Refer to this manual before installing the AutoSteer system

Case Optum AccuGuide

New Holland T7 HD IntelliSteer

<table>
<thead>
<tr>
<th>Supported models</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Case IH Optum - AccuGuide</td>
<td>New Holland – IntelliSteer</td>
</tr>
<tr>
<td>270</td>
<td>T7.290</td>
</tr>
<tr>
<td>300</td>
<td>T7.315</td>
</tr>
</tbody>
</table>
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Introduction

This manual provides an overview of and basic information on the installation of an AutoSteer system (‘AutoSteer’) on Case IH Optum and New Holland T7 HD series tractors. Read this manual before beginning the installation as it provides the warnings and cautions that you need to recognize and understand before installing or operating AutoSteer.

The manual provides parts details and step-by-step installation instructions for the machine-specific kit and references to related sub-kits.

Before installing and operating AutoSteer, read and understand the AutoSteer Operator’s Manual that comes with AutoSteer. That manual provides AutoSteer operating instructions and safety information.

Legal Disclaimer

Notes:

(i) Read and follow ALL instructions in this manual carefully before installing or operating the AutoSteer system.

(ii) Heed all the safety information in the Safety Information section of this manual and the additional safety messages provided throughout this manual and any other supplemental material provided.

The manufacturer disclaims any liability for damage or injury that results from the failure to follow the instructions, cautions, and warnings set forth herein.

About Autosteering:

1. There is NO obstacle avoidance system included with the manufacturer’s product. There must always be a human in the operator’s seat of the vehicle when AutoSteer is in use to look for obstacles including people, animals, trees, ditches, buildings, and to take manual control of the vehicle to avoid them if necessary.

2. AutoSteer does NOT control the speed of the vehicle. The operator must always adjust the speed of the vehicle manually so that it is operated at a safe speed that will not cause the vehicle to roll over or go out of control.

3. AutoSteer will take control of the vehicle’s steering system when it is activated during testing, calibration, tuning, and automatic steering operations. The vehicle’s steering axles, tracks, articulation point, or wheels may move unpredictably when activated. Before starting the vehicle and/or activating AutoSteer, ensure that people and obstacles are clear of the vehicle to prevent death, injury, or damage to property.

4. Use of AutoSteer is NOT permitted while the vehicle is on public roads or in public areas (‘roading’). Ensure that the system is powered OFF before driving on roads or in public areas.
Safety Information

Warnings

The AutoSteer installer and manufacturer disclaim any responsibility 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.
- The steering system is not designed to replace the vehicle’s operator.

Note: After the installation of AutoSteer, ensure that all the screws, bolts, nuts, and cable connections are tight. If any of the hydraulic lines or fittings were disconnected or loosened during the installation, ensure that they have been reattached and tightened to prevent oil leaks. Ensure that all the cables and hoses have been secured to prevent them from being damaged.

![WARNING]

To understand the potential hazards associated with the operation of an AutoSteer equipped vehicle, read the provided documentation prior to installing or operating the AutoSteer system.

![WARNING]

To prevent accidental death or injury from being run over by the vehicle or automated motion of the steering system, never leave the vehicle’s operator seat with AutoSteer engaged.

![WARNING]

To prevent accidental death or injury from being run over by the vehicle verify that area around the vehicle is clear of people and obstacles before startup, calibration, tuning, or use of AutoSteer.
**WARNING**

To prevent the accidental engagement of AutoSteer and loss of vehicle control while driving on roads, shut down AutoSteer. Never drive on roads or in public areas with AutoSteer powered up.

**WARNING**

To prevent accidental falls, maintain a stable position on the vehicle’s platform or stairs when installing or removing the GPS antenna. If the vehicle does not provide a safe platform, use a ladder to safely access the vehicle’s roof.

**WARNING**

To avoid electrical shock hazards, remove the GPS antenna and/or other antennas from the vehicle before driving under low structures or low electrical power lines.

**WARNING**

**High-Pressure Fluid Hazard**

If the installation requires work on the vehicle’s hydraulic system, read and understand the hydraulic sections of the vehicle manufacturer’s operator manual before starting the installation. Wear hand and eye protection while performing hydraulic system maintenance. Relieve hydraulic system pressure before servicing the hydraulic system.

**WARNING**

If the vehicle has a wheel angle sensor as part of the installation, always shut off the vehicle when working around the steering axle while installing, checking, and adjusting the wheel angle sensor and rod lengths. The steering mechanism could move suddenly and cause severe injury or death.
Cautions

The AutoSteer installer and manufacturer disclaim any responsibility for damage or physical harm caused by the failure to adhere to the following safety requirements:

- **CAUTION**
  
  The GPS antenna must be removed when transporting or driving the vehicle at speeds above 31 mph (50 km/h). The GPS antenna can possibly detach due to wind loads at higher speeds.

- **CAUTION**
  
  The AutoSteer system does not detect obstacles in the vehicle’s path. The vehicle operator must observe the path being driven and take over steering manually if an obstacle must be avoided.

- **CAUTION**
  
  The AutoSteer system does not control the speed of the vehicle. The operator must manually adjust the speed of the vehicle to keep the vehicle safely under control.

- **CAUTION**
  
  The AutoSteer system must be powered OFF when installing or removing the GPS antenna, AutoSteer Control Unit, or any other part of the AutoSteer system.

- **CAUTION**
  
  The GPS antenna must always be firmly secured to the mounting plate via the magnet whenever the vehicle is in operation to prevent the GPS antenna from releasing from its bracket and falling and to ensure the GPS antenna is placed at the same point every time.
Installation Requirements

Standard tool requirements

The installer needs to have a complete set of common installation tools that includes:

- Imperial and metric open end wrenches (both standard size and stubby lengths for tight fits)
- Imperial and metric sockets, extensions, and ratchet
- Imperial and metric Allen wrenches
- Flat and Philips screwdrivers
- Torx drivers
- 1/4" nut driver
- 2 mm Allen wrench
- Metal hacksaw
- Sidecutters
- Step ladder, 10 ft (3 m)
- Tape measure, 13 ft (4 m) minimum
- Wire puller

The installer will also need the following supplies and additional tools to complete the installation:

- Cleaning rags, abrasive cleaning pads and brushes
- Alcohol pads or other cleaning solution to ensure oil and dirt are removed from surfaces before gluing them
- Oil pan or bucket when working with hydraulic lines
- Spill absorbent to contain any spills
Vehicle requirements

Before installing AutoSteer, ensure the following:

- If the vehicle is equipped with a factory-installed steering system (ex. AutoTrac Ready¹, AccuGuide Ready², IntelliSteer Ready³, AutoGuide² Ready⁴, VarioGuide Ready⁵, Agrosky Ready⁶), verify with the vehicle manufacturer’s service representative that the factory-installed components (for example, steering valve, steering wheel encoder, wheel angle sensor) have been installed on the vehicle.

  *(i)* Verify that the factory-supplied components have been calibrated and set up by the vehicle manufacturer’s service provider before installing AutoSteer.

  *(ii)* A poor calibration will result in poor AutoSteer performance. The steering valve and wheel angle sensor, in particular, must be fully calibrated either at the factory or by the CNHi dealer (calibration can be completed using the A-post user interface in the cab). Consult your vehicle dealer on any issues relating to the servicing and calibration of factory steering components. If you have any doubts or performance issues, following the procedure recommended by your vehicle manufacturer, complete your own full steering component calibration.

- The vehicle’s steering system is in good working order. Drive the vehicle to verify that there is no play in the steering and that the vehicle turns proportionally the same to the left and right.

- The vehicle’s electrical system and battery are in good working order.

- The vehicle has been fully cleaned. A clean vehicle will improve the overall installation and cable routing and reduce the chance for oil contamination if hydraulic connections are opened. If installing hydraulic components, it is essential to clean the area around the steering unit (Orbitrol), under the cab, behind the rear cab cover, and at all the hydraulic connections.

Any defects with the vehicle must be repaired by a qualified service person before the AutoSteer installation is begun.

Notes:

- *(i)* This installation manual, vehicle-specific installation manuals, and sub-kit manuals contain valuable information for servicing the AutoSteer system. After the installation is complete, store all these manuals in a safe place for future reference.

- *(ii)* When the installation is completed, complete the Final Hardware Installation Checklist and save the checklist with the installation manuals for future reference.

Technical Support

Refer to your display’s operator manual for technical support information.

Contact Information

Refer to your display’s operator manual for contact information.

¹AutoTrac is a registered trademark of John Deere
²AccuGuide is a registered trademark of Case IH
³IntelliSteer is a registered trademark of New Holland
⁴AutoGuide² is a registered trademark of AGCO
⁵VarioGuide is a registered trademark of Fendt
⁶Agrosky is a registered trademark of Same DeutzFahr
Vehicle Inspection

Before installing AutoSteer, confirm that the vehicle and its steering system are in good working order by driving it. In addition:

- Verify that you can turn the steered wheels from lock to lock.
- Record the time it takes to manually turn the vehicle’s steering mechanism (for example, steering axle, articulation point) from lock to lock (both directions) as fast as you can. This will be used later to ensure steering performance is satisfactory.
- Verify the vehicle steers straight and does not pull to one side when driving in a straight line.
- Check that there are no oil leaks.
- Check for loose or worn steering components.

Any defects with the vehicle must be repaired by a qualified service person before the AutoSteer installation is begun.
Installation Overview

Supported Models

The AutoSteer vehicle installation kit (part number 811-0001-01) provides instructions on the installation of AutoSteer—on the specified vehicles—for the easiest installation and best performance. The vehicles covered by this manual are Case IH Optum with AccuGuide and New Holland T7 HD with IntelliSteer steering systems.

*Note:* The installer can install AutoSteer differently than how the manufacturer suggests; however, the components that are called out in this manual may not fit properly or cables and hoses may not be long enough with alternative mounting solutions. If the installer modifies the installation procedure, it is the responsibility of the installer to ensure that specific orientation and mounting requirements of all components are met.

Kits Overview

The kit and sub-kits that are required for the installation of AutoSteer are described in this section. Use this section to check that you have all the sub-kits and parts required.

*Note:* Part numbers provided in this manual are subject to change without notice. They are provided as a reference at the time of writing. If spare parts are needed, check with your AutoSteer dealer that part numbers are still valid.

The following parts are assumed to be available for the installation from an AutoSteer kit that has been purchased separately and are not part of the AutoSteer vehicle-specific kit. This information is provided here for reference only.

**GPS receiver with antenna**

A GPS receiver and a matching antenna provide the longitude and latitude position of the vehicle.

**Steering electronic control unit (ECU)**

The steering controller, using the position information from the GPS receiver, steers the vehicle on the desired path, using terrain compensation and other sensors for higher steering accuracy.

**Display kit**

AutoSteer is compatible with multiple models of displays. The display power and communication cables are supplied with the display’s installation kit. AutoSteer gets its power and activation signal from these cables as well. It is assumed that these parts are available for the installation.

*Note:* If the display kit components have been installed on another vehicle and this kit is being installed as a switch kit, a display harness and display power harness, additional to those in the vehicle-specific kit, should be ordered so they can be left on the vehicle to allow easier switching of components from vehicle to vehicle.
Vehicle install kit

The AutoSteer vehicle install kit (part number 811-0001-01) provides all the components required to install AutoSteer on the specified vehicles. It provides parts details and step-by-step installation instructions for the machine-specific kit and references to any related sub-kits.

AutoSteer vehicle-specific kit 811-0001-01

Figure 1-1  AutoSteer vehicle-specific kit components - schematic

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Assembly, bracket adapter NAV II</td>
<td>200-0651-02</td>
</tr>
<tr>
<td>2</td>
<td>Harness, CAN adapter CASE</td>
<td>201-0647-01</td>
</tr>
<tr>
<td>3</td>
<td>Installation manual (this document)</td>
<td>602-0409-03</td>
</tr>
<tr>
<td>4</td>
<td>Assembly, dummy connector, 30 pin right</td>
<td>201-0566-01</td>
</tr>
<tr>
<td>5</td>
<td>Mounting hardware, JD-8000 series</td>
<td>200-0076-01</td>
</tr>
<tr>
<td>6</td>
<td>Label, ‘Attention’ switch off</td>
<td>603-0074-01</td>
</tr>
</tbody>
</table>
AccuGuide/IntelliSteer-Ready Installation

- Foot switch * (PN 201-0376-01, an optional accessory).
- Component definitions:
  - Display – the display that is connected to AutoSteer (not shown)
    
    Note: AutoSteer can be connected to multiple models of displays. Refer to the display’s user manual for more detailed instructions on how to connect AutoSteer to the display data and power ports.
  - Battery – the battery terminals for the power source for AutoSteer and the display (not shown)
  - AutoSteer control unit – the AutoSteer ECU
  - GPS antenna – the GPS antenna and optional radio modem kits mounted on the roof (not shown)
  - Foot switch * – the optional foot switch that can be used for remote engage (not necessary for installation)
  - AccuGuide/IntelliSteer harness – the 40-pin connector on the factory supplied AccuGuide/IntelliSteer harness

Figure 1-2 AutoSteer cable connections
Installation Procedure Overview

This section provides an overview of all the steps that are required to complete the AutoSteer installation. For more detailed instructions of each step, follow the procedures provided in the subsequent chapters of this manual or the instructions provided with the relevant component. Install the components in the order provided in this section for best results.

1. **Kit verification** – verify that the installation kit ordered matches the vehicle that it is being installed on and that all the parts have been shipped.

2. **Display** – follow the instructions provided with the display’s operator manual and installation manual that comes with the display kit.
   
   *Note: AutoSteer can be matched with multiple display options. Follow the instructions that come with your display for the procedures to install the display and to connect the display harnesses to the vehicle for power and AutoSteer.*
   
   a. Install the display using the RAM mount (if necessary)
   b. Install the display harness
   c. Install the power harness for the display
   
   *Note: Refer to the Install the AutoSteer Harnesses chapter in this manual for information about locating and accessing the battery or other power source.*

3. **AutoSteer Control Unit (ECU)** – follow the instructions provided in the ECU mounting bracket kit installation guide.
   
   *Note: The AutoSteer ECU must be mounted in a place that is solid to the frame or cab of the vehicle. It must not move independently of the vehicle (so, for example, cannot be sitting loose on the cab floor). The mounting point must be vibration free. Use any bracket(s) provided with the installation kit to mount the AutoSteer ECU.*

4. **AutoSteer main harness** – refer to the Install the AutoSteer Harnesses chapter in this manual. Route the harness connections from the AutoSteer ECU’s left connector to each of the following and connect (see the display’s operator manual for instructions):
   
   a. The display and/or display harnesses
   b. The power activation connection
   c. A power supply

5. **AutoSteer vehicle-specific harness** – see the Install the AutoSteer Harnesses chapter in this manual.
   
   Install the CAN harness (PN 201-0647-01) between the CAN B connector of the ECU’s main harness and the existing 40-pin vehicle connector.

6. **Final hardware verification** – verify that all the bolts have been tightened, electrical and hydraulic connections are securely connected, and that all hoses and cables have been routed safely and secured to the frame of the vehicle away from moving parts with cable ties.
   
   a. Fill out the Vehicle Profile Worksheet provided at the end of this manual
   b. Power ON AutoSteer
   c. Create a new vehicle profile

7. **Final vehicle setup** – see the Post-Installation Procedures and Information chapter.
   
   a. Calibrate the vehicle
   b. If necessary, tune the vehicle to improve performance
   c. Verify the system has been installed properly and operates satisfactorily

8. **Final information record and checklists** – add required information and complete the two checklists at the end of this manual.
Install the AutoSteer Harnesses

Connect the various harnesses to the installed components; refer to Figure 1-2, ‘AutoSteer cable connections’, page 11, which shows the cable connections. Also refer to the display’s operator manual for additional instructions on how to connect AutoSteer to the display.

*Note:* When routing harnesses, ensure that all harnesses are routed away from moving parts and sharp objects. Secure the harnesses with cable ties or clips to ensure they are not damaged.

**Attaching Harnesses to the AutoSteer ECU**

This installation kit comes with an AccuGuide ECU (main) harness; the AutoSteer ECU has two connection ports (which are keyed to ensure harnesses cannot be incorrectly connected). Connect the ECU main harness to the left-side port on the ECU (as viewed in Figure 2-1).

![Figure 2-1 AutoSteer control unit cable ports](image)

**CAUTION**

Never force the connectors; the connectors should easily slide into place. Forcing the connector may cause damage.
Installing the Vehicle Port Dummy Connector (as required)

This installation connects to the CAN bus of the vehicle and thus the vehicle-specific ECU harness is not used. The installation kit comes with a vehicle port dummy connector PN 201-0566-01 (item 4 in Figure 1-1) that is used to protect the terminals on the AutoSteer ECU. Connect and secure the 30-pin dummy connector to the right-side port the ECU (as viewed in Figure 2-1 and Figure 2-2). Never force the connector (see CAUTION on page 13).

Figure 2-2  AutoSteer ECU vehicle port dummy connector

Note: The optional remote engage harness (PN 201-0563-01) can be connected to this port instead of the dummy connector in the event the user wishes to attach the optional foot switch (PN 201-0376-01) or some other remote engage switch.

Connecting Other AutoSteer Harnesses

Refer to the manuals and documentation provided with the other components of your AutoSteer system to complete all necessary cable connections. Typically, a display and a steering controller are required to complete the installation, and they each have their own specific cables and installation instructions (see Connecting to the Vehicle’s CAN on the next page).
Connecting to the Vehicle’s CAN

For this installation AutoSteer is connected to the vehicle's CAN bus system and sends steering commands directly to the vehicle. The vehicle then takes this information to control the steering of the vehicle. AutoSteer does not communicate directly with the vehicle's steering valve or wheel angle sensor in this installation.

**Figure 2-3  CAN cable – ECU to vehicle (see also Figure 1-2, page 11)**

Connect harness 201-0647-01 (item 2 in Table 1-1 on page 10) between the 4-pin CAN B connector on the main ECU harness and the vehicle’s 40-pin CAN bus connector.
Supplying Power to AutoSteer

Figure 2-4 Typical battery cable connections

The AutoSteer ECU must be connected to a 12 V uninterrupted power supply. In most situations, a display kit will include a harness for connecting to the battery directly (or to a battery harness). The AutoSteer ECU must also be connected to a power activation signal from the display so that when the display is powered up, a signal commands the ECU to power up. Refer to your display’s documentation for information on connecting the display and AutoSteer to a power source and a power activation signal. Figure 2-4 shows an example of a typical power connection scenario to the battery.
Accessing Vehicle Battery Power

The AutoSteer main cable harness must be connected to a 12V power source. Your display’s user manual provides specific instructions for connecting power to the AutoSteer system and specifies the appropriate vehicle power source.

**Connect to the vehicle battery**

1. Locate the vehicle battery on the right-hand side of the cab behind the steps.

2. Connect to the vehicle battery only if the display manual specifies a direct battery connection (else follow the display manual’s alternative instruction).

   *Note: A battery cable is provided with the AutoSteer system when a direct battery connection is required.*
Post-Installation Procedures and Information

When the AutoSteer installation is complete (as detailed in this guide and the sub-kit guides), follow the procedures and notes in this section to prepare the machine for full AutoSteer capabilities.

**Installing Warning Label(s)**

In an easy-to-read position on the cab window that does not obscure the operator’s view, install the warning label. Install the warning in the language in or that best matches the operators’ language. Install the warning in multiple languages (of four) if necessary.

**Figure 3-1  AutoSteer Warning Label**

![AutoSteer Warning Label Image]
Creating a New Vehicle Profile

The operator must first create a new vehicle profile. This configures the steering system hardware so the display can properly communicate with the various sensors and components on the vehicle. Enter all the appropriate information for setting up the vehicle.

1. Ensure the vehicle is in park and/or the park brake is set to prevent the vehicle from moving.
2. Ensure the engine is not running; do not start the vehicle yet.
3. Power up AutoSteer (turn the key to the ‘run’ position but do not start the engine).
4. Follow the instructions in the display’s operator manual to create a new vehicle using the Setup Wizard.
   
   Note: Select AccuGuide or IntelliSteer as the controller for the specific vehicle model when setting up your vehicle on the AutoSteer display.

5. When the system reaches the Auto Calibrate screen, press the Exit Screen Arrow to exit the procedure and save the vehicle information.


Calibration and Tuning – Guidelines

Notes:

(i) For optimal steering performance, AutoSteer must be fully calibrated and then tuned (see also critical notes (i) and (ii) nearer the top of page 6).

(ii) The vehicle must be in gear and moving for AutoSteer to engage. If the vehicle is stationary, you will get a ‘user turning wheel’ error message.

(iii) You can engage AutoSteer using the engage button on the display or by using the factory remote engage switch.

1. Start the vehicle and move it to an open area.
2. Power up AutoSteer.
3. Follow the instructions in the display’s operator manual to navigate to the Vehicle tab from the AutoSteer Setup screen. The current vehicle should have already been set up and selected during the Create New Vehicle section, if not, select the current vehicle profile in the Manage Vehicles screen.
4. From the Vehicle tab of the AutoSteer Setup screen, press the Auto Calibrate button. Follow the on-screen procedure to calibrate the vehicle.
5. If additional performance is required, follow the instructions provided by the display’s operator manual to tune the vehicle after calibration has completed (under normal circumstances this will not be necessary). See note (i) above.
## Vehicle Profile Worksheet

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<th>Length</th>
<th>Units Used</th>
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<tbody>
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<td><img src="image" alt="Length Units" /></td>
<td>Inches, Feet, Centimeters, Meters</td>
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<table>
<thead>
<tr>
<th>GPS Antenna Location</th>
<th>Fore/Aft</th>
<th>Left/Right</th>
<th>Height</th>
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<td><img src="image" alt="GPS Antenna Location Diagram" /></td>
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<table>
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<tr>
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<th>Fore/Aft</th>
<th>Left/Right</th>
<th>Height</th>
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<td><img src="image" alt="Left/Right Measurement" /></td>
<td><img src="image" alt="Height Measurement" /></td>
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<tr>
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<table>
<thead>
<tr>
<th><img src="image" alt="Direction of Arrows" /></th>
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<table>
<thead>
<tr>
<th>AutoSteer Control Unit Orientation</th>
<th>X Axis</th>
<th>Y Axis</th>
<th>Z Axis</th>
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<tbody>
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<td><img src="image" alt="X Axis" /></td>
<td><img src="image" alt="Y Axis" /></td>
<td><img src="image" alt="Z Axis" /></td>
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<table>
<thead>
<tr>
<th>Draw Orientation of AutoSteer Control Unit for all Three Directions and Angle Measured</th>
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<tr>
<td><img src="image" alt="Orientation Diagram" /></td>
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<table>
<thead>
<tr>
<th>Measured Angle (Degrees):</th>
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</table>
Final Installation Checklists – Hardware and Performance

After the completion of the AutoSteer installation, enter the required information below then complete the Final Hardware Installation Checklist and the AutoSteer Performance Checklist. Use the checklists to confirm that all steps have been completed and create a record of important system information.

Machine Model: ___________________________  Year: _________  Serial #: ___________________________

Customer Name:________________________________________________________________________________________

Location/Address: _____________________________________________ _________________________________________

AutoSteer Installation Kit Part Number: _____________________________________________________________________

Notes:
_____________________________________________________________________________________________________
_____________________________________________________________________________________________________
_____________________________________________________________________________________________________
_____________________________________________________________________________________________________
_____________________________________________________________________________________________________
_____________________________________________________________________________________________________
_____________________________________________________________________________________________________
_____________________________________________________________________________________________________
_____________________________________________________________________________________________________
_____________________________________________________________________________________________________

Name of Installer: ____________________________________________   Date: ____________________________________
Final Hardware Installation Checklist

1. Display bracket and display installed and all fasteners are tight.

2. GPS antenna is installed.

3. AutoSteer ECU installed firmly to frame and all fasteners are tight.

4. All cable ends and terminations are connected.

5. All cables are secured with cable ties.

AutoSteer Performance Checklist

1. Manual steering speed from lock to lock is satisfactory. Value Sec

2. AutoSteer steering speed from lock to lock is satisfactory. Value Sec

3. Wheel angle sensor counts recorded. Left
   Center
   Right

4. Manual kick-out is working when the steering wheel is turned.

5. AutoSteer system calibration completed.

6. AutoSteer system tuning completed (if necessary).

7. Line acquisition steering performance is satisfactory.

8. On-line steering performance is satisfactory.

Print per Specification #953-0001-01.