

MATRIX® PROGS

ASSISTED/AUTO STEERING SETUP GUIDE

For use with software version 3.0x

MATRIX® PRO840GS



MATRIX® PRO570GS



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Assisted/auto steering

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Safety information

TeeJet Technologies is not responsible for damage or physical harm caused by failure to adhere to the following safety requirements.

As the operator of the vehicle, you are responsible for its safe operation.

Assisted/Auto Steering is not designed to replace the vehicle's operator.

Do not leave a vehicle while the Assisted/Auto Steering is engaged.

Be sure that the area around the vehicle is clear of people and obstacles before and during engagement.

The Assisted/Auto Steering is designed to support and improve efficiency while working in the field. The driver has full responsibility for the quality and work related results.

Disengage Assisted/Auto Steering before operating on public roads or when not in use to prevent loss of vehicle control.



WARNING: PINCH POINT HAZARD! To prevent serious injury or death, avoid unsafe practice while manually operating hydraulic steering circuits. Keep others away and stay clear of mechanical steering linkages.

Table of Contents

GENERAL MATRIX® PRO INFORMATION	2
Unavailable options when job is active	2
Warnings and information pop-ups	2
Drop-down menu selections	2
Scrolling screens	2
Setup option information	3
Keyboard entry screen	3
<i>Unit setup mode availability</i>	3
GPS is required	4
<i>PRN not shown</i>	4
ASSISTED/AUTO STEERING CONFIGURATION	5
AUTOSTEER	6
<i>Assisted/auto steering unavailable</i>	6
Enable/disable assisted/auto steering	6
Valve setup	7
Valve type	7
Valve frequency	7
Minimum/maximum duty cycle tests	8
<i>Minimum duty cycle left test</i>	8
<i>Minimum duty cycle right test</i>	9
<i>Maximum duty cycle test</i>	9
Steering settings	10
Coarse steering adjustment	11
Fine steering adjustment	11
Deadband	12
Lookahead	12
Valve test	13
Valve diagnostics	13
<i>Steering valve – no master solenoid</i>	14
<i>Steering valve – with master solenoid</i>	14
Options: Steering wheel sensor	15
Steering angle sensor	15
Enable/disable steering angle sensor	16
Sensor Calibration	16
On line calibration	17
TILT CORRECTION	18
<i>Field level unavailable</i>	18
<i>Tilt correction unavailable</i>	18
Enable/disable tilt	18
Field level	19
AUTO/ASSISTED STEERING OPERATION	20
APPENDIX - FACTORY SETTINGS & RANGES	21

GENERAL MATRIX® PRO INFORMATION

The Matrix Pro is used to configure the vehicle and its implements including auto steering and tilt.

Unavailable options when job is active

When a job is active some setup options are unavailable. See the Unit setup mode availability chart for indication of which options are not accessible.

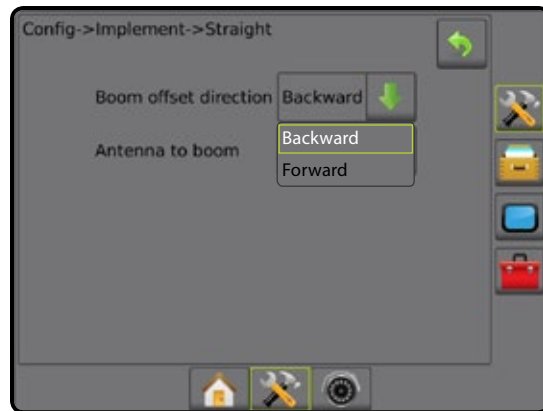
Figure GS-1: Example of unavailable options



Drop-down menu selections

Press DOWN arrow ↓ to access the options. Use the UP/DOWN arrows ▲ ▼ or slide bar if necessary to scroll through the extended list. Select the appropriate option. To close the list without selecting an option, tap anywhere on the screen outside the drop-down menu.

Figure GS-3: Example of drop-down menu



Warnings and information pop-ups

A pop-up warning or information box will be displayed for approximately five (5) seconds. To remove the information box, tap anywhere on the screen.

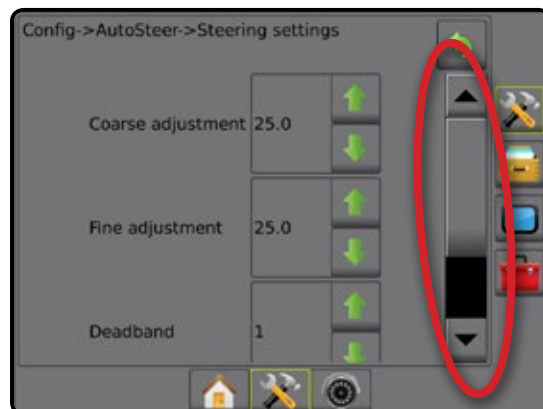
Figure GS-2: Information screens



Scrolling screens

Some screens have more information or options that are visible beyond the current screen. Use the UP/DOWN arrows ▲ ▼ or slide bar to access additional options or information not currently visible on the screen.

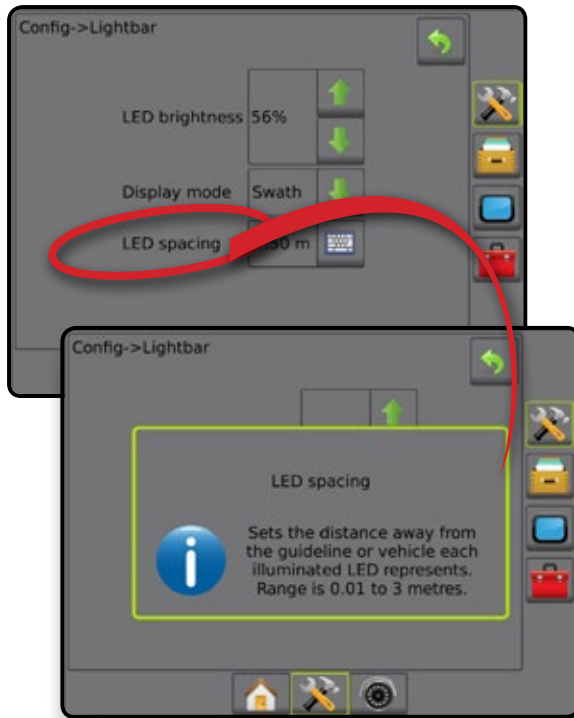
Figure GS-4: Example of scrolling screen



Setup option information

Press the option's icon or option's name of any menu item to display a definition and range values of that item. To remove the information box, press anywhere on the screen.

Figure GS-5: Example of information text box

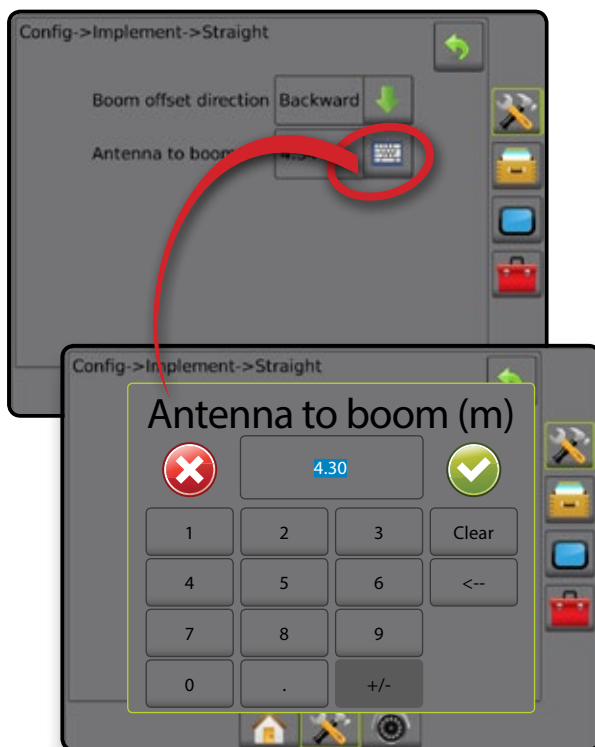


Keyboard entry screen

Press the KEYPAD icon . Use the numeric keypad to enter a value.

Press the ACCEPT icon to save the settings or the CANCEL icon to leave the keypad without saving.

Figure GS-6: Example of keyboard



Unit setup mode availability

Configuration			
	Machine type	✗	
	GPS antenna height	✗	
	Implement type	✗	
	Symmetric implement layout	✗	
	Implement offset distance	✗	
	Implement offset direction	✗	
	Number of implement sections	✗	
	Guidance width	✗	
	Application/working width	✗	
	Applied area alarm	✓	
Implement	Straight mode	Boom offset direction	✗
		Antenna to boom distance	✗
		Overlap	✓
		Delay on/off times	✓
	Spreader mode	Setup type: TeeJet	✗
		• Antenna to disks distance	✗
		• Overlap	✓
		• Delay on/off times	✓
		• Spread offset distance	✗
		• Section offsets	✗
• Section lengths		✗	
Staggered mode	Setup type: OEM	✗	
	• Antenna to disks distance	✗	
	• Start/stop distance	✗	
	• Section start/stop offsets	✗	
	Section 1 offset direction	✗	
	Antenna to section 1	✗	
	Overlap	✓	
	Delay on/off times	✓	
	Section offsets	✗	
	Enabled/disabled	✓	
AutoSteer	Valve setup	Valve type	✗
		Valve frequency	✗
		Minimum duty cycle left/ right	✗
		Maximum duty cycle	✗
	Steering settings	Coarse steering adjustment	✓
		Fine steering adjustment	✓
		Deadband	✓
		Lookahead	✓
		Valve test	✗
		Valve diagnostics	✗
	Options	Steering wheel sensor	✗
	Steering	Enable	✗
	Angle	Sensor calibration	✓
	Sensor	On line calibration	✓
Tilt correction	Enabled/disabled	✓	
	Field level	✓	
GPS	GPS type	✗	
	GPS port	✗	
	GPS status information	✓	
	Programme Receiver	✗	
	PRN	✗	

✓ Available during an active job

✗ Not Available during an active job

Assisted/auto steering

GPS is required

GPS is used to configure GPS type, GPS port and PRN as well as to view GPS status information. For detailed setup instructions, refer to the GPS chapter in the Matrix Pro GS user manual.

NOTE: These settings are required for assisted/auto steering and tilt sensor operation, as well as proper implement operation.




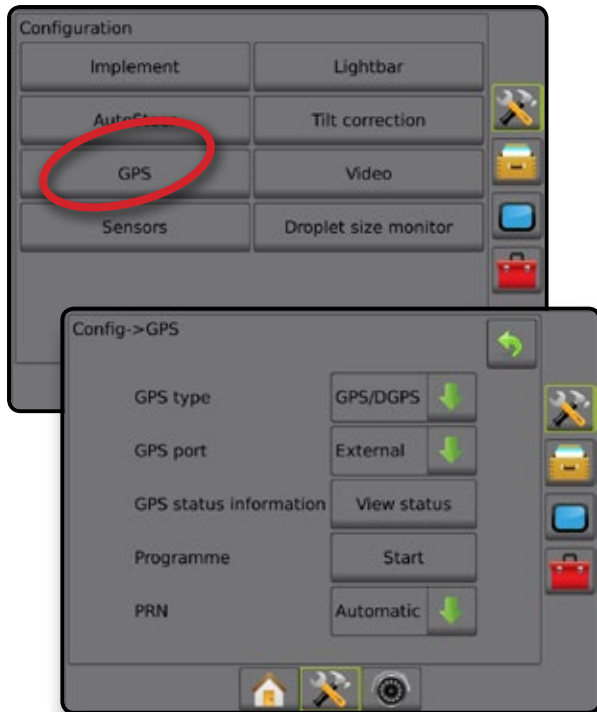
1. Press CONFIGURATION side tab .
2. Press **GPS**.
3. Select from:
 - ▶ GPS type – select GPS source transmissions
 - ▶ GPS port – sets (D)GPS communication port
 - ▶ GPS status information – displays information regarding GGA/VTG (data rates), number of satellites, HDOP, PRN, GGA quality, GPS receiver, receiver version and UTM zone
 - ▶ Programme – allows direct programming of the GPS receiver through a command line interface
 - ▶ PRN – selects the SBAS PRN that will provide GNSS differential correction data. Set to **Automatic** for automatic PRN selection.
 - ▶ Alternate PRN – when PRN is not automatic, a second alternate SBAS PRN will provide a second set of GNSS differential correction data.
4. Press RETURN arrow  or CONFIGURATION side tab  to return to the main Configuration screen.

Figure GS-7: GPS



PRN not shown

When GPS type is set to "GPS+GLONASS", PRN options are not available, nor shown on screen.

ASSISTED/AUTO STEERING CONFIGURATION

The Matrix Pro GS is used to configure the vehicle and its implements including assisted/auto steering and tilt. For recommendations and factory settings for the FieldPilot or UniPilot setup values, see chart on page 21.

To access Matrix Pro GS AutoSteer and Tilt configuration options:



1. Press UNIT SETUP bottom tab .
2. Press CONFIGURATION side tab .
3. Select from:
 - ▶ AutoSteer – used to enable/disable assisted/auto steering as well as establish valve setup settings, steering settings and steering angle sensor settings; and perform valve tests, or valve diagnostics
 - ▶ Tilt correction – used to enable/disable and calibrate the tilt gyro module, allowing for tilt correction for application on hilly or sloped terrain

Figure GS-8: Configuration options - AutoSteer

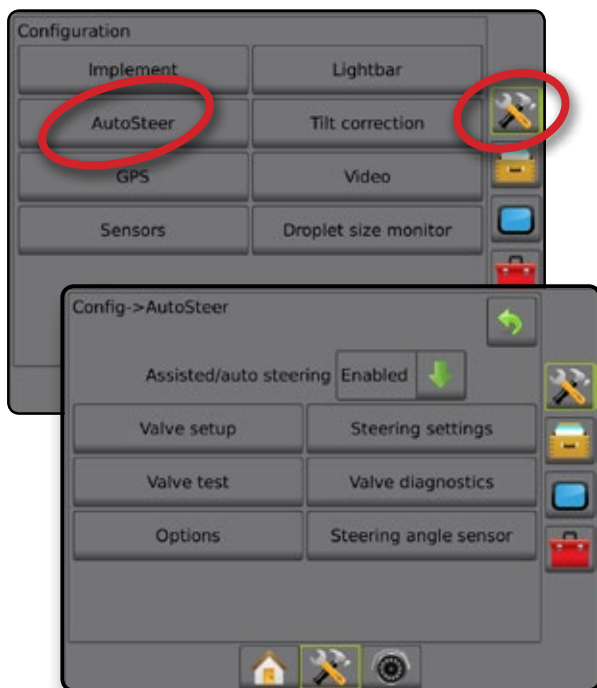
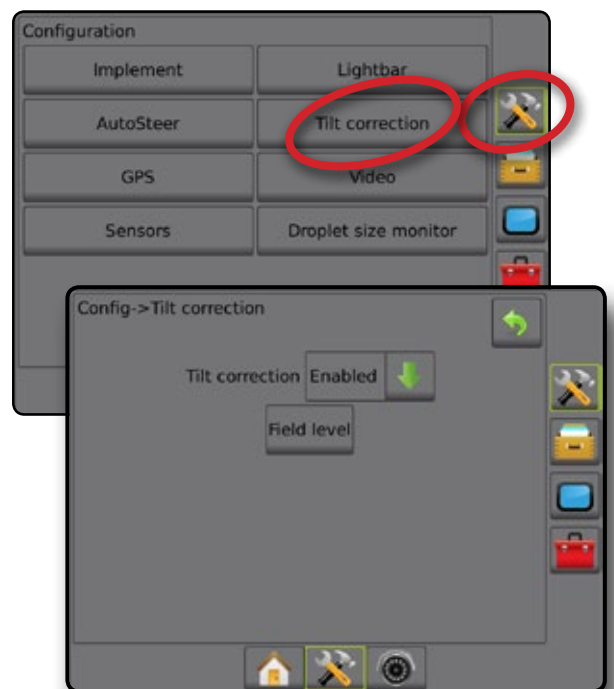


Figure GS-9: Configuration options - Tilt correction



Assisted/auto steering

AUTOSTEER

When a Steering Control Module (SCM) is present, assisted/auto steering options will be available

NOTE: An update of your SCM software may be required when upgrading to a Matrix Pro GS from previous Matrix systems. To view version of software information, see the Console->About screen.

AutoSteer setup is used to enable/disable assisted/auto steering and configure valve setup, steering settings, valve test, valve diagnostics and steering angle sensor. For recommendations and factory settings for the FieldPilot or UniPilot setup values, see chart on page 21.




1. Press CONFIGURATION side tab .
2. Press **AutoSteer**.
3. Select if assisted/auto steering is enabled or disabled.
4. When enabled, select from:
 - ▶ Valve setup – used to configure valve type, valve frequency, minimum duty cycle left/right and maximum duty cycle
 - ▶ Steering settings – used to establish coarse steering adjustment, fine steering adjustment, deadband and lookahead
 - ▶ Valve test – used to verify if steering is directed correctly
 - ▶ Valve diagnostics – used to test the valves to see if they are connected properly
 - ▶ Options: Steering wheel sensor – used to select whether the steering disengage sensor is magnetic or pressure sensor based
 - ▶ Steering angle sensor – used to establish and calibrate the steering angle sensor (SAS) as the primary feedback sensor for auto steering.
5. Press RETURN arrow  or CONFIGURATION side tab  to return to the main Configuration screen.

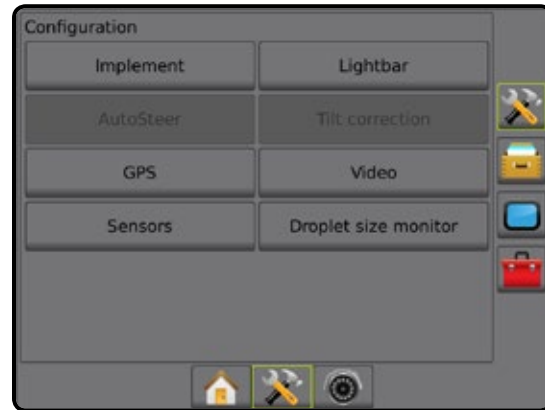
Figure GS-10: AutoSteer



Assisted/auto steering unavailable


If a assisted/auto steering system is not installed, setup options will not be available.

Figure GS-11: Assisted/auto steering not detected



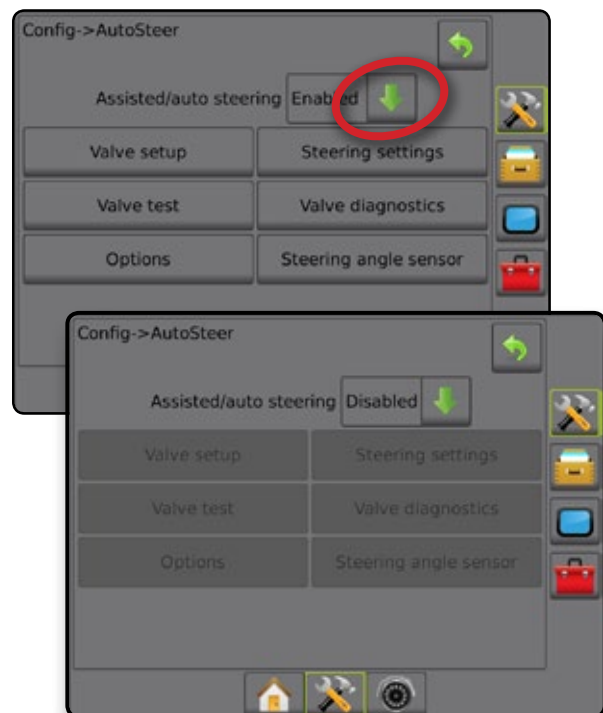
Enable/disable assisted/auto steering

Set assisted/auto steering to enable or disable.

1. Press DOWN arrow  to access the list of options.
2. Select:
 - ▶ Enable
 - ▶ Disabled

If disabled, all assisted/auto steering capabilities and setup functions will be unavailable (options will be greyed out).

Figure GS-12: Enabled and disabled assisted/auto steering options

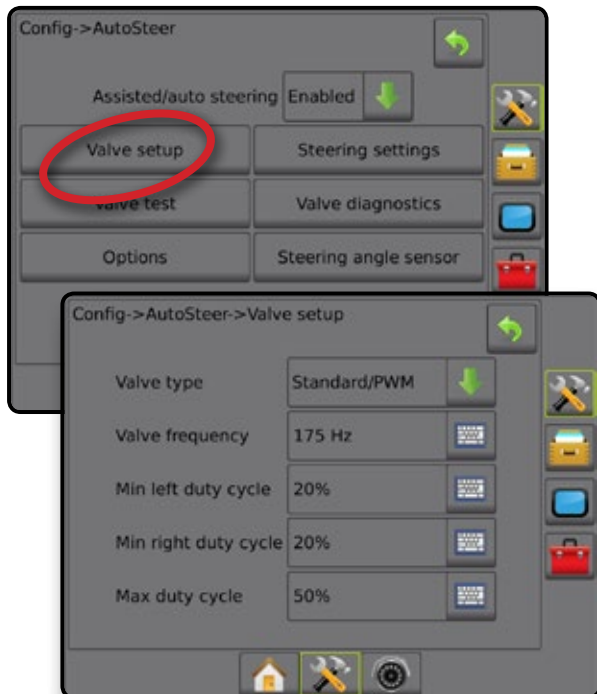


Valve setup

Valve setup is used to configure valve type, valve frequency, minimum duty cycle left, minimum duty cycle right and maximum duty cycle. For recommendations and factory settings for the FieldPilot or UniPilot setup values, see chart on page 21.

1. Select **Valve setup**.
2. Select from:
 - ▶ Valve type – used to select the type of steering valve
 - ▶ Frequency – used to select the valve frequency used to drive the steering valve
 - ▶ Minimum duty cycle left and right – used to set the minimum amount of drive required to begin steering the vehicle left or right
 - ▶ Maximum duty cycle – used to select the maximum speed that the wheels will steer from lock to lock

Figure GS-13: Valve setup

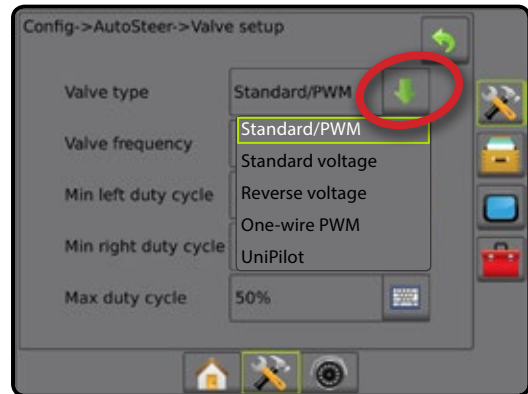


Valve type

Valve type is used to set the type of steering valve. For recommendations and factory settings for the FieldPilot or UniPilot setup values, see chart on page 21.

1. Press DOWN arrow to access the list of options.
2. Select type.

Figure GS-14: Valve type

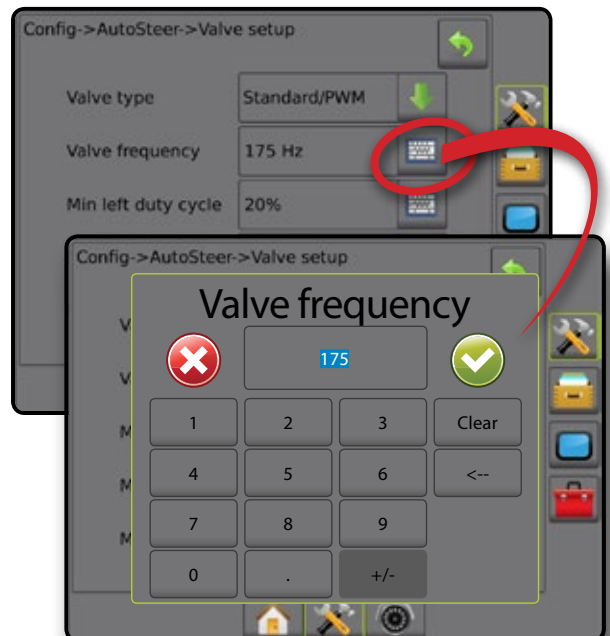


Valve frequency

Valve frequency is used to drive the steering valve. The type of valve being used determines the frequency. Range is 0.9 - 15000.1. For recommendations and factory settings for the FieldPilot or UniPilot setup values, see chart on page 21.

1. Press the KEYPAD icon .
2. Use the entry screen to establish the valve frequency.

Figure GS-15: Valve frequency



Assisted/auto steering

Minimum/maximum duty cycle tests

Minimum duty cycle (minimum dc left + right) sets the minimum amount of drive required to begin steering the vehicle left or right. Range is 0.0 - 50.0. Default is 20%.

Maximum duty cycle sets the maximum speed that the wheels will steer from left to right / right to left (lock to lock). Range is 25 - 100. Default is 50%.

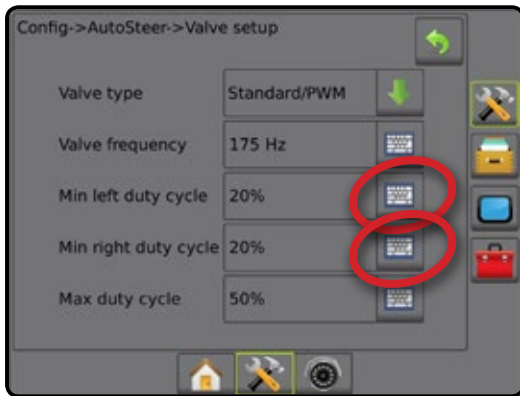
NOTE: A GPS signal is required for these tests.

RECOMMENDATION: Have a large area of clear space available to perform test cycles. Vehicle speed must be between 1.5 - 13.0 km/h (0.4 - 3.6 m/s).

WARNING: Pinch point hazard!

To prevent serious injury or death, avoid unsafe practice while manually operating hydraulic steering circuits. Keep others away and stay clear of mechanical linkage.

Figure GS-16: Duty cycle tests



Minimum duty cycle left test

Minimum duty cycle left sets the minimum amount of drive required to begin steering the vehicle to the left.

NOTE: If the valve frequency is set below 15 Hz (non proportional), set the amount of drive to "25.0". Cycle test is not necessary.




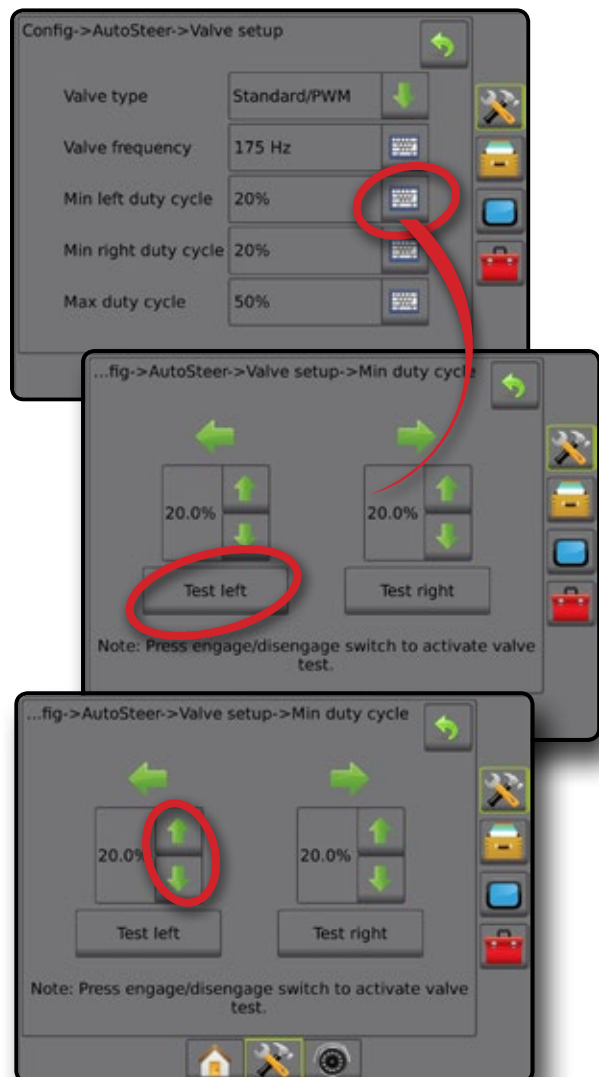
1. Press the KEYPAD icon .
2. While the vehicle is moving in a slow forward straight line motion between 1.5 - 13.0 km/h (0.4 - 3.6 m/s), press **Test Left** .
3. Press the engage/disengage switch or foot switch to activate the test.
4. Slowly increase the duty cycle number using the UP arrow  until the vehicle begins to turn left.
5. Turn the steering wheel or press the engage/disengage switch or foot switch to complete the test.

Figure GS-17: Minimum duty cycle test



Minimum duty cycle right test

Minimum duty cycle right sets the minimum amount of drive required to begin steering the vehicle to the right.

NOTE: If the valve frequency is set below 15 Hz (non proportional), set the amount of drive to "25.0". Cycle test is not necessary.



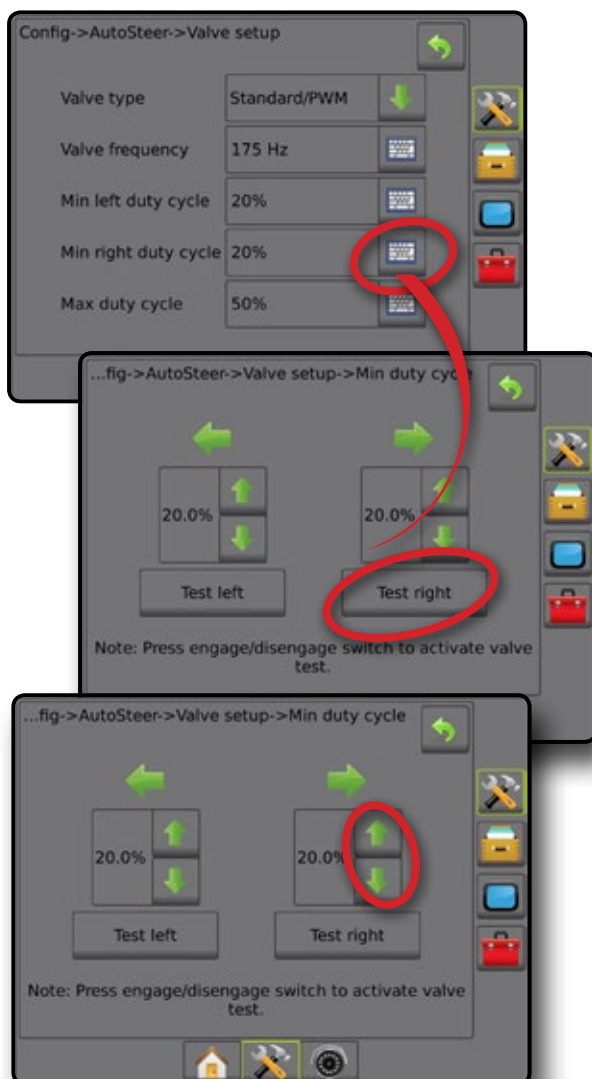
1. Press the KEYPAD icon .
2. While the vehicle is moving in a slow forward straight line motion between 1.5 - 13.0 km/h (0.4 - 3.6 m/s), press **Test Right**.
3. Press the engage/disengage switch or foot switch to activate the test.
4. Slowly increase the duty cycle number using the UP arrow  until the vehicle begins to turn right.
5. Turn the steering wheel or press the engage/disengage switch or foot switch to complete the test.




Figure GS-18: Minimum duty cycle test





Maximum duty cycle test

Maximum duty cycle sets the maximum speed that the wheels will steer from lock to lock. For recommendations and factory settings for the FieldPilot or UniPilot setup values, see chart on page 21.

NOTE: If the valve frequency is below 15 Hz (non proportional), set the value to 100. Speed will be established during the Valve Test.

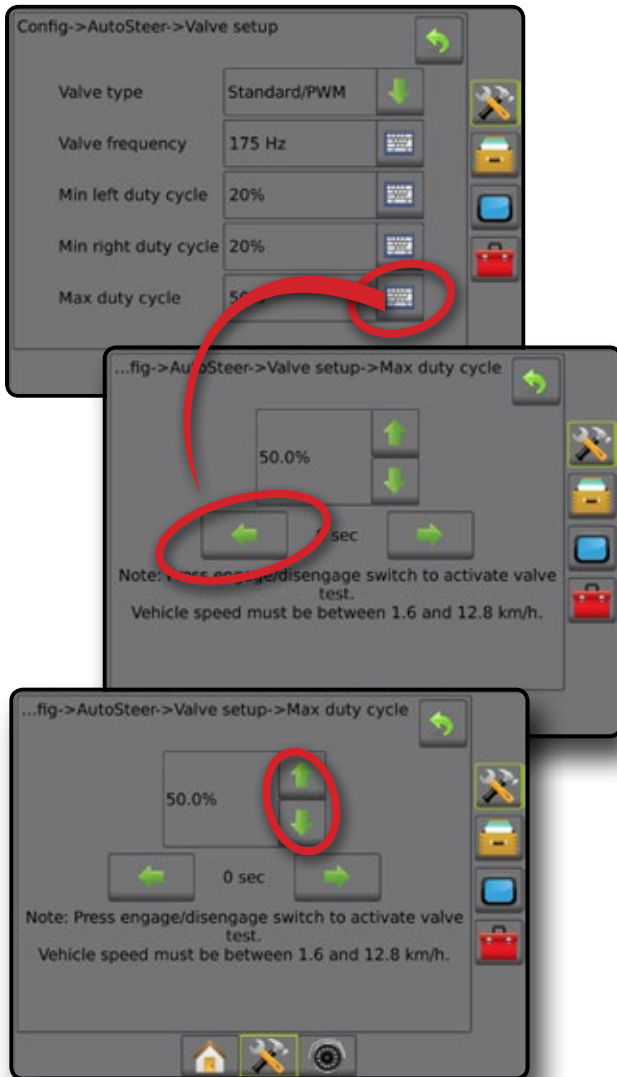
1. Press the KEYPAD icon .
2. While the vehicle is moving in a slow forward motion between 1.5 - 13.0 km/h (0.4 - 3.6 m/s), turn the wheels all the way to the left (or right).
3. Press the RIGHT arrow  (or LEFT arrow .
4. Press the engage/disengage switch or foot switch to activate the test. This will start a timer as well as turn the vehicle to the right (or left).

WARNING! When using a UniPilot, the UniPilot will move the steering wheel very quickly. Keep loose clothing, hair and hands away from the steering wheel while performing this test.

5. When the wheels are all the way to the right (or left), stop the test by pressing the engage/disengage switch or foot switch. The time displayed is the lock to lock time.
6. Repeat to perform procedure to the opposite side.
7. Compare the lock-to-lock time with the recommended time.
8. Press the UP/DOWN arrows   to adjust the value.
 - ▶ Lock-to-lock time is too low (turning too fast) – decrease the value
 - ▶ Lock to lock time is higher (turning too slow) – increase the value
9. Repeat until recommended lock time is achieved.

Assisted/auto steering

Figure GS-19: Maximum duty cycle



Steering settings

Steering settings is used to configure coarse steering adjustment, fine steering adjustment, deadband and lookahead settings.

1. Select **Steering settings**.
2. Select from:
 - ▶ Coarse steering adjustment – used to select how aggressively the vehicle maintains a guideline in Straight AB guidance
 - ▶ Fine steering adjustment – used to select how aggressively the vehicle maintains a guideline in Curved AB guidance
 - ▶ Deadband – used to set if steering is too choppy/responsive or remains consistently off the guideline
 - ▶ Lookahead – used to select the vehicle's approach to the guideline in Straight AB guidance mode

Figure GS-20: Steering settings



Coarse steering adjustment

Coarse steering adjustment adjusts how aggressively the vehicle maintains a guideline in Straight AB guidance mode. Range is 0.0 - 100.0. Default is 25.0.



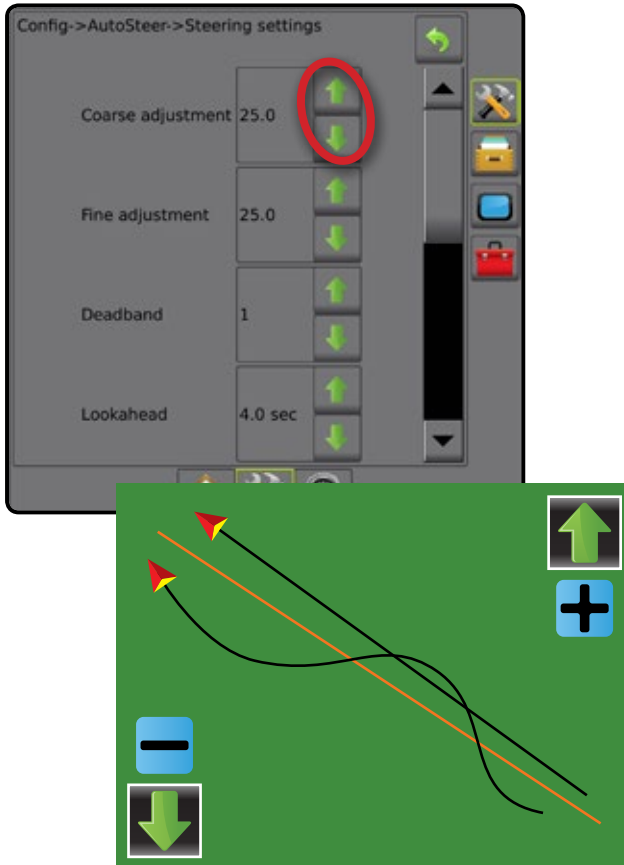
- Press:
 - ▶ UP arrow  if the vehicle is drifting away from the guideline or not approaching it fast enough.
 - ▶ DOWN arrow  if the vehicle is oscillating rapidly or overshooting the guideline.

Figure GS-21: Coarse steering adjustment



Fine steering adjustment

Fine steering adjustment adjusts how aggressively the vehicle maintains a guideline in Curved AB guidance mode. Range is 0.0 - 100.0. Default is 25.0.



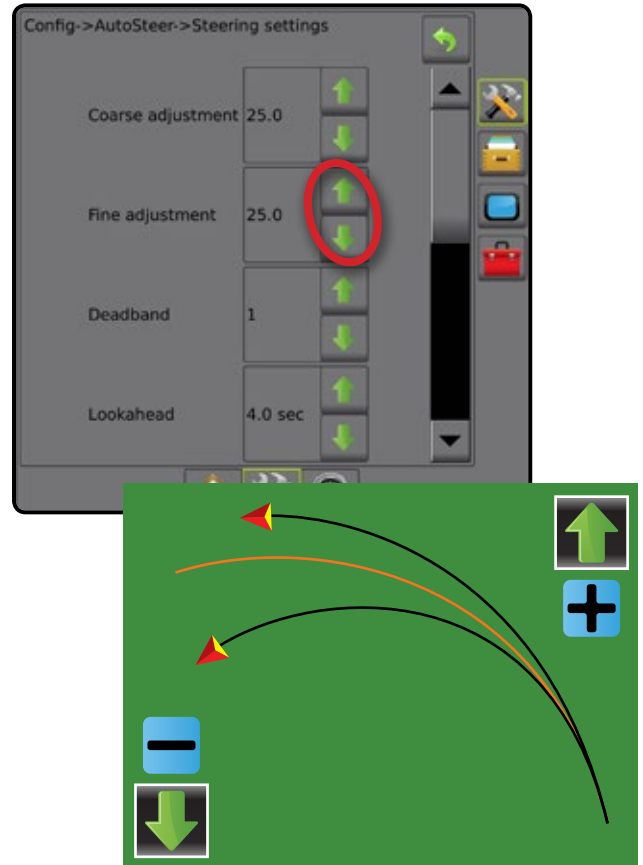
- Press:
 - ▶ UP arrow  if the vehicle drives outside of corners.
 - ▶ DOWN arrow  if the vehicle cuts corners.

Figure GS-22: Fine steering adjustment



Assisted/auto steering

Deadband

Deadband adjusts if steering is too choppy/responsive or remains consistently off the guideline. As the value is increased, stability will increase but so will steady state error. Range is 1 - 10. Default is 1.



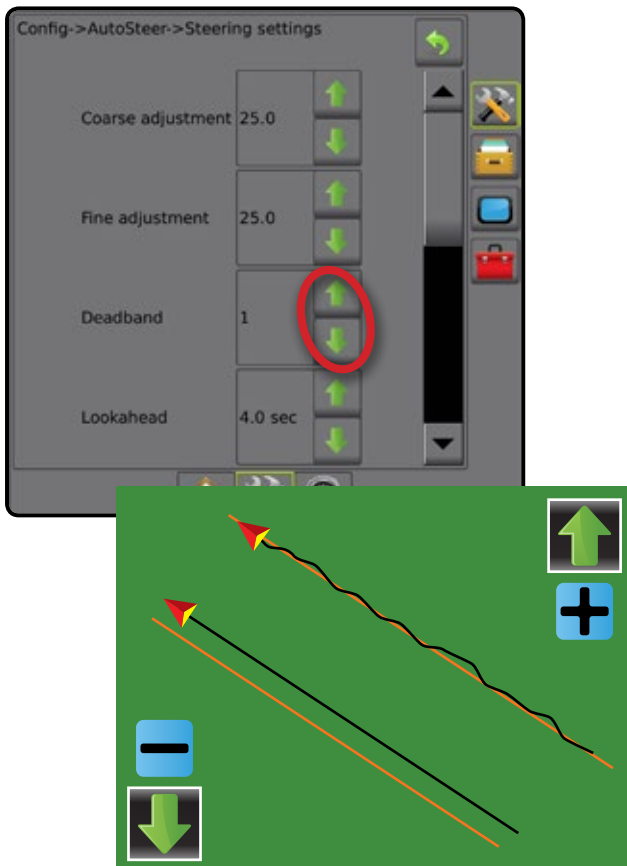
1. Press:
 - ▶ UP arrow  if steering is too choppy or too responsive.
 - ▶ DOWN arrow  if the vehicle remains consistently off the guideline.

Figure GS-23: Deadband



Lookahead

Lookahead used during Straight AB guidance mode to adjust the vehicle's approach to the guideline. Fine tune the Lookahead by conducting several approaches to the guideline. Range is 0.0 - 10.0 seconds. Default is 4.0 seconds.



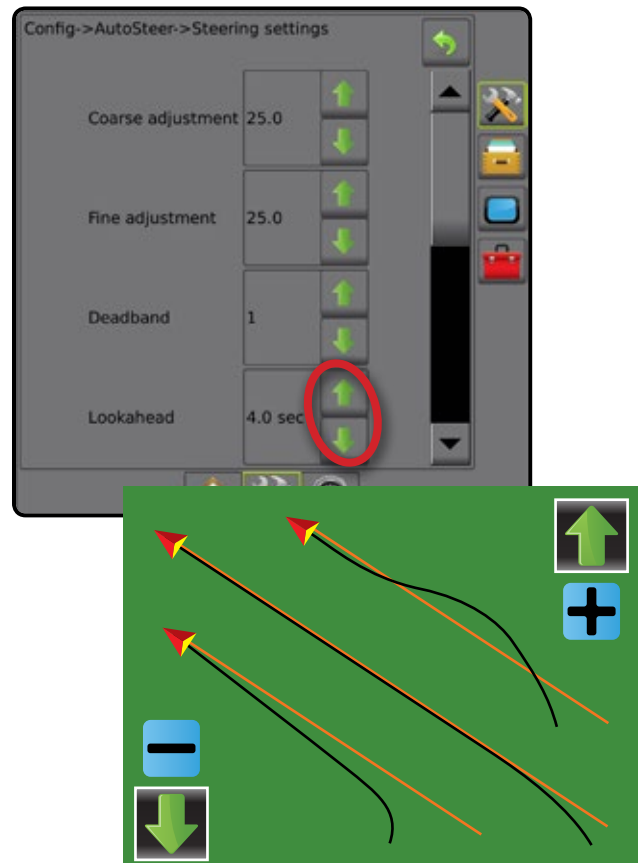
1. Press:
 - ▶ UP arrow  if the vehicle is overshooting the guideline when approaching.
 - ▶ DOWN arrow  if the vehicle takes too long to get to the guideline.

Figure GS-24: Lookahead



Valve test

The valve test verifies if steering is directed correctly. It can also be used to test the amount of time to steer the wheels from full left to full right (lock to lock) for non-proportional valves.

For non-proportional valves, the amount of time for left-to-right or right-to-left (lock to lock) will be established by mechanically adjusting oil flow through the valve.

For a UniPilot ESM, the amount of time for left-to-right or right-to-left (lock to lock) will be established by adjusting the Maximum duty cycle value.

For recommendations and factory settings for the FieldPilot or UniPilot setup values, see chart on page 21.

1. Select **Valve test**.
2. While the vehicle is moving in a slow forward motion, turn the wheels all the way to the left.
3. Press RIGHT arrow →.
4. Press the engage/disengage switch or foot switch to activate the test. This will start a timer as well as turn the vehicle to the right.

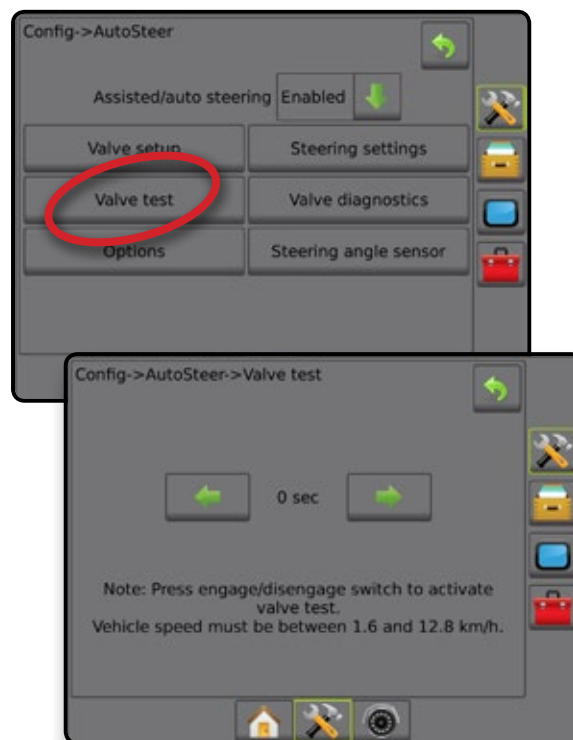
WARNING! When using a UniPilot, the UniPilot will move the steering wheel very quickly. Keep loose clothing, hair and hands away from the steering wheel while performing this test.

5. Press the engage/disengage switch or foot switch when the wheels are all the way to the right. The time displayed is the lock to lock time.
6. While the vehicle is moving in a slow forward motion, turn the wheels all the way to the right.
7. Press LEFT arrow ←.
8. Press the engage/disengage switch or foot switch to activate the test. This will start a timer as well as turn the vehicle to the left.

WARNING! When using a UniPilot, the UniPilot will move the steering wheel very quickly. Keep loose clothing, hair and hands away from the steering wheel while performing this test.

9. Press the engage/disengage switch or foot switch when the wheels are all the way to the right. The time displayed is the lock to lock time.
10. Compare the lock-to-lock time with the recommended time.
11. Adjust the valve oil flow as needed and repeat test as needed.

Figure GS-25: Valve test



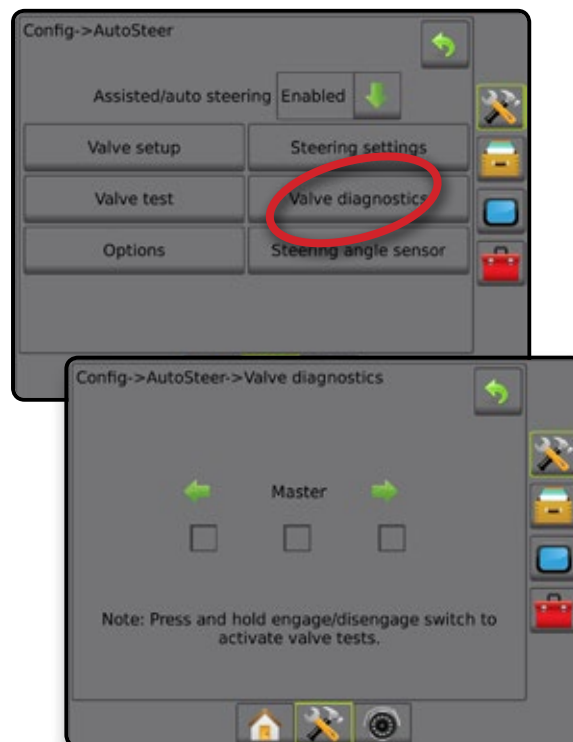
Valve diagnostics

The valve diagnostic test verifies if the valve is operating correctly.

This test is not necessary for UniPilot.

NOTE: The diagnostic tests do not require that the vehicle is in motion. A valid GPS signal is not required.

Figure GS-26: Valve diagnostics



Assisted/auto steering

Steering valve – no master solenoid

1. Select **Valve diagnostics**.
2. Activate the **Left** or **Right** check boxes associated with the valve direction to be tested.
3. Press and hold the engage/disengage switch or foot switch for one second.

NOTE: Do not activate the **Master** check box.

Test reactions

Selected			Reaction	Issue
Left	Master	Right		
			None	Valve is operating correctly
			Wheels turn	Either the left valve or right valve is stuck open
•			Vehicle turns left	Valve is operating correctly
•			None	SCM, harness or valve malfunction
•			Vehicle turns right	Left and right connections to valve are reversed
		•	Vehicle turns right	Valve is operating correctly
		•	None	SCM, harness or valve malfunction
		•	Vehicle turns left	Left and right connections to valve are reversed

Steering valve – with master solenoid

1. Select **Valve diagnostics**.
2. Activate the **Master** check box.
3. Activate the **Left** or **Right** check boxes associated with the valve direction to be tested.
4. Press and hold the engage/disengage switch or foot switch for one second.

Test reactions

Selected			Reaction	Issue
Left	Master	Right		
	•		None	Valve is operating correctly
	•		Wheels turn	Either the left valve or right valve is stuck open
•			None	Valve is operating correctly
•			Wheels turn	Master valve is stuck open
		•	None	Valve is operating correctly
		•	Wheels turn	Master valve is stuck open
•	•		Vehicle turns left	Valve is operating correctly
•	•		Vehicle turns right	Left and right connections to valve are reversed
•	•		None	SCM, harness or valve malfunction
	•	•	Vehicle turns right	Valve is operating correctly
	•	•	Vehicle turns left	Left and right connections to valve are reversed
	•	•	None	SCM, harness or valve malfunction

Options: Steering wheel sensor

Steering wheel sensor selects whether the sensor used to automatically disengage FieldPilot when the steering wheel is turned is magnetic or pressure based. Check your specific configuration to determine if a Steering wheel switch kit or a Pressure switch is being used.

The UniPilot is not affected by this setting.


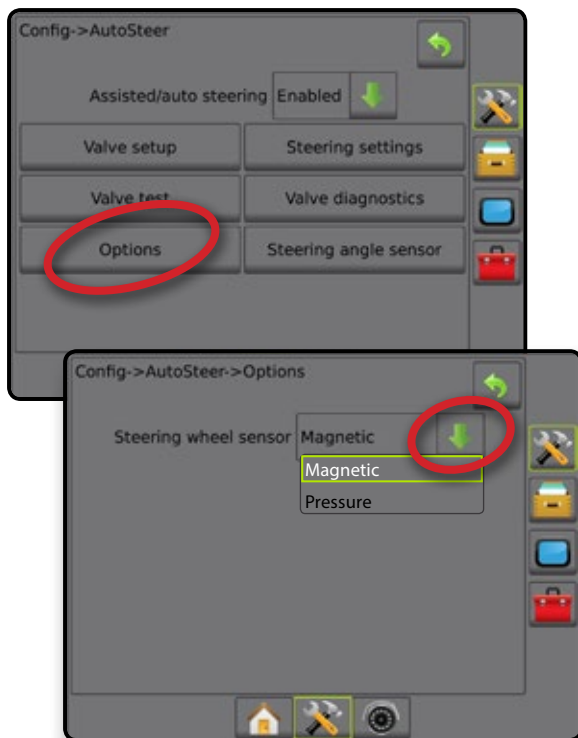
1. Select **Options**.
2. Press DOWN arrow  to access the list of options.
3. Select:
 - ▶ Magnetic
 - ▶ Pressure

Figure GS-27: Options: Steering wheel sensor

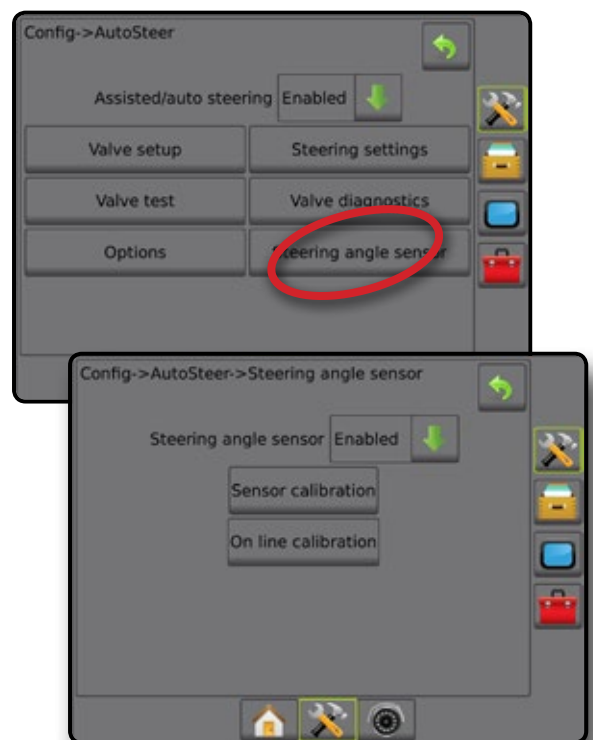


Steering angle sensor

Steering angle sensor is used establish the Steering angle sensor (SAS) as the primary feedback sensor for auto steering.

1. Select **Steering angle sensor**.
2. Select if the steering angle sensor is
 - ▶ Enabled
 - ▶ Disabled.
3. Select from:
 - ▶ Sensor calibration – sets the turn rate when steering the vehicle left and right
 - ▶ On line calibration – adjusts the path of travel to the established guideline when auto steering is tuned well and the vehicle maintains a straight line, but the vehicle hangs off the guideline to one side or another


Figure GS-28: Steering angle sensor



Assisted/auto steering

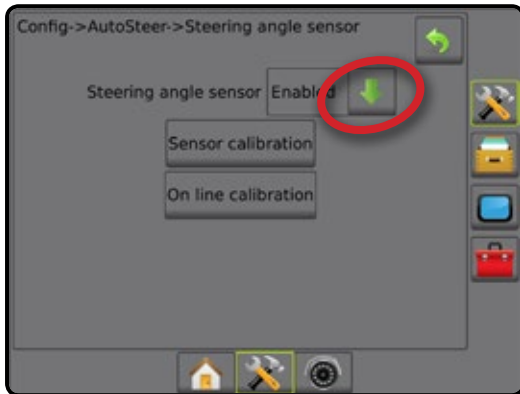
Enable/disable steering angle sensor

Set the use of a steering angle sensor to enabled or disabled.

1. Press DOWN arrow  to access the list of options.
2. Select:
 - ▶ Enabled
 - ▶ Disabled

If steering angle sensor is set to “Disabled”, all steering angle sensor capabilities and setup functions will be disabled (options will be greyed out).

Figure GS-29: Enabled and disabled assisted/auto steering options



Sensor Calibration

Sensor calibration sets the turn rate when steering the vehicle left and right. Calibration is required after the SAS is installed.

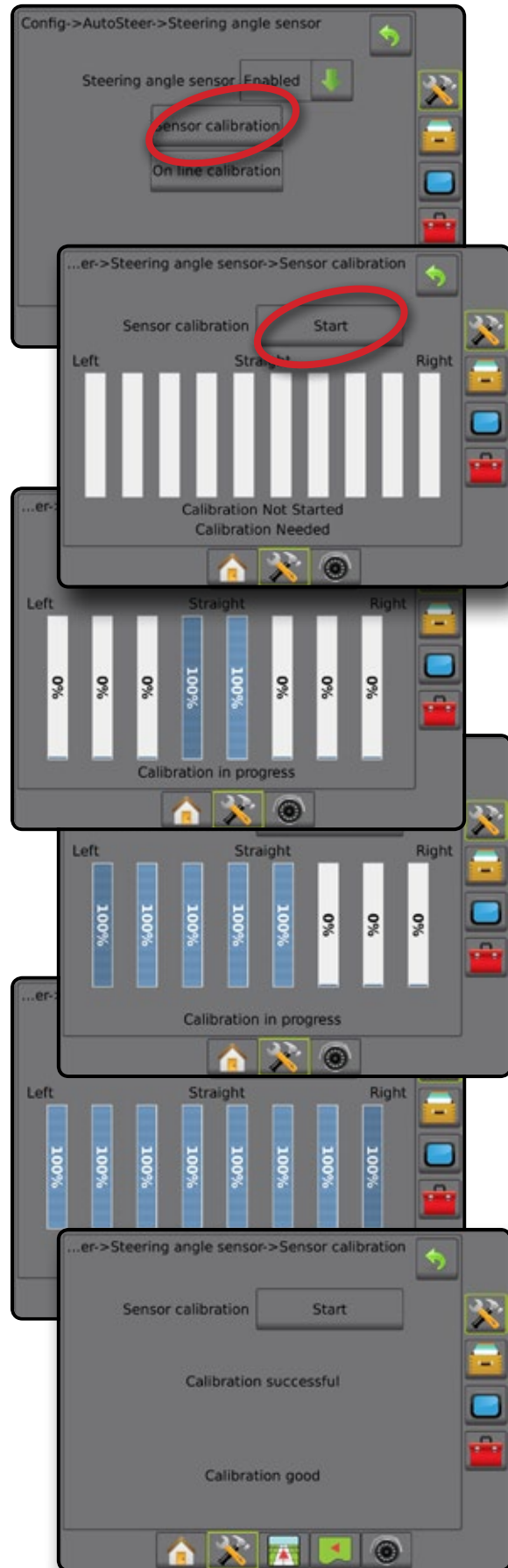
NOTE: A GPS signal is required for this test.

RECOMMENDATION: Have a large area of clear space available to perform test cycles. Vehicle speed must be between 1.5 - 13.0 km/h (0.4 - 3.6 m/s).

1. Select **Sensor calibration**.
2. Slowly move the vehicle in a slow forward motion so the centre two calibration boxes fill to 100%.
3. While still moving, slowly turn to the right or left until the appropriate right or left calibration boxes are filled to 100%.
4. While still moving, slowly turn in the opposite direction until the appropriate left or right calibration boxes are filled to 100%.
5. “Calibration successful” will appear when both left and right calibrations have been completed.

Press **Stop** to cancel the calibration.

Figure GS-30: Calibrate sensor



On line calibration

On line calibration adjusts the path of travel to the established guideline when auto steering is tuned well and the vehicle maintains a straight line, but the vehicle hangs off the guideline to one side or another.

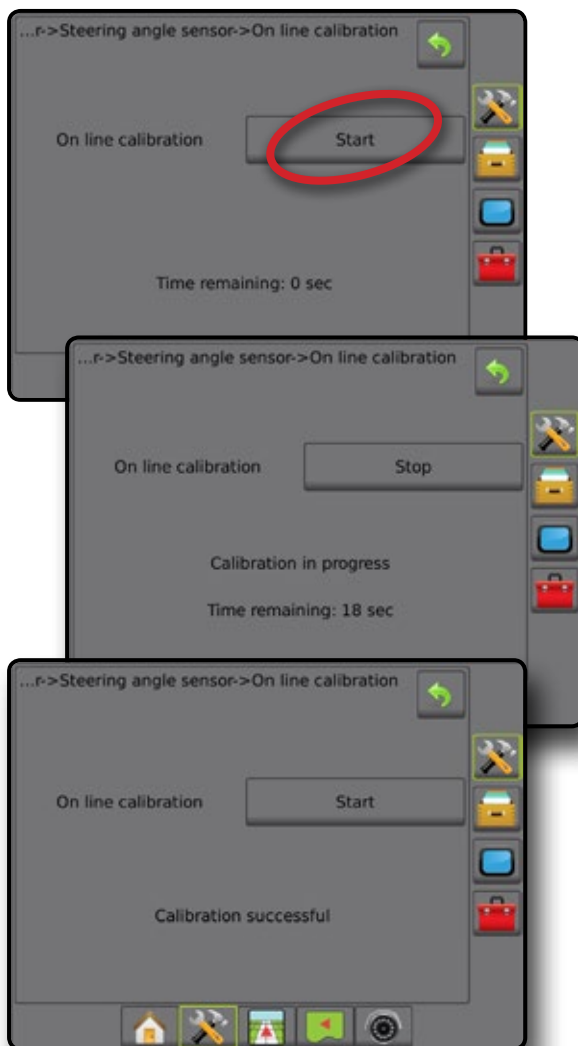
NOTE: A GPS signal is required for this test.

RECOMMENDATION: Have a large area of clear space available to perform a test cycle. Typical operating speed must be maintained for at least 30 seconds.

1. Establish and/or activate a Straight AB guideline.
2. Select **On line calibration**.
3. Engage assisted/auto steering guidance on established straight AB guideline.
4. While the vehicle is moving in a forward straight line motion at typical operating speed on the established guideline, press **Start**.
5. Allow the vehicle to drive using the Assisted/auto steering for 30 seconds
6. "Calibration successful" will appear when calibration has been completed.

Press **Stop** to cancel the calibration.

Figure GS-31: On line calibration






Assisted/auto steering

TILT CORRECTION

When a Steering Control Module (SCM) or Tilt Gyro Module (TGM) is present, Tilt Correction options will be available. The Tilt function corrects the GPS signal to compensate for errors in the GPS position while operating on sloped terrain.

NOTE: A mistake in the calibration process that results in a 1 degree error in the Tilt reading from the SCM/TGM will result in a 5.1 cm error in guidance [on a machine that has 2.9 m antenna height]. This potential error necessitates that all reasonable care is taken to ensure that the system is installed and calibrated correctly in order to produce accurate Tilt measurement and machine guidance.

1. Press CONFIGURATION side tab .
2. Press **Tilt correction**.
3. Select if tilt correction is enabled or disabled.
4. When enabled, select **Field level** to calibrate tilt correction.
5. Press RETURN arrow  or CONFIGURATION side tab  to return to the main Configuration screen.

NOTE: If FieldPilot or UniPilot is being used, a Tilt Gyro Module is built into the system.

NOTE: Antenna Height must be entered prior to Field level procedure.

Figure GS-32: Tilt Correction



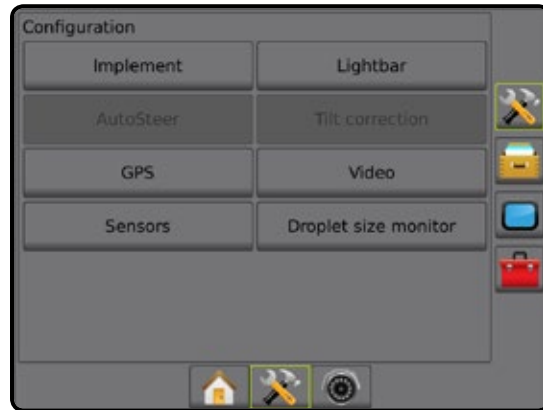
Field level unavailable

If the vehicle is in motion, the field level option will not be available. Vehicle must be stopped for at least 10 seconds to begin to calibrate tilt correction.

Tilt correction unavailable


If a TGM or SCM is not connected, setup options will not be available.

Figure GS-33: Tilt correction not detected



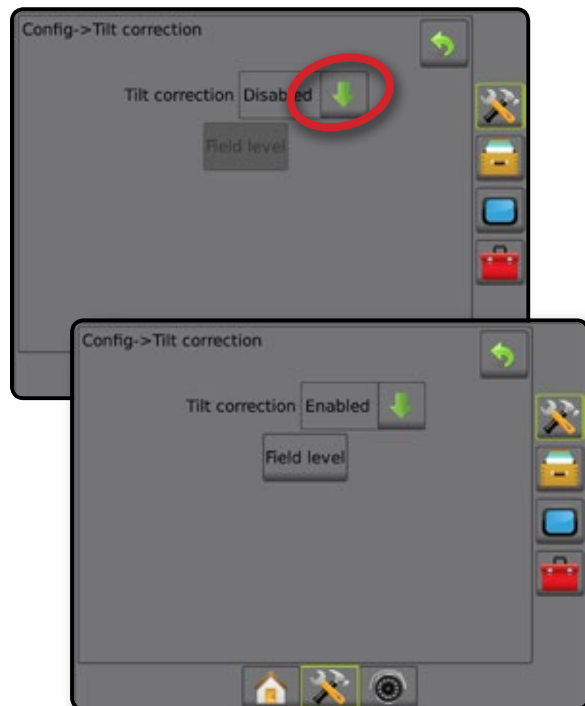
Enable/disable tilt

Set Tilt option to enable or disable.

1. Press DOWN arrow  to access the list of options.
2. Select:
 - ▶ Enable
 - ▶ Disable

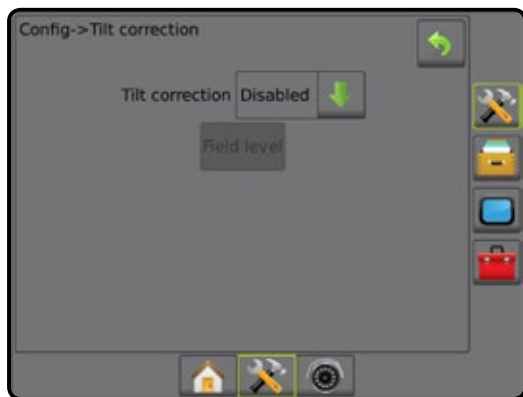
NOTE: When tilt is enabled and the vehicle is in motion, **Field level** will not be available. Vehicle must be stopped for at least 10 seconds to begin to calibrate tilt correction.

Figure GS-34: Tilt enable/disable



If tilt correction is set to "Disable", field leveling capabilities will be disabled (option will be greyed out).

Figure GS-35: Tilt correction disable



Field level

Field level will calibrate the SCM/TGM's level surface value.

Before performing Field level:

- Use a quality GPS receiver/antenna
- Make sure the GPS antenna is mounted as per the manufacturer's installation instructions
- The SCM/TGM **must be securely mounted** to a surface that moves in parallel to the surface that the GPS antenna is mounted on. For example, if the antenna is mounted to the roof of the cab, the SCM/TGM should be mounted to another surface on the cab, not on the chassis.
- Mount the SCM/TGM on a horizontal surface with the connectors facing straight up and the arrow on the decal pointing in the primary direction of travel.
- Choose a calibration site that is as level as possible

To calibrate the SCM/TGM:

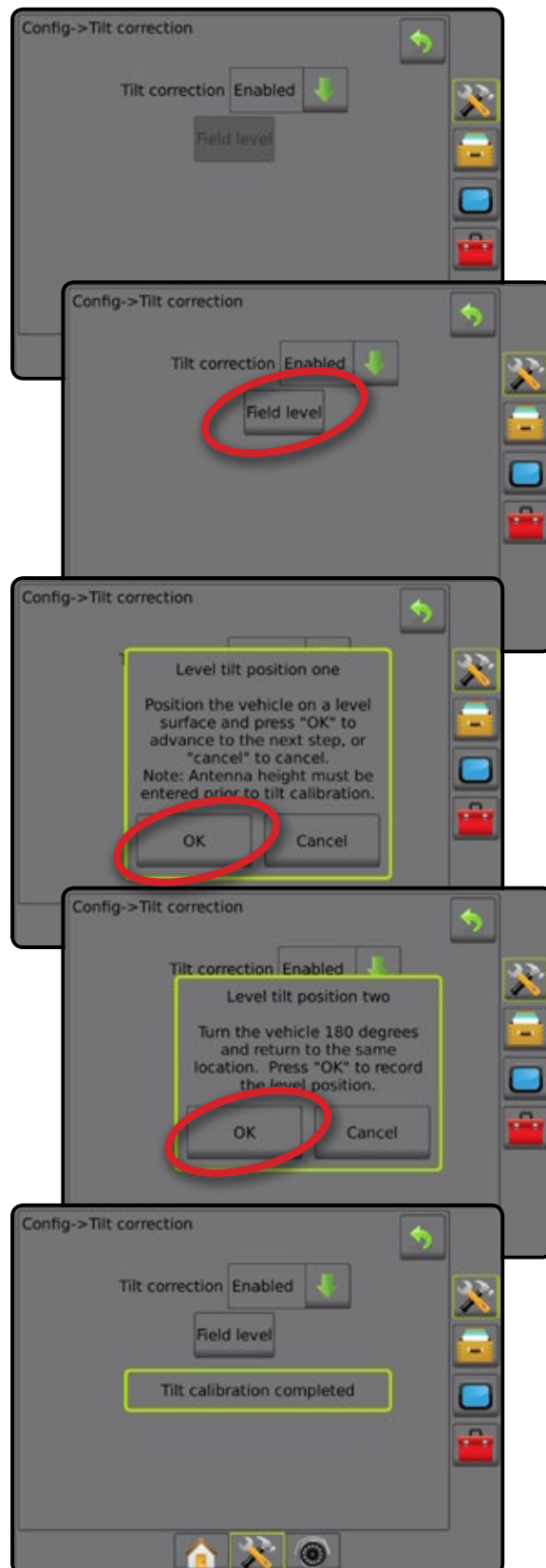
1. Position the vehicle on a level surface. Let vehicle sit/settle for at least 10 seconds.
2. Select **Field Level**.
3. Let vehicle sit/settle for at least 10 seconds.
4. Press **OK**.

*NOTE: Until vehicle has been stopped for at least 10 seconds, **OK** will not be available.*

5. Get out of the vehicle to mark on the ground the exact position of the vehicle (use paint, sticks, or something similar).
6. Turn the vehicle 180 degrees and reposition the vehicle in exactly the same location (the front wheels should now be where the back wheels were, and the back wheels should be where the front wheels were).
7. Let vehicle sit/settle for at least 10 seconds.
8. Press **OK**.

*NOTE: Until vehicle has been stopped for at least 10 seconds, **OK** will not be available.*

Figure GS-36: Field level

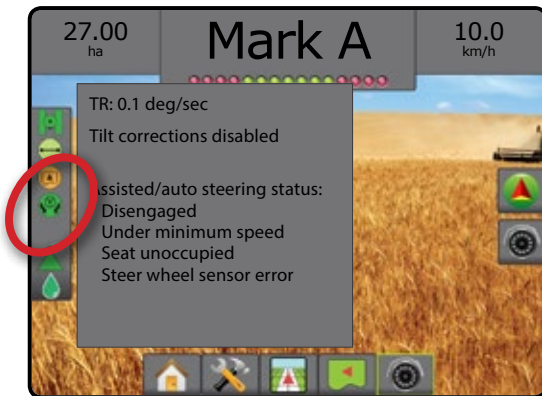


AUTO/ASSISTED STEERING OPERATION




Assisted/auto steering status

Assisted/auto steering status displays information regarding the current status of the assisted/auto steering system including tilt status.

1. Press ASSISTED/AUTO STEERING STATUS icon   .




Assisted/auto steering status

-  Green = engaged, actively steering
-  Yellow = enabled, all conditions have been met to allow for assisted/auto steering
-  Red = disabled, all conditions have not been met to allow for assisted/auto steering.
- No icon = no assisted/auto steering system installed



Tilt correction status

Tilt correction status displays information regarding the current status of the tilt correction system.

1. Press TILT CORRECTION STATUS icon  .



Tilt correction status

-  Coloured = engaged, actively applying tilt correction
-  Red = disabled
- No icon = no tilt gyro module installed on system or tilt is associated with assisted/auto steering system

APPENDIX - FACTORY SETTINGS & RANGES

AutoSteer Setup Settings

Description	Factory Setting	Range	FieldPilot Recommended Setting	UniPilot Recommended Setting	User Settings
AutoSteer	Enabled				
Valve Type	Standard PWM		**	Standard PWM	
Valve Frequency	175 Hz	0.9 - 15000.1 Hz	**	100 Hz	
Minimum Duty Cycle Left	20.0%	0.0 - 50.0%	30.0%	30.0%	
Minimum Duty Cycle Right	20.0%	0.0 - 50.0%	30.0%	30.0%	
Maximum Duty Cycle	50%	25 - 100%	100%	100%	
Lock-to-Lock Time	0 seconds		**	5-6 seconds*	
Coarse Steering Adjustment	25.0	1.0-100.0	25	25	
Fine Steering Adjustment	25.0	1.0-100.0	25	25	
Deadband	1	1-10	1	1	
Lookahead	4.0	0.0-10.0	3.5	3.5	
Steering Wheel Sensor	Magnetic		N/A	N/A	
Steering Angle Sensor	Disabled				

** Specified in specific vehicle installation guide.

* When traveling at speeds greater than 16 kph, increase lock-to-lock time to 7-8 seconds.

Tilt Correction Setting

Description	Factory Setting	Range	FieldPilot Recommended Setting	UniPilot Recommended Setting	User Settings
Tilt Correction	Enabled				