# Spectral Illuminance Meter

Code: 86335
User Manual V1.06

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

# I. Product introduction

The split-type multifunctional spectral illuminance meter features a 3.5-inch IPS color screen with a capacitive touch panel for an intuitive user experience. It uses a spectral sensor to measure illuminance, UV index, correlated color temperature (CCT), flicker frequency and depth, color rendering index (CRI), color tolerance, temperature, humidity, and blue light hazard ratio. The spectral curve display helps identify light source types and assess blue light risk. Suitable for indoor, outdoor, greenhouse, and stage lighting.

The instrument also has a plant illumination mode, which is specially designed for plant growth environments. It can accurately measure photosynthetic photon flux density (PPFD), PPFD (Blue), PPFD (Green), PPFD (Red), Yield Photon Flux Density (YPFD), chlorophyll-a, and chlorophyll-b, helping users understand and optimize light management during the planting process and improve plant growth efficiency. It is suitable for home gardening, plant factories, greenhouses, agricultural research, plant lighting, and other fields.

**Standards for the product**

*JJG 245-2005 Verification Regulation of Illuminance Meter*

*GB/T 50034-2024 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 9473-2022 Performance Requirements for Reading and Writing Desk Lamps*

*GB/T 18204.1-2025 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*

*GBZ 44064-2024 Technical report on LED artificial lighting environment for plant growth*

*GB/T 44941-2024 Terminology for horticulture lighting*

*GB/T 44473-2024 LED lamps, LED luminaires and LED modules for horticulture*

*Lighting-Performance specifications*

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

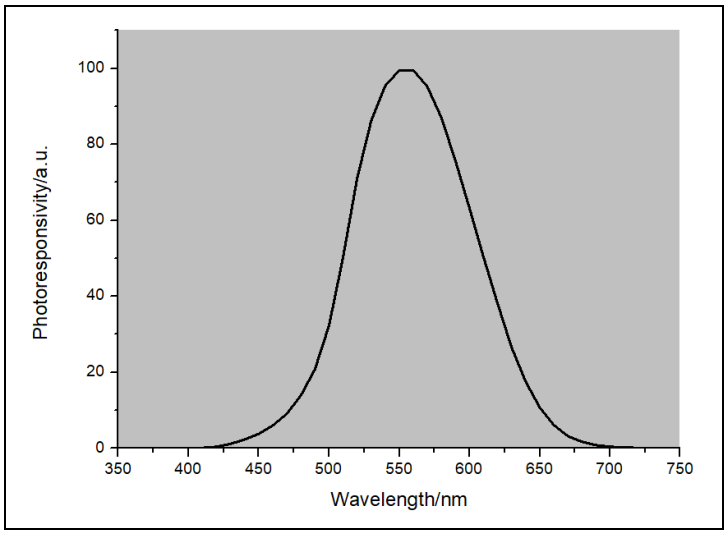
## II. Technical Parameters

| | |
|---|---|
| Illuminance Wavelength Range | 400nm ~ 700nm |
| Illuminance Wavelength Interval | 10nm |
| Illuminance Measurement Range | 0 ~ 1000000 Lux |
| Illuminance Resolution | 0.1 Lux |
| Illuminance Measurement Accuracy | ≤±(4%H + 2 Lux) (H is the standard value, calibrated with the CIE standard illuminant A ) |
| Illuminance Unit Options | Lux (default), FC |
| CCT Measurement Range | 1000 ~ 100000K |
| CCT Measurement Accuracy | ±5% (Calibrated with the CIE standard illuminant A) |
| CRI Measurement Range | 0 ~ 100 |
| CRI Measurement Accuracy | ±2 (Calibrated with the CIE standard illuminant A) |
| UV Index Measurement Range | 0.0 ~ 15.0 |
| UV Index Measurement Accuracy | ±10% |
| Flicker Frequency Measurement Range | 10 ~ 500 Hz |
| Flicker Frequency Measurement Accuracy | ±5% |
| Temperature Measurement Range | -40℃ ~ 120℃ |
| Temperature Measurement Accuracy | ±0.5℃ |
| Humidity Measurement Range | 0%RH ~100%RH |
| Humidity Measurement Accuracy | ±4%RH |
| PPFD measurement range | 0 – 10000 μmol/m²/s |
| PPFD measurement accuracy | ≤±(5%H+0.5 μmol/m²/s) |
| PPFD (Blue) measurement range | 0 – 5000 μmol/m²/s |
| PPFD (Blue) measurement accuracy | ≤±(10%H+0.5 μmol/m²/s) |
| PPFD (Green) measurement range | 0 – 5000 μmol/m²/s |
| PPFD (Green) measurement accuracy | ≤±(10%H+0.5 μmol /m²/s) |
| PPFD (Red) measurement range | 0 – 5000 μmol/m²/s |
| PPFD (Red) measurement accuracy | ≤±(10%H+0.5 μmol /m²/s) |

| | |
|---|---|
| YPFD measurement range | 0 – 10000 μmol/m²/s |
| YPFD measurement accuracy | ≤±(5%H+0.5 μmol /m²/s) |
| Chlorophyll-a measurement range | 0 – 10000μW/cm² |
| Chlorophyll-a measurement accuracy | ≤±(10%H+0.5μW/cm²) |
| Chlorophyll-b measurement range | 0 – 10000μW/cm² |
| Chlorophyll-b measurement accuracy | ≤±(10%H+0.5μW/cm²) |
| Response Time | <0.7 seconds |
| Test Aperture Diameter | Φ21mm |
| Size | 141mm*70.4mm*22mm (Probe: 40mm diameter*20mm thickness) |
| Weight | About 277g |
| Display | 480*320 Dot Matrix IPS color screen |
| Supply Voltage | Rechargeable lithium battery 3.7V@4000mAh |
| Recorded Data | 1000 records |
| Operating Environment | Temperature 0 ~ 40℃, Humidity <85%RH |
| Supply Voltage | DC5V |
| Operating Current | 133mA |
| Operating Power Consumption | 665mW |

## 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).

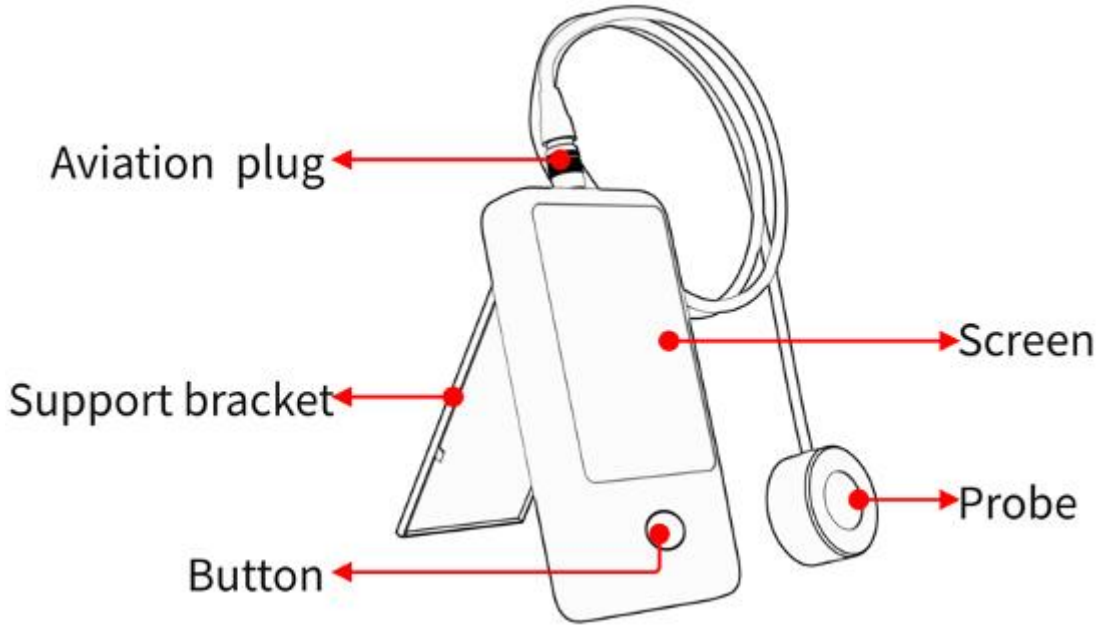



## IV. Product features

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. The instrument has a plant illumination measurement mode, which is used to manage the lighting environment of plants and can greatly improve the quality and yield of various plants.
10. Auto shutdown can be set to prevent battery drain when not in use.
11. Features a split-type design with advanced digital probe technology. Signal processing is performed directly within the probe, minimizing interference and ensuring excellent measurement accuracy.

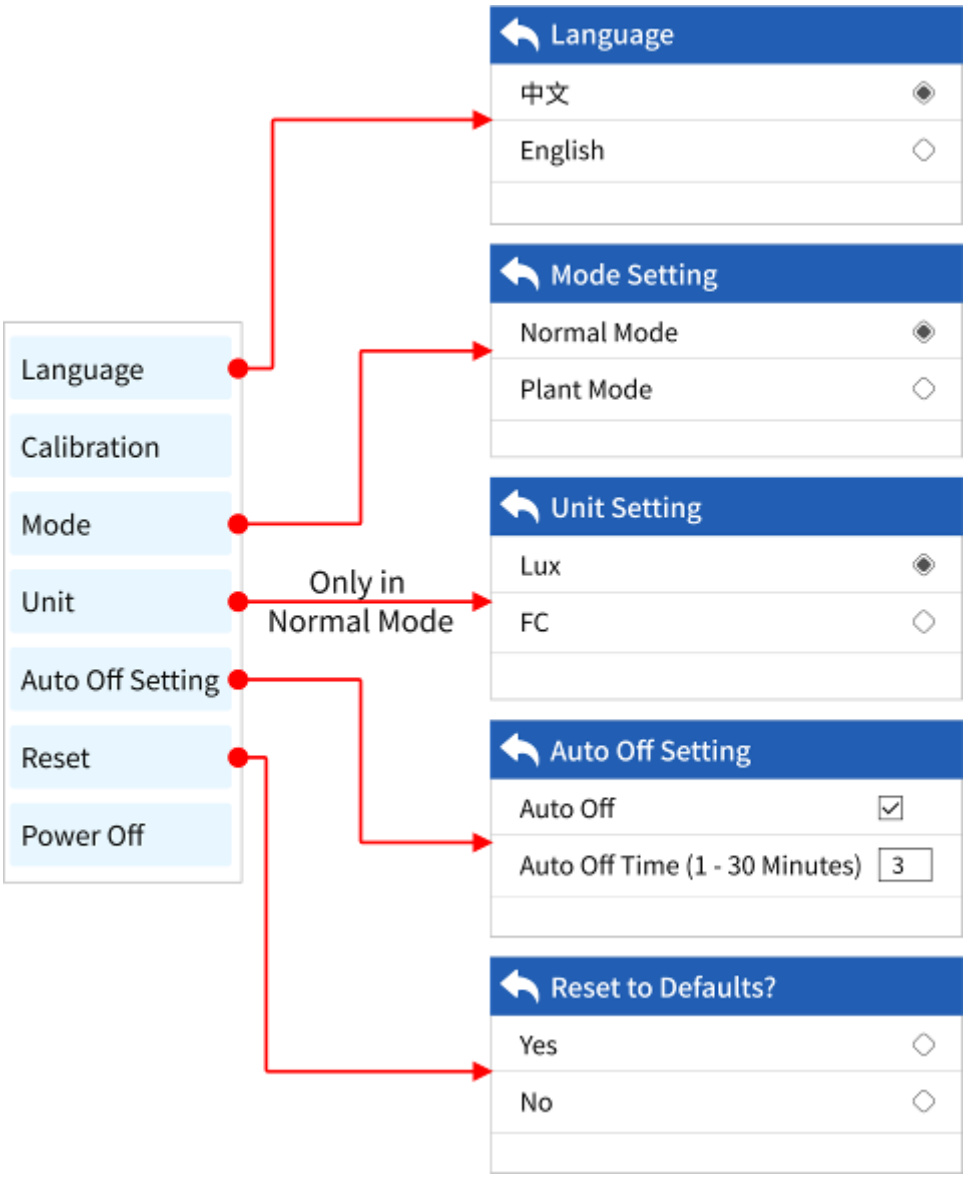
# V. Operations

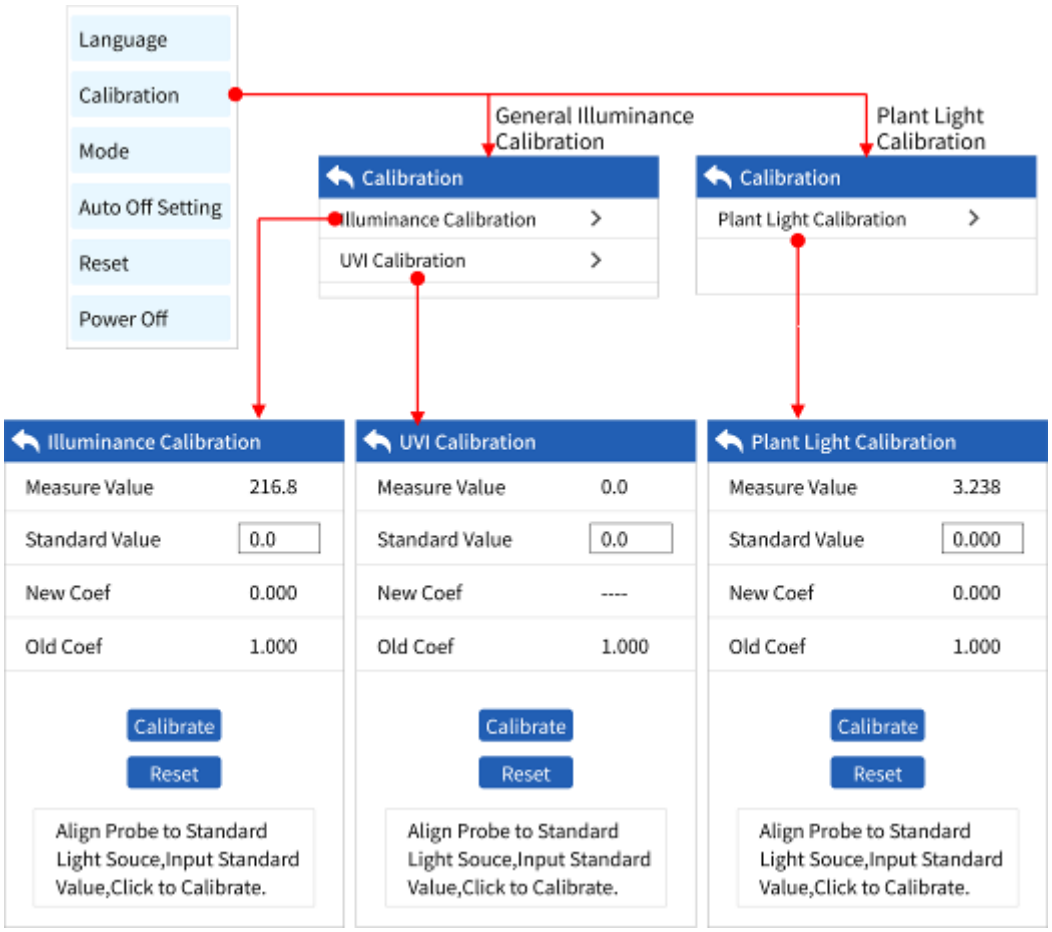
## 1. Instrument Structure




## 2. Parameter settings

In the measurement interface, tap the  icon in the upper left corner to open the menu. The following options are available: Language, Mode, Unit (only available in Normal Mode), Auto Off Setting, Reset, and Power Off.


Language
Calibration
Mode
Unit
Auto Off Setting
Reset
Power Off
Only in
Normal Mode
Language
中文
English
Mode Setting
Normal Mode
Plant Mode
Unit Setting
Lux
FC
Auto Off Setting
Auto Off
Auto Off Time (1 - 30 Minutes)
3
Reset to Defaults?
Yes
No



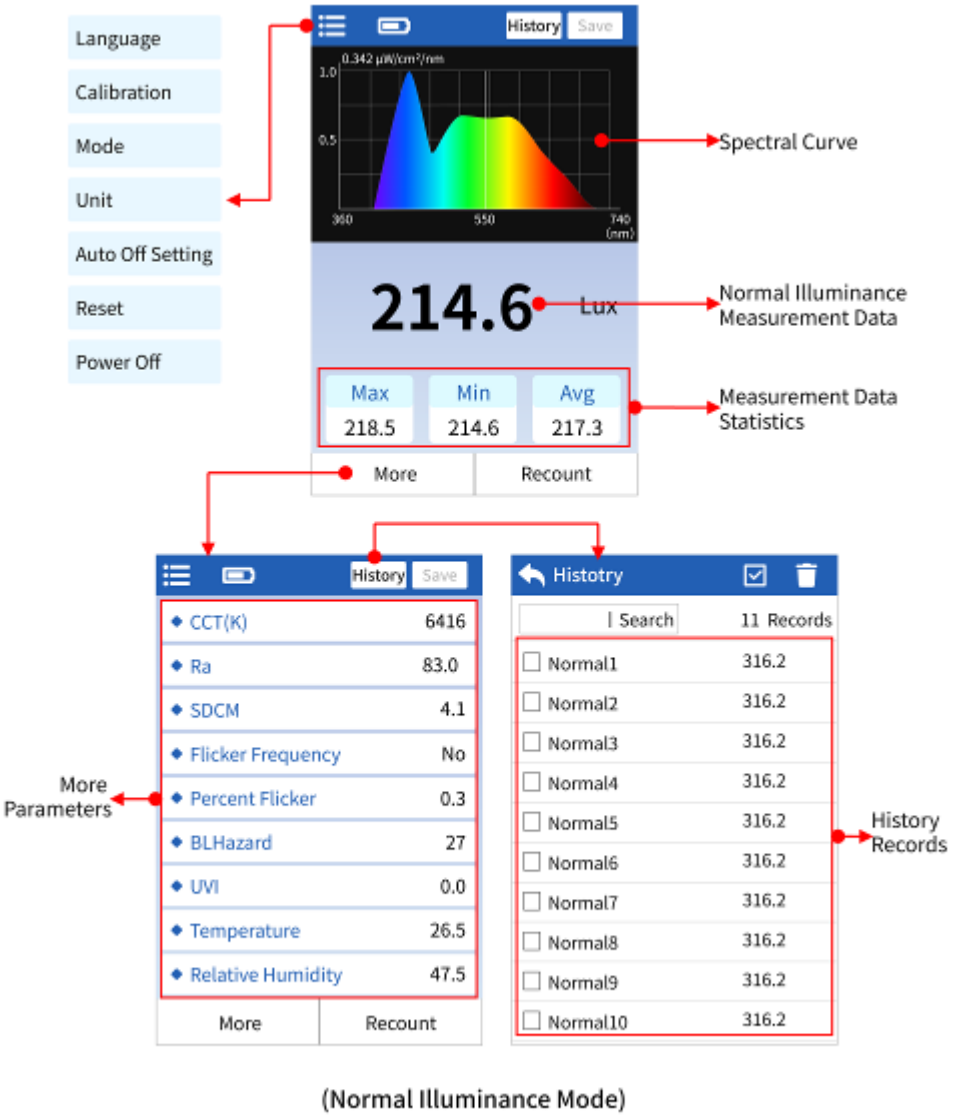

Note: The calibration function is restricted to use by metrology institutes only and is prohibited for use by non-professionals.

## 3. Measurement

In the measurement interface, the measurement modes are displayed across two pages. You can switch between them by tapping the button in the lower left corner of the screen, which indicates the current page.

### Normal illumination mode:

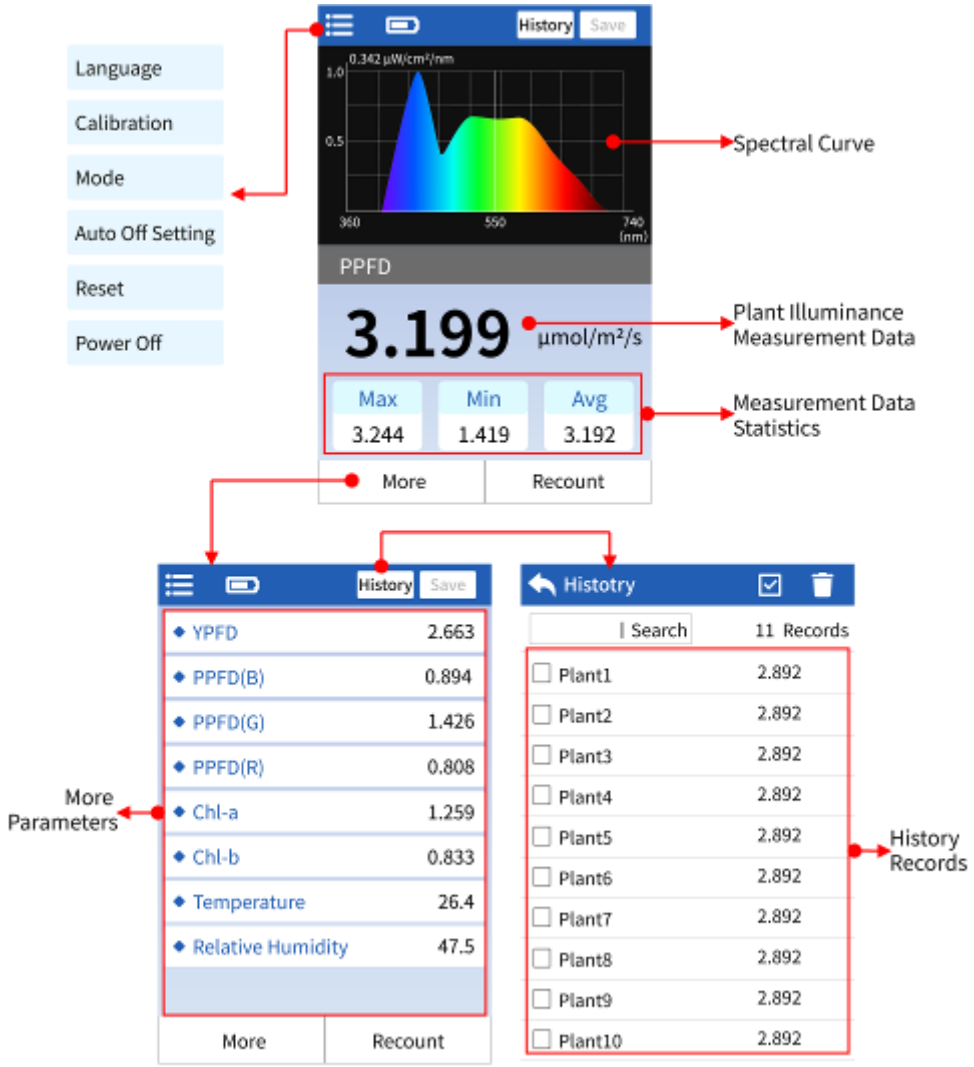
After powering on, the instrument enters the parameter interface of the measurement mode. Page 1 displays the spectral graph, real-time illuminance, maximum, minimum, and average values. Page 2 displays the UV index, color temperature, flicker frequency, flicker depth, color rendering index (CRI), color tolerance, temperature, humidity, and blue light hazard ratio.




(Normal Illuminance Mode)

## Plant Lighting Mode:

Page 1 displays the spectral graph, real-time PPFD, maximum, minimum, and average values. Page 2 displays YPFD, PPFD (blue), PPFD (green), PPFD (red), chlorophyll A, chlorophyll B, temperature, and humidity.

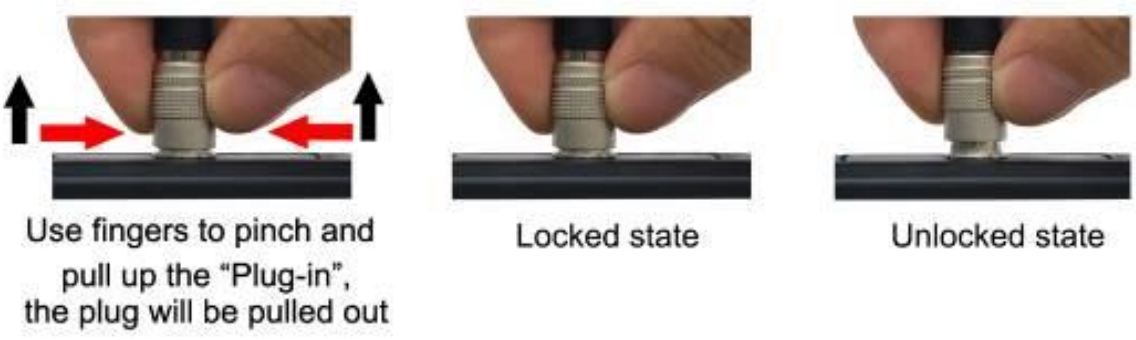



(Plant Illuminance Mode)

- In measurement mode, short press the front button to display the "HOLD" indicator at the top of the screen. While in "HOLD" status, short press the front button again to cancel the HOLD function and start a new measurement.
- In measurement mode, press the “Recount” button at the lower right of the screen to clear the current data and start a new measurement.
- In HOLD mode, the save button is available

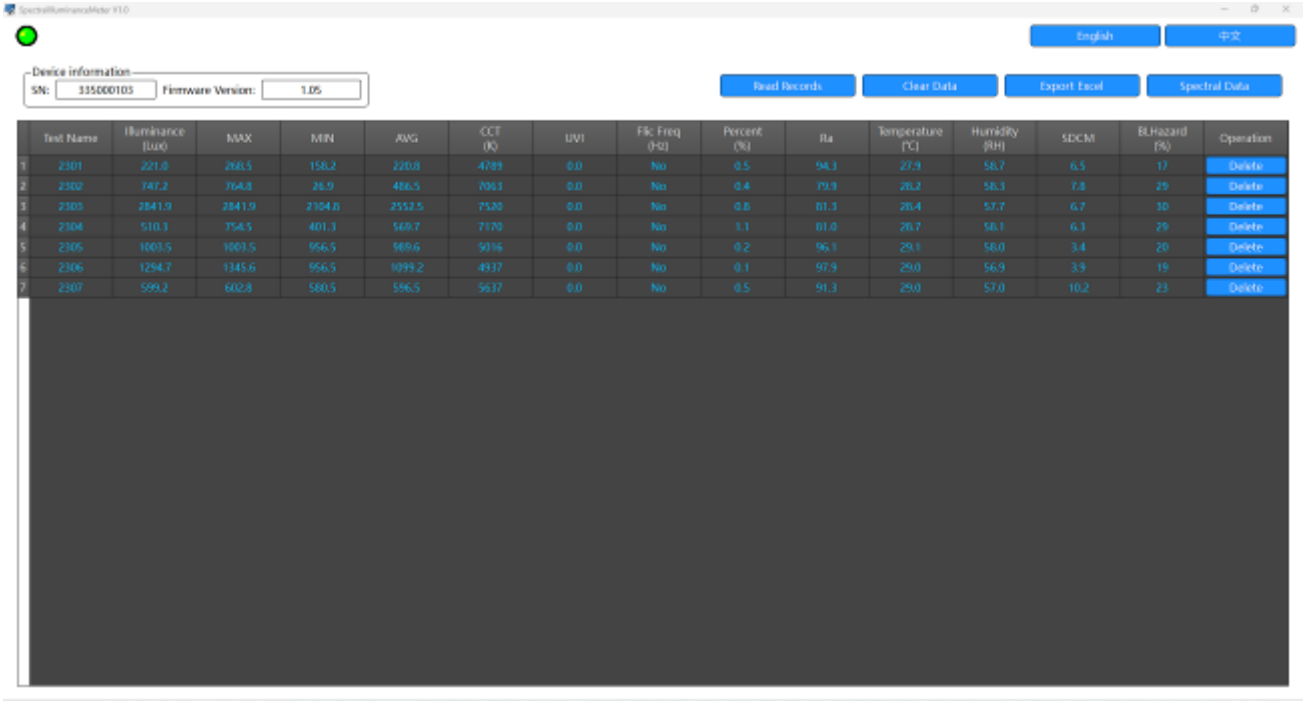
## 4. Aviation plug connection

When plugging out the probe, make sure not to violently rotate and pull the connector, but plug out the plug by the way as shown in the following diagram.




### 5. PC Software

Connect the device to a computer via USB to use the dedicated PC software for illuminance and luminance meters.The software supports reading measurement records, viewing spectral data, exporting data to Excel, and other functions.




## VI. Measurement and precautions

1. When not in use, please long press the front button or select “Power Off” from the menu.
2. Avoid contacting with corrosive materials and keep away from high humidity.
3. The recommended period of calibration is one year.
4. When not in use for a long time, be sure to store the instrument in a low humidity environment.
5. When the instrument displays Low Battery, please replace the battery.
6. If the instrument is not used for more than six months, it should be charged periodically to prevent battery damage caused by over-discharge.

# 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.

   **Color Rendering Index (Ra):** The color rendering index (CRI) is a measure of the color rendering of a light source, which indicates the extent to which the color of the object under the light source being measured and the color 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.

7. *GBZ 44064-2024 Technical report on LED artificial lighting environment for plant growth, P2, 5.3.*

   PPFD (Photosynthetic Photon Flux Density) refers to the number of photons of photosynthetic active radiation (PAR, wavelength 400nm~700nm) directly related to photosynthesis, and is currently an internationally common physical quantity in the field of light environment regulation for plant growth.

   **PPFD blue (400-500nm):** blue light has a regulatory effect on the development of plant roots, stems, leaves, and biomass accumulation.

   **PPFD green (500-600nm):** green light has high transmittance and can penetrate deeper into leaf tissue. For fruit and vegetable crops with larger canopies, appropriately increasing the proportion of green light can help promote photosynthesis of leaves in the middle and lower parts of the canopy.

   **PPFD red (600-700nm):** red light effectively drives photosynthesis, provides energy for plant growth, regulates plant endogenous metabolism and plant growth and development, promotes flowering and fruiting of plants, and improves fruit yield and quality.

   **YPFD (Yield Photon Flux Density):** the total effective radiation calculated by weighting the photosynthetic efficiency of photons of different wavelengths, is calculated by weighting PPFD by

wavelength efficiency to obtain YPFD, which reflects the comprehensive impact of light quality on plant growth. Through systematic measurement of the quantum efficiency (photosynthetic response) of plants to light of different wavelengths, it is found that the efficiency of red light (600-700 nm) and blue light (400-500 nm) is significantly higher than that of green light (500-600 nm).

**Chlorophyll-a, chlorophyll-b:** the effective radiation calculated by weighting the absorption spectra of chlorophyll-a and chlorophyll-b according to the light intensity of different wavelengths.

## VIII. Packing list

| No. | Description | Quantity | Unit |
|---|---|---|---|
| 1 | Spectral Illuminance Meter | 1 | pcs |
| 2 | User Manual | 1 | pcs |
| 3 | Calibration Report | 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