*Ag*GPS® Autopilot™ Automated Steering System

Installation Instructions

Case IH

- **CVX 1135**
- **CVX 1145**
- **CVX 1155**
- **CVX 1170**
- **CVX 1190**
- **CVX 1195**

New Holland

- **TVT 135**
- **TVT 145**
- **TVT 155**
- **TVT 170**
- **TVT 190**
- **TVT 195**

Version 3.00
Revision A
Part Number 54035-28-E03
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This is the November 2006 release (Revision A) of the *AgGPS Autopilot Automated Steering System Installation Instructions*, part number 54035-28-E03. It applies to version 3.00 of the *Ag*GPS Autopilot automated steering system.

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Class B Statement – Notice to Users. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission rules.

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Or
Mail a request for recycling instructions to:
Trimble Europe BV
c/o Menlo Worldwide Logistics
Meerheide 45
5521 DZ Eersel, NL



Safety Information

In this chapter:

- Warnings
- Cautions

Always follow the instructions that accompany a Warning or Caution. The information they provide is intended to minimize the risk of personal injury and/or damage to property. In particular, observe safety instructions that are presented in the following format:



WARNING – This alert warns of a potential hazard, which, if not avoided, can cause severe injury.



CAUTION – This alert warns of a hazard or unsafe practice which, if not avoided, can cause injury or damage.

Note – *An absence of specific alerts does not mean that there are no safety risks involved.*

Warnings



WARNING – When you are working on the vehicle's hydraulic systems, vehicle attachments that are suspended can drop. If you are working around the vehicle, you could suffer serious injury if an attachment dropped on you. To avoid this risk, lower all vehicle attachments to the ground before you begin work.



WARNING – If someone else attempts to drive the vehicle while you are working on or under it, you can suffer serious or fatal injuries. To avoid this possibility, install a lockout box on the battery terminal to prevent the battery from being reconnected, remove the key from the vehicle's ignition switch, and attach a "Do not operate" tag in the cab.



WARNING – Agricultural chemicals can pose serious health risks. If the vehicle has been used to apply agricultural chemicals, steam clean the vehicle to remove any chemical residue from the areas of the vehicle where you will be working.

Cautions



CAUTION – When the vehicle has been running, parts of the vehicle, including the engine and exhaust, can become extremely hot. These hot parts can cause serious burns. To avoid burns, allow hot machine parts to cool before you begin working on them.



CAUTION – The system installation may bring you into contact with chemical substances, such as oil. These can cause poisoning. Ensure that you wash you hands thoroughly after you have finished working on the system.



CAUTION – Battery posts, terminals, and related accessories contain lead and lead compounds. Lead poisoning can cause lowered intelligence and kidney problems. To avoid ingesting lead, ensure that you wash you hands thoroughly after touching the battery.



CAUTION – Vehicle cabs can be quite high in the air. Falling from this height can cause broken bones and internal injuries. To avoid falling from the vehicle, ensure that when you enter or exit the vehicle, you face the vehicle and use the steps and handrails.



CAUTION – Always wear protective equipment appropriate to the job conditions and the nature of the vehicle. This includes wearing protective glasses when you use pressurized air or water, and proper protective welders clothing if you want to complete any welding. Avoid wearing loose clothing or jewelry that can catch on machine parts or tools.



CAUTION – Parts of the vehicle may be under pressure. To avoid injury from pressurized parts, relieve all pressure in oil, air, and water systems before you disconnect any lines, fittings, or related items. To avoid being sprayer by pressurized liquids, hold a rag over fill caps, breathers, or hose connections when you remove them. Do not use your bare hands to check for hydraulic leaks. Use a board or cardboard instead.

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CHAPTER

1

Introduction

This manual describes how to install the Trimble® *Ag*GPS® Autopilot™ automated steering system.

Even if you have used other Global Positioning System (GPS) products before, Trimble recommends that you spend some time reading this manual to learn about the special features of this product. If you are not familiar with GPS, visit the Trimble website (www.trimble.com) for an interactive look at Trimble and GPS.

Technical Assistance

If you have a problem and cannot find the information you need in the product documentation, contact Trimble technical support:

1. Go to the Trimble website (www.trimble.com).
2. Click the **Support** button at the top of the screen. The Support A–Z list of products appears.
3. Scroll to the bottom of the list.
4. Click the **submit an inquiry** link. A form appears.
5. Complete the form and then click **Send**.

Your Comments

Your feedback about the supporting documentation helps us to improve it with each revision. Email your comments to ReaderFeedback@trimble.com.

Manual System Upgrade to Autopilot

EZ-Guide SL *Ag*GPS 114 manual guide system

Retain	Remove
*Ag*GPS 21A lightbar	Lightbar cable (P/N 35204)
*Ag*GPS 114 antenna/receiver	***NOTE**: Replace with lightbar only cable from conversion kit.*
	*Ag*GPS 114 receiver cable (P/N 40947)
	***NOTE**: Replace with cable (P/N 47045) from conversion kit. Extension cable available as accessory.*
	Remote keypad

*Ag*GPS 124 or *Ag*GPS 132 PSO system

Retain	Remove
*Ag*GPS 21A lightbar	Lightbar to receiver cable
Antenna for *Ag*GPS 124 or 132 receiver	***NOTE**: Replace with lightbar only cable from conversion kit.*
*Ag*GPS 124 or 132 receiver	Remote keypad
Antenna to receiver cable	

*Ag*GPS 150 EZ-Guide Plus lightbar

Retain	Remove
*Ag*GPS 150 EZ-Guide Plus lightbar	
Antenna for *Ag*GPS 150 EZ-Guide Plus lightbar	
Antenna to receiver cable	
(Optional) Remote keypad	

Required Components

Kits required	Special tools required
Platform kit: P/N 54035-28	5/16 inch drill bit
Hydraulic hose kit: P/N 59787	Allen wrenches (metric and standard)
Roof bracket kit: P/N 59786	Right angle drill or right angle extension
Mag mount kit: P/N 55685-00	

Note – *The receiver bracket kit (P/N 59786) is not supplied by Trimble. For the receiver bracket dimensions, see* *page 113**.*

Autopilot Hardware Organization - As Shipped

Platform kit (P/N 54035-28)	Common parts	GPS receiver	Display	Hyd. hose kit (P/N 59787)
(2) Hydraulic valve (2) Hydraulic manifold (2) Transducer, flow switch (2) Manifold mounting bracket (2) Manual override cable (2) Bolt kit - hydraulics (2) Hydraulic valve cable (3) Steering angle sensor, mounting brackets, cable, and hardware (4) Roof brackets (6) Power cable (8) Controller bracket (8) Bolt kit, controller	(5) Cable kit (8) Sonalert alarm (8) Controller	(4) GPS receiver (4) GPS antenna (4) GPS receiver mounting bracket (4) GPS receiver power/data cable (4) RTK radio, cable and mounting bracket kit (supplied separately)	(5) Lightbar (5) *Ag*GPS 170 (5) *Ag*GPS 170 mounting bracket (5) *Ag*GPS 170 cable (5) *Ag*GPS 50 Lightbar (5) *Ag*GPS 150 Lightbar	(2) Hyd. hoses (2) Hyd. adapters

Note – *The number in brackets refers to the chapter where that component is installed.*

Autopilot Hardware Organization - As Installed

Hydraulics (2)	Steering device (3)	GPS receiver (4)	Display (5)	Power (6)	Controller (8)
• Hydraulic valve, manifold, flow switch, manifold mounting bracket • Hydraulics/ steering angle/ manual override cable	• Steering device assembly, mounting bracket, and hardware	• GPS receiver • GPS antenna • GPS receiver mounting bracket • GPS receiver power/data cable • Roof brackets	• Lightbar • *Ag*GPS 170 • Lightbar cable • *Ag*GPS 170 cable • Lightbar mounting bracket	• Power cable • Electrical accessory kit	• Controller, controller mounting plate • Controller bracket • Bolt kit - controller

Pre-installation Vehicle Preparation

Step 1

Park the vehicle on a hard, level surface. Block the front and rear wheels.

Step 2

Align the steering straight ahead. On an articulated vehicle, install the articulation locks.

Step 3

Remove all dirt and debris from the areas of the vehicle where the *Ag*GPS Autopilot system will be installed.

Step 4

Open all kit boxes and check the contents of the box against the packing list/s. Lay all of the parts out on a clean workbench.

Note – *The left and right sides of the vehicle are referenced while standing behind the unit, facing the normal direction of travel.*

CHAPTER

2

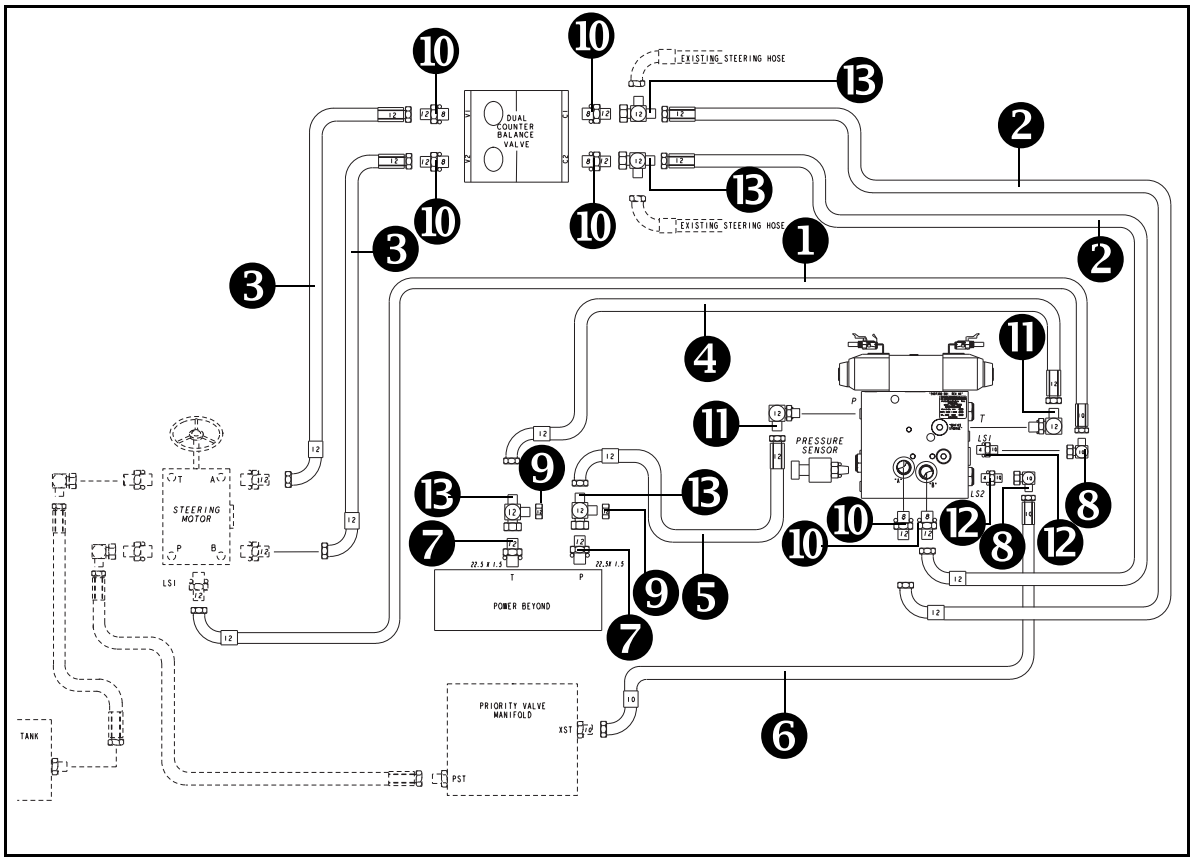
Hydraulic Control Valve Installation

In this chapter:

- Hydraulic Control Valve Components
- Prepare the Hydraulic Control Valve and the Counter Balance Assembly
- Installing the Hydraulic Control Valve
- Install the Hydraulic Hoses
- Hydraulic Counter Balance Installation

This chapter describes how to install the hydraulic control valve and hoses.

Hydraulic Control Valve Components



Item	Description	Part number
❶	87 inch hose	F451TCCACF-10-10-6-87
❷	87 inch hose (x2)	F451TCCACF-12-12-6-87
❸	39 inch hose (x2)	F451TCCACF-12-12-6-39
❹	35 inch hose	F451TCCACF-12-12-6-35
❺	30 inch hose	F451TCCACF-12-12-6-30
❻	24 inch hose	F451TCCACF-10-10-6-24
❼	Fitting (x2)	GE12LM22x1 . 5 EDOMDA3C

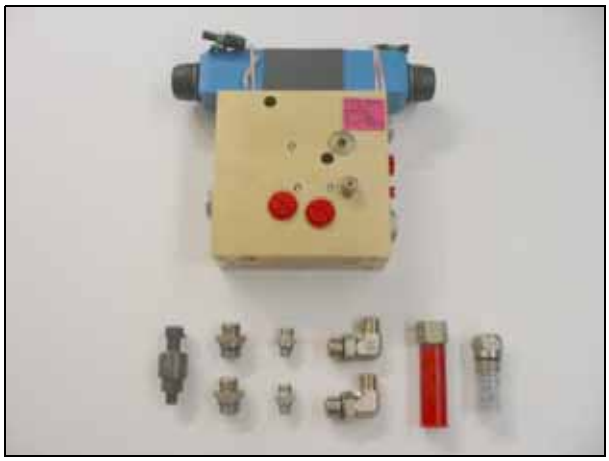
Item	Description	Part number
❽	Fitting (x2)	EW 10LOMDA3C
❾	Fitting (X2)	VKA12 + M12-L
❿	Fitting (x6)	GE12L3/4UNFOMDA3C
⓫	Fitting (X2)	WEE12L3/4UNFOMDA3C
⓬	Fitting (x2)	GE10L7/16UNFOMDA3C
⓭	Fitting (x4)	EL12LOMDA3C

Note – *Part numbers are Parker numbers and are for reference only.*

Prepare the Hydraulic Control Valve and the Counter Balance Assembly

Step 1

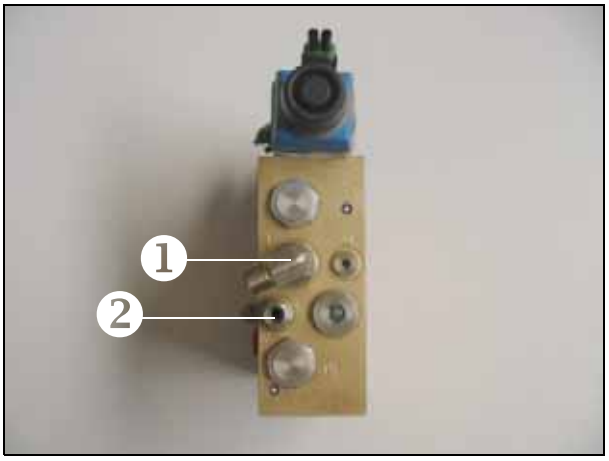
Place the hydraulic control valve and components on a clean working surface. Include the 40 psi Pilot-to-Shift valve and the 40 psi P-COMP cartridge.



Step 2

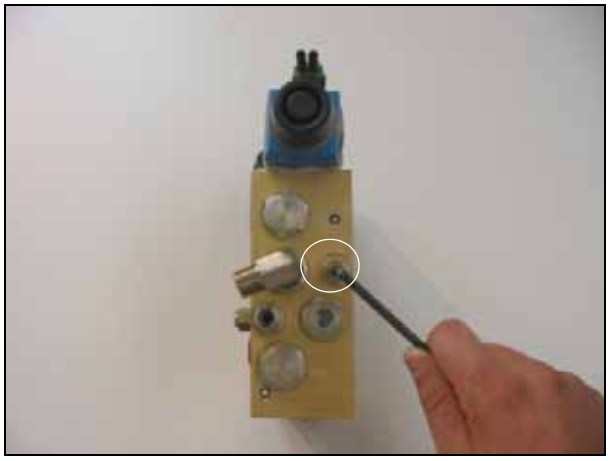
Install:

- a DIN 12L 90 degree connector in the T port ❶
- a DIN 10L straight connector in the LS2 port ❷



Step 3

Remove the SAE 4 plug from the LS1 port. Retain it for the next step.



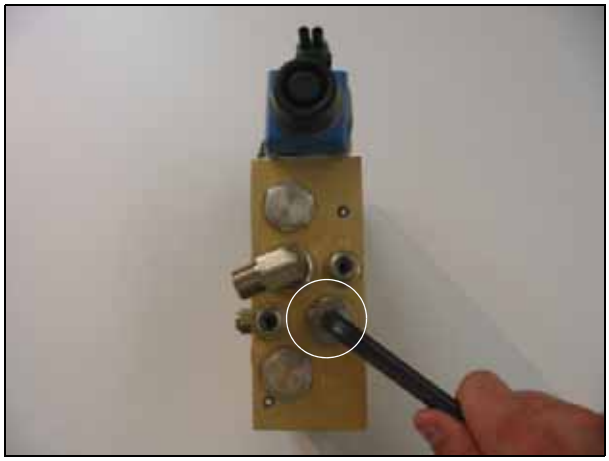
Step 4

Install a DIN 10L straight fitting in the LS1 port.



Step 5

Remove the plug from the PTS port.



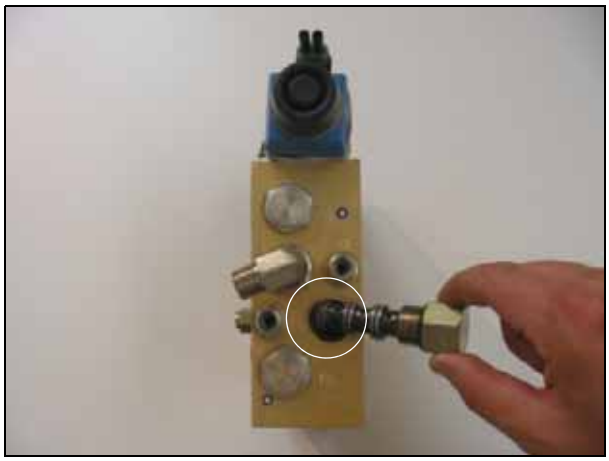
Step 6

Locate the 40 psi pilot-to-shift valve.



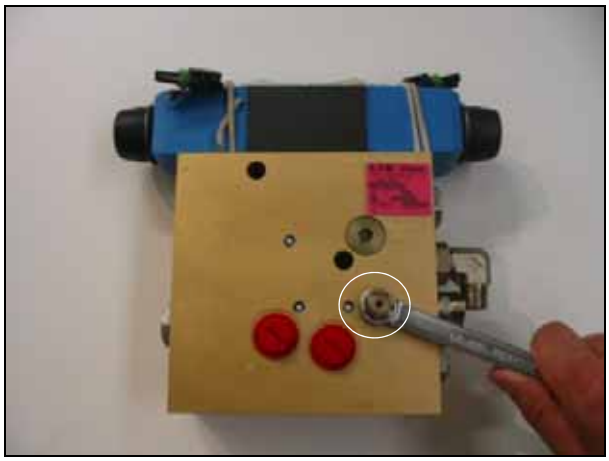
Step 7

Install the pilot-to-shift valve in the PTS port.



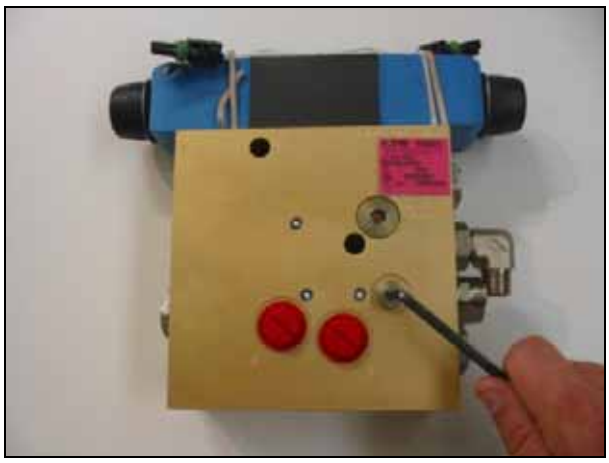
Step 8

Remove the check valve.



Step 9

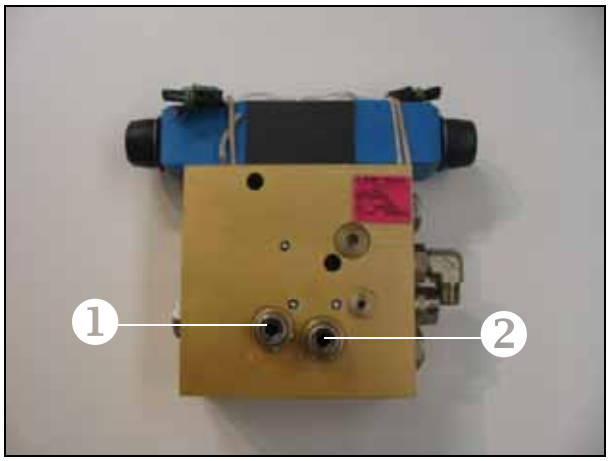
Install a SAE 4 plug in place of the check valve.



Step 10

Install:

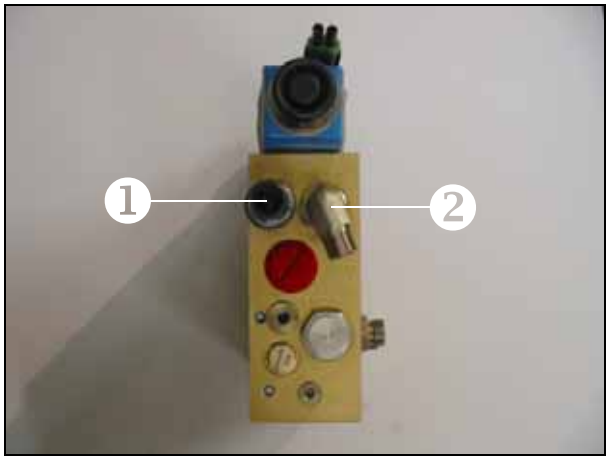
- a DIN 12 straight fitting in the A port
- a DIN 12 straight fitting in the B port



Step 11

Install:

- a pressure sensor in the Px port ❶
- a DIN 12L 90 degree in the P port ❷



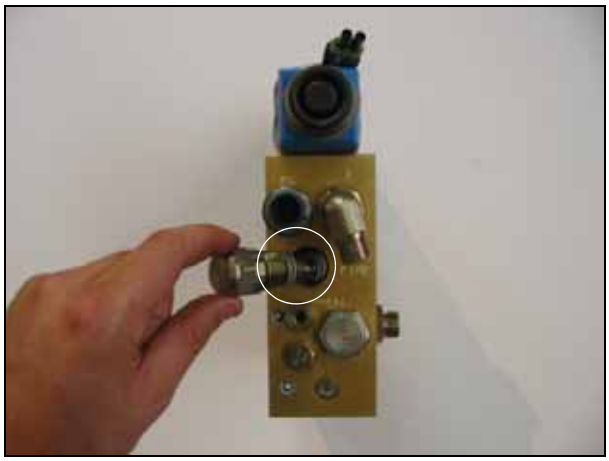
Step 12

Locate the 40 psi P-COMP cartridge.



Step 13

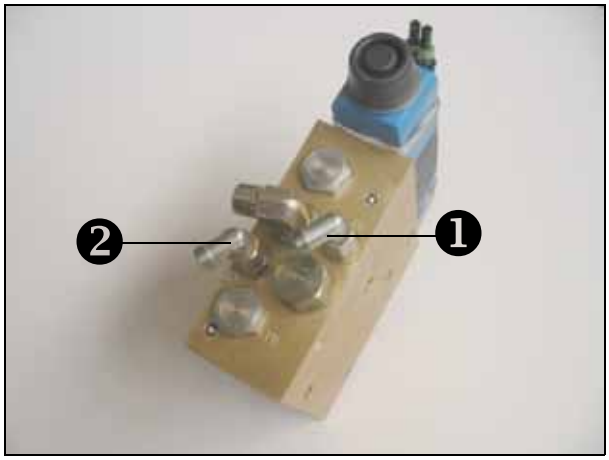
Install the P-COMP cartridge in the P-COMP cavity.



Step 14

Connect:

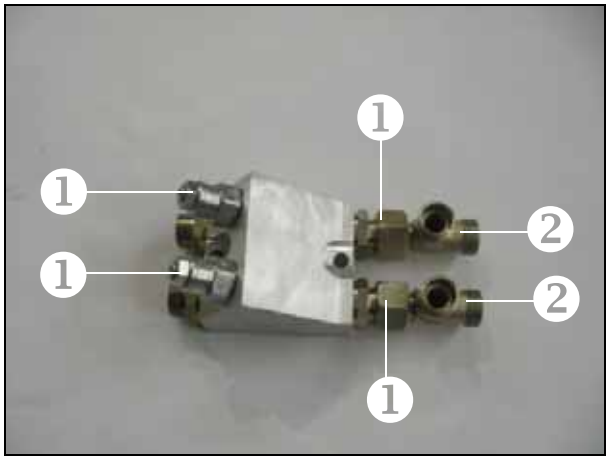
- a DIN 10L 90 degree swivel fitting to the adaptor in the LS1 port
- a DIN 10L 90 degree swivel fitting to the adaptor in the LS2 port



Step 15

In the counter balance valve, install:

- 4 x DIN 12L straight tees in the 4 ports ❶
- 2 x DIN 12L tees in the tees attached to the C1 and C2 ports ❷



Installing the Hydraulic Control Valve

Step 1

Locate the Autopilot manifold mounting location at the rear of the vehicle.



Step 2

Locate the H2 manifold mounting bracket (P/N 59722).



Step 3

Install two of the four spacers (from the manifold mounting kit) over the first hole of the existing bracket at the rear of the tractor.



Step 4

Install the two other spacers as shown.



Step 5

Install the manifold bracket.



Step 6

Attach the two M10 x 70 mm bolts and two M10 nuts from the mounting kit.



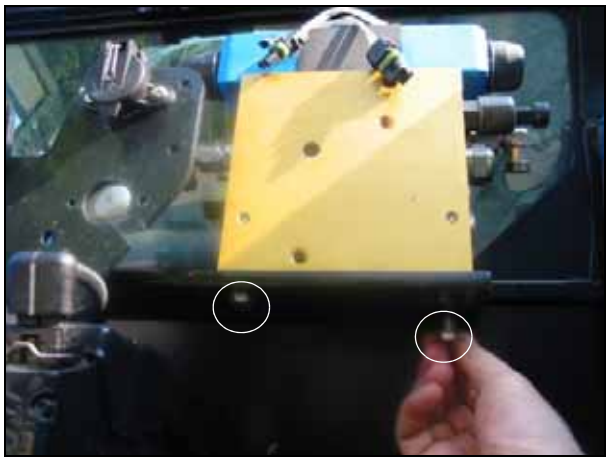
Step 7

Tighten the bolts.



Step 8

Use the two 3/8" **x** 1" bolts from the bolt kit to install the manifold.



Install the Hydraulic Hoses

Step 1

Open the hood of the tractor and locate the plate between the back of the engine and the steering hand pump.



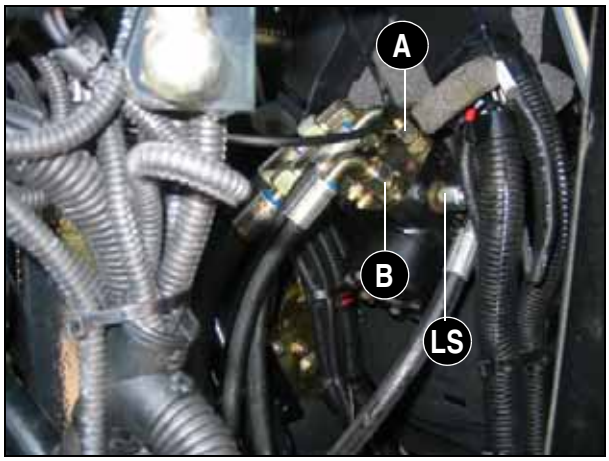
Step 2

Remove the four existing nuts and washers and then remove the steel cover. Retain the nuts and washers.



Step 3

Locate the A, B, and LS connections on the steering unit.



Step 4

Remove the existing B hose.



Step 5

Remove the existing A hose.



Step 6

Remove the existing LS hose from the steering unit.



Step 7

Remove the LS hose from the hard line.



Step 8

Disconnect the front end of the LS hard line from the pass-through.



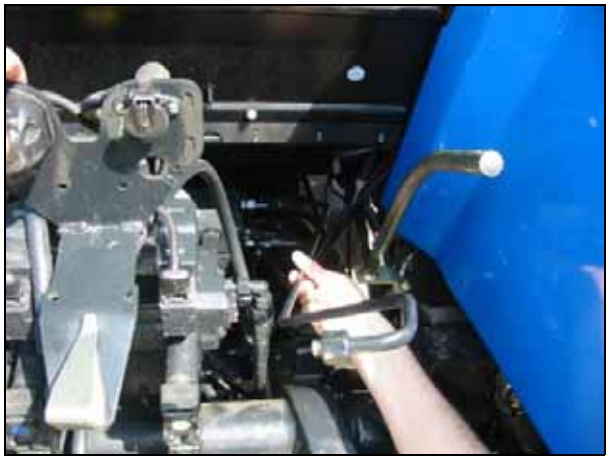
Step 9

Release the rear end of the hard line at the priority valve level and remove it from the tractor.



Step 10

Remove the LS hard line.



Step 11

Route the provided 87" LS1 hose and the two provided 87" A1 and B1 hoses under the cab from the steering unit to the Autopilot manifold.



Step 12

Connect the 90 degree end of the B1 hose to port B on the manifold.



Step 13

Connect the 90 degree end of the A1 hose to port A on the manifold.



Step 14

Connect the 90 degree end of the 87" LS1 hose to the LS port on the steering unit.



Step 15

Connect the other end of the LS1 hose to the LS1 port on the Autopilot manifold. Tighten the connections.



Step 16

Connect the provided 24" LS2 hose to the XST port on the priority valve.



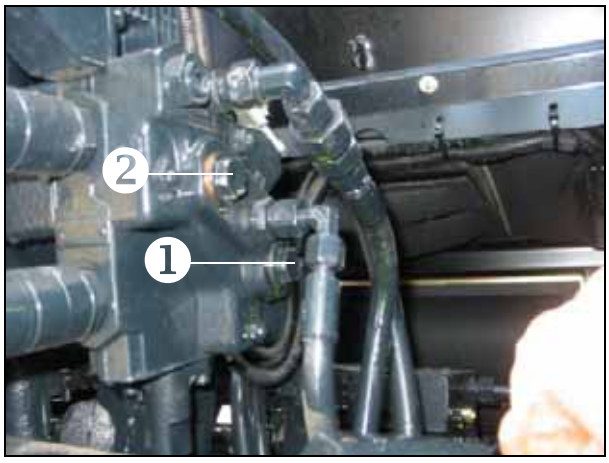
Step 17

Connect the other end of the LS2 hose to the LS2 port on the Autopilot manifold.



Step 18

Remove the plugs from the P port ❶ and the T port ❷ on the Power Beyond end plate and clearly mark both the P and T ports in the manifold.



Step 19

Install a M22 x DIN 12L straight fitting in the P port. Tighten the fitting.



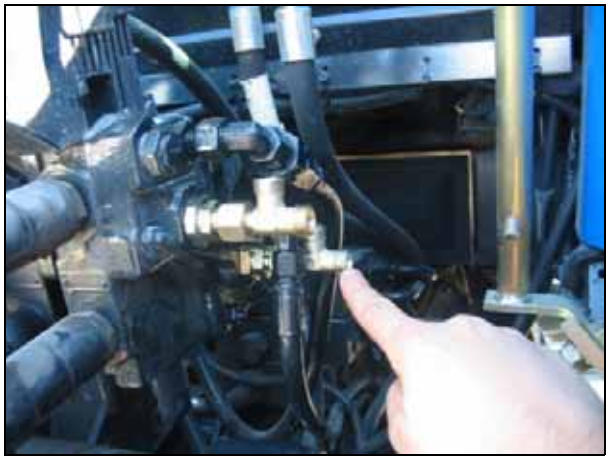
Step 20

Install a M22 x DIN 12L straight fitting in the T port. Tighten the fitting.



Step 21

Install a DIN 12L tee in each of the P and T ports to keep the Power Beyond ports available for some other devices.



Step 22

Install a DIN 12L plug in each of the P and T ports. Tighten the plugs.



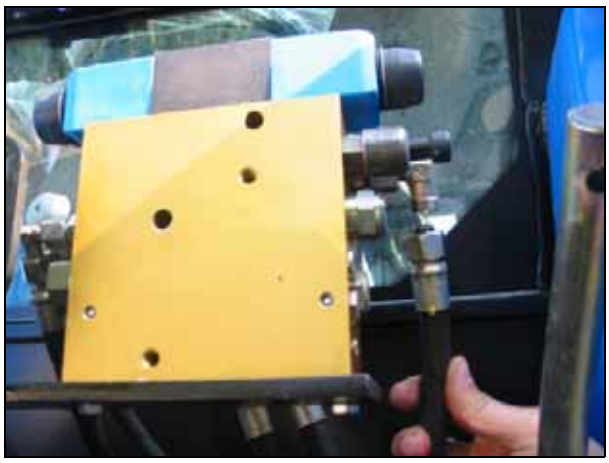
Step 23

Connect the 90 degree end of the provided 30" P hose to the tee.



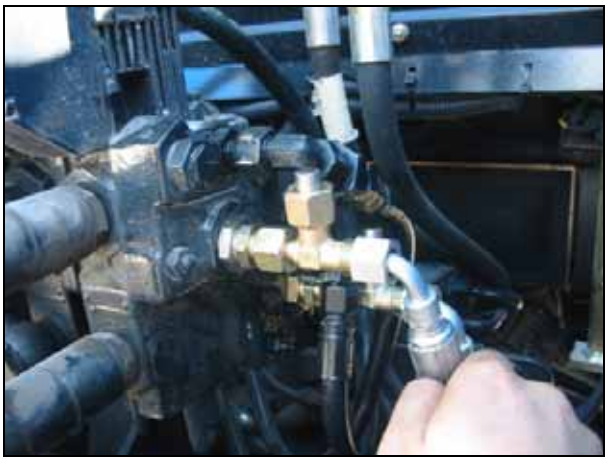
Step 24

Connect the other end of the P hose to the Autopilot manifold. Tighten the connections.



Step 25

Connect the 90 degree end of the provided 35" T hose to the tee.



Step 26

Connect the other end of the T hose to the Autopilot manifold. Tighten the connections.



Hydraulic Counter Balance Installation

Step 1

Locate the counter balance bracket (P/N 59720).



Step 2

Remove the two existing M10 bolts from the front of the panel.



Step 3

Install the bracket with the two provided M10 x 40 mm screws. Insert the screws from the back of the panel and then secure them with the provided M10 nuts.

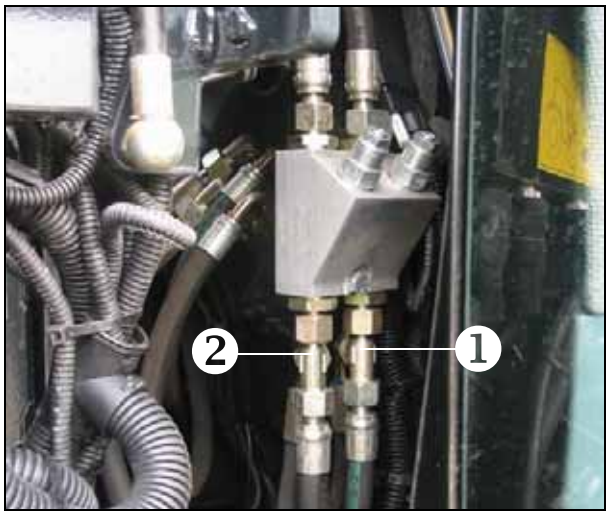


Step 4

Install the counterbalance on the bracket. Use the two M8 x 50 mm bolts and M8 washers from the counterbalance bracket kit.

Connect the 90 degree ends of the existing steering A hose ❶ and B hoses ❷ to the branch leg of the tees connected to the counterbalance C1 and C2 ports.

Note – *The connection in the photo is hidden by tees.*



Step 5

Connect the straight end of the provided 39" A2 hose ❸ to the counterbalance V1 port.



Step 6

Connect the 90 degree end of the A2 hose to the steering unit.



Step 7

Connect the straight end of the provided 39" B2 hose ❹ to the counterbalance valve V2 port.



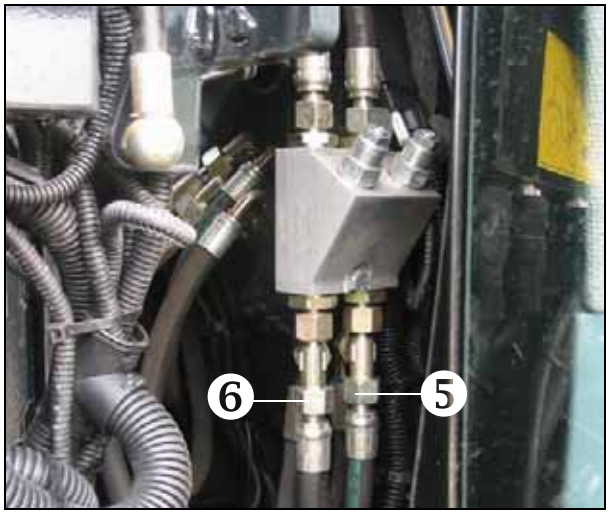
Step 8

Connect the other end of the B2 hose to the steering unit.



Step 9

Connect the straight end of the 87" A1 ❺ and 87" B1 ❻ hoses coming from the Autopilot manifold to the tees connected to the counterbalance C1 and C2 ports.



Step 10

Replace the steel cover. Secure it with the four existing M10 nuts and washers.



CHAPTER

3

AutoSense Steering Device Installation

In this chapter:

- AutoSense Steering Device Components
- Installing the AutoSense Steering Device
- Harness Preparation (P/N 54602 Rev C)

This chapter describes how to install the *Ag*GPS AutoSense™ steering device.

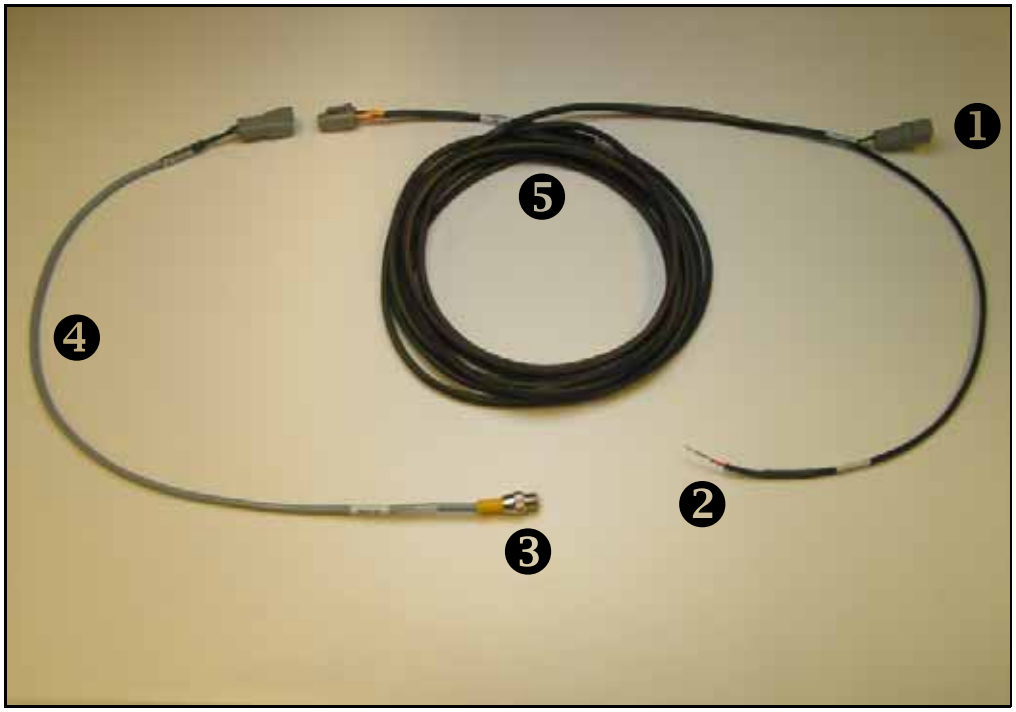
If the described mounting location is not accessible, chose an alternate location. To ensure proper function, the AutoSense device must be located in a position that is free of obstructions and allows it to rotate with the wheels when they turn.

On articulated vehicles, mount the AutoSense device on the opposite side of the pivot point to the Autopilot controller.

Mount the device base down or base up so the sensor maintains a level orientation. Do not mount the device on its side. An angle of up to 10 degrees in any direction is acceptable.

To avoid stretching the cable, leave adequate length on the service loop.

AutoSense Steering Device Components



Item	Description
1	P-6 connector
2	Power connector
3	AutoSense connector
4	Jumper cable
5	AutoSense steering cable

Installing the AutoSense Steering Device

Step 1

Locate the AutoSense bracket adaptor kit.



Step 2

Remove the existing bolt from the front of the left fender bracket.



Step 3

Remove the existing steel plate.



Step 4

Attach the adaptor bracket with the M14 x 60 mm bolt from the bracket adaptor kit.



Step 5

Secure the bolt with the M14 nut.



Step 6

Use the two M8 x 16 bolts and washers from the kit, as shown. Tighten the bolts.



Step 7

Mount the AutoSense device on the bracket with the connector pointing toward the center of the vehicle. Use four provided #6 x ½" socket head screws.



Step 8

Connect the AutoSense cable to the device.



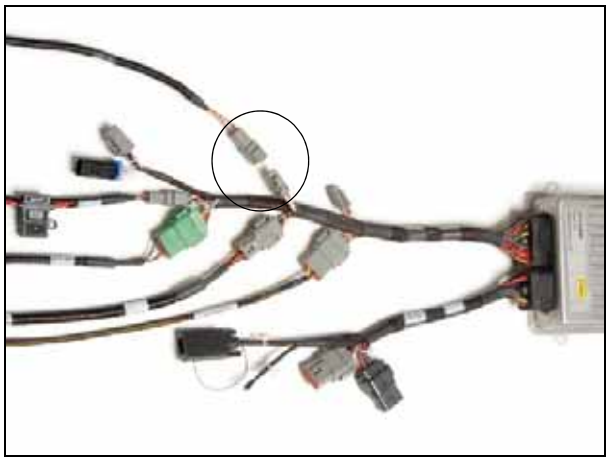
Step 9

Route the steering cable to the steering device along the existing hoses. Leave adequate length on the service loop to avoid stretching the cable.



Step 10

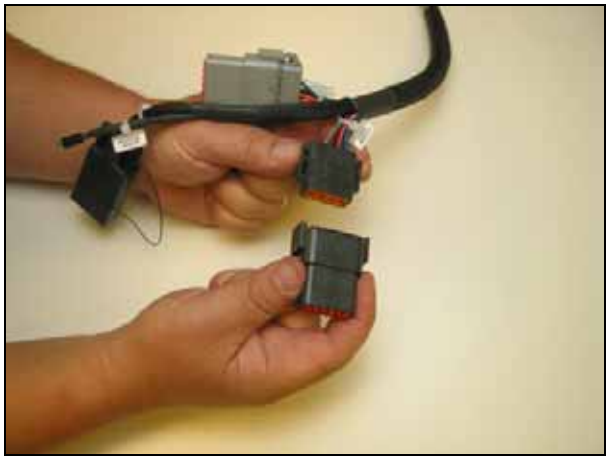
Connect the steering device cable connection to P-6 on the main wiring harness. P-6 is labeled “Steering Sensor”.



Harness Preparation (P/N 54602 Rev C)

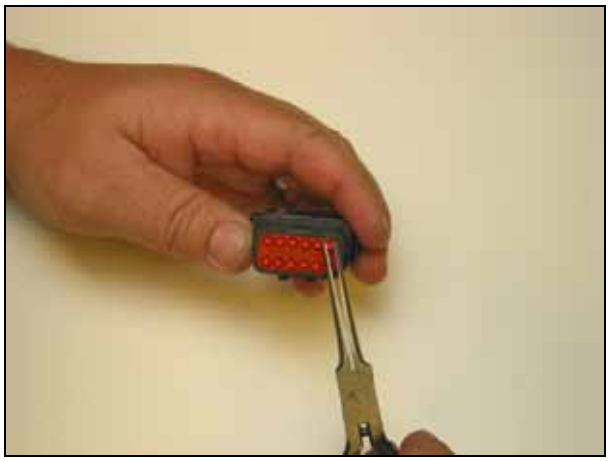
Step 1

Remove the black Deutsch DTM receptacle from the P-13 sensors leg of the auxiliary harness. See Controller Connections, page 106.



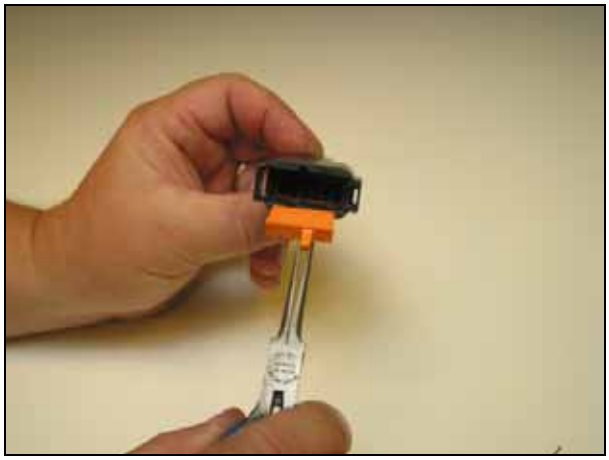
Step 2

Remove the plug from cavity number 1.



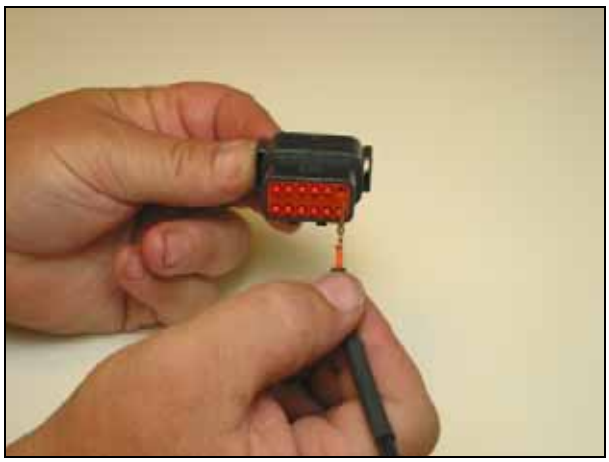
Step 3

Remove the wedge from the connector.



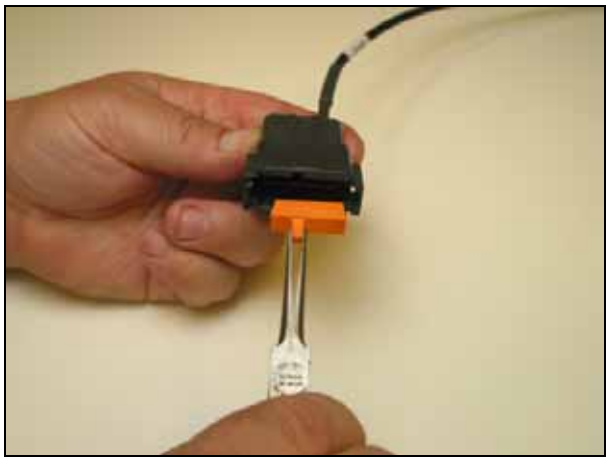
Step 4

Insert the DTM pin labeled “Cavity 1” into the connector.



Step 5

Pull back on the wire to seat the pin. Replace the wedge in the connector.



CHAPTER

4

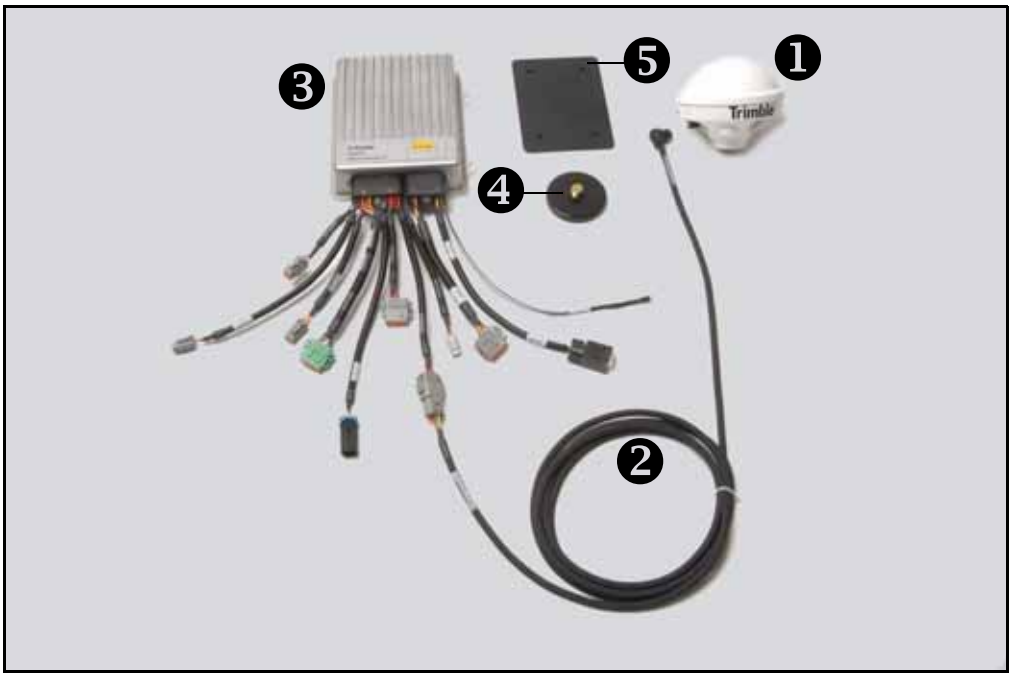
Antenna/Receiver Installation

In this chapter:

- AgGPS 114 Components
- AgGPS 132 Components
- AgGPS 114/132 Installation Process
- AgGPS 252 GPS Receiver with SiteNet Radio (If Equipped) Components
- AgGPS 252 GPS Receiver with SiteNet Radio (If Equipped) Installation Process
- AgGPS 252 GPS Receiver with AgGPS Radio Module (If Equipped) Components
- AgGPS 252 GPS Receiver with AgGPS Radio Module (If Equipped) Installation Process

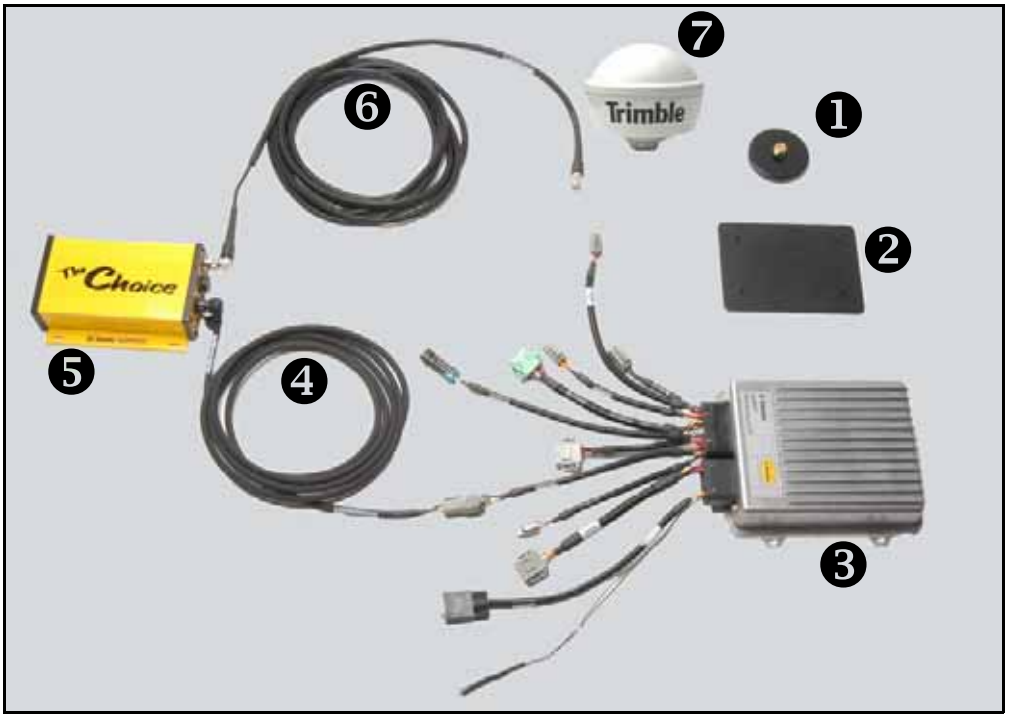
This chapter describes how to install an *Ag*GPS 114 antenna/receiver, an *Ag*GPS 132 receiver and antenna, an *Ag*GPS 252 receiver and SiteNet™ radio, or an *Ag*GPS 252 receiver and *Ag*GPS 900 radio module.

*Ag*GPS 114 Components



Item	Description
1	*Ag*GPS 114 antenna/receiver
2	Antenna/receiver cable
3	Controller
4	Magnetic mount
5	Mount plate

*Ag*GPS 132 Components



Item	Description
❶	Magnetic mount
❷	Mount plate
❸	Controller
❹	Receiver cable
❺	*Ag*GPS 132 receiver
❻	Antenna cable
❼	*Ag*GPS 132 antenna

*Ag*GPS 114/132 Installation Process

Step 1

Measure from left to right on the cab roof. Locate and mark the center point of the cab roof. Clean the area around the center of the cab.



Step 2

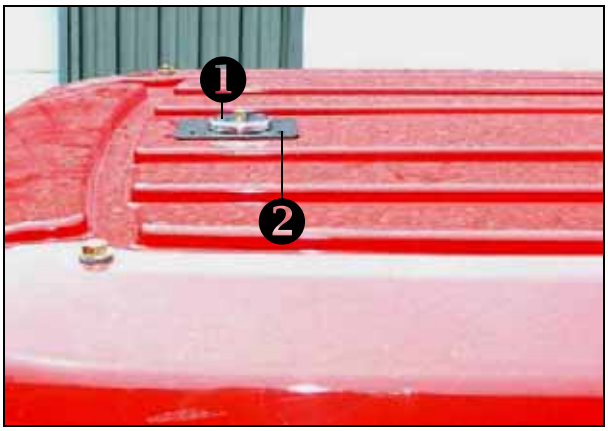
Remove the backing from the adhesive strips on the mounting plate. Mount the plate on the center point mark.

Note – *Place the antenna in an accessible location anywhere between the front and rear of the cab. It must be centered left to right.*



Step 3

Attach the magnetic mount ❶ to the mount plate. Use the four holes ❷ in the plate as a guide to attach the magnetic mount in the center of the plate.



Step 4

Attach the antenna to the magnetic mount.



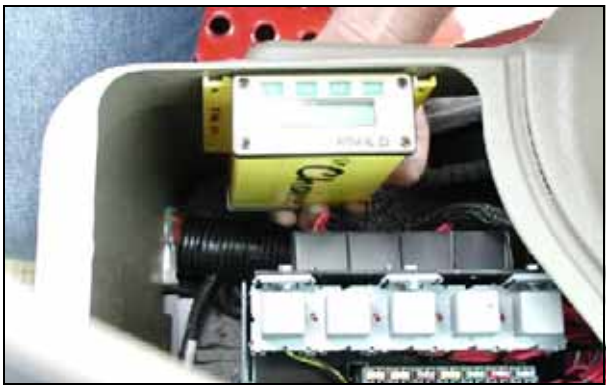
Step 5 *Ag*GPS 114 Only

Attach the antenna/receiver cable and then route the cable toward the C post at the right rear of the cab. Secure the cable to the grab rail with ties. Route the cable into the cab electronics bay, through the access hole in the cab floor. The access hole is insulated with foam. Route the remaining cable toward the instructor seat.



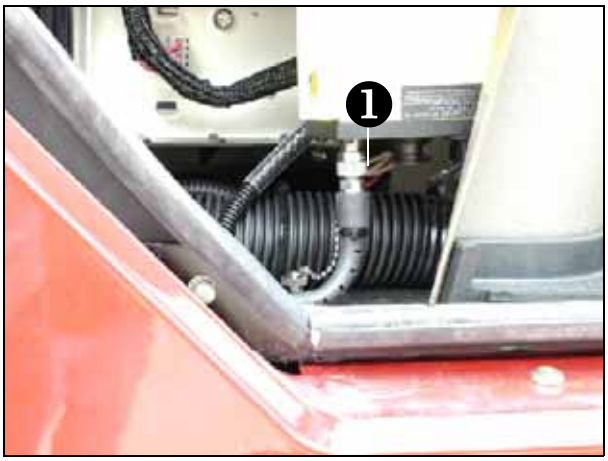
Step 6 *Ag*GPS 132 Only

Attach the antenna/receiver cable and then route the cable toward the C post at the right rear of the cab. Secure the cable to the grab rail with ties. Route the cable into the cab electronics bay, through the access hole in the cab floor. The access hole is insulated with foam. Route the remaining cable toward the front of the operator's seat base. Connections will be established later in the *Installation Instructions*.

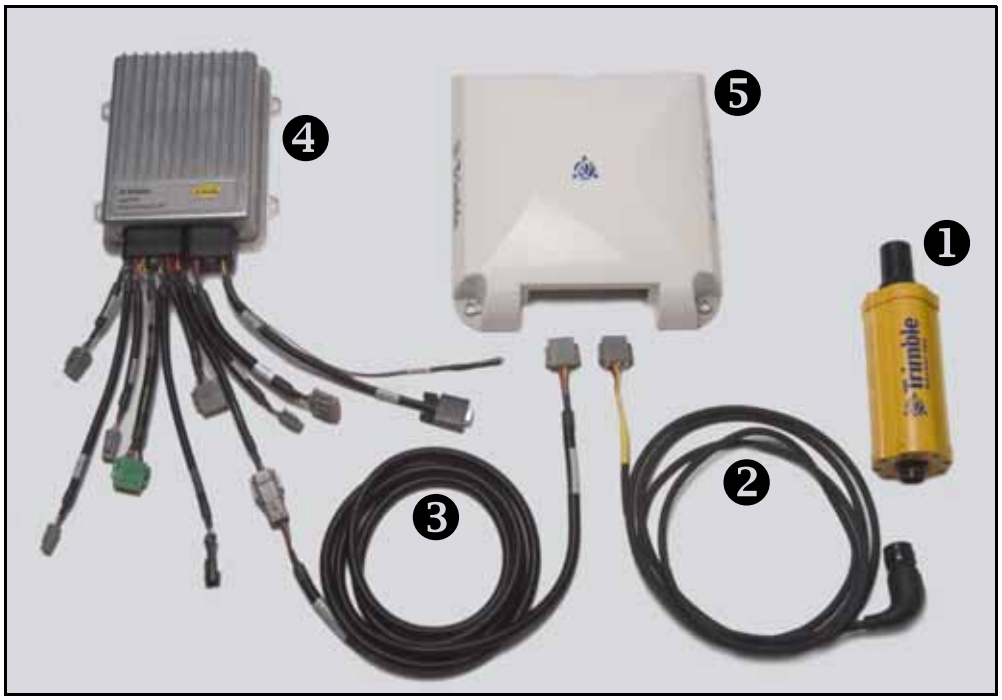


You can mount the *Ag*GPS 132 receiver in the electronics bay next to the operator's seat. Place the receiver in the electronics bay as shown. Use the receiver as a template to mark the top two holes. Drill the holes in the electronics bay and then use bolts and nuts to install the receiver.

Route the antenna cable ❶ and then connect it to the receiver in the electronics bay. Connect the controller cable to cavity "A" on the receiver. Leave the power and ground wires on the controller cable in the cab electronics bay. Route the remaining cable toward the instructor seat. Cable connections will be established later in the *Installation Instructions*.



*Ag*GPS 252 GPS Receiver with SiteNet Radio (If Equipped) Components



Item	Description
❶	SiteNet radio cable (if equipped)
❷	Antenna/receiver cable
❸	SiteNet radio (if equipped)
❹	Controller
❺	*Ag*GPS 252 antenna/receiver

*Ag*GPS 252 GPS Receiver with SiteNet Radio (If Equipped) Installation Process

Step 1

Place the mounting bar on a clean, level surface. Rotate the mounting bar so the four side holes ❶ are on your left.



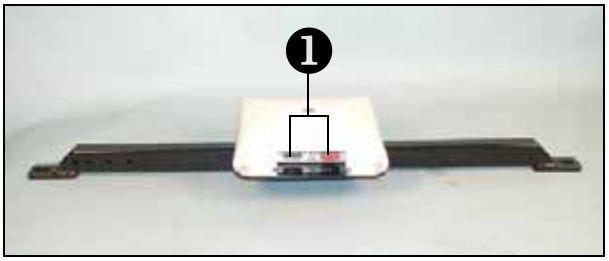
Step 2

Use the four ¼-20 x ½ flat head screws ❶ to attach the receiver mounting bracket to the top of the bar. The curved edge of the mounting bracket faces you.



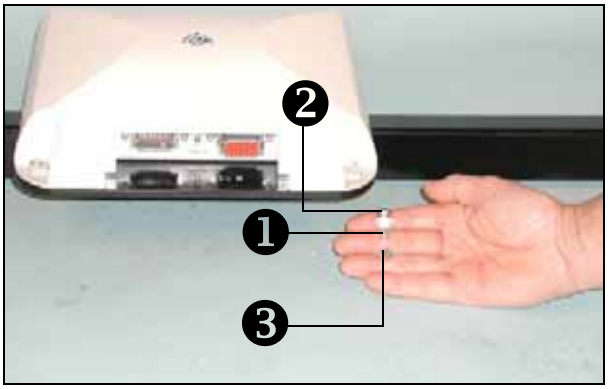
Step 3

Position the *Ag*GPS 252 receiver on the bracket with the connector cavities ❶ facing you.



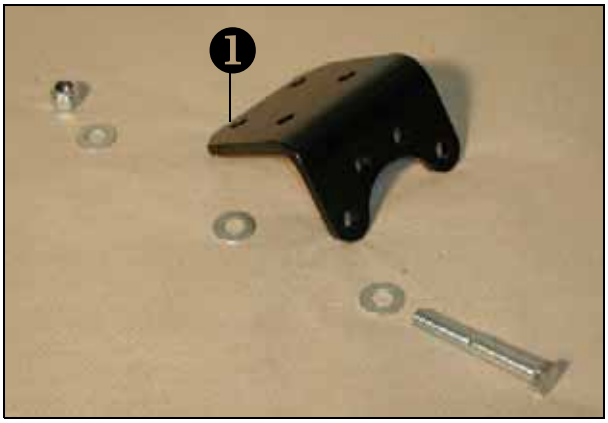
Step 4

Install the nylon shoulder washers ❶, ¼ x 7/8 hex bolts ❷, and ¼ lock nuts ❸ through the receiver and mounting bracket.

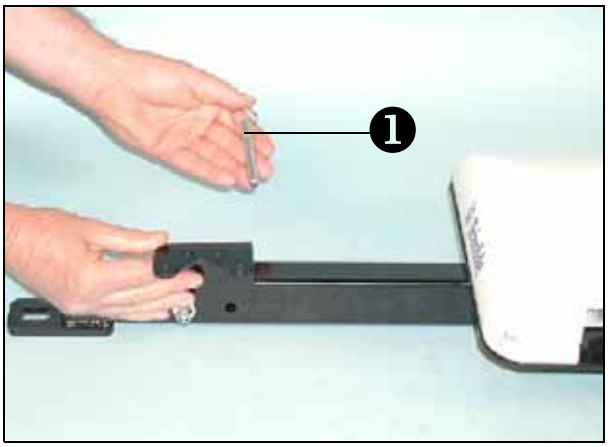


Step 5 If Equipped With SiteNet Radio

Install the SiteNet radio mount bracket. Place a flat washer onto the 3/8 x 2½ hex bolt. Install the bolt through the back of the mounting bar, in the third hole from your left. Install another washer. Place the radio mounting bracket on the bolt through the hole shown. Install another washer and lock nut.

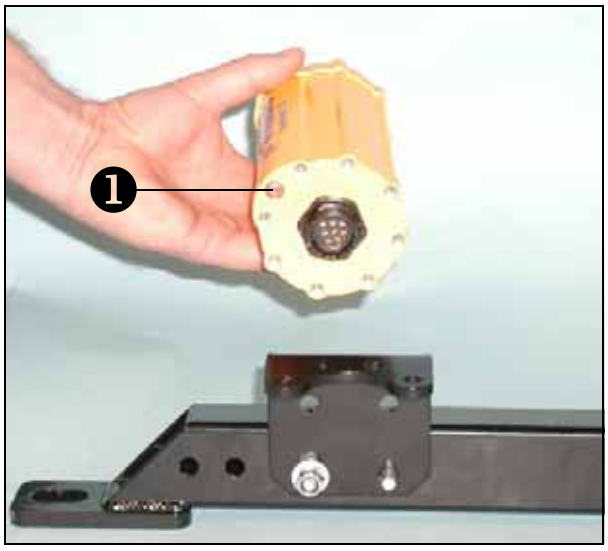


Install the ring grip retaining pin ❶ through the reverse side of the bracket, next to the bolt.

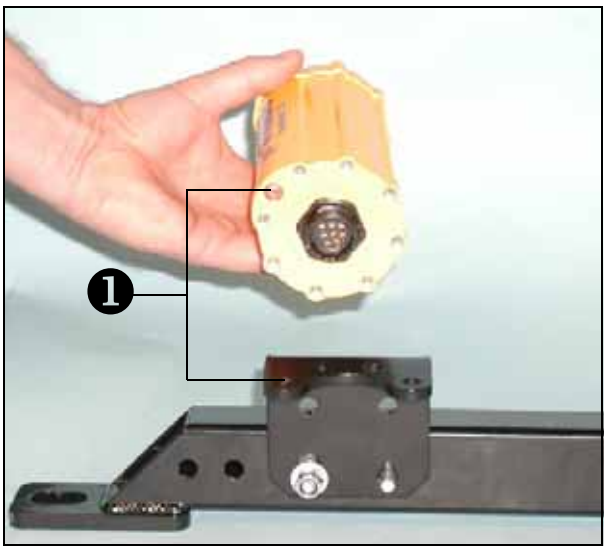


Install the radio on the mount bracket with the connector cavity underneath.

Note – *Mount the radio so the LED* ❶ *on the bottom of the radio is visible.*



Position the radio so the LED is as close to the mounting bracket as possible without being obscured. Align the hole on the radio with the hole on bracket as shown ❶.



Install two 5/16 x 5/8 socket head bolts and washers into the mount bracket and radio.

Note – *You do not need to use all of the bolts provided for the radio.*



Step 6

Remove the two bolts and washers ❶ at the rear of the cab roof. Place the mount bracket assembly over the existing holes. Re-use the existing cab bolts and install bolts onto the bracket. The connector cavities should face the rear of the cab.

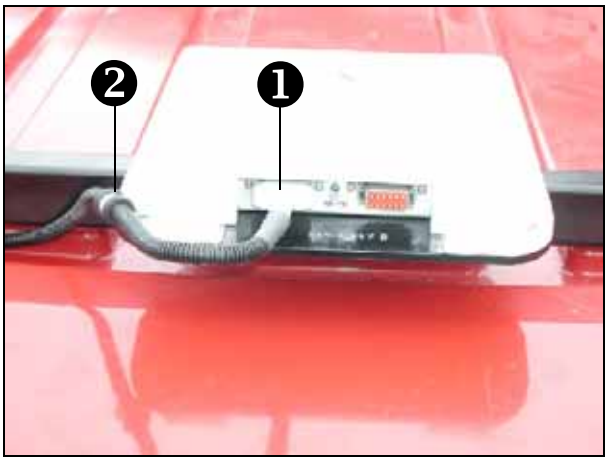
Note – *If the receiver is offset to the left or the right of the vehicle, AgGPS Autopilot system performance can be affected. Before you tighten the cab bolts, ensure that the GPS receiver and bracket are both aligned with the center of the vehicle.*



Step 7

Connect the cable from the cab controller into cavity "A" ❶ of the *Ag*GPS 252 receiver. Use the existing bolt to secure the cable clamp ❷ to the left side of the receiver.

Route the cable along the roof bracket, toward the right side of the cab. Place the cable along the C post of the cab, through the opening in the bottom of the electronics bay. Place ties along the cable to secure it.



Step 8

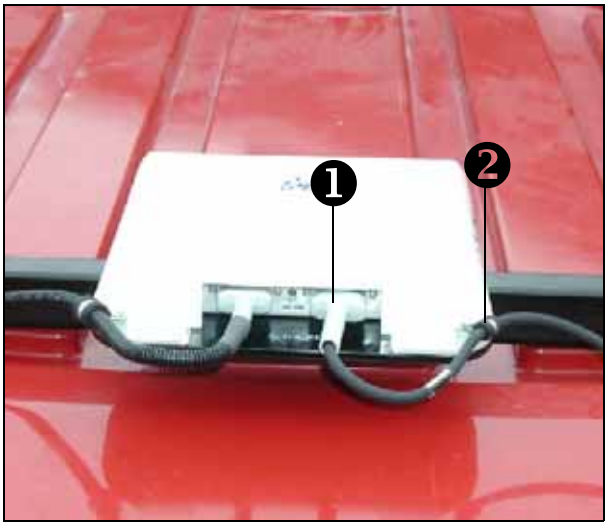
Route the cable toward the instructor seat. Cable connections will be established later in the *Installation Instructions*.

Step 9 If Equipped With SiteNet Radio

Connect the cable to the SiteNet radio. Rotate the connector until it seats and then turn the lock ring into place.



Place the opposite connector end of the radio cable into cavity "B" ❶ of the *Ag*GPS 252 receiver. Remove the plug from cavity "B" and then install the connector. Use the existing bolt to secure the cable clamp ❷ to the receiver.



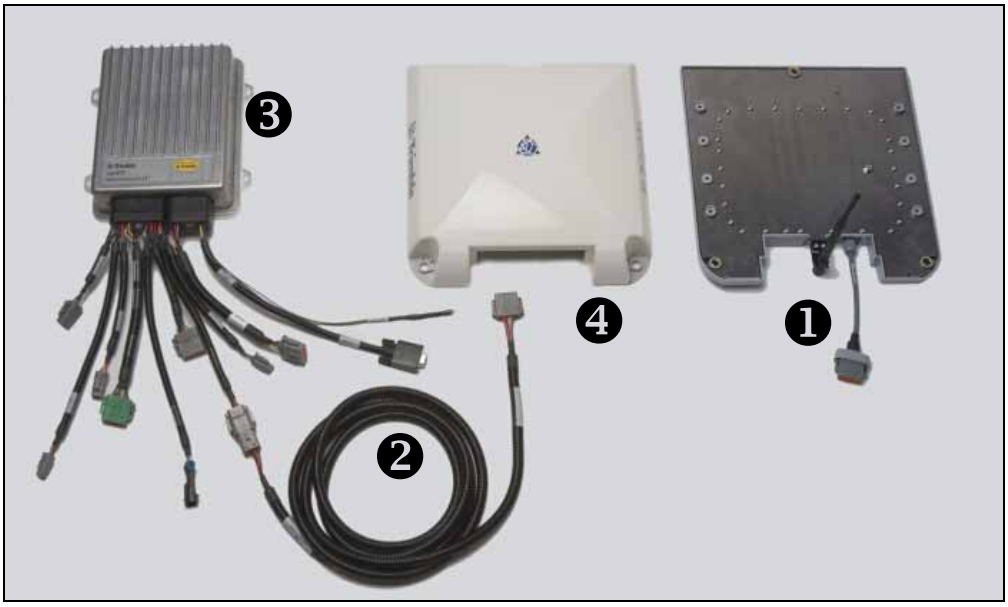
Coil the excess cable and then tie the cable together. Secure the cable to the cab or roof bracket.



You can reposition the radio mount bracket for clearance while the vehicle is traveling. Remove the pin from the mount bracket and then push the radio down toward the left side of the cab. Reinstall the pin through the mount bracket.



*Ag*GPS 252 GPS Receiver with *Ag*GPS Radio Module (If Equipped) Components



Item	Description
1	*Ag*GPS radio (if equipped)
2	Antenna/receiver cable
3	Controller
4	*Ag*GPS 252 antenna/receiver

*Ag*GPS 252 GPS Receiver with *Ag*GPS Radio Module (If Equipped) Installation Process

Primary mount

Step 1

At the rear center of the cab roof, position the three magnetic mounting plates with the antenna mounting plate.

Note – *To achieve the best performance, mount the antenna at the rear of the roof.*



Step 2

Ensure that you have full magnetic contact on the magnetic mounting plates.



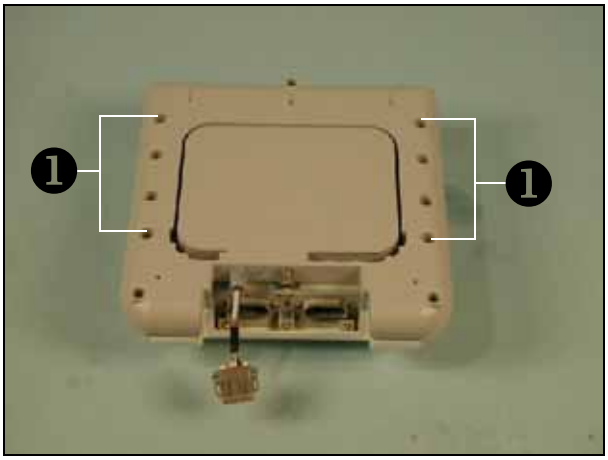
Step 3

Also ensure that you have maximum tape coverage to the cab roof between the roof ribs. Clean the cab roof area where the magnetic mounting pl ates will be adhered. Pull the protective strips from the tape strips and secure the magnetic mounting plates to the cab roof.



Step 4

Place the *Ag*GPS radio module (if equipped) on the *Ag*GPS 252 receiver. Install four screws in the holes ❶ as shown.



Step 5

Install the nylon bushings into the receiver.



Step 6

Position the *Ag*GPS 252 receiver and radio (if equipped) on top of the mounting plate. Align the three bolt holes. Install the magnetic mounts below the mounting plate and secure with a bolt, washer, and nut at each location.



Step 7

Install the magnetic mount pads to the bottom of each magnetic mount.



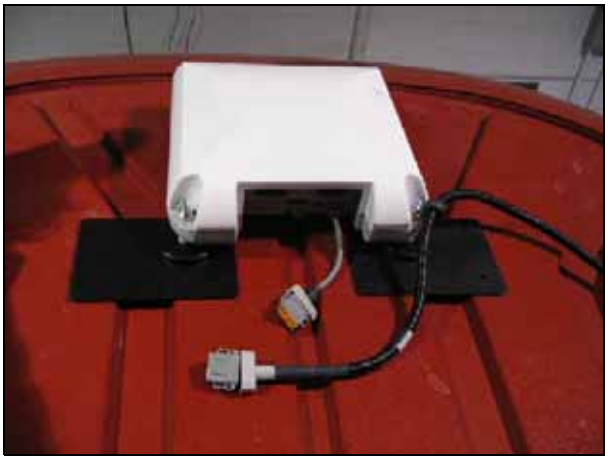
Step 8

Install the antenna cable clamp that is attached to the antenna harness on the right side of the receiver connectors.



Step 9

Place the receiver assembly onto the magnetic mount plates on the cab roof.



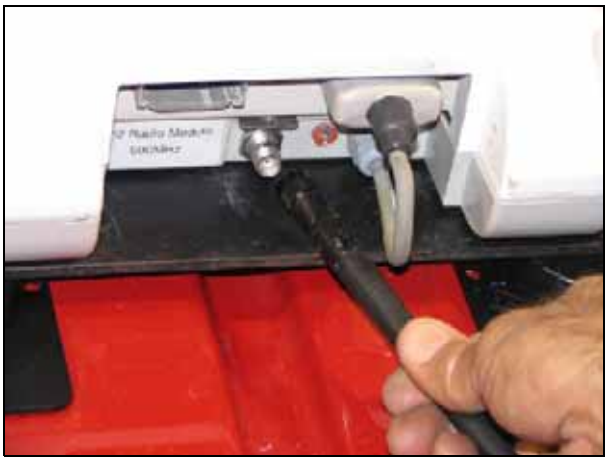
Step 10

Remove the connector plug from port B on the receiver and then plug the connector from the radio (if equipped) into the receiver.



Step 11

Screw the antenna mast onto the radio (if equipped).



Step 12

Plug the antenna/receiver cable into the A port on the receiver. Route the harness over the right mirror, down the right hand grab rail, and then back toward the right hand service door. Secure the cable along the way with tie straps.



Optional mount

Note – *The spars, cross bar, and bolts (P/N 59786) are not supplied by Trimble. For cross bar dimensions, see page 113. For spar dimensions, see page 114.*

Step 1

Assemble the receiver bracket parts. Attach the cross bar to the spars with two M12 x 20 bolts.



Step 2

Remove the padded panel from the roof of the vehicle.



Step 3

Place the bracket on the vehicle sunroof.



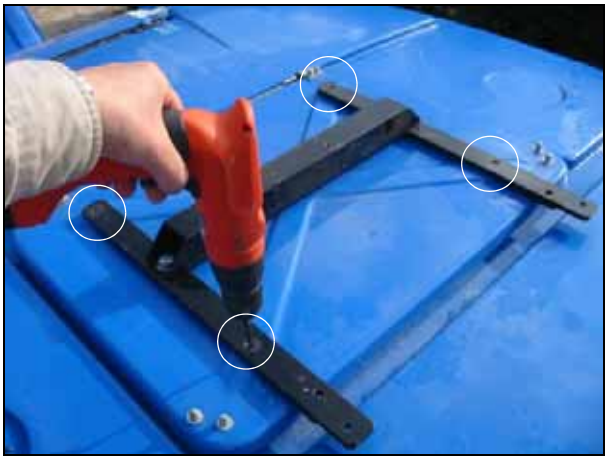
Step 4

Ensure that the spars are parallel.



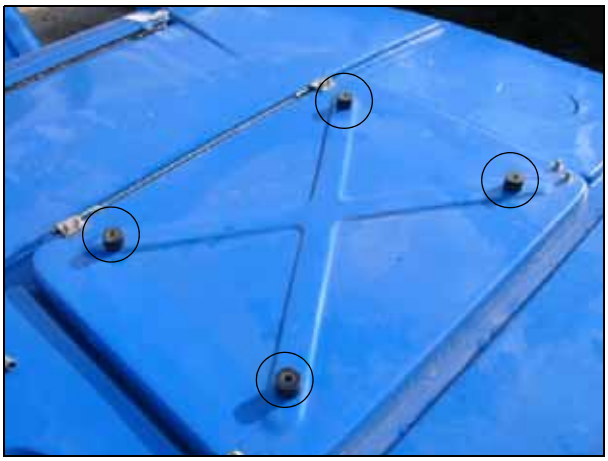
Step 5

Use the spars as a template to drill four bolt holes with a diameter of 6.5 mm in the sunroof.



Step 6

Install the 1¼" x 0.355" spacers over the four holes.



Step 7

Place a steel washer on each of the four M6 x 45 mm bolts and then place a rubber washer on each bolt.



Step 8

Insert the bolts through the four holes.



Step 9

Place the bracket over the spacers. Line up the four holes.



Step 10

On the inside of the sunroof, secure each bolt with a M6 washer and a M6 nut.



Step 11

Tighten the nuts, being careful not to break the rubber washers.



Step 12

Attach the receiver bracket to the spar. Use four ¼" x ½ FH Philips screws.



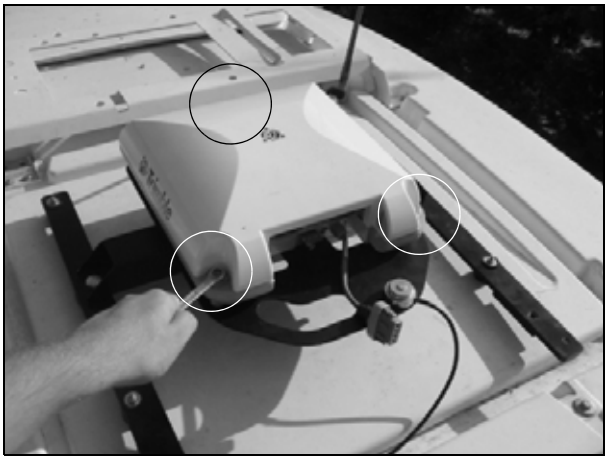
Step 13

Place the radio module and the *Ag*GPS 252 receiver on the receiver bracket.



Step 14

Attach the radio and receiver to the bracket.



Step 15

Attach the antenna cable to the antenna socket.



Step 16

Plug the radio module into port B of the *Ag*GPS 252 GPS receiver.

If it is not already connected, attach the radio antenna to the radio module.



Step 17

Plug the receiver cable from the navigation controller into port A on the *Ag*GPS 252 GPS receiver.



Step 18

If necessary, adjust the position of the cross bar on the spars. By default, locate the cross bar to the front.

Move the cross bar to the back for slow speed applications.



FRONT OF THE SPARS



BACK OF THE SPARS

CHAPTER

5

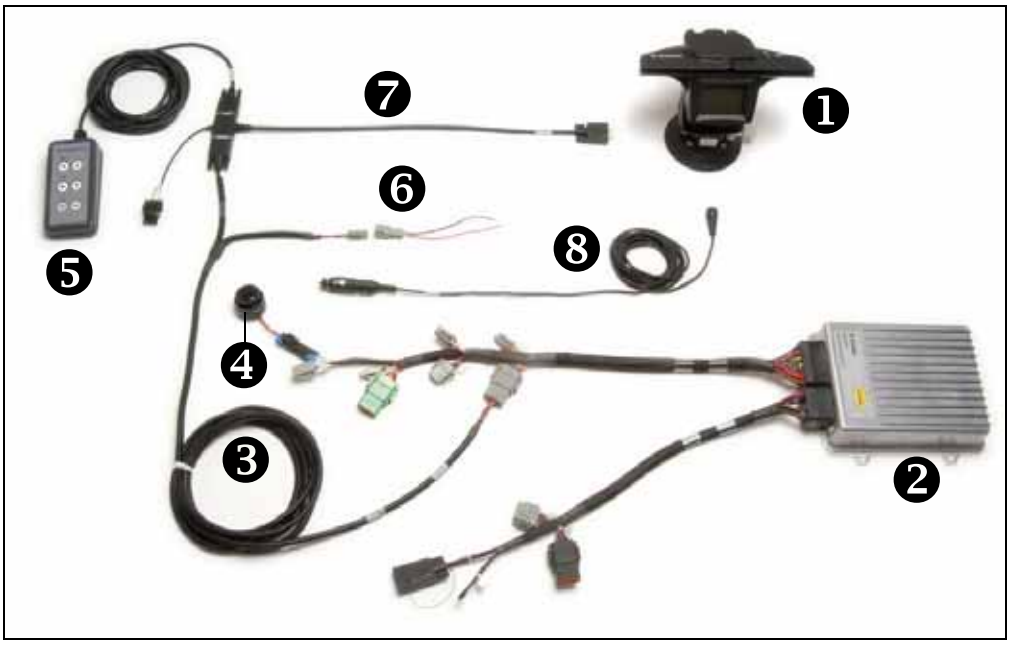
Display Installation

In this chapter:

- EZ-Guide Plus Lightbar Components
- EZ-Guide Plus Lightbar Display Installation
- Mounting the Lightbar
- AgGPS 170 Field Computer System Components
- AgGPS 170 Field Computer System Installation Process

This chapter describes and how to install and connect the EZ-Guide Plus lightbar and the *Ag*GPS 170 Field Computer in the vehicle.

EZ-Guide Plus Lightbar Components

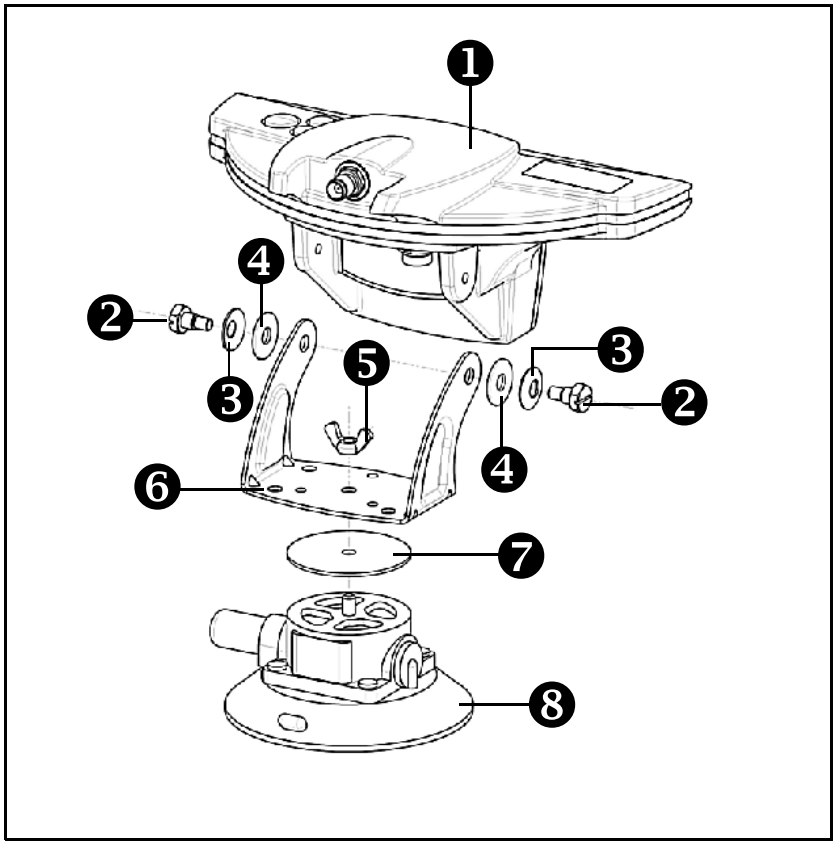


Item	Description
1	EZ-Guide Plus lightbar
2	Controller
3	Display cable
4	Sonalert alarm (if connected)
5	Optional remote keypad
6	Alternative power supply
7	External interface cable
8	Power harness

EZ-Guide Plus Lightbar Display Installation

Step 1

Assemble the lightbar as shown below.



Item	Description
❶	EZ-Guide Plus lightbar
❷	Bracket screw
❸	Bracket lock-washer
❹	Bracket flat-washer

Item	Description
❺	Bracket wing-nut
❻	Mount bracket
❼	Bracket pad
❽	Suction cup mount

Step 2

Tighten the screws ❷ to a torque of 170 cNm (15 in/lbs). Re-apply thread-lock after every ten insertions. Screws require liquid thread-locking compound for optimum performance.

Note – *Check orientation of bracket before inserting screws.*

Mounting the Lightbar

There are two methods of mounting the EZ-Guide Plus lightbar:

- On a vertical, or near vertical surface, using a suction cup vacuum mount, for example to mount the lightbar on a window.
- On a horizontal, or near horizontal surface, using a mount bracket, for example to mount the lightbar directly on the dashboard with screws.

Vacuum mount installation

Note – *The vacuum mount is a temporary mounting device. Before you use it, read the manufacturer's instructions provided with the mounting kit.*

Step 1

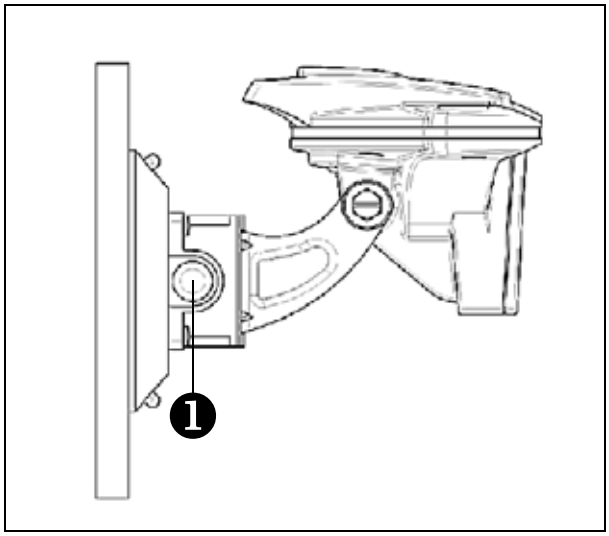
Secure the vacuum mount to the mounting bracket using the hardware provided.

Step 2

Dampen the rubber seal on the suction cup.

Step 3

Secure the lightbar in the desired location by pressing the suction cup against a flat surface and pumping the gray button ❶ until the red line is no longer visible.



Mount bracket installation

Step 1

Use a pen or awl with the bracket drilling template below to mark where the four holes are to be drilled on the mount plate.

Step 2

Drill the holes in the bracket at the marked points.

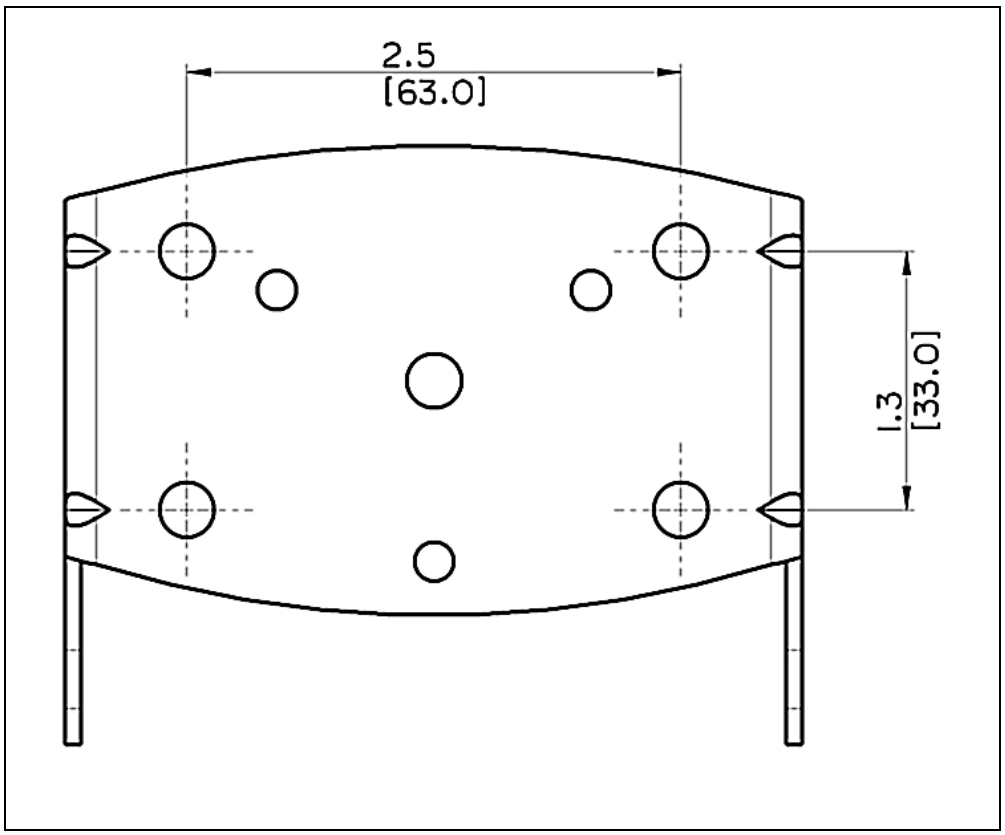


Figure 5.1 Bracket drilling template

Step 3

Screw the mount bracket to the horizontal surface.

Step 4

Attach the EZ-Guide Plus lightbar to the mount bracket.

Step 5

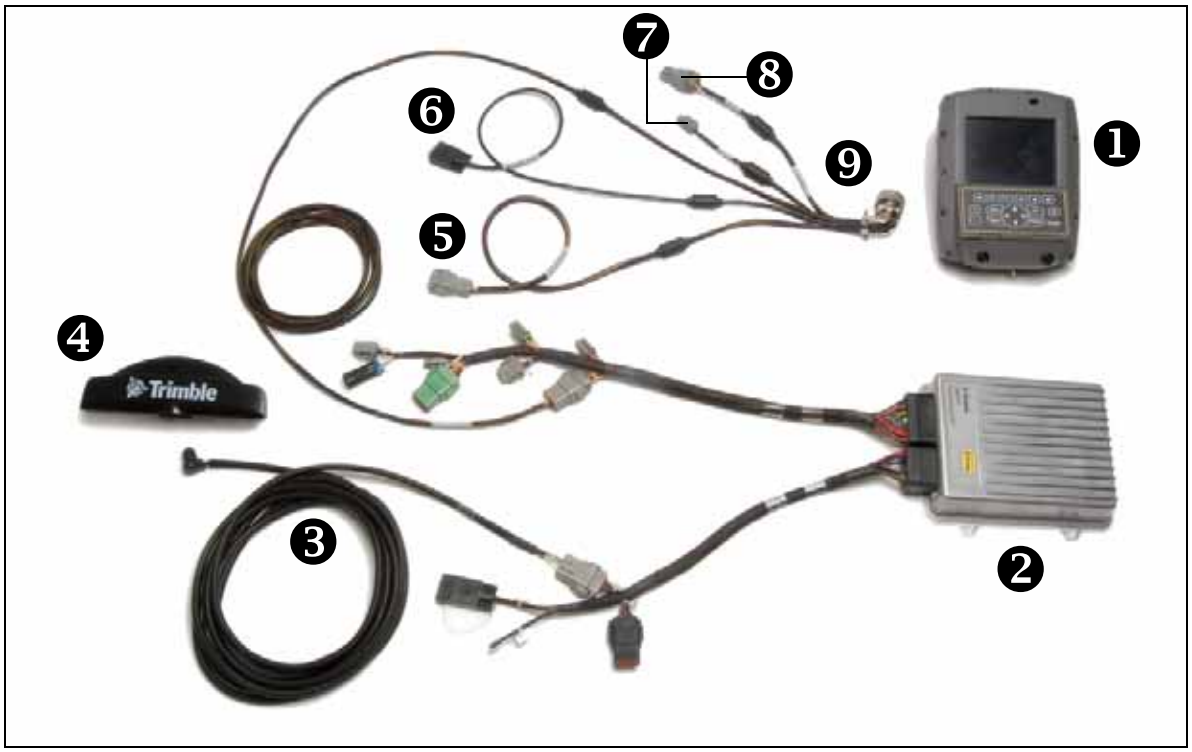
Connect the cable to the EZ-Guide Plus lightbar.

Step 6

Attach the EZ-Guide Plus display cable to the main harness connection labeled “Display”.

Note – *If the cable is connected to the auxiliary harness connection labeled “Spare”, the display will act as a lightbar only.*

*Ag*GPS 170 Field Computer System Components



Item	Description
1	*Ag*GPS 170 Field Computer
2	Controller
3	Lightbar cable (optional)
4	Lightbar (optional)
5	Switch + *Ag*GPS 170 alarm (not used)
6	Com 1 serial I/O (not used)
7	CAN (not used)
8	*Ag*GPS 170 lightbar (not used)
9	Display harness

*Ag*GPS 170 Field Computer System Installation Process

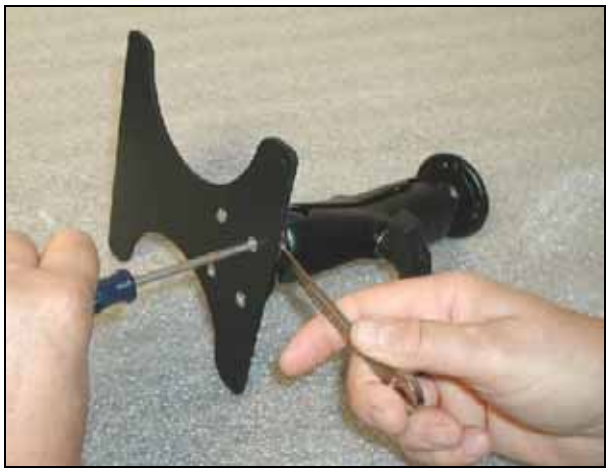
Step 1

The *Ag*GPS 170 Field Computer will be mounted in the cab with a bar mount ram mount. Decide where in the cab it will be mounted.



Step 2

Assemble the display mounting bracket onto the ram mount with the hardware provided.



Step 3

Place a spacer over each threaded hole on back of display.



Step 4

Install the display mount assembly over the spacers. Secure the mount with hardware provided.

The mount is being secured so that, with display facing you, the mount is on the left side. Install the display mount bracket according to where you will be mounting the display in cab.



Step 5

Install the bar clamp mount to the ram mount with hardware provided. The display can now be mounted in cab.



Step 6

Connect the *Ag*GPS 170 display harness to the display. Route the cable to the controller and connect to the connection labeled "Display" on the main harness connection.

Note – *Do not connect the AgGPS 170 connection to the auxiliary harness connection labeled "Spare".*

Step 7

Connect the lightbar display cable to the *Ag*GPS 21A lightbar. Route the cable to the controller and connect to the connection labeled "Spare".

CHAPTER

6

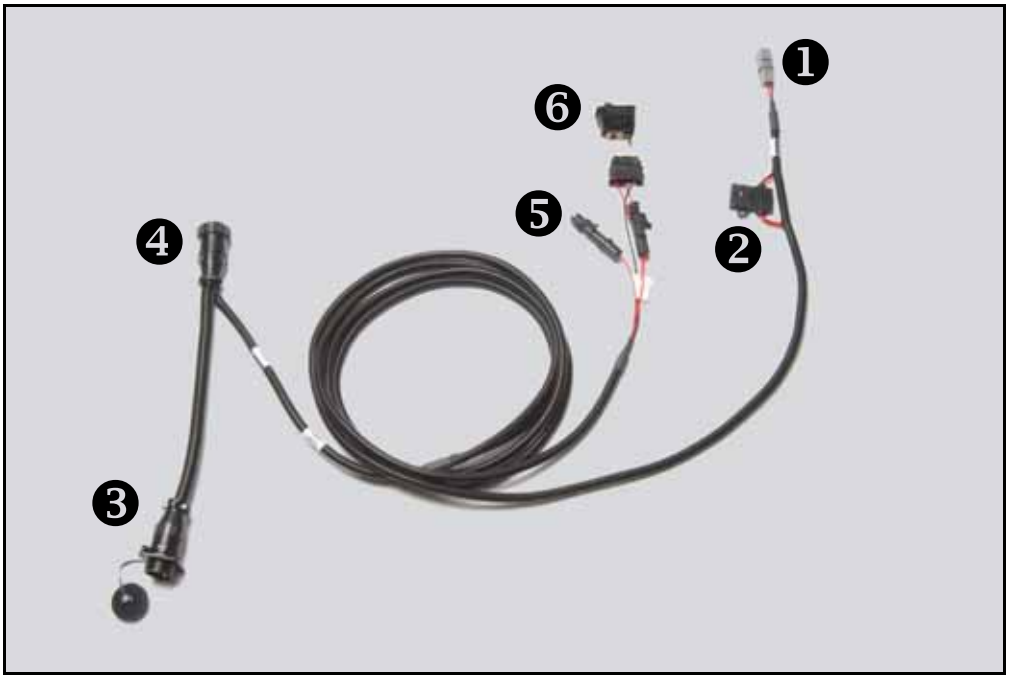
Power Harness Installation

In this chapter:

- Power Harness Components
- Power Harness Installation Process
- Power Connection

This chapter describes how to install the power harness in the vehicle.

Power Harness Components



Item	Description
1	Controller power connection
2	Fuse holder - Littlefuse 257010, 10 amp
3	Extra accessory outlet
4	Accessory jumper cable
5	Switch receptacle
6	Switch

Note – *Route all harnesses, wires, and cables along routes that are free of obstructions and pinch points. Use wire ties where necessary. Connectors on all harnesses are identified by component for ease of installation. The following instructions only give you general directions for routing the components. You are responsible for determining the best method to conceal all routings.*

Note – *Make note of where any wire harness and hose tie straps were removed during disassembly so they can be properly installed during assembly.*

Power Harness Installation Process

Step 1

Remove the screws holding the right hand side panel.



Step 2

Remove the plastic shroud.



Step 3

Lift out the rubber gear lever surround.



Step 4

Remove the screws from the right hand instrument panel.



Step 5

Locate a free switch position in the panel and remove the cavity plug.



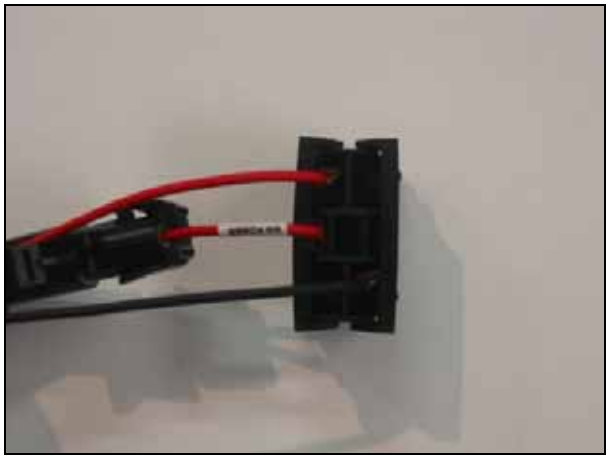
Step 6

Pass the power cable switch receptacle behind the plastic cover and then through the switch cavity.



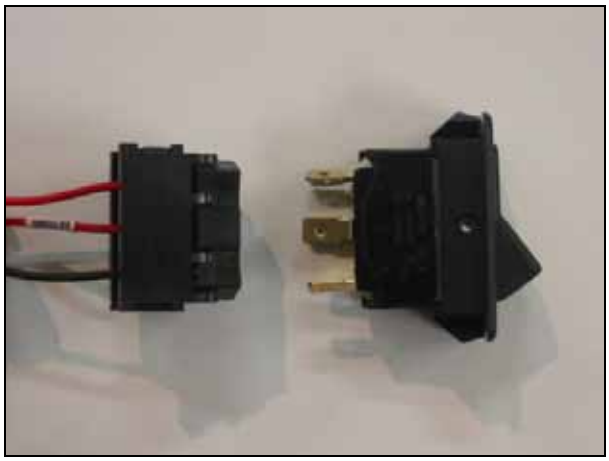
Step 7

Ensure that the pin positions into the switch receptacle are as shown.



Step 8

Mate the black (ground) wire in the receptacle with pin 3 of the switch. The pins are marked on the sides of the switch.



Step 9

Connect the power switch to the power cable.



Step 10

Push the switch into the cavity.

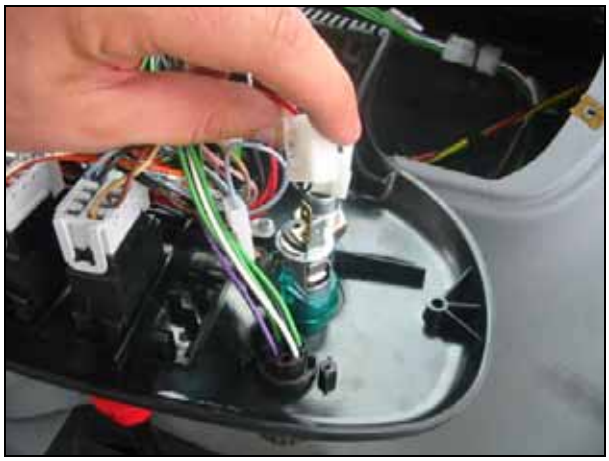
Note – *Do not reattach the panel until you have completed the next section.*



Power Connection

Step 1

Locate the cigarette lighter and disconnect it.



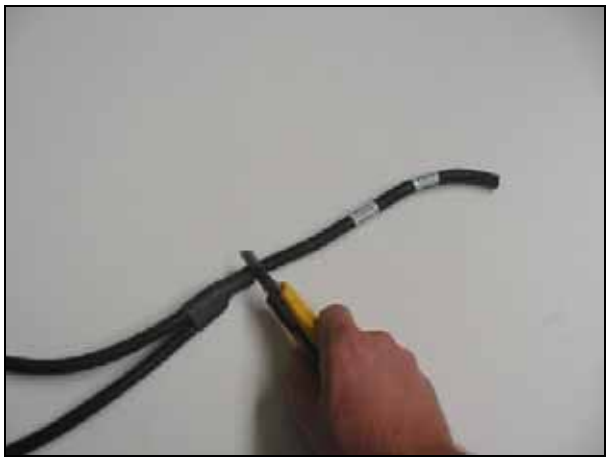
Step 2

Cut the power cable before the splitter, as shown.



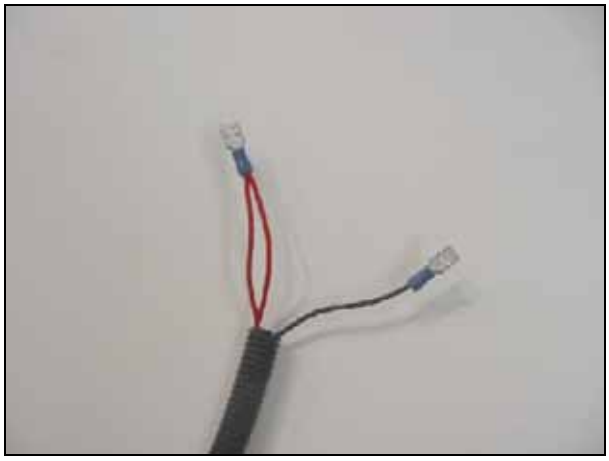
Step 3

Cut back the plastic shroud by an additional 20 cm (8 inches). Do not cut the wires.



Step 4

Attach a socket end to the black (ground) wire. Attach a single socket end to the two red (power) wires.



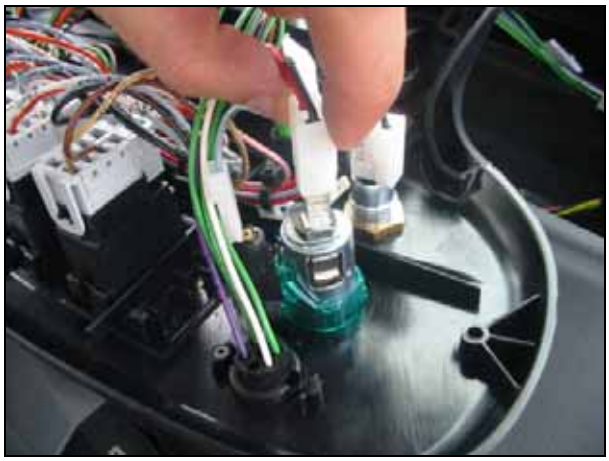
Step 5

Install two spade terminal piggyback adaptors (not included in the kit) onto the cigarette lighter spade terminals.



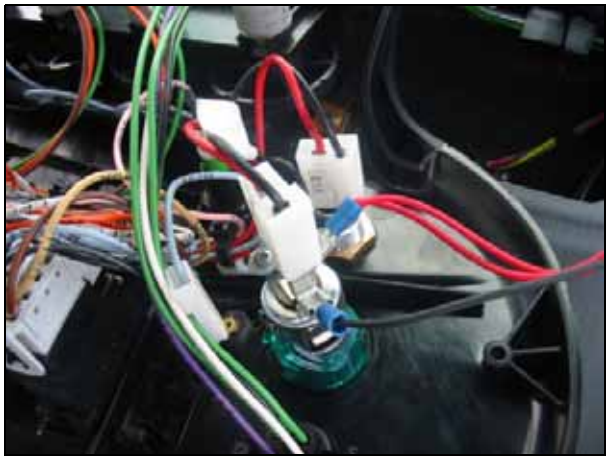
Step 6

Reconnect the cigarette lighter plug.



Step 7

Connect both the power and the ground pins to the adaptors.



Step 8

Reattach the panel.



CHAPTER

7

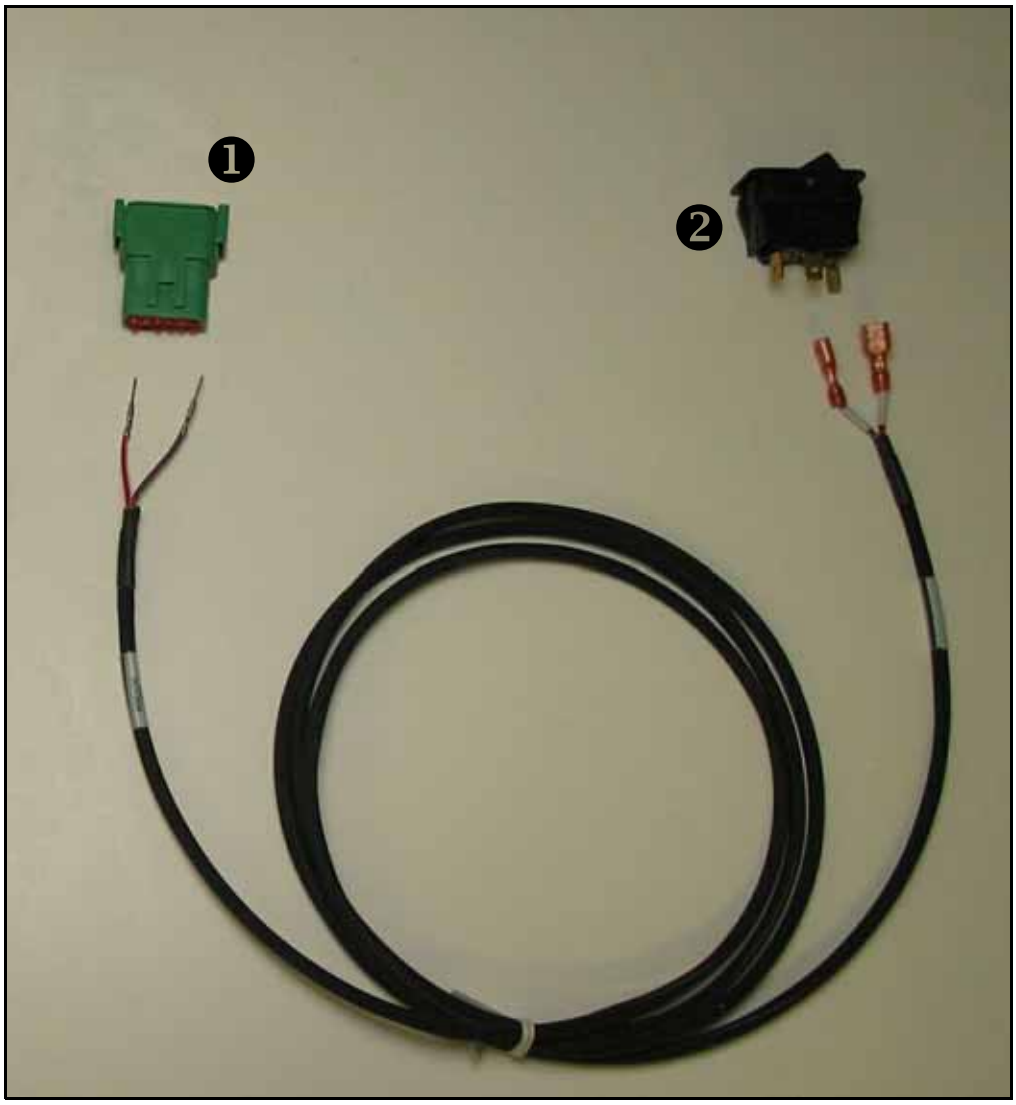
Remote Engage Switch Installation

In this chapter:

- Remote Engage Switch Components: Rocker Switch
- Remote Engage Switch Components: Foot Switch
- Prepare the Remote Engage Cable
- Using the Remote Engage Switch

This chapter describes how to install the remote engage switch.

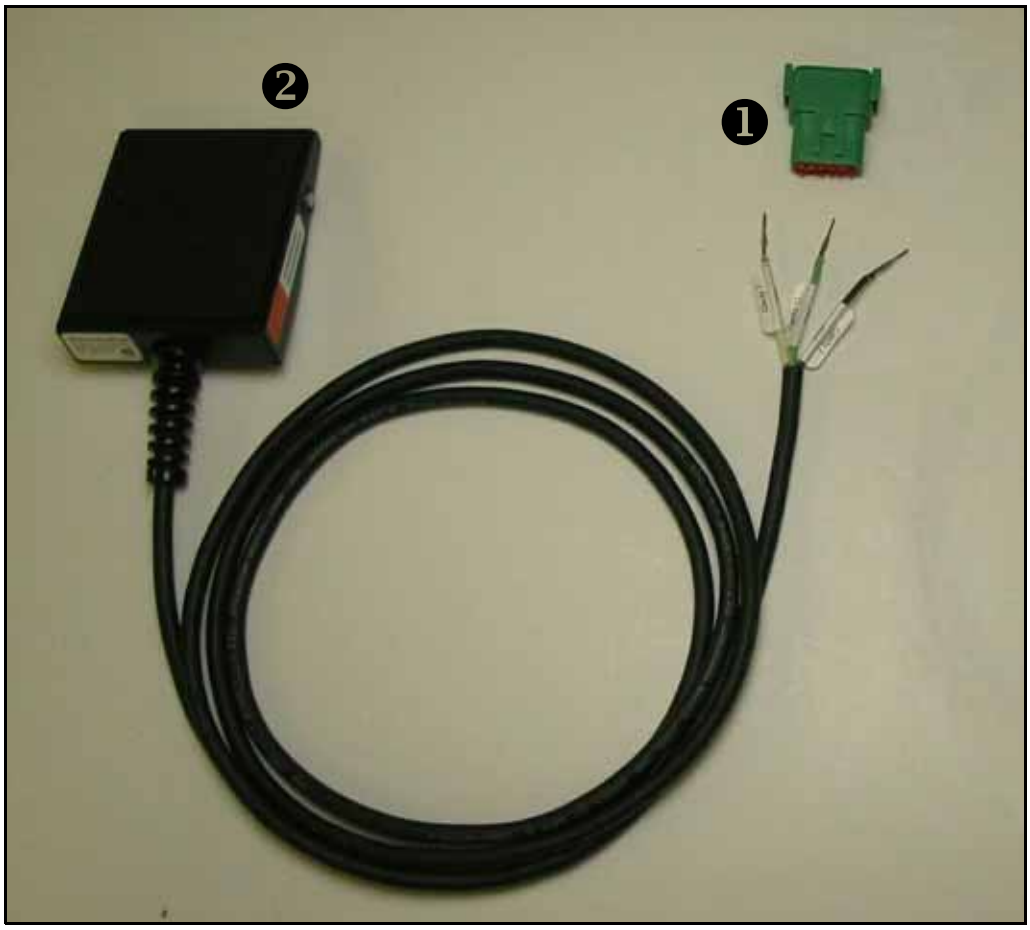
Remote Engage Switch Components: Rocker Switch



Item	Description
❶	DTM receptacle
❷	Remote engage rocker switch

Note – *Full or Standard Euro switch, depending on kit ordered.*

Remote Engage Switch Components: Foot Switch

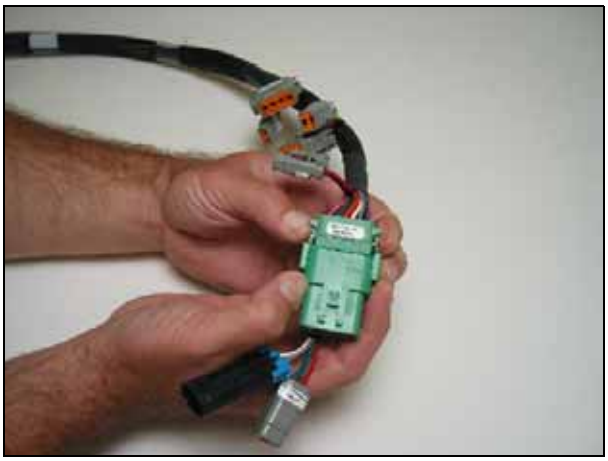


Item	Description
❶	DTM receptacle
❷	Remote engage foot switch

Prepare the Remote Engage Cable

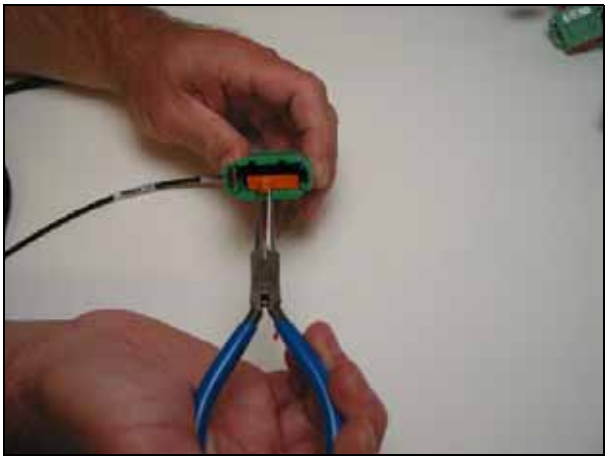
Step 1

Locate the green 12-pin Deutsch receptacle on the P-5 leg of the main controller harness. See Controller Connections, page 106.



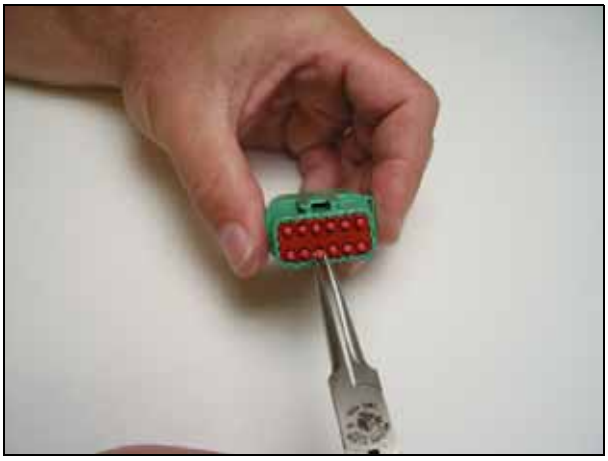
Step 2

Remove the wedge from the connector.



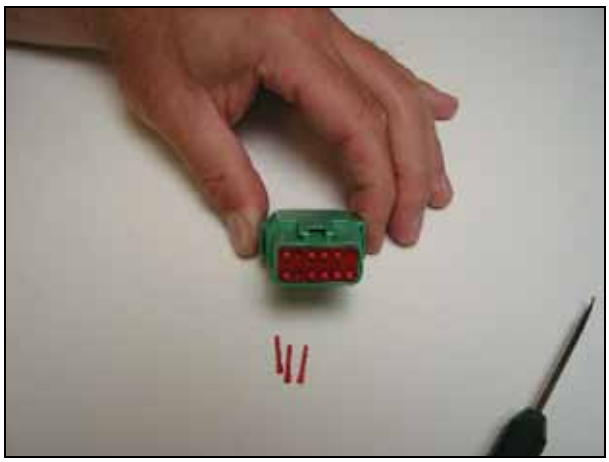
Step 3 Rocker switch only

Remove the plugs from cavity 2 and 7.



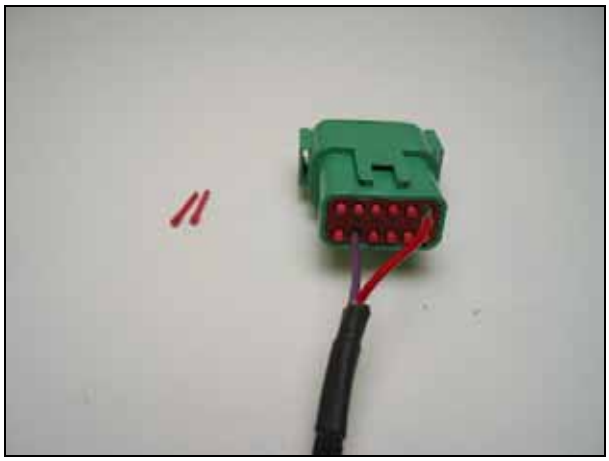
Foot Switch Only

Remove the plugs from cavity 2, 7, and 11.



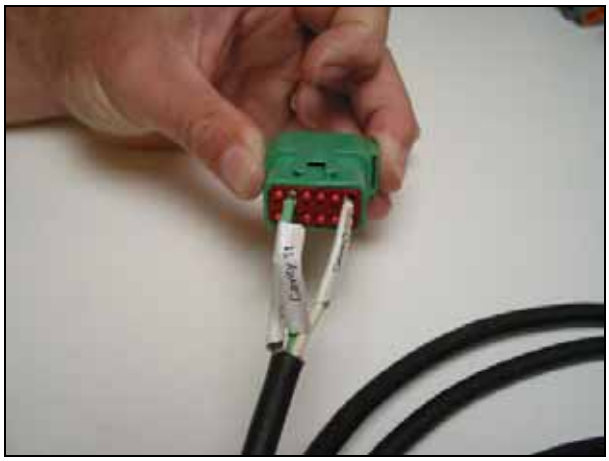
Step 4 Rocker Switch Only

Insert the DTM pins into cavity 2 and 7 according to the labels on the wires.



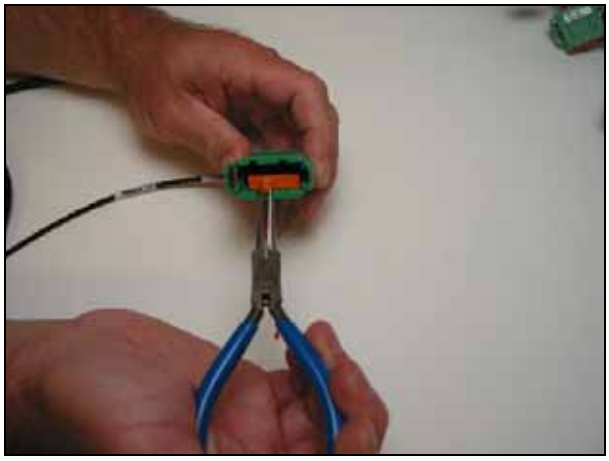
Foot Switch Only

Insert the DTM pins into cavity 2, 7, and 11 according to the labels on the wires.



Step 5

Pull on the wires to seat them in place. Replace the wedge in the connector.



Step 6 Rocker Switch Only

Run the spade ends of the cable to a knockout location in the operator console.



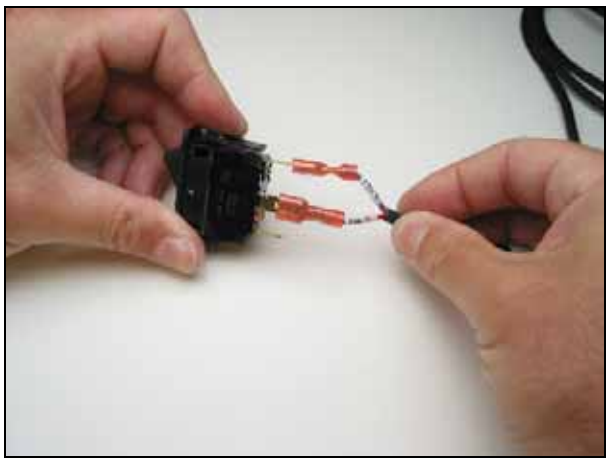
Foot Switch Only

Run the cable to a clear location on the floor board. Use double-sided tape to secure the pedal. Route the cable under the floor mat.



Step 7 Rocker Switch Only

Connect the wires to the switch that matches the print on the switch body and labels on the wires.



Step 8 Rocker Switch Only

Place the switch in the console.



Using the Remote Engage Switch

Step 1

Hold the switch down for at least 0.5 seconds.

Note – *Holding the switch shorter than 0.5 seconds will not engage the system.*

Step 2

Release the switch between 0.5 and 4.0 seconds. The vehicle will engage when the switch is released.

CHAPTER

8

Controller Installation

In this chapter:

- Controller Installation: Main Method
- Controller Installation: Alternative Method
- Controller Cable Installation
- Controller Connections

This chapter describes the installation of the controller unit in the vehicle.

Controller Installation: Main Method

Note – *Route all harnesses, wires, and cables along routes that are free of obstructions and pinch points. Use wire ties where necessary. For ease of installation, connectors on all harnesses are identified by component. The following instructions will only give you the general direction to route the components. You will be responsible for determining the best method of concealing all routings.*

Note – *Make note of where any wire harness and hose tie straps are removed during disassembly so they can be properly installed during assembly.*

Note – *Ensure that the vehicle is parked on flat, level ground.*

Step 1

Remove the instructor seat bolts. Keep them for later.



Step 2

Remove the instructor seat.



Step 3

Remove the screw that holds the matting in.



Step 4

Peel back the matting and then remove the plastic cover screw.



Step 5

Remove the plastic cover from the fender.



Step 6

Remove the cigarette lighter wires.



Step 7

Remove the plastic screws.



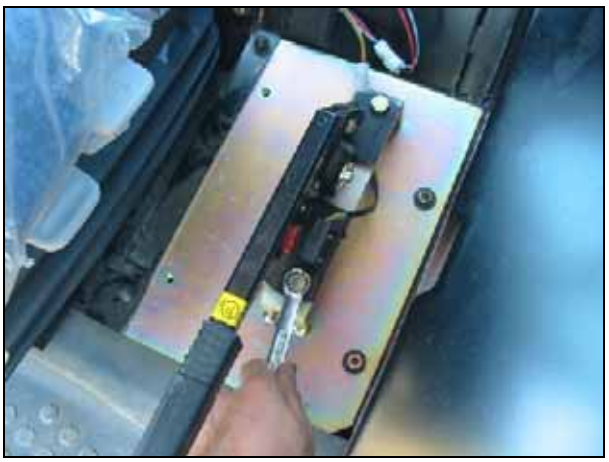
Step 8

Remove the plastic cover around the handbrake.



Step 9

Remove the handbrake bolts.



Step 10

Remove the handbrake.



Step 11

Place the controller mounting plate (P/N 54828) against the left wheel well.



Step 12

Use a level to ensure that the controller mounting plate is parallel to the ground.



Step 13

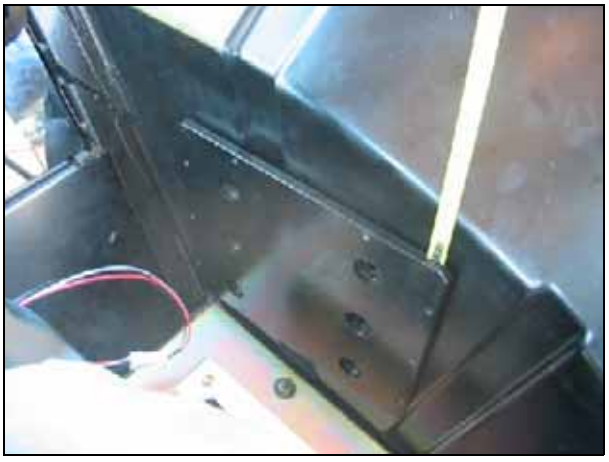
Adjust the controller mounting plate so that the mounting holes are clear of the reinforcement ribs.



Step 14

Ensure that there is enough space:

- above the plate that it will not obstruct the plastic cover.
- at the rear of the plate for the wiring harness.



Step 15

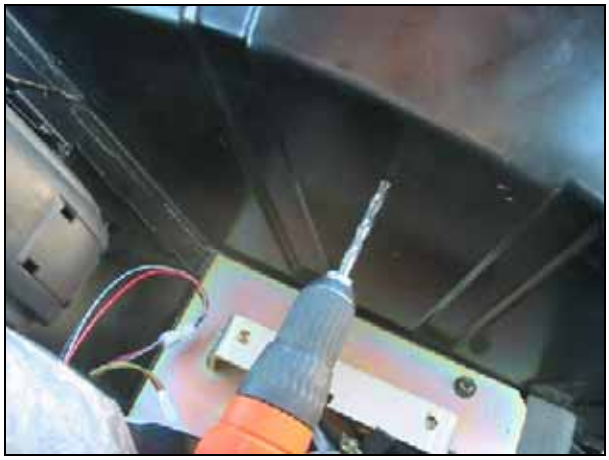
Use the plate as a template to mark the location of the mounting holes.



Step 16

Remove the plate.

Drill four holes with a diameter of 8.5 mm.



Step 17

Attach the mounting plate. Use the four 5/16 x ¾ bolts provided.



Step 18

Secure each bolt with a 5/16 washer and a 5/16-18 nut.



Step 19

Attach the main and auxiliary harnesses to the controller.

Use an Allen key to secure them.



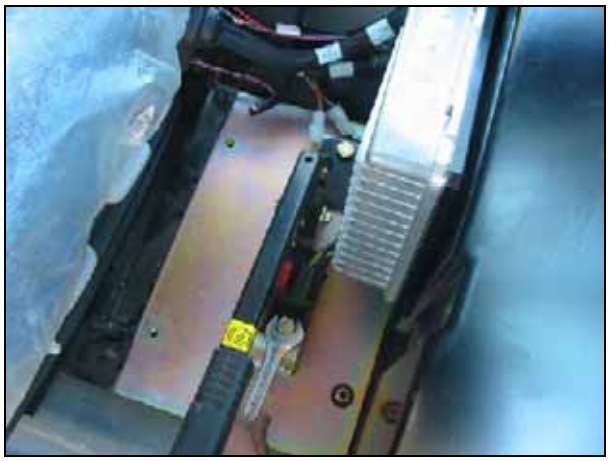
Step 20

Attach the controller to the mounting plate. Use the four 10-32 **x** 5/8 screws provided.



Step 21

Reattach the handbrake.



Step 22

Reattach the plastic cover.



Step 23

Reinstall the plastic screws.



Step 24

Connect the loose wires to the cigarette lighter.



Step 25

Reattach the plastic cover and secure it. Roll back the rubber matting and secure it with a bolt.



Step 26

Reattach the instructor seat.

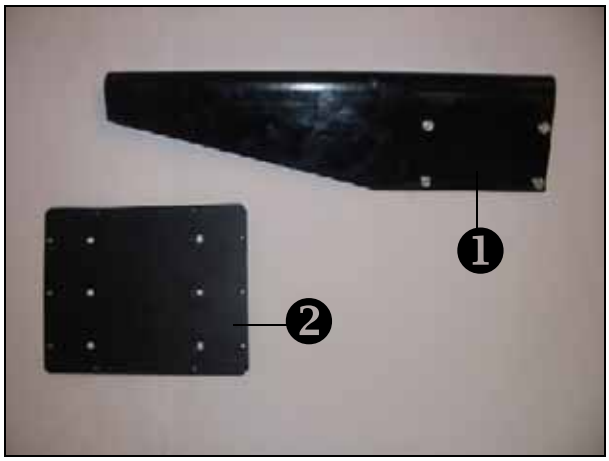


Controller Installation: Alternative Method

Note – *The controller mounting bracket ❶ is not included in the platform kit. For instructions on creating the bracket, see* *Controller Bracket Dimensions (P/N 59721), page 115**. The controller mounting plate (P/N 54828) ❷* ***is*** *included in the platform kit.*

Step 1

Prepare the controller mounting bracket (P/N 59721) ❶ and the controller mounting plate (P/N 54828) ❷.



Step 2

Remove the two bolts from the front of the seat.



Step 3

Attach the controller bracket to the seat base. Use the bolts you removed in Step 2. Tighten the bolts.



Step 4

Place the controller mounting plate against the bracket.



Step 5

Attach the mounting plate. Use the four 5/16 x ½ bolts provided.

Tighten the bolts.



Step 6

Attach the controller to the mounting plate. Use the four 10-32 x 5/8 screws provided.



Step 7

Connect the main and auxiliary cables to the controller. Use an Allen key to secure them.





Controller Cable Installation

Step 1

Locate the pass-through, at the right rear underside of the cab. Cut the cable tie.



Step 2

Remove the plastic cover.



Step 3

Route the cables through the pass through.



Step 4

Replace the plastic cover.



Step 5

Connect the cable to the wiring harness.

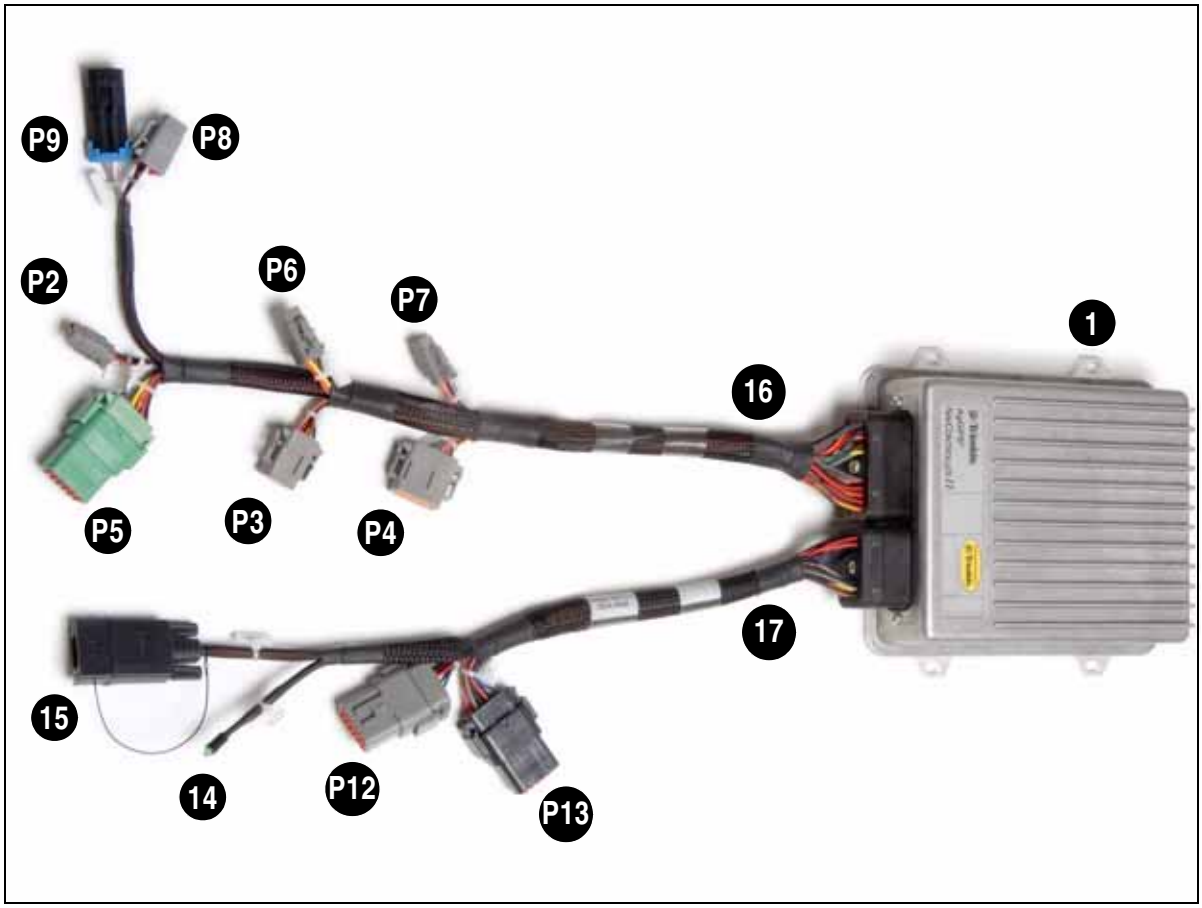


Step 6

Wrap the cables in the protective shroud.



Controller Connections



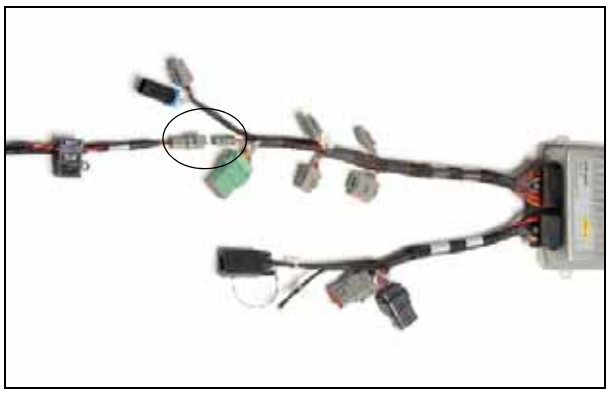
Item	Description
1	NavController II controller
P2	Power connector
P3	GPS connector
P4	Display connector
P5	Vehicle sensors connector
P6	Steering sensor connector
P7	Manual override connector
P8	Hydraulic valve connector

Item	Description
P9	Sonalert connector
P12	Lightbar/spare connector
P13	Spare sensors connector
14	Status indicator
15	Laptop connector
16	Main harness
17	Auxiliary harness

Step 1

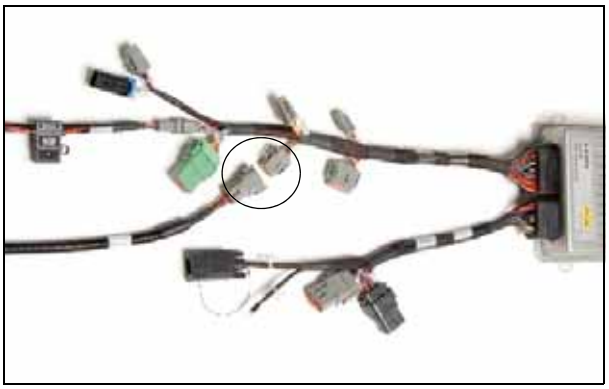
Connect the power cable connection to P-2, which is labeled “Power”. P-2 is located on the main wiring harness.

Note – *The power connection supplies power through the controller to all connected devices, including GPS and displays.*



Step 2

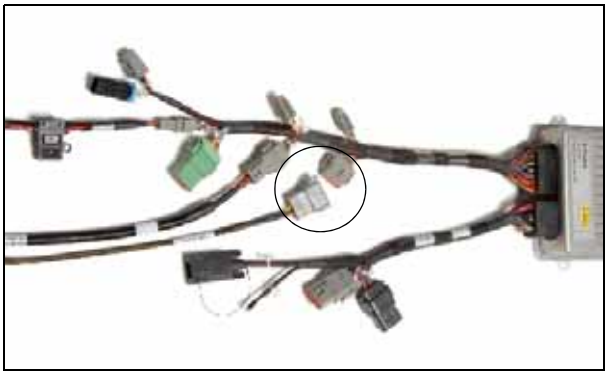
Connect the GPS cable connection to P-3, which is labeled “GPS”. P-3 is located on the main wiring harness.



Step 3

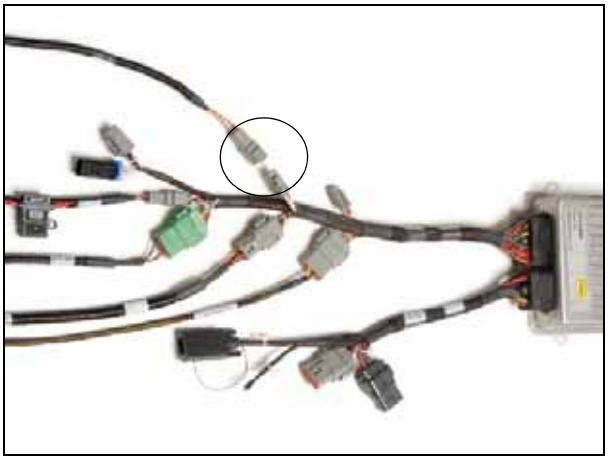
Connect the primary display cable connection to P-4, which is labeled “Display”. P-4 is located on the main wiring harness.

Note – *Do not connect the cable to the connector labeled “Spare” on the auxiliary harness.*



Step 4

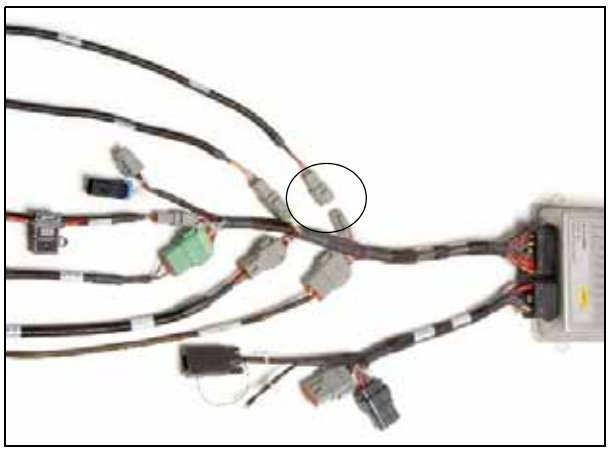
Connect the steering sensor cable connection to P-6, which is labeled “Steering Sensor”. P-6 is located on the main wiring harness.



Step 5

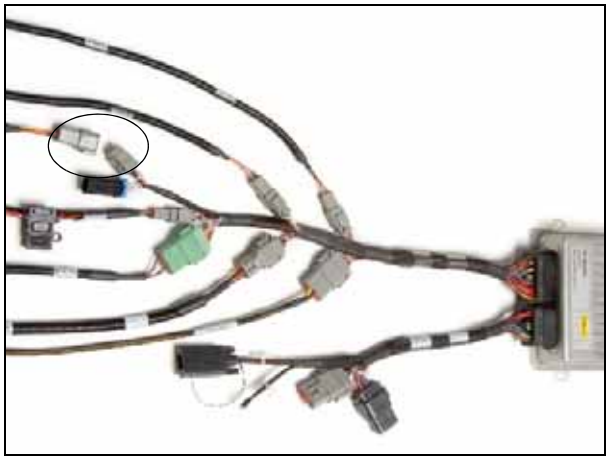
Connect the manual override cable connection to P-7, which is labeled "Manual Override". P-7 is located on the main wiring harness.

Note – *When you install the remote engage harness, add the pins to the existing connector.*



Step 6

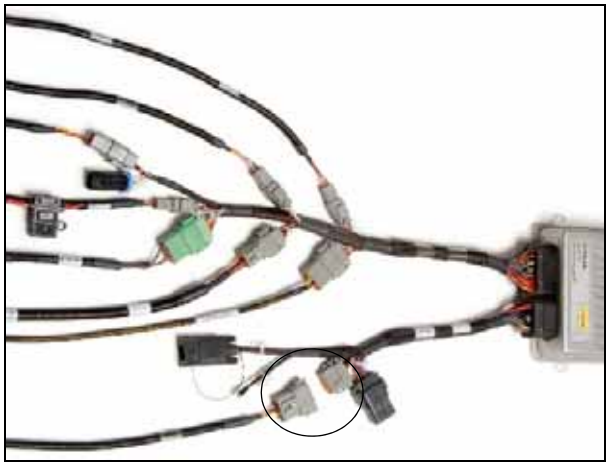
Connect the hydraulic steering valve cable connection to P-8, which is labeled "Hydraulic Valve". P-8 is located on the main wiring harness.



Step 7

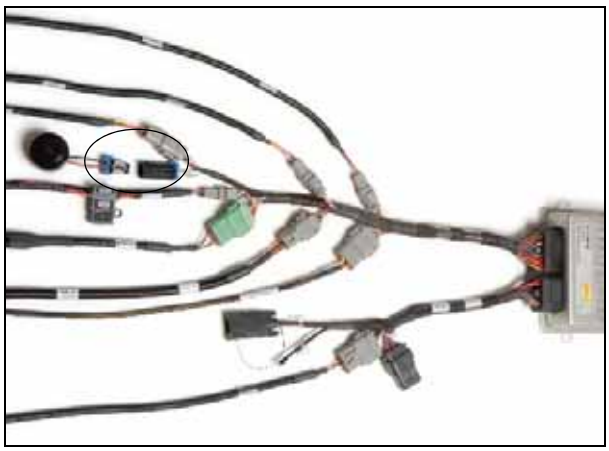
When using a lightbar as a secondary display to an *Ag*GPS 170 field computer, connect the lightbar cable connection to P-12, which is labeled "Lightbar/Spare". P-12 is located on the auxiliary wiring harness.

Note – *If an AgGPS 50 or AgGPS 150 lightbar is connected to P-12, it will act as a lightbar only.*



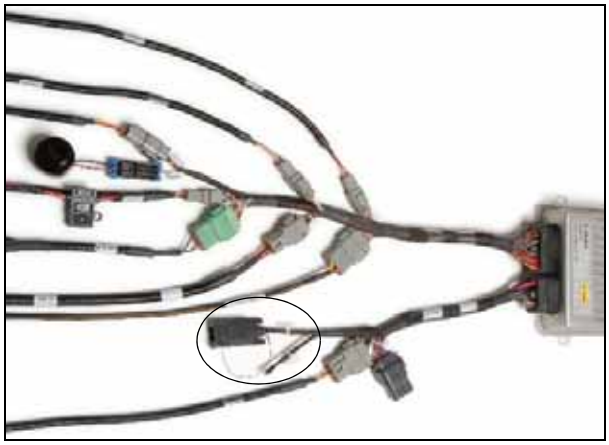
Step 8

Connect the Sonalert P-9 to the two pin Delphi connector on the main wiring harness. Route the cable so the Sonalert warning device is in a position that is audible to the operator.



Step 9

Route the LED and laptop lead, which is located on the auxiliary wiring harness, to a location that allows the operator to determine the controller status. See controller LED status for status determination. Six flashes per second indicates a correctly functioning controller.



Step 10

Use the provided sleeving to secure the harness cables with tie wraps. Cover and route the cable bundle to avoid damage to connectors and strain on wire connections.

CHAPTER

9

Final Machine Check

In this chapter:

- Final Machine Check
- AgGPS 252 Receiver Cross Bar Dimensions
- AgGPS 252 Receiver Spar Dimensions (Two are Required)
- Controller Bracket Dimensions (P/N 59721)

This chapter describes how to perform a final check of the vehicle.

Final Machine Check

Step 1

Connect the battery.

Step 2

Start the machine and check for hydraulic leaks. Correct as needed.

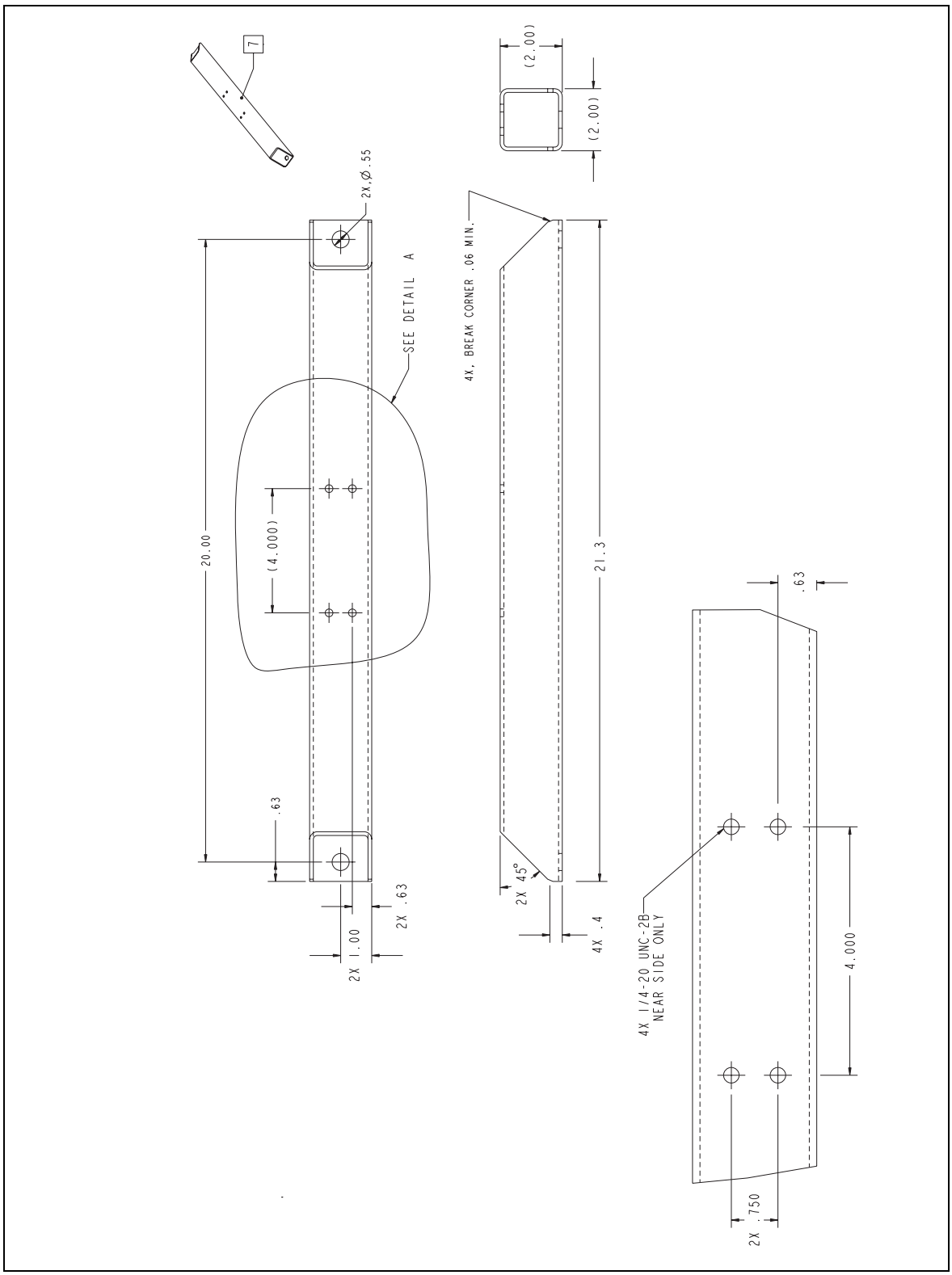
Step 3

Connect and run the *Ag*GPS Autopilot Toolbox II software for system setup and calibration. For more information, refer to the *AgGPS Autopilot Toolbox II Software User Guide*.

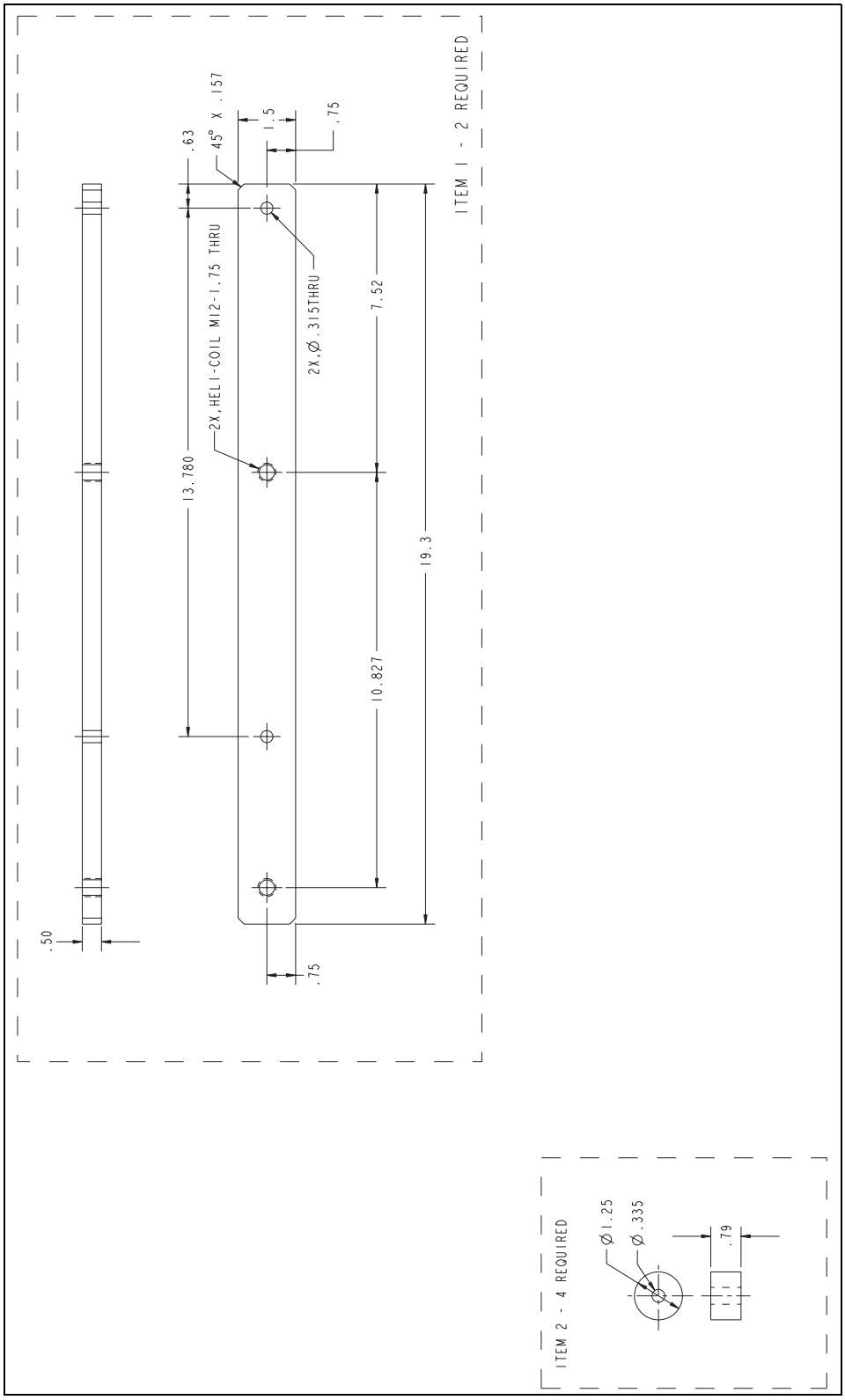
Step 4

Open the Diagnostic page of the Autopilot Toolbox II software and ensure that all signals from the hydraulics and sensors are active.

*Ag*GPS 252 Receiver Cross Bar Dimensions



*Ag*GPS 252 Receiver Spar Dimensions (Two are Required)



Controller Bracket Dimensions (P/N 59721)

