INSTALLATION INSTRUCTIONS

Autopilot™ Automated Steering System

John Deere Combines

- **S680**
- **S690**

Version 5.00
Revision A
August 2012
Part Number 54038-14-E05

Trimble

Agriculture Business Area

Trimble Agriculture Division
10355 Westmoor Drive
Suite #100
Westminster, CO 80021
USA
www.trimble.com

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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.

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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c/o Menlo Worldwide Logistics
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.*

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.

WARNING – Vehicle cabs can be quite high in the air. To avoid potentially serious injury through falling from this height, always use the steps and handrails, and face the vehicle, when you enter or exit it.

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. To avoid ingesting lead, wash your hands thoroughly after touching the battery.

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 correct protective welder's clothing when 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.

CAUTION – Do not direct pressurized water at:
- electronic or electrical components or connectors
- bearings
- hydraulic seals
- fuel injection pumps
- any other sensitive parts or components

Set the hose pressure as low as practicable, and spray at a 45° to 90° angle. Keep the nozzle of the power washer away from the machine at the distance recommended by the manufacturer.

CAUTION – To prevent damage to the system, make sure that no wires or hoses interfere with or catch on any mechanical linkages, or contact any machine parts that get hot.

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CHAPTER

1

Introduction

In this chapter:

- Technical assistance
- Manual system upgrade to Autopilot
- Required components
- Autopilot hardware organization: As shipped
- Preparing the vehicle for installation

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

Even if you have used another GNSS (Global Navigation Satellite System), such as the United States' GPS (Global Positioning System), before, spend some time reading this manual to learn about the special features of this product. If you are not familiar with GNSS, go to the Trimble website (www.trimble.com) for an interactive look at Trimble and GNSS.

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 & Training** link at the top of the screen, select *Support* and then select *Support A–Z list of products*.
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**.

Manual system upgrade to Autopilot

CFX-750 display and FmX integrated display

Retain	Remove
CFX-750™ display: P/N 94000-xx Power cable CFX-750 display: P/N 77282 **FmX® integrated display: P/N 93100-xx** Power cable FmX display: P/N 66694 Antenna for display: P/N 60600-02 (DGPS) or 77038-00 (OmniStar/RTK) Antenna to receiver cable: P/N 50449 Basic cable (both displays): P/N 67258	

EZ-Guide 500 system

Retain	Remove
EZ-Guide® 500 lightbar: 66100-xx Antenna for EZ-Guide 500 lightbar: P/N 60600-xx (DGPS) or 57200-00 (OmniStar/RTK) Antenna to receiver cable: P/N 50449 Power cable: P/N 62817 *Optional.* Remote keypad	Power connection cable: P/N 62818

Required components

Kits required	Special tools
Platform kit: P/N 54038-14	5/16" drill bit Right angle drill or right angle extension Deutsch DTM crimp tool (see Troubleshooting Guide for purchasing information) #25 Torx driver Allen wrench set (metric and SAE) 2" hole saw

Antenna mounting kits

Antenna options
Antenna spar mount: P/N 66774
Standard VHB mount: P/N 62034
Antenna V plate mount and *Ag*GPS 262 / AG-372 receiver magnetic mount: P/N 62388-01 (includes magnets for quick release of the *Ag*GPS 262 / AG-372 receiver – see Chapter 4, Antenna/Receiver Installation).

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 54038-14)	Steering control valve cable and lock out	Chapter 2
	Manual override cable	
	Autosense™ steering device and cabling	Chapter 3
	Autosense mounting bracket and hardware	
	Power switch	Chapter 6
	Bolt kit controller	Chapter 8
Common parts	Controller	Chapter 8
	Controller mounting bracket	
	Cable kit: • Main wiring harness • Power bus auxiliary wiring harness • Sonalert alarm	
GNSS receiver	GNSS receiver	Chapter 4
	GNSS antenna	
	GNSS receiver power/data cable	
	RTK radio, cable, and radio antenna	
Display	CFX-750 display	Chapter 5
	FmX integrated display	
	EZ-Guide 500 lightbar	
	Display cable	
	Mounting bracket	
Roof bracket kit: (P/N 66774	Roof brackets	Chapter 4
	Bolt kit, roof bracket	

Preparing the vehicle for installation

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

1. Park the vehicle on a hard, level surface. Block the front and rear wheels.
2. Align the steering straight ahead. On an articulated vehicle, install the articulation locks.
3. Remove all dirt and debris from the areas of the vehicle where the Autopilot system will be installed.
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.

CHAPTER

2

AutoTrac Harness Component Connections

In this chapter:

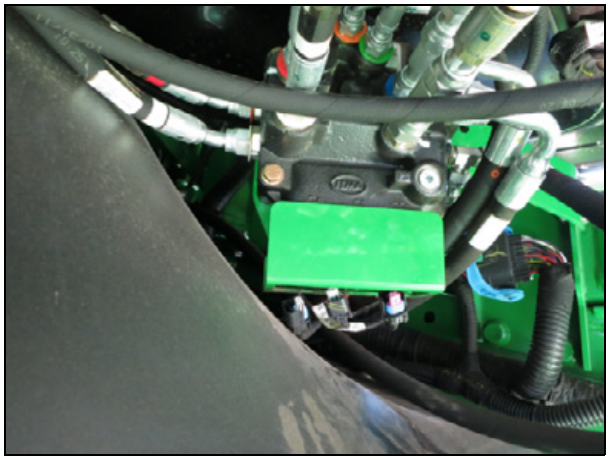
- Installing the components
- Installing the steering sensor adapter cable

This chapter describes how to install the AutoTrac harness components.

Installing the components

Step 1

Check that the machine has a FEMA steering valve. It is located under the cab and towards the left side of the vehicle.



Step 2

Identify the steering valve interface cables:

- P/N 84253
- P/N 54617
- P/N 84252

Step 3

Plug the **R2** connector on cable P/N 84253 into any free connector on the power bus harness P/N 67259.

Plug the **R1** connector on cable P/N 84253 into the FEMA valve where it is labeled "CO," on the right-hand side.

Step 4

For steering control:

Plug the **P8** connector on cable P/N 54617 into connector **R8** on the NavController II harness (P/N 54601).

Plug the connector labeled '**Valve A P2**' on cable P/N 54617 into the cable P/N 84252 labeled '**Steering Right**.'

Plug the other end of the cable P/N 84252 into the FEMA valve at the location labeled **CB**.

Plug the connector labeled '**Valve B P3**' on cable P/N 54617 into the cable P/N 84252 labeled '**Steering Left**.'

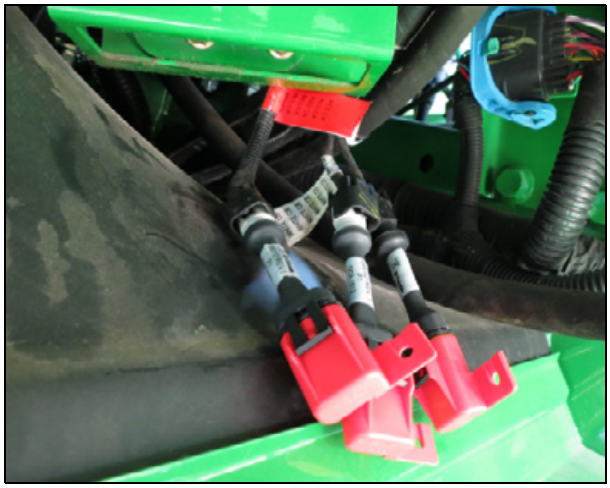
Plug the other end of the cable P/N 84252 into the FEMA valve at the location labeled **CA**.

Step 5

Terminate the OEM steering harnesses with the following phantoms:

- CO valve: P/N 89231
- CA & CB valves: P/N 89232

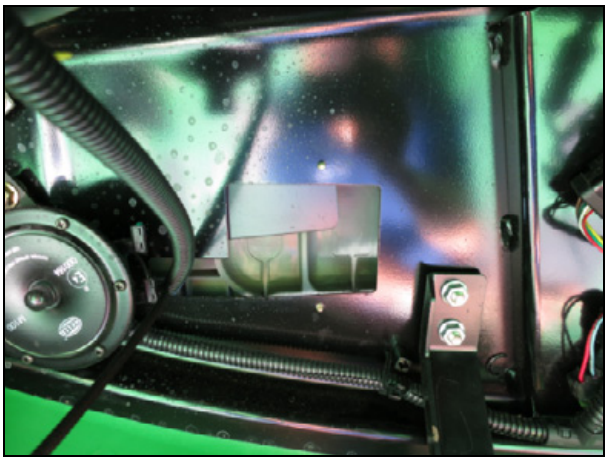
Lightly tug the terminators to check that the connectors are fully seated. Use a wire wrap tie to fasten the phantoms securely to a stationary location.



Step 6

Route the steering valve cables to the cab through an access panel that is under the cab, just to the left of the steering column.

To remove the panel from the cab lift up the floor mat and remove the two Phillips head screws.

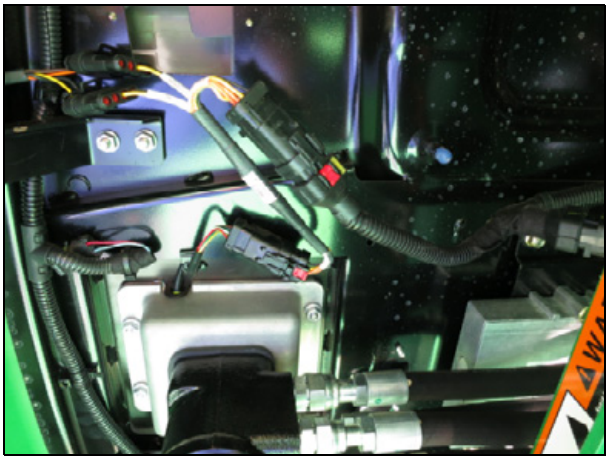


Installing the steering sensor adapter cable

Step 1

The connector for the sheering shaft sensor is located underneath the cab, directly adjacent to the hand pump. It is a black 6-pin Tyco connector that has a small red tab.

Detach the connector, and then insert the jumper cable (P/N 81349).



Step 2

Route the cable P/N 81349 back to the cab through the same access panel used for the steering cables, in Step 6, above.

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 Autosense™ steering device.

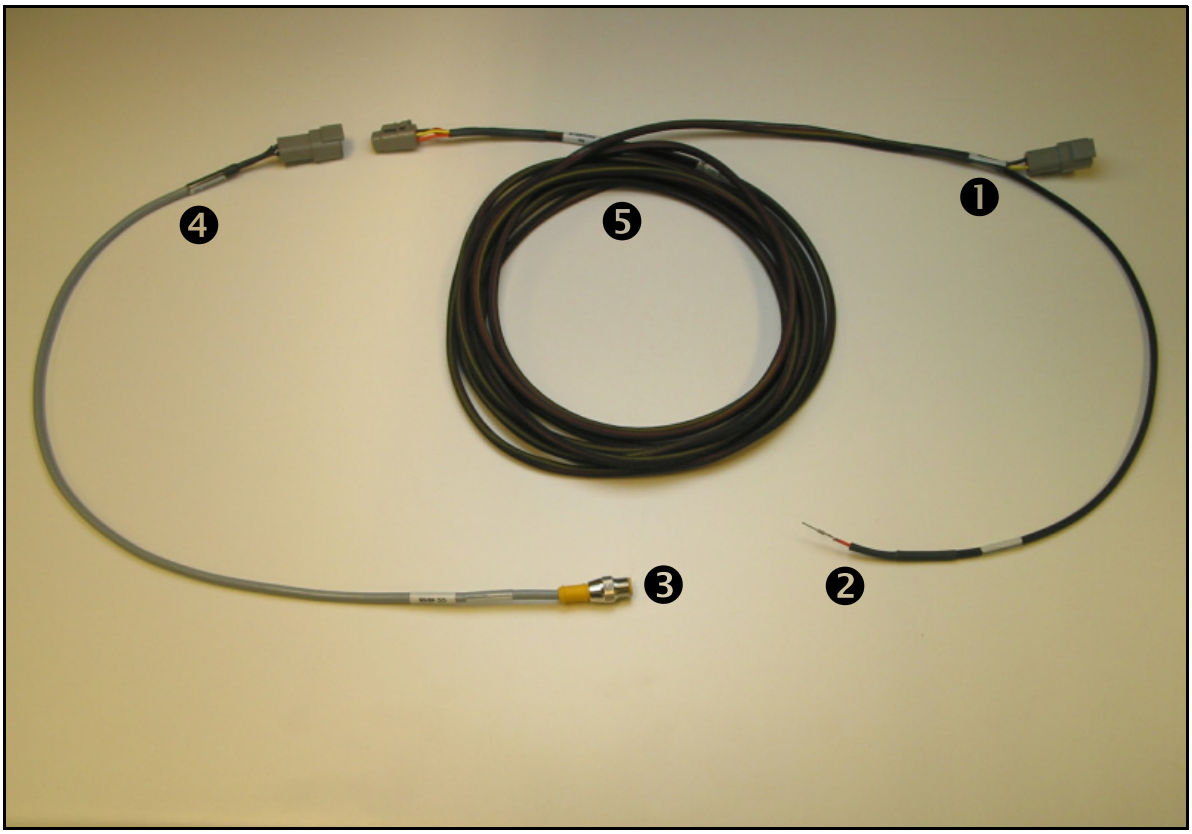
If the required mounting location is not accessible, chose a different place. To ensure proper function, the Autosense device must be located where it is free of obstructions and can rotate with the wheels when they turn.

On articulated vehicles, mount the Autosense device on the opposite side of the pivot point to 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	Trimble part number
❶	P-6 connector	
❷	Power connector	
❸	Autosense connector	
❹	Jumper cable	57560
❺	Autosense steering cable	57885

Installing the Autosense steering device

WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

Step 1

The Autosense cable will be routed out of the cab through the same panel the valve and override cables came through.

Step 2

Attach the Autosense mounting bolts on the steering wheel as shown, If the bolts are already in the holes, remove them and then use them to attach the bracket. If no brackets currently exist, use the ones provided in the platform kit.

Step 3

Mount the Autosense device so that the connector is in the most protected position. Use the four #6 socket head cap screws (provided).

Step 4

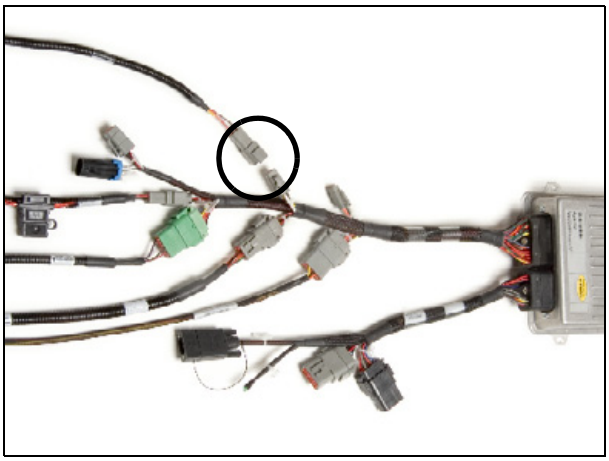
Route the steering cable to the steering device along the frame rail and connect it to the steering device.

Note – *Turn the steering wheel to the full left and the full right to ensure that there is enough spare harness.*

Step 5

Plug the steering sensor cable to P-6 on the Autopilot controller main wiring harness.

The P6 connector is labeled **Steering Sensor**.

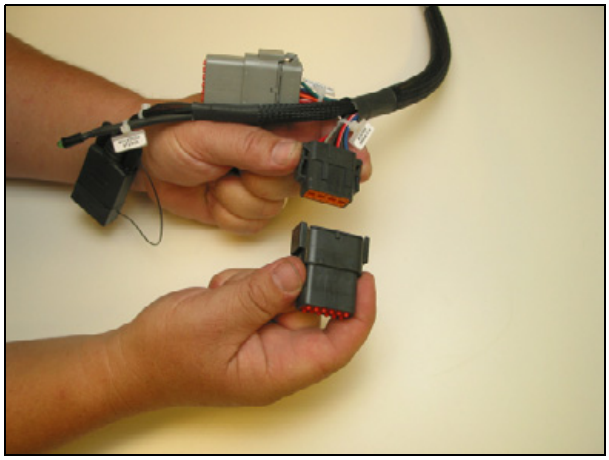


Preparing the harness: P/N 54602 Rev C

Step 1

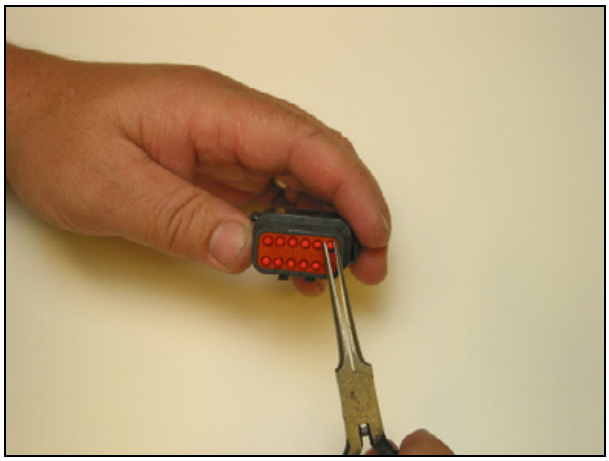
Remove the black Deutsch DTM receptacle from the P-13 sensors leg of the auxiliary harness. See Chapter 8, Controller Installation.

Note – *You will already have a connector for the P/N 81349 manual override cable connected to P13. Use the same connector for the Autosense device.*



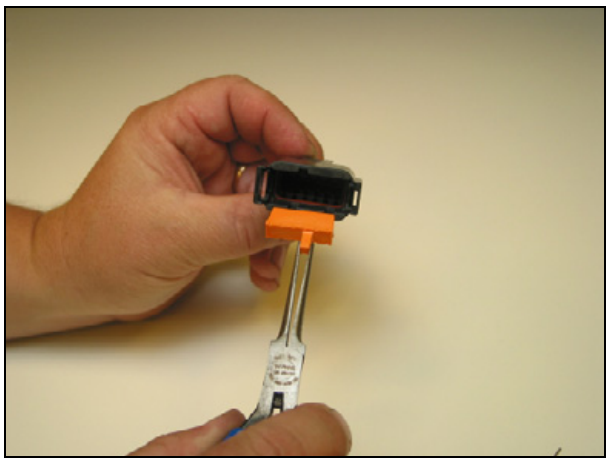
Step 2

Remove the plug from cavity number 1.



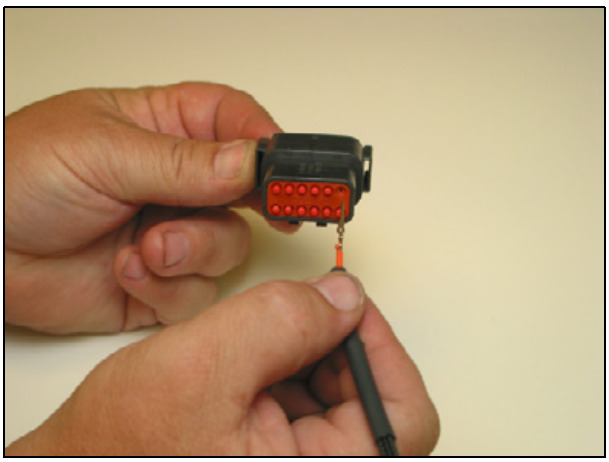
Step 3

Remove the wedge from the connector.



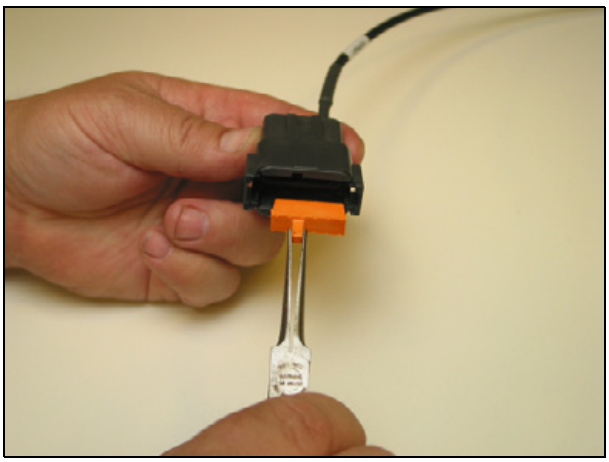
Step 4

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.



Step 6

Plug the assembled Deutsch receptacle into the P-13 sensors leg of the AutoPilot controller auxiliary harness. See Chapter 8, Controller Installation.

CHAPTER

4

Antenna/Receiver Installation

In this chapter:

- Antenna and receiver installation options
- Mounting an adjustable spar to roof bolts
- AgGPS 262 GPS receiver with AgGPS 450/900 radio module (if equipped) components
- AG-372 GPS receiver with AgGPS 450/900 radio module (if equipped) components
- Installing the AgGPS 262 GPS / AG-372 receiver with AgGPS 450/900 radio module (if equipped)
- Installing an AgGPS 262 / AG-372 receiver with magnetic feet
- AgGPS 432 / 442 / 542 receiver components
- Installing the AgGPS 432 / 442 / 542 receiver

This chapter describes how to install the:

- *Ag*GPS 262 / AG-372 receiver and *Ag*GPS radio module
- *Ag*GPS 332 receiver and antenna
- *Ag*GPS 442 receiver and antenna
- *Ag*GPS 542 receiver and antenna

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

Antenna and receiver installation options

There are several options for mounting components (the antenna, radio module, or GNSS receiver) on the cab roof depending on the accuracy required and the antenna type:

- **Spar mount** – This bracket mounts directly to the roof bolts and is required for all high accuracy applications such as RTK and OmniSTAR. Trimble recommends this method for mounting an *Ag*GPS 262/AG-372 receiver. Bolt a metal spar to the roof or to a light bracket and then attach either a V plate for magnetic mounting or an *Ag*GPS 262 receiver plate for permanent mounting.
- **VHB mount** – Attach a 4" x 6" plate or a V plate directly to the roof with VHB (Very High Bond) adhesive for magnetic mounting. See page 30.
- **Magnetic mounting** – Magnetic mounting for quick release is available for both VHB and spar type mounting.

Possible mounting methods

GPS receiver	V plate on spar (removable)	VHB plate on roof (removable)	Standard *Ag*GPS 262 plate bolted to spar (permanent)	AG15/AG25/Zephyr bolted to spar mount
*Ag*GPS 262 / AG-372 receiver	✓	x	✓	x
*Ag*GPS 332 receiver	✓	✓	x	✓
*Ag*GPS 432/442/542 receiver	✓	x	x	✓
EZ-Guide 500 lightbar	✓	✓	x	✓
FmX integrated display CFX-750 display	✓	✓	✓	✓

Notes:

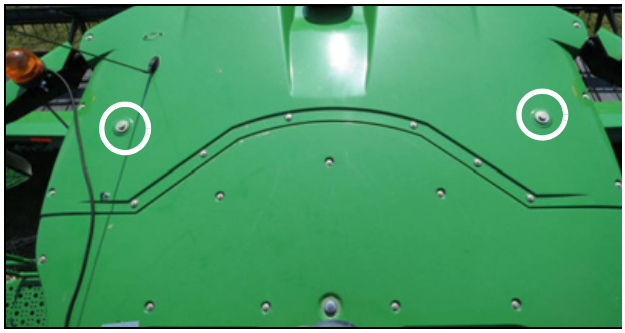
- *For quick release magnetic mounting with an AgGPS 262 / AG-372 receiver, order the kit listed in* Antenna mounting kits, page 9 *and bolt the V plate to the spar.*
- *With all other antennas, bolt the V plate to the spar for high accuracy and repeatability.*
- *For WAAS, EGNOS, OmniSTAR VBS, Beacon, and DGPS applications, place either of the plates in a firm location using the VHB.*

Mounting an adjustable spar to roof bolts

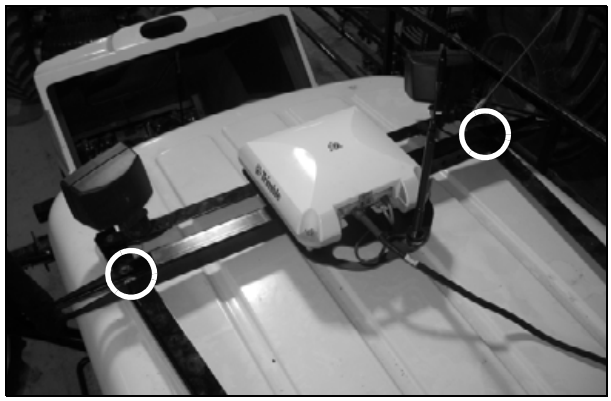
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

Step 1

Position the cab bolts on the roof of the vehicle.

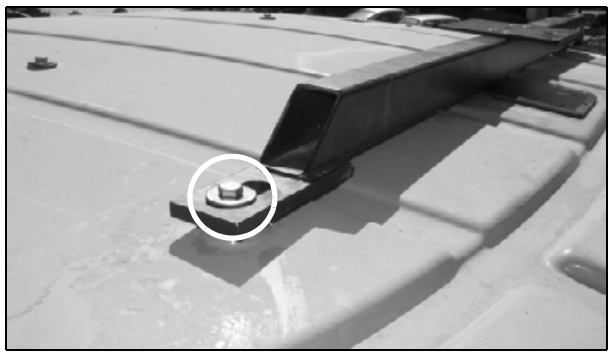


If a light bracket already occupies the roof studs, mount the spar directly onto the light bracket.

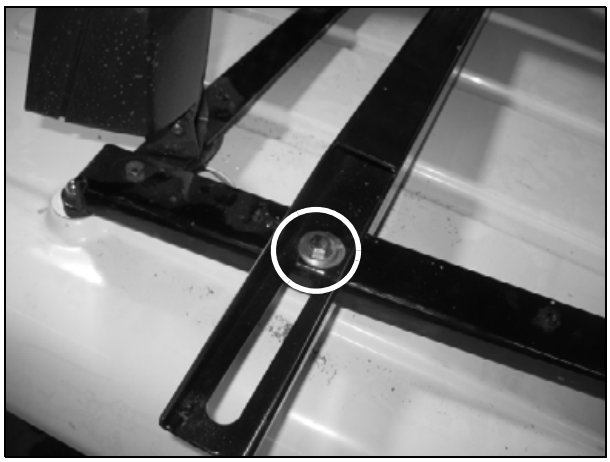


Step 2

If required, replace the existing bolts with longer bolts.



If you use the light bracket, drill two holes to match the spar width.



Step 3

Use the slotted holes to center the spar and then tighten the bolts. If required, use the spacers and flat washers provided to secure the spar.

Note – *If the receiver is offset to the left or the right of the vehicle, Autopilot system performance may be affected. Before you tighten the cab bolts, make sure that the GNSS antenna is aligned with the center of the vehicle.*

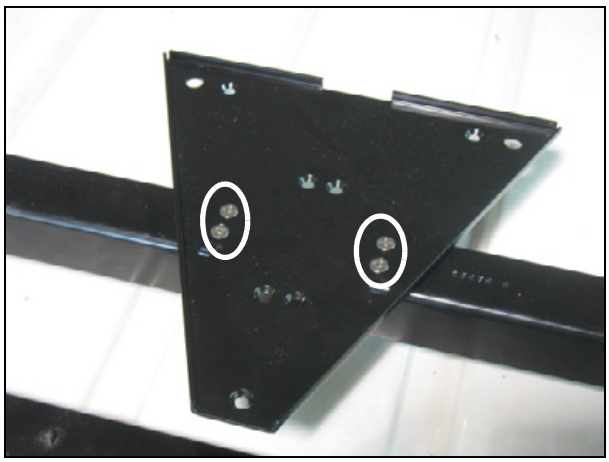
Step 4

For either of the following applications:

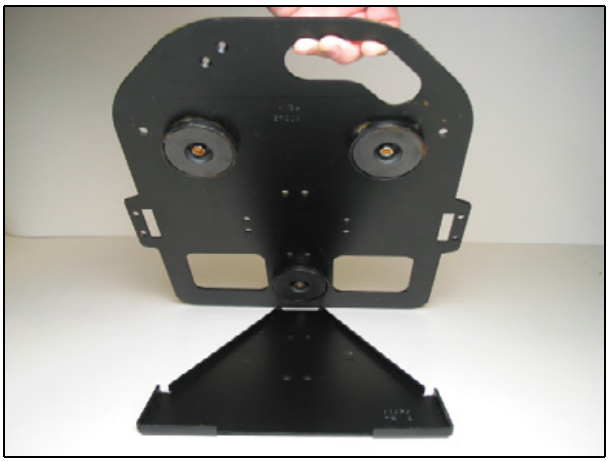
- A single magnet antenna mount
- An *Ag*GPS 262/ AG-372 receiver with magnetic option for quick removal

Attach a V plate with four ¼" flathead screws.

The narrow end points to the front of the vehicle.



V plate on the spar



Magnetic mount on the V plate

If you use a standard *Ag*GPS 262/ AG-372 plate for permanent mounting, install the radio antenna first. Use four ¼" flathead screws to attach the plate, with the handle toward the back of the vehicle.

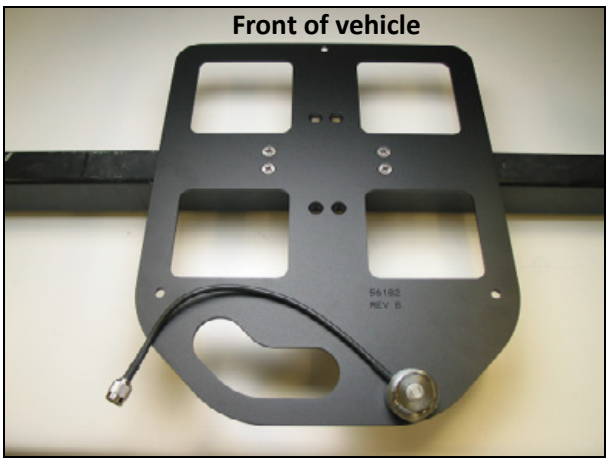


Plate on the spar

Attaching the plate with VHB adhesive

WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

Standard 4" x 6" plates are provided in most kits. You can use the VHB mounting method to attach either a 4" x 6" plate or a V plate.

- **RTK, OmniSTAR, DGPS, GLONASS applications**: To use this method for high accuracy, the surface must be rigid and free of “oil panning”. For RTK or OmniSTAR HP corrections, the spar method is recommended. The V plate provides repeatable positioning of the antenna.
- **WAAS, EGNOS, OmniSTAR VBS, Beacon applications:** Use a 4" x 6" plate for simplified installation in applications where high accuracy is not critical.

Step 1

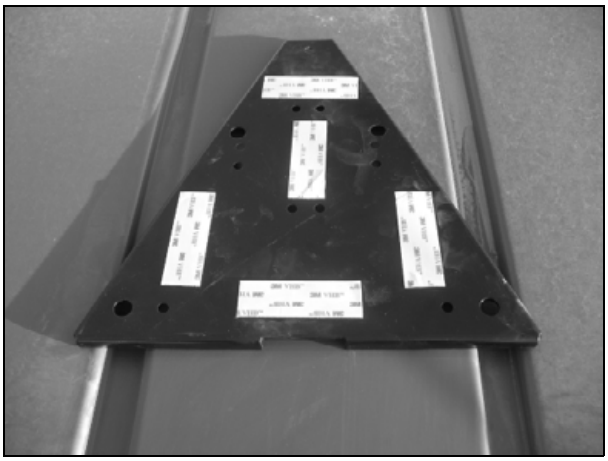
Clean the antenna location on the roof of the cab with a light solvent to remove oil and dust. Apply force to the roof to find a firm location.

Step 2

V plate only

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

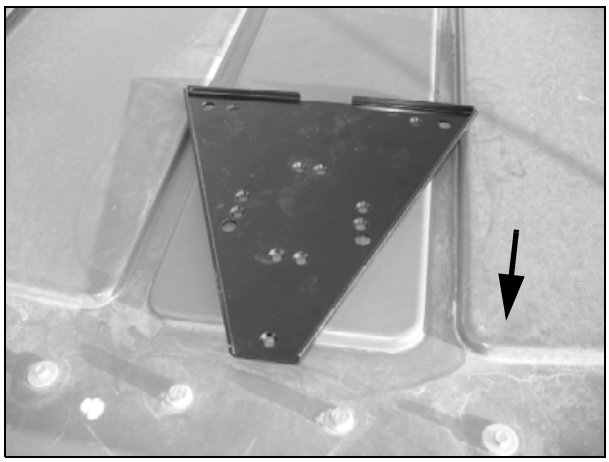
Note – *The VHB strips are pre-applied to the 4" x 6" plate.*



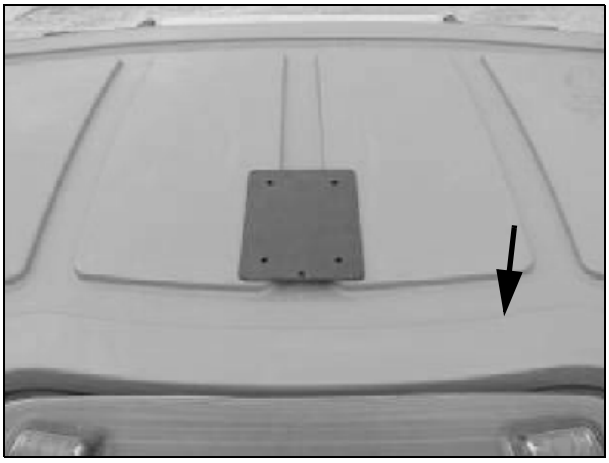
Step 3

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

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

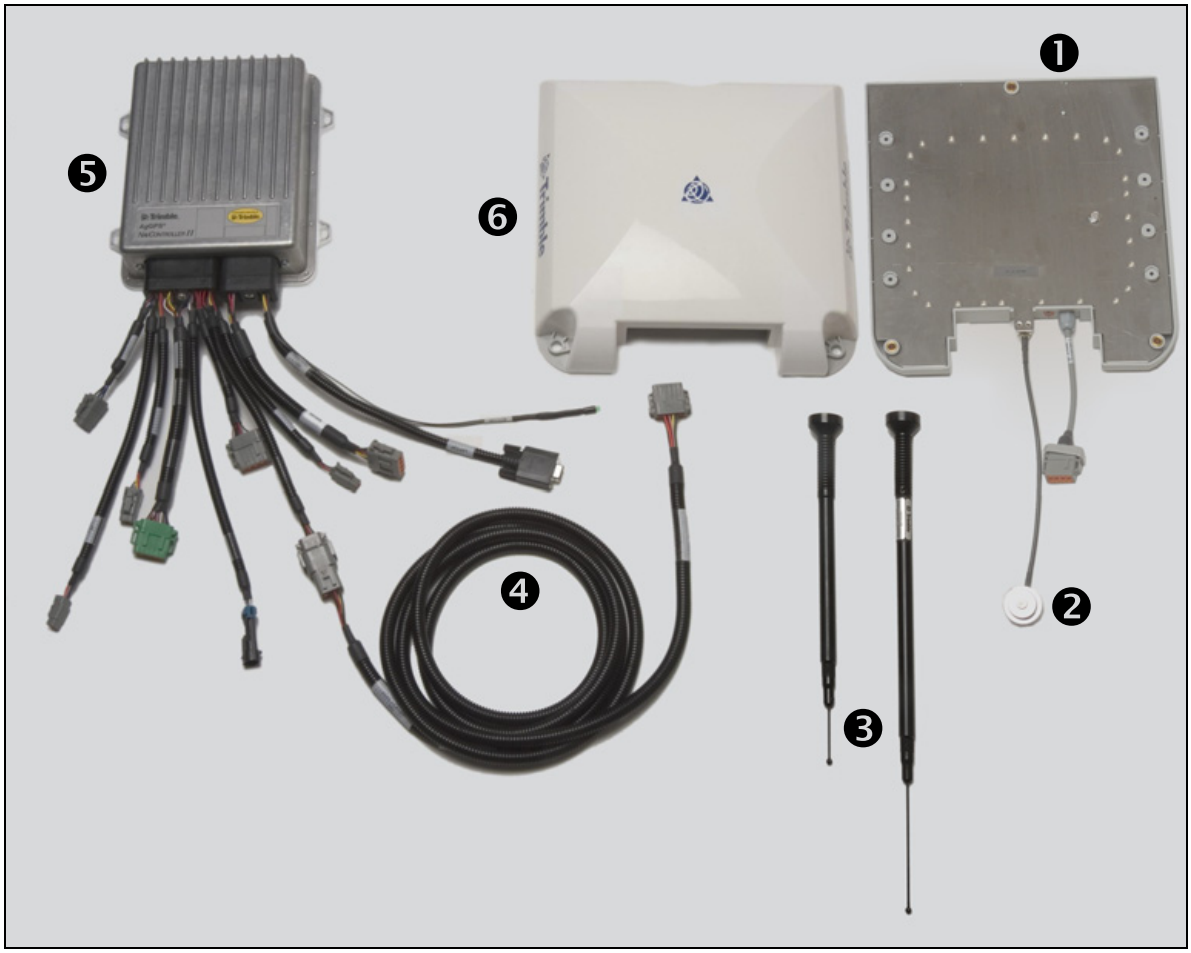


V plate



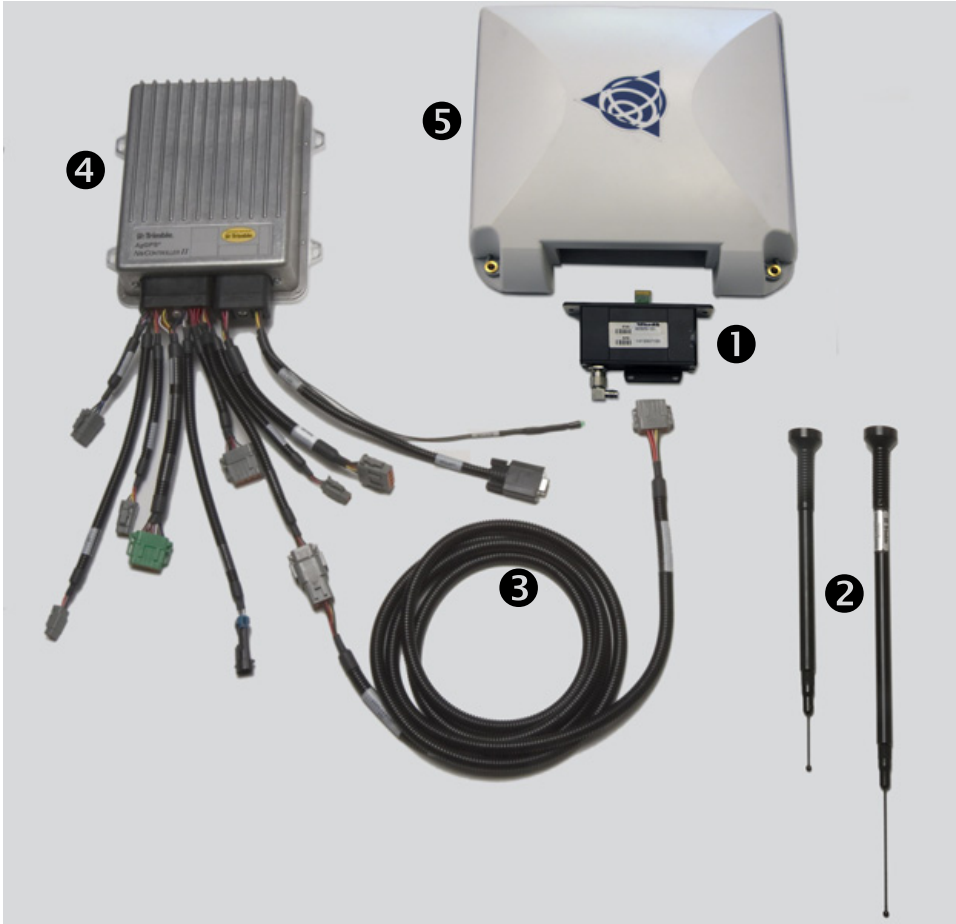
4" x 6" plate

*Ag*GPS 262 GPS receiver with *Ag*GPS 450/900 radio module (if equipped) components



Item	Description	Trimble part number
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	54608
❺	*Ag*GPS Autopilot controller	
❻	*Ag*GPS 262 antenna/receiver	

AG-372 GPS receiver with *Ag*GPS 450/900 radio module (if equipped) components



Item	Description	Trimble part number
❶	*Ag*GPS 450 or 900 radio (if equipped)	
❷	*Ag*GPS 450 or 900 radio antenna	
❸	Antenna/receiver cable	54608
❹	Autopilot controller	
❺	AG-372 antenna/receiver	

Installing the *Ag*GPS 262 GPS / AG-372 receiver with *Ag*GPS 450/900 radio module (if equipped)

WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

To attach the *Ag*GPS 262 receiver plate to the cab roof, do one of the following:

- For a removable installation, attach a V plate to a spar and then stick the receiver plate to the V plate with magnets.
- For a permanent installation, bolt the receiver plate to a spar.

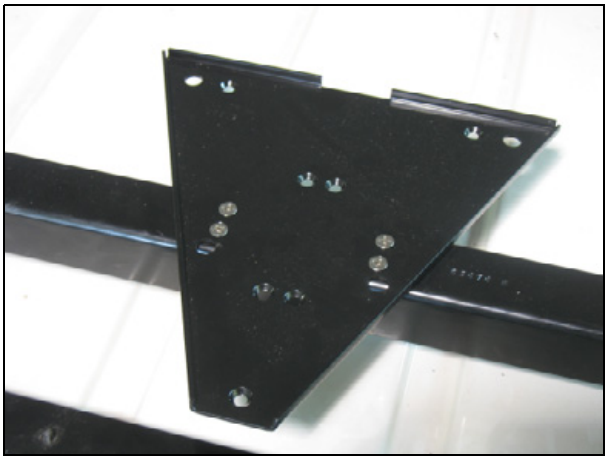
Removable installation

Step 1

V plate

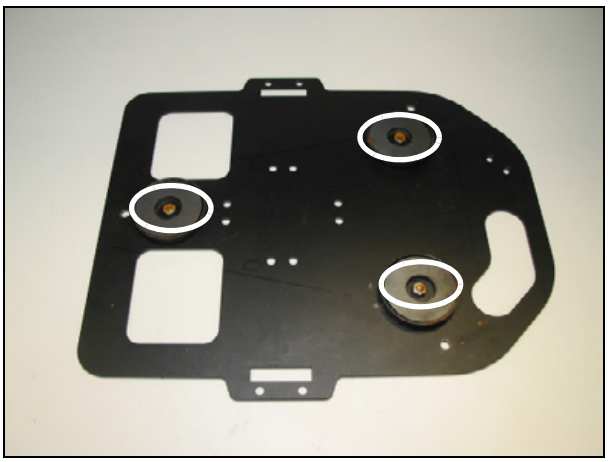
Attach the V plate to the spar using the ¼" flathead screws provided in the V plate bolt kit. Ensure that the narrow end points forward.

For spar mounting instructions, see page 27.



Mounting plate

Attach the three provided magnets to the plate with the ¼" flathead screws and hardware provided.



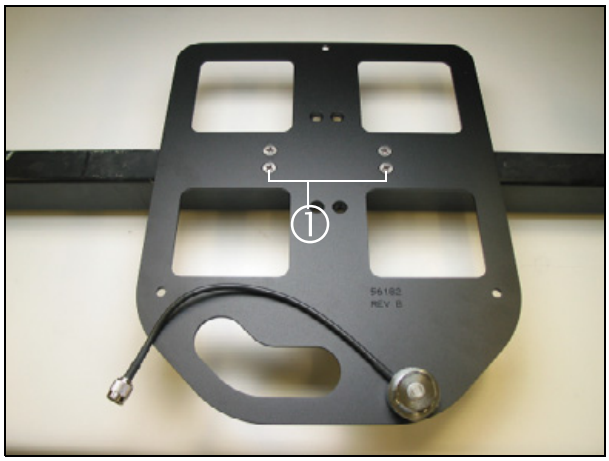
Underside of plate

Permanent installation

Step 1

Use the four provided ¼" flathead screws ❶ to attach the receiver mounting bracket to the spar.

For spar mounting instructions, see page 27.

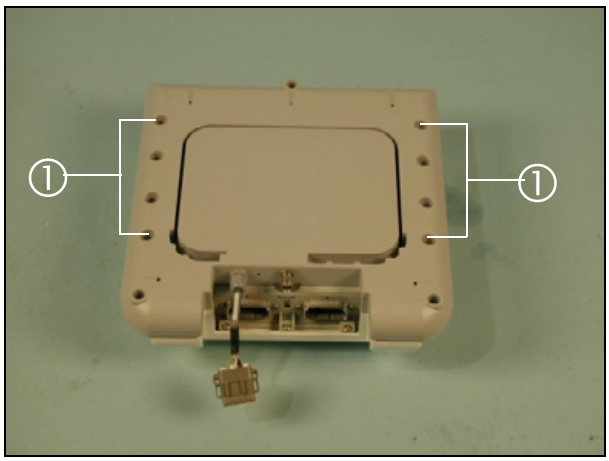


Step 2

Both installation methods

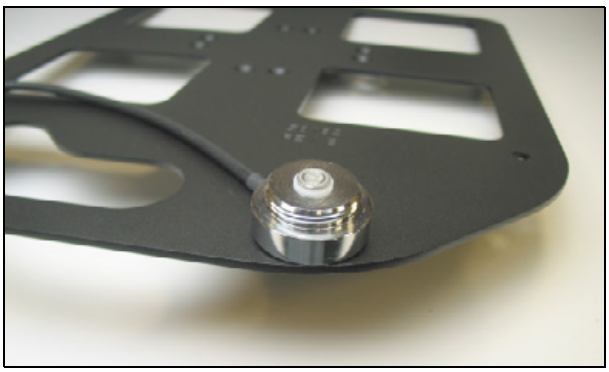
Place the radio module on the *Ag*GPS 262 receiver. Secure it with the eight screws in the positions shown ❶.

For the AG-372 receiver, insert the radio as shown in the *AG-372 Receiver User Guide*.



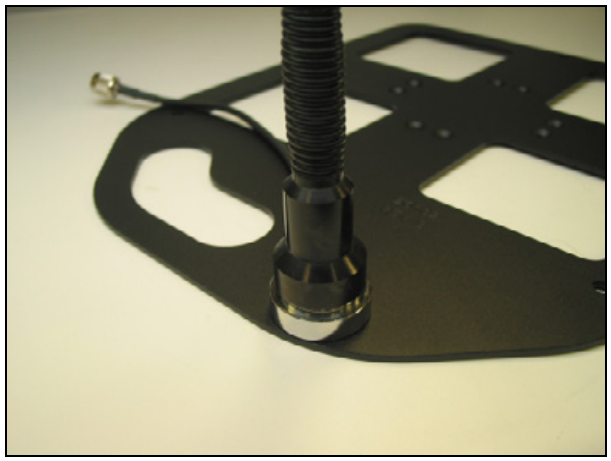
Step 3

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



Step 4

Attach the radio antenna to the antenna base.



Step 5

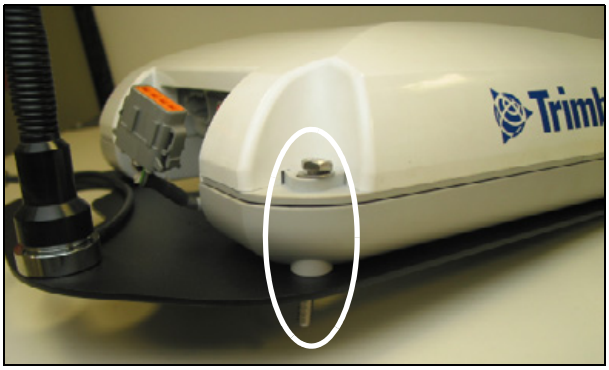
Position the *Ag*GPS 262 / AG-372 receiver and radio on the mounting plate with the connector ports facing the radio antenna. Align the three bolt holes with the receiver, radio, and mounting plate.

Step 6

Insert the nylon bushings provided.

Step 7

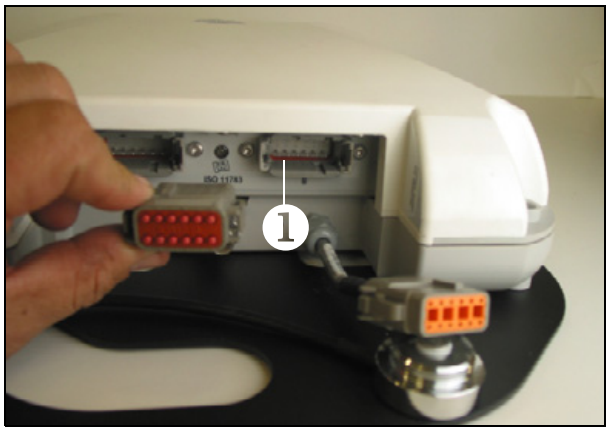
Insert the bolts through the receiver, radio, and mounting bracket. Place nuts on the bolt ends and then tighten them.



Step 8

AgGPS 262 receiver only

Remove the connector plug from port B ❶.



Step 9

AgGPS 262 receiver only

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

Step 10

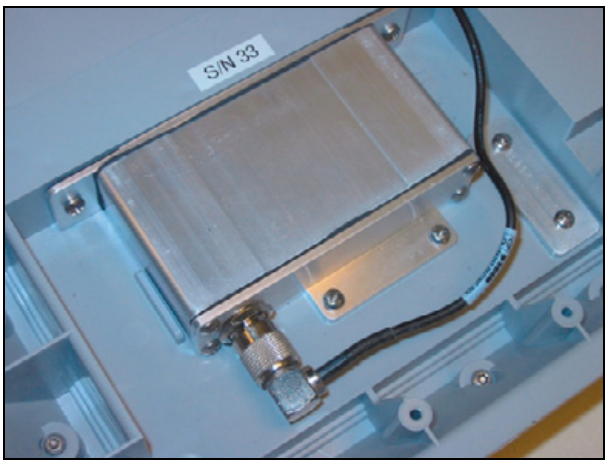
AgGPS 262 receiver only

Connect the radio antenna to the antenna port.

Step 11

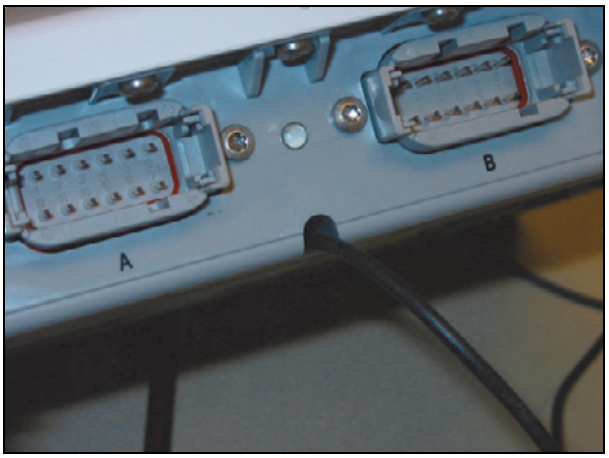
AG-372 receiver only

Attach the radio antenna to the internal radio. Route the cable as shown.



Route the cable through the cable pass as shown.

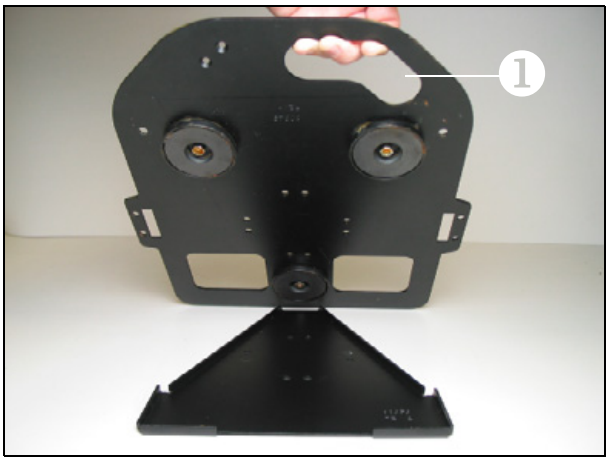
Run the cable out to RTK antenna.



Step 12

Magnet method

Place the receiver on the roof by aligning the magnets with the V plate. Ensure that the handle ❶ is toward the back of the vehicle.

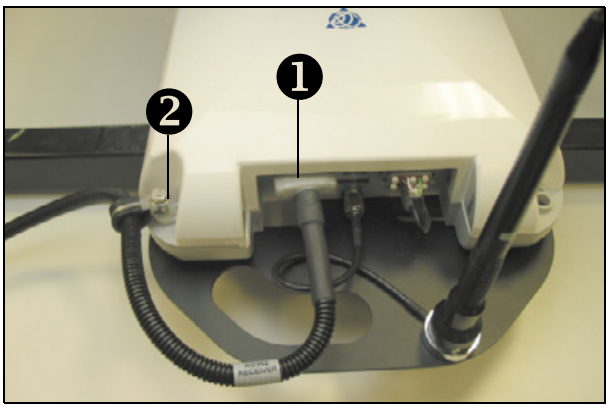


Step 13

Both methods

Connect the cable from the cab controller into port A ❶ of the *Ag*GPS 262 / AG-372 receiver. Bolt the cable clamp ❷ to the left side of the receiver.

Route the cable into the cab and into the controller.



Installing an *Ag*GPS 262 / AG-372 receiver with magnetic feet

WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

Use this option only when all other options are unavailable. It requires a firm surface for mounting to avoid vertical vibration and is not an easily repeatable location when moving receivers. Many cabs do not offer roof bolts; you may need to drill or to construct a firm location.

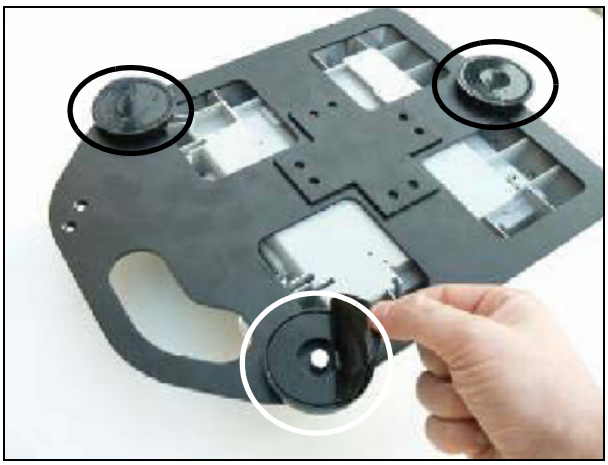
Step 1

Attach the magnets to the receiver mounting plate. Mount the *Ag*GPS 262 / AG-372 GPS receiver using the three ¼" bolts.

Place the nuts on the receiver side.

Step 2

Turn the mounting plate upside down. Stick the covers onto the magnets as shown.

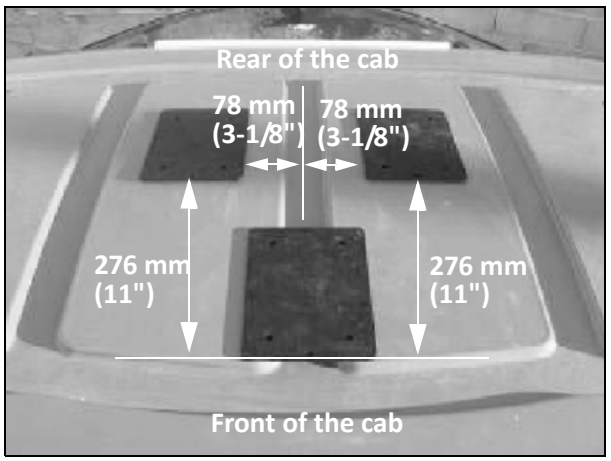


Step 3

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

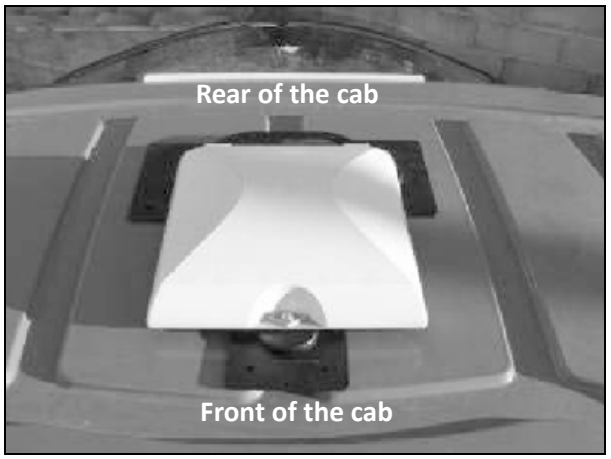
Remove the backing from the VHB strips and then apply the plates to the cab roof.

Attach the three mounting plates so that the receiver is as firm as possible.



Step 4

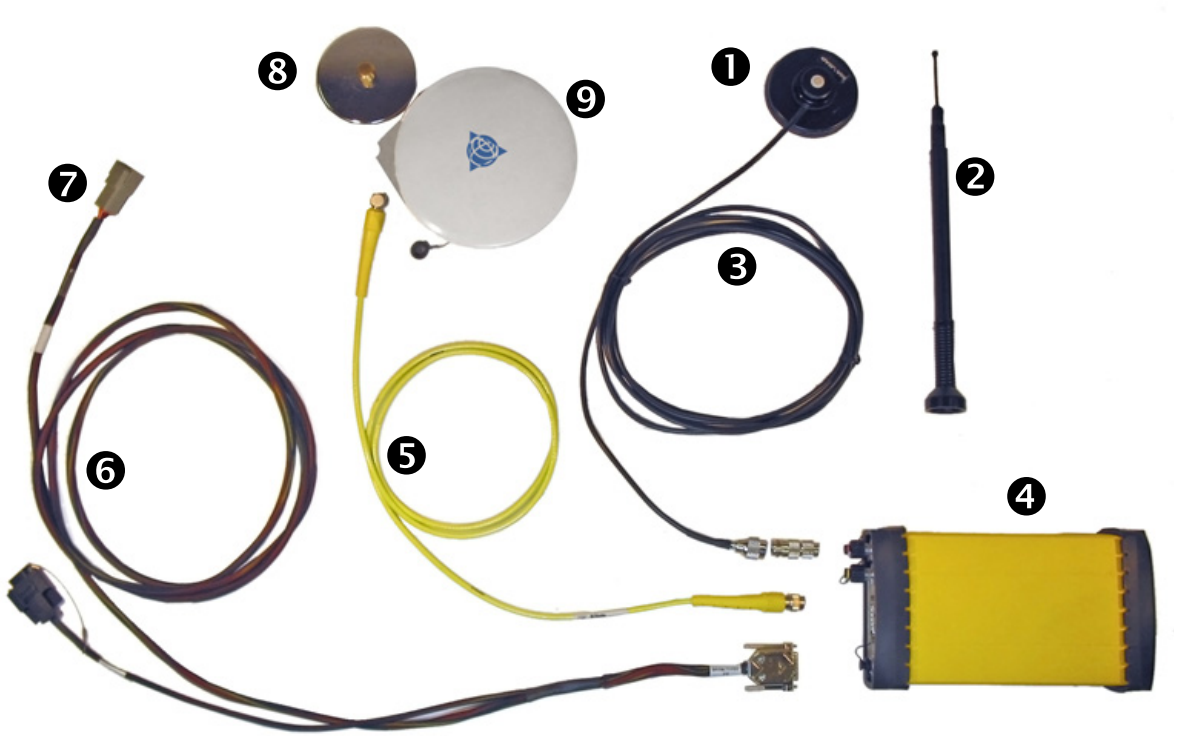
Stick the antenna magnetic mounts at the center of the mounting plates.



Step 5

Connect the antenna cable to port A of the *Ag*GPS 262 / AG-372 GPS receiver and then route the cable toward the NavController II harness.

*Ag*GPS 432 / 442 / 542 receiver components



Item	Description	Trimble part number
❶	Radio antenna magnetic base	
❷	Radio antenna	
❸	Radio antenna cable	
❹	*Ag*GPS 432/442 GPS receiver	
❺	Antenna cable	
❻	Receiver cable	62037
❼	To controller “P3 GPS”	
❽	Antenna magnetic mount	
❾	*Ag*GPS 432/442/542 antenna	

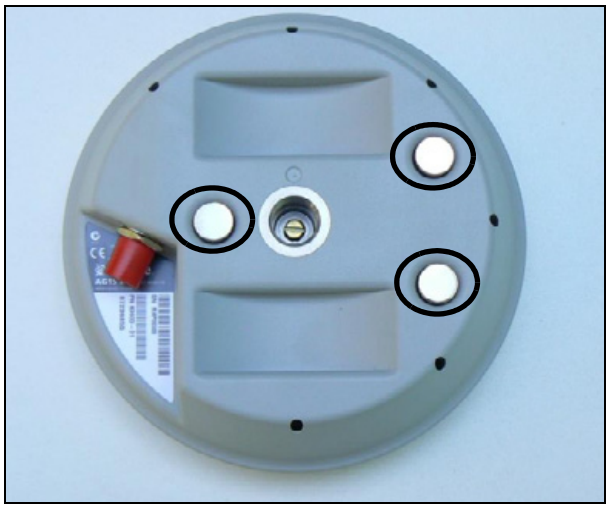
Installing the *Ag*GPS 432 / 442 / 542 receiver

WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

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

RTK, OmniSTAR, DGPS, GLONASS applications

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

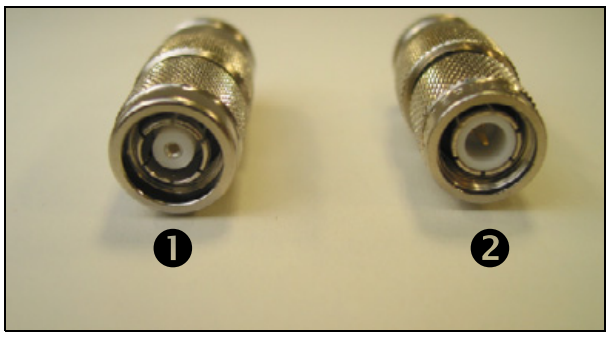
Mount the receiver in a convenient location in the cab. Route the antenna cable to the receiver and then connect it.

Step 5

Identify the correct adaptor for the radio connection:

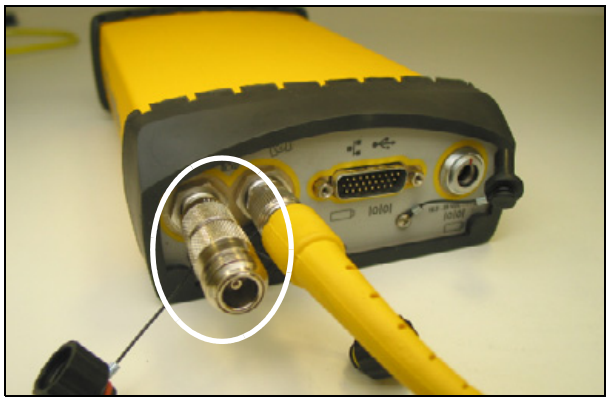
❶ Reverse polarity TNC-to-N for 900 MHz radios

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



Step 6

Attach the adaptor to the radio port.

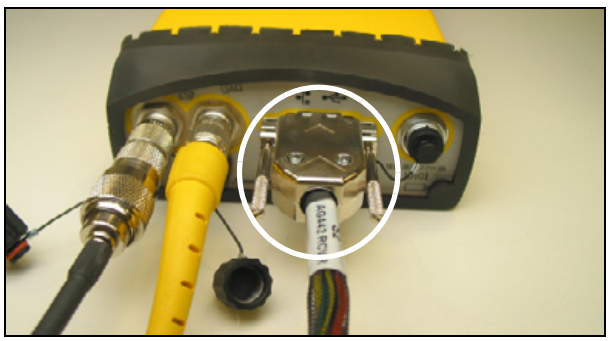


Step 7

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 in Chapter 8, Controller Installation.

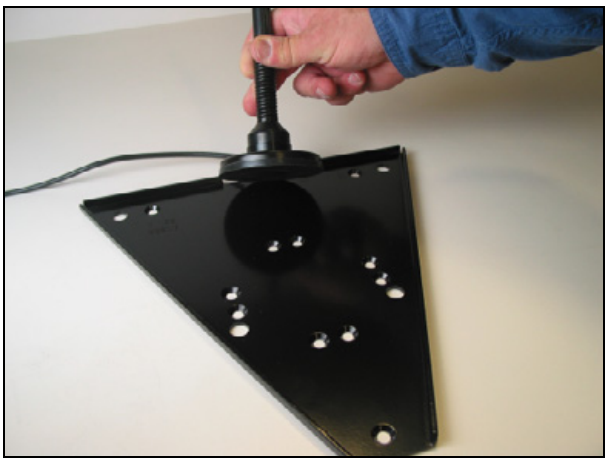


Step 9

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" x 6" plate with the VHB provided to relocate the antenna.



CHAPTER

5

Display Installation

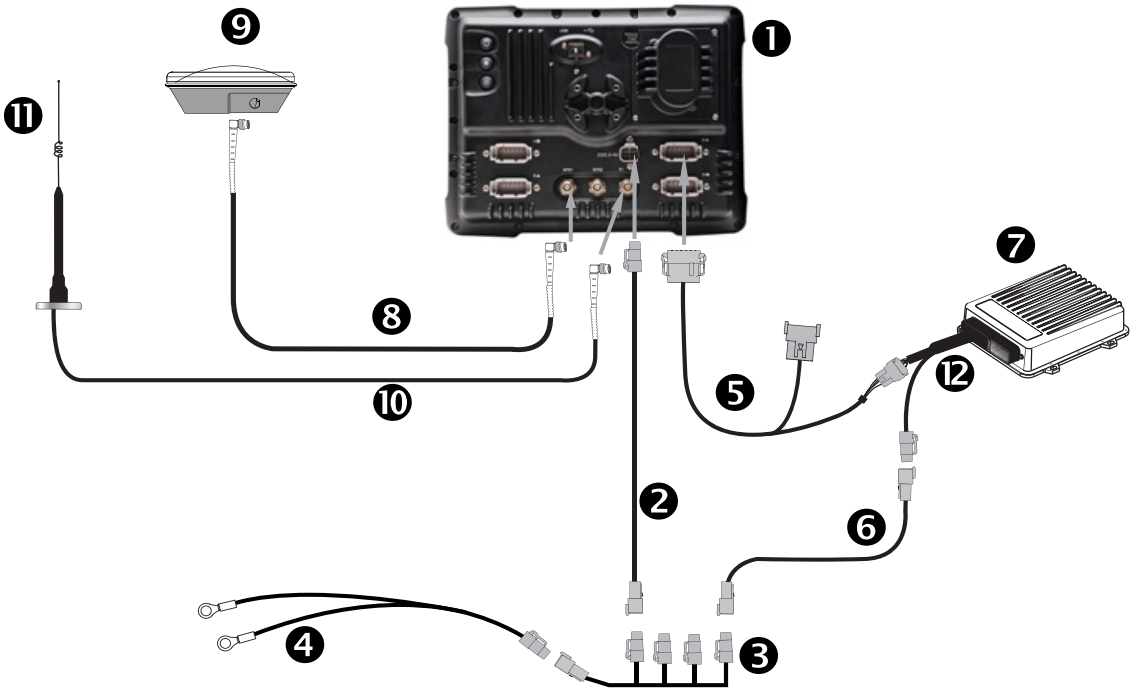
In this chapter:

- FmX integrated display components
- CFX-750 display components
- EZ-Guide 500 lightbar components: With SNB900 radio for RTK corrections (if equipped)
- Preparing the FmX integrated display
- Installing the FmX integrated display
- FmX integrated display: Installing the wiring harness
- Preparing the CFX-750 display
- Installing the CFX-750 display
- CFX - 750 display: Installing the wiring harness
- FmX integrated display and CFX-750 display: Connecting accessory options
- Preparing the EZ-Guide 500 lightbar
- Connecting the EZ-Guide 500 lightbar cables
- Installing the EZ-Guide 500 lightbar
- EZ-Guide 500 lightbar, and CFX-750 and FmX displays: Installing the GNSS antenna and plate
- EZ-Guide 500 lightbar, and CFX-750 and FmX displays: Installing the RTK radio antenna

This chapter describes and how to install and connect the FmX integrated display, CFX-750 display, or the EZ-Guide 500 lightbar in the vehicle.

Note – *Unless otherwise stated, instructions for "the display" refer to either the FmX integrated display or the CFX-750 display.*

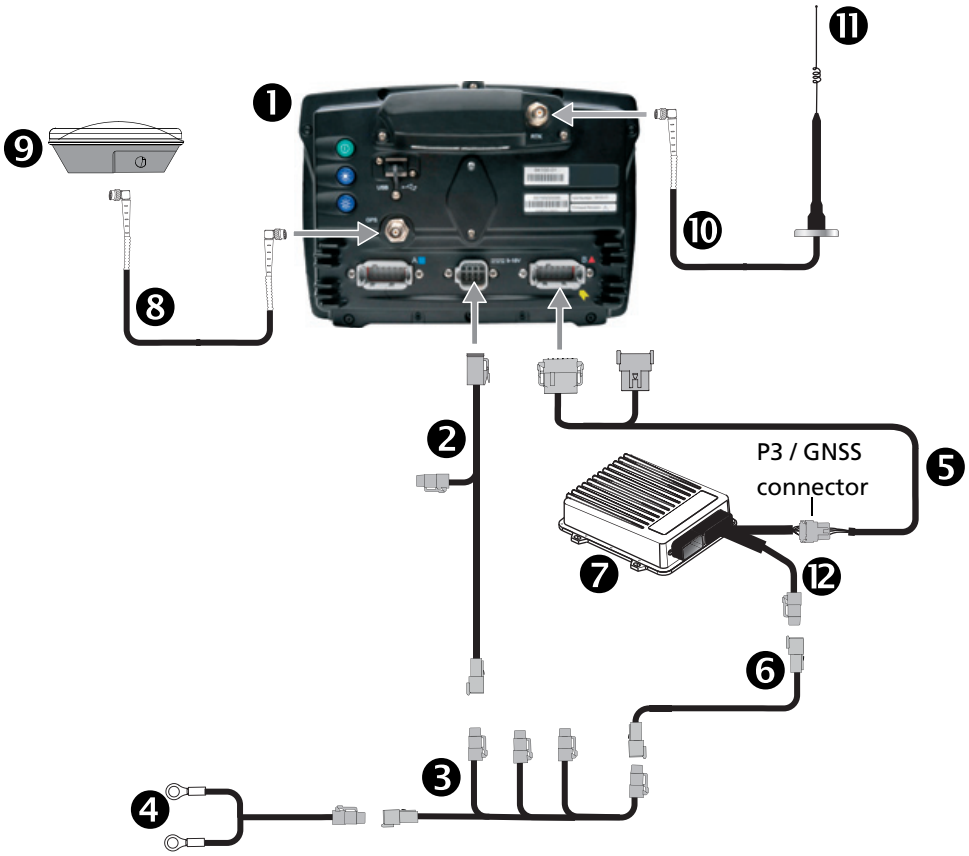
FmX integrated display components



CAUTION – Connecting the Port Replicator on the FmX to NavController II cable ❺ to the P4 or P12 connector of the NavController II harness ⓬ will result in damage to the FmX / FM-1000 integrated display, and will void the warranty.

Item	Description	Trimble part number
❶	FmX integrated display	93100-02
❷	FmX power cable	66694
❸	FmX power cable with relay and switch (power bus)	67259
❹	Basic power cable	67258
❺	FmX to NavController II cable with port replicator	75741
❻	2 pin DTM to 2 pin DT power adaptor	67095
❼	NavController II	55563-00
❽	8 m GNSS TNC/TNC RT angle cable	50449
❾	AG25 GNSS antenna	77038-00
❿	NMO to TNC 20ft antenna cable and base	62120
⓫	900 MHz radio antenna kit	22882-10
⓬	Main NavController II cable	54601

CFX-750 display components

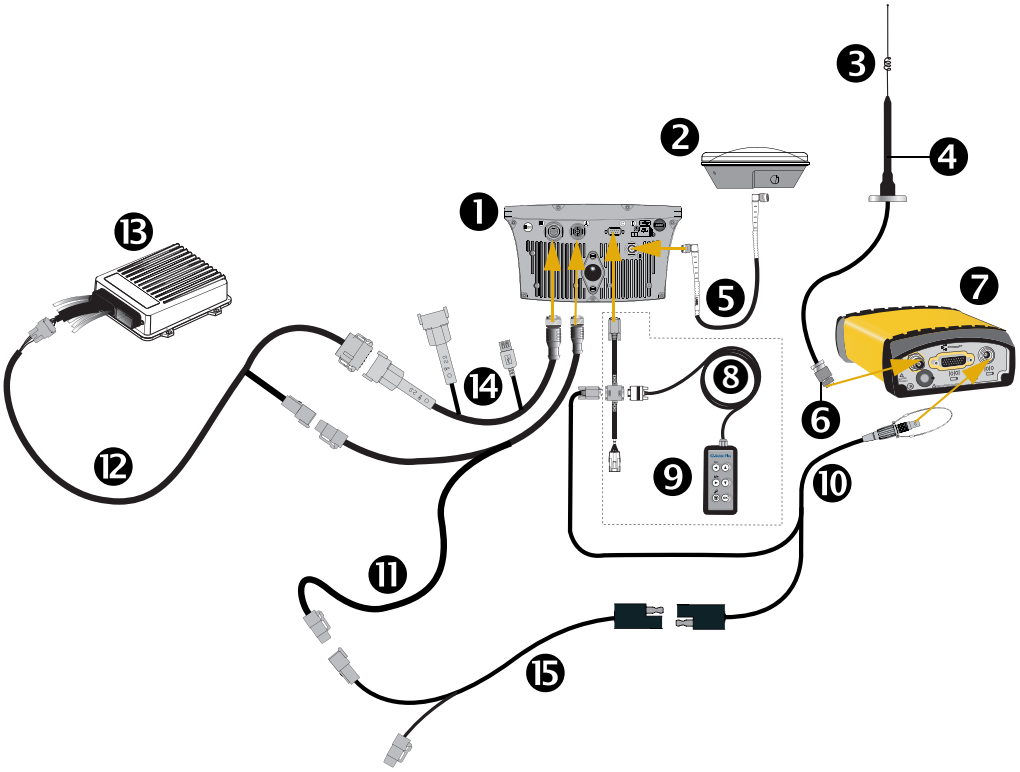


CAUTION – Connecting the Port Replicator on the CFX-750 display to NavController II cable ❺ to the P4 or P12 connector of the NavController II harness ⓬ will result in damage to the CFX-750 display and will void the warranty.

Item	Description	Trimble part number
❶	CFX-750 display ***Note –*** *RTK password required.*	94100-01
❷	CFX-750 power cable	77282
❸	CFX-750 power cable with relay and switch (power bus)	67259
❹	Basic power cable	67258
❺	CFX-750 to NavController II cable with port replicator	75741
❻	2 pin DTM to 2 pin DT power adaptor	67095
❼	NavController II	55563-00
❽	8 m GNSS TNC/TNC RT angle cable	50449
❾	AG25 GNSS antenna	77038-00

Item	Description	Trimble part number
⑩	NMO to TNC 20ft antenna cable and base	62120
⑪	900 MHz radio antenna kit	22882-10
⑫	Main NavController II cable	54601

EZ-Guide 500 lightbar components: With SNB900 radio for RTK corrections (if equipped)



Item	Description	Trimble part number
❶	EZ-Guide 500 lightbar	
❷	GNSS antenna	57200-00
❸	SNB900 radio antenna	22882-00
❹	SNB900 radio antenna magnetic mount	62109
❺	GNSS antenna cable	50449
❻	N Female to REV. POL TNC Male	62114
❼	SNB900 radio	X8480-X0
❽	Remote keypad (optional)	66030-00
❾	External interface cable	62749
❿	Radio power/data cable	61158
⓫	EZ-Guide 500 power cable	62817
⓬	EZ-Guide 500-to-Autopilot cable	62754
⓭	NavController II	55563-00

Item	Description	Trimble part number
⓮	Port expansion cable	62609
⓯	Power tap to PDL radio	63185

Preparing the FmX integrated display

Step 1

Locate the FmX integrated display, the RAM mount, and the RAM mount clamp.

Step 2

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

Step 3

Attach the RAM mount to the rear of the display.

Installing the FmX integrated display

WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

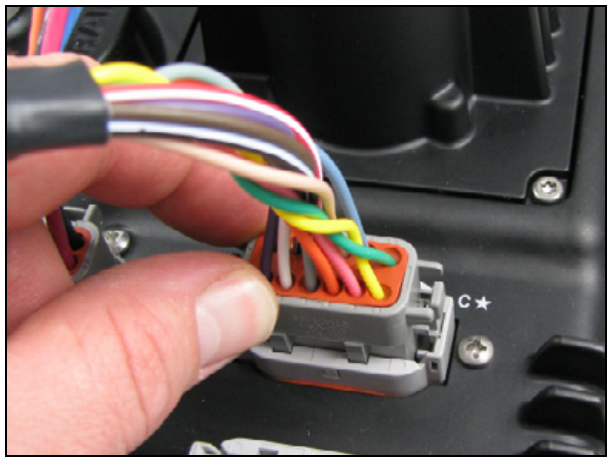
Step 1

Decide where you will mount the display in the vehicle cab and then use the provided bolts to attach the bar mount to the rail. Attach the free end of the RAM mount to the bar mount and then tighten the clamp on the RAM mount so that the display is secure.

Step 2

Connect the cable to the C port of the FmX integrated display.

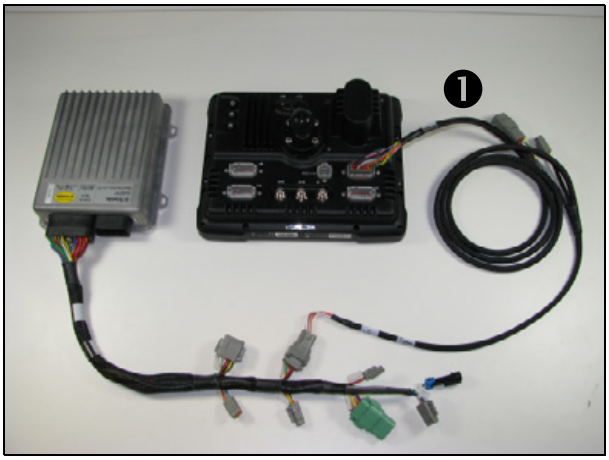
To connect power to the FmX integrated display, see Chapter 6, Power Harness Installation.



FmX integrated display: Installing the wiring harness

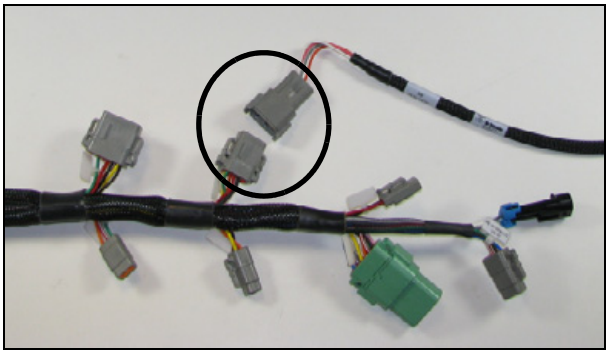
Step 1

Locate the cable that connects the FmX integrated display to the NavController II ❶.



Step 2

Connect the cable to the P3 connector on the NavController II main harness, and then route the cable from the NavController II to the mounting location on the FmX integrated display.



Preparing the CFX-750 display

Step 1

Locate the CFX-750 display, the RAM mount, and the RAM mount clamp.

Step 2

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

Step 3

Attach the RAM mount to the rear of the display.

Installing the CFX-750 display

WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

Step 1

Decide where you will mount the display in the vehicle cab and then use the provided bolts to attach the bar mount to the rail.

Attach the free end of the RAM mount to the bar mount and then tighten the clamp on the RAM mount so that the display is secure.

Step 2

Connect the cable to the B port of the CFX-750 display.

To connect power to the CFX-750 display, see Chapter 6, Power Harness Installation.

CFX - 750 display: Installing the wiring harness

Step 1

Locate the cable that connects the CFX-750 display to the NavController II.

Step 2

Connect the cable to the P3 connector on the NavController II main harness and then route the cable from the NavController II to the mounting location on the CFX-750 display.

FmX integrated display and CFX-750 display: Connecting accessory options

Note – *Unless otherwise stated, "the display" applies to FmX integrated display or the CFX-750 display.*

AgCam

The AgCam and AgCam cable are accessory items that you can purchase separately from the display. The FmX integrated display allows for up to four video inputs; the CFX-750 display allows up to two.

Step 1

Locate the AgCam and AgCam cable.

Step 2

Mount the AgCam in a secure location and then route the cable towards the display.

FmX display

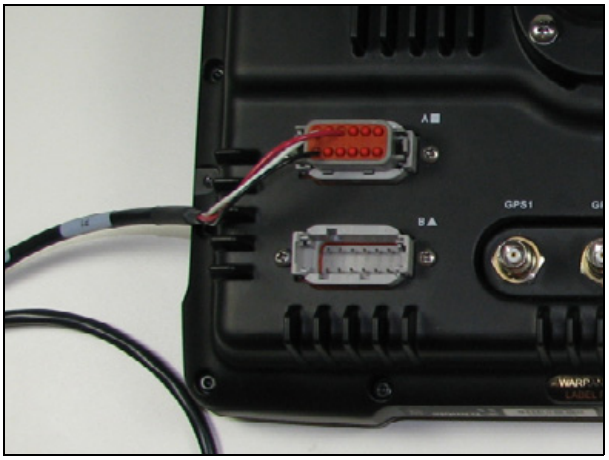
CFX-750 display

Step 3

Connect the AgCam cable to the display adaptor cable.

Step 4

Connect the display to AgCam adaptor cable to one of the open 12 pin connectors on the back of the display.



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

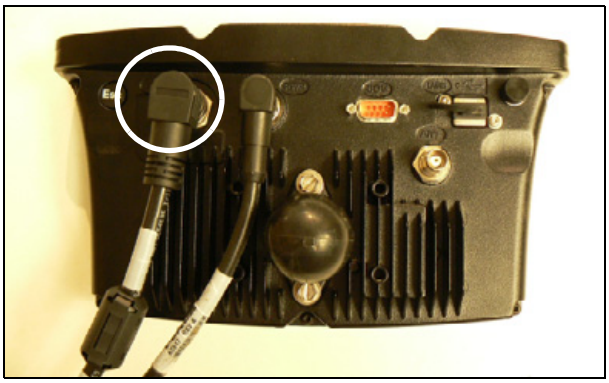
Attach the RAM mount diamond base to the display using the hardware provided.

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.*

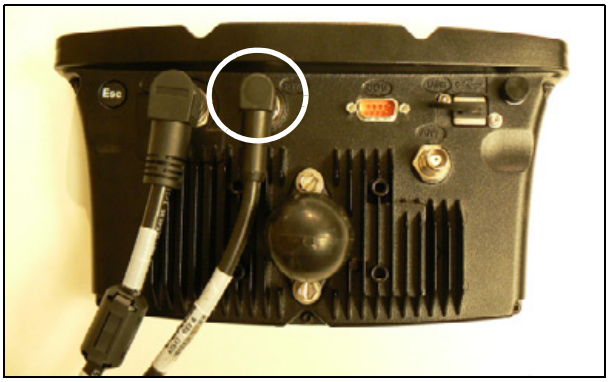
Step 1

Connect the port expansion cable (P/N 62609) to the AUX port on the back of the lightbar.



Step 2

Connect the EZ-Guide 500 power cable (P/N 62817) to the PWR port on the back of the lightbar.

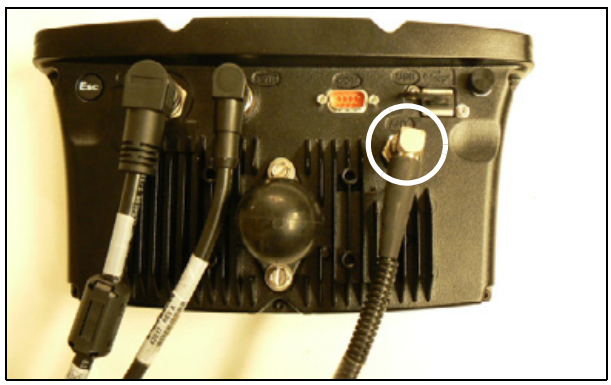


Step 3

Connect the 2-pin connector on the port expansion cable and the 12-pin connector on the power cable to the matching connectors on the EZ-Guide 500-to-Autopilot cable (P/N 62754).

Step 4

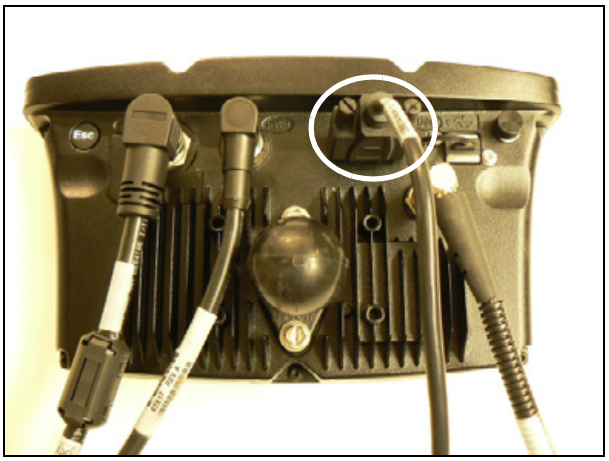
Feed the GNSS antenna cable into the cab and then connect it to the antenna port on the back of the lightbar.



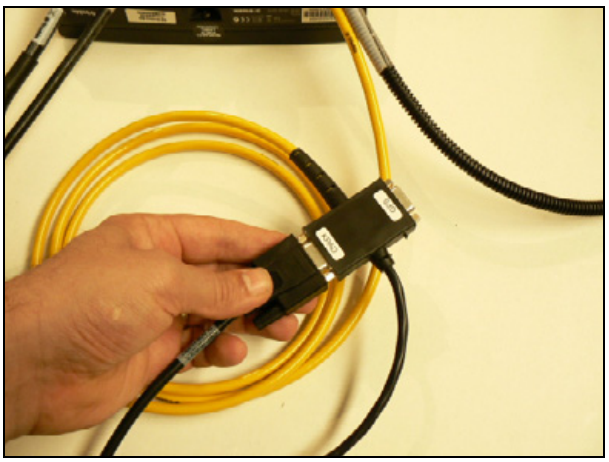
Step 5

With keypad

Connect the external interface cable (P/N 66030-00) to the serial port on the back of the lightbar.

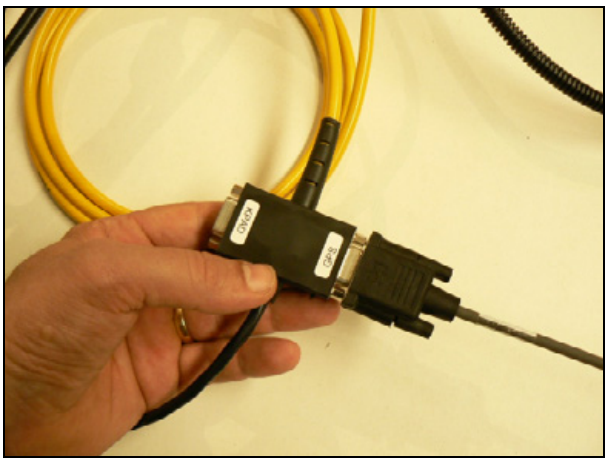


Connect the remote keypad to the KPAD serial port on the external interface cable.



Connect the appropriate cable to the GNSS serial port on the interface cable:

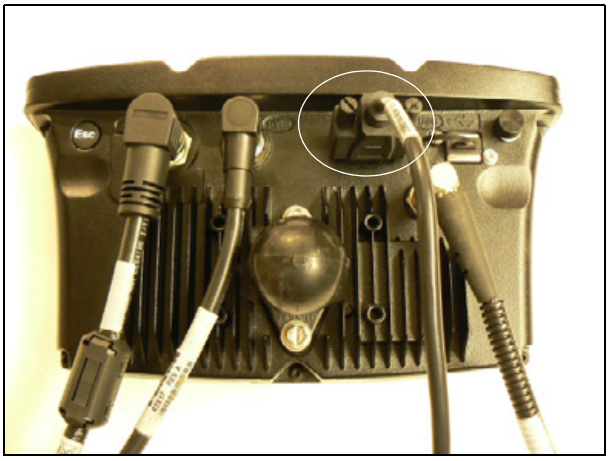
Radio type	Cable to connect
SNB900 radio	EZ-Guide 500-to-radio cable (P/N 61158)
PDL 450 radio	PDL radio power/data cable (P/N 51861-00)



Without keypad

Connect the appropriate cable to the serial port on the back of the lightbar:

Radio type	Cable to connect
SNB900 radio	EZ-Guide 500-to-radio cable (P/N 61158)
PDL 450 radio	PDL radio power/data cable (P/N 51861-00)



Step 6

Connect the other end of the radio cable to the radio.

Step 7

Connect the remaining connector on the PDL radio power/data cable to the matching connector on the power tap cable (P/N 63185).

Connect the connector at the other end of the power tap cable to the EZ-Guide 500 power cable.

Installing the EZ-Guide 500 lightbar

WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

Step 1

Test a location for the lightbar in the cab (there must be a bar that the RAM mount can be attached to); sit in the driver's seat and hold the lightbar in place.

Note – *Make sure the position allows comfortable access to the display buttons and does not obstruct instruments.*

Step 2

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

Step 3

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 and then adjust the angle of the RAM mount for ease of use.

EZ-Guide 500 lightbar, and CFX-750 and FmX displays: Installing the GNSS antenna and plate

WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

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

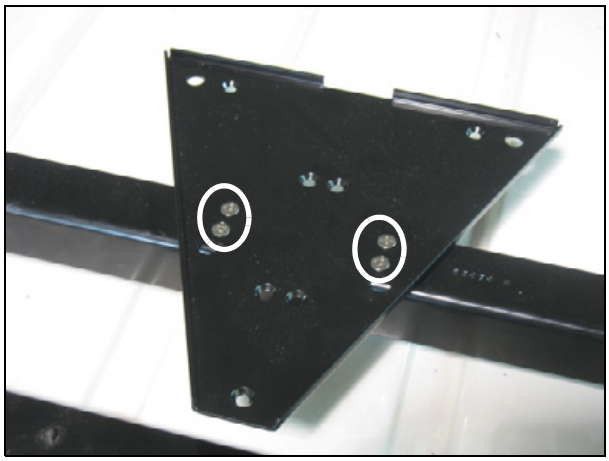
Use one of the following methods:

- Spar mount
- VHB adhesive

Spar mount method

Trimble recommends that you use this method for RTK and OmniSTAR operations. For more information, see Antenna and receiver installation options, page 26.

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



VHB adhesive method

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

- **RTK, OmniSTAR, DGPS, GLONASS applications:** To use this method for high accuracy, the surface must be rigid and free of “oil panning”. For RTK or OmniSTAR HP corrections, the spar method is recommended. The V plate provides repeatable positioning of the antenna.
- **WAAS, EGNOS, OmniSTAR VBS, Beacon applications:** Use a 4" x 6" plate for simplified installation in applications where high accuracy is not critical.

Step 1

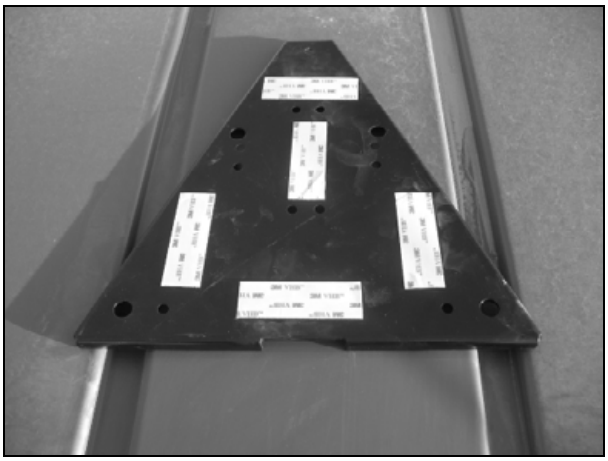
Clean the antenna location on the roof of the cab with a light solvent to remove oil and dust.

Step 2

V plate only

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

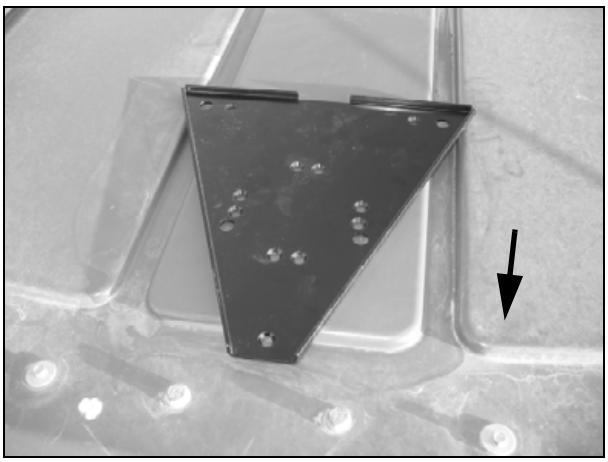
Note – *The VHB strips are pre-applied to the 4" x 6" plate.*



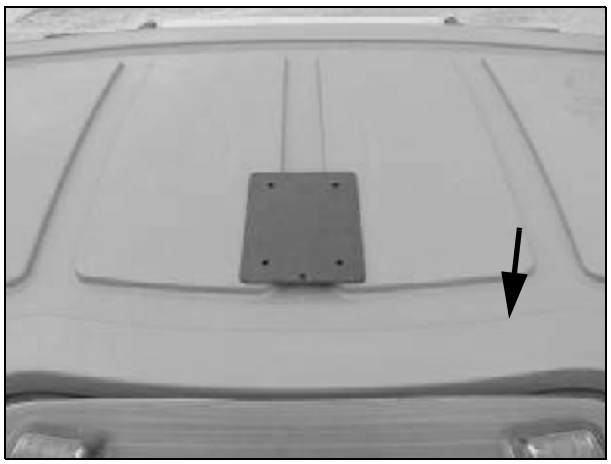
Step 3

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. Ensure 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.*



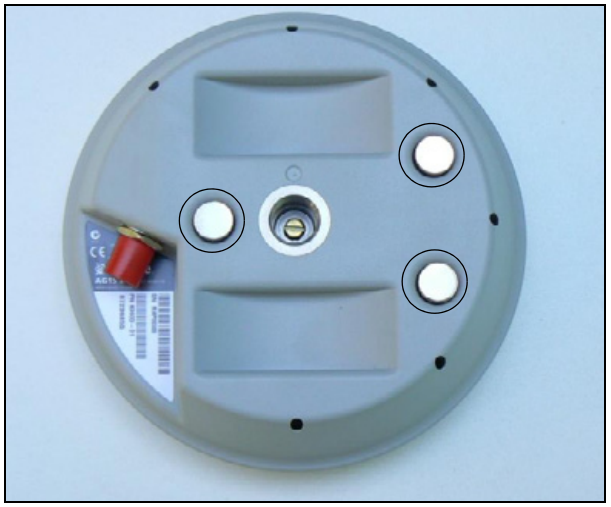
V plate



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 GNSS antenna.

Step 5

RTK, OmniSTAR, DGPS, GLONASS applications

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

WAAS, EGNOS, VBS, Beacon applications

Attach the antenna to the center of the 4" x 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, and CFX-750 and FmX displays: Installing the RTK radio antenna

WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

Step 1

Connect the radio antenna to the magnetic antenna base

Step 2

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

Step 3

Route cable from the vehicle roof into the cab, and connect the radio cable to the display.

CHAPTER

6

Power Harness Installation

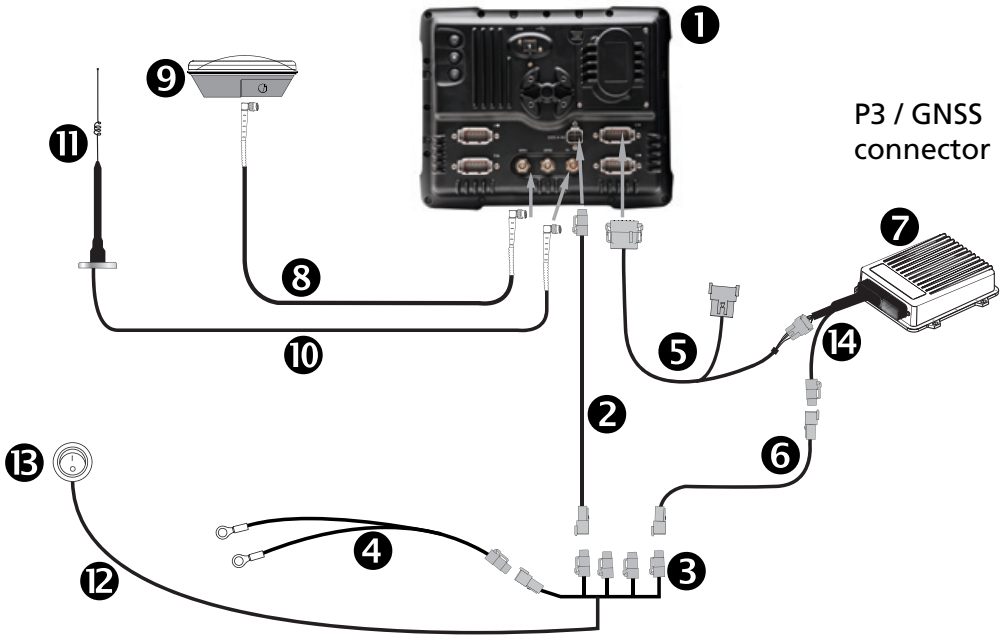
In this chapter:

- FmX integrated display components
- CFX-750 display components
- EZ-Guide 500 lightbar components
- Installing the power harness for the display
- Configuring the power bus options for the display
- Configuring the power bus options for the EZ-Guide 500 lightbar

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

Note – *Unless otherwise stated, instructions for "the display" refer to either the FmX integrated display or the CFX-750 display.*

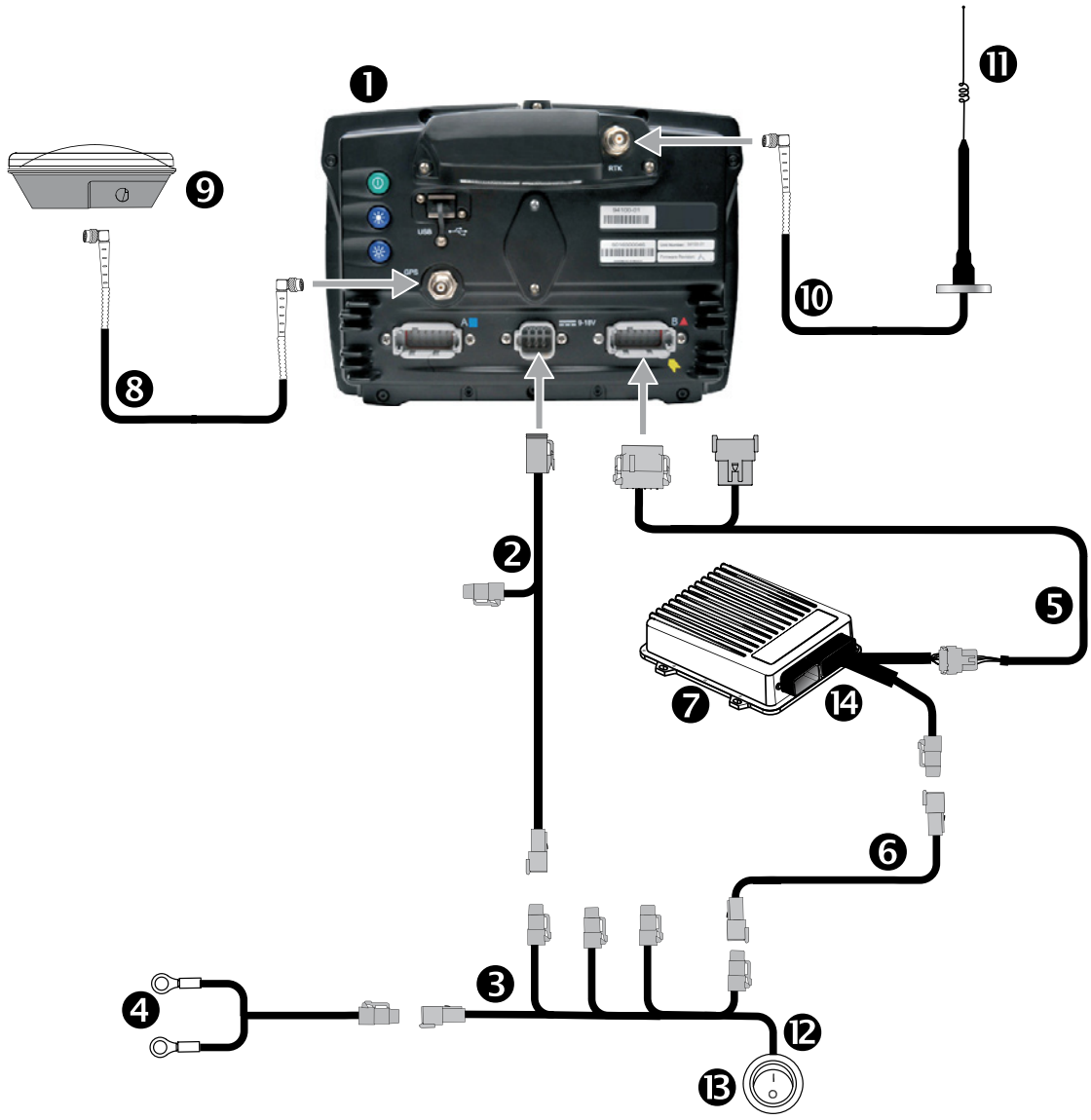
FmX integrated display components



CAUTION – Connecting the Port Replicator on the FmX to NavController II cable ❺ to the P4 or P12 connector of the NavController II harness ⓮ will result in damage to the FmX/FM-1000 integrated display, and will void the warranty.

Item	Description	Trimble part number
❶	FmX integrated display	93100-02
❷	FmX power cable	66694
❸	FmX power cable with relay and switch (power bus)	67259
❹	Basic power cable	67258
❺	FmX to NavController II cable with port replicator	75741
❻	2 pin DTM to 2 pin DT power adaptor	67095
❼	NavController II	55563-00
❽	8 m GNSS TNC/TNC RT angle cable	50449
❾	AG25 GNSS antenna	77038-00
❿	NMO to TNC 20ft antenna cable and base	62120
⓫	900 MHz radio antenna kit	22882-10
⓬	External switch cable included with kit	Part of P/N 67259
⓭	Switch	67095
⓮	NavController II harness	54601

CFX-750 display components

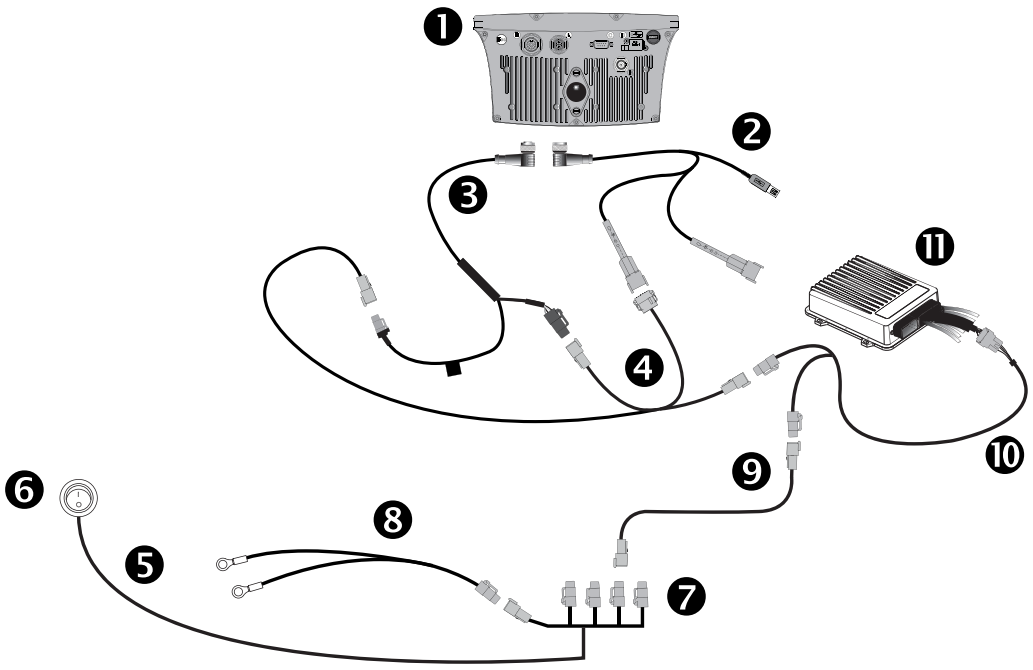


CAUTION – Connecting the Port Replicator on the CFX-750 display to NavController II cable ❺ to the P4 or P12 connector of the NavController II harness ⓮ will result in damage to the CFX-750 display and will void the warranty.

Item	Description	Trimble part number
❶	CFX-750 display ***Note –*** *RTK password required.*	94100-02
❷	CFX-750 power cable	77282
❸	CFX-750 power cable with relay and switch (power bus)	67259

Item	Description	Trimble part number
❹	Basic power cable	67258
❺	CFX-750 to NavController II cable with port replicator	75741
❻	2 pin DTM to 2 pin DT power adaptor	67095
❼	NavController II	55563-00
❽	8 m GNSS TNC/TNC RT angle cable	50449
❾	AG25 GNSS antenna	77038-00
❿	NMO to TNC 20ft antenna cable and base	62120
⓫	900 MHz radio antenna kit	22882-10
⓬	External switch cable included with kit	Part of P/N 67259
⓭	External switch included with kit	Part of P/N 67259
⓮	Main NavController II cable	54601

EZ-Guide 500 lightbar components



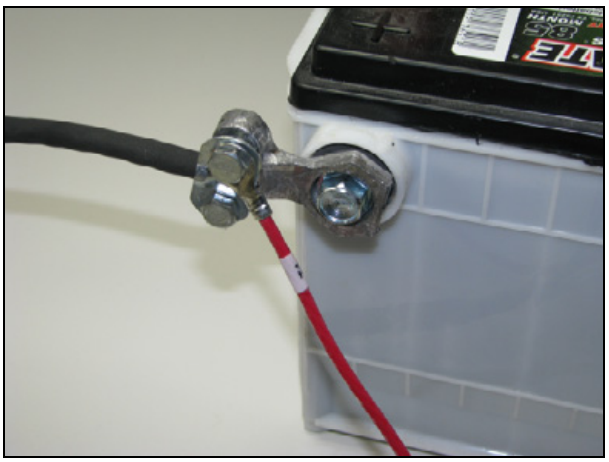
Item	Description	Trimble part number
❶	EZ-Guide 500 lightbar	
❷	EZ-Guide 500 lightbar 19 pin port expansion cable	62069
❸	EZ-Guide 500 lightbar/CAN 90° 5 pin connector	62817
❹	EZ-Guide 500 lightbar port A to NavController II cable	62754
❺	Switch cable	Part of 67259
❻	Switch	67095
❼	FmX power cable with relay and switch	67259
❽	FmX basic power cable	67258
❾	2 pin DTM to 2 pin 2 DT power adaptor	67095
❿	NavController II main cable	54601
⓫	NavController II	55563-00

Installing the power harness for the display

WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

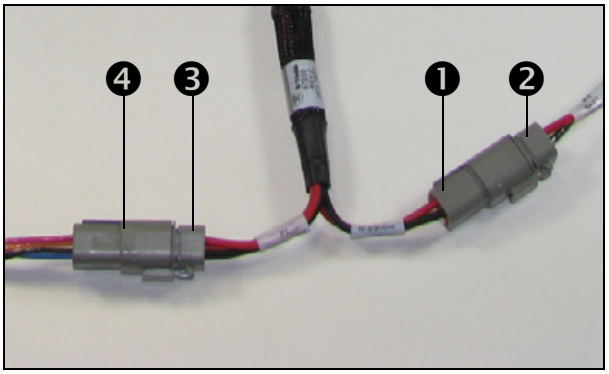
Step 1

Connect the basic power cable to the vehicle battery and then route the cable into the cab.



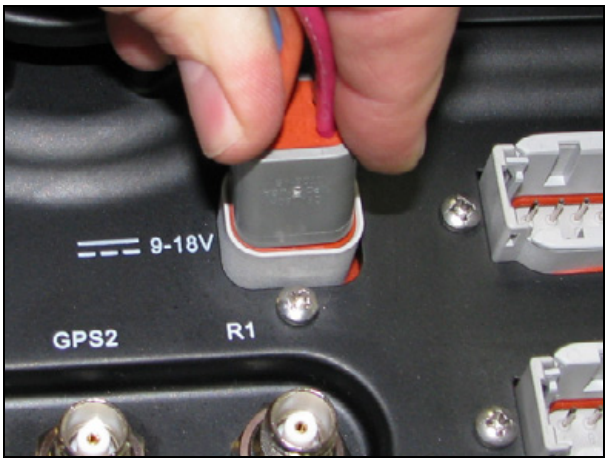
Step 2

Locate and connect the 4-pin Deutsch DTP receptacle on the power bus ❶ to the 4-pin Deutsch DTP plug ❷ on the basic power cable and then remove the protective cap from the 4-pin Deutsch DTP plug ❸ on the power bus and connect the plug to the 4-pin Deutsch DTP receptacle ❹ on the display power adaptor.



Step 3

Route the display power adaptor to the display mounting location and then connect it to the display.



FmX display

CFX-750 display

Configuring the power bus options for the display

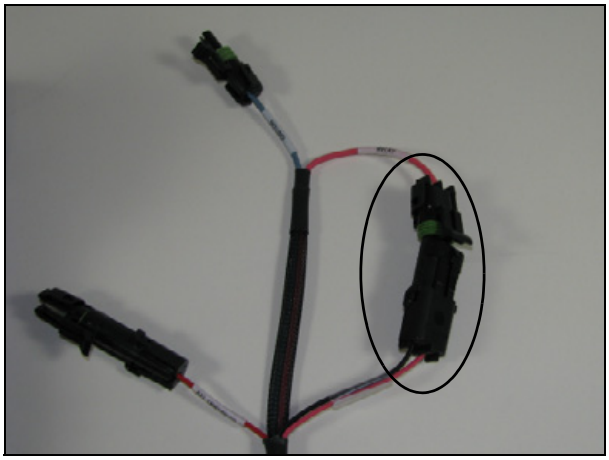
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

When you use the power bus cable, use one of the following configuration methods to turn on the Autopilot system:

- Display power button is used to turn on the Autopilot system
- External switch is used to turn on the Autopilot system
- Ignition is used to turn on the Autopilot system

Display power button is used to turn on the Autopilot system

Connect the 2 pin connectors labeled R2 and P2 on the power bus.

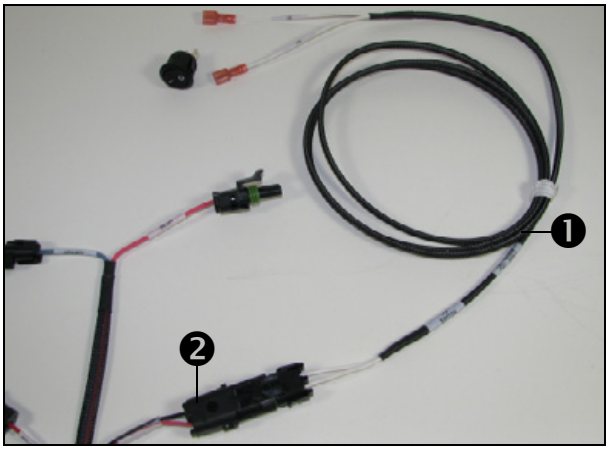


External switch is used to turn on the Autopilot system

Step 1

Connect the cable labeled R7 switch ❶ (included with the power bus) to connector labeled P2 on the power bus ❷ and then route the cable labeled R7 to a switch location.

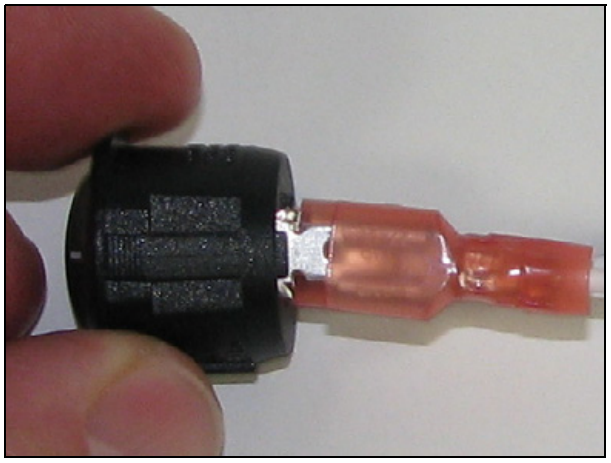
Note – *To install the switch provided, drill a ¾" hole.*



Step 2

Connect the cable labeled R7 to the switch pins.

Note – *Polarity is not important.*

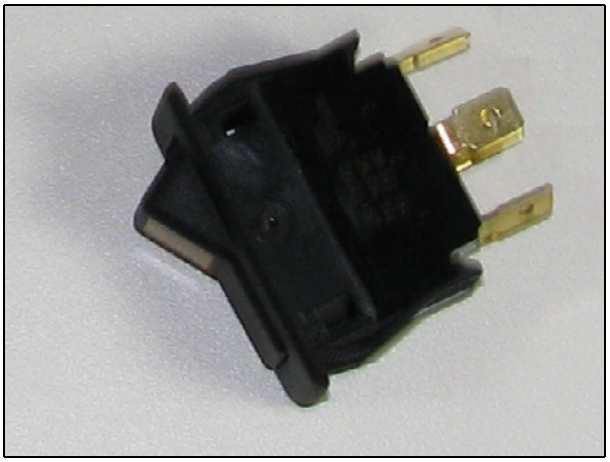


Installing the optional illuminated full or standard Euro switch

Step 1

Find an available knockout location on the vehicle console.

Note – *An alternative location is required for the switch provided.*

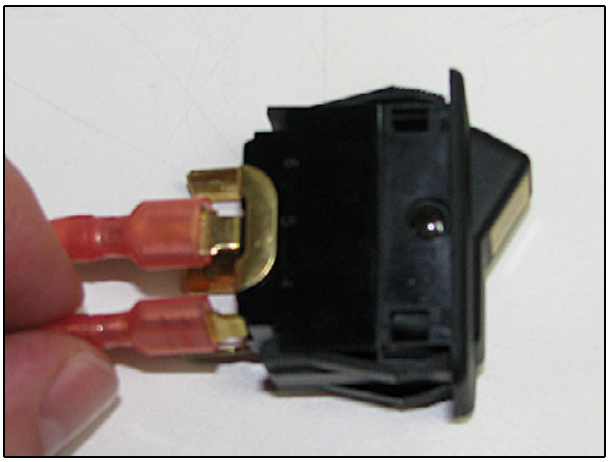


Step 2

Route the cable labeled R7 to the switch location and then connect the cable to the illuminated switch.

Connect the wire labelled S1 to pin 5 on the switch and then connect the wire labelled S2 to pin 4 on the switch.

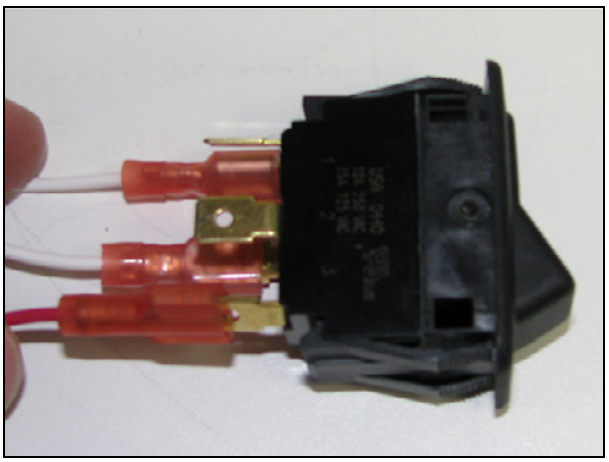
Note – *Polarity **is** important.*



Step 3

Connect a separate wire to pin 3 on the switch using a spade connector. Route the wire and then connect it to the vehicle switched power.

Note – *This additional wire is required to allow the switch to illuminate.*

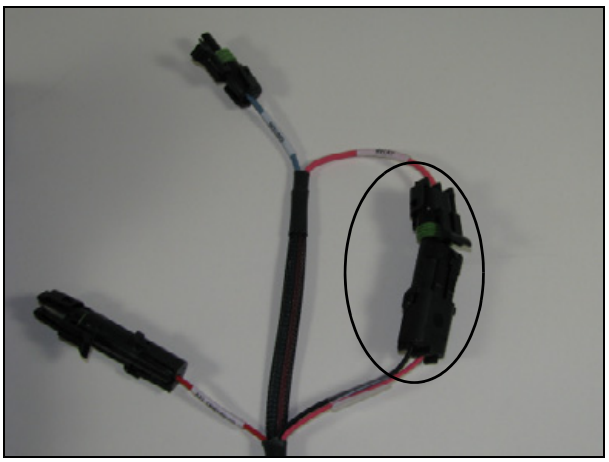


Ignition is used to turn on the Autopilot system

Note – *For more information on how to use the ignition sensing option, see the FmX Integrated Display User Guide.*

Step 1

Note – *Connect the 2-pin connectors labeled R2 and P2 on the power bus.*

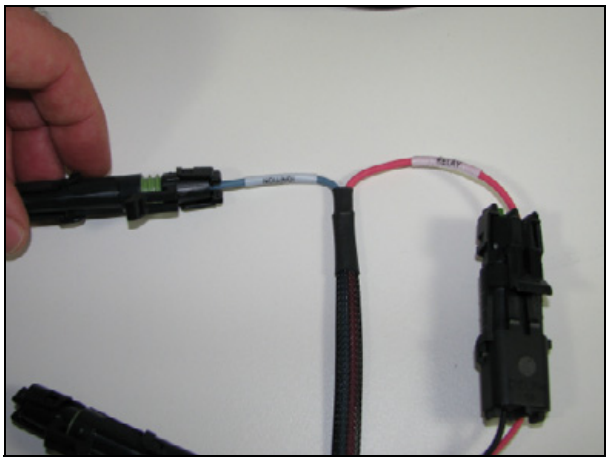


Step 2

Connect the cable labeled R8 Ignition (included with the power bus) to connector P3 Ignition on the power bus.

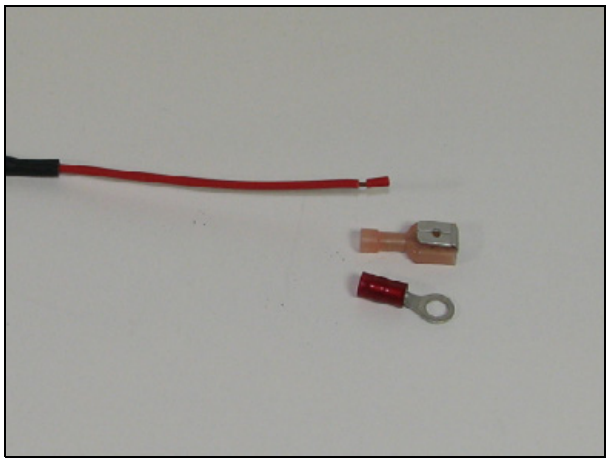
Step 3

Route the cable to the vehicles ignition.



Step 4

Connect the red ignition sense wire to the vehicle ignition using the spade or ring terminal provided.



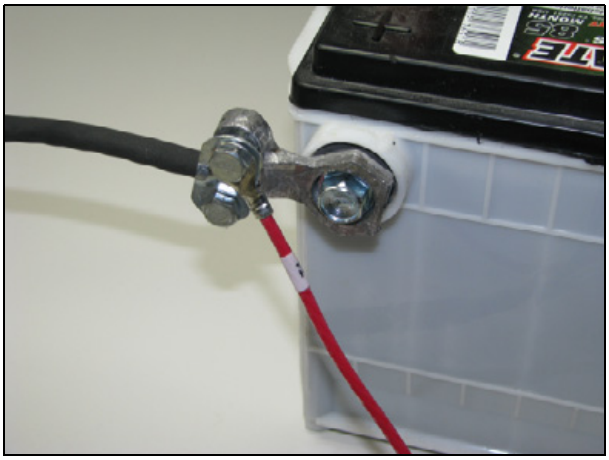
Configuring the power bus options for the EZ-Guide 500 lightbar

WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

Note – *For the EZ-Guide 500 lightbar cable installation instructions see,* EZ-Guide 500 lightbar components, page 77.

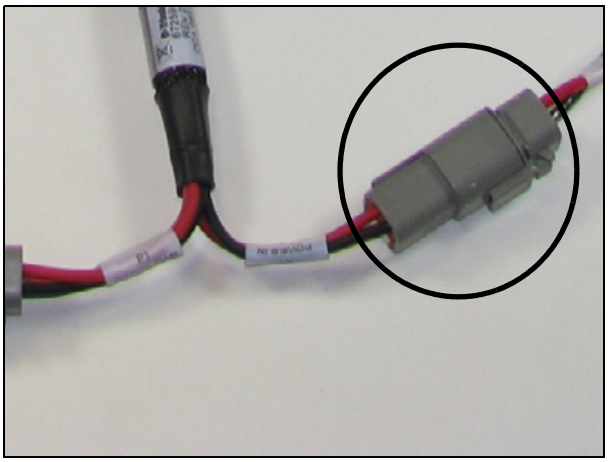
Step 1

Locate and connect the basic power cable to the vehicle battery and then route the cable into the cab.



Step 2

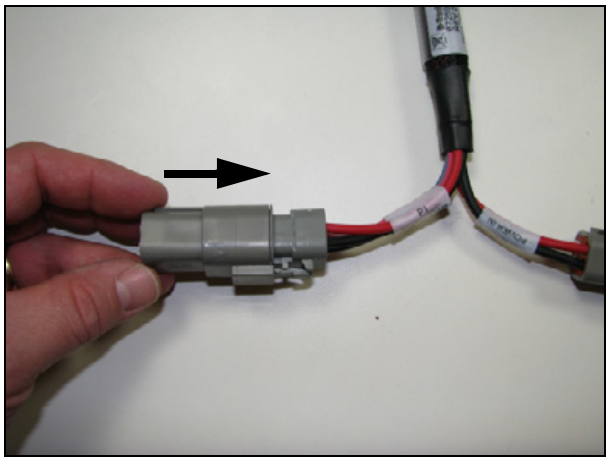
Locate and connect the 4-pin Deutsch DTP receptacle on the power bus to the 4-pin Deutsch DTP plug on the basic power cable.



Step 3

Verify that the protective receptacle is installed on the power bus.

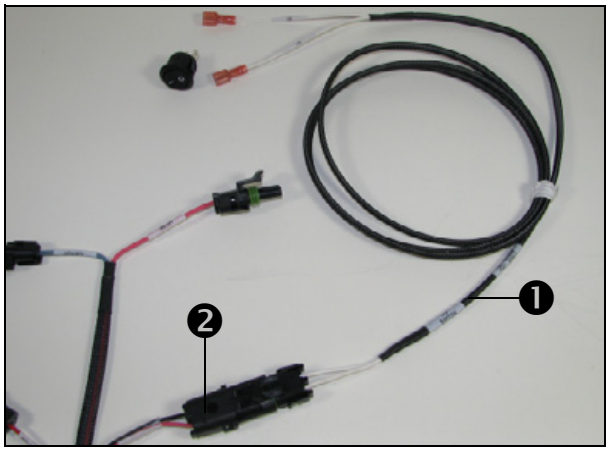
Note – *Damage to the system may result if the protective receptacle is not in place.*



Step 4

Connect the cable labeled R7 switch ❶ (included with the power bus) to connector labeled P2 on the power bus ❷ and then route the cable labeled R7 to a switch location.

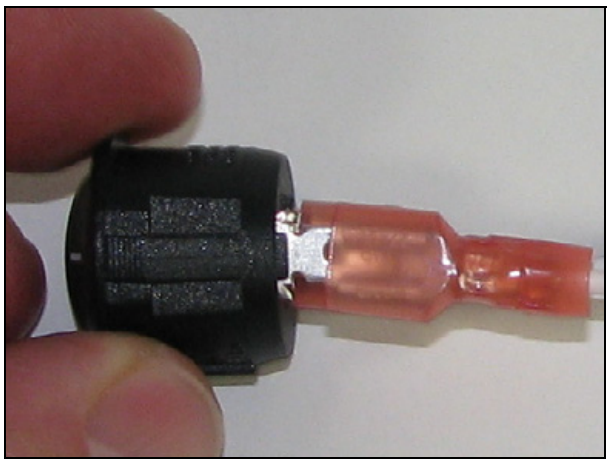
Note – *To install the switch provided, drill a ¾" hole.*



Step 5

Connect cable labeled R7 to the switch pins

Note – *Polarity is not important.*

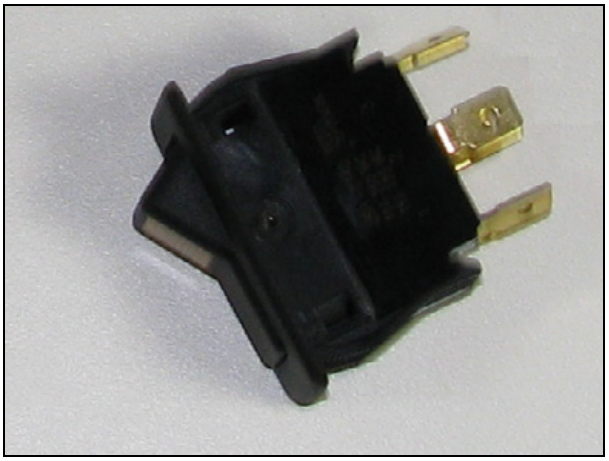


Installing the optional illuminated full or standard Euro switch

Step 1

Find an available knockout location on the vehicle console.

Note – *An alternative location is required for the switch provided.*

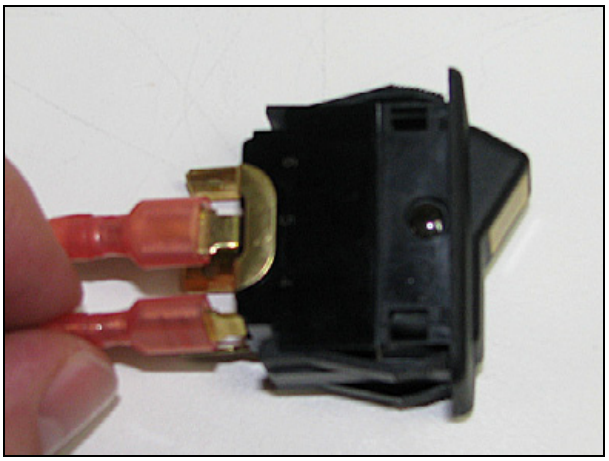


Step 2

Route the cable labeled R7 to the switch location and then connect the cable to the illuminated switch.

Connect the wire labelled S1 to pin 5 on the switch and then connect the wire labelled S2 to pin 4 on the switch.

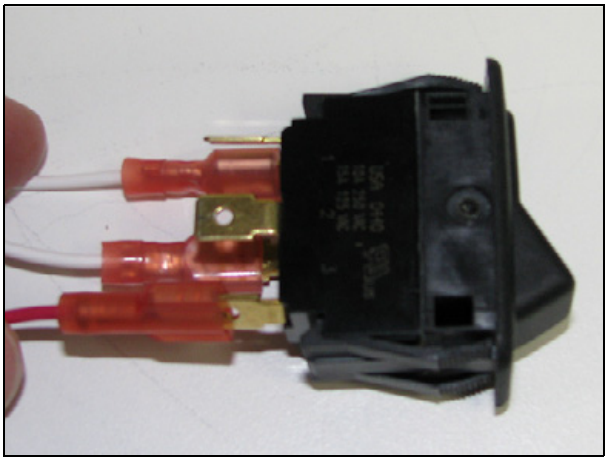
Note – *Polarity **is** important.*



Step 3

Connect a separate wire to pin 3 on the switch using a spade connector. Route the wire and then connect it to the vehicles switched power.

Note – *This additional wire is required to allow the switch to illuminate.*



CHAPTER

7

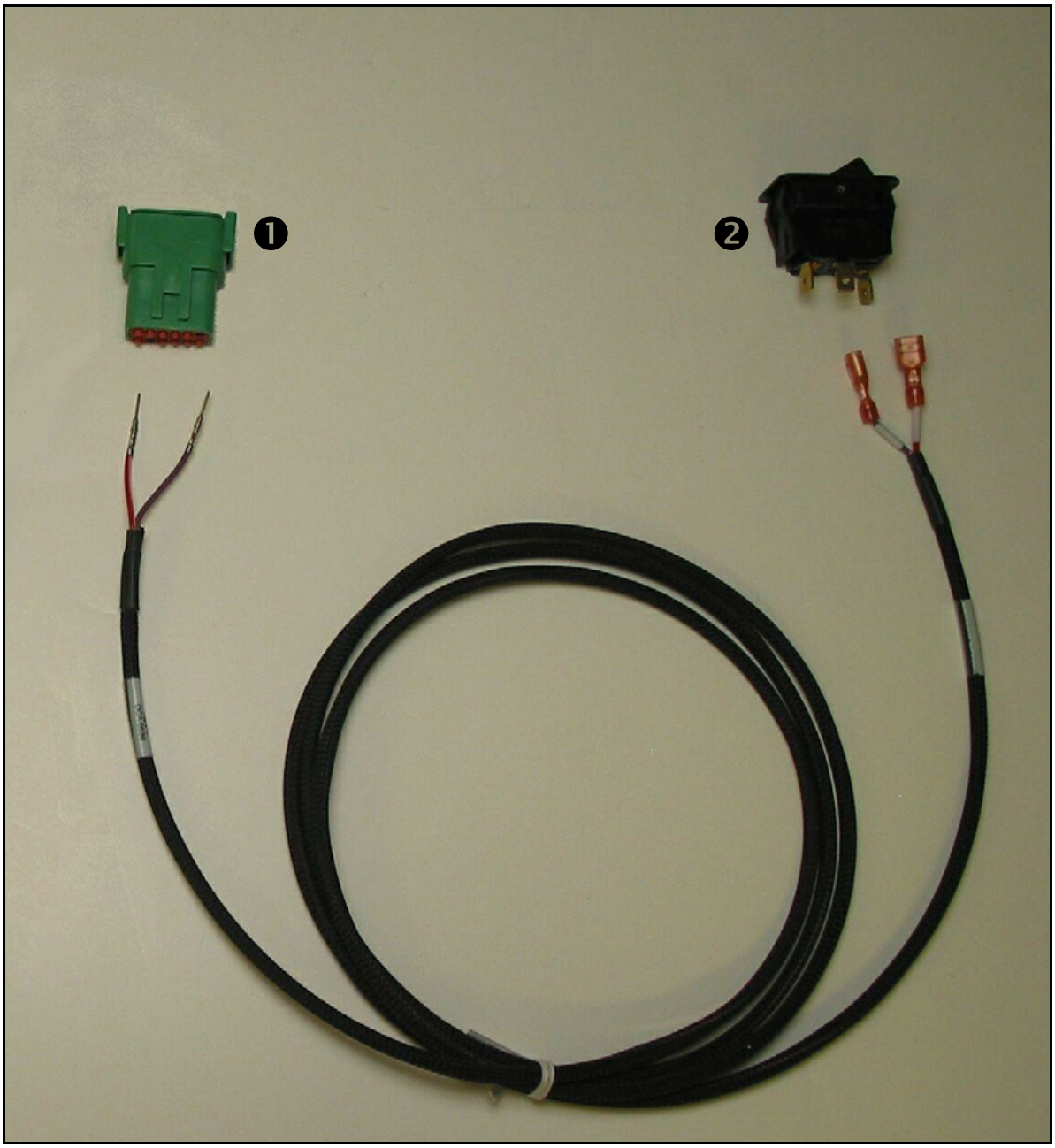
Remote Engage Switch Installation

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.

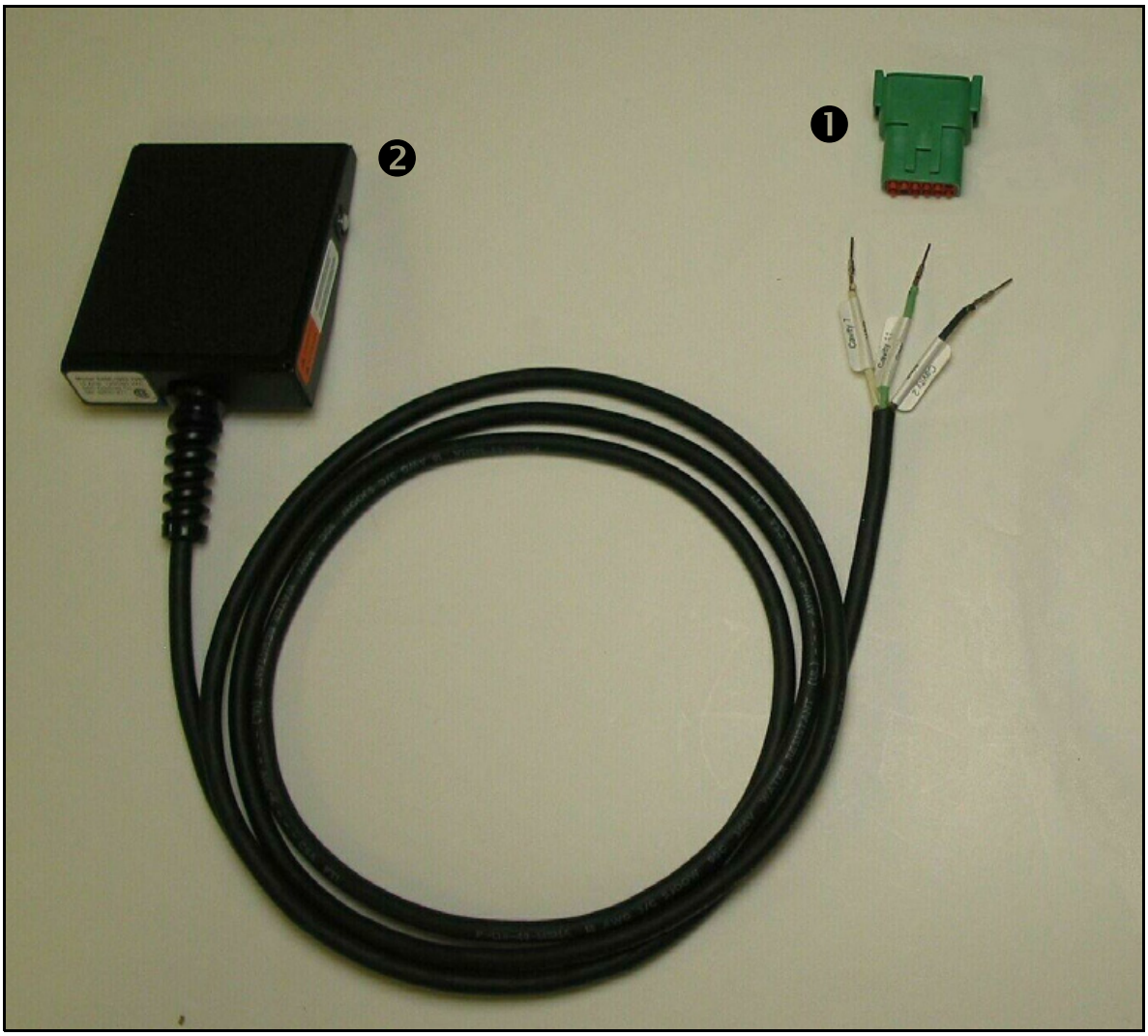
Remote engage switch components: Rocker switch



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



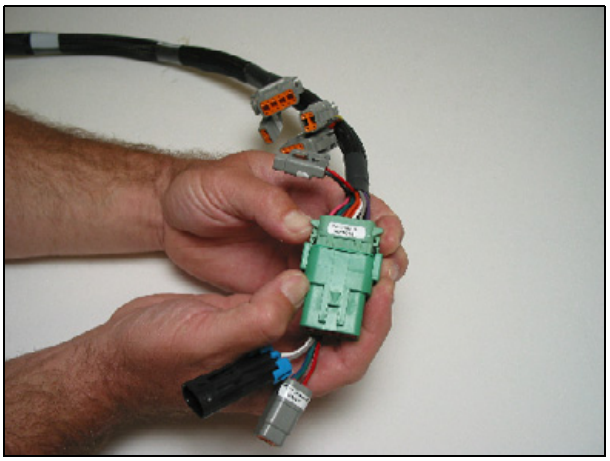
Item	Description
❶	DTM receptacle
❷	Remote engage foot switch

Preparing the remote engage cable

Step 1

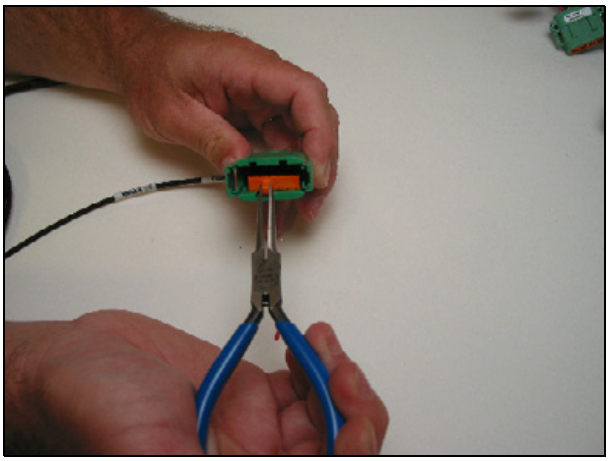
Locate the green 12-pin Deutsch receptacle on the P-5 leg of the main controller harness. For more information, see Chapter 8, Controller Installation.

For this platform, use the green connector on the manual override cable (P/N 81349).



Step 2

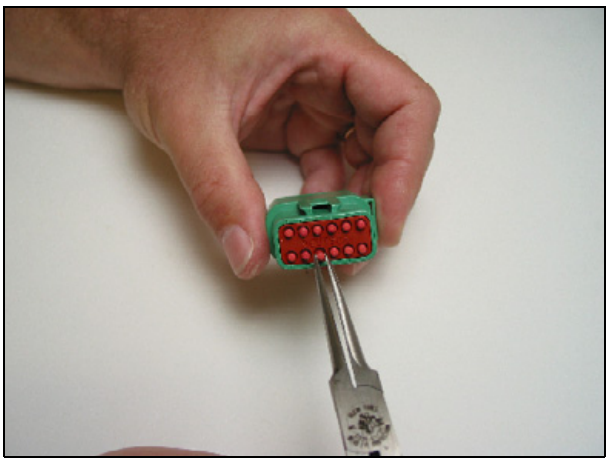
Remove the wedge from the connector.



Step 3

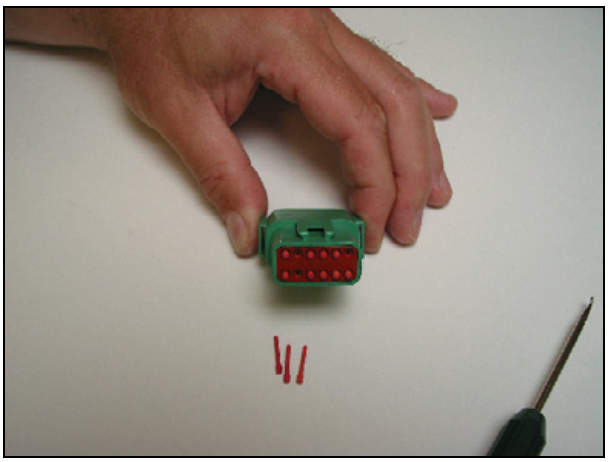
Rocker switch only

Remove the plugs from cavity 2 and cavity 7.



Foot Switch Only

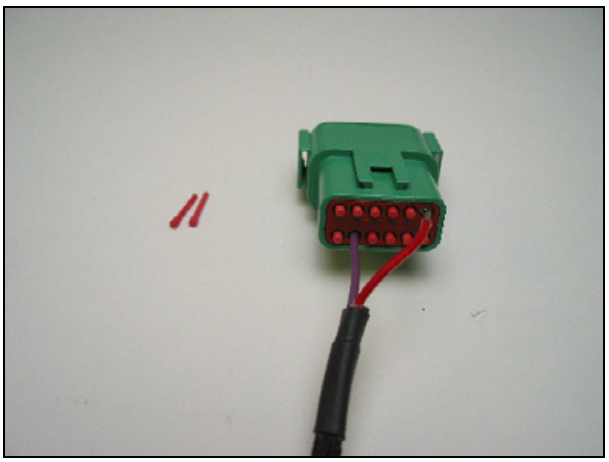
Remove the plugs from cavity 2, cavity 7, and cavity 11.



Step 4

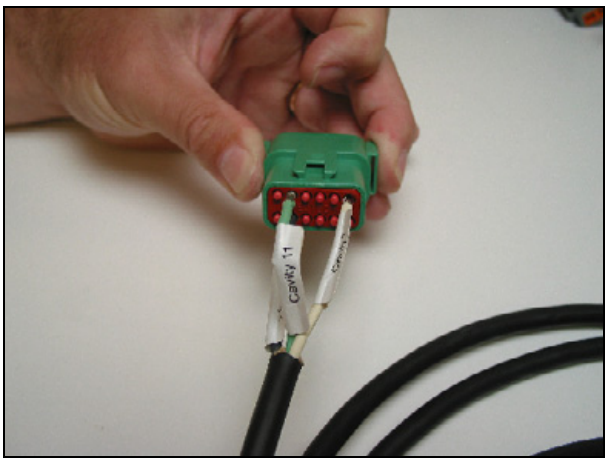
Rocker switch only

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



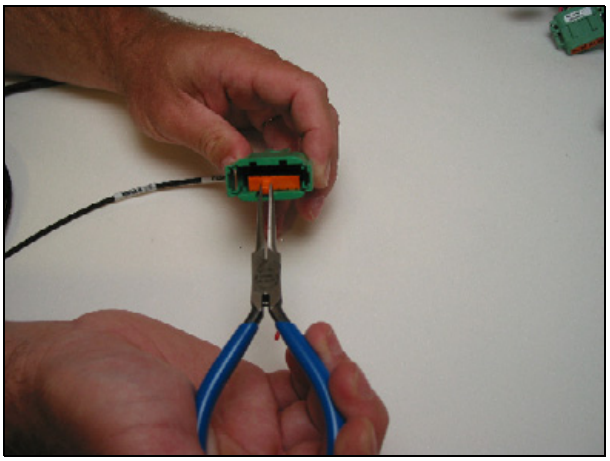
Foot switch only

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

Replace the receptacle on the P5 plug of the NavController II harness.

Step 7

Rocker switch only

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

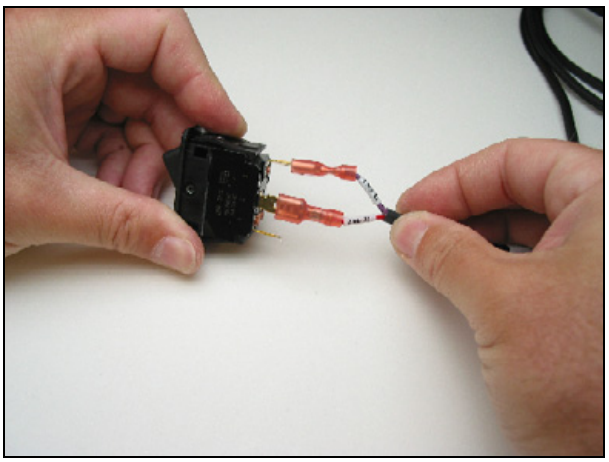
Foot switch only

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 8

Rocker Switch Only

Connect the wires to the switch. Match the print on the switch body with the labels on the wires.



Step 9

Rocker Switch Only

Place the switch in the console.

Using the remote engage switch

To enage as system using NavController II:

- For systems running firmware versions 5.20 and earlier, hold down the remote engage switch for longer than 0.5 seconds and less than 4 seconds.
- For systems running firmware versions 5.21 and later, hold down the remote engage switch for longer than 0.5 seconds and less than 4 seconds

The system engages when you release the switch.

CHAPTER

8

Controller Installation

In this chapter:

- Installing the controller
- Controller connections

This chapter describes how to install the controller unit.

WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

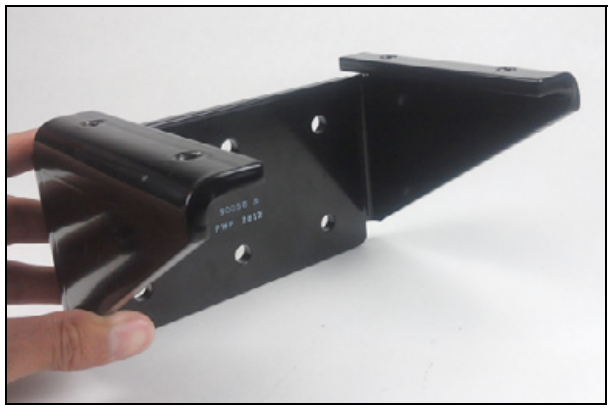
Installing the controller

You can use production bracket to install the NavController II, or mount the NavController directly to the floor:

- Use the production bracket mount the NavController II between the driver's seat and the buddy seat. Bolt the production bracket to the left vertical face of the driver's seat base; this allows the NavController II to sit horizontally, and approximately four inches above the floor mat.
- If you do not use the production bracket, use the plate (P/N 54828), four stand-offs and self-tapping screws to mount the NavController II on the floor. If you use this method, you will have to cut away some of the floor mat ridges.

Step 1

Locate the NavController II mounting bracket, P/N 90050.



Step 2

The controller will be mounted in the area between the driver's seat and the buddy seat. The bracket attaches to the vertical face of the driver's seat base.

If necessary, cut away a portion of the mat to gain access.

Step 3

Hold the bracket up to the seat base; mark the first hole for drilling.

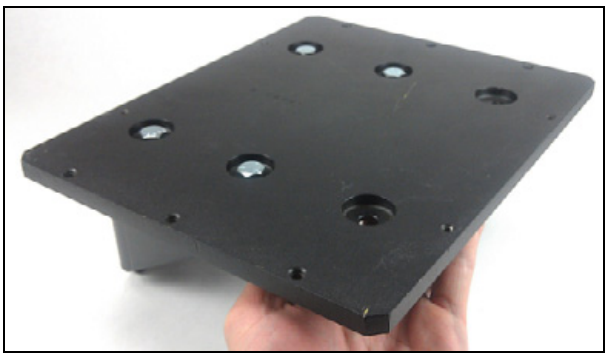
Remove the bracket and then drill a 5/16" through-hole.

Step 4

Secure the bracket to the seat base with a 5/16" or a ¼" nut and bolt. Mark and drill at least two other holes, using the bracket as a template. When finished, you should have at least three bolts securing the bracket to the seat base.

Step 5

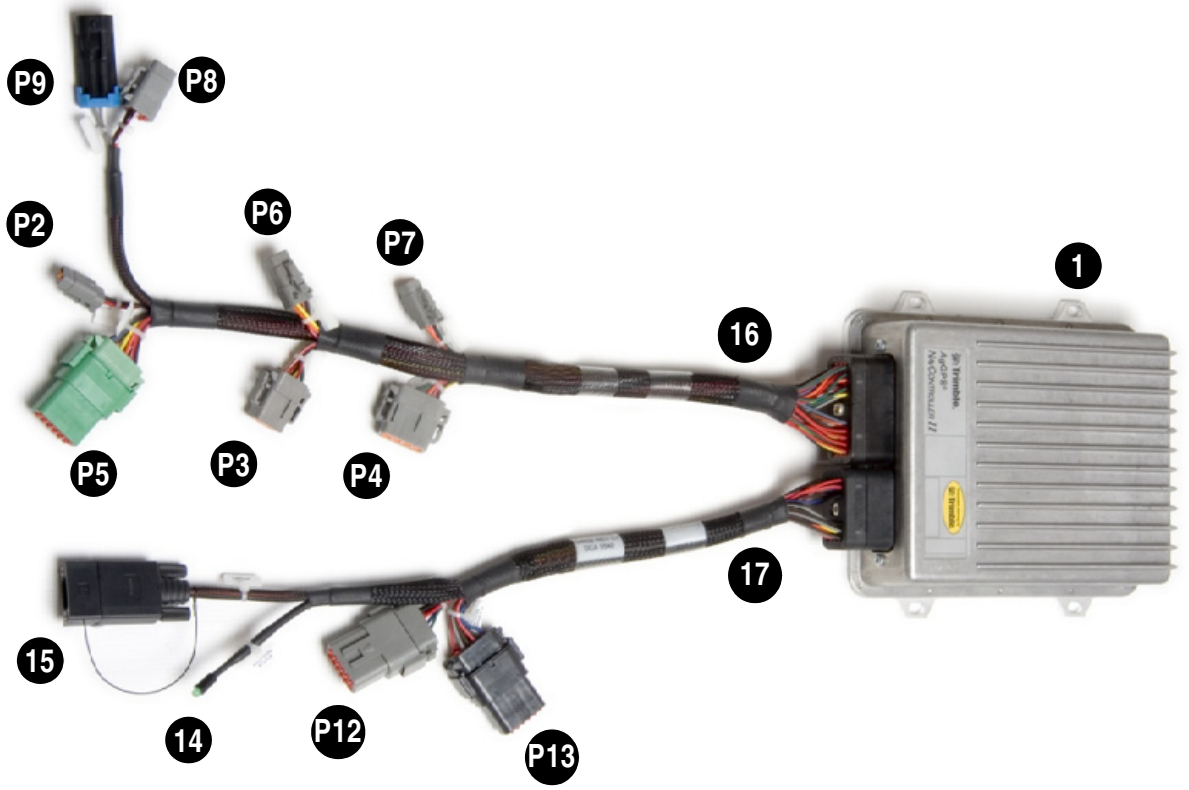
Bolt the controller mounting plate (P/N 54828), to the bracket using four 5/16-18 bolts, included in the hardware kit.



Step 6

Bolt the controller to the plate using the supplied hardware.

Controller connections



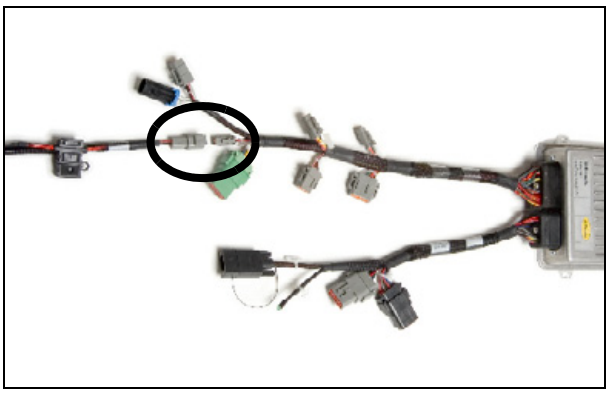
Item	Description
1	NavController II controller
P2	Power connector
P3	GNSS connector
P4	Display connector
P5	Vehicle sensors connector
P6	Steering sensor connector
P7	Manual override connector
P8	Hydraulic valve connector

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.

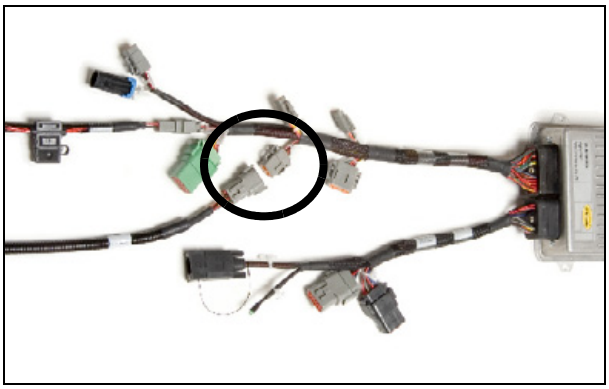
Note – *The power connection supplies power through the controller to all connected devices, including GNSS and displays.*



Step 2

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

For CFX-750 and FmX installation, plug in display cable P/N 75741.

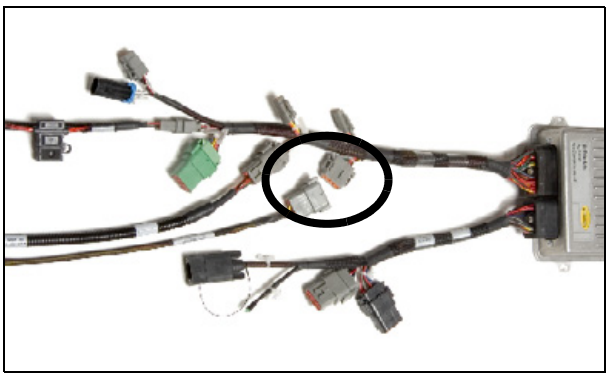


Step 3

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

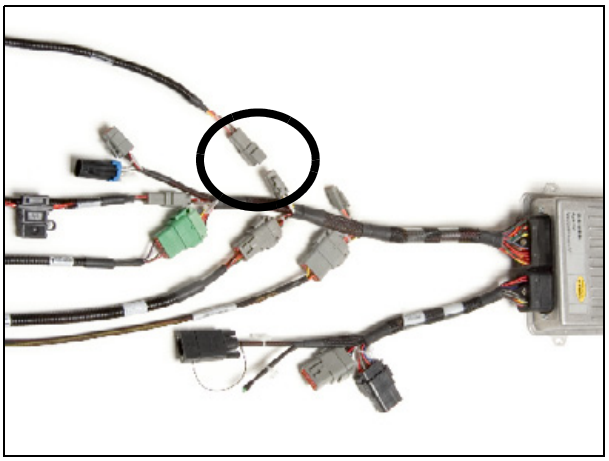
Note – Do not *connect the cable to the connector labeled “Spare” on the auxiliary harness.*

Note – *This connection is not used for CFX-750 and FmX installations.*



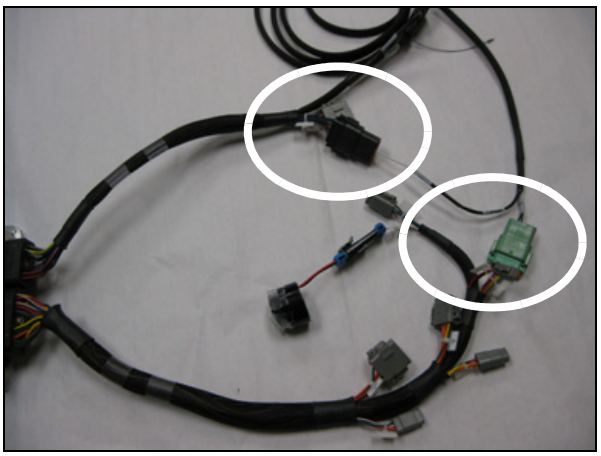
Step 4

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



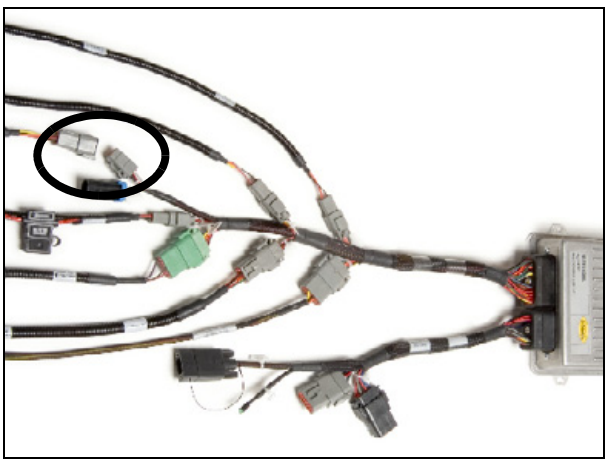
Step 5

For manual override, plug the P/N 81349 cable into P5 and P13.



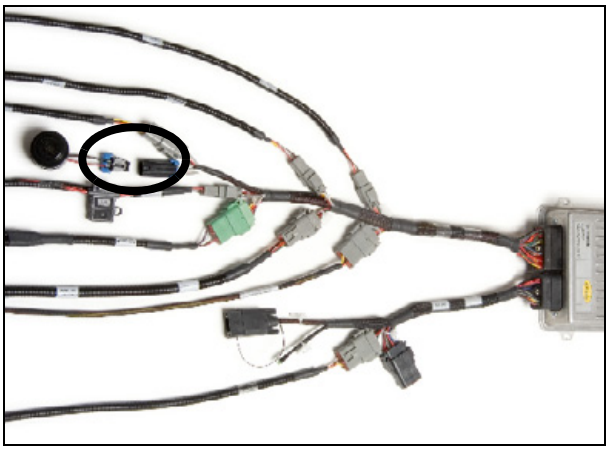
Step 6

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



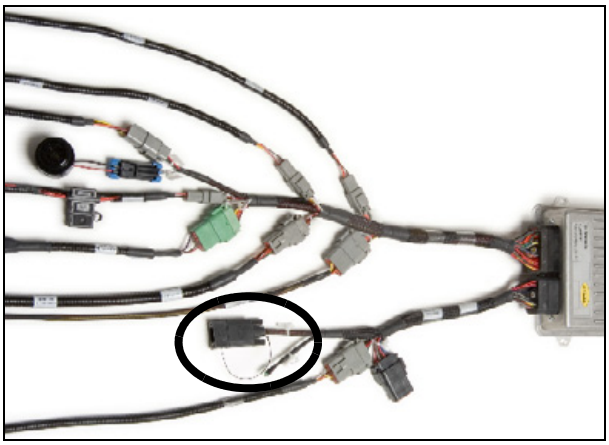
Step 7

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 8

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 9

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

Performing the final machine check

WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

1. Connect the battery.
2. Update the Trimble display and the Autopilot NavController II to the latest firmware from http://www.agpartners.trimble.com.

   You can use FlashLoader 200 software version 3.19 to update the Autopilot controller: Download it from http://agpartners.trimble.com.
3. Do the following:
   - Download the latest set of Autopilot Vehicle Database files from http://www.agpartners.trimble.com.
   - Use the correct VDB file for the vehicle being used.

   You can use Autopilot Toolbox II software version 2.92 to load the configuration file into the Autopilot controller. You can download the AutoPilot Toolbox II software from http://agpartners.trimble.com.
4. Calibrate the Autopilot system using the Trimble display or Autopilot Toolbox II software version 2.92. Depending on your machine type, the following items must be calibrated before you can use the Autopilot system:
   - NavController II mounting orientation
   - Manual override
   - Autosense mounting orientation
   - Valve deadzone
   - Autopilot P-gain
   - Antenna height/Antenna axle offset, and Roll offset