



HOSHIZAKI TECHNICAL SUPPORT TECH -TIPS

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KM SEQUENCE OF OPERATION

With the advent of the new “E” control board, there is a slight change in the KM sequence of operation. This article will cover the change and review the basic sequence of operation.

The “E” board allows for a 5-second delay in the startup of the KM unit. With a “C” or Alpine control board, the unit will start immediately in the 1 minute fill cycle when the control switch is placed to “ICE”. The “E” board performs a 5-second internal board check prior to starting. Approximately 4 seconds after the switch is placed to “ICE”, the red LED will light showing that proper control voltage is present at K2. One second later, the 1 minute fill cycle starts. Remember this short delay when you startup a KM unit with an “E” control board.

The sequence has not changed from this point. The unit will then start the 1-minute fill cycle. The inlet water valve energizes and begins to fill the reservoir. The purpose for always starting with the fill cycle is twofold. It allows for initial low water safety protection and provides a 1-minute time delay for restarting the compressor. At the end of one minute, the control board checks the float switch to see if there is any water in the reservoir. If there is water in the reservoir, the float switch will be closed and the initial harvest will begin. If there is no water in the reservoir, the float switch will be open. This causes the board to repeat the fill cycle. The board will continue to repeat the fill cycle until water enters the reservoir and closes the float switch.

With a closed float switch, the unit starts the initial harvest cycle. The compressor starts, the hot gas valve opens and the water valve remains energized. On remote systems, the condenser fan motor energizes. Two things must occur to end the harvest cycle. The outlet of the evaporator must reach 48°F. This temperature is checked by the suction line thermistor. Then, the harvest (defrost) completion timer must time out. This is a temperature and time terminated harvest. The timer is adjustable from 1 to 3 minutes and is factory set at 1 minute for most models.

If the thermistor fails open or never reaches 48°F a 20-minute backup timer will automatically switch the unit to the freeze cycle. If the harvest last longer than 6 minutes, a maximum water fill timer will de-energize the water valve and the harvest will continue with hot gas only. At the end of the harvest cycle, another float switch check occurs. This allows continuous low water safety. If the float switch is ever open at the end of a harvest, the unit will shut down and repeat the 1-minute fill cycle until water service is restored. The float switch then closes to restart the unit.

After the thermistor senses 48°F and the timer completes, the unit will switch to the freeze cycle. The compressor continues, the hot gas valve & water valve de-energize, and the pump motor and self-contained fan motor energize. Basic refrigeration begins to cool the water that is pumped up and across the evaporator. When the freeze cycle begins, a 5-minute timer starts counting. This provides a minimum freeze cycle so that the unit cannot cycle back into harvest for at least 5 minutes. A maximum freeze timer also begins when the

freeze cycle starts. The latest “E” board with 10 dip-switches has an adjustable maximum freeze timer. Other boards are preset at 60 minutes for the maximum freeze time.

After 5 minutes, the control board turns the freeze cycle over to the float switch. As water freezes on the evaporator, the water level in the reservoir drops. When the water level is low enough to open the float switch, the freeze cycle ends and the pump-out cycle begins.

During the pump-out cycle, the compressor continues, hot gas valves energizes, fan motor stops, and the pump motor stops for 2 seconds, then reverses rotation. This pumps the mineral laden water remaining in the reservoir through the check valve and down the drain. On KML models, the pump turns the same direction and the drain valve opens to drain the mineral laden water out. Ten or 20 seconds later, the pump-out ends. This pump-out cycle can be adjusted to occur every 1, 2, 5, or 10 cycles from this point.

Once the pump-out ends, a normal harvest cycle begins. This harvest cycle will be the same as the initial harvest cycle. The unit will continue to cycle through harvest, freeze, and pump-out (depending on the dipswitch adjustments) until the bin control is satisfied and shuts the KM unit down.

Remember that the unit will always restart in the 1-minute fill cycle after the 5-second delay. A thorough understanding of this sequence is the best tool you can have to diagnose a service problem on the KM series cubers.

FLAKER PERIODIC FLUSH

Hoshizaki flakers have a unique feature with the automatic periodic flush system. This feature has also been added to the latest DCM products. The purpose of the periodic flush is to clean the water system daily to provide better efficiency, reduce preventative maintenance, and give longer life to the auger bearings.

The basic periodic flush shuts down the refrigeration system for 20 minutes every 12 hours to allow the water system to drain. This draining action completely empties the water system to drain away impurities. The

reservoir is then re-filled with clean fresh water. The flush is accomplished by using a mechanical flush timer and a gravity flow flush valve. A manual flush switch is also included to allow manual draining of the water system for service.

There are two models that do not use a mechanical timer. They are the F-300B and the F-500B series under-counter flakers. These models drain the complete water system each time the unit cycles down. This is considered an off cycle drain down and provides the same result as the timed flush.

It is important to remember the flush timer if you are diagnosing a problem on a unit that will not start. Rotating the cam wheel clockwise will advance the timer. This will allow the unit to start if it was off on a periodic flush. The timer motor runs continuously when the power switch is ON. There are no adjustments to the length of the flush time. The flush period however, can be adjusted to occur at a specific time each day. This can be done by rotating the cam wheel until the micro-switch opens. The unit will flush every 12 hours from that specific time.

SERVICE TIP Universal Float Switch....

There are 2 different float switch styles used on the KM cuber. We have a single standpipe float switch and a dual standpipe float switch. The piping to the float switch varies on some models and dictates which float switch is used.

There are 2 service replacement part numbers. Part number 4A0886-01 is the recommended universal float switch replacement. It is actually designed for any 2 dual standpipe application. If you cap off the hole in the outside standpipe, it can be used in a single standpipe application. A drier or refrigerant tubing cap or a small amount of silicone sealant will suffice to cap off this hole.

The single stand pipe replacement is # 4A0886-02. This part is actually a # 4A0886-01 without the hole drilled in the flush standpipe, so they look identical. In a pinch, you can drill this hole and use this part for a dual float switch application.

COMING NEXT MONTH...

1. New IM-51BAF Model
2. R-502 Refrigerant Conversion
3. Service Q & A

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