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## 5700-LS35 COLORIMETER

### OPERATION MANUAL

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## Introduction

This product is a handheld multifunctional colorimeter. It conforms with CIE 15, CIE S 005, ISO 7724-1 and ISO 13655 standards. It has a 3.5-inch IPS color display and capacity touch panel, which has an excellent operating experience. The instrument contains six color cards: PANTON-C 2022、PANTON-U 2022、NCS-S 2022、RAL-K7 2023、SW 2018、PANTON TPG 2024 and can quickly match the measured color to the closest color code. It also has color difference comparison function, color difference threshold can be set and a variety of color difference formulas can be selected to achieve rapid QC testing.

## Features

1. Adopt a 3.5-inch capacity touch panel with human-machine interaction interface for convenient operation.
2. Contains multiple electronic color charts, which can quickly match the closest color code with a color chart matching accuracy rate higher than 90%.
3. QC testing function: the color difference threshold can be set and a variety of color difference formulas are optional.
4. A variety of color spaces are available, suitable for various needs of color measurement.
5. Can store 1000 colors and 1000 color comparison records with large storage space.
6. The instrument has a built-in compensation optical path with stable values, allowing long-period calibration.
7. With built-in rechargeable lithium battery, the instrument can measure continuously for 10,000 times under full charge.

## Parameters

|                           |                                                                                                                                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Illumination geometry     | D/8, specular component include (SCI)                                                                                                                                   |
| Illumination light source | Full spectrum LED light source                                                                                                                                          |
| Measuring aperture        | 8mm                                                                                                                                                                     |
| Measurement conditions    | Light source D65, field of view 10°                                                                                                                                     |
| Measuring time            | About 1s                                                                                                                                                                |
| Color space               | CIE Lab, Luv, LCh, Yxy, CMYK, RGB, WI-98, WI-Ganz, WI-Hunter, WI-R457, YI-98, HSL, HSV, ITA, Spectra                                                                    |
| Color difference formula  | $\Delta E^*ab$ , $\Delta E^*uv$ , $\Delta E^*94$ , $\Delta E^*cmc$ (2:1), $\Delta E^*cmc$ (1:1), $\Delta E^*cmc$ (1.4:1), $\Delta E^*00$                                |
| Repeatability             | Standard deviation $\Delta E^*ab$ is within 0.03 (Measurement condition: the average value of 30 measurements on the whiteboard at an interval of 3s after calibration) |
| Dimension                 | 86mm×63mm×158mm                                                                                                                                                         |
| Weight                    | About 225g                                                                                                                                                              |
| Power supply              | Rechargeable lithium battery 3.7V@4000mAh, can measure 10,000 times continuously under full charge                                                                      |
| Display                   | 480×320 dot matrix IPS color screen                                                                                                                                     |
| Language                  | English, Simplified Chinese, Türkçe                                                                                                                                     |
| Charging port             | USB (Type-C)                                                                                                                                                            |
| Operating environment     | 0~45°C, 0~85%RH (nocondensation)                                                                                                                                        |
| Storage environment       | -25~55°C, 0~85%RH (nocondensation)                                                                                                                                      |

## Operation

### 1. Power on/off

#### ▪ Power on:

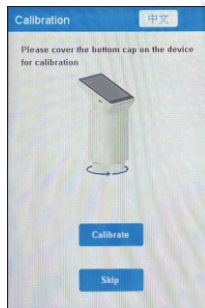
Short press the power button to turn on the colorimeter.

#### ▪ Power off:

Long press the power button to turn off the colorimeter or press "Power off" in the menu bar. If automatic power off is set, the instrument will automatically power off as no operation time exceeds the set value, when the time of no operation is longer than the set automatic power off time.

### 2. Calibration

After entering "calibration" interface, you can perform calibration operation as the calibration animation, or skip the calibration. It is recommended to calibrate after a long time of no usage. Language settings can also be adjusted on the main interface. For example, if the display is currently in Chinese, click "Language" to select English or Türkçe.



For failed calibration, the possible reasons are as below:

- The bottom cap is not closed properly;
- The standard tile on the bottom cap needs to clean;
- The attenuation of the light source leads to failure of normal use and it needs to be returned to the factory for inspection and repair.

### 3. Measurement

To enter the main measurement interface, there are two modes: "Color Scan" and "Color Compare". You can press the button at the bottom of screen to switch and the selected mode will turn blue.

#### A. Color measurement and settings

**Measured Color Data**

| Color Chart | L*    | a*    | b*    | ΔE     |
|-------------|-------|-------|-------|--------|
| YS 016 C    | 67.31 | 51.26 | 50.70 | 6.8 ΔE |
| YS 1585 C   | 66.33 | 45.08 | 53.19 | 7.0 ΔE |
| YS 165 C    | 64.26 | 49.29 | 48.81 | 8.2 ΔE |

**Matched Color Code**

Color Scan    Color Compare

**Select Color Chart** (5 Charts)

- YSPANT C 2022
- YSPANT U 2022
- YSNCS S 2022
- YSRAL K7 2023
- My Color Chart

## B. Color difference compare and settings



## 1) Color Scan

In the "Color Scan" interface, short press the button or press "Scan" button on LCD screen to trigger the color scan. The interface will be as below:

### • Sample Data

After scan, the scan button area will display the color data. The user can set the data type in Setting.

### • Color Matches

According to the color chart selected by the user, the closest three color codes are matched and displayed.

## A. SAVE

Press "Save" on the upper right corner to save scanned color in "MyColors". The record can be saved with a default name or named manually. Colors scanned by the user are stored in "My colors", up to 1000 records. You can swipe the screen to turn pages, delete, modify names, search and view color data.

## B. History

If users need to view the saved comparison results, click "History" to view the color difference comparison record, and enter the history interface to view the next record by sliding left and right.

## C. Color Chart

Select one set of color charts for matching, then samples will be only compared within this chart. Three closest color codes will be matched.

#### D. Setting

Select parameters for the scanned color.

#### 2) Color Compare

In the "Color Compare" interface, press the "Scan Standard" button to set current value as standard. Press the "Scan Sample" button to use current value as sample. Short press the button to scan, and this value will replace the last record.

When the standard is measured or added and sample is measured, color difference between the two colors will be calculated with the following results:

- LabCh difference  $\Delta$

LabCh difference  $\Delta$ : sample color data minus standard color data. The color cast direction between the two is judged by  $\Delta L$ ,  $\Delta a$  and  $\Delta b$ .

- $\Delta E$  value

The value of  $\Delta E$  is calculated according to the selected color difference formula.

- QCtest

Suitable for color difference inspection in production process. If  $\Delta E$  is higher than the set threshold, it will read "unqualified" and shown in red; if  $\Delta E$  is less than or equal to the set threshold, it will read "qualified" and displayed in green. The following operations can be performed after color difference comparison

#### A. SAVE

Press "Save" on the upper right corner to save scanned color in "MyColors". The record can be saved with a default name or named manually.

Colors scanned by the user are stored in "My colors", up to 1000 records. You can swipe the screen to turn pages, delete, modify names, search and view color data.

#### B. History

Color compares are stored in "Compare History", upto 1000 records. You can slide the screen to turn pages, delete, modify the name, search and view the comparison records.

#### C. $\Delta E$ Setup

Set  $\Delta E$  calculation formula and QC test threshold.

$\Delta E$  setup includes  $\Delta E$  threshold setting and color difference formula selection. There are 7 color difference formulas:

$\Delta E^*ab$ ,  $\Delta E^*uv$ ,  $\Delta E^*94$ ,  $\Delta E^*cmc (2:1)$ ,  $\Delta E^*cmc (1:1)$ ,  $\Delta E^*cmc (1.4:1)$ , and  $\Delta E^*00$ . The  $\Delta E$  threshold is used for QC testing the range of 0.1-50.

#### D. Save standard

The standard color can be saved in "My Colors" for further use.

#### E. Input standard

The user can manually input the Lab value or LCh value as standard.

#### F. Add standard

You can choose any color in "My Color" as standard. Press the "Add Standard" button, select any color you want in "Add Standard" interface, the selected color will be used as the standard color and get back to Color Scan interface.

#### 4. Menu bar

In the measurement interface, click the "☰" icon on the upper left corner to pop up the menu bar, with the following options: Language, Calibration, Auto off setting, Reset, Power off.

##### A. Language

Support Simplified Chinese and English, Türkçe

##### B. Calibration

The instrument can be calibrated in Calibration interface at any time.

##### C. Auto off setting

Choose whether to set the auto off and auto off time with a range is 1-30 minutes.

##### D. Restore to defaults

To restore parameters to the factory settings.

##### E. Power off

Press "Poweroff" to power off the instrument.

#### 5. Color format

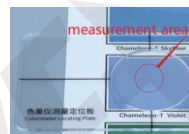
There are 15 color spaces including CIE Lab, Luv, LCh, Yxy, CMYK, RGB, WI-98, WI-Ganz, WI-Hunter, WI-R457, YI-98, HSL, HSV, ITA, Spectra

#### PC Software

By connecting to a computer via USB, you can use the PC software for the color difference and haze meter. This software features comparative measurement, comparative record retrieval, exporting comparative data to Excel, statistics for pass count, fail count, and total count, as well as report generation and printing.

#### Locating Plate

In order to meet the requirements for precise alignment of some measurement areas, the colorimeter is equipped with a locating plate.



Measurement area



Place the meter on the positioning hole

#### Precaution

1. When the colorimeter has not been used for a long time, it is recommended to perform calibration before using.
2. Please ensure that the sample is evenly colored with a flat and clean surface, otherwise it will affect the measurement accuracy.
3. After the base is removed from the host, it should be stored in a clean place to avoid contamination of the standard tile.
4. Do not insert any object inside the colorimeter to clean it, as this will damage it and affect measurement accuracy and operational safety.
5. Charge the colorimeter in time when the battery is out of power.
6. If not in use over 6 months, charge it regularly to prevent the battery from over-discharge and damage.
7. Due to different LCD display, the color displayed on the instrument screen is for reference only.