# Chroma Meter

Colour · Illuminance · Colour Temperature

USER MANUAL
Model CLM-200H




V1.0

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# 1 Product Overview

## 1.1 Front Side

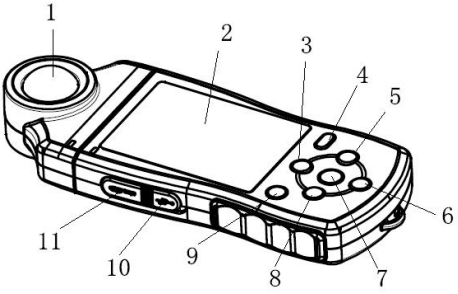



Fig. 1 Front panel

| | | |
|---|---|---|
| **1** | **Measuring lens** | |
| **2** | **Display screen** | |
| **3** | **UP key** | Move up |
| **4** | **MAX key** | Maximum value |
| **5** | **OK key** | Confirm |
| **6** | **DOWN key** | Move down |
| **7** | **MENU key** | Moves to the main measurement screen from other screens and submenus |
| **8** | **BACK key** | Moves back one level in the menu structure |
| **9** | **POWER key** | Power |
| **10** | **USB MICRO interface** | Connected with the power adapter for charging, or with a computer for data transmission |
| **11** | **SD slot** | Install the SD card into this slot |

## 1.2 Reverse Side

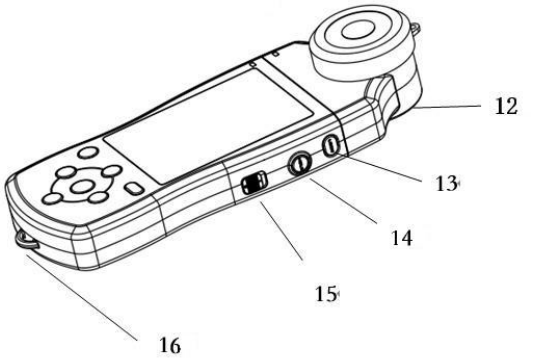



Fig. 2 Rear panel

| | |
|---|---|
| **12 Tripod jack** | |
| **13 Measuring lens uninstall button** | For manufacturer maintenance only. It is strictly prohibited to disassemble it privately under any circumstances, to avoid irreversible damage. |
| **14 HOLD key** | Press the key and the device pauses and saves the latest data; "hold" appears in the upper left corner of the screen. Press it again and the device resumes working. |
| **15 Battery switch** | |
| **16 Wrist strap hook** | |

# 2 Basic Operation

## 2.1 Starting Page

Press the POWER key for 1-2 seconds; after the beep the device starts up and shows the starting page. After the starting process the measuring page is displayed directly, as shown below.

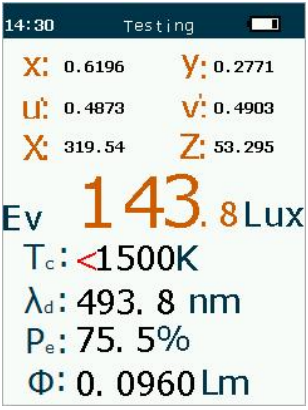



Fig. 3 Measuring page after start-up

Press MENU to jump to the home page and use the other keys to set up the device for measuring.

## 2.2 Home Page

The home page gives access to the six main entries of the device: Test, Calibrate, Sys-Set, Test-Set, SD Card and Instruct.




Fig. 4 Home page

## 2.3 System Settings

Enter the system settings. The factory date has been set to Beijing Time. Power management and language are set to default; users can change them if necessary.




Fig. 5 System settings

### 2.3.1 Time Setting

Time setting can be accurate to seconds and has already been set to Beijing Time. There is no need to change it unless necessary.

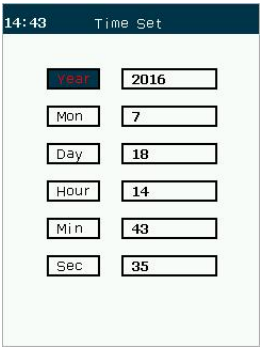



Fig. 6 Time setting

### 2.3.2 Power Management

The functions include screen backlight time setting, auto power-off time setting and backlight brightness adjustment.

The LCD backlight time is set to 30 seconds by default and auto power-off is set to 30 minutes. Backlight brightness has 3 levels, corresponding to dark, medium and bright. It is set to the first level by default.

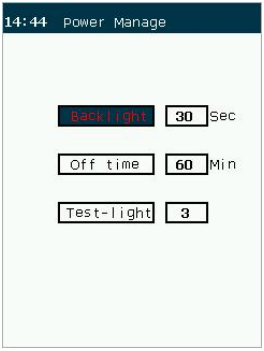



Fig. 7 Power management

### 2.3.3 Language

The device provides two operating languages, Chinese and English. Users can choose as required.




Fig. 8 Language

### 2.3.4 Version

The version number and the identification S/N code can be viewed on this page.




Fig. 9 Version

## 2.4 Test Setup




Fig. 10 Test setup

### 2.4.1 Developer Tools

Developer tools are provided for developers only; the function is not open during normal use of the device. The details are given in 4.3.




Fig. 11 Developer tools

### 2.4.2 Measurement Unit Selection

Two illumination units are provided, lx and fcd.




Fig. 12 Measurement unit selection

### 2.4.3 Integral Time

This menu contains two unit settings. The integral time unit can be set to Evh or Evm, corresponding to integral time in hours or minutes respectively.

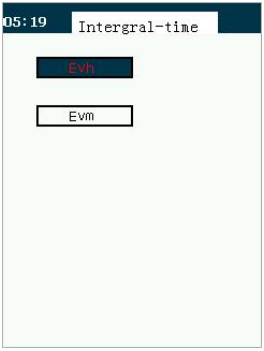



Fig. 13 Integral time

### 2.4.4 Standard Illumination Settings

This function sets a standard illumination value. After entering this screen, press UP/DOWN to enter a number within 0-9. When one position is set, the cursor moves to the next position. After all five positions are set, press UP/DOWN to choose the weight of the digit, or re-enter a standard illumination value.

This function helps field testing: for a known standard range it gives a rapid and accurate check.

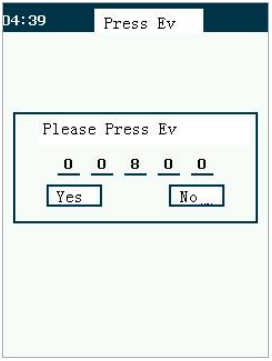



Fig. 14 Standard illumination setting

## 2.5 Parameter Description

Select the parameter description option and press OK to enter the menu below. The definitions of the photometric and colorimetric symbols are provided on this page for reference during operation.

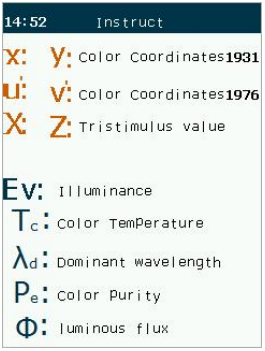



Fig. 15 Parameter description

# 3 Measurement

## 3.1 Measuring Operation

After the start-up setting is finished, point the photosensitive lens directly at the light source to be measured; measurement starts immediately and the data is shown on the display.

The measuring screen shows all real-time measured values, so the parameters of the measured light source can be read at a glance. There are 6 measuring screens; press UP/DOWN to switch between them. All data are real-time measured values. The measuring screens are arranged as follows.

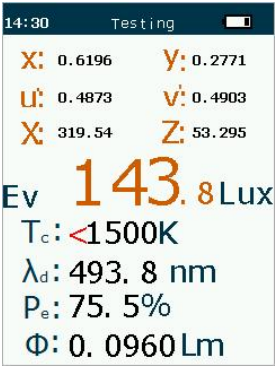



Fig. 16 Measurement screen: all parameters at a glance

Illumination curve and parameters, screen 1:

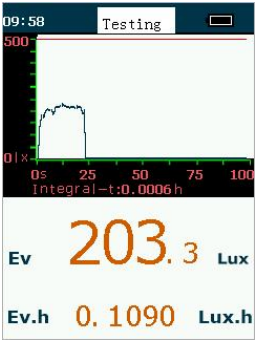



Fig. 17 Illumination curve and parameters, screen 1

- Real-time illumination curve; the red line is the standard illumination value, which can be set according to 2.4.4
- Real-time illumination
- Real-time integral illumination

Illumination curve and parameters, screen 2:

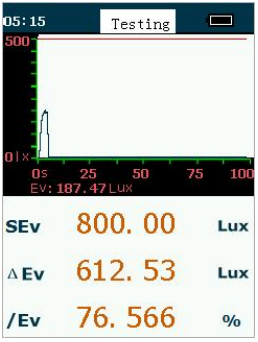



Fig. 18 Illumination curve and parameters, screen 2

- Real-time illumination
- Standard illumination
- Illumination difference value
- Illumination ratio

Chromaticity coordinates, screen 3:

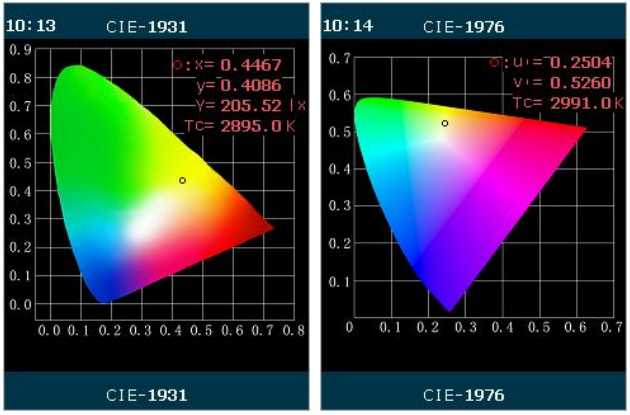



Fig. 19 CIE1931 (left) and CIE1976 (right) real-time chromaticity coordinates

- (x, y) CIE1931 chromaticity coordinates
- Y Illumination value
- Tc Color temperature value
- (u', v') CIE1976 chromaticity coordinates

## 3.2 Operation during Measuring

Press the HOLD key until the word "hold" appears in the upper right corner of the screen; the measuring process then ends and the test data is stored to the SD card automatically.

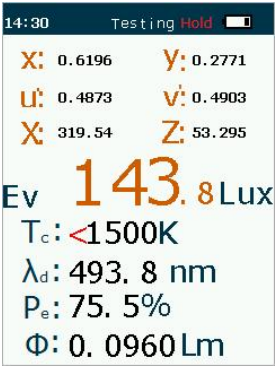



Fig. 20 HOLD during measuring

Press HOLD again and measuring starts again.

When a set of data has been tested, press MENU to jump to the home page and perform other operations. Press MENU again to return to the measuring page.

## 3.3 Color Difference Value and Chromaticity Coordinates

Press OK on the Test icon to enter the testing menu. The color difference value, the chromaticity diagram and the RGB value can be checked here.

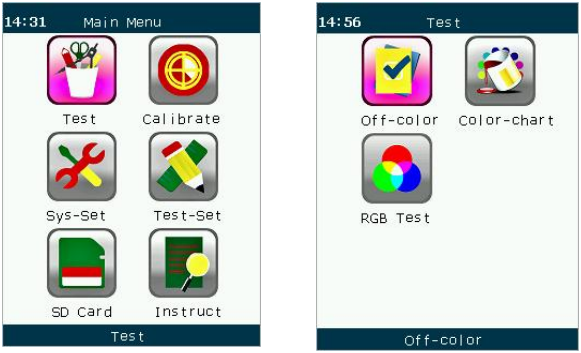



Fig. 21 Main menu (left) and testing menu (right)

The latest color difference values can be read under the color difference value option, including Δ(XYZ), Δ(Evxy), Δ(Evuv), ΔEv, ΔTc and Δuv.

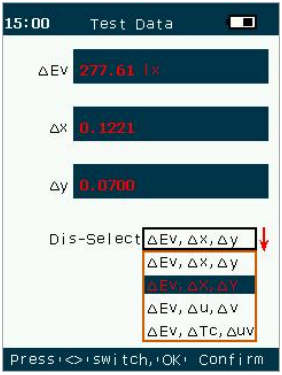



Fig. 22 Color difference values

The chromaticity diagram consists of two coordinate graphs, CIE1931 and CIE1976.

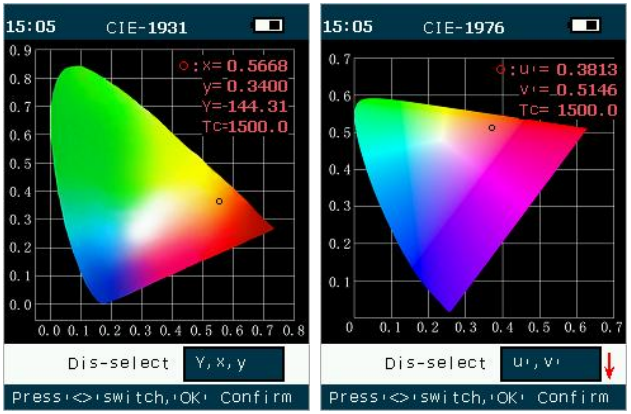



Fig. 23 Chromaticity diagram: CIE1931 (left) and CIE1976 (right)

Select RGB test to view the RGB graph.

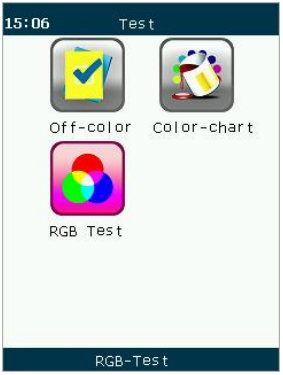



Fig. 24 RGB value

## 3.4 View Data

Enter the home page, select SD store and the latest nine measurement records can be viewed.

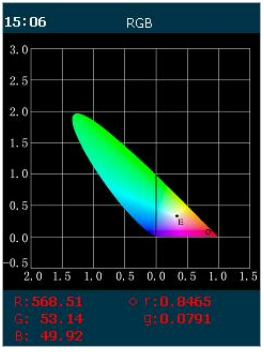



Fig. 25 SD store

Select a record and press OK to open the list of historical data.

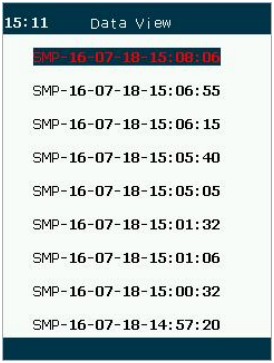



Fig. 26 Historical data list

The data list is sorted by time and the device stores only the latest nine records; new data overwrites the previous data automatically. Select a time and press OK to view that record.

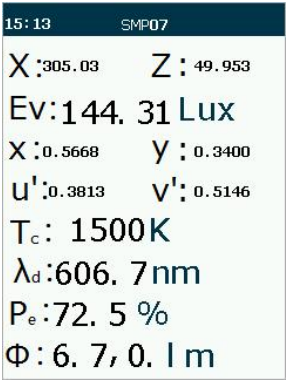



Fig. 27 Viewing a record by time

### 3.5 Maximum Measuring

Press the MAX key, keep the device still and it starts measuring automatically. Every data set is stored in the SD card under the "MAX" measuring condition.




Fig. 28 Starting MAX measuring

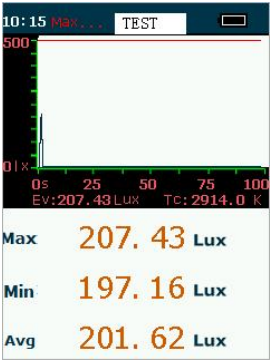



Fig. 29 MAX measuring screen

Under the MAX condition, press HOLD and the device stops measuring and keeps the screen still; the appearing time of the maximum and minimum values is then displayed.




Fig. 30 Maximum / minimum and their appearing time

Press MAX once more to cancel the maximum measuring mode and return to the normal measuring page.

## 3.6 Batch Data Processing

By connecting the device to a computer with the data cable, or by taking out the SD card, batch data processing can be carried out. The device saves a txt file; imported into a PC the file is shown in Excel format, which is convenient for data management.

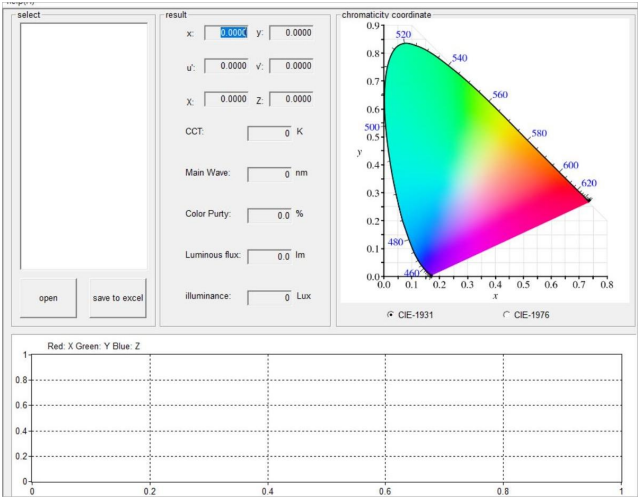



Fig. 31 PC software, start screen

Select the file and click open. Click the data of a certain point in time to view the number of measuring times.

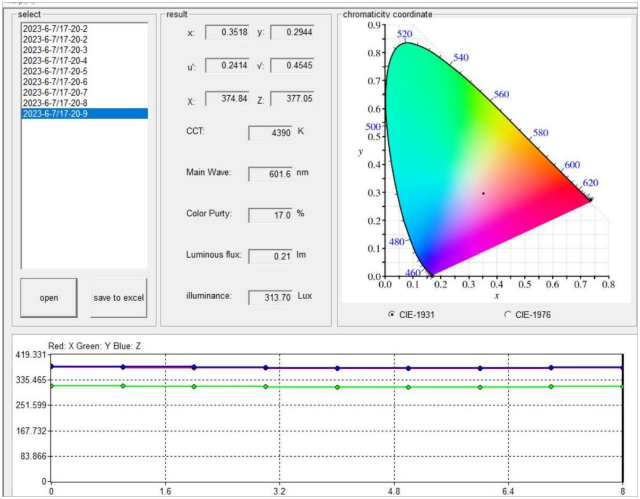



Fig. 32 PC software with a data file loaded

TIP: the software runs under Windows 7 or later.

Select the file and click "save to excel" to export the data from the PC as an Excel file.

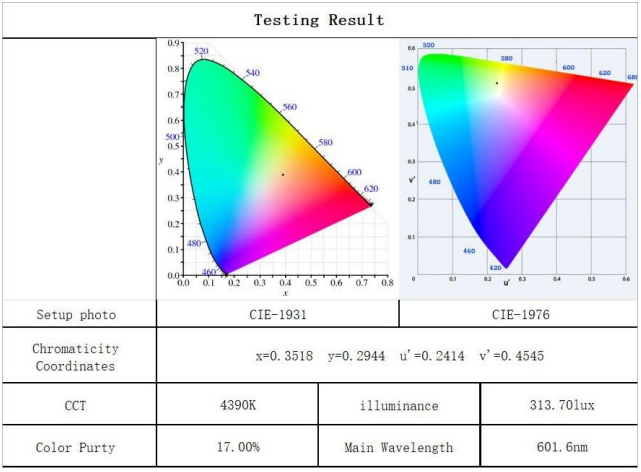



Fig. 33 Exported test report

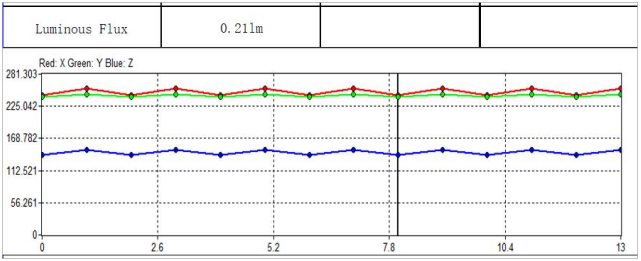
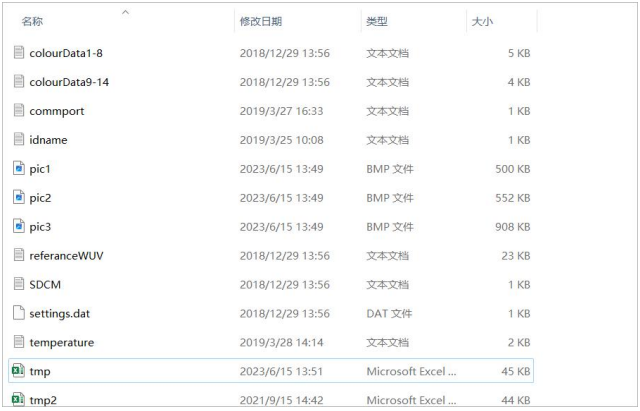



Fig. 34 Exported report: parameter chart

The content of the output file can be modified according to the user's needs. Find the tmp file in the software folder, change the content as required and save it.



| 名称 | 修改日期 | 类型 | 大小 |
|---|---|---|---|
| colourData1-8 | 2018/12/29 13:56 | 文本文档 | 5 KB |
| colourData9-14 | 2018/12/29 13:56 | 文本文档 | 4 KB |
| commport | 2019/3/27 16:33 | 文本文档 | 1 KB |
| idname | 2019/3/25 10:08 | 文本文档 | 1 KB |
| pic1 | 2023/6/15 13:49 | BMP 文件 | 500 KB |
| pic2 | 2023/6/15 13:49 | BMP 文件 | 552 KB |
| pic3 | 2023/6/15 13:49 | BMP 文件 | 908 KB |
| referanceWUV | 2018/12/29 13:56 | 文本文档 | 23 KB |
| SDCM | 2018/12/29 13:56 | 文本文档 | 1 KB |
| settings.dat | 2018/12/29 13:56 | DAT 文件 | 1 KB |
| temperature | 2019/3/28 14:14 | 文本文档 | 2 KB |
| tmp | 2023/6/15 13:51 | Microsoft Excel ... | 45 KB |
| tmp2 | 2021/9/15 14:42 | Microsoft Excel ... | 44 KB |

Fig. 35 Data files in the software folder

| Report of Spectroradiometric Analysis for Light Source | | | |
|---|---|---|---|
| Basic Infomation | | | |
| Sample | Disk Light | | |
| Sample Information | Bin Code:<br>Driver: | Testing Date | 2023/6/19 |
| Tester | | Amblent Temperature | |
| Manufacture | | Amblent Humidity | |
| Testing Result | | | |

Fig. 36 Editable report header

# 4 Attentions and Maintenance

## 4.1 Attentions in Use

- It is a high-precision instrument and must be carried by hand and used carefully.
- Please read this manual thoroughly before using the device for the first time.
- Please switch the device off before removing or installing the measuring lens.
- Protect the measuring lens carefully and keep it clean. Do not wipe it; put the cover on the lens after use.
- Do not press hard on the screen and keep the device away from impact or heavy pressure.
- Use the device at a temperature between -10 °C and 40 °C and a humidity below 85% (at 35 °C).
- The device becomes warm when it is exposed to direct sunlight or surrounded by relatively hot instruments; this is normal. Protect the device carefully in such conditions.
- The apex of the sphere of the measuring lens is used as the reference plane for illumination measurement.
- A strong electromagnetic field may affect the internal microprocessor. Switch off the device and the AC adapter, then power on and restart the device.
- Do not use the device at altitudes above 2000 m.
- If an AC adapter is used, make sure that the power supply specified by the manufacturer is used.
- The instrument is a grade Ⅱ pollution product; do not use it in areas with a high concentration of metal particle dust.

- Put the device into the protective case after use and keep it away from excessive heat, cold and vibration.



Fig. 37 Protective leather case

## 4.2 How to Clean

- Use a dry cloth or a silicon cloth to wipe dust off the lens. Do not use solvents such as thinner or benzene.
- If there is a lot of dust on the lens, wipe it off with a soft dry cloth. If the dust cannot be removed, or the lens has been scratched, contact the after-sales service center nearby immediately.
- If the device is out of order, do not disassemble it or try to repair it yourself; contact the after-sales service personnel immediately.

## 4.3 How to Place

- Do not place the device in an environment of high temperature and humidity.

- Do not place the device behind the rear glass or in the trunk of a car; the temperature rise may deform or damage the instrument.
- If the device is not to be used for 2 weeks or longer, switch the power off completely.
- Do not wrap the device with the cable, otherwise the connector and the root of the cable may be subjected to excessive force and become disconnected.

# 5 Specifications

| | |
|---|---|
| **Model** | CLM-200H |
| **Range** | Illumination: 0.1-200000 lx, 0.01-20000 fcd; color temperature: 1500-25000 K; (5 lx, >0.5 fcd) automatically switches in four gears |
| **Accuracy** | Ev (linear): ±2% of reading; xy: ±0.003 (500 lx, standard light source A) |
| **Repeatability** | Ev: ±2% + 1 digit (2σ); xy: ±0.0005 (500 lx, standard light source A) |
| **Correlative spectral sensitivity** | Consistent with the CIE standard observer curve |
| **Test channel** | Optional multiple channels, adapting to different light sources and applications; optional self-calibration channel |
| **Cosine correction (f2)** | Ev: <3% |

| | |
|---|---|
| **Parameters** | Tristimulus values XYZ; chromaticity values Evxy, Evuv, Ev; illumination Ev, integral illumination, illumination curve and multi-point setting, standard illumination setting; maximum, minimum and average; correlated color temperature Tc; color temperature curve and multi-point setting; standard color temperature setting; chromatic aberration ∆(XYZ), ∆(Evxy), ∆(Evuv), ∆Ev, ∆Tc, ∆uv; chromaticity coordinates CIE1931 (x, y) and CIE1976 (u', v'); dominant wavelength λd; color purity Pe; luminous flux Φ; RGB value; MAX function |
| **Other functions** | Multiple channels, multiple standard samples, large-capacity data storage (more than 1000 records); user calibration; automatic shutdown; auto backlight off |
| **Display interface** | Single screen: Ev, CIE1931 (x, y), CIE1976 (u', v'), Tc, λd, Pe, Φ; multi-screen real-time display: illumination, color temperature curve, CIE1931 and CIE1976 |
| **Language** | Simplified Chinese, English |
| **Interface** | Micro USB 2.0 |
| **Power** | Micro USB data cable for charging; 2200 mAh lithium battery |
| **Operating temperature and humidity** | -10-40 °C, RH <85% (35 °C), no condensation |
| **Storage temperature and humidity** | -10-40 °C, RH <85% (35 °C), no condensation |
| **Dimensions** | 210 × 80 × 35 mm |
| **Weight** | 235 g |
| **Standard accessories** | Dust cover, power adapter, USB data cable, data management software, hand strap, anti-lost lens cover rope, leather bag, baffle |

## Notes

Measurement conditions, calibration dates and service history.