505

■ CLAMP-ON METERS
MEDIDORES DE ABRAZADERA
PINCE MULTIMETRE

ENGLISH

AEMC® INSTRUMENTS
CHAUVIN ARNOUX GROUP

CONTENTS

Thank you for purchasing the AEMC Clamp-On Meter Model 505. For best results from your instrument and for your safety, read the enclosed operating instructions carefully and comply with the precautions for use. This instrument is compliant with safety standard IEC 61010- 2-032; the leads are compliant with IEC 61010-2-031 for voltages up to 600 V in category III. Failure to observe the safety instructions may result in electric shock, fire, explosion, or destruction of the instrument and of the installations.

Symbols

	WARNING, risk of DANGER! The operator must refer to these instructions whenever this danger symbol appears.
	Ground/earth.
	Equipment is protected by double insulation.
	Application or withdrawal authorized on conductors carrying dangerous voltages. Type A current sensor as per IEC 61010-2-032.
	The trash can with a line through it means that in the European Union, the product must undergo selective disposal for the recycling of electric and electronic material, in compliance with Directive WEEE 2002/96/EC.
	The CE marking guarantees conformity with European directives and with regulations covering EMC.
	Battery.
	Alternating current.
	Direct current.
	AC or DC.
	Useful information or tip to read.

Definition of Measurement Categories (CAT)

CAT IV Corresponds to measurements taken at the source of low-voltage installations.
Example: power feeders, counters and protection devices.

CAT III Corresponds to measurements on building installations.
Example: distribution panel, circuit-breakers, machines or fixed industrial devices.

CAT II Corresponds to measurements taken on circuits directly connected to low-voltage installations.
Example: power supply to domestic electrical appliances and portable tools.

PRECAUTIONS FOR USE

These safety instructions are intended to ensure the safety of persons and proper operation of the device.

- The operator and/or the responsible authority must carefully read and clearly understand the various precautions to be taken in use.
- If this instrument is used other than as specified, the protection it provides may be compromised, thereby endangering you.
- Do not use the instrument in an explosive atmosphere or in the presence of flammable gases or fumes.
- Do not use the instrument on networks of which the voltage or category exceeds those mentioned.
- Do not exceed the rated maximum voltages and currents between terminals or with respect to earth.
- Do not use the instrument if it appears to be damaged, incomplete, or not properly closed.
- Before each use, check the condition of the insulation on the leads, housing, and accessories. Any element of which the insulation is deteriorated (even partially) must be set aside for repair or scrapped.
- Use leads and accessories rated for voltages and categories at least equal to those of the instrument. If not, an accessory of a lower category lowers the category of the combined clamp + accessory to that of the accessory.
- Observe the environmental conditions of use.
- Do not modify the instrument and only use factory replacement parts. Repairs and adjustments must be done by approved qualified personnel.
- Replace the batteries as soon as the ▭ symbol appears on the display of the unit. Disconnect all leads before opening the battery compartment cover.
- Use personal protective equipment when conditions require.
- Keep your hands away from the unused terminals of the instrument.
- When handling the test probes, alligator clips, and clamp ammeters, keep your fingers behind the physical guard.
- As a safety measure, and to avoid repeated overloads on the inputs of the device, configuration operations should only be performed when the device is disconnected from all dangerous voltages.

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.

Ordering Information

Clamp-on Meter Model 505 ..... Cat. #2139.82

Includes meter, pair of test leads (red/black with probe tips), two 1.5V AAA batteries, soft carrying case and a user manual.

Replacement Parts:

Lead - Replacement Set of 2, Needle Tip Color-coded (Red/Black) w/4mm Right-angle Plug (600V CAT IV w/shield on Needle Tip, 1000V CAT II w/o Shield) for any meter that accepts 4mm banana plugs ..... **Cat. #2154.74**

Replacement pouch for Model 505..... **Cat. #2118.74**

1 DESCRIPTION

The Model 505 is a clamp-on multimeter that measures electrical and physical quantities. It can perform the following functions:

- AC voltage measurement
- DC voltage measurement
- AC current measurement
- DC current measurement
- Resistance measurement
- Continuity test with buzzer
- “Delta Zero” mode
- “Peak” mode
- Auto Shutdown feature
- “Hold” feature
- Hazardous voltage warning

1.1 Interface

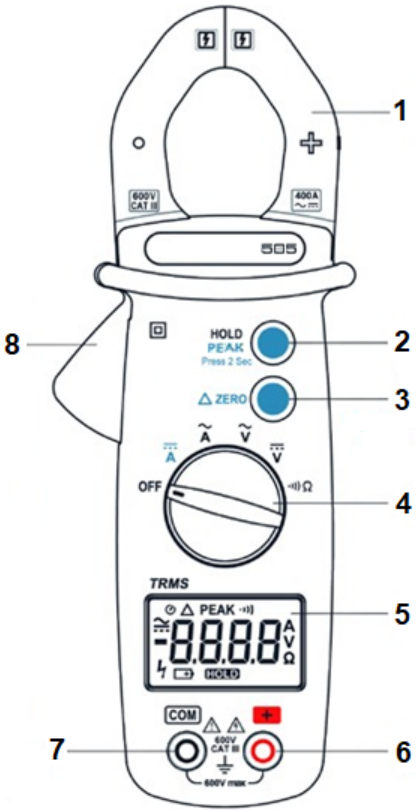

Figure 1

Item	Function
1	Jaws
2	**HOLD** button (>2 sec) **PEAK** button
3	Δ **ZERO** button
4	Rotary switch
5	LCD display screen
6	**+** input terminal
7	**COM** (common) terminal
8	Trigger

1.2 Display

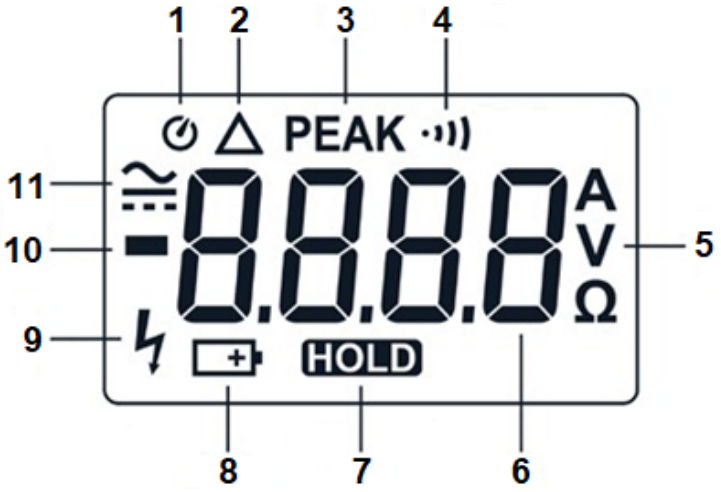

Figure 2

Item	Indicator	See §
1	Auto Shutdown activated	2.7
2	Δ **ZERO** mode	2.4
3	**PEAK** mode	2.6
4	Continuity mode	2.3.6
5	Measurement unit - **A**, **V**, or **Ω** (amp, volt, or ohm)	--
6	Measurement display area	--
7	**HOLD** function	2.5
8	Low battery	2.1
9	Hazardous voltage present	--
10	Negative value	--
11	**DC** or **AC**	--

1.3 Rotary Switch

Figure 3

Setting	Function	See §
OFF	Turns the meter OFF	--
A	DC current measurement (A_{DC})	2.3.1
A	AC current measurement (A_{AC})	2.3.2
V	AC voltage measurement (V_{AC})	2.3.3
V	DC voltage measurement (V_{DC})	2.3.4
Ω	Continuity test Resistance measurement Ω	2.3.6 2.3.5

2 OPERATION

2.1 Battery Installation

Before changing batteries: set the switch to OFF, disconnect the measuring leads, and remove the clamp from the circuit under measurement.

1. Using a screwdriver, remove the battery compartment cover from the back of the housing (see Figure 4).
2. Insert the two supplied 1.5V AA batteries, observing polarities.
3. Replace the battery compartment cover and screw it onto the housing.

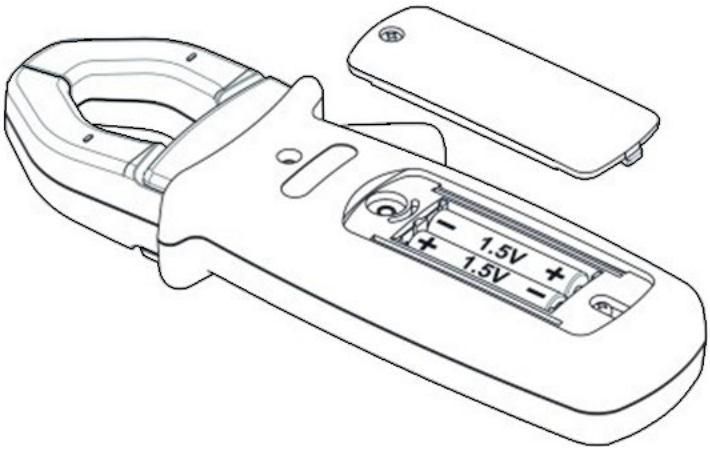

Figure 4

2.2 Instrument Check

- Start the meter by turning the rotary switch to any setting other than **OFF**. Observe the LCD and ensure all segments are displayed (see Figure 2).
- Turn the switch to the •)) Ω (continuity) setting. The LCD should display **OL**.
- Connect the two test leads to the instrument and touch the tips together. The short-circuit buzzer should sound.
- Turn the switch to a voltage setting (either V~ or V⎓) and check a known voltage (for example a battery). Ensure the displayed voltage reading is correct.

If all previous steps function normally, the meter is ready for operation.

2.3 Measurements

2.3.1 DC Current

For safety, disconnect the measurement leads before performing this operation.

The clamp must be positioned around a single conductor in a circuit; otherwise the measurement will be invalid.

To maximize accuracy, center the jaws around the conductor.

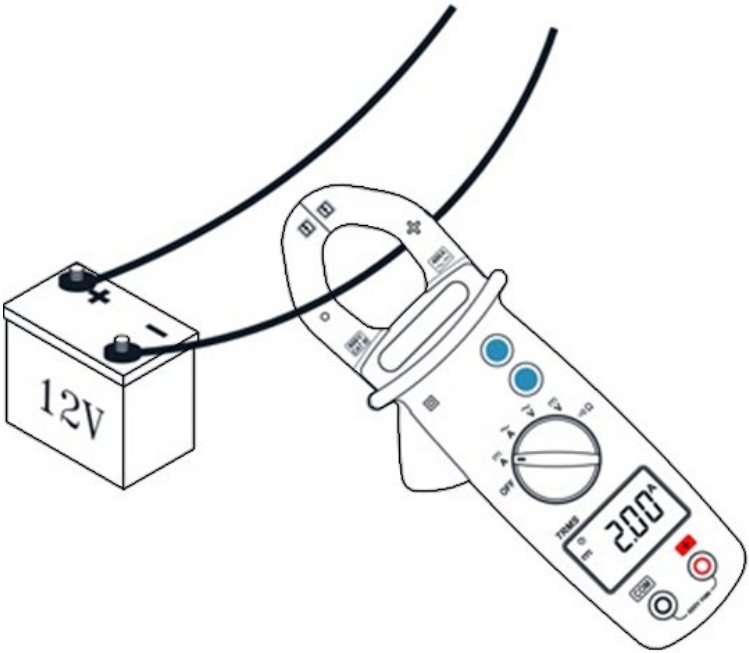

Figure 5

1. Set the switch to $\overline{\overline{\mathbf{A}}}$.
2. Press the trigger to open the clamp.
3. Place the clamp around the conductor to be measured and release the trigger. Ensure the clamp is completely closed.
4. Read the result on the LCD.

2.3.2 AC Current

For safety, disconnect the measurement leads before performing this operation.

The clamp must be positioned around a single conductor in a circuit; otherwise the measurement will be invalid.

To maximize accuracy, center the jaws around the conductor.

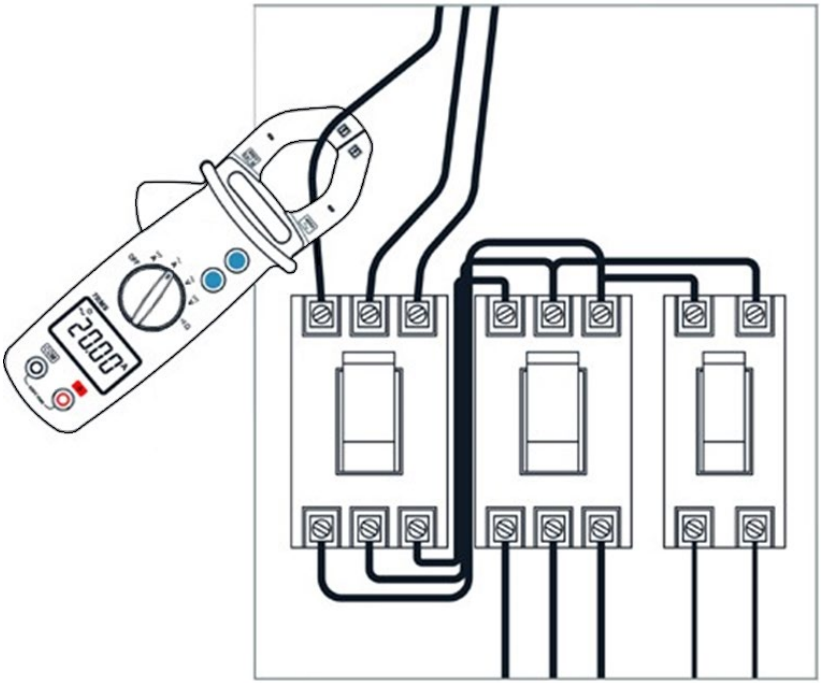

Figure 6

1. Set the switch to $\tilde{A}$.
2. Press the trigger to open the clamp.
3. Place the clamp around the conductor to be measured and release the trigger. Ensure the clamp is completely closed.
4. Read the result on the LCD.

2.3.3 AC Voltage

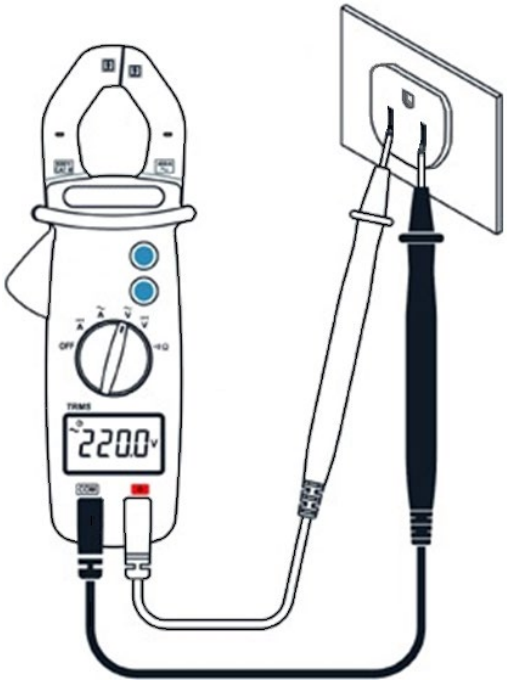

Figure 7

1. Set the switch to $\tilde{\mathbf{V}}$.
2. Connect the red test lead to the **+** input terminal and the black test lead to the **COM** input terminal.
3. Touch the lead probe tips to the AC circuit to be measured.
4. Read the result on the LCD.

If the meter detects voltage >30V_{AC}, the ⚡ (hazardous) icon appears on the LCD. In this case, immediately remove the probes from the circuit under test. Also remove the probes from the circuit if the reading displays **OL**.

2.3.4 DC Voltage

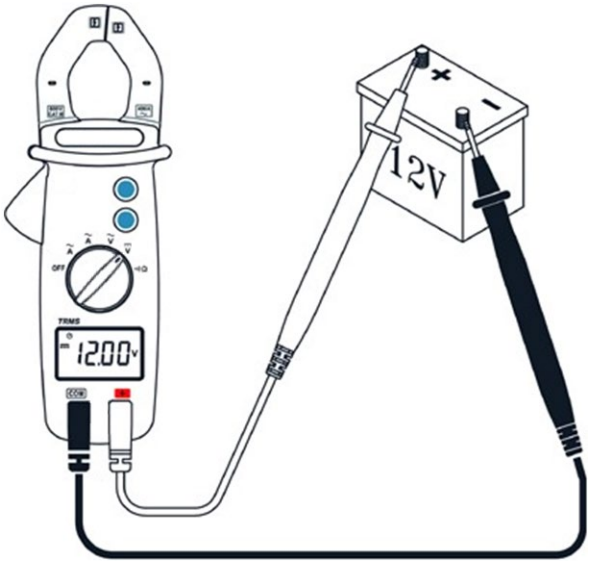

Figure 8

1. Set the switch to $\overline{\overline{\mathbf{V}}}$.
2. Connect the red test lead to the **+** input terminal and the black test lead to the **COM** input terminal.
3. Touch the lead probe tips to the DC voltage to be measured.
4. Read the result on the LCD.

If the meter detects voltage >30V_{DC}, the ⚡ (hazardous) icon appears on the LCD. Remove the probes from the circuit if the reading displays **OL**.

2.3.5 Resistance

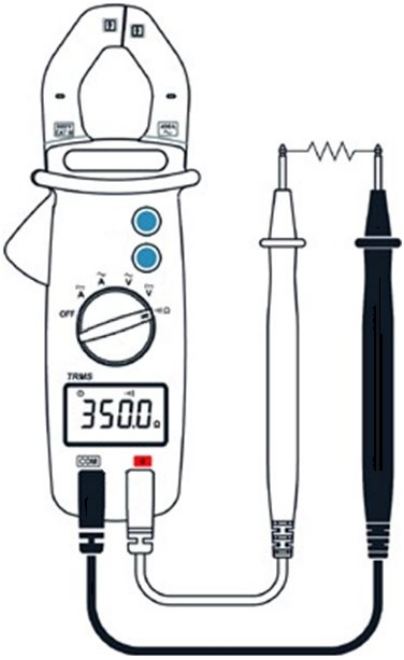

Figure 9

1. Set the switch to •))) Ω.
2. Connect the red test lead to the **+** input terminal and the black test lead to the **COM** input terminal.
3. Touch the lead probe tips to the points across which the resistance is to be measured.
4. Read the result on the LCD.

2.3.6 Continuity Check

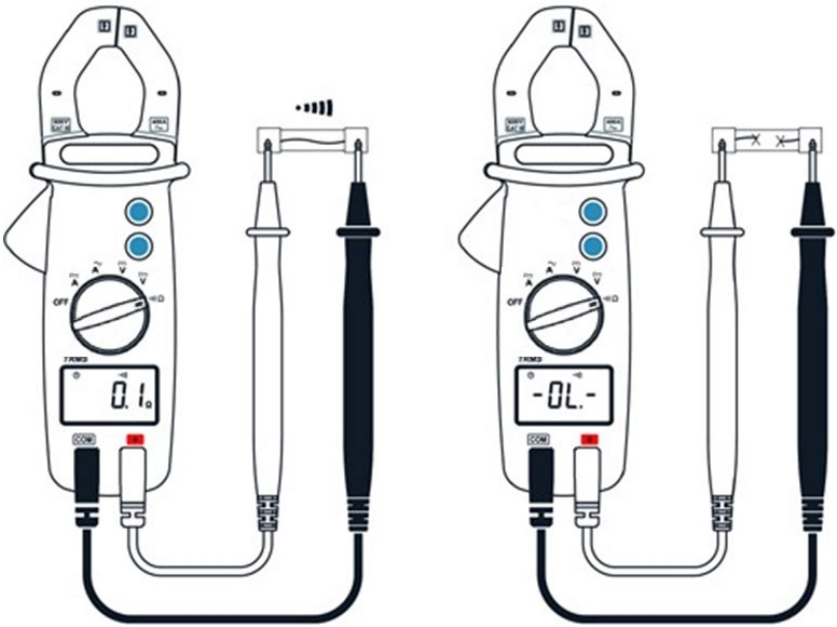

Figure 10

1. Set the switch to •))) Ω.
2. Connect the red test lead to the **+** input terminal and the black test lead to the **COM** input terminal.
3. Touch the lead probe tips to the circuit to be tested.
4. If the resistance is less than 35Ω, the buzzer sounds continuously.

2.4 Δ ZERO Mode

Δ **ZERO** mode enables you to view a measurement as the difference between it and a selected “reference” value.

To enable this mode, press the Δ **ZERO** button after making a measurement. The measurement becomes the reference, and will be subtracted from subsequent measurements. This difference will then be displayed on the LCD.

When the meter is in this mode, the Δ symbol appears on the LCD.

Press Δ **ZERO** a second time to exit this mode.

2.5 HOLD Function

Pressing the **HOLD** button “freezes” the measurement on the LCD. In this mode, the word **HOLD** appears on the LCD.

Press **HOLD** again to exit this mode and resume updating the measurement display.

2.6 PEAK Mode

In **PEAK** mode the instrument only updates the LCD when the instantaneous measurement exceeds the displayed value.

To enable this mode, press the **PEAK** button for >2 seconds. The measurement remains on the screen until an instantaneous measurement is made that exceeds the displayed value, at which point the LCD displays the new measurement.

When the meter is in this mode, the word **PEAK** appears on the LCD.

Press **PEAK** a second time to exit this mode.

In **PEAK** mode, pressing **HOLD** has no effect.

2.7 Auto Shutdown

By default, the Model 505 automatically turns OFF after 20 minutes of inactivity. The instrument can then be re-activated by either pressing the **HOLD** button or changing the switch setting.

When the meter is in this mode, the icon appears on the LCD.

To disable the Auto Shutdown feature, press and hold down the **HOLD** button when turning the instrument ON.

3 SPECIFICATIONS

3.1 Reference Conditions

Quantities of Influence	Reference Conditions
Temperature	73.4°F ± 9°F (23°C ± 5°C)
Frequency range of the applied signal	45 to 65Hz
Magnetic field	<40A/m
Electric field	<1V/m

3.2 Electrical Specifications

Out-of-range measurements are identified by **OL** displayed on the LCD, accompanied by an audible beep.

3.2.1 DC Voltage

Display range	Range	Resolution	Accuracy
60V	0.03 – 60.00V	0.01V	1% R + 3ct
600V	60.0 – 600.0V	0.1V	

3.2.2 AC Voltage

Display range	Range	Frequency	Resolution	Accuracy
60V	0.05 – 60.00V	48 – 65Hz	0.01V	1.9% R + 5ct
		65 – 400Hz		3.8% R + 5ct
600V	60.0 – 600.0V	48 – 65Hz	0.1V	1.9% R + 5ct
		65 – 400Hz		3.8% R + 5ct

Note: *When the measurement exceeds 630V RMS (900V in **PEAK** mode), the LCD displays **OL** and the audible alarm beeps.*

3.2.3 DC Current

Display range	Range	Resolution	Accuracy
60A	0.10 – 60.00A	0.01A	2.5% R + 10ct
400A	60.0 – 400.0A	0.1A	

3.2.4 AC Current

Display range	Range	Frequency	Resolution	Accuracy
60A	0.05 – 60.00A	48 – 65Hz	0.01A	1.9% R + 5ct
		65 – 400Hz		3.8% R + 5ct
400A	60.0 – 400.0A	48 – 65Hz	0.1A	1.9% R + 5ct
		65 – 400Hz		3.8% R + 5ct

***Note**: When the measurement exceeds 420A RMS (600A in **PEAK** mode), the LCD displays **OL** and the audible alarm beeps.*

3.2.5 Resistance

Display range	Range	Resolution	Accuracy
600Ω	0.2 – 600.0Ω	0.1Ω	1% R + 2ct

3.2.6 Continuity

Detection threshold: <35Ω

3.3 General Specifications

3.3.1 Display

LCD 6000 counts

3.3.2 True RMS Measurements

Sampling rate: 2 measurements per second

Accuracy: True RMS value measured up to 1kHz (-3dB), pass band ≤3.5kHz

Peak factor: ≥1.5 full scale

3.3.3 Environmental Conditions

Operation temperature: 32 to 104°F (0 to 40°C)

Storage temperature: 14 to 140°F (-10 to 60°C)

Relative humidity: < 70% RH

3.3.4 Power Supply

Battery: 2 x 1.5V AAA or LR03

Battery life: approximately 40 hours

3.3.5 Mechanical

Dimensions: 7.83 x 2.95 x 1.42” (199 x 75 x 36mm)

Jaws opening: 1.18” (30mm)

Weight: 8.57oz (243g) with batteries

Protection rating: IP30

3.3.6 Compliance with International Standards

Safety: IEC 61010-1; IEC 61010-2-032
IEC 61010-2-033; IEC 61010-2-031

EMC: IEC 61326-1

3.3.7 Safety

Insulation: double insulation - class II

Degree of pollution: 2

Altitude: <6500’ (< 2000m)

Category: CAT III 600V

4 MAINTENANCE

Except for the batteries, the instrument contains no parts that can be replaced by personnel who have not been specially trained and accredited. Any unauthorized repair or replacement of a part by an "equivalent" may gravely impair safety.

4.1 Cleaning

- Disconnect the instrument completely and turn the rotary switch to OFF.
- Use a soft cloth, dampened with soapy water.
- Rinse with a damp cloth and dry rapidly with a dry cloth or forced air.
- Do not use alcohol, solvents, or hydrocarbons.
- Keep the clamp jaws as clean as possible.

REPAIR AND CALIBRATION

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

For instrument repair and calibration:

You must contact our Service Center for a Customer Service Authorization number (CSA#). This will ensure that when your instrument arrives, it will be tracked and processed promptly. Please write the CSA# on the outside of the shipping container. If the instrument is returned for calibration, we need to know if you want a standard calibration, or a calibration traceable to N.I.S.T. (includes calibration certificate plus recorded calibration data).

(Or contact your authorized distributor)

Costs for repair, standard calibration, and calibration traceable to N.I.S.T. are available.

NOTE: All customers must obtain a CSA# before returning any instrument.

TECHNICAL AND SALES ASSISTANCE

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

NOTE: Do not ship instruments to our Foxborough, MA address.

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.

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, at its option, repair or replace the faulty material.

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