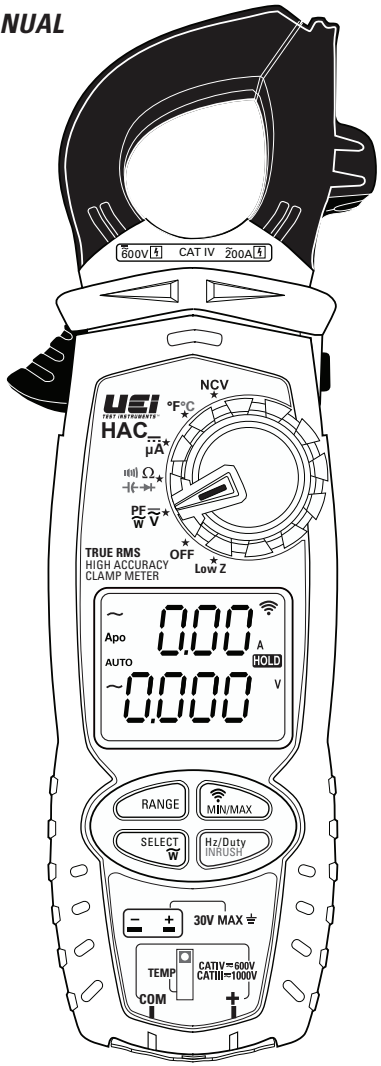
UEi TEST INSTRUMENTS™ HAC

True RMS High Accuracy Clamp Meter

INSTRUCTION MANUAL

ENGLISH



CE

ETL LISTED c US
Intertek

600V CAT IV

1000V CAT III

FC

REACH Compliant

RoHS Compliant

1-800-547-5740

www.ueitest.com • email: info@ueitest.com

Keeping Homes & Workplaces Safe & Comfortable

Table Of Contents

Functions

- **True RMS**
- **750V AC/1000V DC**
- **200A AC**
- **DC microamps: 2,000µA**
- **Capacitance: 6,000µF**
- **Resistance: 60MΩ**
- **Power Factor**
- **Active Power (W)**
- **Apparent Power (VA)**
- **Reactive Power (VAr)**
- **Diode test**
- **Audible continuity**
- **Frequency: 99.99kHz**
- **Duty cycle**
- **LRA Inrush**
- **Low Z (Low Impedance)**
- **Temperature range: -328˚ to 2462˚F**
- **Non-Contact Voltage Detection (NCV)**

Features

- **Wireless to App**
- **Dual display**
- **Back light (1 min.)**
- **Worklight (1 min.)**
- **Data Hold**
- **Min/Max/Avg**
- **Visible high-voltage alert**
- **Test lead storage**
- **Magnetic mount/strap**
- **Input jack locks**
- **Battery compartment latches**
- **Auto calibration**
- **Auto/Manual ranging**
- **Auto power off (30 min.)**
- **Low battery indicator**
- **Free App UEi HUB**

General Specifications

- **Operating Temperature:** 32˚ to 122˚F (0˚ to 50˚C)
- **Storage Temperature:** -4˚ to 140˚F (-20˚ to 60˚C)
- **Temperature Coefficients:** Add 0.15 x specified accuracy for each degree > 82.4°F (28 °C) or < 64.4°F(18 °C)
- **Operating Humidity:** <80%
- **Display:** 3 5/6 digits 6,000 count
- **Back light:** Yes
- **Refresh Rate:** 3/sec
- **Over-range:** "OL" is displayed
- **Pollution Degree:** 2
- **Apo:** Auto power off after 30 minutes of use.
- **Dimensions:** 9.6" x 2.6" x 1.3" (245.2mm x 66.5mm x 42.4mm)
- **Item Weight:** 0.65 lb (387g)
- **CAT Rating:** CATIV 600V
- **Certifications:** cETLus UL 61010-1: 2012
- **Battery Type:** (AAA) 4
- **Ingress Protection Rating:** IP42
- **Jaw Opening Size:** 1.26"(32mm)
- **Test leads:** Silicone Test Leads (ATL70), Alligator clips (AAC3), Temperature Probe (ATT29A), Zippered pouch (AC570), and batteries x4 (AAA).

Important Safety Warnings

⚠ **WARNING**

Read entire Safety Notes section regarding potential hazards and proper instructions before using this meter. In this manual the word "**WARNING**" is used to indicate conditions or actions that may pose physical hazards to the user. The word "**CAUTION**" is used to indicate conditions or actions that may damage this instrument.

⚠ **WARNING**

To ensure safe operation and service of the tester, follow these instructions. Failure to observe these warnings can result in severe injury or death.

⚠ **WARNING**

- Before each use, verify meter operation by measuring a known voltage or current.
- Never use the meter on a circuit with voltages that exceed the category based rating of this meter.
- Do not use this meter during electrical storms or in wet weather.
- Do not use the meter or test leads if they appear damaged.
- Ensure meter leads are fully seated and keep fingers away from the metal probe contact when making measurements. Always grip the leads behind the finger guards molded into the probe. For information on test lead shields instructions on page 19.
- Do not open the meter to replace batteries while the probes are connected.
- Use caution when working with voltages above 60 DC or 25 AC RMS. Such voltages pose shock hazards.
- To avoid false readings that can lead to electrical shock, replace batteries if a low battery indicator appears.
- Unless measuring voltage or current, shut off and lockout power before measuring resistance or capacitance.
- Always adhere to national and local safety codes. Use proper personal protective equipment (PPE) to prevent shock and arc blast injury where hazardous live conductors are exposed.
- Always turn off power to a circuit or assembly under test before cutting, unsoldering or breaking the current path. Even small amounts of current can be dangerous.
- Always disconnect the live test lead before disconnecting the common test lead from the circuit.
- In the event of electrical shock, ALWAYS bring the victim to the emergency room for evaluation, regardless of victim's apparent recovery. Electrical shock can cause unstable heart rhythms that may need medical attention.
- If any of the following occur during testing, turn off the power source to the circuit being tested: arcing, flame, smoke, extreme heat, smell of burning materials or discoloration or melting of components.

⚠ **WARNING**

Higher voltages and currents require greater awareness of physical safety hazards. Before connecting the test leads; turn off power to the circuit under test, set meter to the desired function and range; connect the test leads to the meter first, then connect to the circuit under test. Reapply power. If an erroneous reading is observed, disconnect power immediately and recheck all settings and connections.

⚠ **WARNING**

This meter is designed to provide HVAC/R technicians with the capabilities they need to diagnose and repair HVAC/R system. Observe all recommended safety procedures that include proper lockout utilization and use of personal protective equipment that includes safety glasses, gloves and flame resistant clothing.

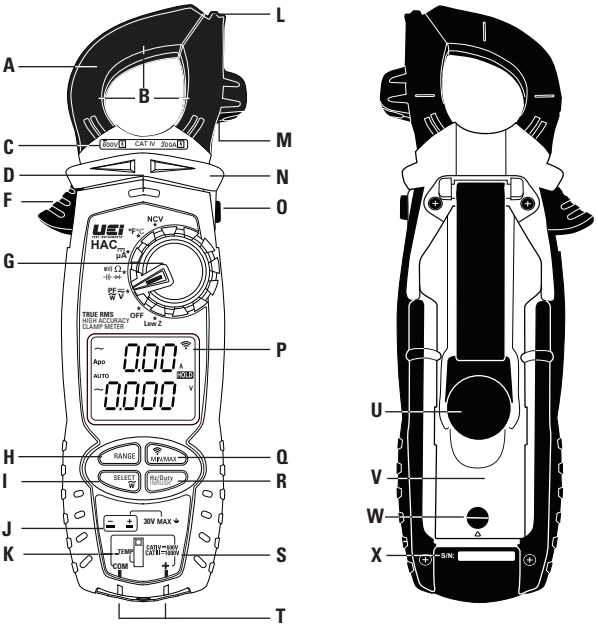
Symbols

~	AC (Alternating current)	⎓	DC (Direct current)
▬	Negative	≂	AC/DC Voltage or Current
AUTO	Auto-ranging	OL	Overload: Range Exceeded
Apo	Auto power off Active	NCV	Non-Contact Voltage
	Low Battery	HOLD	Hold/Capture Value
MIN	Minimum measured value displayed	MAX	Maximum measured value displayed
AVG	Average	Hz	Hertz/Frequency
%	Duty Cycle	INRUSH	Inrush
V	Voltage	Ω	Ohms/Resistance
A	Amperage	⊣⊧	Capacitance
⊣▶	Diode	µF	Microfarad
nF	Nanofarad		Continuity
µA	Microamps	°C	Degrees Celsius
°F	Degrees Fahrenheit	m	Milli (x10^{-3} or 0.001)
M	Mega (x10^{6} or 1,000,000)	µ	Micro (x10^{-6} or 0.000001)
k	Kilo (x10^{3} or 1,000)		Wireless Connection
⚠	Warning or Caution	⧈	Double Insulation (Protection to Class II)
⚠	Dangerous Levels	- - - -	No reading detected
⍐	Safe for disconnect from live conductors	EF	Electric Field
kΩ	Kilo Ohms	MΩ	Mega Ohms
PF	Power Factor	VA	Apparent Power
W	Active Power	VAr	Reactive Power
⏚	Ground		Worklight/Backlight

Category Definitions

Measurement Category	Short-Circuit (typical) kA[a]	Location in the building installation
II	< 10	Circuits connected to mains socket outlets and similar points in the MAINS installation
III	< 50	Mains distributions parts of the building
IV	> 50	Source of the mains installation in the building

Overview



A. Clamp Jaw: Measure inductive AC current. Opens to 1.26" (32.0mm).

B. Conductor Alignment Marks: Use to aid the visual alignment of a conductor when measuring inductive amperage. Greatest accuracy is achieved when the conductor inside the clamp is centered at the intersection of these marks.

C. Category Max Indicator: Maximum CAT Rating for clamp jaw.

D. NCV Alert Light: Indicates voltage when in NCV (Non Contact Voltage) mode and High Voltage alert.

F. Clamp Lever: Opens and closes current clamp jaw.
NOTE: *The clamp uses a high-tension spring to close the jaw. Do not allow fingers or objects to become pinched in the base as the jaws close.*

G. Rotary Selector Dial: Set Rotary Selector Dial desired function

H. Range Button:
- Press to set manual range desired

I. SELECT/ W:
- Press AC or DC on Low Z setting; AC or DC on Voltage setting; to activate ohms, Continuity, Diode, Capacitance on Ohms/Continuity/ Diode/Capacitance setting; °C or °F temperature setting
- Press and hold to enter Power Factor mode
- In Power Factor mode, press to toggle between power types.

J. K-Type Temperature Probe Input

K. Input Jack Lock: Switch to use Temperature or Test lead inputs

L. Wire Separation Tab/ NCV sensor: Use to isolate an individual wire from a bundle for testing. Non-Contact Voltage (NCV) detection sensor to check for live voltage.

M. Test Lead Holder

N. Hand Guard: Used as a point of reference for the operator's safety. Keep hand behind guard when measuring from the clamp jaw.

O. Hold/Back light Button:
- Press to hold the reading on the display. Press again to return to live reading.
- Press and hold to turn on Display Back light and clamp jaw Worklight.
- Worklight and Display turn off after 60 seconds.
- Press and Hold during power up to disable the Auto power off function.

P. Display:
- High contrast dual display with backlit.

Overview (Cont.)

- AC Amps reading will always display on upper display.

Q. Min/Max / Wireless Button:
- Press to toggle through maximum(MAX), minimum(MIN), Average(Avg), and present values.
- Press and hold to use wireless mode to connect to app

R. Hz/Duty INRUSH Button:
- Press to enter Hz/Duty in AC volt
- Press Select to step through Frequency, Duty Cycle, and to return to live readings.
- Press and Hold to select LRA INRUSH mode (See page 17 for details)

S. Category Max Indicator: Maximum CAT Rating for input jacks.

T. Test Lead Input Jacks: Multifunction and Positive input jacks.
- Multifunction input port used for measuring: AC or DC volts, resistance, continuity, diode, capacitance, DC µA.

U. Built-in versatile magnet to use as a mount or as a strap

V. Battery Cover: Easily replace batteries without breaking calibration seals.

W. Battery Compartment Latches: Easy access latches can be opened without screwdriver.

X. Serial Number

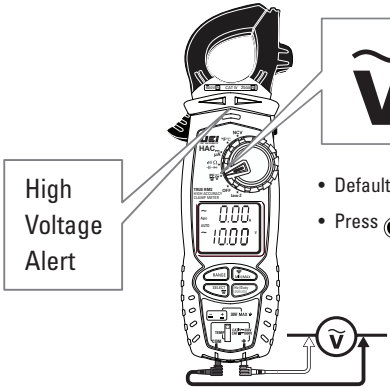
Low Z (Low Impedance)

Low Z

- Rotate Selector Dial to Low Z
- Default = $\widetilde{\mathbf{V}}$
- Press SELECT x1 = $\overline{\overline{\mathbf{V}}}$

Features: HOLD SELECT

Voltage 750V AC



⚠ WARNING

- Use CATIII rated test leads or higher.
- Do not attempt to measure more than 750V AC.
- Keep hands below line when measuring high current levels.

⚠ WARNING

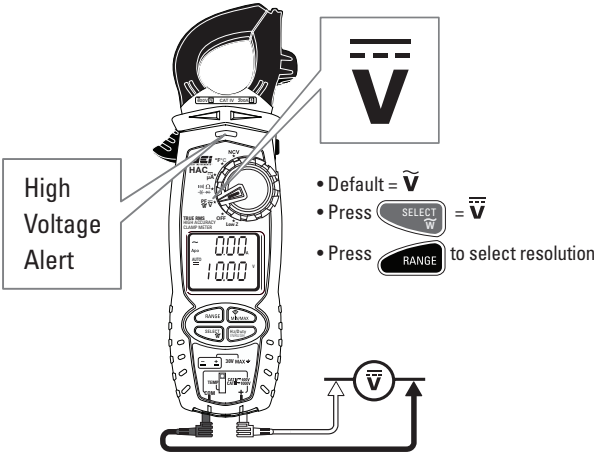
- High Voltage indicator will display and audible alert will sound over 600V AC
- High Voltage indicator will display (without audible alert) over 30V AC

Features: HOLD, MIN/MAX, RANGE, Hz/Duty INRUSH, SELECT

Range	Resolution	Accuracy	Overload Protection
600.0mV	0.1mV	±2.0%+5dgts	750V RMS
6.000V	0.001V		
60.00V	0.01V		
600.0V	0.1V		
750V	1V		

45Hz to 400Hz True RMS

Voltage 1000V DC



⚠ WARNING

- Use CATIII rated test leads or higher.
- Do not attempt to measure more than 1000V DC.
- Keep hands below line when measuring high current levels.

⚠ WARNING

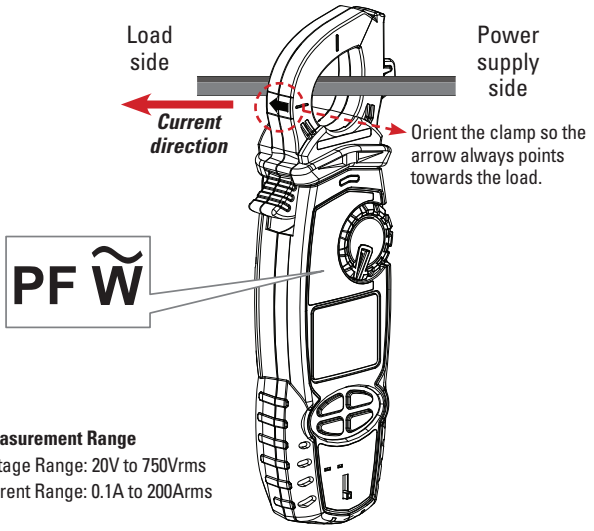
- High Voltage indicator will display and audible alert will sound over 600V DC
- High Voltage indicator will display (without audible alert) over 30V DC

Features: HOLD MIN/MAX RANGE SELECT

DC Volts

Range	Resolution	Accuracy	Overload Protection
600.0mV	0.1mV	±0.5%+4dgts	1000V RMS
6.000V	0.001V		
60.00V	0.01V		
600.0V	0.1V		
1000V	1V	±0.8%+10dgts	

Power Factor



Measurement Range
Voltage Range: 20V to 750Vrms
Current Range: 0.1A to 200Arms

1. Rotate Selector Dial to PF/W
2. Press and Hold SELECT button to enter Power Factor mode.
3. Connect the Black and Red Test Leads to COM and Volt input terminals, respectively.
4. Secure the Jaw around the current carrying conductor to ensure good contact between the closing surfaces of the Jaw.
5. Connect the Test Lead to the circuit under test.
6. Read the value displayed on the Upper Display.
7. Lagging / Leading Power Factor is displayed as a plus or minus value in the Upper Display.

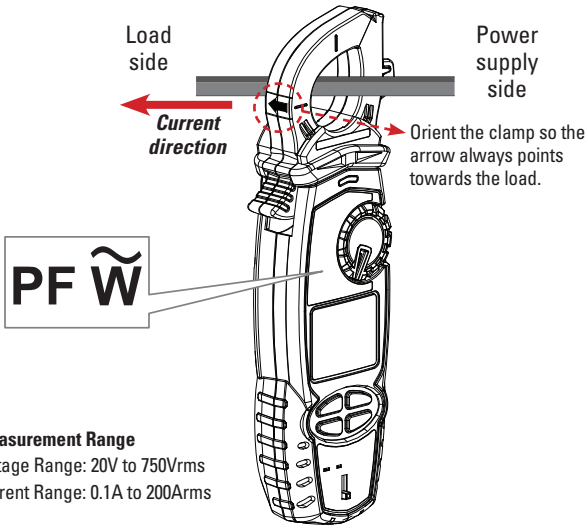
Features:

Power Factor Measurement

Range	Resolution	Accuracy	Overload Protection
-1.00 to -0.30 and 0.30 to 1.00	0.01	±5.0% +5 dgts >10A ±10.0% +5 dgts < 10A	750V RMS

*Measurement range of W, VAr, VA, PF.
Voltage Range : 20V to 750Vrms
Current Range : 0.1A to 200Arms

Watt Measurement



Measurement Range
Voltage Range: 20V to 750Vrms
Current Range: 0.1A to 200Arms

1. Rotate Selector Dial to PF/W.
2. Press and Hold SELECT button to enter Power Factor mode.
3. Press Select Button to place in the W (VA or VAr) range.
4. Connect the Black and Red Test Leads to COM and Volt input terminals, respectively.
5. Secure the Jaw around the current carrying conductor being tested to ensure good contact between the closing surfaces of the Jaw.
6. Connect the Test Lead to the circuit under test and read the value displayed on the Lower Display.

Features: HOLD, MIN/MAX, SELECT W

⚠ WARNING
• The maximum input voltage for the AC voltage range is 750V RMS.
To avoid risk of electric shock or damage to the equipment, do not measure voltages exceeding 750V RMS.

Active Power (W)

Range	Resolution	Accuracy	Overload Protection
1500W	1W	±5.0% +5 digits > 10A, ±10.0% + 5 digits < 10A	750V RMS
15.00KW	0.01KW		
150.0KW	0.1KW		

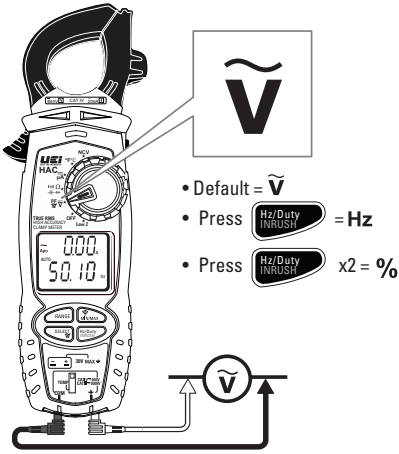
Apparent Power (VA)

Range	Resolution	Accuracy	Overload Protection
1500VA	1VA	±5.0% + 5 digits	750V RMS
15.00KVA	0.01KVA		
150.0KVA	0.1KVA		

Reactive Power (VAr)

Range	Resolution	Accuracy	Overload Protection
1500VAr	1VAr	±5.0% +5 digits > 10A, ±10.0% + 5 digits < 10A	750V RMS
15.00KVAr	0.01KVAr		
150.0KVAr	0.1KVAr		

Frequency (Hz)/Duty Cycle (%)



⚠ **Use CAT III rated leads or higher.**

Rotate Rotary selector Dial to Ṽ position select AC voltage, press the button for Frequency and Duty Cycle modes.

⚠ **WARNING**

Do not attempt to measure more than 750V AC.

Features: HOLD Hz/Duty INRUSH

Frequency Measurement - Test lead input

Range	Resolution	Accuracy	Overload Protection
99.99Hz	0.01Hz	0.1% + 4dgts	750V RMS
999.9Hz	0.1Hz		
9.999kHz	0.001kHz		
99.99kHz	0.01kHz		

Minimum Frequency: 0.5Hz, DC V offset should be zero

Sensitivity: 1.6 Vrms

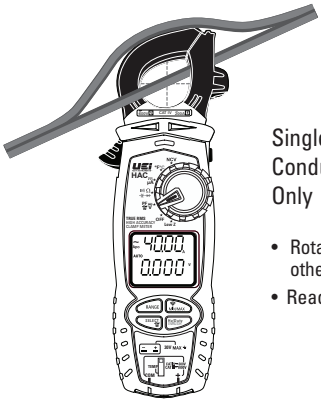
Duty Cycle - Test lead input

Range	Accuracy	Overload Protection
1.0 to 99.0%	±(0.2% per kHz + 0.1% + 5 dgts)	750V RMS

Frequency Range: 0.5Hz to 30kHz

Sensitivity: 1.6 Vrms

AC Amps <200A Jaw



Single
Conductor
Only

- Rotary selector dial = Any position other than NCV
- Reading show on upper display

- AC Amps can be measured in any position of the rotary selector dial.
- Center wire in guides for best accuracy.
- Opposing currents cancel each other (use line-splitter when necessary).
- Keep hands below guard when measuring high current levels.
- Do not attempt to measure more than 200A AC.

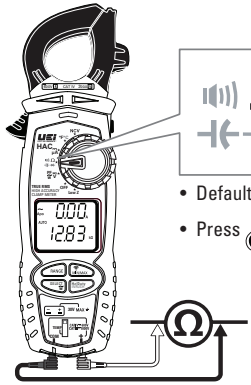
Features:

AC Amps Measurement - Jaw input

Range	Resolution	Accuracy	Overload Protection
20.00A	0.01A	±1.5%+8dgts (50~60Hz), ±1.8%+8dgts (45~50Hz & 60~400Hz)	600V RMS
200.0A	0.1A		

45Hz to 400Hz True RMS
Minimum Current for Clamp Measurement: 0.1A

Resistance: < 60MΩ



- Default = Ω
- Press RANGE to select resolution

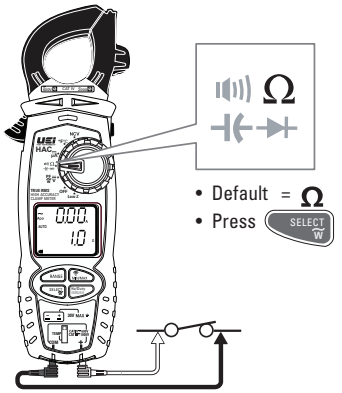
Features: HOLD SELECT RANGE MIN/MAX

⚠ **WARNING**

- Do not measure resistance on a live circuit.

Range	Resolution	Accuracy	Overload Protection
600.0Ω	0.1Ω	±1.0%+4dgts	600V RMS
6.000kΩ	0.001kΩ		
60.00kΩ	0.01kΩ		
600.0kΩ	0.1kΩ		
6.000MΩ	0.001MΩ		
60.00MΩ	0.01MΩ	±2.0%+4digits	

Continuity



- Default = Ω
- Press SELECT x1 = 🔊

- Buzzer sounds at less than < 40Ω.

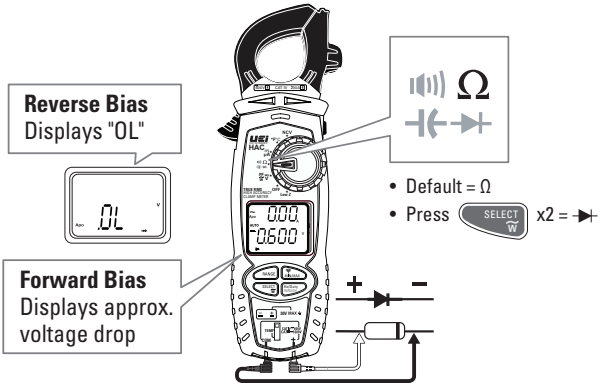
⚠ **WARNING**

- Do not measure resistance on a live circuit.

Features: HOLD SELECT MIN/MAX

Open circuit voltage < 0.64V	Overload Protection
Threshold Approx : < 40Ω	600V RMS

GOOD DIODE



BAD DIODE

Open Diode
Displays "OL"
Both directions

or

'0' Both directions

- Forward voltage drop if forward biased.
- "O.L." if reverse biased.

Features:

Diode Test

Range	Open Circuit Voltage	Test Current(Typical)	Overload Protection
6.0V	< 3.0V DC	0.25mA	600V RMS

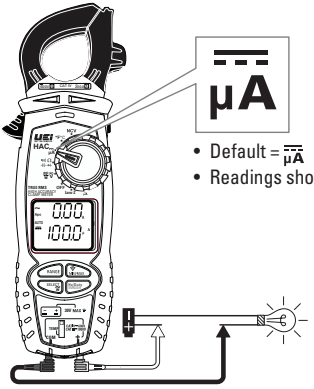
Capacitance

Features: HOLD SELECT RANGE MIN/MAX

Range	Resolution	Accuracy	Overload Protection
60.00nF	0.01nF	±3.5% + 6dgts	600V RMS
600.0nF	0.1nF		
6.000uF	0.001uF		
60.00uF	0.01uF		
600.0uF	0.1uF		
6000uF	1uF		

⚠ **WARNING** To avoid damaging the meter or equipment under test, safely discharge Capacitors before measuring capacitance. Large value capacitors should be discharged through an appropriate resistance load. Use the DC Voltage function to confirm the capacitor discharge.

DC Microamps: <2000µA



- Default = µA
- Readings show on lower display

⚠ WARNING

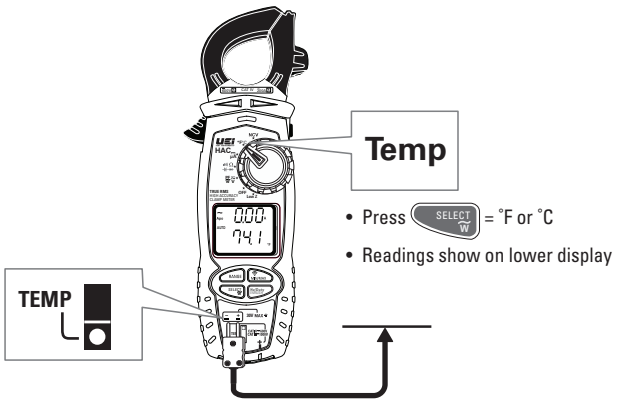
- Do not attempt to measure more than 2000µA.

Features:

DC Microamps Measurement -Test lead input

Range	Resolution	Accuracy	Overload Protection
600.0uA	0.1uA	±1.2%+3dgts	600V RMS
2000uA	1uA		

Temperature °F/°C



- Disconnect test lead probes from voltage source and meter.
- Move Input Jack Locks to "TEMP" setting.
- Use K-Type thermocouple temperature probes only.
- Stated accuracy does not account for thermocouple accuracy.

Features: HOLD MIN/MAX

Range	Resolution	Accuracy	Overload Protection
-328° to 999°F (-200° to 999°C)	0.1°F (0.1°C)	±(1.0% + 3.6°F) ±(1.0% + 2.0°C)	30V RMS
1000° to 2462°F (1000°C to 1350°C)	1°F (1°C)	±(1.0% + 3°F) ±(1.0% + 2°C)	

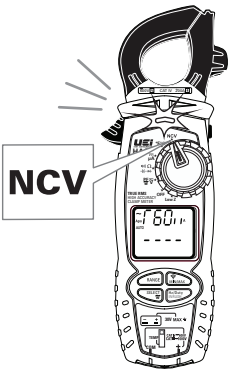
Sensor: K-type Thermocouple, sensor accuracy not included.

Temperature Calibration

The HAC clamp meter offers a digital field temperature calibration procedure to make the process easier. Here are the steps.

1) Set dial position to "°F°C"
2) Press and hold SELECT + HOLD button
3) Press HOLD button while "FCAL" is displayed on top LCD to enter Field Calibration mode.
4) After immersing temperature probe in ice bath and temperature is stable, press and hold Hz/Duty INRUSH button

Non-Contact Voltage



NCV Sensor in the tip.

- Rotate Rotary Selector Dial to **NCV** position move the tip of the clamp meter near voltage source.
- Non-Contact Voltage Detection is used to detect power with sensor located in the tip of the clamp head, indicates positive response with both an Audible and Visual alert.
- Do not use Non-contact voltage detector to determine if there is current on the wire. Detection operation could be affected by socket design, insulation thickness, type or other factors.
- Voltage indicator light may also light when voltage (>AC/DC 30V) is present on the meter's input jack or from an external interference such as motors, flashlights, etc.

Features:

On Voltage
Approx. 24V AC

LRA Inrush

- Rotary selector Dial = Any position other than NCV
- Press and Hold Hz/Duty INRUSH = INRUSH

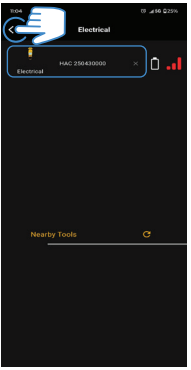
The UEi LRA Inrush is programmed to properly capture the starting current for compressor motors. Inrush current can be measured in any position of the rotary selector Dial.

- Select the range capable of capturing the maximum value.
- Press and Hold Hz/Duty INRUSH button – INRUSH will now be shown on the screen.
- Activate the compressor and read value on the display.
- Press and Hold Hz/Duty INRUSH button to return to live readings.

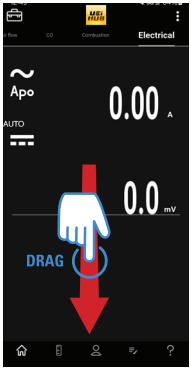
App Overview

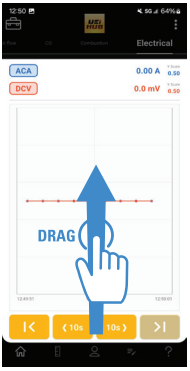
- In the App stores Google Play and the App Store, search "**UEi HUB**".
- App is compatible with iOS® 14.0 and up and Android™ 10.0 and up. If searching for the iPad version, you may have to filter for "iPhone" only.
- Turn on HAC and launch the **UEi HUB** App on device.
- On HAC, Press and hold MIN/MAX button. Beep confirms wireless mode activated. Wireless icon shows in display.
- On Device, Press CONNECT to pair device

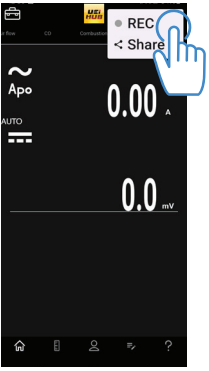
- Click on "Toolbox" icon in the upper left of screen
- Connect your meter by dragging it to the highlighted box in upper screen



- To display measurement graphs, scroll up or down on screen

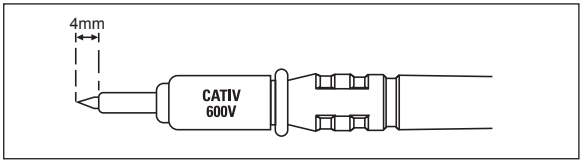






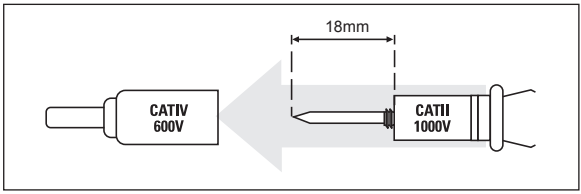
Test Lead Notes

Cat IV and CAT II Measurement Locations



- Ensure the test lead shield is pressed firmly in place. Failure to use the CAT IV shield increases arc-flash risk.

CAT II Measurement Locations

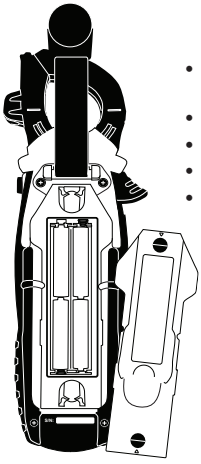


- CAT IV shields may be removed for CAT II locations. This will allow testing on recessed conductors such as standard wall outlets. Take care not to lose the shields.

⚠ **WARNING:** Test Lead category protections apply only to test leads and should not be confused with the meter's specific CAT rating. Observe the maximum category protection indicated on the meter the test leads are plugged into.

⚠ **CAUTION**: If the test leads need to be replaced, you must use a new one which should meet EN 61010-031 standard, rated CATIII 1000V or better.

Battery Replacement



- Rotate Battery Compartment Latches to open position
- Remove battery cover
- Replace the old batteries with 4 new (AAA) batteries
- Replace the battery cover
- Rotate Battery Compartment Latches to lock

Warranty

The HAC is warranted to be free from defects in materials and workmanship for a period of 2 years from the date of purchase. If within the warranty period your instrument should become inoperative from such defects, the unit will be repaired or replaced at UEi's option. This warranty covers normal use and does not cover damage which occurs in shipment or failure which results from alteration, tampering, accident, misuse, abuse, neglect or improper maintenance. Batteries and consequential damage resulting from failed batteries are not covered by warranty.

Any implied warranties, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the express warranty. UEi shall not be liable for loss of use of the instrument or other incidental or consequential damages, expenses, or economic loss, or for any claim or claims for such damage, expenses or economic loss.

Warranty only covers hardware and does not extend to software applications.

A purchase receipt or other proof of original purchase date will be required before warranty repairs will be rendered. Instruments out of warranty will be repaired (when repairable) for a service charge.

For more information on warranty and service, contact:

www.ueitest.com • Email: info@ueitest.com
1-800-547-5740

This warranty gives you specific legal rights. You may also have other rights, which vary from state to state.

Disposal

⚠ **CAUTION:** This symbol indicates that equipment and its accessories shall be subject to separate collection and correct disposal.

Cleaning

Periodically clean your meter's case using a damp cloth. DO NOT use abrasive, flammable liquids, cleaning solvents, or strong detergents as they may damage the finish, impair safety, or affect the reliability of the structural components.

Storage

Remove the batteries when instrument is not in use for a prolonged period of time. Do not expose to high temperatures or humidity. After a period of storage in extreme conditions exceeding the limits mentioned in the General Specifications section, allow the instrument to return to normal operating conditions before using it.