



# DM397

## True RMS Digital Multimeter

# AN ADVANCED METER FOR INDUSTRIAL AND COMMERCIAL TROUBLESHOOTING

*ONE OF THE MOST ADVANCED DIAGNOSTIC MULTIMETERS EVER MADE FOR HVAC/R, ELECTRICAL AND INDUSTRIAL PROCESS DIAGNOSTICS.*

### ■ True RMS

- The standard of industrial maintenance professionals

### ■ Features Include:

- 1000 Volt CAT-III rated for your safety
- Data Logging kit and software included
- High-resolution 5-digit backlit display
- Test lead and fuse error-alerts
- MIN/MAX/AVG recording
- Stores up to 20 readings
- Precision resistance scale (1/1000<sup>th</sup> ohm)
- Temperature (includes probe)
- Capacitance for run & start caps
- Frequency for VFD/VSD and Gen testing
- Duty Cycle and Pulse Width measurement
- 1 Millisecond Peak Capture
- DbM and Db-V for power-out testing
- Easy access fuses and battery



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## Specifications

Accuracy is given as  $\pm$ ([% of reading] + number of digits) at 64° to 78°F with RH% up to 80%, for a period of one year after calibration. True RMS responding accuracies are specified from 5% ~ 100% of range or otherwise specified: Crest Factor <3:1 at full scale and <6:1 at half scale.

### DC Voltage Measurement

Range	Resolution	Accuracy
50 mV	1 $\mu$ V	.05% +10 dgts
500 mV	10 $\mu$ V	.05% +2 dgts
5 V	100 $\mu$ V	
50 V	1 mV	
500 V	10 mV	
1000 V	100 V	0.1% +2 dgts

NMRR : >60dB @ 50/60 Hz  
 CMRR : >120dB DC, 50/60 Hz, Rs = 1k $\Omega$   
 Input Impedance : 10M $\Omega$ , 30 pF nominal  
 (50M $\Omega$ , 100 pF nominal for 50m V & 500 mV ranges)

### AC Voltage Measurement

Range	Resolution	Accuracy			
		40Hz - 1kHz	4kHz - 5kHz	5kHz - 20z	20kHz - 50kHz
500 mV	10 $\mu$ V	0.3%+10	1.0%+10	2.0%+20	Unspecified
5 V	100 $\mu$ V	0.3%+10	0.5%+10	0.5%+10	0.8%+20
50 V	1 mV				
500 V	10 mV	0.4%+10	0.5%+20	Unspecified	Unspecified
1000 V	100 mV				

CMRR : >60dB DC to 60 Hz, Rs = 1k $\Omega$   
 Input Impedance : 10M $\Omega$ , 30 pF nominal  
 (50M $\Omega$ , 100 pF nominal for 50m V & 500 mV ranges)

### DC Current Measurement

Range	Resolution	Accuracy
500 $\mu$ A	10 nA	0.1% + 5
5 mA	100 nA	
50 mA	1 $\mu$ A	
500 mA	10 $\mu$ A	
5 A	100 $\mu$ A	0.3% + 10
10 A	1 mA	0.3% + 20

### AC Current Measurement

Range	Resolution	Accuracy	
		40Hz - 1kHz	1kHz - 10kHz
500 $\mu$ A	10 nA	0.3% + 5	0.8% + 10
5 mA	100 nA		
50 mA	1 $\mu$ A		
500 mA	10 $\mu$ A		
5 A	100 $\mu$ A	0.4% + 10	Unspecified
10 A	1 mA	0.4% + 20	

## (AC+DC) Voltages and (AC+DC) Current

Function	Range	Resolution	Accuracy	
			40Hz - 1kHz	1kHz - 10kHz
DC mV	500 mV	100 $\mu$ V	0.5% + 5	0.8% + 5
DC V	5 V	1 mV	0.5% + 3	0.8% + 3
	50 V	10 mV		
	500 V	100 mV		
DC $\mu$ A	1000 V	1 V	0.8% + 5	0.8% + 5
	500 $\mu$ A	100 nA	0.5% + 3	1.0% + 5
5 mA	1 $\mu$ A			
DC mA	50 mA	10 $\mu$ A		
DC A	500 mA	100 $\mu$ A	0.8% + 10	Unspecified
	5 A	1 mA		
	10 A	10 mA		

## Resistance

Range	Resolution	Accuracy
50 $\Omega$	0.001 $\Omega$	0.5% + 20 *1
500 $\Omega$	0.01 $\Omega$	0.1% + 5 *1
5 k $\Omega$	0.1 $\Omega$	0.1% + 2
50 k $\Omega$	1 $\Omega$	
500 k $\Omega$	10 $\Omega$	
5 M $\Omega$	100 $\Omega$	
50 M $\Omega$	1 k $\Omega$	0.5% + 20

Open Circuit Voltage: <1.3 V DC

\*1 Using relative (REL $\Delta$ ) mode

## Conductance (5,000 counts only)

Range	Resolution	Accuracy
50 nS	0.01 nS	0.1% + 10

## Continuity

Audible threshold:	The beeper sounds if the measured resistance is lower than 10 $\Omega$ , and turns off when greater than about 70 $\Omega$ .
Response time:	< 1 m sec.

## Diode Test

Range	Accuracy	Test Current (typical)	Open Circuit Voltage
4 V	2% + 1	1 mA	<3.0 V DC

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## Capacitance (5,000 counts only)

Range	Resolution	Accuracy
5 nF	1 pF	1.0% + 5 * <sup>2</sup>
50 nF	10 pF	1.0% + 3 * <sup>2</sup>
500 nF	100 pF	
5 µF	1 nF	2.0% + 3
50 µF	10 nF	3.0% + 3
500 µF	100 nF	
5000 µF	1 µF	3.5% + 5

\*1 Accuracy with film capacitor or better

\*2 Using relative (RELA) mode

## Frequency, Duty Cycle, Pulse Width and Temperature

Function	Range	Resolution	Accuracy
Frequency [Minimum Frequency: 0.5 Hz sensitivity 250 mV]	50 Hz	0.001 Hz	0.002% + 3
	500Hz	0.01 Hz	
	5 kHz	0.1 Hz	
	50 kHz	1 Hz	
	500 kHz	10 Hz	
	5 MHz	100 Hz	
Duty Cycle	0.1% to 99.9%	0.1%	0.5 Hz to 300 kHz (pulse width > 3 µ sec.) (0.1% + 0.05% per kHz+1 count) for 5 V input (Logic signals only)
Pulse Width	Input Frequency 0.5 Hz to 300 kHz		Pulse width > 3µs
Temperature	-58° to 2.372°F (-50° to 1.300°C)	0.1°F (0.1°C)	With k-type thermocouple ±5.4°F (±3°C) typical

## dBm and 1mS PEAK Hold (5,000 counts only)

Function	Characteristics	Accuracy
dBm	Selectable reference impedance of 1Ω to 1,999Ω (@ 40 Hz to 20kHz) At 600 Ω: -11.76 dBm to 54.25 dBm Input impedance: 10MΩ, 30 pF nominal	±0.25 dB + 2 digits
1 mS PEAK ±30	Specified voltage or current measurement accuracy counts of the peak value of a single 1 mS pulse.	

## Burden Voltage (A, mA, µA)

Function	Range	Burden Voltage (typical)
mA / µA	500 µA	150 µV / µA
	5000 µA	150 µV / µA
	50 mA	3.3 mV / mA
	500 mA	3.3 mV / mA
A	5 A	0.03 V / A
	10 A	0.03 V / A

## Physical Specifications

Display (LCD)	50,000 count digital primary 5,000 count secondary Updates 4/sec. nominal Analog - 25 segments, updates 40/sec.
Operating temperature	32° to 122°F (0° to 50°C)
Storage temperature	-4° to 140°F (-20° to 60°C)
Temperature coefficient	Nominal 0.15 x (specified accuracy)/°C @ (0° to 18°C or 28° to 50°C) Otherwise as specified
Relative Humidity	0% to 80% @ 32° to 95°F 0% to 70% @ 96° to 122°F
Altitude	Operating - up to 6,500 feet (2,000 m) Storage - up to 32,000 feet (10,000 m)
Battery type	Single 9V battery - NEDA 1604, JIS 006P or IEC 6F 22
Battery life	150 hrs. typical (with backlight off)
Shock vibration	Per MIL-T-PRF 28800 for Class II instruments
Pollution degree	2
Electromagnetic capability (EMC)	Susceptibility - commercial limits for EN 50082-1 Emissions - commercial limits for EN 50081-1
Size (H x W x D)	8.2" x 4.1" x 2.1" (208 x 103 x 54 mm)
Weight	Approximately 1.44 lb (655 g)
Warranty	5 years
Calibration interval	1 year

## Feature Summary

Backlight	For clear readings in poorly lighted areas
Fast auto ranging	Meter automatically selects the best range quickly
AC+DC total RMS (@40Hz to 10 kHz)	Choices for AC only, AC+DC readings or AC and DC Dual display
dBm, dBV	User selectable impedance references for dBm User selectable voltage references for dBV
Auto HOLD	Holds readings on display
Continuity/Open test	Beeper sounds
Fast analog bar graph	25 segments for view of fast events and trends
Memory locations	20
Duty cycle/pulse width	Measures the time that the signal is ON or OFF in % or milliseconds
MIN/MAX mode	Record maximum, minimum and average values
1mS PEAK mode	Captures peaks of 1 millisecond
Close-case calibration	No internal adjustment necessary
Batter/fuse access door	Battery or fuse replaceable without voiding calibration
High-impact over molded case	Protective feature for the meter and user

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The DM397 is an advanced full-featured digital multimeter designed for engineers, HVAC and electrical technicians, whose work demands greater accuracy and resolution. The RS232 data logging kit includes software, and allows any measured parameter to be monitored or recorded to a PC for further analysis. The 50,000 count dual display shows two parameters simultaneously eliminating the need to toggle between selections. The DM397 stands alone as the best value in high-end multimeters.

## The DM397 has the following features:

- True RMS
- All input, ranges, and functions protected to 1000V CAT III
- 1000 AC/DC and AC+DC Volts
- 10 AC/DC and AC+DC Amps
- dBm and dBV
- High resolution Resistance and Conductance
- Frequency / Duty Cycle
- Pulse Width
- Temperature
- Capacitance
- Continuity
- Relative Mode and Diff (RELΔ) mode
- Data logging kit with software
- Data Storage and Recall
- MIN/MAX/AVG
- 1mS Peak Capture
- Audible and Visual input warnings
- Backlit dual display with analog bar-graph
- Closed Case Calibration
- Access to battery and fuses without breaking calibration seals
- Open fuse detection
- Five year limited warranty

## Standard Accessories:

Test Leads .....	ATL55
Alligator Clips .....	AAC3
Battery, 9V.....	NEDA 1604 or 6LR61
Fuse .....	AF38, AF39
Temperature Probe .....	ATT29A
Temperature Plug Adapter.....	ATT70
Software .....	Included
Computer Cable.....	Included

## Optional Accessories:

Flame Safeguard Test Kit .....	ATLFSG
Premium Silicon Leads .....	ATL300
AC/DC Current Clamp Adapter .....	CA383B, CA30
Dual Temperature Adapter .....	TA2K
Line Splitter .....	ALS1
Micro Amp Adapter .....	DLMAT2
Optional Storage Case .....	AC519
Temperature Probe .....	Type K
Thermocouple mV Adapter .....	ATHA1

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