BASF Spectrophotometer 12/6

User Manual

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 model is in compliance with the essential requirements and other relevant provisions of Directive(s) RED 2014/53/EU, LVD 2014/35/EU, and RoHS 2011/65/EU.

Models with WiFi:

CE Mark: Radio Equipment Directive (2014/53/EU)
EN 300 328 V2.1.1
EMC : EN 301 489-1 V2.1.1, EN 301 489-17 V.3.1.1,
EN 55022:2010/AC:2011, EN 55024:2010
Health : EN 62311: 2008
Safety : EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013

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.

Models with WiFi:

Contains FCC ID: LSV-KOHSPEC

NOTICE:

Changes or modifications made to this equipment not expressly approved by (manufacturer name) may void the FCC authorization to operate this equipment.

Industry Canada Compliance Statement

CAN ICES-3 (A) / NMB-3 (A)

Models with WiFi:

Contains IC ID: 20894-KOHSPEC

NOTICE:

This device complies with Part 15 of the FCC Rules and with Industry Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions:

this device may not cause harmful interference, and this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio.

exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RF Exposure

- The radiated output power of the device is far below the FCC radio frequency exposure limits. Nevertheless, the device shall be used in such a manner that the potential for human contact during Wi-Fi transmission is minimized.
- La puissance rayonnée par cet appareil est très inférieure aux limites d'exposition aux ondes radio définies par la FCC. Néanmoins, l'appareil doit être utilisé de telle manière que le potentiel de contact humain pendant la transmission par Wi-Fi soit minimisé.

SRRC (State Radio Regulation of China) Certification

CMIIT ID: 2016DJ1364

Equipment Information

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

To avoid discomfort, do not look directly into the measurement optics when the instrument is on.

Do not immerse the instrument in liquid.

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

Transportation: This product contains a lithium-ion battery. Should you need to ship this device, you may wish to consult published guidance documents by one or more of these organizations for advice on how to comply with the regulations: IATA, ICOA, IMDG & PHMSA. The battery contained in this device is 107g in weight, 7.4V, 2.4 Ah, and complies with the UN 38.3 tests in effect the year it was originally shipped.

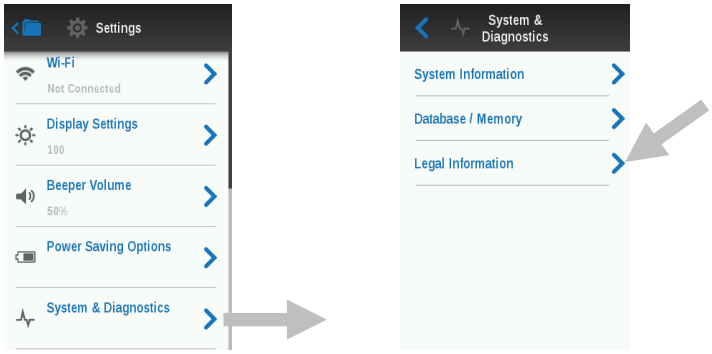
Please remove the battery from the device before shipping.

The product is a sensitive measurement instrument. If the instrument experiences a drop, a calibration should be performed before any measurements are taken to ensure the instrument is working properly. Refer to the Calibration Mode section for information on performing a Calibration.

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

Certification of Compliance

See the "Legal Information" menu on the device for additional certification and compliance marks. To view, choose Settings > System and Diagnostics > Legal Information.



Proprietary Notice

Warranty Information

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

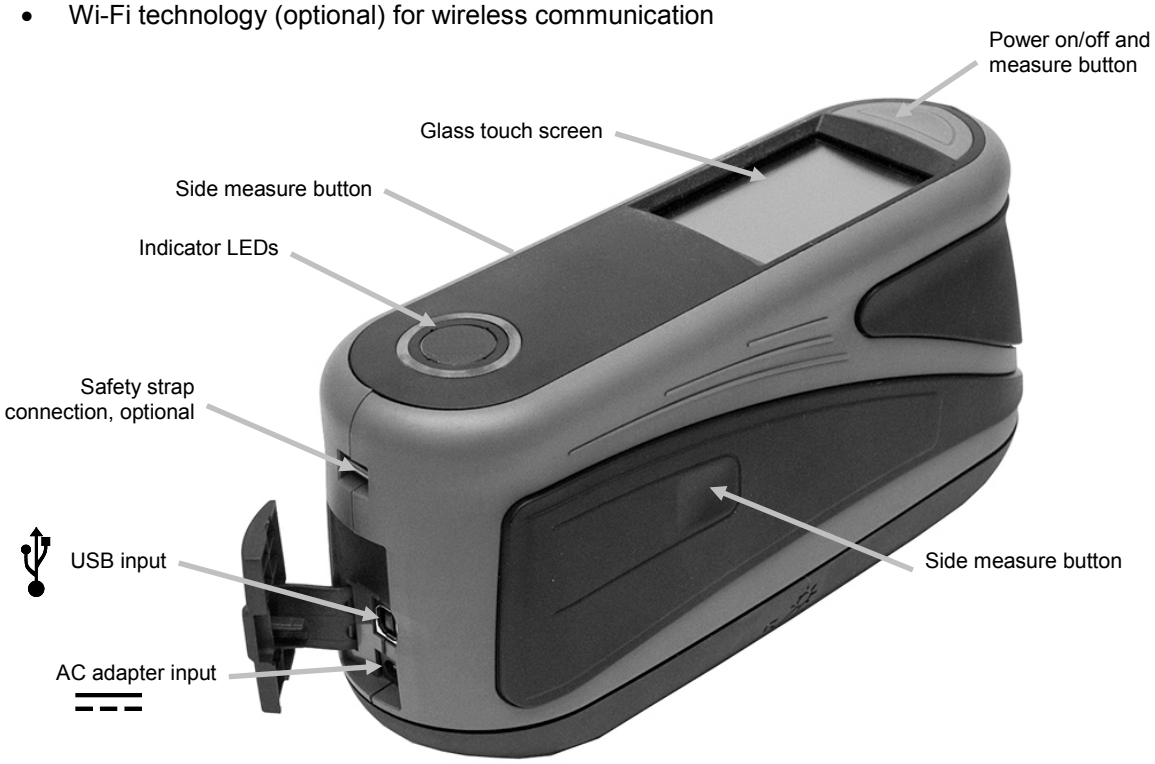
INTRODUCTION AND SETUP

The multi-angle spectrophotometer is designed for consistent, precise color measurement of metallic, pearlescent, and other complex special effect finishes.

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

Key features of the instrument are:

- Color display with touch screen operation
- Measure and power on/off buttons
- Video targeting system for accurate positioning
- Three pressure sensors located on the bottom of the instrument to aid in proper positioning
- Wi-Fi technology (optional) for wireless communication



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.

Instrument

Battery pack

AC adapter/line cord

Calibration reference

USB cable

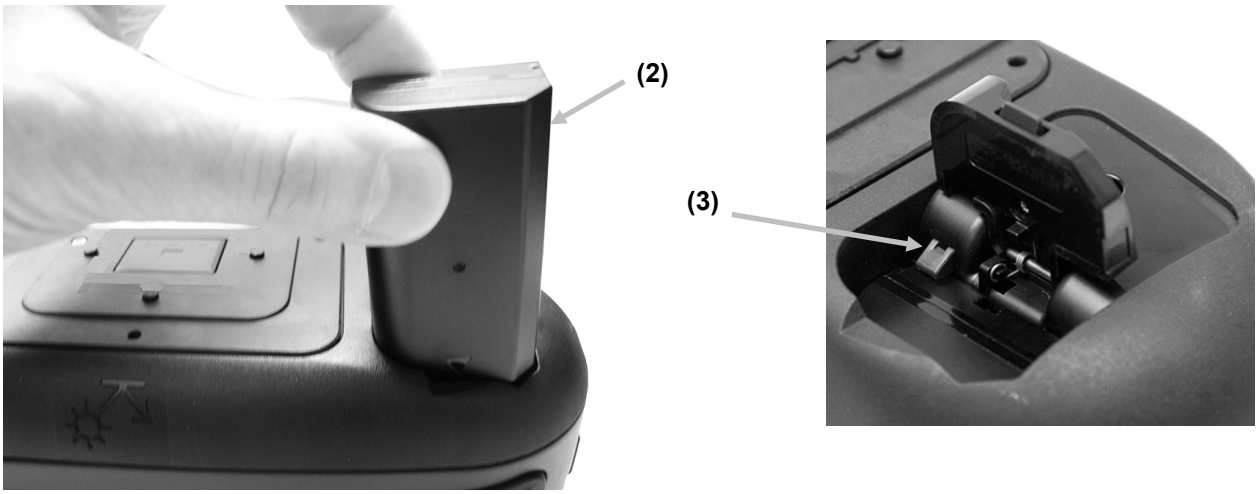
Safety strap
(optional)

Installing the Battery Pack

Your new instrument is shipped from the factory with the battery pack removed. The battery pack is located in the instrument case and should be charged before use. Refer to "Charging the Battery Pack" later in this section for charging details. The instrument will also operate from the AC adapter without a battery pack installed.

1. Carefully turn the instrument over and slide open the latch (1) that secures the battery pack access cover. Open the access cover.

2. Slide the new battery pack (2) into the instrument with the battery contacts facing down until the battery is positioned below the holding latch (3).



3. Close the access cover by pressing down until it locks into position.

Use the rechargeable Li-ion batteries provided (X-Rite P/N SE15-40 / E-One Moli Energy Corp Model MCR-1821J/1-H); other types may burst causing personal injury. Replacement batteries can be purchased from your authorized X-Rite representative or E-One Moli Energy Corp.

Charging the Battery Pack

General

The battery pack for your new instrument comes in a low to medium charge state and should be charged before use (up to 4 hours for full charge) by plugging in the AC adapter. Refer to Connecting the AC Adapter later in this section.

A charged battery pack may eventually lose partial charge if not used for an extended amount of time. You should charge the battery from time to time and store in a cool environment when not in use to maintain battery performance.

Battery Charge Temperature Range

5°C to 40°C

Lifespan Expectations

Lithium-ion batteries typically decay to 80% capacity after 700 charge cycles (see chart below). A charge cycle can be defined as several partial charges equaling 100%. Partial charge and discharge cycles will help maintain the life of the battery. It is best to avoid full discharge and charge cycles. After roughly 700 charge cycles are reached, the amount of measurements you can expect to achieve from one full charge is reduced. At this point, you may wish to replace the battery pack.

Disposal

Dispose of the battery pack in a designated disposal location for recycling.

Powering On the Instrument

When powered-up, the instrument goes through a diagnostics test. The indicator LED and screen illuminate white, followed by a splash screen before the main screen. This startup sequence will take a few seconds to complete.

Power on button

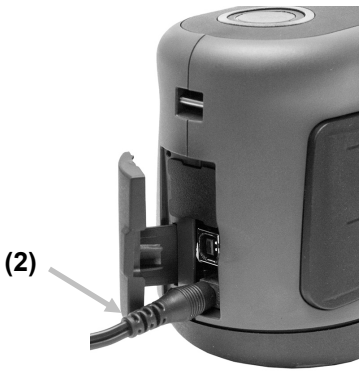
Press the power on/off and measure button or plug in the AC adapter to turn on the instrument. If the instrument does not power up after pressing the power button, the batteries may require charging.

You can press and hold the button for three seconds, and then tap Power Off in the display to turn off the instrument

Connecting the AC Adapter

NOTE: The instrument can operate from the AC adapter only. The battery pack does not need to be installed. The AC adapter (X-Rite P/N SE30-277) overrides any charge condition of the battery pack in the instrument. Measurements can be taken even with a very low battery condition when using the AC adapter and the battery pack is charging.

1. Verify the voltage indicated on the AC adapter complies with the AC line voltage in your area.
2. Open the access cover (1) at the back of the instrument.
3. Insert the small plug from the AC adapter (2) into the input connector on the instrument.
4. Plug the detachable line cord in the AC adapter and plug the line cord into the wall receptacle.



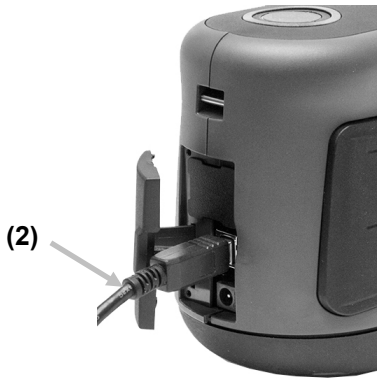
AC Adapter Ratings
Input: 100-240V 50-60 Hz
Output: 12VDC @ 2.5A

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

Connecting the USB Cable

IMPORTANT: You must install the software before connecting the instrument to your computer.

1. Install the software application if not already installed. Refer to the software documentation for additional information.
2. Open the access cover (1) at the back of the instrument.
3. Turn the instrument on and plug the square end of the USB cable into the back of the instrument.
4. Plug the USB cable into an available port on your computer. A USB symbol appears on the screen when the USB connection is established.



IMPORTANT:

Never unplug the USB cable when data is being transferred.

It is recommended that the AC adapter be connected before a data transfer.

Attaching the Safety Strap (optional)

The strap attaches to the back of the instrument and around your wrist. The strap should not be used to carry the instrument.

1. Feed the small looped end (1) of the strap around the post at the back of the instrument.
2. Insert the wrist strap end (2) through the small loop.

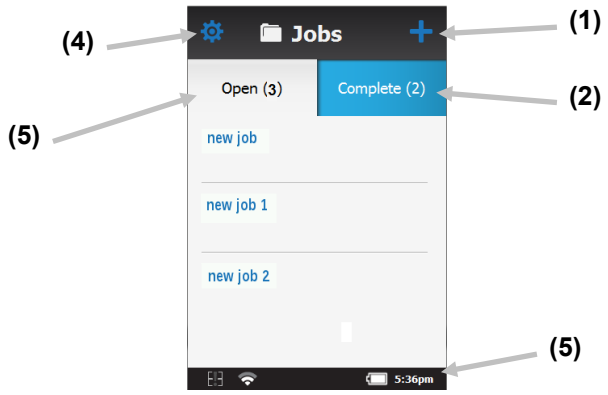
3. Pull on the wrist strap to secure to the strap post.
4. Use the slide (3) to tighten the strap around your wrist.

USER INTERFACE

The instrument features a graphical touch screen display. All functionality is accessed directly through the screen.

Main Screen Description

When the instrument is powered-up, the main (top level) screen appears after the diagnostics test is complete. The main screen consists of the footer bar and operation modes. Select the modes by tapping the icons located on the display screen.



Add New Job (1)

This mode is the main mode of operation. Sample measurements are taken and saved in this mode. Refer to the Measure Mode section for information.

Completed Jobs (2)

This function is used to view and delete stored jobs. Refer to the Job Mode section for information.

Open Jobs (3)

This function displays current jobs that have been downloaded from the software and require measurements. Refer to the Job Mode section for information.

Settings Mode (4)

The settings mode is used to set and edit the instruments configuration options, and to enter the calibration mode. The settings options should be reviewed before you use your instrument for the first time. Refer to the Settings Mode section for information.

Footer Bar (5)

Displays the calibration status, Wi-Fi connection (where applicable), battery life status, and current time.

- **Calibration Status:**

  Indicates that calibration is currently not required.

  Indicates that calibration is required. Refer to Calibration Mode for information on calibrating the instrument.

- **Wi-Fi Connection:**

  The Wi-Fi icon appears when the option is activated in the Settings. Refer to Setting Mode for information on activating.

- **Battery Gauge**: Depicts the current condition of the battery pack.


Indicates the battery pack is fully charged.


Indicates the battery pack has a sufficient charge for a substantial number of measurements.


Indicates the battery pack is low, but measurements are still possible. Battery pack should be charged soon.


Indicates the AC adapter is plugged in and the battery pack is charging.

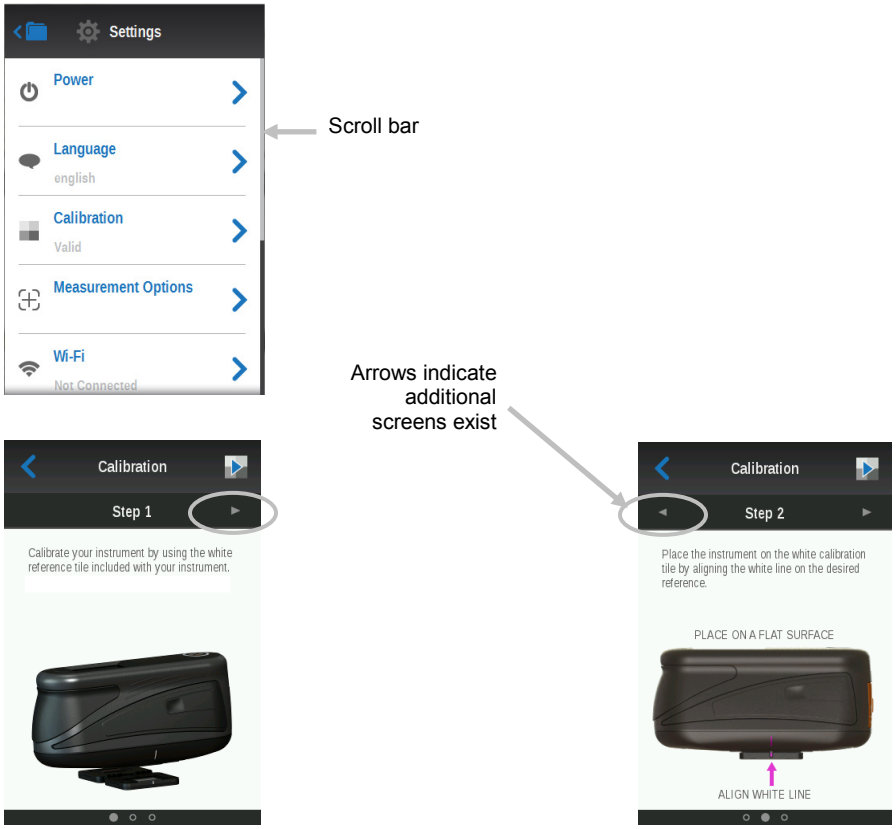

Indicates the AC adapter is plugged in and no battery pack is installed.

- **Timestamp:** Displays the current time of day.

Scrolling Through Settings and Data

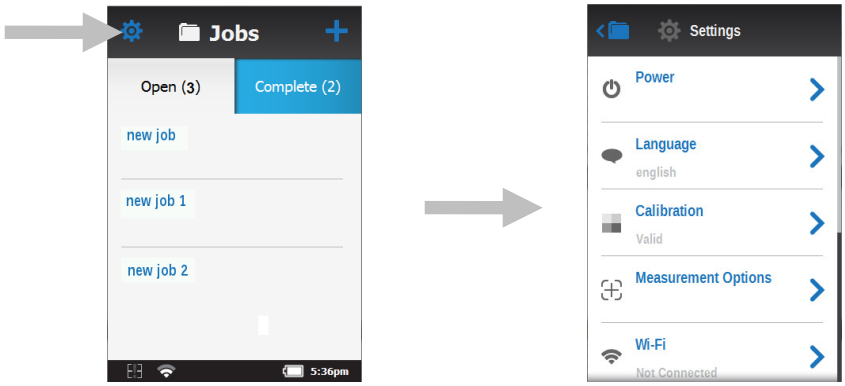
A scroll bar appears on screens when some settings or measurement data cannot be accessed from the main view. A scroll bar on the right indicates additional settings or data views are available. Swipe the screen up or down to view the additional settings.

Left and right arrows at the top of the screen indicate that additional data or information is available. Swiping the screen or tapping the arrows moves the screen to the next available screen. Swiping to the right or tapping the arrow returns the screen to the previous view.

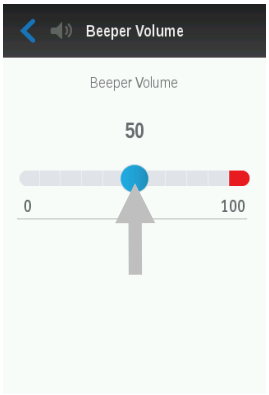


Opening Settings and Jobs

Settings and jobs are accessed by tapping the corresponding icon on the screen. For this example, the Settings icon was tapped to open the Settings screen.



For setting controls that navigate from side to side, slide the dot icon to the right or left to change the parameter. The Beeper Volume option is shown below.



Measure Buttons

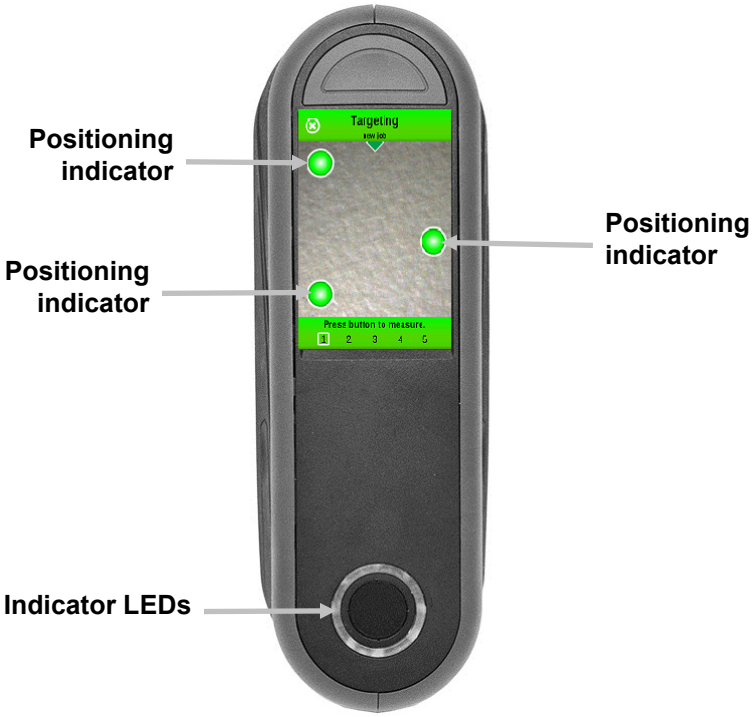
The instrument incorporates three measure buttons. One measure button (1) is located on the top of the instrument. This is the same button that is used to power on and off the instrument. The other two buttons are located on the left (2) and right (3) sides of the instrument. You can also tap the center of the screen to initiate a measurement.

Pressure Sensors, Indicators and LEDs

To aid in proper positioning and ensure repeatability of sample measurements, the instrument incorporates three pressure sensors that are arranged around the measurement port. These sensors require an even amount of pressure to be applied across all three sensors before a measurement is triggered.

Three positioning indicators that appear in the screen as well as the indicator LEDs on the top of the instrument provide positioning feedback. The indicators in the screen are arranged in the same pattern (top, back and side) as the pressure sensors located around the measurement port.

- **Green Indicator:** ideal pressure is being applied to the corresponding sensor. A measurement can be taken when all three indicators illuminate green. If the required pressure is not maintained for the duration of the measurement, an error message will appear on the display and the measurement must be retaken.
- **Red Indicator:** the required pressure is not being applied to the corresponding sensor. Correct pressure must be applied to achieve a green indicator condition.



The circular multi-color LEDs located on the top of instrument provides visual feedback on the status of a measurement and pressure sensor switches.

- **Green LED**: Indicates all three pressure sensors are activated properly and a measurement can now be triggered.
- **Red LED**: Indicates one or more of the pressure sensors is not properly activated or an error has occurred during a measurement.
- **White LED**: Indicates the instrument is being powered on or the AC adaptor is plugged in.
- **Off**: Indicates the instrument is in battery mode or off, not ready to measure, or not in measure mode.

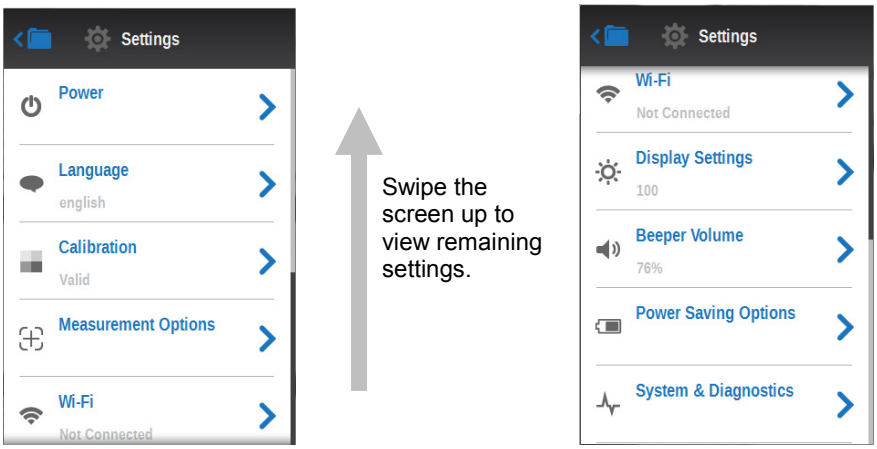
SETTINGS MODE

Settings mode is used to adjust and view the instrument's settings. You should review the current settings before using the instrument for the first time. However, you can go back and change these settings at any time.

Entering Settings Mode

1. From the Main screen, tap the **Settings** icon to access the Setting screen.

2. Tap the Settings option you want to edit or activate.



3. Refer below for information on configuring each Settings option.
4. When finished with the options, tap the Back icon to return to the Settings screen.

Exiting Settings Mode

After configuring settings, tap the Jobs folder to exit the Settings screen and return to the main jobs screen.

Power

This option is used to access the power options. The available options are Standby, Reboot, and Shutdown.

To access, tap **Power** and then tap the desired option. Tap option again to confirm.

Standby: This option puts the instrument into standby mode. You will need to tap the screen or press a button to wake the instrument.

Reboot: This option reboots the instrument.

Shutdown: This option turns the instrument off.

Language

 This option is used to set the language that is displayed on the instrument during operation.

To set the language, tap **Language** and then tap the desired language. A check mark appears next to the selected language.

The language selection also has an influence on the virtual keyboard:

- Sort order of letters
- Specific characters

Calibration

 This option is used to activate the calibration procedure.

To access, tap **Calibration.** Refer to the Calibration mode section later in this manual for detailed information on performing a calibration.

Measurement Options

 This option is used to set auto measurement mode and measurement averaging.

Auto Measurements: When set to On, this option allows the instrument to automatically take a measurement once all three pressure sensor indicators turn green in the display. No measurement switch press or screen tap is required. Once a measurement is taken, the instrument must be repositioned in order for another measurement to occur.

This option is set through the software.

Display LABCH: When set to On, this option displays the LABCH values in the measurement details screen.

To activate, tap the toggle switch. When the switch is in the right position the option is ON and when the switch is in the left position the option OFF.

Averaging: If available, this option is used to set the number of measurements required for calculating a single measurement. Measurements are taken at different locations on a sample to achieve average measurement values. The available settings are No Averaging (default), Average 3, Average 5, and SMC m:n.

SMC m:n (Statistical Measurement Control) is a method of performing a statistical analysis of several measurements to determine the quality of the measurements and/or the sample, before an average value is calculated. A statistical analysis of the measurements' mean and standard deviations eliminates outliers and determines the variability of the measurements. The number of required measurements (1-13) is set along with the maximum number of measurements (1-32) that can be taken to achieve an average value. This method is recommended to limit the risks of using an incorrect reading.

To access, tap **Measurement Options** and then tap No Average (default), Average 3, Average 5, or SMC m:n. When selecting SMC n:m, you will also need to set the number of good measurements required and maximum measurements. Slide the dot icons to the right or left to increase or decrease the measurement numbers.

Wi-Fi

 This option is used to activate or deactivate Wi-Fi mode.

To activate, tap **Wi-Fi** and then tap the toggle switch. When the switch is in the right position the option is ON and when the switch is in the left position the option OFF.

Once activated, the screen will show all available networks.

Display Settings

This option is used to set the display screen brightness.

To set, tap **Display Settings** and then slide the dot icon to the right or left to increase or decrease the brightness of the screen. The setting can range from 1 to 100.

Beeper Volume

This option is used to adjust the volume of the instrument speaker. The instrument beeps when the screen is tapped, after a measurement, and after a calibration.

To set, tap **Beeper Volume** and then slide the dot icon to the right or left to increase or decrease the volume. The setting can range from 0 to 100.

Power Savings Options

This option is used to set the desired power savings levels for the instrument to conserve battery life during nonuse times.

Dim Display: The instrument is ready to measure, however the display is not on. A button press or screen tap will wake up the instrument. Dim Display can be set from 10 to 119 seconds or N/A (off).

Standby Mode: The instrument is in power save mode. A button press or screen tap will wake up the instrument and will take 4 seconds before it is ready for use. Standby Mode can be set from 1 to 119 minutes or N/A (off).

Power Off: The instrument is in power off mode. The power button must be pressed to turn on the instrument and will take 20 seconds before it is ready for use. Power Off can be set from 1 to 119 minutes or N/A (off).

To set, tap **Power Savings Options** and then slide the dot icon to the right or left to increase or decrease the time of the desired option.

System & Diagnostics

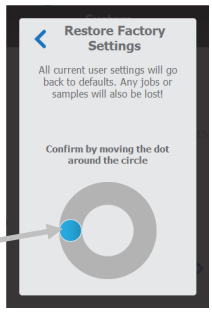
This option is used to view instrument parameters, legal information, open source information, and run a self test. Factory default setting can also be restored from this screen.

System Information: Tap this option to access the following options.

Restore Factory Settings

Note: This option deletes all existing jobs and samples, and reset the instrument to its default state.

To restore defaults, tap **Restore Factory Settings** and rotate the dot icon around the circle in the middle of the screen.



Open Source

This X-Rite product includes software code developed by third parties. This option displays the open source information.

Database/Memory: Tap this option to display memory used and the number of samples stored. All stored jobs and samples can also be cleared from this screen.

Clear Database

Note: This action will delete all samples from the instrument.

To clear jobs and samples, tap **Clear Database** and rotate the dot icon around the circle in the middle of the screen (see screen image above).

Legal Information

This option displays the instrument's compliance information.

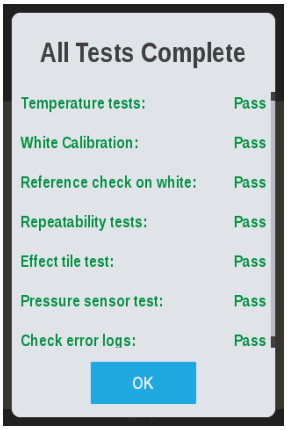
Self Test

This option is used to conduct various performance tests on the instrument. The test can take several minutes to complete.

Refer to the Calibration Mode section for additional information on positioning the instrument on the calibration reference.

To perform this test:

1. Measure the white calibration tile. Tap OK when complete.
2. Measure the effects tile. Tap OK when complete.
3. Measure open air (instrument not on a surface).
4. View test results. Tap OK when complete.



CALIBRATION MODE

The instrument includes an integrated calibration tile on the inside of the measurement port cover, which is used to automatically perform a calibration before each measurement. However, every 30 days a white tile calibration and effect tile check must be performed utilizing the included calibration reference.

The calibration icon at the bottom of the screen changes to this icon  indicating that a calibration must be performed. No measurements can be taken until the calibration is completed.

Refer to the Cleaning section in the Appendices for information on cleaning the calibration reference.

NOTE: Make sure to use the calibration reference supplied with the instrument for calibrating. Do not substitute this reference with a reference from another instrument. The serial number on the reference should match the reference serial number displayed on the instrument screen during calibration.

Calibration Notes

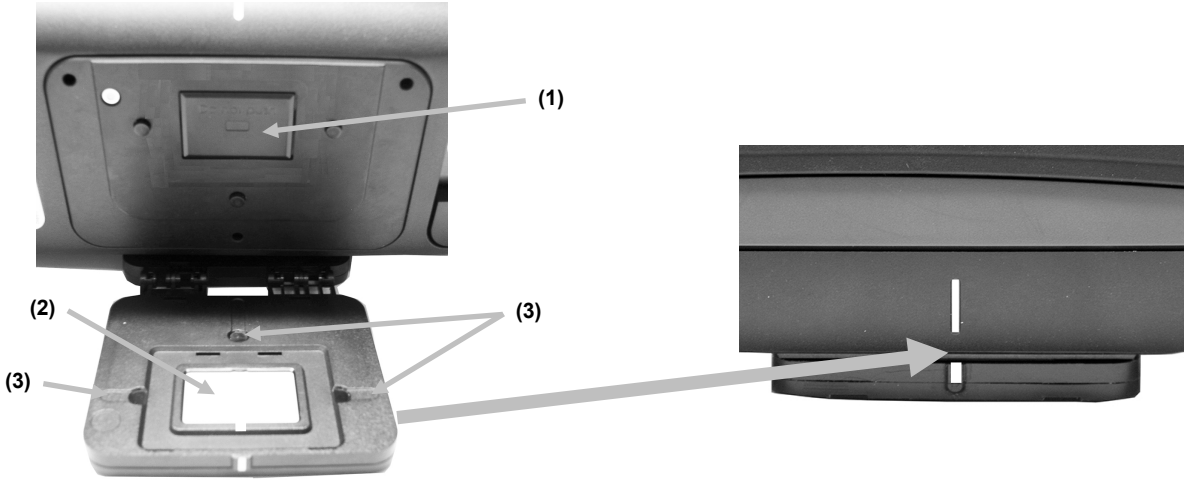
- The **white tile in the calibration reference is dramatically affected by smudge marks, dust, and finger prints**. Refer to Appendices for calibration reference cleaning procedures.
- **Do not move instrument while taking a calibration measurement**. If motion is detected, an error message will be displayed and calibration aborted.

Positioning the Instrument on the Calibration Reference

The calibration reference is designed to keep the white tile and effect tile free of dust and debris.

Position the instrument measurement port (1) over the white tile (2) on the calibration reference. Make sure that the three pressure sensors around the measurement port align with the slots (3) in the calibration reference, and the white line (4) aligns with the reference marks.

Important: Be aware when positioning on the reference that the measurement port is not centered in the bottom of the instrument.

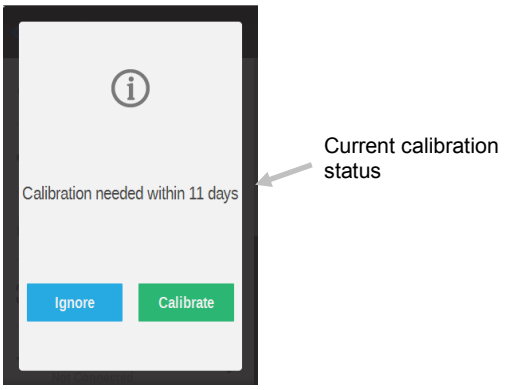


Calibrating the Instrument

1. Select the calibration option from the Settings menu as previously explained (see Entering Settings Mode).

   The message “Calibration Required” appears if the instrument needs to be calibrated. If calibration is not currently needed, the time remaining before the next calibration appears. To exit the calibration mode without calibrating, tap **Ignore**.

2. Tap **Calibrate** to continue with the calibration.



3. Position the instrument on the white tile as previously explained. Swipe the screen to the left for additional information on positioning.

4. When ready, press the top **Measure** button or tap the Calibrate icon  in the screen. Do not touch the instrument throughout the measurement sequence.

   NOTE: If an error message appears after white calibration, try measuring the white tile again. If an error still occurs, clean the white calibration tile as explained in the Appendices.

5. After calibration is completed, remove the instrument from the white tile and position it over the effects tile as previously explained. Press the top **Measure** button or tap the Calibrate icon  in the screen. Do not touch the instrument throughout the measurement sequence.

6. After reference verification is completed, remove the instrument from the calibration reference and return the reference to its storage location.

OPERATION

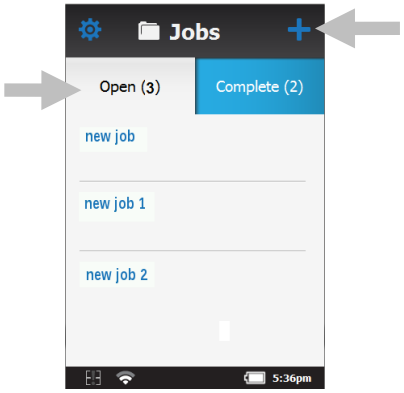
Creating a Job and Measure Sample

In order for the instrument to obtain accurate and repeatable measurements, the bottom of the measurement port must be flat with the sample surface to be measured. Any movement of the instrument can cause the measurement angles to vary, greatly affecting measurements on metallic and pearlescent paint finishes. The pressure sensors ensure the integrity of the measurement data.

Measurement Tips

- Measurements performed on a surface with a curve can cause measurement errors especially at the near specular angles (±15° and 25°). Measurements should be made on the flattest part of a sample whenever possible.
- Hold the instrument firmly by the front and top during a measurement.

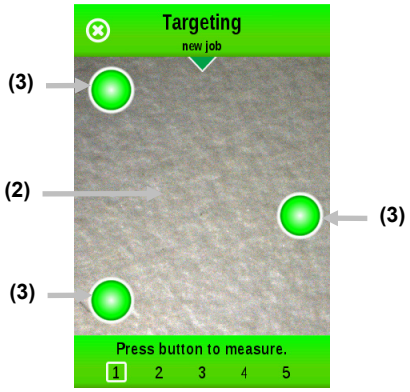
1. From the Main screen, select a downloaded job from the Open list or tap the new job icon + at the top of the screen to start a new job. The instrument goes into targeting mode.

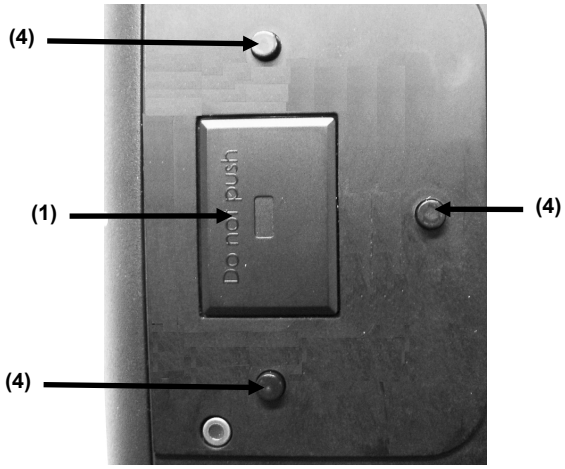


Important: Be aware when positioning on sample that the measurement port is not centered in the bottom of the instrument.

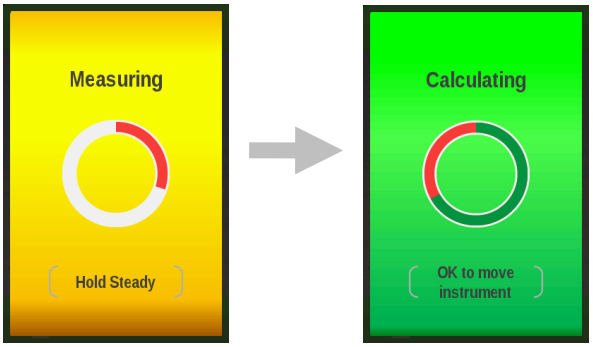
2. Locate the measurement port (1) in the bottom of the instrument over the first measurement area while viewing the screen (2).
3. Gently rock the instrument until all three positioning indicators (3) in the screen turn green. This indicates that all three pressure sensors (4) are activated.

NOTE: Targeting mode is automatically exited if a measurement is not taken within 30 seconds of activation.





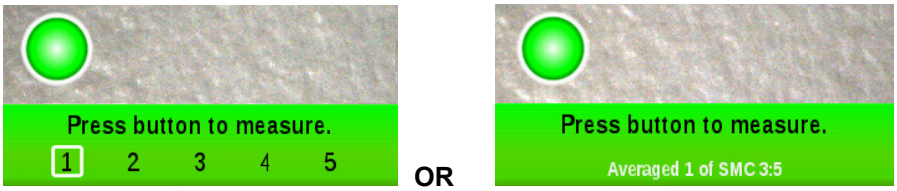
4. Hold the instrument steady and press a Measure button or tap the screen (2) to initiate a measurement (or automatically when this option is selected in settings). Continue to hold the instrument steady until "Calculating" appears in the screen.



NOTES:

- If an error occurs after the measurement, tap **OK** on the screen and try measuring again.
- The current job can be deleted at any time by tapping the Cancel icon at the top left of the screen and then tapping **Delete**.

The bottom of the screen now shows the first measurement as completed and asks you to take the second measurement. If SMC is activated, the screen shows the current number of measurements averaged so far.



5. Position the instrument on the second sample area as previously explained. Hold the instrument steady and press a Measure button or tap the screen.
6. Continue with the remaining sample area measurements to complete the job.
7. After the last measurement for the job is completed, the summary screen appears for the job. Refer to the sections that follow for information on viewing data, entering tags (job names and car information), and deleting individual sample measurements.

   NOTE: Tag information can only be entered if the job was created on the instrument and not downloaded from the software.

8. When completed with viewing and adding tag information (if applicable), tap the checkmark icon of the Summary screen to save the job and return to the main job screen.
9. Terminate

   When SMC is used as the measurement method, it is possible after 5 readings or more to terminate the job. This is accomplished by tapping **Terminate** and selecting one of the three options:

   - **Store Average** of readings already done.
   - **Restart Job** without saving.
   - **Cancel** (terminate) and continue with SMC.

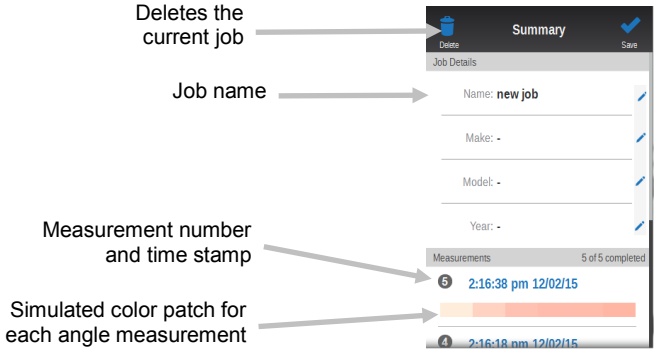
10. Temperature

    When the temperature of the panel is lower or higher than the limit, a warning message is displayed to inform the user. It is recommended to keep the panel around 20°C as temperature could have influence on the color measurement.

Viewing Measurement Data

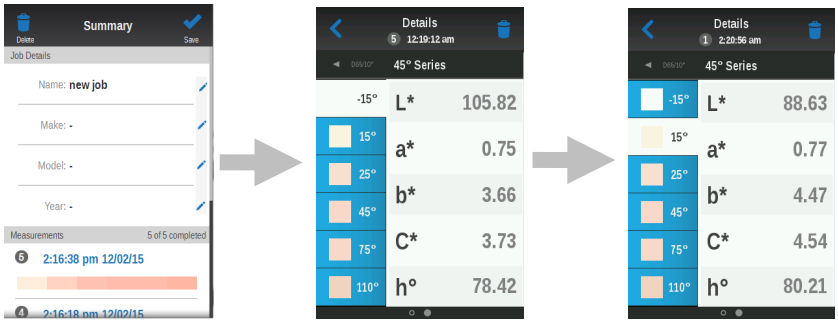
NOTE: The Display LABCH option must be activated in the Setting/Measurement Options screen before L*a*b*C*h° data can be viewed on the Details screen.

The Summary screen appears after all measurements for the job are completed. Swipe the screen up or down to view the additional measurement data.



Data View

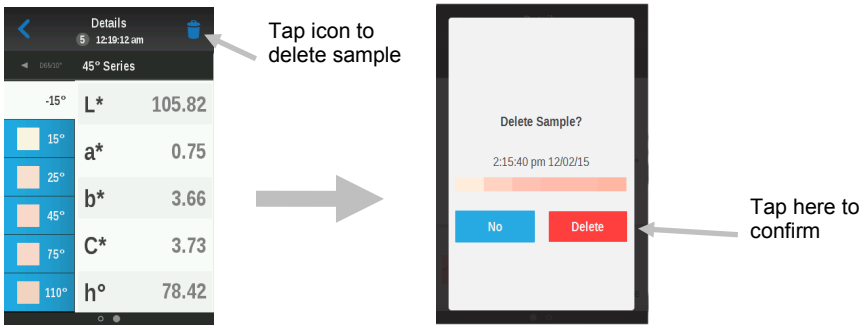
1. Tap a measurement on the Summary screen to access detailed data for that measurement.
2. Tap the arrow icon next to “Measurement” or swipe the screen to the left to view L*a*b*C*h° data for the first angle. Tap another angle patch to view L*a*b*C*h° data for that patch. You can also swipe the screen up to access data for the other angles.



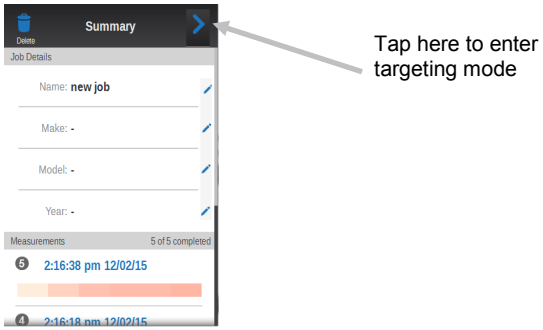
Deleting Samples

Individual samples can be deleted from a job if desired. However, you need to replace the deleted samples from the job with new measurements before the job can be saved.

1. After selecting the sample to delete, tap the delete icon at the top of the screen.
2. A message appears asking you to confirm that you want to delete the sample. Tap **Delete** to continue or **No** to return to the Details screen.



3. After deleting the sample, the Summary screen appears. Tap the arrow icon at the top or press a **Measure** button on the instrument to enter targeting mode.



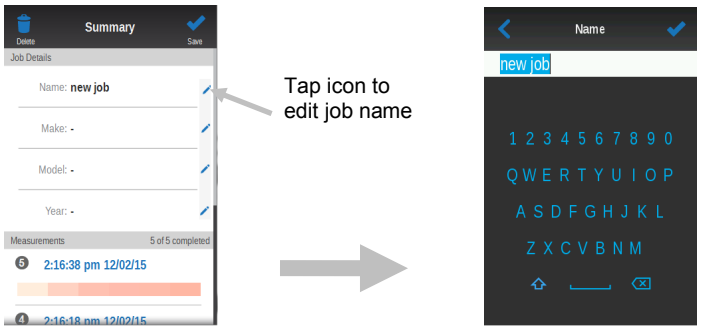
4. Remeasure the sample(s) that was deleted.

Editing the Job Name and Car Description

You can edit the job name if desired and add car description details for jobs that are created on the instrument. Jobs selected from the "Open" list that were downloaded from the software typically have the car name and description already included and cannot be edited. The edit icon does not appear for downloaded jobs.

Job Name

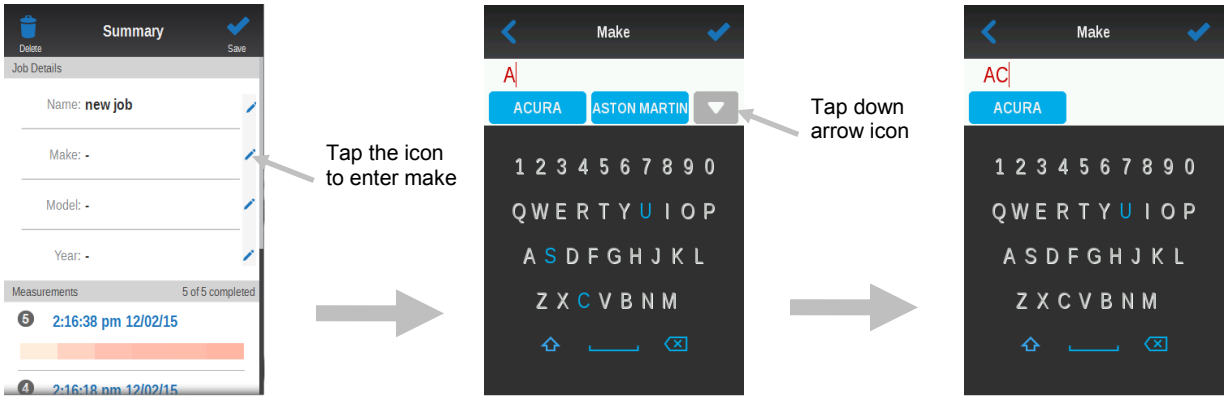
1. To edit the job name, tap the **Job Name** edit icon to access the Name edit screen.
2. Use the virtual keyboard to edit the name and then tap the checkmark icon at the top of the screen to save the name.



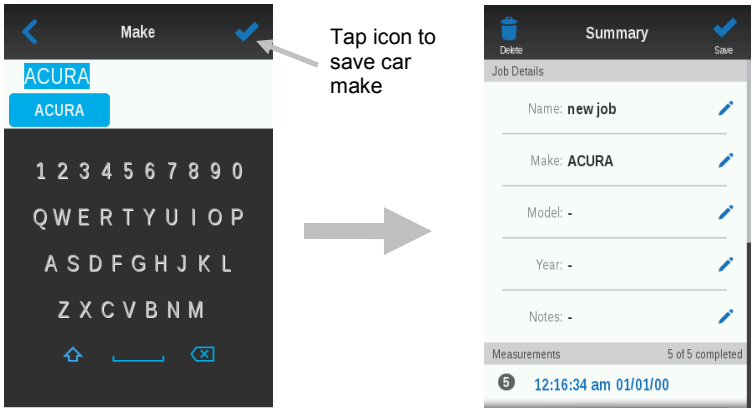
Car Description

NOTE: This example illustrates the procedure for editing the car make. The car model and year would be edited in the same manner.

1. To edit the make, tap the **Make** edit icon to access the Make edit screen.
2. Tap the first letter of the car make. Only letters that can be selected are highlighted on the keyboard. To save time, the instrument automatically starts to show partial car makes from its database that are similar to the entered letter. The down arrow icon can be tapped to show more makes that may be the one required. If the make is not available, continue selecting additional letters until the car make required appears on one the buttons. Tap the car make button to have the car make fill in the field.



3. After the selection is made, tap the checkmark icon at the top of the screen to save the make.



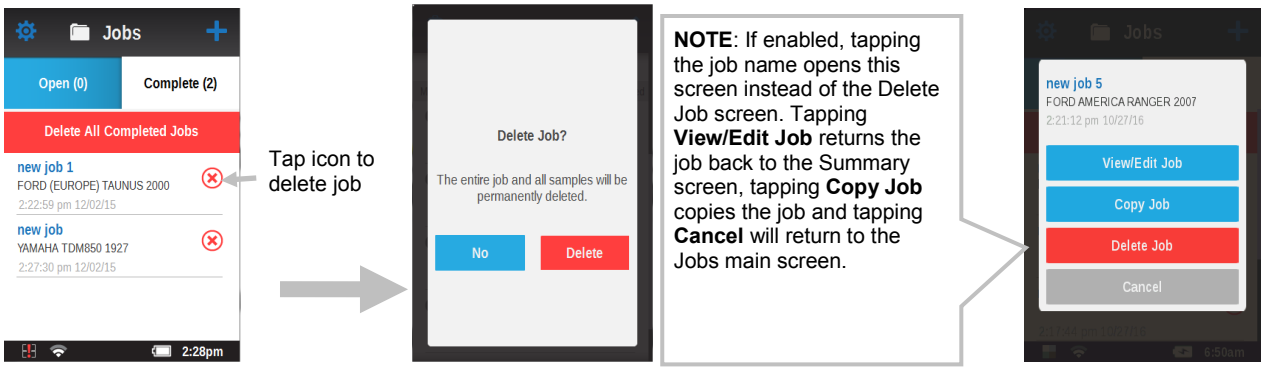
4. Continue with entering additional car description details by tapping **Model**, **Year,** and **Notes** edit icons as required.

Deleting Jobs

You can delete individual jobs or all jobs at once from the Jobs Completed list at the main screen.

Single Job

1. To delete a single job, tap the delete icon next to the job you want to delete from the Complete list. You need to swipe the screen up or down if the job you want to delete is not showing up in the list.
2. A message appears asking you to confirm that you want to permanently delete the job. Tap **Delete** to confirm or **No** to return to the Jobs main screen.



All Jobs

1. To delete all jobs from the Completed list, tap **Delete All Completed Jobs**.
2. A message appears asking you to confirm that you want to permanently delete all jobs. Tap **Delete** to confirm or **No** to return to the Jobs main screen.

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** link.
- For online help, visit our web site 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 or contact your nearest X-Rite dealer or service center.
- Problems and questions can also be emailed or faxed to your local X-Rite office listed on our website.

Cleaning the Instrument

General Cleaning

The exterior of the instrument may be wiped clean with a cloth dampened in water or mild cleaner. Dried paint on the exterior of the instrument can be carefully removed using a paint scraper.

Important Notes:

- DO NOT use any solvents to the clean the instrument, this will cause damage to the cover and internal electronic components.
- Compressed air should not be used to clean the instrument. Cleaning the instrument with blown air can cause dirt on the outside of the instrument to enter into the device, and contaminate optical components.

Cleaning the Calibration Reference

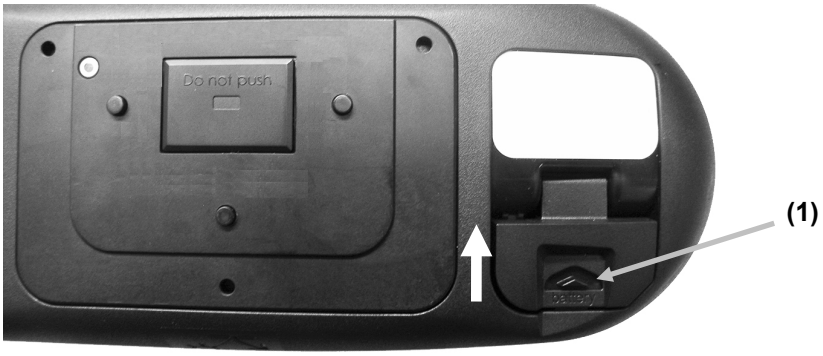
The white tile and effects tile in the calibration reference should be cleaned using a mild soap and warm water solution, thoroughly rinsed with warm water, and wiped dry with a clean, lint-free cloth. You must let the reference dry completely before taking a calibration measurement.

Replacing the Battery Pack

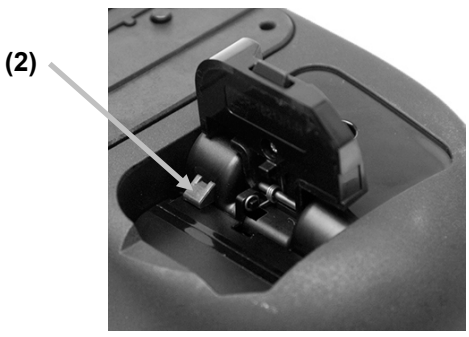
NOTE: If the battery pack is ever dropped, check it for damage and replace if necessary.

⚠ Use the rechargeable Li-ion batteries; other types may cause personal injury or damage to the device. Replacement batteries can be purchased from your authorized X-Rite representative or E-One Moli Energy Corp.

1. Carefully turn the instrument over and slide open the latch (1) that secures the battery pack access cover. Open the access cover.



1. Press in on the battery pack holding latch (2) in the battery compartment to allow the battery to pop up.
2. Turn the instrument over to allow the old battery back to slide out.
3. Slide the new battery pack (3) into the instrument with the battery contacts facing down until the battery is positioned below the holding latch (2).



4. Close the access cover by pressing down until it locks into position.

Troubleshooting

Prior to contacting X-Rite 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.	Instrument is in power down mode.	Press the power button.
	Battery pack is very low or bad.	Charge the battery. If battery pack is faulty, replace using the procedure in the Appendix.
	No battery pack installed.	Install batteries or plug in AC adapter.
		Reset the instrument. See Setting Mode.
Measurement error or results appear inaccurate.	Material being measured is damaged (e.g. scratched)	Obtain new material.
	Instrument requires calibration.	Refer to Calibration mode for procedure.
Calibration procedure fails.	Calibration reference is dirty or damaged.	Clean the reference per procedure in Appendix, or replace if damaged.
Instrument and software not communicating (USB connection).	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.
		Reset the instrument. See Settings Mode procedure.
Instrument will not measure or calibrate.	Sensor indicators in the display do not change color.	Pressure sensors are not working correctly. Put the instrument into targeting mode and place the instrument on a flat surface and then lift. If one or more of the sensor indicators in the display do not change color when lifted, there may be a problem with the pressure sensor. Contact technical support.

Instrument Specifications

Measurement geometries

Spectral multi-angle measurement geometries according ASTM:

- r45as-15, r45as15, r45as25, r45as45, r45as75, r45as110

Image-based texture measurement geometries

- The camera placed at 15° to the nominal.
- Measurement geometries: r15as15, r15as-45, r15as45, 15as80 and semi-diffuse

Spectral analyzer technology

A spectral analyzer at 45° to the nominal is in place for above multi-angle measurement geometries.

- Holographic diffraction grating with 128-pixel diode array (i1 technology)
- Continuous spectral resolution of 10 nm
- Pick-up spot size ~9 x 12 mm

Camera technology

- CMOS RGB camera
- Field of view 9 x 12mm
- Computed standardized HDR images with calibrated resolution
- Pixel size 25µm in object space
- Optical resolution 50µm
- Color space XYZ
- Data format EXR

Directional illumination

Technology

- LED technology
- White high-power LED

Wavelength range

- Wavelength range of illumination: default 400nm-700nm

Spot size

- Illumination spot size 13 x 16mm

Spectral measurement performance

Short-term repeatability (MCDM)

- MCDM: Mean color difference to mean. 10 measurements every 10s
- MCDM <= 0.05 dE on BCRA white

At 23°+-1°C and 40-60% relative humidity

100% test on manufacturing line.

Inter-instrument performance MCDP, XCDP, XCDS

- MCDP: Mean color difference to the population
- XDCP: Max color difference to the population
- XCDS: Max color difference to standard. Standard is defined as the MA91 centroid population transferred to the HEFI calibration line.

Sets of colors

- BCRA tile set or equivalent
- Metallic Panels
    - Metallic panels are the 3 metallic samples used on the MA98 calibration line

Limits

	Far from gloss, kL=1	**Near gloss, kL=2 on metallics**
	dE_{00} (45as45 / 45as75 / 45as110)	**dE_{00} (45as-15 / 45as15 / 45as25)**
MCDP (all BCRA tiles)	0.3 dE	0.3 dE
XCDP (grey BCRA tiles)	0.3 dE	0.3 dE
XCDP (all BCRA tiles)	0.5 dE	0.5 dE
XCDP (metallic tiles)	0.6 dE	0.6 dE
XCDS (all BCRA tiles)	0.6 dE	0.6 dE
XCDS (metallic tiles)	1.0 dE	1.0 dE

At 23°+-1°C and 40-60% relative humidity

Measurement time

- Measurement sequence < 4s

Data interfaces

- USB 2.0
- WLAN (IEEE 802.11 b/g/n). Display
- Color TFT LCD
- 3.5 inch diagonal.
- Resolution: QVGA (320 x 240 pixels)

Buttons

- Dedicated, ergonomically positioned, measurement button for operation either alone or with measurement contact confirmation aperture pins
- GUI navigation on capacitive touch screen

Battery and power supply

- User-replaceable Li-Ion rechargeable battery pack
- External AC-DC power supply with a voltage input range covering global needs
- The battery is charged within the instrument
- The power supply is plugged to the device with a dedicated power connector
- The instrument indicates if it is in charging state
- While the instrument is switched on, it shows battery status in %
- Battery capacity sufficient for about 1000 measurements

Memory size

Storage capacity for 100 car measurements (with 5 technical measurements per car (spectral + 6 images)).

Size and weight

- max. weight: 1500g
- Approx. size: H:128 mm; B: 95mm; L: 267mm

Environmental

Instrument needs to be robust for intended use in car body repair shop environment.

- Operating Temp: 50°F to 104°F (10°C to 40°C)
- Humidity Max: 85% RH max (non condensing)
- Storage Temp: -4°F to 122°F (-20°C to 50°C)
- Usage: Indoor Only
- Altitude: 2000m
- Pollution Degree: 2
- Transient Overvoltage: Category II

Design and specifications subject to change without notice.

Corporate Headquarters
X-Rite, Incorporated
4300 44th Street SE
Grand Rapids, Michigan 49512
Phone 1 800 248 9748 or 1 616 803 2100
Fax 1 800 292 4437 or 1 616 803 2705

European Headquarters
X-Rite Europe GmbH
Althardstrasse 70
8105 Regensdorf
Switzerland
Phone (+41) 44 842 24 00
Fax (+41) 44 842 22 22

Asia Pacific Headquarters
X-Rite Asia Pacific Limited
Suite 2801, 28th Floor, AXA Tower
Landmark East, 100 How Ming Street
Kwun Tong, Kowloon, Hong Kong
Phone (852)2568-6283
Fax (852)2885 8610

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