Calibration methods

Voltage

Using AC or DC, most multimeters can be used for this test. If using pulsed DC (PDC), could employ typical multimeter if the model reads average DC output and you are sure of the duty cycle ($V_{peak} = V_{average}/(\text{duty cycle})$. Otherwise, you'll need to have an oscilloscope or a peak-reading multimeter (as a Fluke 87-V).

Caution: be careful not to apply voltages to the electrodes that exceed the peak capacity of the multimeter or oscilloscope. Meters are rated on RMS values, so the peak capacity is the RMS value multiplied by a factor of 1.41

Method- if applying AC, attach one lead to an electrode (e.g., a boat boom dropper) and the other lead to an electrode of the opposite polarity (e.g., boat hull). If using DC or PDC, attach the red lead to the anode and the "com" or black lead to the cathode. Electrodes must be in water (under a load), preferably at a typical sampling location. Apply a range of voltages from low to high and take associated readings from the control box voltage meter and the multimeter or oscilloscope. Compare. A regression equation can be constructed to describe the relationship between voltage meter readings and multimeter/oscilloscope readings. Make sure you record ambient water conductivity.

Site: Date:

Water conductivity: Water temperature:

Voltage dial setting: Control box voltage meter reading:

Actual voltage output:

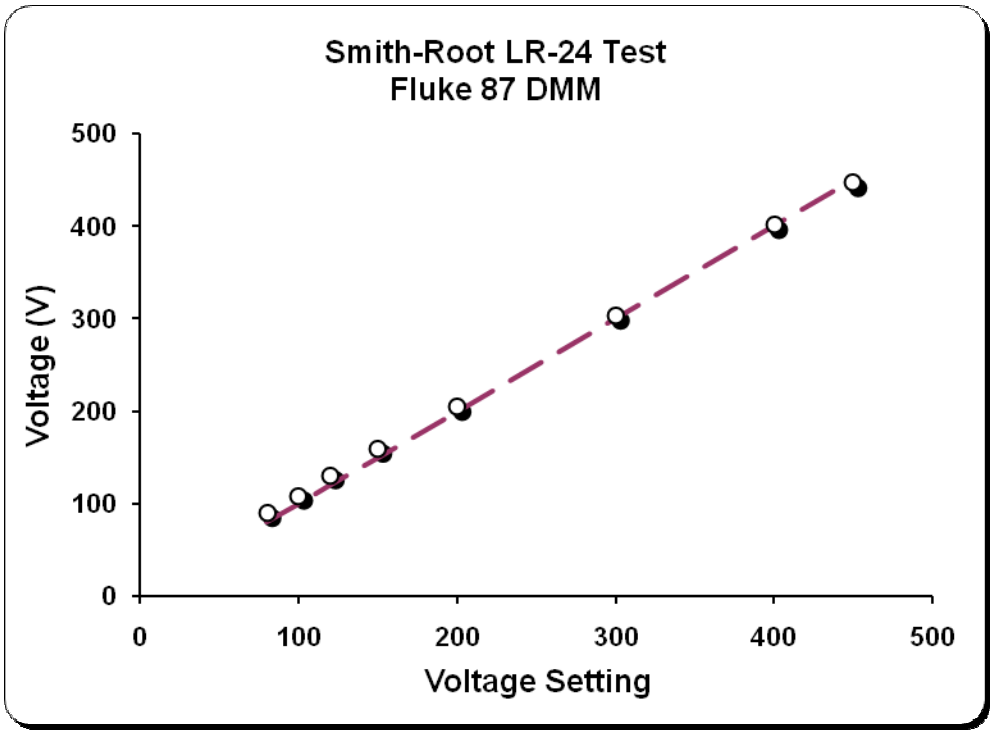
***Also, other waveform attributes as frequency, pulse width, and duty cycle can be checked under this set-up with appropriate equipment (oscilloscope or multimeter as Fluke 87-V).

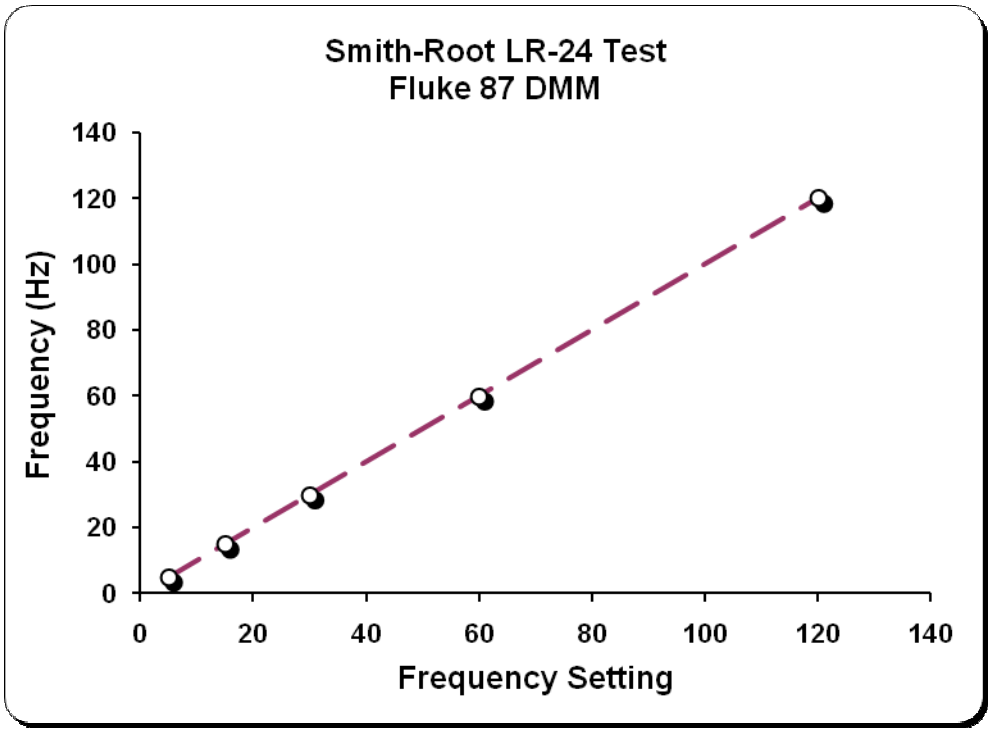
Current

For safety reasons, do not directly place a multimeter in-line. Use a current clamp. Place a current clamp on the conductor to the cathode or to the anode (if a boat with 2 booms, place clamp on conductor before the split to the booms, otherwise you'll need to multiply the current reading by 2 to get total current applied to the electrodes).

Control box current meter reading: Actual current output:

Examples: (all tests performed at ambient water conductivity of ≤ 50 µS/cm)





Examples (continued):