HOSHIZAKI CARE
TECH-TIPS

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FLAKE SIZE ADJUSTMENT

Hoshizaki flakers have a unique feature which allows a service technician to adjust the ice flake size the unit produces. The F-450, F-650, and F-2000 units have two adjustments, medium and large. The F-1000 has three adjustments. The unit is shipped in the medium setting. This adjustment provides the customer with flexibility depending on their ice needs. There is a definite difference in the coarseness and size of these flakes.

Here's how it works. As the auger turns to break the ice away from the inside wall of the evaporator cylinder, it also moves the ice upward to the extruding head. The flight (screw) of the auger moves the ice in an upward spiral direction and forces it through the extruding head to the cutter. The pressure applied to the ice comes from the last two inches at the top of the auger flight.

To adjust the flake size you must remove the cutter bolt and rotate the cutter on the pin at the top of the auger. By doing this, you align the small or large cutter openings with this pressure point on the auger flight. Now, as the auger rotates and applies pressure to the ice, it always comes out at the desired size opening on the cutter. The result is consistent small, medium , or large flakes. The benefit is customer satisfaction.

Hoshizaki also has a similar adjustment for the Flaker C (cubelet) models. The cubelet maker has a different extruding head which has smaller openings. The flaked ice is extruded through the smaller openings, squeezing out additional water and compacting the ice into a cubelet about the size of your little finger. A breaker replaces the cutter on the C models. The breaker breaks the ice off into cubelets. By adding a washer under the cubelet breaker the size of the cubelet can be increased.

KM THERMISTOR FUNCTION

The KM series cuber uses a single thermistor mounted on the suction line. This thermistor is a NTC (negative temperature co-efficient) type. This means that as the temperature of the suction line increases, the resistance of the thermistor decreases. We use this resistance reading as a signal or switch for the control board circuits.

The actual function of the thermistor is to constantly monitor the outlet temperature of the evaporator. In monitoring this temperature, the thermistor does two distinct jobs. It starts the defrost completion timer during harvest and acts as a constant high temperature safety for the evaporator.

During harvest, hot refrigerant gas enters the evaporator serpentine. Water also enters through the center of the evaporator to help distribute this hot gas evenly to the evaporator. When the evaporator reaches 48° F, the thermistor resistance is around 3.9 K ohms. This resistance signals the control board to start the defrost completion timer.

If a problem occurs in the unit to cause a high temperature situation in the evaporator, the thermistor resistance will respond accordingly. High temperature represents low resistance. At 127°F, the thermistor resistance of around 750 ohms or less will signal the

control board to shut down the unit on the manual reset, high temperature safety.

To reset this safety you must turn the power off and back on. The unit will then restart in the one minute

fill cycle and continue with the normal sequence.

Now that you know the function of the thermistor, let's review the symptoms that occur if it fails. A temperature verses resistance chart for thermistor checkout is provided in the technicians pocket guide.

A bad thermistor will either be open or shorted. An open thermistor will have a very high resistance reading of infinity (∞). This represents a cold temperature on the suction line and will result in a consistent 20 minute harvest period. The control board, 20 minute defrost backup timer, will operate to switch the sequence to freeze.

A shorted thermistor will have a low resistance value of around zero ohms. This represents a high evaporator temperature condition to the control board and will shut the unit down on the high temperature safety. When you try to reset the safety by turning the power off and back on, it will not reset. Instead you will hear a relay click after about 2 seconds. The safety will shut down the unit again because of the high temperature signal from the shorted thermistor. Unplug the thermistor and the unit will start up in the one minute fill cycle.

Now that you understand the thermistor function and these simple symptoms, diagnosing a bad thermistor will be much easier.

SERVICE Q & A

Question: We occasionally receive a flaker series call and the technician claims the water reservoir is full, but the gear motor and compressor do not start. What should be checked?

Answer: **by Duncan Sheridan**: In order for the gear motor and compressor to start, the reservoir must be full and both float switches must be in the up position (closed). A full reservoir indicates that the inlet water valve, dual float switch, and water control relay have operated. It also indicates that control voltage, (24 volts A/C) should be present. This can be checked across terminals 1 & 2 on the timer board. If control voltage is not present, check the 1 amp buss type fuse located on the front of the control box. This fuse protects the control circuit (transformer secondary). If the fuse is OK, check

the control transformer primary for 120 volts.

If you find control voltage present at terminals 1 & 2 , check for voltage at terminal 8. This will either be control or line voltage depending on the model. Check the unit wiring diagram to determine what voltage should be present. Voltage here indicates that the timer board has sequenced properly to energize the gear motor circuit and is OK to this point. If voltage is present at terminal 8 and the gear motor has not started, check the gear motor relay circuit. Remember there is a built in time delay. This will be approx. 1~2 minutes depending on the model of the flaker. If it starts, give it time to cycle up completely. Turning off the power restarts the timer count which delays the cycle.

If no voltage is present at terminal 8, a jumper can be used to distinguish between a bad board or an electrical circuit problem. At this time, install a jumper across terminals 3 & 4 on the control timer board. Do not confuse terminals 3 & 4 with the line voltage compressor relay connections marked 3 & 4 (black relay) located on the timer board. If the unit sequences properly with this jumper in place the problem is located in the water relay control circuit. Check the water control relay coil, contacts, and the float switch circuit.

Once the circuit connected to terminals 3 & 4 has been eliminated, place a jumper across terminals 5 & 6. This is the bin control circuit. If the unit cycles up, the bin control circuit should be checked . Check to assure the bin control contacts are closed.

If the unit continues not to start, the last check is to install a jumper across terminals 10 & 11. This is only necessary if the gear motor and condenser fan are running and the compressor does not start within one minute. If the compressor operates, the gear motor protect circuit needs to be checked. In summary, if the jumpers are in place and the machine still does not start,

the circuit board is probably inoperative and needs to be replaced.

COMING NEXT MONTH...

1. DCM Ice
2. Head Pressure Controls
3. Service Q & A