

# USEI

TEST INSTRUMENTS™

# IRT803

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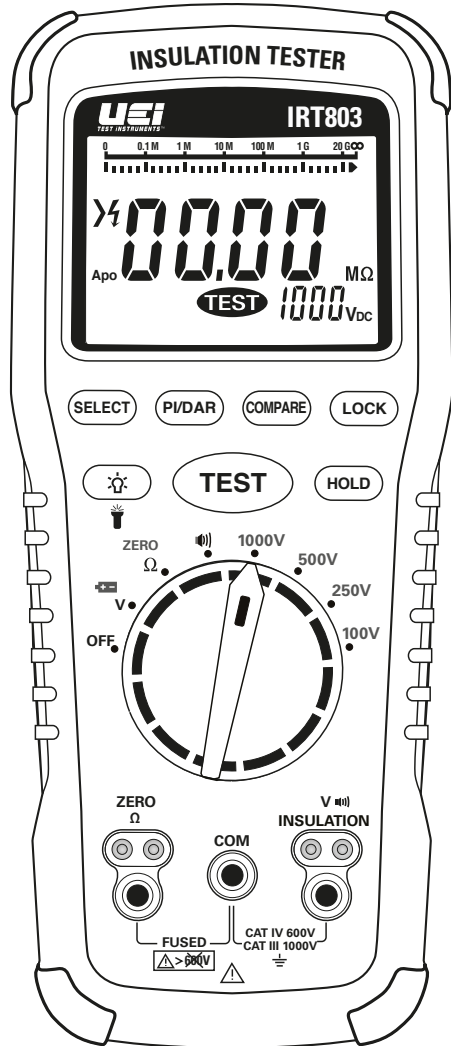
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## 600V AC/DC Digital Insulation Resistance Tester

INSTRUCTION MANUAL

ENGLISH



Intertek

600V

CAT IV

1000V

CAT III

RoHS  
Compliant



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IRT803 Insulation resistance tester is designed to help prevent hazards such as electric shock and short-circuits caused when the insulation in electrical devices, parts, and equipment used in plants, buildings, and other settings degrades over long periods of use.

## FEATURES

- Insulation Resistance 20.0G $\Omega$
- 600V AC/DC
- Earth-bond Resistance 20.00k $\Omega$
- Continuity
- PI/ DAR test
- Hold
- Test lead holders in boot
- Zero reading
- Lock reading
- Compare reading
- Rotary dial selector
- Protective rubber boot
- Kick stand
- Remote probe
- Auto power off
- Backlit Display
- Worklight

## GENERAL SPECIFICATIONS

- Operating Temperature: 32° to 122°F (0° to 50° C)
- Storage Temperature: 14° to 122°F (-10° to 50°C)
- Operating Humidity: <75%
- Operating Altitude: 6,562 ft (2000m)
- Pollution Degree: 2
- Backlight: Yes
- Refresh Rate: 3/sec
- Over-range: "OFL" is displayed.
- Dimensions: 8.27" x 3.52" x 2.17"
- Item Weight: 1.283 lbs.
- Calibration: Recommended annually
- CAT Rating: CATIV 600V/CATIII 1000V
- Certifications: cETLus 3rd edition, CE Conformity, CATIV 600V, CATIII 1000V, IP42, RoHS, 6' Drop Protection, IEC/EN 61010-1: 2010
- Battery Type: (AA) 4
- Test Leads: Silicone test leads w/ alligator clips (red and black) (ATL57), Remote Probe
- Accuracy Temperature: 64° to 82°F (18° to 28° C)
- Temperature Coefficient: Nominal 0.1 x (Specified accuracy)/°C
- Bargraph: 30 segments

## IMPORTANT SAFETY WARNINGS

### **WARNING**

Read entire Safety Notes section regarding potential hazard and proper instructions before using this meter. In this manual the word “**WARNING**” is used to indicate conditions or actions that may pose physical hazards to the user. The word “**CAUTION**” is used to indicate conditions or actions that may damage this instrument.

### **WARNING**

To ensure safe operation and service of the tester, follow these instructions. Failure to observe these warnings can result in severe injury or death.

### **WARNING**

- Before each use, verify meter operation by measuring a known voltage.
- Never use the meter on a circuit with voltages that exceed the category based rating of this meter.
- Do not use this meter during electrical storms or in wet weather.
- Do not use the meter or test leads if they appear damaged.
- Ensure meter leads are fully seated and keep fingers away from the metal probe contact when making measurements. Always grip the leads behind the finger guards molded into the probe.
- Do not open the meter to replace batteries while the probes are connected.
- To avoid false readings that can lead to electrical shock, replace batteries if a low battery indicator appears.
- Unless measuring voltage, shut off and lockout power before measuring resistance.
- Always adhere to national and local safety codes. Use proper personal protective equipment (PPE) to prevent shock and arc blast injury where hazardous live conductors are exposed.
- Always turn off power to a circuit or assembly under test before cutting, unsoldering or breaking the current path. Even small amounts of current can be dangerous.
- Always disconnect the live test lead before disconnecting the common test lead from the circuit.
- In the event of electrical shock, ALWAYS bring the victim to the emergency room for evaluation, regardless of victim's apparent recovery. Electrical shock can cause unstable heart rhythms that may need medical attention.
- If any of the following occur during testing, turn off the power source to the circuit being tested: arcing, flame, smoke, extreme heat, smell of burning materials or discoloration or melting of components.

### **WARNING**

Higher voltages require greater awareness of physical safety hazards. Before connecting the test leads; turn off power to the circuit under test, set meter to the desired function and range; connect the test leads to the meter first, then connect to the circuit under test. Reapply power. If an erroneous reading is observed, disconnect power immediately and recheck all settings and connections.

### **WARNING**

This meter is designed for trade professionals who are familiar with the hazards of their trade. Observe all recommended safety procedures that include proper lockout utilization and use of personal protective equipment that includes safety glasses, gloves and flame resistant clothing.

## SYMBOLS

 DC (Direct current)

 AC (Alternating Current)

**Apo** Auto Power Off Active

 Negative DC

 Low Battery

 High Voltage

**V** Voltage


 Continuity

**Ω** Ohms/Resistance

**COMPARE** Compare

 Warning or Caution

**PASS** Pass

 Fuse

**TEST** Test

**k** Kilo

**RUN TIME** Run Time

**M** Mega

**HOLD** Hold

**G** Giga

**LOCK** Lock

**PI DAR** PI/DAR

 Greater Than

**ZERO** ZERO



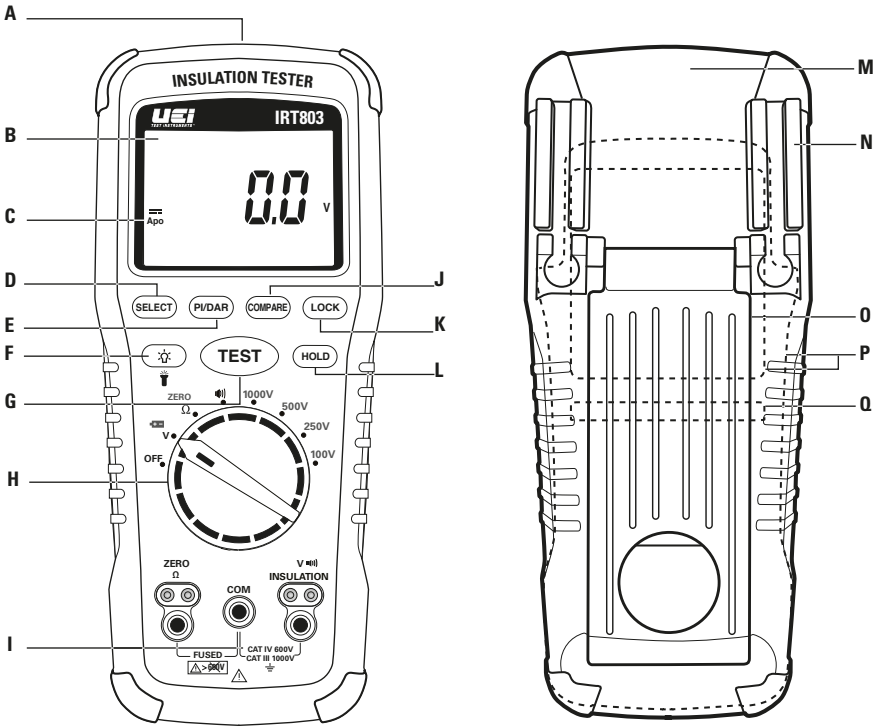
 Ground

**30 Segment Bargraph**

## CATEGORY DEFINITIONS

| Measurement Category | Short-Circuit (typical) kA <sup>a</sup> | Location in the building installation   |
|----------------------|---|---|
| II                   | < 10                                    | Circuits connected to mains socket outlets and similar points in the MAINS installation |
| III                  | < 50                                    | Mains distributions parts of the building   |
| IV                   | > 50                                    | Source of the mains installation in the building  |

## OVERVIEW AND OPERATING INSTRUCTIONS



**A. Worklight:** Lights work area in dark environments.

**B. Display:** High contrast and backlit.

**C. Apo:** Auto power off after 10 minutes of use

**D. Select Button:**

- Press to start battery test in AC/DC V mode.
- Press to activate Zero mode in Earth-bond resistance testing.

**E. PI/DAR (Polarization Index/Dielectric Absorption Ratio) Button:** Use PI for test of insulation deterioration and DAR for extended insulation resistance test.

- Press x1 for PI mode.
- Press x2 for DAR mode.

**F. Back light/ Worklight Button:** Press to turn on worklight and back light.

**G. Test Button:** Start and stop measurement insulation, earth-bond resistance test and PI/PAR test. Also, used for testing the fuse.

**H. Function Dial:** Turns on meter and is used to select the function.

**I. Category Max Indicator:** Maximum CAT Rating for input jacks.

- Use CATIII test leads or higher
- Zero/Ω Test Lead Port: Fused, used for Zero Ohms.
- Common Test Lead Port:
- Volt/Insulation Test Lead Port: CATIV 600V/CATIII 1000V, used for Volts, Continuity and Insulation test

**J. Compare Button:** Used to set a pass/fail compare level for insulation measurements.

**K. Lock Button:** Locks insulation or earth-bond resistance test to ON position. When pressed before the **TEST** button, the test remains active until you press the lock or test button again to release the lock.

**L. Hold Button:**

- Press x1 for Hold mode.

**M. Protective Rubber Boot:** With molded comfortable grip.

**N. Test Lead Holders:** Used for hands-free testing or storage

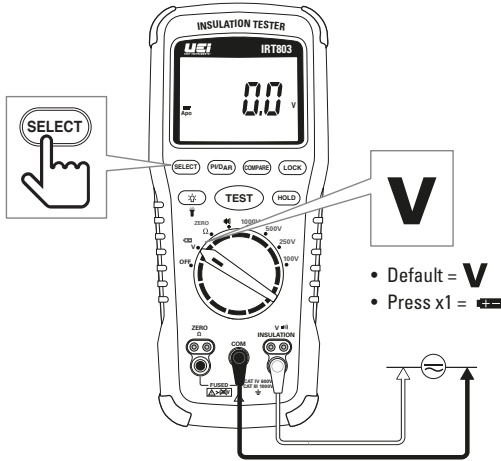
**O. Kick Stand:** For easy viewing of screen when testing.

**P. Battery and Fuse Cover:** (under protective rubber boot)

**Q. Serial Number** (under kick stand)

## Voltage <600V AC/DC

If the meter detects higher than AC or DC 1.5V, the meter will automatically choose AC or DC.



### ⚠ WARNING

- Use CATIII rated Test leads or higher.
- Do not attempt to measure more than 1000V AC/DC.
- Keep hands below finger guards when measuring high voltage levels.

Features:



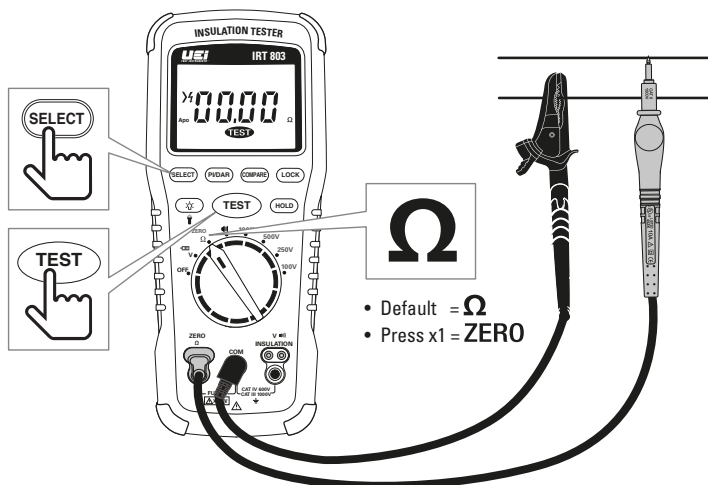
| RANGE | RESOLUTION | ACCURACY      |
|-------|------------|---------------|
| 600V  | 0.1V       | ±(2% +3 dgts) |

1. Bandwidth 45Hz to 400Hz

2. Input Impedance: 10MΩ (nominal), < 100pF

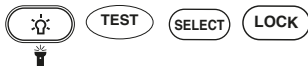
3. Overload Protection: AC 1000V rms or DC.

## Earth-Bond Resistance <20k $\Omega$



- Short the ends of the test leads together, press the **SELECT** button and wait until **ZERO** appears. The meter measures the test leads resistance, stores the data/results in memory and subtracts it from the reading. The test lead resistance is saved even after the meter is powered off. If the Probe resistance is  $>2\Omega$ , the resistance will not be saved.
- Connect the test leads to the circuit to be tested. The tester will automatically detect if the circuit is energized.
- The display will show "----" until a valid resistance reading is detected.
- The High Voltage symbol will display if greater than 2V AC or DC is present. If the meter "chirps" when you press the **TEST** button, test is corrupted due to voltage being present.
- Press and hold the **TEST** button on the Meter or Remote Probe to start test. Test stops when the button is released.

### Features:



**NOTE:** When the resistance is higher than the maximum display range the tester displays the > symbol and the maximum resistance for the range.

### **⚠ WARNING**

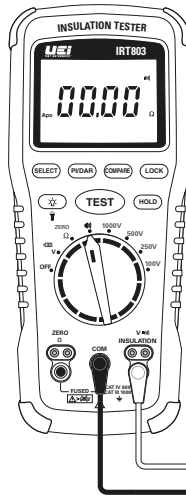
**NEVER** test resistance on a live circuit. (Overload Protection: AC 2V rms or DC)


| RANGE           | RESOLUTION     | ACCURACY        |
|-----------------|----------------|-----------------|
| 20.00 $\Omega$  | 0.01 $\Omega$  | $\pm(1.5\% +3)$ |
| 200.0 $\Omega$  | 0.1 $\Omega$   |                 |
| 2000 $\Omega$   | 1 $\Omega$     |                 |
| 20.00k $\Omega$ | 0.01k $\Omega$ |                 |

1. Accuracies apply from 0 to 100% of range
2. Open Circuit Test Voltage:  $> 4.0V$ ,  $< 8V$
3. Short Circuit Current:  $> 200.0\text{ mA}$



# Continuity



• Default = 

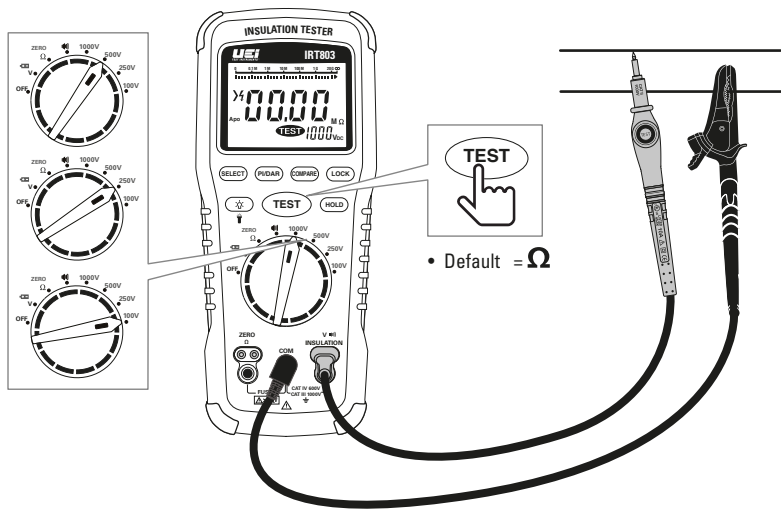


## ⚠ WARNING

- Do not measure resistance/continuity on a live circuit.
- Beeper sounds constant as long as circuit is complete.
- Beeper sounds when a short (<40Ω) is detected.

| RANGE  | RESOLUTION | AUDIBLE THRESHOLD |
|--------|------------|-------------------|
| 400.0Ω | 0.1Ω       | Approx. 40Ω       |

# Insulation Resistance/1000V/ 500V/ 250V/ 100V



- Set Rotary dial to a desired voltage position.
- The display will show "----" until a valid resistance reading is obtained.
- The High Voltage symbol will display if greater than 30V AC or DC is present.
- Press and hold the **TEST button** on the Meter or Remote Probe to start the test. Test stops when **TEST button** is released.
- Keep test leads on test points after **TEST button** is released. The circuit under test will then discharge.

**Features:**



**Note:** When the resistance is higher than the maximum display range the tester displays the > symbol and the maximum resistance for the range.

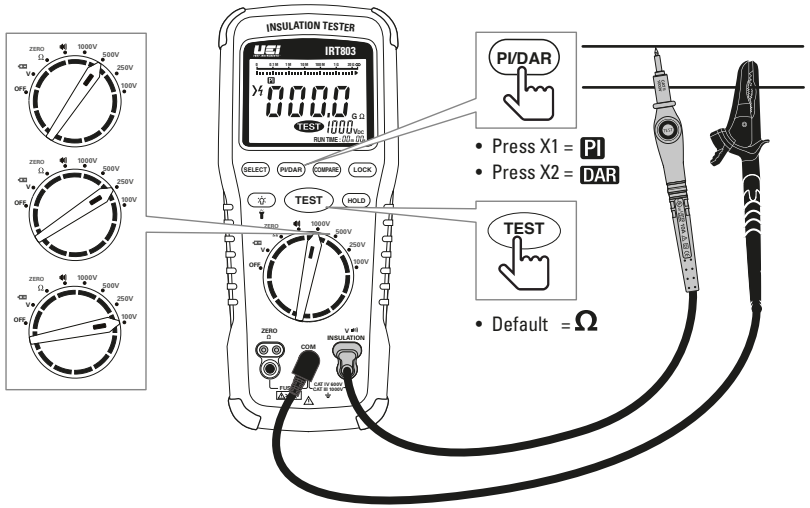
**⚠ WARNING**

**Do not measure resistance on a live circuit.**

| OUTPUT VOLTAGE     | DISPLAY RANGE   | RESOLUTION | TEST CURRENT | ACCURACY       |
|--------------------|-----------------|------------|--------------|----------------|
| 100V (0% to +20%)  | 0.01 to 20.00MΩ | 0.01MΩ     | 1mA @ 100kΩ  | ±(3% +5dpts)   |
|                    | 20.0 to 100.0MΩ | 0.1MΩ      |              |                |
| 250V (0% to +20%)  | 0.01 to 20.00MΩ | 0.01MΩ     | 1mA @ 250kΩ  | ±(1.5% +5dpts) |
|                    | 20.0 to 200.0MΩ | 0.1MΩ      |              |                |
| 500V (0% to +20%)  | 0.01 to 20.00MΩ | 0.01MΩ     | 1mA @ 500kΩ  | ±(1.5% +5dpts) |
|                    | 20.0 to 200.0MΩ | 0.1MΩ      |              |                |
|                    | 200 to 500MΩ    | 1MΩ        |              |                |
| 1000V (0% to +20%) | 0.1 to 20.0MΩ   | 0.1MΩ      | 1mA @ 1MΩ    | ±(1.5% +5dpts) |
|                    | 20 to 2000MΩ    | 1MΩ        |              |                |
|                    | 2.0 to 20.0GΩ   | 0.1GΩ      |              |                |

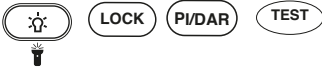
1. Measurement Range: 0.01MΩ to 206G
2. Test Voltages: 100, 250, 500, 1000V
3. Test Voltage Accuracy: 0 to +20%
4. Short-Circuit Test Current: 1mA nominal
5. Auto Discharge: Discharge time <0.5 sec. for C = 1μF or less
6. Live Circuit Detection: Inhibit test if terminal voltage >30V prior to initialization of test
7. Maximum Capacitive Load: Operable with up to 1μF load

## Polarization Index & Dielectric Absorption Ratios (1000V, 500V, 250V, 100V)



Polarization Index (PI) is the ratio of the 10-minute insulation resistance to the 1-minute insulation resistance. Dielectric Absorption Ratio (DAR) is the ratio of the 1-minute insulation resistance to the 30-second insulation resistance.

### Features:



- Because of the time required for the PI and DAR tests, alligator clips are recommended.
- Use rotary selector dial to select desired test voltage.
- The display will show "----" until test starts.
- The High Voltage symbol will display if greater than 30V AC or DC is present.
- Press and hold the Test Button on the Meter or Remote Probe to start the test.

**Note:** When the resistance is higher than the maximum display range the tester displays the > symbol and the maximum resistance for the range.

### WARNING

**NEVER** measure resistance on a live circuit.

## Compare Function

Use the Compare Function to set "Pass/Fail" compare levels for insulation measurements.

Press the Compare Button to select the desired compare value. Choose from the following values:

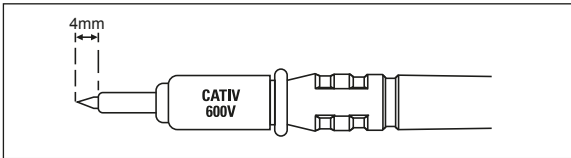
- 100k $\Omega$
- 200k $\Omega$
- 500k $\Omega$
- 1M $\Omega$
- 2M $\Omega$
- 5M $\Omega$
- 10M $\Omega$
- 20M $\Omega$
- 50M $\Omega$
- 100M $\Omega$
- 200M $\Omega$
- 500M $\Omega$

Perform Insulation tests as described in this manual. The PASS symbol will appear on display if the measured value is greater than the selected value.

Press and hold the **Compare button** to stop/disable the Compare function.

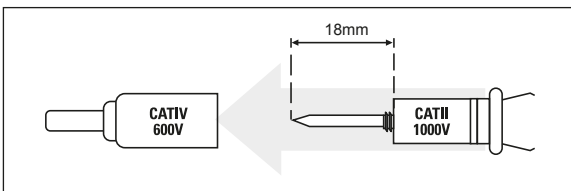
## Test Lead Notes

### CATIV 600V Measurement Locations



- Ensure the test lead shield is pressed firmly in place. Failure to use the CAT IV shield increases arc-flash risk.

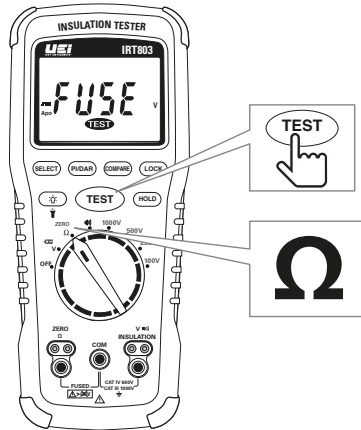
### CAT II Measurement Locations



- CAT IV shields may be removed for CAT II locations. This will allow testing on recessed conductors such as standard wall outlets. Take care not to lose the shields.

**⚠ WARNING:** Test Lead category protections apply only to test leads and should not be confused with the meter's specific CAT rating. Observe the maximum category protection indicated on the meter the test leads are plugged into.

## Testing the Fuse



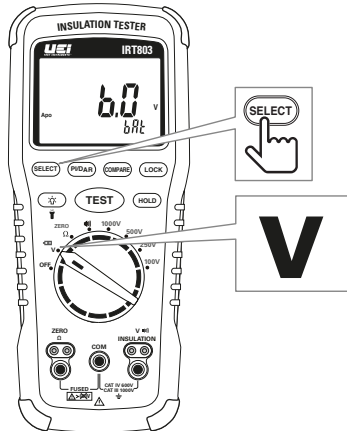
**⚠ WARNING:** To avoid electrical shock or injury, remove the test leads and any input signals/voltages before replacing the fuse.

- Turn the rotary selector dial to (ZERO/Ω) position.
- Press and hold the **Test Button**. If the display shows “FUSE” the fuse is bad and should be replaced. Please see Fuse Replacement section of this manual.

## Testing the Batteries

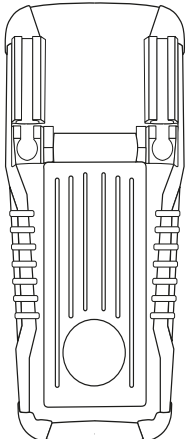
The meter continuously monitors battery voltage. If the Low Battery indicator is displayed, replace the batteries.

To manually test the batteries:

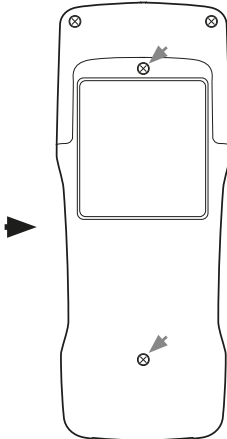


- Turn the rotary selector dial to the Battery/Voltage position, with no test leads connected.
- Press the **Select button** to start the battery test. The battery voltage is displayed for 5 seconds. Then the voltage function is displayed again.

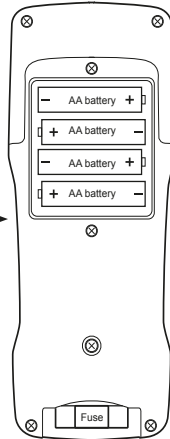
## Battery Replacement




Removed protective rubber boot.

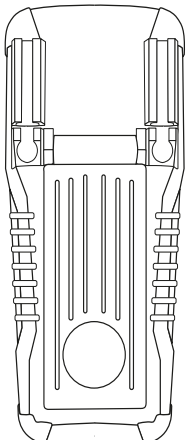


Removed battery cover.

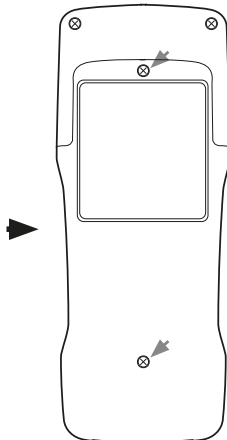


-  When the batteries are too low for safe operation, the Low Battery indicator will display
- Remove protective rubber boot.
- Remove battery cover.
- Replace the batteries (4 AA).
- Replace the battery cover
- Replace the protective rubber boot.

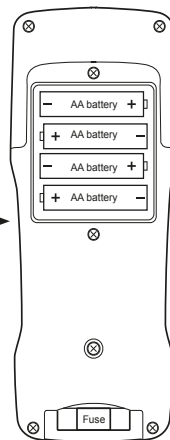
## Fuse Replacement



Removed protective rubber boot.



Removed battery cover.



- Remove protective rubber boot.
- Remove battery cover.
- Replace the fuse (F 440mA 1000V 1R 10kA).
- Replace the battery cover.
- Replace the protective rubber boot.

## 1. Explanation of symbols

Symbols      Description



: Double insulation



: See accompanying user manual

## 2. Intended use and color of the lead Set

- A) Test probe has the lead wire which is composed of the Nickel Silver, Copper Braid, and PVC Rubber. One end has a plug and the other end is 4mm (with cap) or 18mm (without cap) probe tip.
- B) Probe length : 1618 mm  $\pm$  5.0 mm
- C) Wire Color : Black / dimensions :  $\phi$  6mm
- D) Weight : 126g

## 3. Specification (Dual rating)

Voltage (a.c/d.c) : 1000 V Current : Max. 10 A  
Measurement Category : CAT II (without Caps) / CAT III, CAT IV (with Caps)

## 4. Identification of operation control

The test probe is generally attached with Digital Multi-meter. It must be in accordance with the relating meter. (UL 61010-031, CAT II 1000V, CAT III 1000V, CAT IV 600V, 10A)

## 5. WARNING

- Before testing, make sure the test probe is connected to the meter. Make sure that the test probe is disconnected from the test point before the test probe is without connection to the meter.
- If this product is used in manner not specified by the instructions, the protection may be impaired. Replace leads that have the inner contrasting color of the wire exposed.
- Do NOT use test probe in CAT III or CAT IV environments without the cap is assembled with test probe and correct category rating visible on the cap. When the cap is not assembled with test probe, the probe tip is 18mm and rated to CAT II 1000V.
- When used with meter or other accessories, the lowest category rating of the combination applies.

## 6. Instructions for cleaning

Wipe the dirty parts with gauze or soft cloth soaked with dilute detergent. After cleaning, leave the test probe until it dries completely.

**WARNING** - Before cleaning the test probe, make sure the test probe is disconnected from Meter and test point.

## FCC/IC INFORMATION

**NOTE:** this device complies with part 15 of the fcc rules and can ices-3(a).

Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operations.

### INFORMATION TO THE USER

This equipment has been tested and found to comply with the limits for a class b digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/tv technician for help.

**⚠ WARNING** any changes or modifications not expressly approved by the manufacturer, could void the user's authority to operate equipment.

## DISPOSAL



**⚠ CAUTION:** This symbol indicates that equipment and its accessories shall be subject to separate collection and correct disposal.

## CLEANING

Periodically clean your meter's case using a damp cloth. DO NOT use abrasive, flammable liquids, cleaning solvents, or strong detergents as they may damage the finish, impair safety, or affect the reliability of the structural components.

## STORAGE

Remove the batteries when instrument is not in use for a prolonged period of time. Do not expose to high temperatures or humidity. After a period of storage in extreme conditions exceeding the limits mentioned in the General Specifications section, allow the instrument to return to normal operating conditions before using it.

## WARRANTY

The IRT803 is warranted to be free from defects in materials and workmanship for a period of 1 year from the date of purchase. If within the warranty period your instrument should become inoperative from such defects, the unit will be repaired or replaced at UEI's option. This warranty covers normal use and does not cover damage which occurs in shipment or failure which results from alteration, tampering, accident, misuse, abuse, neglect or improper maintenance. Batteries and consequential damage resulting from failed batteries are not covered by warranty.

Any implied warranties, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the express warranty. UEI shall not be liable for loss of use of the instrument or other incidental or consequential damages, expenses, or economic loss, or for any claim or claims for such damage, expenses or economic loss.

A purchase receipt or other proof of original purchase date will be required before warranty repairs will be rendered. Instruments out of warranty will be repaired (when repairable) for a service charge.

This warranty gives you specific legal rights. You may also have other rights, which vary from state to state.