



Leica RTC300/ RTC500/RTC700

User Manual

English
Version 1.0
Model: TLS1



Introduction

Purchase

Congratulations on the purchase of a Leica RTC 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.



Keep for future reference!



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-portal.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.

This User Manual is valid for the following variants of the model TLS1:

- RTC300
- RTC500
- RTC700

Trademarks

- USB-C® is a registered trademark of USB Implementers Forum
- LEMO® is a registered trademark of Lemo SA

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 http://leica-geosystems.com/contact-us/sales_support.

Available documentation

Name	Description/Format		
Leica RTC300/ RTC500/ RTC700 Quick Guide	Provides an overview of the product together with technical data and safety directions. Intended as a quick reference guide.	✓	✓
Leica RTC300/ RTC500/ RTC700 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.	—	✓

Refer to the following resources for all RTC documentation, software and tools:

- [Link to all RTC300/RTC500/RTC700 downloads](#)



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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.

Additional symbols



Operator's manual.
Instruct the operator to read the user manual and safety instructions.



IP Class acc. IEC 60529.
Dust- and dripping water protected.



IP Class acc. IEC 60529.
Dust- and splash water protected.



IP Class acc. IEC 60529.
Dust- and water jet protected.



Product must not be opened or modified or tampered with.



Upper limit of temperature.



Generic warning.



Warning against flammable substances.



Warning against explosive material.



Warning against automatically moving parts.



Laser Warning Class 1.

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.

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 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
- To ensure that radio modems are not operated without the permission of the local authorities on frequencies and/or output power levels other than those specifically reserved and intended for use without a specific permit. The internal and external radio modems have been designed to operate on frequency ranges and output power ranges, the exact use of which differs from one region and/or country to another

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.

WARNING

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.

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 GAD132 adapter 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.

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.
- ▶ Consider the product's IP class restrictions in chapter **5 Technical data**.
- ▶ Do not drop or immerse the product into fluids.

WARNING

Short circuit of battery terminals

Risk of fire, electric shock and damage.

Precautions:

- ▶ Do not open the battery housing.
- ▶ Keep away any metallic or wet objects from the battery terminals.

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/conductive 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.

WARNING

Damaged battery housing

There is a risk of fire. In case skin or eyes have come into direct contact with electrolytes leaking from the battery, rinse them thoroughly with clear water. Immediately contact a doctor.

Precautions:

- ▶ Stop using the battery.
- ▶ Turn off any charging in action.
- ▶ If any electrolytes should leak from a damaged battery, avoid skin contact and direct inhalation of gases.

WARNING

Using charger inside a driving vehicle

This can lead to dangerous situations which may result in damage or personal injury.

Precautions:

- ▶ If it can be avoided, do not use the charger inside a driving vehicle.
- ▶ If it is necessary to use the charger inside a driving vehicle: Ensure that the charger is properly secured against sudden movements, such as acceleration, braking, or steering movements.

WARNING

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.

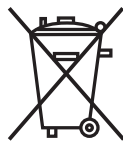
WARNING

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:

▶



The product must not be disposed of 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 Department of Toxic Substances Control - Perchlorate for more details.

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.

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.

For the AC/DC power supply and the battery charger:

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

For the AC/DC power supply and the battery charger:

⚠ 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.

For the AC/DC power supply:

⚠ WARNING

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!



The following warning is only applicable for heavy duty tripods:

⚠ WARNING

Carelessly loosening of tripod leg screws during setup or dismantling

During setup or dismantling, the upper part of the surveying tripod may unexpectedly slide down due to gravity when loosening the leg screws. As a result, fingers can be squeezed/crushed between the upper and the lower part.

Precautions:

- Always keep a safe distance between your fingers and that area.

WARNING

Improperly adjusted and maintained tripod

Improper adjustment and maintenance may lead to insufficient mechanical stability during setup, use or dismantling.

The tripod may topple over or collapse and hit a person. Fingers may be squeezed/crushed in the hinges between tripod head and legs.

Precautions:

- ▶ Always perform the tripod check and adjust procedure as described in this user manual before using the tripod.

WARNING

Transporting an unsecured tripod in a vehicle

In the event of sudden braking or accident the tripod can fly around. Due to its kinetic energy or its pointed feet, it can cause serious injury to the user or 3rd parties.

Precautions:

- ▶ Always secure the tripod properly during transport.

CAUTION

Inadequate securing of the tripod legs during transport in the field

During transport in the field the tripod legs may fold out unexpectedly and hit the user or cause him to slip, stumble or fall.

Precautions:

- ▶ Always secure the tripod legs with the integrated locking mechanism or the fixing strap.

CAUTION

Damage to instrument

Cleaning the instrument while the device is switched on can damage the instrument or the battery.

Precautions:

- ▶ Before cleaning, switch off the instrument and remove 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.

CAUTION

Dropping the product

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

Precautions:

- ▶ Secure the product when operating it.

CAUTION

Using the product under conditions of extreme wind

The product may become imbalanced and topple over or drop down (especially with attached instrument). There is a hazard of being hit by the product, slipping, together with it, stumbling or falling, resulting into head or body injury.

Precautions:

- ▶ Do not use the product with tripods, poles, staffs or struts under conditions of extreme wind.

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.

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 60825-14:2022. 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 60825-14:2022, 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 60825-14:2022.

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”

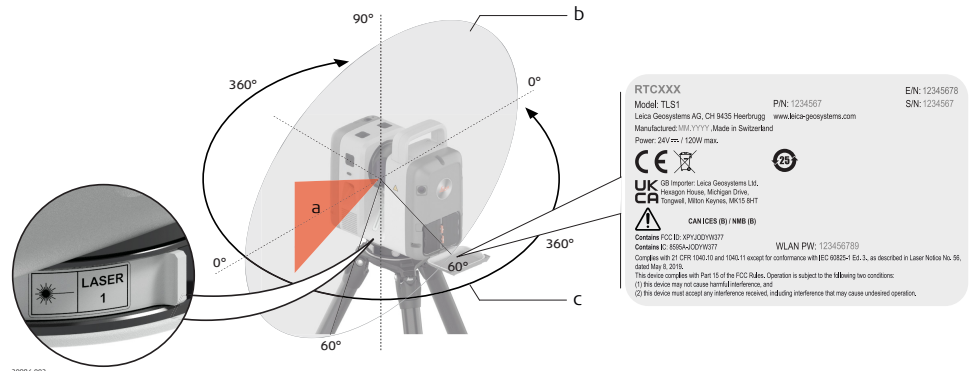
These products are safe under reasonably foreseeable conditions of operation and are not harmful to the eyes provided that the products are used and maintained in accordance with this User Manual.

Description	RTC300/RTC500/RTC700
Wavelength	1550 nm
Maximum pulse energy	2.4 µJ
Pulse duration	0.5 ns
Maximum pulse repetition frequency (PRF)	2 MHz
Beam divergence (1/e ² , full angle)	0.5 mrad
Mirror rotation	100 Hz
Minimal base rotation speed	0.08 mHz

Labelling

RTC300/RTC500/RTC700

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



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

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.

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.

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.

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.

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

User interface

2.1

Power button

Power button



a Power button

Status	Power button	Result
Off	Press and hold the button 1 s.	The instrument switches on and the LED indicator starts blinking orange.
On and ready	Press and hold the button 1 s.	The LED indicator starts blinking orange and the instrument switches off.
On	Press and hold the button 5 s.	The instrument switches off immediately. Hard shutdown.

2.2

Instrument status

Instrument status

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

LED indicator	Status
	Off
	Steady
	Blinking
	High rate blinking

Operation mode

Booting

LED indicator	Instrument status
	The instrument is off.
	The instrument is booting up or shutting down.

General operation

LED indicator	Instrument status
	The instrument is ready and levelled within $\pm 10^\circ$ in upright or upside down orientation. Tilt compensation accuracy: 3".
	The instrument is tilted more than $\pm 10^\circ$ in upright or upside-down orientation. Tilt compensation accuracy: 1'.
	The instrument is recording.
	The instrument is being moved and the visual inertial system is recording.
	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.

Firmware upgrade

LED indicator	Instrument status
	Firmware upgrade in progress.
	Firmware upgrade FAILURE.

Screen overview



3 Operation

3.1 Description of the system

3.1.1 Packing/unpacking the instrument

Packing and unpacking



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

31043.001



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

3.1.2 Container contents

Container contents



31044.001

- a RTC laser scanner
- b GEB461 Lithium-Ion batteries
- c GKL341 Multicharger Professional 5000
- d RTC rain cover
- e RTC Quick Guide
- f Tribrach¹⁾
- g GAD120 tribrach adapter¹⁾
- h GVP780 Transport container for RTC/inlay

¹⁾ Optional

3.1.3

Backpack contents

Backpack contents



3.1.4

Hardshell backpack contents

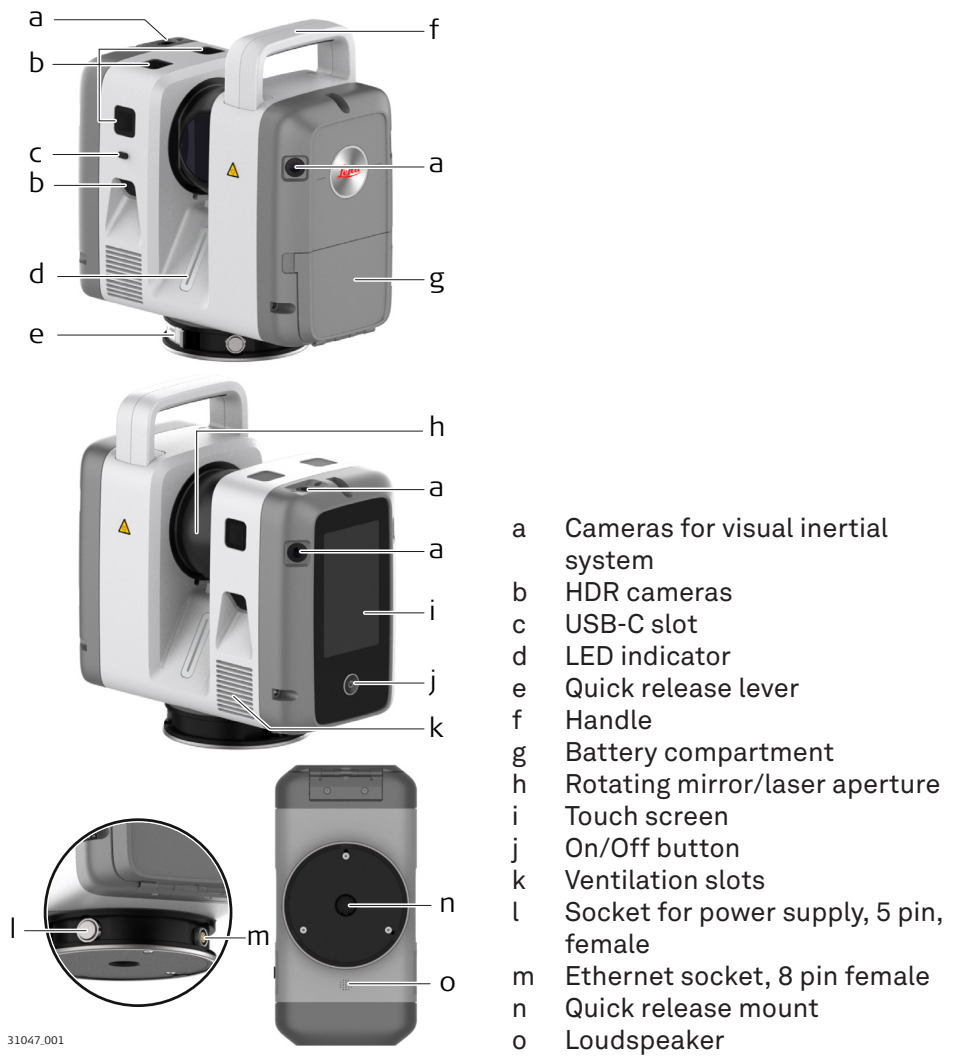
Hardshell backpack contents



3.1.5

Instrument components

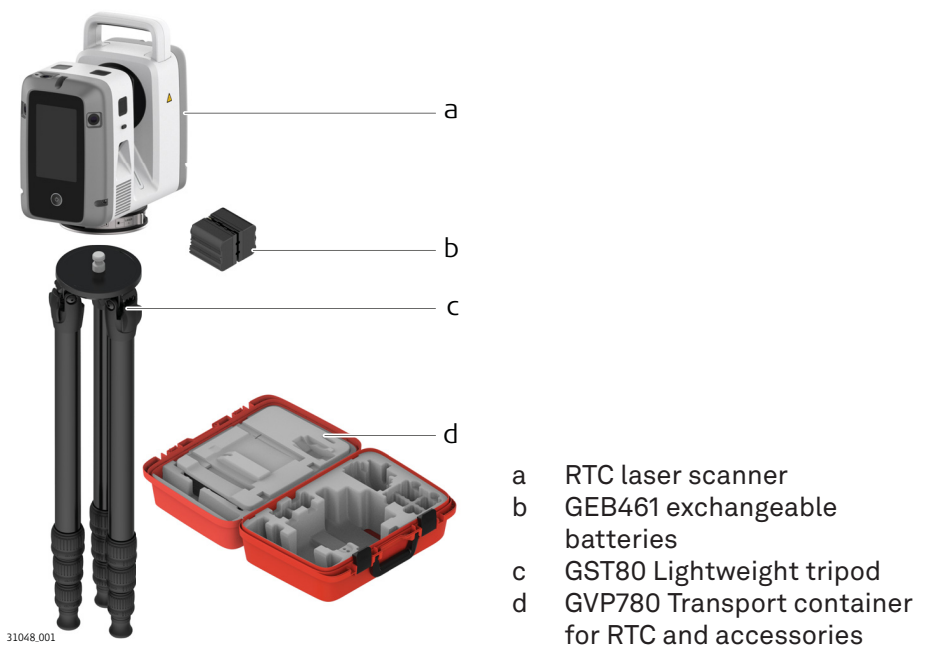
Instrument components



3.1.6

System components

System components



3.1.7 System concept

3.1.7.1 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 GEB461 battery, OR externally by GEV282 AC power supply (for indoor use only).

3.1.7.2 Data storage concept

Description

Data is stored on the internal SSD. Storage capacity is 512 GB.

Data transfer

Use an external drive with USB-C interface to transfer data to external computers or upload the data to the cloud using the Cyclone FIELD 360 App. All data recorded by the instrument and all meta data created by the field app on the remote tablet is stored on the internal SSD.

Type	Description
Data	Scans, images, orientation
Meta data	Registration, tags, images

3.2 Instrument setup

3.2.1 General information

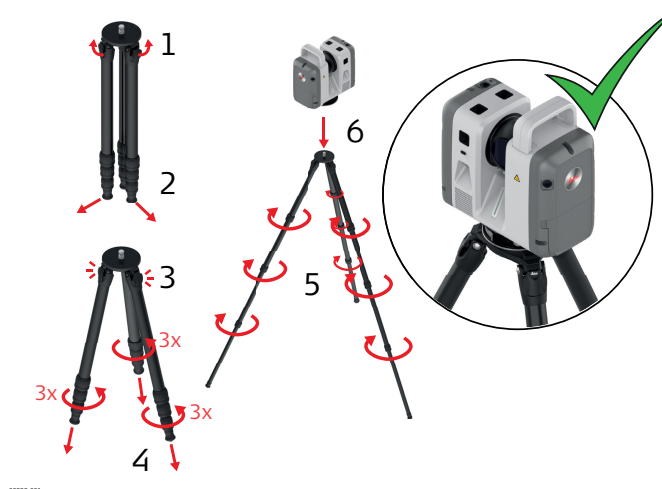
Use the tripod

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.

3.2.2 Lightweight tripod setup

Instrument setup, step-by-step



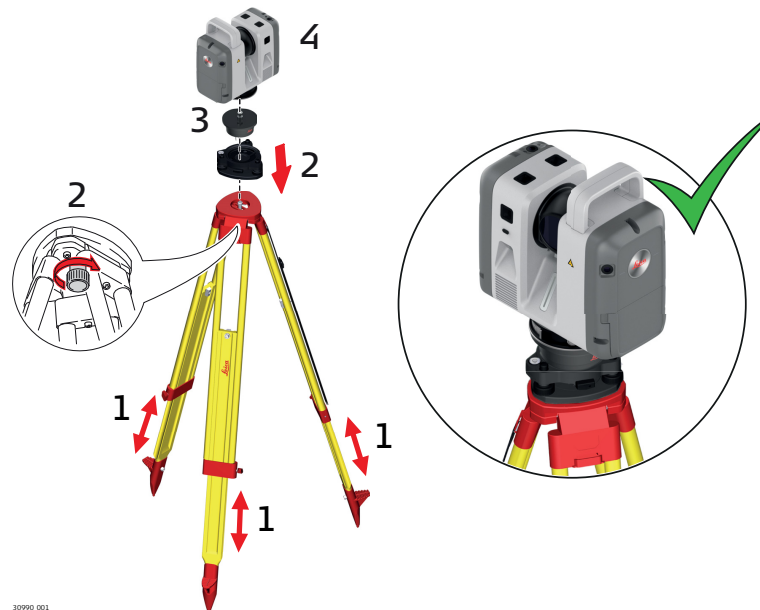
1. Unlock the locks at the top of the legs.

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.

3.2.3

Heavy duty tripod setup

Instrument setup, step-by-step



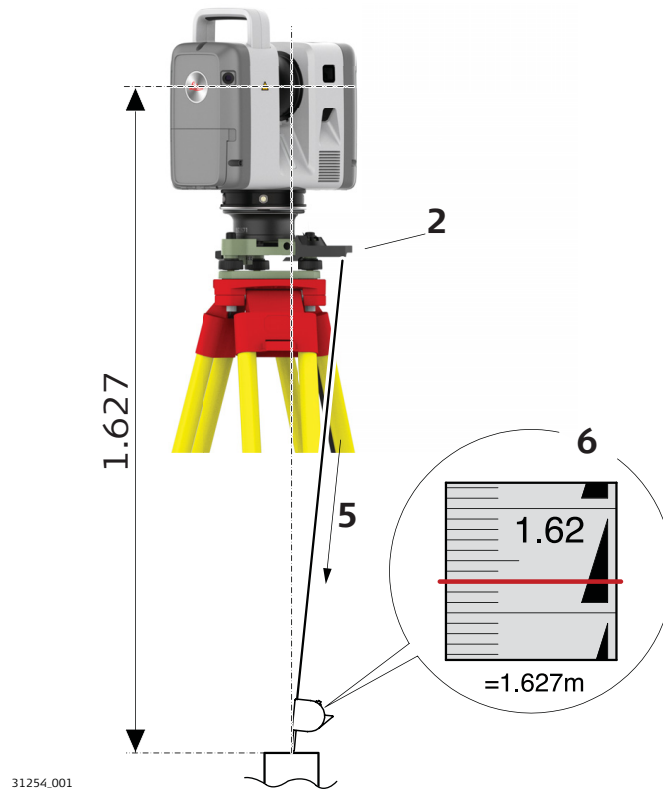
1. Extend the tripod legs to allow for a comfortable working posture. Ensure that the tripod plate is roughly horizontal.
2. Place the tribrach on the tripod and secure it with the central fixing screw.
3. Place the GAD120 tribrach adapter on the tribrach and secure it with the locking knob of the tribrach.
4. Place the instrument on the quick release mount and secure it.

Setup with optical plummet, step-by-step

1.  Extend the tripod legs to allow for a comfortable working posture. Position the tripod approximately over the marked ground point, centering it as well as possible.
2. Place the tribrach on the tripod and secure it with the central fixing screw.
3. Place the GAD120 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.
5. Press the ON/OFF button to turn on the instrument.

Instrument height measurement, step-by-step

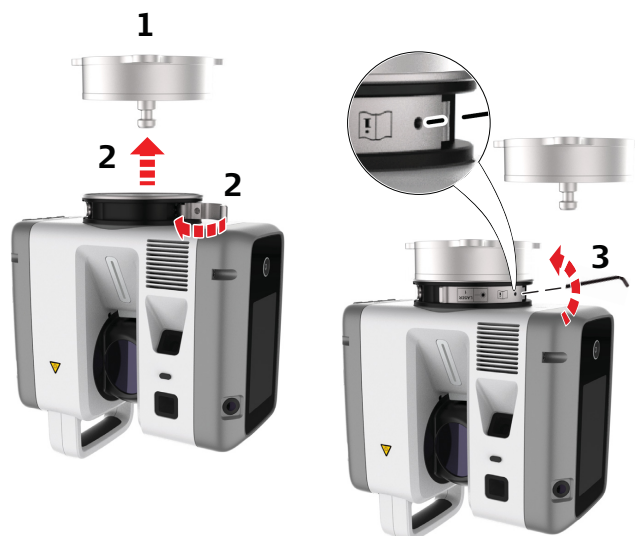
6. Move the tripod legs. Use the tribrach footscrews to centre the device over the ground point, by aiming the crosshair of the optical plummet at the center of the ground point.
 7. Adjust the tripod legs to level the circular level on the tribrach.
 8. Utilise the Digital bubble level (Settings, Digital bubble level).
 Turn the tribrach footscrews to precisely level the instrument.
 9. Centre the instrument precisely over the ground point by shifting the tribrach on the tripod plate.
 10. Repeat steps 8. and 9. until the required accuracy is achieved.
-
1. Make sure the steps in **Setup with optical plummet, step-by-step** were followed rigorously, to centre the instrument over the ground point and level it.
 2. Attach the GHT196 distance holder to the cover of one of the tribrach adjustment screws.
 Make sure the holder is properly attached; this is indicated by a “clicking” sound and tactile feedback.
 3. Unfold the measuring tongue and pull out the measuring tape of the GHM007 slightly.
 4. Slide the GHM007 into the GHT196 distance holder.
 5. Slide the body of the tape measure into the direction of the ground point, extend the tape until the tip of the measuring tongue touches the point on the ground.
 Make sure to keep the tape under tension and do not allow it to sag, close the clamp if necessary.
 6. Read the instrument height (tilt axis over ground point) directly from the reading window of the GHM007 at the red marking.
 The example shows 1.627 m.



3.2.4

Upside-down mounting

Upside-down setup,
step-by-step



1. Tightly mount the GAD132 adapter to the supporting surface, ceiling.
2. Place the instrument onto the GAD132 adapter 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 hex key until the torque increases.
Carefully try to move the locking lever, but do not try to release it.

**Upside-down setup
with the GSK5
protection cover,
step-by-step**



30991.001

1. Tightly mount the GAD132 adapter to the supporting surface, ceiling.
 2. Slide the upside-down Cover Cap over the GAD132 adapter.
 3. Place the instrument onto the GAD132 adapter and secure it by closing the locking lever.
 4. Keep the locking lever closed and turn the locking screw in anticlockwise direction with the 2 mm hex key until the torque increases.
Carefully try to move the locking lever, but do not try to release it.
 5. Join the two halves of the upside-down Cover Shell together over the device. Magnets hold the two halves together.
 6. Slide the upside-down Cover Cap over the upside-down Cover Shell as far as possible.
-  This way, the RTC300/RTC500/RTC700 is IP55 protected when mounted upside-down. Refer to **IP class** for details.

** 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 GAD132 adapter 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.

3.3

Power supply



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

3.3.1

Batteries

First-time use/ charging batteries

- The battery must be charged before using it the first time, because it is delivered with an energy content as low as possible or might be in sleep mode.
 - The permissible temperature range for charging is from 0 °C to +50 °C/ +32 °F to +122 °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-Ion 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 +60 °C/-4 °F to +140 °F
 - Low operating temperatures reduce the capacity that can be drawn; high operating temperatures reduce the service life of the battery
-

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.

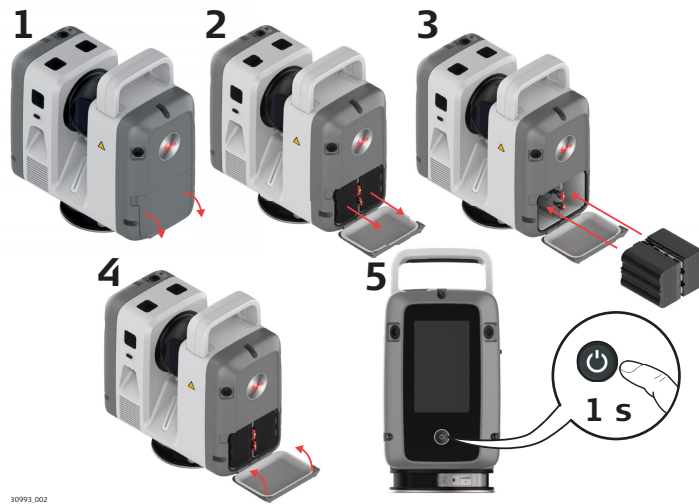


Due to the increased power demand, only GEB461 batteries are supported.



Press the battery button located next to the LED indicators to check the state of charge of the GEB461 battery.

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.
- To hot-swap the batteries, leave the device turned on while replacing the depleted batteries consecutively with two full batteries. Remove and replace one battery before removing and replacing the second one.

Stand-alone operation, step-by-step



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



Do not touch or move the instrument while the system is recording.

Operation with handheld device connection, step-by-step



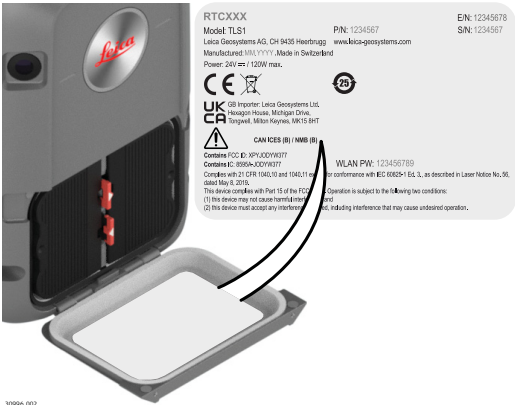
1. Press the power button to turn on the instrument.
2. The instrument is starting. The LED indicator is blinking orange.
3. When the user interface is visible, the instrument is ready for operation. The LED indicator is now continuously green.
4. Connect the handheld device with the instrument.
5. Start 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 open the Cyclone FIELD 360 app and tap **Connect scanner**.
3. Select the RTC300/RTC500/RTC700 in the **Connectivity** settings.
4. Enter the serial number of your scanner into the **SSID** field.
5. Enter the password into the **Password** field and press **Connect**.



The instrument default password is visible in the **Connectivity** screen on the scanner.
Alternatively the instrument default password is printed on the type label in the battery compartment, for example 123456789.



Alternatively, use the QR code in the **Connectivity** screen on the scanner and the QR code reader in the Cyclone FIELD 360 app to establish a connection.



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

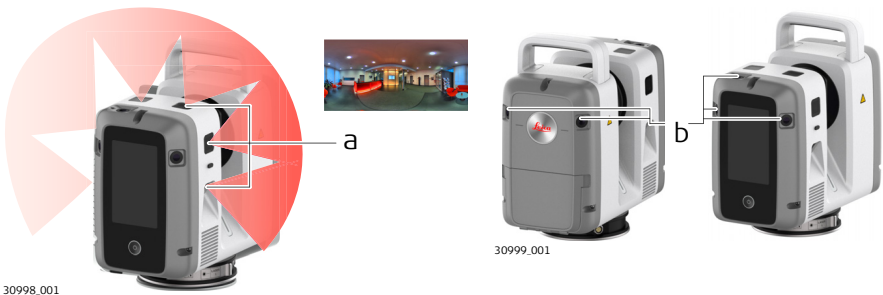
3.5

Imaging

Description

- The instrument has two different types of image sensors:
- Calibrated cameras for HDR, 360° spherical image acquisition
 - Calibrated cameras for the visual inertial system VIS.

Imaging



- a 6 cameras for HDR imaging
b 5 cameras for visual inertial system VIS

3.6	Scanning
3.6.1	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.
3.6.2	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.



31000_002

Element	Description
Status field	Status of exchangeable battery
	Battery SOC 91%-100%

Element	Description
	Battery SOC 61%-90%
	Battery SOC 36%-60%
	Battery SOC 10%-35%
	Battery status critical.
	Battery not inserted
High Tilt Accuracy	
	The instrument is ready and levelled within $\pm 10^\circ$ in upright or upside down orientation. Tilt compensation accuracy: 3".
	The instrument is tilted more than $\pm 10^\circ$ in upright or upside-down orientation. Tilt compensation accuracy: 1'.
WLAN status	
	WLAN enabled
	WLAN disabled
Status of storage device	
	Internal SSD: sufficient free space available (< 80 % full)
	Internal SSD: high storage usage (> 80 % full)
	Internal SSD: critically low free space (> 90 % full)
	Indicates that an external USB drive is connected.
General	
	Job browser

Element	Description	
		Settings
Time	01:26	Display of the acquisition time depending on the scan settings
Start		Click the Start button to start the scan and image acquisition as defined in the scan settings.
Scan settings		Fast scan resolution: 25 mm @10 m
		Low scan resolution: 12 mm @10 m
		Medium scan resolution: 6 mm @10 m
		High scan resolution: 3 mm @10 m
		Dense scan resolution: 1.6 mm @10 m
		HDR image acquisition enabled
		HDR image acquisition disabled
Job field		Thumbnail of the current scan job
	Job 5	Name of the current scan job
		Number of Setups in the current scan job

About the Job list

The job list can be accessed by tapping the **Job browser** button on the main screen. The job list allows the user to create new jobs as well as view and manage existing ones.

Element	Description	
Job list		Tap the Plus button to create a new job. The new job is automatically named and can be renamed in the context menu.
		Tap the three-dot button to open the context menu for a job.

Element	Description
Context menu	In the context menu, the user can perform several actions related to the job, by tapping the corresponding entry: - Set as active job Once set as the active job, all newly created setups will be saved to this job - Rename the job - Delete the job - Move to external storage This option is only available when a USB drive is connected.
multi-select	Tap the multiselect button to perform selected actions from the three-dot menu for all selected jobs simultaneously. The available actions are moving to external storage and deleting.
Job card	The job card indicates the job name, the number of setups in the given job and whether it is set as active job. To check and review a specific job, tap anywhere on its job card in the job list.
Job screen	Within the job screen the content of a single job can be scrolled through and reviewed. All setups that are contained in the job are listed. The three-dot menu from within the job opens the same context menu as in the job list (see above).
	The setup card gives an overview of each setup. In addition to Setup name, collection date, scan resolution, colourisation and data size, also the number of scans is noted. Both full dome and optionally area scans are counted. By tapping anywhere in the setup card, an enlarged version of the setup card, including a scan preview of the full dome scan and a three-dot menu for the selected setup, can be opened.

3.6.3

Surveying workflows

Description

The surveying workflows are available through the Cyclone FIELD 360 app. For instructions and tutorials, visit [Guided Workflows | CycloneFIELD360](#).



About the Settings screen

The **Settings** screen provides access to advanced configuration options, system information, and device management functions.



Main functionalities in the Settings screen:

- Configure WLAN settings
- Check and format onboard storage
- Check the detailed battery state
- Access the Digital bubble level

Setting options:

- General settings
- Metadata settings

Further options:

- Upgrade firmware
- Upload and change languages
- Transfer logfiles
- Reset the EULA (end-user licence agreement)

View:

- Self-calibration status
- System information
- Legal information
- Regulatory information
- US patents

Main functionalities

Element	Description	
Connectivity		Tap to select the preferred WLAN mode. Auto (default mode): Both 2.4 GHz and 5 GHz access points (APs) are available. The tablet automatically selects the most suitable WLAN AP. If a radar signal is detected, the 5 GHz AP is temporarily disabled (for approximately 1 minute), and the tablet switches to the 2.4 GHz AP to maintain connectivity. 2.4 GHz Mode: Only a 2.4 GHz WLAN AP is available. Recommended if the tablet does not reliably switch between APs or if the WLAN connection is unstable. This mode provides more stable connectivity over longer distances between the tablet and the scanner. 5 GHz Mode: Only a 5 GHz WLAN AP is available. Recommended if the tablet does not reliably switch between APs. This mode enables higher data transfer speeds. When the device is sold in a country with restrictions on WLAN bands, the functionality to switch WLAN modes is disabled, and the permitted band is enabled by default.

Functionalities with a connected USB drive

Element		Description
Storage		Check the available storage and format the drive.
Battery		Check the exact state of charge of the batteries.
Digital bubble level		Access and monitor the Digital bubble level in real time.

Element		Description
Install firmware		1. Copy the firmware file to the root directory on the USB drive. 2. Attach the USB drive to the instrument. Once connected the functionalities to interact with the USB drive appear on screen.  Tap this entry to enter the firmware installation screen.
		1. Choose and tap the Download button to install the desired firmware. 2. Accept the Leica Geosystems Software Licence Agreement when prompted. 3. After the installation is complete the instrument is restarted.  A firmware upgrade can take up to 30 minutes. Make sure that the battery power is sufficient or provide AC power. Do not interrupt power supply during the upgrade process.
Upload language file		Tap this entry to enter the language installation screen.
		Choose and tap the Download button to install the desired language.

General

Description	
	Tap the arrow to select one of the available languages from the list. To upload more languages use the Upload Language File tool. Refer to Upload language file
	Choose between a light or dark theme.
	Tap the toggle switch to enable or disable sound notifications.
	Tap Edit to select a time zone.
	1. Attach a USB drive to the instrument. 2. Tap Transfer in order to export logfiles (*.logs) to the Logs directory on the USB drive.  A transfer of logfiles can take up to 5 minutes. When the transfer is complete a message is displayed.

Capturing

Description	
	Tap the toggle switch to enable the visual inertial system VIS.
	Tap the toggle switch to enable or disable the scan preview. When enabled, a preview image is displayed after each scan.
	Tap the toggle switch to enable or disable tilt monitoring and tilt compensation. When this feature is enabled, the point cloud will be levelled. The accuracy of the tilt compensation depends on the tilt of the setup: • If the device is set up horizontally ($\pm 10^\circ$) in upright and upside down orientation of the device, the compensation accuracy is 3" • If the device is tilted more than 10°, the accuracy is 1' This is indicated by the icon in the status field of the display and by the LED indicator. Refer to 2.2 Instrument status and 3.6.2 Onboard controls. Additionally, the user is notified if the tilt of the scanner changes or it is subjected to external forces or shocks.  By default the setting is enabled after each startup of the device. Disable Tilt monitoring only when using the scanner on moving platforms such as ships or offshore platforms.  When the setting is disabled, measured tilt values are not stored.

Metadata

Description	
	Tap the toggle switch to enable or disable the storage of GNSS position data within the setup metadata.

Self-calibration

Description	
	To ensure best data quality, the device automatically performs a self-calibration during the capture workflow when required. The calibration is triggered only when suitable environmental conditions are detected. No user interaction is needed. Enter the Self-calibration menu to confirm the status of your device.

System information

Description	
	Tap this entry to view the system info.
	Tap Transfer to download the User Manual to a USB device (requires a connected USB device).
	Tap Reset to reset the EULA (end-user licence agreement).  With the next start-up of the instrument, the EULA is displayed and must be accepted before the instrument can be used.
	Tap this entry to view the legal info.
	Tap this entry to view the regulatory info.
	Tap this entry to view the US patents.

3.6.5

Troubleshooting

Basic troubleshooting

Problem	Possible Cause(s)	Suggested Remedies
Missing points in scan.	Dust, debris or fingerprints 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. Compare the charging status displayed on the battery charger with the indicator on the battery.
	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.

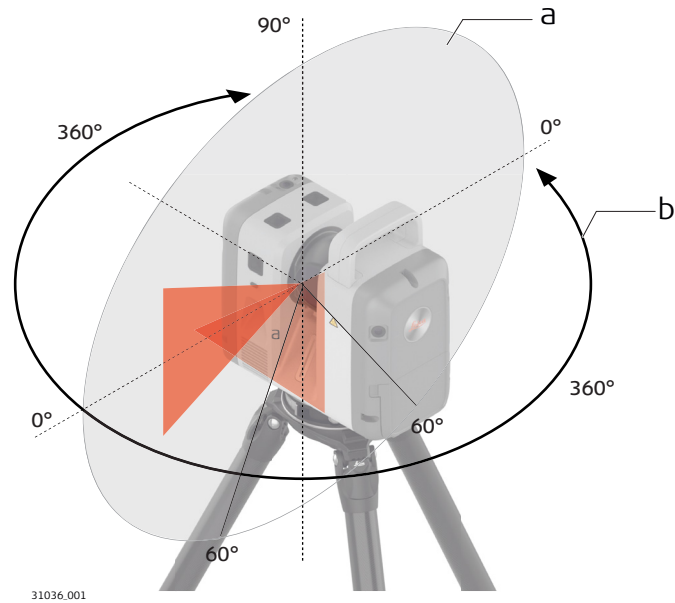
Troubleshooting support contacts

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

- For **America**:
hds.support@leicaus.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.

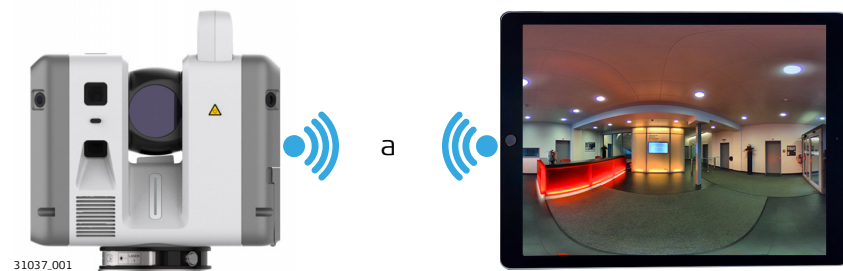
Scanning laser -
field of view

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

3.7

Data transfer

Description



- a Preview and full data transfer from instrument to handheld device. Refer to **3.4 Operation - getting started**



Data can also be transferred to the cloud using the Cyclone FIELD 360 app.

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 one of the optional backpacks, • or carry the product by its handle (only if the product is not attached to a tripod), • 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.
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	Self-calibration
	Advanced software algorithms detect suitable environments and automatically perform self-calibration in the background when necessary. Check the status of the device in the Self-calibration tab in the settings.
4.3	Storage
RTC300/RTC500/RTC700	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 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.

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.

CAUTION

Damage to instrument

Cleaning the instrument while the device is switched on can damage the instrument or the battery.

Precautions:

- Before cleaning, switch off the instrument and remove the batteries.

Dust and debris on optical surfaces

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



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 a pneumatic power system as this is always slightly oily!

Product and accessories

- Blow dust off lenses.
- Never touch the glass with your fingers.

Cleaning the touchscreen:

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



The touchscreen is covered by a thin, touch resistive foil. This foil can easily be damaged during cleaning e.g. by detergents.

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

Storage and communication

Function	Component
Internal storage	Integrated 512 GB Solid State Drive
Communication	Integrated 802.11 a/b/g/n/ac/ax WLAN 2×2 MIMO

Internal HDR cameras

The instrument has six integrated HDR digital cameras.

Camera data	Value
Type	Colour sensor, fixed focal length
Single image	12 MP effective, 4:3 aspect ratio
Colour depth	12-bits RGB
Full dome	36 images, automatically spatially rectified, 432 Mpx raw data 360° × 300° 200 Mpx on point cloud with 3 mm resolution
White balancing	Automatic
HDR	Automatic, 5 brackets, DR~16 stops, tone-mapped to 8 bit RGB
Minimum range	0.5 m

Additional internal sensors

The RTC is a multi-sensor system equipped with various integrated sensors to allow for automated registration in the field.

Sensor	Description
Visual inertial system VIS	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: The instrument is ready and levelled within $\pm 10^\circ$ in upright or upside down orientation. Tilt compensation accuracy: 3". Any Tilt Accuracy: The instrument is tilted more than $\pm 10^\circ$ in upright or upside-down orientation. Tilt compensation accuracy: 1'.
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).

Angular accuracy of single measurement

Accuracy (horizontal/vertical)

10"/10" For RTC300/RTC500/RTC700

Range

Minimal range is 0.5 m.

Type	Maximum range and minimal albedo		
	85 m	130 m	270 m
RTC300	3.5%	n/a	n/a
RTC500	3.5%	8%	n/a
RTC700	3.5%	8%	32%

Speed

Accuracy (horizontal/vertical)

RTC300 1 000 000 points per second

RTC500/RTC700 2 000 000 points per second

3D point accuracy of single measurement

Albedo	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 2 000 000 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 ($1/e^2$, full angle)
Beam diameter at front window	6 mm ($1/e^2$)
Minimum range	0.3 m
Maximum range	270 m @ 32% albedo
Range accuracy	1.2 mm +10 ppm from 0.5 m to 270 m

Range noise of single measurement:

Albedo	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	Full dome and area ²⁾ scans.
Horizontal	360°
Vertical	300°
Scanning optics	Vertically rotating mirror on horizontally rotating base

Scan duration for all settings:

Point density mode	Resolution [mm @ 10 m]	Estimated scan duration for a full dome scan [MM:SS]	
		RTC500/RTC700	RTC300
Fast	25	00:13	00:26
Low	12	00:26	00:51
Medium	6	00:51	01:42
High	3	01:42	03:24
Dense ³⁾	1.6	06:48	
Dense+ ⁴⁾	0.8	Max: 06:48	

Image capturing time:

Camera type	Estimated image duration [MM:SS]
HDR	00:30

Estimated scan size for different settings:

Point density mode	Approx. scan size [Points Hz × V]	Scan without colour [MB]	Scan with colour [MB]
Fast	1042 × 2542	10	160
Low	2083 × 5084	40	190
Medium	4166 × 10168	151	301
High	8333 × 20334	586	736
Dense ³⁾	16666 × 40668	2344	2344
Dense+ ⁴⁾	8333 × 20334	586	586

²⁾ RTC700 only, in combination with the Cyclone FIELD 360 App.

³⁾ RTC700 only

⁴⁾ RTC700 as area scan only, in combination with the Cyclone FIELD 360 App.

5.4

Electrical data

RTC power supply and consumption

Power supply:

Exchangeable battery

Two exchangeable GEB461 batteries needed for operation.

Power consumption:

Instrument

Max. 120 W

GEB461 exchangeable battery

Supply	Value
Type	Li-Ion
Voltage	10.8 V
Capacity	6.7 Ah

Battery operating and charging times

Exchangeable battery	Value
Operating time	up to 60 setups per battery set, typical continuous use: - at room temperature, - with medium resolution and - with Imaging/VIS enabled.
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

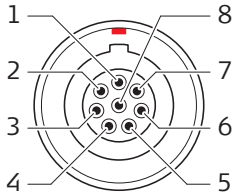
GEV282 AC/DC power supply

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

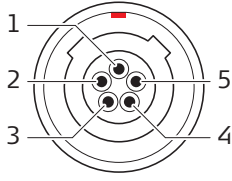
Pin assignment of Lemo ports

Ethernet port

Connector	Pin	Name
Lemo1, 8 pin female  010743_001	1	D2+
	2	D2-
	3	D1+
	4	D4+
	5	D4-
	6	D1-
	7	D3+
	8	D3-

Power supply port

Connector	Pin	Name	Function
Lemo1, 5 pin female	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



010744.001

5.5

Environmental specifications

Environmental specifications

Temperature

Type	Operating temperature [°C]	Storage temperature [°C]
RTC300/RTC500/ RTC700	-20 to +50	-40 to +70
GEB461 battery	Charging: 0 to +50 Discharging: -20 to +60	-40 to +70
GEV282 AC/DC power supply	-10 to +40	-30 to +80

Protection against water, dust and sand

Type	IP class
RTC300/RTC500/ RTC700	IP55 (IEC60529), for upright $\pm 15^\circ$ - Dust protected - Protection against low-pressure water jets
	IP55 (IEC 60529), upside down $\pm 15^\circ$ with GSK5 protection cover - Dust protected - Protection against low-pressure water jets
	IP54 (IEC 60529), upside down $\pm 15^\circ$ without GSK5 protection cover - Dust protected - Protection against splashing water
	IP51 (IEC60529), in any other position - Dust protected - Protection against dripping water
GEB461 battery	IP54 (IEC 60529) - Dust protected - Protection against splashing water from any direction
GEV282 AC/DC power supply	Only operate in dry environments, for example in buildings and vehicles.

Pollution degree

Type	Pollution degree
RTC300/ RTC500/RTC700/ GEB461 battery	4 Electrical equipment for indoor and outdoor use.
GEV282	2 Electrical equipment for office environment.

Humidity

Type	Protection
RTC300/ RTC500/RTC700/ GEB461 battery GEV282	Max 95% non-condensing.

Lighting

Type	Protection
RTC300/RTC500/ RTC700	Operational from bright sunlight to complete darkness.

Altitude

Type	Range
RTC300/ RTC500/RTC700/ GEB461 battery	0-5000 m (IEC 61010-1) Unrestricted acc. to manufacturer specification.
GEV282	0-5000 m

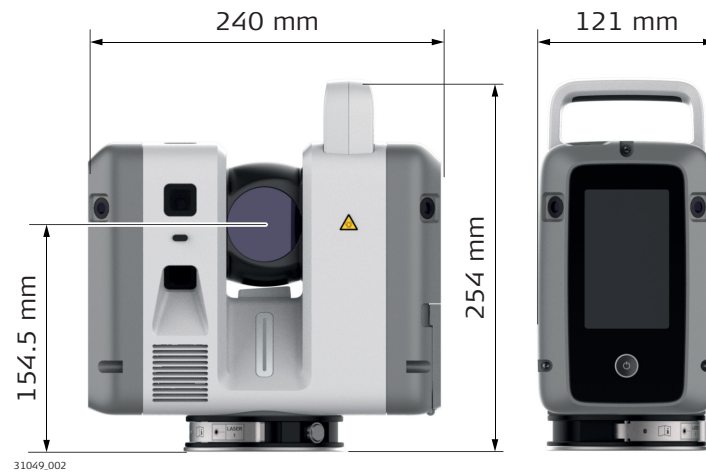
Sound level

Type	Value
RTC300/RTC500/ RTC700	< 70 db(A)

5.6**Dimensions****Dimensions**

Part	Dimensions [mm] (D × W × H)	Dimensions ["] (D × W × H)
RTC300/RTC500/RTC700 laser scanner	121 × 240 × 254	4.8 × 9.4 × 10
GEV282 AC/DC power supply	74 × 176 × 40	2.9 × 6.9 × 1.6
GEB461 battery	60 × 72 × 41	2.4 × 2.8 × 1.6
GVP780 transport container	257 × 537 × 383	10.1 × 21.1 × 15.1
GVP781 backpack	250 × 350 × 430	9.8 × 13.8 × 16.9
GVP782 hardshell backpack	230 × 400 × 550	9.0 × 15.8 × 21.6
Part	Dimensions [mm] (Diameter)	Dimensions ["] (Diameter)
GAD120 tribrach adapter	104.5 × 81.2	4.1 × 3.2
GAD132 adapter	104.5 × 55	4.1 × 2.2
GAD133 adapter for GST with 5/8"	104.5 × 55	4.1 × 2.2

RTC300/RTC500/RTC700 laser scanner:



GAD120 tribrach adapter:



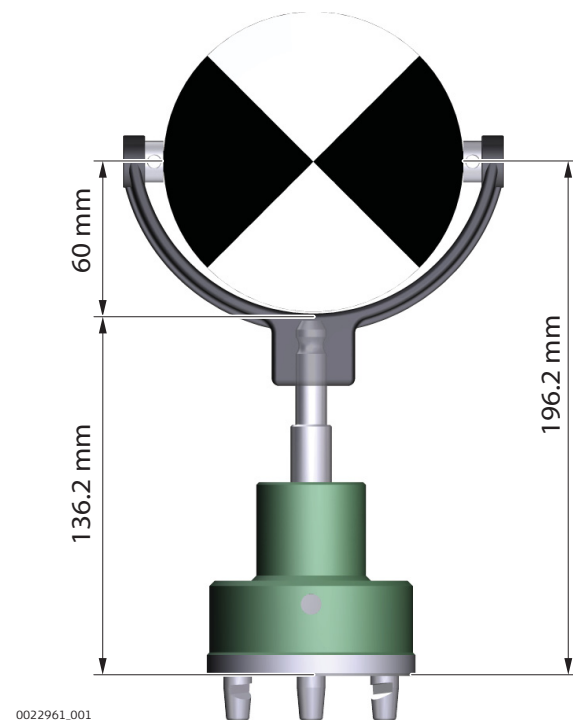
GAD132 adapter for flexible mounting:



GAD133 adapter to mount an RTC on top of a Leica topographic tripod:



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



5.7

Weight

Weight

Part	Weight [kg]	Weight [lbs]
RTC300/RTC500/RTC700 laser scanner	5.56	12.3
GEV282 AC/DC power supply	0.68	1.5
GEB461 battery	0.34	0.7
GVP780 RTC transport container (without scanner and accessories)	3.70	8.2
GVP781 backpack	1.80	4.0
GVP782 hardshell backpack	4.10	9.0
GAD120 tribrach adapter	0.43	0.9
GAD132 adapter	1.10	2.4
GAD133 adapter	0.60	1.3

5.8

Accessories

Scope of delivery

Included standard accessories:	
GVP780	RTC transport container
GKL341	Multicharger Professional 5000
GEB461	Battery, 4 ×
RTC rain cover	
RTC Quick Guide	
Cleaning tissue	
Calibration certificate Silver in paper form	

**Additional
accessories**

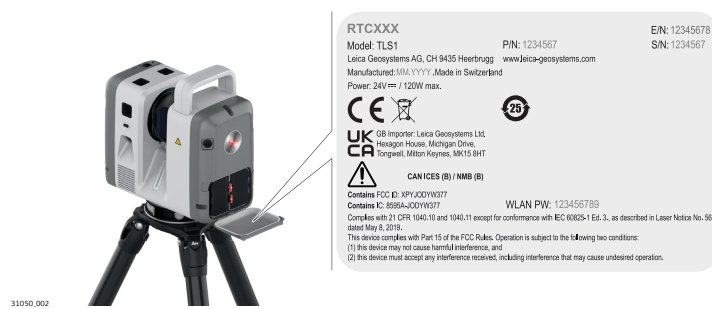
GEB461	Additional batteries
GEV282	AC/DC power supply
GST80	RTC lightweight tripod
GAD120	RTC tribrach adapter
GAD132	RTC adapter for flexible mounting
GAD133	Adapter to mount an RTC on top of a Leica topographic tripod
GVP781	RTC backpack
GVP782	RTC hardshell backpack
GSK5	Upside-down protection kit for RTC
Range of Customer Care Products (CCP) that include support and hardware	

Conformity to national regulations

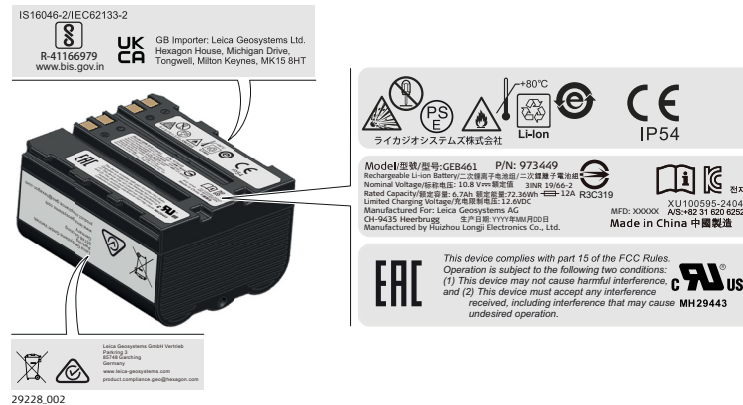
5.9.1

Labelling

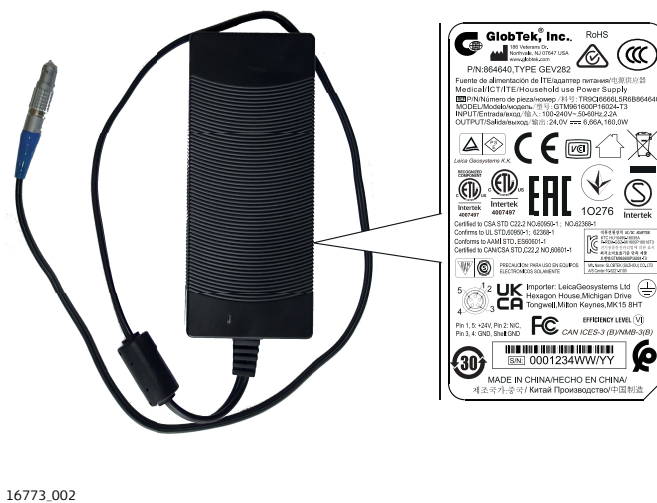
Labelling RTC300/ RTC500/RTC700



Labelling GEB461



Labelling GEV282



5.9.2

GEB461, GKL341

EU



Hereby, Leica Geosystems AG declares that the products GEB461 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>.

UK

The products, GEB461 and GKL341, are in compliance with electromagnetic compatibility regulations in the United Kingdom and is eligible to bear the UKCA mark. The manufacturer, Leica Geosystems, declares that these products have been tested and meet the relevant standards for electromagnetic emissions and immunity.

USA

FCC Part 15 B

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.

Responsible Party – U.S. Contact Information

Michael Harvey
Leica Geosystems, Inc.
10035 Via Colomba Cir #205
Fort Myers, FL 33966, USA
Tel.: (615) 585-0689
Email: michael.harvey@leicaus.com

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(B)/NMB-003(B)

Others

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

Frequency bands,
output power

Type	Frequency band [MHz]	Maximum output power [dBm EIRP]	Comments
GNSS	1575.42 GPS L1, Galileo E1, SBAS, QZSS, Beidou B1C	n/a	
	1589.0625-1605.375 GLO G1	n/a	
	1561.098 Beidou B1L		
WLAN 2.4 GHz	2400–2483 ⁵⁾	20	Europe, Australia, New Zealand, Japan. Accesspoint limited to 2400-2472 MHz.
		22	North America only 2400-2472 MHz
WLAN 5 GHz	5150–5250 ⁵⁾	21	Accesspoint disabled in Japan, Canada (Indoor Only Band).
	5250-5350 ⁶⁾	21	Accesspoint disabled in EU, Australia, New Zealand, Japan (Indoor Only Band).
	5470-5725 ⁵⁾ (except 5600-5650)	23	5600-5650 MHz: Disabled in Canada, Australia 5600-5650 MHz: Accesspoint disabled in North America
	5725–5835 ⁵⁾	22	North America, Australia, New Zealand. Disabled in Japan.
		14	Europe Disabled in Japan.

Radio Exposure
Statement

In order to comply with RF Exposure requirements, this device must be used/ installed to provide at least 20 cm separation from the human body at all times.

EU



Hereby, Leica Geosystems AG declares that the radio equipment type TLS1 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>.

⁵⁾ Mode: Accesspoint and Station

⁶⁾ Mode: Station

UK

Hereby, Leica Geosystems AG declares that the radio equipment type TLS1 is following the provisions of the applicable relevant statutory requirement S.I. 2017 No. 1206 Radio Equipment Regulations 2017.

USA

Contains FCC ID: XPYJODYW377
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.

Responsible Party – U.S. Contact Information
Michael Harvey
Leica Geosystems, Inc.
10035 Via Colomba Cir #205
Fort Myers, FL 33966, USA
Tel.: (615) 585-0689
Email: michael.harvey@leicaus.com

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(B)/NMB-003(B)
Contains IC: 8595A-JODY377

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 du dispositif

Japan

- This device is granted pursuant to the Japanese Radio Law (電波法) and the Japanese Telecommunications Business Law (電気通信事業法).
- 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.

5.9.4

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**.



There are guidelines on **How to carry** and **How to ship** products with Lithium batteries. Before any transportation of a Leica product, we ask you to consult the guidelines on the web page ([IATA Lithium Batteries](#)) 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.

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 [Leica Warranty](#) 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 [Hexagon – Legal Documents](#) 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 <http://opensource.leica-geosystems.com>. Contact opensource@leica-geosystems.com in case you need additional information.



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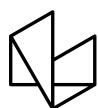
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HEXAGON