

# AC Current Probe

## Models MN210 and MN211

### User Manual

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#### DESCRIPTION

The MN210/MN211 (Catalog #2115.72 and #2115.73) are the latest in compact AC Current probes. Designed to meet the most stringent demands in industry and electrical contracting, they also meet the latest safety and performance standards. The probes have a measurement range up to 240 Arms which makes them perfect tools for measurement with DMMs, recorders, power and harmonic meters. The Models MN210/MN211 are compatible with any AC ammeter, multimeter, or other current measurement instrument with an input impedance lower than 1 $\Omega$ . To achieve the stated accuracy, use the MN210/MN211 with an ammeter having an accuracy of 0.75% or better.

#### WARNING

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

- Read the instruction manual completely and follow all the safety information before attempting to use or service this instrument.
- Use caution on any circuit: Potentially high voltages and currents may be present and may pose a shock hazard.
- Read the Safety Specifications section prior to using the current probe. Never exceed the maximum voltage ratings given.
- Safety is the responsibility of the operator.
- ALWAYS connect the current probe to the display device before clamping the probe onto the sample being tested.
- ALWAYS inspect the instrument, probe, probe cable, and output terminals prior to use. Replace any defective parts immediately.
- NEVER use the current probe on electrical conductors rated above 600V in overvoltage category III (CAT III). Use extreme caution when clamping around bare conductors or bus bars.

#### INTERNATIONAL ELECTRICAL SYMBOLS



This symbol signifies that the current probe is protected by double or reinforced insulation. Use only factory specified replacement parts when servicing the instrument.



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



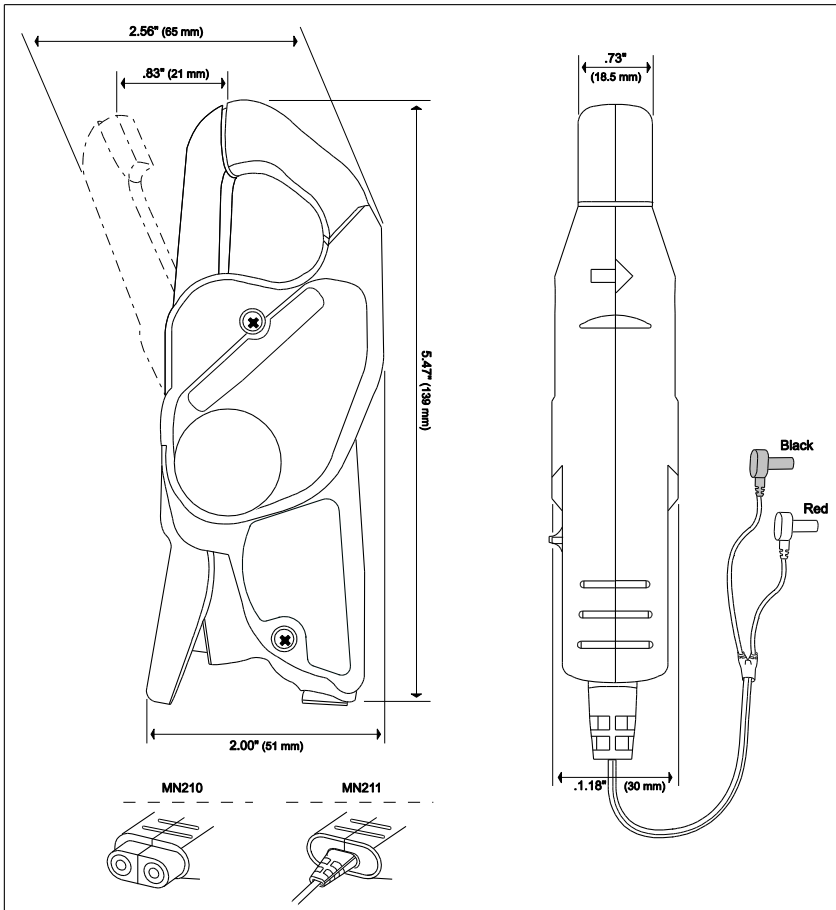
This is a type A current sensor. This symbol signifies that application around and removal from HAZARDOUS LIVE conductors is permitted.

#### DEFINITION OF MEASUREMENT CATEGORIES

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

#### 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.



## **ELECTRICAL SPECIFICATIONS**

**Nominal Range:** 200 A

**Measurement Range:** 0.5 to 240 A AC

**Transformation Ratio:** 1000:1

**Output Signal:** 1 mA/A on 1Ω

**Accuracy and Phase Shift\*:**

Accuracy: 0.5 to 10 A: 3.0% Reading ± 0.5 A

10 to 40 A: 2.5% Reading ± 0.5 A

40 to 100 A: 2.0% Reading ± 0.5 A

100 to 240 A: 1.0% Reading ± 0.5 A

Phase Shift: 0.5 to 10 A: Not Specified

10 to 40 A: ≤ 5°

40 to 100 A: ≤ 3°

100 to 240 A: ≤ 2.5°

(\*Reference conditions: 18°C to 28°C, 20 to 75% RH, external magnetic field < 40 A/m, 48 to 65 Hz sine wave, distortion factor less than 1%, no DC component, no external current carrying conductor, test sample centered.) Load impedance 1Ω.

**Overload:** 240 A for 10 min ON, 30 min OFF

**Frequency Range:** 40 to 10 kHz

**Limit Operating Conditions:**

200 A permanently to 1 kHz  
Derating above 3 kHz: 200 A x (1/0.333 F), F in kHz

**Crest Factor:**

3 @ 200 Arms with an error (due to CF) of 4%

**Working Voltage:** 600 Vrms

**Common Mode Voltage:** 600 Vrms

**Influence of Adjacent Conductor:**

< 15 mA/A at 50 Hz

**Influence of DC (< 20 A) on AC signal:**

< 5%

**Influence of Conductor Position in Jaw:**

0.5% of mA output @ 50/60 Hz

**Influence of Load:**

< 3% of mA output from 40 Hz to 1 kHz  
< 12% of mA output from 1 kHz to 10 kHz

**Influence of Temperature:**

≤ 150 ppm/°K, or 0.15% of mA output per 10°K

**Influence of Humidity (10 - 90% RH):**

≤ 0.2% of mA output per 10°K @ 18°C to 28°C

**MECHANICAL SPECIFICATIONS**

**Operating Temperature:**

14° to 131°F (-10° to +55°C)

**Storage Temperature:**

-40° to 158°F (-40° to +70°C)

**Operating Relative Humidity:**

10-35°C 85% RH (without roll-off above 35°C)

**Maximum Cable Diameter:**

One Ø 0.78" (20 mm), bus bar 20 x 5 mm

**Case Protection:**

IP 40 (IEC 529)

**Drop Test:**

Test per IEC 68-2-32: 1.0 m drop on 38 mm of Oak on concrete.

**Mechanical Shock:**

Test per IEC 68-2-27

**Vibration:**

Test per IEC 68-2-6

**Dimensions:**

5.47 x 2.00 x 1.18" (139 x 51 x 30 mm)

**Weight:** 180 g (6.5 oz)

**Polycarbonate Material:**

Jaws: Polycarbonate with 10% fiberglass charge,  
Red UL 94 V0

Case: Polycarbonate 920A Gray

**Opening Operations - Life:** > 50,000

**Output:**

MN210: Two standard safety banana jacks (4 mm)

MN211: Double/reinforced insulated 5 ft. (1.5 m)  
lead with safety 4mm banana plug

**SAFETY SPECIFICATIONS**



**Electrical:**

Double insulation or reinforced insulation between the primary or secondary and the outer case of the handle conforms to IEC 1010-2-32.

**Common Mode Voltage:**

600 V Category III, Pollution Degree 2

**Dielectric Strength:**

5550 V, 50/60 Hz between primary, secondary and the outer case of the handle

**Electromagnetic Compatibility:**

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

**ORDERING INFORMATION**

**AC Current Probe MN210 ..... Cat #2115.72**

**AC Current Probe MN211 ..... Cat #2115.73**

*Both models include a user manual and a product warranty and registration card.*

**Accessories:**

Leads, set of 2, 5 ft safety (1000V)..... **Cat #2111.29**

Banana plug adapter  
(to nonrecessed plug) ..... **Cat #1017.45**

## OPERATION

Please make sure that you have already read and fully understand the WARNING section on page 1.

### Making Measurements with the AC Current Probe Models MN210/MN211

- Connect the black lead of the current probe to “common” and the red lead to the AC current input on your DMM or other current measuring instrument. Select the appropriate current range (400 mA AC range). Clamp the probe around the conductor to be tested with the arrow pointed toward the load. If the reading is less than 400 mA, select the lower range until you obtain the best resolution. Read the value display on the DMM and multiply it by the probe ratio (1000/1). (If reading = 0.159 A, the current flowing through the probe is 0.159 A x 1000 = 159 A AC)
- For best accuracy, avoid if possible, the proximity of other conductors which may create noise.

### Tips for Making Precise Measurements

- When using a current probe with a meter, it is important to select the range that provides the best resolution. Failure to do this may result in measurement errors.
- Make sure that probe jaw mating surfaces are free of dust and contamination. Contaminants cause air gaps between the jaws, increasing the phase shift between primary and secondary. It is very critical for power measurement.

## MAINTENANCE:

### Warning

- For maintenance use only original factory replacement parts.
- 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

### Cleaning

To ensure optimum performance, it is important to keep the probe jaw mating surfaces clean at all times. Failure to do so may result in error in readings. To clean the probe jaws, use very fine sand paper (fine 600) to avoid scratching the jaw, then gently clean with a soft oiled cloth.

## 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).

Chauvin Arnoux<sup>®</sup>, Inc. d.b.a. AEMC<sup>®</sup> Instruments  
15 Faraday Drive • Dover, NH 03820 USA  
Tel: (800) 945-2362 (Ext. 360)  
(603) 749-6434 (Ext. 360)  
Fax: (603) 742-2346 or (603) 749-6309  
repair@aemc.com

(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 use or application of this instrument, please call our technical hotline:

(800) 343-1391 • (508) 698-2115 • Fax (508) 698-2118  
Chauvin Arnoux<sup>®</sup>, Inc. d.b.a. AEMC<sup>®</sup> Instruments  
techsupport@aemc.com  
www.aemc.com