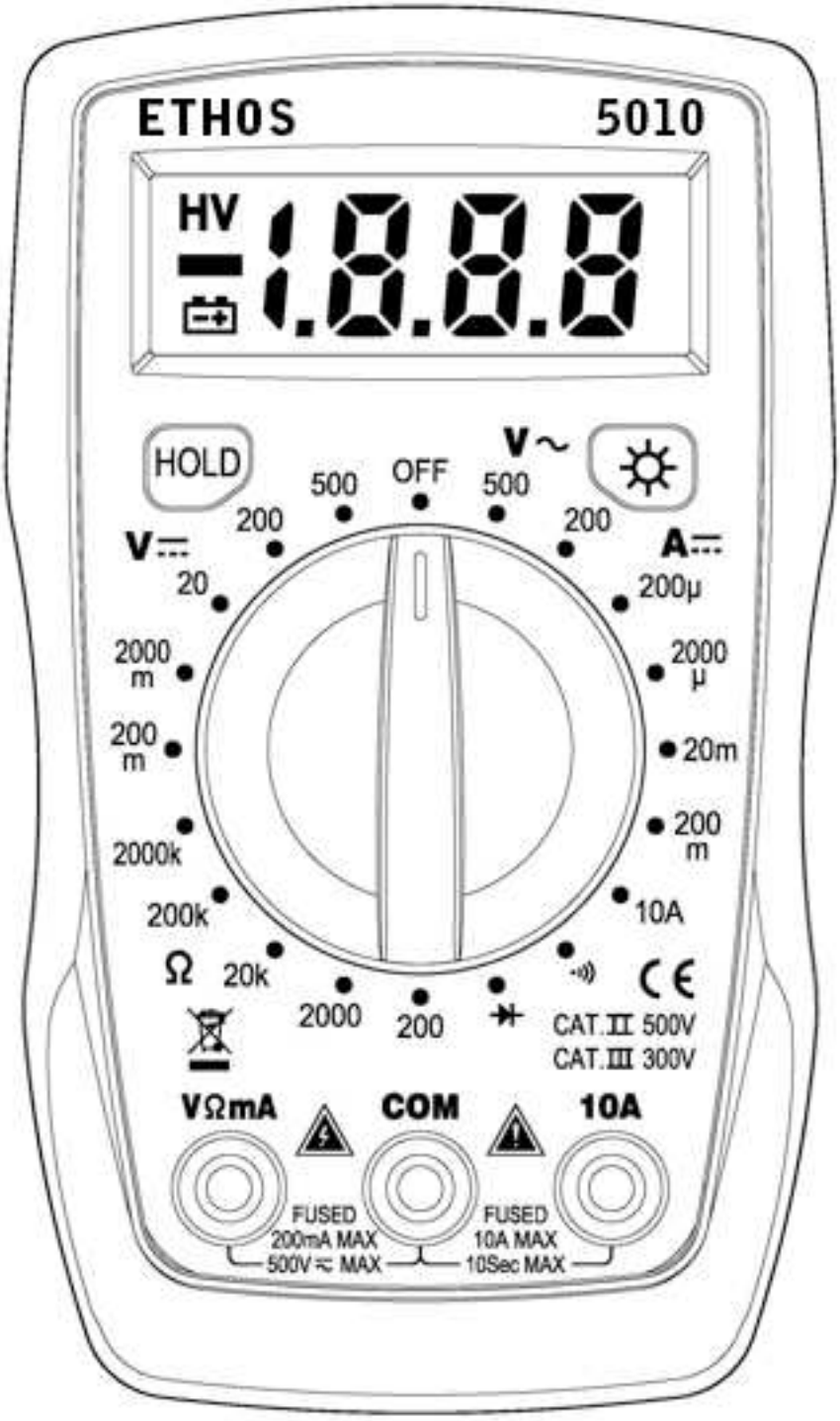
ETHOS 5010

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 is not "live" before opening it in order to connect the test leads.

1.4 Do not perform resistance, 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℃ to 40℃. Maximum relative humidity 80% for temperatures up to 31℃, decreasing linearly to 50% relative humidity at 40℃. Pollution Degree 2.

2. SPECIFICATIONS

2.1 GENERAL SPECIFICATIONS

Display: LCD with a max. reading of 1999.

Range control: Manual range control.

Polarity: Automatic negative polarity indication.

Zero adjustment: Automatic.

Over-range indication: The “1” or “-1” display.

Low-battery indication: Display "  " sign.

Safety standards: CE **EMC/LVD. CAT Ⅱ 500V~. CAT Ⅲ 300V~.**
The meter is up to the standards of IEC1010 Double Insulation, Pollution Degree 2, Overvoltage Category Ⅱ.

Operating environment: Temperature 0°C to 40°C (32 to104°F),
Humidity ≤ 80% RH.

Storage environment: Temperature -20°C to 60°C (-4 to140°F),
Humidity ≤ 90% RH.

Fuse: F0.5A/500V 5 x 20mm, F10A/500V 5 x 20mm.

Test lead probe: CAT Ⅱ 500V / CAT Ⅲ 300V, 10A, L=90cm.

Power supply: 3V CR2032 battery.

Dimension: 125(H) x 74(W) x 30(D) mm

Weight: Approx. 100g (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
200mV	± (1.0%+2)	0.1mV
2000mV		1mV
20V		10mV
200V		100mV
500V	± (1.2%+2)	1V

Overload protection: 500V DC or AC rms

Impedance: 1MΩ

2.2.2 AC Voltage

Range	Accuracy	Resolution
200V	± (1.5%+3)	100mV
500V		1V

Average sensing, calibrated to rms of sine wave

Frequency: 40～500Hz
Overload protection: 500V DC or AC rms
Impedance: 450kΩ

2.2.3 DC Current

Range	Accuracy	Resolution
200μA	± (1.5%+2)	0.1μA
2000μA		1μA
20mA		10μA
200mA	± (2.0%+2)	100μA
10A	± (2.0%+3)	10mA

Overload protection: F0.5A/500V, F10A/500V fuse
Note: 10A up to 10 seconds

2.2.4 Resistance

Range	Accuracy	Resolution
200Ω	± (1.0%+5)	0.1Ω
2000Ω	± (1.0%+3)	1Ω
20kΩ		10Ω
200kΩ		100Ω
2000kΩ	± (1.5%+3)	1kΩ

Overload protection: F0.5A/500V fuse

2.2.5 Diode and Audible continuity test

Range	Description	Test condition
	Display read approximately forward voltage of diode	Forward DC current approx. 10μA Reversed DC voltage approx. 1.8V
	Built-in buzzer sounds if resistance is less than 50Ω	Open circuit voltage approx. 1.8V

Overload protection: F0.5A/500V fuse

3. OPERATION

3.1 DC Voltage Measurement

1) Connect the black test lead to the "**COM**" socket and red test lead to the "**VΩmA**" socket.
2) Set the selector switch to desired "**V⎓**" position.
3) Measure the voltage by touch the test lead tips to the test circuit where the value of voltage is needed.
4) Read the result from the LCD panel. The polarity of the red lead connection

will be indicated along with the DC voltage value.

Note:

a) If the voltage range is not known beforehand, set the selector switch to high range and work down.

b) When “1” or “-1” is display, over-range is being indicated and the selector switch must be set to a higher range.

c) Don’t apply more than 500V DC or AC rms to the input, indication is possible at higher voltage but there is danger of damaging the internal circuit.

d) Use extreme caution to avoid contact with high tension circuits when measuring high voltage.

3.2 AC Voltage Measurement

1) Connect the black test lead to the "**COM**" socket and red test lead to the "**VΩmA**" socket.

2) Set the selector switch to desired “**V~**” position.

3) Measure the voltage by touch the test lead tips to the test circuit where the value of voltage is needed.

4) Read the result from the LCD panel.

Note: See DC voltage measurement note a)～d).

3.3 DC Current Measurement

1) Connect the black test lead to "**COM**" socket. For measurement up to 200mA, connect the red test lead to the "**VΩmA**" socket; for measurement from 200mA to 10A, connect the red test lead to the "**10A**" socket.

2) Set the selector switch to desired “**A⎓**” position.

3) 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.

4) Read the result from the LCD panel. The polarity of the red lead connection will be indicated along with the DC current value.

Note:

a) If the current range is not known beforehand, set the selector switch to high range and work down.

b) When “1” or “-1” is display, over-range is being indicated and the selector switch must be set to a higher range.

c) The maximum input current is 500mA and 10A depending upon the jack used. The F0.5A/500V fuse protect the current measuring circuits that measure up to 200mA, the F10A/500V fuse protect the current measuring circuits that measure from 200mA to 10A. The maximum time of the 10A range measurement each is 15 seconds.

3.4 Resistance Measurement

1) Connect the black test lead to the "**COM**" socket and red test lead to the "**VΩmA**" 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:

a) If the resistance value being measured exceeds the maximum value of the range selected, an over-range indication will be displayed (“1”), select a higher range. For resistance of approximately 1 megohm and above, the meter may take a few seconds to stabilize, this is normal for high resistance readings.
b) When the input is not connected, i.e. at open circuit, the sign “1” or “-1” will be displayed for the over-range condition.
c) When checking in-circuit resistance, be sure the circuit under test has all power removed and that all capacitors are fully discharged.

3.5 Diode Test

1) Connect the black test lead to the "**COM**" socket and red test lead to the "**VΩmA**" socket.
2) Set the selector switch to desired “⊣◀” position.
3) Connect the test leads across the diode under measurement, display shows the approx. forward voltage of this diode.

Note:

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

3.6 Audible continuity Test

1) Connect the black test lead to the "**COM**" socket and red test lead to the "**VΩmA**" socket.
2) Set the selector switch to desired “•))” position.
3) 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.

3.7 Data Hold

On any range, press the “**HOLD**” key to lock display value, press it again to exit.

3.8 Back Light

On any range, press the “☼” key to light the back light, press it again to flash the light.

4. Battery replacement

1) When the battery voltage drop below proper operation range, the “▭”

symbol will appear on the LCD display and the battery need to changed.
2) Before changing the battery, set the selector switch to "**OFF**" position to power off and remove the test leads from the terminals.
3) Remove the two screws on the bottom case and lift the bottom case.
4) Replace the old battery with the same type battery.
5) Close the bottom case and fasten the screws.
Caution: Dispose the used batteries according to the rules, which are defined

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 F0.5A/500V fuse to protect the resistance, Diode, Audible continuity test and the current measuring circuits which measure up to 200mA, with a F10A/500V fuse to protect the 10A range.
2) Ensure the meter is not connected to any external circuit, set the selector switch to "**OFF**" position to power off and remove the test leads from the terminals.
3) Remove the two screws on the bottom case and lift the bottom case.
4) Replace the old fuse with the same type and rating:
   5×20mm F0.5A/500V or 5×20mm F10A/500V fuse.
5) Close the bottom case and fasten the screws.

6. MAINTENANCE

1) Before open the bottom case, disconnect both test lead and never uses the meter before the bottom case 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 personal.
5) Periodically wipe the case with a dry cloth and detergent. Do not use abrasives or solvents on the meter.

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