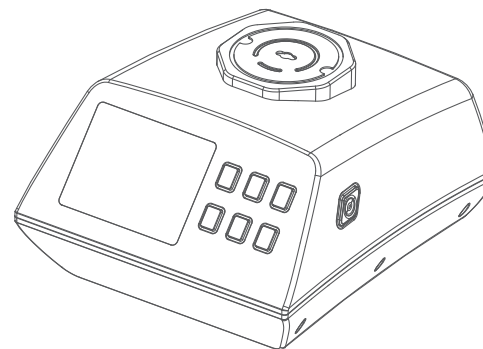China's leading expert of color and gloss analysis

SERIES OF SPECTROPHOTOMETER
OPERATION MANUAL ▶

CS-800C/800CG

Service hotline:+86 571 85888707

Address:No.166,Wenyuan North Road,Jianggan District,Hangzhou City,China

www.chnspec.com

CATALOGUE

Terms of use

1.Our spectrophotometer is the first model in China that incorporates spectrum splitting technology in the measurement of color. This instrument adopts 45/0 geometry,directional dependence is eliminated ,regardless of changing the sample position, tilting sample or rotating instrument can achieve higher accuracy and repeatability.It is mainly used to measure the sample's spectral data, spectral graph, color values, color differences and so on. The structure is compact and handy; measurement is easy to carry out, accurate and precise.

2.Our spectrophotometer is widely used in factories, labs and on spot. It can achieve great color measurement result in the quality control of almost all fields.

3.The warranty period starts from the date you purchase the spectrophotometer. If you need warranty service, please contact local agency or visit our website www.chnspec.com to contact us.

4.To avoid damage to instrument accuracy or precision, please do not disassemble the instrument. Damage to the instrument caused by

Notes

1.Carefully put the instrument on a flat surface.

2.This instrument is not moisture proof,Please store the instrument in a dry area.

3.Large force, or sharp objects may damage the screen.

4.It is recommended to use the original power adapter with the instrument.

5.To ensure that the instrument works properly, please do not store, or use the instrument in places that are too hot or too cold; please do not put the machine in damp locations, or directly under sunlight. Do not use the instrument in severe environment such as strong shock or quake.

6.Check battery before usage.

7.Please avoid strong electromagnetic interference in usage.

8.Please do not use the instrument to measure surfaces that are not flat.

9.Please keep the instrument steady; do not shake the instrument in usage.

10.Please put the instrument directly on the spot to be measured, but do not apply strong force.

11.If this user manual is further updated, we are not obliged to notify you.

12.If any questions, please contact us directly.

Instrument functions

1.To test multiple color parameters:
ΔE*ab,ΔE*ch,ΔE*uv,ΔE*cmc(2:1),ΔE*cmc(1:1),ΔE&94,ΔE*00,
ΔEab(Hunter),555,color classification,CIE-L*a*b*,L*C*h,L*u*v,XYZ,Yxy,
Hunter-lab,Munsell MI,CMYK

2.Large data storage space;

3.TFT display screen;

4.Friendly man-machine interactive interface;

5.LED light source, and possess longer service life;

6.Low power consumption design, high capacity rechargeable lithium-ion battery configuration;

7.Low battery prompt function; full data space prompt function;

8.USB data transfer, PC color QC software;

9.Be able to connect with the mini-printer for printing.

Technical Parameters

Model	CS-800C	CS-800CG
Function	color	color and gloss
Geometry	45/0	
Aperture	11mm	
Wavelength	400-700nm	
Wavelength Interval	10nm	
Sensor	high sensitivity silicon photodiode	
Illumination	LED	
Repeatability	Reflectance: standard deviation within 0.08% Chromaticity value: ΔE*ab 0.03 (when a white plate is measured 30 times at 5 second interval),Maximum 0.05	
Inter Instrument Agreement	0.2 ΔE*ab (BCRA II color tiles, average test value of 12 tiles)	
Language	Chinese and English	
Observer	2°/ 10°	
Illuminants	A,C,D50,D55,D65,D75,F1~F12,CWF,U30,DLF,NBF,TL83,TL84,U35	
Color Space	CIE-L*a*b,L*C*h,L*u*v,XYZ,Yxy, Reflectance,Hunter-lab,Munsell MI,CMYK	
Index	WI(ASTM E313-00,ASTM E313-73,CIE/ISO,AATCC,Hunter,Taube Berger Stensby),YI(ASTM D1925,ASTM E313-00,ASTM E313-73),Tint(ASTM E313,CIE,Ganz),Metamerism index Milm, Stick color fastness, Color fastness,ISO brightness, A density,T density, M density, E density	

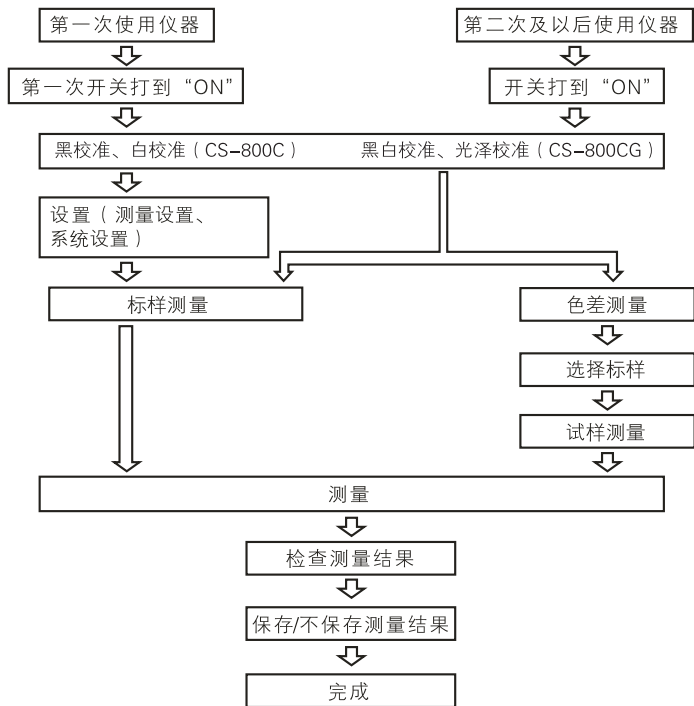| Color Difference	ΔE*ab,ΔE*CH,ΔE*uv,ΔE*cmc(2:1),ΔE*cmc(1:1),ΔE*94,ΔE*00,ΔEab(Hunter), 555 shade sort	
Test Angle		60°
Test Area		5x10 mm
Test Range		0-1000 GU
Repeatability		0.2 GU(0-100GU) 0.2%(100-1000GU)
Reproducibility		1.0 GU(0-100GU) 1.0%(100-1000GU)
Illumination Life Time	10 years 3million test	
Screen	5.0 inch color screen	
Storage	20000 samples	
Interface	USB	
Power	rechargeable Lithium Battery, continuous measurement 20000 times, 7.4V/600mAh	
Work Condition	0-45℃ relative humidity 80% or less (at 35℃) with no condensation	
Size	350*300*200mm（L*W*H）	
Weight	about 4.5kg (without battery)	
Standard accessories	AC adapter, Lithium Battery, operate manual, color QC software, driver software, USB cable, Calibration tile (Black and white)	
		Gloss calibration tile
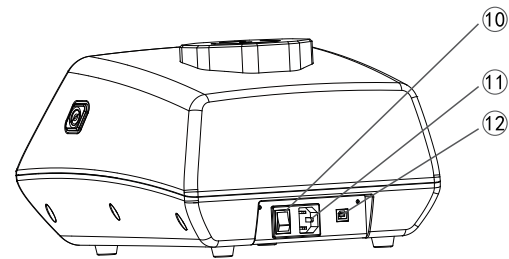
Appearance and structure
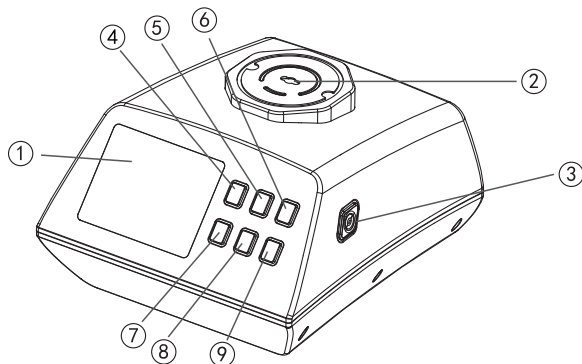
① 显示屏

② 测试口

③ 测试键

④ Menu菜单键

⑤ Up 向上键

⑥ Cancel取消/后退键

⑦ Save保存键

⑧ Down 向下键

⑨ 确认键

⑩ 电源开关键

⑪ 电源接口

⑫ USB数据接口

Measurement flow chart

```
第一次使用仪器                          第二次及以后使用仪器
    ⇩                                        ⇩
第一次开关打到 "ON"                      开关打到 "ON"
    ⇩                                        ⇩
黑校准、白校准（CS-800C）      黑白校准、光泽校准（CS-800CG）
    ⇩
设置（测量设置、
系统设置）
    ⇩
标样测量                                 色差测量
                                            ⇩
                                         选择标样
                                            ⇩
                                         试样测量
                                            ⇩
         测量
          ⇩
      检查测量结果
          ⇩
   保存/不保存测量结果
          ⇩
        完成
```
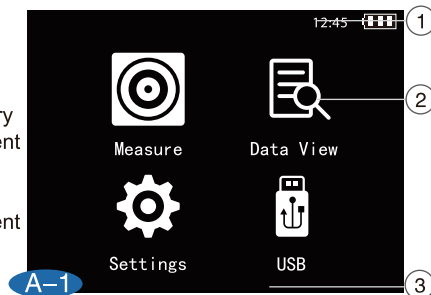
Program interface

A-1

Main interface
① Title area: display primary functions of the current page

② Working area:display primary functions of sub-pages of current page, or measurement data

③Condition area: display current conditions of the current page


```
12:45

①  Measure      Data View  ②

   Settings       USB
A-1                          ③
```

Basic operations:
Use up or down buttons to select the function, then press "Enter" to enter that function's sub-page; press "Cancel" to return to the previous page, "Save" to save measurement data or system settings; "Menu" to show the menu, "Print" to print measurement data or call out camera view.
Measurement: the user can measure the color values of the sample, color differences, and view saved measurement data;
Data view: in this page the user can view the measurement data under saved target, and can view, delete or edit the name of selected sample;
Settings: user can change the measurement and system settings under this page;
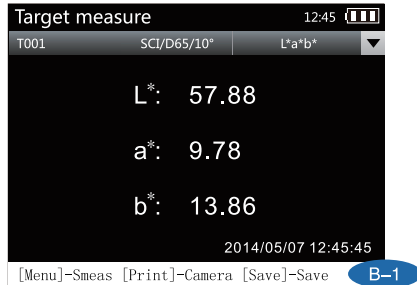USB user can use the USB cable to connect the instrument to with PC.

Measurement

In the main page, use up and down buttons to select "measure", and press "Enter" to enter the measurement page.
Under this page, user can measure the sample's color values, reflectance and so on; and can measure the color difference between two samples and compare their reflectance figure.

Target measurement

Target measure 12:45

T001　　　　SCI/D65/10°　　　　L*a*b* ▼

L*: 57.88

a*: 9.78

b*: 13.86

2014/05/07 12:45:45
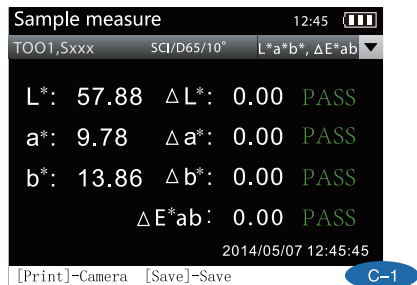
[Menu]-Smeas [Print]-Camera [Save]-Save **B-1**

B-1

Press "print" to view the area being measured, then press the "Test" .
In the title of the measurement results, first column is target name, after pressing "save" to save, it will show the saved name; before being saved, target's default name would be "Txxx".

Second column shows measurement conditions, isuch as, light source ,observe angle and test mode, all of which can be changed in the "settings" page. The third column includes data that can be viewed; press "Enter" to view the reflectance value and figure of the selected data.
When viewing reflectance, press "Up" and "Down" to see reflectance value at different wavelengths.

Sample measurement

Sample measure 12:45

TOO1,Sxxx　　　　SCI/D65/10°　　L*a*b*, △E*ab ▼

L*: 57.88　△L*: 0.00　PASS

a*: 9.78　△a*: 0.00　PASS

b*: 13.86　△b*: 0.00　PASS

　　　　　△E*ab: 0.00　PASS

2014/05/07 12:45:45

[Print]-Camera　[Save]-Save **C-1**

C-1

After measure and save at least one target, press "Menu" to enter the sample measurement page under this target. Press "Test" to measure the color difference; which is same as measuring target, after pressing "save" to save, it will show the saved name; before being saved, sample's default name would be "Sxxx".

Sample test can also be done under data view page. Press "Up" and "Down" to select a target, and press "Test" to measure the color difference.
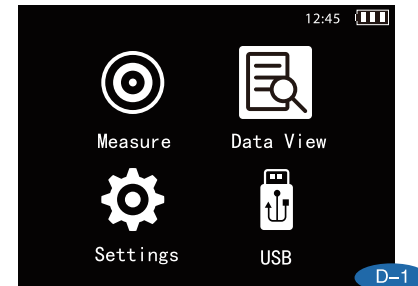
Note: please set the tolerance before measurement;

On sample measurement page, press "Enter", and then you can select reflectance with "Up" and "Down".

Data View

D-1

In the main page, use "Up" or "Down" to select "Data View", press enter to enter the data view page, and view saved target.

12:45

Measure　　　Data View

Settings　　　USB **D-1**

Use "Up" or "Down" to select the target, then press "Enter" to view the measurement results of selected target.

Data View   12:45

T Name	S Num	Tasting time	Pseudo
T001	2	2014/06/06 09:38:10	
T002	1	2014/06/06 09:40:20	
T003	3	2014/06/06 09:43:30	
T004	2	2014/06/06 09:45:20	
T005	0	Sample View 09:50:24	
T006	1	Delete 09:53:20	
T007	2	Editing name 09:54:27	

[Enter]-Target View   [Menu]-Menu   D-2

Use "Up" or "Down" to select the target, then press "Menu" to open a menu, in which you can view or delete a standard sample, or change its name. Delete will also delete all test samples under the target.

Sample View   12:45

S Name	Testing time	Pseudo
S001	2014/06/06 09:38:10	
S002	2014/06/06 09:40:20	
S003	2014/06/06 09:43:30	
S004	2014/06/06 09:45:20	
S005	2014/0 Delete	
S006	2014/0 Editing name	
S007	2014/0 Delete all	

[Enter]-Target View   [Menu]-Menu   D-3

Settings

In the main page, use up and down buttons to select "Settings", and press "Enter" to enter the settings page.

Settings   12:45

Meas Setup   System Setup
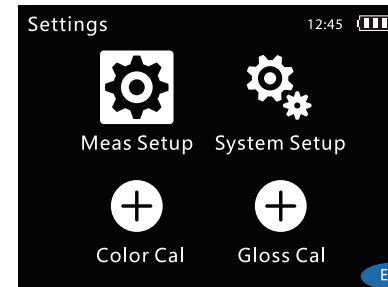
Color Cal   Gloss Cal   E-1/1

Measure Setup： the user can change settings of light source, spectator, tolerance.
System settings： user can set language, time and power do factory reset, and check the version of the instrument.
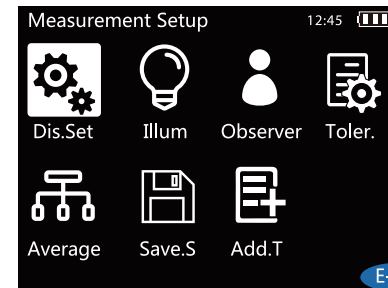**Color calibration**： In the page,the user can perform color calibration.
Gloss calibration： In the page,the user can perform gloss calibration.
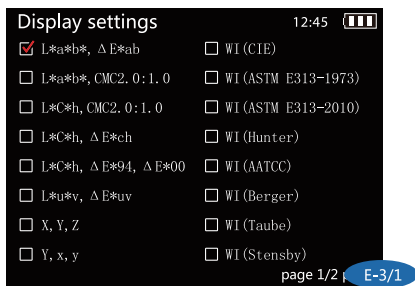
Measurement setup

Use "Up" and "Down" to select; press "Enter" to enter measurement setup page.

Measurement Setup   12:45

Dis.Set   Illum   Observer   Toler.
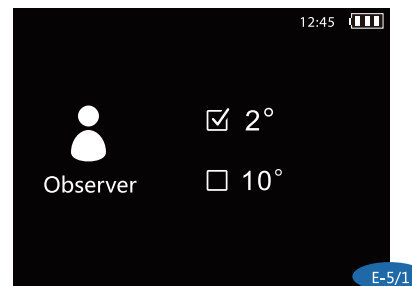
Average   Save.S   Add.T   E-2/1

E-3/1

Display settings: "Up"/ "Down" to select; "Enter" to enter display settings page. Press "Up" and "Down", select the color space and confirm with "Enter" . Then, the measurement page would show the values you need.
Note: after selection "Metamerism", you can set the observer and light source for metamerism comparisons.


| Display settings	12:45
☑ L*a*b*, ΔE*ab	☐ WI(CIE)
☐ L*a*b*, CMC2.0:1.0	☐ WI(ASTM E313-1973)
☐ L*C*h, CMC2.0:1.0	☐ WI(ASTM E313-2010)
☐ L*C*h, ΔE*ch	☐ WI(Hunter)
☐ L*C*h, ΔE*94, ΔE*00	☐ WI(AATCC)
☐ L*u*v, ΔE*uv	☐ WI(Berger)
☐ X,Y,Z	☐ WI(Taube)
☐ Y,x,y	☐ WI(Stensby)

page 1/2 E-3/1

E-4/1

Light source: Use "Up" and "Down" to select; press "Enter" to enter light source selection page. Under this page, you can choose any light source, including A, C, D50,D55, D65, D75, F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, CWF, U30, DLF, NBF, TL83 and TL84 light sources, which is a total of 24 light sources. Use "Up", "Down" and "Enter" to confirm your choice.
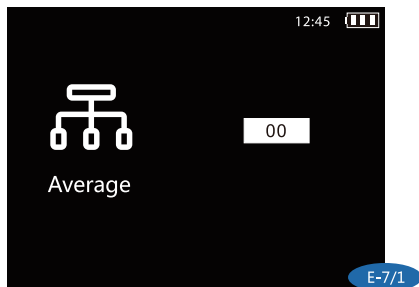

12:45

Illum

☑ A	☐ F1	☐ F7	☐ CWF
☐ C	☐ F2	☐ F8	☐ U30
☐ D50	☐ F3	☐ F9	☐ DLF
☐ D55	☐ F4	☐ F10	☐ NBF
☐ D65	☐ F5	☐ F11	☐ TL83
☐ D75	☐ F6	☐ F12	☐ TL84

E-4/1

E-5/1

Observer: Use "Up" or "Down" to select; press "Enter" to enter observer settings page.
The instrument offers two angles: 2° and 10°. Select with "Up" or "Down".

12:45

Observer   ☑ 2°
            ☐ 10°

E-5/1
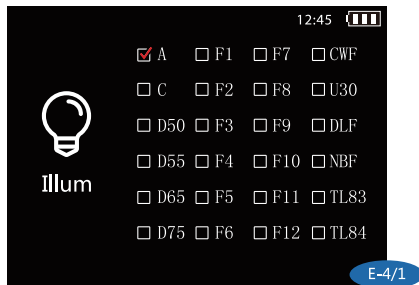
E-6/1

Tolerance settings: Use "Up" or "Down" to select; press "Enter" to enter tolerance settings page. Use "Up" or "Down" to set the values and press "Enter" to confirm.

12:45
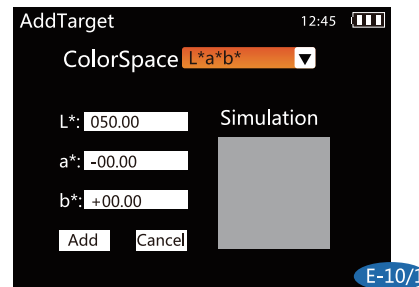
Tolerance   1.0

            [Up],[Down]-Modify
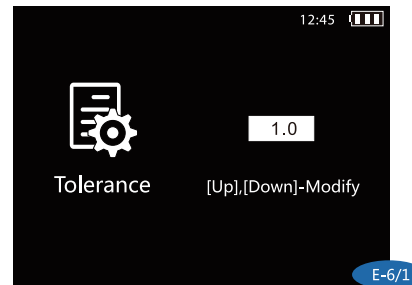
E-6/1

Average:Use "Up" and "Down" to select; press "Enter" to enter average settings page. In this page, the user can set how many measurement for average. Use "Up" and "Down" to set the values and press "Enter" to confirm.

12:45

00

Average

E-7/1

Save setting: Use "Up" and "Down" to select; press "Enter" to enter "Save.S" page. Use "Up" and "Down" to select "Manual save" or "Auto Save", press "Enter" to confirm.
Auto Save: the target and sample measurement will be automatically saved and named every time (T040、S001).
Manual Save: the target and sample measurement will be saved and named by the user (such as Txxx、Sxxx）.

12:45

☑ Manual save

☐ Auto save

Save.S

E-9/1

Add Target : Use "Up" and "Down" to select; press "Enter" to enter "Add.T"page. Press "Up" 、 "Down" and "Enter" , select the color space and enter the vale you need. Use "Up" and "Down" to choose "Add" and press "Enter" to confirm. After saving, simulation area can show the target color you added
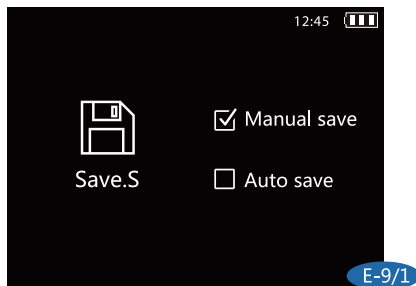
AddTarget   12:45

ColorSpace L*a*b* ▼

L*: 050.00   Simulation

a*: -00.00

b*: +00.00
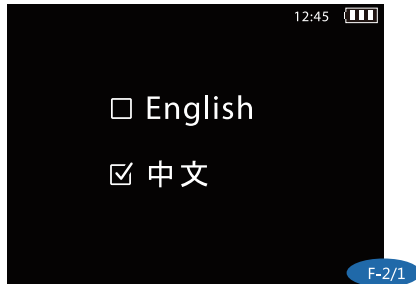
Add   Cancel

E-10/1

System setup

Use "Up" and "Down" to select; press "Enter" to enter system setup page. In the system setup page, you can enter these sub-pages: settings for language, time, power, reset all and version.

System Setup   12:45

中文
English

Language   Set time   Power

Reset All   Version

F-1/1

Language selection: Use "Up" and "Down" to select; press "Enter" to enter language selection page. Use "Up" and "Down" to choose language: Chinese or English.
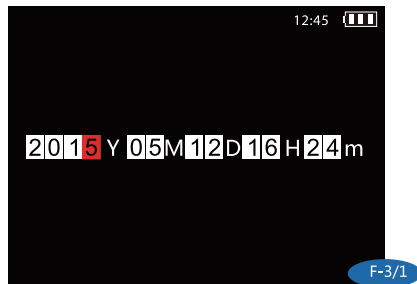
```
                                    12:45  ▯▮▮▮

            ☐ English

            ☑ 中文

                                              F-2/1
```

Time setting: Use "Up" and "Down" to select; press "Enter" to enter time settings page. Use "Up" and "Down" to select the value you want to change and press "Enter"; then use "Up" and "Down" to set the value, press "Enter" to confirm. Finally, press "Cancel" to save the values or exit time setting.

```
                                    12:45  ▯▮▮▮



      2015Y 05M 12D 16H 24m

                                              F-3/1
```

Power: Use "Up" and "Down" to select; press "Enter" to enter power settings page. Use "Up" and "Down" to set lighting time and power off time. Use "Up" and "Down" to select the value you want to change and press "Enter"; then use "Up" and "Down" to set the value, press "Enter" to confirm. Finally, press "Cancel" to save the values or exit time setting.
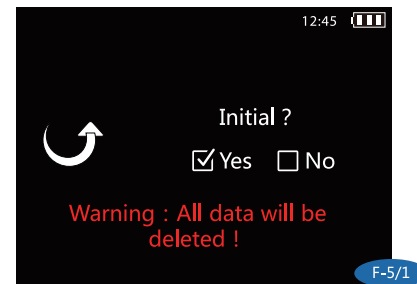
```
                                    12:45  ▯▮▮▮

          ⏻   Lighting Time: 0 0 S

              Poweroff Time: 0 0 m
          Power
                                              F-4/1
```

Reset All:Use "Up" and "Down" to select; press "Enter" to enter reset all page. This action will delete all data and restore all to default settings.
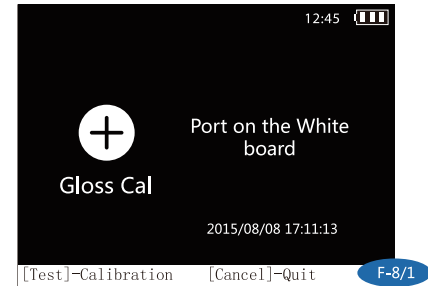
```
                                    12:45  ▯▮▮▮


              ↻       Initial ?

                     ☑ Yes   ☐ No

            Warning : All data will be
                    deleted !
                                              F-5/1
```

Version: Use "Up" and "Down" to select; press "Enter" to enter version page. In this page you can view the instrument's model,serial number, software version and company name.
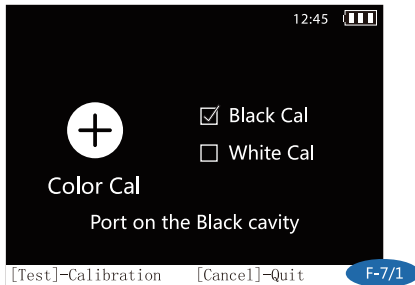(Note: the software version may be subjected to change without notice)

12:45

Instrument Model：xxx

Serial Number：xxx

Version：xxx

HangZhou CHNSpec Technology

CO.LTD

F-6/1

Color calibration

12:45

☑ Black Cal

☐ White Cal

Color Cal

Port on the Black cavity

[Test]-Calibration   [Cancel]-Quit   F-7/1

Put the measurement on the black cavity, press "Enter" to calibrate; then press "Cancel".After black calibration,then put the instrument on standard white tile, Press "Enter" to calibrate.
Calibration is finished after the short "Beep" sound.

Gloss calibration

12:45

Port on the White board

Gloss Cal

2015/08/08 17:11:13

[Test]-Calibration   [Cancel]-Quit   F-8/1

Put the instrument on gloss calibration tile. Press "Enter" to calibrate. Calibration is finished after the short "Beep" sound.
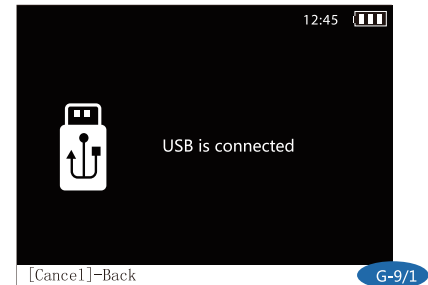
USB

12:45

USB is connected

[Cancel]-Back   G-9/1

In the main page, Use "Up" and "Down" to select; press "Enter" to enter USB page.
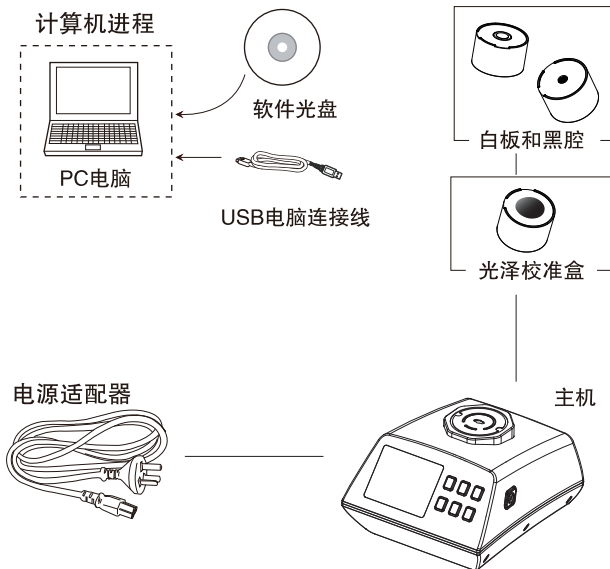Use the USB cable provided with the instrument to connect the instrument to PC. Install the driver program as instructed (driver program is in the CD provided with the instrument). The USB will be connected correctly after the driver program is installed, as shown in the above picture.
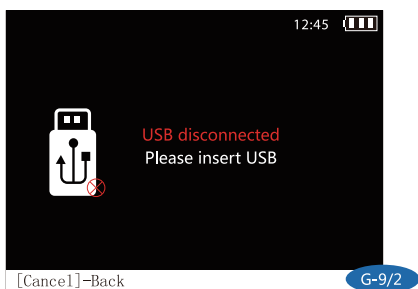
```
12:45  [IIII]



        USB disconnected
        Please insert USB



[Cancel]-Back                    G-9/2
```

After entering the USB connection page, if USB is not connected, or connected unsuccessfully, the page will be shown in the above picture. Use the USB cable to connect again.

System deployment diagram

计算机进程

软件光盘

白板和黑腔

PC电脑

USB电脑连接线

光泽校准盒

电源适配器   主机

Trouble Shooting

Error	Analysis	Handling
1. Instrument can not switch on	1. Check battery or power adapter 2. Check battery power	Install battery or connect power adapter to outside power source
2. Unable to enter main program processes after switch on	1.Check if the instrument is calibrated 2.Check if there are errors during calibration	Calibrate again, and then enter the main program
3.Exception in measurement results	Check if the tolerance setting is reasonable	Check and change tolerance settings
4.Unreasonable measurement results	1.Check if the instrument is lying stably on a flat sample 2.Check if the sample is too thin 3.Check if there are multiple colors in the test area	1.Make sure instrument is lying flat 2.Put a thick piece of white paper under sample 3.Only check single color
5. Large difference between two measurements	Check if the battery is under 20%	Use power adapter

Testing Result Analysis

▼ΔE Color Difference Scale $\qquad \Delta E^*ab= \sqrt{(\Delta L^*)^2+(\Delta a^*)^2+(\Delta b^*)^2}$

$\triangle$L+ represents white, $\triangle$L− represents black, $\triangle$a+ represents red, $\triangle$a− represents green, $\triangle$b+ represents yellow, $\triangle$b− represents blue. When we use CIE−L*a*b* to show a clolr, L* is balck or whilte. a* is red or green.b* is yellow or green.

▼CIE LAB

CIE LAB is color space based on the fact that a color can't be both red and green, or both blue and yellow, because these colors oppose each other.So a single data could be used to describe red/green and yellow/blue. When we use CIEL*a*b* to describe a color,L* means lightness, a* means red/green and b* means yellow/blue.

▼CIE LCH

CIE LCH adopts same color space as L*a*b*, but its L* represents lightness, c* represents saturation and h* represents hue.

Company's statement

1.The company promises that our spectrophotometer offers one year of warranty after purchase date. Non-artificial damage under normal use is subjected to free warranty. The company offers repair services for artificial damage, or damage after the warranty time limit; however, the repair services would require fees relative to the damage.

2.The warranty only holds for the person, or company who purchased the instrument. Damage occurring under third party usage would not be eligible for warranty service.

3.The company is not responsible for data loss because of error, repairing, or power outages. To prevent loss of important data, please save copies of the data on your PC.

4.The copyright ownership of the instrument and its associated software belong to our company and is protected by the Copyright Laws of People's Republic of China.

5.Our company sells the instrument does not mean we transfer the copyright, or any intellectual property's ownership to the user.

6.The specifications and information in this manual are subjected to further updates without notice.