SEA FROST®

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SEA FROST
BAITFREEZER

110-VOLT AIR-WATER Twin Valve

Operation and Installation Instructions

Description: The SEA FROST Freezer system consists of several parts: The cold plates, refrigerant control valves, copper connecting lines, a solenoid valve panel, a receiver filter drier with sight glass, a compressor / condensing unit and thermostats.

Operation: With 110-volt power available and the thermostats in the "on" position (Toggle switch up.), the compressor and fan will operate. If a pump relay is installed or a separate pump is used water will flow as well. About 10 minutes after starting the compressor the area near the valves will begin to cool and frost. After several hours the cabinet temperatures will cool to well below freezing. When the boxes and contents cool to the desired setting on the thermostats the compressor and fan will cycle on and off periodically to maintain the set temperatures.

If cooling is not observed with the compressor and fan running, switch off the unit to avoid damaging it.

OPERATION INSPECTION

One plate in a two-plate box will cool first. Because it is first to freeze, all the moisture suspended in the air within the cabinet will condense and freeze at this plate. ***The amount of frost is not a good indication of proper operation.*** Check the temperature with a thermometer.

INSTALLATION INSTRUCTIONS

CONDENSING UNIT LOCATION AND MOUNTING

The SEA FROST Freezer condensing unit should be mounted with the compressor at the bottom parallel to the boat's water line at rest. Air is drawn through the unit and discharges at the fan screen on the upper left side. Cooling water from an air conditioning system manifold or separate pump may be connected to the water fittings on the left side. Using water-cooling is an option. The unit will operate on air only if needed. If the condensing unit is to be mounted in a confined area with little ventilation or a very hot engine room the water-cooling should be connected.

Service access and installation requires that the front and left end (inlet/outlet side) be exposed.

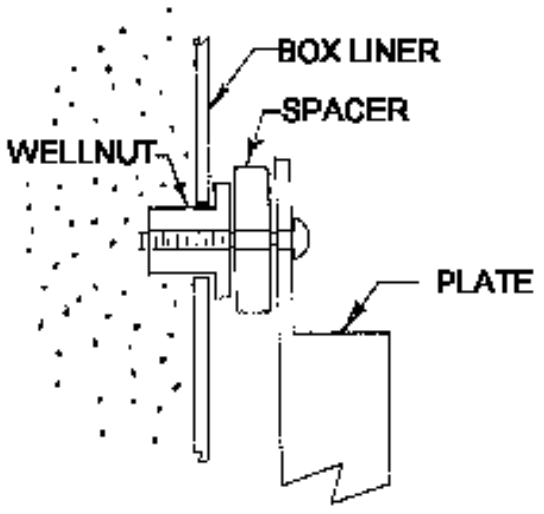
Mount the unit level with the compressor at the bottom. The unit may be bulkhead or platform mounted. Rubber wellnut inserts are installed on the bottom and back of the condensing unit to attach to brackets or shelving. The wellnuts require ¼-20 machine screws.

PUMP AND WATER HOOKUP

Water from the air-conditioning pump manifold can be plumbed into the SEA FROST condensing unit and triggered by the 110-volt supply labeled "Pump". A separate pump can be installed and wired to the 110-volt supply labeled "Pump". A flow of 2 to 3 GPM is sufficient. (Pump draw not to exceed 2.5 amps at 110-volts.)

EVAPORATOR PLATE INSTALATION

Mount the plates on opposite walls as high as possible to take advantage of thermal convection. Install the plates with the wellnuts, spacers and screws provided.

The SEA FROST plate mounts with a Wellnut expandable neoprene blind hole fastener. A template or the plate itself should be used to locate the mounting holes. Drill a 3/16" pilot hole. Increase this hole to 3/8". Install the screw into the plate through the spacer then tighten the screw in the Wellnut. Install the plate pushing the rubber mounts in to the pre-drilled holes. Tighten the screws.	

NOTES ON SWAGELOK FITTINGS

Swagelok fittings come to you assembled and ready for use.

Disassembly before use can result in dirt and foreign material getting into the fitting and causing leaks and you also risk damaging the threads if nuts are removed. If disassembly is necessary, reassemble per drawing.

This is a double ferrule system. The most serious installation problem encountered with SEA FROST is the mis-assembly of these fittings. Be sure that you assemble all fittings as in Drawing #1.

To ease assembly slacken the fitting nut slightly before assembly. Then retighten with fingers before tightening with a wrench. (This is to avoid cross threading.)

Step 1. Always leave two inches of straight, undistorted tubing leading to all Swagelok fittings to allow proper connection.

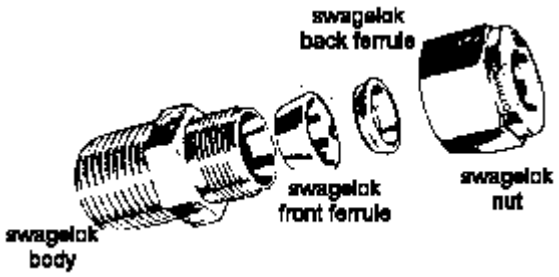
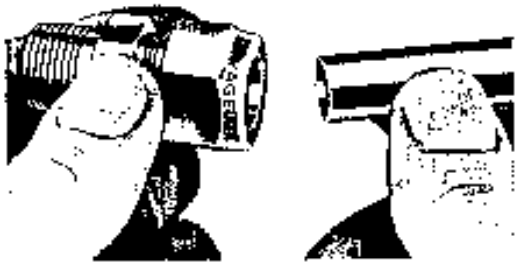
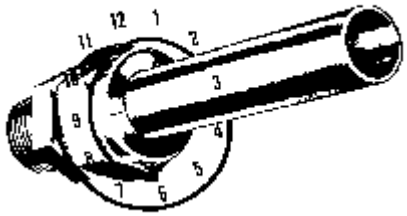
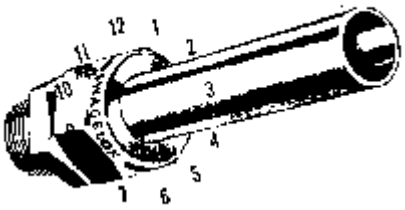
Step 2. Prior to inserting 3/8" tubing into the Swagelok tube fitting, make a pencil mark 3/4" from end of tube. Prior to inserting 5/16" tubing, make a pencil mark 5/8" from the end of the tube. With 1/4" tubing make a mark 5/8" from the end.

Step 3. Insert clean, smooth tubing with the pencil mark into the Swagelok tube fitting. You can be sure the tube is resting firmly on the shoulder of the fitting when the pencil mark is flush with the nut. This mark will also indicate that the tube has not moved before tightening. (As the fitting is tightened the space from the pencil mark to the nut will increase.)

Step 4. Tighten the Swagelok nut to a wrench snug* position. Scribe the nut with a pencil at the 6:00 o'clock position (see drawing #1, step # 2).

* Wrench snug is the first point in the assembly tightening when the tube cannot be pulled from the fitting, (i.e. when the ferrules tighten enough to contact the tubing).

Step 5. Now, while holding the fitting body with a back-up wrench, tighten the nut one-and-one-quarter turns (1-1/4). To do so, watch the scribe mark, make one complete revolution, and continue to the 9:00 o'clock position. (See drawing #1, step #3).

DRAWING 1	
	STEP 1 Simply insert the tubing into the SWAGELOK tube fitting. Make sure that the tubing rest firmly on the shoulder of the fitting and that the nut is wrench snug.
STEP 2 Before tightening the SWAGELOK nut, scribe the nut at the six o'clock position.	
	STEP 3 Now, while holding the fitting body steady with a backup wrench, tighten the nut 1 1/4 turns. Watch the scribe mark, make one complete revolution and continue to the 9 o'clock position. By scribing the nut at the 6 o'clock position as it appears to you, there will be no doubt as to the starting position. When tightened 1 1/4 turns to the 9 o'clock position you can easily see that the fitting has been properly installed.

SWAGELOK FITTINGS ARE TO BE TIGHTENED TO A TORQUE SPEC, NOT INFINITE TIGHTNESS. BE SURE YOUR STARTING POINT IS WRENCH SNUG. A DISTORTED TUBE MIGHT GIVE A FALSE STARTING POINT.

When making all connections, USE TWO WRENCHES. Don't allow the fittings to turn or twist when tightening.

RECONNECTING PRE-SWAGED FITTINGS

Connections can be disconnected and retightened many times.

To reconnect insert the tubing with pre-swaged ferrules into the fitting until the front ferrule seats in the fitting. Tighten the nut by hand. After tightening to wrench snug, rotate the nut about one-quarter turn with a wrench.

EXPANSION VALVES (TXV'S)

On each cabinet trim the tube ends on the plates as necessary. However, allow at least 1" of clean, straight tubing to insert into the fitting. Refer to the Swagelok installation instructions.

On multi plate hook ups, install the Model 40 valve to supply one of the 3/8" tubes from one of the plates. The valve may supply either plate first. Install a jumper between plates. Connecting the remaining tube on the first plate to either tube on the second plate. Connect a return line to the valve from the remaining tube.

RECEIVER FILTER DRIER (RFD)

The receiver filter drier contains desiccant to dehydrate and capture any moisture that could interfere with proper freezing operation. Do not unpack or install this part until everything else is connected and you are ready to evacuate, leak check and charge.

The RFD should be vertical with the fittings at the top. It will be supported by tubing. Plan to locate the RFD in a place where the sight glass can be inspected easily and viewed looking straight down.

RUNNING TUBING LINES

Do not remove the condensing unit caps or unpack the RFD until last. (Position the RFD so that the inlet connects to the compressor, the outlet connects to the solenoid. A bracket and strap are provided for mounting.)

Run a 1/4" copper line between the condensing unit area and the RFD then to the solenoid panel. Run a ¼" line from the solenoid panel to each Model 40 TXV.

Run 3/8” copper line from each valve to the 3/8” swagelok tee. Run a copper line from the center of the tee to the condensing unit. These 3/8” lines will be insulated as well as the Model 40 valves.

A drawing of the piping is attached.

After insulating the tubing support the tube every 18” (minimum) with mountable tie wraps and screws.

COPPER TUBING AND TUBE CAPS

Use only clean, dry refrigeration tubing. When working with the copper tubing be sure to keep each tube end capped after each cut on both the piece used and the coil, until the Swagelok connection is made. Make the connections to the compressor and RFD last. *Moisture and dirt in the tubing can ruin an installation.*

WARNING:

The BF unit is shipped pressurized with nitrogen. Before removing the caps on the connection ports remove the plastic caps on the service valve covers and depress the valves cores to vent any existing pressure.

COMPRESSOR CONNECTIONS

Working one line at a time, remove the Swagelok caps from compressor and condenser fittings. Attach the union fitting bodies. (This is a pre-swaged connection...See the Swagelok fittings text. Make up of these pre-swaged connections is 1/4 turn from wrench snug.

To connect the 1/4" line to the condenser fitting and 3/8" line to the compressor tighten these fittings 1-1/4 turns from wrench snug. (Refer to the Swagelok text.)

THERMOSTAT & WIRING

Ranco controls:

The thermostats are low voltage and connected and powered by the solenoid panel. Mount each thermostat in a convenient location where the sense probe will reach a mounting screw on a plate. It is necessary that the bulb of the sensor have good thermal contact with the plate. Attach the bulb to the plate using the stainless clip. Use one of the existing plate mounting screws as an attachment point.

WIRING THERMOSTATS TO THE SOLENOID PANEL

The thermostat electrical leads are low voltage for safety. A 15' red, white and blue harness is fitted. Use red white and blue 16-gauge wire to extend this harness if needed. Connect both white thermostat wires to the white terminal. Connect thermostat one to blue T1 and red T1 matching the colors. Connect thermostat two to blue T2 and red T2. Leave enough extra wire to allow the thermostat connections to be swapped if the zones are backward.

COMPRESSOR CONNECTION

Connect two wires from the CC (Red and Blue) connections on the solenoid panel to the terminal strip on the compressor. (These are marked T, T, T, use the red and blue only.)

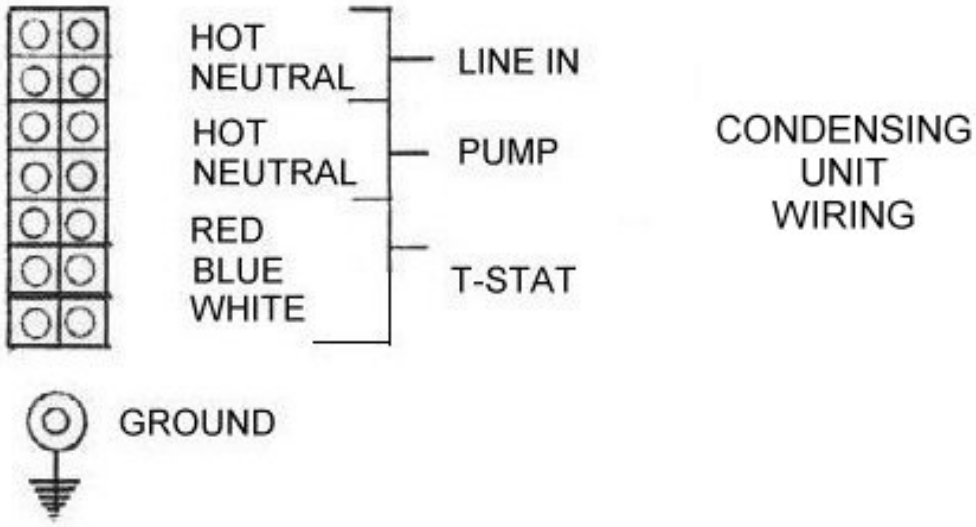
110-VOLT CIRCUIT

A separate 15-amp breaker is required for the 110-volt supply. The solenoid is provided with a 3 wire male plug but may be hard wired. The thermostats are powered by the solenoid*. It is necessary to have power to this solenoid at all times.*

COMMISSIONING

Attach clean, purged gauges to the suction service port on compressor. This is the capped tube stub on the compressor. It is not necessary to connect to the high-pressure port when starting a new system. This is provided to aid in fault diagnosis.

Pressurize with nitrogen or R-134a only*.*



Check for leaks

After checking for leaks, evacuate. Pump down to the best vacuum.

Charge

This system operates with refrigerant R-134a. The proper charge amount and maximum is 12 oz.

This may be liquid-fed into the low side after evacuation, before the compressor is operated.

READING THE SIGHT GLASS

A clear sight glass, when the compressor is operating, signifies a sufficiently charged system. To determine the meaning of "clear", notice the appearance of the RFD sight glass when the system is at rest with the compressor off. This is a "clear" glass.

SPECIAL WARNING: A clear sight glass can also indicate a completely EMPTY system. Anytime the compressor is started, white foam should appear in the sight glass indicating that the refrigerant is present. This foam may disappear quite quickly but, IF NO FOAM IS EVIDENT and the system is not cooling, the system is empty. DO NOT OPERATE THE SYSTEM in this empty condition. Operation in this mode will ruin the compressor. Turn off the main breaker to the control panel to prevent operation until the system can be properly leak tested and recharged.

Fast moving white foam with the compressor operating indicates an insufficient charge level. Watch closely for a transition from foam to total liquid, (indicated by a clear sight glass). This transition point can be missed if proper attention is not given. Also, IT IS POSSIBLE for the sight glass to show large bubbles even when the charge is sufficient, so it is important to differentiate between "foam" and "bubbles". The foam condition has velocity and direction; the bubbles are large, temporary, and nearly stationary. Do not try to chase away these larger bubbles with more refrigerant: overcharging will then occur. Air in the system may give a false sight glass reading, which could lead to overcharging. If in doubt, discharge a suspected overcharged system to continuous foam and slowly add refrigerant to clear the glass. MONITOR THE SIGHT GLASS CONTINUALLY since the glass will not indicate when the system is overcharged.

In a warm system, when the cabinet is above freezing (32.F) upon start-up, the sight glass may take several minutes to clear. A cold cabinet may show a clear glass within seconds of start-up.

RFD SIGHT GLASS DETAIL

CLEAR OR EMPTY	STATIONARY BUBBLES	FOAM (LOW CHARGE)
		

Troubleshooting note: The operating pressure of the system will not indicate the amount of refrigerant in the system.

THE THERMOSTATS

The electronic thermostats for safety operate on low voltage supplied by the solenoid panel. The plate temperature is displayed when the toggle switch is in the on position and 110-volt power is available. The cabinet temperature will be warmer than displayed temperature.

To refrigerate only one cabinet, the main power must be on and the unused box control turned to off.

The thermostat has been pre-set and locked at the factory. It is programmed in Fahrenheit, with a 5 degree differential and set for 0.

❖ To change the setting: Switch off the power. Remove the four cover screws and switch the small slide switch under the cover to unlock the keypad.

❖ Re-power the system.

❖ Pushing the “set” button will now scroll the display to show:

1) F for Fahrenheit.
2) S1 Set temp. (coldest setting.
3) Dif 1 Differential between off and on. (rising).
4) C1H1 (Ignore).

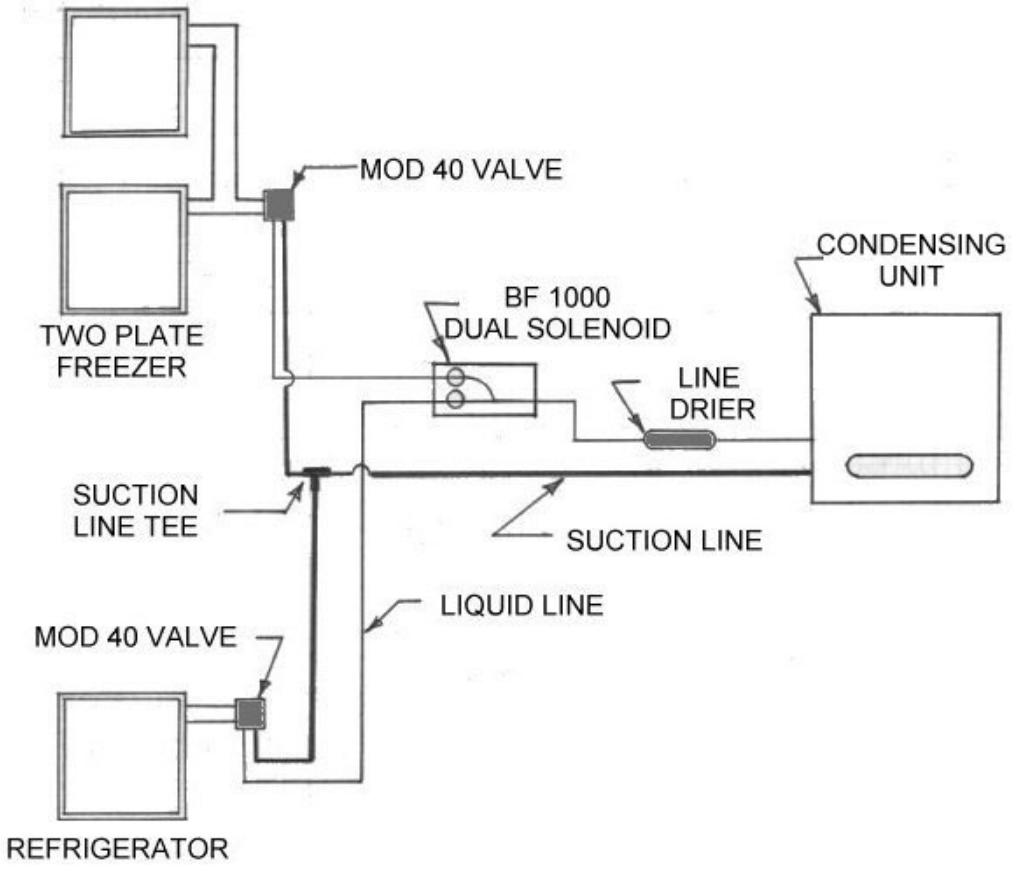
❖ You must push the “set” button through all steps to return to the temperature display to allow the compressor to operate.

To change the temperature press “set” twice displaying S1 blinking and a number. Push the “up” or “down” arrow key to change the number to the desired temp. Press the set key three times to return to the temperature display.

The memory is now set and will not change even if the power is turned off.

You may choose to reset the keypad lock.

TWIN VALVE TUBING



SOLENOID / THERMOSTAT TWIN VALVE WIRING