

# User Guide

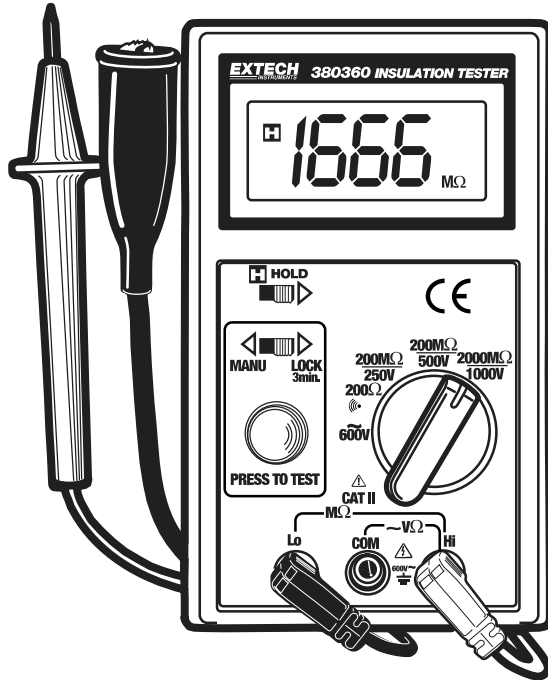
# **EXTECH**<sup>®</sup>

INSTRUMENTS

A FLIR COMPANY

## Model 380360

## Insulation Tester / Megohmmeter



## **Introduction**

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Congratulations on your purchase of Extech's Insulation Tester/Megohmmeter. The Model 380360 provides three test ranges plus continuity and an AC voltage test. A handy 3-minute test lock feature and a data hold switch are also included. This professional meter, with proper care, will provide years of reliable service.

## **Safety**

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1. Circuits under test must be de-energized and isolated before connections are made (except for voltage measurements).
2. Circuit connections must not be touched during a test. Use extreme caution when working near bare conductors and bus bars. Accidental contact with conductors could result in electrical shock.
3. Use caution when working near voltages above 60VDC or 30VACrms.
4. After insulation tests, capacitors must be discharged.
5. Test leads (including alligator clips) must be in good working order, clean and without broken or cracked insulation.
6. When servicing, use only specified replacement parts.

### **International Safety Symbols**



Caution, refer to this manual before using this meter



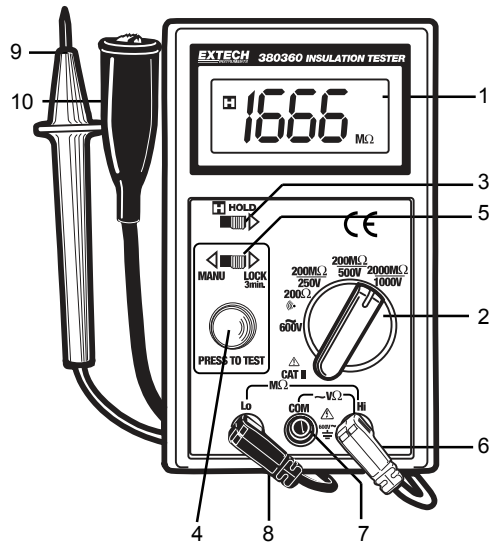
Dangerous Voltages



Meter is protected throughout by double or reinforced insulation

## Meter Description

1. LCD Display
2. Rotary function switch
3. Data hold switch
4. Test button
5. Manual / Lock select switch
6. HI input terminal
7. COM input terminal
8. LO input terminal
9. Positive test lead
10. Negative test lead



## Operation

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### Connecting Test Leads

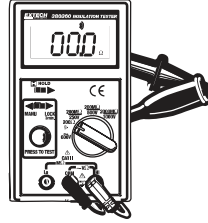
#### Warning

Ensure that the circuit under test does not include components that can be damaged by 1000VDC; such devices include power factor correction capacitors, low voltage mineral insulated cables, electronic light dimmers, and ballasts/starters for fluorescent lamps.

For the M $\Omega$  range, connect the red test lead to the HI input terminal and the black test lead to the LO input terminal. For the 200 $\Omega$  and 600VAC functions, connect the red test lead to the HI (right) input jack and the black lead to the COM (center) jack.

### Test Lead Check

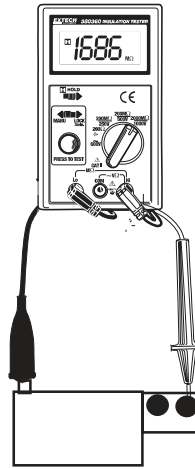
1. Connect the red test lead to the HI input terminal; black lead to the COM terminal.
2. Set the rotary switch to the 200 $\Omega$  range.
3. Set the HOLD switch to the left off position and the MANU/LOCK switch to the MANUAL position.
4. Touch the test lead tips together.
5. Press the red TEST button.
6. Resistance should read less than 1 $\Omega$  and the audio tone should sound.
7. With the leads not touching, the display should read **1\_\_** indicating over-range.
8. Readings displayed other than the readings described above are indicative of a test lead problem. The test leads must be replaced before using the meter. Failure to do so could result in damage to equipment and electrical shock.



## Insulation Resistance Measurements (Megohmmeter Tests)

Warning: Do not perform Insulation Resistance measurements if AC Voltage is present on the device under test.

1. Connect the red test lead to the HI input terminal; black lead to the LO terminal.
2. Set the HOLD switch to the left off position and the MANU/LOCK switch to the MANUAL position.
3. Set the rotary switch to the desired test voltage (250V, 500V, or 1000V).
4. Connect the tips of the test leads to the equipment under test.
5. Press and hold the TEST button. Release the test button to stop the test.
6. Read the measurement value on the LCD display.



### 3-Minute Test Lock

For hands-free operation, use the TEST LOCK feature.

1. Connect the red test lead to the HI input terminal; black lead to the LO terminal
2. Set the rotary switch to the desired voltage test position (250V, 500V, or 1000V).
3. Connect the tips of the test leads to the equipment under test.
4. Set the MANU/LOCK switch to the LOCK position.
5. Press and release the red TEST button. A 3-minute continuous test will begin. The red TEST button can be pressed at any time to end the test. If the TEST button is not pressed, the meter automatically stops the test after 3 minutes.

### Notes on IR (Megohmmeter) testing:

1. The maximum measurement range for the 380360 is 2000M $\Omega$  (2G $\Omega$ ). Frequently, insulation resistance will exceed this value. When this happens, the display will indicate 1 M $\Omega$ , meaning the resistance is very high and the insulation being tested is good.
2. If the device being tested is highly capacitive, the display will indicate an increasing resistance value over time. Always wait until the reading has stabilized before recording the value.

## Low Resistance and Audible Continuity Tests

### WARNING

Do not run this test unless ACV = 0. Do not use this mode to check diodes.

1. Set the Rotary switch to the 200 $\Omega$  (•)) position.
2. Connect the red test lead to the HI input terminal; black lead to the COM terminal.
3. Connect the tips of the test leads to both ends of the circuit under test.
4. Press the red TEST button and read the resistance on the LCD.
5. When the resistance of a circuit is less than approx. 100 $\Omega$  the audible tone will sound.

## AC Voltage Tests

1. Set the Rotary switch to the red 600V position.
2. Connect the red test lead to the HI terminal and the black test lead to the COM terminal.
3. Connect the other end of the test leads to the circuit under test.
4. Read the voltage value on the LCD.

## Data Hold Function

The Data Hold function freezes the displayed reading. Move the HOLD switch to the rightmost position to freeze the displayed reading. The 'H' will appear on left side of the display when the meter is in the Data Hold mode. Move the switch to the left position to exit the Data Hold mode (the 'H' indicator will switch off).

## Maintenance

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### Battery Replacement

When the low battery symbol appears (BT) on the LCD the six 1.5V 'AA' batteries must be replaced.

1. Turn the meter is off and remove the test leads
2. Remove the Phillips head screw on the rear of the meter
3. Remove the battery compartment cover
4. Replace the batteries observing polarity
5. Affix the rear cover and secure the rear screw



You, as the end user, are legally bound (**Battery ordinance**) to return all used batteries and accumulators; **disposal in the household garbage is prohibited!**

You can hand over your used batteries / accumulators at collection points in your community or wherever batteries / accumulators are sold!

**Disposal:** Follow the valid legal stipulations in respect of the disposal of the device at the end of its lifecycle

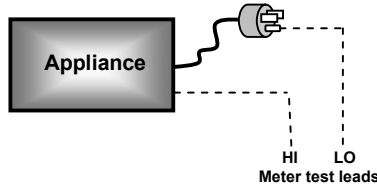
### Cleaning

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

## Applications

### Measuring Power Tools and Small Appliances

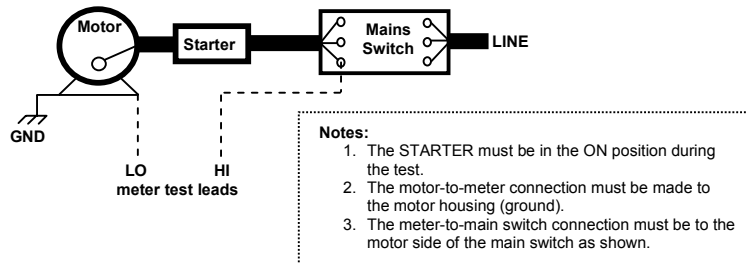
This section applies to any device under test that uses a line cord. For double insulated power tools, the meter's leads should be connected to the device's housing (chuck, blade, etc.) and the ground of the power cord. Refer to the diagram.



### Testing AC Motors

Disconnect the motor from the line by disconnecting the wires from the motor terminals or opening the mains switch.

If the mains switch is opened, and the motor also has a motor-starter, then the starter must be held in the ON position. With the mains 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 one meter lead to the grounded motor housing and the other lead to one of the motor leads. Refer to diagram at below.

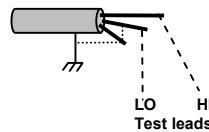


### Testing DC Motors

1. Disconnect the motor from the line.
2. To test the brush rigging, field coils and armature, connect one meter lead to the grounded motor housing and the other lead to the brush on the commutator.
3. If the resistance measurement indicates a weakness, raise the brushes off of the commutator and separately test the armature, field coils and brush rigging (one at a time). Leave one lead connected to the grounded motor housing while testing the motor components. This also applies to DC Generators.

### Testing Cables

1. Disconnect the cable under test from the line.
2. Disconnect the opposite end of the cable to avoid errors as a result of leakage from other equipment.
3. Check each conductor to ground and/or lead sheath by connecting one meter lead to ground and/or lead sheath and the other meter lead to each of the conductors in turn.
4. Check insulation resistance between conductors by connecting meter leads to conductors in pairs. Refer to diagram at right. In the diagram, note that the 3-conductor cable has two wires shorted to the ground shield. This two-wire/shield connection is then connected to one side of the meter. The remaining conductor is connected to the other side of the meter.



## Application Note for Large Installations

In large wiring installations where the insulation of outlets is being tested, more than one insulation resistance measurement may have to be made to take into account parallel resistances. Divide large systems into subgroups and test subgroups individually. Also, in large installations, the capacitance of the insulation will be high, thereby taking longer to charge when being tested. Care must be taken not to finish a measurement until the insulation capacitance is fully charged (a steady, stable reading is an indication that this is the case). Be careful not to turn the range switch while the test button is pressed.

## Specifications

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### General specifications

|                       |   |
|-----------------------|---|
| Display               | 0.65" 3-1/2 digit (2000 count) LCD                                    |
| Sampling rate         | 2.5 readings per second   |
| Test ranges           | 2000M $\Omega$ /1000VDC, 200M $\Omega$ /500VDC, 200M $\Omega$ /250VDC |
| AC Voltage range      | 600VAC  |
| Resistance range      | 200 $\Omega$  |
| Over range indicator  | '1 ____' displayed  |
| Zero adjust           | Automatic   |
| Low battery indicator | 'BT' symbol displayed when battery voltage is low                     |
| Power source          | Six (6) 1.5 'AA' batteries  |
| Power consumption     | 20 to 95mA (depending upon function)                                  |
| Operating conditions  | 0 to 40°C (32 to 104°F); 80% RH                                       |
| Dimensions            | 165 x 100 x 57mm (6.5 x 3.9 x 2.2")                                   |
| Weight                | 500g (1.1 lbs)  |



**Range Specifications**

Accuracies are specified as % reading + digits at 23°C < 80% RH

**RESISTANCE**

| Range | Res.  | Accuracy | Max. open circuit Volt | Overload Protect. |
|-------|-------|----------|------------------------|-------------------|
| 200Ω  | 0.1 Ω | ±1% + 2d | 3.3V                   | 500Vrms           |

**CONTINUITY**

| Range | Res. | Audible tone | Max. open circuit Volt | Overload Protect. |
|-------|------|--------------|------------------------|-------------------|
| 200Ω  | 0.1Ω | < 100Ω       | 3.3V                   | 500Vrms           |

**AC VOLTAGE**

| Range  | Res. | Accuracy   | Input impedance | Overload Protect. |
|--------|------|------------|-----------------|-------------------|
| 600VAC | 1V   | ±0.8% + 3d | 10MΩ            | 750Vrms           |

**MEGOHMMETER RANGES**

| Range                    | Res.  | Accuracy | Terminal voltage  |
|--------------------------|-------|----------|-------------------|
| 200MΩ / 250VDC           | 0.1MΩ | ±3% + 5d | 250V + 10% ~ -0%  |
| 200MΩ / 500VDC           |       |          | 500V + 10% ~ -0%  |
| 0 to 1000MΩ / 1000VDC    | 1MΩ   | ±5% + 5d | 1000V + 10% ~ -0% |
| 1000 to 2000MΩ / 1000VDC |       |          |                   |

| Range                    | Test Current / Load | Short circuit Current |
|--------------------------|---------------------|-----------------------|
| 200MΩ / 250VDC           | 250KΩ               | < 1.5mA               |
| 200MΩ / 500VDC           | 500KΩ               |                       |
| 0 to 1000MΩ / 1000VDC    | 1MΩ                 |                       |
| 1000 to 2000MΩ / 1000VDC |                     |                       |

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