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




## INTRODUCTION

UT2000 series are the large LCD DMM with accurate reading, stable quality, multifunctional and modern design of 3 1/2 and 4 1/2 handheld digital multimeter used for measuring DC voltage and current, AC voltage and current, resistance, capacitance, frequency, temperature, positive diode resistance, transistor hFE and short circuit testing. It is suitable for engineering design, laboratory testing and industrial manufacturing and repair etc.


## ATTENTION

Please go through the instruction manual before using your meter and also pay attention to the section VI. SAFETY RULES.

### International Electrical Symbols:

	AC (Alternating Current)
	DC (Direct Current)
	AC or DC
	Grounding
	Double Insulated
	Deficiency of Built-In Battery.
	Continuity Test.
	Diode.
	Fuse.
	Warning. Refer to the Operating Manual.
	Conforms to Standards of European Union.

## FEATURES

- 1 DC basic accuracy:  $(31/2) \pm 0.5\%$ ;  $(4 1/2) \pm 0.05\%$ .
- 1 Max. display: 1999 (3 1/2 digit) ; 19999 (4 1/2 digit).
- 1 Reading display frequency: 2-3 times per second.
- 1 Automatic indication of polarity, decimal place and signs. Automatic indication of "1" for over-range. "  " shows when the battery is insufficient.
- 1 Auto-zeroing for capacitance test.
- 1 Automatic circuitry protection and buzzer sounds for over-range and mis-operation.
- 1 With automatic power-off function.
- 1 Release the lock by press the cases top button. Adopt large LCD display, 25mm height digit, the angle of the display can be rotated within 70° to select the most suitable reading angle..
- 1 Size: 185x89x32mm.
- 1 Weigh: approx. 300g (including battery).



Model UT2000: OPERATING MANUAL

## ENVIRONMENTAL CONDITIONS

Guarantee accuracy:  $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$  ; relative humidity: <75%.

Temperature range: working temperature:  $0^{\circ}\text{C}$  to  $40^{\circ}\text{C}$  ( $32^{\circ}\text{F}$  to  $104^{\circ}\text{F}$ ),

storing temperature:  $-10^{\circ}\text{C}$  to  $50^{\circ}\text{C}$  ( $14^{\circ}\text{F}$  to  $122^{\circ}\text{F}$ )

Battery: 9V battery (NEDA1604, 6F22 or similar type).

Relative humidity:  $0^{\circ}\text{C}$ - $31^{\circ}\text{C}$ , <80%;  $31^{\circ}\text{C}$ - $40^{\circ}\text{C}$ , <50%

Altitude: (operating) 2000 meters, and 10000 meters for storage.

Replacement Fuse: 5x20mm, 0.2A/250V FAST  
(Except Model 2001, 2A/250V FAST)

### TECHNICAL SPECIFICATION

Accuracy:  $\pm(a\% \text{ reading} + \text{No. of digits})$ , guaranteed for 1 year.

#### 1. DC Voltage

RANGE	3 1/2 Digit ACCURACY				RESOLUTION
	2001	2002/5	2006	2007	
200mV	$\pm (0.5\% \text{ of rdg} + 1 \text{ digit})$				100 $\mu$ V
2V					1mV
20V					10mV
200V					100mV
1000V	$\pm(0.8\% \text{ of rdg} + 2 \text{ digits})$				1V
RANGE	4 1/2 Digit ACCURACY		RESOLUTION		
	2003	2004			
200mV	$\pm (0.05\% \text{ of rdg} + 3 \text{ digits})$		10 $\mu$ V		
2V			$\pm (0.1\% \text{ of rdg} + 2 \text{ digits})$	100 $\mu$ V	
20V			1mV		
200V			10mV		
1000V	$\pm (0.1\% \text{ of rdg} + 5 \text{ digits})$	$\pm (0.2\% \text{ of rdg} + 5 \text{ digits})$	100mV		

Input impedance: 10M $\Omega$  on all ranges.

Overload protection: DC or AC peak value of 1000V. (expect 200mV range with the maximum value being 250V rms)

## 2. AC Voltage

RANGE	3 1/2 Digit ACCURACY				RESOLUTION
	2001	2002/5	2006	2007	
200mV	$\pm (1.2\% \text{ of rdg} + 3 \text{ digits})$				100 $\mu$ V
2V	$\pm (0.8\% \text{ of rdg} + 3 \text{ digits})$				1mV
20V					10mV
200V					100mV
750V	$\pm (1.2\% \text{ of rdg} + 3 \text{ digits})$				1V
RANGE	4 1/2 Digit ACCURACY		RESOLUTION		
	2003	2004			
2V	$\pm (0.8\% \text{ of rdg} + 10 \text{ digits})$		100 $\mu$ V		
20V			1mV		
200V			10mV		
750V	$\pm (1\% \text{ of rdg} + 15 \text{ digits})$		100mV		

Input impedance: 10M $\Omega$  on all ranges. (2003/4 $\geq$  2M $\Omega$ )

Frequency all range: Below 200V; 40-400Hz;  
750V; 40-200Hz.

Overload protection: AC 750V rms or 1000V peak continuous on all ranges. (expect 200mV range with the maximum value being 250Vrms)

Indication: average value (rms of sine wave).

### 3. DC Current

RANGE	3 1/2 Digit ACCURACY	2001	2002/5	2006	2007	RESOLUTION
200µA	± (0.8%of rdg+1digit)	*	*			0.1 µA
2mA		*	*		*	1µA
20mA		*	*	*	*	10µA
200mA	± (1.2%of rdg+1digit)	*	*	*	*	100µA
2A		*				1mA
10A	± (2%of rdg+5digits)	*	*	*	*	10mA
20µA		*				10n A
RANGE	4 1/2 Digit ACCURACY	2003	2004	RESOLUTION		
2mA	± (0.5%of rdg+2digit)	*	*	0.1µA		
20mA		*	*	1µA		
200mA	± (0.75%of rdg+5digit)	*	*	10µA		
10A	± (2%of rdg+10digits)	*	*	1mA		

Overload protection: 0.2A/250V fused (Except 2001:2A/250V) 10A range is not fused.

Maximum input current :10A

Indication: Average value (rms of sine wave)

For 10A input jack, it is non-fused. For safety, each measuring time should be equal to or less than 10 seconds. Time intervals should be equal to or over 15 minutes.

### 4. AC Current

RANGE	3 1/2 Digit ACCURACY	2001	2002/5	2006	2007	RESOLUTION
2mA	$\pm$ (1%of rdg+3digits)	*	*		*	1 $\mu$ A
20mA		*	*	*	*	10 $\mu$ A
200 $\mu$ A	$\pm$ (1.8%of rdg+3digits)	*	*			0.1 $\mu$ A
200mA		*	*	*	*	100 $\mu$ A
2A		*				1mA
10A	$\pm$ (3%of rdg+7digits)	*	*	*	*	10mA
20 $\mu$ A		*				10n A
RANGE	4 1/2 Digit ACCURACY	2003	2004	RESOLUTION		
2mA	$\pm$ (0.8%of rdg+10digit)	*	*	0.1 $\mu$ A		
20mA		*	*	1 $\mu$ A		
200mA		*	*	10 $\mu$ A		
10A	$\pm$ (2%of rdg+10digits)	*	*	1mA		

Overload protection: 0.2A/250V fused (Except 2001:2A/250V) 10A range is not fused.

Maximum input: 10A

Frequency range: 40-400Hz.

Indication: Average value (rms of sine wave)

For 10A input jack, it is non-fused. For safety, each measuring time should be equal to or less than 10 seconds. Time intervals should be equal to or over 15 minutes.



### 5. Resistance

RANGE	3 1/2 Digit ACCURACY				RESOLUTION
	2001	2002/5	2006	2007	
200 Ω	± (0.8%of rdg+3digits)				0.1Ω
2K Ω	± (0.8%of rdg+1digit)				1Ω
20K Ω					10Ω
200KΩ					100Ω
2M Ω					1KΩ
20M Ω	± (1%of rdg+2digits)				10KΩ
200M Ω	± [5%(of rdg-10digits)+10digits]				100KΩ
RANGE	4 1/2 Digit ACCURACY		RESOLUTION		
	2003	2004			
200Ω	± (0.2%of rdg+5digits)	± (0.5%of rdg+5digits)	0.01Ω		
2KΩ	± (0.2%of rdg+1digit)      ± (0.5%of rdg+1digit)		0.1Ω		
20kΩ			1Ω		
200KΩ			10Ω		
2MΩ			100Ω		
20MΩ	± (0.5%of rdg+5digits)	± (1%of rdg+5digits)	1kΩ		

Overload protection: 250VDC or AC rms.

Open circuit voltage: ≤ 0.7V (Except 2003,2004: 3V) 200MΩrange is 3V.

Relative Humidity: >2M range: 0°Cto 35°C: 0~75%, other range: 0°Cto 35°C: 0~90%.

- \* When testing on 200MΩrange, the display will show 1.0 if connect the two test lead together. This reading is a fixed deviation

which does not affect the accuracy of the reading. If the resistor under measurement is 100MΩ, The reading will be 101.0, the actual value should be the display value minus 1.0: 101.0 - 1.0 = 100.0 MΩ

### 6. Capacitance

RANGE	3 1/2 Digit ACCURACY			RESOLUTION
	2002/5	2006	2007	
2nF	± (2.5%of rdg+3digits)			1pF
20nF				10pF
200nF				100pF
2μF				1nF
20μF				10nF
RANGE	4 1/2Digit ACCURACY		RESOLUTION	
	2003	2004		
20nF	± (2.5%of rdg+10digits)		1pF	
200nF			10pF	
2μF			100pF	
20μF			1nF	

Testing frequency: 400Hz

Testing voltage: 40mV

- \* When using the capacitance range for testing, don't connect a resistor or a charged capacitor (especially large capacitor) to the meter. The reading need some times to stabilize or return to zero when changing the range.

### 7. Temperature

RANGE	ACCURACY		RESOLUTION
	2007		
-40°C~+400°C	$\pm (0.75\% \text{ of rdg} + 3 \text{ digits})$		1°C
400°C~1000°C	$\pm (1.5\% \text{ of rdg} + 15 \text{ digits})$		1°C

Temperature sensor: International standard K type (NiCr - NiSi) probe.


### 8. Frequency

RANGE	ACCURACY		RESOLUTION
	2006		
2kHz	$\pm (1.5\% \text{ of rdg} + 5 \text{ digits})$		1Hz
20kHz			10Hz
RANGE	ACCURACY		RESOLUTION
	2003	2004	
20kHz	$\pm (1.5\% \text{ of rdg} + 5 \text{ digits})$		1Hz

Input sensitivity:  $\leq 100 \text{ mV rms}$ .

Overload protection: 250 DC or AC rms.

### 9. Diode


MODEL	RANGE	DESCRIPTIONS	TESTING CONDITION
All series		Display approx. forward voltage of diode	Forward DC current approx. 1mA Reversed DC voltage approx. 3V

Overload protection: 250V DC or AC rms.

### 10 . Transistor hFE

MODEL	RANGE	DESCRIPTIONS	TESTING CONDITION
All series	hFE	Display approx. hFE value (0~1000) of transistor under test	Base current approx. 10 $\mu$ A, V <sub>ce</sub> approx. 3V.

### 11. Open circuit test

MODEL	RANGE	DESCRIPTIONS	TESTING CONDITION
All series		If the resistance between the two testing point less than 30 $\Omega$ , buzzer sounds.	Open circuit voltage approx. 3V

Overload protection: 250V DC or AC rms.

### 12. Battery test

MODEL	RANGE	INTERNAL RESISTANCE	DESCRIPTIONS
2001	1.5V	30 $\Omega$	Display the value of voltage between the cathode and anode of battery.
	9V	1.8k $\Omega$	

### 13. Alarm



ALARM SOUNDS			2001	2002/5	2006	2007	2003	2004
Mis-operation	Switch position	Test leads position						
	V, $\Omega$ , Hz, $\rightarrow$ , BATT	A or 10A	*	*	*	*	*	*
	$\mu$ A, mA, 2A	10A	*	*	*	*	*	*
	10A	A	*	*	*	*	*	*
Over range	Display >19999*						*	*

The testing value for  $\Omega \rightarrow$  range is meaningless.

### 14. Square wave output

Frequency approx. 50Hz, range  $V_p-p \geq 2V$  (only for UT2001).

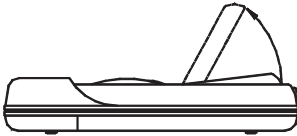
## OPERATING INSTRUCTIONS

1. Check the 9V battery by press down the ON - OFF SWITCH. If the battery is weak, "  " sign will appear on left bottom side of the display. The sign  next to the test lead jacks is for warning that the input voltage or current should not exceed the indicated values. This is used to prevent the damage to the internal circuitry. The function switch should be set to the range which you want to test before operation.
2. Except capacitance, transistor hFE and temperature which use the special test jack, the input terminal for all other range should be "V/ $\Omega$ ", "COM" being the input earth terminal.

3. Input Current Jack: There is a  $\phi 5 \times 20$ mm fuse inside the "A" input jack. Over range measurement will burn the fuse and replacement should use the fuse of the same specification. "10A" input jack does not have fuse protection.
4. The meter will show the room temperature if the temperature probe is not connect to the object under testing. The meter will only shows the object temperature if the probe is connect to it.
5. When the meter is not in use for more than 15 minutes, the power will be automatically turned off. Just release & press the "POWER" button, the meter will be turned on again.
6. Battery or fuse replacement should only be done after the test leads have been disconnected and power is off, to open the battery door, see the following diagram.



7. The choice of LCD display angle: see the following diagram.



### SAFETY RULES

The Digit Multimeter is a precise electronic device. Do not tamper with the circuit and pay attention to the following:

1. The Meter complies with IEC1010-1 pollution Degree2 CAT I 1000V, CAT II 600V over voltage standards. Use the Meter only as specified in this manual, otherwise the protection provided by the Meter may be impaired.
2. CAT I- For signal level, telecommunication, electronic with small transient over voltage.
3. CAT II- For local level, appliances, main wall outlets, portable equipment.
4. The meter is designed to withstand the stated Max. Voltages. If it's not possible to exclude without doubts that impulses, transients, disturbance or for other reasons, these voltages are exceeded a suitable prescale (10:1) must be used.

5. Do not operate the Meter before the cabinet has been closed and screwed safely as terminal can carry voltage.
6. Make sure before each measurement the Meter is set to the suitable range.
7. Before using the Meter, please inspect the cabinet and test leads for damaged insulation or exposed metal.
8. Connect the red and black test lead to the correct measuring input jack properly.
9. Do not input values over the maximum range of each measurement to avoid damages of the Meter.
10. Do not turn the rotary function switch during Voltage or Current measurement, otherwise the Meter could be damaged.
11. Make sure to use new fuses with proper rating to replace the bad fuses.
12. To avoid electric shock or damages, do not apply more than 1000V between the "COM" terminal and "⚡" earth ground.
13. Use caution when working with Voltages above 60V (DC) or 30Vrms (AC). These Voltages pose shock hazard.
14. Replace the battery as soon as the battery indicator "🔋" appears. With a low battery, the Meter might produce false reading that can lead to electric shock and personal injury.
15. Turn off the Meter once finished measuring. Fetch out the battery when the meter will not be used for long period.



16. Do not operate the Meter under adverse environmental condition including high temperature and especially humid area as the Meter's function may be ineffective after moisturizing.
17. To avoid damages and dangerous, do not change the circuit on your own.
18. Periodically wipe the cabinet with a damp cloth and mild detergent. Do not use abrasives or solvents.
19. Dispose the used battery properly.
20. The Meter is suitable for indoor use only.

### Maintenance(1)

This section provides basic maintenance information including battery and fuse replacement instruction.



#### Warning

**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 get water inside the case.**


### 1.General Service

- 1 Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents.
- 1 To clean the terminals with cotton bar with detergent, as dirt or moisture in the terminals can affect readings.
- 1 Turn the Meter power off when it is not in use and take out the battery when not using for a long time.
- 1 Do not store the Meter in a place of humidity, high temperature, explosive, inflammable and strong magnetic field.

### 2.Replacing the Battery



#### Warning

**To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator “” appears.**

To replace the battery:

1. Disconnect the connection between the testing leads and the circuit under test, and remove the testing leads away from the input terminals of the Meter.
2. Turn the Meter power off.
3. Remove the screw from the battery and fuse compartment, and separate the battery and fuse compartment from the case bottom.

### Maintenance(2)

4. Remove the battery from the battery compartment.
5. Replace the battery with a new 9V battery (NEDA 1604 or 6F22 or 006P).
6. Rejoin the case bottom and battery and fuse compartment, and reinstall the screw.

### 3.Replacing the Fuses



#### **Warning**

**To avoid electrical shock or arc blast, or personal injury or damage to the Meter, use specified fuses ONLY in accordance with the following procedure.**

To replace the Meter's fuse:

1. Disconnect the connection between the testing leads and the circuit under test, and remove the testing leads away from the input terminals of the Meter.
2. Turn the Meter power off.
3. Remove the screw from the battery and fuse compartment, and separate the battery and fuse compartment from the case bottom.
4. Remove the fuse by gently prying one end loose, and then take out the fuse from its bracket.
5. Install ONLY replacement fuses with the identical type and specification as follows and make sure the fuse is fixed firmly in the bracket.  
Model UT2002, UT2003, UT2004, UT2005, UT2006 and UT2007: 0.2A, 250V, fast type,  $\phi$  5x20mm.  
Model UT2001: 2A, 250V, fast type,  $\phi$  5x20mm.
6. Rejoin the case bottom and battery and fuse compartment, and reinstall the screw.

Replacement of the fuses is seldom required. Burning of a fuse always results from improper operation.

~ END ~

This operating manual is subject to change without notice.

# UNI-T<sup>®</sup>

**Model UT2000: OPERATING MANUAL**

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