



## Milligauss Meter Model MR3

(3-axis quadrature-cycling magnetoresistive sensor)

**Overview:** After turning the power knob to "On" or "Backlight", the left half of the screen will show the actual values of the magnetic flux density components X,Y,and Z including polarity, with a maximum range of +/-1999.99 milligauss and resolution 0.01 milligauss (=1nT), updated every half second. The larger font number at the top is the magnitude  $\sqrt{x^2+y^2+z^2}=M$  (square root of the sum of the squares of X,Y, and Z). The right side of the display shows the Peak Hold values. Here, the numbers are the highest positive '+' or negative '-' flux densities for X, Y, and Z axes (Magnitude is always a positive number) that have been measured since the last Peak Reset or power down. Upon Power On, spurious values for these peak hold numbers may be present because of turn-on transients. To use the Peak Hold function, first clear any current peaks or transients by pressing the "Reset Peak" button. Any peak values will be cleared and the peak hold function will immediately start tracking the field peak once the button is released (see more about using the Peak Mode with examples further down).

**Power and Battery:** The meter can be powered either by a 6V (center positive) adapter, or by internal batteries (4 x AA alkaline). A battery indicator is on the display. Battery life is ~24 hours or ~20 hours with the backlight on. Whenever the adapter is plugged into the side of the meter, the batteries are disconnected from the circuit.

**Sensor:** There are 3 sensors in the cube (X, Y, and Z). The center of each sensor is located directly below the dot on the corresponding surface at a depth of 5mm from the cube surface. The sensing direction of each is also marked by an arrow. All four white surfaces of the cube are true to these directions within 1° or 1/10° of arc, depending on which sensor accuracy was selected when ordering. These X,Y, and Z sensors each measure a signal proportional to the magnetic flux density x cosine of the angle between the flux density direction and the X,Y, or Z sensor directions, respectively. Proportionality to the cosine is better than 1 part in 10,000.

**Accuracy and Zero:** Scaling accuracy of the fields are +/- 0.5% of the reading for X,Y, and Z with no additional error present in the magnitude displayed. In true zero field (no background field is present including earth field) the maximum zero error is +/- 0.5 milligauss for X,Y, and Z. If the Zero button is pressed, the present values of X,Y, and Z are subtracted from all future readings, like a tare function on a weight scale (Zero is relative). To return to a true zero, turn the meter off and on again. A new relative zero can be assigned at any time by pressing Zero again. Pressing Zero does not affect the numbers stored in the peak hold registers.

**AlphaApp PC Software:** The Milligauss Meter Model MR3 is capable of connecting and streaming data directly to a Windows PC using AlphaLab's free software, AlphaApp (download AlphaApp @ [www.alphalabinc.com/content/alpha-app](http://www.alphalabinc.com/content/alpha-app)). AlphaApp can also be used to configure the meter (sample rate, time interval, etc.) for remote (unconnected) data recording. Once the MR3 has been configured to record, you may start recording by pressing the "Data" button. Recording is noted on the LCD display by showing a disk icon in the upper left hand corner of the screen. Stop recording by pressing the "Data" button again. Data can be downloaded into AlphaApp by reconnecting to a PC, and can be exported as a .CSV file, which can be opened with most available spreadsheet software.

**Peak Mode:** In some instances, both the highest and lowest values of X,Y, and Z and magnitude need to be determined during a defined sampling period (like 24 hours). Instead of recording a large amount of data and using a spread sheet to find these min/max numbers, the Peak Mode button can be pressed. To do this, first press Reset Peak to start the sampling period. From that moment, the meter will save the highest and lowest of the displayed X,Y, and Z axes and magnitude numbers. Nominally, the largest value of magnitude, and the farthest-from-zero values of X,Y,Z (whether these values are positive or negative) will display on the right side of the screen. If Peak Mode is then pressed once, a "+" sign will appear on the upper right of the screen and the peak hold magnitude will remain the same, but the displayed X,Y,Z peak hold values may change. Now they will be the most positive values algebraically. For example, if during a test period the maximum positive value of X was 300.04 milligauss and the maximum negative value was -322.47, then the peak hold for X would display -322.47 before the Peak Mode was pressed, but it will display 300.04 after it was pressed once. If pressed again, a "-" sign will appear in the upper left screen, and X will display -322.47 again. In this third peak hold mode, the peak hold magnitude will generally be lower than in the first two modes. (Remember that magnitude is never negative.) A third press will return peak hold to nominal, and no information will be erased, no matter how many times the mode is cycled.

**Warranty:** This meter has a one year limited warranty under normal use and service. The Milligauss Meter Model MR3 is manufactured in the USA by AlphaLab, Inc., 3005 South 300 West Salt Lake City, UT 84115, email.[mail@trifield.com](mailto:mail@trifield.com) tel. 801-487-9492. Visit [alphalabinc.com](http://alphalabinc.com) for gaussmeters, surface voltmeters, emi/emf detectors, air ion counters and more.