

SPECIFICATIONS

Measurement Range	0.1-511 mG (std.) 0.01-51.1 μ T(opt.)
Accuracy Error (typical)	\pm (2% of rdg. + 1 digit) \pm (1 digit)
>4 mG	
<4 mG	
Directionality Error	\pm 1%, typ. \pm 3%, max.
Overall Error	\pm 5% of rdg., max. \pm 2 digit, max.
>4 mG	
<4 mG	
Frequency Response	25 Hz - 1 kHz
Calibration Frequency	60 Hz (50 Hz opt.)
Display	3 digit LCD
Measurement Type	True RMS
Sampling Interval	0.4 sec.
Battery Life	40 hours (typ.)
Power Source	9V alkaline battery
Operating Temp	0° to + 50°C
Weight	5 oz.
Size	4.7"L x 2.4"W x 1.0"D
Warranty	One Year

REFERENCES

1. Questions and Answers about Electric and Magnetic Fields, NIEHS/DOE, 1994. (800) 363-2383. (Free)
2. Electric and Magnetic Fields From 60 Hertz Electrical Power. Department of Engineering and Public Policy, Carnegie-Mellon University, Pittsburgh, PA 15213, 1989. (412) 268-2670. (\$3.50)
3. Microwave News, P.O. Box 1799, Grand Central Station, New York, NY 10163; published bi-monthly (212) 517-2800.

WARRANTY

Sypris Test & Measurement warrants this product against defects in material and workmanship for a period of one year from the date of purchase. This warranty does not cover damage due to accidents, misuse or tampering, nor does it cover damage resulting from non-authorized repair. If a malfunction or failure occurs, send the unit insured and properly packaged to the address listed below. Sypris Test & Measurement will, at its option, repair or replace the unit and return it to the purchaser, with charges only for shipping. This warranty is limited to the original purchaser and is not transferable.

THE ABOVE WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED AND ALL OTHER OBLIGATIONS AND LIABILITIES ON THE PART OF SYPRIS TEST & MEASUREMENT AND NO PERSON INCLUDING ANY DISTRIBUTOR, AGENT OR REPRESENTATIVE OF SYPRIS TEST & MEASUREMENT IS AUTHORIZED TO ASSUME FOR SYPRIS TEST & MEASUREMENT ANY LIABILITY ON ITS BEHALF OR ITS NAME, EXCEPT TO REFER THE PURCHASER TO THIS WARRANTY. THE ABOVE EXPRESS WARRANTY IS THE ONLY WARRANTY MADE BY SYPRIS TEST & MEASUREMENT. SYPRIS TEST & MEASUREMENT DOES NOT MAKE AND EXPRESSLY DISCLAIMS ANY OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITING THE FOREGOING,

WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ARISING BY STATUTE OR OTHERWISE IN LAW OR FROM A COURSE OF DEALING OR USAGE OF TRADE THE EXPRESS WARRANTY STATED ABOVE IS MADE IN LIEU OF ALL LIABILITIES FOR DAMAGES, INCLUDING BUT NOT LIMITED TO CONSEQUENTIAL DAMAGES, LOST PROFITS OR THE LIKE ARISING OUT OF OR IN CONNECTION WITH THE SALE, DELIVERY, USE OR PERFORMANCE OF THE GOODS. IN NO EVENT WILL SYPRIS TEST & MEASUREMENT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES EVEN IF SYPRIS TEST & MEASUREMENT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

Answers to any questions concerning the use of and authorized repair of this product may be obtained by writing:



6120 Hanging Moss Road
Orlando, Florida 32807

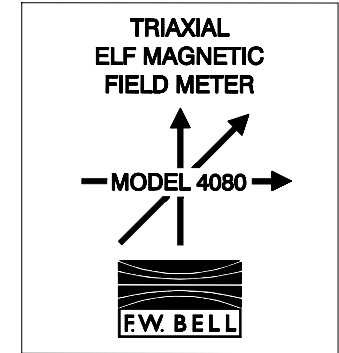
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Printed in Mexico

ELF Meter

Model 4080



Operating Instructions



GENERAL INFORMATION

The Model 4080 is the first economical, handheld, triaxial magnetic field meter available for the measurement of Extremely Low Frequency (ELF) magnetic fields. The Model 4080 allows the user to make quick, accurate spot field measurements from a variety of ELF sources, including AC power lines, office equipment, video display terminals (VDTs), household appliances, and all types of electrical and electronic equipment.

The Model 4080 measures a wide range of ELF magnetic fields, *independent of measurement angle*. The instrument uses three internal sensors and a microprocessor to accurately compute and display the vector magnitude of the magnetic field in milligauss (or microtesla). The autoranging feature adjusts the instrument to the proper scale, yielding a wide measurement range of 0.1 to 511 mG (0.01 to 51.1 μ T). The typical accuracy error is less than 2%, sufficient for characterizing all electrical and electronic equipment.

The instrument comes complete with a padded, durable carrying case, and a full one-year warranty, covering both parts and labor.

Note: The term “magnetic field” is used loosely throughout the manual. All references to magnetic field levels in this manual actually refer to the “magnetic flux density”, which is measured in (CGS) units of milligauss (mG) or (SI) units of microtesla (μ T).

Possible health effects associated with the exposure to ELF magnetic fields have been reported in scientific literature. Although evidence of direct cause and effect between ELF magnetic fields and health problems has not been established, many respected authorities recommend “prudent avoidance” of ELF magnetic fields

until further research leads to more conclusive results.

For more information on the subject of ELF magnetic fields, see the references listed at the end of this manual.

OPERATING INSTRUCTIONS

Turning the Instrument On: To operate the Model 4080, first flip the ON/OFF switch to the UP (ON) position. The instrument will perform a self test and display “-8.8.8” for approximately one second, verifying proper operation.

Operation: After the power-on sequence has finished, the display will indicate the magnetic field reading, in mG (instruments ordered with Option T display the magnetic field level in μ T). Simply bring the instrument into the vicinity of ELF magnetic fields and note the magnetic field level. As a result of its inherent 3-axis method of measurement, the Model 4080 eliminates the measurement error due to improper instrument orientation. Unlike single-axis meters, no special handling or orientation is necessary to obtain an accurate reading.

Battery Replacement: Under normal operating conditions, the unit will provide approximately 40 hours of continuous use using a standard 9V alkaline battery. When the battery level falls below 5.4V, a low battery indication (signaled by a minus sign) will appear. Approximately one additional hour of measurement time is available before accuracy will become degraded. When replacing, use only an alkaline battery.



Make sure the ON/OFF switch is in the “OFF” position before replacing the battery.

Dead Battery: If, after turning the instrument on, either nothing happens or the unit behaves in an unpredictable fashion, try replacing the battery. If this solves the problem, it may be that the instrument was left on accidentally for an extended period of time, resulting in a “dead” battery.

TECHNICAL DESCRIPTION

This section describes some of the technical properties of the Model 4080. The information below explains how the Model 4080 measures magnetic fields.

Magnetic fields are created by electrical current. They have two basic properties: their strength (or level) measured in mG or μ T, and their direction. Magnetic fields form closed, continuous loops around currents, and are therefore, 3-dimensional in nature.

There are three orthogonal magnetic field sensors (one for each dimension) located internal to the Model 4080 just below the F.W. Bell logo. If the three components of the magnetic field are labeled Bx, By, and Bz, then the resultant field is calculated by the microprocessor as:

$$B = \sqrt{B_x^2 + B_y^2 + B_z^2}$$

The display will indicate the magnetic field level, B. Rotating the instrument will not result in a changing field indication, as long as the magnetic field is constant across the dimensions of the internal sensors. Some degree of directionality will be observed in near fields (i.e., where the magnetic field level changes rapidly over distances comparable to the dimensions of the instrument). In far fields, where the magnetic field is essentially constant, directionality of the instrument is typically less than $\pm 2\%$.

Calibration: The Model 4080 has been calibrated in accordance with Sypris Test & Measurement Quality Assurance manual and is traceable to the National Institute of Standards and Technology (NIST). The Sypris Test & Measurement quality system is registered to ISO 9001:2000 and the calibration was performed in compliance with MIL-STD-45662A. For maximum continued accuracy the 4080 should be calibrated annually.

NOTES:

1. Material & Finish: 67 lb vellum, Bristol White, size 6.5" x 11".
2. Fold: Double Parallel
3. All lettering and graphics to be black, printed on both sides of card.
4. Marking Criteria:
 - A. Each letter, number or image is complete: No lines forming a character are missing or broken.
 - B. Lines are sharply defined and uniform in width.
 - C. Ink spots forming images are uniform: No thin spots or excessive buildups are present.
 - D. Open areas within characters or images are not filled: A, B, 6, 8 etc.
 - E. Ink is confined to the lines of the characters: No smeared characters or double images are present.
5. Manuals to be true copies of artwork or electronic file supplied by Sypris Test & Measurement.
6. First article sample required **with any new order.**

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