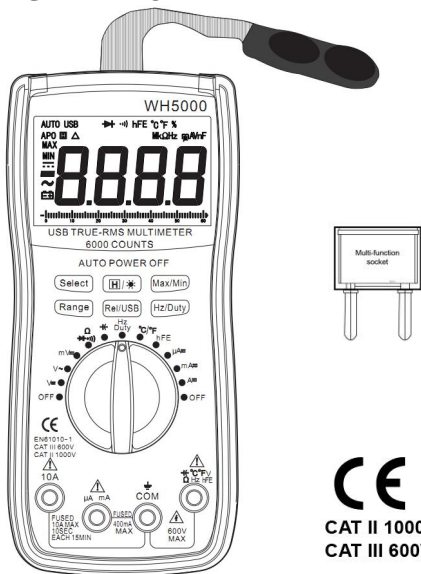


OPERATOR'S INSTRUCTION MANUAL TRUE RMS DIGITAL MULTIMETER



MODEL: WH5000

Read this manual thoroughly before use!

1. INTRODUCTION

■ This manual provides all safety information, operation instruction, specifications and maintenance for the meter, which is compact, hand-held, and battery operated.

■ This instrument performs AC/DC voltage, AC/DC Current, Resistance, Audible Continuity, Diode, hFE, Frequency Battery, Capacitance and Temperature measurements; it is a 3 5/6 digits, 5999 counts auto ranging DMM.

■ It has the functions of polarity indication, data hold, over range indication and automatic power-off. It can be operated easily and is an ideal instrument tool.


■ WH5000 digital multimeter has been designed according to EN61010-1 oncoming electronic measuring instruments with an over voltage category (CAT III 600V, CAT II 1000V) and Pollution degree 2.



Warning


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

- Before using the Meter inspect the case. Do not use the Meter 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 Meter, between the terminals or between any terminal and grounding.
- The rotary switch should be placed in the right position and no any changeover of range shall be made during measurement is conducted to prevent damage of the Meter.











- When the Meter working at an effective voltage over 60V in DC or 30V RMS in AC, special care should be taken for there is danger of electric shock.
- Use the proper terminals, function, and range for your measurements.
- Do not use or store the Meter in an environment of high temperature, humidity, explosive, inflammable and strong magnetic field. The performance of the Meter may deteriorate after dampened.
- 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 or hFE.
- Replace the battery as soon as the battery indicator “+” appears. With a low battery, the Meter might 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.
- When servicing the Meter, use only the same model number or identical electrical specifications replacement parts.
- The internal circuit of the Meter shall not be altered at will to avoid damage of the Meter and any accident.
- Soft cloth and mild detergent should be used to clean the surface of the Meter when servicing. No abrasive and solvent should be used to prevent the surface of the Meter from corrosion, damage and accident.
- The Meter is suitable for indoor use.
- Turn the Meter power off when it is not in use and take out the battery when not using for a long time. Constantly check the battery as it may leak when it has been using for some time, replace the battery as soon

as leaking appears. A leaking battery will damage the Meter.

2. GENERAL CHARACTERISTICS

Display Digital	: 6000 counts updates 2 times /sec
LCD size	: 64 x 42mm
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	: 9V NEDA 1604, 6F22 equivalent
Dimension (H×W×D)	: 190×86×35mm
Weight	: Approx 348g

3. ELECTRICAL SYMBOLS

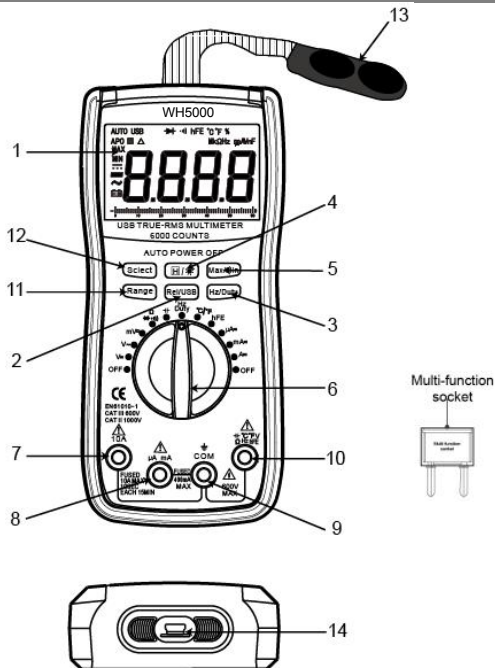
	-----DC (Direct Current).
	----- AC (Alternating Current).
	-----DC or AC
	-----Important safety information. Refer to the manual.
	-----Dangerous voltage may be present.
	-----Earth ground
	-----Low battery
	-----Fuse
	-----Diode
	-----Continuity test


AUTO -----Auto range

CE -----Conforms to European Union directive

□ -----Double insulated.

4.PANEL DESCRIPTION



- | | |
|---------------------------|---|
| 1) LCD | 2) Rel/USB button |
| 3) Hz/Duty button | 4)  /  button |
| 5) Max/Min button | 6) Function switch |
| 7) 10A jack | 8) $\mu\text{A}/\text{mA}$ jack |
| 9) COM jack | 10) INPUT jack |
| 11) Range button | 12) Select button |
| 13) Hang by magnetic-iron | 14) Mini-USB connector |

4-1. Button introduce

◆ “Select” BUTTON

Press this button to select desire function, when the function switch on Ω , $\text{C}/^\circ\text{F}$, mV , μA , mA , and A range. The select function unit icon would be display on the LCD.

◆ “/ ” BUTTON

When this button is pressed, LCD will show the last reading, and “H” symbol will appear till pressed again.

Back-light function, press this button for more than 2 seconds, back-light will light, after 15 seconds, back light will turn off automatically.

◆ “Max/Min” BUTTON

Press this button, the meter enters the MAX mode, and the LCD shows “MAX” as an indicator, the present reading on the LCD is the maximum reading of all readings taken, since the mode was activated. Press this button again, the meter enters the MIN mode, and the LCD shows “MIN” as an indicator, the present reading on the LCD is the minimum reading of all readings taken, since the mode was activated. Press and hold down this button for about 2 seconds to exit MAX and MIN modes.

Note: It will disable Select, H, Range and Rel button function, on Max/Min mode is select.

◆ “RANGE” BUTTON

On V_{DC} , V_{AC} , mV_{DC} , Ω , $^{\circ}\text{C}/^{\circ}\text{F}$, μA_{DC} , mA_{DC} , A_{DC} function, ranges can be selected manually or automatically by pushing the RANGE button. Press this button to up and cycle range, and press it and hold more than 2 seconds, it will return to auto-range mode.

◆ “Rel/USB” BUTTON

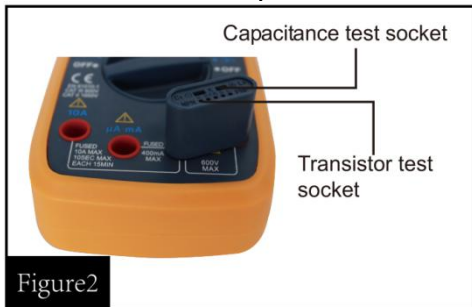
Press this button to set the meter to Relative Mode, and “ Δ ” will appear as an indicator. To exit Relative Mode, press this button again, and “ Δ ” will disappear.

For USB signal output, press it and hold more 2 seconds, will active USB signal output function.

◆ Hz/DUTY BUTTON

Press this button to select Hz or DUTY CYCLE measurement, at Hz function.

4-2.How to Connect the Adapter



4-3.LCD Display



Figure3

1. % --Duty Cycle is selected
2. °F --Fahrenheit temperature test is selected
3. °C --Celsius degree test is selected
4. hFE --Transistor hFE test is selected
5. ♪) --Continuity test is selected
6. ➤ --Diode test is selected
7. 🔑 --External current test is selected
8. AUTO --Auto-range mode is selected
9. APO --Automatic power-off mode is enabled
10. **H** --Data Hold is enabled
11. MAX --Maximum reading is being displayed
12. MIN --Minimum reading is being displayed
13. **≡** --DC
14. **—** --Negative sign
15. **~** --AC
16. **🔋** --Low Battery and replaced immediately
17. **△** --Relative mode is active
18. **🔋** --Battery test is selected (not this function)
19. NCV --non contact voltage (not this function)

5、SPECIFICATIONS

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

5-1. DC VOLTAGE (Auto ranging)

Range	Resolution	Accuracy
60mV	0.01mV	±(1.0% of rdg + 10dgts)
600mV	0.1mV	±(0.8% of rdg + 5dgts)
6V	1mV	±(0.8% of rdg + 3dgts)
60V	10mV	
600V	100mV	±(1.0% of rdg + 5dgts)
1000V	1V	

Input Impedance: 10MΩ

Overload Protection: 1000V DC/AC RMS

Max. Input voltage: 1000V DC

5-2. AC VOLTAGE (Auto ranging)

Range	Resolution	Accuracy
60mV	0.01mV	±(1.5% of rdg + 10dgts)
600mV	0.1mV	±(1.2% of rdg + 8dgts)
6V	1mV	±(1.2% of rdg + 6dgts)
60V	10mV	
600V	100mV	
750V	1V	±(1.2% of rdg + 8dgts)

① Input Impedance: 10MΩ

② Frequency Range: 40Hz ~ 400Hz

③ Overload Protection: 750V DC/AC rms

Max. Input voltage: 750V AC RMS

5-3. TEMPERATURE

Range	Resolution	Accuracy
-20 ~ 1000°C	0.1°C	20°C~150°C:±(1% + 4°C)
		150°C~1000°C:±(2% + 3°C)
-4 ~ 1832°F	0.1°F	-4°F~302°F:±(5% + 4°F)
		302°F~1832°F:±(2.5% + 3°F)

Overload Protection: F0.4A/600V Fuse

5-4. DC CURRENT

Range	Resolution	Accuracy
600 μ A	0.1 μ A	$\pm(0.8\%$ of rdg + 5dgts)
6000 μ A	1 μ A	
60mA	10 μ A	
600mA	100 μ A	
6A	1mA	$\pm(1.5\%$ of rdg + 3dgts)
10A	10mA	

① Overload Protection:

“mA” jack: F0.4A/600V fuse

“10A” jack: F10A/600V fuse

② Max. Input Current:

“mA” jack: 600mA

“10A” jack: 10A

(For measurements >5A: duration <10 seconds,
interval >15 minutes)

③ Voltage Drop:

600 μ A, 60mA and 6A range: 60mV

6000 μ A, 600mA and 10A ranges: 600mV

5-5. Transistor hFE Test (with Adapter)

Range	hFE	Test Current	Test Voltage
PNP & NPN	0~1000	$I_b \approx 2\mu$ A	$V_{ce} \approx 1V$

5-6. AC CURRENT

Range	Resolution	Accuracy
600 μ A	0.1 μ A	$\pm(1.5\%$ of rdg + 8dgts)
6000 μ A	1 μ A	
60mA	10 μ A	
600mA	100 μ A	
6A	10mA	$\pm(2.0\%$ of rdg + 10dgts)
10A	100mA	

① Overload Protection:

“mA” jack: F0.4A/600V fuse

“10A” jack: F10A/600V fuse Max.

② Input Current:

“mA” jack: 400mA

“10A” jack: 10A

(For measurements >5A: duration <10 seconds, interval >15 minutes)

③ Voltage Drop:

600 μ A, 60mA and 6A ranges: 60mV

6000 μ A, 600mA and 10A ranges: 600mV

Frequency Range: 40Hz ~ 400Hz



5-7. RESISTANCE (Auto Ranging)

Range	Resolution	Accuracy
600 Ω	0.1 Ω	$\pm(1.5\%$ of rdg + 3dgt)
6K Ω	1 Ω	
60K Ω	10 Ω	
600K Ω	100 Ω	
6M Ω	1K Ω	
60M Ω	10K Ω	$\pm(1.5\%$ of rdg + 5dgt)

① Open Circuit Voltage: about 0.5V

② Overload Protection: 250V DC/AC RMS

5-8. Diode and Continuity

Range	Introduction	Remark
	The approximate forward voltage drop will be displayed	Open circuit voltage: about 3V
	The built-in buzzer will sound if the resistance is less than about 30 Ω .	Open circuit voltage: about 1V

① Overload Protection: 250V DC/AC rms

② For continuity test: When the resistance is between 30 Ω and 70 Ω , the buzzer may sound or may not sound. When the resistance is more than 70 Ω , the buzzer won't sound

5-9. Capacitance

Range	Resolution	Accuracy
10nF	10pF	±(8% of rdg + 5dgt)
100nF	100pF	
1uF	1nF	
10uF	10nF	
100uF	100nF	
20mF	10uF	

Open circuit voltage: about 0.5V

5-10. FREQUENCY (Auto Ranging)

Range	Accuracy
10 ~10MHz	±(1.0% + 5)

Overload Protection: 250V DC/AC RMS

6. OPERATION INSTRUCTION

6-1. Voltage Measurement

- 1) Connect the black test lead to the "COM" jack and the red test lead to the "INPUT" jack
- 2) Set the function switch to $V\sim$ or $V\text{---}$ range.
Select auto range or manual range with the "Range" button.
- 3) In manual range, if the voltage magnitude to be measured is unknown beforehand, select the highest range.
- 4) Connect the test leads across the source or load to be measured.
- 5) Read LCD display. The polarity of the red lead connection will be indicated when making a DC measurement.




Note:

- a. In small range, the meter may display an unstable reading when the test leads have not

been connected to the load to be measured. It is normal and will not affect the measurements.


- b. In manual range mode, when the meter shows the over range symbol “OL”, a higher range must be selected.
- c. To avoid damage to the meter, don't measure a voltage which exceeds 600Vdc (for DC voltage measurement) or 600Vac (for AC voltage measurement) . under the conditions of CATIII.

6-2. Current Measurement

- 1) Connect the black test lead to the “COM” jack. If the current to be measured is less than 600mA, connect the red test lead to the “mA” jack. If the current is between 600mA and 10A, connect the red test lead to the “10A” jack instead.
- 2) Set the function switch to desired μA , mA  or A  range.
If the current magnitude to be measured is not known beforehand, set the function switch to the highest range position and then reduce it range by range until satisfactory resolution is obtained.
- 3) Select DC current measurement or AC current measurement with the “Select” Button.
- 4) Read the reading on the display. For DC circuit measurement, the polarity of the red test lead connection will be indicated as well.

Note: When the display shows the over range symbol “OL”, a higher range must be selected.

6-3. Resistance Measurement

- 1) 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 “+”).
- 2) Set the function switch to “ ” range

- 3) Select auto range or manual range with the “Range” button. In manual range, if the Resistance magnitude to be measured is not known beforehand, select the highest range.
- 4) Connect the test leads across the load to be measured.
- 5) Read the reading on the display.

Note:


- ① For resistance measurements $>1\text{M}\Omega$, the meter may take a few seconds to stabilize reading. This is normal for high-resistance measurement.
- ② When the input is not connected, i.e. at open circuit, the symbol “OL” will be displayed as an over range indicator.
- ③ Before measuring in-circuit resistance, be sure that the circuit under test has all power removed and all capacitors are fully discharged.

6-4. Continuity Test

- 1) 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 “+”).
- 2) Set the function switch to “ $\rightarrow \Omega$ ” range
- 3) Press the “Select” Button to select continuity measurement mode, and the symbol “ $\rightarrow \Omega$ ” will appear as an indicator.
- 4) Connect the test leads across the load to be measured.
- 5) If the circuit resistance is lower than about 30Ω , the built-in buzzer will sound.

6-5. Diode Test

- 1) 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 “+”).
- 2) Set the function switch to “ $\rightarrow \Omega$ ” range

- 3) Press the “Select” Button to select continuity measurement mode, and the symbol “” will appear as an indicator.
- 4) Connect the red test lead to the anode of the diode to be tested and the black test lead to the cathode.
- 5) The meter will show the approximate forward voltage of the diode. If the connections are reversed, “OL” will be shown on the display.

6-6. Transistor Test

- 1) Set the function switch to “hFE ” range.
- 2) Connect the multi-function socket to the “COM” jack and the “ INPUT ” jack. Please see Figure 2 ,don't reverse the connection.
- 3) Identify whether the transistor is NPN or PNP type and locate Emitter, Base and Collector lead. Insert the leads of the transistor to be tested into the proper holes of the transistor test socket of the adapter.
- 4) LCD display will show the approximate hFE value.

6-7. Temperature Measurement

- 1) Set the function switch to “°C/°F” range.
- 2) Press the “ Select ” button to select “°C” or “°F” mode, and the symbol “°C” or “°F” will appear as an indicator.
- 3) Insert the black (or “-“) plug of the K-type thermocouple to the “COM” jack, and the red(or “+”) plug to the “ INPUT ” jack.
- 4) Carefully touch the end of the thermocouple to the object to be measured.
- 5) Wait a while, read the reading on the display.

NOTE:The measuring range of the meter temperature is the widest value, the accurate measurement must be based on the suitable temperature sensor.

6-8. Capacitance Measurement

- 1) Connect the black test lead to the "COM" jack and the red to the "INPUT" jack.
- 2) Set the function switch to "⌚" range (NOTE: The polarity of the RED lead is positive "+")
- 3) Connect test leads across the capacitor under measure
and be sure the polarity of connection is observed.

Note: When the capacitance under measure is more than 600uF, it needs at least 10 second to make readings stable.

When pin is very short of capacitance, also choose to measure with the multi-function socket, please see FIGURE 3.

6-9. Frequency Measurement

- 1) Set the function switch to the required "Hz/Duty" position.
- 2) Connect the black test lead to the "COM" jack and
- 3) the red to the "INPUT" jack (Note: The polarity of the red test lead is positive "+").
- 4) Read the reading on the display

Note: Do not apply more than 250V RMS to the input. Indication is possible a voltage higher than 100V rms, but reading maybe out of specification.

7. Auto Power Off

If you don't operate the meter for about 15 minutes, it will turn off automatically. To turn on it again, just rotate the function switch or press "Select" or "Range" button. If you want cancel the Auto Power Off function, press the "SELECT" button at same time to rotate function switch turn on meter, it will disable APO function and the symbol 'APO' on the LCD will disappear.


8. Communication feature

To establish the communication between the meter and a PC, refer to the instruction of the communication application on the CD provided

You can use the supplied data cable and the communication application to transfer the measurement readings to a computer in a real-time mode through the USB interface, and these readings will be displayed on the computer in several patterns, and can be stored as a file.

Note: WH5000 and WH6000 can be used with a same program file provide by CD.

9. BATTERY REPLACEMENT

If the sign “” appear on the display, it indicates battery should be replaced. Remove screws and open the back case, replace the exhausted battery with new batteries (NEDA 1604, 6F22 or equivalent, please see Figure 4)


10. ACCESSORIES

Owners manual:	1 piece
Test leads:	1 pair
K-type thermocouple :	1 piece
Multi-function socket:	1 piece
USB Data Cable:	1 piece
CD (content driver and software):	1 piece

11. FUSE REPLACEMENT

Fuse rarely needs replacement and is blown almost always as a result of operator's error. To replace the fuses, open the battery cover, replace the damaged fuse with a new fuse of the specified ratings. Re-install the battery cover and lock this cover.(please see Figure 4)

12.Warning

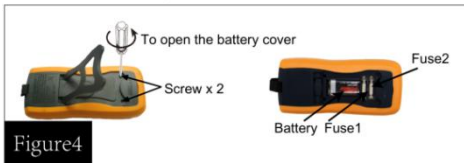
To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator ("  ") appears.

To prevent damage or injury, install only replacement fuses with the specified amperage, voltage, and interrupt ratings.

Disconnect the test leads before opening the back cover or the battery cover.

- 1) Battery and fuse replacement should only do after the test leads have been disconnected and power is off.
- 2) Loosen screws with suitable screwdriver and remove case bottom.
- 3) The meter is powered by a single 9V battery (IEC 6F22, NEDA 1604, JIS006P). Snap the battery connector leads to the terminals of a new battery and reinsert the battery into the case top. Dress the battery leads so that they will not be pinched between the case bottoms and case top.

To open and battery cover



This meter uses two fuses:

Fuse 1: 400mA or 500mA, 600V, FAST, Ø6X30mm

Fuse 2: 10A, 600V, FAST, Ø6X30mm

To replace the fuse, remove the screws on support frame, without remove the meter from its holster, without remove the back cover, replace the fuse with a new one of the same ratings. Rejoin the support frame, re-install the screws.

DISPOSAL OF THIS ARTICLE

Dear Customer,

If you at some point intend to dispose of this article, then please keep in mind that many of its components consist of valuable materials, which can be recycled. Please do not discharge it in the garbage bin, but check with your local council for recycling facilities in your area.

