Spectral Illuminance Meter

Code: 86330

User Manual V1.06

Please read this manual carefully before using and reserve it for reference.

I. Product introduction

Illuminance Meter is a versatile instrument designed with a spectral sensor. It is suitable for measuring illuminance, UV index, flicker frequency, standard deviation of color matching (CDCM), color rendering index (CRI), correlated color temperature (CCT), temperature, and humidity in various scenarios such as lamps and lanterns lighting, outdoor lighting, greenhouse lighting, and stage lighting. This instrument can also display the spectral curve, which can identify the type of lighting fixture and assess blue light hazards.

Standards for the product

JJG 245-2005 Verification Regulation of Illuminance Meter

GB 50034-2013 Standard for lighting design of buildings

GB 40070-2021 Hygienic requirements of study products for myopia prevention and control in children and adolescents

GB/T 5702-2019 Method for measuring the color rendering properties of light sources

GB/T 9473-2017 Performance requirements for table lamps for paper task

GB/T 18204.21-2000 Standard examination methods for public places

GB/T 20145-2006 Photobiological safety of lamps and lamp systems

GB/T 21005-2007 UV erythema reference action spectrum,standard erythema dose and UV index

QX/T 87-2008 UV index forecast

GBZ 39942-2021 Application of GB/T 20145 for the assessment of blue light hazard to light sources and luminaires

IEEE Std 1789-2015 “IEEE Recommended Practices for Modulating Current in High-Brightness LEDs for Mitigating Health Risks to Viewers”

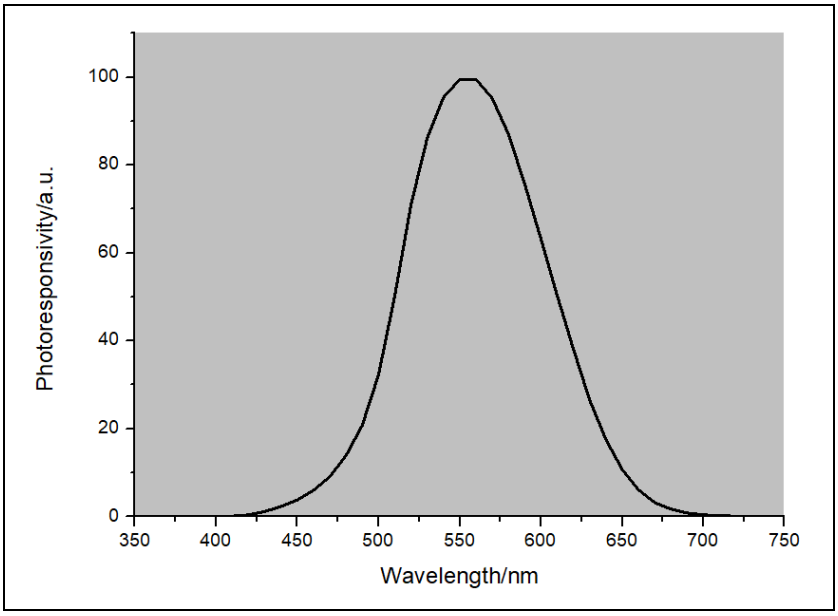
II. Technical Parameters

1. Illuminance Wavelength Range: 400nm ~ 700nm
2. Illuminance Wavelength Interval: 10nm
3. Illuminance Measurement Range: 0 ~ 1000000 Lux
4. Illuminance Resolution: 0.1 Lux
5. Illuminance Measurement Accuracy: ≤±(3%H + 2 Lux) (H is the standard value, calibrated with the CIE standard illuminant A)
6. Illuminance Unit Options: Lux (default), FC

7. CCT Measurement Range: 1000 ~ 100000K
8. CCT Measurement Accuracy: ±5% (Calibrated with the CIE standard illuminant A)
9. CRI Measurement Range: 0 ~ 100
10. CRI Measurement Accuracy: ±2 (Calibrated with the CIE standard illuminant A)
11. UV Index Measurement Range: 0.0 ~ 15.0
12. UV Index Measurement Accuracy: ±0.5
13. Flicker Frequency Measurement Range: 10 ~ 500 Hz
14. Flicker Frequency Measurement Accuracy: ±5%
15. Temperature Measurement Range: -20℃ ~ 80℃
16. Temperature Measurement Accuracy: ±0.5℃
17. Humidity Measurement Range: 0%RH ~ 90%RH
18. Humidity Measurement Accuracy: ±4%RH
19. Response Time: <0.7 seconds
20. Test Aperture Diameter: Φ21mm
21. Size: Length 187.1mm * Width 72mm * Height 29.5mm
22. Weight: About 199g (including batteries)
23. Display: 240*160 Dot Matrix LCD
24. Power Supply: 2 AA Alkaline Batteries
25. Operating Environment: Temperature 0 ~ 40℃, Humidity <85%RH
26. Supply Voltage：DC3V
27. Operating Current：20mA
28. Operating Power Consumption：60mW

III. Spectral response curve

Adopting the spectral sensor design, the illuminance value is obtained by integral of the V(λ) function with the measured spectrum, ensuring that the spectral response curve of the instrument is in perfect agreement with V(λ).



IV. Product features

1. It is designed with a spectral sensor with spectral response identical to the V(λ) function, providing accurate measurement for different colors of light.
2. Ultra-large measurement range up to 1,000,000 Lux, suitable for various illuminance measurements.
3. It can measure flicker frequency to evaluate whether the flicker of the lighting meets requirements.
4. It can measure color rendering index (CRI) to assess the lighting ability to reproduce colors.
5. It can measure correlated color temperature (CCT) to determine if the lighting color temperature meets requirements.
6. The spectral curve can identify if the lighting is full-spectrum LED and its blue light protection.
7. The instrument also can measure UV index, temperature, and humidity measurement for environmental parameters.
8. Rich statistical functions display real-time, maximum, minimum, and average illuminance values simultaneously.
9. Auto shutdown can be set to prevent battery drain when not in use.
10. Utilize advanced digital probe technology, where digital signal processing is performed directly, reducing interference and providing excellent measurement accuracy.

V. Operations

1. Power on/off

- **Power on**: Press to power on the instrument. After powering on, the instrument displays the information of the version number, serial number and enters into the measurement interface:

- **Power off:** Long press the button to power off; or the instrument will automatically power off when "Auto Off" set to ON.

2. Parameter settings mode

In the off state, long press the button 3s to enter the system setting mode. In the setting mode, there are six sub-options, the can select Language, Unit, AutoOff, OffTime, Factory Settings and Exit. Short press to confirm selection.

A. Language

Short press or to enter the language selection, button to select the language, short press , and the setting is completed.

B. Unit

Short press or to enter unit selection, button to select unit, short press , and setting is finished.

C. AutoOff:

Short press the or to enter auto power off selection, button to select [Yes/No] auto power off, short press , then the setting is completed.

D. OffTime

Short press or to select the shutdown time, to extend or shorten the shutdown time (long press to fast change the duration; may be set between 1-255 minutes), then short press to finish the setting.

E. Factory Settings

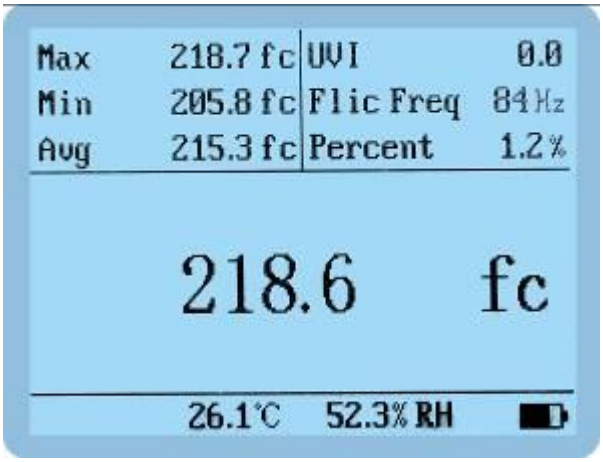
Short press to enter the restore factory selection interface, to switch the [Yes/No] option, short press to confirm the option and return to the setting interface.

F. Exit

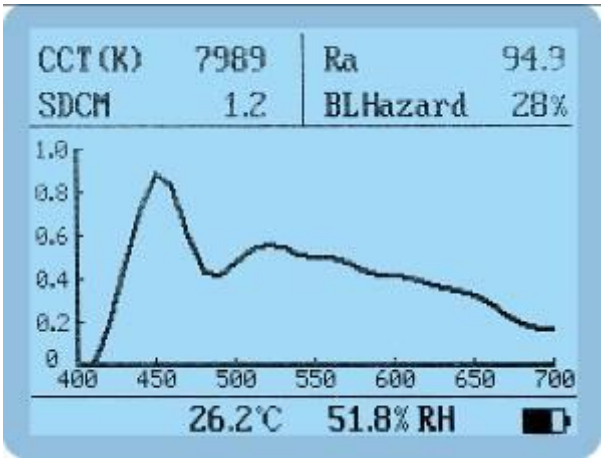
Press Enter briefly to exit the main menu and access the measuring interface.

3. Measurement mode

- After powering on the instrument, it enter the measurement interface. The system displays the real-time illuminance value, maximum value, minimum value, average value, UV index, flicker frequency, percent flicker, temperature and humidity.



- In the measurement mode, if the backlight is off, press the button to light the backlight; if the backlight is already lit, short press the button, the interface switches to the spectral curve interface, which displays the spectral curve, correlated color temperature (CCT), color rendering index (CRI), standard deviation of color matching (SDCM), and blue light hazard ratio.



- In the measurement mode, if the backlight is off, short press the button to light the backlight; if the backlight is already lit, short press the button, and the “HOLD” icon will be displayed in the lower left corner of the interface. All data will be holding on the LCD, and the current data will be recorded.
- In the “HOLD” state, if the backlight is off, press the button to light the backlight; if the backlight is already lit, short press the button to cancel the HOLD state and start a new measurement.
- In the measurement mode, if the backlight is off, short press the button to light the backlight; if the backlight is already lit, press the button to clear up the current data and start a new measurement.
- In the measurement mode, short press or to enter the Record data query mode

4. Record data query mode

- Short press or , enter the record data query mode. The instrument will display the latest recorded data No.1 (up to 9 recorded data are stored in the instrument, and the oldest recorded data will be deleted automatically when exceed 9 recorded data).
- Short press or to scroll up or down a recorded data.
- Short press to display data deletion prompt interface, short press to select [Yes/No], then short press to confirm.

- Short press the  button to enter the measurement mode.

VI. Measurement and precautions

1. When not in use, please long press the  button to power off.
2. Avoid contacting with corrosive materials and keep away from high humidity.
3. Cover the probe with the dust cap after shutting down to avoid contamination of photosensitive part of the probe.
4. The recommended period of calibration is one year.
5. When not in use for a long time, be sure to store the instrument in a low humidity environment.
6. When the instrument displays Low Battery, please replace the battery.

VII. Measurement Parameters and China National Standard Explanation

1. *GBT 21005-2007 UV erythema reference action spectrum,standard erythema dose and UV index*, P7, A.3.

   The UV Index (UVI) is a quantitative indicator of the level of erythemal effective irradiance of solar UV radiation at the earth's surface. The following table shows the protective measures to be taken for different exposure levels:

UVI	Exposure level	Protection should be taken
≤2	Low	No protection needed.
3~5	Middle	When outside, protection needed. Such as applying sunscreen, wearing long-sleeved clothing, wide-brimmed hats, sunglasses, using parasols, or staying in shade.
6,7	High	
8~10	Very high	Minimize outside activities, extra protection needed. Such as applying sunscreen, wearing long-sleeved clothing, wide-brimmed hats, sunglasses, using parasols, or staying in shade.
≥11	Extreme	

2. *IEEE Std 1789-2015*, P12, 4.1, *GBT 9473-2017 Performance requirements for table lamps for paper task*, P2, 3.6, P4, 5.5.2.

   Percent flicker, also known as flicker percentage or modulation depth, is the ratio of the difference between the maximum and minimum values of light output over one cycle to the sum of the maximum and minimum values of light output. The definition of flicker-free LED desk lamps is as follows:

Flicker Frequency/Hz	f≤10	10＜f≤90	90＜f≤3125	f＞3125
Flicker Percentage Limits/%	0.1	f*0.01	f*0.08/2.5	No Limits

Flicker frequency refers to the number of cycles a light source goes through from bright to dim and back to bright within a certain period.

The domestic mains frequency is 50 Hz, corresponding to a flicker frequency of 100Hz. The flicker-free limit is calculated as 100 * 0.08 / 2.5 = 3.2%. If the flicker percentage is below this limit, the flicker frequency is displayed as "No flicker".

3. *GB 50034-2013 Standard for lighting design of buildings,* P5、6.

   Colour Rendering Index (Ra): The colour rendering index(CRI) is a measure of the colour rendering of a light source, which indicates the extent to which the colour of the object under the light source being measured and the colour of the object under the reference standard light source are in accordance with each other.The general CRI, commonly referred to as Ra, is the average value of the CRI of the first 1 to 8 standard color samples specified by the International Commission on Illumination (CIE).

   Correlated Color Temperature (CCT): If the chromaticity of a light source does not lie on the blackbody trajectory but is closest to the chromaticity of a blackbody at a particular temperature, then the absolute temperature of that blackbody is the correlated color temperature of the light source, abbreviated as CCT.

   Standard Deviation of Color Matching (SDCM): This represents the deviation of each light source from the rated chromaticity within a batch of light sources, expressed in terms of the standard deviation of color matching (SDCM).

4. *GBZ 39942-2021 Application of GB/T 20145 for the assessment of blue light hazard to light sources and luminaires*, P1, 3.2.

   Blue Light Hazard Efficiency of Radiation: The ratio of blue light hazard to the corresponding radiation amount. The larger the ratio, the greater the proportion of blue light.

5. *GB 40070-2021 Hygienic requirements of study products for myopia prevention and control in children and adolescents*, P5, 10.

   Hygienic requirements for lighting fixtures in ordinary classrooms: The correlated color temperature (CCT) should be no less than 3300K and no more than 5300K. The general color rendering index (Ra) should be no less than 80.

6. *GBT 9473-2017 Performance requirements for table lamps for paper task*, P2, 3.6, P4, 5.5.2.

   The standard deviation of color matching should not exceed 5, and the general color rendering index (Ra) should not be less than 80. The percent flicker should not exceed the limit corresponding to the "no significant impact" level.

VIII. Packing list

No.	Description	Quantity	Unit
1	Spectral Illuminance Meter	1	pcs
2	AA Battery	2	pcs
3	User Manual	1	pcs
4	Calibration Report	1	pcs
5	Certificate/Warranty Card	1	pcs

IX. Service

1. The meter has one-year warranty. If the instrument works abnormally, please send the whole instrument to our company for maintenance
2. Provide users with spare parts and lifelong maintenance services
3. Provide the users with the meter calibration service
4. Free technical support for long term