OceanAire, Inc.

AquaCooler PORTABLE WATER - COOLED PREMIER AIR CONDITIONERS

Engineering, Installation and Service Manual

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GENERAL DESCRIPTION

Air Conditioners are designed for applications where outside air is not available and spot cooling is needed. The cord connected AquaCooler Models range from 13,780 BTU/HR to 60,100 BTU/HR floor mount configuration to satisfy any space requirements. All models are provided with casters for portability.

These models are thoroughly self-contained with the entire refrigeration system, water valve, condensate pump, fan motor and electrical components neatly arranged in a platinum texture polyester powder coated metal cabinet. Only power, condenser water supply and discharge and condensate drain piping are required for installation.The 24 volt programmable electronic controller, provides the desired comfort. The high counterflow efficiency design of the water-cooled condenser operation allows proper amount of water flow to achieve the desired high and low refrigeration system pressures. Condenser water is regulated by a refrigeration system head pressure actuated water regulating valve.

GENERAL REQUIREMENTS

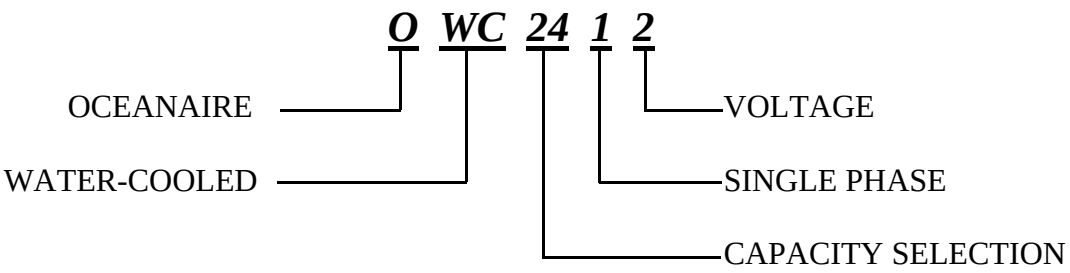
A MINIMUM WATER PRESSURE OF 20 PSIG IS REQUIRED to actuate the water regulating valve and allow water to flow into the condenser coil. The condenser water temperature leaving the unit should not exceed 112° F. Ignoring this compliance will void the warranty on the refrigeration system.

IMPORTANT AquaCooler Air Conditioners are designed and engineered for the comfort of the end user. The length of service received can be extended by following the installation and preventive maintenance instructions. It is important that the warranty card be filled out completely and returned to the factory within fourteen (14) days of installation of the unit in order to receive the benefits of the warranty.

UNIT MODEL CAPACITIES

12780 BTU/HR COOLING
18840 BTU/HR COOLING
23950 BTU/HR COOLING
36100 BTU/HR COOLING
60,300 BTU/HR COOLING

NOMENCLATURE



CAPACITY SELECTION

NUMBER CODE	12.....13780 BTU/HR
	18.....18840 BTU/HR
	24.....23950 BTU/HR
	36.....36100 BTU/HR
	60.....60100 BTU/HR

Aqua Cooler
Portable Water Cooled Air Conditioners

Feb 20, 2001

Water-Cooled Air Conditioners

Specifications

MODEL	OWC1211	OWC1811	OWC2412	OWC3612	OWC3632	OWC6012	OWC6032
Nominal Cooling Capacity①	13,780	18,840	23,950	36,100	36,100	60,100	60,100
Voltage	115/60/1 or 208/230/60/1		208/230/60/1		208/230/3	208/230/1	208/230/3
Cooling Amps⑤	10.5/5.3	12.0/6.2	8.6	13.0	9.4	20.7	14.8
Cooling Watts⑤	1050	1400	1990	3000	3000	5350	5350
E.E.R.	13.1	13.5	12.3	12.0	12.0	11.3	11.3
In Rush Current (AMPS)	79	92.6	64.6	109.6	103.4	183.1	134.2
Fuse/Breaker (AMPS)	15	15	20	20	20	30	20
Plug Type	5-15P	5-15P	6-20P	6-20P	L15-20P	6-30P	L15-20P
Compressor HP	1	1 1/2	2	3	3	5	5
Compressor RLA	9.3	11.4	8.3	17.9	11.4	28.0	20.0
Compressor LRA	58	65	49	88	77	169	123
Evaporator CFM②	400	600	810	1310	1310	2200	2200
Evap Motor HP	1/15	1/5	1/3	1/2	1/2	1	1
Evap Motor Watts	200	210	350	375	375	550	550
Condenser Water Flow at 60°F inlet GPM	0.75	1.10	1.55	2.20	2.20	5.50	5.50
at 85°F inlet	3.0	4.5	6.0	9.0	9.0	15.0	15.0
Condenser Coil Pressure Drop-PSI	.40	.40	.20	.40	.40	.40	.40
Water Valve Pressure Drop-PSI	2.0						
Water Valve Connection④	3/8 MF			5/8 MF			
Drain Connection	3/8 MF						
Condensate Pump Head (Standard)	20 Feet						
Sound Level③	52	57	60	62	62	69	69
R-22 Charge Oz.	19	22	24	36	36	68	
(A) Height with Casters	31 1/2	37 1/2		47		52 1/4	
(D) Height without Casters	28 1/2	34 1/2		42 1/2		46 1/2	
(B) Width	20 1/8	24 1/4		28 1/4			
(C) Depth	13 1/8	13		15 1/2		39	
Net Weight	120	165	170	225	225	350	350
Shipping Weight	125	175	180	235	235	385	385
Shipping Volume	9	18	18	21	21	36	36

①Nominal Capacity is net BTU/HR at 80°F DB/67°F WB return air or 85°F EWT to 95°F LWT (#GPM/Ton). ②CFM with free discharge. ③Sound Pressure, dB at 5 feet Com. Config.

④Size 3/8 valve used on model 12, 18, 24 (3/8 MF Fitting) 5/8 valve used on models 36 and 60 (5/8 MF fitting)

⑤Amps & Watts at 208 volts

Specifications subject to change without notice.

All units available in 220/50 cycle

STANDARD FEATURES

SERVICEABILITY

All AquaCooler Series units are designed with removable panels to provide full service accessibility. Turn to page 11 “Part Replacement Procedure” for removal of the correct panel when replacing a part.

AUTOMATIC WATER VALVE

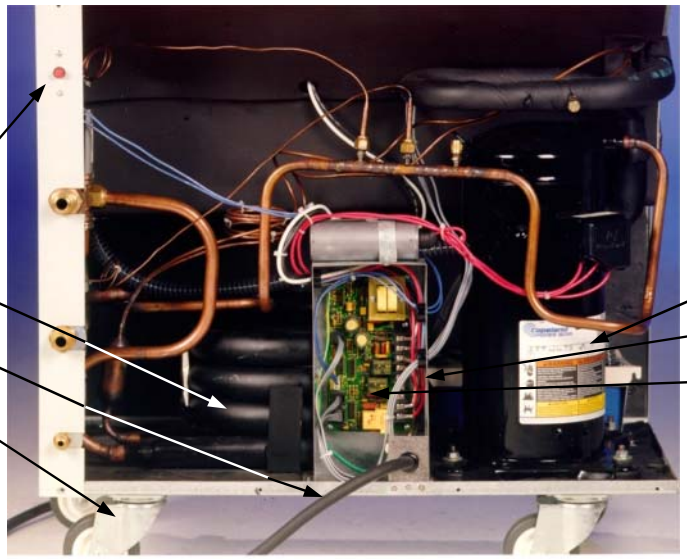
All units are equipped with a direct-acting, refrigeration system head pressure actuated water regulating valve. This valve, factory set for 94° - 100° leaving water temperature (LWT), flows only the amount of water required to achieve the desired refrigeration system operating pressure. Units used for closed loop operation may be ordered without the water valve. If, however, the temperature of the return water is questionable in a closed loop, the water valve may be helpful and left in the system with little pressure drop.

ATTRACTIVE CABINET

The AquaCooler Series cabinet is constructed of 18 gauge galvanized steel with a platinum texture polyester powder coated finish that will compliment any decor. The entire cabinet is insulated with a sound absorbent insulation for cool, quiet comfort. The base pan is 14 gauge galvanized steel and remains dry and free from odor and fungal growth.

HIGH PRESSURE SAFETY SWITCH

All units incorporate a manual re-set high pressure switch for maximum protection of the refrigeration system and compressor. The cut-out pressure setting is 375 ± 5 PSIG for all models except OWC36 which uses 425± 5 PSIG. If the pressure exceeds this setting, the compressor stops and can be re-started by depressing the “RESET” button located on the back panel of the unit. The high pressure control’s capillary line is attached to a schrader valve. This allows replacement of a defective control without recovering the refrigerant.



NOTE: WAIT TWO MINUTES BEFORE RESTARTING UNIT AFTER TRIPPING BY HIGH PRESSURE SWITCH.

STATE-OF-THE-ART CONTROLS

The *AquaCooler* units maintain the desired temperature by setting the 24 volt State-Of-The-Art programmable electronic controller. Turn to page 10 for simplified operating instructions.
The thermostat has a setting range from 55° F to 85° F ± 1° F and also has a Celsius readout. A six speed push-button regulates the evaporator motor if manual control is desired. In automatic mode, fan speed is automatically reduced as temperature approaches set point. This provides maximum cooling with minimum air flow noise.
The Moisture Mode helps to control relative humidity and minimize compressor operation. A de-icing cycle helps prevent evaporator coil icing. The nonvolatile memory retains program and set points without batteries.
A three digit display reads "CON" to indicate condensate alert and/or high pressure cut-out.

BUILT-IN CONDENSATE PUMP

Every unit is equipped with a condensate pump designed as an automatic condensate removal pump for water dripping off the evaporator coil. The pump is capable of pumping against a 20 ft. head and is controlled by a float/switch mechanism which turns the pump "on" when approximately 2 1/2 inches of water collects in the tank, and automatically switches "off" when the tank drains to a level of approximately 1 1/4 inches. A built-in pump safety switch turns off the air conditioner if the condensate line becomes plugged or motor/pump failure should occur. An in line check valve is standard. The entire base pan stays dry.

CONDENSER COIL

The water cooled copper/steel tube-in-tube type condenser coil is designed for a maximum water side working pressure of 400psi. Optional cupro-nickel condenser coils are available for severe duty and salt-water/brine applications. Low pressure drop and efficient design (high EER's) fully utilizes the heat transfer capability of this compact coil.

FILTER

All units are equipped with a 1/4 inch thick, throw away foam air filter located behind the return air grille that can easily be removed and replaced. Just lift and pull the grille out and remove the filter.

SERVICE CORD

All *AquaCooler* Series units are equipped with the standard ten foot long service cord with plug configurations and receptacle requirements as shown in the chart below.

ELECTRICAL SERVICE PLUG CONFIGURATION

UNIT MODEL	PLUG CONFIGURATION	RECEPTACLE
OWC-12-18 115 V	 **15A-125V NEMA 5-15P**	**NEMA 5-15R**
OWC24-36 208/230 V	 **20A-250 V NEMA 6-20P**	**NEMA 6-20R**
OWC6012 208/230 V	 **30A-250 V NEMA-6-30P**	**NEMA-6-30R**
OWC6032 208/230 3 Phase	 **20A-250 V NEMA-L15-20P**	**NEMA-L15-20R**

OPTIONAL FEATURES

HOSE KIT

10, 25, and 40 foot hose kits with flare connectors to match fittings on units, banded 3-in-one design for easy and convenient installation, are available. When using these hoses in applications with water pressures exceeding 50 PSIG, a water pressure reducing valve must be installed in the water supply line prior to the hose kit; otherwise warranty on the hose kits will be void. The water out and condensate of the three-section flexible plastic hose can be fed to a sink or permanent drain. When using a hose kit, avoid sharp corners, hot water pipes and kinking to assure proper water flow of the supply and return lines.

HIGH PRESSURE WATER VALVE

High pressure water regulating valves, designed for use with up to 350 PSI water inlet pressure, are available.

CUPRO-NICKEL CONDENSER

When chemically treated water, salt water or brine is used in the condenser coil, it is recommended that the air conditioner be equipped with a 90/10 Naval Spec. Cupro/Nickel condenser.

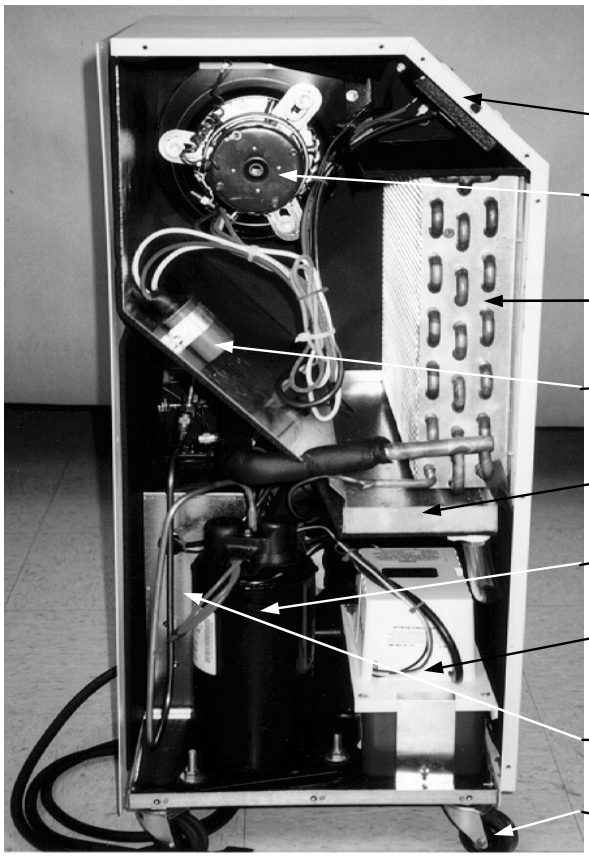
TREATED EVAPORATOR COIL

When airborne contaminants are a problem for air conditioning applications, acrylic coated evaporator coils are recommended to guard against pitting or corroding.

UNIT CONSTRUCTION

FRONT

BACK



CONTROLLER

EVAPORATOR FAN MOTOR

EVAPORATOR COIL

FAN MOTOR CAPACITOR

EVAPORATOR DRAIN PAN

COMPRESSOR

CONDENSATE PUMP

ELECTRICAL PANEL

CASTERS

INSTALLATION INSTRUCTIONS

ELECTRICAL REQUIREMENTS

Adhere to the data plate on the back of the unit and make certain that the proper power is used. Refer to the "Specifications" section for voltage and fuse requirements. Make sure that proper wall outlets and receptacles are used as described in "Standard Features" section of this manual. Operating the unit on improper voltage will void the warranty. CAUTION: the use of an extension cord rated at least:

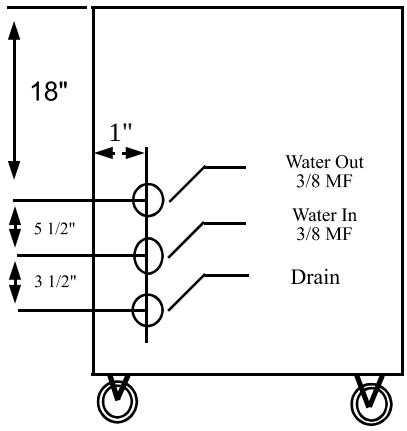
15 Amps @ 115 volts for OWC12 and OWC18 *20 Amps @ 250 volts for OWC3612*
15 Amps @ 250 volts for OWC 12-24 *30 Amps @ 250 volts for OWC6012*

and with grounding-type attachment plug and grounding-type connector (load fitting) may be used.

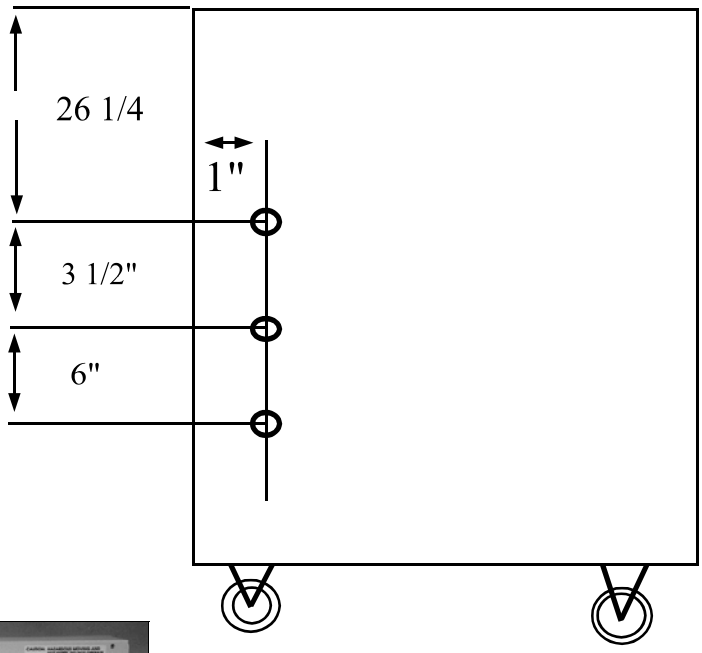
WATER FITTING LOCATION

Check the exact location of the water fittings on the unit back panel before placing the air conditioner in the desired position. Water lines should be securely attached to the proper connections.

OWC12



OWC18, OWC24, OWC36, OWC6012



PRACTICAL INSTALLATION

Proper installation can be achieved by following these simple steps:

1. Turn off cold water supply.

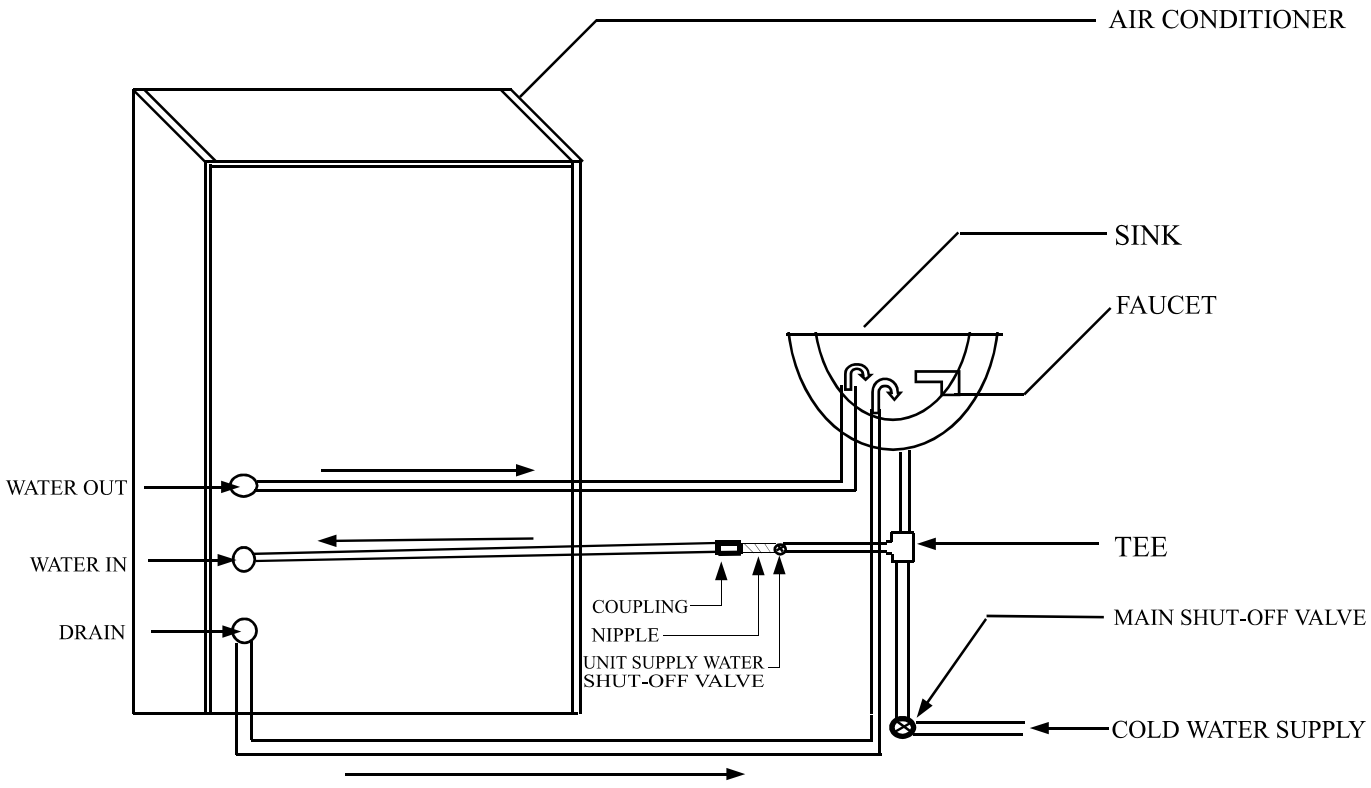
2. Install “T” between faucet of cold water line and supply valve.

3. Connect shut-off valve to “T” branch.

4. Insert a 3/8 pipe nipple in discharge end of water shut-off valve.

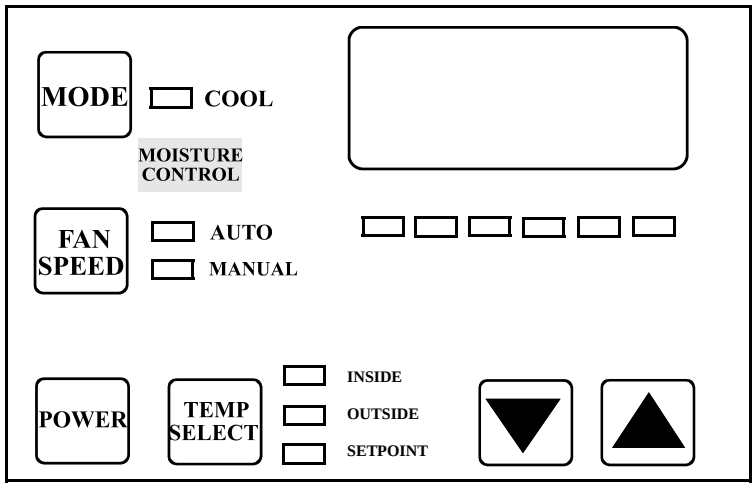
5. Thread coupling onto 3/8 pipe nipple and secure.

An alternate installation method: Drill a 5/16 diameter hole in the cold water line and attach a saddle valve to the line. Complete installation by following above steps.



CHECKOUT OF UNIT OPERATION

POWER BUTTON: Press the *power button* once to toggle the unit to the on mode. Press the power button again to toggle the unit to the off mode.



FAN BUTTON: Press and release the *fan button* to advance from auto to manual fan. Press and release to increase the manual fan speeds, 1 through 6. Press and release again returns to the auto fan mode. The selected fan mode is indicated by the Auto and Manual fan LED's.

UP BUTTON: Momentarily press and the set point will appear in the temperature display. The set point increases one degree each time the up button is pressed and released.

DOWN BUTTON: Momentarily press and release to display the set point. The set point is decreased one degree each time the button is pressed and released.

MODE BUTTON: The *Mode Button* is used to select one of 2 Operating Modes. Press and release to advance to the next mode. Continue to press and release until the desired Operating Mode is reached. The mode selected is indicated by the Mode LED.

TEMP SELECT BUTTON: Press and release to view inside (supply) air temperature, discharge air temperature or set point. The appropriate LED will be lit indicating which temperature is displayed.

THREE DIGIT DISPLAY: The inside (supply) temperature is displayed whenever the control is turned on. The display provides a readout of the inside air temperature which is located in the supply airflow.

COOL MODE LED: The Cool Mode LED is lit when Cooling is selected.

MOISTURE CONTROL LED: The Moisture LED is lit when the Moisture Control is selected.

MANUAL FAN LED: The Manual Fan LED is lit when a manual fan speed is selected.

AUTO FAN LED: The Auto Fan LED is lit when automatic fan speed operation is selected.

FAN SPEED BAR GRAPH: There are six(6) individual fan speed LED's. Each LED represents one (1) fan speed. Low fan (1) is indicated by illuminating the first LED. High fan speed is indicated by illuminating all six (6) LED's.

LED: The system operating status (Compressor On or Off) is indicated by turning On the right most decimal point in the 3 Digit Display.

REPLACEMENT PROCEDURE FOR PARTS

A. FAN MOTOR

1. Remove cabinet's left-hand (when looking at the front of the unit) side panel.

2. Disconnect motor wires from evaporator contactor and fan speed rocker switch.

3. Remove screws securing motor and O-ring to blower housing. All screws are external and visible.

4. Loosen clamp around motor and remove motor.

5. Install new motor, reversing the removal procedure.

B. THERMOSTAT

1. Remove the two screws securing the thermostat to the front panel.

2. Pull the thermostat directly out of the unit. Disconnect the thermostat cable. Re-connect the thermostat cable to the new thermostat.

4. Reverse procedure to re-install.

C. CONDENSATE PUMP

1. Remove cabinet's left hand side panel.

2. Remove front bracket securing condensate pump in base pan by removing nut from weld stud.

3. Disconnect pump wire leads from terminal block. Remove retainer clamp and tubing. Replace pump, install by reversing procedure.

D. PRESSURE ACTUATED WATER VALVE

1. Remove back panel.

2.Remove nut that secures sensing capillary to the refrigeration system's high pressure side. A built in schrader valve allows removal without need to remove refrigerant charge..

3. Remove two screws that retain valve to right side panel.

4. Disconnect valve from “water in” line.

5. Install new valve, reversing the procedure.

E. HIGH PRESSURE CONTROL

1. Follow the first two steps in "**D**".

2. Remove two screws that retain switch to right side panel.

3. Disconnect wire leads from compressor contactor and condensate pump safety switch.

4. Install new High Pressure Control, reversing the procedure.

To gain access to compressor and compressor run capacitor, remove left hand side panel.

TROUBLESHOOTING GUIDE

The following steps and procedures are recommended for correcting the problems indicated. Service, other than routine maintenance, should be performed only by a qualified refrigeration serviceman.

PROBLEM: THE ENTIRE UNIT DOES NOT RUN.

1. *CAUSE:* POWER INTERRUPTION

REMEDY: Check external power supply. Look for blown fuses or tripped circuit breakers. Reset or replace if needed.

2. (REASON) THERMOSTAT INOPERABLE.

REMEDY: Setting may be too high or to low; check and reset. Thermostat may be out of calibration or otherwise defective...remove and replace.

3. (CAUSE) POWER MODULE:

a) Defective

(REMEDY) Correct as follows: (a) Replace

PROBLEM: FAN RUNS BUT COMPRESSOR DOES NOT START

1. (REASON) Low Voltage.

(FIXING) Check power supply for voltage outside the range of 106-126 volts on the 115volt unit and 187-253 volts on the 208/230 volt unit.

2. (CAUSE) Thermostat

(REMEDY) Examine the control unit for loose wires. Tighten any loose connections. Wait 4-minutes before re-start.

3. (REASON) High Pressure Control cutting (turning) unit off

(FIXING) Check for loose wire connections, broken or burned contacts. If switch is defective, replace.

4. (CAUSE) Defective Power Module.

(CURE) Replace

5. (REASON) Refrigerant leak-no freon.

(REMEDY) Locate leak and repair. Evacuate unit and recharge.

6. (CAUSE) Loose or defective wires.

(FIXING) Tug on wires to see if they will separate from connections.

7. (REASON) Defective compressor

(REMEDY) Check for shorts, opens and grounds. Remove and replace compressor.

8. CAUSE) Shorted or open run capacitor

(FIXING) Remove and replace.

PROBLEM: COMPRESSOR STARTS AND RUNS, BUT, FAN DOES NOT RUN.

1. (REASON) Open fan motor coil circuit

(FIXING) Replace fan motor.

2. (CAUSE) Shorted or open fan motor capacitor

(REMEDY) Replace capacitor.

3. (REASON) Loose or defective wires

(REMEDY) Trace and repair

PROBLEM: INSUFFICIENT COOLING

1. (CAUSE) Insufficient air flow through evaporator coil due to:

A. Dirty air filter in unit B. Dirty evaporator coil

C. Ice on evaporator coil D. Obstructed air intake

(REMEDY) Correct as noted:

A. Clean filter (see "Preventive Maintenance" section of this manual)

B. Clean filter with a vacuum cleaner & hose.

C. Defrost; turn on fan only.

D. Remove obstruction

2. (REASON) IMPROPER SIZING OF UNIT

(FIXING) Check to make sure unit is properly sized for load. Add supplemental unit if required.

PROBLEM: NOISY OPERATION

1.(CAUSE) Copper tubing vibrating

(REMEDY) Adjust by bending slightly to firm position. Segregate tubes touching cabinet or each other.

2.(REASON) Loose cabinet or internal component

(FIXING) check and tighten loose screws.

3.(CAUSE) Machine vibrating out of level

(CURE) Level unit base.

4.(REASON) Loose blower wheel

(REMEDY) Tighten screws on blower wheel to motor shaft.

5.(CAUSE) Blower wheel hitting housing.

(REMEDY) Adjust wheel position on motor shaft.

6. (CAUSE) Blower motor bearing defective.

(REMEDY) Replace blower motor.

PROBLEM: WATER LEAKING FROM PAN

1. (CAUSE) Leaky drain pan

(REMEDY) Locate leak and repair pan.

2. (CAUSE) Loose evaporator, drain or condensate pump hose

(REMEDY) Tighten connections.

3. (CAUSE) Defective condensate pump or excessive lift on pump

(REMEDY) Examine to see if elevation exceeds 20 ft. (if it does, a larger pump will be required). Otherwise, change pump if defective. Pump will operate properly against 20 ft. of water total head pressure on pump. If combination of vertical height and horizontal drain line exceeds 20 ft. of water pressure drop, problems will occur.

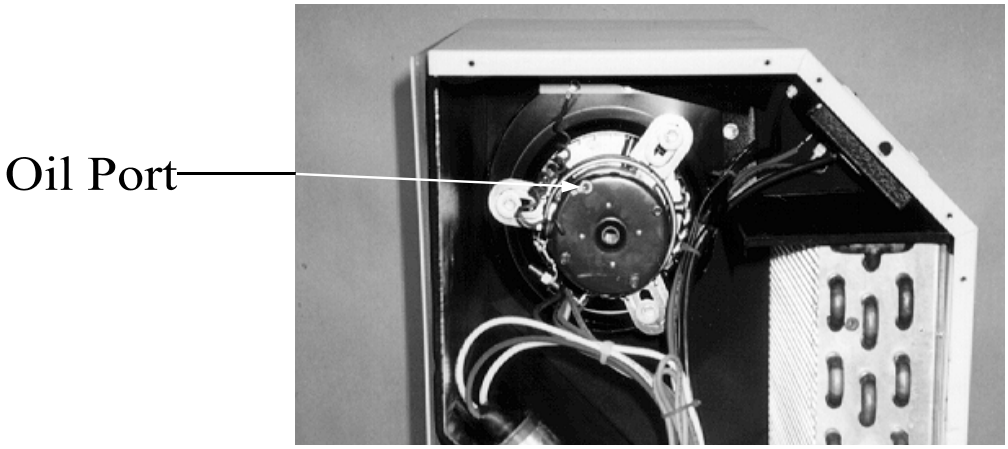
PREVENTIVE MAINTENANCE

AquaCooler Series air conditioners are designed to last a long time and to give maximum performance and reliability with minimum maintenance. To prolong the life of the unit, regular maintenance must be performed as specified below:

1. **BLOWER MOTOR**

The OWC24 and 36 motor should be oiled every six months with SAE 20 non-detergent oil. The oil ports on the motor are visible.

OIL PORT LOCATIONS



2. **FILTER**

A clogged filter will cause the unit to operate at greatly reduced efficiencies. We recommend that the filter be inspected on a regular bases every six weeks or more often depending on the environment. The throw away filter is located behind the return air grille and can be easily removed by pulling the grille out.

3. **CONDENSATE PUMP**

When servicing pump follow these steps;

1. Make certain that the unit is disconnected from the power source before attempting to service or remove any component.

2. Be sure the floats move freely. Clean as necessary.

3. Remove the volute and check for obstructions. Clean as needed.

4. Clean the tank with warm water and mild soap when mineral deposits are visible.

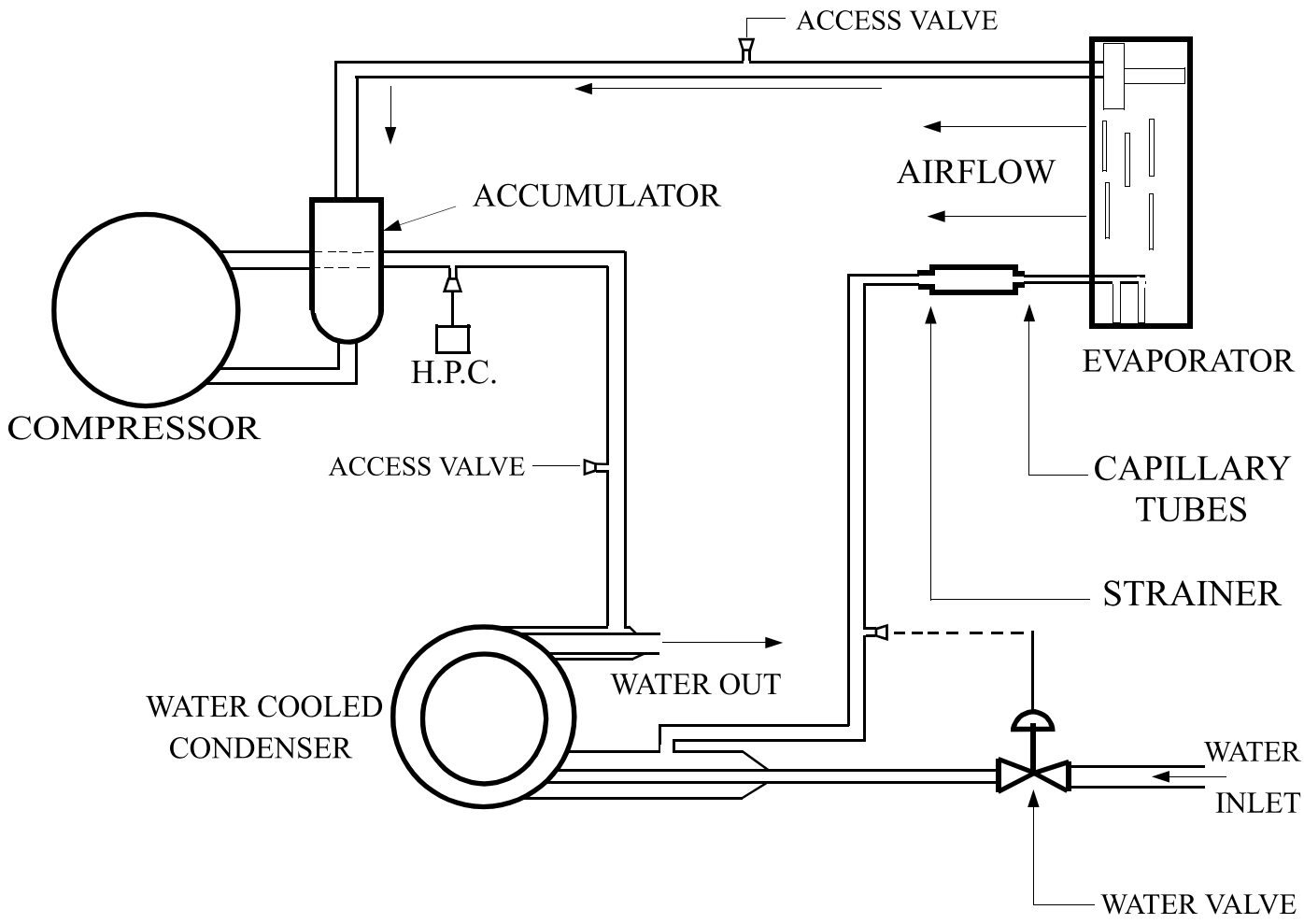
5. Check the inlet and outlet piping. Clean as necessary. Be sure there are no kinks in the lines that would inhibit flow.

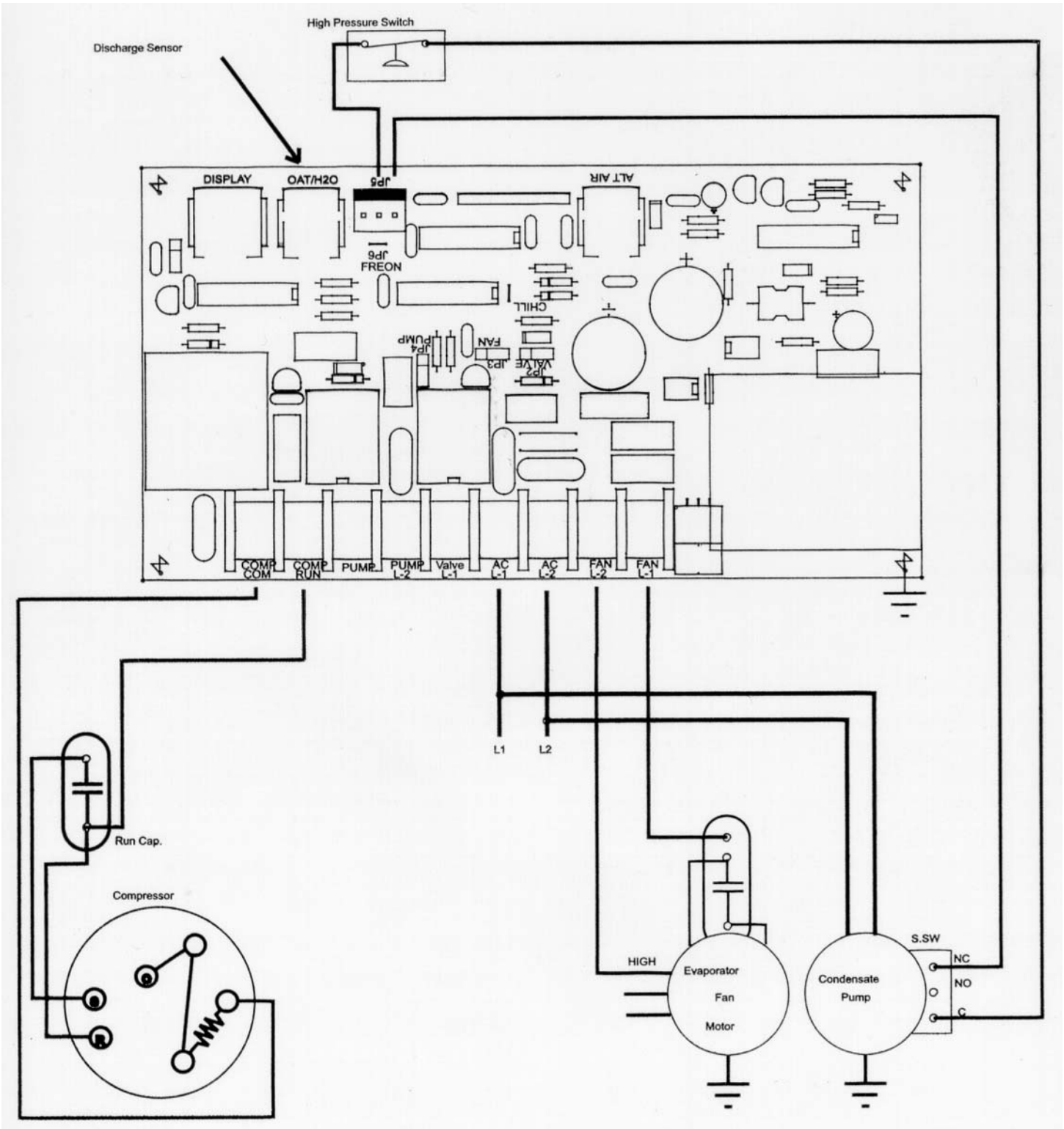
GENERAL

When necessary maintenance steps outlined above are followed, the air conditioner will provide long and reliable service. The refrigeration and electrical circuits of the system should only be serviced by a fully qualified service technician.

PIPING SCHEMATIC

WATER COOLED AIR-CONDITIONER





AquaCooler
Water Cooled Air Conditioners
Models: OWC12 - OWC18 - OWC24 - OWC36 – OWC60

LIMITED WARRANTY

The Manufacturer (OceanAire, Inc.) warrants to the original owner that the Product will be free from defects in material or workmanship for a period not to exceed one (1) year from date of installation. If upon examination by the Manufacturer the Product is shown to have a defect in material or workmanship during the warranty period, the Manufacturer will repair or replace, at its option, that part of the Product which is shown to be defective.

The Manufacturer further warrants that the product's compressor-motor will be free from defects in materials and workmanship for five (5) years from the date of installation. If upon examination by the Manufacturer the Product is shown to have a defect in materials or workmanship during the warranty period, the Manufacturer will repair or replace, at its option, that Part of the Product which is shown to be defective. Electrical parts (such as relays, overloads, capacitors, etc...) and the sealed refrigeration system (condenser and evaporator) are included in the one year limited warranty , but not with the five year limited warranty of the compressor. This limited warranty does not apply:

a) if the Product has been subjected to misuse or neglect, has been accidentally or intentionally damaged, has not been installed, maintained or operated in accordance with the furnished written instructions, or has been altered or modified in any way.

b) to any expenses, including labor or material, incurred during removal or reinstallation of the Product.

c) to any workmanship of the installer of the Product.

This limited warranty is conditional upon:

(a) shipment, to the Manufacturer, of that part of the Product thought to be defective. Goods can only be returned with prior written approval from the Manufacturer. All returns must be freight prepaid.

(b) determination, in the reasonable opinion of the Manufacturer that there exists a defect in material or workmanship.

Repair or replacement of any part under this Limited Warranty shall not extend the duration of the warranty with respect to such repaired or replaced part beyond the stated warranty period.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, AND ALL SUCH OTHER WARRANTIES, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED AND EXCLUDED FROM THIS LIMITED WARRANTY. IN NO EVENT SHALL THE MANUFACTURER BE LIABLE IN ANY WAY FOR ANY CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OF ANY NATURE WHATSOEVER, OR FOR ANY AMOUNTS IN EXCESS OF THE SELLING PRICE OF THE PRODUCT OR ANY PARTS THEREOF FOUND TO BE DEFECTIVE. THIS LIMITED WARRANTY GIVES THE ORIGINAL OWNER OF THE PRODUCT SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY BY EACH JURISDICTION.

AquaCooler