



Service Information

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SI0295

Supersedes SI0295 (1016)

REV

1116

Equipment Affected: YVAA Air-Cooled Screw Chillers

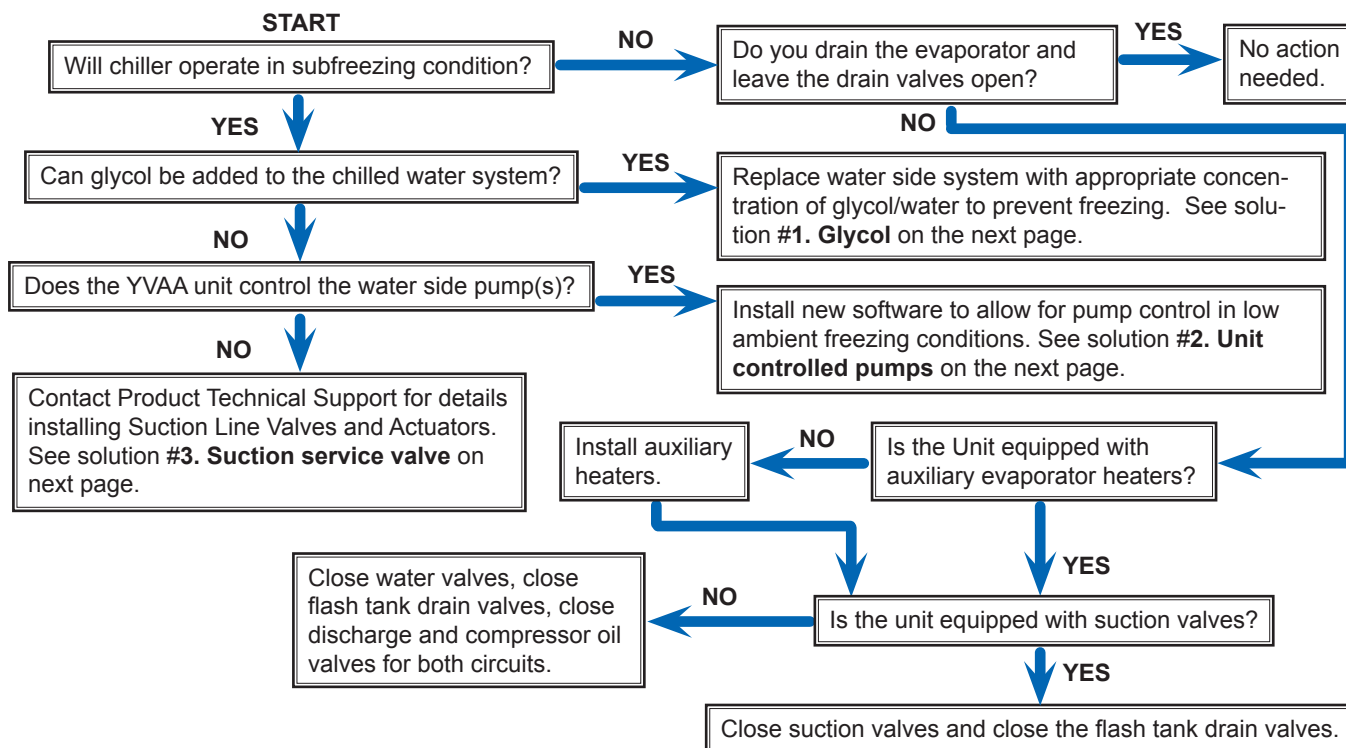
YVAA Evaporator Freeze Damage Potential Due to Refrigerant Migration

PROBLEM

During extreme weather patterns when there is a rapid change in temperature dropping below freezing on chillers with unprotected water (fluid) in the evaporator, the refrigerant may rapidly migrate out of the evaporator, causing the water inside the tubes to freeze and rupture the tube when no water flow is present.

In some cases, after the ruptured, frozen tube thaws, water may flood the entire chiller internals. In the event that this water then refreezes, this can cause physical damage to many components in the chiller system.

Chiller operation and shutdown in subfreezing conditions should be reviewed using the flow chart below.



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.

Product Technical Support

SOLUTIONS

Operation in Sub-Freezing Conditions - Using the flow diagram to determine the correct winter operation technique listed below:

1. **Glycol** – Replace water with the appropriate water to glycol concentration to prevent freezing. This can be used in areas where a glycol solution can be added to the chilled liquid loop to prevent freezing regardless of pump operation. Careful consideration must be made to ensure the proper glycol mixture is met to avoid freezing in static liquid conditions.
2. **Unit controlled pumps** – In applications where glycol cannot be used and pumps are controlled by chiller panel controls, an EPROM replacement can be made to ensure appropriate operation of the unit. New software is available that will run the chilled water pumps given a predetermined ambient temperature, suction pressure, leaving water temperature, and duration of conditions. This operation will ignore any time of day settings when conditions are met operating the pump as needed to prevent liquid freezing. For part numbers please contact Chiller Help for exact EPROM identification.
3. **Suction service valve** – In applications where glycol cannot be added to the chilled liquid source and the unit does not control the pump, a third and final solution can be added to the unit. In this case the chiller must be retrofitted with a suction service valve electric actuator (installed at the suction service valve upstream of the compressor on both systems/circuits). In cases where this solution is required, please contact Screw and Scroll PTS to review the application and to obtain proper kit part numbers. When contacting PTS, please make sure you know the full unit model and serial numbers. These numbers will be needed to accurately identify the correct kit part number.

Unit Maintenance and Shutdown in Sub-Freezing Conditions

- A. Replace water with an appropriate water to glycol concentration to prevent freeze damage.
-or-
- B. Close the water valves, drain the evaporator, leave the evaporator drain valves open, and remove power to the waterbox heaters.
-or-
- C. Close the water valves, close flash tank drain valves, close the suction service valves and leave power to the chiller for heater operation. For units without SSV, close the discharge and compressor oil valves. Ensure activities are performed on both systems/circuits.
-or-
- D. Leave the water valves open and keep power to the chiller in order to have control over chilled water pumps and heater operation (using software from item 1 above). This will enable water to circulate through the evaporator to avoid freezing.

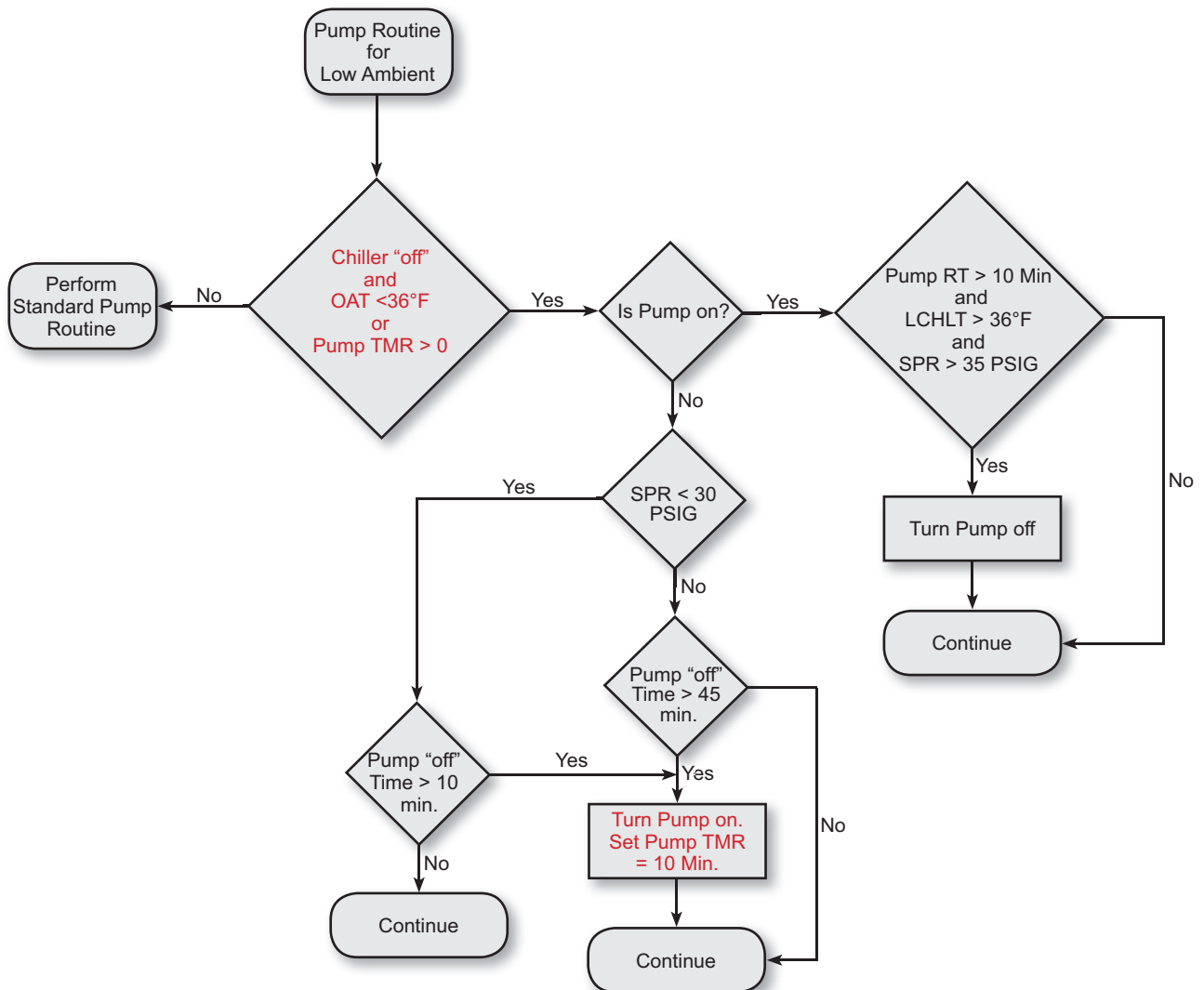


The only options that will fully protect the YVAA from freezing during subzero temperatures and a power failure are option 1 for winter operation, and options A and B for winter shutdowns. Only by adding glycol or completely draining the system can you ensure no evaporator damage in the event of a power failure.

Actuator Options:

Actuated Suction Service Valve Control - The Actuated SSV is controlled by ambient air temperature. When the ambient temperature drops below 40°F the Actuated SSV is commanded closed. When the temperature rises above 45°F or any system is running the Actuated SSV is commanded open. Power must be available in order for the Actuated Suction Service Valve to open or close. Both system Actuated SSV digital outputs are turned on (VALVE CLOSED) and off (VALVE OPEN) together, not independently. Open and closed commands are controlled by the relay within the SSV junction box. Power is always applied to the Normally Closed contact during commanded open operation. To close the Actuated SSV, power is applied to the relay coil within the SSV junction box to drive the actuator closed through the Normally Open contact. Pulling the Actuated SSV handle out will disengage all chiller controlled operation. The Actuated SSV handle should remain pushed in to ensure chiller control.

Unit Controlled Pumps - This evaporator pump control routine is designed to provide freeze protection to the chiller evaporator tubes when exposed to low ambient during the time the chiller is not running. The purpose of activating the evaporator pump in low ambient conditions is to bring the warmer building liquid temperature into the evaporator, thus preventing freeze and increasing suction pressure. See unit IOM for installation details



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ACTUATOR OPTION 1	
Chiller has no SSV	
Kit, Retrofit 5" SSV	492-26807-100
Kit, Retrofit 6" SSV	492-26807-200
Kit, Retrofit 5" and 6" SSV	492-26807-300
*each kit will be supplied with the following for one chiller: electric actuator installed on valve, wiring harness, electrical enclosure, all hardware	



FIGURE 1 - SUCTION SERVICE VALVE IDENTIFICATION