

# Frequently Asked Questions

## Trimble ST30 smart target, EM140 radio, and S/SPS/RTS total stations with Bluetooth Long-range Robotic (BLR) radio

This document serves as a comprehensive FAQ on the Trimble® ST30 smart target, the Trimble EM140 Empower™ module, and the updated Trimble S series, SPS series, and RTS series robotic total stations. It covers key technical topics, including system compatibility, radio technology, active tracking, and maintenance guidelines.

Have a question not covered in the questions below?

**Please contact your local Trimble authorized dealer.**

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## General

### **Q: What are some of the key features of the new Trimble ST30?**

**A:** The Trimble ST30 smart target combines optical tilt compensation, GNSS capabilities, automatic rod height, and best-in-class tracking into a single, highly versatile system for maximum accuracy and productivity.

### **Q: What other equipment do I need to use the ST30?**

**A:** To run an ST30 with all features, you will also need an ST30 rod, a data collector with EM140 radio module, and field software. It's possible to use the ST30 as a standalone GNSS rover, though most people will choose to use it paired with a total station with the BLR radio.

### **Q: What is Optical tilt compensation, and how does it benefit me?**

**A:** Optical tilt compensation is a technology that eliminates the need to level the target. It uses an integrated IMU (Inertial Measurement Unit) to measure the tilt angle and automatically corrects measurements. This feature speeds up topo and stakeout workflows, reduces errors, allows measurement of inaccessible points without additional setups, and eliminates the need for COGO offsets. It enhances productivity and accuracy by simplifying field operations.

### **Q: Is Optical tilt compensation available with instruments using DR HP EDM?**

**A:** Total stations with the DR HP EDM do not support optical tilt compensation with the ST30. Trimble S9 HP and RTS 771, 773 and 873 instruments are equipped with the DR HP phase-shift EDM, which provides higher-accuracy measurements to stationary targets, whereas instruments fitted with DR Plus time-of-flight EDMs are more responsive to dynamic/moving targets. As the ST30 uses dynamic movements to calculate its trajectory, it works best with the DR Plus EDM.

## Radios and compatibility

### **Q: What is LRR?**

**A:** Long Range Radio (LRR) is a Trimble proprietary 2.4 GHz wireless communication technology. LRR has been used on Trimble S / RTS and SPS series total stations since their introduction.

### **Q: What is BLR?**

**A:** Bluetooth® Long-range Robotic (BLR) radio is a 2.4 GHz wireless communication based on Bluetooth Low Energy (BLE) technology. Although BLR operates in the same spectrum as LRR, many underlying attributes make it more technologically capable and suitable for today's wireless communication requirements.

**Q: What is the underlying radio technology used?**

**A:** The radio technology is a customized Trimble implementation based on industry standard and certified Bluetooth Low Energy (BLE) technology. The radios are optimized specifically for Trimble software to ensure seamless performance and complete workflow integration; other non-Trimble BLE devices may connect, but would have unknown performance and capabilities.

**Q: Why is a new radio being introduced on the S / RTS / SPS series total stations?**

**A:** BLR is technologically more capable and suitable for wireless communications than existing LRR, providing a stable and secure communication platform that S / RTS / SPS series total stations can operate on now and into the future.

**Q: Is my current total station compatible with BLR?**

**A:** Full ST30 functionality, including optical tilt compensation, requires a total station with BLR (Bluetooth Long-Range Robotic) radio. New S, SPS, and RTS total stations ship with BLR starting Q4 2026. Many existing instruments can be upgraded. Compatibility depends on your model and serial number — contact your Trimble dealer to confirm eligibility and schedule an upgrade.

**Q: What radio range can I expect with BLR?**

**A:** The typical robotic total station operation range is similar for BLR radios and legacy LRR radios.

**Q: What is the best setup to maximize the radio range?**

**A:** To achieve the maximum radio range, ensure a clear line of sight between your total station and ST30. This can be improved by positioning the total station on elevated terrain, when possible, and increasing the height of the ST30 rod to avoid obstructions from objects or your own body. Also, make sure both the total station antenna and the EM140 antenna are oriented vertically.

**Q: What are some common causes of radio interference, and how can I mitigate them?**

**A:** Common causes include obstacles, low antenna height, and nearby wireless devices. For troubleshooting steps, see the Trimble support bulletin: [Support Bulletin - Robotic Total Station Wireless Connections Troubleshooting](#)

**Q: What is the difference between the EM120, EM130, and EM140 radios?**

**A:** EM120 uses 2.4 GHz frequency hopping radio technology that is historically used with S, SPS, and RTS series robotic total stations. EM130 uses Wi-Fi HaLow technology, which is available in the Trimble SX12 in some regions. EM140 uses BLR technology, which is used with the ST30 and Trimble S, SPS, and RTS series total stations, starting in Q4 2026.

**Q: Why can't I use the Bluetooth built into my data collector?**

**A:** The ST30 and BLR total stations use Trimble's long-range BLR communication, designed for reliable robotic surveying over greater distances than standard Bluetooth. Your controller's built-in Bluetooth does not support this workflow. The EM140 Empower module provides the connection required for stable, secure, long-range communication in the field.

**Q: Why do I need an EM140 if my data collector has Bluetooth built in?**

**A:** The EM140 provides the long-range BLR connection your ST30 and total station require. The built-in Bluetooth on your controller is not supported in this workflow and does not provide the range or reliability required for robotic total station operation.

**Q: Will new total stations come with the BLR radio already installed?**

**A:** Yes. New total stations, beginning in Q4 2026, ship with BLR installed. S series and RTS series instruments include BLR only. SPS series instruments include both LRR and BLR to support machine control workflows and ST30 compatibility.

**Q: Can I use the EDB10 with an EM140 to support the ST30?**

**A:** No. The EDB10 supports the EM120 only. For ST30 compatibility, you need an EM140 and a total station with BLR radio. Please contact your Trimble dealer to learn more about upgrading the radio on your current total station.

**Q: What steps do I need to take to use an EM140 with my data collector?**

**A:** Trimble installs the default drivers for all Empower modules on all new data collectors purchased. To update to the latest versions:

- For Android™ controllers (TSC5), sign in to the device and launch Google Play.
  - Tap on user profile
  - Tap on manage apps & device
  - Tap on updating apps and ensure all apps are updated. Any Empower module support updates will be located here.
- For Windows® controllers
  - Use the [Trimble Update Tool](#)

**Q: What role does the Empower Hub application have?**

**A:** The Empower Hub application displays module-specific information and allows troubleshooting the connection of a device and the attached Empower module.

The Empower Hub is pre-installed in the Windows OS. Empower Hub is accessed under Start > Empower > Empower Hub.

The Empower Hub is also pre-installed in the Android OS. New versions may be included with OS updates and can also be updated through Google Play.

**Q: I need to replace my antenna on the EM140. Do you offer them for sale?**

**A:** Yes, the antenna on the EM140 is the same as the EM120. Order a replacement through your Trimble dealer (part number 115189).

**Q: Can I use an EM120 with a BLR total station?**

**A:** If your total station is equipped with BLR radio only, you will not be able to connect to it with an EM120.

**Q: Can I connect to a total station that has BLR without an EM140?**

**A:** Yes. All Trimble total stations can be connected via a cable; moreover, all S series, RTS573, SPS730, and SPS930 total stations support short-range Bluetooth connectivity.

**Q: I have a total station with both an LRR and BLR radio. How do I know which mode I'm currently using?**

**A:** The radio mode displays on the Face 2 display of the total station, and can also be changed in the Face 2 display. The radio mode is also displayed in the field software once a connection is established.

**Q: Can I use MT1000, MT9x0 or AT360 with a BLR total station?**

**A:** Yes, MT1000, MT9x0 and AT360 can be used with any total station that supports active tracking.

## **Active tracking & target ID**

**Q: How does active tracking work?**

**A:** The LEDs in the ST30 target transmit light at a specific wavelength, which is detected by the sensor in the total station that is tuned to that specific wavelength. This allows the total station to track only that wavelength and avoids 'false locks' on other reflective surfaces (car headlights, traffic signs) that don't emit that specific frequency.

**Q: What is target ID?**

**A:** Target ID is a channel number (1–8) that lets your total station track the correct ST30 when more than one active target is on site.

**Q: How do I configure the target ID channel?**

**A:** Within the field software, navigate to the target settings to select the desired target ID. You can choose any available channel from 1 to 8.

**Q: Does ST30 use the same active target technology as MT1000?**

**A:** Yes, the active tracking technology and target ID method are the same. i.e., an ST30 and an MT1000 can be used at the same location when set to different target ID's without interfering with each other.

**Q: Can the ST30 work in passive tracking mode?**

**A:** Yes. The ST30 works in passive mode with any Trimble total station, including the Trimble SX12.

**Q: Why are the active tracking LEDs inside of the prism?**

**A:** Placing the active tracking LEDs in a single ring and behind the prism glass improves the total station aiming accuracy to the prism, and also protects the LEDs from being scratched or broken.

## **Rod and automatic rod height**

**Q: How does the ST30 measure rod height?**

**A:** The ST30 includes an EDM that measures down the new hollow rod to a prism at the bottom.

**Q: Can I choose any rod height?**

**A:** Yes, you can choose any height from 1.5 to 2.6 m (4.92 ft to 8.53 ft). The height is set using a simple clamp.

**Q: Does the rod height automatically update?**

**A:** Yes, rod height is constantly monitored by the field software and automatically updates as you change heights. The update rate is 1 Hz, but once a variation is detected, it increases to 3 Hz.

**Q: What material is the rod made of?**

**A:** The rod for the ST30 is made of carbon fiber, which ensures the rod is strong, rigid, and light. It also minimizes flex when the rod is tilting. (There is a smaller upper part made of fiberglass in order to be radio wave transparent and maximize BLR propagation in all directions.)

**Q: Is the ST30 rod compatible with targets other than the ST30?**

**A:** Yes, however, the automatic rod height will only be available with ST30.

**Q: Can the metal rod tip be replaced?**

**A:** Yes. The tip that the rod ships with is made of titanium, making it more durable and reducing the need for replacement. When it needs to be replaced, you can do so with another long-lasting titanium rod tip from Trimble or with any standard rod tip.

**Q: How does a worn-out rod tip affect the ST30 automatic rod height?**

**A:** In the field software target settings, you can adjust the pole tip length so it matches exactly with your current tip length, ensuring the auto rod height is correct. A set of tools is included with the ST rod and can be used to measure tip wear.

**Q: Can I use a topo foot or punch tip with the ST30?**

**A:** Yes, the base of the ST rod can accommodate any standard attachment; you'll just need to adjust the pole tip length in the target settings in the field software to ensure the automatic rod height is correct.

**Q: Can I measure heights with the ST30 EDM when it's not mounted on the rod, like a handheld laser distance meter?**

**A:** No. The ST30 EDM is specifically optimized for high-precision measurements when integrated with the ST30 rod system. Because the beam is tailored for this internal configuration rather than for handheld use, it is designed exclusively for operation while mounted on its dedicated rod.

## **Trimble Inertial Platform (TIP) technology**

**Q: Does optical tilt compensation work at any angle?**

**A:** Yes, it works at any angle, but it is more accurate the closer the ST30 is to vertical, including both upright and inverted positions.

**Q: Can I make inverted measurements using the ST30 and my total station?**

**A:** Yes, you can use the rod at any angle, including fully inverted.

**Q: What are the best practices for gaining IMU initialization?**

**A:** The IMU must be initialized to perform tilt-compensated measurements. This process requires movement to establish the ST30's orientation:

- GNSS workflows: Simply enable TIP in your field software and walk to your measurement point. This is usually enough movement for the IMU to initialize. If it still isn't initialized, place the rod tip on the ground and tip the rod back and forth at a comfortable, steady speed.

- Total station workflows: Because the ST30 orientation is relative to the total station, you must change the slope distance to initialize. Gently tip the rod back and forth—toward and away from the total station—at a comfortable, steady speed.

**Q: What are the best practices for maintaining IMU initialization?**

**A:** The ST30 IMU is designed for high stability, so you generally do not need to alter your behavior to maintain initialization.

- Routine use: Normal movement while surveying is sufficient to maintain initialization.
- Stationary periods: You can remain stationary for a few minutes without losing initialization.
- If precisions degrade or initialization is lost: If you notice your estimated precisions degrading, move the ST30 to improve them. Similarly, if initialization is lost, move the ST30 to re-initialize.

**Q: How do I know if the tilt compensation is working?**

**A:** In the field software, there will be a status indicator letting you know whether tilt compensation is turned on and whether it's ready for you to measure. For more information about the icons for Trimble Access™, Trimble FieldLink, and Trimble Siteworks, see the field software help documentation.

**Q: How do I know if the tilt compensation is accurate?**

**A:** In the field software, you can set your precision tolerances. For more information on the settings for Trimble Access, Trimble FieldLink, and Trimble Siteworks, check out the field software help documentation.

**Q: I see the field software shows estimated precisions for the tilt compensation. How are those calculated?**

**A:** The estimated precisions are calculated by the Trimble Internal Platform (TIP) engine in real-time, taking into account the IMU errors, as well as any errors from movement while measuring.

**Q: Is tilt information recorded with each measurement?**

**A:** Yes, tilt information is recorded along with every measurement for QA/QC purposes.

**Q: Is the IMU hardware the same as the Trimble R980?**

**A:** No, it is different IMU hardware that's optimized for use in the ST30 workflows.

**Q: How does tilt compensation affect battery life?**

**A:** Tilt compensation has a minimal impact on power consumption.

## **GNSS & Trimble GeoLock**

**Q: Does the ST30 have a GNSS receiver?**

**A:** Yes, the ST30 includes an integrated GNSS receiver.

**Q: Can ST30 work as a GNSS receiver?**

**A:** Yes, the ST30 can act as a survey-grade GNSS rover. To use this, you will need the optional GNSS subscription for the ST30 and a correction source. Make sure the top mount accessory is not installed on ST30 when running GNSS survey.

**Q: What GNSS corrections work with the ST30?**

**A:** The ST30 can leverage any corrections coming through your controller, whether that's IBSS, VRS, or from a local base using the EM940. The ST30 itself does not include a 450 MHz or 900 MHz radio, so it cannot receive corrections directly.

**Q: Can the ST30 be used as a GNSS base?**

**A:** No, the ST30 is exclusively a GNSS rover.

**Q: What is the GeoLock function on ST30?**

**A:** Trimble GeoLock™ is a field software function available in Trimble Access, Trimble FieldLink, and Trimble Siteworks that uses GNSS positioning to automatically aim the total station toward the target when line of sight is lost. Powered by the ST30's integrated survey-grade GNSS receiver and bundled Trimble RTX® corrections (included exclusively for use with the GeoLock feature), GeoLock delivers fast, reliable target re-acquisition outdoors. Note: the top-mount accessory must be removed while using GeoLock.

**Q: Do I need a GNSS subscription to use GeoLock?**

**A:** No need for a subscription to use GeoLock, it's included as a perpetual feature in all ST30s, including RTX corrections.

**Q: Can I get a perpetual configuration for the ST30 GNSS functionality?**

**A:** GNSS rover capability is available through an annual subscription; there is no perpetual license option. The subscription is optional, which gives flexibility if you mainly work indoors, underground, or in other environments where GNSS is not usable and you rely on the ST30 with a total station. If

your work changes and you need GNSS rover capability on a future project, you can add the subscription when you are ready. An active subscription includes ongoing GNSS firmware updates to ensure you always get the best possible performance from your ST30.

**Q: Can the GNSS in the ST30 be used to establish project control?**

**A:** Yes, available in Trimble Access and Trimble SiteWorks field software.

## **Power & batteries**

**Q: Can the ST30 be powered from the USB-C port**

**A:** The USB-C port is not intended to power the ST30 during normal field operations. However, it can power the device during firmware updates.

**Q: Does the ST30 have a removable battery?**

**A:** Yes, the ST30 uses the Li-35 battery, and it's removable.

**Q: Can I charge the battery inside the ST30 using the USB-C port?**

**A:** No, the USB-C port on the ST30 cannot be used to charge the removable battery. To charge the battery, we recommend using the dual-slot battery charger (PN 109000-10). Alternatively, you can charge it via the USB-C port on the battery.

**Q: How long does the ST30 battery take to charge?**

**A:** A full charge for two Li-35 batteries (PN 220200) takes approximately 4.5 hours when using the dual-slot charger (PN 109000-10).

**Q: What is the battery life of ST30?**

**A:** The device supports a range of operating modes, each with different power-consumption characteristics:

- Passive prism: Operates without requiring a battery.
- Passive prism with automatic rod height: Up to 25 hours of operation.
- Passive prism with GNSS: Up to 10 hours of operation.
- Active tracking on normal power mode and with GeoLock: Approximately 4 hours 30 minutes of operation.
- Active tracking on high power mode and with GeoLock: Approximately 3 hours 30 minutes of operation.

**Q: Why is the battery in my new ST30 not working, and how do I activate it?**

**A:** For safety during transit, the battery ships in a temporary sleep mode. To activate it for the first time, simply connect it to a power source using the provided cable or charger (p/n 109000-10).

## **Environmental & field conditions**

**Q: Is the ST30 waterproof?**

**A:** Yes, the ST30 is rated IP67, which means it is fully protected against dust and can withstand immersion in water up to 1 meter for 30 minutes. Note that while the main enclosure is IP67, the battery compartment itself is rated IP55, providing protection against rain and water sprays. Any water that may enter the battery compartment will not penetrate the main sealed enclosure.

**Q: Is the USB-C port sealed inside?**

**A:** Yes, the USB port is IP67. In addition, a rubber cap on ST30 prevents dust from entering the connector.

**Q: Is the rod waterproof?**

**A:** The bottom of the rod is sealed, so it's safe to put the rod into water. The only place where water can enter the rod is at the sliding joint. Generally, you can work in light rain without issue, though if water enters the rod, the field software will notify you that the height could not be automatically measured. In that situation, you can keep working with manual rod heights or remove the tip and dry the rod.

**Q: How do I dry the rod?**

**A:** Unscrew the tip and inspect the prism assembly for moisture. If moisture is present, follow these three steps to dry it: First, unscrew and dry the prism housing, making sure no water sits under the prism. Second, unscrew the ST30 and dry any moisture from the lens inside the thread. Finally, with the ST30 and rod tip still removed, fully extend and then quickly collapse the rod in a pumping action to help expel water from the bottom.

**Q: If I submerge the rod base and raise the pole, will water enter the base?**

**A:** No, the rod is sealed. It is safe to submerge the tip and adjust the height without water entering the base.

## **ST30 user interface & status lights**

**Q: What do the LED status lights on the ST30 mean?**

**A:** The ST30 has two LEDs:

- Power LED
  - Green slow flashing: Start up and auto-tests
  - Green solid: Functioning normally
  - Green fast flashing: Preparing to power off
  - Green intermittent flash (solid 1.5 s and off 0.5 s): Battery less than 15%
  - Orange flashing: Battery charge is low
  - *For more information on factory resets or debug mode, check out the ST30 User Guide.*
- Radio / Bluetooth LED
  - No light (if the ST30 is running): BLR is on, but no active connection
  - Blue 1 short flash (every 1 s): One device is connected, either the total station or the controller
  - Blue 2 short flashes (every 1 s): both a total station and controller are connected
  - Blue solid: BLR is connected to both the total station and controller and are time synchronized
  - Blue fast flashing (10x per second): BLR bonding request pending. This happens the first time you pair a controller with an ST30. You must press the power button once to confirm pairing.
  - *For more information, check out the ST30 User Guide.*

## Maintenance, calibration & warranty

### Q: Does the ST30 need to be calibrated?

A: Yes, the ST30 system utilizes three types of user calibration:

- **E-bubble calibration:** Aligns the electronic bubble with the vertical axis.
- **IMU calibration (7-pose):** Ensures accurate tilt-compensated measurements.
- **Pole bias calibration:** Compensates for any potential misalignment introduced by the rod itself.

For step-by-step instructions on calibrating your smart target, see the Calibration section in the ST30 Help Portal for your field software.

### Q: Does the ST30 need to go to a service center for regular maintenance?

A: No, the ST30 does not require any regular maintenance.

### Q: Why and how often should I perform a rod bias calibration?

A: To ensure optimal measurement precision, it is recommended that a rod bias calibration be performed every three months, following a significant impact or drop, or upon the introduction of a new rod. This procedure identifies minor misalignments and allows the software to adjust the calculated pole-tip position accordingly.

**Q: How is the rod bias calibration performed?**

**A:** This calibration is performed directly within the field software. Please reference the field software help for more information.

**Q: Does ST30 come with a factory warranty?**

**A:** Yes, the ST30 comes with a 1-year factory warranty.

## **Office & cloud software**

**Q: What office software can I review and edit the measurements from the ST30?**

**A:** Trimble Business Center can be used to review and edit measurements from the ST30.

**Q: Can I see data from the ST30 in Trimble Connect?**

**A:** Yes, you can see and review data from the ST30 in Trimble Connect.

## **Standard parts and optional accessories**

**Q: What comes in an ST30 kit?**

**A:** 1 ST30, 1 Bluetooth antenna for ST30, 1 Li-35 battery, 1 USB-C cable, 1 soft bag.

**Q: What's included in the ST rod kit?**

**A:** 1 ST Rod, wrench tools (set of 2), and 1 bag for the rod. Note that the wrench set can also be used to measure rod tip wear.

**Q: What optional accessories are available for the ST30?**

**A:** The top mount accessory is available as an optional accessory. It includes a plate, short rod, and tip that attach to the top of the ST30 using thumb screws. The top mount accessory can be used to measure points right-side up or inverted. The advantage of the top mount accessory is that its short lever arm increases the 3D point accuracy for optical measurements. The top mount accessory should not be mounted on ST30 when doing GNSS survey and or looking for the GeoLock function to be running.

**Q: How do I install the top mount accessory on the ST30?**

**A:** When installing the top-mount accessory for the first time, you must first remove the four temporary placeholder screws on the top of the ST30. Once the placeholders are removed, install the top mount plate using the attached thumb screws. Start by lightly engaging all four screws, then fully tighten each screw in a crosswise pattern to ensure even tension.

**Q: What cases are available for the ST30?**

**A:** There are three cases available for the ST30:

- The ST30 soft case that ships standard with every purchase
- The S / SPS / RTS total station case has been updated so it can hold an ST30 in the prism slot. This updated case will start shipping Q4 2026 alongside the new BLR total stations.
- The Trimble optical accessories case (PN 189360) can hold a data collector, a dual-slot charger, 2 total station batteries, 3 ST30 batteries and the ST30.

**Q: Does the ST30 fit inside the total station transport case?**

**A:** Yes, the ST30 fits inside the updated total station transport case introduced in Q4 2026 with the BLR-equipped instruments. This updated case is specifically designed to store the ST30 (or the MT1000, AT360, or passive 360 prisms).