Measure what you see.

spectro2guide

Manual

A member of ALTANA

BYK

Table of Contents

1 Introduction

Dear customer,

thank you for having decided for a BYK-Gardner product. BYK-Gardner is committed to providing you with quality products and services. We offer complete system solutions to solve your problems in areas of color, appearance and physical properties. As the basis of our worldwide business, we strongly believe in total customer satisfaction. Therefore, in addition to our products, we offer VALUE-ADDED services:

- Technical Sales Force
- Technical & Application Support
- Application and Technical Seminars
- Repair & Certification Service

BYK-Gardner is part of the Altana Group and a direct subsidiary of BYK-Chemie, the worldwide leader of additives for coatings and plastics. Together we offer complete and unique solutions for you, our customer.

Thank you for your trust and confidence. If there is anything we can do better to serve your needs, do not hesitate to let us know.

Your BYK-Gardner Team

1.1 For Your Safety

⚠ CAUTION

Familiarization with Safety Instructions is necessary

Absence of knowledge of Safety Instructions threatens your health and can damage the instrument.

a) Read the Safety Instructions before you use the instrument the first time. The Safety Instructions are part of the delivery content. You find the Safety Instructions in the dedicated booklet enclosed to the instrument carrying case.

b) The Safety Instructions also includes information about disposal, liability and copyright.

⚠ CAUTION

Ergonomic hazard due to discomfort and fatigue

Discomfort and fatigue during usage of the instrument could lead to ergonomic hazards. For example is a drop-down of the instrument conceivable.

a) Take regularly breaks and use the instrument with the safety wrist strap.

⚠ WARNING

Eye damage caused by illumination LEDs.

Looking into the illumination LEDs during measurement could harm your eyes.

a) Do not look into the measurement aperture during measurement, even if you assume a fault with the instrument.

1.2 Disposal

Disused electrical equipment such as this instrument must be professionally disposed. Do not dispose it in household garbage and make sure to observe the national law in your country.

1.3 Exclusion of Liability

No liability other than as provided by law is assumed for direct or indirect damage sustained in association with the use of the instrument, the software or documentation.

BYK-Garnder GmbH precludes all liability claims if the usage described in chapter “Intended Use” is disregarded. Any other usage than described in “Intended use” is not according to the purpose of the instrument and leads to termination of liability claims.

See also: Intended Use

1.4 Copyright

Specific properties and structural characteristics of the instrument are intellectual property of BYK-Gardner GmbH. The copyright of this manual remains with BYK-Gardner GmbH. This manual must not be reproduced fully or in party, published or used for any other competitive purposes, no matter whether against payment or not, without prior written authorization from BYK-Gardner GmbH.

BYK-Gardner GmbH reserves the right to update the instrument, software and written documentation without prior notice.

1.5 Declarations

1.5.1 EU Declaration of Conformity

Hereby, BYK-Gardner GmbH declares, that this instrument complies with the requirements of the following EU directives:

- 2014/30/EU - Electromagnetic Compatibility
- 2014/35/EU - Low Voltage
- 2014/53/EU - RED (R&TTE) Directive

1.5.2 FCC Declaration (USA)

This equipment contains a radio module with FCC ID QPU8000.

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.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user ´s authority to operate the equipment.

NOTICE! To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of 20cm or more should be maintained between the an-

tenna of this device and persons during operation. To ensure compliance, operations at closer distances than this are not recommended.

1.5.3 IC Declaration (Canada)

This equipment contains a radio module with IC ID 4523A-SN8000.

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

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

(1) This device may not cause interference; and

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

NOTICE! To satisfy IC RF exposure requirements for mobile transmitting devices, a separation distance of 20cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operations at closer distances than this are not recommended.

1.5.4 Japanese Declaration

This equipment contains specified radio equipment that has been certified to the Technical Regulation Conformity Certification under the Japanese Radio Law.

MIC ID: R 006-000497

1.6 Intended Use

The instrument is designed to measure color on different surfaces. By placing the base plate of the unit onto a surface and pressing either the operate button on the side of the instrument or triggering the measurement on the display, the instrument measures the color and processes, displays and stores these values. The instrument can be connected via USB or WiFi to a computer in order to read or write data. A resistive display allows additional functionalities.

2 Delivery Content

The items listed below are contained in the packaging. Please contact BYK-Gardner if any item is missing or damaged:

1 Safety instructions and short instructions	4 Docking station
2 USB Type-C cable	5 Power supply
3 Instrument	6 External White calibration standard and green checking standard

3 Instrument Description

The spectro2guide is a portable spectrophotometer that measures color, gloss and fluorescence light. It is operated by the operate button and the touch screen display. The operate button is used to switch on the instrument and to trigger a measurement. On the touchscreen display you can select icons and functions directly.

This chapter gives an overview of the instrument parts and their functions.

3.1 Names and Functions of Parts

1 LED:

Measure:

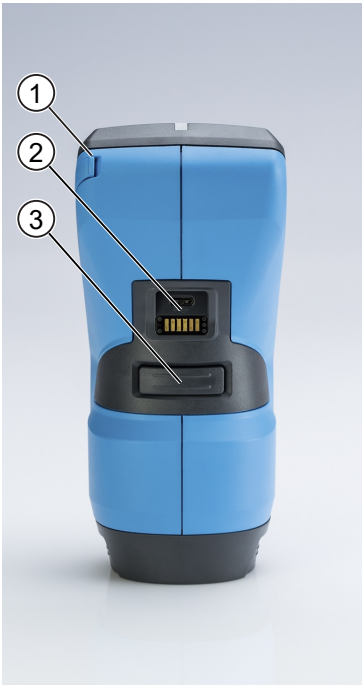
- Light up in green during measurement.
- Light up in blue if the sample is fluorescent.
- Light up in pink if color change due to fluorescence is bigger than 1/3 of the tolerance (default value, can be changed in smart-chart Software).
- Blink red in case of a measurement error.

Charge:

- Pulsates in red, yellow, and green during charging.
- Light up in green when the instrument is fully charged.

2 Touch screen display:

Touch the icons on the screen with your finger or the stylus in order to operate the instrument.



1 Stylus (inserted in instrument):

Can be used for touching the icons on the screen.

2 USB-Type-C plug:

– Transfer data between instrument and computer.

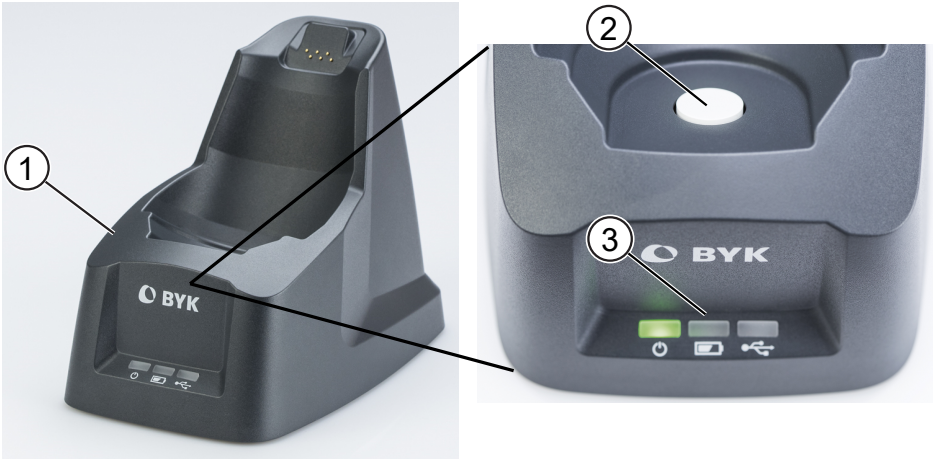
3 Operate button:

Press halfway:

A camera is switched on that shows the surface to be measured on the display.

Press completely:

– Turns the instrument on.
– Executes a measurement.



1 Docking station:
- Charges the instrument.
- Connects instrument and computer.

2 White standard:

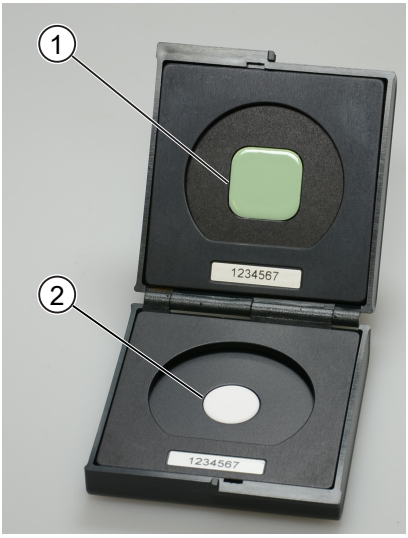
Calibrates the instrument automatically.

3 Docking station LEDs:

From left to right:

1. Shows that the docking station is power supplied.
2. Shows that the instrument is charged.
3. Shows an active connection to a computer.

1 Instrument inserted in docking station



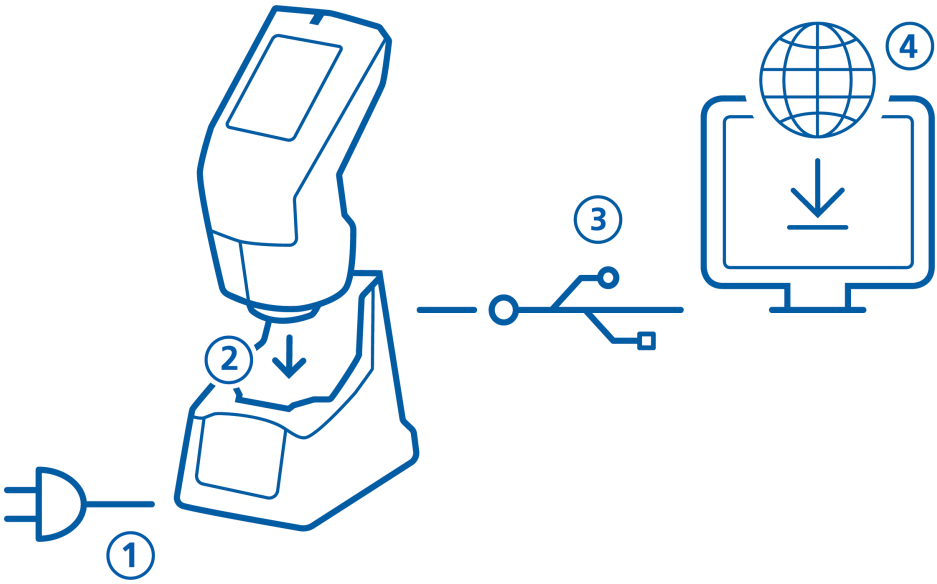
1 Green checking standard 2 White calibration standard

4 Getting Started

Please observe following notes when you put the instrument into operation.

- Assemble the entire system, consisting of instrument, docking station and software. Consult System Diagram [▷ Page: 16] for more information.
- Place the instrument in the docking station and allow it to charge fully. The docking station automatically **loads** and **calibrates** the instrument. Consult Docking Station [▷ Page: 16] and Charging the Instrument [▷ Page: 18] for more information.
- Press the operate button in order to turn the instrument on.
- Become familiar with the main menu for a quick navigation. Consult Main Menu [▷ Page: 19] for more information.
- Press the displayed icons on the touch screen with your finger or the stylus in order to navigate through the menu and perform functions.
- Use the hand strap as protection against dropping the instrument.
- Use the smart-chart software to tap the full potential of the instrument. Consult smart-chart Software [▷ Page: 17] for more information.

4.1 System Diagram



4.2 Docking Station

The docking station is used to store the instrument when it is not in use.

Functions

The docking station charges the instrument and automatically performs auto diagnosis and calibration after positioning. This ensures that the instrument is always ready for operation.

4.2.1 Put the Docking Station into Operation

a) Connect the docking station with the charger to the power supply grid.

b) Connect the docking station via USB cable to the computer that is meant to run the smart-chart software. For more information about smart-chart, consult smart-chart Software [▷ Page: 17].

⇨ The power LED lights up in green.

⇨ The docking station is ready to use.

4.3 smart-chart Software

smart-chart is a modern and intuitive software to document, analyze and optimize your color, gloss and fluorescence data.

It is available in two different software packages: smart-lab Color and smart-process Color. After software download both software packages can be used for 30 days free trail. Thereafter, you need to register either for one of the two software packages. The standard delivery includes two licenses for the selected software package.

Software for download: www.byk.com/spectro2guide

4.3.1 Install smart-chart Software

a) Download the zip-file from http://www.byk.com/spectro2guide. Therefore, save it on your hard drive into a new folder.

b) Extract the complete archive.

c) In the extracted folder, right mouse click on the file “install.exe”.

d) Select “Run as administrator”.

e) Follow the setup instructions on the screen.

4.4 Charging the Instrument

The instrument provides two ways for charging.

4.4.1 Charge via docking station

✓ The docking station is power supplied.

a) Put the instrument into the docking station.

⇨ The charge LED pulsates red as long as the battery charge is < 15%.

⇨ The charge LED pulsates yellow as long as the battery charge is < 50%.

⇨ The charge LED pulsates green as long as the battery charge is < 90%.

⇨ The charge LED lights up in green when the battery charge is ≥ 90%.

b) Keep the instrument in the docking station as long as the instrument is not in use.

⇨ The instrument is fully charged and can be put in operation.

4.4.2 Charge via USB cable

a) Connect the instrument with the USB cable to a power supply.

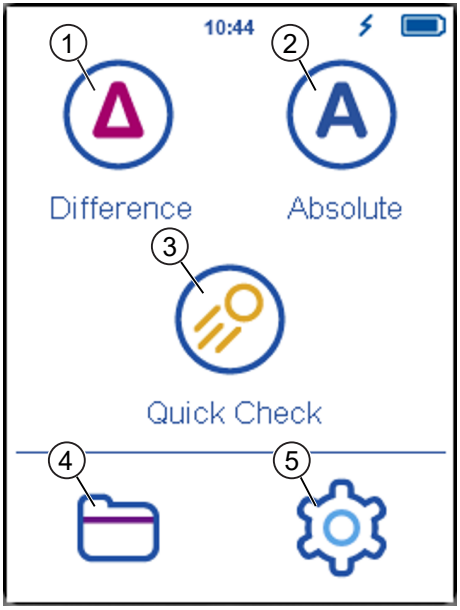
⇨ The instrument loading bar on the display shows the battery charge.

b) Disconnect the instrument from the USB cable when it is fully charged.

⇨ The instrument is fully charged and can be put in operation.

4.5 Main Menu

The screen below shows the icons that are displayed by default.



1	**Difference** Compare standard and sample. Results are saved automatically..	4	**Browse** View and delete measurement data.
2	**Absolute** Take absolute measurements. Results are saved automatically.	5	**Configuration** Change measurement parameters or instrument settings.
3	**Quick Check** Compare standard and sample without saving.		

Display of two additional icons

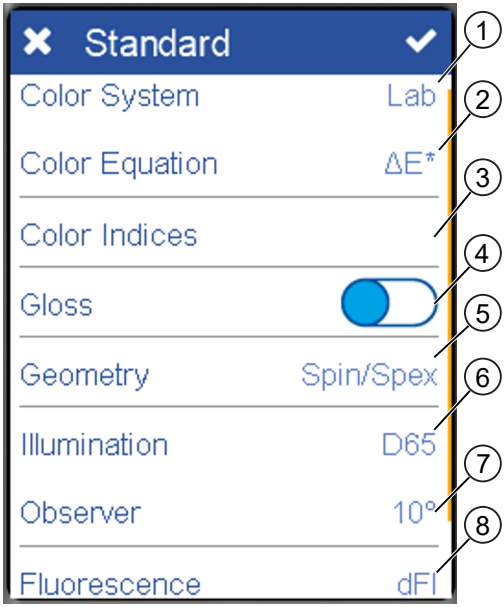
Two more icons will be displayed depending on whether you have activated opacity or downloaded an organizer from smart-chart:

- Opacity  : activatable under **Configuration > Measurement Parameters > Color Indices**.
- Organizer  : Consult Organizer [▶ Page: 31] for more information.

4.6 Define Measurement Parameters

a) Go to **Configuration > Measurement Parameters.**

⇨ The screen below is displayed.



1 **Color System:** Select color system. Default is CIE L*a*b*.	5 **Geometry:** Select SPIN/SPEX mode. Default is SPIN. Mode only available for geometry d:8° (Cat.No. 7070)
2 **Color Equation:** Select color equation. Default is ΔE*.	6 **Illumination:** Select standard illuminant. Default is D65.
3 **Color Indices** Select color indices.	7 **Observer:** Select standard observer. Default is 10°.
4 **Gloss** Turn Gloss on or off.	8 **Fluorescence:** Turn fluorescence indices on or off.

b) Click on the parameter you want to set.

⇨ A respective list with selectable parameters appears.

c) Choose the required parameter and confirm by clicking on the checkmark in the upper right corner.

d) Repeat steps b and c until you set all desired parameters.

e) Confirm by clicking on the checkmark in the upper right corner.

⇨ Measurement parameters are set.

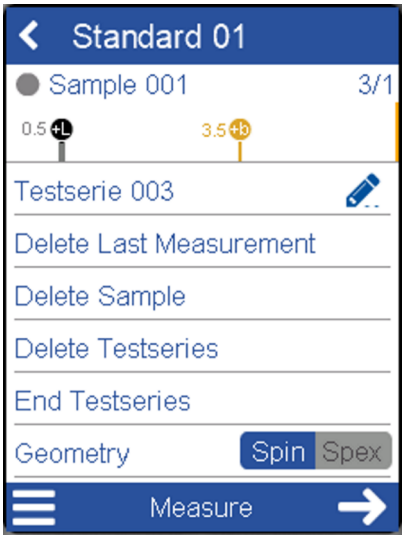
5 Measure

The instrument provides various types of measurement functions:

- Difference measurement : Compare standard and sample. Results are saved automatically.
- Quick check : Compare standard and sample without saving.
- Absolute measurement : Take absolute measurements. Results are saved automatically.
- Opacity measurement : Measures opacity. Measurement values are stored.
  In order to display the measurement icon in the main menu, opacity has to be set in the color indices. See: Define Measurement Parameters [Page: 21]

Context Menu

The context menu provides the commands “Testserie”, “Delete Last Measurement”, “Delete Sample”, “Delete Testseries”, “End Testseries” and “Geometry”. It is accessed via the hamburger menu icon as you see below.



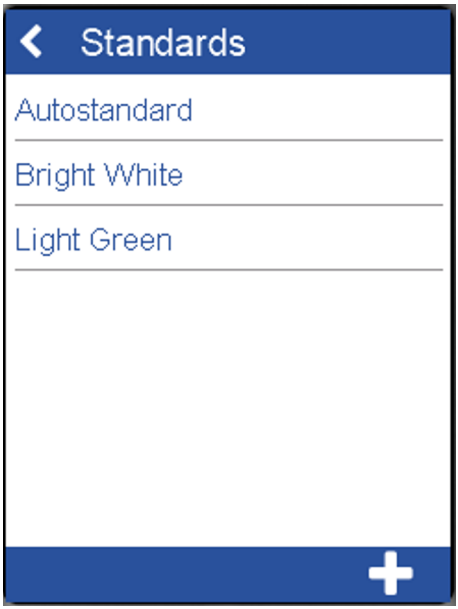
5.1 Perform Standard Measurement

✓ Measurement parameters are set. See: Define Measurement Parameters [▷ Page: 21]

✓ The reference surface is present.

a) Click on icon **"Difference"**: Δ

⇨ The screen below is displyayed.



b) Select existing standard from list or add a new standard.

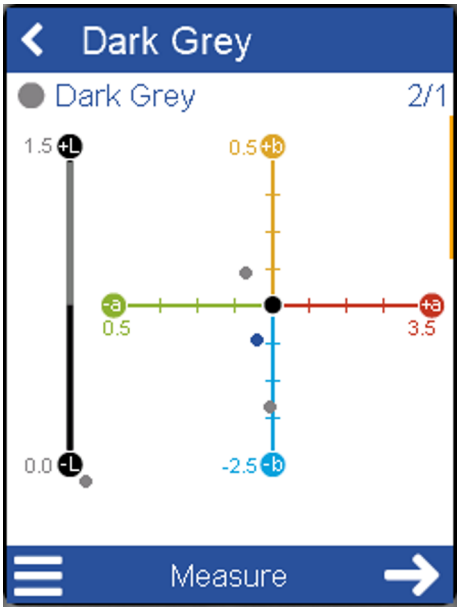
c) To add a new standard click on +.

⇨ A new standard is created.

⇨ A input window for the standard name appears.

d) Accept the default name or enter a desired name and click on the checkmark in the upper right corner.

⇨ The screen below is displayed. The instrument is ready to measure the standard.



e) Place instrument on standard.

f) Click on "**Measure**" or press operate button.

⇨ Standard is measured and automatically saved.

5.2 Perform Difference Measurement

✓ At least one standard is existing.

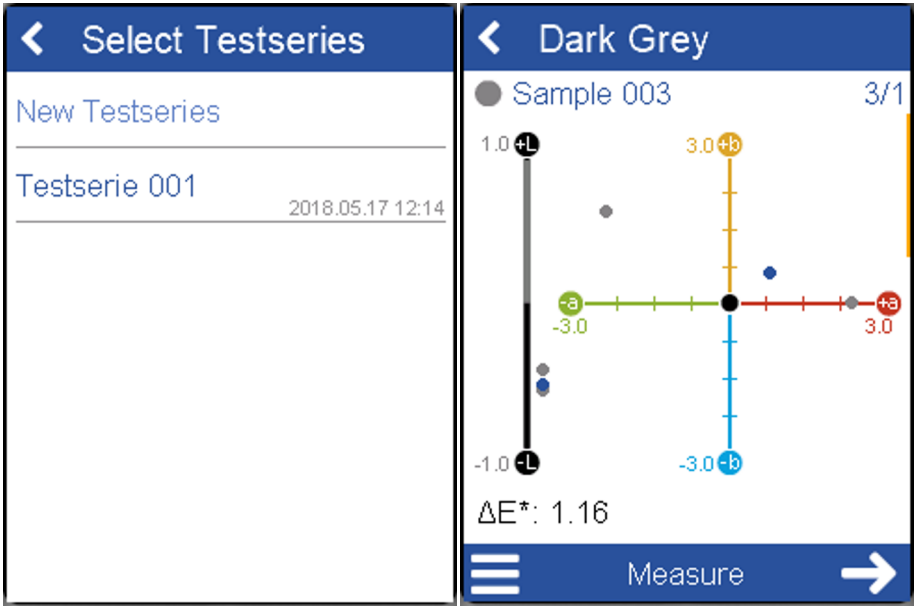
a) Click on icon “**Difference**“: Δ.

⇨ A list with standards appears.

b) To continue existing Testserie select it from list or add new.

c) To add a new Testserie click on "New Testseries".

⇨ The screen below is displayed.



d) Place instrument on sample.

e) Click on “**Measure**” or press operate button.

⇨ Sample is measured and automatically saved. Scroll down to see data table and statistics.

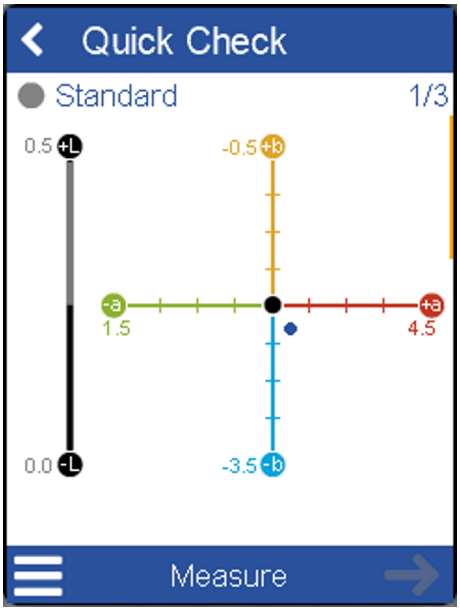
5.3 Perform Quick Check

✓ Measurement parameters are set. See: Define Measurement Parameters [▸ Page: 21]

✓ The reference surface is present.

a) Click on icon “Quick Check“: .

⇨ The screen below is displayed. The instrument is ready to measure the standard for the quick check.

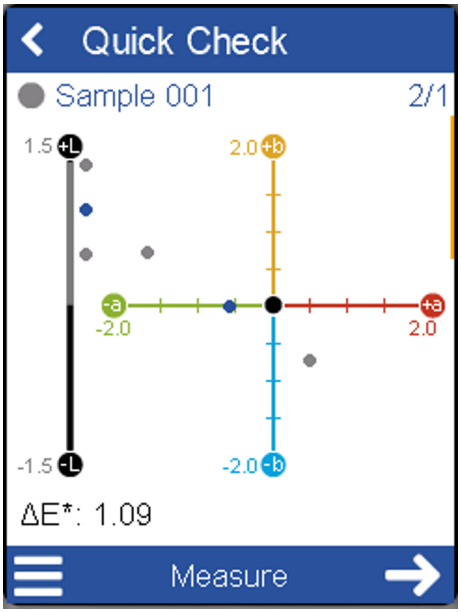


b) Place instrument on standard.

c) Click on “Measure” or press operate button.

⇨ Standard is measured.

d) Continue with “Next” and place instrument on sample.



e) Click on Measure“ or press operate button.

⇨ Sample is measured.

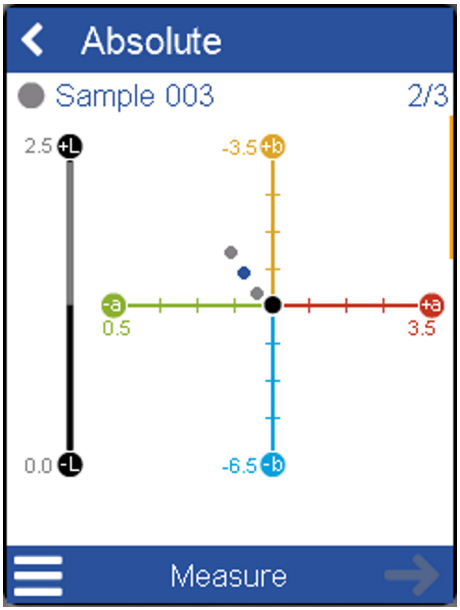
⇨ NOTE: Measurements are not saved!

5.4 Perform Absolute Measurement

✓ Measurement parameters are set. See: Define Measurement Parameters [▸ Page: 21]

a) Click on icon “Absolute“: Ⓐ.

⇨ The screen below is displayed.



b) Place instrument on sample.

c) Click on “Measure” or press operate button.

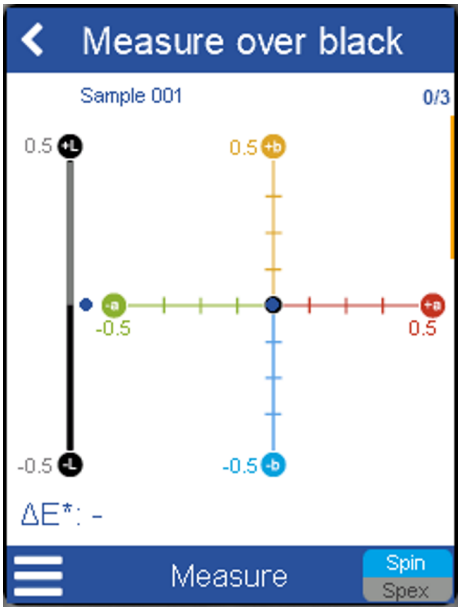
⇨ Sample is measured and automatically saved.

5.5 Perform Opacity Measurement

✓ Opacity is set in the color indices. See: Define Measurement Parameters [▷ Page: 21]

a) Click on icon "Opacity": .

⇨ The screen below is displayed.

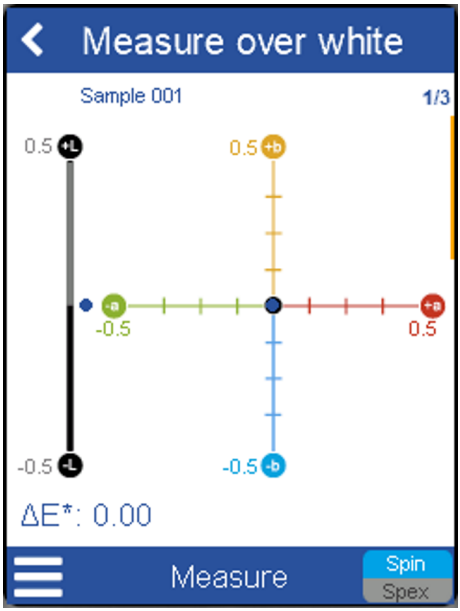


b) Place instrument on the black surface.

c) Click on Measure" or press operate button.

⇨ Standard is measured and automatically saved..

⇨ The screen below is displayed.



d) Place instrument on the white surface.

e) Click on Measure" or press operate button.

⇨ Sample is measured and automatically saved.

5.6 Organizer

Organize the Measurement Process

It is possible to predefine measurement sequences with the software smart-process – the so called organizer. The organizer icon appears after downloading a organizer from smart-process to the instrument.

6 Browse: View and Delete Measurements

Instrument Memory

Measurement values are stored in the instrument memory. The instrument memory is accessible via the browse icon in the main menu.

6.1 View Measurement Values

✓ At least one measurement is stored.

a) Click on icon "Browse": .

⇨ A list with all types of measurements appears.

b) Click on the desired measurement type.

⇨ A list with all dedicated measurement appears.

c) Click on the desired measurement.

⇨ Measurement values are viewed.

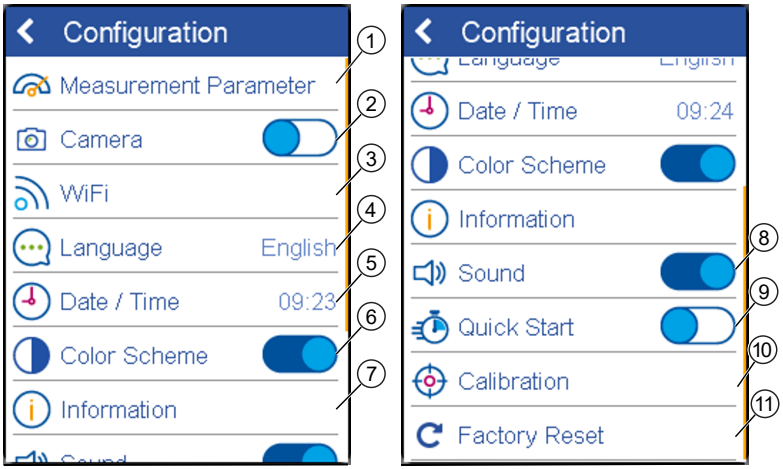
6.2 Delete Measurement Values

Use the smart-chart software in order to delete stored measurement values.

7 Configuration

The configuration menu is accessible via the configuration icon in the main menu. You can change settings or get instrument information here.

The screens below shows the configuration menu. You can use the yellow scroll bar in order to browse the list.



1 **Measurement Parameters**

Set measurement parameters here. Consult Define Measurement Parameters [▷ Page: 21] for more information.

2 **Camera**

The instrument is able to show the surface to be measured on the display when the operate button is pressed the halfway.

You can switch this function on/off here.

3 **WiFi**

Connect instrument with a WiFi network. Consult Connect with WiFi [▷ Page: 35] for more information.

4 **Language**

Select instrument language here.

5 **Date / Time**

Set date and time here.

6 **Color Scheme**

Adjust screen brightness to day and night conditions here.

7 **Information**

Get instrument and network information here.

8 **Sound**

Switch instrument sound on/off here.

9 **Quick Start**

Switch startup animation on/off here.

10 **Calibration**

Calibrate instrument manually. Consult Calibrate Manually [▷ Page: 35] for more information.

11 **Factory Reset**

Reset instrument to factory settings here.

7.1 Calibrate Manually

The docking station automatically calibrate the instrument. In some cases you want to calibrate the instrument manually.

✓ The white standard is present.

a) Go to **Configuration > Calibrate > Calibrate White Standard**.

⇨ The instrument gives you instructions and automatically guides you through the calibration.

b) Follow the instructions of the instrument.

7.2 Connect with WiFi

✓ A WiFi connection needs to be available.

a) Go to **Configuration > WiFi**.

b) Click on the switch symbol in the upper right corner in order to turn on WiFi.

⇨ A list with all available WiFi connections appears.

c) Use the yellow scroll bar in order to browse the list. Select the desired connection by clicking on the arrow behind the name.

⇨ The WiFi access key is queried.

d) Enter the WiFi key and click on the checkmark in the upper right corner.

e) You can cancel by clicking on the “x” in the upper left corner.

⇨ The instrument is connected with WiFi.

8 Troubleshooting

Problem/Error message	Solution
Error! White calibration in docking station.	a) Use external white calibration standard and repeat calibration. ⇨ If white calibration is okay, please clean white calibration standard of docking station. ⇨ If calibration fails again, contact service.
Error! Please clean White Tile or call customer service.	a) Clean white tile and repeat white calibration. ⇨ If white calibration fails again, contact service.
Calibration invalid. Please perform calibration.	a) Perform Calibration using the docking station or the external white calibration standard.
Measurement failed! Please repeat. Ambient light	Appears if an error occurs during measurement. ✓ Make sure to completely cover measurement aperture. ✓ Make sure to hold the instrument stable during measurement. a) Repeat measurement.
Battery empty. Instrument is switching off...	a) Charge the instrument using the docking station.
Battery empty.	a) Charge the instrument using the docking station.
Instrument temperature too high!	Instrument temperature is > 45°C a) Allow the instrument to cool down.

Problem/Error message	Solution
Instrument temperature too low!	Instrument temperature is < 5°C a) Allow the instrument to warm up.
Memory full! Please delete stored measurements.	a) Delete stored measurements.
Light protection ring is broken or fell off	a) Contact service.
Error! White Calibration on external white calibration standard.	a) Use docking station and repeat calibration b) If white calibration is okay, clean external white calibration standard. c) If calibration fails again, contact service.
Instrument is not charging in docking station.	✓ Make sure power supply is connected. ✓ Make sure instrument is positioned correctly. a) If instrument is still not charging, contact service.
Instrument is not charging via USB connection.	✓ Make sure USB power supply provides a minimum of 500 mA (1500 mA recommended). a) If instrument is still not charging, use docking station.

Problem/Error message	Solution
No WiFi connection.	✓ Make sure WiFi connection is available. a) Activate WiFi function. b) ✓ Make sure the instrument is within the WiFi range. a) Reduce distance to the router. b) Increase range of the router. c) WiFi settings not adjusted correctly. a) Re-Enter password.
No connection between instrument and software	✓ Make sure instrument is connected. a) Connect instrument via USB or WiFi.
No data transfer to software	Instrument within a measurement. a) Switch to home screen.

9 Technical Data

General

Memory	5000 Standards and samples
Languages	English, German, French, Italian, Spanish, Russian, Japanese, Chinese
Dimensions (LxWxH)	87 x 110 x 188 mm (3.4 x 4.3 x 7.4 in)
Operation altitude	up to 2000 m / 6561 ft
Weight	707 g (d/8), 690 g (45/0)
Interface	USB-C (device), USB-B (docking station)
Battery	7.2 V, 2350 mAh, 16.92 Wh
Device	Input 12 V, max. 2 A (Docking) 5 V, max. 2 A (USB-C)
Docking station	Input 12 V, max. 2 A (Power supply) Input 5 V, max. 0.5 A (USB-B) Output 12 V, max. 2 A
Power supply	Input 100-240 V, 50-60 Hz, max. 1 A Output 12 V, max. 3 A

Gloss

Aperture Size	5 x 10 mm	
Measurement Range	0-10 GU	10-100GU
Repeatability	± 0.1 GU	± 0.2 GU
Reproducibility	± 0.5 GU	± 1.0 GU

Color

Aperture Size	12 mm / 8 mm
Spectral Range Color	400 - 700 nm, 10 nm resolution
Spectral Range Fluorescence	340 - 760, 10 nm resolution
Repeatability	0.01 DE* (10 consecutive measurements on white)
Reproducibility	0.1 DE* (average on 12 BCRA II tiles)
Color Systems	CIELab/Ch; Lab(h), XYZ, Yxy
Color Differences	DE*, DE(h), DEFMC2, DE94, DECMC, DE99, DE2000
Indices	YIE313; YID 1925; WIE 313; CIE; Berger; Color Strength; Opacity; Metamerism; Grayscale; Jetness
Illuminants	A; C; D50; D55; D65; D75; F2; F6; F7; F8; F10; F11; UL30
Observer	2°; 10°

WLAN RF Specifications

Frequency Range		2400MHz – 2483.5MHz	
IEEE Standards	802.11b	802.11g	802.11n
Modulation	DSSS/CCK	OFDM	OFDM
Transfer Rate	max. 11Mbps	max. 54Mbps	max. 65Mbps
Max Output	19.0 dBm	16.5 dBm	15.5 dBm

WLAN Antenna

Max. Gain	2 dBi

10 Service and Maintenance

General Information

NOTICE

Damage by inserting of objects

Inserting any objects into the measurement aperture could damage the instrument.

a) Do not insert any objects into the measurement aperture.

NOTICE

Damage by using acetone for cleaning

Instrument housing, white and green standard tile can be damaged when they get in contact with acetone.

a) Do not use acetone for cleaning.

NOTICE

Damage by the attempt of self-repair

The instrument can be damaged.

Warranty claims expire.

a) Do not attempt to make any repairs yourself.

b) Contact our customer service in case of malfunction.

When the Instrument is not in Use

Align the protective snap closure when the instrument is not in use. Use the instrument case for storage.

Cleaning the Instrument

Use a soft, moist cloth for cleaning. For cleaning excessive dirt, use propanol.

Cleaning the Standard Tiles

Using dirty or damaged standard tiles can impact the accuracy of measurements significantly. Clean the standard tiles when they are dirty in order to avoid measuring inaccuracy.

NOTICE! Apply only slight pressure as you clean and make certain there are no large particles stuck in the cloth that could damage the surface. We highly recommend to handle the standard tiles with great care. Store them always enclosed.

Use a new lint-free cloth, dust-free lens paper or an optical cloth for cleaning. For dirt that is difficult to remove, use an optical cloth dipped in propanol. Then wipe the surface with a dry optical cloth.

Calibration and Repair Service

Our Service Offer

BYK-Gardner´s global network of own ISO/IEC 17025 accredited service points is equipped with the full line of reference measuring standards and tools needed to ensure highest quality service on a global basis:

- Preventive Maintenance for a longer life
- Certification Services for Standards and Physical Testing Tools
- Repair Service
- On-site Service

Read the BYK-Gardner Global Service Brochure for more information.

You find the brochure on the BYK-Gardner website:
http://www.byk.com/en/support/instruments/repair-service.html

Preventive Maintenance

To increase the reliability and life time of your instrument, regular inspections and optimizations are recommended. With our Preventive Maintenance solution your instrument will always be in the best shape. We clean the optics, check all functions, test and, if required, adjust the measured values by using reference standards.

Preventive maintenance is recommended every 12 - 24 months depending on usage and should only be performed by BYK-Gardner technical service centers. The complete list of certified service centers can be found on: www.byk.com.

Contact Addresses

BYK-Gardner GmbH	
Lausitzer Straße 8	
82538 Geretsried	
Germany	
Tel.:	0-800-gardner
	(0-800-4273637)
	+49-8171-3493-0
Fax:	+49-8171-3493-140

BYK-Gardner USA	
9104 Guilford Road	
Columbia, MD 21046	
USA	
Phone:	800-343-7721
	301-483-6500
Fax:	800-394-8215
	301-483-6555

295 024 855 E 1805