

Item ref: 600.110UK

# **MTS01**

## Smart Digital Multimeter

### User Manual




**Please read this manual thoroughly and ensure all contents are fully understood before using the apparatus.**















## Warning

To avoid possible electric shock or personal injury, and to avoid possible damage to the tester or to the equipment under test, adhere to these following rules:

- Before using the tester inspect the case. Do not use the tester if it is damaged or the case (or part of the case) is removed. Look for cracks or missing plastic. Pay attention to the insulation around the connectors.
- Inspect the test leads for damaged insulation or exposed metal. Check the test leads for continuity.
- Do not apply more than the rated voltage, as marked on the tester, between the terminals or between any terminal and grounding.
- When the tester is working at an effective voltage over 60V in DC or 30Vrms in AC, special care should be taken for there is danger of electric shock.
- Use the proper terminals and function for your measurements.
- Do not use or store the tester in an environment of high temperature, humidity, explosive, flammable, damp or of a strong magnetic field. The performance of the tester may deteriorate after being exposed to any of these elements.
- When using the test leads, keep your fingers behind the finger guards.
- Disconnect circuit power and discharge all high-voltage capacitors before testing resistance, continuity, diodes.
- Replace the battery as soon as the low battery indicator  appears. With a low battery, the meter may produce false readings that can lead to electric shock and personal injury.
- Remove the connection between the testing leads and the circuit being tested and turn the meter power off before opening the meter case.

- The internal circuit of the meter shall not be altered at will to avoid damage of the meter and any accident.
- A soft cloth and mild detergent should be used to clean the surface of the tester on a regular basis. No abrasive and solvent should be used to prevent the surface of the tester from corrosion or damage.
- The tester is suitable for indoor use only.
- Turn the tester power off when it is not in use and take out the battery when not using for a long time. Check the battery regularly; replace the battery immediately if any signs of leaking appear. Battery acid will damage the tester.

## 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
APO	auto power off
HOLD	data hold
	Conforms to European Union directive
	Double insulated
T-RMS	True RMS


## General Specifications

Display: LCD, 6000 counts updates 2/sec

LCD Size: 50 x 27mm

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 2, AAA size  
Dimension (H×W×D): 153×73×35mm  
Weight: Approx 175g with battery

## Technical Specifications

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

### DC Voltage (auto ranging)

RANGE	RESOLUTION	ACCURACY
600mV	0.1mV	±(0.8% of rdg + 5 digits)
6V	1mV	±(0.8% of rdg + 3 digits)
60V	10mV	
600V	1V	±(1.0% of rdg + 5 digits)

**Note:** Voltages below 200mV cannot be accurately measured  
Input Impedance: 10MΩ  
Overload Protection: 600V DC or 600AC rms  
Max. Input voltage: 600V DC

### AC Voltage (auto ranging)

RANGE	RESOLUTION	ACCURACY
600mV	0.1mV	±(1.2% of rdg + 8 digits)
6V	1mV	±(1.0% of rdg + 8 digits)
60V	10mV	
600V	1V	±(1.2% of rdg + 8 digits)

**Note:** Voltages below 500mV cannot be accurately measured.  
Input Impedance: 10MΩ  
Overload Protection: 600V DC or 600V AC rms

Response: True RMS  
Max. Input voltage: 600V AC rms

### DC Current

RANGE	RESOLUTION	ACCURACY
600mA	0.1 $\mu$ A	$\pm(1.2\%$ of rdg + 8 digits)
10A	10mA	

Overload Protection: F10A/600V fuse

Max. Input Current: 10A

**Note:** For measurements >400mA: duration <10seconds, interval >15 minutes

### AC Current

RANGE	RESOLUTION	ACCURACY
600mA	0.1 $\mu$ A	$\pm(2.0\%$ of rdg + 10 digits)
10A	10mA	

Overload Protection: F10A/600V fuse

Max. Input Current: 10A

**Note:** For measurements >400mA: duration <10seconds, interval >15 minutes



Response: True RMS

### Resistance (auto ranging)

RANGE	RESOLUTION	ACCURACY
60 $\Omega$	0.01 $\Omega$	$\pm(1.2\%$ of rdg + 5 digits)
600 $\Omega$	0.1 $\Omega$	
6k $\Omega$	1 $\Omega$	
60k $\Omega$	10 $\Omega$	
600k $\Omega$	100 $\Omega$	
60M $\Omega$	100k $\Omega$	$\pm(3\%$ of rdg + 10 digits)

Overload Protection: 250V DC/AC rms

## Diode and Continuity


RANGE	INTRODUCTION	REMARK
	The approx. forward voltage drop will be displayed	Open circuit Voltage: about 3V
	The built-in buzzer will sound if the resistance is less than about 50Ω	Open circuit Voltage: about 3V

Overload protect: 250V DC/AC rms

## Capacitance

RANGE	RESOLUTION	ACCURACY
9.999nF	1pF	±(1.2% of rdg + 5 digits)
99.99nF	10pF	
999.9nF	100pF	
9.999μF	1nF	
99.99μF	10nF	
999.9μF	100nF	
9.999mF	1μF	

## Operating Instructions

**Turning on and off meter:** Press the  button for more than one second, the meter will turn on and the screen will display "----". After pressing this button again for more than 1 second, the meter will turn off.

## Voltage Measurement

1) When the LCD displays "- - - -", the meter can measure DCV or ACV.

- 2) Connect the black test lead to the "COM" jack and the red to the "INPUT" jack.
- 3) Connect the test leads across the source or load to be measured.
- 4) The LCD display will show the voltage value and DC/AC symbol.
- 5) Also the polarity of the red lead connection will be indicated when making a DC measurement.

**Note:**

- a. Measuring voltages below 200mV may result in measurement errors or may not be tested at all because the input of the meter partially automatically identifies the measurement signal.
- b. To avoid damage to the meter, don't measure a voltage which exceeds 600Vdc (for DC voltage measurement) or 600Vac (for AC voltage measurement).

**Current Measurement**

- 1) When the LCD displays "- - - -", the meter can measure DCA or ACA.
- 2) Connect the black test lead to the "COM" jack, connect the red test lead to the "A mA" jack. If the current is more than 400mA, the measurement time should not exceed 10 seconds and the interval of each measurement should be 15 minutes.
- 3) Connect the test leads series with the circuit to be measured.
- 4) The LCD display shows current value and DC/AC symbol.
- 5) Also, the polarity of the red lead connection will be indicated when making a DC measurement.

**Resistance Measurement**

- 1) When the LCD displays "- - - -", the meter can measure resistance.
- 2) 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 "+")
- 3) Connect the test leads across the load to be measured.
- 4) The LCD displays the current resistance reading.



**Note:**

- a. For resistance measurements  $>10M\Omega$ , the meter may take a few seconds to stabilize the reading. This is normal for high-resistance measurement.
- b. Before measuring in-circuit resistance, be sure that the circuit under test has all the power removed and all capacitors are fully discharged.


**Continuity Test**

- 1) When the LCD displays “- - -”, the meter can measure resistance.
- 2) Connect the black test lead to the “COM” jack and the red to the “INPUT” jack.
- 3) Connect the test leads across the load to be measured.
- 4) If the circuit resistance is lower than about  $50\Omega$ , the built-in buzzer will sound.

**Diode Measurement**

- 1) 1) Press  button to select the diode function, the LCD will display the  icon.
- 2) Connect the black test lead to the “COM” jack and the red to the “INPUT” jack.
- 3) Connect the red test lead to the anode of the diode to be tested and the black test lead to the cathode.
- 4) The meter will show the approximate forward voltage of the diode. If the connections are reversed, “OL” will be shown on the display.


**Capacitance Measurement**

- 1) 1) Press  button to select capacitance function, the LCD will display nF icon.
- 2) Connect the black test lead to the “COM” jack and the red to the “INPUT” jack.
- 3) Connect test leads across the capacitor to measure and be sure the polarity of the connection is observed.





**Note:** When the capacitance under measurement is above 100uF, the meter needs at least 10 seconds to display a stable reading.

## NCV (Non-Contact-Voltage) Test

- 1) Press NCV/  button, to select NCV function the LCD will display EF only.
- 2) "NCV" means "non-contact voltage detection" without the test leads.
- 3) Use the orange probe on top of the meter to test the target. When an AC voltage of 30~1000V is detected, the meter will make a continuous sound, and the LCD will display the number of bars to indicate the voltage intensity.
- 4) Connect test leads across the capacitor under measure and be sure the polarity of connection is observed.


## Back Light and LED Torch

Press the NCV/  or  buttons for more than one second to enter flashlight or backlight modes respectively. Repeat the process again to turn off either function.

## Auto Power Off (APO) Function

The meter is fitted with an APO function to save battery wastage. This function will switch off the meter after around 15 minutes of inactivity.

## Battery Replacement

The  symbol on the display indicates the batteries are running low and need replacing. Remove the small screw on the bottom of the battery cover and replace the 2 AAA batteries, ensuring you have the correct polarity for each battery. Replace the cover and screw to secure the unit.

## Fuse Replacement

The meter's internal fuse rarely needs replacement and is blown almost always because of operator error. This meter uses a 10A/600V fast action fuse. To replace the fuses, open the meter back cover, replace the

damaged fuse with a new fuse of the specified ratings. Re-install the back cover.

## Accessories

- Remote cable test unit
- Set of test leads (red and black)
- 2pcs AAA batteries
- Instruction manual

**CE** EN61010–1:2010



This product is classed as Electrical or Electronic equipment and should not be disposed with other household or commercial waste at the end of its useful life. The goods must be disposed of according to your local council guidelines.

### Errors and omissions excepted.

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