

■ LIGHTMETERS

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# CA811 CA813



# Statement of Compliance

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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.

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

**Catalog #:** 2121.20 / 2121.21

**Model #:** CA811 / CA813

Please fill in the appropriate date as indicated:

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

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



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## **INTRODUCTION**



- Do not connect to, or touch, any electrical circuit with the Lightmeter.
- Do not operate the Lightmeter in wet or excessively damp environments.
- To avoid injury or fire hazard, do not operate this product in an explosive atmosphere or environment.
- To avoid eye injury, wear eye protection if there is a possibility of hazardous or dangerous exposure to high-intensity light rays.
- Do not immerse in liquids. Clean the sensor head only using a damp cloth.
- Place the protective cover on the sensor when not in use (protects the sensor and extends useful cell life).
- Comply with the safety and environmental specifications.

### **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 <b>WARNING</b> and that the operator must refer to the user manual for instructions before operating the instrument. In this manual, the symbol preceding instructions indicates 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 A current sensor. This symbol signifies that application around and removal from <b>HAZARDOUS LIVE</b> conductors is permitted.
	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

**Lightmeter Model CA811..... Cat. #2121.20**

*Includes 9V alkaline battery, rugged, shockproof, protective holster and user manual.*

**Lightmeter Model CA813 ..... Cat. #2121.21**

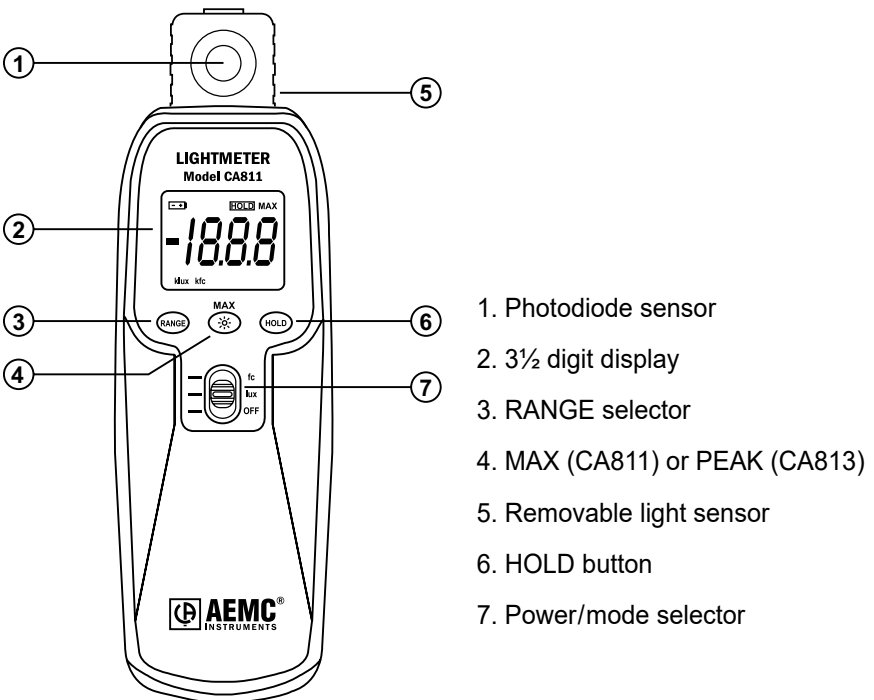
*Includes 9V alkaline battery, rugged, shockproof, protective holster and user manual.*

## **PRODUCT FEATURES**

### **2.1 Description**

The Lightmeter Models CA811 and CA813 are portable, easy-to-use instruments featuring optical sensors that are designed to match the response of the human eye, making them ideal instruments for workspace analysis and planning. The ergonomically designed case, large display and intuitive function selection make these instruments the right choice for any application.

The Lightmeter Models CA811 and CA813 are designed for simple one-hand operation. They provide selectable lux or footcandle units for display and feature a 3½ digit backlit LCD digital display and a HOLD function. The Model CA811 offers a MAX function, while the Model CA813 offers a PEAK function and a broader light response.



## 2.2 Button Functions

### 2.2.1 Center (Yellow) Function Switch

Turns the Lightmeter ON and selects the lux or fc (foot-candles) setting. Slide the switch to OFF after use.

### 2.2.2 RANGE Button

The RANGE button changes the measurement range. At power-up, the selected range is 2000 fc or 2000 lux.


Press the RANGE button until the desired lux or fc range is selected. Each time you press the RANGE button, the range will increase by a factor of ten (x10), and a new value is displayed. The scale factor (fc, kfc, lux, klux) is displayed in the lower left hand corner of the display.

### 2.2.3 HOLD Button


The HOLD button “freezes” the reading on the display.

Press the HOLD button to activate the HOLD function. In the HOLD mode, the HOLD annunciator is displayed in the upper part of the LCD display and the last reading is displayed until the HOLD button is released.


### 2.2.4 Back-light Button

Press the  button to turn the Back-light ON. Press again to turn OFF.

### 2.2.5 MAX Button (Model CA811)

Press the  button for 2 seconds to enter or exit the MAX mode. When enabled, MAX is displayed in the upper right hand corner of the display. The Lightmeter then records and displays the maximum absolute value. It is only updated when a new MAX is reached.

### 2.2.6 PEAK Button (Model CA813)

Press the  button for 2 seconds to enter or exit the PEAK mode. When enabled, PEAK is displayed in the upper left hand corner of the display. In the PEAK mode, the Lightmeter records and displays the maximum absolute value over a 50ms period and is updated when a new PEAK is reached.

## **SPECIFICATIONS**

**Light Conversion Formulas** 1 foot-candle (lumens/foot<sup>2</sup>) = 10.764 lux  
1 lux (lumens/meter<sup>2</sup>) = 0.0929 foot-candles

### **The Inverse-square Law**

The inverse-square law states that the illuminant E at a point on a surface varies directly with the intensity I of a point source, and inversely as the square of the distance d between the source and the point. If the surface at the point is normal to the direction of the incident light, the law is expressed by  $E=I/d^2$ .

### **Cosine Law**

The cosine law states that the illuminant on any surface varies with the cosine of the angle of incidence. The angle of incidence  $\theta$  is the angle between the normal to the surface and the direction of the incident light. The inverse-square law and the cosine law can be combined as  $E=(I \cos \theta) /d^2$ .

## **3.1 Environmental Specifications**

**Range (CA811):** 20 lux, 200 lux, 2000 lux, 20k lux  
20 fc, 200 fc, 2000 fc, 20k fc

**Range (CA813):** 20 lux, 200 lux, 2000 lux, 20k lux, 200k lux  
20 fc, 200 fc, 2000 fc, 20k fc

**Resolution:** 0.01 lux, 0.01 fc

**Accuracy (Type A 2856K light source):**  $\pm 5\% \pm 10$ cts

**Accuracy for Common Light Sources (CA811):**  $\pm 18\% \pm 2$ cts

**Accuracy for Common Light Sources (CA813):**  $\pm 11\% \pm 2$ cts

**Cosine Angle:**  $f'_2 < 2\%$  cosine corrected ( $150^\circ$ )

**Spectral Response:** CIE photopic curve

**Spectral Accuracy (CA811):**  $f'_1 < 15\%$

**Spectral Accuracy (CA813):**  $f'_1 < 8\%$



**Temperature Coefficient:** 0.1 times the applicable accuracy specification per °C from 0° to 18°C and 28° to 50°C (32° to 64°F and 82° to 122°F)

**PEAK Hold Response Time (CA813):** > 50ms light pulse

**Note:** The CIE standard illuminant type A may be obtained by means of CIE standard type A light source, which is defined as type A gas type filled tungsten-filament lamp operating at a correlated color temperature of 2856K.


## 3.2 General Specifications

**Display:** 3½ digit LCD with maximum reading of 1999

**Over-Range:** "OL" is displayed

**Power Source:** Standard 9V battery (NEDA 1604, 6LR61 or equivalent)

**Battery Life:** 200 hours typical with carbon zinc battery

**Low Battery Indication:** The  is displayed when the battery voltage drops below the required level

**Sample Rate:** 2.5 times per second, nominal

**Operating Temperature:** 32° to 122°F (0° to 50°C) at < 80% RH

**Storage Temperature:**

-4° to 140°F (-20° to 60°C), 0 to 80% RH with battery removed

**Accuracy:** Stated accuracy at 73° ± 9°F (23° ± 5°C), <75% RH

**Altitude:** 2000m max

**Dimensions:** 6.81 x 2.38 x 1.5" (173 x 60.5 x 38mm)

**Weight:** Approx 7.9 oz (224g) including battery

## 3.3 Safety Specifications



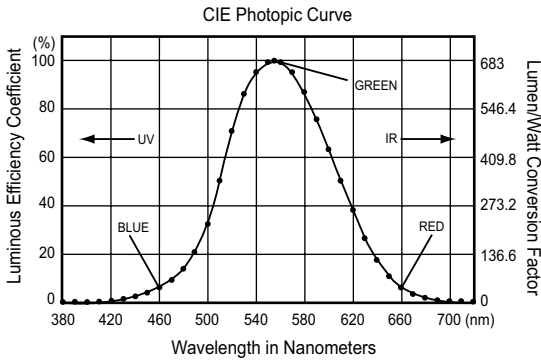
EN 61010-1 (1995-A2), Protection Class III

Overvoltage Category (CAT III, 24V), Pollution Degree 2

Indoor Use

*\*All specifications are subject to change without notice*

# CIE PHOTOPIC CURVE



Wavelength (nm)	VI CIE Photopic Luminous Efficiency Coefficient	Photopic Lumen/Watt Conversion Factor
380	0.0000	0.05
390	0.0001	0.13
400	0.0004	0.27
410	0.0012	0.82
420	0.0040	2.73
430	0.0116	7.91
440	0.0230	15.7
450	0.0380	25.9
460	0.0600	40.9
470	0.0910	62.1
480	0.1390	94.8
490	0.2080	142.0
500	0.3230	220.0
510	0.5030	343.0
520	0.7100	484.0
530	0.8620	588.0
540	0.9540	650.0
550	0.9950	679.0
555	1.0000	683.0
560	0.9950	679.0

Wavelength (nm)	VI CIE Photopic Luminous Efficiency Coefficient	Photopic Lumen/Watt Conversion Factor
570	0.9520	649.0
580	0.8700	593.0
590	0.7570	516.0
600	0.6310	430.0
610	0.5030	343.0
620	0.3810	260.0
630	0.2650	181.0
640	0.1750	119.0
650	0.1070	73.0
660	0.0610	41.4
670	0.0320	21.8
680	0.0170	11.6
690	0.0082	5.59
700	0.0041	2.78
710	0.0021	1.43
720	0.0010	0.716
730	0.0005	0.355
740	0.0003	0.170
750	0.0001	0.820
760	0.0001	0.041

## **OPERATION**

### **4.1 Recommendations Before Operating**

- Keep the white plastic domed cosine corrector clean and free of any scratches. It may be cleaned with a soft cloth and a little water or isopropyl alcohol.
- Avoid reflections or shadows from your body onto the sensor, when light is emitted from many directions.
- For best accuracy, repeat measurements several times to ensure that the light source is stable.
- Avoid flexing the cable excessively at either end.


### **4.2 Operating Instructions**

1. Slide the function switch to the desired lux or fc (foot-candle) setting.
2. Select the appropriate range or, if in doubt, select the highest setting (klux or kfc).
3. Remove the sensor head cover.
4. Hold the sensor head steady and make sure that the light completely fills the cosine correction white dome.
5. Move away from the sensor head to avoid shadowing it. The sensor head has a 5 ft (1.5m) extension cable to allow separation between the case and the unobstructed measurement location.
6. Press the RANGE button until an optimum reading range is obtained.
7. Read the illuminant value directly from the display.
8. When finished, slide the function switch to OFF and cover the sensor head (extends the sensor life).

## **MAINTENANCE**

Use only factory specified replacement parts. AEMC® will not be held responsible for any accident, incident, or malfunction following a repair done other than by its service center or by an approved repair center.

### **5.1 Replacing the Battery**

The  symbol appears on the display when replacement is needed. Replace with a standard 9V battery (NEDA 1604, 6LR61).

#### **To replace the battery:**

- Turn the Lightmeter OFF.
- Remove the rubber holster.
- Remove the screw from the back of the meter and lift off the battery cover.
- Replace the battery, then put the rear cover and holster back on.

### **5.2 Cleaning**

- Use a soft cloth lightly dampened with soapy water.
- Rinse with a damp cloth and then dry with a dry cloth.
- Do not use any abrasives or solvents.
- Do not let any liquid enter the case or sensor area.

## **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:** Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments  
15 Faraday Drive  
Dover, NH 03820 USA  
Phone: (800) 945-2362 (Ext. 360)  
(603) 749-6434 (Ext. 360)  
Fax: (603) 742-2346 or (603) 749-6309  
E-mail: [repair@aemc.com](mailto:repair@aemc.com)

(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:

Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments  
200 Foxborough Boulevard  
Foxborough, MA 02035 USA  
Phone: (800) 343-1391  
(508) 698-2115  
Fax: (508) 698-2118  
E-mail: [techsupport@aemc.com](mailto:techsupport@aemc.com)  
[www.aemc.com](http://www.aemc.com)

**NOTE: Do not ship instruments to our Foxborough, MA address.**

## **Limited Warranty**

The Models CA811 and CA813 are warranted to the owner for a period of one 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 unit has been tampered with, abused or if the defect is related to service not performed by AEMC® Instruments.

**For full and detailed warranty coverage, please read the Warranty Coverage Information, which is attached to the Warranty Registration Card (if enclosed) or is available at [www.aemc.com](http://www.aemc.com). Please keep the Warranty Coverage Information with your records.**

### **What AEMC® Instruments will do:**

If a malfunction occurs within the one-year 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.

**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.





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