Autopilot

AUTOMATED STEERING SYSTEM

INSTALLATION INSTRUCTIONS

Kubota Tractors AutoGuide Ready

- M7 Series
- M7-131 Series
- M7-151 Series
- M7-171 Series

Version 6.00
Revision C
May 2018
P/N 54035-119-E06-C

Trimble

Legal Notices

Agriculture Business Area

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USA

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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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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.

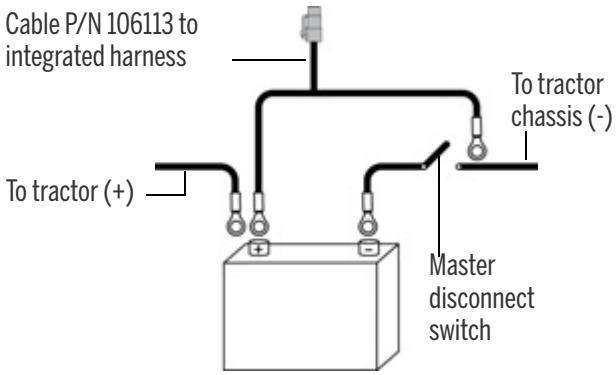
⚠ **CAUTION –** Do not direct pressurized water at:
- Electronic or electrical components or connectors
- Bearings
- Hydraulic seals
- Fuel injection pumps
- Any other sensitive parts or components



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.

⚠ **CAUTION –** If the vehicle has a master electrical disconnect, make sure the basic power cable (P/N 106113) 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.



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1

Introduction

- Technical assistance
- Manual system upgrade to the Autopilot system
- 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 the Autopilot system

CFX-750 display and FmX integrated display

Retain
CFX-750™ display: P/N 94110-xx Integrated cable assembly, integrated harness, Kubota M7: P/N 106112 **FmX® integrated display: P/N 93100-xx** Integrated cable assembly, integrated harness, Kubota M7: P/N 106112 **TMX-2050™ integrated display: P/N 96500-xx** Integrated cable assembly for the Kubota M7: P/N 106111 Antenna for display: P/N 60600-02 (DGPS) or 77038-00 (OmniSTAR®/RTK) Antenna to receiver cable: P/N 106114 Basic cable (all displays): P/N 106113

Required components

Kits required	Special tools
Platform kit: • CFX-750 / FmX displays: P/N 54035-119 • TMX-2050 display: P/N 54035-120	Drill $^{5}/_{16}$" drill bit

Antenna mounting kits

Kits required
Antenna brackets: • AG-15 antenna mounting plate: P/N 62034 • Bracket, GPS - V-base plate indexing: P/N 62388-02

Accessory kits

Kits required
Remote engage switch assembly: P/N 101250 Option B NavController mounting kit: P/N 109107

Autopilot hardware organization: As shipped

Hardware	Component	See...
Platform kit: • CFX-750 / FmX displays: P/N 54035-119 • TMX-2050 display: P/N 54035-120	Installing the in-cab harness	Chapter 4
Roof bracket kit: • AG-15 antenna mounting plate: P/N 62034 • Bracket, GPS - V-base plate indexing: P/N 62388-02	Roof brackets	Chapter 2
	Bolt kit, roof bracket	
GNSS receiver	GNSS receiver	Chapter 2
	GNSS antenna	
	GNSS receiver power/data cable	
	RTK radio, cable, and radio antenna	
Display	CFX-750 display	Chapter 3
	FmX integrated display	
	TMX-2050 display	
	Display cable	
	Mounting bracket	
Common parts	Controller	Chapter 6
	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.

2

Antenna/Receiver Installation

- Antenna and receiver installation options
- Installing the GNSS antenna and plate (all displays)
- Installing the RTK radio antenna (all displays)
- Installing the antenna/ receiver using the Kubota M7 integrated antenna mounting plate

This chapter describes how to install the required receiver and antenna, and radio module (if used).
To install the antenna for the CFX-750 or FmX display, see Chapter 3, 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** – Not compatible.
- **VHB mount** – Attach a P/N 62034 plate or a V plate directly to the roof with VHB (Very High Bond) adhesive for magnetic mounting.
- **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
CFX-750 / FmX / TMX-2050 display	✓	✓

NOTE – For WAAS, EGNOS, OmniSTAR VBS, and DGPS applications, place either of the plates in a firm location using the VHB.

Installing the GNSS antenna and plate (all displays)

⚠ **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 10.

Use the VHB adhesive method to install the antenna.

You can use Very High Bond (VHB) to attach either a P/N 62034, 5" x 5" plate or a P/N 62388-02 V plate.

- **GLONASS, RTK, RTX, OmniSTAR HP/XP/G2, 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, applications** – Use a P/N 62034 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.

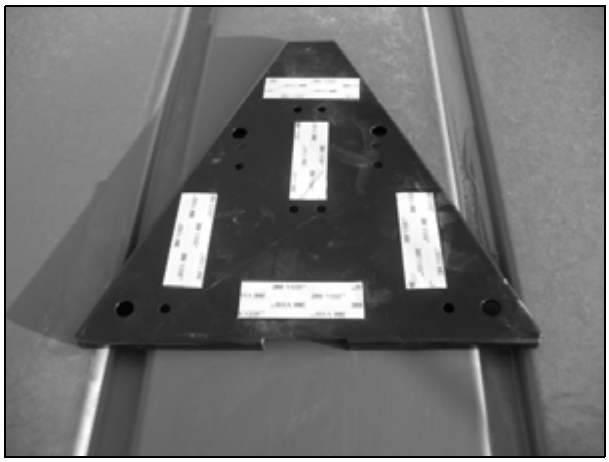


Step 2

V plate only

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

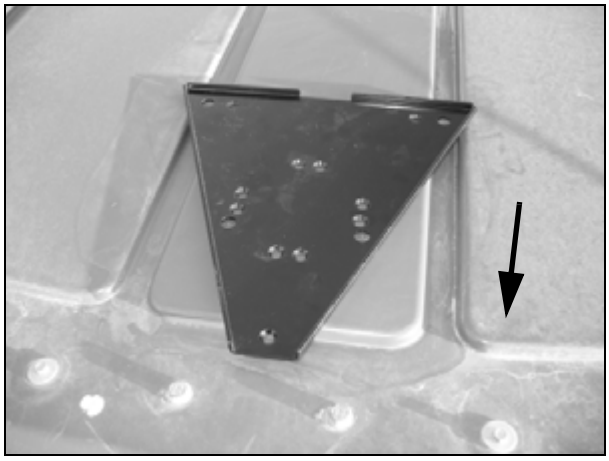
NOTE – The VHB strips are pre-applied to the P/N 62034 plate.



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.



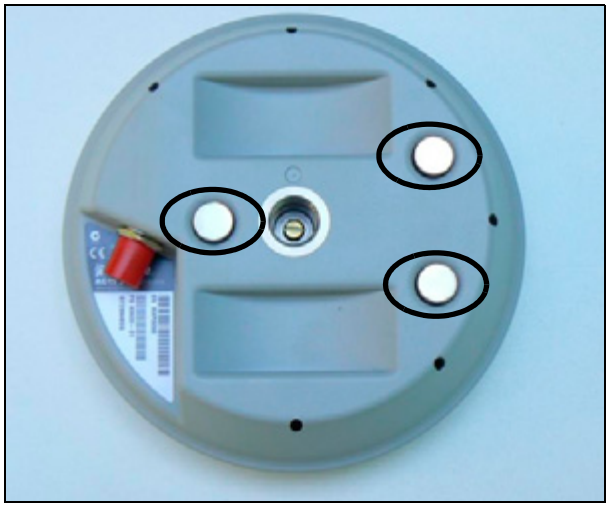
V plate



P/N 62034

Step 4

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



Otherwise, attach the large magnet with a ⅝" stud to the GNSS antenna.



Step 5

GLONASS, RTK, RTX, OmniSTAR HP/XP/G2, DGPS, applications

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



WAAS, EGNOS, OmniSTAR VBS applications

Attach the antenna to the center of the P/N 62034, 5" x 5" plate.



Step 6

Both models

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



Installing the RTK radio antenna (all displays)

⚠ **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 P/N 62034 plate with the VHB provided to relocate the antenna.



Step 3

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.



Installing the antenna/ receiver using the Kubota M7 integrated antenna mounting plate

Step 1

If the machine is equipped with a factory antenna mounting bracket the AG-25 antenna can be positioned on that factory bracket.



Step 2

Install the antenna to the bracket as shown. The antenna is equipped with magnets so that it is easy to position it.



Step 3

Locate the GPS antenna cable provided in the platform kit.



Step 4

Connect the GPS antenna cable, P/N 106114 and route the cable towards the right front light at the corner of the cab.



Step 5

Inside the cab of the machine remove the two screws so that you can then remove the cover from the B pillar.



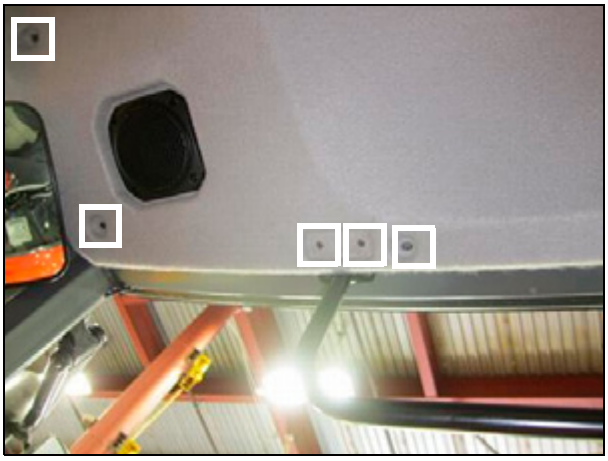


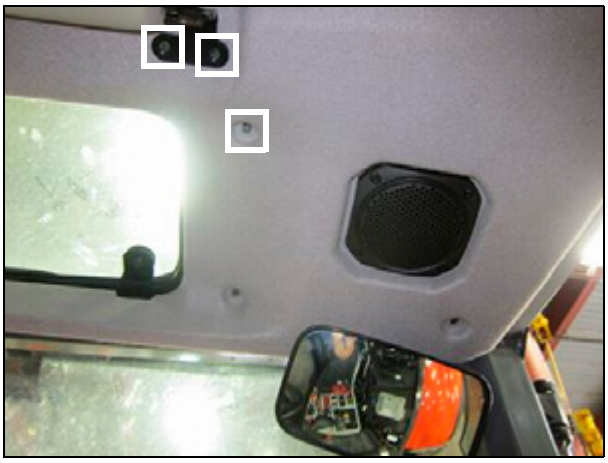
Step 6

The antenna cable will be routed between the roof and the headliner.

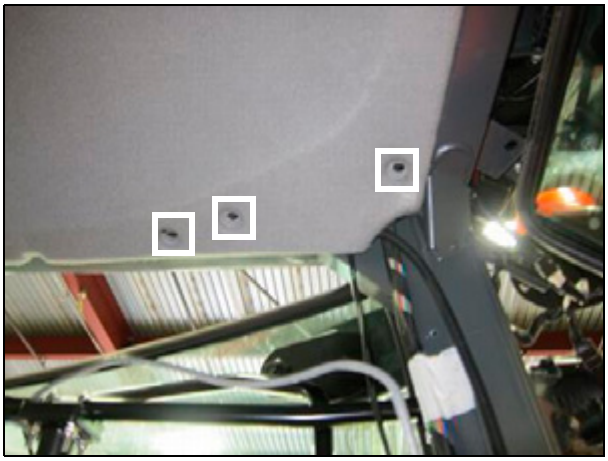
To access this space, you must temporarily remove the bolts for the roof so that the headliner can be flexed down to route the antenna cable.

Remove the screws shown.





Near the B pillar remove the screws shown.



Step 7

Carefully flex the roof of the cab up so that the GPS antenna cable can be passes between the roof top and the frame.

Route the cable back to the B pillar between the headliner and roof.



Step 8

Route the cable to the B pillar and then do one of the following:

- If you have an FmX /CFX-750 display, route the cable to the display.
- If you have a TMX-2050 display, route the cable to the TM-200 module.

Once the antenna cable has been routed to this point, reassemble the fasteners for the headliner and roof.

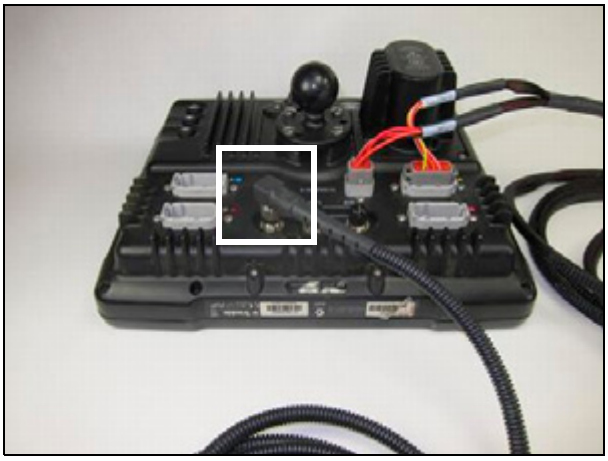
Leave the cover off of the B pillar until the other harnesses have been run to the display (see procedures described in Chapter 4, In-Cab Harness).



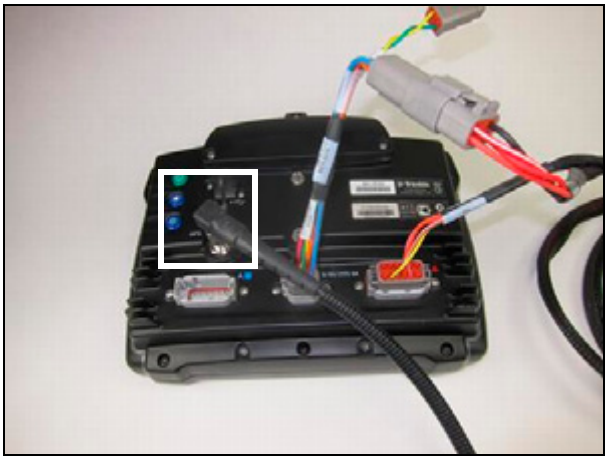
Step 9

Route the cable to the appropriate GPS connector as shown.

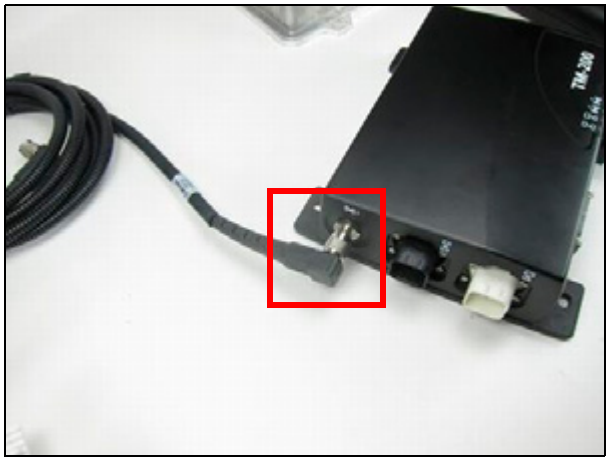
Any excess wire length may be coiled between the headliner and roof top of the machine



Cable routed to the FmX display



Cable routed to the CFX-750 display



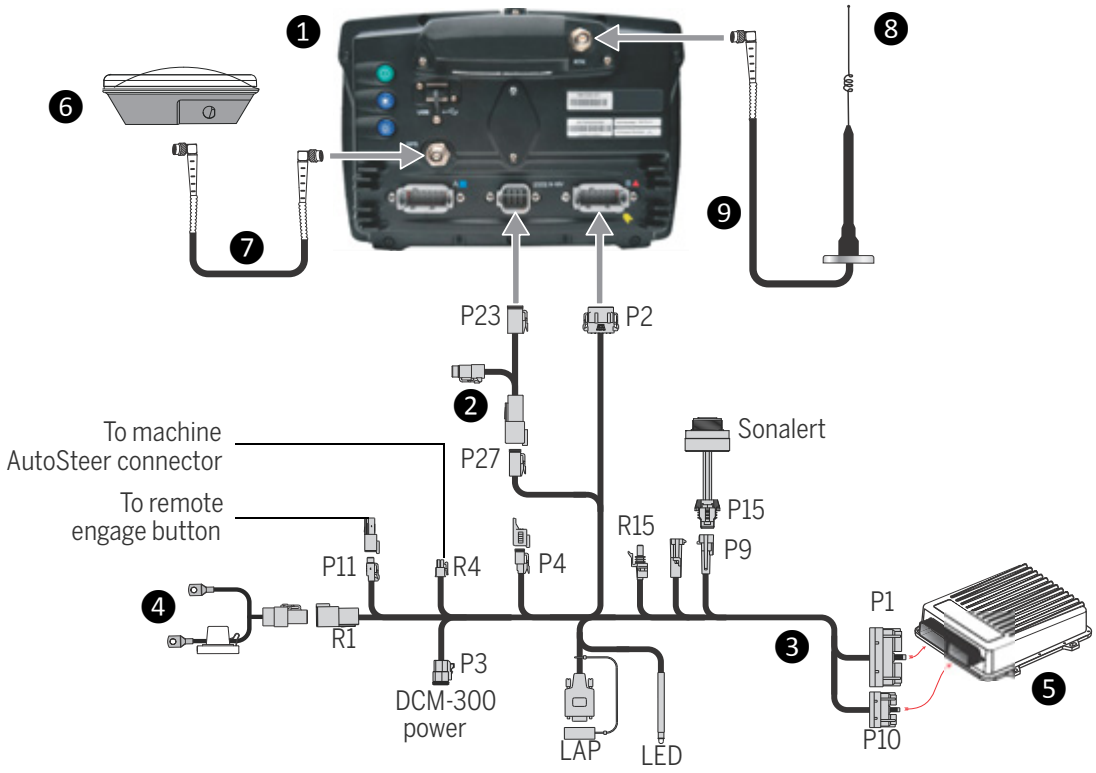
Cable routed to the TM-200 module (TMX-2050 display)

3

Display Installation

- CFX-750 display components
- Preparing the CFX-750 display
- Installing the CFX-750 display and wire harness
- FmX integrated display components
- Preparing the FmX integrated display
- Installing the FmX integrated display and wire harness
- TMX-2050 display components
- Preparing the TMX-2050 display
- Installing the TMX-2050 display and wire harness
- Connecting accessory options (CFX-750 / FmX display)

CFX-750 display components



Item	Description	Trimble part number
1	CFX-750 display **Note –** RTK password required.	94110-xx
2	Additional integrated harness cable for the CFX-750 display	106112
3	Integrated harness cable with extra jumper wire	106112
4	Basic power cable	106113
5	NavController	55563-00
6	AG-25 GNSS antenna	77038-00
7	GNSS TNC/TNC RT angle cable	106114
8	900 MHz radio antenna kit	22882-10
9	NMO-to-TNC 20 ft antenna cable and base	72122

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.



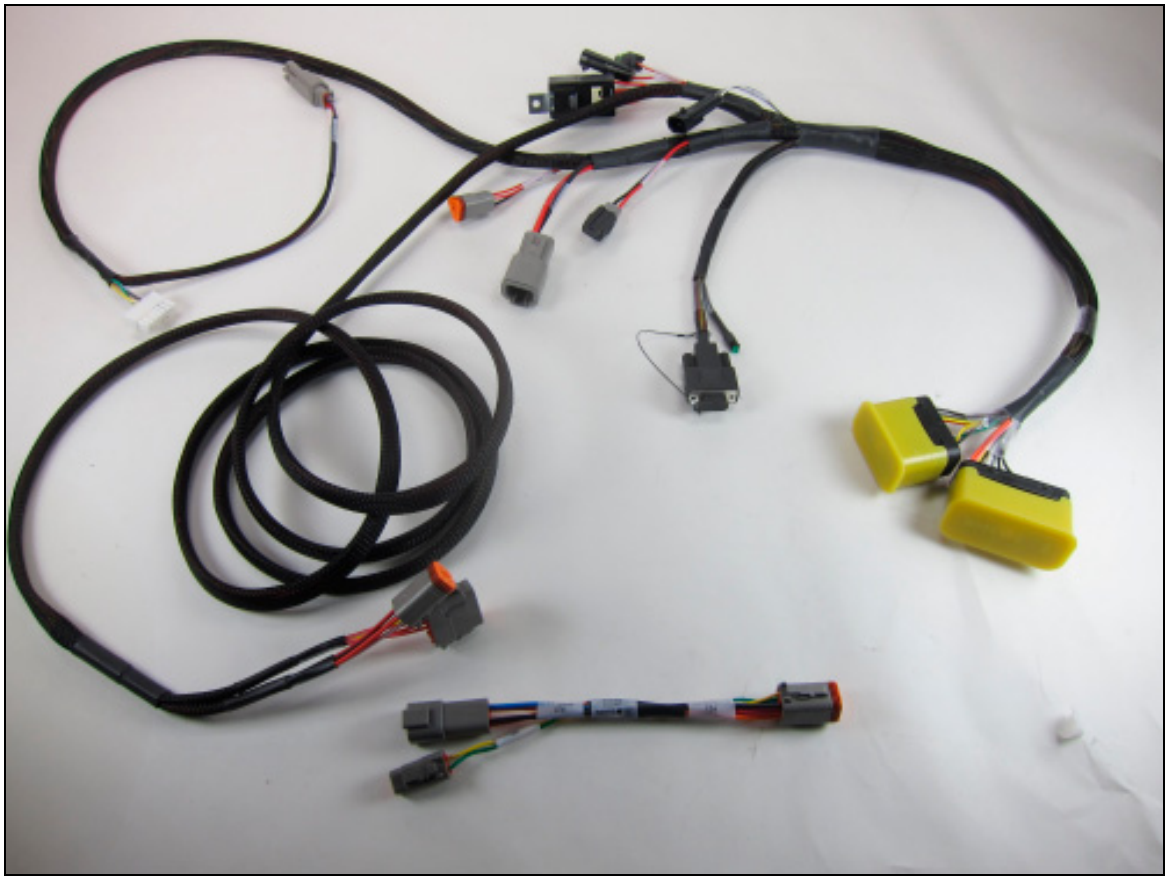
Step 3

Attach the RAM mount to the rear of the display.



Installing the CFX-750 display and wire harness

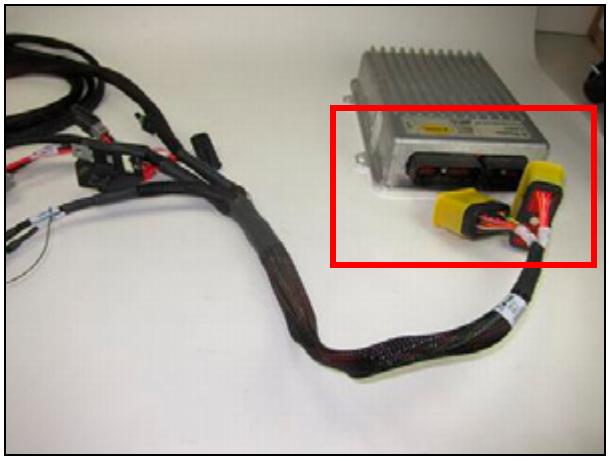
⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.



Step 1

Locate the integrated harness, P/N 106112, provided in the platform kit.

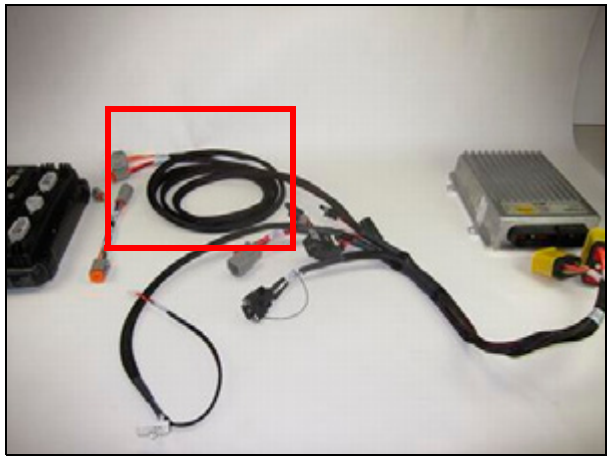
The harness may be connected to the NavController now or the connection can be made later, once the cables are installed onto the machine.





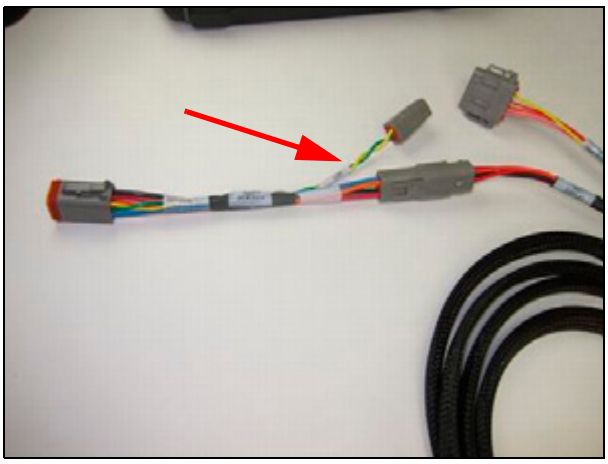
Step 2

On the cable, locate the display portion of the harness.



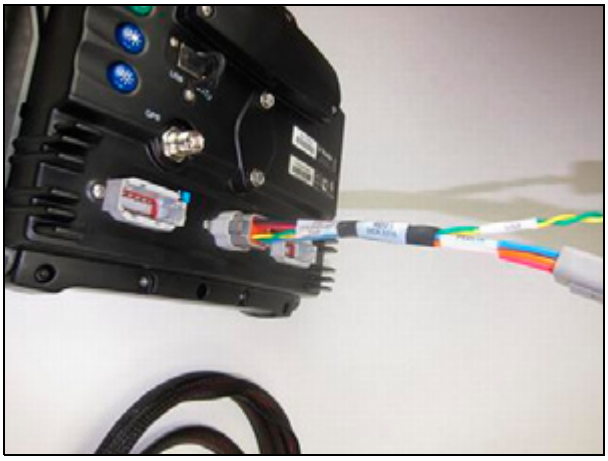
Step 3

Connect the CFX-750 display's power jumper receptacle R27 to the 4-pin power plug P27.



Step 4

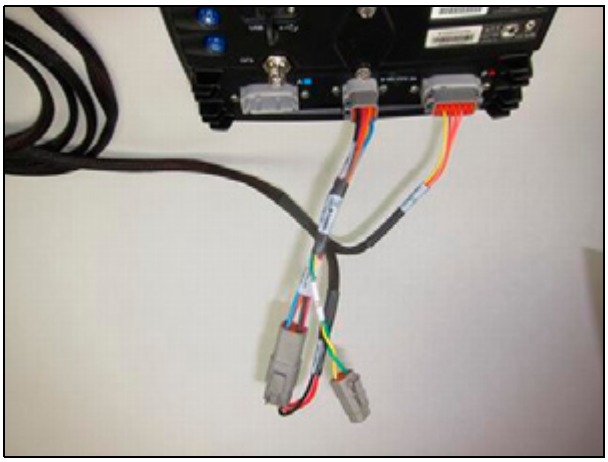
Insert the power plug P23 into the CFX-750 display's power port.



Step 5

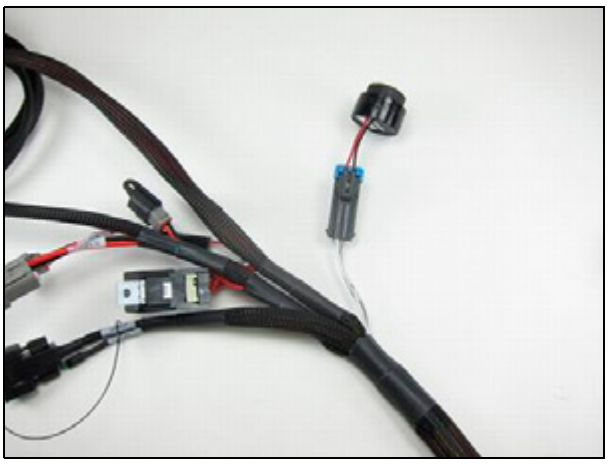
Connect the 12-pin P2 connector to the Port B connector on the CFX-750 display.

Route the rest of the harness from the display mounting point to the B pillar on the machine and then down to the NavController and machine connections. See Chapter 4, In-Cab Harness.

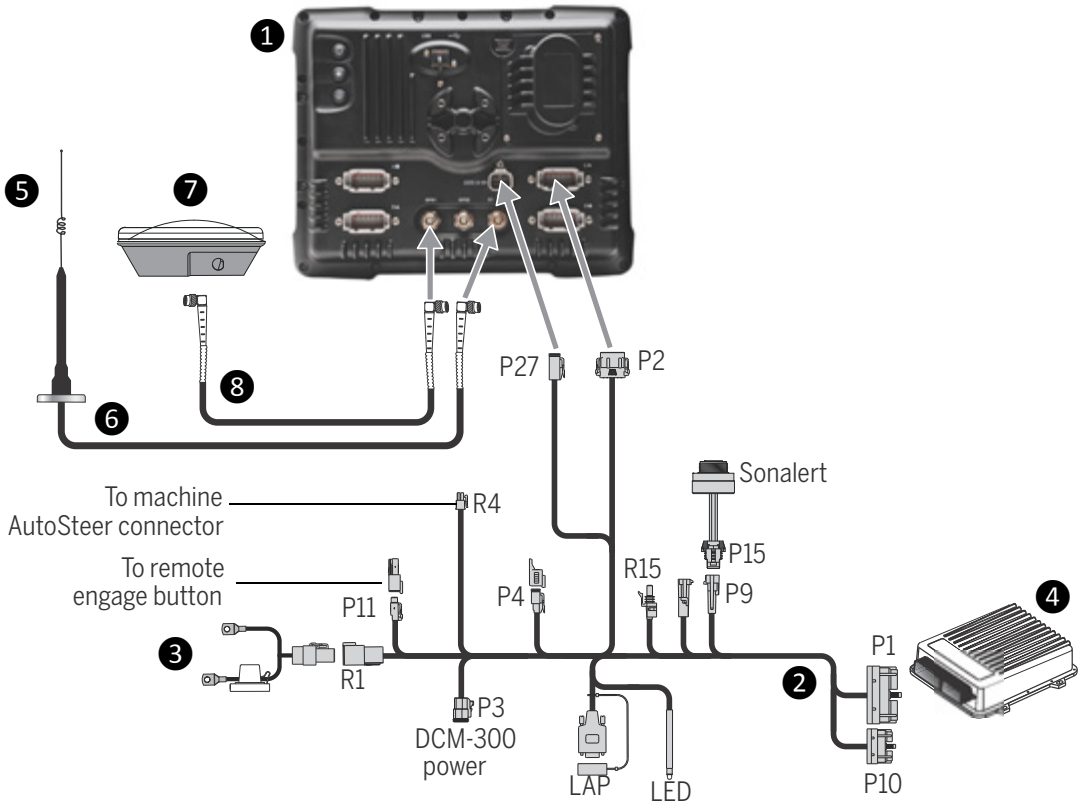


Step 6

Attach the sonalert to the P9 connector on the integrated harness.



FmX integrated display components



Item	Description	Trimble part number
1	FmX integrated display	93100-02
2	Integrated harness cable	106112
3	Kubota M7 basic power cable	106113
4	NavController	55563-00
5	900 MHz radio antenna kit	22882-10
6	NMO-to-TNC 20 ft antenna cable and base	72122
7	AG-25 GNSS antenna	77038-00
8	Kubota M7 GNSS TNC/TNC RT angle cable	106114

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.



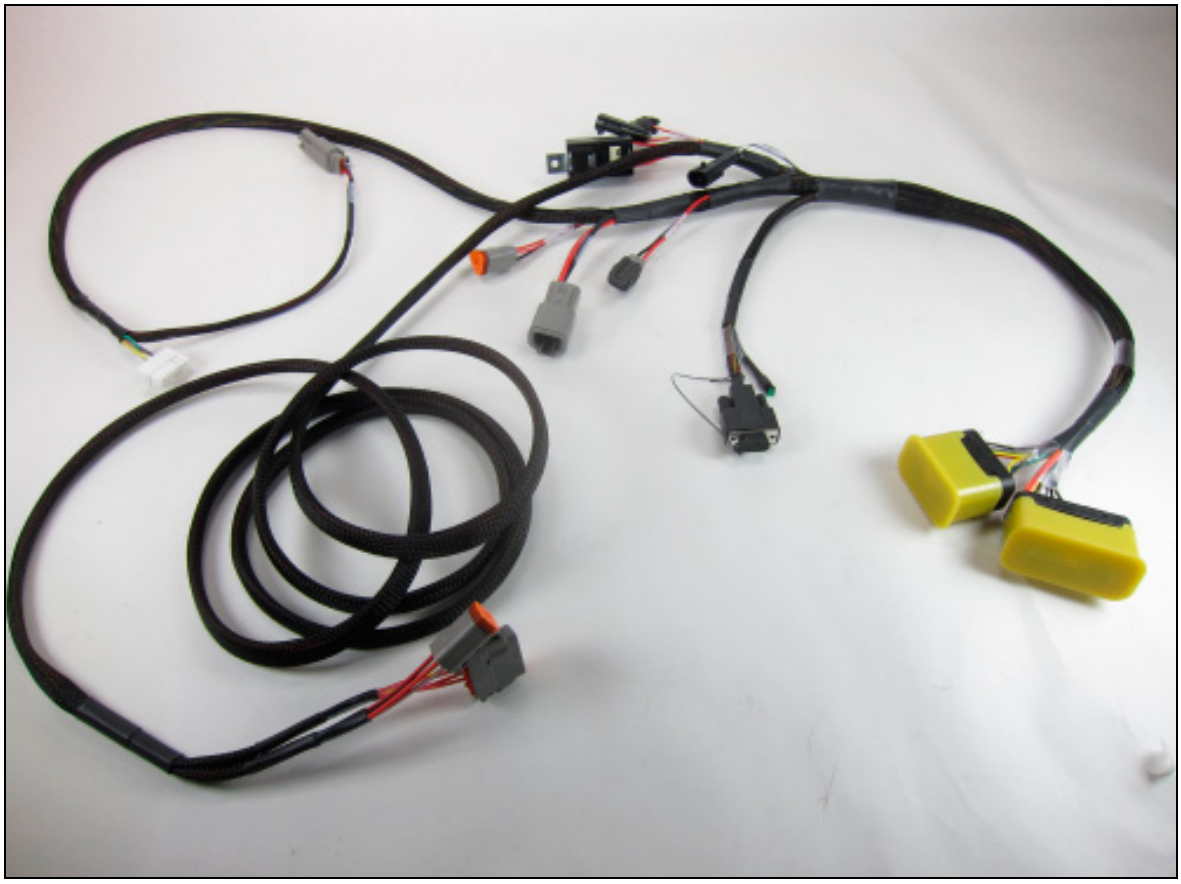
Step 3

Attach the RAM mount to the rear of the display.



Installing the FmX integrated display and wire harness

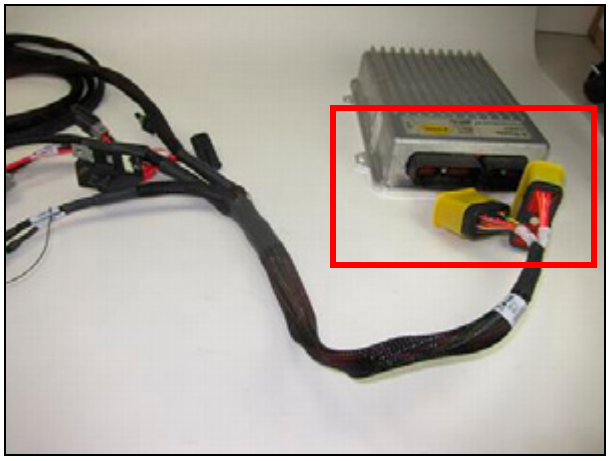
⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.



Step 1

Locate the integrated harness, P/N 106112, provided in the platform kit.

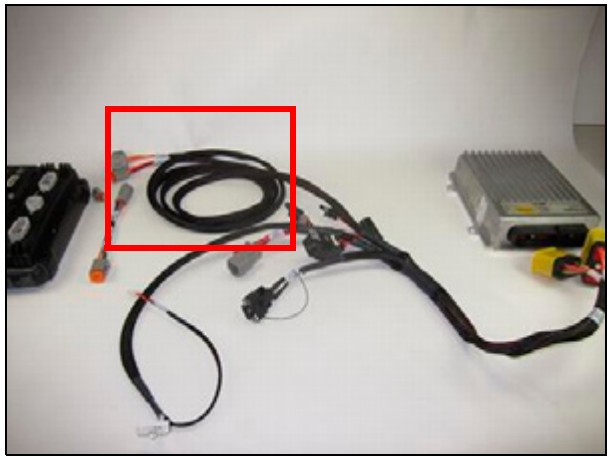
The harness may already be connected to the NavController or the connection can be made later, once the cables are installed onto the machine.





Step 2

On the cable, locate the display portion of the harness.



Step 3

Connect the P27 power plug on the display to the FmX integrated display as shown.



Step 4

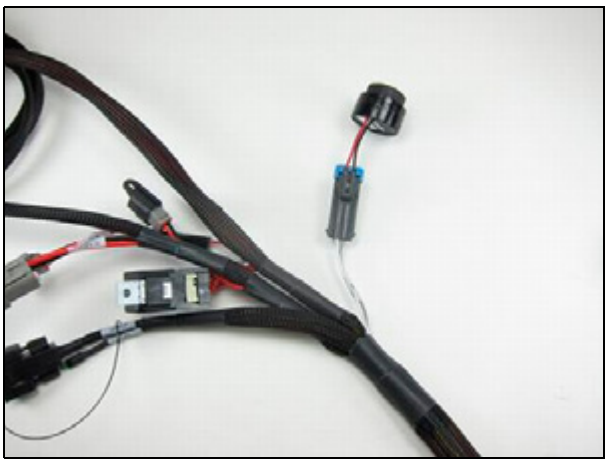
Connect the 12-pin P2 connector to the Port C connector on the FmX display.

Route the rest of the harness from the display mounting point to the B pillar on the machine and then down to the NavController and machine connections. See Chapter 4, In-Cab Harness.

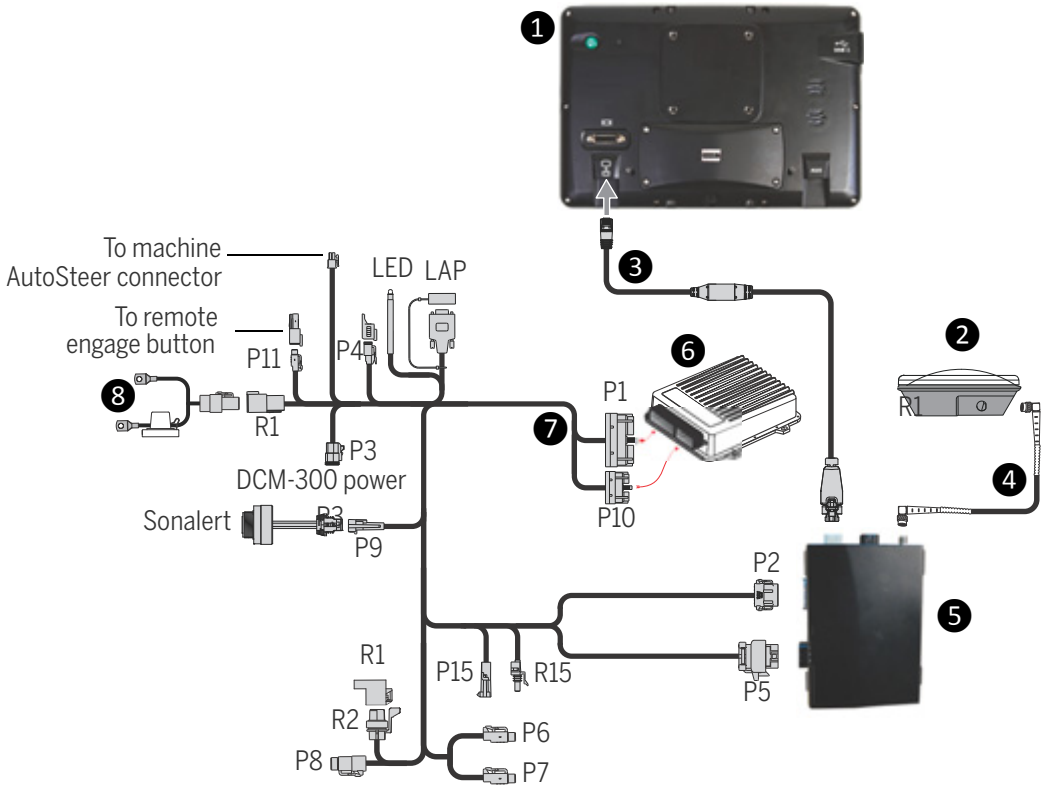


Step 5

Attach the sonalert to the P9 connector on the integrated harness.



TMX-2050 display components



Item	Description	Trimble part number
1	TMX-2050 display	96700-00
2	AG-25 GNSS antenna	77038-00
3	Display cable	93843
4	Kubota M7GPS antenna cable	106114
5	TM-200 module	95060-00
6	NavController	55563-00 55566-00
7	Cable Assy, Autopilot Integrated, Kubota M7, TMX–TM-200	106111
8	Kubota M7 basic power cable	106113

Preparing the TMX-2050 display

The display mount attaches to a rail in the cab of the vehicle. The TMX-2050 display connects to the display mount.

The TM-200 module connects to the display with a single cable.

Additional components to install depend on your connection and correction services, and the features you are using.

⚠ **CAUTION –** Make sure the vehicle power is off when you are connecting system components.

Install the display and mount

Use the mounting hardware supplied in the display kit to mount the display in the vehicle cab.

⚠ **CAUTION –** Make sure the vehicle power is off when you are connecting system components.

Before completing installation steps, select a position in the cab where the bar mount (4) can be attached to a rail. Hold the display in the selected location and make sure that it:

- Is easy to see, but does not block the driver's view.
- Is within the driver's reach so that the USB drive is easy to remove and replace.
- Does not interfere with the driver getting in or out of the cab, or any other activities.

Step 1

Use the provided bolts to attach the bar mount ❹ to a rail in the cab.



Step 2

Use the supplied screws to firmly attach the mounting plate ❶ to the back of the TMX-2050 display.

Step 3

Turn the tightening arm ❸ to loosen the Zirkona mount ❷.

Step 4

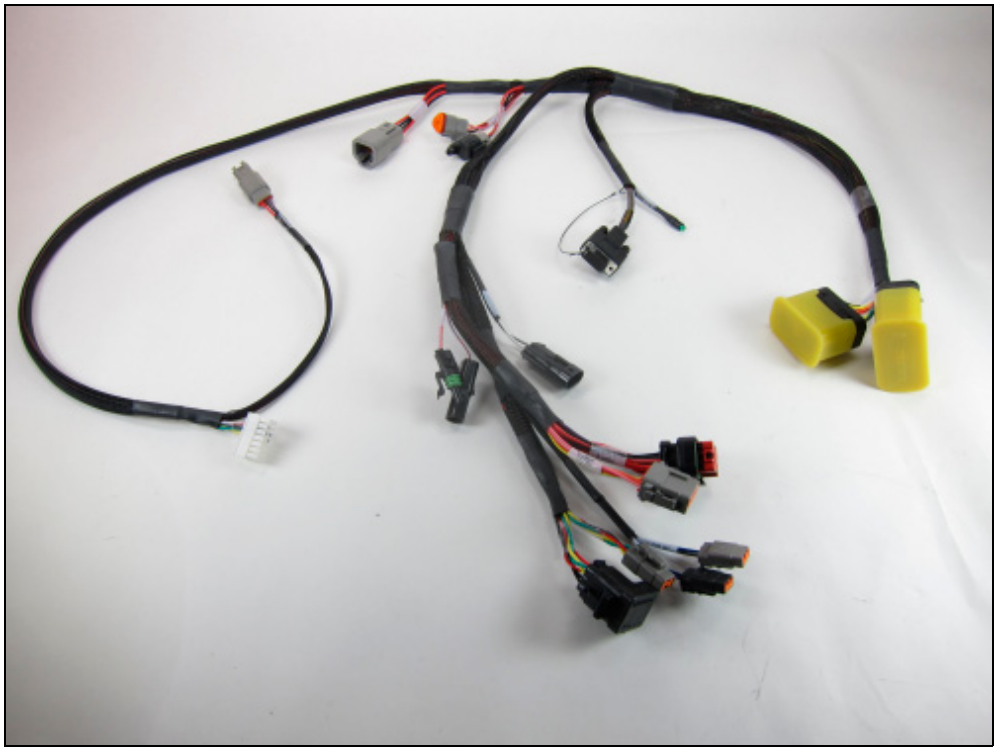
Adjust the TMX-2050 display until it is positioned where you want it. Turn the tightening arm ❸ in the other direction to tighten the Zirkona mount ❷.

Item	Description
1	Mounting plate
2	Zirkona mount
3	Tightening arm
4	Bar mount



Installing the TMX-2050 display and wire harness

⚠ **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

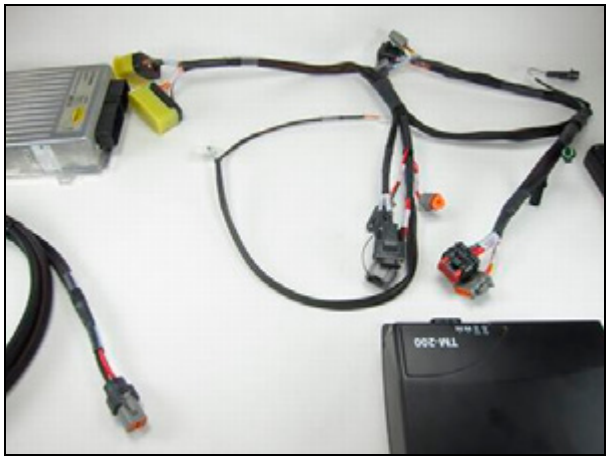
Locate the following items:

- Integrated harness, P/N 106111, provided in the platform kit
- Display cable, P/N 93843



Step 2

The harness may be connected to the NavController now or the connection can be made later, once the cables are installed onto the machine.





Step 3

Connect the P5 and P2 connectors on the harness, P/N 106111, to the TM-200 module.



Step 4

Connect the display cable to the display.



Step 5

Route the other end of the display cable to the TM-200 module and then connect it to the TM-200 Module.



Connecting accessory options (CFX-750 / FmX display)

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

AgCam

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

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.



CFX-750 display



FmX display

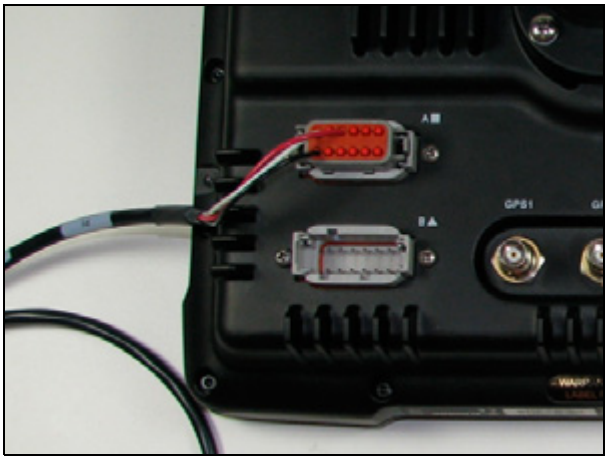
Step 3

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.

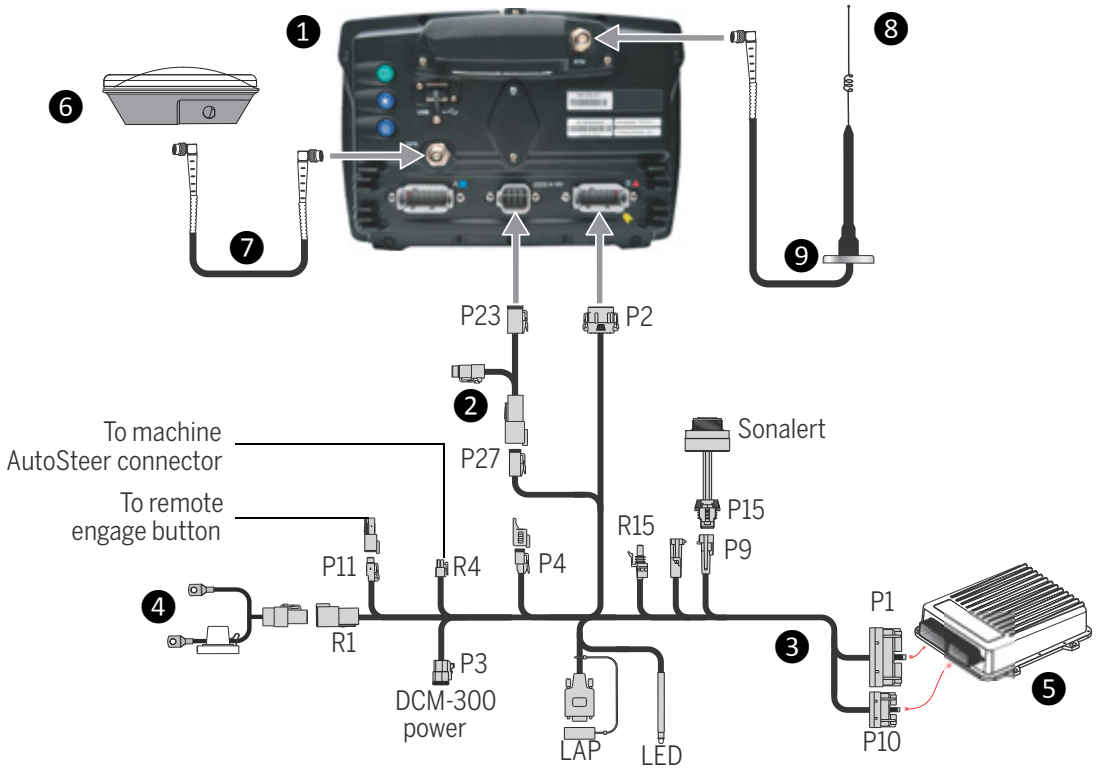


4

In-Cab Harness

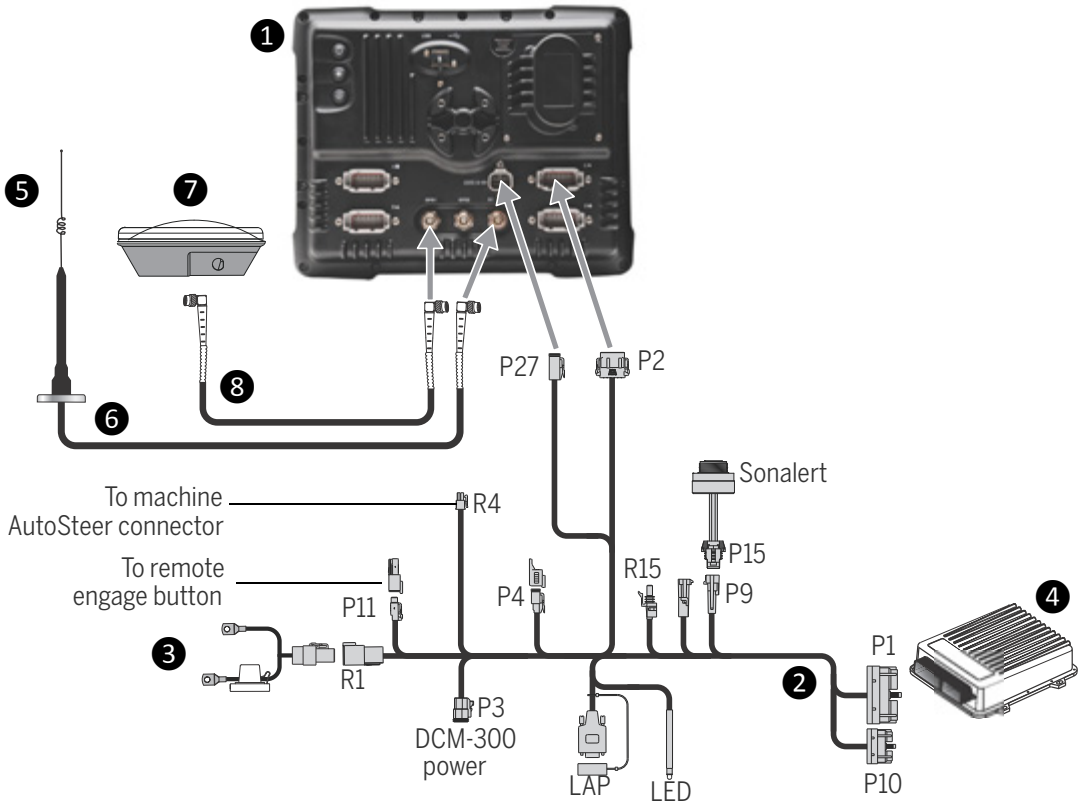
- CFX-750 display components
- FmX integrated display components
- TMX-2050 display components
- Preparing the vehicle to install the Autopilot harness
- Installing the Autopilot harness on the FmX and CFX-750 displays
- Installing the Autopilot harness on the TMX-2050 display and mounting the TM-200 module
- Configuring and connecting the power harness
- Ignition sensing with the Autopilot harness

CFX-750 display components



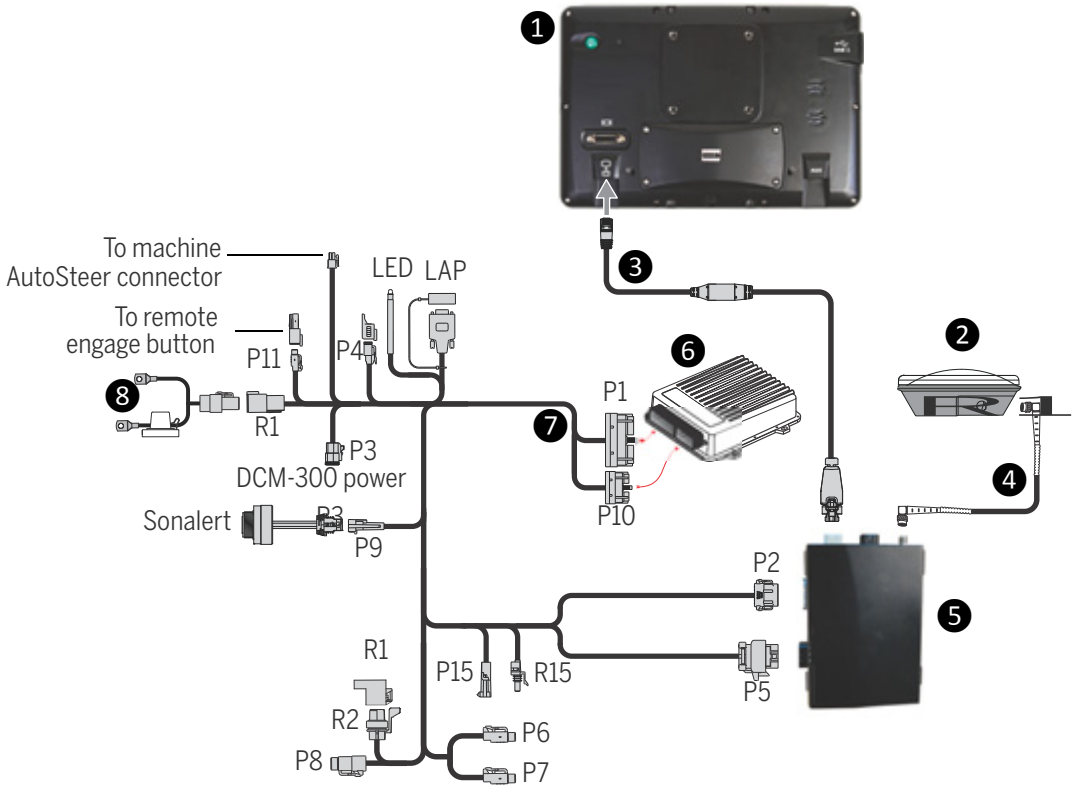
Item	Description	Trimble part number
1	CFX-750 display **Note –** RTK password required.	94110-xx
2	Additional integrated harness cable for the CFX-750 display	106112
3	Integrated harness cable with extra jumper wire	106112
4	Basic power cable	106113
5	NavController	55563-00
6	AG-25 GNSS antenna	77038-00
7	GNSS TNC/TNC RT angle cable	106114
8	900 MHz radio antenna kit	22882-10
9	NMO-to-TNC 20 ft antenna cable and base	72122

FmX integrated display components



Item	Description	Trimble part number
1	FmX integrated display	93100-02
2	Integrated harness cable	106112
3	Kubota M7 basic power cable	106113
4	NavController	55563-00
5	900 MHz radio antenna kit	22882-10
6	NMO-to-TNC 20 ft antenna cable and base	72122
7	AG-25 GNSS antenna	77038-00
8	Kubota M7 GNSS TNC/TNC RT angle cable	106114

TMX-2050 display components



Item	Description	Trimble part number
1	TMX-2050 display	96700-00
2	AG-25 GNSS antenna	77038-00
3	Display cable	93843
4	Kubota M7GPS antenna cable	106114
5	TM-200 module	95060-00
6	NavController	55563-00 55566-00
7	Cable Assy, Autopilot Integrated, Kubota M7, TMX–TM-200	106111
8	Kubota M7 basic power cable	106113

Preparing the vehicle to install the Autopilot harness

To complete the installation of the Autopilot harnesses, TM-200 module (if equipped), and the Option B NavController mounting, the right side fender cover will need to be removed temporarily. Once the Trimble components have been installed, the panel will need to be re-fitted to the machine.

Step 1

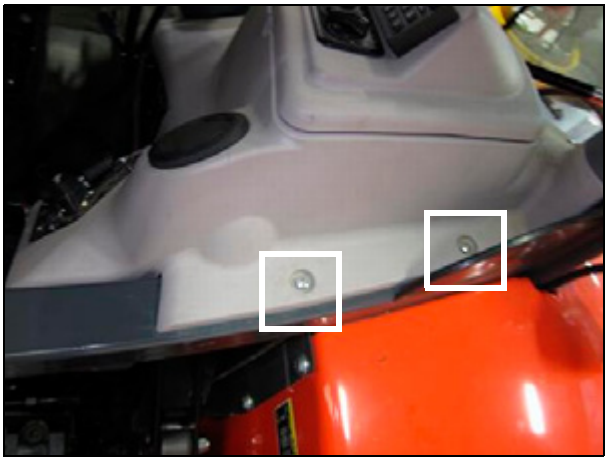
To install the Autopilot harness into the vehicle, you must remove the right side fender cover.

- Step 2 to Step 4 show the fasteners that you need to remove.
- Step 5 to Step 9 show others items that you need to remove before you can remove the fender cover.



Step 2

Remove the fasteners shown here.

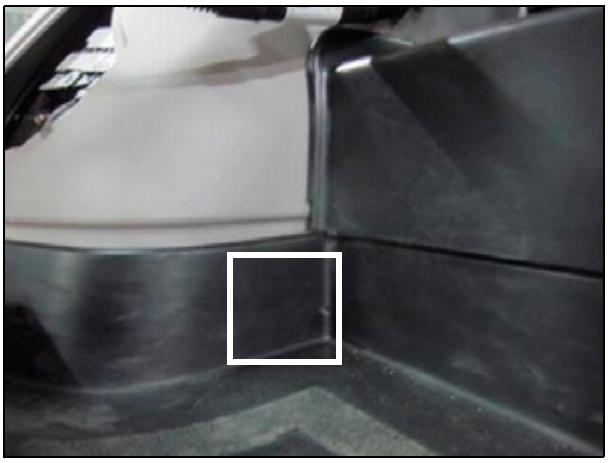




Step 3

There is another fastener In front of the seat behind the floor mat.

Pull back the mat to provide access.

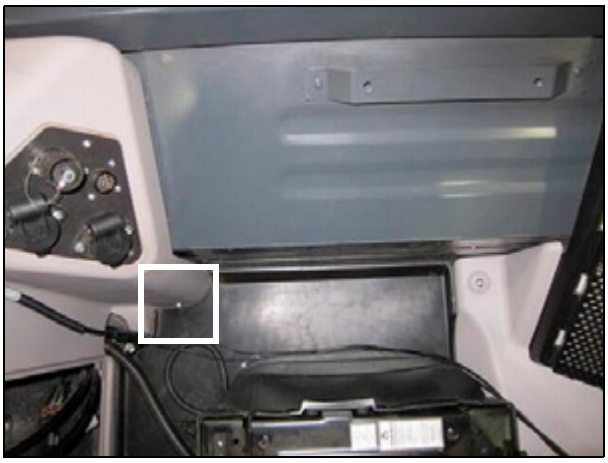


Remove the fastener.



Step 4

Remove the fastener shown here.

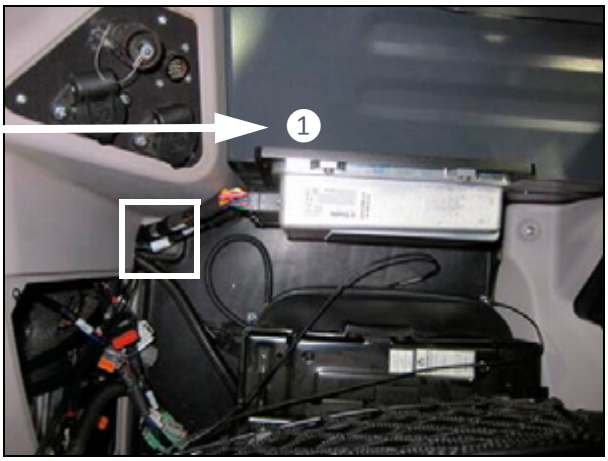


Step 5

Option A NavController install

Before you remove the fender panel, note the location of the NavController installation.

Option A NavController mounting ❶.



The hole identified here may need to be enlarged so that you can route the NavController harness from behind the panel to the NavController unit.



Step 6

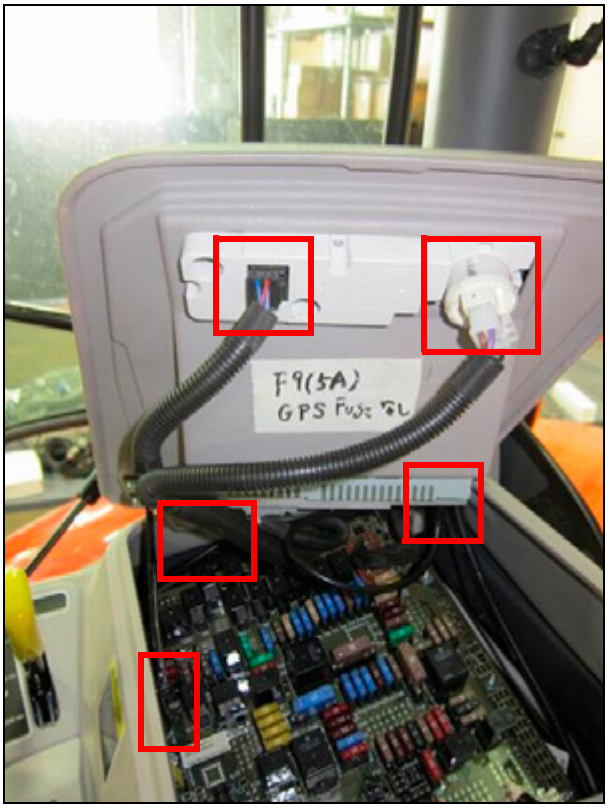
Remove the two remote handles.



Step 7

Remove the clip holding the fuse panel cover support.

Remove the radio and climate control wiring connectors.



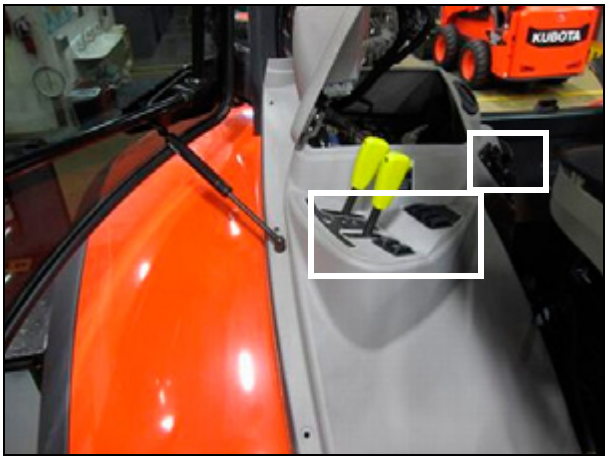
Step 8

If the machine is equipped with a creep speed selector lever, remove the lever.



Step 9

As you lift off the fender, mark and remove all the electrical connectors attached to the panel.



Step 10

Once you have removed the panel, find the connector on the fuse panel labeled **Autosteering**.

If this connector is populated by a third party guidance controller, you must remove it.

Disconnect the harness.



Step 11

Remove the harness from the machine.

Locate the guidance control box below the fuse panel.

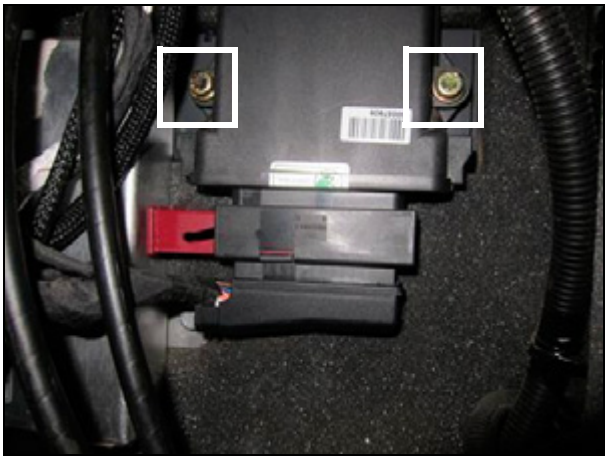
Disconnect the harness,



Step 12

Remove the connector from the controller.

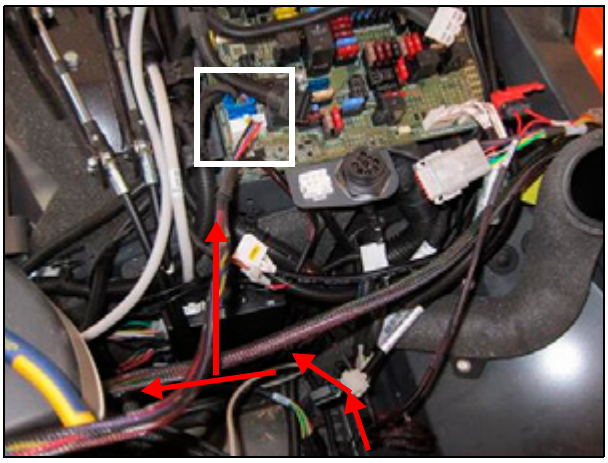
Remove the two mounting bolts to remove the controller.

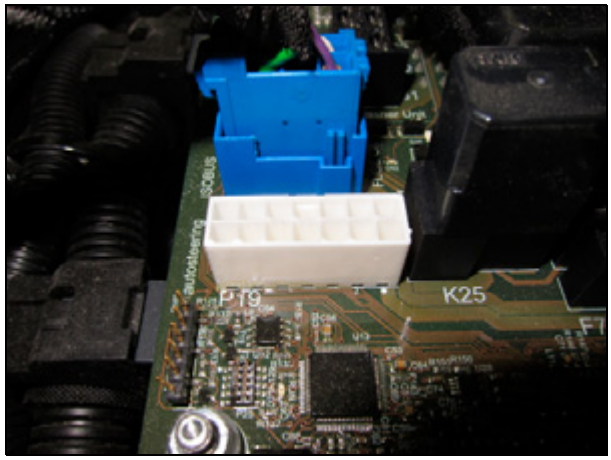


Installing the Autopilot harness on the FmX and CFX-750 displays

Step 1

For FmX and CFX-750 displays, route the harness from the NavController behind where the panel sits, route the Autopilot machine connection R4 to the connection on the fuse panel and then connect it as shown.

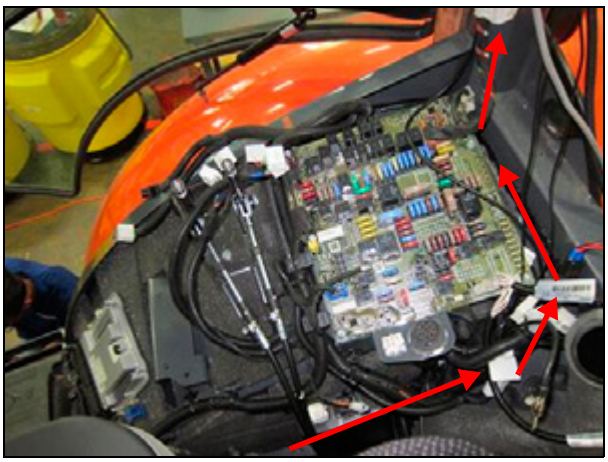




Step 2

Route the display portion of the harness up around the fuse panel to the B pillar of the machine and then up to the display on the machine's display mounting bar.

NOTE – For power connection to the Autopilot harness, see Configuring and connecting the power harness, page 62.

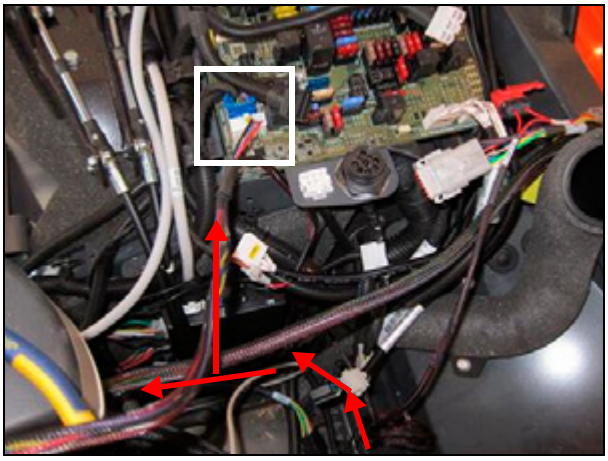


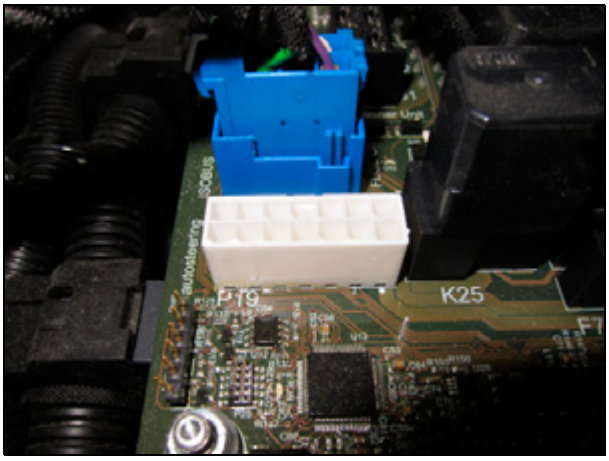
Installing the Autopilot harness on the TMX-2050 display and mounting the TM-200 module

Machines without CVT control module

Step 1

Route the harness from the NavController behind where the panel sits, route the Autopilot machine connection R4 to the connection on the fuse panel and then connect it as shown.



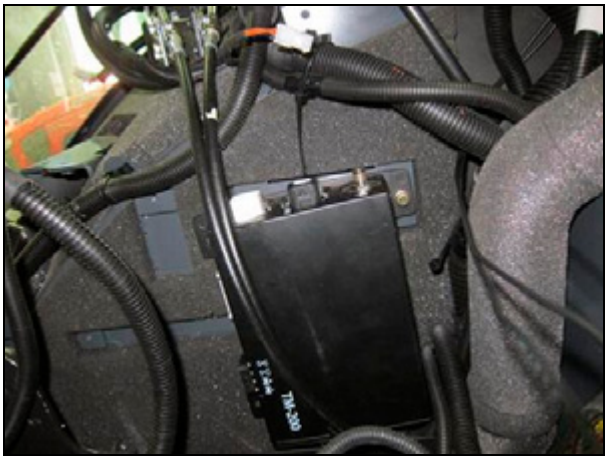


Step 2

For machines being equipped with a TMX-2050 display, the TM-200 module may be mounted in the location from where the third-party guidance box was removed previously.

Use one of the mounting holes from the guidance box that you removed to mount the TM-200 module to the machine.

If the option B NavController mounting is used, the TM-200 module may need to be positioned beneath the NavController II using the mounting method described later.



Step 3

Then drill a hole and use a second fastener to secure the box to the machine.



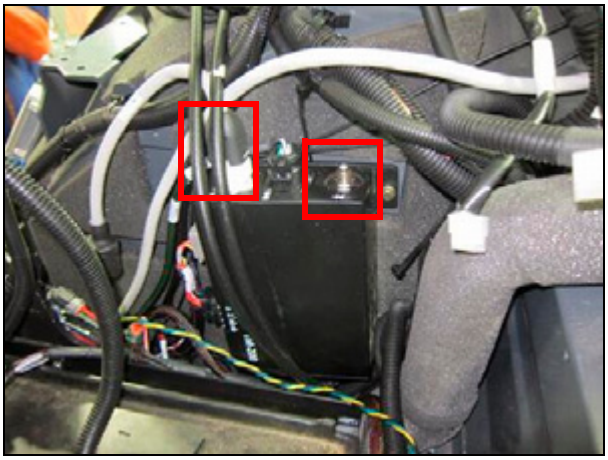
Step 4

Route the harness from the NavController and connect the P2 and P5 connectors to the TM-200 Module.



Step 5

Connect the TM-200 modem's display cable (on the left) and the antenna cable (on the right).



Step 6

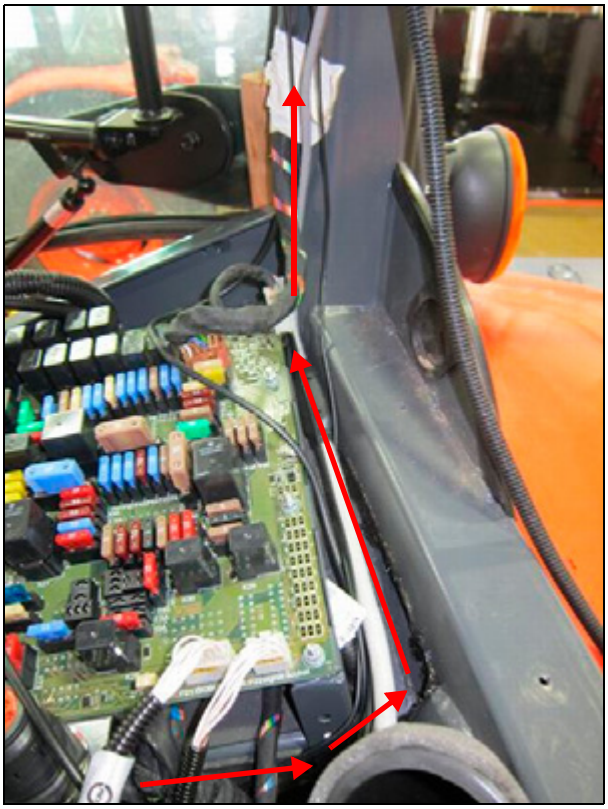
Route the cables up to the B pillar.

Route the antenna cable to the roof.

Route the display cable to the display.

Any extra cabling may be coiled under the fender cover.

NOTE – For power connection to the Autopilot harness, see Configuring and connecting the power harness, page 62.



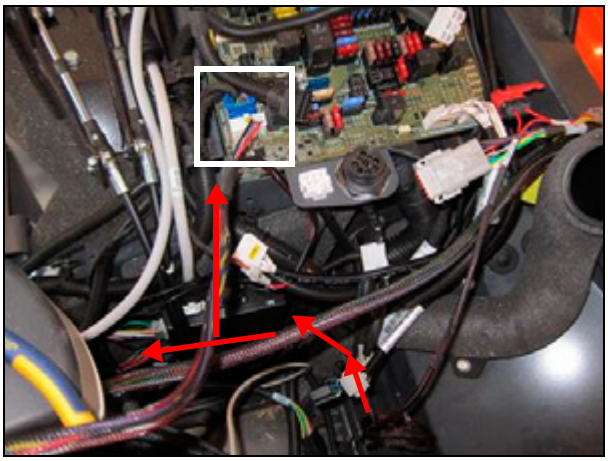
Machines with the CVT control module

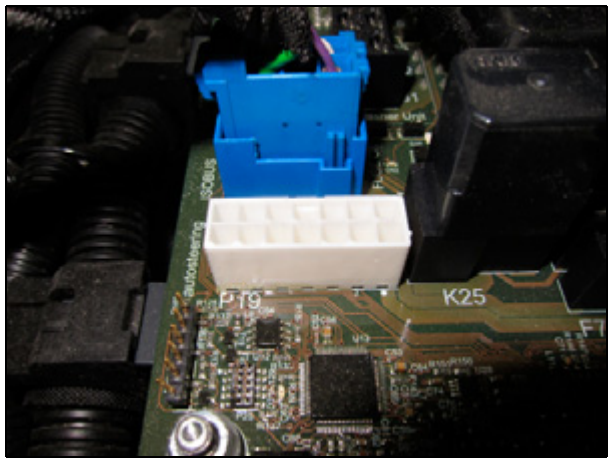
Step 1

Route the harness from the NavController behind where the panel sits, route the Autopilot machine connection R4 to the connection on the fuse panel and then connect it as shown.



Position of CVT control module



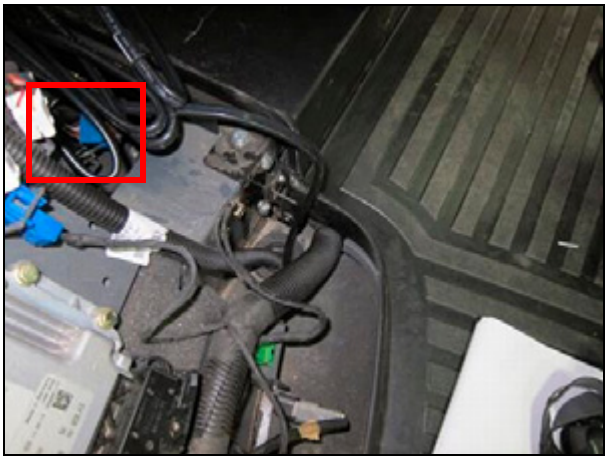


Step 2

Mount the TM-200 module in the location shown here.

If Option B NavController mounting is used, make sure that the TM-200 module mounting does not interfere with the NavController mounting.

For Option B NavController mounting the TM-200 Module must be mounted in the location shown here.

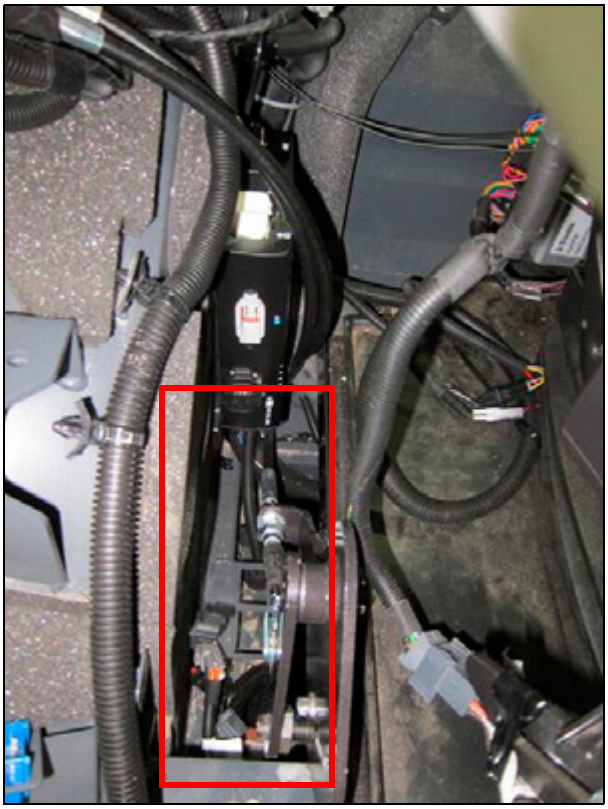


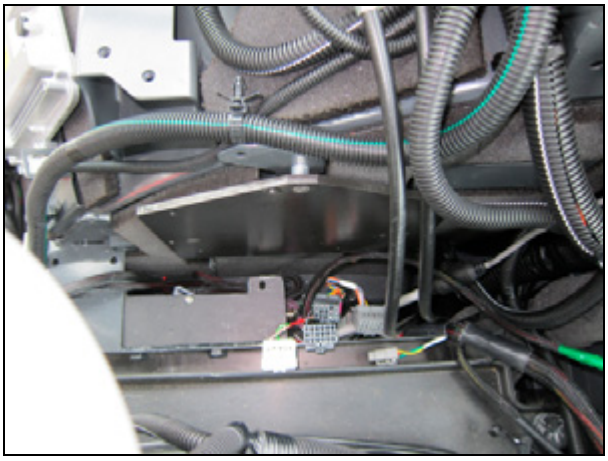
Step 3

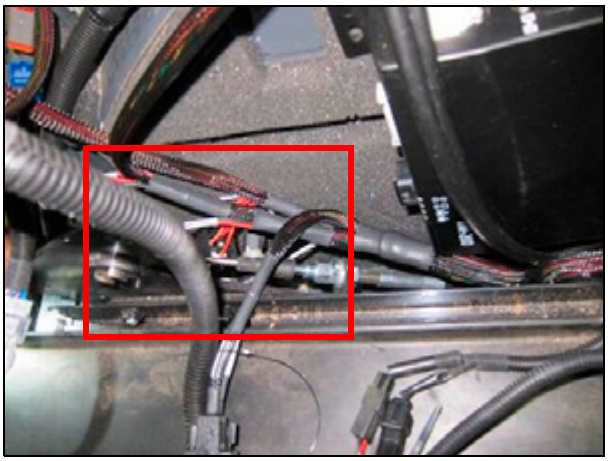
Power shift machines with the creep speed option have the lever shown here. For all other machines, this space is available for mounting the TM-200 module.

Mount the TM-200 module to the machine in any orientation. If the Option B NavController mounting is used, make sure that the mounting of the TM-200 module does not interfere with the mounting of the NavConroller.

For Option B NavController mounting the TM-200 Module can be mounted in the location shown here.







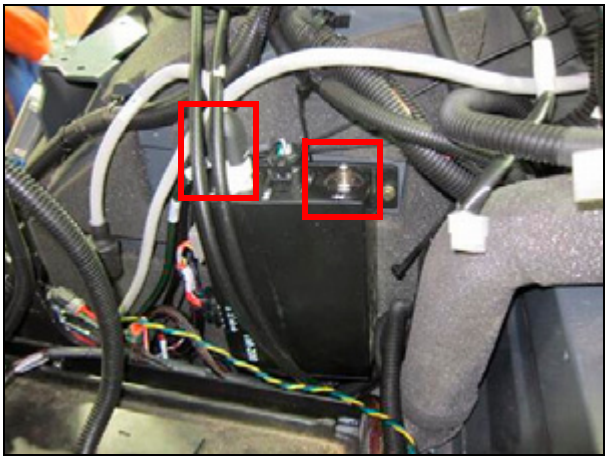
Step 4

Route the harness from the NavController and connect the P2 and P5 connectors to the TM-200 Module.



Step 5

Connect the TM-200 Modem's display cable (on the left) and the antenna cable (on the right).



Step 6

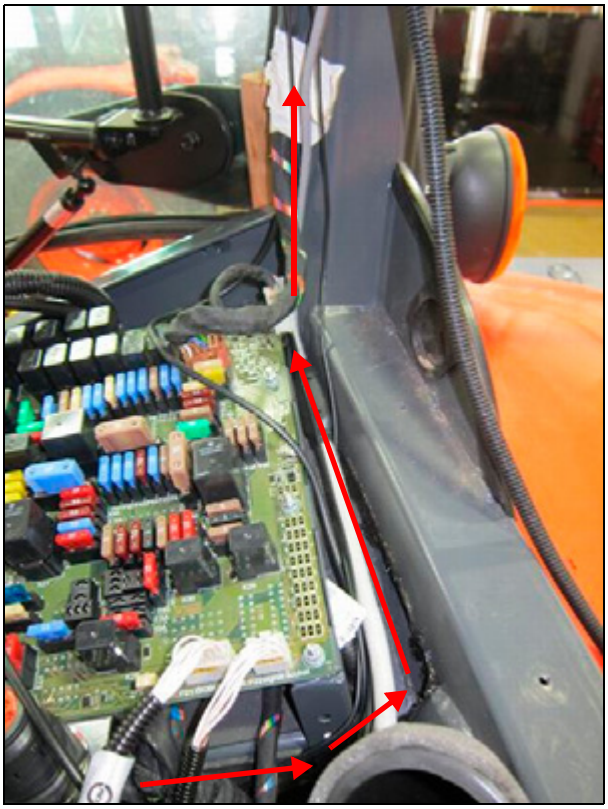
Route the cables up to the B pillar.

Route the antenna cable to the roof.

Route the display cable to the display.

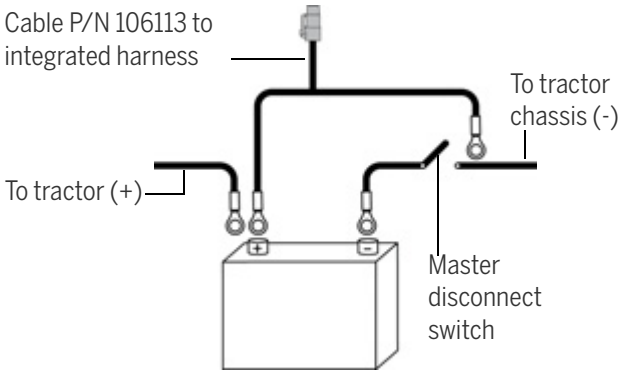
Any extra cabling may be coiled under the fender cover.

NOTE – For power connection to the Autopilot harness, see Configuring and connecting the power harness, page 62.



Configuring and connecting the power harness

⚠ **CAUTION –** If the vehicle has a master electrical disconnect, make sure the basic power cable (P/N 106113) 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.

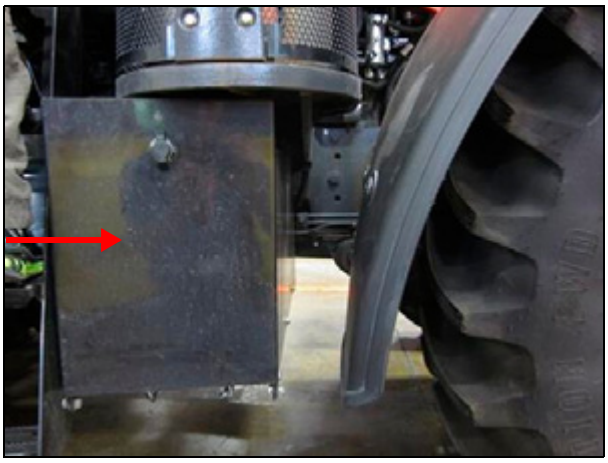


Step 1

The power harness will be connected to the battery.

Locate and then open the battery box.



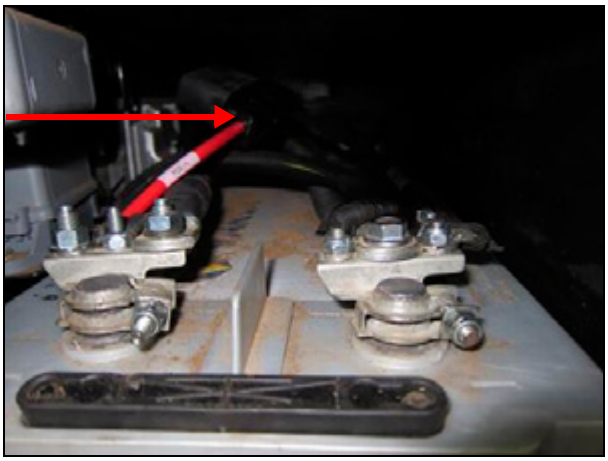


Step 2

Connect the red power connector to the positive battery terminal.

Connect the black ground connector to the negative battery terminal. Alternatively, if the tractor is equipped with a master disconnect switch, connect the black ground wire to the tractor side of the disconnect switch, not the battery side.

Route the cable from the back of the box towards the center of the machine.



Step 3

Locate the grommet at the front of the fender well.

You will route the power cable under the machine and then through the grommet.

See Step 4 and Step 5.



⚠ **CAUTION –** Use zip ties when routing the cable to ensure that it does not contact any hot or moving components and is not hit by field debris.



Step 4

To route the cable through the grommet, it may be necessary to remove the connector from the power harness.

Remove the fuse from the harness.

Remove the front key plug and then label and remove the wires from the plug.

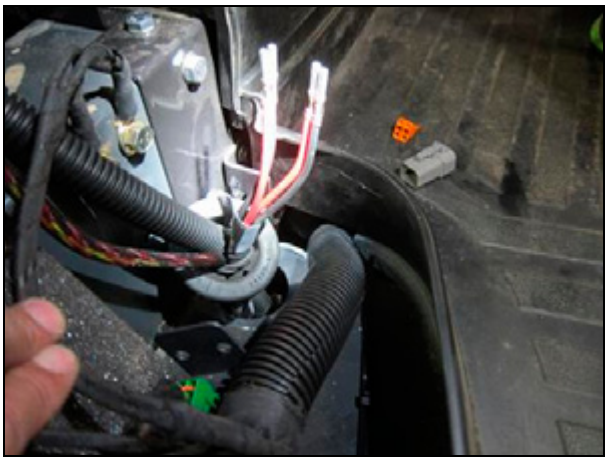


Step 5

Route the wires through the grommet and then reassemble the 4-pin Deutsch plug.

Make sure that the plug is reassembled correctly with red wires going to Pin 2 and Pin 4 and black wires going to Pin 1 and Pin 3.

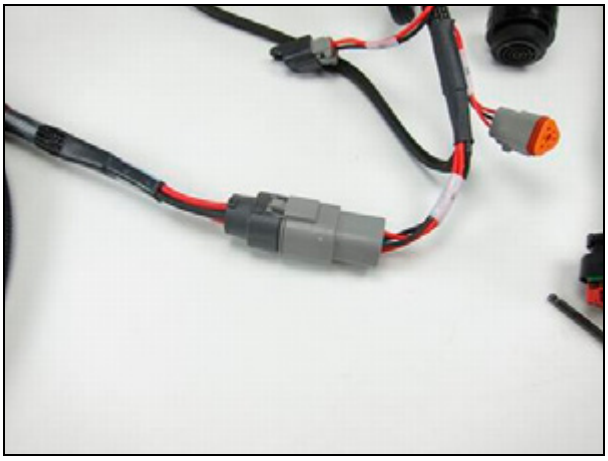
P1 - 1	Black	–Batt
P1 - 2	Red	+Batt
P1 - 3	Black	–Batt
P1 - 4	Red	+Batt





Step 6

Route the wire to the R1 connector on the Autopilot harness and then connect it as shown.

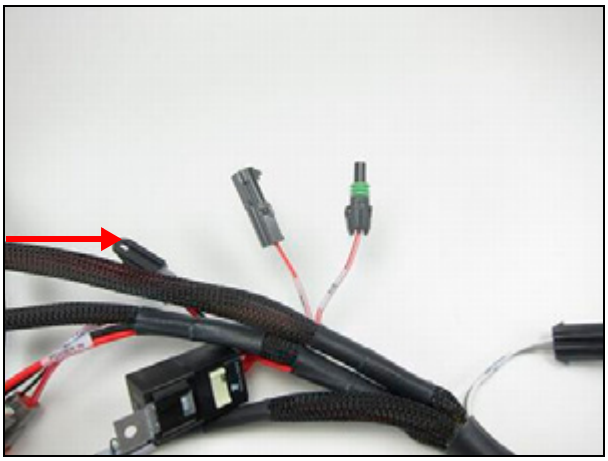


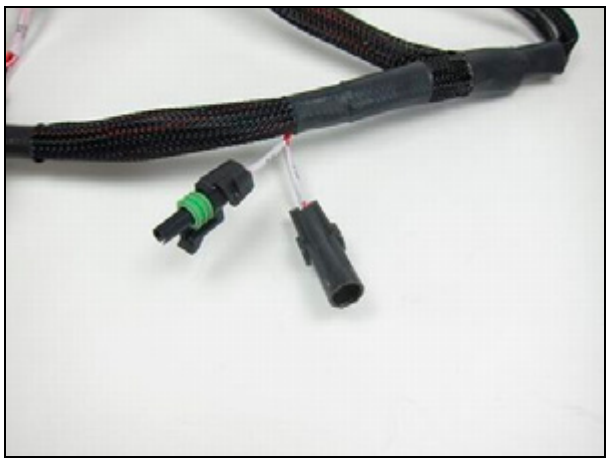
Ignition sensing with the Autopilot harness

The harness can be configured so that the display turns on when you use the key to turn the machine on. If you want to set this up, complete the following procedure. If you do not want to do this, leave the two connectors shown below free—do not connect them to anything.

Step 1

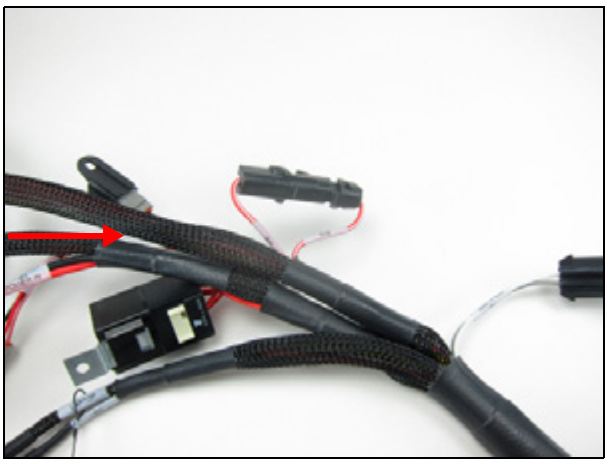
On the Autopilot harness locate the R15 and P15 connectors.





Step 2

If you want the Autopilot system to start up when you use the key to turn the machine on, connect the connectors as shown here.



5

Remote Engage Switch Installation

- Installing the remote engage cable
- Connecting the switch to the integrated harness
- Using the remote engage switch
- Activating the machine AutoSteer switch

Installing the remote engage cable

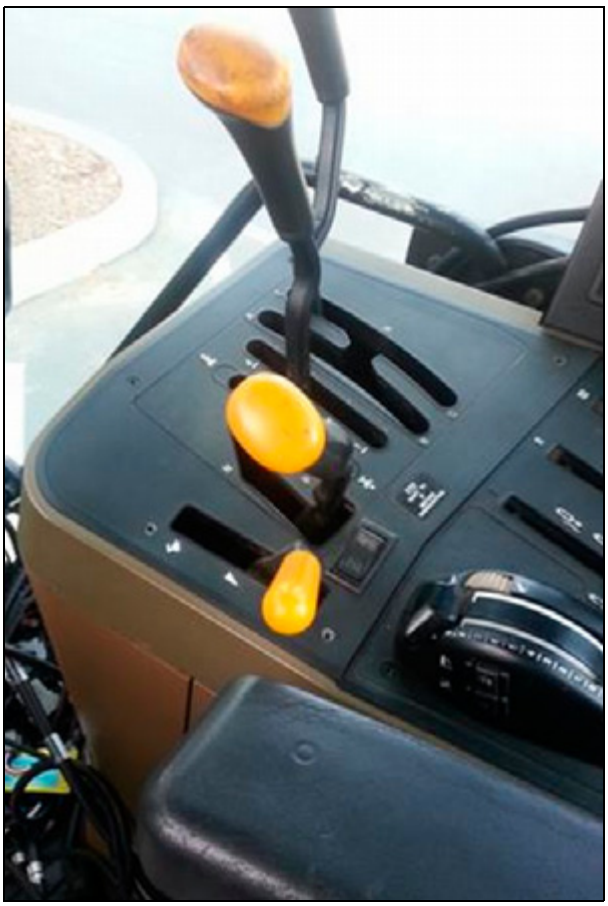
Step 1

Find the remote engage cable.



Step 2

Locate a convenient location on the machine to install the switch. It should be easily accessible while driving but should not interfere with any other machine controls.



Step 3

Remove the panel with the required installation location to verify that there is adequate clearance for the switch and cable. Take care to ensure that the cable will not interfere with any gear levers.



Step 4

Drill a ½" hole for the switch.



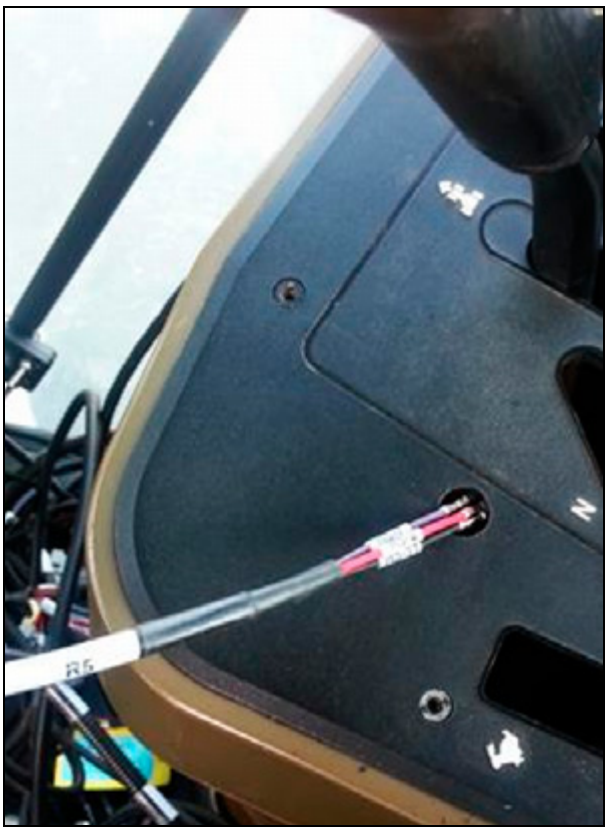
Step 5

Thread the cable through the clear round seal and slide it up until it reaches the switch.



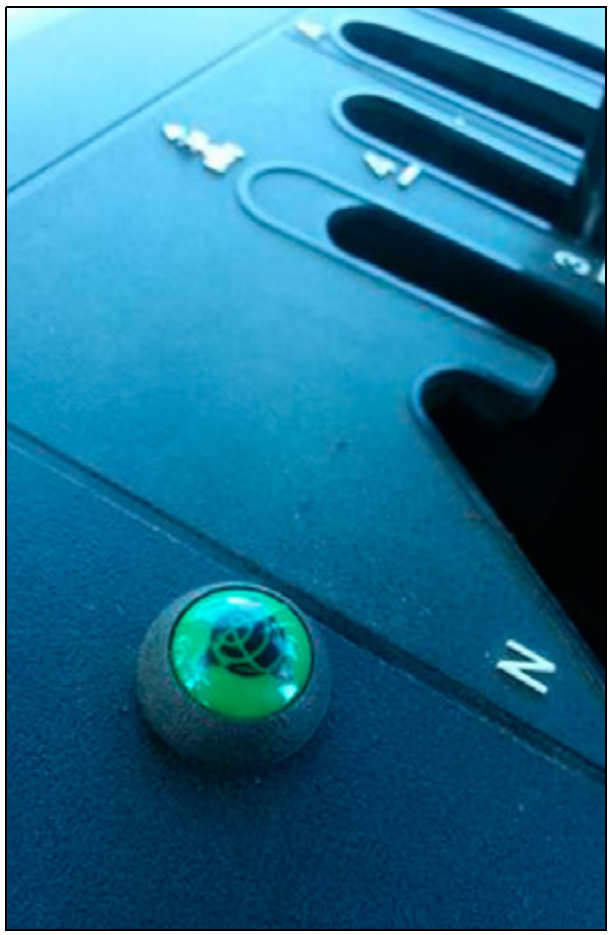
Step 6

Thread the cable through the hole in the instrument panel.



Step 7

Push the button down until it seats. The locking tabs will hold it securely in place.



Connecting the switch to the integrated harness

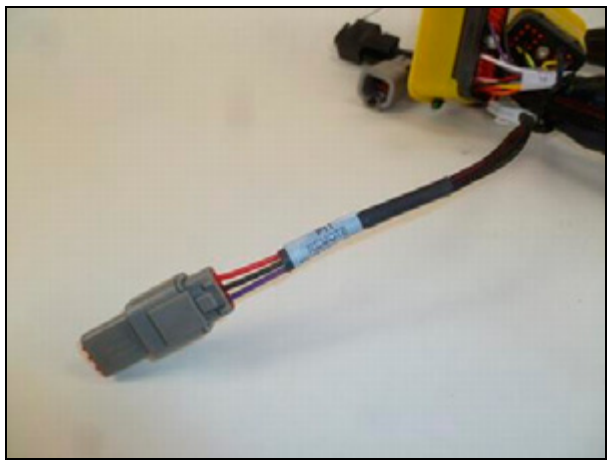
Step 1

Locate the in-cab harness and the remote engage harness, P/N 101250.



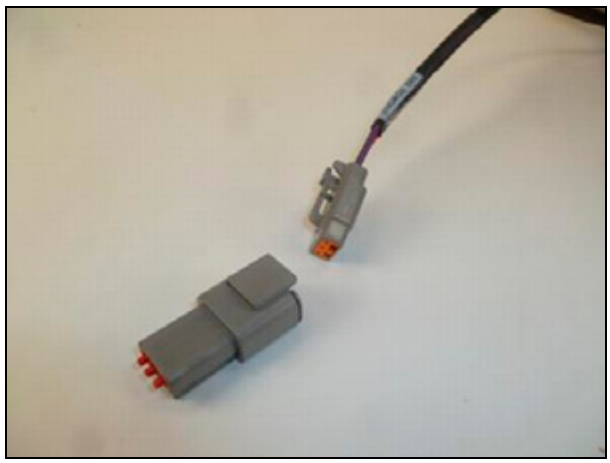
Step 2

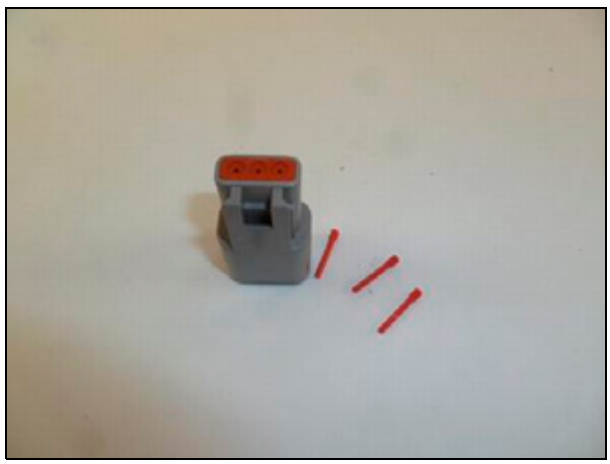
On the in-cab harness locate the P11 remote engage connector.



Step 3

Disconnect the receptacle from the plug connector on the harness and then remove the red plugs from the back of the connector.

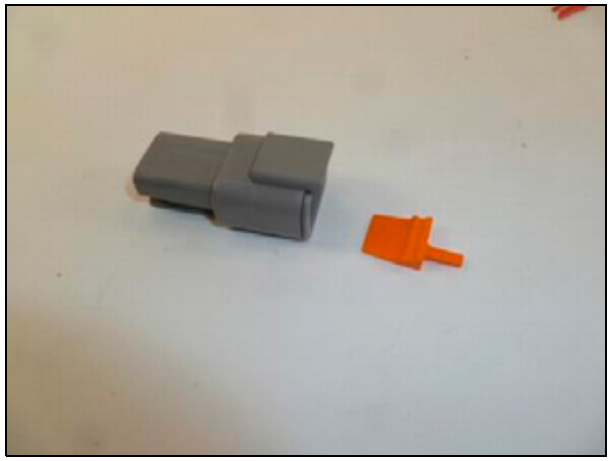




Step 4

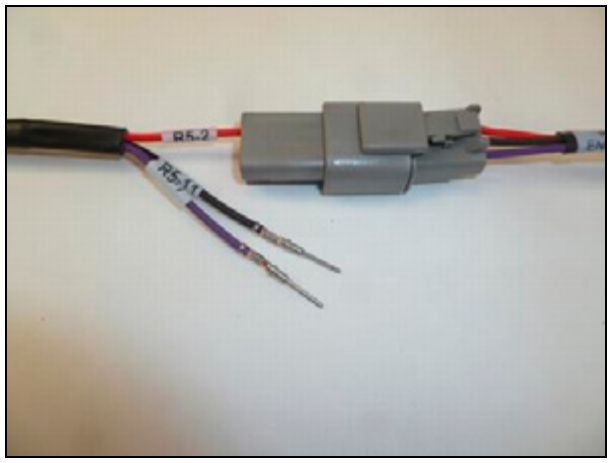
Remove the Orange wedge lock from the connector—pull it out with needle-nose pliers.





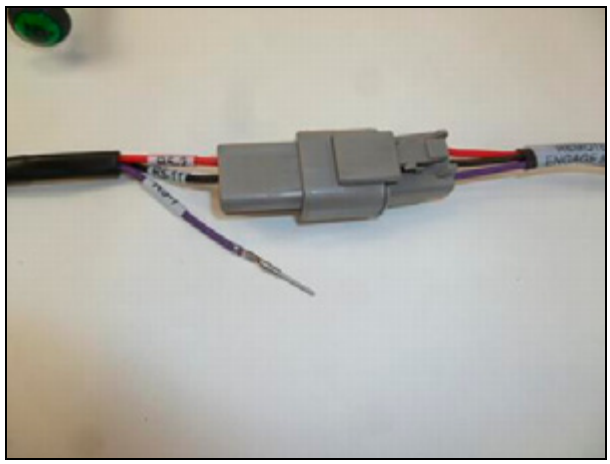
Step 5

Connect the red wire labeled **R5-2** to the pin 3 location.



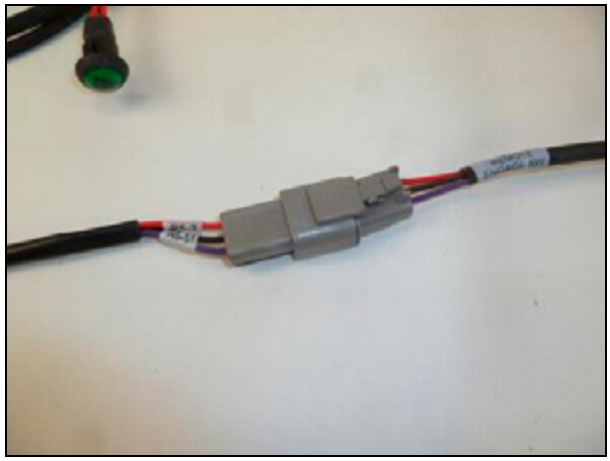
Step 6

Connect the black wire labeled **R5-11** to the pin 2 location.



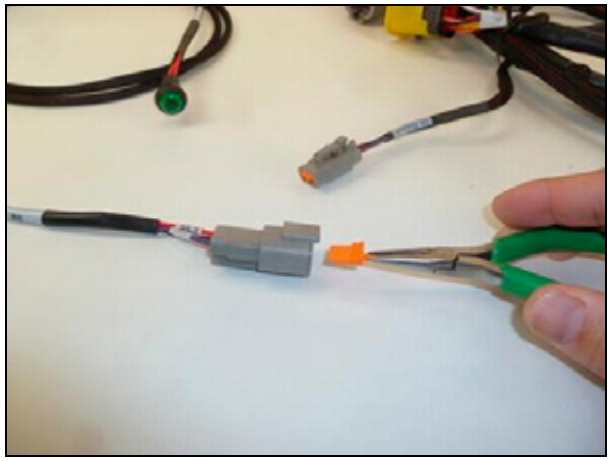
Step 7

Connect the purple wire labeled **R5-7** to the pin 1 location.



Step 8

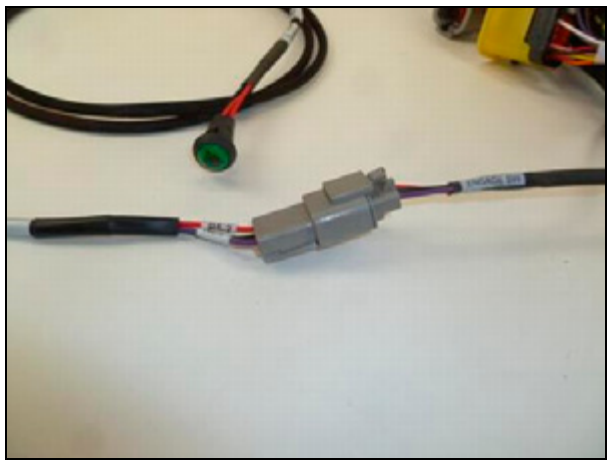
Re-install the wedge lock in the connector.



Step 9

Connect the connector on the remote engage harness P/N 101250 to the P11 connector on the in cab harness.

Route the button to the button location in the cab.



Using the remote engage switch

To use the NavController to engage the system, hold the switch down for longer than **0.15** seconds and less than **4** seconds.

The system engages when you release the switch.

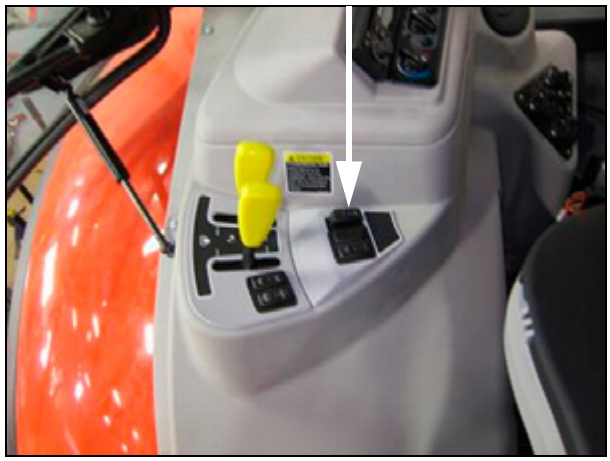
Activating the machine AutoSteer switch

Step 1

For the Autopilot system to function, you must activate the AutoSteer switch on the machine.

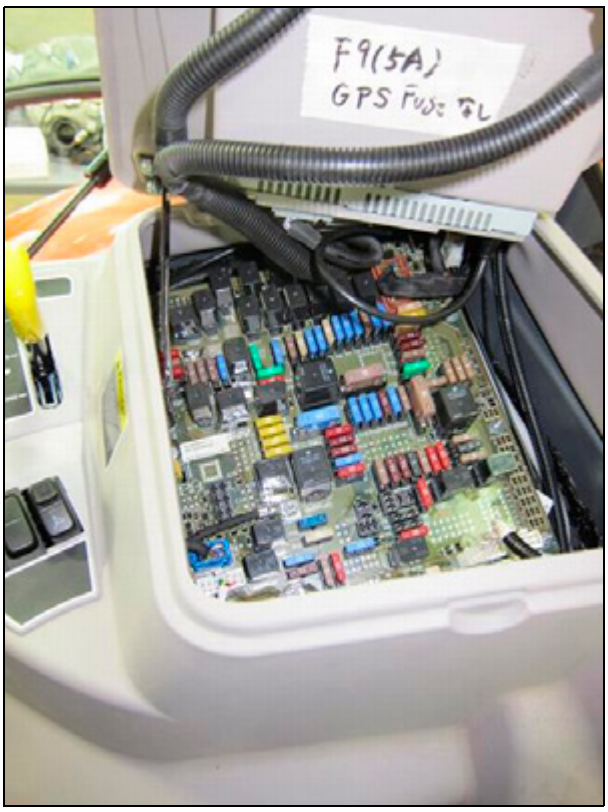
Locate the AutoSteer switch—this is the rear-most switch in the group of switches shown.

If a switch is not present, locate and install the switch in the platform kit for this function (P/N 110852). The switch should be installed to the wiring harness present on the machine, connector labeled **S37**. The wire harness should be connected to the blank-out switch if the machine is not equipped with a factory AutoSteer switch.



Step 2

When auto-steering is required in the field, set this switch so that it is in the position with the steering wheel down / switch light illuminated.



6

NavController Installation

- Installing the NavController: Option A
- Installing the NavController: Option B

Installing the NavController: Option A

⚠ **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

The NavController will be installed on the rear wall behind the seat of the machine.





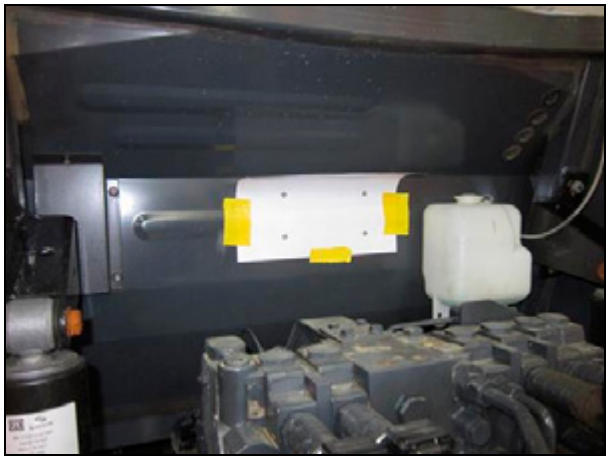
Step 2

Use the controller mounting plate to mark the approximate location of the NavController II.



Step 3

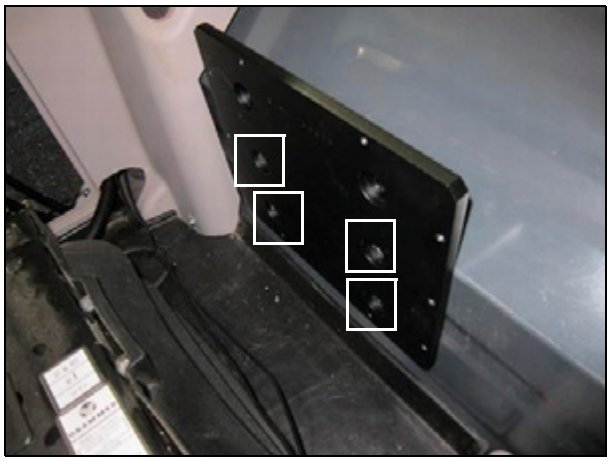
Create a template for mounting the NavController and then use it to mark and drill four 5/16" holes for mounting the controller mounting plate to the rear wall of the machine.



Step 4

Use the provided ¼" hardware to mount the controller mounting plate to the machine.





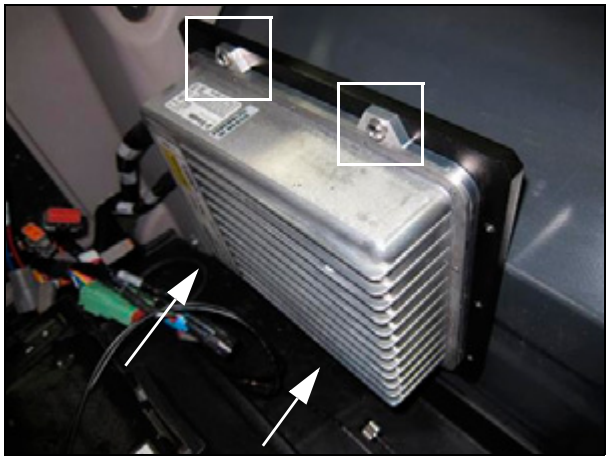
Step 5

Before you install the controller, attach the Autopilot harness. Use an Allen wrench to secure the connectors to the controller.



Step 6

Use the four 10-32 mounting screws provided to attach the NavController II to the controller mounting plate.



Step 7

Once the connections to the harnesses have been made the controller harness can be routed behind the panel of the machine.



Installing the NavController: Option B

⚠ **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

If this option is used to mount the NavController, locate the NavController mounting bracket and bolt kit, P/N 109107.



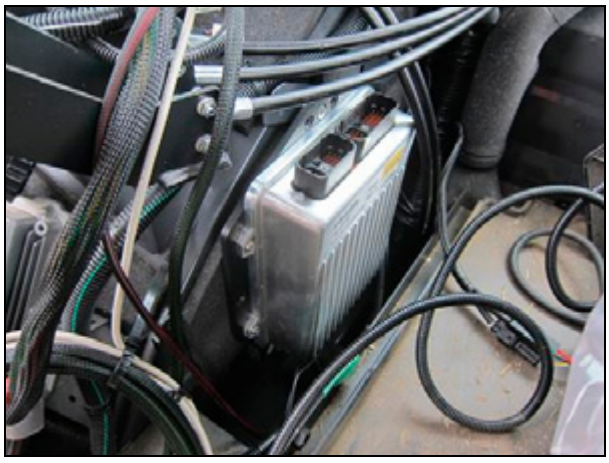
Step 2

Locate the mounting area

The NavController may be mounted behind the fender panel on the right fender well of the machine.

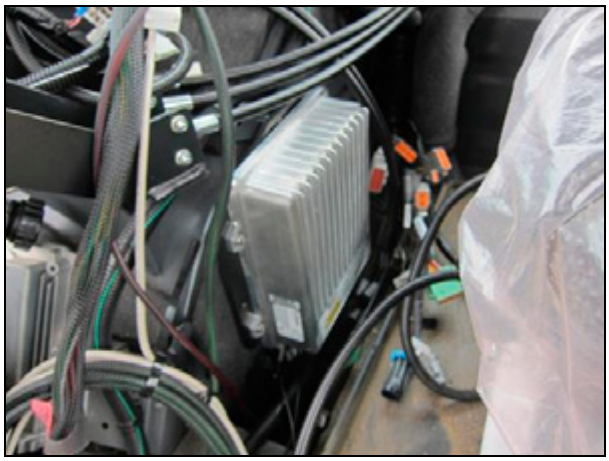
There are several different mounting configurations that can be selected. The NavController may be mounted with the connector up or down:

- With the connector up.

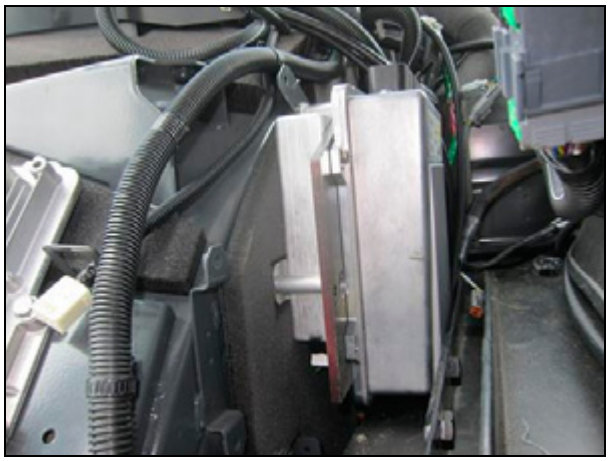


- With the connector down.

  If the TM-200 is located below the NavController it will need to be mounted with the connector up.



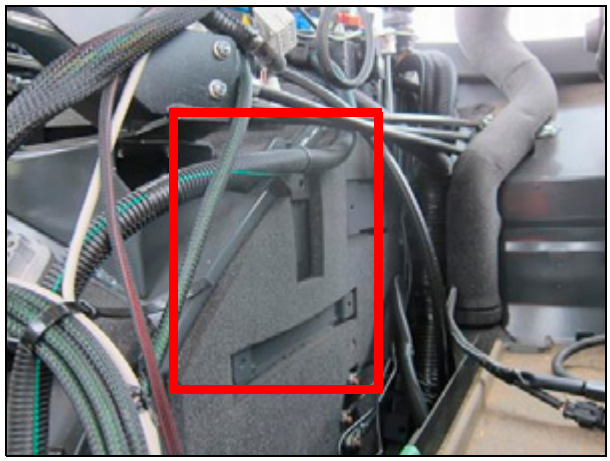
The NavController is shown here mounted with the CVT control module in place.



Step 3

Mounting the NavController

The NavController will be installed on the fender well in the location shown here.



If the CVT control module is present remove the bolts holding the CVT control module to the machine.



Step 4

- For machine without the CVT control module, the NavController mounting plate will be installed using the shorter spacers and screws.

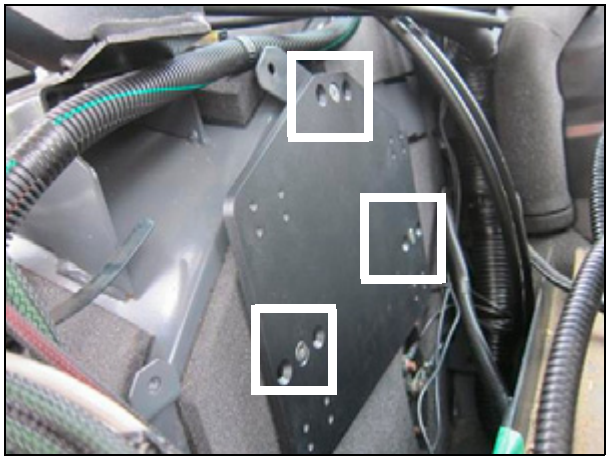


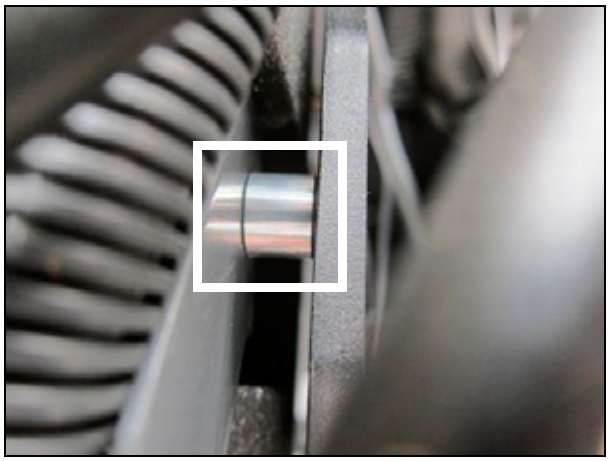
- For machine with the CVT control module, the NavController mounting plate will be installed using the longer spacers and screws.



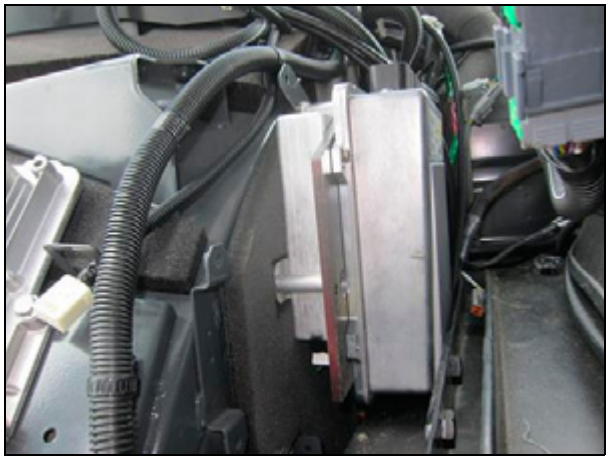
Step 5

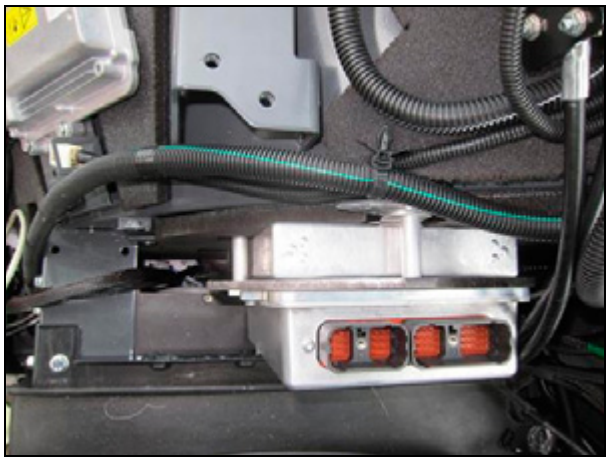
- If the CVT module is not present, install the NavController mounting plate with the provided shorter spacers and screws. The spacers will space the mounting plate off the fender well as shown.





- If the CVT module is present, install the NavController mounting plate with the longer spacers and hardware provided. The spacers will sandwich the CVT control module between the NavController mounting plate and the threaded holes.





Step 6

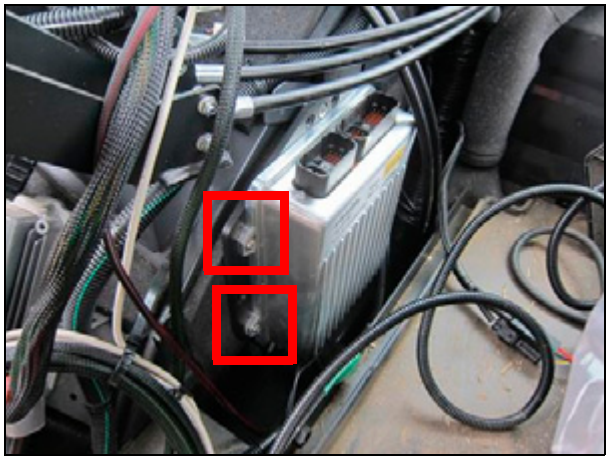
If the controller will be mounted with the connectors facing down, connect the harness to the NavController as shown.

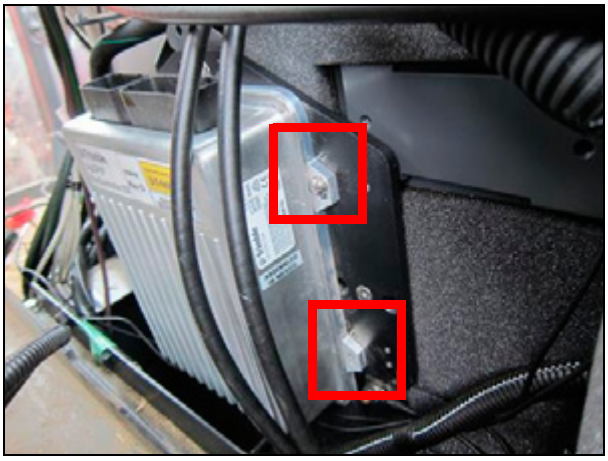


Step 7

Use the provided 10-32 screws to attach the NavController to the controller mounting plate.

Various mounting positions are available; choose the best mounting position for the machine.





7

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.

To perform the final machine check:

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

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

   Download the latest set of configuration files from http://agpartners.trimble.com.

   You can use Autopilot Toolbox II software version 2.92[1] or later to load the configuration file into the Autopilot controller. You can download the Autopilot Toolbox II software from http://agpartners.trimble.com.

4. Verify that the Kubota dealer has enabled the Auto Steering Availability and Steering Angle Sensor Availability. If not, the Kubota dealer will need to connect the Kubota OBD Tool and change the Auto Steering Availability Read and Steering Angle Sensor Availability settings, shown below, to **Installed**. If not, the tractor steering will not accept steering commands from the NavController.



5. Calibrate the Autopilot system using the Trimble display or Autopilot Toolbox II software version 2.92[1] or later. Depending on your machine type, the following items must be calibrated before you can use the Autopilot system:
   - NavController mounting orientation
   - Antenna height/Antnna axle offset, and Roll offset
   - Must use display or Autopilot Toolbox II software to perform the **Auto Cal** routine. Failure to perform the Auto Cal may result in the tractor not responding to steering commands from the NavController.

     NOTE – While performing the Auto Cal it may be necessary to hold the steering wheel in place to prevent the system from causing a manual override.
   - Roll offset
6. For calibration of the Danfoss CLS controller download the latest service bulletin / configuration instructions from the Agriculture Partners website, go to http://agpartners.trimble.com.

[1] For information on the correct version of the Autopilot Toolbox II that is required, refer to the Danfoss service bulletin (see Step 6).