



# Universal Guidance Kit (GEN II) Installation Guide

Part Number AGA5182

Rev Number 1.0

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# Preface

This manual provides information about installing this Topcon Precision Agriculture product. Correct installation, use and servicing is important for safe and reliable operation of the product.

It is very important that you take the time to read this manual before installing the product.

# Terms and Conditions



*Please read these Terms and Conditions carefully.*

This manual is designed to assist you with installing this Topcon product. Its use/maintenance is subject to these Terms and Conditions and any more fully set forth in an Operator's Manual.

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Improper use of the product can lead to death or injury, damage to property and/or malfunction of the product. The product should only be repaired by authorized TPA service centers. You should closely review the safety warnings and directions in this manual and comply with these at all times.

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- the laws of the State of California if the product is sold and supplied to you outside of Australia.

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Comments, suggestions, and questions about TPA products are welcomed. Contact your local TPA representative or a representative at our corporate facility.

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## Service Information

Service assistance can be provided by contacting your local TPA Authorized Dealer or by calling the Topcon Precision Agriculture Service Centre.

Phone: +61 8 8203 3300 Fax: +61 8 8203 3399

Hours: 8.30am to 5pm (Australian Central Time) Monday through Friday.

## Alert Symbols



*Supplementary information to help set up and maintain the system and/or information that will benefit system operation, performance, measurements or personal safety.*



**CAUTION:** *This indicates that an action could affect system operation, system performance, data integrity or personal health.*



**WARNING:** This indicates that an action can/will result in system damage, loss of data, loss of warranty or personal injury.



**CRITICAL:** This indicates a critical action that must be taken to avoid possible serious injury or death.



**PROHIBITED:** UNDER NO CIRCUMSTANCES should this action be performed

## Operator Safety



**WARNING:** DO NOT remove or obscure safety signs. Replace any safety signs that are not readable or are missing. Replacement signs are available from your dealer in the event of loss or damage.



**WARNING:** It is YOUR responsibility to read and understand the safety sections in this book before working on the equipment. Remember that YOU are the key to safety.

Good safety practices not only protect you, but also the people around you. Study this manual as part of your safety program. This safety information only relates to Topcon equipment and does not replace other usual safe work practices.

Information in this manual is current at the time of publication. A system may vary slightly. The manufacturer reserves the right to redesign and change the system as necessary without notification.

## Preparation for Operation



**PROHIBITED:** Never operate the vehicle with any panels or guards removed. If the removal of panels or guards is necessary to make a repair, they MUST be replaced before operation.



**PROHIBITED:** Topcon equipment must not be used by an operator affected by alcohol or drugs. Seek medical advice if using prescription or over-the-counter medication.

## Electrical Safety



**WARNING:** Incorrectly connected power can cause severe injury and damage to people or the equipment.

## Disclaimer

Topcon accepts no responsibility or liability for damages to property, personal injuries, or death resulting from the misuse or abuse of any of its products.

Further, Topcon accepts no responsibility for the use of Topcon equipment or the GNSS signal for any purpose other than the intended purpose.

Topcon cannot guarantee the accuracy, integrity, continuity, or availability of the GNSS signal.

The operator must ensure that the equipment is correctly turned off when not in use.

Before operating any vehicle equipped with Topcon products, read and understand the following product specific safety precautions in the Operator's Manual for the equipment.

## Safety for this Installation



### ***CRITICAL: Before starting any work on the vehicle***

- Shut down the vehicle as per the manufacturer's operator's guide.
- Allow the machine to cool before working on the machine.
- Remove the ignition key to prevent accidental starting of the machine.



### ***CRITICAL: Practice safe workshop practices***

- Clean the machine and target work areas thoroughly before commencing any work on the vehicle to prevent contamination of hydraulic and electrical systems.
- Wear appropriate clothing and footwear protection.
- Do not perform the installation alone. Have someone with you to assist.
- Dispose of any oil, coolant or machine fluid as per local laws and legislation.
- Manually secure any machine components that must be raised, worked under, worked around or removed as part of the installation or service procedure.
- Never work on, adjust, lubricate or perform maintenance on a vehicle that is in motion or has powered moving parts.
- Keep all vehicle parts in good working order. If damage is found, report damage to the vehicle owner and your manager immediately.
- For self-propelled machines equipped with an electrical system, disconnect the negative (-) and positive (+) battery terminals before performing electrical system service and maintenance or welding on the vehicle.
- Implements equipped with an electrical system, disconnect the entire implement - tractor harness connections before performing electrical system service and maintenance or welding on the implement.



### ***CRITICAL: Install and handle brackets and electronic system components safely***

- Install and handle all vehicle mounting brackets in a safe manner. Serious injury can result from falling while performing service, installations or maintenance. Use secure vehicle handholds and footholds where specified by the manufacturer. If footholds and handholds do not allow access to the necessary work area; use a ladder, scaffold or other means of safe, secure access. Do not commence work in wet, windy or icy conditions.
- Inside and outside the cabin, ensure that the harnesses are routed safely out of the way of operators and will not be damaged in normal use.
- Attach the power connector at the end of installation to prevent any risk of electrical damage.

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# Chapter 1 – Introduction and Components

The Universal Guidance Kit Generation II allows generation II consoles and receiver harness systems to be installed on a generic vehicle. This kit is a generic solution for all agriculture vehicle types and is not specific to any brand or manufacturer.

The Universal Guidance harness system supports the ACU-1 and AES-25 guidance controllers directly with ISOBUS options for auto-steering, rate and product control plus ASC-10 options for rate and product control simultaneously.

Installation time: Approximately 3 hours. Installation time may vary from vehicle to vehicle.

## 1.1. Required Components

### 1.1.1. Supplied Components

AGA5183 KIT, Gen II Universal Guidance

### 1.1.2. Additional Components

If connecting to the following products, you may also need:

Product	Part Number	Description
AGI-4 Receiver	AGA4713	HARNESS AGI-4 Receiver Extension
SGR-1 Receiver	AGA4785	HARNESS SGR-1 Receiver Extension
AGI-3 Receiver	AGA4680	HARNESS AGI-3 Receiver Extension
X30 Console	AGA4647	HARNESS X30 Terminal Extension
GX45 Console	AGA4652	HARNESS GX-45 Terminal Extension
A5 Console	AGA4717	HARNESS A5 Terminal Extension
X20 Console	AGA5165	HARNESS X20 Terminal Extension

### 1.1.3. Optional Components

AGA5293 KIT System Switched Power

AGA5179 KIT, Articulated Tractor ISOBUS Extension

A3819 ASSEMBLY AES-25 Power Steer Junction Box

AGA5079 SWITCH Remote Guidance Engage

Contact your Topcon dealer if the required kits are not supplied.

## 1.2. Parts List

### 1.2.1. AGA5183 KIT, Generation II Universal Guidance

<b>Part Number</b>	<b>Description</b>	<b>Quantity</b>
AGA5181	KIT Generation II Universal Guidance Harness	1
AGA5184	KIT Generation II Universal Guidance Hardware Accessory	1
AGA5111	KIT MT700/800/900 C, D, E Terminal Connector Mount	1
AGA4399	BRACKET ASSEMBLY Cab Harness AGI-3	1



**AGA5181 – KIT Generation II Universal Guidance Harness**

Part Number	Description	Quantity
A1119	EXTENSION HARNESS 2 Wire Weather Pack 2M (6.5ft)	1
		
AGA4211	HARNESS, ACU-1 Power Adaptor	1
		
AGA4678	HARNESS Active ISO11783 Terminator	1
		
AGA4807	HARNESS Universal Guidance Cab	1
		
AGK159	CAN TERMINATOR ISO11783 Bias Circuit	2
		

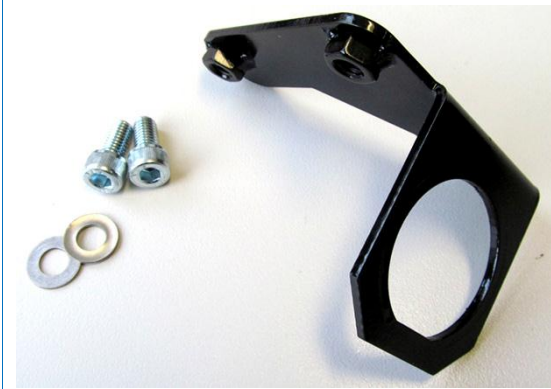
**AGA5184 – KIT Generation II Universal Guidance Hardware Accessory**

Part Number	Description	Quantity
AGA5182	INSTALL GUIDE Generation II Universal Guidance Kit	1
AGA5266	INSTALL GUIDE AGI-4 Mount and Set Up	1
AGM416	GROMMET Krone Harness	1
AGO352	DECAL Sheet Topcon "PRECISION ACTIVE"	1
AGW289	WARRANTY CARD, AG Universal	1
B106	U-BOLT Ram W/2 FOR ¾ - 1¼ Zynx Mount	1
Y004	CABLE TIE 380 mm x 4.8 mm Black	20
Y707	ADHESIVE CABLE CLAMP 26 mm	10



**AGA5111 – KIT MT700/800/900 C, D, E Terminal Connector Mount**

Part Number	Description	Quantity
AGB1307	BRACKET MOUNT MT700/800/900 C,D,E Terminal Connector	1
AGF543	SCREW M8 x 16 SHCS - ZP	2
F379	WASHER M8 304 SS	2


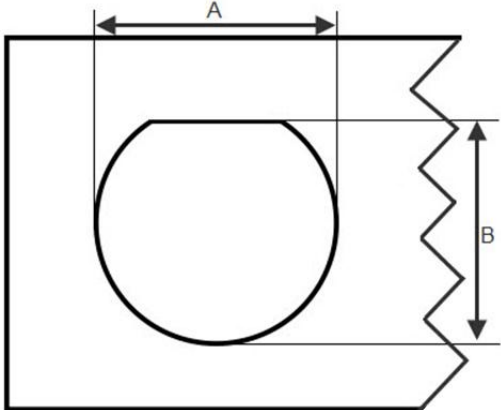



**AGA4399 – BRACKET ASSEMBLY Cab Harness AGI-3**


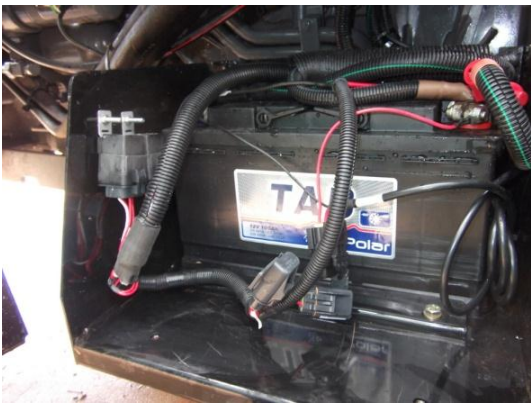

Part Number	Description	Quantity
AGB1240	BRACKET Deutsch HD24 AGI-3 Generic Roof Mount	1
AGF430	BOLT - Carriage M10 x 30 Galvanized DIN 603	1
AGF440	WASHER Plain M10 Galvanized	1
AGF426	NUT M10 Galvanized	1



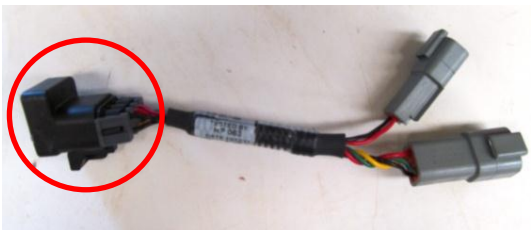



# Chapter 2 – Install the Universal Guidance Harness

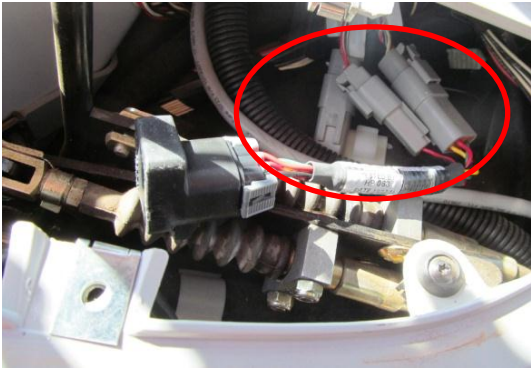
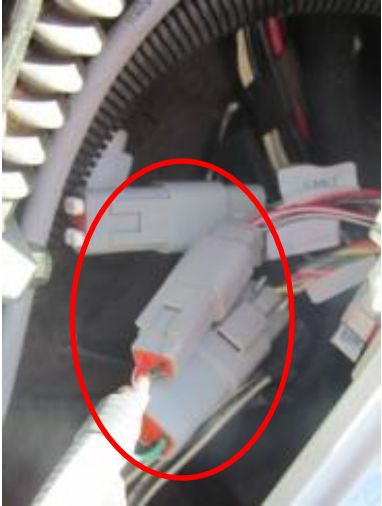


Step	View	Procedure
1.		<p>If a suitable location in the vehicle trim panel can be found to mount the Guidance Harness connector, use a hole-cutter, D punch or similar tool, to cut a hole as per the following dimensions:</p> <p>A = 43 mm/1.69" B = 41.5 mm/1.63"</p>  <p><b>Note:</b> Ensure the supplied console harness will reach between the console mounting location and this hole.</p> <p>Mount the AGA4807 HARNESS connector labeled [TERMINAL SEPARATION] through the drilled hole.</p>
2.		<p>If it is not possible to mount the AGA4807 HARNESS connector labeled [TERMINAL SEPARATION] in the vehicle trim panel, use the AGA5111 KIT Terminal Connector Mount.</p> <p>Mount the AGB1307 BRACKET to a secure surface, such as a rail or mounting surface. Use the M8 x 16 SCREW (AGF543) and M8 WASHER (F379) to fasten the AGB1307 BRACKET.</p> <p>Mount the AGA4807 HARNESS connector labeled [TERMINAL SEPARATION] through the AGB1307 BRACKET.</p>




Step	View	Procedure
3.		<p>Route the AGA4807 HARNESS connector labeled [RECEIVER SEPARATION] towards the roof.</p>
4.		<p>If required, cut a 50 mm/ 1.97” hole in the roof surface or inner roof surface and use AGM416 GROMMET Krone to seal the cavity.</p>
5.		<p>Mount AGB1240 BRACKET to the roof surface.</p> <p>Secure AGB1240 BRACKET to the roof with supplied M10 x 30 BOLT (AGF430), M10 WASHER (AGF440), and M10 NUT (AGF426).</p>

Step	View	Procedure
6.		<p>Place AGA4807 HARNESS connector labeled [RECEIVER SEPARATION] in the bracket and secure with the bolt and washer attached to the end of the harness.</p>
7.		<p>Connect AGA4211 HARNESS directly to the battery, battery relay or cab power pole and a secure ground point.</p> <p>Connect AGA4211 HARNESS to the AGA4807 HARNESS connector labeled [UNSWITCHED POWER].</p> <p>If required, connect the A1119 EXTENSION HARNESS between AGA4211 HARNESS and AGA4807 HARNESS connector labeled [UNSWITCHED POWER].</p>
8.		<p> <i>For ISOBUS terminal installations only</i></p> <p>Install the AGA5293 KIT, and connect the AGA5294 HARNESS, to the AGA4807 HARNESS connector labeled [KEY POWER].</p> <p>To install the AGA5293 KIT, refer to the AGA5295 INSTALL GUIDE.</p>


Step	View	Procedure
9.		<p>Secure the AGA4807 HARNESS connectors labeled [AUX. SERIAL], [GPS OUT], [REMOTE MAPPING] and [RADAR], in a safe location for future use.</p>
10.		<p>Ensure AGA4807 HARNESS connectors labeled [CAN 1] and [CAN 2] have terminators in place.</p>
11.		<p> <i>CAN 1/ ISOBUS connection</i></p> <p>If the installation is <b>not using</b> an ISOBUS breakaway connector extension kit:          Connect the AGK159 CAN TERMINATOR to the AGA4678 HARNESS.</p>

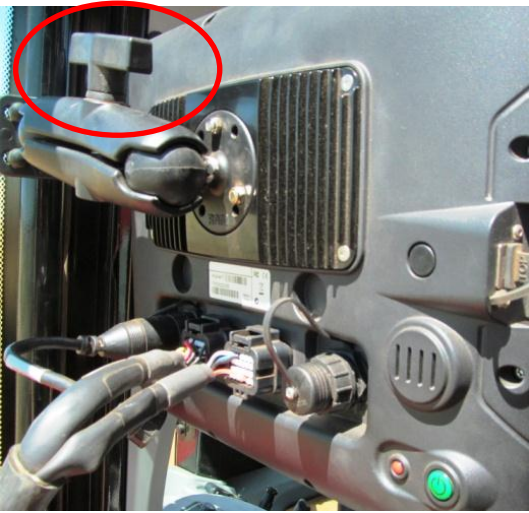








Step	View	Procedure
12.		<p>Connect the AGA4678 HARNES to the AGA4807 HARNES connectors labeled [CAN 1] and [SWITCHED POWER].</p>
13.		<p>If the installation <b>is using</b> an ISOBUS breakaway connector extension kit: Install the AGA5179 KIT. Connect AGA5082 HARNES connectors labeled [CAN 1] and [SWITCHED POWER] to the AGA4807 HARNES connectors labeled [CAN 1] and [SWITCHED POWER] respectively.</p>
14.	 <p data-bbox="284 1686 475 1720"><i>AES-25 shown</i></p>	<div data-bbox="858 1234 970 1346" style="text-align: center;">  </div> <p data-bbox="975 1317 1318 1350" style="text-align: center;"><i>Guidance BUS connection</i></p> <p>If using a Topcon guidance controller (ACU-1 or AES-25) with the universal guidance kit installation: Connect the AGA4807 HARNES connector labeled [GUIDANCE INTERFACE] to the mating 5 pin of the A3819 ASSEMBLY.</p>



Step	View	Procedure
15.		<p> <i>CAN 2/ASC-10 BUS connection</i></p> <p>If using an ASC-10 ECU for implement or section control</p> <p>Install the ASC-10 ECU and connect the CAN connector the AGA4807 HARNESS connector labeled [CAN2].</p>
16.		<p>Apply the AGO352 DECAL SHEET - TOPCON - PRECISION ACTIVE to both left and right lower cab windows as shown.</p>

# Chapter 3 – Installing the Console

Generic Step	Procedure
	<p>To mount a console, install the supplied B106 U-BOLT base mount to the vehicles side rail then refer to the steps described in the following table.</p>

Step	View	Procedure
<b>For X30 Console</b>		
1.		<p>Place the console with supplied RAM arm onto the pre-installed B106 U-BOLT.</p> <p>Adjust the console position and secure by tightening RAM handle, as shown in the picture.</p> <p>Connect the AGA4647 HARNESS to the console connection points.</p> <p> <i>The Ethernet connector is not required for current console use but it can be connected. If required secure the Ethernet connector with supplied Y004 CABLE TIE.</i></p>
2.		<p>Connect AGA4647 HARNESS to the AGA4807 HARNESS connector labeled [TERMINAL SEPARATION].</p>

Step	View	Procedure
<b>For GX45 Console</b>		
1.		<p>Place the console with supplied RAM arm onto the pre-installed B106 U-BOLT.</p> <p>Adjust the console position and secure by tightening RAM handle, as shown in the picture.</p> <p>Connect the AGA4652 HARNESS to the console connection points.</p>
2.		<p>Connect AGA4652 HARNESS to the AGA4807 HARNESS connector labeled [TERMINAL SEPARATION].</p>
<b>For A5 Console</b>		
1.		<p>Place the console with supplied RAM arm onto the pre-installed B106 U-BOLT.</p> <p>Adjust the console position and secure by tightening RAM handle.</p> <p>Connect AGA4717 HARNESS to the console connection points.</p>
2.		<p>Connect AGA4717 HARNESS to the AGA4807 HARNESS connector labeled [TERMINAL SEPARATION].</p>

Step	View	Procedure
<b>For X20 Console</b>		
1.		<p>Place the console with supplied RAM arm onto the pre-installed B106 U-BOLT.</p> <p>Adjust the console position and secure by tightening RAM handle.</p> <p>Connect AGA5165 HARNESS to the console connection points.</p>
2.		<p>Connect AGA5165 HARNESS to the AGA4807 HARNESS connector labeled [TERMINAL SEPARATION].</p>


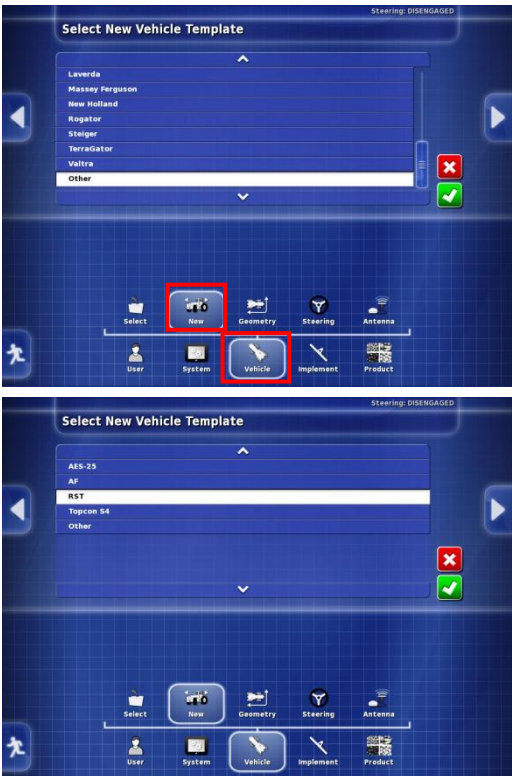
# Chapter 4 – Installing the Receiver

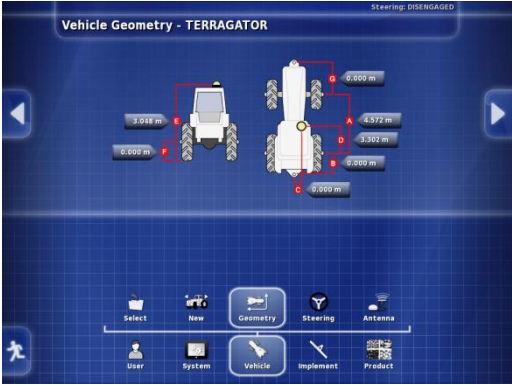

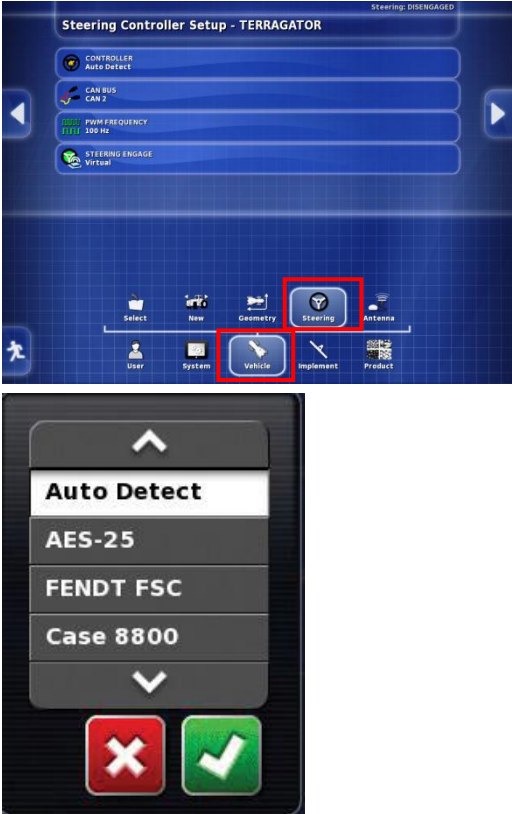

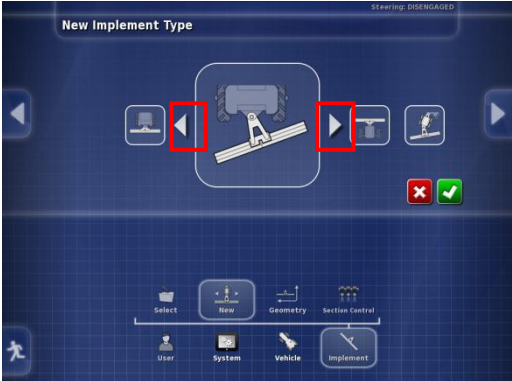
View	Procedure
<p data-bbox="164 347 438 380"><b>For AGI-4 Receiver</b></p>  A photograph showing a grey receiver unit mounted on a metal surface. The receiver is connected to a black harness that loops around and connects to another component below it. The receiver has some yellow markings on its top.	<p data-bbox="726 459 1300 772">Mount the receiver with the desired mounting option. Secure the receiver to the mounting bracket. Connect the AGA4713 HARNESS to the receiver connection points. Connect the other end to the AGA4807 HARNESS connector labeled [RECEIVER SEPARATION]</p>
<p data-bbox="164 855 438 889"><b>For AGI-3 Receiver</b></p>  A photograph showing a receiver unit with a yellow top mounted on a metal surface. It is connected to a black harness. The receiver has a yellow top with some markings.	<p data-bbox="726 996 1300 1310">Mount the receiver with the desired mounting option. Secure the receiver to the mounting bracket. Connect the AGA4680 HARNESS to the receiver connection points. Connect the other end to the AGA4807 HARNESS connector labeled [RECEIVER SEPARATION]</p>
<p data-bbox="164 1433 438 1467"><b>For SGR-1 Receiver</b></p>  A photograph showing a receiver unit with a yellow top mounted on a metal surface. It is connected to a black harness. The receiver has a yellow top with some markings.	<p data-bbox="726 1545 1300 1859">Mount the receiver with the desired mounting option. Secure the receiver to the mounting bracket. Connect the AGA4785 HARNESS to the receiver connection points. Connect the other end to the AGA4807 HARNESS connector labeled [RECEIVER SEPARATION]</p>

# Chapter 5 – Guidance System Calibration

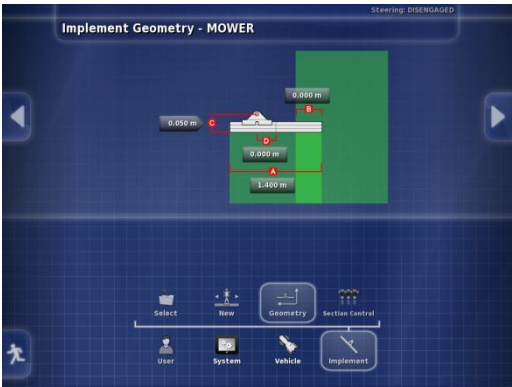

Instruction is shown for X30 console. Instruction procedure is the same for GX45 console. Consult ISOBUS VT or System 250 operator's guide for additional calibration instruction for those specific system installations. Consult ISOBUS VT or System 250 operator's guide for steering system component compatibility.

## 5.1. Select Vehicle and Implement

Step	View	Procedure
1.		<p>Start the X30 console and confirm that the software version is 3.15.22 or above.</p> <p>If not, update console software to 3.15.22 or higher.</p>
2.		<p>Select <b>Vehicle</b> from the <b>Main Setup Menu</b> and select <b>New</b>.</p> <p>Select the vehicle type <b>Other</b> or <b>AES-25</b>.</p> <p>The vehicle name can be edited if required.</p>

Step	View	Procedure
3.	 <p>The screenshot shows the 'Vehicle Geometry - TERRAGATOR' screen. It displays two vehicle models: a tractor on the left and an implement on the right. Dimensions are indicated with red lines and labels: 3.018 m for the tractor's width, 4.000 m for the implement's width, 4.572 m for the implement's length, and 3.202 m for the implement's height. A bottom menu includes 'Select', 'New', 'Geometry', 'Steering', and 'Antenna'.</p>	<p>The vehicle details will automatically populate the geometry fields.</p> <p>Click on a field to enter or alter the dimensions of the vehicle.</p> <p> <i>Always compare vehicle dimensions against actual dimensions as different vehicle options can affect overall dimensions. Different tire size packages are the most common cause. Vehicle dimensions entered should be within 100mm/3.9" of actual measurements for optimal performance.</i></p>
4.	 <p>The top screenshot shows the 'Steering Controller Setup - TERRAGATOR' screen. It lists 'CONTROLLER Auto Detect', 'CAN BUS CAN 2', 'PWM FREQUENCY 350 Hz', and 'STEERING ENGAGE Virtual'. The bottom menu has 'Vehicle' and 'Steering' highlighted with red boxes.</p> <p>The bottom screenshot shows a selection menu with options: 'Auto Detect', 'AES-25', 'FENDT FSC', and 'Case 8800'. There are red 'X' and green checkmark buttons at the bottom.</p>	<p>Select <b>Vehicle</b> and select <b>Steering</b>.</p> <p>Select <b>CONTROLLER</b>.</p> <p>Choose <b>Auto Detect</b> for the ACU-1 controller or <b>AES-25</b> for the AES-25 controller and confirm .</p>
5.	 <p>The screenshot shows the 'New Implement Type' screen. It features a central icon of a combine harvester. Red boxes highlight the left and right arrow buttons. A bottom menu includes 'New', 'Geometry', and 'Section Control'.</p>	<p>Select <b>Implement</b> from the <b>Main Setup Menu</b> and select <b>New</b>. Use the arrows to choose the implement type.</p>



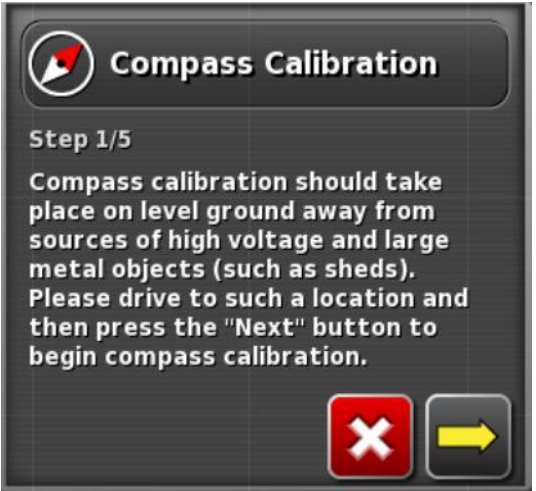

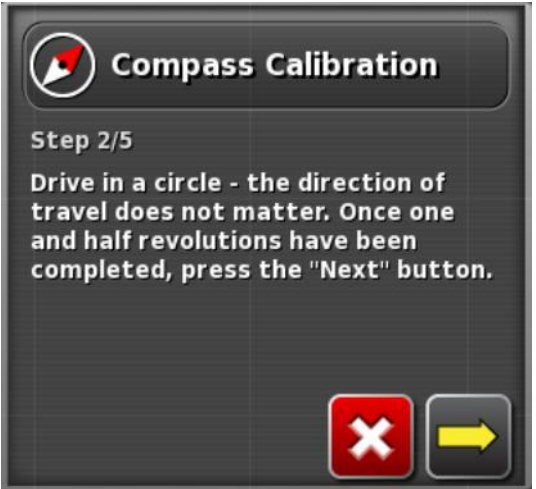



Step	View	Procedure
6.		<p>Select a field to enter the dimensions. (Rear mounted implement type shown.)</p> <p> <i>Full implement/rate control set up is not required for steering but a width dimension is necessary to space waylines. Default is 10m (when any implement is selected without section or rate control) and this is acceptable for steering calibrations.</i></p>

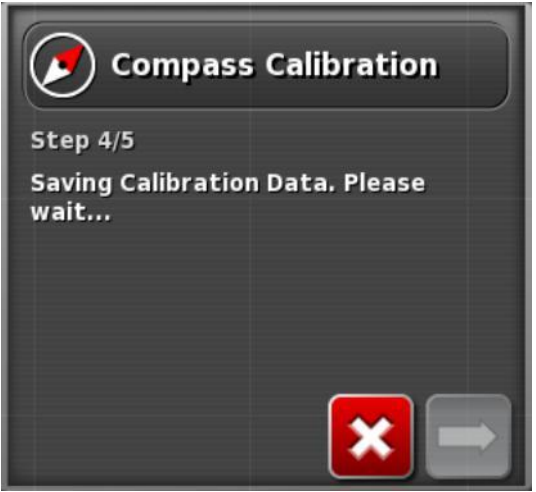
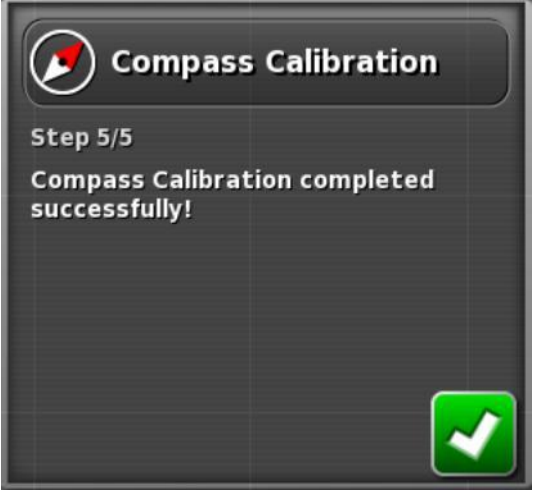

## 5.2. Calibrate Steering














**WARNING:** Drive the vehicle to a suitable area with level ground, away from people and obstacles with room to drive in complete circles. To ensure accurate calibration the vehicle should have open sky visibility and be well away from trees, high voltage power wires and buildings.








Step	View	Procedure
1.		<p>Perform the compass, wheel angle sensor and mounting bias calibrations.</p> <p>Select <b>Steering Options Menu</b> and select <b>Auto Steer Calibration</b> to open the <b>Steering Calibration Menu</b>.</p>
2.		<p>For <b>All</b> guidance controllers: Select <b>COMPASS</b>.</p> <p> <i>If the component reports as calibrated, still complete the calibration procedure if the receiver has not been calibrated on this vehicle.</i></p>






Step	View	Procedure
3.		<p>Compass calibration requires the vehicle to complete 1 and ½ circles at an approximately 75% full lock turn.</p> <p>When ready, select Next .</p>
4.		<p>Drive the vehicle at approximately 75% of full lock; the direction does not matter.</p> <p>Once 1½ turns have been completed select Next .</p>
5.		<p>Drive the vehicle straight ahead for approximately 100 m and then <b>STOP</b> the vehicle.</p> <p>Select Next  to continue.</p>

Step	View	Procedure
6.		<p>The compass calibration data is saved and stored in both the receiver and the vehicle subsystem.</p>
7.		<p>Compass has been calibrated successfully. Select Confirm  to continue and return to <b>Steering Calibration Menu</b>.</p>





Step	View	Procedure
8.		<p>For <b>AES-25 without wheel angle sensor</b> - Wheel angle sensor calibration is not required.</p> <p>For <b>ACU-1 controller or AES-25 controller with wheel angle sensor</b>: Select <b>WHEEL ANGLE SENSOR</b>.</p> <p> <i>If the component reports as calibrated, still complete the calibration procedure if the receiver has not been calibrated on this vehicle.</i></p> <p> <i>AES-25 with wheel sensor calibration will move the wheels automatically to the left, then automatically to the right and then automatically to the center position. Ensure there is enough space to complete the calibration procedure before next is pressed.</i></p>
9.		<p>Drive the vehicle forward to start the procedure. The wheel angle sensor calibration should be completed at 2 kph or 1.2 mph.</p> <p>Turn the steering wheel full lock to the left and select Next .</p>


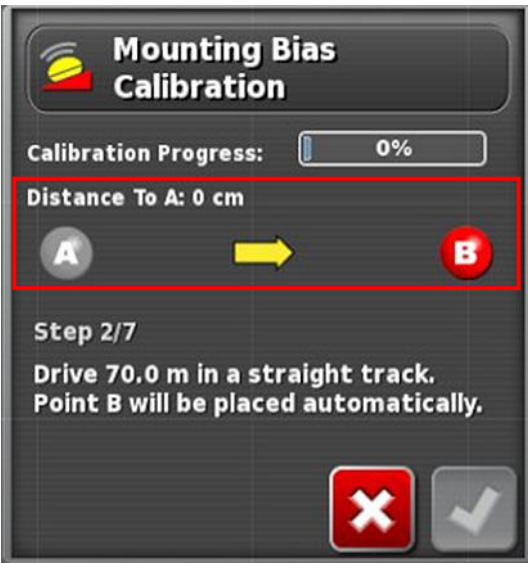

Step	View	Procedure
10.	 <p><b>Wheel Angle Sensor Calibration</b></p> <p>Step 2/5</p> <p>Please turn the steering wheel to full lock right and press "Next".</p> <p>Wheel Angle Sensor: 201</p>	<p>Turn the steering wheel full lock to the right and select Next .</p>
11.	 <p><b>Wheel Angle Sensor Calibration</b></p> <p>Step 3/5</p> <p>Please centre the steering wheel and press "Next".</p> <p>Wheel Angle Sensor: 458</p>	<p>Ensure the vehicle is still moving at 2 kph or 1.2 mph.</p> <p>Turn the steering wheel as close to the center position as possible.</p> <p> <i>Finding the center position and driving in a straight line, before selecting Next, is crucial for system performance.</i></p> <p>Select Next .</p>
12.	 <p><b>Wheel Angle Sensor Calibration</b></p> <p>Step 4/5</p> <p>Saving Calibration Data. Please wait...</p>	<p>The wheel angle sensor calibration data is saved.</p>




Step	View	Procedure
13.		<p>Wheel Angle Sensor has been calibrated successfully.</p> <p>Select  to continue and return to <b>Steering Calibration</b> Menu.</p>
14.		<p>For <b>ACU-1 controller only:</b> Select <b>HYDRAULICS</b>.</p> <p> <i>If the component reports as calibrated, still complete the calibration procedure if the receiver has not been calibrated on this vehicle.</i></p>
	<p><b>WARNING:</b> <i>In the following step, the vehicle will automatically move the front axle wheels progressively to the left position and then progressively to the right when Next  is selected. The calibration can take up to 60 seconds in this mode.</i></p> <p><i>Ensure there is sufficient space for the tractor to complete a progressive turn to the left, right and to move straight ahead before selecting Next .</i></p> <p><i>It is recommended to remove the implement if it is a trailed, pivoted type implement to avoid implement draw bar interference.</i></p>	

Step	View	Procedure
15.		<p>When ready and confident that your pathways left, right and ahead are clear, select Next  to continue.</p>
	<p><i>In the following two steps, the vehicle steering begins without moving and then progressively speeds up as the valve position increases to the minimum hydraulic threshold set in the vehicle profile.</i></p>	
16.		<p>The system will begin calibrating the hydraulic system for the left steering valve.</p>
17.		<p>The system will begin calibrating the hydraulic system for the right steering valve.</p>








Step	View	Procedure
18.		<p>Steering hydraulics are calibrated successfully.</p> <p>The left and right steering valve minimum PWM percentage is displayed.</p> <p>Select <input checked="" type="checkbox"/> to continue and return to the <b>Steering Calibration</b> Menu.</p>
19.		<p>For <b>All</b> guidance controllers: Select <b>MOUNTING BIAS</b>.</p> <p> <i>If the component reports as calibrated or not required, still complete the calibration procedure if the receiver has not been calibrated on this vehicle before.</i></p>
	<p><i>The mounting bias calibration procedure is done by plotting <b>A</b> and <b>B</b> wayline points over 70m/230ft and driving the vehicle at 2 kph or 1.2 mph along the wayline. The operator turns the vehicle around at the end of the pass and repeats the procedure.</i></p> <p><b>ENSURE THE VEHICLE HAS ENOUGH SPACE TO DRIVE THE WAYLINE DISTANCE AND TURN AROUND AT EACH END.</b></p> <p><i>It is important that the vehicle meets the <b>A</b> and <b>B</b> waypoints within approximately 30cm to initiate the next step in the calibration procedure.</i></p>	



Step	View	Procedure
20.		<p>Reposition the vehicle in an open area. When ready to start the procedure select <b>A</b> to mark the <b>A</b> waypoint.</p>
21.		<p>Drive forward in a straight line for 70 m /230 ft and the <b>B</b> waypoint will be created automatically when the <b>Distance to A</b> reaches 70 m /230 ft.</p>
22.		<p>Turn the vehicle around and acquire the wayline just plotted, this track number should read <b>0</b>.</p> <p>Engage the auto-steering to steer on the wayline.</p> <p>Engage the auto-steering to steer on the wayline. The Auto Steering Master Switch background color will turn green, an audible tone will sound and an engage message will flash on screen to indicate the auto-steering has engaged.</p>



Step	View	Procedure
23.		<p>If steering does not engage when the Auto Steering Master Switch is selected, the steering status box will appear.</p> <p>Address any of the issues with red indicators  before proceeding with the mounting bias calibration procedure.</p> <p>Any system errors will be displayed at the bottom of the steering status box. Consult the X30 Operators Guide for further diagnostic information.</p>
24.		<p>Drive the vehicle over the <b>B</b> point previously created during the calibration procedure.</p>

Step	View	Procedure
25.		<p>Set the vehicle speed to 2 kph or 1.2 mph. Steer along the wayline to the <b>A</b> point previously created during the procedure. When the <b>Distance to A</b> reaches 50 m the Calibration Progress bar will start to move and the percentage will increase.</p>
26.		<p>When the Calibration Progress bar reaches 50% the calibration bar will stop and the percentage will remain at 50%. This indicates the system has enough data for the first stage of the calibration and the mounting bias calibration will be paused at this point. Proceed to cross the <b>A</b> waypoint.</p>
27.		<p>When the <b>A</b> waypoint has been crossed, turn the vehicle around.</p>

Step	View	Procedure
28.		<p>Acquire the track <b>0</b> and engage the auto-steering again. Cross over the <b>A</b> waypoint again travelling in the opposite direction.</p>
29.		<p>Cross over the <b>A</b> point previously created during the calibration procedure.</p>
30.		<p>Set the vehicle speed to 2 kph or 1.2 mph. Steer along the wayline back to the <b>B</b> waypoint previously created. When the <b>Distance to B</b> is less than 50 m, the blue line on the calibration progress bar will move from 50% and the percentage will increase.</p>

Step	View	Procedure
31.	 <p><b>Mounting Bias Calibration</b></p> <p>Calibration Progress: 100%</p> <p>Distance To B: 22.7 m</p> <p><b>A</b> → <b>B</b></p> <p>Step 6/7</p> <p>Please engage steering and drive to Point B maintaining a speed of 2.0 kph.</p> <p>[X] [✓]</p>	<p>When the Calibration Progress bar reaches 100% this indicates the system has enough data for the second stage of the calibration and the mounting bias calibration pauses at this point.</p> <p>Proceed to cross the <b>B</b> waypoint.</p>
32.	 <p><b>Mounting Bias Calibration</b></p> <p>Calibration Progress: 100%</p> <p><b>A</b> → <b>B</b></p> <p>Step 7/7</p> <p>Mounting Bias Calibration of the Steering System has completed successfully!</p> <p>[✓]</p>	<p>Stop the vehicle.</p> <p>Mounting Bias has been successfully calibrated.</p> <p>Confirm [✓] to return to calibration menu.</p>

Step	View	Procedure
33.	 <p>The image shows a steering calibration interface. At the top, it says 'Steering Calibration' with a key icon. Below that is 'STEERING CONTROLLER ACU-1'. There are four rows, each with an icon and the text 'Calibrated': 'COMPASS' with a compass icon, 'WHEEL ANGLE SENSOR' with a wheel icon, 'HYDRAULICS' with a hydraulic cylinder icon, and 'MOUNTING BIAS' with a yellow sensor icon. At the bottom right, there are two buttons: a red one with a white 'X' and a green one with a white checkmark.</p>	<p>Steering calibration page will display <b>Calibrated</b> for Compass, Wheel Angle Sensor, Hydraulics and Mounting Bias. Confirm .</p>



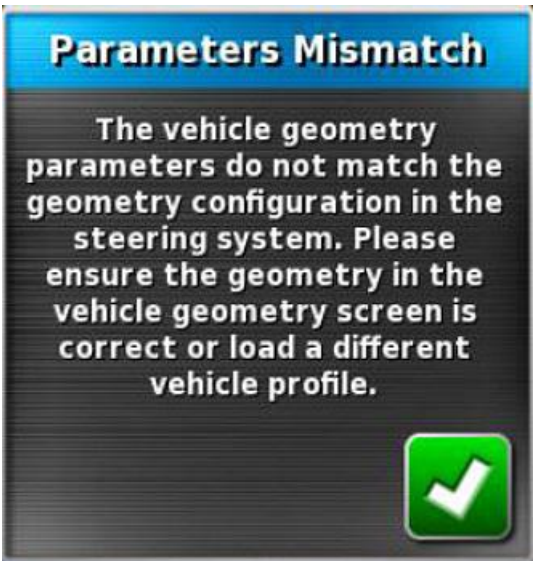
Step	View	Procedure
34.		<p>Steering status box indicators will now be green .</p> <p>The guidance system is now ready for use.</p>



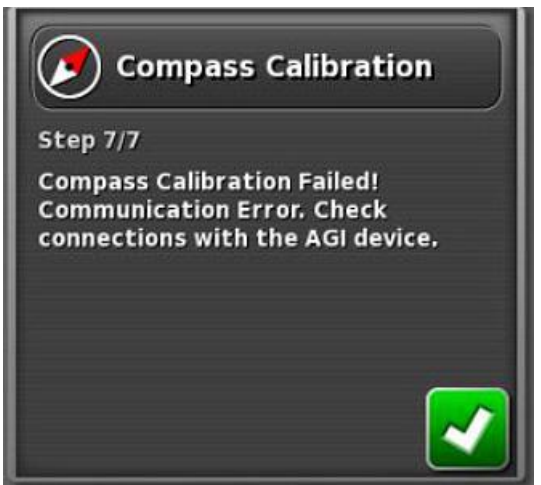







### 5.3. Dealing with Calibration Errors

The following errors can occur during calibrations. Perform the recommended procedures below to fix the errors.


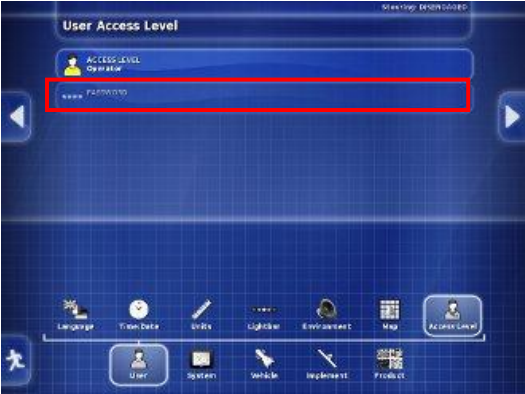


If errors persist, consult the X30 Operators Manual for further information.





View	Error
 <p><b>Operation Not Permitted</b> Steering controller is not initialized.</p>	<p><b>Steering controller not initialized</b> The Steering subsystem is not turned on or is not in a ready state for use. Check to see that the steering subsystem is powered on and ready for use.</p>
 <p><b>Steering Profile Mismatch</b> The parameters in your vehicle profile do not match the vehicle configuration in the steering subsystem system. Please select the correct vehicle profile for this vehicle.</p>	<p><b>Steering Profile Mismatch</b> Vehicle data synchronized between the receiver and the vehicle subsystem is different. Check, adjust and accept the entered vehicle dimensions to re-synchronize the data.</p>
 <p><b>Parameters Mismatch</b> The vehicle geometry parameters do not match the geometry configuration in the steering system. Please ensure the geometry in the vehicle geometry screen is correct or load a different vehicle profile.</p>	<p><b>Parameters Mismatch</b> Vehicle geometry data synchronized between the receiver and the vehicle subsystem is different. Check, adjust and accept the entered vehicle dimensions to re-synchronize the data.</p>




View	Error
 <p><b>Receiver Disconnected</b></p> <p>The AGI receiver is not responding. Please check the connections.</p> 	<p><b>Receiver Disconnected</b></p> <p>The AGI-4 receiver has shutdown, lost power or the receiver – terminal serial connection has been broken.</p> <p>Check the power supply to the receiver and ensure the serial connection is good.</p>
 <p><b>Compass Calibration</b></p> <p>Step 7/7</p> <p>Compass Calibration Failed! Communication Error. Check connections with the AGI device.</p> 	<p><b>Compass Calibration Failed</b></p> <p>Repeat compass calibration and ensure the vehicle completes 1 and ½ turns.</p> <p>Ensure the vehicle is stopped when completing the procedure.</p> <p>Move the receiver away from magnetic sources.</p>
 <p><b>Wheel Angle Sensor Calibration</b></p> <p>Step 7/7</p> <p>Wheel Angle Sensor Calibration Failed! Parameter Cross Check Error. Please repeat the calibration procedure.</p> 	<p><b>Wheel Angle Sensor Calibration Failed</b></p> <p>Repeat procedure and ensure the steering axle moves through the complete range.</p> <p>Confirm wheel angle sensor position information moves when steering axle is turned.</p> <p>Confirm wheel angle sensor harnesses and connections. Check wheel sensor condition.</p>

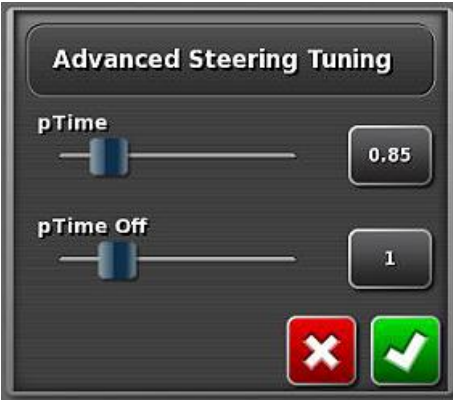


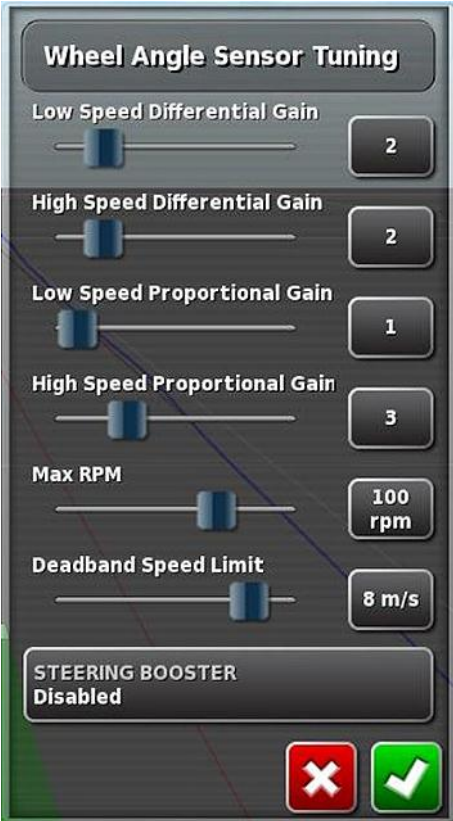
View	Error
	<p><b>Wheel Angle Sensor Not Detected</b></p> <p>Wheel angle sensor value is 0: Check wheel angle sensor harnesses and sensor condition.</p> <p>Vehicle profile error: Check to ensure Guidance controller is configured for wheel angle sensor use.</p>
	<p><b>Receiver firmware version is out of date</b></p> <p>Update receiver firmware.</p>

# Chapter 6 – Advanced Steering Adjustments



Step	View	Procedure
1.		<p>If fine tuning controller adjustment is needed after calibration, navigate to the <b>User</b> menu and then select <b>Access Level</b>, open the <b>ACCESS LEVEL</b> drop down box and select <b>Dealer</b>.</p>
2.		<p>In the <b>PASSWORD</b> box, enter the dealer level password. Contact your dealer if the password is required.</p>
3.		<p>Return to the main guidance screen and select the <b>Steering Options Menu</b>. The Advanced Auto Steer Tuning icon displays. Select <b>Advanced Auto Steer Tuning</b>.</p>
<div style="display: flex; align-items: center;">  <p><i>The following adjustments are available to correct for specific guidance performance issues.</i></p> </div>		

Step	View	Procedure
4.		<p> <b>For ACU-1 controller:</b></p> <p>The following adjustments are available to correct for specific guidance performance issues:</p> <p><b>pTime:</b> Prediction time in the online state (within 25 cm cross track and 5deg heading)</p> <p><b>pTime Off:</b> Prediction time in the offline state (50 cm cross track and 10deg heading)</p> <p> <i>A higher pTime value results in a more stable vehicle but is less accurate. A lower pTime value results in a more aggressive but less stable vehicle.</i></p>
5.		<p><b>Maximum PWM:</b> Maximum allowable PWM duty cycle, used to increase or decrease the maximum oil flow for steering.</p> <p><b>WAS Gain:</b> Wheel angle sensor (WAS) gain, used to increase or decrease wheel angle sensitivity.</p> <p><b>Minimum PWM:</b> To set the minimum flow to move the steering axle satisfactorily to the left or right adjust:</p> <ul style="list-style-type: none"> <li>• <b>Left Minimum</b> (Minimum allowable PWM duty cycle to command steering movement to the left)</li> <li>• <b>Right Minimum</b> (Minimum allowable PWM duty cycle to command steering movement to the right).</li> </ul> <p><b>Minimum Lock (Padlock icon):</b> Select to adjust the left and right minimum values together or adjust independently.</p>

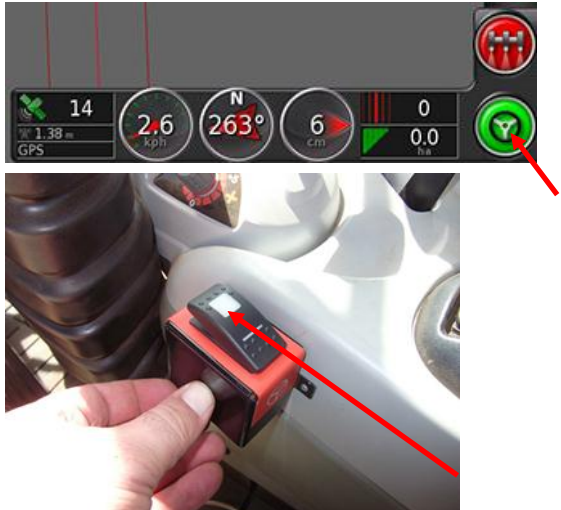
Step	View	Procedure
6.		<p><b>Test Valve Left:</b> Select and hold the icon to actuate the steering valve to the left. When the icon is released the valve will close.</p> <p><b>Reverse Valve Drive Output:</b> Select to reverse the hydraulic left and right port outputs. (Icon backlit indicates reversed state is active.)</p> <p><b>Test Valve Right:</b> Select and hold the icon to actuate the steering valve to the right. When the icon is released the valve will close.</p>
7.		<p> <b>For AES-25 controller</b></p> <p>Return to the main guidance screen and select the <b>Steering Options Menu</b>. The <b>Advanced Auto Steer Tuning</b> icon displays. Select <b>Advanced Auto Steer Tuning</b>.</p>

Step	View	Procedure
8.		<p>The following adjustments are available to correct for specific guidance performance issues <b>with wheel angle sensor disabled</b>:</p> <p><b>pTime:</b> Prediction time in the online state (within 25cm cross track and 5deg heading )</p> <p><b>pTime Off:</b> Prediction time in the offline state (50cm crosstrack and 10deg heading)</p> <p> <i>A higher pTime value results in a more stable vehicle but is less accurate. A lower pTime value results in a more aggressive but less stable vehicle.</i></p>
9.		<p>Return to the main guidance screen and select the <b>Steering Options Menu</b>. The Wheel Angle Sensor Tuning icon displays. Select <b>Wheel Angle Sensor Tuning</b>.</p>
10.		<p><b>Differential Gain:</b> How much extra response is required from the steering wheel to make it reach its required position. If this difference is increasing, extra response will be given, if this difference is decreasing, the extra gain is removed.</p> <p><b>Proportional Gain:</b> How quickly the AES-25 needs to be accelerated to reach the target (speed). The further away, the faster it will try to accelerate to get there.</p> <p><b>Low Speed</b> figures relate to the steering response required when travelling at 3.6 kph.</p> <p><b>High Speed</b> figures relate to the steering response required when travelling at 36 kph.</p> <p><b>Max RPM:</b> Limits the overall speed at which the AES-25 will rotate (RPM).</p> <p><b>Deadband Speed Limit:</b> Limits the speed operating range of the dynamic steering controller deadband function.</p>

## 6.1. Additional Operational Information

Step	View	Procedure
1.	 <p>The image shows a 'Steering Status' menu with the following items, all indicated by green bars: Receiver hardware, Steering controller (ACU-1), Vehicle geometry, Vehicle profile, Steering calibrated, Steering wheel, Position accuracy, Differential correction, Wayline available, Speed, Crosstrack error, Heading error, Prohibited Operation, Wayline Synchronized, and Operator Presence. A green checkmark icon is at the bottom right.</p>	<p>Check the steering status display to ensure that the steering controller has been detected and is operational.</p> <p><b>ACU-1</b> or <b>AES-25</b> will be displayed with <b>Steering controller</b> if the steering controller has been detected and the indicators will be green if it is ready for use.</p>
2.	 <p>The image shows an 'Auto Steering Engage' display with various metrics: 14, 1.39 m GPS, 2.0 kph, 245° heading, 40 cm, 1, and 0.0. A red indicator is visible on the right side.</p>	<p><b>Engaging the guidance system</b></p> <p>Auto Steering Engage must show white to engage the auto-steering.</p> <p>All items on Steering Status must display green before the Auto Steering Engage turns from red to white and ready for use.</p>



Step	View	Procedure
3.		<p>Press the Auto Steering Engage button.</p> <p><b>Or</b></p> <p>Press the AGA5079 SWITCH Remote Guidance Engage (optional) to engage the auto steering.</p>