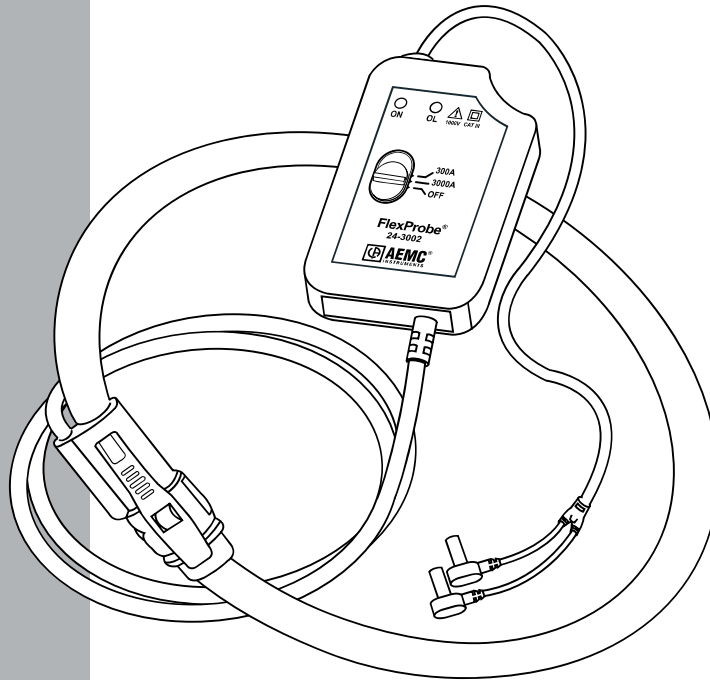


- FLEXIBLE  
AC CURRENT PROBE

# FlexProbe® 24-3001



ENGLISH

User Manual



## **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 its 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. Refer to our repair and calibration section at .

**Serial #:** \_\_\_\_\_

**Catalog #:** 2120.81

**Model #:** 24-3001

Please fill in the appropriate date as indicated:

Date Received: \_\_\_\_\_


Date Calibration Due: \_\_\_\_\_



## Table of Contents

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<b>INTRODUCTION .....</b>	<b>1</b>
1.1 International Electrical Symbols .....	1
1.2 Definition of Measurement Categories .....	2
1.3 Receiving Your Shipment .....	2
1.4 Ordering Information.....	2
1.4.1 Accessories and Replacement Parts .....	2
<b>PRODUCT FEATURES.....</b>	<b>3</b>
2.1 Description .....	3
2.2 General Features .....	4
2.3 FlexProbe® 24-3001 Features.....	5
<b>SPECIFICATIONS.....</b>	<b>6</b>
3.1 Electrical .....	6
3.2 Environmental.....	7
3.3 Mechanical Specifications.....	7
3.4 Safety Specifications.....	8
<b>OPERATION.....</b>	<b>9</b>
4.1 Making Measurements with the FlexProbe®.....	9
4.2 Tips for Making Precise Measurements .....	10
<b>MAINTENANCE .....</b>	<b>12</b>
 Warning .....	12
5.1 Changing the Battery.....	12
5.2 Cleaning.....	12
Repair and Calibration .....	13
Technical and Sales Assistance.....	13
Limited Warranty.....	14
Warranty Repairs .....	14

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## CHAPTER 1






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# INTRODUCTION

### **WARNING**

- Read the instruction manual completely and follow all the safety information before attempting to use or service this instrument.
- Wear protective clothing and gloves as required.
- 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. The FlexProbe® must be used only by qualified personnel using applicable safety precautions.
- ALWAYS de-energize the circuit before wrapping the FlexProbe® around bare conductors, bus bars, or near live parts. Do not wrap on live conductors.
- ALWAYS connect the electronic module to the display device before wrapping the FlexProbe® around the sample being tested.
- ALWAYS inspect the module, sensor, sensor cable, and output terminals prior to use. Replace any defective parts immediately. Use only factory parts.
- NEVER use the FlexProbe® on electrical conductors rated above 1000V CAT III and 600V CAT IV.

### 1.1 International Electrical Symbols

	This symbol signifies that the instrument is protected by double or reinforced insulation.
	This symbol on the instrument indicates a WARNING and that the operator must refer to the user manual for instructions before operating the instrument. In this manual, the warning instructions above indicate that if the instructions are not followed, bodily injury, installation/sample and product damage may result.
	Risk of electric shock. The voltage at the parts marked with this symbol may be dangerous.
	This symbol refers to a type B current sensor. Do not apply around or remove from HAZARDOUS LIVE conductors without additional protective means (de-energizing the circuit or wearing protective clothing suitable for high voltage work).
	In conformity with WEEE 2002/96/EC

## 1.2 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.

## 1.3 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.

## 1.4 Ordering Information

**FlexProbe® 24-3001** (300/3000Aac, 24", 10mV/A/1mV/A, with lead) .... **Cat. #2120.81**

*Includes a flexible probe with electronic module, 9V battery and a user manual.*

### 1.4.1 Accessories and Replacement Parts

Banana (Female) / BNC (Male) Adapter..... **Cat. # 2118.46**

For connection of FlexProbe® to BNC terminals on scopes and other displaying instruments.

## **PRODUCT FEATURES**

### **2.1 Description**

The FlexProbe® is a flexible AC current transformer composed of a flexible sensor and an electronic module. The flexible sensor permits measurements on conductors where standard clamp-on probes could not be used. In particular, it can be installed in tight spaces, around breaker panels, around cable bundles, around wide or large bus bars, or even wrapped around irregular shapes.

The Shape Memory feature enables the user to “pre-shape” the sensor before inserting it between or around conductors. This feature facilitates closing, enhances user safety, and alleviates the drooping effect typically associated with flexible sensors.

The FlexProbe® is lightweight. It does not use magnetic cores like standard transformers. The transformation principle is based on an air core. It presents virtually no load to the system under test, has a low phase shift and excellent frequency response, and cannot be damaged by overloads.

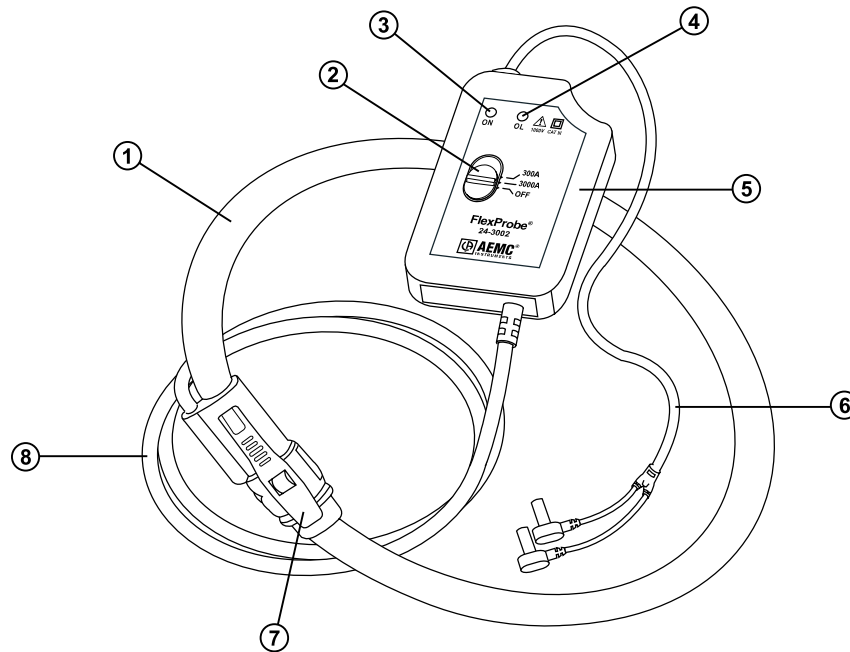
The sensor assembly is waterproof and insulated for 1000V CAT III; 600V CAT IV. The FlexProbe® meets EN 61010-1 and is CE marked.

The FlexProbe® has a mV output proportional to the current measured for direct readings on DMMs, data loggers, oscilloscopes, and power or harmonic meters. TRMS measurements are taken when connected to a TRMS meter. The FlexProbe® is insensitive to DC currents and only the AC component of the measured signal is measured. The sensor length is 24".

## 2.2 General Features

- Models to measure from 0.5 to 3000Arms
- Accuracy 1% of Reading  $\pm$  500mA
- TRMS measurements when connected to a TRMS instrument
- No core saturation or damage if overloaded
- Overrange LED for measurement circuitry
- EN 61010; 1000V CAT III; 600V CAT IV
- Waterproof sensor
- 9V battery for typical 150 hour continuous operations
- Shape Memory™ for custom pre-shaping of sensor before use (no drooping)
- High frequency response
- Low phase shift for power measurements
- Insensitive to DC, measures only AC component on DC + AC signals
- Excellent linearity
- Lightweight

## 2.3 FlexProbe® 24-3001 Features



1. Flexible sensor (Ø 0.5", 12.5mm)
2. Range selection switch
3. Power ON indicator (Green LED)
4. Overload indicator (Red LED)
5. Electronic module
6. Double insulated 14" (36cm) lead with 4mm safety banana plugs
7. FlexProbe® connector/latch
8. Sensor lead



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## CHAPTER 3

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# SPECIFICATIONS

*Reference Conditions: 41°F ± 5°F (23°C ± 3°C), 20 to 70% RH, 50Hz, 1 minute warm-up, battery at 9V ± 0.1V, external magnetic field < 40A/m, no DC component, no external current carrying conductor, 10MΩ load, conductor center.*

### 3.1 Electrical

**Current Range:** 300/3000AAC

**Output Signal:** mV output (4000mV peak max)

**Three position slide switch:** 10mV/A 5A to 300Arms  
1mV/A 50A to 3000Arms  
ON/OFF

**AC Current Accuracy (after calibration and for one year):**  
1% of Reading ± 500mA

**Crest Factor:** 4.5

**Phase Shift:** < 0.7° at 50 or 60Hz

**Frequency Range:** 40 to 5kHz

**Residual Noise When I Measured = 0:** 200mArms

**Working Voltage:** 1000Vrms CAT III; 600V CAT IV

**Common Mode Voltage:** 600Vrms max

**Influence of Frequency:** Add 1% to the reference accuracy between 40 and 2000Hz, and up to 5% at 5kHz

**Influence of Adjacent Conductor:** <2%

**Influence of Conductor Position in Jaw:** <4%

**Power Source:** 9V alkaline (NEDA 1604A, IEC 6LR61)

**Battery Life:** 150 hours typical (continuous use)  
300 hours with Lithium battery

**Low Battery:** Green LED Off when ≥ 7V

**Overload Indication:** Red LED indicates input greater than selected range

### 3.2 Environmental

**Operating Temperature Range:** 14° to 131°F (-10° to +55°C)

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

**Influence of Temperature:**

Sensor: -14° to 212°F (-10° to 100°C); <0.5% per 10°C

Module: -14° to 131°F (-10° to 55°C); <0.5% per 10°C

**Operating Relative Humidity:**

50° to 86°F (10° to 30°C); 85 ± 5% RH (without condensation)

104° to 122°F (40° to 50°C); 45 ± 5% RH (without condensation)

**Altitude:** Operating: 0 to 2000m

Non-operating: 0 to 12000m

### 3.3 Mechanical Specifications

**Dimensions (Sensor):** 24" ± 1" (610 x 25mm)

**Color (Sensor):** Red with black connector

**Dimensions (Electronic Module):** 4.9 x 2.5 x 1.1" (124 x 64 x 28mm)

**Color (Electronic Module):** Dark gray

**Weight:** 1.1 lb (0.5kg)

**Output:** Double insulated 14" (355mm) lead with 4mm safety banana plugs

**Maximum Cable Diameter:** 7.6" (193mm)

**Cable Length from Sensor to Module:** 6.5 ft (2m)

**Drop Test:**

1.0m on 38mm of Oak on concrete. Test according to EN 61010.

**Case Protection:** Sensor: IP65 Electronic Module: IP40

**Vibration:** Test Per IEC 68-2-6

**Frequency Range:** 10 to 55Hz

**Amplitude:** 0.15mm

**Mechanical Shock:** 100G, Test Per IEC 68-2-32


**Material:** Module: Polycarbonate UL 94V1

Cable Assembly: Polyurethane UL94V0

### 3.4 Safety Specifications

#### Electrical Safety - Conformity to International Standards

The instrument is compliant with IEC 61010-2-032, 600V category IV or 1000V category III.

Double or reinforced insulation .

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

#### Electromagnetic Compatibility:

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

*\*Specifications are subject to change at any time without notice*

## **OPERATION**

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

### **4.1 Making Measurements with the FlexProbe®**

1. Connect the electronic module to the AC Volt range of your DMM or measuring instrument.
2. Select the appropriate module output voltage range. If the current magnitude is unknown, select the 3000A range.
3. Wrap the flexible core around the conductor to be tested. Select the 300A range to obtain the best resolution, if the reading is less than 300mV.



**Do not exceed specified current range for the output. Do not use on selected range if Overload LED goes on.**

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4. Example:
  - a. Read the DMM displayed value: 2.59V
  - b. Determine the range and output used on the FlexProbe: 0.01V/A for the 300A range; .001V/A for the 3000A range
  - c. Divide the reading by the output to determine the actual current value:  $2.59 \div 0.01 = 259\text{A}$  or  $2.59 \div 0.001 = 2590\text{A}$

For best accuracy, carefully center the conductor inside the flexible core, and avoid if possible, the proximity of other conductors which may create noise and interference (particularly near the latch).

True RMS measurements are obtained when the FlexProbe® is connected to a True RMS meter. Note that the DC component is not measured.

## 4.2 Tips for Making Precise Measurements

- When using the FlexProbe® with a meter, it is important to select the range that provides the best resolution. Failure to do this may result in measurement errors.
- For best results, select the highest FlexProbe® output signal possible and the most sensitive meter range for this output.
- Make sure the DMM or measuring instrument can accurately measure mVAC. Certain inexpensive DMM have poor resolution and accuracy when measuring low mVAC.
- For best accuracy, center the FlexProbe® around the conductor to be measured.
- To increase the sensitivity or measure on low currents, the FlexProbe® may be wrapped several times around the conductor. Remember to divide your reading by the number of turns for the actual measurement (See Figure 1).
- The overall measurement accuracy is the sum of the FlexProbe® accuracy and the displaying instrument accuracy.
- The FlexProbe® may be doubled around the conductor to be measured to double the output. (See Figures 1 and 2 to show the different values on a DMM while measuring 250AAC.)

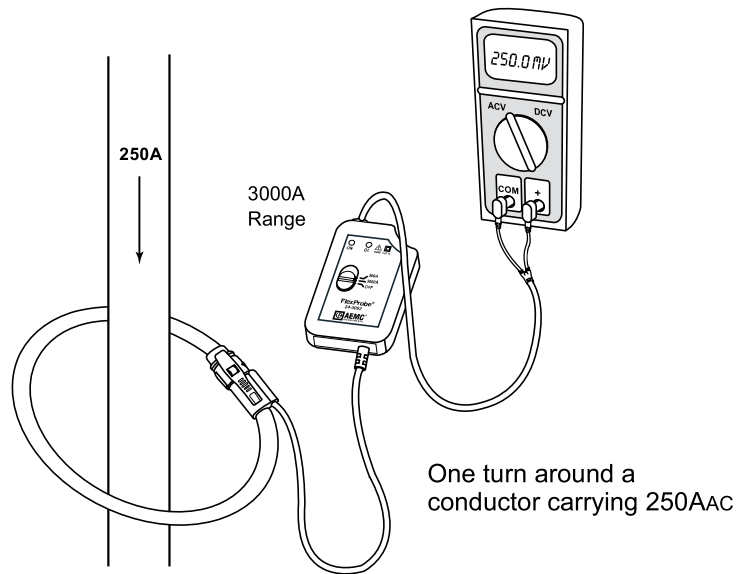


Figure 1

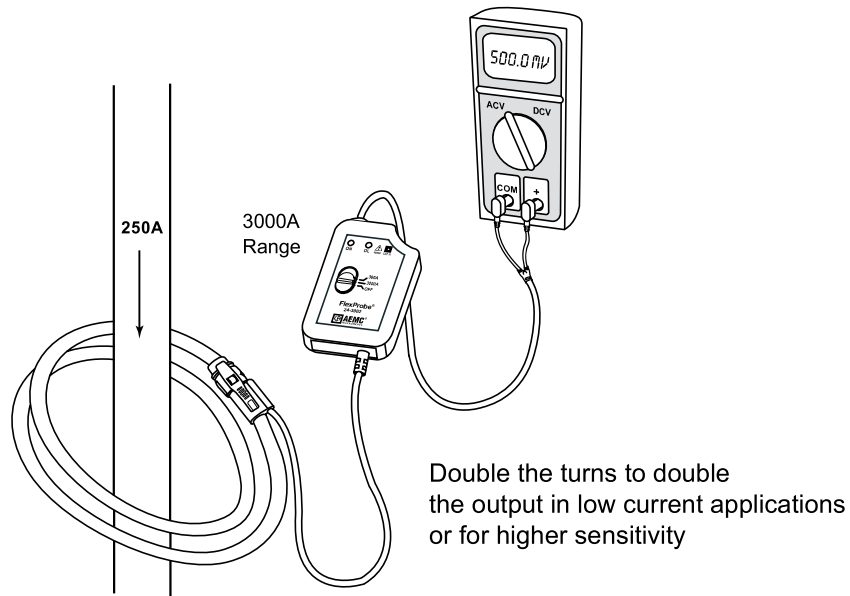


Figure 2

## **MAINTENANCE**

### **Warning**

- For maintenance use only specified replacement parts.
- To avoid electrical shock, do not attempt to perform any servicing unless you are qualified to do so.
- Do not perform any service while the FlexProbe® is on any circuit.
- To avoid electrical shock and/or damage to the instrument, do not get water or other foreign agents into the electronic module.
- Also see warning on page 1.

### **5.1 Changing the Battery**

If the power ON indicator (green LED) blinks or does not light up, replace the battery.

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### **Disconnect the instrument from any source of electricity.**

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- To replace the battery, open rear case, replace battery and re-assemble.
- The green LED should go on when the module is turned on.

### **5.2 Cleaning**

- Use a soft cloth lightly dampened with soapy water, then dry with a dry cloth.
- Do not splash water directly on the instrument.
- Do not use alcohol, solvents or hydrocarbons.
- Make sure the sensor, electronic module, and all leads are dry before any further use.

### **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.

#### **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).

#### **Ship To:**

(Or contact your authorized distributor)

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

**NOTE: You 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 team:



### **Limited Warranty**

The FlexProbe® 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.

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



### **Warranty Repairs**

#### **What you must do to return an Instrument for Warranty Repair:**

First, request a Customer Service Authorization Number (CSA#) by phone or by fax from our Service Department (see address below), then return the instrument along with the signed CSA Form. Please write the CSA# on the outside of the shipping container. Return the instrument, postage or shipment pre-paid to:

#### **Ship To:**

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

**NOTE:** You must obtain a CSA# before returning any instrument.