SEA FROST®

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ELECTRONIC THERMOSTAT AND THERMOMETER

- The Sea Frost ETT's (Electronic Thermostat/Thermometer) accurate operating settings and the programmable differential increases efficiency. In comparison, mechanical controls tend to over run the desired temperature range and must be set colder, running the compressor longer, to maintain the proper average temperature.

- The ETT is powered by low voltage and will operate any Sea Frost electric system, AC or DC.

- The ETT always shows cabinet temperature, displayed in Centigrade or Fahrenheit.

- Accurate numerical setting of operating temperatures and differential makes set up and temperature adjustment easy.

- Thermometer mode when operating dual systems.

- Wire leads allow mounting any distance from cabinet.

- Black faceplate with red L.E.D. operation indicators.
- Non-volatile memory, control will not lose settings.

The ETT is pre-wired with plug in connectors for the two 10' probes and 20' harness included. Custom lengths are available.

The left hand rocker switch turns on the display. The right hand switch activates the control relay. Red L.E.D.s indicate ON and RUN modes.

Faceplate size: 4 5/8" x 3-½" (120 mm x 90 mm). Requires 3" (76.20 mm) clearance behind the mounting panel. Weight 1 lb (.4 kilo).

Specify the voltage of the system to be controlled: 110 volts AC, 12 volts DC or 24 volts DC.

INSTALLATION AND OPERATION MANUAL

Operation

The Sea Frost Electronic Thermostat and Thermometer (ETT) is an electronic device using two probes installed in the refrigerated space. One probe is sensing the cabinet temperature, which is displayed. The other probe controls the compressor operation by measuring the temperature of a cold plate.

To operate the control, switch both rocker switches to the left position (off). Make sure power is available then push the left rocker switch to the right (on). The display will light and the temperature will be displayed. To switch on the compressor controlled by the ETT, switch the right switch to the on position. The run light indicates the compressor is operating. In addition, two orange indicator lights will light up on the control head. Number "1" to the left of the temperature display and "D" to the right. When the compressor cools to the pre-set cut out temperature the run indicator light, the "1" and the "D" will all go off with the compressor. The ON indicator light will remain lit indicating a standby or ready to run mode.

To display temperature only turn off the right ON/RUN switch. To turn off both the temperature readout and compressor the left switch may be used however when turning it back on the compressor will start immediately. All settings will always be saved.

CHECKING THE TEMPERATURE SETTING

Before adjusting the thermostat be sure the refrigeration system is working properly.

The ETT can be adjusted and will maintain very stable temperatures. Care must be taken to adjust the settings to maintain obtainable temperatures. Do not set below -10

F. (–23 degrees C.) Excessive power drain and compressor wear will occur with no benefit if the setting is below the temperature the compressor system can easily obtain.

Changing the Temperature ~ To lower or raise the box temperature

To change the cut out setting (cold stopping point) press and hold the SET button until the display shows ST1 then release. Press the SET button again until the display shows ST2. The display will show ST2 and then the current value of ST2. This is the cut out temperature. The factory setting is 20 degrees. Use the ↑ up and ↓ down arrows to change to desired temperature. Press SET to save and exit. The readout will return to operating display mode (box temperature). The cut out temperature is associated with the second probe (red banded plate probe). This probe read out temperature is hidden and can only be seen following instructions below.

Note: While changing ST2 a red wrench will light up on the display. This means you are in programming mode.

The cut out temperature is associated with the second probe (red banded plate probe). This probe read out temperature is hidden and can only be seen following instructions on the next page.

Plate Probe Temperature

- Press the ↓ arrow once (b1) alternating with the value is displayed.
- Then press the ↑ arrow once (b2) alternating with the value is displayed.
- To exit, press the ↓ arrow once to go back to (b1).
- Press and hold the SET button for 3-5 seconds.

To view the temperature of probe 2 (plate probe) Press the ↓ down arrow once. This displays probe 1 first (b1). It will alternate between (b1) and the value of (b1) box temperature. Press the ↑ arrow once to show (b2), the display will alternate between (b2) and the temperature of (b2), this is probe 2, the thermostat plate probe.

There are two ways to exit and go back to the operating display mode.

1. Wait about 1 minute until it times out on it's own and returns to operating mode.
2. Press the down arrow once to go back to (b1). Press and hold the SET button for 3-5 seconds until the display temperature appears and stops flashing.

Note: Six different parameters can be viewed by pressing the ↓ down arrow button.

b1: probe 1	di1: digital input 1 – not used	st1: set point 1 - not used
b2: probe 2	di2: digital input 2 – not used	st2: set point 2

This is for viewing these parameters only no changes can be made.

Important: If you press and hold the SET button while still viewing (b2) or any other parameter, that parameter will be displayed on exit. Make sure you go back to b1 before holding the SET button to save and exit.

Recommended Settings

The air temperature in a refrigerator is always 10 to 15 degrees F. (6 to 9 C.) warmer than the cooling device. This difference in temperature must be remembered when setting the control cut out temperature (stopping point). A refrigerator might have to be set to run up to 20 degrees colder than the desired box temperature.

Make several small setting changes over a period of several days to determine the proper setting.

The Differential Setting (p2)

The differential is the number of degrees the temperature must rise before the compressor will come back on after cooling to the set point. The factory test setting is 6 degrees F. (4.5 C.) To change the differential setting press and hold PRG until P1 is displayed, then press the up ↑ arrow to display P2. Press SET. Use the up ↑ and down ↓ arrows to change to desired degrees of differential. Press SET again, this will bring you back to P2. Hold the PRG button for 3-5 seconds to save changes and exit. Normal operation and box temperature will now be displayed.

- Press and hold PRG until P1 is displayed. (Not used)
- Press the up ↑ arrow to display P2.
- Use the ↑ and ↓ arrows to change P2 to desired degrees of differential.
- Press SET again, this will bring you back to P2.
- Hold the PRG button for 3-5 seconds to save changes and exit.

Note: While changing P2 a red wrench will light up on the display. This means you are in programming mode.

Readout Changes (c18) ~ Fahrenheit to Centigrade

- Press and hold both PRG and SET for 5 seconds until 0 is displayed.
- Press ↑ arrow to navigate to #77. This is the password.
- Press SET.
- Press ↑ arrow to scroll to C-18.
- Press SET.
- Using the arrows keys to select either 0 for centigrade or 1 for Fahrenheit.
- Press SET to return to C-18.
- Hold the PRG button for 3-5 seconds to save changes and exit.

Note: While changing C-18 a red wrench will light up on the display. This means you are in programming mode.

WARNING: When changing temperature measurement units the cutoff setting (ST2) and the differential setting (P2) must be changed to represent the proper units.

INSTALLING THE ETT

The ETT can be located anywhere as long as it is protected from water and spray. The leads to the probes may be extended if the connections are soldered and sealed with heat shrink.

The ETT requires a 3 5/8" x 2 ¾" (91 mm x 70 mm) panel cut out. The minimum depth is 3" (76.20 mm).

Wire Routing

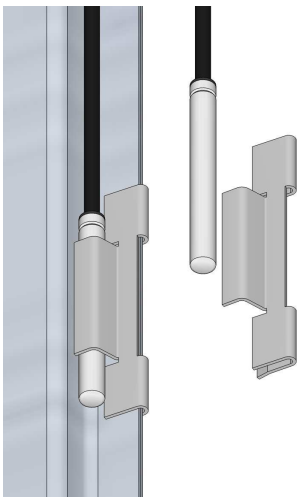
The gray 4-wire cable connects at the compressor. The two black probe wires must enter the refrigerated space.

Wiring Connections

The harness and the probes plug into the head unit and are polarized. NOTE: One probe has red bands and should connect to the head unit plug with the red band. The probe with the red bands must be routed to attach to the cold plate. If you need to disconnect the plugs, do not pull on the wires. See special instructions for series plates and twin valve systems.

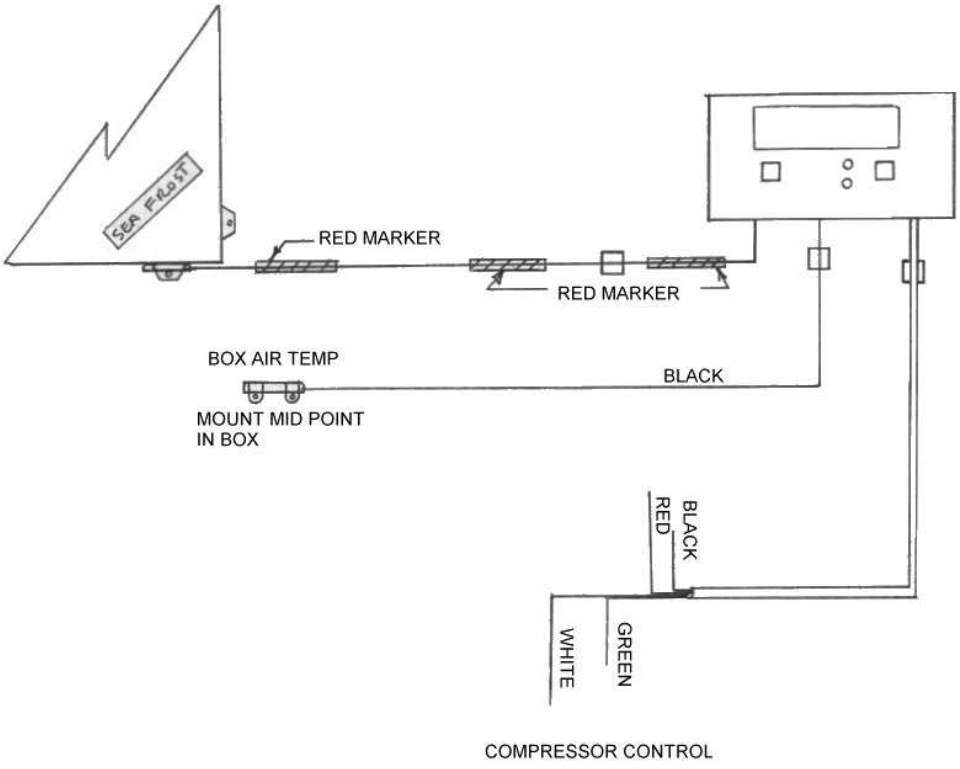
PROBE ATTACHMENT – EVAPORATOR PLATES

The probe with red bands must be in excellent thermal contact with the cold plate. Use the stainless steel clip provided, and attach it to the edge of the plate as shown in the drawing to the right.



The probe without a red band should be installed at the mid point of the cabinet to get an accurate reading of the average temperature. Avoid installing this probe near a front opening door or too close to a cold plate. Mount the probe bulb with two nylon straps or self stick pads and tie wraps provided. Do not drill and screw into a vacuum panel box!

Secure the wires neatly using cable ties, self-stick pads, and proper yacht wiring practices.



COMPRESSOR CONTROL WIRING HOOKUP

AC Units – BG 1000 and Shore Assist Systems

Connect the white and green wires from the ETT gray cable to the two red wires coming from the (CC) condensing unit.

12/24-Volt BD and Tradewinds

Connect the white and green wires from the ETT gray cable to the end of the yellow harness. There is no polarity.

12/24-Volt BDXP and Tradewinds XP

Connect the white and green wires from the ETT gray cable to terminals T and C on the module. There is no polarity.

12/24-Volt DC 5000

Connect the white and green wires from the ETT gray cable to T1 and T1 in the solenoid junction box.

DC 5000 Twin Valve Systems

When connecting to a dual solenoid a second ETT is required. One green and white pair is connected to T1 and T1 and the second green and white pair is connected to T2 and T2.

ETT POWER INPUT

12/24-Volt DC5000

Connect the black wire with a 3/8" ring terminal to the negative supply grounding stud. Connect the red wire with a #8 ring terminal to the positive supply at the power solenoid. The red wire must be fused. (2 amps) On twin valve systems, two ETTs must be connected to the DC 5000 solenoid panel. Connect the red wires from the ETT to terminal L with a 2-amp fuse. Connect the black wires to B-.

AC Units – BG 1000 and Shore Assist Systems

Wire the red and black wires from ETT gray cable to 12-volt DC power using a 2-amp fuse. In order to maintain the temperature readouts when compressor is not running the ETT needs to be wired to 12 or 24 volts DC.

12/24-Volt BD and Tradewinds

See electrical connections in the compressor unit manual.

Crimp the red and black wires from the power source to the 12-10 gauge yellow piggyback terminals. Crimp a female 22-18 (red) terminal to the red and black wires from the ETT gray cable. Be sure to fuse the red wire with a 2-amp fuse. Slide onto the yellow 12-10 gauge piggyback terminals. Attach these to the positive and negative terminals of the compressor module. **Observe polarity, red is positive and black is negative.**

CLEANING

Do not use acetone or any solvent on the control panel, clean with a damp cloth and mild detergent.

PROBE ATTACHEMENT - HOLDOVER PLATE