



OPERATING INSTRUCTIONS - CATALOG NO. 1120 RF METER

Taking Readings:

Hold the meter as shown (See Figure 1). Do not cover the top of the meter. This prevents your hand from shielding electric fields or microwaves. Normally, the indoor RADIO/MICROWAVE (RF) readings should be near zero in most parts of a home or office, and will almost certainly be zero if you cup your hand in front of the antenna or place the meter in a metal box.



Figure 1

Magnetic Standard and Weighted (B-S & B-W)

To measure the 60 Hz-equivalent effect of a magnetic field on the human body, turn the knob to the B-W setting and hold the meter at whatever location you want to measure. For standard technical magnetic field measurement, turn the knob to the B-S setting.

Maximum range is 100.0 mG, with resolution of 0.1 mG, and accuracy of $\pm 4\%$ of reading at 50 Hz and 60 Hz.

Electric Standard and Weighted (E-S & E-W)

To measure the effect of an electric field on the human body, turn the knob to the E-W setting and hold the meter at the location to be measured. For standard technical electric field measurement, turn the knob to the E-S setting.

Your body can easily shield electric fields; the reading is lower if you cover the top surface of the meter with your hand. Also, the presence of your hand at the back of the meter compresses the electric field, making it read somewhat higher than if the meter



were suspended from a string or held on a board, away from you. In either case, the true electric field near the meter will be displayed.

The AC Electric Mode uses a metal plate sensor under the top of the meter. Circuitry similar to the magnetic section converts the signals into an electric field strength. Maximum range is 1000 V/m with resolution of 1 V/m and accuracy of $\pm 5\%$ of reading at 50 Hz and 60 Hz.

Standard Mode and Weighted Mode:

The standard modes for AC magnetic fields (B-S) and AC electric fields (E-S) will measure fields using a flat frequency response. That is, all frequencies from 40 Hz to 100 kHz (100,000 Hz) are measured with equal sensitivity. The weighted modes for magnetic (B-S) and electric (E-S) fields measure 60 Hz fields with the same sensitivity as the Standard mode. However, the weighted modes are more sensitive at frequencies higher than 60 Hz, and from 60 Hz to 500 Hz, sensitivity increases proportional to frequency. That is, 1 milligauss (mG) at 60 Hz will read “1.0” on the display, whereas 1 mG at 120 Hz will read “2.0”. On Weighted modes, the Field Measurement shows a number proportional to the average electric current induced inside the human body from the fields, and the number is equivalent to the amount of 60 Hz magnetic or electric field that would be required to induce that much current. However, biological reactions generally occur at speeds that are slower than 1000 Hz, so on Weighted modes, the meter is designed to become less and less sensitive at frequencies above 1000 Hz.

RF Setting (Radio/Microwave):

To measure an RF field, turn the knob to the RF setting and point the top of the meter at the potential source, or simply hold the meter vertically.

Generally, your hand can shield the RF signals, so grip the meter as shown in Figure 1. The RF Mode uses the same plate sensor as the AC Electric Mode. The signal is amplified and converted to a power density magnitude, calibrated at a frequency of 1 GHz (1000 MHz). Maximum range is 19.999 mW/m^2 with resolution of 0.001 mW/m^2 ($0.0000001 \text{ mW/cm}^2$) and accuracy of 20% of reading at 1 GHz.

When reading RF emitted by digital devices, such as mobile phones and smart meters, the Peak Measurement (small numerals in the upper-left of the display) is of more interest than the Field Measurement (large numerals at the bottom). The information from digital RF devices is transmitted in brief packets that occur irregularly (perhaps once per minute with smart meters and several times per second with Wi-Fi transmitters or mobile phones that are in use). The Peak Measurement detects these packets and displays the strongest packet for several seconds before resetting itself.

High Radio/Microwave Power Sources

With the setting switched to “RF” and pointing the RF Meter toward the following sources, you can see how high RF sources compare to AMI meters, reading the bottom scale on the display.



Strong sources include:

- Cordless phones, CB, or amateur radio transmitter.
- Microwave ovens near door seal. A reading of more than 0.2 mW/cm² at a distance of six feet suggests a leaking microwave door seal (which should be repaired).



Figure 2

Calibration:

The TESCO RF Meters are shipped calibrated to their specifications. Recalibration is not required within 10 years; however, if a calibration certification compliant with ISO 17025 is required, the meter must be recertified at least once a year in order to remain in compliance with that standard. Accuracy of the meters is guaranteed to within the specifications whether or not a certificate is issued.

Changing the Battery:

The battery is a 9 Volt alkaline battery. The battery will last about 20 hours with the backlight off, and about 12 hours with the backlight on. Turn the meter to the “OFF” position. Remove the battery cover by sliding it downward and tap the battery compartment on the palm of your hand so the battery falls out. Replace/Reconnect the new battery and reassemble. Leave the meter OFF while not in use.

Backlight/Audio Indicator:

The Tesco RF Meter has both a backlight and an audio indicator. To turn these functions on or off, simply use the buttons beneath the battery cover. The battery cover can be removed as described in the above section.