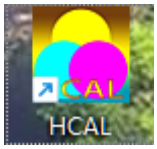
HUICOLOR

HCAL Calibration software

User Manual

Please read carefully,

before using the instrument.



V 1.0

Contents

I. Overview

1.1 Overview

HCAL is a color calibration software for irradiance/ luminance colorimeter running on the Windows operating system. It supports 800 series spectral Irradiance Colorimeter, 500 series Irradiance Colorimeter, 300 series Irradiance Colorimeter, as well as various models of luminance colorimeter and color analyzers.

The irradiance/ luminance colorimeter has been calibrated with standard lamps according to industry standards when it leaves the factory, and can meet the measurement of irradiance/ luminance in general application (engineering lighting, indicator panels, LED,etc.).

The LCD panel/OLED panel/miniLED panel industry requires high testing accuracy for luminance, and color coordinates, and must be consistent with data from specific brand instruments (standard machines). The testing principle of irradiance/ luminance colorimeter using coated filter plates+CMOS/PD silicon photovoltaic cell detectors usually has CIEXYZ adaptation errors, which can result in slightly lower testing accuracy and data consistency for this type of irradiance/ luminance colorimeter.

In this case, HCAL software can be used to calibrate this type of irradiance/ luminance colorimeter. If the calibration is reasonable and compared with standard machine test data, the calibrated irradiance/ luminance colorimeter usually has a luminance accuracy of 3% and an average chromaticity coordinate xy error of 0.003.

A standard colorimeter can be a high-precision spectrometer or an instrument that users consider to have high accuracy. The photometric data of typical samples tested by a standard colorimeter can be manually input or measured through a USB data cable/Bluetooth.

The calibrated colorimeter is connected to HCAL through a USB data cable and measures the photometric data of typical samples. After the measurement is completed, the HCAL software automatically calculates the calibration factor and writes it into the instrument.

The calibrated colorimeter needs to enable user calibration mode for the calibration coefficient to take effect.

1.2 PC Requirements

① 64 bit Windows 10 and above operating systems.
② Running memory of 2GB or more.
③ 120M of available hard disk space for installation and operation.

II. Installation and uninstallation

2.1 Installation

As shown in Figure 1, double-click the executable file "HCAL_Setup. exe" to complete the software installation as shown in Figures 2-6.

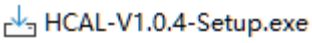


Figure 1

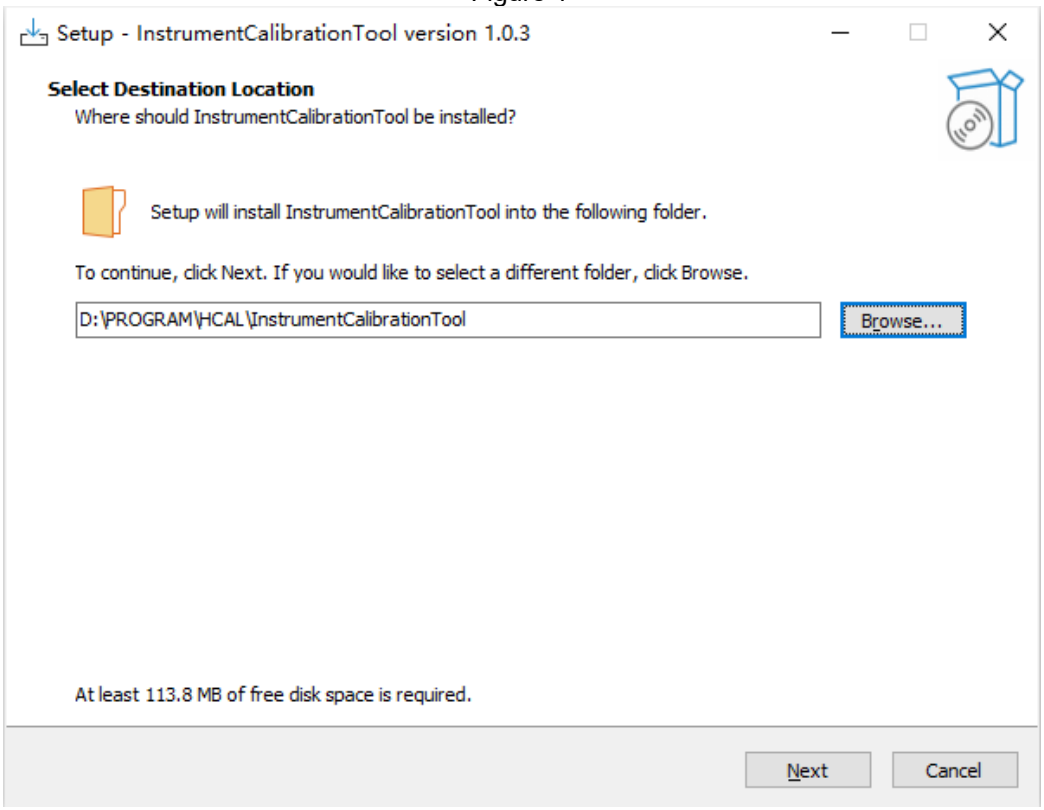


Figure 2

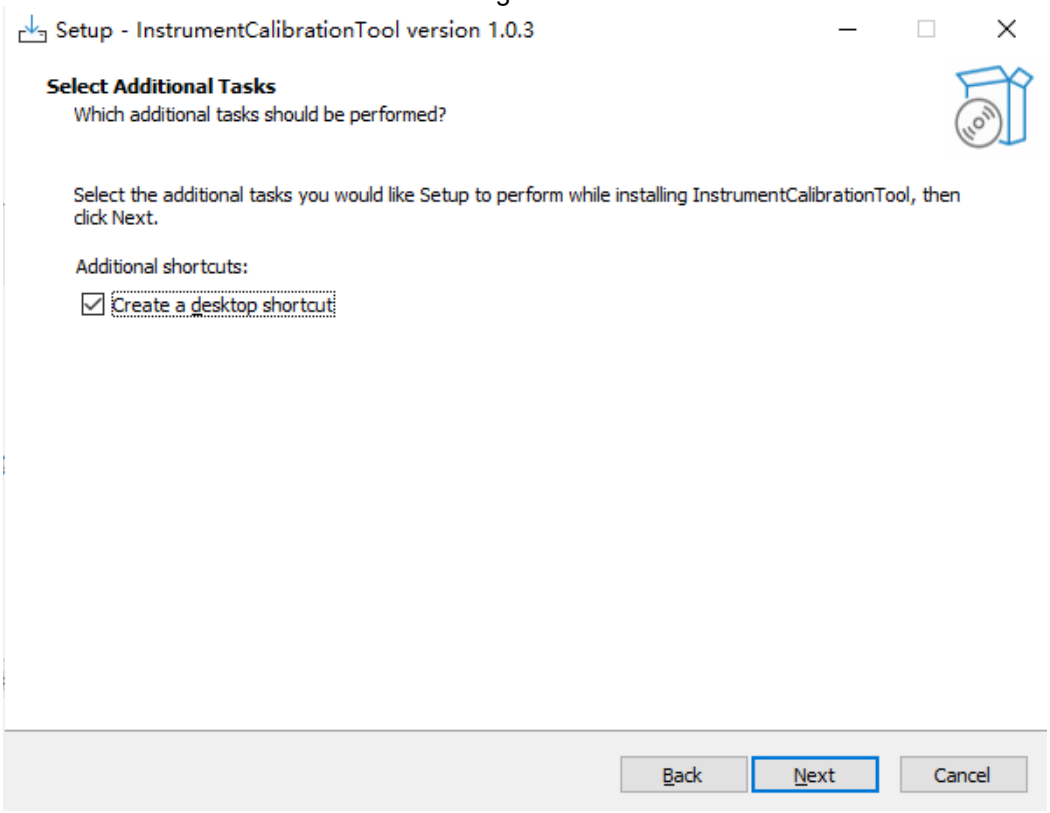


Figure 3

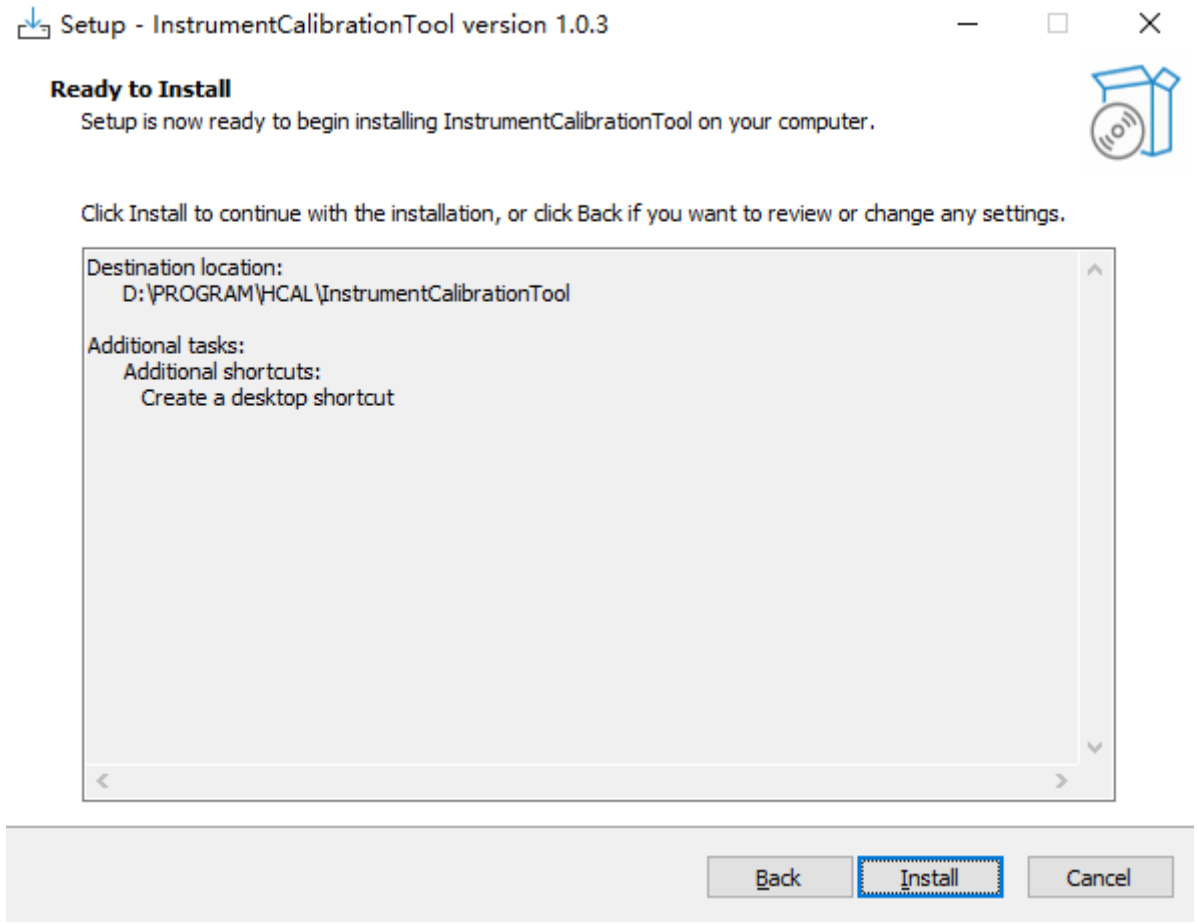


Figure 4

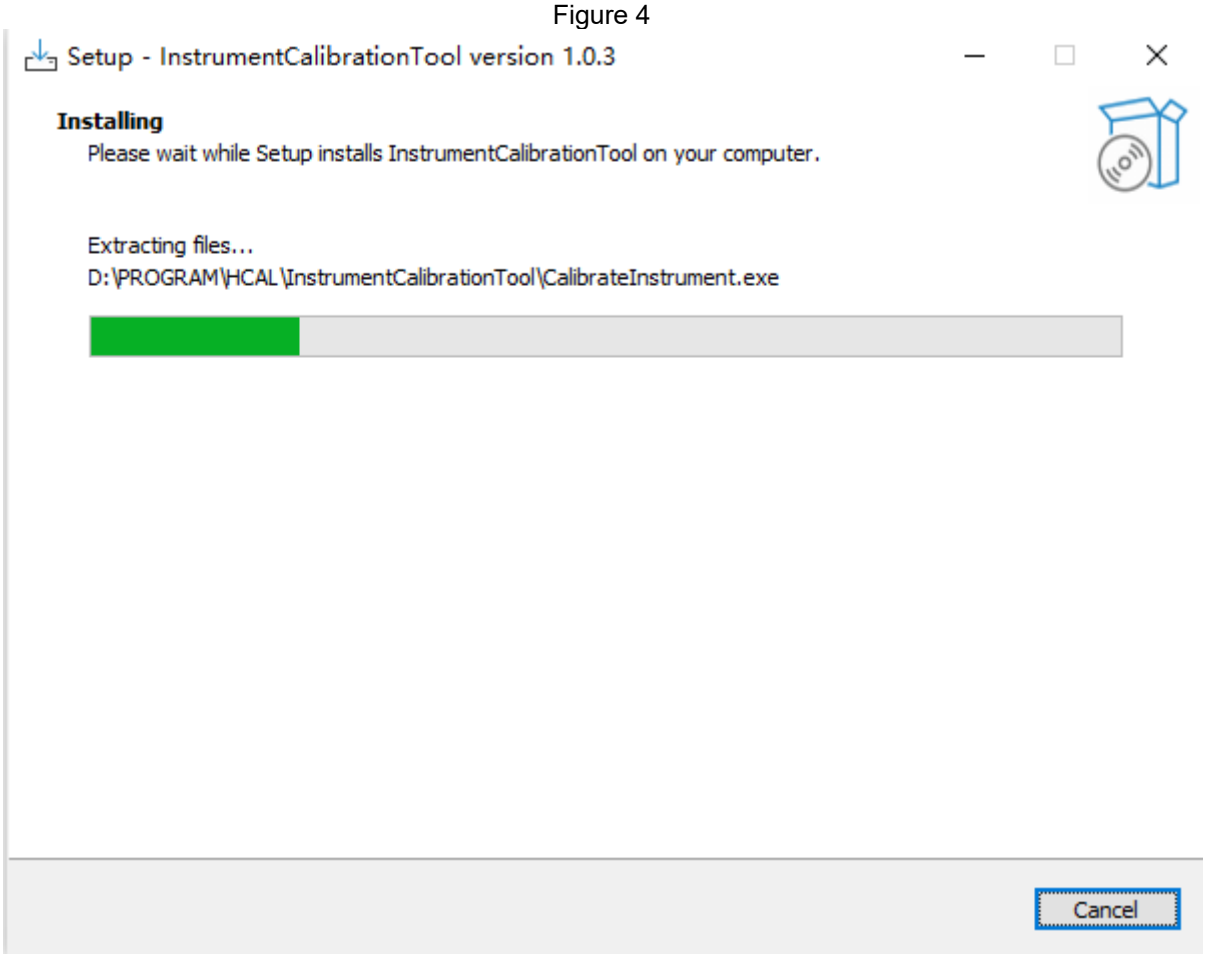


Figure 5

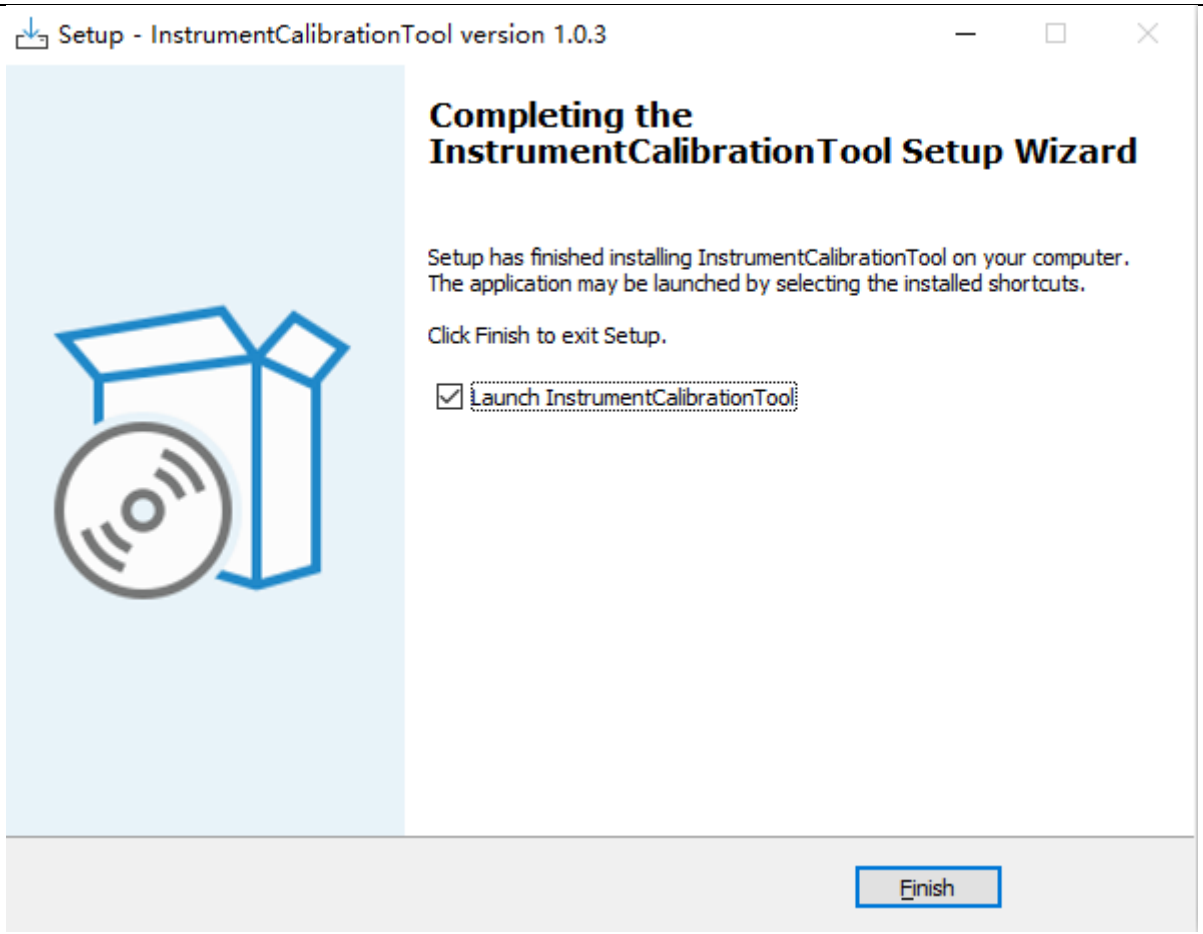


Figure 6

2.2 Uninstallation

Find the HCAL software in the "Applications" list of the Windows operating system, click uninstall, as shown in Figure 7, and the software uninstallation is complete.

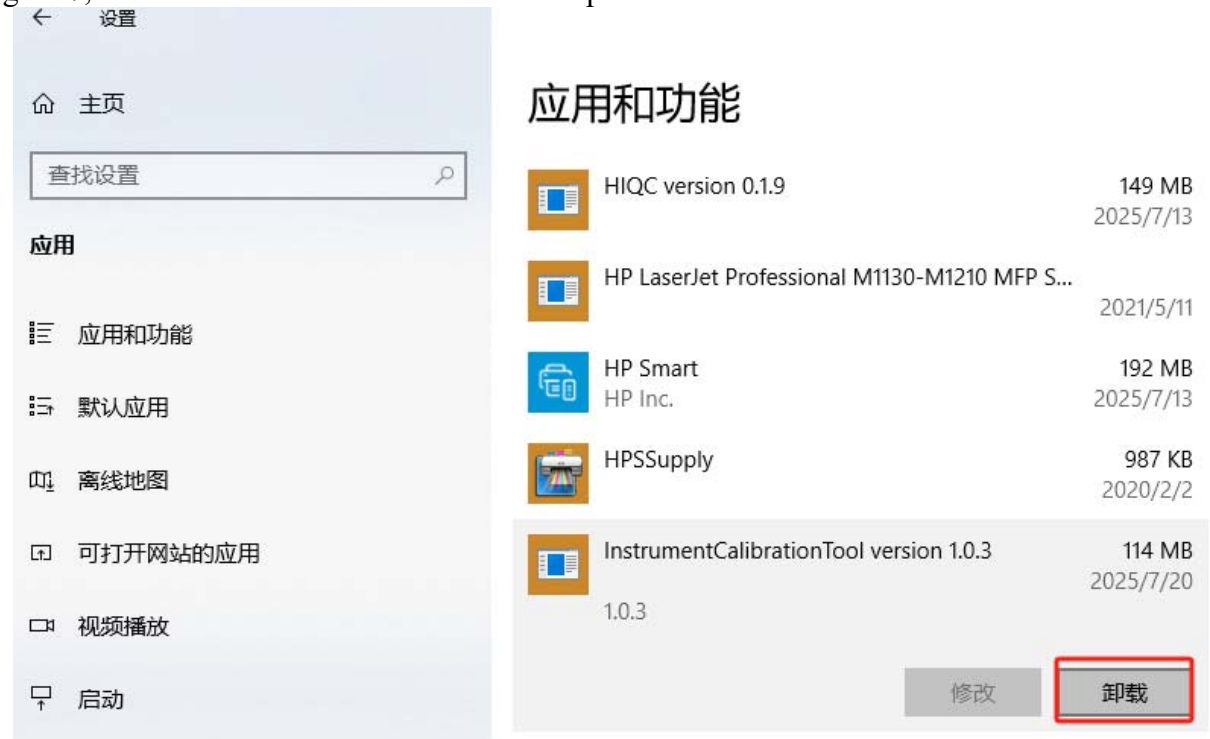


Figure 7

III. Main interface and basic operation

3.1 Main Interface

As shown in Figure 8, double-click HCAL to start the software.

The main interface is shown in Figure 9. HCAL supports generating calibration coefficients from online measurement data and also allows users to manually input calibration coefficients. HCAL software can drive LCD to display colors based on the RGB information of the color blocks in the data display area. This software is more suitable for colorimeter calibration of testing display products.

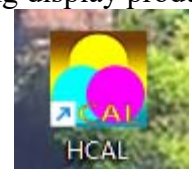


Figure 8

Figure 9

3.2 Standard Colorimeter

Standard Colorimeter: Colorimeters that users consider accurate for testing, such as Minolta CA410, CS2000, CS3000, CL500A, Topcon's BM7, and HUICOROR's CL800 series spectral Irradiance Colorimeter/ CI800 series spectral Luminance Colorimeter.

If you choose HUICOROR's spectral Luminance Colorimeter as Standard Colorimeter, you can connect it to HCAL soft with a USB data cable for direct testing.

For other standard Colorimeter, it is necessary to manually input the Yxy of the sample (in the data display area, double-click the table to enter data).

3.3 Tested Colorimeter

Tested Colorimeter(calibrated Colorimeter): Only supports multiple types of HUICOLOR Irradiance Colorimeter or Luminance Colorimeter, such as CL300/CL350/CI300/CI350/CI510, etc.

3.4 Calibration mode

3.4.1 One-point Calibration

Users select a typical light source to calibrate, usually using typical white light for calibration. For example, if the user test sample is an LED light source, a typical 5000K white LED light source can be used for one-point calibration.

3.4.2 Multi-point Calibration

Users choose multiple typical light sources to calibrate, usually including white light, red, green, blue, and other typical light sources.

For example, when testing LED light sources, users can use typical white LED light sources of 3000K/4000K/5000K/6000K for multi-point calibration.

For example, when testing the luminance of an LCD screen, users can use white light (255/255/255)+Red light (R255)+Green light (G255)+Blue light (B255) to perform multi-point calibration.

Generally, users can choose the regular mode for calibration ("One-point Calibration " or " Multi-point Calibration "), and the color blocks can be selected or customized, as shown in Figures 10-11.

3.4.3 Composite Calibration

Manufacturer can choose the " Composite Calibration ", which has more color types and requires spectral data from standard machines, resulting in higher calibration accuracy.

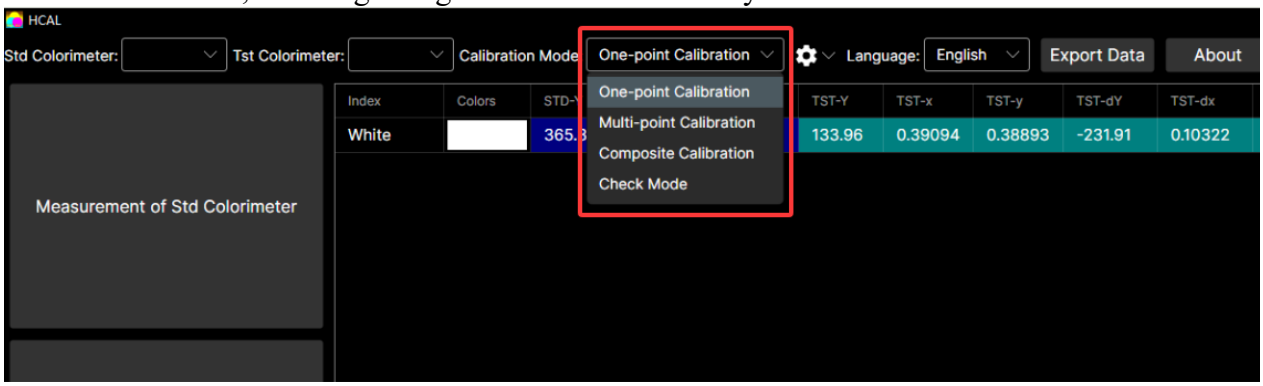


Figure 10

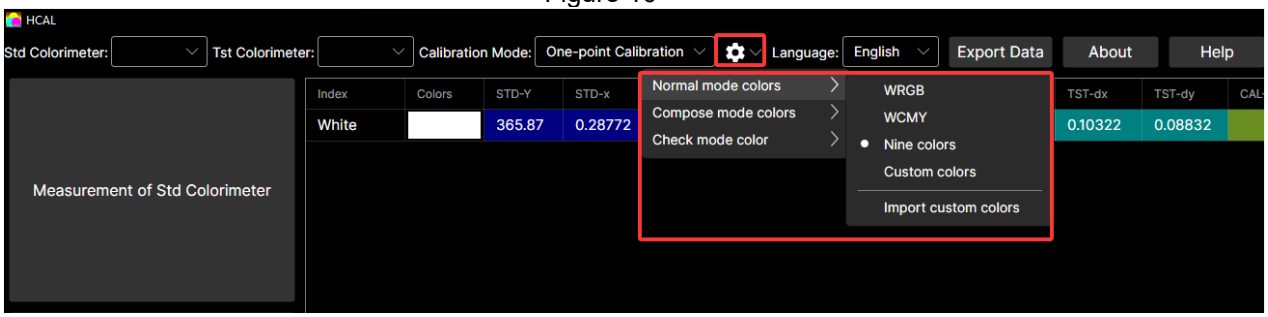


Figure 11

3.4.4 Check mode

After the calibration is completed, you can choose the " Check mode " to perform color block inspection on the calibrated colorimeter.

3.5 Setting

As shown in Figure 11, various color settings are made for various calibration modes, and the software allows custom colors.

3.6 Export Data

All records can be exported in Excel format.

3.7 Langguage

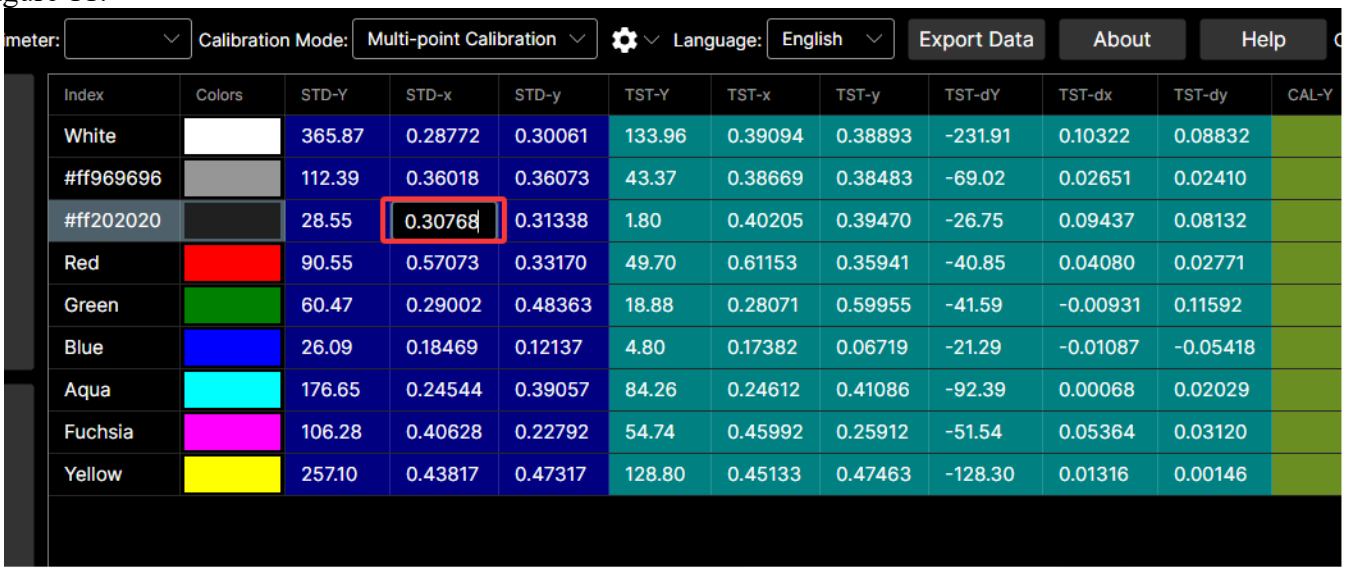
The software supports both Chinese and English.

3.8 Std / Tst Colorimeter sampling

3.8.1 Measurement of Std Colorimeter

The user clicks on " Measurement of Std Colorimeter ". If the standard colorimeter is already connected to the computer software HCAL, the HCAL software drives the computer to display the color blocks based on the RGB values of the color blocks in the current data display area, and the standard colorimeter automatically measures color samples.

The data of the standard machine can also be entered by double clicking on the data display table, as shown in Figure 11.



Index	Colors	STD-Y	STD-x	STD-y	TST-Y	TST-x	TST-y	TST-dY	TST-dx	TST-dy	CAL-Y
White		365.87	0.28772	0.30061	133.96	0.39094	0.38893	-231.91	0.10322	0.08832	
#ff969696		112.39	0.36018	0.36073	43.37	0.38669	0.38483	-69.02	0.02651	0.02410	
#ff202020		28.55	0.30768	0.31338	1.80	0.40205	0.39470	-26.75	0.09437	0.08132	
Red		90.55	0.57073	0.33170	49.70	0.61153	0.35941	-40.85	0.04080	0.02771	
Green		60.47	0.29002	0.48363	18.88	0.28071	0.59955	-41.59	-0.00931	0.11592	
Blue		26.09	0.18469	0.12137	4.80	0.17382	0.06719	-21.29	-0.01087	-0.05418	
Aqua		176.65	0.24544	0.39057	84.26	0.24612	0.41086	-92.39	0.00068	0.02029	
Fuchsia		106.28	0.40628	0.22792	54.74	0.45992	0.25912	-51.54	0.05364	0.03120	
Yellow		257.10	0.43817	0.47317	128.80	0.45133	0.47463	-128.30	0.01316	0.00146	

Figure 12

3.8.2 Measurement of Tst Colorimeter

The user clicks on "Measurement of Tst Colorimeter". If the colorimeter to be calibrated is already connected to the computer software HCAL, the HCAL software will drive the computer to display the corresponding color blocks based on the RGB values of the color blocks in the current data display area, and the tested colorimeter automatically measures color samples.

3.8.3 Write Calibration Data to Colorimeter

If all data in the data display area has been measured or inputted, and the user clicks "Write Calibration Data to Colorimeter", the software will automatically generate calibration coefficients and write them into the colorimeter .

3.9 Result operation

If users use CL300/CI300/CL350/CI350 colorimeters to test display (LCD, etc) products, it is very convenient to directly use the " **Measurement of Std Colorimeter->Measurement of Tst Colorimeter->Write Calibration Data to Colorimeter** " process in section 3.8 to calibrate the colorimeter.

Users can also generate their own calibration coefficient Mat and directly write it into the colorimeter. The calculation method of the calibration coefficient Mat is shown in Figure 13.

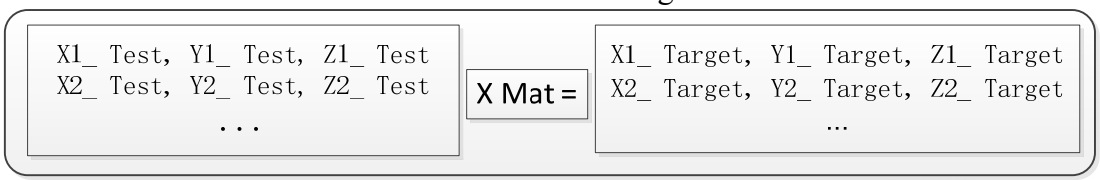


Figure 13

3.9.1 Read Calibration factor

Click on ' Read Calibration factor', as shown in Figure 14, and the colorimeter's calibration coefficient will be displayed in the coefficient area. The instrument calibration factor defaults to a diagonal matrix of 1 or 0, which means it does not work.

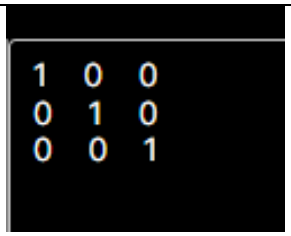


Figure 14

3.9.2 Write Calibration factor

Click " Write Calibration factor" to write the calibration factor in the coefficient area into the colorimeter.

3.9.3 Detector coefficient

Click on ' Reset Calibration factor ', as shown in Figure 14, and the detector coefficient of the colorimeter will be displayed in the coefficient area. The colorimeter defaults to a 1-diagonal matrix or 0, which means it does not work. The detector coefficient is reserved for use by colorimeter manufacturers.

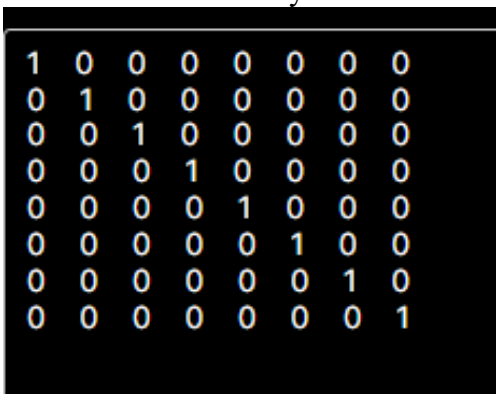


Figure 15

3.9.4 Reset Calibration factor

Click on 'Reset Correction Factor' to set the correction factor to default to a diagonal matrix of 1 or 0, which will have no effect.

3.10 Calibration parameter usage

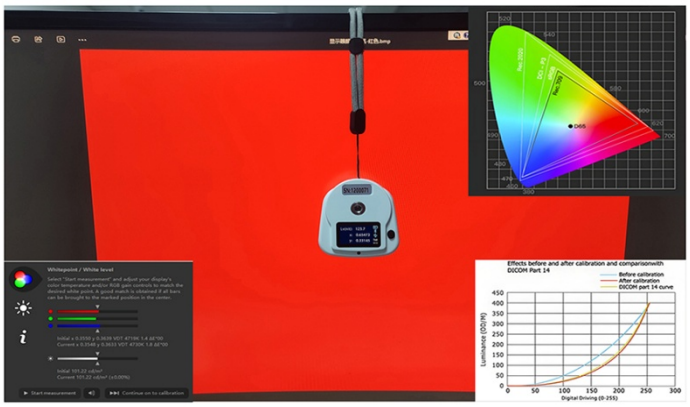
After the tested colorimeter calibration is completed, turn on the "User Calibration" mode on the tested colorimeter, and the above calibration will take effect.

Figure 16

SPECTRAL IRRADIANCE COLORIMETER

SPECTRAL LUMINANCE COLORIMETER/ COLOR ANALYZER

Screen Color Calibrator



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Please keep the manual properly for reference.