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Saunas, Steamrooms, and Swimming Pool, Spa & Hot Tub Equipment

ALMOST HEAVEN FREEZE PROTECTOR INSTALLATION INSTRUCTIONS

NOTICE - BECAUSE OF THE WIDE VARIETY OF FACTORS INVOLVING HOT TUB AND SPA SYSTEM INSTALLATIONS, THE INSTALLER AND END USER MUST DETERMINE MERCHANTABILITY AND FITNESS OF THIS PRODUCT FOR THE PURPOSE INTENDED. THIS PRODUCT IS NOT INTENDED TO REPLACE INSULATION, COVERINGS AND/OR MAINTENANCE. ALMOST HEAVEN ACCEPTS NO LIABILITY WHATSOEVER FOR ANY DAMAGES INCURRED DUE TO FREEZING. THE LEN GORDON FC-5 IS SUPPLIED WITH ITS OWN INSTRUCTIONS FROM THE MANUFACTURER. BE SURE TO READ THESE INSTRUCTIONS FOR ADDITIONAL INFORMATION. READ ALL SUPPLIED INSTRUCTIONS CAREFULLY BEFORE PROCEEDING.

INTRODUCTION

If you are in a freezing climate where the temperature may occasionally drop rapidly, then you have just purchased the most important accessory your outdoor hot tub or spa will ever have.

The Almost Heaven Freeze Protector system acts as an override device for your spa or hot tub. A sensing bulb housed in a drywell (thermowell) directly measures water temperature in one of the supply lines to or from the tub. When it detects cold temperatures, a relay energizes the pump and heater. Water in the system is then circulated and heated to prevent freezing. Because of the great variety of outdoor installations, however, the correct operation of the Freeze Protector relies very much on proper system design and accurate placement of the sensing bulb.

Unlike usual freeze protection systems, which sense ambient air temperature; the Almost Heaven Freeze Protection System uses the Len Gordon FC-5 and a drywell assembly to sense water temperature directly. This eliminates having the pump run continuously (and needlessly) when temperatures remain just below freezing.

A properly designed freeze protection system begins with the covers on your spa or hot tub. To minimize surface heat loss, you should use an insulated top cover and an inexpensive floating blanket (heat cap). Locate the support pack indoors, in the basement or a utility room, if possible. This will also cut energy costs, and reduce the danger of expensive repairs due to ice damage. Most important, to add to energy savings and prevent the pump from cycling too frequently, you should also apply some type of insulation to the piping.

In poorly insulated systems, the water temperature at different places in the plumbing can vary by as much as 50°F to 60°F (between timer cycles). Two distinct problems can arise as a result of such large temperature variations. The first, obviously, will be a frozen system if the temperature at the Freeze Protector probe's drywell is much warmer than the temperature at the coldest place in the plumbing. The other problem is less obvious. If the plumbing that connects the support pack to the water vessel remains uninsulated, a very large temperature variation can exist between the vessel and its plumbing. The Freeze Protector will successfully turn the system on as the water in the pipes begins to cool, but warmer water from the tub will quickly reach the probe and shut the pump down. This 'overcycling' of the pump can result in abnormal wear and cause the pump to fail prematurely. Check for and correct this condition at the beginning of the winter season (see TESTING below).

DRYWELL ELBOW MOUNTING

Your Freeze Protection system includes a drywell sleeve mounted into a special PVC Elbow. Glue this Elbow into the water line which warms last as circulation begins. Take into account the heat supplied by the heater and also the retained heat of the vessel. On Almost Heaven systems, a TEE at the support pack divides water coming from the pump into two separate lines. One line supplies the tub or spa directly and the other is routed through the heater and filter. Either the unheated return line to the tub or the suction line from the tub to the pump is then the best choice for the probe's drywell. If the system has only one return line from the pack to the vessel, then mount the probe in the suction line to prevent heat from the heater from overcycling the pump. Try not to mount the Drywell Elbow too close to the tub or the support pack since they both retain heat.

The box that houses your Freeze Protector is a raintight enclosure, but you should still mount it away from any possible flood damage. It must be mounted within six or seven feet of the Drywell Elbow. The Drywell Elbow also includes a rubber bushing that can be used to secure the probe from the FC5.

Insulate the drywell assembly only after some winter testing has been done (see below).

WIRING

If you have an Almost Heaven system, with either a Len Gordon or Intermatic timer, follow the electrical diagrams supplied by Almost Heaven in either case. Note that the FC-5 connects directly to the control and not the pump. The Almost Heaven Freeze Protection System will also work with any other Hot Tub or Spa system regardless of the type of controls used. You must wire the FC-5 in parallel with any timer or air switch controlling the system. DO NOT attempt to connect more than one wire to each screw terminal in the FC-5 control box. Use approved connectors to make the splices. Use #12 Gauge (AWG) copper wire for the connections.

If you are wiring a single speed pump without a Len Gordon or Intematic timer/air switch control, you will have to connect all four terminals in the FC-5. Terminals #1 & #2 are Lines 1 & 2 respectively. Splice these directly into the supply from the circuit breaker. Terminals #3 and #4 are Loads 1 & 2 respectively. Splice these directly to the single speed pump. CAUTION - you must not cross the two voltage legs supplying the pump. Maintain proper phase through all devices that might control the pump, including the FC-5.
If you are using a two-speed pump, you must also use a relay or device similar to the timers supplied by us to prevent motor burnout. Consult with Almost Heaven or your electrician. A licensed electrician should make or check all connections.

TESTING AND OPERATION

Test the unit's operation by packing the sensing bulb with ice. As the probe cools, the pump should activate. If it does not, check all the connections and test for proper continuity of the thermostat and relay. Once you're certain that the unit is functioning properly, it's time to wait for winter.

Monitor the Freeze Protector's operation at the beginning of the winter. MAKE SURE THE PUMP AND HEATER HAVE POWER, and that the heater is turned on. If you're using bottled gas, make certain you have an ample supply. If the support equipment is not located directly next to the tub or spa, ascertain that the LO speed on the pump will develop enough pressure to circulate water through the heater. Unless a properly functioning bypass valve is installed on your two-speed equipment pack, it may be necessary to balance the water flow by adjusting gate valves or jets in the system. Consult with our Technical Assistance department if you need help.

With a clean cartridge in place and the pump running on HI speed, make a note of the action of the jets. If ice begins to collect in the plumbing, it will restrict the water's flow. During falling temperatures, watch the jet action carefully. If you notice a reduction in performance (with the pump running on HIGH), to prevent freezing operate the tub manually on a continuous basis until the jet action returns to near its previous level.

The occurrence of ice buildup indicates that the probe is sensing temperatures that are much warmer than the lowest temperatures in the system. Try to determine the location of the ice buildup in the system. You may be able to melt ice in plastic pipes with a household hand-held hairdryer. For safety, you must plug the hairdryer into a GFI protected circuit. Do not leave the hairdryer unattended and exercise care not to melt the plastic pipe with it. Maintain an adequate distance between the pipe and the hairdryer. If a particular location in the plumbing is suspect, and the plumbing is not completely clogged with ice, run the pump on HI and watch the filter's gauge while you use the hair dryer to see if there is an immediate decrease in pressure. Add insulation where necessary. You can try removing any insulation from the probe and drywell assembly (NOT the plumbing) to lower the effective temperature that it senses. Move the drywell assembly if necessary.

To check the pump for overcycling, watch the system when it first begins to operate on the freeze protector. If the tub's water is much warmer than the water in the plumbing, the pump will shut off just seconds after it comes on. This suggests that the piping requires better insulation. You can also compensate for this by removing insulation from around the drywell assembly (NOT the plumbing). If it becomes necessary, you can pull the probe partly out from the drywell. As a last resort, remove the probe completely and tape it to the pipe.

This will expose the probe to a temperature lower than the actual temperature of the water in the pipe. It can also reduce the efficiency of the freeze protection system to the point where the pump will run when it is not necessary. Experiment during the first winter with varying amounts of insulation on the probe, or by withdrawing the probe partly from the drywell to varying degrees. If you must remove the probe from the drywell completely, you can vary the result by positioning the probe on the top, bottom or sides of the pipe (heat rises). THERE IS NO SUBSTITUTE FOR PROPER INSULATION OF THE ENTIRE SYSTEM.

Continue checking the system throughout the first winter especially during heavy cold snaps.

NOTE: The Almost Heaven Freeze Protection System is not intended to maintain your tub at usable temperatures. It is meant to prevent costly freezing when the tub is not in use. Therefore, in properly cycled and insulated systems, an entire winter may elapse without the freeze protector being called into use. With this in mind you should intentionally test your system when freezing temperatures first occur.

If your system has a timer, it can be set to come on during any 30-minute period. Additional timer intervals can help keep the tub at a usable temperature in hard freezing climates by activating the system automatically at more than just two predetermined periods through the day. The timer's action can, however, lead to confusion when trying to analyze a particular system's needs. Be sure to account for the timer's effect when taking measurements and determining temperature differences.

IF YOU HAVE ANY PROBLEMS OR QUESTIONS, PLEASE FEEL FREE TO CONTACT US!