EZ-Steer Assisted Steering System

TROUBLESHOOTING GUIDE

Version 3.0
Revision A
August 2023

Trimble Agriculture
Easier Farming with Precision

Legal Notices

Agriculture Business Area

Trimble Agriculture Division
10368 Westmoor Drive
Westminster, CO 80021-2712
USA

www.trimble.com

Copyright and Trademarks

© 2023, Trimble Inc. All rights reserved.

Trimble, and the Globe & Triangle logo are trademarks of Trimble Inc, registered in the United States and in other countries.

All other trademarks are the property of their respective owners.

Warranty Exclusions and Disclaimer

These warranties shall be applied only in the event and to the extent that (i) the Products and Software are properly and correctly installed, configured, interfaced, maintained, stored, and operated in accordance with Trimble's relevant operator's manual and specifications, and; (ii) the Products and Software are not modified or misused. The preceding warranties shall not apply to, and Trimble shall not be responsible for defects or performance problems resulting from (i) the combination or utilization of the Product or Software with hardware or software products, information, data, systems, interfaces or devices not made, supplied or specified by Trimble; (ii) the operation of the Product or Software under any specification other than, or in addition to, Trimble's standard specifications for its products; (iii) the unauthorized, installation, modification, or use of the Product or Software; (iv) damage caused by accident, lightning or other electrical discharge, fresh or salt water immersion or spray; or (v) normal wear and tear on consumable parts (e.g., batteries). Trimble does not warrant or guarantee the results obtained through the use of the Product.

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

TRIMBLE INC. IS NOT RESPONSIBLE FOR THE OPERATION OR FAILURE OF OPERATION OF GPS SATELLITES OR THE AVAILABILITY OF GPS SATELLITE SIGNALS.

Limitation of Liability

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

NOTE: THE ABOVE LIMITED WARRANTY PROVISIONS MAY NOT APPLY TO PRODUCTS OR SOFTWARE PURCHASED IN THE EUROPEAN UNION. PLEASE CONTACT YOUR TRIMBLE DEALER FOR APPLICABLE WARRANTY INFORMATION.

Contents

General Problems **1**

Foam Motor Drive Wheel has a Flat Spot 2
Foam Wheel Slips on the Steering Wheel 2
Premature Foam Wheel Deterioration 2
Guidance LEDs are Jumping from Side to Side and Map Display is Jerky 3
CAN Communication Failure 3
Power and Communication Loss 4
Pin 5 Missing in EZ-Steer Motor Cable 5
Missing Templates from Platform Kits 5

EZ-Steer Performance Problems **7**

EZ-Steer System is Hard to Disengage While Manually Turning the Steering Wheel 8
EZ-Steer System Disengages on Large Bumps 8
Difficulty Engaging the EZ-Steer System 9
EZ-Steer Motor Struggles to Turn the Vehicle's Steering Wheel 10
Vehicle is Oscillating About the Line 11
Oscillating Quickly (< 5 sec per oscillation) 11
Oscillating Slowly (>5 sec per oscillation) 13
Vehicle is Off of the Line Greater Than 6 Inches 15
The Vehicle is Slow to get Online 15
The Vehicle Runs Parallel to the Line 17
EZ-Steer System Overshoots the Line and Disengages 18
Bumps in the Field Cause Large Offline Distances 19
Vehicle Overcorrects if a Bump is Hit During Curve Guidance 19
In the Adaptive Curve Pattern, a Minor Inaccuracy Increases During Subsequent Swaths 20
Vehicle is Difficult to Calibrate 21
Lower Bridge Fault 22
VHF Radio Interference with GPS Receivers and T2 Terrain Compensation Technology 23

GPS Problems **26**

On-the-Ground Pass-to-Pass Errors are Greater Than 12 Inches 27
GPS Position Jumps up to Several Feet Soon After Startup 28
Intermittent GPS or WAAS Signals 29
Losing GPS Satellites 29
Electrical Interference 29
GPS Signal Obstruction 30

EZ-Steer Fault Codes **31**

Fault Code 1: Excessive Manual Override 32
Fault Code 2: Hardware Fault 32
Fault Code 3: Controller Reset 32
Fault Code 4: Communication Error 33
Fault Code 5: Bridge Fault 33
Fault Code 7: Broken Motor Cable 34
Fault Code 8: EEPROM Fault 34
Fault Code 9: No Motor Connected 35
Fault Code 10: Unknown Fault 35
Fault Code 11: System Fault 35
Fault Code 12: Temperature Too High 36
Fault Code 13: Over Voltage 36
Fault Code 15 with T2 Technology 36

1

General Problems

- Foam Motor Drive Wheel has a Flat Spot
- Foam Wheel Slips on the Steering Wheel
- Premature Foam Wheel Deterioration
- Guidance LEDs are Jumping from Side to Side and Map Display is Jerky
- CAN Communication Failure
- Power and Communication Loss
- Pin 5 Missing in EZ-Steer Motor Cable
- Missing Templates from Platform Kits

Foam Motor Drive Wheel has a Flat Spot

This may be causing vibration when the EZ-Steer system is operating.

Cause

The motor drive wheel was not locked away from the steering wheel when the vehicle was not in use.

Solution

Lock the motor drive wheel away from the steering wheel when not in use.

NOTE – This sort of flat spot usually disappears after an hour of operation.

Foam Wheel Slips on the Steering Wheel

Cause 1

Grease, oil, or protectant products such as Armor All may cause the foam drive wheel to slip on the steering wheel.

Solution 1

Clean the steering wheel with denatured alcohol to remove grease, oils, and protectant products.

Cause 2

There is not enough pressure between the drive wheel and the steering wheel.

Solution 2

Loosen thumb screws and move the motor closer to the steering wheel to increase pressure and stop slippage.

Premature Foam Wheel Deterioration

A material change in the foam used in EZ-Steer assisted steering system replacement foam wheels (Trimble P/N's 53152-02, 53152-04) resulted in foam wheels deteriorating sooner than intended.



Problem Resolution

The affected part numbers have been removed from the Trimble Store. An updated design of foam wheel with an improved wear life is now available under a new part number:

Kit Description	Affected Part Number	New Part Number
EZ-Steer Foam Wheel 2-Pack	53152-02	128789-02
EZ-Steer Foam Wheel 4-pack	53152-04	128789-04

However, Trimble is also aware that it is common for these wheels to be stocked by resellers in order to provide faster availability to their customers. If you have experienced issues with and/or have concerns about the wear life of EZ-Steer replacement foam wheels (P/N 53152-0x) in your dealer stock, contact Ag Support to RMA them under the warranty process.

Only wheels ordered since 01 January 2021 are eligible for RMA, and proof of destruction will be required.

Guidance LEDs are Jumping from Side to Side and Map Display is Jerky

The *Look Ahead* setting is too high.

Cause

The *Look Ahead* setting is only used for the Headland warning on the EZ-Guide® Plus lightbar. It does not affect EZ-Steer system performance.

Solution

When evaluating EZ-Steer system performance, set the *Look Ahead* time to **zero**.

CAN Communication Failure

Cause

There are three symptoms that may identify the CAN communication failure:

1. The error message *No Heartbeat Found* appears.
2. The AgGPS EZ-Boom® automated application control system status LED remains yellow (CAN bus off).
3. The EZ-Boom system status LED changes from green to red when the *EZ-Steer is Connected* message is acknowledged.

Solution

1. Verify that the cabling is connected properly and is in good condition.
2. Verify that there are no loose or bent pins on the S3 and P3 connectors.
3. Restore defaults on the EZ-Guide lightbar guidance system (not a hard reset).

   To restore defaults on a EZ-Guide 500 or 250 system:

a. From the *Main Guidance* screen, select the wrench icon and then press OK. The *Configuration* screen appears.

b. Select **System / Restore Defaults** and then press OK. The *Restore Defaults* screen appears.

c. Select **Yes** and then press OK. The lightbar automatically restarts.

To restore defaults on an EZ-Guide Plus lightbar guidance system, hold down the **OK** button while powering the unit up and then select **Restore Defaults**.

If the Problem Persists

If these actions do not resolve the issue, the EZ-Steer steering control module (SCM) needs to be serviced. To arrange repair, contact your local service provider.

Include the following in your problem description:

- The SCM serial number
- Description of the issue
- Steps taken to resolve the problem

Power and Communication Loss

Problem

The EZ-Steer assisted steering system appears to have no power and does not communicate. When connected to a power supply, the unit draws current (~200mA) but the LED does not flash.

Any unit within the serial number range 49265XXXX to 51105XXXX may have a short to the SCM daughter board. When it is shorted, the top cover may connect the power supply to the tractor chassis, which otherwise floats with respect to cable connections.

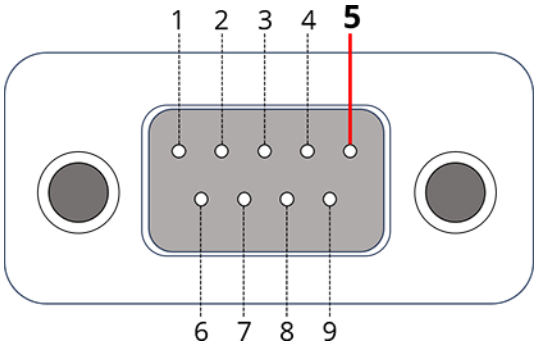
Solution

1. Using a volt meter, touch the negative (black) lead to the ground input pin (power connector or J3).
2. Touch the positive (red) lead to the EZ-Steer case (or the outside connector) as shown below.
3. If this measures more than 0.7 volts, send the unit to your local service provider.



Pin 5 Missing in EZ-Steer Motor Cable

Pin 5 has been reported missing on EZ-Steer motor cable P/N 62257. The position of the missing pin is shown below:



Solution

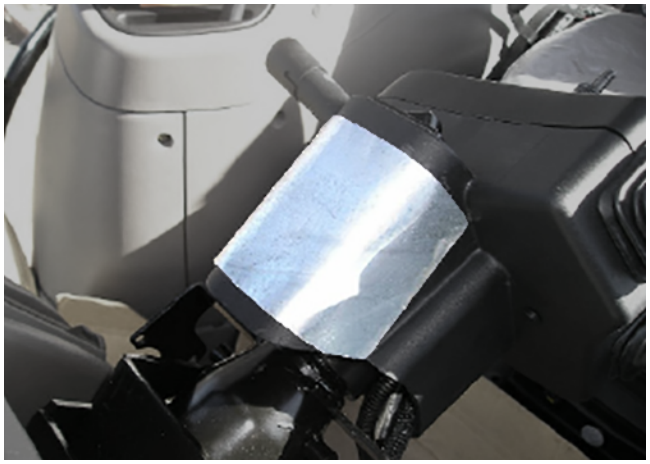
Pin 5 on the EZ-Steer motor cable P/N 62257 is a spare pin and is not used at this time. Missing pin 5 will not affect the performance or operation of the Trimble AgGPS EZ-Steer system.

Missing Templates from Platform Kits

Problem Description

Several EZ-Steer platform kits for CNH MFWD machines (platform kit part number 53059-21) were shipped without the templates necessary to modify the steering column plastic:

Part Number 59383



Part Number 59382



Affected Parts

This issue affects platform kits part number 53059-21 that were shipped after March 22, 2021.

Problem Resolution

If you have a platform kit part number 53059-21 in stock, then examine it to ensure that the templates are included. If they are missing from your kit, then contact Trimble Support (ag_support@trimble.com) to have your kit replaced.

2

EZ-Steer Performance Problems

- EZ-Steer System is Hard to Disengage While Manually Turning the Steering Wheel
- EZ-Steer System Disengages on Large Bumps
- Difficulty Engaging the EZ-Steer System
- EZ-Steer Motor Struggles to Turn the Vehicle's Steering Wheel
- Vehicle is Oscillating About the Line
- Vehicle is Off of the Line Greater Than 6 Inches
- EZ-Steer System Overshoots the Line and Disengages
- Bumps in the Field Cause Large Offline Distances
- Vehicle Overcorrects if a Bump is Hit During Curve Guidance
- In the Adaptive Curve Pattern, a Minor Inaccuracy Increases During Subsequent Swaths
- Vehicle is Difficult to Calibrate
- Lower Bridge Fault
- VHF Radio Interference with GPS Receivers and T2 Terrain Compensation Technology

EZ-Steer System is Hard to Disengage While Manually Turning the Steering Wheel

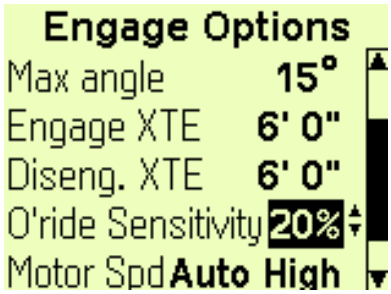
Cause

The Override Sensitivity setting is too low. The EZ-Steer™ system may take one second to detect if you move the steering wheel manually.

Solution

Increase the Override Sensitivity setting:

1. From the *EZ-Steer* menu, select Engage Options.



2. Press OK until the **O'ride Sensitivity** setting is selected.
3. Press ▲ to increase the **O'ride Sensitivity** value.

> **NOTE –** Move up in 5% increments. Try to disengage each time you change the setting to test the effect of the change.

EZ-Steer System Disengages on Large Bumps

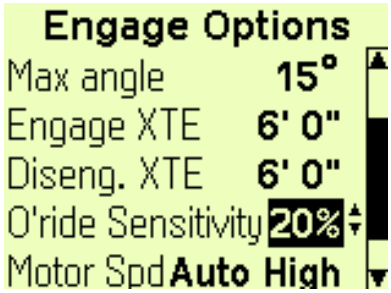
Cause 1

The *Override Sensitivity* setting is too high. The EZ-Steer system is confusing large bumps with the driver manually turning the steering wheel.

Solution 1

Decrease the *Override Sensitivity* setting:

1. From the *EZ-Steer* menu, select **Engage Options**.



2. Press OK until the **O'ride Sensitivity** setting is selected.
3. Press ▼ to decrease the **O'ride Sensitivity** value.

> **NOTE –** Move down in 5% increments. Try to disengage the system each time you change the setting to test the effect of the change.

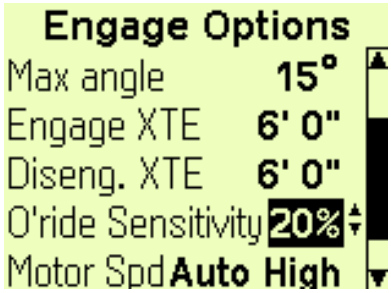
Cause 2

The offline distance limit is too small to accommodate disturbances to the EZ-Steer system caused by rough field conditions.

Solution 2

Increase the *Disengage XTE* setting:

1. From the *EZ-Steer* menu, select **Engage Options**.



2. Press OK until the **Diseng. XTE** setting is selected.
3. Press ▲ to increase the **Diseng. XTE** value.

Difficulty Engaging the EZ-Steer System

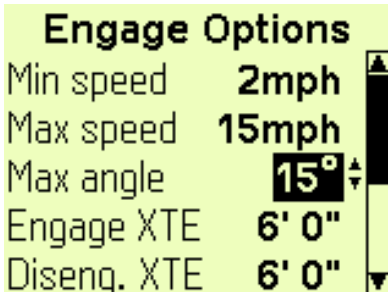
Cause 1

The *Maximum Angle* setting is too narrow, making it difficult to line up the vehicle within the engage angle.

Solution 1

Increase the *Maximum Angle* setting:

1. From the *EZ-Steer* menu, select **Engage Options**.



2. Press OK until the **Max Angle** setting is selected.
3. Press ▲ to increase the **Max Angle** value.

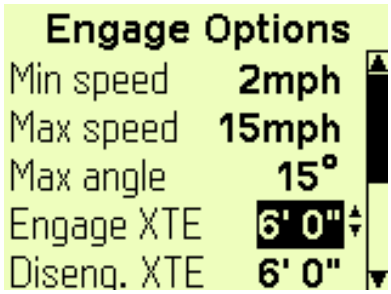
Cause 2

The *Engage XTE* limit is too low, which means the vehicle has to be very close to the line before engaging.

Solution 2

Increase the *Engage XTE* limit:

1. From the *EZ-Steer* menu, select **Engage Options**.



2. Press OK until the **Engage XTE** setting is selected.
3. Press ▲ to increase the **Engage XTE** value.

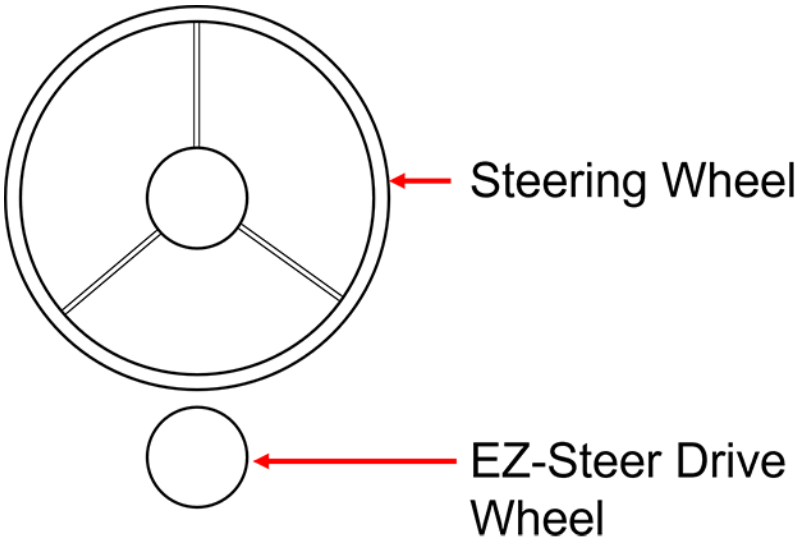
EZ-Steer Motor Struggles to Turn the Vehicle's Steering Wheel

Cause

An excessively worn steering column is binding in its housing inside the steering shaft when the EZ-Steer motor presses against it.

Solution 1

Mount the EZ-Steer drive wheel at 6 o'clock on the steering wheel. The force of the motor mount spring might push the wheel upwards and stop the binding:



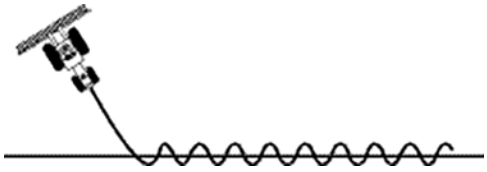
WARNING – Ensure that installing the motor in this location does not hinder emergency access to and from the vehicle.

Solution 2

If Solution 1 does not work, repair or replace the steering shaft.

Vehicle is Oscillating About the Line

Oscillating Quickly (< 5 sec per oscillation)



Cause 1

The antenna is behind the rear axle.

Solution 1

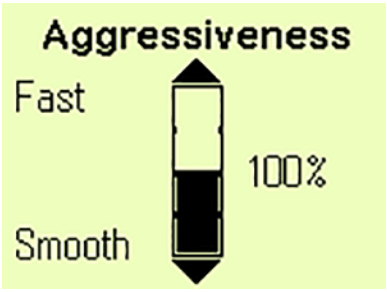
Place the antenna ahead of the rear axle.

Cause 2

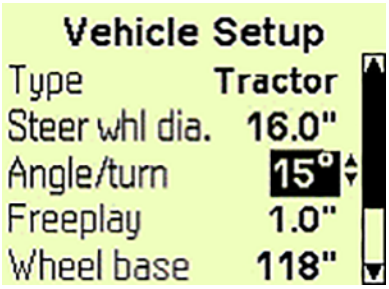
The *Angle/Turn* setting is too low.

Solution 2

1. Reset the *Aggressiveness* setting back to 100%:
   a. From the *EZ-Steer* menu, select **Aggressiveness**.
   b. Press ▲ to ▼ to change the setting to 100%.



2. Increase the *Angle/Turn* value:
   a. From the *EZ-Steer* menu, select **Vehicle Setup**.
   b. Press OK until the **Angle/turn** setting is selected.
   c. Press ▲ to increase the Angle/turn value by **1–5°**.



3. Test performance. If the problem is not solved, go to Cause 3.

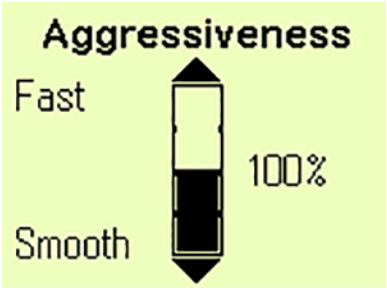
Cause 3

The *Aggressiveness* setting is too high.

Solution 3

Decrease the *Aggressiveness* setting:

1. From the *EZ-Steer* menu, select **Aggressiveness**, or press .



2. Decrease the Aggressiveness setting in increments of **10%** up to a limit of **70%**.

> **NOTE –** If you need to go below 70%, this is an indication that there is an incorrect setting somewhere else in the system. Refer to the *Calibrating and Optimizing Performance* document for guidance on how to re-calibrate your vehicle.

3. Test performance. If problem is not solved, go to Cause 4.

Cause 4

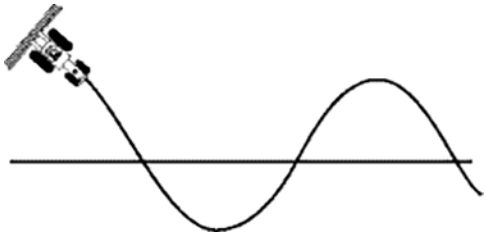
The AgGPS Freeplay™ technology setting is too high.

Solution 4

Check the Freeplay technology setting. For more information, refer to the *Calibrating and Optimizing Performance* document.

Oscillating Slowly (>5 sec per oscillation)

The vehicle is oscillating slowly from one side of the line to the other in broad sweeps:

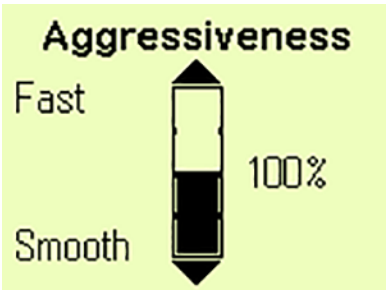


Cause 1

The *Angle/Turn* setting is too high.

Solution 1

1. Reset the Aggressiveness setting back to **100%**:
   a. From the *EZ-Steer* menu, select **Aggressiveness**.
   b. Press ▲ to ▼ to change the setting to 100%.



2. Decrease the *Angle/Turn* value:

   From the *EZ-Steer* menu, select **Vehicle Setup**.

   Press OK until the **Angle/turn** setting is selected.

   Press ▼ to decrease the Angle/turn value by **1–5°**.



NOTE – Only move in 1° increments and test each change.

3. Test performance. If the problem is not solved, go to Cause 2.

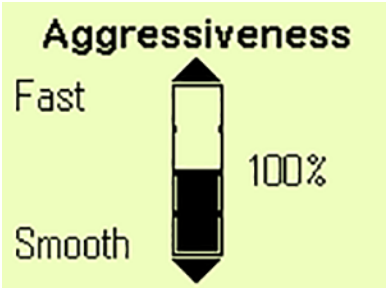
Cause 2

The Aggressiveness setting is too low.

Solution 2

Increase the *Aggressiveness* setting:

1. From the *EZ-Steer* menu, select **Aggressiveness**, or press .



2. Press to increase the **Aggressiveness** setting in increments of **10%** up to a limit of **120%**.
3. Test performance. If the problem is not solved, go to Cause 3.

Cause 3

The Freeplay technology setting is too low.

Solution 3

Check the Freeplay technology setting. For more information, refer to the *EZ-Steer system Calibrating and Optimizing Performance* document.

Vehicle is Off of the Line Greater Than 6 Inches

> **NOTE –** If the vehicle is off of the line by ***less*** than 6 inches, where the lightbar shows the vehicle is on the line but ground errors are visible, then GPS errors are most likely. See GPS Problems.

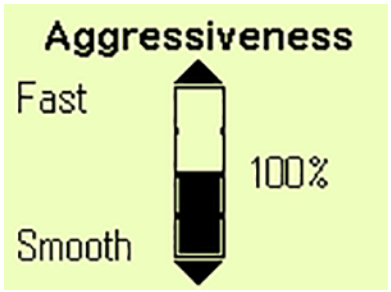
The Vehicle is Slow to get Online

Cause 1

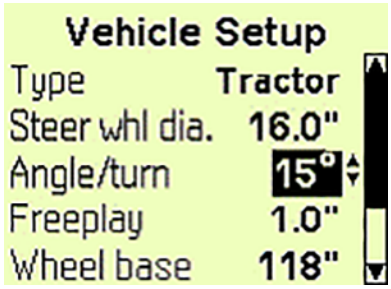
The *Angle/turn* value is too high.

Solution 1

1. Reset Aggressiveness back to 100%:
   a. From the *EZ-Steer* menu, select **Aggressiveness**.
   b. Press to to change the setting to 100%.



2. Decrease the *Angle/turn* value:
   a. From the *EZ-Steer* menu, select **Vehicle Setup**.
   b. Press OK until the **Angle/turn** setting is selected.
   c. Press ▼ to decrease the Angle/turn value by **1–5°**.



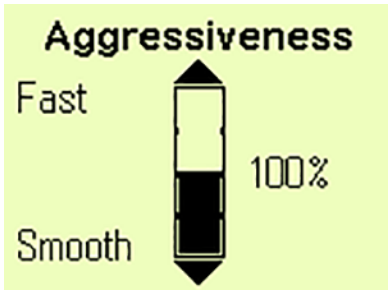
3. Test performance. If the problem is not solved, go to Cause 2.

Cause 2

The *Aggressiveness* setting is too low.

Solution 2

1. Increase the Aggressiveness setting:
2. From the *EZ-Steer* menu, select **Aggressiveness** or press .
3. Press ▲ to increase the Aggressiveness in increments of **10%** up to a limit of **120%**.



4. Test performance. If the problem is not solved, go to Cause 3.

Cause 3

The Freeplay technology setting is too low.

Solution 3

Check the Freeplay technology setting. For more information, refer to the *Calibrating and Optimizing Performance* Support Note.

The Vehicle Runs Parallel to the Line

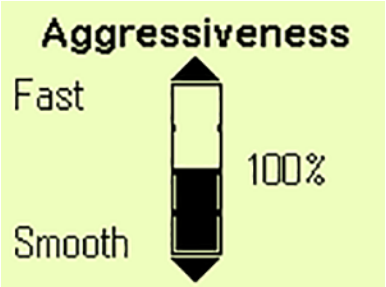
Cause 1

The *Aggressiveness* setting is too low.

Solution 1

Increase the Aggressiveness setting:

1. From the *EZ-Steer* menu, select **Aggressiveness** or press .
2. Press to increase the Aggressiveness setting in increments of **10%** up to a limit of **130%**.



Cause 2

The vehicle has greater Freeplay in one direction than the other.

Solution 2

To adjust the Freeplay for individual directions:

1. Go to *Lightbar/Tests*. The *Tests* screen appears.
2. If the vehicle is offline:

Direction Offline	Action
To the right	Select **Freeplay Left** and then increase the Freeplay Left value in 0.2 cm (0.1 inch) increments.
	Select **Freeplay Right** and then decrease the Freeplay Right value by the same amount.
To the left	Select **Freeplay Right** and then increase the Freeplay Right value in 0.2 cm (0.1 inch) increments.

Direction Offline	Action
	Select **Freeplay Left** and then decrease the Freeplay Left value by the same amount.

3. Test the new setting and then adjust the Freeplay again if necessary. Repeat the process until the vehicle makes only small deviations (+/- 4–8 inches) either side of the guidance line.

EZ-Steer System Overshoots the Line and Disengages

Not long after engaging, the vehicle goes across the line and disengages because it has passed the disengage limit.

Cause 1

The vehicle is approaching the line at too steep an angle.

Solution 1

Move the vehicle closer to the line with a shallower angle before engaging.

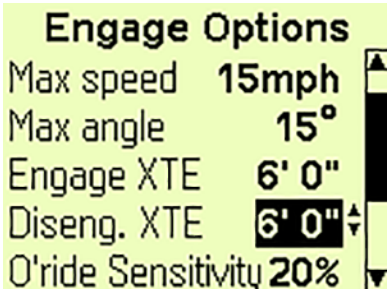
Cause 2

The engage limits are too narrow to allow the vehicle to maneuver onto the line.

Solution 2

Increase the *Max Angle* and *Disengage XTE* settings:

1. From the *EZ-Steer* menu, select **Engage Options**.
2. Press OK to select the **Max angle** field.
3. Press ▲ to increase the **Max angle** value.
4. Press OK to select the *Diseng. XTE* field.
5. Press ▲ to increase the *Diseng. XTE* value.



Bumps in the Field Cause Large Offline Distances

In rough field conditions, too much steering wheel movement is causing the vehicle to move offline.

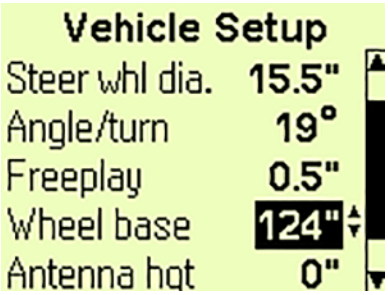
Cause 1

Bumps in the field are causing the cab to roll. The EZ-Steer system is over-compensating for this motion.

Solution 1

Increase the *Angle/Turn* value:

1. From the *EZ-Steer* menu, select **Vehicle Setup**.
2. Press OK until the **Angle/turn** setting is selected.
3. Press ▲ to increase the Angle/turn value by **1–5°**.



Cause 2

The vehicle is rolling significantly when it hits a bump. This is especially common on tall narrow vehicles and vehicles with single rear tires.

Solution 2

Move the antenna from the vehicle cab to the nose of the vehicle. Then recalibrate the system.

> **CAUTION –** Always ensure that the antenna is on a flat surface. If the nose of the vehicle has a slope of more than five degrees, it is inappropriate.

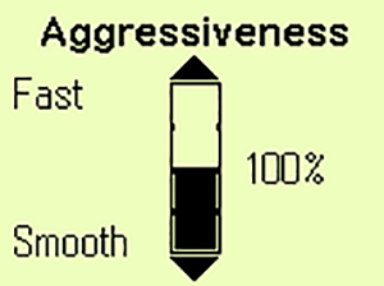
Vehicle Overcorrects if a Bump is Hit During Curve Guidance

Cause

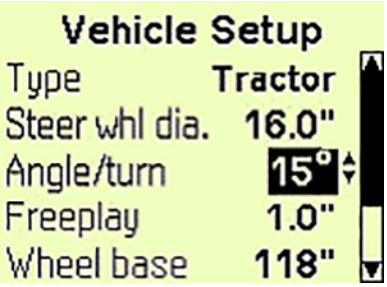
The *Angle/turn* setting is too low.

Solution

1. Reset the Aggressiveness setting back to **100%**:
   a. From the *EZ-Steer* menu, select **Aggressiveness**.
   b. Press ▲ or ▼ to change the setting to **100%**.



2. Increase the *Angle/turn* value by **1-5°**:
   a. From the *EZ-Steer* menu, select **Vehicle Setup**.
   b. Press OK until the **Angle/turn** field is selected.
   c. Press ▲ to increase the **Angle/turn** value.
   d. Test each change to evaluate performance. Repeat this process until performance is satisfactory.



3. Fine tune the Aggressiveness setting.

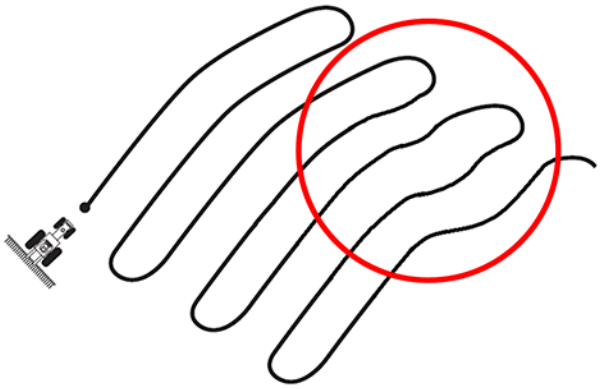
In the Adaptive Curve Pattern, a Minor Inaccuracy Increases During Subsequent Swaths

Cause

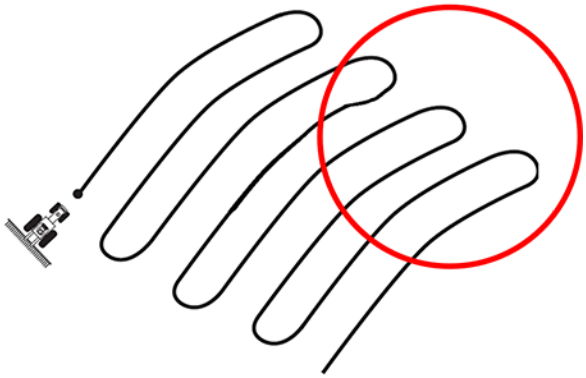
If you use the Adaptive curve pattern, any minor inaccuracies in the early swaths increase in later swaths.

Solution

Use the **Identical curve** pattern instead. It does not emulate the previous line.



Adaptive Curve



Identical Curve

Vehicle is Difficult to Calibrate

Cause 1

Worn steering components reduce steering efficiency.

Solution 1

Check your vehicle for worn components and replace them if required. For more information, refer to the *Vehicle Inspection* Support Note.

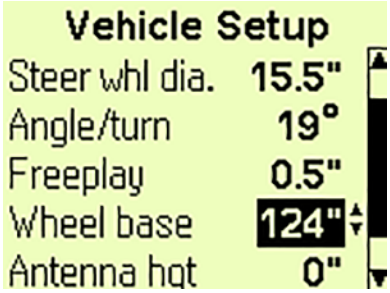
Cause 2

In some cases the dynamics of the vehicle affect the way the EZ-Steer system operates. For example, tracked tractors, sprayers, and 4WD tractors steer in very different ways to manual front wheel assist tractors.

Solution 2a

Reduce the wheelbase setting:

1. From the *EZ-Steer* menu, select **Vehicle Setup**.
2. Press OK until the **Wheel base** field is selected.
3. Press ▼ to decrease the **Wheel base** value in increments of **20** inches until performance improves.



Solution 2b

Move the antenna from the rear axle to either the front of the cab or over the nose of the vehicle. Then recalibrate the EZ-Steer system.

> **CAUTION –** Always ensure that the antenna is on a flat surface. If the nose of the vehicle has a slope of more than five degrees, it is inappropriate.

Cause 3

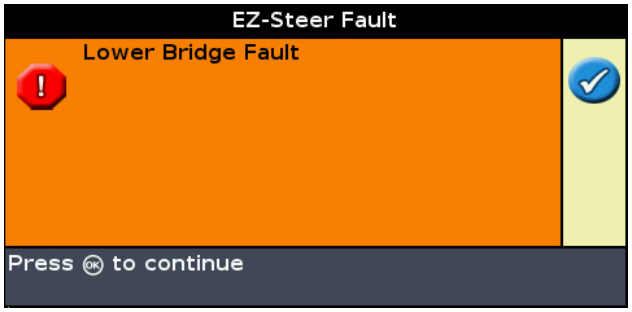
The antenna is mounted behind the rear axle.

Solution 3

Move the antenna to the front of the cab. If you are unable to do this, ensure that the antenna is ahead of the rear axle.

Lower Bridge Fault

Some EZ-Steer assisted steering systems and EZ-Steer 500 systems report a *Lower Bridge Fault* error and then show a recurring manual disengage condition and/or manually disengage:



When the EZ-Steer system is engaged, but then unexpectedly disengages and shows a *Manual Override* message and/or the *Lower Bridge Fault* warning screen, there may be a fault with the EZ-Steer system.

The condition may be so sensitive that the EZ-Steer system disengages as soon as you engage it, so the system does not operate at all. The *Lower Bridge Fault* warning screen may or may not appear.

Solution

If your EZ-Steer system experiences these symptoms, do the following:

1. Verify that the vehicle is approved for use with the EZ-Steer system.
2. Verify that the vehicle's steering is properly maintained and in correct working order. If there is too much resistance when you turn the steering wheel, the EZ-Steer system may not be able to operate until the vehicle's steering is repaired.
3. Adjust the EZ-Steer system's *Override Sensitivity* setting. If you experience manual disengage faults during normal operation, try reducing the *Override Sensitivity* value until the manual disengage occurrences are

eliminated.

> **NOTE –** Lowering the *Override Sensitivity* value too far can make it difficult to disengage the EZ-Steer system when you take manual control of the steering wheel at the end of rows. Be prepared to disengage the system using either the engage/disengage buttons on the display or the optional footswitch.

If these actions do not resolve the condition, the EZ-Steer Steering Control Module (SCM) needs to be serviced. Contact your local service provider to arrange for repair. Include the following in your problem description:

- The SCM serial number
- The words “lower bridge fault”

VHF Radio Interference with GPS Receivers and T2 Terrain Compensation Technology

Issue

VHF two-way radios that transmit with a frequency between 150 and 160 MHz may interfere with:

- Any GPS receiver.
- The T2 terrain compensation technology of the EZ-Steer assisted steering system.

VHF radio interference can affect all brands of GPS receivers, whether you are using no corrections, WAAS/EGNOS, OmniSTAR VBS/HP/XP, or RTK corrections.

Symptoms

The following symptoms may occur when radio interference is present:

- A vehicle may drive significantly offline when you transmit on a VHF radio.
- Radio interference may cause errors in the T2 terrain compensation technology roll and yaw outputs and cause the vehicle to drive significantly offline.
- The GPS receiver may track fewer satellites. This reduces accuracy and may cause one of the following warnings to be displayed on the screen of the EZ-Guide® Plus lightbar guidance system:
  - Few Sats
  - High DOP
  - No Corrections

  If one of these warnings appears on the EZ-Guide Plus lightbar screen while you are transmitting on a VHF radio:

1. Stop transmitting from the radio.
2. Select **GPS / Diagnostics**.
3. Begin transmitting data with the VHF radio. Check the number of satellites and the WAAS/EGNOS SNR for changes while you are transmitting.

GPS Interference Confirmation

If the number of GPS satellites drops by 1 or more, or the WAAS/EGNOS SNR drops by 3dB or more when you transmit on the VHF radio, try the solutions below until the problem is solved.

T2 Technology Interference Confirmation

1. On the lightbar, select **Lightbar / Status Text**.
2. Press  until **Status Screen** appears.
3. Change three of the fields to display:
   - Roll [angle]
   - Roll Rate
   - Yaw Rate

   TIP – For the next step, try to remain still so the vehicle does not rock.
4. While the vehicle is stationary with the engine turned off, press the transmit button on your radio and check if the *Roll, Roll Rate,* or *Yaw Rate* values change by more than **0.3** degrees.

   If the T2 outputs do change by more than 0.3 degrees, try the following solutions until the changes reduce to **0.3** degrees or less when transmitting.

Solutions

You can eliminate most radio interference problems by making the following simple changes:

- Move the two-way radio antenna at least 1.2 meters (4 feet) away from the GPS antenna and the T2 controller.
- Ensure that your two-way radio antenna cable is grounded to the chassis of the vehicle.
- Separate the two-way radio antenna cable from the GPS antenna cable and the EZ-Steer power and motor cables.
- Remove any loops from the GPS antenna cable and the EZ-Steer power and motor cables.

  Cable loops that are approx 0.5 meters (1.5 feet) in diameter can act like a radio antenna and amplify radio interference. Straightening the GPS antenna cable and EZ-Steer controller cables can significantly reduce interference. If you have a lot of spare cable, route the cable around the driver's seat to eliminate any slack.

- If the T2 controller is mounted vertically, change to horizontal mounting. Remember to select **Terrain Comp. / Orientation** and then change the **Towards** option.
- Select **Terrain Comp. / Filter** and then select **Roll Only**. This can significantly reduce the effect of radio interference on T2 terrain compensation technology.

Further Assistance

If you make all the above changes to the two-way radio antenna and cables and you find that the vehicle still drifts offline or exhibits any of the symptoms described above when you transmit on a VHF radio, contact your reseller.

3

GPS Problems

- On-the-Ground Pass-to-Pass Errors are Greater Than 12 Inches
- GPS Position Jumps up to Several Feet Soon After Startup
- Intermittent GPS or WAAS Signals
- Losing GPS Satellites

On-the-Ground Pass-to-Pass Errors are Greater Than 12 Inches

Cause 1

The GPS position is drifting more than 12 inches over two passes.

Solution 1

Increase the OnPath® advanced filter technology decay time:

1. From the *GPS* menu, select **Filter**.



2. Press OK until the **Decay Time** field is selected.
3. Press ▲ to increase the **Decay Time** value:
   - If there are no trees near your field, select **999** minutes.
   - If there are trees nearby, select **30** minutes.

NOTES –

- The receiver specification shows accuracy should be 15-30 cm (6-12 inches) 95% of the time in the American Midwest.
- If you are not using GPS corrections, the accuracy specification is 15-46 cm (6-18 inches) in open fields with a decay time setting of greater than 30 minutes.

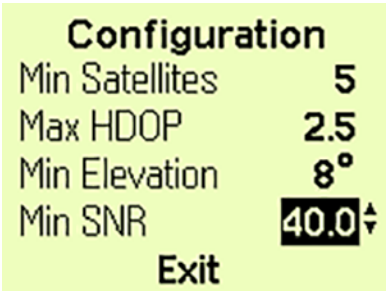
Cause 2

The GPS antenna is on the nose of the vehicle which is causing GPS signal blockage.

Solution 2

Go to *GPS/Configuration*, and increase the *Min SNR* setting:

1. From the *GPS menu*, select **Configuration**.



2. Press OK until the **Min SNR** field is selected.
3. Press ▲ to increase the **Min SNR** value.

TIP – Try raising the Min SNR value to 42. If this does not fix the issue, set the Min SNR value to 45. Do not use a setting higher than this.

NOTE – Altering this setting may affect the overall number of satellites you are able to track. If you are not getting a GPS position, you may have to drop the setting back to its default value of 40.

Cause 3

The antenna is not level, which may cause GPS signal errors in some directions.

Solution 3

Ensure that the antenna is mounted within 5 degrees of horizontal.

GPS Position Jumps up to Several Feet Soon After Startup

Cause

To achieve optimal accuracy with WAAS corrections, the WAAS ionosphere model must be downloaded to the receiver, which can take up to 10 minutes. When the download is complete, the GPS position updates, which can lead to a position jump of up to several feet.

Solution

Wait 10 minutes after getting your first DGPS position before you start using guidance or autosteering.

Intermittent GPS or WAAS Signals

The receiver intermittently loses WAAS corrections or GPS positions or only ever tracks seven satellites or less.

Cause 1

The vehicle cab, exhaust stack, or loader arms are blocking part of the view of the sky from the GPS antenna.

Solution 1

Mount the antenna at least 3 ft away from any obstruction or source of potential interference. Remove any obstruction from near the antenna that may be blocking GPS signals.

> **NOTE –** If you must move the antenna, recalibrate your vehicle for optimum EZ-Steer system performance.

Cause 2

The receiver is affected by electrical interference.

Solution 2

See Electrical Interference.

Losing GPS Satellites

Electrical Interference

EZ-Guide Plus loses satellites when electrical devices are used in the cab.

Cause

Some electrical devices (such as 2 way radios, DVD players, and other GPS antennas) interfere with GPS signals. If the device emits interference the GPS signal may be jammed. Certain types of two way radios and other transmitting devices can cause this problem.

Solution

If you permanently lose all satellites or only ever get a maximum of seven satellites on a regular basis, switch off all electrical devices in the cab one by one until you isolate the device that causes the issue. If this does not work, move the antenna to the nose of the vehicle to avoid interference.

> **NOTE –** If you move the antenna, recalibrate the EZ-Steer system.

GPS Signal Obstruction

The vehicle moves *Offline* when driving past trees.

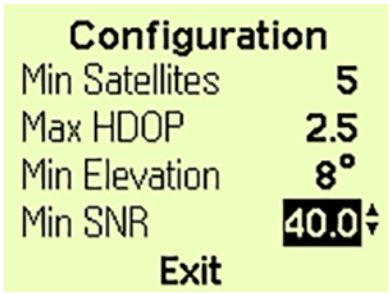
Cause

Trees can interfere with the GPS signal. If a tree is partially blocking a satellite it can cause the GPS position to shift.

Solution

Go to GPS/Configuration, and increase the Min SNR setting.

1. From the *GPS* menu, select **Configuration**.



2. Press OK until the **Min SNR** field is selected.
3. Press ▲ to increase the **Min SNR** value.

TIP – Try raising the Min SNR value to **42**. If this does not fix the issue, set the Min SNR value to **45**. Do not use a setting higher than this.

NOTE – Altering this setting may affect the overall number of satellites you are able to track. If you are not getting a GPS position, you may have to drop the setting back to its default value of **40**.

4

EZ-Steer Fault Codes

- Fault Code 1: Excessive Manual Override
- Fault Code 2: Hardware Fault
- Fault Code 3: Controller Reset
- Fault Code 4: Communication Error
- Fault Code 5: Bridge Fault
- Fault Code 7: Broken Motor Cable
- Fault Code 8: EEPROM Fault
- Fault Code 9: No Motor Connected
- Fault Code 10: Unknown Fault
- Fault Code 11: System Fault
- Fault Code 12: Temperature Too High
- Fault Code 13: Over Voltage
- Fault Code 15 with T2 Technology

The products that use these codes include:

> EZ-Steer assisted steering system
> EZ-Guide Plus lightbar
> EZ-Guide 500 lightbar
> EZ-Guide 250 lightbar

Fault Code 1: Excessive Manual Override

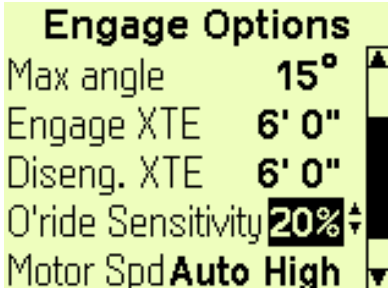
Cause

There have been a large number of manual overrides on one swath.

Solution

Lower the manual override sensitivity:

1. From the *EZ-Steer* menu, select **Engage Options**:



2. Press OK to select the *O'ride Sensitivity field.*
3. Press ▼ to decrease the *O'ride Sensitivity* value.

Fault Code 2: Hardware Fault

Cause

There has been a general hardware fault.

Solution

Check all equipment and cables for damage.

Fault Code 3: Controller Reset

Cause 1

There was a power brown out (a momentary loss of power).

Solution 1a

Ensure that none of the power cables are damaged and check that the connectors are tight.

Solution 1b

If Solution 1a does not work, connect the power directly to the battery.

Cause 2

The EZ-Steer system controller has reset unexpectedly.

Solution 2

1. Download the error log:
   a. Connect the EZ-Steer system controller to your office computer or laptop.
   b. Use the EZ-Toolbox™ software to download the error log.

   For more information, refer to the EZ-Toolbox User Guide.
2. Send the error log to your local reseller.

Fault Code 4: Communication Error

Cause

There was a communication error between the EZ-Steer system controller and the EZ-Guide Plus lightbar guidance system; the controller failed to receive CAN messages from the lightbar.

Solution

1. Check that the cable connection is secure.
2. Check that the cable is not damaged.

Fault Code 5: Bridge Fault

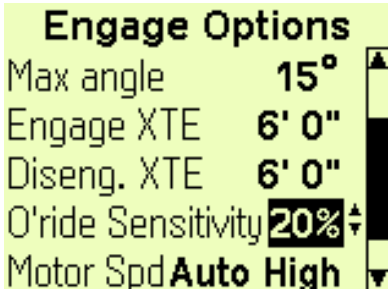
Cause 1

The manual override sensitivity is too low.

Solution 1

Increase the manual override sensitivity:

1. From the *EZ-Steer* menu, select **Engage Options**.



2. Press OK to select the *O'ride Sensitivity* field.
3. Press ▲ to increase the *O'ride Sensitivity* value.

Cause 2

You have a faulty controller.

Solution 2

Contact your local EZ-Steer system reseller for a repair or replacement.

Fault Code 7: Broken Motor Cable

Cause

The motor cable is broken.

Solution

Contact your local reseller for a replacement motor cable.

Fault Code 8: EEPROM Fault

Cause

There was a memory error in the EZ-Steer system controller.

Solution

1. Download the error log:
   a. Connect the EZ-Steer system controller to your office computer or laptop.
   b. Use the EZ-Toolbox software to download the error log.

   For more information, refer to the EZ-Toolbox User Guide.
2. Send the error log to your local reseller.

Fault Code 9: No Motor Connected

Cause

The motor, or motor cable is not connected to the EZ-Steer system controller.

Solution

1. Check that the motor cable is connected to the EZ-Steer system motor.
2. Check that the motor cable is connected to the EZ-Steer system controller.
3. Check that all cable connections are secure, and that the cables are not damaged.

Fault Code 10: Unknown Fault

Cause

There was an unknown fault in the EZ-Steer system.

Solution

1. Download the error log:
   a. Connect the EZ-Steer system controller to your office computer or laptop.
   b. Use the EZ-Toolbox software to download the error log.

   For more information, refer to the EZ-Toolbox User Guide.
2. Send the error log to your local reseller.

Fault Code 11: System Fault

Cause

The lightbar failed to receive messages from the controller.

Solution 1

Make sure that none of the cables are damaged, and check that the connectors are tight.

Solution 2

1. If Solution 1 does not work, download the error log:
   a. Connect the EZ-Steer system controller to your office computer or laptop.
   b. Use the EZ-Toolbox software to download the error log.

   For more information, refer to the EZ-Toolbox Software User Guide.
2. Send the error log to your reseller.

Fault Code 12: Temperature Too High

Cause

The controller temperature has exceeded the maximum operating temperature (140 °F).

Solution

1. Move the controller out of direct sunlight.
2. Ensure the controller is well ventilated.

Fault Code 13: Over Voltage

Cause

The controller received power input over 15.5V.

Solution

Ensure that you only connect the EZ-Steer system to a 12 V power supply.

Fault Code 15 with T2 Technology

EZ-Steer™ system with T2® terrain compensation technology users may occasionally see a Fault 15 error displayed on the EZ-Guide® Plus lightbar.

There are several possible causes/solutions to this problem:

Cause	Solution
EZ-Steer controller has older version of firmware.	1. Check the firmware version on the EZ-Steer controller (Select Config Menu>EZ-Steer>Diagnostics:EZ-Steer Ver) 2. Make sure it is version 3.01 or later.
Cranking the vehicle engine while EZ-Steer system with T2 technology is powered on.	Power down EZ-Steer system with T2 technology before starting the vehicle engine.
Corroded or lose connectors, or long/narrow wires may result in occasional power drops to the EZ-Steer system.	1. Wire the EZ-Steer system power cable direct to the vehicle battery. 2. You may want to install a switch into the EZ-Steer system power cable so you can still turn EZ-Steer system off when the vehicle is not in use.

Cause	Solution
	3. Ensure the power supply is continuous 7 amps, 12-15.5 VDC.
The foam wheel slips on the vehicles steering wheel	1. Increase tension on the EZ-Steer motor mount by sliding the motor mount closer to the steering wheel. 2. If the steering wheel is very slippery then put a steering wheel cover on it, or wrap the steering wheel in athletic tape (e.g. Tennis racquet handle tape).
EZ-Steer controller not mounted correctly and properly	1. Ensure the EZ-Steer controller is bolted down solidly to the vehicle. 2. Ensure the EZ-Steer controller is not mounted on a side wall, and that it is not mounted upside down. 3. Ensure there is no vibration.

NOTE – If you still get Fault 15 after implementing all the above solutions then contact Trimble Agriculture Support with the Error Log from the EZ-Guide Plus lightbar. Advise what the customer was doing when the Error appeared.

Trimble Agriculture

Easier Farming with Precision