

MODEL 510

- 50,000-count liquid crystal digital display with bargraph and backlight
- AC & DC True RMS voltage measurements
- Low-voltage Ohms
- Capacitance, Inductance, and Conductance measurements
- Temperature measurement in Centigrade, Fahrenheit and Kelvin
- Decibel measurements
- Frequency counter mode
- Continuity and Zener Diode testing
- Data hold feature freezes readings.
- RS-232 interface and software for downloading measurements to a PC

Model 510 5-Digit True RMS Digital Multimeter

The Model 510 Digital Multimeter from TEGAM offers a broad combination of features and measurement capabilities in an easy-to-use, handheld package. The Model 510 measures DC, AC, and true RMS voltage, current, and resistance, as well as temperature, conductance, inductance, capacitance, frequency, duty cycle, and pulse width.

The meter also includes continuity, zener diode test, peak detect/hold, and Go/No-Go test modes to simplify troubleshooting. Compact size, light weight, and battery operation make this digital DMM an ideal tool for field service applications. In addition, its unique infrared serial interface and included software enable the Model 510 to be used with a personal computer

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for isolated, automated data collection, graphing, and analysis. The Model 510 contains 10 data memories for storing measurements.

Display and Controls

The Model 510 contains a back-lit, 5-digit (50,000 count), 67 mm x 47 mm liquid crystal display (LCD). A full complement of annunciators indicate measurement functions and the selected range. Controls consist of one rotary dial and eight pushbuttons that select all functions, ranges, and special operating parameters for fast operation. A secondary 5-digit "subdisplay" shows information related to the main display. For example, when the main display shows temperature in degrees C, the secondary display shows the corresponding Kelvin temperature. The LCD includes a binary expression bargraph that gives rapid indication of signal trends, or small changes in signal level. Auto power off and "keep on" modes, and a Low Battery indicator help users conserve battery life.



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Advanced Features

The Model 510 performs a variety of special measurements typically requiring separate instruments. These include:

- Low-voltage Ohms function – for easy measurement of in-circuit resistances without turning on nearby semiconductor junctions.
- Minimum, Maximum, and Average modes – find or calculate important data values from a set of measurements.

- “Relative” mode – shows measurements referenced to a stored (non-zero) reference value
- Go/No-Go, Continuity, and Zener diode tests – for fast, qualitative measurements.
- Decibel measurements
- Peak Detect, pulse width and duty cycle
- Data hold overload protection for all functions, plus fused current input with warning beeper

Computer Interface

The Model 510 includes a CD of software utilities, and an infrared RS-232 interface that enables the meter to operate with a Windows based PC as a virtual instrument. Multiple readings can be captured, stored, and processed with ease. The interface’s IR link isolates and protects the computer and user from high voltages that may be present in test circuitry. When used with a computer, measurement modes can be controlled remotely from the computer.

Specifications

DC mV & V

Range:	500 mV, 2500 mV, 5 V, 50 V, 500 V, 1000 V
Accuracy:	$\pm(0.05\% + 5 \text{ digits})$
Best Resolution:	10 μV on 500 mV and 2500 mV ranges, 100 μV on higher ranges.
Input Impedance:	$>1 \text{ G}\Omega$ on 500 mV and 2500 mV ranges; approx. 10 $\text{M}\Omega$ on rest of ranges.

AC mV & V

Range:	500 mV, 5 V, 50 V, 500 V, 750 V
Accuracy:	AC V: $\pm(0.75\% + 20 \text{ digits})$ AC mV: up to $\pm 3\%$ depending on frequency.
Best Resolution:	10 μV on 500 mV range, 100 μV on higher ranges.
Bandwidth:	50 Hz to 20 kHz

AC + DC mV & V (True RMS)

Range:	500 mV, 5 V, 50 V, 500 V, 750 V
Accuracy:	AC + DC mV: up to 4.5% for $> 50 \text{ mV}$ depending on frequency. AC + DC V: up to $\pm 3.5\%$ depending on frequency.
Best Resolution:	10 μV on 500 mV range, 100 μV on higher ranges.
Bandwidth:	50 Hz to 20 kHz

DC Current

Ranges:	5000 μA , 500 mA, 10 A
Accuracy:	$\pm(0.2\% + 5 \text{ digits})$ 5000 μA and 500 mA ranges. $\pm(0.5\% + 5 \text{ digits})$ 10 A range.
Best Resolution:	0.1 μA
Overload Protection:	1 A/1600 V and 15 A/600 V fuse

AC Current

Ranges:	5000 μA , 500 mA, 10 A
Accuracy:	$\pm(0.75\% + 20 \text{ digits})$, for $< 40000 \text{ count}$ $\pm 1.0\%$ for $> 40000 \text{ count}$
Best Resolution:	0.1 μA

Specifications (continued)

Overload Protection: 1 A/1600 V and 15 A/600 V fuse
Bandwidth: 50 Hz to 1 kHz

AC + DC Current (True RMS)

Ranges: 5000 μ A, 500 mA, 10 A
Accuracy: $\pm(1.5\% + 50 \text{ digits})$, for < 30000 count
 $\pm 2.0\%$ for > 30000 count
Best Resolution: 0.1 μ A
Overload Protection: 1 A/1600 V and 15 A/600 V fuse
Bandwidth: DC to 1 kHz

Resistance

Ranges: 50 Ω to 50 M Ω
Accuracy: $\pm(0.2\% + 5 \text{ digits})$
(50 Ω range is 5000 count)
Best Resolution: 0.01 m Ω

Resistance, Low Volt Ohms (5000 count)

Ranges: 5 k Ω to 50 M Ω
Accuracy: $\pm(0.2\% + 5 \text{ digits})$
Test voltage/current: 0.25 V, open circuit; 25 nA to 250 μ A maximum current (range dependent).
Best Resolution: 1 Ω

Conductance (5000 count)

Ranges: 500 nS
Accuracy: $\pm(3\% + 5 \text{ digits})$
Best Resolution: 0.1 nS

Capacitance (5000 count)

Ranges: 5 nF to 5000 μ F
Accuracy: $\pm(2\% + 5 \text{ digits})$
Best Resolution: 1 pF

Zener Diode Test

Ranges: 15.00 V
Accuracy: $\pm(5\% + 10 \text{ digits})$
Test: 15 to 22 V @ 1 mA

Continuity Test

Buzzer sounds at less than 5 Ω to 5 k Ω range dependent

Temperature

Ranges: -20° to 0°C
0° to 150°C
150° to 1200°C
-253° to 1473°K
Thermocouple: Type K
Display: °C, °F, °K
Accuracy: -20° to 0°C: $\pm 3^\circ\text{C}$
0° to 150°C: $\pm 2^\circ\text{C}$
150° to 1200°C: $\pm 2\%$
Resolution: 0.1°



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Specifications (continued)

Frequency

Ranges:	50 Hz to 5 MHz
Accuracy:	$\pm(0.01\% + 5 \text{ digits})$ (50 Hz and 500 Hz range – 5000 count)
Input Sensitivity:	2 Vac
Best Resolution:	0.01 Hz

Pulse Width

Ranges:	200 ms
Accuracy:	$\pm(0.1\% + 5 \text{ digits})$
Best resolution:	10 μs

Duty Cycle

Ranges:	0 to 100%
Accuracy:	$\pm(0.1\% + 5 \text{ digits})$
Best resolution:	0.01%

Peak Hold

Accuracy:	<10% of peak for >10% of full scale reading
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General Specifications

Display:	5 digits (50,000 count resolution)
Bargraph:	Binary 17 bit expression of main digit decimal
Update Rate:	2/second
Memory location:	10 memories for 10 measured data
RS-232 Output Medium:	Infrared
Operating Temperature:	0° to 40°C at <80% relative humidity
Power:	9V battery: carbon zinc or alkaline NEDA 1604 or equivalent. Typical carbon zinc cell life: 36 hours continuous operation
Safety:	CE approved
Dimensions: (without holster)	width: 3.7 inches (89 mm) Height: 8 inches (160 mm) Depth: 1.7 inches (43.5 mm)
Weight:	14.7 oz (417 gm)
Operating System:	Supplied software compatible with MS Windows® 3.1/95/98
Standard Accessories:	Protective holster, manual, safety probes, temperature adapter and probe, RS-232 cable, and CD ROM
Warranty:	The Model 510 Digital Multimeter is warranted against defects in workmanship and materials for two years.