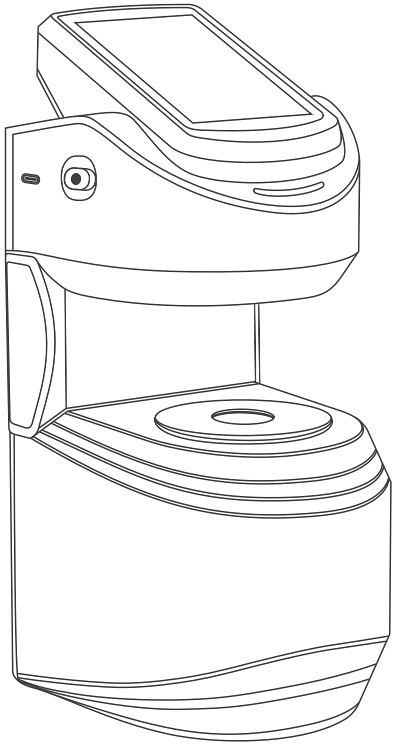
HAZE METER

OPERATION MANUAL



V2.0

Read this manual carefully before use the spectrophotometer.

CONTENT

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Instruction

Haze meter is a domestic haze meter independently developed by our company with independent intellectual property rights.This series of instruments is divided into vertical and horizontal types.According to the CIE standard transmission O/D (parallel light illumination,diffuse reflection receiving)design,the instrument can easily realize ASTM D1003 non-compensation method,ISO 13468 compensation method,full transmittance,fog measurement.With high hardware configuration of the instrument,open measurement area,both vertical and horizontal instruments can be used for vertical measurement and horizontal measurement.It is widely used in glass processing,film processing,display screen processing,lens processing,liquid medicine analysis,food hygiene, plastic processing and other aspects.

Cautions

1)This instrument is a precision optical measuring instrument.During measurement,drastic changes in the external environment of the instrument should be avoided,such as the flashing of ambient light and rapid changes in temperature,etc.

2)During measurement,the instrument should be kept stable,the measured object should be placed on the measuring platform,and the test port should be aligned to avoid moving.

3)The instrument is not waterproof,can not be used in high humidity environment or water mist.

4)Keep the instrument clean and tidy,avoid water,dust and other liquid, powder or solid foreign matter entering the integrating sphere and the instrument,and avoid the impact and collision of the instrument.

5)After the instrument is used,the power supply should be cut off,and theinstrument, 0%calibration cover and compensation port cover should be put into the instrument case and stored in a dry and cool environment.

6)Users shall not make any unauthorized changes to the instrument.Any unauthorized changes may affect the accuracy of the instrument or even irreversibly damage the instrument.

7) Try to avoid letting the battery power of the device drop below 20%, so as to avoid over-discharge resulting in the device can not be turned on.

1.Interface Description

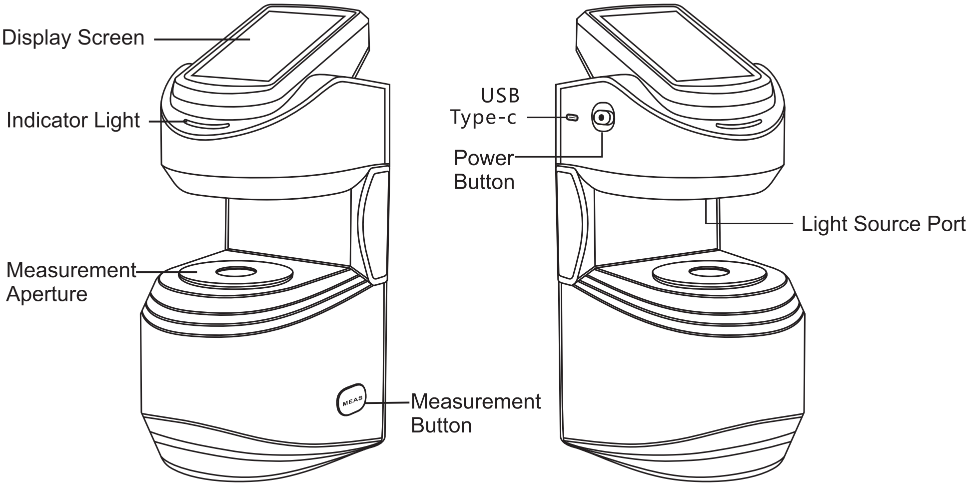
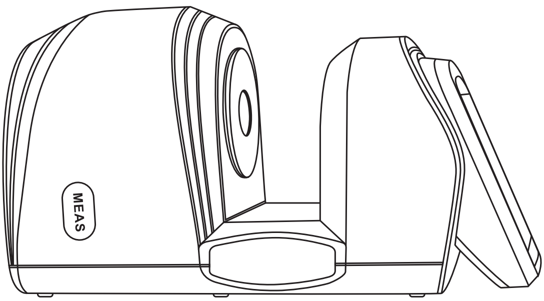


Figure 1 Schematic diagram of the button interface of
a vertical instrument (compensation port)



Horizontal Measurement

Figure 1-1 Schematic diagram of button interface of
horizontal instrument (compensation port)

Display: 3.5-inch TFT pure color capacitive touchscreen, used for displaying measurement data and instrument operation navigation.

Measurement Button: In standby mode, short press the measurement button to wake up the system; in measurement mode, short press the measurement button to start measurement. The measurement button is surrounded by a ring-shaped LED indicator, and the LED indicator color is green.

Power On: When the instrument is powered on (power adapter connected, switch button pressed), the indicator light flashes. After successful startup, the green light is on constantly. During the measurement process, the green light is always on. When the instrument is low on power, it turns red.

Power Switch: Press the button to turn on the instrument; press the button again to turn off the instrument. The instrument is powered on and off by pressing the button.

USB Interface: The USB interface is used for communication with the PC. More functions can be extended through PC color management software.

Light Source: Full-spectrum LED light source, providing illumination during calibration and measurement. Light passes through the transmission sample and enters the integrating sphere.

Transmission Port: During measurement, parallel light emitted by the instrument's light source passes through the sample to be tested, and then enters the integrating sphere through the transmission port. During calibration and sample measurement, follow the prompts to place the sample tightly against the transmission port or remove it.

Testing Fixture (Optional): Used for clamping the object to be measured.

Standard Haze Plate (Optional): A semi-transparent inspection plate with calibrated haze values, assisting users in haze testing.

2.Operation Instructions

2.1 Power on&off

Pressing the power button switch turns on the instrument, and the system starts. At this time, the indicator light shows green. After releasing the power button switch, the instrument is turned off, and the indicator light is off. When the instrument is low on power, the indicator light shows red.

If there is no operation for a long time under the power-on state (power button switch set to "1"), the instrument will automatically enter the sleep state. At this time, press the "measurement button" or lightly touch the screen to wake up the instrument and enter the working state. After startup, the instrument enters the measurement interface directly, as shown in Figure 2.

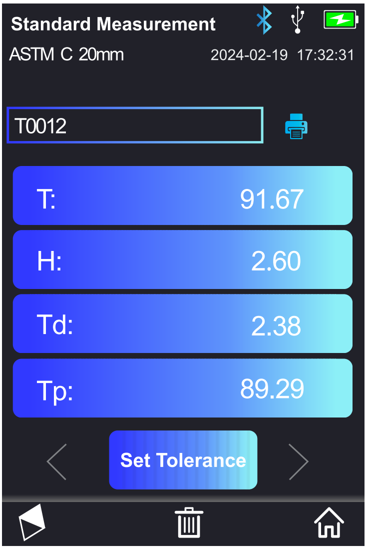


Figure 2 Measurement Interface (Standard Measurement)

Note:Please cut off the power when the instrument is not in use for a long time.

2.2 Calibration

100% Calibration:

Users can select corresponding 100% calibration reference objects according to different types of transmission samples to be tested.

Under normal circumstances:

If the sample to be tested is plastic, glass, transparent film, etc., air can be selected as the reference for 100% calibration.

If the sample to be tested is liquid, a cuvette filled with deionized water or distilled water can be selected as a 100% calibration reference.

If the sample to be tested is a powder contained in a cuvette, you can select an empty cuvette as a reference for 100% calibration.

Of course, the user can also select a calibrated standard solution (such as potassium permanganate solution with calibrated transmittance) as the 100% calibration reference (calibration parameters should select the corresponding calibration channel).

After correct calibration, the instrument system will restart the timing according to the calibration validity period set by the user.

2.2.1 Reference Standard

There are two kinds of reference standards: ASTM (American Standard) and ISO. After switching between ASTM (American Standard) and ISO standards, the instrument needs to be re-calibrated when the sample is measured.

In the measurement interface, press " ⌂ ", and click "Confirm" on the bottom of other screens " √ ", return " ↩ ", as shown in Figure 3.

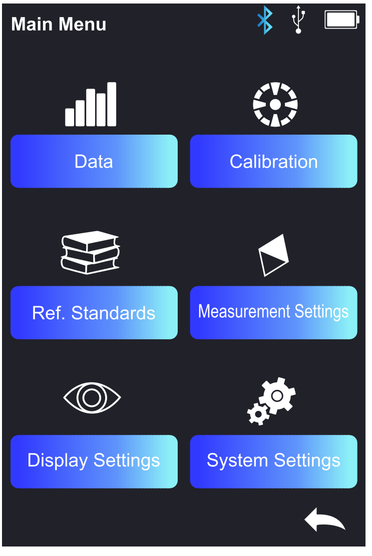


Figure 3 Main menu

Click "Reference Standard" in the main menu to enter the setting interface of the reference standard. ASTM or ISO can be selected. Select "ASTM" and click " ↩ ", the instrument switches to the ASTM (American Standard) measurement standard. After measurement, you can view the data under the current ASTM measurement standard. Select "ISO" and click " ↩ ", the instrument switches to the ISO measurement standard. After measurement, you can view the data under the current ISO measurement standard. The instrument switches to the ISO measurement standard, as shown in Figure 4.

Figure 4 Reference standard selection interface

Note：

Operation Methods: The operation methods for ASTM and ISO reference standards are identical.

For Some Instruments:Some instruments are equipped only with ASTM standards. Please set according to the product you have purchased.

2.2.2 Calibration（ASTM）

After the instrument enters the ASTM (American Standard) measurement standard, click "Calibration" in the main menu to enter the calibration interface, as shown in Figure 5. The interface displays the current calibration status and the remaining validity period.

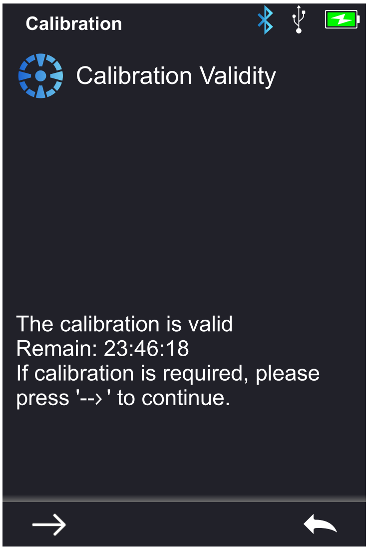


Figure 5 ASTM calibration interface

Click " → " to continue the operation, automatically entering the 100% calibration interface, as shown in Figure 6. Ensure alignment with air, then click " → " or press the "Measurement Button" to perform 100% calibration.

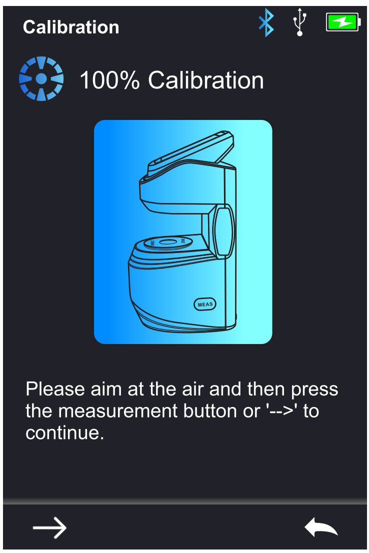


Figure 6 100%calibration

After correct calibration, a prompt indicating calibration completion will appear, as shown in Figure 7. The timer will be reset according to the calibration validity period set by the user. Users can click " → " to recalibrate as needed, or click " ↩ " to return to the main menu.

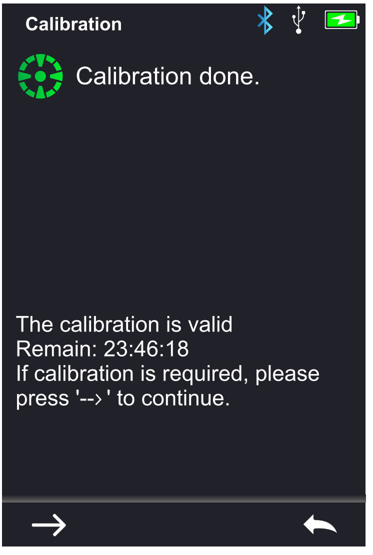


Figure 7 Calibration completed

2.2.3 Calibration (ISO)

After selecting the ISO measurement standard, click "Calibration" in the main menu to enter the calibration interface. In the interface, the current calibration status and the remaining validity period are displayed. ISO calibration is the same as ASTM, as shown in Figures 5, 6, and 7 above.

2.3 Measurement Interface

2.3.1 Standard measurement interface

Standard Measurement Interface as Shown in Figure 8

The upper part of the standard measurement interface is the working state area, used to display the current setting working state, including: interface name, ASTM and ISO switching state, Bluetooth, USB connection state, system time, etc. The middle part is the data display area, where the instrument displays the corresponding Haze (H), Transmittance (T), Scattered Transmittance (Td), and Parallel Light Transmittance (Tp) data based on the current user settings. The bottom part is the operation key area, where clicking the corresponding operation key allows for operations on the current data.

Interface Name: Displays the current interface name for standard measurement.

Standard Light Source: Displays the currently set standard light source.

Aperture Display: Shows the current aperture settings of the system.

Reference Standard Display: Indicates the current reference standard settings of the system.

Standard Name: During standard measurement, the instrument automatically generates a standard name, typically starting from T0001. Click to quickly modify.

Standard Measurement Data: Displays the current measured sample's transmittance (T), haze value (H), scattered transmittance (Td), and parallel light transmittance (Tp). (Interface display may vary depending on the version).

Data Switching: Click the "、" button to switch to the previous or next sample data.

Operation Key Area: Includes sample switching button, delete button, main menu button.

Status Bar: Includes Bluetooth indicator, Bluetooth printer indicator, USB connection indicator, charging indicator, current sample measurement time.

Print Standard Data Button: Clicking this button allows you to print the current standard data. Printer connection is required.

Set Tolerance: Sets the tolerance for the current sample.

Figure 8 Standard measurement interface

2.3.2 Sample measurement interface

In the bottom left corner of the standard measurement interface, clicking allows for quick switching to the sample measurement interface associated with that standard.

The sample measurement interface as Shown in Figure 9.

The sample measurement interface differs from the standard measurement interface in that, if measurement result prompts and tolerance judgments are set, the sample measurement will prompt whether the measurement result is qualified.

Associated Standard Name: The name of the standard associated with the current sample.

Sample Name: During sample measurement, the instrument automatically generates a sample name, typically starting from S0001. Click to quickly modify.

Status Bar: Includes Bluetooth indicator, Bluetooth printer indicator, USB connection indicator, charging indicator, and current sample measurement time.

Measurement Data Display Area: Displays the measurement data of the current standard and sample, including transmittance (T), haze (H), scattered transmittance (Td), and parallel light transmittance (Tp).

Difference Display: Shows the difference between the current standard and sample.

Measurement Result Display: Displays the measurement result of the current sample.

Switch Data: Click the "〈, 〉" button to switch to the previous or next standard data.

Operation Key Area: Includes buttons for switching standards, deleting data, and accessing the main menu.

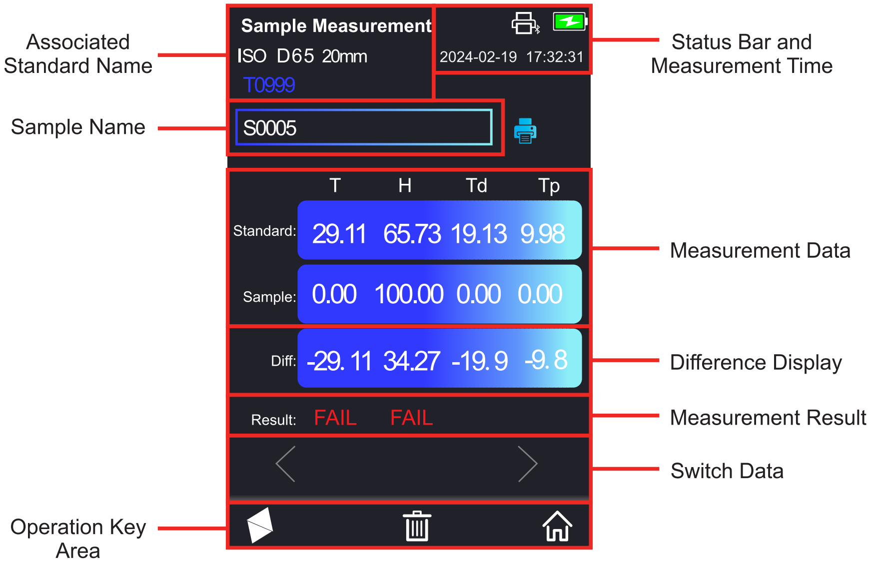


Figure 9 Sample Measurement Interface

2.4 Measurement Mode

2.4.1 Average Measurement Settings

When the measured object is relatively large or the color distribution is uneven, obtaining the average transmittance of representative multiple test points can provide color data that better represents the true color data of the sample. This instrument can achieve averaging measurements from 0 to 100 times per group.

In the main menu, click "Measurement Mode" to enter the measurement mode settings interface, as shown in Figure 10. Click "Average Measurement" to set the "Standard Measurement Times" and "Sample Measurement Times", as shown in Figure 11. After setting, click the return button “ ” repeatedly, and the instrument enters the average measurement mode.

Note: Average measurement and continuous measurement cannot be enabled simultaneously; enabling one will automatically disable the other.

When the measurement times for both average measurement and continuous measurement are set to 0 or 1, the instrument is in single measurement mode.

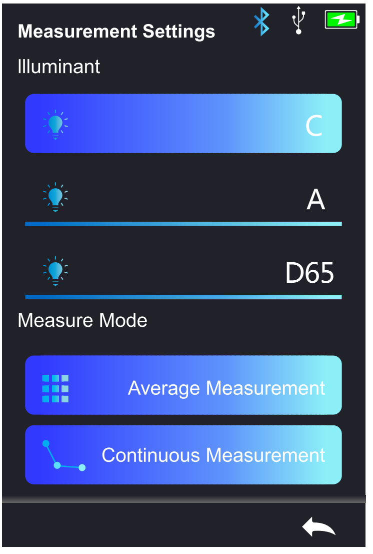


Figure 10 Measurement mode setting interface

Figure 11 Average measurement settings

In the measurement mode settings interface, click "Standard Light Source", as shown in Figure 12. Select the standard light source; only three light sources are available: C, A, and D65. After selecting, click the return button“ ”repeatedly to complete the setting, then continue clicking return“ ”to enter the average measurement interface.

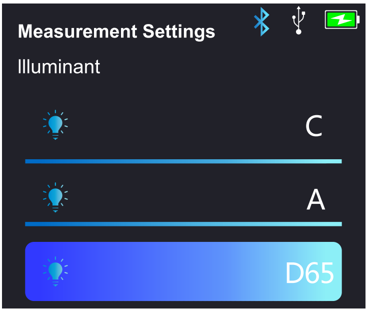


Figure 12 Standard Light Source Selection Interface

2.4.2 Continuous measurement settings

When measurement conditions are fixed and continuous measurement of samples is required (e.g., in an automated production line), the continuous measurement mode can be used to reduce operation steps and save measurement time.

This instrument can perform continuous measurements in each group from 1 to 10,000 times, with a measurement interval of 1 to 300 seconds.

In the measurement mode settings interface, click "Continuous Measurement" to enter the continuous measurement settings interface. Set the "Standard Sample Measurement Count" and "Test Sample Measurement Count," as well as the measurement interval time, as shown in Figure 13. After setting, click the return button“ ”continuously to enter continuous measurement mode.

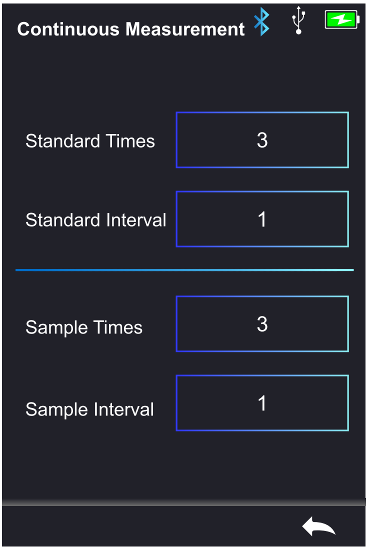


Figure 13 Continuous Measurement Settings

2.5 ASTM measurement

ASTM measurement, that is, when the instrument selects the ASTM (American Standard) reference standard, the sample is measured.

Note: The measurement process in this manual takes the measurement interface of vertical instrument as an example, and the measurement interface of horizontal instrument is subject to the actual interface.

2.5.1 Average measurement of standard samples

In the standard sample average measurement interface, press the "Measure button" to start the measurement.

During measurement, the sample is attached to the transmission port, and then the measurement is performed. When measuring, you will be prompted "Measuring, please wait …", and the measurement result will be displayed after the measurement is completed (as shown in Figure 14).

If multiple measurements are set, continue the measurement according to the above steps until all the set measurement times are completed. In the process of average measurement of standard samples, the average measurement result will be automatically updated every time the measurement is completed, and an average measurement result will be obtained after the measurement is completed. As shown in Figure 15.

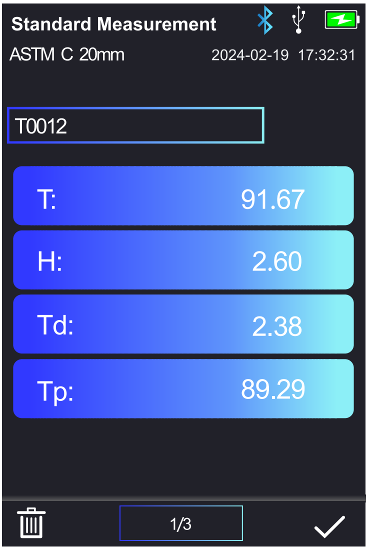


Figure 14 The first standard sample average measurement is complete

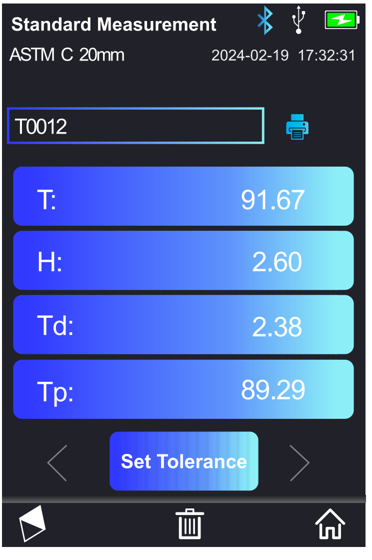


Figure 15 A set of standard sample average measurements is complete

1.Below is a detailed explanation of the icons on the measurement interface:

In the measurement interface, click“ ”to quickly switch to the sample measurement interface, and click“ ”to quickly switch to the standard sample measurement interface;

2. In the standard sample measurement interface, click the“ Set Tolerance ”button to set the tolerance of the standard sample, as shown in Figure 16. The setting method of standard sample tolerance is the same as that of system tolerance (please refer to section 3.6.6). If the standard sample tolerance is not modified, the standard sample tolerance will use the system tolerance by default.

The tolerance of standard sample can choose "transmittance" and "haze" to judge the measurement result of sample.

When "Transmittance" is selected, transmittance is used to evaluate the sample measurement results.

When "Haze" is selected, haze is used to evaluate the sample measurement results.

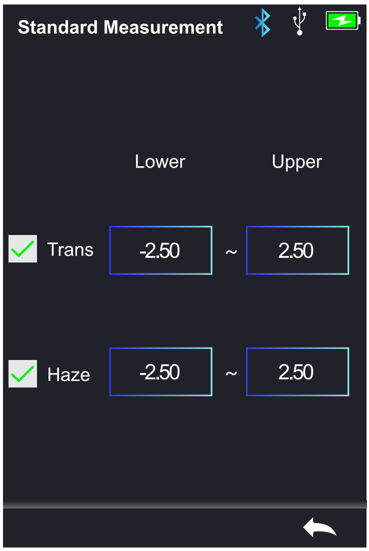


Figure 16 Standard sample tolerance setting

Note:"Transmittance" and "Haze" can be selected individually or together. If neither is selected, tolerance evaluation will not be prompted during sample measurement.

3. After measurement is completed, if the auto-save function is enabled (refer to section 3.6.1), the average measurement mode will automatically save the average measurement results, and the continuous measurement mode will automatically save the results of each measurement. If the auto-save function is not enabled, a save“ ”button will appear at the bottom of the measurement interface. In the average measurement mode, click to save the average measurement results; in the continuous measurement mode, click to save only the last measurement result. After saving, the save button automatically switches to a delete button “ ”.

4.After measurement is completed, click“ ”. If the current interface is the standard sample measurement interface, this will permanently delete the standard record and its associated sample records. If the current interface is the sample measurement interface, this will permanently delete the sample record but retain its associated standard record.

5.Click the standard sample or sample name to modify the name.

6. During the measurement process, click“ ”to end the current measurement.

7. During continuous measurement (see section 2.5.3 for details), pressing the measurement button again can pause the measurement. Once paused, the current continuous measurement cannot be resumed.

2.5.2 Sample Average Measurement

The sample average measurement method is the same as the standard average measurement method.

If the test result prompt function is enabled (please refer to section 3.5) and the standard tolerance judgment is set, after the sample measurement is completed, the instrument will determine whether the sample measurement results are qualified or unqualified based on the tolerance settings, as shown in Figure 17.

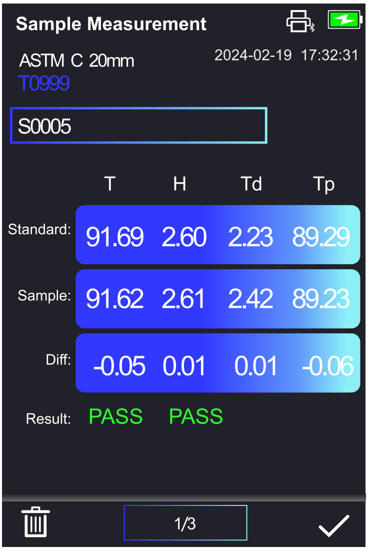


Figure 17: Sample Average Measurement

2.5.3 Continuous Measurement of Standard Samples

In the continuous measurement interface of standard samples, press the "Measure" button to start the measurement.

During measurement, place the sample closely against the transmission port, then initiate the measurement. The display will show "Measuring, please wait..." during the measurement process. Once the measurement is complete, the results will be displayed (as shown in Figures 18 and 19).

Note: During continuous measurement, if the automatic storage function is not enabled, each measurement will only display the result without saving it. After completing the measurement, clicking "Save" will only save the last measurement result.

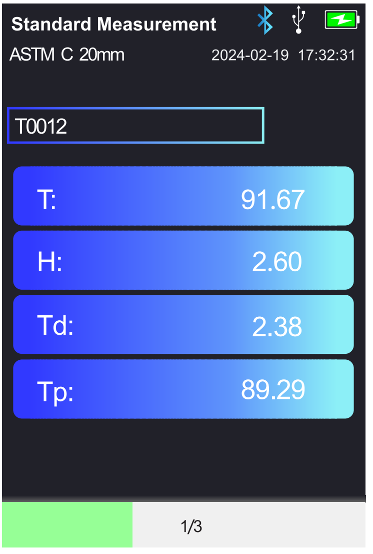


Figure 18: First Continuous Measurement of Standard Samples Completed

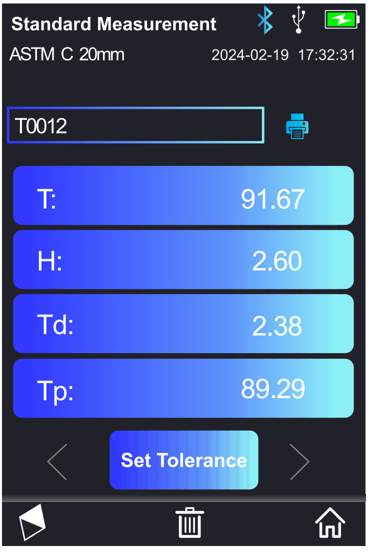


Figure 19: One Set of Continuous Measurements of Standard Samples Completed

2.5.4 Continuous measurement of samples

The continuous measurement method of sample is the same as that of standard sample. If the test result prompt function is turned on (please refer to section 3.5), and the tolerance judgment of the standard sample is completed, the instrument will judge whether the sample measurement result is qualified or unqualified according to the tolerance setting. As shown in figure 20.

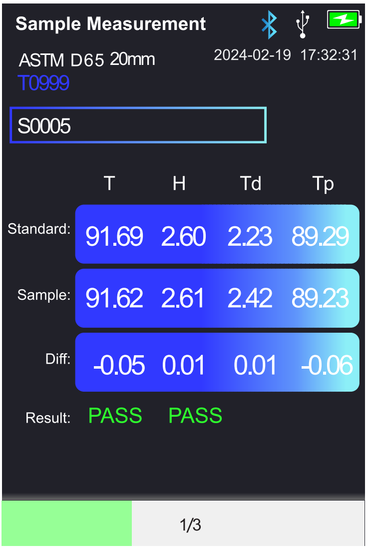


Figure 20 Continuous measurement of samples

2.6 ISO measurement

ISO measurement refers to the process of measuring samples when the instrument selects the ISO reference standard.

Both ASTM and ISO measurements can be set to single measurement, average measurement, and continuous measurement. The methods for setting average and continuous measurements are detailed in section 2.4. When the measurement count for both average and continuous measurements is 0 or 1, the instrument operates in single measurement mode. Below, we provide an explanation of ISO sample and standard measurement using single measurement as an example.

2.6.1 Standard Measurement

In the standard measurement interface, press the "Measure" button to initiate the measurement.

When conducting measurements according to ISO standards, place the sample on the transmittance port and then proceed with the measurement. During measurement, a message "Measuring, please wait..." will be displayed. Upon completion of the measurement, the measurement result will be displayed (see Figure 21).

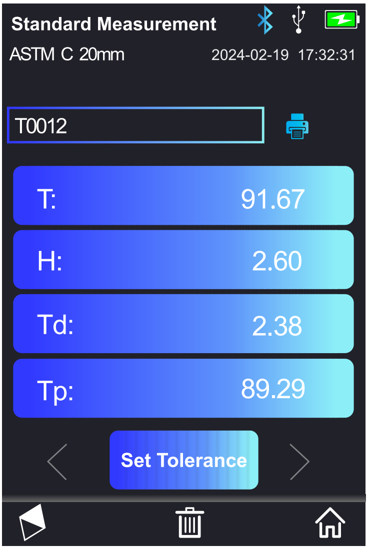


Figure 21 Standard Sample Measurement Completed

2.6.2 sample measurement

The sample average measurement method is the same as the standard sample average measurement method, and the sample measurement completion interface is shown in Figure 22.

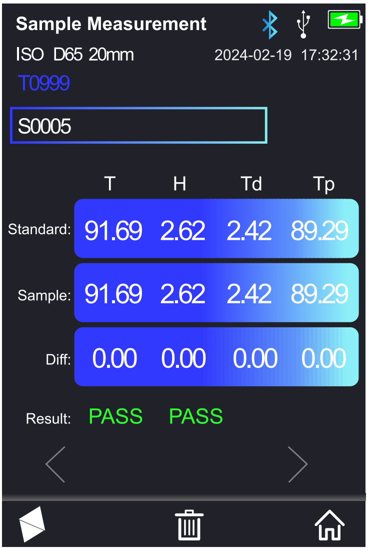


Figure 22: Sample Measurement Completed

2.7 Communication with PC

The PC software offers powerful extension capabilities, enabling more color data analysis. This series of instruments can establish communication with PC color management software via USB data cable or Bluetooth module (only applicable to product models equipped with Bluetooth module).

2.7.1 Communication via USB with PC

After installing the color management software on the PC, connect the instrument to the PC using the USB data cable. The software will automatically connect to the instrument. When the connection is successful, the instrument's status bar will display the USB connection indicator. Through the software, you can achieve comprehensive control of the terminal instrument and perform related sample measurement and analysis.

2.7.2 Communication via Bluetooth with PC

For instruments equipped with a Bluetooth module, communication with PC color management software can be achieved via Bluetooth.

Install the color management software on the PC and enable Bluetooth connection on the PC side. Simultaneously, enable the Bluetooth function in the "System Settings" of the instrument. The instrument's status bar will display the Bluetooth indicator when connected. The software will automatically connect to the instrument. Once connected successfully, you can achieve comprehensive control of the terminal instrument through the software and perform related sample measurement and analysis.

2.8 Bluetooth Printer

The Bluetooth printer is an optional accessory and needs to be purchased separately. Users can first measure the color data of the sample, save the sample record to be printed, connect the miniature printer to the instrument via Bluetooth, and select the desired sample from the standard or sample records for printing by selecting and clicking" ". Alternatively, you can choose to print from the measurement completion interface.

Note: When the Bluetooth printer is turned off, the Bluetooth printer function in the instrument's print settings needs to be turned off as well, otherwise the Bluetooth function cannot be used normally.

3.The system function description

Press" "in the measurement interface to enter the main menu. In other interfaces, you can click" "to enter the main menu. From the main menu, you can enter the submenus to realize all system function settings. As shown in figure 3.

3.1 Data management

In the main menu interface, click on "Data Management" to enter the data management interface, as shown in Figure 23. Data management primarily involves viewing and managing previously measured records. The data management interface includes options such as "Browse ," "Search ," "Input Standard ," and "Delete .”

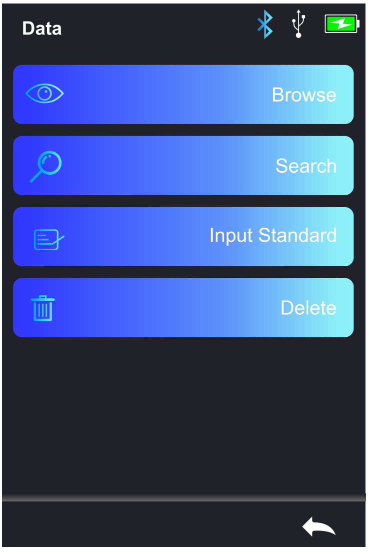


Figure 24 Data management

3.1.1 Browse Records

Click on "Browse " in the data management interface to navigate to the "Browse Standard " screen, as shown in Figure 24. Click the "❮ 、❯ " buttons to paginate through all standard sample records. Click the " Page:1/2 " button to customize page selection, as illustrated in Figure 25. Check the box " Page:1/2 " in front of the name to select the current standard record.

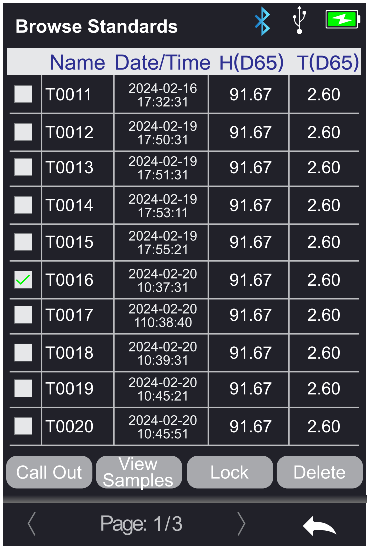


Figure 24 Browse standard

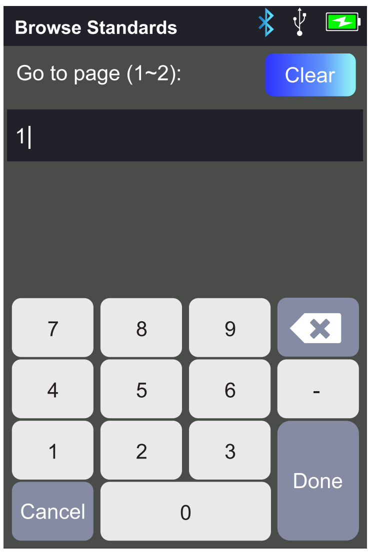


Figure 25 Custom Pages

Browse standard

1)Select a standard sample record in the Browse Standard interface, and you can perform operations such as calling out the selected Standard, viewing the sample, locking the selected Standard and deleting the selected Standard.

2)Select a standard record in the Browse Standard interface, and click Call Out Selected to open the Standard Measurement interface, where you can view the measurement records of T, H, Td and Tp of the current standard , as shown in Figure 26.In the view standard interface, click the

"〈 、〉" button to view the "T", "H", "Td", and "Tp" measurement records of other standard samples. Click the standard name to modify the name of the standard .

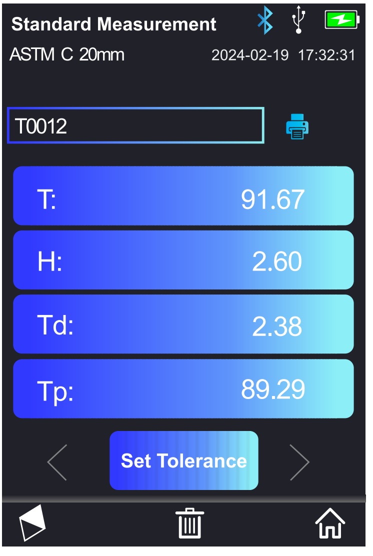


Figure 26 Call up the interface

3)In the View sample interface, you can call out the selected sample and delete the selected sample, as shown in Figure 27.

Figure 27 viewing the sample

1. Click "Call Up Selected" to call up the currently selected sample record;

2. Click "Delete Selected" to delete the currently selected sample record;

4) When multiple standard sample records are selected in the "Browse Standard " interface, the operations of "Lock Selected" and "Delete Selected" can be performed, as shown in Figures 28 and 29.

1. Click "Lock Selected", and the selected standard will be locked. Once locked, the standard cannot be modified in terms of name, tolerance settings, replacement, or deletion. However, you can choose to unlock it later.

2. Click "Delete Selected" to delete the selected standard along with its associated sample records.

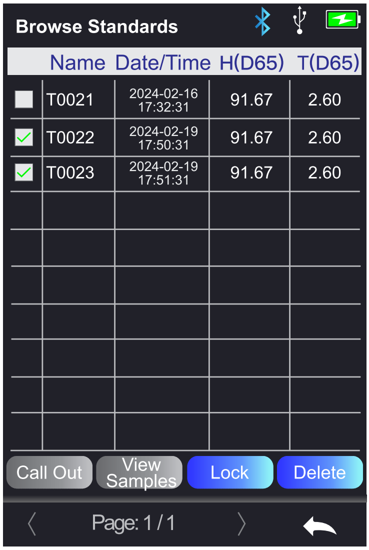


Figure 28: Viewing Multiple Standard Selected

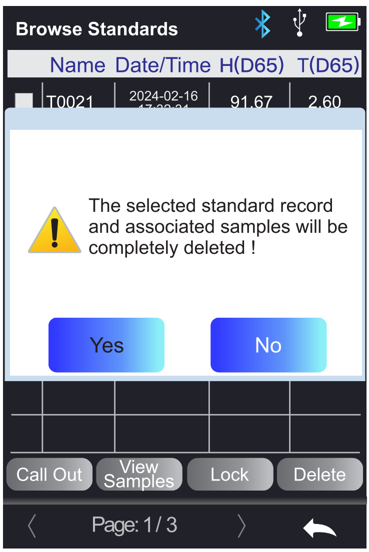


Figure 29: Prompt for Deleting Multiple Standard Sample Records

Browse samples

In the "Browsing Standard" interface, select a standard sample, then click "View Samples." If there are no associated sample records under the current standard sample, a prompt stating "No associated samples for the selected standard sample" will appear, as shown in Figure 30. If there are associated sample records, the browsing sample interface will display the sample records associated with the selected standard sample, as illustrated in Figure 31. Click the " Page:1/2 " button to customize the page selection, as shown in Figure 32.

1) In the browsing sample interface, select a sample record, then click "Retrieve Selected" to view the "T," "H," "Td," and "Tp" measurement records for that sample. Click the "〈 、〉" button to view the measurement records for other samples associated with the selected standard sample. Click the sample name to modify it. Select "Delete Selected" to delete the current sample data.

2) In the browsing sample interface, select one or more sample records, then click "Delete Selected" to delete the selected sample records. However, the sample records associated with the standard will not be deleted.

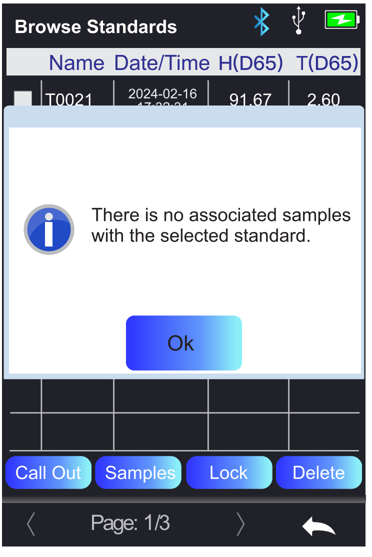


Figure 30: No Associated Sample Records for the Current Standard

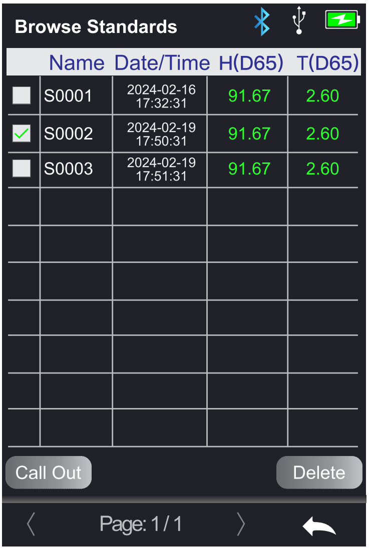


Figure 31 Browse the sample interface

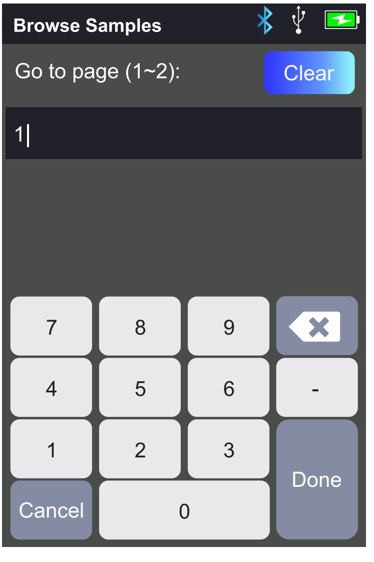


Figure 32 User-defined page number interface

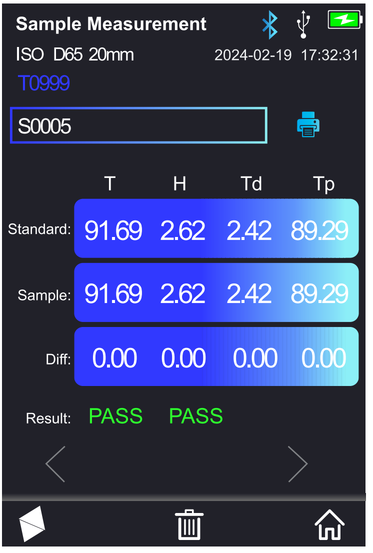


Figure 33 View sample details

3.1.2 Search Records

Access the "Search Records" interface by selecting it from the data management menu.

Search by Name

1) Click on the "Name" column to prompt the name input box. Enter partial text from the sample name or test sample name in the "Name" column. Click "OK," then select "Search Sample" or "Search Test Sample" to retrieve sample or test sample records containing the entered text. See Figures 34 and 35 for reference.

2) Enter the complete sample or test sample name in the "Name" column. Check the "Exact Match" box (if unchecked, this option will not be effective). Click "Search Sample" or "Search Test Sample" to find sample or test sample records that match the entered name exactly.

3)Enter the name and check "Specify Date." Select a date to search for sample or test sample records within the specified date range. (This option will not be effective if unchecked, and you won't be able to select a date.)

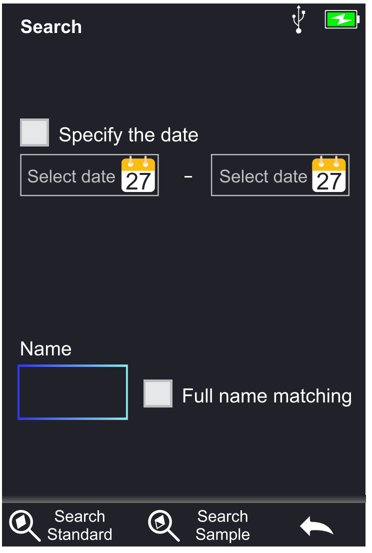


Figure 34 Search record interface

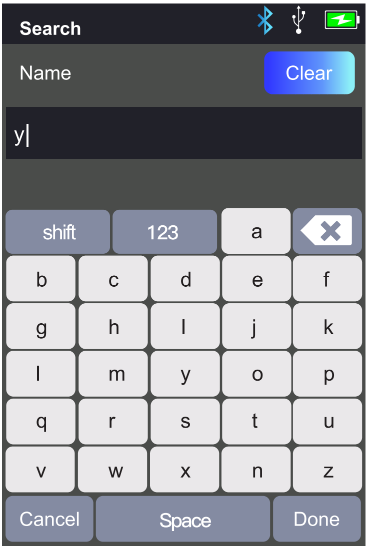


Figure 35 Search record name input box

Note: Searching by specifying a date without entering a name will not yield any results.

3.1.3 Input standard

Clicking on "Input Standard " in the data management interface leads to the input standard interface, as shown in Figure 36. Select the input type, enter the standard name, T (Total Transmittance), and H (Haze). Upon completion, click "Confirm" (✓), and the standard will be stored in the list of standard records. You can view this standard record through the "Browse Records" option in the data management interface.

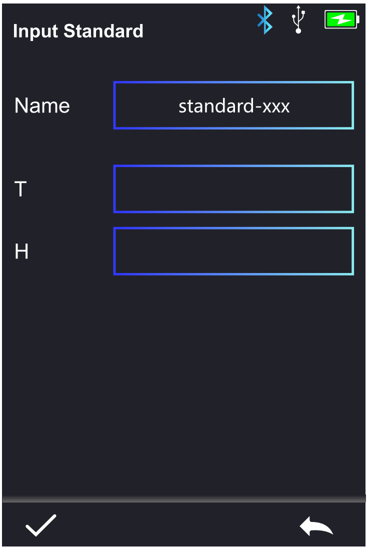


Figure 36 Input standard

3.1.4 Deleting Records

Clicking on "Delete Records" in the data management interface leads to the delete records interface. You can delete all sample and standard records or choose to delete them based on specific dates, as shown in Figure 37.

When choosing to delete all sample or standard records, a warning prompt appears, as illustrated in Figure 38. Clicking "Yes" will delete all corresponding records, while clicking "No" will return you to the previous screen.

If selecting to delete records based on specific dates, as depicted in Figure 39, choose the cutoff date and click " 🗑 " to delete all corresponding records. To cancel the deletion, click " ↩ " to return. When deleting a sample, associated standard records will remain unaffected. Conversely, when deleting a standard record, associated sample records will also be deleted.

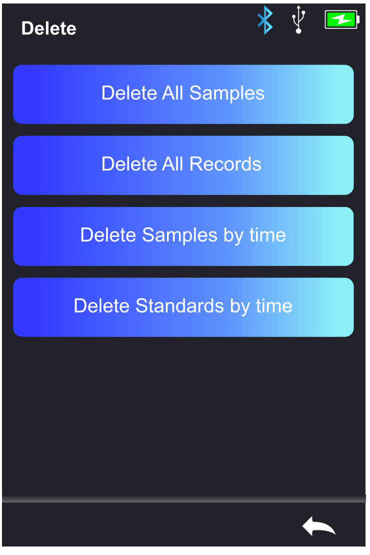


Figure 37 Delete record interface

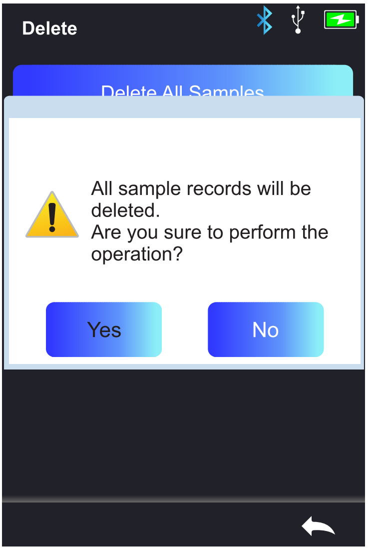


Figure 38 Prompt for deleting all sample records

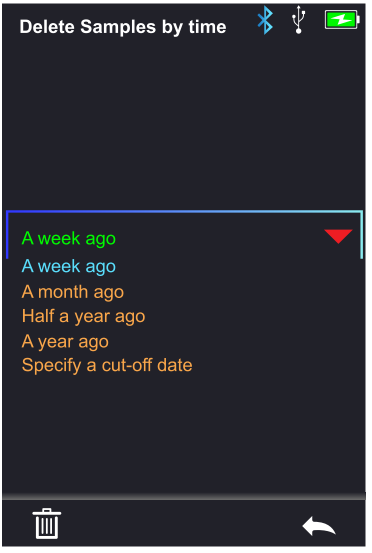


Figure 39 Delete samples by time

Note: You will not be able to recover the data after deletion. Please be careful to prevent the required history from being deleted by mistake.

3.2 Calibration

Calibration as the measurement benchmark,must be accurate,otherwise it will affect the validity of the measurement data.This series of instruments requires calibration in the following situations:

1) When there is a significant difference between the calibration environment and the current sample measurement environment (such as severe temperature fluctuations).

2) When the instrument has exceeded the expiration date of calibration, and it needs to be recalibrated when measuring samples.

3) After switching between ASTM (American Standard) and ISO standards when measuring samples.

4) After switching the measurement aperture when measuring samples.

5) After switching between 100% calibration air and custom calibration when measuring samples.

For the calibration method, please refer to section 2.2.

3.3 Reference standard

There are two kinds of reference standards: ASTM (American Standard) and ISO. After switching the reference standards, the accuracy of instrument data can be prevented from deviating, and the instrument can be calibrated again. Refer to section 2.2.1 for the setting method of the standard.

3.4 measurement mode

Measurement mode can set average measurement and continuous measurement. Please refer to Section 2.4 for the setting methods of average measurement and continuous measurement. Click "standard light source" in the measurement mode setting interface, as shown in Figure 12. Select the standard light source, and there are only three light sources to choose from, namely C, A and D65. Click the back button " ↩ " continuously, and the setting is complete. Please refer to Section 2.4.

3.5 Display Settings

Click "Display Settings" in the main menu interface to enter the display settings interface, as shown in Figure 40.

Turn on the "Test Result Prompt". If the error between the sample and the standard is within the tolerance range, the green word "Pass" will be prompted, otherwise the red word "Fail" will be prompted.

When "Td", standard measurement and sample measurement are turned on, the Td display value of the sample will be displayed, otherwise it will not be displayed.

When "Tp (parallel light transmittance)", standard sample measurement and sample measurement are turned on, the Tp display value of the sample will be displayed, otherwise it will not be displayed.

Turn off "recumbent measurement" and the instrument will be measured vertically, otherwise the instrument will automatically switch between vertical measurement and horizontal measurement according to its own situation.

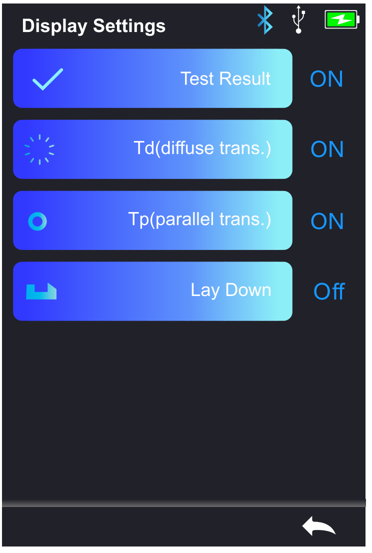


Figure 40 shows the settings

3.6 System Settings

In the main menu, click on "System Settings" to enter the system settings interface, as shown in Figures 41, 42, and 43.

System settings include "Auto Save", "Bluetooth", "Key Sound", "Calibration Setting", "Calibration Validity Period", "Setting System Tolerance", "Print Setting", "Measurement Control", "Language Setting", "Backlight Setting", "Date/Time", "Restore Factory Settings", and "About the Instrument", etc.

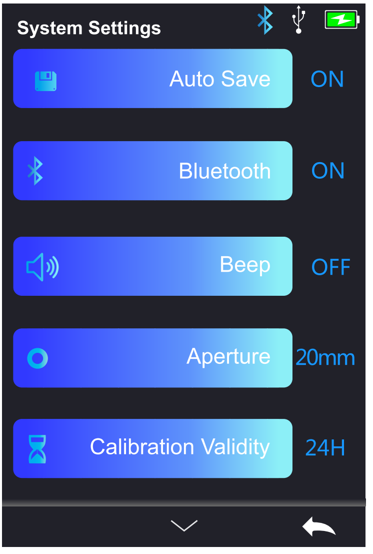


Figure 41 System Settings

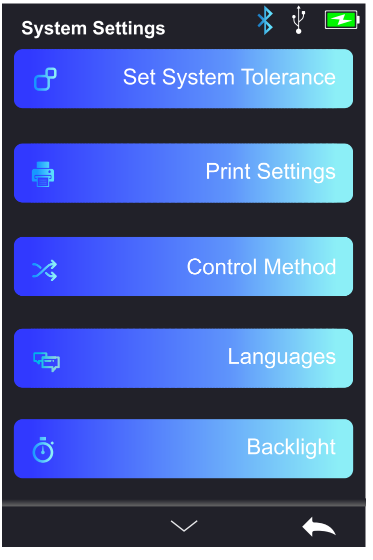


Figure 42 System Settings

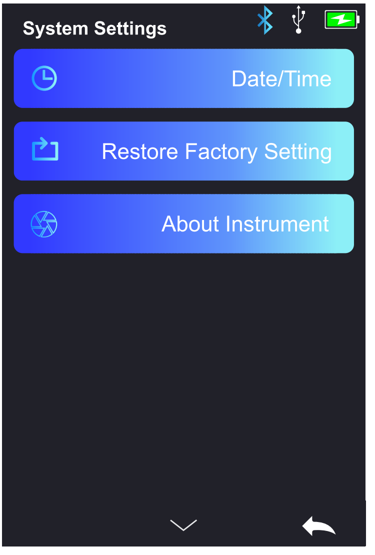


Figure 43 System Settings

3.6.1 Auto Save

When the Auto Save function is turned on,every time sample measurement results will be automatically stored in the instrument.Otherwise,the measurement record will not be automatically saved after finishing the sample measurement,and it needs to manually save it.

3.6.2 Bluetooth

For instruments equipped with Bluetooth, they can communicate with color management software on the PC via Bluetooth. For instructions on how to set up communication between the instrument and PC software via Bluetooth, please refer to Section 2.7.2.

3.6.3 Beep

The beep switch controls whether the prompt sound is sounded during the measurement.When the beep function is open,a beep voice will be sounded for each measurement,otherwise,there will be no beep voice during measurement.

3.6.4 Aperture Setting

Click on "aperture Setting" to enter the aperture setting interface, as shown in Figure 44. Position the cursor on the aperture name, click "✓ ", and after setting the new aperture, the instrument must be recalibrated during measurements.

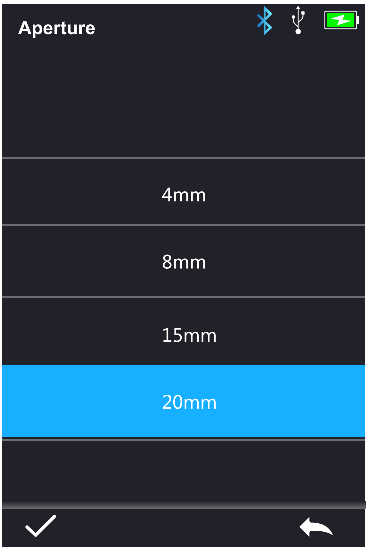


Figure 44 Aperture Setting

3.6.5 Calibration Validity

Click "Validation Validity"on the system setting interface to manage the timeliness of calibration,as shown in Figure 45.

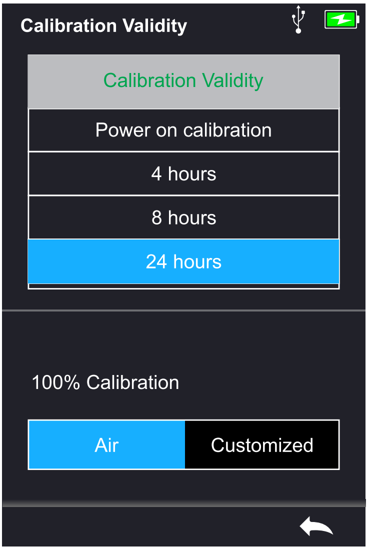


Figure 45 Calibration validity period selection interface

In the system settings interface, click "Calibration Validity" to enter the calibration validity settings interface. You can select "4 hours," "8 hours," "24 hours," or "Power-on Calibration."

If you select 4 hours, the calibration validity of the instrument will expire 4 hours after each calibration. After it expires, you can only view data and cannot perform measurements. After recalibration, the calibration validity period restarts. The settings for "8 hours," "24 hours," and "Power-on Calibration" have the same meaning.

In the calibration validity interface, you can set 100% calibration to either air or a custom setting.

If set to air, you need to perform a zero calibration during 100% calibration. If set to custom, follow the custom settings for 100% calibration.

3.6.6 Set System Tolerance

Tolerance refers to the standard and will affect the instrument's judgment of the test sample measurement results. System tolerance is the default tolerance assigned by the instrument to the standard . If the standard tolerance is not set, the system tolerance will be used by default.

In the system settings interface, click "Set System Tolerance" to enter the tolerance settings interface, as shown in Figure 46. In this interface, you can set the tolerance range for "Transmittance" and “Haze."

Click on the corresponding tolerance value to enter the value settings interface, as shown in Figure 47. The right-side tolerance upper limit must be greater than the left-side tolerance lower limit. After setting, click return" "to save.

Figure 46 Set System Tolerance

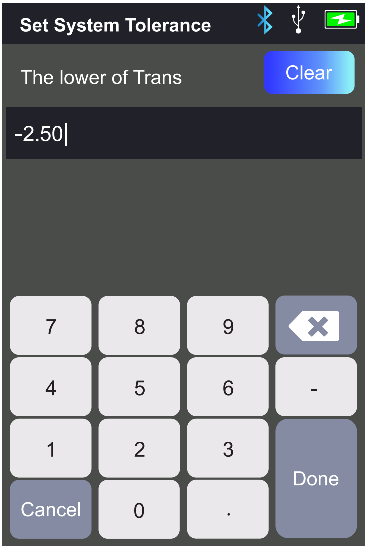


Figure 47 Editing Tolerance Values

Once the tolerance settings are complete, the sample measurements will determine if the sample is within the acceptable range based on the tolerance type and range. If the error between the sample and the standard falls within the tolerance range, it is considered a pass; otherwise, it is deemed a fail (when the test result prompt function is enabled).

3.6.7 Print Settings

When automatic printing is enabled, each sample measurement will be automatically printed. If automatic printing is not enabled, the sample measurement will not be printed automatically, and you will need to manually click to print. As shown in Figure 48, to enable automatic printing, open "System Settings" and turn on "Automatic Printing". Connect the printer to print the data. For detailed instructions, please refer to section 2.8.

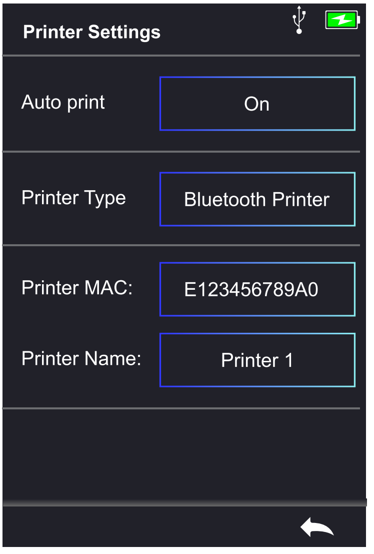


Figure 48 Printer Settings

3.6.8 Measurement Control

When the instrument communicates with the PC software, users can set a specific measurement control method as needed. In the system settings interface, click "Measurement Control" to open the measurement control interface (as shown in Figure 49). Select the appropriate method and then click confirm" ✓ ".

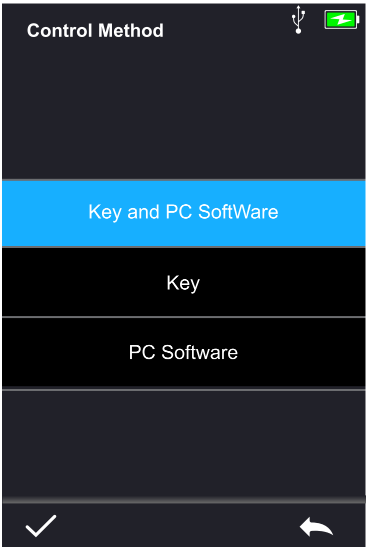


Figure 49 Measurement Control

PC Software

Selecting this mode means the instrument measurement is triggered only through the measurement button on the PC software, and the data is uploaded to the PC software.

Test Button | PC Software

Selecting this mode allows the user to complete sample testing through either the instrument's test button or the PC software measurement button, and the data will be uploaded. This is the default mode for the instrument.

Test Button

Selecting this mode means the instrument measurement is triggered only through the instrument's measurement button, and the data is uploaded to the PC software.

Note:The measurement control method is effective only when the instrument is connected to the PC software. When not connected, only the measurement button on the instrument can be used for measurements.

3.6.9 Language Settings

Language settings are used to set the language of the instrument interface. In the system settings interface, click "Language Settings", select the desired language, and then click return" "to apply the changes, as shown in Figure 50.

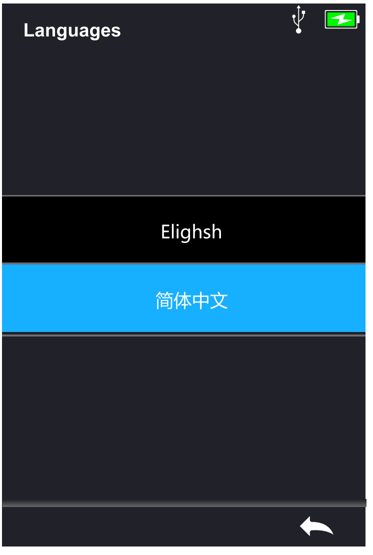


Figure 50 Language Settings

3.6.10 Backlight Settings

In the system settings interface, click "Backlight Settings" to enter the backlight settings selection interface. You can select screen brightness and auto-off time, as shown in Figure 51.

To adjust the brightness of the screen, move the brightness regulator left and right in the "Brightness" settings bar.

The auto screen-off time options are: "Constant Light," "1 minute," "5 minutes," "10 minutes," and "30 minutes," as shown in Figure 52. If you select "Constant Light," the screen will not automatically turn off when there is no operation. If set to "1 minute," the instrument will time from the last operation, and the screen will turn off after 1 minute, entering power-saving mode. The settings for "5 minutes," "10 minutes," and "30 minutes" have the same meaning as above.

The auto-off time options are: "Off," "1 minute," "5 minutes," "10 minutes," and "30 minutes," as shown in Figure 53. If "Off" is selected, the instrument will not automatically power off when there is no operation. If set to "1 minute," the instrument will time from the last screen-off and power off after 1 minute. The settings for "5 minutes," "10 minutes," and "30 minutes" have the same meaning as above.

During the screen-off period, the instrument can be lit up by pressing the "Measurement Button" briefly or touching the screen. The default screen backlight time of the instrument is "5 minutes," putting it in power-saving mode.

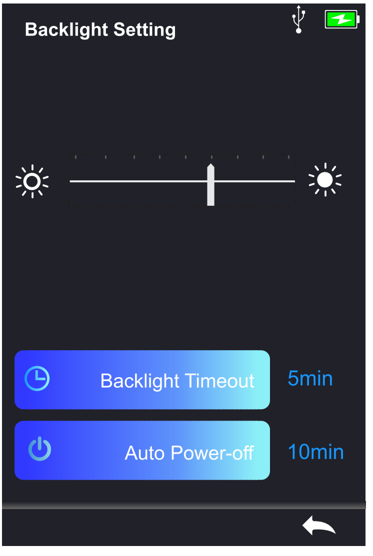


Figure 51 Screen backlight setting interface

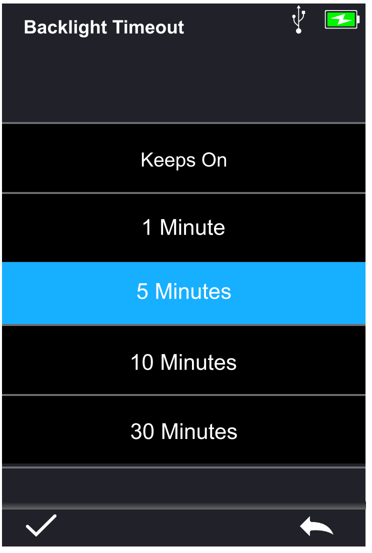


Figure 52 Screen backlight setting interface

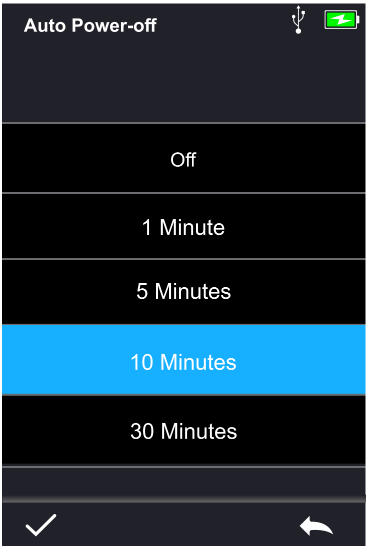


Figure 53 Screen backlight setting interface

3.6.11 Date/Time

When the instrument leaves the factory, it is usually synchronized with the local time of the manufacturer. Users can also set the time of the instrument according to the actual situation. Click "Date/Time" in the system setting interface to enter the setting interface of year, month, day, hour, minute, and second, as shown in Figure 54. After setting, click "OK" ( ) to save the settings, and click "Return" ( ) to cancel saving.

Figure 54 Date/time setting interface

3.6.12 Restore Factory Settings

Click "Restore Factory Settings" in the system setting interface to enter the interface shown in Figure 55, and click "OK" ( ). The instrument clears all measurement records and user settings, and returns to the factory state. Click "Return" ( ) to cancel this operation.

Note: This operation will clear all data and user settings of the instrument, and restore it to the factory default state. All data cannot be recovered, so please proceed with caution.

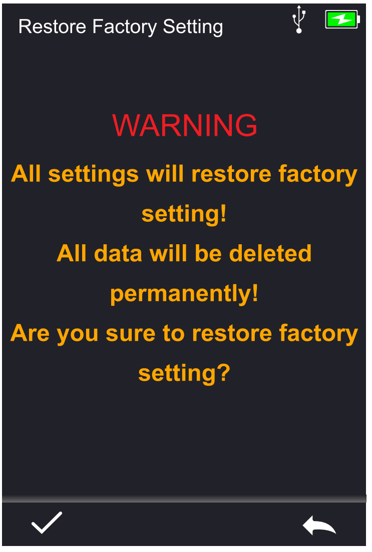


Figure 55 Restore factory Settings interface

3.6.13 About Instrument

Display instrument model,SN number and current software and hardware version number.

4. Daily Maintenance

1) This instrument is a precision optical instrument. Please keep and use the instrument properly and avoid using and storing the instrument in environments with high humidity, strong electromagnetic interference, intense light, and heavy dust. It is recommended to use and store the instrument in a standard laboratory environment (temperature 20~25°C,1 standard a atmosphere,humidity 30~70%RH).

2) The standard plate (haze film, etc.) is a precision optical component, which should be properly stored and used. Avoid hitting the working surface with sharp objects, prevent dirt from accumulating on the working surface, and shield the standard plate from exposure to strong light. The surface of the standard board is extremely sensitive. It is strictly forbidden to wipe the working surface of the standard board to avoid dust scratches. Dust and fluff will affect the measured value. The standard plate must be cleaned with oil-free compressed air before use. Be very careful when cleaning the standard plate with distilled water. Use a new soft cloth to ensure that particles that may damage the surface of the standard plate are not adhered to the cloth, and wipe gently. To remove stubborn dirt, add a small amount of acid-free household detergent to distilled water and wash in distilled water. After cleaning, dry it with oil-free compressed air to blow off residual dust or fluff. Do not allow corrosive cleaning agents, such as solvents, alcohol, trichloroethylene, benzene, strong alcohols, acids, or alkalis, polishing agents, and other destructive chemical cleaning agents to contact the standard plate.

3) In order to ensure the validity of the measurement data, it is recommended to go to the manufacturer or qualified metrological research institute for metrological inspection one year from the date of purchase of the haze meter.

4) The instrument is powered by an external power adapter. Please use the original power adapter. At the same time, the power should be used in a standard way to avoid frequent unplugging of the power, protect the performance of power, and extend the service life of power.

5) Please do not disassemble and install the instrument without consent. If you have any problems, please contact the relevant after-sales staff. Tearing off the easy-to-tear label will affect the after-sales maintenance service of the instrument.

5.Technical Parameters

5.1 Product Features

1) High Hardware Configuration:Equipped with a 3.5-inch TFT true-color capacitive touchscreen and Bluetooth, with a storage capacity of over 21,000 data points.

2) PD Array Detector:Utilizes a PD array detector that satisfies CIE V(λ)2-degree visual response.

3) Accurate Measurement of Transmittance and Haze:Capable of accurately measuring chromatic data such as transmittance and haze, suitable for color matching and precise color transmission.

4) Multiple Measurement Apertures: Offers various measurement apertures including standard Φ20mm, with options for custom Φ15mm, Φ8mm, and Φ4mm apertures.

5) Long-life Full-spectrum LED: Utilizes a combined LED light source with a wavelength range of 400 to 700nm, ensuring longevity.

6)Independent Light Source Detector: Constantly monitors light source changes to ensure reliability.

7) Various Measurement Modes:Provides multiple measurement modes to meet diverse customer needs.

8) Multiple Accessories and Fixtures (optional):Compatible with various accessories and fixtures to adapt to different working conditions.

9) PC-based Color Management Software: Features powerful expansion capabilities in the PC-based color management software.

5.2 Technical Specifications

Product Model	Haze Meter (Photoelectric Integration)
Lighting Mode	Transmission: 0/D (parallel light illumination, diffuse reflection reception)
Compliance with Standards	ASTM D1003/1044, ISO 13468, ISO 14782, GB/T 2410, JJF 1303-2011, CIE 15.2, JIS K7105, JIS K7361, JIS K 7136
Integrating Sphere Size	Φ90mm
Illumination Light Source	400~700nm combined LED light source
Splitting Mode	/
Sensor	PD array detector, meets CIE V((λ)2 degrees visual response
Measuring Wavelength Range	/
Wavelength Interval	/
Half Bandwidth	/
Measurement Range of Transmittance	0~100%
Measuring Aperture	Φ20mm/Φ15mm/Φ8mm/Φ4mm (select single caliber)
Sample Size	Thickness less than 40mm
Color Space	/
Color Difference Formula	/
Other Chromaticity Indexes	Haze (ASTM D1003/1044, ISO 13468), transmittance T(ISO), transmittance T(ASTM)
Observer Angle	2°
Observation Light Source	D65, A, C

Display	Pass/Fail results
Measuring Time	About 1.5s
Haze Resolution	0.01 unit
Haze Repeatability	Φ20mm caliber, less than 0.05 (after preheating and correction, the standard deviation value of the standard haze sheet with a haze of about 30 is tested 30 times at 5s intervals)
Inter-Station Difference	Φ20mm caliber, less than 0.4 (after preheating and correction, test the standard deviation between the standard haze sheet and the reference value at 5s intervals)
Dimensions	Horizontal: Length x Width x Height = 140 x 100 x 230mm Vertical: Length x Width x Height = 140 x 100 x 230mm
Weight	About 1.5kg
Power Supply Mode	Built-in 5000mAh lithium battery
Lighting Source Life	More than 3 million measurements in 5 years
Monitor	TFT true color 3.5 inch, capacitive touch screen
Interface	USB, print serial port
Storage Data	1000 standard samples and 20000 test samples
Language	Simplified Chinese, Traditional Chinese, English
Operating Temperature Range	0~40℃（32~104˚F）
Storage Temperature Range	-20~50℃（-4~122˚F）
Standard Attachments	Power adapter, manual, quality management software (download from official website), data cable, 0% calibration box, measuring caliber
Optional Accessories	Micro printer, test fixture, standard haze sheet, foot switch

Note The technical parameters of different models of instruments will vary. The above technical parameters are for reference only. Actual products sold prevail. Changes may be made without notice.

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