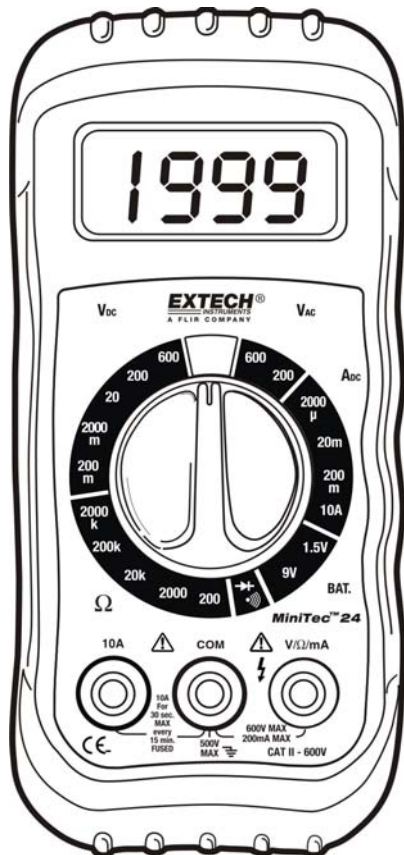


User's Manual

EXTECH[®]
INSTRUMENTS
A FLIR COMPANY

MiniTec™ Series MultiMeter

Model MN24



Introduction

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

International Safety Symbols



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



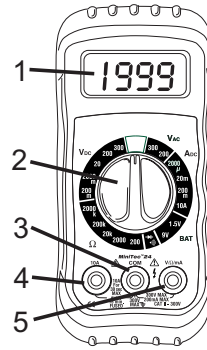
This symbol, adjacent to a terminal, indicates that, under normal use, hazardous voltages may be present

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

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

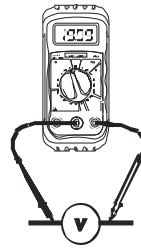
Symbols

•)))	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

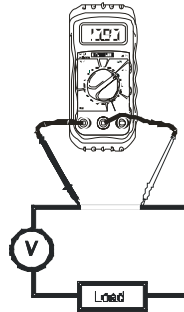
1. Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive **V** jack.
2. Turn the rotary switch to the **VDC** or **VAC** range needed.
3. Touch the test probes to the circuit under test and read the voltage on the display.



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.

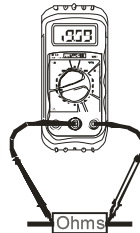


Resistance Measurements

1. Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive **Ω** jack.
2. Turn the rotary switch to the **Ω** 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 **Ω** jack.
2. Turn the rotary switch to the **\rightarrow / \bullet** position.
3. Touch the test probes to the circuit or device under test. If the resistance is less than approximately 30Ω 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.

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

Maintenance

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.

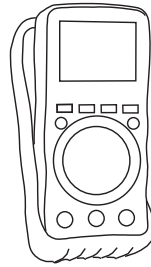
This Multimeter is designed to provide years of dependable service if the following care instructions are observed.

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

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

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 (0.5A/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)	2000μA	1μA	± (1.0% reading + 2 digits)
	20mA	10μA	
	200mA	100μA	± (1.2% reading + 2 digits)
	10A	10mA	± (2.0% reading + 2 digits)
Resistance	200Ω	0.1Ω	± (0.8% reading + 2 digits)
	2000Ω	1Ω	
	20kΩ	0.01kΩ	
	200kΩ	0.1kΩ	
	2000kΩ	1kΩ	± (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.

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

Warranty

EXTECH INSTRUMENTS CORPORATION (A FLIR COMPANY) 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 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 at (781) 890-7440 ext. 210 for authorization or visit our website www.extech.com for contact information. 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.

Calibration and Repair Services

Extech offers repair and calibration services for the products we sell. Extech also provides NIST certification for most products. Call the Customer Service Department for information on calibration services available for this product. Extech recommends that annual calibrations be performed to verify meter performance and accuracy.



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
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