

UNIQUE MULTIFUNCTION INSTRUMENT FOR TESTING SAFETY ON ELECTRICAL INSTALLATIONS

MACROTEST^{GB}

A NEW WORKING CONCEPT BY HT...

NEW

Leakage Currents
Environmental Parameters Measure
Phase Sequence Indication
Continuity Test 200mA
Ground Resistivity
MCB Test

Insulation Resistance 1000VDC
Earth Resistance

Display Touch-Screen

Advanced Loop Impedance

RCDs Type A AC B up to 1A

Advanced Loop Impedance

Display Touch-Screen

Earth Resistance

Insulation Resistance 1000V



MacrotestG3 represents the ideal fusion between HT 30 years' experience and the numberless opportunities offered nowadays by new technologies.

Feel free to let yourself be assisted by MacrotestG3 to find promptly a solution to all problems related to safety check on civil and industrial installations.

Touch-screen

All measurements at your fingertips.



Adding a note and saving measurements has never been so easy thanks to its interactive keyboard.

Simple, outright, accurate.

- One instrument to carry out all measurements required by standards in force
- Intuitive icons
- On-line help
- Display of measurement outcome ok  or not ok 





App HTanalysis for
IOS (iPad/iPhone) and
Android systems.

HTanalysis

**You can share pictures
and reports all the time**

Install App HTanalysis on your
tablet or smartphone.

By means of **HTanalysis** you can write detailed
reports with pictures, add audiovisual notes, manage
all measurement results.

3

HTCloud

**You can share measurements
wherever you wish!**

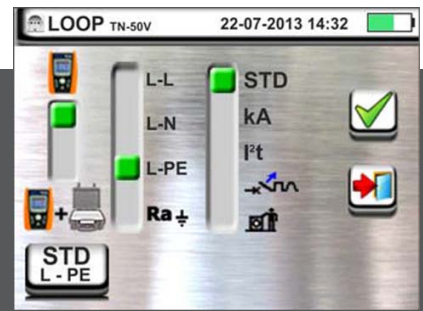
Install App HTanalysis to avail yourself of HTCloud
database for storage purposes.



ADVANCED LOOP

Testing of protective MCBs, fuses and cable sizing

According to IEC/EN61557-3



HT enriched loop measurement integrating calculations and analysis of test results

According to standards installers are required to size electrical installations in order to grant:

- line protection,
- protection against indirect contacts,
- protection against short circuits, that is to say:
 - a) protection device breaking power shall not be lower than the prospective short circuit current value where it was installed;
 - b) protection device shall trip out promptly in case of short circuit at any point of the protected line.

MacrotestG3 carries out the following functions:

- Check of protection against indirect contacts (TT - TN - IT)

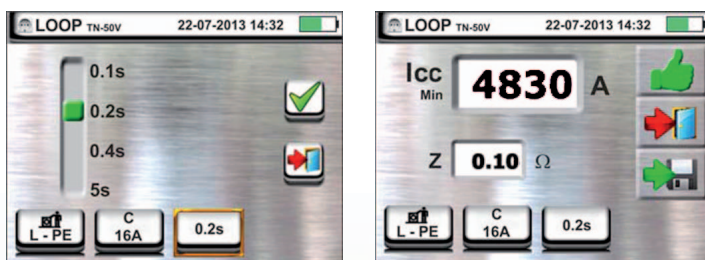
When an earth fault occurs masses' voltage values can become dangerous for a while equal to the protection device tripping time. Based on the system (TT, TN, IT) as well as on protection device type the instrument effects measurements checking protection device breaking power and tripping time provided by the standards so granting positive outcome in case of compliance.

For example in a TN system when setting the MCB/fuse curve type as well as tripping type the instrument:

- measures fault loop impedance calculating short circuit current I_{sc} ,

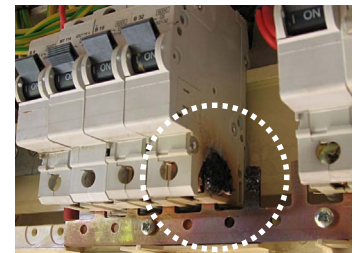
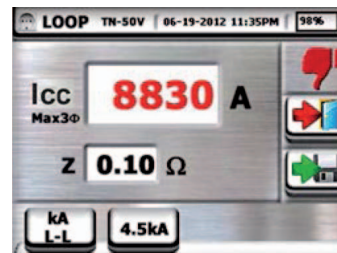
- measures short circuit current I_a which shall be interrupted by MCB/fuse within the set time.

If relation $I_a \leq I_{sc}$ is complied, measurement outcome will be OK. Voltage on masses is not dangerous for indirect contacts.



kA - Check of MCB/fuse breaking power

The unit detects impedance value upstream of the measuring point, calculates value of maximum short circuit current granting negative outcome if such a value is higher than the limit set by user (usually the value indicated on protection device).



I²t - Check of protection against short-circuit thermal effects

Setting fuse or MCB type, rated current, diameter and conductor material as well as number of cables in parallel, the instrument measures impedance calculating the short circuit current value I_{sc} as well as corresponding value of protection device tripping time (t) giving negative outcome if energy flowing allowed by protection device is higher than that supported by cables according to the following relation:

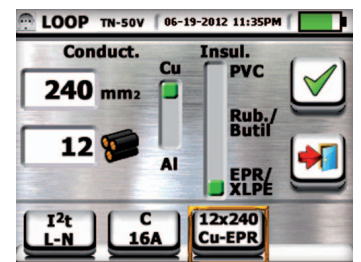
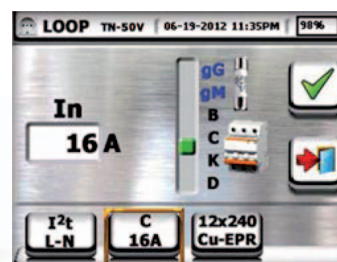
$$I_{sc}^2 t \leq K^2 S^2$$



where:

K is a parameter indicated by standards depending on material of conductor and of insulating sheath

S is cable section.



- Check of protection tripping time

The unit detects impedance value upstream of the measuring point, calculates value of minimum short circuit current (I_{Min}) and the corresponding value of protection tripping time (t) granting positive outcome if such a time is lower than the limit set by user. In addition to the above said tests the unit carries out also:

STD - Line impedance measurement among L-N, L-L, L-PE and calculation of prospective short circuit current. All the above mentioned measurements can be effected with high resolution of 0.1mohm by means of accessory **IMP57**.



EARTH

Earth resistance measurement

According to IEC/EN61557-5

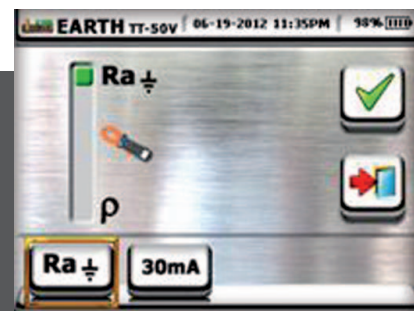
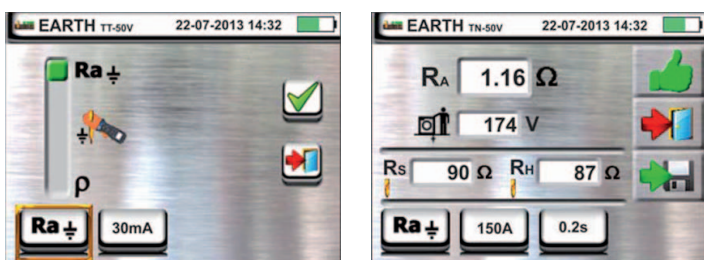


Measurement of earth resistance by means of 3- and 2-wires on TT TN and IT systems

Depending on system type set by users (TT, TN, IT) the unit effects measurements checking conditions provided by the standards for protection against direct contacts so granting positive outcome in case of compliance.

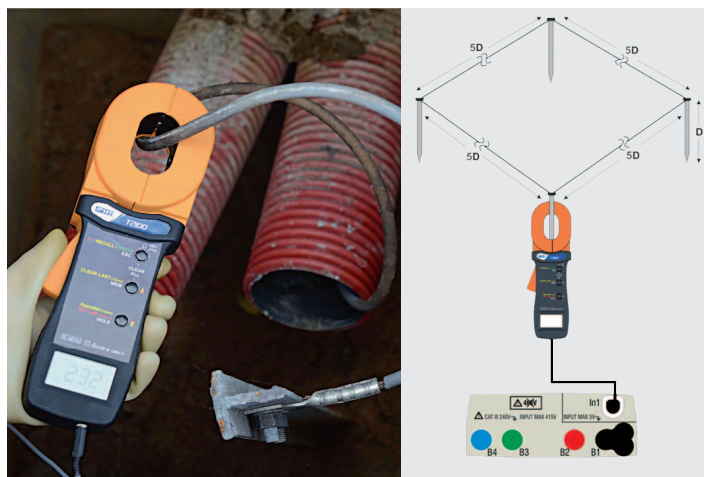
For example in a TN system when setting maximum earth fault current I_g and MV protection tripping time (as per indication given by the energy supply company), the instrument calculates contact voltage U_{tp} after measuring earth resistance, then compares value with data provided by standards.

If outcome is OK step and contact measurement shall not be carried out.



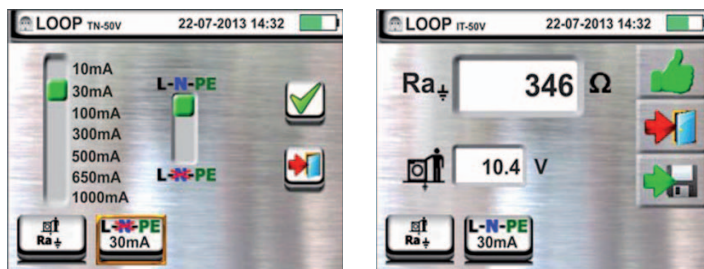
Measurement of earth resistance with clamp T2100

MacrotestG3 employs an innovative method of measuring earth resistance so eliminating the problem of identifying the proper location where auxiliary rods can be set. Earth measurement becomes easier thanks to a new algorithm HTEarth capable of storing all measurements effected with clamp T2100 on each rod and automatically calculating overall earth resistance value.



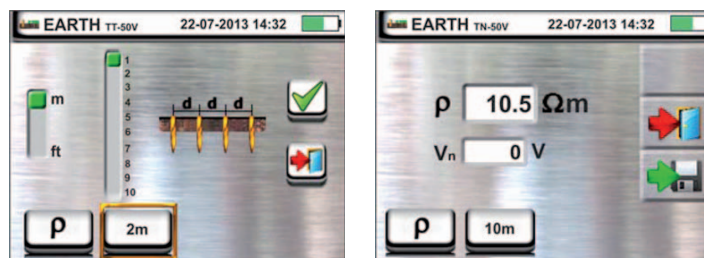
Non-trip earth loop impedance (overall earth resistance)

Measurement of earth resistance without causing RCD tripping out in systems with and without neutral as well as measurement of contact voltage.



Ground resistivity

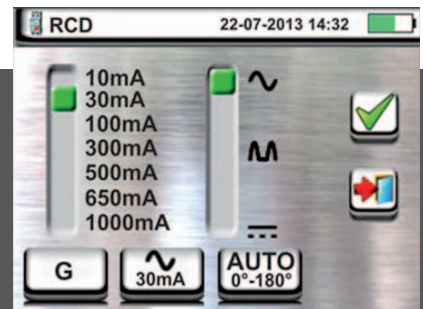
Measurement of ground resistivity (ρ) by 4-wire Wenner method.



RCD

Test on RCDs

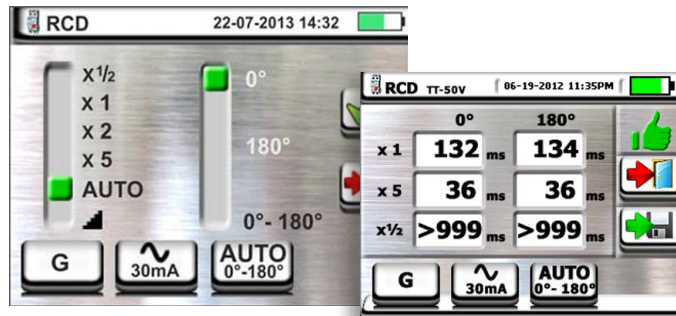
According to IEC/EN61557-6



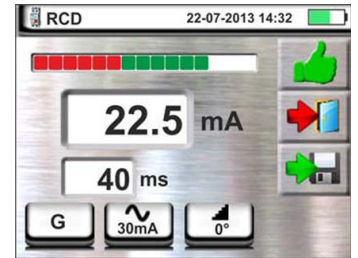
Test of RCD type A, AC with test current up to 1A and type B.



Test of **General**, **Selective** and **Delayed** RCDs with possibility of setting delay time.



Test type: $x\frac{1}{2}$ $x1$ $x2$ $x5$ and AUTO mode to effect 6 sequential tests.



Ramp

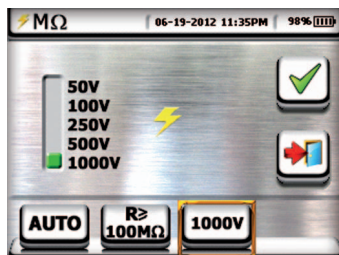
Measurement of real tripping current.

Mohm

Measurement of insulation resistance

According to IEC/EN61557-2

- Quick setting of limit values and test voltages through virtual keyboard
- Setting of TIMER for test duration
- Test voltage 50, 100, 250, 500, 1000 VDC
- Function AUTO.



Continuity

of protective conductors with 200mA

According to IEC/EN61557-4

- Calibration of measuring cables
- Quick setting of limit values through virtual keyboard
- Setting of TIMER for test duration.



AUX

Measurement of environmental parameters with optional probes

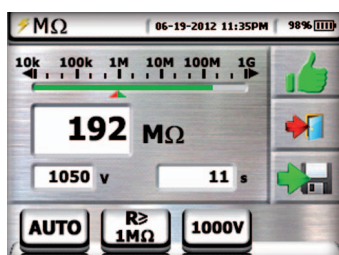
This function permits to measure the following environmental parameters by means of external transducers:

- Air temperature in °C, °F as well as relative humidity RH%,
- Illuminance (range 20/2K/20K Lux),
- DC mV input voltage.



Measurement saving and management software

The instrument permits to save each result into its memory organized in a tree view. Adding comments is possible thanks to a virtual keyboard. Data transfer to a PC can be effected through both USB and Wi-Fi connection by software capable of creating measurement reports



SEQ

SEQ (phase sequence detection)

- Detection of phase sequence under one or two terminal mode,
- Detection of phase conformity.

Leakage currents

Setting full scale values 1A, 100A, 1000A, measurement of leakage current will be possible through an external clamp meter HT96U.



TECHNICAL SPECIFICATIONS

Continuity with 200mA

Measuring range: 0.01Ω ÷ 99.9Ω
 Accuracy: ±(5.0%reading + 3 digits)
 Test current: > 200mA (R ≤ 2Ω)
 Open circuit voltage: 4V ≤ V₀ ≤ 12V

Insulation resistance

Test voltage: 50, 100, 250, 500, 1000VDC
 Measuring range: 0.01MΩ ÷ 99.9MΩ (50V),
 0.01MΩ ÷ 199.9MΩ (100V),
 0.01MΩ ÷ 499MΩ (250V),
 0.01MΩ ÷ 999MΩ (500V),
 0.01MΩ ÷ 1999MΩ (1000V)
 Basic accuracy: ±(2.0% reading + 2 digits)
 Test current: >1mA on 1kΩ x V_{nom} (50,100, 250,1kV)
 >2,2mA on 230kΩ @ 500V
 Short circuit current: <6.0mA for each test voltage

Line/Loop Impedance (L-L, L-N, L-PE)

Measuring range: 0.01Ω ÷ 199.9Ω
 Resolution: 0.01Ω min (0.1mΩ with optional accessory IMP57)
 Accuracy: ±(5.0% reading + 3 digits)
 Test voltage: 100÷265V (L-N) / 100÷460V (L-L), 50/60Hz

Maximum test current: 81A (@265V), 10.10A (@457V)
 Selectable MCB protections: curves B, C, D, K
 Selectable fuse protections: type aM and gG
 Insulating material (test I2t): PVC, butyl rubber, EPR, XLPE

Earth resistance and ground resistivity

Measuring range R: 0.01Ω ÷ 49.99kΩ
 Measuring range ρ: 0.06Ωm ÷ 3.14MΩm
 Accuracy: ±(5.0%reading + 3digits)
 Test current: 10mA, 77.5Hz
 Open circuit voltage: <20Vrms

RCD tripping time and current

RCD type: AC (⌚), A (⌚), B (⌚), General (G), Selective (S), Delayed (R)
 RCD rated currents: 10, 30, 100, 300, 500, 650, 1000mA
 L-N, L-PE voltage: 100V ÷ 265V, 50/60Hz ± 5%
 Half sine-wave test current: 0°, 180°
 Tripping time accuracy: ±(2.0%reading + 2 digits)
 Test current multipliers: x1/2, x1, x2, x5
 Tripping current range: (0.3 ÷ 1.1) I_{dn} (AC, A)
 Tripping current accuracy: 5%I_{dn} (10mA – 650mA)

Non-trip earth loop impedance

L-N, L-PE voltage range: 100V ÷ 265V, 50/60Hz ± 5%
 Measuring range: 0.01Ω ÷ 1999Ω (systems with neutral), 1Ω ÷ 1999Ω (systems without neutral)
 Accuracy: ±(5.0%reading + 3digits)
 Test current: <15mA

Contact voltage Ut

Measuring range: 0 ÷ U_{lim} (U_{lim} = 25V or 50V)
 Accuracy: ±(5.0%reading + 3digits)

1 terminal phase sequence

L-N, L-PE voltage range: 100V ÷ 265V, 50/60Hz ± 5%
 Measurement type: contact on metal parts (no insulating material)

Leakage current (with clamp HT96U)

Measuring range: 2mA ÷ 999mA
 Resolution: 1mA
 Accuracy: ±(5.0%reading + 3 digits)

Measurement of environmental parameters (with optional probes)

Air temp. (°C/°F): -20.0÷60.0°C/-4.0÷140.0°F
 Relative humidity: 0% ÷ 100%RH
 Illuminance (Lux): 0.001lux ÷ 20klux
 Accuracy: ±(2.0%readig + 2digits)

GENERAL SPECIFICATIONS

Power supply: 6x1.2V rechargeable type AA NiMH or 6x1.5V type AA alkaline
 Battery life: >500 test (alkaline)
 Display: 320x240 resistive color LCD with touch screen
 Memory: 999 locations, 3 marker levels
 PC interface: optical/USB and Wi-Fi (with accessory C2013)

Dimensions (L x D x H): 225 x 165 x 75mm
 Weight (including batteries): 1.2kg
 Safety: IEC/EN61010-1, double insulation

Pollution degree: 2
 Mechanical protection: IP50
 Measuring cat.: CAT III 240V, max 415V among inputs

Reference standards: IEC/EN61557-1-2-3-4-5-6-7
 Working temperature: 0° ÷ 40°C
 Working humidity: <80%RH
 Storage temp.: -10 ÷ 60°C
 Storage humidity: <80%RH

STANDARD ACCESSORIES

C2033X: 3-banana to Shuko plug cable
 PR400: remote switch probe
 KITGSC5: kit including 4 cables, 4 alligator clips and 2 test leads
 KITERRNE: soft carrying bag containing 4 cables and 4 earth rods
 PT400: stylus
 BORSA2051: soft carrying bag
 TOPVIEW2006: PC software and optical-to-USB connection cable C2006
 YABAT0003000: rechargeable NiMH battery 1.2V, AA, 6 pcs
 YABAT0002000: external battery charger, 2 pcs

Quick user's guide
 User's manual on CD-ROM
 Calibration certificate ISO9000

OPTIONAL ACCESSORIES

HT96U: transducer for AC currents (including leakage current) 0 ÷ 1, 0 ÷ 100, 0 ÷ 1000A AC
 IMP57: high resolution impedance measurements adapter
 T2100: earth ground clamp transducer
 HT52/05: transducer for temperature/humidity measurement
 HT53/05: transducer for illuminance measurement
 C2013: Wi-Fi adapter
 SP-0400: free hands kit
 606-IECN: magnetic adapter for connection to screw heads
 1066-IECN: black connector for extensions (4mm banana)
 1066-IECR: red connector for extensions (4mm banana).



HT96U



IMP57



HT52/05



HT53/05



C2013



PR400



TOPVIEW2006

T2100

Earth ground clamp transducer (optional accessory)



