■ LIGHTMETERS

CA811
CA813

ENGLISH **User Manual**

AEMC® INSTRUMENTS
CHAUVIN ARNOUX GROUP

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 #: 2121.20 / 2121.21

Model #: CA811 / CA813

Please fill in the appropriate date as indicated:

Date Received: _____

Date Calibration Due: _____

AEMC® INSTRUMENTS
CHAUVIN ARNOUX GROUP

Table of Contents

1. INTRODUCTION 2

1.1 International Electrical Symbols 2

1.2 Definition of Measurement Categories 3

1.3 Receiving Your Shipment 3

1.4 Ordering Information 3

2. PRODUCT FEATURES 4

2.1 Description 4

2.2 Button Functions 5

2.2.1 Center (Yellow) Function Switch 5

2.2.2 RANGE Button 5

2.2.3 HOLD Button 5

2.2.4 Back-light Button 5

2.2.5 MAX Button (Model CA811) 5

2.2.6 PEAK Button (Model CA813) 5

3. SPECIFICATIONS 6

3.1 Environmental Specifications 6

3.2 General Specifications 7

3.3 Safety Specifications 7

4. OPERATION 9

4.1 Recommendations Before Operating 9

4.2 Operating Instructions 9

5. MAINTENANCE 10

5.1 Replacing the Battery 10

5.2 Cleaning 10

Repair and Calibration 11

Technical and Sales Assistance 11

Limited Warranty 12

Warranty Repairs 12

INTRODUCTION

⚠ WARNING ⚠

- 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 WARNING 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 HAZARDOUS LIVE conductors is permitted.
	In conformity with WEEE 2002/96/EC

1.2 Definition of Measurement Categories

CAT IV: For measurements performed at the primary electrical supply (<1000V) such as on primary overcurrent protection devices, ripple control units, or meters.

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 II: For measurements performed on circuits directly connected to the electrical distribution system. Examples are measurements on household appliances or portable tools.

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**

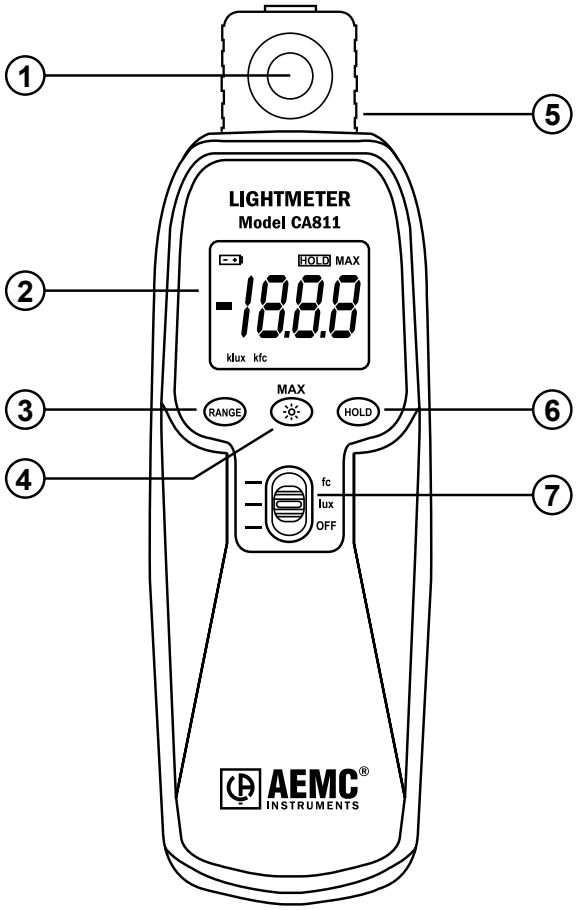
Includes 9V alkaline battery, rugged, shockproof, protective holster and user manual.

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.



1. Photodiode sensor
2. 3½ digit display
3. RANGE selector
4. MAX (CA811) or PEAK (CA813)
5. Removable light sensor
6. HOLD button
7. Power/mode selector

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^2) = 10.764 lux
1 lux (lumens/meter^2) = 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 θ is the angle between the normal to the surface and the direction of the incident light. The inverse-square low 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): ±5% ± 10cts

Accuracy for Common Light Sources (CA811): ±18% ± 2cts

Accuracy for Common Light Sources (CA813): ±11% ± 2cts

Cosine Angle: f'_2 <2% cosine corrected (150°)

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

Electromagnetic compatibility: Emissions and immunity in an industrial setting compliant with EN 61326-1

3.3 Safety Specifications

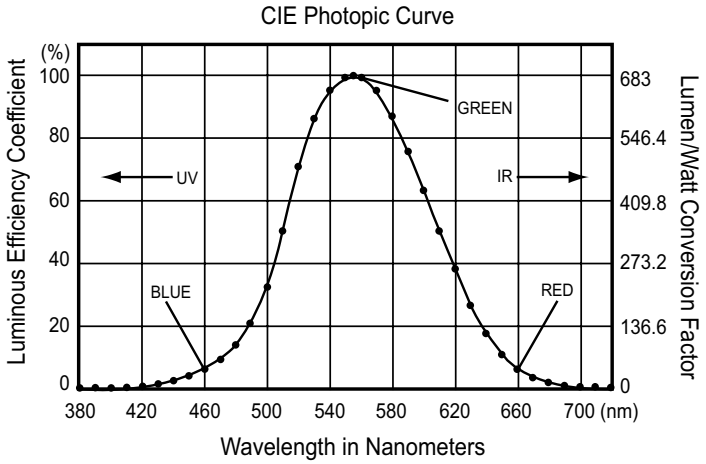
CE

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	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	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 iso-propyl 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).

(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, fax or e-mail our technical support team:

Limited Warranty

The Models CA811 and CA813 are 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.

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. Please keep the Warranty Coverage Information with your records.

What AEMC® Instruments will do:
If a malfunction occurs within the warranty period, you may return the instruiment 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:

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.