

40.00/400.0/4,000/40,000/400,000 Lux

LIGHT METER

Model : LX-1102



Your purchase of this LIGHT METER marks a step forward for you into the field of precision measurement. Although this LIGHT METER is a complex and delicate instrument, its durable structure developed. Please read the following instructions carefully and always keep this manual within easy reach.

OPERATION MANUAL

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1. FEATURES

- * 5 ranges : 40.00/400.0/4,000/40,000/400,000 Lux, wide measuring range.
- * High resolution : 0.01 Lux to 100 Lux, 0.001 Ft-cd to 10 Ft-cd.
- * Sensor used the exclusive photo diode & color correction filter, spectrum meet C.I.E. photopic.
- * Sensor cosine correction factor meet standard.
- * Separate Light Sensor allows user to measure the light at an optimum position.
- * Lux & Foot-candle unit selection.
- * Large LCD display with bar graph and indicator.
- * Water resistance front panel
- * Use the rubber key for the function select.
- * Microprocessor circuit ensure high accuracy, and also and also provides special functions and features.
- * LSI circuit provides high reliability and durability.
- * Zero adjusting button.
- * Data hold, to freeze the desired reading value.
- * Peak hold measurement.
- * Memory function to display the max. & min. display value with Recall.
- * Auto power auto off or manual power off.
- * Compact size and excellent operation.
- * Built-in low battery indicator.
- * RS-232 computer serial data output.

2. SPECIFICATIONS

2-1 General Specifications

Display	Large LCD display. LCD size 52 x 38 mm, 4 digits. with bar graph indicator.
Measurement & ranges	5 ranges : 40.00 Lux, 400.0 Lux, 4,000 Lux, 40,000 Lux, 400,000 Lux.
Unit	Lux, Foot-candle (Ft-cd).
Sensor	The exclusive photo diode & color correction filter, spectrum meet C.I.E. Cosine correction factor meet standard.
Zero Adjustment	External adjustment by pushing button, (<i>40.00 Lux range only</i>)
Peak Hold	To hold the peak display.
Data Hold	To freeze the display value.
Memory	Save the max. & min. value with Recall.
Power Off	Auto or manual power off.
Over and Under Range Indication	Over range indicator : " - - - - " Under range indicator : " _ _ _ _ _ "
Data Output	RS-232 serial data output.
Operating Temperature	0 to 50 °C (32 to 122 °F).
Operating Humidity	Less than 80% RH.

Power Supply	DC 9V battery. 006P, MN1604 (PP3) or equivalent.
Power Consumption	Approx. DC 8 mA.
Weight	220 g/0.48 LB.
Dimension	<i>Main instrument :</i> 200 x 68 x 30 mm (7.9 x 2.7 x 1.2 inch).
	<i>Light Sensor probe :</i> 82 x 55 x 7 mm (3.2 x 2.2 x 0.3 inch).
Accessories	Instruction Manual..... 1 PC. Light Sensor with protection cover 1 PC.

2-2 Electrical Specifications (23± 5 °C)

Unit	Range	In-range Display	Resolution
Lux	40.00 Lux	0 to 40.00 Lux	0.01 Lux
	400.0 Lux	36.0 to 400.0 Lux	0.1 Lux
	4,000 Lux	360 to 4,000 Lux	1 Lux
	40,000 Lux	3,600 to 40,000 Lux	10 Lux
	400,000 Lux	10,000 to 400,000 Lux	100 Lux
Foot-candle (Ft-cd)	4.000 Fc	0 to 3.720 Fc	0.001 Fc
	40.00 Fc	3.35 to 37.20 Fc	0.01 Fc
	400.0 Fc	33.5 to 372.0 Fc	0.1 Fc
	4,000 Fc	335 to 3,720 Fc	1 Fc
	40,000 Fc	930 to 37,200 Fc	10 Fc
<i>Foot-candle = Ft-cd = Fc</i>			

Unit	Range	Accuracy
Lux	40.00 Lux	± (3% rdg + 0.5 % F.S.)
	400.0 Lux	
	4,000 Lux	
	40,000 Lux	
	400,000 Lux	< 100,000 Lux : ± (3% rdg + 0.5 % F.S.) 100,000 Lux : <i>@ for reference only</i>
Foot-candle (Fc)	4.000 Fc	± (3% rdg + 0.5 % F.S.)
	40.00 Fc	
	400.0 Fc	
	4,000 Fc	
	40,000 Fc	< 9,300 Fc : ± (3% rdg + 0.5 % F.S.) 9,300 Fc : <i>@ for reference only</i>

Note : Accuracy tested by a standard parallel light tungsten lamp of 2856 K degree temperature.

2-3 Spectrum for Light Sensor

3. FRONT PANEL DESCRIPTION

- | | |
|-----------------------------|--------------------------------------|
| 3-1 Display | 3-8 Light Sensor Input Socket |
| 3-2 Power Button | 3-9 Stand |
| 3-3 Hold Button | 3-10 Battery Compartment/Cover |
| 3-4 REC (Max/Min) Button | 3-11 RS-232 Output |
| 3-5 Lux/Fc (Ft-cd) Button | 3-12 Light Sensor |
| 3-6 Range Button | 3-13 Sensor Cover |
| 3-7 Zero Button | 3-14 Light Sensor Plug |
| | 3-15 LCD display contrast adjust VR. |

4. MEASURING PROCEDURE

- 1) Push the " Power Button " (3-2, Fig. 1) to switch the instrument on.
- 2) Select the desired measuring unit by pressing the " Lux/Fc Button " (3-5, Fig. 1). The display will indicate the selected unit of " Lux " or " Ft-cd " .
- 3) Select the max. range by using the " Range Button " (3-6, Fig. 1).
 - a. *If the main display shows " - - - - ", it indicates overload condition, select the next higher range.*
 - b. *If the main display shows " _ _ _ _ ", it indicates out-of-range, select the next lower range.*
 - c. *As intend to get more accuracy reading, try to select the range that it have the high resolution*
- 4) Position the " Light Sensor " (3-12, Fig. 1) directly under the light source.
- 5) **Zero adjustment**
 - a. Cover the " Light Sensor " (3-12, Fig. 1) using the " Sensor Cover " (3-14, Fig. 1).
 - b. Set to 40.00 Lux range.
 - c. Pushing the " Zero Button " (3-7, Fig. 1), LCD will reach to zero values.
 - d. Upon completion, remove the sensor cover.

Note :

For precision measurement, only the 40.00 Lux range need to make Zero Adjustment.

6) Data Hold

- a. During the measurement, pushing the " Hold Button " (3-3, Fig. 1) will hold the measured value & the LCD will indicate " HOLD " symbol.
- b. Push the " Hold Button " again to release the data hold function.

7) Peak Hold

- a. During the measurement, pushing the " Hold Button " (3-3, Fig. 1) at least 2 to 3 seconds continuously, the meter will execute the Peak Hold function and at the same time LCD display will show the " Peak HOLD " indicator.
- b. During execute the Peak Hold function, pushing the " Hold Button " (3-3 , Fig. 1) once a while will clear the Peak Value from the display and enter the new Peak Value again.
- c. When execute the Peak Hold function, pushing the " Hold Button " (3-3 , Fig. 1) at least 2 seconds continuously will cancel the Peak Hold function, the the " Peak HOLD " indicator will be disappeared.

8) Data Record (Max., Min. reading)

- a. The data record function records the maximum and minimum readings. Press the " REC. Button " (3-4, Fig. 1) to start the Data Record function and there will be a " REC " symbol on the display.

b. With the " REC " symbol on the display :

- * Press the " REC Button " (3-4, Fig. 1) once, the " REC Max " symbol along with the maximum value will appear on the display.

Note :

If intend to delete the maximum value, just press the " Hold Button " (3-3, Fig. 1) for a while, and then the display will show the " REC " symbol only & execute the memory function continuously.

- * Press the " REC. Button " (3-4, Fig. 1) again, the " REC Min " symbol along with the minimum value will appear on the display.

Note :

If intend to delete the minimum value, just press the " Hold Button " (3-3, Fig. 1) for a while, and then the display will show the " REC " symbol only & execute the memory function continuously.

c. To exit the memory record function, just press the " REC " button for 2 seconds at least. The display will revert to the current reading.

5. AUTO POWER OFF DISABLE

The instrument has " Auto Power Off " function in order to prolong battery life. The meter will shut off automatically if none of the buttons are pressed in approx. 10 min.

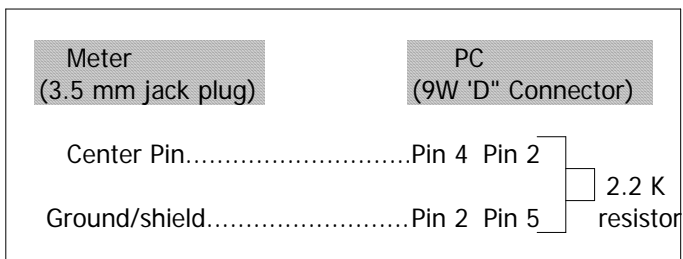
To disable this function, Select the memory record function during the measurement by pressing the " REC. Button " (3-4, Fig. 1).

6. RS232 PC SERIAL INTERFACE

The instrument has RS232 PC serial interface via a 3.5 mm terminal (3-11, Fig. 1).

The data output is a 16 digit stream which can be utilized for user's specific application.

A RS232 lead with the following connection will be required to link the instrument with the PC serial port.



The 16 digits data stream will be displayed in the following format :

D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0

Each digit indicates the following status :

D0	End Word
D1 & D8	Display reading, D1 = LSD, D8 = MSD <i>For example :</i> <i>If the display reading is 1234, then D8 to D1 is :</i> <i>00001234</i>
D9	Decimal Point(DP), position from right to the left 0 = No DP, 1 = 1 DP, 2 = 2 DP, 3 = 3 DP
D10	Polarity 0 = Positive 1 = Negative
D11 & D12	Annunciator for Display Lux = 15 Ft-cd = 16
D13	When send the upper display data = 1 When send the lower display data = 2
D14	4
D15	Start Word

RS232 FORMAT : 9600, N, 8, 1

7. BATTERY REPLACEMENT

- 1) When the left corner of LCD display show " ", is necessary to replace the battery. However, in-spec. measurement may still be made for several hours after low battery indicator appears.
- 2) Slide the " Battery Cover " (3-10, Fig. 1) away from the instrument and remove the battery.
- 3) Replace with 9V battery (Alkaline or Heavy duty type) and reinstate the cover.
- 4) Make sure the battery cover is secured after changing the battery.