PORT-A-COOL®

PORTABLE EVAPORATIVE COOLING UNIT

OWNERS MANUAL

U.S. Patent 6,223,548

U.S. Patent D 362,905

U.S. Patent 6,502,414

FOR ELECTRIC MODELS

PAC2K482S, PAC2K361S, PAC2K363S,
PAC2K36HPVS, PAC2K243S, PAC2K163S

Includes Export Models
PAC2K481S-230/50
PAC2K362S-230/50, PAC2K361S-230/50,
PAC2K242S-230/50, PAC2K2415-230/50
PAC2K161S-230/50

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PAC2K161S-230/50

READ AND SAVE THESE INSTRUCTIONS

CONTENTS:

I. INTRODUCTION

The **PORT-A-COOL®** unit is a fully self-contained, portable, high efficiency evaporative cooler that is proudly made in America at our Center, Texas factory.

A. What is Evaporative Cooling?

When trying to understand evaporative cooling, it may be best to think of air as being like a sponge, in that regard, air has an ability to absorb moisture that it comes in contact with. The amount of moisture that the air will absorb depends on the state of the air, or specifically, how much moisture the air already contains and the temperature of the air. If the air is warm and contains only a small amount of moisture, it will more readily absorb moisture. As air cools, its volume decreases, and with it, its ability to absorb moisture decreases.

The term "relative humidity" describes the quantity of water in the air in relation to its total capacity. Any volume of air at any given temperature has an ability to hold a certain quantity of moisture. If the air contains 20% of its total capacity to hold moisture, the relative humidity is said to be 20%. Whereas, a humidity of 100% indicates that the air at this temperature and pressure is holding all the moisture it can. If the air has less that 100% relative humidity when entering the **PORT-A-COOL®** unit, then it has the ability to hold more moisture, and will thus evaporate more water and cool more effectively.

When describing the amount of moisture in the air, the term relative humidity is used because the absorption capacity of air changes relative to air temperature. The warmer the air, the more absorbent it becomes, and can consequently hold more water. That is to say that air that has a 100% relative humidity can hold no more water vapor. However, if the air is heated, it expands, and as a result the relative humidity decreases even though the total amount of water vapor in the air has not changed. As a result, we must describe the level of humidity relative to its maximum capacity. Is it a 50˚F sponge or an 80˚F sponge? An 80˚F sponge will hold more water at 50% humidity than a 50˚F sponge.

How is cooling produced? In order to evaporate water, heat (energy) is required. In fact, the evaporation of one gallon of water requires almost 8,700 BTU's. Where does this heat come from? The heat comes from whatever the water is in contact with as it evaporates. This could be a hot sidewalk, your body, a tree, or from the air itself. As the heat is removed from an object, the temperature of that object is decreased. In the case of the **PORT-A-COOL®** unit, heat is removed from the air, reducing the temperature of the air.

It is important to realize that the temperature of the water does not have a great effect upon the cooling produced by the evaporation. If you were to place a gallon of 50˚F water on a warm sidewalk, it would consume 9,000 BTU's during its evaporation, thus making the sidewalk 9,000 BTU's cooler. A gallon of 90˚F water would produce 8,700 BTU's of cooling, only a 3 percent difference in the total result. This translates into a difference of less than 1˚ F in the performance of a **PORT-A-COOL**® unit.

The following table demonstrates the BTU's removed from the air based on a given amount of water evaporated in an hour by the **PORT-A-COOL**® unit.

U. S. Gallons / Hour	Total BTU's Removed
10 (37.8 liters or 8.3 Imperial Gallons)	87,000
12 (45.4 liters or 10.0 Imperial Gallons)	104,400
14 (53.0 liters or 11.7 Imperial Gallons)	121,800

For actual temperature drops refer to Appendix A.

In simple terms, evaporative cooling is nature's way of cooling. The **PORT-A-COOL**® unit utilizes the same phenomenon, but in an extremely efficient manner.

B. Humidity and Evaporative Cooling.

A given volume of air at a certain temperature and pressure has the ability to absorb and hold a certain amount of water vapor. If that volume of air contains 50% of the amount of moisture that it is capable of holding, it said to be at 50% relative humidity. The higher the temperature of the air, the higher the amount of moisture it is capable of holding. Any change in the temperature without a corresponding change in the pressure results in an increase or decrease in the amount of water vapor the air can hold.

If the temperature increases without an increase in the pressure, the result is a decrease in the relative humidity, and thus an increase in its ability to hold moisture. That is to say that in the morning the humidity may be high, but as the day passes and the temperature increases the relative humidity will naturally decrease.

The extent to which relative humidity decreases through the day can be affected by local weather systems and proximity to large bodies of water. If an increase in temperature accompanied by a weather system containing moisture moves in, then the drop in humidity will not be as great. Nevertheless, the fact remains that relative humidity does drop as air temperature increases. In fact, for every 20˚F rise in temperature, the moisture-holding ability of air doubles. For instance, if the temperature of the air was 70˚F and the relative humidity was 100% at 5 a.m., and the temperature increased to 90˚F at noon, the moisture holding ability of the air would double.

As a result, the air would now be holding only half of the moisture it is capable of holding, and the relative humidity of the air would drop to 50%.

The hotter the day, the drier the air becomes, and the more cooling that can take place through the evaporation of water. This means that when the day gets hot enough to require cooling, the relative humidity will be much lower than in the morning and will allow an evaporative cooling device to work more effectively.

Since any evaporative cooling device must evaporate water to achieve cooling, more water vapor is put into the air. As the ambient relative humidity increases, it becomes more difficult to put moisture into the air. The efficiency of any evaporative cooling device is directly related to its ability to evaporate water (cooling the air) at a given relative humidity. A unit with low efficiency will cool only at low relative humidity levels, while a unit with high efficiency can achieve effective cooling at much higher humidity levels.

C. Evaporative Cooling and the PORT-A-COOL® unit.

The **PORT-A-COOL®** unit is the state-of-the-art, high efficiency, portable evaporative cooling system that utilizes high efficiency **KÜÜL®** brand, rigid cooling media, manufactured with the patent pending ***"thru-cure"*** ™ process.The **PORT-A-COOL®** unit's unique patented housing enclosure, along with the **KÜÜL®** brand high efficiency cooling media, allows the unit to cool effectively in very high relative humidity conditions. Conditions that other portable evaporative cooling devices, such as the old style "swamp coolers", cannot approach.

The public has an initial tendency to equate the **PORT-A-COOL®** unit with the "swamp cooler," types of evaporative coolers and, in reality, the only thing that they have in common is that they are both evaporative coolers, much as the 1973 model automobile and 2003 model automobile are both cars. The key to efficient evaporative cooling is using a specially designed, high efficiency, rigid cooling media contained in a properly designed housing to insure effective directing of the air over the water saturated media at the proper velocity. The **PORT-A-COOL®** unit has incorporated all of these features and more.

As explained in PART B of this section, the effectiveness of the **PORT-A-COOL®** unit is best appreciated when it is above 85˚F and below 75% relative humidity. By the time the outside temperature reaches 85˚F, the humidity is almost always below 75%. Generally, as one goes up, the other goes down.

For actual temperature drops refer to the charts of Appendix A.

II. SETUP

A. Unpacking the PORT-A-COOL® unit.

The standard 24", 36" and 48" electric models of the **PORT-A-COOL®** unit are shipped completely assembled and sitting on a plastic or wooden pallet with a large cover box strapped over the **PORT-A-COOL®** unit. It is a simple matter to cut the straps and remove the box by lifting it over the **PORT-A-COOL®** unit. Remove the protective plastic dust cover to expose the **PORT-A-COOL®** unit. The 16" model **PORT-A-COOL®** units are shipped in an enclosed corrugated box and need only be removed from the box.

B. Removing the cooling media. (Disconnect Electric Power)

Caution - Disconnect power before performing this operation!!

The **PORT-A-COOL**® unit should now be exposed to allow removal of the cooling media (pads). Although removal of the cooling media is for visual inspection, service and cleaning only it is not necessary to remove for the initial setup. The front flap must be removed to allow access to the cooling pads. Start with the center pad, which should be tilted out from the top and lifted out of the drain trough. The two pads to either side of the center pad may then be removed in the same manner. Should you desire to remove the two outside pads, they must first be pulled sideways toward the center of the **PORT-A-COOL**® unit until they clear the side retainer. They may then be removed in the same manner as the other pads.

C. Connecting the water and electricity.

Water Connection (PORT-A-COOL® unit *must be in the upright position*)

After the **PORT-A-COOL**® unit has been thoroughly tested at the factory, a special 2-sided brass hose adapter is attached to the water inlet on the side of the **PORT-A-COOL**® unit, which is below the spray bar adjustment and drain valves. A standard garden hose is attached to this brass hose adapter and cinched down to preclude leaks. Visually verify that the hose washer is in position and in good condition.

Water supply inlet pressure should be limited to 50 PSI maximum

Once the hose connection is made, water may be turned on to the **PORT-A-COOL**® unit. Water should now be entering through the float valve to fill the sump tank.

To verify that your connections are secure, visually inspect connections for leaks. Once the sump tank is filled, the water flow should cease and the inlet connections may now be visually checked for leaks, paying particular attention to the hose connection into the float valve and the connections into the brass inlet fitting. All of these inspections have been performed at the factory but shipping may have caused connections to loosen.

The cooling pads may now be replaced by reversing the removal operation above in Section II, Paragraph B.

Electrical Connection

PORT-A-COOL® unit *must be in the upright position with cooling pads installed!*

All models utilize a single power cord and control switches. Before connecting the plug to an outlet, insure that there is no standing water where the cord may lie. Check the chart below to determine what the electrical requirements for your specific model may be. When using an extension cord for connection, a 12-gauge 3-wire grounded cord is highly recommended. The use of separate multiple outlet devices are not recommended. Also, the use of a GFCI type of outlet is not required but may be used to enhance safety.

When making electrical connections insure that local and national codes are adhered to.

ELECTRICAL REQUIREMENTS				
MODEL #	VOLTS +/- 10%	FREQ. HR.	MAX AMPS	MAX WATTS
PAC2K163S	115	60	8.3	450
PAC2K243S	115	60	8.5	700
PAC2K361S	115	60	9.2	800
PAC2K363S	115	60	9.2	800
PAC2K36HPVS	115	60	9	800
PAC2K482S	115	60	13.5	950
PAC2K361S-230/50	230	50	3.8	850
PAC2K362S-230/50	230	50	4.1	850
PAC2K481S-230/50	230	50	5.4	850

III. OPERATING PROCEDURES

Specifications

Each model of the **PORT-A-COOL®** unit has its own set of operational specifications, sizes, weights, voltage / frequency, current requirements, etc. Please ask for the specifications for your model from your distributor or check the serial number plate.

B. Placement of the PORT-A-COOL® unit.

PORT-A-COOL® unit should be used in well-ventilated areas only.

There are three primary considerations when deciding where to place the **PORT-A-COOL®** unit.

1) Fresh Air Supply - The inlet side of the **PORT-A-COOL®** unit (pad side) must be placed so as to insure that a smooth, uninterrupted supply of fresh air is available.

2) Air Pattern - The cool air discharged from (fan side) the **PORT-A-COOL®** unit should have a clear area in which to circulate, being as free of obstructions as possible.

3) Ventilation (Exhaust) - There should be a defined place in which the air from the **PORT-A-COOL®** unit can be exhausted from the area being cooled. This is to prevent the **PORT-A-COOL®** unit from recirculating air that has already been through the cooling process.

A primary consideration when actually deciding where to place the **PORT-A-COOL®** unit is the direction of the airflow. The **PORT-A-COOL®** unit creates a fan-shaped air pattern that disburses the air over a large area. This pattern may be disturbed or broken up by obstacles such as shelves, work benches, etc. It is important to insure that a clean, unbroken path for the air from the **PORT-A-COOL®** unit is provided to the maximum extent possible.

It may be desirable to raise the **PORT-A-COOL®** unit above any low obstructions in order to increase the overall coverage. When raising the height, insure that the platform constructed for holding the **PORT-A-COOL®** unit is stable, well constructed, and will not allow the **PORT-A-COOL®** unit to tip over. The **PORT-A-COOL®** unit must be level and in the upright position. When supporting with a platform allow for the full weight of a functioning **PORT-A-COOL®** unit by including the weight of the water both in the sump tank and the added weight of the water saturated cooling pads. The total weight could be in excess of 500 lbs. (227 kg.).

When the **PORT-A-COOL®** unit is placed near a wall or other obstruction, it is recommended that a distance of at least 3 feet from the wall or obstruction to the face of the cooling pads be maintained. This allows the unrestricted flow of warm air to the fan-side of the **PORT-A-COOL®** unit. When using multiple units in close proximity, be sure to aim the **PORT-A-COOL®** unit so that the airflows compliment each other and not oppose. Opposition will negate the airflow and allow an area of dead air to accumulate between **PORT-A-COOL®** units.

C. Filling with water.

Referring to Section II, Part C, which details how to connect the water supply line, turn on your supply valve, allowing the **PORT-A-COOL®** unit sump tank to fill with water. Once the sump tank is full, the float valve will shut off the supply flow. (50-PSI max. inlet water pressure.)

D. Starting the pump and adjusting the water flow.

CAUTION - DO NOT RUN PUMP WHEN SUMP IS DRY.

Once the sump tank is full, moving the pump switch to the "ON" position will turn on the pump.

When initially turning on the pump, the level in the sump will drop suddenly and restart the flow of supply water. This is a normal condition, as the cooling pads require a large amount of water for proper wetting.

When the **PORT-A-COOL®** unit is new, the new pads will require an initial 'breaking-in' period. This period is required for the pads to begin readily absorbing water. It may require up to a week to achieve maximum efficiency.

It is important to insure that the spray bar is properly adjusted when first starting the water flow in the **PORT-A-COOL**® unit. Increasing the flow using the SPRAY BAR ADJUSTMENT valve on the side of the unit makes this adjustment.

E. Starting the fan. *(Cooling pads must be installed and caster brakes must be engaged.)*

Starting the fan is as simple as turning the fan switch to the 'ON' position or to one of the available speeds on the three-speed models. On the three-speed model (PAC2K363S, PAC2K243S & PAC2K163S) it is preferred to step slowly through the speeds allowing the fan to obtain its full speed at the LOW speed before going to MEDIUM and before going to HIGH.

After the fan and pump have been running for 1 1/2 to 2 hours the pads should be completely saturated and the outside face of the cooling pads should display what appears to be 3 or 4 one inch wide dry streaks. This is an indication that the water is properly adjusted. If the dry streaks are more numerous and wider, then a small adjustment to the SPRAY BAR ADJUSTMENT valve to increase the flow of water over the cooling pads (counter-clockwise) should suffice. Allow several minutes of operation before adjusting again.

When turning the fan off at the end of the day or week, the pump should be turned off about 15 minutes before the fan to allow the cooling pads to dry. This will enhance the life of the pads.

IV. MAINTENANCE & STORAGE

Very little maintenance is actually required on the **PORT-A-COOL**® unit. The primary topic that accounts for most of the maintenance is cleanliness. Keeping the **PORT-A-COOL**® unit clean will do more than any other single item to keep your **PORT-A-COOL**® unit in peak operating condition. The rugged, corrosion-resistant construction of the **PORT-A-COOL**® unit and industrial grade components make for the low maintenance characteristics.

A. Daily Maintenance

Daily maintenance is really more an operational consideration than actual maintenance. On a daily basis, the pump should be turned off approximately 15 minutes before the fan is turned off. This will allow the cooling pads to dry out and help extend their life, helping to control the growth of mildew, mold, bacteria and other odor causing elements.

B. Weekly Maintenance

At the end of the week or at a scheduled time, the unit should be shut down and the sump tank should be drained. Closing the Spray Bar Adjustment Valve and opening the Drain Valve accomplish this. If it is desired, a hose may be attached to the Drain Valve to direct the drained water to a remote disposal area. Once the Drain Valve is open, starting the pump will drain the unit. When the pump has removed most of the water a small amount will be left in some areas. In the PAC2K163S model, removal of the drain plug will accomplish the same results without the use of the pump.

Once the sump is drained and the power disconnected, the pads may be removed to allow inspection of the sump tank. Assuming that the **PORT-A-COOL®** unit is in a dusty environment, dust will collect in the sump tank over time. This dirt and any remaining water may be vacuumed out using a wet/dry shop vacuum and wiped clean with a cloth. Also, inspect and clean the Inlet Strainer located on the bottom of the pump.

C. Storage

Storage of the **PORT-A-COOL®** unit is very simple.

1) Drain all water from the sump tank and clean as above, ensuring that the pads and sump are completely dry.

2) Roll up the electrical power cord and secure it to ensure that it will not be rolled over, tripped over or caught in equipment.

3) Cover the **PORT-A-COOL®** unit completely to prevent dust build-up and store in a dry area. This also helps prevent damage to the pads. Optional dust covers are available from your distributor. (P/N #: PAC-CVR-01).

CAUTION: DISCONNECT POWER BEFORE REMOVING PAD GUARD OR COOLING PADS FROM THE PORT-A-COOL® unit!!

V. TROUBLESHOOTING / REPAIR

NOTICE: POWER CORD MAY BE REPLACED ONLY BY THE MANUFACTURER OR QUALIFIED AGENT!!

A. Troubleshooting

The most common problems encountered with a **PORT-A-COOL®** unit are operational problems. The **PORT-A-COOL®** unit consists of three systems. It is important to determine which system of the **PORT-A-COOL®** unit the problem is associated with. Certain problems may be associated with more than one system.

When determining which system that the problem is associated with you must first define the problem, i.e., the pump is not running. Although this might seem a bit over-simplified, several things may cause a particular problem. So while defining the problem, a careful check of all systems should be made to fully understand the extent of the problem.

If you have a complete understanding of all the systems of the **PORT-A-COOL®** unit and how they depend on each other, it becomes much simpler to define and solve any problems.

Although the **PORT-A-COOL®** unit is designed to be simple to maintain, it will be necessary

to have some basic hand tools (screwdrivers, pliers, adjustable wrenches, etc.) as well a volt/ohm meter for troubleshooting the electrical system.

FAN SYSTEM

This section is divided into the two categories of fans used on all **PORT-A-COOL®** models: Direct Drive and Belt Drive. Both have some symptoms in common, and both have problems that are particular to each.

CAUTION

Please use caution when troubleshooting or repairing all electrical components. Be certain that all power is disconnected from the PORT-A-COOL® unit before the cooling pads are removed to gain access to the fan.

BELT DRIVE MODELS

PROBLEM	CHECK	SOLUTION
Fan motor won't run and makes no sound.	Power cord, extension cord, switches, circuit breaker, etc.	Reconnect power or extension cord, reset breaker.
Fan motor won't run and makes a humming sound.	Blade in contact with shroud	Check mounting bolts.
	Motor stalled (will not turn by hand)	Replace motor.
Breaker trips or fuse blows when fan is started.	Motor stall (as above).	Replace motor.
	Other items on circuit.	Remove other items.
Motor overheating and shutting off and restarting several minutes later.	Extension cord gauge too small.	Replace with 12 gauge cord.
	Inlet air obstructed or too close to wall.	Provide minimum 36 inch inlet clearance.
	Faulty motor.	Replace motor.
Fan motor won't run and switch makes soft clicking sound.	Switch making good contact.	Replace switch.
Fan motor won't run and has a burning smell and hums.	Start capacitor leaking from cover.	Replace capacitor.
	Motor stall (as above).	Replace motor.
Fan blade doesn't turn and unit makes squealing sound.	Fan Belt, loose or broken.	Tighten or replace fan belt.
	Fan pulley spinning on shaft.	Tighten pulley set screw.
Fan belts do not last very long.	Motor and fan pulleys misaligned	Realign motor and mount.
Fan will not reach speed but turns and makes humming sound.	Capacitor (where visible) and motor electrical connections.	Replace capacitor or motor.

DIRECT DRIVE MODELS

PROBLEM	CHECK	SOLUTION
Fan motor won't run and makes no sound.	Power cord, extension cord, switches, circuit breaker, etc.	Reconnect power or extension cord, reset breaker.
Fan motor won't run and makes a humming sound.	Blade in contact with shroud	Check mounting bolts.
	Motor stalled (will not turn by hand)	Replace motor.
Breaker trips or fuse blows when fan is started.	Motor stall (as above).	Replace motor.
	Other items on circuit.	Remove other items.
Motor overheating and shutting off and restarting several minutes later.	Extension cord gauge too small.	Replace with 12 gauge cord.
	Inlet air obstructed or too close to wall.	Provide minimum 36 inch inlet clearance.
	Faulty motor.	Replace motor.
Fan motor won't run and switch makes soft clicking sound.	Switch making good contact.	Replace switch.
Fan motor won't run and has a burning smell.	Start capacitor leaking from cover.	Replace capacitor.
	Motor stall (as above).	Replace motor.

WATER SYSTEM

The water system consists of three primary elements: 1) Water Delivery System, 2) Spray Bar Assembly; 3) Pump. Troubleshooting of this system is fairly simple.

The Water Delivery System consists of two assemblies: A) The Water Inlet assembly and B) The Plumbing assembly.

The Water Inlet assembly is made up of three components: 1) The bulkhead fitting, 2) The float valve connection hose and 3) The float valve.

The Plumbing assembly consists of three elements: 1) Riser (PVC components), 2) Drain Valve, 3) Spray Bar Adjustment Valve. The 16 inch model has no riser or drain valve.

The Spray Bar Assembly consists of two components: 1) Spray Bar, 2) 4 foot connection hose.

The pumps that actually move the water through the delivery system are discussed in the charts below. These charts indicate the major symptoms of problems that may be encountered with the Water System components.

WATER INLET SYSTEM

PROBLEM	CHECK	SOLUTION
Floor at side of **PORT-A-COOL®** unit is wet.	Water inlet hose is loose at supply hose or inlet hose is loose at bulkhead fitting	Tighten connections and/or replace hose washers.
PORT-A-COOL® unit overflows from sump tank or is spitting water through fan.	Float valve hose is loose at bulkhead fitting or at float valve.	Tighten connections and /or replace hose washers.
	Water pressure is too high to allow float valve to shutoff. (50 psi max.)	Reduce water pressure by checking in-line reducer.
	Float valve is not seating properly.	Check for particles in valve. Replace float valve.

PLUMBING ASSEMBLY

PROBLEM	CHECK	SOLUTION
Water spitting from the from the unit.	Cracked riser assembly. Spray Bar Adjustment valve.	Replace riser assembly.
Water leaking from Drain Valve.	Washer worn.	Replace washer.
	Stem worn.	Replace Drain Valve.
Water leaking from Spray Bar Valve.	Washer worn.	Replace washer.
	Stem worn.	Replace Spray Bar Valve.

SPRAY BAR ASSEMBLY *(ALL MODELS)*

PROBLEM	CHECK	SOLUTION
Too many dry streaks in the pads.	Holes in spray bar blocked by foreign material.	Remove and clean spray bar.
		Clean individual holes.
Water spitting from the unit.	Hose connection loose.	Tighten hose.
		Replace hose and washer.
		Reseat spray bar end caps

DIAPHRAGM PUMPS PROBLEM CHECK SOLUTION

PROBLEM	CHECK	SOLUTION
Pump will not run when switch is turned on.	Power cord, extension cord, switches, circuit breaker, etc.	Reconnect power or extension cord, reset breaker.
Pump hums when switch is turned on, but does not pump water.	Inlet filter clogged.	Clean filter.
	Pump motor locked.	Replace pump.
	Other items on circuit.	Remove other items.
Breaker trips or fuse blows when switch is turned on.	Wiring short in line between pump and switch box.	Check and/or replace wiring.
Pump cycling on and off periodically	Extension cord gauge too small.	Replace with min. 12-gauge cord.
	Sump tank is empty.	Fill with water.
	Spray bar valve is closed.	Open valve.
Pump will not run and power is available and pump is functional.	Switch making closure contact.	Check continuity/ Replace switch.

BRONZE PUMP (PAC2K36Epxx or PAC2K48EP)

PROBLEM	CHECK	SOLUTION
Pump motor will not run when switch is turned on.	Power cord, extension cord, switches, circuit breaker, etc.	Reconnect power or extension cord, reset breaker.
Pump motor hums when switch is turned on, but does not pump water.	Object jammed into impeller blade.	Remove object. Prime pump.
	Air Locked. Pump/Motor locked.	Replace pump/motor.
Pump makes loud noise while running	Pump bearings.	Replace pump.
	Object in impeller housing.	Clear object.
Breaker trips or fuse blows when switch is turned on.	Pump motor locked.	Replace pump/motor.
Pump cycling on and off periodically	Extension cord gauge too small.	Replace with 12-gauge cord.
Pump will not run and power is available and pump is functional	Switch making closure contact.	Replace switch.
Pump motor running but pump is not turning.	Set screws on coupling.	Tighten set-screw / Replace coupling.

SHAFT TYPE PUMP *(PAC2K163S Only)*

PROBLEM	CHECK	SOLUTION
Pump motor will not run when switch is turned on.	Power cord, extension cord, switches, circuit breaker, etc.	Reconnect power or extension cord, reset breaker.
Pump motor hums when switch is turned on, but does not pump water.	Object jammed into impeller blade.	Remove object.
	Air Locked.	Prime pump.
	Pump motor locked.	Replace pump.
Pump makes loud noise while running.	Pump bearings.	Replace pump.
	Object in impeller housing.	Clear object.
Breaker trips or fuse blows when switch is turned on.	Pump motor locked.	Replace pump.
Pump cycling on and off periodically.	Extension cord gauge too small.	Replace with 12-gauge cord.
Pump won't run and power is available and pump is functional.	Switch making closure contact.	Replace switch.

B. Repair Procedures

Only qualified and trained distributors or factory personnel should perform repairs!!

Ensure that all water is removed from the **PORT-A-COOL®** unit and all power is disconnected. Remove all impediments to access the component you are checking or replacing.

FAN MOTOR REPLACEMENT

Belt Drive Models

1) Disconnect the 5-pin quick release connector from the switch harness inside the switch box by removing the cover plate.
2) Loosen the four bolts that secure the motor mounting plate. This will allow the motor plate to move up or down. Loosen and remove the belt from the motor pulley.
3) Loosen the four nuts that fasten the motor to the motor plate. This will allow the removal of the motor from the motor plate.
4) Remove the motor pulley by loosening the setscrew and slide the pulley off. This may require the use of a gear puller if the pulley is oxidized.
5) Remove the motor wiring plate and disconnect motor wires from the old motor. Mark each wire pair with markers that will allow easy matching when the new motor is installed. Install the pulley onto the new motor and slightly tighten the setscrew.
6) Place new motor onto the motor plate, install and tighten the washers and nuts onto the plate. Reinstall the four mounting bolts onto the fan assembly and slightly tighten.
7) Install the fan belt and tighten by sliding the motor plate away from the fan hub.

8) Visually align the motor pulley and fan pulley by using the belt as a reference. Adjust the motor pulley in or out to align. Tighten the motor pulley setscrew.

9) Apply pressure on the motor and motor plate to further tighten the belt, being careful not to over-tighten. (About 15 lbs of pressure should be sufficient.) Complete tightening of the four motor plate bolts.

10) Reconnect the 5 pin quick release connector to the switch and re-secure the switch box cover plate.

11) Replace the motor wiring cover-plate and inspect to be certain that the rubber seal is properly seated.

12) Replace the cooling pads, reconnect the unit power and test motor.

Direct Drive Models

1) Disconnect the 5-pin quick release connector from the switch harness inside the switch box by removing the cover-plate.

2) Note the distance that the front of the motor shaft extends past the fan blade hub. Loosen the setscrew that attach fan blades to motor shaft and remove the fan blade.

3) Loosen the bolts that secure the motor mounting plate. This will allow the removal of the motor. Remove the motor wiring plate and disconnect motor wires. Mark each wire pair with markers that will allow easy matching when new motor is installed.

4) Place new motor onto the mounting frame and reinstall the mounting nuts and tighten.

5) Reattach the fan blades onto the motor shaft and tighten the setscrew being sure that the motor shaft extends the same distance beyond the blade hub as the previous motor.

6) Position the fan blade on the motor shaft so that the fan can turn freely and is centered in the venturi shroud. Also, be certain that the fan blade is back from the fan guard but not hitting the mounting supports. Tighten the setscrew on the fan blade.

7) Reconnect the 5-pin quick release connector to the switch and re-secure the switch box cover-plate.

8) Replace the motor wiring cover-plate and inspect to be certain that the rubber seal is properly seated.

9) Replace the cooling pads, reconnect the unit power and test motor.

PUMP REPLACEMENT

48 inch, 36 inch and 24 inch Models (Except Hazardous Location Models)

1) Disconnect hose from pump and slide pump down and out of the mounting bracket.
2) Disconnect 4-pin quick release from the switch harness inside the switch box by removing the cover plate. Remove old pump from unit.
3) Position new pump under mounting bracket and re-attach hose to secure the pump.
4) Reconnect the 4-pin quick release connector from the new pump and resecure the switch box coverplate.

16 inch Models

1) Remove output tubing from insert fitting on base of pump.
2) Remove the switch box wiring cover and disconnect the 4-pin quick release connector from the pump switch assembly.
3) Remove the pump from the sump tank by removing the two nuts that hold the pump cover in place.
4) Install the pump cover onto the new pump and reverse the above procedures and install the new pump.
5) Replace the cooling pads, reconnect the unit power and test pump.

C. TECHNICAL SUPPORT

Technical support and service is available directly from your distributor or call **PORT-A-COOL**® Technical Support Hot Line at 888-266-5243 (888-COOL-AID) for the distributor nearest you. You may also contact the Support Hot Line for consultation on parts replacement.

VI. REPLACEMENT PARTS

A. Returned Merchandise Authorization (RMA) Procedures

All Port-A-Cool® units, parts, or materials being returned to General Shelters for warranty replacement or repair require an RMA (Return Merchandise Authorization) number.

There are two methods for replacing warranty parts:

1. The distributor can purchase the part with an RMA number and will only be charged for the cost of the part, not for the shipping. When the defective part is returned, the distributor's account will be credited for the cost of the part.
2. The customer / distributor can call Tech Support to get an RMA number to send the defective part back to General Shelters. Once the part is received by General Shelters, a replacement part will be sent at no charge.

Information needed to get an RMA number:

1. The UNIT serial number.
2. The UNIT model number (ex. PAC2K363S)

3. The part number or description of the part to be replaced.

Only major component parts need an RMA number, i.e. fans, motors, pumps, and some plumbing parts. For replacement of small parts, the serial and model numbers are still required, but the parts do not need to be returned to General Shelters.

For warranty replacement parts call PORT-A-COOL® Technical Support at 1-888-266-5243.
FAX: 936-598-1431.

Shipping Address
General Shelters of Texas
FM 2468 at Henrietta Road
Center, Texas 75935

Mailing Address:
General Shelters of Texas
P.O. Box 2108 - Dept. A
Center, Texas 75935

B. Port-A-Cool® Unit Limited Warranty

For one year from date of installation, General Shelters of Texas, S.B., Ltd., warrants any original component part or parts of the Port-A-Cool® evaporative unit found, upon examination by factory authorized personnel, to be defective in material or workmanship. All transportation charges on parts submitted for replacement or repair under this warranty must be borne by the purchaser. If said equipment develops such defects within this period, it will be repaired or replaced at our option. For breach of any implied or written warranty on this product, General Shelters of Texas, S.B., Ltd., shall not be liable for any incidental or consequential damages. This warranty is declared void if the equipment if found to have been misused, abused or tampered with by unauthorized personnel.

Due to warranty limits placed on our products by the original manufacturers, our warranty is limited on manufactured units and their original component parts as well as replacement parts to a total of one (1) year after the date of installation.

Port-A-Cool® unit

TEMPERATURE OUTPUT CHARACTERISTICS
10% TO 25% RELATIVE HUMIDITY

10% RH

DRY BULB		TEMP. °F		OUTPUT TEMP.	
Temp. °C	Temp. °F	Difference	Drop	°C	°F
32.2	90	65	46.8	6.1	43
35.0	95	65	46.8	8.9	48
37.8	100	66	47.5	11.1	52
40.6	105	67	48.2	13.9	57
43.3	110	68	49.0	16.1	61
46.1	115	67	48.2	19.4	67

15% RH

DRY BULB		TEMP. °F		OUTPUT TEMP.	
Temp. °C	Temp. °F	Difference	Drop	°C	°F
32.2	90	55	39.6	10.0	50
35.0	95	56	40.3	12.8	55
37.8	100	57	41.0	15.0	59
40.6	105	57	41.0	17.8	64
43.3	110	58	41.8	20.0	68
46.1	115	59	42.5	22.8	73

20% RH

DRY BULB		TEMP. °F		OUTPUT TEMP.	
Temp. °C	Temp. °F	Difference	Drop	°C	°F
32.2	90	47	33.8	13.3	56
35.0	95	47	33.8	16.1	61
37.8	100	48	34.6	18.3	65
40.6	105	49	35.3	21.1	70
43.3	110	49	35.3	23.9	75
46.1	115	51	36.7	25.6	78

25% RH

DRY BULB		TEMP. °F		OUTPUT TEMP.	
Temp. °C	Temp. °F	Difference	Drop	°C	°F
32.2	90	41	29.5	15.6	60
35.0	95	43	31.0	17.8	64
37.8	100	44	31.7	20.0	68
40.6	105	44	31.7	22.8	73
43.3	110	44	31.7	25.6	78
46.1	115	45	32.4	28.3	83

WET BULB TEMPERATURE	Wet Bulb Temperature @ Current Humidity Level
DRY BULB TEMPERATURE	Current Ambient Air Temperature
TEMPERATURE DIFFERENCE	Dry Bulb Temp Minus Wet Bulb Temp
TEMPERATURE DROP	Temperature Difference Multiplied by 72%
OUTPUT TEMPERATURE	Dry Bulb Temperature Minus Temperature Drop

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Port-A-Cool® unit

TEMPERATURE OUTPUT CHARACTERISTICS
30% TO 45% RELATIVE HUMIDITY

30% RH

DRY BULB		TEMP. °F		OUTPUT TEMP.	
Temp. °C	Temp. °F	Difference	Drop	°C	°F
26.7	80	34	24.5	13.3	56
29.4	85	35	25.2	15.6	60
32.2	90	35	25.2	18.3	65
35.0	95	36	25.9	20.6	69
37.8	100	37	26.6	22.8	73
40.6	105	38	27.4	25.6	78

35% RH

DRY BULB		TEMP. °F		OUTPUT TEMP.	
Temp. °C	Temp. °F	Difference	Drop	°C	°F
23.9	75	30	21.6	11.7	53
26.7	80	31	22.3	14.4	58
29.4	85	30	21.6	17.2	63
32.2	90	32	23.0	19.4	67
35.0	95	32	23.0	22.2	72
37.8	100	33	23.8	24.4	76

40% RH

DRY BULB		TEMP. °F		OUTPUT TEMP.	
Temp. °C	Temp. °F	Difference	Drop	°C	°F
29.4	85	27	19.4	18.9	66
32.2	90	28	20.2	21.1	70
35.0	95	29	20.9	23.3	74
37.8	100	27	19.4	27.2	81
40.6	105	29	20.9	28.9	84
43.3	110	28	20.2	32.2	90

45% RH

DRY BULB		TEMP. °F		OUTPUT TEMP.	
Temp. °C	Temp. °F	Difference	Drop	°C	°F
29.4	85	24	17.3	20.0	68
32.2	90	25	18.0	22.2	72
35.0	95	25	18.0	25.0	77
37.8	100	25	18.0	27.8	82
40.6	105	25	18.0	30.6	87
43.3	110	25	18.0	33.3	92

WET BULB TEMPERATURE	Wet Bulb Temperature @ Current Humidity Level
DRY BULB TEMPERATURE	Current Ambient Air Temperature
TEMPERATURE DIFFERENCE	Dry Bulb Temp Minus Wet Bulb Temp
TEMPERATURE DROP	Temperature Difference Multiplied by 72%
OUTPUT TEMPERATURE	Dry Bulb Temperature Minus Temperature Drop

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Port-A-Cool® unit

TEMPERATURE OUTPUT CHARACTERISTICS
50% TO 65% RELATIVE HUMIDITY

50% RH

DRY BULB		TEMP. °F		OUTPUT TEMP.	
Temp. °C	Temp. °F	Difference	Drop	°C	°F
23.9	75	22	15.8	15.0	59
26.7	80	20	14.4	18.9	66
29.4	85	22	15.8	20.6	69
32.2	90	21	15.1	23.9	75
35.0	95	22	15.8	26.1	79
37.8	100	22	15.8	28.9	84

55% RH

DRY BULB		TEMP. °F		OUTPUT TEMP.	
Temp. °C	Temp. °F	Difference	Drop	°C	°F
23.9	75	17	12.2	17.2	63
26.7	80	19	13.7	18.9	66
29.4	85	18	13.0	22.2	72
32.2	90	19	13.7	24.4	76
35.0	95	19	13.7	27.2	81
37.8	100	19	13.7	30.0	86

60% RH

DRY BULB		TEMP. °F		OUTPUT TEMP.	
Temp. °C	Temp. °F	Difference	Drop	°C	°F
23.9	75	15	10.8	17.8	64
26.7	80	15	10.8	20.6	69
29.4	85	15	10.8	23.3	74
32.2	90	15	10.8	26.1	79
35.0	95	17	12.2	28.3	83
37.8	100	16	11.5	31.1	88

65% RH

DRY BULB		TEMP. °F		OUTPUT TEMP.	
Temp. °C	Temp. °F	Difference	Drop	°C	°F
23.9	75	13	9.4	18.9	66
26.7	80	13	9.4	21.7	71
29.4	85	13	9.4	24.4	76
32.2	90	13	9.4	27.2	81
35.0	95	14	10.1	29.4	85
37.8	100	13	9.4	32.8	91

WET BULB TEMPERATURE	Wet Bulb Temperature @ Current Humidity Level
DRY BULB TEMPERATURE	Current Ambient Air Temperature
TEMPERATURE DIFFERENCE	Dry Bulb Temp Minus Wet Bulb Temp
TEMPERATURE DROP	Temperature Difference Multiplied by 72%
OUTPUT TEMPERATURE	Dry Bulb Temperature Minus Temperature Drop

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Port-A-Cool® unit

TEMPERATURE OUTPUT CHARACTERISTICS
70% TO 75% RELATIVE HUMIDITY

70% RH

DRY BULB		TEMP. °F		OUTPUT TEMP.	
Temp. °C	Temp. °F	Difference	Drop	°C	°F
21.1	70	10	7.2	17.2	63
23.9	75	10	7.2	20.0	68
26.7	80	11	7.9	22.2	72
29.4	85	11	7.9	25.0	77
32.2	90	12	8.6	27.2	81
35.0	95	12	8.6	30.0	86

75% RH

DRY BULB		TEMP. °F		OUTPUT TEMP.	
Temp. °C	Temp. °F	Difference	Drop	°C	°F
18.3	65	8	5.8	15.0	59
21.1	70	8	5.8	17.8	64
23.9	75	9	6.5	20.6	69
26.7	80	9	6.5	23.3	74
29.4	85	9	6.5	26.1	79
32.2	90	9	6.5	28.9	84

WET BULB TEMPERATURE	Wet Bulb Temperature @ Current Humidity Level
DRY BULB TEMPERATURE	Current Ambient Air Temperature
TEMPERATURE DIFFERENCE	Dry Bulb Temp Minus Wet Bulb Temp
TEMPERATURE DROP	Temperature Difference Multiplied by 72%
OUTPUT TEMPERATURE	Dry Bulb Temperature Minus Temperature Drop

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