LAFAYETTE

HE-89

2-METER AND 6 METER VARIABLE FREQUENCY OSCILLATOR

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OPERATING MANUAL

TECHNICAL SPECIFICATIONS

FREQUENCY COVERAGE	6-meter Band: 50.0 — 54.0 Mc 2-meter Band: 144 — 148 Mc
FUNDAMENTAL OSCILLATOR FREQ.	8.0 Mc — 9.0 Mc
OUTPUT FREQUENCY	8.0 Mc — 9.0 Mc
OUTPUT VOLTAGE	10 — 20 volts RMS (approx.)
OUTPUT IMPEDANCE	High Impedance (10 K ohms)
TUBE COMPLEMENT	V1 6BA6 Series-tuned Clapp Oscillator V2 VR105MT/OB2 Voltage Regulator
POWER SOURCE	117 volts 50 — 60 cps AC
POWER CONSUMPTION	10 watts
DIMENSIONS	4½" H. × 6¼" W. × 4" D.
WEIGHT (Net)	4½ lbs.

GENERAL DESCRIPTION

The HE-89 is a rugged Variable Frequency Oscillator designed for dependable, stable operation on 2-meter and 6-meter bands, with sufficient output to drive any multi-stage transmitter or transceiver of modern design. It is intended for use with crystal-controlled transmitters or transceivers presently operating on the 6 or 2 meter amateur bands.

For high electrical stability, the VFO employs a series-tuned Clapp oscillator whose fundamental tuning range is 8 to 9 Mc. This range of frequencies is available at the VFO output and is used to provide suitable frequencies for both 2 and 6 meter bands, as shown below.

8.333 — 9.00 Mc for the 6 meter band
8.00 — 8.222 Mc for the 2 meter band

A transformer-operated power supply uses a low-heat silicon rectifier in a half-wave circuit with good filtering. A voltage regulator tube maintains stability by eliminating any effect on the oscillator due to line voltage variations. Rigid mechanical construction has been used throughout. All frequency-determining components have been carefully isolated from heat-producing elements in the circuit. These factors contribute significantly to the electrical and mechanical stability of the unit.

The HE-89 will be compatible with most crystal-controlled transmitters or transceivers which have a VFO input and which offer the necessary multiplication as indicated below. Any questions regarding the compatibility of this VFO with units that do not have a VFO input should be directed to the transmitter manufacturer, who is best qualified to give such information.

Amateur Band	VFO Output Frequency	Multiplication Required by Trans.	Transmitter RF Output
6 meters	8.333 — 9.0 Mc	X6	50.00 — 54.00 Mc
2 meters	8.00 — 8.222 Mc	X18	144.00 — 148.00 Mc

INSTALLATION

POWER

The VFO operates from 105 — 120 volts, 50 — 60 cycles AC. Do not use any other power source.

LOCATION

Install the VFO as close to the transmitter as possible. Avoid very warm locations and allow at least two inches between the rear of the VFO and a wall.

OUTPUT CONNECTION

The VFO has been supplied with a 24 inch length of low-loss coaxial cable which is equipped with a coaxial connector at one end (this end attaches to the VFO output). The other end of the cable should be terminated with a suitable plug for the VFO input receptacle on your transmitter or transceiver.

NOTE: The type of plug used for the VFO input will depend on the receptacle available on the transmitter. Generally, an RCA-type phono jack or ½" crystal socket will be used. An RCA-type phono plug will be needed for the former socket. A suitable plug for the ½" crystal socket is a universal twin lead connector available under Lafayette stock number TS-329. This connector is required in the case of the HE-45 (series) transceiver.

REMOTE SWITCHING

The Remote socket at the rear of the VFO has been wired across the "Send" contacts of the Function switch. In the VFO's present condition, B+ voltages will be applied when the Function switch is manually set to the "Send" position.

However, the Remote socket (and 2-pin plug supplied) may be used to permit simultaneous control of the VFO with a transmitter switching device so that VFO will be operative when the transmitter is switched to its operating position. For remote operation of this type, connect the contacts of the external switching device to the small 2-pin plug as indicated in the illustration, using 2-conductor wire. When the plug is attached, insert it into the REMOTE socket. The Function switch is now set to the "Stand By" position, voltage being applied only to the tube heater and pilot lamp. When the external switch contacts are closed, B+ voltages will be applied to the VFO, automatically, even though the Function switch is set at the "Stand By" position. This arrangement thus allow the Stand By-Send switching to be carried out remotely.

DIAL CALIBRATIONS

The dial is calibrated to indicate the RF carrier of the transmitter for 2 meters and 6 meters. Also provided are calibrations showing the actual VFO output frequency (8-9 Mc) for both bands.

OPERATING INSTRUCTIONS

1. Set the VFO Function switch to STAND BY. This applies heater and pilot lamp voltages.

2. Place the transmitter or transceiver in the standby position. On transceivers, this will normally be the "receive" mode. Allow all units to reach operating temperature (usually 15 — 20 minutes).

3. Tune the VFO to the desired transmitting frequency as indicated on the outer calibrations of the dial. The transmitter multiplication necessary to produce this RF carrier output is as follows:

Amateur Band	Multiplication Required By The Transmitter
2 meters	X18
6 meters	X6

4. Set the transmitter to the desired band, either 2 or 6 meters, and make sure the VFO input is selected.

5. Set the VFO to SEND. If the VFO has been arranged to operate simultaneously with the transmitter switching (see "Remote Switching"), the Function switch may be left in the "Stand By" position.

6. Switch the transmitter to its operating position and follow the manufacturer's recommended tuning procedure.

VFO ADJUSTMENTS

The HE-89 was calibrated at the factory before shipment. However, with prolonged use or after servicing, it may become necessary to readjust to VFO for accurate calibration.

There are only two adjustments on the HE-89. One is an adjustment for maximum output (Output ADJ) and the other is an adjustment for frequency calibration (CAL). Both are located at the rear of the VFO. Tools and equipment required are as follows:

A. A communications receiver capable of tuning 8.5 Mc and equipped with a 100 Kc crystal calibrator.

B. A small screwdriver for adjustments.

1. The receiver antenna should be loosely coupled to the VFO output cable — just sufficient to produce a moderate reading on the receiver's "S" meter.

CALIBRATION

2. Rotate the tuning control on the VFO (counter-clockwise) until the tuning capacitor plates are fully closed and no further rotation is possible. The indicator line on the front panel should line up exactly with the calibration mark on the right-hand side of the tuning dial (this calibration mark is slightly to the right of the 144/8.0 Mc dial mark). If it does not, remove the chassis (as indicated under "Chassis Removal") and proceed as follows:

   a) Loosen the Phillips-head screw securing the clear plastic dial to tuning capacitor shaft.

   b) Line up calibration mark on dial with indicator line on the front panel. Make sure capacitor plates are fully closed when doing this.

   c) Tighten Phillips-head screw *frimly*, to secure dial to tuning shaft.

   d) Re-install chassis in its cabinet.

3. Switch receiver on, and VFO to Stand By. Allow both units to warm up for at least 15 minutes.

4. Tune receiver to 8.5 Mc. Use crystal calibrator to accurately determine this point.

5. Set VFO tuning dial to 8.5 Mc (precisely) on lower scale (51 on upper scale).

6. Using a small screwdriver, rotate the CAL trimmer slightly to the left and then to the right, until a beat note is heard in the receiver (the VFO output will beat with the crystal calibrator signal on 8.5 Mc).

   Adjust the CAL trimmer for zero beat. When this condition exists, the VFO output frequency has been adjusted to 8.5 Mc. You should remember, however, that the accuracy of this calibration can be no better than the accuracy of the 100 Kc crystal calibrator in your receiver.

OUTPUT ADJUSTMENT

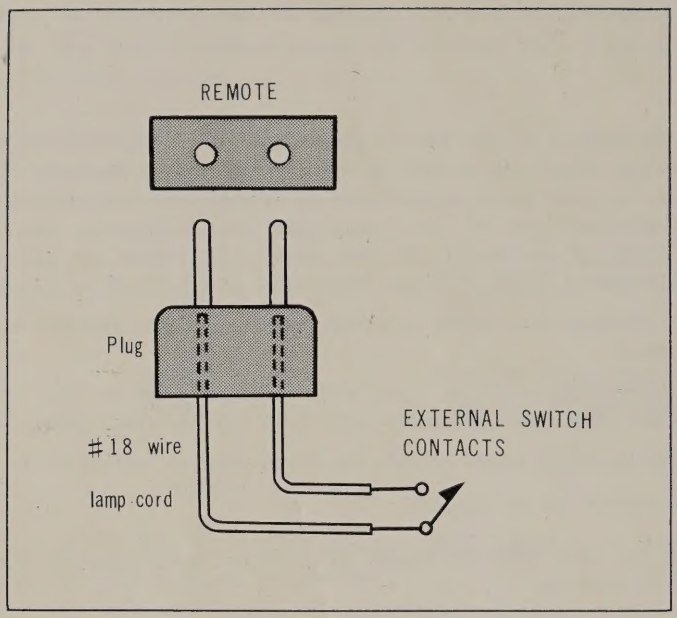
7. Adjust the OUTPUT ADJ coil slug for a maximum "S"-meter reading on the receiver.

This completes all adjustments on the VFO.

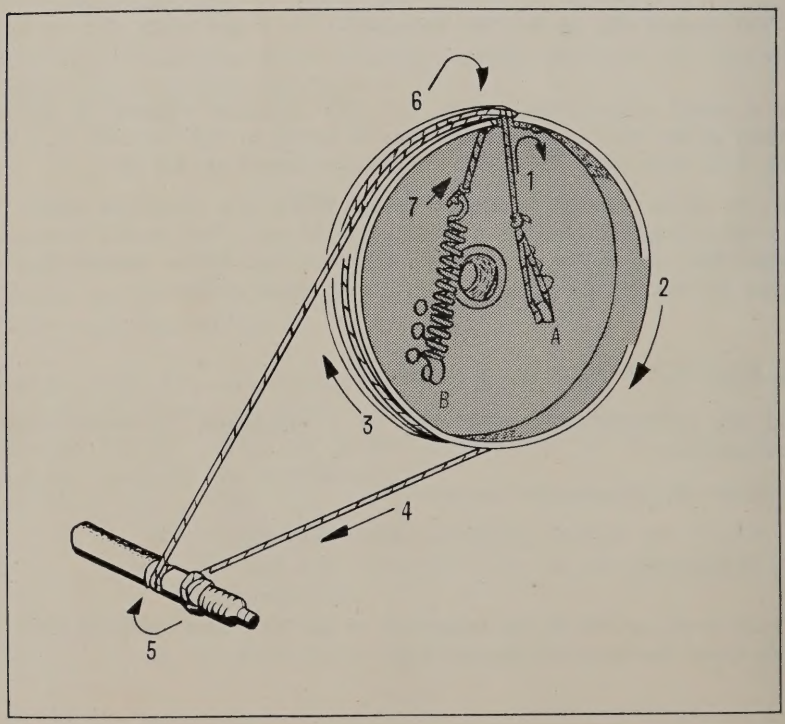
CHASSIS REMOVAL

Remove four small screws on the underside of the VFO and carefully slide the chassis out from the front of the cabinet.

REMOTE PLUG CONNECTION

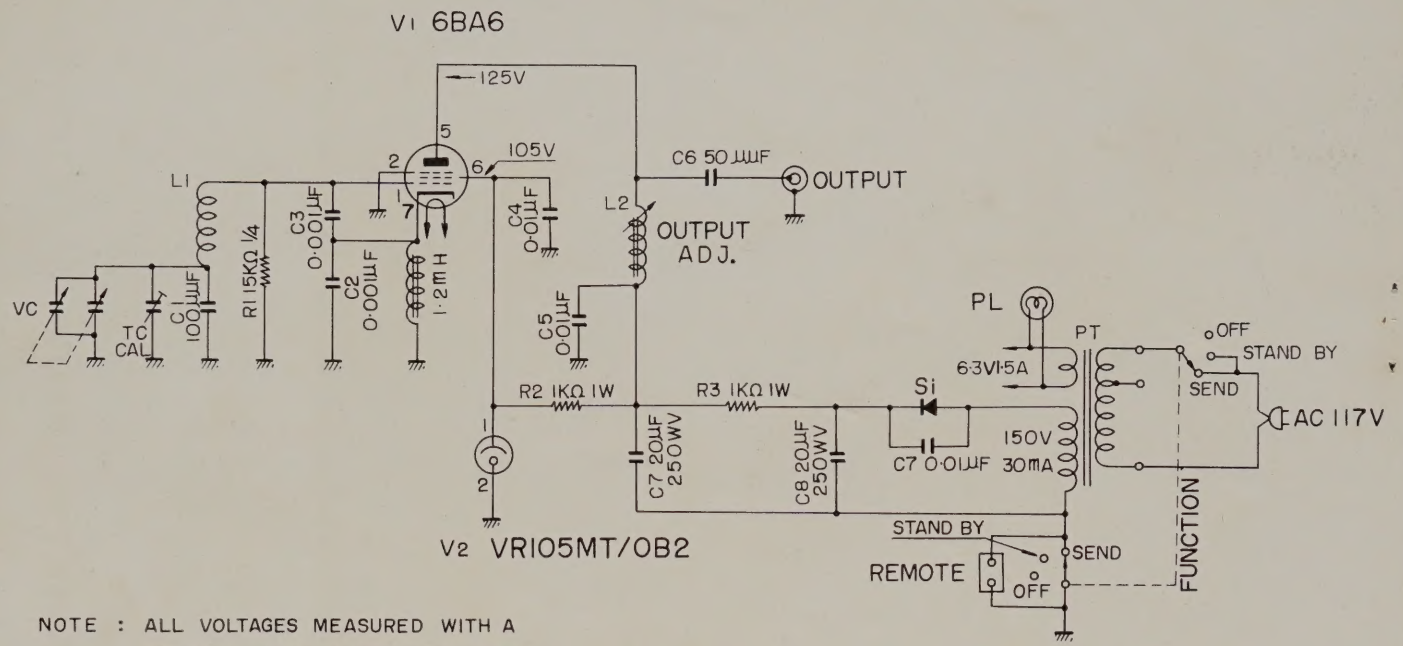


DIAL CORD STRINGING



SCHEMATIC DIAGRAM

VARIABLE FREQUENCY OSCILLATOR "HE-89" SCHEMATIC DIAGRAM



NOTE : ALL VOLTAGES MEASURED WITH A 2000Ω/V TESTER BETWEEN POINTS INDICATED AND CHASSIS GROUND.

LAFAYETTE RADIO ELECTRONICS CORP.

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