LIST OF PRODUCTS

* Digital Multimeter
* Digital AC & AC/DC Clampmeter
* AC Clamp Adaptor
* AC/DC Current Adaptor
* Thermo Anemometer
* Thermo Hygrometer
* Distance Meter
* Digital Lux Meter
* Network Cable Tester
* Power Factor Regulator
* Earth Resistance Tester
* Digital Panel Meters
* DC Power Supplies
* High Voltage Detector
* Calibrators
* Gas Analysers
* Frequency Counter
* Function Generator
* Phasing Sticks
* Battery Tester
* Waterproof Pen Testers
* Solar Power Meter
* EMF Detector
* Wood, Paper & Grain Moisture Meter
* Transistorised Electronic Analog & Digital Insulation Resistance Testers(upto 10 KV)
* Digital Sound Level Meter & Sound Level Calibrator
* Digital contact & Non-contact Type Tachometer
* Digital Non-contact (infrared) Thermometer
* Maximum Demand Controller/Digital Power Meter
* Digital Hand Held Temperature Indicators

KUSAM-MECO®

OFFICE ADDRESS / SERVICE CENTER

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Rajiv Gandhi Marg, Sanpada, Navi Mumbai - 400705.
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Email : sales@kusam-meco.co.in **Website :** www.kusamelectrical.com

KUSAM-MECO®

An ISO 9001:2015 Company

TRUE RMS DIGITAL CLAMPMETER + MULTIMETER

MODEL - KM 111M / KM 112M

OPERATION MANUAL

KUSAM-MECO®

TAKE MEASUREMENT CAREFULLY AND YOU'LL SPARE YOUR METER AND YOURSELF, SOME PAIN

Nearly every electrical engineer has a hand held digital clamp meter (Tongtester). We sometimes take them for granted, until we damage them or "burn them out". If you incorrectly connect your clamp meter to a circuit, or if you have the clamp meter 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.

Clamp meter 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 clamp meter becomes a low impedance circuit element.

Even if you correctly insert your clamp meter in to the circuit, you can still damage your meter. Don't try to measure current in excess of your meter's capacity. Check the current capacity of the Clamp meter.

If you are measuring current in industrial environment to prevent excess current from flowing through your meter, always disconnect your test leads from the circuit under test whenever you change Clamp meter functions. Set your meter to the correct function, say current, and its highest range for the setting. If the reading is small, change the range to the next lower range till the reading can be read with the best possible accuracy. When measuring voltage, connect the test leads before your apply power to your circuit. To be safe, start by setting your meter to its highest range first.

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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 meets the requirements for double insulation to IEC/UL/EN61010-1 Ed. 3.0, IEC/EN61010-2-032 Ed. 3.0, IEC/EN61010-2-033 Ed. 1.0, IEC/UL/EN61010-031Ed., 1.1and CAN/CSA-C22.2 No. 61010-1-12 Ed. 3.0:

Category III 600Volts ac and dc.

Per IEC61010 Overvoltage Installation Category

Overvoltage Category II

Equipment of ***Overvoltage Category II*** is energy-consuming equipment to be supplied from the fixed installation.

Note : Examples include household, office, and laboratory appliances.

Overvoltage Category III

Equipment of ***Overvoltage Category III*** is equipment in fixed installations.

Note : Examples include switches in the fixed installation and some equipment for industrial use with permanent connection to the fixed installation.

Overvoltage Category IV

Equipment of ***Overvoltage Category IV*** is for use at the origin of the installation.

Note : Examples include electricity meters and primary over-current protection equipment.

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.

WARNING

To reduce the risk of fire or electric shock, do not expose this product to rain or moisture. The meter is intended only for indoor use.

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.

Keep your hands/fingers behind the hand/finger barriers (of the meter and the test leads) that indicate the limits of safe access of the hand-held part 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.

This Clamp-on meter is designed to apply around or remove from uninsulated hazardous live conductors. But still, individual protective equipment must be used if hazardous live parts in the installation where measurement is to be carried out could be accessible.

CAUTION Disconnect the test leads from the test points before changing meter functions.

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
	Application around and removal from hazardous live conductors is permitted

2) CENELEC Directives

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

SPECIFICATIONS

General Specifications

Display	:	3¾ digits 4000 counts LCD display(s)
Update Rate	:	3 per second nominal
Polarity	:	Automatic
Low Battery	:	Below approx. 2.4V
Operating Temperature	:	0°C to 40°C.
Relative Humidity	:	Maximum relative humidity 80% for temperature up to 31°C decreasing linearly to 50% relative at 40°C
Altitude	:	Operating below 2000m
Storage Temperature	:	-20°C to 60°C, <80% R.H. (With battery removed)
Temperature Coefficient:		nominal 0.15 x (specified accuracy)/°C @(0°C ~ 18°C or 28°C ~ 40°C), or otherwise specified.
Sensing	:	Average (KM 111M); True RMS (KM112M)
Overload Protections	:	
ACA Clamp-on jaws	:	AC 600A rms continuous
+/μA & COM terminals	:	600VDC / VAC rm.
Transient protection	:	6.5KV (1.2/50μS surge)
Safety	:	Meets IEC/UL/EN61010-1 Ed. 3.0, IEC/EN61010-2-032 Ed. 3.0, IEC/EN61010-2-033 Ed. 1.0, IEC/UL/ EN61010-031Ed., 1.1and CAN/CSA-C22.2 No. 61010-1-12 Ed. 3.0:
Measurement Category	:	III 600 Volts AC & DC
Pollution degree	:	2

E.M.C. : Meets EN61326 (1997, 1998/A1), EN61000-4-2 (1995, 2000/A2), and EN61000-4-3 (2002)

In an RF field of 3V/m :

Capacitance function is not specified

Other function ranges :

Total Accuracy = specified Accuracy + 45 digits

Performance above 3V/m is not specified

Power Supply : Single 3V coin battery IEC-CR2032

Power Consumption : 2.8mA typical except that 3.3mA typical for ACA function.

APO Timing : Idle for 30 minutes.

APO Consumption : 5μA typical

Dimension : 190(L) x 63(W) x 32(H) mm.

Weight : 139gm approx.

Jaw opening & conductor diameter : 26mm max.

Accessories : Test leads (pair), battery installed, user's manual & soft carrying case.

Special Features : Data Hold, Relative Zero mode, Slim jaws, Light weight.

ELECTRICAL SPECIFICATIONS

Accuracy is ± (% reading digits + number of digits) or otherwise specified, at 23°C ± 5°C & less than 75% R.H.

True RMS accuracy of ACV is specified from 5% to 100% of range, & ACA is specified from 10% to 100% of range, or otherwise specified. Maximum Crest Factor <1.75 : 1 at full scale & <3.5 : 1 at half scale, and with frequency spectrums, besides fundamentals, fall within the meter specified AC bandwidth for non-sinusoidal waveforms.

DC VOLTAGE

Range	Resolution	Accuracy
400.0 mV	100.0 μV	± (0.3% rdg + 4 dgts)
4.000 V	1 mV	± (0.5% rdg + 3 dgts)
40.00 V	10 mV	± (0.5% rdg + 3 dgts)
400.0 V	100 mV	± (0.5% rdg + 3 dgts)
600 V	1 V	± (1.0% rdg + 4 dgts)

NMRR : >50dB @ 50/60Hz

CMRR : >120dB @ DC, 50/60Hz, Rs = 1kΩ

Input Impedance : 10MΩ, 30pF nominal (1000MΩ for 400.0mV range)

AC VOLTAGE (50Hz ~ 500Hz)

Range	Resolution	Accuracy
4.000 V	1 mV	± (1.5% rdg + 5 dgts)
40.00 V	10 mV	± (1.5% rdg + 5 dgts)
400.0 V	100 mV	± (1.5% rdg + 5 dgts)
600 V	1 V	± (2.0% rdg + 5 dgts)

CMRR : >60dB @ DC to 60Hz, Rs = 1kΩ

Input Impedance : 10MΩ, 30pF nominal

AC CURRENT (Clamp-On)

Range	Resolution	Accuracy[1)2)3)]
50Hz / 60Hz		
40.00 A	10 mA	± (1.5% rdg + 8 dgts)
400.0 A	100 mA	
600 A	1 A	

[1)] Induced error from adjacent current carrying conductor : 0.05/A
[2)] Specified accuracy is from 1% to 100% of range and for measurements made at the jaw center. When the conductor is not positioned at the jaw center, position errors introduced are :
Add 2% to specified accuracy for measurements made BEYOND jaw marking lines (toward jaw opening)
[3)] Add 8d to specified accuracy @ reading <10% of range.

OHMS

Range	Resolution	Accuracy[1)2)3)]
400.0 Ω	0.1 Ω	± (0.8% rdg + 8 dgts)
4.000 kΩ	1 Ω	± (0.6% rdg + 4 dgts)
40.00 kΩ	10 Ω	
400.0 kΩ	100 Ω	
4.000 MΩ	1 kΩ	± (1.0% rdg + 4 dgts)
40.00 MΩ	10 kΩ	± (2.0% rdg + 4 dgts)

Open Circuit Voltage : 0.4VDC typical

MAX HOLD

Specified accuracy ± 50 digits for changes > 25ms in duration.

AUDIBLE CONTINUITY TESTER

Audible threshold : between 5Ω and 120Ω.

DIODE TESTER :

Open Circuit Voltage : <1.6 VDC
Test Current (Typical) : 0.25mA

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CAPACITANCE

Range[1)]	Resolution	Accuracy[2)3)]
500.0 nF	100 pF	± (3.5% rdg + 6 dgts)
5.000 μF	1 nF	
50.00 μF	10 nF	
500.0 μF	100 nF	
3000 μF	1 μF	

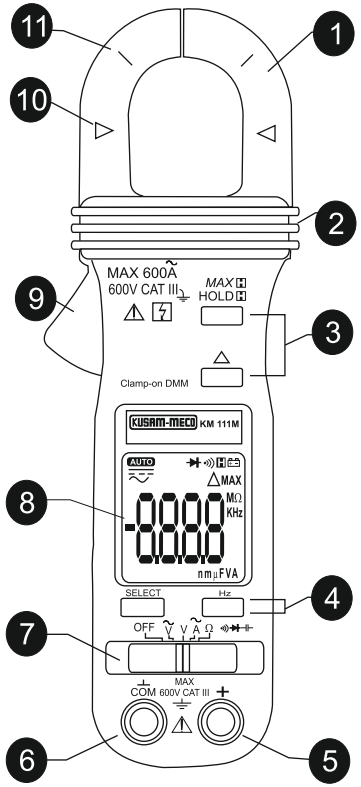
[1)] Additional 50.00nF range accuracy is not specified.
[2)] Accuracies with film capacitor or better
[3)] Specified with battery voltage above 2.8V (approximately half full battery).
Accuracy decreases gradually to 12% at low battery warning voltage of approximately 2.4V.

Hz FREQUENCY

Function	Sensitivity (Sine RMS)	Range
400.0 mV	350 mV	10Hz ~ 2kHz
4.000 V	1 V	10Hz ~ 5kHz
4.000 V	32 V	10Hz ~ 100kHz
40.00 V		
400.0 V	100 V	10Hz ~ 10kHz
600 V	500 V	10Hz ~ 5kHz
400.0 A	60 A	40Hz ~ 400Hz

Display Counts : 5000
Best resolution : 0.001Hz
Accuracy : 0.5% + 4d

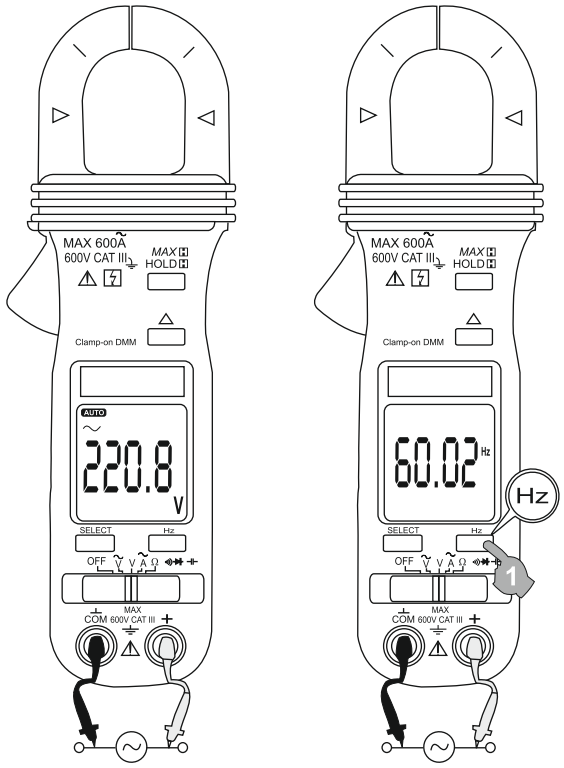
3) PRODUCT DESCTRIPTION



1) Transformer Clamp Jaw for AC current magnetic field pick up
2) Hand / Finger Barrier to indicate the limits of safe access of the meter during measurement.
3) Push-buttons for special functions & features.
4) Push-buttons for special functions & features on Slide-switch Selector functions.
5) Input Jack for all functions EXCEPT non-invasive ACA current function.
6) Common (Ground reference) Input Jack for all functions EXCEPT non-invasive ACA current function.
7) Slide-switch Selector to turn the Power ON /OFF and Select a function.
8) 3¾ digits 4000 counts LCD displays.
9) Jaw trigger for opening the transformer clamp jaw.
10) Jaw center indicators, at where best ACA accuracy is specified.
11) Jaw marking lines for ACA position error indication.

4) 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.



DC VOLTAGE, AC VOLTAGE, Hz FREQUENCY FUNCTIONS

Set slide-switch to Voltage function positions. Inputs are made through the test leads terminals.

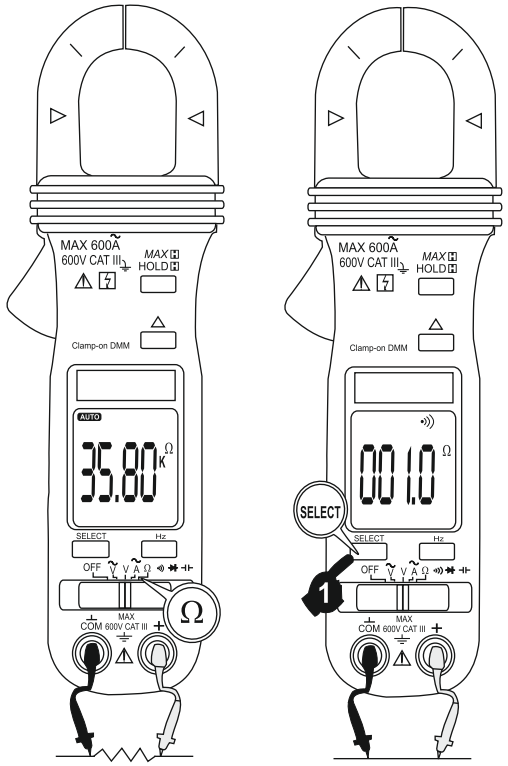
Press the Hz button momentarily to activate Hz Frequency function in the following slide-switch functions: DCV & ACV via the test leads; ACA via the clamp jaw.

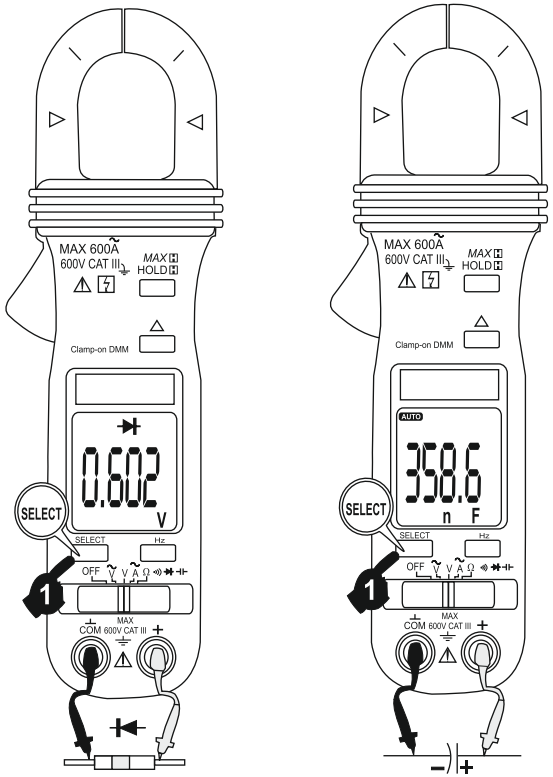
Note : DC 400.0mV range is designed with 1000MΩ high input impedance for least current drain in measuring small signals, and can cope better with most commercially available voltage output transducers / adapters. The non-zero display reading is normal when the meter inputs are open circuit, which will not affect actual measurement accuracy. The meter will show close to zero readings when the inputs are shorted. Open input is actually a floating condition, which is not a zero-volt-input condition.

Note : The Hz trigger level is determined by the selected function-range from where the Hz function is activated. In ACV function :
Activating the Hz function during significant measurements can get the most appropriate trigger level to avoid electrical noises in most cases. Electrical noise may cause unstable Hz reading.
Activating the Hz function at AC 4.000V range (before making significant measurements) can get lower trigger level (higher sensitivity). Hz reading may show zero when the sensitivity is insufficient.

CAUTION

Using Resistance, Continuity, Diode or Capacitance 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 measurement reading.





Ω RESISTANCE, AND ·)) CONTINUITY FUNCTIONS

Inputs are made through the test leads terminals. Slide-switch on defaults at Ω. Press SELECT button momentarily to select ·)) continuity function which is convenient for checking wiring connections and operation of switches. A continuous beep tone indicates a complete wire.

→|– DIODE TEST FUNCTION

Inputs are made through the test leads terminals. Slide-switch on defaults at Ω. Press SELECT button momentarily 2 times to →|– Select Diode test function. 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 it the diode is good. Any other readings indicate the diode is resistive or shorted (defective).

⊣⊢ CAPACITANCE FUNCTION

Inputs are made through the test leads terminals. Slide-switch on defaults at Ω. Press SELECT button momentarily 3 times to select ⊣⊢ Capacitance function.

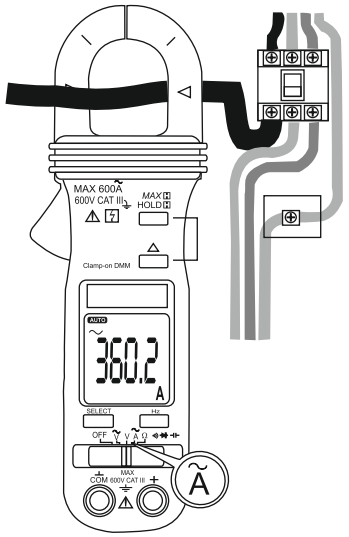
Relative zero △ mode can be used to zero out the parasitic capacitance of the leads and the internal protection circuitry of the meter when measuring low capacitance in the order of Pico Farad (pf).

CAUTION

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

ACA FUNCTION

Inputs are made through the clamp jaws for non-invasive ACA current measurements. Set the slide-switch to select the ACA function.



CAUTION (Application and removal of the Clamp-on meter)

For non-invasive ACA current measurements, press the jaw trigger and clamp the jaws around only one single conductor of a circuit for load current measurement. Make sure the jaws are completely closed, or else it will introduce measurement errors. Enclosing more than one conductor of a circuit will result in differential current (like identifying leakage current) measurement. Locate the conductors at the Jaws center as much as possible to get the best measuring accuracy. For removal, press the jaw trigger and remove the jaws from the conductors.

Adjacent current-carrying devices such as transformers, motors and conductor wires will affect measurement accuracy. Keep the jaws away from them as much as possible to minimize influence.

HOLD H

The hold feature freezes the display for later view. Press the **HOLD H** button momentarily toggles to hold mode in the following function:

MAX H

The max feature compares and displays the measured maximum value as fast as 30ms with auto-ranging capability. Press the **MAX H** button for 1 second or more toggles to max feature in the following functions(s):
DCV, ACV & ACA functions

RELATIVE ZERO △ MODE

Relative zero △ mode allows the user to offset the meter consecutive measurements with the displaying reading as the reference value. The display will now show readings relative to the stored reference value. That is, display = reading - stored value. Press the △ button momentarily toggles to relative zero mode.

AUTO-RANGING

Where there is more than one measuring range under a selected meter function, the LCD annunciator "a" turns on. The meter will automatically switch to the best resolution range when making measurements. No manual ranging selection is required.

AUTO POWER OFF (APO)

When the meter is on, the Auto Power Off (APO) feature will switch the meter into a sleep mode automatically to extend battery life after approximately 30 minutes of no slide-switch nor push button operations. To wake up the meter from APO, press the buttons momentarily or set the slide-switch to the OFF position and then slide back on again. Always set the slide-switch to the OFF position manually when the meter is not in use.

5) 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.

Trouble Shooting

If the instrument fails to operate, check batteries and test leads etc., and replace as necessary. Double check operating procedure as described in this user's manual

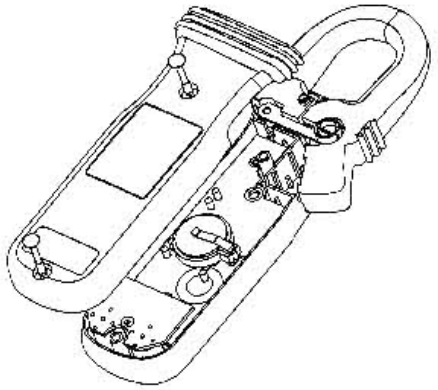
If the instrument voltage-resistance input terminal has subjected to high voltage transient (caused by lightning or switching surge to the system) by accident or abnormal conditions of operation, the series fusible resistors will be blown off (become high impedance) like fuses to protect the user and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

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 batteries and store them separately

Battery Replacement

The meter uses standard Single 3 V IEC-CR2032 coin batteries
Loosen the 2 screws from the case bottom and remove the bottom case. Slide the battery out the side of the holder and replace with a new battery (observe polarity). Replace the bottom case. Re-fasten the screws.



KUSAM-MECO®

MUMBAI

TEST CERTIFICATE

DIGITAL TRMS CLAMPMETER + 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 111M / KM 112M

SERIAL NO. _____

DATE: _____

ISO 9001
REGISTERED

QC
KUSAM-MECO
PASS

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.