Ci4100
Spectrophotometer

User Guide

x-rite

Consult this documentation in all cases where the Attention symbol ⚠ appears. This symbol is used to inform you of any potential HAZARD or actions that may require your attention.

CE Declaration

CE Hereby, X-Rite, Incorporated, declares that this Ci4100 Series is in compliance with the essential requirements and other relevant provisions of Directives 2014/35/EU (LVD), 2014/30/EU (EMC), and RoHS 2011/65/EU.

Federal Communications Commission Notice

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Industry Canada Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Equipment Information

Use of this equipment in a manner other than that specified by X-Rite, Incorporated may compromise design integrity and become unsafe.

WARNING: This instrument is not for use in explosive environments.

This product has been evaluated to IEC 62471-1:2006; Photobiological safety of lamps and lamp systems, and found to be EXEMPT CLASS.
Invisible UV radiation is emitted from this product.

The exposure limits represent conditions under which it is believed that nearly all individuals in the general population may be repeatedly exposed without adverse health effects. However, they do not apply to photosensitive individuals or individuals exposed to photosensitizing agents.
The philosophical basis for the exempt group classification is that the lamp does not pose any photobiological hazard.

Instructions for disposal: Please dispose of Waste Electrical and Electronic Equipment (WEEE) at designated collection points for the recycling of such equipment.

Proprietary Notice

Warranty Information

X-Rite, Incorporated ("X-Rite") warrants each instrument manufactured to be free of defects in material and workmanship for a period of 12 months*. This warranty shall be fulfilled by the repair or replacement, at the option of X-Rite, of any part or parts, free of charge including labor, F.O.B. its factory or authorized service center.

X-Rite warrants this Product against defects in material and workmanship for a period of twelve (12) months from the date of shipment from X-Rite's facility, unless mandatory law provides for longer periods. During such time, X-Rite will either replace or repair at its discretion defective parts free of charge.

X-Rite's warranties herein do not cover failure of warranted goods resulting from: (i) damage after shipment, accident, abuse, misuse, neglect, alteration or any other use not in accordance with X-Rite's recommendations, accompanying documentation, published specifications, and standard industry practice; (ii) using the device in an operating environment outside the recommended specifications or failure to follow the maintenance procedures in X-Rite's accompanying documentation or published specifications; (iii) repair or service by anyone other than X-Rite or its authorized representatives; (iv) the failure of the warranted goods caused by use of any parts or consumables not manufactured, distributed, or approved by X-Rite; (v) any attachments or modifications to the warranted goods that are not manufactured, distributed or approved by X-Rite. Consumable parts and Product cleaning are also not covered by the warranty.

X-Rite's sole and exclusive obligation for breach of the above warranties shall be the repair or replacement of any part, without charge, which within the warranty period is proven to X-Rite's reasonable satisfaction to have been defective. Repairs or replacement by X-Rite shall not revive an otherwise expired warranty, nor shall the same extend the duration of a warranty.

Customer shall be responsible for packaging and shipping the defective product to the service center designated by X-Rite. X-Rite shall pay for the return of the product to Customer if the shipment is to a location within the region in which the X-Rite service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations. Proof of purchase in the form of a bill of sale or receipted invoice which is evidence that the unit is within the Warranty period must be presented to obtain warranty service. Do not try to dismantle the Product. Unauthorized dismantling of the equipment will void all warranty claims. Contact the X-Rite Support or the nearest X-Rite Service Center, if you believe that the unit does not work anymore or does not work correctly.

THESE WARRANTIES ARE GIVEN SOLELY TO BUYER AND ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR APPLICATION, AND NON-INFRINGEMENT. NO EMPLOYEE OR AGENT OF X-RITE, OTHER THAN AN OFFICER OF X-RITE, IS AUTHORIZED TO MAKE ANY WARRANTY IN ADDITION TO THE FOREGOING.

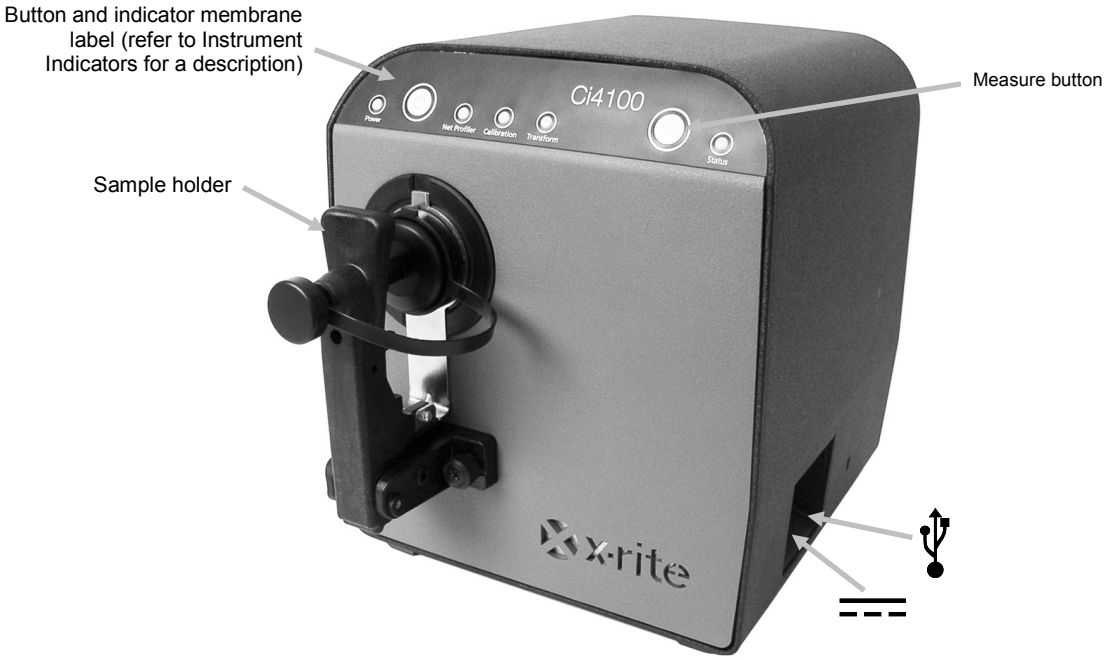
IN NO EVENT WILL X-RITE BE LIABLE FOR ANY OF BUYER'S MANUFACTURING COSTS, OVERHEAD, LOST PROFITS, GOODWILL, OTHER EXPENSES OR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES BASED UPON BREACH OF ANY WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, STRICT TORT, OR ANY OTHER LEGAL THEORY. IN ANY EVENT OF LIABILITY, X-RITE'S MAXIMUM LIABILITY HEREUNDER WILL NOT EXCEED THE PRICE OF THE GOODS OR SERVICES FURNISHED BY X-RITE GIVING RISE TO THE CLAIM.

Table of Contents

INTRODUCTION AND SETUP

The Ci4100 spectrophotometer is a self contained color measurement instrument that reports spectral data to a computer.

This manual covers the installation, basic operation and maintenance of the instrument. Specific instructions for using the instrument with your software application can be found in the software documentation.



Packaging

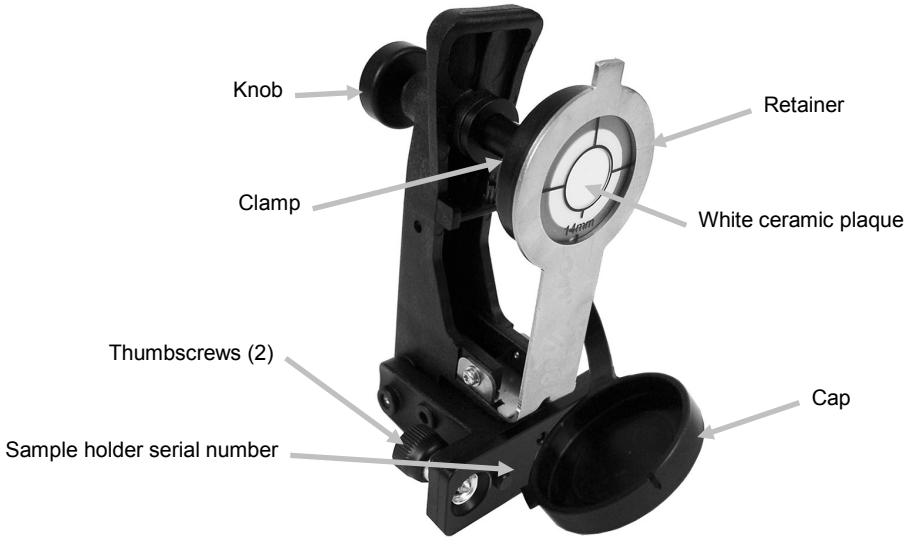
Your instrument packaging should contain all the items listed below. If any of these items are missing or damaged, contact X-Rite or your Authorized Representative.

- Ci4100 instrument
- USB interface cable
- AC adapter (X-Rite P/N SE30-277) and line cord
- Sample holder with white calibration plaque
- Manuals & utilities CD
- Documentation and registration material

Sample Holder

The sample holder is a mechanism that secures a sample in place against the sample port for color measurements. Samples are held between the clamp and retainer.

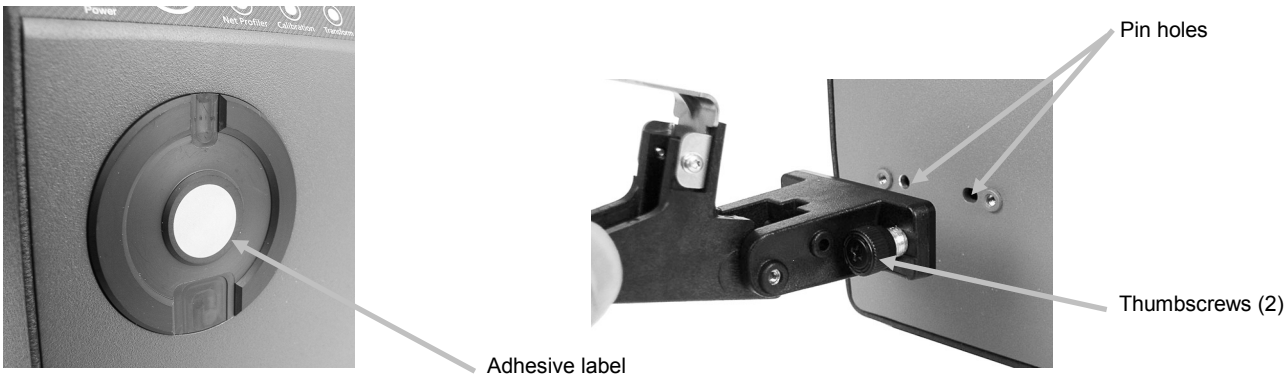
For regular measurements, the cap covers the white ceramic plaque for protection. To calibrate the instrument, the cap is removed and the sample port simply measures the white ceramic plaque.



Installing the Sample Holder

The sample holder is shipped detached from the instrument and must be installed before use.

1. Remove the adhesive label from the sample port and remove any residue left by the sticker. This can be done with a lint-free cloth with alcohol.
2. Open the sample holder and align the sample holder's pins with the pin holes in the front of the instrument.
3. Tighten each thumbscrew, pressing against the mounting holes while turning. Tighten the screws finger tight and close the sample holder.



Installing the USB Driver (if required)

IMPORTANT: This installation procedure can be skipped if you are running a software application such as ColorDesigner PLUS that automatically installs the USB driver.

1. Locate the Manual and Utilities CD and insert it into the CD drive of the computer. If the CD does not autorun, double-click the Ci4X00 CD icon in the My Computer window.
2. Double-click the **.exe** file in the Driver folder.
3. The setup program guides you through the rest of the installation process. Follow the instructions on each setup screen to complete the installation. When finished, remove the CD and store in a safe location.

Connecting the Power Supply

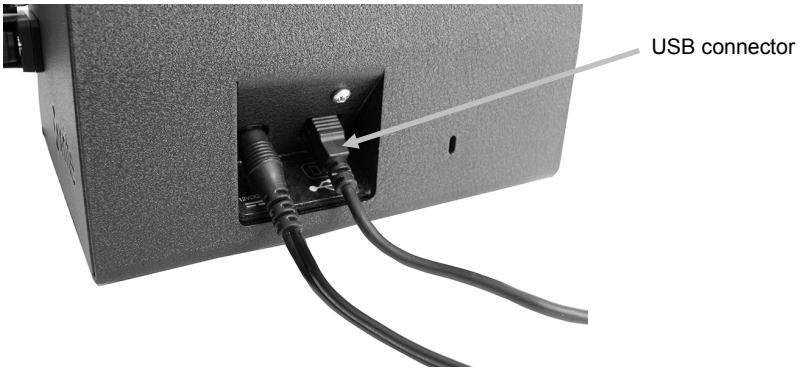
1. Verify the voltage indicated on the AC adapter complies with the AC line voltage in your area.
2. Insert the small plug from the AC adapter into the input connector on the side of the instrument.
3. Plug the detachable line cord in the AC adapter and plug the line cord into the wall receptacle.

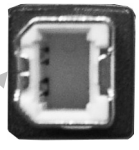
AC Adapter Ratings
Input: 100-240V 50-60 Hz
Output: 12VDC @ 2.5A

⚠ Operational hazard exists if an AC adapter other than X-Rite SE30-277 is used.

Connecting the USB Cable

1. Install the software application if not already installed. Refer to the software documentation for additional information.
2. Plug the square end of the USB cable into the side of the instrument.
3. Plug the USB cable into an available port on your computer.





Beveled side of the USB connector faces the front of the instrument.

Power "Standby" Button

The power "standby" button can be used to wake the instrument after it goes into a power down state. A power on condition is designated by a solid green power indicator. Simply press the power "standby" button to wake the instrument. A power down state occurs after five minutes of non use, and is designated by an "off" power indicator.

Instrument Indicators

The LED indicators convey a variety of instrument conditions, such as calibration status, measurement status, etc. Below is description for each color displayed by the instrument indicators during operation.

NetProfiler

- *Indicator Off:* NetProfiler feature is not enabled
- *Solid Green:* NetProfiler subscription is currently activated
- *Solid Amber:* The profile has expired and updating is required

Calibration

- *Solid Red:* Calibration is required
- *Solid Green:* Calibration is not required at this time

Transform

- *Indicator Off:* Transform feature in not enabled
- *Solid Green:* Transform feature is activated

Status

- *Solid Amber:* Measurement in progress
- *Solid Green:* Successful measurement was taken
- *Solid Red:* Measurement failed

CALIBRATING

The software application prompts for an instrument calibration when required. The frequency at which this occurs depends on the application. Refer below for procedure.

A calibration consists of a white ceramic plaque measurement followed by an open port measurement.

Refer to Cleaning section in the Appendices for information on cleaning the optics area and white ceramic plaques.

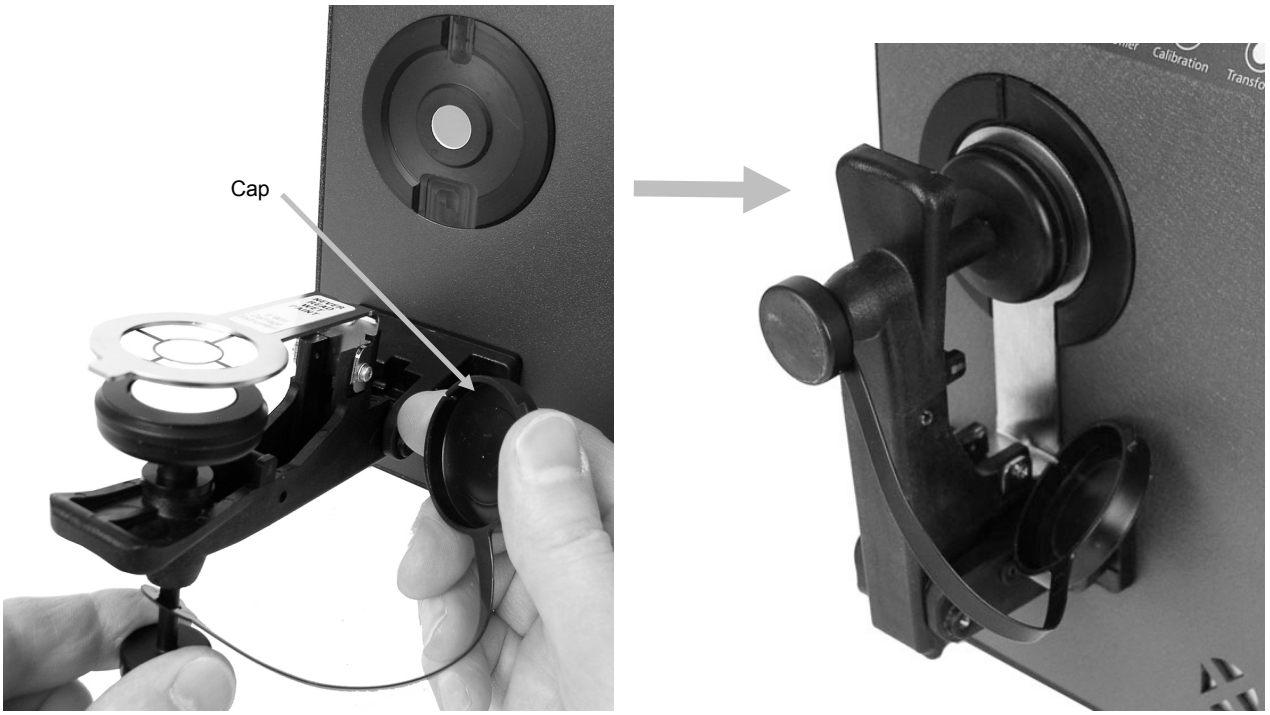
NOTE: Make sure to use the sample holder supplied with the instrument for calibrating. Do not substitute a sample holder from another instrument. The serial number on the sample holder should match the sample holder (plaque) serial number on the instrument.

Calibration Notes

- Dirt or dust in the aperture area will cause an inaccurate calibration reading. Refer to the Appendices for optics cleaning procedure.
- **The white ceramic plaque is dramatically affected by smudge marks, dust, and finger prints**. Refer to Appendices for ceramic plaque cleaning procedures.

Calibration Procedure

1. Open the sample holder completely.
2. Pull down on the knob and remove the cap from the white ceramic plaque. Release the clamp to the retainer.
3. Close the sample holder to the sample port.



4. Initiate the white calibration procedure from the software application. The status indicator changes to amber. The calibration indicator should change to red.
5. After white calibration is complete, open the sample holder and reinstall the cap on the calibration plaque. Make sure that you firmly press the cap into place over the calibration plaque.
6. Leave the sample holder open. Make sure no objects are within three feet of the open port and it is not pointed towards a light source or window.

7. Initiate the open port calibration procedure from the application. The status indicator changes from amber to off, and the calibration indicator changes to green. This is an indication that the calibration procedure was successful.
8. Close the sample holder and exit the calibration procedure from the application.

TAKING MEASUREMENTS

You should refer to the documentation for the software program that you are using with your instrument. All applications that use the instrument must be running during measurements.

Sample Criteria

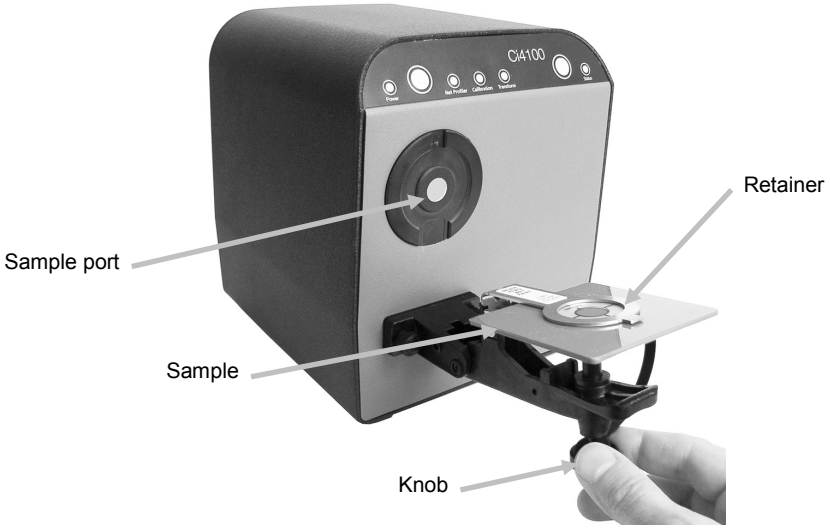
The instrument can take measurements from just about any clean, dry surface that is reasonably flat. The sample area to measure must be at least 14 mm in diameter. To ensure an accurate and reliable measurement, the sample should be held securely against the port in the sample holder.

NOTE: Never measure wet paint. Wet paint will contaminate the instrument.

Measurement Techniques

1. Clear the sample surface of any dirt, dust, or moisture.
2. Pull the top portion of the sample holder away from the instrument until it stops in the open position.

3. Pull the knob back and insert the color sample between clamp and retainer. Make sure the sample side you wish to measure is facing the sample port.



4. Close the clamp against the sample. Make sure the sample covers the entire opening in the retainer.
5. Close the sample holder. You are now ready to measure the sample.

6. Initiate the measurement from the software application.

   NOTE: Your application may also require you to press the Measure button during a measurement.

   The status indicator changes to red and an error beep occurs if the measurement was unsuccessful. Refer to the Troubleshooting section in the Appendices for more details.

Measuring Large or Oddly-Shaped Samples

When measuring large or oddly-shaped samples you can open the holder completely or remove the holder if necessary. The sample is then—held securely against the sample port.

NOTE: Sample port is very sensitive to movement and light!

When holding a sample for measurement yourself, remember to keep the sample perfectly still. Also, the sample surface should be able to rest completely flat against the sample port, preventing any light from entering the measurement area.

Sample Holder Open

Sample Holder Removed

APPENDICES

Service Information

X-Rite provides repair service to their customers. Because of the complexity of the circuitry, all warranty and non warranty repairs should be referred to an authorized service center. For non warranty repairs, the customer shall pay shipping and repair cost to the authorized service center, and the instrument shall be submitted in the original carton, as a complete unaltered unit, along with all the supplied accessories.

X-Rite, Incorporated has offices around the world. You can contact us using one of the following methods:

- To identify the X-Rite service center nearest you, please visit our web site at: www.xrite.com and click the **Contact Us** link.
- For online help, visit our web site (www.xrite.com) and click the **Support** link. Here you can search for software or firmware updates, white papers, or frequently asked questions which can quickly resolve many common user problems.
- Send an e-mail to Technical Support: casupport@xrite.com detailing your problem and listing your contact information.
- For sales questions or to order cables and accessories, visit our web site (www.xrite.com) or contact your nearest X-Rite dealer or service center.
- Problems and questions can also be faxed or emailed to your local X-Rite office listed on our website.

Cleaning the Instrument

Your instrument requires very little maintenance to achieve years of reliable operation. However, to protect your investment and maintain reading accuracy, a few simple-cleaning procedures should be performed from time to time.

General Cleaning

The cover, sample holder and sample port surface of your instrument should be kept clean and free of dust. This can be accomplished by dusting these components with a lint-free cloth. General cleaning should be performed on a weekly basis or more often if the unit is used in a dusty operating environment.

NOTE: DO NOT use any solvents to the clean the instrument.

Cleaning the Optics

The optics should be cleaned once a week in a normal environment. If the instrument is used in a dirty or dusty environment, more frequent cleaning may be required.

1. Place the sample holder in the open position.

2. Blow short bursts of clean, dry air into the measurement port. This should remove any accumulated debris from the optics.

IMPORTANT: If can air is used for cleaning, do not invert or tilt the can during use. This could cause damage to the optics.

Cleaning the White Ceramic Plaque

The white ceramic plaque requires very little cleaning because it is protected by the cap. When calibrating you should be very careful not to touch the surface of the plaque. Fingerprints can affect the measurement accuracy of the instrument. Should your calibration plaque become dirty or smudged follow the steps below for cleaning.

1. Place the sample holder in the open position.
2. Pull the knob back and remove the cap.
3. Using a lint free cloth, gently rub the white calibration plaque until it is free of dust and dirt.
4. Place the cap back on the clamp.
5. Place sample holder in the closed position.

Troubleshooting

Prior to contacting the support department for instrument problems, try the applicable solution(s) described below. If the condition persists, contact us using one of the methods listed in the Service Information section.

Problem	**Cause/Solution**
Instrument not responding (no indicator lights during measurements).	*AC adapter not connected.* Plug in AC adapter. *Incorrect AC adapter.* Plug in correct AC adapter.
Solid red calibration indicator.	*Calibration required.* Calibrate instrument.
Calibration procedure fails.	*Calibration plaque is dirty or damaged.* Clean the white ceramic plaque per procedure in Appendix, or replace if damaged.
Instrument and software not communicating.	*Interface cable not connected.* Connect the interface cable between the computer and the instrument. Close and restart the software application. If this does not work, reboot the computer. Remove power from the instrument, reapply power and see if the condition is corrected. Check for proper configuration setting from the software provider.
Repeated sample measurement failures (red indicator).	Ensure that the sample is being measured in accordance with your software's documentation. Close and restart the software application. Perform a calibration on the instrument (see Calibration section). Clean instrument optics (see General Cleaning).

Technical Specifications

Measurement Geometrics:	d/8°, DRS spectral engine, 8mm viewing/14mm illumination
Receiver:	Blue-enhanced silicon photodiodes
Spectral Range:	400nm – 700nm
Spectral Interval:	10nm – measured, 10nm – output
Measurement Range:	0 to 200% reflectance
Measuring Time:	Approx. 2 seconds
Inter-Instrument Agreement:	0.30 ΔE^*_{ab}, based on avg. of 12 BCRA series II tiles 0.50 ΔE^*_{ab} max. on any tile (specular component included).
Short-Term Repeatability:	0.10 ΔE^*_{ab} max. on white ceramic, standard deviation (specular component included)
Lamp Life:	Approx. 500,000 measurements
Power Consumption:	12VDC, 1.5 A max.
Power Supply:	12VDC, 2.5 A (X-Rite Part Number SE30-277 AC adapter)
Data Interface:	USB 2.0
Operating Temperature Range:	50° to 104°F (10° to 40°C) 85% relative humidity maximum (non-condensing)
Storage Temperature Range:	-4° to 122°F (-20° to 50°C)
Dimensions:	8.66" H (22.0 cm) 7.48" W (19.0 cm) 10.43" L (26.5 cm)
Weight:	11.1 lbs. (5.03 kg)
Accessories Provided:	Quick Start Guide**,** USB cable, Manuals & Utilities CD, AC Adapter
Usage:	Indoor only
Altitude:	2000m
Pollution Degree:	2
Overvoltage:	Category II

Design and specifications subject to change without notice.

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Please visit www.xrite.com for a local office near you.

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