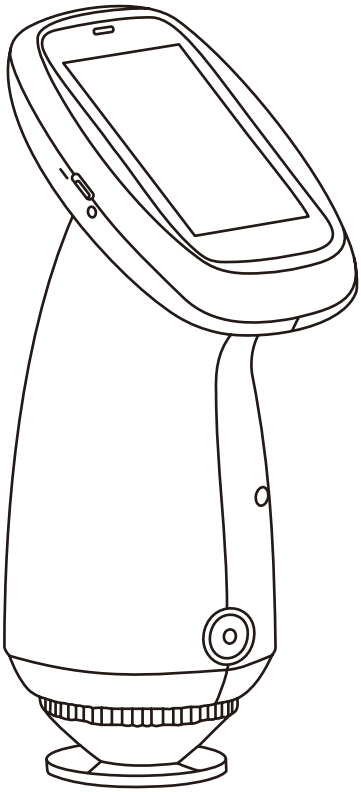
Spectrocolorimeter

OPERATION INSTRUCTION



V1.0

Read this manual carefully before use the spectrophotometer.

Safety Instructions

This instrument is a very safe device, but in order to ensure that you can use it correctly and safely, please carefully read and strictly abide by the following clauses to avoid accidental injury or harm. The loss caused by not using the instrument according to the operation guide of this manual is not within the scope of our company.

External Power	1. When external power supply is required, please use the standard power adapter of this instrument, and do not use other power adapters that do not meet the technical specifications, otherwise it may shorten the battery life or even cause electric shock, which may damage the instrument or cause fire. 2.If the instrument is not used for a long time, the external power supply should be cut off to prevent the instrument from burning and causing fire.
Instrument	1.Do not use this instrument in places where there are flammable or combustible gases (gasoline, etc.), or it may cause fire. 1. Do not disassemble the instrument privately, otherwise it will be destroyed, and dust and foreign metals may enter the instrument. The instrument may be short-circuited, resulting in electric shock, resulting in the destruction of the instrument and even fire. 3.In the process of using the instrument, if the instrument emits peculiar smell such as burning, it should be stopped immediately and sent to the maintenance point for inspection and maintenance.
Battery	1. This instrument is a built-in battery. Please use the original battery, and do not replace other batteries to prevent damage to the instrument or other failures. 2. Do not disassemble, squeeze, blow or heat the battery privately, or place the battery in a fire or a high-temperature environment, otherwise the battery will explode and cause a fire. 3. When the instrument is fully charged and not in use, the external power supply should be cut off to prevent electric shock and damage to the instrument. 4.If you don't use the instrument for a long time, you should charge it once every two weeks, otherwise the internal battery will be easily damaged, which will make it impossible to use the instrument again.

Please keep this manual properly for reference at any time.

CONTENT

Instructions

spectrocolorimeter is a domestic color measuring instrument independently developed by our company with independent intellectual property rights. It is a color measuring instrument developed according to CIE (International Commission on Lighting) standard and national standard. It is a simple spectral colorimeter with convenient use, stable performance, fast and accurate measurement. This instrument is powered by lithium battery or external DC power adapter.

This instrument has the following advantages (some models have different configurations):

1) It can be measured when it is turned on, without black-and-white calibration every time, which simplifies the operation steps;without black-and-white calibration every time, which simplifies the operation steps;
2) Camera locating, light spot positioning or cross positioning are adopted, which can quickly aim at the measuring part;
3) Equipped with 2.8-inch capacitive touch TFT display screen, large-capacity storage space and Bluetooth 5.0/USB interface;
4) SQCX quality management software, connecting PC to realize more function expansion;
5) It can be connected to the color management software of mobile APP, to meet users' various needs;
6) Original whiteboard calibration technology, reliable calibration, greatly increasing the service life of whiteboard;
7) Φ8mm, Φ4mm and 1x3mm measuring apertures, which are suitable for more test samples;
8) It can test the reflection spectrum and various chromaticity indexes of the object, with accurate measurement and simple use.

Cautions

1) This instrument is a precision measuring instrument. During measurement, drastic changes in the external environment of the instrument should be avoided, for example, the flickering of the ambient light and the rapid change of temperature should be avoided.
2) During measurement, the instrument should be kept stable, the measuring port should be close to the measured object, and shaking and shifting should be avoided. This instrument is not waterproof and cannot be used in high humidity environment or water mist.
3) Keep the instrument clean and tidy, and avoid liquid, powder or solid foreign bodies such as water and dust from entering the measuring aperture and

4) After the instrument is used, put the instrument and related accessories into the instrument box and keep them properly;

5) The instrument should be stored in a dry and cool environment;

6) Users are not allowed to make any unauthorized changes to this instrument. Any unauthorized changes may affect the accuracy of the instrument, or even irreversibly damage the instrument;

1.Interface Description

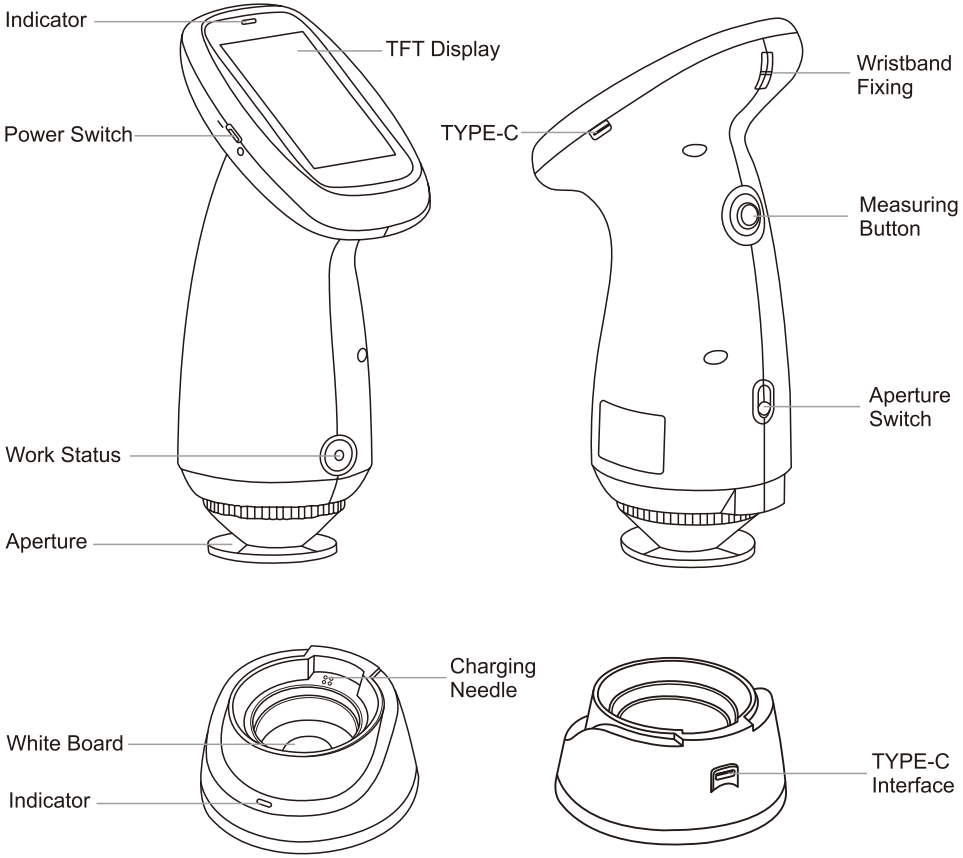


Figure1 Schematic diagram of instrument button interface

Power Switch 1/0: when the switch is turned to "1", the instrument is powered on and started; When the switch is turned to "O", the instrument is powered off and turned off, and the hardware is turned on and off by turning the switch.

TYPE-C Interface: the TYPE-C interface on the instrument is a common interface, which

can be used to connect and communicate with PC, and the instrument automatically judges the connection; It can also be used to connect printers.
The TYPE-C interface on the base is a power charger, which can charge the instrument (5V⎓2A).

Note: Two TYPE-C interfaces cannot be connected to the data cable for charging at the same time, so as to avoid unknown danger.

Measurement Button: Short press to wake up the instrument in sleep state, and short press to measure in normal state.

Aperture Switch: Aperture switch (some models) is used to switch the measurement aperture. When the switch is toggled, the logo shows "MAV", which means that the lens is switched to theΦ8mm aperture position; When the switch is toggled, the logo shows "SAV", which means that the lens is switched to theΦ4mm aperture position. Some models support Φ 1× 3mm measuring aperture. When Φ1× 3mm aperture is used, dial the aperture switch to "SAV".

LED Indicator: The indicator on the instrument has three indicator states: green, yellow and red. When the power is turned on, the power below 20% is a red light; More than 20% is a green light. When the measurement indicator is yellow**.**

Note: The indicator light on the base has only two indication states: green on and off. When not connected to USB, it is off; The green light is always on when the USB cable is plugged in.

M5 fixed Srew Hole: The screw interface of the fixed instrument. The screw thread type is standard metric common coarse thread, with a pitch of 0.8mm and a depth of 5mm.

Wristband Fixing Post: It is used to fix the wrist band, which can prevent the instrument from slipping off accidentally when the wrist band is put on the wrist.
Charging stand: used for white calibration and charging. Please refer to the chapter on black and white calibration for details.

2.Operating Instruction

2.1 Power On & Off

As shown in Figure 1, when the 1/0 switch of the power supply is turned to "1", the instrument will be powered on and started, and the instrument will automatically enter the startup screen and start. When the 1/0 switch of the power supply is turned to "O", the instrument will be powered off and shut down.

If you don't do anything for a long time in the startup state, the instrument will automatically enter the sleep state. At this time, press the "Measure button" to wake up the instrument.

2.2 Black and White Calibration

Click the main menu button" " on the measurement interface or other interfaces to enter the main menu interface, as shown in Figure 2.

Click Black and White calibration in the main menu to enter the Black and White calibration interface, as shown in Figure 3. The whiteboard number and the aperture used will be displayed in the interface.

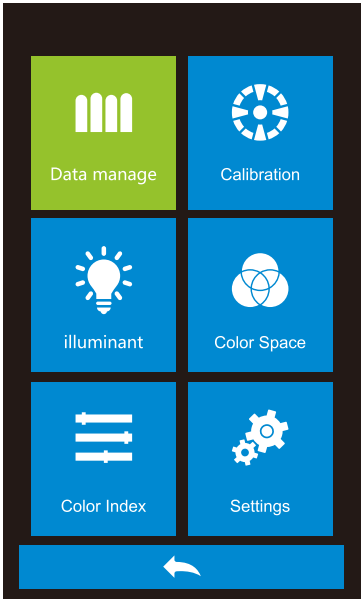


Figure 2 Main menu

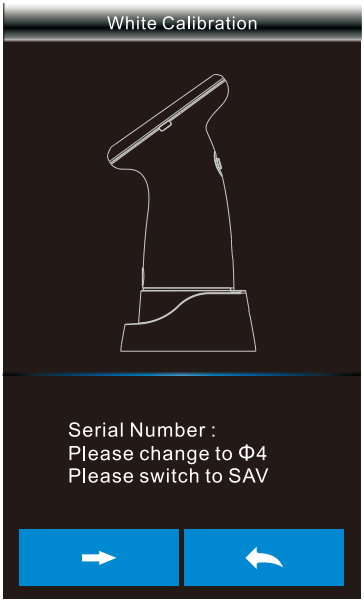


Figure 3 Black and white calibration

Click " " to return to the main menu interface.

White calibration interface, according to the prompt requirements, make white calibration. Please align the measuring aperture with the whiteboard and stick it tightly**.** After the whiteboard number and measuring aperture are set correctly, press the " " button or the "Measure" button to start white calibration. The words "On calibrating, please waiting" will appear in the interface, and the indicator will turn yellow. If the correct white calibration is completed, it will automatically jump to the black calibration interface in Figure 5. If there is any misunderstanding in the white calibration, the corresponding reminder box will pop up.

In the black calibration interface, click the " " button or press the "Measure" button to perform black calibration on the instrument, and the words "On calibrating, please waiting" will appear in the interface, and the indicator will turn yellow. Correct black calibration will automatically jump to the main menu interface (as shown in Figure 2).If there is any misunderstanding in the black calibration, the corresponding reminder box will pop up.

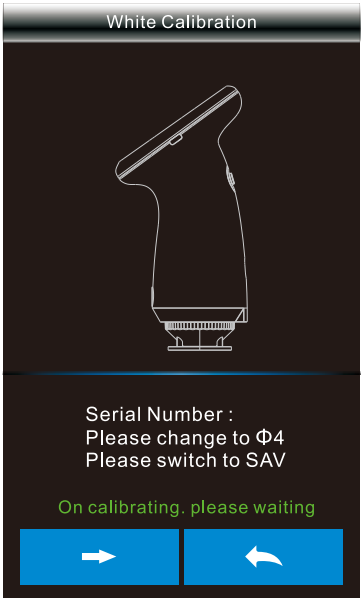


Figure 4 White calibration

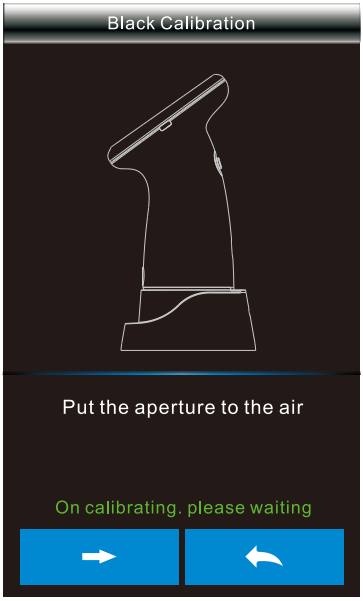


Figure 5 Black calibration

After the black calibration is finished, you will jump back to the main menu in Figure 2, and perform corresponding operations as required. Click the " " button to return to the standard sample measurement interface.

2.3 Description of Measurement Interface

As shown in Figure 6, the upper part of the measurement interface is the working status area, where the measurement mode and Bluetooth status set by the instrument are displayed in real time. The middle part of the test interface is the data display area, and the instrument displays the corresponding chromaticity data according to the current user's setting. Below the data display area are the shortcut display area and the operation button area, and the operation of the current data can be realized by clicking the corresponding operation button.

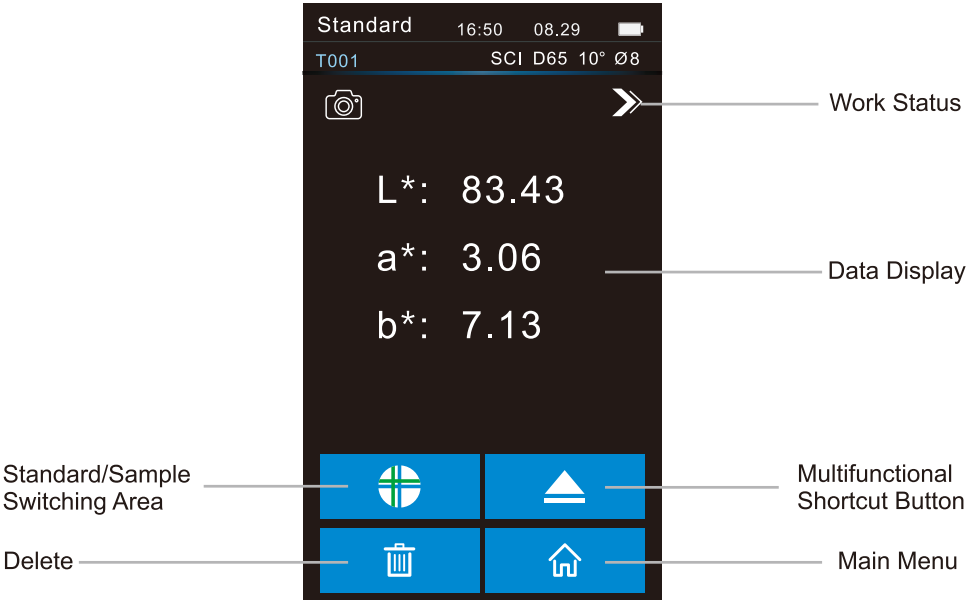


Figure 6 Measurement Interface

2.4 Measurement

Measurement is divided into standard measurement and sample measurement. Standard measurement is generally used to measure the chromaticity data of the target sample, while sample measurement is used to measure the color difference or contrast chromaticity data between the sample and the target sample.

After the instrument is turned on and the correct black-and-white calibration is completed, the measurement can be carried out (customers can set the corresponding light source, color space and color index in the main menu interface as required). If you are not currently in the measurement interface, you can click the " ↩ " button on the interface to return to the measurement interface.

Note: The default color space of the system is CIE lab, the color difference formula is ΔE*ab, and the color index is CIE1976.

2.4.1 Standard Measurement

On the standard measurement interface, aim the measured sample at the measuring aperture of the instrument and stick it tightly. Press the measuring button lightly, and the buzzer will "drip" and the LED indicator will turn from yellow to green, which means the measurement is completed. The interface of the tested sample after the test is completed is shown in Figure 7.

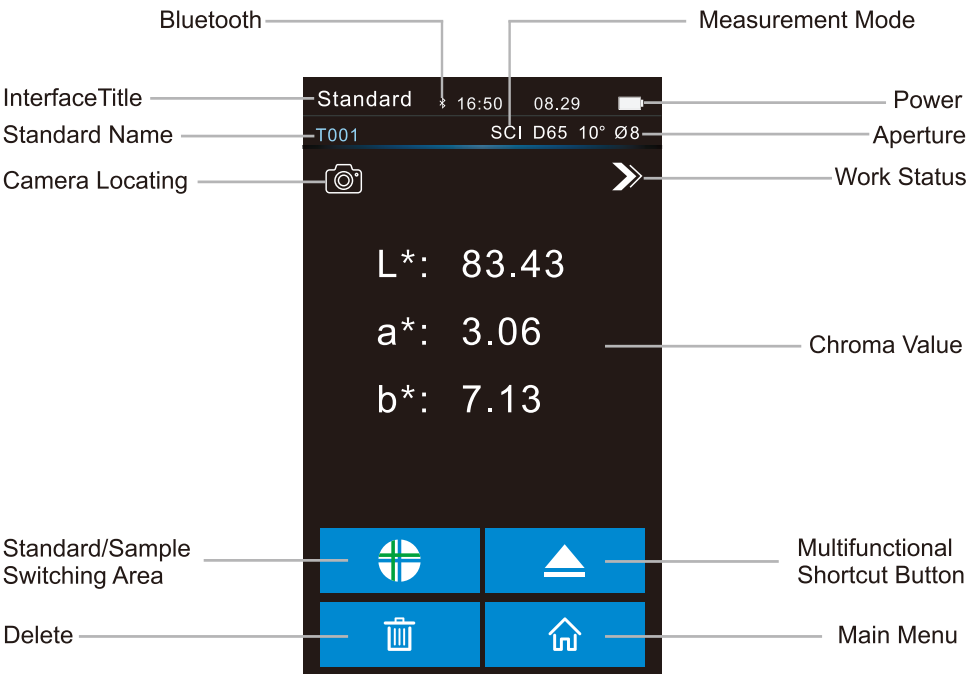


Figure 7 Standard Measurement

1)**Interface Title:** Indicates that it is currently under the standard measurement interface.

2)**Status Bar:** Displays system setting information, such as lighting mode, Bluetooth logo, measurement mode, and current time, date, light source, observation angle, aperture and power quantity, etc. If Bluetooth is turned on, its logo will be displayed in the status bar, otherwise it will not be displayed.

3)**Checking and Positioning:** Click on the checking and positioning camera (some models),

and you can use the checking and positioning camera to position the measurement position. After the positioning is completed, lightly press the measurement button to complete the measurement.

4)**Standard Name:** Displays the name of the currently measured standard sample, which starts with "T" by default, followed by the serial number from T001 to T500.

5)**Standard Chromaticity Value:** The value measured by standard. Some models of instruments display one decimal place, while others display two decimal places.

6)**Multifunctional Shortcut Button:** Click the shortcut switch menu button to switch SCI, observation angle and light source.

Note: SCI and SCE switching of display mode only switches the current display data, and the measurement modes of standard sample and sample are set in measurement mode of system setting.

If the current test data does not support the mode selected by the customer, the corresponding display may be "-"(for example, if the measurement mode is SCI, but the user switches SCE, SCE,Lab will be displayed as "-").

7)**Standard/Sample Switching Area:** Click to switch to the sample measurement interface.

8)**Delete/Save:** When automatic saving of measurement is turned on, click delete the current measurement data. When the automatic saving of measurement is closed, it will be displayed as the save button "  ", and click to save the current measurement data.

9)**Wavelength Switch Button:** As shown in Figure 8, click the"  " button, and the reflectivity of the currently measured sample and the wavelength of light will be switched at intervals of 10nm"  "

Note: The reflectivity interface can be switched by "  " to indicate the current interface.

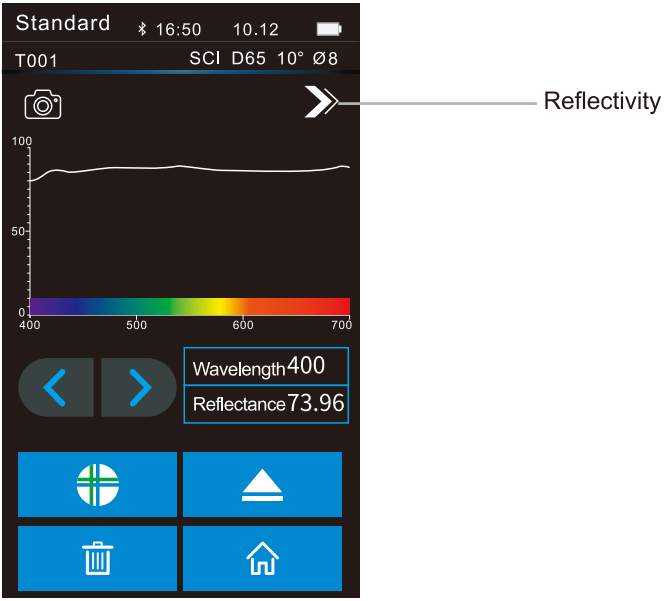


Figure 8 Measuring Reflectivity of Standard

2.4.2 Sample Measurement

Under the standard measurement interface, click "Sample Measurement" to switch to the sample measurement interface. Point the measured sample at the measuring aperture of the instrument and stick it tightly. Press the measuring button lightly, and the buzzer will "drip" and the LED indicator will turn from yellow to green, which means that this measurement is completed. The interface of the sample after measurement is shown in Figure 9, and the differences from the standard sample measurement are described in detail below.

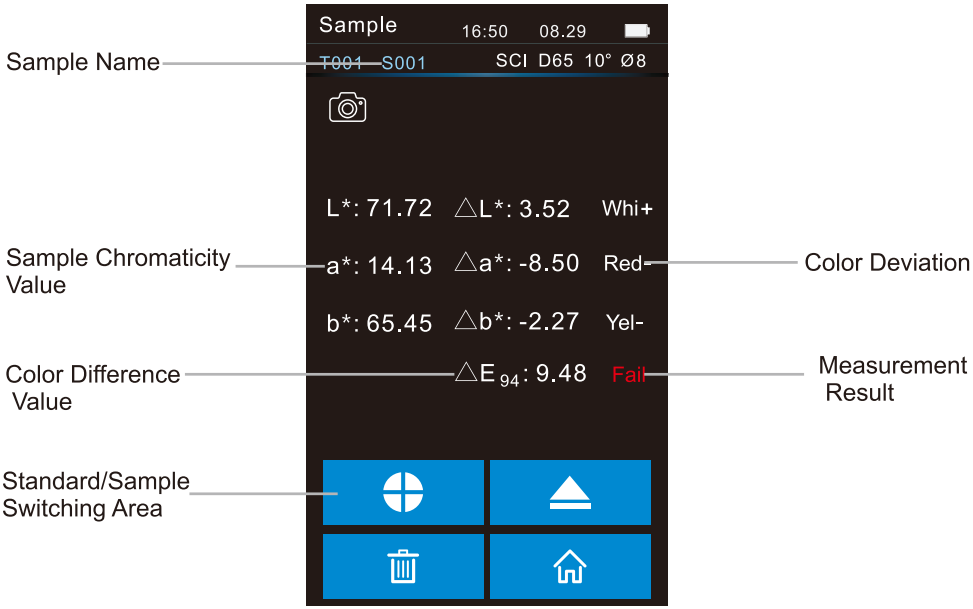


Figure 9 Sample Measurement

1) **Interface Title:** Indicates that it is currently under the sample measurement interface.

2) **Sample Name:** Displays the name of the currently tested sample, which starts with "S" by default, followed by the serial number.

3) **Chroma Value of Sample:** The value measured by the sample in the current display mode is displayed. Some models of instruments display one decimal place, while others display two decimal places.

4) **Color Difference Value:** displays the difference between the chromaticity value of the sample minus the chromaticity value of the standard sample in the current display mode.

5) **Color Deviation:** The color deviation of the current sample compared with the standard. It will only be displayed if "Color Bias" is turned on in the display setting.

6) **Measurement Result:** The test result of the current sample is displayed, which is judged by the tolerance of the standard sample and the specified color difference formula. If the color difference exceeds the tolerance, it will show "unqualified", otherwise it will show "qualified". It will only be displayed when "Test Result Prompt" is turned on in the display setting.

7) **Reflectance Difference:** The difference between the measurement sample and the standard under the current reflectivity**.** As shown in Figure 10, click the button" " , and the difference between the light wavelength of the currently measured sample, the reflectivity of the sample and the reflectivity of the sample standard will be switched at intervals of 10nm.

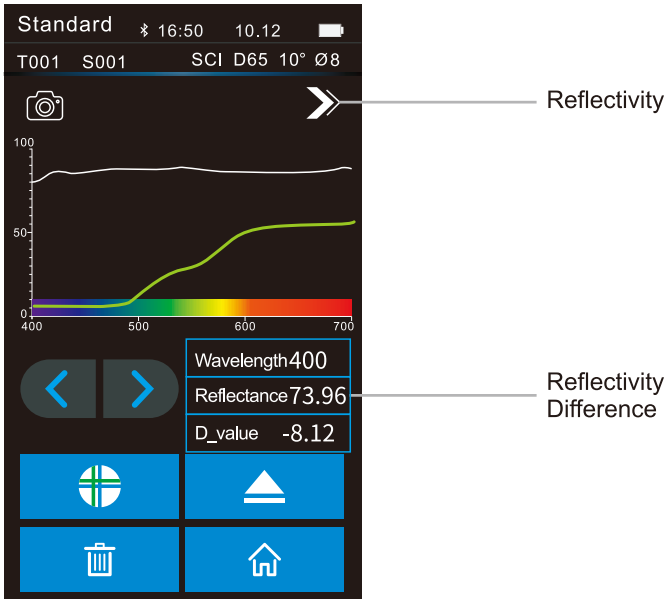


Figure 10 Measured Reflectivity of Sample

2.5 Communication with PC with Bluetooth

The PC-side software has powerful function expansion, which can realize more chroma data analysis. This series of instruments can communicate with PC software models (some models) through USB data cable and Bluetooth module (only for products equipped with Bluetooth module).

2.5.1 Communicate with PC through USB

When the client program is installed on the PC, connecting the instrument with the PC by USB data cable will automatically recognize the connection. If the connection is successful, the terminal instrument can be fully controlled by software, and the relevant samples can be tested and analyzed.

2.5.2 Communicate with PC and Mobile APP via Bluetooth.

For some instruments equipped with Bluetooth module, you can communicate with PC through Bluetooth.

When the client program is installed on the PC, turn on the Bluetooth option in the system setting of the instrument, and match the computer with Bluetooth. After the matching is successful, the software is connected in Bluetooth connection mode, and the Bluetooth icon appears in the lower right corner of the software, which indicates that the connection is successful through Bluetooth. Then, the comprehensive control of the terminal equipment can be realized by software, and the relevant samples can be tested and analyzed.

When the APP is installed on the mobile phone, turn on the "Bluetooth" option in the "system setting" of the instrument, and match the APP with the instrument. After the matching is successful, the APP uses Bluetooth connection mode to connect, and the Bluetooth connection is successful. The software realizes the overall control of the terminal instrument, and tests and analyzes related samples.

3. Description of System Function

Click the main menu "  " in the measurement interface to enter the main menu interface (as shown in Figure 2). In other interfaces, you can click the back button "  " to enter the main menu. From the main menu, you can enter each submenu to realize all system function setting.

3.1 Data Manage

Click data management in the main menu to enter the data manage, as shown in Figure 11. Data manage is mainly used to check and operate the measured records.

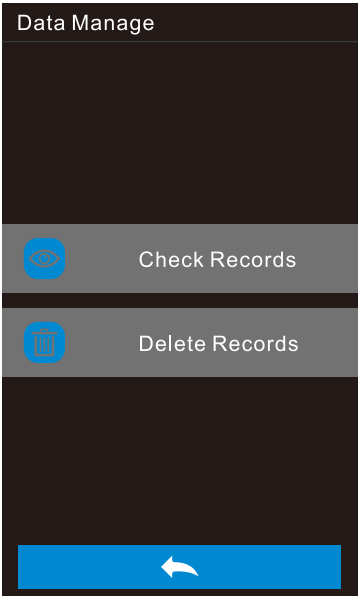


Figure 11 Data Manage

3.1.1 Check Records

1) Check the Standard Records

Click check record in the data manage to enter the standard record, as shown in Figure 12. Note: The instrument displays two decimal places when checking the chromaticity value of the standard record.

Click" ▼ " o check the next record, and click" ▲ " to check the previous record.

Click "  " to perform operations: SCI, 10, delete records, and import standard samples, as shown in Figure 13.

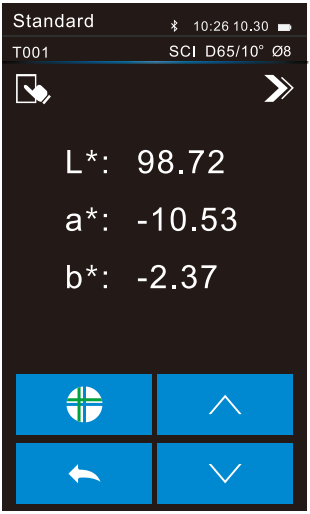


Figure 12 Standard Record

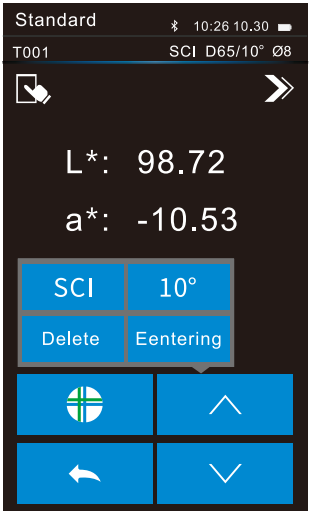


Figure 13 Standard Record Operation Menu

SCI: Click "SCI" to switch the measurement mode to SCE mode.

10: Click "10" to switch the observation angle to 2.

Delete Record: click "delete" to enter the interface of deleting record, and click "OK" to finish deleting; Or click cancel to delete and return to the operation menu.

Entering: Click "Entering" to set the standard being checked as the current standard, and then click "sample measurement" to measure the sample under this standard.

2）Check Sample Records

Click "Sample" under the standard record to check the sample record under this standard, as shown in Figure 14.

Click" ▼ "to check the next record, and click" ▲ "to check the previous record.

Click "  " to perform operations: standard transfer in, record deletion, SCI and 10, as shown in Figure 15.

Sample Transfer-in: Click "Sample Transfer-in" to set the sample record being checked as the new current standard sample, and then click "Sample Measurement" to measure the sample under this standard sample.

SCI: Click "SCI" to switch the measurement mode to SCE mode.

10: Click "10" to switch the observation angle to 2.

Delete Record: click "delete" to enter the interface of deleting record, and click "OK" to finish deleting; Or click Cancel to delete and return to the operation menu.

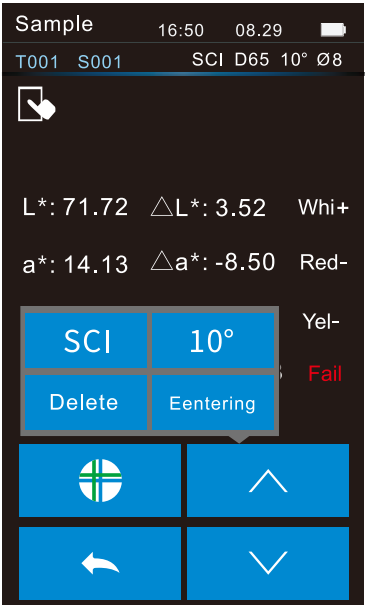


Figure 14 Sample Record

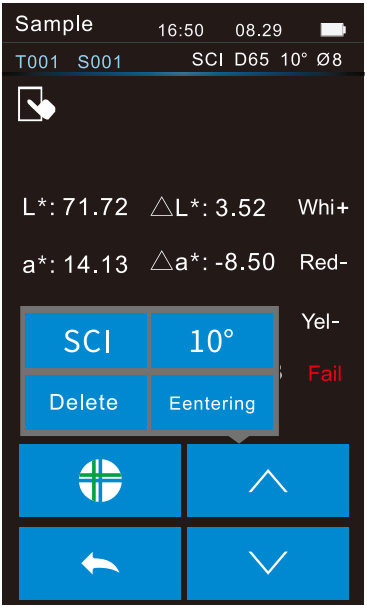


Figure 15 Sample Record Operation Menu

3.1.2 Delete Records

Click Delete Record in the data management interface to enter the Delete Record menu interface, as shown in Figure 16. Delete records are divided into "all records delete" and "all samples delete". Click the corresponding option, enter the delete prompt warning interface first, and click thein the"✓" "warning interface to delete all the corresponding records; To cancel, click the" ↩ ", as shown in Figure 17.