Trimble SiteWorks

Complete Base & Rover Connection Guide — Radio & Bluetooth | Site Calibration | Common Fixes

This guide walks you through the complete workflow for connecting a Trimble GNSS base receiver and rover to a data collector running Trimble SiteWorks. Whether you're setting up for the first time on a new jobsite or troubleshooting a connection that stopped working, follow these steps in order for the fastest, most reliable result. Both radio (UHF) and internet/VRS correction methods are covered.

■ **NOTE:** Always set up and start the BASE first, then connect the ROVER. This is the correct sequence in SiteWorks — reversing it is the #1 cause of connection failures.

■ How Base & Rover Work Together

Understanding the roles of each component helps you diagnose problems faster:

Component	Role	Key Requirement
Base Receiver	Stays fixed. Broadcasts RTK correction signals to the rover via radio or internet.	Must be set on a known control point (or AutoBase/BaseAnywhere). Must NOT move while transmitting.
Rover Receiver	Moves around the jobsite. Receives corrections from the base to compute a precise position.	Must be connected to the data collector via Bluetooth. Must receive base corrections to achieve RTK Fix.
Data Collector	Runs SiteWorks. Connects to the rover via Bluetooth and displays position, cut/fill, and design data.	Must have the correct Project, Work Order, and Design open before connecting.
Radio Link	Carries RTK correction data from base to rover wirelessly over UHF (900 MHz typical).	Base and rover must be on the same channel and Network ID. Radio antenna must be attached before powering on.

■ Pre-Flight Checklist — Before You Start

Run through these checks before touching SiteWorks. Most field connection failures trace back to one of these items being skipped:

✓	Base receiver is placed on a stable, level tripod or fixed base post/pole over the control point.
✓	Radio antenna is physically connected to the base receiver BEFORE powering on. Powering on without the antenna connected can damage the radio.
✓	Base receiver battery is charged. Rover receiver battery is charged. Data collector battery is charged.
✓	You know the antenna height of the base (vertical height from control point benchmark to the bottom of the receiver or antenna reference point).
✓	Control point coordinates are loaded into the SiteWorks project (imported .csv or manually entered).
✓	SiteWorks is open on the data collector with the correct Project, Work Order, and Design selected.
✓	Both base and rover are powered on and have been given 60–90 seconds to acquire satellites before you attempt to connect.
✓	At least 11 satellites visible on both receivers (check GNSS status LED or SiteWorks status bar).

■ Phase 1 — Setting Up the Base Station

Complete all of Phase 1 at the base receiver before moving to the rover. The base must be actively transmitting corrections before the rover can connect.

Physical setup of the base receiver

Set the tripod directly over the control point benchmark. Use a plumb bob or optical plummet to center precisely.
Level the tripod carefully — any tilt introduces elevation error.
Mount the base receiver (e.g. R750, R780, SPS986) onto the tribrach/tripod adapter.
If using a Zephyr antenna: connect the yellow GNSS cable from Zephyr to the base receiver. Use the black cable for an external dog-bone radio antenna.
Connect the radio antenna (or verify internal radio antenna is in place) BEFORE powering on.
Measure the antenna height: vertical distance from the benchmark to the base of the antenna or receiver reference point. Record this number — you will enter it in SiteWorks.

Power on the base receiver

Press and hold the power button until LED indicators illuminate.
Allow 60–90 seconds for full boot and satellite acquisition.
The radio/transmit LED should blink green to indicate the radio is active.
Verify at least 11 satellites are being tracked (check receiver LED or WebUI at http://192.168.142.1).

Connect the data collector to the base via Bluetooth

On the data collector, open Trimble SiteWorks and open the correct Project and Work Order.
Tap the Hamburger button (three stacked lines, top-left) → Project Setup → Connect Device.
On the pop-up, tap GNSS.
On the Receiver Setup screen, set:
• Mode: Base
• Connection Type: Bluetooth
• Bluetooth Device: Tap the scan icon — look for your receiver model + last 4 digits of serial (e.g. R750-1234 or SPS986-5678). If not visible, move within 10 meters and rescan.
• Correction Method: Radio in Receiver (for UHF radio setups)

■ **TIP:** Bluetooth PIN for Trimble GNSS receivers is 0000 (four zeros) by default. If you have changed it via the WebUI, use the updated PIN.

Set the radio channel and Network ID

After selecting your receiver, SiteWorks will ask for the radio channel and Network ID.
Channel convention (common practice): A=1, B=2, C=3 … match the first letter of your company name to a channel number, and use that channel consistently on all jobs.
SiteWorks will scan to check if the channel is already in use on site. If busy, select a different channel.
Set the same Network ID on both base and rover. This must match exactly.

Set the base position (control point)

SiteWorks will prompt you to select a Base Position.
Select the control point from the list (this is the point your tripod is set over).
The control point name becomes the base station name broadcast over the radio.
Enter the antenna height (the measurement you recorded in Step 1).
Select the correct antenna type for your receiver.
Tap Accept / Start Base.

Verify the base is transmitting

In SiteWorks, the base status should show Active and transmitting corrections.
The radio transmit LED on the receiver should blink green at regular intervals (approx. once per second).
If the LED is not blinking, the radio is not transmitting — check that the radio antenna is attached and the UHF Transmit option is licensed on the receiver.
You can now disconnect the data collector from the base. Do NOT power off the base receiver.

■ **TIP:** If the base is set on the same post/pole as yesterday and the receiver is the same unit, AutoBase may start automatically without needing SiteWorks — the receiver remembers its last programmed position. However, always verify it is transmitting correctly before walking away.

■ Phase 2 — Setting Up the Rover

With the base actively transmitting, you can now connect the rover to your data collector and configure it to receive corrections.

Physical setup of the rover
Attach the rover receiver (e.g. R750, R780, SPS986) to the range pole/rover rod.
Snap or thread the receiver onto the pole securely.
Attach the data collector holder to the pole and slide the data collector in.
Ensure the pole bubble is leveled — check before every shot.
Set and confirm the pole height (default is typically 2.0 m). Any height change requires updating SiteWorks immediately.

Power on the rover receiver
Press and hold the power button until LEDs illuminate.
Allow 60–90 seconds for satellite acquisition.
Power on the rover FIRST, then wake the data collector — SiteWorks can auto-reconnect if the rover is already booted.
Verify at least 11 satellites visible.

Connect the data collector to the rover via Bluetooth
In SiteWorks, tap Hamburger button (three stacked lines, top-left) → Project Setup → Connect Device → GNSS.
On the Receiver Setup screen, set:
• Mode: Rover
• Connection Type: Bluetooth
• Bluetooth Device: Select your rover receiver from the scan list (model + last 4 digits of serial)
• Correction Method: Radio in Receiver
• Network ID: Must match the Network ID set on the base exactly
Tap Accept / Connect.

Confirm the rover is receiving corrections
Watch the GPS status indicator in the SiteWorks toolbar.
Status will progress: Autonomous → Float → Fixed
RTK Fixed is the target — this means the rover is receiving and processing base corrections. Typical precision: ±10–15 mm horizontal, ±20 mm vertical.
Float means corrections are being received but the solution is not yet resolved — wait up to 60–90 seconds. If it stays in Float, see Troubleshooting.
Autonomous means no corrections at all — base is not reaching the rover.

■ **TIP:** Both base and rover must be on the same radio channel and Network ID. This is the most common reason a rover stays in Float or Autonomous — double-check these settings on both units before investigating further.

Enter the rover antenna (pole) height
In SiteWorks, tap the antenna height icon or go to Measure → Antenna Height.
Enter the current pole height in the correct units (meters or feet — match your project setting).
If using a quick-release adapter, enter the height to the bottom of the quick release only — SiteWorks adds the quick release offset automatically.
Incorrect antenna height is the #1 cause of elevation errors in the field. Always verify this number before collecting data.

■ Phase 3 — Site Calibration

Site calibration ties your GPS coordinate system to the local jobsite grid. This is the most critical step — skipping or rushing it causes rework. It must be performed with the rover at RTK Fixed before starting.

■ **NOTE:** A calibration created with a Base Station CANNOT be used later with VRS/Network corrections on the same project, and vice versa. Decide which correction method your project will use before calibrating.

Start site calibration in SiteWorks
With the rover at RTK Fixed, tap Hamburger button (three stacked lines, top-left) → Project Setup → Site Calibration.
SiteWorks will guide you through the calibration wizard.
Trimble recommends a minimum of 3 control points for a multi-point calibration. Two points are the minimum (one sets position/elevation, one sets orientation).
More control points improve accuracy and help identify bad control.

Measure each control point
Walk the rover to the first control point. Level the pole carefully.
In SiteWorks, tap the control point from the list and select Measure.
Set the Observation Method to Observed Control Point.
Hold the pole steady and tap Measure. SiteWorks will collect observations.
Repeat for each additional control point.
A control point shows red in the calibration if the residual error is too large — this indicates the control coordinates may be wrong, the point has moved, or the antenna height is incorrect.

Review residuals and accept the calibration
After measuring all points, SiteWorks shows the calibration residuals table.
Horizontal residuals should typically be under 0.025 m (25 mm). Vertical under 0.030 m.
If a point shows a large residual, verify the coordinates, re-measure, or exclude it.
Tap FINISH to accept the calibration. Once accepted with FINISH, it CANNOT be adjusted — a new project must be created if the calibration is wrong.
Both a .cal file and a .dc file are created in the project folder upon successful calibration.

■ **TIP:** Always check into at least one known control point AFTER calibration to verify the system is working correctly. A 5-second check shot can prevent hours of rework.

Reconnect rover for field work
After calibration, reconnect the rover to SiteWorks if it disconnected during the process.
Confirm RTK Fixed status before beginning measurement or stakeout.
Select your Work Order and Design if not already active.
You are now ready to measure, stake, or collect topo points.

■ Alternative: VRS / Network Corrections (No Physical Base)

If your jobsite has cellular coverage, you can use a Virtual Reference Station (VRS) network instead of a physical base receiver. This eliminates base setup entirely and is highly recommended for long-term projects.

Create the project with a coordinate system
When creating a new project, check 'Select Coordinate File' and choose the correct county/state coordinate system (e.g. NAD83 state plane zone).
Select the appropriate Geoid file (GEOID18 recommended).
This replaces the site calibration for VRS projects — the coordinate system defines the grid.

Connect the rover to VRS
In SiteWorks Receiver Setup, set Correction Method to NTRIP (or your VRS network name, e.g. Trimble RTX, state DOT network).
Enter your NTRIP caster IP, port, mountpoint, username, and password.
The rover connects via the data collector's cellular or Wi-Fi connection.
Rover status should show RTK Fixed once corrections are flowing from the network.

■ **TIP:** VRS projects can also accept a physical base station later — set up the base on a post/pole, measure the control point with VRS, then program the base to that point. This lets VRS and base station rovers work on the same calibrated project.

■ End of Day — Proper Shutdown Procedure

Improper shutdown is a common cause of data loss and hardware damage:

1.	Exit Trimble SiteWorks fully on the data collector. Do NOT just put it to sleep — data may not save properly.
2.	Power off the data collector completely (hold power → Shut Down). This is especially critical if storing inside a closed hard case — heat buildup can cause component failure or fire.
3.	Power off the rover receiver (press and hold power button).
4.	Power off the base receiver. It is safe to power down once the rover is done for the day.
5.	Disconnect all cables. Remove antennas if storing in a case. Charge all batteries overnight.
6.	Do NOT store rovers or data collectors inside closed hard cases while powered on or charging.

■ Common Issues & Fixes

These are the most frequently reported SiteWorks base/rover connection issues, drawn from Trimble documentation, field technician forums, and 9JA's own service experience:

Problem	Most Likely Cause	Fix
Rover stuck in Float — won't reach RTK Fixed	Base and rover on different radio channel or Network ID	Verify both units share the same channel and Network ID in SiteWorks. Reconnect both. Check base radio transmit LED is blinking green.
Rover shows Autonomous — no corrections at all	Base not transmitting / radio not reaching rover	Verify base is Active in SiteWorks. Check radio antenna connection on base. Move rover closer to base. Ensure 11+ satellites visible on both units.
Receiver not found during Bluetooth scan	Receiver not fully booted or Bluetooth already in use by another device	Wait 90 sec after power-on. Move within 10 m. If another device is paired, unpair it. Delete old pairings on data collector and re-scan. Reboot receiver if needed.
Bluetooth drops intermittently during the day	Bluetooth module degrading (common on older/used receivers) or data collector OS issue	Reboot data collector and receiver. Delete and re-pair Bluetooth. If persistent, power cycle the receiver completely. Known hardware issue on some older R8 units — may need repair.
Elevation readings are consistently off by a fixed amount	Incorrect antenna/pole height entered in SiteWorks	Recheck the rover pole height. Recheck the base antenna height entered during setup. A 10 mm error in height entry = 10 mm error in every elevation collected.
Control points show red during calibration	Bad control coordinates, moved benchmark, or incorrect antenna height	Re-verify control point coordinates against the survey file. Re-measure the suspect point. Check pole is level. Disable the bad point and recalibrate — re-enable only after resolving.
Calibration accepted with large errors — all data is off	Calibration was accepted before verifying residuals	Cannot edit the calibration after FINISH. Create a new Project, re-import control points, and recalibrate. Always verify residuals before tapping FINISH.
'Building base list' message — won't proceed	Rover radio not seeing base radio transmissions	Stop the base in SiteWorks. Reconnect to the base radio via SiteWorks to 'wake' it. Restart the base survey. Check that protocol settings match on both radios (TT450s baud rate).
Base transmit LED not blinking after setup	UHF Transmit option not licensed on receiver, or radio antenna missing	Confirm UHF Transmit is a licensed option on your receiver (check WebUI → Options). Attach radio antenna firmly. Use SiteWorks to restart the base, not the power button alone.
SiteWorks won't connect to receiver after project was calibrated with different correction method	Project calibrated with Base Station cannot be used with VRS (and vice versa)	Create a new project with the correct calibration method. Import the existing control points and recalibrate. You cannot switch correction methods on a calibrated project.

Position jumps or drifts after base was moved/bumped	Base receiver moved while transmitting corrections	STOP all rover work immediately. Reprogram the base using SiteWorks. Perform Bench My Rover (BaseAnywhere) or restart the full calibration if base position is uncertain.
Data collector overheats / SiteWorks crashes in field	Device stored in closed hard case while powered on or in direct sun	Never store powered devices in closed cases. Keep devices shaded. Exit SiteWorks and restart. Do not use 'sleep' as end-of-day — always power off fully.
SBAS / WAAS corrections preventing RTK Fix on VRS	Some VRS networks reject rovers broadcasting WAAS corrections in their NMEA string	Disable SBAS/WAAS tracking in the rover receiver settings or SiteWorks connection options. Reconnect to the VRS mountpoint. Try an RTCM mountpoint if CMR fails.

■ Quick Reference — Key Settings at a Glance

Setting	Value / Notes
Bluetooth PIN	0000 (four zeros — factory default)
Min. Satellites Required	11 or more on both base and rover
RTK Fixed Precision	±10–15 mm horizontal | ±20 mm vertical (typical)
Radio Channel	Match to company name initial: A=1, B=2, C=3 etc. Consistent across all jobs.
Network ID	Must be identical on base and rover. Set in SiteWorks during device connect.
Antenna Height Entry	Vertical height from benchmark to receiver reference point. If using quick-release, measure to bottom of quick-release only.
Calibration Min. Points	2 minimum (1 for position+elevation, 1 for orientation). 3+ recommended.
Calibration Horizontal Residual	Target under 25 mm. Investigate any point over 30 mm.
Calibration Vertical Residual	Target under 30 mm. Investigate any point over 40 mm.
AutoBase / Same Point Daily	Receiver remembers programmed point. Verify transmitting before walking away. Must reprogram if antenna height changes.
End of Day	Exit SiteWorks → Power off data collector → Power off rover → Power off base. Never sleep inside closed case.

■ Still Stuck? Get Expert Support from 9JA Enterprise

9JA Enterprise LLC specializes in Trimble GNSS receivers — sales, repair, rental, and technical support. If your base, rover, or data collector is not behaving as expected after following this guide, our team can help diagnose the issue

remotely or arrange service.

■ **Knowledge Base & Resources** www.9ja.tools	■ **Call or Text** 1-866-210-6660	■ **Shop Pre-Owned Trimble Gear** www.9ja.tools | eBay: 9JA Enterprise Tools	■ **Houston / Hempstead, TX** Serving customers nationwide & internationally

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