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
* Digital AC & AC/DC Clampmeter
* AC/DC Current Adaptor
* Thermo Hygrometer
* Digital Lux Meter
* Power Factor Regulator
* Digital Panel Meters
* High Voltage Detector
* Gas Analysers
* Function Generator
* Battery Tester
* Solar Power Meter
* 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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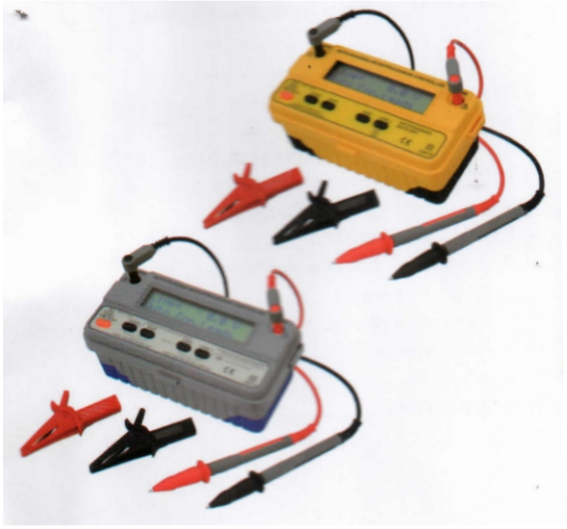
Web.: www.kusamelectrical.com

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AN ISO 9001:2015 COMPANY

MULTIFUNCTION & INSULATION CONTINUTY - VOLTAGE TESTER

MODEL - KM 1152MF



OPERATION MANUAL

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1. SAFETY RULES

CAUTION ⚠ RISK OF ELECTRIC SHOCK

This tester has been designed with your safety in mind. However, no design can completely protect against incorrect use. Electrical circuits can be dangerous and/or lethal when lack of caution or poor safety practices are used.

Do not carry out field measurements on either the power system grounding, during periods of forecast lightning activity, in areas that encompass the station being measured or of the power network connected to the station being measured. In the event that lightning occurs, stop all testing and isolate any temporarily installed test spikes.

Preparations for testing of power system grounding can leave personnel vulnerable to exposure caused by faults at or fed from the system under test, transferred potentials from remote test grounds, and inadvertent line energisations.

While the probability of the occurrence of one of these events is low, personnel safety will, nevertheless, be enhanced by the following:

When working near high tension systems rubber gloves and shoes should be worn.
Work on clean, dry crushed rock or an insulating blanket.
Avoid bare hand to hand contact between the tester and extended test leads.

When using the tester with test leads, ensure that they are safe and properly authorized

Disconnect the tester from any external circuit when checking or changing the Fuse and/or batteries.

CAUTION ⚠ READ THE MANUAL

Follow the instructions in the Manual for every measurement. Read and understand the general instructions before attempting to use this tester

2. SAFETY CHECK

Before using the tester check the condition of the test leads and the fuses.

The test leads must be free of cracks or any damages and must be insulated as when they were new.

Fuse replacement is described later in this user's manual.

When changing the fuses by removing the cover to access the internal circuitry, always disconnect the test leads.

When replacing the fuse use only the type specified, HBC fuse, and insert correctly into the fuse holder.

Always double check the lead connections before making any measurements.

For increased safety, use fused test leads (optional).

DON'T TOUCH

Don't touch exposed wiring, connections or other "Live" parts of an electrical circuit. If in doubt, check the circuit first for voltage before touching it.

Do not use cracked of broken test leads.

THIS INSTRUMENT SHOULD ONLY BE USED BY A COMPETENT, SUITABLY TRAINED PERSON.

REMEMBER
SAFETY IS NO ACCIDENT



CAUTION RISK OF ELECTRIC SHOCK



CAUTION READ THE MANUAL

3. GENERAL DESCRIPTION

A new generation of Modern Digital Multi-Function Testers is born.

These Testers have a range of new features not even found in Expensive Advanced Test Equipments.

Not only Rugged, but designed to excel in Harsh environment, still, remaining low cost and affordable.

They can be operated with rechargeable batteries, alkaline or low cost general purpose batteries.

This Family of Originally Designed Unique Products have features ranging from Insulation Resistance Testing, Voltage (ac-dc) measurements with Automatic Hold facility, Continuity Test with a short circuit current of minimum 200mA.

Two very unique features are found on the Multifunction Tester ; MOV and GAS Arrester Testing.

Today, most equipments and electrical installations are protected by MOVs and GAS arresters.

The Multifunction Tester can test these devices to establish if the devices are still operating correctly or not.

Energy conservation is featured on all these new Advanced Products.

EnerSaveTM limits the test duration to about 10 Seconds to save energy.

This new generation of test equipments have no moving parts.

All calibration are saved internally in a non volatile memory.

Calibration can be done at any calibration facility around the world, without the need for dedicated calibration equipment.

This makes these products easier to maintain and lower the cost of calibration and ownership.

Their calibration interval can be extended without much problem.

They comply to all the latest regulations, including UK 16Th Edition .

This product family is part of our new World Class series.

They prominently feature heavy duty protections in their circuitry.

4. BRIEF PRODUCT DESCRIPTION FOR INSULATION TESTER

The Insulation Tester has all the basic features needed to check and certify an electrical installation. The buzzer feature is always ON.



The Batteries are tested at startup. It complies to all good Standards.
The Test Button is utilized to switch the Instrument On as well as to start or stop the test.
It is also utilized to accept a selection and to disable the EnerSave feature.
In order to use te PI and DAR function on this tester, the EnerSave need to be disabled.
To disable EnerSave, the user need, while starting a test, to depress the TEST key for more than 3 Seconds.
After 3 Seconds, a short beep will be heard, meaning that EnerSave has been disabled.
Once EnerSave is disabled, the test duration can go for as long as 10 minutes.
At any time, the test can be stopped by depressing the Test key again.
The Ohm Key is a multi-purpose key, you press it to select the

Continuity Test, then you use it too to Auto-mull the test leads and fuse.
There is an automatic Voltmeter which is accessed after start up.
The Voltmeter is the default mode of this instrument.
For Insulation Testing, the user can select the test voltage of 250V, 500V and 1000Vdc.

5. BRIEF PRODUCT DESCRIPTION FOR MULTIFUNCTION TESTER

The Multifunction Tester has the features of the Insulation Tester plus the MOV and GAS Arrester Test.
To access the MOV test, You need the depress the 1000V and 500V keys Simultaneously And To access the GAS Arrester Test, you need to depress the 250V and Ohm Key simultaneously.



The Multifunction Tester has everything. You'll ever Want from an electrical Test and Measuring tool.
Before any test is performed, (provided the test leads are connected properly and the fuse is intact) it make a voltage test to assert that there is no voltage on the device or circuit under test.

If there is a voltage which could be a problem for the test, the tester, automatically, switch to the Voltmeter and shows the voltage on the display. Be it AC or DC.
If voltage is present on the leads before test is started, the selected test is cancelled and the keypad is disabled, preventing errors of operation. This makes this tester one of the safest to operate to date.
Once any voltage is cleared, test can begin. Should you want to measure Insulation Resistance, you can select by using the 250V, 500V and the 1kV test Voltage which all go into the Giga-Ohm range. Should you want to test continuity, use the Low ohms scale, down to 0.01Ohm and also the buzzer. You can null the fuse and test leads using the Auto-Null feature. Of Course on this model, Auto-hold is featured. You will appreciate the superior Safety of Auto-Hold when you decide to visually look after your arms and fingers without needing to check the display. Auto-Hold is always turned ON and with it, you can simply touch the voltage and remove the test probes. The last valid voltage will be on the display when you want to see it. While Dangerous voltages are present on the leads, it beep too, signalling the user that he is touching dangerous voltage.

6. Notes

7. FEATURES

ON Key.

When Depressing the ON button, the tester starts up. The tester will automatically make a battery test (under load condition) and display the results.
After that, the voltmeter is automatically selected. If voltage is present, the tester will automatically display it on the display and disable all other features until the voltage is removed from the terminals.

Battery Test

There is no battery Key, but a Controlled Load is switched ON automatically during starting of the tester.
That Load draw some current from the battery.
While drawing that current, the battery voltage is measured and displayed.
To do an other "under load" battery test, you will need to re-start the tester.
The battery is monitored constantly while the tester is operating. Should the battery be low, the low battery indicator will lit up on the display.

Voltmeter

There is no Voltmeter Key as this is the default mode of this instrument.
The tester switch to the voltmeter mode after start-up.
This is an automatic AC/DC voltmeter.
This mode is the default mode of the tester, meaning that it's monitoring the leads before any test is started and also monitoring the leads at Switch ON of the tester.
The voltmeter is also activated during automatic discharge of circuit after an Insulation test.

Auto-Hold

Auto-Hold feature is always ON (displays Auto Hold on the LCD), the tester automatically hold the last valid reading present on the test leads.

This is a very good feature for added safety. That mean that the user can focus on his test leads and what they are touching instead of looking at the display.

The voltmeter is like an automatic Hold.

This feature has been developed by Toptronic Limited so that the user can focus on his personal safety first.

The value will be held on the LCD for later reading after the leads are removed from Dangerous voltage and situations.

250V, 500V, 1kV Insulation Resistance Tests

When an Insulation Resistance Test is selected, the first thing the tester requires, is for you to connect the leads to the circuit under test. If the circuit is not voltage free, the tester will go back to the safety voltmeter until you insulate the circuit under test from any voltage source.

If the circuit under test is voltage free, then you will be asked to confirm that you want to test it now, then the test will start. You can observe the voltage output on the bar-graph and see the Insulation resistance results.

Test can be stopped at any time or automatically, according to the type of test started and the duration you depressed TEST (see EnerSave Mode)

TEST Key

The Test Key is utilized to start and stop the test.

This is in conjunction with EnerSave™.

EnerSave™ feature

When you depress the TEST key to turn the selected test ON. The tester will automatically stop the test for you after about 10 Sec, but if you whish to keep the test running much longer, then depress and keep depressing the TEST key for more than 3 Seconds, the tester will beep when EnerSave™is disabled.

For longer tests duration, every time you start a test, you need to keep depressing the TEST key for more than 3 Seconds to disable EnserSave™. EnerSave™ is the default setting of these testers. EnerSave™ was developed by Toptronic Ltd to help reduce Consumption by reducing the test duration automatically.

Ohm Key for Continuity Tests

Select the ohm key to make Continuity tests. Continuity test has a short circuit current of more than 200mA. That range can measure down to 0.01Ohms.

Use this feature with Auto-Null for Convenience.

Auto-Null Key for Continuity Tests (same key as ohm key)

You must depress the ohm key to auto-null the resistance of the test leads and the resistance of the fuse. Once this is done, that auto-null value is saved internally and only need to be done if you change the test leads of the fuse. This feature is very useful when checking Wiring Continuity with long wires. For example when measuring the continuity of the earth protective wires in a house.

Don't forget to short the test leads together while auto-nulling them.

OFF Key (Auto OFF always present)

The OFF key is a software key which is activated When the 1kV key is depressed for more than 5 seconds (provided no test is in progress and everything is discharged.

The 1kV key, when depressed for more than 5 Sec, will switch the tester OFF, Or stop the test in progress.

In this case, you have to depress 1kV again to turn the tester OFF. The Tester turns OFF by itself after the programed time

MOV Selection Keys

On the Multifunction Tester. The MOV test can be accessed by depressing the 1kV and 500V keys simultaneously.
This select the MOV test.
Make sure that you are testing the correct component before starting this test.
This test starts with a voltage of 0Vdc, then increase that voltage until the MOV start conducting with 1mA of current.
The Voltage on the MOV while at 1mA is going through it is displayed on the LCD as well as the equivalent Max AC voltage which could be utilized on this device.

GAS Arrester Selection keys

On the Multifunction Tester. The GAS test can be accessed by depressing the 500V and Ohm keys simultaneously.
This select the GAS Arrester test.
Very similarly to the MOV test, but using an other algorithm, much faster.

AUTOMATIC DISCHARGE ON INSULATION TESTS

All insulation tests have an automatic discharge which can be monitored on the LCD bar-graph while discharging.
The discharge will continue until the voltage is safe. ONLY then, you can disconnect the test leads.

NON DESTRUCTIVE TESTS

All the tests are using a current of maximum 1mA and are non destructive.
The only test which use more than that is the continuity test. It's voltage is 5V maximum.
The user should make sure that when doing a test, he knows what he is testing and how he is testing it. Making a sketch of every test will lower the risk of bad testing. If you are not sure of the test you are going to proceed with, ask someone which is qualified to give you the correct answers.

8. PRE-TESTING SAFETY

Always check the fuse before using the instrument.
This is done by shorting the test leads and selecting the Continuity test.
Use this, to null the test leads resistance at the same time.
Always **clip securely the leads onto the circuit under test**.
DO NOT JUST TOUCH IT as this could make intermittent contact and therefore the safety features may not work all the times because the connections may not be present at all times.
Always connect the test leads and make sure they **make proper contacts to the circuit under test before pressing the test buttons.** These testers are smart, but can only be as smart as your connections. That mean that all **the safety features will only work if you have proper connections prior, during and post testing, to the circuit under Test.**
All safety features can only work if the fuse is intact and correct.
Follow the interactive messages on the display.
These testers rely completely on you, the user, to connect the leads securely onto the circuit under test before starting any tests and before selecting any test.
That mean that from the time you switch the tester ON, you should connect securely the test leads from the tester's terminals to the circuit under test.
When ever possible, **use fused test leads** for increased safety.
Fused test leads are in series with the existing internal fuse, so the voltage will be divided on both fuses, therefore, reducing the voltage on both fuses and therefore in the worst case, making them safer when opening (breaking the circuit).

9. OPERATING INSTRUCTIONS

Leads Connections

The Test Leads are color coded for easy use. These testers only use 2 leads which are located on both back extremities of the front panel.
The user can vusualy check these connections at any time.

FUNCTIONS

ON/TEST



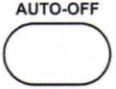
AUTO-OFF

When Depressing the "ON-TEST" Button, the Instrument starts up or Resets.

Please Note:
If after a test, no key is depressed for ± 5 minutes, the Instrument will switch off automatically.

To Switch Instrument OFF DEPRESS for more than 5 Sec

AUTO-OFF



1000V

You can turn OFF the Tester without having to wait for Auto-off. To Turn-Off and switch OFF the Tester immediately, Depress the 1kV key for 5 Seconds. If a test is still in Progress, pressing 1kV will stop the test.
In this case you need to press 1kV for 5 Sec again.

Batteries are Tested during start-up of the Tester. During this Battery Test, a larger than average current is drawn. The worst cast Battery Voltage is seen on LCD.

The Batteries are tested automatically at start up The current Drawn from the batteries is about 300mA.
While current is drawn, the total battery voltage is measured and displayed.
Note that battery voltage is always monitored during use of the instrument.
Should the battery become too low, the low battery symbol will be displayed.

Voltmeter ac-dc is automatically selected after starting the tester and if voltage is present on the test leads before any test. Follow instructions on the display.

Ac and Dc voltages are automatically detected and shown. This is the default function of the Instrument. The Voltmeter is selected by default by the Instrument. The voltmeter is activated before any test start and the user must connect the test leads to any circuit before starting any test. This ensure complete safety to the user and the Instrument. Should voltage be present on the circuit under Test, this SAFETY VOLTMETER will warn the user of the danger.

VOLTMETER
AUTO-HOLD

As ADDED SAFETY, this Auto-Hold helps the user taking measurement without watching the display. The user can focus instead, on it's hands and test leads. AUTO-HOLD is always enabled, the tester will automatically HOLD the last valid reading, which mean that when the user touch a voltage, that voltage is held on the display even after un-touching the voltage.
This add great safety for the user as he can focus on it's safety by only looking at the test leads.

Insulation test Voltage selection is done by Depressing the corresponding key.

EnerSave™

EnerSave™ is a Smart Program which EnerSave™ Save Energy when ever possible by limiting the Test Duration.

PI= Polarisation Index

PI: this is the ratio of the Insulation Index Resistance at 10 Min divided per the Insulation Resistance at 1 Minute.

DAR = Dielectric Absoprtion Ratio

DAR: this is the ratio of the Insulation Resistance at 1 Min divided per the Insulation Resistance at 30 Seconds.

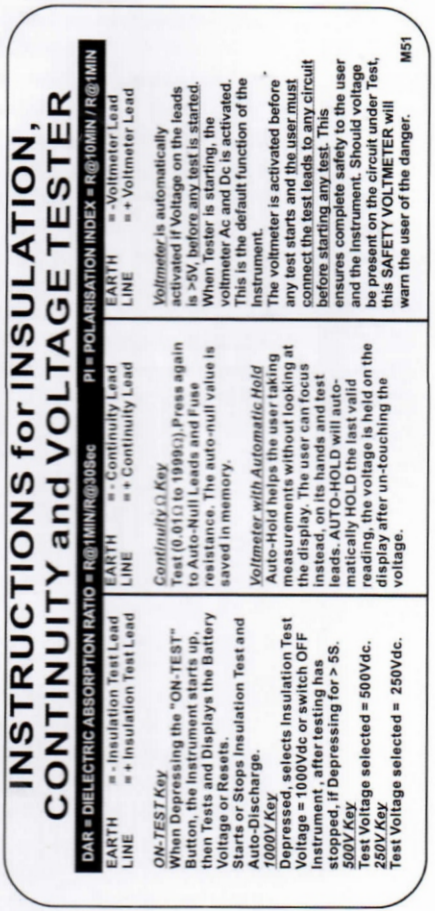
Low Ω
200mA SC
AUTO-NULL

Select the Continuity test which has a Short Circuit Current of 200mA. It Complies to all latest standard. Auto-Null the resistance of the test leads and of the fuse so that continuity measurements can show only the resistance under test.
Buzzer is always On. Low resistance value BEEP when low. It's helping when tracing circuitry.

Pressing the 1000V and 500V keys simultaneously will select the MOV Test. Today's new Equipments and Electrical Installations are generally Protected by MOVs. It is now easy to test these devices to ensure their proper working and replace them if found damaged. The knee Voltage is shown on the display.

Pressing the 250V and Ω keys **simultaneously** will select the GAS Arrester test Function. The Trigger Threshold Voltage is shown on the LCD.
All GAS protection can be Tested, including Neon Lights.

10. Inside Lid Instructions for Insulation Tester



INSTRUCTIONS for INSULATION, CONTINUITY and VOLTAGE TESTER

DAR = DIELECTRIC ABSORPTION RATIO = R@1MIN/R@30Sec PI = POLARISATION INDEX = R@10MIN / R@1MIN

EARTH = - Insulation Test Lead
LINE = + Insulation Test Lead

ON-TEST Key
When Depressing the "ON-TEST" Button, the Instrument starts up, then Tests and Displays the Battery Voltage or Resets.
Starts or Stops Insulation Test and Auto-Discharge.

1000V Key
Depressed, selects Insulation Test Voltage = 1000Vdc or switch OFF Instrument, after testing has stopped, if Depressing for > 5S.

500V Key
Test Voltage selected = 500Vdc.

250V Key
Test Voltage selected = 250Vdc.

EARTH = - Continuity Lead
LINE = + Continuity Lead

Continuity Ω Key
Test (0.01Ω to 1999Ω). Press again to Auto-Null Leads and Fuse resistance. The auto-null value is saved in memory.

Voltmeter with Automatic Hold
Auto-Hold helps the user taking measurements without looking at the display. The user can focus instead, on its hands and test leads. AUTO-HOLD will automatically HOLD the last valid reading, the voltage is held on the display after un-touching the voltage.

EARTH = - Voltmeter Lead
LINE = + Voltmeter Lead

Voltmeter is automatically activated if Voltage on the leads is >5V, before any test is started. When Tester is starting, the voltmeter Ac and Dc is activated. This is the default function of the Instrument.
The voltmeter is activated before any test starts and the user must connect the test leads to any circuit before starting any test. This ensures complete safety to the user and the Instrument. Should voltage be present on the circuit under Test, this SAFETY VOLTMETER will warn the user of the danger.

M51

11. Inside Lid Instructions for Multifunction Tester.



12. VERY IMPORTANT AUTOMATIC FEATURES

Automatic Vac-dc Detect.

All of these testers in this family have the capability to detect Voltage AC and DC.

This is done with the use of the internal safety voltmeter which does this work.

However, ***this feature will only work if the test leads are securely connected to the circuit under test.***

So, you must ensure that the lest leads are doing a perfect contact before beginning any test and before selecting any function. That contact must remain secure during the entirety of the tests on a particular circuit.

We recommend you to use clip-on alligators and not the tips only, so that you can make sure the test leads are making a proper contact during the all duration of the tests.

Should the test leads not make contact at any time before, during and after the test, all the safety features of these testers will not functions.

It's your responsibility to ensure proper contact of the leads at all times.

Automatic Discharge of Capacitive and inductive Circuits

These testers will discharge automatically all circuits charged by the tester, after a test is done, again, this will only be activated if the test leads make contact at any time before, during and after the test.

It's your responsibility to ensure proper contact of the leads at all times.

Once a test is finished, the testers will automatically discharge capacitive or inductive circuit of their charge. The discharge can be observed on the display, in the form of a bar-graph. Again, do not disconnect the leads while discharge. Wait until completion of the discharge before removing any lead.

During Discharge, the Buzzer will beep and the bar-graph will

show some voltage. With some high charges, this may takes some time. Be patient and let the instrument discharge completely before proceeding to removing the leads.

Auto-off

This family of instruments has an Auto-off feature which will switch off the tester, should no key or function be in use. Please, again, note that if voltage is present on the leads, the instrument will warn the user of that and the auto-off feature will be inactive until dangerous voltage has been removed from the circuit.

13. FEATURES COMPARISONS

	Insulation Tester	Multifunction Tester
Digital EE Calibration (No Potentiometers)	■	■
Keypad Operation	■	■
Automatic Voltmeter AC/DC at Start / Reset	■	■
ON-Reset/Restart Key	■	■
Off Push Button (press more than 5 Sec on 1kV key)	■	■
Auto-Off	■	■
MOV / Protection Devices Test		■
Test ON-OFF	■	■

Polarization Index (PI) on 250, 500 and 1000V	■	■
Dielectric Absorption Ratio (DAR) on 250, 500 and 1000V	■	■
Battery Test by Key	Test Battery at Start	Test Battery at Start
Battery Test at Switch ON / Reset	■	■
Voltmeter on request by Keypad	Automatic	Automatic
Safety Voltmeter before each Test	■	■
Auto-Discharge on all Test and all Ranges	■	■
Continuity Short Circuit Current >220mA (225mA Typical)	■	■
Continuity Open Circuit Voltage of 5V dc	■	■
Nominal Voltage @ 1mA on all Insulation Ranges	■	■
Buzzer ON/OFF by Key	Always ON	Always ON
Leads Auto-Null key	■	■
Test Auto-Stop	■	■
Display Customization for OEM	■	■

Re-programmable Microprocessor for Easy Updates	■	■
Can be calibrated in ALL calibration laboratories	■	■
Insulation measurement from 2kΩ (250V range) to 8GΩ (1kV Range)	■	■
Continuity from 0.01Ω (220mA) to 1999Ω	■	■
DC Voltmeter from ±1Vdc to ±950Vdc	■	■
AC Voltmeter from ±1Vac to ±700Vac	■	■
Accept 8 Rechargeable Batteries or Alkaline or Normal	■	■
Smart Hold & Stop on Voltmeter ac / dc	■	■
GAS Arrester Function		■
EnerSave™	■	■

14. PRINCIPLE OF HOW THEY WORK AND DISPLAYS RESULTS

This family if Test instruments operate through a keypad interface. The number of keys and their function are different on each model. All interactions between the user and the instrument is done via the keypad.
The testers have a liquid Crystal Display and two or three terminals.
Each push button or key has a function.

DIGITAL DISPLAY

The digital Liquid Crystal Display is large. It measures (W)98mm x (H)24mm and has a 2Lines of 16 Characters.
Language can be changed on demand.
Dutch / French / German etc... (factory fitted at order)

FUSED

The tester is fused by a fast blow 500mA fuse.

CROWBAR PROTECTION

In case of misuse, a crowbar is integrated and will blow the fuse.
This crowbar will reduce the damages in case of user mistake.
The crowbar is activated at less than 6V (ac or dc).

AUTOMATIC BATTERY TEST

When the tester starts, it test it's batteries by drawing a heavy current from the batteries. During that heavy current, it measures the battery voltage and display it for a few seconds on the display.
During normal use, the tester monitor the battery voltage, but without drawing a battery test current. It just measure the battery while in normal use.

SAFETY VOLTMETER

Once the battery test is terminated, the tester goes automatically into the Voltmeter mode.
It has an Automatic voltmeter AC and DC.

The safety voltmeter even has a Hold function built-in.
The Hold Function will automatically put the last valid reading on hold if the user disconnect the leads.
This is a safety feature, where the user does not need to observe the display but instead observe where he has his hands and probes. This way, safety is increased.

The Safety Voltmeter works up to Vdc 900V (both polarities) with resolution of 1V and 1% accuracy. It also measure up to Vac 700V, with the same resolutions and accuracies.

INSULATION

It has three insulation test Voltages. 250, 500 and 1000V, all of theses are capable of giving more than 1mA at their nominal voltages.
250V Key to select 250Vdc insulation test voltage.
500V Key to select 500Vdc insulation test voltage.
1000V key to select 1000Vdc insulation test voltage.

250V range can measure from 2 K ohms up to 2G ohms
500V range can measure from 4 K ohms up to 4G ohms
1000V range can measure from 8 K ohms up to 8G ohms
On some models it automatically calculates the PI and DAR and has an automatic timer.

CONTINUITY

The continuity test has an open circuit voltage of exactly +5Vdc regulated.
The Short Circuit Current of the continuity circuit is about 220mA.
The Continuity test can measure from 10 milli- ohm (0.01) up to 2Kohms.
The accuracy is better than 1% of reading from 1 ohms to 200 ohms, plus minus one digit.
Below 1 ohms, it's better than 5% of readings plus minus 3digits.

Above 200 ohms, up to 1999 ohms, it's better than 3% of readings plus minus 3 digits.
The Continuity has an auto-nulling facility which is saved into non volatile memories, so you only need to null the leads of fuse again if they are changed.

AUTO-OFF

They have an auto-off feature and the power automatically turn off after 5 minutes of inactivity.

EnerSave

The battery life can be saved when the user make spot check.
To make a spot check, the user only press the test button for less than 3 seconds, or use the Quick Test key.
If the user press the test key for more than 3 seconds, the tester make a long test (timer enabled up to 10 minutes for PI test).
Any test can be stopped at any time.

SAFE VOLTMETER DETECTION

On any of the tests, if the user connect the leads to a voltage, prior to starting the test, te tester will detect the voltage and automatically turn the Voltmeter ON as well as an alarm. All other test facilities are disabled when this happen.

DIGITAL CALIBRATION

This family of testers are digitally calibrated. That mean that there have no potentiometers or moving part in this product. All the correction factors are saved into the internal memory.

BATTERIES

The testers can work with 8 x 1.5V batteries.
The user can also use rechargeable batteries in the same product.

15. PREPARATION FOR USE

Fuses:

In doubt, check the fuses using a ohm meter.
Please note that this instrument will not indicate anything, should the fuses be blown.
Please note that this instrument will be unsafe if the fuse is blown as no indication will be shown and nothing will be detected by it.
For that reason, **you must verify the fuse Before and after any test.**

Test Leads:

Check the test leads for defects or cracks. Replace if cracked or damaged. Only replace with the same type. Use the Continuity test to check, with the fuse(s), that the complete circuit is in good condition.

Cleaning:

Use a damp cloth to clean the case. Do not use chemicals

16. REPLACE BATTERIES

This instrument operate well with Alkaline 1.5V or rechargeable 1.2V batteries. It could be operated with inferior batteries too. It use 8 of them. To replace the batteries, disconnect the test leads, then unscrew the bottom battery cover and replace the batteries.

DISPOSING OF BATTERIES

Only dispose of batteries into a purposely dedicated disposal system. Do not dispose to the wrong place. Look after your environment, please.

17. FUSES REPLACEMENT

Unscrew the back cover and replace the faulty fuse with the same type, then screw the cover back into place correctly

18. SPECIFICATIONS

GENERAL

Load Battery Test Current	About 300mA
Battery Voltage Display Accuracy	±0.5V

BATTERIES

Type alkaline	1.5V
Other Type	1.2V
Quantity	8

DISPLAY

Type	LCD 2 lines x 16 Characters

AUTO-OFF

Automatic Turn OFF Time after last action	5Min.

VOLTMETER (3 minutes maximum)

Automatic Voltage DC Range	0 to 950Vdc
Automatic Voltage AC Range	0 to 700Vac
Resolution on both voltage types	±1V
Accuracy on both voltage types	±1.5% of FS

INSULATION TEST

Resistance Range

250V Test Voltage	2k-2G Ohms
500V Test Voltage	4k-4G Ohms
1000V Test Voltage	8k-8G Ohms
Accuracy	>1MΩ:±3%rdg 30KΩ-1MΩ:±5%rdg <30KΩ:±20%rdg

Typical Output Voltage @ 1mA

250V Setting	275V Max.
500V Setting	550V Max.
1000V Settings	1100V Max.
When Voltage is constant, Current is software limited at	±1.2mA

Short Circuit Current on all ranges.
Short Circuit Current..... about ±1.1mA

Polarization Index
Ratio Resolution..... ±0.1
Ratio Accuracy..... ±1% of Rdg

Dielectric Absorption Ratio
Ratio Resolution..... ±0.1
Ratio Accuracy..... ±1% of Rdg

Fast Test
Test Duration with EnerSave Enabled.... 10Sec

Long Test
Test Duration without EnerSave
Enabled..... 60Sec.
With PI and DAR test Function..... 10Min.

CONTINUITY TEST
Short Circuit Current Test..... >220mA
Open Circuit Voltage..... 5Vdc
Continuity Range(Ohms)..... 0.01-1999
Continuity Accuracy 0.01 to 100 Ohms.. ±1% of Rdg
Continuity Accuracy 100 to 300 Ohms... ±1.5% of Rdg
Continuity Accuracy 300 to 1999 Ohms. ±2% of Rdg
Continuity Resolution..... ±2 Counts

AUTO-NULL
Auto-Null Value Saved in no volatile Memory
Auto-Null Threshold..... 5 Ohms

BUZZER
Buzzer Threshold..... 3 Ohms

MOV TEST
Test Voltage..... 5-1020Vdc
Voltage Results Accuracy..... ±3%
Voltage Result Resolution..... ±2 Counts

Measure the Threshold Voltage Calculate the approximate Vac Marking on the MOV (depend on manufacturer)
Contact toptronic@telkomsa.net for more details on this function.

GAS ARRESTER TEST
Test Voltage..... 5-1020Vdc
Voltage Results Accuracy..... ±3%
Voltage Result Resolution..... ±2 Counts Measure the Threshold Voltage.
Contact toptronic@telkomsa.net for more details on this function.

PROTECTIONS
Over Load..... 700V (between all terminals)
Over Voltage ..... Class III - 700V towards ground.
Fuses..... 1 x 500mA/250V 5 x 20mm

MECHANICAL
Size..... 175(L) x 85(W) x 75(H)mm
Material..... Polycarbonate /ABS
Weight ..... Approx 655g (battery included)
Display..... Liquid Crystal Display

ENVIRONMENTAL
Operating temperature Range..... 1°C to +55°C not in full sun!!!!
Storage Temperature..... -20°C to +70°C

CLEANING
Clean the instrument case with an anti-static cleaner and wipe with dry cloth.

OPTIONS
1- Rechargeable batteries.
2- Pouch.
3- Fused test Leads
4- Calibration Certificate.
5- Fuses.

MUMBAI

TEST CERTIFICATE

MULTIFUNCTION & INSULATION CONTINUTY - VOLTAGE 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 1152MF**

SERIAL NO. _____

DATE: _____

ISO 9001:2015
REGISTERED

QC
KUSAM-MECO
PASS

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, 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.