TELECOMS DIGITAL MULTIFUNCTION & INSULATION CONTINUITY-VOLTAGE TESTER

INSTRUCTION MANUAL

INDEX PAGE

SAFETY RULES 1
SAFETY CHECKS 2
DON'T TOUCH 2
GENERAL DESCRIPTION 3
BRIEF PRODUCT DESCRIPTION FOR 4-5
ESSENTIAL FEATURES 6-8
PRE-TESTING SAFETY 9
OPERATING INSTRUCTIONS 10-11
INSIDE LID INSTRUCTIONS 12
VERY IMPORTANT AUTOMATIC FEATURES 13
FEATURES 14
PRINCIPLE OF HOW IT WORK-DISPLAYS-RESULTS 15-16
PREPARATION FOR USE 17
REPLACING BATTERIES 17
FUSE REPLACEMENT 17
SPECIFICATIONS 18-20
LIMITED WARRANTY 21

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.

SAFETY CHECK

Before using this beautiful Tester, check the condition of the test leads and all the fuses. Ensure fused test leads are in perfect condition.

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. The use is the most important protection device in your Tester. Please, do not use inferior quality fuse. Your safety depend on it.

Always double check the lead connections before making any measurements.
For increased safety, use the optional fused test leads.

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 lead

THIS INSTRUMENT SHOULD ONLY BE USED BY A COMPETENT, SUITABLY TRAINED PERSON. CONTACT YOUR DISTRIBUTOR FOR YOU'RE THE INFORMATION ABOUT THE NEAREST TRAINING CENTER.

REMEMBER

SAFETY IS NO ACCIDENT

CAUTION RISK OF ELECTRIC SHOCK

CAUTION READ THE MANUAL

GENERAL DESCRIPTION

A new Modern Digital MultiFunction Tester is born.
This Tester has a range of new features not even found in Expensive Advanced Test Equipments.

It is optimized for Telecommunication and Electrical work.
● **It tests Insulation and Voltages settings of:**
1000V, 500V, 250V, 125V, 100V and 50V

Not only it is Rugged, but designed to excel in Harsh environment, still, it remains low cost and affordable.
● **It can be operated with rechargeable batteries, alkaline or low cost general purpose batteries.**

This Originally Designed Unique Product has multi-features:
● **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 this Multifunction tester;
● **MOV and Gas Arrester Testing.**

Today, most equipments and electrical installations are protected by MOVs and/or Gas arresters or a combination of these.
The Tester can test these devices to establish if they are still operating correctly or not.
Energy conservation is featured in this Products.
● **TM EnerSave limits the test duration to about 10 Seconds to save energy.**

This new Tester has no moving parts in its calibration circuitry.
● **Ee-Calibration Inside!!!**

All the calibration factors are saved internally into a non volatile memory.
Calibration can be done at any calibration facility around the world, without the need for dedicated calibration equipment.
Any good and qualified personal operating a good calibrator, will be able to calibrate this equipment.
This makes this product easier to maintain and lower the cost of calibration and ownership.
Its calibration interval can be extended without much problem as vibrations does not affect the calibration adjustments.
It comply to all the latest European and U.K. Regulations at the time of manufacture .
This product is part of our new World Class series.
It prominently feature heavy duty protections in the circuitry.
● **It display the Polarization Index and the Dielectric Absorption Ratio automatically when operating the insulation test features**

BRIEF PRODUCT DESCRIPTION

The have all the basic features needed to check and certify an electrical or telecommunication installation.

- **The buzzer features are always ON.**
- **The Batteries are tested at startup.**

This Tester comply 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 the most important multi-function control button.**
- **It is also utilized to accept a selection and to disable the EnerSave feature.**

At any time, the test can be stopped by depressing the Test button again.

- **The Ohm Key is a multi-purpose key, you press it to select the Continuity**
- **Test. You press it too, to Auto-null the test leads and fuse.**

The Voltmeter is the default mode of this instrument.

- **The automatic Voltmeter is accessed after start up (default mode).**

The user does not have to do anything to access the voltmeter. The Tester does it automatically.

For Insulation Testing, the user can select the test Voltage.

- **Test Voltage of 1000V, 500V, 250V, 125V, 100V or 50Vdc can be selected.**

The MOV and Gas Arrester Tests are available.

- **To access the MOV test, You need the depress the 1000V/500V and the 250V/125V keys simultaneously.**

The MOV test results will be shown on the LCD, showing the knee Voltage while 1mA is flowing through the device under test.

- **To access the Gas Arrester Test, you need to depress the 100V/50V And the Ohm keys simultaneously.**

The Gas Arrester test results will be shown on the LCD, showing the firing Voltage at which the current started to flow into the device under test.

The has everything you'll ever want from an electrical and telecommunication Test and Measuring tool. It has the PI and DAR.

- I**n order to use te PI and DAR function on this Tester, the EnerSave mode needs to be disabled.**
- **To disable EnerSave , the user needs, 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 (PI test).

Before any test is performed, (provided the test leads are connected properly and the fuse is intact) it makes 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 safety problem, 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.
<u>This makes this Tester one of the safest to operate to date.</u>

Once any Voltage is cleared, test can begin.
Should you want to measure Insulation Resistance, you can select it by using a test Voltage which can measure well into the Giga-Ohm range on the higher Voltages settings.
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 resistance 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 beeps too, signaling the user that he is touching dangerous Voltage.

This feature is an added safety feature which is most useful when the user need to be concerned about his own safety while measuring. For example is very small space or wired cabinets or non insulated bus bar cabinets. IN all these cases, the user need to be extra cautious and have a visual of his hands and test leads at all times. Auto-Hold is most useful in this case because the user does not need to check the display while taking his measurement. After measurement has been done, the user can safely remove the leads and test probes from the circuit under test and check the display

ESSENTIAL 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 its 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.
Automatic Vac/Vdc Detection was developed by Toptronic Ltd to help the user finding the type of Voltage selection.

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 has 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.

1000V, 500V, 250V, 125V, 100V, 50V 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 EnerSave™.
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 (top left key of the keypad) 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
The MOV test can be accessed by depressing the 1000V/500V and 250V/125V 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 1mA is flowing through it, is displayed on the LCD as well as the equivalent Max AC Voltage which could be utilized by this device.

GAS Arrester Selection keys
The GAS test can be accessed by depressing the 100V/50V and the Ohm keys simultaneously.
This select the Gas Arrester test.
Very similarly to the MOV test, but using an other algorithm, much faster. It display the firing Voltage of the Gas arrester.

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 of non-destructive type. 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 and understanding fully the 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 advise and answers

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.**

This Tester is 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 test 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 testers 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).

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

START/ON RESET — When Depressing the "ON-TEST" Button, the Instrument starts up or Resets.

Please Note:

AUTO-OFF — If after a test, no key is depressed for ±5 minutes, the Instrument will switch off automatically.

OFF — You can turn OFF the Tester without having to wait for Auto-off.
To Turn-Off and switch OFF the Tester immediately, Depress the 1000/500V key for 5 seconds. If a test is still in Progress, pressing 1000/500V key will stop the test.
In this case you need to press 1000/500V for 5 secretary again.

BATTERY TEST — 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.

BATTERY INDICATOR — 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 — This is the default function of the Instrument. The Voltmeter is selected by default by the Instrument.

AUTOMATIC VOLTMETER AC or DC — AC and DC Voltages are automatically detected and shown.
The voltmeter is activated before any test start and the user must connect the test leads to any circuit before starting any test.

SAFETY VOLTMETER — 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 and disable all the other functions.

AUTO-HOLD — As an ADDED SAFETY, this Auto-Hold helps the user taking measurement without watching the display. The user can focus instead, on its hands and test leads.
On this model, AUTO-HOLD is always enabled, the Tester will automatically HOLD the last valid reading and this will be displayed
This 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.

MULTIPLE INSULATION TEST VOLTAGE	Insulation test Voltage selection is done by depressing the Scorresponding key. Depress twice the 1000V/500V for example to select 500V, similarly for 250V/125V or 100V/50V, etc ...
	● **EnerSave™** is a Smart Program which Save Energy when ever possible by limiting the Test Duration.
	● **PI:** this is the ratio of the Insulation Resistance at 10 Min divided per the Insulation Resistance at 1 Minute.
	● **DAR:** this is the ratio of the Insulation Resistance at 1 Min divided per the Insulation Resistance at 30 Seconds.
CONTINUITY TEST	Select the Continuity test which has a Short Circuit Current of 200mA. It complies to all latest standards.
AUTO-NULL	Auto-Null the resistance of the test leads and of the fuse so that continuity measurements can show only the resistance under test.
BUZZER	Buzzer is always On. Low resistance value BEEP when low. It's helping when tracing circuitry.
MOV TEST	Pressing the 1000V/500V and 250V/125V keys multaneously 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.
GAS ARRESTER TEST	Pressing the 100V/50V and W keys simultaneously will select the Gas Arrester test Function. The Trigger Threshold Voltage is shown on the LCD. All Gas protection devises can be Tested, including Neon Lights.

INSTRUCTIONS DIGITAL ADVANTAGE™ Series
TELECOM MULTIFUNCTION TESTER

DAR = DIELECTRIC ABSORPTION RATIO = R@1MIN/R@30Sec

PI = POLARISATION INDEX = R@10MIN / R@1MIN

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

INSULATION

ON - TEST — When Depressing the "ON-TEST" Button, the Instrument starts up, then Test and Display the Battery Voltage (or Resets).

ON - TEST — Starts or Stops Insulation Test and Auto-Discharge.

1000V / 500V — Selects Insulation Test Voltage = 1000V or 500Vdc. To witch Instrument OFF, After test has stopped, Depress for more > 5 Sec.

250V / 125V — Selects Insulation Test Voltage = 250V or 125Vdc.

100V / 50V — Selects Insulation Test Voltage = 100V or 50Vdc.

EARTH = -Continuity Lead
LINE = + Continuity Lead

CONTINUITY

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

VOLTMETER AUTO-HOLD — Auto-Hold helps the user taking measurments without looking at the display. The user can focus instead, on it's 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

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 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.

Test Varistors or MOVs
The Knee DC voltage is indicated when Current in the device reaches 1mA.

To select the Varistor / MOV or the Gas Arrester / Neon Test, press both keys simultaneously as indicated on the facia. Once selected, the display will change accordingly.

Test Gas Arrester and Neon Lights
The striking DC voltage is indicated when Current in the device reaches 1mA.

VERY IMPORTANT AUTOMATIC FEATURES

Automatic Vac-dc Detect.
This Tester has the capability to detect Voltage AC or DC automatically.
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.

You must ensure that the lest leads are doing a perfect contact before beginning any test and before selecting any function.
These contacts must remain secure during the entirety of the tests on a particular circuit.
We recommend you to use our 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 at the end 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 Capacive and Inductive Circuits.
This Tester 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 the 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.
Please, note that 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 instrument 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.
this feature will only work if the test leads are securely connected to the circuit under test

FEATURES

EXTRA INSULATION ELECTRICAL TEST VOLTAGES (125, 250)	■
TELECOMMUNICATION TEST VOLTAGES 50V and 100V	■
Automatic Voltmeter AC/DC at Start / Reset	■
ON-Reset/Restart Key	■
Off Push Button (press more than 5 Sec on 1kV key) and AUTO-OFF	■
Large range of insulation test Voltages: 50, 100, 125, 250, 500, 1000V	■
MOV / Protection Devices Test	■
Test ON-OFF	■
Polarization Index (PI) on 50, 100, 125, 250, 500 and 1000V	■
Dielectric Absorption Ratio (DAR) on 50, 100, 125, 250, 500 and 1000V	■
Battery Test by Key	Test Battery at Start
Battery Test at Switch ON / Reset	■
Voltmeter on request by Keypad	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 5Vdc	■
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 2kW (250V range) to 8GW (1kV Range)	■
Continuity from 0.01W (220mA) to 1999W	■
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	■
TM Ener	■

PRINCIPLE OF HOW IT WORK-DISPLAYS-RESULTS
This Test instrument operate through a keypad interface.
All interactions between the user and the instrument is done via the keypad.
The Testers have a liquid Crystal Display and two terminals.
Each push button or key has a function and when pressing two buttons, other functions is accessed.

DIGITAL DISPLAY
The digital Liquid Crystal Display is large. It measures (W)98mm x (H)24mm and has a 2 Lines of 16 Characters.
Language can be changed on demand (Factory 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) between the terminals.

AUTOMATIC BATTERY TEST
When the Tester starts, it test its 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. If the Voltage become too low, the battery symbol will be displayed on the LCD.

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 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. It also measure up to Vac 700V, with the same resolution and accuracy.

INSULATION
It has six insulation test Voltages. 50, 10, 125, 250, 500 and 1000V, all of theses are capable of giving more than 1mA at their nominal Voltages.
50V range can measure from 100K ohms up to 400M ohms
100V range can measure from 100K ohms up to 800M ohms
125V range can measure from 100K ohms up to 1G ohms
250V range can measure from 100K ohms up to 2G ohms
500V range can measure from 100K ohms up to 4G ohms
1000V range can measure from 100K ohms up to 8G ohms
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 205mA.
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, its better than 5% of readings plus minus 3digits.
Above 200 ohms, up to 1999 ohms, its 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
It has 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.

SAFETY VOLTAGE DETECTION
On any of the tests, if the user connect the leads to a Voltage, prior to starting the test, the 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 Tester is digitally calibrated. That mean that there is no potentiometers or moving part in this product. All the correction factors are saved into the internal memory.

BATTERIES
The Tester can work with 8 x 1.5V batteries. Alkaline are recommended.
The user can also use rechargeable batteries in the same product.

PREPARATION FOR USE

Fuses

In doubt, check the fuse using the ohm meter function or use an other instrument to check the fuse.
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.

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.

FUSES REPLACEMENT

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

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
50V Test Voltage..... 100k-400M Ohms
100V Test Voltage..... 100k-800M Ohms
125V Test Voltage..... 100k-1G Ohms
250V Test Voltage..... 100k-2G Ohms
500V Test Voltage..... 100k-4G Ohms
1000V Test Voltage..... 100k-8G Ohms
Accuracy on all ranges..... 100k-4G Ohms ±3% rdg
4G-8G Ohms ±5% rdg

Limited at around..... ±1.2mA

Short Circuit Current on all ranges
Maximum Short Circuit Current..... ±2mA

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 witht EnerSave Disabled..... 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 lab@toptronic.co.za 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
OverLoad..... 700V (between all terminals)
Over Voltage ..... Class III - 700V towards ground.
Fuses..... 1 x 500mA, 5 x 20mm, HBC,600V Fast Blow

MECHANICAL
Size..... 250 x 190 x 110 (mm)
Material..... Polycarbonate / A BS
Weight ..... Approx. 1450 g(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