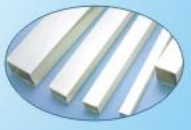
AMT506 COLORIMETERS

Professional Color Detection Tool


Rubber


Spray-paint


Hardware


Building


Electrical


Printing

Suitable for multi-industry's color analysis and quality control of Color difference

CONTENTS

1 Summarize

1.1 Introduction:

The AMT506 is design and developed according to international CIE1931, 1976 and other relevant standards at home and abroad, it is a new economic and practical general colorimeter, we introduce the latest imported LED light source and sensor from other countries, and it has stable, durable, the characteristics of the economy.

The interface we design the menu type, because it is simple and easy to understand. Our AMT506 is not only widely used on Quality department to test the color difference, but also used on the school teaching, scientific research, and color design.

1.2 Feature:

* Three languages to switch, buttons and menus operation are easy to control
* A variety of light and color space modes meet special needs of different measurement conditions
* Two calibrations: white calibration and zero calibration, the measurement data are more accurate and stable
* 1500 sets of data storage space, can check, callout, upload the data at any time
* Professional color quality software would assist the color analysis and quality control

1.3 Applied:

- Color matching in injection and quality control in production process
- Color-difference detection and color-difference batch control in printing process
- Color-difference analysis of spray paint surface and electroplate surface
- Color-difference of different areas of the metal treating surface
- Quality control in color difference in sample and the standard
- Color difference inspection of batch products in outdoors
- On-line monitoring of color difference in production process

1.4 Accessory:

	No.	Accessories name	Pieces	Remark
Standard accessories	1	instrument	1	
	2	bag	1	
	3	AC adapter	1	
	4	USB cable	1	
	5	Calibration plate	1	
	6	software	1	
	7	hard case	1	
	8	instruction	1	
Optional accessory	9	micro-printer		

1.5 Condition:

- Operating temperature: 0 to 40° C,relative humidity 80% or less, no condensation
- Storage temperature:10 to 30° C, relative humidity 70% or less
- Do not store the JZ-350 in areas where with strong vibration, magnetic field interference, corrosive medium and severe dust

1.6 Note:

□ This instrument should use our own AC adapter and qualified AA battery only, otherwise, the instrument may damage, battery leakage, fire and even explosion.

□ The instrument should not put on the high temperature environment longterm, this would cause instrument accuracy reduced and performance fault.

□ Do not use the AMT506 in areas where dust, smoke, corrosive gases into the instrument inside, it may cause the damage of instrument.

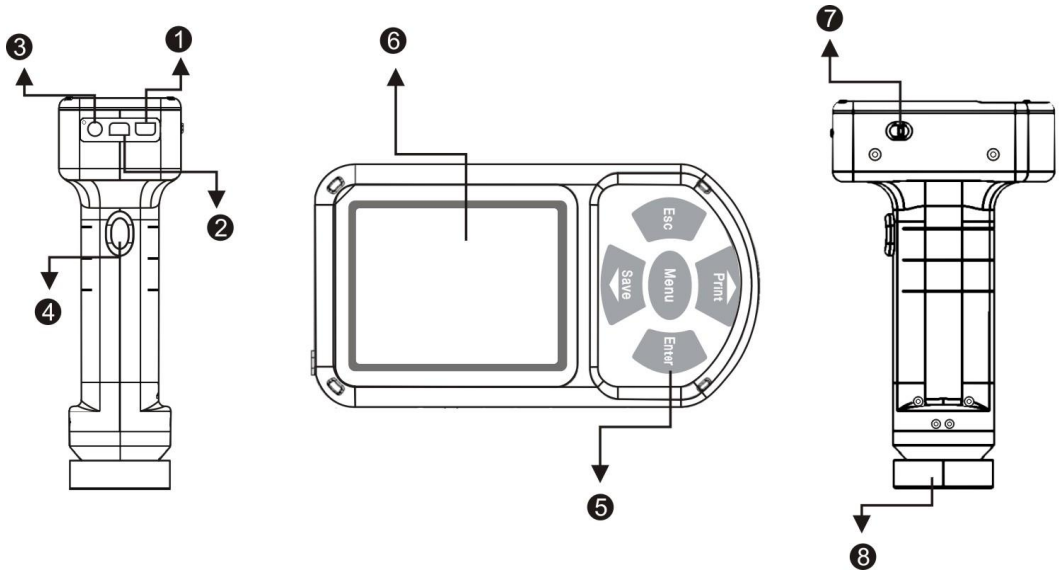
□ Do not use the AMT506 near equipment which produces a strong magnetic field, it would cause data exception of instrument.

□The instrument belongs to precision instrument, other person is not allowed to disassemble it except our company person, or if the instrument damaged, we may not warranty it.

2 Architectural feature and working principle

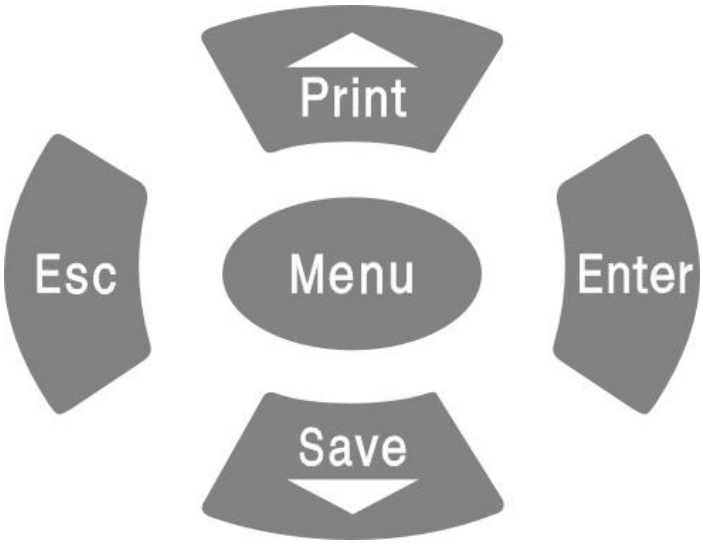
2.1 Architectural feature

2.1.1 Colorimeter



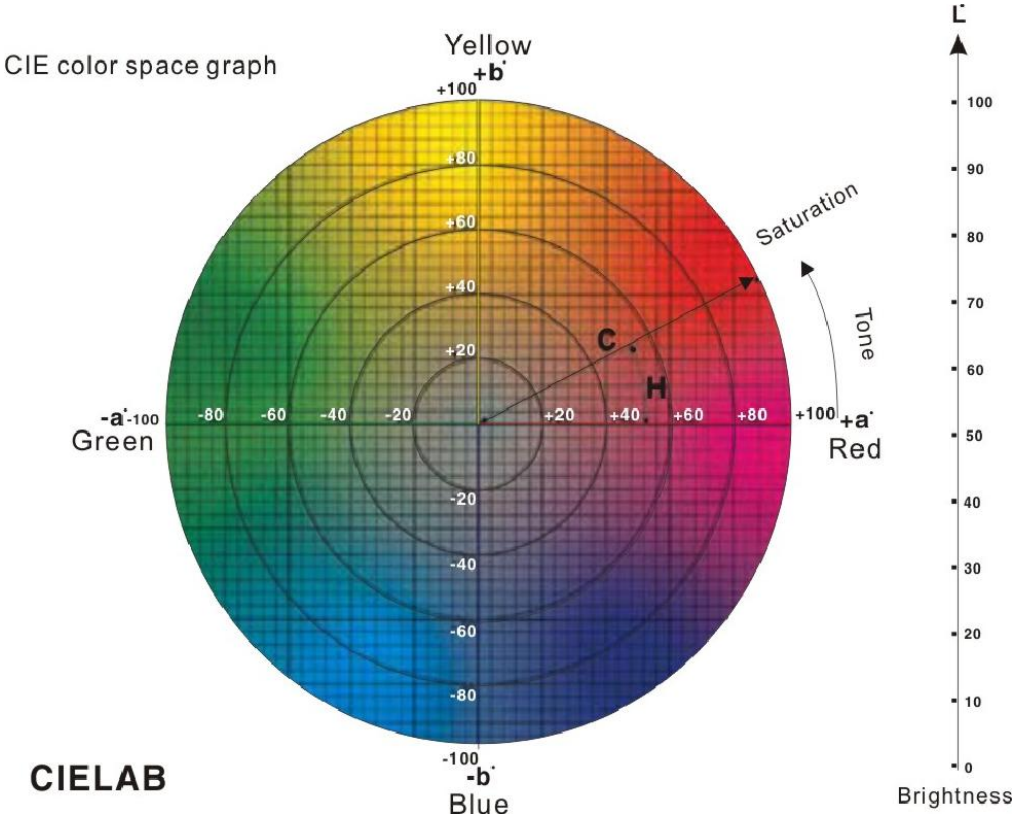
1 USB port
2 Micro- printer port
3 AC adapter port
4 Test key
5 Keyboard
6 LCD
7 On/off
8 Dust cap

2.1.2 Keyboard



2.2 Working principle

According to the CIE's light of tristimulus principle, the standard illuminant irradiates to the object surface, it would spread to the micro-computer to calculation and analysis, after the sensor receives the reflected light information. The color space would display the digital color data at the same time, and it would calculate the color difference between the standard and sample, formula as follows:



△ E* =[(△L*)^2 + （△a*)^2+(△b*)^2]$^{1/2}$ △E*：The total color difference

△ L* = L*Sample- L*S tandard △ L+ Whitish， △L- Blackish

△ a* = a*Sample - a*Standard △ a+ Reddish，△a- Greenish

△ b* = b*Sample - b*Standard △ b+Yellow， △b-Bluish

Basic judgment of Color-difference

Color-difference range	Basic judgment of Color-difference
0 - 0.25△E	Very small or none, exact match
0.25 - 0.5△E	Very small, acceptable match
0.5 -1.0△E	Small to middle, acceptable in some occasions
1.0 -2.0△E	Middle, acceptable in some specific occasions
2.0 -4.0△E	Large, acceptable in specific occasions
4.0△E	Very large, can not acceptable in most occasions

3 Technical characteristic

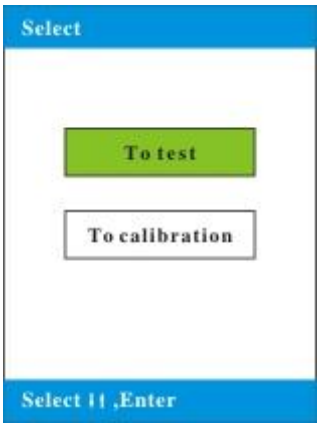
Technical parameters:

Illuminant/light system:	**45/0**
Measuring aperture:	**Ø8mm**
Display model:	**L*a*b*、L*C*H*、XYZ、∆E*ab、∆（L*a*b*）、∆（L*C*H*）、∆XYZ**
Operating language:	**Simplified Chinese, Traditional Chinese, English**
Storage space:	**Standard: 50 sets, 30 sets color difference data under a standard data.**
Standard illuminant:	**D65, D50, F11, C**
Calibration:	**White calibration, Zero calibration**
Repeatability:	**Standard deviation:within △E*ab≤0.08 (When the white calibration plates is measured 30 times, and averaged)**
Weight	**330g(Without batteries）**
Size(WxHxD)	**110 ×60 ×190mm**
Standard Accessories	**Bag, Protection cap, Software, , USB cable, Instrument, Hard case, Calibration plate**
Optional accessory	**Micro-printer**

4 Using the AMT506

4.1 Turning the Power ON:

Insert 4 AA size batteries or connect the AC/DC adapter, and turn the power ON in the side face, the AMT506 would enter the operation interface after a “beep” tone, as shown below:

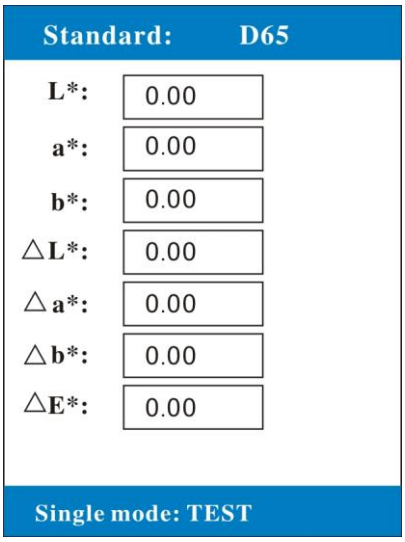


Note: You can enter the test mode directly, but if it not calibration for long times, you should calibrate the instrument first to ensure the measurement accuracy.

4.2 Standard measured

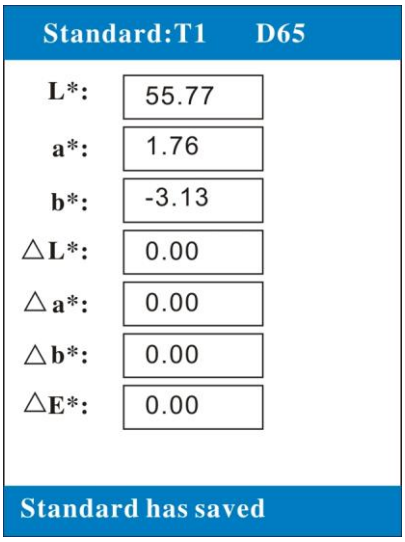
When turn it on, the instrument would automatically enter the test interface, the default mode, Illuminant and Color space is single mode, D65/10° and L*a*b.

The measuring aperture should closely fit the measured object, then press the 'Test' key to start standard test, as shown below:



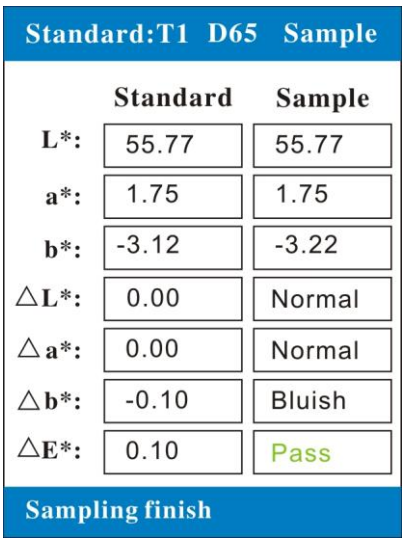
4.3 Save

Please press the 'Enter' key to enter the sample test after the standard measured, and you can press 'Save'key to save the standard sample , it would display the standard number in the top left of the current interface.



4. 4 Sample measured

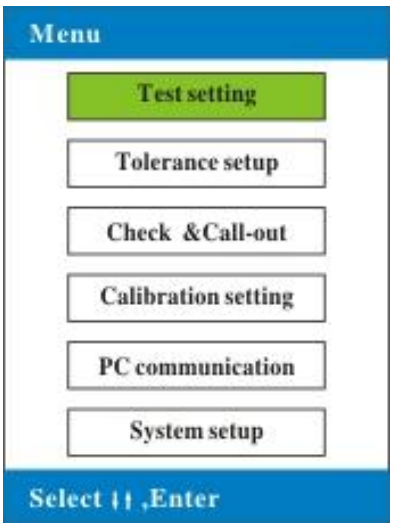
Press the ‘Test’ key to test sample after you enter the sample measured interface, and it would show the color difference between the standard data and sample data, please press the ‘Save’ key to save the color difference data, it would display the color difference number in the upper right of the current interface.



Note: Before you store the color difference data, you should store the standard data first.

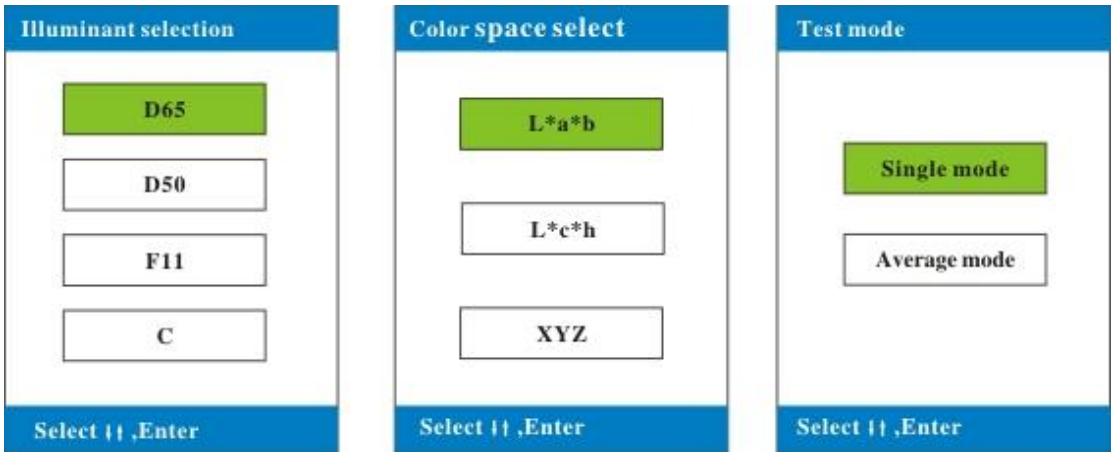
5 Function menu

Press the ‘Menu’ key to enter the function menu interface, 6 functions to select: <<Test setup>>, <<Tolerance setup>>,<< Check&Call-out>>, << Calibration setup>>, <<PC communication>> and << System setup>>.



5.1 Test setup

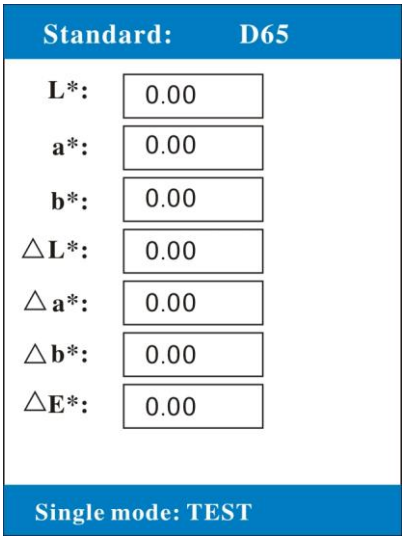
Select the << Test setup>> of the menu selection interface to enter the test mode interface, select << Illuminant selection>> << Color space selection>> <<Test mode>> .



Notes: It would automatically retain the settings if you select to exit.

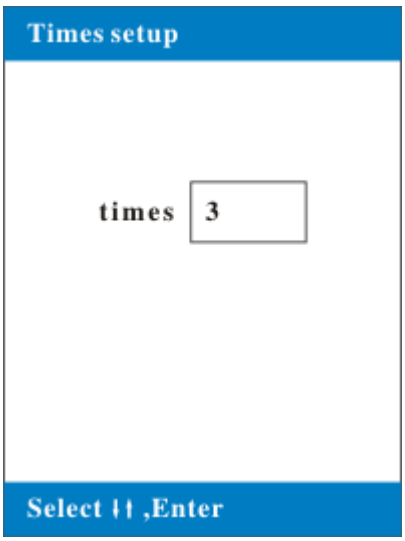
5.1.1 Single mode

It would enter the sampling test interface after you select the <<Single mode>>, you can do sampling test directly, the default test mode is Single mode.



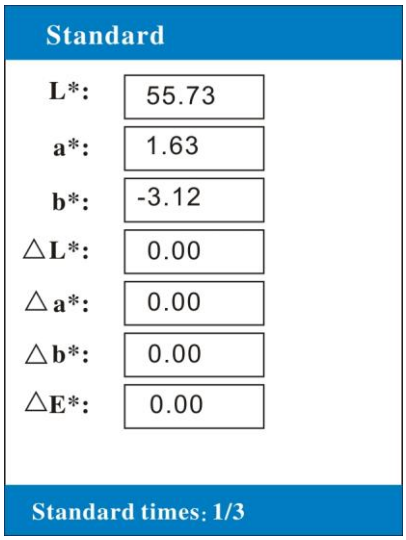
5.1.2 Average mode

Now we are enter the average times interface, the Average mode is suitable for testing uneven color and large areas surface. According to the actual situation, we can press the arrow key to select the appropriate average times, as shown below:



After select the desired average times, press the ‘Enter’ key to enter the <<Average mode>> interface for testing.

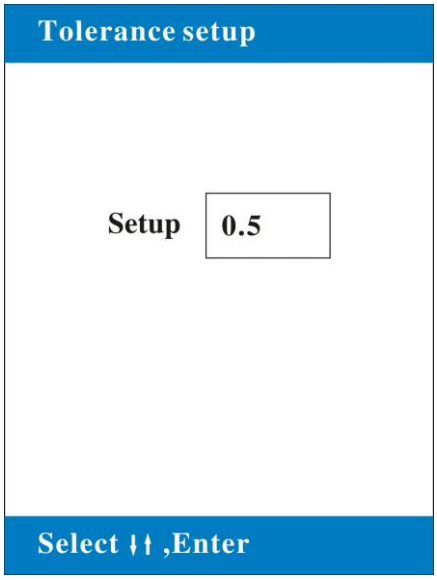
Notes: The test times and the sample measurement times are the same, as shown below:



5.2 Tolerance setup

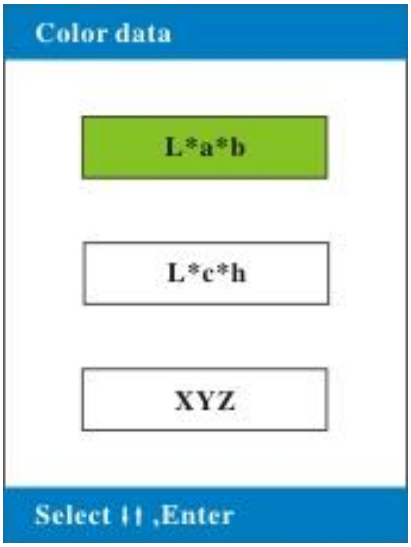
Tolerance setup is setting the qualified color difference data, which should be the maximum, allowable; after you setup, it would automatically determine if the measured item is qualified or unqualified.

Select the <<Tolerance setup>>, and press the ‘Enter’ key to enter the tolerance setup interface, the default data is 0.5, you can press arrow keys to adjust the tolerance.



5.3 Check&Call out

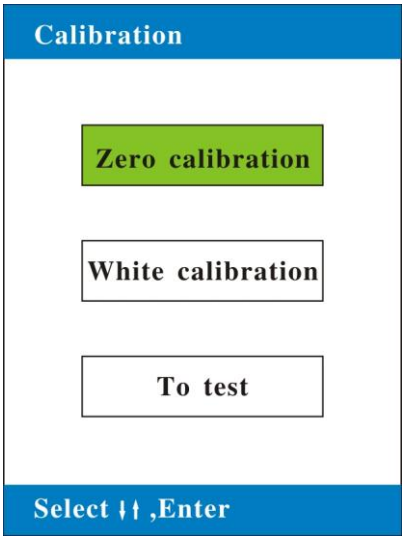
According to the different selection of the color space, you can check the stored standard data and its corresponding color difference data in the L*a*b,L*c*h and XYZ of the three color space modes.



Note: Select and check the data in different color space, the ‘Menu’ key can call out the call out the stored standard value to measure directly.5.4 Calibration setup

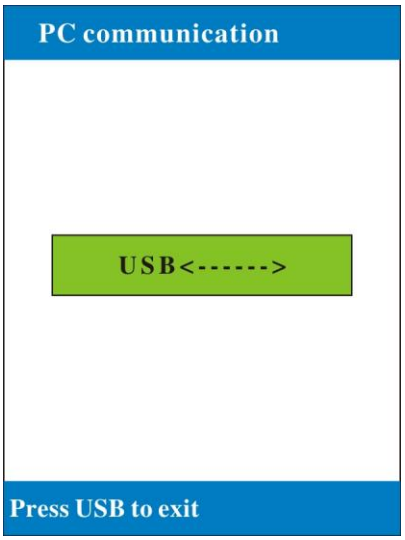
5.4 Calibration setup

Set the white calibration and zero calibration here, and after finish this step, it would enter test interface.



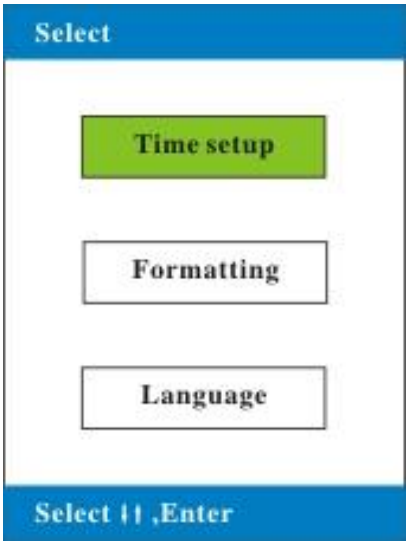
5.5 PC communication

The AMT506 can connect the computer through our software, it would extend more functions of the instrument.
Note: After you enter the PC communication interface, then the instrument can connect with the computer software, as shown below:



5.6 System setup

Set the ‘Time setup’, ‘Formatting’ and ‘Language setup’ in this interface.



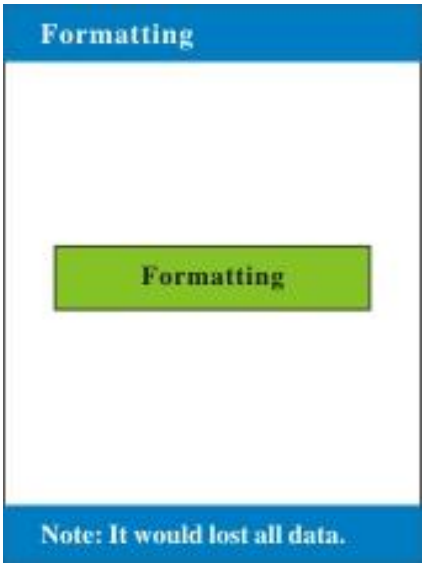
5.6.1 Time setup

Press the ‘Year’, ‘Month’, ‘Date’, ‘Hour’ and ‘Minute’ to set of the << Time setup>> interface, and press the arrow key to correct, press ‘Enter’ key to finish the setting.

5.6.2 Formatting

The function is clear all the data of the instrument, press ‘Enter’ to start formatting, and the ‘Esc’ to exit.

Warning: Be careful! All data would be lost if you confirm formatting.



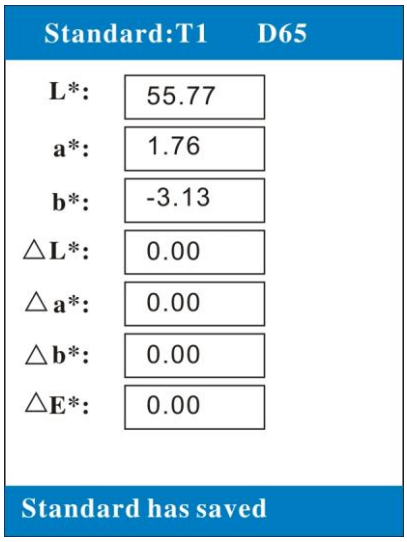
5.6.3 Language selection

There are Simplified Chinese, Traditional Chinese and English three languages to select, please according to the demand to select the operation language.

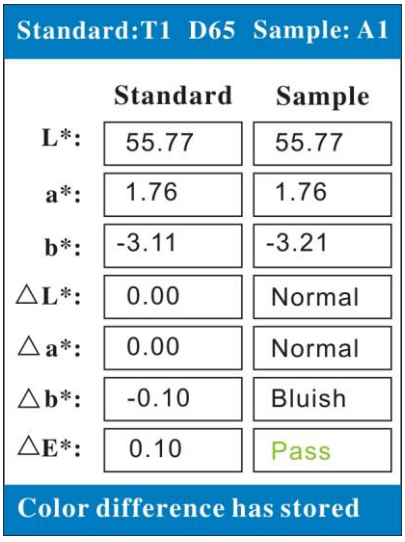
6 Other functions explaining

6.1 Save, Check and call-out

It not default to save the data when you measure, if you want the data save, measure the standard, you should press the ‘Save’ key to save it, and we can save 50 sets standard data, use the symbol ‘T’ to represent it, when the record more than 50 sets, it can’t store the data any more, and please formatting it.



Press the ‘Enter’ key to enter the color difference test interface for comparison test in this interface, please press the ‘Save’ key to save it, we can save 30 sets color difference data, use the symbol ‘A’ to represent it. When the record more than 30 sets, it can’t store the data now, please formatting it, then you can save the data.

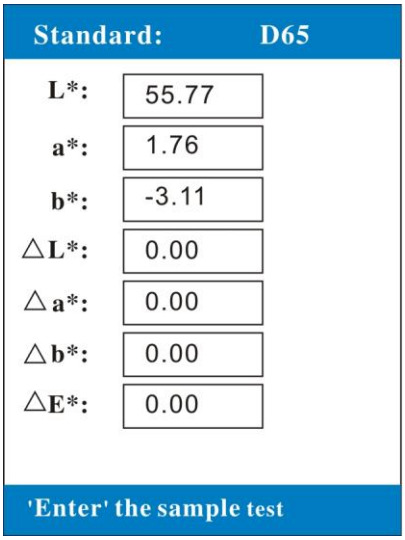


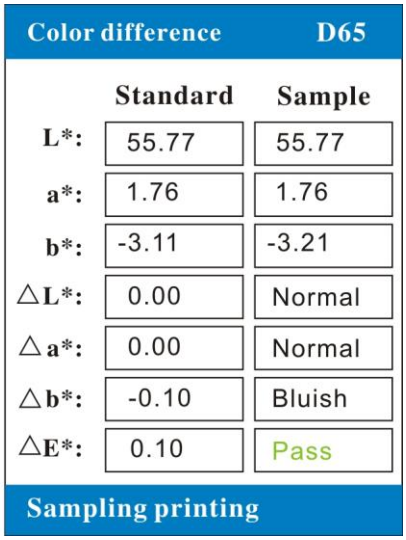
Note: Press the arrow key to check the data after you select the color space, and if you need call-out the standard sample to measure, please press the "Menu" key to call-out the standard sample.

6.2 Micro-printer to print

Only the AMT506 connects the micro-printer and enters the test interface can you print out the test data, as shown below:

Notes: We don't provide the Micro-printer with the instrument, you need purchase it in addition





7 Other functions explaining

7.1 Standby and wake up

In order to save the battery power, the AMT506 would enter the standby state of black screen if you don't use it for 5 minutes. The instrument will wake up to the previous interface for press any key.

7.2 Battery test

It would lead to the test data anomalies if the working battery has not enough power , and the AMT506 will automatically popup a prompt interface, remind us to change the battery. Now we should change the battery immediately, or it may affect the measure accuracy.

7.3 Safety instruction

If the AMT506 would not use for a long time, disconnect the AC outlet to prevent battery damage and corrosion the instrument. If it is DC power, also need remove the battery, it may damage the AMT506.

8 Software driver installation

8.1 Driver description

When you connect the computer of the first time, you should install our own drive.

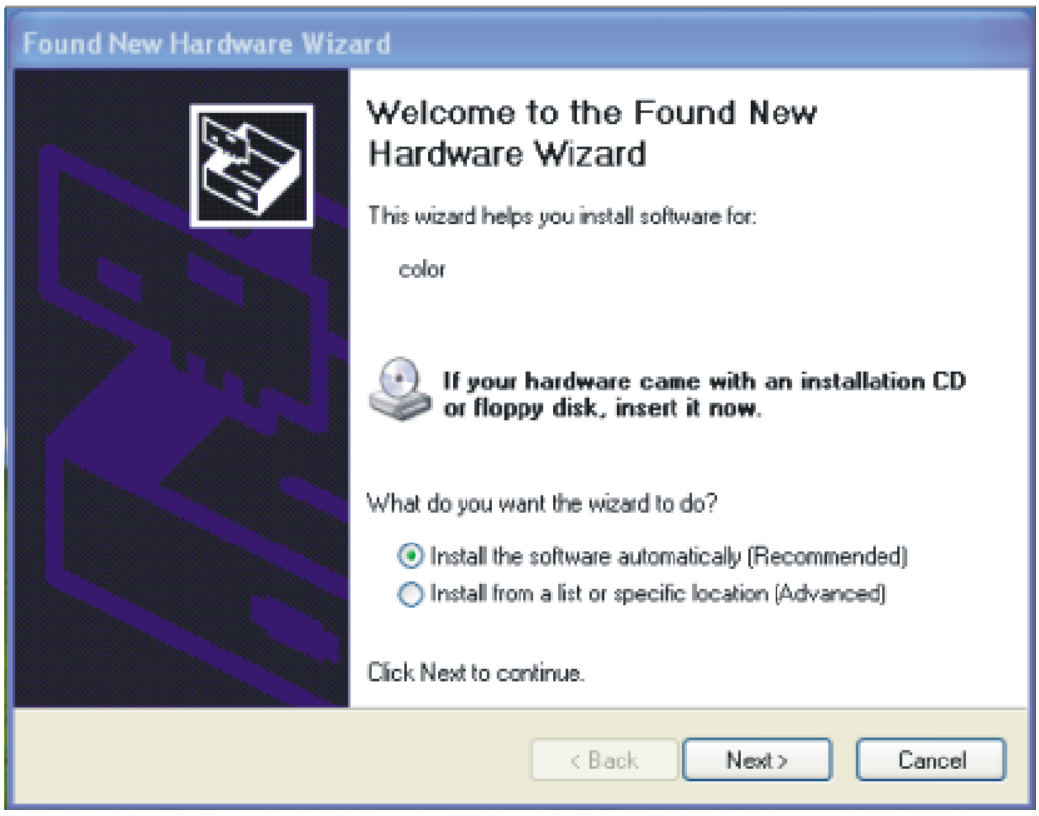
8.2 Connection the AMT506

Enter the <<PC communication>> interface and select the PC communication, it would appear the USB connection interface when you press Enter key.

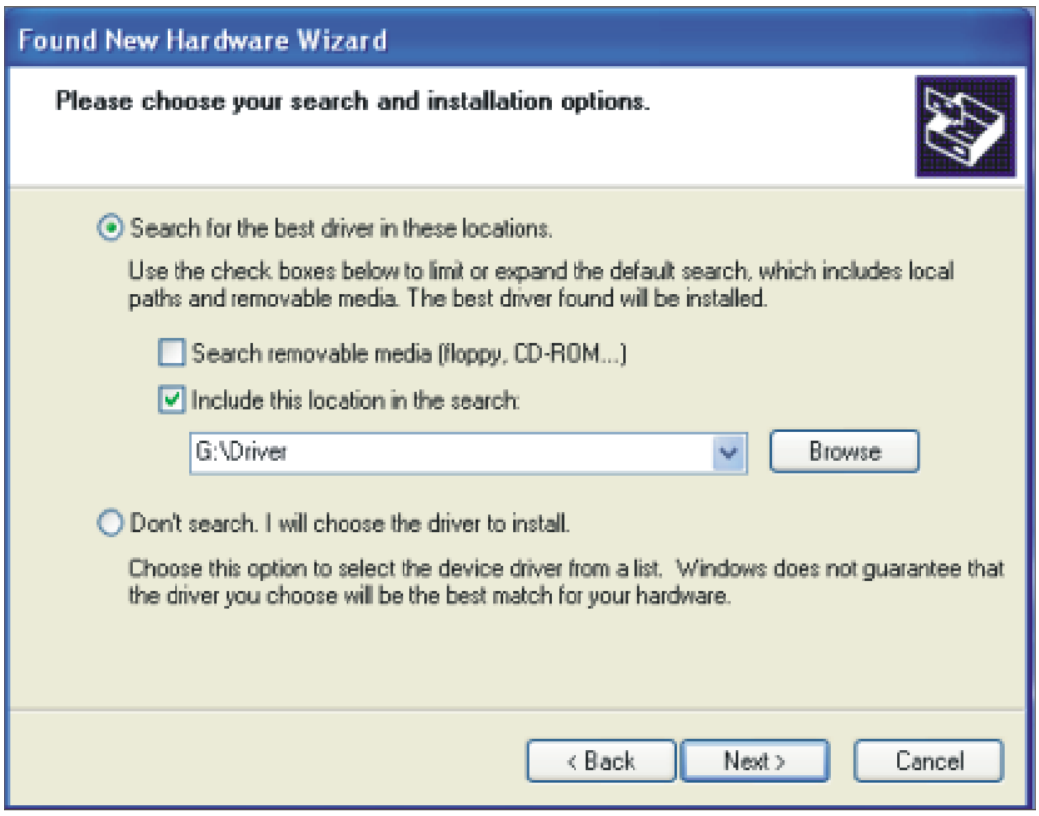
8.3 USB installation

1 Put the CD to the CD-ROM, and insert the USB cable to the USB port of AMT506, it would appear‘Found new hardware’, as shown below:

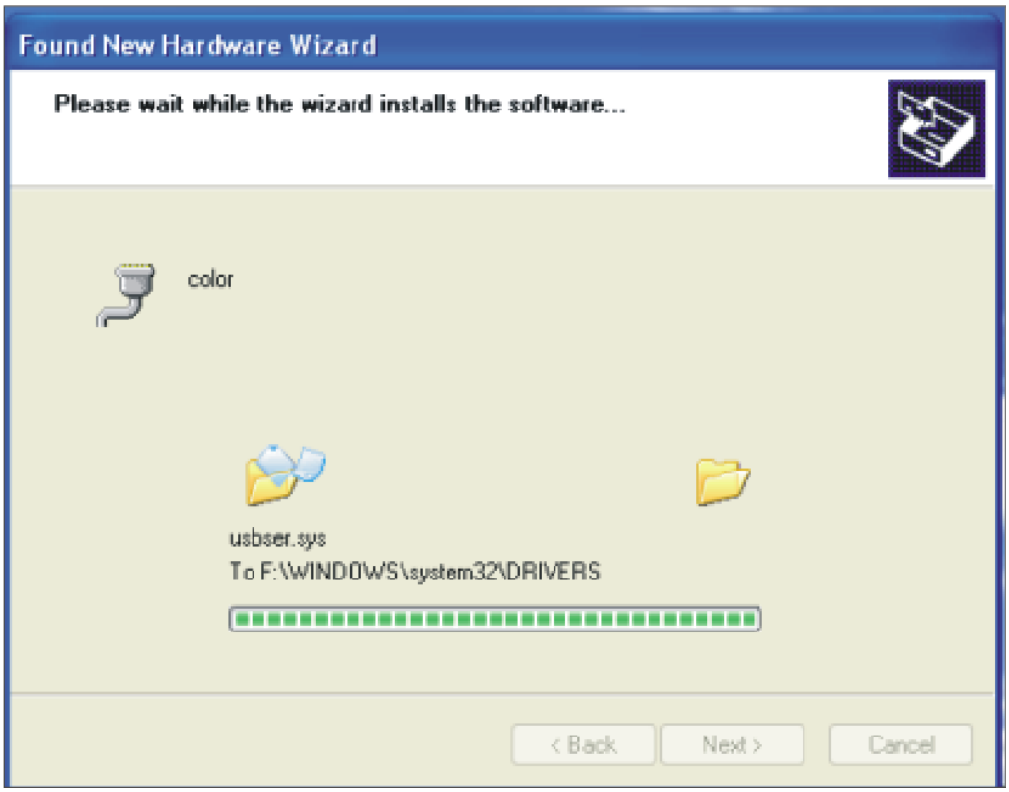
2 It would popup the dialog box later.



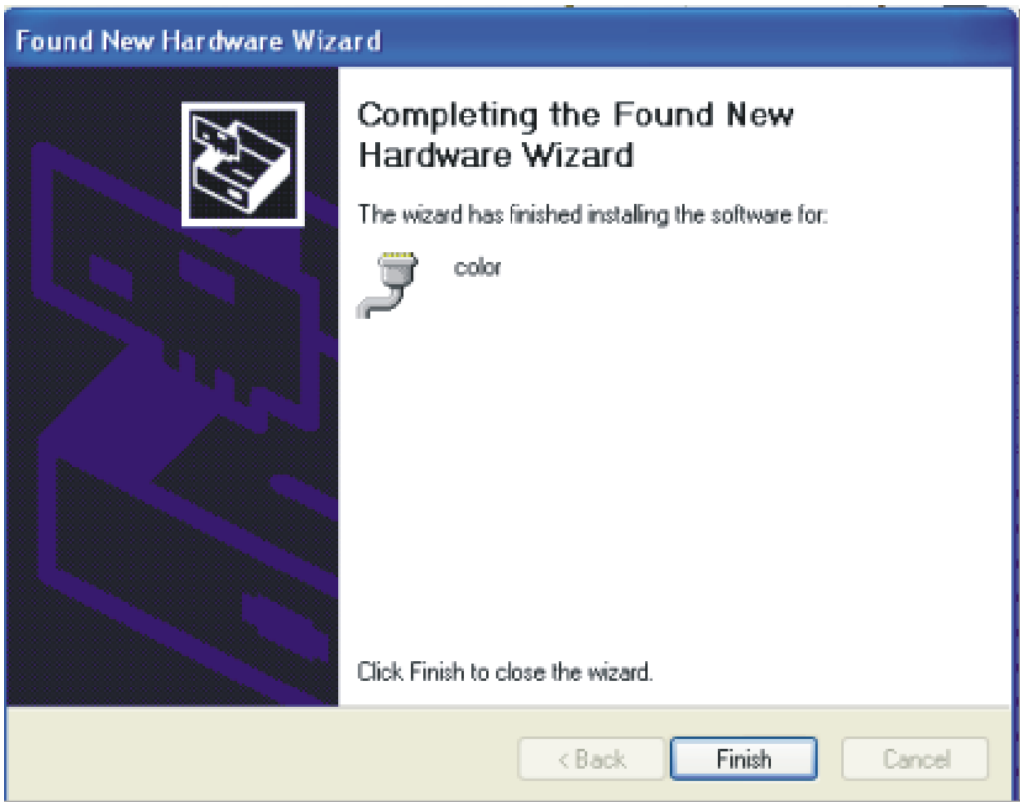
3 Click ‘’Next” to install, or install the specific location from the list.



4 Click‘Browse’ to find the ‘Driver File’ in the CD-ROM directory, and click ‘Next’,the installation wizard will automatically install the driver.



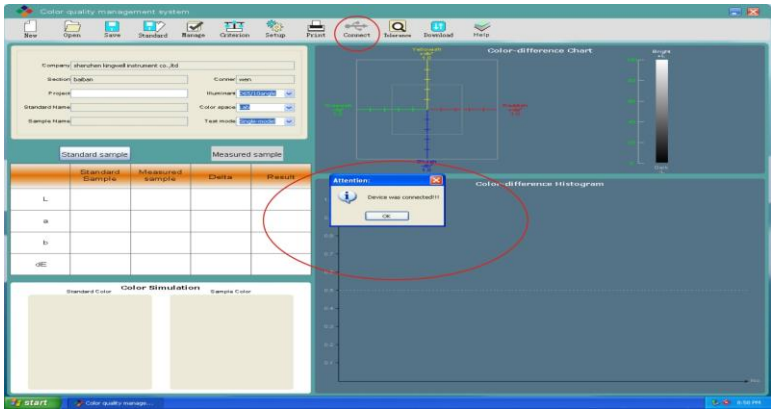
5 Click ‘Finish’, the driver has finish the installation.



9 Software instructions

9.1 Operating instructions

1. Press ‘Connect’ after you install the software, if it appear the ‘software successfully connected’, then you can go on next step, if it failed, please check the drive and the connection status.



2. Now we are in the ‘Calibration’ interface, it will enter the operation interface after you finished the calibration.

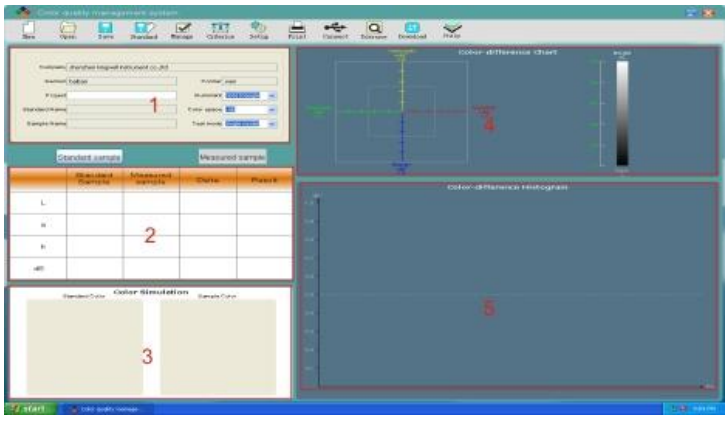
Note：It must calibration before you start any operation step.

3. If it need re-connect, just need press the ‘Connect’, no need to close the software.

9.2 Interface description

The main interface has two parts: toolbar and 5 functions

1. Related information: you can set it in the software system, and it would display it when you print.
2. Measurement interface: show the related data of the standard measured and sample measured.
3. Color simulation: display the simulation color of the standard and sample.
4. Color difference graph: display the difference location in the color space of the standard and sample
5. Color-difference histogram: show the tolerance between the sample and standard of every batch

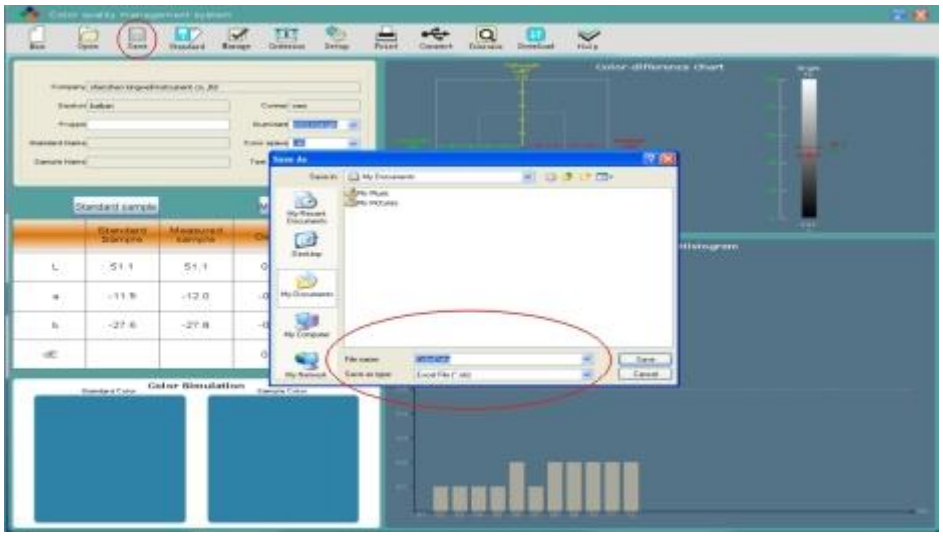


9.3 Save and open

The test data you can save, and we have two formats to select:

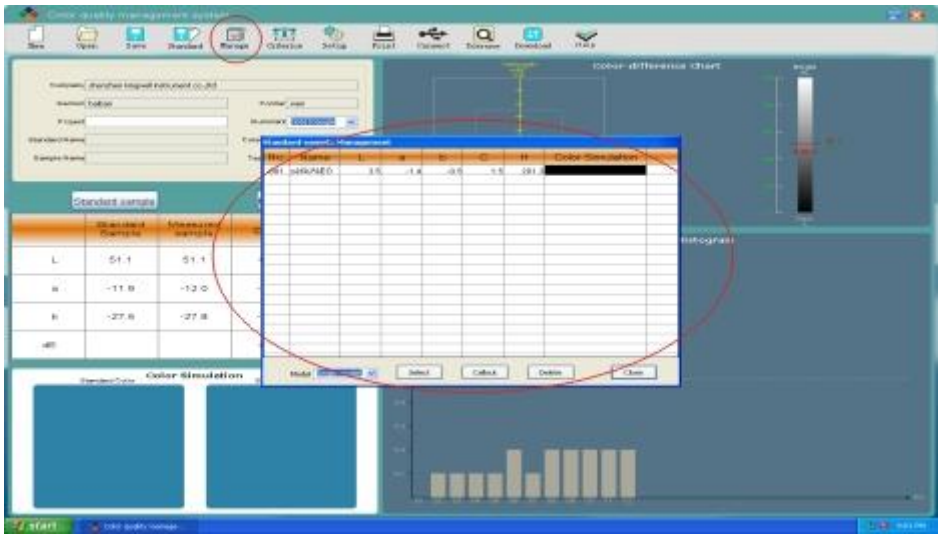
1. Color-difference data file (*dat), you can callout the data in next measurement.
2. Excel file(*.xls)，you can edit and print it after you saved, but it can’t callout again.

Notes: We need store the files first, and the data can open in next



9.4 Standard management

Save the standard sample first, if the measured standard data need test in next measurement, you need open the management and callout the standard data, and continue the measurement.

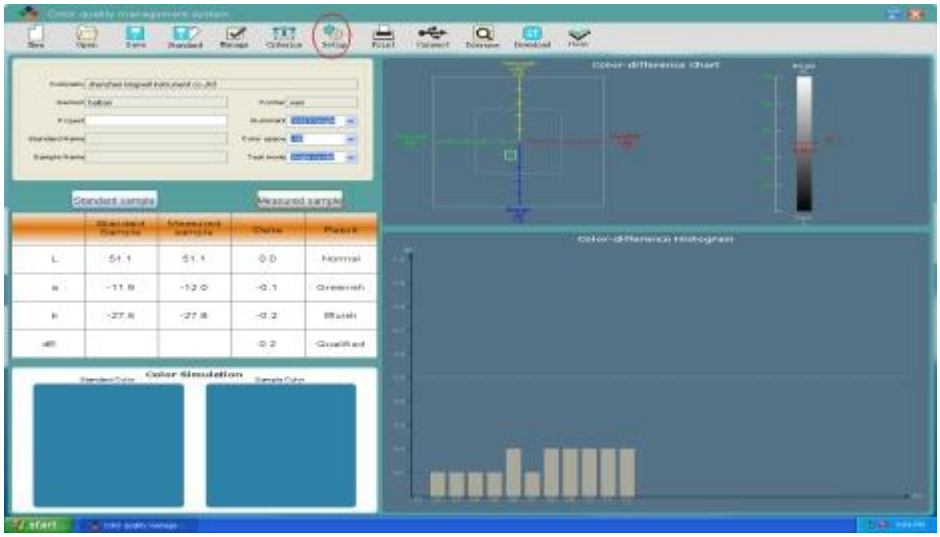


9.5 Tolerance judgment

We can set the △E*ab、△*Lab of the color difference data, it would automatically determine whether the color difference meet the requirement according to your tolerance range.

9.6 System setup

Setting the related information of the measured object and it would form the complete measurement information, it would also automatically generate the relevant information when you print the report.



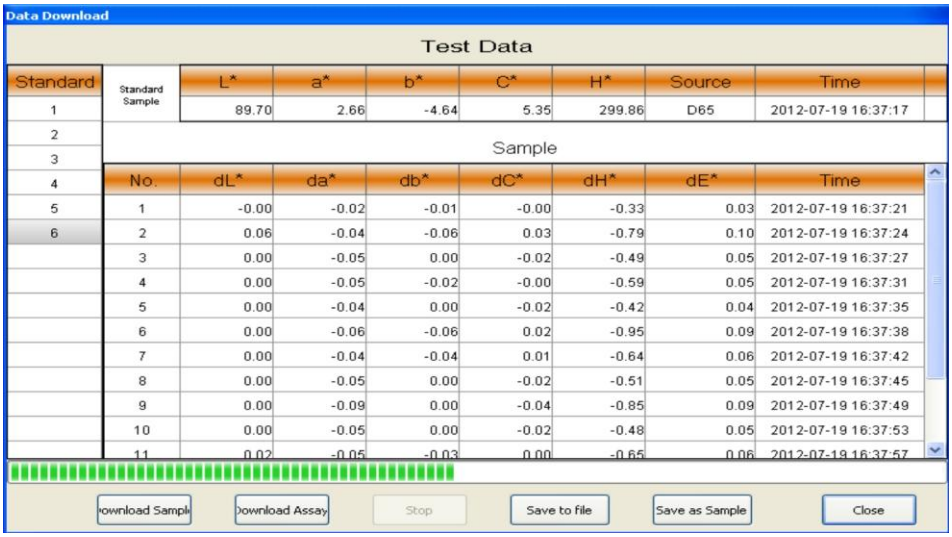
9.7 Print function

It would formation the measurement report after the data measurement completed, and we have three output modes:

1. Single report: Output the color difference data of sample and standard in two illuminant source modes.
2. Summary report: The output of each color difference data in the same standard sample batch
3. Color-difference histogram: color-difference analysis of the summary

9.8 Download the data of instrument

Press the 'Dwenload'button,we can download the instrument datas to computer,and the data also can store or callout the standard data.



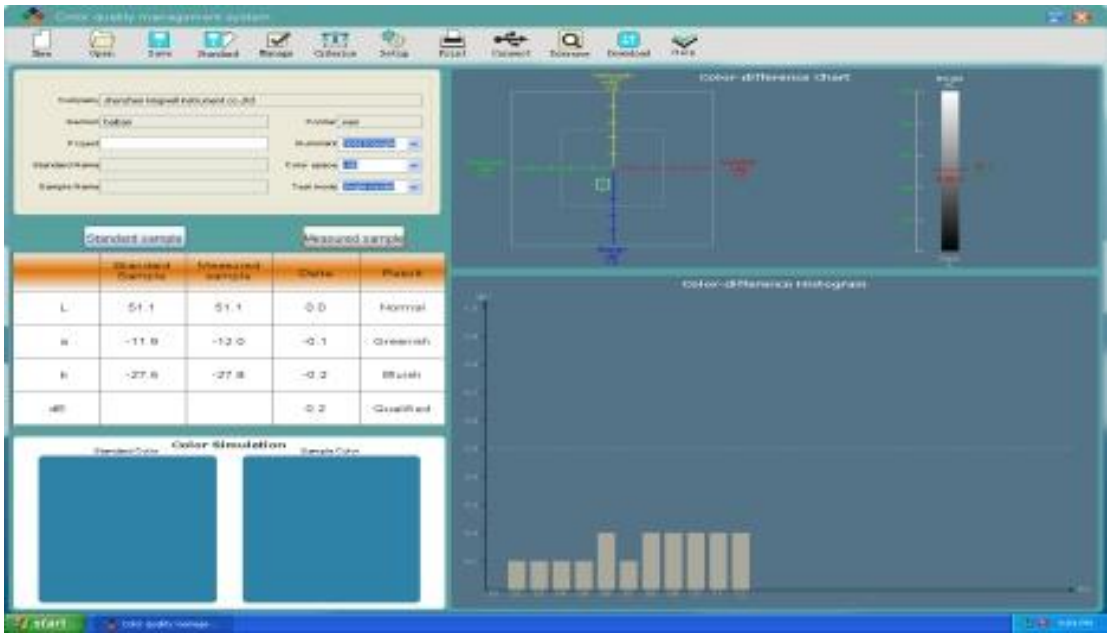
We should download the ‘Standard’ data first, and after it finish this step, double-click the standard data, and it would show the checked standard data, and now press ‘Sample’ data, after it you can check the color difference data.

9.8.1 Save and Callout

Press the ‘Save to file’ after you download the data, then press ‘Save standard ’, the standard data would save in ‘management’.

9.9 Help

Check the software version information and the software operation instructions in this function.



10 Troubleshooting guide

Condition	Checkpoint	Recommended action
1、can not startup	A、no power of the battery	A、Change a new battery.
	B、insert the wrong polarity	B、Insert the correct polarity.
2、test data execption	A、not close contact, or it may shake when you measured.	A、Close contact of the object surface, and measuring smoothly.
	B、the object is too thin, or it has other color in reverse side	B、Pad the whiteboard reverse side or pad some white measurement.
	C、uneven color of the obje-Ct, or color mixed	C、Avoid the uneven color position, or select the average measurement.
	D、no power of the battery	D、Change the battery or use the DC adapter
	E、the instrument no calibration for long times.	E、Please calibration first, then go on operation.
3、System halted of the AMT506	A、the key pressed too fast	A、It need pause when pressed the button.