Measure what you see

spectro2guide Family

Operating Instructions

A member of ALTANA

BYK

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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, 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

www.byk-instruments.com

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. 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.

The safety instructions also include 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 a drop-down of the instrument is conceivable.

Always use the instrument with the safety wrist strap and take regularly breaks during your work with instrument.

⚠ WARNING

Eye damage caused by illumination LEDs

Looking into the illumination LEDs during measurement could harm your eyes. Do not look into the measurement aperture when the instrument is turned on - even if you assume a fault with the instrument.

1.2 Disposal

Disused electrical equipment such as this instrument or its batteries and / or battery packs must be professionally disposed.

Do not dispose it in household garbage and make sure to observe the national law in your country.

1.3 Disclaimer

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-Gardner precludes all liability claims if the usage described in “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 [▶ 10]

1.4 Copyright

Specific properties and structural characteristics of the instrument are intellectual property of BYK-Gardner. The copyright of this manual remains with BYK-Gardner.

This document 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.

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

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1.5 Declarations

1.5.1 Declaration of Conformity (EU)

We,

BYK-Gardner GmbH

Lausitzer Strasse 8

D-82538 Geretsried

declare, 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 - Radio Equipment Directive (RED)

The following harmonized standards were applied:

- EN 61010-1:2010
- EN 61326-1:2013

Geretsried, November 13, 2019

Frank R. Wagner

Managing Director

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.
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.

RF exposure statement (portable devices)

This device complies with the RF exposure SAR test exclusion requirements for portable devices, if a minimum separation distance (2 cm) to the antenna is kept. If the device is used and held correctly, the distance to the antenna will be maintained and the risk of human contact during normal operation is minimized.

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.

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

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, gloss and fluorescence on different surfaces. Via the integrated camera the current spot on the surface can be viewed on the display – allowing exact positioning.

By placing the base plate of the unit onto a surface and pressing either the **Operate** button on the rear side of the instrument or triggering the measurement on the display, the instrument measures the surface and processes, displays and stores the measured 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 System Description

The **spectro2guide** is a portable spectrophotometer which is operated by the touch screen display and the **Operate** button. The button is used to switch on the instrument and to trigger a measurement. On the touch-screen display you can select icons and functions directly.

2.1 Delivery Content

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

2.1.1 Delivery of spectro2guide

1	System documentation	5	Hand strap, power supply cable and USB cable type B/A to connect docking station with PC
2	USB online cable type C/A for direct data transfer	6	Docking station
3	Power supply	7	External black high gloss and green standard for testing
4	Instrument with protective cap	8	External white standard for calibration

For more details on the spectro2guide refer to our website:

- https://www.byk-instruments.com/c/p-32824

2.1.2 Delivery of spectro2go

1	System documentation	4	Power supply with adapters type A/C/G/I
2	Hand strap and USB online cable type C/A for direct data transfer	5	External black high gloss and green standard for testing
3	Instrument with protective cap	6	External white standard for calibration

NOTICE

The docking station in the **spectro2guide** delivery can be purchased as an accessory for the **spectro2go**. All sections about docking station within this documentation are valid for **spectro2guide** and **spectro2go** with docking station.

For more details on the spectro2go refer to our website:

- https://www.byk-instruments.com/c/p-343

2.2 Names and Functions of Parts

2.2.1 Frontside

1 LED:

Measure:

- Lights up in green during measurement.
- Lights up in blue if the sample is fluorescent.
- Lights up in pink if color change due to fluorescence is bigger than 1/3 of the tolerance This is default value, it can be changed in the software “smart-chart”.
- Blinks red in case of a measurement error.

NOTE:

The indication of fluorescence is not available for the spectro2go.

Charge:

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

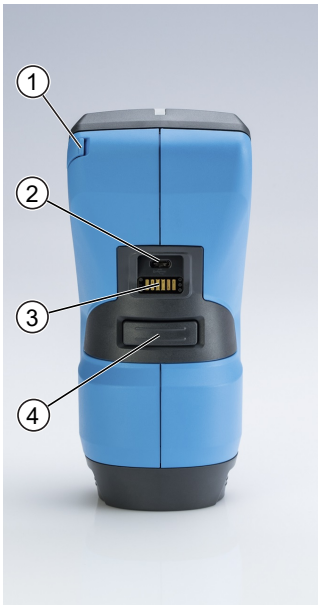
2 Touch screen display:

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

3 Protective cap:

- Remove before putting into docking station or performing measurements.
- Attach when instrument is not used or placed in the transportation case.

2.2.2 Rearside



1 Stylus (inserted in instrument):
- Can be used for touching the icons on the screen.

2 USB type C plug:
- Charging: Connect to power supply in order to charge the instrument.
- Data transfer: Connect to PC in order to transfer data between instrument and software “smart-chart”.

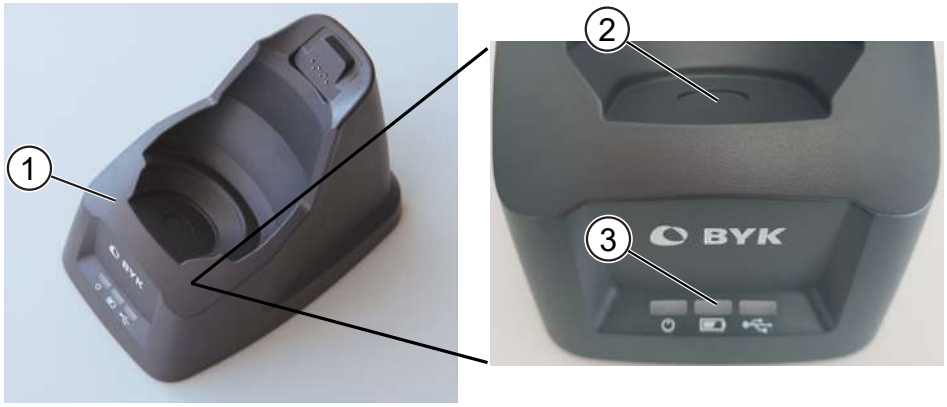
3 Contact plates:
- Used for charging and data connection with docking station.
- Always keep the electrical contacts clean and dry.

4 Button **Operate**:

Press halfway:
- A camera is switched on that shows the surface to be measured on the display.

Press completely:
- Instrument is switched off: Turns the instrument on.
- Instrument is switched on: Executes a measurement.

2.2.3 Docking Station



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

2 White test standard:
- Used to perform auto diagnosis of instrument.

3 Docking station LEDs - from left to right:
- Power: Indicates that docking station is power supplied.
- Battery: Indicates that instrument is charged.
- USB: Indicates an active data connection to a computer.

2.2.4 Instrument in Docking Station

1 Instrument inserted in docking station

2.2.5 Test and Calibration Standards

1	Black high gloss test standard	3	White calibration standard
2	Green test standard		

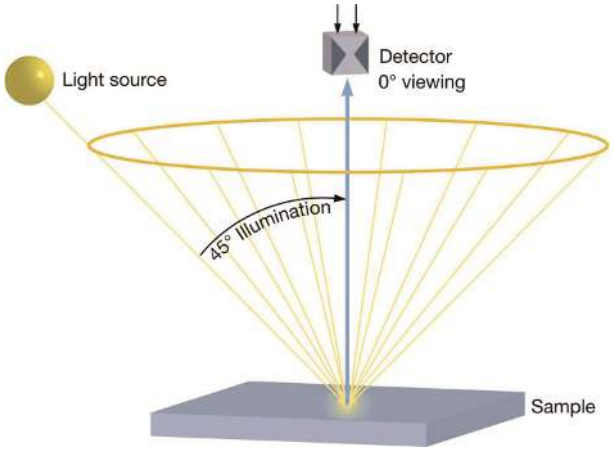
Consult Instrument Calibration [▸ 54] for details on usage.

2.3 Measurement Principle

The instrument is available with two different measurement geometries.

2.3.1 45°c:0° Geometry

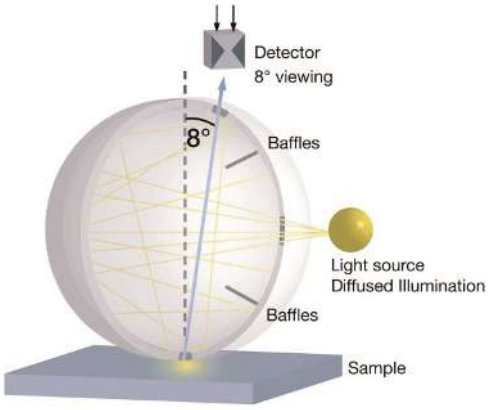
The 45°c:0° geometry uses 45° circumferential illumination and 0° viewing perpendicular to the sample plane. The circumferential illumination is essential to achieve repeatable measurement results on directional and structured surfaces



The 45/0 geometry simulates the normal condition used for color evaluation. For example, when we read a glossy magazine we position it to avoid the gloss from coming into our eye. A high gloss sample with the same pigmentation is visually judged darker by the eye when compared to a matte or structured sample.

2.3.2 D:8° Geometry

A sphere geometry illuminates the sample diffusely by means of a white coated integration sphere. Baffles prevent the light from directly illuminating the sample surface. Measurement is done using an 8° view angle.

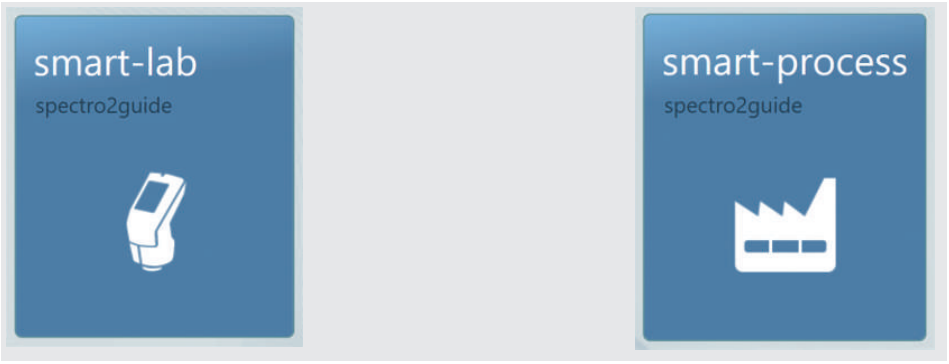


A sphere instrument may be operated under two different measurement conditions: **specular included (spin)** or **specular excluded (spex)**. In the “spin” mode, the total reflected light is measured. In the “spex” mode, a gloss trap is used to capture the directly reflected light (gloss). Color is measured independent of the sample’s gloss or surface texture

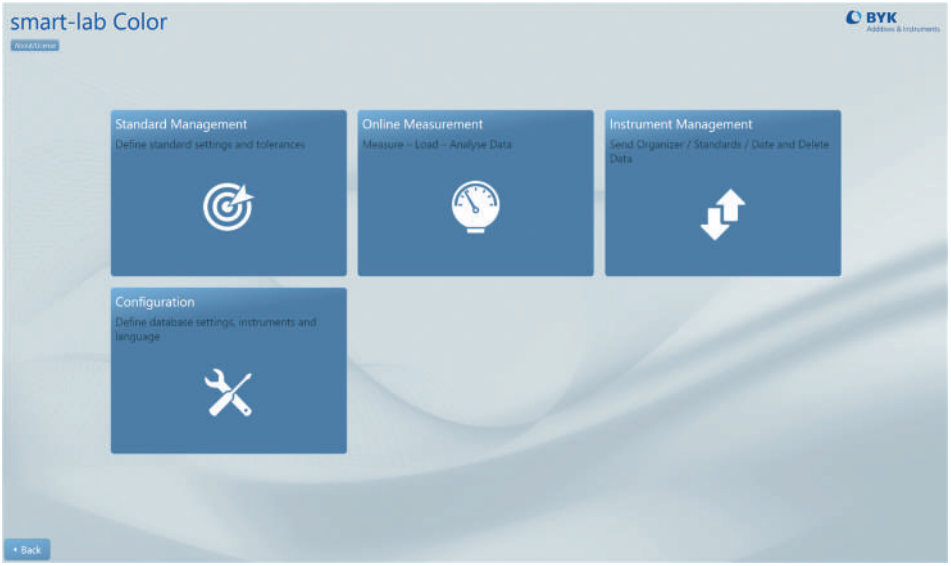
2.4 Software Installation

The software “smart-chart” is a modern and intuitive program 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”.

- Download the ZIP file from: https://www.byk-instruments.com/spectro2guide
- Save it on your hard drive into a new folder.
- Extract the complete archive.
- In the extracted folder, right mouse click on the file **install.exe**.
- Select **Run as administrator**.
- Follow the setup instructions on the screen.



After software download both software packages can be used for 30 days free trial. Thereafter, you need to register either for one of the two software packages. The standard delivery includes two licenses for the selected software package.



3 Getting Started

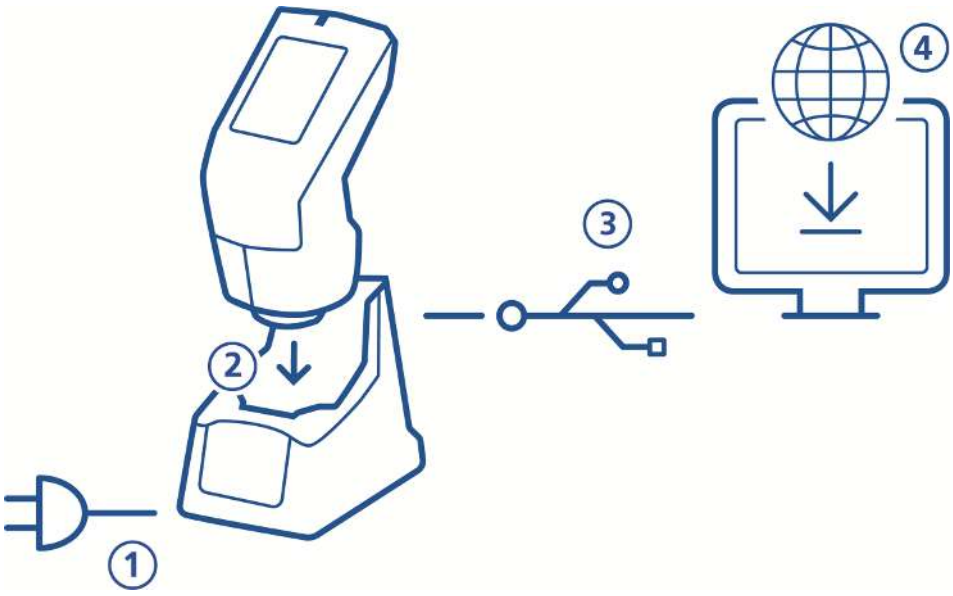
Please observe following notes when you put the instrument into operation.

- Assemble the entire system, consisting of instrument, docking station (option) and software. Consult System Diagram [▶ 19] for more information.
- Place the instrument in the docking station and allow it to charge fully. The docking station automatically **charges** the instrument and performs auto diagnosis. Consult Docking Station [▶ 20] and Charging Procedures [▶ 21] 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 Using the Main Menu [▶ 22] 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 software “smart-chart” to tap the full potential of the instrument. Consult Software Installation [▶ 18] for more information.

3.1 System Diagram

3.1.1 System Setup for spectro2guide

The entire system consists of instrument, docking station with power supply and software.



Connect docking station with power supply **(1)**.

Place instrument in docking station **(2)**.

Docking station automatically charges the instrument and performs auto diagnosis.

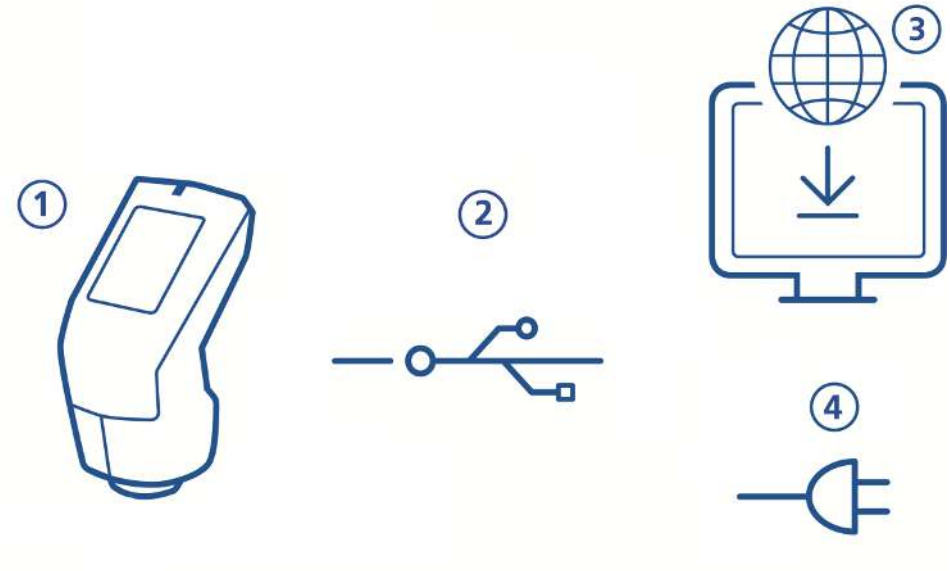
Connect docking station with PC via USB cable **(3)**.

Download and install “smart-chart” software **(4)**.

Turn instrument on by pressing the **Operate** button.

3.1.2 System Setup for spectro2go

The entire system consists of instrument, power supply and software.



Connect instrument **(1)** via USB cable **(2)** with PC.

Download and install “smart-chart” software **(3)**.

Turn instrument on by pressing the **Operate** button.

If instrument is to be charged, disconnect USB cable from PC.

Connect instrument **(1)** via USB cable **(2)** with power supply **(4)**.

3.2 Docking Station

The docking station is used to store the instrument when it is not in use. It charges the instrument and automatically performs auto diagnosis after positioning. This ensures that the instrument is always ready for operation.

Default interval for auto diagnosis is 7 days - this can be adapted via the system settings, see Instrument Calibration [▶ 54].

To put the docking station into operation:

- Connect the docking station with the charger to the power supply grid.
- Connect the docking station via USB cable to the computer that is meant to run the software “smart-chart”, see Software Installation [▶ 18].
- The power LED lights up in green and the docking station is ready to use.

NOTE:

If you buy a docking station as an accessory for the spectro2go, you can add it via the configuration menu, see Instrument Calibration [▶ 54].

3.3 Charging Procedures

The instrument provides two ways for charging.

3.3.1 Charge via Docking Station

Check that the docking station is power supplied and put the instrument into the docking station. The charge LED indicates the following states:

- Pulsates red as long as the battery charge is < 15%.
- Pulsates yellow as long as the battery charge is < 50%.
- Pulsates green as long as the battery charge is < 90%.
- Lights up in green when the battery charge is ≥ 90%.

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

3.3.2 Charge via Power Supply

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

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

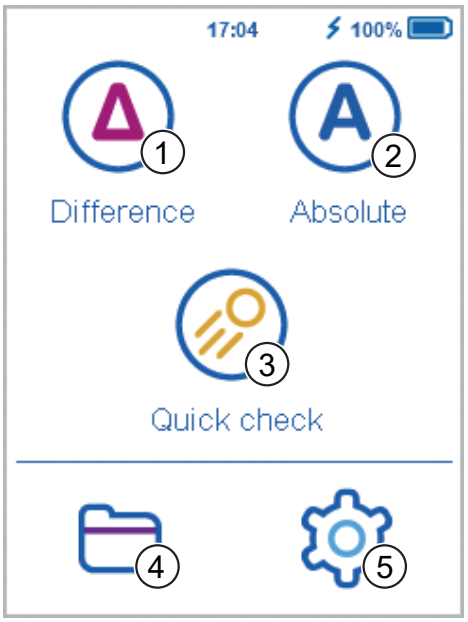
Disconnect the instrument from the power supply when it is fully charged.

NOTE:

If you have both docking station and power supply the docking station is the preferred option for charging. It provides more power to the instrument – the charging is faster.

3.4 Using the Main Menu

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



1	**Difference** Compare standard and sample. Results are saved automatically. Details see Difference Measurement [▶ 26].	2	**Absolute** Take absolute measurements without compare. Results are saved automatically. Details see Absolute Measurement [▶ 32].
3	**Quick Check** Perform quick evaluations without saving. Details see Perform Quick Check [▶ 33].	4	**Browse** View and delete measurement data. Details see Browse Measurements [▶ 37].
5	**Configuration** Change measurement parameters or instrument settings and calibrate instrument. Details see System Configuration [▶ 41].		

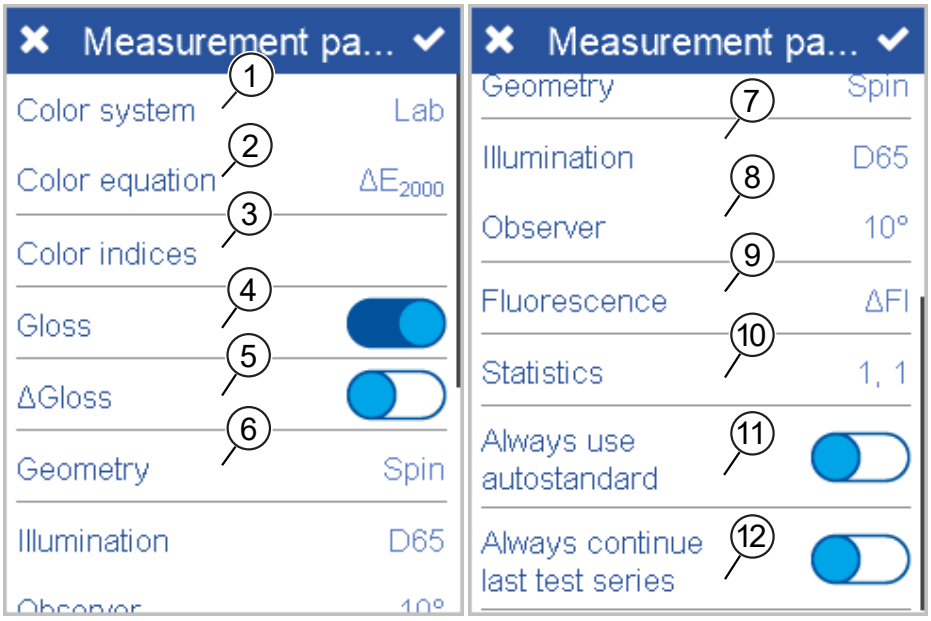
Additional Icons

Two more icons can be displayed - depending on whether you have activated **Opacity** or downloaded an **Organizer** from “smart-chart”.

	Opacity: Activate under **Configuration > Measurement Parameters > Color Indices**. Details see Opacity Measurement [▶ 34].
	Organizer: Download at least one organizer from “smart-chart”. Details see Organizer Measurement [▶ 36].

3.5 Setting Measurement Parameters

The instrument is working with default measurement parameters. Before starting with measurements these parameters may have to be controlled. Go to **Configuration** > **Measurement Parameters**.



1	**Color System** Select color system. Default is **CIE L*a*b***. Details see Color System [▶ 42].	7	**Illumination** Select standard illuminant. Default is **D65**.
2	**Color Equation** Select color equation. Default is **ΔE***. Details see Color Equation [▶ 43].	8	**Observer** Select standard observer. Default is **10°**.
3	**Color Indices** Select color indices. Default is none. Details see Color Indices [▶ 45].	9	**Fluorescence:** Turn fluorescence indices on or off.
4	**Gloss** Turn gloss measurement on or off.	10	**Statistics** No. of readings to be taken per standard or per sample. Statistics are evaluated, if **n > 1**. Details see Statistics [▶ 48].
5	**ΔGloss** Turn difference measurement for gloss on or off.	11	**Always use autostandard** Search for nearest standard is always active.
6	**Geometry:** Select Spin/Spex mode. Default is SPIN. Mode only available for geometry d:8°. Details see Geometry [▶ 46].	12	**Always continue last test series** No new test series is created; latest series is opened automatically.

To set measurement parameters:

- Click on the parameter you want to set.
- A respective list with selectable parameters appears.
- Choose the required parameter and confirm via the checkmark in the upper right corner.
- Repeat these steps for all desired parameters.

Confirm by clicking on the checkmark in the upper right corner. More details see Measurement Parameter [▶ 42].

NOTES:

- Changes in the measurement parameters apply to new standards only.
- Standards with existing measurement data will be measured with previous parameters in order to ensure data consistency.

4 Perform Measurements

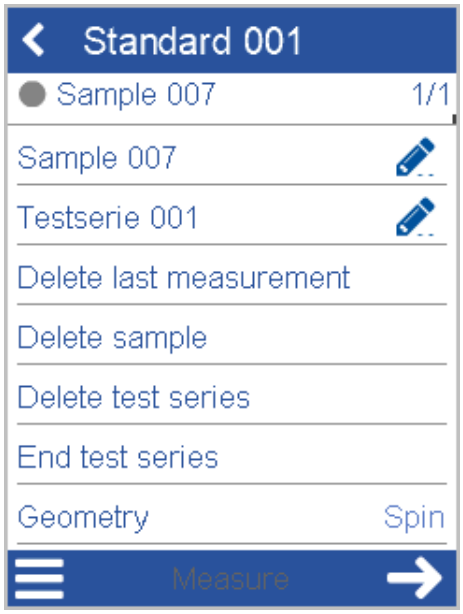
The instrument provides various types of measurement functions:

1. Difference Measurement [▸ 26]: In this mode samples are compared to a standard and the results are saved automatically.
   - Load existing Standard [▸ 26]: Compare sample(s) to a standard
   - Search for closest Standard [▸ 29]: Search for best match in instrument
   - Measure new standard [▸ 30]: Create standard based on current sample
2. Absolute measurement [▸ 32]: Take absolute measurements without compare. Results are saved automatically.
3. Quick check [▸ 33]: Perform quick evaluations without automatically saving the data.
4. Opacity measurement [▸ 34]: Measure the opacity of a coating. Measurement values are stored.
5. Organizer Measurement [▸ 36]: Load organizers with predefined measurement sequence via “smart chart” into the instrument. An organizer will guide you through the measurement process.

The instrument also provides a comfortable function to filter for standards – useful in case of many standards being stored in the instrument.

Context Menu

The context menu is accessed via the hamburger menu icon. It starts with less entries and grows up during measurements.



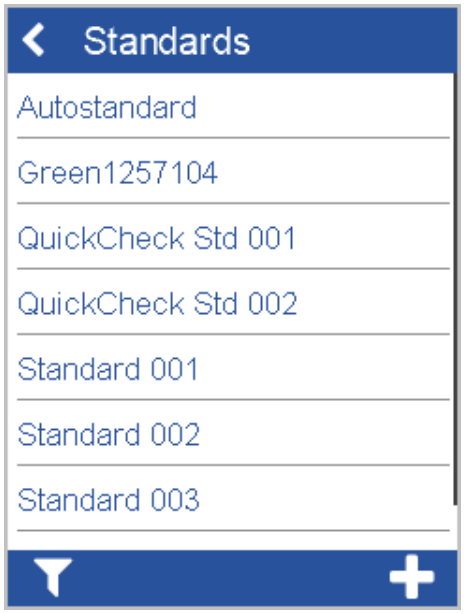
During measurements the menu provides the commands **Rename Sample**, **Rename Testserie**, **Delete last measurement**, **Delete sample**, **Delete test series**, **End test series** and **Geometry**.

4.1 Difference Measurement

Using this function you can compare standard and sample(s). You can load existing standards, search for the closest standard or measure new standards. Click on icon **Difference**.

4.1.1 Loading existing Standard

In case standards are already stored in the instrument, the list with existing standards appears.

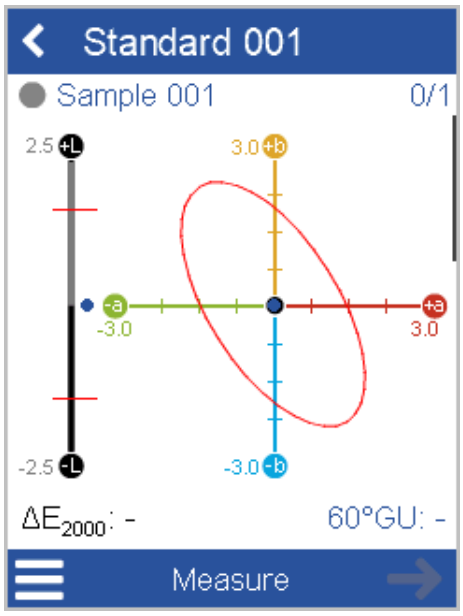


Select a standard to continue. The list with existing test series appears.

To continue existing test serie select it from list.

To add a new test serie click on **New test series**.

The new test serie is created and the measurement screen is displayed.



Select **Rename test serie**s from context menu, if required.

Enter the name and confirm via the checkmark in the upper right corner.

The instrument is ready to measure.

Place instrument on sample.

Click on **Measure** or press the **Operate** button.

Sample is measured and automatically saved.

Scroll down to see data table and statistics.

NOTES:

There are various options to configure the display of the data for the measurement results, e.g.:

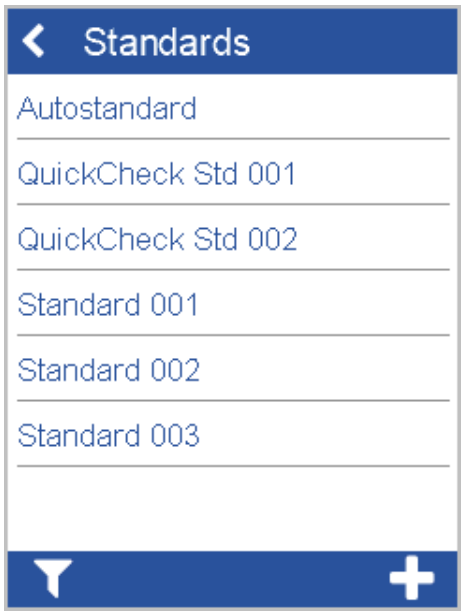
- Display absolute values for standard and sample
- Display differences between standard and sample
- Display statistical data with 1..3 columns
- Activate/inactivate fixed statistics etc.

Details see Measurement Parameter [▸ 42].

Using the Filter Function

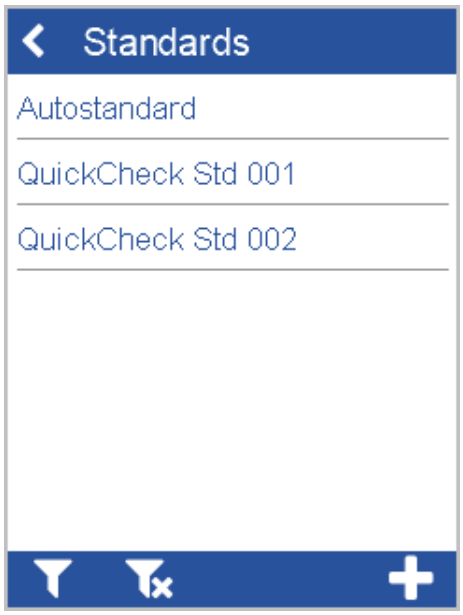
The system provides a function to filter for standards. This is helpful in case of many standards being stored in the instrument.

Click on the filter icon in the lower left. The window to enter the filter criteria is displayed.



Enter the criteria for the filter – i.e. a part of the standard name.

After confirmation all standards matching the current criteria are displayed.



To change the filter criteria select the filter icon again.

To remove the filter select the cancel filter icon.

4.1.2 Search for closest Standard

Using this function you can measure any sample - the system will automatically present the standard(s) in the instrument, which are closest to the current sample.

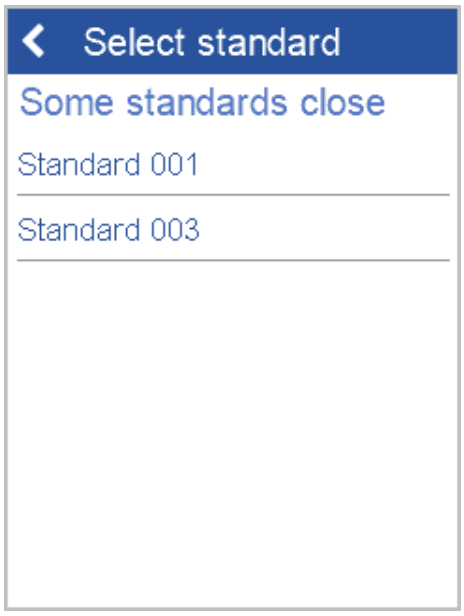
Click on icon **Difference**. The list with existing standards is displayed.

Click on item **Autostandard**. The measurement screen is displayed.

NOTE:

Autostandard only appears when at least one standard is stored in the instrument.

Measure your current sample just one time to search for closest standard.



Following scenarios are supported:

- **Nearest standard found**: If matching standard is found in instrument, it is selected automatically.
- **Some standards close**: If more than one matching standard is found in instrument, a list for selection is displayed.
- **No good match**: No matching standard was found in the instrument.

4.1.3 Measure new Standard

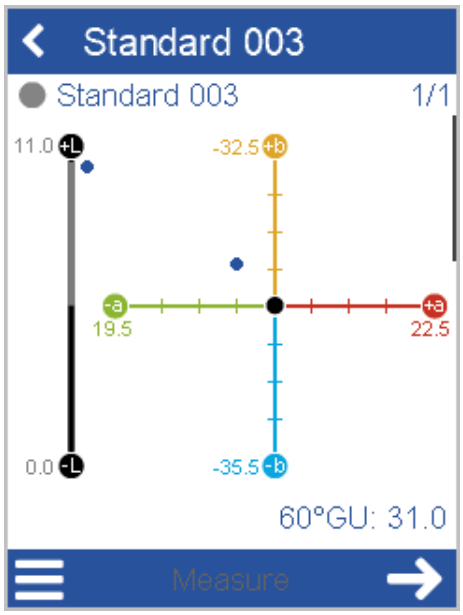
Using this function you can create new standards. Click on icon **Difference**. The list with existing standards is displayed.

To add a new standard click on **+**.

A new standard is created.

The input window for the standard name appears.

Accept the default name or enter a desired name and click on the check-mark in the upper right corner. The instrument is ready to measure the standard.



Place instrument on standard.

Click on **Measure** or press the **Operate** button.

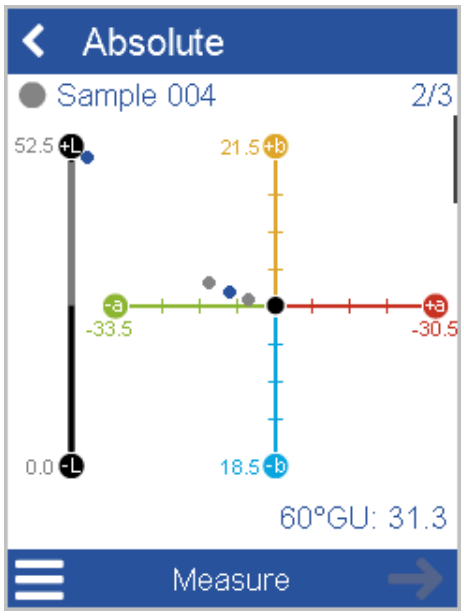
Standard is measured and automatically saved.

NOTE:

New standards can also be downloaded from “smart-chart” into the instrument.

4.2 Absolute Measurement

Using this function you can take measurements without comparing to a standard. Click on icon **Absolute**.



Place instrument on sample.

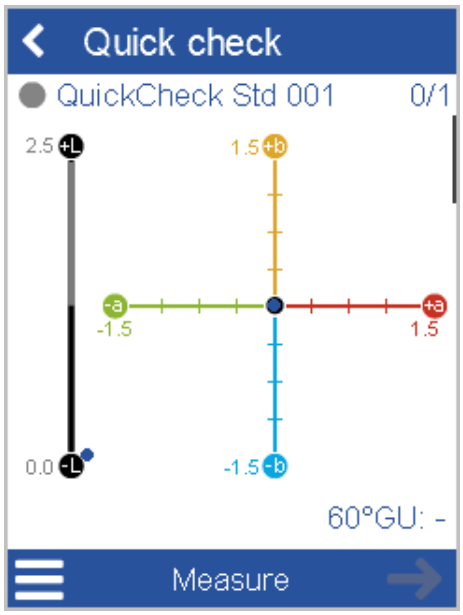
Click on **Measure** or press the **Operate** button.

Sample is measured and automatically saved.

4.3 Perform Quick Check

Using this function you can compare a standard with one or more samples without saving for a quick evaluation.

Click on icon **Quick check**. The instrument is ready to measure the standard for the quick check.

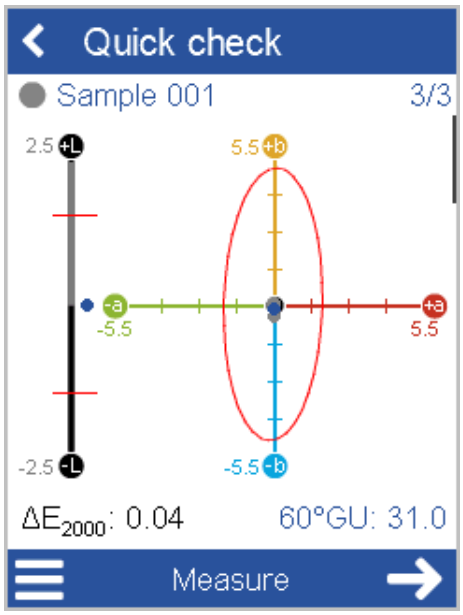


Place instrument on standard.

Click on **Measure** or press the **Operate** button.

Standard is measured.

Continue with **Next** and place instrument on sample.



Click on **Measure** or press the **Operate** button.

Sample is measured.

Continue with next sample.

NOTE:

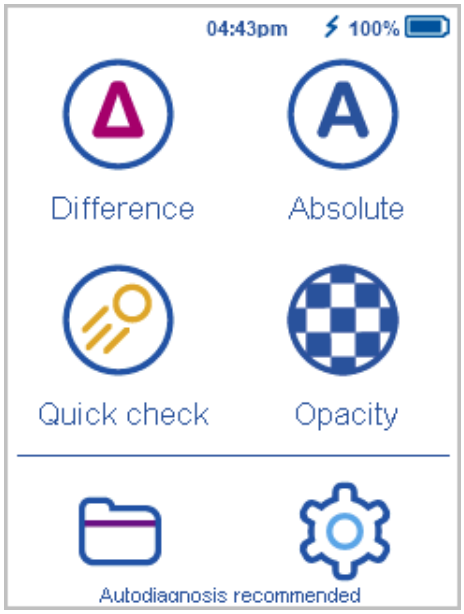
Measurements are not saved by default. To save the standards and samples measured select **Save data** from the context menu.

4.4 Opacity Measurement

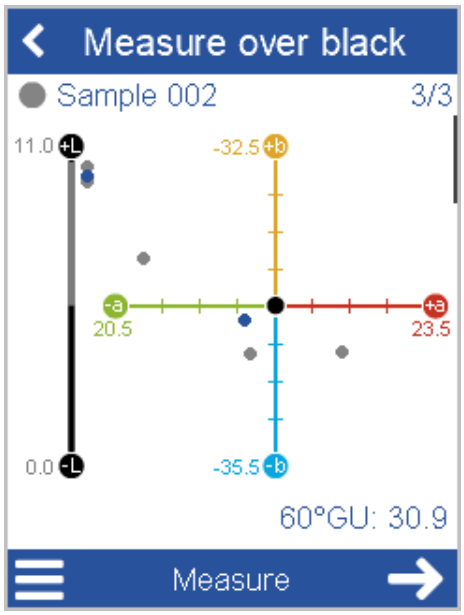
With this function you can measure the hiding power of your coating using - for example - the BYK-Gardner byko-charts, see https://www.byk-instruments.com/c/p-5916.

NOTE:

In order to display the measurement icon in the main menu, **Opacity** has to be selected as a color index, see Color Indices [▶ 45].



Click on icon **Opacity**. The measurement starts with the reading over **black** and finishes with the reading over **white**.

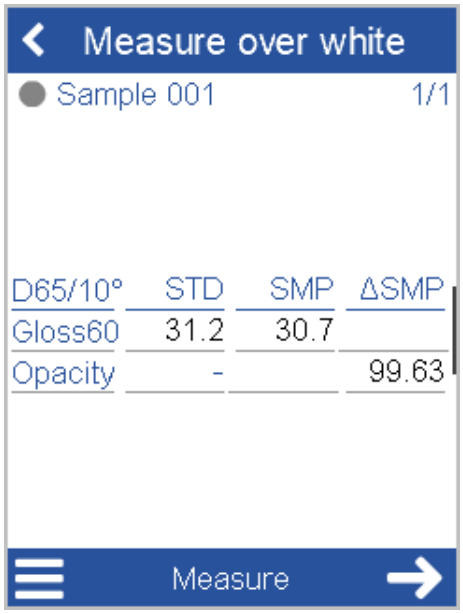


Place instrument on the **black** background.

Click on **Measure** or press the **Operate** button.

Sample is measured and automatically saved.

Continue with **Next** and place instrument on the **white** surface.



Click on **Measure** or press the **Operate** button.

Sample is measured and automatically saved.

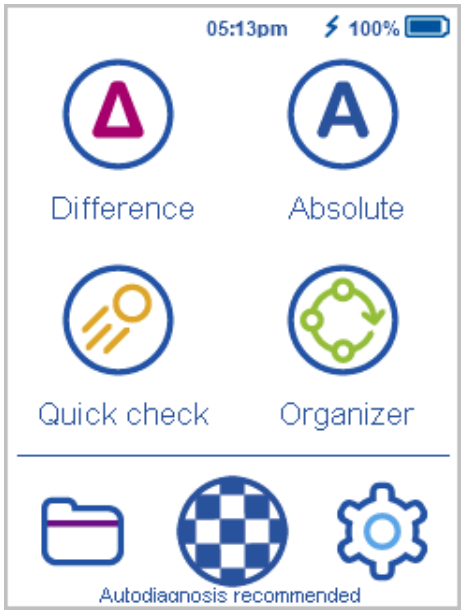
Scroll down to see the **Opacity** value in %.

4.5 Organizer Measurement

Standardization of Measurement Procedure

It is possible to predefine the measurement sequence in the software “smart-process” with the so-called “organizer”.

The organizer icon appears after downloading an organizer from “smart-process” into the instrument.



Multiple organizers can be downloaded. The organizer selected for measurement will guide you through the whole measurement process.

5 Browse Measurements

Using this function you can view measured data and / or delete existing standards or test series.

Click on icon **Browse**. The list with all types of measurements is displayed.

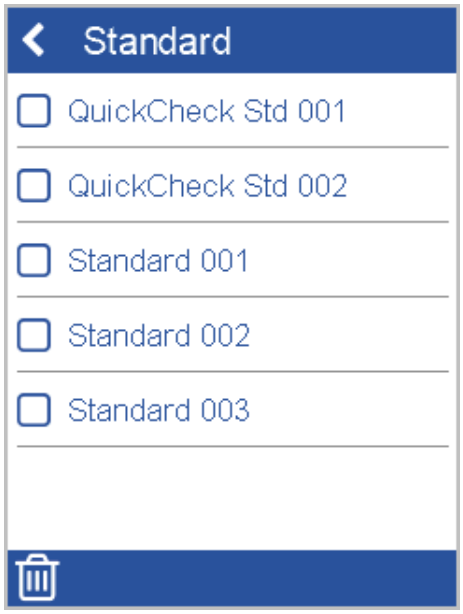
You can browse through the list in order to view or delete the data.

NOTE:

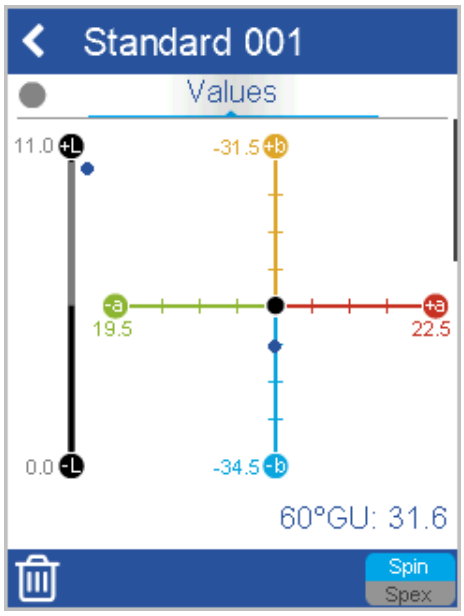
You can also use the software “smart-chart” in order to delete stored measurement values or standards.

5.1 View Measurement Data

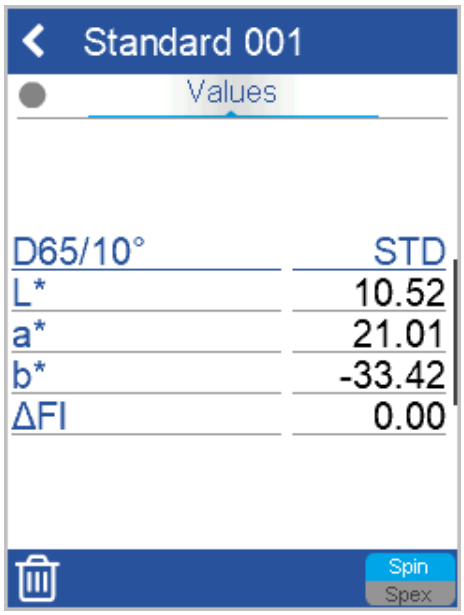
In the list of measurement types open the object for which you want to view the measured data – for example “**Difference**”. The standards for which test series were measured are displayed.



Open the desired object to view the measurement data.



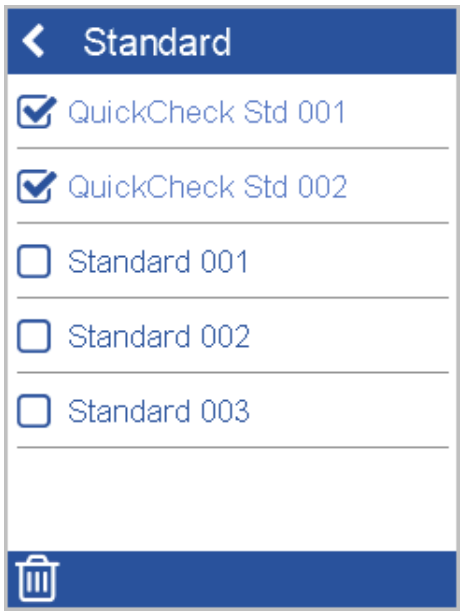
Scroll down to view values and statistics.



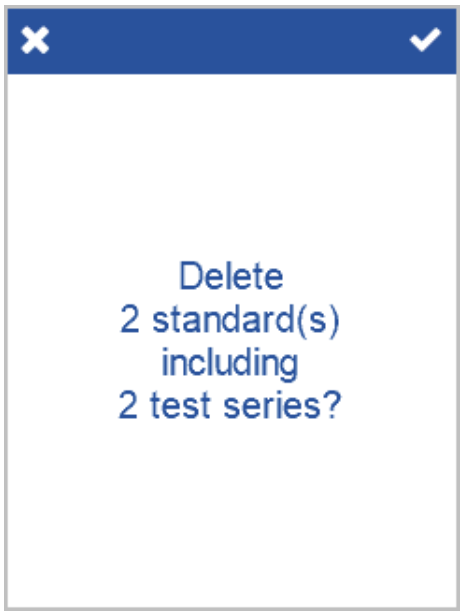
You can browse through the different samples measured.

5.2 Delete Standard

You can delete standards with all stored test series. Select **Standard** and select the standard(s) to be deleted in the list.



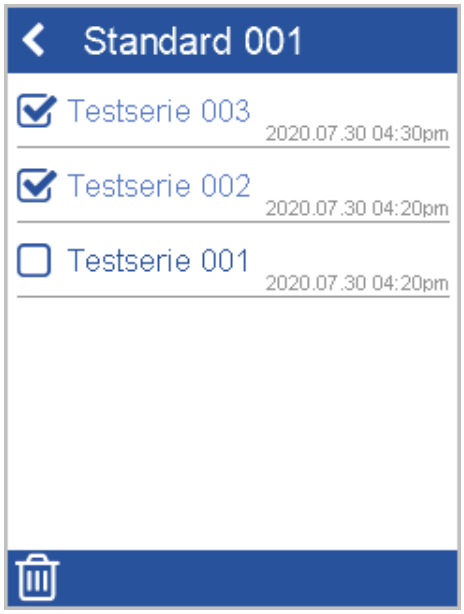
Click on the **Trashcan** icon. A confirmation dialog is displayed.



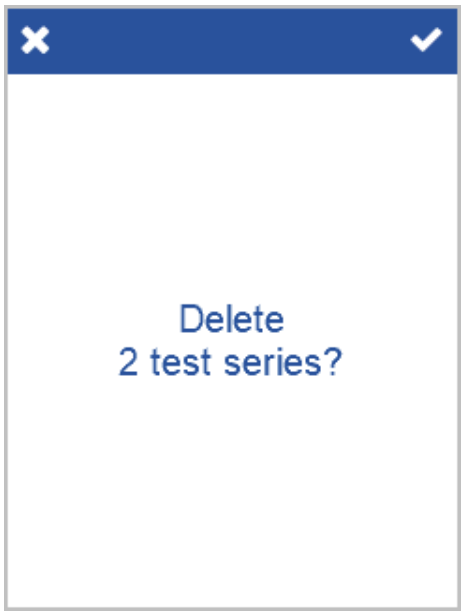
Confirm with the checkmark in the upper right corner. The selected objects are deleted.

5.3 Delete Test series

To delete only single test series select **Difference**, click on the standard and select the test series to be deleted in the list.



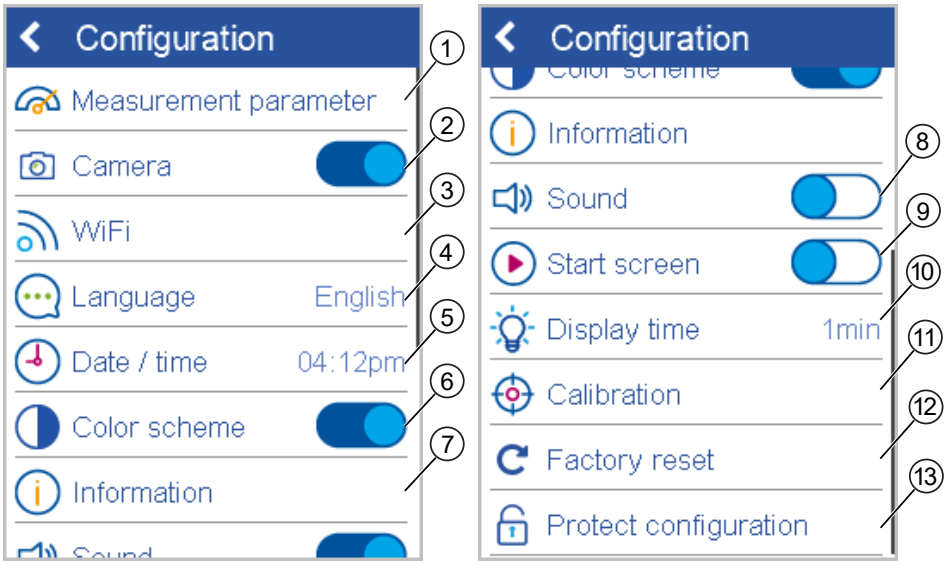
Click on the **Trashcan** icon. A confirmation dialog is displayed.



Confirm with the checkmark in the upper right corner. The selected test series are deleted.

6 System Configuration

With this function you can configure the instrument according to your needs.



1 **Measurement parameters**

Set measurement parameters here, see Measurement Parameter [▶ 42].

2 **Camera**

Switch integrated camera on/off here. It shows the sample surface in the display.

3 **WiFi**

Configure the integrated WiFi adapter here, see Wireless Connection [▶ 50].

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 **Start screen**

Switch startup animation on/off here.

10 **Display time**

Defines the interval for automatic shutdown of instrument if not used.

11 **Calibration**

Calibrate and check instrument manually here, see Instrument Calibration [▶ 54].

12 **Factory reset**

Reset instrument to the initial settings here, see Perform Factory Reset [▶ 61].

13 **Protect configuration**

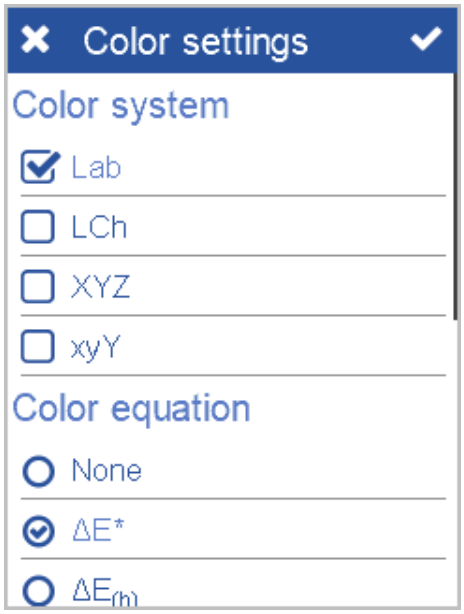
Protect the system by a password here, see Protect Configuration [▶ 62].

6.1 Measurement Parameter

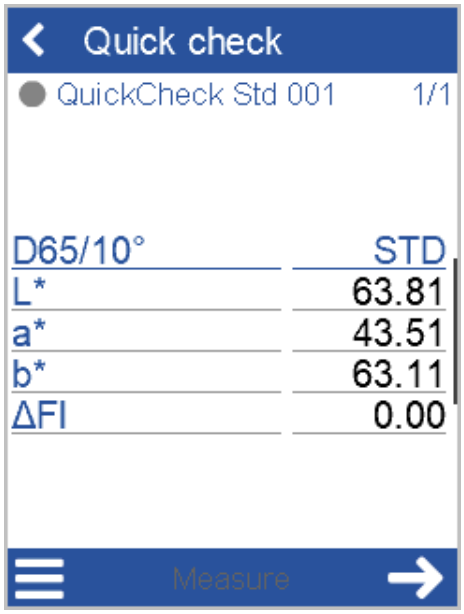
The list of measurement parameters is shown in section Setting Measurement Parameters [▶ 23]. Below the most important parameters are described.

6.1.1 Color System

Go to **Measurement Parameters** > **Color system** and select the color system(s) you want to use for measurements.



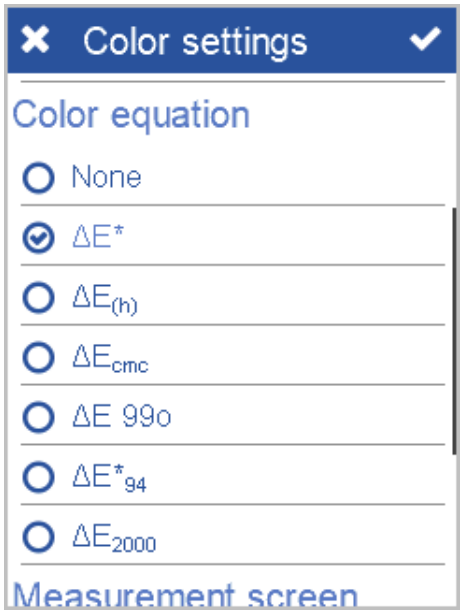
These color systems is visible in the measurements results.



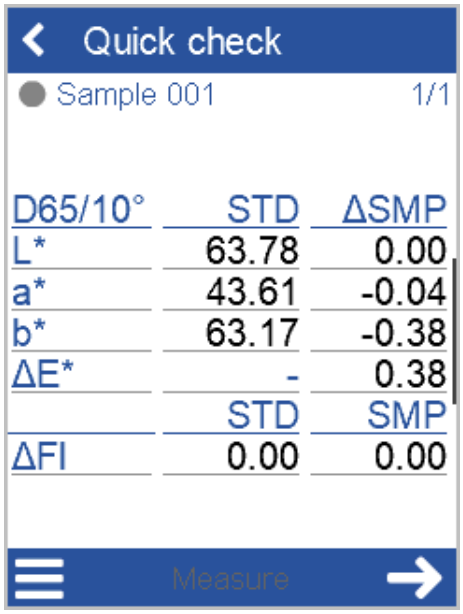
If the graph is shown, scroll down to see results in the first color system. Scroll more down to see the results in the next color system.

6.1.2 Color Equation

Go to **Measurement Parameters** > **Color equation** and select the color equation you want to use for measurements.

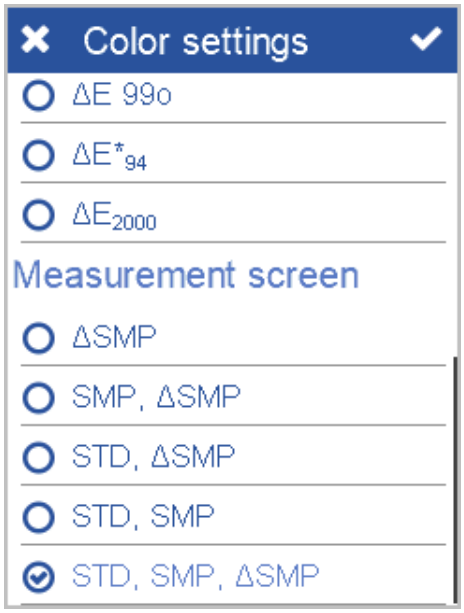


The color equation is visible in the measurements results.



6.1.3 Measurement-Screen

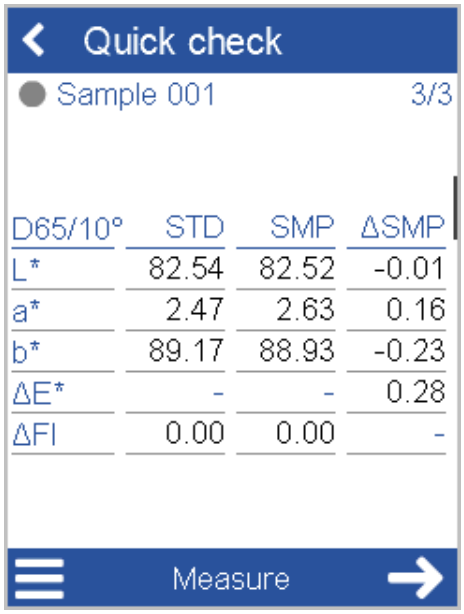
Go to **Measurement Parameters** > **Color equation** and scroll down to **Measurement Screen** and select the data to be displayed in the measurement results.



Following data can be selected:

- STD = Standard
- SMP = Sample,
- Δ = Difference (Delta) between Standard and Sample.

These data are visible in the measurements results.

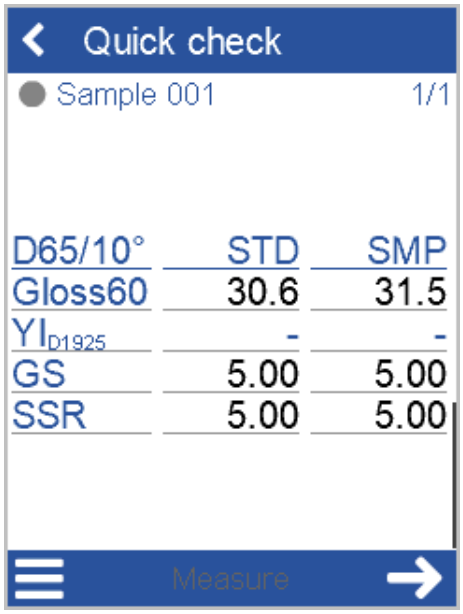


The default setting is **SMP, ΔSMP**. In the example shown above the value for **STD** is displayed too.

6.1.4 Color Indices

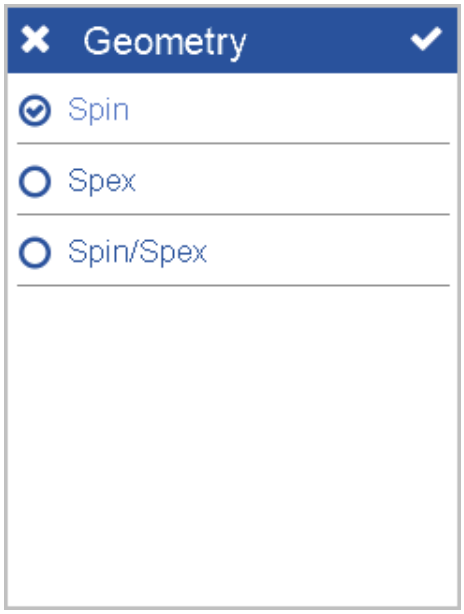
Go to **Measurement Parameters** > **Color indices** and select the color indices you want to use for measurements. You can decide to display absolute and/or difference values.

These color indices are visible in the measurements results.

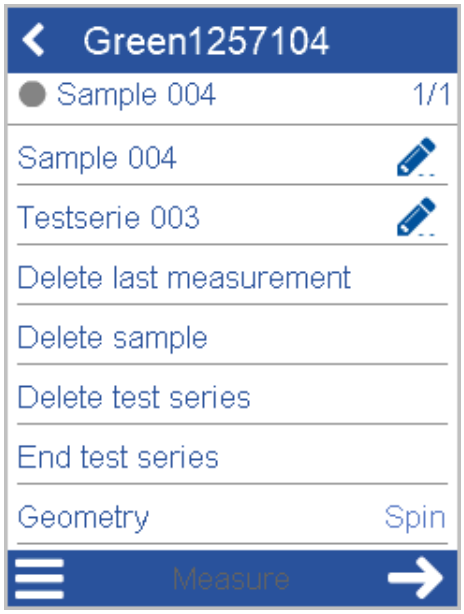


6.1.5 Geometry

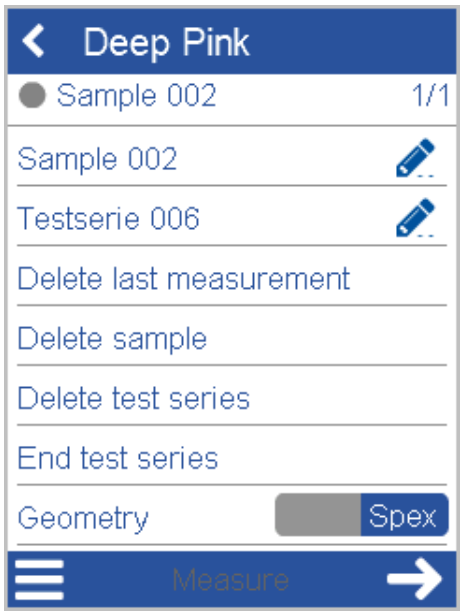
If your instrument is a sphere instrument – see - D:8° Geometry [▶ 17] - you can configure the measurement condition: Specular included (Spin) or Specular excluded (Spex). Go to **Measurement Parameters** > **Geometry** and select the mode to be used during measurement.



The mode is visible in the measurement screen when using the context menu which is accessed via the hamburger menu icon.



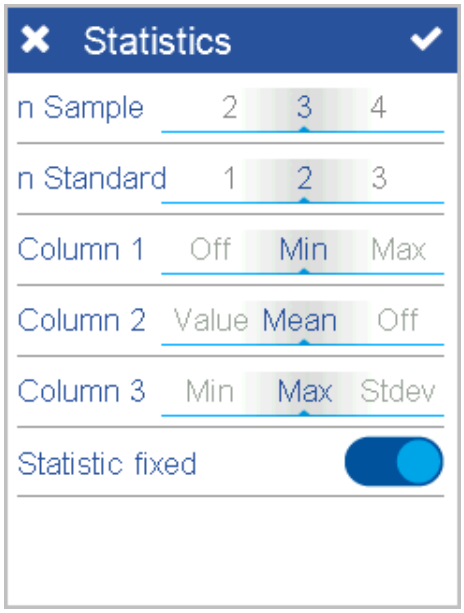
If you select the option **Spin/Spex** in **Measurement Parameter**, the context menu offers a control to toggle between the two modes.



Click left on the control to select **Spin** and click right to select **Spex**.

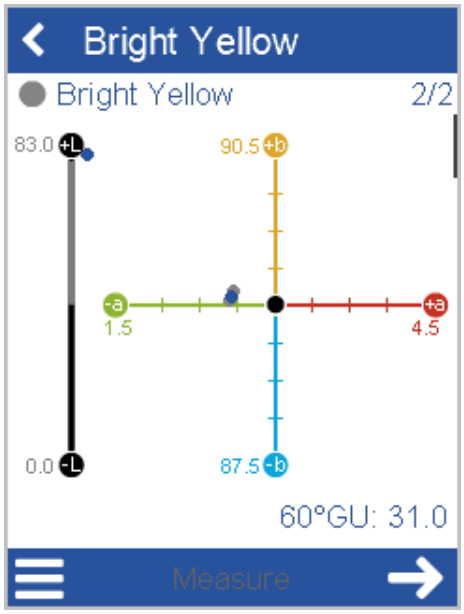
6.1.6 Statistics

Go to **Measurement Parameters** > **Statistics** and select the statistic options to be used during measurement: No. of measurements required on standard and on sample and statistic data to be displayed.

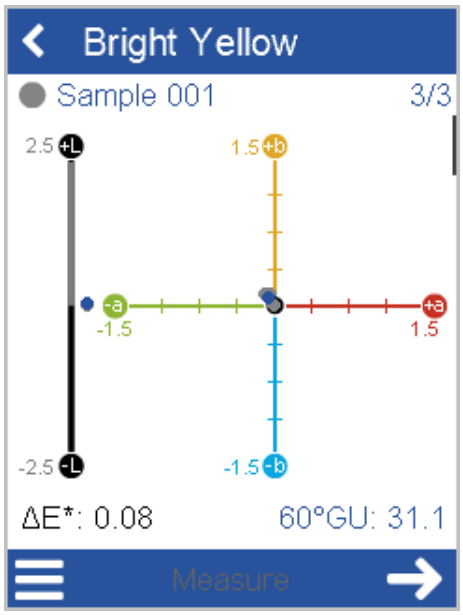


The number of measurements required is visible in the measurements results in the upper right of the screen, e.g. “2/2” means: 2 measurements are required and 2 measurements are done.

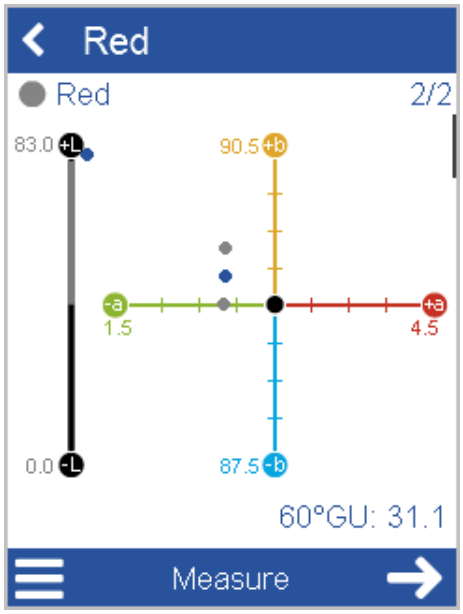
If the no. of measurements on standard is e.g. “2”, the icon for **Next** becomes active after the second measurement.



If the no. of measurements on sample is e.g. “3”, the icon for **Next** becomes active after the third measurement.



The option **Statistic fixed** means: The exact no. of measurements is to be made.



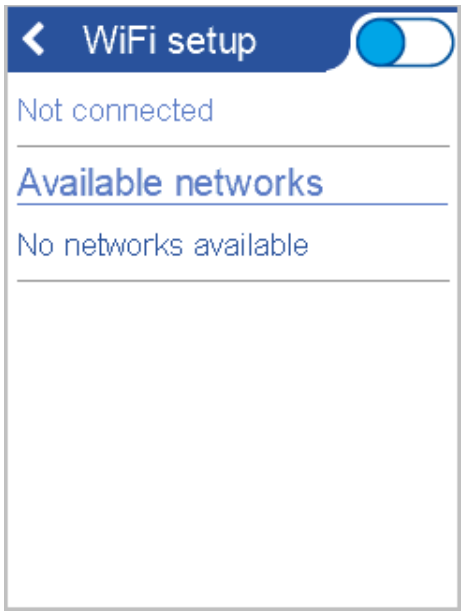
If this options is inactive, the minimum no. is required, but additional measurements can be made – both **Measure** and **Next** are active.

6.2 Wireless Connection

The instrument is equipped with a WiFi adapter. You can use the WiFi connection alternatively to the USB connection.

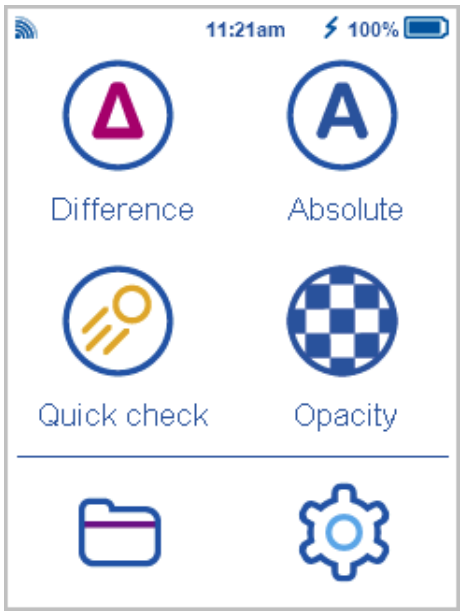
6.2.1 Connect Automatically

In the configuration menu select **WiFi** and then your respective country. The WiFi setup screen is displayed.



Activate the WiFi toggle button. The list of available WLAN networks is displayed. Select the desired network from the list.

Enter the WiFi key - required if the network is secured. The instrument connects to the network, a confirmation message is displayed.

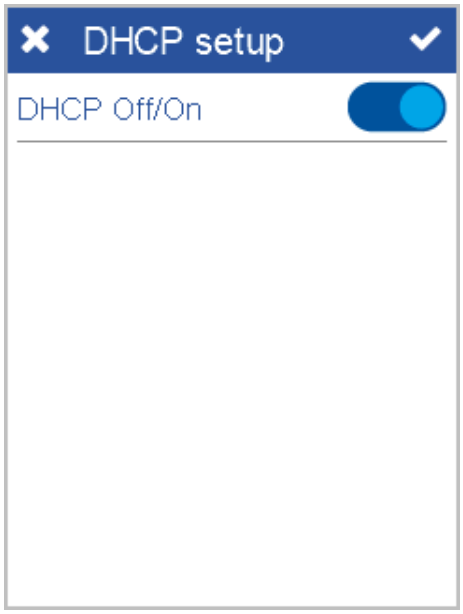


You are connected to the network. In the main menu the WiFi symbol is shown indicating the current field strength. The chosen network will be connected automatically if in range.

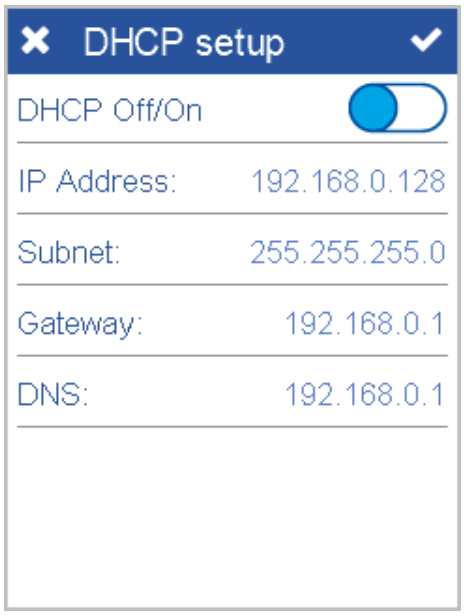
6.2.2 Connect Manually

If required the DHCP setup can also be done manually.

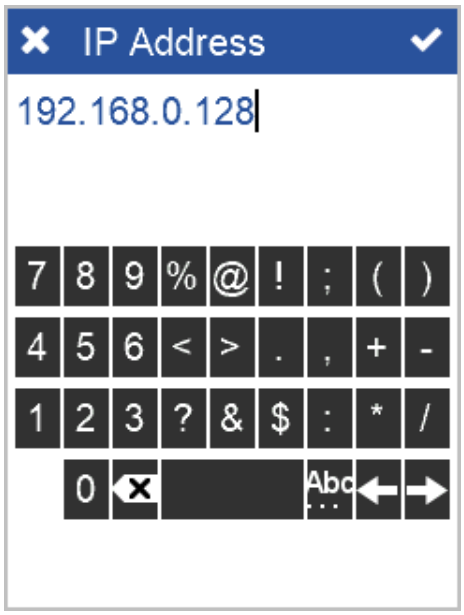
By clicking on the line showing **Not connected** or **<Network-Name>** you can decide to activate or deactivate the DHCP option.



If the DHCP option is inactive, you can enter the IP details for the WiFi connection manually.



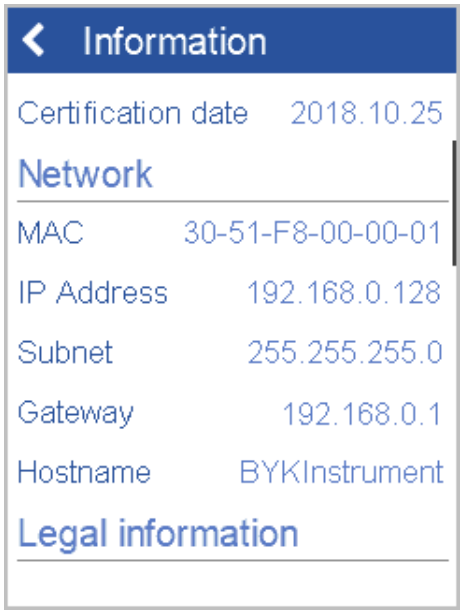
Click a line to enter the corresponding data.



Accept your changes to enter the WiFi key – required if the network is secured. The instrument connects to the network, a confirmation message is displayed. The active connection is shown in the WiFi configuration screen.

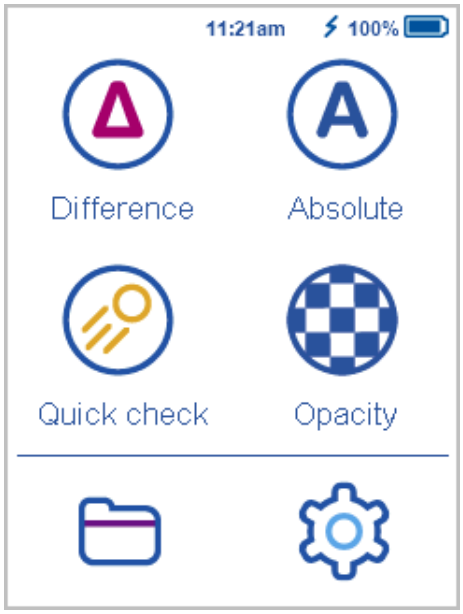
6.2.3 Network Information

The network data like MAC and IP address can be checked in the information screen.



6.2.4 Disconnect Network

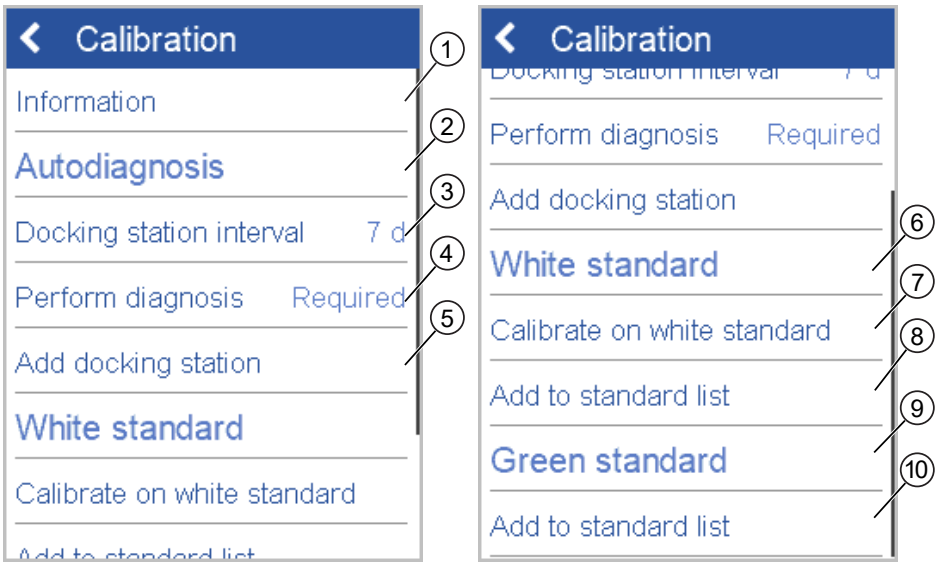
To disconnect from the network, switch the WiFi option off in the WiFi configuration screen.



The Wifi icon disappears in the main menu.

6.3 Instrument Calibration

The system delivery comprises a calibration tile and test tiles for color and gloss, see Test and Calibration Standards [▶ 16]. These tiles can be used to check if your instrument is measuring correctly. Each tile comes with a dedicated serial number matching your instrument. In the configuration menu select **Calibration**.



1	**Information** Check date of last calibration, serial numbers and values for calibration and test tiles here.	6	**White standard** Comprises the options for instrument calibration.
2	**Autodiagnosis** Comprises the options for auto diagnosis.	7	**Calibrate on white standard** Start the manual calibration procedure here.
3	**Docking station interval** Select interval for the auto diagnosis here. Possible values: 1, 3, 7, 14 days. Default: 7 days.	8	**Add standard to list** Add calibration tile to the list of standards in the instrument.
4	**Perform diagnosis** Start the auto diagnosis procedure here.	9	**Green standard** Comprises the options for instrument test.
5	**Add docking station** Turn your spectro2go into spectro2guide here or replace existing docking station.	10	**Add standard to list** Add test standard to the list of standards in the instrument.

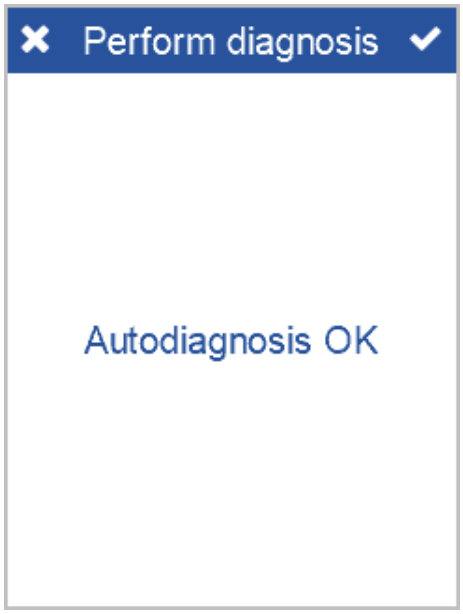
NOTES:

- The option **Add standard to list** is active, if the standard has not been added yet.
- In order to delete these standards from memory use the function Browse Measurements [▶ 37].

6.3.1 Auto Diagnosis and Calibration

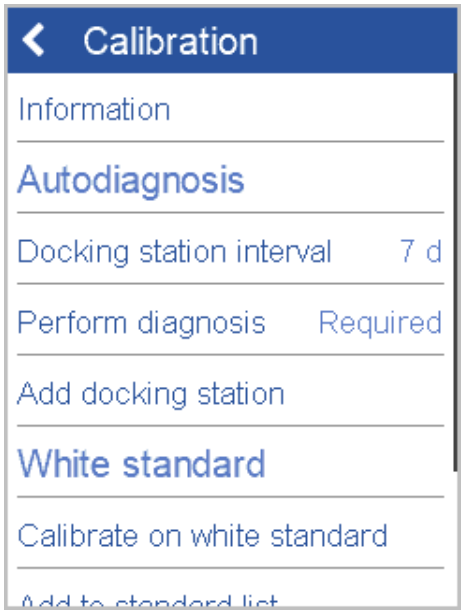
The auto diagnosis takes place in the docking station. The white test standard in the docking station is used to check color and gloss. In the given interval the auto diagnosis is requested.

If auto diagnosis in the docking station passes, you can use the instruments to measure.



If auto diagnosis fails, following message appears: “Please clean white test standard of docking station or calibrate on external white calibration standard.”

After calibration on the external white calibration standard following message appears: “Perform diagnosis: Required”.



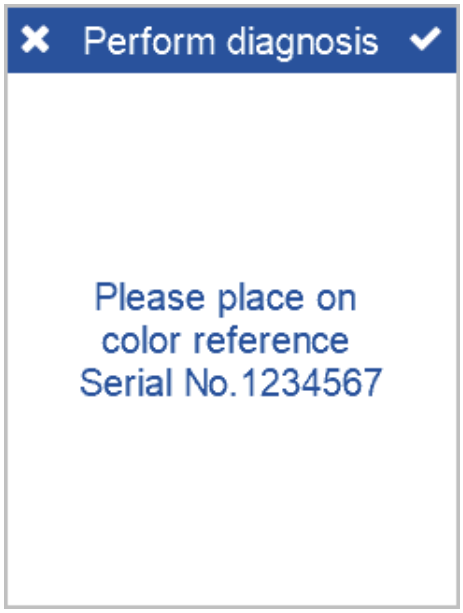
Verify performance on external test standard color (green) and external test standard gloss (high gloss). Take care for correct alignment of instrument on standard. The instrument will guide you through the diagnosis procedure.

NOTES:

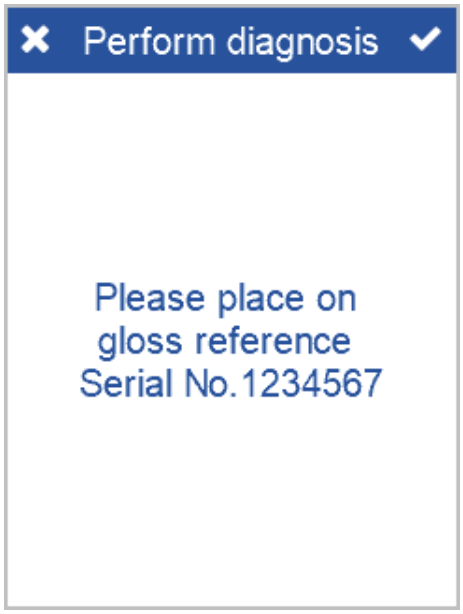
- The auto diagnosis and calibration applies for the use with a docking station. In case of spectro2go the external test and calibration standards are to be used.
- If the instrument has not been put in the docking station and no manual external auto diagnosis has been performed for 4 weeks, the auto diagnosis reminder will be displayed automatically.

6.3.2 Manual Diagnosis

The option **Perform diagnosis** can be performed manually at any time to check the instrument on the test standards. The instrument will guide you through the diagnosis procedure. First measure on test standard color.



Second measure on test standard gloss.

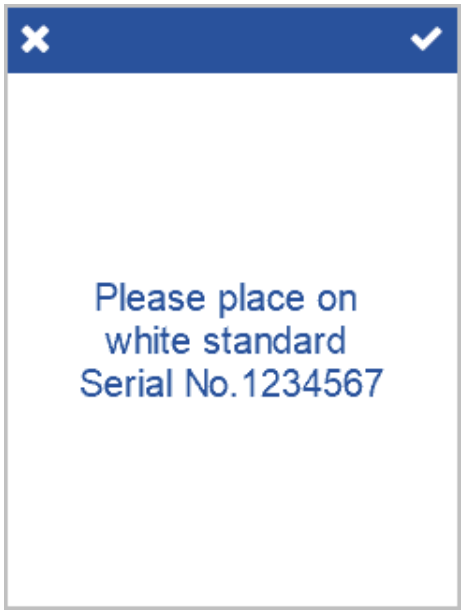


If diagnosis passes, you can use the instruments to measure.

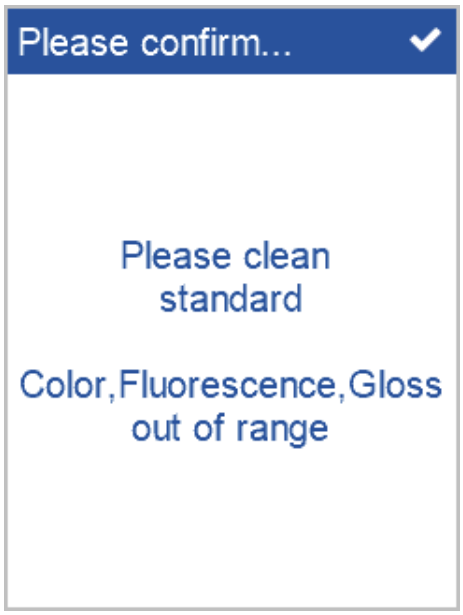
If diagnosis fails, clean test standard and repeat or calibrate on external white standard.

6.3.3 Calibration Standard

If auto diagnosis or manual diagnosis fails, use the option **Calibrate on white standard**. The instrument will guide you through the calibration procedure.



If calibration fails, clean test standard and repeat.



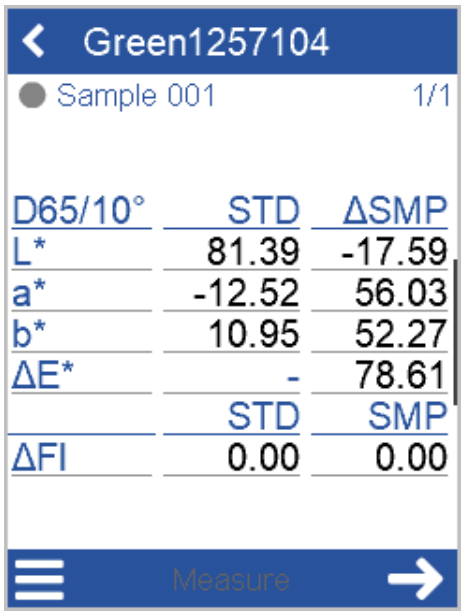
NOTE:

Perform calibration only, if required in order to ensure correct status of your calibration standard.

6.3.4 Test Standards

In order to document the correct measurement status of your instrument you can save the test standards in the system memory. Select the option **Add standard to list** and use Difference Measurement [▶ 26] to frequently monitor instrument performance.

Select the corresponding item from the list and measure it on the external test standard.



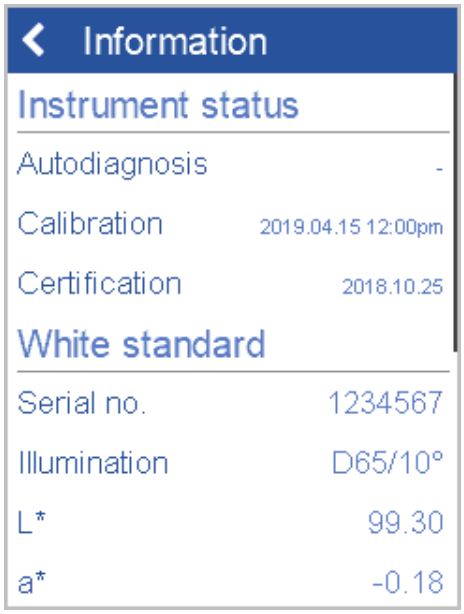
If the differences are within your tolerances you can continue to measure with your instrument. Otherwise calibrate your instrument on the white standard.

NOTE:

Every difference measurement is stored in the instrument. Transfer the measurement data to “smart-chart” to document each test case.

6.3.5 Calibration Information

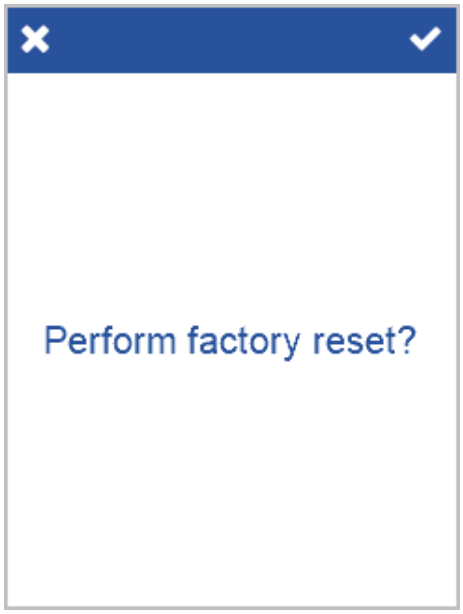
Use the information screen to check the current status of diagnosis and calibration.



The screen shows the details for instrument status and for calibration and test standards.

6.4 Perform Factory Reset

If you are having technical problems with your instrument, you can perform a fallback to the factory settings. In the configuration menu select **Factory reset**.



Confirm the security message to perform the fallback. You have to enter a password - details see Technical Data [▸ 65].

After fallback all your personal configuration and measurement data in the device will be lost. The instrument is set back to original state.

6.5 Protect Configuration

You can protect the current configuration of your instrument via password against accidental or intentional changes. In the configuration menu **Protect configuration**.

Activate the option. You have to enter a password. The password is shown in clear text during input. There is no 2nd confirmation input of password required.

If the option is activated the configuration menu can only be accessed from the main menu by entering the password. Note down the password on a secure place – if you do not remember, you will have to contact your local BYK-Gardner certified service center to get the master password.

7 Troubleshooting

The system provides messages on the display in case of errors or problems.

7.1 Error Messages

Message	Solution
Error! White calibration in docking station.	Use external white calibration standard and repeat calibration. If white calibration is okay, please clean white test standard of docking station. If calibration fails again, contact service.
Error! Please clean White Tile or call customer service.	Clean white tile and repeat white calibration. If white calibration fails again, contact service.
Error! White Calibration on external white calibration standard.	Use docking station and perform diagnosis. If white calibration is okay, clean external white calibration standard. If calibration fails again, contact service.

7.2 Measurement Problems

Message	Solution
Calibration invalid. Please perform calibration.	Perform calibration 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. Repeat measurement.
Instrument temperature too high!	Instrument temperature is > 45°C Allow the instrument to cool down.
Instrument temperature too low!	Instrument temperature is < 5°C Allow the instrument to warm up.
Memory full! Please delete stored measurements.	Delete stored measurements.
Light protection ring is broken or fell off	Contact service.

7.3 Battery Problems

Message	Solution
Battery empty. Instrument is switching off...	Charge the instrument using the docking station or external power supply.
Battery empty.	Charge the instrument using the docking station or external power supply.
Instrument is not charging in docking station.	Make sure power supply is connected. Make sure instrument is positioned correctly. 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). If instrument is still not charging, use docking station.

7.4 Connection Problems

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

8 Technical Data

8.1 Color

Geometry	45°c:0°, d:8° (spin/spex)
Aperture Size	12 mm / 8 mm
Spectral Range Color	400–700 nm, 10 nm resolution
Spectral Range Fluorescence	340-760 nm, 10 nm resolution (spectro2guide only)
Repeatability	0.01 ΔE94 (10 readings on white)
Reproducibility	0.1 ΔE94 (average of 12 BCRA II tiles)
Color Systems	CIELab/Ch, Lab(h), XYZ, Yxy
Color Differences	ΔE*, ΔE(h), ΔE94, ΔECMC, ΔE99, ΔE2000
Indices	YIE313, YID 1925, WIE 313, CIE, Berger, Color Strength, Opacity, Metamerism, Grayscale, Jetness (spectro2guide Pro only)
Illuminants	A, C, D50, D55, D65, D75, F2, F6, F7, F8, F10, F11, UL30
Observer	2°, 10°

8.2 Gloss

Aperture Size	5 x 10 mm
Repeatability	± 0.1 GU (0–20 GU) ± 0.2 (20–100 GU)
Reproducibility	± 0.2 GU (0–20 GU) ± 1.0 (20–100 GU)

8.3 General

Memory	4000 standards and 10 000 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	45/0: 690 g (1.52 lbs) d/8: 707 g (1.56 lbs)
Interface	Docking Station: USB-B Instrument: USB-C
Battery	7.2 V, 2350 mAh, 16.92 Wh
Instrument	Input: 12 V, max. 2 A (Docking Station) 5 V, max. 2 A (USB-C)
Docking Station	Input: 12 V, max. 2 A (Power Supply) 5 V, max. 0.5 A (USB-B) Output: 12 V, max. 2 A
Power Supply (Docking Station)	Input: 100–240 V AC, 50-60 Hz, max. 1 A Output: 12 V, max. 3 A
Power Supply (Instrument)	Input: 90–264 VAC, 47-63 Hz, max. 0.5 A Output: 5 V DC, max. 2.1 A (USB)
Password for Factory Reset	touchthecolor

8.4 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

8.5 WLAN Antenna

Max. Gain	2 dBi

9 Service and Maintenance

9.1 General Information

NOTICE

Damage by insertion of objects

Inserting any objects into the measurement aperture could damage the instrument. 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. Do not use acetone for cleaning.

NOTICE

Damage by the attempt of self-repair

The instrument can be damaged. Warranty claims expire. Do not attempt to make any repairs yourself. Contact our customer service in case of malfunction.

9.2 Storing the Instrument

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

9.3 Cleaning the Instrument

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

9.4 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.

9.5 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

Consult Service Points [▶ 69] for the list of ISO/IEC 17025 accredited service points.

Read the information about the BYK-Gardner global service on our website:

- https://www.byk-instruments.com/technical-services

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:

- https://www.byk-instruments.com/global-service-centers

9.6 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

10 Service Points

	BYK-Gardner global service centers with ISO / IEC 17025 accredited laboratories	
Headquarter Germany c/o BYK-Gardner GmbH Lausitzer Strasse 8, 82538 Geretsried, Germany	**Headquarter USA** c/o BYK-Gardner USA 9104 Guilford Rd., Columbia, MD 21046, USA	**Headquarter PTE** c/o BYK USA dba Paul N. Gardner 316 N.E. First Street Pompano Beach, FL 33060 - 6608, USA
BYK-Gardner Service Point Austria, Hungary, Slovenia c/o Friedrich W. Bloch GmbH Wagramerstrasse 201, 1210 Vienna, Austria	**BYK-Gardner Service Point France** c/o Eckart France S.A.S. 31 Rue Amilcar Cipriani 93400, Saint Ouen, France	**BYK-Gardner Service Point Spain** c/o Actega Artística S.A.U. Calle Balmes 8, Suite: 3º 2ª, 08291 Ripollet, Spain
BYK-Gardner Service Point UK and Ireland c/o BYK Additives Ltd. 450 Bath Road, Longford, Heathrow, UB7 0EB, United Kingdom	**BYK-Gardner Service Point South Latin America** c/o MAST Comercial e Importadora LTDA Rua Itaporanga, 340-B, Bairro Paraiso, Santo André - SP, 09190-640, Brazil	**BYK-Gardner Service Point China** c/o BYK (Tongling) Co. Ltd. Shanghai Branch Block 6A, Building A, No 88 Hong Cao Road, Xuhui District, Shanghai 200233, P.R. China
BYK-Gardner Service Point India BYK India Pvt. Ltd. 147, Mumbai - Pune Road 411018 Pune Maharashtra, India	**BYK-Gardner Service Point Japan** c/o Tetsutani Co. Ltd. Chuo-ku, Osaka, Tokui cho 2-2-2, Japan	**Complete list** https://www.byk-instruments.com/global-service-centers

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