

**KUSAM-MECO**

®

An ISO 9001:2015 Company

# INTRINSICALLY SAFE TRUE RMS DIGITAL MULTIMETER WITH PC INTERFACE MODEL - KM 822EX

- Ex-rating : Ex ib IIA T4 Gb / ib I Mb
- Intrinsicly Safe
- These meters comply to IEC SANS 600790:2000 & IEC SANS 60079-11:1999, which is applicable for electrical apparatus for use in explosive gas atmospheres. Part 0 (general requirements) & Part 1 (intrinsic). The approved explosive protection rating of this equipment is suitable for use in Zone 1 hazardous area. Group I (coal mines) underground & Group II (surface).

### \* SPECIAL FEATURES :

- Splash / Drop Proof
- 1000V AC / DC
- Dual Display
- Backlit Display
- Beep-Jack Audible & Visible Input Warning
- Relative Zero Mode
- PC Interface Capability
- Data Hold
- Fuse 1A / 1kV (IR10kA) for mA & mA (1000V HRC Fuse)
- Fuse 11A / 1kV (IR20kA) for A (1000V HRC Fuse)

### \* GENERAL SPECIFICATIONS :

- Sensing : AC True RMS
- Display : 9999 Counts : ACV, DCV, Hz & nS  
6000 Counts : mV,  $\mu$ A, mA, A, Ohm & Capacitance
- Update Rate :  
Digital Display : 5 per second nominal;  
41 Segments Bar-graph : 60 per second max
- Low Battery : Below approx 7V
- Operating Temperature : 0°C to 45°C
- Relative Humidity : Max. 80% R.H. for Temperature up to 31°C decreasing linearly to 50% R.H. at 45°C
- Pollution degree : 2
- Storage Temperature : -20°C to 60°C, <80% R.H. (with battery removed)
- Altitude : Operating below 2000m
- Temperature Coefficient : nominal 0.15 x ( specified accuracy)/°C @ (0°C ~ 18°C or 28°C ~ 45°C), or otherwise specified.
- Power Consumption : 5mA typical
- APO Timing : Idle for 30 minutes
- APO Consumption : 50 $\mu$ A typical
- Power Supply : Single Alkaline 9V batteries.
- Weight : Approx. 635gm with holster
- Dimension : Approx. 208(L)x103(W)x64.5(H)mm with holster

### \* ACCESSORIES :

Test lead pair, Battery installed, User Manual, Carrying case.

### \* OPTIONAL ACCESSORIES :

USB interface kit BU-86X, BMH-01 Magnetic Hanger.

### \* FEATURES :

- DC Voltage Basic Accuracy 0.08%
- 4 Digit 10,000 counts large easy to read Backlight LCD display
- Fast Measurements, 5/sec;  
Fully Auto-Ranging
- Logic & Line Level Frequency
- Logic Level Duty Cycle Readings & Diode Tester
- Fast Audible Continuity
- Auto Power Off
- Warranty : 1(one) year.

### \* MARKING ON METER :

- MTEEx-MS/19.0358 X
- Ex Rating: Ex ib IIA T4 Gb
- Ex ib I Mb.
- IP 64



Test Lead Pair



Carrying Case



USB Interface Kit  
BU-86X  
(Optional)



Magnetic Hanger  
(Optional)

### \* SAFETY :

- Double insulation per IEC61010-1 2nd Ed., EN61010-1 2nd Ed., UL61010-1 2nd Ed. & CAN/CSA C22.2 No. 61010.1-0.92 to Category IV 1000VAC & VDC.
- Transient Protection : 12 kV (1.2/50 $\mu$ s surge)
- Terminals (to COM) Measurement Category :  
V / A / mA $\mu$ A : Category IV 1000VAC & DC
- Overload Protection :  
 $\mu$ A & mA : 0.44A/1000Vac & Vdc, IR 10kA or better, F Fuse  
A : 11A/1000Vac & Vdc, IR 20kA or better, F Fuse  
V : 1050Vrms, 1450Vpeak  
mV,  $\Omega$  & Others : 600Vdc and Vac rms
- EMC : Meets EN61326-1:2006 (EN55022, EN61000-3-2, EN61000-3-3, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11)  
In an RF field of 3V/m :  
Capacitance function is not specified  
Other function ranges : Total Accuracy = Specified Accu. + 100 dgts  
Performance above 3V/m is not specified.

All Specifications are subject to change without prior notice.

## ELECTRICAL SPECIFICATIONS : KM 822EX

Accuracy is  $\pm$  (% readings digits + number of digits) or otherwise specified, at 23°C  $\pm$  5°C & less than 75% relative humidity.

True RMS Voltage & Current accuracies are specified from 10% to 100% of range or otherwise specified.

Maximum Crest Factor < 2:1 at full scale & <4:1 at half scale, and with frequency components within the specified frequency bandwidth for non-sinusoidal waveforms.

### AC VOLTAGE

Range	Resolution	Accuracy
<b>50Hz ~ 60Hz</b>		
60.00 mV	0.01 mV	$\pm(0.5\% \text{rdg} + 3 \text{dgts})$
600.0 mV	0.1 mV	
9.999 V	1 mV	
99.99 V	10 mV	
999.9 V	100 mV	
<b>40Hz ~ 500Hz</b>		
60.00 mV	0.01 mV	$\pm(0.8\% \text{rdg} + 4 \text{dgts})$
600.0 mV	0.1 mV	
9.999 V	1 mV	$\pm(1.0\% \text{rdg} + 4 \text{dgts})$
99.99 V	10 mV	
999.9 V	100 mV	$\pm(2.0\% \text{rdg} + 4 \text{dgts})$
<b>500Hz ~ 1kHz</b>		
60.00 mV	0.01 mV	$\pm(2.0\% \text{rdg} + 3 \text{dgts})$
600.0 mV	0.1 mV	
9.999 V	1 mV	$\pm(1.0\% \text{rdg} + 4 \text{dgts})$
99.99 V	10 mV	
999.9 V	100 mV	$\pm(2.0\% \text{rdg} + 4 \text{dgts})$
<b>1kHz ~ 3kHz</b>		
60.00 mV	0.01 mV	$\pm(2.0\% \text{rdg} + 3 \text{dgts})$
600.0 mV	0.1 mV	
9.999 V	1 mV	$\pm(3.0\% \text{rdg} + 4 \text{dgts})$
99.99 V	10 mV	
999.9 V	100 mV	
<b>3kHz ~ 20kHz</b>		
60.00 mV <sup>1)</sup>	0.01 mV	$\pm(2\% \text{rdg} + 3 \text{dgts})$
600.0 mV <sup>1)</sup>	0.1 mV	
9.999 V <sup>2)</sup>	1 mV	3dB
99.99 V	10 mV	3dB
999.9 V	100 mV	Unspec'd

<sup>1)</sup> Specified from 30% to 100% of range.

<sup>2)</sup> For 3kHz ~ 15kHz only

Input Impedance : 10M $\Omega$ , 50pF nominal  
(80pF nominal for mV ranges)

### DC VOLTAGE

Range	Resolution	Accuracy
60.00 mV	0.01 mV	$\pm(0.12\% \text{rdg} + 2 \text{dgts})$
600.0 mV	0.1 mV	$\pm(0.06\% \text{rdg} + 2 \text{dgts})$
9.999 V	1 mV	$\pm(0.08\% \text{rdg} + 2 \text{dgts})$
99.99 V	10 mV	
999.9 V	100 mV	

Input Impedance : 10M $\Omega$ , 50pF nominal  
(80pF nominal for 600mV range)

### AC & AC+ DC CURRENT

Range	Resolution	Accuracy	Burden Voltage
<b>50Hz ~ 60Hz</b>			
600.0 $\mu$ A	0.1 $\mu$ A	$\pm(0.6\% \text{rdg} + 3 \text{dgts})$	0.08mV / $\mu$ A
6000 $\mu$ A	1 $\mu$ A		
60.00 mA	0.01 mA	$\pm(1.0\% \text{rdg} + 3 \text{dgts})$	2.1mV / mA
600.0 mA	0.1 mA		
6.000 A	0.001 A	$\pm(0.8\% \text{rdg} + 6 \text{dgts})$	0.02V / A
10.00 A <sup>1)</sup>	0.01 A		
<b>40Hz ~ 1kHz</b>			
600.0 $\mu$ A	0.1 $\mu$ A	$\pm(0.8\% \text{rdg} + 4 \text{dgts})$	0.08mV / $\mu$ A
6000 $\mu$ A	1 $\mu$ A		
60.00 mA	0.01 mA	$\pm(1.0\% \text{rdg} + 4 \text{dgts})$	2.1mV / mA
600.0 mA	0.1 mA		
6.000 A	0.001 A	$\pm(0.8\% \text{rdg} + 6 \text{dgts})$	0.02V / A
10.00 A <sup>1)</sup>	0.01 A		

<sup>1)</sup> 10A continuous, > 10A to 20A for 30 second max with 5 minutes cool down interval

### DC CURRENT

Range	Resolution	Accuracy	Burden Voltage
600.0 $\mu$ A	0.1 $\mu$ A	$\pm(0.2\% \text{rdg} + 4 \text{dgts})$	0.08mV / $\mu$ A
6000 $\mu$ A	1 $\mu$ A		
60.00 mA	0.01 mA		2.1mV / mA
600.0 mA	0.1 mA		
6.000 A	0.001 A		0.02V / A
10.00 A <sup>1)</sup>	0.01 A		

<sup>1)</sup> 10A continuous, > 10A to 20A for 30 second max with 5 minutes cool down interval

### CAPACITANCE

Range	Accuracy <sup>1)</sup>
60.00nF, 600.0nF	0.8% + 3d
6.000 $\mu$ F	1.0% + 3d
60.00 $\mu$ F	2.0% + 3d
600.0 $\mu$ F <sup>2)</sup>	3.5% + 5d
6.000mF <sup>2)</sup>	5.0% + 5d
25.00mF <sup>2)</sup>	6.5% + 5d

<sup>1)</sup> Accuracies with film capacitor or better

<sup>2)</sup> In manual-ranging mode, measurements not specified below 50.0 $\mu$ F, 0.54mF and 5.4mF for 600.0 $\mu$ F, 6.000mF and 25.00mF ranges respectively.

### RESISTANCE (OHMS)

Range	Resolution	Accuracy
600.0 $\Omega$	0.1 $\Omega$	$\pm(0.1\% \text{rdg} + 3 \text{dgts})$
6.000 k $\Omega$	0.001 k $\Omega$	
60.00 k $\Omega$	0.01 k $\Omega$	
600.0 k $\Omega$	0.1 k $\Omega$	$\pm(0.4\% \text{rdg} + 3 \text{dgts})$
6.000 M $\Omega$	0.001 M $\Omega$	
60.00 M $\Omega$	0.01 M $\Omega$	$\pm(1.5\% \text{rdg} + 5 \text{dgts})$

Open Circuit Voltage : < 1.2VDC (<1.0VDC for 60M $\Omega$  range)

All specifications are subject to change without prior notice.

## ELECTRICAL SPECIFICATIONS : KM 822EX

### AUDIBLE CONTINUITY TESTER

<b>Audible threshold</b>	Between 20Ω and 300Ω
<b>Response time</b>	< 100μs

### DIODE TESTER

Range	Accuracy
2.000V	±(1.0%rdg + 1dgts)

Test Current (Typically) : 0.4mA  
Open Circuit Voltage : < 3.5V DC

### CREST MODE (INSTANTANEOUS PEAK HOLD)

**Accuracy :**  
Specified accuracy adds 250 digits for changes > 1.0ms in duration

### LINE LEVEL FREQUENCY (~Hz)

Function Range	Frequency	Sensitivity (sine Rms)
AC 60.00mV	15.00 ~ 50.00kHz	40mV
AC 600.0mV		60mV
AC 9.999V	15.00 ~ 10.00kHz	2.5V
AC 99.99V		25V
AC 999.9V		100V
AC 600.0μA	15.00 ~ 3.000kHz	200μA
AC 6000μA		600μA
AC 60.00mA		40mA
AC 600.0mA		60mA
AC 6.000A		4A
AC 10.00A		6A

Accuracy : 0.04% + 4d

### LOGIC LEVEL FREQUENCY (⏏ Hz) & DUTY CYCLE (D%)

@DCmV Function	Range	Accuracy <sup>1)</sup>
Frequency	5.00Hz ~ 1.000MHz	±(0.04%rdg + 4dgts)
Duty Cycle	0.00% ~ 100.0%	±(3d/kHz + 2d <sup>2)</sup> )

<sup>1)</sup> Sensitivity : 2.5Vp (Square wave) for 3V & 5V Logic Family

<sup>2)</sup> Specified Frequency : 5Hz ~ 10kHz

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# INTRINSICALLY SAFE TRUE RMS DIGITAL MULTIMETER WITH PC INTERFACE MODEL - KM 822EX

“KUSAM-MECO” offers Intrinsically safe Digital Multimeter Model KM 822EX suitable for use in explosive / hazardous gas atmospheres. These meters comply to IEC SANS 600790:2000 & IEC SANS 60079-11:1999, which is applicable for electrical apparatus for use in explosive gas atmospheres. Part 0 (general requirements) & Part 1 (intrinsic). The approved explosive protection rating of this equipment is suitable for use in Zone 1 hazardous area. Group I (coal mines) underground & Group II (surface).

EX	ib	I / II	T4
Explosion protected	Explosive atmosphere between 10 to 1000hrs/year Zone I	Group 1 & 2 C gases	Temperature Class 4 85°C

As this is a hand held instrument to be used as & when required for measurement of electrical parameters for short duration & not for continuous monitoring (e.g. fixed gas detectors- on line) class **ib** is applicable for such applications. Class **ia** is recommended only where continuous monitoring of the measured parameters is required e.g. fixed online gas detectors or recording instruments etc & the explosive atmosphere is >1000 hrs / year. (Zone 0).

In addition to the above feature DMM KM 822EX has the functions for measuring TRMS AC Voltage (40Hz ~ 20kHz), DC Voltage, AC & AC+DC Current, DC Current, Resistance, Line level Frequency, Capacitance, Logic level Frequency & Duty Cycle, Diode & Continuity Test.

The Transient protection is 12KV.

It has sturdy Splash Proof / Drop Proof construction. The body is made from self extinguishing poly carbonate. For safety, Beep-Jack Audible & visible input warning is featured in this instruments. It has PC Interface.

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