

User Manual
ENGLISH



TRMS Clamp-On Meter Model 514



CLAMP-ON METER

Measure Up
WITH AEMC INSTRUMENTS



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Statement of Compliance

Chauvin Arnoux[®], Inc. d.b.a. AEMC[®] Instruments certifies that this instrument has been calibrated using standards and instruments traceable to international standards.

We guarantee that at the time of shipping your instrument has met the instrument's published specifications.

An NIST traceable certificate may be requested at the time of purchase, or obtained by returning the instrument to our repair and calibration facility, for a nominal charge.

The recommended calibration interval for this instrument is 12 months and begins on the date of receipt by the customer. For recalibration, please use our calibration services.

Serial #: _____

Catalog #: 2117.70

Model #: 514


Please fill in the appropriate date as indicated:


Date Received: _____

Date Calibration Due:



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1. INTRODUCTION

Thank you for purchasing an AEMC® Instruments
TRMS Clamp-On Meter Model 514.

For best results from your instrument and for your safety, read the enclosed operating instructions carefully and comply with the precautions for use. Only qualified and trained operators should use this product.


1.1 International Electrical Symbols

	Signifies that the instrument is protected by double or reinforced insulation.
	CAUTION - Risk of Danger! Indicates a WARNING . Whenever this symbol is present, the operator must refer to the user manual before operation.
	Indicates a risk of electric shock. The voltage at the parts marked with this symbol may be dangerous.
	Application or withdrawal authorized on conductors carrying dangerous voltages. Type A current sensor as per IEC 61010-2-032.
	Indicates Important information to acknowledge
	This product complies with the Low Voltage & Electromagnetic Compatibility European directives.
	The product has been declared recyclable.
	In the European Union, this product is subject to a separate collection system for recycling electrical and electronic components in accordance with directive WEEE 2012/19/EU.

1.2 Definition of Measurement Categories

- CAT IV:** Corresponds to measurements performed at primary electrical supply (< 1000 V).
Example: primary overcurrent protection devices, ripple control units, and meters.
- CAT III:** Corresponds to measurements performed in the building installation at the distribution level.
Example: hardwired equipment in fixed installation and circuit breakers.
- CAT II:** Corresponds to measurements performed on circuits directly connected to the electrical distribution system.
Example: measurements on household appliances and portable tools.

1.3 Precautions for Use

- Read the user manual before operating and follow all safety information. Only use the meter as specified in this user manual.
- The operator and/or the responsible authority must carefully read and clearly understand the various precautions to be taken in use. Sound knowledge and a keen awareness of electrical hazards are essential when using this instrument.
- Never use this meter on a circuit with voltages greater than 600 V_{RMS} @ 50/60 Hz, CAT III or 1000 V, CAT II.
- Never measure current while the test leads are connected to the input jacks.
- Do not operate the meter if the body or test leads look damaged.
- Do not perform resistance and continuity test on a live circuit.
- Use extreme caution when measuring live systems with voltages greater than 60 V_{DC} or 30 V_{AC}.
- Use extreme care when working around bus bars and bare conductors.
- Do not use the meter in overrange/overload conditions (**OL**).
- For accurate readings, change the battery when the  symbol appears.

1.4 Receiving Your Shipment

Upon receiving your shipment, make sure that the contents are consistent with the packing list. Notify your distributor of any missing items. If the equipment appears to be damaged, file a claim immediately with the carrier and notify your distributor at once, giving a detailed description of any damage. Save the damaged packing container to substantiate your claim.

1.5 Ordering Information

Clamp-On Meter Model 514 Cat. #2117.70

Includes meter, pair of test leads (red/black with probe tips), 9 V battery, soft carrying case and a user manual.

1.5.1 Accessories and Replacement Parts

Set of two, 5 ft color-coded leads **Cat. #2140.68**

Replacement Pouch **Cat. #2118.94**

2. PRODUCT FEATURES

2.1 Description

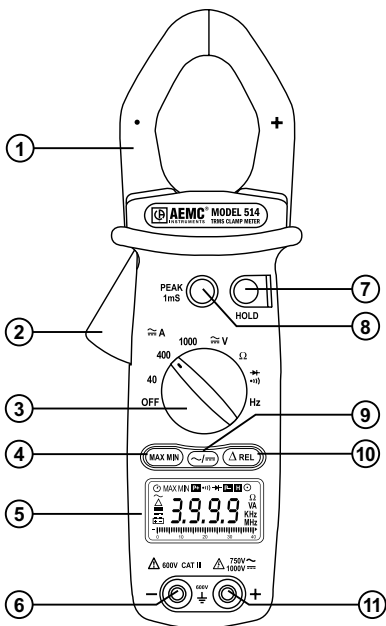
The AEMC® Instruments Model 514 is a general purpose professional clamp-on meter that measures up to the toughest standards. This meter offers a complete set of measurement ranges including AC Amps, AC Volts, DC Volts, Ohms, Continuity with beeper, Frequency from V or A, Diode Test function and also uses Hall Effect sensor technology that provides both DC and AC current measurements to 1000 A.

The Model 514 is in compliance with international safety and quality standards to ensure professional and reliable measuring tools.

The Models 514 is sized for comfortable, one-handed operation. The tapered and hooked jaw design facilitates maneuvering in crowded wiring and breaker panels, making it easy to select conductors. The jaw opening accommodates one 750 kcmil cable or two 350 kcmil cables. The large and easy-to-read 4000-count LCD features comprehensive user information symbols, such as low battery, polarity, overload, and an analog bargraph for easy trend readings. It is equipped with a Data Hold function that freezes the measurement for later viewing, Min/Max, and a fast 1ms Peak Hold function for capture of signals.

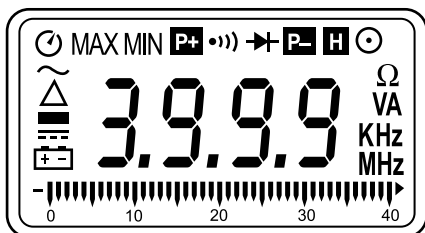
The Model 514 is a True RMS clamp-on that provides RMS measurements for today's non-linear electrical environments.

2.2 Model 514 Control Features



1. Jaw Assembly
2. Lever for Jaw Opening/Closing
3. Rotary Range Selector Switch
4. Maximum/Minimum Button
5. LCD Display
6. COM (black) Input
7. Data Hold Button
8. Peak Hold Button
9. AC/DC Selector Button
10. Relative Button
11. Positive (red) Input

2.3 LCD Display



	Low Battery
	DC Input
	Polarity Indicator
	Zero (Relative)
	AC Input
	Auto Power Off Indication
	Positive Peak Detect Indication
	Continuity Beeper Enabled
	Diode Function Indication
	Negative Peak Detect Indication
	Data Hold
	Manual Range
	Resistance Measurement Indicator
	Voltage/Current Indicator
	Frequency Measurement Indicator
	Analog Bargraph

3. SPECIFICATIONS

3.1 Electrical Specifications

Reference Conditions: 23°C ±5°C, (45 to 80) % RH, True RMS for V_{AC} and A_{AC} accuracy are specified from (5 to 100) % of range, crest factor 1.4 < CF < 3 at full scale & CF < 6 at half scale.

AC Amperes (Auto-Ranging)

Range	Resolution	Accuracy	Overload
40 A	0.01 A	50/60 Hz: 1.9 % of Reading ± 5 cts	1200 ARMS
400 A	0.1 A	60/500 Hz: 2.5 % of Reading ± 5 cts	
1000 A	1 A		

AC Volts (Auto-Ranging)

Range	Resolution	Accuracy (50/500Hz)	Overload
400 V	0.1 V	1.5 % of Reading ± 5 cts	1000 VRMS
750 V	1 V		

DC Amperes (Auto-Ranging)

Range	Resolution	Accuracy (50/500Hz)	Overload
40 A	0.01 A	2.5 % of Reading ± 10 cts	1200 ARMS
400 A	0.1 A		
1000 A	1 A		


DC Volts (Auto-Ranging)

Range	Resolution	Accuracy (50/500Hz)	Overload
400 V	0.1 V	1.0 % Reading ± 2 cts	1000 VRMS
1000 V	1 V		


Resistance - Ohms (Ω)

Range	Resolution	Accuracy (50/500Hz)	Overload
400 Ω	0.1 Ω	1.0 % of Reading ± 2 cts	600 VRMS
4000 Ω	1 Ω		

Diode ()

Range	Test Current	Open Circuit Voltage	Overload Protection
	1.7 mA max	6 V max	600 VRMS

Continuity ()

Range	Beeper Activation	Overload
	< 40 Ω	600 VRMS

Frequency (Hz) (Auto Ranging)

Function	Range	Resolution	Accuracy	Sensitivity
A-Hz	4 KHz	1 Hz	0.1 % R \pm 1 ct	2 ARMS
	10 KHz	10 Hz		5 ARMS
V-Hz	4 KHz	1 Hz	0.1 % R \pm 1 ct	5 VRMS
	10 KHz	10 Hz		10 VRMS

3.2 Mechanical Specifications

Digital Display:

4000-count $3\frac{3}{4}$ digits LCD display (max reading 3999)

Analog Display:

Fast 40 segment analog bargraph display

Symbol and Scale Range:

Automatic according to range and input signal

Polarity:

 displayed when negative signal applied to input

Over Load:

 displayed when input signal exceeds range

Sample Rate:


2 samples/sec for the digital display

20 samples/sec for the analog bargraph

Power Supply:

9 V, NEDA 1604 (6LR61) alkaline battery

Low Battery Indication:

 displayed when the battery is below the required voltage

Battery Life:

40 h approx

Auto-Power Off:

The meter will power itself OFF if there is no push button or rotary switch operation for 30 minutes. To deactivate this function, press the **MAX/MIN** button and keep it pressed down, then power up the probe.

Jaw opening size:

1.575 in (40 mm)

Dimension:

(9.53 x 2.60 x 1.42) in (242 x 66 x 36) mm

Weight:

14.10 oz (400 g) with batteries

3.3 Environmental Specifications

Altitude: 2000 m

Operating Temperature:

(-14 to 122) °F (-25 to 50) °C, 80 % RH, non-condensing



NOTE: If the meter is to be used below 32 °F (0 °C), we suggest that the battery be replaced to ensure proper results.

Storage Temperature:

(-14 to 140) °F (-25 to 60) °C < 80 % RH, battery removed

3.4 Safety Specifications



EN 61010, 300 V, CAT IV, Pollution Degree: 2

EN 61010, 600 V, CAT III, Pollution Degree: 2

EN 61010, 1000 V, CAT II, Pollution Degree: 2

4. OPERATION

4.1 Button Functions

4.1.1 Data Hold

- The last reading may be held on the display by pressing the **HOLD** button. The **H** symbol will be displayed in data hold mode.
- When the held data is no longer needed, release the hold function by pressing the **HOLD** button again.

4.1.2 Peak Hold Function

- This meter is built with 1 ms peak hold function on AAC, VAC, ADC and VDC ranges.
- Calibration is necessary before performing a peak hold operation.
- To start the calibration process, press and hold the **PEAK** button for 2 seconds. **CAL** will display on the LCD and the offset will be calculated and kept in the meter.
- After calibration, choose either **P+** or **P-** by pressing the **Peak Hold** button to keep the peak reading.
- Pressing the **PEAK** button for 2 seconds will return the meter back to normal operation.
- Once the function range is changed, the meter will need another calibration for peak measurement.

4.1.3 MAX/MIN Function

- This meter is built with MAX/MIN function at AAC, VAC, ADC and VDC ranges.
- Pressing the **MAX/MIN** button once will set the meter to **MAX** mode.
- Pressing it twice will set the meter to **MIN** mode.
- Pressing it three times will display the present reading and still keep track of the MAX and MIN change. This mode will also indicate a blinking **MAX/MIN** symbol.
- Pressing the **MAX/MIN** button for more than 2 seconds will set the meter back to normal operation.

4.1.4 REL Function

- This meter is built with REL function at AAC, VAC, ADC and VDC ranges.
- Pressing the Δ REL button once will change the zero to the present reading and the relative value will show on the LCD.
- Pressing it twice will display the relative zero point. This mode will also indicate a blinking Δ symbol.
- Pressing the Δ REL button for more than 2 seconds will set the meter back to normal operation.

4.2 AC/DC Current Measurement



NOTE: Remove the test leads before measuring current.

AAC

- Press the lever to open the jaws, then clamp the jaws around the conductor to be measured.
- Choose AC current measurement by pressing the **AC/DC** selector button for AAC reading.

ADC

- Choose DC current measurement by pressing the **AC/DC** selector button for ADC reading.
 - Wait for the reading to stabilize, then press the Δ REL button to null the reading.
 - Press the lever to open the jaws, then clamp the jaws around the conductor to be measured.
 - If reading is unstable and is hard to read, push the **HOLD** button and read the measurement.
-



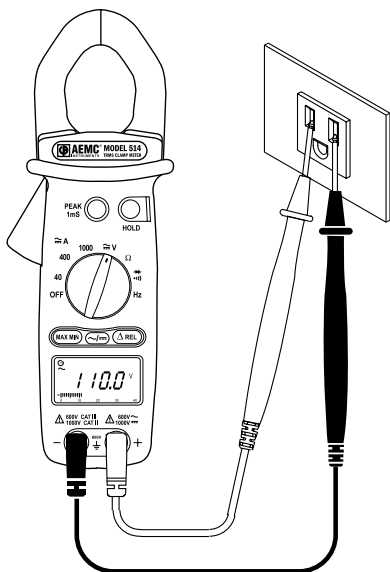
WARNING: If overload **OL** is displayed, unclamp the meter immediately.

4.3 AC Volt Measurement

- Turn the rotary range switch to the $\approx V$ range.
- Insert red test lead to the red + input jack and the black lead to the black **COM** input jack.
- Choose AC by pressing the **AC/DC** button.
- Bring the test probe tips into contact with the test points.
- If reading is unstable and hard to read, push the **HOLD** button and read the measurement.



WARNING: Immediately unclamp the meter from the conductor under test if overload **OL** is displayed.

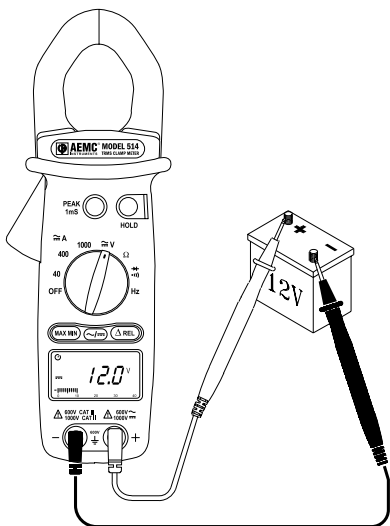


4.4 DC Volt Measurement

- Turn the rotary range switch to the \approx V range.
- Insert red test lead to the red + input jack and the black lead to the black **COM** input jack.
- Choose DC by pressing the **AC/DC** button.
- Bring the test probe tips into contact with the test points.
- If reading is unstable and hard to read, push the **HOLD** button and read the measurement.



WARNING: Immediately unclamp the meter from the conductor under test if overload **OL** is displayed.



4.5 Resistance Measurement

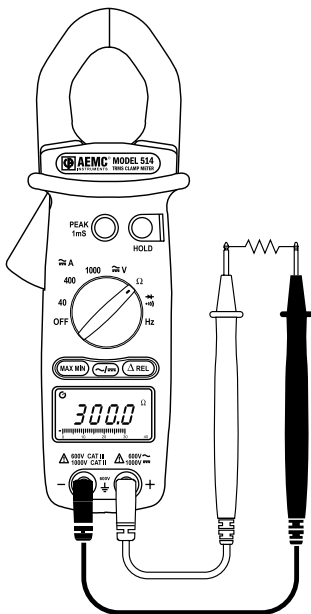
- Turn the rotary range switch to the Ω range.
- Insert the red test lead to the red **+** input jack and the black lead to the black **COM** input jack.
- Bring the test probe tips into contact with the sample under test.



WARNING: Immediately unclamp the meter from the conductor under test if overload **OL** is displayed.



WARNING: When making a resistance measurement, make sure that the power is off (dead circuit), and that all capacitors in the measured circuit are fully discharged.



4.6 Continuity Measurement

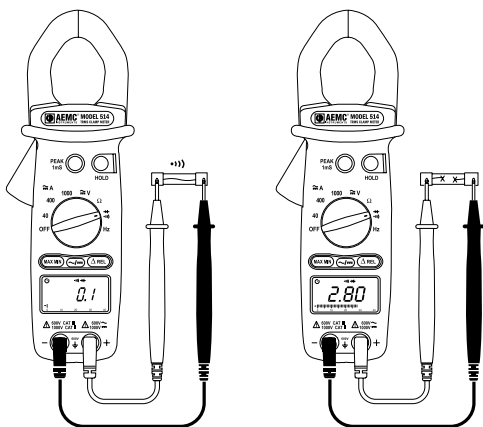


WARNING: When testing continuity, make sure that there is no power in the tested sample or circuit (dead circuit). This may be checked by using the voltage functions.

- Turn the rotary range switch to the **▶+ ∞))** range.
- Insert red test lead to the red **+** input jack and the black lead to the black **COM** input jack.
- Bring the test probe tips into contact with the sample under test.
- If the resistance is less than 40 Ω , the beeper emits a continuous sound. The readings on the display are not valid.
- If overload (**OL**) is displayed, the resistance exceeds the measurement range or the circuit is open.



WARNING: Immediately unclamp the meter from the conductor under test if overload **OL** is displayed.

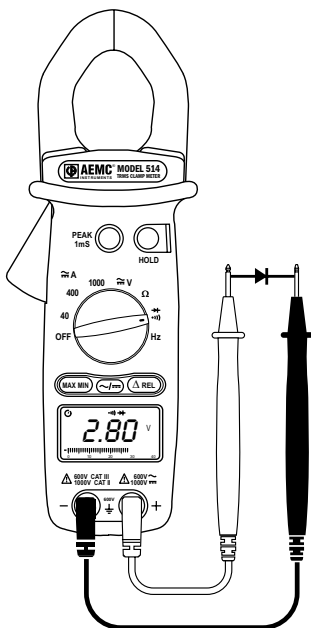


4.7 Diode Measurement



WARNING: Make sure that there is no power in the tested sample or circuit (dead circuit).

- Turn the rotary range switch to the $\rightarrow + \bullet \text{||}$ range.
- Insert red test lead to the red **+** input jack and the black lead to the black **COM** input jack.
- Bring the test probe tips into contact with the sample under test.
- If the polarity of the test leads are reversed with diode polarity, the digital reading shows ≥ 3.0 . This can be used for distinguishing anode and cathode terminals of a diode.

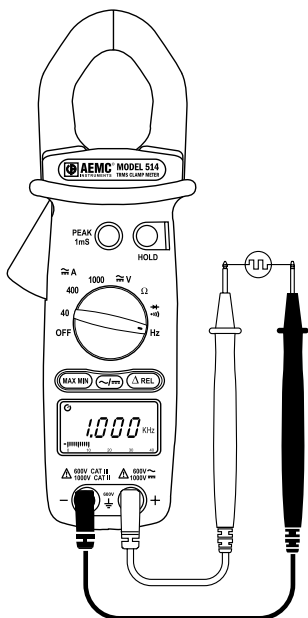


4.8 Frequency Measuring Using Voltage Input

- Turn the rotary range switch to the **Hz** range.
- Insert red test lead to the red **+** input jack and the black lead to the black **COM** input jack.
- Bring the test probe tips into contact with the sample under test.



WARNING: Immediately unclamp the meter from the conductor under test if overload **OL** is displayed.



4.9 Frequency Measurement Using Current Input

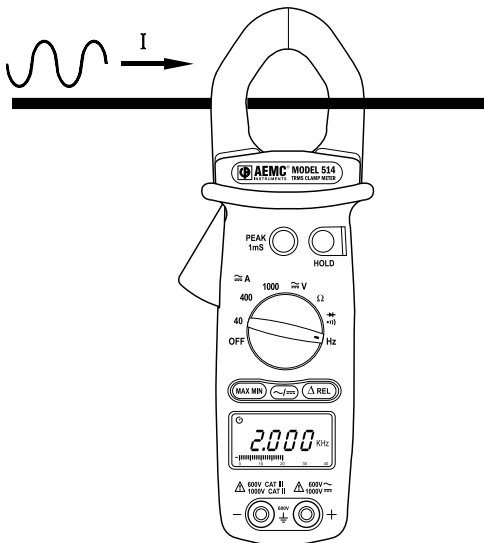


NOTE: Remove the test leads before measuring current.

- Turn the rotary range switch to the **Hz** range.
- Press the lever to open the jaws.
- Clamp the jaws around the conductor to be measured.



WARNING: Do not use both voltage and current inputs at the same time when measuring frequency. This may be dangerous. Erroneous readings will occur if both inputs are used at the same time.



5. MAINTENANCE


5.1 Warning

- Remove the test leads on any input before opening the case.
- Do not operate the clamp-on probe without a battery case cover.
- To avoid electrical shock, do not attempt to perform any servicing unless you are qualified to do so.
- To avoid electrical shock and/or damage to the instrument, do not get water or other foreign agents into the probe.

5.2 Cleaning

- To clean the probe, wipe the case with a damp cloth and mild detergent.
- Do not use abrasives or solvents.
- Do not get water inside the case. This may lead to electrical shock or damage to the instrument.

5.3 Battery Replacement

- The Clamp-On Meter Model 514 is powered by a 9 V battery. The  symbol will appear on the LCD display when the supply voltage drops below proper operating range. This indicates that the battery needs to be changed.
- The meter must be in the OFF position and disconnected from any circuit or input.
- Place the meter face down and loosen the battery cover screw with a screwdriver.
- Replace the old battery with a new 9 V battery.
- Replace the battery compartment cover and tighten down the screw.

5.4 Repair and Calibration

To ensure that your instrument meets factory specifications, we recommend that it be sent back to our factory Service Center at one-year intervals for recalibration or as required by other standards or internal procedures.

(Or contact your authorized distributor.)

Contact us for the costs for repair, standard calibration, and calibration traceable to N.I.S.T.



NOTE: A CSA# must be obtained before returning any instrument.

5.5 Technical Assistance

If you are experiencing any technical problems or require any assistance with the proper operation or application of your instrument, please call, e-mail or fax our technical support team.

5.6 Limited Warranty

The instrument is warranted to the owner for a period of two years from the date of original purchase against defects in manufacture. This limited warranty is given by AEMC® Instruments, not by the distributor from whom it was purchased. This warranty is void if the unit has been tampered with, abused, or if the defect is related to service not performed by AEMC® Instruments.

Please print the online Warranty Coverage Information for your records.

What AEMC® Instruments will do:

If a malfunction occurs within the warranty period, you may return the instrument to us for repair, provided we have your warranty registration information on file or a proof of purchase. AEMC® Instruments will repair or replace the faulty material at our discretion.

Caution: To protect yourself against in-transit loss, we recommend that you insure your returned material.



NOTE: A CSA# must be obtained before returning any instrument.

NOTES:



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