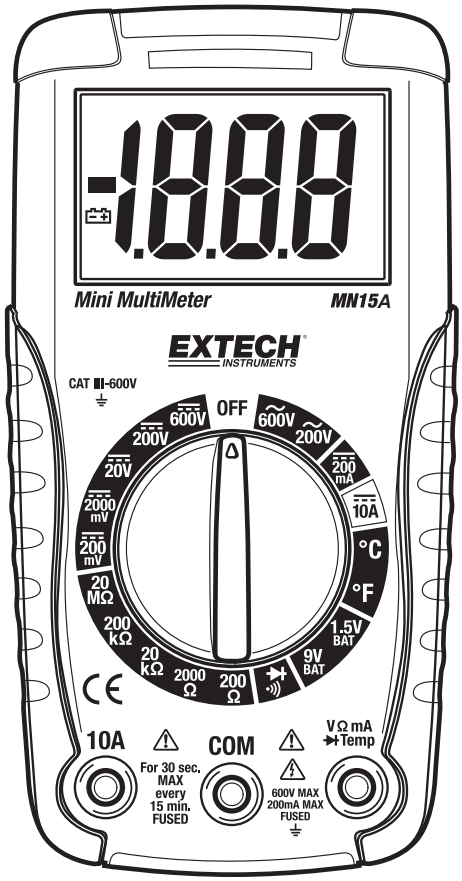
User's Guide

EXTECH INSTRUMENTS
A FLIR COMPANY

Mini Digital Multimeter

Model MN15A



Introduction

Congratulations on your purchase of the Extech MN15A MultiMeter. The MN15A offers AC/DC Voltage, AC/DC Current, Resistance, Diode, and Continuity testing plus Type K thermocouple temperature measurements. Proper use and care of this meter will provide many years of reliable service.

Safety



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 600V.



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.

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.

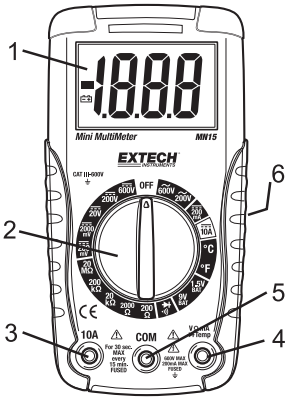
1. NEVER apply voltage or current to the meter that exceeds the specified maximum:

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

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 power and disconnect test leads before opening the covers to replace the fuse or battery.
7. NEVER operate the meter unless the back cover and the battery and fuse covers are in place and fastened securely.
8. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Controls and Jacks

1. LCD display
2. Rotary function switch
3. 10 ampere test lead jack
4. Test lead jack for voltage, milliamp, resistance/continuity, diode and temperature functions
5. COM test lead jack
6. Battery compartment (rear)



SYMBOLS

•)))	Continuity		Diode
~	AC	⎓	DC
M	megga (10^6) (ohms)	m	milli (10^{-3}) (volts, amps)
k	kilo (10^3) (ohms)	V	Volts
A	Amps	Ω	Ohms
BAT	Battery test	°C	Degrees Celsius
°F	Degrees Fahrenheit		Low battery indicator

Operating Instructions

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

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.

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 600 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 neutral side of the circuit.
4. Touch the red test probe tip to the "hot" side of circuit.
5. Read the voltage in the display.
6. If the reading is less than 200V, switch to the 200V range to improve resolution.



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.

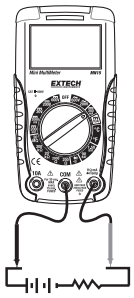
1. Set the function switch to the highest 600VDC position.
2. Insert the black test lead banana plug into the negative **COM** jack. Insert the red test lead banana plug into the positive **V** jack.
3. Touch the black test probe tip to the negative side of the circuit. Touch the red test probe tip to the positive side of the circuit.
4. Read the voltage in the display.
5. If the reading is less than the maximum of a lower range, switch to that range to improve resolution.



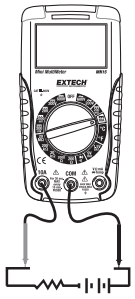
DC CURRENT MEASUREMENTS

CAUTION: Do not make current measurements at 10 Amps 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, set the function switch to the 200mA position and insert the red test lead banana plug into the **mA** jack.



3. For current measurements up to 10A, set the function switch to the 10A position 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.

RESISTANCE MEASUREMENTS

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

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.
4. Read the resistance in the display. Move the function switch to successively lower **Ω** ranges to obtain a higher resolution reading.



CONTINUITY CHECK

WARNING: To avoid electric shock, never measure continuity on circuits that have a voltage potential.

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 100Ω, the audible signal will sound. If the circuit is open, the display will indicate "**1.** ".



DIODE TEST

1. Set the function switch to the position.
2. Insert the black test lead banana plug into the negative **COM** jack Insert the red test lead banana plug into the positive jack.
3. Touch the test probes to the diode under test.
4. A typical diode will indicate approximately .400 to .500 volts for the forward test and "**1.** " for the reverse test.
5. A shorted diode will indicate a low value in both the reverse and forward test directions. An open diode will indicate "**1.** " in both test directions.



BATTERY VOLTAGE TEST

CAUTION: Do not measure batteries while they are installed in the devices they are powering. The batteries must be removed from installations before tests can be made.

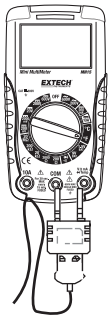
1. Set the function switch to the **1.5V** or **9V BAT** switch position. Use the 1.5V position for 'AAA', 'AA', 'C', 'D', and other 1.5V batteries. Use the 9V position for square 9V transistor batteries.
2. Insert the black test lead banana plug into the negative **COM** jack. Insert the red test lead banana plug into the positive **V** jack.
3. Touch the black test probe tip to the negative side of the battery. Touch the red test probe tip to the positive side of the battery.
4. Read the voltage in the display.



TEMPERATURE MEASUREMENTS

1. Set the function switch to the **°F** or **°C** position.
2. Insert the Temperature Probe into the **COM** and **Temp** jacks, making sure to observe the correct polarity.
3. Touch the Temperature Probe head to the part to be measured. Keep the probe touching the part under test until the reading stabilizes.
4. Read the temperature in the display.

Note: The temperature probe is fitted with a type K mini connector. A mini connector to banana connector adaptor is supplied for connection to the input banana jacks.



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, 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 battery should be removed to prevent damage to the unit.

BATTERY/FUSE INSTALLATION and LOW BATTERY INDICATION

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery cover. Do not operate meter unless the battery is in place.

LOW BATTERY INDICATION

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

BATTERY REPLACEMENT

1. Disconnect the test leads from the meter.
2. Remove the 2 Phillips head screws located on the back of the instrument and remove the battery cover.
3. Replace the 9V battery.
4. Secure the fuse/battery compartment cover.
5. Dispose of the old battery as required by local regulations.

FUSE REPLACEMENT

1. Disconnect the test leads from the meter.
2. Remove the 2 Phillips head screws located on the back of the instrument and remove the battery cover.
3. Gently remove the fuse(s) and install the new fuse(s) into the holder(s).
4. Always use fuses of the proper size and value (200mA/660V ceramic fast blow for the mA / µA ranges, 10A/250V ceramic fast blow for the A range).
5. Secure the fuse/battery compartment cover.

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

Range 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	±(0.8% reading + 2 digits)
	600V	1V	
AC Voltage (V AC)	200V	0.1V	±(1.2% reading + 10 digits (50/60Hz)
	600V	1V	
DC Current (A DC)	200mA	0.1mA	±(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	
	20MΩ	10kΩ	±(1.5% reading + 2 digits)
Battery Test	9V	10mV	±(1.0% reading + 2 digits)
	1.5V	1mV	
Temperature	-20°C to 750°C	1°C	±(3% of reading +5°C/9°F)
	-4°F to 1400°F	1°F	

Notes:

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.

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

General Specifications

Diode Test	Bias voltage: 2.8VDC typical
Continuity Check	Audible signal will sound if the resistance is less than 100Ω
Input Impedance	1MΩ (VDC & VAC)
AC Bandwidth	50 / 60Hz
Display	2000 count (0 to 1999) LCD
Overrange indication	"1___" is displayed
Polarity	Automatic (no indication for positive); Minus (-) sign for negative
Measurement Rate	2 times per second, nominal
Low Battery Indication	" " is displayed
Battery	One (1) 9V battery (NEDA 1604)
Fuses	mA range; 200mA/250V ceramic fast blow A range; 10A/250V ceramic fast blow
Operating Temperature	32ºF to 122ºF (0ºC to 50ºC)
Storage Temperature	-4°F to 140°F (-20°C to 60°C)
Operating Humidity	Max 70% up to 87ºF (31ºC) decreasing linearly to 50% at 122ºF (50ºC)
Storage Humidity	< 80% RH
Operating Altitude	7000 ft. (2000 meters) maximum.
Weight	9.17 oz (255g)
Size	5.2" x 2.6" x 1.5" (132 x 66 x 38mm)
Approvals	CE, ETL
Safety	This meter is intended for indoor use and protected, against the users, by double insulation per EN61010-1 and IEC61010-1 2nd Edition (2001) to CAT III 600V; Pollution Degree 2. The meter also meets UL 61010-1, Second Edition (2004), CAN/CSA C22.2 No. 61010-1, Second Edition (2004), and UL 61010B-2-031, First Edition (2003)

PER IEC1010 OVERVOLTAGE INSTALLATION CATEGORY

OVERVOLTAGE CATEGORY I

Equipment of OVERVOLTAGE CATEGORY I is equipment for connection to circuits in which measures are taken to limit the transient overvoltages to an appropriate low level. Note – Examples include protected electronic circuits.

OVERVOLTAGE CATEGORY II

Equipment of OVERVOLTAGE CATEGORY II is energy-consuming equipment to be supplied from the fixed installation.
Note – Examples include household, office, and laboratory appliances.

OVERVOLTAGE CATEGORY III

Equipment of OVERVOLTAGE CATEGORY III is equipment in fixed installations.
Note – Examples include switches in the fixed installation and some equipment for industrial use with permanent connection to the fixed installation.

OVERVOLTAGE CATEGORY IV

Equipment of OVERVOLTAGE CATEGORY IV is for use at the origin of the installation.
Note – Examples include electricity meters and primary over-current protection equipment

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. 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 complete repair and calibration services for most of the products we sell. For periodic calibration, NIST certification or repair for most Extech products, call customer service for details. Extech recommends that calibration be performed on an annual basis to ensure calibration integrity.

☎

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

©Copyright © 2009 Extech Instruments Corporation (a FLIR company)

All rights reserved including the right of reproduction in whole or in part in any form.