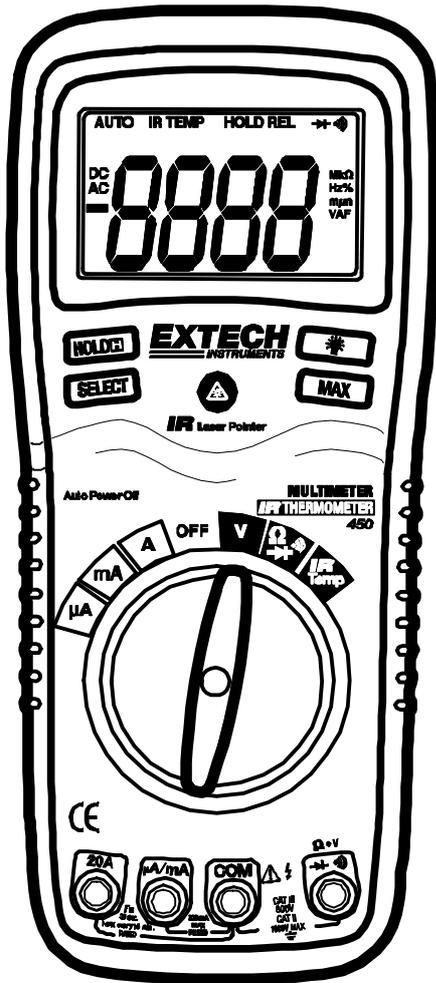


User's Guide



# Digital Multimeter plus IR Thermometer

**Extech 450**  
Patented





EN 60729-2007:2007

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EX450-EU\_ENG V3.1 10/07



### OVERVOLTAGE CATEGORY III

This meter meets the IEC 610-1-2001 standard for OVERVOLTAGE CATEGORY III. Cat III meters are protected against overvoltage transients in fixed installation at the distribution level. Examples include switches in the fixed installation and some equipment for industrial use with permanent connection to the fixed installation.

### SAFETY INSTRUCTIONS

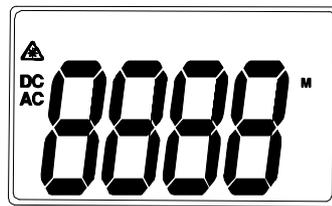
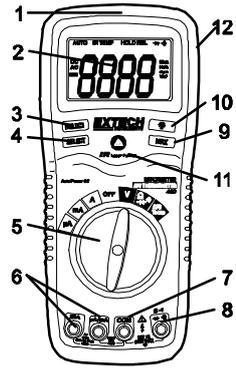
This meter has been designed for safe use, but must be operated with caution. The rules listed below must be carefully followed for safe operation.

1. **NEVER** apply voltage or current to the meter that exceeds the specified maximum:

Input Protection Limits	
Function	Maximum Input
V DC or V AC	1000VDC/750AC, 200Vrms on 400mV range
mA AC/DC	500mA 250V fast acting fuse
A AC/DC	20A 250V fast acting fuse(30 seconds max every 15 minutes)
Resistance, Diode Test, Continuity	250Vrms for 15sec max
Temperature	60V DC/24V AC

2. **USE EXTREME CAUTION** when working with high voltages.
3. **DO NOT** measure voltage if the voltage on the "COM" input jack exceeds 600V above earth ground.
4. **NEVER** connect the meter leads across a voltage source while the function switch is in the current, resistance, or diode mode. Doing so can damage the meter.
5. **ALWAYS** discharge filter capacitors in power supplies and disconnect the power when making resistance or diode tests.
6. **ALWAYS** turn off the power and disconnect the test leads before opening the covers to replace the fuse or batteries.
7. **NEVER** operate the meter unless the back cover and the battery and fuse covers are in place and fastened securely.
8. **NEVER** look directly at the laser light source or aim the pointer at an eye.





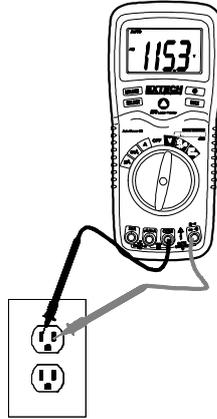


## AC VOLTAGE MEASUREMENTS

**WARNING:** Risk of Electrocution. The probe tips may not be long enough to contact the live parts inside some 240V outlets for appliances because the contacts are recessed deep in the outlets. As a result, the reading may show 0 volts when the outlet actually has voltage on it. Make sure the probe tips are touching the metal contacts inside the outlet before assuming that no voltage is present.

**CAUTION:** Do not measure AC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.

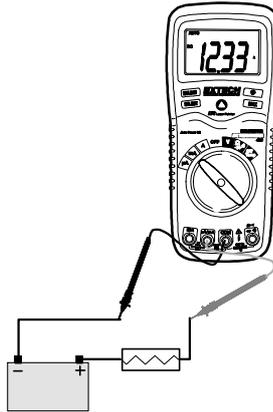
1. Set the function switch to the green V position.
2. Press the SELECT button to indicate "AC" on the display.
3. Insert the black test lead banana plug into the negative **COM** jack.  
Insert red test lead banana plug into the positive **V** jack.
4. Touch the black test probe tip to the neutral side of the circuit.  
Touch the red test probe tip to the "hot" side of the circuit.
5. Read the voltage in the display.

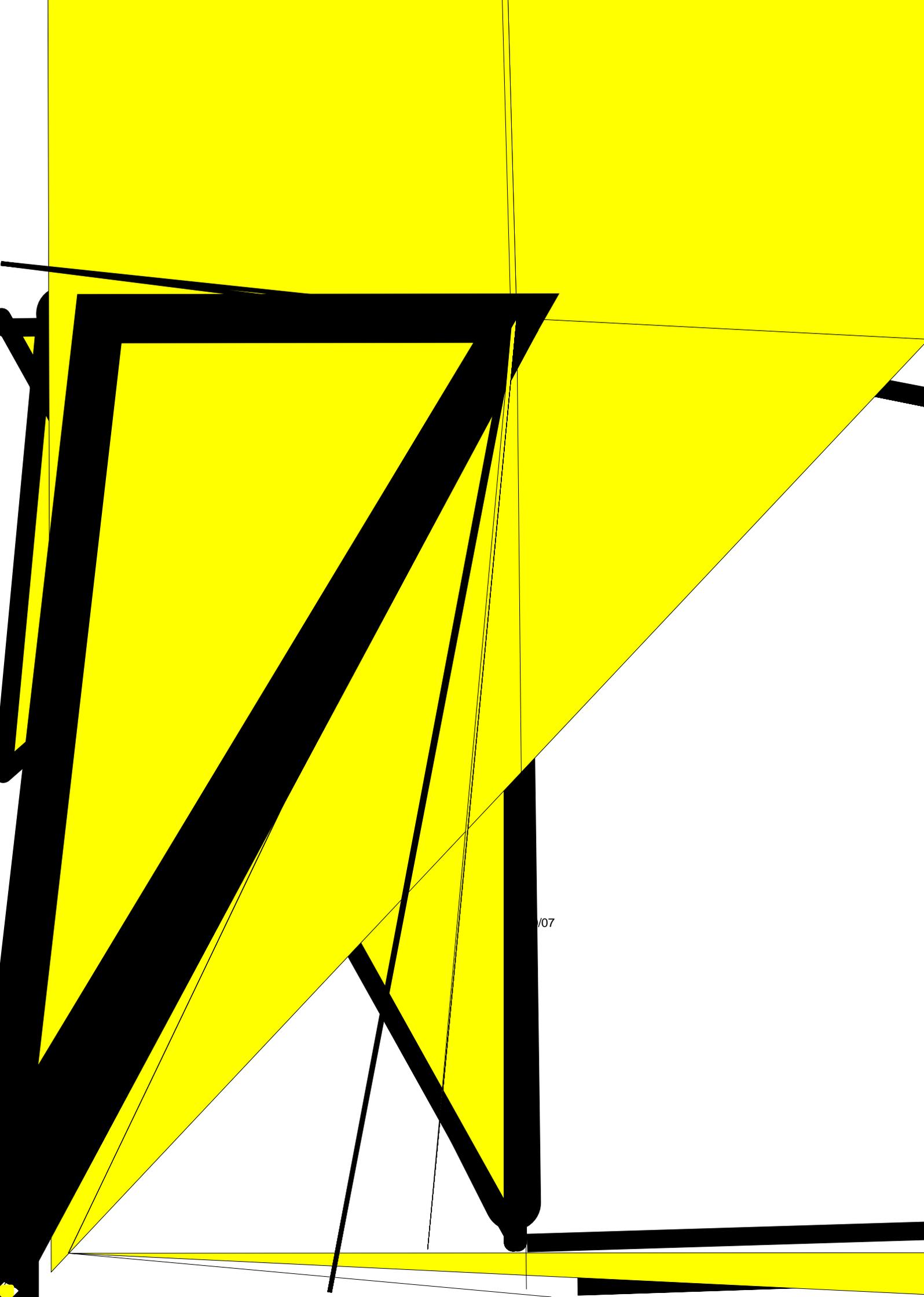


## DC CURRENT MEASUREMENTS

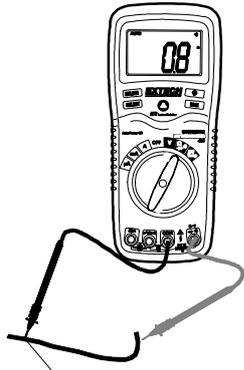
**CAUTION:** Do not make current measurements on the 20A scale for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or the test leads.

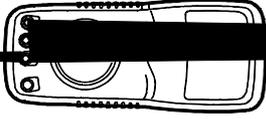
1. Insert the black test lead banana plug into the negative **COM** jack.
2. For current measurements up to 2000 $\mu$ A DC, set the function switch to the yellow  $\mu$ A position and insert the red test lead banana plug into the  **$\mu$ A/mA** jack.
3. For current measurements up to 200mA DC, set the function switch to the yellow mA position and insert the red test lead banana plug into the  **$\mu$ A/mA** jack.
4. For current measurements up to 20A DC, set the function switch to the yellow A range and insert the red test lead banana plug into the **A** jack.
5. Press the SELECT button to indicate "DC" on the display.
6. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
7. Touch the black test probe tip to the negative side of the circuit.  
Touch the red test probe tip to the positive side of the circuit.
8. Apply power to the circuit.
9. Read the current in the display.





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**↑ AVOID EXPOSURE**  
Laser radiation is emitted  
from this aperture

 **CAUTION**

**LASER RADIATION-DO NOT STARE INTO BEAM**  
OUTPUT<1mW WAVELENGTH 630-670nm  
CLASS 2 LASER PRODUCT  
EN 60825-1:1994/A11:1996/A2:2001/A1:2002

**DISPLAY BACKLIGHT**

Press and hold the HOLD key for >1 second to turn on or off the display backlight function.

**Note: The HOLD feature will activate when the Backlight is turned on. Press the HOLD key again to exit Hold.**

**MAX**

Press the MAX button to activate the MAX feature in the voltage or current functions. The display will hold the maximum reading and will update only when a reading higher than the currently displayed reading occurs. Press the MAX button again to disable the feature.

**HOLD**

The hold function freezes the reading in the display. Press the HOLD key momentarily to activate or to exit the HOLD function.

**AUTO POWER OFF**

The auto off feature will turn the meter off after 15 minutes.

**LOW BATTERY INDICATION**

The  icon will appear in the lower left corner of the display when the battery voltage becomes low. Replace the battery when this appears.

**WRONG CONNECTION INDICATION**

The  icon will appear in the upper right corner of the display and the buzzer will sound whenever the positive test lead is inserted into the 20A or uA/mA input jack and a non-current (green, black or red) function is selected. If this occurs, turn the meter off and reinsert the test lead into the proper input jack for the function selected.

## Specifications

Function	Range	Resolution	Accuracy	
DC Voltage	200mV	0.1mV	±(0.5% reading + 2 digits)	
	2V	0.001V	±(0.8% reading + 2 digits)	
	20V	0.01V		
	200V	0.1V		
	1000V	1V	±(1.0% reading + 3 digits)	
AC Voltage			50 to 400Hz	400Hz to 1kHz
	2V	0.001V	±(1.0% reading + 4 digits)	±(2.5% reading + 8 digits)
	20V	0.01V	±(1.5% reading + 4 digits)	±(3.0% reading + 8 digits)
	200V	0.1V		
	750V	1V	±(2.0% reading + 6 digits)	±(3.5% reading + 8 digits)
DC Current	200µA	0.1µA	±(1.5% reading + 3 digits)	
	2000µA	1µA		
	20mA	0.01mA		
	200mA	0.1mA	±(2.5% reading + 5 digits)	
	2A	0.001A		
	20A	0.01A		
AC Current			50 to 400Hz	400Hz to 1KHz
	200µA	0.1µA	±(1.8% reading + 8 digits)	
	2000µA	1µA		
	20mA	0.01mA		
	200mA	0.1mA	±(3.0% reading + 8 digits)	
	2A	0.001A		
	20A	0.01A		

**NOTE:** Accuracy is stated at 65°F to 83°F (18°C to 28°C) and less than 75% RH.

Function	Range	Resolution	Accuracy
Resistance	200Ω	0.1Ω	±(0.8% reading + 4 digits)
	2kΩ	0.001kΩ	±(0.8% reading + 2 digits)
	20kΩ	0.01kΩ	±(1.0% reading + 2 digits)
	200kΩ	0.1kΩ	
	2MΩ	0.001MΩ	±(3.0% reading + 5 digits)
	20MΩ	0.01MΩ	
Temp (IR)	-58 to 518°F	1°F	±2.0% reading or ±2°C, ± 4 °F
	-50 to 270°C	1°C	

**NOTE:** Accuracy specifications consist of two elements:

- (% reading) – This is the accuracy of the measurement circuit.
- (+ digits) – This is the accuracy of the analog to digital converter.

<b>Diode Test</b>	Test current of 0.3mA maximum, open circuit voltage 1.5V DC typical
<b>Continuity Check</b>	Audible signal will sound if the resistance is less than 150Ω (approx.), test current <0.7mA
<b>IR Spectral response</b>	6 to 16μm
<b>IR Emissivity</b>	0.95 fixed
<b>IR distance ratio</b>	8:1
<b>Input Impedance</b>	>7.5MΩ (VDC & VAC)
<b>AC Response</b>	Average responding
<b>ACV Bandwidth</b>	50Hz to 1kHz
<b>Display</b>	2000 count backlit liquid crystal
<b>Overrange indication</b>	"OL" is displayed
<b>Auto Power Off</b>	15 minutes (approximately)
<b>Polarity</b>	Automatic (no indication for positive); Minus (-) sign for negative
<b>Measurement Rate</b>	2 times per second, nominal
<b>Low Battery Indication</b>	"  " is displayed if battery voltage drops below operating voltage
<b>Patent notice</b>	U.S. Patent 7056012

## Maintenance

**WARNING:** To avoid electrical shock, disconnect the meter from any circuit, remove the test leads from the input terminals, and turn OFF the meter before opening the case. Do not operate the meter with an open case.

This MultiMeter is designed to provide years of dependable service, if the following care instructions are performed:

1. **KEEP THE METER DRY.** If it gets wet, wipe it off.
2. **USE AND STORE THE METER IN NORMAL TEMPERATURES.** Temperature extremes can shorten the life of the electronic parts and distort or melt plastic parts.
3. **HANDLE THE METER GENTLY AND CAREFULLY.** Dropping it can damage the electronic parts or the case.
4. **KEEP THE METER CLEAN.** Wipe the case occasionally with a damp cloth. DO NOT use chemicals, cleaning solvents, or detergents.
5. **USE ONLY FRESH BATTERIES OF THE RECOMMENDED SIZE AND TYPE.** Remove old or weak batteries so they do not leak and damage the unit.
6. **IF THE METER IS TO BE STORED FOR A LONG PERIOD OF TIME,** the batteries should be removed to prevent damage to the unit.

### Battery Replacement

1. Remove the Phillips head screw that secures the rear battery door
2. Open the battery compartment
3. Replace the 9V battery
4. Secure the battery compartment



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, gratuitously, at the collection points for our branches 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

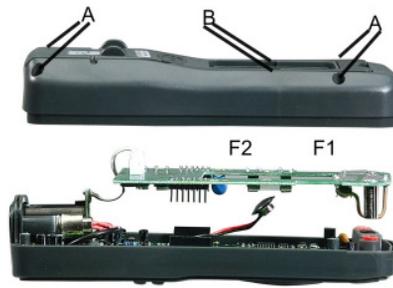
**WARNING:** To avoid electric shock, do not operate the meter until the battery cover is in place and fastened securely.

**NOTE:** If your meter does not work properly, check the fuses and batteries to make sure that they are still good and that they are properly inserted.

## REPLACING THE FUSES

**WARNING:** To avoid electrical shock, disconnect the meter from any circuit, remove the test leads from the input terminals, and turn OFF the meter before opening the case. Do not operate the meter with an open case.

1. Disconnect the test leads from the meter.
2. Remove the protective rubber holster.
3. Remove the battery cover (two "B" screws) and the battery.
4. Remove the four "A" screws securing the rear cover.
5. Lift the center circuit board straight up from the connectors to gain access to the fuse holders.
6. Gently remove the old fuse and install the new fuse into the holder.
7. Always use a fuse of the proper size and value (0.5A/250V fast blow for the 400mA range, 20A/250V fast blow for the 20A range).
8. Align the center board with the connectors and gently press into place.
9. Replace and secure the rear cover, battery and battery cover.



**WARNING:** To avoid electric shock, do not operate your meter until the fuse cover is in place and fastened securely.

### UL LISTED

The UL mark does not indicate that this product has been evaluated for the accuracy of its readings.

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