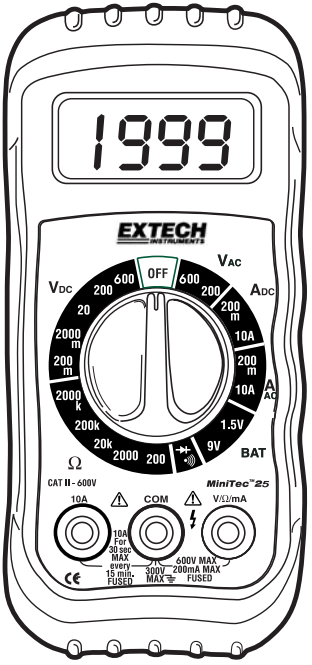
User's Guide

EXTECH INSTRUMENTS

MiniTec™ Series

Model MN25 MultiMeter



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 or visit our website at www.extech.com (click on 'Contact Extech' and go to 'Service Department' to request an RA number). 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.

Introduction

Congratulations on your purchase of Extech's MN25Multimeter. This meter measures AC/DC Voltage, AC/DC Current, Resistance, Capacitance, Frequency, Duty Cycle, Temperature, Diode Test and Continuity. Proper use and care of this meter will provide many years of reliable service.

Safety

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 Limits	
Function	Maximum Input
V DC, V AC	600V DC/AC, 200Vrms on 200mV range
mA DC	200mA 250V fast acting fuse
A DC, A AC	10A 250V fast acting fuse(30 seconds max every 15 minutes)
Resistance, Continuity	250Vrms for 15sec max

2. **USE EXTREME CAUTION** when working with high voltages.
3. **DO NOT** measure voltage if the voltage on the "COM" input jack exceeds 500V 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 doors to replace the fuse or batteries.

Safety Symbols



NEVER operate the meter unless the back cover and the battery and fuse doors are in place and fastened securely. 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.

WARNING

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

CAUTION

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 (in this case) 500 VAC or VDC.



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.

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	± (1.5% reading + 5 digits (Frequency 50/60Hz)
	600V	1V	
DC Current (A DC)	200mA	100μA	± (1.2% reading + 2 digits)
	10A	10mA	± (2.0% reading + 2 digits)
AC Current (A AC)	200mA	100μA	± (1.8% reading + 5 digits)
	10A	10mA	± (3.0% reading + 5 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	

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.

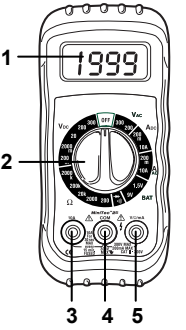
NOTE: Accuracy is stated at 65°F to 83°F (18°C to 28°C) and less than 75% RH.

Display	3 ½ digit, 2000 count LCD, 0.5" digits
Overrange indication	"1" is displayed
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 approximately 30Ω
Battery Test current	9V (6mA); 1.5V (100mA)
Input Impedance	>1MΩ
ACV Bandwidth	45Hz to 450Hz
DCA voltage drop	200mV
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	9 Volt Battery
Fuses	mA, µA ranges; 0.2A/250V fast blow A range; 10A/250V fast blow
Operating Temperature	41ºF to 104ºF (5ºC to 40ºC)
Storage Temperature	-4°F to 140°F (-20°C to 60°C)
Operating Humidity	Max 80% up to 87ºF (31ºC) decreasing linearly to 50% at 104ºF (40ºC)
Storage Humidity	< 80%
Operating Altitude	7000ft. (2000) meters maximum.
Weight	9.17 oz. (260g).
Size	4.78 x 2.38 x 1.57" (121.5 x 60.6 x 40mm)
Safety	For indoor use and in accordance with Overvoltage Category II, Pollution Degree 2. Category II includes local level, appliance, portable equipment, etc., with transient overvoltages less than Overvoltage Category III.

Meter Description

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

Note: Tilt stand, fuse and battery compartment are on rear of unit.



LCD Display Indicators

•)))	Continuity
▶|	Diode test
m	milli (volts, amps)
k	kilo (ohms)
Ω	ohms
V DC	volts direct current
V AC	volts alternating current
A DC	amps direct current
A AC	amps alternating current
BAT	Low battery and battery test

Operation

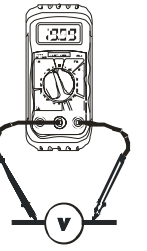
WARNING: Risk of electrocution. High-voltage circuits, both AC and DC, are very dangerous and should be measured with great care.

1. ALWAYS turn the function switch to the OFF position when the meter is not in use.
2. If "OL" appears in the display during a measurement, the value exceeds the range you have selected. Change to a higher range.

NOTE: On some low AC and DC voltage ranges, with the test leads not connected to a device, the display may show a random, changing reading. This is normal and is caused by the high-input sensitivity. The reading will stabilize and give a proper measurement when connected to a circuit.

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.

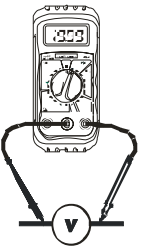


1. Set the function switch to the highest V_{DC} position.
2. Insert the black test lead banana plug into the negative (COM) jack.
   Insert the red test lead banana plug into the positive (V) jack.
3. Touch the black test probe tip to the negative side of the circuit.
   Touch the red test probe tip 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 resolution reading. The display will indicate the proper decimal point and value. If the polarity is reversed, the display will show (-) minus before the value.

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.

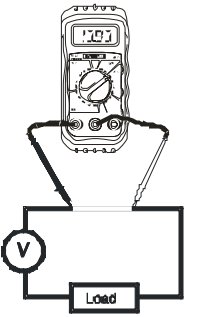
CAUTION: Do not measure AC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.



1. Set the function switch to the highest VAC 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 VAC positions to obtain a higher resolution reading. The display will indicate the proper decimal point and value.

DC Current Measurements

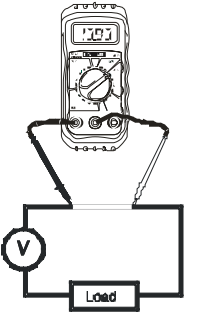
CAUTION: Do not make current measurements on the 10A scale for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or the test leads.



1. Insert the black test lead banana plug into the negative (COM) jack.
2. For current measurements up to 200mA DC, set the function switch to the 200m A⎓ position and insert the red test lead banana plug into the (mA) jack.
3. For current measurements up to 10A DC, set the function switch to the 10A range and insert the red test lead banana plug into the (10A) jack.
4. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
5. 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.
6. Apply power to the circuit.
7. Read the current in the display. The display will indicate the proper decimal point and value.

AC Current Measurements

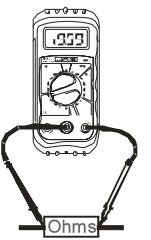
CAUTION: Do not make current measurements on the 10A scale for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or the test leads.



1. Insert the black test lead banana plug into the negative (COM) jack.
2. For current measurements up to 200m A AC, set the function switch to the 200m AAC position and insert the red test lead banana plug into the (mA) jack.
3. For current measurements up to 10A AC, set the function switch to the 10A range and insert the red test lead banana plug into the (10A) jack.
4. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
5. Touch the black probe tip to the negative side of the circuit. Touch the red test probe tip to the positive side of the circuit.
6. Apply power to the circuit.
7. Read the current in the display. The display will indicate the proper decimal and value.

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 highest Ω position.
2. Insert the black test lead banana plug into the negative (COM) jack
   Insert the red test lead banana plug into the positive Ω jack.
3. 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.
4. Read the resistance in the display and then set the function switch to the lowest Ω position that is greater than the actual or any anticipated resistance. The display will indicate the proper decimal point and value.

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

Diode Test

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 "I". Shorted devices will indicate near 0mV. Shorted devices will indicate near 0mV and an open device will indicate "I" in both polarities.

Continuity Check

WARNING: To avoid electric shock, never measure continuity on circuits or wires that have voltage on them.

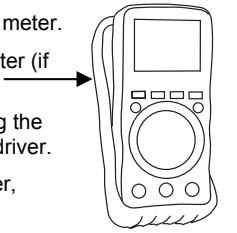
1. Set the function switch to the ⏭ position.
2. Insert the black lead banana plug into the negative (COM) jack
   Insert the red test lead banana plug into the positive (Ω) jack.
3. Touch the test probe tips to the circuit or wire you wish to check.
4. If the resistance is less than approximately 30Ω, the audible signal will sound. If the circuit is open, the display will indicate "1".

Maintenance

Battery Replacement

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery door.

When the batteries drop below the operating voltage, 'BAT' will appear in the right-hand side of the LCD display. The batteries should be replaced as follows.



1. Disconnect the test leads from the meter.
2. Remove the protective rubber holster (if installed).
3. Open the battery door by loosening the screw using a Phillips head screwdriver.
4. Insert the battery into battery holder, observing polarity.
5. Put the battery door back in place. Secure with the screw.

Fuse Replacement

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the fuse door.

1. Disconnect the test leads from the meter and any item under test.
2. Remove the protective rubber holster.
3. Open the fuse door by loosening the screw on the door using a Phillips screwdriver.
4. Remove the old fuse from its holder by gently pulling it out.
5. Install the new fuse into the holder.
6. Always use a fuse of the proper size and value (0.2A/250V fast blow for the 200mA range, 10A/250V fast blow for the 10A range).
7. Put the fuse door back in place. Insert the screw and tighten it securely.

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.

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