ELECTRICAL SPECIFICATIONS : KM 076

Accuracy is ± (% of reading digits + number of digits) or otherwise specified, at 23°C ± 5°C
Maximum Crest Factor <2.5:1 at full scale & <5:1 at half scale or otherwise specified, and with frequency spectrum not exceeding the specified frequency bandwidth for non-sinusoidal waveforms.

REGULAR CLAMP-ON AC CURRENT

Range	Resolution	Accuracy[1) 2)]
50Hz ~ 100Hz		
60.00 A[3)]	0.01 A	±(1.8%rdg + 5dgts)
600.0 A	0.1 A	
100Hz ~ 400Hz		
60.00 A[3)]	0.01 A	±(2.0%rdg + 5dgts)
600.0 A	0.1 A	

[1)] **Induced error from adjacent current-carrying conductor :** < 0.01A/A
[2)] Specified accuracy is for measurements made at the jaw center. When the conductor is not positioned at the jaw center, add 2% to specified accuracy for position errors.
[3)] Add 10d to the specified accuracy @ < 6A & unspecified accuracy @ < 0.2A

DC VOLTAGE

Range	Resolution	Accuracy
600.0 V	0.1 V	±(1.0%rdg + 5dgts)
1000 V	1 V	

Input Impedance : 10MΩ, 100pF nominal

RESISTANCE

Range	Resolution	Accuracy
600.0 Ω	0.1 Ω	±(1.0%rdg + 5dgts)
6.000KΩ	1 Ω	
60.00KΩ	10 Ω	

Open Circuit Voltage : 1.0VDC typical

HZ LINE LEVEL FREQUENCY

Function	Sensitivity[1)] (Sine RMS)	Range
600 V	50 V	5.00Hz~999.9Hz
1000 V		
60 A (AmpTip™)	20 A	50.00Hz~400.0Hz
60 A	20 A	50.00Hz~400.0Hz
600 A		

Accuracy : ±(1%rdg + 5dgts)
[1)] DC-bias, if any, not more than 50% of Sine RMS

CAPACITANCE

Range	Resolution	Accuracy[1)]
200.0 μF	0.1 μF	±(2.0%rdg + 4dgts)
2500 μF	1 μF	

[1)] Accuracies with film capacitor or better

DIODE TESTER

Range	Resolution	Accuracy[1)]
2.000 V	1 mV	±(1.5%rdg + 5dgts)

Test Current : 0.3mA typically
Open Circuit Voltage : < 3.5VDC typically

AMPTIP™ CLAMP-ON AC CURRENT

Range	Resolution	Accuracy[1) 2) 3) 4)]
DC, 50Hz ~ 60Hz		
60.00 A	0.01 A	±(1.5%rdg + 5dgts)

[1)] **Induced error from adjacent current-carrying conductor :** < 0.01A/A
[2)] Specified with Relative Zero mode applied to offset the non-zero residual readings, if any
[3)] Add 10d to the specified accuracy @ < 4A
[4)] Add 10d to the unspecified accuracy @ < 0.2A

DCμA

Range	Resolution	Accuracy
200.0 μA	0.1 μA	±(1.0%rdg + 5dgts)
2000 μA	1 μA	

Burden Voltage : 3.5mV/μA

AC VOLTAGE (with Digital Low-Pass Filter)

Range	Resolution	Accuracy
50Hz ~ 60Hz		
600.0 V	0.1 V	±(1.0%rdg + 5dgts)

Input Impedance : 10MΩ, 100pF nominal

Non-Contact EF-Detection

Typical Voltage	Bar-Graph Indication
20V (tolerance : 10V~36V)	-
55V (tolerance : 23V~83V)	- -
110V (tolerance : 59V~165V)	- - -
220V (tolerance : 124V~330V)	- - - -
440V (tolerance : 250V~1000V)	- - - - -

Indication : Bar-graph segments & audible beep tones proportional to the field strength
Detection Frequency : 50/60Hz
Detection Antenna : Inside the top side of the stationary jaw
Probe-Contact EF-Detection : For more precise indication of live wires, such as distinguishing between live and ground connections, use one single probe to test via terminal COM for direct contact EF-Detection with best sensitivity.

TEMPERATURE

Range	Accuracy
-40.0ºC ~ 99.9ºC	1.0%~0.8ºC
100ºC ~ 400ºC	1.0%~1ºC
-40.0ºF ~ 211.8ºF	1.0%~1.5ºF
212ºF ~ 752ºF	1.0%~2ºF

K-type thermocouple range & accuracy not included

CREST (PEAK-HOLD)

Accuracy	Add 250 digits to specified accuracy for changes > 5ms

PEAK-RMS (ACV & ACA)

Response	80ms to > 90%

AUDIBLE CONTINUITY TESTER

Audible Threshold	Between 10Ω and 250Ω
Response Time	32ms approx.

KUSAM-MECO®
An ISO 9001:2008 Company

USE TRUE RMS WHEN MEASURING AC WAVEFORMS

The waveforms on today's AC power lines are anything but clean. Electronic equipment such as office computers, with their switching power supplies, produce harmonics that distort power-line waveforms. These distortions make measuring AC voltage inaccurate when you use an averaging DMM.

Average voltage measurements work fine when the signal you're measuring is a pure sine wave, but errors mount as the waveform distorts. By using true RMS measurements, however, you can measure the equivalent heating effect that a voltage produces, including the heating effects of harmonics. Table 1 shows the difference between measurements taken on averaging DMMs & those taken on true RMS DMMs. In each case, the measured signal's peak-to-peak value is 2V. Therefore, the peak value is 1V.

For a 1-V peak sine wave, the average & RMS values are both 0.707V. But when the input signal is no longer a sine wave, differences between the RMS values & the average readig values occur. Those errors are most prominent when you are measuring square waves & pulse waveforms, which are rich in harmonics.

Table 1. Average versus true RMS comparison of typical waveforms.

Waveform	Actual Pk-Pk	True RMS Reading	Average Reading	Reading Error
Sine Wave	2.000	0.707	0.707	0%
Triangle Wave	2.000	0.577	0.555	-3.8%
Square Wave	2.000	1.000	1.111	+11.1%
Pulse (25% duty Cycle)	2.000	0.433	0.416	-3.8%
Pulse (12.5% duty Cycle)	2.000	0.331	0.243	-26.5%
Pulse (6.25% duty Cycle)	2.000	0.242	0.130	-46.2%

One limitation to making true RMS measurements is crest factor, and you should consider crest factor when making AC measurements. Crest factor is the ratio of a waveform's peak ("crest") voltage to its RMS voltage. Table 2 shows the crest factors for ideal waveforms.

Table 2. Crest factors of typical waveforms.

Waveform	Crest Factor
DC	1.000
Square Wave	1.000
Sine Wave	1.414
Triangle Wave	1.732
Pulse (25% duty Cycle)	1.732
Pulse (12.5% duty Cycle)	2.646
Pulse (6.25% duty Cycle)	3.873

A DMM's specifications should tell you the maximum crest factor that the meter can handle while maintaining its measurement accuracy. True RMS meters can handle higher crest factors when a waveform's RMS voltage is in the middle of the meter's range setting. Typically, a DMM may tolerate a crest factor of 3 near the top of its scale but it might handle a crest factor of 5 that's in the middle of the range. Therefore, if you're measuring waveforms with high crest factors (greater than 3), you should adjust the DMM so the measured voltage is closest to the center of the measurement range.

Another limitation of true RMS is speed. If you're measuring relatively clean sine waves, then you can save time & money by using as averaging DMM. True RMS meters cost more than averaging meters and can take longer to produce measurements, especially when measuring millivolt-level AC signals. At those low levels, true RMS meters can take several seconds to stabilize a reading. Averaging meters won't leave you waiting.