INSTALLATION INSTRUCTIONS

Autopilot™ Automated Steering System

John Deere Tractors

- **6215**
- **6415**
- **6615**
- **6715**

Version 5.00
Revision A
February 2012
Part Number 54035-161-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.

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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.*

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
- Required components
- 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**.

Required components

Kits required	Special tools
Platform kit: P/N 54035-161 Hydraulic hose kit: P/N 83927	

Antenna mounting kits

Antenna options	For more information...
Antenna V-plate mount, P/N 62388-01. Antenna Spar mount P/N 53676.	See Chapter 4, Antenna 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 54035-161)	Hydraulic valve	Chapter 2
	Hydraulic manifold	
	Transducer flow switch	
	Manual override cable	
	Hydraulic brackets and bolt kits	
	Hydraulic valve cable	
	L/S precharge kit (P/N 83965)	
	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	Chapter 1
	Cable kit: • Main wiring harness • Power bus auxiliary wiring harness • Sonalert alarm	Chapter 8
Antennas	GNSS antenna and cable	Chapter 4
	GNSS antenna mounting plate	
	RTK antenna and cable	
	RTK antenna and mounting plate	
Display	EZ-Guide 500 lightbar	Chapter 5
	FmX integrated display	
	CFX-750 display	
	Display cable	
	Mounting bracket	
Hydraulic hose kit: P/N 83927	Hydraulic hoses	Chapter 2
	Hydraulic adaptors	

Preparing the vehicle for installation

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.

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

CHAPTER

2

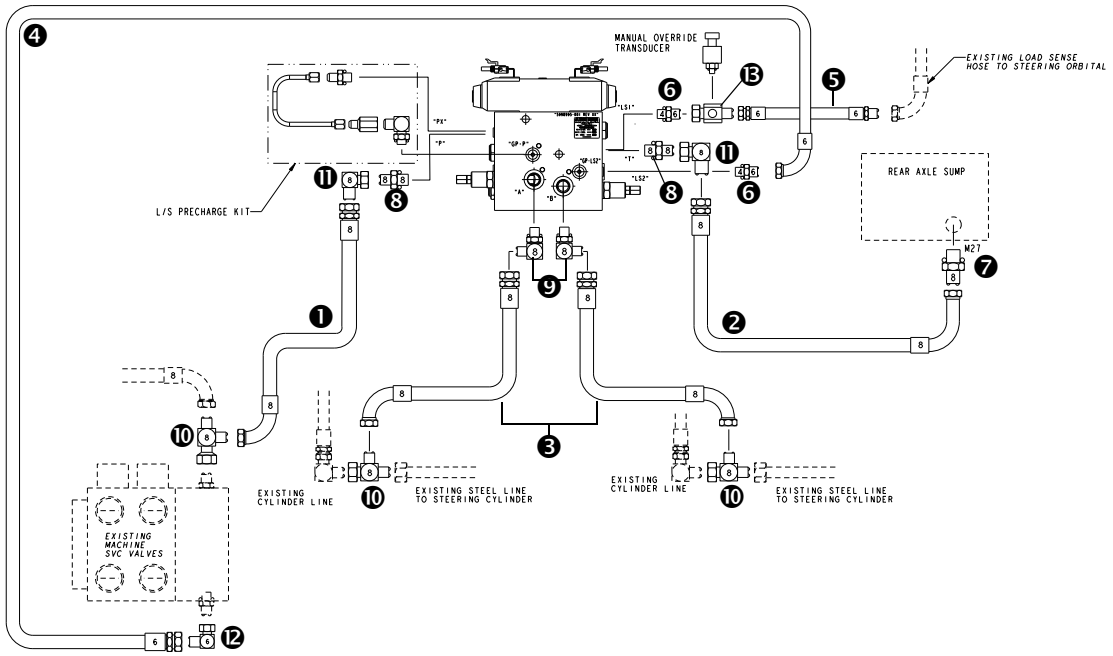
Hydraulic Control Valve Installation

In this chapter:

- Hydraulic control valve components
- Prepare the Autopilot manifold and hydraulic control valve
- Installing the hydraulic manifold
- Installing the hydraulic hoses
- Securing the electrical connectors

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

Hydraulic control valve components



Tip – The L/S precharge kit (P/N 83965) is supplied in the platform kit.

Item	Description	Part number
❶	18" hose	F451TCJSJ9-08-08-08-18
❷	29" hose	F451TCJSJ1-08-08-08-29
❸	90" hose	F451TCJSJ9-08-08-08-90
❹	23" hose	F451TCJSJ9-06-06-06-23
❺	10" hose	F451TCJSJ0-06-06-06-10
❻	Fitting (x2)	6-4 F50L0-S
❼	Fitting	8M27F87ML0-S

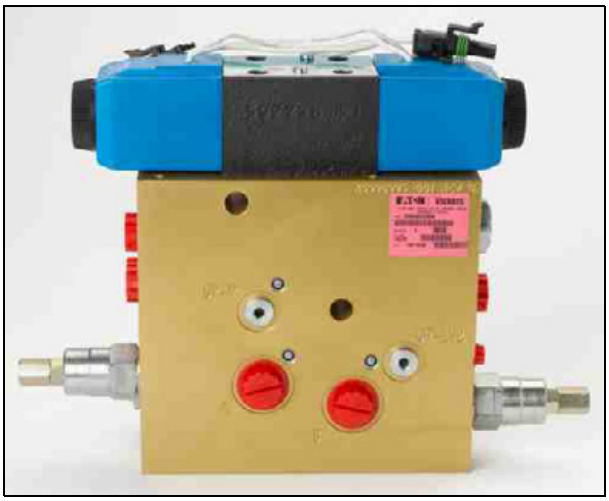
Item	Description	Part number
❽	Fitting (x2)	8 F50L0-S
❾	Fitting (x2)	8 C50L0-S
❿	Fitting (x3)	8 R6L0-S
⓫	Fitting (x2)	8 C6L0-S
⓬	Fitting	8 C6L0-S
⓭	Fitting	6-4 L0HL6G5TP-S

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

Prepare the Autopilot manifold and hydraulic control valve

Step 1

Locate the Autopilot manifold place it on a clean work surface.



Step 2

Locate the cavity plug; it will be stamped with **2186484**.

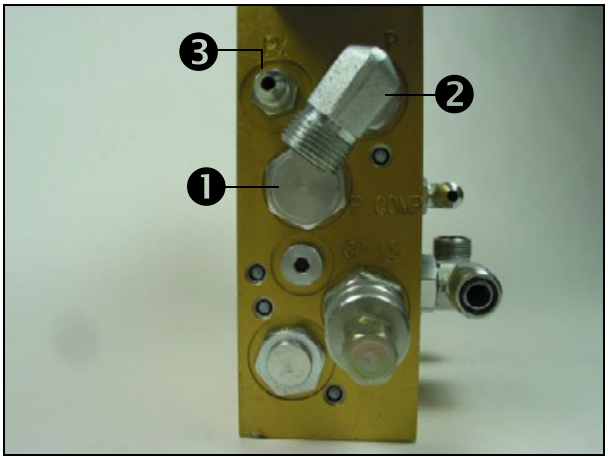


Step 3

Install the cavity plug ❶ into the PCOMP port on the Autopilot manifold.

Install an 8-8 ORB-ORFS 90° adaptor ❷ in the P port.

With the P port adaptor oriented roughly as shown, install a 4-4 ORB-JIC straight adapter into the PX port ❸.

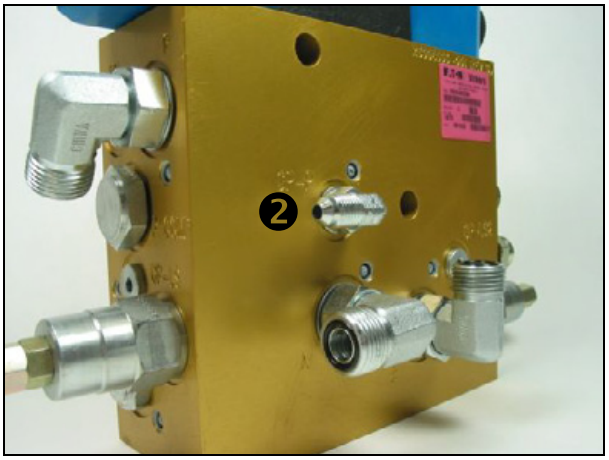


Step 4

On the front face of the manifold, install a pair of 8-8 ORB-ORFS 90° adaptors ❶ into the A and B ports.

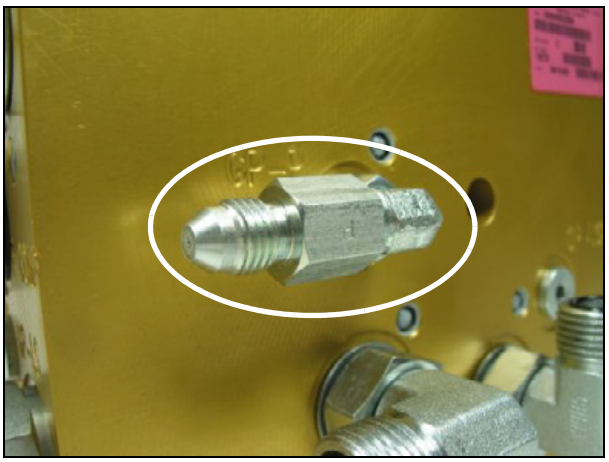


Install a -4-4 ORB-JIC 90° adaptor into the GP-P port ❷.



Step 5

Install the supplied -4 JIC straight orifice, stamped **0.031** onto the -4 JIC 90° elbow in the GP-P port.



Step 6

Remove the plug from the PTS port.



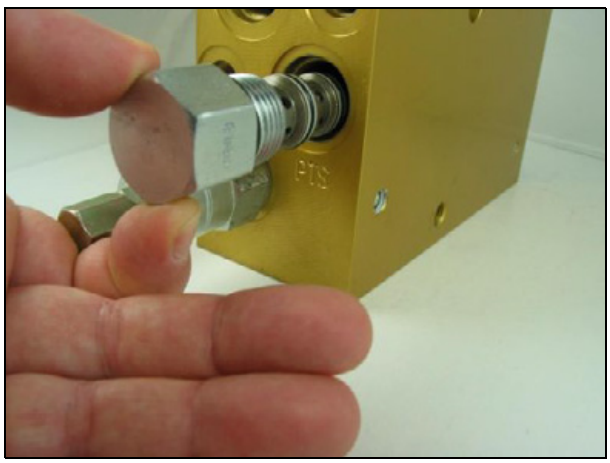
Step 7

Locate the pilot-to-shift cartridge stamped **PTS3-10-0-40** on the hexagonal head.



Step 8

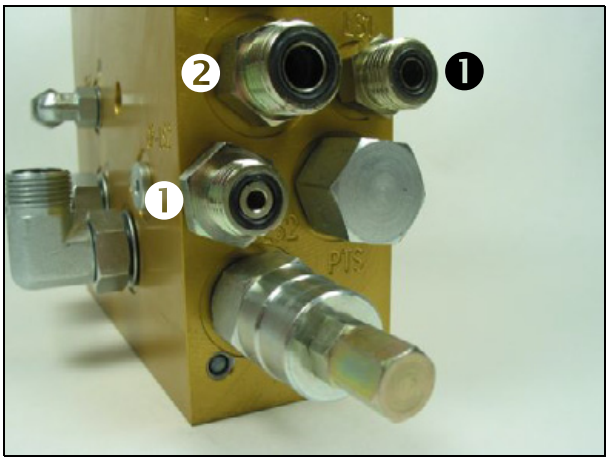
Install the pilot-to-shift valve in the PTS port.



Step 9

Install 4-6 ORB-ORFS straight adaptors ❶ in the LS1 and LS2 ports.

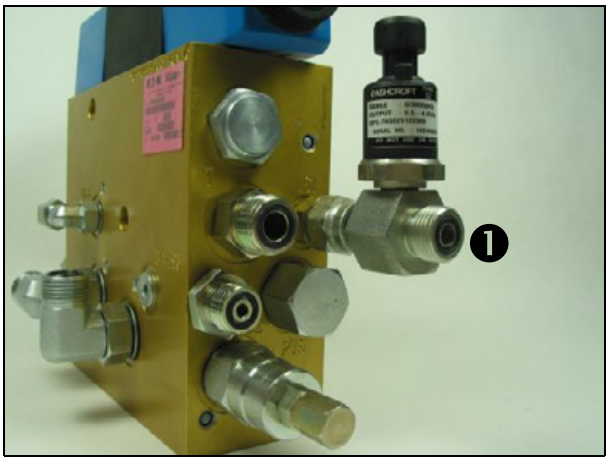
Install an 8-8 ORB-ORFS straight adaptor ❷ into the "T" port.



Step 10

Install a -6 OFRS diagnostic tee ❶ onto the LS1 port.

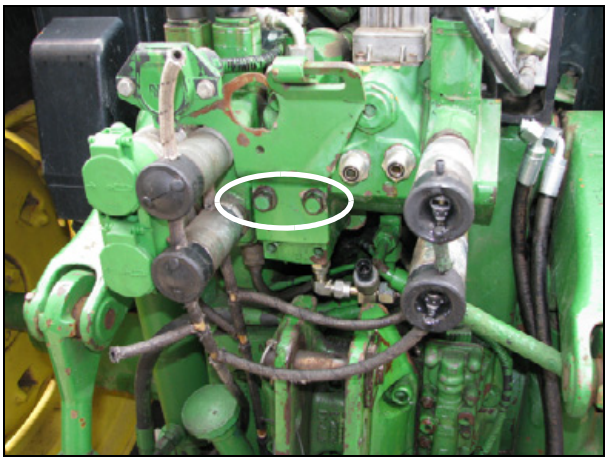
Thread the pressure sensor into the diagnostic tee



Installing the hydraulic manifold

Step 1

Locate the top link bracket. Remove the two bolts indicated in the figure.



Step 2

Install the supplied bracket between the existing bracket and the tractor.

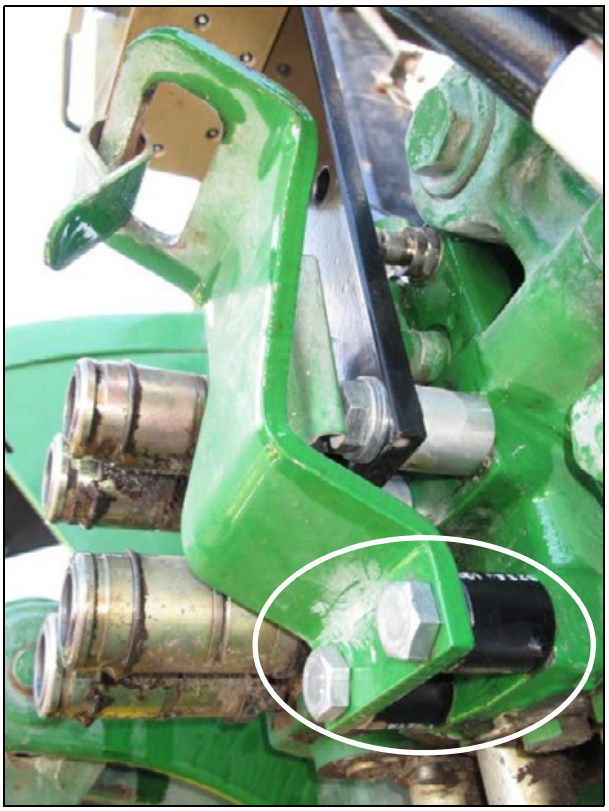


Use the supplied 12 mm x 50 mm bolts, flat washers, and spacers.



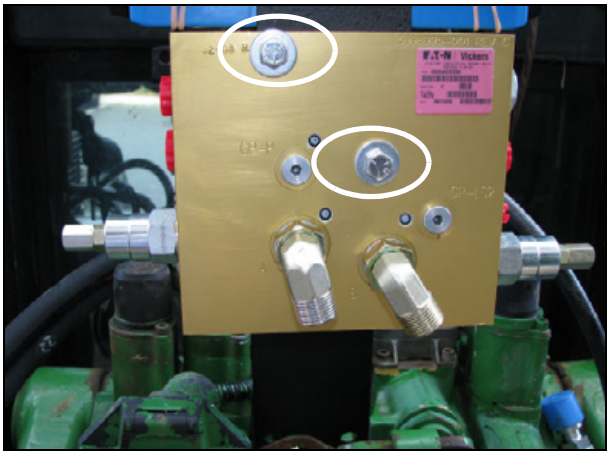
Step 3

Reinstall the top link bracket. Use the supplied 12 mm x 50 mm bolts, flat washers, and spacers.



Step 4

Attach the assembled Autopilot manifold to the bracket using the supplied 3/8" bolts and flat washers.



Installing the hydraulic hoses

Step 1

Disconnect the pressure line shown.



Step 2

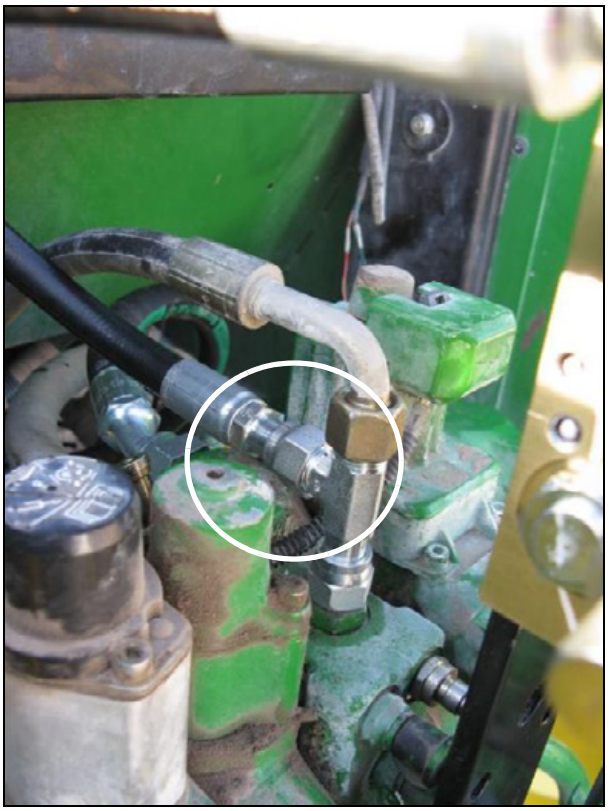
Install a -8 ORFS run tee and then reconnect the original pressure hose.





Step 3

Connect the -8 ORFS 90° female end of the 18" hose to the branch port of the run tee.



Step 4

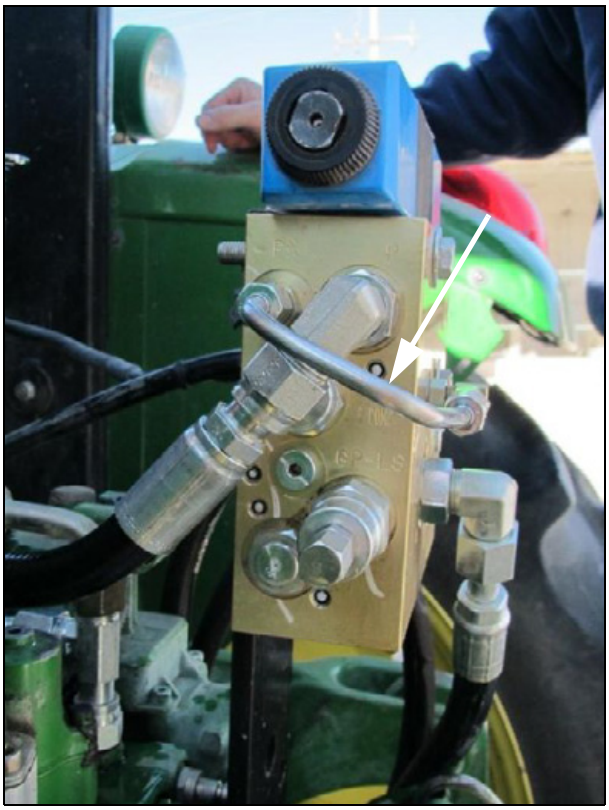
Connect the -8 OFRS straight female end of the 18" hose to the P port of the Autopilot manifold.



Step 5

Connect the supplied load sense pre-charge steel tube between the GP-P port and PX port.

You may need to twist the tube during installation.



Step 6

Disconnect the orbital motor hoses on the right side of the tractor, below the operator's platform.

Insert -8 ORFS run tees.



Step 7

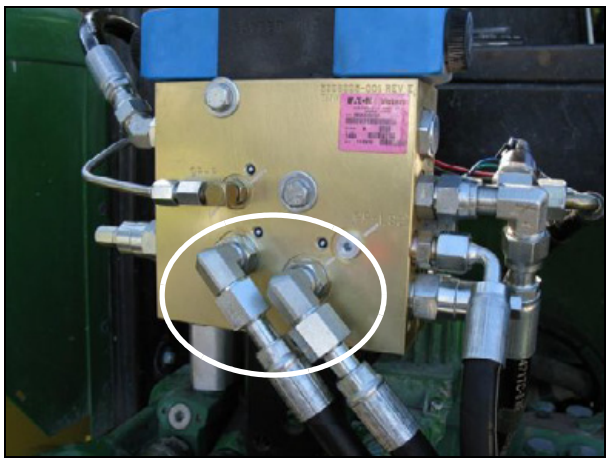
Connect the -8 ORFS 90° female ends of both 90" hoses to the run tees.

Route the both of the 90" hoses under the operator's platform to the rear of the tractor.



Step 8

Connect the 90" hoses to the A and B ports of the Autopilot manifold.



Step 9

Remove the 27 mm hex plug from the rear of the tractor.

Install the supplied 27 mm -8 ORFS straight adapter.



Step 10

Attach the -8 OFRS 90° female end of the 29" hose to the 27 mm adapter fitting.



Step 11

Install a -8 ORFS 90° elbow onto the T port.

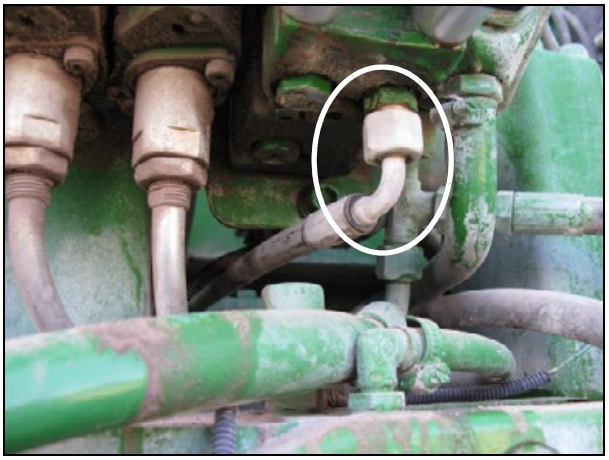
Connect the -8 ORFS straight female end of the 29" hose to the elbow



Step 12

Disconnect the tractor's existing LS hose.

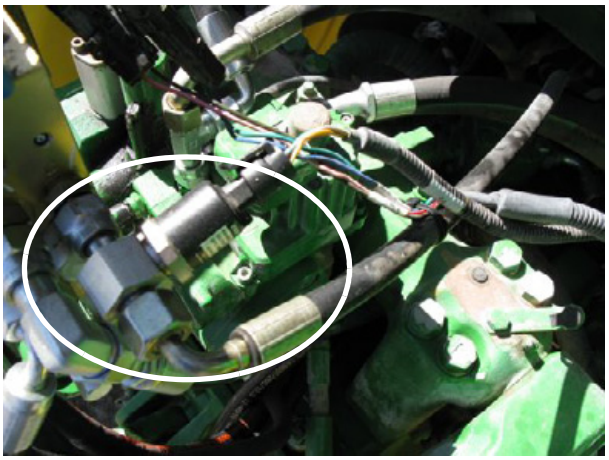
Route the hose to the LS1 port of the Autopilot manifold.



Step 13

Reroute the hose and connect it to the diagnostic tee on the LS1 port of the Autopilot manifold.

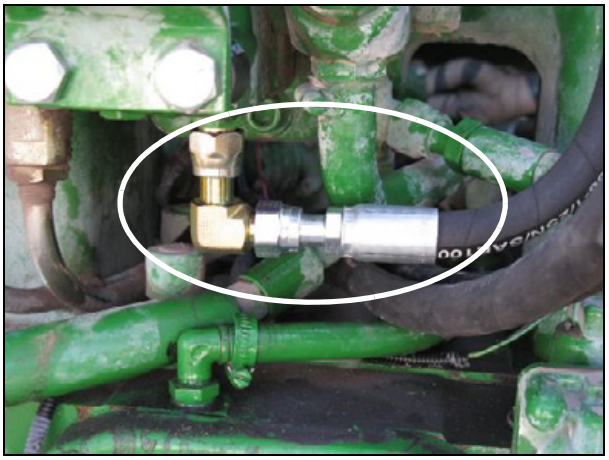
Note – *The 10" extension hose is not shown in the photo. This part was added to the hose kit after this photo was taken. See* ❺ *on page 12.*



Step 14

Install -6 ORFS 90° elbow onto the existing tractor LS port.

Connect the -8 ORFS straight female end of the 23" hose to the elbow.



Step 15

Connect the -8 ORFS female end of the 23" hose to the LS2 port.

Step 16

Check and tighten all of the fittings. Refill the hydraulic reservoir if necessary. Start the engine and then have an assistant turn the steering from full left lock to full right lock to check for leaks. If the tractor steers backwards, reverse the 90° hoses on the right side of the tractor below the operator's platform.



Securing the electrical connectors

Step 1

Locate the control valve cable (P/N 54617).

Plug the weatherpack connectors from the control valve cable into the control valve.

Route the cable towards the Autopilot controller following the existing hoses and steel lines.

Secure the harness with tie straps along the path.



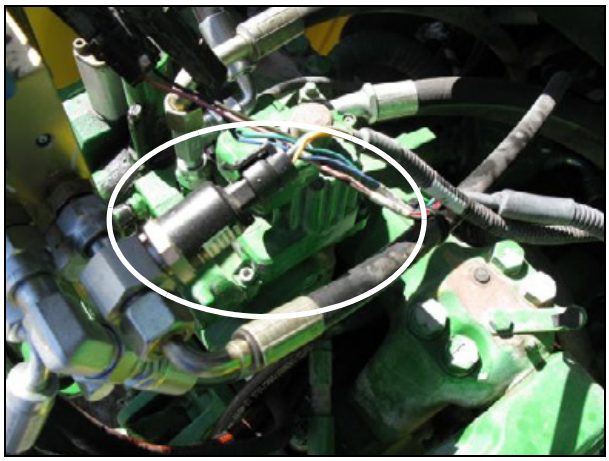
Step 2

Locate the pressure transducer cable (P/N 54618).

Plug the cable into the pressure sensor located at the manifold block.

Route the cable towards the Autopilot controller following the existing hoses and steel lines.

Secure the harness with tie straps along the path.



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.

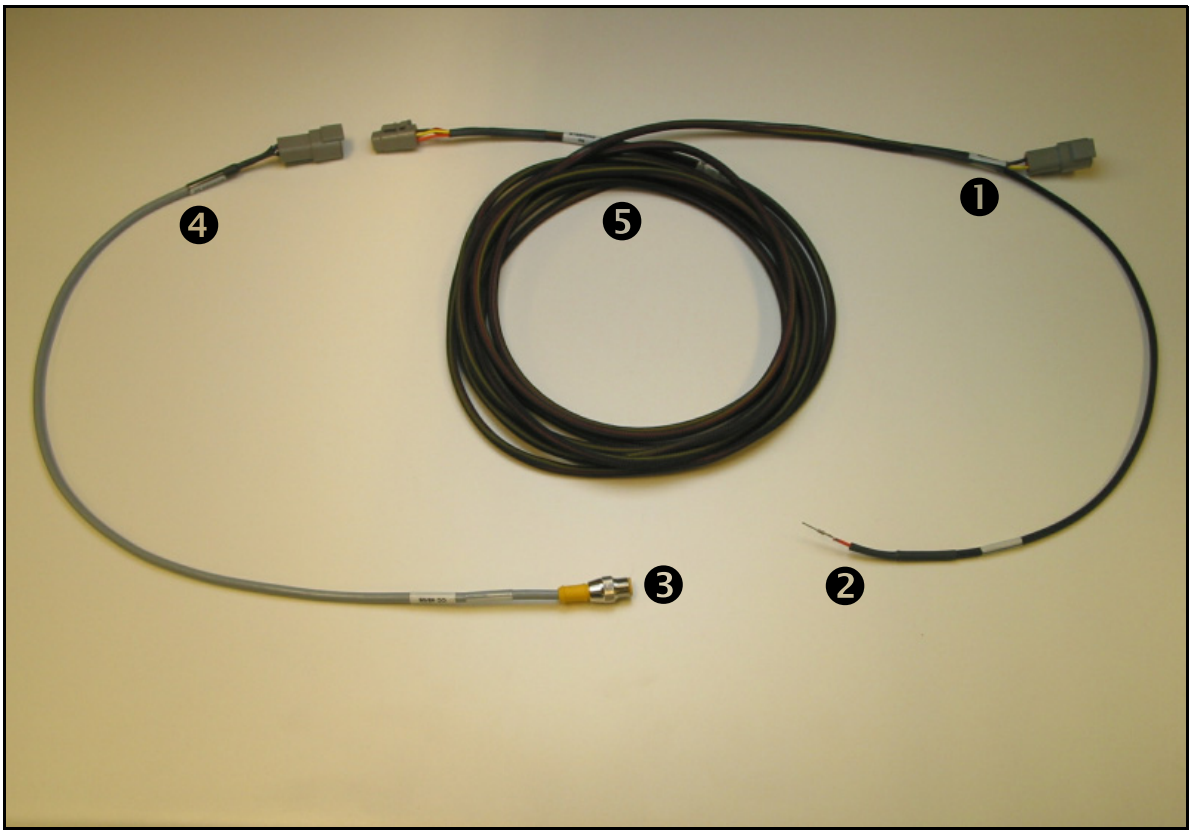
If the required mounting location is not accessible, chose a different place. To ensure proper function, the AutoSense device must be located where it is free of obstructions and can rotate with the wheels when they turn.

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

Locate the mounting position on top of the right or left side of the front axle.



Step 2

Attach the AutoSense device to the plate (P/N 84836) using the included #6-32 screws.



Step 3

Attach the mounting plate to the front axle. Use the supplied 16mm x 25mm bolts.

Position the AutoSense connector to point toward the axle.



CAUTION – To operate correctly, the AutoSense device must be mounted level. If necessary, bend the bracket P/N 58042 downward.

Step 4

Connect the jumper cable P/N 57560 to the steering device. Leave adequate length on the service loop to avoid stretching the cable.

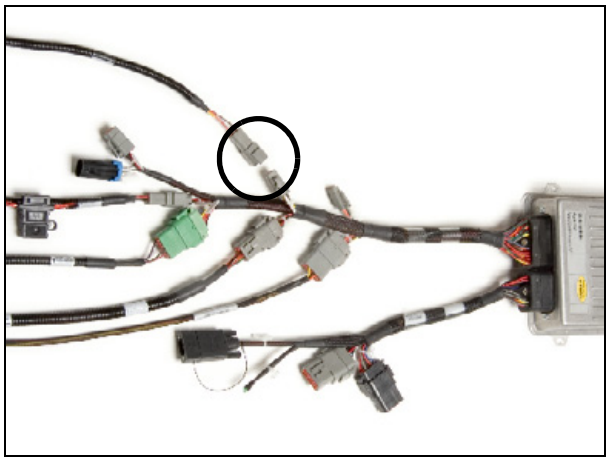
Connect the steering cable P/N 57885 to the jumper cable P/N 57560.



Step 5

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

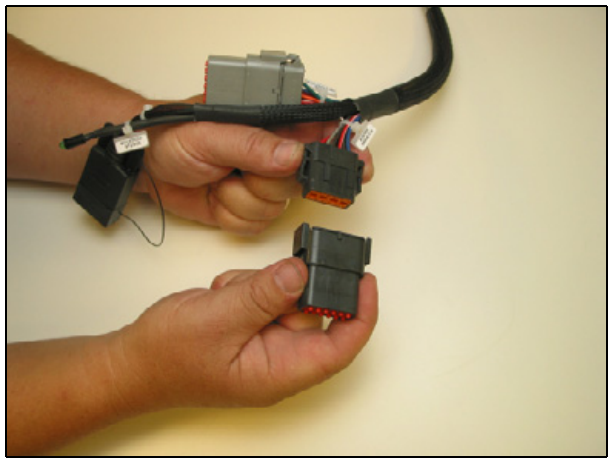
The P6 connector is labeled **Steering Sensor**.



Preparing the harness: P/N 54602 Rev C

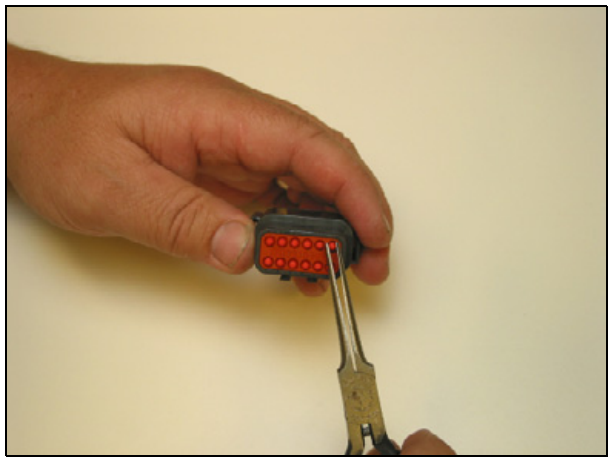
Step 1

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



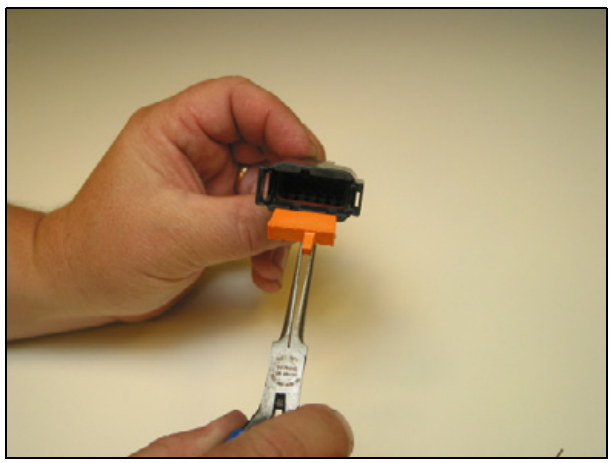
Step 2

Remove the plug from cavity number 1.



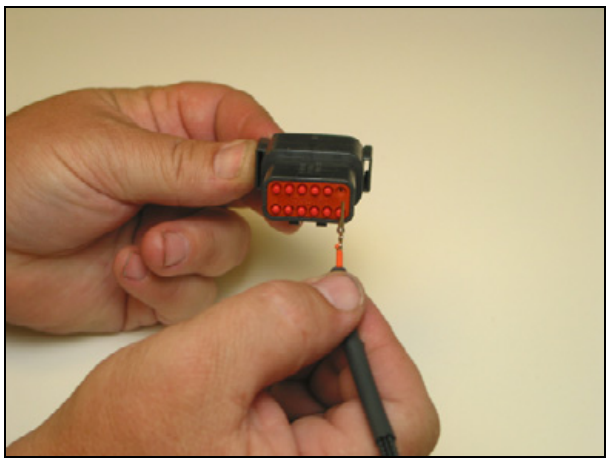
Step 3

Remove the wedge from the connector.



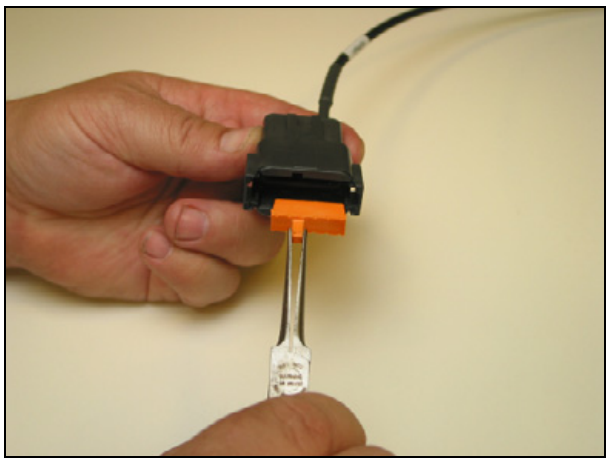
Step 4

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 Installation

In this chapter:

- Antenna installation options
- Mounting an adjustable spar to roof bolts

This chapter describes how to install an GNSS antenna or RTK radio antenna.

Antenna installation options

There are several options for mounting components (GPS antenna or RTK radio antenna) on the cab roof depending on the accuracy required and the antenna type:

- **Spar mount** – This bracket mounts directly to the cab roof bolts and is required for all high-accuracy applications such as RTK, RTX, and OmniSTAR XP / HP. Bolt a metal spar to the roof or to a light bracket and then attach a V-plate for magnetic mounting.
- **VHB (Very High Bond) mount** – Attach a 5" x 5" plate or a V-plate directly to the roof for WAAS, EGNOS, and OmniSTAR VBS applications. See page 41.
- **Magnetic mounting** – Magnetic mounting for quick release is available for both VHB and spar type mounting.

Possible mounting methods

Display	V-plate on spar (removable)	VHB plate on roof (removable)	*Ag*15/*Ag*25/Zephyr bolted to spar mount
CFX-750 display	✓	✓	✓
FmX integrated display	✓	✓	✓
EZ-Guide 500	✓	✓	✓
*Ag*GPS 252/262	✓	✓	x
*Ag*GPS 434/442/542	✓	✓	✓

Note – *The V-plate antenna bracket is available separately. See Antenna mounting kits, page 8.*

Mounting an adjustable spar to roof bolts

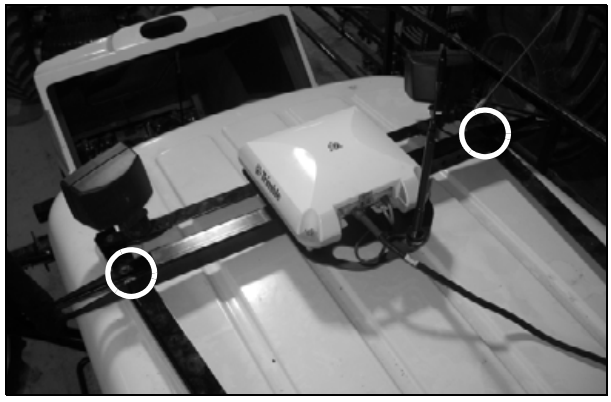
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

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.

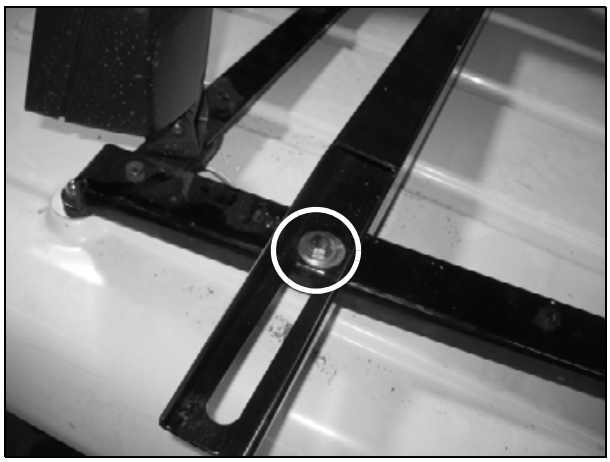


Step 2

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.

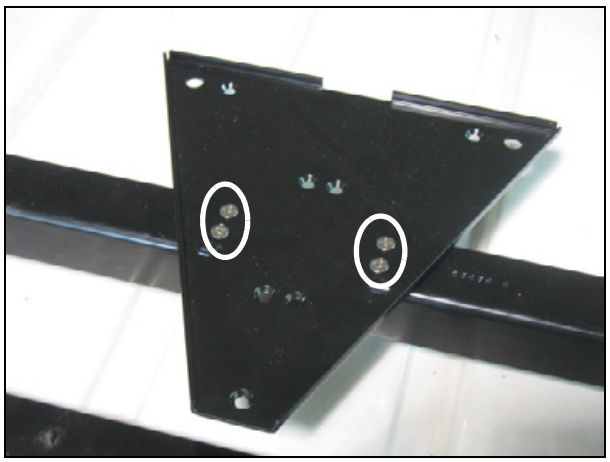
Note – *If the GNSS antenna is offset to the left or the right of the vehicle center-line Autopilot system performance may be affected. Before you tighten the cab bolts, make sure that the GNSS antenna is aligned with the center of the vehicle.*



Step 4

For a single magnet antenna mount, attach a V-plate with four ¼" flathead screws.

The narrow end points to the front of the vehicle.



V-plate on the spar



Zephyr mounted 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.

You can use the VHB mounting method to attach either a 5" x 5" plate or a V-plate.

- **GLONASS, RTK, RTX, OmniSTAR XP/HP:** The spar method is recommended. The V-plate provides repeatable positioning of the antenna.
- **WAAS, EGNOS, OmniSTAR VBS**: Use a 5" x 5" plate for simplified installation in applications where high accuracy is not critical.

Step 1

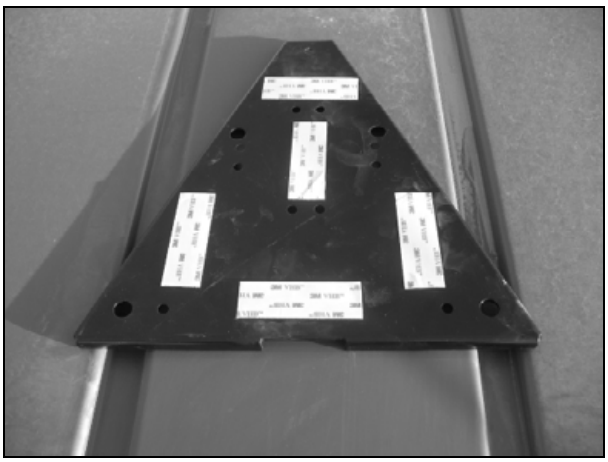
Pick a location on the cab roof where the GNSS antenna will be mounted level. Push down on the roof to find a firm location.

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



Step 2

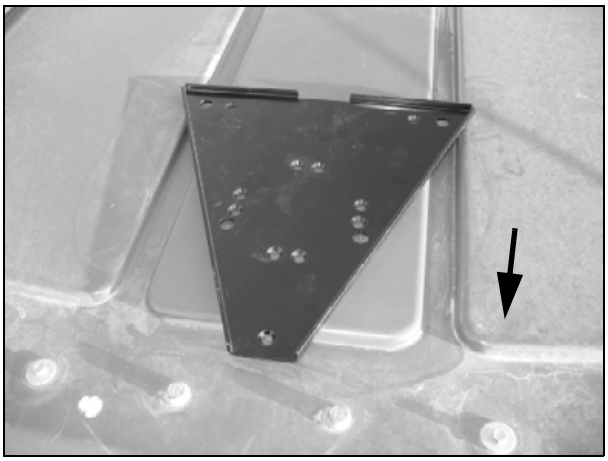
Remove the backing from one side of the VHB strips provided and then apply the strips to the plate.



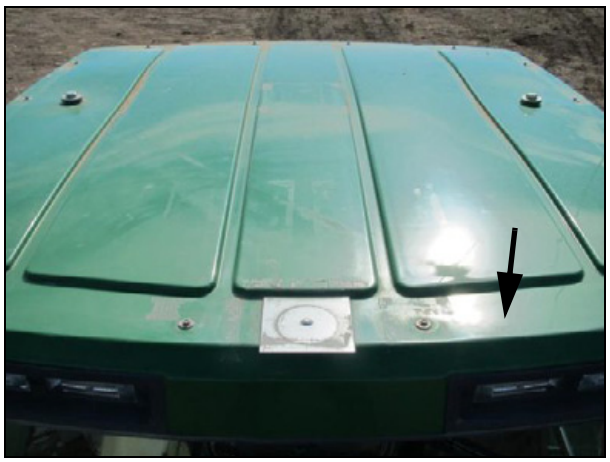
Step 3

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 on tractor



5" x 5" plate on tractor

CHAPTER

5

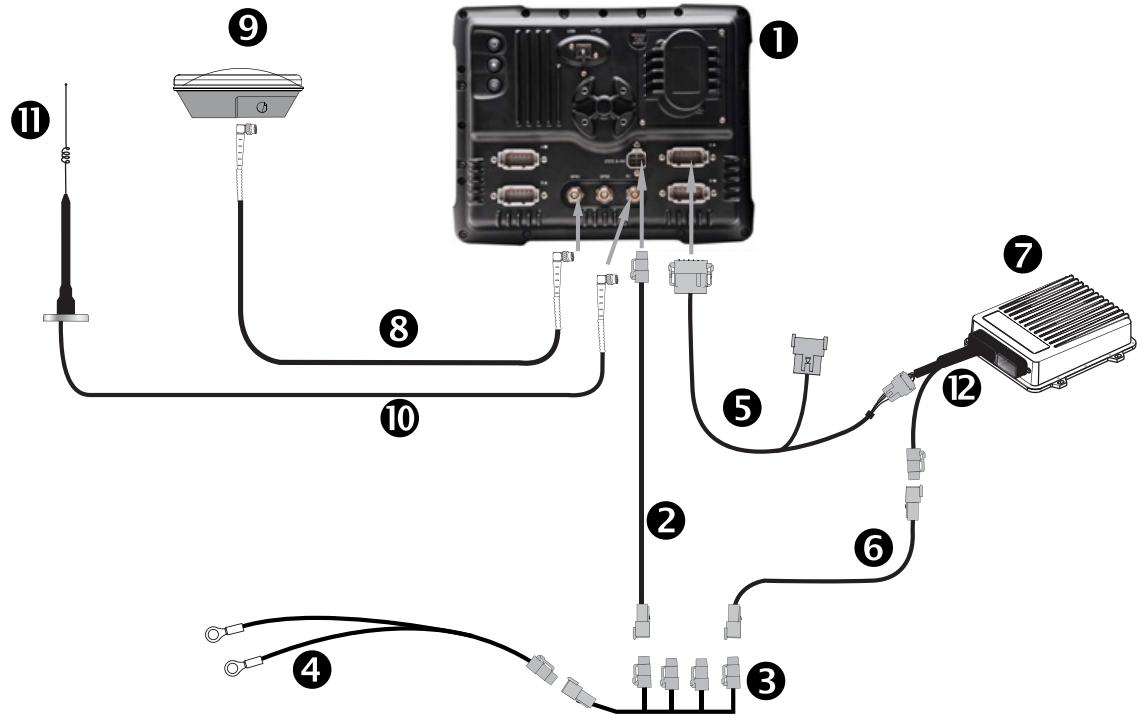
Display Installation

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
- 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.

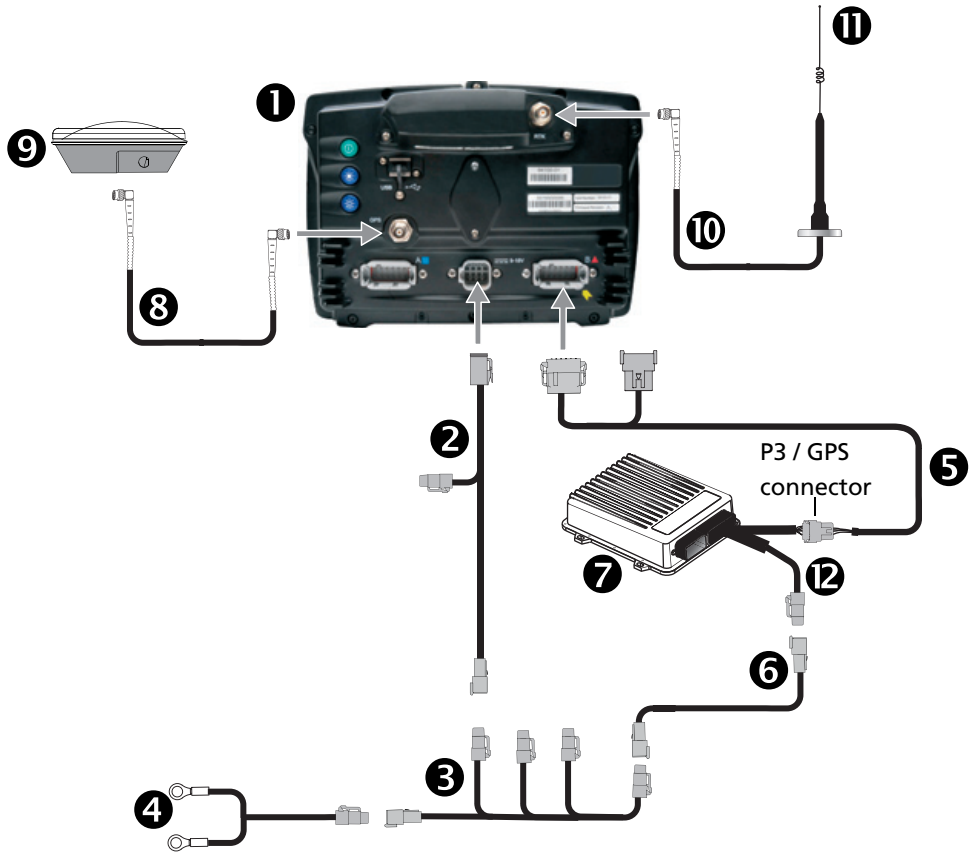
FmX integrated display components



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 GPS TNC/TNC RT angle cable	50449
❾	AG25 GNSS antenna	77038-00
❿	NMO to TNC 20ft antenna cable and base	62120
❶❶	900 MHz radio antenna kit	22882-10
⓬	Main NavController II cable	54601

CFX-750 display components

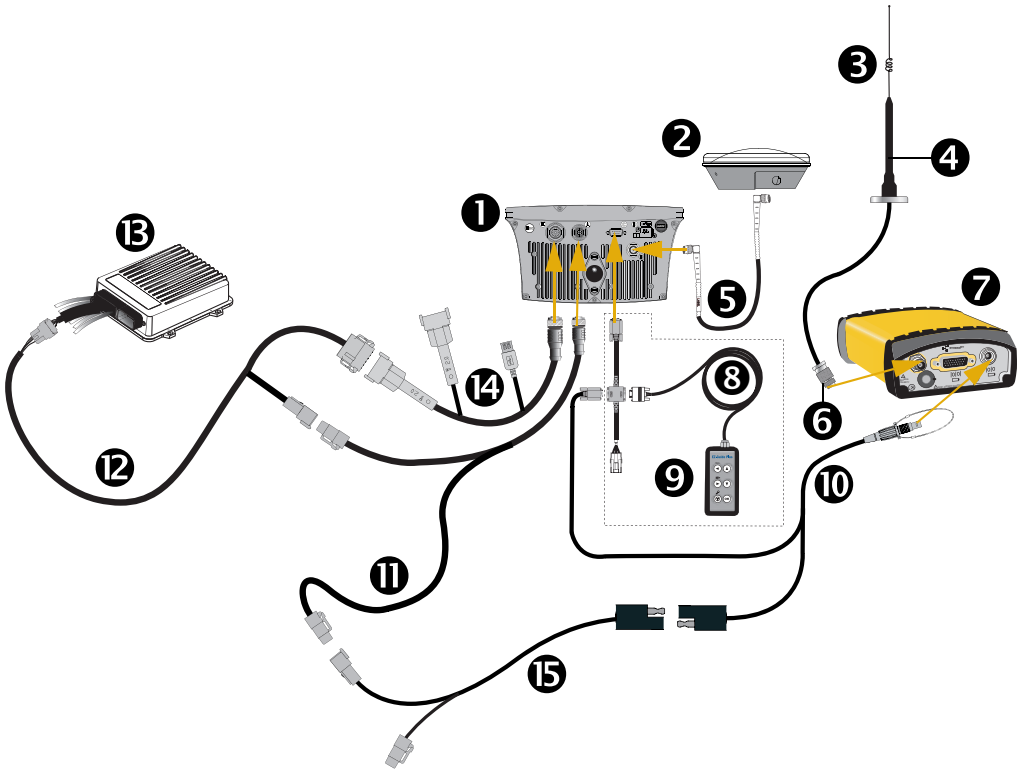


CAUTION – Connecting the Port Replicator on the CFX-750 display to NavController II cable ❺ to the P4 or P12 connector of the NavController II harness ⓬ will result in damage to the CFX-750 display and will void the warranty.

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 GPS TNC/TNC RT angle cable	50449
❾	AG25 GNSS antenna	77038-00
❿	NMO to TNC 20ft antenna cable and base	62120

Item	Description	Trimble part number
⓫	900 MHz radio antenna kit	22882-10
⓬	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	GPS antenna	57200-00
❸	SNB900 radio antenna	22882-00
❹	SNB900 radio antenna magnetic mount	62109
❺	GPS 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
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.

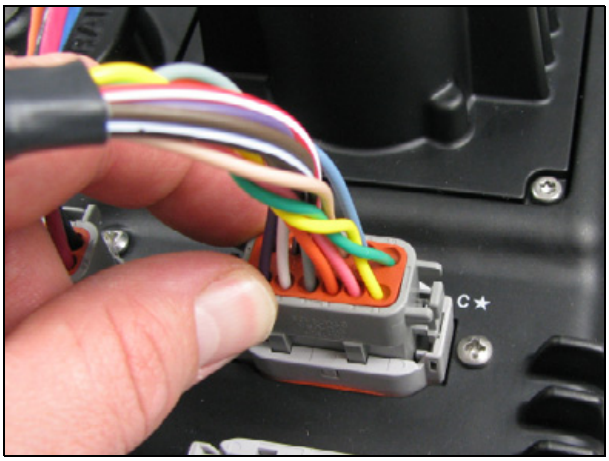
Step 1

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.

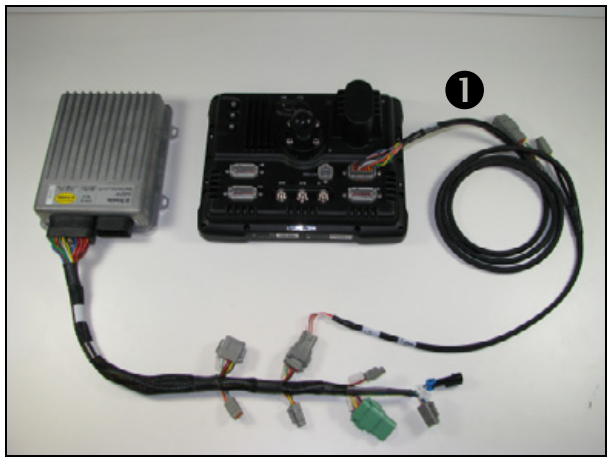
To connect power to the FmX integrated display, see Chapter 6, Power Harness Installation.



FmX integrated display: Installing the wiring harness

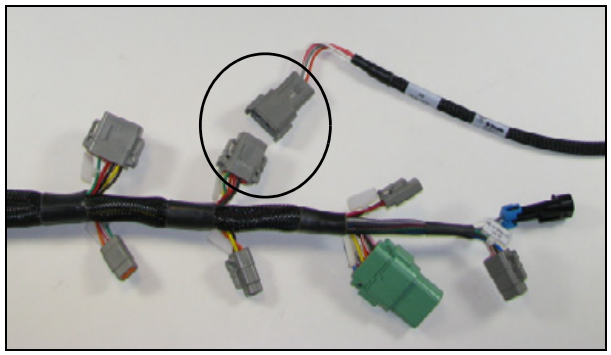
Step 1

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

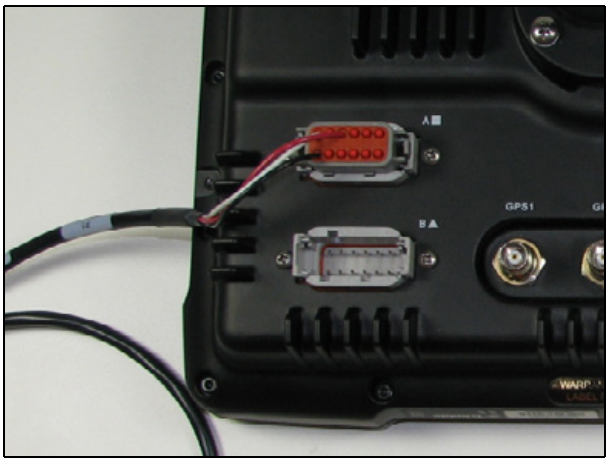
Step 3

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.

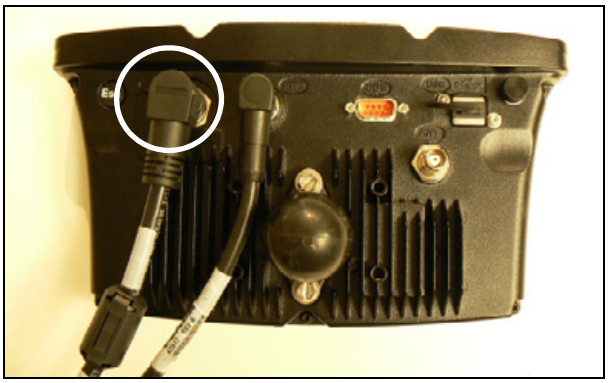


Connecting the EZ-Guide 500 lightbar cables

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

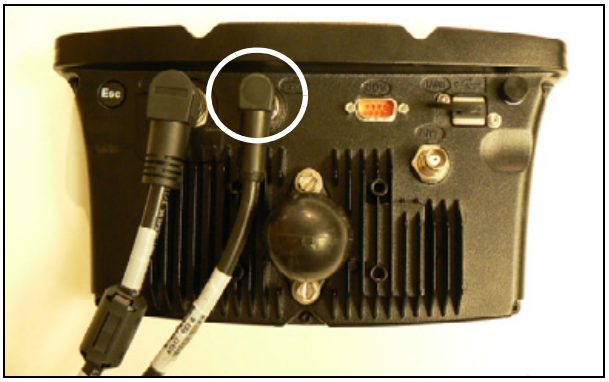
Step 1

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.

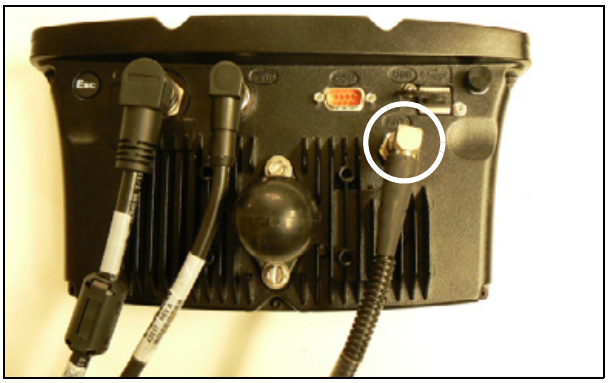


Step 3

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

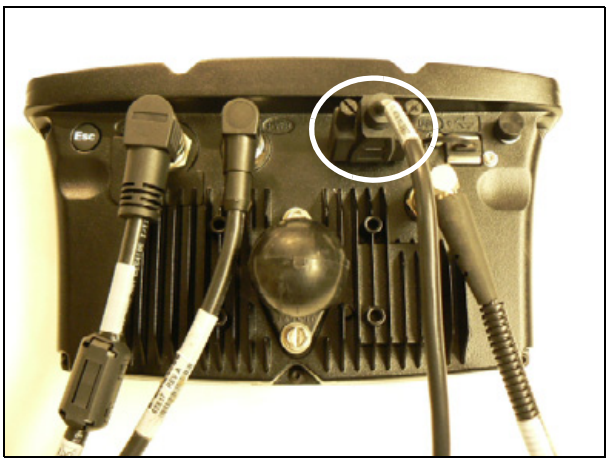
Feed the GPS antenna cable into the cab and then connect it to the antenna port on the back of the lightbar.



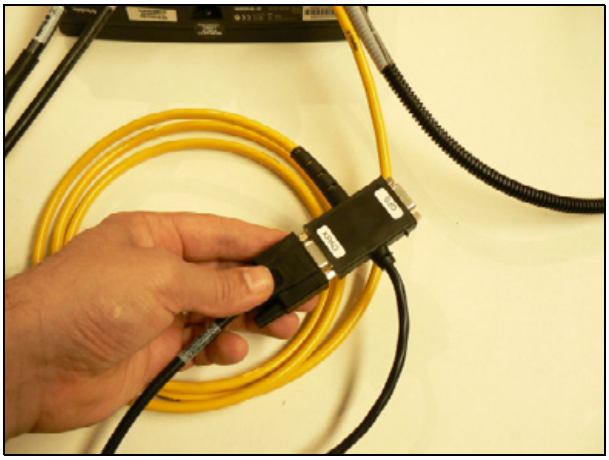
Step 5

With keypad

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

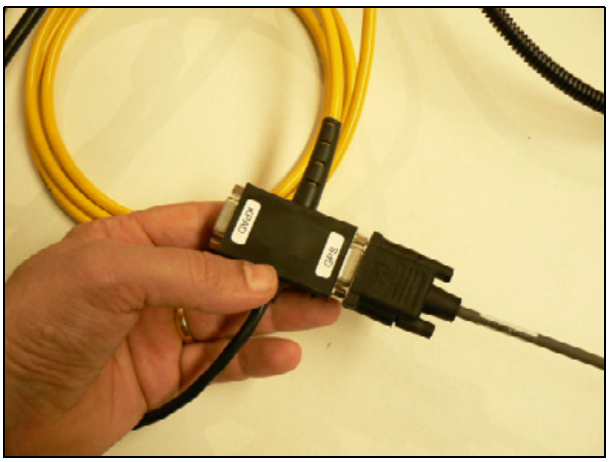


Connect the remote keypad to the KPAD serial port on the external interface cable.



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

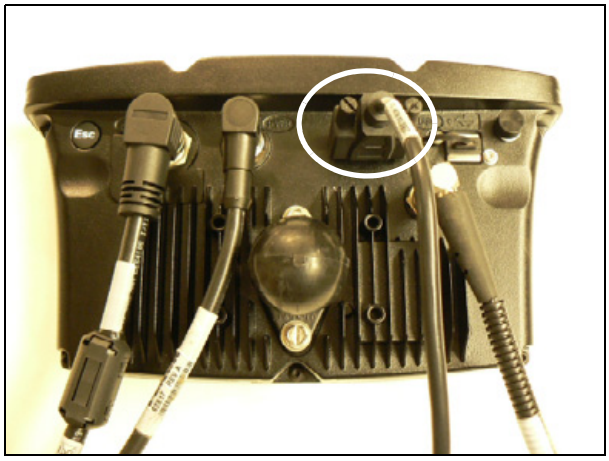
Radio type	Cable to connect
SNB900 radio	EZ-Guide 500-to-radio cable (P/N 61158)
PDL 450 radio	PDL radio power/data cable (P/N 51861-00)



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 separately. See Antenna mounting kits, page 8.*

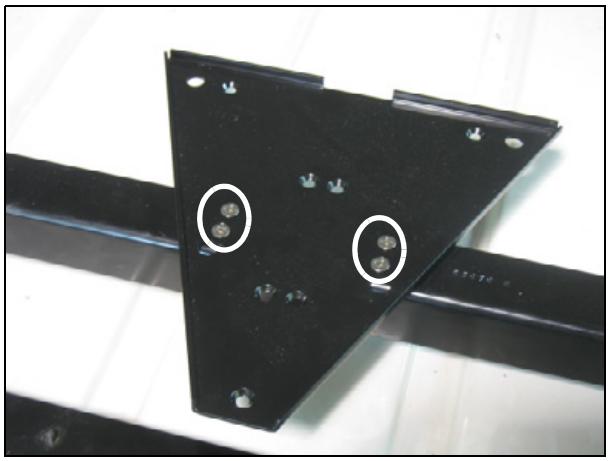
Use one of the following methods:

- Spar mount
- VHB adhesive

Spar mount method

Trimble recommends that you use this method for RTK, RTX, and OmniSTAR operations. For more information, see Antenna installation options, page 38.

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



Alternatively, use a 5/8" bolt to attach the antenna to the spar mount.



VHB adhesive method

You can use Very High Bond (VHB) to attach either a 5" x 5" plate or a V-plate.

- **GLONASS, RTK, RTX, OmniSTAR XP/HP**: The spar mounting method is recommended. The V-plate provides repeatable positioning of the antenna.
- **WAAS, EGNOS, OmniSTAR VBS**: Use a 5" x 5" plate for simplified installation in applications where high accuracy is not critical.

Step 1

Pick a location on the cab roof where the GNSS antenna will be mounted level. Push down on the roof to find a firm location.

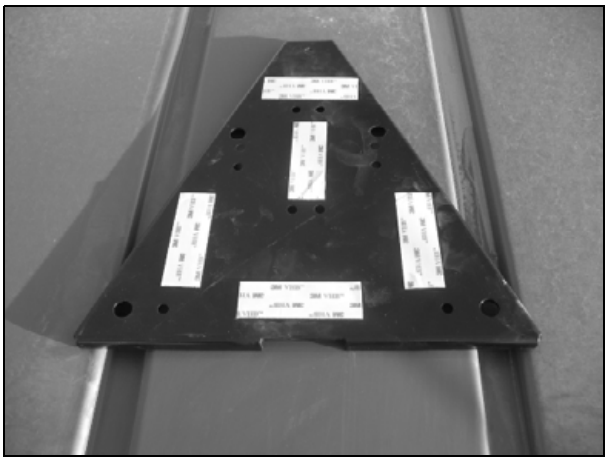
Clean the location on the roof of the cab with a light solvent to remove oil and dust.



Step 2

V-plate only

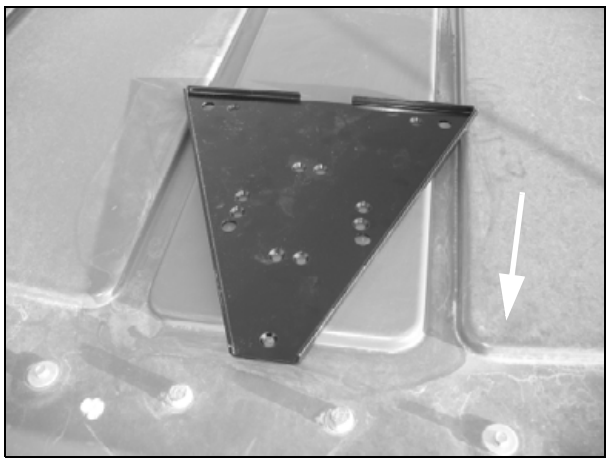
Remove the backing from one side of the VHB strips provided and then apply the strips to the plate.



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.*



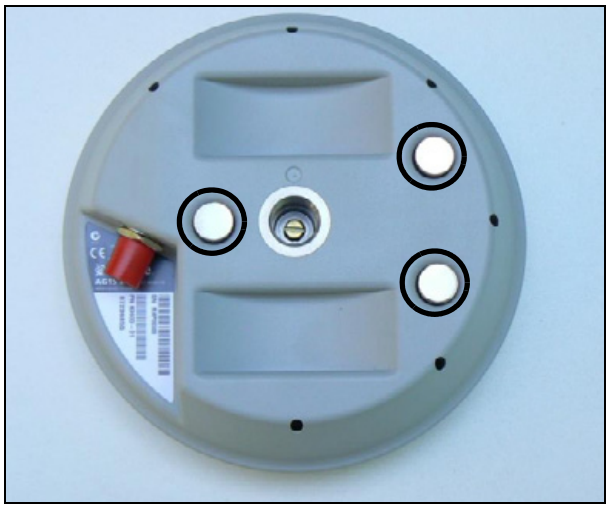
V-plate on tractor



5" x 5" plate on tractor

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

GLONASS, RTK, RTX, OmniSTAR XP/HP

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



WAAS, EGNOS, OmniStar VBS

Attach the antenna to the center of the 5" x 5" 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.



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 a 5" x 5" plate (P/N 62034) 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

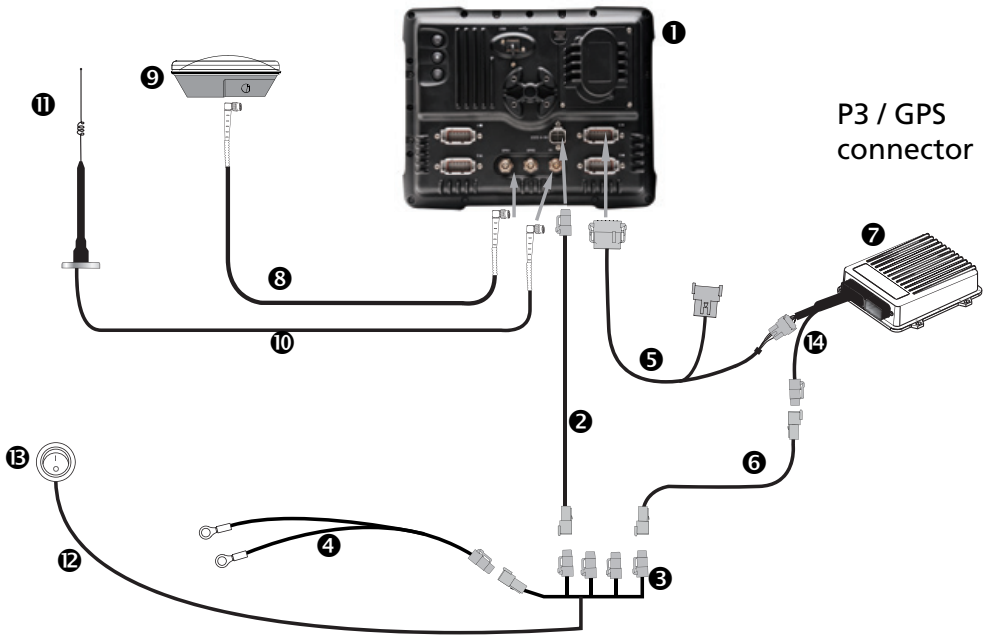
Power Harness Installation

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 power bus
- For the EZ-Guide 500 lightbar cable installation instructions see, EZ-Guide 500 lightbar components, page 71.

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

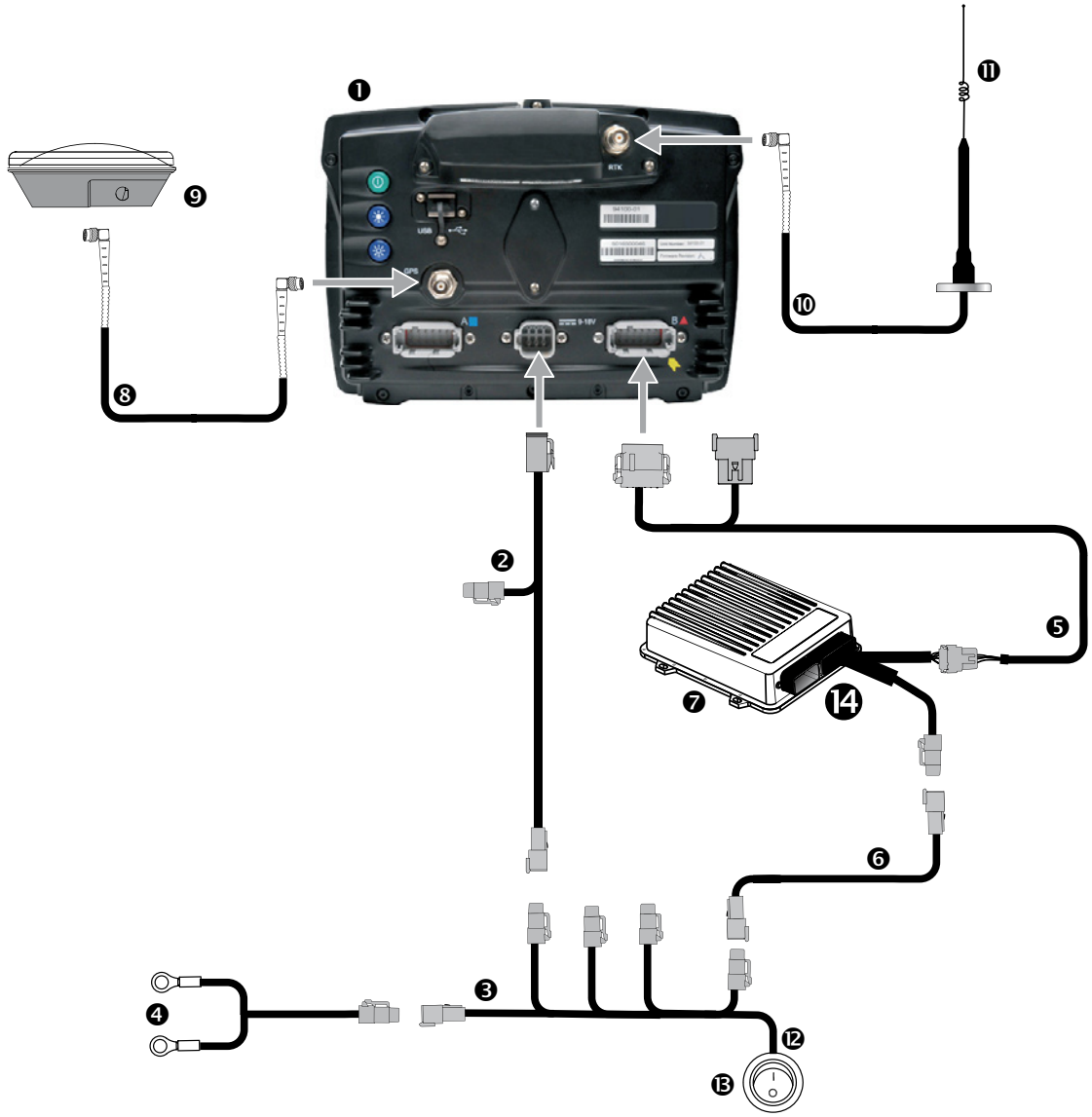
FmX integrated display components



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 GPS TNC/TNC RT angle cable	50449
❾	*Ag*25 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

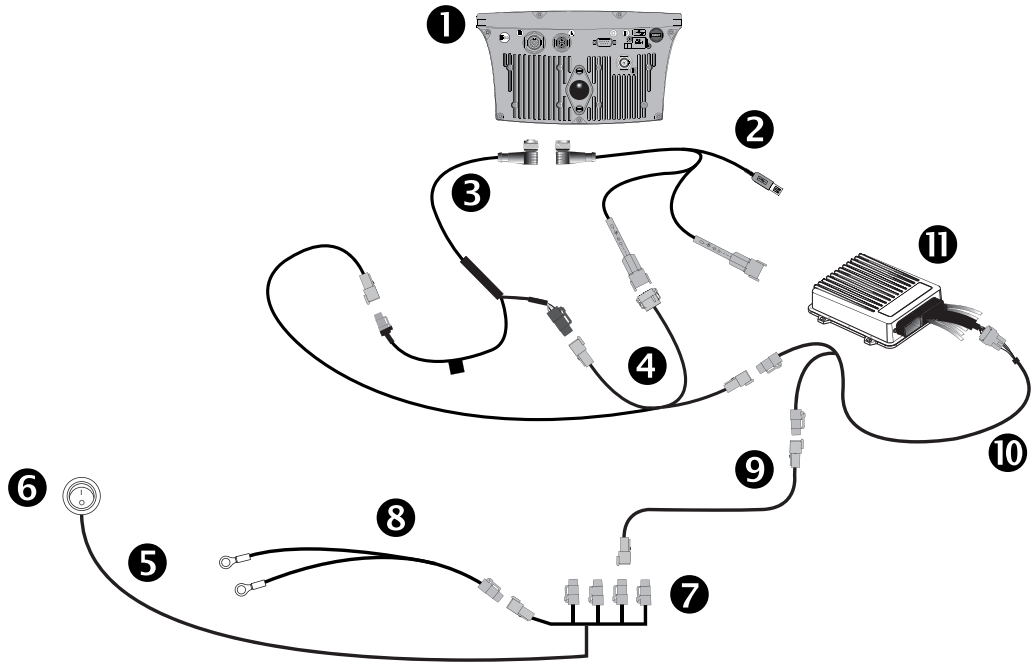


CAUTION – Connecting the Port Replicator on the CFX-750 display to NavController II cable ❺ to the P4 or P12 connector of the NavController II harness ⓮ will result in damage to the CFX-750 display and will void the warranty.

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 GPS TNC/TNC RT angle cable	50449
❾	*Ag*25 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



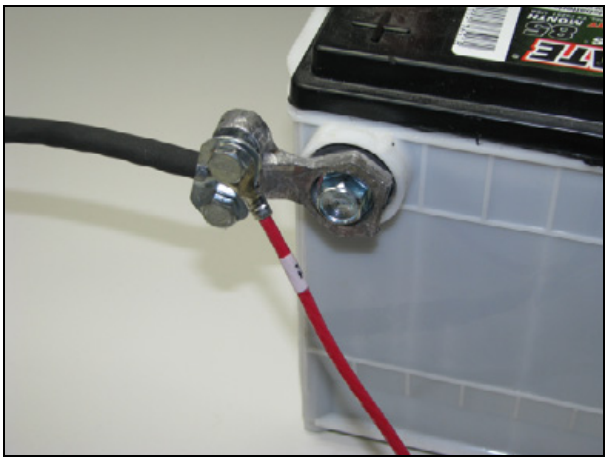
Item	Description	Trimble part number
❶	EZ-Guide 500 lightbar	
❷	EZ-Guide 500 lightbar 19 pin port expansion cable	62069
❸	EZ-Guide 500 lightbar/CAN 90° 5 pin connector	62817
❹	EZ-Guide 500 lightbar port A to NavController II cable	62754
❺	Switch cable	Part of 67259
❻	Switch	67095
❼	FmX power cable with 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.

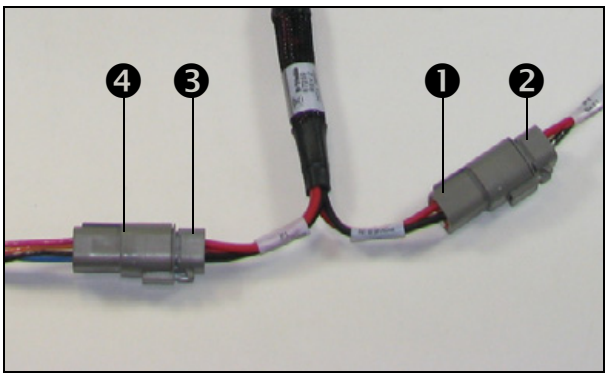
Step 1

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



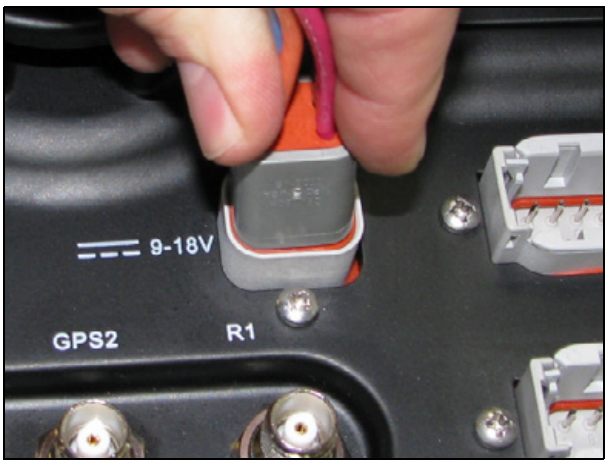
Step 2

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 power bus

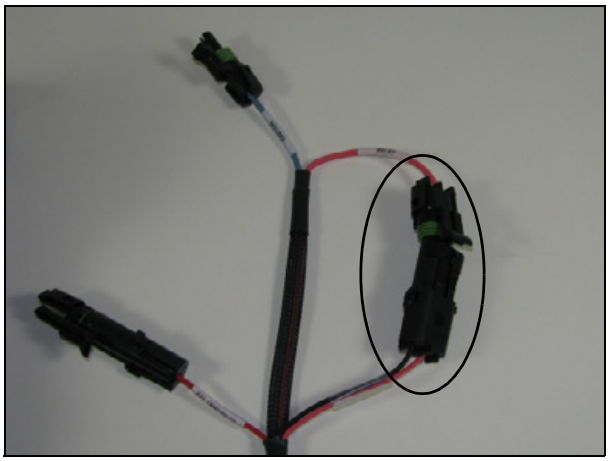
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

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.

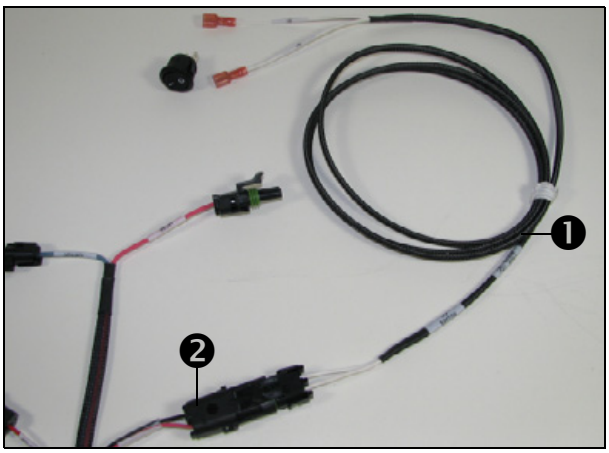


External switch is used to turn on the Autopilot system

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.

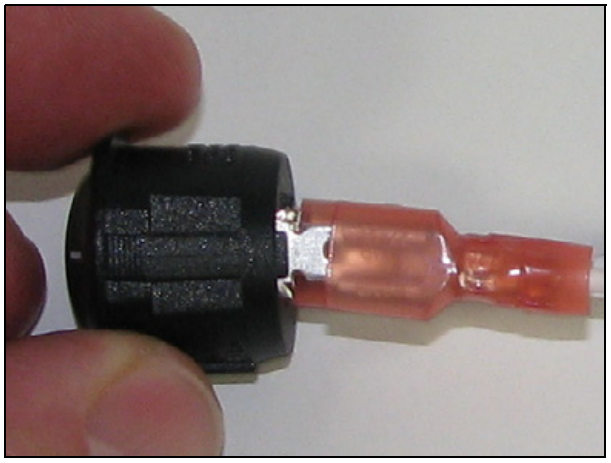
Note – *To install the switch provided, drill a ¾" hole.*



Step 2

Connect the cable labeled R7 to the switch pins.

Note – *Polarity is not important.*

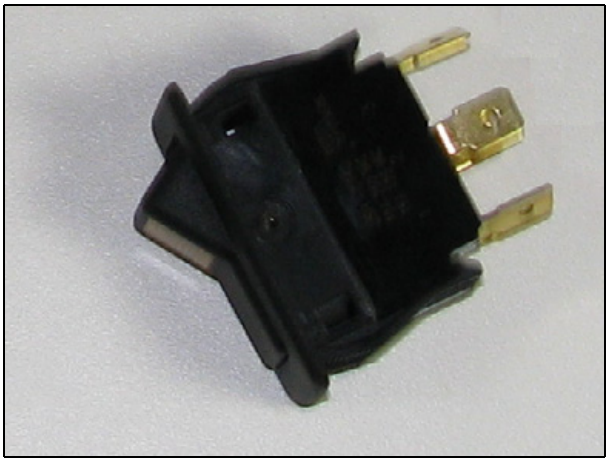


Installing the optional illuminated full or standard Euro switch

Step 1

Find an available knockout location on the vehicle console.

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

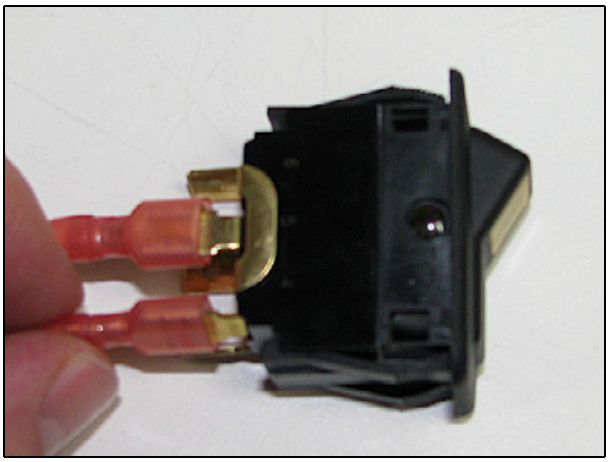


Step 2

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.

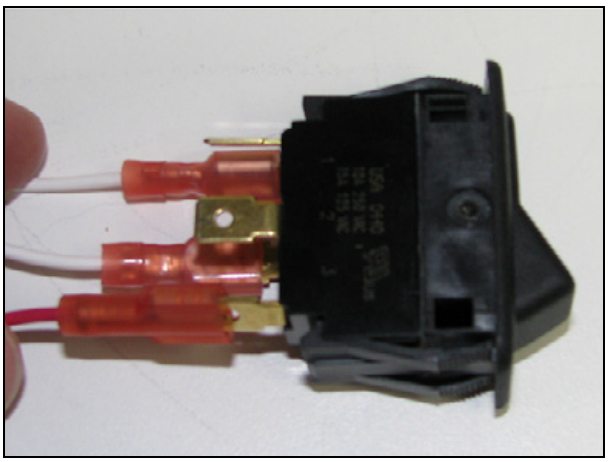
Note – *Polarity* ***is*** *important.*



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.*

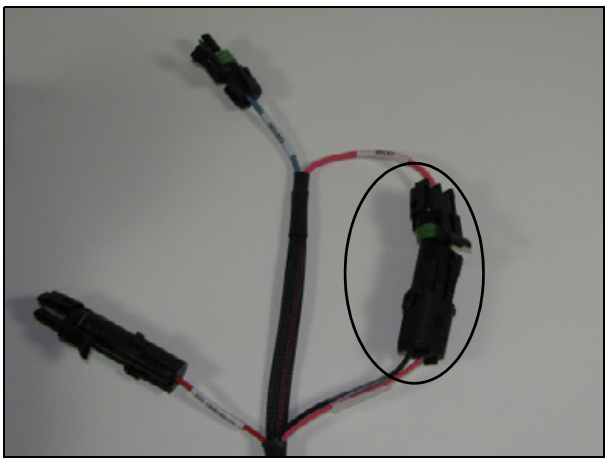


Ignition is used to turn on the Autopilot system

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.*

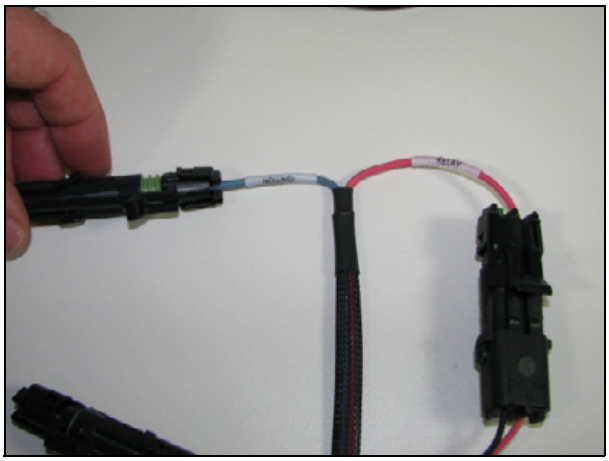


Step 2

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

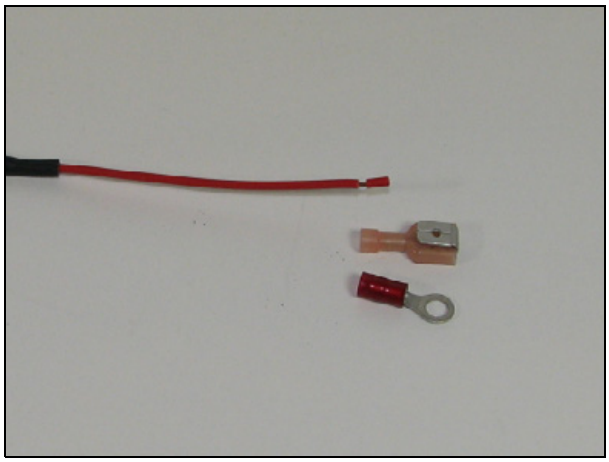
Step 3

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.



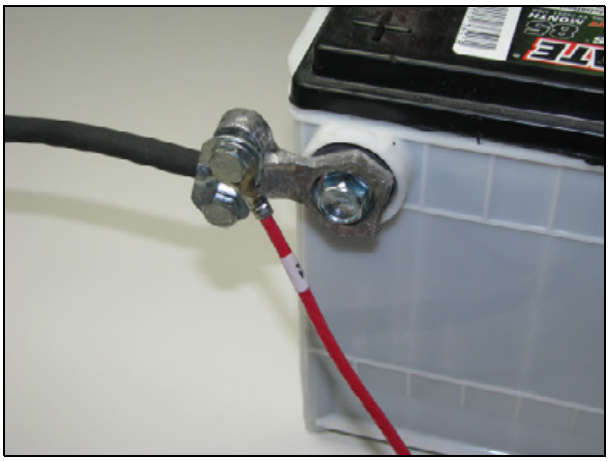
Configuring the power bus options for the EZ-Guide 500 lightbar

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 71**.*

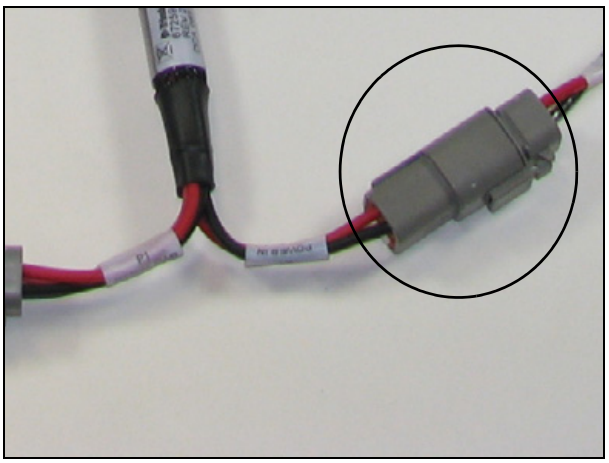
Step 1

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



Step 2

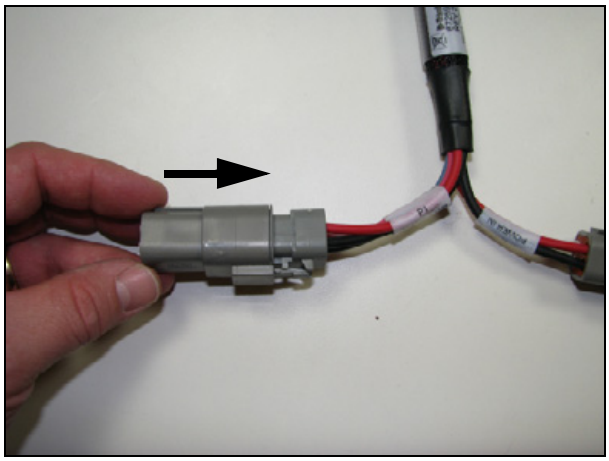
Locate and connect the 4-pin Deutsch DTP receptacle on the power bus to the 4-pin Deutsch DTP plug on the basic power cable.



Step 3

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

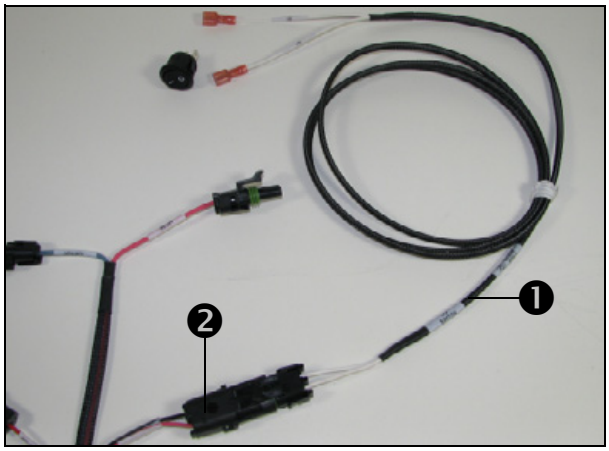
Note – *Damage to the system may result if the protective receptacle is not in place.*



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.

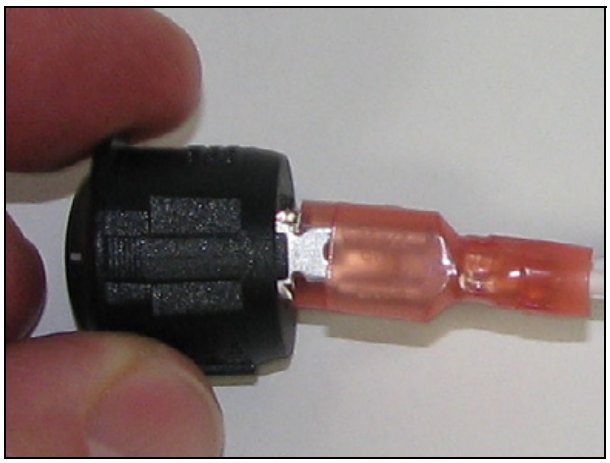
Note – *To install the switch provided, drill a ¾" hole.*



Step 5

Connect cable labeled R7 to the switch pins

Note – *Polarity is not important.*

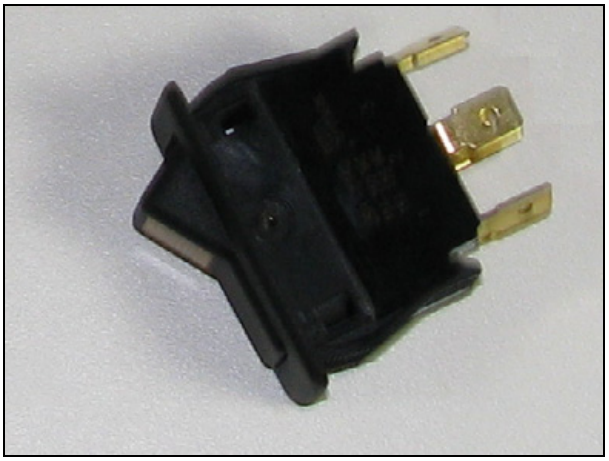


Installing the optional illuminated full or standard Euro switch

Step 1

Find an available knockout location on the vehicle console.

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

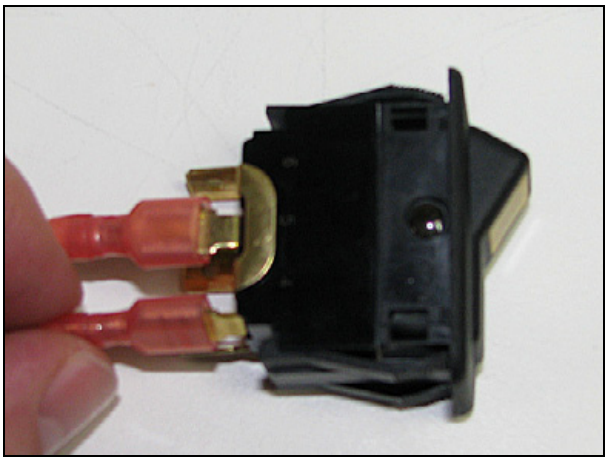


Step 2

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.

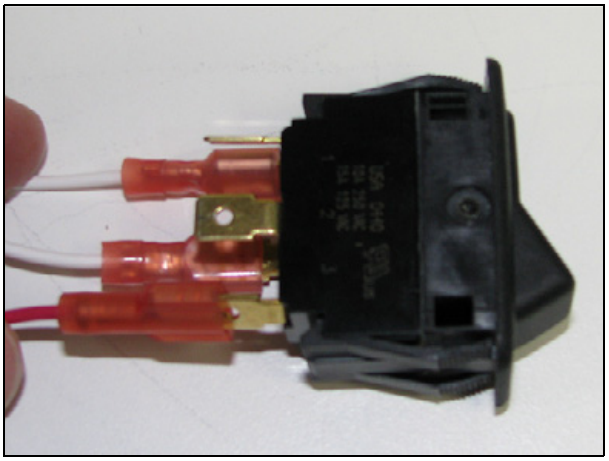
Note – *Polarity* ***is*** *important.*



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

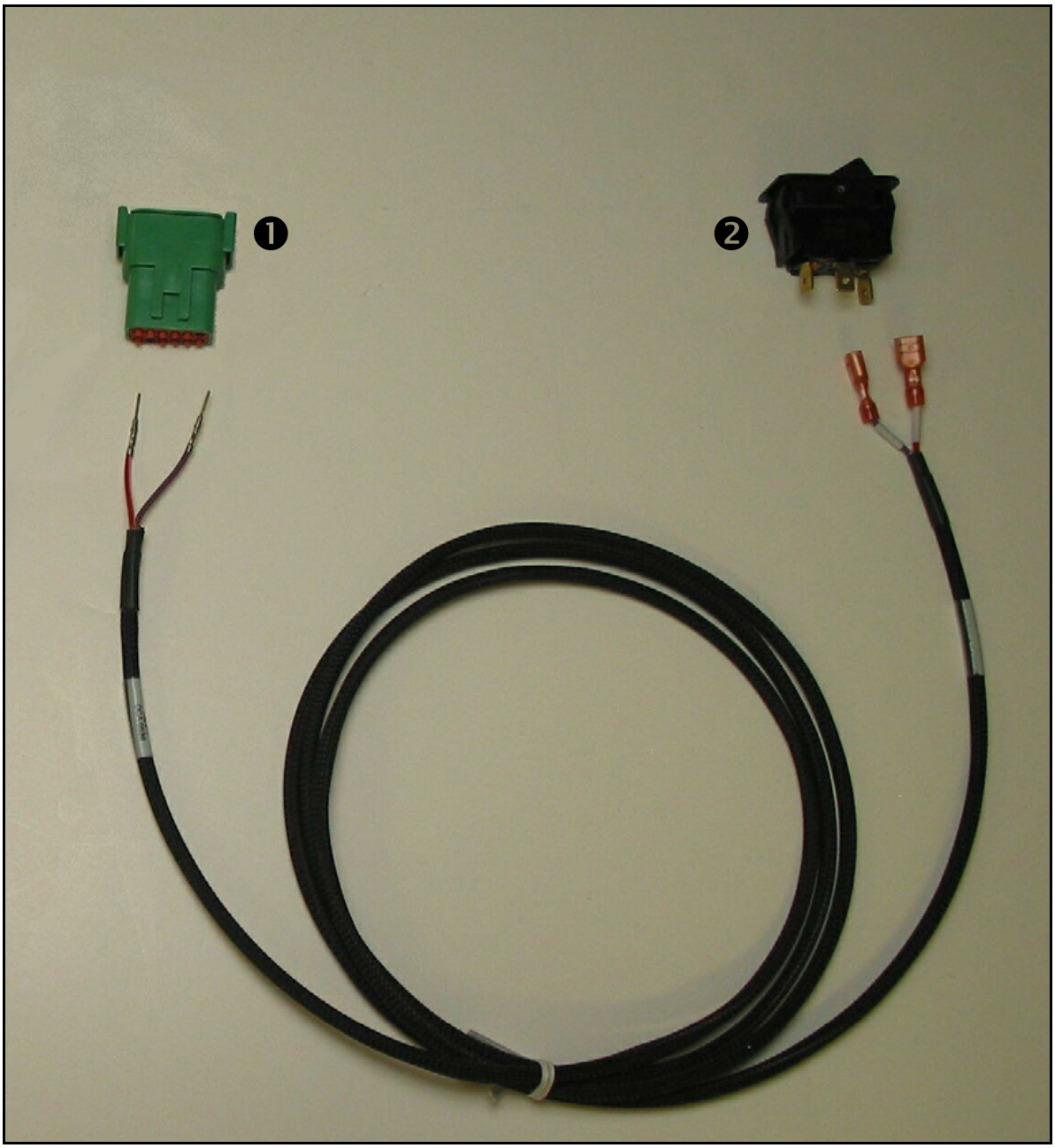
Remote Engage Switch Installation

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.

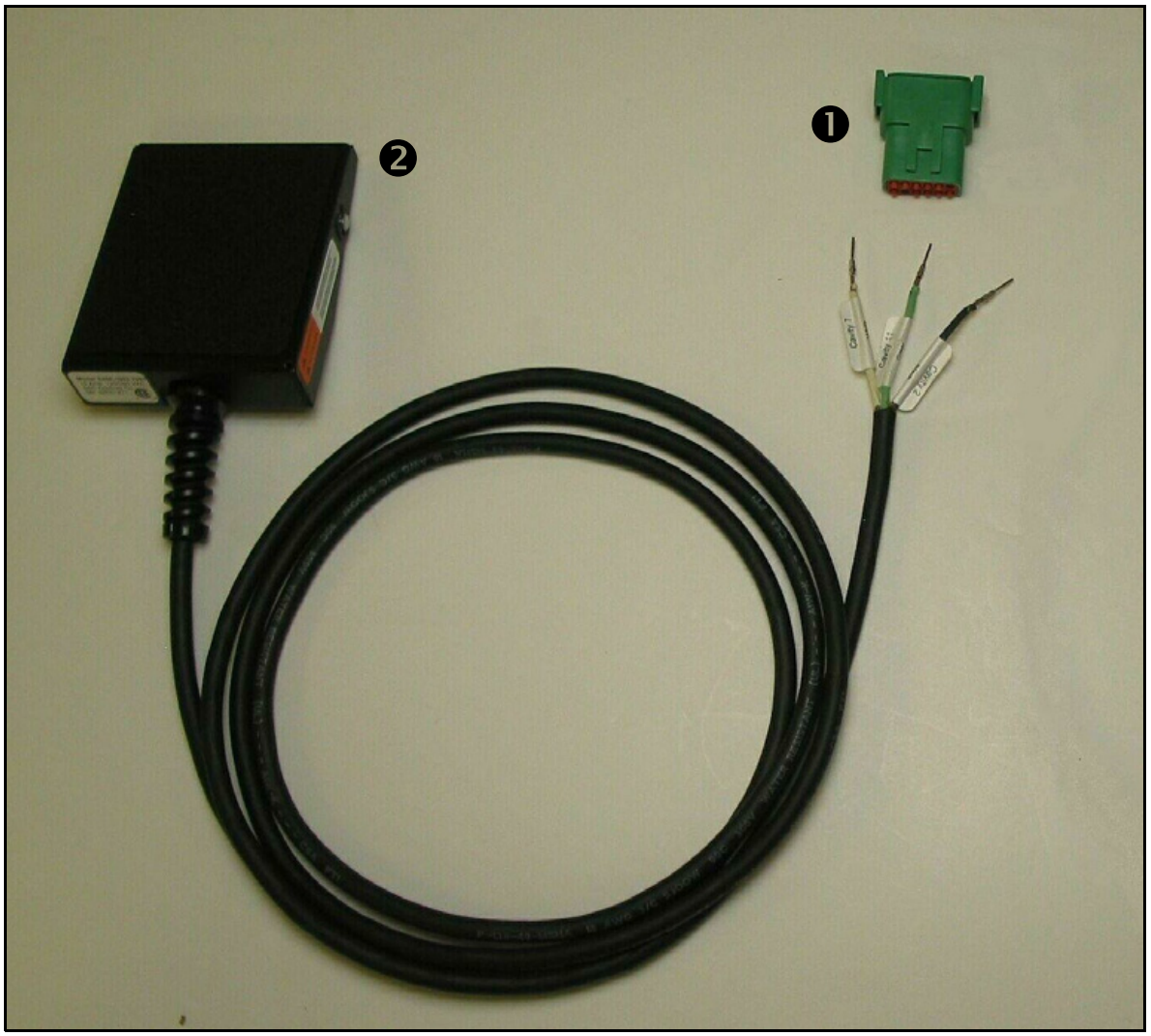
Remote engage switch components: Rocker switch



Item	Description
❶	DTM receptacle
❷	Remote engage rocker switch

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

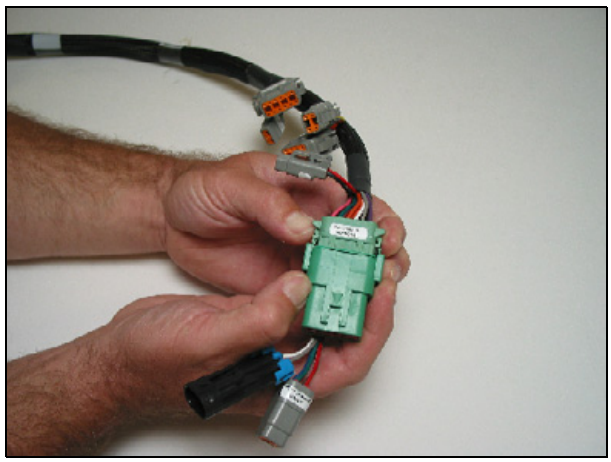
Remote engage switch components: Foot switch



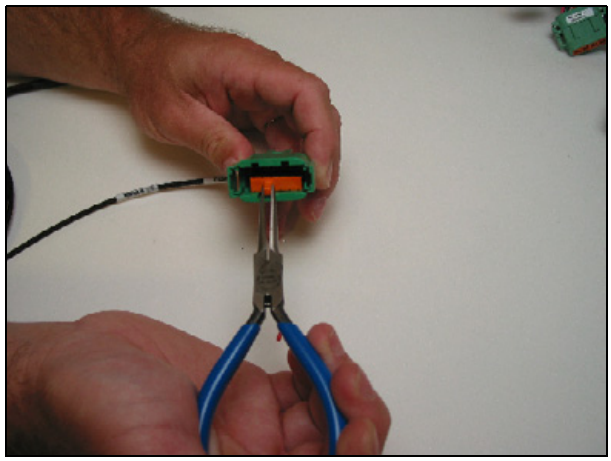
Item	Description
❶	DTM receptacle
❷	Remote engage foot switch

Preparing the remote engage cable

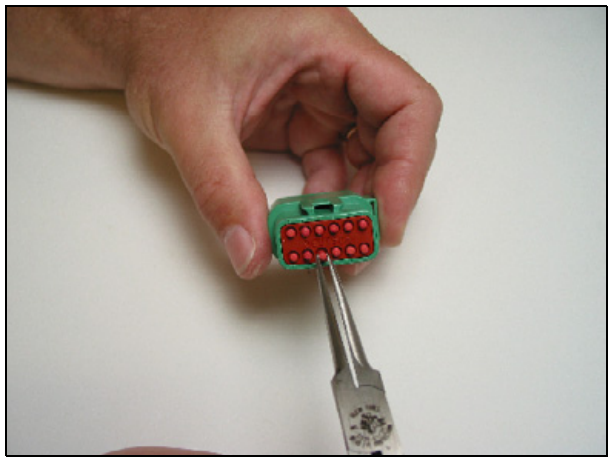
1. Locate the green 12-pin Deutsch receptacle on the P-5 leg of the main controller harness. For more information, see Chapter 8, Controller Installation.



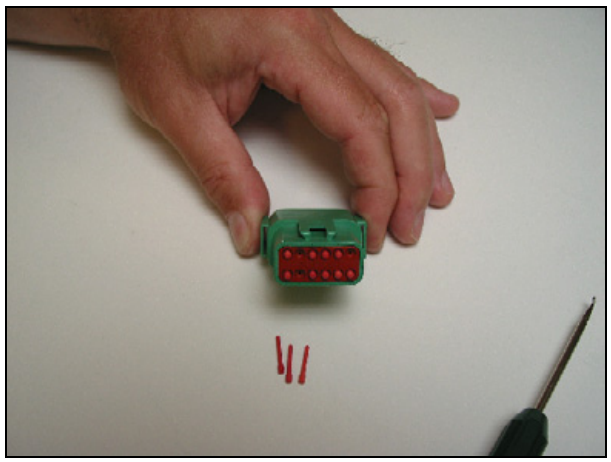
2. Remove the wedge from the connector.



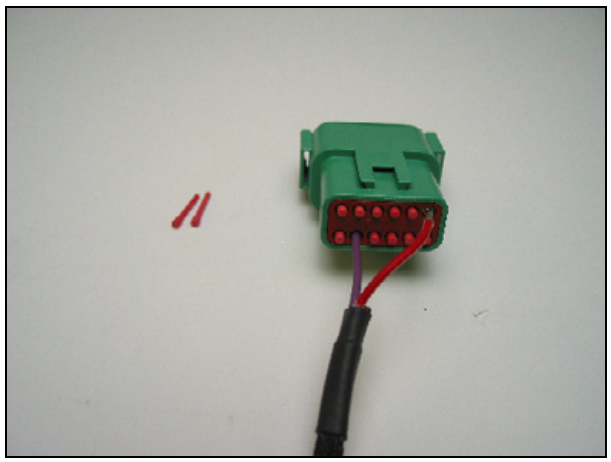
3. ***Rocker switch only***: Remove the plugs from cavity 2 and cavity 7.



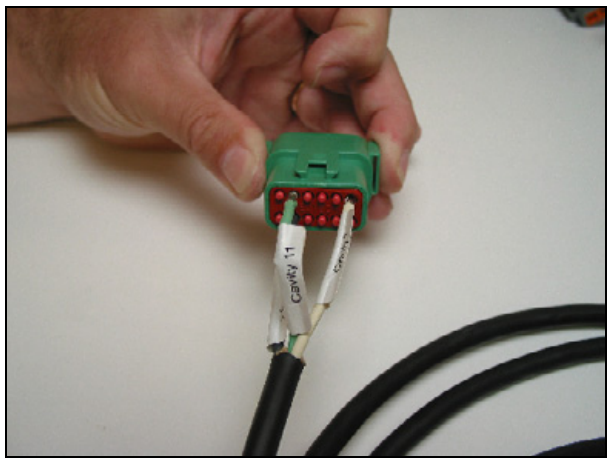
4. ***Foot Switch Only:*** Remove the plugs from cavity 2, cavity 7, and cavity 11.



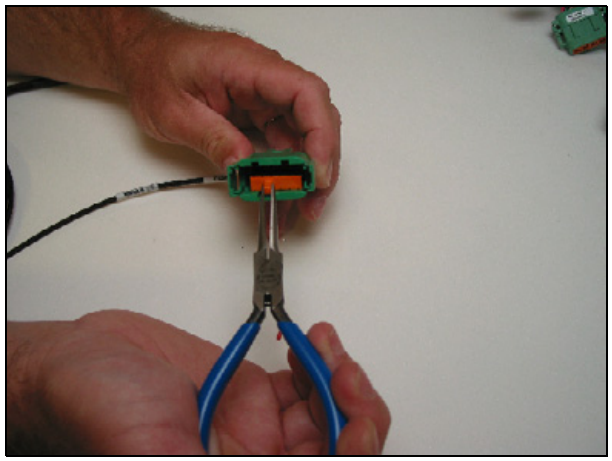
5. ***Rocker switch only***: Insert the DTM pins into cavity 2 and cavity 7, according to the labels on the wires.



6. ***Foot switch only***: Insert the DTM pins into cavity 2, cavity 7, and cavity 11, according to the labels on the wires.



7. Pull on the wires to seat them in place and then replace the wedge in the connector.



8. Plug the assembled Deutsch receptacle into the P-5 leg of the Autopilot controller harness. See Chapter 8, Controller Installation.

9. ***Rocker switch only***: Run the spade ends of the cable to a knockout location in the operator console.

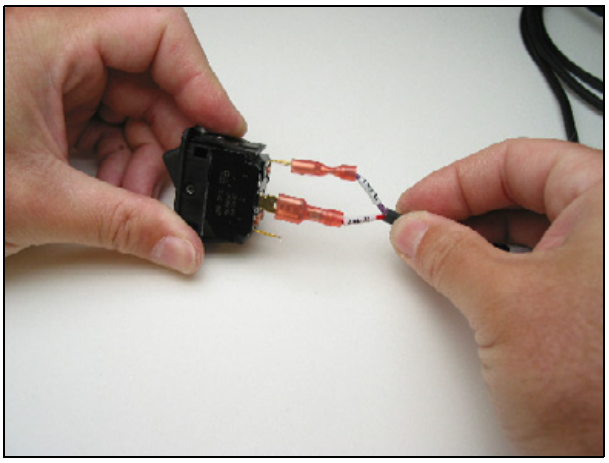


10. ***Foot switch only:*** Run the cable to a clear location on the floor board. Use double-sided tape to secure the pedal. Route the cable under the floor mat.

11. ***Rocker Switch Only:*** Connect the wires to the switch. Match the print on the switch body with the labels on the wires.







12. ***Rocker Switch Only:*** Place the switch in the console.

Using the remote engage switch

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.*

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

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

Step 1

Locate the left side fender beside the operator's seat.

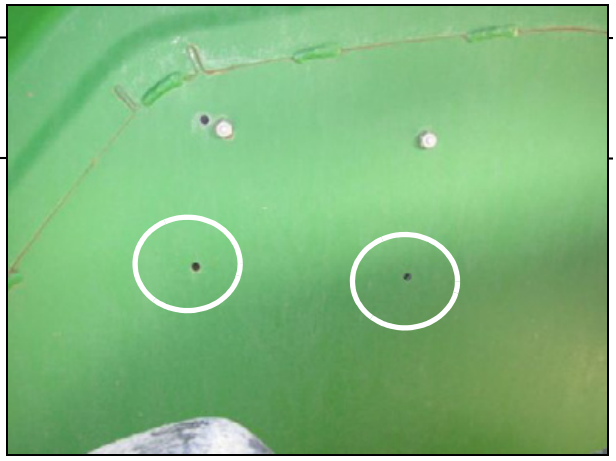
Place the controller mounting plate against the fender's wall.

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



Step 2

WARNING – Before drilling, inspect the back side of the fender for electrical cables.



The plate must be level when attached to the tractor.

Using the mounting plate as a template, drill four 5/16" holes and then fasten the plate using the ¼" hardware provided.

This figure shows the back side of the fender.

Step 3

Before you install the controller, attach the main and auxiliary cable harnesses.

Use an Allen wrench to secure the connectors to the controller.



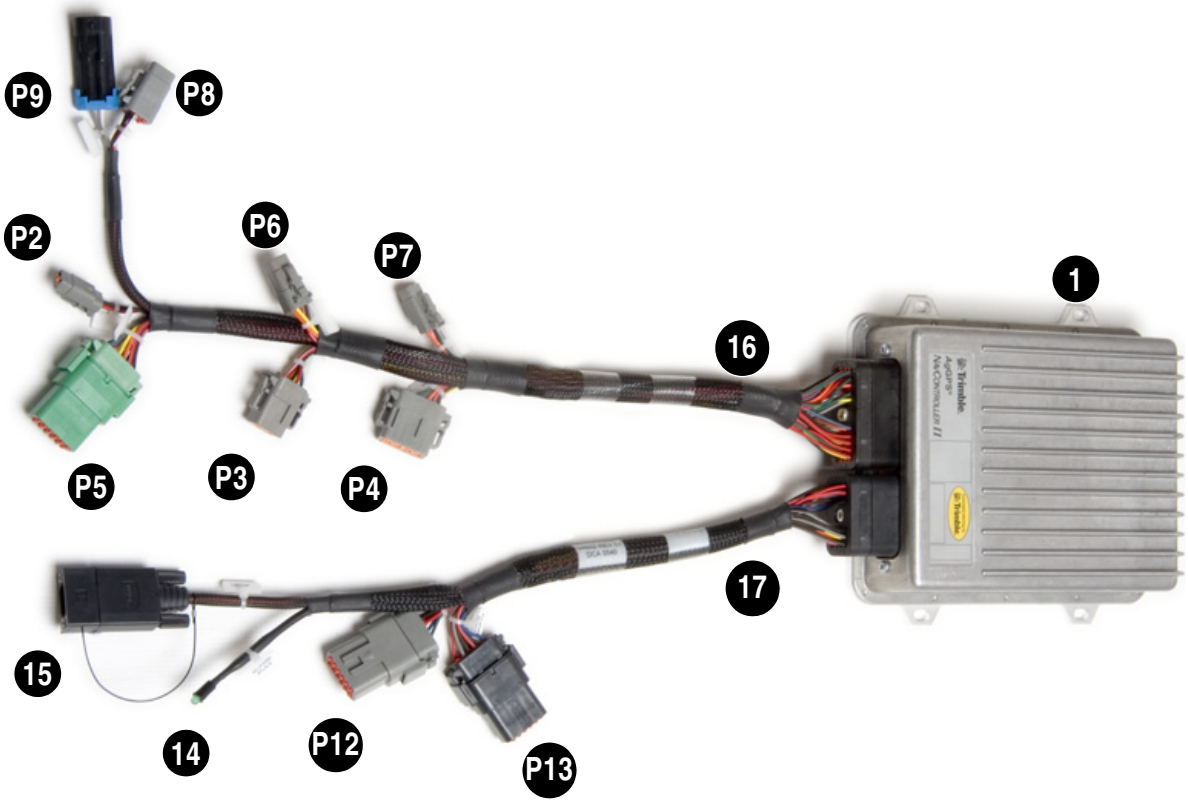
Step 4

Install the controller with the connectors pointing to the back of the tractor.

Use the four #10-32 screws provided.



Controller connections



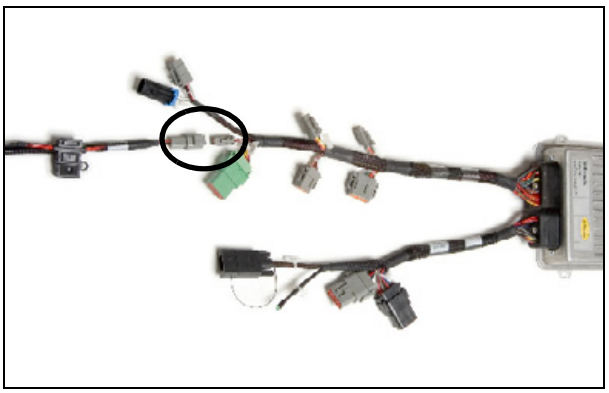
Item	Description
1	NavController II controller
P2	Power connector
P3	GPS connector
P4	Display connector
P5	Vehicle sensors connector
P6	Steering sensor connector
P7	Manual override connector
P8	Hydraulic valve connector

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

Step 1

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

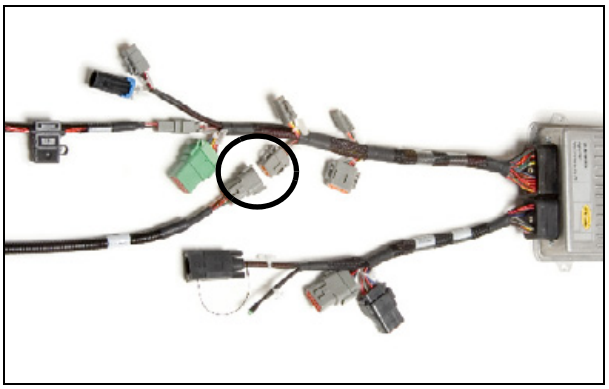
Note – *The power connection supplies power through the controller to all connected devices, including GPS and displays.*



Step 2

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

Note – *For CFX-750 and FmX display installations, plug in the display cable at this step.*

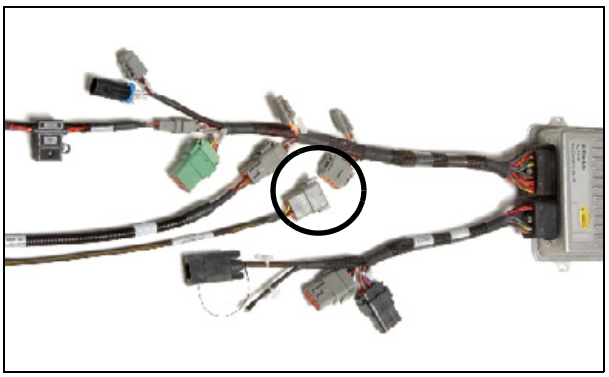


Step 3

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

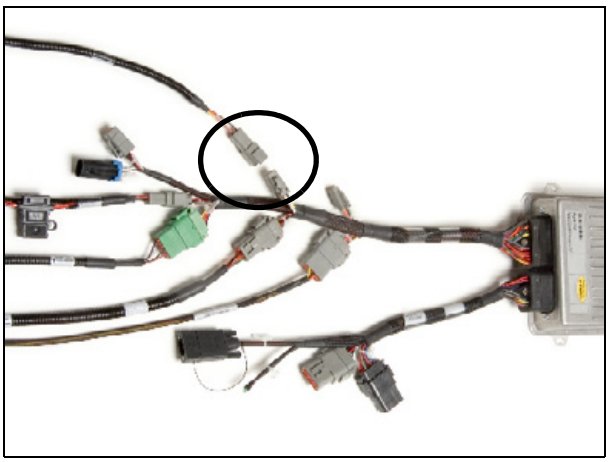
Note – Do not *connect the cable to the connector labeled “Spare” on the auxiliary harness.*

Note – Do not *use this connection for CFX-750 and FmX display installations.*



Step 4

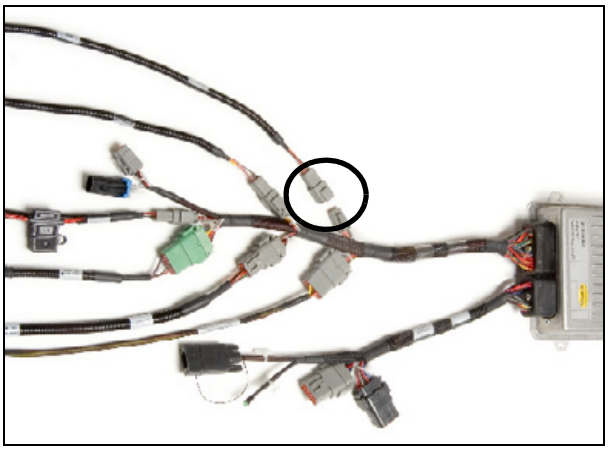
Connect the steering sensor cable connection to P-6, which is labeled “Steering Sensor”. P-6 is located on the main wiring harness.



Step 5

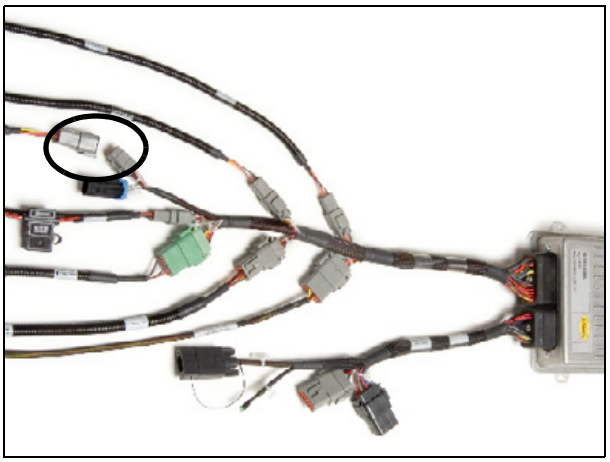
Connect the manual override cable connection to P-7, which is labeled “Manual Override”. P-7 is located on the main wiring harness.

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



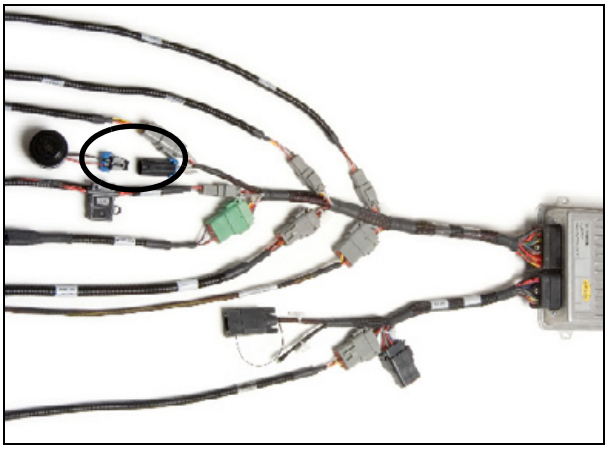
Step 6

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



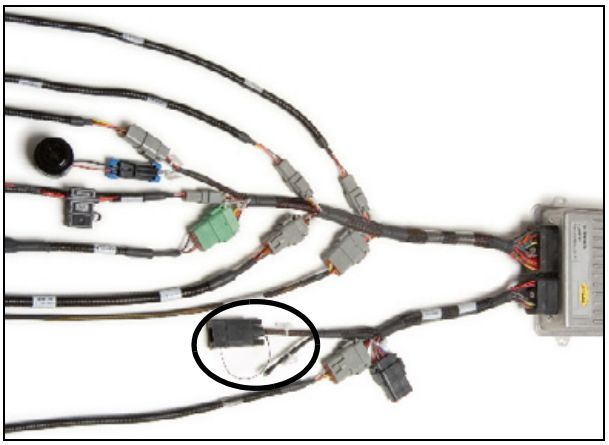
Step 7

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

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

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. Start the machine and check for hydraulic leaks. Correct as needed.
2. Update the Trimble display and the NavController II to the latest firmware from http://www.agpartners.trimble.com.

   You can use FlashLoader 200 software version 3.19 to update the controller: Download it from http://agpartners.trimble.com.
3. Load the correct configuration file into the NavController II for the machine model being used.

   Download the latest set of External Vehicle Profiles files from http://www.agpartners.trimble.com.

   You can use Autopilot Toolbox II software version 2.90 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 2.90. 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