

# TENMA®



**Pocket Size Digital Multimeter**

**Model: 72-10395**

## IMPORTANT SAFETY INFORMATION

Please read these instructions carefully before use and retain for future reference.

This digital multimeter is designed and manufactured in accordance with IEC61010, double insulation, CAT II 600V overvoltage and pollution grade 2 safety standard.










Please operate according to this manual, otherwise the protection provided by the device will be impaired or fail.

- Check the test leads, probe and case insulation function before using. If you find any breakage or abnormality, or you consider the device is broken, stop using the device immediately.
- When using the test probes, keep your fingers behind the finger protection ring
- Ensure all inputs are less than the range selected otherwise it may cause electrical shock or meter damage.
- Take caution when voltages are above 60V DC and 42V AC rms.
- Do not use the meter with the back cover removed.
- Do not adjust the range selector during measurement.
- Replace the batteries as soon as the low battery indicator appears on the display.
- Remove dead batteries from the meter or if it is not going to be used for a long time.
- Never mix old and new batteries together, or different types of batteries.
- Never dispose of batteries in a fire, or attempt to recharge ordinary batteries.
- Before replacing the battery, turn off the meter and disconnect all the test probes.
- To prolong battery life turn off the meter after use.

## WHAT'S INCLUDED

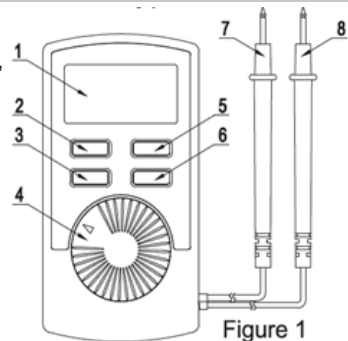
- Digital palm size Multimeter with test leads.
- Instruction manual.

## ELECTRICAL SYMBOLS GUIDE

	Low battery		Grounding		Warning
	Continuity Buzzer		AC		DC
	Fuse		Double insulated		Diode




## FUNCTIONS

1. LCD display
2. Select button (press to switch between resistance, capacitance, diode or continuity measurements).
3. REL button (relative value measurement).
4. Range selector.
5. Hz / % measurement (press this button to switch between DC V, AC V and Hz / %).
6. Data Hold (press this button to hold displayed values).
7. Positive input end (red test probe).
8. Negative input end (black test probe).



## OPERATING PARAMETERS

- Ambient temperature:  $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ .
- Relative humidity:  $\leq 75\%$
- Auto power off - the meter will enter the standby mode if there is no operation of the range selector and buttons within 30 minutes. In standby mode it can be re-activated by pressing any button or turning the range selector.
- Pressing SELECT button to activate the meter will cancel Auto Power Off function.

Function	Range	Res olution	Accuracy $\pm$ (a% readings +b digits)	Input Protection	Description
Capacitance CAP (F)	4.000nF	0.001nF	$\pm(4\%+3)$	600V AC	For ref only
	40.00nF	0.01nF			Measuring in relative measuring mode, the open circuit voltage is around 0.45V
	400.0nF	0.1nF			
	4.000 $\mu$ F	0.001 $\mu$ F			
	40.00 $\mu$ F	0.01 $\mu$ F	$\pm(5\%+10)$		When measured capacitance is above "100 $\mu$ F", the reading is for reference only
100 $\mu$ F	0.1 $\mu$ F				
Frequency (Hz)	99.9Hz	0.1Hz	$\pm(0.5\%+3)$	600V AC	Input sine wave, 10Hz~10kHz: $\geq 1\text{Vrms}$ 10kHz~100kHz: $\geq 30\text{Vrms}$
	0.999kHz	0.001kHz			
	9.99kHz	0.01kHz			
	99.9kHz	0.1kHz			
Duty Cycle	0.1%~99.9%	0.10%		600V AC	Press DUTY button to switch to the measuring mode when the knob is turned to AC/DC stall (the reading is for reference only)
Diode		1mV	0.5V~0.8V	600V AC	Open circuit voltage is about 1.5V
Buzzer Continuity		0.1 $\Omega$	$\sim \leq 60\Omega$	600V AC	Continuity resistance $\leq 60\Omega$ : buzzer beeps; $> 60\Omega$ : not necessarily to beep, and displays approximate resistance value with unit " $\Omega$ "
Low Voltage Indication			$\sim < 2.4\text{V}$		icon appears

## OPERATION

### DC voltage measurement (See Figure 2)

- Turn the range selector to DC V, Auto and DC icons appear on the LCD.
- Connect the black test probe to the cathode of the power to be measured and the red test probe to the anode of the power to be measured.
- Read measuring results displayed on the LCD.
- If the probes are reversed polarity, then the LCD will display negative readings.

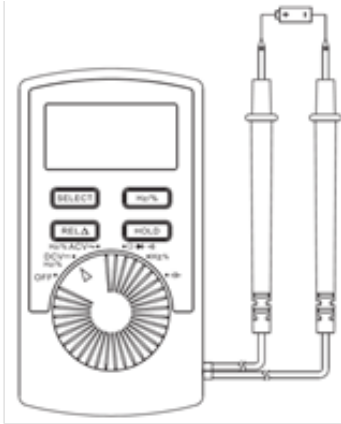


Figure 2

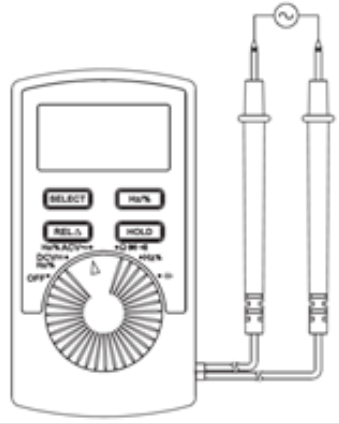


Figure 3

### AC voltage measurement (See Figure 3)

- Turn the range selector to AC V, Auto and AC icons appear on the LCD.
- Connect the black test probe to the cathode of the power to be measured and the red test probe to the anode of the power to be measured.
- Read measuring values displayed on the LCD.
- If the probes are reversed polarity, then the LCD will display negative readings.

#### Notes:

- Do not attempt to measure above 600V, you may get desired values, however, it may risk damaging the meters internal wiring.
- To avoid electric shock, please use it with extreme caution when measuring high voltages.
- Disconnect test probes from the circuit after finishing measurement.

### Resistance measurement (See Figure 4)

- Turn the range selector to  $\Omega$   $\rightarrow$   $\rightarrow$   $\rightarrow$   $\rightarrow$ )
- Connect test probes in parallel to the resistance to be measured;
- Read measured results on the display.

#### Notes:

- To avoid meter damage, when making in-circuit measurements make sure the circuit power is turned off and all capacitance has been discharged before measurement.
- As for 400 $\Omega$  resistance measurement, test probes will cause 0.1 $\Omega$ ~0.3 $\Omega$  measuring deviation. In order to get accurate readings, the ultimate results should subtract the short circuit reading values of the red and black test probes. It is suggested to perform the operation in relative value measurement mode.
- The meter displays “OL” when no signal is input, for instance in open circuit condition.
- For measurement  $\geq 1\text{M}\Omega$ , it normally takes several seconds to get stable readings

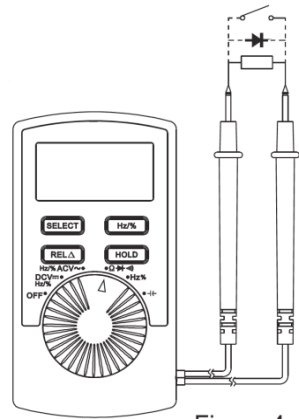


Figure 4

### Frequency and duty cycle measurement (See Figure 5)

- Turn the range selector to Hz/%, DC V or AC V.
- Press Hz/% button to access frequency measurement.
- Connect test probes in parallel to frequency signal source to be measured.
- Read measured results on the display.
- Press Hz/% button again to access % measurement.

#### Notes:

- The measured resolution based on frequency and waveform will vary slightly. The meter resolution has been set according to sine wave.

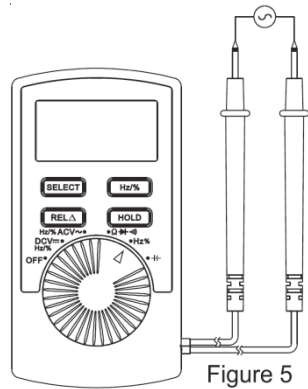


Figure 5

## Diode and continuity measurement (See dotted part in Figure 6)

- Turn the range selector to  $\Omega \rightarrow \rightarrow \bullet \cdot 1)$
- Press SELECT button to access diode mode (press it again to switch to continuity test).
- If connect test probes to the diode to be measured (with black test probe to cathode and red test probe to anode), then the reading on LCD will be an approximate value of diode forward voltage drop (when connecting test probes to both ends of the circuit to be measured, if the resistance between these two ends is  $\leq 60\Omega$ , the built-in buzzer will sound and the resistance value appears on LCD).

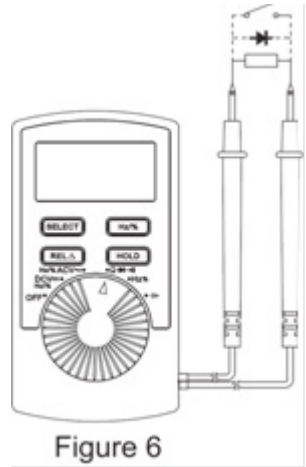


Figure 6

### Notes:

- If the measured diode is under open circuit status or the polarity is wrongly connected (namely, with black test probe connecting to anode and red test probe to cathode), LCD will display "OL".
- This meter can measure the voltage drop of PN joint of diode and other semiconductors. For a silicon semiconductor with normal structure, the reading of the forward voltage drop should be within 0.5~0.8V.
- To avoid meter damage, before measuring the resistance in line, please make sure the measured circuit power is turned off, and all capacitance has been discharged.
- In order to avoid meter damage or injury, do not input voltage above 60V DC or 30Vrms AC.

## Capacitance measurement (See Figure 7)

- Turn the range selector to  $\text{---} \text{---} \text{---}$
- As there is a capacitance reading displayed under open circuit status, please select relative value measuring mode.
- Press REL button once.
- Connect test probes to the capacitance to be measured, and read data on LCD.

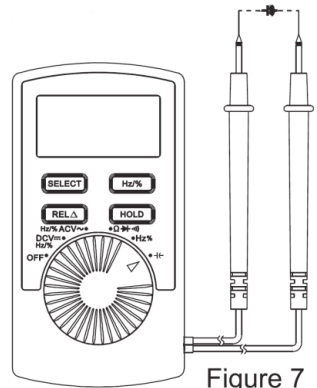


Figure 7


### Notes:

- Turn off all power in the measured circuit and fully discharge all capacitors before measurement.
- If the capacitance being measured has polarity, the red probe is connected to the anode and the black one to the cathode of capacitance.
- It normally takes several seconds to display the value when measuring capacitance higher than 10uF.
- To avoid meter damage or injuries, do not measure voltage above 60V DC or 30Vrms AC.

## GENERAL SPECIFICATIONS

Function	Range	Resolution	Accuracy $\pm$ (a% readings +b digits)	Input Protection	Description
DC Voltage (DC V)	4V	1mV	$\pm$ (0.8%+1)	600V DC 600V AC	Input impedance $\geq 10\text{M}\Omega$
	40V	10mV			
	400V	100mV	$\pm$ (1%+3)		
	600V	1V			
AC Voltage (AC V)	4V	1mV	$\pm$ (1.2%+3)	600V DC 600V AC	Input impedance $\geq 10\text{M}\Omega$ ; Frequency response: 40~400Hz; Display: RMS of sine wave (mean value response)
	40V	10mV			
	400V	100mV			
	600V	1V	$\pm$ (1.5%+5)		
Resistance ( $\Omega$ )	400 $\Omega$	0.1 $\Omega$	$\pm$ (1.2%+2)	600V AC	Open circuit voltage is about 0.45V
	4k $\Omega$	1 $\Omega$	$\pm$ (1%+2)		
	40k $\Omega$	10 $\Omega$			
	400k $\Omega$	100 $\Omega$	$\pm$ (1.2%+2)		
	4M $\Omega$	1k $\Omega$			
40M $\Omega$	10k $\Omega$	$\pm$ (1.5%+2)			

## BATTERY REPLACEMENT

- If  icon appears on LCD, please replace the battery as follows:
- Disconnect test probes from circuits being measured, turn range selector to OFF position.
- Remove the screw and lift off the back cover.
- Replace the 3V battery with a new one (Lithium-manganese button cell, 3V, model: CR2032).





**INFORMATION ON WASTE DISPOSAL FOR CONSUMERS OF ELECTRICAL & ELECTRONIC EQUIPMENT**

These symbols indicate that separate collection of Waste Electrical and Electronic Equipment (WEEE) or waste batteries is required. Do not dispose of these items with general household waste. Separate for the treatment, recovery and recycling of the materials used. Waste batteries can be returned to any waste battery recycling point which are provided by most battery retailers. Contact your local authority for details of the battery and WEEE recycling schemes available in your area.



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