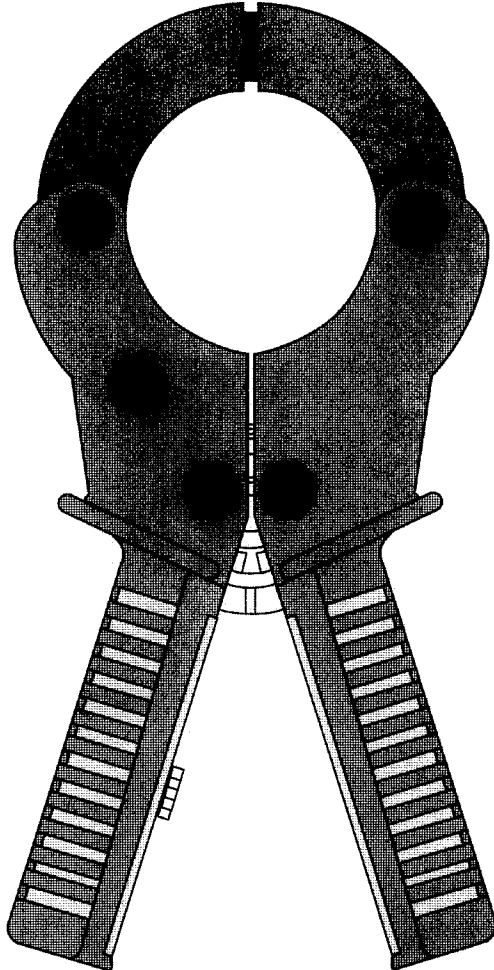


M1201.49

# AC Current Oscilloscope Probe Model SD661

USER MANUAL



**AEMC**  
INSTRUMENTS

# AC CURRENT OSCILLOSCOPE PROBE MODEL SD661 (Cat. #1201.49)

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## Receiving Your Shipment

Upon receiving your shipment, check that the contents agree with the packing slip. Notify your distributor at once of any shortages. If the equipment appears to be damaged, file a claim immediately with your carrier, and notify your distributor at once, giving a detailed description of the damages. Save the damaged packing container to substantiate your claims.

## Packaging

AC Current Oscilloscope Probe Model SD661 (Cat. #1201.49) is shipped with an instruction manual.

## Warning

- Connect the probe to the oscilloscope or voltage measuring instrument **before** clamping the probe around a conductor.
- Never use the probe on circuits rated higher than 650 V or with float voltage greater than 250 V.
- Never leave the probe clamped around a conductor while not connected to an oscilloscope or voltage measuring instrument.
- Carefully center the conductor inside the probe jaws and ascertain that the probe is perpendicular to the conductor.
- Avoid, if possible, the proximity of other conductors which may create noise.
- Check the magnetic mating surfaces of the probe jaws; these should be free of dirt, rust, or other foreign matter.
- Do not use a probe which is cracked, damaged or has defective leads.

## Description

AC Current Oscilloscope Probe Model SD661 expands oscilloscope applications in industrial or power environments, and is ideal for analysis and measurement of distorted current waveforms and harmonics. The Model SD661 permits accurate display and measurement of currents from 10 mA to 1000 A rms, 1 Hz to 100 kHz 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.

## Compatibility

The AC Current Oscilloscope Probe Model SD661 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.
- ✓ Minimum input impedance of 1 M $\Omega$ .

## Control and Connector Identification

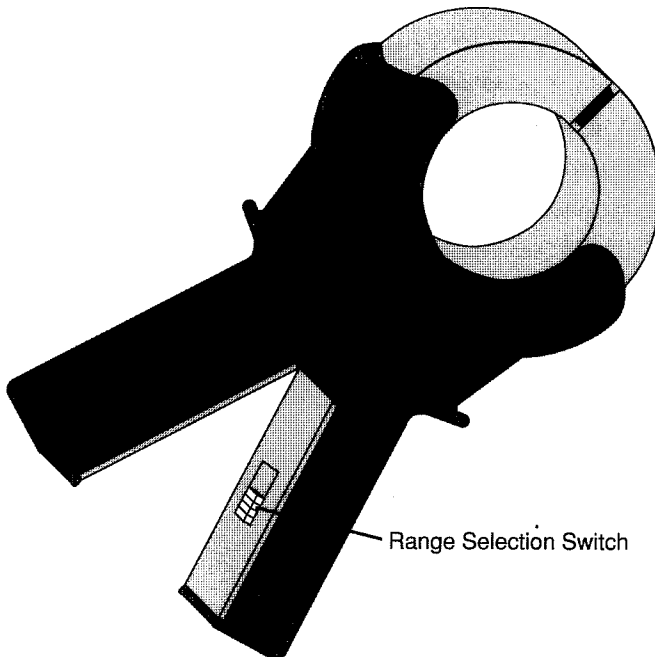


Figure 1

# SPECIFICATIONS

## ELECTRICAL SPECIFICATIONS

**Current Range:** 10 mA to 1200 A rms continuous (2000 A peak)

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

3 range switch selectable on handle

100 mV/A: 10 mA to 20 A peak

10 mV/A: 0.5 A to 200 A peak

1 mV/A: 5 A to 2000 A peak

### Accuracy\*:

100 mV/A: 3% reading  $\pm$  10 mV

10 mV/A: 2% reading

1 mV/A: 2% reading

### Phase Shift\*:

<u>100 mV/A</u>	<u>10 mV/A</u>	<u>1 mV/A</u>
0.5 A: 20°	5 A: 3°	50 A: 1.5°
2 A: 15°	20 A: 2°	200 A: 0.5°
10 A: 10°	100 A: 1.5°	1000 A: 0.5°
12 A: 10°	120 A: 1.5°	1200 A: 0.5°

**Frequency Range** (with current derating): 1 Hz to 100 kHz (@ -3dB)

*See typical response curves on page 6.*

**Load Impedance:** >1 M $\Omega$ /47 pF

**di/dt max.:** 10 A/ $\mu$ s

**Ampere. Second product:** 0.1

**Rise or fall time:** <40  $\mu$ s

**Internal Impedance:** <100  $\Omega$ /2.2 nF

**Insertion Impedance** (50/60 Hz):

100 mV/A: 0.1  $\Omega$

10 mV/A: 0.02  $\Omega$

1 mV/A: 0.01  $\Omega$

**Working Voltage:** 650 V max. (conductor to ground)

**Common Mode Voltage:** 250 V max. (output to ground)

**Influence of Adjacent Conductor:** <0.2 mA/A AC

**Influence of Conductor Position in Jaw Opening:**

$\pm$ 0.02 reading from 10 Hz to 5 kHz

$\pm$ 1% reading from 5 kHz to 100 kHz

## MECHANICAL SPECIFICATIONS

**Maximum Cable Diameter:** 2.13" (54 mm)

**Influence of Temperature:** <0.1% per °K

**Operating Temperature/RH:** -13° to 122°F (-25° to 50°C), 0 to 85% RH

**Storage Temperature/RH:** -40° to 176°F (-40° to 80°C), 0 to 90% RH

**Dimensions:** 4.1 x 8.1 x 1.6" (105 x 206 x 48 mm)

**Weight:** 1.43 lbs (650 g)

**Color:** Dark gray handles with red jaws

**Material:** Fiberglass charged polycarbonate

**Output:** 5 ft (1.5 m) insulated lead with insulated BNC connector

**US Patents:** design patent pending

## SAFETY SPECIFICATIONS

### Electrical:

- IEC 414 Class I
- Dielectric Test: 2 kV, 50/60 Hz
- Leakage Current: < 0.5 mA @ 600 V, 50/60 Hz
- Working Voltage: 650 V max. (conductor to ground)
- Float Voltage: 250 V max. (output to ground)

**Envelope Protection:** IP 20 (IEC 529)

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

**Mechanical Shock:** 100 G (IEC 68-2-27)

**Vibration:** 10/55/10 Hz, 15 mm (IEC 68-2-6)

**Polycarbonate Material** (10% Fiberglass charged polycarbonate):

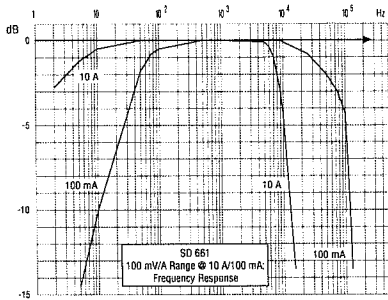
*Handles:* UL 94 VO

*Jaws:* UL 94 V2

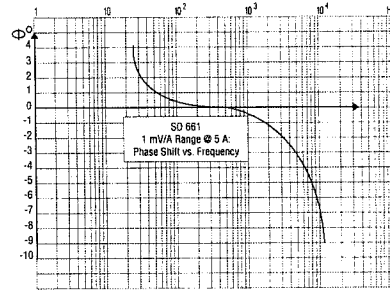
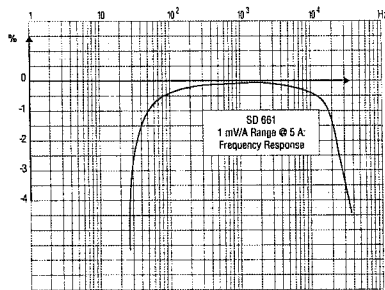
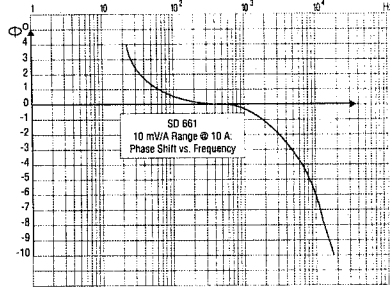
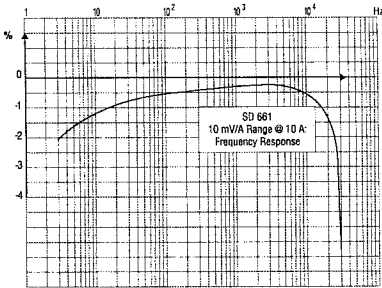
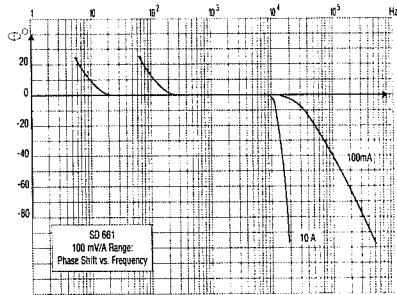
\*Accuracies are given for an ambient temperature of 23°C ±3°K, relative humidity of 20 to 75%, conductor centered in jaw window, no DC component, no external current carrying conductor, 45 Hz to 1 kHz, magnetic field < 40 A/m and 1 MΩ/47 pF load.

# TYPICAL RESPONSE CURVES

## FREQUENCY



## PHASE SHIFT VS. FREQUENCY



# Operation

## Current Measurement

Connect the Current Probe Model SD661 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 your oscilloscope. Clamp the probe on the conductor to be measured and read the current flowing directly on your oscilloscope.

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.

## Maintenance

Be sure that mating surfaces of the jaw are free of dirt or foreign matter. If they are rusted, gently clean with a soft, lightly oiled cloth.



## Repairs

For further maintenance, N.I.S.T. calibration, and/or repair, contact our factory service center:

Instrumentation Corporation  
15 Faraday Drive  
Dover, NH 03820  
603/749-7366  
603/742-2346 fax

## Technical Assistance

If you are experiencing any technical problems, or require assistance with the proper application of this instrument, please call our toll-free hotline: 800/343-1391