

## 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
- \* 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
- \* 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)

**KUSAM-MECO**<sup>®</sup>

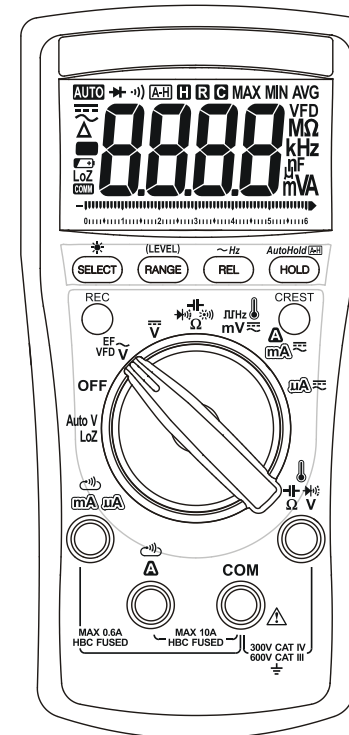
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**KUSAM-MECO**<sup>®</sup>

AN ISO 9001:2015 COMPANY

## TRMS DIGITAL MULTIMETER MODEL - KM 2257



**OPERATION MANUAL**

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**TAKE MEASUREMENTS CAREFULLY AND YOU'LL SPARE YOUR METER AND YOURSELF, SOME PAIN.**

Nearly every electrical engineer has a hand held Multimeter. We sometimes take them for granted, until we damage them or "burn them out". If you incorrectly connect your DMM to a circuit or have the DMM on wrong setting, you damage the meter and possibly hurt yourself. You can also get into trouble if you try to measure the voltage across a charged capacitor.

DMM users frequently burn their meters by trying to measure current the same way as they measure voltage, Remember, you measure voltage across a circuit, and current through a circuit. When you use the current input, your DMM becomes a low impedance circuit element. If you accidentally connect this low impedance path across your circuit, you'll effectively short-circuit it. You can, therefore send high current through your meter and severely damage it. Unless the meter has a fused input, you can even get an explosion or fire.

Even if you correctly insert your DMM into the circuit, you can still damage your meter. Don't try to measure current in excess of your meter's capacity. Handheld DMMs usually have a maximum current rating of 10A or 20A.

If you are measuring current in industrial environment, you can easily exceed those ratings. The best way to avoid damage is to use a clamp meter or to connect a clamp attachment to your DMM.

To prevent excess current from flowing through your meter, always disconnect the test leads from the circuit under test whenever you change DMM functions, Set your meter to the correct function, say current and its highest range for the setting, say 20A.

Next, connect the test leads before you apply power to the circuit. To be safe, start by setting your meter to its highest range first.

## 1. SAFETY

### 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.



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

Observe proper safety precautions when working with voltages above 30 Vrms, 42.4 Vpeak or 60 VDC. These voltage levels pose a potential shock hazard to the user. Disconnect the test leads from test points before changing functions. Do not expose this product to rain or moisture. The meter is intended only for indoor use. Individual protective equipment must be used if hazardous live parts in the installation where measurement is to be carried out could be accessible.

Keep your hands/fingers behind the hand/finger barriers (of the meter and the test probe assembly, where applicable) that indicate the limits of safe access of the handheld parts during measurements. Inspect lead wires, connectors, and probes for damaged insulation or exposed metal periodically. If any defects are found, replace them immediately.

Only use the test probe assembly provided with the meter or a UL Listed test probe assembly with the same meter ratings or better. Optional offer premium test probe assembly using silicone lead wire insulation, at agent's discretion, is equipped with white inner insulation layers as wear indicators. Replace them immediately if any of the white layers has become visible.

The meter meets IEC/EN/BSEN/CSA\_C22.2\_No./UL standards of 61010-1 Ed. 3.1, 61010-2-033 Ed. 2.0 to Measurement CAT III 600V and CAT IV 300V. The accompanied test probe assembly meets IEC/EN/BSEN/CSA\_C22.2\_No./UL standards of 61010-031 Ed. 2.0 to the same meter ratings or better.

The 61010-031 requires exposed conductive test probe tips to be  $\leq 4\text{mm}$  for CAT III & CAT IV ( $\leq 19\text{mm}$  for CAT II) ratings. The accompanied add-on caps (or permanent insulated tips option) must then be used for applications in CAT III & CAT IV areas. Refer to the category markings on your probe assemblies as well as on the add-on accessories (like detachable Caps or Alligator Clips), if any, for applicable rating changes.

### **BRIEF INFORMATION ON MEASUREMENT CATEGORIES**











**Measurement Category IV** is applicable to test and 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 and 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, cables, bus-bars, junction boxes, switches, socket-outlets, stationary motors in the fixed installation, and equipment for industrial use.

**Measurement Category II** is applicable to test and measuring circuits connected directly to utilization points (socket outlets and

similar points) of the low-voltage MAINS installation. Examples are measurements on MAINS CIRCUITS of household appliances, portable tools and similar equipment.

**2. INTERNATIONAL ELECTRICAL SYMBOLS**

	Marking of Electrical and Electronic Equipment (EEE). Do not dispose of this product as unsorted municipal waste. Contact a qualified recycler
	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
	Three-phase Alternating Current
	Application around and removal from hazardous live conductors is permitted

**3. CENELEC DIRECTIVES**

The instruments conform to (CE) Low-Voltage Directive 2014/35/EU, Electromagnetic Compatibility Directive 2014/30/EU, and RoHS 2 Directive 2011/65/EU plus amendment Directive (EU) 2015/863.

**4. SPECIFICATIONS :**

**GENERAL SPECIFICATIONS :**

**Display:** 3-5/6 digits 6,000 counts.

**Update Rate:**

3-5/6 digits: Max 5 per second nominal

60 Segment Bar-graph: 40 per second max

**Operating Temperature:** -10°C to 50°C continuous operating (except on **A** function, see Electrical Specifications below for more details)

**Relative Humidity:** Maximum relative humidity 80% for temperature up to 31°C decreasing linearly to 50% relative humidity at 50°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 @ (-10°C ~ 18°C or 28°C ~ 50°C), or otherwise specified

**Sensing:** True RMS Sensing

**Ingress Protection:** IP40

**Safety:** Double insulation per IEC/UL/EN/BSEN 61010-1 Ed. 3.1, IEC/UL/EN/BSEN 61010-2-033 Ed. 2.0, IEC/UL/EN/BSEN 61010-031 Ed.2.0 and the corresponding CAN/CSA-C22.2 regulations to Measurement Categories CAT III 600V and CAT IV 300V AC & DC

**Overload Protections:**

**µA & mA:** 0.63A/1000V DC/AC rms, IR 30kA, F fuse or better

**A:** 12A/600V, IR 50kA for Vdc & 100kA For Vac, F fuse; or

11A/1000V DC/AC rms, IR 30kA, F fuse; or better

**V & AutoV:** 1100V AC rms & 660V DC

**mV, Ohm & others:** 600V DC/AC rms

**Transient protection:** 6.0kV (1.2/50µs surge)

**E.M.C. :** Meets EN61326-1

In an RF field of 3V/m:

Temperature function is not specified

Ohm function:

Total Accuracy = Specified Accuracy + 15 digits

Other functions:

Total Accuracy = Specified Accuracy

Performance above 3V/m is not specified

**Low Battery:** Below approx. 2.5V

**iAPO Timing:** Idle for 30 minutes

**iAPO Consumption:** 20µA typical.

**Power Consumption (typical):** 5mA

**Power Supply:** Standard 1.5V AAA battery x 2

**Weight:** Approx. 334 gm (With Holster)

**Dimension:** Approx. 161(L) X 80(W) X 50(H)mm

**Accessories:** Test lead pair, User's manual, Bkp60 banana plug  
K-type thermocouple x 1

**Optional Accessories:** BKB32 banana plug to type-K socket  
plug adaptor, BMH-01 magnetic hanger  
strap, USB interface kit BRUA-20X

**Special Features:**

- AutoHold
- AutoV (LoZ)
- VFD-ACV & VFD-Hz
- Hi/Lo EF-Detection (NCV & Single pole)
- BeepLit™ Diode w/BeepPass™ indication
- BeepLit™ Continuity
- Auto-ranging REC MAX/MIN/AVG
- Auto-ranging CREST (Instantaneous Peak) MAX/MIN
- Backlighted LCD
- Auto-ranging Relative-zero
- Display Hold
- BeepJack™ audible & visible input warning

**ELECTRICAL SPECIFICATIONS :**

Accuracy is given as  $\pm$  (% of reading digits + number of digits) or otherwise specified @ 23°C  $\pm$  5°C.

ACV & ACA accuracies are specified from 1% to 100% of range or otherwise specified.

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

**AC VOLTAGE**

RANGE	ACCURACY
<b>50Hz ~ 60Hz</b>	
6.000V, 60.00V, 600.0V	0.7% + 3d
<b>45Hz ~ 500Hz</b>	
6.000V, 60.00V, 600.0V	1.0% + 5d

Input Impedance: 10M $\Omega$ , 54pF nominal  
 Overload Protection: 1100vrms for AC;660V For DC

**ACmV**

RANGE	ACCURACY
<b>40Hz ~ 500Hz</b>	
60.00mV <sup>1)</sup> , 600.0mV <sup>2)</sup>	1.0% + 3d
<b>500Hz ~ 1kHz</b>	
60.00mV <sup>1)</sup> , 600.0mV <sup>2)</sup>	2.0% + 3d

Input Impedance: 10M $\Omega$ , 54pF nominal  
 1) Signal peak absolute values, including DC bias, less than 130mV<sub>peak</sub>  
 3)Signal peak absolute values, including DC bias, less than 130mV<sub>peak</sub>

**DCmV**

RANGE	ACCURACY
60.00mV, 600.0mV	0.3% + 4d

Input Impedance: 10M $\Omega$ , 54pF nominal

**VFD\_ACV (with Low Pass Filter )**

RANGE	ACCURACY <sup>1)</sup>
<b>10Hz ~ 100Hz (fundamental)</b>	
600.0V	1.0% + 3d
<b>100Hz ~ 400Hz (fundamental)</b>	
600.0V	10% + 3d <sup>2)</sup>

Overload Protection: 1100Vrms for AC; 660V for DC

- 1) Not specified for fundamental frequency > 400Hz
- 2) Accuracy linearly decreases from 1% + 3d @100Hz to 10% + 3d @400Hz

**AutoV\_ACV**

RANGE	ACCURACY <sup>1)</sup>
<b>50Hz ~ 60Hz</b>	
6.000V, 60.00V, 600.0V	1.0% + 5d

Overload Protection: 1100vrms for AC; 660V for DC

- 1)Not specified at <1.5VAC
- Threshold: > 1.5VAC nominal
- Input Impedance: Initially approx. 2.1k $\Omega$ , 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 $\Omega$  @100V  
 100k $\Omega$  @300V  
 240k $\Omega$  @600V

**DC VOLTAGE**

RANGE	ACCURACY
6.000V	0.3% + 4d
60.00V	0.4% + 3d
600.0V	0.2% + 3d

Overload Protection: 1100Vrms for AC;660V For DC  
 Input Impedance: 10M $\Omega$ , 54pF nominal

**AutoV\_DC**

RANGE	ACCURACY <sup>1)</sup>
<b>50Hz ~ 60Hz</b>	
6.000V, 60.00V, 600.0V	1.0% + 4d

Overload Protection: 1100Vrms for AC; 660V for DC

1) Not specified at <1.5VDC

Threshold: > +1.5VDC or < -1.5VDC nominal

Input Impedance:

Initially approx. 2.1kΩ, 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:

12kΩ @100V

100kΩ @300V

240kΩ @600V

**DC Current**

RANGE	Accuracy	Burden Voltage
600.0μA, 6000μA	0.5% + 5d	0.1mV/μA
60.00mA, 600.0mA		1.9mV/mA
6.000A, 10.00A <sup>1)</sup>	1.0%+5d	0.04V/A

<sup>1)</sup>10A continuous up to ambient 40°C only, and is <3mins on per >15 mins off @ 40°C~ 55°C; >10A to 20A for <30 seconds on per >15 mins off

**AC Current**

RANGE	Accuracy	Burden Voltage
<b>50Hz ~ 400Hz</b>		
600.0μA, 6000μA	1.0% + 5d	0.1mV/μA
60.00mA, 600.0mA		1.9mV/mA
6.000A, 10.00A <sup>1)</sup>		0.04V/A

<sup>1)</sup>10A continuous up to ambient 40 C only, and is <3 mins on per >15 mins off @ 40°C~ 55°C; >10A to 20A for <30 seconds on per >15 mins off

**Capacitance**

RANGE	Accuracy
20.00nF, 200.0nF	1.5% + 8d
2000nF, 20.00μF, 200.0μF, 2000μF	1.5% + 2d
10.00mF	4.5% + 10d

Accuracies with film capacitor or better

**BeepLit™ Continuity Tester**

Continuity Threshold: Between 30Ω and 480Ω

Continuity ON Response Time: <15ms

Audible Indication: Beep sound

Visible Indication: LCD Backlight

**Ohm**

RANGE <sup>1)</sup>	Accuracy
600.0Ω, 6.000kΩ, 60.00kΩ, 600.0kΩ	0.5% + 4d
6.000MΩ <sup>2)</sup>	0.7% + 4d
60.00MΩ <sup>3)</sup>	2.0% + 4d <sup>4)</sup>

<sup>1)</sup>Open Circuit Voltage: 1.6VDC typical

<sup>2)</sup>Constant Test Current: 0.2μA Typical

<sup>3)</sup>Constant Test Current: 0.02μA Typical

<sup>4)</sup>5%+20d @ >30MΩ

**CREST mode (Instantaneous Peak Hold)**

Resolution: 6000 counts

Accuracy: Specified accuracy ± 250 digits

for changes in duration

>1ms for VFD-ACV function;

>350μs for other Voltage and Current functions

**AutoHold Real-Read™**

Accuracy: Specified accuracy ± 50 digits  
 Availability: Resistance, Continuity, LoZ AutoV, VFD Volts, Voltage and Current functions

**TEMPERATURE**

RANGE	ACCURACY <sup>1)2)</sup>
-40°C ~ 99.9°C	1.0% + 1°C
100°C ~ 1000°C	0.3% + 3°C
-40.0°F ~ 99.9°F	1.0% + 2°F
-100°F ~ 1832°F	0.3% + 6°F

1)Accuracies assume the meter interior and the ambient have reached the same temperature (isothermal stage) for a correct junction voltage compensation. Allow enough settling time for a significant change in ambient temperature. It can take up to an hour for changes > 5°C.  
 2)Type-K thermocouple range & accuracy not included

**LOGIC FREQUENCY**

RANGE	SENSITIVITY (SQUARE WAVE)
10.00Hz~200.0 kHz	3Vpeak

Accuracy: 0.03% + 4d

**BeepLit™ Diode Tester**

RANGE	ACCURACY	Test Current (Typical)	Open Circuit Voltage
3.000V	1.0% + 3d	0.3mA	<3.2 VDC

BeepPass™ Indication (Short-beep) : Drop Across 0.850V  
 BeepLit™ Indication (Continuity) Threshold : < 0.100V  
 Audible Indication : Beep Sound  
 Visible Indication : LCD Backlight

**LINE FREQUENCY**

AVAILABLE FUNCTION	TRIGGER LEVEL	SENSITIVITY (SINE RMS)	RANGE
ACV / DCV	0	1V	10Hz ~ 50kHz
	1	4V	
	2	40V	
	3	400V	
VFD-ACV	2	40V	10Hz ~ 1kHz
	3	400V	
µA	0	40µA	10Hz ~ 5kHz
	1	400µA	
mA	0	4mA	
	1	40mA	
A	0	0.6A	50Hz ~ 1kHz
	1	6A	

Accuracy: 0.03% + 4d

**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: Display bar-segments, backlight flashing, & beep tones in proportion to the field strength

Detection Frequency: 50/60Hz

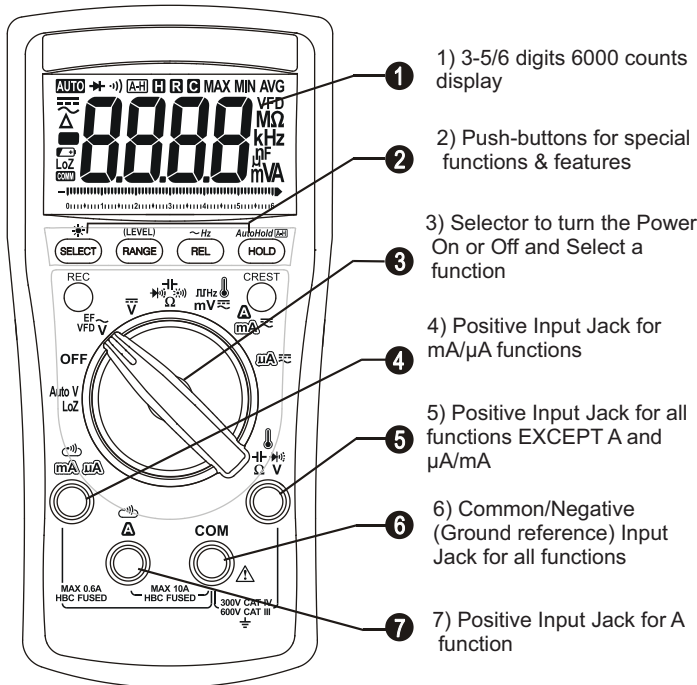
Detection Antenna: Top-right end of the meter

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



**5) PRODUCT DESCRIPTION**

This user's manual uses only representative model(s) for illustrations. Please refer detailed specifications for function availability to each model.



**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.

**6) OPERATION**

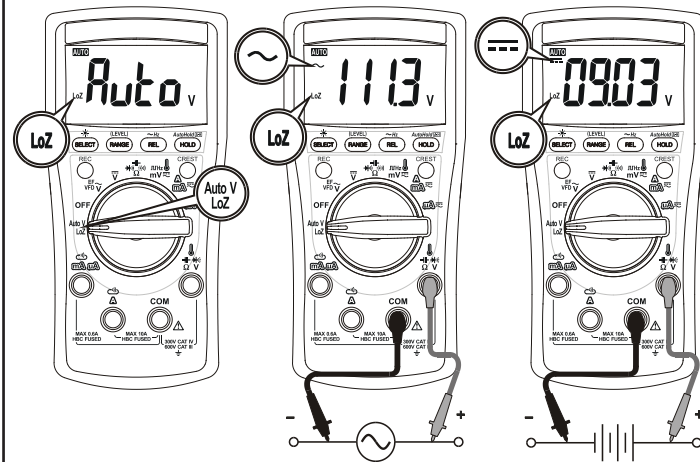
**Note:**

- Before and after hazardous voltage measurements, test the voltage function on a known source such as line voltage to determine proper meter functioning.
- Long-press (a button): press for one second or more
- Short-press (a button): press momentarily and release

**LoZ AutoV**

Inputs are made via the test lead terminals **V-COM**. AutoV automatically selects measurement function of DCV or ACV based on their input levels via the test leads. The input also provides a low ramp-up impedance (LoZ) to drain ghost voltages.

- With no input, the meter displays "Auto" when it is ready.
- When a signal above the voltage threshold of 1.5V DC or AC up to the rated 600V is present, the meter displays the voltage value in appropriate DC or AC, whichever larger in peak magnitude.
- Only **HOLD** & **AutoHold** Push-button features are available in AutoV mode.

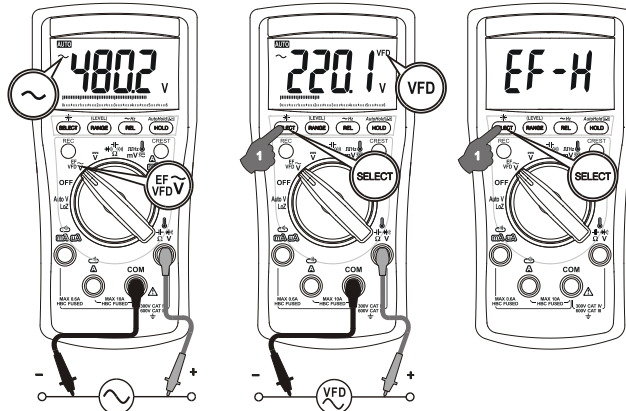


**Note:**

- **Ghost-voltage Buster:** Ghost-voltages are unwanted stray signals coupled from adjacent hard signals, which confuse common multimeter voltage measurements. The AutoV mode provides low (ramp-up) input impedance (approx. 2.1kΩ at low voltage) to drain ghost voltages leaving mainly hard signal values on meter readings. It is an invaluable feature for precise indication of hard signals, such as distinguishing between hot and open wires (to neutral) in electrical installation applications.
- **AutoV Mode** input impedance increases abruptly from initial 2.1kΩ to a few hundred kΩ's on high voltage hard signals. "LoZ" displays on the LCD to remind the users of being in such a low impedance mode. Peak initial load current, while probing 600VAC for example, can be up to 404mA ( $600V \times 1.414 / 2.1k\Omega$ ), decreasing abruptly to approx. 3.5mA ( $600V \times 1.414 / 240k\Omega$ ) within a fraction of a second. Do not use AutoV mode on circuits that could be damaged by such low input impedance. Instead, use rotary selector  $\nabla$  or  $\nabla$  high input impedance voltage modes to minimize the test loadings for such circuits.

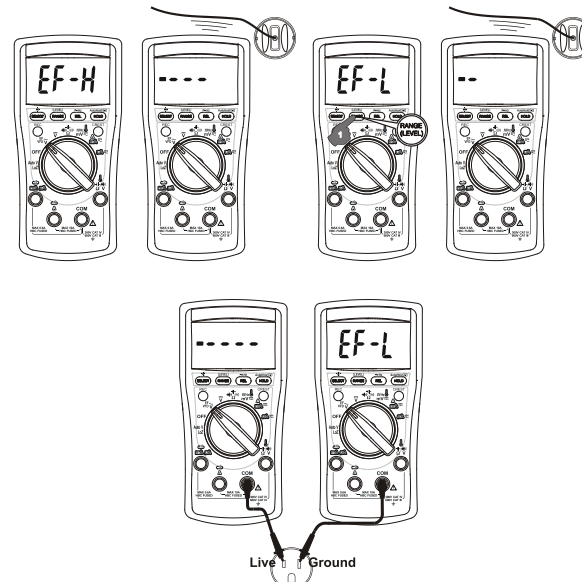
**ACV; VFD-ACV; EF-Detection**

Inputs are made via the test lead terminals **V-COM** EXCEPT for the EF-Detection functions as specified later. Short-press the **SELECT** button to select the subject functions in sequence. The last selection will be saved as power-up default for repeat measurement convenience.



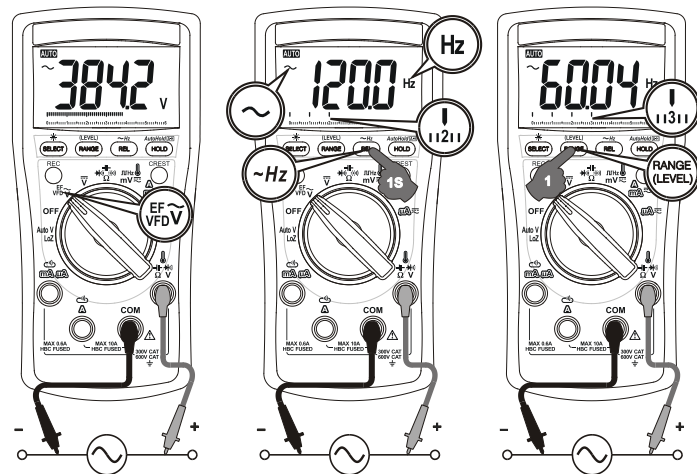
- **EF-Detection** defaults to "EF-H", the High sensitivity, when it is ready. If it is too sensitive for your applications, short-press the **(LEVEL)** button to toggle to **EF-L**, the Low sensitivity. The detected Electric Field is indicated as a series of display barsegments, backlight flashing, and beep sounds in proportion to the field strength.
- **Non-Contact EF-Detection (NCV):**  
An antenna is located along the top-right corner which detects the electric field surrounding energized conductors. It is ideal for tracing live wiring connections, locating wiring breakages and to distinguish between live and earth connections.
- **Probe-Contact EF-Detection (Single-pole):**

For more precise indication of live wires, such as distinguishing between Live and Ground connections, use one single test-probe to test via terminal **COM** for direct metal contact probing to achieve the most distinctive indications.



**~Hz Line Frequency**

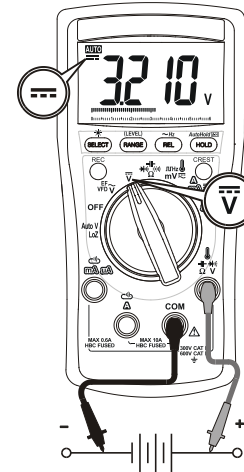
This function is only available to the ACV, VFD-ACV, DCV,  $\mu$ A, mA, & A functions. Long press the ~Hz button to toggle to the Line Frequency function. The input sensitivity varies according to the available function range selected on which the ~Hz function is activated. Trigger Level 0 is the highest sensitivity while Level 3 is the lowest. Short-press the **RANGE (LEVEL)** button can manually select the available Trigger Levels (see details in the specification section) in sequence.



**NOTE:** It is recommended to start testing with the selected available function on the signal-under-test in auto-ranging mode before activating the ~Hz function for an appropriate trigger level automatically. If the ~Hz reading is unstable, manually select lower sensitivity to avoid possible electrical noises. If the reading shows zero, manually select higher sensitivity for the measurement.

**DCV**

Inputs are made via the test lead terminals **V-COM**.

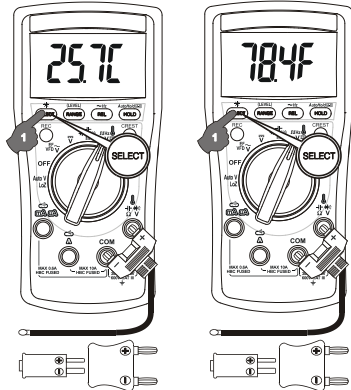
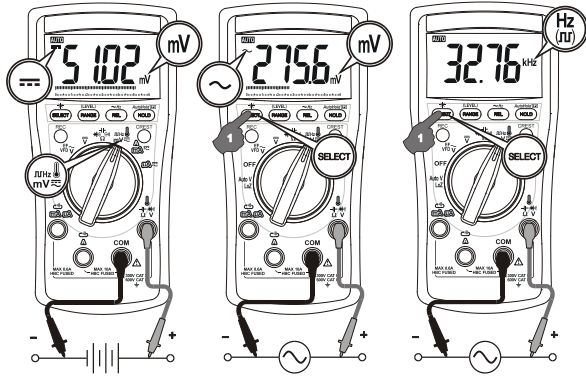


**DCmV; ACmV; Logic  $\Pi$  Hz; °C ; °F**

Inputs are made via the test lead terminals **V-COM**. Press the **SELECT** button momentarily to select the subject functions in sequence. Last selection will be saved as power up default for repeat measurement convenience. °F selection can be left out as factory calibration default for countries that only accept metric units.

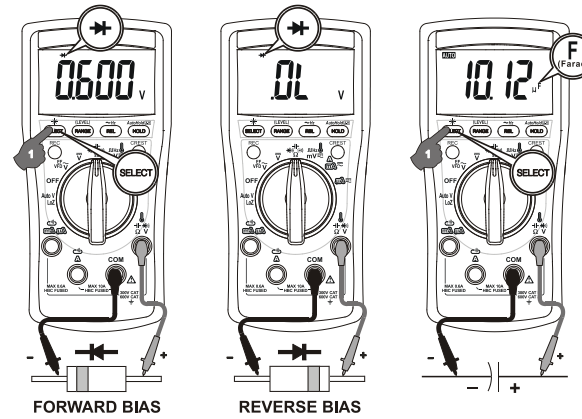
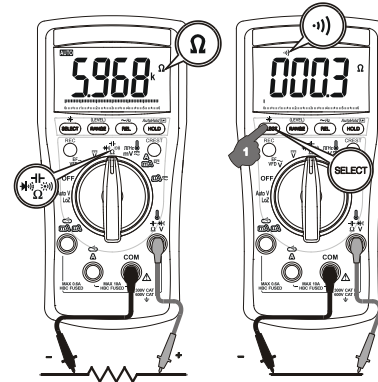
**Note:**

- Be sure to insert the banana-plug type-K temperature bead-probe with correct + - polarities. Banana-pins to type-K socket adapter Bkb32 (Optional purchase) can be used to accept other type-K probes with standard miniature plugs.
- Temperature accuracies assume the meter interior has the same temperature (isothermal stage) as the ambient, particularly at the plug of the probe being used, for a correct junction voltage compensation. Allow the meter's interior temperature to catch up with that of the plug after any significant changes in the measuring environment and hence the ambient temperature. This can take up to an hour, for changes > 5°C, within a low-ventilated sturdy meter housing. The uncompensated temperature differences, if any, will be reflected as offsets on the meter readings.



- Resistance; BeepLit™ Continuity; BeepLit™ Diode; Capacitance

Inputs are made via the test lead terminals V-COM. Press the **SELECT** button momentarily to select the subject functions in sequence. Last selection will be saved as power up default for repeat measurement convenience.



- BeepLit™ Continuity

This function is having improved convenience for checking wiring connections and operation of switches. Resistance threshold is being used. A continuous beep sound together with display backlight flashing indicate a complete wire. Such audible and visible indications improve continuity readabilities in noisy working environments.

### BeepLit™ Diode

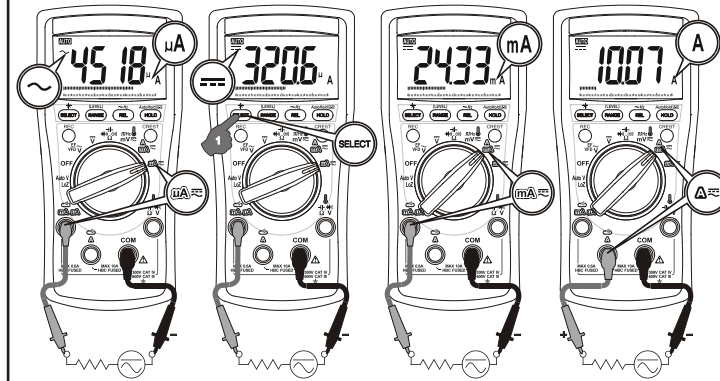
- **Reading indication:** Forward voltage drop (forward-biased) for a good silicon diode is between 0.400V to 0.900V. A higher reading indicates a leaky diode (defective). A zero reading indicates a shorted diode (defective). An over-range display indicates an open diode (defective). Reverse the test leads connections (reverse-biased) across the diode. The digital display shows an over-range if the diode is good. Any other readings indicate the diode is resistive or shorted (defective).
- **BeepPass™ indication (Short-beep):** When the display reading drops across 0.850V, the BeepPass™ indication gives a short beep sound to signal a Good forward voltage drop of common diodes.
- **BeepLit™ indication (Continuity):** If the reading further drops below 0.100V, the BeepLit™ indication gives a continuous beep sound together with the display backlight flashing to indicate a shorted diode or a complete wire. It is similar to that of the resistive BeepLit™ Continuity function but this BeepLit™ indication, instead, is based on the voltage threshold to indicate continuity.

### Note:

- Using **Resistance, BeepLit™ Continuity, BeepLit™ Diode, or Capacitance** function in a live circuit may produce false results. In many cases, the device-under-test should be disconnected from the circuit for an accurate measurement reading.
- Discharge capacitor(s) before making capacitance measurements. Large-value capacitors should be slowly discharged through an appropriate resistance load.

### A, mA, & $\mu$ A

The inputs of **A** functions are made via the input terminals **Δ-COM**. The inputs of **mA** or  **$\mu$ A** functions are made via the input terminals  **$\mu$ A mA** -COM. Short-press the **SELECT** button to toggle between **DC** and **AC** functions. The last selection will be saved as power-up default for repeat measurement convenience that applies to all Current functions.



### LCD Backlight

Long-press the **\*** button to toggle the LCD backlight on and off. The LCD backlight goes off automatically after idling for approximately 16 minutes to extend battery life.

### Auto-ranging with Manual-ranging Override



LCD "**AUTO**" turns on in auto-ranging mode by default. Short-press the **RANGE** button to select manual-ranging override. The meter will remain in the range it was in, and the LCD "**AUTO**" turns off. Short-press the button again to select the next range in sequence. Long-press the button to resume auto-ranging.


**Note:** Manual-ranging override is not available to the **Auto-V, Capacitance, & Hz** functions.

### HOLD

**HOLD** feature freezes the display for later viewing. LCD "**H**" turns on. Short-press the **HOLD** button to toggle the **HOLD** feature.




**AutoHold Real-Read™ **

**AutoHold** feature displays the last latched stable-reading for later viewing when the test leads are removed from the test points after a significant-measurement session. Real-Read™ is to show real-time readings during the significant-measurement session to avoid “blind” measurements. Long-press the **AutoHold ** button to toggle the **AutoHold** feature on. LCD “” turns on. Availability: Resistance, Continuity, LoZ AutoV, VFD Volts, Voltage, and Current functions.

- Significant-measurements (readings) are >5% of range in the Voltage and Current functions, or non-OL in the Resistance function.
- Stable-reading is a significant-measurement reading having  $\leq 30$  counts in difference from its two immediate preceding measurement readings.
- Significant-measurement readings are being displayed in real time (Real-Read™); LCD “- - - -” is being displayed while awaiting significant-measurements.
- The **AutoHold** gives a short-beep with a flashing LCD “” when a stable-reading is successfully latched ready for later display. If any of the successive significant-measurement readings differs from the latched reading by >30 counts, the latched reading will be reset awaiting a new stable-reading to re-latch.
- After a significant-measurement session, **AutoHold** gives a short-beep and displays the latched-reading. The reading flashes to emphasize it is on hold to avoid confusion.
- The **AutoHold** gives 3 short-beeps and LCD “- - - -” flashes to indicate a null capture after a significant-measurement. It represents no stable-reading is latched or has been reset after encountering further unstable signal changes to avoid displaying misleading readings.

**Note:** Make sure both test probes are making good contacts simultaneously when using the **AutoHold** feature. Single probe contact may lead to latching floating-signal readings. Removing both probes from the test points simultaneously largely avoids the mis-latching of an unwanted floating signal.






**MAX/MIN/AVG Record mode**

Short-press the **REC ** button to activate **MAX/MIN/AVG** recording mode. LCD “ **MAX AVG MIN**” turn on. The meter beeps when a new **MAX** (maximum) or **MIN** (minimum) reading is updated. The **AVG** (average) reading is calculated on all measured readings in the session. Short-press the button again to read the **MAX, MIN, AVG, and MAX AVG MIN** (active measurement) readings in sequence. Long-press the **REC ** button to exit this mode. Auto-Power-Off is disabled automatically in this mode.

**Relative  $\Delta$  mode**

**Relative  $\Delta$**  mode allows the user to offset the meter consecutive measurements with the displaying reading as the reference value. LCD “ $\Delta$ ” turns on. Short-press the **REL** button to toggle the **Relative  $\Delta$**  mode.

**CREST mode**

Short-press the **CREST** button to activate **CREST** mode (Instantaneous PEAK-HOLD) to capture Current or Voltage peak values in durations as short as 5ms. LCD ** & MAX** turn on. The meter beeps when a new ** MAX** (maximum) or ** MIN** (minimum) reading is updated. Short-press the button again to toggle the ** MAX** and ** MIN** readings. Long-press the button to exit this mode. Auto-Power-Off is disabled automatically in this mode. Availability: Voltage and Current 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  $\mu$ A, mA, or A input jacks when another function, especially a voltage function, is selected.

**Intelligent Auto-Power-Off (iAPO)**

The Auto-Power-off (iAPO) mode turns the meter off automatically to extend battery life after approximately 20 minutes of no specified activities, where applicable:

- 1) Rotary switch or push button operations
- 2) Significant measuring readings of above 8.5% of ranges
- 3) Non-OL readings for Resistance, Continuity, or Diode function
- 4) Non-zero readings for Hz function

In other words, the meter will intelligently avoid entering the iAPO mode when it is under normal measurements. To wake up the meter from iAPO, short-press the **SELECT** or **REC** button, 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.

**Power-on Options**

● **Disabling iAPO**

Press-and-hold the **SELECT** button while powering on the meter can disable **iAPO** feature temporarily during the power-on session. The LCD will display “**dAPO**” to confirm the selection before the **SELECT** button is released.

● **Disabling beep tone**

Press-and-hold the **RANGE** button while powering on the meter can toggle the beep tone OFF or ON in sequence. The meter confirms the selection by displaying “**dSbP**” for beeper OFF (disabled) or “**EnbP**” for beeper ON (enabled), before the **RANGE** button is released. The last selection will be saved as power-up default. When disabled, most operation beep tones are turned off except those for BeepLit™ Continuity and BeepLit™ Diode functions.

● **Shortening iAPO idling time**

Press-and-hold the **REL** button while powering on the meter can shorten the **iAPO** idling time to approximately 5 seconds temporarily during the power-on session. This mode is designed mainly for production verification use.

● **Enabling PC-COMM computer interface capabilities**

The instrument equips with an optical isolated interface port at the meter back for data communication. Press the **HOLD** button while turning the meter on to enable the PC-COMM output. LCD **COMM** annunciator turns on. **iAPO** is disabled automatically. Optional purchase PC interface kit BRUA20X is required to connect the meter to the PC computer RS232 or USB ports.

**7) MAINTENANCE**

**Note:** 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 an open case.

**Trouble Shooting**

If the instrument fails to operate, check batteries and test leads etc., and replace as necessary. Double-check the operating procedure as described in this user's manual. Refer to the LIMITED WARRANTY section for obtaining calibration, repairing, or warranty service.

**Accuracy and Calibration**

Accuracy is specified for a period of one year after calibration. Periodic calibration at intervals of one year is recommended to maintain meter accuracy.

**Cleaning and Storage**

Periodically wipe the meter and the test probe assembly with a damp cloth and mild detergent. Do not use abrasives or solvents. Allow to dry completely before operating. If the meter is not to be used for periods of longer than 60 days, remove the batteries and store them separately.

**Battery and Fuse replacement:**

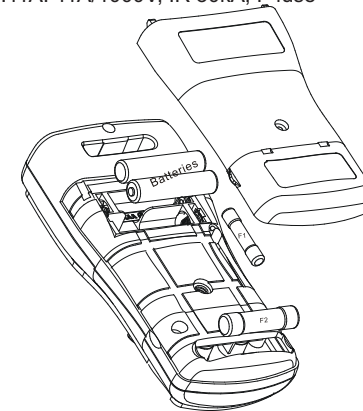
Loosen the screw from the access cover of the case bottom. Lift the access cover. Replace the batteries or fuse(s). Put back the access cover and re-fasten the screw.

**Battery use:** 1.5V AAA size battery x 2

**Fuse use:**

F1 Fuse (Dimension: 6x32 mm) for **µA/mA** input:  
ASTM HV620.0.63: 0.63A/1000Vac & Vdc, IR 30kA, F fuse

F2 Fuse (Dimension: 10x38 mm) for **A** input:  
Bussmann KLM-12: 12A/600V, IR 50kA for Vdc & 100kA for Vac, F fuse  
or  
ASTM HV110.11A: 11A/1000V, IR 30kA, F fuse



MUMBAI

**TEST CERTIFICATE**  
**TRMS DIGITAL MULTIMETER**

This Test Certificate Warranties 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 2257**    

SERIAL NO. \_\_\_\_\_

DATE: \_\_\_\_\_

**ISO 9001:2015  
REGISTERED**



**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, 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.