

# MM350 True RMS Auto Ranging Digital Multimeter



## ***Introduction***

Congratulations on your purchase of the Triplet MM350 True RMS Auto Ranging Digital Multimeter. This instrument performs AC/DC voltage, AC/DC Current, Resistance, Audible Continuity, Diode, Temperature measurements and Frequency measurements, it is a 3 3/4 digits, 3999 counts Auto Ranging DMM.

# Safety

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- Circuits under test must be de-energized and isolated before connections are made (except for voltage measurements).
- Circuit connections must not be touched during a test. Use extreme caution when working near bare conductors and bus bars. Accidental contact with conductors could result in electrical shock.
- Use caution when working near voltages above 60VDC or 30VACrms.
- After insulation tests, capacitors must be discharged.
- Test leads (including alligator clips) must be in good working order, clean and without broken or cracked insulation.
- When servicing, use only specified replacement parts.

## International Safety Symbols



Caution, refer to this manual before using this meter



Dangerous Voltages



Meter is protected throughout by double or reinforced insulation

## ELECTRICAL SYMBOLS



DC (Direct Current)



AC (Alternating Current)



DC or AC



Important safety information.



Refer to the manual



Dangerous voltage maybe present










Earth ground



Low battery

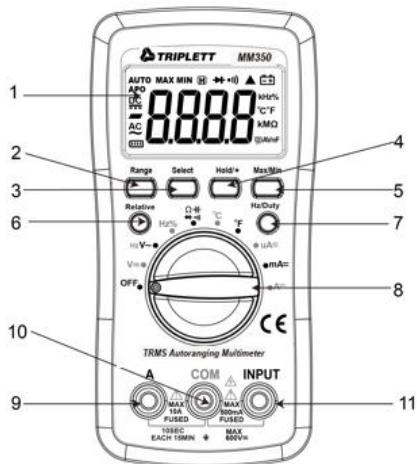


Fuse

	Diode
	Continuity test
°C	Centigrade
°F	Fahrenheit
AUTO	Auto range
	Conforms to European Union directive
	Double insulated
APO	APO auto power off
	Battery capacity
	Relative test
	Data hold

## Meter Description

- 3 3/4 digit LCD, with a max. reading of 3999
- Range Button  
The meter defaults to the auto range mode when you measure the voltage, current, resistance or capacitance. When the meter is in the auto range mode, "AUTO" is displayed.  
To enter and exit the manual range mode:  
a. Press "RANGE" button  
The meter enters the manual range mode and the symbol "AUTO" turns off.  
b. To exit the manual range mode, press and hold down the "RANGE" button for 2 seconds, the meter returns to the auto range mode and the symbol "AUTO" is displayed.
- "Select." Button  
When you measure the current, pressing this button will switch the meter between DC function and AC function.



When you measure the diode or the continuity, pressing this button will switch the meter between the diode and the continuity functions.

#### “Hold/⌘” Button

After pressing the button, the present reading is held on the display, meanwhile “Hold/⌘” is displayed on the LCD as an indicator. To exit the Hold Mode, press

the button again and the indicator “H” will disappear.

pressing the button more than 2 second, Backlight turned on, pressing the button more than 2 second again, Backlight turned off

- 4) “Max/Min” Button: After pressing the button Displays the maximum and minimum values during the test. The maximum and minimum values are cleared after the changes the test function, or meter be off.
  
- 5) Relative Button  
This Meter will display relative measurements in all functions, except frequency.
  
- 6) Hz% button  
When you measure the Hz%, pressing this button will switch the meter between HZ function and duty cycle function.  
When you measure the ACV, pressing this button will switch the meter will show the frequency of the AC voltage.
  
- 7) Function/Range Switch  
This switch can be used to select desired function and range.
  
- 8) “A” Jack  
Plug-in connector for the red test lead for Current (200mA ~ 10A) measurements.
  
- 9) “COM” Jack  
Plug-in connector for black(negative) test lead.
  
- 10) “INPUT” Jack  
Plug-in connector for the red test lead for all measurements except current( $\geq 200\text{mA}$ ) measurements.

# Operation

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## Measuring Voltage

- 1) Connect the black test lead to the "COM" jack and the red to the "INPUT" jack.
- 2) Set the function switch to  $V\sim$  or  $V\overline{\square}$  range.  
Select auto range or manual range with the "RANGE" button.
- 3) In manual range, if the voltage magnitude to be measured is unknown beforehand, select the highest range.
- 4) Connect the test leads across the source or load to be measured.
- 5) Read LCD display. The polarity of the red lead connection will be indicated when making a DC measurement.

### Note:

- a. In small range, the meter may display an unstable reading when the test leads have not been connected to the load to be measured. It is normal and will not affect the measurements.
- b. In manual range mode, when the meter shows the over range symbol "OL", a higher range must to be selected.
- c. To avoid damage to the meter, don't measure a voltage which exceeds 600Vdc (for DC voltage measurement) or 600Vac (for AC voltage measurement).

## Measuring Current

- 1) Connect the black test lead to the "COM" jack. If the current to be measured is less than 200mA, connect the red test lead to the "INPUT" jack. If the current is between 200mA and 10A, connect the red test lead to the "10A" jack instead.
- 2) Set the range switch to desired  $\mu A\overline{\sim}$ ,  $mA\overline{\sim}$  or  $A\overline{\sim}$  range.  
If the current magnitude to be measured is not known beforehand, set the ranges switch to the highest range position and then reduce it range by range until satisfactory resolution is obtained.
- 3) Select DC current measurement or AC current measurement with the "Select" Button.
- 4) Select auto range or manual range with the "Range" button. In manual range, if the current magnitude to be measured is not known beforehand, select the highest range.
- 5) Connect test leads in series with the circuit to be measured.
- 6) Read the reading on the display. For DC current measurement, the polarity of the red test lead connection will be indicated as well.

**Note:** When the display shows the over range symbol “OL”, a higher range must be selected.

### Measure Resistance

- 1) Connect the black test lead to the “COM” jack and the red to the “INPUT” jack (Note: The polarity of the red test lead is positive “+”).
- 2) Set the range switch to “ $\Omega$  f” position
- 3) Set the “Select” button to “ $\Omega$  f” range
- 4) Select auto range or manual range with the “Range” button. In manual range, if the current magnitude to be measured is not known beforehand, select the highest range.
- 5) Connect the test leads across the load to be measured.
- 6) Read the reading on the display.

### Note:


- a. For resistance measurements  $>1M\Omega$ , the meter may take a few seconds to stabilize reading. This is normal for high-resistance measurement.
- b. When the input is not connected, i.e. at open circuit, the symbol “OL” will be displayed as an over range indicator.
- c. Before measuring in-circuit resistance, be sure that the circuit under test has all power removed and all capacitors are fully discharged.

### Continuity Test


- 1) Connect the black test lead to the “COM” jack and the red to the “INPUT” jack (Note: The polarity of the red test lead is positive “+”).
- 2) Set the range switch to “ $\Omega$  f” position
- 3) Press the “Select” Button to select continuity measurement mode, and the symbol “ $\Omega$  f” will appear as an indicator.
- 4) Connect the test leads across the load to be measured.
- 5) If the circuit resistance is lower than about  $30\Omega$ , the built-in buzzer will sound.

### Diode Test

- 1) Connect the black test lead to the “COM” jack and the red to the “INPUT” jack (Note: The polarity of the red test lead is positive “+”).
- 2) Set the range switch to “ $\Omega$  f” position.
- 3) Press the “Select” Button to select continuity measurement mode, and the symbol

- “” will appear as an indicator.
- 4) Connect the red test lead to the anode of the diode to be tested and the black test lead to the cathode.
  - 5) The meter will show the approximate forward voltage of the diode. If the connections are reversed, “OL” will be shown on the display.

### Capacitance Measuring

- 1) Connect the black test lead to the COM jack and the red to the “INPUT” jack.
- 2) Set the range switch to “” position
- 3) Press the “Select” Button to select continuity measurement mode, and the symbol “mF” will appear as an indicator.
- 4) Connect test leads across the capacitor under measure and be sure the polarity of connection is observed.

**Note:** When the capacitance under measure is above 100uF, it needs at least 10 seconds to make readings stable.

### Measuring Temperature

- 1) Set the range switch to “°C” or “°F” range.
- 2) Insert the black (or “-”) plug of the K type thermocouple to the “COM” jack, and the red( or “+”) plug to the “INPUT” jack.
- 3) Carefully touch the end of the thermocouple to the object to be measured.
- 4) Wait a while, read the reading on the display.

### Frequency / Duty cycle measure

- 1) Connect the black test lead to the COM jack and the red to the “INPUT” jack.
- 2) Set the range switch to “Hz %” range.
- 3) Press the “Select” Button to select “Hz” or “duty cycle” mode
- 4) Connect test leads across the source or load under measurement.

**NOTE:** The input voltage should be between 200mV and 10V rms AC. If the voltage is more than 10V rms, reading may be out of the accuracy range.

### Auto Power Off

If you don't operate the meter for about 15 minutes, it will turn off automatically. To turn on it again, just rotate the range switch or press a button.  
In the power off state, press and “Select” button to Rotary range switch, you can cancel the auto power off function, “APO” symbol disappear from the LCD.

# Specifications

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Accuracy is guaranteed for 1 year 23°C±5°C less than 80%RH

## 5-1. DC VOLTAGE (Auto ranging)

Range	Resolution	Accuracy
400mV	0.1mV	±(0.8% of rdg + 5dgts)
4V	1mV	±(0.8% of rdg + 3dgts)
40V	10mV	
400V	100mV	
600V	1V	±(1.0% of rdg + 5dgts)

Input Impedance: 10MΩ

Overload Protection: 600V DC or 600AC rms

(200mV range: 250V DC/AC rms)

Max. Input voltage: 600V DC

## 5-2. AC VOLTAGE (Auto ranging)

Range	Resolution	Accuracy
400mV	1mV	±(1.2% of rdg + 5dgts)
4V	1mV	±(1.0% of rdg + 8dgts)
40V	10mV	
400V	100mV	
600V	1V	±(1.2% of rdg + 8dgts)

Input Impedance: 10MΩ

Frequency Range: 40Hz ~ 400Hz

Overload Protection: 600V DC or 600AC rms

Response: Average, calibrated in rms of sine wave

Max. Input voltage: 600V AC rms

## 5-3. TEMPERATURE

Range	Resolution	Accuracy
-40 ~ 1370° C	1°C	-40°C~150°C:±(2.5% + 4)
		150°C~1370°C:±(2.5% + 4)
-40 ~	1°F	-40°F~302°F:±(2.5% + 4)



2000° F		302°F~2000°F:±(2.5% + 4)
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**NOTE:** Different temperature sensors are configured in different temperature test ranges, and normal temperature sensors are provided for standard configuration

#### 5-4. DC CURRENT

Range	Resolution	Accuracy
400μA	0.1μA	±(1.2% of rdg + 8dgts)
4000μA	1μA	
40mA	10μA	
400mA	100μA	
4A	1mA	
10A	10mA	

Overload Protection:

μA↔ and mA↔ ranges: F0.5A/600V fuse

4A and 10A ranges: F10A/600V fuse

Max. Input Current:

“INPUT” jack: 200mA

“A” jack: 10A

(For measurements>5A: duration <10 seconds, interval >15 minutes)

Voltage Drop: 400μA, 40mA and 4A ranges: 40mV

4000μA, 400mA and 10A ranges: 400mV

#### 5-5. AC CURRENT

Range	Resolution	Accuracy
400μA	0.1μA	±(1.5% of rdg + 8dgts)
4000μA	1μA	
40mA	10μA	
400mA	100μA	
4A	1mA	±(2.0% of rdg + 10dgts)
10A	10mA	

Overload Protection:

μA↔ and mA↔ ranges: F0.5A/600V fuse

4A and 10A ranges: F10A/600V fuse

Max. Input Current:

“INPUT” jack: 200mA

“A” jack: 10A

(For measurements>5A: duration <10 seconds, interval >15 minutes)

Voltage Drop: 400μA, 40mA and 4A ranges: 40mV

4000μA, 400mA and 10A ranges: 400mV

Frequency Range: 40Hz ~ 400Hz

Response: Average, calibrated in rms of sine wave



### 5-6. RESISTANCE (Auto Ranging)

Range	Resolution	Accuracy
400Ω	0.1Ω	±(1.5% of rdg + 3dpts)
4KΩ	1Ω	
40KΩ	10Ω	
400KΩ	100Ω	
4MΩ	1KΩ	
40MΩ	10KΩ	

Open Circuit Voltage: about 0.25V

Overload Protection: 250V DC/AC rms

### 5-7. Diode and Continuity

Range	Introduction	Remark
	The approximate forward voltage drop will be displayed	Open circuit voltage: about 1.5V
	The built-in buzzer will sound if the resistance is less than about 30Ω.	Open circuit voltage: about 0.5V

Overload Protection: 250V DC/AC rms

For continuity test: When the resistance is between 50Ω and 100Ω, the buzzer may sound or may not sound. When the resistance is more than 100Ω, the buzzer won't sound.


### 5-8. Capacitance

Range	Resolution	Accuracy
40nF	10pF	±(8% of rdg + 10dpts)
400nF	100pF	±(5% of rdg + 5dpts)
4uF	1nF	
40uF	10nF	
100uF- 2mF	100nF	

### 5-10. FREQUENCY

Range	Accuracy
5/50/500/5K 50K/500K/5MHz	±(1.0% of rdg + 3dpts)


## **General specifications**

Display	: LCD, 3999 counts updates 2/sec
LCD Size	: 55 x 31mm
Polarity Indication	: “-” displayed automatically
Over-range Indication	: “OL” displayed
Low Battery Indication	: “  ” displayed
Range select	: auto or manual
Operation Temperature	: 0°C to 40°C, less than 80%RH
Storage Temperature:	-10°C to 50°C, less than 85%RH
Battery Type	: 1.5V x 3, AAA size
Dimension (HxWxD)	: 5.7 x 2.8 x 1.4" (145 x 70 x 35mm)
Weight	: 5.5oz. (157g)

Approvals



## **8. BATTERY REPLACEMENT**

If the sign “ ” appear on the display, it indicates battery should be replaced. Remove screws and open the back case, replace the exhausted battery with new batteries (Size AAA, 1.5V x3 or equivalent).

## **9. ACCESSORIES**

User Manual, Test leads, Type K Thermocouple with Banana Connectors

## **10. FUSE REPLACEMENT**

Fuse rarely needs replacement and is blown almost always as a result of operator's error. This meter uses a fuse: F1:500mA/600V and F2: 10A/600V fast action. To replace the fuses, open the meter back cover, replace the damaged fuse with a new fuse of the specified ratings. Reinstall the battery cover and lock this cover.

## **Warranty Information**

Triplett / Jewell Instruments extends the following warranty to the original purchaser of these goods for use. Triplett warrants to the original purchaser for use that the products sold by it will be free from defects in workmanship and material for a period of (1) one year from the date of purchase. This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons in any way or purchased from unauthorized distributors so as, in our sole judgment, to injure their stability or reliability, or which have been subject to misuse, abuse, misapplication, negligence, accident or which have had the serial numbers altered, defaced, or removed. Accessories, including batteries are not covered by this warranty

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