

# CL800 SPECTRAL IRRADIANCE COLORIMETER

## I Product Overview

CL800 spectroradiometer is a portable illuminometer, independently developed by Huicolor Company. The illuminometer uses a high-precision concave grating as a spectroscopic component, which can collect the wavelength 350~800 nm, It outputs 1 nm interval irradiance spectrum, and the  $E_v$  range can reach up to 200,000 lx.

The instrument is equipped with a 2.8-inch TFT capacitive touch screen, 4000mAh Li-ion battery, Bluetooth / WIFI multi-function chip, Mass storage device.

The instrument can not only measure the irradiance spectrum,  $E_v$ , CCT, CRI, white balance, but also measure the parameters of leds for plant growth, UVI index, blue light hazard, display color gamut, uniformity, CQS, TM-30, TLCI-2012, flicker and other parameters.



Figure 1

## II Product Characteristics

1. The instrument utilizes a high-precision concave grating as the spectral element and a 256-pixel CMOS as the detector. With a compact structure, it can measure the radiance spectrum of ambient light and flickering light sources within the wavelength range of 350-800nm, achieving high measurement accuracy, with a wavelength accuracy of 0.2 nm and a spectral output of 1nm.

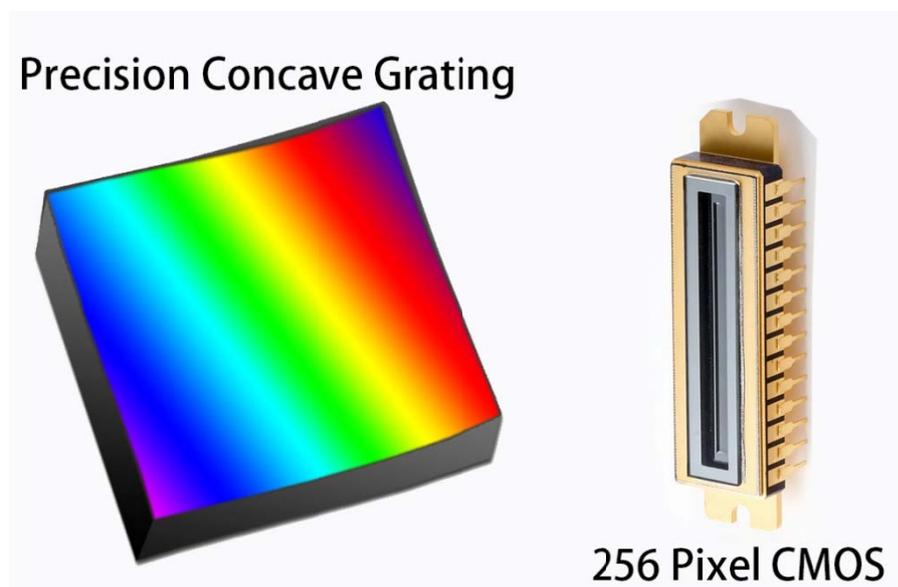


Figure 2

2. The instrument utilizes an industrial-grade MCU processor, equipped with a 2.8-inch TFT capacitive touch screen and up to 10,000 storage spaces. It features simple operation and stable performance.

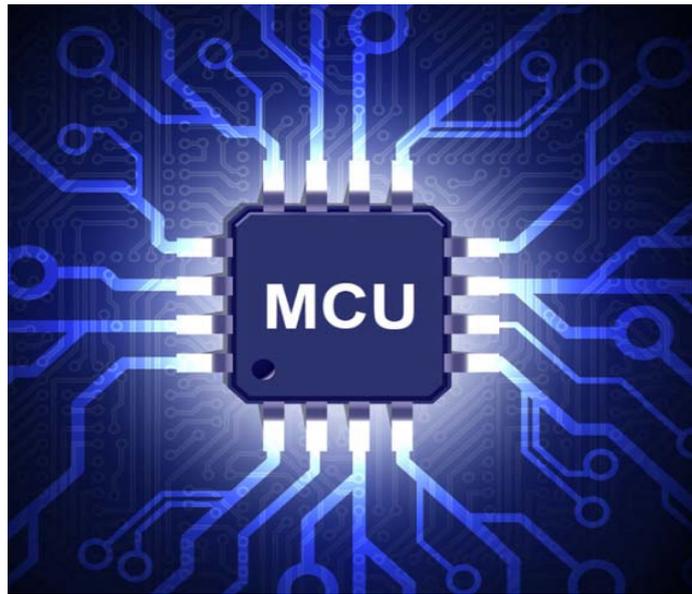


Figure 3

3. The instrument is equipped with a 4000mAh lithium-ion battery, offering a long standby time. It is also equipped with Type-C and Bluetooth 5.0 interfaces, with a reserved WIFI interface. These rich expansion interfaces are highly suitable for secondary development and have a wide range of application scenarios.



- \* TypeC USB
- \* Bluetooth
- \* Reserve WIFI access
- \* Rich SDK kits (C,C++,C#,Python,LabVIEW)
- \* Support serial port & Modbus

Figure 4

4. A novel and fashionable appearance design based on ergonomics.



Figure 5

5. The instrument can test not only spectrum,  $E_v$ , color temperature, color rendering index, but also white balance, plant growth lamp parameters, UVI index, blue light hazard, display color gamut, uniformity, CQS, TM-30 index, flicker frequency, transmittance and other parameters, with wide applications.

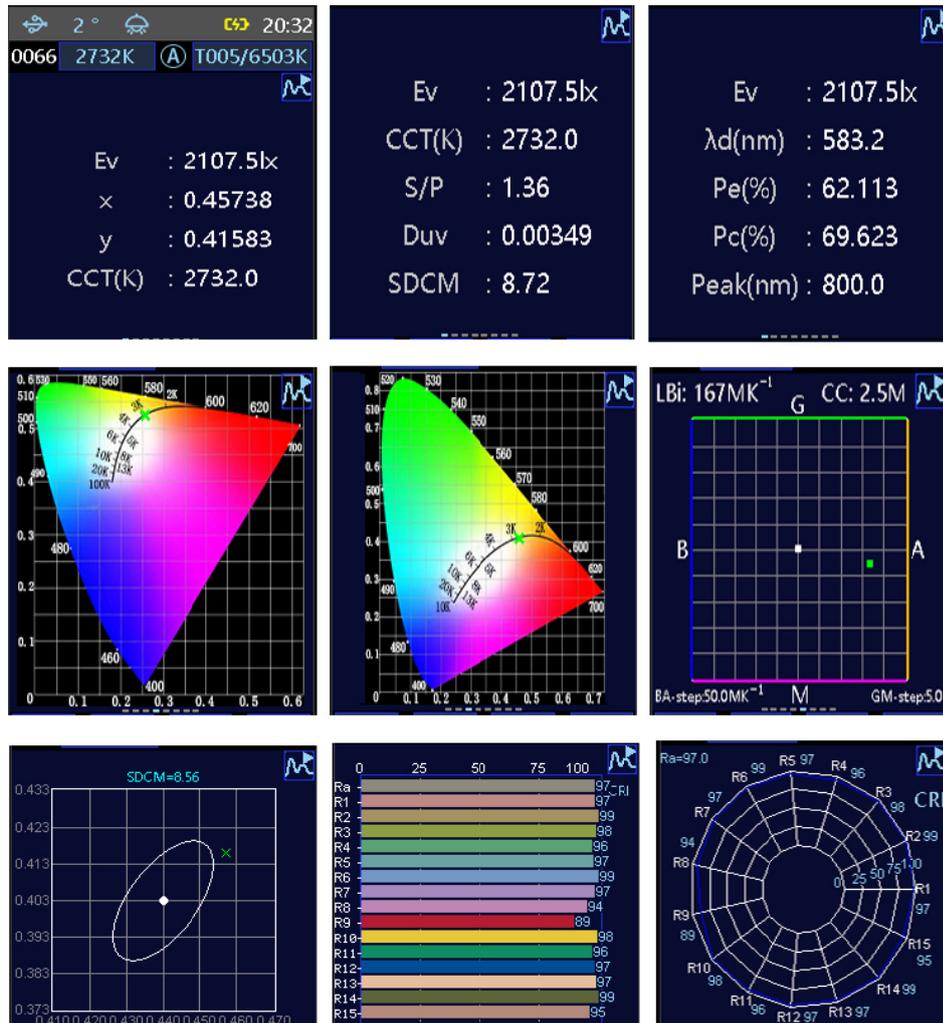


Figure 6

6. The instrument has multiple testing functions, with the functional modules being humanizedly distinguished, and the operation is simple, smooth and fluent.

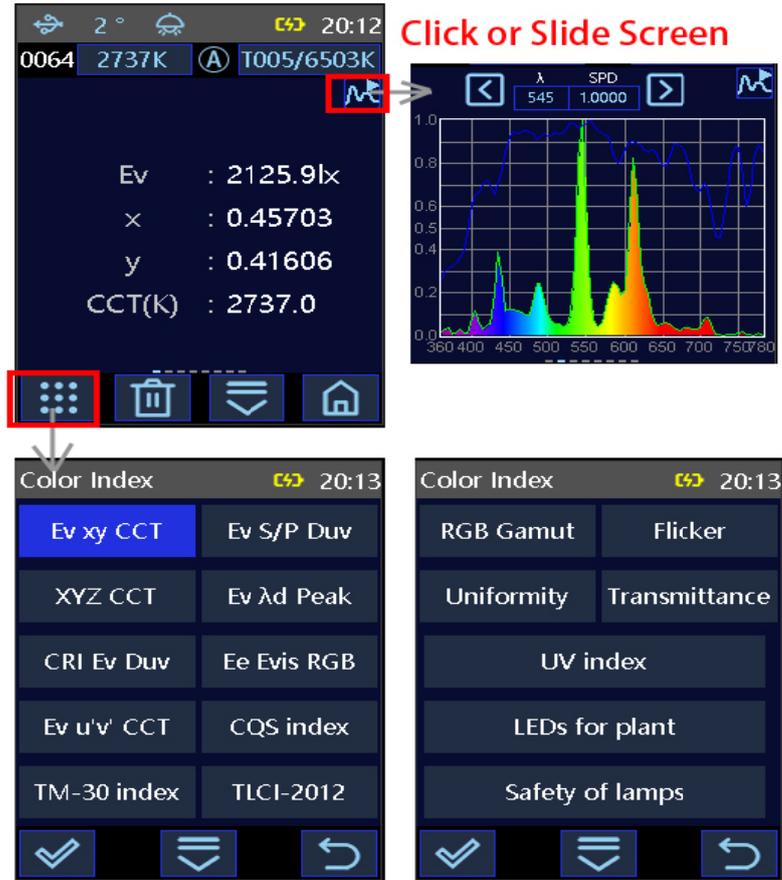


Figure 7

7. The instrument is built with the radiation spectra of standard illuminants such as D65, A, C, D50, and D75. In the comparison mode, it is very convenient to conduct spectral comparisons with the samples to be tested.

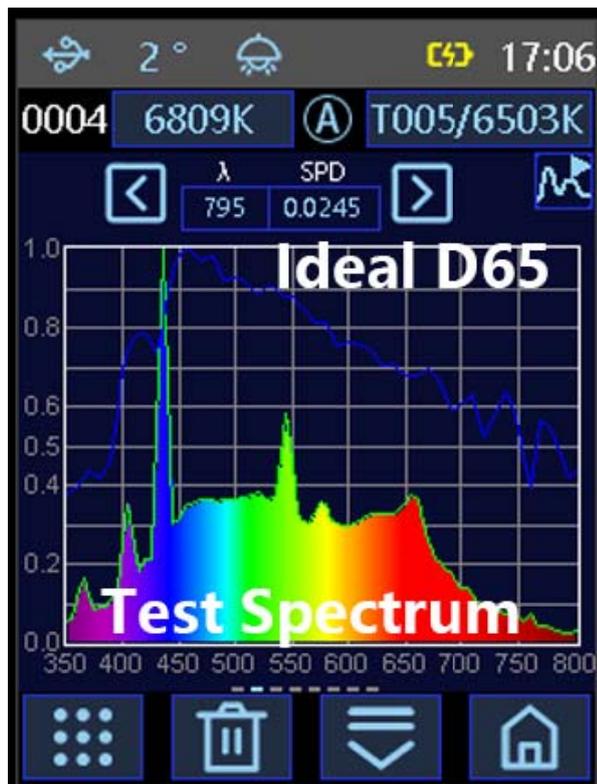


Figure 8



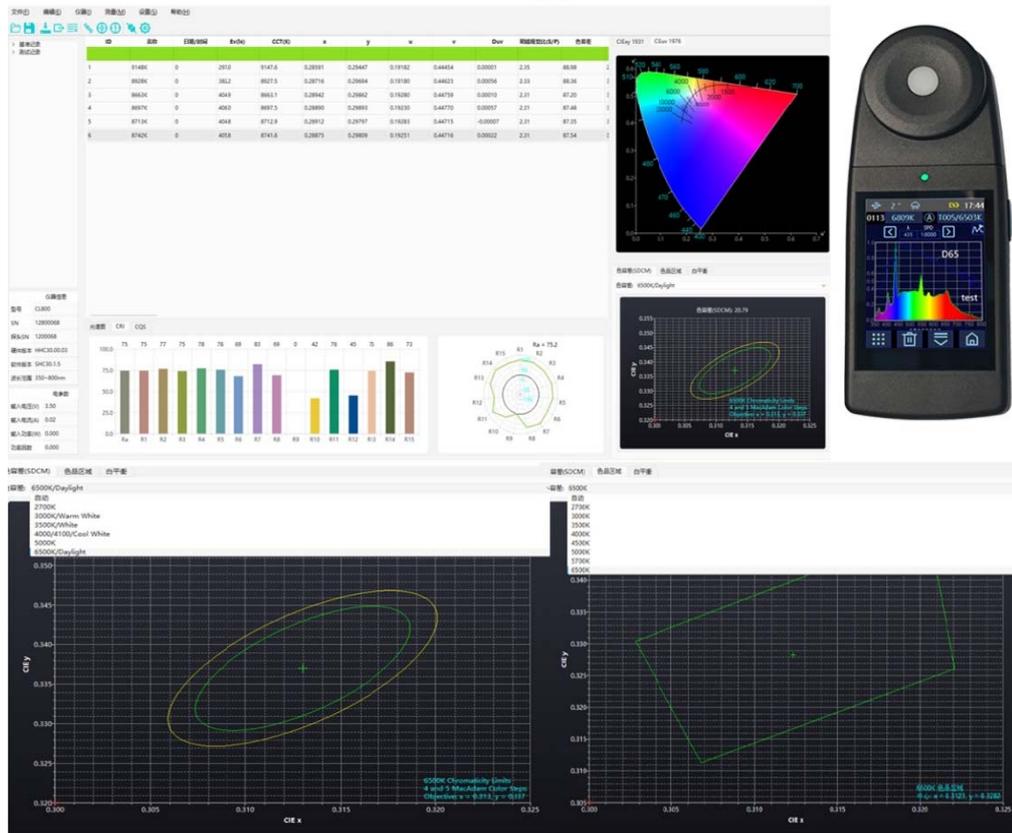
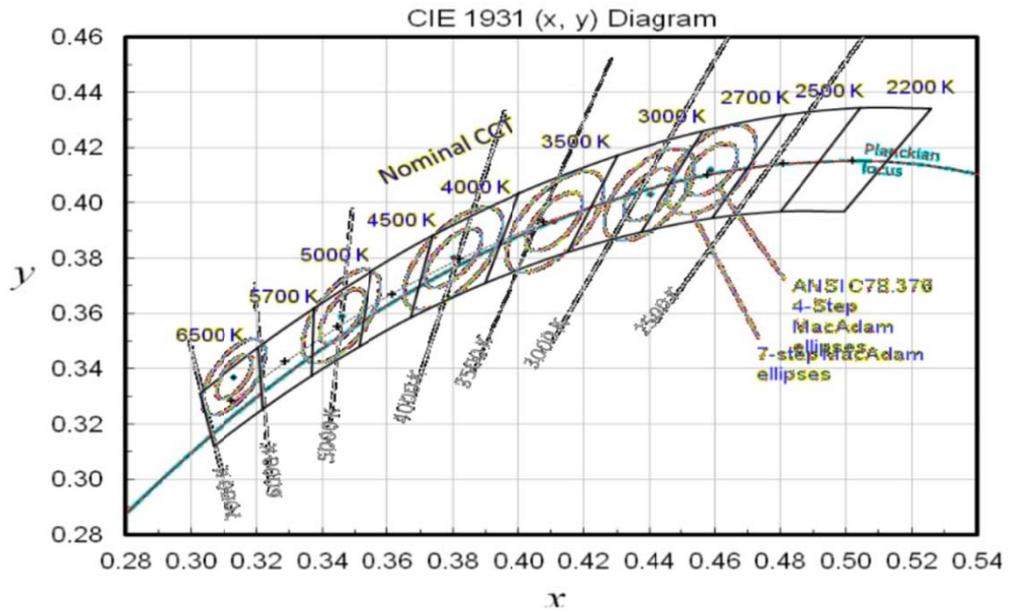


Figure 10

### 3.2 PAR,PPFD,YPPFD,E-ch A/B,Erb-p measurement of leds for plant in smart agriculture

CL800 spectroradiometer stand-alone instrument can easily achieve spectrum,  $E_v$ , photosynthetically active radiation PAR, photosynthetic photon flux density PPFD, photosynthetically active photon flux density YPPFD, chlorophyll weighted irradiance E-ch A and E-ch B, photosynthetic irradiance E-P, photosynthetic red-blue irradiance ratio Erb-p, etc. .



Figure 11



Figure 12

### 3.3 Color temperature(CCT), Color rendering index(CRI), Uniformity measurement of Light box or Display panel

The main technical indexes of the light box include the following: the standardization of the spectral distribution of the light source, the display uniformity of the illumination of the light source, the stability of the light source, the color temperature and color rendering index of the light source, and the life of the light source. CL700 spectroradiometer can easily measure the stability, uniformity and spectral matching of the light box.



Figure 13

### 3.4 Transmittance Test

Transmittance is the ratio of the luminous flux (radiant flux) of light passing through the measured object to the incident luminous flux (radiant flux) . The transmittance of visible light is usually the ratio

of the luminous flux of visible light at wavelengths of 380-780 nm, UVA transmissivity is usually the ratio of UVA to UVA radiation flux, and IR transmissivity is the ratio of IR radiation flux at wavelengths over 780 nm.

LED light source or halogen tungsten lamp is usually used as the lighting source in the transmissometer. From the test results, different lighting sources have a certain influence on the transmittance test results, usually affecting about 5% .

Many standards and documents clearly state that the D65 standard illuminator is the most ideal illuminator for transmissometers. The D65 standard lighting source is the Earth's average northern hemisphere solar spectrum, so the transmittance tested under this light source condition is very representative and easily accepted by the public. For example, outdoor glass, UV sunscreen glasses and other related standards clearly state that the D65 light source should be used for transmittance testing. However, the light source used by the common transmittance meter is far from the D65 standard lighting source, so the test results are not very good.

CL800 spectroradiometer can use outdoor sunlight (as close as possible to the D65 standard lighting source) as the lighting source, after two tests, very convenient test glasses, architectural glass in D65 standard lighting source under the condition of transmittance.

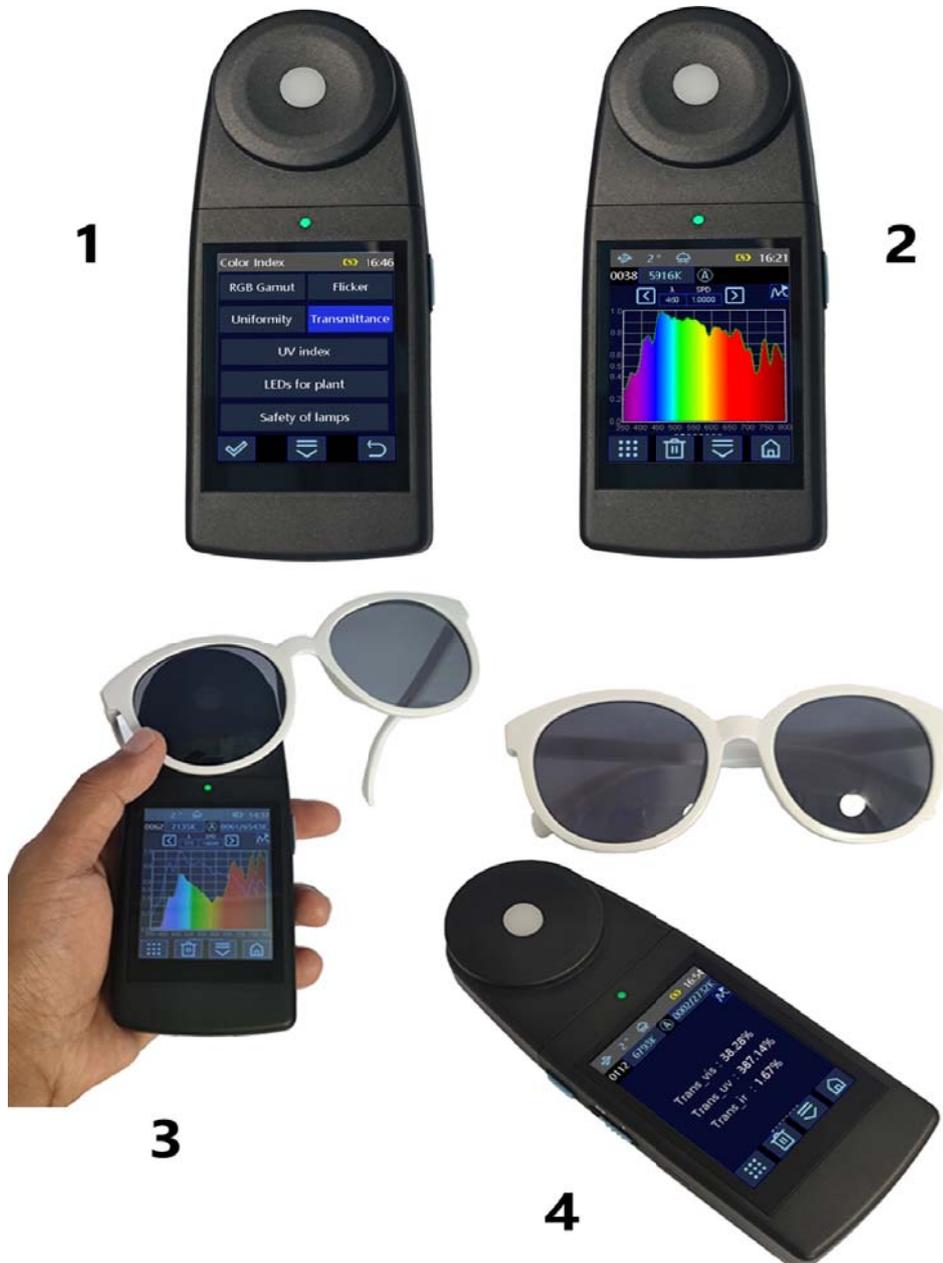


Figure 14

### 3.5 Camera White Balance

When the camera is taking pictures, the lighting environment, the sensor response characteristics, the lens filter and the exposure parameters have a certain influence on the imaging quality. When the lighting environment and the sensor matching degree are not high, the image quality can be optimized by adjusting the lens filter. The CL800 illuminometer gives the corresponding white balance correction filter number by measuring the illumination source. In the white balance diagram of the instrument test, the abscissa represents the color temperature difference between the current test sample and the target comparison sample; the ordinate represents the compensation filter number value, and the suffix G represents the green filter, suffix M means magenta filter. The instrument supports Kodak G/M series compensation filter by default, need other brands or series of filters can find manufacturers for personalized customization.



Figure 15

### IV Dimensions

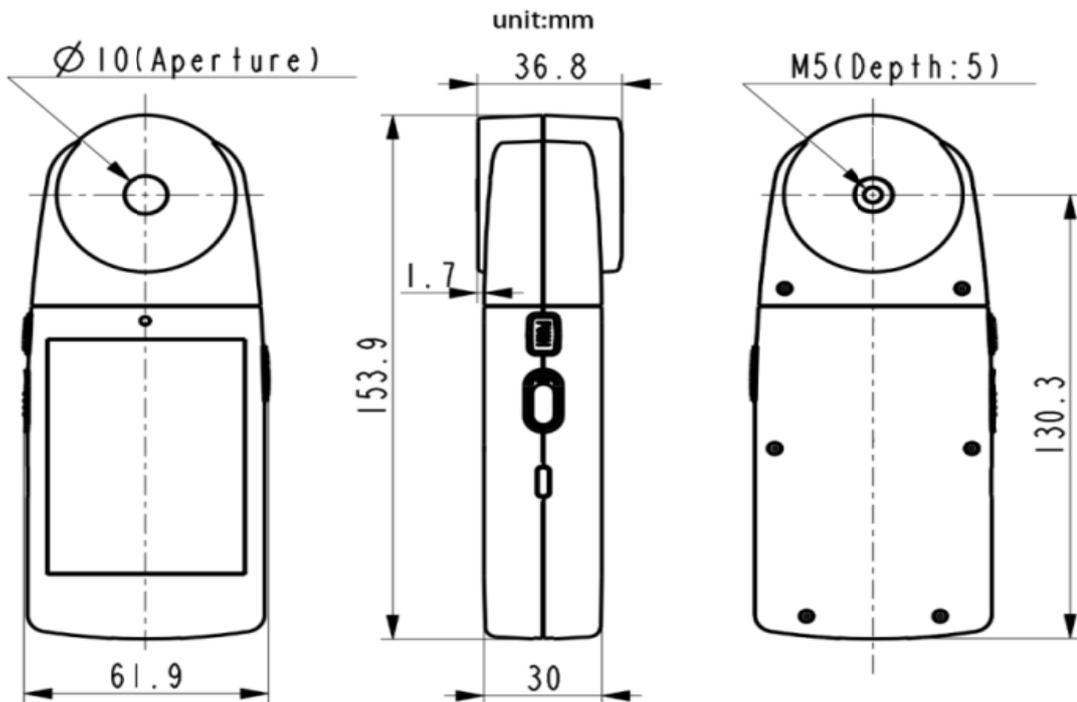


Figure 16

## V Technical Parameter

Model	CL900	CL800	CL700
Product	SPECTRAL IRRADIANCE COLORIMETER	SPECTRAL IRRADIANCE COLORIMETER	SPECTRAL IRRADIANCE COLORIMETER
Standard	GB/T 7922 , GB/T 5700, GB/T 5702, JJG 245, GB/T 24824, GB / T 36979, ANSI C78 377, GB 50034, CIE S 009, GB / T 20145, GB/T 9473, CIE S 025, GBT 32655, GB/T 15609		
Wavelength	320~800nm	350~800nm	360~780nm
Wavelength Interval	1nm		
Spectrophotometric Mode	Concave Grating		
Ev Range	0.1~2000001x		
Accuracy (Light source A)	Ev: ±4% ±1 display value xy: ±0.0015 (10~2000001x) xy: ±0.002 (5~101x)		
Repeatability (Light source A)	Ev: 0.5% ±1 display value xy: 0.0005 (500~2000001x) xy: 0.001 (100~5001x) xy: 0.002 (20~1001x) xy: 0.004 (5~201x)		
Cosine Response	Ev: ≤3%		
Measurement Mode	Auto mode, Flash mode, Continuous mode, Average mode, Flicker mode (no function in CL700)		
Measuring Time	Auto mode: 0.2~10 s		
Observer Angle	2° (CIE1931)		
Color Space	Spectrum, CIE XYZ, Ev xy, Ev u'v'		
Colorimetric Index	1. Ev, CCT (K), CRI; CIE31x, y; CIE76u', v'; CIE31X, Y, Z; Duv, SDCM, S/P, White Balance; Peak (nm), Center (nm), Centroid (nm); λ d, PE, PC; Ee, Evis, Euv, Eb, Eg, Er, Efr, Eir, Erb, R(%), G(%), B(%); 2. PAR, PPF, YPF, Kppfv, PPF-uv, PPF-R, PPF-G, PPF-B, PPF-FR, PPF-IR, E-ch A and E-ch B, E-p, Erb-p; 3. Flicker (Hz), Modulation (%); (no function in CL700) 4. Display screen Gamut, Gamut Area (%), ΔCuv; 5 Points/9 Points Uniformity; 5. CQS CRI, Color Fidelity Qf, Gamut Index Qg and Qp; TM-30 Color Fidelity Rf and Gamut Index Rg; TLCI-2012 (no function in CL700); 6. UVA, UVI, Es-uv, Es-B, RG (BLH), PermitTime (S); (no function in CL700) 7. CIE31 xy diagram, CIE76 u'v' diagram, CRI/CQS histogram, CRI/CQS radar chart, MacAdam ellipse diagram, White Balance diagram		
Data Storage	Sample 10000 Pcs (Including reference records)	Sample 10000 Pcs (Including reference records)	Sample 8000 Pcs (Including reference records)
Dimension	L*W*H=154X62X37mm		
Weight	about 200g		
Battery	Li-ion battery, 3.7V, 4000mAh (8000 measurements within 24 hours)		
Display	2.8-inch TFT color LCD, Capacitive Touch Screen		
Data Port	Type C USB, Bluetooth 5.0 (Customizable WIFI)		
Language	English, Chinese		
Operating Environment	-10~40°C (0~85%RH/no condensing)		
Storage Environment	-20~50°C (0~85%RH/no condensing)		
Standard Accessory	Power adapter, USB cable, manual, PC Software (Download from office website), Protective Cover, Wrist strap, Wiping cloth		

Figure 17

## VI About Huicolor

**Shenzhen HUICOLOR Technology Co., Ltd.** was established in Nanshan District, Shenzhen, P.R.China. in 2015, it is a high-tech enterprise focusing on the research and development and manufacturing of precision optical detection instruments.

HUICOLOR Company adheres to the concept of "continuous innovation", aspires to build a well-known brand in the precision optical detection instrument industry, contributes to China 's intelligent manufacturing.HUICOLOR Company has obtained multiple national technology patents, and hold the trademarks "HUICOLOR", simultaneously possessing multiple software copyrights.

HUICOLOR Company adheres to independent R&D, design, production and manufacturing. Since the establishment of the company, it has successfully launched multiple high-precision optical products with independent intellectual property rights, such as CL800 series spectral Irradiance Colorimeter, CL500 series Irradiance Colorimeter, CI800 series spectral Luminance Colorimeter, CL300 series spectrometer / UV energy meter and CI350 Display Calibration system, which are widely used in LED lighting, spectral analysis, liquid crystal display, intelligent agriculture, scientific research and other fields.

Shenzhen HUICOLOR Technology Co., Ltd. adheres to the concept of "continuous innovation", manufactures "excellent quality" precision optical equipment, provides professional technical services, and "creates value" for users to achieve a win-win situation.

## VII Contact Huicolor

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