

Model 3301 Calibration with a 3301CAL Fixture

Safety Information

For complete safety information, see the *Product Information Bulletin* and/or the Model 3301 user manual.



ONLY QUALIFIED PERSONNEL should install, operate, or service this equipment.

CONTACT ETS-LINDGREN PRIOR TO SERVICING. Servicing (or modifying) the unit by yourself may void your warranty. If you attempt to service the unit by yourself, disconnect all electrical power before starting. There are voltages at many points in the instrument that could, if contacted, cause personal injury. Only trained service personnel should perform adjustments and/or service procedures upon this instrument. Capacitors inside this instrument may still be CHARGED even when instrument is disconnected from its power source.

Warranty Information

For complete warranty information, see the *Product Information Bulletin* and/or the Model 3301 user manual.



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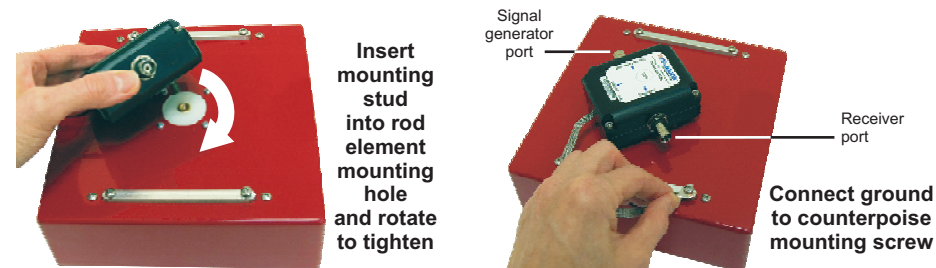
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The ETS-Lindgren 3301CAL Calibration Fixture incorporates a resistive T network and a 10-picofarad capacitor to perform the Equivalent Capacitive Substitution Method (ECSM) of calibration for rod antennas. The T allows for accurate reading of the input to the 3301CAL, and the capacitor feeds the amplifier through the same impedance as the rod.



Before connecting components, read **Safety Information** on the back page of this document.



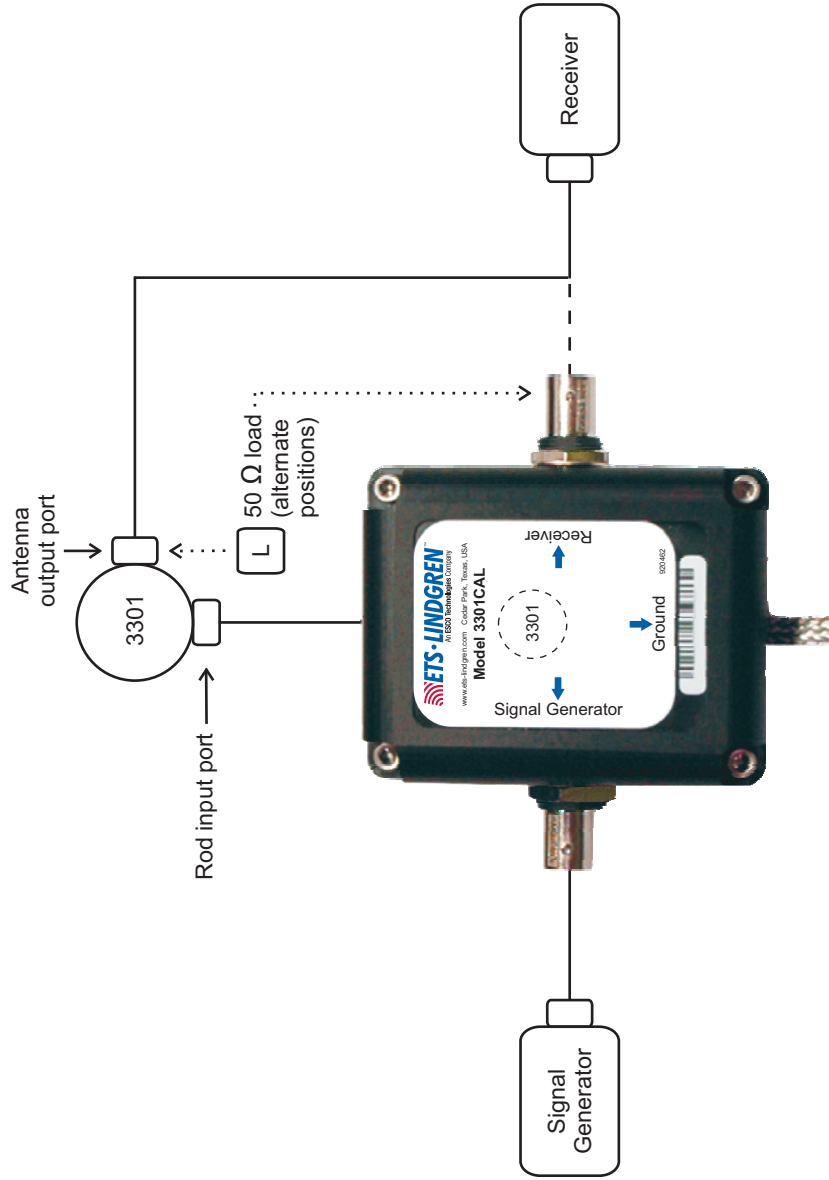
1. Connect the 3301CAL to the Model 3301 antenna by inserting the mounting stud on the fixture into the rod element mounting hole on the antenna; rotate to tighten.
2. Connect the 3301CAL ground to one of the counterpoise mounting screws on the Model 3301.
3. Place a signal source on the signal generator port of the 3301CAL and a receiver on the receiver port.
4. Terminate the output of the Model 3301 with 50 Ω , and record the input signal strength.
5. **Compensate for test fixture and effective height of antenna:** The receiver port on the 3301CAL has a 5 dB loss in signal strength from the mounting stud due to the resistor network in the fixture. In addition, the effective height of the 1.04-meter monopole is 0.5 meters; this adds a 6 dB correction factor, making the combined correction factor 11 dB.
6. Move the receiver cable to the output port on the Model 3301, and then place a 50 Ω load on the receiver port of the 3301CAL.
7. Read the output signal. The antenna factor is the input signal (read from the receiver port on the 3301CAL) plus the combined correction factor of 11 dB, minus the output signal (read from the output port on the Model 3301). Both readings are assumed to be logarithmic.

- Example:**
1. The input read from the 3301CAL receiver port is 50 dB μ V.
 2. The output read from the Model 3301 output port is 59 dB μ V.
 3. The antenna factor is the input plus the combined fixture loss and effective height correction factor, minus the output. Assuming a reading is taken with a 1-MHz signal input to the 3301CAL and a combined correction factor of 11 dB:

$$50 \text{ dB}\mu\text{V} + 11 \text{ dB (1/m)} - 59 \text{ dB}\mu\text{V} = 2 \text{ dB (1/m)}$$

Model 3301 Calibration With a Receiver and Signal Generator

Attenuators may be required if VSWR of the receiver or signal generator is high.



Model 3301 Calibration With a Network Analyzer

Attenuators are not required with a network analyzer.

