



# Trimble® Earthworks Release Notes

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# Installing the EC520 System Electronic Control Module Firmware

## In this chapter:

- ▶ Confirm before the install
- ▶ Complete excavator-only tasks
- ▶ For dozers—Complete Body Sensor Calibration and Sensor Correction Check if the body sensor is moved or replaced

## 1.1 Confirm before the install

### 1.1.1 Upgrade the MS9xx GNSS receiver with the minimum firmware

To use Trimble® Earthworks 2.15.1 and later the following GNSS receivers must be upgraded with the minimum firmware:

- M9x6 - firmware v5.56 or later
- MS9x5—firmware v5.45 or later
- MS9x2—firmware v5.31 or later

The latest required firmware is bundled in the software. After installing the software, in the Web Interface open MONITOR > Onboard Devices to confirm the minimum firmware is installed.

Minimum firmware and latest firmware available can be confirmed on [Partners](#) .

### 1.1.2 Upgrade the VM510 valve module and CAN Gateway

When upgrading excavators with a VM510 from pre v1.7.0 or earlier to v1.7.0 or later or motor graders or dozers from previous VM510 versions, the firmware must be upgraded to match the requirements below. The firmware is bundled with the software. To update:

1. Open the Web Interface > MONITOR > Onboard Devices
2. Select the available firmware for:
  - a. Excavators —v1.03.00 or later
  - b. Motor graders and dozers valve module— v1.02.10

- c. Motor graders and dozers CAN Gateway— v1.04.00 or later

### 3. Tap Apply Firmware

**Note** – Excavators only - If the system is downgraded to v1.6.0 or earlier, the VM510 firmware v1.03.00, which is available on [Partners](#), must be re-applied.

### 1.1.3 Recommended TD520/TD540/TD510 firmware versions

The recommended firmware versions are:

- TD520/TD510 - v4.31.2
- TD540 - v002.000.005

The minimum firmware versions that are compatible with this release are:

- TD520 - v4.19
- TD540 - v002.000.001
- TD510 - v2.3

Refer to the TD5x0 release notes, available on [Partners](#), for more information.

## 1.2 Complete excavator-only tasks

The following actions apply to excavators only.

### 1.2.1 For excavators - redo the Sensors section of the Install Assistant

When upgrading from v1.2.x or earlier, restart and complete the Sensors section of the Web Interface > Configure > Install Assistant.

Until the sensors are re-identified, the message *Installation Setup Is Incomplete. Sensor Section Incomplete.* displays when the Operator's Interface is started.

**Note** – The Sensor section of the Install Assistant now asks you to pause briefly before moving the front linkage component you are identifying. These pauses are required to gather information on the sensor orientation.

### 1.2.2 For excavators—redo the Body section of the Install Assistant

When upgrading from v1.2.x or earlier, restart and complete the Body section of the Web Interface > Configure > Install Assistant.

### 1.2.3 For excavators—do the Fixed Sensor Initialization section of the Install Assistant

When upgrading from v1.7 or earlier on excavators with GS520, you *must* do the Fixed Sensor Initialization section of the Web Interface > Configure > Install Assistant. To record accurate sensor readings, ensure the:

- Machine is completely stationary
- Machine is at full revs
- Linkage is not at its travel limits

Some machines do not allow full revs when the machine is stationary, which causes inaccurate sensor readings. Avoid running the machine at a lower rate of revs as a way to complete the initialization.

*Note – If a machine will not run at full revs when stationary, ensure that auto engine idle is disabled. Move the linkage to circulate hydraulic oil. Cease all machine movement and then perform the fixed sensor initialization.*

### 1.3 For dozers—Complete Body Sensor Calibration and Sensor Correction Check if the body sensor is moved or replaced

The precise location of the body sensor contributes to the measure-up and system accuracy. For active body IMU dozers, if the body sensor is removed or replaced, complete the following sections of the Install Assistant again:

- Sensor Correction Check
- Body
- Measure-up
- Pass Match adjustment



# TD5x0 Android Recovery Mode

## 2.1 Recovery Mode

Recovery Mode provides an option to clear a TD5x0 hard drive. This option is useful for resetting a TD5x0 Android password. This option resets the Android device password only and does NOT reset the Trimble® Earthworks password.

## 2.2 Reset a TD510 or TD520 Android password

To reset the Android password on a TD510 or TD520:

1. Turn on the display. Press and hold the power button to open an options menu.
2. Tap Recovery and then OK on the Recovery Mode box.
3. Wait for the No Command, or dead Android, image to display.
4. Press simultaneously the power and volume up button a few times until the Android Recovery menu opens.
5. Follow the on-screen instructions to select wipe data/factory reset.
6. Wait for the display to reboot and enter a new password.

**Note** – *Wipe data/factory reset erases all files, such as design files, from the display's hard drive. All installed apps remain.*

## 2.3 Reset a TD540 Android password

To reset the Android password on a TD540:

1. Turn off the display. Press and hold the power and volume down buttons at the same time until the display turns on.
2. Wait while the device image displays.
3. Press the volume up button for five seconds and release. This makes the menu open.
4. Follow the on-screen instructions to select wipe data/factory reset.  
**Note** - *Tapping the screen also scrolls through the menu items.*
5. Wait for the display to reboot and enter a new password.

**Note** – *Wipe data/factory reset erases all files, such as design files, from the display's hard drive. All installed apps remain.*

## 2.4 Exit the No Command screen

To exit the No Command, or dead Android, screen (before the Recovery Mode menu screen), press the display's power button or leave the display on for two minutes and it will automatically reboot.

## 2.5 Exit Recovery Mode menu

To exit the Recovery Mode menu, follow the on-screen instructions to select reboot system now.

# Overview of this release

## In this chapter:

- ▶ [User documentation](#)
- ▶ [System requirements](#)
- ▶ [New features](#)

## 3.1 User documentation

This release of Trimble® Earthworks version 2.15.1 provides release notes and a full set of English user documentation.

Complete user documentation is available in the following places:

- Operator guides:
  - the help in the Trimble Earthworks app
  - on [Partners](#)
  - EarthworksAssistant app available on the Play Store
- Technician guides:
  - the help in the Web Interface
  - on [Partners](#)

## 3.2 System requirements

### 3.2.1 Supported third-party tablets

If using a third-party tablet, this release requires that the tablet meets the following requirements:

- OS: Android 6.0 - 12
- 3D graphics: OpenGL ES 3.0 or higher
- Display: 8 inches or larger

The recommended third-party tablet is the Samsung Galaxy Tab S7 (SM-T830) running Android 10 or 11. On start-up Trimble Earthworks checks the display's screen zoom to ensure optimal viewing. If the screen zoom needs adjusting, you will be instructed on what to do.

### 3.2.2 Project and design creation

Project files can be created in Business Center – HCE v3.80 or later. For customers using Business Center's VCL design file format in Trimble Earthworks, use v5.21 or later.

## 3.3 New features

The 2.15.1 release of Trimble Earthworks supports the following new features:

For	The system now supports	See
v2.15.1 Improvements	Designs converted with File Flipper now load	Chapter 3, v2.15.1 Improvements
	Improved support for CANopen Trimble Ready Tiltrotators	Chapter 3, v2.15.1 Improvements
All machine types	Firmware updates	Chapter 4, Common Features
	Design validation and error message	Chapter 4, Common Features
	System Snapshot auto delete	Chapter 4, Common Features
	Network connection messaging changes	Chapter 4, Common Features
	Cat factory license updates	Chapter 4, Common Features
Excavators	TRS23 tiltrotator support	Chapter 5, Excavator Features
	Aftermarket Tilt Autos	Chapter 5, Excavator Features
Dozers	Center guidance focus point	Chapter 6, Dozer Features
	Sensor Correction Checks updates	Chapter 6, Dozer Features
Compact Loaders	EM41x electric mast support	Chapter 7, Compact Loader Features
	CASE and New Holland grading attachments now supported	Chapter 7, Compact Loader Features

# v2.15.1 Improvements

## v2.15.1 improvements:

The following improvements are available in this v2.15.1 release:

- ▶ [Designs converted with File Flipper now load](#)
- ▶ [Improved support for CANopen Trimble Ready Tiltrotators](#)

### 3.4 Designs converted with File Flipper now load

Designs converted with File Flipper now load as expected and an error message no longer displays.

### 3.5 Improved support for CANopen Trimble Ready Tiltrotators

Improved support for CANopen Trimble Ready Tiltrotators on excavators.



# Common Features

## In this chapter:

- ▶ Firmware updates
- ▶ Design validation and error message
- ▶ System Snapshot auto delete
- ▶ Network connection messaging changes
- ▶ Cat factory license updates

## 4.1 Firmware updates

The following components have new minimum firmware as of this release:

Component	Required minimum firmware
MX9x2	5.56
MS9x5	5.55
SNM941	2.0.1
SNRx21	5.82
SNRx3x	5.78
AS45x	3.00
LC450	3.00
GS520	1.60
GS521	1.90
GS520 (valve cal sensor only)	1.60
GS513	1.85

SPSx30	C10.10.7
LR410	2.09

## 4.2 Design validation and error message

An error message now displays in the Operator App when a .vcl or .dsz design fails to display design elements, fails to load completely or has problems that may cause guidance issues. Details about the issue are now listed on the Program Log in the Web Interface.

## 4.3 System Snapshot auto delete

System Snapshots taken within the Operator App now automatically delete to maintain sufficient EC520 storage space . System Snapshots are deleted when one of two conditions are met, either:

- The System Snapshot is 16 days old
- The storage space limit of 200 MB is reached, the oldest System Snapshots are deleted to reduce storage space to 200 MB

Consider saving System Snapshots to an external storage device to use for troubleshooting purposes.

## 4.4 Network connection messaging changes

The cloud services connection status message no longer displays on the work screen. The cloud services connection status still displays on the cloud services icon on the action bar.

## 4.5 Cat factory license updates

The .xml license file that enables over-the-air-license updates is now available for use on Cat factory installations.

# Excavator Features

## In this chapter:

- ▶ [TRS23 tiltrotator support](#)
- ▶ [Aftermarket Tilt Autos](#)

## 5.1 TRS23 tiltrotator support

The Cat TRS23 tiltrotator is now supported and configurable on Cat Grade Assist and Cat Advanced Assist machines. Cat Integrated TRS23 tiltrotators are also configurable on Cat Advanced Assist machines.

## 5.2 Aftermarket Tilt Autos

Tilt Autos for tilt attachments is now available on excavators configured with PWM or analog differential signal joysticks, medium flow hydraulic circuits and joystick thumb roller. Unique connectors on each machine require machine-specific, and possibly make-specific, Tilt Autos kits. Contact your regional account representative to determine if your machine's PWM or analog differential signal joystick are compatible with Tilt Autos.



# Dozer Features

## In this chapter:

- ▶ [Blade center focus point](#)
- ▶ [Sensor Correction Checks updates](#)

### 6.1 Blade center focus point

The blade center focus point is now available for use. The center focus point can be used to verify that a machine's E, N, and Elv are within expectation.

### 6.2 Sensor Correction Checks updates

The following updates are now available to the Sensor Correction Check;

- All Sensor Correction Checks updates are now applied (previously only significant corrections were applied)
- After the Sensor Correction Check is complete, a message advises if the correction applied was significant or not significant
- Checks now take 15 seconds to complete (previously was 5 seconds)
- Machine revs need to be high idle (previously was low idle) during the check to reduce noise in the sensor signal



# Compact Loader Features

## In this chapter:

- ▶ EM41x electric mast support
- ▶ CASE and New Holland grading attachments now supported

## 7.1 EM41x electric mast support

EM41x electric masts are now supported, which enable operators remain in the cab while using LR410 laser receivers. EM41x is available for all supported mast-mounted sensors, including GNSS.

## 7.2 CASE and New Holland grading attachments now supported

The following CASE and New Holland grading attachments are now supported for all sensors and configurations that are supported for other attachments:

- CASE Construction
  - GB-108 Grader Blade Attachment
  - PD-72 Box Blade Attachments
  - PD-84 Box Blade Attachment
  - PD-96 Box Blade Attachment
- New Holland Construction
  - GB-108 Grader Blade Attachment
  - PD-72 Box Blade Attachment
  - PD-84 Box Blade Attachment
  - PD-96 Box Blade Attachment

Use one of the following kits to install these new supported attachments :

- P/N 160668-501: Kit - Base, ATI Level Best, CASE, and New Holland GB108, Grader Blade Attachment, V3.0
- P/N 163170-501: Kit - Base, ATI Level Best, CASE, and New Holland, PD series Box Blade Attachment, V3.0



# Improvements

## In this chapter:

- ▶ Improvements
- ▶ Enhancements
- ▶ Fixes

System improvements include:

- Enhancements: Changes to the software and/or hardware to enhance existing features.
- Fixes: Changes to the software and/or hardware to correct known issues.

## 8.1 Enhancements

### 8.1.1 Message Center

The Message Center in the Operator App now changes from a bell icon to a number in a circle when new messages are available. The number indicates the number of active messages. Tap the number to view the messages on the new Active Messages list. After active messages are resolved or acknowledged, they are removed from the Active Messages list and remain on the Message Log list, and the Message Center icon becomes a bell. Messages that are resolved or acknowledged by the operator can be recalled within 24 hours from the Message Log list.

### 8.1.2 Up and Down values on Diagnostics screen

In the Web Interface, the Diagnostics screen now has Up and Down values for Drawbar Digital Level Reading.

### 8.1.3 UTS quick search

When using UTS guidance with the Auto Search option enabled and the target is lost the total station will perform a quick search around the location that the target was last tracked before it continues to a Full Search. Previously the instrument skipped the quick search step.

#### **8.1.4 Motor grader Blade PSC is disconnected message**

A full screen Blade PSC is disconnected message now displays when a sideshift PSC disconnects.

#### **8.1.5 Cat NextGen excavator attachment tilt sensor no longer displays in the Web Interface**

Cat NextGen excavators running Grade Assist that are configured with an attachment tilt sensor no longer display on the Onboard Devices screen in the Web Interface. This attachment tilt sensor displays on the machine display.

### **8.2 Fixes**

#### **8.2.1 The Operator App now opens as expected on TD540 displays**

The Operator App now opens as expected when opened on TD540 startup. Previously opening the Operator App caused the TD540 to crash.

#### **8.2.2 Active Apply button on Job Setup screen**

After adding a new design to an existing project using File Transfer via the Job Setup screen, the Apply button is available for selecting.

# Known Issues

## In this chapter:

- ▶ Introduction
- ▶ Web and Operator App issues
- ▶ General system issues
- ▶ Excavator system issues
- ▶ Dozer system issues
- ▶ Motor grader system issues
- ▶ Compact loader system issues
- ▶ Soil compactor system issues

## 9.1 Introduction

Known issues include:

- Unresolved errors in the software
- Unexpected behavior of the system as a whole, or of a device

Future product releases may resolve these issues. When an issue is resolved it is removed from this chapter and listed as an improvement.

For the most recent known issues, contact customer support.

## 9.2 Web and Operator App issues

### 9.2.1 TCC sync delays WorksManager design download

When a design is downloaded at the same time the system is syncing large files from TCC, the design cannot be applied even when the download status is 100%. Wait for the TCC synch to complete for the design to become available for applying.

### 9.2.2 Unlock request does not display when the Operator App is open

When the Operator is open on a TD520 display and an Unlock request is sent from the Web Interface, the Unlock request does not display in the Operator App. Close the Operator

App, resend the Unlock request from within the Web Interface, open the Operator App and the Unlock request will display.

### 9.2.3 .vcl designs not displaying on the work screen

Occasionally when a .vcl design is selected on the Job Setup screen, the design does not display on the work screen and the 'Unable to read design file' message displays. Return to the Job Setup screen and apply a different design file. Then open the work screen and return to the Job Setup screen again and select the desired .vcl file. The design will then display on the work screen.

### 9.2.4 Pass Shift lines blend into areas with no mapping data

Pass Shift lines can blend into gray shaded areas where there is no mapping data when the display is in light background mode. Either temporarily turn off mapping data or change the display to dark background mode to make the Pass Shift lines more visible.

### 9.2.5 The Apply button may be available when no design is selected

Occasionally the Apply button in the Operator App may be available when no design is selected and the workscreen opens with no design visible. Open the job Setup screen and select a design.

### 9.2.6 WorksOS Surface Download status remains as configuring after enabling

In the Web Interface the WorksOS Surface Download status (under Network > Cloud Services) may remain in a 'Configuring...' state after the toggle is enabled. From the Operator App, open the Cut / Fill Mapping screen, set the Ground Surface field to WorksOS Download and tap Apply. The WorksOS Surface Download status updates to 'Connected'.

### 9.2.7 'Unexpected error occurred' message may display on .SG6 upload

When uploading an .SG6 file, the 'Unexpected error occurred' message may display. Power cycle the EC520 and upload the .SG6 again.

### 9.2.8 Missing notifications when no signal to SNM94x

When an SNM94x loses cellular or Wi-Fi connection, the Operator App does not display the connection status icon on the action bar nor the Connection panel on the Network screen.

### 9.2.9 Horizontal alignments may be difficult to see against certain background colors

Horizontal alignments may be difficult to see when they are viewed against a background of a similar color, for example if they are drawn over a mapped area.

### 9.2.10 'x' button does not clear Touch Point in v2.10.x

In v2.10.x, when using Touch Point to transfer a bench, you cannot clear the Touch Point via the 'x' on the blue call-to-action banner. To clear the Touch Point, open the Work Settings

menu, tap Touch Point and then tap Cancel on the Touch Point screen. Alternatively, consider not upgrading to v2.10.x if Touch Points are important to your workflow.

### 9.2.11 System licenses may appear as missing after upgrading

When upgrading from v2.3 and earlier to v2.4 and later version, the License Service may cause the Earthworks System Licenses to appear as missing. Power cycle the display, re-open Earthworks and the System Licenses should appear. If the System Licenses are still missing, re-install the system license files.

### 9.2.12 The Web Interface fails to load or log in while a system snap is in progress

The Web Interface fails to load or log in while a system snap in the Operator App is in progress. Wait for the system snap to complete before accessing the Web Interface. System snaps can take several minutes to complete.

### 9.2.13 The last selected point in Infield Designs is always the point you edit

In Infield Designs, when you select a point and then change views, the selected point is not highlighted in the current view, but still selected in the previous view. Edits made on the current view are applied to the point selected, which may be highlighted in another view. To edit a point on the current view, select it before editing.

## 9.3 General system issues

### 9.3.1 Incorrect TD5x0 date and time may cause license loading issues

If the TD5x0 date and time are incorrect there may be issues with loading licenses. Confirm the TD5x0 date and time are correct before loading licenses.

### 9.3.2 Voltage drop may report inaccurate body pitch/roll values

Machines with a single 12V battery may report inaccurate body pitch/roll values if the voltage drops too low when starting the engine. To resolve the issue, let the machine idle or power cycle the EC520.

### 9.3.3 UTS remains in a configuring state

If your UTS is in a configuring state for two minutes or longer on the UTS Management screen of the Operator App, power cycle the system to make the UTS available for use.

### 9.3.4 Incorrect machine settings when switching between Roadworks and Earthworks on the same EC520

When switching between Roadworks and Earthworks on the same EC520 without resetting to defaults, incorrect machine settings persist. After installing the Roadworks .sg6 on an EC520 that was previously running Earthworks, or vice versa, reset the system to defaults in the Web Interface by going to Advanced > Reset to defaults.

### 9.3.5 TD5x0 displays with old firmware is missing the Operator App launcher

TD5x0 displays with old firmware are missing the Operator App launcher. Use MC Installer to install the Operator App. Also, use:

- TD520 - operating system v4.20.0 or later
- TD510 - operating system v2.4.0 or later

## 9.4 Excavator system issues

### 9.4.1 GS520 tilt sensor disconnects when non-tilt attachment selected

When a GS520 tilt sensor is installed but a non-tilt attachment is selected, the GS520 disconnects and then reconnects. First select a tilt or tiltrotator attachment and then select the non-tilt attachment to maintain the tilt sensor.

### 9.4.2 Some help guides do not open from overflow menu

Two different guides do not open from the overflow menu in the Operator App:

- Depth Autos Setup guide
- Remote Switch guide

See the relevant sections in the Excavator Operator's Manual available in the Assistant app or on Partners.

### 9.4.3 A dedicated MT900 mast option is unavailable for single GNSS machines

Machines measured-up for a single left GNSS configuration and for a dedicated MT900 mast will not offer both positioning sources on one machine file. Save each positioning source to a single machine file and apply that machine file to make the positioning source available. Each positioning source needs a dedicated machine file. Changing machine files requires an Operator Plus login.

### 9.4.4 New GNSS receivers require high accuracy options or licenses for a mast measure-up

GNSS receivers require high accuracy options/licenses to complete the measure-up. If you have new receivers and plan to use Subscription GNSS licenses, it is necessary to install these licenses before the measure-up. In this scenario, it is recommended to connect the gateway device to the internet and sync the licenses before commencing.

### 9.4.5 Guidance on a Cat NGH Standard/XE - Grade Assist machines can freeze

In some situations, the front linkage of NGH Grade Assist machines can freeze or jump in the Operator App without a warning nor alarm. Check the machine display for errors.

#### 9.4.6 Autos may drive with Cat NGH 07 Assist Prod 8.1

Autos may drive when the system is not benched or is off design while using a Cat NGH Standard/07 - Grade Assist machine with Prod 8.1. machine ECM software. Toggle Autos off to stop Autos. Upgrading to Prod 8.1.1 or later resolves this issue.

#### 9.4.7 Single 3D guidance will lose avoidance machine boundary while tramming

Excavators using GNSS or UTS for single 3D guidance will lose the center of rotation as soon as the machines tram and the machine boundary overlay circle may expand into an avoidance zone. If this happens, the avoidance zone breach operational state will not display. To fix the issue, stop the machine and rotate until you regain COR and the operational state displays correctly.

### 9.5 Dozer system issues

#### 9.5.1 Untranslated column headings in Sensor Correction Check on Active Body IMU Dozers

In the Sensor Correction Check, the column headings for Device, Pitch, Roll and Target values are not translated on the 2nd - 5th Position screens. The English headings display for all language settings.

#### 9.5.2 Sensor IDs may be incorrect when model, series or build selection is incorrect

The lift arm or C-frame sensor may appear as a blade sensor on the Onboard Devices page of the Web Interface for some Cat dozer models. This can occur if an incorrect model, series or build is selected on the Machine Description page of the Setup section in the Install Assistant. To check the sensor ID, in the Web Interface open the Machine Diagnostics page and the Current Machine Angles section, change the blade tilt and confirm that the Blade Roll angle updates. If the incorrect sensor angle updates, open the Advanced menu, Reset to Default and then redo the Setup section of the Install Assistant, being sure to select the correct model, series and build.

### 9.6 Motor grader system issues

#### 9.6.1 GNSS error message displays when starting a measure-up and blade mount receivers are connected

When all devices are confirmed as connected and a measure-up is started, the 'Device Status Error - GNSS Receiver' message may display. Disconnect the blade mounted receivers and start the measure-up section. Then reconnect the blade mounted receivers when the measure-up is complete.

### 9.6.2 Steep grade changes may cause quick jumps on the work screen

When the Vertical Guidance Point passes over a steep grade change in the design surface (like the face of a kerb or the edge of the trench) the blade drawing in cross section view may momentarily appear to move when the machine and blade are stationary. This has no impact on guidance and the cut / fill text item values are still correct.

### 9.6.3 Keyboard obscures images on Input Method - Horizontal and Vertical screen

The keyboard partially obscures the images that provide instructions on how to take the measurements on the Blade Manager > Cutting Edge Length > Input Method - Horizontal and Vertical screen. You can minimize the keyboard by tapping the down arrow in the Android action bar at the bottom of the screen.

### 9.6.4 Incorrectly connected inc/dec switches cause valve tests to fail on motor graders with aftermarket installed lever-style switches

Valve tests performed in the Web Interface on motor graders with aftermarket installed lever-style switches, such as Case motor grader, may fail. Check in the following order:

1. Inc/Dec switches are connected correctly
2. Valves are wired correctly
3. Hydraulics are installed and working properly

Check the electrics first (easiest) before checking the hydraulic install (hardest).

## 9.7 Compact loader system issues

### 9.7.1 ATI grader blade rotary dial switch Autos left and right buttons do not engage Autos

On the ATI grader blade rotary dial switch, the left and right Autos buttons do not engage left and right Autos. Use the center combined button to engage Autos.

### 9.7.2 Guidance Lost messages may display on systems using a Wi-Fi connection between the display and EC520

Systems using a Wi-Fi connection between the display and the EC520 may experience Guidance Lost messages. Either change to a different Wi-Fi channel in the Web Interface under Configure > Wi-Fi Network or use a wired connection between the display and the EC520.

## 9.8 Soil compactor system issues

### 9.8.1 Licenses - On GNSS panel of the Factory End of Line Validation web page may show a missing Precision license

For systems using GNSS receivers intended to operate with SBAS corrections only, and with no RTK license installed, the Licenses - On GNSS panel of the Factory End of Line Validation web page shows a missing Precision license. For this system configuration, this warning can be ignored.

### 9.8.2 Prerequisites for Dynapac asphalt compactor installation

Dynapac compaction mapping requires the prior installation of the optional Dynapac Dyn@lyzer compaction control system and machine interface in order to connect with the 3D system.

In addition, to support compaction mapping the Compaction Meter Evib option must be installed.

These kits are installed as a factory fit option, or by your Dynapac dealer as an aftermarket option.

### 9.8.3 Incorrect value may intermittently display on Frequency text item

If unrealistically high values intermittently display on the Frequency text item, the Dynapac ECM firmware needs updating. Contact your Dynapac dealer.

### 9.8.4 New compaction data does not record to an existing tds file after a configuration change

When you change the system configuration, compaction data from the newly configured sensor does not display in the VETA software and it does not record onto the existing tds file. Create a new Measured Data display the compaction data in the VETA software and to record the compaction data in the new tds file.



# Known Limitations

## In this chapter:

- ▶ Introduction
- ▶ Documentation limitations
- ▶ Web and Operator App limitations
- ▶ General system limitations
- ▶ Excavator system limitations
- ▶ Dozer system limitations
- ▶ Motor grader system limitations
- ▶ Soil compactor system limitations

## 10.1 Introduction

Known limitations include:

- Unresolved errors in the software
- Unexpected behavior of the system as a whole, or of a device

Future releases probably will not resolve these limitations.

For the most recent known limitations, contact customer support.

## 10.2 Documentation limitations

### 10.2.1 The excavator stick and dogbone measurement instructions do not warn of possible errors when the linkage is close to vertical

Stick and dogbone sensor calibrations performed during the measure-up procedure are inaccurate when the measured linkage is close to vertical.

For best results, make sure the measured linkage is greater than  $\pm 30^\circ$  from vertical.

### 10.2.2 Always perform automatic excavator measure-ups and valve calibrations on a flat pad

To enable the system to accurately calculate front linkage sensor angles during measure-up and valve calibration, make sure the machine pitch and roll is  $0^\circ \pm 1^\circ$ . This applies to

automatic excavators only.

## 10.3 Web and Operator App limitations

### 10.3.1 Surface shading on infield slope designs extends 1km (0.6mi) on the work screen

Surface shading on infield slope designs extends only 1km (0.6mi) from the alignment on the work screen. Guidance is still given past 1km (0.6mi) but surface shading is unavailable. Consider creating a second infield slope design parallel to the original if surface shading is required beyond 1km (0.6m) from the original line.

### 10.3.2 Sensor section may not complete for some dual tilt Cat D8T configurations

After changing a single tilt D8T to a dual tilt D8T in the Setup section, the Sensor section shows 'Start' on the Install Assistant page and the section may not complete. Reset to defaults and redo the Install Assistant sections to make the Sensor section complete successfully.

### 10.3.3 Canceling a GS510 update displays the device as missing in the Web Interface

When a GS510 automatic update is canceled during the update, the device displays as missing in the Web Interface and a new unknown device with the same serial number displays. Power cycle and allow the automatic upgrade to complete, or manually upgrade the device, to display the GS510 as expected.

### 10.3.4 The cutting edge may cut into steep section of a design surface when Overcut Protection is on

When using Overcut Protection with 1 Point vertical guidance and the vertical guidance point is near a sharp change in grade with near vertical surfaces, the cutting edge may cut into the design surface. Move the attachment or blade so the vertical guidance point is farther away from the sharp grade change.

### 10.3.5 Unexpected guidance behavior from a Master Alignment that turns back on itself

A master alignment that turns back on itself will create unexpected guidance behavior when the operator is working in that area. When using Lane Guidance ensure the Master Alignment (either defined in the office or user selected in Earthworks) does not turn back on itself.

### 10.3.6 Upgrades may not occur when using multiple user profiles on Android devices

The Android operating system allows for multiple user profiles. If Earthworks is installed on multiple profiles, the latest Earthworks version may not update for each profile. Use the

default Android user profile (Owner) to ensure apps install, update and launch as expected.

### 10.3.7 Some text items do not show after upgrading

When upgrading to v2.6 if the following text items were configured they will no longer show in the ribbon after upgrade and will need to be re-configured if the user needs them.

- RAISE\_LOWER\_LEFT - AsphaltPaver
- RAISE\_LOWER\_RIGHT - AsphaltPaver
- BLADE\_ROTATION - All Machines
- BLADE\_SLOPE - All Machines
- BODY\_MAINFALL - All Machines
- BODY\_SLOPE - All Machines

### 10.3.8 Mapping information may not display after editing an Infield Design

Sometimes after editing an Infield Design and re-entering the workscreen, mapping information will not display. To activate the map view functionality, open the Job Setup screen and tap Apply to re-apply the Project and Design.

### 10.3.9 Input field validation delay when adding a radio correction source

Adding a radio in the Web Interface GNSS Correction Source has an unexpected behavior. Each field in the interface is dependent on values entered in previous fields and field validation takes about 30 seconds after a value is entered. To ensure field validation, enter a value into a field and then wait about 30 seconds before populating the next field.

If all fields are populated without waiting 30 seconds in between each field, the values appear to be valid but will be marked invalid when submitted, even when the values are valid.

### 10.3.10 MC Installer may not install on upgrade

MC Installer will be unable to install when a device has limited storage space. To run MC Installer successfully, create more storage space on the device.

### 10.3.11 MC Installer may incorrectly indicate updates are available

MC Installer may occasionally indicate that updates are available when updates are not available. Reboot the system to clear the updates list. If the updates still appear after rebooting, factory reset the display.

### 10.3.12 The Web Interface Unlock button may stop working

The Unlock button (the Technician Request access button) in the Web Interface may stop working.

If this occurs, refresh the Web Interface page of the browser.

### **10.3.13 For some languages, the Web Interface toggle text exceeds the available space**

For some languages, the length of the text describing the state of Web Interface toggle switches exceeds the space available.

The full text displays when you hover over the toggle with a mouse pointer.

### **10.3.14 A selected line may show arrows in both directions**

If a selected line shows arrows running in both directions or if an offset applied to a selected line applies in both directions (left and right), the design includes duplicate lines. Remove the duplicate lines in Business Center and export the updated design to the machine.

### **10.3.15 Mapping displayed while using lane guidance is limited to the temporary guidance surface**

When using lane guidance with mapping, mapping displays as a subset of the entire mapped ground surface, most noticeable when using lane guidance on a horizontal curve. Toggle lane guidance off to display the ground surface mapping over the complete design reference.

### **10.3.16 Cannot export a .tsd file from BC to Trimble® Earthworks**

Exporting a .tsd file from Business Center to Trimble® Earthworks as a .dsz design is unsupported. To use data from a .tsd, export the file as .vcl from Business Center and import the .vcl file into Trimble® Earthworks.

### **10.3.17 Start button may take a few minutes to become available**

Within the Operator App, the Start button may take a few minutes to become available. This may occur when the SNM94x needs to configure when starting up.

### **10.3.18 Data Error message may display when Operator App opens**

When opening the Operator App, a Data Error message may display, making the application inaccessible. If this message appears, close and then re-start the app.

### **10.3.19 Infield Designs master alignment missing from horizontal guidance**

When an Infield Design is created using the Alignment & Section option, the master alignment may sometimes appear unavailable to select for horizontal guidance. To select the master alignment, open the Horizontal Alignment screen, press the Select Alignment button and select Master Alignment from the drop-down menu rather than from the plan view pane in that screen.

### **10.3.20 Decimal indicator may be incorrect for some languages**

When using Trimble® Earthworks in non-English languages, the decimal indicator may be incorrect on fields where numbers are entered. The decimal indicator may be a dot instead of a comma.

### 10.3.21 Points cannot overlap in Infield Designs

Infield Designs created with overlapping surfaces may fail to get guidance to the overlapping portion. To get guidance in these areas you may need to rework the design to eliminate or minimize the overlapping areas.

### 10.3.22 Case sensitivity issues with file names may cause problems when transferring files

To avoid case sensitivity issues, when you save a Project, Section, or machine settings file, you must use a unique name. Do not use a name that differs only in upper and lower case, as this may cause issues when transferring files.

### 10.3.23 Restart and complete the Setup section of the Install Assistant after uploading an MDF in the Web Interface

After using the Web Interface to upload an MDF downloaded from [Partners](#), restart and complete the Setup section of the Install Assistant to apply the MDF.

### 10.3.24 Issues with Web Interface file transfers on Apple iOS devices

The iOS file system management limits the ability to move files between the Web Interface and an iOS device when using some browsers such as Safari. Chrome is the only fully supported browser for the Web Interface.

### 10.3.25 A currently loaded Infield Design cannot be deleted

You cannot delete an Infield Design that is currently being used. To delete the current design, load a new design and then you can delete the previous design that was being used.

## 10.4 General system limitations

### 10.4.1 A machine's UTS radio may become unstable if too many UTS

instruments are started at once. If more than five UTS instruments are started on a single channel, one or more instruments may fail to advance from Configuring to Searching.

To resolve the issue:

1. Power cycle the machine's UTS radio by disconnecting it from its harness and then reconnecting it.
2. Restart the UTS instruments, ensuring that no more than five instruments are started at the same time.

### 10.4.2 TD5x0 OS v4.31.2 is not backwards compatible with v2.4 or earlier

Displays that are running OS firmware v4.31.2 or later will not be backwards compatible with Earthworks v2.4 or earlier. Licenses will not be recognized. Update the EC520 to v2.5 or later before upgrading the display OS. This applies to all EC520s if using one display on multiple machines.

### 10.4.3 900MHz radios could be configured wrong after upgrading

When upgrading from v2.4.x or v2.5.x while using a 900MHz radio for corrections, you may experience guidance solution issues if the radio is configured with the wrong network. Edit and resave the 900MHz radio correction source to resolve the issue.

### 10.4.4 You cannot configure a networked device from a computer with multiple networks connected

You cannot configure a networked device, for example an SNM94x gateway, from a PC or tablet that is connected to multiple networks, for example a laptop connected to both Wi-Fi and an office network.

### 10.4.5 Earthworks app icons may not display on the home screen after install or upgrade

After installing or upgrading Earthworks, the Web Interface or Operator app icons may not display on the home screen. Add the missing icons to the home screen via the app drawer.

### 10.4.6 TD520 may display two, one or no Web Interface icons

When upgrading Earthworks, the TD520 desktop may display two, one or no Web Interface icons. All icons will open the Web Interface, regardless of the branding. To put a Web Interface icon on the desktop, get a generic Web Interface icon from the app drawer.

### 10.4.7 EC520 may have insufficient storage space on upgrade

If the EC520's storage space is limited when upgrading Earthworks, error messages may appear and the upgrade cannot complete. Before upgrading, delete any old .sg6 files from previous upgrades.

### 10.4.8 Downgrading v2.3.x to v2.0.x or earlier may fail

Downgrading Earthworks from v2.3.x to v2.0.x or earlier may fail. To ensure a successful downgrade, downgrade to a minor version such as v2.1.x or v2.2.x.

### 10.4.9 Back up on BYOD may fail

When doing a Backup All on a BYOD, the download may fail. Backup from a laptop or TD5x0.

### 10.4.10 System Snap Causes Autos to Stop

When a machine is in Autos and a system snap is captured from within the Web Interface or Operator App, Autos will stop. Turn Autos back on to continue using.

## 10.5 Excavator system limitations

### 10.5.1 Transitioning between UTSs may cause guidance errors

When transitioning between connected UTSs, horizontal and vertical errors may occur. Stop the current UTS and then start the next UTS to maintain accurate horizontal and vertical guidance.

### 10.5.2 Single GNSS machines require a new mast and machine file for MT900

To use a UTS Positioning Source on a machine with a single GNSS system on a GNSS mast (P/N 111961-09) and an MS95X receiver, the MT900 needs to be mounted onto an alternative mounting solution, such as mast P/N 520-6048.

The Dedicated MT900 Mast option is not available on single mast machines. To switch between UTS and single GNSS, save two machine files with each mast measured up separately. For example:

1. Fully commission the machine. As you will be saving two machine files you will want to do as much as possible up front to avoid doing it using each saved machine file.
2. Perform a Mast Measure-up for the single GNSS receiver.
3. Select the GNSS Positioning Source in Machine Setup in the Operator App.
4. Save a machine file for the single GNSS configuration.
5. Install a mast etc. for the MT900 and perform a mast measure-up.
6. Select the UTS Positioning Source in Machine Setup in the Operator App.
7. Save a machine file for the UTS configuration.
8. Enable Operator Plus to allow the operator to switch machine files depending on the desired positioning source.

The operator can swap between single GNSS and UTS configurations by swapping machine files.

### 10.5.3 Guidance screen may be unavailable after changing configuration for Trimble Autos on Cat NGH

With a tilt bucket selected, the GRADE guidance screen may be unavailable after changing from an Advanced Assist configuration to Standard/XE via loading a machine file. Re-measure the attachment to make the guidance screen available.

### 10.5.4 Upgrading with Loadrite running may cause EC520 disconnection

If the Loadrite Payload Management application is running on the display when upgrading from v1.11.x, the Web Interface may temporarily lose connection to the EC520, causing the upgrade progress indicator to not display during the four-minute upgrade time. Check the EC520 firmware version in the Web Interface to verify the upgrade. To maintain the connection to the EC520, before upgrading from v1.11.x, Force Stop or uninstall the Loadrite Payload Management application on the display.

### **10.5.5 Activating a machine file while running Loadrite on v1.11 or earlier may fail**

If Loadrite Payload Management is running on a display with v1.11 or earlier, activating a machine file may fail. To prevent the failure, first either Force Stop or uninstall Loadrite before activating the machine file.

### **10.5.6 Disconnecting the laser catcher early during a measure-up may cause an error**

When performing a GNSS mast measure-up on a Cat 07 series excavator with a laser catcher, disconnecting the laser catcher from the harness early may result in failed horizontal and vertical precision values. Keep the laser catcher connected during the measure-up and disconnect only when prompted.

### **10.5.7 Operator Plus cannot add a new attachment if no attachment already exists**

If no attachments exist in the Web Interface, Operator Plus operators will be unable to access the Web Interface. Have a technician add an attachment in the Web Interface to enable the Web Interface access for an Operator Plus.

### **10.5.8 Stick may breach avoidance zone before the system reports the breach**

When an attachment is fully curled in, the stick may extend into an avoidance zone before the breach is reported on screen and audibly. To minimize this issue, enter the Additional Machine Dimensions into the Install Assistant.

### **10.5.9 The Operator App may display an unnecessary SENSOR INVALID alert on Cat 07 excavators**

After updating the Web Interface configuration, Trimble® Earthworks may display SENSOR INVALID alerts. You can ignore these alerts.

### **10.5.10 When using a Steelwrist tiltrotator, rotate the bucket one full rotation at start-up to sync with Earthworks**

When starting up a Steelwrist tiltrotator, the system defaults to a bucket rotation of 52°. To sync the machine with and resume Earthworks accuracy, rotate the bucket one full rotation.

### **10.5.11 The Record Mast Positions section of the 3D measure up may fail**

When doing a 3D measure-up, if the Record Mast Positions section fails, the machine vibrations may be causing the failure. Try changing the machine revs, turning the machine off and then on, or moving the machine onto a different ground type.

### **10.5.12 For best performance, the automatic controls feature requires a wired connection between the EC520 system ECM and the display**

For best performance, the automatic controls feature requires a reliable, high-bandwidth connection between the EC520 system ECM, VM510 and the display. Use the wired

Ethernet functionality of a TD5x0 display to connect to the EC520 system ECM.

In particular, when using the automatic controls in areas of high Wi-Fi usage, avoid using a Wi-Fi connection between the EC520 system ECM and the display.

### **10.5.13 You cannot perform a valid fixed sensor initialization without an attachment selected**

If you complete the Fixed Sensor Initialization section of the Web Interface Install Assistant without selecting an attachment, then an active Start button is not available in the Earthworks app.

### **10.5.14 The value of the attachment slope reported in the Cat® GRADE Assist diagnostics screen and the value reported in the Earthworks text item may not match**

The Cat GRADE Assist diagnostics screen reports raw tilt angles. The Earthworks Attachment Slope text item reports calibrated tilt angles. The values reported by the two systems cannot be compared.

## **10.6 Dozer system limitations**

### **10.6.1 Sensor section may not complete for some dual tilt Cat D8T configurations**

After changing a single tilt D8T to a dual tilt D8T in the Setup section, the Sensor section shows 'Start' on the Install Assistant page and the section may not complete. Reset to defaults and redo the Install Assistant sections to make the Sensor section complete successfully.

### **10.6.2 System may display Calculating Positions message**

In Earthworks v2.5, enhancements were made to use additional ECM outputs to improve blade rotation calculations on CAT VPAT dozers. To get the correct data from the machine ECM, software part number 585-6633 or later is required on some K2 model dozers. If running a previous version of machine ECM software, the Earthworks/GRADE system will get stuck at the dashboard screen showing "Calculating Positions".

Affected Machines:

- D3K2 – S/N: KF27000-UP; KL27000-UP; JPJ7000-UP
- D4K2 – S/N: KM27000-UP; KR27000-UP; MT37000-UP; RT37000-UP
- D5K2 – S/N: KW27000-UP; KY27000-UP; WT37000-UP; YT37000-UP; RRE7000-UP

Resolution:

When updating to v2.5 on the affected machines, ensure the machine ECM software is updated to 585-6633 or later. This software may not be linked to the machine serial number when searching for the latest files in SIS, but the file is available for download using filename search.

### 10.6.3 Upgrading to v2.1.x and later requires the machine setup section to be done again

When upgrading to Earthworks v2.1.x or later on Cat D8T dozers with single tilt blade linkage, the Setup Section of the Install Assistant needs to be completed again. This will apply the latest default machine measurement information to the machine and ensure optimal future accuracy.

### 10.6.4 Valve speeds may require adjusting when using a Positioning Source other than Dual GNSS

Users may need to adjust valve speeds for expected performance when using Laser, UTS or blade mounted GNSS. This can be done via the Auto Mode Work Settings dialog in Trimble®Earthworks and valve speed memories can be saved and restored as required. For details, refer to the Using Autos guide in the Trimble®Earthworks overflow menu.

### 10.6.5 Center-mounted mast support

Some Active Body IMU push arm dozer models do not support masts mounted in the center of the blade. This means that single 3D, (GNSS, UTS) and single 2D (laser)+ cross slope are unsupported sensor configurations on these machine models. For confirmation of which models are supported for center mast, contact customer support.

### 10.6.6 UTS guidance supported on center blade mounted mast only

On Active Body IMU dozers, UTS guidance is supported on center blade mounted masts only. Use the following connection requirements:

- Fixed mast - plug the MT900 into the 'left' nose connector
- Electric mast - connect the MT900 into the electric mast and plug the electric mast into the 'left' nose connector

### 10.6.7 Joystick commands may suspend Cross Slope Autos

When running Cross Slope, if joystick commands on your machine suspend tilt Autos, the Autos indicator in the Work Screen will change from green to gray while Autos are suspended. Stop joystick commands to resume Autos.

### 10.6.8 Cat® GRADE Slope Assist and Earthworks 3D Autos operation

Cat® GRADE Slope Assist and Earthworks 3D Autos modes interact in the following ways:

- If the Slope Assist screen is active on the machine display, then you cannot activate Autos in the Cat® GRADE app on the TD5x0 or Web Interface.
- To allow Autos to be activated, return the machine's display to the Home screen.
- If Cat® GRADE on the TD5x0 is in the Auto Engaged state and the operator enters the Slope Assist screen on the machine display, then Cat® GRADE goes to the Manual Interlock state, preventing automatic controls operation. When the operator returns to the machine display's Home screen, then Cat® GRADE on the TD5x0 goes to the

Manual state and Autos are available by pressing the auto button on the blade control lever.

## 10.7 Motor grader system limitations

### 10.7.1 Cross slope may not work without base station corrections

On a motor grader with mastless GRADE 3D, when GNSS receivers are not receiving base station corrections, Cross Slope in the machine display may not show values.

To use the Cross Slope system when base station corrections are not available, either: confirm that the latest version of ECM firmware is installed on the machine and upgrade if required, or configure the Cat GRADE system to a 2D mode by selecting 2D as the positioning source in the Machine Setup screen in the Operator App.

### 10.7.2 Enabled E-Fence interferes with calibrations

On some Cat graders, when E-Fence is enabled in the integrated machine display settings, some calibrations performed in the Web Interface will not progress. Disable E-Fence in the integrated machine display settings before performing any calibrations.

## 10.8 Soil compactor system limitations

### 10.8.1 Incorrect value may intermittently display on Frequency text item

If unrealistically high values intermittently display on the Frequency text item, the Dynapac ECM firmware needs updating. Contact your Dynapac dealer.

### 10.8.2 Mapping stops updating in the Operator App when the machine is off design

When machines using either compaction mapping or cut/fill mapping go off design mapping may stop updating. Mapping data is still being recorded, it is just not updated in the workscreen.

To resolve for compaction mapping, try either:

- Exiting to the dashboard and tap the Start button to re-enter the work screen. Map rendering will update.
- Selecting Compaction Mapping in the Job Setup screen. Compaction Mapping mode does not require a design to be loaded.

To resolve for cut/fill mapping, try either:

- Moving the machine closer to the design
- Loading a design that is closer to the machine's current position

### 10.8.3 Compaction Mapping Mode Design surface in Cross Section and Profile View

When Compaction Mapping is the mode selected in the Job Setup screen a “temporary” design surface is created to enable mapping data to display in the plan view. This surface displays some distance below the machine if the user configures a cross section or profile view. Ignore this surface.

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