Installation Instructions

*Ag*GPS® Autopilot™ Automated Steering System

Case IH

- **9210 Steiger**
- **9230 Steiger**
- **9250 Steiger**
- **9270 Steiger**
- **9280 Steiger**
- **9330 Steiger**
- **9350 Steiger**
- **9370 Steiger**
- **9380 Steiger**
- **9390 Steiger**

Version 4.00
Revision A
January 2009
Part Number 54036-31-E04

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This is the January 2009 release (Revision A) of the *Ag*GPS *Autopilot Automated Steering System Installation Instructions*, part number 54036-31-E04. It applies to version 4.00 of the *Ag*GPS Autopilot automated steering system.

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- 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.

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Meerheide 45
5521 DZ Eersel, NL



Safety Information

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.*

1.1 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.

1.2 Cautions

CAUTION – When the vehicle has been running, parts of the vehicle, including the engine and exhaust, can become extremely hot and 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, which can cause poisoning. Wash your hands thoroughly after you finish working on the system.

CAUTION – Battery posts, terminals, and related accessories contain lead and lead compounds, which can cause serious illness through. To avoid ingesting lead, wash your hands thoroughly after touching the battery.

CAUTION – Vehicle cabs can be quite high in the air. Falling from this height can cause serious injury. To avoid falling from the vehicle, as you enter or exit the vehicle, 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 welder's 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 sprayed 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.

Contents

Safety Information 3

Warnings 3
Cautions 3

Contents 5

1 Introduction 7

Technical assistance 8
Your comments 8
Manual system upgrade to Autopilot 9
AgGPS 150 EZ-Guide Plus lightbar 9
EZ-Guide 500 manual guidance upgrade 9
Required components 9
Antenna mounting kits 9
Accessory kits 9
Autopilot hardware organization as shipped 10
Autopilot hardware organization as installed 11
Preparing the vehicle for installation 11

2 Hydraulic Control Valve Installation 13

Hydraulic components 14
Preparing the manifold and the hydraulic control valve 15
9x10, 9x30, and 9x50 models: Installing the hydraulic valve 17
9X70 and 9x80 models: Installing the hydraulic valve 19
Installing the hydraulic hoses 21
Securing the electrical connectors 27

3 AutoSense Steering Device Installation 29

AutoSense steering device components 30
Installing the AutoSense steering device 31
Preparing the harness (P/N 54602 Rev C) 34

4 Antenna/Receiver Installation 37

AgGPS 252 GPS receiver with AgGPS 450/900 radio module (if equipped) components 38
Installing the AgGPS 252 GPS receiver with AgGPS 450/900 radio module (if equipped) 39
AgGPS 332 receiver components 43
Installing the AgGPS 332 receiver 44
AgGPS 442/432 receiver components 46
Installing the AgGPS 442/432 receiver 47
Installing a SiteNet radio and antenna 50
Installing a PDL radio modem 52

5 Display Installation 55

EZ-Guide Plus lightbar components 56
Installing the EZ-Guide Plus lightbar. 57
Mounting the EZ-Guide Plus lightbar 58
Installing the vacuum mount 58
Installing the mount bracket. 59
Preparing the existing EZ-Guide Plus power cable 61
AgGPS FieldManager display components 63
Preparing the AgGPS FieldManager display 64
Installing the AgGPS FieldManager display. 65
Preparing the AgGPS FieldManager display wiring harness 67
EZ-Guide 500 lightbar components 69
With a SiteNet radio for 900 MHz RTK corrections (if equipped) 69
With a PDL 450 radio for 450 MHz RTK corrections (if equipped) 70
EZ-Guide 500 lightbar: Installing the antenna plate and GPS antenna 71
Spar mount method 71
VHB adhesive method. 72
EZ-Guide 500 lightbar: Installing the SiteNet radio and antenna 76
Installing a PDL radio modem 78
Preparing the EZ-Guide 500 lightbar 80
Connecting the EZ-Guide 500 lightbar cables 81
Installing the EZ-Guide 500 lightbar 83

6 Power Harness Installation 85

Power harness components 86
Installing the power harness 87

7 Remote Engage Switch Installation 89

Remote engage switch components: Rocker switch 90
Remote engage switch components: Foot switch 91
Preparing the remote engage cable 92
Using the remote engage switch. 95

8 Controller Installation 97

Installing the controller 98
Controller connections 100
Connecting the cables to the controller 101

9 Final Machine Check 105

Performing the final machine check 106

CHAPTER

1

Introduction

In this chapter:

- Technical assistance
- Your comments
- Manual system upgrade to Autopilot
- Required components
- Autopilot hardware organization as shipped
- Autopilot hardware organization as installed
- Preparing the vehicle for installation

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

*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	Power cable (for modification)

EZ-Guide 500 manual guidance upgrade

Retain	Remove
EZ-Guide 500 lightbar Antenna for EZ-Guide 500 lightbar Antenna to receiver cable (Optional) Remote keypad	Power cable (for modification)

Required components

Kits required	Special tools
Platform kit: P/N 54036-31 Hydraulic hose kit: P/N 66818	¾" and 1-$^{5}/_{8}$" hole saw $^{5}/_{16}$" drill bit 5000 psi hydraulic gauge and extension hose Allen wrench set (metric and SAE)

Antenna mounting kits

Antenna options
Antenna spar mount: P/N 55346

Accessory kits

Accessory options
Remote engage switch assembly – standard Euro: P/N 57227-10 Remote engage switch assembly – full Euro: P/N 57227-20 Remote engage foot pedal: P/N 57259

Autopilot hardware organization as shipped

Hardware	Component	See...
Platform kit (P/N 54036-31)	Hydraulic valve	Chapter 2
	Hydraulic manifold	Chapter 2
	Transducer flow switch	Chapter 2
	Manual override cable	Chapter 2
	Hydraulic brackets and bolt kits	Chapter 2
	Hydraulic valve cable	Chapter 2
	AutoSense steering device and cabling	Chapter 3
	AutoSense mounting bracket and hardware	Chapter 3
	Power cable and switch	Chapter 6
	Controller mounting bracket	Chapter 8
	Bolt kit controller	Chapter 8
Common parts	Controller	Chapter 8
	Cable kit: • Main wiring harness • Auxiliary wiring harness • Sonalert alarm	Chapter 8
GPS receiver	GPS receiver	Chapter 4
	GPS antenna	Chapter 4
	GPS receiver mounting bracket	Chapter 4
	GPS receiver power/data cable	Chapter 4
	RTK radio, cable, and radio antenna	Chapter 4
Display	*Ag*GPS FieldManager display	Chapter 5
	EZ-Guide 500 lightbar	Chapter 5
	Display cable	Chapter 5
	Mounting bracket	Chapter 5
	*Ag*GPS 150 lightbar	Chapter 5
Hydraulic hose kit (P/N 66818)	Hydraulic hoses	Chapter 2
	Hydraulic adaptors	Chapter 2
Roof bracket kit (P/N 55346)	Roof brackets	Chapter 4
	Bolt kit, roof bracket	Chapter 4

Autopilot hardware organization as installed

Hardware	Component	See...
Hydraulics	• Hydraulic valve, manifold, pressure transducer, or flow switch • Hydraulic valve cable • Manual override cable • Hydraulic brackets and bolt kits	Chapter 2
AutoSense steering device	• AutoSense steering device and cabling • AutoSense mounting brackets and hardware	Chapter 3
GPS receiver	• GPS receiver • GPS antenna • GPS receiver mounting bracket • GPS receiver power/data cable • Roof brackets	Chapter 4
Display	• EZ-Guide 500 lightbar • *Ag*GPS FieldManager display • Display cable(s) • Mounting bracket • EZ-Guide Plus lightbar	Chapter 5
Power	• Power cable and switch	Chapter 6
Controller	• Controller • Mounting plate • Bolt kit - controller • Main wiring harness • Aux. wiring harness • Sonalert alarm	Chapter 8

Preparing the vehicle for installation

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

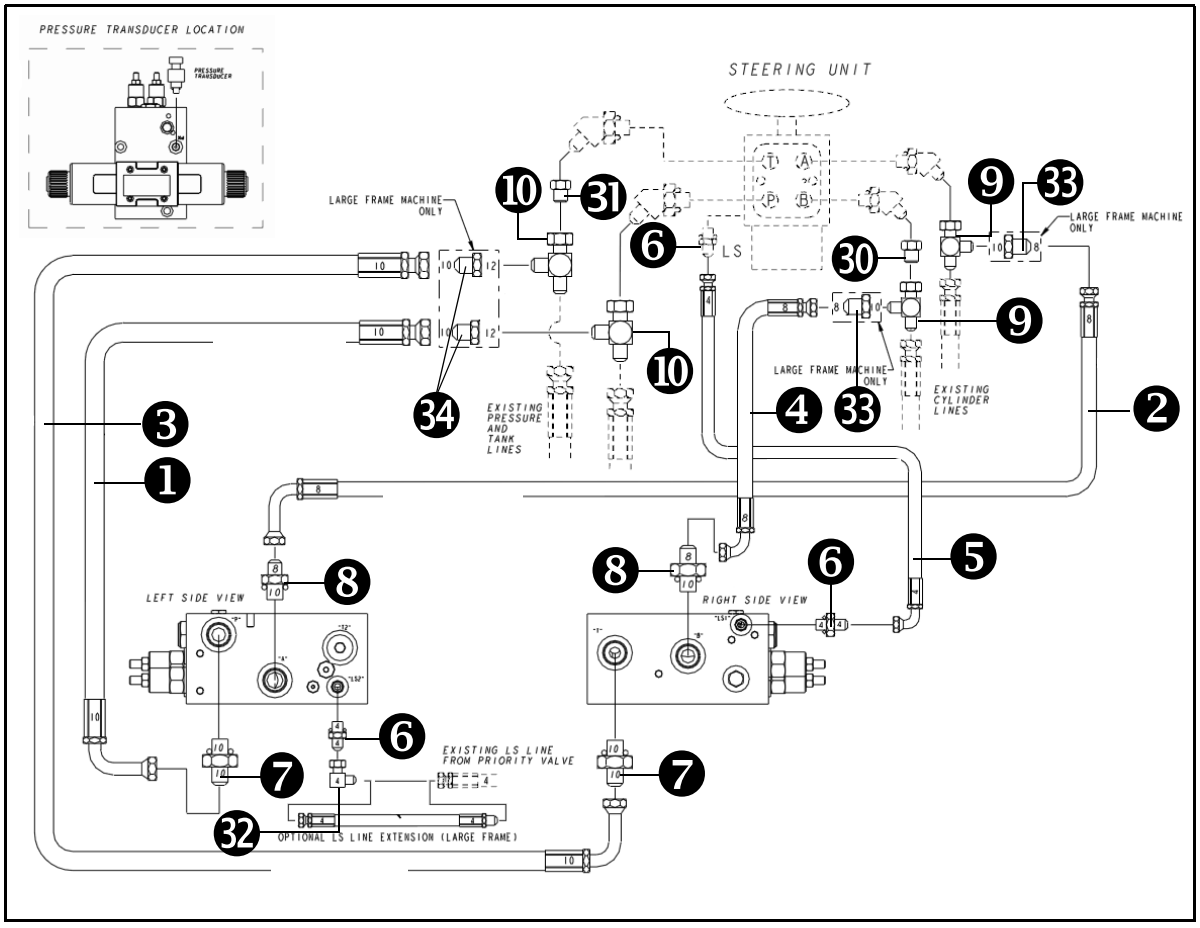
Hydraulic Control Valve Installation

In this chapter:

- Hydraulic components
- Preparing the manifold and the hydraulic control valve
- 9x10, 9x30, and 9x50 models: Installing the hydraulic valve
- 9X70 and 9x80 models: Installing the hydraulic valve
- Installing the hydraulic hoses
- Securing the electrical connectors

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

Hydraulic components



Item	Description	Part number
❶	36-inch hose	F451TC4106-10-10-10-36
❷	36-inch hose	F451TC3906-08-08-08-36
❸	32-inch hose	F451TC4106-10-10-10-32
❹	30-inch hose	F451TC3906-08-08-08-30
❺	28-inch hose	F451TC3906-04-04-04-28
❻	Fitting (x3)	4 F50X
❼	Fitting (x2)	10 F50X
❽	Fitting (x2)	10/8 F50X

Item	Description	Part number
❾	Fitting (x2)	10 R6X
❿	Fitting (x2)	12 R6X
㉚	Fitting	10 XHX6-S
㉛	Fitting	12 XHX6-S
㉜	Fitting	4 C6X-S
㉝	Fitting	10-8 TRTXN
㉞	Fitting	12-10 TRTXN

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

Preparing the manifold and the hydraulic control valve

Step 1

Place the hydraulic control valve, manifold, pressure transducer, fittings, and hardware on a clean work surface.



Step 2

Install the control valve onto the manifold. Correctly align the ports on the control valve to the manifold. Make sure that the O-ring seals are in place on the hydraulic valve. If necessary, lubricate the O-rings.



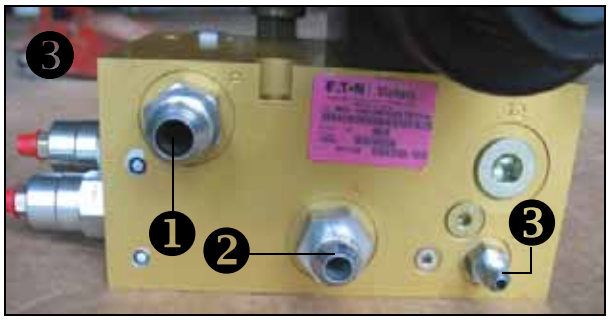
Step 3

Use four ¼" × 1¾" socket head bolts to secure the control valve to the manifold. Torque the bolts to 14–16 Nm (10–12 ft/lbs.).



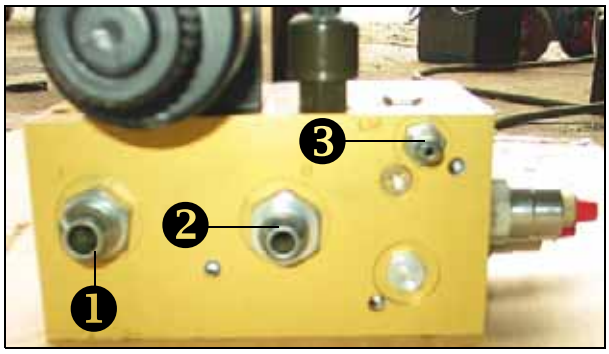
Step 4

Remove the plastic caps from the manifold. Install the -10 straight connector into the P port (❶). Install the -8-10 straight connector into the A port (❷). Install the -4 straight connector into the LS2 port (❸). Tighten the connectors into the manifold.



Step 5

Turn the manifold and remove the plastic caps. Install the -8-10 straight connector into the B port (❷). Install the -10 straight connector into the T port (❶). Install the -4 straight connector into the LS1 port (❸). Tighten all the connectors.

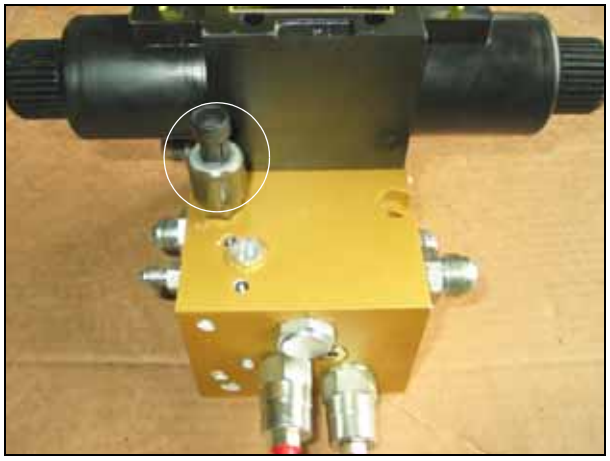


Step 6

Install the transducer into the manifold PX port.

Step 7

Power wash the steering hand pump area at the front of the cab. Several hydraulic hose connections will be made in this area. Make sure that you do not introduce any contaminants into the hydraulic system.



9x10, 9x30, and 9x50 models: Installing the hydraulic valve

Step 1

Locate the hood brace where the hydraulic control valve will be installed.

Note – *The image shown is from the operator side of the engine compartment.*



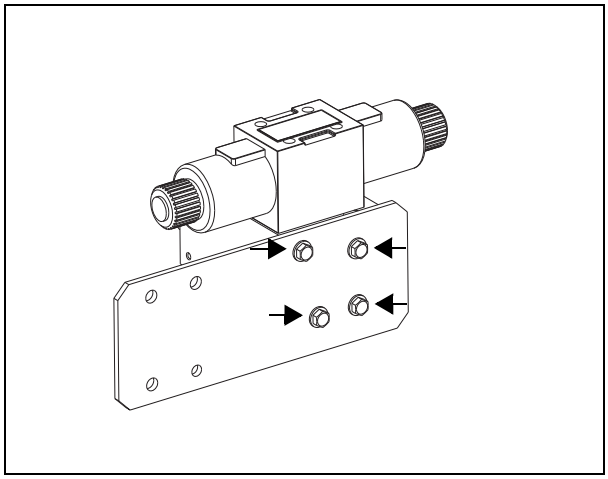
Step 2

Remove the two existing bolts from the brace. These bolts will be used to mount the control valve assembly



Step 3

Mount the bracket onto the manifold and then secure it with the hardware provided.



Step 4

Mount the valve assembly to the brace. Adjust it so that the valve assembly is parallel to the cab floor.



9X70 and 9x80 models: Installing the hydraulic valve

Step 1

Locate the hood brace ❶ where the hydraulic control valve will be installed.

The figure shows the brace from the steps on the operator's side, looking down on the left side of the engine compartment.



Step 2

Measure 21 cm (8 ¼") up from the side support and then mark the brace.



Step 3

Align the top of the bracket with the mark from the previous step. Attach the bracket to the brace with a clamp. The two 1.3 cm (½") holes must be on the left side and centered on the brace. Mark the hole locations for drilling.



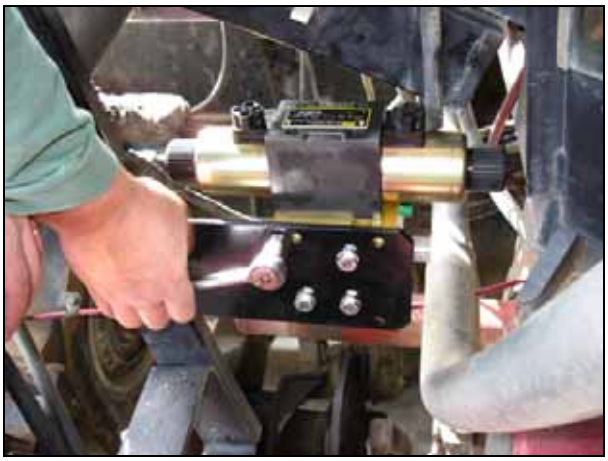
Step 4

Remove the bracket and then drill two 1 cm ($^3/_8$") holes into the brace.



Step 5

Mount the bracket to the brace and attach the valve/manifold using the supplied hardware.



Installing the hydraulic hoses

Step 1

Tag the opposite end of the hose assemblies (B port, and so on) for identification when connecting them to the steering hand pump.

Connect the 90° end of the 30-inch long hydraulic hose to the B port. Adjust the hose end so that it does not rub on the solenoid. Tighten the connection.



Step 2

Connect the 90° end of the 32-inch long hydraulic hose to the T port. Adjust the hose position down into engine compartment and then tighten the connection.



Step 3

Connect the 90° end of the 28-inch long hydraulic hose to the LS1 port and then tighten the connection.



Step 4

Connect the -4 90° fitting to the fitting installed on the LS2 port and then orientate it as shown.



Step 5

Disconnect the hose from the signal port on the steering hand pump.



Step 6

Route the hose that you disconnected from steering hand pump to the manifold. Connect the hose to the LS2 port and then tighten the connection.

Note – *On large frame machines, you may need to add the included LS hose extension to allow the existing LS line to reach the LS 2 port fitting.*



Step 7

Connect the 90° end of the 35" long hose to the A port. Adjust the hose to feed down into the engine compartment and then tighten the connection.



Step 8

Connect the 90° end of the 32" long tank hose to the P port. Adjust the hose to feed down into the engine compartment and then tighten the connection.



Step 9

Locate the -4 hose labeled LS1 from Step 3 and then connect it to the signal port on the steering hand pump. Tighten the hose connection at the steering hand pump.



Step 10

Identify and mark the four hose connections at the steering hand pump.



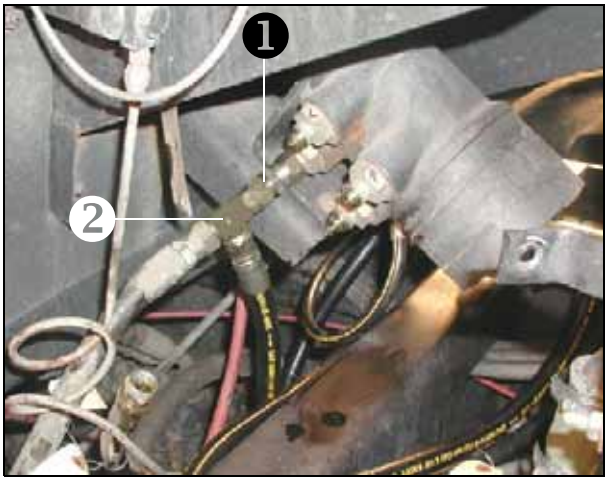
Step 11

Disconnect the four hoses at the steering hand pump.



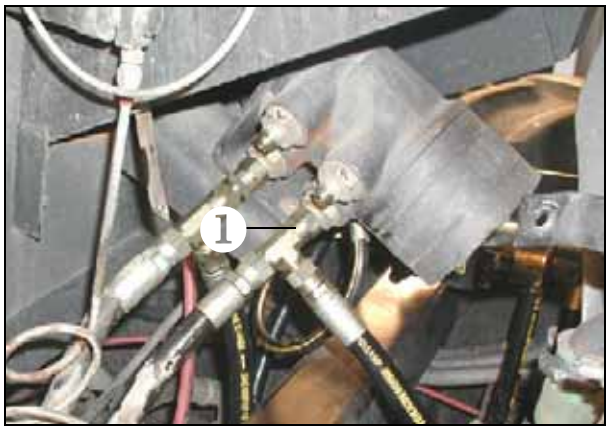
Step 12

Connect an extension swivel fitting ❶ and tee ❷ at the T port on the steering hand pump. On large frame machines, connect a supplied -12-10 adaptor to the tee. Connect the existing tank port hose to the end of the tee. Connect the new T hose to the branch of the tee. Tighten all the connections.



Step 13

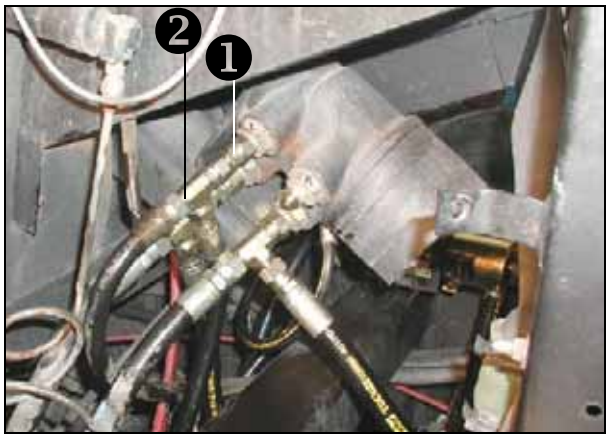
Connect a tee ❶ at the P port on the steering hand pump. Connect the existing pressure port hose to the end of the tee. On large frame machines, connect a supplied -12-10 adaptor to the tee. Connect the new P hose to the branch of the tee. Tighten all the connections.



Step 14

Note – *The steering hand pump L port connects to A on the manifold. The R port connects to B.*

Connect an extension swivel fitting ❶ and tee ❷ at the L port on the steering hand pump. Connect the existing left port hose to the end of the tee. On large frame machines, connect a supplied -10-8 adaptor to the tee. Connect the new A hose to the branch of the tee. Tighten all the connections.



Step 15

Connect a tee ❶ at the R port on the steering hand pump. Connect the existing right port hose to the end of the tee. On large frame machines, connect a supplied -10-8 adaptor to the tee. Connect the new B hose to the branch of the tee. Tighten all the connections.

Make sure that all of the connections at the steering hand pump and manifold are tight.

Check the machine hydraulic oil level and add oil if necessary.

Reconnect the battery and then start the machine to check for hydraulic leaks. After you perform the leak check, disconnect the battery.



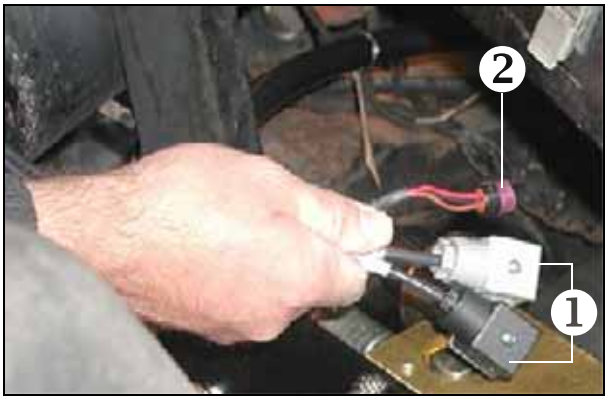
Securing the electrical connectors

Step 1

On the exterior right rear corner of the cab, route the controller connector of the steering valve/steering sensor cable up into the electronic console, which has an opening through the floor for cable routing. Route the controller connector out of the electronic console toward the front of the seat at the floor. The controller installation and controller connections will be completed later in the *Installation Instructions* (see Installing the controller, page 98).

Step 2

Route the steering valve connectors ❶ and pressure transducer connector ❷ of the cable under the cab toward the left side of the engine compartment.



Route the steering sensor cable to the left side of the articulation joint. The steering sensor connection will be completed later (see Installing the AutoSense steering device, page 31).

Step 3

Connect the included DIN adaptor cables to the valve cable ends. Connect the light gray DIN adaptor to the valve cable end marked Valve A and the black cable end to the Valve B cable lead.



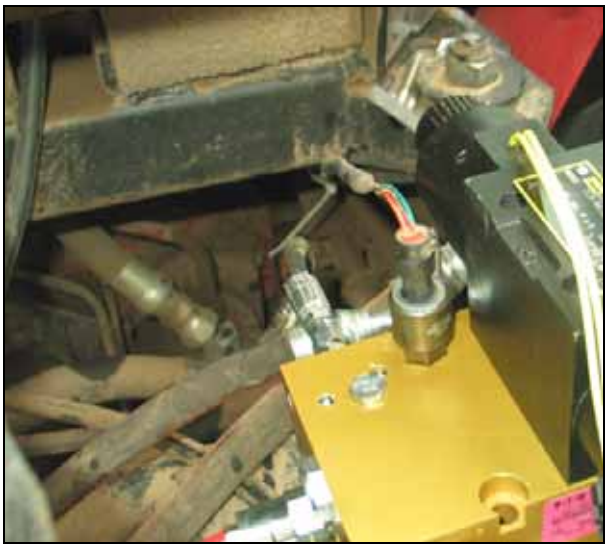
Step 4

Connect the light gray DIN cable plug to the “B” end of the valve.



Step 5

Connect the manual override cable connector to the pressure transducer.



CHAPTER

3

AutoSense Steering Device Installation

In this chapter:

- AutoSense steering device components
- Installing the AutoSense steering device
- Preparing the harness (P/N 54602 Rev C)

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

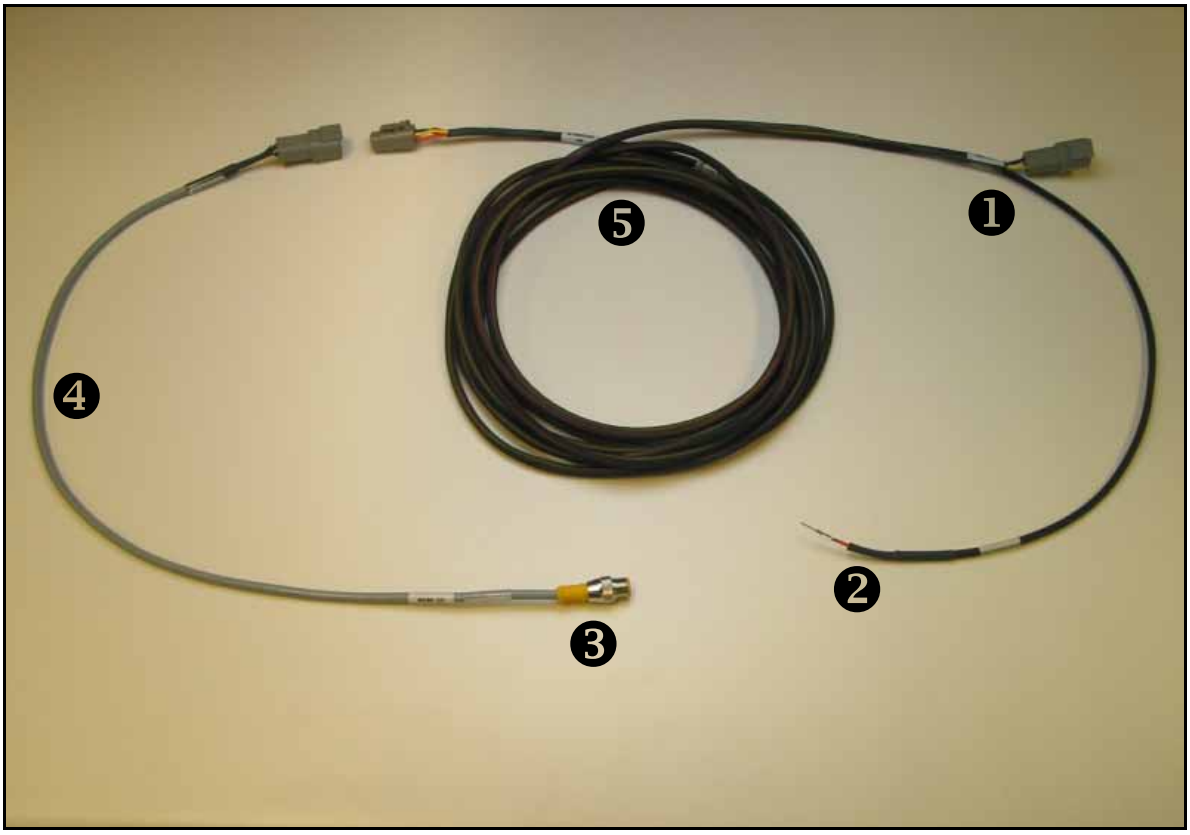
If the described mounting location is not accessible, chose a different location. To ensure correct operation, the AutoSense device must be located where it is free of obstructions and can rotate with the wheels when they turn.

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

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

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

AutoSense steering device components



Item	Description
❶	P-6 connector
❷	Power connector
❸	AutoSense connector
❹	Jumper cable (P/N 57560)
❺	AutoSense steering cable (P/N 57885)

Installing the AutoSense steering device

Step 1

Locate the mounting position behind the cab.



Step 2

Use the included alcohol pad to clean the area behind the articulation joint.



Step 3

Peel the adhesive backing for the sensor mount bracket and press it firmly in place.



Step 4

Mount the *Ag*GPS AutoSense device with the connector pointing toward the front of the vehicle.



Step 5

Route the steering sensor cable over the articulation joint and then tie-wrap it securely out of the way to make sure that it will not get caught or cut.



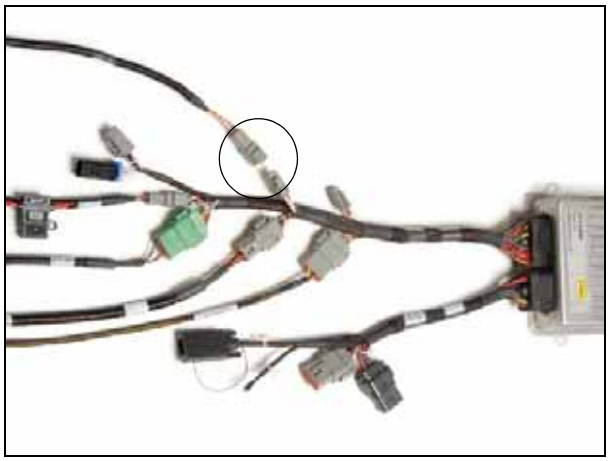
Step 6

Route the steering cable along the existing hoses and into the cab. To avoid stretching the cable, leave adequate length on the service loop.



Step 7

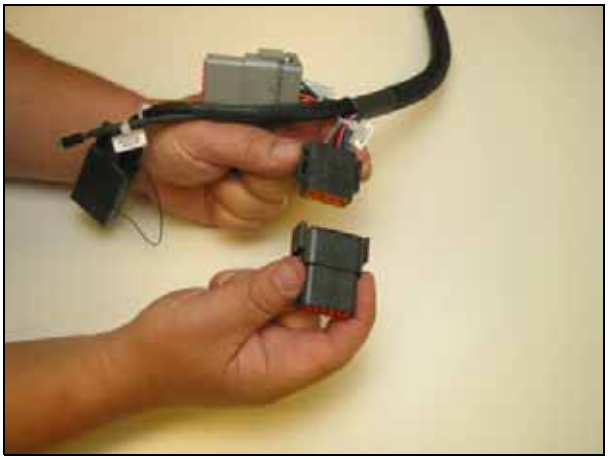
Connect the steering device cable to P-6 on the main wiring harness. P-6 is labeled “Steering Sensor”.



Preparing the harness (P/N 54602 Rev C)

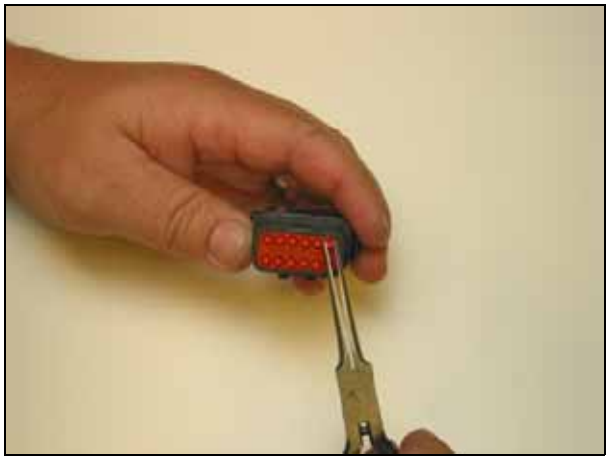
Step 1

Remove the black Deutsch DTM receptacle from the P-13 sensors leg of the auxiliary harness. See Chapter 8, Controller connections.



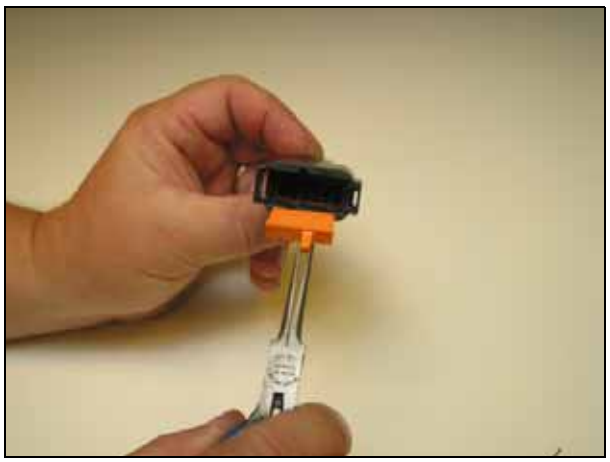
Step 2

Remove the plug from cavity number 1.



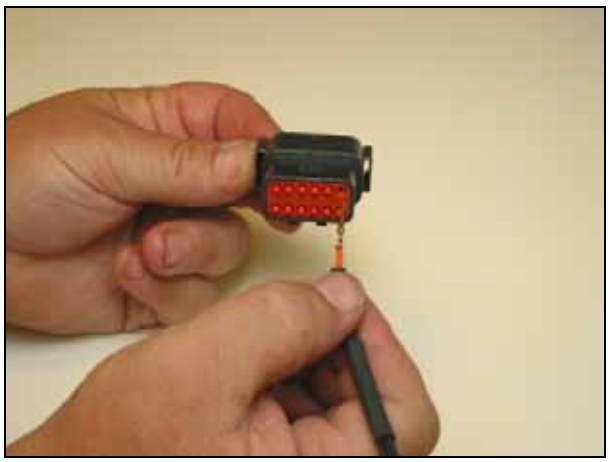
Step 3

Remove the wedge from the connector.



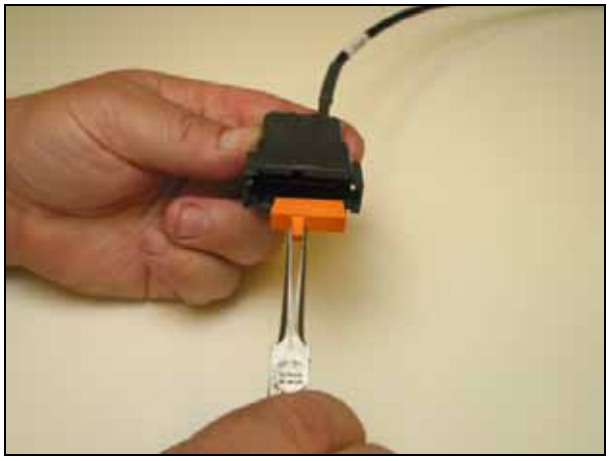
Step 4

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



Step 5

Pull back on the wire to seat the pin and then replace the wedge in the connector.



CHAPTER

4

Antenna/Receiver Installation

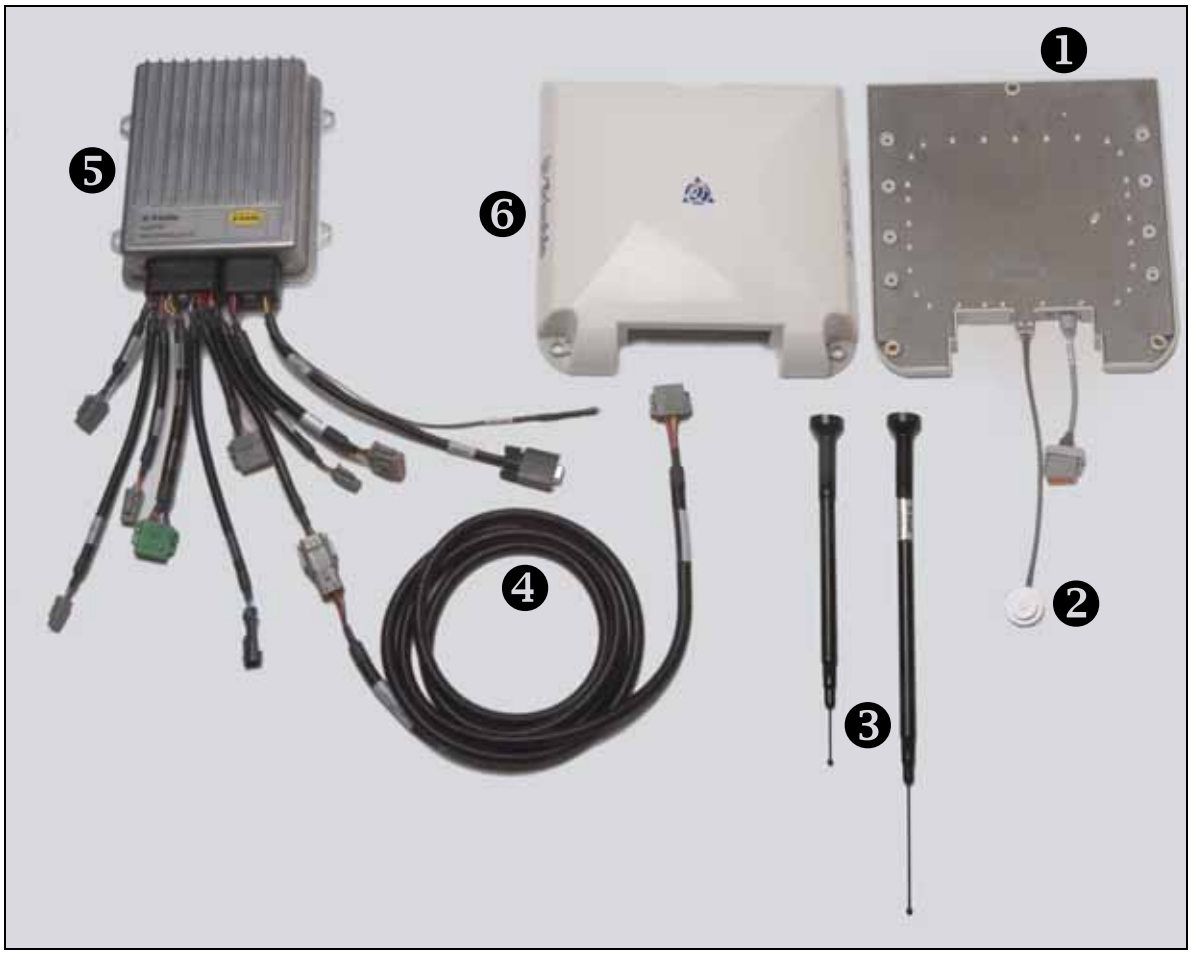
In this chapter:

- AgGPS 252 GPS receiver with AgGPS 450/900 radio module (if equipped) components
- Installing the AgGPS 252 GPS receiver with AgGPS 450/900 radio module (if equipped)
- AgGPS 332 receiver components
- Installing the AgGPS 332 receiver
- AgGPS 442/432 receiver components
- Installing the AgGPS 442/432 receiver
- Installing a SiteNet radio and antenna
- Installing a PDL radio modem

This chapter describes how to install an *Ag*GPS 252 receiver and *Ag*GPS radio module, an *Ag*GPS 332 receiver and antenna, or an *Ag*GPS 442 receiver and antenna.

Note – *To install the antenna for an EZ-Guide 500 system, see Chapter 5, Display Installation.*

*Ag*GPS 252 GPS receiver with *Ag*GPS 450/900 radio module (if equipped) components



Item	Description
❶	*Ag*GPS 450 or 900 radio (if equipped)
❷	Radio antenna cable and magnetic mount
❸	*Ag*GPS 450 or 900 radio antenna
❹	Antenna/receiver cable (P/N 54608)
❺	*Ag*GPS Autopilot controller
❻	*Ag*GPS 252 antenna/receiver

Installing the *Ag*GPS 252 GPS receiver with *Ag*GPS 450/900 radio module (if equipped)

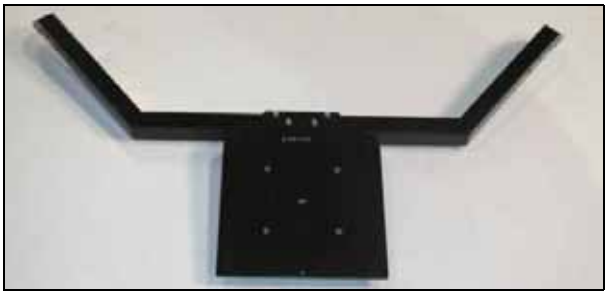
Step 1

Place the mounting bar on a clean, level surface.



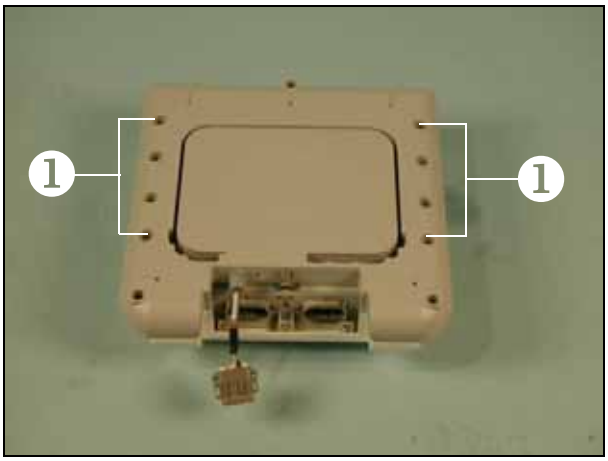
Step 2

Attach the mount plate to the top of the roof bracket.



Step 3

Place the radio module on the *Ag*GPS 252 receiver. Secure it with the eight screws provided at positions marked ❶.



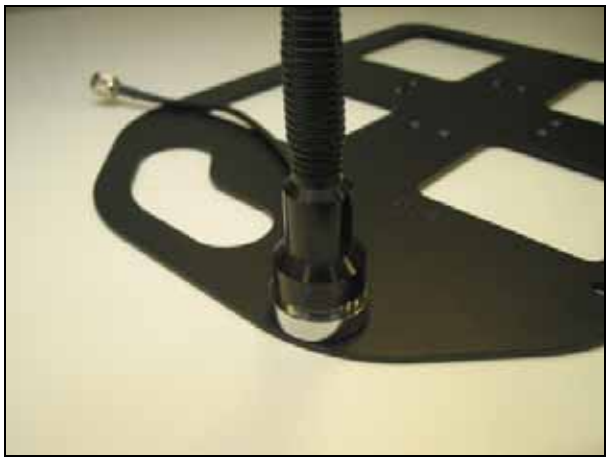
Step 4

Attach the antenna base to the rear of the plate with the two flathead screws provided.



Step 5

Attach the radio antenna to the antenna base.



Step 6

Position the *Ag*GPS 252 receiver and radio on the mounting plate with the connector ports facing the radio antenna. Align the three bolt holes with the receiver, radio, and mounting plate.



Step 7

Insert the nylon bushings provided.



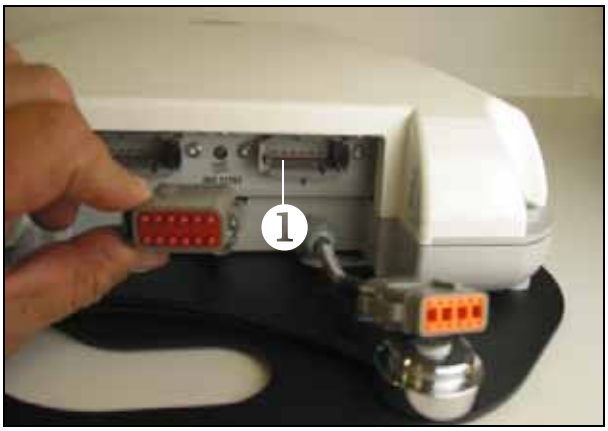
Step 8

Insert the bolts through the receiver, radio, and mounting bracket. Place nuts on the bolt ends and then tighten them.



Step 9

Remove the connector plug from port B ❶.



Step 10

Place the radio module connector into port B of the receiver.



Step 11

Connect the radio antenna to the antenna port.



Step 12

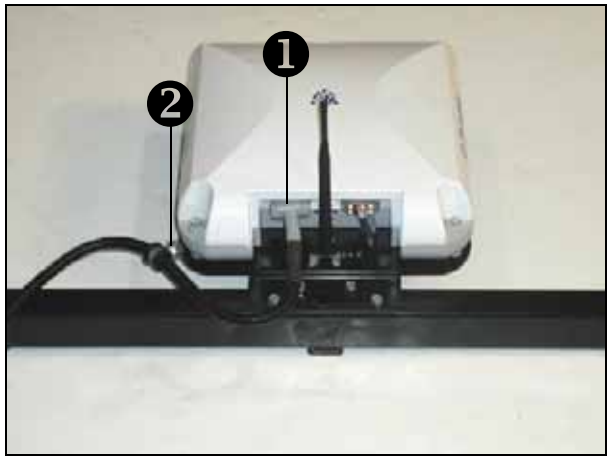
Remove two bolts and washers on each side of the cab roof. Place the mount bracket assembly over the existing holes. Reinsert the bolts onto the bracket. Face the connector ports toward the rear of the cab.



Step 13

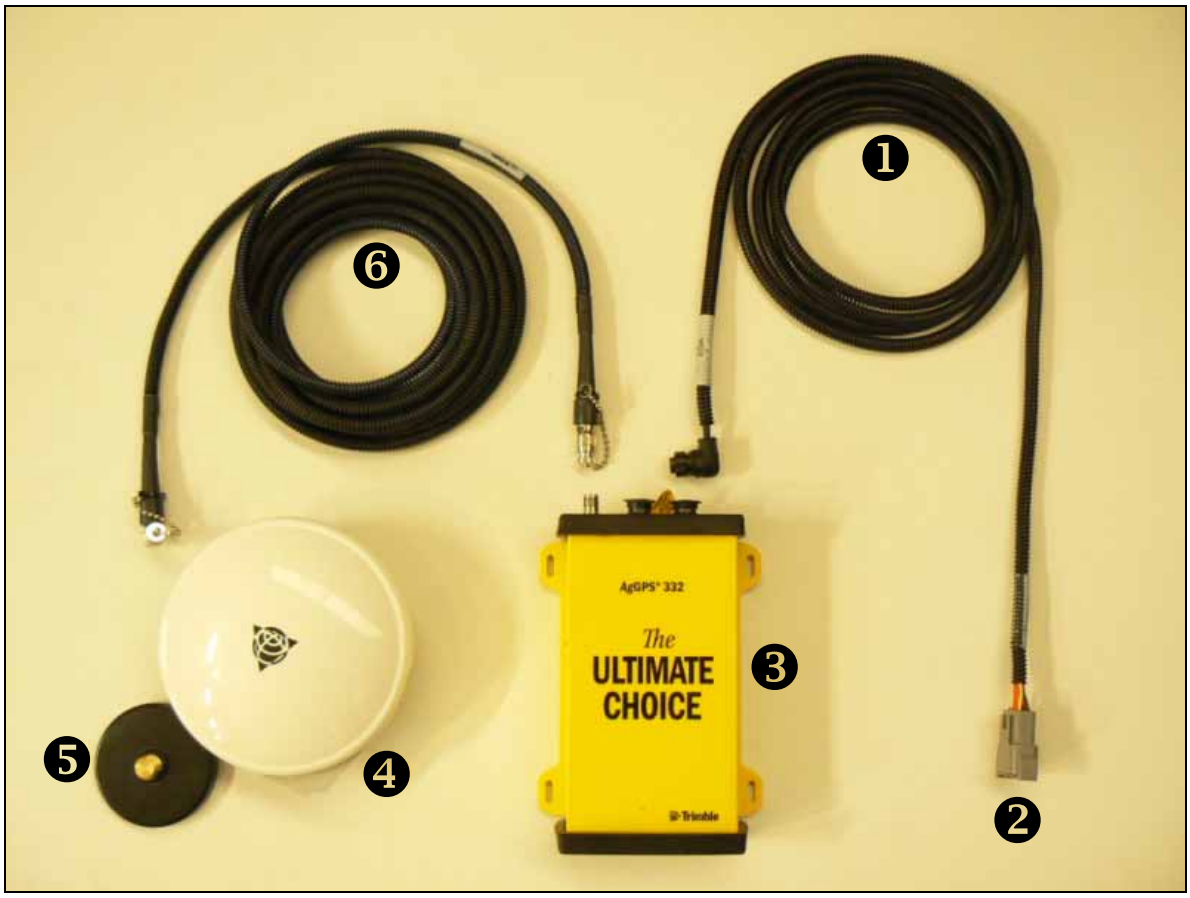
Connect the cable from the cab controller into port A ❶ of the *Ag*GPS 252 receiver. Use the existing bolt to secure the cable clamp ❷ to left side of the receiver.

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 console. Continue to route the cable toward the front of the seat bottom. The cable connections will be established later.



*Ag*GPS 332 receiver components

Note – *To receive RTK corrections with a radio, Trimble recommends the use of the AgGPS 432 GPS receiver with integrated radio modem.*



Item	Description
❶	Receiver-to-Autopilot controller cable (P/N 54610)
❷	To controller "P3 GPS" connection
❸	*Ag*GPS 332 GPS receiver
❹	GPS antenna
❺	Magnetic mount
❻	GPS antenna cable

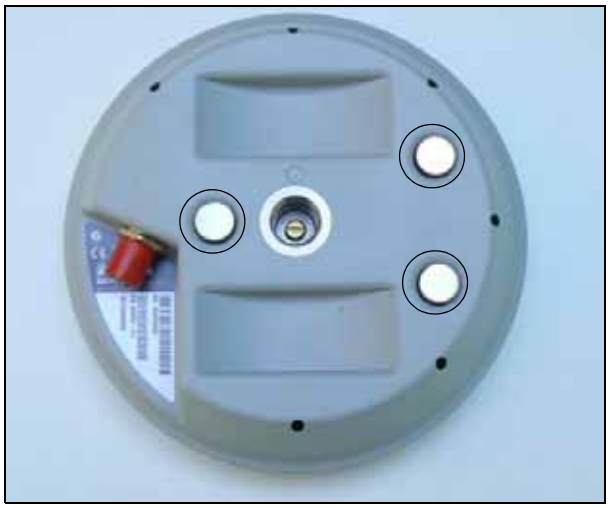
Installing the *Ag*GPS 332 receiver

Step 1

Attach the large magnet with a $^{5}/_{8}$" stud to the GPS antenna.



If the antenna has magnets built in, skip this step.



Step 2

L1/L2 dual-band antenna (RTK, OmniSTAR, DGPS)

For repeatable positioning, place the antenna against the lip at the narrow end of the V plate.



L1 single-band antenna (WAAS, EGNOS, VBS, Beacon)

Attach the antenna to the center of the 4" × 6" plate.



Step 3

Attach the antenna/receiver cable to the antenna and then route the cable into the cab through the rubber grommet at the base of the rear window. Secure the cable along the way.

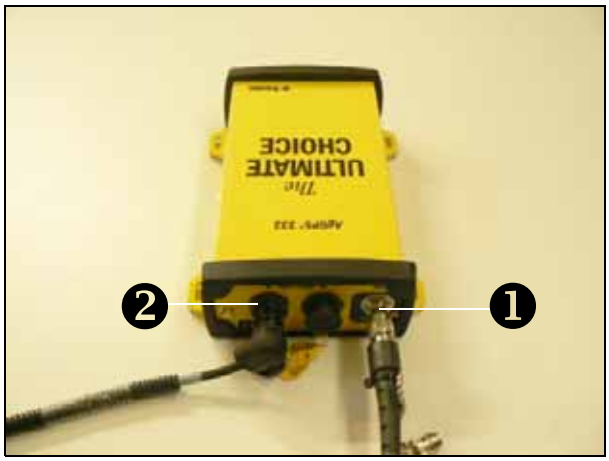


Step 4

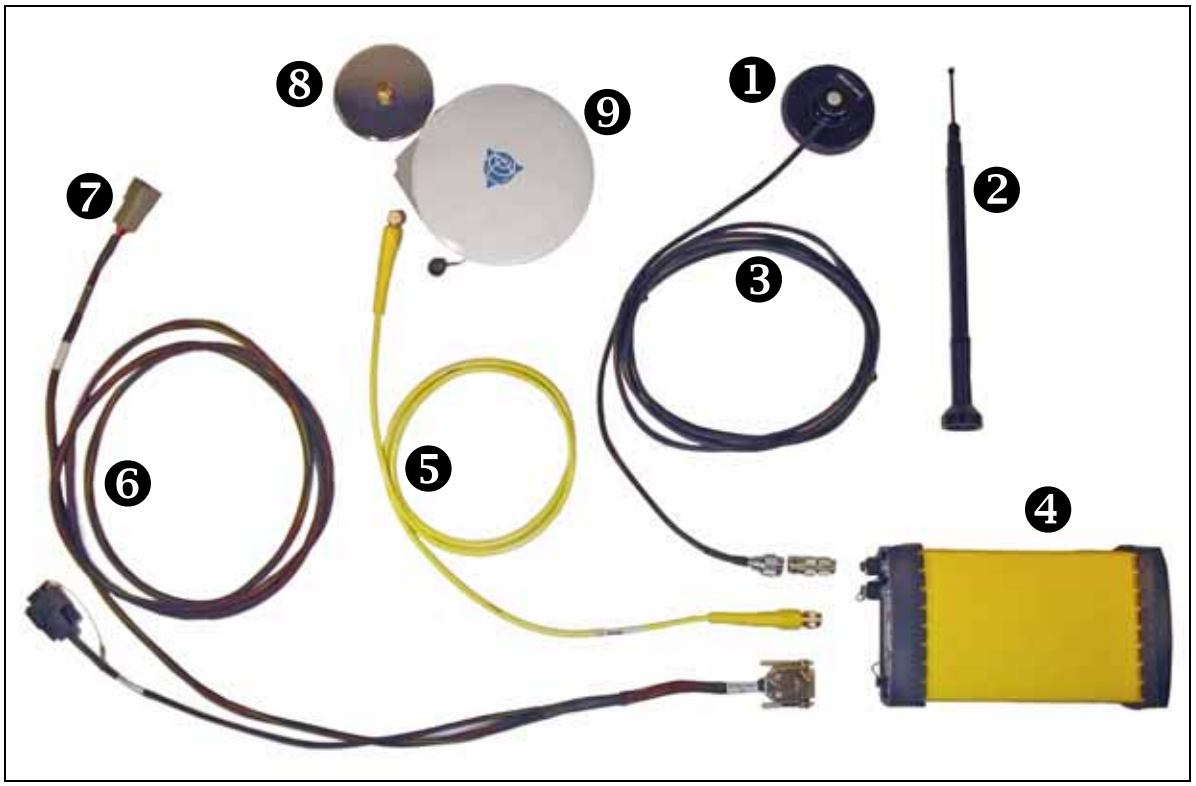
Mount the receiver in a convenient location in the cab.

Route the antenna cable ❶ to the receiver and then connect it. Connect the controller cable to cavity "A" ❷ of the receiver.

Controller cable connections will be completed later in Chapter 8, Controller Installation.



*Ag*GPS 442/432 receiver components



Item	Description
❶	Radio antenna magnetic base
❷	Radio antenna
❸	Radio antenna cable
❹	*Ag*GPS 442/432 GPS receiver
❺	Antenna cable
❻	Receiver cable (P/N 62037)
❼	To controller “P3 GPS”
❽	Antenna magnetic mount
❾	*Ag*GPS 442/432 antenna

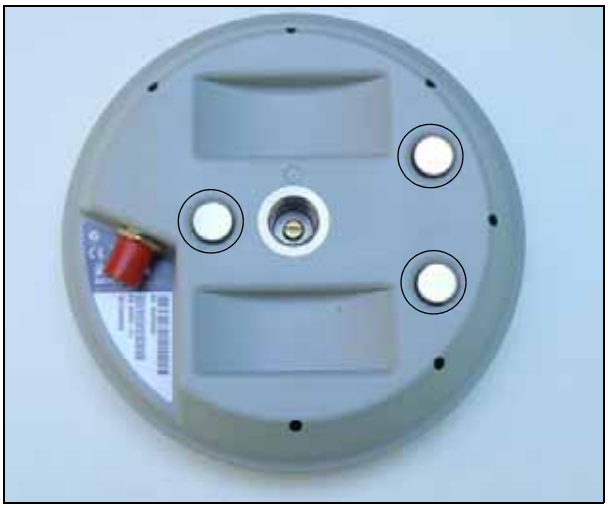
Installing the *Ag*GPS 442/432 receiver

Step 1

Attach the large magnet with a $^{5}/_{8}$" stud to the GPS antenna.



If the antenna has magnets built in, skip this step.



Step 2

L1/L2 dual-band antenna (RTK, OmniSTAR, DGPS)

For repeatable positioning, place the antenna against the lip at the narrow end of the V plate.



Step 3

Attach the antenna/receiver cable to the antenna and then route the cable into the cab through the rubber grommet at the base of the rear window. Secure the cable along the way.



Step 4

Mount the receiver in a convenient location in the cab. Route the antenna cable to the receiver and then connect it.

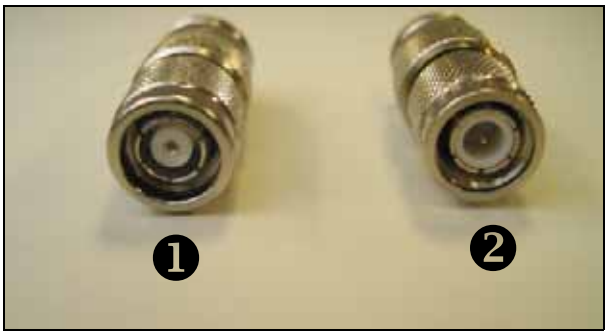


Step 5

Identify the correct adaptor for the radio connection:

❶ Reverse polarity TNC-to-N for 900 MHz radios

❷ Normal polarity TNC-to-N for 400 MHz radios



Step 6

Attach the adaptor to the radio port.



Step 7

Connect the radio antenna cable to the radio port adaptor.



Step 8

Connect the controller cable to the 26-pin connector of the receiver. Controller cable connections will be completed later in Chapter 8, Controller Installation.



Step 9

Connect the radio antenna to the magnetic antenna base.



Step 10

Attach the magnetic radio antenna base to the rear of the V plate on the roof. If the cable does not reach the V plate, use the 4" × 6" plate with the VHB provided to relocate the antenna.



Installing a SiteNet radio and antenna

Step 1

Position the SiteNet™ radio in the cab where it is out of sight and secured from rolling. Connect the antenna adaptor to the SiteNet radio.



Step 2

Connect the radio antenna to the magnetic antenna base.



Step 3

You can mount the radio antenna using the standard adhesive backed steel plate with a standard magnetic mount.

a. Clean the antenna location on the roof of the cab with a light solvent to remove oil and dust. Press on the roof to find a firm location.

b. Remove the backing from the VHB strips and then apply the plate to the cab roof as shown. Make sure that the VHB strips make even contact with the surface. Apply pressure and then leave for approximately 30 minutes to adhere.



Step 4

Feed the radio antenna cable down from the roof and into the cab to the radio. Connect the cable to the radio.



Installing a PDL radio modem

Step 1

Position the radio where it is accessible for the operator to select a new radio channel ID.



Permanent mount

For a permanent mount, bolt the radio onto a bracket with a $^{5}/_{8}$" UNC screw.



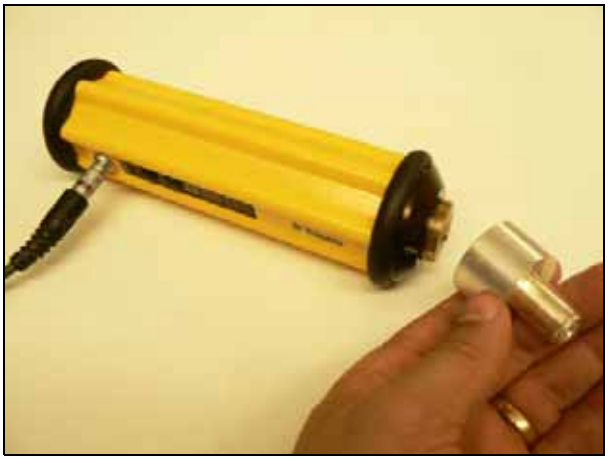
Temporary mount

For a temporary mount (so it can be moved between vehicles), mount the radio on a magnet with a $^{5}/_{8}$" UNC stud.



Step 2

Connect the radio antenna cable adaptor to the radio.



Step 3

Connect the radio cable to the adaptor.



CHAPTER

5

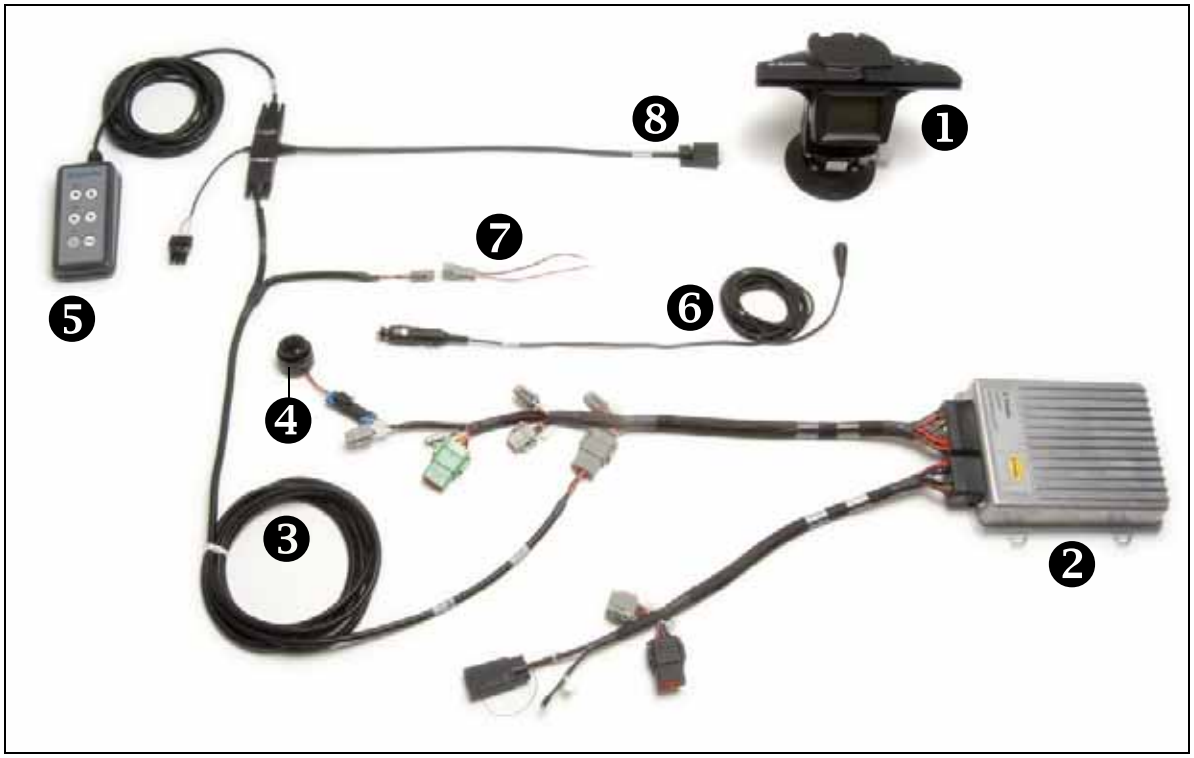
Display Installation

In this chapter:

- EZ-Guide Plus lightbar components
- Installing the EZ-Guide Plus lightbar
- Mounting the EZ-Guide Plus lightbar
- Preparing the existing EZ-Guide Plus power cable
- AgGPS FieldManager display components
- Preparing the AgGPS FieldManager display
- Installing the AgGPS FieldManager display
- Preparing the AgGPS FieldManager display wiring harness
- EZ-Guide 500 lightbar components
- EZ-Guide 500 lightbar: Installing the antenna plate and GPS antenna
- EZ-Guide 500 lightbar: Installing the SiteNet radio and antenna
- Connecting the EZ-Guide 500 lightbar cables
- Installing the EZ-Guide 500 lightbar

This chapter describes and how to install and connect the EZ-Guide Plus lightbar, the *Ag*GPS FieldManager™ display, or the EZ-Guide 500 lightbar in the vehicle.

EZ-Guide Plus lightbar components

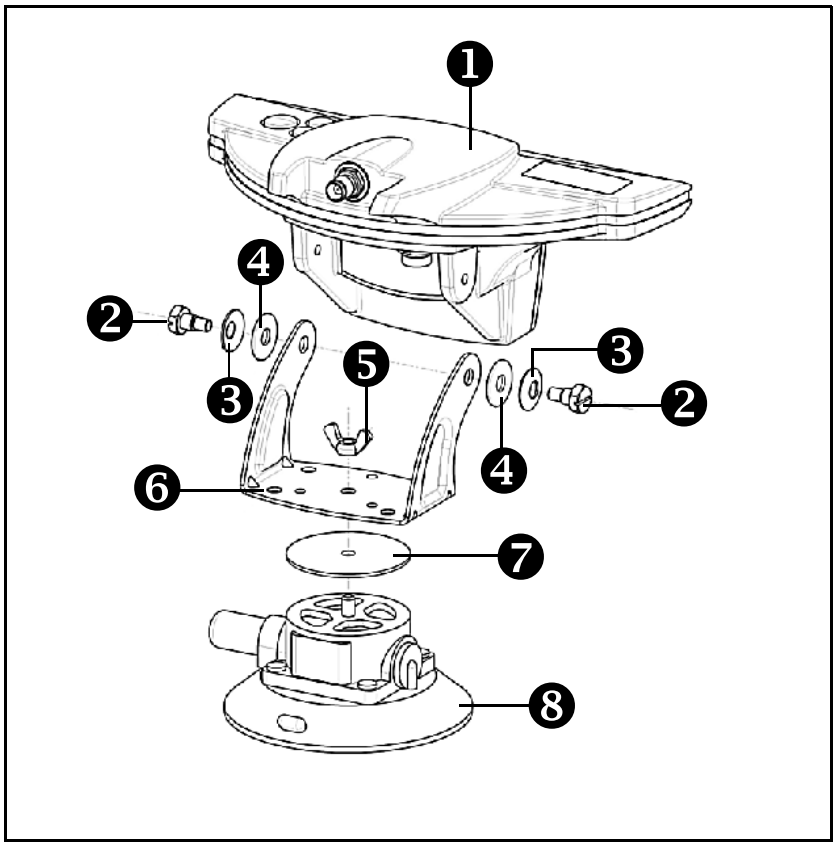


Item	Description
❶	EZ-Guide Plus lightbar
❷	Controller
❸	Display cable (P/N 54612)
❹	Sonalert alarm (if connected)
❺	Optional remote keypad
❻	Power harness
❼	Alternative EZ-Guide Plus lightbar power supply
❽	External interface cable

Installing the EZ-Guide Plus lightbar

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

Check that the bracket is correctly oriented and then insert the screws ❷. Tighten them to a torque of 170 cNm (15 in/lbs).
Screws require liquid thread-locking compound for optimum performance; re-apply thread-lock after every 10 insertions.

Mounting the EZ-Guide Plus lightbar

Use one of the following methods to mount the EZ-Guide Plus lightbar:

- On a vertical, or near vertical surface, such as a window, use a suction cup vacuum mount.

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

- On a horizontal, or near horizontal surface, such as a vehicle dash, use a screw-on mount bracket.

Installing the vacuum mount

Step 1

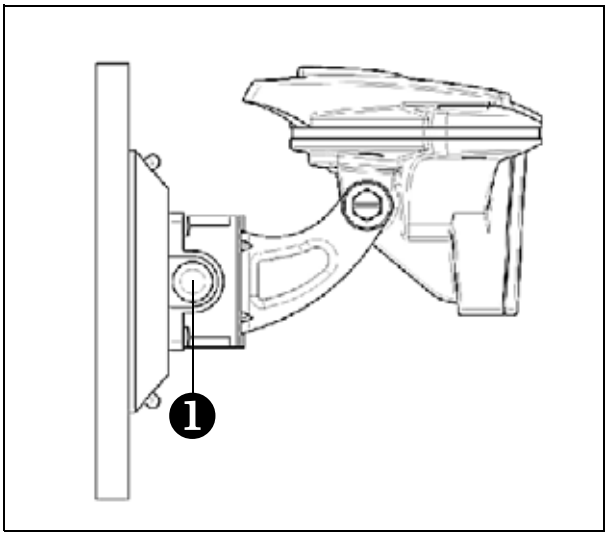
Secure the vacuum mount to the mounting bracket using the hardware provided.

Step 2

Dampen the rubber seal on the suction cup.

Step 3

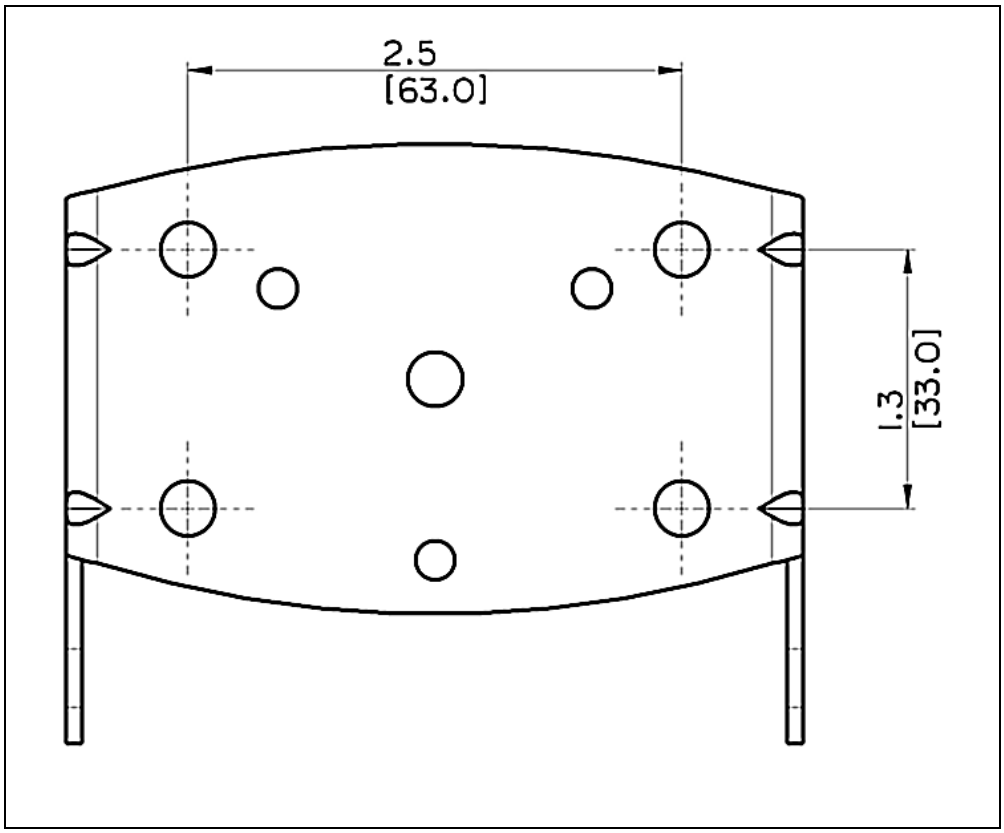
To secure the lightbar in position, press the suction cup against a flat surface and then pump the gray button ❶ until the red line is no longer visible.



Installing the mount bracket

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.

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

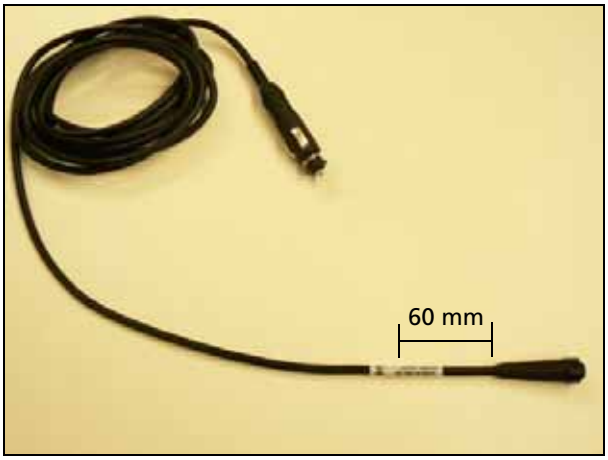
Attach the EZ-Guide Plus display cable to the main harness connection labeled “Display”.

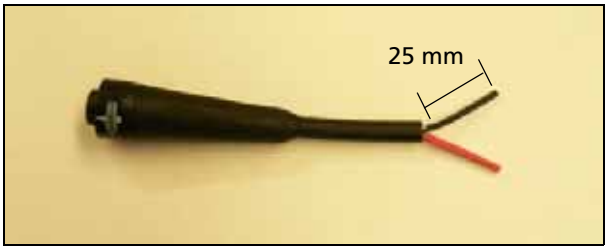
Note – *If the cable is connected to the auxiliary harness connection labeled “Spare”, the display will act as a lightbar only.*

Preparing the existing EZ-Guide Plus power cable

Step 1

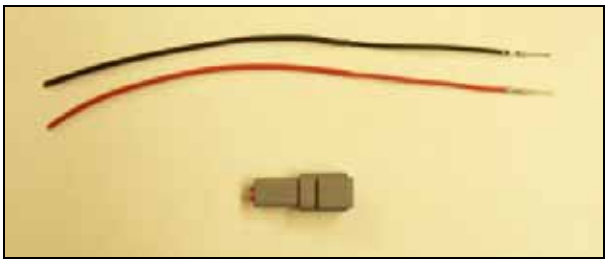
Locate the EZ-Guide Plus power cable, cut it as shown and then strip 25 mm of insulation off it.





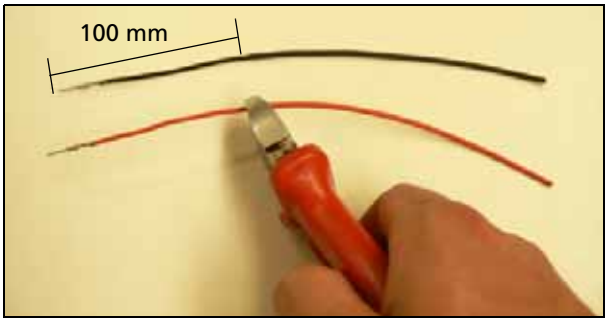
Step 2

Locate the power leads (with one open end) and the two-cavity Deutsch connector that come with the Autopilot display cable (P/N 54612).



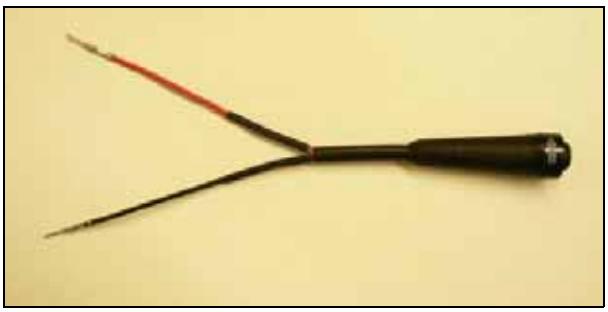
Step 3

Cut the two power lead wires as shown.



Step 4

Crimp new TM pins on the ends of the wires or strip approximately 10 mm of insulation off the four wires and then add solder to the ends.



Step 5

Insert the wires into the Deutsch connector as follows:

Wire	Cavity
Red	Deutsch connector position A
Black	Deutsch connector position B

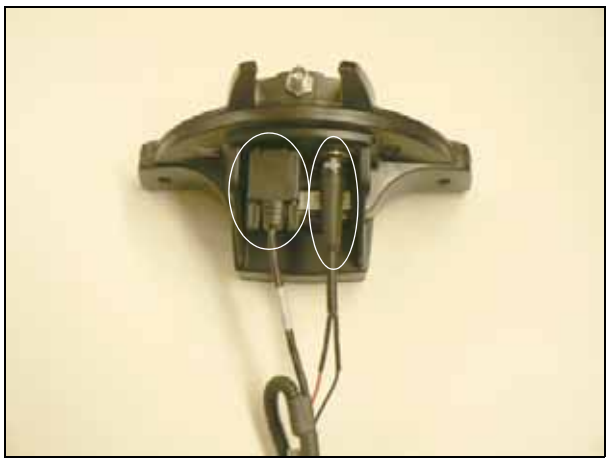
Step 6

Connect the two Deutsch connectors together, coil the power cable, and then attach it to the cable end with a DB9 connector so that both ends are at the same length.

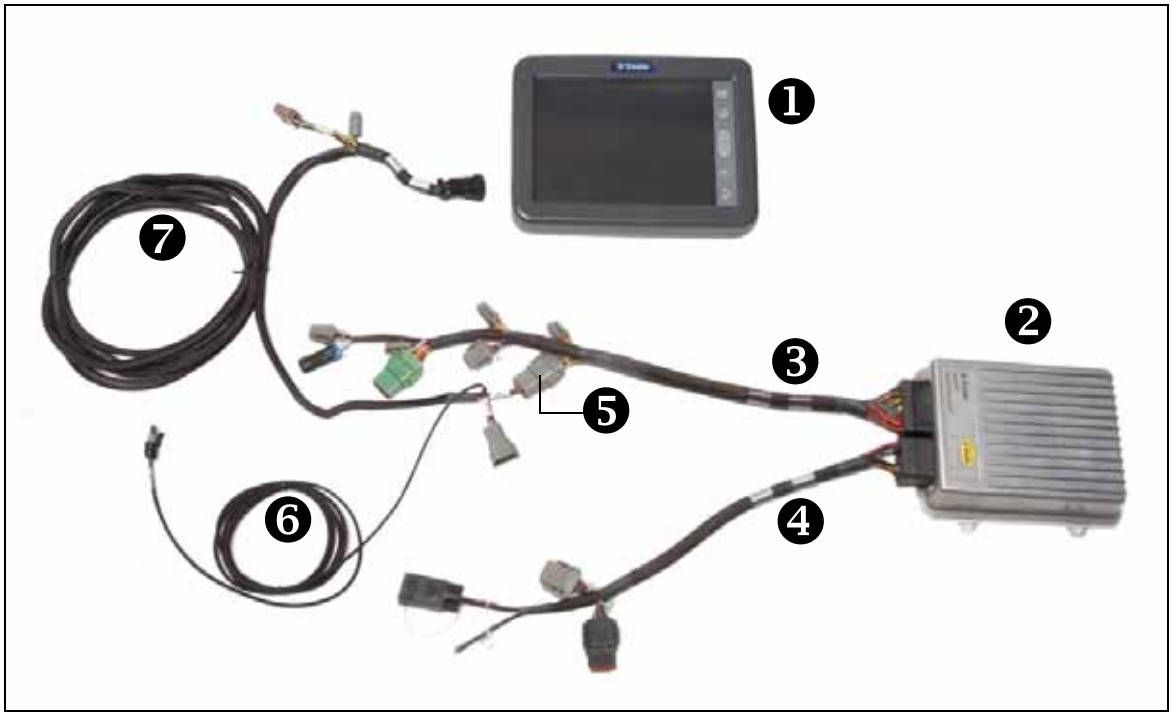


Step 7

Attach the DB9 connector and the power connector from the Autopilot display cable to the lightbar.



*Ag*GPS FieldManager display components



Item	Description
❶	AgGPS FieldManager display
❷	Autopilot NavController II navigation controller
❸	Autopilot main harness
❹	Autopilot auxiliary harness
❺	P4 connector – “Display”
❻	Power lead
❼	FieldManager display harness (P/N 59872)

Preparing the *Ag*GPS FieldManager display

The *Ag*GPS FieldManager display is mounted in the cab with a bar-style RAM mount.

Step 1

Locate the FieldManager display, the RAM mount bracket, and the RAM mount clamp.



Step 2

Use the provided metric hardware to attach the RAM mount bracket to the rear of the display.



Step 3

Attach the RAM mount to the rear of the display.



Installing the *Ag*GPS FieldManager display

Step 1

Determine the best mounting position in the cab. Use the provided bolts to attach the bar mount to the rail.

Feed the Autopilot harness through to the display position.





Step 2

Attach the free end of the RAM mount to the bar mount. Tighten the clamp on the RAM mount so that the display is held securely in place.



Step 3

Attach the Autopilot cable to the back of the FieldManager display. Route the cable to the Autopilot controller and then attach it to the connection labeled “Display” on the main harness.

Do not connect the FieldManager display to the auxiliary harness connection labeled “Spare”.

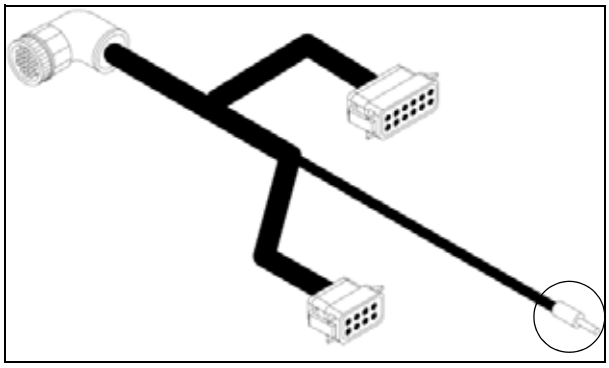


Preparing the *Ag*GPS FieldManager display wiring harness

The FieldManager display requires a constant unswitched B+ power lead.

Step 1

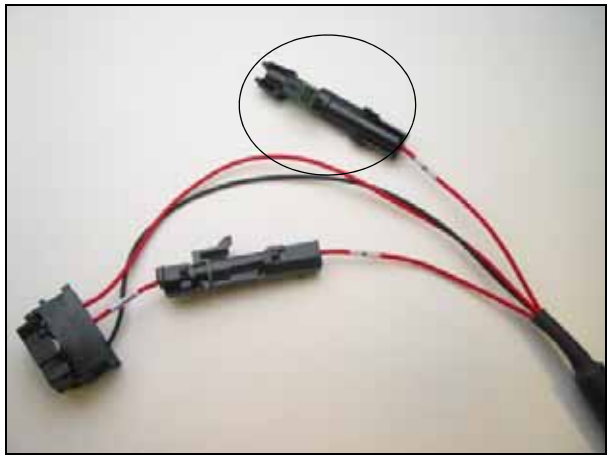
Locate the P9 "Continuous Power" connector on the FieldManager display harness.



Step 2

Locate the unused connector labeled "B" on the power harness at the power switch and then verify that it is the unswitched power lead. If it is not, swap the "A" and "B" leads so that unswitched power is available in the extra lead.

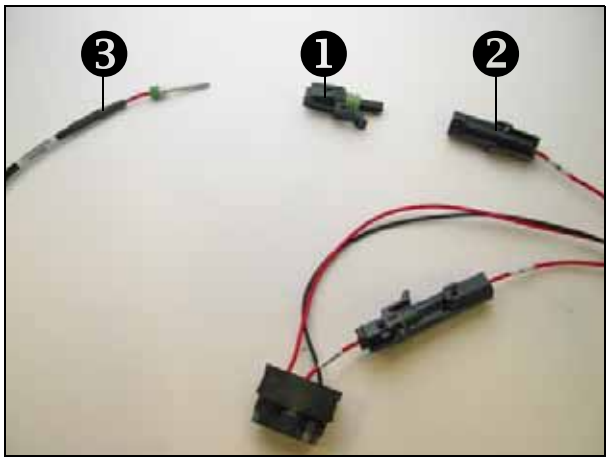
To determine which lead is constant battery power, turn off the vehicle key and then use a volt meter on each lead.



Step 3

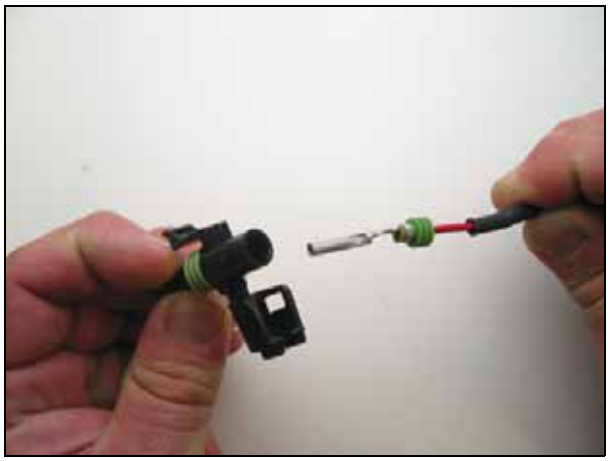
Remove the plug ❶ in the unswitched power lead ❷ and then insert the FieldManager display P9 ❸ pin into the female 1-pin Weatherpack plug. Connect to the mating connector.

To verify that the lead is battery power, turn off the vehicle key and then turn on the display.



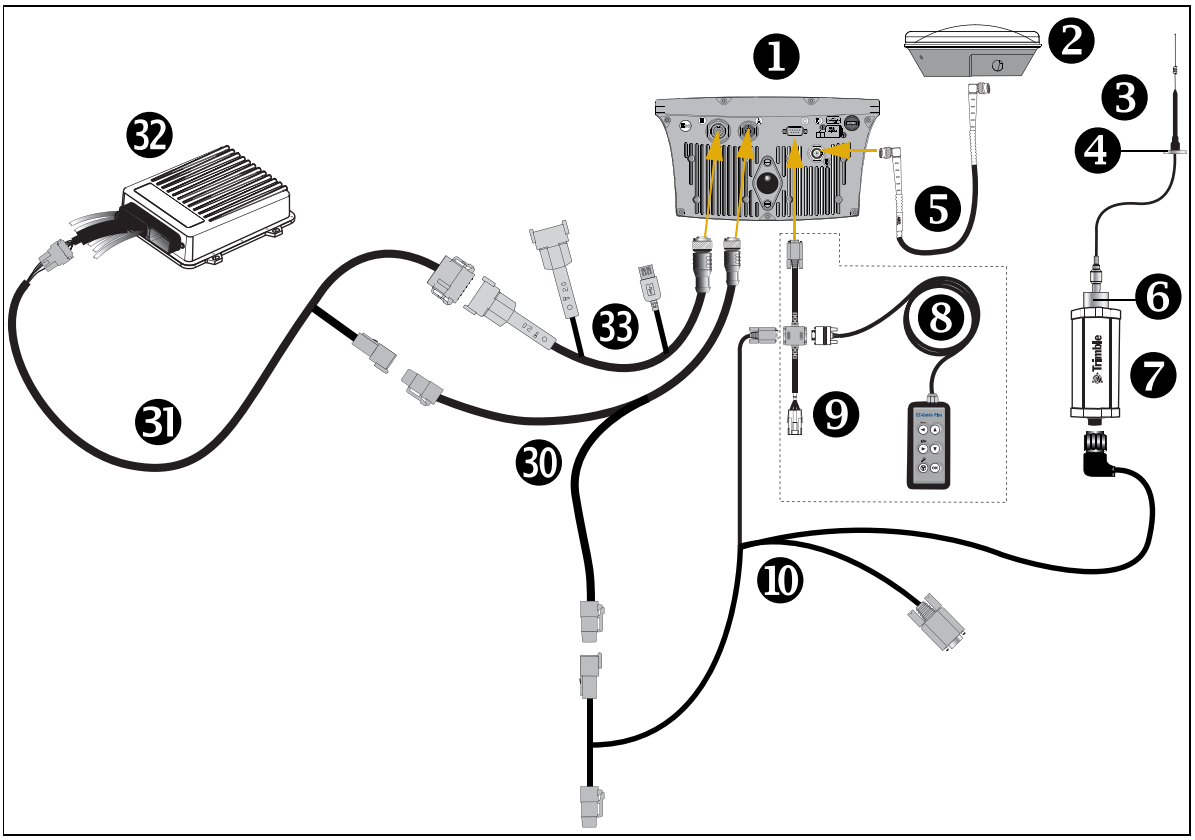
Step 4

To insert the wire end into the connector, release the clips and then remove the cavity plug. Insert the pin.



EZ-Guide 500 lightbar components

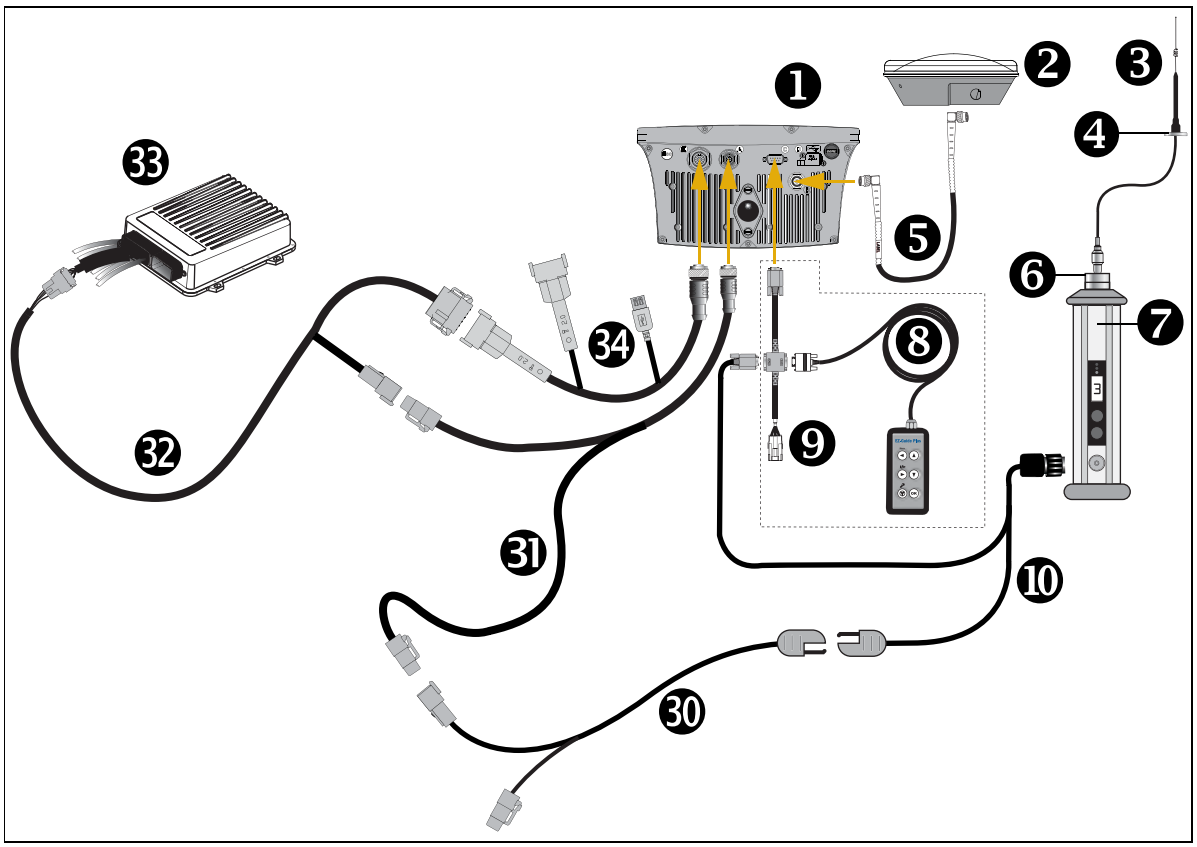
With a SiteNet radio for 900 MHz RTK corrections (if equipped)



Item	Description
❶	EZ-Guide 500 lightbar
❷	Antenna
❸	SiteNet radio antenna (P/N 22882-00)
❹	SiteNet radio antenna magnetic mount (P/N 62109)
❺	Antenna cable
❻	Antenna connector (P/N 46740)
❼	SiteNet radio

Item	Description
❽	EZ-Guide 500-to-radio cable (P/N 62082)
❾	Remote keypad (optional - P/N 66030-00)
❿	External interface cable (P/N 52033)
❿❿	EZ-Guide 500 power cable (P/N 62817)
❿❶	EZ-Guide 500-to-Autopilot cable (P/N 62754)
❿❷	*Ag*GPS Autopilot controller
❿❸	Port expansion cable (P/N 62609)

With a PDL 450 radio for 450 MHz RTK corrections (if equipped)



Item	Description
❶	EZ-Guide 500 lightbar
❷	Antenna
❸	SiteNet radio antenna (P/N 22882-00)
❹	SiteNet radio antenna magnetic mount (P/N 62109)
❺	Antenna cable
❻	Antenna connector (P/N 46740)
❼	SiteNet radio
❽	EZ-Guide 500-to-radio cable (P/N 62082)

Item	Description
❾	Remote keypad (optional - P/N 66030-00)
❿	External interface cable (P/N 52033)
㉚	Power tap to PDL radio (P/N 63185)
㉛	EZ-Guide 500 power cable (P/N 62817)
㉜	EZ-Guide 500-to-Autopilot cable (P/N 62754)
㉝	*Ag*GPS Autopilot controller
㉞	Port expansion cable (P/N 62609)

EZ-Guide 500 lightbar: Installing the antenna plate and GPS antenna

Note – *The V plate antenna bracket is available on the Autopilot price list. See* *Antenna mounting kits, page 9**.*

Use one of the following methods:

- Spar mount
- VHB adhesive

Spar mount method

Trimble recommends that you use this method for RTK and OmniSTAR operations. For more information, see Antenna/Receiver Installation, page 37.

Attach the V plate to the spar with the four ¼"-20 flathead screws provided. The narrow end points forward.



VHB adhesive method

Standard 4" × 6" plates are provided in most kits. You can use Very High Bond (VHB) adhesive to attach either a 4" × 6" plate or a V plate.

- **L1 single-band antenna (WAAS, EGNOS, OmniSTAR VBS, Beacon)** – Use a 4" × 6" plate for simplified installation in applications where high accuracy is not critical.

Step 1

Clean the antenna location on the roof of the cab with a light solvent to remove oil and dust.

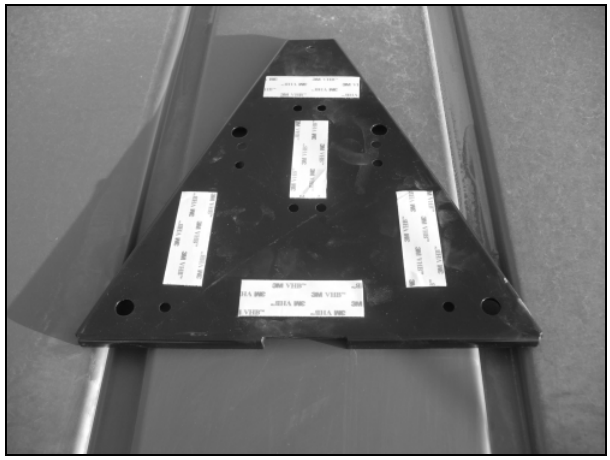


Step 2

V plate only

Remove the backing from one side of the VHB strips provided and then apply the strips to the plate.

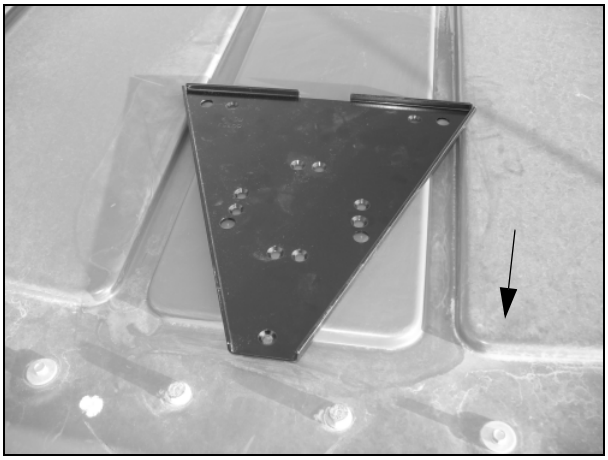
Note – *The VHB strips are pre-applied to the 4" x 6" plate.*



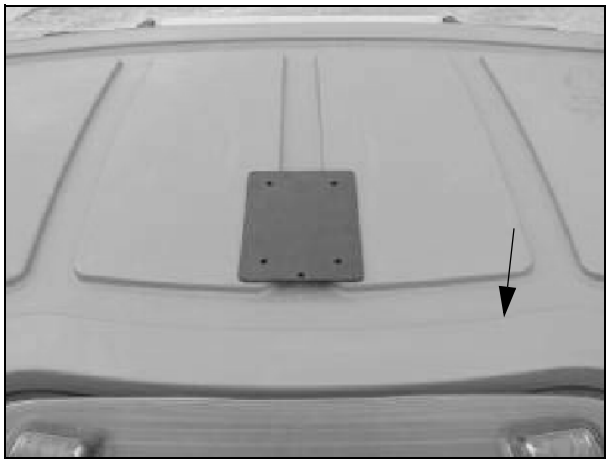
Step 3

Remove the backing from the other side of the VHB strips and then apply the plate to the cab roof. The narrow end points forward. Make sure that the VHB strips make even contact with the surface. Apply pressure and then leave for approximately 30 minutes to adhere.

Note – *The arrow in this figure points to the front of the vehicle.*



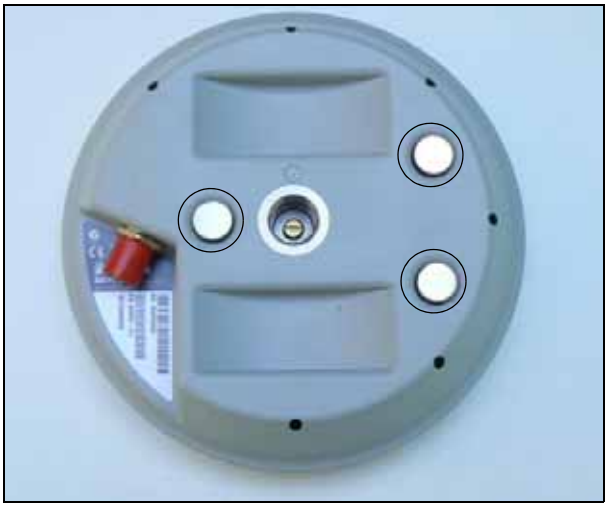
V plate



4" x 6" plate

Step 4

If the antenna has magnets built in, omit this step.



Otherwise, attach the large magnet with a $^{5}/_{8}$" stud to the GPS antenna.



Step 5

L1/L2 dual-band antenna (RTK, OmniSTAR, DGPS)

For repeatable positioning, place the antenna against the lip at the narrow end of the V plate.



L1 single-band antenna (WAAS, EGNOS, VBS, Beacon)

Attach the antenna to the center of the 4" × 6" plate.



Step 6

Both models

Attach the antenna/receiver cable to the antenna and then route the cable into the cab through the rubber grommet at the base of the rear window. Secure the cable along the way.



EZ-Guide 500 lightbar: Installing the SiteNet radio and antenna

Step 1

Position the SiteNet radio in the cab where it is out of sight and secured from rolling. Connect the antenna adaptor to the SiteNet radio.



Step 2

Connect the radio antenna to the magnetic antenna base.



Step 3

You can mount the radio antenna using the standard adhesive backed steel plate with a standard magnetic mount, as shown:

a. Clean the antenna location on the roof of the cab with a light solvent to remove oil and dust. Press on the roof to find a firm location.

b. Remove the backing from the VHB strips and then apply the plate to the cab roof as shown. Make sure that the VHB strips make even contact with the surface. Apply pressure and then leave for approximately 30 minutes to adhere.



Step 4

Feed the radio antenna cable down from the roof and into the cab to the radio. Connect the cable to the radio.



Installing a PDL radio modem

Step 1

Position the radio where it is accessible for the operator to select a new radio channel ID.



Permanent mount

For a permanent mount, bolt the radio onto a bracket with a $^{5}/_{8}$" UNC screw.



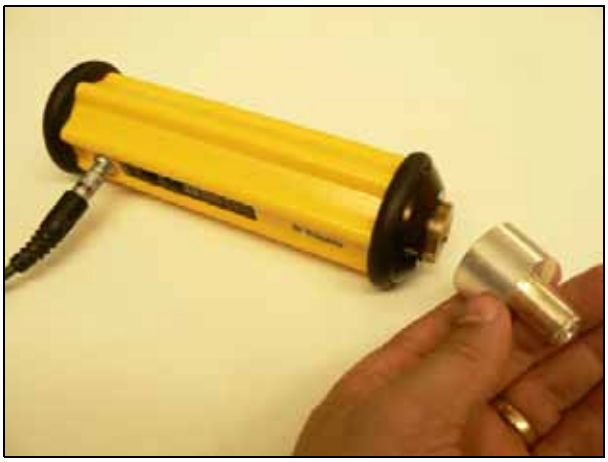
Temporary mount

For a temporary mount (so it can be moved between vehicles), mount the radio on a magnet with a $^{5}/_{8}$" UNC stud.



Step 2

Connect the radio antenna cable adaptor to the radio.



Step 3

Connect the radio cable to the adaptor.



Preparing the EZ-Guide 500 lightbar

Note – *Before you attach the lightbar to the RAM mount, connect the EZ-Guide 500 cables to the back of the lightbar.*

Step 1

Locate the EZ-Guide 500 lightbar, the RAM mount and hardware, and the RAM mount clamp.



Step 2

Attach the RAM mount diamond base to the display using the hardware provided.

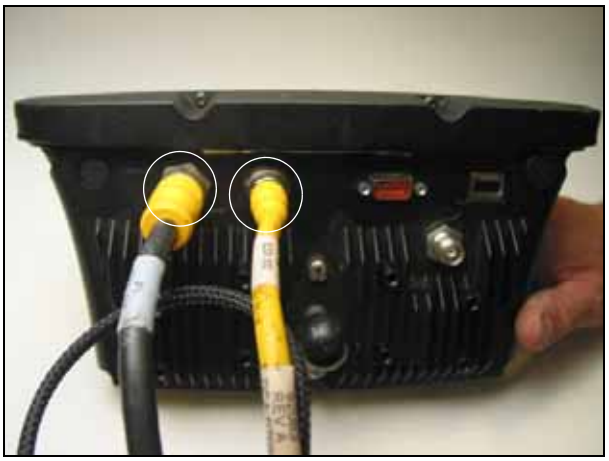


Connecting the EZ-Guide 500 lightbar cables

Note – *Before you attach the lightbar to the RAM mount, connect the EZ-Guide 500 cables to the back of the lightbar.*

Step 1

Connect the two round connectors on the EZ-Guide 500-to-Autopilot cable to the power and extension ports on the back of the lightbar.



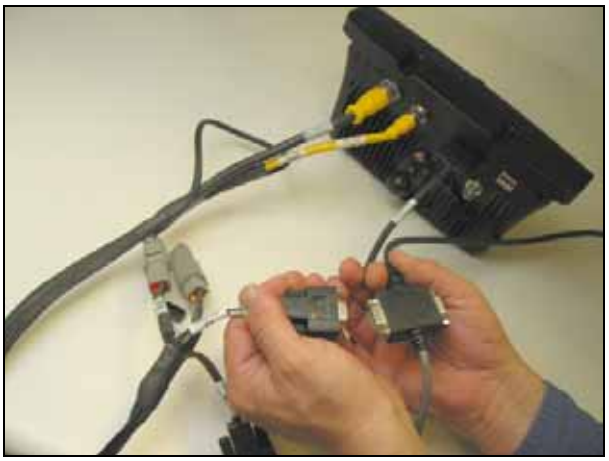
Step 2

With keypad

If you are using the optional keypad, connect the external interface cable to the serial port on the back of the lightbar.

Connect the remote keypad to one of the serial ports on the external interface cable.

Connect the EZ-Guide 500-to-radio cable to one of the other serial ports on the external interface cable.



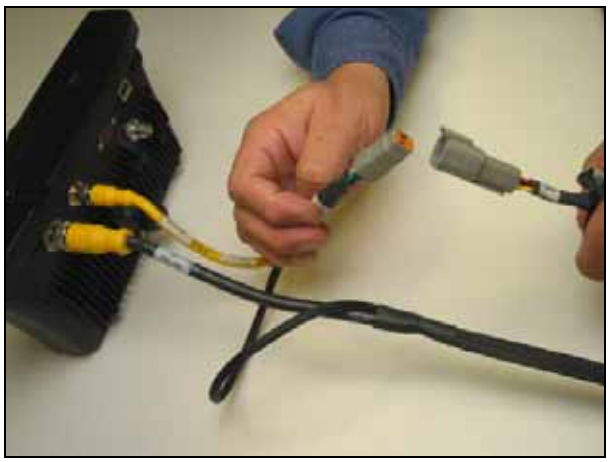
Without keypad

Connect the EZ-Guide 500-to-radio cable to the serial port on the back of the lightbar.



Step 3

Connect the 4-pin Deutsch DTM connector on the EZ-Guide 500-to-radio cable to the matching Deutsch connector on the EZ-Guide 500-to-Autopilot cable.



Step 4

Connect the large, circular antenna connector on the EZ-Guide 500-to-radio cable to the SiteNet radio.



Step 5

Feed the GPS antenna cable into the cab and then connect it to the antenna port on the back of the lightbar.



Installing the EZ-Guide 500 lightbar

Step 1

Select the location for the lightbar in the cab. There must be a bar that the RAM mount can be attached to.



Step 2

Sit in the driver's seat and hold the lightbar in place. Make sure that it allows comfortable access to the display buttons and does not obstruct instruments.



Step 3

Attach the RAM mount to the ball on the rear of the lightbar.



Step 4

Attach the free end of the RAM mount to the bar mount. Tighten the clamp on the RAM mount so that the lightbar is held securely in place.



Step 5

Adjust the angle of the RAM mount for ease of use.



CHAPTER

6

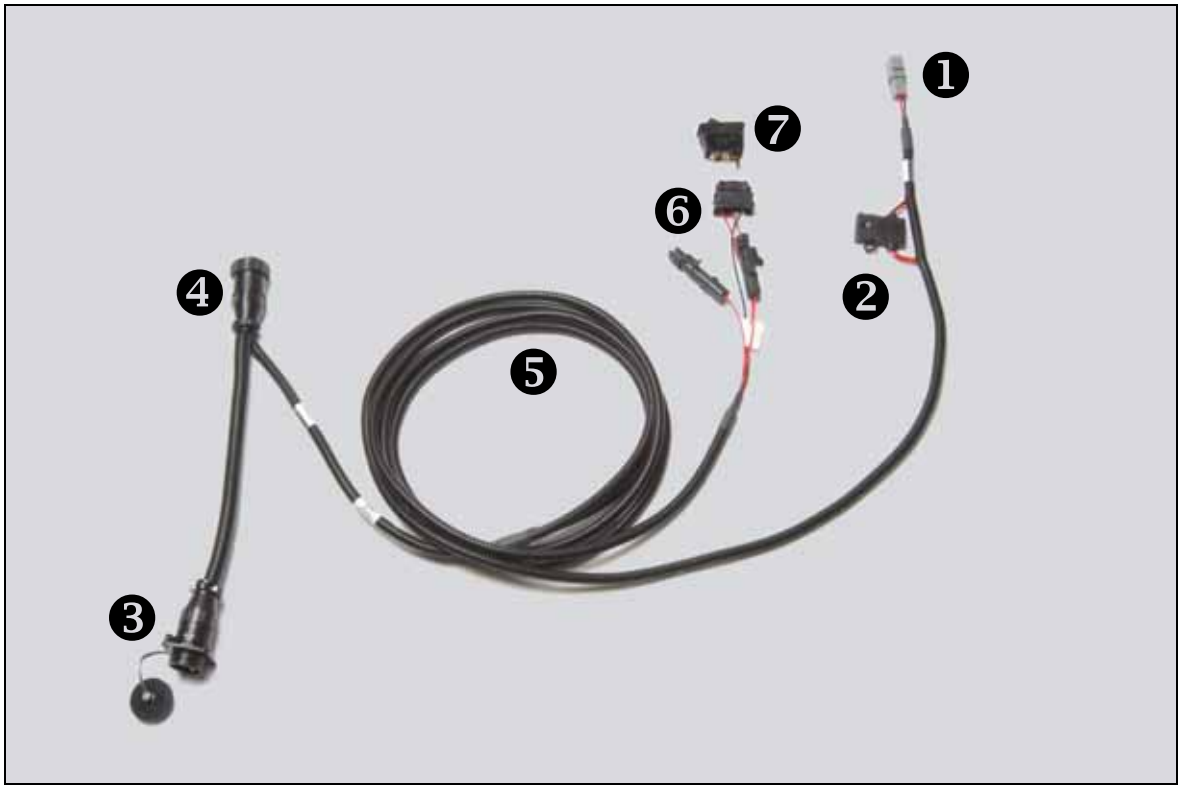
Power Harness Installation

In this chapter:

- Power harness components
- Installing the power harness

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

Power harness components



Item	Description
❶	Controller power connection
❷	Fuse holder - Littlefuse 257010, 10 amp
❸	Extra accessory outlet
❹	Accessory jumper cable
❺	Power harness cable (P/N 54630)
❻	Switch receptacle
❼	Switch

Installing the power harness

During installation:

- Make note of where any wire harness and hose tie straps were removed during disassembly so that you can correctly re-install them.
- Route all harnesses, wires, and cables so that they are free of obstructions and pinch points. Use wire ties where necessary.
- Make sure that connectors on all harnesses are identified by component for ease of installation.
- The following instructions give only general directions for routing the components. You are responsible for determining the best method to conceal all routings.

Step 1

If the vehicle has a standard accessory outlet, you can jumper the Universal Power Cable in place inside or outside the console. If there is no accessory outlet, you can cut off the jumper end from the cable and then crimp on suitable spade or ring terminals to connect as suggested in steps 2 and 3.

Step 2

Optional

In the right rear corner of the cab, find an unused connector on the main cab harness. Use a multimeter to test the connector for a switched 12-volt power source.



Step 3

Optional

The red wire that becomes available after you cut off the jumper is the positive power lead. The black wire is negative. Crimp a female ¼" spade terminal to the red lead. Crimp a ¼" or $^{5}/_{16}$" ring terminal to the black lead. Attach the red lead to the connector ❶ identified in step 2. Find a ground connection ❷ inside the electronics bay. Attach the ring terminal securely to the ground stud. Secure all wires.



Step 4

Find and remove a blank plug in the console to install the switch. Route the switch leads from the power cable up inside the console and pass the switch socket through the hole. Plug the switch into the socket and snap it into the hole. If no knockout is available, you may need to cut a hole or make a suitable bracket. Connect the power cable switch socket to the switch.

CHAPTER

7

Remote Engage Switch Installation

In this chapter:

- Remote engage switch components: Rocker switch
- Remote engage switch components: Foot switch
- Preparing the remote engage cable
- Using the remote engage switch

This chapter describes how to install the remote engage switch.

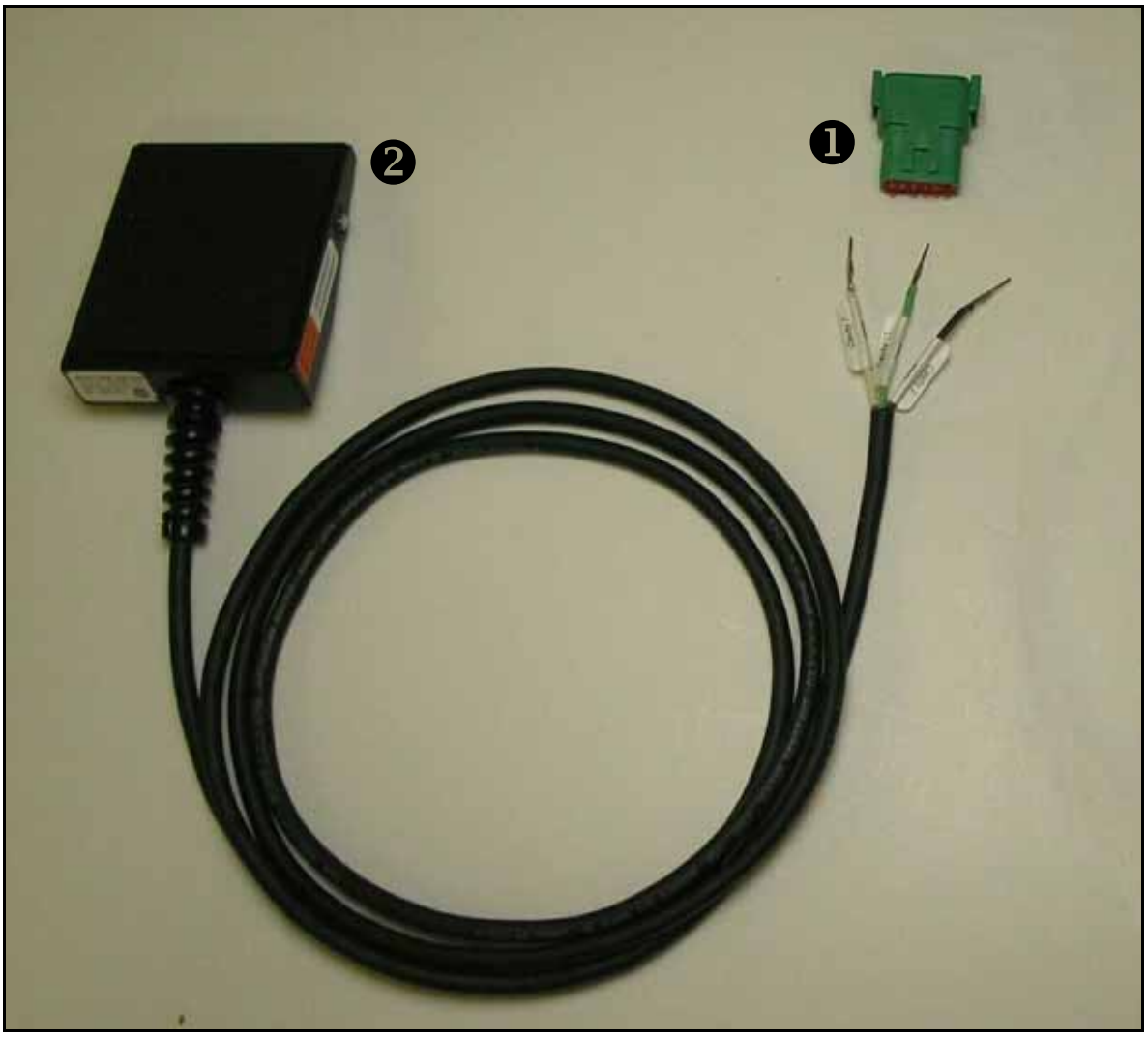
Remote engage switch components: Rocker switch



Item	Description
❶	DTM receptacle
❷	Remote engage rocker switch

Note – *This is a Full or Standard Euro switch, depending on the kit ordered.*

Remote engage switch components: Foot switch

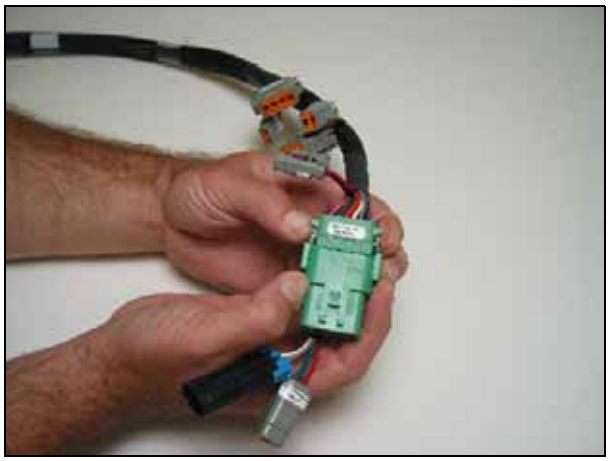


Item	Description
❶	DTM receptacle
❷	Remote engage foot switch

Preparing the remote engage cable

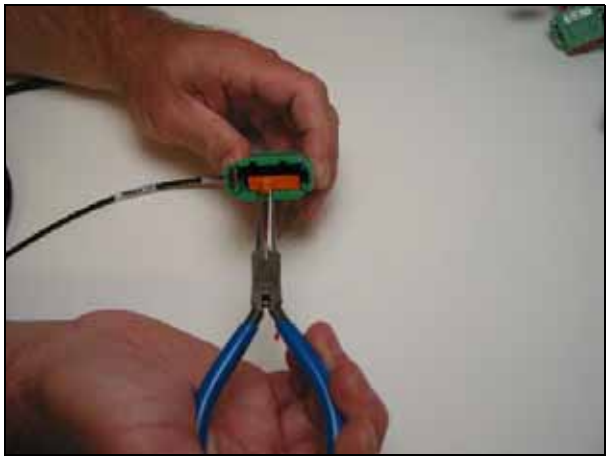
Step 1

Locate the green 12-pin Deutsch receptacle on the P-5 leg of the main controller harness. For more information, see Chapter 8, Controller connections.



Step 2

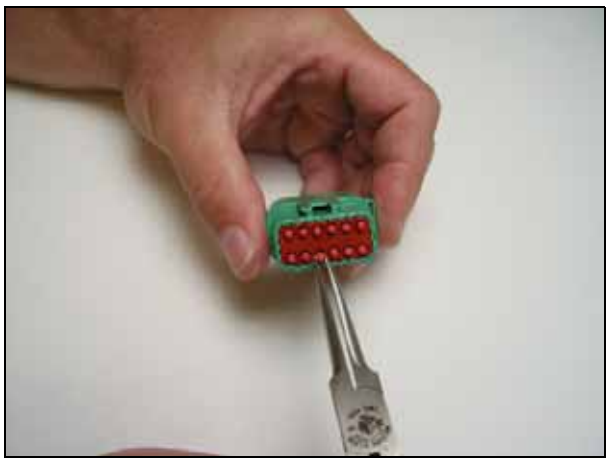
Remove the wedge from the connector.



Step 3

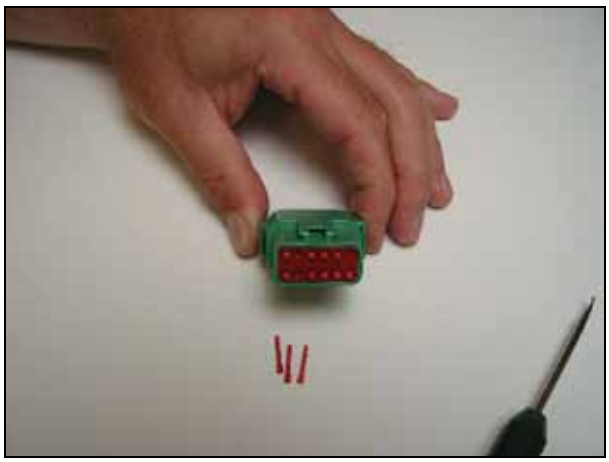
Rocker switch only

Remove the plugs from cavity 2 and cavity 7.



Foot switch only

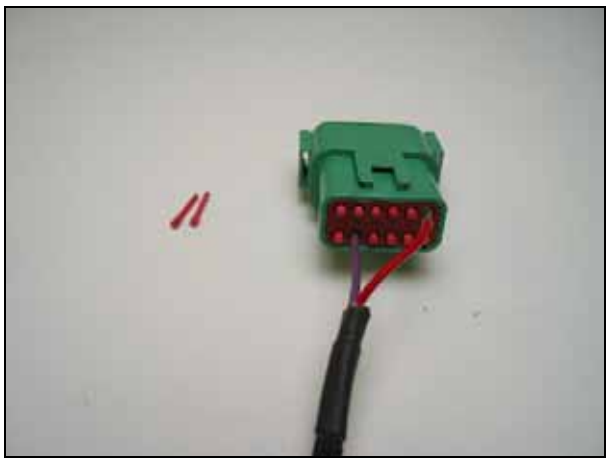
Remove the plugs from cavity 2, cavity 7, and cavity 11.



Step 4

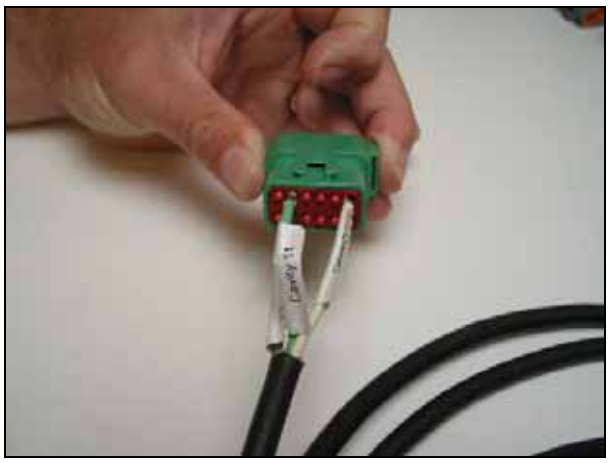
Rocker switch only

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



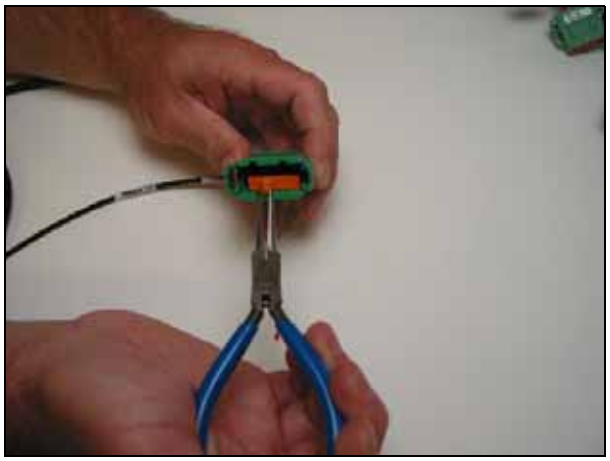
Foot switch only

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



Step 5

Pull on the wires to seat them in place and then 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

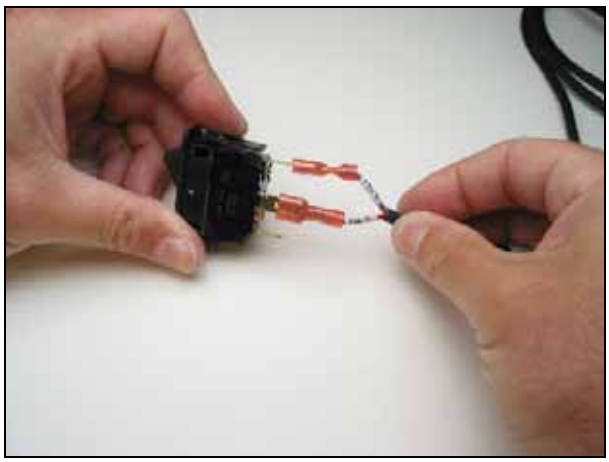
Run the cable to a clear location on the floor board. Use double-sided tape to secure the pedal. Route the cable under the floor mat.



Step 7

Rocker switch only

Connect the wires to the switch matching 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 for less than 0.5 seconds will not engage the system.*

Step 2

Release the switch between 0.5 and 4.0 seconds. When you release the switch, the vehicle will engage.

CHAPTER

8

Controller Installation

In this chapter:

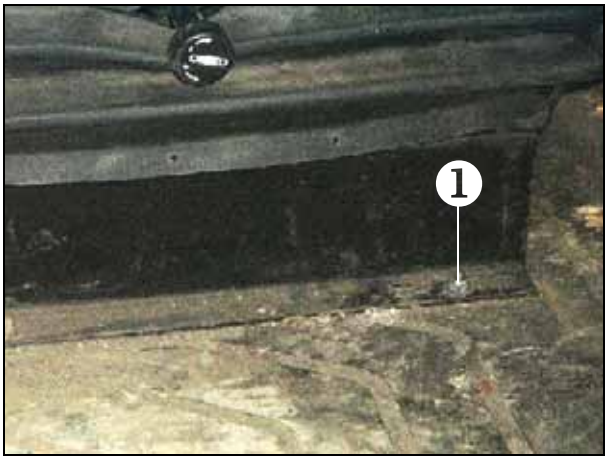
- Installing the controller
- Controller connections
- Connecting the cables to the controller

This chapter describes how to install the controller unit in the vehicle.

Installing the controller

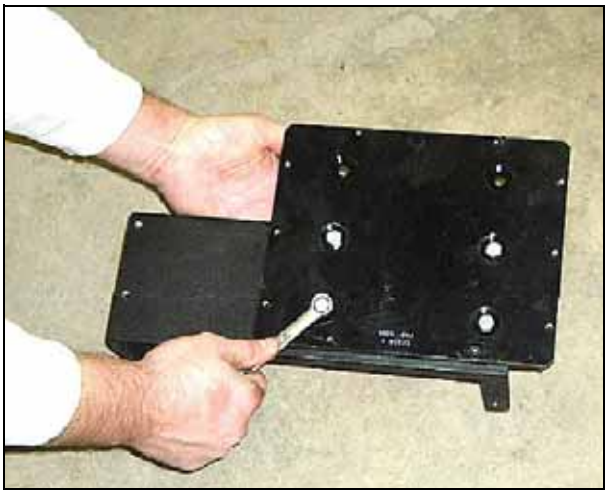
Step 1

Locate and remove the two rear seat mount nuts ❶.



Step 2

Use the four supplied bolts and washers to attach the controller bracket to the mount bracket. Tighten the bolts securely.



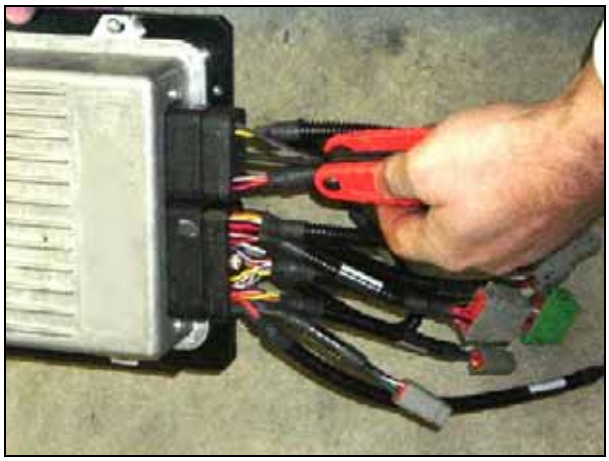
Step 3

Use the four supplied #10-32 Phillips head screws to firmly attach the controller to the mount plate.



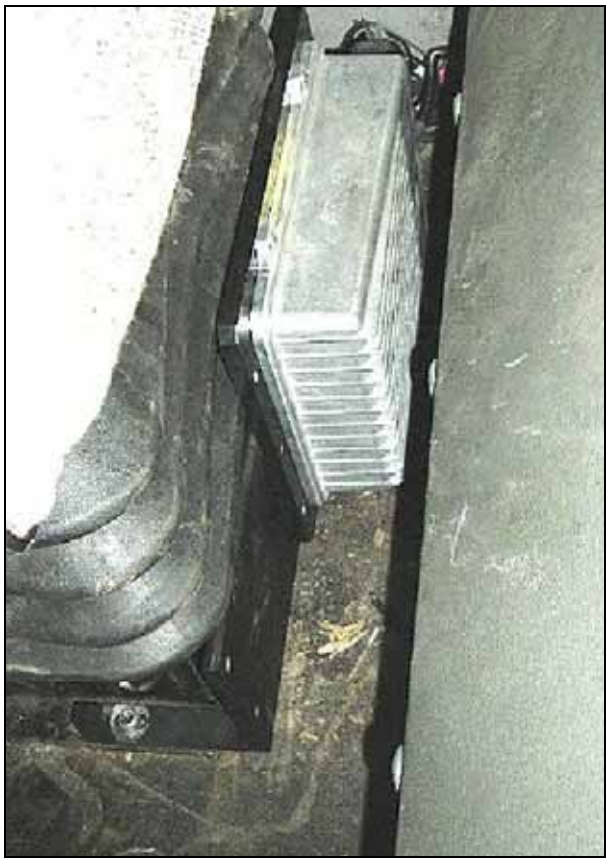
Step 4

Insert the two main harnesses into the connectors on the controller. Tighten the Allen head screws to secure the harnesses to the controller. Do not overtighten the screws; they should be only snug.



Step 5

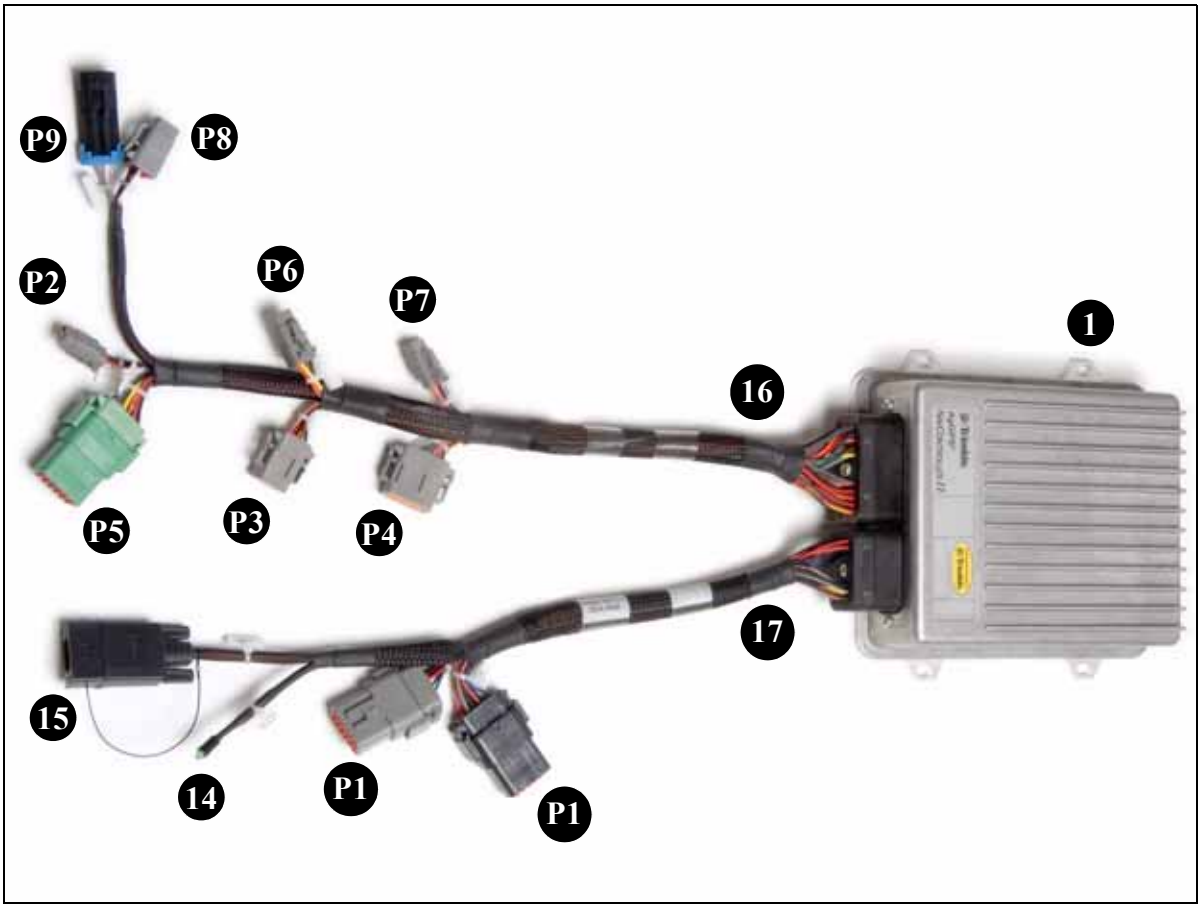
Slip the controller and bracket assembly over the rear seat base studs. Reinstall the nuts and then tighten them securely.



Step 6

Connect the various cables to the appropriate leads on the controller main harness. The connectors are marked with identifying labels for ease of connection.

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

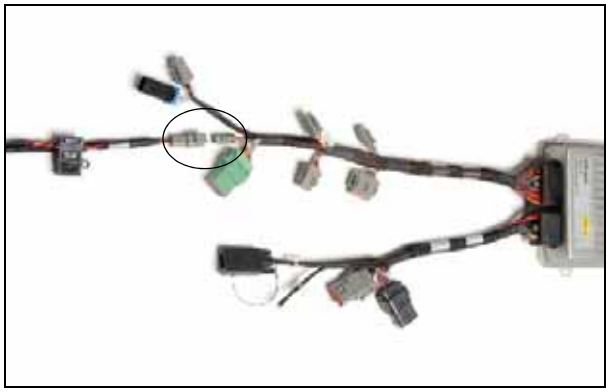
Item	Description
P9	Sonalert connector
P12	Lightbar/spare connector
P13	Spare sensors connector
14	Status indicator
15	Laptop connector
16	Main harness
17	Auxiliary harness

Connecting the cables to the controller

Step 1

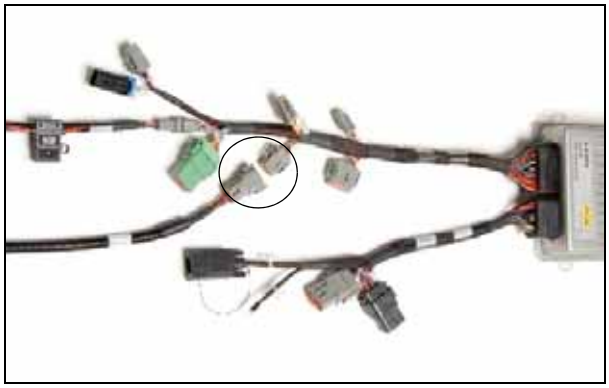
Connect the power cable connection to P-2, which is labeled “Power”. P-2 is on the main wiring harness.

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



Step 2

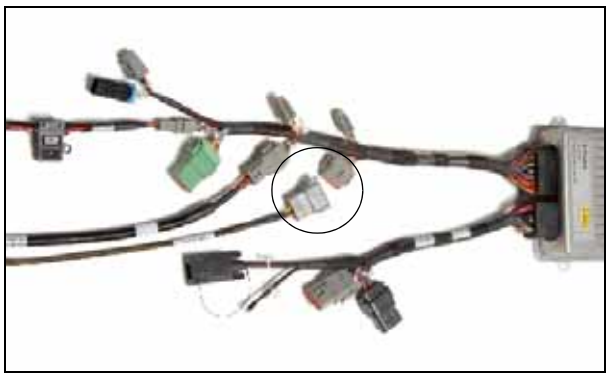
Connect the GPS cable connection to P-3, which is labeled “GPS”. P-3 is on the main wiring harness.



Step 3

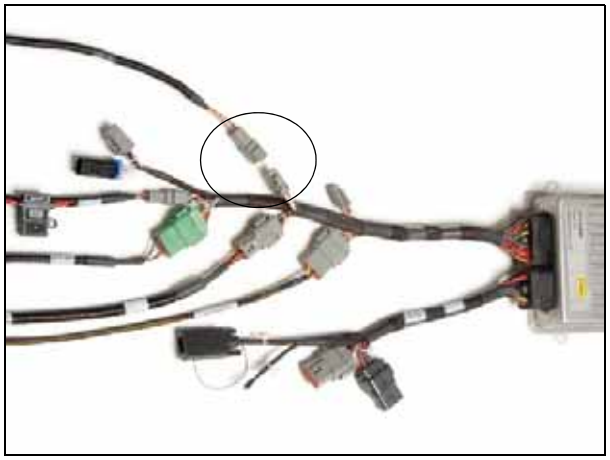
Connect the primary display cable connection to P-4, which is labeled “Display”. P-4 is on the main wiring harness.

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



Step 4

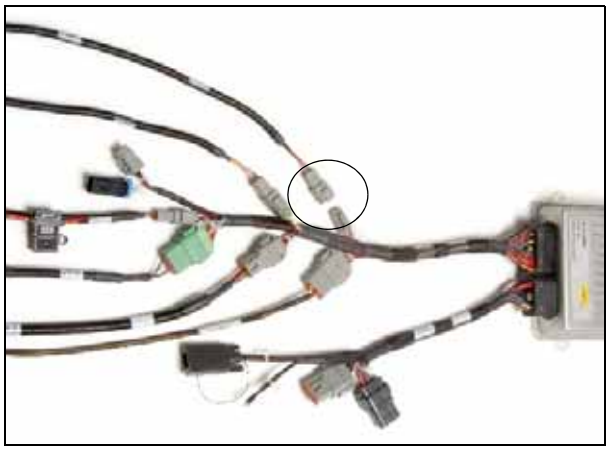
Connect the steering sensor cable connection to P-6, which is labeled “Steering Sensor”. P-6 is on the main wiring harness.



Step 5

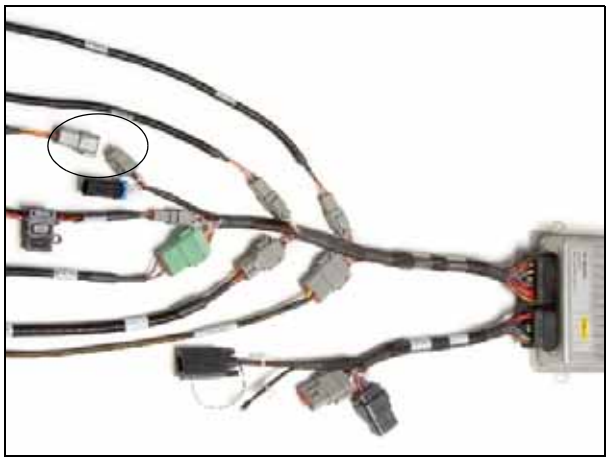
Connect the manual override cable connection to P-7, which is labeled “Manual Override”. P-7 is on the main wiring harness.

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



Step 6

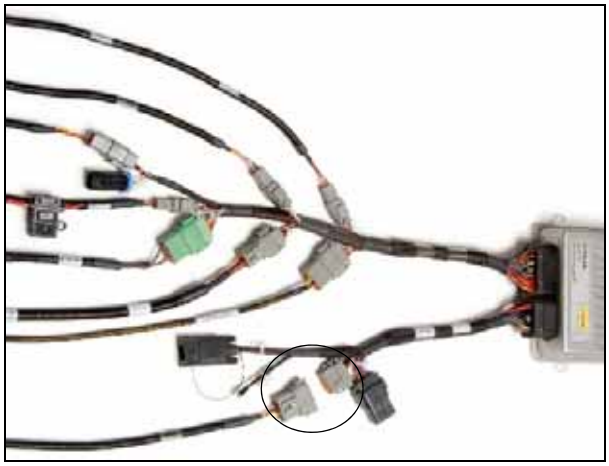
Connect the hydraulic steering valve cable connection to P-8, which is labeled “Hydraulic Valve”. P-8 is on the main wiring harness.



Step 7

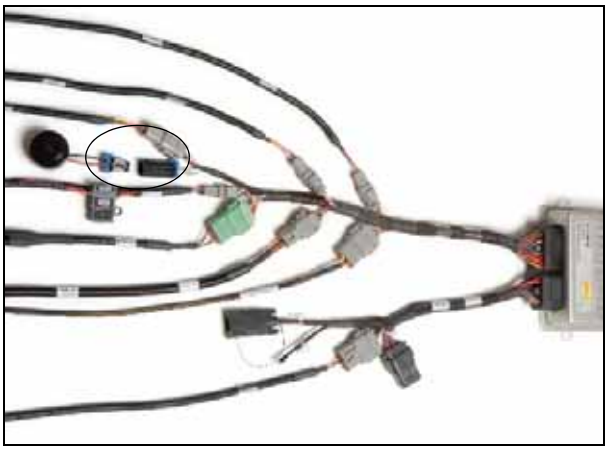
When using a lightbar as a secondary display to an *Ag*GPS 170 field computer, connect the lightbar cable connection to P-12, which is labeled "Lightbar/Spare". P-12 is on the auxiliary wiring harness.

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



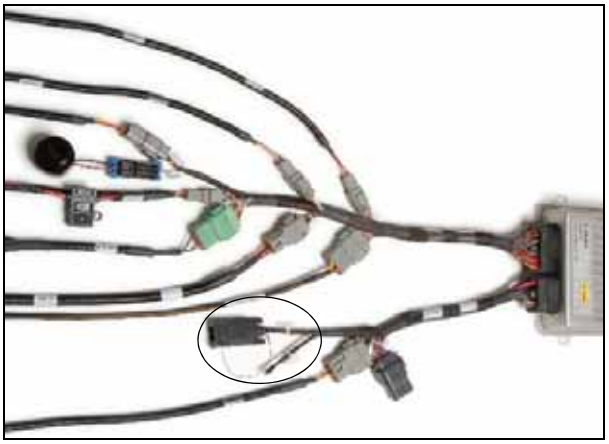
Step 8

Connect the Sonalert P-9 to the 2-pin Delphi connector on the main wiring harness. Route the cable so that the Sonalert warning device is in a position that is audible to the operator.



Step 9

Route the LED and laptop lead, which is on the auxiliary wiring harness, to a place 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:

- Performing the final machine check

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

Performing the 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 *Ag*GPS Autopilot Toolbox II software and make sure that all signals from the hydraulics and sensors are active.