7640 LIGHT & UV MONITOR

USER MANUAL

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INTRODUCTION

One of the primary responsibilities of the custodian of artworks and museum artefacts is to preserve them for future generations. How they are stored and displayed is central to this, the 7640 Environmental Monitor is an easy to use tool to help in achieving the safest long term protection.

For many years it has been recognised that one of the major causes of damage to museum objects and other antiquities is the fading and rotting effect of light on the object. The most damaging part of the illumination is its ultraviolet (UV) content.

Using the 7640 measurements can be taken of the proportion of UV present as microwatts per lumen (μW/lumen), the total amount of UV as milliwatts per square meter (mW/M^2) and the amount of visible light present (Lux).

We always want to improve our products. If you have any suggestions please send them to us.

BASIC OPERATION

To take a reading the appropriate yellow button is pushed depending on the measurement required and the reading is taken.

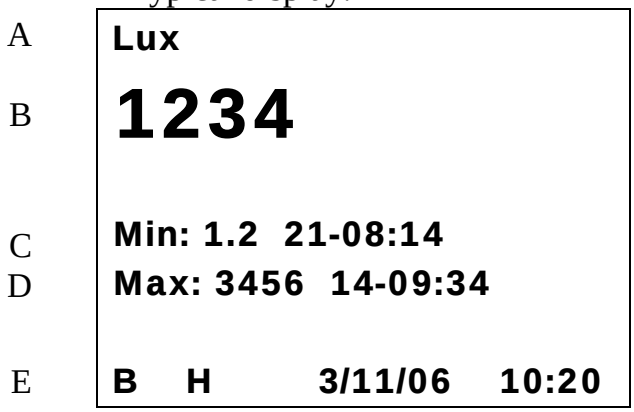
UV= Ultra Violet (µW/lumen or mW/M^2)

Vis= Visible light (Lux or Foot-candles)

The unit automatically turns off 10 seconds after the button is released unless a button is held down for over 5 seconds, this will cause readings to be taken continuously until a button is pressed.

Note that the buttons should be pressed firmly for a second or so to ensure reliable operation.

Typical display:



A: Units of measurement

B: Current reading

C: Minimum reading since last reset, day of month and time of minimum

D: Maximum reading since last reset, day of month and time of maximum

E: **H** shows that the reading is "held" and the unit will turn itself off after 10 seconds of inactivity. A round blob shows the unit is in continuous reading mode until a button is pushed, nothing here means that a single reading is being taken.

The current time and date are also shown. Unless they are hidden by pressing Set\Clock\Hide-Unhide.

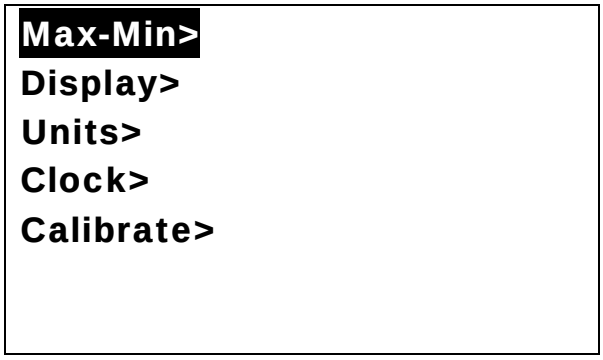
If a battery symbol appears at B it means that the batteries need to be replaced.

Min & Max are reset by pressing Set\Max-Min\Reset (Press Set 3 times)

The above format is slightly different for some parameters and can be altered by the user if required, see below.

Set Button

The blue Set button is used to access advanced functions, change units etc. If it is pushed once a menu similar to that below is shown:



The first menu item “Max-Min” is highlighted, different menu items can be highlighted using the ↑ and ↓ buttons. The wanted action is done by highlighting the appropriate menu item and pressing the Set button. To abort without doing anything press the X button. In some cases a further sub-menu is displayed with more choices.

Elsewhere in this manual directions in the form Set\item1\item2 are given. This means Press Set, select item1 in the first menu, press Set again, select item2 in the next menu and press Set.

To take a measurement without having to look at the display while the reading is taken (for example where the operators head may effect the reading) proceed as follows:

1. Position the monitor where the reading is to be taken.
2. Push the appropriate button for 1-2 seconds and release.
3. Hold the monitor in position for at least 2 seconds.
4. Without operating any buttons by mistake move the monitor so the reading can be noted before it turns itself off.

UNITS OF MEASUREMENT

Ultra-Violet (UV)

Traditionally UV has been measured in museums as the proportion of ultraviolet present. This result is useful for checking a particular lamp or window because the proportion of UV does not change with the distance from the light source. Using a simple rule the amount of UV on an object can be limited. It is usual to arrange that the proportion of UV should not exceed 75µW/lumen in museums and galleries, though some organisations try to keep UV levels below 25µW/lumen

The damage is done by the total amount of UV falling on the object so it is useful to be able to measure this directly, especially if non standard amounts of illumination are required. The amount of UV should be as little as possible but in general should not exceed 20mW/M^2, again some organisations keep the level below 6mW/M^2.

Both the above units are displayed when the UV button is pressed, one in large characters, the other smaller at the bottom of the screen. Which is displayed where can be swapped by pressing Set\Units\µW/Lumn-mW/M^2.

Visible Light

This can be displayed either in Lux or Foot-candles. To change the units press Set\Units\Lux-Footcandl.

A visible light readout is provided to control illumination and limit damage done by visible light. Normal museum light levels should be limited to 150-250 Lux.

Once measurements have been made the light level can be altered if necessary and UV filters can be fitted on windows, fluorescent tubes or other UV producing light sources as required. These filters often deteriorate over a period of years so it is essential to re-check them periodically.

Magazine reprints on the subject of museum lighting , UV etc can be obtained from the manufacturer.

Suggested light levels for various other purposes are given below:

Corridor, stairs etc	100/150 Lux
Warehouses, storage bays	100/150 Lux
General office work	300/500 Lux
Rough bench/machine work	300/500 Lux
Medium bench/machine work	500/700 Lux
Drawing offices	750/1000 lux
Fine bench work	1000/1500 Lux
Fine inspection	1500/3000 Lux
Minute work	3000/5000 Lux

MAXIMUM AND MINIMUM

The maximum and minimum values for each unit are displayed along with the day of the month and time the maximum or minimum occurred.

The values can be reset by pressing Set\Max-Min\Reset (This equates to pressing Set 3 times).

To find the date when maxima & minima occurred press Set\Max-Min\Date or Time, repeat to display the times again.

DISPLAY

Contrast

The display contrast can be increased/decreased by pressing Set\Display\Contrast UP or DOWN. If this is done the menu continues to be displayed and the set button can be pressed repeatedly until the required contrast is achieved.

Backlight

The display backlight operation can be adjusted from the Set\Display menu as follows:

Menu item	**Action**
Lamp off	Backlight always off
Lamp mostly off	Backlight initially off, turns on if visible light is less than 10 Lux
Lamp mostly on	Backlight is initially on, turns off if visible light is more than 10 Lux
Lamp on	Backlight always on

The backlight uses a considerable amount of power, the more it is used the less time the batteries will last.

MAINTENANCE

The sensor windows should be kept clean and grease free. Grease and finger marks that look clear may be opaque to UV. Ensure that solvents do not come into contact with plastic parts, especially the perspex window over the visible (left-hand) sensor.

Battery

The batteries should be replaced as soon as the battery symbol is seen on the bottom left of the display. Any 1.1 to 2.5 volt AA style battery can be used, though it is preferable to use alkaline cells because of their longer life and much reduced tendency to leak.

The battery compartment can be accessed by removing the single screw in the bottom centre of the case.

Suggested battery types (2 off required):

MANUFACTURER	TYPE
Duracell	MN1500
Ever Ready	LR6B4

Nickel Cadmium rechargeable types can be used but they cannot be charged inside the instrument.

Mains Power Supply

The optional external mains power supply can be connected to the power input socket on the right hand side of the instrument. This socket is only fitted if requested with order because the hole required compromises the moisture seal on the casing.

Software Version

The internal software version is displayed when the 7640 is turned on. A typical start-up message might be “ELSEC 7640 V2.1”, in this case the software version is 2.1

CALIBRATION

The calibration information is kept in non-volatile EEPROM. If this fails the instrument displays “Mem Fail” when turned on and will load default calibration values and future readings may be 25% in error. If this happens a question mark “?” is displayed on the top right of the display with suspect readings.

UV & Visible Light

The 7640 calibration should not drift with time but to be sure of accuracy the instrument can be returned to the manufacturer for a calibration check every 2-5 years.

The 7640 has a very carefully defined frequency response (i.e. which wavelengths of light it is sensitive to). Other light meters are often more sensitive to infra red light than they should be and so will give a higher reading with light sources that contain infrared (e.g. ordinary filament light bulbs).

Because the 7640 has a cosine angular response it may give different readings to a type 762 which is relatively directional. In other words the 7640 is more sensitive to light coming at an oblique angle than the 762.

Note that the human eye has a logarithmic response, this means that if two luxmeters are placed side by side they may give different readings even if it looks like they are getting a similar amount of light. To compare the readings on 2 meters they each need to be placed in the exactly same position under exactly the same lighting conditions with the operator being very careful not to shade the meters differently.

SERVICE AND SUPPORT

For support and repairs contact:

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This equipment complies with EU Directive 2002/96/EC

The symbol of the crossed container on the equipment shows that the product, at the end of its useful life, must be collected separately from other refuse. When it is disposed of in the European Union it should be placed with other electronic waste at the place designated by the waste collection authority.

SPECIFICATIONS

Method of radiation detection	Twin silicon photodiodes connected to microprocessor.
Visible wavelength range	400-700nM (CIE response). No correction required for different light sources.
Visible power range	0.1 - 200,000 Lux (0.1 – 20,000 Foot-candles)
UV wavelength range	300-400 nM
UV power range	2 - 50,000 mW/M^2
UV proportion range	0 - 10,000 μW/Lumen
Display resolution	Lux: 0.1 up to 100 then 1 Foot-candles: 0.1 up to 100 then 1 UV: 0.1 up to 100 then 1 Proportion of UV: 1 μW/Lumen
Accuracy	Light: 5% ±1 displayed digit UV: 15% ±1 displayed digit
Angular response	Cosine (Light & UV)
Readout	8 line graphical Liquid Crystal Display with automatic backlight
Date functions	Display as day-month-year or month-day-year.
Batteries	2 off alkaline AA type.
Battery Life	Approx 100 Hours continuous use or 12,000 readings taking 30 seconds each. Battery life will be less if the display backlight is used
External Power Supply (If available)	4.0-5.2V DC, 100mA A suitable mains power supply can be provided as an optional extra (please specify mains voltage required).
Operating Temperature	0-50°C
Dimensions	120 x 65 x 25mm 4.7 x 2.5 x 1 inches.
Weight	160g (5.4 oz) with batteries.