KUSAM-MECO®

An ISO 9001:2008 Company

3¾ DIGIT AC LEAKAGE DIGITAL CLAMPMETER WITH HARMONICS LOW PASS FILTER FUNCTION

8 FUNCTIONS 6 RANGES

Model KM 2007

SPECIAL FEATURES :

- LPF (Low Pass Filter) function
- In Continuity Test, reading below 100 approx. will be indicated by buzzer
- Display annunciators for Units & Functions
- MAX Hold Function
- Wide frequency range selection with Low Pass Harmonics filter for accurate measurements.

GENERAL SPECIFICATIONS :

- **Sensing :** Average sensing
- **Jaw Opening Size :** 32 mm
- **Display :** 3¾ digits 4000 counts LCD display
- **Max. Opening Jaw Size :** 36mm
- **Low Battery :** LCD displays "⊟" as replace battery
- **Overload indication :** "OL" display at left side
- **Sampling Time :** 2.5 times per second
- **Pollution degree :** 2
- **Operating Temperature :** -10°C to 50°C below 80% R.H.
- **Operation height under 2000M above sea level.**
- **Storage Temperature:** -20°C to 60°C below 70% R.H.
- **Power Supply :** 9V battery
- **Dimension :** 250(L) X 85(W) X 35(H) mm
- **Weight :** Approx. 342 gm (battery included)

ACCESSORIES :

Test leads, Carrying Case, Battery installed, User's Manual

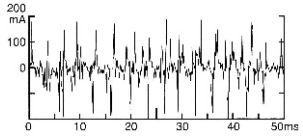
SAFETY :

IEC1010-1 & IEC1010-132 CAT III 600V Installation CAT III. Double & Reinforce Insulation with safety sockets design

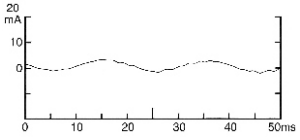
HIGH FREQUENCY SELECTOR SWITCH

This switch is designed to select "WIDE" or "50/60Hz" range. "WIDE" range covers a wide frequency band of 40Hz to 1kHz. AC current having a fundamental waveform and harmonics can be measured over this range. "50/60Hz" is restricted to a frequency response of 40Hz to 100Hz and therefore permits measurement of AC current of fundamental frequency only by filtering harmonic content. When in doubt as to the presence of harmonics you can indentify it by using this frequency selector switch. To give an example, the following shows the results of AC current measurement on an earthing wire within a switchbox where there is an inverter based airconditioner is connected at summertime. Suppose Model KM-2007 reads 60mA AC with the frequency selector switch set at the "WIDE" position as shown, while it displays 5mA at the "50/60Hz" switch position. The difference between the two readings (60mA - 5mA = 55mA) is considered leakage current caused by harmonics. The test also found that this leakage current is flowing into single phase, 3-wire circuits other than those connected with the inverters in the building inspected.

"WIDE" range - 60mA reading



"50/60Hz" range - 5mA reading



Wide Frequency Function:

If the circuit under test is originated from a high frequency generating device such as inverter, switching regulators, etc., Then the switch should be set at wide position to measure the signal which contains the frequency from 40Hz ~ 1KHz. To make sure the presence of high frequency signal, set the switch at 50/60 Hz and wide position to see the difference. If the reading is very different. It is certain that high frequency signals or harmonics are present.

ELECTRICAL SPECIFICATIONS - KM 2007

Accuracy is ± (% reading digits + number of digits) or otherwise specified, at 23°C ± 5°C below 80% R.H.

AC CURRENT

Range	Resolution	Accuracy 50Hz~500Hz	Overload Protection
40 mA	10 A	±(1.5%rdg + 2dgts)	1 A
400 mA	100 A	±(1.5%rdg + 2dgts)	10 A
4 A	1 mA	±(1.5%rdg + 2dgts)	100 A
100 A	100 mA	±(1.5%rdg + 5dgts)	500 A

40 mA range is very sensitive such that the reading may fluctuates on "ZERO" easily.

AC VOLTAGE

Range	Resolution	Accuracy 50Hz~500Hz	Overload Protection
600 V	1 V	±(1.5%rdg + 5dgts)	DC 600V / AC 600V rms

Input Impendence : 10M

RESISTANCE

Range	Resolution	Accuracy	Overload Protection
400	0.1	±(1.2%rdg + 3dgts)	AC/DC 500Vrms

Continuity Test function by buzzer will sound if the measured resistance below 100 .

All Specifications are subject to change without prior notice

KUSAM-MECO®

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LIST OF PRODUCTS

- Digital Multimeter
- Digital AC & AC/DC Clampmeter
- AC Clamp Adaptor
- AC/DC Current Adaptor
- Transistorised Electronic Analog & Digital Insulation Resistance Testers
- Digital Sound Level Meter & Sound Level Calibrator
- Digital contact & Non-contact Type Tachometer
- Digital Non-contact (infrared) Thermometer
- Thermo Hygrometer
- Thermo Anemometer
- Wood Moisture Meter
- Distance Meter
- Digital Hand Held Temperature Indicators
- Digital Lux Meter
- Network Cable Tester
- Power Factor Regulator
- Maximum Demand Controller/Digital Power Meter

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KUSAM-MECO®

LEAKAGE CURRENT CLAMP METER
KM-2007

OPERATION MANUAL

KUSAM-MECO

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.

KUSAM-MECO®

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KUSAM-MECO

LEAKAGE CURRENT CLAMP METER

KM 2007

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 or 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 changed 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 you 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.

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, Burn't PCB's, fuses, disposable batteries, carrying case, electrodes probes, clamps, cables 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.

KUSAM-MECO

MUMBAI

TEST CERTIFICATE

LEAKAGE CURRENT CLAMPMETER

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 2007**

SERIAL NO. _____

DATE: _____

ISO 9001
REGISTERED

QC
KUSAM-MECO
PASS

KUSAM-MECO

TABLE OF CONTENTS

Thank you for your patronage. Please thoroughly read this manual before use in order to operate correctly, decrease damage, and obtain the best performance of this meter.

I. FEATURES

- Maximum opening size of the jaw is up to 36mm.
- Maximum conductor size: 32mm
  The meter is double insulated and designed for your Safety requirements.
- With safety sockets design.
- With indication of measurement units and functions.
- With Peak Hold function.
- In continuity test, reading below 100Ω approx. will be indicated by buzzer.
- With LPF (Low Pass Filter) function.

II. SPECIFICATIONS

GENERAL SPECIFICATIONS

1. Display: 3 ¾ digit LCD with maximum reading 3999, units, decimal point, and symbols.
2. Overload indication: Display the highest "OL" at left side.

5-2. Storage

1. This meter is a precision instrument. Whether in use or in store, please do not exceed the specification requirements to avoid any possible damage or danger during use.
2. Do not place this meter in a location that is in high temperature or humidity or in exposure to direct sunray.
3. Be sure to turn the meter off after use. For long time storage, take out the battery to avoid leakage of battery liquid which will damage the interior parts.

5-3.Maintenance and Cleaning:

Only use a dry cloth to clean the plastic case.

Wide Frequency Function:

If the circuit under test is originated from a high frequency generating device such as inverter, switching regulators, etc., Then the switch should be set at wide position to measure the signal which contains the frequency from 40Hz ~ 1KHz. To make sure the presence of high frequency signal, set the switch at 50/60 Hz and wide position to see the difference. If the reading is very different. It is certain that high frequency signals or harmonics are present.

V. Maintenance

5-1. Replace battery as LCD displays "⊟+"

1. Turn off the power switch.
2. Remove the test leads or the objects to be tested.
3. Remove the screws on the bottom cover, and detach the battery cover from the bottom cover.
4. Take out the battery from the battery fastener carefully.
5. Set the new battery with battery fastener, then put it back in the battery case.
6. Put the bottom cover back to its position and fasten with screws.

ACV MEASUREMENT:

The maximum ACV input should not exceed 600V. If 600V AC is exceeded, the meter will show the measured value, but the accuracy, and the safety of meter and user cannot be accepted as the manufacturer's responsibility.

ACA MEASUREMENT :

The maximum ACA input should not exceed 100A. When the measurement of ACA current is over AC 100A the measured value will be displayed but the accuracy, and the safety of meter and user cannot be accepted as manufacturer's responsibility.

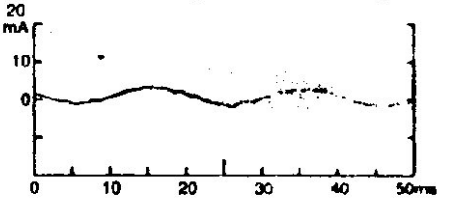
3. Low battery indication : Replace battery as LCD displays " ⊟+ ".
4. Battery life : About 200 hours.
5. Sampling time : 2.5 times / sec.
6. Peak Hold : to hold the maximum reading of the measured value.
7. Power supply : 9V battery.
8. Installation categories III.
   Double & Reinforce Insulation.

9. Operation height under 2000M above sea level.
10. Operating Temperature & Humidity :
    -10 ~ 50°C, below 80% RH.
11. Operation environment : Indoor uses only.
    Pollution degree 2.
12. Storage Temperature & Humidity :
    -20 ~ 60°C, below 70% RH.
13. Dimension :250(L) x 85(W) x 35(H)mm.
14. Weight : approx. 342g. (including battery).
15. Accessories : Test leads 1 set, user manual,
    Carrying case & battery.

with the frequency selector switch set at the "WIDE" position as shown, while it displays 5mA at the "50/60Hz" switch position. The difference between the two readings (60mA - 5mA = 55mA) is considered leakage current caused by harmonics. The test also found that this leakage current is flowing into single phase, 3-wire circuits other than those connected with the inverters in the building inspected.

"WIDE" range - 60mA reading

"50/60Hz" range - 5mA reading



To eliminate the effect of high frequency noise, a low pass filter is designed to filter out high frequency signal. To enable the filter, set the switch at the 50/60 position. The filter's cut-off frequency is set at 100Hz with an attenuation characteristic of approx. 24dB/Octave.

HIGH FREQUENCY SELECTOR SWITCH

This switch is designed to select "WIDE" or "50/60Hz" range. "WIDE" range covers a wide frequency band of 40Hz to 1kHz. AC current having a fundamental waveform and harmonics can be measured over this range. "50/60Hz" is restricted to a frequency response of 40Hz to 100Hz and therefore permits measurement of AC current of fundamental frequency only by filtering harmonic content. When in doubt as to the presence of harmonics you can indentify it by using this frequency selector switch. To give an example, the following shows the results of AC current measurement on an earthing wire within a switchbox where there is an inverter based airconditioner is connected at summertime. Suppose Model KM-2007 reads 60mA AC

ELECTRICAL SPECIFICATIONS:

Accuracy:±(.....% Rdg + ...dgt)

AC CURRENT

Range	Resolution	Accuracy (50Hz~60HZ)	Overload Protection
40mA	0.01 mA	±(1.5%+2)	1A
400mA	0.1 mA		10A
4A	1 mA		100A
100A	0.1A	±(1.5%+5)	500A

* 40mA range is so sensitive that the reading is easily changed or not zero.

AC VOLTAGE

Range	Resolution	Accuracy (50Hz~500HZ)	Input Impedance	Overload Protection
600V	IV	±(1.5%+5)	10MΩ	DC 600V AC 600Vrms

RESISTANCE

Range	Resolution	Accuracy	MAX.Open Voltage	Overload Protection
400Ω	0.1Ω	±(1.2%+3)	3.3V approx.	AC/DC 500Vrms

* Also with buzzer function for continuity, buzzer will sound if the measured resistance is below 100Ω..

Description of Symbols:

~	Represent AC.
⏚	Earth (ground) **TERMINAL**
⧈	Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION.
⚠	Caution, risk of electric shock.
⚠	Caution (refer to accompanying documents).

4-4. Resistance measurement

1. Select the range of 400Ω
2. Connect the test leads of Voltage/ Resistance plug into the sockets, plug the red plug into V/Ω socket, and b l a c k plug into COM socket.
3. Connect the two long ends of test leads to the desired circuit, then reading will be displayed.
4. When measuring resistance, any voltage existing in circuit is not allowed.
   If a capacitor is installed, it must be discharged before test.
5. Peak Hold function is effective here.
   Please refer to Subitem 4-2. For instruction
6. With a buzzer for continuity purpose. Any resistance value below 100Ω will be sounded.

4-5. Using the 50/60 Hz and Wide Frequency Function

50/60 Hz Function :

This clamp meter has very good frequency response due to the electric property of the transformer jaws used. Therefore, the measurement result contains not only the fundamental frequency of 50/60Hz but also the high frequencies and harmonics superimposed on the fundamental frequency.

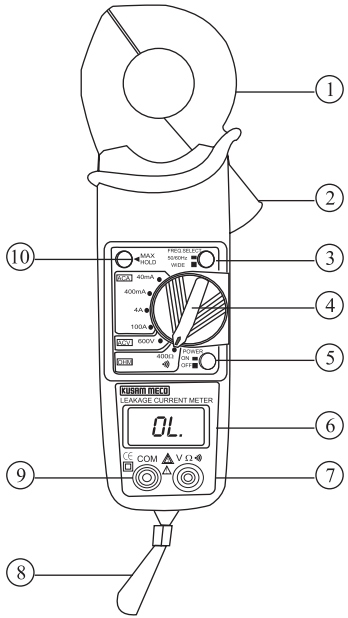
4-2. ACA MEASUREMENT

*** General current measurement**

1. Select a proper range.
2. Open the clamp and put the tested conductor in the center of the clamp jaw.
3. In the dark or where the reading is difficult, use the Peak Hold switch button to hold the obtained value.
   Unless a bigger value is re-obtained, the previously obtained value would maintain permanently.
4. To release the reading, just press the Peak Hold switch button again.

4-3. ACV MEASUREMENT

1. Select the range of AC 600V.
2. Connect the test leads of Voltage/ Resistance plug into the sockets, plug the red plug into V/Ω socket,and black plug into COM socket.
3. Connect the two long ends of test leads to the desired circuit, then reading will be displayed.
4. Peak Hold function is effective here.



III. Names of Parts

1.Inductive clamp jaw
2.Jaw trigger
3.LPF Function Switch.
4.Rotary range selector.
5.Power switch
6.LCD
7. V/Ω Test socket
8. Wrist strap
9. COM test socket
10.Peak hold switch button.

IV. Operation

4-1. Notes

1. Check if the battery is installed correctly.
2. Check if the LCD and the range indicator show the same as the function desired.
3. When changing range, please remove the tested conductor or electrical circuit in advance from the clamp jaw in order to avoid any accident.
4. Always keep your hand through the wrist strap to avoid drop of the meter due to carelessness. Also any serious vibration or impacts should be avoided so as not to damage the meter.
5. Do not test or connect to any circuit rated over AC 100A or AC 600V.
6. When measuring resistance, please do not add any voltage. Though there is a protection circuit, excessive voltage will still cause malfunction.
7. When measuring current, please remove the test lead of voltage & resistance in advance.
8. When measuring current, any strong current near or close to the clamp jaw will affect the accuracy.
9. This meter is not available for DC Voltage and current measurements or non sine wave AC signal, otherwise there will be a great error.

10. When measuring current, always put the tested conductor in the center of the clamp jaw so as to obtain more accurate reading.
11. During measuring, if the value of reading or indication of sign remains unchanged, check if the function of the peak hold is in effective.