

Clamp-On Multimeters Models 701 and 703

USER MANUAL

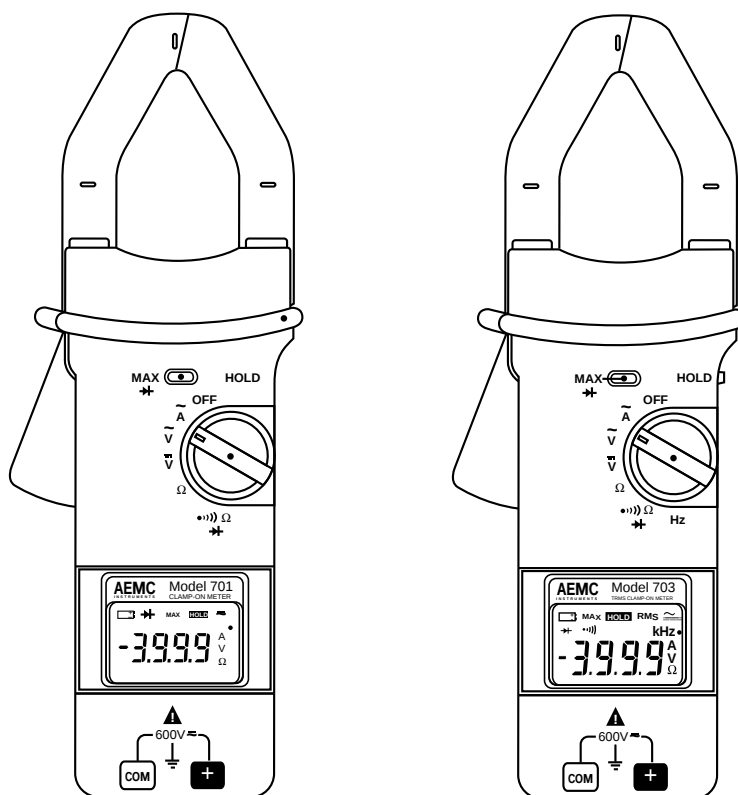


Chauvin Arnoux, Inc. d.b.a. AEMC® Instruments

99-MAN-100071 Rev 03 01/98

Clamp-On Multimeters Models 701 and 703

USER MANUAL



Owner's Record

The serial number for the Clamp-On Multimeters Models 701 or 703 is located inside the battery compartment of your instrument. Please record this number and purchase date for your records.

CLAMP-ON MULTIMETER MODEL 701

CATALOG #1207.51

SERIAL #: _____

PURCHASE DATE: _____

DISTRIBUTOR: _____

CLAMP-ON MULTIMETER MODEL 703

CATALOG #1207.53

SERIAL #: _____

PURCHASE DATE: _____

DISTRIBUTOR: _____

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Warning

These safety warnings are provided to ensure the safety of personnel and proper operation of the instrument.

- Read this instruction manual completely before attempting to use or service this instrument and follow all the safety information.
- Use caution on any circuit: Potentially high voltages and currents may be present and may pose a shock hazard.
- The instrument must not be operated beyond its specified operating range.
- Safety is the responsibility of the operator.
- Never open the back of the instrument while connected to any circuit or input.
- Always make connections from the instrument to the circuit under test.
- Always inspect the instrument and accessory leads for serviceability prior to use, and replace defective parts immediately.
- Do not use the meter or any test leads, connectors, probes or clips if they look damaged.
- Never use the clamp-on meters on electrical conductors rated above 600 Vrms.
- Never make resistance measurements on a live circuit.
- Never make diode tests on a live circuit.
- Do not have voltage or current inputs connected at the same time.

International Electrical Symbols



This symbol signifies that the Models 701 and 703 are protected throughout by double or reinforced insulation. Only use specified replacement parts when servicing the meter.



This symbol signifies CAUTION! and requests that the user refer to the user manual before using the meter.

Receiving Your Shipment

Upon receiving your shipment, be 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.

Packaging

Clamp-On Multimeter Model 701 (Cat. #1207.51) and Model 703 (Cat. #1207.53) include a 9 V battery, two 4-ft (1.2 m) test leads, a user manual and a soft carrying case.

Description

The AEMC® Instruments Clamp-on Multimeter Models 701 and 703 are general purpose professional clamp-ons. A strong mechanical case design, quality materials (GE Lexan®), full ranges and compliance to international safety and quality standards insure a professional and reliable measuring tool. Both models are autoranging, and provide AC amperes and AC volts, plus DC volts, ohms, continuity with a beeper, and a diode test function. The Model 703 also has a frequency function. Both models are equipped with a large and complete 4000 count LCD with annunciator symbols such as HOLD, Low Battery, Max etc. for easy operation.

The Model 701 is average sensing RMS calibrated and designed for the traditional average responding electrical systems. The Model 703 is a True RMS clamp-on that provides RMS measurements for today's non-linear electrical environments. Both clamp-ons are supplied with test probe terminated test leads, a soft carrying case, a 9 V battery and a user manual.

We designed and built the Models 701 and 703 for reliability: the right size; the right functions, display and performance; the right single-handed operation; the right professional tool.

Specifications

ELECTRICAL SPECIFICATIONS

Reference Conditions for following tables:

Accuracies are provided under the following reference conditions: Temperature 18° to 28° C, 45 to 75% RH; battery voltage 9 V $\pm$ 0.1 V; conductor centered in the probe jaws, earth's magnetic field; no external AC magnetic or electrical field; sine wave 45 to 450 Hz.

	Model 701	Model 703
AC Current*		
Range	1 to 100 A	1 to 100 Arms
Resolution	0.1 A	0.1 A
Basic Accuracy	$\pm 2\% R \pm 5 \text{ cts}$	$\pm 2\% R \pm 5 \text{ cts}(1)$
Range	100 to 399.9 A	100 to 399.9 Arms
Resolution	0.1 A	0.1 A
Basic Accuracy	$\pm 2\% R$	$\pm 2\% R(1)$
Range	400 to 600 A	400 to 600 Arms
Resolution	1 A	1 A
Basic Accuracy	$\pm 2\% R$	$\pm 2\% R(1)$
AC Volts*		
Range	1 to 40 V	1 to 40 Vrms
Resolution	0.1 V	0.1 V
Basic Accuracy	$\pm 1\% \pm 2 \text{ cts}$	$\pm 1\% \pm 2 \text{ cts}(2)$
Input Impedance	1 M Ω	1 M Ω
Range	40 to 399.9 V	40 to 399.9 Vrms
Resolution	0.1 V	0.1 V
Basic Accuracy	$\pm 1\%R$	$\pm 1\%R(2)$
Input Impedance	1 M Ω	1 M Ω
Range	400 to 600 V	400 to 600 Vrms
Resolution	1 V	1 V
Basic Accuracy	$\pm 1\%R$	$\pm 1\%R(2)$
Input Impedance	1 M Ω	1 M Ω

* A residual value of 7 counts may be displayed in the AC range.

- | | |
|-----------------------------|-----------------------------|
| 1. Additional error with CF | 2. Additional error with CF |
| CF from 1.5 to 2.5: 5% R | CF from 1.5 to 3: 3% R |
| CF from 2.5 to 5: 8% R | CF from 3 to 5: 8% R |

	Model 701	Model 703
DC Volts		
Range	1 to 40 V $\pm$ 2 count	1 to 40 V $\pm$ 2 count
Resolution	0.1 V	0.1 V
Basic Accuracy	$\pm$ 0.5%	$\pm$ 0.5%
Input Impedance	1 M Ω	1 M Ω
Range	40 to 399.9 V	40 to 399.9 V
Resolution	0.1 V	0.1 V
Basic Accuracy	$\pm$ 0.5%	$\pm$ 0.5%
Input Impedance	1 M Ω	1 M Ω
Range	400 to 600 V	400 to 600 V
Resolution	1 V	1 V
Basic Accuracy	$\pm$ 0.5%	$\pm$ 0.5%
Input Impedance	1 M Ω	1 M Ω
Ohms		
Range	1 to 40	1 to 40
Resolution	0.1 Ω	0.1 Ω
Basic Accuracy	$\pm$ 1% R $\pm$ 3 cts	$\pm$ 1% R $\pm$ 3 cts
Open Voltage	4.4 V	4.4 V
Short Circuit Current	1.2 mA	1.2 mA
Range	40 to 399.9 Ω	40 to 399.9 Ω
Resolution	0.1 Ω	0.1 Ω
Basic Accuracy	$\pm$ 1% R	$\pm$ 1% R
Open Voltage	4.4 V	4.4 V
Short Circuit Current	1.2 mA	1.2 mA
Range	400 to 4 k Ω	400 to 4 k Ω
Resolution	1 Ω	1 Ω
Basic Accuracy	$\pm$ 1% R	$\pm$ 1% R
Open Voltage	4.4 V	4.4 V
Short Circuit Current	1.2 mA	1.2 mA

	Model 701	Model 703
Frequency		
Range	NA	0 to 4 kHz
Basic Accuracy	NA	$\pm 0.1\% R \pm 1$ count
Hz pick-up	NA	from A or V
Continuity		
Range	0 to 40 Ω	0 to 40 Ω
Beeper	below 20 Ω	below 20 Ω
Basic Accuracy	$\pm 10\Omega R$	$\pm 10\Omega R$
Open Voltage	4.4 V	4.4 V
Short Circuit Current	1.2 mA	1.2 mA
Diode Test		
Range (DC)	0 to 4 V	0 to 4 V
Resolution	0.001 V	0.001 V
Open Voltage	4.4 V	4.4 V
Short Circuit Current	1.2 mA	1.2 mA
Additional Functions	Max Display Hold	Max Display Hold

General Specifications

Ranging:

Model 701: 6-position switch, autoranging

Model 703: 7-position switch, autoranging

Jaw size: Accommodates two 500 MCM (1.25" or 32 mm) or one 750 MCM (0.77" or 20 mm)

Battery: 9 V alkaline battery; automatic low battery indicator

Life:

Model 701: 180 hr typical

Model 703: 100 hr typical

Typical consumption:

Model 701: 2.5 mA without buzzer

Model 703: 3.5 mA without buzzer

Buzzer:

Continuous beep for the continuity sound test below 20Ω

Frequency: 2.5 kHz

Dimensions: 10 x 3.8 x 1.7" (252 x 97 x 44 mm)

Weight: 17 oz (500 g)

Operating Temperature:

32° to 122°F (0° to 50°C), 0 to 90% RH (@ 31°C)

Storage Temperature: - 40° to 158°F (- 40° to 70°C)

Safety Specifications

Protection Level: Double insulation
IEC 1010-1, 600 V category III, Pollution degree 2

Electromagnetic Compatibility: (CE mark)

EN 50081-1 Class B
EN 50082-2 Electrostatic discharge IEC 1000-4-2
Radiated Field IEC 1000-4-3
Fast transients IEC 1000-4-4
Magnetic Field
at 50/60 Hz IEC 1000-4-8

Working Voltage: 600 Vrms

Dielectric Test: 6 kV between terminals and case

Overload Protection:

Voltage: 1000 Vrms
Current: 700 Arms(@ 500 Hz @ 50°C)
Ohms: 600 Vrms
Continuity/Diode: 600 Vrms
Frequency: see voltage and current

Warranty: One year

Controls for Model 701

1. Jaw Assembly
Transformer jaws open to 1.7" (43 mm)
Accepts two 500 MCM or one 750 MCM
2. Cable Positioning
The three markings indicate the position of the conductor inside the magnetic core for best accuracy.
3. Anti-Slip Guard
4. Hold/Data Hold
HOLD button freezes the measurement on the display; the "HOLD" symbol will be displayed.
5. MAX
The MAX button displays the maximum value of the signal measured.
6. Rotary Selector Switch
6-position rotary switch selects the main functions for Model 701.
7. Display
Digital 4000-count
Measurement function and control function symbols
8. Jacks
Two input terminals for the measurement of DC and AC voltages, resistance, continuity, and diode tests

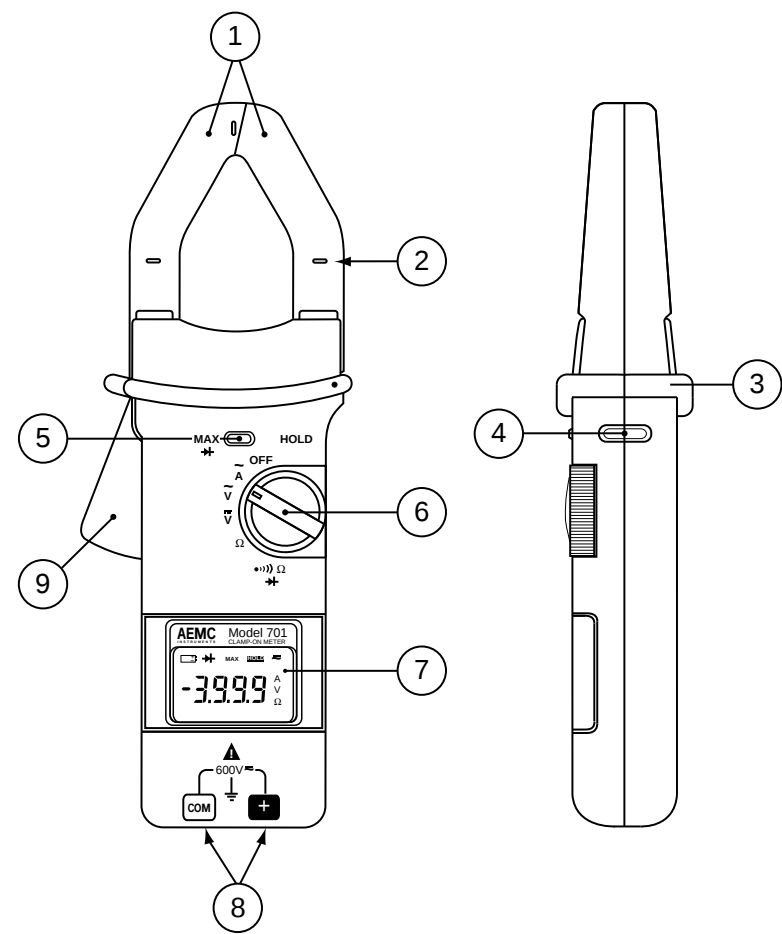
COM

 : black

+

 : red
9. Lever/Trigger
Trigger opens and closes the clamp jaws.

Model 701



Controls for Model 703

1. Jaw Assembly
Transformer jaws open to 1.7" (43 mm)
Accepts two 500 MCM or one 750 MCM
2. Cable Positioning
The three markings indicate the position of the conductor inside the magnetic core for best accuracy.
3. Anti-Slip Guard
4. Hold/Data Hold
HOLD button freezes the measurement on the display; the "HOLD" symbol will be displayed.
5. MAX
The MAX button displays the maximum value of the signal measured.
6. Rotary Selector Switch
7-position rotary switch selects the main functions for Model 703.
7. Display
Digital 4000-count
Measurement function and control function symbols
8. Jacks
Two input terminals for the measurement of DC and AC voltages, resistance, continuity, diode tests and frequency

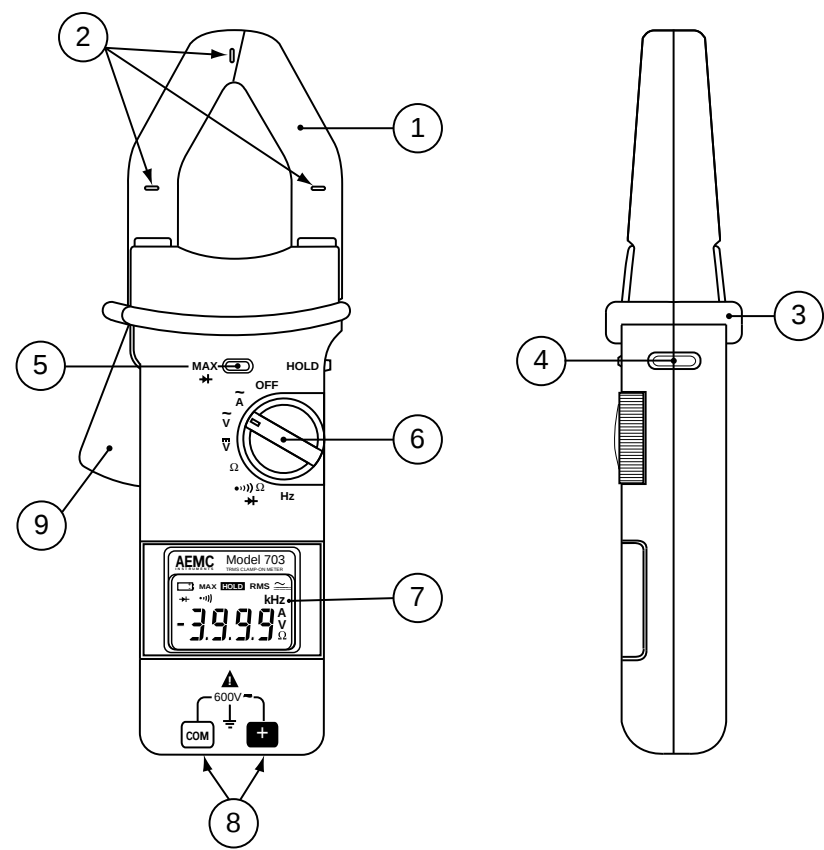
COM

 : black

+

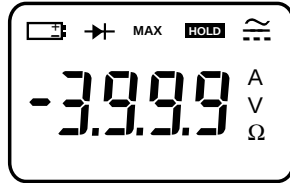
 : red
9. Lever/Trigger
Trigger opens and closes the clamp jaws.

Model 703

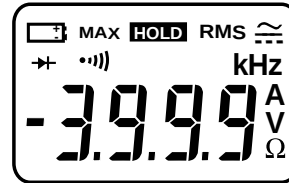


Digital Display Features

The digital display gives measurements on a large, 4000-count LCD



Model 701



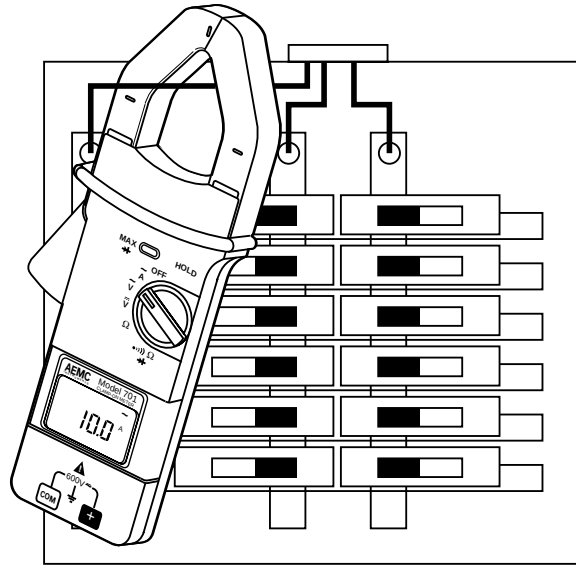
Model 703

- MAX Displays maximum measurement value
- HOLD Displayed when Hold function is activated
-  Indicates that battery requires replacement
- OL Overload indication
- A Displayed when instrument is measuring amperes
- V Displayed when instrument is measuring volts
- ~ Displayed when measuring AC volts or amperes
- — — — — Displayed when measuring DC volts
- Ω Displayed when measuring resistance
- | Displayed when performing the diode test

For the Model 703 only:

- RMS Displayed when performing a RMS measurement
- kHz Displayed when performing a frequency measurement
- | Displayed when performing the continuity with sound test

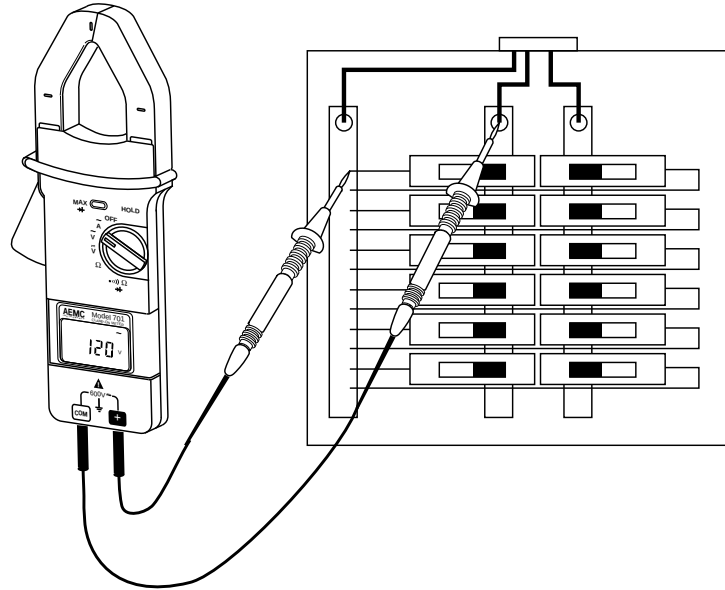
AC Current Measurements



WARNING: Do not exceed operating voltage specifications!

1. Turn the rotary switch to the current measurement function A~.
2. Press the trigger to open the instrument jaws. Clamp the jaws around the conductor. For the most accurate readings, align the conductor with the centering marks on the jaws.
3. Take the reading from the display. Current measurements are possible from 1 A to 700.0 A.
4. If you have the instrument positioned so that you cannot read the display, press the HOLD button on the side of the instrument to freeze the reading. Remove the clamp-on and read.

AC and DC Voltage Measurements



WARNING: Do not exceed operating voltage specifications!

1. Turn the rotary switch to the voltage measurement function to measure AC or DC volts.
2. Insert the red test lead into the **+** jack and the black test lead into the **COM** jack. Select the appropriate termination (test probes or clips).
3. Touch or connect the voltage test leads to the circuit under test.
4. Take the reading from the display. Voltage measurements are possible from 0.0 to 600 V.

MAX Value Measurements

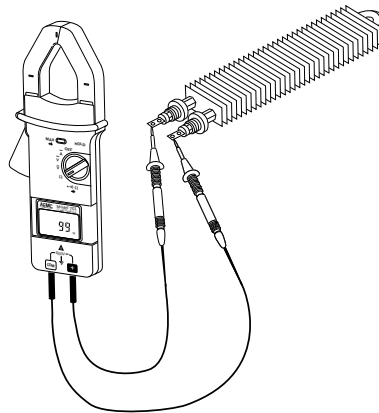
1. With the switch in the AAC, V AC or V DC function, push and release the MAX button (positive MAX value will be displayed).
2. Take the reading.

For the Model 703

There is approximately a 2-second delay before the MAX indication is shown on the display.

When taking repetitive MAX measurements, wait approximately 5 seconds between measurements.

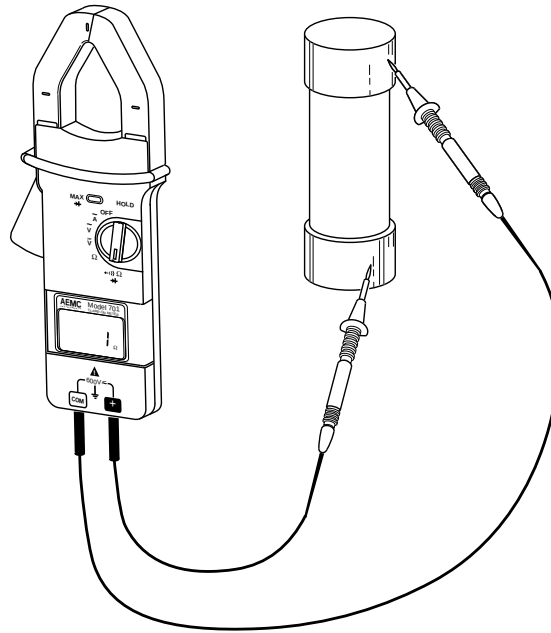
Resistance Measurements



WARNING: Check that the circuit is not live. Do not test resistance on a live circuit.

1. Turn the switch to the Ω function.
2. Connect the red lead to the **+** terminal and black to the **COM** terminal.
3. Take the reading from the display. Resistance measurements are possible from 0 to 4 k Ω .

Continuity Sound Tests



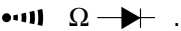
WARNING: Check that the circuit is not live. Do not test continuity on a live circuit.

1. Turn the switch to the Ω symbol.
2. Connect the red lead to the **+** terminal and the black lead to the **COM** terminal.
3. If the resistance is less than 40Ω , the buzzer emits a continuous beep and displays the value of the resistance.

Diode Tests



WARNING: Check that the circuit is not live. Do not test resistance on a live circuit.

1. Turn the switch to .
2. Press the MAX/  button.
3. Connect the red lead to the  terminal and the black lead to the  terminal.
4. Connect to the diode under test and take the reading from the display.
5. In the forward direction the reading is in Volts DC (4 V range).
6. In the reverse direction: indication of overload, OL is displayed.

Frequency Measurements

This function is only available on the Model 703.

Frequency measurements on the voltage input:

1. Check that the Model 703 jaws are not clamped around a cable.
2. Turn the switch to the Hz function.
3. Connect the red lead to the  terminal and the black lead to the .
4. Connect to the unit under test and take the reading from the display.

Frequency measurement on the current input:

1. Check that the test leads of the Model 703 are disconnected.
2. Set the switch to the Hz function.
3. Clamp the jaws around the conductor and take the reading.

Maintenance

WARNING:

- 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 probe, do not get water or other foreign agents into the case. Turn the Model 701/703 OFF and disconnect the meter from all circuits and inputs before opening the case.

Maintenance

Keep the jaws perfectly clean so that they close correctly. The faces should be cleaned with a lightly oiled soft cloth.

To clean the Model 701 or 703 wipe the case and jaw covers with a damp cloth and mild detergent. Do not use any abrasives or solvents.

If rusted, the jaw mating surfaces may be lightly sanded with very fine sandpaper and then very lightly oiled. Wipe off excess oil, and do not let it drip into the case.

We recommend a general check of the clamp every 12 months to ensure accuracy.

Battery Replacement

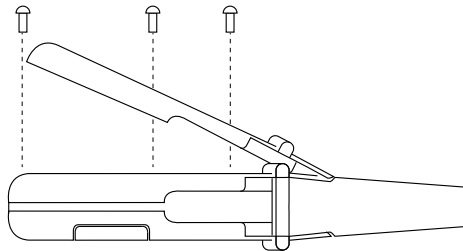


WARNING: Never disassemble the instrument without first disconnecting it from all external electrical sources.

Clamp-On Multimeter Models 701 and 703 are powered by a 9-volt battery. The battery replacement indicator will display continuously when battery replacement is required.

Recommended replacement type is alkaline (NEDA 1604 or IEC 6 LF22). To change the battery, follow this procedure:

1. The instrument must be OFF and disconnected from any circuit or input.
2. Place the meter face down and remove the three Phillips screws on the back of the instrument.



3. Remove the back cover by pulling it down and away from the instrument.
4. Lift the battery away from the case and disconnect the battery.
5. Connect the new battery and position the leads so that they won't get pinched when the cover is replaced.
6. Replace the back cover, noting that it slips beneath the hold-down lip and fits securely into position. Take care to position any loose wire or circuit correctly before closing.
7. Install and tighten the three screws.

Repair and Calibration

To guarantee that your instrument complies with the factory specifications, we recommend that the Models 701 & 703 be submitted to our factory service center at one-year intervals for recalibration, or as required by other standards.

For instrument repair and/or calibration, please call our factory, toll-free, at **(800) 945-AEMC** (800-945-2362):

CHAUVIN ARNOUX, Inc.
d.b.a. AEMC® Instruments
15 Faraday Drive
Dover, NH 03820, USA
Tel: (800) 954-2362
(603) 749-6434
Fax: (603) 742-2346

(Or contact your authorized distributor.)

Estimates for repairs, normal recalibration, and calibration traceable to N.I.S.T. are available upon request. Overseas customers must receive written authorization before returning any instrument.

Technical and Sales Assistance

If you are experiencing any technical problems, or require any assistance with the proper use or application of this instrument, please call our technical hotline:

CHAUVIN ARNOUX, Inc.
d.b.a. AEMC® Instruments
200 Foxborough Blvd.
Foxborough, MA 02035 USA
Tel: (800) 343-1391
(508) 698-2115
Fax: (508) 698-2118
www.aemc.com

NOTES

Limited Warranty

These Clamp-on Multimeters Models 701 & 703 are warranted to the owner for a period of 1 year 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 Clamp-on Multimeters Models 701 & 703 have been tampered with, abused or if the defect is related to service not performed by AEMC® Instruments.

What AEMC® Instruments Will Do: If a malfunction occurs within the 1 year period, you may return the Clamp-on Multimeters Models 701 & 703 to us for repair or replacement free of charge, provided we have your REGISTRATION CARD on file. AEMC® Instruments will, at its option, repair or replace the faulty material.

Note: If a card is not on file, we will require a dated proof of purchase as well as your REGISTRATION CARD accompanied by the defective material.

What You Must Do: First obtain a return authorization by phone or by fax from AEMC® Instruments, then return the Clamp-on Multimeters Models 701 & 703, indicating place and date of purchase, with a written explanation of the reason for return. Return material, postage pre-paid to:

Chauvin Arnoux, Inc.
d.b.a. AEMC® Instruments
Service Department
15 Faraday Drive
Dover, NH 03820 USA
Tel: (800) 945-2362
(603) 749-6434
Fax: (603) 742-2346

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

For full warranty coverage, please read the Warranty Card which is affixed to the Warranty Registration Card. Please keep the Warranty Card with your records.