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 Detectors
* Calibrators
* Gas Detectors
* Frequency Counter
* Function Generator
* Phasing Sticks
* Battery Tester
* Waterproof Pen Testers
* Solar Power Meter
* EMF Detector
* Discharge Rods(400 KV)
* Wood, Paper & Grain Moisture Meter
* Transistorized 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

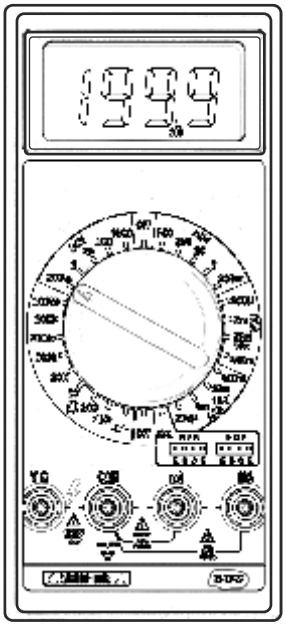
KUSAM-MECO®

OFFICE / SERVICE CENTER
Shop no.18, 1st Floor, CIDCO Shopping Complex, Plot # 9,
Sector-7, Rajiv Gandhi Marg, Sanpada, Navi Mumbai - 400705.
Sales Direct : +91-9867488006, 9867675093
Email : sales@kusam-meco.co.in
Website : www.kusamelectrical.com

KUSAM-MECO®

AN ISO 9001:2015 COMPANY

DIGITAL MULTIMETER
603



OPERATION MANUAL

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

Nearly every electrical engineer has a hand held digital multimeter (DMM). We sometimes take them for granted, until we damage them or "burn them out" if you incorrectly connect your DMM to a circuit, or if you 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 lower 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 10A. 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.

KUSAM-MECO

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Overview

⚠ **Warning**

To avoid electric shock or personal injury, read the "Safety Information" and "Rules for Safe Operation"carefully before using the Meter.

Digital Multimeter Model - 603 (hereafter referred to as "the Meter") is a 3½ digits Multimeter with steady operations, and highly reliable hand-held measuring instrument having different measurement positions. The Multimeter not only can measure AC/DC Voltage, AC/DC Current, Resistance, Diode & Continuity Test, Transistor Test but also has range Display.

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.

Unpacking Inspection

Open the package case and take out the Multimeter. Check the following items carefully to see any missing or damaged part :

Item	Description	Qty.
1	English Operating Manual	1 piece
2	Test Lead	1 pair

In the event you find any Part missing or damaged, please contact your dealer immediately.

Rules For Safe Operation (1)

⚠ **Warning**

To avoid possible electric shock or personal injury, and to avoid possible damage to the Meter or to the equipment under test, adhere to the following rules :

- Before using the Meter inspect the case. Do not use the Meter if it is damaged or the case (or part of the case) is removed. Look for cracks or missing plastic. Pay attention to the insulation around the connecting Terminals.
- Inspect the test leads for damaged insulation or exposed metal. Check the test leads for Continuity. Replace damaged test leads with identical electrical specifications before using the Meter.
- Do not apply more than the rated voltage, as marked on the Meter, between the terminals or between any terminal and grounding.
- The rotary switch should be placed in the right position and no changeover of range should be made while measurement is conducted to prevent the Meter from getting damaged.
- When measurement is taken at an effective voltage over 60V in DC or 30V rms in AC, special care should be taken for there is danger of electric shock.
- Use the proper terminals, function, and range for your measurements.
- Do not use or store the Meter in an environment of high temperature, humidity, explosive, inflammable and strong magnetic field. The performance of the Meter may deteriorate after the meter is dampened.
- When using the test leads, keep your fingers behind the finger guards.

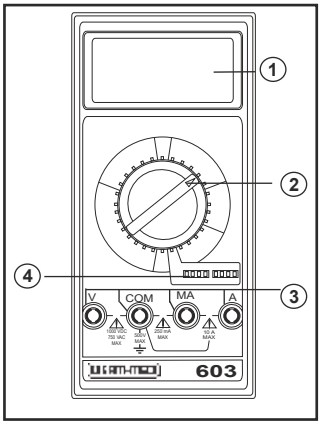
Rules For Safe Operation (2)

- Disconnect circuit power and discharge all high -voltage capacitors before testing resistance, continuity, diodes, or current.
- Replace the battery as soon as the battery indicator "" appears. With a low battery, the Meter might produce false readings that can lead to electric shock and personal injury.
- Turn the Meter power off when it is not in use and Remove the battery when not using for a long time.
- Constantly check the battery as it may leak when it has not been used for some time, replace the battery as soon as leaking appears. A leaking battery will damage the Meter.

International Electrical Symbols

~	AC (Alternating Current).
⎓	DC (Direct Current).
≂	Both DC & AC.
⏚	Grounding.
▣	Double Insulated.
⊟	Deficiency of Built-In Battery.
•)))	Continuity Test.
⊣◁	Diode.
⊟	Fuse.
⚠	Warning ! Refer to the Operating Manual.
⚠	Caution ! Risk of Electric Shock.

The Multimeter Structure (see figure 1)



(Figure 1)

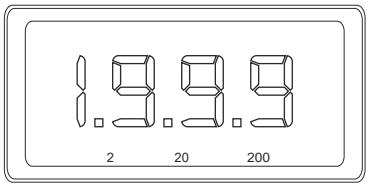
1) **LCD DISPLAY :**
   A 3½ digit display (maximum reading 1999) indicates measured values, and features symbols indicating ranges, Low Battery,.
2) **FUNCTION SELECTOR :**
   To Select ACV, DCV, ACA, DCA, RESISTANCE, Diode, Continuity & Transistor Test.
3) **INPUT JACKS (V**W, **m**A, A **and COM) :**
   Test leads are inserted into these jacks for Voltage, Resistance, Current measurements, Continuity & Diode Checks.
4) **Input Socket for Transistor Test.**
   NPN or PNP transistors are inserted in the sockets provided to measure their ratings.

Functional Buttons

Below table indicates the functional button operations

Buttons	Operation Performed
POWER (Yellow Switch)	Turn the Meter ON and OFF. ● Rotate the **SWITCH** to turn ON the Meter. ● Rotate the **SWITCH** to OFF position to turn OFF the Meter.

Display Symbols (see figure 2)



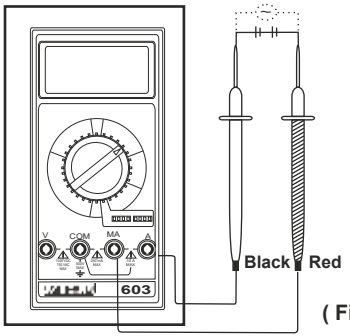
(Figure 2)

No.	Symbol	Meaning
1	—	Indicates negative reading.
2		The battery is low. ⚠ Warning : To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator appears.
3	▯	Indicates the range in which the switch position is placed.

Measurement Operation

- Make sure the Low Battery display is not on, otherwise false readings may be provided.
- Pay extra attention to the ⚠ symbol which is located besides the input terminals of the Meter before carrying out measurement.

A. DC voltage measurement (see figure 3)



(Figure 3)

⚠ **Warning**
To avoid harms to you or damages to the Meter from electric shock, please do not attempt to measure voltages higher than 1000V or 750V rms although readings may be obtained.

The DC Voltage ranges are : 200mV, 2V, 20V, 200V, 1000V.
To measure DC voltage, connect the Meter as follows :

1) Insert the red test lead into the **V**W input terminal and the black test lead into the **COM** input terminal

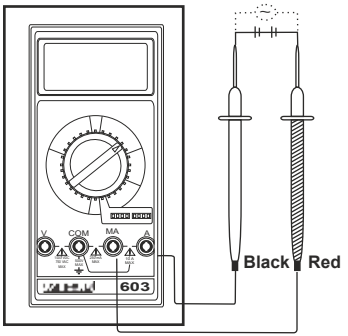
2) Set the rotary switch to an appropriate measurement position in V ⎓ range.

3) Connect the test leads across with the object being measured.
The measured value shows on the display.

⚠ Caution :

- If the value of voltage to be measured is unknown, use the maximum measurement position (1000V) and reduce the range step by step until a satisfactory reading is obtained.
- The LCD displays “1” indicating the existing selected range is overloaded, it is required to select a higher range in order to obtain a correct reading.
- In each range, the Meter has an input impedance of approx. 10MW. This loading effect can cause measurement errors in high impedance circuits. If the circuit impedance is less than or equal to 10kW, the error is negligible (0.1% or less).
- When DC voltage measurement has been completed, disconnect the connection between the testing leads and the circuit under test.

B. AC Voltage Measurement (see figure 4)



(figure 4)

⚠ Warning :

To avoid harm to you or damages to the Meter from electric shock, please do not attempt to measure voltages higher than 1000V or 750V rms although readings may be obtained.

The AC Voltage measurement has 5 measurement positions on the rotary switch : 200mV, 2V, 20V, 200V, 750V.

To measure AC Voltage, connect the Meter as follows :

1) Insert the red test lead into the VW terminal and the black test lead into the **COM** terminal.

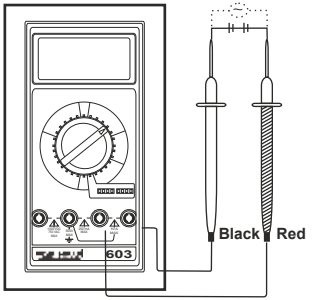
2) Set the rotary switch to an appropriate measurement position in V ~ range.

3) Connect the test leads across with the object being measured.
The measured value is shown on the display, which is effective value of sine wave (mean value response).

⚠ Caution :

- If the value of voltage to be measured is unknown, use the maximum measurement position (750V) and reduce the range step by step until a satisfactory reading is obtained.
- The LCD displays “ 1 “ indicating the existing selected range is overloaded, it is required to select a higher range in order to obtain a correct reading.
- When AC Voltage measurement has been completed, disconnect the connection between the testing leads and the circuit under test.

C. AC Current Measurement (see figure 5)



(figure 5)

⚠ Warning

Never attempt an in-circuit current measurement where the voltage between terminals and ground is greater than 60V.

Use proper function, and range for the current measurement.

The AC Current measurement has 5 measurement positions on the rotary Switch : 200mA, 2mA, 20mA, 200mA, and 10A

To measure AC Current :

1) Turn off power to the circuit. Discharge all high-voltage capacitors.

2) Insert the red test lead into the mA or 10A input terminal and the black test lead into the **COM** input terminal.

3) Set the rotary switch to an appropriate measurement position in mA or A range.

4) Break the current path to be tested. Connect the meter in series in the circuit.

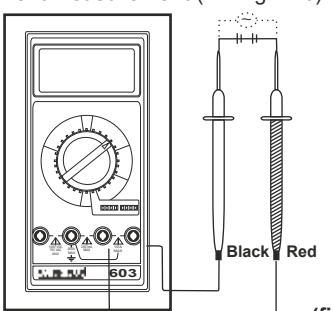
5) Turn on power in the circuit.

The measured value is shown on the display.

⚠ Caution :

- If the value of voltage to be measured is Unknown, use the maximum measurement position (10A) and reduce the range step by step until a satisfactory reading is obtained.
- The LCD displays " 1 " indicating the existing selected range is overloaded, it is required to select a higher range in order to obtain a correct Reading.
- When AC Current measurement has been Completed, switch off power in the circuit, switch off the meter & then remove the test leads.

D. DC Current Measurement (see figure 6)



(figure 6)

⚠ Warning :

Never attempt an in - circuit current measurement where the open circuit voltage between terminals and ground is greater than 60V DC or 30V rms. If the fuse burns out during measurement, the Meter may be damaged or the operator himself may be hurt. Use proper terminals, function, and range for the measurement. When the testing leads are connected to the current terminals, do not parallel them across any circuit.

The DC current measurement has 5 measurement positions on the rotary switch : 200mA, 2mA, 20mA, 200mA, and 10A.

To measure DC Current :

1) Turn off power to the circuit. Discharge all High -Voltage capacitors.

2) Insert the red test lead into the mA or 10A terminal and the black test lead into the **COM** terminal

3) Set the rotary switch to an appropriate Measurement position in mA or A range.

4) Break the current path to be tested. Connect the red test lead to the positive side of the break and the black test lead to the negative side of the break.

5) Turn on power to the circuit.
The measured value shows on the display.

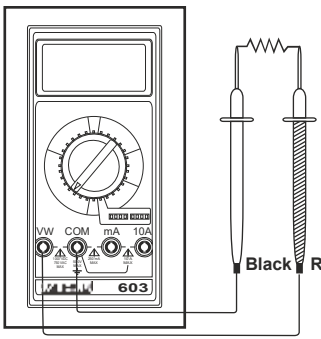
⚠ Caution

- If the value of current to be measured is unknown, use the maximum measurement position (10A) and 10A terminal, and reduce the range step by step until a satisfactory reading is obtained.
- When current measurement has been completed, disconnect the connection between the testing leads and the circuit under test.

E. Resistance Measurement (see figure 7)

⚠ Warning

To avoid damages to the Meter or to the devices under test, disconnect circuit power and discharge all the high-voltage capacitors before measuring resistance.



(figure 7)

The resistance range has 7 measurement positions on the rotary switch : 200W, 2kW, 20kW, 200kW, 2000kW, 20MW, 200MW.

To measure resistance, connect the meter as follows :

1) Insert the red test lead into the VW terminal and the black test lead into the **COM** terminal.

2) Set the rotary switch to an appropriate measurement position in W range.

3) Connect the test leads across with the object being measured.
The measured value shows on the display,

Note :

- The test leads can add 0.1W to 0.3W of error to the Resistance measurement. To obtain precision readings in low-resistance, that is the range of 200W, short-circuit the input terminals beforehand and record the reading obtained (call this reading as X). (X) is the additional resistance from the test lead.

Then use the equation :
Measured resistance value (Y) - (X) = precision readings of resistance.

- When there is no input, for example in open circuit condition, the Meter displays " 1" When resistance measurement has been completed, disconnect the connection between the testing leads and the circuit under test.

⚠ Caution :

- Never connect high voltage. to the input sockets with the switch in Resistance range. ●

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

F. Measuring Diodes & Continuity (See figure 8)

⚠ Warning

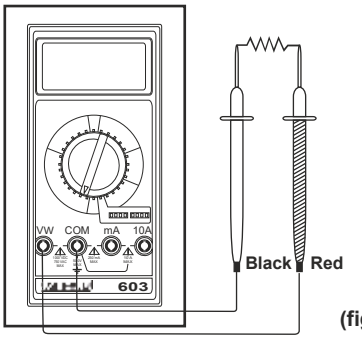
To avoid damage to the Meter or to the equipment under test, disconnect circuit power and discharge all high-voltage capacitors before measuring diodes and continuity.

Testing Diodes

Use the diode test function to check diodes, The diode test sends a current through the Semiconductor junction, and then measures the voltage drop across the junction. A good silicon junction drops between 0.5V and 0.8V.

To test a diode out of a circuit, connect the Meter as follows :

1) Insert the red test lead into the VW terminal and the black test lead into the COM terminal.



(figure 8)

2) Set the rotary switch to ⊣◀ position.

3) For forward voltage drop reading on any Semiconductor component, place the red test lead on the component's anode and place the black test lead on the component's cathode. The measured value is shown on the display.

⚠ Caution :

- In a circuit, a good diode will produce a forward voltage drop reading of 0.5V to 0.8V; however ; the reverse voltage drop reading can vary depending on the resistance of other pathways between the probe tips.
- Connect the test leads to the proper terminals as said above, to avoid error display. The LCD will display "1" indicating open-circuit for wrong connection. The unit of diode is Volt (V), displaying the positive connection voltage-drop value.
- When diode testing has been completed, disconnect the connection between the testing leads and the circuit under test.

Testing for Continuity

To test for continuity :

1. Insert the red test lead into VWterminal and the black test lead into the **COM** terminal.
2. Set the rotary switch to •))) position
3. Connect the test leads across with the object being measured.
   The buzzer sounds if the resistance of a circuit under test is less than 100W.
   The LCD displays the resistance value of a circuit under test.

Caution :

- The LCD displays “1” indicating the circuit being tested is open.
- When continuity testing has been completed, disconnect the connection between the testing leads and the circuit under test.

G. Transistor Testing

To test the Transistors, connect the Meter as below :

1. Insert the transistor (NPN or PNP) in the respective sockets provided.

2. The measured value is shown on the LCD Display.

FEATURES :

- **High Accuracy, Digital Reading.**
- **Large LCD for easy reading.**
- **Digit Size :** 18mm(H)
- **Instant Continuity Buzzer.**
- **Overload Protection on All Ranges.**
- **Recessed Safety Designed Input Jacks.**
- **Display :** 3½ digit LCD display (1999 Counts)
- **Automatic Zero adjustment.**

GENERAL SPECIFICATIONS :

Display	: 3½ digit LCD. Maximum reading 1999 with automatic sign and Function annunciators.
Overrange indication	: MSB (highest) digit (1) or (-1) is displayed.
Low battery	: “ ⊟ ” is displayed when The battery voltage drops below the operating voltage.
Measurement rate	: 3 measurements per second, nominal.
Operating temperature	: 0°C to + 50°C-70% RH.
Storage temperature	: -20°C to 60°C, 0-80% RH with battery removed.
Accuracy	: Accuracy specifications at 23 ± 5°C less than 75% RH.
Power	: Single 9 V Battery.
Dimension	: 170mm (L),84mm(W), 45mm(H)
Weight	: Approx (250 grams) including battery
Accessories	: Test leads, Spare Fuse, Operating Manual, Battery, Carrying Case.

ELECTRICAL SPECIFICATION :

DC VOLTAGE

Range	Resolution	Accuracy
200 mV	100 mV	± (0.5% rdg + 1 dgt)
2 V	1 mV	
20 V	10 mV	
200 V	100 mV	
1000 V	1 V	

OL. Protection : 500V DC/350V AC for 15 sec. On 200mV range, 1200V DC/800V AC on all other range

Input Impedance : 10MW

AC VOLTAGE

Range	Resolution	Accuracy
200 mV	100 mV	± (1.0% rdg + 4 dgts)
2 V	1 mV	
20 V	10 mV	
200 V	100 mV	
750 V	1 V	± (1.5% rdg + 4 dgts)

OL. Protection : 500V DC/350V AC for 15 sec. On 200mV range, 1200V DC/800V AC on all other range

Input Impedance : 10MW

AC CURRENT

Range	Resolution	Accuracy
200 mA	100 n A	± (1.2% rdg + 4 dgts)
2 mA	1 mA	
20 mA	10 mA	
200 mA	100 mA	
10 A	10 mA	± (2.0% rdg + 4 dgts)

OL. Protection : 10A Input, unfuse, upto 12A for 30 sec. Other range Input, 0.8A/250V Fuse.

Voltage Burden : 10A range 700mV MAX

DC CURRENT

Range	Resolution	Accuracy
200 mA	100 n A	± (1.0% rdg + 1 dgt)
2 mA	1 mA	
20 mA	10 mA	
200 mA	100 mA	
10 A	10 mA	± (2.0% rdg + 3 dgts)

OL. Protection : 10A Input, unfuse, upto 12A for 30 sec. Other range Input, 0.8A/250V Fuse.

Voltage Burden : 10A range 700mV MAX.

RESISTANCE

Range	Resolution	Accuracy
200 W	0.1 W	± (1.0% rdg + 3 dgts)
2 KW	1 W	± (0.8% rdg + 1 dgt)
20 KW	10 W	
200 KW	100 W	
2000 KW	1 KW	
20 MW	10 KW	± (3.0% rdg + 3 dgts)
200 MW	100 KW	± (5.0% rdg - 10 dgts)

OL. Protection : 500V DC/AC

Test Voltage : 200 Wrange 3.2V MAX. 20MWrange 3.0V MAX 200MWrange 3.2V MAX, Other range 3.0V MAX

DIODE TEST

Test Current	Accuracy
1.0 ± 0.6 mA	3.2V MAX

OL. Protection : 500V DC/AC rms

CONTINUITY TEST

Audible Sound Buzzer	Less than 100W

OL. Protection : 500V DC/AC rms

TRANSISTOR hFE TEST

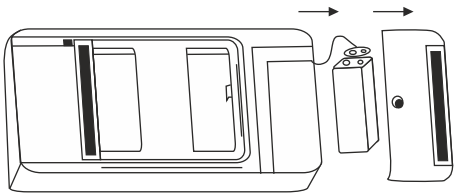
Range	Vce	Basic DC Current
0 to 1000	2.8V ± 0.4V	10 mA

Maintenance

⚠ Warning
To avoid false reading, replace the battery as soon as the battery indicator appears.

To replace battery :

- Disconnect the connection between the testing leads and the circuit under test, and remove the testing leads away from the input terminals of the Meter.
- Turn the Meter OFF.
- Remove the screws from the battery compartment, and separate the battery compartment from the case bottom
- Remove the battery from the battery compartment.
- Replace the battery with a new Standard 9V Battery.
- Rejoin the battery compartment and the case bottom, and install the screw.



To replace Fuse :

When an input is given to the terminals and the display does not show any reading, check if the fuse is ok. If the fuse has burnt out then it has to be replaced.

- Disconnect the connection between the testing leads and the circuit under test, and remove the testing leads away from the input terminals of the Meter.
- Turn the Meter OFF.
- Remove the screws from the battery compartment, and separate the battery compartment from the case bottom
- Remove the fuse from the fuse holder.
- Insert the new fuse having the same electrical specifications in the fuse holder.
- Rejoin the battery compartment and the case bottom, and install the screw.

KUSAM-MECO

MUMBAI

TEST CERTIFICATE

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. **603**

SERIAL NO. _____

DATE: _____

ISO 9001:2015
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.

KUSAM-MECO

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All transaction are subject to Mumbai Jurisdiction.

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OFFICE ADDRESS / SERVICE CENTER

Shop no.18, 1st Floor, CIDCO Shopping Complex,
Plot # 9, Sector-7, Rajiv Gandhi Marg, Sanpada,
Navi Mumbai - 400705. Maharshtra.

Sales Direct : +91-9867488006, 9867675093

Email : sales@kusam-meco.co.in

Website : www.kusamelectrical.com