



LED-R™ Series LEDCure™ User's Manual

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Introduction

The EIT® LED-R™ Series of instruments is a new family of instruments with optics designed for the measurement of UV LEDs. The instruments build on EIT's 32+ years of UV measurement experience and previously released products that have been used to measure broadband UV sources. The first products released are LEDCure™ Radiometers in Profiling and Non-Profiling (Standard) versions.

The EIT® LED-R™ Series of instruments feature a **Total Measured Optics Response**.

The LEDCure builds and improves on the success of previous EIT radiometers, instruments which are widely used for accurate, repeatable UV measurement of broadband sources throughout the global UV industry. The LEDCure features selectable sample rates, reference modes and UV irradiance profile graphs. The new instrument is designed specifically to measure UV output from industrial UV LED light sources. As with other EIT products, the instrument is simple to use with easy push-button operation.

The LEDCure™ is a self-contained, electro-optic radiometer that measures and displays the total UV energy and UV irradiance of a UV LED curing system. The LEDCure™ combines compact size and robust design to withstand the extremes of UV LED curing environments while providing accurate measurements.

The carefully engineered optical sensing systems only measure LED wavelengths that are relevant to the UV process in the LED band specified. The output of the sensing system is converted to digital form and displayed on an easy-to-read OLED display.

The LEDCure™ provides measurement from a choice of one of the available EIT wavelength bands designated LXXX, where XXX is the center wavelength of the source to be measured in nanometers (e.g. the LEDCure™ Model L395 measures 395nm center wavelength LED sources).

EIT Instrument Markets LEDCure™ is manufactured in the USA. Patent Pending.

The Process Values

The two process values read by the LEDCure™ are total energy and peak irradiance. The irradiance reading is instantaneous and is the highest amount of UV energy that the unit senses during an exposure run. The irradiance value is energy at one instant in time during the exposure run. The radiometers measure and display irradiance in Watts or milliWatts per square centimeter (W/cm^2 , mW/cm^2).

Total energy density (sometimes referred to as "dose") is a factor of irradiance over time. The instruments derive this value from the irradiance values during the exposure run and the length of time of the run. Total energy is measured in Joules or milliJoules per square centimeter (J/cm^2 , mJ/cm^2).

Reaching the energy and irradiance values specified by your process is necessary for achieving a complete UV cure.

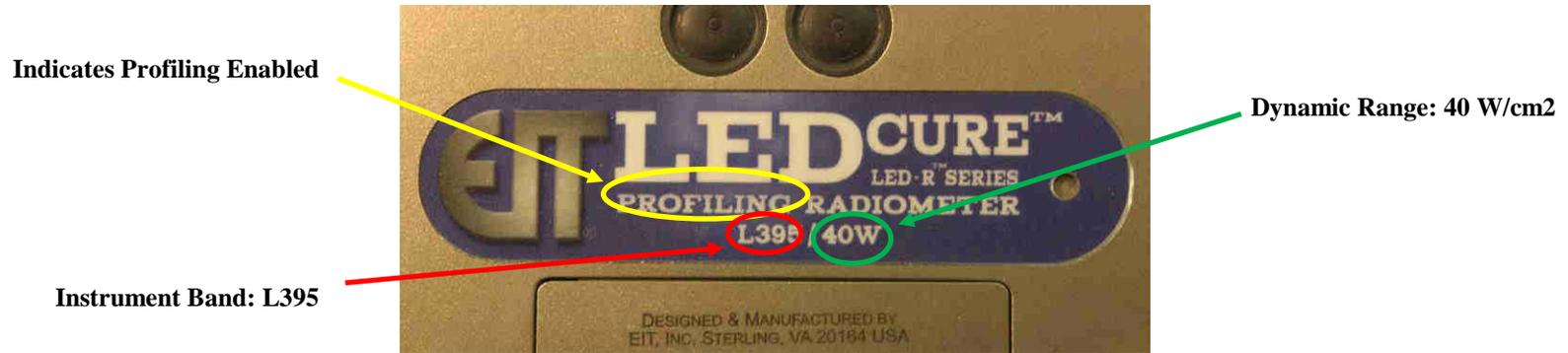


Ultraviolet Radiation

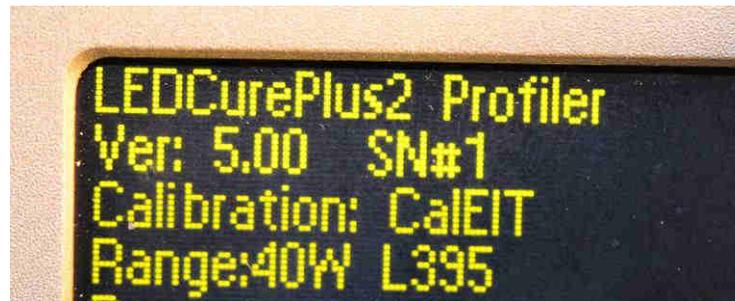
Although this product is not a source of UV light, it is used in a UV environment. Refer to the UV source's documentation for recommended protective measures against UV radiation present in the UV environment.

Identifying Instrument Type

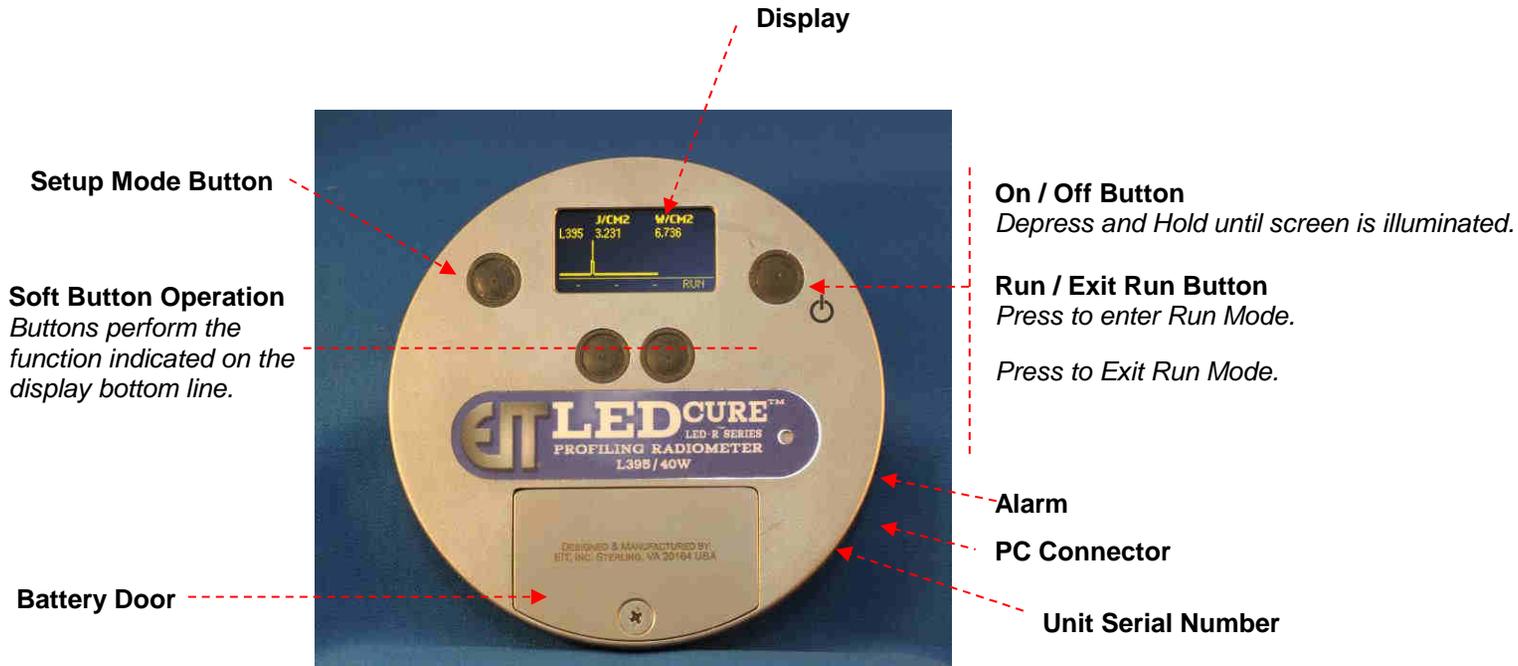
The instrument band, dynamic range and whether the instrument is Profiler enabled can be found in two locations on the instrument



The same information can be found on the instrument display when the instrument is first turn on



Operation and Features: Non-Profiling (Standard) Version



Above: Side view of instrument showing Serial Number, USB port and Alarm

Right: Back of unit showing optics window



Operating the Radiometer

Turning “ON” the Radiometer: Press and Hold the **ON/OFF** button until the display illuminates. The display will briefly display the Radiometer Model Name, Serial Number, Software Version, Calibration Date, Range, and Wavelength Bands installed. The display will then enter the default mode and display the data from the last run before the unit was turned off.

Turning “OFF” the Radiometer: Press and Hold the **ON/OFF** button. A tone will sound. When tone stops, release the button. The unit turns off.

Entering the “RUN” MODE: A short press of the **RUN** button clears the memory and puts the unit in the “**RUN**” mode. The display shows “**RUNNING**” after shortly displaying the internal temperature of the unit. Confirm that the unit displays “**RUNNING**” before initiating a reading.

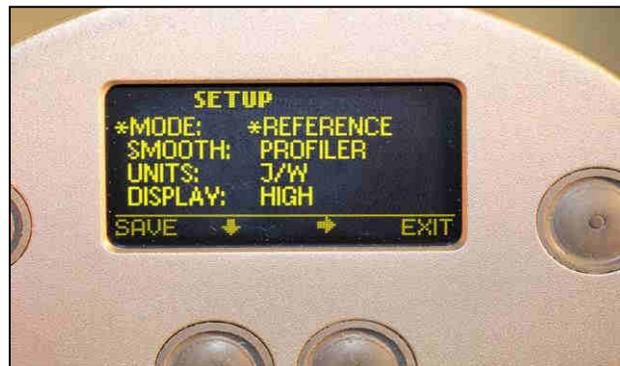
Place the radiometer on the belt or object with the optic window looking toward the UV source. The display and buttons will be facing away from the UV source. When the radiometer exits the curing chamber, the display will still be flashing “**RUNNING**”.

CAUTION: Exposing the display to high UV radiation will damage the display.

Exiting the “RUN” MODE: A short press of the **STOP** button (Soft button display bar indicates **STOP** next to the **ON/OFF** button) will exit the **RUN** mode and will return to the same default mode prior to making the exposure run, but will display the new value.

Setup & Default Modes

To enter the Setup Mode, use the soft button to the left of the display, Press and hold for 0.5 second, then release. The Setup screen will display the current settings. Default modes will appear preceded with an *asterisk. The setup screen below shows the four user selectable variables.



LEDcure™ Setup Screen

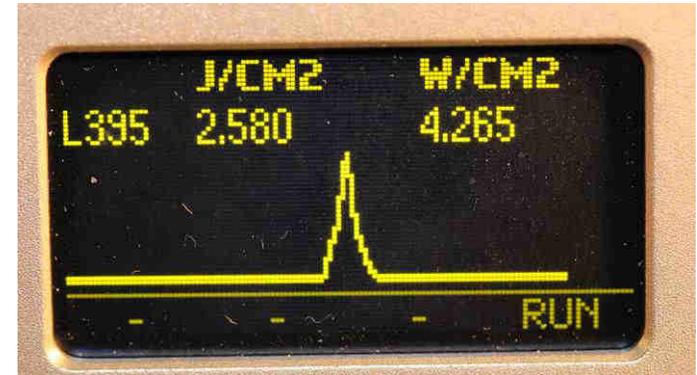
To change selections:

1. Use the down ↓ and right → arrow buttons located under the arrows to scroll in the indicated direction.
2. To change the default selection, first select the line, then the setting on each line.
3. Press the **SAVE** button to save the setting as the new default. An *asterisk will appear next to the setting.
4. When changes are completed, press the **EXIT** button to return to the default mode.

Explanation of Settings:

MODE:

GRAPH Mode– Illustrates the irradiance profile for the UV source(s). The Profile is stored and displayed as a graph of time (X axis) vs. intensity (Y axis) for each UV lamp source. The Profile and Data will be stored in the unit until the RUN button is pushed.



REFERENCE Mode– Make a run, data will appear next to the UV band. **CAUTION:** *Be sure you want to overwrite the current data on the REF line before pressing SAVE.* Press **SAVE**, data is transferred to the REF line. The data will remain until it is overwritten.

The difference or change between the current run data and the reference data is displayed as a percentage change on the DIFF% line as shown below.



TOGGLE Mode– Pressing the **SEL** button, the user can “toggle” between the **GRAPH** mode and **REFERENCE** mode. TOGGLE Mode is only available on single band instruments

SMOOTH:

OFF Displays the Peak Irradiance as measured at 2048 samples per second.
ON Displays the Peak Irradiance as measured at 25 samples per second.
PROFILER: Displays the Peak Irradiance as measured at 128 samples per second.

UNITS: J/W, mJ/mW, $\mu\text{J}/\mu\text{W}$ Select the how the instrument display shows the values

DISPLAYS: LOW, MEDIUM, HIGH – Select the display intensity

SAVE ↓ → **EXIT** – Soft Button Indicators

Diagnostics & Error Messages

The LEDCure™ continuously performs internal self-diagnostic tests. If the unit detects an internal problem, it will display one or more of the following error codes in the upper left corner on the display. Error codes are two alphanumeric characters preceded by an *. If two errors are experienced at the same time, both error codes will flash alternately on the screen every 0.5 seconds. Certain error codes may indicate problems that require returning the unit to the factory for service.

Low Battery Indicator

***LB** – Low Battery

If this happens during an exposure run, the reading is still valid. The low battery indicator is designed to illuminate early enough so that your data remains valid. Under severe low battery conditions, the unit does not operate. Therefore, confirm that the unit flashes **"RUNNING"** before initiating a reading.

Over-Temperature State

***OT** – Over Temperature

If the internal temperature of the LEDCure™ Plus exceeds 65° C during an exposure run, the unit will emit a steady beeping tone after the run. However, the data it has collected is accurate and can be read by pressing the Select button. When doing this, the beeping tone stops and you can scroll through the data readings. In addition, if the internal temperature of the unit exceeds 75° C, the unit beeps once then displays the internal temperature continuously. The unit will not operate until the internal temperature drops below 75° C. The maximum internal temperature is 80°C. If the internal temperature exceeds 80°C, the warranty is voided. **CAUTION:** If you press the Reset button to initiate the RUN mode before the unit cools to 75°C, all data from the previous exposure run is cleared from memory. The unit beeps and again continuously displays the temperature.

Over Range State

***OR** – Over Range

The over range error message will be displayed if the peak irradiance value is too large for the instrument to measure. Note that a unit's full scale range will be marginally higher than the normal range. Readings that exceed the nominal range and do not result in an *OR error are valid.

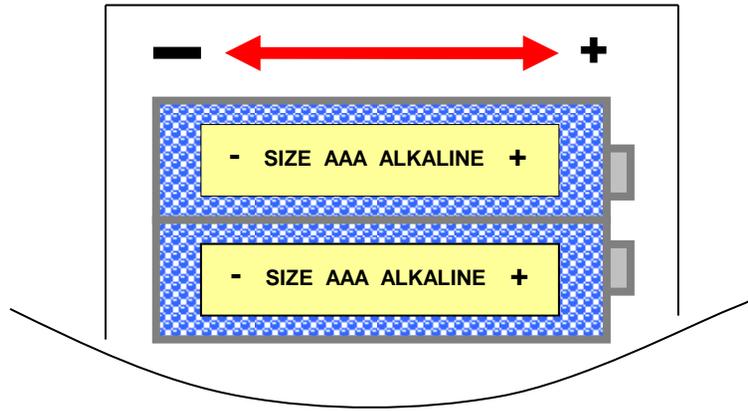
Other Error Codes

For all other error codes, please call EIT for disposition.

Replacing the Batteries

The LEDCure™ should be turned OFF.

1. Loosen the screw on the battery door and remove the door.
2. Remove the old batteries.
3. Install two new AAA size alkaline cells, observing polarity. Note: ***Both cells are installed in the same direction.*** The proper direction is indicated on the PCB and on the housing inside the battery compartment. The unit is designed so it will not operate with reversed cells.
4. Replace the door and the screw.



Warranty and Returns

New Product Warranty

EIT Instrument Markets warrants that all goods described in this manual (except consumables) shall be free from defects in material and workmanship. Such defects must become apparent within six months after delivery of the goods to the buyer.

EIT Instrument Markets' liability under this warranty is limited to replacing or repairing the defective goods at our option. EIT Instrument Markets shall provide all materials and labor required to adjust, repair, and/or replace the defective goods at no cost to the buyer only if the defective goods are returned, freight prepaid, to EIT Instrument Markets during the warranty period.

EIT Instrument Markets shall be relieved of all obligations and liability under this warranty if:

1. The user operates the device with any accessory, equipment, or part not specifically approved or manufactured by EIT Instrument Markets, unless the buyer furnishes reasonable evidence that such installations were not a cause of the defect. This provision shall not apply to any accessory, equipment, or part that does not affect the proper operation of the device.

2. Upon inspection, the goods show evidence of becoming defective or inoperable due to abuse, mishandling, misuse, accident, alteration, negligence, improper installation, lack of routine maintenance, or other causes beyond our control.
3. The goods have been repaired, altered, or modified by anyone other than EIT Instrument Markets authorized personnel.
4. The buyer does not return the defective goods, freight prepaid, to EIT Instrument Markets within the applicable warranty period.

There are no warranties that extend beyond the description on the face hereof. This warranty is in lieu of - and is exclusive of - any and all other expressed, implied, or statutory warranties or representations. This exclusion includes merchantability and fitness, as well as any and all other obligations or liabilities of EIT Instrument Markets. EIT Instrument Markets shall not be responsible for consequential damages resulting from malfunctions of the goods described in this manual.

No person, firm, or corporation is authorized to assume for EIT Instrument Markets, any additional obligation or liability not expressly provided for herein except in writing duly executed by an officer of EIT Instrument Markets.

If any portion of this agreement is invalidated, the remainder of the agreement shall remain in full force and effect.

This warranty shall not apply to any instrument or component not manufactured by EIT Instrument Markets.

Calibration and Repair Warranty

EIT Instrument Markets will warranty calibration and/or repair services just performed, for 90 days. This Calibration and Repair Warranty does not apply to nor cover repairs that may otherwise occur to the instrument. Such repairs may be covered under the New Product Warranty based on the age of the instrument.

Returning the Instrument to EIT Instrument Markets

Warranty Repair, Non-Warranty Repair, and Instruments being returned for Calibration:

You do not need to contact EIT Instrument Markets before returning your unit for Service or Repair. An RMA is not required.

Please visit our website (eit.com) for the latest ***Service Request Form***.

Look under EIT Products UV Instruments to find the Service Request Form on the website.

The Service Request Form should be included in the box with the instrument. It can also be emailed ahead of time

When returning the LEDCure™, please return the equipment in the original (or equivalent) packaging. You will be responsible for damage incurred from inadequate packaging, if the original packaging is not used. **The customer is responsible for insuring the unit during transportation to EIT Instrument Markets.**

Equipment repaired under warranty will be returned to the user with no charge for the repair or shipping. EIT Instrument Markets will notify you of repairs not covered by warranty and their cost prior to performing any work on the equipment.

EIT Instrument Markets reserves the right to make changes in design at any time without incurring any obligation to install the same on units previously purchased.

Address for Returning All Instruments to EIT-IM

Please note that EIT expects to relocate to a new purpose-built facility in the Fall of 2016. Please verify the address on our website.

<http://www.eit.com/support-service>

Questions can also be directed to: calibration@eit.com

On all returns, please include your company name, address, telephone number, fax number, and e-mail address on your shipping documents. EIT Instrument Markets will contact you if any additional information is needed.

Appendix A.

Display Cleaning Instructions

Use of a clean cotton swab, lint free wipe, or EIT prepackaged optical wipes are recommended for cleaning the display window. Use of Isopropyl Alcohol is acceptable.

WARNING – DO NOT USE ACETONE TO CLEAN THE DATA DISPLAY SCREEN. IT MAY DAMAGE THE DISPLAY.

Optics Cleaning Instructions

EIT Instrument Markets cannot have full knowledge of contaminants present in all applications and as a result cannot test for their effects. Therefore, we cannot assume responsibility for damage to customer instruments, which results from following these directions once the warranty period has expired. In addition, customers are advised to obtain and read the MSDS for any chemical used for cleaning optics, and for taking necessary precautions. EIT Instrument Markets makes no claim for the safety of any of these chemicals.

Two common practices are not recommended. Blowing on the optics with the mouth is not recommended; various components of saliva are extremely difficult to remove from the optics. Ordinary compressed air (sometimes referred to as shop air) should also be avoided because of the difficulty in removing oil from the optical surface.

For proper cleaning instructions please visit the EIT web site, where you will find detailed instructions, an instructional video, and the ability to order EIT optical wipes for proper cleaning.

Please visit: <http://www.eit.com/uv-products/care-and-cleaning>

Appendix B

Specifications (Specifications subject to change without notice)

Display	Easy to Read, Yellow Text on Black Background
Dynamic Range	400mW/cm ² - 40 Watt/cm ²
Accuracy	±10% of reading, ±2% of full scale, ±5% typical
Repeatability	±1-3% typical, dependent on source, and equipment stability, unit alone better than ±1%
Spectral Response	Approximately cosine
Spectral Ranges	1-channel continuous monitoring. L395 model: 370-420nm
Spatial Response	Approximately cosine
Smooth Modes	ON: 25 samples/sec; OFF: 2048 samples/sec; Profile: 128 samples/sec
Operating Temperature	0-75°C Internal temperature; tolerates high external temperatures for short periods (audible alarm indicates overheat)
Time-Out Period	2 minutes DISPLAY mode (no key activity). A no time-out mode can be activated by EIT-IM.
Profiling Memory Capacity	Sufficient for >100 minutes
Battery / Battery Life	Two user-replaceable AAA Alkaline Cells ; Approx. 20 hours with display on
Dimensions	4.60 x 0.50 inches; 117 mm x 12.7 mm (D x H)
Weight	10.1 ounces (289 grams)
Package Material	Aluminum, stainless steel
Carrying Case Material	Cut polyurethane interior, scuff resistant nylon exterior cover
Carrying Case Weight	10.1 ounces (289 grams)
Carrying Case Dimensions	10.75 x 3.5 x 7.75 inches; 274 x 89 x 197 mm (W x H x D).

Regulatory Statements

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This equipment is a Class A device, suitable for use in all establishments other than domestic and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

This equipment is in conformity with the following standards and therefore bears CE marking:

- IEC 61326-1:2005
- EN55011: 1998
- EN61000-4-2: 1995, A1: 1998, A2: 2001
- EN 61000-4-3: 2002, A1: 2002

Following the provisions of the applicable directives:

- 98/34/EEC and amendments
- 89/336/EEC and amendments.

Designed and manufactured in the USA. Patent Pending.

