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› Themisto TH-M120 Digital Multimeter User Manual

## THEMISTO TH-M120

# Themisto TH-M120 Digital Multimeter User Manual

Model: TH-M120

## 1. INTRODUCTION

Thank you for choosing the Themisto TH-M120 Digital Multimeter. This manual provides essential information for the safe and effective operation, maintenance, and troubleshooting of your device. Please read this manual thoroughly before use and retain it for future reference.

The Themisto TH-M120 is a True RMS, auto-ranging digital multimeter designed for measuring AC/DC current, AC/DC voltage, resistance, capacitance, frequency, diode, and continuity. It also features Non-Contact Voltage (NCV) detection and temperature measurement, making it a versatile tool for both professionals and hobbyists.

## 2. SAFETY INFORMATION

**WARNING: To avoid possible electric shock, fire, or personal injury, please read all safety information before you use the product.**

- Always ensure the test leads are properly connected and the rotary switch is set to the correct function before making any measurements.
- Do not measure voltage or current exceeding the specified maximum limits (1000V DC, 750V AC, 20A AC/DC).
- Exercise extreme caution when working with voltages above 30V AC RMS, 42V peak, or 60V DC. These voltages pose a shock hazard.
- Before measuring resistance, capacitance, or diode, ensure that all power to the circuit under test is off and all capacitors are discharged.
- Do not use the multimeter if it appears damaged or if the test leads are damaged.
- Replace batteries and fuses only with the specified type and rating.
- Keep fingers behind the finger guards on the test probes during measurements.
- The Non-Contact Voltage (NCV) function is for indication only; always verify live circuits with a contact method before touching.

## 3. PRODUCT OVERVIEW

The Themisto TH-M120 Digital Multimeter features a robust design with a large backlit LCD display and intuitive controls.



Figure 3.1: Front view of the Themisto TH-M120 Digital Multimeter, showing the display, rotary switch, and input jacks.

### 3.1 Key Features

- **6000-Count Backlit LCD Display:** Provides clear visibility of readings, even in low-light conditions.
- **True RMS:** Ensures accurate measurements for non-sinusoidal AC waveforms.
- **Auto-Ranging:** Automatically selects the appropriate measurement range, simplifying operation.
- **Non-Contact Voltage (NCV) Detection:** Safely identifies live wires without direct contact.
- **Data Hold Function:** Freezes the displayed reading for convenient recording.
- **Auto Power-Off:** Conserves battery life by automatically shutting down after a period of inactivity.
- **Overload Protection:** Protects the device from damage due to excessive input.
- **Built-in LED Flashlight:** Assists in working in dimly lit environments.






					
<b>Model</b>	<b>TH-M98</b>	<b>TH-M100</b>	<b>TH-M110</b>	<b>TH-M120</b>	<b>TH-M200</b>
<b>Range</b>	Manual	Auto	Manual	Auto	Auto
<b>AC Current</b>	✗	10A	20A	20A	10A
<b>DC Current</b>	10A	10A	20A	20A	10A
<b>AC Voltage</b>	600V	600V	750V	750V	750V
<b>DC Voltage</b>	600V	600V	1000V	1000V	1000V
<b>Resistance</b>	20M	60M	60M	60M	100MΩ
<b>Capacitance</b>	✗	100mF	100mF	100mF	100mF
<b>Frequency</b>	✗	9.999MHz	10MHz	10MHz	10MHz
<b>NCV</b>	Yes	Yes	Yes	Yes	Yes
<b>Temperature</b>	✗	-20°C~ +1000°C (-4°F~ 1832°F)	-20°C~ +1000°C (-4°F~ 1832°F)	-20°C~ +1000°C (-4°F~ 1832°F)	-20°C~ +1000°C (-4°F~ 1832°F)
<b>Counts</b>	2000 Counts	6000 Counts	6000 Counts	6000 Counts	9999 Counts

Figure 3.2: Detailed view of the 3.0-inch backlit LCD screen and its various indicators.

### 3.2 Physical Components

- **LCD Display:** Shows measurement readings, units, and function indicators.
- **Function Buttons:** Include FUNC (function select), HZ/% (frequency/duty cycle), RANGE (manual range), HOLD (data hold), and backlight/flashlight button.
- **Rotary Switch:** Used to select the desired measurement function.
- **Input Jacks:**
  - **COM:** Common terminal for all measurements (black test lead).
  - **VΩHz°C:** Input for voltage, resistance, frequency, capacitance, diode, continuity, and temperature (red test lead).
  - **mA:** Input for milliampere current measurements (red test lead).
  - **20A:** Input for high current measurements up to 20A (red test lead).
- **Kickstand:** Allows the multimeter to stand upright for hands-free operation.
- **Pen Slot:** Convenient storage for test leads on the back.

## Ease of Use

A handy kickstand, protective rubber sleeve, and pen slot on the back help you make convenient measurements



Figure 3.3: The multimeter's design includes a handy kickstand, protective rubber sleeve, and a pen slot for convenience.

## 4. SETUP

### 4.1 Battery Installation

The Themisto TH-M120 requires 4 AAA batteries (included). To install or replace batteries:

1. Ensure the multimeter is turned off and test leads are disconnected.
2. Locate the battery compartment cover on the back of the device.
3. Unscrew the retaining screw(s) and remove the cover.
4. Insert the 4 AAA batteries, observing correct polarity (+ and -).
5. Replace the battery compartment cover and secure it with the screw(s).

### 4.2 Connecting Test Leads

Always connect the black test lead to the COM jack. Connect the red test lead to the appropriate input jack based on the measurement function:

- **VΩHz°C:** For voltage, resistance, frequency, capacitance, diode, continuity, and temperature

measurements.

- **mA**: For current measurements up to 600mA.
- **20A**: For current measurements between 600mA and 20A.

## 5. OPERATING INSTRUCTIONS

### 5.1 Power On/Off

Turn the rotary switch from the OFF position to any desired measurement function to power on the multimeter. To power off, turn the rotary switch back to the OFF position.

### 5.2 AC/DC Voltage Measurement

Measures AC voltage up to 750V and DC voltage up to 1000V.

1. Set the rotary switch to the **V~** (AC Voltage) or **V-** (DC Voltage) position.
2. Connect the black test lead to the **COM** jack and the red test lead to the **VΩHz°C** jack.
3. Connect the test probes in parallel to the circuit or component being measured.
4. Read the voltage value on the display.



Figure 5.1: Example of AC Voltage measurement (600mV-750V).



Figure 5.2: Example of DC Voltage measurement (600mV-1000V).

### 5.3 AC/DC Current Measurement

Measures AC/DC current up to 20A.

1. Set the rotary switch to the  $\mu\text{A}$ ,  $\text{mA}$ , or  $\text{A}$  position. Use the FUNC button to switch between AC and DC current if necessary.
2. Connect the black test lead to the COM jack. Connect the red test lead to the mA jack for currents up to 600mA, or to the 20A jack for currents up to 20A.
3. Disconnect power to the circuit. Open the circuit where current is to be measured and connect the multimeter in series with the circuit.
4. Apply power to the circuit and read the current value on the display.



Figure 5.3: Example of AC/DC Current measurement (600 $\mu$ A-20A).

#### 5.4 Resistance Measurement

Measures resistance up to 60M $\Omega$ .

1. Set the rotary switch to the  $\Omega$  position.
2. Connect the black test lead to the COM jack and the red test lead to the V $\Omega$ Hz $^{\circ}$ C jack.
3. Ensure the circuit is de-energized and all capacitors are discharged. Connect the test probes across the component to be measured.
4. Read the resistance value on the display.

#### 5.5 Capacitance Measurement

Measures capacitance up to 100 $\mu$ F.

1. Set the rotary switch to the **CAP** position.
2. Connect the black test lead to the COM jack and the red test lead to the V $\Omega$ Hz $^{\circ}$ C jack.
3. Ensure the capacitor is fully discharged before connecting the test probes across it.
4. Read the capacitance value on the display.

## 5.6 Frequency Measurement

Measures frequency up to 10MHz.

1. Set the rotary switch to the **Hz** position.
2. Connect the black test lead to the COM jack and the red test lead to the V $\Omega$ Hz $^{\circ}$ C jack.
3. Connect the test probes in parallel to the circuit where frequency is to be measured.
4. Read the frequency value on the display.

## 5.7 Diode Test

1. Set the rotary switch to the **Diode** position.
2. Connect the black test lead to the COM jack and the red test lead to the V $\Omega$ Hz $^{\circ}$ C jack.
3. Connect the red probe to the anode and the black probe to the cathode of the diode. The display will show the forward voltage drop. Reverse the probes; the display should show OL (open loop) for a good diode.

## 5.8 Continuity Test

1. Set the rotary switch to the **Continuity** position.
2. Connect the black test lead to the COM jack and the red test lead to the V $\Omega$ Hz $^{\circ}$ C jack.
3. Connect the test probes across the circuit or component. If resistance is below approximately 50 $\Omega$ , the buzzer will sound, indicating continuity.

## 5.9 Non-Contact Voltage (NCV) Detection

The NCV function allows for detection of AC voltage without direct contact.

1. Set the rotary switch to the **NCV** position.
2. Move the top end of the multimeter close to the conductor being tested.
3. If AC voltage is detected, the NCV indicator will light up, and an audible alarm will sound. The intensity of the alarm and light indicates the strength of the detected field.

# Non Contact Voltage Testing

Safe design with audial and visual alarm



Figure 5.4: Using the NCV function to detect live wires safely.

## 5.10 Temperature Measurement

Measures temperature from  $-20^{\circ}\text{C}$  to  $1000^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$  to  $1832^{\circ}\text{F}$ ).

1. Set the rotary switch to the  $^{\circ}\text{C}/^{\circ}\text{F}$  position.
2. Connect the temperature probe (thermocouple) to the COM and  $\text{V}\Omega\text{Hz}^{\circ}\text{C}$  jacks, observing polarity.
3. Place the tip of the temperature probe on or near the object whose temperature is to be measured.
4. Read the temperature value on the display. Use the FUNC button to switch between Celsius and Fahrenheit.



Figure 5.5: Example of temperature measurement using the included probe.

## 6. MAINTENANCE

### 6.1 Battery Replacement

When the low battery indicator appears on the display, replace the batteries as described in Section 4.1. Prompt battery replacement ensures accurate readings and proper device function.

### 6.2 Fuse Replacement

The Themisto TH-M120 is equipped with overload protection fuses. If the current measurement function stops working, a fuse may have blown. The device includes spare fuses.

1. Ensure the multimeter is turned off and test leads are disconnected.
2. Remove the protective rubber cover from the multimeter.
3. Unscrew the screws on the back casing and carefully open the multimeter.
4. Locate the blown fuse(s) and replace them with fuses of the same type and rating (e.g., F600mA/250V for mA input, F20A/250V for 20A input).
5. Carefully reassemble the multimeter, ensuring all screws are tightened and the rubber cover is properly fitted.

### 6.3 Cleaning

Wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents. Ensure the device is completely dry before use.

## 7. TROUBLESHOOTING

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- **No Display/Faint Display:** Check battery level. Replace batteries if low.
- **Incorrect Readings:** Ensure test leads are correctly connected to the appropriate jacks and the rotary switch is set to the correct function. Verify the circuit is de-energized for resistance/capacitance measurements.
- **Current Measurement Not Working:** Check and replace the fuse(s) if blown.
- **OL (Overload) Display:** The measured value exceeds the selected range. For auto-ranging, this indicates the value is beyond the meter's maximum capability for that function.

## 8. SPECIFICATIONS

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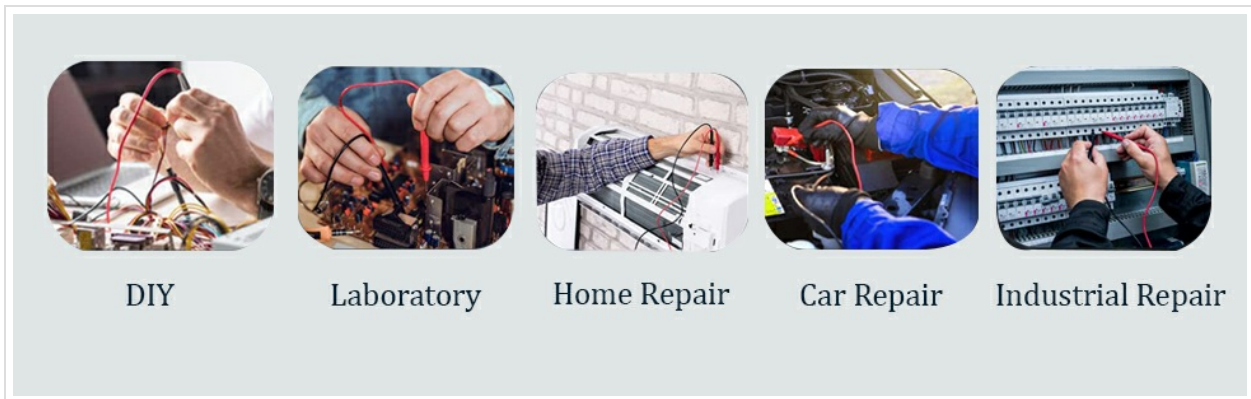


Figure 8.1: Comparison of Themisto multimeter models, highlighting TH-M120 specifications.

Parameter	Specification
Model Number	TH-M120
Display	6000 Counts, Backlit LCD
AC Current	600 $\mu$ A / 60mA / 600mA / 20A
DC Current	600 $\mu$ A / 60mA / 600mA / 20A
AC Voltage	600mV / 6V / 60V / 600V / 750V
DC Voltage	600mV / 6V / 60V / 600V / 1000V
Resistance	600 $\Omega$ / 6K $\Omega$ / 60K $\Omega$ / 600K $\Omega$ / 6M $\Omega$ / 60M $\Omega$
Capacitance	6nF / 60nF / 600nF / 6 $\mu$ F / 60 $\mu$ F / 600 $\mu$ F / 6mF / 100mF
Frequency	10Hz / 10MHz
Temperature	-20°C to 1000°C (-4°F to 1832°F)
Diode Test	Yes
Continuity Test	Yes
NCV Detection	Yes
Power Source	4 x AAA Batteries (included)
Item Weight	332 Grams
Product Dimensions	18.5 x 9 x 5 Centimeters
Included Components	1 x multimeter, a pair of test leads, user manual

## 9. WARRANTY AND SUPPORT

The Themisto TH-M120 Digital Multimeter comes with a **6 Months Warranty** against manufacturing defects. This warranty ensures peace of mind regarding the quality and reliability of your product. For any technical assistance, warranty claims, or support inquiries, please refer to the contact information provided with your purchase or visit the official Themisto website.