INSTALLATION INSTRUCTIONS

Autopilot™ Automated Steering System

Challenger
ISO Equipped

- **MT 735B / MT 745B / MT 755B / MT 765B**
- **MT 835B / MT 845B / MT 855B / MT 865B**
- **MT 755C / MT 765C / MT 835C / MT 845C**
- **MT 855C / MT 865C / MT 875C**
- **MT 755D / MT 765D**

Version 5.00
Revision A
January 2013
Part number 54035-18-E05

Trimble

Legal Notices

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This is the January 2013 release (Revision A) of the Autopilot Automated Steering System Installation Instructions, part number 54035-18-E05. It applies to version 5.00 of the Autopilot automated steering system.

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Notices

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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For product recycling instructions and more information, please go to:
www.trimble.com/ev.shtml



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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.

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

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CHAPTER 1

Introduction

In this chapter:

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

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

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

Technical assistance

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

1. Log into http://agpartners.trimble.com.
2. Click the *Feedback* link at the right of the screen. A form appears.
3. Complete the form and then click **Submit Feedback**.

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	

Required components

Kits required	Special tools
Platform kit: P/N 54038-18	1" hole saw with 1/4" center bit Allen wrench set (metric and SAE) Open end wrench set (metric and SAE) T-30 Torx bit

Antenna mounting kits

Kits required
Bracket kit, GPS CAT 35/45/55 and MT 700/800 Tracked: P/N 0795-0290
Ag15 antenna mounting plate: P/N 62034
Bracket, GPS Spar 36.5" - 46.5": P/N 53676

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 54035-18	CAN bus cable	Chapter 2
	Power cable	Chapter 4
	Bolt kit controller	Chapter 7
Bracket kit, GPS CAT 35/45/55 and MT 700/800 Tracked: P/N 0795-0290 Bracket, GPS Spar 36.5" - 46.5": P/N 53676	Roof brackets	Chapter 3
	Bolt kit, roof bracket	
GNSS receiver	GNSS receiver	Chapter 3
	GNSS antenna	
	GNSS receiver power/data cable	
	RTK radio, cable, and radio antenna	
Display	CFX-750 display	Chapter 4
	FmX integrated display	
	EZ-Guide 500 lightbar	
	Display cable	
	Mounting bracket	
Common parts	Controller	Chapter 7
	Controller mounting bracket	
	Cable kit: • Main wiring harness • Power bus auxiliary wiring harness • Sonalert alarm	

Preparing the vehicle for installation

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

1. Park the vehicle on a hard, level surface. Block the front and rear wheels.
2. Align the steering straight ahead. On an articulated vehicle, install the articulation locks.
3. Remove all dirt and debris from the areas of the vehicle where the Autopilot system will be installed.
4. Open all kit boxes and check the contents of the box against the packing list/s. Lay all of the parts out on a clean workbench.

CHAPTER 2

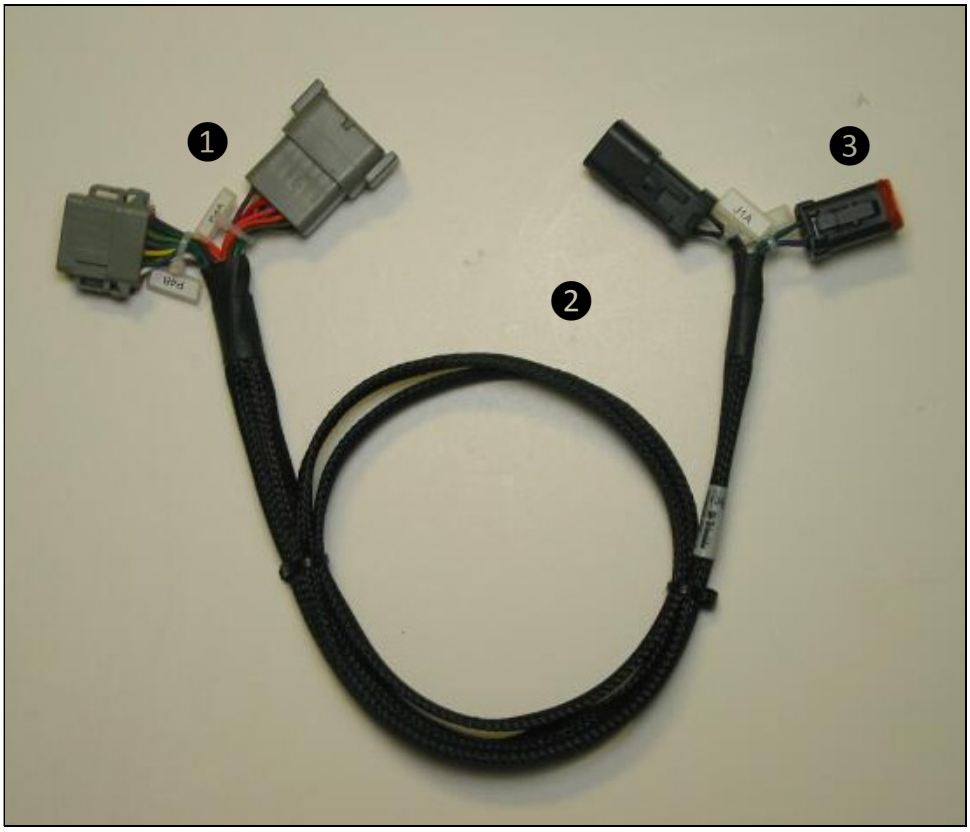
Can Bus Installation

In this chapter:

- Can bus cable components
- Setting up the CAN bus: non-C Series models
- Enabling the ISO11783 class 3 hitch
- Setting up the CAN bus: C Series models
- Installing the CAN bus Cable: non-C Series models
- Installing the CAN bus cable: C Series models

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 – *For Cat C Series tractors, connect to the P12 connector on the 54601. Do not connect to the P4 connector.*

Setting up the CAN bus: non-C Series models

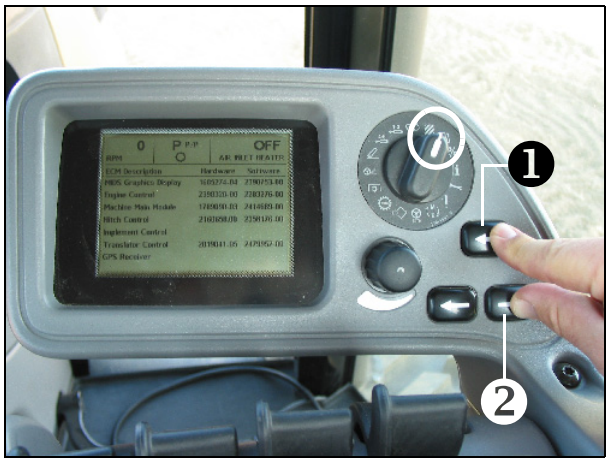
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

Step 1

Verify the vehicle has a CAN translator through the MIDS display:

– Turn the upper knob to the hash marks at the 1 o'clock position.

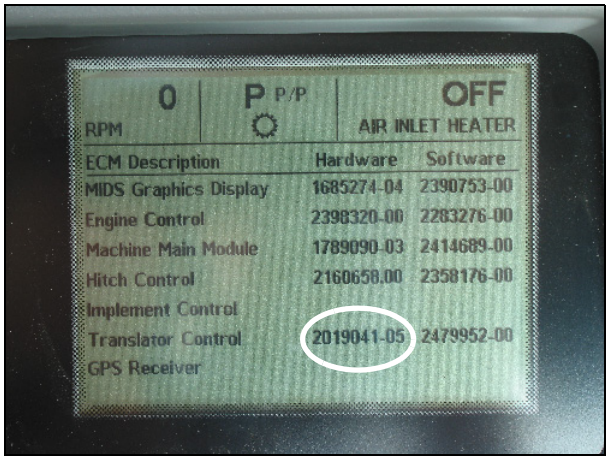
– Press the Enter key ❶ and the right arrow key ❷at the same time.



Step 2

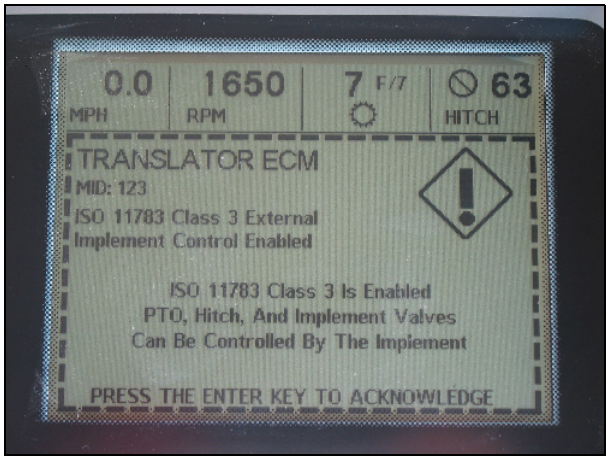
The number next to "Translator Control" indicates the software and hardware (controller) part number. If no number is present, the tractor is not CAN-ready. Contact your dealer.

Note – *If the updated version of the software that is compatible with the AgGPS Autopilot system is not on the translator controller, the tractor will not accept Autopilot CAN commands. To update the software, contact your MT tractor dealer. Visit the Trimble website for compatible software.*



Step 3

If the TRANSLATOR ECM warning appears, go to Step 8.



Step 4

Rotate the main selector knob to the M->E setting, at the 5 o'clock position.



Step 5

Rotate the lower left knob to highlight "P3" (page 3). A page is highlighted when it has a black background.



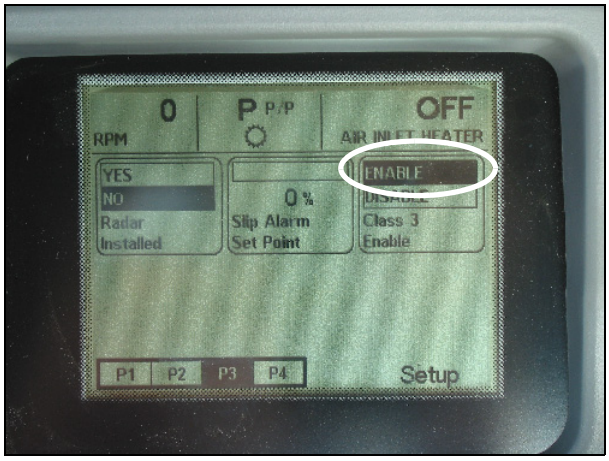
Step 6

Press the left ❶or right ❷arrow key until the "Class 3" box has a thick, dark border around it.



Step 7

Rotate the small, black knob to highlight the word “ENABLE”.



Step 8

A warning message appears. Press the Enter key to acknowledge the ISO 11783 activation.

Note – *At every power cycle, a warning that the ISO 11783 network is enabled appears on the tractor’s MIDS monitor. The tractor will not accept AgGPS Autopilot commands until this warning is acknowledged. To acknowledge the warning, press the Enter key (center right)*



Step 9

Class 3 is enabled. Rotate the main selector knob to the 12 o’clock position.



Enabling the ISO11783 class 3 hitch

Step 1

Start the tractor and then wait for the Home screen to appear on the arm rest controller.



Step 2

Check the version of the operating system software that is on the arm rest controller:

a. Rotate the round selector knob on the upper right corner of the display to highlight the wrench icon.

b. With the icon highlighted, press the round selector knob.



The operating system must be version 2.0.00 or later.

If it is not, contact your Challenger representative to update the software.



Step 3

Return to the Home screen: press the Esc button in the lower right the display.



Step 4

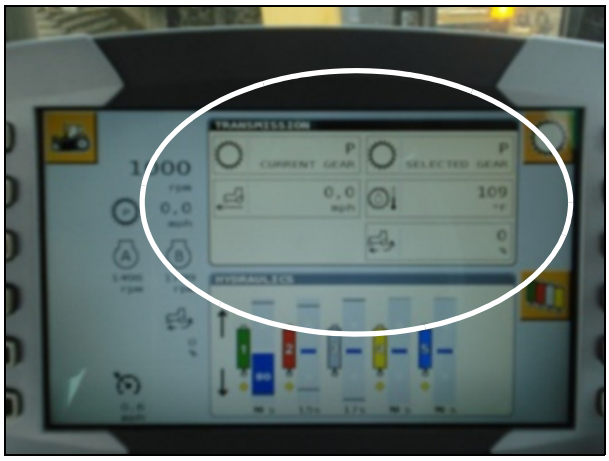
Rotate the round selector knob on the upper right of the display until the tractor icon is highlighted in yellow and then press the selector knob.



Step 5

Use the round selector knob to highlight the transmission heading (the selected heading is highlighted in black) and then press the selector knob.

If the transmission heading does not appear on the display, but another heading (such as engine) appears, select this heading.



Step 6

Rotate the selector knob to highlight the wrench icon and then press the selector knob.



Step 7

Press the button next to the wrench icon in the upper right corner.



Step 8

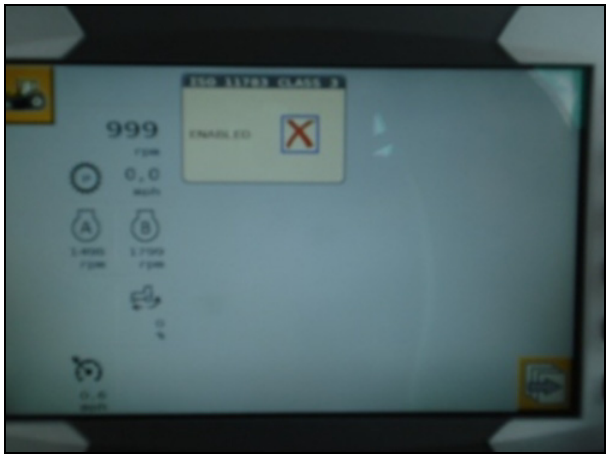
Press the button next to the next page icon in the lower right corner.



Step 9

Look at the ISO 11783 Class 3 settings.

If it shows a red X, the ISO is disabled.



To enable the ISO, do the following:

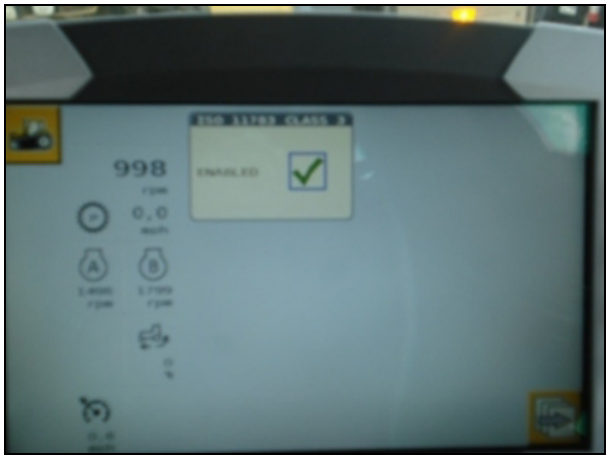
a. Press the selector knob.

b. Rotate the selector knob to highlight the green checkmark.



c. Press the selector knob to enable.

   The ISO 11783 Class 3 message appears.



d. To acknowledge that the ISO 11783 Class 3 is enabled, press the button next to the green checkmark on the upper right corner of the display.



Setting up the CAN bus: C Series models

Step 1

Start the tractor. The arm rest controller displays the Home screen.

Rotate the selector knob ❶ to highlight the Wrench Icon ❷, and then press the selector knob inwards.



Step 2

Check that the Operating System is at least 2.0.00 or later. To update the Operating System version, contact your AGCO dealer.



Installing the CAN bus Cable: non-C Series models

Note – *Before installing the CAN bus cable, verify the CAN connectors were connected at the factory. If the connectors are disconnected, the CAN system will not work. For more information, see below.*

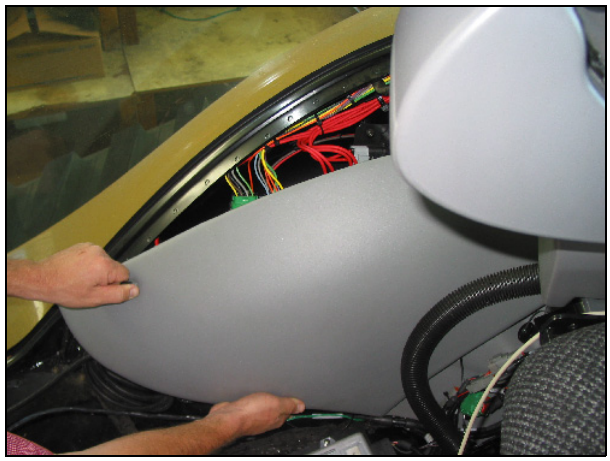
Step 1

The CAN bus connection is made in the electrical panel to the right of the driver's seat.



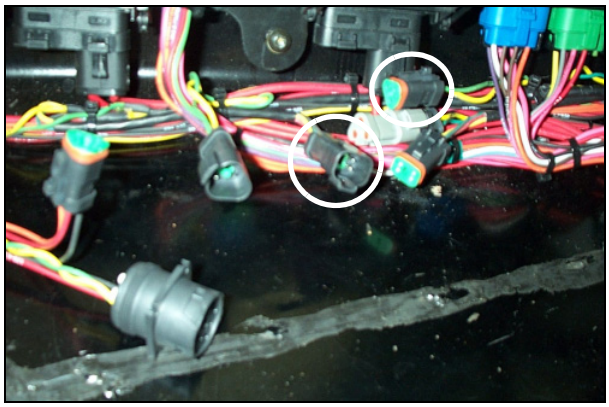
Step 2

Pull up the floor mat and remove the access panel.



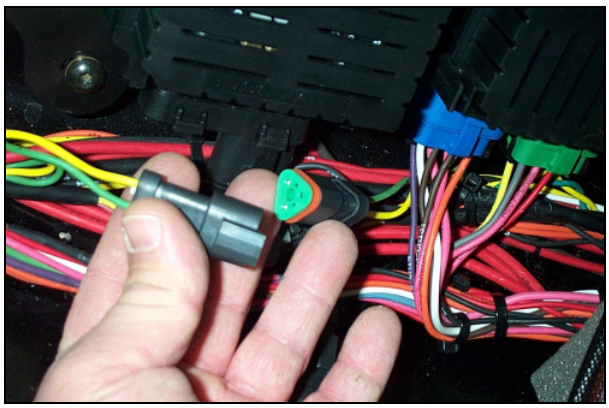
Step 3

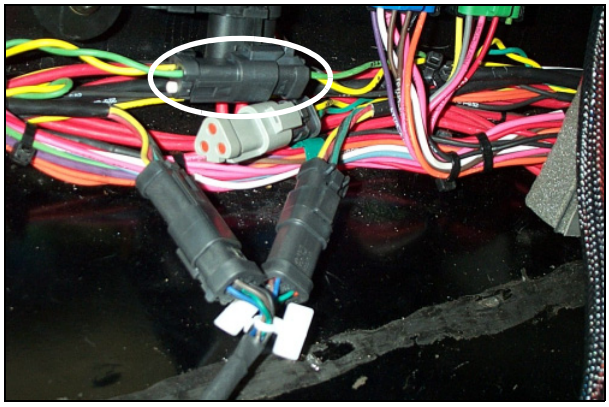
Verify that the CAN connectors were connected at the factory. If the connectors are disconnected, the CAN system will not work.



Ensure that the CAN cable has been connected together. Identify the two connectors by the attached wires:

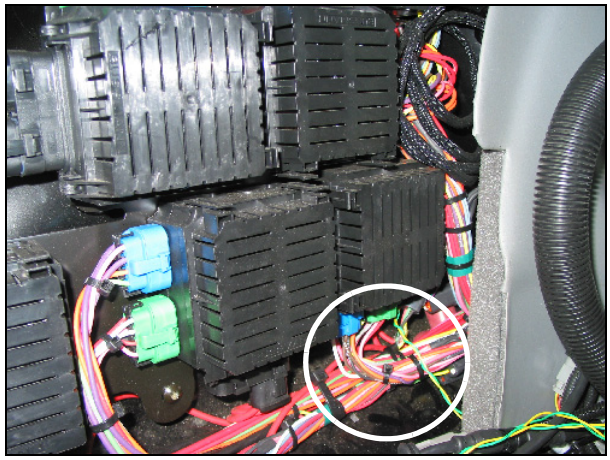
Wire	Color	Code #
1	Green	F712
2	Yellow	F711





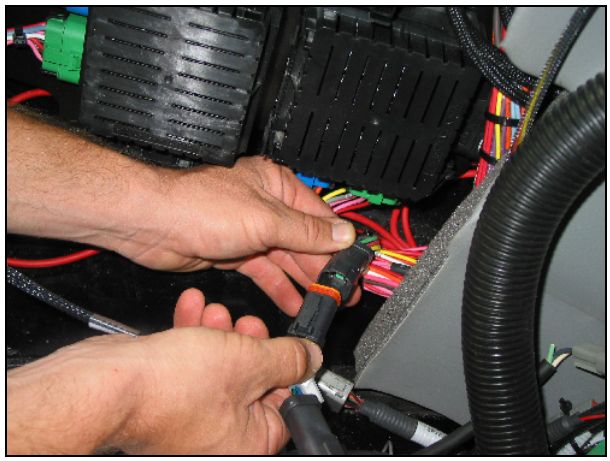
Step 4

Locate the 4 pin Deutsch DT connector that is behind the bundled wire. The connector has red, yellow, green, and black wires.



Step 5

Remove the cable ties to install the jumper.



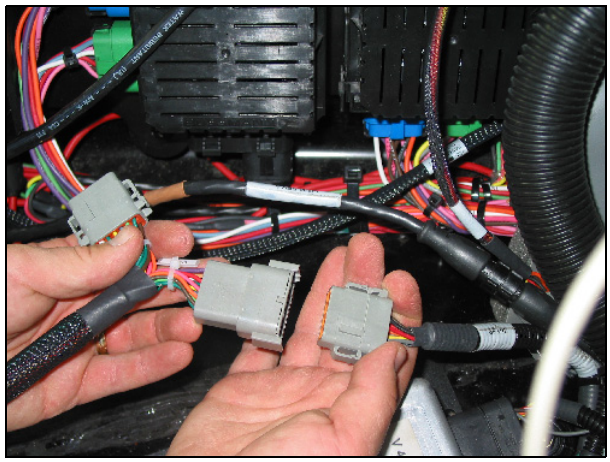
Step 6

Install the CAN bus jumper.



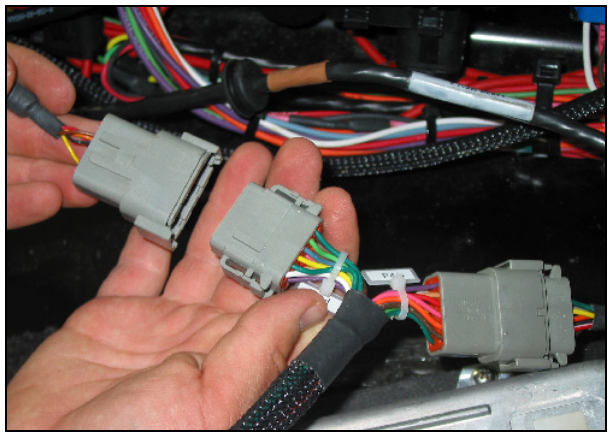
Step 7 S

The controller end of the cable is connected to the “Spare (P-12)” leg of the auxiliary harness. See Controller connections, page 97. Attach the receptacle end of the gray DTM connector to the spare connection.



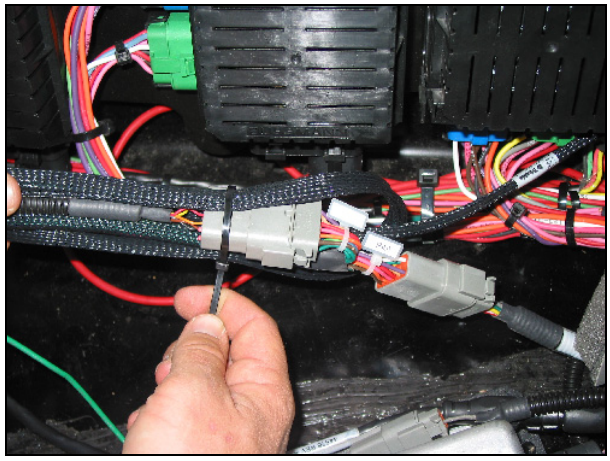
Step 8

The jumper allows continued use of the “Spare” port for secondary display devices.



Step 9

Secure all cabling with ties. Minimize any wire strain.



Step 10

Replace the panelling and floor mat.



Installing the CAN bus cable: C Series models

Step 1

The CAN bus connection is made in the electrical panel to the right of the driver's seat.



Step 2

Remove the access panel.



Step 3

Locate the CAN bus connection towards the back of the access panel.

Note – *This is the approximate location. You may have to move wires/cables to locate the connection.*



Step 4

Disconnect the CAN bus connector.



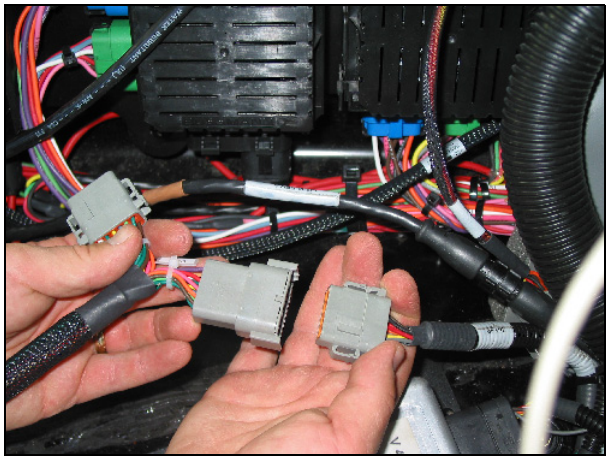
Step 5

Install the CAN bus jumper.



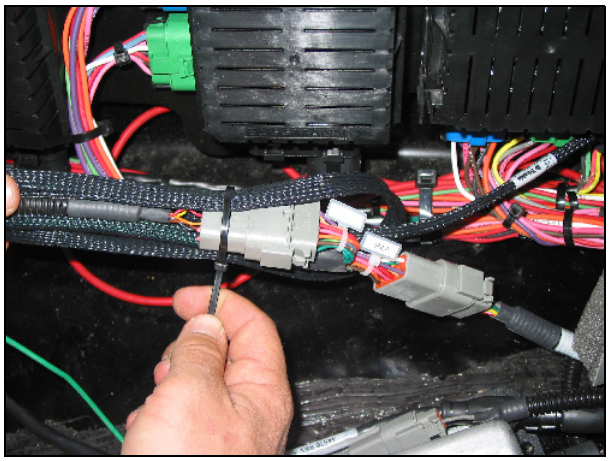
Step 6

Connect the controller end of the cable to the “Spare (P-12)” leg of the auxiliary harness. See Controller connections, page 97. Attach the receptacle end of the gray DTM connector to the spare connection



Step 7

Secure all cabling with ties. Minimize any wire strain. Re-install the access panel.



CHAPTER 3

Antenna/External Receiver (If Used) Installation

In this chapter:

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

This chapter describes how to install the required receiver and antenna, and radio module (if used).

To install the antenna for CFX-750 or FmX display, see Chapter 4, Display Installation.

Antenna and receiver installation options

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

- **Spar mount** – Spar mounts bolt directly to the roof and are recommended for high accuracy applications such as RTK and OmniStar. Trimble recommends this method for mounting the AG-372 receiver.
- **Bolting the Antenna to the existing OEM mount** - This method can be used on newer Topcon ready vehicles that have the mounting plate. It will work well for high accuracy applications.
- **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 35.
- **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	AG15/AG25/Zephyr/ AG-372 bolted to spar mount	AG15/AG25/Zephyr bolted to OEM Mount
CFX-750 display; FmX integrated display	✓	✓	✓	✓
AG-372 receiver	✘	✓	✓	✘
*Ag*GPS 542 receiver	✓	✓	✓	✓

Notes:

- *For quick release magnetic mounting with an AG-372 receiver, order the kit listed in Antenna mounting kits, page 8 and bolt the V plate to the spar.*
- *When spar mounting is not available and high accuracy is required, see Installing a AG-372 receiver with magnetic feet.*
- *With all other antennas, bolt the V plate to the spar for high accuracy and repeatability.*
- *For WAAS, EGNOS, OmniSTAR VBS, Beacon, and DGPS applications, place either of the plates in a firm location using the VHB.*

Mounting an adjustable spar to roof bolts

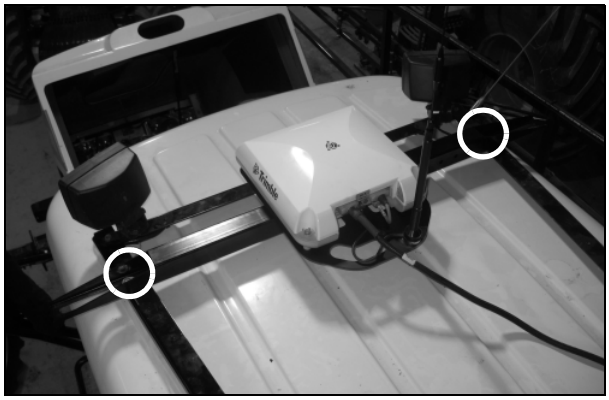
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

Step 1

Position the cab bolts on the roof of the vehicle.

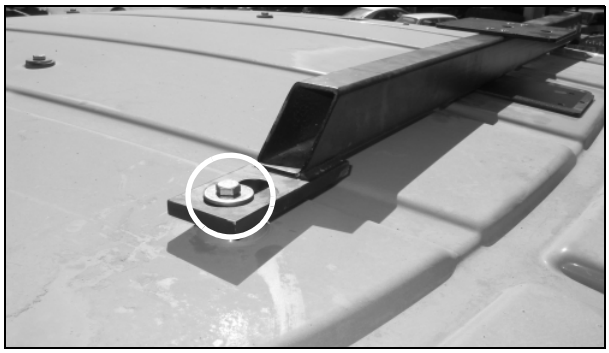


If a light bracket already occupies the roof studs, mount the spar directly onto the light bracket.



Step 2

If required, replace the existing bolts with longer bolts.



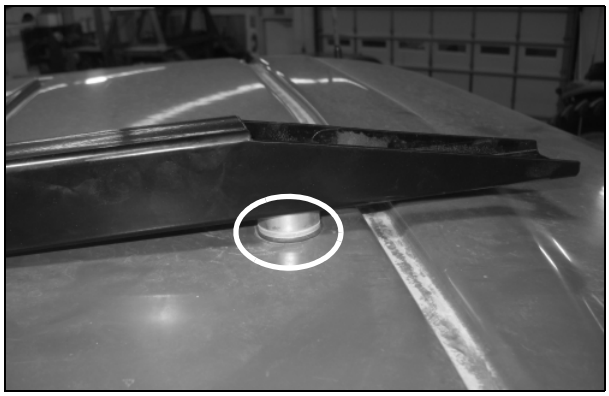
If you use the light bracket, drill two holes to match the spar width.



Step 3

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

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



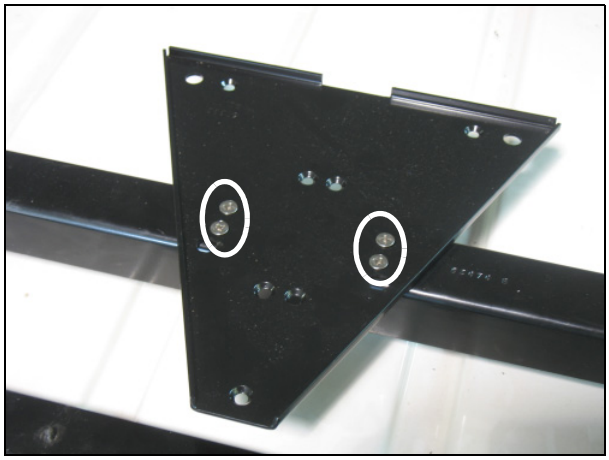
Step 4

For either of the following applications:

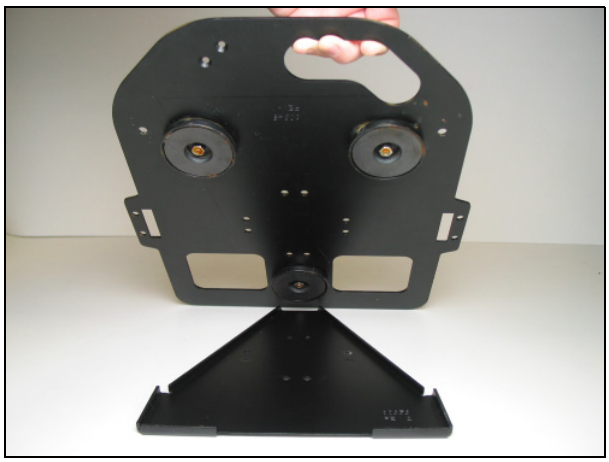
- A single magnet antenna mount
- An AG-372 receiver with magnetic option for quick removal

Attach a V plate with four ¼" flathead screws.

The narrow end points to the front of the vehicle.



V plate on the spar



Magnetic mount on the V plate

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

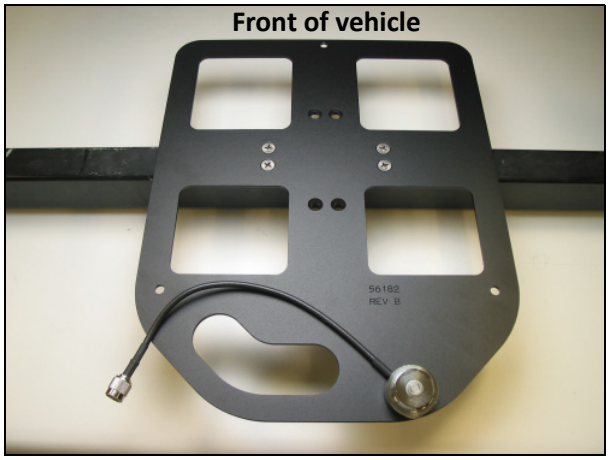


Plate on the spar

Mounting the antenna to the OEM antenna bracket

If the tractor has a factory-installed antenna bracket, you can mount the antenna on to it, as shown in the images to the right.





To mount the antenna on a factory-installed antenna bracket:

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

Insert a 2" 5/8" NC bolt through the hole, keeping the head of the bolt below the bracket.

Step 4

Secure the bolt with a nut.

Step 5

Put an additional nut onto the bolt.

Step 6

Thread the antenna onto the bolt.

Step 7

Use the second nut (see Step 5) 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.

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

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

Step 1

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

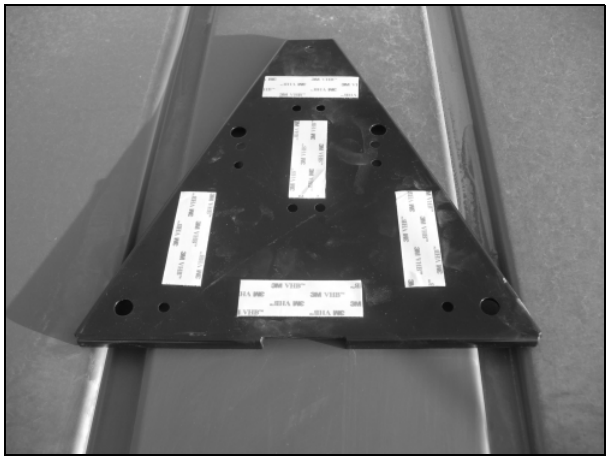


Step 2

V plate only

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

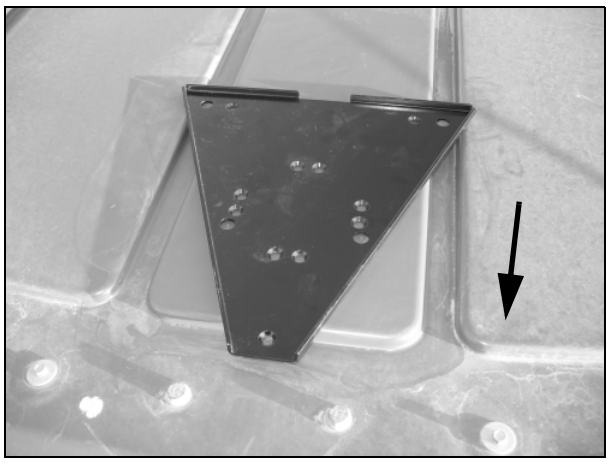
Note – *The VHB strips are pre-applied to the 4" x 6" plate.*



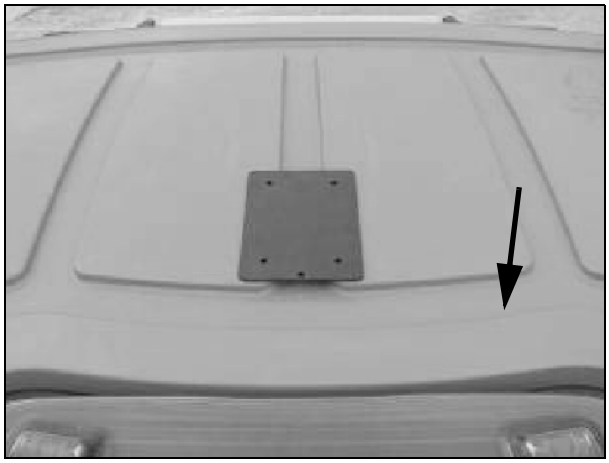
Step 3

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

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

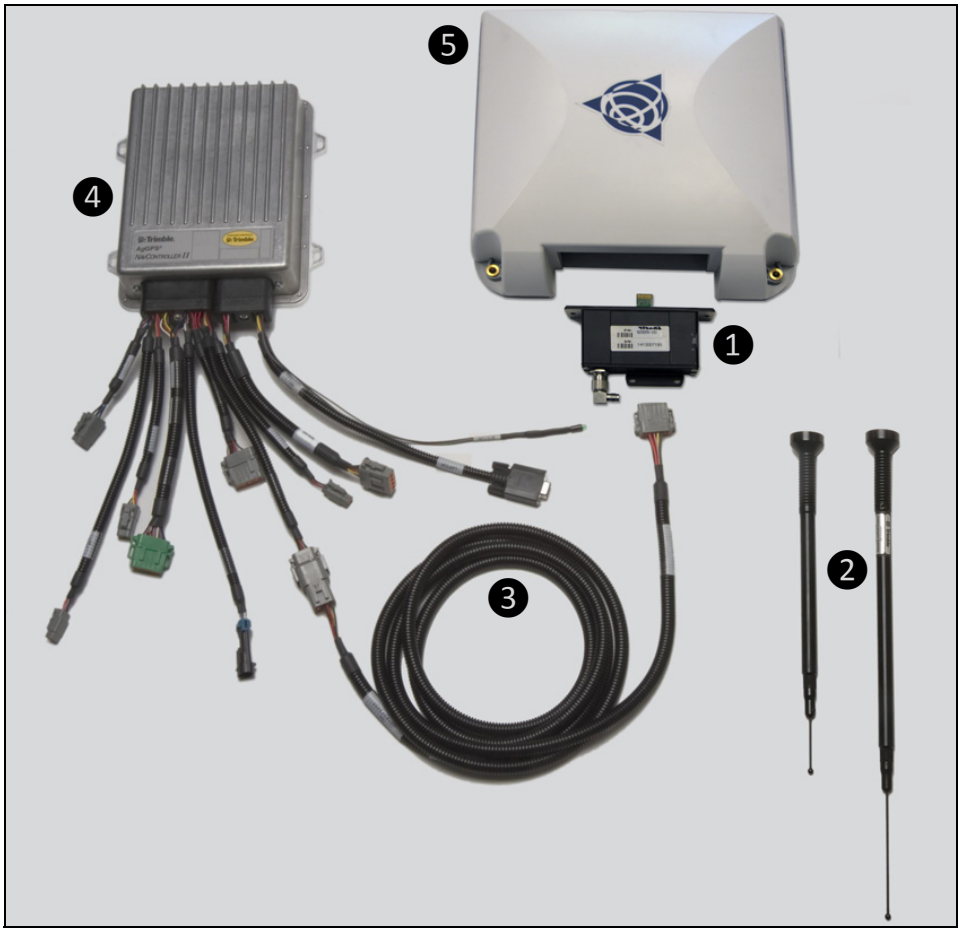


V plate



4" x 6" plate

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



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

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

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

To attach the AG-372 receiver plate to the cab roof, do one of the following:

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

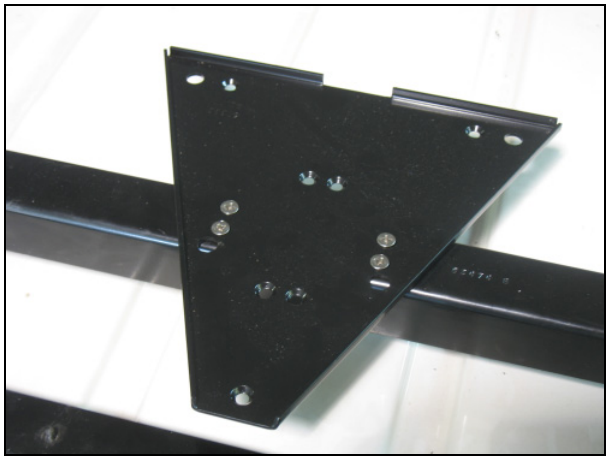
Removable installation

Step 1

V plate

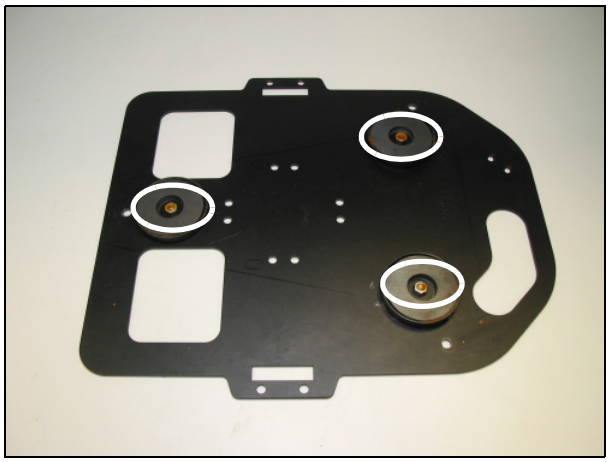
Attach the V plate to the spar using the ¼" flathead screws provided in the V plate bolt kit. Ensure that the narrow end points forward.

For spar mounting instructions, see page 31.



Mounting plate

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



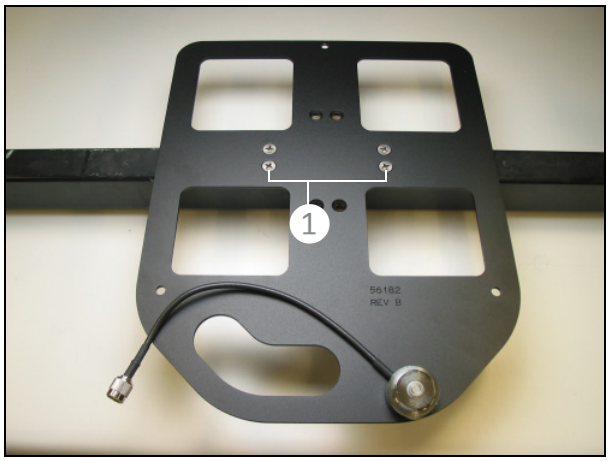
Underside of plate

Permanent installation

Step 1

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

For spar mounting instructions, see page 31.



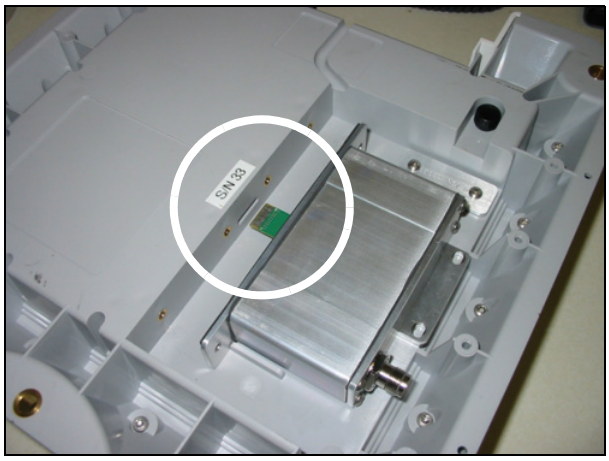
Step 2

Remove the blanking plate and set it aside.



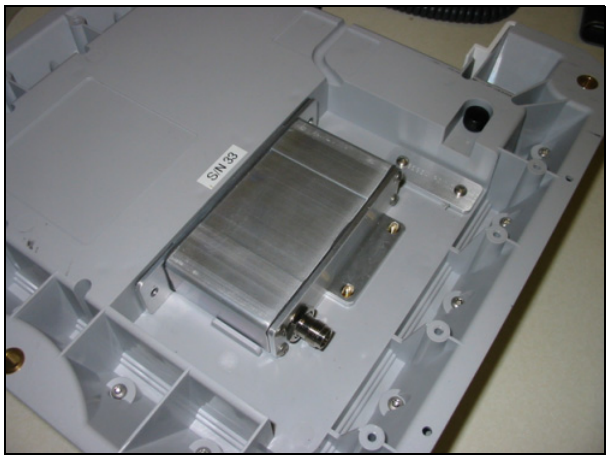
Step 3

Place the integrated radio inside the AG-372 receiver. Ensure that the circuit board is aligned with the slot in the vertical wall of the receiver.



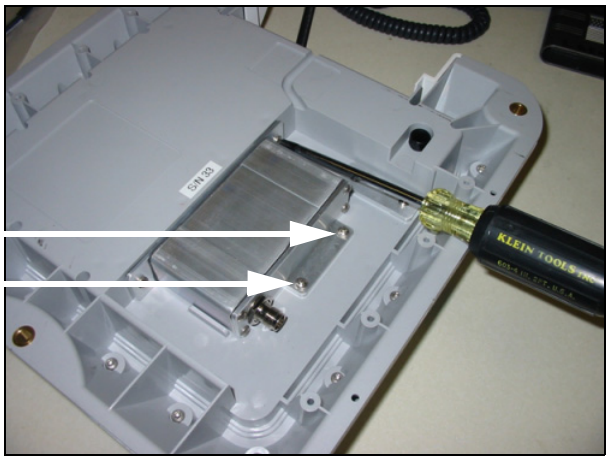
Step 4

Slide the integrated radio back so that it is flush with the vertical wall of the receiver.



Step 5

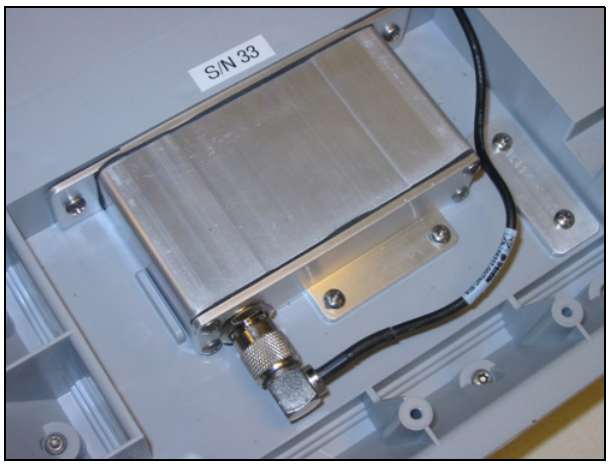
Use a #1 or #2 Phillips screwdriver and the supplied screws to install the integrated radio. First insert and tighten the two screws on the horizontal wall (arrowed), and then insert the remaining screws.



Step 6

Install the supplied antenna cable.

Note – *The housing can accommodate a cable diameter of up to ¼".*

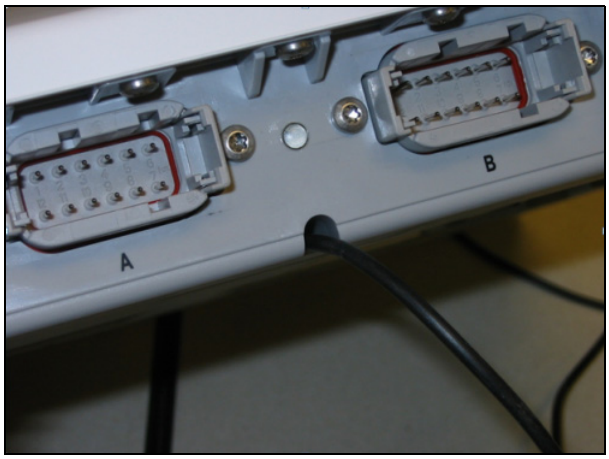


Step 7

Route the cable through the cable channel and then insert the cable cover.

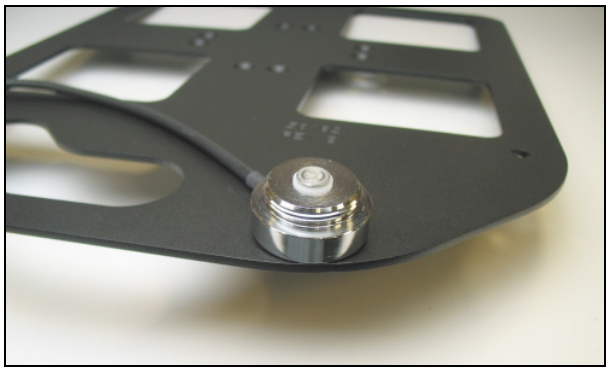


This image shows the unit with the cable routed through the channel.



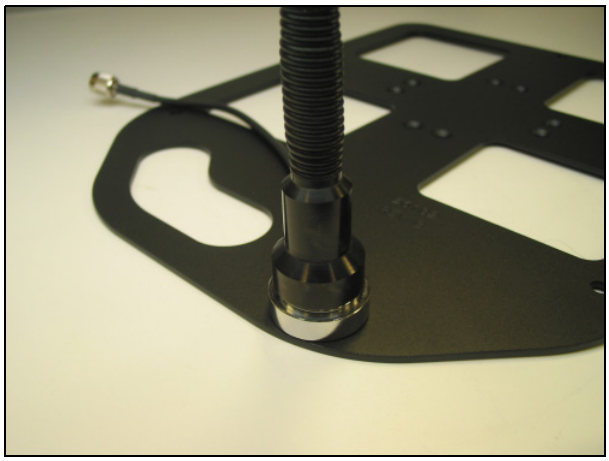
Step 8

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



Step 9

Attach the radio antenna to the antenna base.



Step 10

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



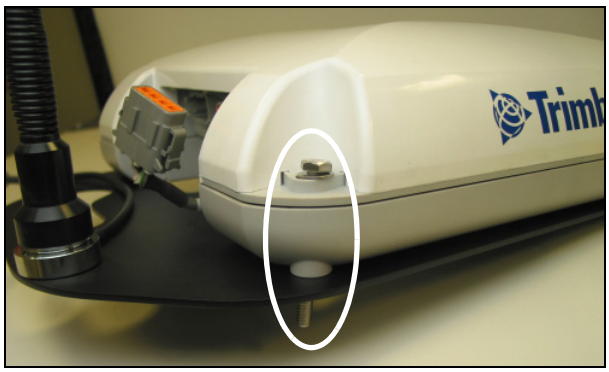
Step 11

Insert the nylon bushings provided.



Step 12

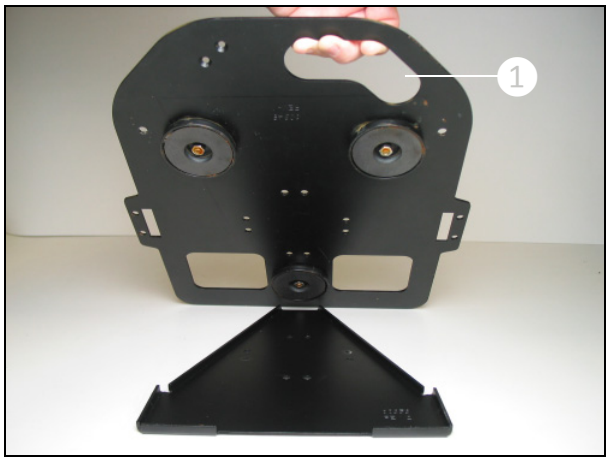
Insert the bolts through the receiver, radio, and mounting bracket. Place nuts on the bolt ends and then tighten them.



Step 13

Magnet method

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

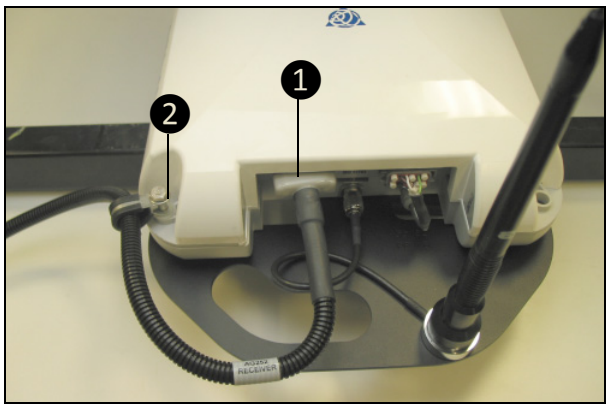


Step 14

Both methods

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

Route the cable into the cab and into the controller.



Installing a AG-372 receiver with magnetic feet

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

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

Step 1

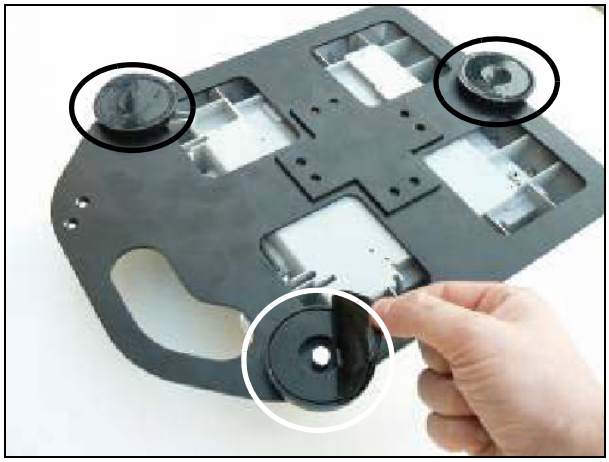
Attach the magnets to the receiver mounting plate. Mount the AG-372 receiver using the three ¼" bolts.

Place the nuts on the receiver side.



Step 2

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

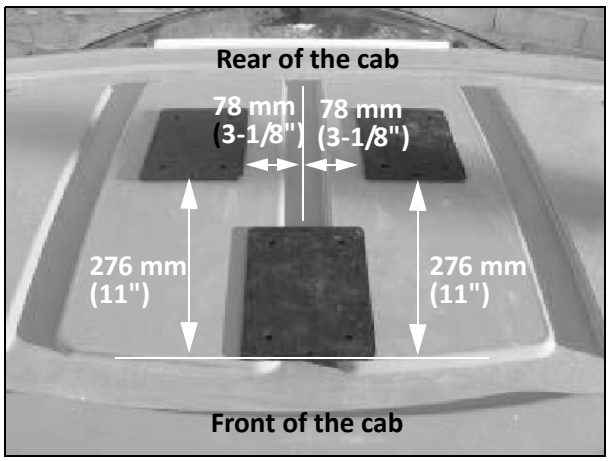


Step 3

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

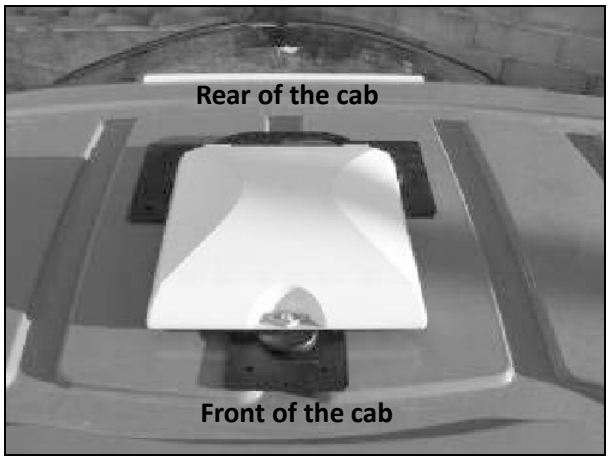
Remove the backing from the VHB strips and then apply the plates to the cab roof.

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



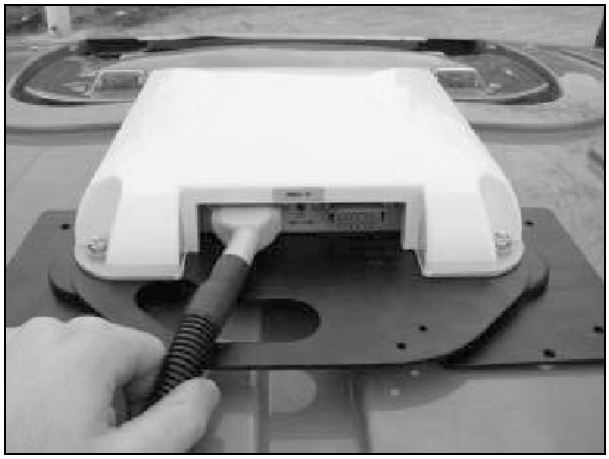
Step 4

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

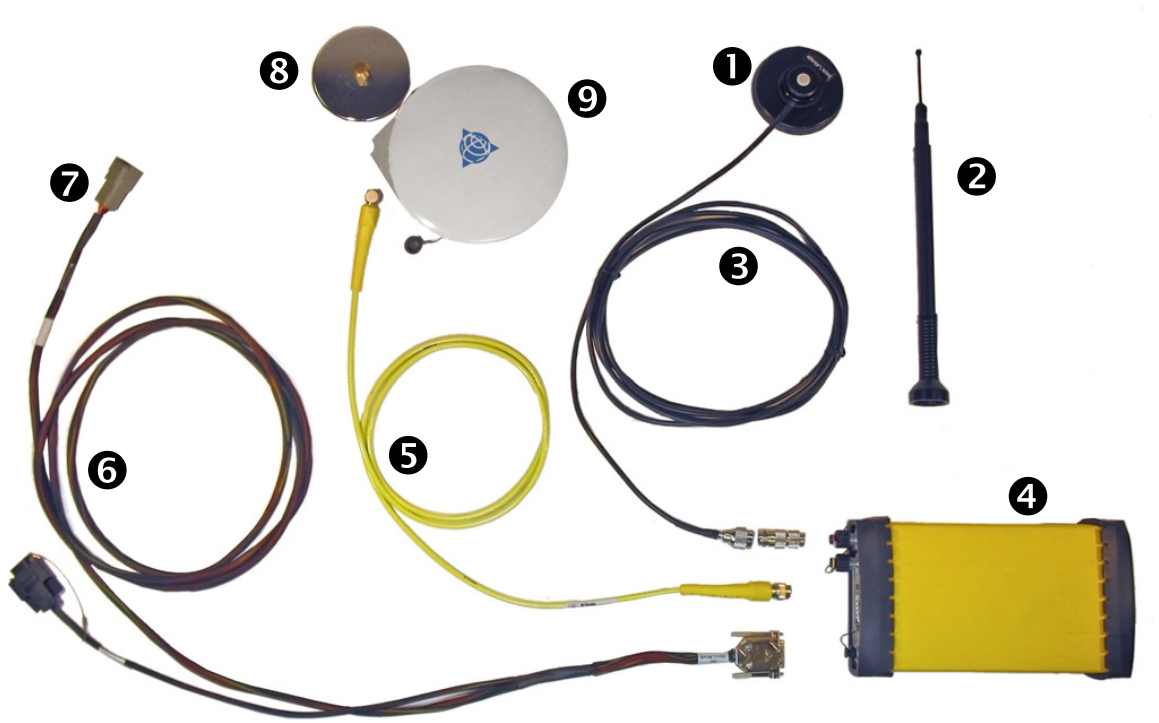


Step 5

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



*Ag*GPS 542 receiver components



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

The Zephyr antenna can be bolted to the OEM mount for repeatable high accuracy applications. For more information see page 34.

Installing the *Ag*GPS 542 receiver with a magnetic mount

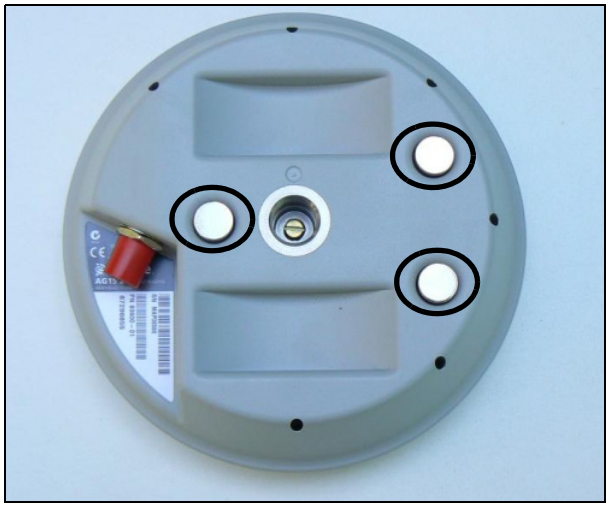
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

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

GLONASS,RTK, OmniSTAR, DGPS applications

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



Step 3

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



Step 4

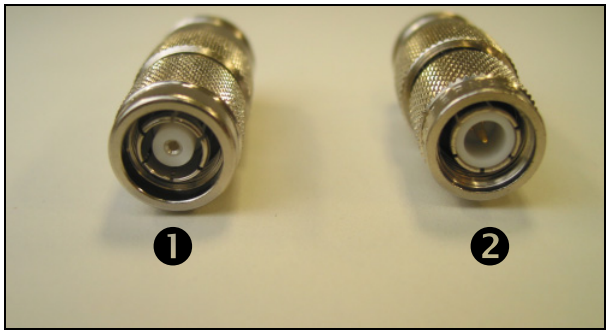
Mount the receiver in a convenient location in the cab. Route the antenna cable to the receiver and then connect it.



Step 5

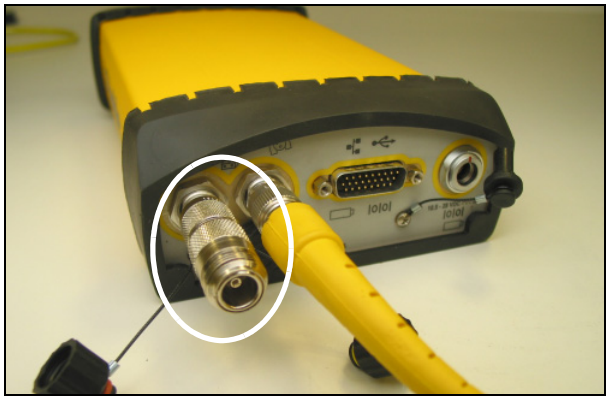
Identify the correct adaptor for the radio connection:

- ❶ Reverse polarity TNC-to-N for 900 MHz radios
- ❷ Normal polarity TNC-to-N for 400 MHz radios



Step 6

Attach the adaptor to the radio port.



Step 7

Connect the radio antenna cable to the radio port adaptor.



Step 8

Connect the controller cable to the 26-pin connector of the receiver. Controller cable connections will be completed in Chapter 7, Controller Installation.



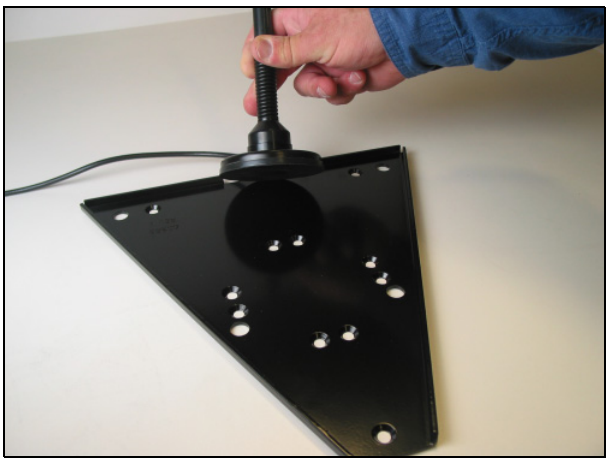
Step 9

Connect the radio antenna to the magnetic antenna base.



Step 10

Attach the magnetic radio antenna base to the rear of the V plate on the roof. If the cable does not reach the V plate, use the P/N 62034 plate with the VHB provided to relocate the antenna.





RTK antenna on P/N 62034 plate

CHAPTER 4

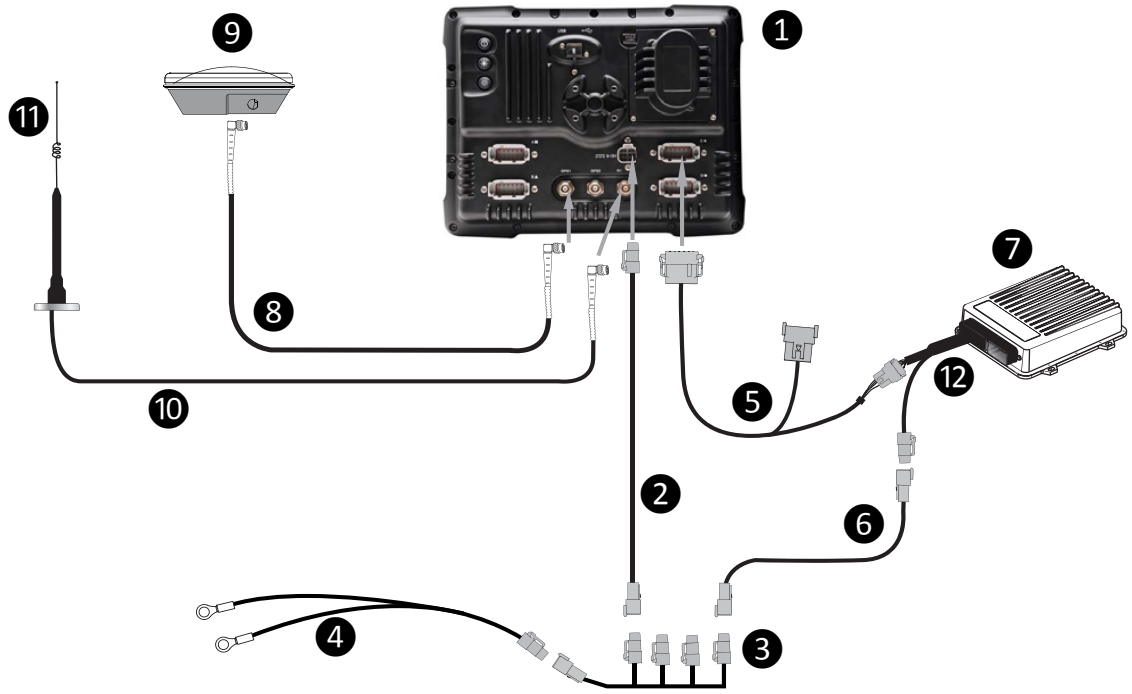
Display Installation

In this chapter:

- FmX integrated display components
- CFX-750 display components
- 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
- CFX-750 and FmX displays: Installing the GNSS antenna and plate
- CFX-750 and FmX displays: Installing the RTK radio antenna

This chapter describes how to install and connect the FmX integrated display or the CFX-750 display in the vehicle.

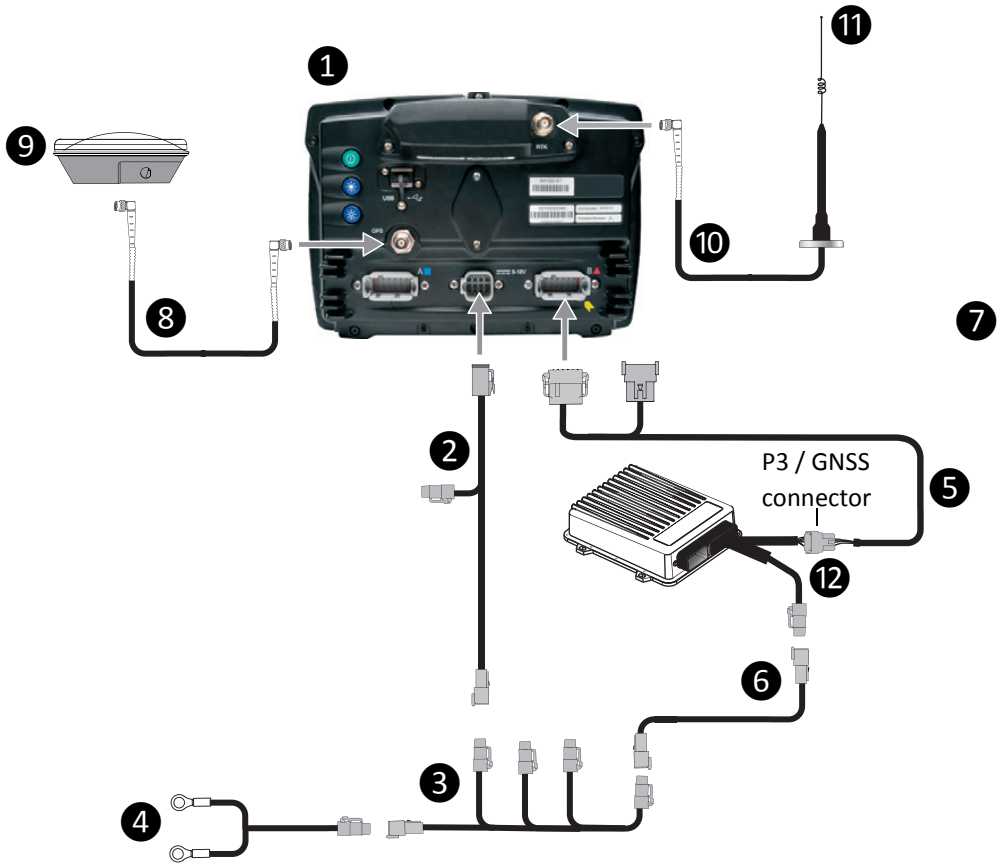
FmX integrated display components



⚠ **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 GNSS TNC/TNC RT angle cable	50449
❾	AG25 GNSS antenna	77038-00
❿	NMO to TNC 20ft antenna cable and base	72122
⓫	900 MHz radio antenna kit	22882-10
⓬	Main NavController II cable	54601

CFX-750 display components



CAUTION – Connecting the Port Replicator on the 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	CFX-750 display ***Note –*** *RTK password required.*	93100-02
❷	CFX-750 power cable	66694
❸	CFX-750 power cable with relay and switch (power bus)	67259
❹	Basic power cable	67258
❺	FmX to NavController II cable with port replicator	75741
❻	2 pin DTM to 2 pin DT power adaptor	67095
❼	NavController II	55563-00
❽	8 m GNSS TNC/TNC RT angle cable	50449
❾	AG25 GNSS antenna	77038-00
❿	NMO to TNC 20ft antenna cable and base	72122
⓫	900 MHz radio antenna kit	22882-10
⓬	Main NavController II cable	54601

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.

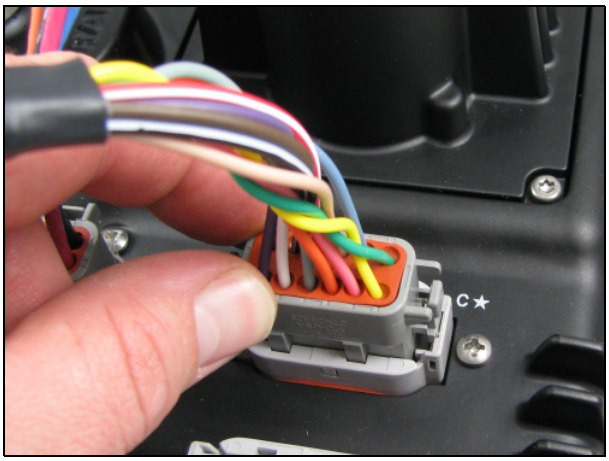
Step 1

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.

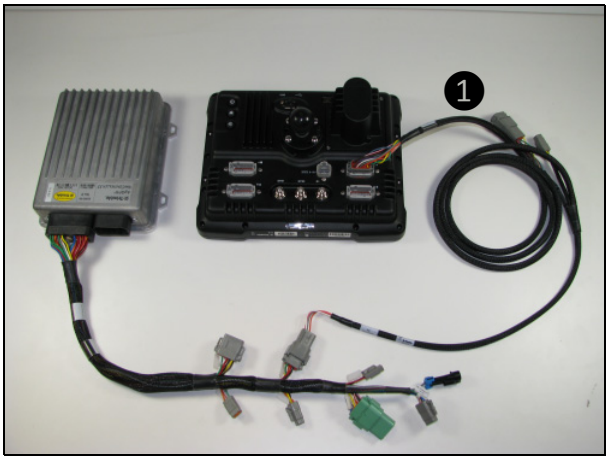
To connect power to the FmX integrated display, see Chapter 7, Controller Installation.



FmX integrated display: Installing the wiring harness

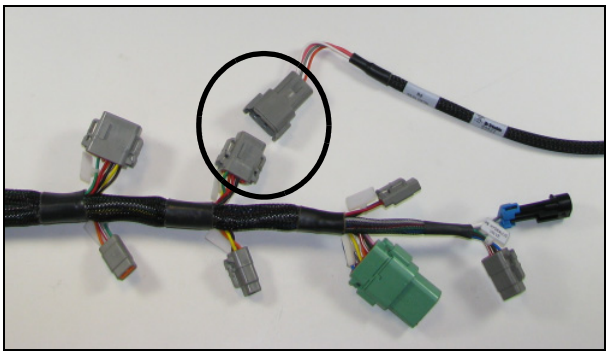
Step 1

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.

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 7, Controller 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.



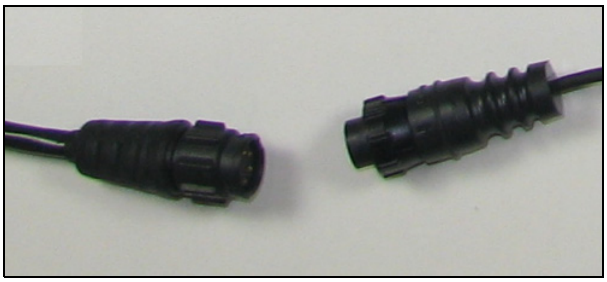
FmX display



CFX-750 display

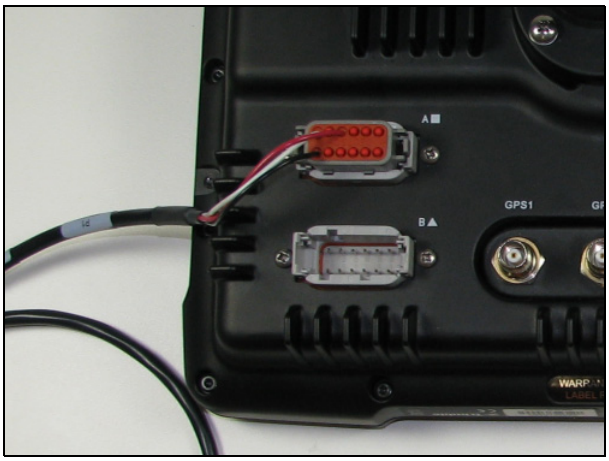
Step 3

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.



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.

Note – *The V plate antenna bracket is available on the Autopilot price list. See* *Antenna mounting kits, page 8**.*

To install the GNSS antenna and plate, use one of the following methods:

- Spar mount method
- Bolting to the existing OEM mount
- Mounting the antenna to the OEM antenna bracket
- VHB adhesive method

Spar mount method

Trimble recommends that you use this method for RTK and OmniSTAR operations. For more information, see Antenna and receiver installation options, page 30.

Use a $^{5}/_{8}$" bolt to attach the AG25 antenna to the spar, as shown. The narrow end points forward.



Bolting to the existing OEM mount

If the vehicle is equipped with the Topcon antenna mount this method can be used for high accuracy applications.

Mounting the antenna to the OEM antenna bracket

If the tractor has a factory-installed antenna bracket, you can mount the antenna on to it, as shown in the images to the right.





To mount the antenna on a factory-installed antenna bracket:

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

Insert a 2" 5/8" NC bolt through the hole, keeping the head of the bolt below the bracket.

Step 4

Secure the bolt with a nut.

Step 5

Put an additional nut onto the bolt.

Step 6

Thread the antenna onto the bolt.

Step 7

Use the second nut (see Step 5) to tighten down against the antenna. **DO NOT OVER-TIGHTEN**.

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.

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

Step 1

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

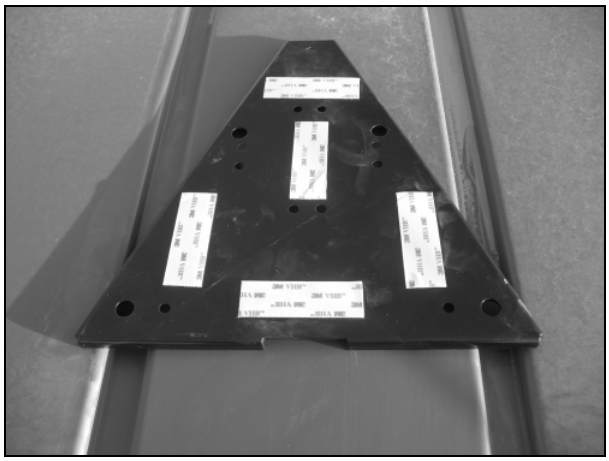


Step 2

V plate only

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

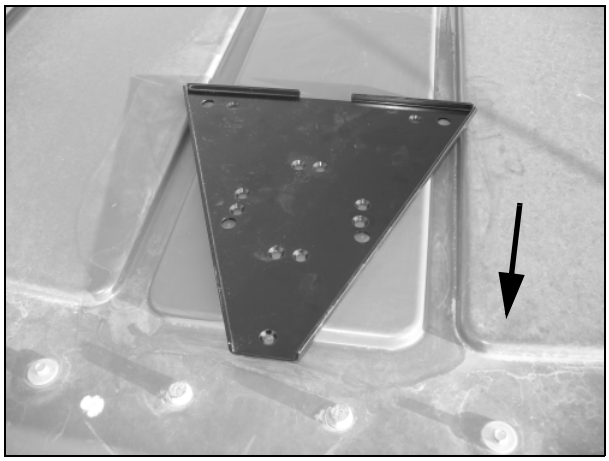
Note – *The VHB strips are pre-applied to the 4" x 6" plate.*



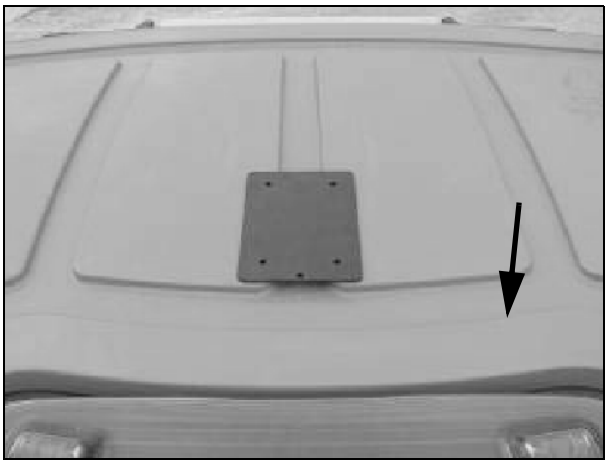
Step 3

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

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



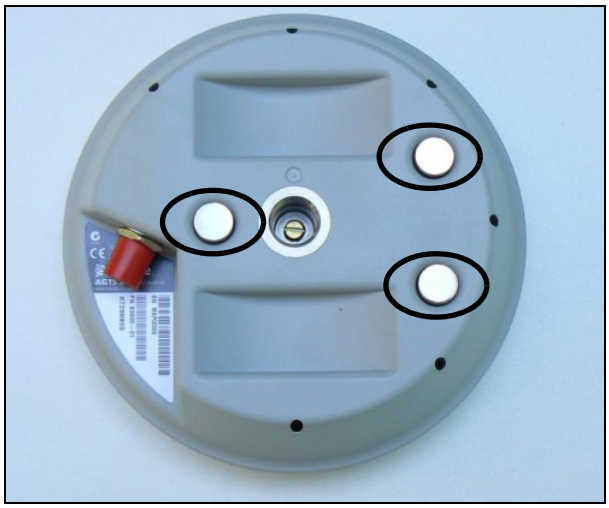
V plate



4" x 6" plate

Step 4

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



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



Step 5

GLONASS, RTK, OmniSTAR, DGPS, 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.



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.

Step 1

Connect the radio antenna to the magnetic antenna base

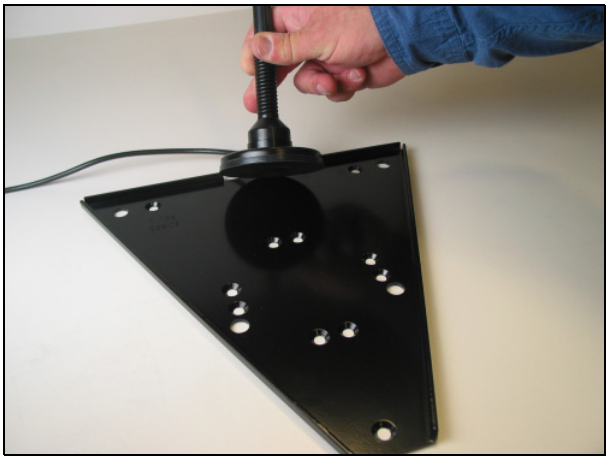


Step 2

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.

Step 3

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





RTK antenna on P/N 62034 plate

CHAPTER 5

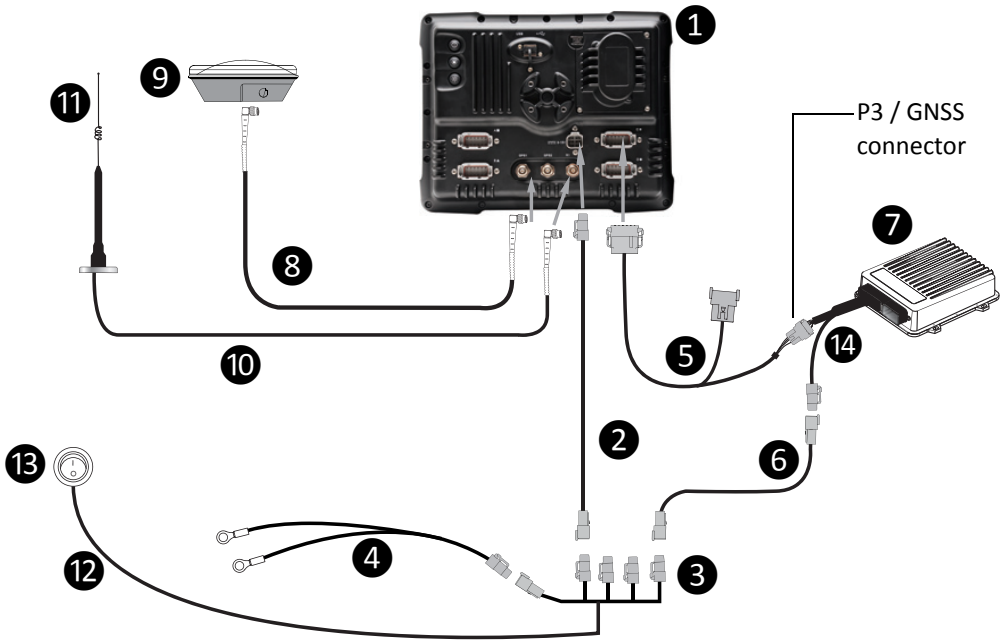
Power Harness Installation

In this chapter:

- FmX integrated display components
- CFX-750 display components
- Installing the power harness for the display
- Configuring the power bus options for the display

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

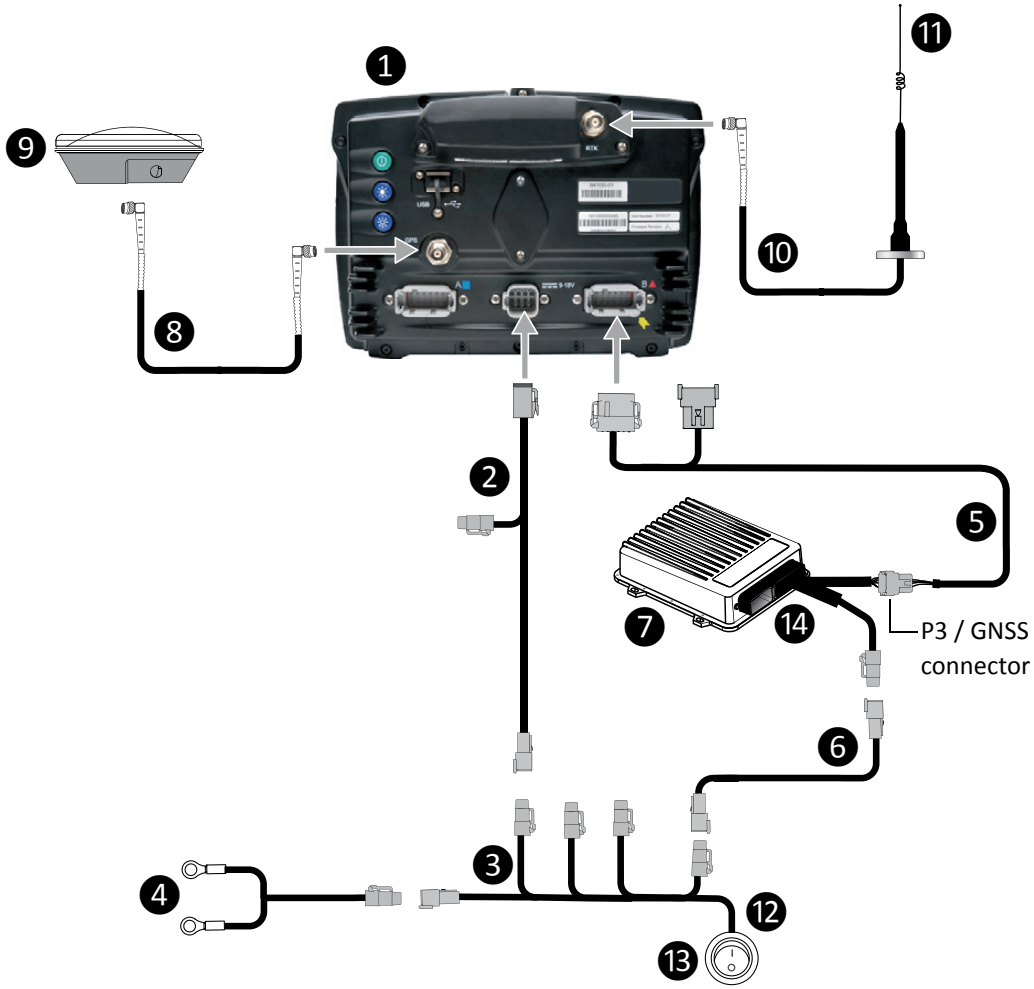
FmX integrated display components



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

Item	Description	Trimble part number
❶	FmX integrated display	93100-02
❷	FmX power cable	66694
❸	FmX power cable with relay and switch (power bus)	67259
❹	Basic power cable	67258
❺	FmX to NavController II cable with port replicator	75741
❻	2 pin DTM to 2 pin DT power adaptor	67095
❼	NavController II	55563-00
❽	8 m GNSS TNC/TNC RT angle cable	50449
❾	AG25 GNSS antenna	77038-00
❿	NMO to TNC 20ft antenna cable and base	72122
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 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	CFX-750 display ***Note –*** *RTK password required.*	93100-02
❷	CFX-750 power cable	66694
❸	CFX-750 power cable with relay and switch (power bus)	67259
❹	Basic power cable	67258
❺	FmX to NavController II cable with port replicator	75741
❻	2 pin DTM to 2 pin DT power adaptor	67095
❼	NavController II	55563-00
❽	8 m GNSS TNC/TNC RT angle cable	50449
❾	AG25 GNSS antenna	77038-00

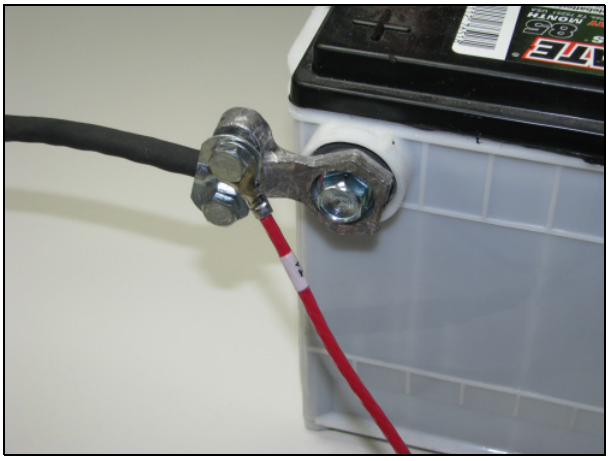
Item	Description	Trimble part number
⑩	NMO to TNC 20ft antenna cable and base	72122
⑪	900 MHz radio antenna kit	22882-10
⑫	External switch cable included with kit	Part of P/N 67259
⑬	External switch included with kit	Part of P/N 67259
⑭	Main NavController II cable	54601

Installing the power harness for the display

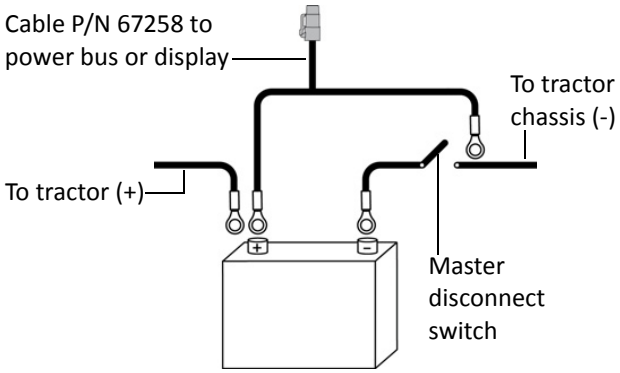
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

Step 1

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

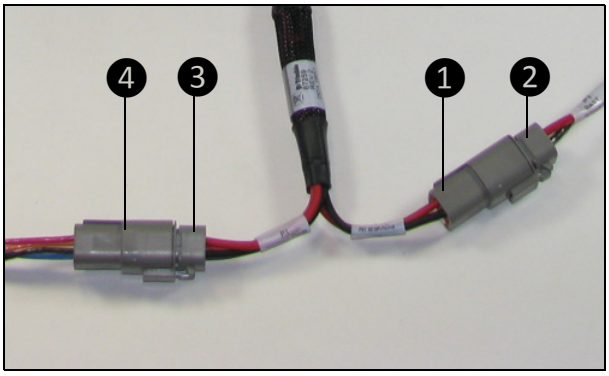


CAUTION – If the vehicle has a master electrical disconnect, make sure the basic power cable (P/N 67258) is ***not*** directly attached to the battery terminal that is disconnected by the master switch - the negative pole in this example.
Attach this terminal side just past the main disconnect so that it is as close as possible to the battery but still gets disconnected when the master disconnect is turned off. Failure to do so can result in damaging the display.



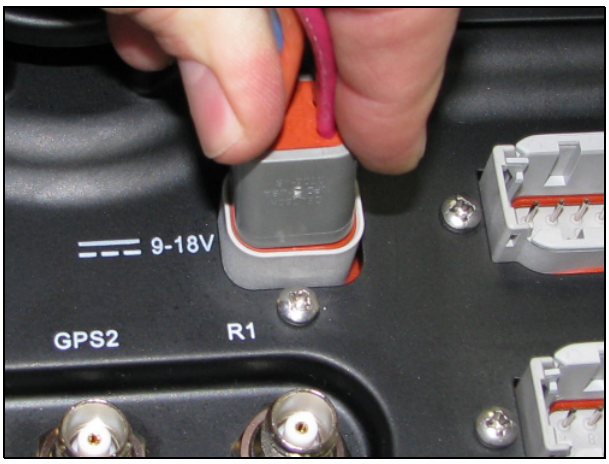
Step 2

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



Step 3

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



FmX display



CFX-750 display

Configuring the power bus options for the display

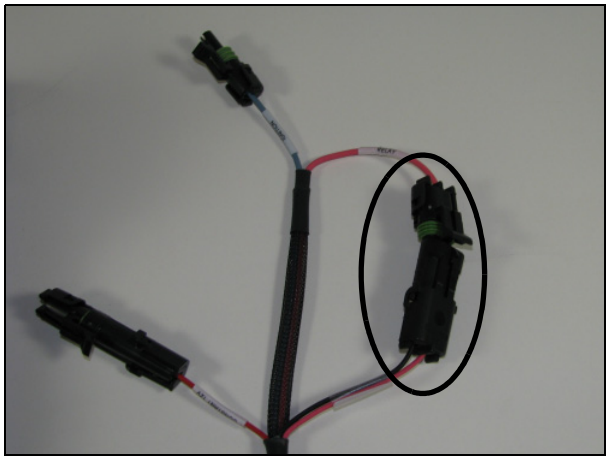
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

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.

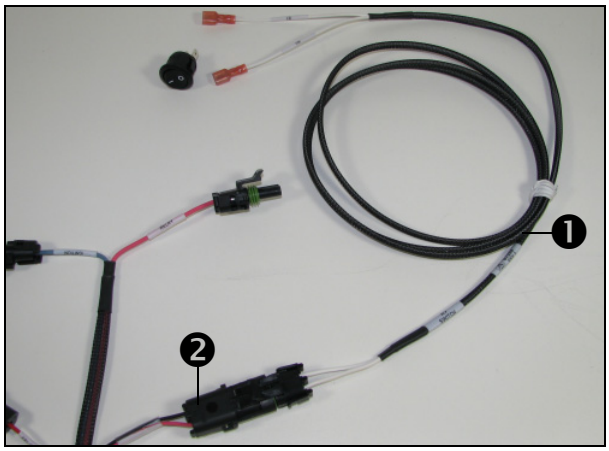


External switch is used to turn on the Autopilot system

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.

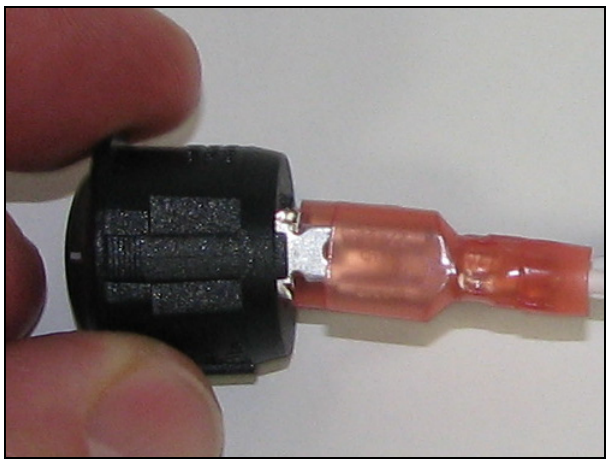
Note – *To install the switch provided, drill a ¾" hole.*



Step 2

Connect the cable labeled R7 to the switch pins.

Note – *Polarity is not important.*

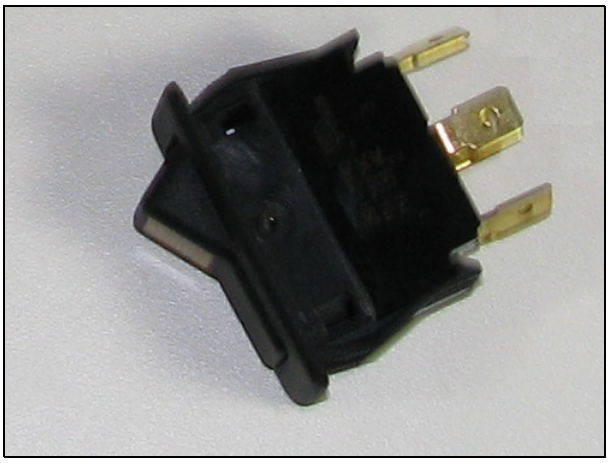


Installing the optional illuminated full or standard Euro switch

Step 1

Find an available knockout location on the vehicle console.

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

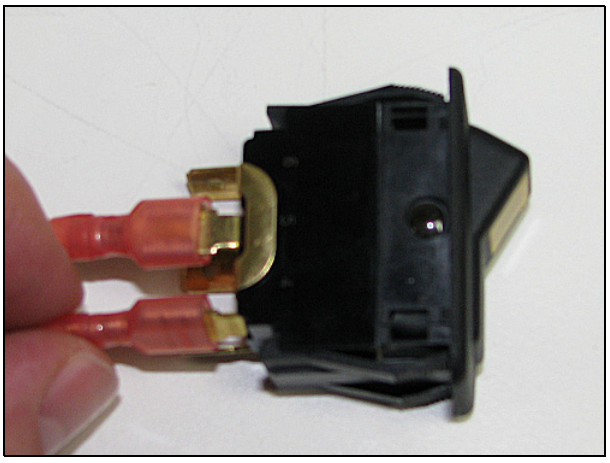


Step 2

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.

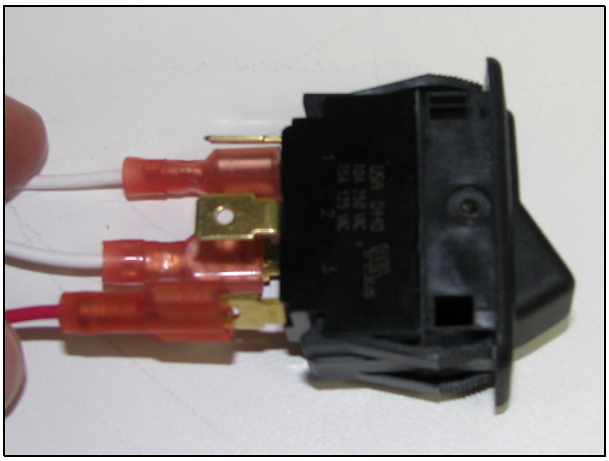
Note – *Polarity **is** important.*



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.*

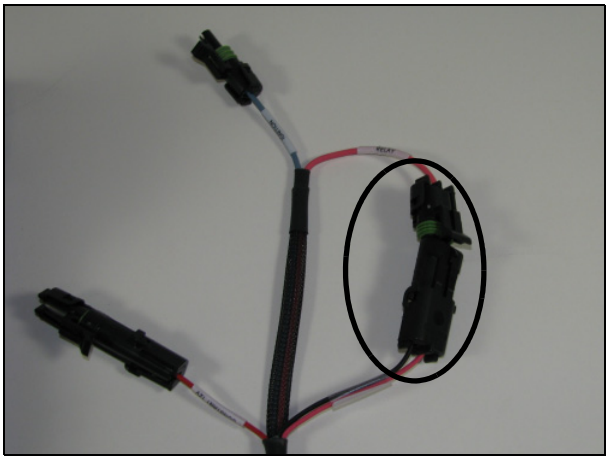


Ignition is used to turn on the Autopilot system

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.

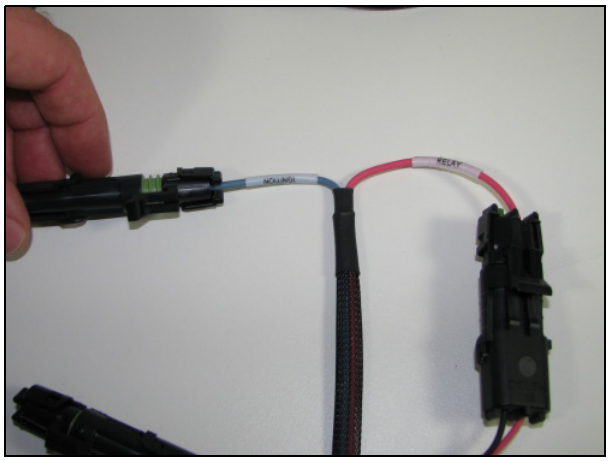


Step 2

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

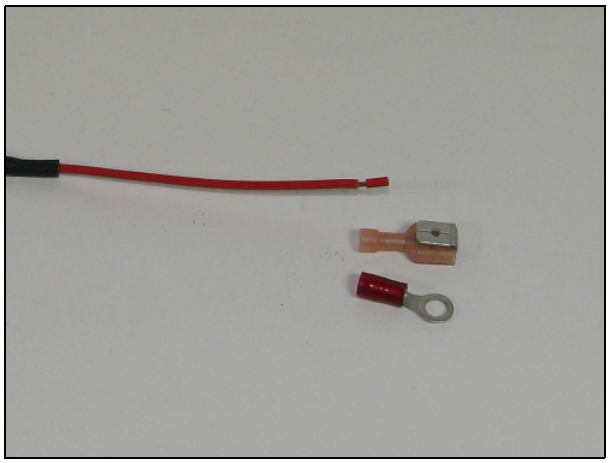
Step 3

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.



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

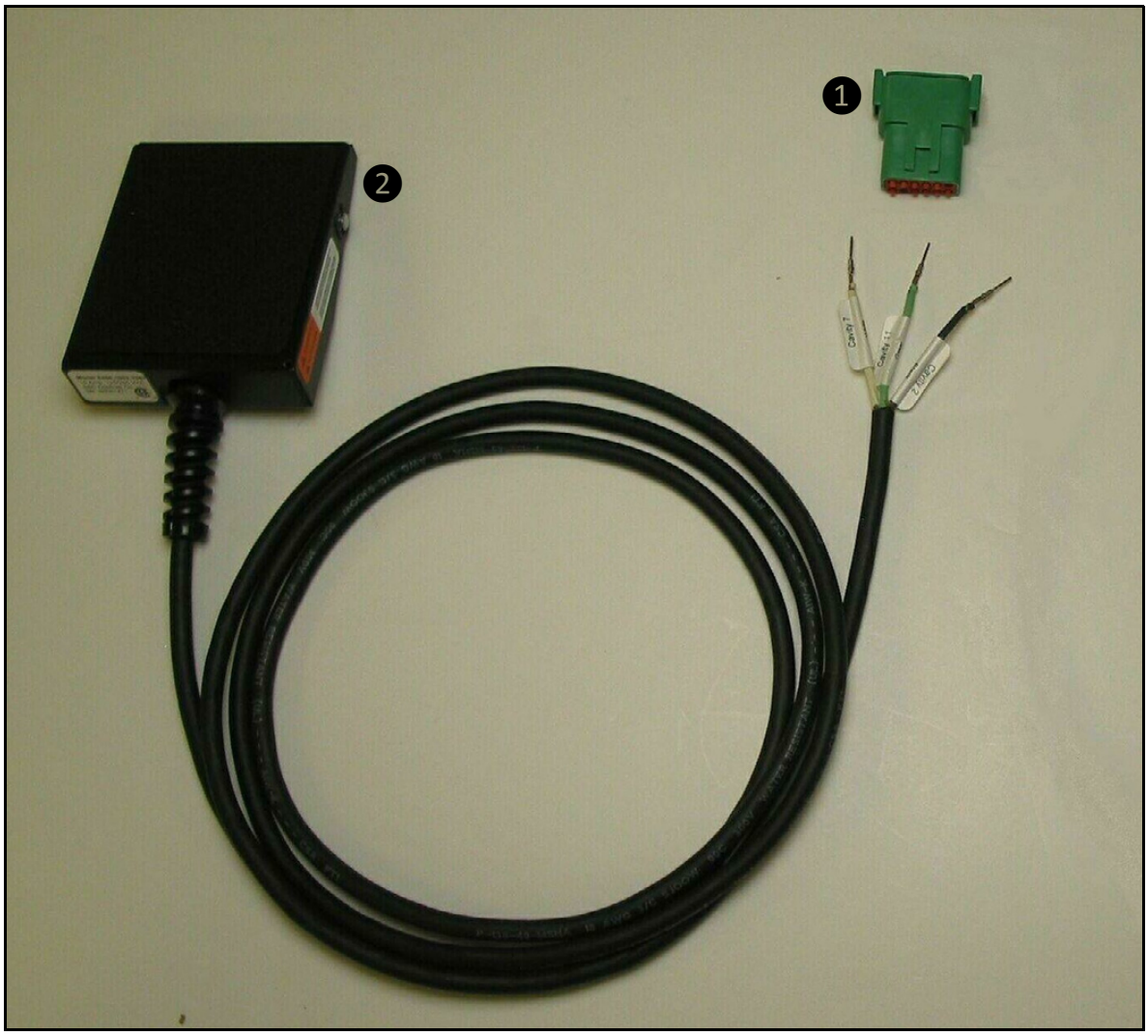
This chapter describes how to install the remote engage switch.

Remote engage switch components: Rocker switch



Item	Description
❶	DTM receptacle
❷	Remote engage rocker switch

Remote engage switch components: Foot switch

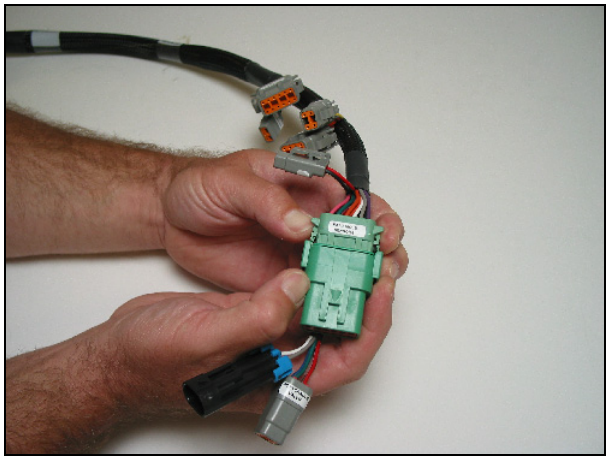


Item	Description
❶	DTM receptacle
❷	Remote engage rocker switch

Preparing the remote engage cable

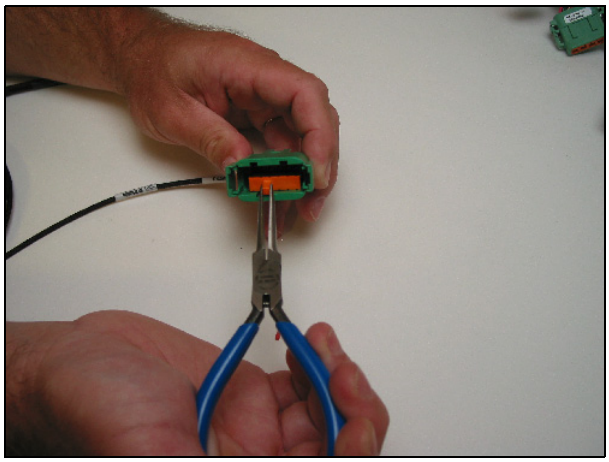
Step 1

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

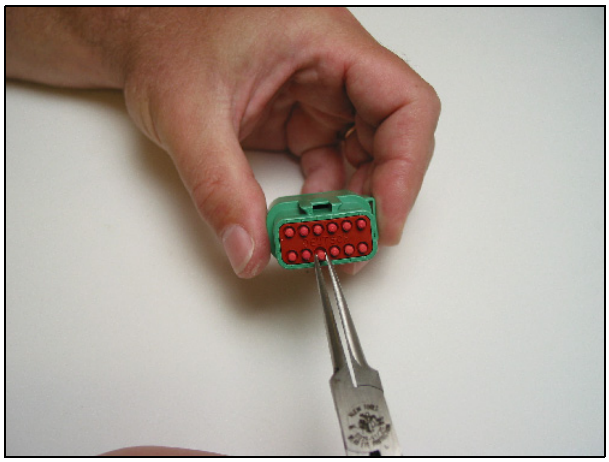
Remove the wedge from the connector.



Step 3

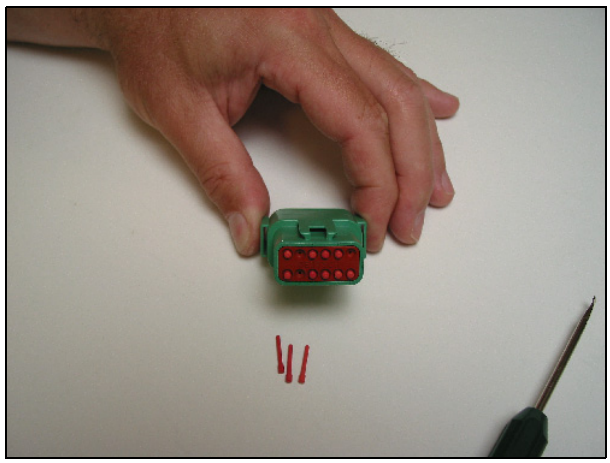
Rocker switch only

Remove the plugs from cavity 2 and cavity 7.



Foot Switch Only

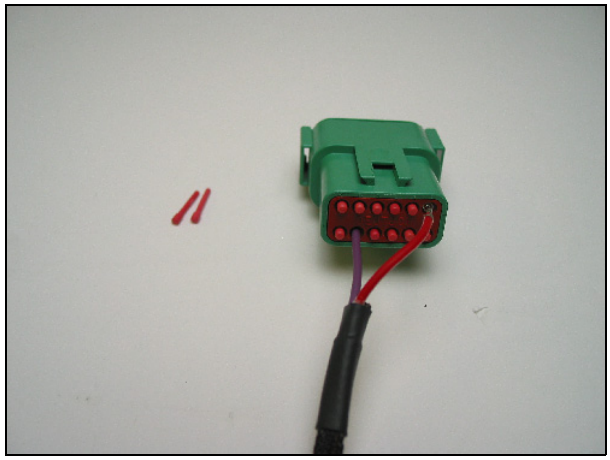
Remove the plugs from cavity 2, cavity 7, and cavity 11.



Step 4

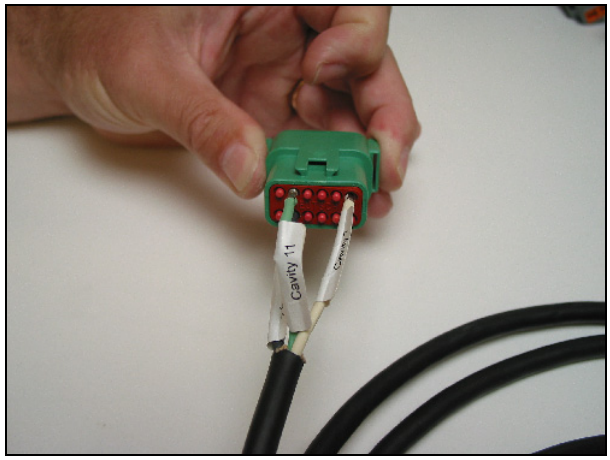
Rocker switch only

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



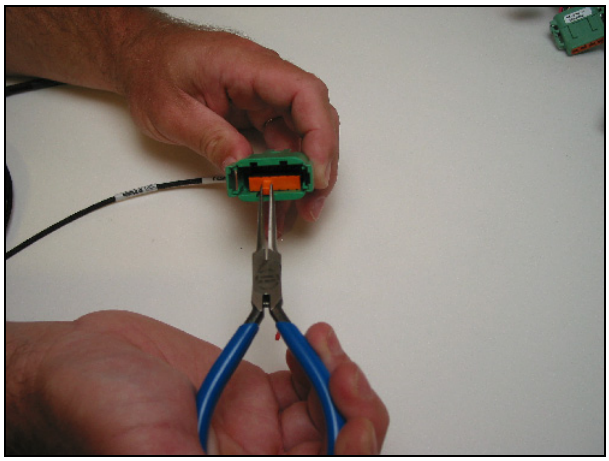
Foot switch only

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

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

Step 7

Rocker switch only

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



Foot switch only

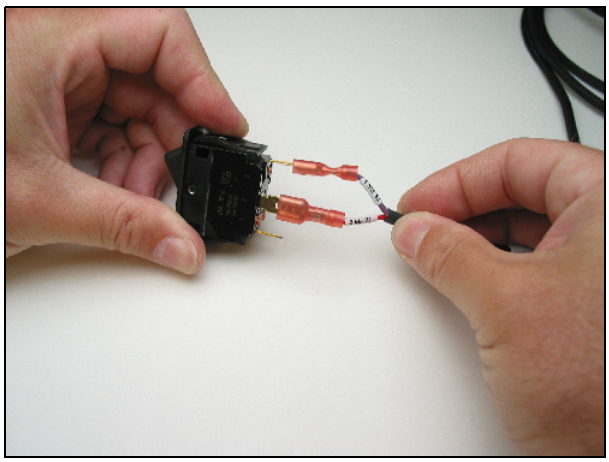
Run the cable to a clear location on the floor board. Use double-sided tape to secure the pedal. Route the cable under the floor mat.



Step 8

Rocker Switch Only

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



Step 9

Rocker Switch Only

Place the switch in the console.



Using the remote engage switch

To use NavController II to engage the system:

- For firmware versions 5.20 and earlier: Hold down the remote engage switch for longer than **0.5** seconds and less than **4** seconds.
- For firmware 5.21 and later: Hold the switch down for longer than **0.15** seconds and less than **4** seconds.

The system engages when you release the switch.

CHAPTER 7

Controller Installation

In this chapter:

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

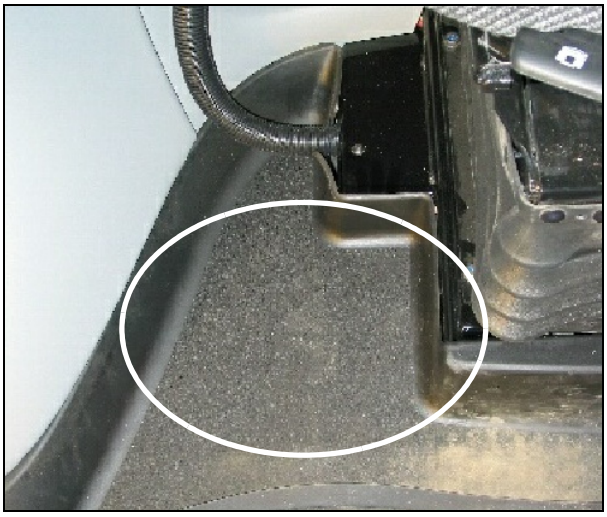
This chapter describes how to install the controller unit.

Installing the controller

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.

Step 1

Mount the controller 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

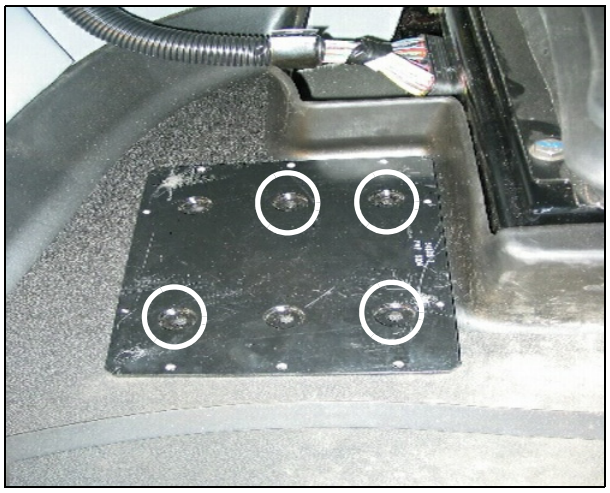
Remove the bolt holding the cable clip to the shield. Remove the shield and set it aside.



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.

Note – *It is very important that you only use the four holes pictured. There is a structure under the floor that will interfere with the other holes.*









Step 5

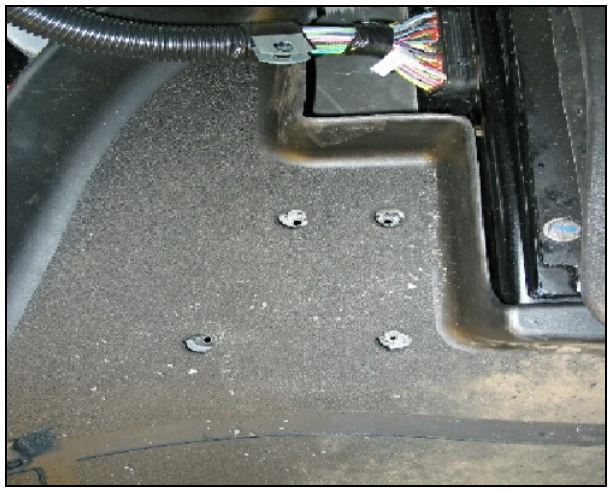
Use a 1" hole saw with a ¼" center bit to drill a 1" hole in the two-layer floor mat and only a ¼" hole in the sheet metal floor that is underneath.



⚠ **WARNING –** Do not drill a 1" 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 aft. 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.



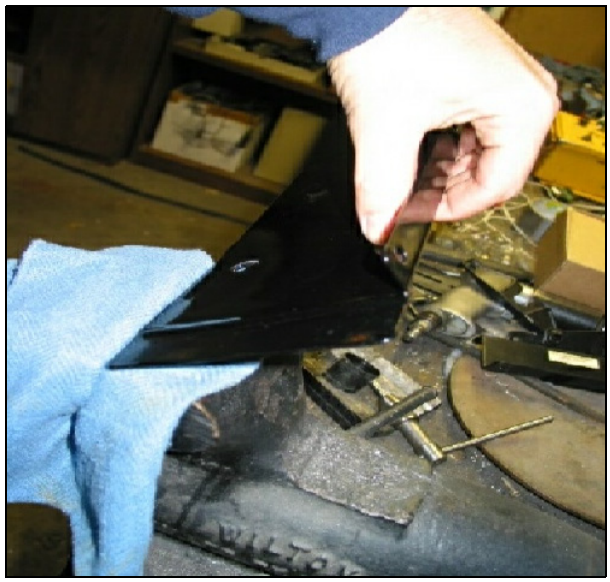
Step 18

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.

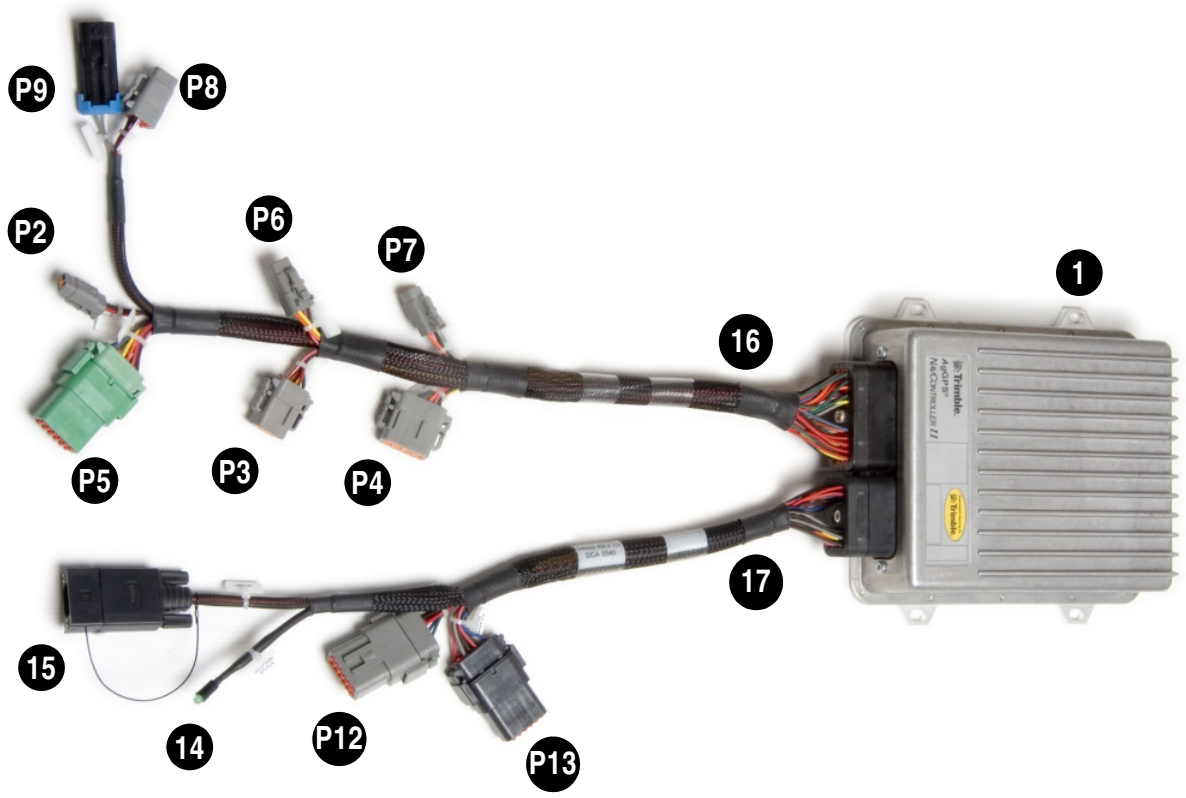


Step 23

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

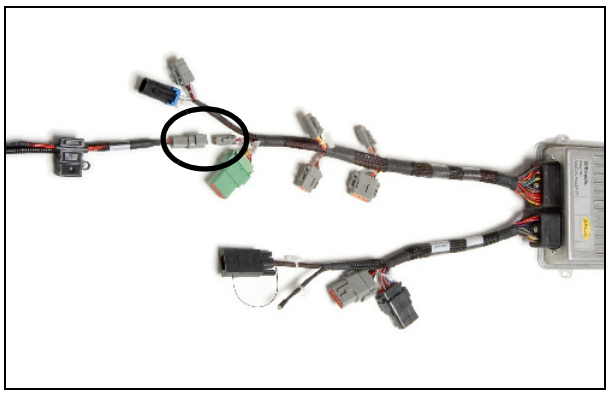
Item	Description
P9	Sonalert connector
P12	Lightbar/spare connector
P13	Spare sensors connector
14	Status indicator
15	Laptop connector
16	Main harness
17	Auxiliary harness

Connecting the cables to the controller

Step 1

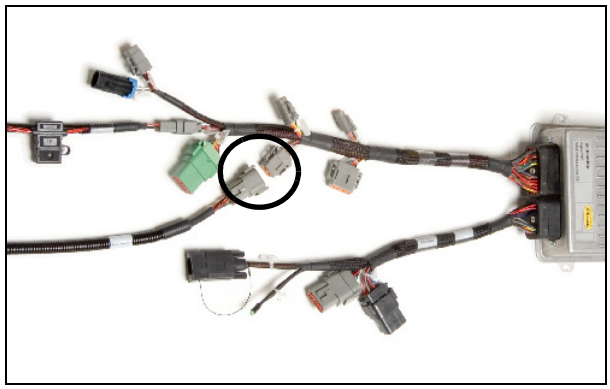
Connect the power cable connection to P-2, which is labeled “Power”. P-2 is located on the main wiring harness.

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



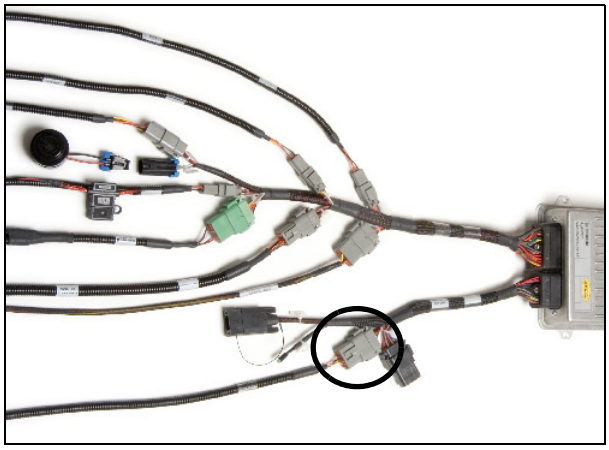
Step 2

Connect the CFX-750 display or FmX integrated display to P-3, which is labeled “GPS”. P-3 is located on the main wiring harness.



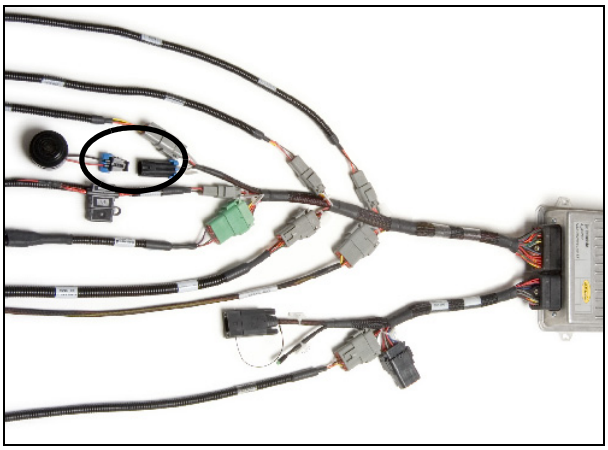
Step 3

Connect the CAN interface cable to "P12 Spare".



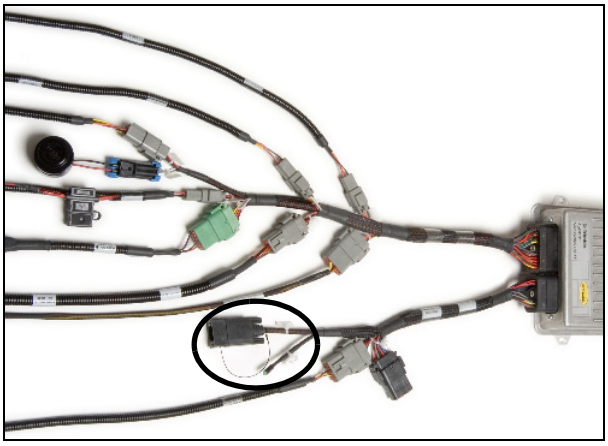
Step 4

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 5

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 6

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

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.

1. Connect the battery.
2. Start the machine and check for hydraulic leaks. Correct as needed.
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.