# Coffee Colorimeter

Model: LS177C

User Manual V1.01

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

# I Product Introduction

The instrument is a coffee colorimeter. It has a 7-inch IPS color display and capacity touch panel, which has an excellent operating experience. The instrument can quickly match the closest SCAA number and HCCI to the measured coffee beans, and display the relevant coffee roast level. It also has color difference comparison function and color difference threshold can be set to achieve rapid QC testing. The instrument can also connect to APP for color measurement and sharing. It is also equipped with a powerful PC software to meet various needs of customers. The instrument meets the requirements about grade 1 colorimeter in the Chinese *JJG 595-2002 Colorimeters and Color Difference Meters* in all directions employing full-spectrum LED light source and advanced spectral sensor.

**Standards for the product**

*JJG 595-2002 Colorimeters and Color Difference Meters*

*GB/T 3978-2008 Standard illuminants and geometric conditions*

*GBT 7921-2008 Uniform color space and color difference formula*

*GB/T 11186.1-1989 Methods for measuring the colour of paint films--Part 1: Principles*

*GB/T 11186.2-1989 Methods for measuring the colour of paint films--Part 2: Colour measurement*

*GB/T 11186.3-1989 Methods for measuring the colour of paint films--Part 3: Calculation of colour differences*

# II Parameters

| | |
|---|---|
| Illumination geometry | D/8, specular component include (SCI) |
| Illumination light source | Full spectrum LED light source |
| Spectral range | 400-700nm |
| Spectral interval | 10nm |
| Measuring aperture | 50mm |
| Measurement conditions | Light source D65, field of view 10° |
| Measuring time | About 1.5s |
| Color space | CIE Lab |
| Color difference formula | ΔE*ab |
| Repeatability | Standard deviation ΔE*ab is within 0.03 (Measurement condition: the average value of 30 measurements on the whiteboard at an |

| | |
|---|---|
| | interval of 3s after calibration) |
| Inter-instrument agreement | △E*ab<=0.4, based on avg. of 12 BCRA series II tiles |
| Dimension | 21.1 * 26.4 * 15.5cm (L*W*H) |
| Weight | About 3.29kg |
| Power supply | 100~277V 0.4A 50/60HZ |
| Display | 7-inch 1024*600 dot matrix IPS color screen |
| Language | Simplified Chinese, English |
| Data transmission | USB, Bluetooth |
| Operating temperature range | 0~45℃, 0~85%RH (no condensation) |
| Storage temperature range | -25~55℃, 0~85%RH (no condensation) |
| Supply Voltage | AC 100~277V 50/60HZ |
| Operating Current | 0.4A |
| Operating Power Consumption | 80W |

# III Features

1. The measuring aperture is up to 50mm and the instrument is equipped with special plastic cuvettes, which is suitable for measuring coffee beans of various uneven shapes.
2. The instrument has the function of multi-point calibration of SCAA Agtron number and coefficient setting of HCCI HunterLab Coffee Color Index.
3. The instrument is fashioned with a full-spectrum LED light source and spectral sensor, and it meets the requirements of the national metrology grade 1 machine.
4. Adopt a 7-inch capacity touch panel with human-machine interaction interface for convenient operation.
5. It has QC testing function and the color difference threshold can be set.
6. It can store 1000 colors and 1000 color comparison records with large storage space.
7. It can connect to APP for color sharing.
8. Equip with PC software which has stronger color difference statistical analysis function, spectral reflectance measurement and curve data export EXCEL function.
9. The instrument has a built-in compensation optical path with stable values, allowing long-period

calibration.

# IV Operation

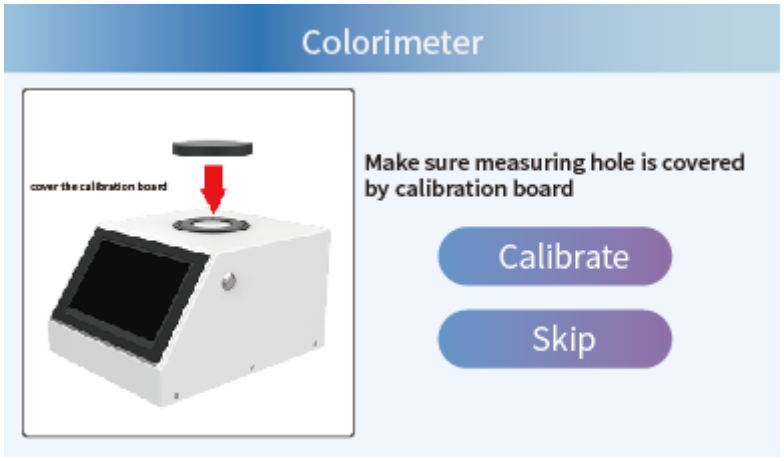
## 1. Power on/off

**Power on:** Plug in the power supply, short press the right side button to turn on the instrument.

**Power off:** Long press the right side button to turn off or press “Power off” in the menu bar.

## 2. Calibration

After entering "calibration" interface, you can perform calibration operation as the calibration animation, or skip the calibration. It is recommended to calibrate after a long time of no usage.

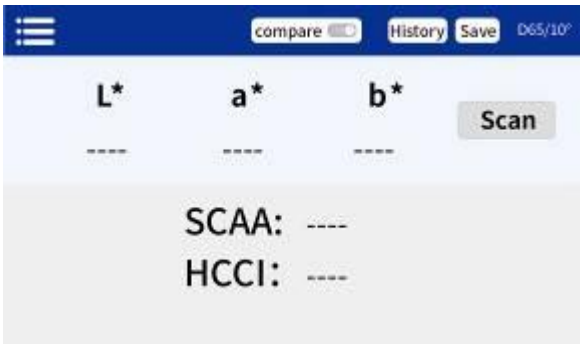



For failed calibration, the possible reasons are as below:

- The standard tile is not closed properly;
- The standard tile needs to clean;
- The attenuation of the light source leads to failure of normal use and it needs to be returned to the factory for inspection and repair.

## 3. Measurement

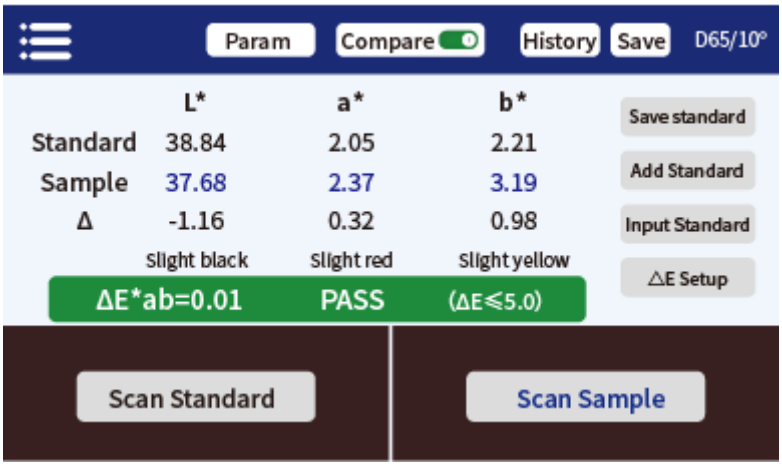
Entering the measurement interface, you can click the "Compare" on the top of the screen to switch the compare measurement mode.




Color measurement mode


Compare measurement mode

## 3.1 Compare on




Compare on

In the measurement interface, press the "Scan Standard" button to set current value as standard. Press the "Scan Sample" button to use current value as sample. If short press the button on the right side, another measurement will also be taken and the current value will replace the previous one. When measuring or adding a standard and measuring a sample, the color difference between the two measured values will be calculated with the following results:

- **The difference value**

The difference Δ is the sample data minus the standard data;

- **Color Bias**

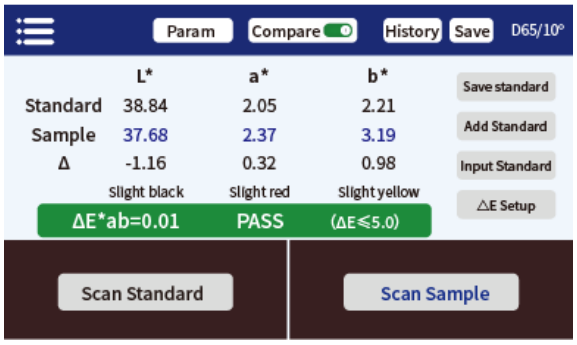
The color bias will be judged by ΔL, Δa, and Δb;

- **Δ E value**

ΔE is calculated by using the ΔE*ab color difference formula;

- **QC test**

Suitable for color difference inspection in production process. If ΔE is higher than the set threshold, it will read “NG” and display in red; if ΔE is less than or equal to the set threshold, it will read “Pass” and display in green.




Pass


NG

The following steps can be performed after completing compare measurement:

- **Save**

To save the comparison result, press "Save" on the upper right corner. You can choose default or name the record manually.

- **History**

If users need to view the saved results, click "History" to view the records, and records can be paged, deleted, renamed and searched.

- **Save standard**

After the user has finished measuring the standard value, if need to save it for later calling, click the "Save standard" to save it, and the saved value can be queried in the add standard interface.

- **Add standard**

After clicking "Add standard", the interface will jump to "Add standard", click the value you want to add, and the selected value will be used as the standard, and will automatically return to the measurement interface to compare with the current sample or the upcoming sample.

- **Input standard**

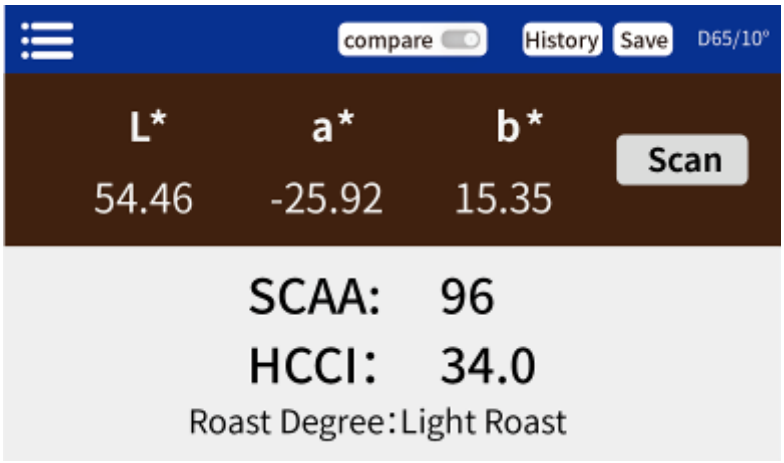
The user can manually input the Lab value as standard.

- **△E Setup**

Setting the threshold for QC inspection.

## 3.2 Compare off

In the interface where the compare measurement is switched off, click on "Scan" or short press the button on the right side of the instrument to measure.




Compare off

**SCAA:** Match the closest SCAA number to the measured coffee bean color.

**HCCI:** HunterLab Coffee Color Index measures the reflectance of ground coffee products at 640 nm.

**Roast Degree:** The corresponding roast level is displayed according to SCAA.

| No. | SCAA range | Roast Degree |
|---|---|---|
| 1 | <30 | Italian Roast |
| 2 | 30-40 | French Roast |
| 3 | 40-50 | Full City Roast |
| 4 | 50-60 | City Roast |
| 5 | 60-70 | High Roast |
| 6 | 70-80 | Medium Roast |
| 7 | 80-90 | Cinnamon Roast |
| 8 | >90 | Light Roast |

The following steps can be performed after completing measurement:

◆ **Save**

To save the comparison result, press "Save" on the upper right corner. You can choose default or name the record manually.

◆ **History**

If users need to view the saved results, click "History" to view the records, and records can be paged, deleted, renamed and searched.

# 4. Menu bar

In the measurement interface, click the "  " icon on the upper left corner to pop up the menu bar, with the following options: Language, Calibration, SCAA Calibration, HCCI Calibration, Device info, Reset to defaults and Power off.

## 4.1 Language

Support Simplified Chinese and English.

## 4.2 Calibration

Can enter the calibration interface to perform calibration operation of the instrument.

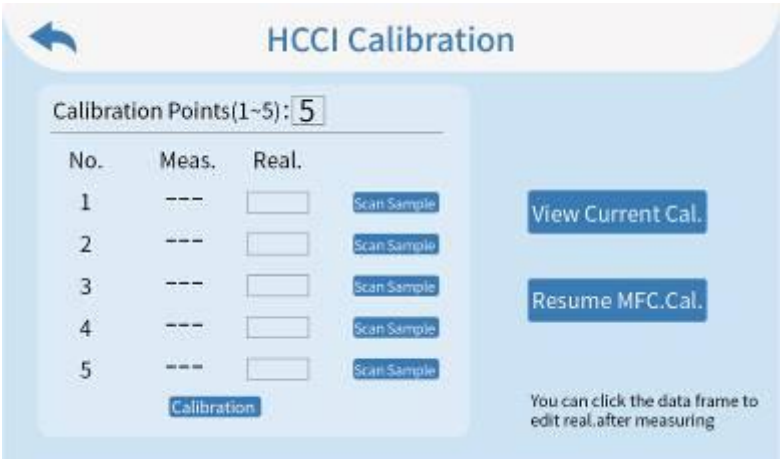
## 4.3 SCAA Calibration

As the color of coffee beans from different brands is different, when the tested SCAA number does not match the actual one, the SCAA can be adjusted with multiple points.


SCAA Calibration

## 4.4 HCCI Calibration

As the color of coffee beans from different brands is different, when the tested HCCI does not match the actual one, the HCCI can be adjusted with multiple points.




HCCI Calibration

### 4.5 Device Info

"Device Info" displays the basic information of the instrument, including: Serial Number, Firmware Version, and Device Status.

### 4.6 Reset to defaults

Restore the instrument to factory settings and clear the data in the measurement interface.

### 4.7 Power Off

Press "Power off" to power off the instrument.

# V Bluetooth Connection

## 1. App Installation

The colorimeter APP supports Android operating system 7.0 and above as well as iOS system 7.0 and above. Choose one of the following methods to install:

1) Scan the QR code on the cover with a mobile browser or WeChat, follow the prompts to download and install Lscolor.

2) Search for "LScolor" from the iOS App Store or Google Play App market and follow the prompts to download and install LScolor.


App icon

**Precautions:**

Open the App during the installation process or after the first installation, the mobile phone will prompt the permission of setting, the customer needs to allow all of them, otherwise the App cannot search for the

device, and App cannot be used.

## 2. Device connection

Turn on the colorimeter, open the App, after display of LOGO. Enter the "Connect Device" interface and automatically start searching for Bluetooth devices. The searched devices will be displayed at the bottom of the interface. Click the device that matches the SN of the colorimeter and wait for the device to connect. Once connected, it will jump to "Calibration interface.

**Precautions:**

1) If there is a Bluetooth connection error or failure, you can restart the App and the colorimeter, or turn off/start Bluetooth in the setting interface and reconnect.

2) Click the "Browse" button, App is not connected to the colorimeter, you can enter the App to view historical data.

## 3. APP operation

The APP has the same function of color scan and color compare as the instrument with the same operation. The only difference is that the APP has color sharing function, and can import and export colors.

### 3.1 Color sharing

There are two ways to share colors:

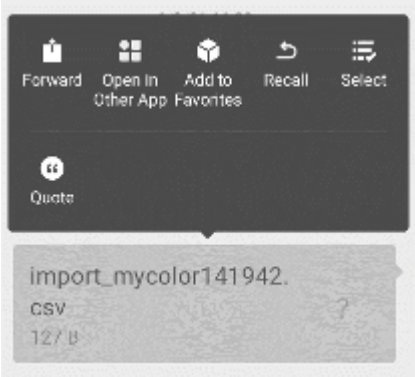
a) Scan a color in the “Color Scan” interface, press the "Share" icon to share the scanned color in image format or data format (the sharing methods are: WhatsApp, Facebook, email, etc.).

b) In the "My Colors" folder, select the colors to share and click "Share" icon to share the colors in data format.

### 3.2 Color import

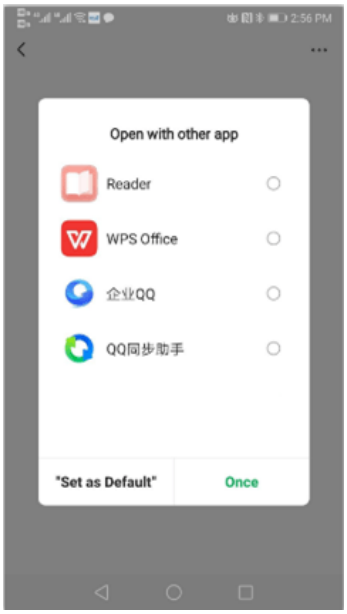
Users can import colors shared by others into their own App, but the colors must be scanned by the same model of colorimeter. Both single color and batch of colors can be imported as follows:

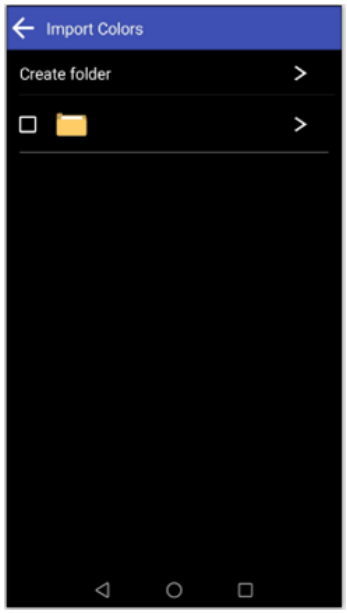
Take WeChat sharing and import on Android as an example, find the file to import with a name of "import_mycolor" and long press the file to be imported.




If use the iOS system, click the file and download it first, and then select "Open with other app" to realize data sharing.

a) If the above interface appears, click "Open with other app" and select the App "LScolor", after confirmation, jump to the import interface and select the file to complete the import.



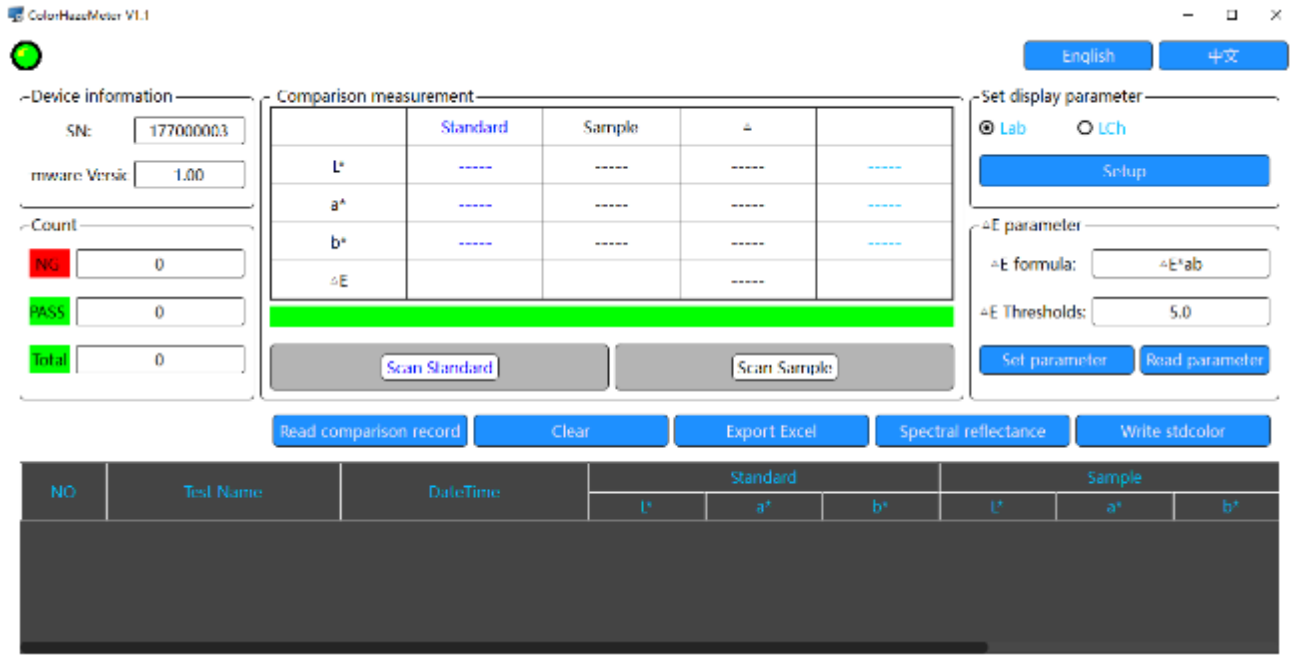




b) If the import has completed, it will prompt "Import successful". After pressing "Confirm", the imported color will be displayed. After the import is completed, the import can be checked as the first record under the folder.

c) If the product model does not match, it will prompt "Unmatched device model ". Please connect to the correct model before importing.

# VI PC Software

You can use the PC software to connect the computer via USB. The software has functions of color compare measurement, reading compare record, export compare data to Excel, spectral reflectance measurement, qualified number, unqualified number, total number statistics, report generation and printing, etc. For specific operation, please refer to the "Color Haze Meter Software Operation Manual".




# VII Precaution

1. When the colorimeter has not been used for a long time, it is recommended to perform calibration before using.
2. Please ensure that the sample is evenly colored with a flat and clean surface, otherwise it will affect the measurement accuracy.
3. The calibration cover should be adsorbed to the iron shell after it is removed from the main unit to avoid fouling of the standard plate.
4. Do not apply any objects to the glass of the measuring port, as this will damage the instrument and affect the measurement accuracy and operational safety.
5. When the instrument is not in use, put on the calibration cover to prevent dust from entering or prolonged humidity, which may affect the measurement accuracy.
6. It's recommended to calibrate the instrument once each year. And we offer calibration service.
7. Due to color difference in the LCD display, the color displayed on the instrument screen is for reference only.

# VIII Plastic cuvettes

In order to meet the measurement requirements of coffee beans, the instrument is equipped with a plastic cuvettes.

# IX Packing List

| No. | Description | Quantity | Unit |
|---|---|---|---|
| 1 | Colorimeter | 1 | Set |
| 2 | USB cable | 1 | pcs |
| 3 | Cleaning cloth | 1 | pcs |
| 4 | Power cable | 1 | pcs |
| 5 | User manual | 1 | pcs |
| 6 | Calibration Report | 1 | pcs |
| 7 | Plastic Cuvettes | 2 | pcs |

# X Service

1. The colorimeter has one-year warranty. If the meter 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 gauge calibration service.
4. Free technical support for long term.

Manufacturer: Shenzhen Linshang Technology Co., Ltd.
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Email: sales21@linshangtech.com