

SPECIFICATIONS

Accuracy is specified at 18°C to 28°C (64°F to 82°F) with relative humidity up to 90%, for a period of one year after calibration. AC Conversions are ac-coupled, average responding, and calibrated to the RMS value of a sine wave input.

Summary of Accuracy Specifications

The table below provides summary accuracy specifications for basic meter functions.

Basic Accuracy

FUNCTION	BASIC ACCURACY (±% OF READING)
Volts AC ~ V	1.5%
Volts DC ≡ V	0.15%
Resistance Ω	0.2%
Milliamps/Amps DC (mA A [≡])	0.8%
Milliamps/Amps AC (mA A [~])	3.0%/1.5%
Frequency Hz	0.01%

Complete Accuracy Specifications

The complete Meter specifications follow. In the complete specifications, accuracy is given as:

$$\pm([\% \text{ of Reading}] + [\text{Number of Least Significant Digits}])$$

In the 4 1/2 - digit mode, multiply the number of least significant digits (counts) by 10.

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Input Terminals Limits

ROTARY SWITCH FUNCTION	RED LEAD	MIN DISPLAY READING	MAX DISPLAY READING	MAXIMUM INPUT**
~V	VΩ→ RPM	0.01 mV	1000V	300V
≡V	VΩ→ RPM	0.0001V	1000V	300V
≡mV	VΩ→ RPM	0.01 mV	400.0 mV	300V
∥Ω	VΩ→ RPM	0.01Ω (Lo-ohms)	400.0 MΩ	300V
→	VΩ→ RPM	0.0001V	3.000V	300V
mA A~	A mA	0.1 mA 0.01 mA	20.00 A* 400.0 mA	10 A/600V* 400 mA/600V
mA A≡	A mA	0.1 mA 0.001 mA	20.00 A* 400.0 mA	10 A/600V* 400 mA/600V

* 10 A continuous, 20 A overload for 30 seconds maximum.
** 10³ V-Hz maximum.

Volts AC ~V (Input Impedance: 10 MΩ (nominal), <100 pF)

RANGE	RESOLUTION	ACCURACY		COMMON MODE REJECTION RATIO (1 kΩ unbalance)
		45 Hz - 1 kHz	1 kHz - 5 kHz	
400.0 mV	0.1 mV	±(1.5% + 10)	±(1.9% + 10)	>60 dB, dc to 60 Hz
4.000V	0.001V	±(1.5% + 5)	±(1.9% + 5)	>60 dB, dc to 60 Hz
40.00V	0.01V	±(1.5% + 5)	±(1.9% + 5)	>60 dB, dc to 60 Hz
300.0V	0.1V	±(1.5% + 5)	±(1.9% + 5)	>60 dB, dc to 60 Hz
300V	1V	±(2.5% + 5)	±(2.5% + 5)	>60 dB, dc to 60 Hz

* Below a reading of 200 counts, add 10 digits.

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Volts DC \approx V (Input Impedance: 10 M Ω (nominal), < 100 pF)

RANGE	RESOLUTION	ACCURACY	COMMON MODE REJECTION RATIO (1 k Ω unbalance)	NORMAL REJECTION MODE
4.000V	0.001V	$\pm(0.15\% + 2)$	>120 dB at dc, 50 Hz or 60 Hz	>60 dB at 50 Hz or 60 Hz
40.00V	0.01V	$\pm(0.15\% + 2)$	>120 dB at dc, 50 Hz or 60 Hz	>60 dB at 50 Hz or 60 Hz
300.0V	0.1V	$\pm(0.15\% + 2)$	>120 dB at dc, 50 Hz or 60 Hz	>60 dB at 50 Hz or 60 Hz
300V	1V	$\pm(0.3\% + 2)$	>120 dB at dc, 50 Hz or 60 Hz	>60 dB at 50 Hz or 60 Hz

Millivolts DC \approx mV

RANGE	RESOLUTION	ACCURACY	COMMON MODE REJECTION RATIO (1 k Ω unbalance)	NORMAL REJECTION MODE
400.0 mV	0.1 mV	$\pm(0.15\% + 2)$	>120 dB at dc, 50 Hz or 60 Hz	>60 dB at 50 Hz or 60 Hz

Resistance Ω

RANGE	RESOLUTION	ACCURACY*	SHORT CIRCUIT CURRENT
400.0 Ω	0.01 Ω	$\pm(0.2\% + 2)$	700 μ A
4.000 k Ω	0.001 k Ω	$\pm(0.2\% + 2)$	170 μ A
40.00 k Ω	0.01 k Ω	$\pm(0.2\% + 2)$	20 μ A
400.0 k Ω	0.1 k Ω	$\pm(0.2\% + 2)$	2 μ A
4.000 M Ω	0.001 M Ω	$\pm(0.2\% + 2)$	0.2 μ A
40.00 M Ω	0.01 M Ω	$\pm(1\% + 3)$	0.2 μ A
400.0 M Ω **	0.1 M Ω	$\pm(1\% + 20)$	0.2 μ A

*When using 1- Ω Ohms/High Resolution in combination with Touch Hold, Manual Range must be selected.

**These ranges can be selected only in Manual Range.

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Diode Test \rightarrow

RANGE	RESOLUTION	ACCURACY	SHORT CIRCUIT CURRENT
3.000V	0.001V	$\pm(2\% + 2)$	1.0 mA typical

mA/A DC mA A \rightarrow

RANGE	RESOLUTION	ACCURACY	BURDEN VOLTAGE (TYPICAL)
40.00 mA	0.01 mA	$\pm(0.8\% + 2)$	2.3 mV/mA
400.0 mA	0.1 mA	$\pm(0.8\% + 2)$	2.3 mV/mA
4000 mA	1 mA	$\pm(0.8\% + 2)$	0.03 V/A
10.00A *	0.01 A	$\pm(1.3\% + 2)$	0.03 V/A

* 10A continuous, 20A overload for 30 seconds maximum.

mA/A AC (45 Hz to 2 KHz) mA A \sim

RANGE	RESOLUTION	ACCURACY**	BURDEN VOLTAGE (TYPICAL)
40.00 mA	0.01 mA	$\pm(3\% + 10)$	2.3 mV/mA
400.0 mA	0.1 mA	$\pm(3\% + 5)$	2.3 mV/mA
4000 mA	1 mA	$\pm(1.5\% + 5)$	0.03 V/A
10.00A *	0.01A	$\pm(1.5\% + 5)$	0.03 V/A

* 10A continuous, 20A overload for 30 seconds maximum.
 ** Below a reading of 200 counts, add 10 digits.

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Frequency, RPM, Duty Cycle, and Pulse Width

FUNCTION	RANGE	RESOLUTION	ACCURACY	PULSE WIDTH RANGE (ms)#	RESOLUTION (ms)
Frequency* (0.5 Hz to 200 KHz, Pulse Width >2 μs)	199.99 Hz 1999.9 Hz 19,999 KHz 199.99 KHz >200 KHz	0.01 Hz 0.1 Hz 0.001 KHz 0.01 KHz 0.1 KHz	±(0.01% +1) ±(0.01% +1) ±(0.01% +1) ±(0.01% +1) Unspecified	1999.9 5.00 0.500 0.0500	0.1 0.01 0.001 0.0001
RPM 1	30-9,000	1 RPM	± 2 RPM		
RPM 2	60-12,000	1 RPM	± 2 RPM		
%Duty Cycle**	0.0-99.9% (0.5 Hz to 200 KHz, Pulse Width > 2 μs)				
Pulse Width**	0.002-1999.9 ms (4 Hz to 200 KHz, Pulse Width >2 μs)				

Pulse Width range is determined by the frequency of the signal.
 * Frequency measurements can be made on voltage or current inputs. The current inputs are always dc-coupled.
 ** For rise times < 1 μs, Duty Cycle accuracy: ±(0.2% per KHz + 0.1%).
 Pulse Width accuracy: ±(0.002 ms + 3 digits).

Counter Sensitivity and Trigger Level

INPUT RANGE*	MINIMUM SENSITIVITY @ 0.5 Hz - 200 KHz (RMS SINEWAVE)	APPROXIMATE TRIGGER LEVEL (DC VOLTAGE FUNCTION)
400 mV dc	70 mV (to 400 Hz)	40 mV
400 mV ac	150 mV	-
4.000V	0.7V	1.7V
40.00V	7V	4V
300V	70V (≤14 KHz)	40V

*Maximum Input for Specified Accuracy = 10 x range or 300V

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MIN MAX Recording

NOMINAL RESPONSE	ACCURACY
100 ms to 80%	Specified accuracy \pm 12 digits for changes > 200 ms in duration.
1 sec	Same as specified accuracy for changes > 2 seconds in duration.

General

Maximum Voltage between any Terminal and Earth Ground	300V
Input Impedance	10 M Ω (nominal), < 100 pF
Fuse Protection	1A 600V FAST FUSE 15A 600V FAST FUSE
Display (LCD)	Digital Counts: 4,000 19,999 in High Resolution, 4 $\frac{1}{2}$ -digit Mode only. Update Rate: 1/sec in High Resolution, 4 $\frac{1}{2}$ -digit Mode only. 3/sec in RPM, Frequency, Duty Cycle, and Pulse Width. 4/sec in all other functions and ranges.
	Analog 2 x 32 Segments Update Rate: 40/sec Counts: 19,999 Update Rate: 3/sec @ >10 Hz
	Backlight Backlight turns on for 68 seconds, then turns off automatically if not turned off by user.
Meter Operating Temperature	-20 to 55°C (-4 to 131°F)
Meter Storage Temperature	-40 to 60°C (-40 to 140°F)

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Meter Storage Temperature	-40 to 60°C (-40 to 140°F)
Temperature Coefficient	0.05 x (Specified Accuracy)/°C (<18 or >28°C; <64 or >82°F)
Relative Humidity	0% to 90% (0 to 35°C; 32 to 95°F) 0% to 70% (35 to 55°C; 95 to 131°F)
Inductive Pickup	Magnetic field from Spark Plug Pulse to Trigger
Input:	
Output:	12,000
Maximum RPM:	
Electromagnetic Compatibility	In an RF field of 1V/m on all ranges and functions: Total accuracy = Specified Accuracy. Performance above 1 V/m is not specified.
Battery Type	9V, NEDA 1604 or 6F22 or 006P
Battery Life	500 hrs typical with alkaline
Shock, Vibration	Per MIL-T-28800 for a Class 2 Instrument
Size (HxWxL)	
Meter only:	1.25 in x 3.41 in x 7.35 in
With Holster & Flex-Stand:	(3.1 cm x 8.6 cm x 18.6 cm)
	2.06 in x 3.86 in x 7.93 in
	(5.2 cm x 9.8 cm x 20.1 cm)
Weight	
Meter only:	12.5 oz (355g)
With Holster & Flex-Stand:	22.0 oz (624g)
Altitude	2000m
Safety	
Meter:	Complies with EN61010-1:1993, ANSI/ISA S82.01-1994, CAN/CSA 22.2 No. 1010.1:1992 Overvoltage Category III/300 volts. UL License, TUV License, CSA License.
Pickup:	Specified for spark-plug wire use only.