## Leica RTC360/RTC360 LT



User Manual Version 6.0 English





### Introduction

#### **Purchase**

Congratulations on the purchase of a Leica RTC360/RTC360 LT series instrument.



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.

To ensure safety when using accompanying battery charger, also observe the directions and instructions contained in the User Manual of the battery charger.



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.

Updated versions are available for download at the following Internet address: https://myworld.leica-geosystems.com > myDownloads

#### **Product identification**

The model and serial number of your product are indicated on the type label. Always refer to this information when contacting your agency or Leica Geosystems authorised service centre.

#### **Trademarks**

 Windows® is a registered trademark of Microsoft Corporation in the United States and other countries

All other 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 <a href="http://leica-geosystems.com/contact-us/sales\_support">http://leica-geosystems.com/contact-us/sales\_support</a>.

#### Available documentation

Name	Description/Format		PDF
Leica RTC360/ RTC360 LT Quick Guide	Provides an overview of the product together with technical data and safety directions. Intended as a quick reference guide.	<b>√</b>	✓
Leica RTC360/ RTC360 LT User Manual	All instructions required in order to operate the product to a basic level are contained in the User Manual. Provides an overview of the product together with technical data and safety directions.	_	<b>√</b>
Leica RTC360/ RTC360 LT Check & Adjust User Manual	All instructions required in order to perform the Check & Adjust of the instrument are contained in the separate User Manual.	_	<b>√</b>

Name	Description/Format	y	PDF
Leica RTC360 myLearning course	The course introduces the Leica RTC360 3D reality capture solution. It covers the benefits of using it, how it works and how to use it.  Leica Geosystems Online Learning	_	_

## Refer to the following resources for all RTC360/RTC360 LT documentation/software:

- The supplied USB documentation card
- https://myworld.leica-geosystems.com
- Leica Geosystems Online Learning

## **Table of Contents**

1	Safe	ty Directions	6
	1.1	General Introduction	6
	1.2	Definition of Use	6
	1.3	Limits of Use	7
	1.4	Responsibilities	7
	1.5	Hazards of Use	8
	1.6	Laser Classification	12
		1.6.1 General	12
		1.6.2 Scanning Laser	12
	1.7	Electromagnetic Compatibility (EMC)	13
2	User	Interface	16
	2.1	Power Button	16
	2.2	Instrument Status	16
	2.3	Screen	18
3	Oper	ration	19
	3.1	Instrument Setup	19
		3.1.1 General Information	19
		3.1.2 Lightweight Tripod Setup	19
		3.1.3 Heavy Duty Tripod Setup	20
		3.1.4 Upside-down Mounting	20
	3.2	Power Supply	21
		3.2.1 Batteries	21
	2.2	3.2.2 Exchanging the Batteries	21
	3.3	Operation - Getting Started	22
	3.4	Imaging	24
	3.5	Scanning 3.5.1 Ambient Conditions	24
		3.5.1 Ambient Conditions 3.5.2 Onboard Controls	24 25
		3.5.3 Settings	28
		3.5.4 Troubleshooting	33
		3.5.5 Field of View (FoV)	32
	3.6	Data Transfer	35
	3.7	Working with the USB Data Storage Device	35
	3.8	Description of the System	36
	3.0	3.8.1 Packing / Unpacking the Instrument	36
		3.8.2 Container Contents	36
		3.8.3 Backpack Contents	37
		3.8.4 Instrument Components	37
		3.8.5 System Components	38
		3.8.6 System Concept	38
		3.8.6.1 Power Concept	38
		3.8.6.2 Data Storage Concept	38
4	Care	and Transport	40
	4.1	Transport	40
	4.2	Check & Adjust	40
	4.3	Storage	40
	4.4	Cleaning and Drying	41
	4.5	Glass Cleaning Procedure	41
	4.6	Maintenance	42
5		nical Data	43
	5.1	General Technical Data of the Product	43

4 Table of Contents

	5.2	System Performance		
	5.3	Laser Sy	ystem Performance	44
	5.4	Electrica	al Data	46
		5.4.1	Pin Assignment of Lemo Ports	46
	5.5	Environr	mental Specifications	47
	5.6	Dimensi	ions	49
	5.7	Weight		51
	5.8	Accesso	pries	52
	5.9	Conform	nity to National Regulations	52
		5.9.1	RTC360/RTC360 LT	52
		5.9.2	Dangerous Goods Regulations	56
6	Softw	are Lice	ence Agreement/Warranty	57

**Table of Contents** 

## Safety Directions

## 1.1 General Introduction

#### Description

1

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.

Туре	Description
<b>⚠</b> DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
<b>MARNING</b>	Indicates a potentially hazardous situation or an unintended use which, if not avoided, could result in death or serious injury.
<b>∆</b> 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
- Measuring distances
- Scanning objects
- 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 instructions
- Use outside of the intended use and limits
- Disabling of safety systems
- Removal of hazard notices
- Opening the product using tools, for example a 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.

### **MARNING**

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 the AC/DC power supply and the battery charger.

#### **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 the product is used in accordance with the instructions
- To be familiar with local regulations relating to safety and accident prevention
- To stop operating the system and inform Leica Geosystems immediately if the product and the application become unsafe
- To ensure that the national laws, regulations and conditions for the operation of the products are respected

### 1.5 Hazards of Use

## **MARNING**

#### 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.

### **MARNING**

#### 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.

#### **MARNING**

#### Moving parts at the product during operation

Risk of squeezing extremities or entanglement of hair and/or clothes.

#### **Precautions:**

Keep a safe distance to the moving parts.

If the instrument moves unexpectedly during operation, stop the instrument via user interface (display, key) or alternatively remove the battery or main power source to prevent further movements.

## **A**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.

### **MARNING**

#### Instrument mounted sideways or upside down

If the instrument is mounted in a tilted, that is non-upright way, or even upside down, for example at a ceiling, it may drop due to an unintentional release of the locking lever which may result in serious injury.

#### **Precautions:**

- ▶ Only use the GAD121 adapter plate for tilted or upside-down mounting.
- ► Make sure that the locking lever is secured by the locking screw from unintended release by turning the locking screw in anticlockwise direction until the locking lever is locked. If the locking lever cannot be moved, it is secured.

## **N**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.

#### **MARNING**

#### 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/conductive objects.

## **MARNING**

### 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.

## **MARNING**

### Overheating hazard

If the ventilation slots are covered while the product is being used, the product can overheat and cause injury or fire.

#### **Precautions:**

Make sure that the ventilation slots are not covered by any objects while the product is being used.

### **AWARNING**

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

- 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.
- The product includes parts of Beryllium inside. Any modification of some internal parts can release dust or fragments, creating health hazard.

#### Precautions:

 $\blacktriangleright$ 



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.



Applies only for California. The product contains CR Lithium Cell(s) with perchlorate material inside – special handling may apply. Refer to <u>Department of Toxic Substances Control - Perchlorate</u> for more details.

### **WARNING**

### Lightning strike

If the product is used with accessories, for example masts, staffs, poles, you may increase the risk of being struck by lightning.

#### **Precautions:**

Do not use the product in a thunderstorm.

## **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.

### **MARNING**

#### 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 authorised Leica Geosystems Service Centres are entitled to repair these products.

## **AWARNING**

#### 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.

## **AWARNING**

### Electric shock due to missing ground connection

If unit is not connected to ground, death or serious injury can occur.

#### **Precautions:**

► The power cable and power outlet must be grounded!





## 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 evewear
- special warning signs in the laser working area if used and operated as defined in this User Manual due to the low eve 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"

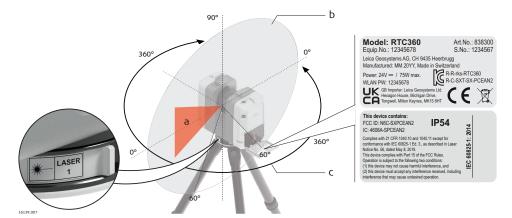
These products are safe under reasonably foreseeable conditions of operation and are not harmful to the eyes provided that the products are used and maintained in accordance with this User Manual.

Description	RTC360	RTC360 LT
Wavelength	1550 nm	1550 nm
Maximum pulse energy	1.5 µJ	1.5 μͿ
Pulse duration	0.5 ns	0.5 ns
Maximum pulse repetition frequency (PRF)	2 MHz	2 MHz
Beam divergence (1/e², full angle)	0.5 mrad	0.5 mrad
Mirror rotation	100 Hz	100 Hz

Description	RTC360	RTC360 LT
Minimal base rotation speed	5 mHz	2.5 mHz

#### Labelling

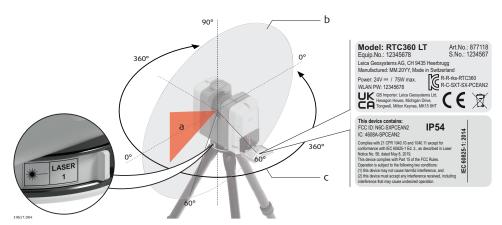
#### **RTC360**



- a Laser beam
- b Vertical laser scanning area
- c Horizontal laser scanning area

Class 1 Laser Product according to IEC 60825-1 (2014-05)

#### RTC360 LT



- a Laser beam
- b Vertical laser scanning area
- c Horizontal laser scanning area

Class 1 Laser Product according to IEC 60825-1 (2014-05)

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

## **A**CAUTION

#### **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.
- ► The product is a class A product when operated with WLAN and powered by the external AC/DC power supply. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

## **A**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, other accessories must 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.

## **A**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 the function of the product may be disturbed in such an electromagnetic environment.

#### Precautions:

Check the plausibility of results obtained under these conditions.

## **A**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, the permitted level of electromagnetic radiation may be exceeded and the correct functioning of other products may be impaired. For example, external supply cables or interface cables.

#### Precautions:

While the product is in use, connecting cables, for example product to external battery or 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, installations, medical devices, for example pacemakers or hearing aids, and 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 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.

## 2.1 Power Button

#### **Power button**

2



a Power button

Power button	when the instrument is	THEN
Press and hold the button 1 sec.	off.	The instrument switches on and the Power button starts blinking yellow.
Press and hold the button 1 sec.	on and ready.	The Power button starts blinking yellow and the instrument switches off.
Press and hold the button 10 sec.	on.	The instrument switches off immediately. Hard shutdown.

## 2.2 Instrument Status

#### Instrument status

The power button and the LED indicator light up green, yellow or red to show the operation states of the instrument.

Component	Status
Power button	lights up continuous.
	is blinking.
	is blinking.

16 User Interface

Component		Status
LED indicator		lights up continuous.
	No. See BORRESS IN the	is blinking.
		is blinking fast.

### Operation mode

#### Power **LED** indicator Instrument status button





The instrument is off.





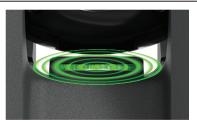
The instrument is booting up.





Instrument is ready and leveled within ±10° in upright or upside down orientation. High tilt accuracy of 18" is applied.





Instrument is ready, but tilted more than ±10° in upright or upside down orientation. High tilt accuracy of 18" is not applied.





The instrument is recording.

**User Interface** 17





The instrument is being moved and the visual inertial system is recording (RTC360 only).





The instrument is shutting down.





An unrecoverable system error occurred. Follow the instructions in the display. If necessary, shut down the instrument and reboot again. If status does not change, contact the instrument support.

## 2.3 Screen

#### Screen overview



- a Status field
- b Job field
- c Acquisition time
- d Start button
- e Scan settings
- f Setup field

18 User Interface

## 3 Operation

## 3.1 Instrument Setup

#### 3.1.1 General Information

#### Use the tripod

The instrument should always be set up on its tripod. Using the tripod specified for the scanning system guarantees maximum stability during scanning operations.



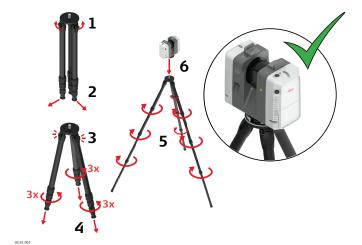
Always set up the instrument on its tripod. Do not set up the instrument directly on the ground for scanning operations.



It is always recommended to shield the instrument from direct sunlight and avoid uneven temperatures around the instrument.

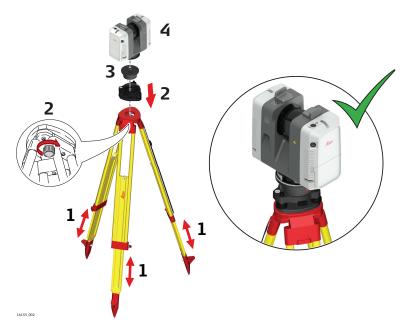
## 3.1.2 Lightweight Tripod Setup

## Instrument setup step-by-step



- 1. Unlock the locks at the top of the legs.
- 2. Unfold the legs so that the locks lock in their maximum position.
- 3. Move the legs back to a fixed position so that the locks click into place.
- 4. Unscrew the locking screws and extend the tripod legs to allow for a comfortable working posture.
- Only unscrew the locking screws by half a revolution.
- 5. Tighten all locking screws at the tripod legs.
- Remove the rubber caps at the bottom of the tripod legs to uncover spikes for usage on a soft ground.
- Do not use the spikes on slippery ground.
- 6. Place the instrument on the quick release mount and secure it.

## Instrument setup step-by-step

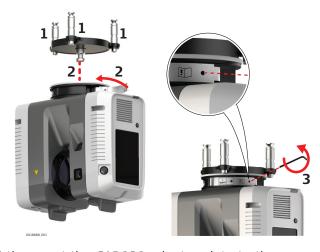


- 1. Extend the tripod legs to allow for a comfortable working posture. Ensure that the tripod plate is roughly horizontal.
- 2. Place the tribrach on the tripod and secure it with the central fixing screw.
- 3. Place the tribrach adapter on the tribrach and secure it with the locking knob of the tribrach.
- 4. Place the instrument on the quick release mount and secure it.

### 3.1.4

# Instrument setup step-by-step

## **Upside-down Mounting**



- 1. Tightly mount the GAD121 adaptor plate to the supporting surface.
- 2. Place the instrument onto the GAD121 adaptor plate and secure it by closing the locking lever.

3. Keep the locking lever closed and turn the locking screw in anticlockwise direction with the 2 mm allen key until the torque increases.

Carefully try to move the locking lever, but do not try to release it.

#### WARNING

#### Instrument mounted sideways or upside down

If the instrument is mounted in a tilted, that is non-upright way, or even upside down, for example at a ceiling, it may drop due to an unintentional release of the locking lever which may result in serious injury.

#### **Precautions:**

- ▶ Only use the GAD121 adapter plate for tilted or upside-down mounting.
- ▶ Make sure that the locking lever is secured by the locking screw from unintended release by turning the locking screw in anticlockwise direction until the locking lever is locked. If the locking lever cannot be moved, it is secured.

## 3.2 Power Supply

For details regarding the charging station refer to GKL341 User Manual.

#### 3.2.1 Batteries

#### First-time use/ charging batteries

- The batteries must be charged before using them for the first time because they are 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 a discharge/charge cycle
- For Li-lon batteries, a single discharge/charge 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

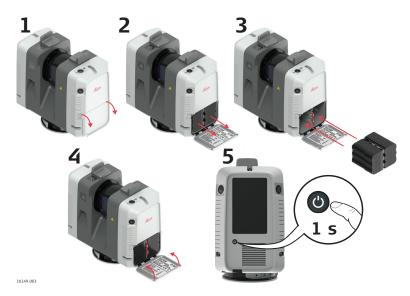
- The batteries can be operated from -20 °C to +55 °C/-4 °F to +131 °F.
- Low operating temperatures reduce the capacity that can be drawn; high operating temperatures reduce the service life of the battery.

## 3.2.2 Exchanging the Batteries

#### NOTICE

The batteries are hot-swappable. Data acquisition requires two batteries inserted into the battery compartment. The instrument does not shut down when only one battery is inserted.

Insert and remove the exchangeable batteries



- 1. Open the battery compartment.
- 2. Remove the left battery from the battery compartment by pushing the upper red button to the right.

  Remove the right battery from the battery compartment by pushing the lower red button to the left.
- 3. Insert the new batteries into the battery compartment.
- Ensure that the battery contacts are facing inwards.
- 4. Close the battery compartment.
- 5. Turn on the instrument to start the boot process.

### 3.3

### Stand-alone operation step-by-step

## **Operation - Getting Started**

green.



- 1. Press the power button to turn on the instrument.
- 2. The instrument is starting. The power button is blinking green and the LED indicator is blinking yellow.
- When the user interface is visible, the instrument is ready for operation.
   The power button and the LED indicator are now continuously

Operation with handheld device connection step-by-step



- 1. Press the power button to turn on the instrument.
- 2. The instrument is starting. The power button is blinking green and the LED indicator is blinking yellow.
- When the user interface is visible, the instrument is ready for operation.
   The power button and the LED indicator are now continuously
- 4. Connect the handheld device with the instrument.
- 5. Start the recording and simultaneous data transfer with the handheld device.
- 6. Start the processing of data on the handheld device.

Connecting to a handheld device step-by-step

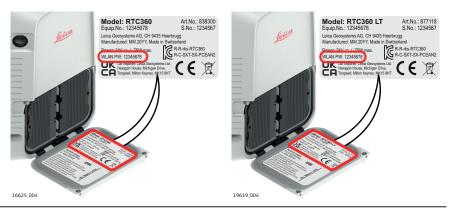
- 1. Start the instrument and wait until the user interface is visible.
- 2. On the handheld device select **Settings** and tap **WLAN**.
- 3. Select the network RTC360-298xxxx/RTC360LT-3005xxx in the WLAN settings to be connected.

The number **298xxxx/3005xxx** is the serial number of the instrument.

4. Enter the password.

green.

The instrument specific password is printed on the type label in the battery compartment, for example "test1111".



5. Start the app and connect the instrument.

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

## 3.4

## **Imaging**

Description The instrument has two different types of image sensors:

- Three calibrated cameras for HDR, 360° spherical image acquisition.
- Five calibrated cameras for the visual inertial system VIS (RTC360 only).

## **Imaging**



3 cameras for HDR imaging

## system VIS (RTC360 only)

#### 3.5 Scanning

#### 3.5.1 **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 rotating mirror-protection glass

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

#### 3.5.2

#### **Onboard Controls**

## About the Start screen

The Start screen is displayed after the system boot process. Once it is visible the instrument is ready for scanning.







RTC360 LT

#### Element

## nent Description

#### Status field

#### **High Tilt Accuracy**

High Tilt Accuracy mode enabled. Instrument is leveled within ±10° in upright or upside down orientation. High tilt accuracy of 18" is applied.



High Tilt Accuracy mode enabled. Instrument is tilted more than ±10° in upright or upside down orientation. High tilt accuracy of 18" is not applied.



WLAN enabled

## Status of exchangeable battery



100% - 75% of capacity left

Element Description		
	75% - 25% of capacity left	
	25% - 12% of capacity left	
	Less than 12% of capacity left	
	Battery not inserted	
	<ul> <li>When facing the battery compartment:</li> <li>Left battery icon indicates the status of the battery on the left side of the battery compartment.</li> <li>Right battery icon indicates the status of the battery on the right side of the battery compartment.</li> </ul>	
	Status of USB storage device	
	0% - 25% of storage used	
	25% - 75% of storage used	
	More than 75% of storage used	
	USB storage device not attached	
	Do not remove the USB storage device.	
•	Click the <b>Settings</b> icon to open the <b>Settings</b> screen.	
Job field	Click the <b>Job</b> icon to open a list of all stored jobs.	
Job 1	Name of the current scan job	

Element	nt Description	
Status of data security		Job not signed
		Job signed
		Job signed, but modified
Time	00:48	Display of the acquisition time depending on the scan settings
Start	D	Click the <b>Start</b> button to start the scan and image acquisition as defined in the scan settings.
Scan settings		Low scan resolution: 12 mm@10 m, max-imum range 130 m
		Medium scan resolution: 6 mm@10 m, maximum range 130 m
		High scan resolution: 3 mm@10 m, maximum range 65 m
		HDR image acquisition enabled
		HDR image acquisition disabled
	(2)	Double Scan enabled
	Z	Double Scan disabled
	<b>₩</b>	Visual inertial system VIS enabled (RTC360 only)
	D	Visual inertial system VIS disabled (RTC360 only)

Element		Description
Setup field	7 Setups	Number of setups in current job Click the Setup field to open the setups list with a thumbnail for each setup.

## 3.5.3 Settings

## About the Settings screen



Setting options in Settings screen:

- Scan settings
- Instrument settings
- Language
- Date and Time
- Data security

### Further options:

- Upload language files
- Upgrade firmware
- Transfer logfiles
- Perform a Check & Adjust
- Sign jobs

#### View:

- System information
- Legal information
- Regulatory information
- US patents

To close the Settings screen tap the backwards arrow.

Element				Description	
Scan settings		Resolution V Medium		Tap the arrow to select a scan resolution (low, medium or high) from the drop-down menu.	
		Image		Tap the checkbox to enable HDR image acquisition.	
		Adaptive Resolution		Tap the checkbox to enable adaptive image resolution. Image resolution gets automatically adapted to suit the selected scan resolution.	
		By default, the setting is disabled. To get images with highest resolution for all kinds of scan resolutions keep the setting disabled.			
2		Double Scan		Tap the checkbox to enable Double Scan.	
	N	VIS		Tap the checkbox to enable the visual inertial system VIS (RTC360 only).	
	•	High Tilt Accuracy		Tap the checkbox to enable High Tilt Accuracy mode. In order to achieve the specified high tilt accuracy, the approximate GPS position of the scanner must be known.	

Element

Description

High Tilt Accuracy is applied only when the instrument is positioned inside the working range of the High Tilt Accuracy mode. This is indicated by the icon in the status field of the display and by the

3.5.2 Onboard Controls.

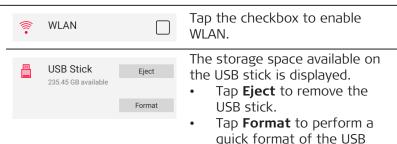
It is recommended to leave the GPS setting enabled so that the scanner's position is automatically updated.

LED indicator. Refer to 2.2 Instrument Status and

Make sure that the GPS position is updated after travelling with the scanner a long distance (> 100 km) before starting a project in a new location.

The scanner's GPS position can be updated manually by tapping the **Update** button. Refer to **Instrument settings**.

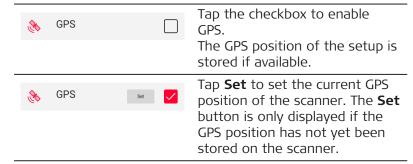
## Instrument settings



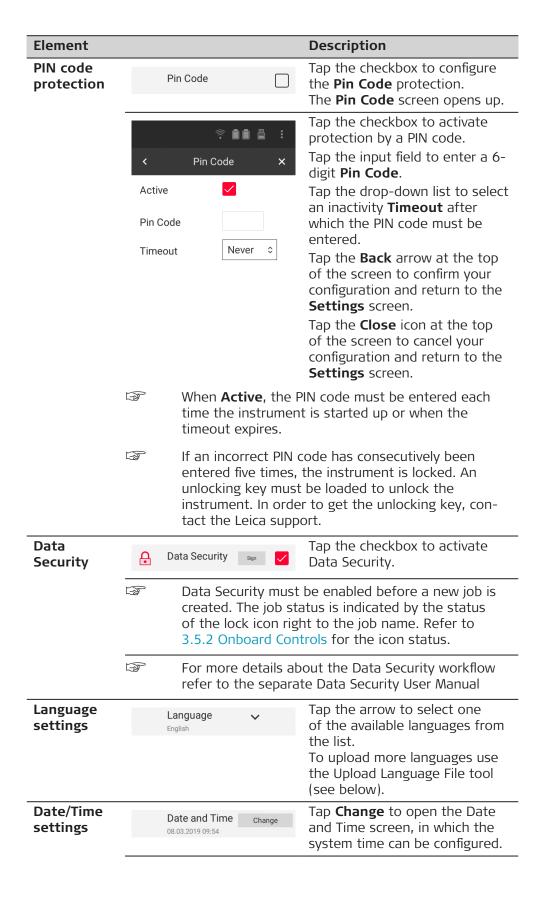
stick.

In order to avoid loss of data, only remove the USB stick when the Eject function has been completed.

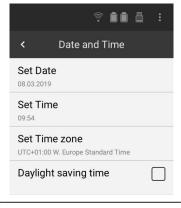
Formatting is irreversible. Make sure to back up the data from USB stick before formatting to avoid loss of data. When quick Format is performed the content of the USB stick is deleted and default directories "RTC360Store" and "Languages" are automatically created.



Element				Description
	*	GPS Update		Tap <b>Update</b> to manually update the current GPS position of the scanner.  If a GPS position is unavailable, move the scanner to an area with an open view to the sky.
	Ø	Compass		Tap the checkbox to store and use the compass reading with the setup.
	₩]	Altimeter		Tap the checkbox to determine and use relative height differences.
	M	Altimeter		Tap <b>Set</b> to set the atmospheric pressure at your reference elevation.
	M	Altimeter	<u> </u>	Tap <b>Update</b> to update the atmospheric pressure at your reference elevation.
		LED Indicator		Tap the checkbox to enable the LED indicator.
		Monitor Tilt Change		Tap the checkbox to enable monitoring of tilt change occurred during data acquisition.  To detect a tilt change of the instrument, tilt values measured before and after data acquisition are compared.  A notification of a change in tilt is displayed when the data acquisition is completed.
		By default the setting is enabled after each start- up of the device. Disable <b>Monitor Tilt Change</b> only when using the scanner on moving platforms such as ships, offshore platforms.		
		When the setting is disabled, measured tilt values are not stored.		
		To use the <b>High Accuracy Tilt</b> mode, the <b>Monitor Tilt Change</b> setting must be enabled.		
		Show Preview		Tap the checkbox to enable a scan preview. The preview will be shown when the scan is completed.
	սիսի	Sound		Tap the checkbox to enable sound notifications.



**Element Description** 



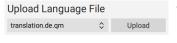
Tap **Set Date** to enter a local

Tap **Set Time** to enter a local time.

Tap **Set Time Zone** to select a time zone.

Tap the checkbox in order to adjust the time to daylight saving time.

## Language upload



- Copy the language file (\*.qm) to the Languages directory on the USB stick.
- Attach the USB stick to the instrument.
- Tap the double arrow and select the language file from the drop-down list.
- Tap Upload.

Do you want to set Deutsch as active language?

NO YES

A language can be activated directly after upload. A confirmation message will be displayed. Tap **YES** to activate the language.

Tap **NO** to keep the current language.

## Firmware upgrade



A firmware upgrade can take up to 30 minutes. Make sure that you have got sufficient battery power or provide AC power. Do not interrupt power supply during the upgrade process.



- Copy the firmware file (\*.fw) to the root directory on the USB stick.
- 2. Attach the USB stick to the instrument.
- 3. Tap the double arrow and select the firmware file from the drop-down list.
- 4. Tap **Upgrade**.
- Accept the Leica Geosystems Software Licence Agreement to start the upgrade process.

When the upgrade is complete the instrument is restarted.

Element				De	scription
Transfer of logfiles	Log Files		Transfer	1. 2.	Attach the USB stick to the instrument. Tap <b>Transfer</b> in order to export logfiles (*.logs) to the Logs directory on the USB stick.
			_		n take up to 5 minutes. Implete a message is dis-
Check & Adjust	Check & A	Adjust	Start		o <b>Start</b> to start the Check & just procedure.
					Check & Adjust, read the 60 LT Check & Adjust User
					eck & Adjust for more Check & Adjust.
	<b>7</b>		remove the procedure.	USB	s stick during Check &
System information	System In	formation	View		o <b>View</b> to get displayed ormation like: Instrument Type Serial Number Firmware Version WLAN Password Internal Temperature
Resetting EULA	EULA		Reset		Reset to reset the EULA nd-user licence agreement).
		is displa		ıst b	of the instrument, the EULA be accepted before the l.
Viewing information	Legal Info	rmation	View		o <b>View</b> to display legal ormation.
	US Patent	ts	View		o <b>View</b> to get displayed US tents.
	Regulator	y Info	View		o <b>View</b> to get displayed reguory information.

## 3.5.4 Troubleshooting

## Basic troubleshooting

Problem	Possible Cause(s)	Suggested Remedies
Missing points in scan.	Dust, debris or finger- prints on the rotating mirror-protection glass.	Use a glass cleaning tissue to clean the specific areas.

## Advanced troubleshooting

Problem	Possible Cause	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.
	Exchangeable battery is no longer charging.	At the end of its life time the exchangeable battery has lost most of its capacity. The battery needs to be replaced.

# Troubleshooting - support contacts

If you experience problems with your instrument, e-mail the scanner's log files to your local support:

- For **America**:
  - us-support@hds.leica-geosystems.com
- For South America: suporte@leica-geosystems.com.br
- For **Europe**, **Middle East** and **Africa**: euro-support@hds.leica-geosystems.com
- For Asia: asia-support@hds.leica-geosystems.com

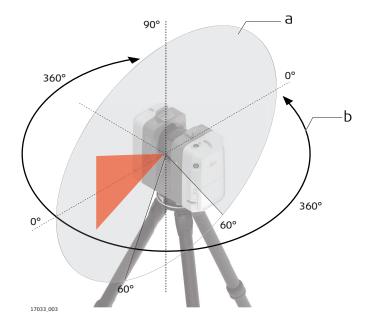


Log files can be transferred to the USB stick using the Transfer command in the Settings screen.

#### 3.5.5

## Field of View (FoV)

## Scanning laser - field of view



a Vertical field of view: 300°

b Horizontal field of view: 360°

#### **Data Transfer**

#### Description



a Preview data transfer from instrument to handheld device. Refer to 3.3 Operation - Getting Started.

#### 3.7

## Working with the USB Data Storage Device



- Keep the USB data storage device dry.
- Use it only within the specified temperature range.
- Do not bend the USB data storage device.
- Protect the USB data storage device from direct impacts.

#### Step-by-step

#### Insert and remove the USB data storage device



Only remove the USB data storage device after it has been checked out from the system using the *Eject* functionality in the **Settings** menu.



Failure to follow these instructions could result in data loss and/or permanent damage to the USB data storage device.



- 1. Open the USB compartment at the bottom of the instrument.
- 2. To insert the MS256 USB data storage device, hold the USB data storage device with the Leica logo facing to the right. Slide it into the USB slot until it clicks into position.
- Do not force the USB data storage device into the slot.

- 3. To remove the MS256 USB data storage device, slide the USB data storage device out of the USB slot.
- 4. Close the USB compartment.

#### 3.8

### **Description of the System**

#### 3.8.1

### Packing / Unpacking the Instrument

## Packing and unpacking

When in its transport container, the instrument can sit in either a face-up or face-down position.



To take the instrument out of its container, grasp the instrument at the left and right side covers, and lift.

Use caution due to the weight of the instrument (6 kg).

#### 3.8.2

#### **Container Contents**

#### **Container contents**



\*optional

- a RTC360/RTC360 LT laser scanner
- b GEB364 Lithium-Ion batteries
- GKL341 Multicharger Professional 5000
- d RTC360 USB flash drive 256 GB
- e RTC360 rain cover
- f RTC360/RTC360 LT Quick Guide
- g RTC360 System USB card
- h Tribrach\*
- i Tribrach adapter\*
- j RTC360 transport container

#### **Backpack contents**

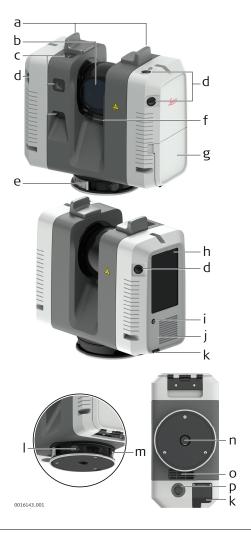


- a RTC360/RTC360 LT laser scanner
- b RTC360 backpack
- c GEB364 Lithium-Ion batteries
- d Lightweight tripod

#### 3.8.4

#### **Instrument Components**

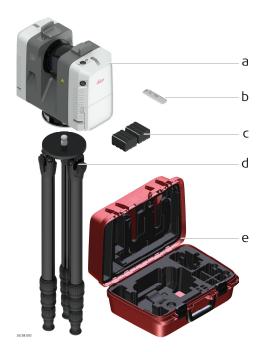
## Instrument components



- a Antennas
- b Rotating mirror/laser aperture
- c HDR cameras
- d Cameras for visual inertial system (RTC360 only)
- e Quick release
- f LED indicator
- g Battery compartment
- h Touch screen
- i On/Off button
- j Ventilation slots
- k USB slot
- I Socket for power supply, 5 pin female
- m Ethernet socket, 8 pin female
- n Quick release mount
- o Ventilation slots
- p Loudspeaker

Operation 37

#### **System components**



- a RTC360/RTC360 LT laser scanner
- b RTC360 USB flash drive
- c GEB364 exchangeable batteries
- d Lightweight tripod
- e Transport container for RTC360 and accessories

#### 3.8.6 System Concept

#### 3.8.6.1 Power Concept

#### General

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

#### **Power options**

Model	Power supply		
All instrument types	Internally by GEB364 battery, OR Externally by GEV282 AC power supply (for indoor use only).		

#### 3.8.6.2 Data Storage Concept

#### Description

Data is stored on an exchangeable USB data storage device.

#### Data storage device

The instrument comes with two Leica MS256 USB sticks (exFAT formatted) which fit into the USB slot of the instrument.

3

Only use the Leica MS256 USB stick. Other devices are not compatible and may damage the instrument.



Unplugging connecting cables or removing the USB stick during the measurement can cause loss of data. Only remove the USB stick or unplug connecting cables when the **Eject USB stick** function has been executed.

38 Operation

#### Data transfer

The LeicaMS256 USB stick is used to transfer data from the instrument to external computers.

All data recorded by the instrument and all meta data created by the field app on the remote tablet is stored on the USB stick.

Туре	Description	
Data	Scans, images, orientation	
Meta data	Registration, tags, images	
- Micta data	registration, tags, images	

Operation 39

### 4 Care and Transport

### 4.1 Transport

#### Transport in the field

When transporting the equipment in the field, always make sure that you:

- either carry the product in its original container,
- or in the backpack,
- or carry the tripod with its legs splayed across your shoulder, keeping the attached product upright.

## 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.

### 4.2 Check & Adjust



For units that are exposed to high mechanical forces, for example through frequent transport or rough handling, perform the Check & Adjust periodically. Perform the Check & Adjust also for units, which were stored for a long period.

The Check & Adjust procedure is a smart and user-friendly solution. It does not require a specific measurement field having a prescribed configuration of targets. This feature makes Check & Adjust a quick and fully automated procedure that allows the user to:

- check the current angular accuracy of the instrument,
- adjust the angular parameters to improve the angular accuracy of the instrument.

Refer to the separate RTC360/RTC360 LT Check & Adjust User Manual:

- for more information about the Check & Adjust,
- how to select a suitable location to perform a Check & Adjust.



Before performing the Check & Adjust, read the separate RTC360/RTC360 LT Check & Adjust User Manual.

### 4.3 Storage

#### RTC360/RTC360 LT

Respect the temperature limits when storing the equipment, particularly in summer if the equipment is inside a vehicle. Refer to 5.5 Environmental Specifications for information about temperature limits.

#### Li-Ion battery

- Refer to 5.5 Environmental Specifications 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 AC/DC power supply

- Keep chargers and AC/DC power supply away from excessive dirt, dust and contaminants
- After unpacking the product, visually inspect the charger for possible damages
- Unplug the product from the outlet before attempting any maintenance or cleaning

#### 4.4

#### **Cleaning and Drying**

# Housing parts of product and accessories

- Never touch the glass surfaces or the rotating mirror-protection glass with vour 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.

#### Damp products

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



## 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.

#### 4.5

#### **Glass Cleaning Procedure**

## General cleaning information

The scanning window must be kept clean. The instructions must be followed as described in this chapter to clean the scanner window.

### **A**CAUTION

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

## Dust and debris on optical surfaces

Using only a compressed gas duster to remove dust and debris from surface of scanner window.



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 optical surfaces

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 Leica cleaning tissue provided with the system is recommended.

#### 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 Leica cleaning tissue.
- 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!

#### 4.6 Maintenance



An inspection of the product must be done in a Leica Geosystems authorized service workshop. Leica Geosystems recommends an inspection of the product every 12 months.

## 5 Technical Data

### 5.1 General Technical Data of the Product

For details regarding the charging station refer to GKL341 User Manual.

#### Storage and communication

Function	Component	
Internal storage	Exchangeable 256 GB USB 3.0 storage device 235 GB effective, exFAT formatted	
Communication	Integrated 802.11 a/b/g/n WLAN	

#### Internal HDR cameras

The instrument has three integrated HDR digital cameras.

Camera data	Value	
edificia data		
Туре	Colour sensor, fixed focal length	
Single image	4000 × 3000 pixels, 62° × 48° (V × Hz) 2000 × 1500 pixels for medium scan resolution with Adaptive Resolution enabled. Refer to: <b>About the Settings screen</b> 1000 × 750 pixels for low scan resolution with Adaptive Resolution enabled. Refer to: <b>About the Settings screen</b>	
Colour depth	8-bits per RGB channel	
Full dome	36 images, automatically spatially rectified, 432 Mpx raw data, 108 and 27 Mpx raw data for medium and low scan resolution with Adaptive Resolution enabled Refer to: About the Settings screen 360° × 300° 200 Mpx on point cloud with 3 mm resolution	
White balancing	Automatic	
HDR	Automatic, 5 brackets	
Minimum range	0.5 m	

## Additional internal sensors

The RTC360/RTC360 LT is a multi-sensor system equipped with various integrated sensors to allow for automated (RTC360 only) or semi-automated online registration in the field.

Sensor	Description		
Visual inertial sys- tem VIS (RTC360 only)	Video enhanced inertial measuring system to track movement of the scanner position relative to the previous setup in real-time.		
Tilt	IMU-based.		
	High Tilt Accuracy: $18^{\prime\prime}$ in working range $\pm~10^{\circ}$ for upright and upside down orientation of the scanner with enabled High Tilt Accuracy setting.		
	Any Tilt Accuracy: 3' for any tilt.		

Sensor	Description	
Altimeter	Electronic barometer to detect the difference in elevation relative to a reference elevation.	
Compass	Electronic compass to deliver the orientation of the instrument.	
GNSS	Onboard GNSS receiver to calculate the position of the instrument.	

#### 5.2

### **System Performance**

## System performance and accuracy



All accuracy specifications are on a level of confidence of 68% according to the Guide of the Expression of Uncertainty in Measurement (JCGM100:2008).

#### Angle accuracy of single measurement

Accuracy (horizontal/vertical)	
18"/18"	

#### 3D point accuracy of single measurement

Albedo	Distance	Distance [m]			
	5	10	20	40	60
White 89%	1.4 mm	1.9 mm	2.9 mm	5.3 mm	7.8 mm
Grey 21%	1.5 mm	2.0 mm	3.2 mm	5.7 mm	8.2 mm
Black 8%	1.6 mm	2.2 mm	3.4 mm	6.1 mm	8.8 mm

#### 5.3

## **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:

- RTC360: 2.000.000 points/second
- RTC360 LT: 1.000.000 points/second

#### Laser unit:

Scanning laser	Value
Classification	Laser Class 1 (in accordance with IEC 60825-1 (2014-05))
Wavelength	1550 nm (invisible)

#### Range:

Scanning data	Value
Beam divergence	0.5 mrad (1/e <sup>2</sup> , full angle)
Beam diameter at front window	6 mm (1/e <sup>2</sup> )
Minimum range	0.3 m
Maximum range	130 m @ 89% albedo
Range accuracy	1.0 mm +10 ppm from 0.5 m to 130 m

## Range noise of single measurement:

Albedo	Distance	Distance [m]			
	5	10	20	40	60
White 89%	0.3 mm	0.4 mm	0.5 mm	0.6 mm	1.0 mm
Grey 21%	0.4 mm	0.5 mm	0.6 mm	0.8 mm	2.0 mm
Black 8%	0.5 mm	0.6 mm	0.7 mm	2.5 mm	5.0 mm

## Field-of-View (per scan):

Field-of-View	Value
Selection	Always full dome
Horizontal	360°
Vertical	300°
Scanning optics	Vertically rotating mirror on horizontally rotating base

### Maximum range for 3 settings:

Point density mode	Resolution [mm @ 10 m]	Maximum range [m]
Low	12	130
Medium	6	130
High density	3	65

### Scan duration for 3 settings:

Point density mode	Resolution [mm @ 10 m]	Estimated duration [/ full dome s	MM:SS] for a
		RTC360	RTC360 LT
Low	12	00:25	00:50
Medium	6	00:50	01:40
High density	3	01:40	03:25

## Image capturing time:

Camera type	Estimated image duration [MM:SS]
HDR	01:00

## Estimated scan size for different settings:

Point density mode	Approx. scan size [Points Hz × V]	Scan without colour [MB]	Double Scan without colour [MB]
Low	2083 × 5084	40	76
Medium	4166 × 10168	151	296
High density	8333 × 20334	586	1145

Point density	Approx. scan size	Scan with colour [MB]		Double Scan with colour [MB]	
mode	[Points Hz × V]	Full res- olution	Adaptive resolu- tion	Full res- olution	Adaptive resolu- tion
Low	2083 × 5084	296	92	333	129
Medium	4166 × 10168	408	373	551	516
High density	8333 × 20334	849	849	1413	1413

#### 5.4 Electrical Data

#### RTC360/RTC360 LT power supply and consumption

#### Power supply:

#### **Exchangeable battery**

Two exchangeable GEB364 batteries needed for operation.

#### Power consumption:

#### Instrument

30 W typical; 75 W max.

## GEB364 exchangeable battery

Supply	Value	
Туре	Li-lon	
Voltage	10.8 V	
Capacity	6.7 Ah	

## Battery operating and charging times

Exchangeable battery	Value	
Operating time	<ul> <li>up to 60 setups per battery set, typical continuous use:</li> <li>at room temperature,</li> <li>with medium resolution and</li> <li>with Imaging/VIS enabled.</li> </ul>	
Charging time	Typical charging time with charger GKL341 is 4-8 hours at room temperature.  • 1-2 batteries: up to 4 h  • 3-4 batteries: up to 8 h	

## GEV282 AC/DC power supply

Mode	Value
Input	100-240 V AC, 50-60 Hz, 2.0 A
Output	24 V DC, 6.25 A, 150 W

#### 5.4.1

#### **Pin Assignment of Lemo Ports**

**Ethernet port** 

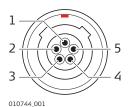
Lemo1, 8 pin female



Pin	Name
1	D1+
2	D1-
3	D2+
4	D2-
5	D3+
6	D3-
7	D4+
8	D4-

#### Power supply port

#### Lemo1, 5 pin female



Pin	Name	Function
1	PWR_IN	Power-In, 24 V
2	NC	Do not connect
3	GND	Ground
4	GND	Ground
5	PWR_IN	Power-In, 24 V

#### 5.5

## **Environmental Specifications**

## Environmental specifications

### Temperature

Туре	Operating temperature [°C]	Storage temperature [°C]
RTC360/RTC360 LT	-5 to +40	-40 to +70

Extended low temperature operation is possible down to -10 °C if internal temperature is at or above -5 °C when powered on. When the device is operated in the extended low temperature range, redundant measurements and plausibility checks are recommended to verify the measurement results.

Internal temperature can be checked in the **System Information** screen on the device. Refer to 3.5.3 Settings.

Туре	Operating temperature [°C]	Storage temperature [°C]
GEB364 battery	Charging: 0 °C to +50 °C Discharging: -20 °C to +60 °C	-40 to +70
GEV282 AC/DC power supply	0 °C to +40 °C	-10 to +80

## Protection against water, dust and sand

Туре	IP class
RTC360/RTC360 LT	<ul> <li>IP54 (IEC 60529), upright ±15°/</li> <li>upside down ±15°</li> <li>Dust protected</li> <li>Protection against splashing water from any direction</li> <li>IP51 (IEC60529), in any other position</li> <li>Dust protected</li> <li>Protection against dripping water</li> </ul>
GEB364 battery	<ul><li>IP54 (IEC 60529)</li><li>Dust protected</li><li>Protection against splashing water from any direction</li></ul>
GEV282 AC/DC power supply	Only operate in dry environments, for example in buildings and vehicles.

## Pollution degree

Туре	Pollution degree
RTC360/RTC360 LT/ GEB364 battery	4 Electrical equipment for indoor and outdoor use.
GEV282/GKL341	2 Electrical equipment for office environment.

## Humidity

Туре	Protection
RTC360/RTC360 LT/ GEB364 battery	Max 95% non-condensing.

## Lighting

Туре	Protection	
RTC360/RTC360 LT	Fully operational from bright sunlight to complete darkness.	

### Altitude

Туре	Range
RTC360/RTC360 LT/ GEB364/GKL341	Unrestricted
GEV282	0-2000 m

### Sound level

Туре	Value
RTC360/RTC360 LT	< 70 db(A)

## 5.6

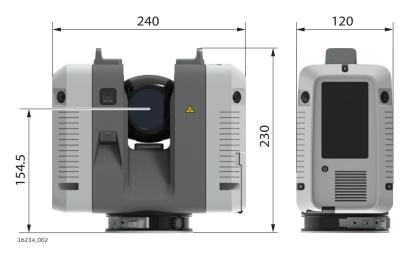
#### **Dimensions**

### **Dimensions**

Part	Dimensions [mm] (D × W × H)	Dimensions ["] (D × W × H)
RTC360/RTC360 LT laser scanner	120 × 240 × 230	4.7 × 9.4 × 9.1
GEV282 AC/DC power supply	2.5 × 72.2 × 42.0	0.1 × 2.8 × 1.7
GEB364 battery	60 × 72 × 31	2.4 × 2.8 × 1.2
GVP730 transport container	257 × 537 × 383	10.1 × 21.1 × 15.1
GVP736 backpack	200 × 350 × 460	7.9 × 13.8 × 18.1
Part	Dimensions [mm] (Diameter)	Dimensions ["] (Diameter)
GAD120 tribrach adapter	104.5 × 81.2	4.1 × 3.2
GAD121 adapter plate for flexible mounting	104.5 × 35	5.7 × 1.4
GAD122 adapter to mount a RTC360 on	104.5 × 40	4.1 × 1.6

#### RTC360/RTC360 LT laser scanner:

top of a Leica tripod



GAD120 tribrach adapter:



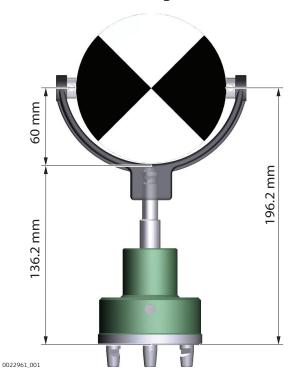
GAD121 adapter plate for flexible mounting:



GAD122 adapter to mount a RTC360 on top of a Leica tripod:



GZT21 Leica B/W 4.5" target on a GRT144 carrier:



## 5.7 Weight

## Weight

Part	Weight [kg]	Weight [lbs]
RTC360 laser scanner	5.3 nominal	11.7 nominal
RTC360 LT laser scanner	5.2 nominal	11.5 nominal
GEV282 AC/DC power supply	0.86	1.9
GEB364 battery	0.34	0.7
RTC360 transport container (without scanner and accessories)	3.67	8.1
GVP736 backpack	1.79	3.9
GAD120 tribrach adapter	0.43	0.9
GAD121 adapter plate for flexible mounting	0.85	1.9

#### 5.8

#### **Accessories**

#### Scope of delivery

Included standard accessories:

- RTC360 transport container
- GEV282 AC/DC power supply
- GKL341, Multicharger Professional 5000
- Battery GEB364, 4x
- RTC360 USB Flash Drive 256 GB, 2  $\times$
- RTC360 Rain cover
- RTC360/RTC360 LT Quick guide
- RTC360 System USB card
- Cleaning tissue
- Calibration certificate digital access via online registration

## Additional accessories

- Additional batteries GEB364
- RTC360 lightweight tripod GST80
- RTC360 tribrach adapter GAD120
- RTC360 adapter plate for flexible mounting GAD121
- Adapter to mount a RTC360 on top of a Leica tripod GAD122
- RTC360 backpack GVP730
- Range of Customer Care Products (CCP) that include support and hardware.

### 5.9

#### **Conformity to National Regulations**

#### 5.9.1

#### **RTC360/RTC360 LT**

#### Labelling RTC360



#### Labelling RTC360 LT



#### Labelling GEB364



#### Labelling GKL341



#### Labelling GEV282



16773\_002

#### Frequency band

Туре	Frequency band
WLAN 2.4 GHz	2400-2483.5 MHz

#### **Output power**

Туре	Output power	
WLAN 2.4 GHz	Max. 80 mW, at each of 2 antenna channels	

#### **Antenna**

Туре	Antenna	Gain [dBi]
WLAN 2.4 GHz	Integrated antennas 2×2 MIMO	0 dBi

EU



Hereby, Leica Geosystems AG declares that the products GEB364 and GKL341 are in compliance with the essential requirements and other relevant provisions of the 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.

EU



Hereby, Leica Geosystems AG declares that the radio equipment type RTC360/RTC360 LT 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: <a href="http://www.leica-geosystems.com/ce">http://www.leica-geosystems.com/ce</a>.

**USA** 

FCC ID: N6C-SXPCEAN2 FCC Part 15 B/C

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1. This device may not cause harmful interference, and
- 2. This device must accept any interference received, including interference that may cause undesired operation.

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, it may cause harmful interference to radio communications.

However, there is no guarantee that interference does 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.

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

#### Canada

CAN ICES-003 Class B/NMB-003 Class B IC: 4608A-SPCEAN2

#### **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

#### Japan

- 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).

#### **Others**

The conformity for countries with other national regulations has to be approved prior to use and operation.

#### **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.



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 (<u>IATA Lithium Batteries</u>) 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.

### 6 Software Licence Agreement/Warranty

## International Limited Warranty

This product is subject to the terms and conditions set out in the International Limited Warranty which you can download from the Leica Geosystems home page at <u>Leica Warranty</u> or collect from your Leica Geosystems distributor.

#### 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.

Such agreement is provided together with all products and can also be referred to and downloaded at the Leica Geosystems home page at <a href="Hexagon-Legal Documents">Hexagon-Legal Documents</a> or collected from your Leica Geosystems distributor.

You must not install or use the software unless you have read and accepted the terms and conditions of the Leica Geosystems Software Licence Agreement. Installation or use of the software or any part thereof, is deemed to be an acceptance of all the terms and conditions of such Licence Agreement. If you do not agree to all or some of the terms of such Licence Agreement, you must not download, install or use the software and you must return the unused software together with its accompanying documentation and the purchase receipt to the distributor from whom you purchased the product within ten (10) days of purchase to obtain a full refund of the purchase price.

## 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.

If foreseen in the corresponding open source licence, you may obtain the corresponding source code and other related data on <a href="http://opensource.leica-geosystems.com">http://opensource.leica-geosystems.com</a> in case you need additional information.

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