

HAMTRONICS® OV-1 CRYSTAL OVEN: INSTALLATION INSTRUCTIONS

FUNCTIONAL DESCRIPTION.

The OV-1 is a solid-state, proportionally-controlled crystal oven designed to maintain an HC-25/u oscillator crystal at 60°C (140°F). It draws 10 to 500 mA of current at 13.6 Vdc, depending on environmental temperature and air flow. Normally, it draws full power for 10-15 seconds when first activated, and then it idles until additional heating cycles are required to maintain the temperature of the crystal.

With the OV-1 installed over a crystal, ± 2 PPM frequency stability can be expected in a Hamtronics® transmitter or receiver if used with crystals we supply or with similar high-quality commercial-grade crystals. Special oven type crystals are not required because the operating temperature is lower than for most ovens, while still higher than normal ambient temperature so good stability results. The ± 2 PPM stability can be realized over a temperature range of -30 to +60°C (-22 to +140°F). 2 PPM is equivalent to ± 300 Hz at 150 MHz or ± 900 Hz at 450 MHz. Of course, over a narrower temperature range, the stability can be expected to be even better.

INSTALLATION.

Refer to diagram below. The OV-1 Oven merely slips over the top of an HC-25/u crystal. The positive lead must be connected to +13.6Vdc (± 1 Vdc) and the negative lead to the ground plane on the board. The positive lead is the clockwise-most pin when viewed from the top.

Space has been provided for an oven on our TA51, TA451, and TA901 Exciters and on the R144, R220, R451, and R901 Receivers. Note that the oven has three leads, and the center lead is provided only for mechanical stability and polarity protection.

Since earlier models of the OV-1 oven had only two leads, older exciters and receivers have only two holes on the board. In such a case, the center lead can be cut off, or better, bent over and tack soldered to the ground plane on the top of the board.

The crystal is inserted into sockets on the board. The oven is installed on the board over the crystal, observing polarity by matching the 3-lead pattern to the holes in the board. Then, the pins of the oven are soldered to the board.

For other equipment not specifically designed to accommodate the oven, some improvisation is needed. The oven must have sufficient clearance from surrounding components to be able to seat fully on the crystal. The negative lead is soldered to the pc board ground plane, and the positive lead usually requires an extension wire to reach a convenient source of +13.6Vdc, usually at the B+ input terminal on the board. Be sure not to key the oven power when used on a transmitter. Although the transmitter power is turned off in receive, the oven power must remain on.

TROUBLESHOOTING.

The crystal oven contains a heating element which is thermally coupled to the shell surrounding the crystal. It is powered by a transistor which has a thermistor sensor to detect temperature. There are no moving parts -- no make/break contacts to wear out. Because the oven is solid state, it is necessary to observe polarity and protect from excessive voltage and transients to avoid damage. The oven should feel slightly warm to the touch (not hot).

