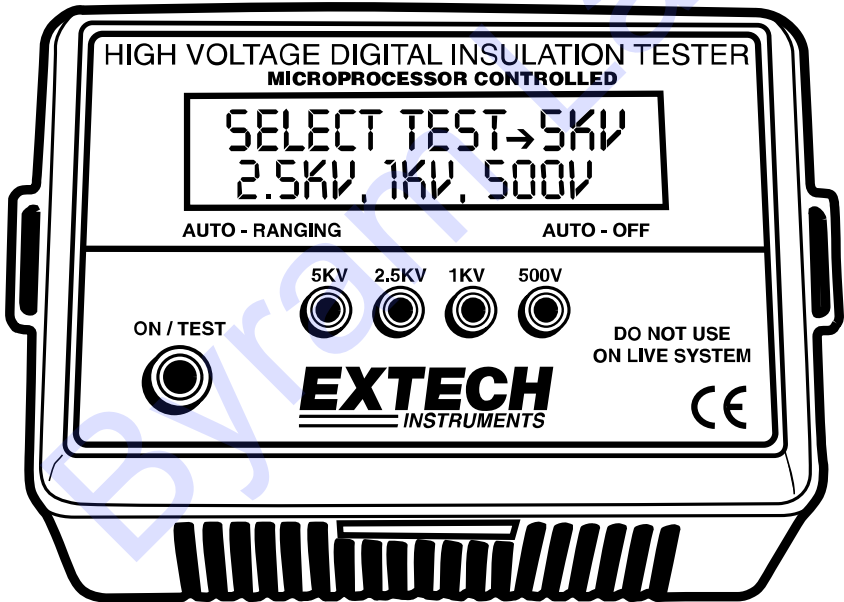


# User's Manual

**EXTECH**  
INSTRUMENTS

## Digital High Voltage Insulation Tester

Model 380375



**BYRAM LABS**  
AN ENERGY TECHNOLOGY COMPANY

## Warranty

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EXTECH INSTRUMENTS CORPORATION warrants this instrument to be free of defects in parts and workmanship for one year from date of shipment (a six month limited warranty applies on sensors and cables). If it should become necessary to return the instrument for service during or beyond the warranty period, contact the Customer Service Department at (781) 890-7440 ext. 210 for authorization or visit our website at [www.extech.com](http://www.extech.com) (click on Contact Extech and go to Service Department to request an RA number). A Return Authorization (RA) number must be issued before any product is returned to Extech. The sender is responsible for shipping charges, freight, insurance and proper packaging to prevent damage in transit. This warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification. Extech specifically disclaims any implied warranties or merchantability or fitness for a specific purpose and will not be liable for any direct, indirect, incidental or consequential damages. Extech's total liability is limited to repair or replacement of the product. The warranty set forth above is inclusive and no other warranty, whether written or oral, is expressed or implied.

## Introduction

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Congratulations on your purchase of Extech's High Voltage Insulation Tester. This device has four voltage test ranges (up to 5kV) and measures insulation resistance to 250G $\Omega$ . This professional meter, with proper care, will provide years of safe reliable service.

## Safety

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1. Circuits under test must be de-energized and isolated before connections are made.
2. Circuit connections must not be touched during a test.
3. After insulation tests, capacitors must be discharged.
4. Test leads (including alligator clips) must be in good working order, clean and without broken or cracked insulation.
5. When servicing, use only specified replacement parts.
6. Environmental conditions:
  - Indoor use only; Installation category II
  - Pollution degree 2
  - Altitude up to 2000 meters
  - Relative Humidity 80% max.; Temperature 0 to 40°C

### International Safety Symbols



Caution, refer to this manual before using this meter



Dangerous Voltages; risk of electric shock



Meter is protected throughout by double or reinforced insulation

# Specifications

## General specifications

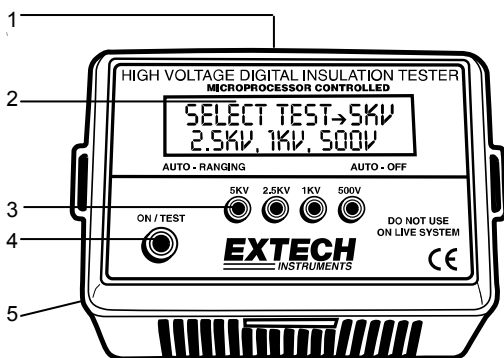
Display	2 x 16 character alphanumeric multi-function dot matrix
Range selection	Automatic ranging
Bargraph	Displays voltage ramp, soak, and decay
Automatic discharge	After automatic & manual stop or upon completion of test
Low battery indicator	"Replace battery" displayed when battery voltage is low
Power source	Eight 1.5V AA cells; Battery life 40 hrs (no load at 5kV)
Auto Power off	After 30 minutes
Enersave™ mode	Shorter test time to conserve battery life
Operating conditions	32 to 104°F (0 to 40°C); < 80% RH
Storage conditions	14 to 140°F (-10 to 60°C); < 80% RH
Dimensions	4.7 x 6.7 x 3.7" (120 x 170 x 95mm)
Weight	1.94 lbs (880g)

## Range Specifications

Test Voltage	Resistance Ranges	Short Circuit Current	Accuracy	Resolution
500V DC	0 to 25 GΩ	1mA	0 to 50GΩ: ± 3% reading 50 to 250GΩ: ± 5% reading	1kΩ
1000V DC	0 to 50 GΩ	1mA		
2500V DC	0 to 125 GΩ	1mA		
5000V DC	0 to 250 GΩ	1.6 mA		

## Meter Description

1. Test lead jacks compartment
2. Dot Matrix Display
3. Voltage test buttons
4. ON / TEST button
5. Battery compartment is located on bottom of unit



## Operation

**Note:** Ensure that the circuit under test does not include devices or components that can be damaged by 5000VDC; such devices include power factor correction capacitors, low voltage mineral insulated cables, electronic light dimmers, ballasts and starters for fluorescent lamps.

### Connecting the Test Leads to the meter

The **Black (Earth)** and **Red (Line)** test leads connect to the meter in the lead compartment located on the back of the meter (the meter jacks are color coded). NOTE: The **Green (Guard)** lead is typically not used. Do not connect this test lead to the meter unless absolutely certain it is going to be used. For more information, continue reading this Operation section and the Applications section to follow.

### Connecting the Test Leads to the device under test

The **Black (Earth)** lead is connected to the conductive material. The **Red (Line)** lead is connected to the insulating material. The **Green (Guard)** lead is at the same potential as the negative terminal (0V) and, when required, is used to prevent erroneous readings by removing parallel leakage paths from the measurement.

### Insulation Resistance Measurements

1. Connect the test leads to the meter and the device under test.
2. Press the **ON / TEST** button to turn the unit on. The unit will display the turn-on screens and then stop at the "Select Test" display.

Select Test → 5kV  
2.5kV, 1kV, 500V
3. Select the desired test voltage by pressing the **500V**, **1KV**, **2.5KV**, or **5KV** button. The screen will briefly display the selected test voltage and then will proceed to the "Connect Leads Testing for LIVE" display. If the circuit is "live" the display will indicate "Live Warning... Circuit Live" and the meter will beep. If this occurs, remove the test leads and press the **ON / TEST** button.

Connect Leads  
Testing for LIVE
4. Press the **ON / TEST** button to apply the voltage and begin the test. The meter will beep every 2 seconds which indicated high voltage is on the test leads and the meter will intermittently buzz while the high voltage is being generated.
5. On the display, elapsed test time appears on the upper right, the resistance reading appears on the upper left, the selected voltage is shown on the lower right and the bar graph indicates the actual voltage present on the test leads.

R= 108.2MΩ 6.5s  
0 → ██████████ ← 500V
6. At the completion of the test the meter will discharge the device under test and the display "HOLD". Do not remove the test leads until the bargraph disappears (complete discharge) and "HOLD" appears in the display.

R= 128.4MΩ 7.4s  
0 → HOLD ← 500V
7. The meter automatically discharges the system at the end of the test. The test ends when one of the following occurs.
  - a. After approximately 10 seconds in the Enersave™ mode.
  - b. After approximately 100 seconds in the continuous mode.
  - c. When the red **ON / TEST** button is pressed.

## The Enersave™ Mode

Enersave™ conserves battery life by reducing the test time from 100 seconds to approx. 10 seconds. Enersave™ is the default mode of operation. To disable Enersave™ press and hold the **ON / TEST** button for three seconds to begin a test.

## Bargraph Voltage Display

The bargraph represents the voltage present on the test leads as it charges, soaks, and discharges. The bargraph appears on the lower portion of the display during tests.

## Automatic Low Resistance Detect

If the display shows the message “LOW MΩ”, the test should be interrupted immediately by pressing the **ON / TEST** button. This message indicates that the insulation under test has broken down and the meter is trying to inject a high potential onto a short circuit.

## Elapsed Timer

The test duration is indicated on the display. This is particularly useful in determining whether an insulating material under test will break down in a given amount of time.

## Manual Test STOP

To stop a test in progress, press the **ON / TEST** button. The test will immediately end and the system will automatically discharge.

## Automatic Test STOP

The test automatically stops after 100 seconds if the meter is not in the Enersave™ mode. When in the Enersave™ mode, the test automatically stops after approx. 10 seconds.

## Live Circuit Warning

If the test leads are connected to a live circuit when testing, a warning beeper will sound and the meter will display “Live Warning...Circuit Live...”. In this case, correct the problem and retest.

## Automatic Discharge

At the end of a test, the meter automatically discharges the high voltage. The automatic discharge status is reflected on the display. During discharge the beeper will sound and, when completely discharged, the HOLD icon appears on the display.

## Auto OFF

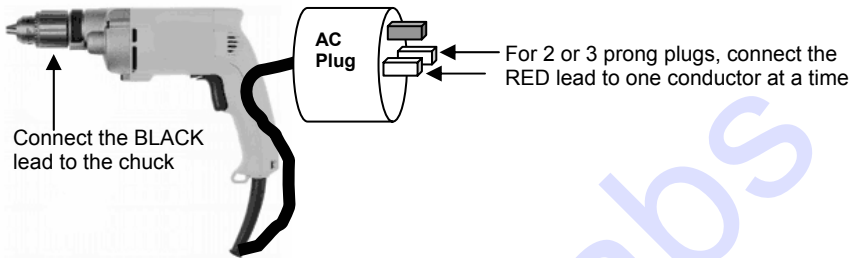
The meter will automatically turn off after approximately 30 minutes of operation.

# Applications

## Measuring Power Tools and Small Appliances

For small appliances, connect the Black (EARTH) lead to conductors and the Red (LINE) lead to insulating material.

For single or double insulated power tools, one lead should be connected to the device's chuck, blade, etc. and the other lead to one of the AC power cord conductors (test both conductors in turn). Refer to the power tool application diagram below.



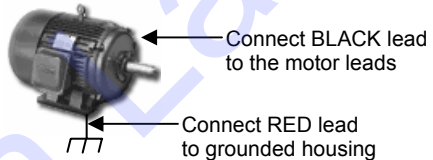
## Testing Motors

### AC Motors

Disconnect the motor from the line by:

- Disconnecting the wires from the motor terminals or
- Opening the main switch

If the main switch is opened, and the motor also has a motor-starter, then the starter must be held in the ON position. With the main switch opened, the measured resistance will include the resistance of the motor wire and all other components between the motor and the main switch. If a weakness is indicated, the motor and other components should be checked individually. If the motor is disconnected at the motor terminals, connect the RED lead to the grounded motor housing and the BLACK lead to one of the motor leads.

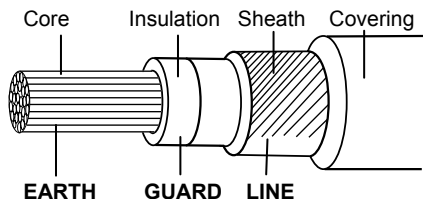


### DC Motors

- Disconnect the motor from the line.
- To test the brush rigging, field coils and armature, connect the RED lead to the grounded motor housing and the BLACK lead to the brush on the commutator.
- If the resistance measurement indicates a weakness, raise the brushes off of the commutator and separately test the armature, field coils and brush rigging by connecting one lead to each individually, leaving the other connected to the grounded motor housing. This also applies to DC Generators.

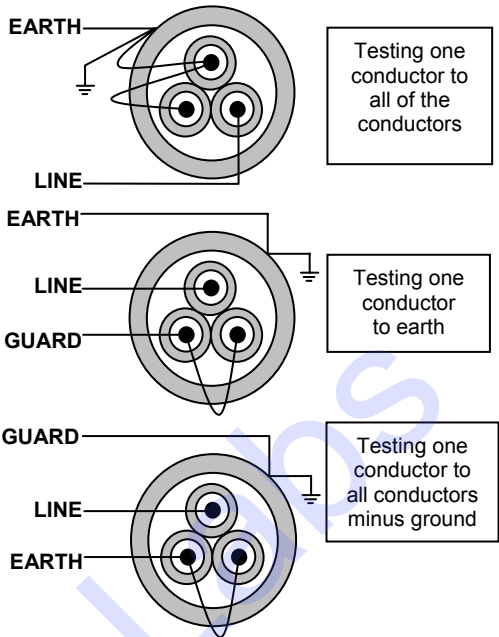
## Testing Single Conductor Cables

- Completely disconnect the cable under test from its source and destination.
- Connect the test leads to the cable as shown at right.



## Testing Multi Conductor Cables

1. Completely disconnect the cable under test from its source and destination.
2. Refer to the diagrams at right for three possible tests.



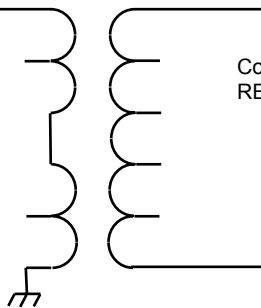
## Transformer Testing

Transformer tests are performed with the transformer completely disconnected from the line and the load. Note that the case ground should not be removed.

The five tests listed below will completely test a single-phase transformer. Note that at least 1 minute should be allowed between each test.

1. High voltage winding to low voltage winding and ground
2. Low voltage winding to high voltage winding and ground
3. High voltage winding to low voltage winding (pictured below)
4. High voltage winding to ground
5. Low voltage winding to ground

Connect the  
BLACK lead here



Connect the  
RED lead here

## **Maintenance**

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### **Battery Replacement**

When 'REPLACE BATTERY' appears on the display, replace the eight 1.5V 'AA' batteries.

1. Ensure that the meter is powered down and that the test leads are not connected
2. Close the instrument cover and turn the instrument upside down
3. Remove the phillips head screw located on the bottom of the meter
4. Remove the battery compartment cover
5. Replace the eight batteries ensuring proper polarity
6. Affix the rear cover and secure the rear screw

### **Cleaning**

Periodically wipe the case with a dry cloth. Do not use solvents or abrasives to clean this instrument.

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