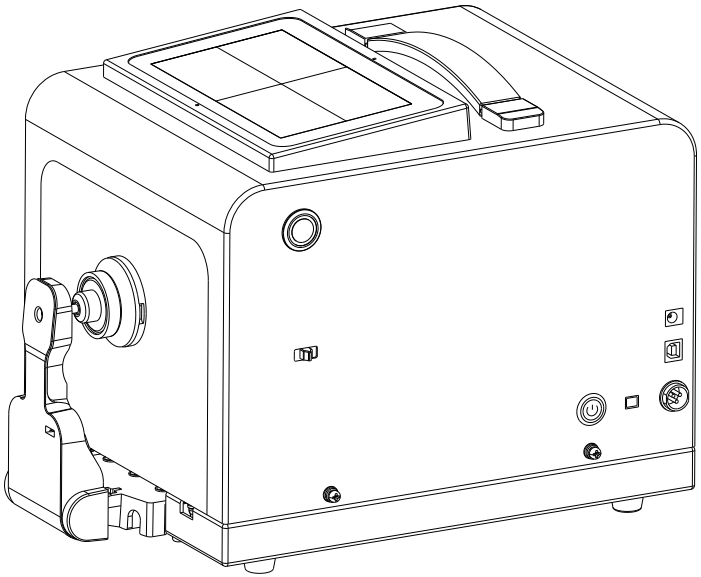
PORTABLE BENCHTOP
SPECTROPHOTOMETER
Operation Manual



V1.0

Read this manual carefully before use the spectrophotometer.

Safety Symbol

In order to avoid accidents caused by improper operation, the following symbols are used in this manual or on the instrument label.

This symbol instructs relative safety warnings or precautions.
Read these instructions carefully to use this instrument safely and correctly.

This symbol is a description of electrical hazards associated with electric shock.
Read these instructions carefully to use this instrument safely and correctly.

This symbol is a description of fire hazards。
Read these instructions carefully to use this instrument safely and correctly。

Represents a prohibiting execution. This is absolutely not executable.

Represents an instruction.The instruction must be strictly performed.

Represents a prohibiting execution. Do not disassemble this instrument.

Represents an instruction.Make sure that the AC adapter is pulled out from the AC socket.

Cautions

- •No copy or copy of all or part of this manual is strictly prohibited without authorization from the company.
- •The contents of this manual are subject to change without prior notice.
- •When preparing this manual, we have done our best to ensure the accuracy of its contents. If you have any questions or find any errors, please contact your retailer or our authorized maintenance agency.
- •The company has no liability for all consequences arising from the improper operation of this instrument。

Please keep this manual carefully for your reference at any time.

Safety Measures

To ensure proper use of this instrument , please read carefully and strictly observe the following points

Warning : Failure to comply with the following points may pose a danger to personal safety.

	1.Do not use this instrument in a place where there are combustible or flammable gases (gasoline, etc.), otherwise it may cause fire. 2.Do not allow liquid or metal objects to enter the instrument, otherwise it may cause fire or electric shock. If a liquid or metal object enters the instrument, turn off the power immediately, unplug the AC adapter plug, and contact the nearest authorized maintenance institution. 3.Do not force, twist or pull the power cord of the AC adapter. Do not scrape or modify the power cord, or place heavy objects on the power cord, otherwise it may damage the power cord, and cause fire or electric shock. 4.Do not use wet hand to plug AC adapter plug, otherwise it may cause electric shock. 5.If the instrument or AC adapter is damaged, or smokes, do not continue to use this instrument, otherwise it may cause fire. In this case, power should be switched off immediately, AC adapter plug removed from the AC socket, and contact the nearest authorized maintenance institution. 6.Do not measure the face directly on the sample measuring aperture, otherwise it may damage the eyes. Do not place the instrument on an unstable or inclined surface, or it may cause the instrument to slide or overturn, causing injury to personnel.
	1.Be sure to always use a standard AC adapter or an optional AC adapter and connect it to an AC socket with rated voltage and frequency. If you use a not specified AC adapter, it may damage the instrument or cause a fire or electric shock. 2.Be careful not to put your hand in the notch of the instrument, or you may get stuck in your finger and cause injury.
	Do not disassemble or refit the instrument or AC adapter, otherwise it will cause fire or electric shock.
	1.If the instrument is not used for a long time, please pull the AC adapter plug from the AC socket. Because the dust or water stains on the AC adaptor pins may cause a fire, they should be pulled out immediately.When pulling the AC adapter plug out of the AC socket, be sure to always hold the plug itself to avoid pulling the power cord, which may damage the power cord and cause fire or electric shock.

The benchtop spectrophotometer is designed for the measurement of color and color difference in all fields. It can measure the color for reflection and transmission with high accuracy.

Operating Environment

•Please use this instrument at ambient temperatures ranging from 0℃ to 40℃ without condensation. Do not use this instrument in areas where temperature varies dramatically.
•Do not place this instrument near direct sunlight or heat sources such as furnaces. In this case, the internal temperature of the instrument may be higher than the ambient temperature.
• Do not use this instrument in the presence of dust, cigarettes or chemical gases, or it may cause performance degradation or even system collapse.
•Do not use this instrument near devices such as loudspeakers that generate strong magnetic fields.
•The bench-top spectrophotometer and its standard AC adapter are designed for indoor use only. Because rain or other factors may damage the instrument, so do not use it outside.

White Calibration Plate

•Do not scrape or dirty the white correction board, for example, do not leave fingerprints.
•When white calibration plate is not used, be sure to place them properly to prevent white calibration plate from being exposed to light.
•To achieve accurate measurement, we advise that the white calibration plate should also be calibrated periodically.

Power

•Ensure that the power switch is switched to "O" when the benchtop spectrophotometer is not used.

•Make sure you always use a standard AC adapter and connect it to an AC socket with rated voltage and frequency.

CATALOGUE

CATALOGUE

Instruction

portable benchtop spectrophotometer are independently developed by our company, who has complete intellectual property rights. The instrument hold as large as 7 inch capacitive touch screen. according to the geometric optical illumination D/8°(Reflection), the instrument can measure reflection and colorimetric data of various samples.it adopt combination full spectrum LED light source 400~700nm ,it enable to meet different sample measurement and fluorescent samples of colorimetric data measurement ,

With USB, Bluetooth dual mode and with high-end color management software which can be connected to PC to achieve more extension functions, it has the character of stable working, accurate color measurement, large storage capacity and it is good to achieve the accurate color analysis and transmission. the instruments can be accurate in measuring for color matching system and apply to color quality control area. they are widely used in plastic, electronics, paints, textile, printing, automobile, medical, cosmetic and food industries or science research institutes and laboratories

Cautions

●The spectrophotometer is a precise measuring instrument. Please avoid drastic changes of external environment when measuring. These changes, including the flash of surrounding light and the rapid change of temperature, will affect measurement accuracy.

●Keep the instrument balanceable,--stable, make sure the measuring aperture touch the surface of the test sample placidly, and no shaking or shifting when measuring. Please prevent the colorimeter from fierce collision or crash.

●The instrument is not waterproof. Do not use it in high humidity environment or in water.

●Keep the instrument clean. Avoid dust, powder or solid particles entering the measuring aperture and the instrument.

●Replace the white calibration cavity and put the spectrophotometer into

●The instrument is not waterproof. Do not use it in high humidity environment or in water.

●Keep the instrument clean. Avoid dust, powder or solid particles entering the measuring aperture and the instrument.

●Replace the white calibration cavity and put the spectrophotometer intoinstrument case when not in use.

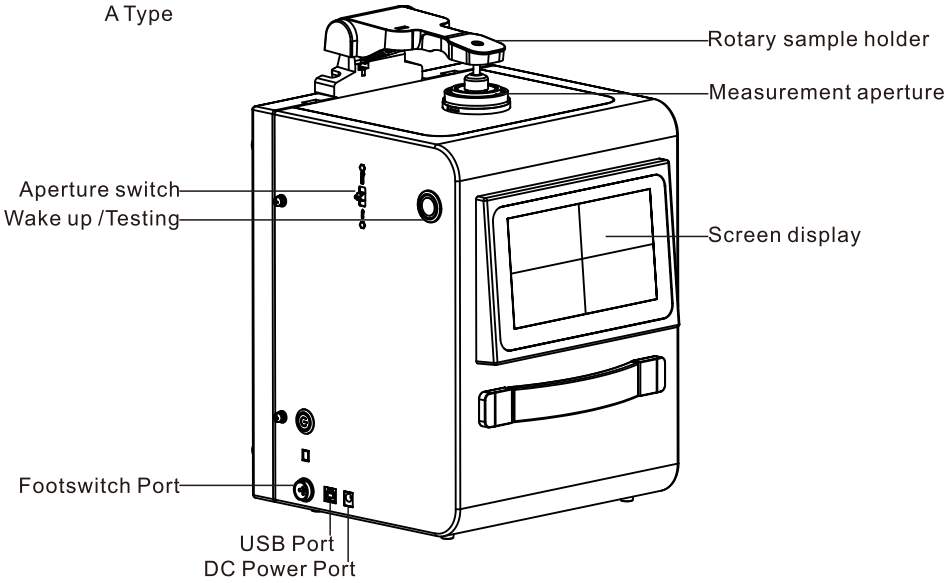
●Please power it off to prevent the instrument from damage if you don't use it for a long time.

●Please keep the instrument in a cool dry place.

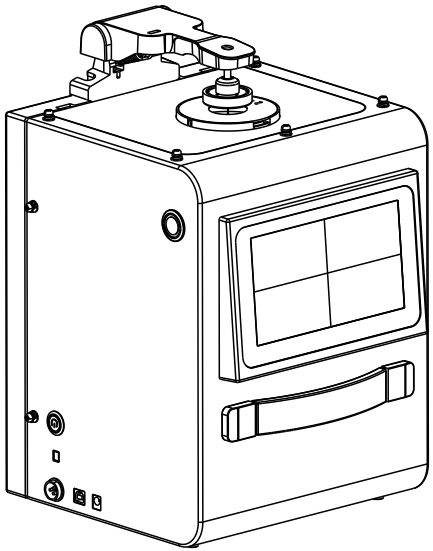
●Any unauthorized changes to the instrument are not permitted, or it will affect the measuring accuracy, even cause irreversible damage.

1. External Structure Description

A Type

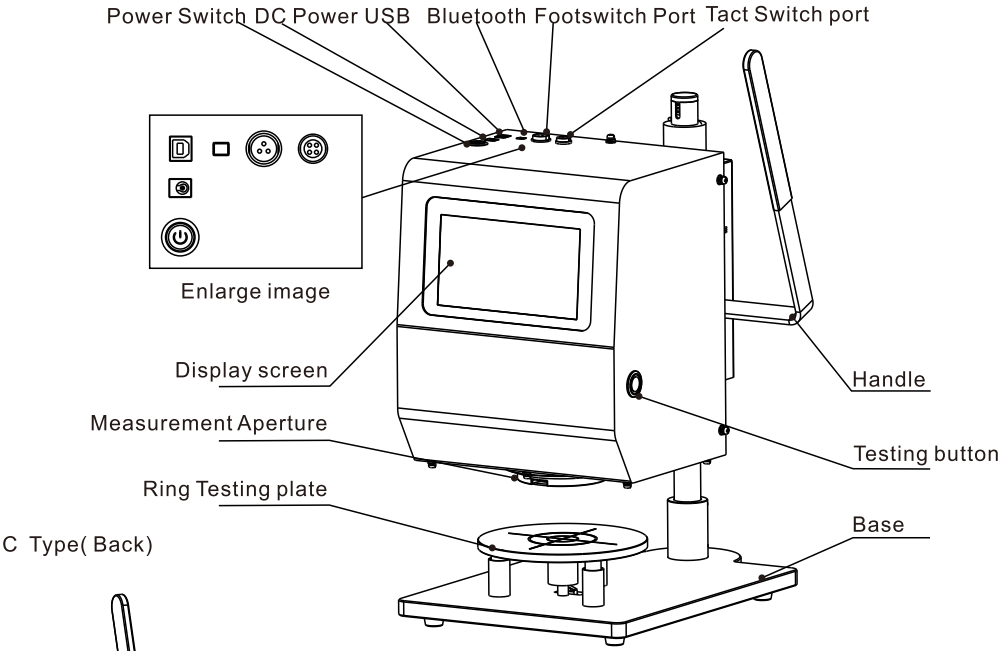


B Type



No switching of measurement aperture

C Type (Front)



C Type(Back)

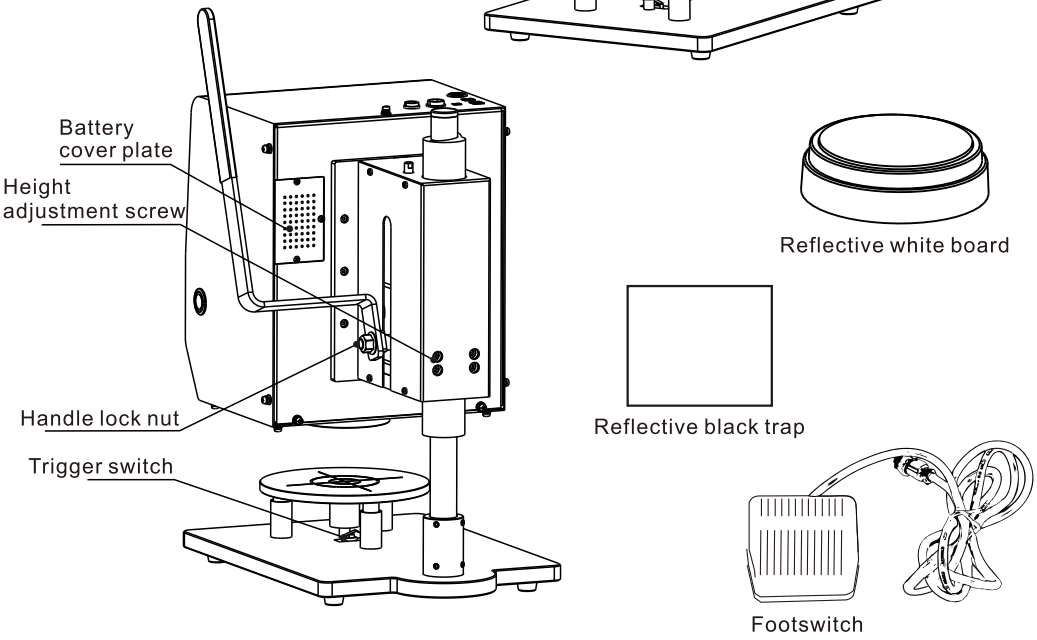


Figure 1 Schematic Diagram of Instrument exterior structure

Display
7-inch TFT color LCD, Capacitive Touch Screen,Used to display measurement data and instrument operation navigation.

Wake-up/Testing to Measuring
*Pressing the button shortly is to wake up the system and start measuring.
*Pressing the button during measurement will cause operation invalid.there is a ring indicator light on this button. the indicator light flashes during the measurement process and is always on when the measurement is completed.

Rotary sample holder
the sample holder on the rotating bracket is used to hold the sample. When the sample is heavy, it can be supported by the rotating bracket.

Measuring Aperture
Reflective measuring apertures: Φ25.4mm/Φ8mm/Φ4mm;The customer selects the appropriate measuring aperture according to the measuredsample size to the benefit of accurate measurement.

Aperture switch
Be used for Φ8mm/ Φ4mm switching (some models without this function);The measuring aperture is Φ8mm and the switch is moved to the MAV position; The measuring aperture is Φ4mm and the switch moves the SAV position.

Reflective White Calibration Plate
During Reflective measurement mode, white calibration is used as the highest reflectance test benchmark of the instrument. For specific operation please refer to the section of black and white calibration.

USB Port
USB port is used to connect with PC computerized high-end color management software to achieve more extension functions.

DC Power Port
The power adapter connects Alternating Current (AC110V-240V) to power the instrument. The specification of external power adapter is DC 24V/3A.

Power Switch
The power switch has a ring indicator light, only red on and off two states. Press down the switch, the instrument is started with red light always on; Press down the switch again, the indicator light goes off, the instrument power off.

Reflective black trap
For black and white correction, refer to black & white correction section for specific operation. (Type C instrument)

Footswitch port
The Footswitch Port is connected with the instrument, the pedal design is more humanized and the measurement is convenient and quick.

Ring Testing plate
Used to place measuring samples

Bluetooth
Connect the color management software on PC with the instrument through Bluetooth

Trigger switc port
For connection of Tact Switch switch

Handle
When measuring, the user faces the instrument and turns the handle downward to measure.

Trigger switch
When measuring, the handle can be turned to make the whole machine move downward and touch the tact switch for measurement.

Base
Used to support the instrument.

Battery cover plate
Remove the cover plate and put the battery into the battery compartment.

Height adjustment screw
4 pieces screws. loosen the screw to adjust the height of the machine to an appropriate height and tighten the screw to prevent the instrument from moving up and down.

Handle lock nut
Before use, the user should tighten the handle nut to prevent the handle from falling off.

2.Operating Instruction

2.1Power On & Off
Press the power switch the red indicator light always on, the instrument is powered on. Press the power switch again, the instrument is turned off, and the indicator light goes out. If the operation is not done for a long time when the instrument is on, it will automatically enter into standby mode. At this time, press the test key to wake- up the instrument to keep working. Please refer to the instruction section of screen backlight.

⚠ Please cuff off the power if not to use the instrument for a long time.

2.2Calibration
Black and white calibration is required under the following circumstances.

1、Before the first time of measuring after power is on.
2、Before the first time of measuring after switching measuring aperture..
3、Before the first time of measuring after switching UV mode
4、When the environmental condition change relatively large (such as temperature changes exceeding 5 degrees Celsius).
5、Use the instrument for a continuous long time (over 8 hours)
6、When the user finds that the measuring data is inaccurate.

Calibration Steps
1.In Figure 2 standard measurement interface, click ⌂ ,or in other interfaces click, ✓ or ↩ ,to enter into Figure 3 main menu, as shown in the following figure.

Figure 2 Standard Measurement

Figure 3 Main Menu

2.In the main menu to click “Calibration” to enter white and black calibration interface as shown in Figure 4. It will show whether the calibration is valid or not and how long the remaining time is.

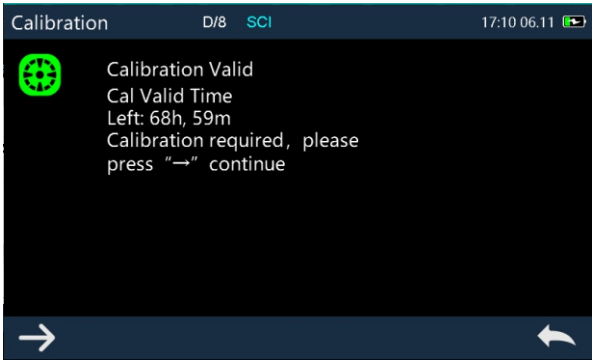


Figure 4 Black and White Calibration

3.Click → to enter Reflective Black Calibration interface as shown in Figure 5.According to the instructions, put the measuring aperture against the blank (Type C instrument, put the reflective black trap on the ring testing plate,press down the handle, so that the measuring aperture and the black trap fit closely. the black trap can also be held by hand so that make them close to better . then press the test key to start black calibration, or click ↩ to cancel and quit the calibration.

Note

when the instrument performs "reflection black correction" the surrounding environment must be dark and without bright light, and there is no shelter within 1m of the direction of the instrument

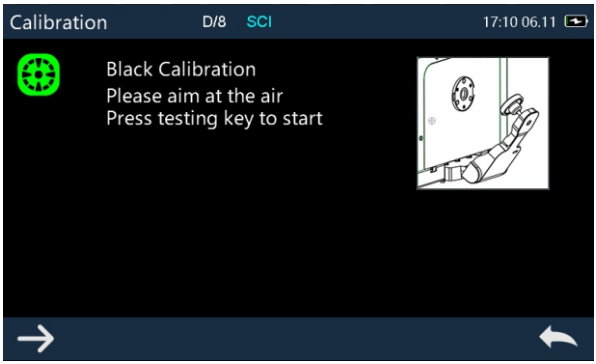


Figure 5 Reflective Black Calibration Interface

4.It will automatically enter White Calibration after Black Calibration is finished as shown in Figure 6. Place well white plate (Type C instrument whiteboard can be hold by hand), then press test key to start white calibration, or click ↩ to cancel and quit the white calibration.

Note

1.Do not press the handle when the white board is placed on the testing plate of Type C instrument, so as not to damage the white board.

2.The white board number corresponds to the instrument one to one, and "white board number" is displayed on the reflection white calibration interface.

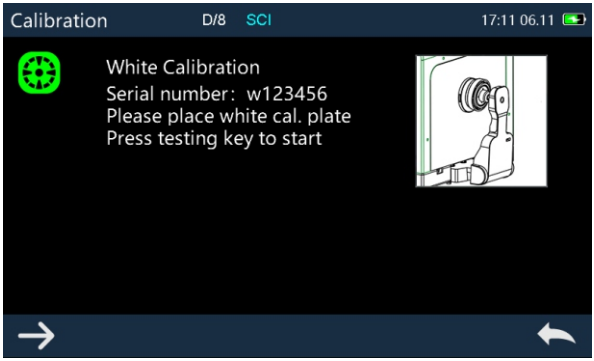


Figure 6 Reflective White Calibration

After black and white calibration are finished rightly, the instrument system will reset remaining time according to valid time after last calibration (As shown in Figure 4)

2.3Measurement

2.3.1Measurement Interface

As shown in Figure 7, it is working condition area at the top of measurement interface, displaying the status of measurement mode, including: Interface Name, optical configuation. Measurement model, UV status, Bluetooth, System time, and so on.At the left side, it is shortcut area, it could switch different modes by touching different icons.At the middle, it displays different chromatic data according to different setting of color formula.It is operation buttons area at the bottom, which could operate the data by touching the different icons.

Figure 8 is the interface of reflectance rate spectrum. Figure 9 is colorimetric index display area, fast switch by touching the ▼ icon.

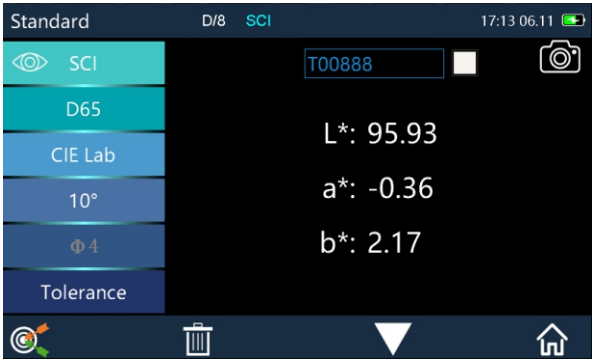


Figure 7 Colorimetric Measure

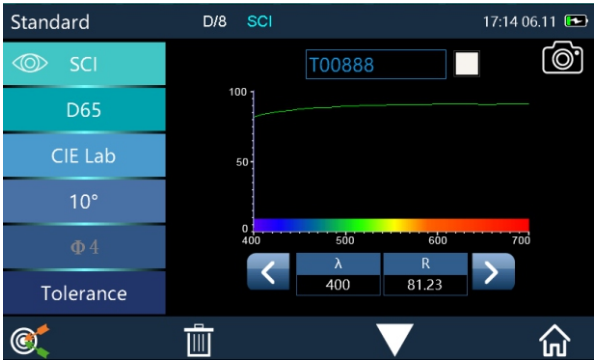


Figure 8 Reflectance Spectrum

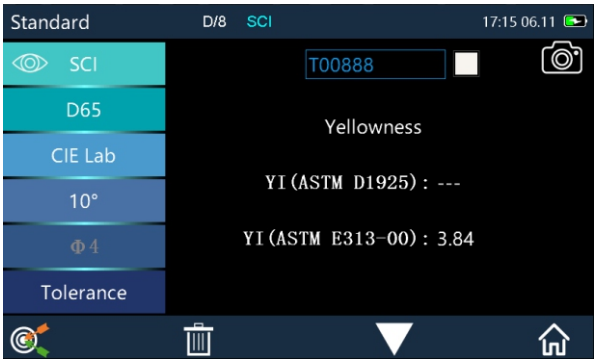


Figure 9 Colorimetric Index Measurement Interface

Measurement is divided into standard sample measurement and sample measurement, Standard sample measurement is generally used to measure the target sample chromaticity data, sample measurement is used to measure the sample and the target sample chromaticity difference or contrast data.after calibration ,Standard sample measurement and sample measurement can be carried out, the user can set the corresponding measuring aperture, light source, color space and color index on the main menu interface as required (see Chapter 3). the system default is CIE Lab color space, the color difference formula is $\triangle E^*ab$, and the color index is empty. you can click " ↩ " on the interface for several times or press the measurement button return to the measurement interface.

2.3.2Reflection Standard Measurement

the measured sample is placed cling to the reflective measurement aperture of the instrument. The buzzer emits the sound of "beep" when the measuring key is pressed shortly. At the same time, the LED indicator flashes until the flashing stops, the buzzer emits the sound of "beep" again, then the measurement is finished. After it, the interface is shown as in Figure 10 and Figure 11. The following is a detailed description of the standard measuring interface.

(1)Interface Title: indicate the current interface name;
(2)Status bar: display the current measurement mode, UV status, Bluetooth status, system time, etc.
(3)Sample measurement mode: Standard sample measurement defaults to SCI+ SCE data; it is able to choose SCI, SCE, I + E for sample measurement.
(4)Display mode: click SCI or SCE to switch the current mode.
(5)Light source: click on the shortcut key, the current test data can be quickly switched between D65, D50 and other standard light sources;
(6)Color space: by clicking the shortcut key, the current test data can be quickly switched between CIE Lab, CIE XYZ, CIE Yxy, CIE LCh and other color spaces.
(7)Observer angle: click to quickly switch the observer angle between 10 degree / 2 degrees.
(8)Measuring aperture: indicates the measuring aperture currently using.
(9)Standard sample tolerance: Click to set the tolerance of current standard sample.If not set it, this is default system tolerance. For details please refer to section 2.5.
(10)Name of standard sample: showing the name of the current measured sample. Click to modify quickly.
(11)Standard sample simulation color: the color corresponding to the test result of the standard sample
(12)Camera locating: click to view the position of the object to be measured at the reflective measurement aperture.
(13)Switch to sample measurement: click to enter the sample measurementinterface.
(14)Delete: Click the icon of to delete the current standard record, at this moment the system defaults to open the automatic saving function. If you turn off this function, the icon should be For details please refer to section 3.8.1.
(15)Page turn: click to look at other colorimetric data index of the current standard.

Figure 10

(16)Wavelength switch button: Click < or > button to switch the wavelength of the light wave, the reflectance of the sample and the wavelength switched at intervals of 10nm.

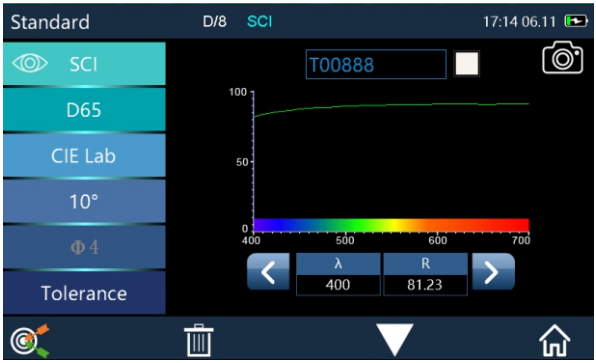


Figure 11

2.3.3Reflection Sample Measurement

The sample measurement of reflective sample is based on the standard measurement or standard record entering.Under the standard measurement interface of reflective sample, click switch to the sample measurement interface, short press the “measuring key” to start testing, the buzzer makes a "beep" sound and the LED indicator flashes at the same time. Until the flashing stops, the buzzer sounds again, indicating that the measurement is completed. After it, the interface is as shown in Figure 12,13.The following is a detailed description of the different contents of the sample measurement interface and the standard measurement interface.

(1)Interface Title: indicate the current interface name

(2)Standard name: the name of the standard corresponding to the sample.

(3)Sample name: the name of the current measured sample, click to quickly modify.

(4)Simulation color: the simulation color of the current standard is displayed onthe left side and on the right side is the simulation color of the current sample.

(5)Sample chromaticity value: the left side of the display area shows the chromaticity data of the current standard in the current system mode, and the right side shows the chromaticity data difference between the current sample and the current standard.

(6)Color difference value: under the current mode, the sample chromaticity value minus the standard chromaticity value of the difference.

(7)Color Offset: The color deviation of the current sample compared to the standard. It is only displayed when "Color Offset" is turned on in the system settings.

(8)Testing result: It is judged by the tolerance of the standard and the specified color difference formula. When the color difference exceeds the tolerance, the red will display “fail”, or the green will display “Pass”. It is only displayed when "Display Testing Results" is turned on in the system settings.

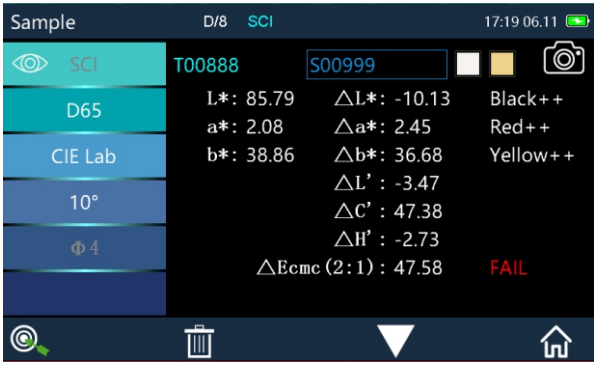


Figure 12

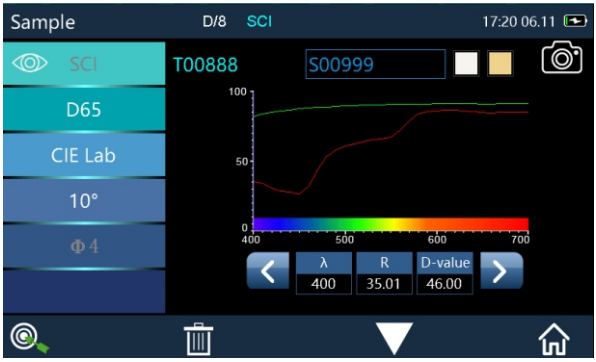


Figure 13

2.3.4Average Measurement

When the measured object is relatively large, or the chromaticity is relatively uneven, the multi-points average reflectance is obtained by measuring a plurality of representative test points, and then the calculated chromaticity data is more representative of the true color of the measured sample. The instrument can achieve 1~99 times average measurement, and the average number of measurements can be set for both samples and standards.Click “Measurement Mode” on the main menu, then click “Average Measurement” to enter the average measurement setting interface, as shown in Figure 14:

Figure 14

2.4Connection To Pc

The PC-side color management software has many functions to realize richer chroma data analysis. The instrument can communicate with the installed PC- side color management software via USB or Bluetooth module (only for product models equipped with Bluetooth modules).

2.4.1USB Connection

When the color management software is installed on the PC, use USB cable to connect the instrument to the PC. The software will automatically connect to the instrument. If the connection is successful, the status bar of the instrument will display the USB connection icon . Through the PC color management software, it can have or take over complete control of the terminal instrument, and related sample testing and analysis.

2.4.2Bluetooth Connection

With Bluetooth-equipped instruments, first turn on the Bluetooth function in the system settings, open Bluetooth on the Bluetooth-enabled PC, search for devices such as " Instrument model: SN code" (Instrument model and SN code can be viewed in "System Settings" → "About Instrument") and fill in the matching code to connect. if the connection is successful, the status bar of the instrument will display the Bluetooth connection icon, then through the PC-side color management software, it can achieve complete control of the terminal instrument, and related sample testing and analysis.

2.5Tolerance Setting

The tolerance is for the standard, and the tolerance of the standard will affect the instrument's determination of the sample result. System tolerance is the tolerance that the instrument assigns to the standard by default. If the standard tolerance is not set, the system tolerance will be used by default, so the accuracy of the system tolerance is critical to the accuracy of the test result judgement.

2.5.1System Tolerance Setting

From the main menu, enter the system setting interface (Figure 15), click ⓐ or ⓓ to find the system tolerance, click on the "System Tolerance" to the editing interface, as shown in Figure 16.

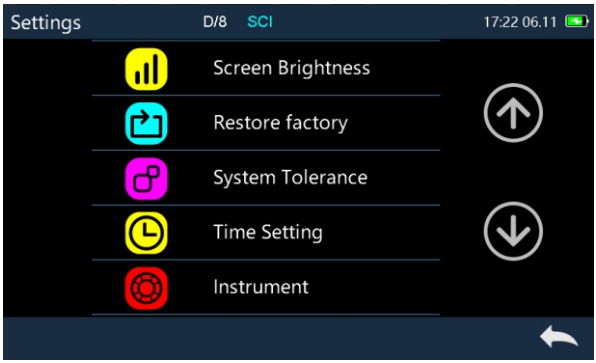


Figure 15

Figure 16

The total tolerance of the standard is set in the interface ▵E* (CIE1976)The left side ▵L* is the lower limit of the set standard tolerance, the right side▵L*is the upper limit of the set standard tolerance, and the upper limit of theright tolerance must be greater than the lower limit of the tolerance. The setting method ▵a* and ▵b* is the same as ▵L* . Click the corresponding tolerancevalue to enter the corresponding value setting interface. After setting, click ✓to confirm the saving, and this means the tolerance is the standard or click the lower side ↩ to cancel and exit the tolerance setting interface.When the standard uses the default system tolerance, the sample is compared with the standard data, and only if the tolerance ▵E*, ▵L* , ▵a*, ▵b* iswithin the tolerance range, the sample will be Pass, or the prompt will be Fail (the test result prompts the function to open).

2.5.2Standard Tolerance Setting

Standard measurement interface (Figure 2) Click “Standard Tolerance” to enter the editing interface, as shown in Figure 17:The setting interface and method are the same as the system tolerance setting, but the difference is that the location of the click is different. When the user has special tolerance requirements for the standard, click the tolerance setting to set the tolerancefor the standard.

Figure 17

2.6print

There are two ways to print the sample chromaticity data of the instrument. One is to print it through the printer connected to the PC software when connecting the PC to the color management software; the other is to print by a micro printer connected to the instrument, and this way is described in detail below..Micro-printers are non-standard accessories and required to be purchased separately.

Printing steps

1.First test the standard and save the test record to print;
2.Enter "System Settings" from the main menu, click "Print Data" to open this function;
3.Connect the micro printer to the instrument via USB;
4.Enter “Data Management” from the main menu, view the record, and find the sample record (standard record or sample record) to be printed by → or ←
5.Click to select “Print Data” in the pop-up menu and click “Confirm” to start printing the sample chromaticity data, as shown in Figure 18:

Figure 18

3.Main Menu

In the measurement interface (Figure 2) click to enter the main menu, or click in other interfaces to enter the main menu. From the main menu, it can enter each sub-menu to achieve all system function settings.

3.1Data Management

Click “Data Management” on the main menu interface to enter the data management interface, as shown in Figure 19. Data management can realize functions such as “Check Record”, “Delete Record”,“Search Record” and “Standard Input”.

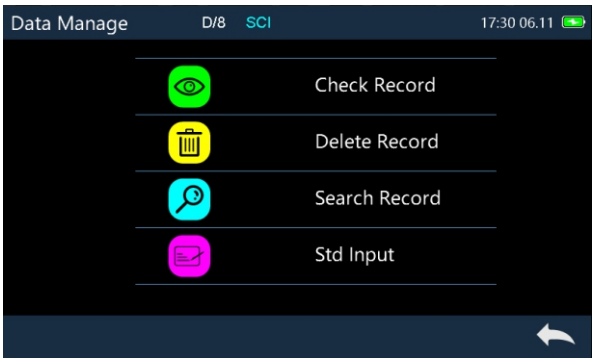


Figure 19

3.1.1Check Record

(1)Check Standard Record

Click “Check Record” to enter the "Standard Record" interface in the data management interface. As shown in Figure 20.

Figure 20

Switch records by clicking ← or →Switch among chromaticity data,reflectance curve and color index by clicking ▼ Click to replace,lock, to current STD, and print data as shown in figure 18.

Figure 21

Edit the current viewing standard record name: click standard name to enter Edit Name interface, then input new name and click “ENTER” to save. The maximum name is 16 characters. Press "ENTER" to confirm the save or Click to cancel editing operation as shown in Figure 21.

Set the viewing standard as the current standard: Click and “Standard Input” to set the current viewing standard as the current standard. Then click to perform the sample measurement under this standard.Reset the current viewing standard record: Click and “Replace” to remeasure and replace the viewing standard record. The is switched to standard measurement and short press the measurement button to remeasure the standard as shown in Figure 22.

Figure 22

(2)Check Sample Record

Click on the standard record interface to switch to the sample record interface and check the corresponding sample record. Click on the sample record interface to return the standard record interface as shown in Figure 23

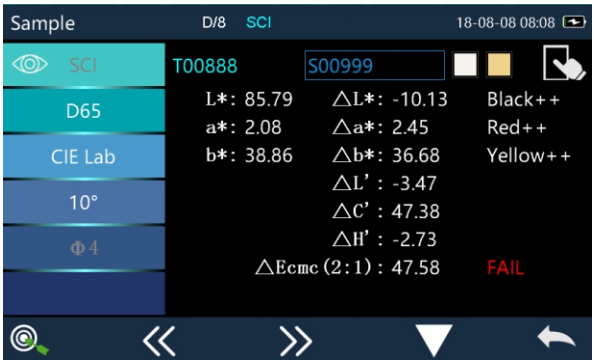


Figure 23

3.1.2Delete Record

Click "Delete Record " to enter delete record menu on the Data Manage interface as shown in Figure 24. “Delete Record” includes “Delete All Samples” and “Delete All Records”.Click the corresponding option to enter Warning on “Delete Records”. Click ✓ on the Warning to delete all corresponding records. Click ↩ to cancel delete as shown in Figure 25.

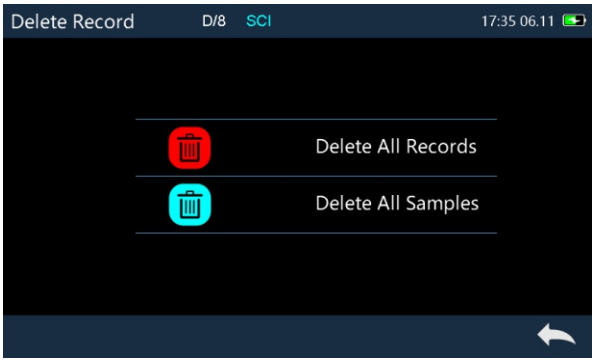


Figure 24

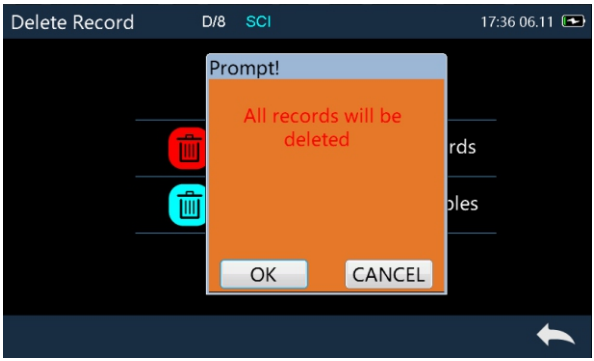


Figure 25

3.1.3Search Record

Click "Search Record" on the Data Manage interface to enter search menu ,Select "Search Standard" and "Search Sample". Search by inputting searching name as shown in Figure 26.

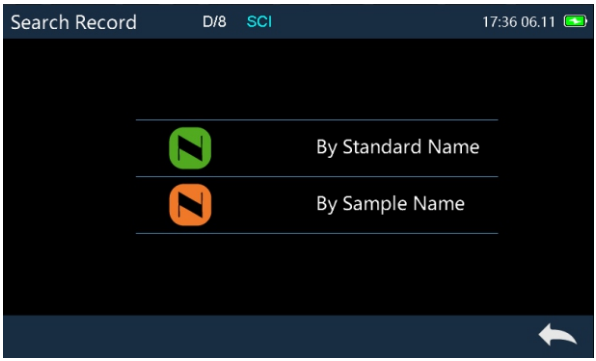


Figure 26

3.1.4Standard Input

Click "Standard Input" to enter “standard inputting” in the Data Manage interface as shown in.

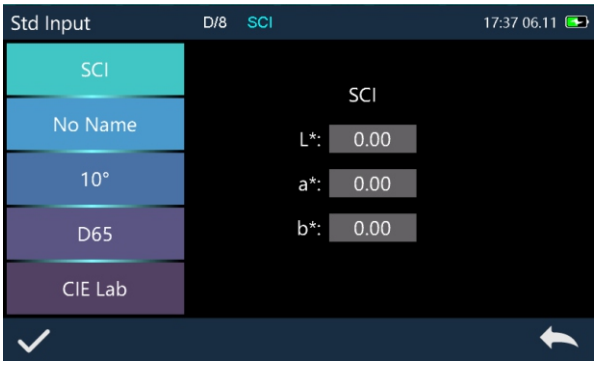


Figure 27

Click Measure Mode to set standard measure mode to SCI or SCE or SCI+SCE. Click the standard light source to set the light.Click Color Space to select the color space of standard input. Currently only support CIE Lab and CIE XYZ.Click Observer Angle to set the standard's observer angle.Click standard tolerance to set standard tolerance value. Use system tolerance without setting default.Click standard name to input standard name.Click the corresponding chromaticity coordinate value to input the chromaticity value of the corresponding coordinate. Input all standard information and click ✓ to confirm then the standard is saved in the standard record list, whose standard number is added in order.

3.2Calibration

As the basis of chromaticity measurement, black and white calibration must be carried out accurately, or it will affect the validity of test data.

When the current black and white calibration environment is greatly different from the current sample test environment (such as temperature drastic fluctuation), the instrument is required to be re-calibrated in time. After the last successful black and white calibration exceeds the setting time, it is also recommended to redo black and white calibration before the measurement.

The whiteboard should be cleaned regularly, and properly kept under the dark, dust-proof and dry environment. Please refer to section 2.2 for black and white calibration method.

3.3Illuminant

The user can set the corresponding light source according to the actual measurement condition. It can set the system standard observer angle, standard light source type and UV light source opening in this illuminant setting interface.

Click "Illuminant" to enter illuminant setting on the main menu (Figure 28). Click observer angle to switch between 10° and 2°. 10° is CIE1964 standard. 2° is CIE1931 standard

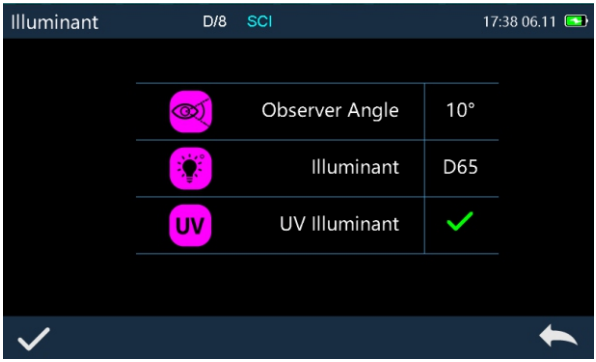


Figure 28

Click "Illuminant" as shown in Figure 29. In the Illuminant option window, D65, A, C, D50, D55, F1~F12 and other light sources can be selected.

Note: Some models of instruments do not have the function of "UV light source"; the light source options in Light Source Selection vary from model to model.

Figure 29

3.4Average Measurement

Click “Measurement Mode” on the main menu, then click “Average Measurement” to enter the average measurement setting interface, as shown in Figure 14, enter the average number and click " ✓ " to confirm.

If the average number is 1, then do the measurement routinely , If greater than 1, the measurement result will to be a average results after averaging the specified number of measurements during the standard /sample measurement. In the average measurement process, the measurement interface will display the average measurement identification.

3.5Color Space

In the main menu, click “Color Space” to enter the color space interface as shown in Figure 30, select the corresponding color space there, and then click ✓ to confirm the setting.

Note:color space options are different for some models.

Figure 30

3.6Color Index

The color index interface can select the currently use color diff formula, Optional chromaticity index, and parameter factors setting, as shown in Figure 31:

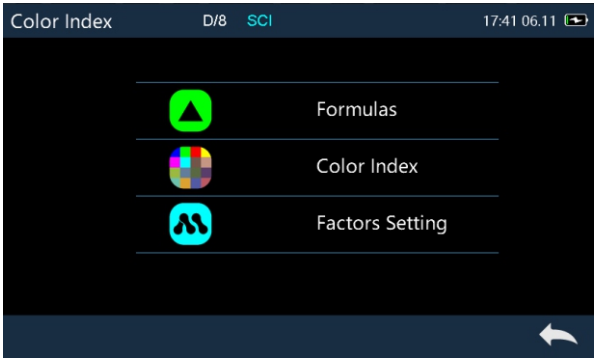


Figure 31

When set the Color Diff Formula, the user can choose △E* ,△Ecmc(2:1) , △E 94 ,△E c m c (l : c) ,etc. After selecting, click ✓ to confirm the Color Diff Formula, as shown in Figure 32.

Note: color formulas options are different from some models

Figure 32

After the chromaticity index is set, the selected color index will be displayed in the color index of the standard and sample measurement (depending on the index, part of the index is only displayed in the sample and is also affected by the type of transmission and reflection). Click ▼ on the measurement interface or check record interface to page to the color index display area, as shown in Figure 33 for the whiteness display interface.

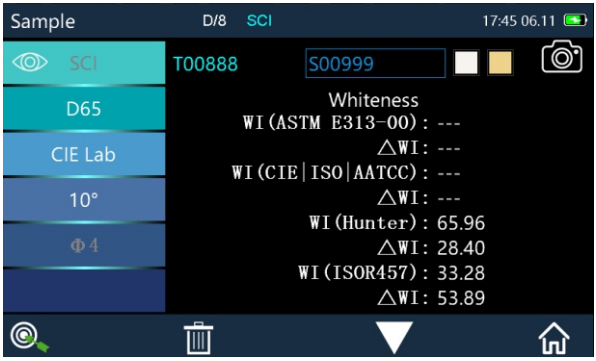


Figure 33

Click “Parameter Factor Settings” on the color index interface to enter the parameter factor setting interface, as shown in Figure 34:

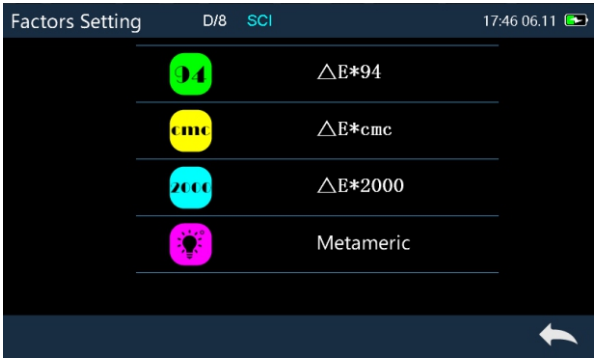


Figure 34

In the parameter factor setting interface, click△E*94 to enter the △E*94 factors setting interface (as shown in Figure 35).

Figure 35

Click on the factor KL, factor KC, and factor KH to enter the editing interface (as shown in Figure 36), then input the new value, click to confirm saving parameters, or clickto cancel the saving settings

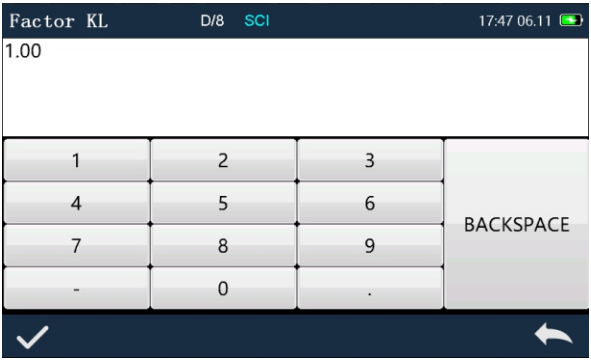


Figure36

3.7Display Setting

Click “Display Settings” on the main menu interface to enter the display setting interface, as shown in Figure 37. In this interface, the user can set some functions like open the Color offset or not, test result prompt, display mode, difference value or absolute value display.

When open the function of the color offset, it will display the color deviation between the sample and the standard when the sample is measured. When it is closed, there is no corresponding prompt.

When open the test result prompt, if the test result exceeds the tolerance range set for the standard during the sample measurement, the red font “Fail” will be prompted. If it is within tolerance range, the green "Pass" is displayed.

Instrument display can be set to 0 or 180 rotate display.

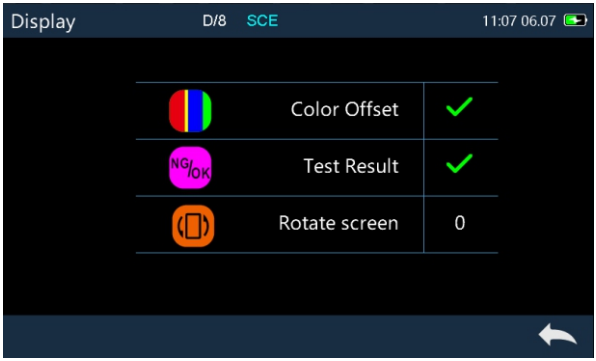


Figure 37

3.8System Setting

Click “System Settings” in the main menu to enter the system setting interface.as shown in Figure 38, Figure 39 and Figure 40

Figure 38

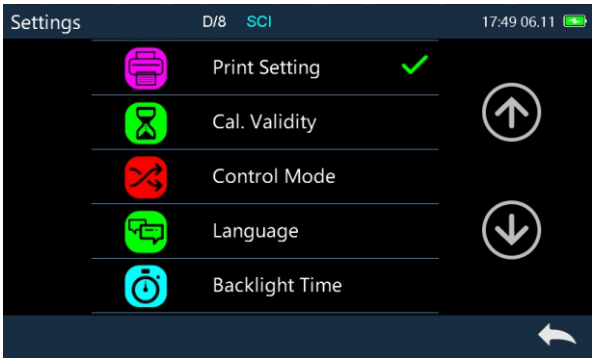


Figure 39

Figure 40

System settings include: Auto Save, Bluetooth, Buzzer, Print Data, Control Mode, Language Setting, Time Date Setting, Backlight Time, System Tolerance, Screen Brightness, TEMP threshold, Calibration Validity, system error, Restore factory settings, About Instrument.

3.8.1Auto Save

When Auto Save is turned on, all test results for every standard measurement will be automatically saved in the instrument. Or when the standard measurement is finished, the record will not be saved automatically and it is required to click the save icon to save manually as shown in Figure 41:

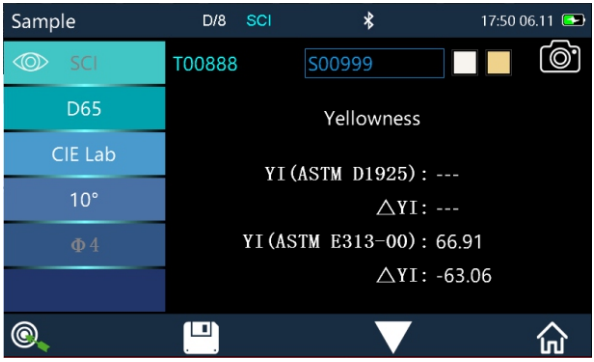


Figure 41

3.8.2Buzzer Switch

The buzzer switch controls whether a beep sounds when measuring. When the buzzer is on, a beep will sound every time when the measurement starts; or there is no buzzer prompt during the measurement.

3.8.3Bluetooth

When the Bluetooth function is turned on, the instrument will automatically turn on the Bluetooth module , The method of setting for the Bluetooth to PC color management software. Please refer to Section 2.4.2.

3.8.4Measurement aperture

The measurement aperture is used to show the aperture currently used . For dual-aperture instrument,when using Φ8mm to measure, choose 8mm , and when using Φ4mm ,choose 4mm .

Single aperture instrument only shows the single measuring aperture.

3.8.5Sample measurement mode

Click the sample measurement mode to realize the switch between SCE, SCI and I+E modes.

3.8.6Print Data

Open the print data switch and connect the printer to print data output. For more information, please refer to section 2.6

3.8.7Calibration validity

Click “Calibration Validity” on the system setting interface to enter this interface. Set the effective time of the black and white plate calibration. If the effective time is exceeded, the instrument will prompt to perform the black and white plate calibration again. The optional valid time is 4 hours, 8 hours, 24 hours and start-up calibration .

3.8.8Control Mode

When the instrument communicates with the PC software, the user can set a specific control method as needed. In the system setting interface, click “Control Mode” to open the control mode interface. There are three options: Key, PC software, Key and PC Software. Select the corresponding method, and then confirm, as shown in Figure 42:

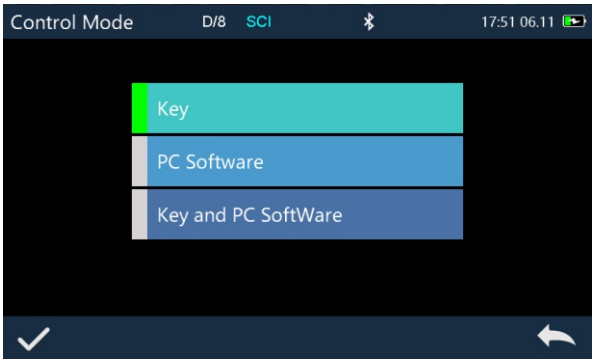


Figure 42

Key: Select this mode. When the instrument communicates with the PC software, the instrument is only triggered by the instrument measure key. The user needs to complete the data measurement through the instrument measure key and upload the data to the PC software.

PC Software: Select this mode. When the instrument communicates with the PC Software, the instrument measurement can only be controlled by the PC color management software to complete the data measurement and upload the data to the PC software.

Key and PC Software: Select this mode. The user can complete the sample measurement through the instrument measure key or PC software command, and upload the data. This is the instrument default mode.

3.8.9Language Setting

Click "Language Settings" to select the appropriate language.

3.8.10Backlight Time

Click “Backlight Time” on the system setting interface to enter the “Backlight Time” interface.

the options of the backlight time are: Always on, 30 mins, 10 mins, 5 mins, 1 min. If you select Always On, the screen will always be lighted even instrument not in use for long time; if it is set to other modes, the instrument will start counting down from the last operation, and will enter the power saving state with screen lights out if there is no operation after the countdown ends.

3.8.11Screen Brightness

Click “Screen Brightness” on the system setting interface to enter this interface. move the brightness adjuster left or right to adjust the brightness of the screen.

3.8.12Restore Factory Settings

Click “Restore Factory Settings” on the system setting interface to enter this interface, as shown in Figure 43. Click ✓ to clear all measurement records and parameter settings and restore to the factory state; click ↩ to cancel this operation.

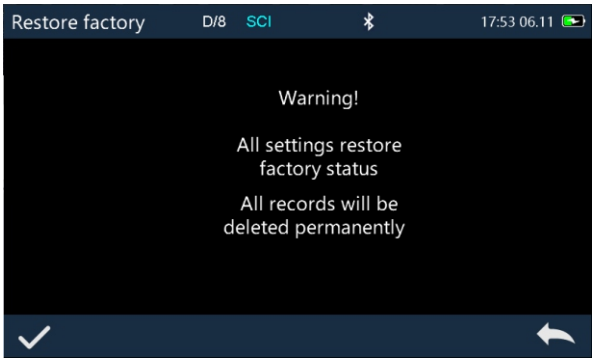


Figure 43

3.8.13System tolerance

Click “System tolerance” on the system setting interface to enter this interface. Please refer to the section 2.5.1 for system tolerance settings.

3.8.14Time Date Setting

When the instrument is out of the factory, it is the local time of the manufacturer, and the user can set the time according to their requirement. In the system setting interface , click “Time Date Setting” to set as shown in Figure44. click “confirm” button to save.

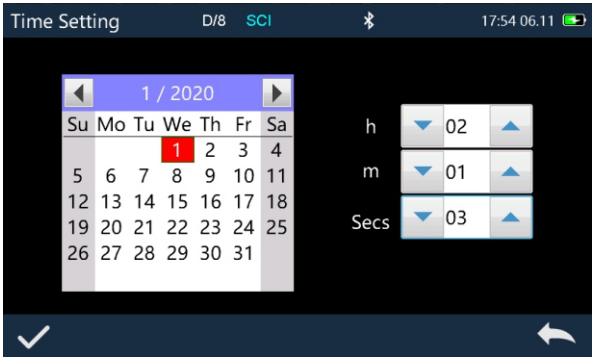


Figure 44

3.3.15About Instrument

Click “About Instrument” on the system setting interface to enter this interface. View the product model, Instrumental SN, software version, hardware version, black plate number, white plate number and other information.

4.daily Maintenance

(1)This instrument is a precision optical instrument. Please keep and use the instrument properly. Avoid using and storing the instrument under humid, strong electromagnetic interference, strong light and dust. It is recommended to use and store the instrument in a standard laboratory environment.

(2)The white plate is a precision optical component. It should be kept and used properly. Avoid rubbing the work surface with sharp objects, avoid soiling the work surface with dirt, and avoid exposing the white plate under strong light.Regularly clean the white plate working surface with a cloth and alcohol. Before calibration, clean the dust on the white plate surface in time.

(3)In order to ensure the validity of the measured data, it is recommended to inspect the instrument and the white plate to the manufacturer or a qualified metrological institute for every year from the date of purchase.

(4)This instrument get power from the external supply power adapter. The power supply should be used in a standard manner to avoid frequent plugging and unplugging, to protect the power supply performance and to extend the service life.

(5)Please do not disassemble the instrument privately. Please contact the relevant after-sales staff If there is any problem. Torn the easy-to-tear label will affect the after-sales maintenance service of the instrument.

5.Technical Parameters

5.1Product Feature

1.High hardware configuration: 7-inch TFT pure color capacitive touch screen; Bluetooth 5.0; concave grating.

2.Dual array 256-pixel CMOS detector; high lifetime stable LED / UV LED / xenon lamp.

3.Measuring reflective and transmissive spectrum of sample, accurate Lab data, can be used for color matching and accurate color transfer.

4.Automatic identification of aperture change, Φ 25.4/8/4mm four apertures can be switched at will, taking into account the special needs of customers.

5.Temperature monitoring and compensation, built-in temperature sensor, monitor and compensate the test environment to ensure more accurate measurement results.

6.Measurement wavelength range of 400~700nm,./ 460nm(460nm limited to xenon edition),measuring UV more professionally.

7.Independent illuminant detector, monitoring the illuminant changes at all times to ensure reliable illuminant.

8.Multiple measure modes: quality mode, sample mode, to meet more customer needs.

9.A variety of accessories: holding tool of reflective sample, transmission holder, for more conditions.

10.Large-capacity storage space.

11.Built-in Camera measured area positioning.

12.PC color management software has powerful extensions.

5.2Technical Specifications

Optical Geometry	Reflectance：D/8（Diffused illumination，8-degree viewing angle）;SCI/SCE, include UV/Exclude UV；Conforms to CIE No.15，GB/T 3978,GB 2893,GB/T 18833,ISO7724/1,ASTM E1164,DIN5033 Teil7
Characteristic	Multiple aperture ,Customized single aperture, good for horizontal or vertical measurement, wider adaptability . For accurate analysis and delivery of laboratory colors; Used for color transfer and quality control in plastic electronics, paint and ink, textile and garment printing and dyeing, printing and other industries. It also can be used for fluorescence sample measurement.
Integrating Sphere Size	Φ40mm（MAV/SAV） Φ152mm(LAV)
Light Source	Combined full spectrum LED light source,UV light source
Spectral mode	Flat grating
Sensor	Silicon photodiode array (double row 40 groups)
Wavelength Range	400~700nm
Wavelength Interval	10nm
Half Bandwidth	10nm
Reflectance Range	0~200%
Measuring Aperture	LAV：Φ30mm/Φ25.4mm MAV：Φ8mm/Φ10mm， SAV :Φ4mm/Φ5mm； Remarks: (Some models can be customized single aperture)
Specular Component	SCI/SCE
Color Space	CIE Lab,XYZ,Yxy,LCh,CIE LUV,sRGB,Munsell,βxy (there are differences between different models)
Color Difference Formula	ΔE*ab,ΔE*uv,ΔE*94,ΔE*cmc(2:1),ΔE*cmc(1:1),ΔE*00, DINΔE99,ΔE(Hunter)
Colorimetric Index	WI (ASTM E313，CIE/ISO, AATCC, Hunter)，YI(ASTM D1925，ASTM 313),TI(ASTM E313，CIE/ISO),, MI(Metamerism Index), Staining Fastness, Color Fastness, Color Strength, Opacity, 8° gloss, 5551ndex,
Observer Angel	2°/10°
Illuminants	D65,A,C,D50,D55,D75,F1,F2(CWF),F3,F4，F5，F6,F7 (DLF),F8,F9，F10(TPL5),F11(TL84),F12(TL83/U30)
Displayed Data	Spectrogram/data, sample chromaticity value, color difference/graph, chromaticity diagram, color simulation, pass/fail result, color offset

Measurement Time	About 1.5s (simultaneous measurement SCI/ SCE about 3.2 s)
Repeatablity	Chromaticity value: MAV/SCI, within ΔE*ab 0.05 (When a white calibration plate is measured 30 times at 5 second intervals after white calibration)
Inter-instrument Error	MAV/SCI, Within ΔE*ab 0.15 (Average for 12 BCRA Series II color tiles)
Measurement Mode	Single Measurement, Average Measurement(2-99times)
Locating Method	Camera Locating
Size	A.B Type : Length*width*Height=370X240X260mm C type : Length*width*Height=425X250X470mm
Weight	A.B Type : About 7.8kg C Type : 18kg
Power Supply	DC 24V,3A Power Adapter
Illuminant Life Span	More than 3 million measurements in 5 years / more than 200,000 measurements in 3 years (some models'
Display	7 inches TFT color capacitive screen-touch display
Date Port	USB，Bluetooth® 5.0，trigger switch interface
Data Storage Capacity	Standard 1000 Pcs, Sample 30000 Pcs
Language	Simplified Chinese, Traditional Chinese, English
Working Environment	0~40℃（32~104°F）
Storage Environment	-20~50°C（-4~122°F）
Standard Accessory	Power Adapter, USB Cable, User Guide, PC Software (Download from office website), White and Black Calibration Cavity(C type) ,Aperture.
Optional Accessory	Micro Printer, Foot Switch, Rotating Bracket
Note：	The technical parameters are for reference only, the specific values are subject to the actual product of sales.