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®

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KUSAM-MECO®

An ISO 9001:2015 Company

EARTH RESISTANCE & RESISTIVITY TESTER

KM 4235ER



OPERATION MANUAL

KUSAM-MECO®

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1. INTRODUCTION

This tester has been designed and tested according to EN 61010-1, EN 61326-1, EN 61557-1, EN 61557-5 and other safety standards. Follow all warnings to ensure safe operation.

The tester meets EN61010-1 CAT IV 300V Electrical test & measurement tools are assigned to 4 different designations from CAT I-IV (category) rating. The higher the category, the more risk there is that a high voltage can overload a circuit and cause electrical and physical damage. Usually, the higher the CAT rating, the safer the rating.

2)SAFETY NOTES

● Read the following safety information carefully before attempting to operate or service the detector.

● Use the meter only as specified in this manual, otherwise, the protection provided by the meter may be impaired.

● **Rated environment conditions :**
1) Indoor & out door use
2) Installation Category IV 300V.
3) Pollution Degree 2.
4) Altitude up to 2000m
5) Relative Humidity 80% max.
6) Ambient temperature 0 ~ 40°C

● **Observe the International Electrical Symbols listed below:**


Detector is protected throughout by double insulation or reinforced insulation.


Warning ! Risk of electric shock.


Caution ! Refer to this manual before using the detector.


Earth (ground) terminal.


Equipment complies with current EU directives.

3) FEATURES

- Auto-Rating Microprocessor controlled.
- LCM display
- Earth resistivity (p) test.
- Earth resistance testing at 20Ω / 200Ω / 2kΩ
- Earth voltage measuring : 0 ~300V AC
- Automatic C spike check.
- Automatic P spike check.
- 2- Wire test
- 3- Wire test
- 4- Wire test
- Auto Power Off
- Data Hold
- 200 measurement results can be saved in the memory and recalled on the display.
- Interval between auxiliary earth spikes is 1.0~50.0m.
- Safety standard : EN 61010-1 CAT IV 300V
  EN 61557-1
  EN 61557-5
  EN 61326-1

4. SPECIFICATIONS

Measuring Ranges	Earth Resistance 0-20Ω, 0-200Ω, 0-2kΩ Earth Resistivity 0.06~6.28 kΩ.m 0.62~62.8 kΩ.m 6.28~628 kΩ.m Earth Voltage 0-300V AC
Accuracy	Earth Resistance ±2%rdg3dgt Earth Resistivity ρ = 2 x π x L x R Earth Voltage ±2%rdg±3dgt
Earth Resistance Resolution	0-20Ω:0.01Ω 0-200Ω:0.1Ω 0-2kΩ:1Ω
Measuring System	Earth resistance by constant current Inverter 820Hz approx. 2mA
Temperature & Humidty	Operating:0℃~50℃≤80%R.H. Storage:-10℃~60℃≤80%R.H.
Power Source	1.5V(AA) x 8
Dimensions	250(L) x 190(W) x 110(D)mm
Weight	Approx. 1430g (battery included)
Accesories	Test leads (red-15m, black-10m, yellow-10m, green-5m) Auxiliary earth bars Instruction manual Carrying case Batteries

• Maximum Operating Error

Operating error (B) is an error obtained within the rated operating conditions, and calculated with the intrinsic error (A), which is an error of the instrument used, and the error (En) due to variations.

$$B=\pm(|A|+1.15\sqrt{E_2^2+E_3^2+E_4^2+E_5^2})$$

A: Intrinsic error
E_2: Variation due to changing the supply voltage
E_3: Variation due to changing the temperature
E_4: Variation due to series interference voltage
E_5: Variation due to resistance of the probes and auxiliary earth electrode resistance

• Range to keep the maximum operating error

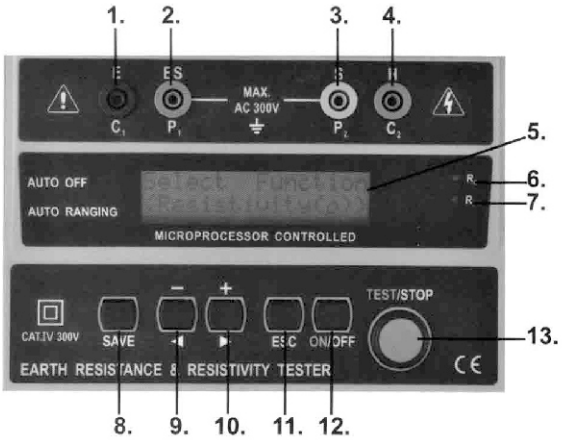
Measurement range within which the maximum operating error (±30%) applies.

20 Range : 5 ~ 19.99Ω
200 Range : 20 ~ 199.9Ω
2000 Range : 200 ~ 1999Ω

• Temperature & Humidity

Operating : 0℃~50℃ ≤80%R.H.
Storage : -10℃~60℃ ≤80%R.H.

5. INSTRUMENT LAYOUT



1. C1 terminal (Black test lead connection)
2. P1 terminal (Green test lead connection)
3. P2 terminal (Yellow test lead connection)
4. C2 terminal (Red test lead connection)
5. LCM display
6. Rc LED
7. Rp LED
8. SAVE button
9. Cursor button
10. Cursor button
11. ESC button
12. Power button
13. TEST/STOP button

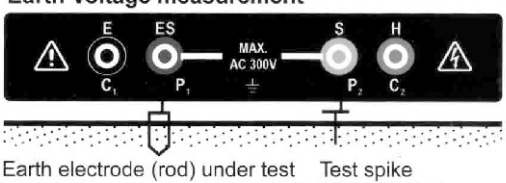
6. MEASURING METHODS

⚠ Before Measuring

- Battery voltage check
  a. Before testing, press the "ON/OFF" button, when the "Battery : Low" appears on the display, replace with new batteries.
  b. Prior to measuring, if "Battery : Low" appears on the display, replace with new batteries.

1. Earth voltage check
   a. Test leads connection.

Earth Voltage measurement



   b. Press "ON/OFF" button, " Select function <.....2P.....> " appears on the display.
   c. Press " ► " button 3 times until " Select function <.....ACV.....> " appears on the display.
   d. Press "TEST/STOP" button.
   e. Take a reading.

2. Earth resistance measurement

⚠ CAUTION

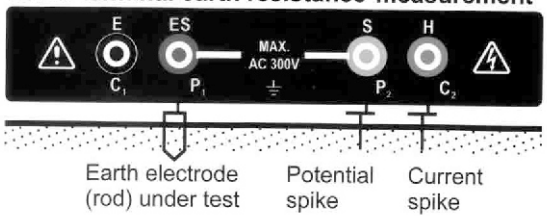
The measured results may be influenced by indication if measurements are made with the Test Leads twisted or connected each other. When connecting the probes, they should be separated.

a. Wiring system: Selection: Press the "ON/OFF" and " ► " button. Select "2P", "3P", "4P".
b. Insert the three Auxiliary Earth Spikes into the ground. The distance must be 5~10m between the Auxiliary Earth Spikes.
c. Test leads connections.

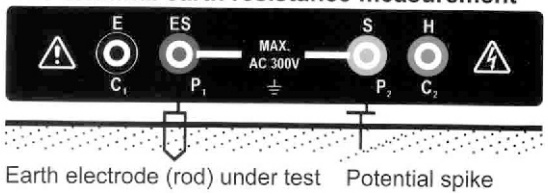
Four-terminal earth resistance measurement



Three-terminal earth resistance measurement



Two-terminal earth resistance measurement

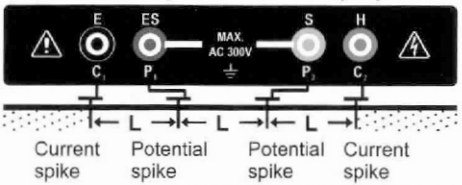


Notes:
Check the following prior to proceeding with measurement:

I. Checking if Auxiliary Earth Spikes connect correctly when the "Rc" LED lit.
II. Indication for "Rc" & "Rp"
Rc: When the "Rc" LED lit, this means there is no test current output.
Stop testing and check relevant testing point.
Rp: When the "Rp" LED is lit, the "R" value on the LCD will displayed ">2kΩ". This means testing Earth Resistance value is over 2kΩ.

3. Earth resistivity(ρ)measurement
a. Wiring system Selection:
Press the " ► " button 4 times, select "Resistivity(ρ)".
b. Press "TEST/STOP" button," Setting length -< xm >+ " appears on the display, " + ► " count up, " - ◄ " count down; can seting length 1~50m.
c. Test lead connections.

Earth resistivity measurement(ρ)



d. Press the "TEST/STOP" button and take a reading.

⚠ CAUTION

- Insert the four Auxiliary Earth Spikes into the ground deeply. They should be aligned at an interval of 1-30m. The depth should be 5% or less of the interval between the spikes.
- The spikes should be stuck in the depth of 25cm or less when the interval of the Auxiliary Earth Spikes is 5m.

4. SAVE function
   Press "SAVE" can storage test data and display "Save No.".

5. Log Display
   a. Press "ON/OFF" button, "Select function <.....2P.....>" appears on the display.
   b. Press " ► " 5 times until "Select function <LOG Display>" appears on the display.
   c. Press "TEST/STOP" button.
   d. Press "+" or "-" select want read Log data.

6. Log Clear
   a. Press "ON/OFF" button, "Select function <.....2P.....>" appears on the display.
   b. Press " ► " 6 times until "Select function <LOG Clear>" appears on the display.
   c. Press "TEST/STOP" button, display "Are you sure?"
   d. Press "TEST/STOP" display "Successful !".
   e. Press "TEST/STOP" display "No Log Data".

7. MAINTENANCE

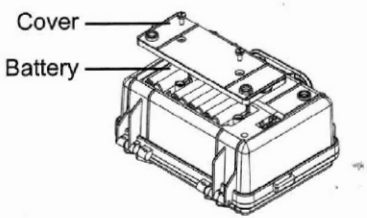
- Battery replacement

⚠ CAUTION

- Do not mix new and old batteries.
- Install batteries in the orientation as shown inside the battery compartment, observing correct polarity.

When the "Battery:LOW" appears on the display, replace the batteries as follows:

1. Disconnect the test leads from the instrument.
2. Remove the battery cover and the batteries.
3. Replace with eight 1.5V(AA) new batteries, taking care to observe correct polarity.
4. Reinstall battery holder and the battery cover.



- Fuse replacement:

⚠ CAUTION

When replacing the fuse, it must be replaced with same specification as the original.

1. Press the "ON/OFF" button to turn off the power, and disconnect the test leads from the instrument.
2. Open and remove the battery cover.

KUSAM-MECO®

MUMBAI

TEST CERTIFICATE

EARTH RESISTANCE & RESISTIVITY TESTER

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 4235ER

SERIAL NO. _____

DATE: _____

ISO 9001:2015
REGISTERED

QC
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PASS

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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 guarantee 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, Burn PCB, 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.