



HOSHIZAKI CARE TECH-TIPS

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Compressor Checkout

By David Brown

The heart of the refrigerant system in the Hoshizaki Ice Machine is the compressor. The compressor pumps refrigerant through the system. A bad or inefficient compressor means low or no refrigerant flow.

Since proper diagnoses of an inefficient compressor can be very difficult, all other components must be checked first for proper operation. The condenser and evaporator must be clean. Check the water distribution system and be sure the water solenoid valve is not leaking-by during the freeze cycle. Confirm TXV operation and that the refrigerant type and charge is correct.

The symptoms of an inefficient compressor are high suction and low discharge pressure, longer than normal cycle times, and hot running compressor. The manufacturers have a Full Load Amperage (FLA) rating for each of their compressors. An inefficient compressor will be drawing considerably less than FLA.

The older method of testing for an inefficient compressor was done by closing off a liquid line valve and pumping down the refrigeration system into a 10" to 15" vacuum. This method is no longer approved by compressor manufacturers, and is not recommended by Hoshizaki.

If you suspect an inefficient compressor, check system pressures and amp draw. For cubers, also check the complete cycle time. A border line compressor may

have "decent" pressures and a normal freeze time but the harvest time will be longer than normal.

In cases where the compressor will not run, the first thing to do is check the voltage at the compressor which it is attempting to run. The voltage should be within 10% of the rating on the compressor tag.

If the compressor will not attempt to start, the thermal overload may have opened. If the crankcase is hot, cool down the compressor. restart and check the amp draw. If amperage exceeds 40% of FLA, check for an overcharge of refrigerant, excessive or no evaporator load, an over feeding TXV, or a high side restriction. The overload could also be stuck open.

A malfunctioning TXV can cause extensive damage to the compressor if not corrected. An over feeding TXV will cause flooding of the compressor which can wash the lubricating oil from the crank case causing the bearings to seize and resulting in Lock Rotor Amps (LRA). Flood back can cause the compressor to pump liquid refrigerant causing the valves to warp or break. Along with flooding comes high amp draw, and a cooler compressor.

An under charge of refrigerant can cause the compressor to overheat and the valves to warp. An indication of an undercharged system is low pressures, long cycles and the amperage draw will be less than FLA.

If the compressor will not run, trips the breaker or hums, check for voltage across the run and common motor windings. If the proper voltage is found, the compressor needs to be ohmed to see if there is an open

or shorted winding. Most Hoshizaki compressors utilize an internal thermal overload in the windings which could also open not allowing the compressor to start.

In order to ohm out the compressor; disconnect the power to the ice machine, remove the compressor terminal leads and set your multimeter on the ohm scale. Read the resistance from terminal to terminal recording the resistance. The least resistance will be from run to common, start to common will have more resistance, and start to run will have the most resistance. Make note that this applies to single phase compressors only. Three phase compressors will have equal resistance between all 3 terminals. Also check each terminal to the crankcase for a grounded condition. A readable resistance from any terminal to ground is a shorted condition.

A run capacitor can fail causing the compressor to draw excess amperage while the pressures are correct. Failure of a start relay or capacitor will cause high amp draw or failure to start. Check both start and run components thoroughly. Most compressors fail due to other component failure. Action must be taken to correct this or you will lose another compressor. Inspect the system completely to determine the cause of the problem and replace the compressor and components as necessary.

Front Panel Insulation

Effective on June production, a change has occurred on the KM-500 and KM-30 front panel insulation. The polyethylene foam which was attached to the lower panel has been changed to a one piece molded ABS separator that fits inside the edges of the front panel. This separator provides an air gap which insulates the front panel from the ice drop and pump compartment. This reduces the possibility of condensation. It can also be removed for cleaning if necessary. This change will likely be implemented on the 30" "M" models in the future.

KM-2400 Part Change

Effective on the June production for the KM2400, a change was made in the Discharge Line Gas Valve. The original Fugikoki valve part number 2U0131-01 is being

replaces with a Sporlan Valve part number 4A0582-01. If a discharge line gas valve is ordered for the KM-2400, the Sporlan Valve will be shipped. Don't get excited when you see the new valve because it looks a little different from the original. The inlet is stamped "IN" and should point towards the compressor when installed. Be sure to use a good heat sink to protect the valve body from overheating during the brazing process.

CFC Update

Time is quickly slipping away on the phase out of CFC Refrigerants. I'm sure you are also aware that November 14 is the date that Technicians must be EPA Certified to handle refrigerants. If you are not prepared, you won't be able to purchase refrigerant after that date!!

When we look at HCFC or HFC options to replace CFC's we find some controversy as to the best choice.

In the ice machine industry, some have chosen to go directly to the "new" HFC refrigerant R404A (SUVA HP62). Some have chosen "HP81" which is another "new" HCFC refrigerant. While others are using the "old stand by" HCFC R-22 which has been utilized in the refrigerant industry since its introduction in 1936.

Hoshizaki chose R-22 as an interim refrigerant due to its compatibility with our ice machine application, the vast industry acceptance and experience, lower price and excellent market availability. Also when you look at its potential to destroy the ozone (0.05 ODP) you will find it 4.6 times less than R-502 at 0.23 ODP. Refrigerants are also rated on their effect during production and use on Global Warming or Global Warming Potential (GWP). The GWP for

R-22 is 0.3 as compared to R-502 at 3.75. The new HFC HP62 has a 0. ODP and a GWP of 0.94. Since we expect GWP to be the next "Hot Issue" with EPA, we made the R-22 choice. Who knows, in the near future, someone may develop the perfect refrigerant which will resolve all our problems and drop in to existing units. Yeah right! Meanwhile, we have a few years while using R-22 to thoroughly test all the new

alternative refrigerants and chose the best one to the environment and our customers.

Coming Next Month...

1. Replacement Refrigerants...
2. Seasonal Adjustments-No thanks!...
3. Thermo-Disc Use and Function...

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