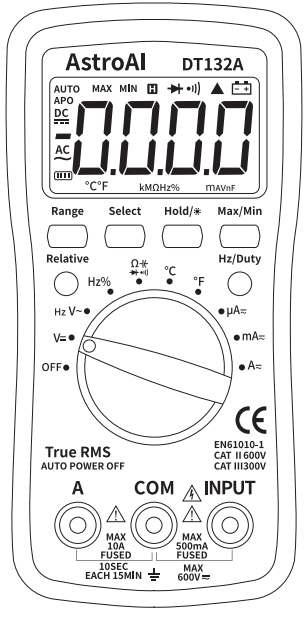
TRUE RMS 4000 Count DIGITAL MULTIMETER User Manual



Model:DT132A

- V1.1 -

CATALOGUE

Thank you for purchasing the True RMS 4000 Count Digital Multimeter from AstroAI. The AstroAI True RMS 4000 Digital Multimeter is designed to be safely and accurately used by professionals in a commercial setting or DIYer's who need a little more utility from their standard digital multimeter. This manual provides all safety information, operation instruction, specifications, and maintenance for the meter. The instrument performs AC/DC Current, AC/DC Voltage, Resistance, Diode, Capacitance, Continuity, Frequency, Duty ratio, Temperature measurement.
Thank you again for choosing AstroAI, if you have any questions or concerns regarding your product, please contact us via support@astroai.com.

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

UK	REP

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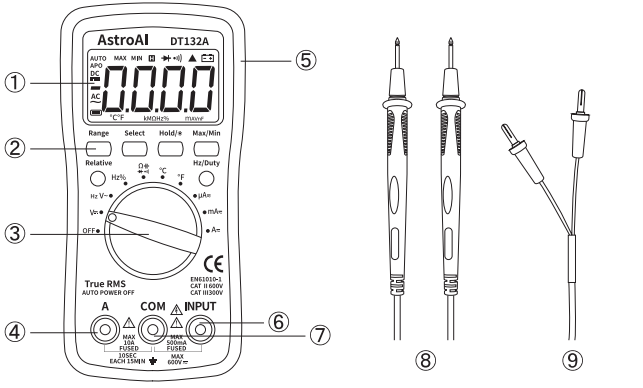
WARNING

- Before using the Meter, inspect the exterior casing. Do not use the Meter if it is damaged or if all or part of the exterior casing is removed. Look for cracks or missing plastic. Pay special 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 manual rotary switch should be placed in the correct position before measurement and should NOT be moved during measurement to prevent damage to the Meter.
- When the Meter is working at an effective voltage over 60V in DC or 30V rms in AC, special care should be taken because there is a danger of electric shock.
- Use the proper terminals, function, and range for your measurements.
- Do not use or store the Meter in a high-temperature environment, do not expose to high levels of humidity, or near strong magnetic fields. The performance of the Meter may deteriorate after dampening.
- 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, or diodes.
- 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.

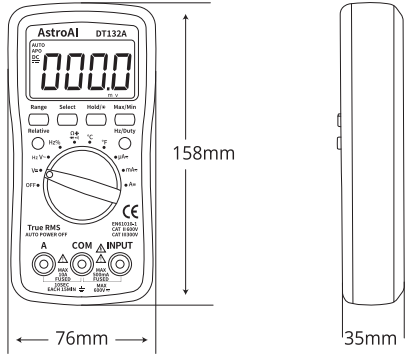
- The internal circuit of the Meter shall not be altered at will to avoid damage to the Meter and any accident.
- Use a soft cloth and mild detergent to clean the surface of the Meter. Do not use abrasive materials or solvents to prevent the surface of the Meter from corrosion and damage.
- Turn the Meter off when not in use. Take out the battery when not in use for an extended period. Regularly check the battery as it may leak when it has not been used for some time. Replace the battery as soon as leaking appears. A leaking battery will damage the Meter.

DIAGRAM



① LCD Screen
② Function Buttons
③ Rotary Function Switch
④ 10A Terminal
⑤ Rubber sleeve
⑥ INPUT Terminal
⑦ COM Terminal
⑧ Pair of Test Leads
⑨ K-Type Thermocouple

SIZE DESCRIPTION



SYMBOLS

⎓	DC (Direct Current)	APO	Automatic Power-Off
~	AC (Alternating Current)	H	Data Hold
≂	AC and DC	MAX	Maximum Reading
°F	Fahrenheit Temperature	MIN	Minimum Reading
°C	Celsius Temperature	AUTO	Auto-range Mode
%	Duty Ratio		Low Battery
Hz	Frequency	−	Negative Reading
⊣⊢	Capacitance	▲	Relative Mode
•))	Continuity Test	⚠	Warning
→|	Diode Test	⚡	Dangerous Voltage may be present
Ω	Resistance		

⏚	Earth Ground	⎓	Fuse
⧈	Double Insulated	CE	Complies with EU directives

FUNCTIONS

Select Select Button	When using the rotary switch to select a multimeter function, use the Select Button to further select the function. This applies only to multifunction settings like capacitance, resistance, diode, continuity, AC/DC current.
Relative Relative Button	When taking measurements, you can utilize the Relative Button to get more accurate readings by removing the resistance of the test leads, for example. To activate this function, simply press the Relative Button. A small triangle (delta symbol) will appear on the display and the reading should change to zero. Press the Relative Button again to exit relative mode.
Range Range Button	AC/DC Voltage, AC/DC Current, and Resistance can all be measured in both Auto and Manual ranging. The multimeter will come set to Auto, but if you desire to select the range manually, press the Range Button repeatedly to find the desired range. Beware of selecting a range too low, as it will overload the device and the multimeter will not display a reading. Press and hold the Range Button to return to Auto Ranging.

Max/Min  Max/Min Button	When taking a measurement, press this button once to enter 'Max Mode' . In this mode, the multimeter will capture the highest reading it records. Press this button again to enter 'Min Mode' which will capture the lowest reading it records. Press and hold this button to exit the Max/Min Modes.
Hold/✳  Hold Button and backlight function button.	When taking a measurement, press this button to hold the data for easier recording. Press the button again to remove the hold function. Press and hold this button to turn on the back-light on the LCD screen. Press and hold the button again to turn off the backlight.
Hz/Duty  Hz/Duty Button	When using the Hz/Duty function on the multi-meter, quickly switch functions by pressing this button. You can also switch to measuring Hz/Duty ratio during the AC voltage measurement.
Type Thermocouple	When measuring the temperature, insert the red test lead into the 'Input' Jack, the black test lead into 'COM' Jack. Note: the leads must not be connected in reverse.
Multi-Function Socket	Use the multi-function socket to measure both Capacitors and Transistors. Be sure to correctly insert the multi-function socket into the COM and INPUT plugs with negative the negative terminal on the multi-function socket on the left side and the positive on the right side. Note: the leads must not be connected in reverse.

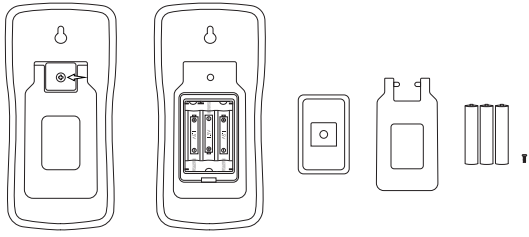
INSTALLATION

Ⅰ.BATTERY REPLACEMENT

If the '⊟' symbol appears on the display, the battery should be replaced immediately.

- Turn off the power and remove the test leads plugged into the meter.

- Unscrew the screw and remove the kickstand to replace the battery.
- Replace it with a new battery of the same specification(size AAA, 1.5V×3).
- Put the kickstand in place and fasten it with a screw.



Ⅱ.FUSE REPLACEMENT

Fuses will rarely need replacement and are normally only blown due to operator error.

- Turn off the power and remove the test leads plugged into the meter.

- Remove the rubber sleeve of the multimeter, unscrew the 6 screws and remove the back cover to replace the fuse.
- Remove the blown fuses and replace them with new fuses of the same specification.
- Put the back cover in place and fasten it with screws.

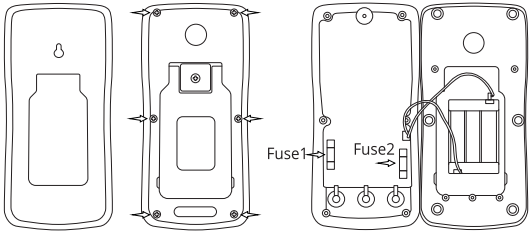
Note:

Replace the damaged fuse with a new one with the same ratings.

This meter uses two fuses:

Fuse1: 500mA, 600V, Ø5×20mm

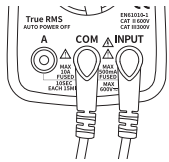
Fuse2: 10A, 600V, Ø5×20mm



INSTRUCTIONS

I .VOLTAGE MEASUREMENT

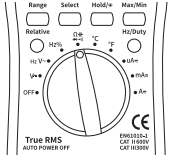
- Connect the test leads: Insert the red test lead into the 'Input' Jack and the black test lead into the 'COM' Jack.

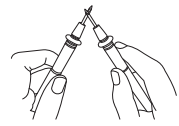


• Continuity test:

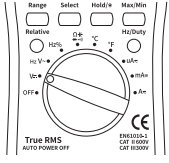
a.Turn the rotary switch to the ‘ Ω⁺ ’ setting, choose the ‘Select’ button, choose continuity Mode, ‘ •)) ’ symbol will display on the screen.

b.Touch the red test lead and the black test lead to check whether they are normal. The buzzer will beep if the test leads are normal.





• Choose functions: Turn the rotary switch to ‘ V ∽ ’ or ‘ V⎓ ’ setting according to the measured voltage property.



• Connect the circuit: Connect one end of test leads to the circuit that needs to be measured, in series with the circuit.

• Reading: Record the reading from the LCD screen.

• After measurement, turn the rotary switch to the OFF position to turn off the Meter.

Note:

a.When a small measuring range is selected, the display of the multimeter may show unstable results if the test leads do not connect to the load. This is a normal event and will not affect the measurement.

b.During the DC voltage measurement, use the ' ▬ ' symbol on the screen to judge the polarity of the red test lead connection. Without the ' ▬ ' symbol, that means the red test lead is connected with positive polarity.

c.To avoid damage to the meter, do not measure voltages exceeding 600V DC or 600V AC.

d.If necessary, the 'Range' button can be pressed to operate manually (default mode as the Auto range). During manual operation please choose the widest range by pressing the 'Range' Button, then choose a suitable range based on the initial reading access to precise reading. When the 'OL' symbol is displayed on the screen or over-ranging measurement, users must choose a wider range to get the reading. As for the Auto range, Auto range mode need not choose range.

e.Do not use the AC voltage test function to test DC voltage and vice versa. Performing this action has the potential to damage the Meter or any components you are attempting to test.

f. Press the Hz/Duty button to switch to Frequency or Duty ratio when testing the AC voltage.

g. How to find a live wire in a socket:

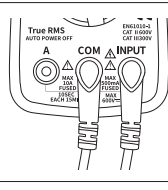
(1).Switch to the voltage test setting.

(2).Connect the black test lead to the grounded wire or jack. Connect the red test lead to one of the jacks to be measured.

(3).Check both jacks. One should have a reading and the other should remain at or near zero. The live wire will have the reading.

II.CURRENT MEASUREMENT

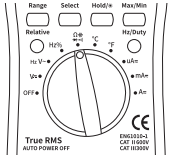
- Connect the test leads: Insert the red test lead into the 'Input' Jack and the black test lead into the 'COM' Jack.

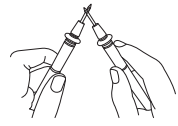


- Continuity test:

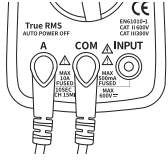
a.Turn the rotary switch to the ‘ Ω⊣◄•)) ’ setting, choose the ‘Select’ button, choose continuity Mode, ‘ •)) ’ symbol will display on the screen.

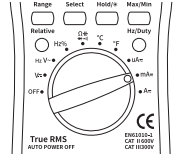
b.Touch the red test lead and the black test lead to check whether they are normal. The buzzer will beep if the test leads are normal.





- Re-connect the test leads: Insert the black test lead into the ‘COM’ Jack. If the current is less than 500mA, insert the red test lead into the ‘INPUT’ jack; if the current ranges from 500mA-10A, insert the red test lead into the ‘A’ jack.
- Choose functions: Turn the rotary switch to ‘μA≈’ , ‘mA≈’ , or ‘A≈’ setting according to the estimated value.





- Choose current types: Press the ‘Select’ button to test DC current test value or AC current test value.
- Connect the circuit: Connect the test lead to the source lead or load to be measured, in series with the circuit.
- Reading: Record the reading from the LCD screen.

- After measurement, turn the rotary switch to the OFF position to turn off the Meter.
- Note:

a.DO NOT test currents exceeding 10A AC/DC.

b.When performing DC current measurements, determine the polarity of the red lead connection based on the presence or absence of the '−' symbol display.

c.When testing a high current, for safety reasons, each measurement time should be less than 10 seconds, and the interval time between tests should be greater than 15 minutes.

d.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 can potentially damage the Meter.

e.If necessary, the 'Range' button can be pressed to operate manually (default as Auto range). During manual operation please choose the widest range by pressing the 'Range' button, then choose a suitable range based on the initial reading access to precise reading. When the 'OL' symbol is displayed on the screen or over-ranging measurement, users must choose a wider range to get results. As for Auto range, Auto range mode need not choose range.

f.Automotive Parasitic Battery Drain

(1).Check if the battery voltage and power generation are within the normal range. The battery voltage is generally around 12.7V and the power generation is around 14V.

(2).Turn off all electrical accessories inside and outside the car and close the doors.

(3).Remove the negative electrode of the battery. Set the Multimeter to the maximum current level and connect the Meter in series to the battery.

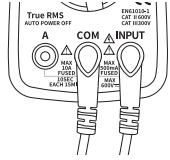
(4).Connect the red test lead to the negative line and the black test lead to the battery terminal.

(5).If the drain is larger than 50mA, begin checking fuses individually for which circuit is carrying the excess load.

(6).Adjust the Meter, if necessary, to a lower range.
(7).Wait for about 30 minutes; after all the modules of the vehicle enter the sleep state, read the accurate static discharge current. The discharge current is generally 0.02A (20mA), however, this can vary depending on the vehicle. Generally, it is normal to not exceed 50mA.
(8).If a removed fuse reduces the battery draw to below 50mA, it can be determined the corresponding circuit is drawing the excess discharge.

III. RESISTANCE MEASUREMENT

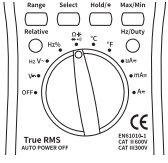
- Connect the test leads: Insert the red test lead into the 'Input' Jack and the black test lead into the 'COM' Jack.

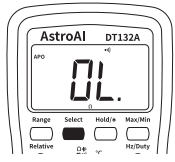


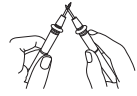
- Continuity test:

a.Turn the rotary switch to the '⏚' setting, choose the 'Select' button, choose continuity Mode, '•))' symbol will display on the screen.

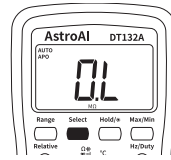
b.Touch the red test lead and the black test lead to check whether they are normal.The buzzer will beep if the test leads are normal.







- Choose functions: Press the 'Select' button to choose the resistance mode.



- Connect load: Place the test leads at both ends of the resistance to be measured.
- Reading: Record the reading from the LCD screen.
- After measurement, turn the rotary switch to the OFF position to turn off the Meter.

- Note:

a.If the resistance test value exceeds 1MΩ, the meter may take seconds to stabilize the reading, which is normal for high resistance testing.

b.Do not change the resistance while taking a measurement. Doing so may damage the Meter and affect the test results.

c.Do not test parallel circuits. The accuracy of the measurement will be affected, and the results may not be accurate.

d.Do not directly measure the internal resistance of micrometers, galvanometers, batteries, and other instruments.

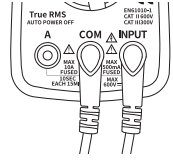
e.In case of disconnection, the symbol 'OL' will be displayed.

f.Before testing the internal resistance of the circuit, please ensure that all power sources are removed from the tested circuit and all capacitors are fully discharged.

g.If necessary, the 'Range' button can be pressed to operate manually (default as the Auto range). During manual operation please choose the widest range by pressing the 'Range' button, then choose a suitable range based on the initial reading access to precise reading. When the 'OL' symbol is displayed on the screen or over-ranging measurement, users must choose a wider range to get results. As for Auto range, Auto range mode need not choose range.

IV .CONTINUITY TEST

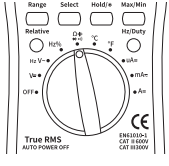
- Connect the test leads: Insert the red test lead into the 'Input' Jack and the black test lead into the 'COM' Jack.

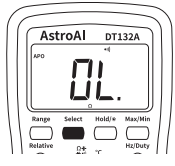


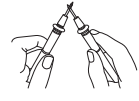
- Continuity test:

a.Turn the rotary switch to the 'Ω⁎' setting, choose the 'Select' button, choose continuity Mode, '•))' symbol will display on the screen.

b.Touch the red test lead and the black test lead to check whether they are normal. The buzzer will beep if the test leads are normal.



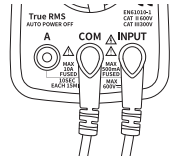




- Connect load: Place the test leads at both ends of the load to be measured.
- Reading: If the circuit load is less than 30Ω, the buzzer will buzz. If it exceeds 30Ω, the LCD screen will display the load reading.
- After measurement, turn the rotary switch to the OFF position to turn off the Meter.

V .DIODE TEST

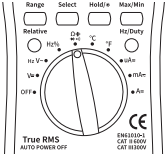
- Connect the test leads: Insert the red test lead into the 'INPUT' Jack and the black test lead into the 'COM' Jack.

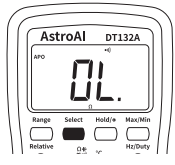


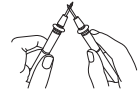
- Continuity test:

a.Turn the rotary switch to the ' ' setting, choose the 'Select' button, choose continuity Mode, ' ' symbol will display on the screen.

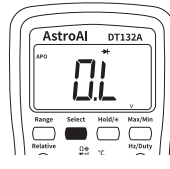
b.Touch the red test lead and the black test lead to check whether they are normal. The buzzer will beep if the test leads are normal.







- Choose functions: Press the' Select' button to choose the diode mode. ' ' will display on the screen.



- Connect diode: Connect the red test lead to the positive end of the diode and the black test lead to the negative end.

- Reading: The meter will display the approximate value of positive voltage. If the leads are incorrectly connected to the diode electrodes, the LCD will display 'OL', the solution is to change the test leads position, vice versa.
- After measurement, turn the rotary switch to the OFF position to turn off the Meter.
- Note:

a.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, and the displayed value is the forward voltage drop.

b.Normal diode forward pressure drop: the general silicon tube is 0.5- 0.7V, germanium tube is 0.15-0.3V.

c.Polarity Judgment Method.

(1).Switch the Multimeter to the Resistance setting.

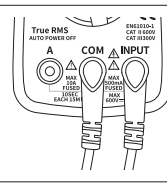
(2).Connect the two test leads to the two electrodes of the diode.

(3).Measure one result, then swap the positions of the test leads, then 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.

VI .CAPACITANCE MEASUREMENT

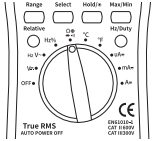
- Connect the test leads: Insert the red test lead into the 'INPUT' Jack and the black test lead into the 'COM' Jack.

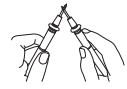


• Continuity test:

a.Turn the rotary switch to the ‘ Ω ’ setting, choose the ‘Select’ button, choose continuity Mode, ‘ •)) ’ symbol will display on the screen.

b.Touch the red test lead and the black test lead to check whether they are normal. The buzzer will beep if the test leads are normal.



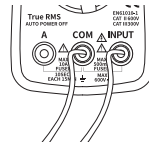


• Choose functions: Press the ‘ Select’ button, choose the capacitance function.

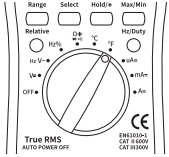
• Connect Capacitance: Connect the capacitance that is to be measured.
• Reading: Record the reading from the LCD screen.
• After measurement, turn the rotary switch to the OFF position to turn off the Meter.

VII .TEMPERATURE MEASUREMENT

• Insert the negative (-) plug of the K-type thermocouple to the ‘COM’ jack and the positive (+) plug to the ‘INPUT’ jack.



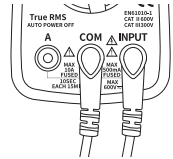
- Choose functions: turn the rotary switch to the ‘ºC’ or ‘ºF’ setting.



- Method: Carefully use the end of the K -Type thermocouple to touch the object being measured.
- Reading: Record the stable result from the LCD screen.
- After measurement, turn the rotary switch to the OFF position to turn off the Meter.

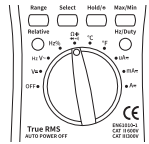
VIII .FREQUENCY MEASUREMENT

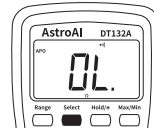
- Connect the test leads: Insert the red test lead into the ‘INPUT’ Jack and the black test lead into the ‘COM’ Jack.



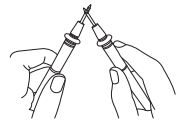
- Continuity test:

a.Turn the rotary switch to the ‘ ’ setting, choose the ‘Select’ button, choose continuity Mode, ‘ ’ symbol will display on the screen.

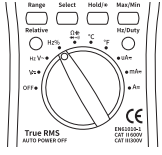




b.Touch the red test lead and the black test lead to check whether they are normal. The buzzer will beep if the test leads are normal.



- Press the 'Hz/Duty' button to switch frequency measurement or duty ratio measurement.



- Connect signal source: Connect the test leads to the two ends of the circuit to be measured.
- Reading: Record the reading from the LCD screen.
- After measurement, turn the rotary switch to the OFF position to turn off the Meter.

SPECIFICATIONS

Digital Display	3 ¾ , 3999
Sampling Speed	2 times per second
LCD Size	55x31mm/2.17x1.22in
Range Selection	Auto or Manual
Polarity Indication	'-' displayed
Overload Indication	'OL' displayed
Low Battery Indication	Yes

Operating Environment	32°F~104°F (0°C~40°C); <80% RH
Storage Temperature	14°F~122°F (-10°C~50°C); <85% RH
Power	3x1.5V, AAA battery
Dimensions	145x70x35mm/5.71x2.76x1.38in
Weight	Approx157g/0.35lb
Temperature Test	Yes
Diode Test	Yes
Continuity Test	Yes
Frequency	Yes

DETAILED SPECIFICATIONS

Accuracy is guarantied for 1 year 23°C±5°C/73°F ±9°F
less than 80%RH

Ⅰ.DC VOLTAGE (AUTO RANGING)

Range	Resolution	Accuracy
400mV	0.1mV	± (0.8% of rdg + 5 dgts)
4V	1mV	± (0.8% of rdg + 3 dgts)
40V	10mV	
400V	100mV	
600V	1V	± (1.0% of rdg + 5 dgts)

- Input Impedance: 10MΩ
- Overload Protection: 600V DC or 600V AC RMS
- (200mV range: 250V DC/AC RMS)
- Max. Input Voltage: 600V DC

II .AC VOLTAGE (AUTO RANGING)

Range	Resolution	Accuracy
400mV	1mV	± (1.2% of rdg + 5 dgts)
4V	1mV	± (1.0% of rdg + 8 dgts)
40V	10mV	
400V	100mV	
600V	1V	± (1.2% of rdg + 5 dgts)

- Input Impedance: 10MΩ
- Frequency Range: 40Hz ~ 400Hz
- Overload Protection: 600V DC or 600V AC RMS
- Response: Average, calibrated in rms of sine wave
- Max. Input Voltage: 600V AC RMS

III .TEMPERATURE

Range	Resolution	Accuracy
-40~1370°C	1°C	-40°C~150°C: ± (2.5% + 4)
		150°C~1370°C: ± (2.5% + 4)
-40~2000°F	1°F	-40°F~302°F: ± (2.5% + 4)
		302°F~2000°F: ± (2.5% + 4)

NOTE: Different temperature sensors are configured in different temperature test ranges and normal temperature sensors are provided for standard configuration.

IV .DC Current

Range	Resolution	Accuracy
400μA	0.1μA	± (1.2% of rdg + 8dgts)
4000μA	1μA	
40mA	10μA	
400mA	100μA	

4A	1mA	± (1.2% of rdg + 8dgts)
10A	10mA	

- Overload Protection: µA and mA ranges: F0.5A/600V fuse
- 4A and 10A ranges: F10A/600V fuse
- Max. Input Current: 'INPUT' Terminal: 200mA
- 'A' Terminal: 10A
- (For measurements >5A: only measure in durations less than 10 seconds, in intervals greater than 15 minutes.)
- Voltage Drop: 400µA, 40mA and 4A ranges: 40mV
- 4000µA, 400mA and 10A ranges: 400mV

V .AC CURRENT

Range	Resolution	Accuracy
400µA	0.1µA	± (1.5% of rdg + 8dgts)
4000µA	1µA	
40mA	10µA	
400mA	100µA	
4A	1mA	± (2.0% of rdg +10dgts)
10A	10mA	

- Overload Protection: µA and mA ranges: F0.5A/600V fuse
- 4A and 10A ranges: F10A/600V fuse
- Max. Input Current: 'INPUT' Terminal: 200mA
- 'A' Terminal: 10A
- (For measurements >5A: only measure in durations less than 10 seconds, in intervals greater than 15 minutes.)
- Voltage Drop: 400µA, 40mA and 4A ranges: 40mV
- 4000µA, 400mA and 10A ranges: 400mV
- Frequency Range: 40Hz~400Hz
- Response: Average, calibrated in rms of sine wave

VI .RESISTANCE (AUTO RANGING)

Range	Resolution	Accuracy
400Ω	0.1Ω	± (1.5% of rdg + 3dgts)
4KΩ	1Ω	
40KΩ	10Ω	
400KΩ	100Ω	
4MΩ	1KΩ	
40MΩ	10KΩ	

- Open Circuit Voltage: ~0.25V
- Overload Protection: 250V DC/AC rms

VII .DIODE AND CONTINUITY

Range	Description	Remark
	The approximate forward voltage drop will be displayed	Open circuit voltage: about 1.5V
	The built-in buzzer will sound if the resistance is less than about 30Ω	Open circuit voltage: about 0.5V

- Overload Protection: 250V DC/AC rms
- For continuity test: When the resistance is between 50Ω and 100Ω, the buzzer may sound or may not sound. When the resistance is more than 100Ω, the buzzer will not sound.

VIII .CAPACITANCE

Range	Resolution	Accuracy
40nF	10pF	± (8% of rdg + 10 dgts)
400nF	100pF	± (5% of rdg + 5 dgts)
4uF	1nF	

40uF	10nF	± (5% of rdg + 5 dgts)
100uF~2mF	100nF	

IX .FREQUENCY

Range	Accuracy
5/50/500/5K/50K/500K/5MHz	± (1.0% of rdg + 3dgts)

PACKAGE INCLUDED

- 1 x Owners Manual
- 1 x Pair of Test Leads
- 1 x K-Type Thermocouple
- 1 x AstroAI 4000 Counts Multimeter

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 Warranty Limited Warranty From AstroAI.

Each AstroAI True RMS 4000 Count 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 overvoltage failures caused by use outside the Multimeter' s specified rating, or normal wear and tear of mechanical components. This warranty covers the original purchaser only and is not transferable.

If this product is defective, please contact AstroAI Customer Support at support@astroai.com.

Web:www.astroai.com
E-mail:support@astroai.com