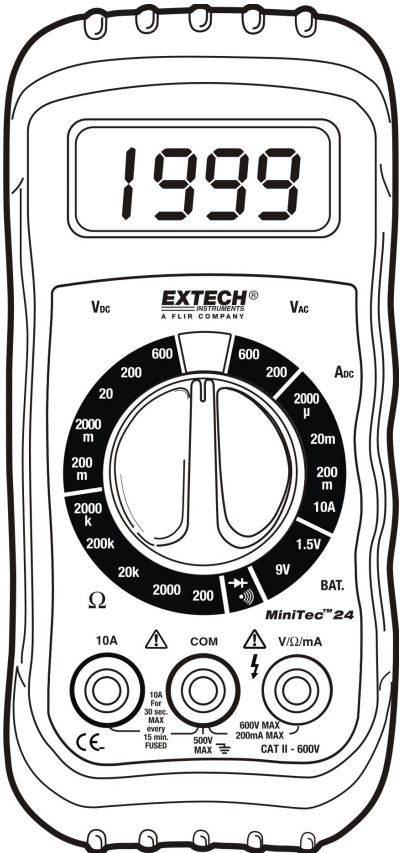




# MiniTec™ Series MultiMeter

Model MN24



## ***Introduction***

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Congratulations on your purchase of Extech's MN24 Multimeter. This meter measures AC/DC Voltage, DC Current, Resistance, Battery Voltage, Diode Voltage and Continuity. This professional meter is shipped fully tested and calibrated and, with proper care, will provide years of safe reliable service.

## ***Safety***

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### **International Safety Symbols**



This symbol, adjacent to another symbol or terminal, indicates the user must refer to the manual for further information.



This symbol, adjacent to a terminal, indicates that, under normal use, hazardous voltages may be present

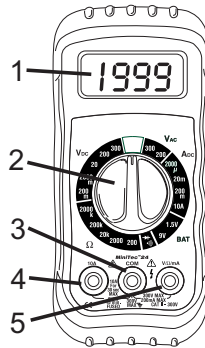
### **Safety Precautions**

1. Improper use of this meter can cause damage, shock, injury or death. Read and understand this user manual before operating the meter.
2. Make sure any covers or battery doors are properly closed and secured.
3. Always remove the test leads before replacing the battery or fuses.
4. Inspect the condition of the test leads and the meter itself for any damage before operating the meter. Repair any damage before use.
5. Do not exceed the maximum rated input limits.
6. Use great care when making measurements if the voltages are greater than 25VAC rms or 35VDC. These voltages are considered a shock hazard.
7. Always discharge capacitors and remove power from the device under test before performing Diode, Resistance or Continuity tests.
8. Remove the battery from the meter if the meter is to be stored for long periods.
9. Voltage checks on electrical outlets can be difficult and misleading because of the uncertainty of connection to the electrical contacts. Other means should be used to ensure that the terminals are not "live".

## Description

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1. LCD Display
2. Function switch
3. COM jack
4. 10A jack
5. Positive jack



**Note:** Tilt stand, fuse, and battery compartment are located on the rear of the unit

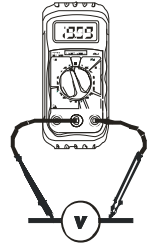
## Symbols

•)))	Continuity
▶	Diode test
μ	micro (amps)
m	milli ( volts, amps)
k	kilo (ohms)
Ω	ohms
VDC	volts direct current
VAC	volts alternating current
ADC	amps direct current
BAT	Low battery

## Operating Instructions

### AC or DC Voltage Measurements

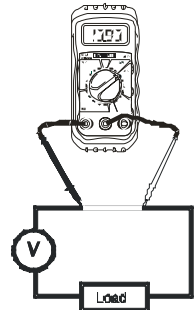
1. Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive **V** jack.
2. Turn the rotary switch to the **VDC** or **VAC** range needed.
3. Touch the test probes to the circuit under test and read the voltage on the display.



### DC Current Measurements

**CAUTION:** Do not make current measurements on the 10A scale for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or the test leads. Allow 15 minute cool-down after high current measurements

1. Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the;
  - a. Positive **mA** jack for currents to 200mA
  - b. Positive **10A** jack for currents to 10A
2. Turn the rotary switch to the **ADC** range needed.
3. Touch the test probes in series with the circuit under test and read the current on the display.

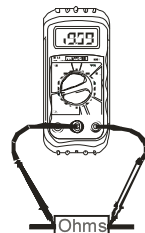


### Resistance Measurements

1. Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive  **$\Omega$**  jack.
2. Turn the rotary switch to the  **$\Omega$**  range needed.
3. Touch the test probes to the circuit or device under test and read the resistance on the display.

### Continuity Measurements

1. Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive  **$\Omega$**  jack.
2. Turn the rotary switch to the **▶ / •)))** position.
3. Touch the test probes to the circuit or device under test. If the resistance is less than approximately  $30\Omega$  the buzzer will sound. Read the resistance on the display.



## Diode Measurements

1. Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive diode jack.
2. Turn the rotary switch to the **▶ / •)))** position.
3. Touch the test probes to the diode under test. Forward voltage will indicate 400 to 700mV. Reverse voltage will indicate "1". Shorted devices will indicate near 0mV. Shorted devices will indicate near 0mV and an open device will indicate "1" in both polarities.

## Battery Test

1. Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive **V** jack.
2. Select the **1.5V** or **9V BAT** position using the function select switch.
3. Connect the red test lead to the positive side of the 1.5V or 9V battery and the black test lead to the negative side of the 1.5V or 9V battery.
4. Read the voltage in the display.

	<b>Good</b>	<b>Weak</b>	<b>Bad</b>
<b>9V battery:</b>	> 8.2V	7.2 to 8.2V	< 7.2V
<b>1.5V battery:</b>	> 1.35V	1.22 to 1.35V	< 1.22V

## **Maintenance**

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**WARNING:** To avoid electrical shock, disconnect the test leads from any source of voltage before removing the rear cover.

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

This Multimeter is designed to provide years of dependable service if the following care instructions are observed.

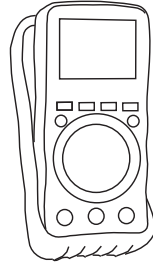
1. Keep the meter dry.
2. Use and store the meter in mild ambient conditions. Temperature extremes can shorten the life of the electronic parts and distort or melt plastic parts.
3. Handle the meter gently. Dropping it can damage the electronic parts or the case.
4. Keep the meter clean. Wipe the case 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***

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**WARNING:** To avoid electrical shock, disconnect the test leads from any source of voltage before removing the rear cover.

1. Disconnect the test leads from the meter.
2. Remove the rubber holster (if in place)
3. Open the battery door by removing the screw with a Phillips head screwdriver
4. Insert the new battery into the battery holder, ensuring correct polarity
5. Replace the battery door and secure with the screw



## ***Fuse Replacement***

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**WARNING:** To avoid electric shock, disconnect the test leads from any source of voltage before removing rear cover.

1. Disconnect the test leads from any circuit being measured.
2. Remove the rubber holster (if in place)
3. Open the fuse cover by removing the screw with a Phillips head screwdriver.
4. Remove the old fuse and Install the new fuse by gently pushing it into the holder.
5. Always use a fuse of the proper size and value (0.2A/250V fast blow, or 10A/250V fast blow).
6. Replace the fuse cover and secure with the screw

## Specifications

Function	Range	Resolution	Accuracy
DC Voltage (V DC)	200mV	0.1mV	± (0.5% reading + 2 digits)
	2000mV	1mV	
	20V	0.01V	
	200V	0.1V	
	600V	1V	
AC Voltage (V AC)	200V	0.1V	± (1.2% reading + 10 digits (50/60Hz))
	600V	1V	
DC Current (A DC)	2000 $\mu$ A	1 $\mu$ A	± (1.0% reading + 2 digits)
	20mA	10 $\mu$ A	
	200mA	100 $\mu$ A	± (1.2% reading + 2 digits)
	10A	10mA	± (2.0% reading + 2 digits)
Resistance	200 $\Omega$	0.1 $\Omega$	± (0.8% reading + 2 digits)
	2000 $\Omega$	1 $\Omega$	
	20k $\Omega$	0.01k $\Omega$	
	200k $\Omega$	0.1k $\Omega$	
	2000k $\Omega$	1k $\Omega$	± (1.0% reading + 2 digits)
Battery Test	9V	10mV	± (1.0% reading + 2 digits)
	1.5V	10mV	

Input Limits	
Function	Maximum Input
VAC	600VDC/VAC
VDC	600VDC, 600VAC, 200Vrms on 200mV range
Ohms, Continuity	220Vrms for 15sec max
mA DC	200mA, 250V fast acting fuse
10A DC	10A, 250V fast acting fuse

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



<b>Diode Test</b>	Test current of 1mA maximum, open circuit voltage 2.8V DC typical
<b>Continuity Check</b>	Audible signal will sound if the resistance is less than approx 30Ω
<b>Battery Test current</b>	9V (6mA); 1.5V (100mA)
<b>Input Impedance</b>	>1MΩ
<b>ACV Bandwidth</b>	45Hz to 450Hz
<b>DCA voltage drop</b>	200mV
<b>Display</b>	3 ½ digit, 2000 count LCD, 0.5" digits
<b>Over range indication</b>	"1" is displayed
<b>Polarity</b>	Automatic (no indication for positive polarity); Minus (-) sign for negative polarity.
<b>Measurement Rate</b>	2 times per second, nominal
<b>Low Battery Indication</b>	"BAT" is displayed if battery voltage drops below operating voltage
<b>Battery</b>	one 9 volt (NEDA 1604) battery
<b>Fuses</b>	mA, μA ranges; 0.2A/250V fast blow A range; 10A/250V fast blow
<b>Operating Temperature</b>	32°F to 122°F (0°C to 50°C)
<b>Storage Temperature</b>	-4°F to 140°F (-20°C to 60°C)
<b>Relative Humidity</b>	<70% operating, <80% storage
<b>Operating Altitude</b>	7000ft. (2000) meters maximum.
<b>Weight</b>	9.17 oz. (260g).
<b>Size</b>	4.78" x 2.38" x 1.57" (121.5mm x 60.6mm x 40mm)
<b>Approvals</b>	UL, CE
<b>Safety</b>	For indoor use and in accordance with Overvoltage Category II 600V, Pollution Degree 2. Category II includes local level, appliance, portable equipment, etc., with transient overvoltages less than Overvoltage Category III.
<b>UL Listed</b>	The UL mark does not indicate that this product has been evaluated for the accuracy of its readings.

## **Warranty**

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*FLIR Systems, Inc. warrants this Extech Instruments brand device to be free of defects in parts and workmanship for one year from date of shipment (a six month limited warranty applies to 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 for authorization. Visit the website [www.extech.com](http://www.extech.com) for contact information. A Return Authorization (RA) number must be issued before any product is returned. 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. FLIR Systems, Inc. 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. FLIR'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.*

## **Calibration, Repair, and Customer Care Services**

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**FLIR Systems, Inc. offers repair and calibration services** for the Extech Instruments products we sell. NIST certification for most products is also provided. Call the Customer Service Department for information on calibration services available for this product. Annual calibrations should be performed to verify meter performance and accuracy. Technical support and general customer service is also provided, refer to the contact information provided below.

**Support Lines: U.S. (877) 439-8324; International: +1 (603) 324-7800**

Technical Support: Option 3; E-mail: [support@extech.com](mailto:support@extech.com)

Repair & Returns: Option 4; E-mail: [repair@extech.com](mailto:repair@extech.com)

Product specifications are subject to change without notice

**Please visit our website for the most up-to-date information**

**[www.extech.com](http://www.extech.com)**

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