HOSHIZAKI TECHNICAL SUPPORT
TECH-TIPS

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DIAGNOSING HEAD PRESSURE PROBLEMS

Head pressure problems in a refrigeration system fall into two different categories. There are definite symptoms for low head pressure and high head pressure problems.

First let's take a look at low head pressure problems. Low head pressure can cause poor harvest, low suction pressure, and little or no ice production. These symptoms will definitely occur if the refrigerant charge is low. A low charge is normally the result of a system leak or an improperly charged unit. The refrigerant charge is critical for proper operation. Always weigh-in the charge per the amount listed on the unit nameplate. All leaks must be repaired using proper refrigeration practices.

Generally, anything that causes low suction pressure will cause low head pressure and vise versa. On a water cooled unit, a water regulating valve that is adjusted or stuck wide open can drop the head pressure below normal. Low head pressure can also be caused by a restriction in the liquid flow to the evaporator. This could be caused by a restricted drier or the liquid line valve or TXV not opening properly. Also, if the hot gas valve does not open during harvest, any unit with a liquid line valve will pull into a vacuum and cause low head pressure as well as an extended harvest period.

Extremely low ambient conditions or a head pressure control (headmaster) that is stuck so that it does not bypass will reduce the head pressure. This will also occur if the headmaster is set too low. The last item on this list is an inefficient compressor. As valves get weak, the compression ratio will be reduced so that the head pressure will run below normal.

All Hoshizaki ice machines have an internal auto-reset high pressure switch. This switch is a safety to protect against excessive high pressures. The head pressures in an ice machine will vary somewhat with changing ambient conditions. You will find however, that the average head pressure of a R-22 unit will run from 220 to 230 psig. If the unit cycles off on the high pressure switch, a problem exists.

The number one reason for high head pressure is reduced heat transfer in the condenser. On a water cooled model check for internal scale build up or reduced water flow through the condenser, i.e. restricted water regulating valve, etc. On air cooled models it could be inadequate clearances, extreme ambient temperatures, plugged air filters or dirty or loose condenser fins. An inoperative fan motor or a unit without adequate clearance for proper air flow will also cause elevated head pressures. You should always eliminate low heat transfer items first.

On remote systems, check the headmaster. If this valve sticks in the bypass mode, head pressure will increase. On self contained models check for a hot gas valve/coil problem. If the coil overheats and the valve closes before the harvest is compete, the unit usually shuts down on the high pressure safety. Also check for a TXV that is fully open as the harvest ends. This can cause a head pressure spike and shut down the unit on the high pressure safety. Usually, it is caused by a loose bulb or a sticking TXV valve.

Finally check for an overcharge of refrigerant or non-condensibles in the system. A thorough cleanup is required if non-condensibles are present. As always, Hoshizaki recommends using proper refrigeration practices including drier replacement when servicing a sealed refrigeration system.

SMALL KM CUBES

Small cubes on a KM cuber mean only one thing. There's not enough water to make normal size cubes or the water is disappearing. During harvest, the reservoir should fill to overflowing. If it does, there is plenty of water in the reservoir for a full batch of normal size KM cubes. If it doesn't fill to overflowing check the incoming water supply. A plugged external filter or inlet water valve screen is likely. Low water pressure or an improper inlet water line size is also a possibility.

If the reservoir filled properly during harvest, the water had to go somewhere. In this case check for leak by at the pump-out check valve caused by dirt, scale, or a weak spring. Also look for a missing displacement cap or o-ring for the drain stand pipe. A water trail caused by shipping tape, an out of position ice chute guide, or algae can cause water to run into the bin. There is also the remote possibility of a leaking reservoir. Search until you find the missing water culprit and correct it, and the KM cube size should return to normal.

SERVICE Q & A

Question: The toggle switch is "OFF" but the compressor is still running. What do I check?

Answer: ***by Rodd Burger*** Many times we hear this complaint on the technical support line. For the most part this problem is easy to resolve. This is however, a serious problem and can cause severe damage to the compressor if not corrected.

The most common reason for this call is the control board has been changed and was incorrectly installed. When replacing a board in units that were originally manufactured with a Alpine board a modification must be made. The modification is to cut the black jumper located between X3 and X4 relays. Cutting this jumper allows the universal replacement part number 2U0139-01 to fit the original Alpine application.

The easiest way to determine if the wire should be cut or not is to look at the K1 connector. If a white wire is not included in this connector wiring, the jumper should be cut. When the wire is not cut the magnetic contactor will remain energized when the control switch is in the off position.

Another reason for this symptom is a sticking magnetic contactor. There are two ways to check for this problem. First check for voltage at the coil of the contactor. The coil terminals are usually marked with A and B. Use your voltmeter to check for 120 volts across these points. If no voltage is present and the compressor is running, the contactor points may be welded together or stuck closed. Another way to confirm a stuck contactor is to pull one wire off of the contactor coil at A or B, if the compressor does not stop running, check for a stuck contactor. Many times you can take the butt of a screwdriver and rap the side of the contactor to dislodge the stuck contacts and stop the compressor. Always replace the contactor in this case.

If the compressor stops when one wire is removed from the coil or you find 120 volts applied to the coil, you may need to look at the next scenario.

Finally, the compressor may run with the toggle switch in the off position if the magnetic contactor is energized by back feed voltage. This may happen if a non-dedicated neutral wire is installed on the unit. 208/230 volt 1∅ models use 115 volt controls. It is very important that these units be supplied with a dedicated neutral. This is a neutral conductor that runs directly from the power supply neutral lug to the ice maker. A dedicated neutral should not be connected on 3∅ models.

In some cases, if the neutral is connected with other neutral wires from an outside source (non-dedicated) a back feed voltage or back EMF may occur. This back feed voltage can be caused by a component failure or through an inductive load in another circuit. To check for this problem, check voltage at the coil of the contactor while the unit switch is in the off position. If voltage is present, check from neutral to ground. If you have voltage to ground, back feed voltage is occurring

and you should investigate the external wiring and connections.

We hope these suggestions will help the next time you experience this mysterious symptom.

COMING NEXT MONTH...

1. Reach-In Alarms / Features
2. Locating Remote Condensers
3. Service Q & A