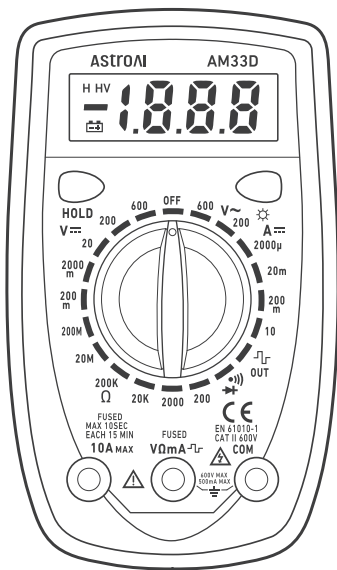


AstroAI



AM33D

DIGITAL MULTIMETER USER MANUAL

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INTRODUCTION

Thank you for purchasing the AstroAI Digital Multimeter.

The AstroAI Digital Multimeter is designed to be safely and accurately used in schools, laboratories, factories and other social/industrial settings. This user manual provides all the safety information, operation instructions, specifications and maintenance information for the meter. This tool can test AC/DC Voltage, DC Current, Resistance, Diodes and Continuity.

Thank you again for choosing AstroAI, if you have any questions or concerns regarding your product, please contact us at **support@astroai.com**



Please fully read and understand this manual before using this product and keep it for future reference.

WARNING

To avoid possible electric shocks, personal injury and damage to the meter or the equipment being tested, adhere to the following rules:

- Use the meter strictly in accordance with this manual. Otherwise, the protection function provided by the meter may be damaged or weakened.
- Please be especially careful when measuring over 60 V DC, 30 V AC RMS or 42 V peak value, there is an increased risk of electric shocks.
- Do not apply more than the rated voltage marked on the meter, between the terminals or between any terminal and grounding.
- Check whether the meter is working normally by measuring a known voltage, do not use it if the readings are incorrect or if the meter is damaged.
- Before using the meter, please check whether there are cracks or damage to the meter's plastic casing. Do not use the meter if any part of the exterior casing is damaged.
- Use the meter according to the measurement category, voltage or current rating specified on the meter or manual.
- Comply with local and national safety regulations. Wear personal protective equipment (such as approved rubber gloves, masks and flame-retardant clothing, etc.) to prevent injury from electric shocks and arcs when hazardous live conductors are exposed.
- Replace the battery as soon as the low-battery indicator appears to avoid measurement errors.
- Do not use the meter around explosive gas, steam or humid environments.
- When using the test leads, keep your fingers behind the finger guards.
- When measuring, connect the neutral/ground wire first, then connect the live wire. When disconnecting, disconnect the live wire first and then disconnect the neutral/ground wires.

- Before opening the case or battery cover, remove the test leads from the meter. Do not use the meter when it is disassembled or when the battery cover is opened.
- The meter can only be safely used with the equipped test leads. Before using the meter, please check the test leads. If they are damaged and need to be replaced, only replace them with the same model and the same electrical specifications.

PACKAGE INCLUDES

User Manual	x 1
Pair of Test Leads	x 1
AstroAI Digital Multimeter	x 1

ELECTRIC SYMBOLS

 AC (Alternating Current)

 DC (Direct Current)

V Voltage

A Current

 Square Wave

 Double Insulation

CE Compliant with EU Standards

 Low Battery Symbol

 Audible Continuity Test

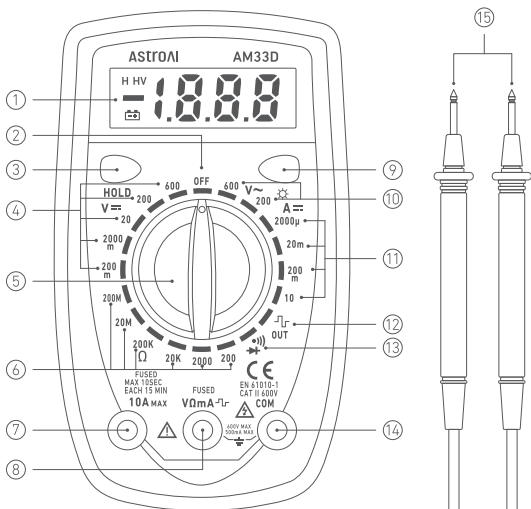
 Diode Test

 Resistance Test

 Earth Ground

 Warning

DIAGRAM



① LCD Screen

⑥ Resistance

⑪ DC Current Test

② OFF

⑦ 10 A Terminal

⑫ Square Wave Output

③ Hold Button

⑧ VΩmA Terminal

⑬ Continuity Test/Diode Test

④ DC Voltage Test

⑨ Backlight Button

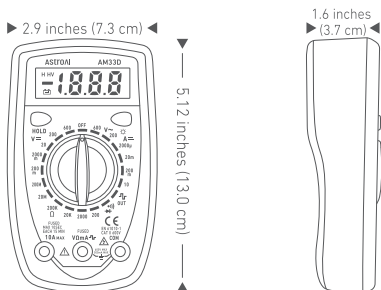
⑭ COM Terminal

⑤ Rotary Switch

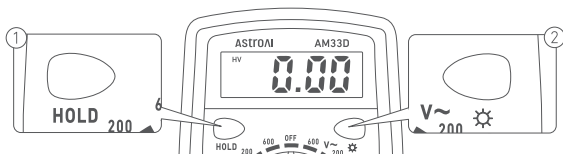
⑩ AC Voltage Test

⑮ Test Leads

DIMENSIONS



BUTTON FUNCTIONS



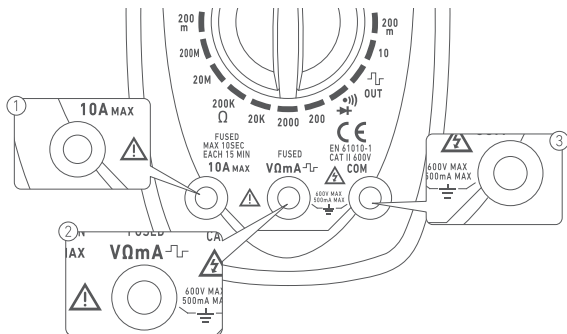
① Hold Button

- Press the HOLD Button to hold or cancel the data.
- Press this button while performing a test to freeze (hold) the reading for recording. The reading will stay on the screen while the hold function is activated. Press the HOLD Button again to turn off this function.

Note: The screen will display " H " while the data hold function is active.

② Backlight Button

Press the Backlight Button to turn on the screen's backlight. The backlight allows you to get a clear reading in a dim environment. When the backlight is turned on, it will turn dark slowly until it is completely off. When it turns dark, press the button again and it will illuminate again. If you need to quickly turn off the backlight, move the rotary switch to the OFF position.



① 10 A Terminal

Plug the red test lead into the 10 A terminal when using the 10 A DC current test.

② VΩmA Terminal

Plug the red test lead into the “VΩmA” terminal when you need to use functions other than 10 A.

③ COM Terminal

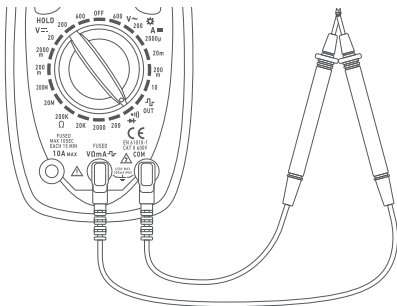
Plug the black test lead into the COM terminal.

INSTRUCTIONS

- To avoid damaging the meter, do not measure voltages exceeding 600 V.
- This meter is a manual range multimeter. Ensure you choose the correct measuring range to prevent damage.
- Pay special attention to safety when measuring high voltages to avoid electric shock or personal injury.
- Before using, please confirm that the meter's functions work properly by testing a known voltage or current.

Measuring DC Voltage

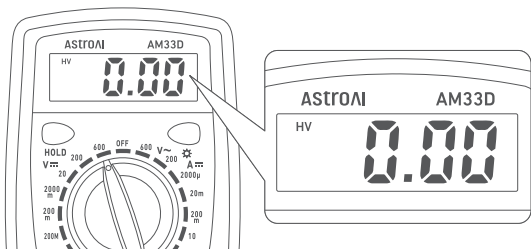
1. Insert the red test lead into the "VΩmA" terminal and the black test lead into the "COM" terminal.
2. Turn the rotary switch to the continuity test and touch the red and the black test leads together to check whether they are functioning normally. The buzzer will beep if the test leads are normal.



3. Turn the rotary switch to the " V_{DC} " area with a white font. The screen will display "000" indicating that the measurement function is DC voltage.

Note:

- The test unit of the " V_{DC} " area is "V"; If the number on the white area is followed by "m", then the test unit is "mV".
- If the measurement range is at the maximum (600 V setting) "HV" will be displayed on the screen.



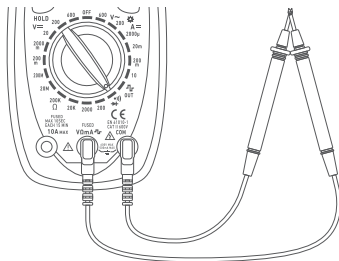
4. Connect the test leads to the circuit being tested. Be sure to connect the leads in parallel to the power supply or circuit.

Note: If the reading is negative when measuring the DC voltage, it means that the positive and negative poles of the test leads are reversed, please switch the test leads.

5. After the reading stabilizes, record the reading from the LCD screen.
6. Turn the rotary switch to the OFF position to turn off the meter.

Measuring AC Voltage

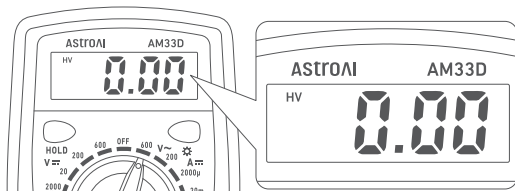
1. Insert the red test lead into the “VΩmA~” terminal and the black test lead into the “COM” terminal.
2. Turn the rotary switch to the continuity test and touch the red and black test leads together to check whether they are functioning normally. The buzzer will beep if the test leads are normal.



3. Turn the rotary switch to the “V~” area with a white font. The screen will display “000” indicating that the measurement function is AC voltage.

Note:

- The test unit of the “V~” area is “V”.
- If the measurement range is at the maximum (500 V setting) “HV” will be displayed on the screen.



4. Connect the test leads to the circuit being tested. Be sure to connect the leads in parallel to the power supply or circuit.
5. After the reading stabilizes, record the reading from the LCD screen.
6. Turn the rotary switch to the OFF position to turn off the meter.

Voltage Tips

How to find a live wire in a socket:

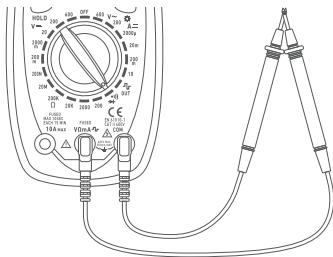
1. Switch to the voltage test setting.
2. Connect the black test lead to the grounded wire or terminal. Connect the red test lead to one of the terminals to be measured.
3. Check both terminals. One should have a reading and the other should remain at or near zero. The live wire will be the one with the reading.

Voltage Notes

- When measuring an unknown voltage, choose the 600 V setting. After the initial measurement, select an appropriate range based on its voltage.
- To avoid damaging the meter, do not measure voltage exceeding 600 V DC or 600 V AC CAT II.
- If the AC setting is used to measure DC or vice versa, an overflow symbol will be displayed. Performing this action may damage the meter and any components you are attempting to test.
- When measuring voltage, the result will fluctuate depending on the power supply. Generally, the result will fluctuate ± 10 V, which is NOT an inaccurate result.

Measuring DC Current

1. Disconnect the power supply of the circuit under test.
2. Insert the red test lead into the "VΩmA" terminal and the black test lead into the "COM" terminal.
3. Turn the rotary switch to the continuity test and touch the red and black test leads together to check whether they are functioning normally. The buzzer will beep if the test leads are normal.



4. Insert the black test lead into the "COM" terminal and the red test lead into the 10 A terminal.

Note: Please be sure to start the test from the 10 A setting when measuring an unknown current.

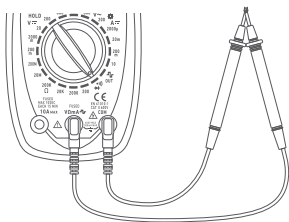
5. Turn the rotary switch to the 10 A setting of "A" area. The screen will display "0.00" indicating that the measurement function is a DC current from 200 mA to 10 A.



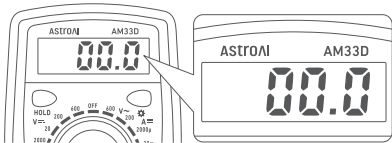
6. Connect the meter to the circuit under test in series and then turn on the circuit's power supply.
7. After the reading stabilizes, record the reading from the LCD screen.
8. Turn the rotary switch to the OFF position to turn off the meter.

Measuring DC A Current

1. Disconnect the power supply of the circuit under test.
2. Insert the red test lead into the "VΩmA" terminal and the black test lead into the "COM" terminal.
3. Turn the rotary switch to the continuity test and touch the red and black test leads together to check whether they are functioning normally. The buzzer will beep if the test leads are normal.



4. Turn the rotary switch to the "A" area with yellow font. The screen will display "000" indicating that the measurement function is a DC A current from 2000 μ A to 200 mA.



Note:

- The test unit of the "A~~---~~" area is "A"; If the number on the yellow area is followed by "m", then the test unit is "mA". If the number on the yellow area is followed by "μ", then the test unit is "μA".
 - When measuring an unknown current, start by measuring it on a setting with a higher maximum rating. After the initial measurement, select an appropriate range based on the measured current.
5. Connect the meter to the circuit under test in series and then turn on the circuit's power supply.
 6. After the reading stabilizes, record the reading from the LCD screen.
 7. Turn the rotary switch to the OFF position to turn off the meter.

Automotive Parasitic Battery Drain

1. Check if the battery voltage and power generation are within the normal range. The battery voltage is generally around 12.7 V and the power generation is around 14 V.
2. Turn off all electrical accessories inside and outside the car and close the doors.
3. Remove the battery's negative electrode. Set the multimeter to the maximum current level and connect the meter in series to the battery.
4. Connect the red test lead to the negative line and the black test lead to the battery terminal.
5. Adjust the meter, if necessary, to a lower range.
6. Wait for about 30 minutes; after all the modules of the vehicle have entered the sleep state, read the static discharge current. The discharge current is generally 0.02 A (20 mA). However, this can vary depending on the vehicle. Normally it will not exceed 50 mA.

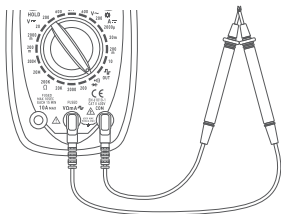
7. If the drain is larger than 50 mA, begin checking fuses individually to determine which circuit is carrying the excess load. If removing a fuse reduces the battery draw to below 50 mA, it likely means that the corresponding circuit is drawing the excess discharge.

Current Notes

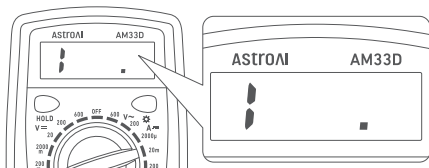
- When measuring an unknown current, start by measuring it on a setting with a higher maximum rating. Then select an appropriate range according to the result.
- If you insert the red test lead into the 10 A terminal, be sure to insert the test lead back into the "VΩmA-" terminal after the test. Failure to switch the test lead back before the next operation may damage the multimeter.
- When testing a high current, each measurement time should be less than 10 seconds for safety reasons. The interval time between tests should be greater than 15 minutes.
- When testing the current, there must be a load in the circuit. Do not connect the multimeter in series with the circuit without a load to measure. Doing so may damage the meter.
- Do not apply a current exceeding the meter's range, doing so may damage the meter.

Measuring Resistance

1. Insert the red test lead into the “VΩmA” terminal and the black test lead into the “COM” terminal.
2. Turn the rotary switch to the continuity test and touch the red and black test leads together to check whether they are functioning normally. The buzzer will beep if the test leads are normal.



3. Turn the rotary switch to the “Ω” area with a yellow font. The screen will display “1” indicating that the measurement function is resistance.



Note:

- The test unit of the “Ω” area is “Ω”; If the number on the yellow area is followed by an “M”, then the test unit is “MΩ”; If the number on the yellow area is followed by a “K”, then the test unit is “KΩ”.
- When measuring an unknown resistance, start by measuring it on a setting with a higher maximum rating. Then select an appropriate range according to the result.

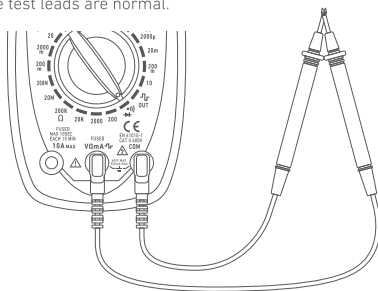
4. Connect the test leads to both ends of the circuit or resistor under test in parallel.
5. After the reading stabilizes, record it from the LCD screen.
6. Turn the rotary switch to the OFF position to turn off the meter.

Resistance Notes

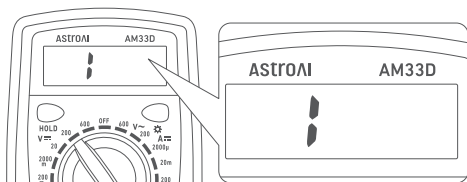
- Do not change the resistance while taking a measurement. Doing so may damage the meter and affect the test results.
- Do not test parallel circuits. The accuracy of the measurement will be affected and the results may not be accurate.
- Do not directly measure the internal resistance of micrometers, galvanometers, batteries and other instruments.

Continuity Test

1. Insert the red test lead into the "VΩmA-" terminal and the black test lead into the "COM" terminal.
2. Turn the rotary switch to the "" setting. Touch the red and black test leads together to check whether they are functioning normally. The buzzer will beep if the test leads are normal.



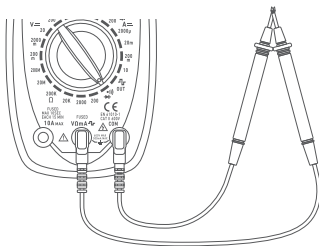
3. Connect the test leads to both ends of the circuit or resistor under test in parallel. If the resistance of the circuit or resistor under test is connected and less than $50\ \Omega$, the buzzer will emit a beep sound.
4. If the circuit or resistor under test is disconnected, or the resistance value is greater than $30\ \Omega \pm 20\ \Omega$, the LCD screen will display "1".



5. Turn the rotary switch to the OFF position to turn off the meter.

Diode Test

1. Insert the red test lead into the "VΩmA- " terminal and the black test lead into the "COM" terminal.
2. Turn the rotary switch to the " " setting. Touch the red and black test leads together to check whether they are functioning normally. The buzzer will beep if the test leads are normal.



3. Connect the red test lead to the anode of the diode under test and the black test lead to the cathode of the diode.

Note: Usually the anode of the diode is the longer end.

4. The LCD screen will display the approximate voltage drop reading of the diode. The test unit is "mV". If the test leads are connected in reverse, "1" will be displayed on the LCD screen. Please switch the test leads and measure again.

5. Turn the rotary switch to the OFF position to turn off the meter.

Diode Test Tips

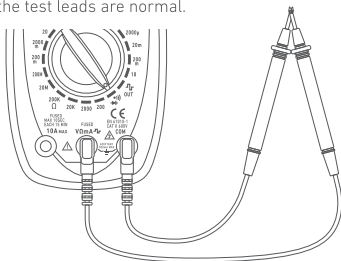
- Is the diode functioning correctly? If the red test lead is connected to the positive pole of the diode and the black lead is connected to the negative, then the diode should be in a forward conduction state. The displayed value is the forward voltage drop.
- Normal diode forward pressure drop: For general silicon tubes the range is 0.5-0.7 V, for germanium tubes the range is 0.15-0.3 V.
- You can also verify that the red test lead is connected to the negative pole of the tested diode and the black test lead is connected to the positive pole. The diode should display "1".

Polarity Judgment Method

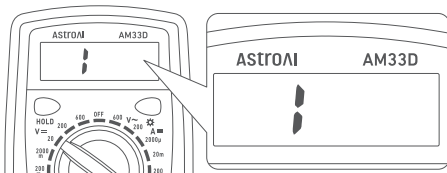
1. Switch the multimeter to the Resistance setting.
2. Connect the two test leads to the two electrodes of the diode.
3. Measure one result, then swap the positions of the test leads and measure the second result.
4. The larger result is the reverse resistance and the smaller result is the forward resistance. The smaller resistance is when the black test lead is connected to the positive end of the diode and the red lead is connected to the negative end.

Square Wave Output

1. Insert the red test lead into the "VΩmA- μ " terminal and the black test lead into the "COM" terminal.
2. Turn the rotary switch to the continuity test. Touch the red and black test leads together to check whether they are functioning normally. The buzzer will beep if the test leads are normal.



3. Turn the rotary switch to the " μ OUT" setting. The screen will display "1" indicating that the measurement function is square wave output.



4. Connect the test leads in parallel to both ends of the power supply or circuit being tested.
5. After the reading stabilizes, record the reading from the LCD screen.
6. Turn the rotary switch to the OFF position to turn off the meter.

MAINTENANCE

Cleaning the Meter

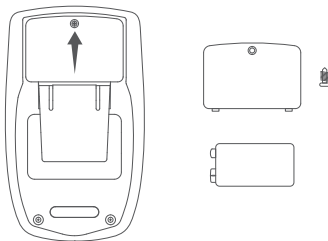
If there is dust or humidity in the terminals, it may produce erroneous measurements. Please clean the meter as follows:

1. Turn off the meter and remove the test leads.
2. Turn the meter over and shake out the dust accumulated in the input terminal. Then, wipe the case with a damp cloth or mild detergent. Wipe the contacts in each terminal with a clean cotton swab dampened in alcohol.

Replacing the Battery and Fuse

Battery Replacement

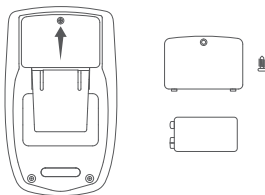
1. Turn off the meter and remove the test leads.
2. Unscrew the battery cover screws with a screwdriver and remove the cover.



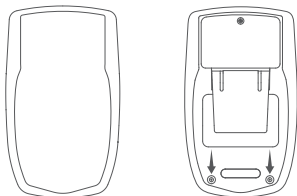
3. Remove the old battery and replace it with a new battery of the same specification.
 4. Put the battery cover back to its original position and affix the battery cover with the removed screws.
- Battery Type: 1 x 9 V Battery NEDA 1604/6F22/006P.

Fuse Replacement

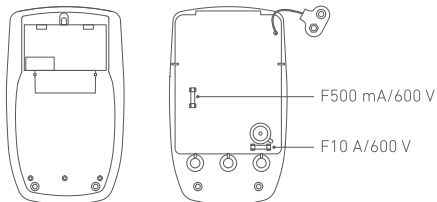
1. Turn off the meter and remove the test leads.
2. Unscrew the battery cover screws with a screwdriver and remove the cover and the batteries.



3. Remove the insulating sleeve and screws on the back cover of the meter.



4. Remove the blown fuses and replace them with new fuses of the same specification, make sure that the fuses are loaded into the fuse clip and clamped tightly.



5. Put the insulation cover, battery and battery cover back. Then replace the cover with the removed screws.

- Fuse specifications:

Fuse 1: F500 mA/600 V fuse; Size: $\Phi 5 \times 20$ mm.

Fuse 2: F10 A/600 V fuse; Size: $\Phi 5 \times 20$ mm.

SPECIFICATIONS

Digital Display	2000, 3 1/2
Sampling Speed	2 Times/Second
LCD Dimensions	1.93 x 0.67 Inches/49 x 17 mm
Range Selection	Manual
Polarity Indication	"-" Automatically Displayed
Overload Indication	"1" Displayed
Work Environment	32~104 °F; 0~40 °C, at <80%RH
Storage Temperature	14~122 °F; -10~50 °C, at <85%RH
Power	1 x 9 V Battery NEDA 1604/6F22/006P
Weight	0.32 lb/Approximately 145 g
Dimensions	5.12 x 2.87 x 1.46 Inches/130 x 73 x 37 mm
Low Battery Indication	"  " Displayed when battery voltage is lower than normal

DETAILED SPECIFICATIONS

Accuracy is guaranteed for 1 year, with storage conditions of $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, less than 80%RH.

DC Voltage

Range	Resolution	Accuracy	Overload Protection
200 mV	100 μV	$\pm (0.5\% + 3)$	220 V RMS AC
2000 mV	1 mV	$\pm (0.8\% + 2)$	600 V DC/600 V RMS
20 V	10 mV		
200 V	100 mV		
600 V	1 V	$\pm (0.8\% + 3)$	

AC Voltage

Range	Resolution	Accuracy	Overload Protection
200 V	100 mV	$\pm (2.0\% + 10)$	600 V DC/600 V RMS
600 V	1 V		

DC Current

Range	Resolution	Accuracy	Overload Protection
2000 μA	1 μA	$\pm (2.0\% + 5)$	500 mA, 600 V fuse
20 mA	10 μA		
200 mA	100 μA		
10 A	10 mA	$\pm (2.5\% + 5)$	10 A, 600 V fuse

Measured Voltage Drop: 200 mV.

Resistance

Range	Resolution	Accuracy	Overload Protection
200 Ω	0.1 Ω	± (1.5% + 5)	15 seconds maximum exposure to 220 V RMS
2000 Ω	1 Ω	± (1.0% + 4)	
20 KΩ	10 Ω		
200 KΩ	100 Ω		
20 MΩ	10 KΩ	± (1.0% + 10)	
200 MΩ	100 KΩ		

Maximum Open Circuit Voltage: 3 V.

Continuity Test

Range	Resolution	Overload Protection
	A built-in buzzer sounds if resistance is less than $30 \pm 20 \Omega$	15 seconds maximum exposure to 220 V RMS

RECYCLING

You may dispose of the product when its service life has ended, please recycle the recyclable parts according to local guidelines.

WARRANTY PERIOD

3-Year Limited Warranty from AstroAI.

Each AstroAI Digital Multimeter will be free from defects in material and workmanship. This warranty does not cover fuses, disposable batteries and damage from neglect, misuse, contamination, alteration, accident, or abnormal conditions of operation or handling, including over-voltage failures caused by use outside the meter's specified rating, or normal wear and tear of mechanical components. This warranty covers the original purchaser only and is not transferable.

Questions or concerns? We're happy to help! Please contact us via **support@astroai.com**

AstroAI

Web: www.astroai.com

E-Mail: support@astroai.com

V2.1