KUSAM-MECO®

LIST OF PRODUCTS

* Digital Multimeter
* AC Clamp Adaptor
* Thermo Anemometer
* Distance Meter
* Network Cable Tester
* Earth Resistance Tester
* DC Power Supplies
* Calibrators
* Frequency Counter
* Phasing Sticks
* Waterproof Pen Testers
* EMF Detector
* Digital AC & AC/DC Clampmeter
* AC/DC Current Adaptor
* Thermo Hygrometer
* Digital Lux Meter
* Power Factor Regulator
* Digital Panel Meters
* High Voltage Detectors
* Gas Detectors
* Function Generator
* Battery Tester
* Solar Power Meter
* Discharge Rods(400 KV)
* Wood, Paper & Grain Moisture Meter
* Transistorised Electronic Analog & Digital Insulation Resistance Testers(upto 15 KV)
* Digital Sound Level Meter & Sound Level Calibrator
* Digital contact & Non-contact Type Tachometer
* Digital Non-contact (infrared) Thermometer/ Thermal Imaging Camera
* Maximum Demand Controller/Digital Power Meter
* Digital Hand Held Temperature Indicators

KUSAM-MECO®

OFFICE ADDRESS / SERVICE CENTER

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KUSAM-MECO®

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AN ISO 9001:2015 COMPANY

TRMS DIGITAL INSULATION MULTIMETER MODEL - KM 878



OPERATION MANUAL

KUSAM-MECO®

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KUSAM-MECO®

WARRANTY

Each “KUSAM-MECO” product is warranted to be free from defects in material and workmanship under normal use & service. The warranty period is one year (12 months) and begins from the date of despatch of goods. In case any defect occurs in functioning of the instrument, under proper use, within the warranty period, the same will be rectified by us free of charges, provided the to and fro freight charges are borne by you.

This warranty extends only to the original buyer or end-user customer of a “KUSAM-MECO” authorized dealer.

This warranty does not apply for damaged Ic's, fuses, burnt PCB's, disposable batteries, carrying case, test leads, or to any product which in “KUSAM-MECO’s” opinion, has been misused, altered, neglected, contaminated or damaged by accident or abnormal conditions of operation or handling.

“KUSAM-MECO” authorized dealer shall extend this warranty on new and unused products to end-user customers only but have no authority to extend a greater or different warranty on behalf of “KUSAM-MECO”.

“KUSAM-MECO’s” warranty obligation is limited, at option, free of charge repair, or replacement of a defective product which is returned to a “KUSAM-MECO” authorized service center within the warranty period.

THIS WARRANTY IS BUYER’S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. “KUSAM-MECO” SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, INCLUDING LOSS OF DATA, ARISING FROM ANY CAUSE WHATSOEVER.

All transaction are subject to Mumbai Jurisdiction.

I. SAFETY :

This manual contains information and warnings that must be followed for operating the instrument safely and maintaining the instrument in a safe operating condition. If the instrument is used in a manner not specified by the manufacturer, the protection provided by the instrument may be impaired. The meter is intended only for indoor use.

Terms in this manual :

WARNING : Identifies conditions and actions that could result in serious injury or even death to the user.

CAUTION : Identifies conditions and actions that could cause damage or malfunction in the instrument.

Measurement Category

Measurement Category IV is applicable to test & measuring circuits connected at the source of the building's low-voltage MAINS installation. Examples are measurements on devices installed before the main fuse or circuit breaker in the building installation.

Measurement Category III is applicable to test & measuring circuits connected to the distribution part of the building's low-voltage MAINS installation. Examples are measurements on distribution boards (including secondary meters), circuit-breakers, wiring, including cables, bus-bars, junction boxes, switches, socket-outlets in the fixed installation, & equipment for industrial use & some other equipment such as stationary motors with permanent connection to the fixed installation

Measurement Category II is applicable to test & measuring circuits connected directly to utilization points (socket outlets & similar points) of the low-voltage MAINS installation. Examples are measurements on MAINS CIRCUITS of household appliances, portable tools & similar equipment.

The meter protection rating, against the users, is double insulation per IEC/UL/EN61010-1 Ed. 3.0, IEC/EN61010-2-030 Ed. 1.0, IEC/EN61010-2-033 Ed. 1.0, IEC/UL/EN61010-031 Ed. 1.1 and CAN/CSA-C22.2 No. 61010-1-12 Ed. 3.0 to measurement Category III 1KV & Category-IV 600V, AC & DC. All Terminals are also rated to such measurement categories requirements.

The meter also meets the relevant parts of EN61557 for CE requirements, & are not certified by UL or ETL. In particular, Part 1 Ed. 2.0 General requirements, Part 2 Ed. 2.0 Insulation Resistance & Part 4 Ed. 2.0 Resistance of earth connection & equipotential bonding, where applicable.

WARNING :

To reduce the risk of fire or electric shock, do not expose this product to rain or moisture. To avoid electrical shock hazard, observe the proper safety precautions when working with voltages above 60 VDC or 30 VAC rms. These voltage levels pose a potential shock hazard to the user. Do not touch test lead tips or the circuit being tested while power is applied to the circuit being measured. Keep your fingers behind the finger guards of the test leads during measurement. Inspect test leads, connectors, and probes for damaged insulation or exposed metal before using the instrument. If any defects are found, replace them immediately. Never attempt a voltage measurement with the test lead inserted into the ⊖**INS./mA** or→((•←input jack that is available. Only replace the blown fuse with the proper rating as specified in this manual. Only use the Test Probe Assemblies provided with the equipment or UL Listed Probe Assemblies with same rating or better. IEC 61010-031 requires exposed conductive test probe tips to be £ 4mm for CAT III & CAT IV ratings. It is commonly achieved by permanently over-molded plastic shrouds, or by detachable Cap shrouds for interchangeable between CAT II ratings. Refer to the category markings on your probe assemblies as well as on the add-on accessories, if any, for applicable rating changes.

CAUTION :

Disconnect the test leads from the test points before changing functions. Always set the instrument to the highest range and work downward for an unknown value when using manual ranging mode.

INTERNATIONAL ELECTRICAL SYMBOLS :

- ⚠ Caution ! Refer to the explanation in this Manual
- ⚠ Caution ! Risk of electric shock
- ⏚ Earth (Ground)
- ▣ Double Insulation or Reinforced insulation
- ⎓ Fuse
- ~ AC--Alternating Current
- ⎓ DC--Direct Current

II. CENELEC DIRECTIVES :

The instruments conform to CENELEC Low-voltage directive 2006/95/EC and Electromagnetic compatibility directive 2004/108/EC.

III. SPECIAL FEATURES :

- VFD V & Hz readings.
- Paper-White Backlight LCD Display
- Record MAX / MIN readings.
- Display Hold Function.
- Dual Digital Display.
- LOCK-Test mode for Insulation Resistance & Earth Continuity Test.

IV. GENERAL SPECIFICATIONS :

Display	: 3-5/6 digits 6,000 counts
Polarity	: Automatic
Update Rate	: 5 per second nominal
61 Segments Bar graph	: 40 per second max
Operating Temperature	: -10ºC to 40ºC
Relative Humidity	: Maximum relative humidity 90% for temperature up to 28ºC decreasing linearly to 50% relative humidity at 40ºC
Pollution degree	: 2
IP Rating	: IP40
Storage Temperature	: -20ºC to 60ºC, < 80% R.H. (with battery removed)
Altitude	: Operating below 2000m
Temperature Coefficient	: nominal 0.15 x (specified accuracy)/ºC @(-10ºC ~ 18ºC or 28ºC ~ 40ºC), or otherwise specified
Sensing	: AC, True RMS
Low Battery	: Approx. 4.6V
APO Timing	: Idle for 20 minutes
APO Consumption	: 50mA typical
Power Supply	: Four Alkaline AA batteries (IEC LR6)
Power Consumption	: 4.5mA typical except the followings: ACV^{+Hz} & VFD ACV^{+Hz}: 7.0mA
Dimension	: Approx. 208(L) X 103(W) X 64.5(H) mm with holster
Weight	: Approx. 635 gm with holster
Accessories	: Test probe pair, Alligator clip pair, BRP21S2-C Remote probe, Holster, User manual, Bkp60 banana plug K-type thermocouple(250°C) & Carrying Case.
Optional Accessories	: BKB32 banana plug to type-K socket plug adaptor & Magnetic hanger.

SAFETY : Double insulation per IEC/UL/EN61010-1 Ed. 3.0, IEC/EN61010-2-030 Ed. 1.0, IEC/EN61010-2-033 Ed. 1.0, IEC/UL/EN61010-031 Ed. 1.1 and CAN/CSA-C22.2 No. 61010-1-12 Ed. 3.0

Measurement Category : CAT III 1000 V AC & DC and CAT IV 600V AC & DC

Compliance to IEC/EN61557 (Per CE requirements, not certified by UL or ETL): IEC/EN61557-1, IEC/EN61557-2 & IEC/EN61557-4 where applicable.

Overload Protections :

Insulation Resistance & mA : 0.4A/1KV, IR 30kA or better
Earth Continuity Test : 0.25A/1KV, IR 30kA or better
V : 1100Vrms
mV, W & Others : 1000 Vrms

Transient protection : 8kV (1.2/50ms surge)

E.M.C. :

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 :

Total Accuracy = Specified Accuracy + 25 digits
Performance above 3V/m is not specified

Earth Continuity Test :

110mA@20W Range,
220mA@2.0W Range

Tester can perform at least 3000 Earth Eontinuity Test measurements with new alkaline batteries at room temperature. These are standard tests of 1W with a duty cycle of 5 seconds on and 25 seconds off.

Insulation Resistance @1mA test current :

50V output voltage : 25mA
100V output voltage : 45mA
250V output voltage : 85mA
500V output voltage : 170mA
1000V output voltage : 440mA

Tester can perform at least 950 insulation tests with new alkaline batteries at room temperature. These are standard tests of 1000 V into 1 MW with a duty cycle of 5 seconds on and 25 seconds off.

ELECTRICAL SPECIFICATIONS :

Accuracy is (% reading digits+number of digits)or otherwise specified, at 23C 5C & less than 80% relative humidity. True RMS voltage & current accuracies are specified from 1 % to 100 % of range or otherwise specified. Maximum Crest Factor < 1.70:1 at full scale & < 3.4:1 at half scale, and with frequency components fall within the specified frequency bandwidth for non-sinusoidal waveforms.

AC Voltage :

Range	Resolution	Accuracy
50Hz ~ 60Hz		
6.000 V	1 mV	±(1%rdg + 3dgts)
60.00 V	10 mV	
600.0 V	100 mV	
1000 V	1 V	
60Hz ~ 1kHz		
6.000 V	1 mV	±(2%rdg + 3dgts)
60.00 V	10 mV	
600.0 V	100 mV	
1000 V	1 V	

1kHz ~ 3kHz		
6.000 V	1 mV	±(2%rdg + 3dgts)
60.00 V	10 mV	
600.0 V	100 mV	Unspecified
1000 V	1 V	
3kHz ~ 5kHz		
6.000 V	1 mV	±(4%rdg + 5dgts)
60.00 V	10 mV	
600.0 V	100 mV	Unspecified
1000 V	1 V	

Input Impedance : 10MW, 110pF nominal

DC Voltage :

Range	Resolution	Accuracy
6.000 V	1 mV	±(0.2%rdg + 3dgts)
60.00 V	10 mV	
600.0 V	100 mV	±(0.3%rdg + 3dgts)
1000 V	1 V	

Input Impedance : 10MW, 110pF nominal

VFD AC Voltage :

Range	Resolution	Accuracy[1)]
10Hz ~ 45Hz		
600.0 V	100 mV	±(4%rdg + 5dgts)
45Hz ~ 200Hz		
600.0 V	100 mV	±(2%rdg + 5dgts)
200Hz ~ 440Hz		
600.0 V	100 mV	±(7%rdg + 5dgts[2)])

[1)] Unspecified for fundamental frequency > 440Hz
[3)] Accuracy linearly decreases from 2%+5d@200Hz to 7%+5d@440Hz.
Input impedance : 10MW, 110pF nominal.

DCmV :

Range	Resolution	Accuracy
60.00 mV	10 mV	±(0.5%rdg + 3dgts)
600.0 mV	100 mV	±(0.1%rdg + 3dgts)

Input Impedance : 10MW, 140pF nominal

ACmV :

Range	Resolution	Accuracy
50Hz ~ 60Hz		
60.00 mV	10 mV	±(1%rdg + 3dgts)
600.0 mV	100 mV	
60Hz ~ 3kHz		
60.00 mV	10 mV	±(2%rdg + 3dgts)
600.0 mV	100 mV	
3kHz ~ 5kHz		
60.00 mV	10 mV	±(3%rdg + 5dgts)
600.0 mV	100 mV	

Input Impedance : 10MW, 140pF nominal

ACmA :

Range	Resolution	Accuracy
50Hz ~ 1kHz		
60.00 mA	10 mA	±(1.5%rdg + 3dgts)
600.0 mA	100 mA	

Burden Voltage : 3.0 mV/mA

DCmA :

Range	Resolution	Accuracy
60.00 mA	10 mA	±(0.5%rdg + 3dgts)
600.0 mA	100 mA	

Burden Voltage : 3.0 mV/mA

Insulation Resistance :

Test Voltage[1]	Range	Test Current	Accuracy
50 V	3.000MW, 30.00MW, 55.0MW	1mA @50kW	±(1.5%rdg + 5dgts)
100 V	3.000MW, 30.00MW, 110.0MW	1mA @100kW	
250 V	3.000MW, 30.00MW, 275.0MW	1mA @250kW	
500 V	3.000MW, 30.00MW, 300.0MW, 550.0MW	1mA @500kW	
1000 V	3.000MW, 30.00MW, 300.0MW	1mA @1MW	±(1.5%rdg + 5dgts)
	3000MW		±(2.0%rdg + 5dgts)
	25.0GW		±(10%rdg + 5dgts)

[1] Actual output voltage : 100% ~ 120% of Test Voltage
Live Circuit Detector : Inhibit test and display voltage reading instead if terminal voltage > 30V prior to initialization of test.
Display Voltage Accuracies : DCV : 1.5% + 5d

Earth Continuity Test :

Range	Resolution	Accuracy	Measuring Range[1]
2.000 W	> 200 mA	±(1.5%rdg+3dgts)	0.015W~ 2.199W
20.00 W	> 90 mA		0.15W~ 21.99W

Open Circuit Voltage : > 4VDC
Live Circuit Detector : Inhibit test if terminal voltage >2V prior to initialization of test.

[1] Specified measuring range at percentage operating uncertainty B[%] £ ±30%per IEC/EN61557-4 requirements.

Resistance :

Range	Resolution	Accuracy
600.0 W	100 mW	±(0.9%rdg + 5dgts)
6.000 KW	1 W	±(0.9%rdg + 2dgts)
60.00 KW	10 W	
600.0 KW	100 W	
6.000 MW	1 kW	±(1.2%rdg + 3dgts)
60.00 MW	10 kW	±(3.0%rdg + 6dgts)

Open Circuit Voltage : <1.5VDC typical

Capacitance :

Range	Resolution	Accuracy[1]
3.000 mF[2]	1 nF	±(1.5%rdg + 5dgts)
30.00 mF	10 nF	
300.0 mF	100 nF	
3000 mF	1 mF	
30.00 mF	10 mF	±(10%rdg + 5dgts)

[1] Accuracies with film capacitor or better.
[2] Reading not available below 200nF.

Temperature :

Range	Accuracy[1]
-50.0ºC ~ 0.0ºC	2% + 3ºC
0.0ºC ~ 50.0ºC	2.2ºC
50.0ºC ~ 537.0ºC	2% + 2ºC
-58.0ºF ~ 32.0ºF	2% + 6ºF
32.0ºF ~ 122.0ºF	4.4ºF
122.0ºF ~ 999.0ºF	2% + 4ºF

[1] K-type thermocouple range & accuracy not included.

Hz Line Level Frequency :

Function Range		Sensitivity (Sine RMS)		Range
60	mV	6	mV	10Hz ~ 50kHz
600	mV	60	mV	10Hz ~ 100kHz
6	V	0.6	V	10Hz ~ 20kHz
60	V	6	V	
600	V	60	V	10Hz ~ 3kHz
1000	V	600	V	
VFD 600	V	60~240	V[2)]	10Hz ~ 440Hz
60	mA	6	mA	10Hz ~ 5kHz
600	mA	60	mA	

Accuracy : ±(0.02%rdg + 4dgts)

[2)] VFD sensitivity linearly decreases from 10% F.S. @200Hz to 40% F.S. @440Hz.

Audible Continuity Tester :

Audible Threshold	Between 20W and 200W.
Response time	< 30ms approx.

Diode Tester :

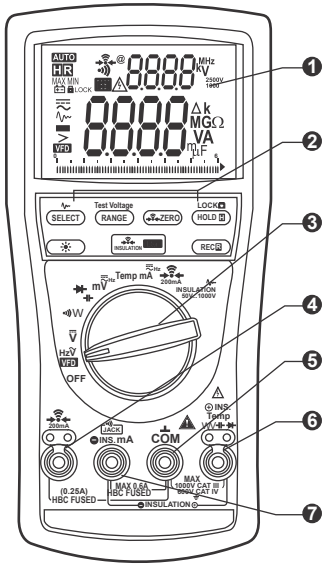
Range	Resolution	Accuracy
2.000 V	1 mV	±(1.5%rdg + 4dgts)

Test Current (Typical) : 0.5mA

Open Circuit Voltage : < 2.8VDC

V. PRODUCT DESCRIPTION :

Note : Top of the line model is used as representative for illustration purposes. Please refer to your particular model for function availability.



1. 3-5/6 digits 6000 counts dual displays.
2. Push-buttons for special functions & features.
3. Selector to turn the Power On or Off and Select a function.
4. Input Jack only for Earth Continuity Test function.
5. Common (Ground reference) Input Jack for all functions EXCEPT Insulation Resistance function.
6. Input Jack for all functions EXCEPT Earth Continuity Test & mA functions.
7. Input Jack for insulation function Ground reference **INS.** or mA function positive input.

Analog bar-graph :

The analog bar graph provides a visual indication of measurement like a traditional analog meter needle. It is excellent in detecting faulty contacts, identifying potentiometer clicks, and indicating signal spikes during adjustments.

VI. OPERATION :

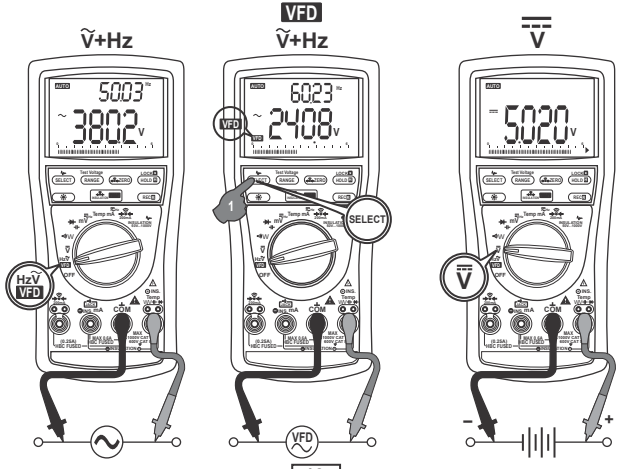
CAUTION :

Before and after hazardous voltage measurements, test the voltage function on a known source such as line voltage to determine proper meter functioning.

ACV^{+Hz} & VFD ACV^{+Hz} Functions :

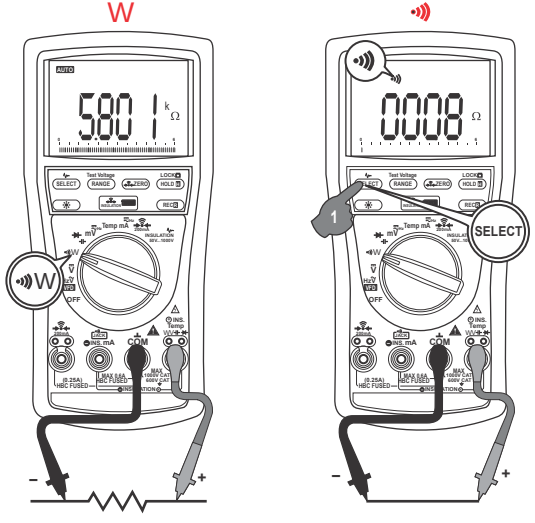
Press the **SELECT** button momentarily to toggle the subject functions. Last selection will be saved as power up default for repeat measurement convenience. For ACV^{+Hz} function, press the **RANGE** button momentarily to select other ranges when needed. For **VFD ACV^{+Hz}** function, only 600V range is available to best cope with the range of most Variable Frequency Drives (VFD) measurements.

DCV Function : Turn Rotary Knob to **DCV** position for measurement.



W Resistance, •)) Continuity

Press the **SELECT** button momentarily to toggle the functions. Last selection will be saved as power up default for repeat measurement convenience. •)) Continuity function is convenient for checking wiring connections & operation of switches. A continuous beep tone indicates a complete wire.

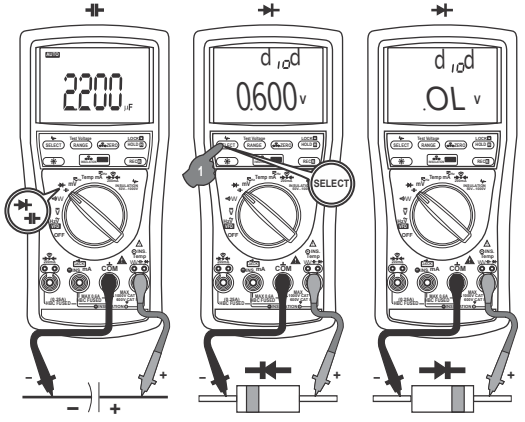


CAUTION :

Using resistance or continuity function in a live circuit will produce false results and may damage the instrument. In many cases the suspected component must be disconnected from the circuit to obtain an accurate reading.

Diode Test, Capacitance Function

Press the **SELECT** button momentarily to toggle the functions. Last selection will be saved as power up default for repeat measurement convenience.



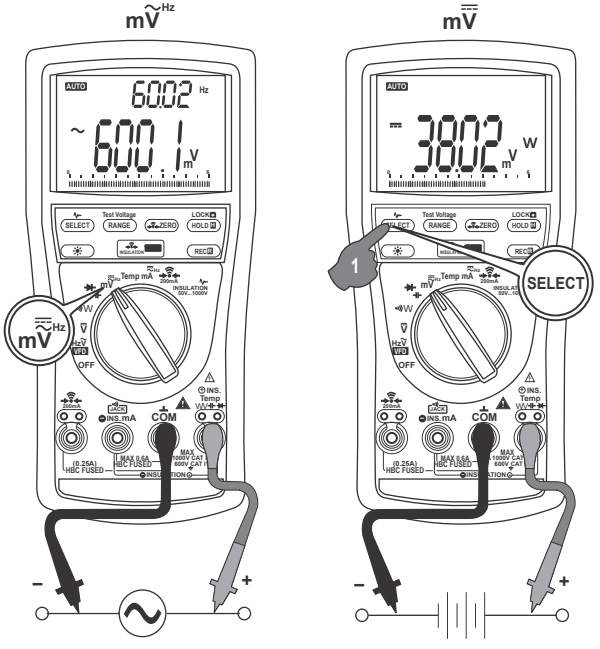
CAUTION :

Discharge capacitors before making any measurement. Large value capacitors should be discharged through an appropriate resistance load.

Normal forward voltage drop (forward biased) for a good silicon diode is between 0.400V to 0.900V. A reading higher than that indicates a leaky diode (defective). A zero reading indicates a shorted diode (defective). An OL indicates an open diode (defective). Reverse the test leads connections (reverse biased) across the diode. The digital display shows OL if the diode is good. Any other readings indicate the diode is resistive or shorted (defective).

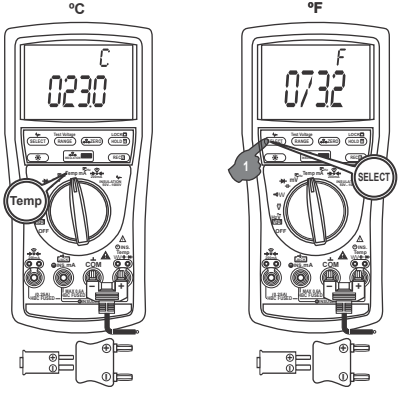
DCmV, ACmV^{+Hz} functions :

Press the **SELECT** button momentarily to toggle the subject functions. Last selection will be saved as power up default for repeat measurement convenience.



Temperature functions :

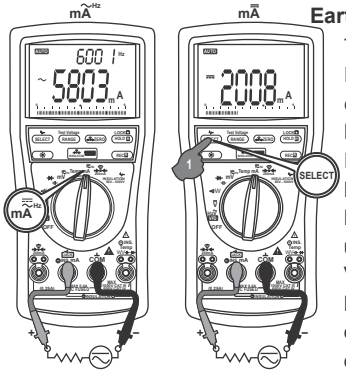
Press **SELECT** button momentarily to toggle ºC and ºF readings. Last selection will be saved as power up default for repeat measurement convenience.



Note : Be sure to insert the banana plug type-K temperature bead probe Bkp60 with correct **+ –** polarities. You can also use a plug adapter Bkb32 (Optional purchase) with banana pins to type-K socket to adapt other standard type-K mini plug temperature probes.

DCmA, ACmA^{+Hz} functions :

Press the **SELECT** button momentarily to toggle the subject functions. Last selection will be saved as power up default for repeat measurement convenience.



Earth Continuity Test Function :

This function measures the Resistance values of earth connection & equipotential bonding in Low Voltage Distribution Systems upto Nominal Voltage (Un)830V, Phase-to-phase. DO NOT use on Systems with Nominal Voltages above that. Measurements shall only be carried out on de-energized circuits.

The measuring loop is protected by an HBC 1KV F fuse against accidental extraneous overvoltages.

The LCD icon TEST used alone throughout in this manual is referred as active measurements of Earth Continuity Test Function through the activation of the **TEST** button on the meter or on the Remote Probe. Check the fuse before each TEST . If the fuse is open, the meter will display **"OPEn"** when the TEST is being activated at no circuit connection to the probes. Refer to the maintenance section for fuse replacement.

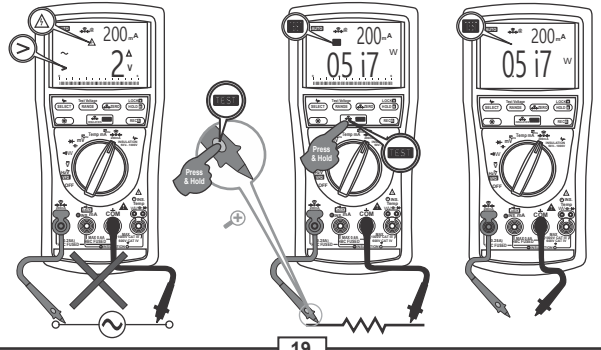
TEST is inhibited when the meter beeps and displays **">2V"** plus ⚠ warning against energized circuit of more than 2V is being connected, before the TEST is active. Connecting to energized circuits when the TEST is active will produce false results & may blow the protection fuse and / or damage the instrument. Always check with voltage function & remove power from the circuits before carrying out the TEST .

The results of measurements can be adversely affected by impedances of additional operating circuits connected in parallel or by transient currents.

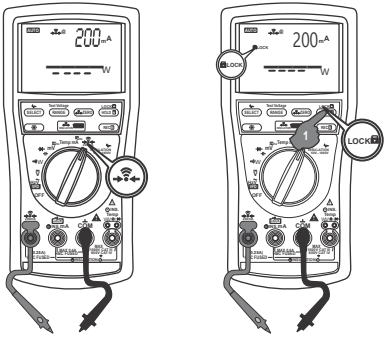
Setup as illustrated below. This function uses measuring currents of ≥ 200mA for 2.199W range & ≥ 90mA for 21.99W range measurements, auto-ranging. Press the **RANGE** button momentarily to override auto-ranging & select a range. Press & hold for 1 second or more to resume auto-ranging.

The TEST is active as long as the **TEST** button is pressed and hold. The **TEST** buttons on the meter & on the Remote Probe work alike. The Continuity Resistance readings are shown on the primary display. The RANGE of measuring current is indicated on the secondary display as **"200mA"** or **"90mA"**. The meter further gives a beep sound for continuity when the active Resistance reading is **"<2W".**

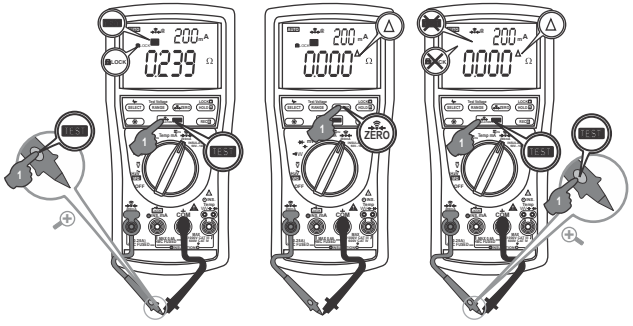
Default startup primary display reading is **"-.---".** Allow enough TEST time for a good measuring result. After the TEST is released, the last measuring display stays unitl the next TEST or a function change.



Lock-Test mode is recommended for continuous measurement. To apply, press the **LOCK** button momentarily to display the annunciator **LOCK** before pressing the **TEST** button momentarily. The LCD will show both **LOCK** & TEST to indicate continuous measurement is active. Press again either button momentarily to release the Lock-Test mode.



ZERO mode is useful for offsetting measuring probes residue resistance reading in consecutive TEST readings. Only residue readings from the 2,199W (200mA) range can be set as offset reference value. To apply, activate the Lock-Test as mentioned above. Connect the probes together to show the residue resistance reading & then press the **ZERO** button momentarily. The LCD will display a zero reading with the annuciator Δ turns on. The residue resistance reading is then saved temporarily as offset value for the TEST that follow until a further function change or power off.



Insulation Resistance function :

WARNING

The LCD icons TEST⚠ used together throughout in this manual is referred as active measurements of Insulation Resistance Function through the activation of the **TEST** button on the meter or on the Remote Probe. The TEST⚠ sources a user selectable test voltage of 50V, 100V, 250V, 500V or 1000V to measure Insulation Resistance values. The ⚠ in a flashing manner warns against test voltage is being output. Use extreme caution when operating the TEST⚠ to avoid electric shock.

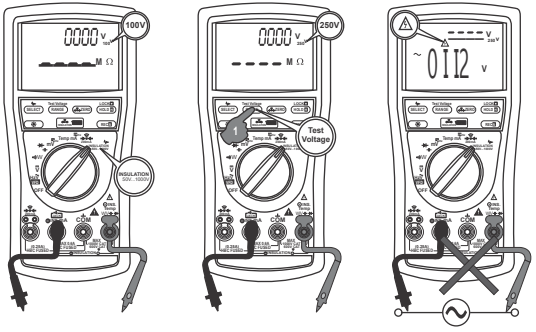
TEST⚠ is inhibited when the meter sounds 3-beeps and displays the detected voltage value plus ⚠ warning against energized circuit of more than 30V is being connected, before the TEST⚠ is active. Measurements shall only be carried out on parts of an installation or equipment that are de-energized.

Connecting to energized circuits when the TEST⚠ is active will produce false results and may damage the instrument. Always check with voltage functions and remove power from the circuits before carrying out the TEST⚠ .

Setup as illustrated below.

Select an intended test voltage of 50V, 100V. 250V. 500V or 1000V. press the **RANGE** (Test Voltage) button momentarily to select the voltage in sequence. Last selection will be saved as power up default for repeat measurement convenience.

The secondary display shows the selected voltage for 1 second right after the selection, and then displays the actual detected voltage readings. The voltage annunciator by the secondary display remains indicating the voltage selected.

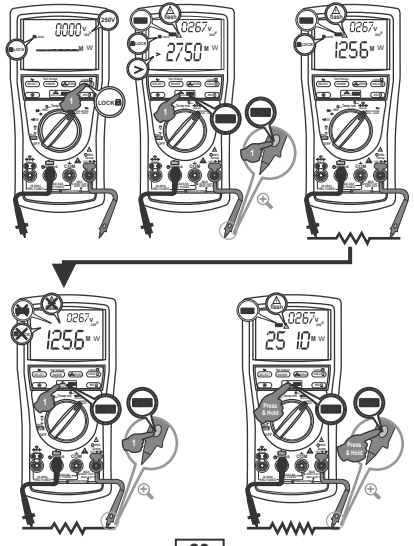


The TEST⚠ is active as long as the **TEST** button is pressed and hold. The **TEST** buttons on the meter and on the Remote Probe work alike. The Insulation Resistance readings are shown on the primary display.

Default startup primary display reading is "-.---". Allow enough TEST⚠ time for a good measuring result. After the TEST⚠ ink, is released, the measuring loop starts to discharge the testing voltage. The last measured resistance reading stays on the primary display until the next TEST⚠ or a function change. The secondary display keeps showing the actual detected voltage readings.

Lock-Test mode is recommended for continuous measurements. To apply, press the **LOCK** button momentarily to display the annunciator **LOCK** before pressing the **TEST** button momentarily. The LCD will show both **LOCK** & TEST to indicate continuous measurement is active. Press again either button momentarily to release the Lock-Test mode.

NOTE. Maximum display reading of each Insulation Resistance range is subjected to the test voltage selected. They are 55.0MW, 110.0MW, 275MW, 550MW & 25.0GW for 50V, 100V, 250V, 500V & 1000V respectively. Over-range is indicated as > maximum display-reading.



Smooth ∿ mode (Insulation function only) :

Smooth ∿ mode displays the running average of the last eight measured readings having changes within 300 counts in sequence. On the contrary, it displays directly, without smoothing, the measured reading that is beyond 300 counts in changes comparing to its former one. Press the ∿ button momentarily to enable with LCD annuciator "∿" turned on. Press momentarily again to disable.

Backlighted display :

Press ✱ button momentarily to toggle the LCD backlight. The backlight will also be turned off automatically after approximate 37 seconds to extend battery life.

Auto- or Manual-ranging (Volt, mA & Ω functions only) :

Press the **RANGE** button momentarily to select manual-ranging, and the meter will remain in the range it was in, the LCD AUTO turns off. Press the button momentarily again to select an adjacent range. Press and hold the button for 1 second to resume auto-ranging.

Hold: The hold feature freezes the display for later view. Press the **HOLD** button momentarily to toggle the hold feature. This feature does not apply to Earth Continuity Test & Insulation Resistance Functions.

MAX/MIN Recording Mode: Press **REC** button momentarily to activate MAX/MIN recording mode. The LCD "**R**" & "**MAX MIN**" turn on. The meter beeps when new MAX(maximum) or MIN(minimum) reading is updated. Press the button momentarily to read the Real-time, MAX & MIN readings in sequence. Press the button for 1 second or more to exit MAX/MIN recording mode. When activated, Auto-Power-Off is disabled automatically. This feature does not apply to Earth Continuity Test & Insulation Resistance functions.

Beep-Jack™ Input Warning : The meter beeps as well as displays "**InEr**" to warn the user against possible damage to the meter due to improper connections to the "**mA**" ("**INS. mA**") input jack when other functions, especially voltage function, is selected.

Set Beeper Off : Press the **RANGE** button while turning the meter on to temporarily disable the Beeper feature. Turn the rotary switch OFF and then back on to resume.

Auto-Power-off (APO) : The Auto-Power-off (APO)mode turns the meter off automatically to extend battery life after approximately 20 minutes of no rotary switch or push button operations. To wake up the meter from APO, press the **SELECT**, ✱ or turn the rotary switch OFF and then back on. Always turn the rotary switch to the OFF position when the meter is not in use.

Disabling Auto-Power-off :

Press the **SELECT** button while turning the meter on to temporarily disable the Auto-Power-Off feature. Turn the rotary switch OFF and then back on to resume.

MAINTENANCE :

WARNING :

To avoid electrical shock, disconnect the meter from any circuit, remove the test leads from the input jacks and turn OFF the meter before opening the case. Do not operate with open case. Install only the same type of fuse or equivalent

Cleaning and Storage :

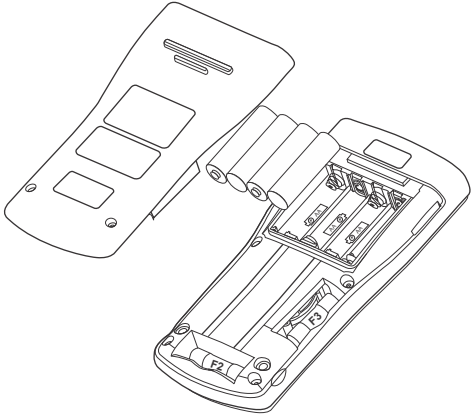
Periodically wipe the case with a damp cloth and mild detergent; do not use abrasives or solvents. If the meter is not to be used for periods of longer than 60 days, remove the battery and store it separately.

Trouble Shooting :

If the instrument fails to operate, check battery, fuses, leads, etc., and replace as necessary. Double check operating procedure as described in this manual.

If the instrument voltage-resistance input terminal has subjected to high voltage transient (caused by lightning or switching surge to the system) by accident or abnormal conditions of operation, the series input protection resistors may be blown off (become high impedance) like fuses to protect the user and the instrument. Most measuring functions through this terminal will then be open circuit. The series input protection resistors and the spark-gaps (or varistors) should then be replaced by qualified technician. Refer to the WARRANTY section for obtaining warranty or repairing service.

Battery and Fuse replacement :
Battery use : Four 1.5V AA battery (IEC LR6)
Fuses use :
Fuse (F2) for ⊖ **INS.**/mA input :
0.4A/1000Vac & Vdc, IR 30kA or better, FF fuse;
Dimension : 6 x 32 mm
Fuse (F3) for Earth Continuity Test input :
0.25A/1000Vac & Vdc, IR 30kA or better, FF fuse;
Dimension : 6 x 32 mm



Battery and Fuse replacement :
Loosen the screws from the access cover of the case bottom. Lift the access cover. Replace the batteries or fuse. Re-fasten the screws.

TEST CERTIFICATE

TRMS DIGITAL INSULATION MULTIMETER

This Test Certificate warrantees that the product has been inspected and tested in accordance with the published specifications.

The instrument has been calibrated by using equipment which has already been calibrated to standards traceable to national standards.

MODEL NO. **KM 878**

SERIAL NO. _____

DATE: _____

ISO 9001:2015
REGISTERED

QC
KUSAM-MECO
PASS