

Spectra Geospatial Ranger 5 Data Collector

User Guide

Model: 121900
Version 2.00, Revision B
May 2024

SPECTRA
GEOSPATIAL®

Legal Notices

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Global technical support

To request detailed technical assistance for Spectra Geospatial solutions, contact trimble_support@trimble.com or locate the appropriate Trimble Support representative for your solution.

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Release Notice

This is the May 2024 release (Version 2.00, Revision B) of the Spectra Geospatial Ranger 5 data collector documentation.

Recycling information

You should dispose of the device and accessories properly according to local laws and regulations. Because the device contains electronic components, it must be disposed of separately from household waste. When the device reaches its end of life, contact your local Spectra Geospatial dealer to learn about disposal and recycling options for your area.

Recycling in Europe



The symbol above means that according to local laws and regulations your product and/or its battery shall be disposed of separately from household waste. When this product reaches its end of life, take it to a collection point designated by local authorities. The separate collection and recycling of your product and/or its battery at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.

For information about recycling Trimble WEEE (Waste Electrical and Electronic Equipment) products that run on electrical power go to <https://www.trimble.com/en/our-commitment/responsible-business/product-compliance/environmental-compliance/spectrageospatial.com/weee-and-rohs/>.

The ERFC Netherlands will recycle on behalf of Trimble Distributors, conforming to the European Union's WEEE Directive 2002/96/EC, any WEEE supplied to the market by Trimble Inc., their partners and/or subsidiaries.

Taiwan – Battery Recycling Requirements



The product contains a Lithium-ion battery. Taiwanese regulations require that waste batteries are recycled.

廢電池請回收

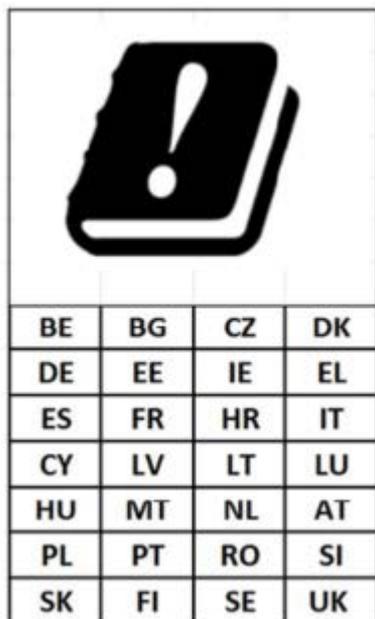
Regional compliance

Australia and New Zealand



This product conforms with the regulatory requirements of the Australian Communications and Media Authority (ACMA) Telecommunications, Radiocommunications and EMC Labelling Notices, thus satisfying the requirements for RCM marking and sale within Australia and New Zealand.

Europe



This Trimble product has been tested and found to comply with all requirements for CE Marking and sale within the European Economic Area (EEA). The device has Bluetooth and wireless LAN approval and satisfies the requirements for Radio and Telecommunication Terminal Equipment specified by European Council Directive 1999/5/EC. These requirements provide reasonable protection against harmful interference when the equipment is operated appropriately in a residential or commercial environment.

European declaration of conformity

According to ISO / IEC Guide 22 and EN 450 14

Manufacturer's Name: Trimble Inc.

Manufacturer's Address: 4408 Gibson Dr, Tipp City, OH 45371, USA

Trimble declares, under our sole responsibility, that the product:

Product Name: Ranger 5 / TSC5

Model Number: 121900

Spectrum and maximum power: BT 13dBm; Wi-Fi 2.4GHz 17dBm; Wi-Fi 5GHz 19dBm

Conforms to the following Product Specifications:

2014/53/EU LVD 2014/35/EU EMC 2014/53/EU

R&TTE Directive 1999/5/EC

- ETSI EN 300 328
- ETSI EN 300 328 V1.8.1 (2012-06)
- ETSI EN 300 893
- ETSI EN 301 489-1 V1.9.2 (20011-09)
- ETSI EN 301 489-3
- ETSI EN 301 489-17 V2.2.1 (2012-09)
- ETSI EN 303 413
- EN 55022: 2010+AC: 2011
- EN 55024: 2010+A1:2015

- EN 55032: 2012+AC: 2013
- EN 60950-1 (2001)
- EN 60950-1:2006/A11:2009/A1:2010/
- EN 61000-3-2: 2006+A2: 2009
- EN 61000-3-3: 2013
- EN 62368-1:2014

Supplementary information

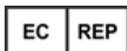
In addition, the product is battery powered and the power supply provided with this product has been certified to IEC 60950 +A1, A2, A3, A4, A11. As manufacturer, we declare under our sole responsibility that the equipment follows the provisions of the Standards stated above.

Importer of Record

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Logistics Manager
Trimble Europe B.V. & Trimble International B.V.
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5683 CC Best
The Netherlands

Trimble EC

Trimble Germany
Am Prime Parc 11
65479 Raunheim
Germany



CAUTION - Only approved accessories may be used with this equipment. In general, all cables must be high quality, shielded, correctly terminated and normally restricted to two meters in length. Power supplies approved for this product employ special provisions to avoid radio interference and should not be altered or substituted. Unapproved modifications or operations beyond or in conflict with these instructions for use may void authorization by the authorities to operate the equipment.

Canada

IC ID:5817A-EM7455 / 5817A-121900

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe B prescrites dans le règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Industry Canada rules.

Les changements et modifications non expressément approuvés par le fabricant ou le détenteur de cet équipement peuvent annuler votre droit à utiliser cet appareil en vertu des règles d'Industrie Canada.

Licence exempt

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) this device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie 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, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

This Category II radio communication device complies with Industry Canada Standard RSS-310.

Ce dispositif de radiocommunication de catégorie II respecte la norme CNR-310 d'Industrie Canada.

IMPORTANT NOTE: IC Radiation Exposure Statement

For satisfying FCC RF exposure compliance requirements, body-worn operations are restricted to belt-clips, holsters or similar accessories that have no metallic component in the assembly and must provide at least 10 mm separation between the device and the user's body. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter. The County Code Selection feature is disabled for products marketed in the US/Canada.

Pour satisfaire aux exigences de conformité d'exposition RF de la FCC, les opérations portées sur le corps sont limitées aux clips de ceinture, aux étuis ou aux accessoires similaires qui n'ont pas de composant métallique dans l'assemblage et doivent fournir une séparation d'au moins 10 mm entre l'appareil et le corps de

l'utilisateur. Cet appareil et son (ses) antenne (s) ne doivent pas être colocalisés ou fonctionner avec une autre antenne ou émetteur. La fonction de sélection du code de comté est désactivée pour les produits commercialisés aux États-Unis / au Canada.

IC SAR warning

Radio Frequency (RF) Exposure Information

The radiated output power of the Wireless Device is below the Industry Canada (IC) radio frequency exposure limits. The Wireless Device should be used in such a manner such that the potential for human contact during normal operation is minimized.

This device has been evaluated for and shown compliant with the IC Specific Absorption Rate ("SAR") limits when installed in specific host products operated in portable exposure conditions.

Informations concernant l'exposition aux fréquences radio (RF)

La puissance de sortie émise par l'appareil de sans fil est inférieure à la limite d'exposition aux fréquences radio d'Industry Canada (IC). Utilisez l'appareil de sans fil de façon à minimiser les contacts humains lors du fonctionnement normal.

Ce périphérique a été évalué et démontré conforme aux limites SAR (Specific Absorption Rate - Taux d'absorption spécifique) d'IC lorsqu'il est installé dans des produits hôtes particuliers qui fonctionnent dans des conditions d'exposition à des appareils portables.

The device could automatically discontinue transmission in case of absence of information to transmit, or operational failure. Note that this is not intended to prohibit transmission of control or signaling information or the use of repetitive codes where required by the technology.

The device for the band 5150-5250 MHz is only for indoor usage to reduce potential for harmful interference to co-channel mobile satellite systems; the maximum antenna gain permitted (for devices in the bands 5250-5350 MHz and 5470-5725 MHz) to comply with the e.i.r.p. limit; and The maximum antenna gain permitted (for devices in the band 5725-5850 MHz) to comply with the e.i.r.p. limits specified for point-to-point and non-point-to-point operation as appropriate, as stated in section A9.2(3). In addition, High-power radars are allocated as primary users (meaning they have priority) of the band 5250-5350 MHz and this radar could cause interference and/or damage to LAN devices.

Le dispositif pour la bande 5150-5250 MHz est uniquement destiné à une utilisation en intérieur afin de réduire les risques d'interférences nuisibles aux systèmes mobiles par satellite dans le même canal; le gain d'antenne maximal autorisé (pour les appareils dans les bandes 5250-5350 MHz et 5470-5725 MHz) pour se conformer à la p.i.r.e. limite; et Le gain d'antenne maximal autorisé (pour les appareils dans la bande 5725-5850 MHz) pour se conformer à la p.i.r.e. limites spécifiées pour le fonctionnement point à point et non point à point, selon le cas, comme indiqué dans la section A9.2 (3). De plus, les radars haute puissance sont attribués comme utilisateurs principaux (c'est-à-dire qu'ils ont la priorité) de la bande 5250-5350 MHz et ce radar pourrait causer des interférences et / ou endommager les dispositifs LE-LAN.

U.S.

FCC ID: S9E-121900

Federal Communication Commission (FCC) Interference Compliance Statement

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. 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 generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission rules.

The radios in this device have been designed and manufactured to not exceed stipulated emission limits for exposure to radio frequency (RF) energy as required by the Federal Communications Commission of the U.S. Government 47 C.F.R. § 2.1091 and 2.1093.

For satisfying FCC RF exposure compliance requirements, body-worn operations are restricted to belt-clips, holsters or similar accessories that have no metallic component in the assembly and must provide at least 10 mm separation between the device and the user's body. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter. The County Code Selection feature is disabled for products marketed in the US/Canada. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter. The County Code Selection feature is disabled for products marketed in the US/Canada.

Operation on the 5.15-5.25GHz frequency band is restricted to indoor use only. The FCC requires indoor use for the 5.15-5.25GHz band to reduce the potential for harmful interference to co-channel Mobile Satellite Systems. Therefore, it will only transmit on the 5.25-5.35 GHz, 5.47-5.725 GHz and 5.725 -5.850 GHz band when associated with an access point (AP).

CE

Limited Warranty Terms and Conditions

Product Limited Warranty

Subject to the terms and conditions set forth herein, Trimble Inc. ("Trimble") warrants that for a period of two (2) years from date of purchase this Trimble product (the "Product") will substantially conform to Trimble's publicly available specifications for the Product and that the hardware and any storage media components of the Product will be substantially free from defects in materials and workmanship.

Product Software

Product software, whether built into hardware circuitry as firmware, provided as a standalone computer software product, embedded in flash memory, or stored on magnetic or other media, is licensed solely for use with or as an integral part of the Product and is not sold. The terms of the end user license agreement, as included below, govern the use of the Product Software, including any differing limited warranty terms, exclusions and limitations, which shall control over the terms and conditions set forth in the limited Product warranty.

Warranty Remedies

If the Trimble Product fails during the warranty period for reasons covered by this limited warranty and you notify Trimble of such failure during the warranty period, Trimble will repair OR replace the nonconforming Product with new, equivalent to new, or reconditioned parts or Product, OR refund the Product purchase price paid by you, at Trimble's option, upon your return of the Product in accordance with Trimble's product return procedures then in effect.

How to Obtain Warranty Service

To obtain warranty service for the Product, it is recommended you contact your Trimble dealer. Alternatively, you may contact Trimble to request warranty service by emailing Repair_Services@Trimble.com. Please be prepared to provide:

- your name, address, and telephone numbers;
- product name, part number and serial number;
- proof of purchase;
- an explanation of the problem.

The customer service representative may need additional information from you depending on the nature of the problem.

Warranty Exclusions and Disclaimer

This Product limited warranty shall only apply in the event and to the extent that (i) the Product is properly and correctly installed, configured, interfaced, maintained, stored, and operated in accordance with Trimble's applicable operator's manual and specifications, and; (ii) the Product is not modified or misused. This Product limited warranty shall not apply to, and Trimble shall not be responsible for, defects or performance problems resulting from (i) the combination or utilization of the Product with hardware or software products, information, data, systems, interfaces, or devices not made, supplied, or specified by Trimble; (ii) the operation of the Product under any specification other than, or in addition to, Trimble's standard specifications for its products; (iii) the unauthorized installation, modification, or use of the Product; (iv) damage caused by: accident, lightning or other electrical discharge, fresh or salt water immersion or spray (outside of Product specifications); or exposure to environmental conditions for which the Product is not intended; (v) normal wear and tear on consumable parts (e.g., batteries); or (vi) cosmetic damage. Trimble does not warrant or guarantee the results obtained through the use of the Product or Software, or that software components will operate error free.

NOTICE REGARDING PRODUCTS EQUIPPED WITH TECHNOLOGY CAPABLE OF TRACKING SATELLITE SIGNALS FROM SATELLITE BASED AUGMENTATION SYSTEMS (SBAS) (WAAS, EGNOS, GAGAN, MSAS AND LUCH), OMNISTAR, BEIDOU, GPS, GALILEO OR GLONASS SATELLITES, OR FROM IALA BEACON SOURCES: TRIMBLE IS NOT RESPONSIBLE FOR THE OPERATION OR FAILURE OF OPERATION OF ANY SATELLITE BASED POSITIONING SYSTEM OR THE AVAILABILITY OF ANY SATELLITE BASED POSITIONING SIGNALS.

THE FOREGOING LIMITED WARRANTY TERMS STATE TRIMBLE'S ENTIRE LIABILITY, AND YOUR EXCLUSIVE REMEDIES, RELATING TO THE TRIMBLE PRODUCT. EXCEPT AS OTHERWISE EXPRESSLY PROVIDED HEREIN, THE PRODUCT, AND ACCOMPANYING DOCUMENTATION AND MATERIALS ARE PROVIDED "AS-IS" AND WITHOUT EXPRESS OR IMPLIED WARRANTY OF ANY KIND, BY EITHER TRIMBLE OR ANYONE WHO HAS BEEN INVOLVED IN ITS CREATION, PRODUCTION, INSTALLATION, OR DISTRIBUTION, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, TITLE, AND NONINFRINGEMENT. THE STATED EXPRESS WARRANTIES ARE IN LIEU OF ALL OBLIGATIONS OR LIABILITIES ON THE PART OF TRIMBLE ARISING OUT OF, OR IN CONNECTION WITH, ANY PRODUCT. BECAUSE SOME STATES AND JURISDICTIONS DO NOT ALLOW LIMITATIONS ON DURATION OR THE EXCLUSION OF AN IMPLIED WARRANTY, THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

Limitation of Liability

TRIMBLE'S ENTIRE LIABILITY UNDER ANY PROVISION HEREIN SHALL BE LIMITED TO THE AMOUNT PAID BY YOU FOR THE PRODUCT. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT SHALL TRIMBLE OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGE WHATSOEVER UNDER ANY CIRCUMSTANCE OR LEGAL THEORY RELATING IN ANYWAY TO THE PRODUCTS, SOFTWARE AND ACCOMPANYING DOCUMENTATION AND MATERIALS, (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS OF DATA, OR ANY OTHER PECUNIARY LOSS), REGARDLESS OF WHETHER TRIMBLE HAS BEEN ADVISED OF THE POSSIBILITY OF ANY SUCH LOSS AND REGARDLESS OF THE COURSE OF DEALING WHICH DEVELOPS OR HAS DEVELOPED BETWEEN YOU AND TRIMBLE. BECAUSE SOME STATES AND JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

NOTE: THE ABOVE TRIMBLE LIMITED WARRANTY PROVISIONS WILL NOT APPLY TO PRODUCTS PURCHASED IN THOSE JURISDICTIONS (E.G., MEMBER STATES OF THE EUROPEAN ECONOMIC AREA) IN WHICH PRODUCT WARRANTIES ARE THE RESPONSIBILITY OF THE LOCAL DEALER FROM WHOM THE PRODUCTS ARE ACQUIRED. IN SUCH A CASE, PLEASE CONTACT YOUR TRIMBLE DEALER FOR APPLICABLE WARRANTY INFORMATION.

Notice to Australian Purchasers - The Australian Consumer Law

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Trimble's warranty, as set out in the user manual accompanying this statement, or as described in the warranty card accompanying the Product you purchased, is in addition to any mandatory rights and remedies that you may have under the Australian Consumer Law.

Official Language

THE OFFICIAL LANGUAGE OF THESE TERMS AND CONDITIONS IS ENGLISH. IN THE EVENT OF A CONFLICT BETWEEN ENGLISH AND OTHER LANGUAGE VERSIONS, THE ENGLISH LANGUAGE SHALL CONTROL

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Safety information

Read this guide for important safety and health information and the terms of the Limited Warranty that apply to the Spectra Geospatial® Ranger® 5 data collector that you have purchased. Keep all printed guides for future reference. Failure to follow instructions and properly set up, use, and care for this product can increase the risk of serious injury or death, or damage the device or devices.

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Safety notices

Battery safety

Lithium-Ion batteries are classified by the U. S. Federal Government as non-hazardous waste and are safe for disposal in the normal municipal waste stream. These batteries contain recyclable materials and are accepted for recycling. Dispose of used batteries in accordance with local regulations.

WARNING – Non-approved batteries will not function in the device. Use only the battery for the system for which it was specified. Only use the battery with a charging system that has been qualified with the system per this standard. Use of an unqualified battery or charger may present a risk of fire, explosion, leakage, or other hazard.

WARNING – There are no user-serviceable parts in the batteries. Do not disassemble or open, crush, bend or deform, puncture, or shred the battery. Do not modify or remanufacture, attempt to insert foreign objects into the battery, immerse or expose to water or other liquids, or expose to fire, explosion, or other hazard. Do not expose to temperatures above +70 °C (+158 °F).

WARNING – Improper battery use may result in a fire, explosion, or other hazard.

- Do not short circuit a battery or allow metallic or conductive objects to contact the battery terminals.
- Avoid dropping the device or battery. If dropped, especially on a hard surface, and the user suspects damage to the battery, take it to a service center for inspection.
- In the event of a battery leak, do not allow the liquid to come in contact with the skin or eyes. If contact has been made, wash the affected area with large amounts of water and seek medical advice.
- Battery usage by children should be supervised.

Power supply safety

WARNING – Use only AC and vehicle adapters intended for the device. Other external power sources may damage your product and void the warranty.

- Ensure the input voltage on the adapter matches the voltage in your location. Ensure the adapter has prongs compatible with your outlets.
- The AC power supply is designed for indoor use only. Avoid using the AC power supply in wet areas.
- Unplug the power supply from power when not in use.
- Do not short the output connector.

Touchscreen glass

CAUTION – The touchscreen on this device is made of glass. This glass could break if the device is dropped on a hard surface or receives a significant impact. If the glass chips or cracks, do not touch or attempt to remove the broken glass. Cracked or chipped glass due to misuse or abuse is not covered under the product's limited warranty.

Service safety

WARNING – Do not attempt to take apart, open, service, or modify the product, accessories, or power supply. Doing so could present the risk of electric shock or other hazard. Any evidence of any attempt to open and/or modify this device, including any peeling, puncturing, or removal of any of the labels, will void the Limited Warranty.

Safe environments of use

WARNING – Areas with potentially explosive atmospheres are often, but not always, posted and can include fueling areas, such as below decks on boats, fuel or chemical transfer or storage facilities, or areas where the air contains chemicals or particles, such as grain dust, or metal powders. When you are in such an area, turn off your mobile device, and do not remove or install battery chargers, AC adapters, or any other accessory. In such areas, sparks can occur and cause an explosion or fire.

Hearing damage

WARNING – To prevent possible hearing damage, do not listen to high volumes for long periods.

Distraction

WARNING – Using the device in some circumstances can distract you and may cause a dangerous situation. Observe rules that prohibit or restrict the use of mobile devices (for example, avoid operating the device while driving a vehicle).

Telecommunications & Internet Association (TIA)

Hearing Aids: Some digital wireless devices may interfere with some hearing aids. In the event of such interference, you may want to consult your service provider, or call the customer service line to discuss alternatives.

Pacemakers and Other Medical Devices: The Health Industry Manufacturers Association recommends a minimum separation of six inches be maintained between a handheld wireless device and a pacemaker to avoid potential interference with the pacemaker. These recommendations are consistent with the independent research by and recommendations of Wireless Technology Research. Persons with pacemakers should use the ear opposite the pacemaker to minimize the potential for interference. If you have any reason to suspect that interference is taking place, turn the device OFF immediately.

If you use any other personal medical device, consult the manufacturer of your device to determine if they are adequately shielded from external RF energy. Your physician may be able to assist you in obtaining this information.

Turn the device OFF in health care facilities when any regulations posted in these areas instruct you to do so. Hospitals or health care facilities may be using equipment that could be sensitive to external RF energy.

Specific Absorption Rate (SAR)

This device complies with FCC and CE standards when used as designed.

SAR is measured with this device at a separation of 5 mm to the body, while transmitting at the highest certified output power level in all frequency bands of this device. Keep this device at least 5 mm away from your body to ensure exposure levels remain at or below the as-tested levels.

Caring for your device

Cleaning

Turn off the device, and disconnect it from external power. Use a soft, dampened cloth with either water or a diluted mild detergent. If a mild detergent is used, ensure all soap residue is removed. Do not use chemical cleaners.

Touchscreen care

The Ranger 5 data collector is extremely rugged, and is designed to withstand extreme conditions and harsh treatment, however taking proper care of the touchscreen will prolong the life and ensure optimal display performance of the

touchscreen of this product. Excessive or prolonged exposure to abrasives, oil, dust, chemicals, and ultraviolet light can affect the performance of your touchscreen over time.

To help protect the screen:

- **Clean it frequently.** Use a soft, lint-free cloth to wipe the screen. You can dampen the cloth with water or an eyeglass cleaner. If the display is very dirty, it can be washed off under a gently running tap.

WARNING – Make sure that all ports and doors are fully closed, and that the device is not connected to an external power supply. Do not use chemical or abrasive cleaners.

- **Keep it covered when not in use.** Store the Ranger 5 data collector in a carry case or pouch while you are in transit or not using it.
- **Keep it out of the sun when not in use.** Do not store the Ranger 5 data collector in direct sunlight for a long time unnecessarily. Ultraviolet light and excessive heat from sun-loading heat can damage the display.
- **Use proper touchscreen tools.** Use either fingers or the Ranger 5 data collector's stylus, or other devices specifically designed for use with capacitive touchscreens to operate the touchscreen of this device. The use of ballpoint pens, metal tools or other sharp objects to operate the touchscreen may scratch and/or damage the surface of the touchscreen.
- **Avoid drops, tumbles, and abrasives.** The Ranger 5 data collector is designed to resist damage for drops up to 122 cm (4 feet). However, you should protect the display from impact, pressure, and abrasive substances that can scratch it or crack it. The device should not be dropped unnecessarily. Use the screen protectors to keep the touchscreen clean and protected, following the instructions provided on the screen protector packaging.

Battery care

Use and storage temperature: Lithium-ion batteries are sensitive to high temperatures, so keep the device's batteries out of direct sun for long periods, and do not leave batteries in a hot car, especially on a dashboard in full sun or other environments where temperatures can exceed +70 °C (+158 °F). Battery life can be shortened if stored or operated outside of these temperature ranges. The batteries have a storage temperature rating of -40 °C to +70 °C (-40 °F to +158 °F), however, for maximum battery life, the recommended storage temperature is at room temperature (~+20 °C / +68 °F). When you are using the device or charging the batteries, it is normal for the device and batteries to get warm.

If the interior temperature of the device exceeds normal operating temperatures (for example, in a hot car or in direct sunlight for extended periods of time), you may experience the following as it attempts to regulate its temperature automatically:

- The device stops charging.
- If the device cannot regulate its internal temperature, it may go into a Sleep state until it cools.

Move the device to a cooler location out of direct sunlight and wait a few minutes before trying to use the device again.

Charging: Recharge the battery any time; the battery does not need to be empty or low before you recharge it. However, it is best to let the battery run to below 10 percent at least once a month before you recharge it. Battery recharging is supported at temperatures between 0 °C and +40 °C (+32 °F and +104 °F). Use only the manufacturer designated charging accessories to recharge the batteries.

Other environmental conditions: The batteries are sealed from water and dust, and are tested for protection from drops from heights up to 1.22 m (4.00 ft). However to prolong the life of the battery, dry it off with a cloth if it becomes wet, do not intentionally submerge the battery, and take care to avoid unnecessary drops, mechanical shocks, and vibrations.

The Ranger 5 data collector is designed to work in ambient temperatures between -30 °C and +60 °C (-22 °F and +140 °F) and to be stored in temperatures between -40 °C and +70 °C (-40 °F and +158 °F). Avoid exposing the device to dramatic changes in temperature or humidity.

Product specifications

Physical	<p>Size L x W x H: 287.1 mm x 175.6 mm x 43.9 mm (11.3" x 6.9" x 1.7")</p> <p>Weight 934 grams (2.06 pounds), excluding the optional removable battery, Empower module, pole bracket and other accessories</p> <p>Housing PC-EXL9330 Case with TPU-TeXin990 Overmold</p>
Operating System	Android 10
Processor	Qualcomm SDA660
Graphics	Qualcomm Adreno 512 GPU
RAM	4GB LPDDR4X RAM
User Storage	64 GB Flash eMMC
Display	<p>5-inch, HD landscape display (1280x720 pixels)</p> <p>300 DPI Transflective type TFT Display</p> <p>365 cd/m2 sunlight readable LED backlight</p> <p>Contrast Ratio (typical): 800:1</p> <p>Projective capacitive multi-touch touchscreen with stylus, finger, and glove modes</p>
Keyboard	<p>International backlit Alpha-Numeric & QWERTY keyboard</p> <p>12 Programmable Function keys</p> <p>Multiple Fn, Shift & AGr key combinations</p>
Notification LED	Battery Status, Shift, Fn, Ctrl, AGr, Caps Lock, Search, and Cursor Lock LED indicator
I/O	<p>x1 USB Type-C Host/Client port for charging and USB 2.0 data transfer</p> <p>Supports USB BC 1.2 and USB-PD 2.0 charger inputs up to 9V/3A</p> <p>x1 Empower module bay</p>

Battery & Power	<p>Batteries</p> <ul style="list-style-type: none"> • Internal Li-Ion batteries <ul style="list-style-type: none"> • 4530 mAh / 7.2V (32.6 Wh) nominal capacity • Optional removable Li-35 Li-Ion accessory battery pack provides an additional 34.85 Wh <p>Battery Life</p> <ul style="list-style-type: none"> • RTS workflow ~16 hours & GNSS workflow ~18 hours usage <ul style="list-style-type: none"> • Depends on display settings, connectivity, data processing, ambient temperature, etc. • Fully charged battery can support Sleep State for 7.2 days, Powered Off State (device is off but still powered by the battery) for >175 days, and Shelf Mode (battery is off) for 490 days. <p>Charging Time</p> <ul style="list-style-type: none"> • Full-charge 3.5 hours, 0-50% charge in 1.5 hours • If the optional removable Li-35 accessory battery pack is installed, the total time to fully charge both internal and accessory batteries, when in an empty state, is approximately 8 hours. <p>Power Input</p> <ul style="list-style-type: none"> • 5V/9V, 3A charging, USB-PD compliant with Type C connector
Audio	<p>1W Mono Speaker</p> <p>Dual Microphones with noise cancelling technology</p> <p>Bluetooth or USB-C headsets supported</p>
External speaker / microphone	<p>USB-C port for external headsets</p> <p>Bluetooth headsets supported</p>
Camera	Rear camera: 13MP auto-focus with LED flash
GNSS	<p>Integrated Sierra Wireless EM7565 chipset</p> <p>L1 C/A GPS/GLONASS/BeiDou/Galileo/QZSS</p> <p><10 m accuracy</p>
Bluetooth	<p>Bluetooth 5 classic & BLE 5, Class 1</p> <p>1.7 Mbps at 100m range</p>
Wi-Fi	2.4 GHz 802.11 b/g/n/ac & 5.0 GHz 802.11a/n/ac
Mobile broadband / WWAN (optional)	<p>Worldwide LTE 4G in regions where it is available, and compatible with 3G networks</p> <p>LTE: Bands 1, 2, 3, 4, 5, 7, 8, 9, 12, 13, 18, 19, 20, 26, 28, 29, 41, 66</p> <p>UMTS (3G): Bands 1, 2, 4, 5, 6, 8, 9, 19</p> <p>AT&T and Verizon certified</p> <p>MicroSIM card</p>

Sensors	<p>Orientation: 3-axis accelerometer, Magnetic heading sensor (E-compass), 3-axis Gyro sensor</p> <p>The orientation sensors are active and applications can access and use the sensors. Use Google Play to search and browse for 3rd party tools that enable you to view sensor output.</p> <p>Display: Ambient light sensor</p>
Environmental Certifications	Conflict Minerals, China RoHS 2.0, EU RoHS 2.0, EU REACH
Safety Certifications	US/CA (UL/cUL), EU (CB), UK (UKCA), AUS/NZ (AS/NZS), China (CCC), India (TEC), Russia (CU), S. Africa (LoA+NRCS), Taiwan (BSMI), UAE (UAB.S IEC60950)
EMI/EMC Certifications	CE, FCC/IC, VCCI, C-Tick, BSMI
ESD Certifications	IEC 61000-4-2, Level 4, 8KV contact and 15KV air
RF Certifications	PTCRB, AT&T OTA, Verizon OTA, Wi-Fi RSE & SAR
Regional Compliance	US (FCC), Canada (IC), EU (CE), UK (CE), Australia (C-tick, A-tick), New Zealand (C-tick, A-tick), Japan (MIC), Thailand (NBTC), Russia (FAC), South Korea (KCC), Taiwan (NCC), UAE United Arab Emirates (GCC), Mexico (IFETEL), Brazil (ANATEL), India (ETA-SD), China (SRRC+NAL) and South Africa (ICASA)
Security	Qualcomm SDA660 Hardware Backed Encryption, Quarterly Android Security Patches, Storage Encryption, and TLS 1.3

Rugged Specifications	<p>IEC-529: Independently tested and certified for:</p> <ul style="list-style-type: none"> • Water Ingress Protection: IPx5 • Sand & Dust Ingress Protection: IP6x <p>MIL-STD-810H: Independently tested and certified for:</p> <ul style="list-style-type: none"> • Operating temperature: -30 °C to +60 °C (-22 °F to +140 °F) • Storage temperature: -40 °C to +70 °C (-40 °F to +158 °F) • Startup temperature: -20 °C to +60 °C (-4 °F to +140 °F) • Charging (AC adapter) temperature: 0 °C to +40 °C (+32 °F to +104 °F) • Temperature shock: survives cycles between -30 °C and +60 °C (-22 °F and +140 °F) • Humidity: 90% RH temp cycle +30 °C / +60 °C (+86 °F / +140 °F) • Vibration: General Minimum Integrity and Loose Cargo Test • High altitude (low pressure) <ul style="list-style-type: none"> • Operation 9,144 m (30,000 ft) at +5 °C (+41 °F) • Storage 12,192 m (40,000 ft) at -30 °C (-22 °F) • Rapid Decompression 2,438 m (8,000 ft) to 12,192 m (40,000 ft) in <15 seconds at +25 °C (+77 °F) • Drop / Shock protection: <ul style="list-style-type: none"> • 26 drops at room temperature from 1.22 m (4 ft) onto concrete • 6 faces at high and low temperature (-30 °C and +60 °C (-22 °F and +140 °F) • Ball drop protection: 50 mm steel ball dropped 0.5 m on to touch panel • Solar Radiation Exposure: Survives prolonged solar exposure • Salt Spray: ASTM B117 5% salt solution, 96 hours
Configuration Options: Empower Modules	<p>x1 Empower module bay supports:</p> <ul style="list-style-type: none"> • EM100 GNSS Receiver Module • EM120 2.4 GHz Receiver Module • EM11x Barcode/RFID Modules • Custom modules
Compatible Field Software	<p>Android 10 applications</p> <p>Trimble Access™ software version 2021 and later</p> <p>Trimble Siteworks Positioning System version 1.40 and later</p> <p>Spectra Geospatial Origin software</p> <p>Trimble 3Log ScaleWiz</p> <p>Trimble Unity Remote Monitoring and Work Management Software</p> <p>Trimble GasOps</p>

Introduction

This User Guide describes how to configure and use the Spectra Geospatial Ranger® 5 data collector powered by the Android™ 10 operating system. The information in this guide supplements the information in the Quick Start Guide. Even if you have used other Spectra Geospatial handheld field computers, data collectors or survey controllers before, Spectra Geospatial recommends that you spend some time reading this guide to learn about the special features of the product.

WARNING – Before you use this product, make sure that you have read and understood all safety requirements. Failure to follow these safety instructions could result in fire, electric shock, or other injury, or damage to the device and/or other property. For more information refer to [Safety information, page 12](#) of this guide.

- [Registration, page 21](#)
- [Configuration options, page 22](#)
- [In the box, page 22](#)
- [Replacement and spare or optional accessories, page 23](#)
- [Parts of the Ranger 5 data collector, page 25](#)

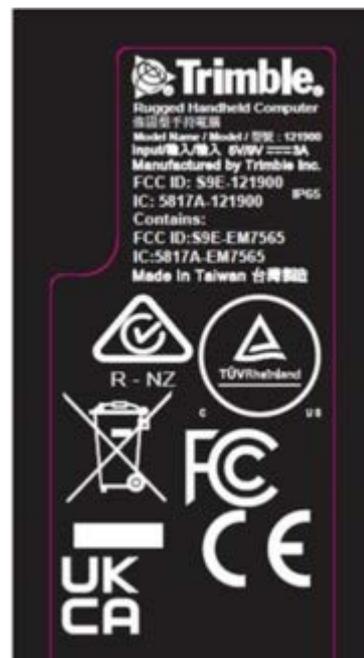
Registration

To receive information regarding updates and new products, contact your local dealer or go to <https://mytrimbleprotected.com/cc/productsRegistration.html>. When you register your device, you can select the newsletter, upgrade, or new product information.

To receive information regarding updates and new products, contact your local dealer or go to the Spectra Geospatial website at <https://www.spectrageospatial.com> and click Register My Spectra Product.

To register your device, you will need the serial number—a unique 12 digit number for your Ranger 5 data collector (for example, JAJ201300096)

The serial number (along with the Regulatory label) is on a label inside the removable battery / SIM card compartment on the back of the device; see [Installing and removing the optional accessory battery pack, page 28](#) or [Inserting a MicroSIM card \(optional\), page 27](#) for instructions on removing the compartment cover.



Configuration options

The Ranger 5 data collector is powered by the Android 10 operating system, and has a built-in QWERTY keyboard, integrated Wi-Fi, Bluetooth® wireless technology, and optional worldwide 4G LTE Cellular WWAN connectivity (data only).

For a full list of product features and their specifications, refer to the [Product specifications, page 17](#) section, or contact your local Spectra Geospatial reseller for information.

In the box

A standard pack-out has the following items:

- A Ranger 5 data collector



- Corning AG2bc Glass Screen Protector with Anti-UV AB Adhesive. The screen protector package includes the screen protector in a foam sleeve, and a sealed yellow pack containing:
 - 70% Isopropyl Alcohol prep pad
 - grey lint-free cleaning cloth
 - blue lint/dust removal sticker
- 45W AC USB-C PD power supply with regional plug adapters (EU, UK, SAA)
 - Input: 100-240VAC ~ 50/60Hz 1.3A
 - Output: 45W: 5V/3A, 9V/3A, 12V/3A, 15V/3A, 20V/2.25A
 - The Ranger 5 data collector uses 5/9V, 3A charging
 - Size: 58 X 46 X 28 mm
- 2 m (6.56 feet) USB-Type C (male) to USB-Type C (male) USB 2.0 cable for charging and data transfer
- Capacitive stylus with tether and 2 stylus tips
- Philips #1 screwdriver
- Handstrap
- Protective soft carry case and a Quick Start Guide



Replacement and spare or optional accessories

WARNING – Only Spectra Geospatial approved accessories should be used with this product. Failure to use Spectra Geospatial approved accessories could result in fire, electric shock, or other injury, or damage to the handheld computer and/or other property. For more information refer to [Safety information, page 12](#).

A wide range of replacement and optional accessories are available to purchase for the Ranger 5 data collector, including:

- AC power supply with regional plugs and USB-C port
- USB-C to USB-C cable for charging and data transfer
- Tempered glass screen protector
- Capacitive stylus with tether, 2 stylus tips
- Pack of 5 replacement stylus tips
- Handstrap

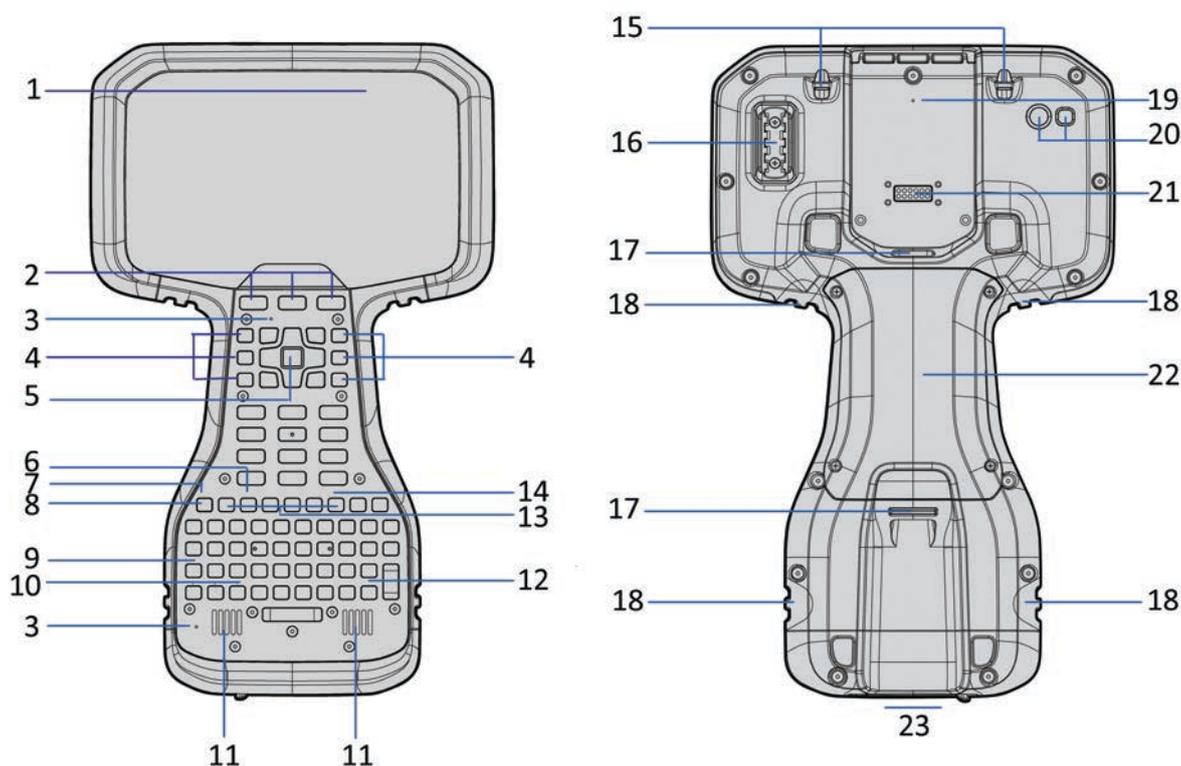
- Protective pouch
- Removeable, rechargeable accessory battery pack to double battery run-time
 - Compatible with the Ranger 5 data collector USB-C power supply and USB-C to USB-C cable
- USB-A to USB-C cable
- USB-C to USB-A adapter
- USB-C vehicle charger
- Ranger 5 data collector pole mount bracket
- Quick release pole mount clamp and adjustable arm
- Fabric shoulder bag
- Shoulder sling

Trimble Empower modules

The following Empower modules are also available:

- Trimble EM120 2.4GHz Radio Module
- Trimble EM100 GNSS Receiver Module
- Trimble EM110 1D/2D Barcode Imager Module
- Trimble EM111 1D/2D Barcode Imager & UHF 902-928 MHz RFID - NA
- Trimble EM111 1D/2D Barcode Imager & UHF 865.6-867.6 MHz RFID - EU
- Trimble EM112 1D/2D Barcode Imager & UHF 902-928 MHz RFID with AEI - NA

Parts of the Ranger 5 data collector



- | | | | |
|-----------|--------------------------------------|-----------|---|
| 1 | Ambient light sensor | 13 | Function Keys (F7 - F12) |
| 2 | Android keys | 14 | Cursor lock LED |
| 3 | Microphone (x2) | 15 | Stylus tether points |
| 4 | Function keys (F1 - F3, F4 - F6) | 16 | Stylus holder |
| 5 | OK and directional keys | 17 | Pole mount latches (x2) |
| 6 | CAPS lock LED | 18 | Handstrap connector points (x4) |
| 7 | Battery charging LED | 19 | Gore Vent: DO NOT COVER! |
| 8 | Power key | 20 | Camera & camera flash |
| 9 | Shift LED | 21 | Trimble Empower module bay |
| 10 | LEDs left to right; Fn, Ctrl, Search | 22 | Cover for battery pack & SIM card slot |
| 11 | Speakers (x2) | 23 | USB-C port, bottom of device under port cover |
| 12 | AGr LED | | |

Setting up the device

- [Inserting a MicroSIM card \(optional\), page 27](#)
- [Installing and removing the optional accessory battery pack, page 28](#)
- [Tethering the stylus, page 31](#)
- [Installing a screen protector, page 31](#)
- [Attaching the pole bracket \(optional\), page 35](#)
- [Attaching the handstrap, page 36](#)
- [Attaching an Empower module \(optional\), page 36](#)

This section tells you how to set up your Ranger 5 data collector before you start using it.

Inserting a MicroSIM card (optional)

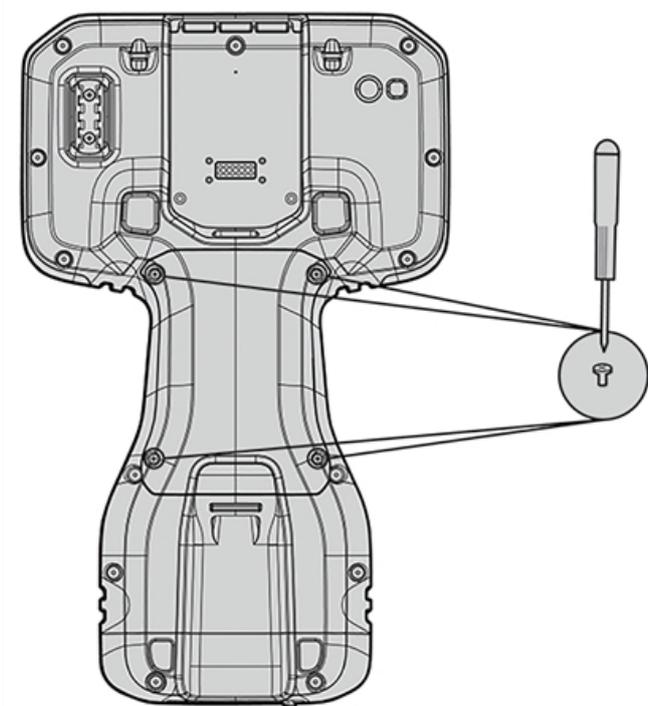
If your Ranger 5 data collector is equipped with a 4G LTE modem, you will need a data plan and microSIM card from your local cellular service provider to use cellular data. If you are unsure, check with your mobile operator. See [Working with mobile broadband, page 72](#) for more information.

CAUTION - Do not replace the SIM card while outdoors. Water, dust, dirt or debris may collect inside the SIM card bay causing performance issues.

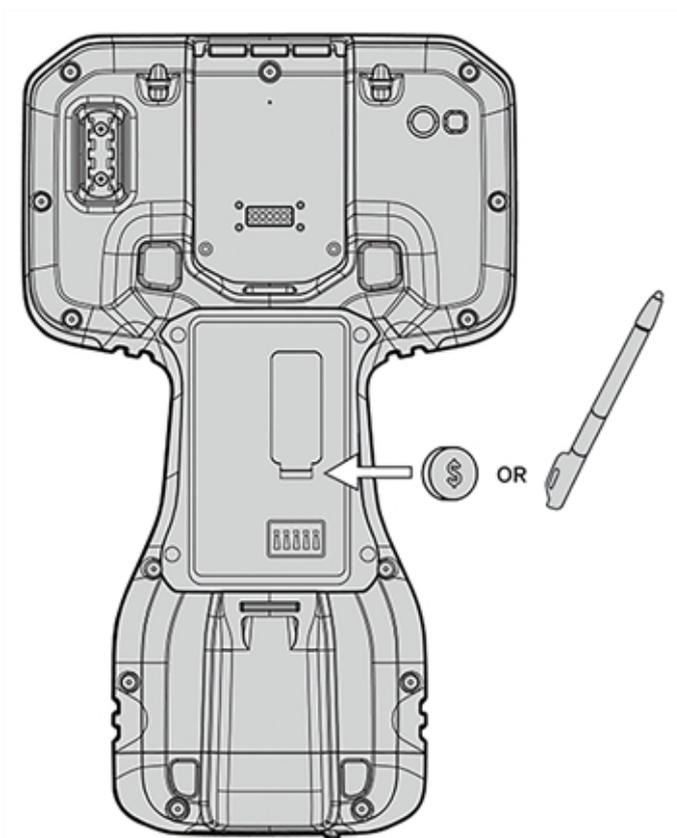
CAUTION - The SIM card door can be damaged if handled carelessly or if sharp tools are used to open the door. Take care not to twist or warp the door when opening or closing it.

1. If the device is on, turn it off; press-hold the **Power** key, then tap **Power Off**.
2. Using the Philips screwdriver, loosen the 4 screws to remove the cover from the back of the device.

NOTE - If [the accessory battery is installed](#), remove it to access the MicroSIM card door.



3. Pry open the MicroSIM card door using a coin or the tool located on the stylus tether as shown; do not remove the door completely.



4. Slide the microSIM card into the slot in the orientation shown on the microSIM door.
5. Close the microSIM door, making sure it clicks shut.
6. See the next section to [Install the optional accessory battery](#).
7. Replace the cover and tighten the 4 screws using the Philips screwdriver.

Installing and removing the optional accessory battery pack

The Ranger 5 data collector contains internal batteries which are not removable. An optional, user-replaceable accessory battery pack is available, which enables you to double the battery run-time.

You can charge the battery pack when it is installed in the device, or to decrease the total charging time, you can charge it externally. See [Charging the Li-35 accessory battery pack separately from the Ranger 5 data collector, page 50](#) for more information.

Before you insert or remove the accessory battery pack, you must first shut down the device.

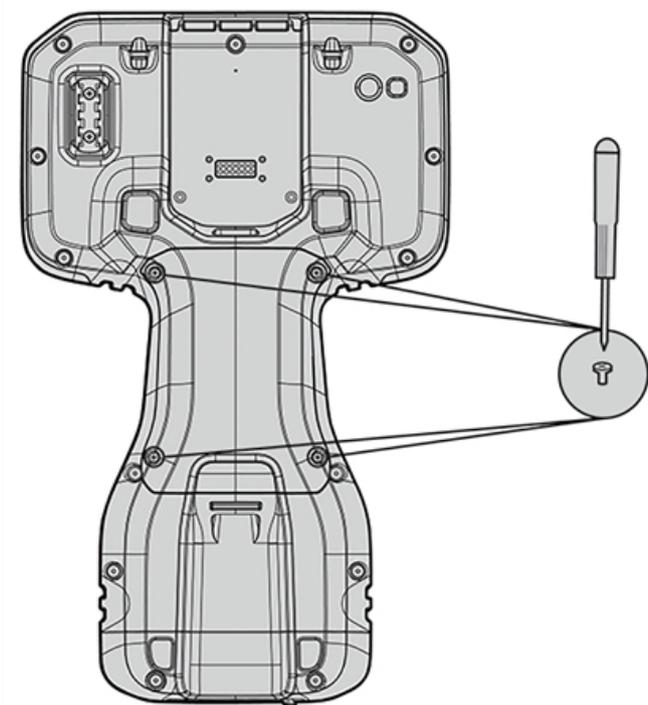
CAUTION - Do not replace the accessory battery pack while outdoors. Water, dust, dirt or debris may collect around the battery contacts causing performance issues.

Installing the optional accessory battery pack

NOTE – You must re-calibrate the compass after installing or removing the optional accessory battery pack. For more information, see [Calibrating the compass, page 75](#).

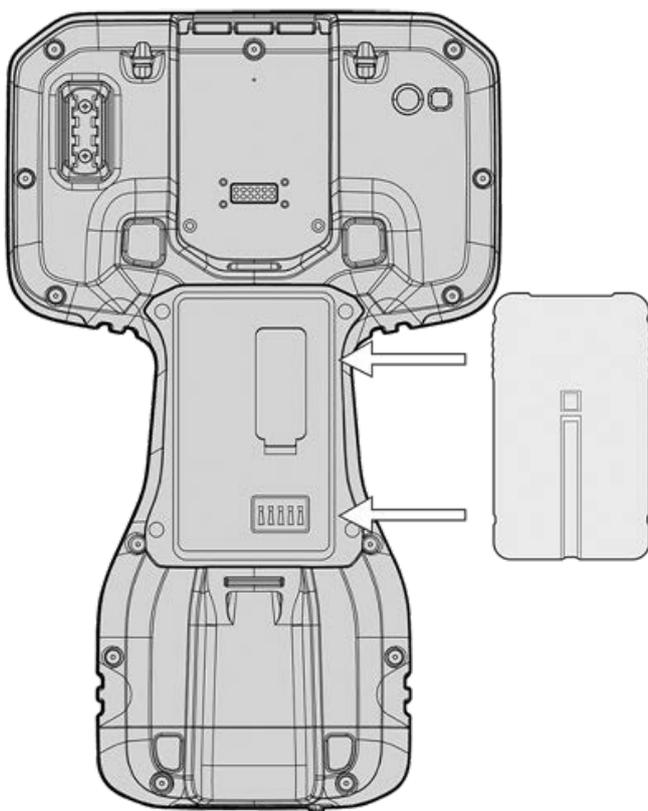
To avoid dust or water from entering the battery bay, remove the battery bay door cover and install the accessory battery pack only when you are indoors.

1. You must shut down the device before you install the accessory battery pack; press-hold the **Power** key, then tap **Power Off**.
2. Using the Philips screwdriver, loosen the 4 screws to remove the battery bay cover from the back of the device.



3. Insert the battery in the battery cavity.

4. Replace the battery bay cover and tighten the 4 screws using the Philips screwdriver.



Removing / replacing the optional accessory battery pack

Before you remove the accessory battery pack, you must first shut down the device.

1. Using the Philips screwdriver, loosen the 4 screws to remove the battery bay cover from the back of the device. To avoid dust or water from entering the battery bay, remove the battery bay door cover and remove / install the accessory battery pack only when you are indoors.
2. Remove the battery, lifting up and out.
3. Replace the battery with a fully charged battery if available.
4. Replace the battery bay cover and tighten the 4 screws using the Philips screwdriver.

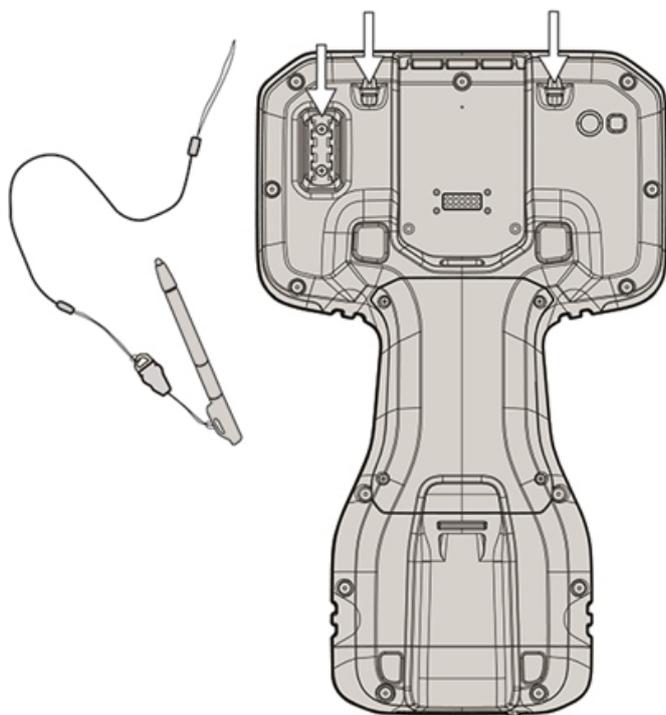
NOTE - The Ranger 5 data collector consumes power even when the device is off. Depending on how your system is configured, if the battery pack is fully charged, it will fully discharge in approximately the following period of time:

Power state	Discharge Period
Sleep mode	Approximately 7.2 days.
Power Off mode	Approximately 175 days.
Shelf / Shipping mode	Approximately 490 days.

Tethering the stylus

Attach the stylus to the device to prevent accidentally dropping the stylus. The stylus is supplied with one end of the tether cord pre-looped to the stylus. You can attach the stylus to the left or the right side of the device. To tether the stylus to the device:

1. Take the loose end of the tether cord and push it through the left or right stylus tether point.
2. Feed the stylus through the loop and pull tight.
3. Place the stylus in the stylus dock to store it when not in use (top left corner as in image below).

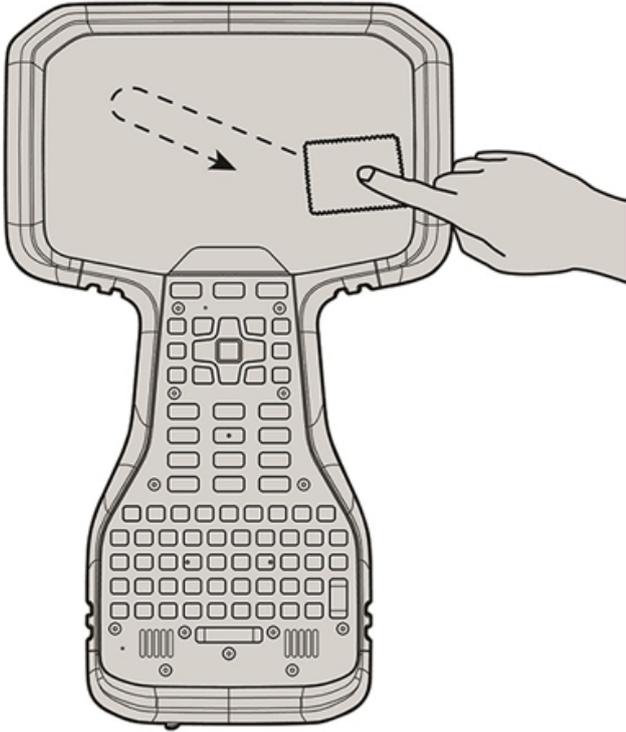


Installing a screen protector

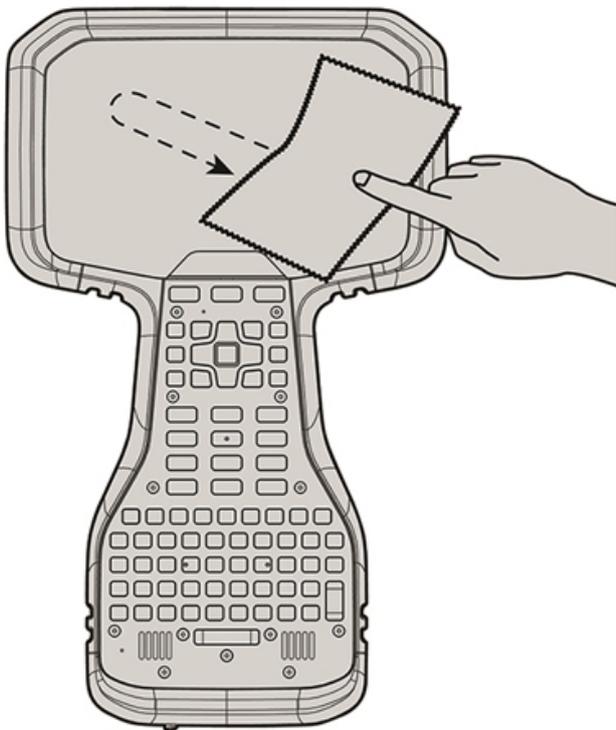
The Ranger 5 data collector is fitted with a mechanically strengthened glass touchscreen which is highly resistant to abrasion and impact damage. However to ensure maximum protection, it is recommended that you use a Spectra Geospatial-approved glass Ranger 5 data collector screen protector.

To install a screen protector:

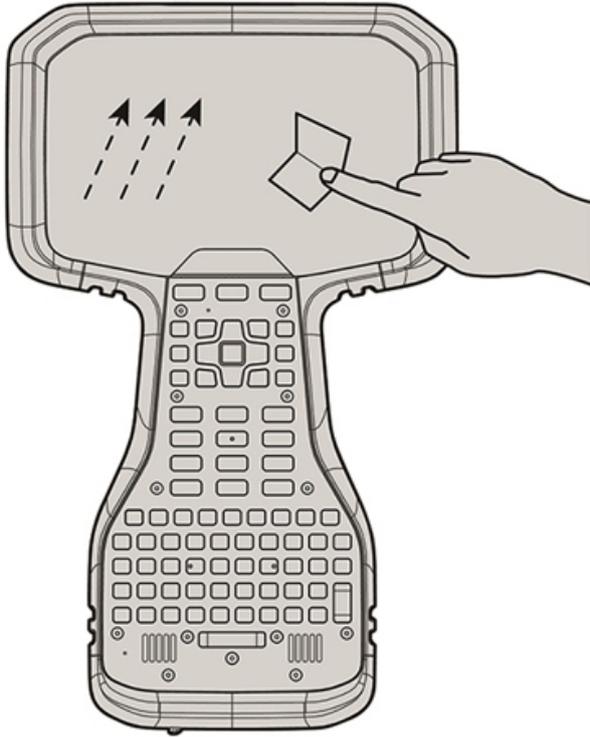
1. Place the device on a clean, flat surface. Make sure your hands are clean.
2. Clean the touchscreen with the supplied alcohol wipe.



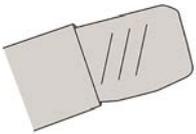
3. Polish and dry the screen with the lint-free cleaning cloth supplied.



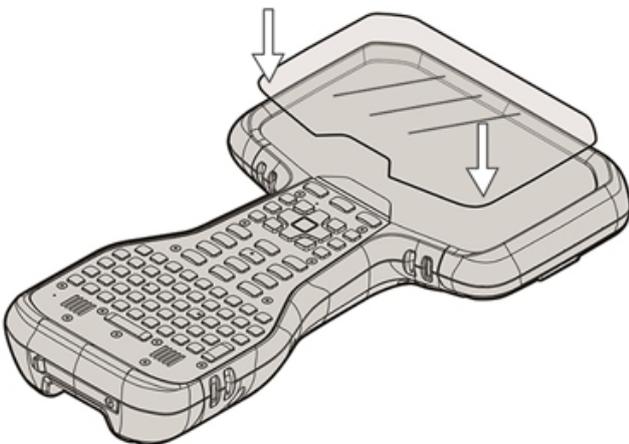
4. Remove any dust specs with the supplied dust sticker.



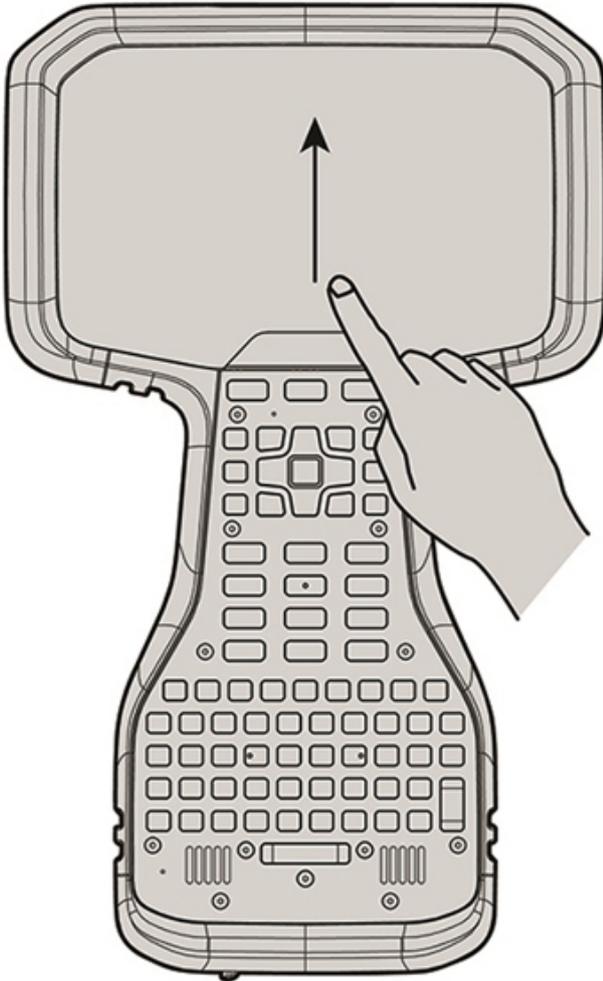
5. Remove the protective film from the screen protector.



6. Align the screen protector with the bottom of the glass display. Use the Ranger 5 data collector badge at the top of the keyboard as a guide, leaving a small, evenly spaced gap around all edges. The screen protector should line up evenly with the Ranger 5 data collector label and the edges of the device.



7. Carefully lay the screen protector down on the screen. If you make a mistake and the glass looks off-center, you can gently lift the screen protector up and realign it. Then, once the protector is on the screen, give it a soft press in the center and allow the adhesive surface to grip to the screen naturally.
8. If there are any bubbles remaining, use the cloth provided to gently smooth them toward the edges of the screen protector.



For more information on where to purchase the correct screen protector for your device, contact your local Spectra Geospatial reseller.

Attaching the pole bracket (optional)

An optional accessory for the Ranger 5 data collector, the pole mount consists of three parts:

- the Ranger 5 data collector-facing part. This is a custom bracket mount which attaches to the Ranger 5 data collector .
- The adjustable arm.
 - One end screws onto the custom Ranger 5 data collector bracket mount, and the other end includes a connector that is compatible with other Spectra Geospatial mounting products.
 - The arm can be set up for left or right hand usage. To switch it from one side to the other, unscrew the black screws in the cradle plate where the device sits, rotate the cradle plate, then screw it back into place.

NOTE - This part can also be used with a Spectra Geospatial Ranger 7 data collector.

- The pole-facing part.
 - One side attaches to the connector on the adjustable arm, and the other side includes the pole clamp.
 - The pole-facing part is compact, so that it fits into a 10 cm (4") pipe for storage.

NOTE - This part can also be used with a Spectra Geospatial Ranger 7 data collector and other Spectra Geospatial products.



The Ranger 5 data collector bracket mount “snaps” easily onto the Ranger 5 data collector.

To attach the bracket to the Ranger 5 data collector:

1. Screw the adjustable arm onto the bracket mount.
2. To install the bracket onto the Ranger 5 data collector, place the bracket hook into the mount point directly above the battery door on the data collector. Then, pull down on the spring mechanism on the bottom of the bracket mount and push firmly into the data collector to snap into place.

To remove the bracket mount from the Ranger 5 data collector , pull down on the spring mechanism and lift up to remove.

When the pole bracket mount and adjustable arm are attached to the Ranger 5 data collector , it “snaps” easily into the cradle of the pole clamp assembly.

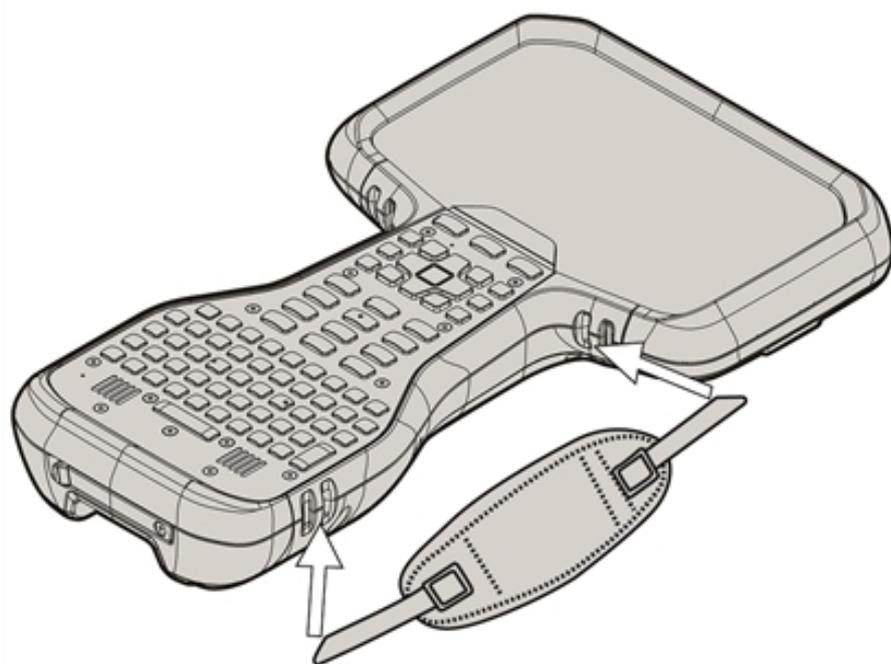
To attach the Ranger 5 data collector onto the pole mount, place the connector on the adjustable arm into the pole clamp and then push it firmly into the snap lock.

To remove the Ranger 5 data collector from the pole clamp, on the back of the locking mechanism, pull the lever to release the Ranger 5 data collector .

Attaching the handstrap

Attach the handstrap to the left or the right side of the device, according to your personal preference. To ensure a good fit:

1. Thread one end of the handstrap ribbon through the top handstrap slot; thread from the center of the device toward the top of the device.



2. Pull the end of the ribbon back towards the center of the handstrap and feed it up, over, and down through the lock buckle on the handstrap and pull it tight.
3. Thread the ribbon at the other end of the handstrap through the bottom handstrap slot; thread from the center of the device toward the bottom of the device.
4. Pull the end of the ribbon back towards the center of the handstrap and feed it up, over, and down through the lock buckle on the handstrap and pull it as tight as is comfortable for your hand.

If required, use a small blunt tool to push the ribbons through the handstrap slots on the device. Do not use a sharp tool.

When using the handstrap, the device should sit firmly in the hand.

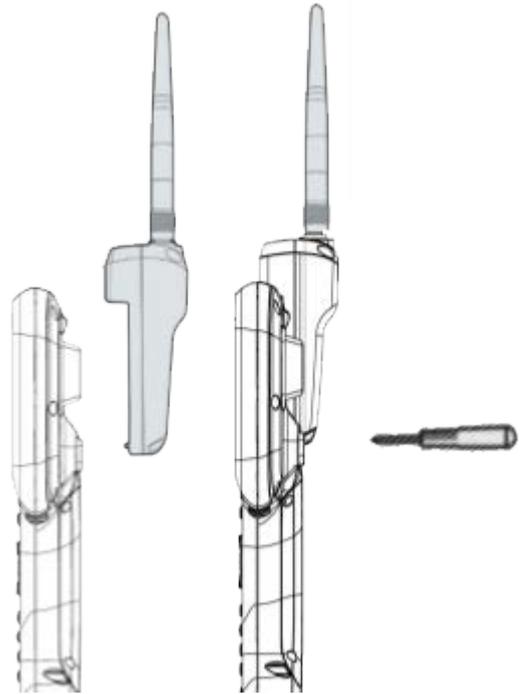
Attaching an Empower module (optional)

NOTE – Before you install or remove a module from the device, make sure the device is powered off or in Sleep state. For more information, see [About Sleep state, page 40](#).

NOTE – You need to re-calibrate the compass after installing or removing an Empower module. For more information, see [Calibrating the compass, page 75](#).

To attach an Empower module to the Ranger 5 data collector:

1. Hook the Empower module onto the back of the device, ensuring that the slots on the top of the device line up with those on the Empower module.
2. Using the Phillips #1 screwdriver, tighten the 2 captive screws at the bottom of the Empower module to secure the module in place. Do not overtighten the screws.



Getting started: basic operation

This section covers some explains some basic features to get you started using your Ranger 5 data collector .

When you start your device for the first time, the Android operating system takes you through some basic setup steps; follow the instructions on the screen.

For more details on setting up and using the Android operating system, see [Using the Android operating system, page 63](#) or go to the [Android 10 website](#).

- [Charging the device for the first time, page 39](#)
- [Turning the device on, off, page 40](#)
- [Checking the battery charge levels and LED status, page 41](#)
- [Charging the internal batteries and the optional Li-35 accessory battery pack while installed in the Ranger 5 data collector, page 49](#)
- [Charging the Li-35 accessory battery pack separately from the Ranger 5 data collector, page 50](#)
- [Making your battery last longer, page 50](#)
- [Using the touchscreen, page 52](#)
- [Display settings: adjusting the backlight, page 54](#)
- [Display settings: rotation lock, page 55](#)

Charging the device for the first time

The internal battery and optional Li-35 user-removable accessory battery pack are charged using the USB-C port directly on the bottom of the device. It takes approximately 3.5 hours to fully charge the device's internal batteries from an empty state using the AC adapter and USB-C to USB-C cable included in the packout. If the [optional removable Li-35 accessory battery pack is installed](#), the total time to fully charge both internal and accessory batteries, when in an empty state, is approximately 8 hours.

NOTE – It may take longer to charge the batteries if you use third party AC adapters, or PC \ laptop USB Ports.

1. Connect the appropriate international plug adapter for your region to the AC adapter.
2. Connect one end of the USB-C to USB-C cable to the USB-C port located on the AC adaptor.
3. Connect the other end of the USB-C cable to the USB-C port on the Ranger 5 data collector .
4. Plug the power supply into an electrical outlet and charge for 3.5 hours.



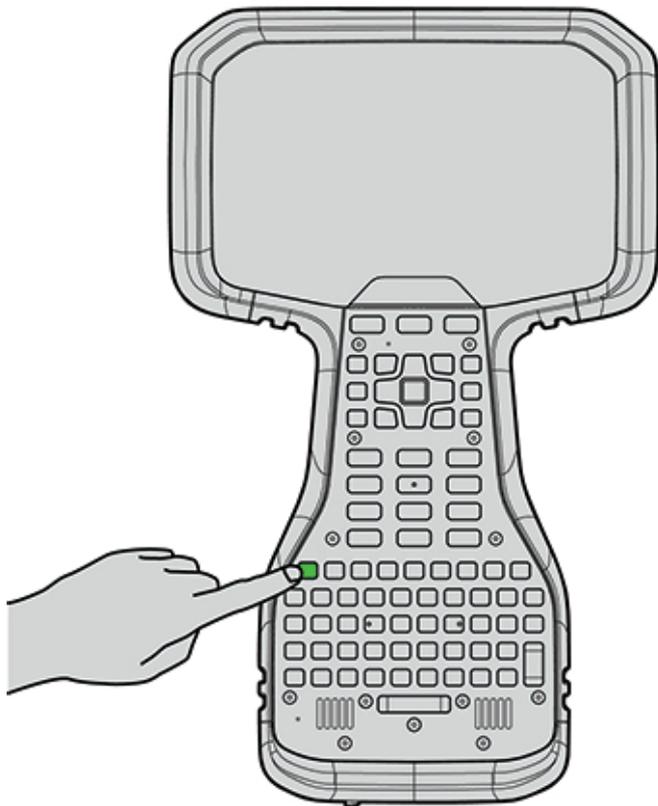
Using Shelf mode

If required, you can place the device into Shelf mode for shipping or long term storage; this is a low power mode to conserve power. Go to **Settings / Battery / Advanced / Shelf Mode Enable**, and select **OK**. Alternatively, press-hold the **Power** key for a couple of seconds to access the option to place the device in Shelf mode. The device will shut down.

To turn the device on and take it out of Shelf mode, it will require charging with a USB-A to USB-C cable.

NOTE – If the [optional removable Li-35 accessory battery pack is installed](#), when you put the device into Shelf mode, the battery pack is also put into a low power mode (Shipping mode).

Turning the device on, off



To turn on the Ranger 5 data collector:

1. Press-hold the **Power** key until the **Powered by Android** boot screen appears.
2. Swipe up on the touchscreen to enter a PIN, password, or pattern, if one has been set.

The first time you use your Ranger 5 data collector, the Android operating system will guide you through some basic setup steps.

About Sleep state

If the Ranger 5 data collector is unplugged and stationary for one minute (default setting), the screen turns off and the device goes into a power-saving Sleep state, called Android Doze. Doze reduces battery consumption by deferring background CPU and network activity for apps when the device is unused for long periods of time. App Standby defers background network activity for apps with which the user has not recently interacted. The device exits Doze mode and resumes normal activity as soon as the device is moved, the screen is turned on, or when connected to a charger.

To force your device to Sleep, briefly press the **Power** key.

To set the screen turn-off time, go to **Settings / Display / Advanced / Screen timeout**, and select 2, 5, 10 or 30 minutes.

Waking and unlocking the device

To wake the screen when it has turned off, briefly press the **Power** key.

Depending on your security settings, your device may be locked. To unlock it, swipe up on the screen then enter your PIN, password, or pattern.

Restarting the device

To restart your device, press-hold the **Power** key until the **Power** menu appears, then tap **Restart**.

Turning off the device

To turn off the device, press-hold the **Power** key until the **Power** menu appears, then tap **Power Off**.

Checking the battery charge levels and LED status

The Ranger 5 data collector is powered by internal batteries which are not removable, and an optional, [user-replaceable accessory battery pack](#) which enables you to double the battery run-time.

It takes approximately 3.5 hours to charge the Ranger 5 data collector internal batteries from an empty state using the AC adapter and USB-C to USB-C cable included in the packout.

If you are using the optional user-replaceable Li-35 accessory battery pack, you can charge it while installed in the device, or externally. While installed in the device, the total time to fully charge both internal and accessory batteries, when in an empty state, is approximately 8 hours.

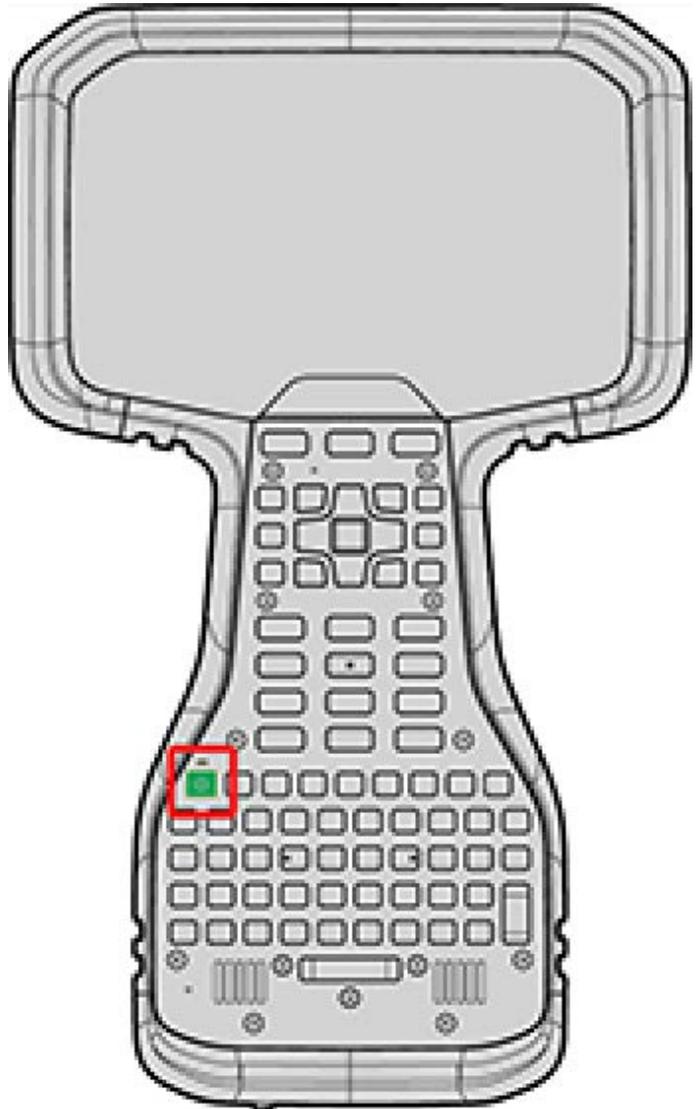
It may take longer if you are using your device for power-intensive activities, for example using GNSS or processing a lot of data while you are charging it.

NOTE - It may also take longer to charge the batteries if you use third party AC adapters, or PC \ laptop USB Ports.

LED charging status

An LED on the keyboard (above the **Power** key) shows the charging status. The charging LED applies to the internal non-removable battery, and the optional user-removable battery pack.

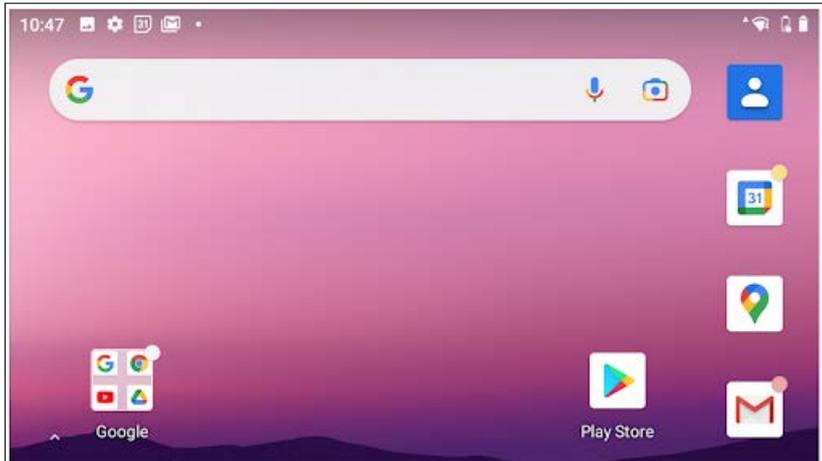
-  Green: fully charged.
-  Amber: charging normally.
-  Red: battery charging error. It can take the device approximately 30 seconds to recognize a bad battery and indicate a charging error.



Checking the charge level of the internal batteries and the Li-35 accessory battery pack

You can check the charge level of the internal batteries and the user-replaceable Li-35 accessory battery pack (if installed) from the **Status** bar (top right corner of the screen).

If there is no Li-35 accessory battery in the device, only one battery icon is shown. If an [Li-35 accessory battery is installed](#) correctly, a second battery icon with a small circle in its lower right corner is also shown:



If **Battery percentage** is turned on, each battery icon also shows the battery charge level on the **Status** bar as a percentage.



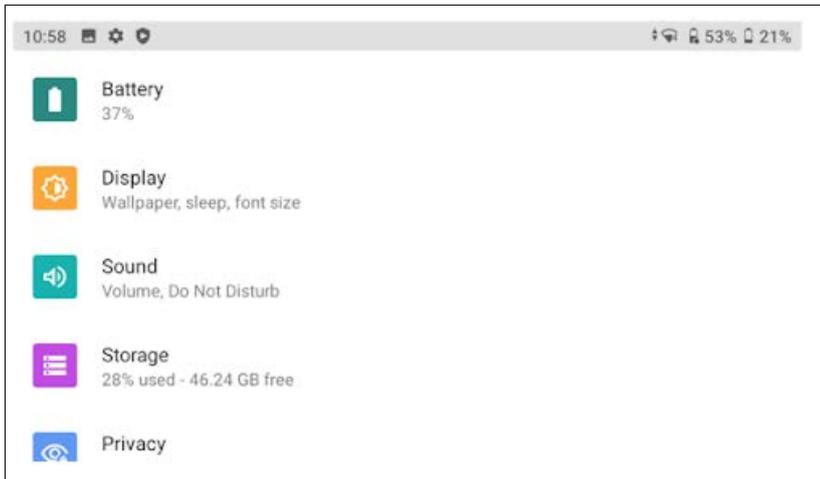
See [Using the Battery settings](#), page 43 for more information on turning on **Battery percentage**.

To access the detailed battery charge information for the internal batteries and the Li-35 accessory battery pack, swipe down from the top of the display, tap the **Settings** icon, then tap **Battery**. See [Using the Battery settings](#), page 43 for more information.

To check the battery status of the accessory battery pack when it is not installed in the device, see [Checking the charge level of the Li-35 accessory battery pack using the battery indicator](#), page 49.

Using the Battery settings

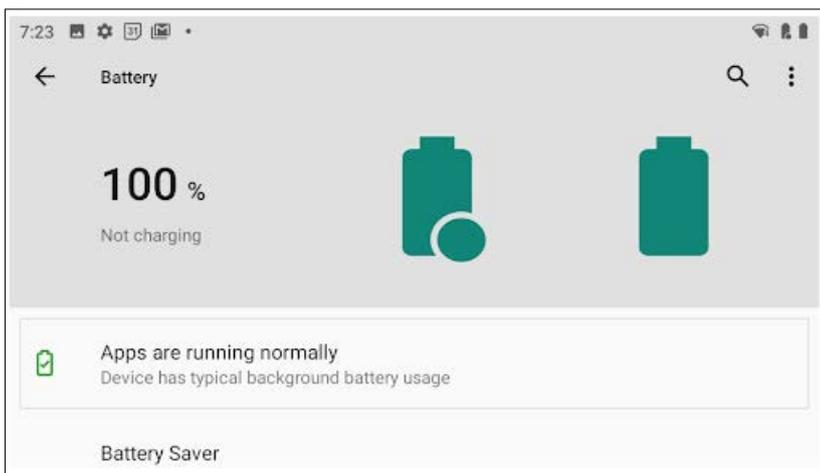
To access **Settings**, swipe down from the top of the display then tap the **Settings** icon. Under **Battery**, the combined percentage charge of the internal batteries and the Li-35 accessory battery is displayed:



In the image above, at the top of the screen, the Li-35 accessory battery shows a 53% charge and the internal batteries show a 21% charge. There is therefore a 37% combined total charge available.

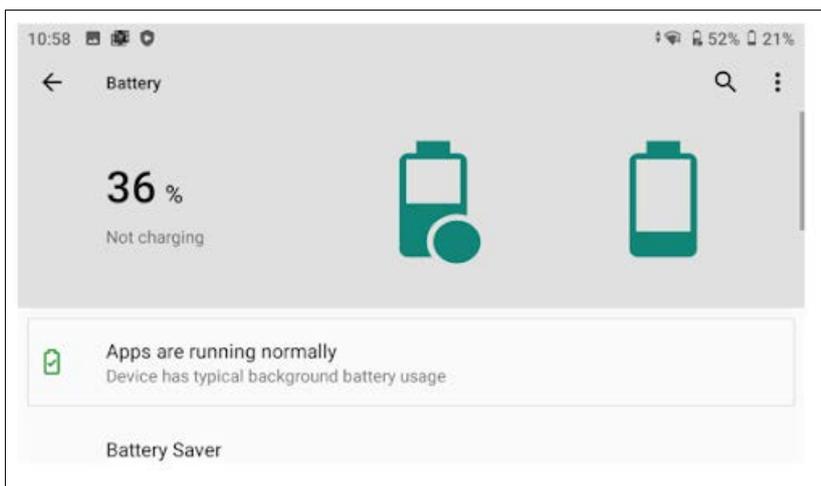
Fully charged internal batteries will run on average for approximately 17 hours (depending on workflow). A fully charged Li-35 accessory battery provides an additional 17 hours of battery run-time. If the combined charge is 37%, this means that there is 37% available run-time from the combined estimated total battery run-time of 34 hours; that is, 37% would yield approximately 12.6 hours of typical run-time.

To access the **Battery settings**, tap **Battery**. The **Battery settings** screen shows the combined charge level of the internal and the Li-35 accessory batteries and their charging status:

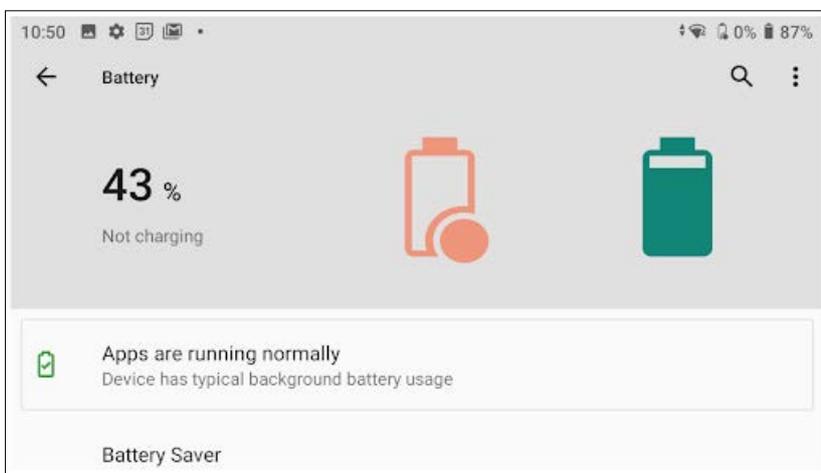


As on the **Status** bar, the battery icons are filled according to their charge level (in the image above, both are 100% charged). For example:

- the **Battery settings** screen below is showing (top right of the screen) 52% charge for the Li-35 accessory battery and 21% charge for the internal battery, with a combined total charge of 36%:



- the **Battery settings** screen below is showing 0% charge for the Li-35 accessory battery and 87% charge for the internal battery, with a combined total charge of 43%:



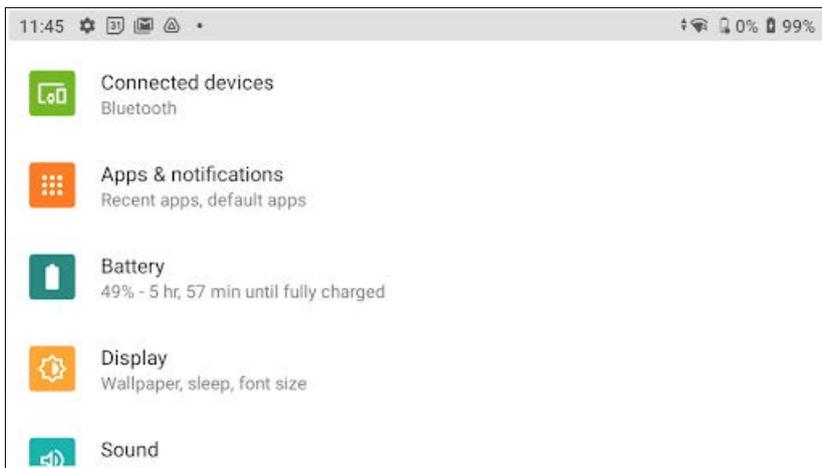
Scroll down to access other settings:

- **Battery Saver**
- **Battery Manager**
- **Battery percentage:** Turn on to display the battery charge % level next to the battery icons on the **Status** bar for the internal battery and the accessory battery. This setting is off by default. When turned on, the Battery settings will still show the combined % charge of both the internal and the accessory batteries.
- **Last full charge**
- **Screen usage since full charge**
- **Advanced:** Tap to access additional battery information such as Max / Min Voltage, Max / Min Temperature, and Charging Cycles for the internal batteries and the Li-35 accessory (external) battery.

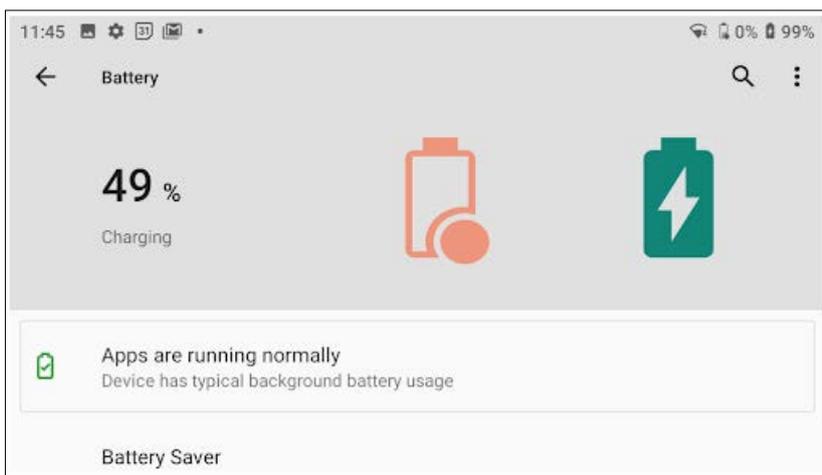
Battery charging

- The internal battery always charges first to 100%. Charging then switches to the Li-35 accessory battery.
- A lightning bolt displays on the internal battery icon while the battery is charging. It remains on when the internal batteries are fully charged and the Li-35 accessory battery is charging.

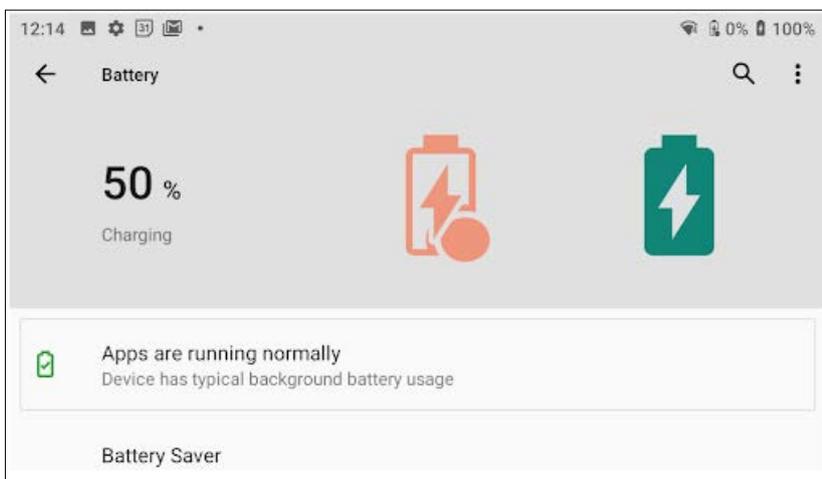
- The Li-35 accessory battery is always used first until drained to 0%; the device then switches to using the internal batteries.
- Under **Battery**, the charge percentage and charge status, including time remaining to full charge, is displayed:



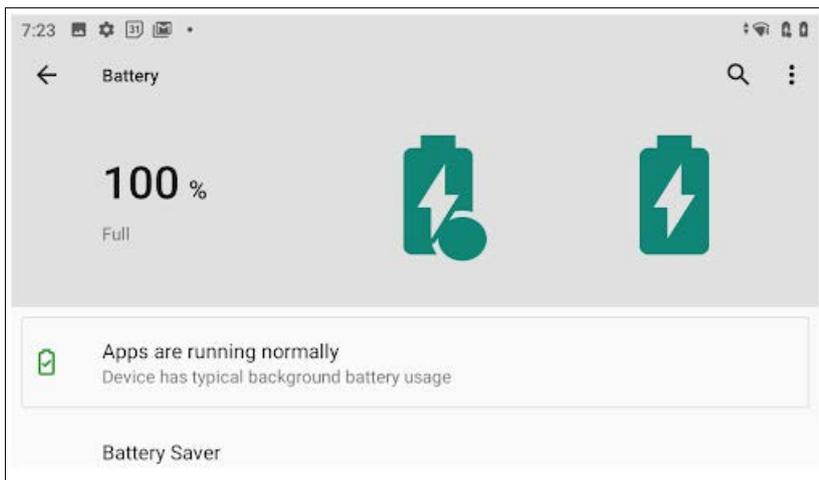
- The following image shows that the internal batteries are charging, as indicated by the lightning bolt on the internal battery icon. This same icon shows on the **Status** bar in the **Battery settings** and on the device's home screen. The Li-35 accessory battery has 0% charge:



- When the internal battery is 100% charged, the Li-35 accessory battery starts charging. The lightning bolt appears on both battery icons:



- When both batteries are 100% charged, and the device is still plugged in to main power, both battery icons show as full and both display the lightning bolt:

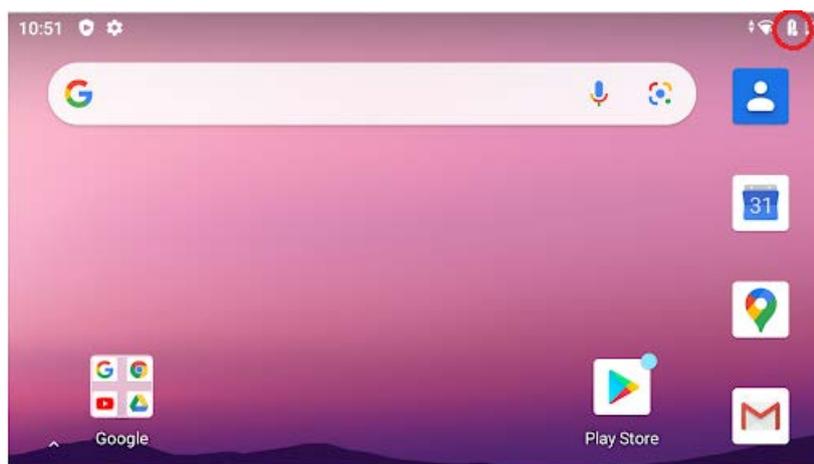


When the device's charger is no longer connected, the batteries appear without the lightning bolt.

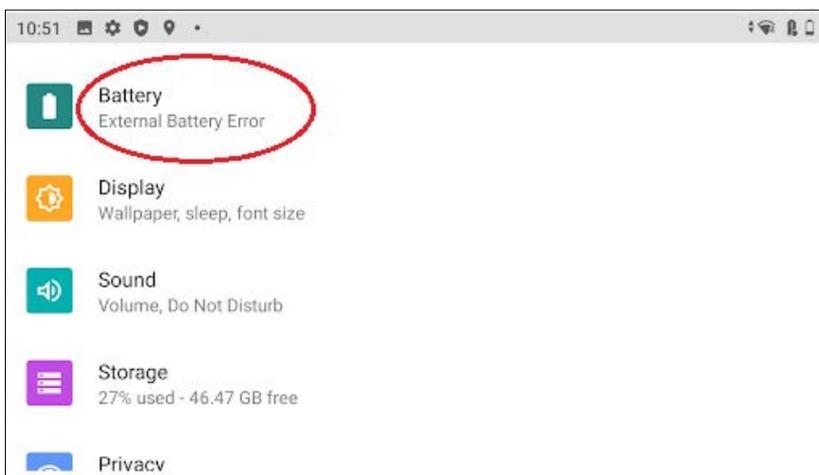
Li-35 accessory battery: external battery error indicator

If a fault is detected in the Li-35 accessory battery, the Li-35 accessory battery icon alerts you as follows:

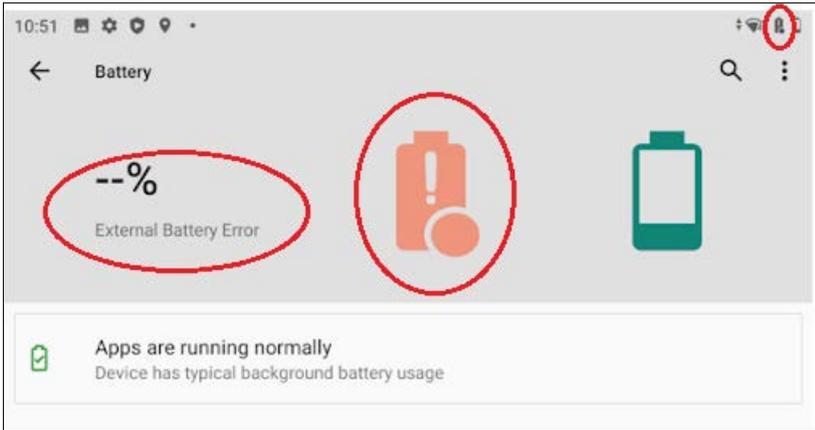
- in the **Status** bar:



- Under **Settings**:



- in the **Battery** settings:



Checking the charge level of the Li-35 accessory battery pack using the battery indicator

You can check the battery charge level of the Li-35 accessory battery pack while it is removed from the device.

Press-hold the button on the battery to check the battery charge level.



The LEDs on the battery will show one of the following:



No LEDs are lit: Battery is empty, or is in Shelf mode (see [Charging the device for the first time, page 39](#)).



Green LED flashing = < 10% charged



Green LED solidly lit = 10-25% charged



25-50% charged



50-75% charged



ALL LEDs are lit: 75-100% charged

For charging options, see:

- [Charging the internal batteries and the optional Li-35 accessory battery pack while installed in the Ranger 5 data collector, page 49](#)
- [Charging the Li-35 accessory battery pack separately from the Ranger 5 data collector, page 50](#)

Charging the internal batteries and the optional Li-35 accessory battery pack while installed in the Ranger 5 data collector

The internal batteries are charged using the USB-C port directly on the bottom of the device. If you have the [Li-35 accessory battery pack installed](#), it is also charged through the USB-C port.

1. Connect the appropriate international plug adapter for your region to the AC adapter.
2. Connect one end of the USB-C to USB-C cable to the USB-C port located on the AC adaptor.
3. Connect the other end of the USB-C cable to the USB-C port on the Ranger 5 data collector.

4. Plug the power supply into an electrical outlet.



The internal Ranger 5 data collector batteries will charge first. When the internal batteries are fully charged, the optional Li-35 accessory battery pack, if installed, will charge.

It may take longer to charge the batteries if you are using your device for power-intensive activities, for example using GNSS or processing a lot of data while you are charging it. For details on other charging options and charge time for the accessory battery pack, see [Charging the Li-35 accessory battery pack separately from the Ranger 5 data collector](#), page 50.

Charging the Li-35 accessory battery pack separately from the Ranger 5 data collector

If you are using the optional Li-35 user-replaceable accessory battery pack, you can charge it while installed in the device, or externally. To charge the battery pack while installed in the device, see [Charging the internal batteries and the optional Li-35 accessory battery pack while installed in the Ranger 5 data collector](#), page 49.

You can charge the accessory battery pack outside the device using the AC adapter and USB-C to USB-C cable included in the packout.

Charging the battery pack using the AC adapter and USB-C to USB-C cable included in the packout

It takes approximately 10 hours to fully charge the accessory battery pack from an empty state using the AC adapter and USB-C to USB-C cable included in the packout, while charging outside of the device. Charging the battery pack using a 3rd party USB-C charger may increase the charge time. For best results, Spectra Geospatial recommends using the USB-C charger and cable provided in the packout.

1. Connect the appropriate international plug adapter for your region to the AC adapter.
2. Connect one end of the USB-C to USB-C cable to the USB-C port located on the AC adaptor.
3. Connect the other end of the USB-C cable to the accessory battery pack. The accessory battery pack is charged using the USB-C port directly on the battery pack.
4. Plug the power supply into an electrical outlet.

NOTE – The Li-35 battery fits into the dual slot battery charger, P/N 109000, but due to firmware incompatibility the battery only trickle-charges so it is not recommended to use the office charger with the Li-35 battery.

Making your battery last longer

The Android 10 operating system includes a number of features to help you get the maximum run time out of your battery. Here are some practical suggestions that you can do to maximize the operating time of the battery:

- **Use Battery Saver mode** to help the device's battery last longer when it is running low. This mode turns off or restricts background activity, some visual effects and other high-power features to extend battery life. To turn on **Battery Saver** mode, swipe down from the **Status** bar and tap the **Battery Saver** icon, then tap **TURN ON**. When **Battery Saver** mode is on, the battery icon in the **Status** bar is red.

NOTE – Battery saver turns off automatically when your device is charging.

NOTE – Battery saver does not stop position data coming through from location services.

- **Keep Battery optimization on.** To have apps use your device's battery only when they need to, keep **Battery optimization** on for all apps. **Battery optimization** is on by default.

To specify battery optimization for any apps, go to **Settings / Battery**, then tap  / **Battery usage**. Tap on any app in the list to view options. Under **MANAGE BATTERY USAGE**, you can view or select **Background restriction** and **Battery optimization**.

- **Background restriction.** To save battery charge, tap **Background restriction** and then select **RESTRICT**. This stops the app from using battery charge in the background. Note that this may cause apps to work improperly and cause delayed notifications.
- **Battery optimization.** Most apps will have the **Optimizing battery use** setting enabled by default. Tap this option to view apps that are not optimized. Select **All apps** from the dropdown next to **NOT OPTIMIZED** to view all apps. Select an app from the list to turn **Battery optimization** on or off. Turning off is not recommended, as it may drain the battery more quickly as the app will no longer be restricted from using background battery.
- **Stretch a low battery's power.** To help a dying battery last until you can charge it, first turn on **Battery saver** mode. Often, battery saver is all you'll need for a low battery's power to last until you can get to a charger. Stretch your remaining battery power with temporary changes to your settings/usage.

TIP – Turn the features back on when you have charged the battery.

- **Avoid high-drain activities;** for example, heavy screen use, heavy data processing.
- **Turn off the wireless radios** when not using them to limit connectivity; for example, turn on Airplane mode, turn off Bluetooth. See [Using wireless networks, page 70](#).
- **Limit location data;** for example, turn on GPS battery saving mode, turn off Location services.
- **Limit automatic syncing;** for example, turn off auto-sync for your Google account, turn off auto-sync for certain Google apps.
- **Unplug USB devices.** Many USB devices use power just by being connected. If you use a USB flash drive, unplug it when you are not using it.
- **Turn off EMPOWER modules** if you will not be using them for a prolonged period; see [Disabling and enabling modules in the Empower Hub, page 83](#).
- **Decrease the display brightness** to the lowest comfortable level. See [Display settings: adjusting the backlight, page 54](#) for more information.
- **Turn off screen rotation.** See [Display settings: rotation lock, page 55](#) for more information.
- If you don't work in low light settings, **disable the keypad backlight.** Go to **Settings / System / Languages & input / Physical keyboard / Built-in Keyboard**. Tap the slider next to **Enable** to disable the keyboard backlight.

You can also adjust the brightness of the keyboard backlight by moving the **Backlight brightness** slider left or right.

- **Turn off the handheld** when you are not using it. See [Turning off the device, page 41](#).
- **Reduce the length of time before the operating system turns off the display.** To further save battery power, ensure the device settings are configured to turn off the screen when you haven't used it for a length of time. See [About Sleep state, page 40](#).

For more information on making your battery last longer, refer to the help topic [Get the most life from your battery](#) on the google.com support site.

Using the touchscreen

Your Ranger 5 data collector can be easily operated with the touchscreen (using your fingers, a stylus, or a glove), a mouse, an onscreen keypad, or the full built-in keyboard. You can easily switch between any of these input methods.

Switching between finger, glove and stylus mode

To select or switch between Finger, Glove, and Stylus mode:

1. Swipe down on the **Notifications** bar at the top of the **Home** screen.
2. Tap the touch mode icon to cycle through Finger  / Stylus  / Glove  modes or swipe down a second time to view the icon and text and cycle through the 3 modes.

You can also open the **Touch Panel Mode** settings to select or switch between Finger, Glove, and Stylus mode:

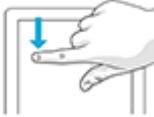
1. Swipe down on the **Notifications** bar at the top of the **Home** screen then swipe down again and tap the **Settings** icon.
2. Select **Display** then tap the **Advanced** dropdown.
3. Select **Touch Panel Mode** and choose between Finger, Stylus or Glove Mode.

When using the device in the rain, Spectra Geospatial recommends that you use Finger mode, with a screen protector installed. The stylus does not work in the rain.

Main touchscreen input gestures and functions supported on the Ranger 5 data collector

The table below describes the main touchscreen input gestures and functions supported on this device.

Tap	Tap once on something.	Opens/executes the action of what you tap on. To enter text, tap where you want to type; the onscreen keypad displays.
	Press- hold	Press-hold your finger or the stylus down for a few seconds. Shows a menu with options related to what you're doing (like right-clicking with a mouse). On the pop-up menu that appears, tap the action you want to perform.
		

<p>Double-tap</p> 	<p>Double-tap on something.</p>	<p>Tap quickly twice on a webpage, map, or other screen to zoom. Double-tapping after pinching to zoom in some apps, such as Browser, reflows a column of text to fit the width of the screen.</p>
<p>Slide / swipe</p> 	<p>Slide / swipe your finger or the stylus across the screen.</p>	<p>Scrolls through what's on the screen. Quickly move your finger across the surface of the screen, without pausing when you first touch it, to scroll a page or a list up or down. Scrolls vertically or horizontally.</p> <p>Swipe a Home screen left or right to see your other Home screens.</p>
<p>Drag</p> 	<p>Drag your finger or the stylus across the screen.</p>	<p>Hold your finger or the stylus on an item for a moment and then, without lifting your finger/the stylus, move across the screen until you reach the target position.</p> <ul style="list-style-type: none"> • Drag in a list to select multiple items. • Drag items on the screen to reposition them.
<p>Pinch / stretch</p> 	<p>Pinch your thumb and forefinger together or move them apart.</p>	<p>Zooms in or out of a website, map, or picture.</p>
<p>Rotate</p> 	<p>Put two or more fingers on an item and then turn your hand.</p>	<p>Rotate the screen left or right in apps that support it, such as Maps.</p>
<p>Swipe from edge</p> 	<p>Swipe in from the left or right edge of the screen.</p>	<p>Left edge swipe opens Google search. Right edge swipe opens other Home screens.</p>
<p>Swipe from top</p> 	<p>Swipe down from the top of the screen</p>	<p>Displays the Notifications bar. Swipe up to close the Notifications bar.</p>

Using the onscreen keypad

You can type on the device using a keypad (virtual keyboard) on the touchscreen. The onscreen keypad is disabled by default. To turn it on:

1. Go to **Settings / System / Languages & input / Physical keyboard**.
2. Next to the **Show virtual keyboard** setting, tap the slider to turn it on.
3. When you tap in a text field on the screen, the onscreen keypad will appear.

You can still use the physical keyboard while the virtual keyboard setting is on.

Using the stylus

NOTE – Spectra Geospatial recommends that you use the Spectra Geospatial Ranger 5 data collector stylus accessory. There are many other capacitive touch styli available that will work with the Ranger 5 data collector as long as they have a rubber tip; however the stylus available as an accessory is tuned for the Ranger 5 data collector display and it fits into the stylus holder. Spectra Geospatial offers no guarantee that other styli will work.

Take notes, draw, navigate, and mark up documents in your apps using the stylus that comes with your device.

To make a selection, tap the screen once on the item you want to select.

To display a right-click menu, tap and hold an item on the screen, then tap the required menu item.

CAUTION – The stylus does not work in the rain.

Using a USB or Bluetooth mouse and keyboard

You can attach a physical keyboard, mouse and other peripherals to your device via USB or Bluetooth wireless technology. For more information see [Using accessories and connecting to other devices, page 76](#).

Display settings: adjusting the backlight

The Ranger 5 data collector is equipped with a high brightness outdoor readable display. You can easily increase the brightness of the display to increase the readability of the device in bright sunlight conditions, or turn down the brightness to help conserve battery power when working indoors or in dull conditions. You can also have the device automatically adjust the backlight power depending on the ambient light conditions.

Configuring Adaptive brightness

Adaptive brightness is on by default. It uses the ambient light sensor on the device's screen (see [Parts of the Ranger 5 data collector, page 25](#)) (see Parts of the Ranger 5 data collector) to adjust your screen brightness depending on the amount of light around you.

To adjust the backlight settings, and turn Adaptive brightness off / on:

1. Open the **Settings** app .
2. Tap **Display**.
3. Tap the setting that you want to change.

Manually adjusting the backlight brightness

1. Swipe down from the **Status Bar** at the top edge of the screen to view the **Quick Settings** bar.
2. Slide the backlight slider  left or right to adjust the brightness.

NOTE – You can manually adjust your brightness level while Adaptive brightness is on.

TIP – You can also access the backlight slider by pressing **Fn + 7**.

Display settings: rotation lock

The Ranger 5 data collector is equipped with orientation sensors that can detect if your device is in portrait or landscape orientation. The operating system can automatically adjust the display to match your device orientation, or you can lock the orientation.

Swipe down from the top of the screen to display the **Quick Settings** bar.

- If auto-rotate is turned off, the auto-rotate icon  is not visible; **Portrait** or **Landscape** will be displayed instead. Tap to turn on auto-rotate .
- If auto-rotate is turned on, the auto-rotate icon  is visible. You can:
 - Tap  to toggle auto-rotate Off.
 - Lock the orientation. Orientate the device to **Portrait** or **Landscape**, then tap  to turn off auto-rotate and lock the device in the selected orientation.

Using the integrated keyboard

The Ranger 5 data collector has a full built-in QWERTY keyboard. The keyboard is similar in most ways to a standard PC keyboard; there are some differences due to the keyboard's small physical size, and some special features have been added to support users' specific requirements.

This section covers how to use the keyboard, and describes the special / non-standard functionality of the keyboard and the associated utilities.

- [About the keyboard controller firmware, page 56](#)
- [Main keyboard keys, page 57](#)
- [Configuring built-in keyboard settings, page 59](#)
- [Keyboard status LEDs, page 61](#)

About the keyboard controller firmware

To check the keyboard controller firmware version and keyboard type, go to: **Settings / System / Languages & input / Physical keyboard / Built-in Keyboard / About**.

The keyboard controller manages the [sticky key operation of all modifier keys](#).

Main keyboard keys



1 **Android Back key**

2 **Android Home key**

3 **Android Overview key**

4 **App Menu:** App-specific, this launches the menu for the active app; it performs the same function as the  menu key that most apps have (giving options for help, about, exit, etc.). For 3rd party apps it may not do anything.

5 **Function keys F1-F12**

These can be configured in the Trimble software according to your requirements. Refer to the Trimble software documentation.

6 Numeric Keypad, Numeric Keypad Enter key, and Cursor Lock / Num Lock key:

- The **Numeric Keypad** is locked to **Num Lock** by default; the 0 to 9, decimal point ('.') and minus ('-') keys perform the same as the numeric keyboard on a standard PC keyboard.
- The **Numeric Keypad Enter** key performs the same as the numeric keyboard Enter key on a standard PC keyboard.
- **Cursor Lock / Num Lock key**. By default, the numeric keypad is locked in **Num Lock** (the LED status icon below the key is OFF).

To turn off Num lock and turn on Cursor lock, press-hold the yellow **Fn** key and press the **.** key (the decimal point) to change the numeric keypad to a Cursor Navigation state. In Cursor Navigation state, the keys function according to the "key+Shift" behavior (Home; End; Page up; Page Down; left, right, up, or down arrow; Insert; and Delete.)

When in Cursor Navigation state, the LED status icon below the key is ON (green).

7 Master Volume keys: Use to adjust the device's speaker volume.

- **Fn+8** = Volume up
 - **Fn+5** = Volume down.
-

8 Print Screen (Fn+0). Capture a screenshot of what is currently visible on the screen.

Screenshots are saved to the **Files / Images / Screenshots** folder and can also be accessed under **Photos / Screenshots**.

You can also Print Screen by holding down the Power key and tapping Screenshot.

9 Modifier Keys: **Fn**, **Shift**, **Ctrl**, and **AGr**

The **Search** key () is used as a non-modifier key to open the Android Search function. You can make it non-sticky by turning this option Off. See [Modifier keys and Sticky keys: modes and settings, page 60](#) for more information.

The modifier keys are keys that modify the action taken when other keys are pressed while the modifier key is held down. Modifier keys can be used in combinations with more than one key pressed at the same time.

To make the keyboard easier to use the modifier keys can be configured as **sticky keys**. When sticky keys are enabled the modifier keys "stick down" when pressed so that you do not need to press-hold a modifier key while you press the other key. See [Modifier keys and Sticky keys: modes and settings, page 60](#) for more information.

10 Fn Key (Function Select key). Use the **Fn** key to access a key's alternate function, as printed above the key.

- If sticky keys are not enabled, press-hold the **Fn** key and press the other required key.
- If sticky keys are enabled you do not need to hold the **Fn** key while pressing the other key.

See [Modifier keys and Sticky keys: modes and settings, page 60](#) for more information.

11 Caps Lock = **Fn+Z**: locks the keyboard alphabetic keys to capital letters.

12 Power key. Turn the screen on / off. Press-hold the Power key for a couple of seconds to quickly access settings to power off or restart the device, capture a screenshot or place the device into [Shelf mode](#) (see [Using Shelf mode, page 39](#)).

13 Screen Lock = Fn+1. Use to temporarily disable the touchscreen to clean the display. Press any key to unlock the touchscreen.

In this mode the Notification bar is still accessible.

14 Screen Display Brightness: Adjust the display's backlight brightness:

- **Fn+7** = brighter
- **Fn+4** = dimmer

You can also set the display brightness to adjust automatically when the ambient lighting conditions change. See [Display settings: adjusting the backlight, page 54](#).

15 Back Tab key The back tab key performs the same function as pressing the **Shift** key and the **Tab** key. For many applications this will move the focus to the previous control in the sequence, as opposed to the **Tab** key which moves the focus to the next control.

For applications that use the **Tab** key for text entry, the **Back Tab key** typically performs the same as the **Tab** key.

Configuring built-in keyboard settings

You can configure some keyboard behaviors under **Settings / System / Languages & input / Physical keyboard / Built-in Keyboard**.

Use the Built-in Keyboard settings to check settings or make changes to some of the built-in keyboard behavior. Use the Android toggle to Enable/Turn On (slide to the right) or Disable/Turn Off (slide to the left). Details for each setting are covered below.

Built-in keyboard backlight

The built-in keyboard is equipped with a backlight that makes it easier to use in dimly lit areas. The backlight is activated when you press a key; it stays on for a while and then turns off to conserve power. You can manually turn off the backlight or adjust its brightness.

To edit the backlight behaviors, go to **Settings / System / Languages & input / Physical keyboard / Built-in Keyboard / Backlight** and configure as required:

- **Enable.** This is On by default. If you don't work in low light settings, turn Off to completely disable the backlight and save battery power.
- **Timeout .** Set the Timeout value to determine how long the backlight stays on when no keys are pressed.
- **Automatic Mode.** When set to:
 - Off, the backlight is always enabled . This is the default setting.
 - On, the device's ambient light sensor is used to keep the backlight from turning on in well lit areas.
- **Backlight brightness.** Move the slider to adjust the brightness of the backlight (right = brighter, left = dimmer). Brighter settings consume more power than dimmer settings.

Modifier keys and Sticky keys: modes and settings

Use Modifier keys to modify the action of another pressed key, while you press-hold the modifier key. Modifier keys can be used in combinations, with more than one modifier key pressed at the same time.

The modifier keys are:

- the **Fn** key
- the **Shift** () key
- the **Ctrl** key
- the **AGr** key

Since the device is normally hand-held, it can be difficult to press multiple keys on the built-in keyboard at the same time. To make the keyboard easier to use, you can set the modifier keys to be Sticky keys.

NOTE – You can also set the **Search** key  to be a Sticky key.

When Sticky keys are enabled, the modifier keys “stick down” when pressed so that you do not need to press-hold a modifier key while you press the other key(s), allowing multiple key combinations to be pressed sequentially.

To configure Modifier / Sticky key behavior, go to **Settings / System / Languages & input / Physical keyboard / Built-in Keyboard / Sticky Keys**. If Sticky key behavior is off, move the **Sticky modifier keys** slider to the right to turn on Sticky key behavior.

- **On (default)** = Sticky key behavior is enabled. Modifier keys “stick down” when pressed, and stay active until you press a non-modifier key.
- **Off** = Sticky key behavior is disabled. To access modified key functions, you must press-hold the required Modifier key and then press the other key you want. E.g. press-hold **Shift** then press an alpha key to access the capital letter.

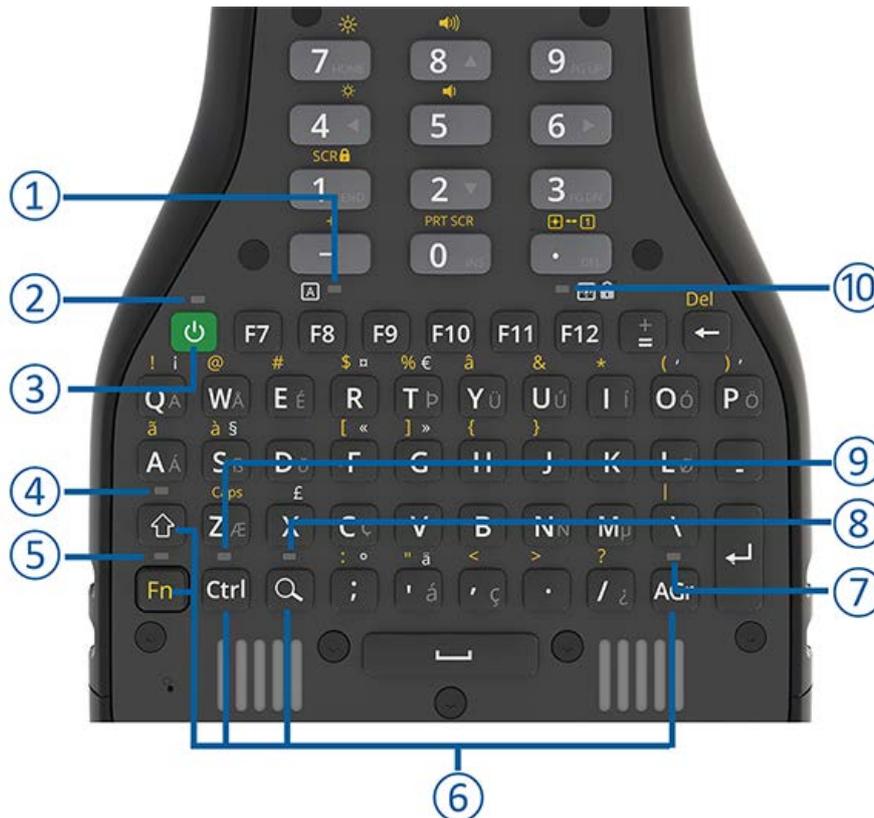
The different Sticky key modes / settings and behavior of the modifier keys when Sticky key behavior is enabled is described below.

- The **Search** key is used as a non-modifier key to open the Android Search function. You can make it non-sticky by turning this option Off.
 - **Off (default)**: Search key is not a sticky key. Because the Search key is sometimes used in a non-modifier fashion this control allows the Search key to not be sticky while the other keys remain sticky.
 - **On**: Search key is a sticky key.
- **Lock modifier keys** when pressed twice in quick succession. You can set a modifier key to be locked down indefinitely by turning this setting On; when you then press a modifier key twice, it locks down until you press the key a third time.
 - **Off (default)**: Modifier keys are released when pressed two times in quick succession. Normal Sticky keys mode: Temporarily latch modifier key when pressed. Pressing and releasing a modifier key one time latches the modifier key state down until a non-modifier key is pressed at which point the modifier key is released.
 - **On**: Modifier keys are locked down when pressed twice in quick succession (press a third time to release). Pressing and releasing a modifier key one time latches the modifier key state down until another non-modifier key is pressed at which point the modifier key is released. Pressing and releasing a modifier key two times in quick succession locks the modifier key state down until it is pressed and released a third time.

- **Play sounds** when modifier keys are pressed. Plays a sound when sticky keys are locked down or released to make it easier to determine the locked state of the modifier keys.
 - **Off (default):** No sound when sticky keys are pressed or released.
 - **On:** Play a sound when a modifier key is latched down, locked down, or sticky keys are pressed or released.

Keyboard status LEDs

There are 8 LEDs on the keyboard, including five Modifier / Sticky key LEDs. The Sticky key LEDs represent the sticky state of the Modifier key it is located above.



The different LED states are:

	No LEDs On	None of the Modifier keys are set as "sticky".
1	Caps Lock LED	ON: Caps locked. OFF (Default): Caps unlocked.
2	Battery Charging LED	See Checking the battery charge levels and LED status, page 41
3	Power key	
4	Shift key LED	ON= the Shift key is set as "sticky".
5	Fn key LED	ON= the Fn key is set as "sticky".
6	Modifier keys	Shift, Fn, Ctrl, Search, AGr
7	AGr key LED	ON= the AGr key is set as "sticky".

8	Search key LED	ON= the Search key is set as "sticky".
9	Ctrl key LED	ON = the Ctrl key is set as "sticky".
10	Cursor / Num Lock LED	<p>OFF = Num Lock is on (this is the default) and Cursor Navigation mode is off. The numeric keyboard performs the number functions.</p> <p>ON = Cursor Lock is set as "sticky"; the Cursor Navigation mode is on, and the Numeric function is off (the numeric keyboard performs the cursor navigation function).</p> <p>To turn off Cursor Navigation mode and turn on the Numeric function, press Fn + ".".</p>

See [Modifier keys and Sticky keys: modes and settings, page 60](#) for more information.

Using the Android operating system

This section introduces some basic information on using the Android operating system on the Ranger 5 data collector. For additional information, go to the [Android 10 website](#).

Press the Power key to turn on the Ranger 5 data collector . The Android operating system will guide you through the setup process. The first time you use the Ranger 5 data collector , you'll be prompted to set up a Wi-Fi network and a Google Account to use with your device.

- [Using Accounts, page 63](#)
- [The Android interface, page 65](#)
- [Using the pre-installed Google apps and other apps, page 67](#)

Using Accounts

You can sign up for a Google Account or use one that you already have. You already have a Google Account if you use an email address to sign in to any Google product, for example: Gmail, YouTube, Google Play, AdWords, Google Apps, or any other Google product.

When you sign in with your Google Account, you'll have access to everything associated with your Google Account, like Gmail, calendar, contacts, apps you've purchased on Google Play, and other data associated with that account. If you have multiple Google Accounts, you can add the others later.

NOTE – If you have personal and work (Enterprise) Google accounts, refer to support documentation on the Ranger 5 data collector product page for details on how to best set up your device.

WARNING – Make sure you remember the password you use to sign into your device or else you won't be able to access it. Even if you do a factory reset, you will be required to enter the password you used to sign into this device.

Add a Google or other account

1. Open the **Settings** app.
2. Tap **Accounts**.
3. Tap **Add account**.
4. Tap the type of account you want to add.
 - To add your Google Account, tap **Google**. When you sign in with a Google Account, the email, contacts, calendar events, and other data associated with that account automatically sync with your device.
 - To add a different personal account, tap **Personal (IMAP)** or **Personal (POP3)**. You'd generally choose these if you use an email program like Microsoft Outlook or Apple Mail.

TIP – [Learn how to use IMAP or POP3 with Gmail.](#)

5. Follow the on-screen instructions.
6. If you're adding accounts, you may need to enter your device's pattern, PIN, or password for security.

You can add more accounts by repeating the steps above.

Remove a Google or other account

1. Open the **Settings** app.
2. Tap **Accounts**.
3. Tap the account you want to remove.
4. Tap **REMOVE ACCOUNT**.
5. If this is the only Google Account on the device, you'll need to enter your device's pattern, PIN, or password for security.

The Android interface

When you turn on your device, the main **Home** screen appears. The **Home** screen is the primary screen for accessing all of the Ranger 5 data collector features on the device. You can add and customize **Home** screen(s) by adding app shortcuts and widgets (an at-a-glance view of the app's most important information). The main parts of the screen are:



- 1 Notifications.** To see notifications, swipe down from the top of the screen with one finger. **Quick Settings** (frequently used settings), are also located here. To open all Settings, swipe down from the top of the screen a second time, then tap the **Settings** icon.
- 2 Home screen.** To move between **Home** screens if you have more than one, swipe left or right. On the main **Home** screen, tap **Google** at the top of the screen or say OK Google to search, send messages, ask for directions, or give other instructions.
- 3 Android Back key.** Returns to the previous screen you were working in, even if it was in a different app. Once you back up to the **Home** screen, you can't go back any further.
- 4 Android Home key.** Returns to the **Home** screen. To get suggestions based on the screen you're currently viewing, tap and hold this button.
- 5 Android Overview key.** Opens thumbnails of items you've worked with recently. To open an item, tap it. To remove an item, swipe it up or down.
- 6 App shortcuts** to content inside apps.
- 7 A widget** shows information without opening the app.
- 8 Status bar** indicator icons are shown at the top of the display. The right side of the status bar shows the mobile signal strength, Wi-Fi signal strength, and how much battery charge is left. The left side shows the time and app notifications.

Android navigation keys

The Ranger 5 data collector includes navigation keys on the physical keyboard, so they do not appear on the screen.

1. Touch-hold the app until **App info** appears, then lift your finger off the screen.
2. Tap **App info**.
3. On the App info screen, select **UNINSTALL** to remove the app.

Using the pre-installed Google apps and other apps

The Ranger 5 data collector comes with a range of useful pre-installed software. The following describes some important bundled applications and summarizes what they can be used for.

Google bundled apps



Google Play is a global online store to find, enjoy, and share your favorite apps, games, movies, music, and books on all your favorite devices.



Google The Google app keeps you in the know about the things you care about. Find quick answers, explore your interests, and get personalized updates in your Google feed. The more you use the Google app, the better it gets.



Google Chrome is a fast, easy to use, and secure web browser. Designed for Android, Chrome brings you personalized news articles, quick links to your favorite sites, downloads, and Google Search and Google Translate built-in. Enjoy the same Chrome web browser experience you love across all your devices.



Gmail is an easy to use email app that saves you time and keeps your messages safe. Get your messages instantly via push notifications, read and respond online and offline, and find any message quickly.



Google Maps allows you to navigate your world faster and easier with over 220 countries and territories mapped and hundreds of millions of businesses and places on the map. Get real-time GPS navigation, traffic, and transit info, and explore local neighborhoods by knowing where to eat, drink and go—no matter what part of the world you're in.



YouTube is the official app for Android devices which allows you to see what the world is watching—from the hottest music videos to what's trending in gaming, entertainment, news, and more. Subscribe to channels you love, share with friends, and watch on any device.



Google Drive is a safe place to back up and access all your files from any device. Easily invite others to view, edit, or leave comments on any of your files or folders. With Drive, you can safely store and access your files anywhere, quickly access recent and important files, search for files by name and content, share and set permissions for files and folders, view your content on the go while offline, receive notifications about important activity on your files, and use the device camera to scan paper documents.



YouTube Music is a music app that allows you to easily find what you're looking for and discover new music. Get playlists and recommendations served to you based on your context, tastes, and what's trending around you.



Google TV, previously Play Movies & TV, makes it easy to find and enjoy the entertainment you love in one place. With Google TV, you'll be able to browse movies and TV episodes across all of your streaming apps, see the latest releases, and create a watchlist shared across devices.



Google Duo is a simple, high-quality video chat application for everyone. With its easy one-tap interface, Google Duo gives users simple, high quality video communication that just works on any device, so they never miss a moment with the people who matter most.



Google Photos is the home for all your photos and videos, automatically organized and easy to find so you can share and save what matters.



Calculator provides simple and advanced mathematical functions.



Google Calendar is the official Google Calendar app to manage your schedule across multiple devices.



Clock combines all of the functionality you need.



Contacts is the official Google app that allows you to back up your contacts and sync them across all your devices. See each contact's email address, phone number, website, and other information at a glance.



Google Keep can be used to take notes, including text, lists, images, and audio.



Messages is Google's official app for texting and can be used to send SMS text messages on to your contacts.



Recorder brings the power of search to audio recording. Meetings, lectures, band practices, family memories—anything you want to save and listen to later. Recorder automatically transcribes and labels what you record so you can easily find the parts that matter to you.

Other bundled apps



Files is a file manager that you can use to view and open recent files, including images, videos, audio and downloads stored on the device or in Google Drive.



Camera. The Camera app lets you take regular photos or video using the rear facing camera on the device.



Trimble Empower Hub is a utility for management of Empower modules on the Trimble Empower enabled devices.



Trimble Installation Manager for Android enables you to easily install and update supported Trimble software to supported devices running the Android platform.



Trimble GNSS Status Utility is a software utility that allows for configuration of the Trimble EM100 GNSS receiver module, and the Trimble R1, R2, and PG200 GNSS receivers. For receivers that support these functions, use the GNSS Status utility to:

- view GNSS status and accuracy information for the currently selected GNSS source
- set up correction sources
- apply licensing options
- configure NMEA output



Asset Reader is a Trimble demo app for the EM110 / EM111 / EM112 barcode and RFID Empower modules. For more information, refer to the documentation at <https://geospatial.trimble.com/products-and-solutions/trimble-empower>



Asset Settings is a Trimble settings app which allows configuration of the EM110 / EM111 / EM112 barcode and RFID Empower modules. For more information, refer to the documentation at <https://geospatial.trimble.com/products-and-solutions/trimble-empower>



Music is a utility for managing songs, albums, artists and playlists stored on the device.



Videos is a utility for videos stored on the device.



Settings

Getting more apps

You can get apps, games, digital content and popular office apps such as Google Docs, Sheets, and Slides for your device using Google Play. Google Play is pre-installed on your Ranger 5 data collector.

1. Open **Apps** and tap Google Play .
2. Use Google Play to search and browse for content to download.

Using wireless networks

The Ranger 5 data collector supports wireless connectivity; connect to wireless networks using the built-in Wi-Fi radio (also sometimes called Wireless LAN, WLAN, or 802.11), or the built-in mobile broadband data (also called Wireless WAN, WWAN, or cellular data) capability.

This section describes how to get online with the Ranger 5 data collector using these wireless networking capabilities.

- [Working with Wi-Fi networks, page 70](#)
- [Working with mobile broadband, page 72](#)
- [Airplane mode, page 73](#)

Working with Wi-Fi networks

Using Wi-Fi you can connect to a wireless network and browse the internet, download apps, send email messages, access online services, or access other computers and devices on your network.

Before you can send and receive data over Wi-Fi, you need to turn on Wi-Fi on the Ranger 5 data collector and connect to a wireless network.

To access Wi-Fi settings, do one of the following:

- From the **Apps** screen, open the **Settings**  app. Tap **Network & Internet**, then tap **Wi-Fi**.
- On a **Home** screen, swipe down from the status bar at the top of the screen twice with one finger to open **Quick Settings**. If the device is connected to Wi-Fi, the network name is displayed; otherwise, it shows **Wi-Fi**. Tap-hold to open the Wi-Fi settings.

See [The Android interface, page 65](#) for more information on the **Apps** and **Home** screens, and **Quick Settings**.

Connecting to Wi-Fi

1. At the top of the Wi-Fi screen, tap the **On/Off** switch to turn on Wi-Fi. A list of available wireless networks appears.
2. Tap the Wi-Fi network you want to connect to.

If the network is secured and you need a password, you'll see the Wi-Fi lock icon  .

Once you are connected:

- **Connected** shows under the network name.
- The Wi-Fi network is a **Saved network**. When in range, your device automatically connects to it.

Disconnecting from a Wi-Fi network

At the top of the Wi-Fi screen, tap the **On/Off** switch to turn off Wi-Fi.

Forgetting a Wi-Fi network

If you do not want your device to automatically connect to a saved Wi-Fi network, you can forget that network.

To forget a wireless network so it no longer appears in your list of networks:

1. From the **Apps** screen, open the **Settings**  app.
2. Tap **Network & Internet**.
3. Tap **Wi-Fi**.
4. At the top of the Wi-Fi screen, make sure the **On/Off** switch is On.
5. Tap the saved network you want to forget, then tap **Forget**.

Advanced Wi-Fi settings

To change the advanced Wi-Fi settings on your device:

1. On the Wi-Fi screen, tap **Wi-Fi preferences** then tap **Advanced**.
2. Tap an available setting option:
 - **Turn on Wi-Fi automatically**. Wi-Fi will turn on near high-quality saved networks, e.g. your home network.
 - **Open network notification**. Get a notification when your device finds a Wi-Fi network to which it can connect.
 - **Install certificates**. Digital certificates can identify your device for many purposes, including VPN or Wi-Fi network access.
 - **Network rating provider**. Select None or Google.
 - **Wi-Fi Direct**. Let your device connect with other Wi-Fi Direct-capable devices without a network.
 - **MAC address**
 - **IP address**

Configure proxy settings

To connect to a Wi-Fi network via a proxy:

1. From the Apps screen, open the **Settings**  app.
2. Tap **Network & Internet / Wi-Fi**.
3. Tap a network.
4. At the top, tap **Edit**  / **Advanced options**.

5. Under **Proxy**, tap the dropdown arrow and select the configuration type:
 - **None**
 - **Manual**
 - **Proxy Auto-Config**
 6. If needed, enter the proxy settings.
 7. Tap **Save**.
- Proxy settings must be set up separately for each Wi-Fi network.

Managing Wi-Fi from the Status bar / Quick Settings on the Home screen

You can quickly turn Wi-Fi on or off, or switch networks, from the **Status bar / Quick Settings** on a **Home** screen.

On a **Home** screen, swipe down from the **Status** bar at the top of the screen twice with one finger to open **Quick Settings**. If the device is connected to Wi-Fi, the network name is displayed; otherwise, it shows **Wi-Fi**.

- To turn Wi-Fi on if it is off, tap the Wi-Fi icon.
- To turn Wi-Fi off if it is on, tap the Wi-Fi network that the device is connected to.
- To connect to a different network, tap the dropdown arrow then select the network you want to connect to.

See [The Android interface, page 65](#) for more information on the **Status** bar and **Quick Settings**.

Working with mobile broadband

The Ranger 5 data collector has an integrated cellular modem enabling you to connect to a mobile broadband network. The Ranger 5 data collector supports Worldwide LTE (where available), and is compatible with AT&T- and Verizon-certified 3G and 4G networks.

Before you can send and receive data over mobile broadband, you must have a microSIM card in the device (see [Inserting a MicroSIM card \(optional\), page 27](#)). You must then turn on Cellular data on the Ranger 5 data collector and configure the connection.

Using mobile data

You can adjust how your device uses mobile data by changing your cellular network settings.

Depending on your carrier and service plan, your device may connect automatically to your carrier's fastest available data network. Or you may need to choose settings and use a SIM card for a specific carrier.

To adjust cellular network settings:

1. From the **Apps** screen, open the **Settings**  app.
2. Tap **Network & Internet**, then tap **Mobile network**.
3. Adjust the settings as required:

- **Mobile data.** Access data using mobile network.
- **Roaming.** Let your device transmit data over other carriers' networks when you leave an area covered by your own carrier's networks.
- **App Data** usage.

Locating the device's IMEI number

The IMEI number is a unique 15-digit number that identifies the cellular module installed on your device. Your mobile broadband operator may need to know the IMEI number of your device to register the device with the network and activate your mobile broadband data plan.

The IMEI number is printed on the serial number label located in the removable battery / SIM card compartment on the back of the device; see [Installing and removing the optional accessory battery pack, page 28](#) or [Inserting a MicroSIM card \(optional\), page 27](#) for instructions on removing the compartment cover.

Alternatively, to check the IMEI number in the operating system:

1. From the **Apps** screen, open the **Settings**  app.
2. Tap **About device**.
3. Tap **IMEI**.

If you cannot find the IMEI number for your device, or you do not have the device with you, contact your reseller.

Airplane mode

If you are traveling on an airplane, or don't need to use wireless functions on the Ranger 5 data collector for a while, use Airplane mode to turn on or off all wireless radios with transmitting features built into the Ranger 5 data collector, including Bluetooth, Wi-Fi, Cellular, or GNSS, as well as any wireless radios connected to the Ranger 5 data collector such as Empower modules.

To turn Airplane mode on or off:

1. Swipe down from the top edge of the screen twice to open **Quick Settings** (see [The Android interface, page 65](#) for more information about Quick Settings).
2. Tap the Airplane mode icon to turn it on or off.

Working with GNSS

The Ranger 5 data collector has a built-in 10 meter accuracy GNSS (Global Navigation Satellite System) receiver module, and an integrated antenna with automatic SBAS corrections. The integrated receiver supports SBAS satellites under normal conditions.

The Ranger 5 data collector supports most of the external Spectra Geospatial GNSS receivers. If you want to connect via Bluetooth make sure your receiver is capable of using a Bluetooth PIN; older receivers may not connect due to the security expectations of the Android operating system.

You cannot use an external antenna with the Ranger 5 data collector's integrated GNSS receiver. For advanced GNSS setups, use a survey-grade receiver, or the Trimble EM100 GNSS Empower module; refer to the Trimble Empower module user documentation for more information. With a GNSS L1/L-band GNSS module, you can receive GNSS positions with submeter accuracy.

You cannot postprocess GNSS data from the internal receiver. If you want raw GNSS data for postprocessing, use an external GNSS receiver or the EM100 GNSS Empower module; refer to the Trimble Empower module user documentation for more information.

- [Using the GNSS Status utility, page 74](#)
- [Using 3rd party applications, page 75](#)
- [Calibrating the compass, page 75](#)

Using the GNSS Status utility

The Trimble GNSS Status utility allows you to configure the EM100 GNSS receiver module, and the R1, R2, and PG200 GNSS receivers. For receivers that support these functions, use the GNSS Status utility to:

- view GNSS status and accuracy information for the currently selected GNSS source
- set up correction sources
- apply licensing options
- configure NMEA output

If required, you can update or download it from Google Play.

NOTE – The built-in GNSS is hosted on the WWAN module, so you cannot connect to it directly to configure it (using the GNSS Status utility or any other 3rd party apps).

Using 3rd party applications

The orientation sensors are active and applications can access and use the sensors. Use Google Play to browse for 3rd party tools that enable you to view sensor output.

Calibrating the compass

CAUTION - If an Empower module or the optional accessory battery pack is installed or removed from the device, the compass must be re-calibrated, or you may experience poor accuracy.

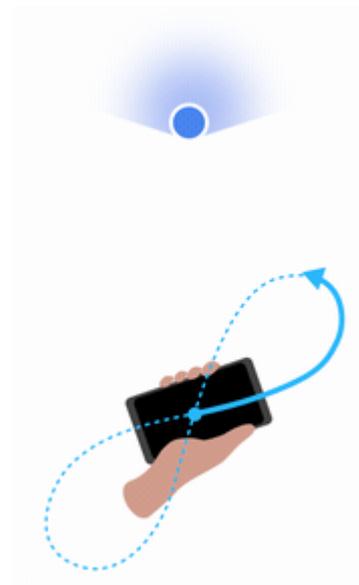
A device that is exhibiting poor accuracy may have bad calibration data on the device. In most cases, this will be resolved after performing one to four calibrations to clear out bad data and correctly calibrate the device. If the compass still appears inaccurate, more calibrations may improve this.

If the blue dot's beam is wide or pointing in the wrong direction, calibrate the compass:

1. On the device, open the Google Maps app.
2. Make a figure 8 until your compass is calibrated. You should only have to do this a few times.

The beam should become narrow and point in the right direction.

For more information on improving your device accuracy, including the instructions on how to perform a calibration, refer to the [Google Maps Help page](#).



Using accessories and connecting to other devices

You can connect monitors, accessories, and other devices directly to your Ranger 5 data collector using USB or Bluetooth and RS-232.

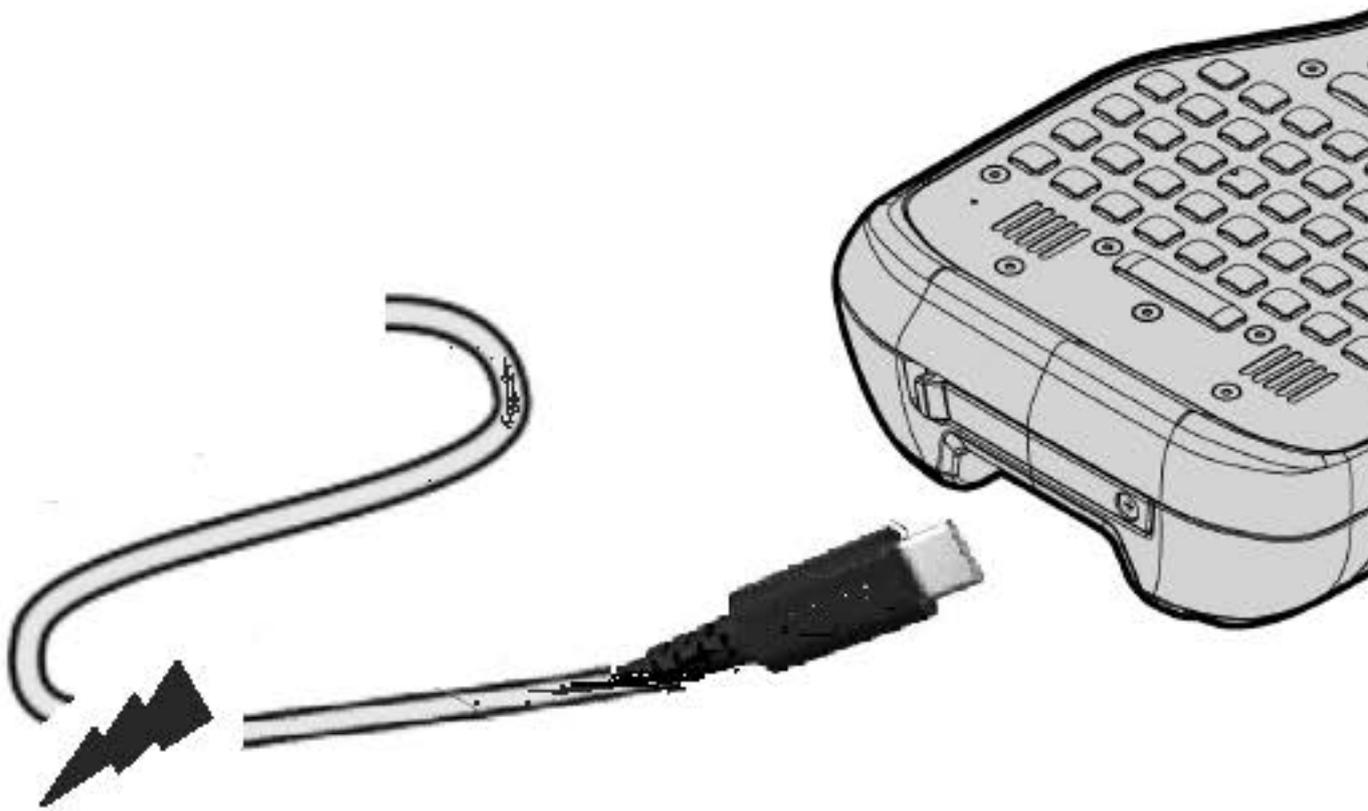
- [Connecting to USB accessories, page 76](#)
- [Connecting to Bluetooth accessories, page 78](#)
- [Connecting to RS-232 peripherals, page 80](#)
- [Transferring data between your Ranger 5 data collector and another computer, page 80](#)
- [Using Trimble Empower modules, page 81](#)

Connecting to USB accessories

The Ranger 5 data collector has a USB type C port for connecting USB devices, such as a flash drive, scanner, printer, keyboard, or mouse. The Ranger 5 data collector has built-in support for mass storage devices and human interface devices.

Other types of USB devices may require drivers.

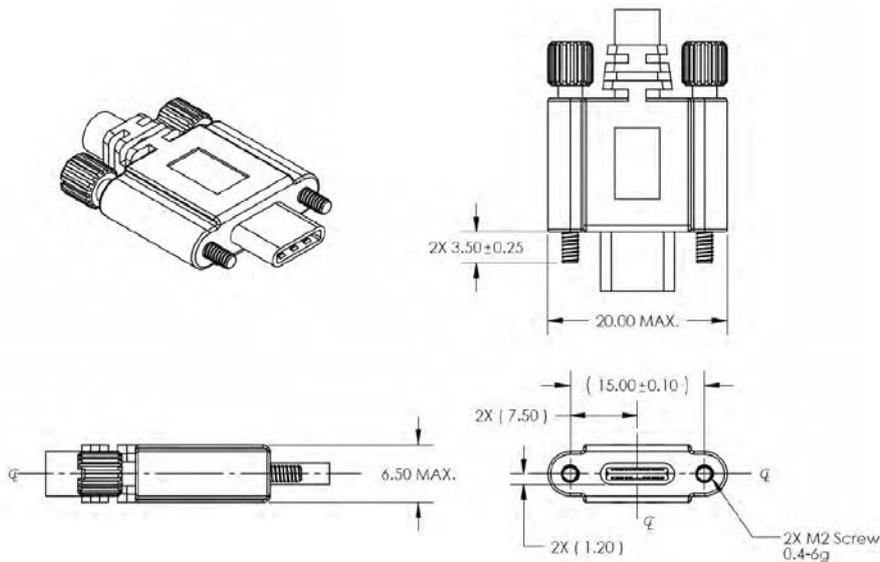
To connect a USB device, plug the device cable into the USB (type C) port on the bottom of the Ranger 5 data collector.



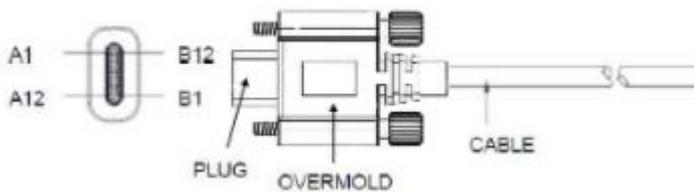
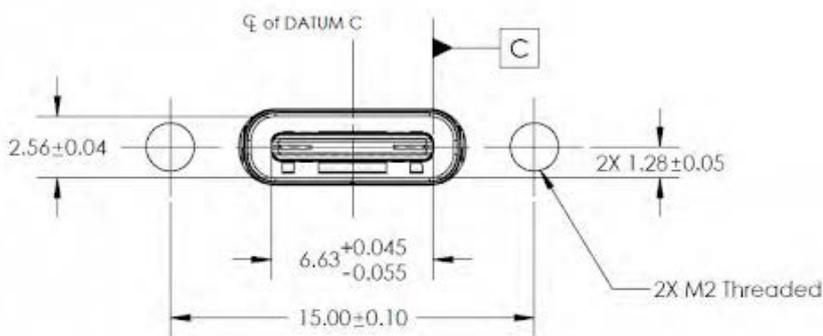
Using USB Type-C locking cables

If a locking USB Type-C cable is required, there are many 3rd party options available. Below are the required specifications for compatible cables with the Ranger 5 data collector.

The Type-C connector should be the dual screw USB Type-C locking plug type, as specified by the [Universal Serial Bus Type-C Locking Connector Specification Revision 1.0 March 9, 2016](#). The below figures are extracted from the above specification, highlighting the required critical dimensions for the locking plug:



Threaded hole location relative to receptacle for the dual screw version:



Connecting to Bluetooth accessories

The Ranger 5 data collector has embedded Bluetooth wireless technology—a short-range wireless communication technology that allows wireless data transfer and communication between devices over a distance of up to 100 meters (328 feet).

You can use Bluetooth wireless technology to connect the Ranger 5 data collector to a Bluetooth headset.

Turning Bluetooth on or off

1. Swipe down from the top of the screen.
2. Tap the **Bluetooth** icon  to switch Bluetooth **On** or **Off**.

At the top of the screen, a Bluetooth icon  shows when Bluetooth is turned on and connected to a device.

TIP – To save battery, turn off Bluetooth when you are not using it. Bluetooth is off when the device is in [Airplane mode](#).

Pairing and connecting a Bluetooth device with the Ranger 5 data collector

Before you can transfer data or communicate between your Ranger 5 data collector and another Bluetooth enabled device, you must pair the Ranger 5 data collector and the device.

Step 1: Pair a Bluetooth accessory

1. Swipe down from the top of the screen.
2. Tap-hold Bluetooth .
3. Tap **Pair new device**.
4. Tap the name of the Bluetooth device you want to pair with your device.
5. Follow any on-screen instructions. If the pairing is successful, the Ranger 5 data collector connects to the device.

TIP – If you are asked to enter a passcode or Bluetooth PIN, try entering 0000 or 1234 (the most common passcodes), or see the documentation that came with your Bluetooth device. Some old Bluetooth devices do not require a PIN.

NOTE – To connect to a Bluetooth-enabled receiver with a PIN, if for any reason you cannot connect via Bluetooth, connect over Wi-Fi to configure the receiver. The IP address is in most cases 192.168.142.1. Refer to the documentation for the receiver for details and receiver specific settings.

Step 2: Connect to a Bluetooth device

After pairing with a Bluetooth device, you can connect to it manually— for example, to switch devices or to reconnect after a device comes back in range.

1. Swipe down from the top of the screen.
2. Make sure Bluetooth is turned on.
3. Tap-hold Bluetooth .
4. In the list of paired devices, tap a paired but unconnected device.

When your phone and the Bluetooth device are connected, the device shows as **Connected**.

Connecting to RS-232 peripherals

If you require an RS-232 port, you can connect a 3rd party USB-C to RS-232 adapter.

To connect an RS-232 device, plug the device cable into the RS-232 adapter port and plug the USB-C plug on the adapter into the USB-C port on the Ranger 5 data collector .

The adapter may require drivers to be installed on the Ranger 5 data collector.

Refer to the documentation for the RS-232 device for instructions on setting up and using the device.

Transferring data between your Ranger 5 data collector and another computer

You can transfer data or files between your Ranger 5 data collector and another device. There are a number of ways you can do this, including:

- using a USB (type C) data transfer cable. See [Transferring data using a USB-C cable, page 80](#).
- using a USB (type C) memory stick; see [Connecting to USB accessories, page 76](#).
- via Wireless LAN; see [Working with Wi-Fi networks, page 70](#).
- using cloud-based file sync services, such as [Dropbox](#), [Microsoft OneDrive](#), [Google Drive](#) over Wi-Fi or 4G.

Transferring data using a USB-C cable

You can transfer data to a device powered by a Windows[®] operating system or to a MacOS device using a USB (type C) data cable.

Transfer with the Windows operating system

1. Unlock the screen on the Ranger 5 data collector .
2. Use a USB type C data transfer cable to connect the Ranger 5 data collector to the Windows device.
3. On the Windows device, follow the prompts to set up the method you want to view and transfer files.
4. On the Ranger 5 data collector , the USB preferences screen should open. Under the **USE USB FOR** section, select **File Transfer**.
5. You can now view and transfer the files on the Ranger 5 data collector from the Windows file browser. Use it to drag and drop files, just like other external storage devices.
6. When you are done, eject the Ranger 5 data collector from the Windows device and unplug the USB cable.

Transfer with a MacOS device

To transfer files, you must have [Android File Transfer](#) installed on your device. Android File Transfer is compatible with MacOS X 10.5 or later and Android 3.0 or later.

1. Download and install Android File Transfer on your MacOS device.
2. Open **Android File Transfer**. (The next time that you connect your device, it should open automatically.)
3. Unlock the screen on the Ranger 5 data collector .

4. Use a USB type C data transfer cable to connect the Ranger 5 data collector to the MacOS device.
5. Swipe down from the top of the Ranger 5 data collector screen to see your notifications.
6. Tap the **USB for...** notification. Then tap **File Transfer**.
7. An **Android File Transfer** window opens. Use it to drag and drop files.
8. When you are done, unplug the USB cable.

Using Trimble Empower modules

The Ranger 5 data collector is part of the Trimble Empower platform, a family of professional modular field devices that can be customized for nearly any application and industry. Each product in this product family is equipped with one or more Empower module bays, which can be used to extend or expand the basic capabilities of your device. Each Empower module can be installed, removed, or moved from one Empower enabled device to another. The Empower platform devices and modules make it easy for you to manage a fleet of devices across multiple users, field roles and job requirements.

For more information about the Empower platform, and the selection of Empower enabled modules that are compatible with your device, contact your local reseller.

The functionality of Empower modules is unlocked through applications and utilities developed specifically for each module. For more information about using Trimble Empower modules, refer to the module documentation.

Module functionality can also be directly integrated into field software by developers with access to the Trimble Empower Developer Program using system and module SDKs and APIs. Module Developer Kits are also available to quickly prototype custom modules. For more information on the developer resources and tools available for the Ranger 5 data collector, contact your local reseller.

The Ranger 5 data collector allows one Empower module to be installed at a time.

This section tells you how to install and start using Trimble Empower modules.

- [Attaching and removing Empower modules, page 81](#)
- [Installing Empower module drivers and software apps, page 82](#)
- [Configuring and controlling a module with the Trimble Empower Hub application, page 82](#)

Attaching and removing Empower modules

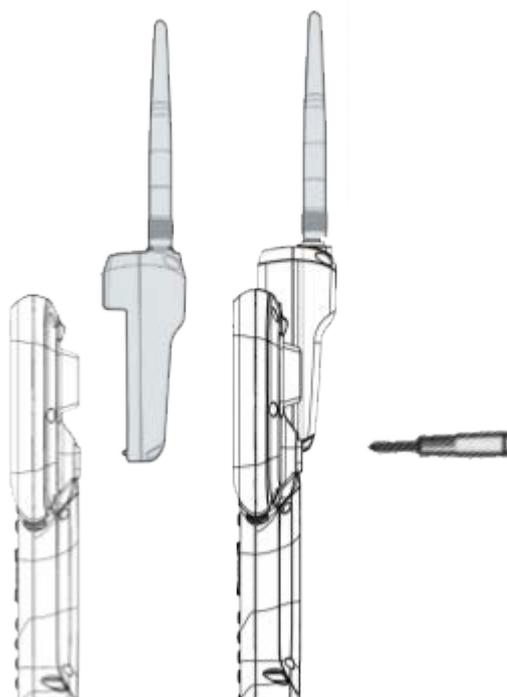
To attach a module, see [Attaching an Empower module \(optional\), page 36](#).

When you attach a module, make sure that the Empower Hub and other supporting software is updated. See [Installing Empower module drivers and software apps, page 82](#).

You do not need to remove a module from the device unless you need to swap it between devices, or for troubleshooting purposes (e.g., if the device does not recognize the module is attached).

To remove the module:

1. Make sure the [device is turned off](#).
2. Using the Phillips #1 screwdriver, loosen the 2 captive screws at the bottom of the Empower module. Slide the module up and off. Store the module in a safe, dry location to prevent damage to the module interface pogo-pins.



Installing Empower module drivers and software apps

The Empower software and drivers come pre-installed in the operating system. However, before using an Empower module for the first time, you may need to check for updated drivers and software apps on the Ranger 5 data collector for the device to recognize and operate the module. If you need to download or update these components, you can find the apps and drivers on Google Play, which is pre-installed on the Ranger 5 data collector :

1. Open **Apps** and tap **Google Play**  .
2. Use Google Play to browse for the drivers and software apps to download.
3. Download the drivers and apps directly to the Ranger 5 data collector .
4. Follow the instructions on the screen to install the drivers and other software as required for your Empower module.

Refer to the documentation supplied with your module for instructions on which components to update and how to use the module and software utilities.

Configuring and controlling a module with the Trimble Empower Hub application

The Empower Hub is a centralized location to control and manage Trimble Empower modules from one convenient, easy-to-use application. The Empower Hub comes pre-installed on the Ranger 5 data collector and can be used to monitor module status and manage modules attached to your device, including:

- View module status information
- Enable and Disable connected modules
- Launch utilities to configure your module(s)
- Configure and launch applications associated with your modules
- Check for and install module firmware updates

Turn on the device and from the **Home** screen, swipe up to open the **Apps** screen. Tap on the Empower Hub icon to start the Empower Hub app.

For more information, refer to the module documentation.

TIP - To save battery power, turn off the Empower module if you will not be using it for a prolonged period.

Disabling and enabling modules in the Empower Hub

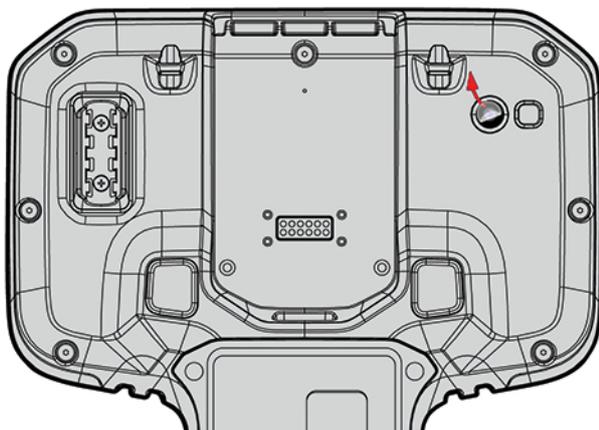
Refer to the module documentation.

Using the camera

- Taking photos and videos, page 84
- Changing camera settings, page 85
- Enable the Camera app to access your location to geo-tag photos, page 86
- Viewing photos and videos, page 86

The Ranger 5 data collector is fitted with one rear facing 13MP autofocus camera with LED flash. The camera is accessible from the Camera app .

NOTE - The device may be shipped with a protective film covering the camera and flash windows. Remove the film with a fingernail or the plastic stylus tip before first use to ensure proper focus and exposure of your photos and videos.



Taking photos and videos

By default, the built-in Camera app is ready to take photos, but you can switch easily between photo and video mode. Before you use the camera, make sure you have removed the protective film on the camera and flash window.

To take a photo or record a video:

1. Swipe up on the **Home** screen to access the Apps screen.
2. Tap  to launch the Camera app.
3. Tap the icon in the top right corner to select the mode you want to use:
 -  Photo
 -  Panorama
 -  Video
4. To take a photo, panorama, or video:
 - a. Point the camera and wait for it to auto-focus.
 - b. To zoom in, move your thumb and forefinger apart on your screen. To zoom out, pinch your thumb and forefinger on your screen.
 - c. To focus on and expose the subject of the photo, tap it on your screen.
 - d. Tap the capture icon in the right center of the screen. The capture icon will vary depending on the mode you selected:
 -  Take a Photo.
 -  Start capturing a Panorama.
 -  Start shooting a Video.
5. To see the photos you've saved, tap the thumbnail image in the corner of the screen.

Changing camera settings

To change how photos or videos are captured:

1. Tap the icon in the top right corner to select the mode you want to change settings for:
 -  Photo
 -  Video
2. Do one of the following:
 - Tap Settings  in the top left corner to access a list of settings specific to photo or video capture.
 - Turn the camera flash on, off or auto.
 - Turn GPS location On/Off for geo-tagging.
 - Choose picture size up to 12 MP.
 - Set picture quality / resolution.

- Set countdown timer.
 - Choose storage.
 - Set manual exposure control.
 - Set white balance.
 - Turn shutter sound on or off.
- Tap any of the options at the left of the screen to access other settings specific to the active capture mode.

Enable the Camera app to access your location to geo-tag photos

1. In the Camera app, tap **Settings** .
2. In the **Settings** list, tap **GPS location** to toggle on/off as required.
3. To close the **Settings** list, tap anywhere on the screen off the list.

Viewing photos and videos

By default, your photos and videos are saved to the Photos and Gallery apps on the Ranger 5 data collector ; open these apps from the Apps screen.

There are several ways to look through your photos and videos:

- **Camera app:** From within the Camera app, tap an image thumbnail in the bottom right corner of the screen to open the photo. Swipe right or left to scroll through other photos / videos in your collection.
- **Photos app:** Images captured with the Camera app are automatically accessible in the Photos app. Open the Photos app from the Apps screen.
- **Files app:** Images captured with the Camera app are automatically accessible in the Files app. Open the Files app from the Apps screen.

Troubleshooting

This section contains answers to some common troubleshooting questions. If you encounter problems when using the Ranger 5 data collector, try the following troubleshooting tips to detect and solve the problem. If problems persist, contact your local distributor for support.

- [Performance issues, page 87](#)
- [Empower module issues, page 89](#)
- [Wireless connectivity issues, page 89](#)
- [GNSS accuracy issues, page 90](#)
- [Power and battery issues, page 90](#)
- [Restarting or resetting the operating system, page 91](#)
- [Operating system and software updates, page 92](#)
- [Repairing your device, page 92](#)

Further assistance and support with the Android 10 operating system

For comprehensive online support, how-to guides, troubleshooting articles and related downloads for the Android 10 operating system, go to the online [Android support pages](#) for the Android 10 operating system.

Performance issues

Device is running slowly, restarts or crashes frequently

If your device is running slowly, keeps rebooting itself, or crashing without restarting, one of the steps below may fix the issue. After following the steps for each recommended solution, check whether it fixed your issue.

Check for Android updates

System updates can bring improvements that may fix your issue. To check for and install system updates:

1. Tap  to open the **Settings** app.
2. Scroll to the bottom and tap **System update**. The update status displays.
3. Follow any on-screen instructions.

Check storage and free up space

You may experience issues if the device's internal storage is full or almost full. The device can start having issues when less than 10% of storage is free.

To check how much storage the device has:

1. Tap  to open the **Settings** app.
2. Tap **Storage** to see how much storage is available.

To free up space that the device needs to work properly, remove unnecessary files and clear cached data.

Check for app updates

App updates can bring improvements that may fix your issue. To see and get updates for your apps:

1. Open **Google Play**.
2. At the top left, tap .
3. Tap **My apps & games**.
4. Apps with available updates are labeled **Update**. If an update is available, tap the app **Update**. If multiple updates are available, tap **Update all**.

Close apps that you are not using

Normally, you don't need to close apps; Android automatically manages the memory that apps use. But to completely shut down an app, including any background services that it may be using:

1. Tap  to open the **Settings** app.
2. Tap **Apps & notifications** then if required tap to expand the list of all apps.
3. Tap the app that you want to close then tap **Force stop**.
4. Tap **Force stop**.

TIP – To help identify apps that cause problems, make a list of which apps you have manually force-stopped.

Check if an app is causing the issue

The issue may be caused by an app that you downloaded. To see whether a downloaded app is causing the issue, you can reboot your device in safe mode. Safe mode temporarily disables all downloaded apps.

1. To reboot the device in safe mode and temporarily disable all downloaded apps, [follow the steps to turn on safe mode](#).
2. Once in safe mode, wait to see if the problem goes away.
 - **If the issue isn't resolved in safe mode**, a downloaded app is most likely not causing the issue. Restart the device and try other troubleshooting solutions. Restart the device and try other troubleshooting solutions.
 - **If the issue is resolved in safe mode**, a downloaded app is most likely causing the issue. To find out which app it is:
 - a. Restart the device to exit safe mode.
 - b. One by one, uninstall recently downloaded apps. After each removal, restart the device and check if the issue is resolved.
 - c. When you have identified and removed the app that was causing the problem, you can reinstall the other apps that you removed.

Empower module issues

My field software doesn't recognize my Empower module

- Check module contacts and attachment

It is possible the contacts between the module and the device are dirty, or that the module is not attached correctly. Ensure that the module contacts are clean and that the screws are tightened correctly.

- Your field software is not configured to communicate with the Empower module

Check that your field software supports the Empower module directly and that the field software is configured to talk to the Empower module directly or through the correct COM port.

The Empower Hub doesn't show my module

- Check module contacts and attachment.

It is possible the contacts between the module and the device are dirty, or that the module is not attached correctly. Ensure that the module contacts are clean and that the screws are tightened correctly.

Refer to the Trimble Empower modules documentation for more information.

Wireless connectivity issues

Wi-Fi speed is slow

- Your network is running slow for all devices.

You should first check to see whether your network is slow on another device. Can you connect to your wireless network and browse the web at normal speeds from another device? Try running a Network Speed Test to ensure your internet connection is functioning normally.

- Your Wi-Fi signal is weak.

Look at the Wireless network icon in the taskbar.



This icon shows your current signal strength. If the icon is partially dimmed, move your device closer to your wireless router to see if the signal improves. If your router is broadcasting on both a 2.4 GHz and 5 GHz frequency,

try connecting to a different frequency. In general, a network operating on the 5 GHz frequency will be faster and less susceptible to interference, but will have a shorter range than a 2.4 GHz network.

GNSS accuracy issues

You may need to re-calibrate the compass, especially if you have removed or [installed an Empower module](#) or [optional accessory battery pack](#).

See [Calibrating the compass, page 75](#) for more information.

Power and battery issues

Battery will not charge

- The battery is overheated, or too cold.

The battery will charge between 0 °C and +40 °C (+32 °F and +104 °F). If you have been using or storing the battery and/or device in a particularly hot or cold environment, the battery may be outside the safe charging temperature range. Sensors in the battery will prevent the battery from charging until its temperature returns to a normal level.

- The optional user-replaceable battery is not installed correctly.

If the optional user-replaceable battery is not installed correctly in the device or the battery charger, it may not have a proper connection and will not charge.

- The optional user-replaceable battery terminals are dirty or corroded.

If the terminals of the battery are dirty or corroded, it may not have a proper connection and will not charge.

Device will not start up

- The batteries do not have enough charge to power the device.

The internal batteries must be partially charged to boot the device, and the device must be between -20 °C and +60 °C (-4 °F and +140 °F) to boot up. Plug the charger into the device and leave on charge for 30 minutes then try to boot the device. If you see a battery indicator with a red charge level and charger icon, it needs to continue charging before the device can turn on.

- Check the optional-user removable battery charge level.

If the device will not power on with the internal batteries, check the optional user-removable battery charge level, if available. Remove from the device, and press-hold the charge indicator button on the battery. At least one charge LED must be lit up to indicate that a battery has enough power for the device to start on battery power. If no LEDs light up on a battery, swap the battery for a charged battery, or charge the battery using the battery charger accessory (see [Charging the Li-35 accessory battery pack separately from the Ranger 5 data collector, page 50](#)) before reinserting it.

- The optional user-replaceable battery is not installed correctly.

The device may not be receiving power from the battery if it is not installed properly. Remove the battery, then [replace it correctly](#). Replace the battery bay door and tighten the 4 screws.

Device suddenly turns off during use

- Make sure you are not accidentally pressing the Power key.

The Power key is located on the left side of the keyboard. Make sure that while gripping the device you are not accidentally pressing the Power key, which places the device into suspend mode.

- The device may have run out of power.

If your device's battery charge level gets too low, the device will automatically power down to prevent loss of data. You must charge the internal batteries before it will turn on, or insert an optional user-removable battery. See [Checking the battery charge levels and LED status, page 41](#) for more information on batteries.

If you regularly run out of battery power while in the field, consider carrying a spare accessory battery pack with you.

If you already have a user-replaceable battery installed in the device, shut down the device then remove the battery from the device, and check the battery level by pressing-holding the battery level button on the battery. If the battery charge is too low, reinsert the battery into the device and attach the device to an external power source, swap the battery for a charged battery, or charge the battery using the battery charger accessory (see [Charging the Li-35 accessory battery pack separately from the Ranger 5 data collector, page 50](#)) before reinserting it.

Restarting or resetting the operating system

If your device becomes unresponsive, and the troubleshooting guide does not resolve the problem, you need to restart or reset your device.

Restarting your (unresponsive) device

If your device is no longer responding to touchscreen or keypad input, you may need to force it to restart by removing power from the system.

CAUTION – Restarting the system by holding down the Power key removes power to the CPU. Any unsaved files and settings will be lost.

To force your device to restart:

1. Press-hold the Power key until the **Power Off** and **Restart** options appear on the screen.
2. Tap **Restart** to restart the device.

Resetting your device to factory default settings

If restarting your device does not resolve the issue that you are seeing, resetting it might help.

You can remove all data from your device by resetting it to factory settings.

WARNING – A factory reset wipes all data from the device. While any data stored in your Google Account will be restored, all apps and their associated data will be uninstalled.

WARNING – Your device is protected to prevent other people from using it if it's been reset to factory settings. After a factory reset, you'll need to enter your Google username and password associated with the device. If you don't have this information, you won't be able to finish the setup process and use the device at all after the factory reset.

Erasing your data may take some time, so make sure that you plug your device into a power source before you start.

1. Tap  to open the **Settings** app.
2. Tap **System**, then tap **Advanced**.
3. Tap **Reset options**, and then tap the reset option you want to use:
 - **Reset Wi-Fi, Mobile & Bluetooth**
 - **Reset app preferences**
 - **Erase all data (factory reset)**. Select this option to factory reset the device to the original state it was shipped in.
4. Follow the on-screen instructions for the option you selected. You may need to enter your unlock pattern, PIN, or password.
5. When the device has finished erasing, you'll be prompted to go through the new device setup.

Operating system and software updates

Periodically, operating system and software application updates will be available for your device.

Android updates

Any operating system updates for your device will be available to you over the air.

- See [Check for Android updates, page 87](#)
- See [Check for app updates, page 88](#)

Software downloads and updates

The latest versions of software including drivers, firmware updates, and software utilities, are available on Google Play. Additional material and information can be found on the Trimble [technical support pages](#) on trimble.com.

Repairing your device

Before you send your Ranger 5 data collector for repair, check the troubleshooting guide in this document. If you can't solve the problem with troubleshooting, contact your local Spectra Geospatial dealer for further support.

Repair of this product should only be performed by an authorized service provider. Any attempt to disassemble this product by a non-authorized service provider will void the warranty.

For more information, contact your local Spectra Geospatial dealer.