Leica BLK2GO

User Manual
Version 0.9
English

- when it has to be **right**

Leica Geosystems

Introduction

Purchase

Congratulations on the purchase of the Leica BLK2GO.

This manual contains important safety directions as well as instructions for setting up the product and operating it. Refer to "1 Safety Directions" for further information.

Read carefully through the User Manual before you switch on the product.

☞ The content of this document is subject to change without prior notice. Ensure that the product is used in accordance with the latest version of this document.
For updated version, contact your local agency or your Leica Geosystems authorised service centre.

Product identification

The model and serial number of your product are indicated on the type plate.

Always refer to this information when you need to contact your agency or Leica Geosystems authorised service centre.

Trademarks

Trademarks are the property of their respective owners.

Leica Geosystems address book

On the last page of this manual, you can find the address of Leica Geosystems headquarters. For a list of regional contacts, please visit **http://leica-geosystems.com/contact-us/sales_support**.

Available documentation

Name	Description/Format		
Leica BLK2GO Quick Guide	Provides an overview of the instrument together with technical data and safety directions. Intended as a quick reference guide	✓	✓
Leica BLK2GO User Manual	Provides all required instructions to operate the instrument to a basic level. Provides an overview of the instrument together with technical data and safety directions.	-	✓
Leica BLK2GO Tutorial videos	How-to videos explaining the basic workflow.	-	-

Refer to the following resources for all BLK2GO documentation/software:

- the Leica USB documentation card
- https://myworld.leica-geosystems.com

Table of Contents

1 Safety Directions

1.1 General Introduction

Description

The following directions enable the person responsible for the product, and the person who actually uses the equipment, to anticipate and avoid operational hazards.

The person responsible for the product must ensure that all users understand these directions and adhere to them.

About warning messages

Warning messages are an essential part of the safety concept of the instrument. They appear wherever hazards or hazardous situations can occur.

Warning messages...

- make the user alert about direct and indirect hazards concerning the use of the product.
- contain general rules of behaviour.

For the users' safety, all safety instructions and safety messages shall be strictly observed and followed! Therefore, the manual must always be available to all persons performing any tasks described here.

DANGER, **WARNING**, **CAUTION** and **NOTICE** are standardised signal words for identifying levels of hazards and risks related to personal injury and property damage. For your safety, it is important to read and fully understand the following table with the different signal words and their definitions! Supplementary safety information symbols may be placed within a warning message as well as supplementary text.

Type	Description
⚠ DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a potentially hazardous situation or an unintended use which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in appreciable material, financial and environmental damage.
☞	Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

1.2 Definition of Use

Intended use

- Measuring horizontal and vertical angles.
- Scanning objects.
- Measuring distances.
- Capturing and recording images.
- Recording measurements.
- Computing with software.
- Remote control of product.
- Data communication with external appliances.

Reasonably foreseeable misuse

- Use of the product without instruction.
- Use outside of the intended use and limits.
- Disabling safety systems.
- Removal of hazard notices.
- Opening the product using tools, for example screwdriver, unless this is permitted for certain functions.
- Modification or conversion of the product.
- Use after misappropriation.
- Use of products with recognisable damage or defects.
- Use with accessories from other manufacturers without the prior explicit approval of Leica Geosystems.
- Inadequate safeguards at the working site.
- Deliberate dazzling of third parties.

1.3 Limits of Use

Environment

Suitable for use in an atmosphere appropriate for permanent human habitation: not suitable for use in aggressive or explosive environments.

⚠WARNING

Working in hazardous areas, or close to electrical installations or similar situations

Life Risk.

Precautions:

- ▸ Local safety authorities and safety experts must be contacted by the person responsible for the product before working in such conditions.

☞ The following advice is only valid for battery charger, power adapter and car adapter.

Environment

Suitable for use in dry environments only and not under adverse conditions.

1.4 Responsibilities

Manufacturer of the product

Leica Geosystems AG, CH-9435 Heerbrugg, hereinafter referred to as Leica Geosystems, is responsible for supplying the product, including the User Manual and original accessories, in a safe condition.

Person responsible for the product

The person responsible for the product has the following duties:

- To understand the safety instructions on the product and the instructions in the User Manual.
- To ensure that it is used in accordance with the instructions.
- To be familiar with local regulations relating to safety and accident prevention.
- To inform Leica Geosystems immediately if the product and the application becomes unsafe.
- To ensure that the national laws, regulations and conditions for the operation of the product are respected.

1.5 Hazards of Use

⚠WARNING

Distraction or loss of attention

During dynamic applications there is a danger of accidents occurring if the user does not pay attention to the environmental conditions around, for example obstacles, excavations or traffic.

Precautions:

- ▸ The person responsible for the product must make all users fully aware of the existing dangers.

⚠WARNING

Inadequate securing of the working site

This can lead to dangerous situations, for example in traffic, on building sites and at industrial installations.

Precautions:

- ▸ Always ensure that the working site is adequately secured.
- ▸ Adhere to the regulations governing safety, accident prevention and road traffic.

NOTICE

Dropping, misusing, modifying, storing the product for long periods or transporting the product

Watch out for erroneous measurement results.

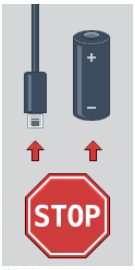
Precautions:

- ▸ Periodically carry out test measurements, particularly after the product has been subjected to abnormal use and before and after important measurements.

NOTICE

Removal of battery during operation or shutdown

This can result in a file system error and data loss!



Precautions:

- Do **NOT** remove the battery during operation of the instrument, or during the shutdown procedure.
- Always switch off the instrument by pressing the On/Off key, and wait until the instrument has shutdown completely before removing the battery.

⚠CAUTION

Not properly secured accessories

If the accessories used with the product are not properly secured and the product is subjected to mechanical shock, for example blows or falling, the product may be damaged or people can sustain injury.

Precautions:

- When setting up the product, make sure that the accessories are correctly adapted, fitted, secured, and locked in position.
- Avoid subjecting the product to mechanical stress.

⚠WARNING

Exposure of batteries to high mechanical stress, high ambient temperatures or immersion into fluids

This can cause leakage, fire or explosion of the batteries.

Precautions:

- Protect the batteries from mechanical influences and high ambient temperatures. Do not drop or immerse batteries into fluids.

⚠WARNING

Short circuit of battery terminals

If battery terminals are short circuited e.g. by coming in contact with jewellery, keys, metallised paper or other metals, the battery can overheat and cause injury or fire, for example by storing or transporting in pockets.

Precautions:

- Make sure that the battery terminals do not come into contact with metallic objects.

⚠WARNING

Inappropriate mechanical influences to batteries

During the transport, shipping or disposal of batteries it is possible for inappropriate mechanical influences to constitute a fire hazard.

Precautions:

- Before shipping the product or disposing it, discharge the batteries by the product until they are flat.
- When transporting or shipping batteries, the person in charge of the product must ensure that the applicable national and international rules and regulations are observed.
- Before transportation or shipping, contact your local passenger or freight transport company.

⚠CAUTION

Dropping the product

When being dropped, the product can cause personal injury and/or mechanical damage.

Precautions:

- Secure the product when operating it.

⚠WARNING

Improper disposal

If the product is improperly disposed of, the following can happen:

- The product does include parts of Beryllium inside. Any modification of some internal parts can release Beryllium dust or fragments, creating a health hazard.
- If polymer parts are burnt, poisonous gases are produced which may impair health.
- If batteries are damaged or are heated strongly, they can explode and cause poisoning, burning, corrosion or environmental contamination.
- By disposing of the product irresponsibly you may enable unauthorised persons to use it in contravention of the regulations, exposing themselves and third parties to the risk of severe injury and rendering the environment liable to contamination.

Precautions:

- 

  The product must not be disposed with household waste. Dispose of the product appropriately in accordance with the national regulations in force in your country.
  Always prevent access to the product by unauthorised personnel.

  Product-specific treatment and waste management information can be received from your Leica Geosystems distributor.

⚠WARNING

Improperly repaired equipment

Risk of injuries to users and equipment destruction due to lack of repair knowledge.

Precautions:

- ▸ Only authorised Leica Geosystems Service Centres are entitled to repair these products.

For the AC/DC power supply:

⚠WARNING

Unauthorised opening of the product

Either of the following actions may cause you to receive an electric shock:

- Touching live components
- Using the product after incorrect attempts were made to carry out repairs.

Precautions:

- ▸ Do not open the product!
- ▸ Only Leica Geosystems authorised service centres are entitled to repair these products.

For the AC/DC power supply:

⚠WARNING

Electric shock due to use under wet and severe conditions

If unit becomes wet it may cause you to receive an electric shock.

Precautions:

- ▸ If the product becomes humid, it must not be used!
- ▸ Use the product only in dry environments, for example in buildings or vehicles.

- ▸ Protect the product against humidity.

1.6 Laser Classification

1.6.1 General

General

The following chapters provide instructions and training information about laser safety according to international standard IEC 60825-1 (2014-05) and technical report IEC TR 60825-14 (2004-02). The information enables the person responsible for the product and the person who actually uses the equipment, to anticipate and avoid operational hazards.

☞ According to IEC TR 60825-14 (2004-02), products classified as laser class 1, class 2 and class 3R do not require:

- laser safety officer involvement,
- protective clothes and eyewear,
- special warning signs in the laser working area

if used and operated as defined in this User Manual due to the low eye hazard level.

☞ National laws and local regulations could impose more stringent instructions for the safe use of lasers than IEC 60825-1 (2014-05) and IEC TR 60825-14 (2004-02).

1.6.2 Scanning Laser

General

The laser incorporated in the product produces an invisible beam which emerges from the rotating mirror.

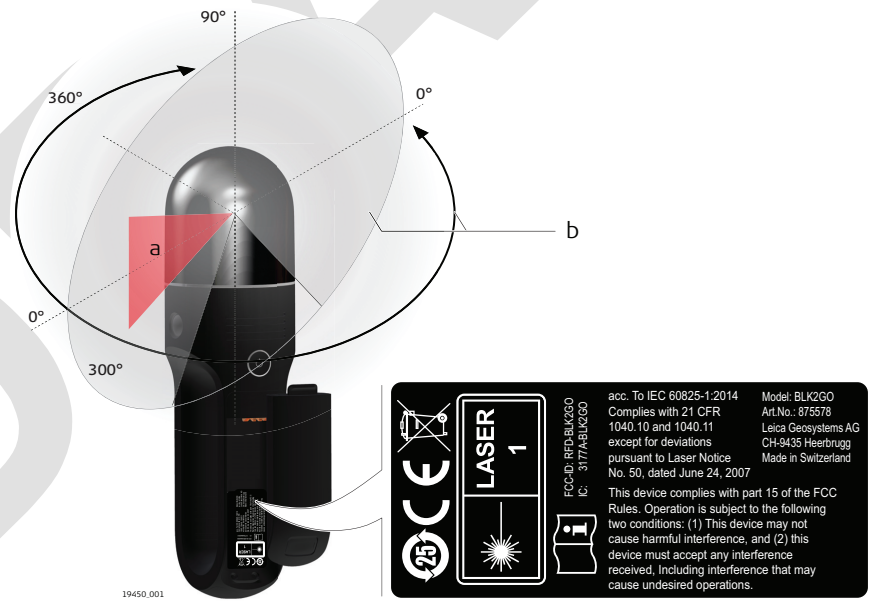
The laser product described in this section is classified as laser class 1 in accordance with:

- IEC 60825-1 (2014-05): “Safety of laser products”

These products are safe under reasonably foreseeable conditions of operation and are not harmful to the eyes provided that the products are used and maintained in accordance with this User Manual.

Description	Value
Wavelength	830 nm
Maximum pulse energy	10 nJ
Pulse duration	3 ns
Pulse repetition frequency (PRF)	1.64 MHz
Beam divergence (FWHM, full angle)	0.5 mrad
Mirror rotation	100 Hz
Base rotation	2.5 Hz

Labelling



a Location of laser beam
b Sphere of scanning laser beam

1.7 Electromagnetic Compatibility (EMC)

Description

The term Electromagnetic Compatibility is taken to mean the capability of the product to function smoothly in an environment where electromagnetic radia-

tion and electrostatic discharges are present, and without causing electromagnetic disturbances to other equipment.

⚠WARNING

Electromagnetic radiation

Electromagnetic radiation can cause disturbances in other equipment.

Precautions:

- Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that other equipment may be disturbed.

⚠CAUTION

Use of the product with accessories from other manufacturers. For example field computers, personal computers or other electronic equipment, non-standard cables or external batteries

This may cause disturbances in other equipment.

Precautions:

- Use only the equipment and accessories recommended by Leica Geosystems.
- When combined with the product, they meet the strict requirements stipulated by the guidelines and standards.
- When using computers, two-way radios or other electronic equipment, pay attention to the information about electromagnetic compatibility provided by the manufacturer.

⚠CAUTION

Intense electromagnetic radiation. For example, near radio transmitters, transponders, two-way radios or diesel generators

Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that function of the product may be disturbed in such an electromagnetic environment.

Precautions:

- Check the plausibility of results obtained under these conditions.

⚠CAUTION

Electromagnetic radiation due to improper connection of cables

If the product is operated with connecting cables attached at only one of their two ends, for example external supply cables, interface cables, the permitted level of electromagnetic radiation may be exceeded and the correct functioning of other products may be impaired.

Precautions:

- While the product is in use, connecting cables, for example product to external battery, product to computer, must be connected at both ends.

⚠WARNING

Use of product with radio or digital cellular phone devices

Electromagnetic fields can cause disturbances in other equipment, in installations, in medical devices, for example pacemakers or hearing aids and in aircrafts. Electromagnetic fields can also affect humans and animals.

Precautions:

- Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that other equipment can be disturbed or that humans or animals can be affected.
- Do not operate the product with radio or digital cellular phone devices in the vicinity of filling stations or chemical installations, or in other areas where an explosion hazard exists.
- Do not operate the product with radio or digital cellular phone devices near to medical equipment.
- Do not operate the product with radio or digital cellular phone devices in aircrafts.
- Do not operate the product with radio or digital cellular phone devices for long periods with the product immediately next to your body.

1.8 FCC Statement, Applicable in U.S.

☞ The greyed paragraph below is only applicable for products without radio.

⚠WARNING

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

⚠CAUTION

Changes or modifications not expressly approved by Leica Geosystems for compliance could void the user's authority to operate the equipment.

Labelling

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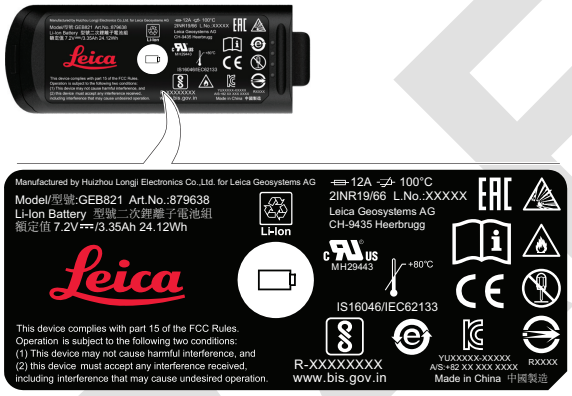
Labelling GEB821



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Labelling GKL821

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1.9 IC Statement, Applicable in Canada

⚠WARNING

This Class (B) digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe (B) est conforme à la norme NMB-003 du Canada.

Canada Compliance Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). 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.

Canada Déclaration de Conformité

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Exposure to Radio Frequency (RF) Signals

The wireless device is a radio transmitter and receiver. It is designed and manufactured not to exceed the emission limit for exposure to radio frequency (RF) energy set by the OET Bulletin 65 Supplement C / Ministry of Health (Canada), Safety Code 6. These limits are part of comprehensive guidelines and established permitted levels of RF energy for the general population. These guidelines are based on the safety standards previously set by international standard bodies. These standards include a substantial safety margin designed to assure the safety of all persons, regardless of age and health.

This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

This device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment / general public exposure limits specific in ANSI/IEEE C95.1-1992 and had been tested in accordance with the measurement procedures specified in IEEE Std. 1528-2003.

2 Description of the System

2.1 System Components

System components

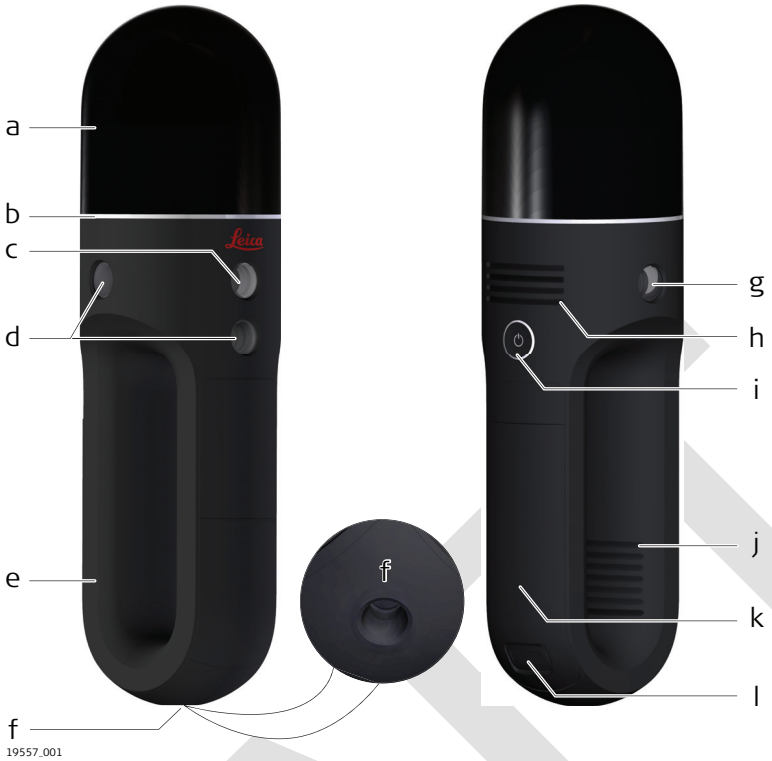
a BLK2GO with table stand
b Lithium-Ion battery GEB821 (3x)
c AC power cable
d AC power adapter
e Battery charger GKL821
f Transport case

2.2 Container Contents

Container contents

a Battery charger GKL821
b AC power adapter and AC power cable
c Transport case
d BLK2GO with battery
e BLK2GO box
f Hand strap
g USB-C data cable
h Table stand for BLK2GO
i Lithium-Ion battery GEB821 (2x)
j BLK2GO Quick Guide
k USB swing card

Instrument components

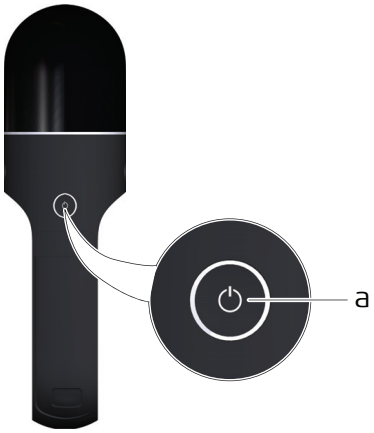


a	Dome	h	Cooling fin/air outlet
b	Ring-shaped LED	i	Power button
c	Detail camera	j	Cooling fin/air inlet
d	Panoramic camera	k	Battery compartment
e	Handle	l	Locking mechanism for battery cover
f	Mounting for table stand		
g	Panoramic camera		

3 User Interface

3.1 Power Button

Power button



a Power button

Power button	when the BLK2GO is	THEN
Press and hold the button >5 sec.	off.	The BLK2GO switches on and the LED starts blinking yellow.
Press and hold the button for 2 sec.	on and ready. The LED is continuous green.	The BLK2GO starts recording and the LED starts blinking green.
Press and hold the button >5 sec.	on and ready. The LED is continuous green.	The BLK2GO switches off immediately. Hard shut down.
Press and hold the button <0.25 sec. (quick click)	in recording mode.	The BLK2GO is taking a picture with the detail camera.
Press and hold the button for 2 sec.	in recording mode.	The BLK2GO stops recording and gets into idle state. The LED is continuous green.
Press and hold the button >5 sec.	in recording mode.	The BLK2GO switches off immediately. Hard shut-down.

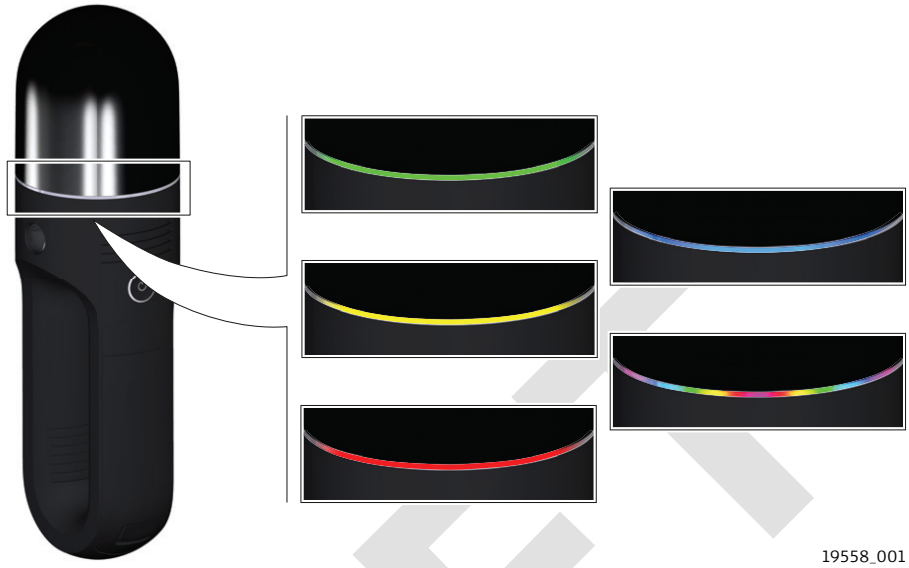
NOTICE

It is mandatory to follow always this procedure to shut down the instrument. Do not remove the battery from a running instrument!

3.2 Instrument Status

Instrument status

The ring-shaped LED lights up in different colours and lighting intervals to show the operation states of the BLK2GO.



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Description	Details
Colours	• Green • Yellow • Red • Blue • Rainbow
Lighting intervals	• Continuous • Blinking • Pulsating • 3 pulses, every 30 seconds • 1 pulse • Rotating

Operation mode

LED colour	Lighting interval	Instrument status
	none	The BLK2GO is off or in Power Safe mode.
	continuous	The BLK2GO is ready or recording. • Light green: The battery/memory has more than 30% capacity. • Dark green: The battery/memory has less than 30% capacity. ☞ In case of low battery, refer to "Charge batteries step-by-step".

LED colour	Lighting interval	Instrument status
	pulsating	The BLK2GO is in recording state.
	blinking	The BLK2GO is starting, switching off or something to be notified or action needed.
	pulsating	Message to be notified or problem.
	continuous	Critical problem or major failure. Contact a Leica Geosystems authorised service centre for further investigation.
	1 pulse	Picture from the detail camera successfully taken.

Firmware update mode

LED colour	Lighting interval	Instrument status
	rotating	The BLK2GO is running a firmware update.
	1 pulse	The firmware update was successful.
	3 pulses	The firmware update failed.

☞ Refer to the help menu in the Leica BLK2GO app for details about firmware update process.

4 Power Supply

4.1 Battery and Charger Safety

General

Use the batteries, chargers and accessories recommended by Leica Geosystems to ensure the correct functionality of the instrument.

First-time use/ charging batteries

- The battery must be charged before using it for the first time because it is delivered with an energy content as low as possible.
- The permissible temperature range for charging is from 0 °C to +40 °C/ +32 °F to +104 °F. For optimal charging, we recommend charging the batteries at a low ambient temperature of +10 °C to +20 °C/+50 °F to +68 °F if possible.
- It is normal for the battery to become warm during charging. Using the chargers recommended by Leica Geosystems, it is not possible to charge the battery once the temperature is too high.
- For new batteries or batteries that have been stored for a long time (> three months), it is effectual to make only one charge/discharge cycle.
- For Li-Ion batteries, a single discharging and charging cycle is sufficient. We recommend carrying out the process when the battery capacity indicated on the charger or on a Leica Geosystems product deviates significantly from the actual battery capacity available.

Operation/ discharging

- The batteries can be operated from −20 °C to +55 °C/−4 °F to +131 °F.
- Low operating temperatures reduce the capacity that can be drawn; high operating temperatures reduce the service life of the battery.

4.2 Charging Station

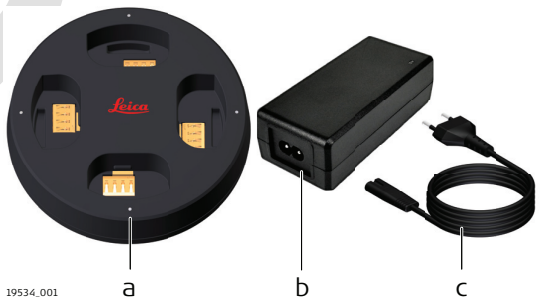
Description

The Charger GKL821 is a multi-charger for indoor-use with four battery bays. The charger is used for battery packs which are used in reality capturing equipment. In these applications, and thus for the charger, high reliability and safe operation over the expected product lifetime are of highest importance. The GKL821 offers the following functions:

- Power supply either over AC or DC
- LED to indicate the status
- Four battery positions
- Charging of two to four battery packs at the same time

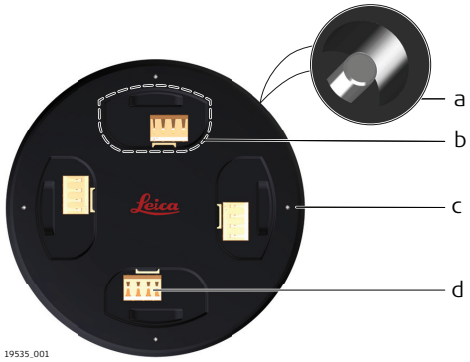
☞ The GKL821 can charge two to four batteries at a time depending on requested battery charging current.

System components



a GKL821charger
b AC/DC power adapter
c AC power cable

Charger components



a DC input
b Battery bay with charging function
c Battery status LED
d Battery connector

LED indicators

LED indicator	Status	Description
	Off	No activity.
	Solid green	The battery is fully charged.
	Blinking orange	The battery is charging.
	Solid red	Failure. Refer to "Trouble-shooting".

Power supply

The charger GKL821 is only allowed to be operated with its own AC/DC power adapter. The AC/DC power adapter is part of the delivered package.

EU 230 V~
US 120 V~
CN 220 V~
UK 230 V~
AUS 230 V~

Input voltage: 100-240 V AC

Troubleshooting

If an error occurs, the LED indicator of the related battery bay lights constantly red.

Remove and insert the battery again. Make sure that the battery is correctly positioned in the battery bay. If the failure persists, the charger must be sent to a Leica Geosystems authorised service centre.

4.3 Battery

NOTICE

Always shut down the instrument before removing the battery.

Remove and insert the battery step-by-step

Remove the battery

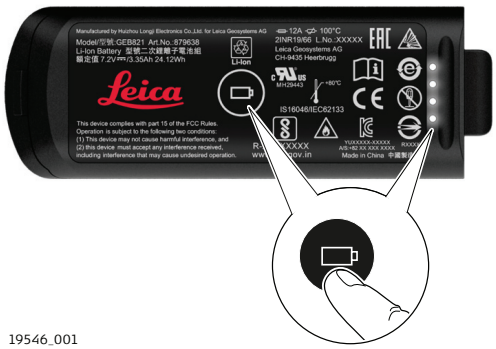
1. Slide the locking mechanism of the battery to the open position.
2. Lift the battery and remove it from the compartment.

Insert the battery

1. Attach the upper side of the battery to the compartment at an angle and then lower the bottom side.
   ☞ Ensure that the battery contact slots are facing inwards.
2. Slide the locking mechanism of the battery to the lock position to secure the battery in the compartment.
   ☞ The IP rating is only ensured if the battery is attached correctly.

Battery status

Press the status button to check the battery status.



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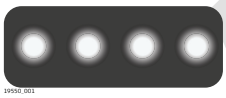
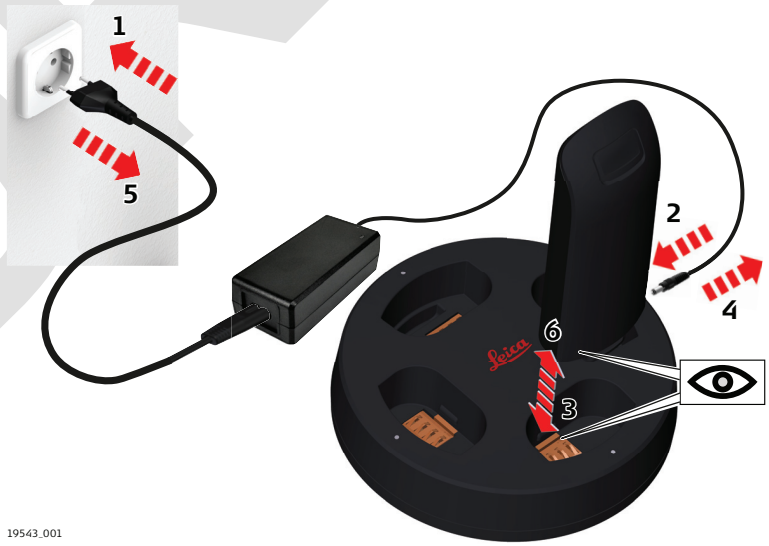
Status LED	Battery status
	0%-30%
	31%-60%
	61%-90%
	91%-100%

Charge batteries step-by-step

The GKL821 can charge 1 to 4 batteries at a time depending on requested battery charging current. If inserting more than two batteries, charging priority is given by the order of when the batteries were inserted.



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1. Plug the AC/DC power adapter into the appropriate AC power source.
2. Connect the charger plug into the DC input of the charger

3. Insert the battery with the contact slots facing downwards.

   The LED of the battery bay blinks orange  indicating the charge process.
   Refer to "LED indicators".

4. If the LED of the battery bay lights solid green  the battery is fully charged.
   Disconnect the charger plug from the DC input of the charger.
   Unplug the AC/DC power adapter from the AC power source.

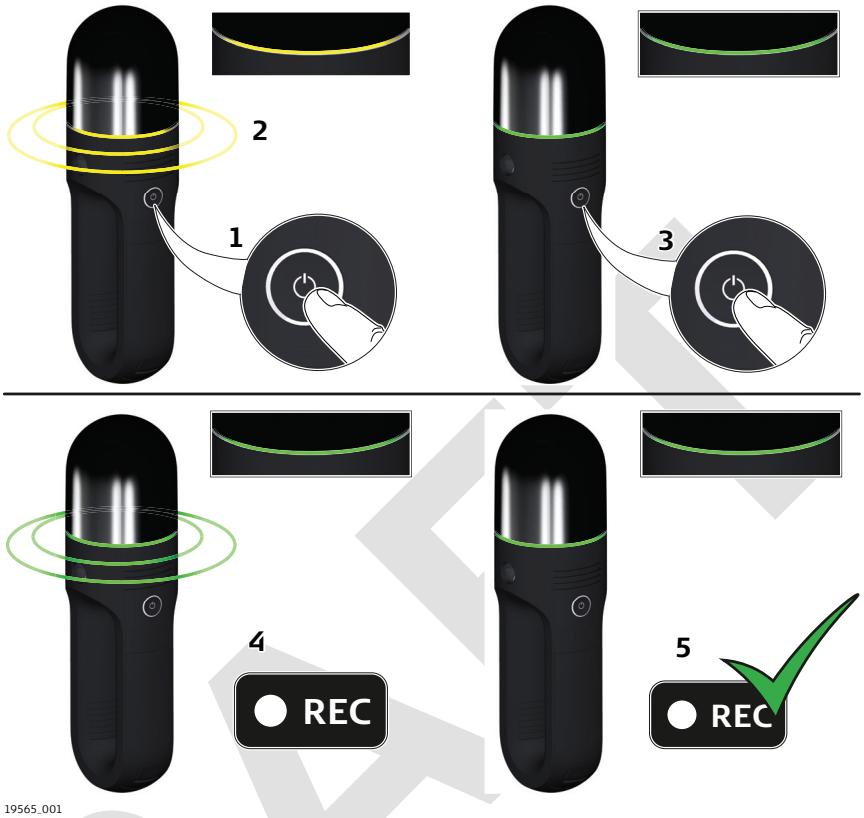
5. Carefully pull the battery upwards.

   The LED indicator of the battery bay is off  .

5 Operation

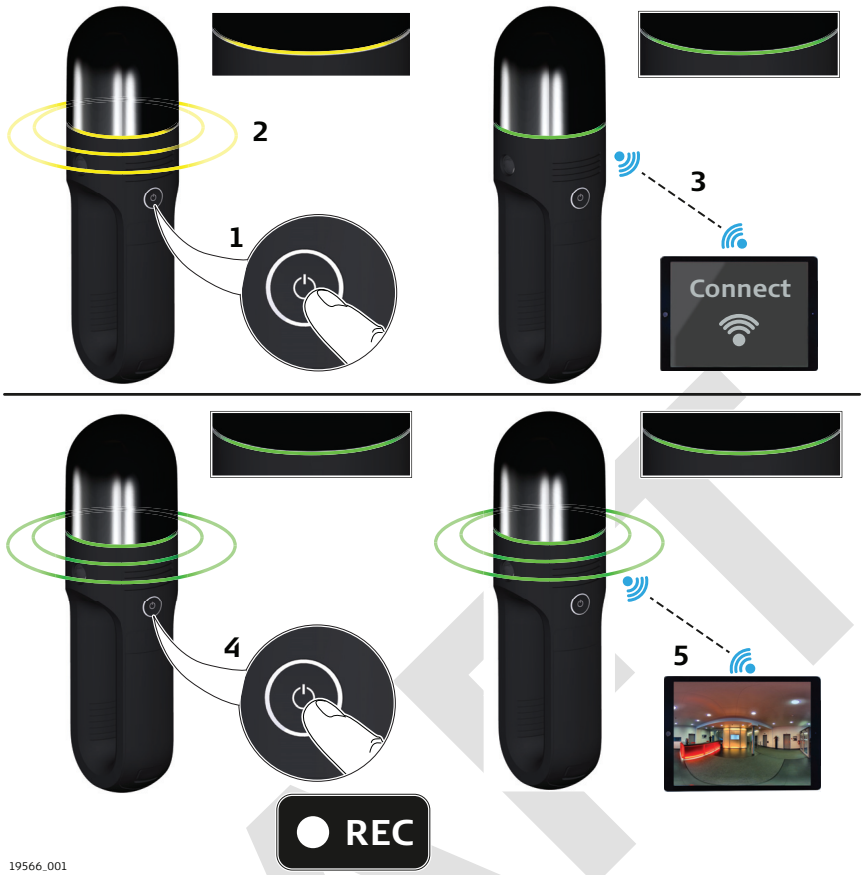
5.1 Operation - Getting Started

Stand-alone operation step-by-step



1.	Press the power button to turn on the BLK2GO.
2.	The BLK2GO is starting. The ring-shaped LED is blinking yellow.
3.	If the ring-shaped LED is continuous green, the BLK2GO is ready for operation. Press the power button to start recording.
4.	Recording starts. The ring-shaped LED is blinking green.
5.	The recording is finished. The ring-shaped LED is continuous green.

Operation with computing device connection step-by-step



1. Press the power button to turn on the BLK2GO.
2. The BLK2GO is starting. The ring-shaped LED is blinking yellow.
3. If the ring-shaped LED is continuous green, the BLK2GO is ready for operation.
   Connect the computing device with the BLK2GO.
4. Press the power button on the BLK2GO to start the recording. The ring-shaped LED is blinking green.
5. Use the computing device for immediate feedback.

Connecting to a computing device step-by-step

1. Start the BLK2GO and wait until the LED is continuous green.
2. On the computing device, select **Settings** and tap **Wi-Fi**.
3. Select the network **BLK2GO-36xxxxx** in the **Wi-Fi** settings to be connected.
   ☞ The number **36xxxxx** is the serial number of the BLK2GO.
4. Enter the password.
   ☞ The instrument specific password is printed on the label in the battery compartment (e.g. AL-123-456-789).

5. Start the app and connect the instrument.

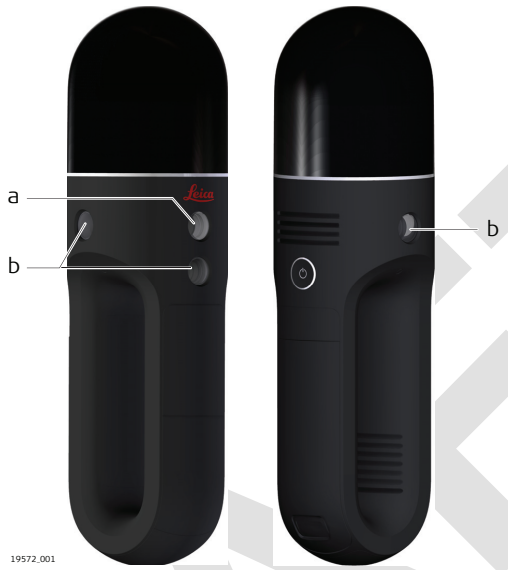
☞ For further information, refer to the help menu in the app.

5.2 Imaging

Description

The BLK2GO can collect two different types of images:
- A panoramic image using 3 calibrated panoramic cameras
- A high resolution image using the detail camera

Camera position



a Detail camera
b Panoramic camera

5.3 Scanning

5.3.1 Ambient Conditions

Unfavourable surfaces for scanning

- Highly reflective (polished metal, gloss paint)
- Highly absorbent (black)
- Translucent (clear glass)

☞ Colour, powder or tape these surfaces before scanning if necessary.

Unfavourable weather conditions for scanning

- Rain, snow or fog may adversely affect measurement quality. Always use care when scanning in these conditions.
- Surfaces that are directly illuminated by the sun cause an increased range noise and therefore a larger measurement uncertainty.
- If some objects are scanned against the sunlight or a bright spotlight, the optical receiver of the instrument can be dazzled so heavily that in this area no measured data is recorded.

Temperature changes during scanning

If the instrument is brought from a cold environment, for example from storage, into a warm and humid environment, the mirror or in extreme cases even the interior optics can condense. This may cause measurement errors.

☞ Precaution: Avoid rapid temperature changes and give the instrument time to acclimatise.

Dirt on the dome

Due to the encapsulated mirror design, the mirror is protected against direct contact. But dirt on the dome such as a layer of dust, condensation or fingerprints may cause considerable measuring errors.

5.3.2 Troubleshooting

Basic troubleshooting

Problem	Possible Cause(s)	Suggested Remedies
Missing points in scan.	Dust, debris or fingerprints on the dome.	Use a glass cleaning tissue to clean the specific areas.

Advanced troubleshooting

Problem	Possible Cause(s)	Suggested Remedies
When switching on the instrument or starting a scan, the system switches off automatically.	Capacity of battery is too low.	Recharge or change battery.
When switching on the instrument or starting a scan, the system switches off automatically even though it was totally recharged.	Battery charger is defective.	Check the function of the battery charger. Please note the charging status displayed on the battery charger.
	Internal battery is no longer charging.	At the end of its life time the internal battery has lost most of its capacity.The battery needs to be replaced.

Troubleshooting in operation mode

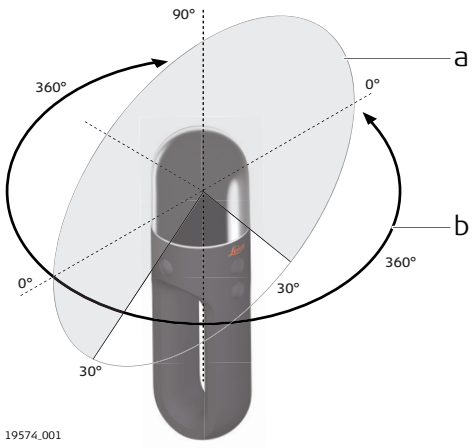
LED colour	Lighting interval	Instrument status
	3 Pulses, every 30 seconds	System warning. For example, full storage device, empty battery. Shut down the instrument and reboot again. If status does not change, check internal storage capacity and power status of battery. Delete data and/or exchange battery.
	continuous	An unrecoverable system error occurred. Shut down the instrument and reboot again. If status does not change, contact the Leica support.

Troubleshooting - support contacts

If you experience problems with your instrument, check the BLK2GO web page at Variable "fix_Support_Weblink" not defined. for support information and contacts.

5.3.3 Field of View (FoV)

Scanning laser - field of view



a Vertical field of view: 300°
b Horizontal field of view: 360°

5.4 Data Transfer

Description

Raw data can be transferred from the BLK2GO to a computing device using a wireless connection.

5.5 Cooling System

Description

The core of the cooling system is a 10-blades impeller driven by a high-speed motor. The fresh air is filtered by an inlet fine filter cartridge, to avoid dust particles entering the housing and components. The fine filter cartridge is removable and can be reached opening the handle cover. It is necessary to clean the fine filter cartridge periodically.

To remove and clean the filter, refer to "Filter Cleaning Procedure" and follow the instructions.

☞ The cleaning period depends on the environment where the BLK2GO is mostly used. The more dusty the environment is, the more frequently the BLK2GO has to be cleaned.

☞ The BLK2GO is not supposed to work in a dusty environment, since the laser measurements suffer a lot from dust refraction. Refer to "Ambient Conditions".

6 Care and Transport

6.1 Maintenance

☞ For units that are exposed to high mechanical forces, for example through frequent transport or rough handling, it is recommended to carry out test measurements periodically.

6.2 Transport

Transport in the field

When transporting the equipment in the field, always make sure that you carry the product in its original container.

Transport in a road vehicle

Never carry the product loose in a road vehicle, as it can be affected by shock and vibration. Always carry the product in its container and secure it.

For products for which no container is available use the original packaging or its equivalent.

Shipping

When transporting the product by rail, air or sea, always use the complete original Leica Geosystems packaging, container and cardboard box, or its equivalent, to protect against shock and vibration.

Shipping, transport of batteries

When transporting or shipping batteries, the person responsible for the product must ensure that the applicable national and international rules and regulations are observed. Before transportation or shipping, contact your local passenger or freight transport company.

6.3 Storage

BLK2GO

Respect the temperature limits when storing the equipment, particularly in summer if the equipment is inside a vehicle. Refer to "7 Technical Data" for information about temperature limits.

Li-Ion battery

- Refer to "7 Technical Data" for information about storage temperature range.
- Remove batteries from the product and the charger before storing.
- After storage recharge batteries before using.
- Protect batteries from damp and wetness. Wet or damp batteries must be dried before storing or use.
- A storage temperature range of 0°C to +30°C/+32°F to +86°F in a dry environment is recommended to minimise self-discharging of the battery.
- At the recommended storage temperature range, batteries containing a 40% to 50% charge can be stored for up to one year. After this storage period the batteries must be recharged.

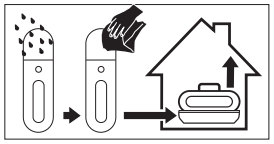
Charger and docking station

- Keep chargers and docking stations away from excessive dirt, dust and contaminants.
- After unpacking the product visually inspect the charger for possible damage.
- Unplug the product from the outlet before attempting any maintenance or cleaning.

6.4 Cleaning and Drying

Damp products

Dry the product, the transport case, the foam inserts and the accessories at a temperature not higher than 40°C /104°F and clean them. Remove the battery cover and dry the battery compartment. Do not repack until everything is completely dry. Always close the mission bag when using in the field.



Housing parts of product and accessories

- Never touch the dome with your fingers.
- Only use a clean, soft, lint-free cloth for cleaning. If necessary, moisten the cloth with water or pure alcohol. Do not use other liquids; other liquids may attack the polymer components.

Charger and AC/DC power supply

Use only a clean, soft, lint-free cloth for cleaning.

Cables and plugs

Keep plugs clean and dry. Blow away any dirt lodged in the plugs of the connecting cables.

6.5 Dome Cleaning Procedure

General cleaning information

The dome must be kept clean. The instructions must be followed as described in this chapter to clean the dome.

⚠CAUTION

Before any cleaning procedure, ensure that the instrument is switched off and the battery has been removed.

Dust and debris on the dome

Using a compressed gas duster (e.g., UltraJet® 2000 Gas Duster or UltraJet® Compressed CO2 Duster), remove dust and debris from surface of the dome.

☞ Never rub off dust or debris as this will scratch the glass and so possibly cause permanent damage to the special optical coatings.

Cleaning of the camera lenses

Soiling of the glass pane can cause extreme measurement errors and therefore useless data!

☞ All soiling that is visible on the glass pane has to be removed, except for single small dust particles that adhere inevitably.

For the glass cleaning procedure, the wet and dry lens cleaner Green Clean LC-7010 is recommended (www.green-clean.at/en.html).

Clean the glass pane regularly with the recommended cleaning tissue:

- Switch off instrument and remove the battery.
- Washing hands is necessary in order to avoid grease on the cleaning tissue.
- Better, use gloves to avoid finger oil on the glass.
- Then use the wet lens cleaning tissue (Green Clean LC-7010) until there is only a thin film of detergent visible.
- After that use the dry lens cleaning tissue (Green Clean LC-7010) to remove any remaining detergent.
- If any smears from cleaning are visible against back light, repeat the procedure.
- Do not use air from the pneumatic power system as this is always slightly oily!

6.6 Filter Cleaning Procedure

General cleaning information

If the BLK2GO reaches high temperature it is indicated by the temperature warning light. If this occurs after few minutes of operation and in standard working conditions it can be necessary to clean the fine filter cartridge.

The instructions to clean the fine filter cartridge must be followed as described in this chapter.

☞ Make sure that the cleaning procedure is carried out very carefully. The instrument must be opened, with the potential risk of dust entering the system.

NOTICE

Run the device without filter cartridge and filter cover

If the device is used without filter cartridge and filter cover, dust will suck inside and irretrievably damage inner components.

Precautions:

- ▸ Do not run the device without the filter cartridge and the filter cover properly mounted!

⚠CAUTION

Before any cleaning procedure, ensure that the instrument is switched off and the battery has been removed.

Filter cleaning procedure step-by-step

☞ Always work in a very clean indoor environment, with no draft nor breeze. Do the cleaning as fast as possible and do not leave the system open for a long time.

☞ Do not use water to clean the filters.

1. Open the handle by removing the cover sheet.
2. To remove the fine filter cartridge:
   a) Grab the bottom flap with your thumb and index finger.
   b) Gently push the fine filter cartridge towards the impeller and raise up the bottom part of it.
   c) Slide the fine filter cartridge back few millimeters, then remove it.
3. Close the impeller suction side with its proper plug after the removal of the fine filter cartridge.

The following steps **4.** to **6.** shall not be done in the same room as the mounting/dismounting takes place.

4. Clean the fine filter cartridge with fresh clean compressed air, for example with compressed air spray. Clean it from the inside of the fine filter cartridge to the out and not the vice-versa.

5. Clean the coarse suction filter with fresh clean compressed air, for example with compressed air spray. Clean it from the inside out and not the vice-versa.

6. Clean the coarse discharge filter gently with a small brush, to remove dust laying down on the aluminum ribs.

   If some particles of dust are clearly stuck inside the mesh fibers, do not try to remove them to not force it more inside or to avoid damaging the mesh.

   Do not use compressed air to clean the discharge filter.

NOTICE

Damaged filter cartridge, filter mesh or seals

If the device is used with damaged filter cartridge, filter mesh or seals, it will irretrievably damage inner components.

Precautions:

- The BLK2GO needs technical assistance from a Leica Geosystems authorised service centre if:
  - Any filter mesh is damaged.
  - The cartridge is deformed and cannot be properly plugged inside.
  - In case of damages to the O-rings which seal the filter to the impeller housing.

7 Technical Data

7.1 General Technical Data of the Product

Storage and communication

Function	Value
Internal storage	6 hours of scanning
Communication	Integrated 802.11 b/g/n/ac WLAN with MIMO.

Detail camera

Camera data	Value
Type	Colour sensor, fixed focal length
Single image	3040 x 4056 pixels
Field of view	90° x 120°
White balancing	Automatic
Minimum range	55 cm
Shutter	Rolling

Panoramic cameras

Camera data	Value
Type	Colour sensor, fixed focal length
Single image	1080 x 1440 pixels
Field of view	100° x 135°
White balancing	Automatic
Minimum range	30 cm
Shutter	Global

7.2 System Performance

System performance and accuracy

☞ All ± accuracy specifications are one sigma (1σ) under Leica Geosystems standard test conditions unless otherwise noted.

Accuracy of single measurement at 78% albedo	Value
Angle (horizontal/vertical)	30"/30"
3D point accuracy	±5 mm

7.3 Laser System Performance

Laser scanning system data

☞ The scanning system is a high speed time-of-flight unit, enhanced by Waveform Digitising (WFD) technology with a maximum scan rate of 410.000 points/second.

Laser unit:

Scanning laser	Value
Classification	Laser Class 1 (in accordance with IEC 60825-1 (2014-05))
Wavelength	830 nm (invisible)

7.4 Electrical Data

BLK2GO power supply

Internal battery
7.2 V DC; one internal battery provided with the instrument.

Battery operating and charging times

Internal battery	Value
Operating time	>30-40 minutes operating, continuous use at room temperature.
Charging time	Typical charging time with GKL821 charger is 2.5 hours at room temperature.

7.5 Environmental Specifications

7.5.1 BLK2GO

Environmental specifications BLK2GO

Temperature range:

Type	Operating temperature [°C]	Storage temperature [°C]
Instrument	+5 to +40	–25 to +70

Protection against water, dust and sand:

Type	Protection
Instrument	IP54 (IEC 60529) Dust protected BOPP Betamesh BM90 – filtration level 69 µm BOPP Betamesh BM20 – filtration level 20 µm Protection against splashing water from any direction

Humidity:

Type	Protection
Instrument	max. 95% non condensing

Lighting:

Type	Conditions
Instrument	Fully operational from bright sunlight to complete darkness.

7.5.2 Charger and Batteries

Charger and battery specifications

Temperature range for GKL821 and GEB821

Operating temperature [°C]	Mode
0 to +50	Charging and operating

Storage temperature [°C]
–40 to +70

Protection against water, dust, sand and humidity

Type	Protection
Battery	IP54 (IEC 60529) Dust protected Protection against splashing water from any direction. Humidity max. 95% non condensing.
Charger and AC/DC power supply	Only operate in dry environments, for example in buildings and vehicles.

7.6 Dimensions

Dimensions

Instrument	Dimensions [mm] (D x W x H)
Leica BLK2GO	80 x 80 x 279
to define AC power supply for charging station GKL821	to define
GKL821 charging station	120 x 120 x 36
GEB821 battery	40.5 x 113.5 x 23
Transport container	200 x 380 x 200

7.7 Weight

Weight

Instrument	Weight [kg]	Weight [lbs]
Leica BLK2GO	0.655 nominal	1.4 nominal
AC power supply for GKL821	0.1	0.3
GKL821 charging station	0.1	0.3
GEB821 battery	0.1	0.3
Leica BLK2GO transport container (without scanner and accessories)	1.0	2.3
Leica BLK2GO transport container (with scanner and standard accessories)	3.0	6.7

7.8 Accessories

Scope of delivery

Included standard accessories:

- BLK2GO transport case
- Battery charger GKL821 with AC power adapter
- Battery GEB821 (3x)
- Quick guide BLK2GO
- 12 month warranty

Additional accessories

- Additional batteries GEB821
- Fine filter cartridge
- Cover sheet

7.9 Conformity to National Regulations

Conformity to national regulations

- FCC Part 15 (applicable in US)
- Hereby, Leica Geosystems AG declares that the radio equipment type BLK2GO is in compliance with Directive 2014/53/EU and other applicable European Directives.
  The full text of the EU declaration of conformity is available at the following Internet address: http://www.leica-geosystems.com/ce.

CE Class 1 equipment according to European Directive 2014/53/EU (RED) can be placed on the market and be put into service without restrictions in any EEA member state.

- The conformity for countries with other national regulations not covered by the FCC part 15 or European Directive 2014/53/EU has to be approved prior to use and operation.

Japanese Radio Law Compliance:

- This device is granted pursuant to the Japanese Radio Law (電波法).
- This device should not be modified (otherwise the granted designation number will become invalid).

Frequency band

Type	Frequency band [MHz]
WLAN	2412 - 2462
Client mode	5000

Output power

Type	Output power [mW]
WLAN	100 max.

Antenna

Type	Antenna	Gain [dBi]
WLAN	Dual dipole antenna MIMO system	2

7.9.1 Dangerous Goods Regulations

Dangerous Goods Regulations

Many products of Leica Geosystems are powered by Lithium batteries.

Lithium batteries can be dangerous under certain conditions and can pose a safety hazard. In certain conditions, Lithium batteries can overheat and ignite.

☞ When carrying or shipping your Leica product with Lithium batteries onboard a commercial aircraft, you must do so in accordance with the **IATA Dangerous Goods Regulations**.

☞ Leica Geosystems has developed **Guidelines** on "How to carry Leica products" and "How to ship Leica products" with Lithium batteries. Before any transportation of a Leica product, we ask you to consult these guidelines on our web page (http://www.leica-geosystems.com/dgr) to ensure that you are in accordance with the IATA Dangerous Goods Regulations and that the Leica products can be transported correctly.

☞ Damaged or defective batteries are prohibited from being carried or transported onboard any aircraft. Therefore, ensure that the condition of any battery is safe for transportation.

8 Software Licence Agreement

Software Licence Agreement

This product contains software that is preinstalled on the product, or that is supplied to you on a data carrier medium, or that can be downloaded by you online according to prior authorisation from Leica Geosystems. Such software is protected by copyright and other laws and its use is defined and regulated by the Leica Geosystems Software Licence Agreement, which covers aspects such as, but not limited to, Scope of the Licence, Warranty, Intellectual Property Rights, Limitation of Liability, Exclusion of other Assurances, Governing Law and Place of Jurisdiction. Please make sure, that at any time you fully comply with the terms and conditions of the Leica Geosystems Software Licence Agreement.

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Open source information

The software on the product may contain copyright-protected software that is licensed under various open source licences.

Copies of the corresponding licences:

- are provided together with the product (for example in the About panel of the software).
- can be downloaded on http://opensource.leica-geosystems.com/blk2go.

If foreseen in the corresponding open source licence, you may obtain the corresponding source code and other related data on http://opensource.leica-geosystems.com/blk2go. Contact opensource@leica-geosystems.com in case you need additional information.

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- when it has to be **right**

Leica Geosystems