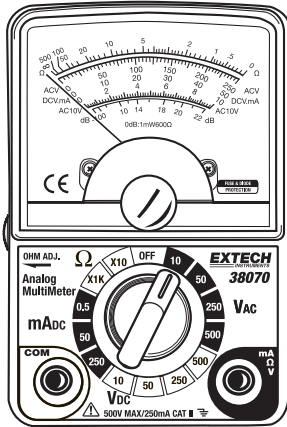


## User's Guide



### Analog Multimeter Model 38070



## Introduction

Congratulations on your purchase of the Extech model 38070 Analog Multimeter. This device measures AC/DC Voltage, DC Current, Resistance, and dB, displaying measurements in analog format. Properly used, this meter will provide many years of reliable service.



#### Support line (781) 890-7440

Technical support: Extension 200; E-mail: support@extech.com

Repair & Returns: Extension 210; E-mail: repair@extech.com

#### Product specifications subject to change without notice

For the latest version of this User's Guide, Software updates, and other up-to-the-minute product information, visit our website: www.extech.com  
Extech Instruments Corporation, 285 Bear Hill Rd., Waltham, MA 02451

#### WARNING: USE EXTREME CAUTION IN THE USE OF THIS DEVICE.

Improper use of this device can result in injury or death. Follow all safeguards suggested in this manual in addition to the normal safety precautions used in working with electrical circuits. DO NOT service this device if you are not qualified to do so.

## 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.

- NEVER** apply voltage or current to the meter that exceeds the specified maximum:
- | Input Protection Limits |                |
|-------------------------|----------------|
| Function                | Maximum Input  |
| V DC or V AC            | 500V AC and DC |
| mA DC                   | 500mA DC       |
| Resistance              | 50V DC/AC      |
- USE EXTREME CAUTION** when working with high voltages.
  - DO NOT** measure voltage if the voltage on the "COM" input jack exceeds 500V above earth ground.
  - NEVER** connect the meter leads across a voltage source while the function switch is in the current or resistance mode. Doing so can damage the meter.
  - ALWAYS** discharge filter capacitors in power supplies and disconnect the power when making resistance tests.
  - ALWAYS** turn off power and disconnect test leads before opening the covers to replace the fuse or battery.
  - NEVER** operate the meter unless the back cover and the battery and fuse covers are in place and fastened securely.
  - If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

## Safety Symbols



This symbol adjacent to another symbol, terminal or operating device indicates that the operator must refer to an explanation in the Operating Instructions to avoid personal injury or damage to the meter.



This **WARNING** symbol indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.



This **CAUTION** symbol indicates a potentially hazardous situation, which if not avoided, may result damage to the product.



This symbol advises the user that the terminal(s) so marked must not be connected to a circuit point at which the voltage with respect to earth ground exceeds 500V.



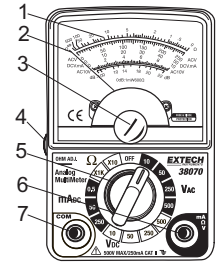
This symbol adjacent to one or more terminals identifies them as being associated with ranges that may, in normal use, be subjected to particularly hazardous voltages. For maximum safety, the meter and its test leads should not be handled when these terminals are energized.



This symbol indicates that a device is protected throughout by double insulation or reinforced insulation.

## Controls and Jacks

- Scale
- Pointer
- Scale zero adjust
- Ohms zero adjust
- Rotary function switch
- Positive V, mA and  $\Omega$  input jack
- COM input jack



## Specifications

Function	Range	Accuracy
DC Voltage	500V	± 4% of full scale
	250V	
	50V	
	10V	
AC Voltage (50/60Hz)	500V	± 5% of full scale
	250V	
	50V	
	10V	
DC Current	250mA	± 4% of full scale
	50mA	
	0.5mA	
Resistance	Rx10 (10,000 $\Omega$ )	± 5% of full scale
	Rx1k (1,000,000 $\Omega$ )	
Decibels	-10 to +56 dB (4 ranges)	0dB=1mW in 600 $\Omega$

<b>Max input voltage</b>	500V AC/DC
<b>Input Sensitivity,</b>	2k $\Omega$ /V
<b>Frequency Range</b>	50/60Hz
<b>Battery</b>	One (1) 1.5V AA battery
<b>Fuse</b>	500mA/250 fast blow (5mmx20mm)
<b>Operating Temperature</b>	41°F to 104°F (5°C to 40°C)
<b>Storage Temperature</b>	14°F to 122°F (-10°C to 50°C)
<b>Operating Humidity</b>	Max 80% up to 87°F (31°C) decreasing linearly to 50% at 104°F (40°C)
<b>Storage Humidity</b>	<80%
<b>Operating Altitude</b>	7000ft. (2000meters) maximum.
<b>Weight</b>	3.88oz (110g)
<b>Size</b>	3.82x3.34x1.3" (97x65x33mm)
<b>Safety</b>	For indoor use and in accordance with the requirements for double insulation to IEC1010-1 (1995); EN61010-1 (1995) Overvoltage Category II 500V, Pollution Degree 2. UL, CE Approved

## Battery Installation

**WARNING:** To avoid electric shock, always turn off the power and disconnect the test leads before opening the back to replace the fuse or battery.

1. Remove the screws securing the rear cover using a Phillips head screwdriver.
2. Lift the cover off and replace the battery observing the correct polarity.
3. Insert the new battery into the battery holder.

Replace the rear cover and secure with the screws. **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 battery to make sure that they are still good and that they are properly inserted.

## Operating Instructions

**WARNING:** Risk of electrocution. High-voltage circuits, both AC and DC, are very dangerous and should be measured with great care.

1. ALWAYS turn the function switch to the OFF position when the meter is not in use.

## DC VOLTAGE MEASUREMENTS

**CAUTION:** Do not measure DC 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 highest V DC position.
2. Insert the black test lead banana plug into the negative (COM) jack. Insert the red test lead banana plug into the positive (V) jack.
3. 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.
4. Read the voltage in the display. Reset the function switch to successively lower V DC positions to obtain a higher scale reading.



## DC CURRENT MEASUREMENTS

1. Insert the black test lead banana plug into the negative (COM) jack.
2. Set the function switch to the 250mA DC position and insert the red test lead banana plug into the (mA) jack.
3. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
4. 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.
5. Apply power to the circuit.
6. Read the current in the display. Reset the function switch to successively lower mA positions to obtain a higher scale reading.

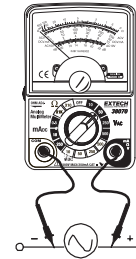


## AC VOLTAGE MEASUREMENT

**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 highest V AC position.
2. Insert the black test lead banana plug into the negative (COM) jack. Insert red test lead banana plug into the positive (V) jack.
3. 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.
4. Read the voltage in the display. Reset the function switch to successively lower V AC positions to obtain a higher scale reading.



## RESISTANCE MEASUREMENTS

**WARNING:** To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any resistance measurements. Remove the batteries and unplug the line cords.

1. Set the function switch to the X10 or X1K position.
2. Insert the black test lead banana plug into the negative (COM) jack. Insert the red test lead banana plug into the positive  $\Omega$  jack.
3. Touch the test probe tips together and adjust the OHM Zero Adjust knob for a "0" reading.
4. Touch the test probe tips across the circuit or part under test. It is best to disconnect one side of the part under test so the rest of the circuit will not interfere with the resistance reading.
5. Read the resistance on the scale



## dB MEASUREMENTS

The dB scale can be used to measure the milliwatt power dissipation on a 600 $\Omega$  load by measuring the voltage across a 600  $\Omega$  load. An AC voltage of 0.775Vrms across 600 $\Omega$  is equal to 1mW or "0"dB. When converting an AC Voltage measurement to dB take the dB reading from the lowest arc on the scale plate and then add the appropriate dB correction found in the table below.

ACV	ADD	dB
10	0	-10 ~ 22
50	14	4 ~ 36
250	28	18 ~ 50
500	34	24 ~ 56

## Maintenance

**WARNING:** To avoid electric shock, disconnect the test leads from any source of voltage before removing the back cover or the battery or fuse covers.

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

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, dry it immediately.
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.

## UL LISTED

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

## Warranty

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. **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.

## Repair and Calibration Services

Extech offers complete repair and calibration services for all Extech products. For periodic calibration, NIST certification or repair of any Extech product, call customer service for details on services available. Extech recommends that calibration be performed on an annual basis to insure calibration integrity.