

# **TENMA<sup>®</sup>**

**Model 72-8170**

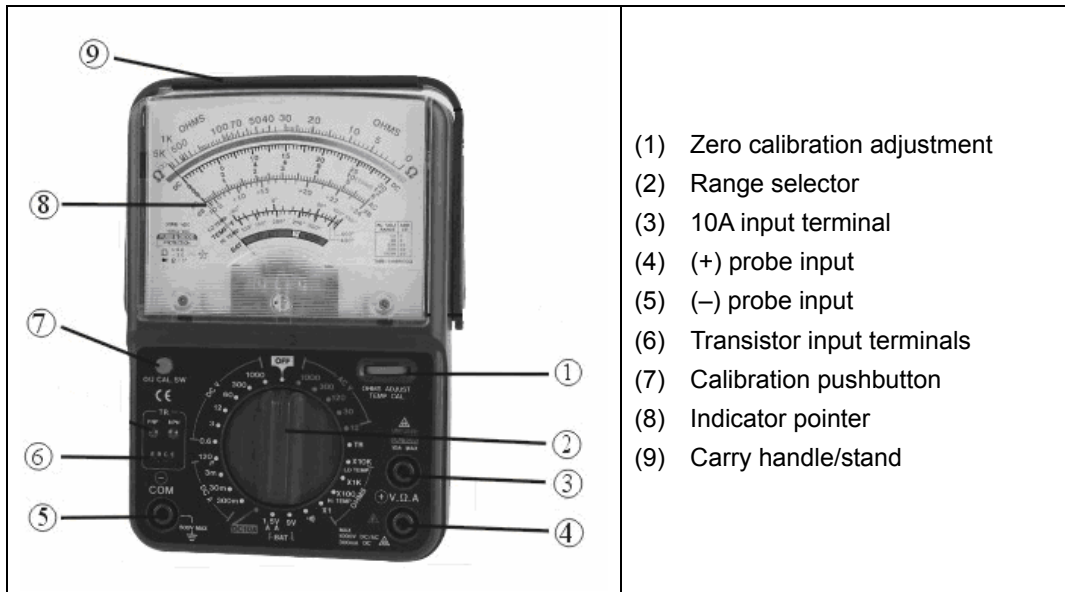
Analog Volt/Ohm Meter

INSTRUCTION MANUAL

**Tenma Test Equipment**

**[www.tenma.com](http://www.tenma.com)**

## Controls and Functions



- (1) Zero calibration adjustment
- (2) Range selector
- (3) 10A input terminal
- (4) (+) probe input
- (5) (-) probe input
- (6) Transistor input terminals
- (7) Calibration pushbutton
- (8) Indicator pointer
- (9) Carry handle/stand

## Specifications

Function	Measurement Ranges	Accuracy	Remarks
DCV	0.6V, 3.0V, 12V, 60V and 300V	±3% full scale	Input impedance
	1000V	±5% full scale	20KΩ/volt
ACV	12V, 30V, 120V, 300V	±4% full scale	Input impedance
	1000V	±5% full scale	9KΩ/volt
DCA	120μA, 3mA, 30mA, 300mA	±3% full scale	
	10A	±5% full scale	
Ohms	x1Ω, x100Ω, x1KΩ, x10KΩ	±3% of arc	
Continuity	Beeps below 100Ω		
Battery test	1.5V @ 300mA		Displays Replace/Good
	9V @ 30mA		

Operating temperature range:	0~40° C
Relative humidity:	≤80%
Power source:	1.5V AA (x2), plus 9V (x1)
Fuse:	0.5A fast blow, 5 × 20mm
Dimensions:	6.7" (H) x 4.9" (W) x 1.9" (D)
Included accessories:	Test leads, instruction manual

### Tips for Use

- This manual should be read thoroughly before use and kept for future reference.
- Make certain that the red lead is connected to the (+) input terminal, and the black lead is connected to the (-) input terminal.
- Make certain the leads are fully inserted into the meter input sockets.
- When measuring resistance, check the zero adjustment after each change of measurement range.
- Set the meter to the OFF position when not in use. This will engage dampening, providing protection to the meter movement.
- When measuring voltage, if the approximate voltage is unknown, start at the top range and work down.

### DC Voltage Measurement

- Set the range selector to the proper DCV position.
- Connect the red lead to the **(+) V $\Omega$ A** input.
- Connect the black lead to the **(-) COM** input.
- Keeping certain to observe correct polarity, connect the test leads in parallel to the load to be measured.
- Read the value on the DC scale, be sure to use the correct scale for the range selected.

### AC Voltage Measurement

- Set the range selector to the proper ACV position.
- Connect the red lead to the **(+) V $\Omega$ A** input.
- Connect the black lead to the **(-) COM** input.
- Connect the test leads in parallel to the load to be measured.
- Read the value on the AC scale, be sure to use the correct scale for the range selected

### DC Current Measurement ( $\leq 300\text{mA}$ )

- Set the range selector to the proper DCA position.
- Connect the red lead to the **(+) V $\Omega$ A** input.
- Connect the black lead to the **(-) COM** input.
- Connect the test leads in series to the load to be measured. In other words, the meter must be part of the circuit to be measured.
- Read the value on the DC scale, be sure to use the correct scale for the range selected

### DC Current Measurement ( $>300\text{mA}$ )

- Set the range selector to the DC 10A position.
- Connect the red lead to the **DC10A 10A MAX** input.
- Connect the black lead to the **(-) COM** input.
- Connect the test leads in series to the load to be measured. In other words, the meter

must be part of the circuit to be measured.

- Read the value on the topmost DC scale. Note that full 10A measurement will register as “10” on this scale, and not provide a full scale reading.
- **Important Note:** Measurements in excess of 5A should not be done for periods in excess of 20 seconds.

### Testing Continuity

- Set the range selector to .))) position (one position counterclockwise from the x1 OHMS scale).
- Connect the red lead to the (+) **VΩA** input.
- Connect the black lead to the (–) **COM** input.
- Connect the test probes to the circuit or device to be tested.
- The internal buzzer will sound when continuity exists between the two probes.
- Note: The buzzer will sound when the circuit impedance is below 100Ω.

### Resistance Measurement (Ω)

- **Important Note:** Make sure that no voltage is present in the circuit to be measured, including discharging of any associated capacitors. Even small voltage levels can cause permanent damage if applied to the meter while in the OHMS range.
- Set the range selector to proper Ω position
- “Zero” the meter. This is accomplished by simultaneously depressing the 0Ω CAL. SW button, and rotating the OHMS ADJUST control until the meter displays “0” ohms. If a 0Ω reading cannot be obtained, the meter batteries are low and should be replaced.
- Connect the red lead to the (+) **VΩA** input.
- Connect the black lead to the (–) **COM** input.
- Connect the test probes to the circuit or device under test. Make certain not to touch the metal probe tips with your fingers, as your body resistance will affect the reading.
- Read the value on the OHM scale and multiply it by the multiple designated by the range you have selected.
- For best accuracy, select a range that will provide a meter reading closest to the center of the scale.
- To obtain accurate readings, perform the Zero meter function each time the OHMS scale is changed.

### Decibel (dB) Measurement

- Set the range selector to one of the ACV ranges.
- Connect the red lead to the (+) **VΩA** input.
- Connect the black lead to the (–) **COM** input.
- When using the 12V range, read the measurement directly from the dB scale.
- When using other scales, you must add the appropriate number of dB as noted on the following table:

ACV Range	12V	30V	120V	300V	1000V
-----------	-----	-----	------	------	-------

<b>Add dB</b>	0	8	20	28	40
---------------	---	---	----	----	----

### Battery test

- Connect the red lead to the **(+) VΩA** input.
- Connect the black lead to the **(-) COM** input.
- Select the proper range for the type of battery to be used.
- For “AAA”, “AA”, “C” and “D” type batteries, select the 1.5V range.
- For rectangular 9V batteries, select the 9V range.
- Connect the black lead to the negative terminal of the battery.
- Connect the red lead to the positive terminal of the battery.
- The BAT scale at the bottom of the meter display will show GOOD, REPLACE or Questionable status.
- Please note that this will only provide relative battery condition results. The actual usefulness of a specific battery in a given application will depend upon the current requirements of that application. This tester provides the following reference loads:  
•9V, 30mA •1.5V, 300mA

### Transistor Type Check

- This meter will identify whether a given transistor is PNP or NPN.
- Insert the transistor into the correct socket inputs labeled Emitter, Base and Collector.
- Select the TR position on the Range Selector
- The red LED will indicate a PNP transistor, the green LED indicates NPN

### Cleaning and General Maintenance

- Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents.
- Periodically terminals and test probes standard spray contact cleaner as dirt and moisture affect readings.
- Turn the Meter to OFF position when it is not in use and remove the batteries if the meter is not to be used for a long period of time.
- Do not attempt to repair or service your Meter unless you are qualified to do so and have the relevant calibration, performance test, and service information.
- To avoid electrical shock or damage to the Meter, do not allow water inside the case.
- Do not store the Meter in a place of high humidity or temperature

### Battery Replacement

- When using the OHMS scale, if the meter cannot be calibrated to the Zero position, the batteries should be replaced.
- Make certain the test leads are removed from the circuit under test and disconnected from the meter.
- Remove the three Philips head screws from the rear of the meter housing
- Remove the rear housing from the meter assembly.
- Locate and replace the three batteries inside the meter (2x AA, plus 1x 9V).
- It is recommended that only good quality alkaline batteries be used.

- Replace the rear housing and reinstall the screws.

#### **Replacing the Fuse**

- Make certain the test leads are removed from the circuit under test and disconnected from the meter.
- Remove the three Philips head screws from the rear of the meter housing
- Remove the rear housing from the meter assembly.
- Locate and replace the fuse in its socket located on the surface of the internal PC board.
- Replace with only a comparable 5mm x 20mm 0.5A 250V fast blow type fuse.
- Replace the rear housing and reinstall the screws.
- Important Note: Replacement of the fuses is seldom required. A blown fuse is always a direct result from improper meter use.

**Tenma Test Equipment**  
**405 S. Pioneer Blvd.**  
**Springboro, Ohio 45066**  
**[www.tenma.com](http://www.tenma.com)**