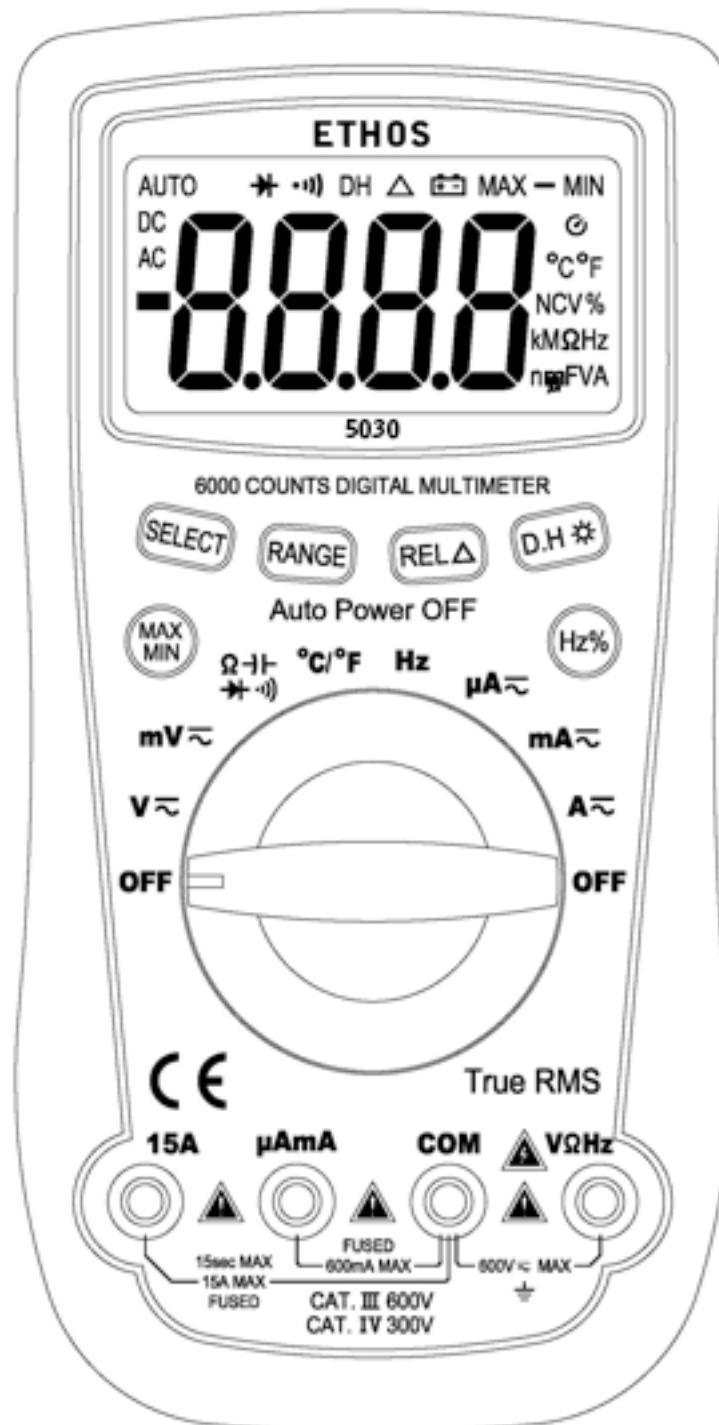


ETHOS 5030









TRUE-RMS DIGITAL MULTIMETER




OPERATION MANUAL




1. SAFETY INFORMATION

SAFETY SYMBOLS

-  **Warning!** Dangerous Voltage (Risk of electric shock).
-  **Caution!** Refer to the user's manual before using this Meter.
-  **Double Insulation** (Protection Class II).
-  Alternating Current (**AC**).
-  Direct Current (**DC**).
-  Either **DC** or **AC**.
-  **Ground** (maximum permitted voltage between terminal and ground).
-  The symbol indicating separate collection for electrical and electronic equipment.

-  **The RESPONSIBLE BODY shall be made aware that, if the instrument is used in a manner not specified by the manufacturer, the protection provided by the instrument may be impaired.**
-  **The finger or any part of your body shall not be beyond the barrier of the test probe when measuring.**
-  **Individual protective equipment must be used if HAZARDOUS LIVE parts in the installation where measurement is to be carried out could be ACCESSIBLE.**

The following safety information must be observed to insure maximum personal safety during the operation at this meter.

- 1.1 Do not operate the meter if the body of meter or the test leads appear damaged.
- 1.2 Check the main function dial and make sure it is at the correct position before each measurement.
- 1.3 When making current measurements ensure that the circuit not "live" before opening it in order to connect the test leads.
- 1.4 Do not perform resistance, capacitance, diode and continuity test on a live power system.
- 1.5 Do not apply voltage between the test terminals and test terminal to ground that exceeds the maximum limit record in this manual.
- 1.6 Exercise extreme caution when measuring live system with voltage greater than 60V DC or 30V AC.
- 1.7 Change the battery when the  symbol appears to avoid incorrect data.
- 1.8 Use the DMM indoor, altitude up to 2000m and temperature 5°C to 40°C. Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C. Pollution Degree 2.

2. SPECIFICATIONS

2.1 GENERAL SPECIFICATIONS


Display: LCD with a max. reading of 6000.

Range control: Auto range & Manual range control

Polarity: Automatic negative polarity indication.

Zero adjustment: Automatic.

Over range indication: The "OL" or "-OL" display.

Low battery indication: Display "" sign.

Data hold: Display "DH" sign.

Relative measurement: Display "Δ" sign.

Auto Power Off: When measurement exceeds 15 minutes without switching mode and pressing key, the meter will switch to standby mode. Press any key to exit standby mode. When restart the system, press and hold **SELECT** key to disable auto power off.

Safety standards: **CE EMC/LVD. CAT III 600V. CAT IV 300V.**

The meter is up to the standards of IEC1010 Double Insulation, Pollution Degree 2, Overvoltage Category III.

Operating environment: Temperature 32 to 104°F (0°C to 40°C), Humidity ≤ 80% RH.

Storage environment: Temperature -4 to 140°F (-20°C to 60°C), Humidity ≤ 90% RH.

Fuse: F0.8A 600V 5 x 20mm, F15A 600V 5 x 20mm.

Power supply: 9V battery (6F22).

Test lead probe: RE10, CAT III 600V / CAT IV 300V, 15A, L=90cm.

Dimension: 177(H) x 92(W) x 40(D) mm

Weight: Approx. 320g (including battery).

2.2 ELECTRICAL SPECIFICATIONS

Accuracies are ± (% of reading + number in last digit) at 23 ± 5°C, ≤ 75% RH.

2.2.1 DC Voltage

Range	Accuracy	Resolution
60.00mV	± (0.5%+2)	0.01mV
600.0mV		0.1mV
6.000V		1mV
60.00V		10mV
600.0V		100mV
600V	± (0.8%+2)	1V

Overload protection: 600V DC or AC rms

Impedance: 10MΩ, More than 100MΩ on 60mV/600mV range

2.2.2 AC Voltage

Range	Accuracy	Resolution
60.00mV	$\pm (1.2\%+3)$	0.01mV
600.0mV		0.1mV
6.000V	$\pm (0.8\%+3)$	1mV
60.00V		10mV
600.0V		100mV
600V	$\pm (1.2\%+3)$	1V

AC True RMS

Frequency: 40Hz~1kHz

Overload protection: 600V DC or AC rms

Impedance: 10M Ω , More than 100M Ω on 60mV/600mV range

2.2.3 DC Current

Range	Accuracy	Resolution
600 μ A	$\pm (1.2\%+2)$	0.1 μ A
6000 μ A		1 μ A
60mA		10 μ A
600mA		100 μ A
6A	$\pm (2.0\%+3)$	1mA
15A		10mA

Overload protection: 0.8A/600V, 15A/600V fuse

Continuous testing the maximum steady-state current of 1A

2.2.4 AC Current

Range	Accuracy	Resolution
600 μ A	$\pm (1.5\%+3)$	0.1 μ A
6000 μ A		1 μ A
60mA		10 μ A
600mA		100 μ A
6A	$\pm (2.5\%+5)$	1mA
15A		10mA

AC True RMS

Frequency: 40Hz~1kHz

Overload protection: 0.8A/600V, 15A/600V fuse

Continuous testing the maximum steady-state current of 1A

2.2.5 Resistance

Range	Accuracy	Resolution
600 Ω	$\pm (1.0\%+3)$	0.1 Ω
6k Ω	$\pm (1.0\%+2)$	1 Ω
60k Ω		10 Ω
600k Ω		100 Ω
6M Ω		1k Ω
60M Ω	$\pm (1.5\%+3)$	10k Ω


Overload protection: 600V DC or AC rms

2.2.6 Capacitance

Range	Accuracy	Resolution
9.999nF	$\pm (3.0\%+10)$	1pF
99.99nF	$\pm (2.5\%+5)$	10pF
999.9nF		100pF
9.999 μ F		1nF
99.99 μ F	$\pm (5.0\%+10)$	10nF
999.9 μ F	$\pm (10.0\%+20)$	100nF
9.999mF		1 μ F
99.99mF		10 μ F

Overload protection: 600V DC or AC rms

2.2.7 Diode and Audible continuity test

Range	Description	Test condition
	Display read approximately forward voltage of diode	Forward DC current approx. 1.5mA Reversed DC voltage approx. 3.2V
	Built-in buzzer sounds if resistance is less than 50 Ω	Open circuit voltage approx. 1V

Overload protection: 600V DC or AC rms

2.2.8 Frequency

Range	Accuracy	Resolution
9.999Hz	$\pm (0.1\%+5)$	0.001Hz
99.99Hz		0.01Hz
999.9Hz		0.1Hz
9.999kHz		1Hz
99.99kHz		10Hz
999.9kHz		100Hz
9.999MHz		1kHz

Sensitivity: sine wave 0.6V rms (9.999MHz: 1.5V rms)

Overload protection: 600V DC or AC rms

2.2.9 Duty cycle

0.1%~99.9%: $\pm (2.0\%+2)$ Frequency lower than 10kHz

Sensitivity: sine wave 0.6V rms

Overload protection: 600V DC or AC rms

2.2.10 Temperature

Range	Accuracy		Resolution
$^{\circ}$ C/ $^{\circ}$ F	-20~150 $^{\circ}$ C	$\pm (3^{\circ}$ C+1)	1 $^{\circ}$ C/1 $^{\circ}$ F
	-4~302 $^{\circ}$ F	$\pm (5^{\circ}$ F+2)	
	151~1000 $^{\circ}$ C	$\pm (3\%+2)$	
	303~1832 $^{\circ}$ F	$\pm (3\%+3)$	

NiCr-NiSi sensor

Overload protection: 600V DC or AC rms

3. OPERATION

3.1 DC and AC Voltage Measurement

- 1) Connect the black test lead to "**COM**" socket and red test lead to the "**VΩHz**" socket.
- 2) Set the selector switch to desired "**mV**" or "**V**" position.
- 3) Press "**SELECT**" key to choose "**DC**" or "**AC**" measurement.
- 4) Measure the voltage by touch the test lead tips to the test circuit where the value of voltage is needed.
- 5) Read the result from the LCD panel.
- 6) On **AC** range, press "**Hz/%**" key to measurement **frequency** or **duty cycle**.

3.2 DC and AC Current Measurement

- 1) Connect the black test lead to "**COM**" socket. For measurement up to 600mA, connect the red test lead to the "**μA**" socket; for measurement from 600mA to 15A, connect the red test lead to the "**15A**" socket.
- 2) Set the selector switch to desired "**μA**", "**mA**" or "**A**" position.
- 3) Press "**SELECT**" key to choose "**DC**" or "**AC**" measurement.
- 4) Remove power from the circuit under test and open the normal circuit path where the measurement is to be taken. Connect the meter in series with the circuit.
- 5) Read the result from the LCD panel.
- 6) On **AC** range, press "**Hz/%**" key to measurement **frequency** or **duty cycle**.

3.3 Resistance Measurement

- 1) Connect the black test lead to "**COM**" socket and red test lead to the "**VΩHz**" socket.
- 2) Set the selector switch to desired "**Ω**" position.
- 3) Connect tip of the test leads to the points where the value of the resistance is needed.
- 4) Read the result from the LCD panel.

Note:

When take resistance value from a circuit system, make sure the power is cut off and all capacitors need to be discharged.

3.4 Capacitance Measurement

- 1) Connect the black test lead to "**COM**" socket and red test lead to the "**VΩHz**" socket.
- 2) Set the selector switch to desired "**Ω**" position.
- 3) Press "**SELECT**" key to choose **Capacitance** measurement.
- 4) Connect tip of the test leads to the points where the value of the capacitance is needed.
- 5) Read the result from the LCD panel.

Note: Before testing, discharge the capacitor by shorting its leads together.

Use caution in handling capacitors because they may have a charge on them of considerable power before discharging.

3.5 Diode and Audible continuity Test

- 1) Connect the black test lead to "**COM**" socket and red test lead to the "**VΩHz**" socket.
- 2) Set the selector switch to desired " $\Omega \rightarrow \rightarrow \rightarrow \rightarrow$ " position.
- 3) Press "**SELECT**" key to choose **Diode** or **Audible continuity** measurement.
- 4) Connect the test leads across the diode under measurement, display shows the approx. forward voltage of this diode.
- 5) Connect the test leads to two point of circuit, if the resistance is lower than approx. 50Ω , the buzzer sounds.

Note:

Make sure the power is cut off and all capacitors need to be discharged under this measurement.

3.6 Frequency and Duty cycle measurement

- 1) Connect the black test lead to "**COM**" socket and red test lead to the "**VΩHz**" socket.
- 2) Set the selector switch to desired "**Hz**" position.
- 3) Press "**Hz/%**" key to choose **Frequency** or **Duty cycle** measurement.
- 4) Connect the probe across the source or load under measurement.
- 5) Read the result from the LCD panel.

3.7 Temperature Measurement

- 1) Connect the black banana plug of the sensor to "**COM**" socket and red banana plug to the "**VΩHz**" socket.
- 2) Set the selector switch to desired " $^{\circ}\text{C}/^{\circ}\text{F}$ " position.
- 3) Press "**SELECT**" key to choose $^{\circ}\text{C}$ or $^{\circ}\text{F}$ measurement.
- 4) Put the sensor probe into the temperature field under measurement.
- 5) Read the result from the LCD panel.

3.8 Data Hold

On any range, press the "**D.H ✱**" key to lock display value, and the "**DH**" sign will appear on the display, press it again to exit.

3.9 Back Light

On any range, press the "**D.H ✱**" key over 2 seconds to light the back light, press it again for more than 2 seconds to wink the light.

3.10 Relative measurement

Press the "**REL Δ** " key, you can measure the relative value and " Δ " sign will appear on the display, the auto range mode is changed to manual range mode. Press it again to exit relative measurement and " Δ " sign disappears, but you can not go back to auto range mode. This function is non effective on **Hz/%** measurement.


3.11 Auto/Manual range

The auto range mode is a convenient function, but it might be faster to manually set the range when you measure values that you know to be within a certain range.

To select manual range, repeatedly press “**RANGE**” key until the display shows the desired range. The range steps upward as you press “**RANGE**” key. The meter will go back to auto range mode when you press “**RANGE**” key for more than 2 seconds.

Caution: while using the manual range mode, if “**OL**” sign appears on the display, immediately set range to a higher.

4. Battery replacement

- 1) When the battery voltage drop below proper operation range, the “” symbol will appear on the LCD display and the batteries need to be changed.
- 2) Before changing the battery, set the selector switch to “**OFF**” position. Open the cover of the battery cabinet by a screwdriver.
- 3) Replace the old battery with the same type battery.
- 4) Close the battery cabinet cover and fasten the screw.

Caution: Dispose the used batteries according to the rules, which are defined by each community.

Warning: If an explosion or fire hazard could occur through fitting a battery of the wrong type.

5. Fuse replacement

- 1) This meter is provided with a 0.8A/600V fuse to protect the battery test and the current measuring circuits which measure up to 600mA, with a 15A/600V fuse to protect the 15A range.
- 2) Ensure the instrument is not connected to any external circuit, set the selector switch to “**OFF**” position and remove the test leads from the terminals.
- 3) Remove the three screws on the bottom case and lift the bottom case. Replace the old fuse with the same type and rating:
5×20mm 0.8A/600V or 5×20mm 15A/600V fuse.
- 4) Close the bottom case and fasten the screws.

6. MAINTENANCE

- 1) Before opening the battery cover, disconnect both test leads and never use the meter before the battery cover is closed.
- 2) To avoid contamination or static damage, do not touch the circuit board without proper static protection.
- 3) If the meter is not going to be used for a long time, take out the battery and do not store the meter in high temperature or high humidity environment.
- 4) Repairs or servicing not covered in this manual should only be performed by qualified personnel.
- 5) Periodically wipe the case with a dry cloth and detergent. Do not use abrasives or solvents on the meter.

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