull towards you to expose the chassis. Dispose of the room cabinet if the new unit comes with a new one. Set it aside if it is to be used with the new 'WCS' chassis.
- 3). Disconnect the power supply at the chassis junction box or unplug the line cord.

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). Remove fasteners that mount the old chassis to the wall. Remove the chassis and dispose of properly. Note that the old unit contains R-22 refrigerant, which must be handled and reclaimed by certified technicians. You are responsible for making arrangements for proper disposal.

Before Installing the New Unit:

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). Fuse/Circuit Breaker:

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

3). Grounding:

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

4). The Whalen Company’s WCS 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.

5). Check the supply, return, and drain lines for cuts, kinks or blockage. Repair or replace as necessary.

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 Whalen Company 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 Unit:

1). Carefully move the new chassis into position aligning it with the location of the old one. Support wiring, water lines, and drain lines so that they are clear and not susceptible to damage as the chassis is moved into position. Level the chassis using shims if necessary. Lag the chassis to the wall using fasteners appropriate for the wall construction.

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 to the chassis junction box or if a line cord is used plug it into the receptacle. Be sure all wiring is in accordance with the requirements outlined above.

4). Do a final visual inspection of the chassis before installing the room cabinet then lift the cabinet (new or old) onto the chassis. The rear flange of the room cabinet locks over the rear offset flange of the chassis.

You may have to jostle the cabinet from side-to-side for proper alignment. Once the cabinet is properly aligned and locked down on the chassis flange install the mounting screws at the cabinet kick plate and screw into the chassis.

5). Turn on the power at the source.

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 at the unit .

Has the unit been properly grounded and fused with the recommended fuse size?

Has all work been done in accordance with applicable local and national codes?

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 Cool Heat selector switch, Fan 'HI' 'LO' switch, and thermostat.

WCS Models - Cooling Operation:

1). Open the cabinet control door. Locate the "COOL, 'OFF', 'HEAT' and the 'FAN' 'HI' 'LO' push button switches. Push the switch on the unit control panel to the 'COOL' position. Select either FAN 'HI' or 'LO' as desired.

2). Set the desired temperature you want to maintain by moving the thermostat dial to the 'WARMER' or 'COOLER' position. 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 normally.

3). Check unit operation. The compressor and blower should be running supplying cool air through the supply air grille located on the top of the cabinet. Compressor and blower operation should be smooth and quiet. Water leaving the unit should be 9° - 12° warmer than the entering water.

4). 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.

5). **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.

6). 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.

WCS Models Heating Operation:

WCS Series Heat pumps are designed to also provide heating. Setting the to the 'Heat' position and setting the ther-

mostat dial 'WARMER' activates heating operation. Adjust the thermostat set point above room temperature. Warm air should blow from the grille. A water temperature decrease of approximately 5-9 F leaving the heat exchanger should be noted. The blower and compressor operation should be smooth and quiet.

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 electrostatic type air filter. The unit should not be operated without this filter installed.

2). Filters should be inspected at least every three months, and cleaned when dirty. Unit operation becomes very inefficient with dirty filters. Unit warranty is void if filters are not maintained properly. 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 motor in WCS units 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 manufacturer'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 its 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.
- 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.

The Whalen Company
P.O. Box 1390
Easton, MD 21601
Phone: 410.822.9200
Fax: 410.822.8926

- ____ 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

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	Possible Cause	Correction
No response to any thermostat setting	X	X	Main power off	Check fuses/ breakers
	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	Defective compressor overload	Replace (if external)
		X	Defective compressor contactor	Replace
		X	Supply voltage too low	Correct
		X	Defective compressor capacitor	Replace
		X	Defective windings	Replace
		X	Limit switches open	Check cause/replace or repair-Reset lock-out Circuit
Inadequate cooling or heating	X	X	Dirty Filter	Replace/clean
	X	X	Blower RPM too low	Correct
		X	Introduction of excessively hot return air	Correct/ Check 3-way valve
		X	Low on refrigerant charge	Locate leak, repair & recharge
		X	Restricted capillary tube	Replace
	X	X	Unit undersized	Recalculate heat gains/losses
	X	X	Thermostat improperly located	Relocate
High head pressure		X	Overcharge of refrigerant	Decrease charge
		X	Non-condensable in system	Evacuate and recharge
		X	Low water flow	Correct
		X	Dirty clogged coil	Clean/replace
		X	Inadequate air flow	Check, clean filter blower, and coil
		X	Water temperature too warm	Lower water temperature
		X	Dirty filter	Clean/replace
Low suction pressure		X	Undercharged	Locate leak, repair & recharge
		X	Restricted metering device	Repair/replace
		X	Inadequate air flow	Check, clean filter blower, and coil
		X	Dirty filter	Clean/replace

