

Instructions for Use: DSP-521N Single Axis AC Gaussmeter with DSP Power Lines Filtering

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SPECIFICATIONS

Advanced DSP Filtering: Digital Signal Processing allows you to ignore power line frequencies at 50 (Europe) or 60 Hz (North America), including harmonics.

Measurement Range: 0.00 to 99.99 milliGauss (Single-Axis True-RMS)

Accuracy: $\pm(4\% + 2 \text{ counts})$ from 48 to 62 Hz

Measurement Bandwidth: Flat Response ($\pm 1/2\text{dB}$) from 30 to 500 Hz
-3dB from 15 Hz and 550 Hz

Screen Update Rate: 4 times per second

Battery Type: 9v Battery, Alkaline type recommended (included)

Battery Life: Approximately 15 hours with backlight on, 20 hours with backlight off

Intro: Power Line Noise

Power line electromagnetic fields are an invisible force all around us, emitted by anything powered by the AC power grid. This power grid provides energy to your home or office with current alternating at a rate of 60 cycles per second in North America, or 50 cycles per second in Europe. This manual uses 60 cycles per second (or 60 Hertz, "Hz") for examples, but all examples can be applied to 50Hz fields as well. This alternating current creates a strong magnetic field at 60 Hz, but small fluctuations and non-linear loads create magnetic fields at harmonics of 60 Hz. These harmonics exist at 120 Hz, 180 Hz, 240 Hz, and every integer multiple of 60 Hz to infinity. Other types of waveforms, such as square or triangle waves, also contain many harmonics.

DSP Filtering

The core of the DSP-521N's technology is its digital signal processing (DSP) algorithms that allow not only the ability to ignore 50/60Hz power line noise, but also harmonics of 50/60Hz. The DSP-521N works by zeroing out (notching) every frequency associated with power lines (50/60Hz + Harmonics). It is not enough to just ignore 50 or 60 Hz, as in most areas $\frac{1}{3}$ rd the energy is in harmonics, which are at integer multiples of the main frequency (120, 180, 240 Hz, and so on).

DSP-521N Quick Start Guide

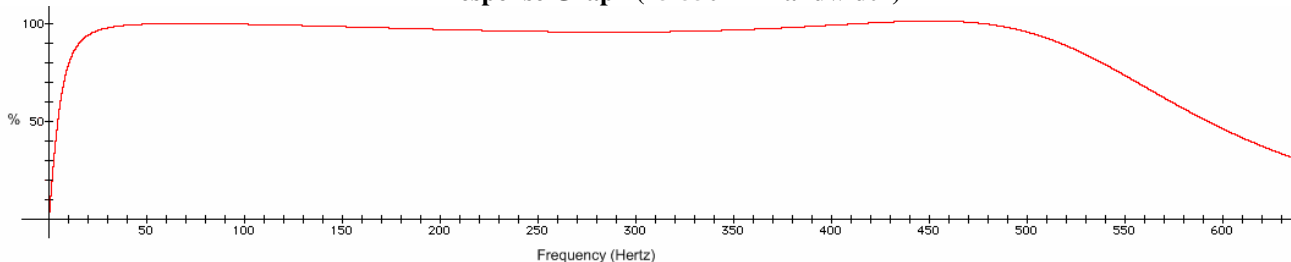
1) Setting the Filter Frequency (50 or 60 Hz)

- The filtering frequency is displayed at power-up ("FILTER F=60Hz" or "FILTER F=50Hz").
- Upon power-up, if the total field strength is over 3 mG the unit will automatically detect whether 50 Hz or 60 Hz power lines are present.
- To change the filtering frequency, switch the unit ON and scan the area to find a field higher than 3.00 mG ("T:" measurement). Try holding the meter near AC adapters or alarm clocks to find a high field strength. Now toggle the power by turning the meter OFF then back ON. The meter will instantly detect the power lines frequency as either 50 Hz (Europe) or 60 Hz (North America).
- If the filtering frequency changes, you will see an asterisk next to the filtering frequency upon power-up, for example "FILTER F=60Hz*" or "FILTER F=50Hz*".
- You should only have to reset the filtering frequency if you travel to an area that uses a different power line frequency. During normal operation, the meter will default to the last saved frequency.
- Always pay attention to what filtering frequency is displayed upon startup to ensure the meter is setup correctly to filter power lines at your location.

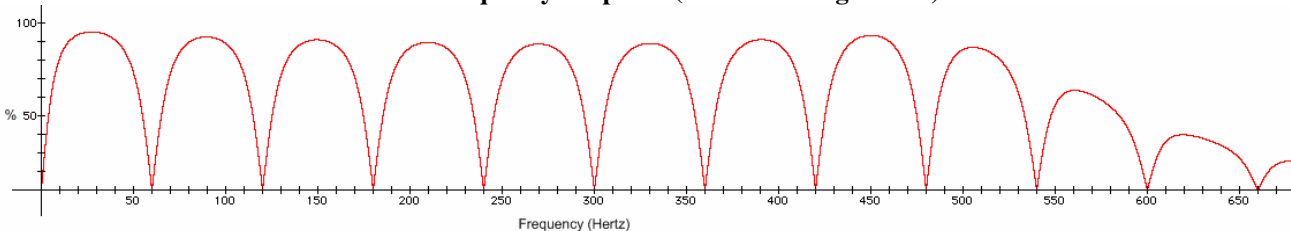
2) Your First Measurements

- Once the filtering frequency is set, using the meter is just a matter of turning it on.
- The top line, labeled "T:" displays the total field strength.
- The bottom line, labeled "-PL:" displays the field strength with power line fields ignored.
- Compare the two readings to see if the fields are from power-lines or other sources.

"T" Response Graph (15-550 Hz Bandwidth)



"-PL" Frequency Response (60Hz Filtering Shown)



APPLICATIONS & USAGE TIPS

SINGLE AXIS MEASUREMENTS:

Because this is a single-axis meter, sensor orientation is important. The direction of sensitivity and location of the sensor is denoted on the label with an arrow. While taking measurements, tilt the meter at different angles until you find the peak reading. To measure the field from a current-carrying wire (such as an extension cord or overhead power line), hold the meter so the sensor arrow is perpendicular to the wire (because magnetic fields exist perpendicular to current flow).

COMPARE MEASUREMENTS:

If the total field strength (“T”) is much larger than the field strength with power lines ignored (“-PL”), this means that the field being measured is at power line frequencies.

If the total field strength is very close to the field strength with power lines ignored, this means the field being measured is not at power line frequencies and is from other sources.

To measure fields from non-power line frequencies such as DC motors, CRT monitors, inside automobiles, etc., you can simply use the “-PL” measurement. Because this is measurement does not include power lines, it will be very accurate for other frequencies of interest.

OTHER FEATURES & NOTES

BACKLIGHT:

By default the LCD backlight is ON. If you wish to conserve battery time or do not want the backlight, it can be turned off via a jumper in the battery compartment. Remove the battery door and battery, and move the jumper over one pin to turn the backlight off. Note that you must physically pull the jumper off and then place it over the desired pins, following the diagram in the battery compartment, to turn the backlight ON or OFF (similar to jumpers on computer hard drives).

UNIT OF MEASUREMENT:

All units of measurement are in milliGauss (mG). To convert to microTesla (μT), divide the reading shown by 10. For example, 17.63 mG is equal to 1.763 μT .

BATTERY LEVEL:

The battery strength is shown in the upper left corner on power-up (a small battery icon). If the battery becomes low, a low battery icon will appear in the lower right hand corner of the screen.

MEASUREMENT RANGE & RESOLUTION

Measurement range is 0.00 to 99.99 mG for fields with a crest factor below approximately 1.5. Higher crest factor fields can be measured, but the meter may display overflow before reaching 99.99 mG. This ensures that the True-RMS measurement is always accurate, no matter what the crest factor is of the field being measured. If an overflow/over-range condition occurs, the meter will display “OVFL” for the T field strength and “N/A” for the -PL field strength.

WARRANTY

This product is covered by a manufacturer’s warranty for a period of 1 year. If the product fails because of a manufacturer’s defect within the warranty period, Magnii Technologies will repair or replace the unit at no cost to you, less shipping. Additional extended warranty options may be available at www.magnii.com. Made in the U.S.A.