HOSHIZAKI CARE TECH-TIPS

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CONTACTORS

A magnetic contactor is a large relay with contacts designed to handle the higher current flow of the compressor. A typical contactor will have 1 or more primary contacts sized to carry a heavy current load. It may also have 1 or more auxiliary or secondary contacts to be used for smaller loads or controls.

You will find two different contactors used in the KM series. Hoshizaki part number 428393-01 is used in all KM models through the KM-1200 series. Part number 438215-01 is used on KM-1600 and larger units. This multi-purpose contactor has three sets of primary and four sets of auxiliary contacts. It is also used on the F-2000 flaker.

Sometimes in three phase applications, a larger contactor is used together with current type overload protection. This combination is found in part number 440360-01 used on the KM-2400 SRE3.

In the KM series, the contactor serves to operate two components. When the 115 volt coil is energized, the primary contacts close to complete the compressor circuit. The auxiliary contacts open to de-energize the crankcase heater found on all remote units.

Diagnosing a bad contactor is simple once you understand that it is a mechanical switching device. When voltage is supplied to the designated coil terminals, the magnetic coil armature moves the mechanical linkage to open or close the contacts. Contactor problems fall into one of three categories, open or grounded coil, sticking or broken linkage, and pitted, burnt, or welded contacts.

If the contactor does not switch with proper voltage applied to the coil, check the coil first. Disconnect the power and terminals and use an ohm meter to check the coil for continuity. If the coil is good, you can usually hear the linkage snap when power is supplied. A broken or stuck linkage will not allow any of the primary or auxiliary contacts to switch. This can be checked by using an volt/ohm meter to check across the contacts appying basic electrical trouble-shooting techniques.

Lastly, pitted, burnt, or welded contacts are a symptom of a possible problem with the component in series with those contacts. Pitted or burnt contacts can cause a voltage drop. These contacts can be carefully dressed with a contact file or fine sandpaper and cleaned with contact cleaner to correct the voltage drop. If not corrected this drop can cause further problems with the corresponding component. Welded contacts are caused by the excessive heat related to high amp draw. The problem causing the high amp draw must be corrected when the contactor is changed out.

LEAK DETECTION METHODS by David Brown

Leak detection has become more important now, with present EPA rules and the high cost of replacement refrigerants. The industry offers several methods for leak detection.

Soap bubbles is the oldest and cheapest method. Applying the soap solution with a dauber or spray bottle to joints and fittings will quickly locate many refrigerant leaks.

The "sniffer" halide torch, halogen electronic, and pump methods detect the chlorine present in CFC/HCFC refrigerants. The halide torch flame will turn green when chlorine gas is sniffed through the sniffer hose. The halogen electronic and pump detectors have a pump probe that can sniff out leaks as low as .5 oz/year. Sniffer type detectors are less effective in areas where a high concentration of refrigerant is present. Recent models of pump type detectors are designed to detect new HFC's also.

Note : When using these detectors to check for leaks in the evaporator area of an ice machine, the sniffer can pick up traces of chlorine gas released from the water. This could lead to the mis-diagnosis of an evaporator leak. Moisture in the probe tip can give the same results.

Other types of electronic leak detectors are available. The corona discharge system is a recent design that uses a high voltage arc in the sensing tip to detect gases that are denser than air. The ultrasonic leak detector senses the high frequency "hiss" or sound produced as gas escapes the leak. This system works well where high concentrations of gases exist. There are certain noises however, that will limit its effectiveness. Since the ultrasonic detects a hissing sound, it can be used if the refrigeration system is in a vacuum or is pressurized with nitrogen. Detection by sound also makes this system directional so that leaks can be pinpointed easier.

Pressurizing the system with dry nitrogen has always been an acceptable means to assist in leak detection. Proper safety practices must be followed when using dry nitrogen. Always throughly **evacuate all** nitrogen from the system **prior to recharging** with refrigerant. Remember that **oxygen should never be used to pressurize a system.** It is acceptable with the EPA to add a small amount of refrigerant with the nitrogen charge (HCFC's are preferred) to assist in locating the leak with a sniffer type system.

Some system additives like red and florescent dyes are available now to help pinpoint leaks. Testing is not complete as to the long term effects of these dyes on the system. Hoshizaki does not recommend the use of **any system additives** at this time.

As the role of new refrigerants expands, new technology in leak detection will surface. Watch the technical publications for future improvements that will help you find difficult leaks.

WHY LONGER CYCLES ?

Without a doubt Hoshizaki KM series cubers have the longest cycle time of any comparable cuber on the market today. Is this a problem? Not if you look at the benefits of longer cycles.

The KM series was deliberately designed with longer cycles and a larger ice drop weight. The truth is , **longer cycles mean fewer cycles a day**. Fewer cycles relate directly to longer component life and better running efficiency.

Consider this, for every freeze cycle there is a harvest period. While the harvest period does function to release the ice, it decreases efficiency by stopping the refrigeration process. Also, harvest puts additional stress on the compressor. This is a fact of life with a hot gas defrost system. Fewer cycles in the KM series means fewer harvest periods a day. Fewer harvest periods means more time to make ice, less stress on the compressor, longer life and better efficiency.

This logic applies to every component in the ice machine that cycles on and off between freeze and harvest. Fewer starts and stops relate to longer life.

Does longer cycle times mean longer diagnosis time? The answer to this question is no. A technician who understands the KM sequence of operation can diagnosis a defective component using the ten minute check-out procedure quickly and easily.

This longer cycle theory has been proven by the higher reliability and efficiency of the KM design.

COMING NEXT MONTH...

1. The Critical Charge
2. Expedite Your Call
3. DB Gear Motor Change