

Troubleshooting Guide – Compressor Runs; No Cooling

This situation could be the result of one of three main conditions:

- 1) System is low on refrigerant (undercharge/leak) or has an excess of refrigerant (overcharge).) For guidance see our fact sheet “Refrigerant R134a Charge Guidelines”.
- 2) Compressor is damaged and unable to achieve sufficient differential pressures. This is highly unlikely and not to be considered at this stage.
- 3) There is a blockage somewhere in the refrigerant circuit. This is possible. Frigoboat systems employ a capillary tube (cap tube) metering device to separate the high and low pressure sides of the system. This is a very small tube that looks like a piece of copper wire and has a micro-bore in the center through which the liquid refrigerant is forced by the high pressure from the compressor. When the refrigerant leaves the other end of the cap tube, which is at the entrance to the evaporator, it is exposed to the suction pressure of the system and boils (evaporates) rapidly inside the channels of the evaporator at very low temperatures. There are three possible types of cap tube blockage;
 - a) Dirt or debris blocking the orifice at the entrance to the cap tube and preventing liquid refrigerant entering.
 - b) Moisture (or wax) freezing and causing ice to form and block the exit of the cap tube at the evaporator.
 - c) Oil in the cap tube causing a hydraulic lock.

a) Dirt or Debris There is a mesh screen before the beginning of the cap tube on Frigoboat systems that is designed to trap particles that might otherwise clog the orifice at the beginning of the Cap Tube. If dirt somehow does get through or small particles coagulate into a larger mass, a blockage may occur. These blockages tend to be of an intermittent nature, and can happen days, weeks, even months apart, and often after a boisterous passage. Typically, the system will resort to normal operation after being deactivated for a time to let the pressure decrease, allowing the particle to unclog the orifice. Reworking the section of tubing containing the transition of liquid line to cap tube so that it is vertical, and then tapping gently with a screwdriver handle (or similar), may help to re-locate any debris to a location where it will not cause further blockages. (See NOTE A over). If the blockages re-occur, the remedy is to install a Cap Tube Filter (available from Coastal Climate Control, Inc. for professional installation), or replace the evaporator and install a Filter/Drier.

b) Moisture Frigoboat systems are supplied as components, with each part containing levels of moisture well within the acceptable limit. A Filter/Drier is not required on new installations. If an unacceptable level of moisture is in the system it would have been introduced through poor servicing techniques, or from being drawn in as air from a leak on the suction side of the system when in a vacuum. Heating the end of the cap tube at the evaporator with a hot, wet towel will melt an ice blockage and start the system working again, but the moisture will remain in the system and further freeze-ups are inevitable. (See NOTE B over). The system should be evacuated, any leaks repaired, a Filter/Drier installed, and the system recharged following the recommended procedure overleaf. Wax formation is a phenomenon that is little understood, and opinions differ even as to its very existence, but there is a Filter/Drier available from Coastal Climate Control, Inc. that is designed to remove wax as well as moisture and particulates.

c) Hydraulic Lock Under certain circumstances, an accumulation of some of the refrigerant oil that naturally circulates with the refrigerant can be forced back into the cap tube at the evaporator end and prevent refrigerant from flowing. This is most likely to occur in freezer systems that have seen continuous or near continuous trouble-free operation for several years and either; (a) after the evaporator is defrosted with a high temperature heat source (hair drier, heat gun), or (b) after the vessel has been left unattended and closed up in a hot environment. Applying heat to the coil of excess cap tube at the entrance to the evaporator will expand the cap tube and lower the viscosity of the oil enough for it to clear the cap tube and allow refrigerant to flow. (See NOTE B over). This is best done with a hot, wet rag or towel, and the process may require repeating several times before the system reverts to normal operation. Positioning the coil of excess cap tube horizontally may speed up the process and help prevent similar issues in the future.

Frigoboat refrigeration system showing Cap Tube details

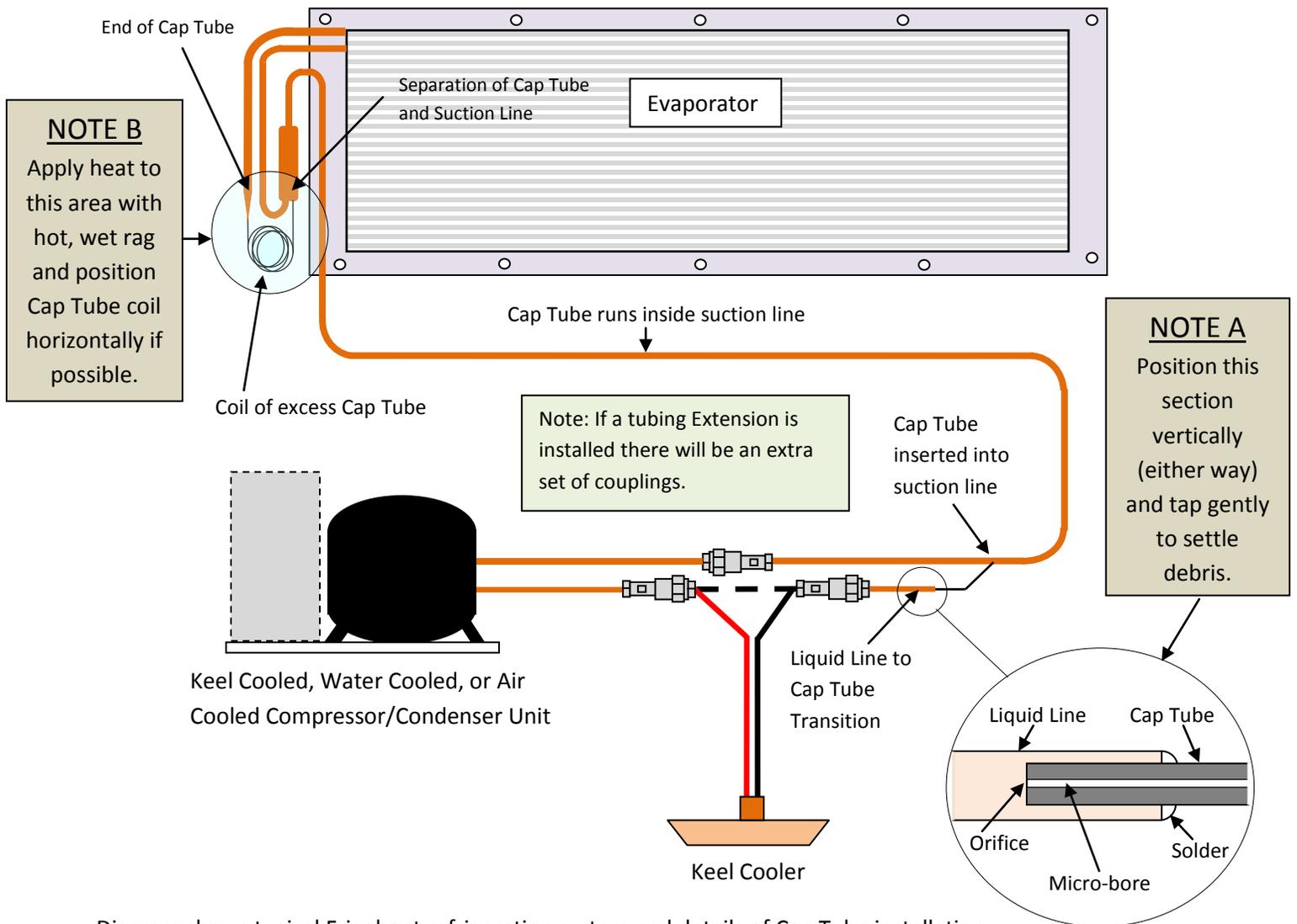


Diagram shows typical Frigoboat refrigeration system and details of Cap Tube installation. Evaporator shown is Flat (F) model, but instructions apply also to Bin (B) and Horizontal (H) models.

Recommended Procedure for Removing Moisture from System

1. Recover refrigerant
2. Evacuate system while applying heat to evaporator and tubing inside box
3. Run nitrogen through system
4. Repeat evacuation and heat process
5. Run nitrogen through system again
6. Add Filter/Drier, evacuate, and charge with refrigerant



Coastal Climate Control, Inc.

www.coastalclimatecontrol.com

info@coastalclimatecontrol.com

PO Box 4535 Annapolis MD 21403

301-352-5738