III. Specifications

Dynamic Range: 0.1 mG to 1999 mG, RMS, autoranging over four decades (20,000:1). 199.9 mG full-scale with 0.1 mG resolution in high-sensitivity mode. 1999 mG full-scale with 1 mG resolution in low-sensitivity mode.

Accuracy: 1% ±1 digit typical. The instrument is true RMS responding, calibrated to a sine wave at 55 Hz.

DC Output (OPT D): 10 mV/mG; 2 volts FS at 200mG. Output impedance is 4kΩ.

Directionality: ± 1% (typical) for all measurement angles.

Frequency Response: Essentially flat (± 10%) between 40-400 Hz, with cutoff frequencies (-3 dB) of 30/600 Hz. Accuracy is better than ± 5% between 40-200 Hz for accurate measurement of the 3rd and 5th 60 Hz harmonic. OPTION F20 extends the -3 dB frequencies to 20/2000 Hz.

Sensor Type: 3 x 1700 turns #38 Cu; 0.29" dia. air core.

Environmental: Temperature Range: -10°C to +50°C operating and -20°C to +85°C storage. Relative Humidity: 90% at +40°C operating and 95% up to +60°C storage.

Battery Life/Power Source: 50 hours, typical use (to 5.1V min.) using standard 9V alkaline battery (Duracell MN1604/Eveready 522/or equivalent).

Size/Weight: Case dimensions are 5.9"H X 3.2"W x 1.2"D (OPT X01 add 0.4" to H). Weight approximately 7 oz. (200g).

Analog Output (OPT A): Z-Axis waveform only. 5 mV/mG; 1 volt FS at 200 mG. Output impedance is 4 kΩ.

IV. 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:

SYPRIS® TEST & MEASUREMENT

F.W. BELL®

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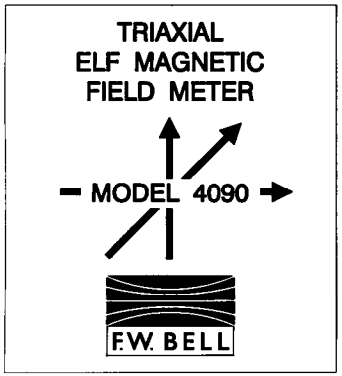
Manual UN-01-227
Rev. C
Item No. 359194
Assembled in Mexico Printed in Mexico

ELF Meter

Model 4090



Operating Instructions

SYPRIS® TEST & MEASUREMENT

F.W. BELL®

I. General Information

The Model 4090 uses three internal orthogonal sensors to evaluate and display a wide range of ELF magnetic fields, independent of measurement angle. The instrument utilizes a precision analog-to-digital converter and CMOS microprocessor to accurately compute and display the vector magnitude of the magnetic flux density in milligauss. The instrument will automatically adjust to the proper scale, yielding a wide dynamic measurement range of 0.1 to 1999 mG with a typical accuracy better than 2%, sufficient for characterizing essentially all electrical and electronic equipment.

Under normal operating conditions the unit will provide 50 hours of continuous use with a standard 9v alkaline battery. A low battery indicator will signal the user when approximately one additional hour of measurement time is available before the battery needs replacing.

The instrument comes complete with a padded, imitation leather carrying case and a one year warranty, covering both parts and labor. Optional features include a switchable single-axis mode (to display the individual vector components), analog output, DC (recorder) output and wideband frequency response.

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 has (CGS) units of milligauss (mG).

II. Operating Instructions

a. General

As a result of its inherent 3-axis method of measurement, the Model 4090 virtually eliminates the measure errors associated with single-axis instruments due to improper instrument orientation. With the Model 4090, it is virtually impossible to get an erroneous reading of the magnetic field. Inexperienced and non-technical users will benefit from the Model 4090’s ease of use, while experienced users will appreciate the ability to make accurate measurements and field surveys quickly and with full confidence.

b. Turning the Instrument On

To operate the Model 4090, first flip the ON/OFF switch to the UP position. The instrument will perform a self-test and display –18.8.8 for approximately two seconds, verifying proper operation. After the power-on sequence has finished, the display will indicate the magnetic reading in mG.

c. Operation

Simply bring the instrument into the vicinity of ELF magnetic fields and note the magnetic field level. Upon power-on, the meter is placed in the high-sensitivity mode (0.1 mG resolution) and will remain in that range until the magnetic field exceeds 199.9 mG. At that time, the unit is placed into the low-sensitivity mode, where it will remain as lonl as the magnetic field stays within the 180-1999 mG range. If the field exceeds the upper limit of 1999 mG, the display will blank, other than leaving a leading “1” in the display, signifying an out-of-range condition. If the level falls below 180 mG, the unit will revert back to high sensitivity mode.

The three magnetic field sensors are located internal to the instrument just below the LCD display, behind “TRIAXIAL” on the front panel. The display will indicate the magnetic field level at that point in space. Rotation of 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 1%.

d. Battery Replacement

Under normal operating conditions, the unit will provide approximately 50 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; however, the battery should be replaced as soon as possible.

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

e. 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.

f. Single-Axis Mode

(Option X01). Units equipped with OPT X01 have the ability to display the vector components of the magnetic flux density: Bx,By and Bz, in mG. When placed in the single-axis mode, an arrow symbol will appear in the upper-left area of the LCD. It will disappear when the Model 4090 is returned to the triaxial (default) mode. To activate the single-axis mode, depress the push-button on the top panel firmly until the display blanks, then release. After blanking for approximately one-half second, the display will indicate the x-component of the magnetic field, Bx. Depress the push-button a second time until the display blanks, release and the display will indicate By. Depress the push-button a third time until the display blanks, release and the display indicates Bz. Depress the button once more and the instrument will reset itself and enter the triaxial mode.

Note: The x-sensor is aligned across the meter face, from left to right. The y-sensor alignment is across the meter face, from top to bottom. The z-sensor alignment is through the meter, from front to back.

NOTES:

1. Material & Finish: 67 lb vellum, Bristal 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.***