HOSHIZAKI TECHNICAL SUPPORT
TECH -TIPS

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CHECKING A PSC MOTOR

Permanent split capacitor (PCS) motors are common in Hoshizaki equipment. You will find them used for most water pump assembly and condenser fan motor applications. A PSC motor has a moderate starting torque and a good running efficiency. A run capacitor is wired in series with the start winding. When power is supplied to the winding, the capacitor causes a phase shift between the start and run windings. The resulting magnetic field causes the motor to turn. The increased efficiency of the PSC motors is a definite benefit to the overall operating efficiency of the unit.

The run capacitor is in the circuit all the time so that it continues to assist the motor to turn and maintains the efficiency. If the run capacitor is removed from the circuit, the motor may have difficulty starting or may start and run with a high amp draw. If the capacitor fails open, usually the amp draw will increase and the motor will overheat. Most of the PSC motors that are used have an internal thermal overload protector in the windings.

The run and start windings in a PSC motor are very similar. They are generally wound with similar size and length of wire. When checking the windings, use an ohmmeter to check for open or shorted windings between common, run, and start, or check from each lead to the motor housing for a grounded condition. If the motor is hot and the winding is open, allow it to cool and check it again. It could simply be an open thermal overload due to a bad run capacitor. In the case of a failure of PSC motor, it is recommended that the run capacitor should always be replaced along with a new motor.

The bearings a the PCS motor are sealed stainless steel roller bearings or sleeve type bearings depending on the specific motor. The sealed bearing motors do not require lubrication. Replacement bearings are not available through the Hoshizaki Parts Department and it is rare to find general replacement bearings in the field. If the bearings fail, the motor must be replaced.

ADDRESSING HARD WATER

The term hard water is used to describe water that has a high content of calcium and magnesium ions. Generally, low pH (acidic) water picks up these minerals as it filters through rock and soil on its way down to the water table. The type of minerals in the water will depend on the local terrain and the type of rock and soil it passes through. Calcium and magnesium are primarily found in limestone, which covers a large portion of the earth's crust.

The amount of water hardness is usually expressed in grains per gallon. One grain is equal to 1/7,000 of a pound (17.1ppm) of calcium per gallon of water. Hard water will usually have 7 or more grains of hardness. These minerals will effect surfaces by causing scale or scum.

Hard water will cause scale buildup over a period of time in the water circuit, and on the evaporator plate of an ice machine. This occurs when the minerals

precipitate out during the freezing process and are continually re-circulated. The scale covers the freezing surface and impedes heat transfer, sticks to other surfaces in the water system, and plugs water spray tubes.

Hardness can be corrected so that the scale does not build up. Adding a controlled amount of polyphosphate to the water can prohibit scale buildup. Polyphosphate basically encapsulates the calcium ion and allows it to flush out of the reservoir more easily. There are many filter manufacturers who either add polyphosphate to their assemblies or offer polyphosphate feeders that meter a specific amount into the water line. The key is not to over-do it. Excess polyphosphate can build up like calcium and effect the water system.

A water softener will treat the hard water so that calcium or lime scale does not build up as quickly. A water softener reduces calcium buildup through ion exchange. The calcium ions are exchanged for less obtrusive sodium ions through softening resins in the softener reservoir that have an excess of sodium ions. The resin is recharged with sodium ions from a brine tank that is filled with a salt solution. This is done automatically through the softener controls.

Another method of addressing hard water is through devices that change the molecular structure of the water. This supposedly causes the calcium to suspend so that it can be easily flushed from the reservoir. There are several different devices available in the market, some of which have shown favorable results in some locations.

Treating hard water is beneficial and will reduce scale build-up and increase operating efficiency, regardless of the method you choose.

SERVICE Q & A:

Question: I am installing 2 F-1000MAF models on a single bin. I noticed that an air louver is now included on the right side panel. Can these units be installed side by side? What do I do about the louver?

Answer by Chad Darnell: Let's discuss the reason that this model now has a louver on the side panel. As most know with the changeover from R-22 to R-404A there was an increase in high side pressures between these refrigerants. This increase in operating pressures required more airflow at higher ambient conditions. The increase showed up when our R&D Department tested under desert conditions. Desert conditions are extreme (120º F air and 100º F water.) All machines are tested at this condition to assure proper operation when machines are sold to customers in Southern California as well as Arizona. Even though this is outside of regular testing per A.R.I. specifications, we as a company realize that our machines can be placed in conditions with extreme temperatures. It is however, ***not recommended*** because our operating specifications are 45-100 degree air and 45-90 degree water.

Now lets get to the question at hand. These machines can still be placed on one bin side by side like the older R-22 models. To accomplish this, set one machine on the bin on the extreme right side and remove the louver panel from the left side panel. After removing this louver panel the second machine can sit on the bin adjacent to the first machine. There is no concern with airflow at normal operating conditions as set forth in our specs. If these machines will be installed in higher operating conditions my suggestion would be to use a B-800 or a B-900 bin. In this situation the top kit can be placed between the two units to cover the gap on the top of the bin.

As an example: you have a B-800 bin and you need to place two F-1000MAF's on top. As stated earlier, one machine is placed on the extreme right side and the other machine on the extreme left. This leaves a 4-inch gap in between the two units. To cover this gap, order a 4C top kit and place it between the units. A B-900 bin will require an 8C top kit since the difference is this bin is 52 inches wide and creates an 8-inch gap between the units.

As stated earlier Hoshizaki does not recommend placing the machine outside our specifications.

COMING NEXT MONTH...

1. New KM-1300NRF /Bin Control
2. Tech-Spec's and CD Update
3. Service Q & A