User Manual
ENGLISH

AEMC® INSTRUMENTS
CHAUVIN ARNOUX GROUP

AC Current Oscilloscope Probe
Model SR661

CURRENT MEASUREMENT PROBES

Measure Up
WITH AEMC® INSTRUMENTS

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 #: **2113.49**

Model #: **SR661**

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 **AC Current Oscilloscope Probe Model SR661.**

For the best results from your instrument and for your safety, you must 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.
	This symbol signifies a voltage limiting circuit.
	Indicates Important information to acknowledge
	This product complies with the Low Voltage & Electromagnetic Compatibility European directives.
	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 the 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 ⚠

- The safety warnings are provided to ensure the safety of personnel and proper operation of the instrument. Read the instructions completely.
- Use caution on any circuit: potentially high voltages and currents may be present and may pose a shock hazard.
- Do not use the probe if damaged. Always connect the current probe to the measuring device before it is connected around the conductor.
- Do not use on non insulated conductor with a potential to ground greater than 600 V CAT III pollution 2. Use extreme caution when clamping around bare conductors or bus bars.
- Before each use, inspect the probe; look for cracks in housing or output cable insulation.
- Do not use clamp in wet environment or in locations that hazardous gases exist.
- Do not use the probe anywhere beyond the tactile barrier.

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

AC Current Oscilloscope Probe Model SR661 .....Cat. #2113.49
Includes a user manual.

1.5.1 Accessories and Replacement Parts

Adapter - BNC (Female) to 4 mm Banana (Male) **.....Cat. #2119.94**

2. PRODUCT FEATURES

2.1 DESCRIPTION

The AC Current Oscilloscope Probe Model SR661 expands oscilloscope applications in industrial or power environments, and is ideal for analysis and measurement of distorted current waveforms and harmonics.

The Model SR661 permits accurate display and measurement of currents from 100 mA to 1000 ARMS, 1 Hz to 100 kHz (with current derating) without breaking into the circuit. A passive filter eliminates noise, ring on rapid rising (di/dt) waveforms, and ensures accurate screen displays.

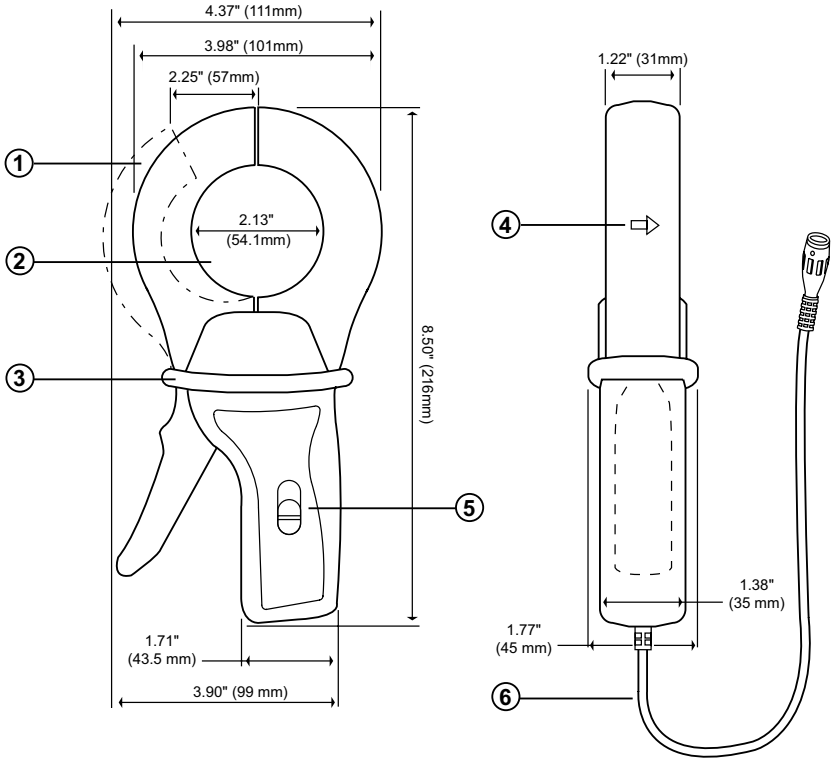
The probe connects directly to an oscilloscope through an insulated coaxial cable with an insulated BNC.

2.2 COMPATIBILITY

The Model SR661 is compatible with any analog or digital oscilloscope or other voltage-measuring instrument which has the following features:

- BNC input connector
- Range capable of displaying (0.2 to 0.5) V per division, or 2 V range
- Minimum input impedance of 1 MΩ

2.3 FEATURES



1. Jaw opening of 2.25 in
2. Maximum dimension of conductor is 2.13 in (54 mm)
3. Tactical Barrier. Always keep hands below this barrier at all times.
4. Arrow indicates direction of current flow. Current flows in a positive direction when it travels from supply to load.
5. Three position switch
6. 6.5 ft (2 m) output cable

3. SPECIFICATIONS

3.1 ELECTRICAL SPECIFICATIONS

*Reference conditions: 23 °C ± 3 °K, (20 to 75) % RH, (48 to 65) Hz, external magnetic field <40 A/m, no DC component, no external current carrying conductor, test sample centered.

Operating Range: (0.1 to 2000) A peak

Measurement Range: 100 mA to 1200 ARMS (2000 A peak)

Output Signal: mV output signal (2 V peak max)

100 mV/A: 10 mA to 20 A peak
10 mV/A: (0.1 to 200) A peak
1 mV/A: (1 to 2000) A peak

1 mV/A, (1 V at 1000 A)

Range	Accuracy	Phase Shift
(1 to 50) A	≤1 % ± 1 mV	N/A
(50 to 200) A		≤3°
(200 to 1000) A		≤2°
(1000 to 1200) A		≤1°

Overload: 15 minutes ON, 30 minutes OFF

10 mV/A, (1 V at 100 A)

Range	Accuracy	Phase Shift
(0.1 to 5) A	≤2 % ± 5 mV	N/A
(5 to 20) A		≤15°
(20 to 100) A		≤10°
(100 to 120) A		≤5°

Overload: 120 A continuous

100 mV/A, (1 V at 10 ARMS)

Range	Accuracy	Phase Shift
(0.1 to 0.5) A	≤3 % ± 10 mV	N/A
(0.5 to 2) A		N/A
(2 to 10) A		≤15°
(10 to 12) A		

Overload: 12 A continuous

Frequency Range (with current derating):

1 Hz to 100 kHz (@ -3 dB); current derating above 1 kHz using the formula 1000 A x 1/(F (in kHx))
See typical response curves (pages 10-12)

Crest Factor: ≤ 6

Load Impedance: ≥1 MΩ @ ≤ 47 pF

Rise/Fall Time: <40 µS

Working Voltage: 600 V CAT III

Common Mode Voltage: 600 V CAT III

Influence of Adjacent Conductor: < 0.2 mA/A$_{AC}$

Influence of Conductor Position in Jaw Opening:

0.02 % of Reading under 400 Hz

Influence of Frequency:

Range 1 mV/A:	From (10 to 1000) Hz: <1 % of Reading
	From (1 to 10) kHz: <2 % of Reading
	From (10 to 50) kHz: <10 % of Reading
	From (50 to 100) kHz: - 3 dB
Range 10 mV/A:	From (10 to 1000) Hz: <5 % of Reading
	From (1 to 10)kHz: <3 % of Reading
	From (10 to 50) kHz: <20 % of Reading
	From (50 to 100) kHz: - 3 dB
Range 100 mV/A:	From (10 to 1000) Hz: <10 % of Reading
	From(1 to 10) kHz: <5 % of Reading
	From (10 to 50) kHz: <20 % of Reading
	From (50 to 100) kHz: - 3 dB

3.2 MECHANICAL SPECIFICATIONS

Dimensions: (4.4 x 8.5 x 1.8) in (111 x 216 x 45) mm

Weight: (1.21 lbs) (550 g)

Jaw Opening: (2.25 in) (57 mm) max

Maximum Cable Diameter: (2.13 in) (54 mm)

Maximum Conductor Size:

Cable: (2.05 in) (52 mm)

Bus Bar: (1.95 x .19 in) (50 x 5 mm)

Case Protection: IP 40 (IEC 529)

Drop Test: 1 m (IEC 68-2-32)

Mechanical Shock: 100 g (IEC 68-2-27)

Vibration: (5 to 15) Hz, 0.15 mm (IEC 68-2-6)
(15 to 25) Hz, 1 mm
(25 to 55) Hz, 0.25 mm

Output: Insulated lead with insulated BNC Connector, 6 ft (2 m)

3.3 ENVIRONMENTAL SPECIFICATIONS

Operating Temperature/RH: (14 to 122) °F (-10 to 50) °C)

Storage Temperature/RH: (-4 to 158) °F (-20 to 70) °C

Altitude: Non-operating: (0 to 12,000) m
Operating: (0 to 2000) m

Operating Relative Humidity: (0 to 85) % @ 35 °C

Influence of Temperature: ≤0.15 % / 10 K

Influence of Humidity: (10 to 90) %: 0.1 %

3.4 SAFETY SPECIFICATIONS

CE c UL us LISTED E192383

Electrical - Conformity to International Standards

This instrument is compliant with IEC 61010-2-032, 300 V in CAT IV or 600 V in CAT III.

Double or reinforced insulation 

Type of current sensor per IEC 61010-2-032: type A 

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

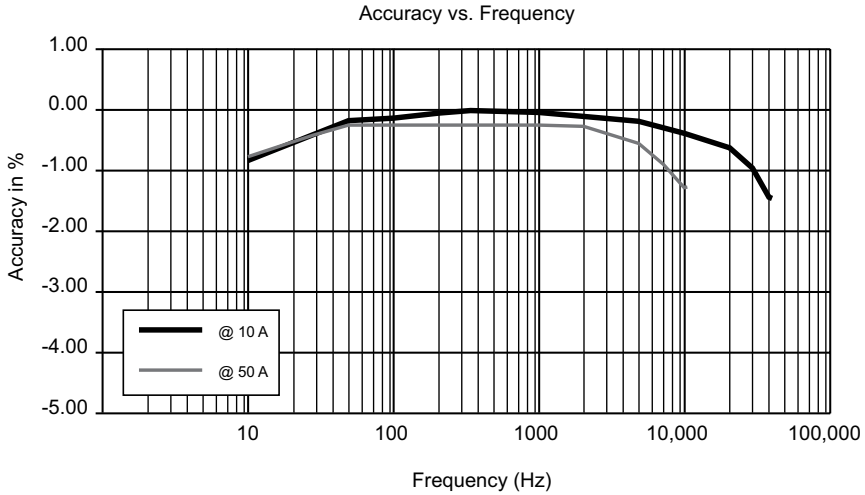
Electromagnetic Compatibility:

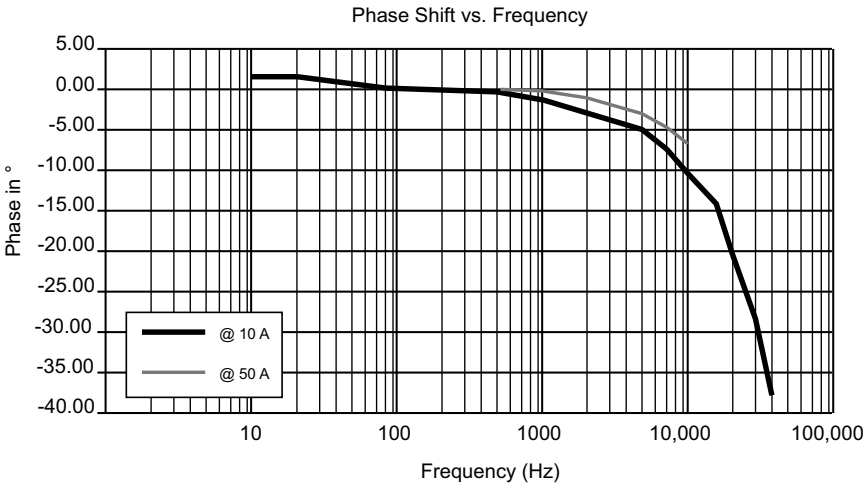
This device is in conformity with standard IEC 61326-1.

**Specifications are subject to change without notice.*

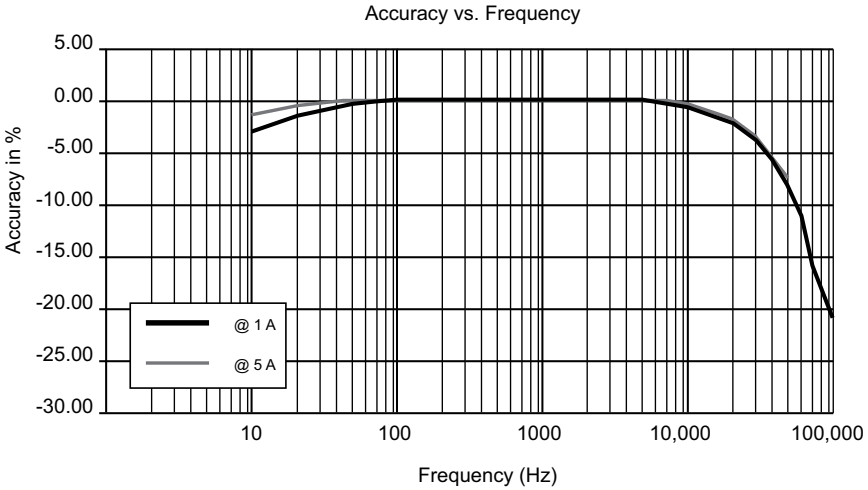
3.5 TYPICAL RESPONSE CURVES

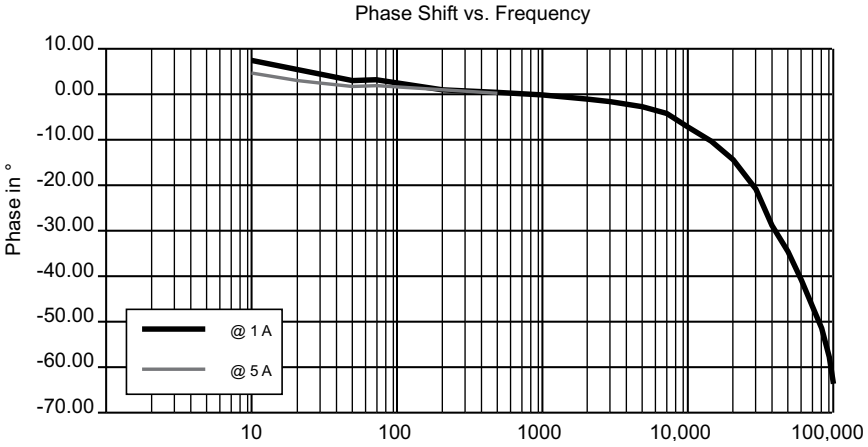
1mV/A Range:



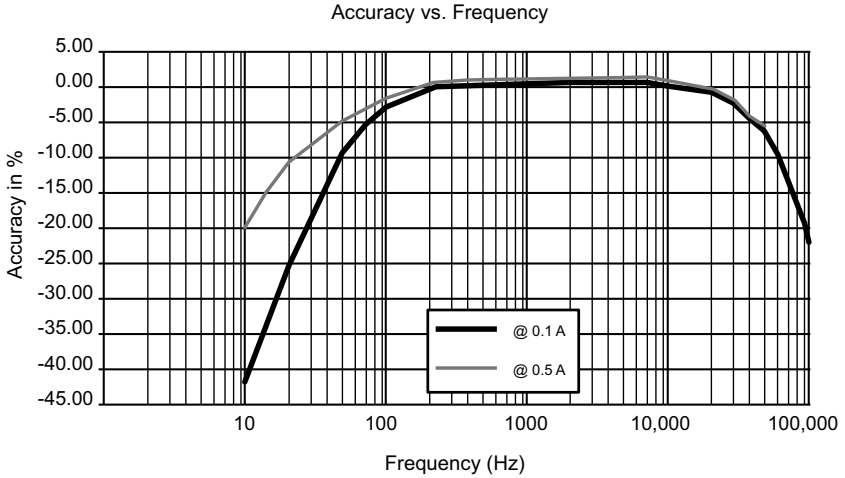


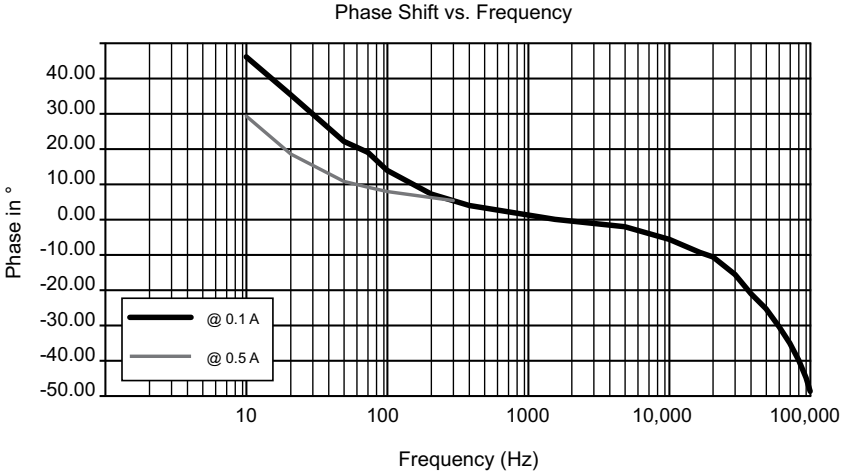
10mV/A Range:


Accuracy vs. Frequency
5.00
0.00
-5.00
-10.00
-15.00
-20.00
-25.00
-30.00
Accuracy in %
@ 1 A
@ 5 A
10
100
1000
10,000
100,000
Frequency (Hz)


Phase Shift vs. Frequency
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
-70.00
Phase in °
@ 1 A
@ 5 A
10
100
1000
10,000
100,000

100mV/A Range:





4. OPERATION

4.1 CURRENT MEASUREMENT

WARNING: Always connect the probe to the instrument before clamping onto the circuit under test.

- Connect the Model SR661 to the proper input channel on the oscilloscope.
- Begin with the least sensitive range on the current probe (1 mV/A)
- Select the 0.5 V/Division range on the oscilloscope.
- Clamp the probe on the conductor to be measured and read the current flowing directly on your oscilloscope.

NOTE: Remember to unclamp the probe from the conductor before disconnecting it from your meter or instrument.

You may also use your oscilloscope to amplify the signal while using the 1 mV/A probe range (which offers the best accuracy and least phase shift).

NOTE: It is possible to change the range on the current probe without removing the probe from the current carrying conductor, but it is important to remember not to exceed the permissible peak ratings of 2000 mV peak or 4000 mV peak to peak maximum.

The peak ratings by range are: 20 A peak @ 100 mV/A, 200 A peak @ 10 mV/A and 2000 A peak @ 1 mV/A.

5. MAINTENANCE

WARNING ⚠

- 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.
- For maintenance use only specified 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 allow water or other foreign substances into the case.
- Disconnect the unit from all circuits and test cables before opening the case.
- Use caution with metallic tools that may short battery packs, power supplies, etc.

5.1 CLEANING

- To clean the probe body, use a soft cloth dampened in a solution of mild detergent and water. To clean the core, open the jaw and clean the exposed core surfaces with a cotton swab dampened with isopropyl alcohol (isopropanol) or ethyl alcohol (fotocol or ethanol). Lubricate the jaws mating surfaces with a light oil.
- Do not use chemicals containing benzine, benzene, toluene, xylene, acetone, or similar solvents.
- Do not immerse the probe in liquids or use abrasive cleaners.

5.2 REPAIR AND CALIBRATION

To ensure that your instrument meets factory specifications, we recommend that it be scheduled 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: You must obtain a CSA# before returning any instrument.

5.3 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.

5.4 LIMITED WARRANTY

The instrument is warrantied 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: You must obtain a CSA# before returning any instrument.

NOTES:

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