Auto Guidance Calibration

AGRICULTURE

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TRIMBLE RESELLER CONFIDENTIAL

Auto Guidance Calibration

Note: This feature is optional and requires a license. See App Central: Installing Licenses from a USB Drive.

The calibration process for auto guidance records additional details about your vehicle, which helps the system to steer the vehicle more accurately. For high accuracy applications, you must have all the correct calibrations.

Notes:

- CAT Challenger vehicles (Autopilot™ hydraulic installation) **OR** John Deere Tracked vehicles (SIU-200 Interface box installation) cannot be calibrated with the Precision-IQ application. Autopilot Toolbox software application must be used. Contact Trimble Agriculture Support.
- Calibration is only complete when all calibrations on the screen show results instead of Incomplete. Prior to performing calibrations ensure you completed the steps to Controller Setup.

1. Remove any implement and excessive front ballast from the vehicle. Drive the vehicle to an open area free of obstacles in which the vehicle can make long passes (400m/0.25 mile).
2. On the Home screen, tap the **Vehicle** tile to display the Vehicle screen.
3. From the list of available vehicles, tap the name of the vehicle you want to edit.
4. Tap the **Calibrate** button. The display shows ***only*** the calibrations required for the vehicle you have selected.
5. Perform each of the CALIBRATION selections presented. Follow the on-screen instructions when applicable. More detailed information on each calibration follows.

   Note: The CALIBRATION section lists only the routines required for the selected vehicle and auto guidance steering system.

6. When you are finished, tap the **Save** icon to store the calibration values.

Auto Guidance Calibration Routines

Note: Not all calibration items listed below will be available for your machine.

Calibration	Description
Manual Override Sensitivity *For vehicles that use a pressure transducer for the manual override.*	Adjusts how much steering wheel rotation is required to disengage Autopilot. **Note:** The system detects whether the vehicle configuration includes this type of sensor. This option only appears if required.
Enable Auto Cal	Recommended to turn ON this feature.
Auto Cal	Automated calibration of Angle-per-Turn, Dead Zone, Steering Servo Response, Sensor Estimation and Steering CL Servo. Executed calibration routines are dependent upon vehicle and autosteer system type selected.
Steering Sensor *For vehicles that use a rotary potentiometer for measuring steering angle.*	Converts the voltage output of the rotary potentiometer sensor into an equivalent steering angle measurement **Note:** The system detects whether the vehicle configuration includes this type of sensor. This option only appears if required. Depending on the Guidance system installed for slow speed application, a potentiometer may need to be installed. If so, then the TAP setting will need to be adjusted.
Automated Steering Deadzone (Manual Calibration)	For measuring the vehicle's steering dead zones. Determines the minimum valve command required for steering movement.
Steering Proportional Gain (Manual Calibration)	Sets the proportional gain(P-gain) to control steering overshoot and responsiveness.
Roll Correction	Compensates for minor variations in the placement of the navigation controller and vehicle tilt.
Line Acquisition	Controls how fast the guidance system attempts to steer the vehicle onto the current guidance line (50% - 150%). Two modes: **Classic** and **OnSwath**.

Manual Override Sensitivity

This section applies to an Autopilot (hydraulic steering) installation.

WARNING!

Incorrect adjustment of Manual Override Sensitivity could cause this critical safety feature to fail, resulting in personal injury or damage to the vehicle. Do not choose a setting that is either too sensitive or not sensitive enough. It is vital to avoid setting the sensitivity so low that the system will not detect any steering wheel motion.

Note: This control is for vehicle platforms that use a pressure transducer for manual override.

Disengage the Autopilot system by manually rotating the steering wheel. This motion creates a hydraulic pressure increase that can be measured.

Manual Override Sensitivity sets the level that the sensor voltage change must reach before the guidance system disengages. The voltage must also drop below that level before Autopilot can be re-engaged again.

Tip: Manual override calibration must be completed with the machine's hydraulic oil at normal operating temperature.

A high level of sensitivity results in very small steering wheel rotation to induce a disengage. A low level of sensitivity results in large steering wheel rotation to induce a disengage.

1. At the Vehicle setup panel, select the vehicle you want to work with. Tap the **Calibrate** button.
2. On the Guidance Calibration screen, tap **Manual Override Sensitivity**.
3. Manually rotate the vehicle's steering wheel. If the set voltage threshold is exceeded, the steering wheel icon will change color.

4. If the disengage response is acceptable, then tap the green check mark.

5. If the response is ***not*** acceptable, and:
    a. The system disengages too easily (barely touching the steering wheel), then move the slider bar to the right to increase the value and decrease the sensitivity.
    b. The system requires too much steering wheel rotation, then move the slider bar to the left to decrease the value and increase the sensitivity.

    Note: The default setting provides a balance between rapid activation of the override function and rejection of steering wheel motion due to accidental contact (for example, due to travel in a rough field).

    Tip: Evaluate Manual Override Sensitivity under conditions which may affect the pressure of the hydraulic system. For example, turn on the auxiliary hydraulics while you evaluate the sensitivity.

    c. Repeat steps 4 and 5 until the disengage response is acceptable.
6. Tap the red "x" button to exit without saving. The display returns to the CALIBRATION section where you can perform another calibration or exit.
7. Tap the **Save** icon to store the new setting.

Enable Auto Cal

It is recommended to turn ON this feature.

1. On the Home screen, tap the **Vehicle** icon to display the Vehicle screen.
2. From the list of available vehicles, tap the name of the vehicle you want to edit. Then tap the **Calibrate** button.
3. On the Guidance Calibration screen, tap **Enable Auto Cal**.
4. Move the **Enable Auto Cal** slider to the right and tap the green check mark.
5. Tap the **Save** icon to store the new setting.

Auto Cal

Tip: The machine's hydraulic fluid must be at normal operating temperature.

Follow the steps below for instructions on how to use Auto Cal:

1. On the Home screen, tap the **Vehicle** tile to display the Vehicle screen.
2. From the list of available vehicles, tap the name of the vehicle you want to edit. Then tap the **Calibrate** button.
3. On the Guidance Calibration screen, tap **Auto Cal**. Read the instructions and tap **OK**.
4. Auto Cal will then run through the automated process as long as the GNSS quality and forward speed (along with two predetermined speeds) are sufficient.

Example

Tip: Use maximum engine speed, **2.2-3** kph (**1.4-1.8** mph) works well. Do not attempt running Auto Cal in mud, rain, snow, or frost. Must be dry field conditions only. Firm and smooth soil conditions result in the best calibration values. Please monitor the target speed through the calibration process as this can change.

CAUTION!

While Running the Calibration the required speed will change. It is vital that the operator adjusts the tractor speed as requested from the User interface.

The hydraulic fluid must be at normal operating temperature. Cold oil will yield incorrect calibration values and degraded auto steer accuracy.

5. Once complete, the results will be shown. Tap the green check mark to save the calibration values.
6. Tap the **Save** icon to store the new setting.
7. On the Precision-IQ Home screen, tap the **Run** button, create an AB line, engage auto steer, and test steering performance accuracy.

Auto Cal Error Messages

Manual Override Detected

Manual override was detected before the calibration cycle could be completed. Restart the calibration and do not rotate the steering wheel.

No GPS

The GNSS position quality is not ready. In the activity bar, tap the **Diagnostics** icon.

Look at GNSS RECEIVER, tap **Performance**. RTX status must be **Converged**, RTK status must be **Fixed**, and SBAS status must be **DGPS** before calibration can be started.

No Direction

Direction estimator is not initialized. Drive forward, then stop and retry the calibration.

OR

NavController orientation is wrong. Recheck mounting angles and verify the values are correct in the display.

Moving Too Slow

Increase vehicle speed. **2.3-4** kph (**1.5-2.5** mph), which is indicated on the display, works well when running Auto Cal.

Direction Unknown

Nav controller's direction estimator has not initialized:

1. Exit Auto Cal.
2. From the Home screen, tap **Run**.
3. Enable auto guidance and drive forward until the steering wheel icon color is yellow.
4. Go back to vehicle calibration and restart Auto Cal.

OR

Steering sensor is disconnected:

1. Check cabling.
2. Clear the nav controller fault.
3. Drive forward for 10 seconds and start Auto Cal again.

OR

Wrong steering sensor type selected:

1. Clear the nav controller fault.
2. Drive forward for 10 seconds and start Auto Cal again.
3. Check sensor setup in display.

OR

Nav controller orientation is incorrect:

1. Recheck mounting angles.
2. Verify the values are correct in the display.

Auto Cal completed, but some calibration steps experienced issues and did not finish correctly

Drive the machine forward and start Auto Cal again. If the problem happens repeatedly, then reboot the display.

Disengage detected

Center the machine's steering, drive forward for 10 seconds, and restart Auto Cal.

Timeout

A calibration routine did not complete within an expected period of time. Center the machine's steering, drive forward, and tap Start over.

Steering Sensor

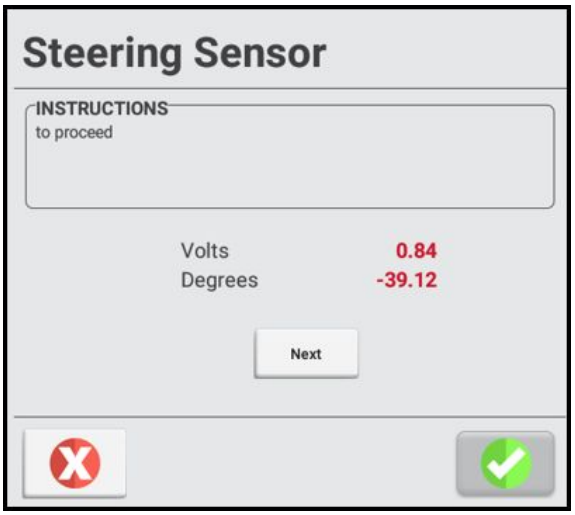
This section applies to an Autopilot (hydraulic steering) installation.

Steering sensor calibration converts the voltage output of the rotary potentiometer sensor into an equivalent steering angle measurement. The calibration process maps the values for a full left turn, a full right turn, and center steering.

Notes:

- Steering sensor calibration is only for platforms with a rotary potentiometer installed. If the angle sensor is an AutoSense device, or if Auto Cal is enabled, this calibration is not available.
- Complete this calibration before you attempt the Automated Steering Deadzone (Manual Calibration) or Roll Correction.

1. Drive the vehicle to a field with a hard, level surface without obstructions.
2. On the Home screen, tap the **Vehicle** tile to display the Vehicle screen. Select the vehicle you want to work with, then tap the **Calibrate** button.
3. On the Guidance Calibration screen, tap **Steering Sensor**.
4. Read the onscreen instructions and tap **Next** in the center of the window:



5. Steer straight ahead and drive forward slowly. Maintain a tractor speed above **1.6 kph** (**1 mph**). Tap **Next**.
6. Turn the steering wheel all the way to the left and continue moving forward. While the steering wheel is at the full left position, tap **Next**.
7. Turn the steering wheel all the way to the right. While the steering wheel is at the full right position, tap **Next**.
8. Rotate steering to straight ahead and drive forward.
9. With wheels straight, tap **Next**.
10. Do a quick diagnostic test. Rotate the steering wheel to full left, full right, and center.
    a. Full left voltage should be approximately 0.5 volts. Full right voltage should be approximately 4.5 volts. Center voltage should be near 2.5 volts.
    b. If the left and right sensor values are not approximately symmetrical, tap the red "x" button to discard the calibration and repeat step 5 through step 9.
11. Tap the green check mark to accept the calibration. To repeat the calibration, tap **Restart**.
12. Tap the **Save** icon to store the new setting.

Steering Sensor Calibration Error Messages

Steering Angle sensor voltage too high

Wrong sensor type selected.

OR

Sensor is rotated near or beyond the 5.0 volts limit. Shorten mechanical linkage to produce less sensor rotation.

Steering Angle sensor voltage too low

Wrong sensor type selected.

OR

Sensor is rotated near or beyond 0 volt limit. Shorten mechanical linkage to produce less sensor rotation.

OR

Sensor is disconnected. Check cabling connections.

Sensor range not large enough

Loosen mechanical arm at sensor. Rotate the sensor's shaft. Set at **2.5** volts with wheels straight ahead. Tighten mechanical arm clamp. Adjust increase length of linkage to create more sensor rotation. Make full left movement close to **0.5** volts and full right movement close to **4.5** volts.

OR

Sensor may have failed. Check voltage output on display diagnostics. If the sensor voltage does change during steering movement, check for sensor rotation and/or consider replacing the potentiometer.

OR

Sensor's voltage output is not consistent. Check voltage output in display diagnostics. Rotate machine's steering very slowly.

Automated Steering Deadzone (Manual Calibration)

This section applies to an Autopilot (hydraulic steering) installation.

The Automated Deadzone calibration runs a series of tests on the hydraulic valve. In this test, the system independently calibrates both sides of the valve to determine the command signal at which wheel movement occurs for each direction.

Notes:

- A smooth, level surface is recommended for this calibration.
- If Auto Cal is enabled, then this calibration is not available.

WARNING!

During the Deadzone calibration, the system moves the vehicle's steering wheels. To avoid injury, be prepared for sudden vehicle movement.

Pre-calibration Steps

Complete these steps **before** you begin calibration:

1. Complete the vehicle profile steps for setup.
2. Warm up the vehicle. The hydraulic fluid must be at normal operating temperature.
3. Prepare the steering sensor. If the vehicle has a potentiometer, complete the Steering Sensor calibration first.

Calibration Steps

1. Drive the vehicle to a large field without hazards or obstructions. The field should have smooth soil that is loose but firm.

CAUTION!

Obstacles in the field can cause collisions, which may injure you and damage the vehicle. If an obstacle in the field makes it unsafe to continue the Automated Deadzone calibration, stop the vehicle and turn the steering wheel to disengage the system.

2. On the Home screen, tap the **Vehicle** tile to display the Vehicle screen.
3. Select the vehicle you want to work with, then tap the **Calibrate** button.
4. On the Guidance Calibration screen, tap **Automated Steering Dead Zone**.
5. Read each on screen instruction and then tap the **Next** button in the center of the window:

6. Center the steering on the tractor and move forward in first gear at maximum engine RPM for at least five seconds. **1.2** mph (**2.2** kph) or higher is recommended.
7. Tap **Test Right** and continue moving forward while the system performs a coarse right side test.
8. When the test is finished, center the steering again and drive forward for five seconds.
9. Tap **Test Left** and continue moving forward while the system performs a coarse left side test.
10. Continue driving ahead slowly and tap **Test Right**. The system will perform the first right turn fine calibration.
11. Continue driving ahead slowly and tap **Test Left**. The system will perform the left turn fine calibration.
12. Repeat the right and left hand fine calibrations a minimum of three (3) times until there is a change of less than 0.5 in each of the deadzone values.
13. Tap the green check mark to accept the calibration or the red "x" button to exit without saving. The display returns to the CALIBRATION section where you can perform another calibration or exit.
14. Tap the **Save** icon to store the new setting.

Automated Deadzone Error Messages

Manual Override Detected

Manual override was detected before the calibration cycle could be completed. Retry the calibration.

No GPS

The GNSS position quality is not ready. From the activity bar, tap the **Diagnostics** icon.

Look for GNSS RECEIVER, tap **Performance**. RTX status must be Converged, RTK status must be Fixed and SBAS status must be DGPS, before calibration can be started.

No Steering Response Detected

During the calibration cycle, there was not enough movement for the calibration to complete.

Check the steering sensor setup in the display and cabling connections.

Software Problem Detected

The software was unable to complete the calibration due to insufficient movement of the vehicle. If the problem persists, contact Technical Support.

Steering Close to End Stops

Before the calibration cycle could be completed, the measured steering angle approached the end stops. Retry, and if the problem persists, instead of centering the steering at the start of each cycle, try turning the steering in the opposite direction to that which is being tested so that the calibration procedure has a greater range to test over.

Unable To Determine DZ: Try Again

A problem occurred when trying to compute dead zone. Retry. If the problem persists, contact Technical Support.

Valve Connectors Could Be Swapped

The calibration test sensed the steering turning in the opposite direction to what was expected. Retry. If the problem persists, then either the valve connectors need to be changed or the steering sensor calibration was interrupted by the user rotating the steering wheel opposite to the steering commands during the calibration.

OR

The steering sensor type is incorrect. Check the vehicle's auto guidance setup. For example: **Potentiometer** is the sensor selected when AutoSense installed on the machine.

OR

AutoSense is not initialized. Drive forward with wheels straight for 10 seconds. Go to: **Diagnostics -> Autopilot -> Performance -> Steering**. Verify the actual steering angle reported close to 0.

Vehicle Moving Too Slow

The vehicle was moving too slowly for the calibration cycle to successfully finish. Make sure the vehicle is moving at least **1.6** kph (**1** mph) during each calibration cycle.

Steering Proportional Gain (Manual Calibration)

This section applies to an Autopilot (hydraulic steering) installation.

Note: Adjust the steering gain only when the Autopilot steering performance is less than satisfactory.

Proportional steering gain (PGain) balances rapid steering response and stability. PGain affects the following:

- **Slew Time:** The amount of time that the front wheels take to move from the far left to the far right position.
- **Overshoot:** The percentage by which the steered wheels exceeded the maximum angle before stopping.

Type	Description
High Gain	Decreases the slew time and increase the overshoot. This provides rapid responses, but can cause the steering to exhibit signs of instability (for example, a tendency to excessively overshoot).
Low Gain	Increases the slew time and decrease the overshoot. This improves the stability but can introduce delays in the steering response and can cause the vehicle to oscillate from side to side.

Pre-calibration Steps

1. Drive the vehicle to a large field without hazards or obstructions. The field should have smooth soil that is loose but firm.
2. Perform a steering valve deadzone calibration. Two methods are possible:
   - Use Auto Cal's automatic process (recommended).
   - Manual calibration using Automated Steering Deadzone by following onscreen instructions.

   See Automated Steering Deadzone (Manual Calibration) or Auto Cal before you perform the calibration for steering gain.
3. Warm up the vehicle. The hydraulic fluid must be at normal operating temperature for deadzone calibration.

CAUTION!

The wheels can move abruptly during the Steering Proportional Gain calibration procedure while the Autopilot system tests the hydraulic response to its steering commands. To avoid injury, be prepared for vehicle movement.

Calibration Steps

1. From the Home screen, tap the **Vehicle** tile to display the Vehicle screen.
2. Select a vehicle you want to work with, then tap the **Calibrate** button.

3. On the Guidance Calibration screen, tap **Steering Proportional Gain**.
4. On the Steering Proportional Gain window, tap the **Run Slew Test** button.
5. Read each on-screen instruction, then tap **Next**.
6. Drive forward at **1** mph (**1.6** kph) or faster. Tap **Next**.
7. Read each on-screen instruction, then tap **Next**.
8. Turn the front wheels completely to the right and then tap **Turn Left**. Drive forward while the vehicle turns left, until the screen shows the test is complete.
9. Turn the front wheels completely to the left and then tap **Turn Right**. Drive forward while the vehicle turns right, until the screen shows the test is complete.

> **Note:** With some vehicles, valve size and hydraulic capabilities of the machine will limit the slew time and overshoot In such cases, optimizing the P-gain value will be difficult.

10. Note the Slew Time and Overshoot values.
11. Adjust the gain value.
12. Repeat step 3 through step 9 until the Gain is just below the level where any one of the following occurs:
    - Slew times no longer decrease (**1200 - 1800** milliseconds is ideal).
    - Overshoot exceeds **5 - 8%** (can be a higher value depending on the vehicle).
    - Wheels noticeably shake near end stops.
    - Slew time and overshoot for both Left and Right sides are consistent and similar values. When you find the optimum gain, tap the green check mark to accept the calibration or the red "x" button to exit without saving. The display returns to the CALIBRATION section where you can perform another calibration or exit.

Steering Proportional Gain Error Messages

Wheels do not rotate

If steering is starting from full right or left lock, on some machines manual override could be triggered.

1. Go to: **Diagnostics → Autopilot → Performance → Sensors**
2. Verify manual override voltage is below the preset sensitivity voltage.
3. Restart PGain calibration again.

Roll Correction

Roll correction compensates for non-level navigation controller mounting and vehicle left or right tilt.

> **Note:** For best results, use a RTK or RTX GNSS correction source. RTX must be converged for at least 10 minutes. RTK must be **Fixed**. Repeat the steps below at least four times for greater accuracy.

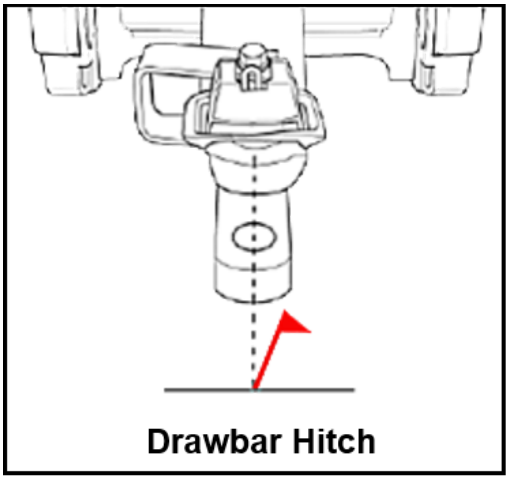
Precalibration Steps

1. Set up a vehicle and perform all calibrations preceding this one.
2. Read and understand the instructions provided below for the calibration procedure.
3. Remove any implement from the vehicle and drive it to a flat, smooth area where you can complete passes of at least 400 ft (125 m) in length.
4. Create a field.

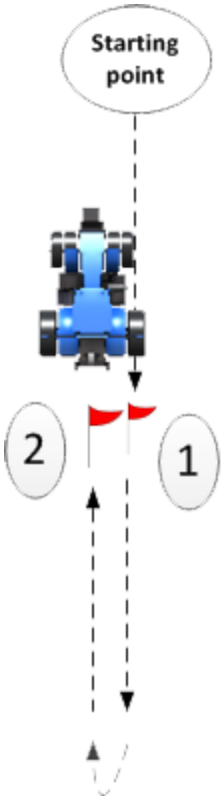
Calibration Steps

1. Select a Vehicle and on the Implements screen, you can add, edit, and delete an implement as well as calibrate one for application or section control. From the Home screen, tap the **Implement** tile to select an implement or create a new implement.
2. On the Home screen, select a field and tap the **Run** button to enter the Run screen.
3. Create a new, straight guidance line.
4. Make sure the on-screen lightbar is displayed on the screen.
5. Engage automatic steering on the guidance line. Autosteer until the onscreen off-line distance number is as close to zero as possible, and then roll to a stop.
6. Mark the vehicle's position:
    a. Place the vehicle in park and exit the cab.
    b. Place a flag in the ground that will mark the vehicle's center line. Use the drawbar pin hole or use another feature of the vehicle as a reference point.

       On vehicles such as sprayers, swathers, or combines, determine a reference point in the center of the vehicle to mark (preferably near to the reference location for the antenna such as front axle, rear axle, or center of track rotation).

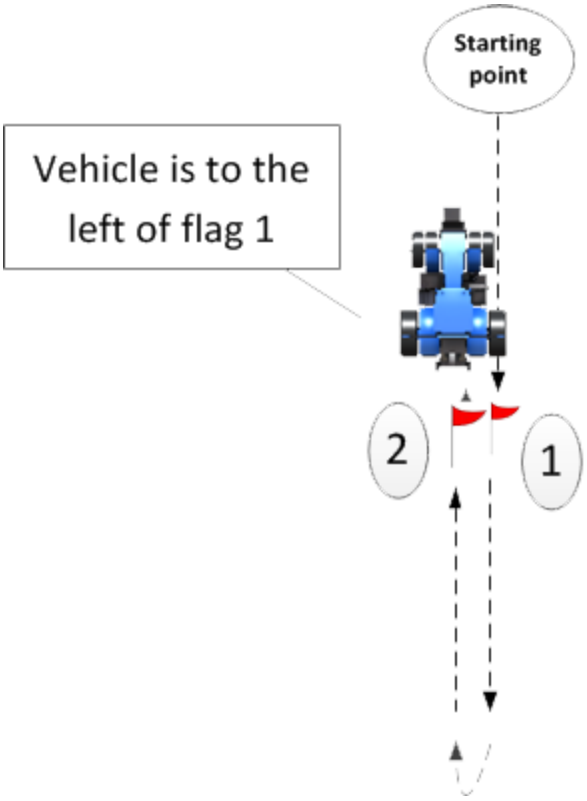


7. Re-enter the cab and continue to drive down the guidance line.
8. Turn the vehicle around and re-engage automatic steering ***on the same line*** in the opposite direction.
9. Roll to a stop with the drawbar (or other feature used to mark the center line of the vehicle) as close to the first flag as possible.
10. Mark the vehicle's position:
    a. Place the vehicle in park and exit the cab.
    b. Place a second flag in the ground to mark the vehicle's center line.
    c. Measure the distance between flag 1 and flag 2 and note it.



Distance between flag 1 and flag 2 (step c): _____

d. Also note where the vehicle's current position is in relation to flag 1 (in other words, the vehicle is either to the right or left of flag 1). The diagram, this example shows the vehicle is to the left of flag 1.



Vehicle is to right or left of flag 2 (step d): _____

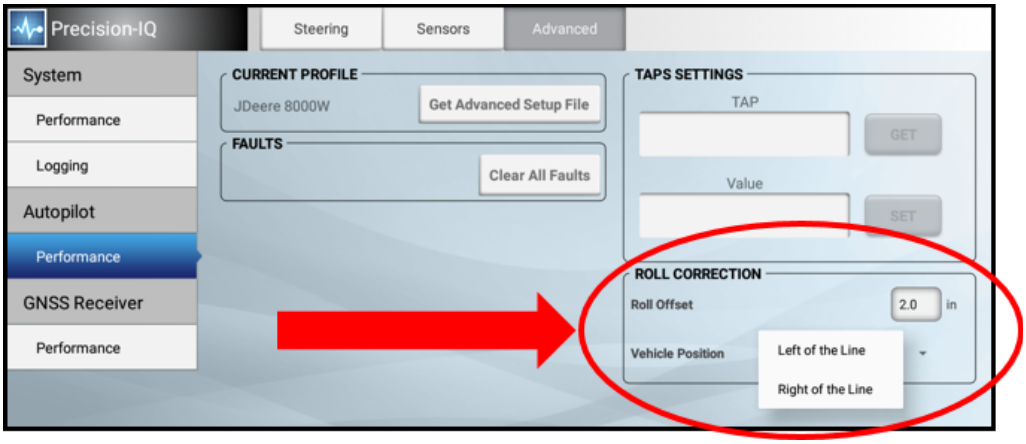
e. Return to the cab and in the Run screen note the cross-track error (the number on the on-screen lightbar).

Cross-track error (number on Run screen) (step e): _____

f. Note the direction highlighted on the lightbar (left or right).

Direction highlighted on lightbar (left or right) (step f): _____

11. On the activity bar, tap the **Diagnostics** icon to display the Diagnostics screen.
12. Listed under AUTOPILOT or EZ-PILOT PRO, tap **Performance**, then tap **ADVANCED** at the top of the screen.
13. At the **Roll Offset** entry box and **Vehicle Position** selection box:



- Calculate the roll offset and enter it in the display. Refer to your notes and compare them to the following table to determine how to calculate roll offset.
- Determine the direction of the Vehicle Position and enter it on the display. Refer to your notes and compare them with the following table to find which Vehicle Position to select.

Current vehicle position is to the _____ of flag 1	Lightbar highlight is on the:	Calculate Roll Offset value:	Lightbar (cross-track) value is _____ than flag distance value	Vehicle Position selection
Right	Right	Flag distance minus Cross-track value	Less	Right
Right	Right	Flag distance minus Cross-track value	Greater	Left
Left	Left	Flag distance minus Cross-track value	Less	Left
Left	Right	Flag distance minus Cross-track value	Greater	Right
Right	Left	Flag distance minus Cross-track value	N/A	Right
Left	Right	Flag distance minus Cross-track value	N/A	Left

14. Pull both flags out of the ground and continue driving down the line.
15. Turn the vehicle around again so that you are traveling in the same direction as you were when you originally set the line.
16. Repeat the steps starting at Step 4 until the two flags are under 1" (2.54 cm) apart.

Line Acquisition

Classic Mode

Note: Exceeding the capability of the tractor will cause instability (such as oscillating back and forth up and down the line) during line acquisition. Stock values are recommended since excessive values will cause oscillation, the number 1 cause of poor performance.

1. From the Home screen, tap the **Run** button to enter the Run screen.
2. Create a new, straight guidance line.
3. On the activity bar, tap the **Diagnostics** icon to display the Diagnostics screen.
4. Under the AUTOPILOT heading in the left-hand list, tap **Performance**, then tap **Steering** at the top of the screen.
5. Tap the **Engage** button in the lower-right part of the screen:

   Let the machine autosteer until the cross track error is close to **0**.
6. Evaluate the time and distance and travel path it took the machine to drive onto the guidance line.
7. Tap the **Line Acquisition** button at bottom of the screen.
8. On the Line Acquisition window, tap the **Classic** button at top of the screen.

CAUTION!

Stability needs to be checked at 4.5 mph.

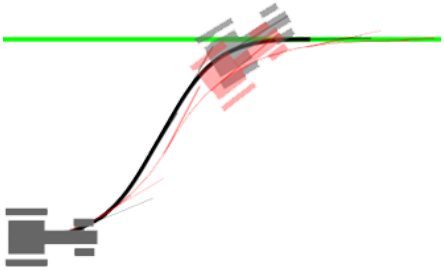
9. Move the **Line Acquisition Aggressiveness** percentage slider to the left or right. Tap the **+** or **-** buttons.
10. Drive forward and re-engage auto-steering if necessary to test the setting.
11. When you find the optimum aggressiveness, tap the green check mark to accept the calibration or tap the red "x" button to exit without saving.

Calibration	Description
Line Acquisition Aggressiveness	Line acquisition controls how fast the guidance system attempts to steer the vehicle onto the current guidance line (50% - 150%). ● With a high setting, the vehicle approaches the line quickly, but may overshoot the line and drive into instability. ● With a low setting, the vehicle steers onto the line more slowly, but is less likely to overshoot the line.

Engage Aggressiveness	Controls to set how aggressively the vehicle initially turns towards the guidance line. ● With a high setting, the vehicle will initially respond quickly. ● With a low setting, the vehicle will respond more smoothly when initially engaged.

OnSwath Mode

With OnSwath™, you can customize line acquisition to the vehicle, operation and operator preference. Vehicle behavior during line acquisition is more controlled, more predictable, and more repeatable.



The benefits of OnSwath include:

- Up to 50% faster line acquisition.
- Separate tuning for online and line acquisition.
- More repeatable performance.
- Consistent performance over entire speed range.
- Cab shake eliminated on articulated machines.
- Limited turn rates reduce impact on field for tracked machines.
- Front axle/nose overshoots more, so that the rear axle acquires the line faster.

OnSwath requires:

- NavController firmware version 6.00 and higher.

OnSwath Line-Acquisition Mode Setup

Note: Autopilot Motor Drive and EZ-Pilot Pro use only OnSwath line acquisition.

1. From the Home screen, tap the **Run** button to enter the Run screen.
2. Create a new, straight guidance line.
3. On the activity bar, tap the **Diagnostics** icon.
4. Under the AUTOPILOT heading in the left-hand list, tap **Performance**, then tap **Steering** at the top of the screen.
5. Tap the **Engage** button in the lower-right part of the screen:

   Let the machine autosteer until the cross track error is close to **0**.

6. Evaluate the time and distance and travel path it took the machine to drive onto the guidance line.
7. Tap the **Line Acquisition** button at bottom of the screen. On the Line Acquisition window, tap the **OnSwath** button at top of the screen and tap the **+** or **-** buttons to adjust the following settings as needed:

Setting	Description
Steering Angle (normal maximum)	Set the desired maximum steering angle (turn radius) for the system to use during line acquisition and end-of-row turns. This is not a hard limit, but the value the system plans for.
Steering Angle Aggressiveness at High Speeds	Set the speed at which the maximum steering angle starts to reduce.
Slew Rate (normal maximum)	Set the slew rate that the Autopilot system will plan for during line acquisition and end- of-row turns. A higher slew rate increases the rate at which the steering angle (turn radius) changes, up to the vehicle's physical capabilities. If you ran Auto Cal previously, do not adjust the value shown. Auto Cal calculated the maximum value possible for the steering response limits of your machine.
Steering Slew Rate Aggressiveness for High Speeds	Set the slew rate for high speeds at which the Autopilot system will begin to reduce the slew rate. A lower aggressiveness will reduce the slew rate more at high speeds. This results in a smoother and more stable operation.
Approach Angle	The desired approach angle that the Autopilot system will drive to the line if adequate space is available. If space is not available, the angle may not be achievable.
Initial Turn Aggressiveness	Adjusts how sharp or smooth the initial turn toward to the line will be in comparison to the final turn onto the line. This affects only the initial turn towards, while the final turn onto the line is not affected. If the value is: ● Lower: The initial turn will be smoother and more gradual. ● Higher: The initial turn will be harder and sharper toward the line.

8. Once you have completed and checked the entries in all sections, tap the green check mark to save the settings.

For More Information

Contact your local Trimble Regional Sales Manager.