

TRMS DIGITAL MULTIMETER WITH VFD, EF-DETECTION 3PHASE ROTATION-R & 3PHASE ROTATION-M Model KM 239R

SPECIAL FEATURES :

- **Display** : 3-5/6 digits 6000 counts LCD display
- DC μ A function for HVAC / R flame sensor application.
- Auto V(LoZ), VFD V & Hz Function
- EF-Detection (NCV)
- Paper White Backlight Display
- Auto Power Off
- Auto-ranging MAX/MIN/AVG record
- Diode & Continuity Test
- Display Hold; Relative zero mode.
- Low Battery Indication
- Temperature Function
- BeepLit Continuity, Features Audible Beep & Visible Backlight Effects
- Beep-Jack Input warning against improper A-terminal plug in
- Auto-ranging Relative Zero Mode
- 3phase rotation-R(Regular-sensitivity mode) for supply systems(probe-contact)
- 3phase rotation-M (Hi-sensitivity mode) for Motors (probe-contact)
- Rugged Fire retarded casing.

GENERAL SPECIFICATIONS :

- * **Sensing** : TRUE RMS AC conversion
- * **IP Rating** : IP40
- * **Update Rate** : 5 per second nominal
- * **Operating Temperature** : -10°C to 45°C
- * **Relative Humidity** : Maximum relative humidity 80% for temperature upto 31°C decreasing linearly to 50% relative humidity at 45°C
- * **Altitude** : Operating Below 2000m.
- * **Storage Temperature** : -20°C to 60°C, <80% R.H. With battery removed from meter.
- * **Pollution Degree** : 2
- * **Drop** : 1 meter.
- * **Temperature Coefficient** : nominal 0.15 x (specified accuracy) /°C @ (-10°C~18°C or 28°C~45°C), or otherwise specified.
- * **Low battery** : Below approx. 2.5V
- * **Power Consumption** : Typical 3.2mA
- * **APO Consumption** : Typical 10 μ A
- * **APO Timing** : Idle for 30 minutes
- * **Power Supply** : 1.5V AAA battery x 2
- * **Dimension** : 161(L) X 80(W) X 50(H) mm (with Holster)
- * **Weight** : Approx. 334 gm (with Holster)

SAFETY :

- **Transient Protection** : 6.0kV lightning surge (1.2/50 μ s)
- **Safety** : Double insulation per IEC/UL/EN61010-1 Ed. 3.0, IEC/UL/EN61010-2-030 Ed. 1.0, IEC/UL/EN61010-2-033 Ed. 1.0, IEC/UL/EN61010-031 Ed. 1.1 & the corresponding CAN/CSA-C22.2 regulations to measurement CAT II 1000V, CAT III 600V and CAT IV 300V AC & DC.
- **E. M. C.** : Meets EN61326-1:2013
In an RF field of 3V/m :
Temperature function is not specified.
Ohm function : Total Accuracy = Specified Accuracy + 15 digits
Other function ranges : Total Accuracy = Specified Accuracy
Performance above 3V/m is not specified.
- **Terminals (to COM) Measurement Category** :
V/ mA μ A / A / L3 : CAT II 1000 Volts, CAT III 600V and CAT IV 300 Volts AC & DC.
- **Overload Protections** :
A : 11A / 1000V DC/AC rms, IR 20kA, F fuse or better
V, Auto V & L3 : 1100V DC/AC rms
mV, Ω & Others : 1000V DC/AC rms

ACCESSORIES : Test leads pair, Alligator clip set, Batteries included, User's Manual, BKP60 banana plug type-K Thermocouple & Carrying case.

OPTIONAL ACCESSORIES : Magnetic Hanger, BKB32 banana plug to type-K socket plug adaptor.

Current Clamp Adaptor CA500, CA1000, CA2000, High Voltage Probe PD-28.

CAT II 1000V
CAT III 600V
CAT IV 300V
UL
APPROVED

6 KV
Transient
Protection

25 FUNCTIONS 50 RANGES

NEW



Magnetic Hanger

All Specifications are subject to change without prior notice.

ELECTRICAL SPECIFICATIONS - KM 239R

Accuracy is $\pm$ (% reading digits + number of digits) or otherwise specified, at 23°C $\pm$ 5°C

ACV & ACA accuracies are specified from 5% to 100% of range or otherwise specified. Maximum Crest Factor <2:1 at full scale & <4:1 half scale, and with frequency components fall within the meter specified frequency bandwidth for non-sinusoidal waveforms.

DC VOLTAGE

Range	Resolution	Accuracy
60.00 mV	10 μ V	$\pm(0.3\%rdg + 2dgt)$
600.0 mV	100 μ V	
6.000 V	1 mV	
60.00 V	10 mV	$\pm(0.4\%rdg + 2dgt)$
600.0 V	100 mV	$\pm(0.2\%rdg + 2dgt)$
1000 V	1 V	$\pm(0.4\%rdg + 2dgt)$

Input Impedance : 10M Ω , 54pF nominal

AC CURRENT

Range	Resolution	Accuracy	Burden Voltage
50Hz -- 400Hz			
6.000 A ²⁾	1 mA	$\pm(1.0\%rdg + 3dgt)$	0.04 V / A
10.00 A ¹⁾	10 mA		0.04 V / A

¹⁾ 10A continuous, >10A to 20A for 30 Sec. Max with 5 minutes cool down interval

²⁾ <5d non-zero residue may appear when backlight is on, which will not affect the specified measuring range & accuracy.

DC CURRENT

Range	Resolution	Accuracy	Burden Voltage
6.000 A	1 mA	$\pm(0.7\%rdg + 3dgt)$	0.04 V / A
10.00 A ¹⁾	10 mA		0.04 V / A

¹⁾ 10A continuous, >10A to 20A for 30 Sec. Max with 5 minutes cool down interval
Overload Protection type : HBC fuse

AC μ A

Range	Resolution	Accuracy	Burden Voltage ¹⁾
50Hz -- 400Hz			
200.0 μ A	100 nA	$\pm(1.0\%rdg + 3dgt)$	2.5 mV/ μ A
2000 μ A	1 μ A		2.5 mV/ μ A

¹⁾ Combination PTC protective impedance is being used.

DC μ A

Range	Resolution	Accuracy	Burden Voltage ¹⁾
200.0 μ A	100 nA	$\pm(0.7\%rdg + 3dgt)$	2.5 mV/ μ A
2000 μ A	1 μ A		2.5 mV/ μ A

¹⁾ Combination PTC protective impedance is being used.

DC μ A function is useful for HVAC / R flame sensor application.

ACmV

Range	Resolution	Accuracy
10Hz -- 500Hz		
60.00mV ¹²⁾	10 μV	±(1.0%rdg + 3dgts)
600.0mV ³⁾	100 μV	
500Hz -- 800Hz		
60.00mV ¹²⁾	10 μV	±(2.0%rdg + 3dgts)
600.0mV ³⁾	100 μV	

Input Impedance : 10M Ω , 54pF nominal

¹⁾ <5d non-zero residue may appear when backlight is on, which will not affect the specified measuring range & accuracy.

²⁾ Signal peak absolute values, including DC bias, less than 130mV_{peak}

³⁾ Signal peak absolute values, including DC bias, less than 1300mV_{peak}

AC VOLTAGE

Range	Resolution	Accuracy
50Hz -- 60Hz		
6.000 V ¹⁾	1 mV	±(0.7%rdg + 3dgts)
60.00 V	10 mV	
600.0 V	100 mV	
1000 V	1 V	
45Hz -- 440Hz		
6.000 V ¹⁾	1 mV	±(2.0%rdg + 3dgts)
60.00 V	10 mV	
600.0 V	100 mV	
1000 V	1 V	

Input Impedance : 10M Ω , 54pF nominal

¹⁾ <5d non-zero residue may appear when backlight is on, which will not affect the specified measuring range & accuracy.

VFD AC VOLTAGE (with Low Pass Filter)

Range	Resolution	Accuracy ¹⁾
10Hz -- 100Hz (fundamental)		
600.0 V	100 mV	±(1.0%rdg + 3dgts)
1000 V	1 V	
100Hz -- 400Hz (fundamental)		
600.0 V	100 mV	±(10%rdg + 3dgts) ²⁾
1000 V	1 V	

¹⁾ Not specified for fundamental frequency >400Hz

²⁾ Accuracy linearly decreases from 1% + 3d @ 100Hz to 10% + 3d @ 400Hz

AUTOV_ AC VOLTAGE (LoZ)

Range	Resolution	Accuracy ¹⁾
45Hz -- 440Hz		
600.0 V	100 mV	$\pm(2.0\%rdg + 3dgt)$
1000 V	1 V	

¹⁾ Not specified at <1VAC

Threshold : >1VAC nominal

Input Impedance : Initially approx. 2.1k Ω , 164pF nominal; Impedance increases abruptly within a fraction of a second as display voltage is above 50V (typical).

Ended up impedances vs display voltages typically are:

12k Ω @100V
100k Ω @300V
240k Ω @600V
580k Ω @1000V

AUTOV_ DC VOLTAGE (LoZ)

Range	Resolution	Accuracy ¹⁾
600.0 V	100 mV	$\pm(2.0\%rdg + 3dgt)$
1000 V	1 V	

¹⁾ Not specified at <1VDC

Threshold : > + 1.0VDC or < -1.0VDC nominal

Input Impedance : Initially approx. 2.1k Ω , 164pF nominal; Impedance increases abruptly within a fraction of a second as display voltage is above 50V (typical).

Ended up impedances vs display voltages typically are:

12k Ω @100V
100k Ω @300V
240k Ω @600V
580k Ω @1000V

All Specifications are subject to change without prior notice.

ELECTRICAL SPECIFICATIONS - KM 239R

CAPACITANCE

Range	Resolution	Accuracy
2000 nF	1 nF	$\pm(1.5\%rdg + 2dgt)$
20.00 μ F	10 nF	
200.0 μ F	100 nF	
2000 μ F	1 μ F	$\pm(4.5\%rdg + 10dgt)$
10.00 mF	10 μ F	

Accuracies with film apacitor or better

TEMPERATURE

Range	Resolution	Accuracy ⁽¹⁾⁽²⁾
-40.0°C ~ 99.9°C	0.1°C	$\pm(1\%rdg + 1^{\circ}C)$
100°C ~ 400°C	0.1°C	
-40.0°F ~ 99.9°F	0.1°F	$\pm(1\%rdg + 2^{\circ}F)$
100°F ~ 752°F	0.1°F	

¹⁾ Accuracies assume meter interior & the ambient have reached the same temperature (isothermal stage) for a correct junction voltage compensation. Allow enough settling time for a significant change of ambient temperature. It can take up to an hour for changes > 5°C.

²⁾ Type-K thermocouple range & accuracy not included.

LINE FREQUENCY

Function	Sensitivity (Sine RMS)	Range
60 mV	50 mV	10Hz - 50kHz
600 mV	50 mV	10Hz - 50kHz
6 V	5 V	10Hz - 50kHz
60 V	10 V	10Hz - 50kHz
600 V	50 V	10Hz - 1kHz
1000 V	500 V	10Hz - 1kHz
VFD 600 V	50 V	10Hz - 1kHz
VFD 1000V	500 V	10Hz - 1kHz
200 μ A	50 μ A	10Hz - 5kHz
2000 μ A	500 μ A	10Hz - 5kHz
6 A	4 A	50Hz - 1kHz
10 A	8 A	50Hz - 1kHz

Accuracy : 0.03%+2d

BEEPLIT CONTINUITY TESTER

Continuity Threshold :	Between 30 Ω and 480 Ω
Continuity on Response time :	<15ms
Audible Indication:	Beep sound
Visible Indication:	LCD Backlight

DIODE TESTER

Range	Resolution	Accuracy
3.000 V	100mV	$\pm(0.9\%rdg + 2dgt)$

Test Current : 0.3mA typical.

Open Circuit Voltage : <3.2VDC typical.

OHMS

Range ⁽¹⁾	Resolution	Accuracy
600.0 Ω	100 m Ω	$\pm(0.3\%rdg + 3dgt)$
6.000 k Ω	1 Ω	
60.00 k Ω	10 Ω	$\pm(0.5\%rdg + 3dgt)$
600.0 k Ω	100 Ω	
6.000 M Ω ⁽²⁾	1 k Ω	$\pm(0.9\%rdg + 3dgt)$ ⁽⁴⁾
60.00 M Ω ⁽³⁾	10 k Ω	

¹⁾ Open Circuit Voltage : 1.6VDC typical.

²⁾ Constant Test Current : 0.2 μ A Typical

³⁾ Constant Test Current : 0.02 μ A Typical

⁴⁾ 5% + 20d @ > 30M Ω .

NON-CONTACT EF-DETECTION

Bar-Graph Indication	EF-H (Hi Sensitivity)	EF-L (Lo Sensitivity)
	Typical Voltage (Tolerance)	
-	10V (3V ~ 19V)	40V (16V ~ 71V)
--	20V (10V ~ 38V)	80V (32V ~ 142V)
---	40V (21V ~ 79V)	160V (63V ~ 285V)
----	80V (40V ~ 156V)	300V (105V ~ 608V)
-----	160V (>80V)	500V (>300V)

Indication : Bar-graph segments & audible beep tones proportional to the field strength

Detection Frequency : 50/60Hz

Detection Antenna : Top left end of the meter

Probe-Contact EF-Detection : For more precise indication of live wires, such as distinguishing between live and ground connections, use direct contact testing with one single test-probe via an input terminal COM or V. The COM terminal (Black) has the best sensitivity.

Ⓜ 3-PHASE MOTOR ROTATION FUNCTION

Hi-sensitivity mode (Ⓜ) (It detects low signal)	
Voltage Range	0.4V ~ 1000V
Frequency Range	3Hz ~ 400Hz

Out put generated from motor rotation for checking phase connection of motors.

Ⓡ 3-PHASE ROTATION FUNCTION

Normal sensitivity mode (Ⓡ)	
Voltage Range	65V ~ 1000V
Frequency Range	35Hz ~ 400Hz

For identifying phase sequence of Electricity supply.

All Specifications are subject to change without prior notice



Shop no.18, 1st Floor, CIDCO Shopping Complex, Plot # 9, Sector-7, Rajiv Gandhi Marg,
Sanpada, Navi Mumbai - 400705. Sales Direct : +91-9867488006, 9867675093
Email : sales@kusam-meco.co.in Web.: www.kusamelectrical.com