

ARCTIC
HAYES

PROFESSIONAL DIGITAL MULTIMETER

WITH TEMPERATURE FUNCTION

User Manual



AH118



Before using the instrument, please read this manual carefully, and save for future reference.

The instrument is designed according to the requirements of the international electrical safety standard IEC61010-1 for the safety requirements of the electronic testing instruments. The design and manufacture of instruments strictly comply with the requirements of IEC61010-1 CAT.III 600V over voltage safety standards.

Warning. 

In order to avoid possible electric shock or personal injury, please abide by the following specifications:

- Please read this manual carefully before using the instrument and pay special attention to safety warning information.
- Strictly observe the operation of this manual and use this instrument. Otherwise, the protection function of the instrument may be damaged or weakened.
- Please be careful if the measurement exceeds 30V AC true RMS, 42V AC peak or 60V DC. There may be danger of electric shock at this kind of voltage.

- By measuring the known voltage to check whether the meter work is normal, if it is not normal or damaged, do not use.
- Before using the instrument, please check whether there is any crack or plastic damage in the instrument case. If there is any damage, do not use.
- Before using the instrument, please check whether the probe is cracked or damaged. If so, please replace the same type and the same electrical specifications.
- The instrument shall be used in accordance with the specified measurement category, voltage or current rating.
- Please comply with local and national safety code. Wear personal protection equipment to prevent injury by electric shock and electric arc due to exposed hazardous live conductor.
- When the low battery indicator shows, replace the battery to prevent any measurement error.
- Do not use the instrument around explosive gas, steam or in wet environment.
- When using the probe, please put your fingers behind the finger protector of the probe.












- When measuring, please connect the ground line first, then connect the live wire; when disconnecting, please disconnect the live wire first then disconnect the zero-ground line.
- Do not use the multimeter if it is damaged or the battery cover is open.
- Only use with the supplied probes. If the probe is damaged and needs to be replaced contact the manufacturer. Do not use probes with a different specification.

Calibration

To maintain the integrity of measurements, Arctic Hayes recommends that the multimeter is calibrated annually at an approved Calibration Laboratory.

Arctic Hayes can offer this service, please contact sales@arctic-hayes.com or call +44(0)113 271 5245 to arrange.

Safety Instructions


Safety symbols	
	High Voltage Warning
	AC (Alternating current)
	DC (Direct current)
	AC or DC
	Warning, important safety signs
	Ground
	Fuse
	Equipment with double insulation/reinforced insulation protection
	Battery under voltage
	Product complies with all relevant European laws
	The additional product label shows that do not discard this electrical/electronic product into household garbage.
CAT.II	Class II measurements are suitable for testing and measuring circuits directly connected to power points (sockets and similarities) of low voltage power installations.
CAT.III	Class III measurement is suitable for testing and measuring circuits connected to the distribution part of low voltage power supply devices in buildings.
CAT.IV	Class IV measurements are suitable for testing and measuring circuits connected to the power supply of low voltage power installations in buildings.

Specification



Environment condition of using

CAT IV	600V
CAT III	1000V
Pollution level	2
Altitude	<2000m
Working environment temperature & humidity	0~40°C (<80% RH, <10°C non condensing).
Storage environment temperature & humidity	-10~60°C (<70% RH, remove the battery).

General technical specifications

Temperature coefficient:	0.1 x accuracy/°C (<18°C or >28°C).
MAX. Voltage between terminals and earth ground	DC1000V/AC750V
Fuse protection	mA: F600mA / 1000V fuse 10A: F10A / 1000V fuse
Sampling rate	about 3 times/second
Display	6000 counter readout. Automatically display the unit symbols according to the shift of the measurement function.
Over range indication	Displays "OL".
Low battery indication	when the battery voltage is lower than the normal working voltage, "  " will be displayed.
Input polarity indication	automatically display "-".
Power requirement:	2 x 1.5V AA batteries

Specification

Operation	
FUNC key	Where there are multiple measuring functions on the selection switch, the function button will change between the measurement functions.
Data hold	Press " HOLD " key, enter data hold mode/ cancel data hold mode.
Maximum measurement	Press " Max " key, enter Maximum measurement/cancel Maximum measurement.
Backlight	Press "  " key, turn on backlight/turn off backlight.
Flashlight	Press "  " key and keep more than 2 seconds to turn on the flashlight / turn off flashlight.
Auto power off	<ul style="list-style-type: none"> • There will be no operation in 15 minutes , The instrument will turn off automatically to save battery energy. After automatic shutdown, press any key to restore the working state of the instrument. • If you press the "FUNC." button and turn on the meter power, the automatic shutdown function will be cancelled. After turning off the meter, the meter is reopened to restore the automatic shutdown function.
Input LED indication function	When power on or function switching, the corresponding input light flashes to prompt the user to insert the input port of the probe.
High voltage prompt function	When the measuring voltage is greater than 80V or the measuring current is greater than 1A, the orange backlight will light up, prompting the users to be careful.



Warning for all below measurements.





1. The voltage above DC1000V or AC750V can't be measured; otherwise the instrument may be damaged.
2. Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury.
3. Test the known voltage with the meter before use, confirm the instrument function is intact.

Note: When the voltage is greater than 80V, the orange backlight will light up.


DC/AC Voltage Measurement

1. Turn the knob to “” and Switching AC or DC voltage function by “FUNC.” key.
2. Insert the red probe in “” socket, insert the black probe in “COM” socket.
3. Contact the probe to the measured circuit (connect to the measured power supply or circuit in parallel), measure the voltage.
4. Read the measurement result on the screen, when measuring AC voltage the frequency is displayed on LCD simultaneously.

DC/AC Voltage mV Measurement

1. Turn the knob to “” and Switching AC or DC voltage function by “FUNC.” key.
2. Insert the red probe in “” socket, insert the black probe in “COM” socket.
3. Contact the probe to the measured circuit (connect to the measured power supply or circuit in parallel), measure the voltage.
4. Read the measurement result on the screen, when measuring AC voltage the frequency is displayed on LCD simultaneously.

Frequency/Duty Measurement

1. Turn the knob to “Hz%” and Switching Frequency or duty function by “FUNC.” key
2. Insert the red probe in “” socket, insert the black probe in “COM” socket.
3. Contact the probe to the measured circuit (connect to the measured power supply or circuit in parallel), measure the frequency and duty.
4. Read the measurement result on the screen.

Warning.

The voltage above 10V can't be measured; otherwise the instrument may be damaged. Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury. Test the known voltage with the meter before use, confirm the instrument function is intact.

Caution.

To avoid damaging instruments or equipment, do not enter frequency or duty cycle signal greater than 10V valid value.

DC/AC Current Measurement

1. Turn the knob to " $\mu\text{A}/\text{Hz}$ " or " mA/Hz " or " A/Hz " and Switching Frequency or duty function by "FUNC." key
2. Insert the red probe in "mA" or "10A" socket, insert the black probe in "COM" socket.
3. Disconnect the power of the tested circuit; connect the meter to the circuit under test, then turn on the circuit power supply..
4. Read the measurement result on the screen. When measuring AC current, the frequency is displayed on LCD simultaneously.

Warning.

The voltage above 1000V can't be measured; otherwise the instrument may be damaged. Pay special attention to safety when measuring high voltage to avoid electric shock or personal injury.

Test the known voltage with the meter before use, confirm the instrument function is intact.



Caution.

To avoid damaging instruments or equipment, do not enter frequency or duty cycle signal greater than 10V valid value.

Warning for all below measurements.



When measuring resistance on the line, disconnect the power supply and discharge all the high-voltage capacitors. Otherwise, the instrument may be damaged and the user may suffer an electric shock.

Resistance Measurement



1. Turn the knob to "" and Switch to resistance function by "FUNC." key.
2. Insert the red probe in "" socket, insert the black probe in "COM" socket.
3. Contact the probe to the measured circuit or resistance, measure the resistance.

4. Read the measurement result.



Continuity Measurement

1. Turn the knob to " " and Switch to continuity function by "FUNC." key.
2. Insert the red probe in " " socket, insert the black probe in "COM" socket.
3. Contact the probe to the measured circuit or resistance.
4. If the resistance or circuit of the measured resistance is less than 30Ω , the buzzer will on and the green indicator lights up at the same time; when the resistance is about between 30Ω to 60Ω , the red indicator lights up; LCD displays the resistance.

Diode Measurement

1. Turn the knob to " " and Switch to diode function by "FUNC." key.
2. Insert the red probe in " " socket, insert the black probe in "COM" socket.
3. Touch the diode anode with the red probe, the black probe contacts the diode cathode.
4. Read the measurement result on the screen.

Capacitance Measurement


1. Turn the knob to “”.
2. Insert the red probe in “” socket, insert the black probe in “COM” socket.
3. Contact the probe to the measured circuit or Capacitance, measure the resistance.
4. Read the measurement result on the screen.

Warning for all below measurements.





In order to avoid possible accidents such as electric shock or personal injury, please follow the safety regulations.


NCV Test

1. Turn the knob to the “” shift, and Switch to NCV test function according to “FUNC.” key. Meter will display “NCV”.
2. Then NCV probe gradually approaches the detected point.
3. When the meter senses weak AC signals, the green indicator lights up, while the beeps send out slow dips.
4. When the meter senses strong AC signals, the red indicator lights up, while the beeps send out fast dips.

Live Test

1. Turn the knob to the “” shift, and Switch to live test function according to “FUNC.” key. Meter will display “LIVE”.
2. Insert the red probe in “” socket, Then the probe contact to the test point.
3. When the meter senses weak AC signals, the green indicator lights up, while the beeps send out slow dips.
4. When the meter senses strong AC signals, the red indicator lights up, while the beeps send out fast dips.

Temperature Measurement

1. Turn the knob to the “ °C / °F “.
2. Insert the black side of K Type adapter into the negative (COM) jack and the red side of K Type adapter into the positive input “” making sure to observe the correct polarity.
3. Contact the measured object with the thermocouple probe and read the result from the display.

Note 1: The cold junction of thermocouple is placed inside the instrument, and it needs longer heat balance with the measuring environment.

Note 2: Using K type thermocouple probe.

Accuracy Specification

DC Voltage		
Range	Resolution	Accuracy
600mV	0.1mV	±(0.5% reading +3)
6V	0.001V	
60V	0.01V	
600V	0.1V	
1000V	1V	

AC Voltage		
Range	Resolution	Accuracy
600mV	0.1mV	±(1.0% reading +3)
6V	0.001V	
60V	0.01V	
600V	0.1V	
750V	1V	


DC Current		
Range	Resolution	Accuracy
600 μ A	0.1 μ A	±(1.2% reading +3)
6000 μ A	1 μ A	
600mA	0.001mA	
10A	0.01A	

AC Current		
Range	Resolution	Accuracy
600 μ A	0.1 μ A	±(1.5% reading +3)
6000 μ A	1 μ A	
600mA	0.01mA	
10A	0.01A	

Accuracy Specification


Resistance		
Range	Resolution	Accuracy
600Ω	0.1Ω	±{1.0% reading +3}
6kΩ	0.001kΩ	
60kΩ	0.01kΩ	
600kΩ	0.1kΩ	
6MΩ	0.001MΩ	±{1.5% reading +3}
60MΩ	0.01MΩ	

Capacitance		
Range	Resolution	Accuracy
10nF	0.001nF	±{4.0% reading +3}
100nF	0.01nF	
1000nF	0.1nF	
10μF	0.001μF	
100μF	0.01μF	
1000μF	0.1μF	
10mF	0.001mF	±{5.0% reading +3}
100mF	0.01mF	

Diode Test		
	<p>It displays the approximate forward voltage of the diode</p>	<p>Forward DC current is about 2.5mA Reverse DC voltage is about 3V Overload protection:1000V</p>

Accuracy Specification

Frequency / Duty		
Range	Resolution	Accuracy
10Hz	0.001Hz	±[1.0% reading +3]
100Hz	0.01Hz	
1000Hz	0.1Hz	
10kHz	0.001kHz	
100kHz	0.01kHz	
1000kHz	0.1kHz	
10MHz	0.001MHz	±[3.0% reading +3]
1~99%	0.1%	

Continuity Test		
	<p>The resistance is <30, the buzzer will sound and the indicator light is green. When the resistance >30 and <60, the buzz does not ring, the indicator light is red.</p>	<p>Open circuit voltage is about 1V Overload protection:1000V</p>

Temperature			
Range	Resolution	Temperature	Accuracy
°C	1°C	-40°C ~1000°C	±[1.0%+3]
°F	1°F	-40°F ~1832°F	±[1.0%+3]

Thermocouple rating		
Range	Temperature	Accuracy
°C	-40°C ~200°C	±1.5°C
°F	-40°F ~392°F	±1.5°F

Battery Replacement


1. Turn off the power supply of the instrument, and remove the probe on the instrument.
2. Use screwdriver to unscrew screws fixing the battery cover, remove the battery cover.
3. Remove old batteries, replace with new batteries of the same specifications. Please note the polarity of the battery according to the positive and negative polarity marks inside of the battery cover.
4. Install the battery cover to its original position, fix and lock the battery cover with screws.

Fuse Replacement

1. Turn off the power supply of the instrument, and remove the probe on the instrument.
2. Use screwdriver to unscrew screws fixing the back cover, and remove the back cover.
3. Remove the burnt fuse, replace with new fuse of the same specifications, and ensure that the fuse is clamped in the safety clip.
4. Install the back cover, fix and lock it with screws.

Limited warranty

1 year warranty against any manufacturing defects or faulty workmanship. This warranty does not cover fuses, disposable batteries or damage from accident, neglect, misuse, alteration, contamination or abnormal conditions of operation or handling.

 **WEEE Directive 2012/19/EU At the end of the product life, dispose of the instrument & batteries in a corresponding recycling centre. Do not dispose of the unit with the usual domestic refuse. Do not burn the product.**



Arctic Hayes Ltd
9 Millshaw Park Ave | Leeds
LS11 0LR | United Kingdom
sales@arctic-hayes.com
www.arctic-hayes.com
+44(0)113 271 5245

Arctic Hayes Ltd
Ipco B.V, Spinel 400
3316 LG Dordrecht
The Netherlands
info@arctic-hayes.eu
+44(0)113 271 5245