



## INTRODUCTION

This HHLM3 is a portable easy use 3 1/2 digit, compact-sized digital lightmeter designed for simple one hand operation. It provides measure ments in lux and fc units.

The HHLM3 features PEAK-HOLD (60ms pulse light) and DATA-HOLD function. There is a pocket hook and magnetic holder on the back of the unit.

## SAFETY INFORMATION

It is recommended that you read the safety and operation instructions before using the lightmeter.

### WARNING

- To avoid electric shock, do not operate this product in wet or damp conditions.
- To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.
- To avoid eye injury, wear eye protection if there is a possibility of exposure to high-intensity rays.
- Do not immerse in liquids, clean the sensor head using only a damp cloth.
- Cover sensor head when not in use to extend silicon photodiode sensor life.

## SPECIFICATIONS

### GENERAL

**Display:** 3 1/2 digit liquid crystal display (LCD) with maximum reading of 1999.

**Overrange:**

(OL) is displayed.

**Low battery indication:**

The "E3" is displayed when the battery voltage drops below the operating level.

**Measurement rate:**

2.5 times per second, normal.

**Operating Environment:**

0°C to 50°C at < 75% R.H.

**Storage Temperature:**

-20°C to 60°C, 0 to 80% R.H. with battery removed from meter.

**Accuracy:**

Stated accuracy at 23°C ± 5°C, < 75% R.H.

**Auto power off:**

15 seconds.

### Battery:

3 pcs 1.5V (AAA size) included.

### Battery Life:

90 hours (continuous) typical.

### Dimensions:

152mm(H) x 48mm(W) x 26mm(D).

### Weight:

Approx. 2.9 oz. (81.2g) including battery.

## ELECTRICAL

### Photometric Formulas:

10,764 footcandles=lux (lumens/meter<sup>2</sup>)

0.0929 lux=footcandles(lumens/foot<sup>2</sup>)

### Range:

20 lux, 200 lux, 2000 lux, 20000 lux

20 fc, 200fc, 2000fc, 20000fc

### Resolution:

0.01lux, 0.01fc

### Spectral response:

CIE photopic

The CIE photopic curve is an international standard for the color response of the average human eye

### Acceptance angle:

$f_1$  < 2% cosine corrected (150°)

### Total accuracy for CIE standard Illuminant A

±(3%/rdg + 10dgt)

CIE standard illuminant A can be realized by means of CIE standard source A, which is defined as: A gas-filled tungsten-filament lamp operating at a correlated colour temperature of 2856K

### Temperature Coefficient:

0.1% (specified accuracy)/°C

(< 18°C or > 28°C)

## OPERATING INSTRUCTIONS

### Push buttons

#### MEAS (MEASURE) Button

Press "MEAS" button to turn on the meter for measuring illumination. Press "MEAS" button again to turn off the meter.

#### Range Select Button

Press "RNG" button to select the desired lux range. Each time you press "RNG" button, the range (and the input range annunciator) increments, and a new value is displayed.

## SPECIAL CONSIDERATIONS

- Keep the plastic domed cosine corrector clean and free of scratches. It may be cleaned with a soft cloth and isopropyl alcohol.
- When light is received from many directions simultaneously, take special care to avoid reflections or shadowing the sensor with your body.
- For best accuracy, repeat the measurement several times to ensure that the light source has remained stable.

- The **Inverse-square Law**  
The law states that the illuminance 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 law that the illuminance on any surface varies as 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  $E=(I \cos \theta) / d^2$ .

## PROCEDURE OF CALIBRATION

### Note:

The following calibration procedure should perform only by a qualified technician who have access to the items as following.

### Equipment:

A gas-filled tungsten-filament lamp operating at a correlated color temperature of 2856K.

### Zero Calibration

Set the function/range to the 2000lux, then cover sensor head adjust VR21 until display reading 00.0±2dgt.

### Basic Calibration

Set the function/range to the 2000lux, then apply 1800lux adjust VR10 until the reading 1800.±1dgt.

### fc Calibration

Set the function/range to the 200fc, then apply 180fc adjust VR22 until display reading 180.0±2dgt.

## MAINTENANCE

### Battery Replacement

- Power is supplied by three 1.5V (AAA size) batteries.
- The "E3" appears on the LCD display when replacement is needed. To replace the batteries, remove the screw from the back of the meter and lift off the battery cover.
- Remove the batteries from battery contacts and replace.
- When not in use for long period of time, remove the batteries.
- Don't store in a location with high Temp. or high humidity.

### Cleaning

Periodically wipe the case with a damp cloth and detergent, do not use abrasives or solvents.

Wavelength (nm)	V <sub>A</sub> CIE Photopic Luminous Efficiency Coefficient	Photopic Lumen/Watt Conversion Factor
380	0.0000	0.05
390	0.0004	0.27
410	0.0012	0.82
420	0.0040	2.73
430	0.0116	7.81
440	0.0230	15.7
450	0.0390	25.9
460	0.0600	40.9
470	0.0870	61.8
480	0.1300	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	586.0
540	0.9540	650.0
550	1.0000	683.0
560	0.9650	678.0
570	0.8520	649.0
580	0.6700	583.0
590	0.4570	516.0
600	0.2610	430.0
610	0.1330	243.0
620	0.0620	121.0
630	0.0280	53.0
640	0.1250	119.0
650	0.1070	173.0
660	0.0810	41.4
670	0.0320	21.8
680	0.0170	11.6
690	0.0092	5.99
700	0.0041	2.78
710	0.0010	0.716
720	0.0005	0.355
730	0.0003	0.170
740	0.0001	0.820
750	0.0001	0.041
760	0.0001	0.041