Datacolor SPECTRAVISION

User's Guide

Datacolor SPECTRAVISION User's Guide
Part No. 020-400100, Rev C

All efforts have been made to ensure the accuracy of the information presented in this format. However, should any errors be detected, Datacolor appreciates your efforts to notify us of these oversights.

Changes are periodically made to this information and are incorporated into forthcoming versions. Datacolor reserves the right to make improvements and/or changes in the product(s) and/or program(s) described in this material at any time.

To obtain information on local agents, contact either of the offices listed below, or visit our website at www.datacolor.com.

Support Questions?
If you need help with a Datacolor product, please contact one of our top-rated technical support teams listed in the appendix for the Datacolor office in your area.

Contents

Datacolor Spectrophotometers

About the Datacolor SPECTRAVISION Spectrophotometer

The Datacolor reference-grade benchtop Datacolor SPECTRAVISION spectrophotometer is the newest generation of benchtop color measuring instruments, incorporating spectral imaging technology in the instrument design. The Datacolor SPECTRAVISION is intended for use as a device for measuring, specifying and evaluating color in both laboratory and production settings, especially where precise digital color communication is required.

Features of the Datacolor SPECTRAVISION .

Datacolor SPECTRAVISION

Below is a summary of the standard features included with the instrument.

Standard features include the following:

- Pulsed xenon light source
- Automated specular port
- Integrated camera and viewing display for precise sample positioning
- Automated, adjustable ultra-violet filters for measuring fluorescent samples

Electrical/Environmental Requirements

Input Power Requirements	Input Voltage: 100-240 VAC Frequency: 50/60 Hz 150 VA Peak
Operating Environment	**Temperature:** 10°C to 35°C **Maximum Relative Humidity**: 20%-85% non-condensing **Altitude:** Up to 2,000 meters Do not store above 140°F (60°C) Indoor Use Do not crush, short circuit, mutilate, reverse polarity, disassemble, or dispose. In fire, might cause burns or release toxic materials.
Peripheral Interfaces	HDMI USB: 2.0
Communications	Ethernet

Safety Features

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

> ⚠ **CAUTION**
> There are no user-serviceable parts for this equipment.

Light Source

Do not stare directly into the open port located in the front door panel when the measurement is in progress.

Staring directly into the light source can result in eye discomfort similar to that of staring at a camera flash.

Ensure that an aperture plate is installed prior to calibrating the instrument or performing measurements.

Power

> ⚠ **CAUTION**
> Disconnect power before servicing.

The power cord supplied with the unit *must* be used to connect to an earthed (grounded) power supply.

Position the product such that the AC power cord that attaches to the rear of the unit is easily accessible and can be disconnected if required.

Servicing of this instrument is to be performed only by qualified Datacolor personnel. **DO NOT** remove bottom cover screws to expose internal components. The following warning is located on the bottom cover:

<div align="center">

HIGH VOLTAGE

DO NOT REMOVE SCREWS

ONLY TO BE OPENED BY

QUALIFIED SERVICE PERSON

</div>

Instrument Handling

This instrument is intended for use on a stable benchtop and is not meant to be a portable instrument.

> ⚠ **CAUTION**
> The equipment shall only be operated as instructed in this guide. If equipment is used in a manner other than that specified in this document, the protection provided by this instrument may be impaired.
> Read this user's guide carefully before placing the unit in service.
> This unit weighs approximately 70 lbs (31.75kg). Any movement or relocation of the unit requires a minimum of two persons.

Feature Summary

These instruments employ state-of-the-art features including the spectrometer, integrating sphere, light source, and optics. Below is a summary of those features:

FEATURE	DESCRIPTION	PURPOSE/BENEFIT
Integrating sphere	Barium coated sphere.	Industry standard.
Measurement Geometry	D/8º geometry, Specular Component Included (SCI) or Excluded (SCE).	Provides for more uniform measurement of samples with irregular surfaces.
Imaging Spectral Analyzer	Proprietary hyperspectral imaging assembly with 31 narrow band filters covering 400 nm to 700 nm. Unique design allowing imaging both the reference and sample channels at the same time.	Capable of capturing spectral information on pixel level allowing analysis of non-solid color samples that cannot be measured with a traditional spectrophotometer. Dual channel design provides continuous monitoring of sample illumination and compensates for changes.
Light source	Pulsed xenon	Filtered to provide D65 illumination including UV component.
Effective Bandwidth	10 nm	Reliable Spectral data for determining color and color difference.

Accessories

All models come with the following standard accessories:

- Power cable
- Ethernet cable
- Black Trap
- White Tile
- Green Tile
- White Tile Calibration data on USB Memory Stick

Calibration Tiles

A black trap, white tile and green tile are provided with all instruments:

- The black trap and white tile are used each time the instrument is calibrated.
- The green tile is used to perform an optional diagnostic test.
- A USB Memory Stick containing the calibration values for the white tile is also provided.

Aperture Plate

The aperture plate listed below is provided with every model:

- Square 25 mm

Below is the aperture plate specification:

Aperture Identification	Sample Area Measured	Sample Area Illuminated
Square	22.7mm	25mm

Cable Installation

Overview

You must install a power cable and an Ethernet interface cable to connect the instrument to a computer.

NOTE
The connections for the cables are found on the back of the instrument.

⚠ **WARNING**
Read the "Electrical and Environmental Requirements" section *BEFORE* connecting your instrument.

Power Cable

A power cable is provided with the instrument.

NOTE
The power cord supplied with the unit *must* be used to connect to an earthed (grounded) power supply.

Power is supplied to the back of the unit via a 3-prong male connector.

Plug the female end of the power cord into the power receptacle on the rear panel of the instrument. Insert the plug into a standard AC outlet.

Driver Installation

All current Datacolor software ships with the necessary drivers for the Datacolor SPECTRAVISION. If you are using Third party software with the Datacolor SPECTRAVISION, please contact Datacolor Support via our website at:

http://industrial.datacolor.com/industrial-support/

Ethernet Cable Installation

Instruments manufactured by Datacolor can now be connected to an Ethernet port on a desktop system. *See Appendix, Ethernet Connection Considerations, before you attempt to connect to an Ethernet port.*

This section provides instructions for using the Ethernet cable.

An Ethernet cable is shown below:

1. Connect either end of the Ethernet cable to the connector on the rear panel of the instrument.
2. Connect the other end of the Ethernet cable to an Ethernet LAN port or an Ethernet port on your computer.

See the Appendix for additional Ethernet Connection Considerations.

Powering Up

Use this simple procedure to start using your instrument:

1. Verify all cable connections. The AC power cord should be plugged into an outlet. An Ethernet communications cable should be attached to the instrument and host computer or LAN connection as applicable.
2. Turn on the computer.
3. Turn on the instrument power switch. This is located on the front of your instrument.

    – When power is applied, all mechanisms are automatically reset.

4. Launch a Datacolor program on your computer.
5. Prepare to calibrate the instrument. You will need the black trap, the white calibration tile and the green diagnostic tile.

Instrument Calibration

Overview

The instrument must be calibrated regularly to ensure that the measurements are accurate. This section provides instructions for performing reflectance calibrations.

NOTE
We recommend that you calibrate the instrument every 8 hours. *Please refer to your software documentation for specific calibration instructions.*

Reflectance Calibration

The instrument should be calibrated every 8 hours to compensate for changes in the environment. A black trap, white tile and green tile are provided with all instruments to complete the calibration:

The black trap and white tile are used each time the instrument is calibrated. The green tile is used to perform an optional diagnostic test.

Reflectance Calibration Procedure

The software prompts for calibration vary from one program to another. All of the procedures include two measurements:

- The black trap
- The white tile

Before you begin, verify that the aperture plate at the port matches the aperture selection in the program you are running.

1. Access the calibration procedure in the program you are running.
2. When you are prompted by the program, place the black trap at the instrument port.
3. When you are prompted by the program, place the white tile at the instrument port.
4. The program may prompt you for a diagnostic tile. If prompted, place the green tile at the instrument port, and start the measurement.
5. After these measurements are completed, the program will display a message that the calibration is successful. You can now start measuring samples.

The Datacolor User's Guide for the program you are running (e.g., Datacolor TOOLS, etc.) provides step-by-step instructions regarding the (instrument) software setup and calibration procedure.

UV Filter Calibration

The procedure for calibrating the adjustable UV filter is performed in reflectance mode, and requires the use of a UV calibration standard obtainable from a number of standardization organizations. Datacolor provides a fluorescent white tile (Fluorescent Reference Standard) that may be used as a reference standard after the instrument has been calibrated for UV using an official UV calibration standard. An applicable whiteness value can only be assigned to the Datacolor Fluorescent Reference Standard after the instrument has been calibrated for UV using an official UV calibration standard. This procedure requires the selection of specific software options. *See also the Datacolor TOOLS User's Guide, which contains step-by-step instructions to calibrate the adjustable UV filter.*

NOTES

This calibration procedure is critical to the accurate measurement of fluorescent samples.

If you are sharing reflectance data for fluorescent samples, the adjustable UV filter in each of the instruments must be calibrated regularly.

Sample Presentation and Measurement

Sample Presentation and Measurement Overview

You must pay close attention to the positioning of the sample to insure an accurate measurement. When positioned correctly, the sample rests between the sample holder and the front panel door. If the sample does not completely cover the aperture opening, ensure that the sample does not fall into the sphere by securing it to non-optically brightened material. The background color can be excluded during image processing.

Reflectance Measurements

1. Grasp the sample holder and pull forward.
2. Position the sample, then carefully bring arm back up to normal operating position.

⚠ WARNING
Do not allow sample arm to spring back. Also, the sample arm attaches to the instrument via two captive fasteners that can be hand tightened. Before first use, ensure that the sample arm is firmly attached.

Sample Viewing Port

When measuring small samples, you may need to check that the sample is properly centered at the port. To verify that the correct area of the sample is being measured:

1. Place the sample at the port. Grasp the black tab above the aperture plate.

2. Pull top of door down to its full horizontal position.

3. The backside of this door reveals the area of the sample covering the port opening. If necessary, adjust the placement of the sample to target the portion of the sample to be measured.
4. Push the door back to its normal position.

Sample Viewing Window

When measuring samples on the Datacolor SPECTRAVISION, the image of the sample can be displayed on the monitor to assure proper alignment in the aperture.
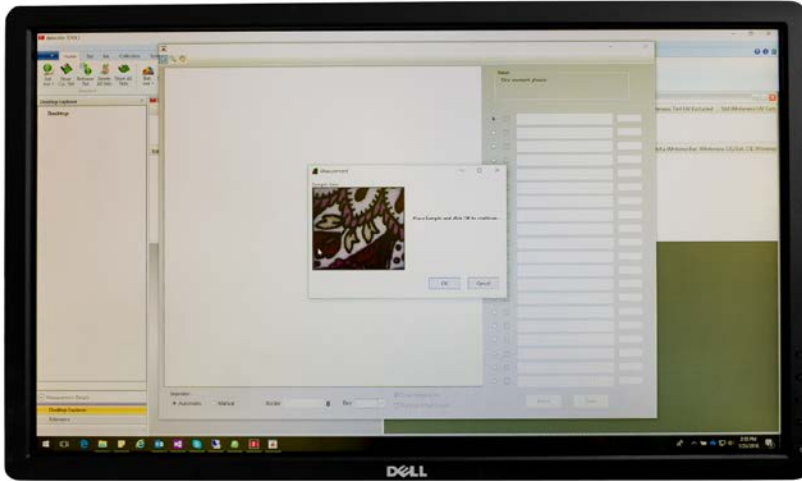
Access to the inside of the sample holder

The white stripes in the inside of the sample holder should never be touched or cleaned!

These stripes are made from the same material as the inside of the sphere. They are used by the camera to calibrate the sample measurements.

Touching the white stripes might deposit dirt, or finger oils. These could alter the spectral characteristics of the coating, and consequently the calibration of the measurements.

Best practice to align the sample to the desired position within the measurement aperture is to use the Sample Viewing Window.
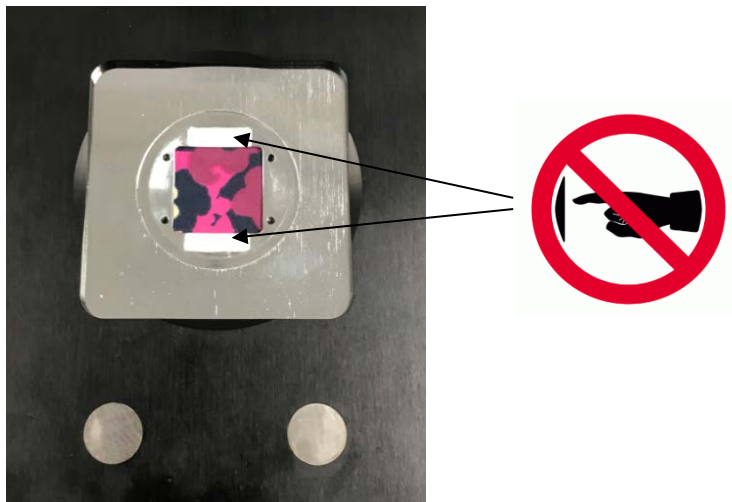
N O T E S

Maintenance

About Instrument Maintenance

The certificate of performance supplied with this instrument is valid for one (1) year under the following conditions:

- It is used in an environment suitable for the instrument type.

- It is handled and used with care.

Datacolor strongly recommends that the instrument be serviced once/year by an authorized service engineer.

Datacolor offers a variety of maintenance and certification services to match your needs. Please contact your local Datacolor office for more information.

The sections that follow provide detailed instructions for maintaining the instrument and calibration tiles. These instructions and tips will help to insure that the instrument continues to perform properly over its life.

⚠ CAUTION
There are no user-serviceable parts for this equipment.

Exterior Surface Cleaning

The white, exterior surface of the instrument can be cleaned with an isopropyl alcohol wipe.

Sphere Cleaning

The measurement port should be examined visually for the presence of dust, sample particles, fibers, and excessive yellowing due to environmental influences*. This inspection should be performed frequently, especially if you measure loose materials.*

Loose materials in the sphere should be removed by a Datacolor-certified technician.

Tile Handling and Cleaning

Handling Tiles

- Handle calibration tiles with extreme care. Do not drop them, or scratch the glazed surface.

- Always use the edges to grasp the tile.

Cleaning Tiles

- The calibration tiles should be cleaned before each use. Wipe each tile clean with a soft, lint-free cloth.

- A detergent, free of optical brighteners, fluorescent materials or photoactive dyes should be use as needed to clear any oils, fingerprints or other deposits. Liquid dish detergent is a suitable detergent. The detergent/water solution should be prepared as follows: **1 part detergent : 250 parts water.** Use a few drops of the detergent solution to moisten a soft, lint-free cloth, and gently wipe the tile surface. Rinse the detergent from the tile by wiping it with a cloth, moistened with clean water.

- **NEVER** use abrasive cleansers, razor blades or other metal objects to remove dirt or foreign substances from the calibration tiles. This will damage the surface.

- **NEVER** immerse the tiles in water.

- Tiles that have scratches, chips, abrasions or cracks must be replaced. Signs of wear and tear on the tile surface will affect the accuracy of the calibration.

Tile Storage

- Large temperature variations will affect the accuracy of the calibration, requiring more frequent calibration. The calibration tiles should be stored in an environment that simulates the temperature of the samples to be measured.

- Prolonged exposure to sunlight or other sources of ultra-violet radiation will cause the color of the tiles to change. The tiles should always be stored in a protective case or container away from direct sunlight and environmental contaminants.

Cleaning the Black Trap

The black trap should be kept dust-free. Dust accumulating in the black trap should be blown out with compressed air.

🗒 NOTES

Only use the black trap provided with this instrument model.

N O T E S

Appendix

Datacolor SPECTRAVISION Instrument Specifications

Specifications are subject to change without notice.

ITEM	DESCRIPTION
Instrument Type	Barium coated sphere with xenon flash lamp.
Measuring Geometry	Diffuse illumination, 8º viewing in conformance with CIE publication No. 15.2 Colorimetry.
Illumination Source	Pulsed xenon, filtered to provide D65 illumination including UV component.
Sphere	Diameter 152 mm / 6.0 inches, Barium coated
Specular Port	Automated specular included or specular excluded
Spectral Analyzer	Proprietary hyperspectral imaging assembly with 31 narrow bands covering 400 to 700 nm. Unique design allowing imaging both the reference and sample channels at the same time. The imaging is with a scientific 90 db camera with a sCMOS sensor.
Wavelength Range	400 – 700 nm
Filters Bandwidth	10 nm
Photometric Range	0 to 200%
Aperture Configuration	Square. 25 mm illuminated/ 22.7 mm viewed
Image resolution	821 by 821
Effective pixel size	27.6 micrometers
Input Power Requirements	Input Voltage: 100-240VAC Frequency: 50/60 Hz 150 VA Peak
Operating Environment	**Temperature:** 10°C to 35°C **Recommended Temperature:** 23°C +/- 2°C **Maximum Relative Humidity**: 20%-85% non-condensing **Recommended Relative Humidity**: 50% +/-15% non-condensing **Altitude:** Up to 2,000 meters Do not store above 140°F (60°C) Indoor Use Do not crush, short circuit, mutilate, reverse polarity, disassemble, or dispose. In fire, might cause burns or release toxic materials.
Peripheral Interfaces	HDMI USB: 2.0
Communication	Ethernet
Instrument Dimensions	Size: L 19.9" (50.6 cm) front to back L 21.71" (55.14 cm) sample arm to back H 15.17" x W 12.3" (38.54 cm x 31.3 cm) Weight: 70 lbs (31.75kg)

Datacolor SPECTRAVISION Instrument Features

FEATURE	Datacolor SPECTRAVISION
Reporting Interval	10 nm
Effective Bandwidth	5 nm
20 Read Repeatability on White Tile Using Two Flashes (CIELAB)	0.03 dE (max)
Inter-instrument Agreement—Reflectance Measurements* (CIEL*a*b*)	0.25 (max)* 0.15 (avg)*
Lens	50 mm, fixed focus
Aperture Plate	1 standard 25 mm
Automated, adjustable UV Calibration	Yes
Image Acquisition Time	35 sec
UV Cutoff Filters	400 nm 420 nm 460 nm
Remote Measurement Button	No
Sample Viewing Camera	Yes
Vertical Mount	No
Transmittance	No
Output	QTX2, Reflectance Hypercube
Operating Software	Tools 2.5, and SDK

* Measurements made at 23º C +/- 1º C.

COMPONENT	MINIMUM REQUIREMENTS
PROCESSOR	Intel i7 2 Core 8 MB Cache 4.6 GHz
RAM Memory	64 GB
Hard Drive	4 TB SSD
Video Resolution	1280 X 1024
DVD Drive	DVD Writer
Automated, adjustable UV Calibration	Yes
Image Acquisition Time	35 sec
Peripheral Interface	(3) USB (1) HDMI
Operating System	Windows 7 Windows 8 Windows 10
Email (for supported level)	Outlook 2007 Outlook 2010 POP3
Authenticated Sybase Database	Sybase 12.0.1 EBF 3994 (Supplied with the system)
Optional Textile Database (upon request)	Microsoft SQL Server 2008
Server OS	Microsoft Server 2008R2 Microsoft Server 2012 Citrix ZenApp 6.0
Operating Software	Tools 2.5, and SDK

Miscellaneous Technical Information

Ethernet Connection Considerations

The instrument connects to an Ethernet port via a standard Cat 5 cable.

Manufacturer

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Datacolor Global Support

A complete User's Guide is provided with this product. However there are also resources regarding color education on the Datacolor website, including contact information for local Datacolor offices.

http://industrial.datacolor.com/support/contact-us-2/