

Troubleshooting Antenna Ice Buildup

Precautions:

WARNING

Troubleshooting should be performed only by personnel experienced in RF systems, qualified in electric work, and familiar with this equipment.

The broadcast industry has recently recognized the potential medical hazards of intense radio frequency radiation. Don't expose personnel to personal harm. For reference, see CFR 29, Section 1910.97, the OSHA standard for exposure to non-ionizing radiation. Whenever a rigger is on the tower in the area of the antenna, shut off the transmitter and lock it off so that it cannot be turned on accidentally.

Lockout-tagout:

WARNING

Before exposing yourself to electric components, **PLEASE** disconnect power remotely from the de-icer system and lock and tag the disconnect to prevent its being turned on again while you're working. If the power must be kept on for troubleshooting, be very careful, and secure it again immediately when troubleshooting is complete.

Troubleshooting diagrams:

The de-icer system consists of the heating elements in the bays, their branch cables, and the main harness. The main harness consists of a bay junction box for each antenna bay, interbay cables, and a "pigtail" of wires extending about 10 feet (3 meters) which you will connect to the tower junction box you are to provide.

Your system may also include specially-ordered items, such as a ground-mounted main control box, a power cable extending up the tower, or a tower-mounted thermostat.

NOTES

Customer-supplied items are shown in broken lines.

A liquid-tight conduit connector (3/8" conduit size by 1/2" hub size) for the harness entry to the tower junction box, is packed loose with the de-icer harness.

Symptoms:

Your first clue to ice buildup may be a rise in antenna VSWR or a change in signal coverage, which may or may not be caused by ice buildup on the antenna (see your antenna manual for troubleshooting of other problems).

Ice buildup may occur in several ways:

- The de-icers may not have been on when rime ice buildup began.

NOTE:

Deicers are designed to prevent rime ice from forming on antenna elements. They are not designed to melt ice that has already formed.

Deicers should be operated any time potential icing conditions exist.

NOTE:

Keep in mind that the temperature at the antenna may vary significantly from the temperature at ground level.

- Rime ice may be accumulating faster than the deicers can stop it.

De-icers are generally able to prevent about 1/4 inch (0.6 cm) of rime ice per hour. In unusual circumstances, rime ice can build up much faster than that.

There's not much you can do about extreme ice buildup, although if it occurs frequently, you might want to think about installing radomes.

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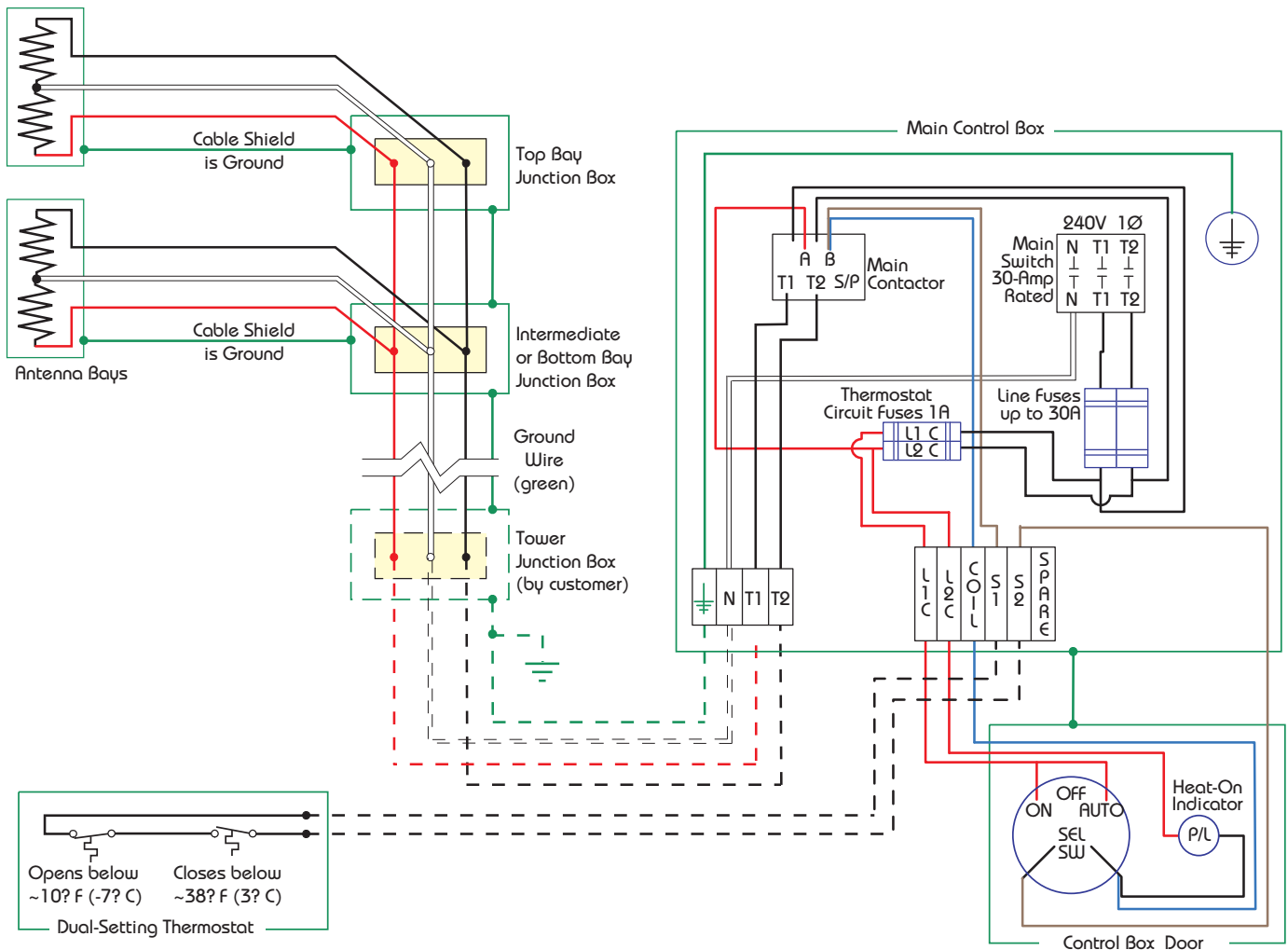


Figure 1. Schematic diagram of the overall de-icer system

- The deicers may have failed.

The de-icers are a simple resistive electric circuit (schematic diagram). They will be connected to some kind of control system, probably with a thermostat to save electricity during warm weather.

Though generally dependable, such a system can fail from a number of causes.

De-icer failure may be due to:

- Loss of heater input power

Check to be sure the whole system is getting power.

- Burnt-out fuse.

- a. Lockout-tagout.
- b. Remove the fuses from their fuse holders.
- c. Using an ohmmeter, test each fuse for continuity.
- d. Replace any burned-out fuses.

- Lightning damage

- a. Lockout-tagout.
- b. Inspect the entire antenna system for signs of lightning damage.
- c. If lightning damage is found, test the de-icer system for burnt fuses, burnt wires, and heater failure and correct as appropriate.

- Thermostat failure

- a. Lockout-tagout.
- b. Check for continuity at the locations indicated as S1 and S2 on the schematic, (schematic diagram).

- c. Check the temperature at the thermostat location (not at the control box location) and use Table 1 of "Installing the Shively Labs Model 94068 Dual-Setting Thermostat" to check thermostat performance.
- d. If the thermostat does not perform as described, replace it.
- **Moisture in junction box.**
 - a. Lockout-tagout.
 - b. Check each junction box for signs of moisture or water damage.
 - c. If water damage is found, clean and dry the components and inspect them for arcing or excessive corrosion.
 - d. Make sure the box is mounted right-side-up. Correct if necessary.
 - e. Carefully re-seal the junction box to prevent recurrence.
- **Loose wiring connections**
 - a. Lockout-tagout.
 - b. Check all wiring connections for tightness and signs of arcing or other damage.
- **Heater or wiring burnout**
 - a. Lockout-tagout.
 - b. First, check all wiring for loose connections.
 - c. Then, test each circuit for proper resistance. Tables in "Sizing of De-Icer Control Box and Wiring" show approximate heater leg resistances and current draws, respectively, for various models and configurations.
 - d. Alternatively, without locking and tagging out, test the heater legs for current draw.