# Deicers sold prior to May 2006: Installation and Operation

## Before beginning de-Icer installation:

#### **CAUTION**

It is YOUR responsibility to ensure that your installation meets all applicable electrical codes. We recommend that the installation be reviewed by a qualified electrician before you apply power.

All parts of the de-icer system within about 20 feet (6 meters) of any radiator must be shielded from RF energy, and the entire outdoor portion of the system must be made waterproof.

Note that unless an exterior box has been ordered specially, a de-icer control box purchased from Shively Labs is designed for interior installation only.

To prevent electrical short-circuiting, secure all cables to minimize wind-induced motion and chafing against edges of system or tower components.

It is important that you ground both the tower junction box and the control box.

When testing the thermostat in step 10, be sure to disconnect one or both thermostat leads before taking resistance readings. Otherwise, readings may be affected by other components.

The resistance readings in tables 3 through 6 are for the Shively-supplied portion of the systems only, and do not take into account any long run of cable to the tower and up to the antenna.

An improperly installed de-icer can overheat and damage your antenna.

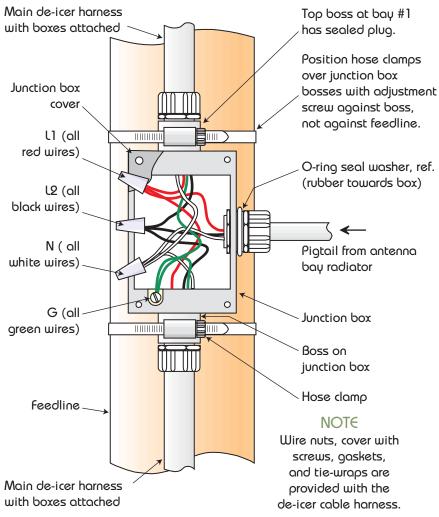


Figure 1. Bay junction box installation

## Installation procedure:

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 control box, a power cable extending up the tower, or a tower-mounted thermostat.

The de-icer system requires 220 VAC, 50 - 60 Hz., single-phase. Table 5 shows approximate current draws for various configurations.

### Install the de-icer system as follows:

- a. Install the main de-icer harness with its bay junction boxes as shown in the installation drawing and Figures 1 and 2.
- b. (Center-fed antenna only) You may find that the feedline mounts are in the way when mounting the bottom-most bay junction box. If necessary, using hose clamps, secure the bay junction box to the mounting bar provided, then secure the mounting bar to the feedline section. See Figure 3.
- c. Connect the leads from each bay deicer to the main harness in that bay's junction box as shown in Figure 1.
  Secure any slack in these cables to the feedline with tie-wraps to avoid wind damage.
- d. Furnish a tower junction box as shown in Figure 4.
- e. Using tie-wraps, secure the entire length of the de-icer harness to the RF feedline at about 24" (60 cm) intervals. Run the ten-foot pigtail along a feedline mount to the tower junction box and secure it to the mount and the tower.
- e. Furnish a main control box as shown in figure 5.
- f. You may locate the thermostat, if applicable, at your discretion. We recommend mounting it as closely as practical to the antenna.
- g. Wire the thermostat and the main control box as shown in Figure 5.
- Run a power cable from the control box in the building to the tower junction box and connect it to the de-icer harness pigtail(s) in the tower junction box.
- After installation is complete, measure the resistance from each heater leg to ground to ensure that there are no short-circuits. Resistance should be infinite.
- j. Measure the resistance across the thermostat circuit and from it to ground in the same way. Test at the location shown in Figure 5. Be sure to disconnect one or both thermostat leads before

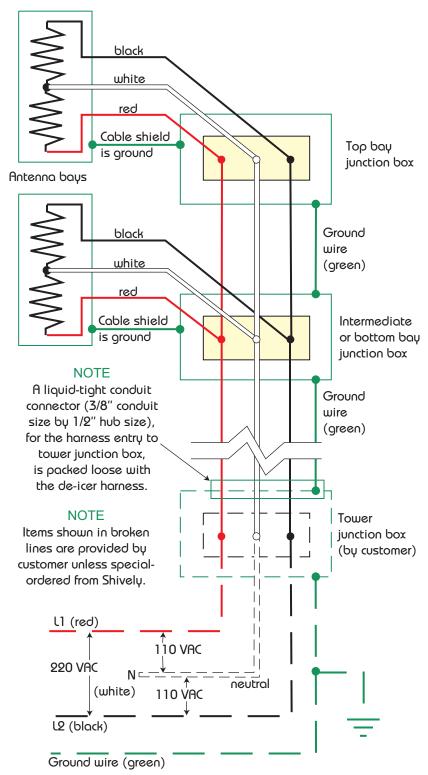


Figure 2. System electrical schematic diagram

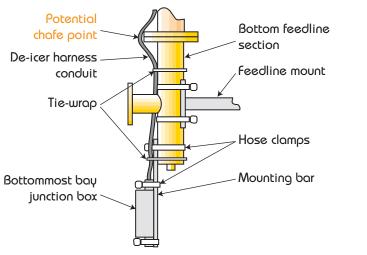
- nect one or both thermostat leads before taking resistance readings.
- k. Thermostat readings should be as shown in Table 1 (single thermostat) or Table 2 (tandem thermostat).
- I. Measure the resistance across each heater leg. Be sure to add in the resistance of any long cable runs from the control box to the antenna. Compare readings against Table 3.
- m. Turn the de-icer on by switching it to Manual, and measure its current draw with an ammeter. Compare this reading with Table 4.
- n. Record the resistance and current readings in your maintenance log for future reference in troubleshooting the deicer system.

Table 1. Single thermostat readings

Reading Location	Ambient Temperature	Resistance = 0 ohms (short circuit)	Resistance = infinite ohms (open circuit)
leg-to-Ground	Αηγ	Defective thermostat or shorted leads	OK
leg-to-leg	Above about 38° F (3.3° C)	Defective thermostat or shorted leads	OK
11 9 10 10 9	Below about 38° F (3.3° C)	OK	Defective thermostat or broken leads

Table 2. Tandem thermostat readings

Reading Location	Ambient Temperature	Resistance = 0 ohms (short circuit)	Resistance = infinite ohms (open circuit)
leg-to-Ground	Αηψ	Defective thermostat or shorted leads	OK
	Above about 38° F (3.3° C)	Defective thermostat or shorted leads	OK
leg-to-leg	Between about 10° and about 38° F (-6.7° to 3.3° C)	OK	Defective thermostat or broken leads
	Below about 10° F (-6.7° C)	Defective thermostat or shorted leads	OK



(for center-fed antennas only)
Figure 3. Mounting of bottommost bay
junction box

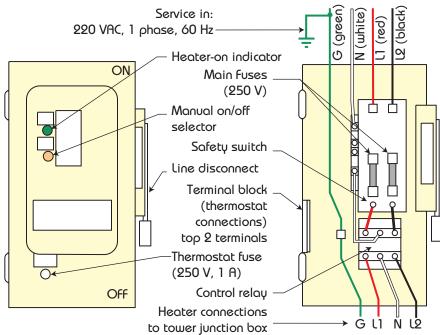


Figure 4. Tower junction box layout

Table 3. Heater resistance, ohms

Model	6600	6602 or 6602B	6810	6812 or 6812B	6813	6814
1-βαγ	60	182	56	182	100	60
2-вау	30	91	28	91	50	30
3-вау	20	61	18.6	61	33	20
4-Вау	15	45	14	45	25	15
5-Вау	12	36	11	36	20	12
6-Вау	10	30	9.3	30	17	10
7-Вау	8.6	26	8	26	14	8.6
8-Bay, single circuit	7.5	23	7	23	12.5	n/a
8-Bay, each of two circuits	n/a	n/a	n/a	n/a	n/a	15
10-Bay, single circuit	6	18	n/a	18	10	n/a
10-Bay, each of two circuits	n/a	n/a	11	n/a	n/a	12
12-Bay, single circuit	5	15	n/a	15	8.3	n/a
12-вау, each of two circuits	n/a	n/a	9.3	n/a	n/a	10
14-Bay, single circuit	n/a	13	n/a	13	7	n/a
14-Bay, each of two circuits	8.6	n/a	8	n/a	n/a	8.6
16-Bay, single circuit	n/a	11.4	n/a	11.4	n/a	n/a
16-Bay, each of two circuits	7.5	n/a	7	n/a	12.5	n/a
16-Bay, each of four circuits	n/a	n/a	n/a	n/a	n/a	15

Table 4. Heater leg current draw (L1 or L2), amps

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Model	6600	6602 or 6602B	6810	6812 or 6812B	6813	6814
1-вау	1.5	0.75	2.2	0.75	1.3	2.8
2-вау	3.0	1.5	4.4	1.5	2.6	5.6
3-вау	4.5	2.25	6.6	2.25	3.9	8.4
4-вау	6.0	3.0	8.8	3.0	5.2	11.2
5-ваү	7.5	3.75	11.0	3.75	6.5	14.0
6-Вау	9.0	4.5	13.2	4.5	7.8	16.8
7-Вау	10.5	5.25	15.4	5.25	9.1	19.6
8-Bay, single circuit	12.0	6.0	17.6	6.0	10.4	n/a
8-Bay, each of two circuits	n/a	n/a	n/a	n/a	n/a	11.2
10-Bay, single circuit	15.0	7.5	n/a	7.5	13.0	n/a
10-Bay, each of two circuits	n/a	n/a	11	n/a	n/a	14.0
12-Bay, single circuit	18.0	9.0	n/a	9.0	15.6	n/a
12-Bay, each of two circuits	n/a	n/a	9.3	n/a	n/a	16.8
14-Bay, single circuit	n/a	10.5	n/a	10.5	18.2	n/a
14-Bay, each of two circuits	10.5	n/a	8.0	n/a	n/a	19.6
16-Bay, single circuit	n/a	12.0	n/a	12.0	n/a	n/a
16-Bay, each of two circuits	12.0	n/a	7.0	n/a	10.4	n/a
16-Bay, each of four circuits	n/a	n/a	n/a	n/a	n/a	11.2

### Operation:

#### **WARNING**

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.

#### **CAUTION**

Never operate the antenna system without proper purging and constant positive dry gas pressure. Shively labs will not accept responsibility for antenna failure after operation without proper purging or positive pressure of dry air or dry nitrogen.

Don't leave the de-icer on for extended periods when the weather is above  $60^{\circ}$  f  $(16^{\circ}$  C); it may overheat and be damaged.

# Operating the De-Icer System:

There is a generous margin of safety built into the de-icer system, and operation for prolonged periods below 60° F (16° C) will do no harm. If icing conditions are expected, the heaters should be turned on ahead of time as a preventive measure. It is much easier to prevent ice formation than

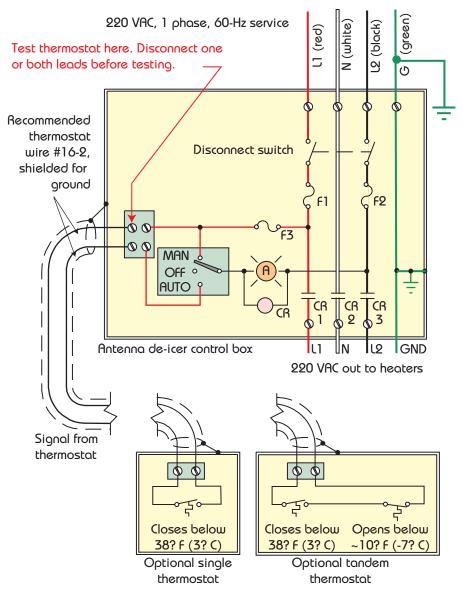


Figure 5. Main control box electrical schematic

to remove a heavy coating. Thermostatic control systems which sense temperature conducive to ice formation are highly desirable and are available from Shively Labs upon request.

If you have the Shively Labs de-icer control box, you have the choice of manual or automatic operation. There are three switch settings: AUTOMATIC, Off, and MANUAL. When the switch is set to AUTOMATIC, the thermostat turns the heaters on and off according to the temperature.

When the switch is set to Off, the thermostat is overridden and the heaters will stay off no matter what the temperature

When the switch is set to MANUAL, the thermostat is overridden and the heaters will stay on no matter what the temperature.

The rate of ice removal will vary greatly with temperature, wind speed, and type of ice. As a guide, the de-icers will remove 1/4 inch (6 mm) of clear ice at  $32^{\circ}$  f (0° C) in still air in about 15 minutes.