

User's Manual

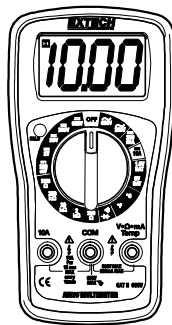
EXTECH
INSTRUMENTS

A FLIR COMPANY

MiniTec™ Series

Model MN35

Manual Ranging Mini MultiMeter



Introduction

Congratulations on your purchase of Extech's MN35 Manual Ranging Multimeter. This meter measures AC/DC Voltage, DC Current, Resistance, Temperature, Battery Test, Diode Test and Continuity. Proper use and care of this meter will provide many years of 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



Double insulation

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 latched.
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. To avoid electric shock, do not measure AC current on any circuit whose voltage exceeds 250V AC.


Input Limits	
Function	Maximum Input
VDC, VAC	600V DC/AC
Resistance, Diode, Continuity	500V DC/AC
mA DC	250mA DC
10A DC	10A DC (15sec. max every 15 min.)

Specifications





Function	Range	Accuracy
DC Voltage (V DC)	200.0mV	±(0.5% reading + 2 digits)
	2.000V	
	20.00V	
	200.0V	
	600V	±(0.8% reading + 2 digits)
AC Voltage (V AC) (40 - 400Hz)	200.0V	±(1.2% reading + 10 digits)
	600V	
DC Current (A DC)	200.0mA	±(1.5% reading + 2 digits)
	10.00A	±(3.0% reading + 5 digits)
Resistance	200.0Ω	±(0.8% reading + 4 digits)
	2.000kΩ	±(0.8% reading + 2 digits)
	20.00kΩ	
	200.0kΩ	
	20.00MΩ	±(3.0% reading + 3 digits)
Temp °F	-4 to 1400°F	-4 to 59°F; ±(2.5% reading + 19 digits) 60 to 750°F ±(1.0% reading + 9 digits) 751; to 1400°F; ±(2.5% reading + 19 digits)
Temp °C	-20 to 750°C	-20 to 16°C; ±(2.5% reading + 10 digits) 17 to 400°C; ±(1.0% reading + 5 digits), 400 to 750°C; ±(2.5% reading + 10 digits) (probe accuracy not included)

Accuracy Stated at 73°F ±10°F (23°C ±5°C) and less than 70% 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 approximately $<40\Omega \pm 5\Omega$
Temperature sensor	Requires type K thermocouple
Input Impedance	10M Ω (VDC) and 4.5M Ω (VAC)
Display	1999 count LCD
Overrange	"1 or -1" is displayed
Polarity	Automatic (no indication for positive polarity); Minus (-) sign for negative polarity.
Measurement Rate	3 times per second, nominal
Low Battery	"  " is displayed if battery voltage drops below operating voltage
Batteries	Requires one 9V battery (NEDA 1604 or equivalent)
Fuses	mA range; 250mA/250V fast blow 10A range, no protection
Operating Temp	32°F to 104°F (0°C to 40°C)
Storage Temp	-4°F to 140°F (-20°C to 60°C)
Relative Humidity	Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.
Operating Altitude	7000ft (2000 meters) maximum.
Weight	5.4 oz. (153g).
Size	5.43" x 2.83" x 1.5" (138mm x 72mm x 38mm)
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.

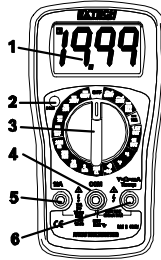
Symbols

	AC (voltage)
	DC (direct current or voltage)
	Continuity and Diode test
mV, V	millivolt, volt (voltage)
Ω , k Ω , M Ω	ohm, kilohm, megohm (resistance)
μ A, mA, A	microamp, milliamp, Amp (current)
°F, °C	Degrees fahrenheit, centigrade (temperature)
	Low battery
HOLD	Display hold

Meter Description

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

Note: Tilt stand and battery access is on the rear of unit.



Operating Instructions

Note: If "H" and a blank screen appear when the meter is turned on the HOLD feature is active. Press the HOLD button to exit the HOLD mode.

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 highest **VAC** or **VDC** position.
3. Touch the test probes to the circuit under test and read the voltage on the display.
4. Reset the function switch to successively lower positions to obtain a higher resolution reading. If the polarity is reversed (DC voltage only), the display will show (-) minus before the value.

DC Current Measurements

CAUTION: Do not make current measurements on the 10A scale for longer than 15 seconds followed by a 15 minute cool down period. Exceeding 15 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 200mA DC position and insert the red test lead banana plug into the **V/Ω/mA** jack.
3. For current measurements up to 10A DC, set the function switch to the 10A DC 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.

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 **V/Ω/mA** jack.
2. Set the function switch to the highest Ω position.
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.

Temperature Measurements

WARNING: To avoid electric shock, disconnect test leads from any source of voltage before making a temperature measurement. Be sure that the thermocouple has been removed before changing to any other measurement function.

1. Insert the type K thermocouple probe into the **V/Ω/mA** and **COM** jacks.
2. Turn the rotary switch to the **°F** or **°C** position.
3. Read the temperature 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 **V/Ω/mA** jack. Observe polarity.
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 40Ω the buzzer will sound.

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 **V/Ω/mA** jack.
2. Turn the rotary switch to the **▶•••••** position.
3. Touch the test probes to the diode under test. Forward voltage will indicate 0.4V to 0.7V. Reverse voltage will indicate "1. ". 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. Turn the rotary switch to the **1.5V** or **9V BAT** position.
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

Data Hold

Press the **Hold** button to freeze the reading in the display. "H" will appear in the LCD. Press the key again to release the display.

Maintenance

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

WARNING: To avoid electric shock, do not operate your meter until the battery/fuse cover is 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.
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 electric shock, disconnect the test leads from any source of voltage before removing the battery/fuse cover.

1. Disconnect the test leads from the meter.
2. Remove the rubber holster (if in place).
3. Remove the two screws securing the rear cover using a Phillips head screwdriver.
4. Lift the cover off and replace the battery observing the correct polarity.
5. Insert the new battery into the battery holder.
6. Replace the rear cover and secure with the screws.



You, as the end user, are legally bound (**Battery ordinance**) to return all used batteries and accumulators; **disposal in the household garbage is prohibited!**

You can hand over your used batteries / accumulators at collection points in your community or wherever batteries / accumulators are sold!

Disposal: Follow the valid legal stipulations in respect of the disposal of the device at the end of its lifecycle

Fuse Replacement

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

1. Disconnect the test leads from any circuit being measured.
2. Remove the rubber holster (if in place).
3. Remove the two screws securing the rear cover using a Phillips head screwdriver. Remove the rear cover.
4. Remove the old fuse by gently pulling up on it.
5. Install the new fuse by gently pushing it into the holder.
6. Always use a fuse of the proper size and value; 250mA/250V fast blow.
7. Replace the rear cover and secure with the screws.

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