INSTALLATION INSTRUCTIONS

Autopilot™ Automated Steering System

Challenger

- **MT945C**
- **MT955C**
- **MT965C**
- **MT975C**

Version 5.00
Revision A
February 2012
Part Number 54036-80-E05

Trimble

Agriculture Business Area

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Class B Statement – Notice to Users. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

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Or

Mail a request for recycling instructions to:

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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.

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CHAPTER

1

Introduction

- 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 54036-80	5/8" or 11/16" drill bit Allen wrench set (metric and SAE) Combination wrench set (metric and SAE) Standard and phillips screwdrivers sets, T-30 Torx bit

Antenna mounting kits

Antenna options
Antenna spar mount: P/N 0795-0290
Antenna V plate mount and *Ag*GPS 262 receiver magnetic mount: P/N 62388-01 (includes magnets for quick release of the *Ag*GPS 262 receiver – see Chapter 3, 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 54036-80)	CAN Bus cable	Chapter 2
	Power cable	Chapter 2
	Bolt kit controller	Chapter 2
Common parts	Controller	Chapter 7
	Controller mounting bracket	Chapter 7
	Cable kit: • Main wiring harness • Power bus auxiliary wiring harness • Sonalert alarm	Chapter 7
GNSS receiver	GNSS receiver	Chapter 3
	GNSS antenna	Chapter 3
	GNSS receiver power/data cable	Chapter 3
	RTK radio, cable, and radio antenna	Chapter 3

Hardware	Component	See...
Display	CFX-750 display	Chapter 4
	FmX integrated display	Chapter 4
	EZ-Guide 500 lightbar	Chapter 4
	Display cable	Chapter 4
	Mounting bracket	Chapter 4
Roof bracket kit: (P/N 0795-0290)	Roof brackets	Chapter 3
	Bolt kit, roof bracket	Chapter 3

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

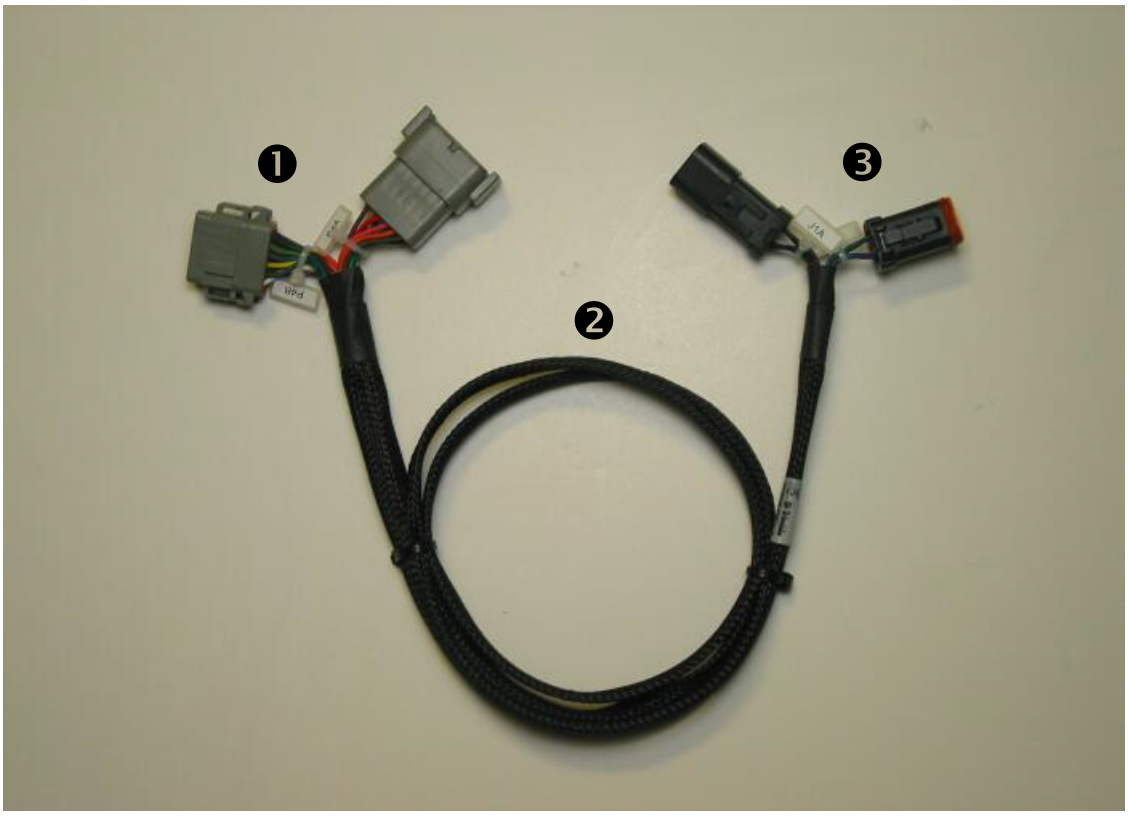
2

CAN Bus Installation

- CAN bus cable components
- Setting up the CAN bus

This chapter describes how to install the CAN interface cable in the vehicle.

CAN bus cable components



Item	Description
❶	Autopilot jumper
❷	CAN bus cable
❸	CAN jumper

Note – *Connect to the P12 connector on P/N 54601. Do not connect to the P4 connector.*

Setting up the CAN bus

Step 1

Start the vehicle. The arm rest controller shows the Home screen.

Rotate the selector knob ❶ to highlight the Wrench icon ❷ and then press the selector knob inward.



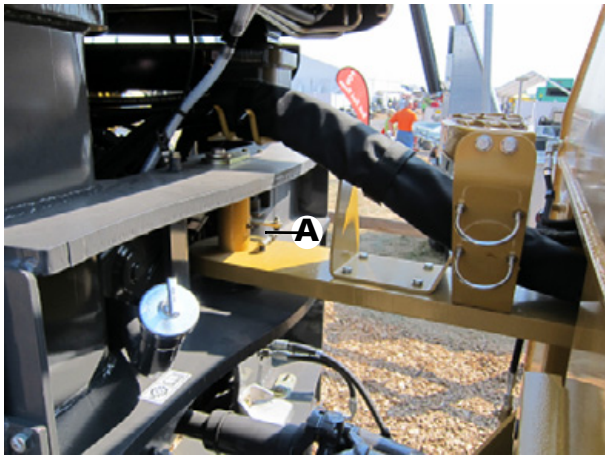
Step 2

Check that the operating system is version 2.0.00 or later. To update the operating system, contact your Caterpillar dealer.



Step 3

Make sure that the machine is AutoGuide Ready: If it is, it will have an articulation sensor (A).



WARNING – Take the proper precautions when standing near the articulation point to inspect for the sensor. Make sure that the engine is off, or that the hydraulic articulation cylinders are blocked.



Step 4

Identify the Trimble CAN interface cable (P/N 56850). The CAN connection to the machine is made using the two black 4-pin Deutsch connectors. The connection to the Trimble NavController II is made using the grey 12-pin Deutsch connector.



Step 5

Find the CAN connection on the machine: It is located near the fuse panel on the right side of the driver's seat.



Step 6

Remove the access panel.



Step 7

Find the BUS extension connectors: They are toward the bottom right of the fuse panel.

Note – *This is an approximate position only. You may need to push some harnesses out of the way to gain access.*



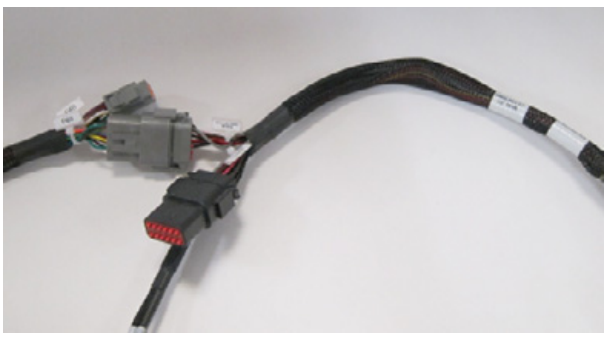
Step 8

The connectors are labeled **BUS EXTENSION**. Disconnect them and then insert the Trimble CAN jumper cable in between.



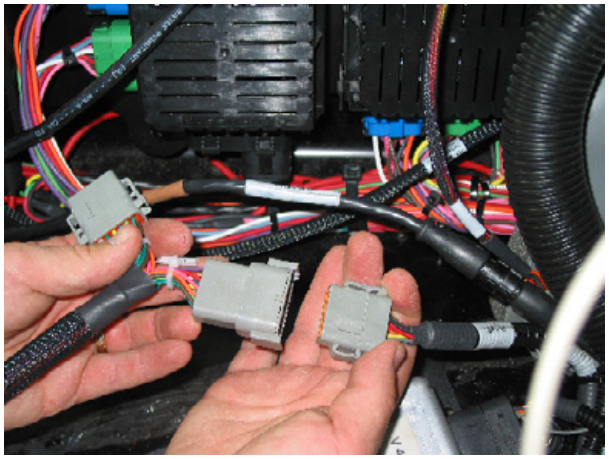
Step 9

Connect the other end of the Trimble CAN cable to the NavController II harness. Plug connector P4A on P/N 56850 into P12 **Lightbar/Spare** on P/N 54602. Do not plug it into P4 **Display** on P/N 54601.



Step 10

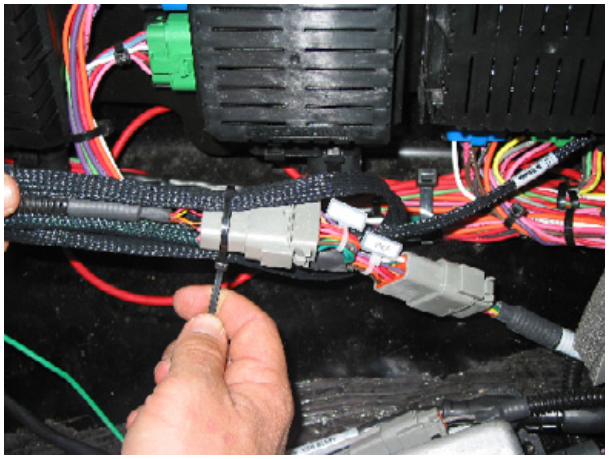
Connect the controller end of the cable to the **Spare (P-12)** leg of the auxiliary harness. See Controller connections, page 85. Attach the receptacle end of the gray DTM connector to the spare connection.



Step 11

Secure all cabling with wire ties. Make sure that the wiring is not stretched or strained.

Replace the access panel.



CHAPTER

3

Antenna/Receiver Installation

In this chapter:

- Antenna and receiver installation options
- AgGPS 262 GPS receiver with AgGPS 450/900 radio module (if equipped) components
- Installing an AgGPS 262 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 receiver and *Ag*GPS radio module
- *Ag*GPS 432 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, FmX, or CFX-750 system, see Chapter 4, Display Installation.*

Antenna and receiver installation options

Note – Trimble recommends that you install the antenna with the VHB plate, or bolted to the OEM roof bracket, centered left to right on the vehicle cab, and as far forward as possible.

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:

- **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 22.
- **Magnetic mounting** – Magnetic mounting for quick release is available for both VHB and spar type mounting:

Possible mounting methods

GNSS receiver	VHB mounted plate	VHB V mounted plate	Bolted to OEM bracket
FmX integrated display; CFX-750 display	✓	✓	✓
EZ-Guide 500 lightbar	✓	✓	✓
*Ag*GPS 262 / 252 receiver	x	✓	x
*Ag*GPS 432 / 442 / 542 receiver	✓	✓	✓

Notes:

– *For quick release magnetic mounting with an AgGPS 262 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.*

Attaching the antenna to the OEM antenna bracket

If there is a factory antenna bracket on the tractor, you can attach the antenna to it.

Step 1

Determine the center point of the cab and mark this on the bracket.



Step 2

Drill an 11/16" or 5/8" hole in the center of the front of the bracket. NOTE: the 5/8" hole may have to be filed slightly to accommodate the bolt in step 3.

Step 3

Put a 2" 5/8" NC bolt through the hole with the head of the bolt below the bracket.

Step 4

Secure the bolt with a nut.



Step 5

Put an additional nut on the bolt

Step 6

Thread the antenna on the bolt

Step 7

Use the second nut to tighten down against the antenna. ***Do not over tighten***.

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". 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.

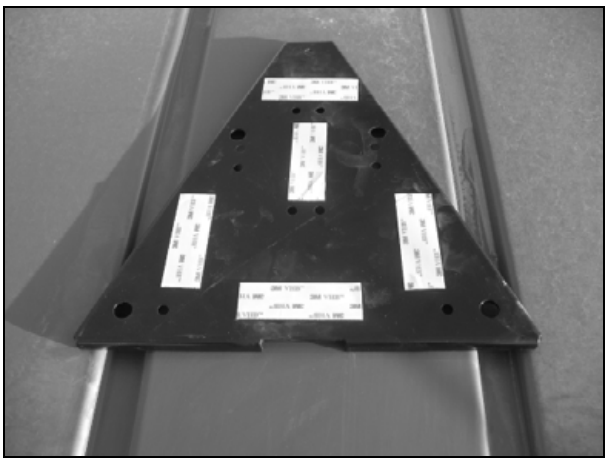


Step 2

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.*

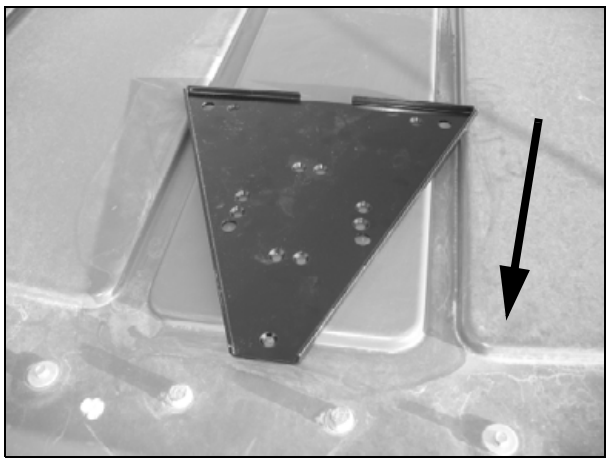


Step 3

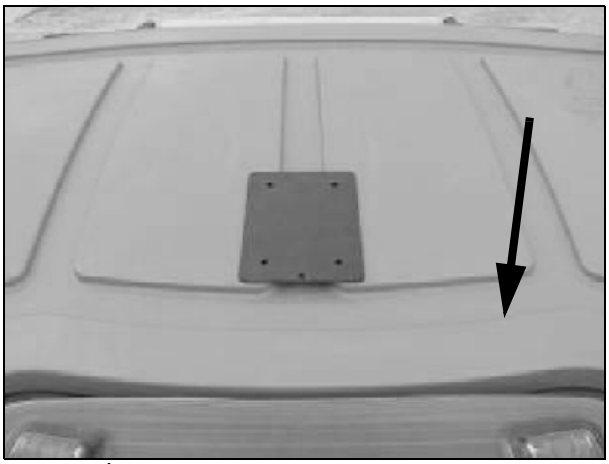
Remove the backing from the other side of the VHB strips and then apply the plate to the cab roof. The narrow end of the plate points forward. Ensure that the VHB strips make even contact with the surface. Apply pressure and then leave for approximately 30 minutes to adhere.

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

For best performance, attach the plate as close as possible to the front of the cab.

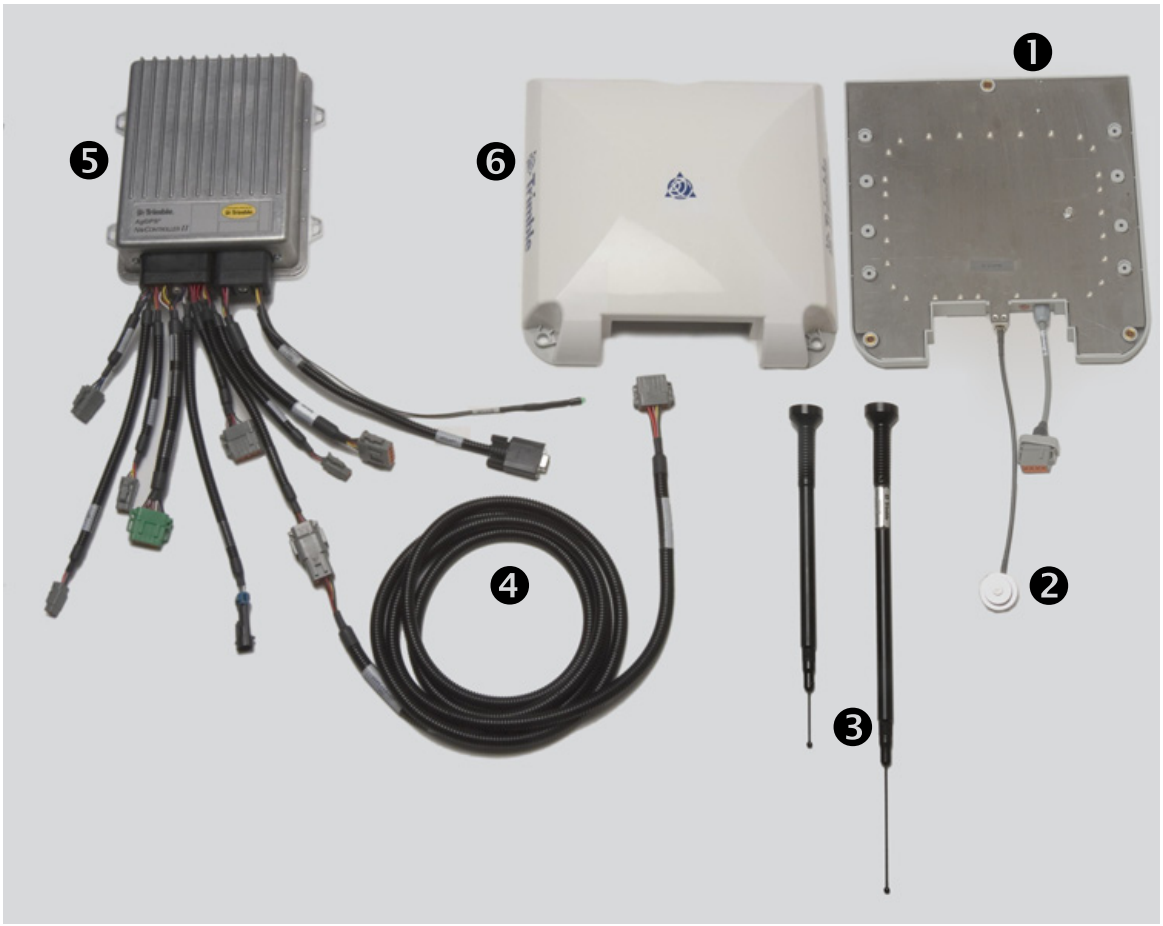


V plate



4" x 6" plate

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



Item	Description	Trimble part number
❶	AgGPS 450 or 900 radio (if equipped)	
❷	Radio antenna cable and magnetic mount	
❸	AgGPS 450 or 900 radio antenna	
❹	Antenna/receiver cable	54608
❺	Autopilot controller	
❻	AgGPS 262 antenna/receiver	

Installing an AgGPS 262 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.

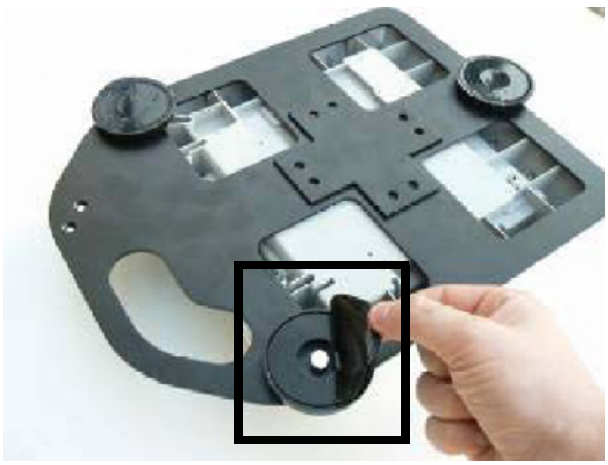
Step 1

Attach the magnets to the receiver mounting plate. Mount the AgGPS 262 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

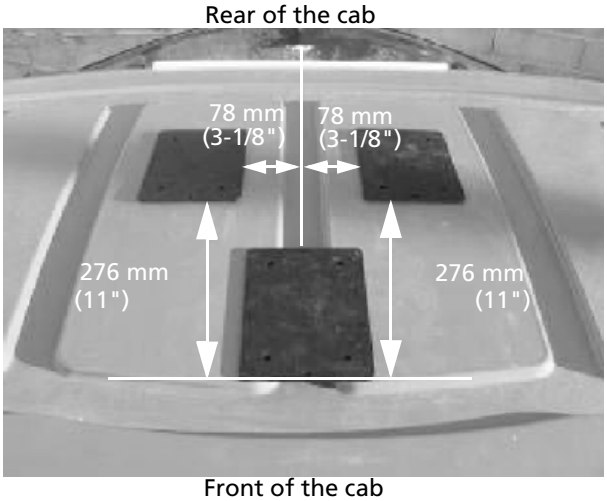
Clean the antenna location on the roof of the cab with a light solvent to remove oil and dust.

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.

For best performance, locate the antenna as close to the front of the cab as possible.

Rear of the cab



Front of the cab

Step 4

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

Rear of the cab



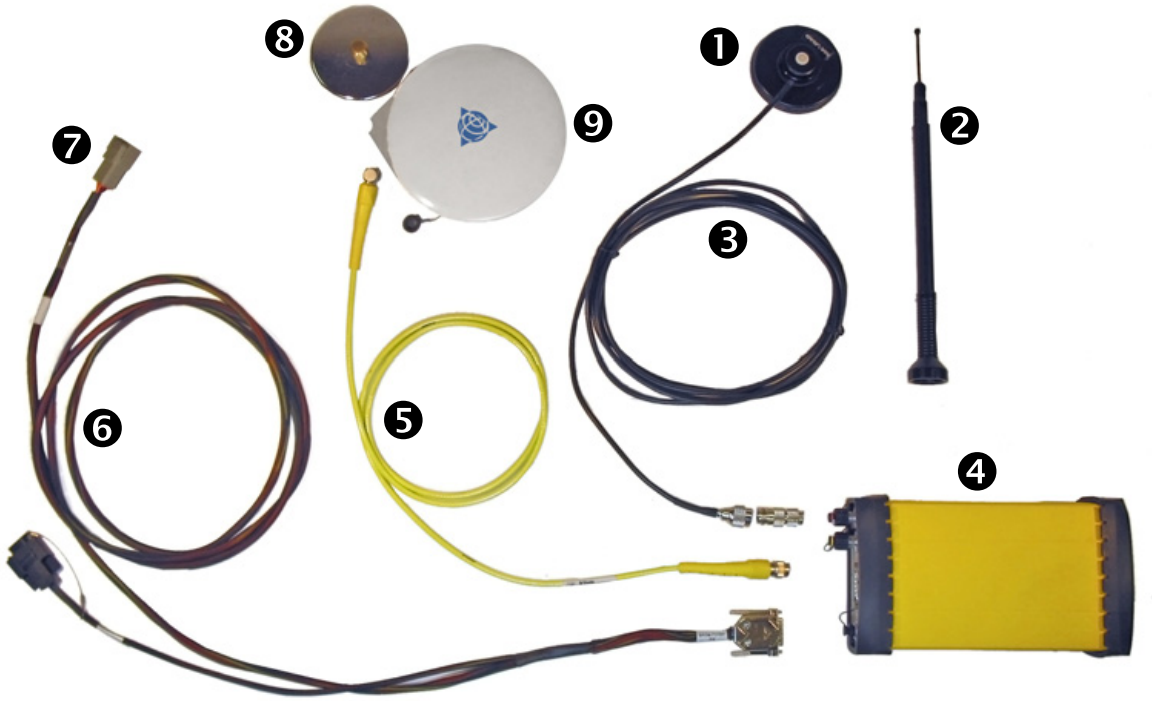
Front of the cab

Step 5

Connect the antenna cable to port A of the AgGPS 262 GPS receiver and then route the cable toward the NavController II harness.



AgGPS 432/442/542 receiver components



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

Installing the AgGPS 432/442/542 receiver

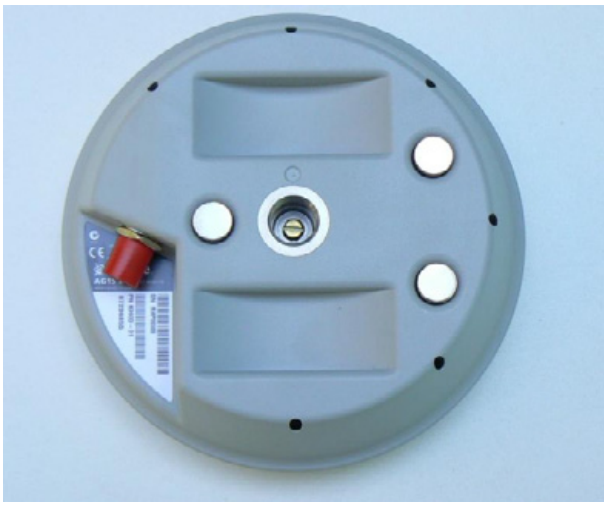
WARNING – C WARNING - To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

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.

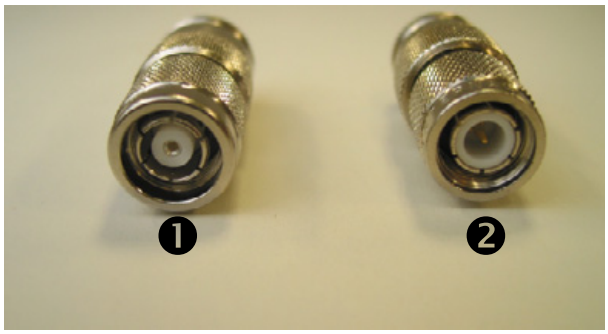


Step 5

Identify the correct adaptor for the radio connection:

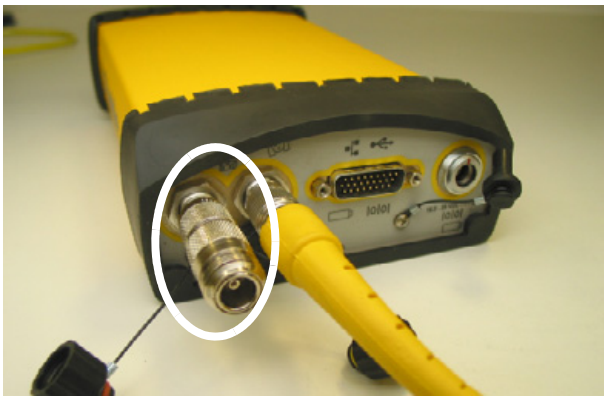
❶ Reverse polarity TNC-to-N for 900 MHz radios

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



Step 6

Attach the adaptor to the radio port.



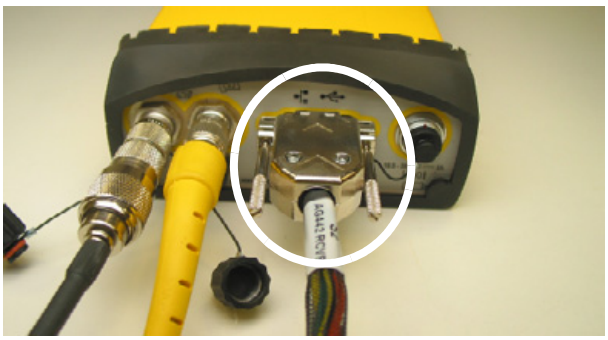
Step 7

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 later (Controller connections, page 85).



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

4

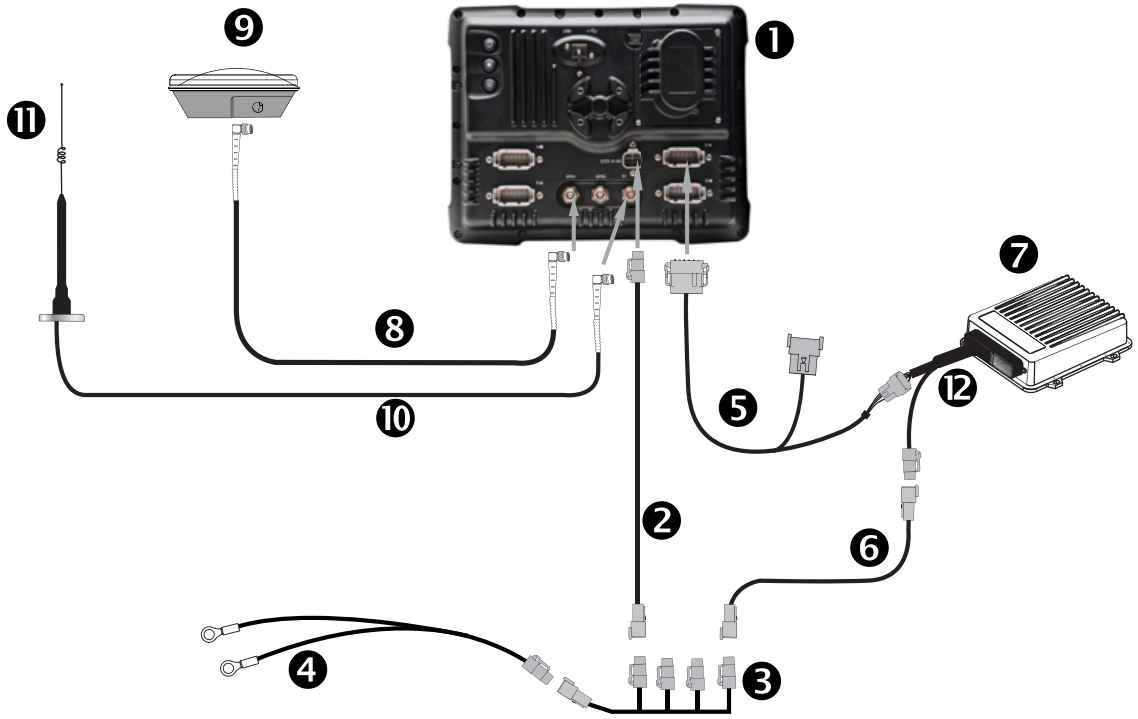
Display Installation

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.

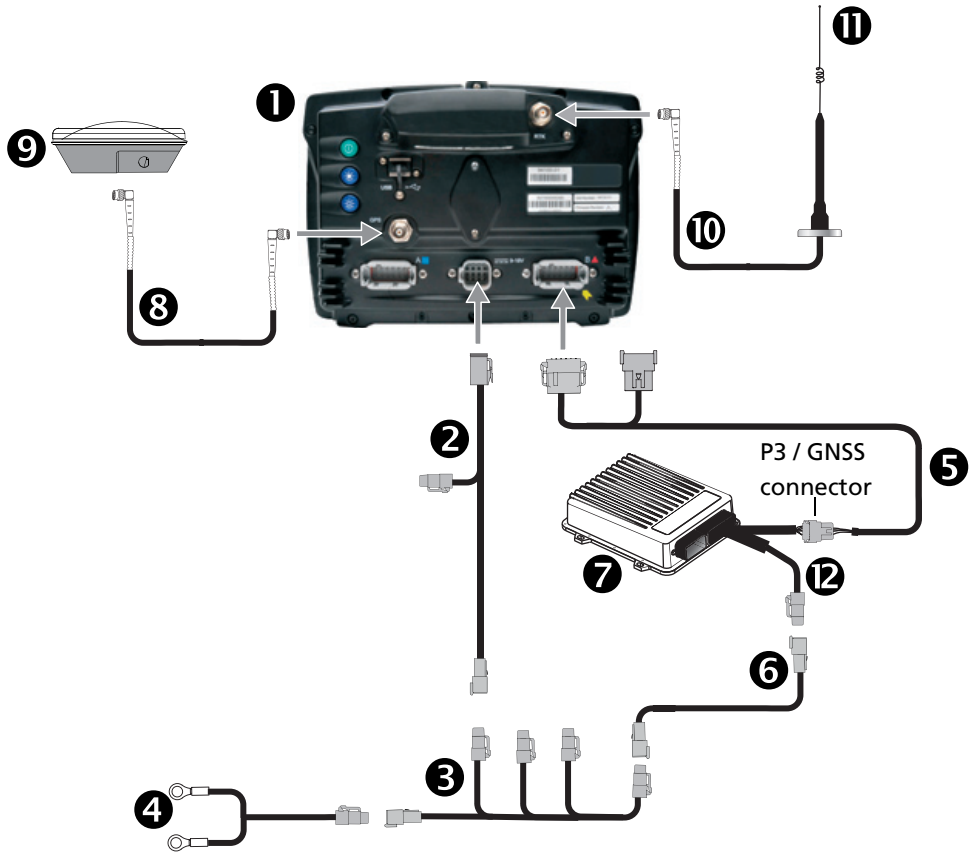
FmX integrated display components



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

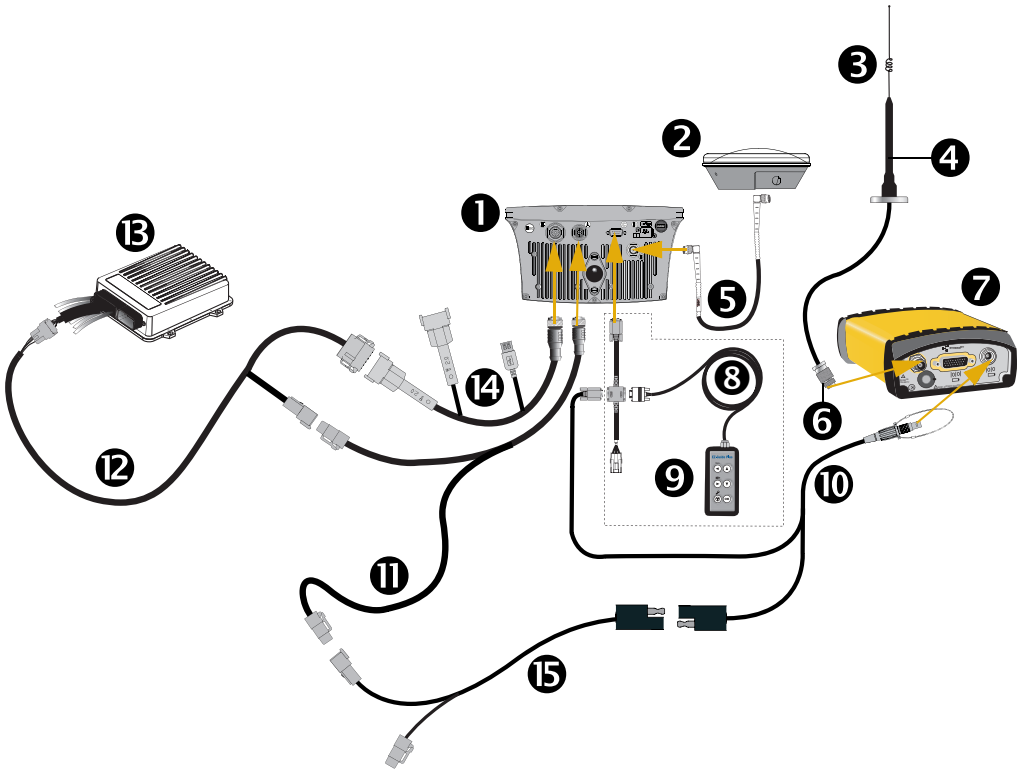
CFX-750 display components



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 P/N	Item	Description	Trimble P/N
❶	CFX-750 display ***Note –*** *RTK password required.*	94100-01	❼	NavController II	55563-00
❷	CFX-750 power cable	77282	❽	8 m GNSS TNC/TNC RT angle cable	50449
❸	CFX-750 power cable with relay and switch (power bus)	67259	❾	AG25 GNSS antenna	77038-00
❹	Basic power cable	67258	❿	NMO to TNC 20ft antenna cable and base	62120
❺	CFX-750 to NavController II cable with port replicator	75741	⓫	900 MHz radio antenna kit	22882-10
❻	2 pin DTM to 2 pin DT power adaptor	67095	⓬	Main NavController II cable	54601

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



Item	Description	Trimble P/N
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
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.

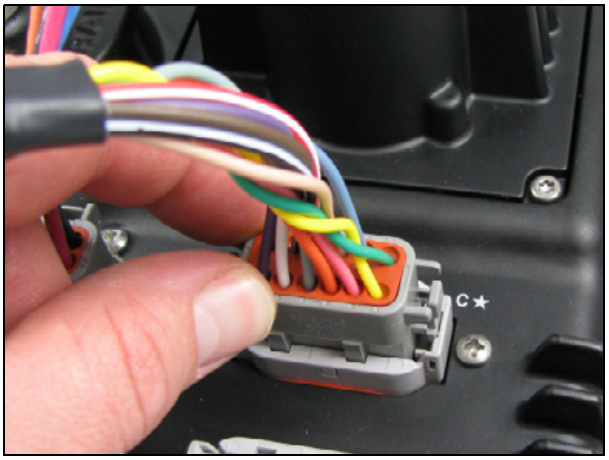
Step 1

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.

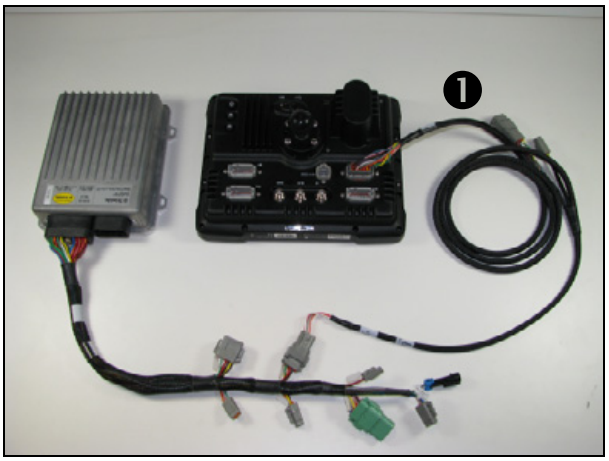
To connect power to the FmX integrated display, see Chapter 5, Power Harness Installation.



FmX integrated display: Installing the wiring harness

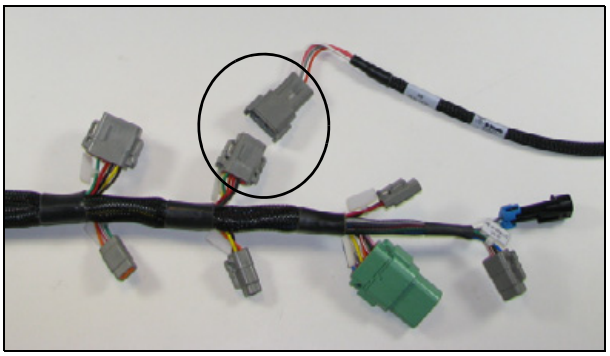
Step 1

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 5, 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

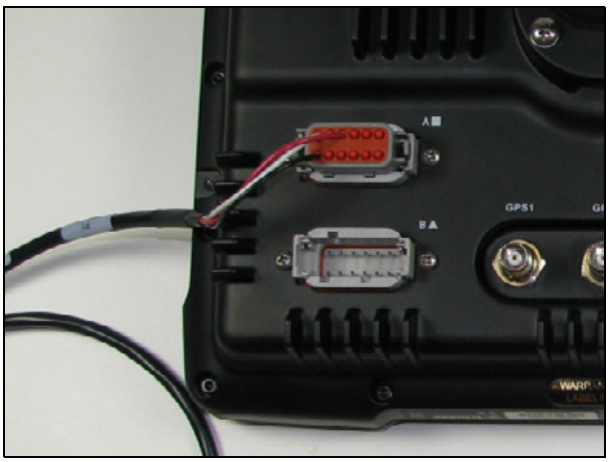
Step 3

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.

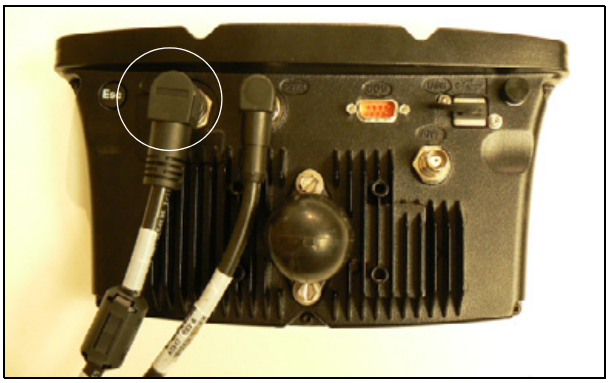


Connecting the EZ-Guide 500 lightbar cables

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

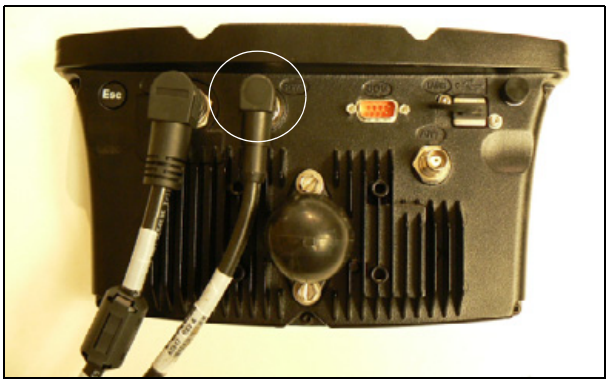
Step 1

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

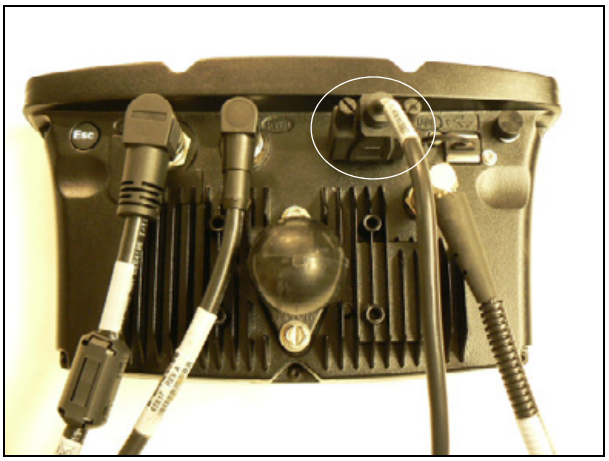
Feed the GNSS antenna cable into the cab and then connect it to the antenna port on the back of the lightbar.



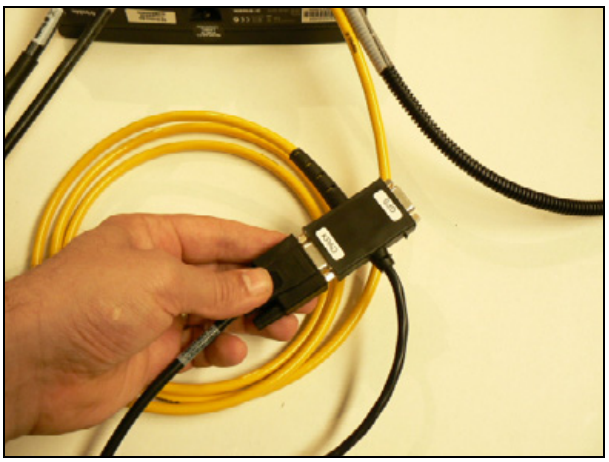
Step 5

With keypad

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

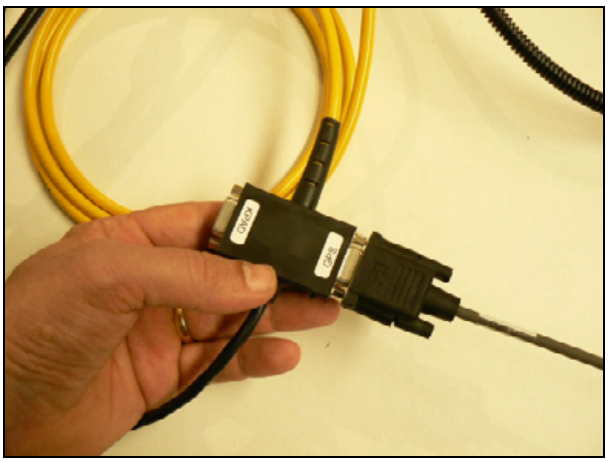


Connect the remote keypad to the KPAD serial port on the external interface cable.



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

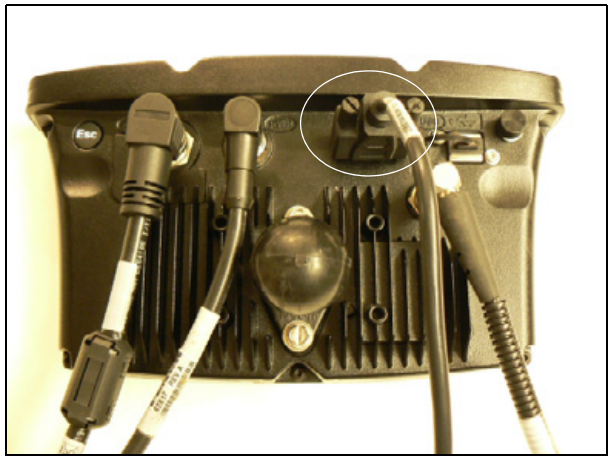
Radio type	Cable to connect
SNB900 radio	EZ-Guide 500-to-radio cable (P/N 61158)
PDL 450 radio	PDL radio power/data cable (P/N 51861-00)



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 – For best performance, Trimble recommends that you center the antenna left to right, and place it as far forward as possible on the vehicle cab.

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

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". 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.

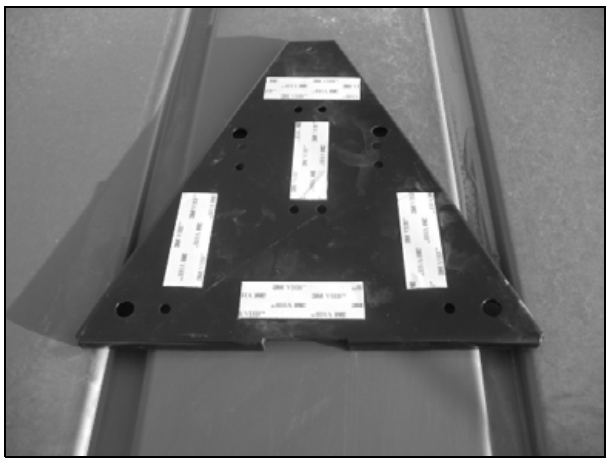


Step 2

V plate only

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

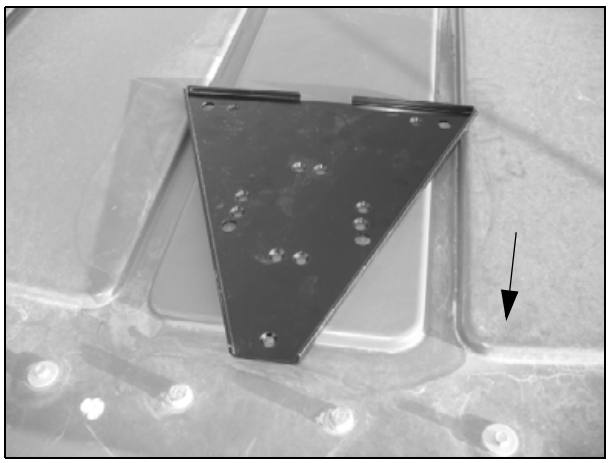
Note – *The VHB strips are pre-applied to the 4" x 6" plate.*



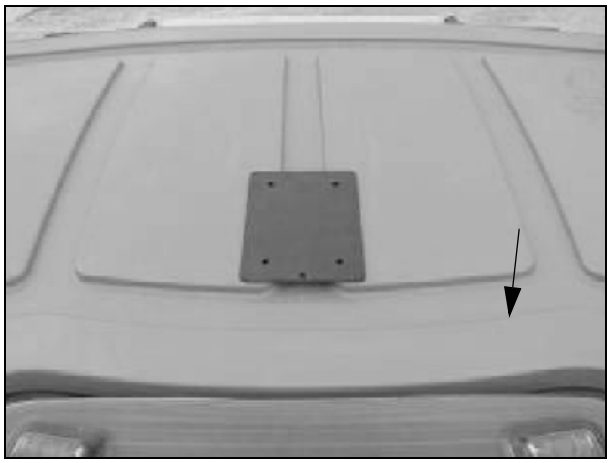
Step 3

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.*



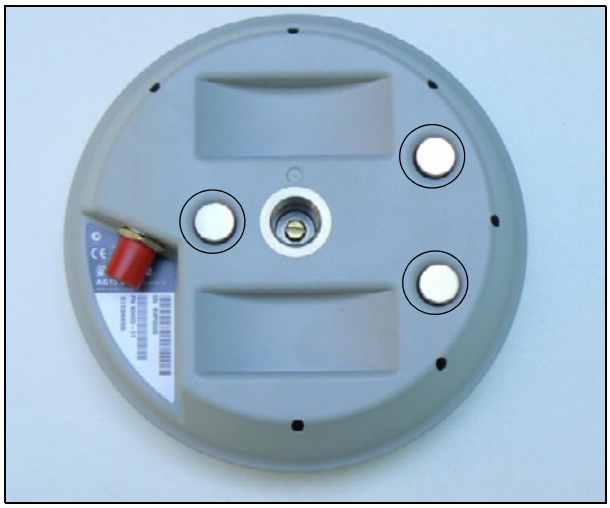
V plate



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.



Attaching the antenna to the OEM antenna bracket

If there is a factory antenna bracket on the tractor, you can attach the antenna to it.

Step 1

Determine the center point of the cab and mark this on the bracket.

Step 2

Drill an 11/16" or 5/8" hole in the center of the front of the bracket. NOTE: the 5/8" hole may have to be filed slightly to accommodate the bolt in step 3.



Step 3

Put a 2" 5/8" NC bolt through the hole with the head of the bolt below the bracket.

Step 4

Secure the bolt with a nut.



Step 5

Put an additional nut on the bolt

Step 6

Thread the antenna on the bolt

Step 7

Use the second nut to tighten down against the antenna. ***Do not over tighten***.

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

5

Power Harness Installation

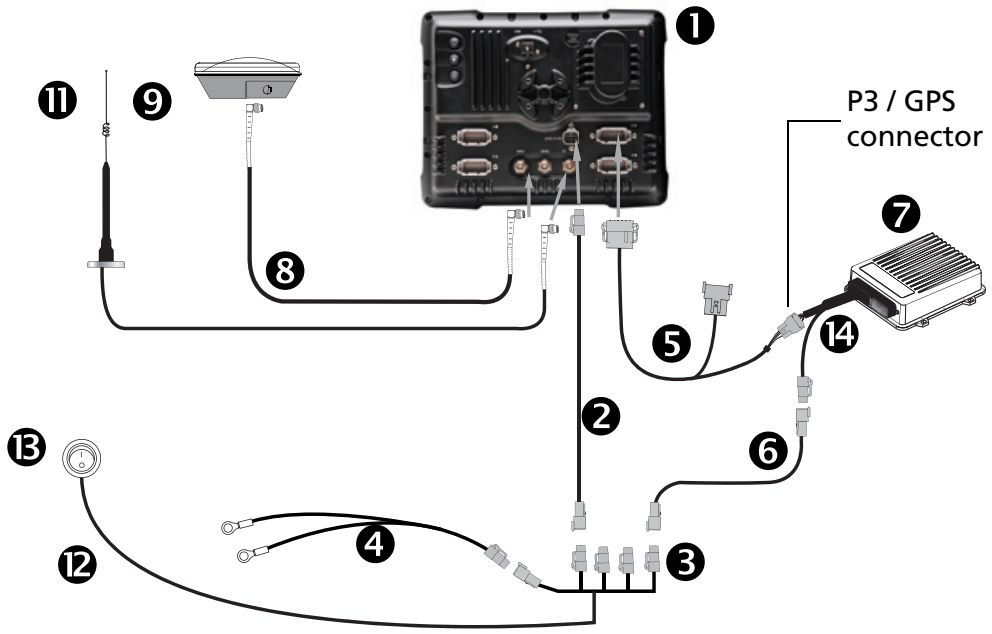
In this chapter:

- FmX integrated display components
- CFX-750 display components
- EZ-Guide 500 lightbar components
- FmX and CFX-750 displays: Installing the power harness
- FmX and CFX-750 displays: Configuring the power bus options
- 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.*

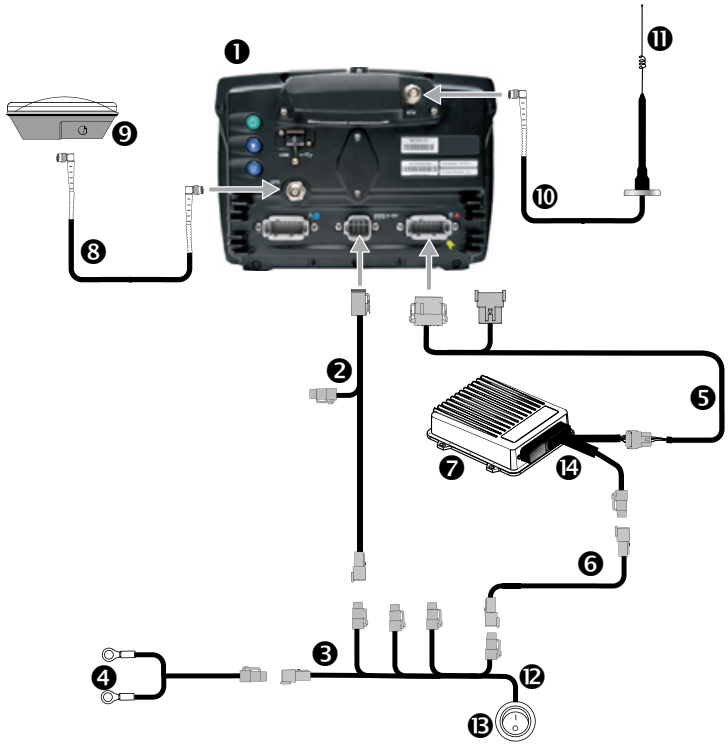
FmX integrated display components



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 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
⓫	900 MHz radio antenna kit	22882-10
⓬	External switch cable included with kit	Part of P/N 67259
⓭	Switch	67095

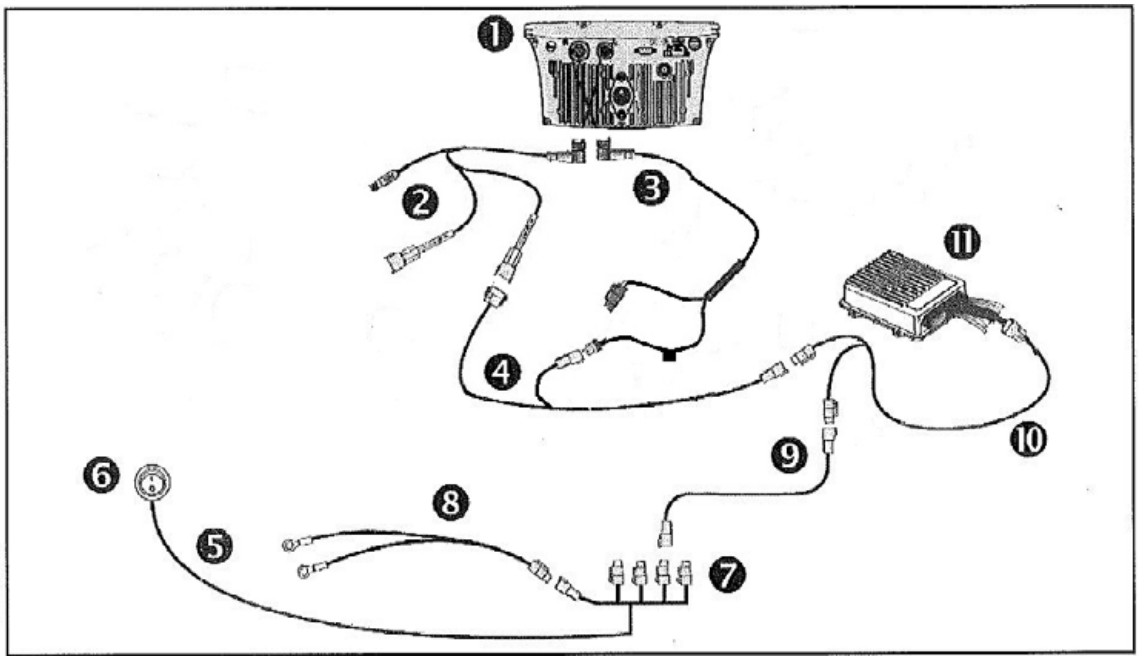
CFX-750 display components



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 P/N	Item	Description	Trimble P/N
❶	CFX-750 display ***Note –*** *RTK password required.*	94100-02	❽	8 m GPS TNC/TNC RT angle cable	50449
❷	CFX-750 power cable	77282	❾	AG25 GNSS antenna	77038-00
❸	CFX-750 power cable with relay and switch (power bus)	67259	❿	NMO to TNC 20ft antenna cable and base	62120
❹	Basic power cable	67258	⓫	900 MHz radio antenna kit	22882-10
❺	CFX-750 to NavController II cable with port replicator	75741	⓬	External switch cable included with kit	Part of P/N 67259
❻	2 pin DTM to 2 pin DT power adaptor	67095	⓭	External switch included with kit	Part of P/N 67259
❼	NavController II	55563-00	⓮	Main NavController II cable	54601

EZ-Guide 500 lightbar components



Item	Description	Trimble part number
1	EZ-Guide 500 lightbar	
2	EZ-Guide 500 lightbar 19 pin port expansion cable	62069
3	EZ-Guide 500 lightbar/CAN 90° 5 pin connector	62817
4	EZ-Guide 500 lightbar port A to NavController II cable	62754
5	Switch cable	Part of 67259
6	Switch	67095
7	FmX power cable with relay and switch	67259
8	FmX basic power cable	67258
9	2 pin DTM to 2 pin 2 DT power adaptor	67095
10	NavController II main cable	54601
11	NavController II	55563-00

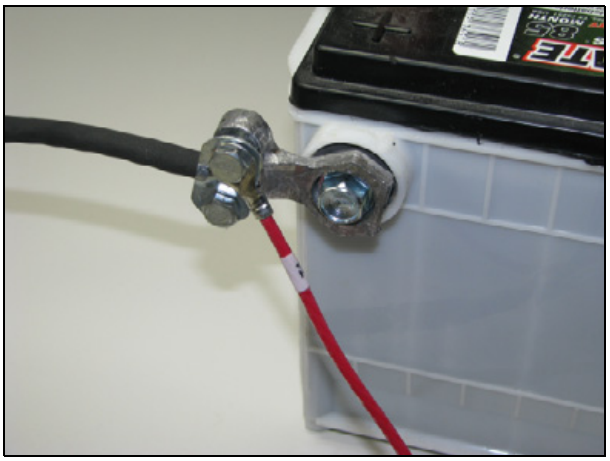
FmX and CFX-750 displays: Installing the power harness

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

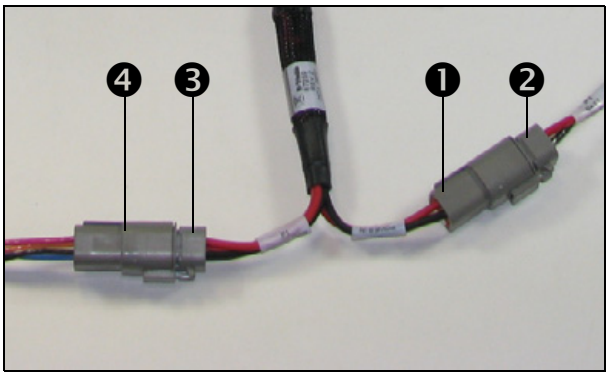
Step 1

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



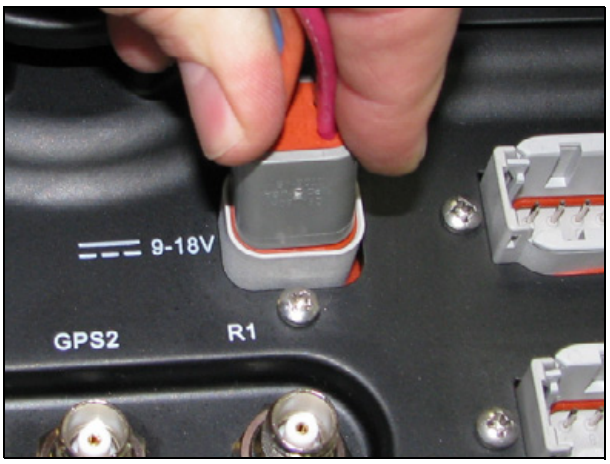
Step 2

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

FmX and CFX-750 displays: Configuring the power bus options

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

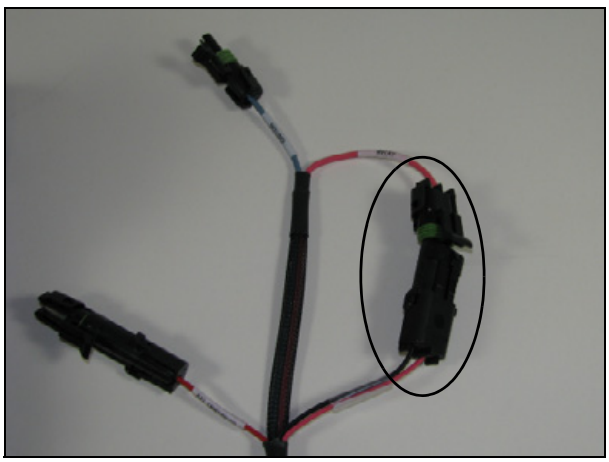
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

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.

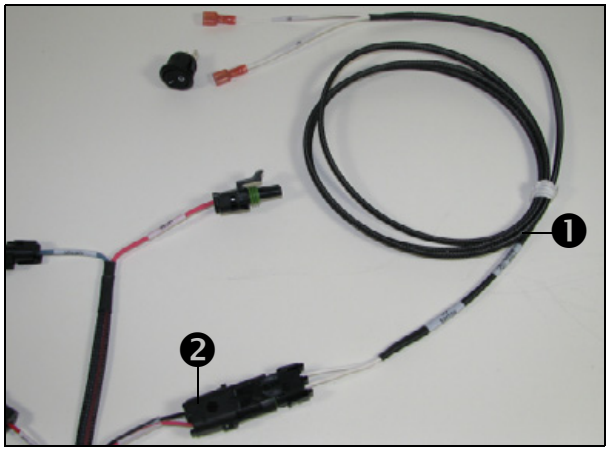


External switch is used to turn on the Autopilot system

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.

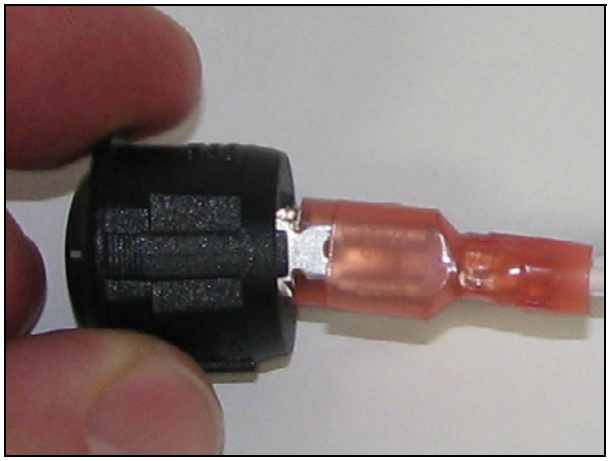
Note – *To install the switch provided, drill a ¾" hole.*



Step 2

Connect the cable labeled R7 to the switch pins.

Note – *Polarity is not important.*

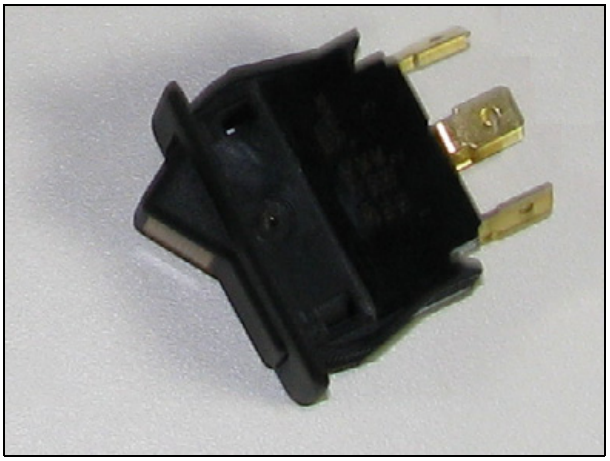


Installing the optional illuminated full or standard Euro switch

Step 1

Find an available knockout location on the vehicle console.

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

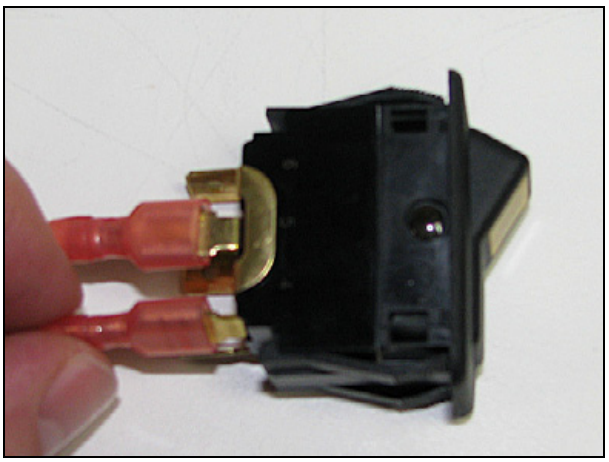


Step 2

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.

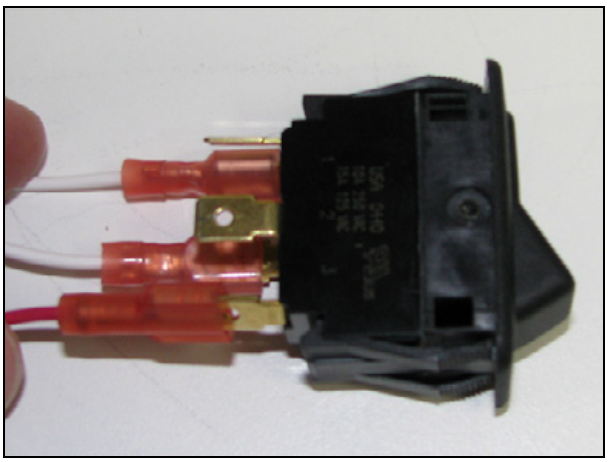
Note – *Polarity is important.*



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.*

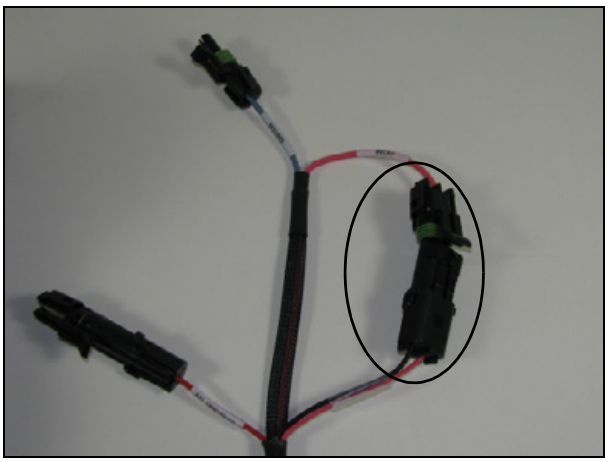


Ignition is used to turn on the Autopilot system

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

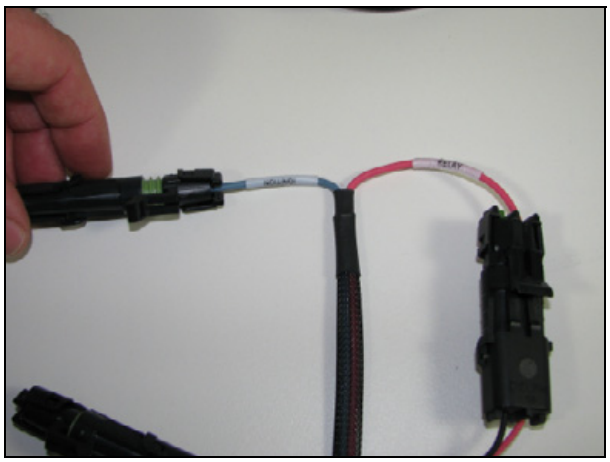
Step 1

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.

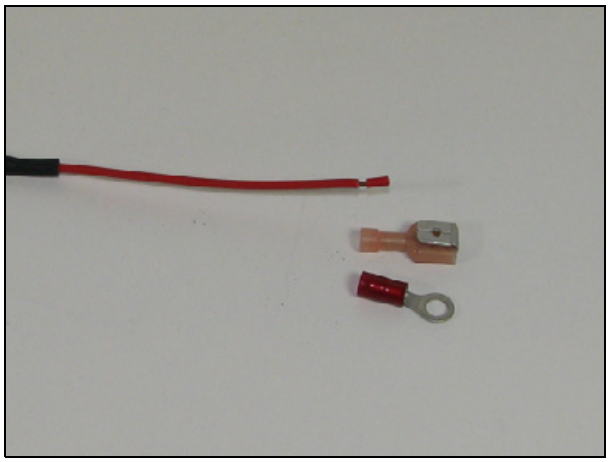


Step 3

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.



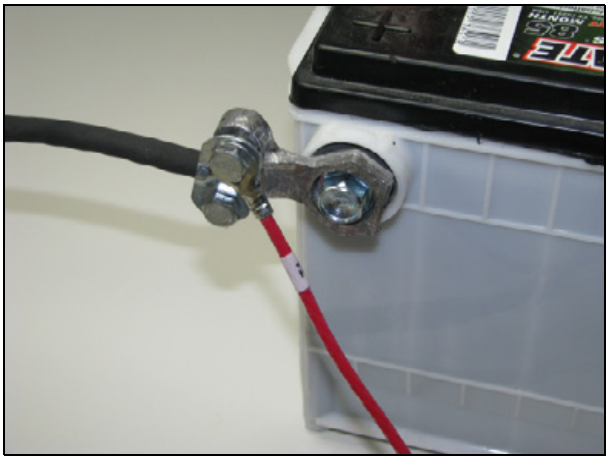
Configuring the power bus options for the EZ-Guide 500 lightbar

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 58*.

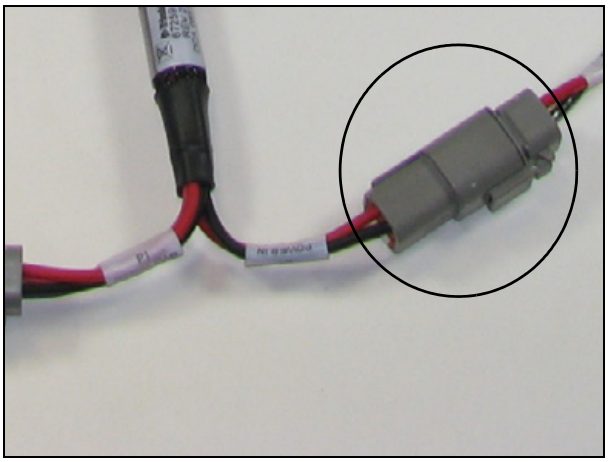
Step 1

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



Step 2

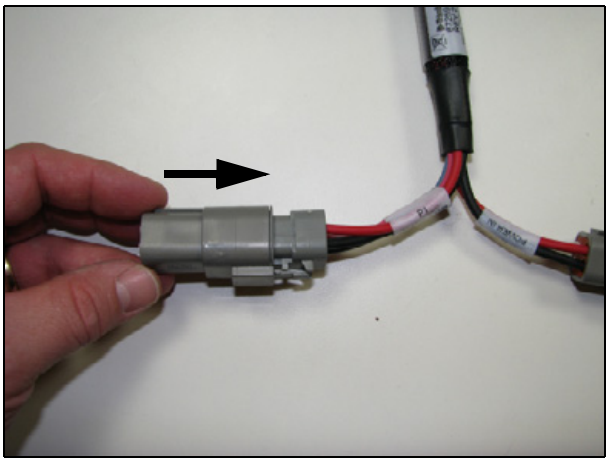
Locate and connect the 4-pin Deutsch DTP receptacle on the power bus to the 4-pin Deutsch DTP plug on the basic power cable.



Step 3

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

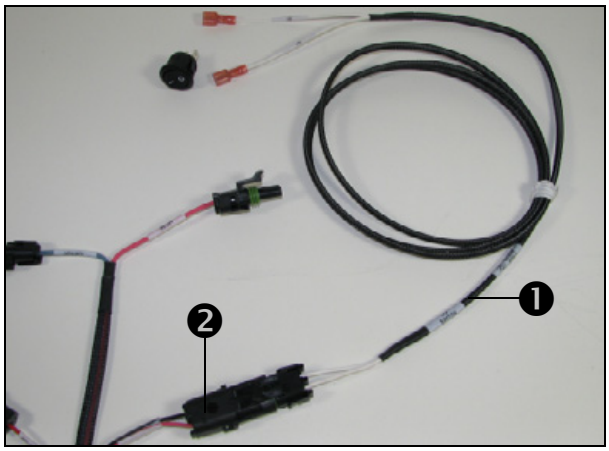
Note – *Damage to the system may result if the protective receptacle is not in place.*



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.

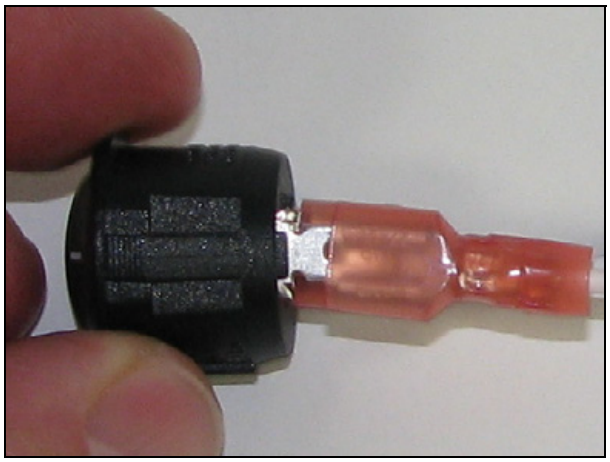
Note – *To install the switch provided, drill a ¾" hole.*



Step 5

Connect cable labeled R7 to the switch pins

Note – *Polarity is not important.*

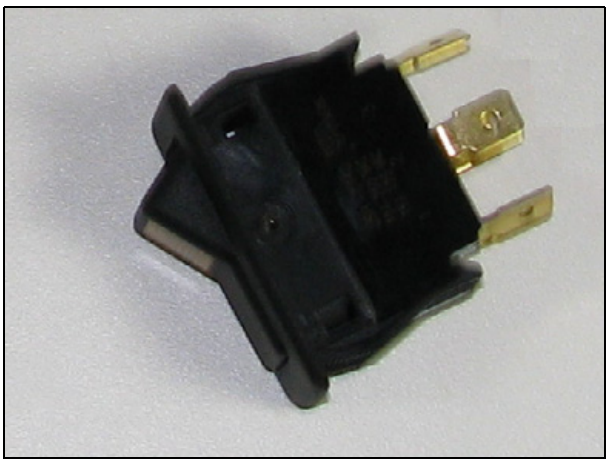


Installing the optional illuminated full or standard Euro switch

Step 1

Find an available knockout location on the vehicle console.

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

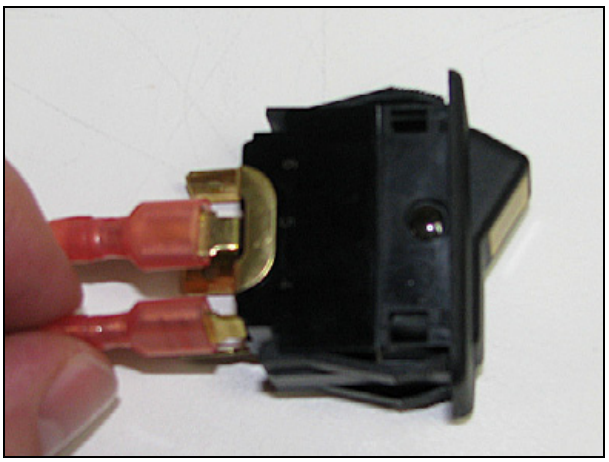


Step 2

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.

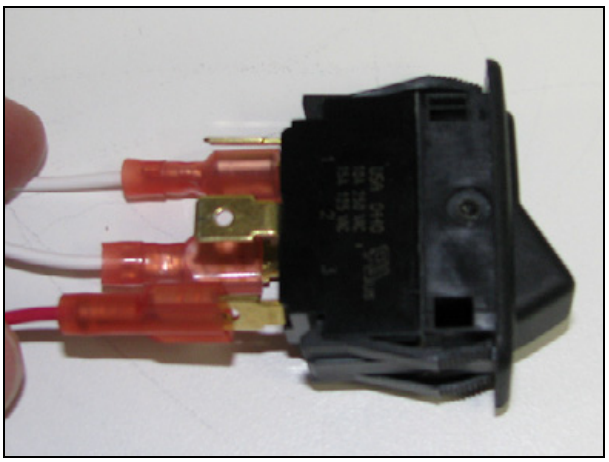
Note – *Polarity is important.*



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

6

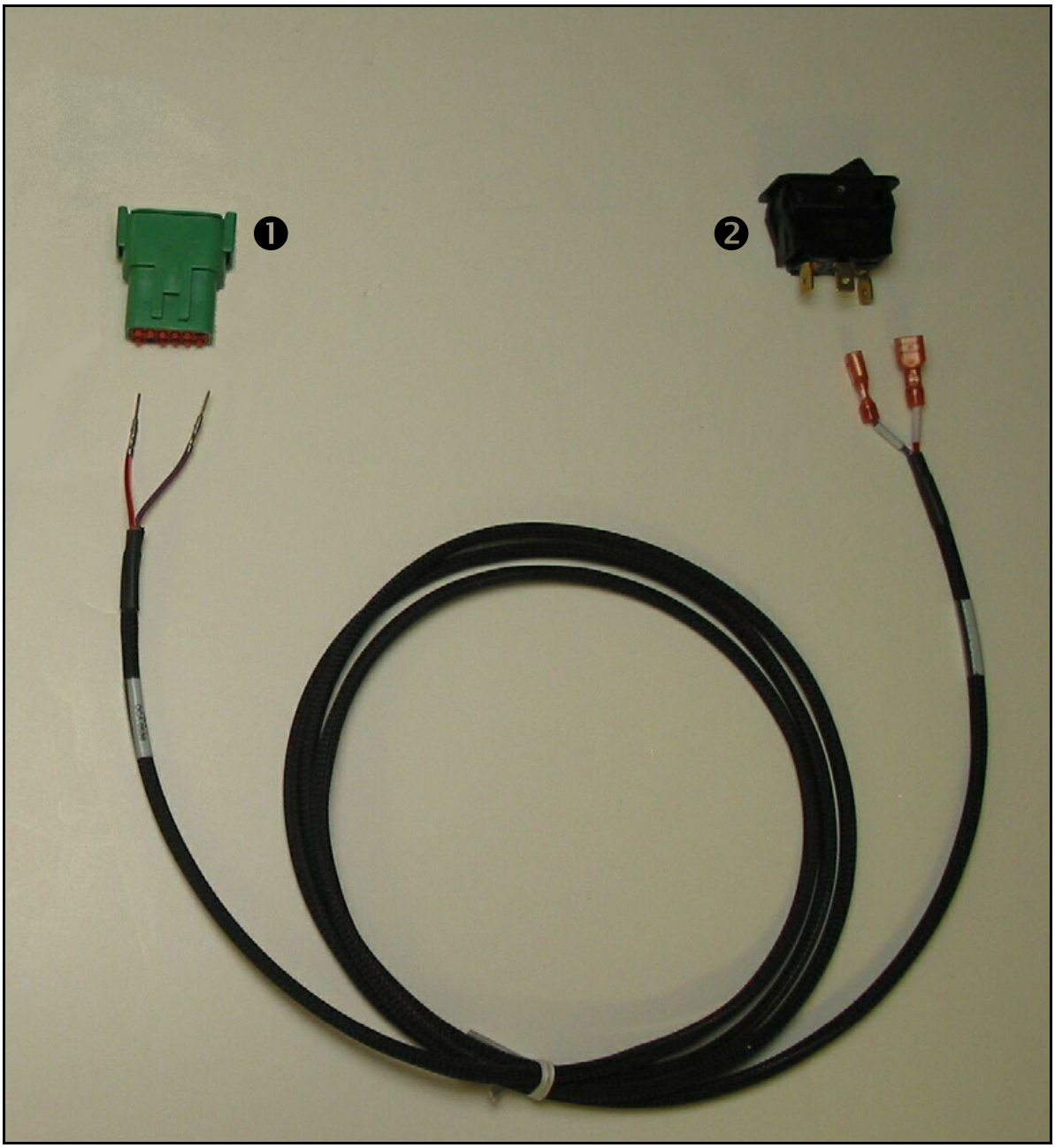
Remote Engage Switch Installation

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.

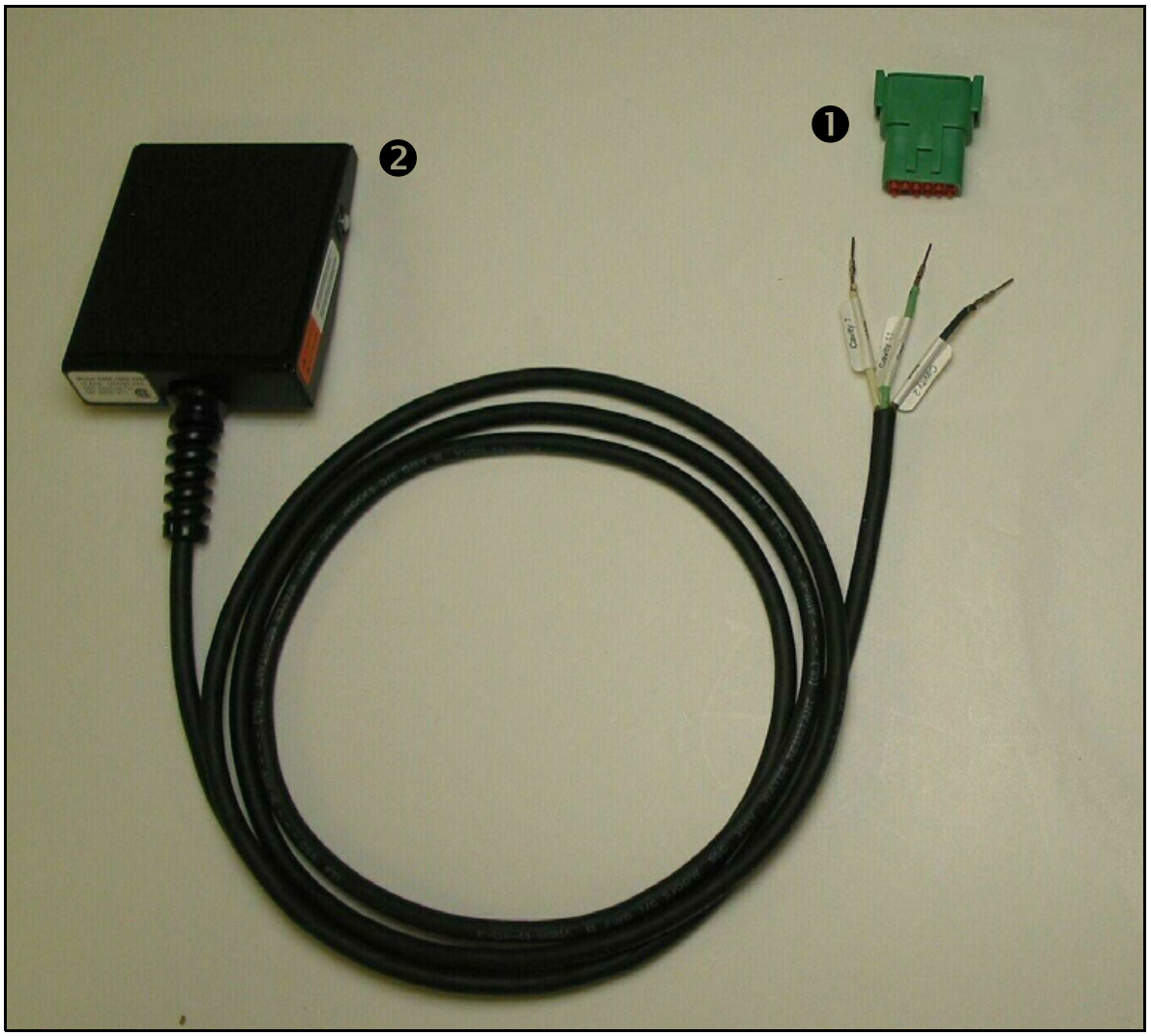
Remote engage switch components: Rocker switch



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

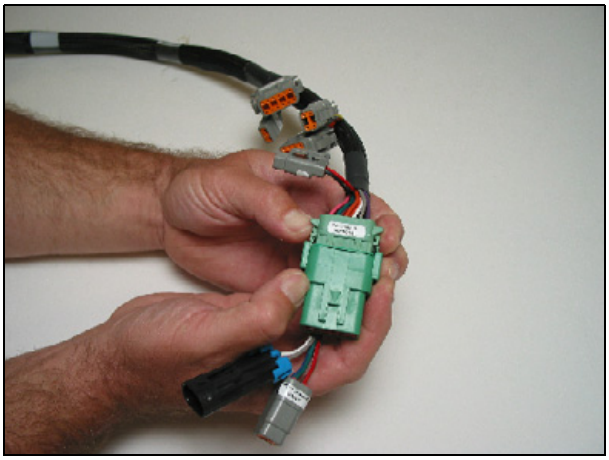


Item	Description
❶	DTM receptacle
❷	Remote engage foot switch

Preparing the remote engage cable

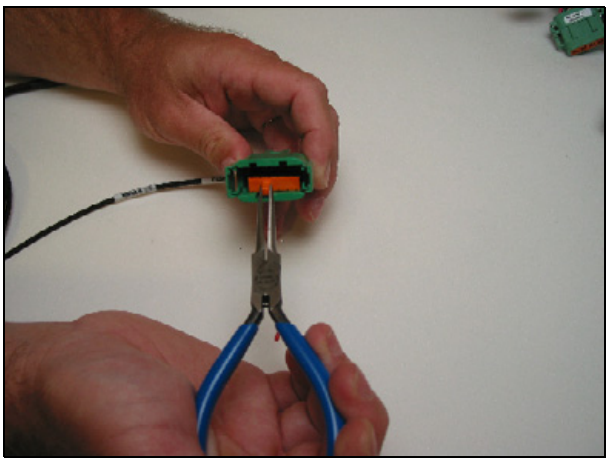
Step 1

Locate the green 12-pin Deutsch receptacle on the P-5 leg of the main controller harness. For more information, see Chapter 7, Controller Installation.



Step 2

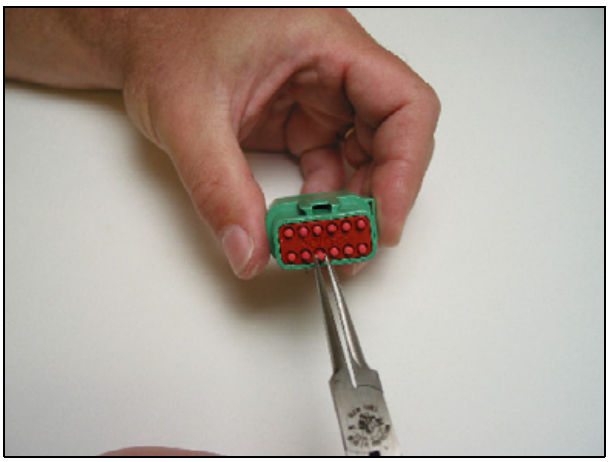
Remove the wedge from the connector.



Step 3

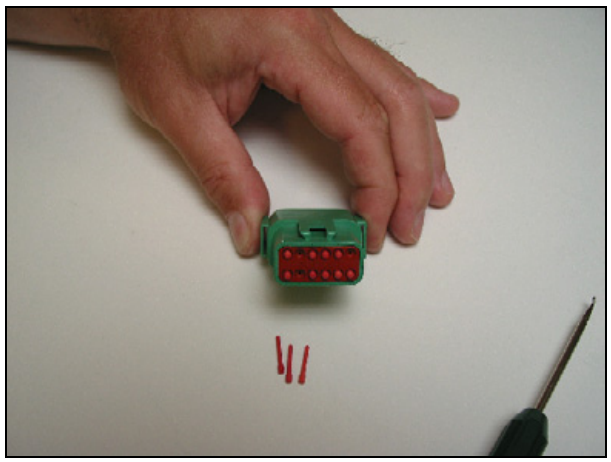
Rocker switch only

Remove the plugs from cavity 2 and cavity 7.



Foot Switch Only

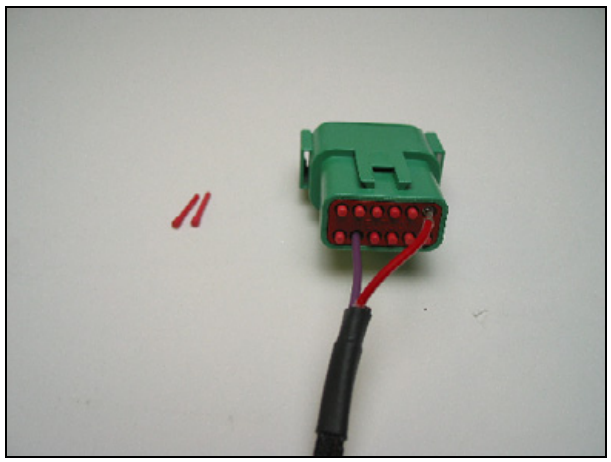
Remove the plugs from cavity 2, cavity 7, and cavity 11.



Step 4

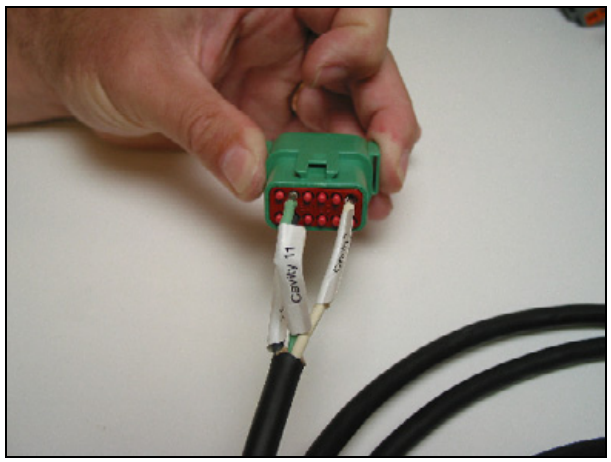
Rocker switch only

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



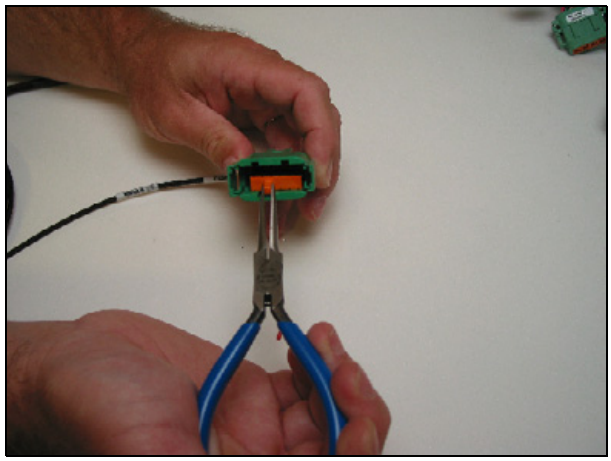
Foot switch only

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



Step 5

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



Step 6

Rocker switch only

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



Foot switch only

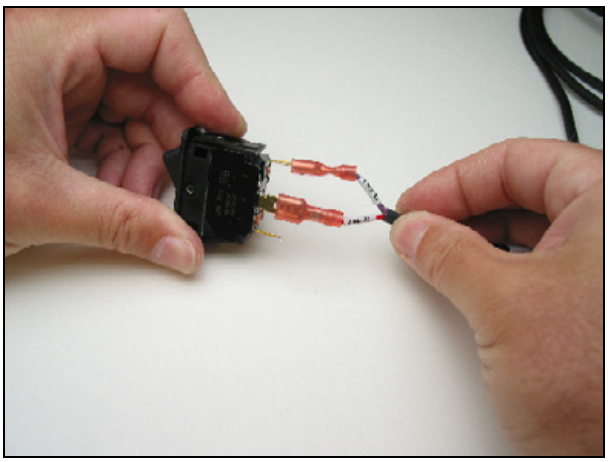
Run the cable to a clear location on the floor board. Use double-sided tape to secure the pedal. Route the cable under the floor mat.



Step 7

Rocker Switch Only

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



Step 8

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

7

Controller Installation

In this chapter:

- Installing the controller
- Controller connections

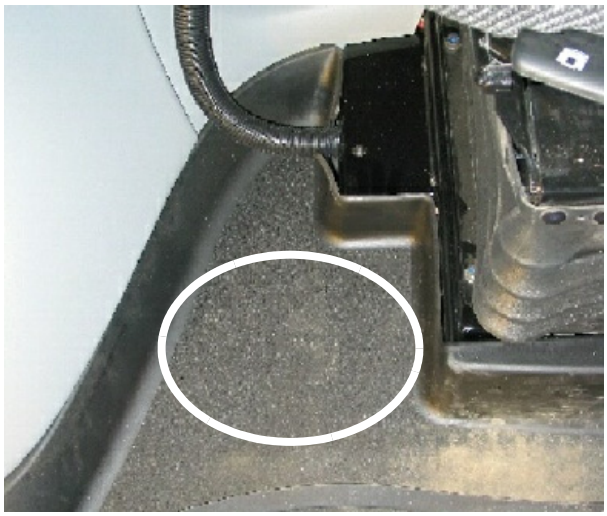
This chapter describes how to install the controller unit.

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

The controller will be positioned on the floor to the right of the driver's seat.



Step 2

Use a T-30 Torx bit to remove the bolts on the shield where the armrest harness meets the seat base.



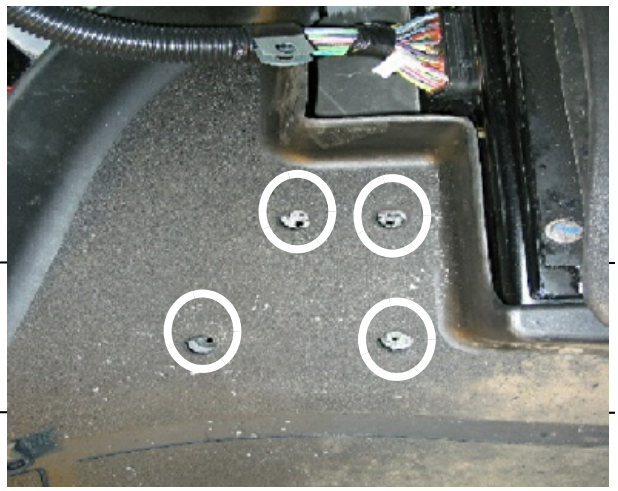
Step 3

Remove the bolt holding the cable clip to the shield. Remove the shield and set it aside.



Step 4

Place the plate (P/N 54828) on the floor. Ensure that it is square with the seat base. Mark the two outer forward holes and the two inner aft holes.



CAUTION – Use only the four holes indicated. There is a structure under the floor that will interfere with other holes.







Step 5

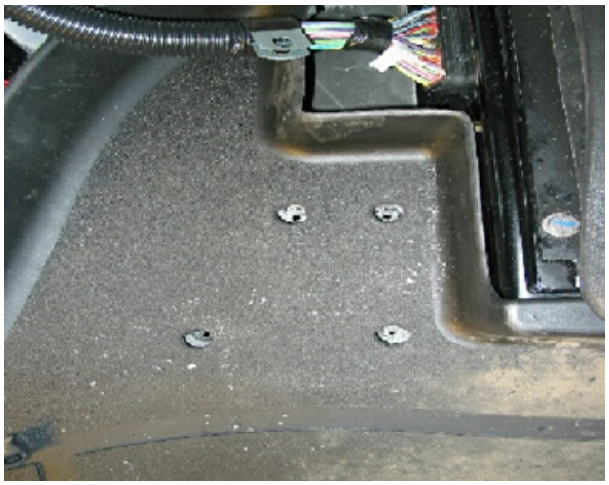
Use a 1" hole saw with a ¼" center bit to drill a 1" hole in the two-layer floor mat and only a ¼" hole in the sheet metal floor that is underneath.



CAUTION – Do not drill the hole all the way through the sheet metal.

Step 6

Notice the black sheet metal floor under the mat with only a ¼" hole in it.



Step 7

Peel both floor mats up, exposing the entire right half of the cab floor.



Step 8

Locate the access panel on the floor.



Step 9

Use a T-30 Torx bit to remove the six screws in the access panel.



Step 10

Remove the panel and set it aside.



Step 11

Reach through the access panel to install the standoffs and bolts (which are provided in the kit).



Step 12

Tighten the standoffs into place. Reinstall the access panel.



Step 13

Replace the mat over the standoffs.



Step 14

Place the plate (P/N 54828) over the mat and standoffs and tighten it into place.



Step 15

Place the controller on the plate (P/N 54828) with the connectors facing toward the rear of the vehicle. Mark the area on the mat that will interfere with the connector.



Step 16

Use heavy sheers to cut away the mat so the connector will clear.



Step 17

Clamp the shield in a vise. Use a rag to protect the paint.



Step 18

Bend the shield as shown.



Step 19

Clamp the other side of the shield in the vise.



Step 20

Bend the shield as shown.



Step 21

Reinstall the newly bent shield.



Step 22

Attach the main cable and auxiliary cable harnesses to the controller. Use an Allen wrench to secure the connectors.

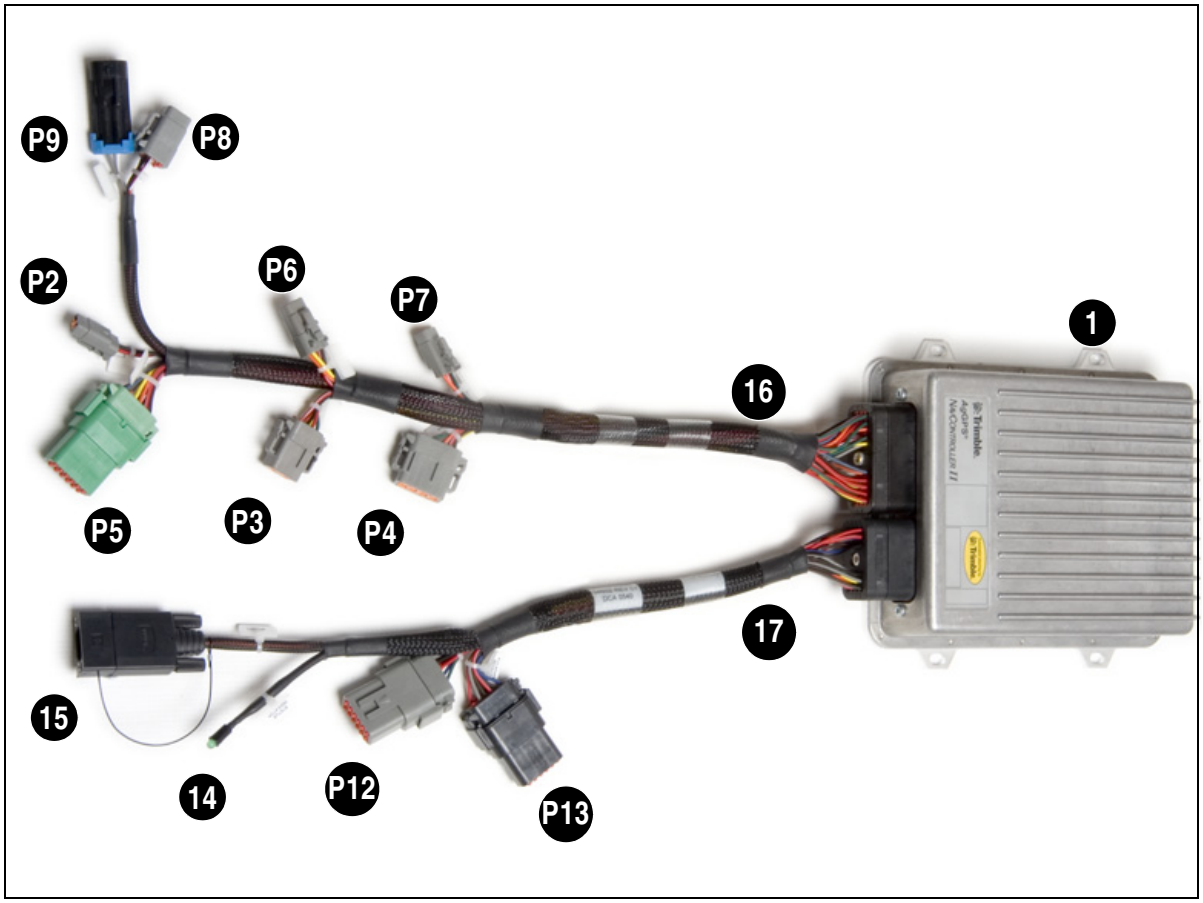


Step 23

Use the supplied hardware to install the controller onto the plate.



Controller connections



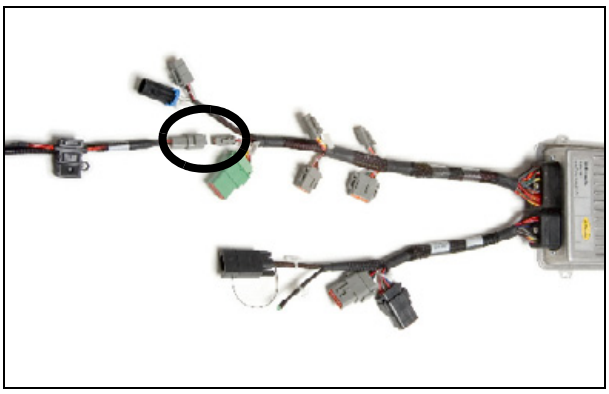
Item	Description
1	NavController II controller
P2	Power connector
P3	GNSS connector
P4	Display connector
P5	Vehicle sensors connector
P6	Steering sensor connector
P7	Manual override connector
P8	Hydraulic valve connector

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.

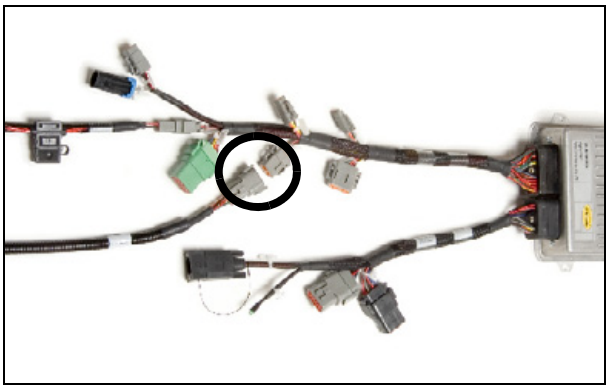
Note – *The power connection supplies power through the controller to all connected devices, including GNSS and displays.*



Step 2

For EZ-Guide-500, FmX, and CFX-750 installations, the display cable will be plugged in here.

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

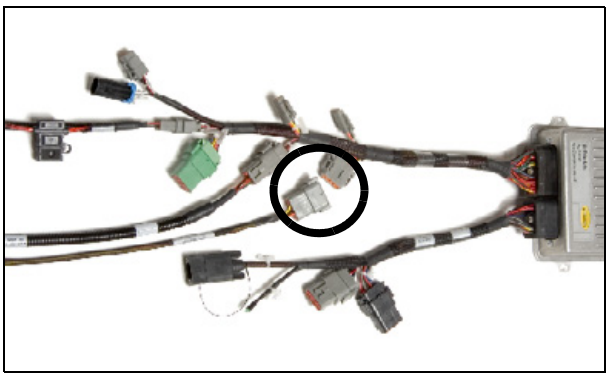


Step 3

Do not use this connection for EZ-Guide 500, FmX, or CFX-750 installations.

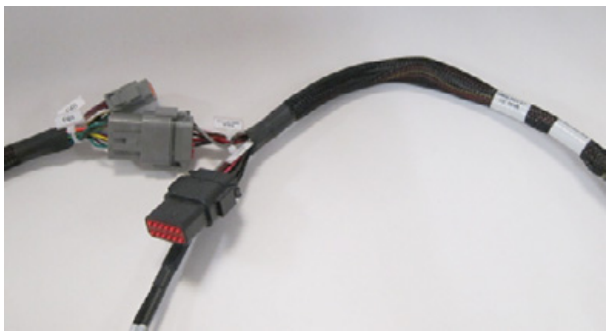
Connect the primary display cable connection to P-4, which is labeled “Display”. P-4 is located on the main wiring harness.

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



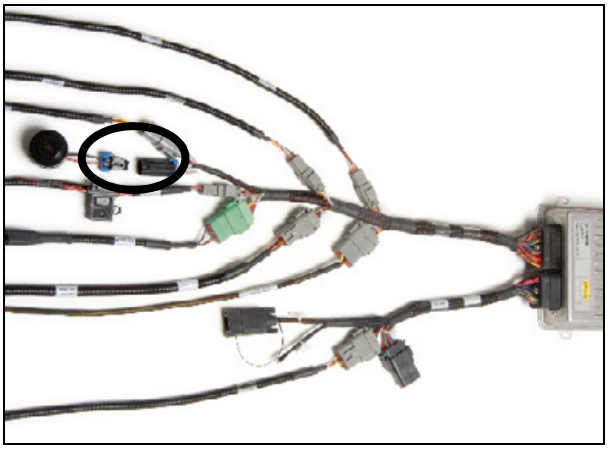
Step 4

Connect the AGCO CAN communication cable to P12 on the controller.



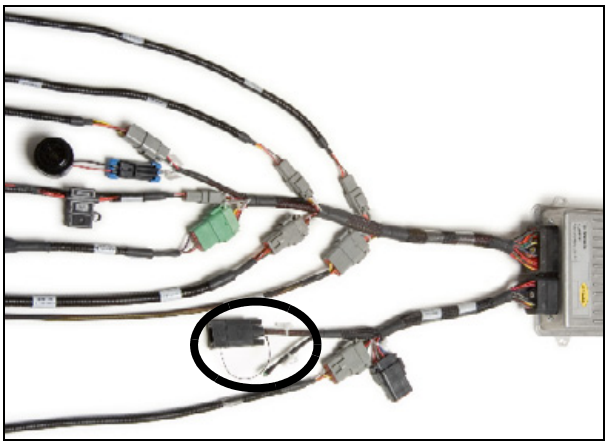
Step 5

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 6

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 7

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

8

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. Connect the battery.
2. Make sure that the NavController II has version 5.21 or later on it.
3. Connect and run the Autopilot Toolbox II software for system setup and calibration. For more information, refer to the *Autopilot Toolbox II Software User Guide*.
4. Open the Diagnostic page of the Autopilot Toolbox II software and ensure that all signals from the hydraulics and sensors are active.

CAN Bus interface troubleshooting

If the installation was completed, but the Trimble display shows fault code #118 when attempting to engage the Autopilot system, check the CAN Bus cable connections. This fault code relates to lack of CAN communication with the steering valve. Check the following:

- Make sure that connector **P4A** on cable P/N 56850 is connected to **P12** on P/N 54602.
- There is a 60-second time-out parameter on the machine's steering valve. For guidance to be enabled, the steering wheel must be turned within 60 seconds prior to engaging Autopilot.

If all of the connections are correct and secure, and the time-out is not the problem, you must change one of the machine parameters:

Normally, CAT Challenger MT9xxC tractors are configured to be AutoGuide Ready from the factory. However, in some instances, this did not happen. If this is the case, contact your local AGCO dealer and request that they update your machine with the latest firmware using the Electronic Diagnostic Tool (EDT).

Use the EDT to make sure that guidance is enabled: Set *AutoGuidance Ready* to the enabled state. Alternatively, select *System 150 Installed*.

Make sure that the PVED-CL valve is version 1.38 or later.

While you are using the EDT on the machine, take the opportunity to re-calibrate the articulation sensor. This is done at the factory, but doing it again can only improve the accuracy and performance of auto guidance.