



HOSHIZAKI TECHNICAL SUPPORT TECH -TIPS

Rodd Burger
Writer/Editor

Hoshizaki America, Inc.
618 Hwy. 74 South
Peachtree City, GA 30269

Volume 206
Sept 16,-2003

Ph: (800) 233-1940 Fax: (800) 843-1056 E-mail: techsupport@hoshizaki.com

HEADMASTER

By Rodd Burger

With cooler temperatures coming, it is a good time to review Headmasters or Condenser Pressure Regulators. Headmasters are used on various types of equipment throughout the refrigeration industry. Although they are commonplace, many technicians do not understand their function or operation. As a result, they are sometimes misdiagnosed. In this article, we will attempt to address these issues as they relate to the Hoshizaki remote icemakers.

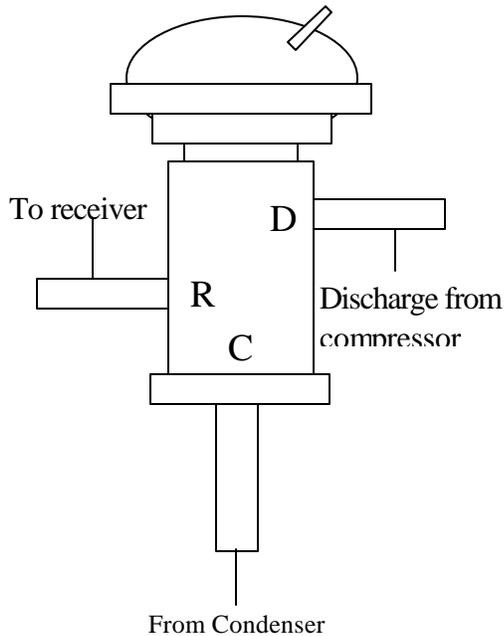
First: What is the purpose of the Headmaster? Basically, the headmaster does as the name implies, it controls head pressure. Head pressure control is necessary for two reasons. 1) To maintain proper head pressure levels allowing for proper pressure drop across the expansion valve causing the liquid refrigerant to flash. (Basic Refrigeration) The second and main function is to maintain the head pressure in lower ambient conditions to assist in our hot gas, water assisted harvest.

The headmaster is necessary since the remote condenser is usually located outdoors in areas that will typical see a much colder ambient than the ice machine itself. Therefore, if there was no headmaster, the head pressure could drop low enough to prevent proper harvest or the refrigerant could “store” or isolate in the condenser. The headmaster will usually begin to operate at about 50°F ambient around the condenser. Although this is the temperature that the valve might begin to operate, it is important to remember that the valve operates

through pressure within the valve dome and not by temperature.

Now, how does the valve work? The headmaster consists of three different ports (Fig. 1). One connects to the condenser, one to the receiver and one directly to the discharge line. Under normal conditions, the pressure from the receiver pushes against the valves dome pressure and keeps the seat closed between the discharge line and the receiver. This forces the discharge gas to go through the condenser so that it can release heat and condense. As the condenser pressure drops, the dome pressure forces the seat open and allows some discharge gas to go directly to the receiver, increasing the head pressure. As the head pressure rises in the receiver, it overcomes the dome pressure, stopping the refrigerant flow form the discharge line to the receiver. The valve cycles open and closed to maintain the desired head pressure setting. For the most part, the valve will only operate in cooler ambients unless there is a problem.

Let’s look at the two ways a headmaster will typically fail. The first way a valve will fail is to “stick” in the bypass position. This will cause the head pressure to rise causing long freeze cycles or in extreme circumstances the unit will trip out on the high pressure safety. The easiest way to determine if your valve is in by-pass is to feel the line that comes IN to the receiver. If this line is hot to the touch, the valve is in by-pass (Assuming that the rest of the system is working correctly i.e. condenser fan motors, etc.)



(Fig 1) Headmaster

When troubleshooting a headmaster we must be careful not to confuse a bypassing headmaster with a low charge. Remember that the valve operates on pressure so if the charge in the unit is low, the valve will begin to do its job by trying to raise the head pressure. In this case there may not be enough refrigerant in the system to raise the pressure and the headmaster appears stuck in bypass. So how do we determine if it is a headmaster or charge? First look at your head pressure and the pressure rating of your headmaster (See Fig. 2). If the head pressure is higher than the rating of your valve, the valve is probably stuck. If your pressure is lower than the rating and the valve is by-passing, the valve is working and your charge is probably low. Adding a couple of pounds of refrigerant in this case should allow the pressures to increase and the valve to cycle normally. As always, a unit with low charge should be recovered, leak checked, repaired, evacuated and recharged.

The second way a valve will fail is to not by-pass when the head pressure is low. The checking method for this condition is similar to the situation above except in this case your head pressure will be low and the valve is not in by-pass. Again, this can usually be determined by the temperature of the liquid

line going into the receiver tank. If the liquid line is not hot and your pressure low then the valve is probably not bypassing correctly.

Headmaster settings:

R-502	190PSI	LAC-4	ALL
R-22	145PSI	LAC-5	KM-2400
	155PSI	LAC-4	KM-1600-KM-2000
	190PSI	LAC-4	KM-500-KM-1300
R-404a	210PSI	LAC-4	ALL
	210PSI	LAC-5	KM-2400

(Fig. 2)

As you can see, the headmaster is an important part of the unit and at times maybe difficult to diagnose however with a better understanding of the operation and function this task will be easier. For information on headmaster installation please see SB98-0010R at www.hoshizaki.com

REMINDER!!

The Hoshizaki Technical Support Department is sponsoring two Advanced Training classes at the factory in Peachtree City, GA. These are two-day classes and consist of detailed training on all model lines, factory tour, along with a limited amount of hands on trouble shooting. See the schedule below for dates

October 21-22
December 9-10

For more information on these classes, please call 1-800-233-1940 ext. 358.

AS ALWAYS...

If you have any comments or suggestions for Tech Tips please send them to:

Techsupport@hoshizaki.com or

Fax to 1-800-843-1056 ATTN: Tech Tip editor

COMING NEXT MONTH...

1. 3 Beep errors (Part 1)

Volume 206 page 2