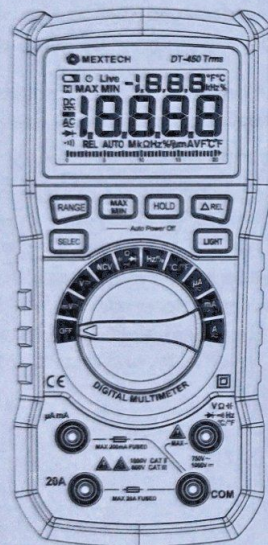




User Manual Digital Multimeter



Model:DT-450Trms

1.Introduction

This series of instruments is a stable performance, battery-driven high reliability digital multimeter, the instrument uses 34mm word high-definition LCD display, the degree of clarity, more convenient to use.

This series of instruments can be used to measure DC voltage and AC voltage, DC current and AC current, resistors, capacitors, diodes, transistors, on-off test, temperature, frequency, automatic shutdown turn on and off, backlight and other parameters. The whole machine is based on dual integral A / D conversion. It is an excellent tool and instrument, and is an ideal tool for laboratories, factories, radio enthusiasts and families.

⚠ Warning

Take special care when using this instrument. Improper use may cause electric shock or damage to the instrument. In use should follow the usual safety procedures and in full compliance with the safety manuals provided.

To fully utilize the features of the instrument and ensure safe operation, carefully follow the instructions in this section (chapter).

2.Security Information

In order to avoid personal injury caused by electric shock and Instrument damage, users should pay attention to the following safety tips.

- Do not measure any voltage beyond the measurement range specified by this instrument.
- Although there is an internal protection circuit in the resistance measurement range, do not apply a high voltage (above 100V) to the input of the resistance measurement range.
- Check the test leads for damage or exposure of metal parts.
- Try to avoid the instrument in the direct sunlight or very high temperature environment.
- Be aware of the possibility of electric shock when measuring voltages in excess of 30V AC or 50V DC.
- Before measuring the current, turn off the power, disconnect the circuit under test after measuring the power.
- Replace the battery to pay attention to its polarity.

Electrical symbols:

	Dangerous voltage		Ground
	AC (alternating current)		Warning, to see the tips in the instructions.
	DC (direct current)		Double insulated
	AC or DC		Fuse

3.Product Overview

3.1.Product appearance and description

1. Non-contact voltage sensing area

2. LCD Monitor

3. Function button

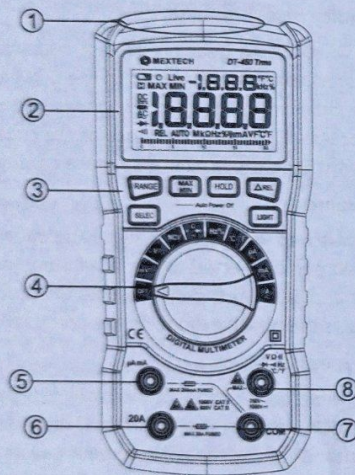
4. range switch

5. $\mu\text{A}/\text{mA}$ Input

6. 20A Input

7. "COM" Input

8. "V/ Ω / $\rightarrow$ / $\leftarrow$ / ∇ / ∇ /Hz/%/ $^{\circ}\text{C}$ $^{\circ}\text{F}$ " Input



3.2.Function button

Select key: this key work on the " Ω " range.

push the key to choose resistance ,diode,Continuity or Capacitance test. Press this key in "V" or "A" range, choose AC or DC test.

HOLD key:

In any range, push the key, the present display value will be locked and the "H" symbol will appear, push it again to exit HOLD and the "H" symbol disappear.

RANGE select key: push the key to select manual mode ,push it again to change the range, Press the key for more than 2 seconds to go back auto range mode. But in Hz/duty and Capacitance measurement,it can not select manual range mode.

REL key: Push the key, the present display value will be stored in memory, then the new display value is the difference between input value and stored data In Hz/Duty measurement , it can not work.

LIGHT key:

push the key the back light will light, press it again,the back light will light off.

MAX/MIN key:

push the key ,display MAX value & MIN value.

4.Technical indicators

4.1.General characteristics

- Manual range digital multimeter, full scale is 20000 counts
- Display: 4 1/2 digit LCD double display & 40 paragraph
- Overload protection: In the resistance, the use of PTC protection circuit;
- battery low voltage display;
- Fuse protection: μA , mA file: ceramic fuse F1 200mA / 250V
20A file: ceramic fuse F2 20A / 250V
- Automatic shutdown: about 15 minutes without turning the function knob switch or use any key operation, the display will blanking the display, then the instrument into the micro-power hibernation. To awaken the meter to work again, just turn the range knob or press any button;
- Power: 9V battery NEDA1604 / 6F22 or 006P;
- Working temperature and humidity: $0 \sim 40^{\circ}\text{C}$ / $32 \sim 104^{\circ}\text{F}$, 45% -80% RH;
- Storage temperature and humidity: $-20 \sim 60^{\circ}\text{C}$ / $-4 \sim 140^{\circ}\text{F}$, 45% -80% RH;
- Security level: IEC61010-1, CAT III 600V
- Size and weight: 195 (L) x92 (W) x55 (H) mm. About 380g (with battery)

4.2. Electrical Specifications

Accuracy: $\pm$ (a% of reading + number of words), one year warranty
(ambient temperature: $23 \pm 5^\circ\text{C}$ relative humidity: $< 75\%$)

4.2.1 DC voltage

Range	Resolution	Accuracy
200mV	0.01mV	$\pm$ (0.08% of reading + 5words)
2 V	0.0001V	
20V	0.001V	
200V	0.01V	
1000V	1V	$\pm$ (0.1% of reading + 5words)

Input impedance: 10M Ω

Maximum input voltage: 200mV Range of 250V DC or AC peak,
other Range of 1000V

4.2.2 AC voltage true RMS (50Hz-1000Hz)

Range	Resolution	Accuracy
200mV	0.01mV	$\pm$ (1.0% of reading + 25words)
2 V	0.0001V	$\pm$ (0.8% of reading + 25words)
20V	0.001V	
200V	0.01V	
750V	1V	$\pm$ (1.2% of reading + 25words)

* Input impedance: 10M Ω

* Response: True RMS

* Maximum input voltage: 750V AC(RMS)

* Frequency response: 40Hz ~ 1KHz (for standard sine wave and triangle wave)

* Display: True RMS (other waveform size 200Hz for reference only)

4.2.3 Resistance

Range	Resolution	Accuracy
200 Ω	0.01 Ω	$\pm$ (1.2% of reading + 15words)
2K Ω	0.0001K Ω	
20K Ω	0.001K Ω	
200K Ω	0.01K Ω	
2M Ω	0.0001M Ω	$\pm$ (2.0% of reading + 25words)
20M Ω	0.001M Ω	

* Open circuit voltage: about 0.8V

* Overload protection: 250V DC and AC RMS

* Warning: Input voltage is forbidden in the resistance range for safety

4.2.4 DC Current

Range	Resolution	Accuracy
200 μA	0.01 μA	$\pm$ (0.5% of reading + 5words)
2000 μA	0.1 μA	
20mA	0.001mA	$\pm$ (0.5% of reading + 5words)
200mA	0.01mA	
20A	0.001A	$\pm$ (0.8% of reading + 15words)

* Overload protection: μA / mA Range: F200mA fuse (fast blow),
20A Range: F20A fuse (fast blow)

* Maximum input current: μA / mA jack: 200mA , 20A jack: 20A

4.2.5 AC Current (50Hz-1000Hz)

Range	Resolution	Accuracy
200 μA	0.01 μA	$\pm$ (0.8% of reading + 25words)
2000 μA	0.1 μA	
20mA	0.001mA	$\pm$ (0.8% of reading + 25words)
200mA	0.01mA	
20A	0.001A	$\pm$ (1.0% of reading + 25words)

* Overload protection: μA / mA Range: F200mA fuse (fast blow),
20A Range: F20A fuse (fast blow)

* Maximum input current: μA / mA jack: 200mA , 20A jack: 20A

* Frequency response: 50Hz ~ 1KHz (for standard sine wave and triangle wave)

4.2.6 Capacitance measurement

Range	Resolution	Accuracy
2nF	0.0001nF	$\pm (4.0\% \text{ of reading} + 50\text{words})$
20nF	0.001nF	
200nF	0.01nF	
2 μ F	0.0001 μ F	
20 μ F	0.001 μ F	
200 μ F	0.01 μ F	
2mF	0.0001mF	
20mF	0.001mF	

* Overload protection: 36V DC and AC RMS

4.2.7 Frequency

Range	Resolution	Accuracy
200Hz	0.01Hz	$\pm (1.0\% \text{ of reading} + 30\text{words})$
2KHz	0.0001KHz	
20KHz	0.001KHz	
200kHz	0.01kHz	
2MHz	0.0001MHz	
10MHz	0.001MHz	$\pm (3.0\% \text{ of reading} + 30\text{words})$

* Overload protection: 250V DC or AC (rms) - Measuring signal: Vpp
30mV AC signal.

Note: As the measurement frequency increases, the VPP input signal also increases

4.2.8 Duty cycle

Range	Resolution	Accuracy
1%~99%	0.1%	$\pm (3.0\% \text{ of reading} + 30\text{words})$

4.2.9 Temperature

Range	Resolution	Accuracy
-20℃~1000℃	0.1℃/2℉	<400 ℃ ± (1.0% of reading + 4 words)
		≥400 ℃ ± (1.5% of reading + 5 words)
-4℉~1832℉		<752 ℉ ± (1.0% of reading + 6 words)
		≥752 ℉ ± (1.5% of reading + 10 words)

* Temperature specifications do not include thermocouple error.

4.2.10 Diode

Range	Resolution	Accuracy
	0.0001V	Display diode forward voltage approximation

* Forward DC current: about 1mA

* Reverse DC voltage: about 3.2V



4.2.11 On-off measurement

Range	Accuracy
	If the measured line resistance is less than 50Ω, the buzzer inside the instrument will sound.

* Open circuit voltage is about 1V.

4.3 Automatic shut-down

1. If there is no operation for any 15 minutes after power on, the meter will go to sleep state and shut down automatically to save power.
2. Automatic shutdown, press any key, the instrument resume working condition.
3. If the "SELECT" button is pressed during power-on, the buzzer will give out 5 beeps. The auto power-off function will be canceled, the auto power off symbol will disappear and the auto power off function will resume after power off.

4.4 NCV (non-contact voltage detection)

1. Switch the instrument rotary switch to the NCV position and close the top of the instrument to the conductor. When the detected voltage is greater than 90Vac (RMS), when the instrument is close to the conductor, there will be a dripping alarm sound from the instrument induced voltage buzzer. The LED indicator will be adjusted according to Light from different colors of LED lights, about 2-5cm, green light, about 1-2cm bright yellow light, 0-1cm bright red light and flashing.

Warning :

1. Even if there is no indication, voltage may still exist. Do not rely on non-contact voltage detectors to determine if there is voltage on the wire. Detection operations may be affected by socket design, insulation thickness and type of different factors.
2. When the input voltage of the instrument input terminal or external environment interference sources (such as flash, motor, etc.), due to the induced voltage may trigger false non-contact voltage detection, the instrument will alarm and blink.

4.5 DC voltage measurement

1. Turn the rotary switch to the $\underline{V}$ gear, connect the black test pen and the red test pen to the COM input socket and the V input socket respectively, and measure the voltage of the circuit to be tested with the other two ends of the test pen. (In parallel with the circuit under test), measured by the liquid crystal display voltage reading. When measuring DC voltage, the display will also show the voltage polarity connected to the orange test lead.

4.6 AC voltage measurement

1. Turn the rotary switch to the $\underline{V}$ gear, connect the black test pen and the red test pen to the COM input socket and the V input socket respectively, and measure the voltage value of the circuit to be tested with the other two ends of the test pen. (In parallel with the circuit under test), the crystal display reads the measured voltage value.

4.7 Resistance measurement

1. Turn the switch to Ω gear, respectively, the black test pen and red test pen connected to the COM input socket and V input socket, the other end of the test pen measured resistance of the circuit under test, the LCD reads the measured resistance value.

4.8 On-off continuity measurement

1. Turn the rotary switch to  gear, on-off test, respectively, the black test pen and red test pen connected to the COM input jack and input jack, the other end of the test pen measured resistance of the circuit under test, When the resistance of the circuit under test is less than about 50Ω, the buzzer may make continuous sound.

4.9 Diode measurement

1. Turn the rotary switch to  gear, diode test, respectively, the black test pen and red test pen connected to the COM input jack and input socket  the other end of the test pen measures the diode under test, the instrument shows the positive diode To the pressure drop value.

4.10 Capacitance measurement

1. Turn the rotary switch to "F", connect the black test pen and the red test pen to the COM input socket and the $\underline{F}$ input socket, measure the capacitance of the capacitor to be measured at the other two ends of the test pen, and read the measured value from the LCD .