YORK BY JOHNSON CONTROLS

SB0133	0112
File In: N/A	

SERVICE BULLETIN

Affected Equipment: YCAV & YCIV AIR COOOLED CHILLERS

Subject: Discharge Temperature Sensor Leaks

Issue Date: 1/24/12 **Withdrawal Date:** 1/2/14 **Data Control Level:** x

Materials Needed: 025-32924-000 Discharge Temperature Sensor, one per circuit.

Tools Required: As needed to replace a defective sensor. This includes general tools of the trade, vacuum pump and a refrigerant cylinder for storing R-134a.

Estimated Time Required: 4 hours per sensor replacement.

Warranty: See details within the bulletin.

PROBLEM

Long body discharge temperature sensors (025-43945-000) threaded into the discharge housing of MTS compressors may fail due to a machining problem that causes the brass sensor body to crack after ongoing exposure to the discharge gas stream in the compressor. When a crack occurs, the sensor will leak refrigerant into the crack in the brass tube exposed to the gas stream and out through the external sensor wiring. The location of the sensor and an example of the long body sensor is shown in *Figures 1* and *2* below.

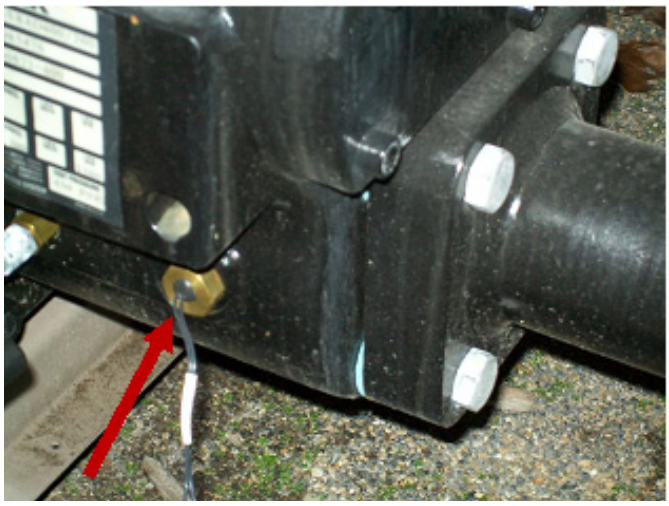

FIGURE 1 - DISCHARGE TEMP SENSOR COMPRESSOR LOCATION

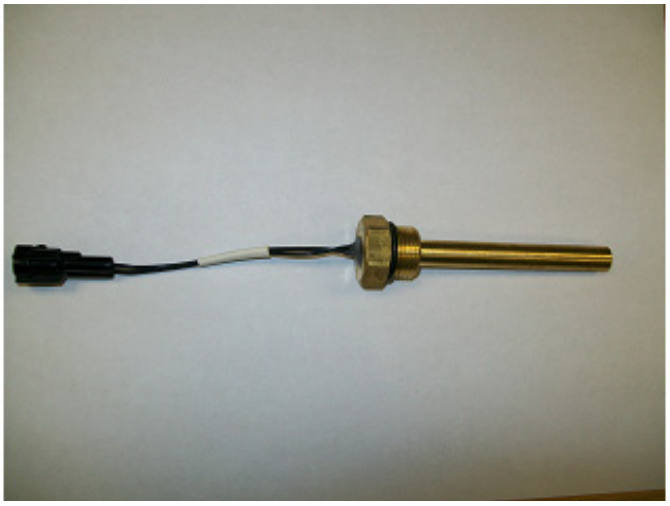

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FIGURE 2 - LONG BODY SENSOR (025-43945-000 3" SENSOR TUBE)

Work on this equipment should only be done by properly trained personnel who are qualified to work on this type of equipment. Failure to comply with this requirement could expose the worker, the equipment and the building and its inhabitants to the risk of injury or property damage.

The instructions on this service bulletin are written assuming the individual who will perform this work is a fully trained HVAC & R journeyman or equivalent, certified in refrigerant handling and recovery techniques, and knowledgeable with regard to electrical lock out/tag out procedures. The individual performing this work should be aware of and comply with all Johnson Controls, national, state and local safety and environmental regulations while carrying out this work. Before attempting to work on any equipment, the individual should be thoroughly familiar with the equipment by reading and understanding the associated service literature applicable to the equipment. If you do not have this literature, you may obtain it by contacting a Johnson Controls Service Office.

Should there be any question concerning any aspect of the tasks outlined in this bulletin, please consult a Johnson Controls Service Office prior to attempting the work. Please be aware that this information may be time sensitive and that Johnson Controls reserves the right to revise this information at any time. Be certain you are working with the latest information.

SOLUTION

When a long body sensor on a system fails, the long body sensors on all compressors in the chiller should be changed to the short 1-3/4" body sensor (P/N 025-32924-000), since there is a possibility that all sensors came from the same production lot of sensors and a similar failure may occur on another sensor at a later time. If any short bodied 025-32924-000 sensors are already installed, they do not need to be changed. If multiple YCAV/YCIV chillers were ordered on the same sales order, it will be necessary to change the long body sensors on all chillers. An example of the short body replacement sensor is shown in *Figure 3* below.

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FIGURE 3 - SHORT BODY SENSOR P/N 025-32924-000 (1-3/4" SENSOR TUBE)

PROCEDURE

When changing a discharge temperature sensor, it is not necessary to remove the entire system refrigerant charge. Typically, only a small amount of refrigerant will need to be recovered from the system and re-installed. However, two refrigerant handling scenarios may be encountered, depending upon the options installed on the chiller:

Scenario #1

1. On systems equipped with an optional suction and economizer service valve, the discharge, suction, oil, and economizer valves can be closed and a very small amount of refrigerant in the compressor recovered after lock-out/tag-out of the chiller.
2. Replace the long body sensor with the short body sensor.
3. Evacuate the system to 500 microns and assure the vacuum holds.
4. Break the vacuum, open the four valves, return the system to service and add the small amount of charge that was removed. Return the system to operation.
5. Repeat the process for the other discharge temperature sensors on the chiller.
6. If the refrigerant charge was lost on the system with the actual leak, check the liquid line subcooling on a system that did not experience a leak to establish an operating value for the liquid line subcooling relative to the ambient temperature and full speed operating conditions of a known good system. This will enable adding the correct amount of charge to the leaking system based on subcooling, without weighing the charge at virtually any ambient temperature.
7. Check and adjust the liquid line subcooling at full speed stabilized conditions with a similar number of fans operating as observed in the known good system.
8. As a final check, assure there is a solid column of liquid in the liquid line sight glass once the charge has been adjusted.

Scenario #2

If optional service valves are not installed, the entire system charge will not need to be removed. Refrigerant only needs to be removed from the low pressure side of the system. The compressor can be utilized to pump most of the low side charge into the condenser. To pump the charge into the condenser, perform the following steps:

1. Close the liquid line stop valve.
2. Wire 115 VAC to the economizer solenoid on the Relay Output Board to energize it. This will typically be Terminal 2 on the Relay Output Board.
3. Assure water is flowing through the evaporator at design flow rate.
4. Run the system until it shuts down on a low pressure cut-out or shut it down manually using the UNIT rocker switch, if the pressure drops less below 5 PSIG. Do not allow the system to pump into a vacuum.
5. Immediately close the discharge and the oil line ball valves when the compressor stops to isolate the charge in the condenser and assure the UNIT switch is placed in the OFF position.
6. Place the panel in the SERVICE mode and open the Drain and Feed valves to 100%. After the valves are open, remove power from the chiller and lock-out/tag-out the chiller.
7. Recover the remaining refrigerant in the compressor and the low side of the system. Replace the long body sensor with the short body sensor.
8. Evacuate the low side of the system to 500 microns and assure the vacuum holds. Break the vacuum and add any charge that was removed.
9. Remove the 115 VAC jumper from the economizer solenoid.
10. Open the liquid line, oil and discharge valves. Re-apply chiller power to “zero” the drain and feed valves on the system. Return the system to operation. Repeat the process for the other sensors on the chiller.

If the refrigerant charge was lost on the system with the actual leak, check the liquid line subcooling on a system that did not experience a leak to establish an operating value for liquid line subcooling relative to the ambient temperature and full speed operating conditions of a known good system. This will enable adding charge to the leaking system without weighing the charge at virtually any ambient temperature. Check and adjust liquid line subcooling at full speed conditions with similar numbers of fans operating as a known good system. As a final check, assure there is a solid column of liquid in the liquid line sight glass once the charge has been adjusted.

WARRANTY

If the chiller is in warranty, place all charges for labor, sensors, and refrigerant on a single warranty claim. Be sure to reference Service Bulletin SB0133 in the problem description section of the warranty claim and indicate that a discharge temperature sensor failed and include the number of additional discharge temperature sensors on the chiller that were replaced.