Autopilot

AUTOMATED STEERING SYSTEM

INSTALLATION INSTRUCTIONS

CLAAS Lexion 600 and 700 series with factory Autopilot system valve

- 670
- 730
- 740
- 750
- 760
- 770

CLAAS Trion

- 520
- 530
- 530 MONTANA
- 530 TERRA TRAC
- 640
- 650
- 650 MONTANA
- 650 TERRA TRAC
- 660
- 660 MONTANA
- 660 TERRA TRAC
- 710
- 720 MONTANA
- 720 TERRA TRAC
- 730
- 730 MONTANA
- 730 TERRA TRAC
- 750
- 750 MONTANA
- 750 TERRA TRAC

Version 8.00
Revision A
February 2023
P/N 54038-42-E08-B

Trimble Agriculture

Legal Notices

Agriculture Business Area

Trimble Agriculture Division
10368 Westmoor Drive
Westminster, CO 80021
USA
trimble.com

Copyright and Trademarks

©1999–2023, Trimble Inc. All rights reserved.
Trimble, the Globe & Triangle logo, FmX, and OmniSTAR are trademarks of Trimble Inc., registered in the United States and in other countries. Autopilot, CFX-750, FM-750, FM-1000, GFX-750, Precision-IQ, TMX-2050, XCN-1050, and XCN-2050 are trademarks of Trimble Inc. All other trademarks are the property of their respective owners.

Release Notice

This is the February 2023 release (Revision A) of the *Autopilot Automated Steering System Installation Instructions*, part number 54038-42-E08-B. It applies to version 8.00 of the Autopilot automated steering system.

Notice to Our European Union Customers

For product recycling instructions and more information, please go to:
trimble.com/en/our-commitment/responsible-business/corporate-compliance/environmental-compliance



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.

WARNING – If the machine has a master electrical disconnect, ensure that the display/receiver is disconnected from the battery when the master disconnect is used. Failure to do so may result in hardware damage and void warranty. Additionally, it is suggested to utilize power terminals located within the cab of the vehicle that ground in the same location as the cab components to avoid ground shifts between the display and any vehicle ECUs.

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

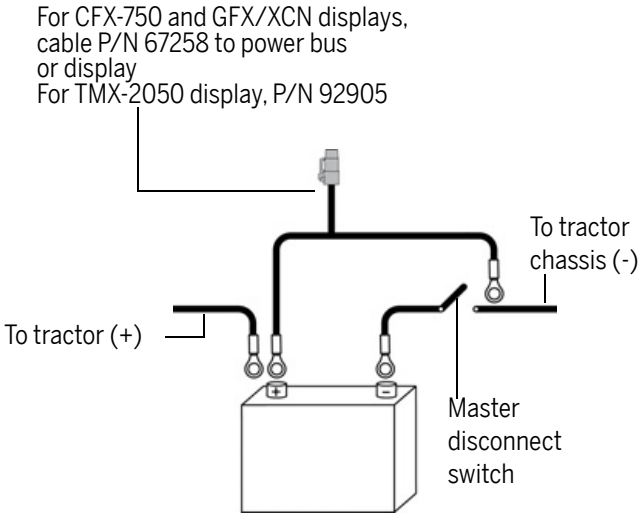


Set the hose pressure as low as practicable, and spray at a 45° to 90° angle. Keep the nozzle of the power washer away from the machine at the distance recommended by the manufacturer.

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 –** Wireless cellular radio and GNSS signals can interfere with each other. For best performance, mount antennas at least 1 meter away from each other.

⚠ **CAUTION –** If the vehicle has a master electrical disconnect, make sure the basic power cable (P/N 67258 / 92905) 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.



Contents

Safety Information . . . 3

Warnings . . . 3
Cautions . . . 4

1 Introduction . . . 8

Technical assistance . . . 8
Manual system upgrade to Autopilot . . . 9
Displays . . . 9
Required components . . . 9
Antenna mounting kits . . . 10
Accessory kits. . . . 10
Autopilot hardware organization: As shipped . . . 11
Preparing the vehicle for installation . . . 11

2 Antenna/Receiver Installation . . . 12

Antenna mounting location . . . 13
Installing the antenna . . . 14
Routing the antenna cables . . . 15
Antenna and receiver installation options . . . 17
Possible mounting methods . . . 17
Attaching the plate with VHB adhesive . . . 17
Installing the NAV-900 guidance receiver using the CLAAS NAV-900 mount bracket P/N 2669092.3 . . . 19
Installing the NAV-900 guidance receiver using a spar mount . . . 20
Optional: Using the P/N 110308 for quick release mounting of the NAV-900 from the spar . . . 25
NAV-900 guidance receiver: Connecting the cables . . . 26
NAV-900 guidance receiver: Connecting an external radio (as required) . . . 28

3 Display Installation . . . 30

CFX-750 display: Preparation . . . 31
CFX-750 display: Installation . . . 32
CFX-750 display: Installing the wiring harness. . . . 32
TMX-2050 display: Preparation . . . 33
Installing the display and mount. . . . 33
TMX-2050 display: Installing the wiring harness . . . 36
TMX-2050 display: AG-25 GNSS antenna . . . 38
CFX-750 and TMX-2050 displays: Installing the GNSS antenna and plate . . . 39
Spar mount method . . . 39
VHB adhesive method. . . . 39
CFX-750 and TMX-2050 displays: Installing the RTK radio antenna. . . . 43
GFX/XCN display: Preparation . . . 45
GFX/XCN display: Installation . . . 46
GFX/XCN display: Installing the wiring harness. . . . 48

4 CLAAS CAN and Power Harness Installation 50
CLAAS CAN cable – P/N 108791 51
Connecting the CLAAS CAN connection 52
Routing the cables to the display. 54
CFX-750 display: Components 57
GFX/XCN display: Components 58
CFX-750 and GFX/XCN displays: Installing the power harness. 59
CFX-750 displays: Configuring the power bus options 61
Display power button is used to turn on the Autopilot system 61
External switch is used to turn on the Autopilot system. 62
Ignition is used to turn on the Autopilot system 63
TMX-2050 display: Components. 65
TMX-2050 display: Installing the power harness 66
TMX-2050 display: Configuring the power options. 68
Ignition sensing. 69
5 Remote Engage Switch Installation. 71
Remote engage switch components: Rocker switch 72
Remote engage switch components: Foot switch 73
Preparing the remote engage cable 74
Installing the Remote Engage push button (P/N 101250) 78
Using the remote engage switch 83
6 Controller Installation 84
Installing the controller—CLAAS Lexion models 84
Installing the controller—CLAAS Trion models 87
Controller connections. 89
Connecting the cables to the controller. 90
7 Final Machine Check 91
Perform machine check 91
Setting up the CLAAS CEBIS unit for Trimble Autopilot—NON open steering interface 92
Setting up the CLAAS display for Trimble Autopilot—Trion and open steering interface systems 94

1

Introduction

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

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

Even if you have used other Global Positioning System (GPS) products before, Trimble recommends that you spend some time reading this manual to learn about the special features of this product. If you are not familiar with GPS, visit the Trimble website (trimble.com) for an interactive look at Trimble and GPS.

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 agpartners.trimble.com.
2. Click the **Feedback** link at the right of the screen.
3. Complete the form and then click **Submit Feedback**.

Manual system upgrade to Autopilot

Displays

Retain
CFX-750™/FM-750™ display: P/N 94110-xx
Power cable CFX-750 display: P/N 77282
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
TMX-2050™/XCN-2050™ display: P/N 96700-00
TM-200 module: P/N 95060-00
TM-200 module to display cable: P/N 93843
TM-200 module power I/O cable: P/N 92676
TM-200 module battery cable: P/N 92905
GFX/XCN display: P/N 13x000-01
Power cable GFX/XCN: P/N 110551
Base power cable: P/N 67258
NAV-900 guidance controller: P/N 108993-05
GFX/XCN display to NAV-900 Comms cable: P/N 110540 Kits

Required components

Kits required	Special tools
Platform kit: P/N 54038-42	5/16" drill bit and sheet metal cutting tool Allen wrench set (metric and SAE) Deutsch DTM crimp tool Right angle drill or right angle extension #25 Torx driver

Antenna mounting kits

Antenna options
Bracket, GPS - V base plate indexing: P/N 62388-02
Optional spar mounts (must measure application for proper part number):
• P/N 64898: Bracket, GPS Spar 16.5"– 28.5"
• P/N 55349: Bracket, GPS Spar 27.5"– 37.5"
• P/N 53676: Bracket, GPS Spar 36.5"– 46.5"
• P/N 55348: Bracket, GPS Spar 45"– 55"
• P/N 66774: Bracket, GPS Spar 54"– 64"
NOTE – For quick release mounting of the NAV-900 to a Spar mount, use P/N 110308: Bracket, NAV-900, Spar Quick Release Adapter
CLAAS P/N 2669092.3 - NAV-900, Mount Bracket

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 push button: P/N 101250
Remote engage foot pedal: P/N 57259

Autopilot hardware organization: As shipped

Hardware	Component	See...
Platform kit (P/N 54038-42)	CLAAS CAN cable	Chapter 4
	Power cable and switch	Chapter 4
	Bolt kit controller	Chapter 6
Common parts	Controller	Chapter 6
	Controller mounting bracket	
	Cable kit: • Main wiring harness • Auxiliary wiring harness • Sonalert alarm	
GPS receiver	GNSS receiver	Chapter 2
	GNSS antenna	
	GNSS receiver mounting bracket	
	GNSS receiver power/data cable	
	RTK radio, cable, and radio antenna	
Display	CFX-750 display	Chapter 3
	TMX-2050 display, GFX/XCN display	
	Display cable	
	Mounting bracket	
Roof bracket kit:	Roof brackets	Chapter 2
	Bolt kit, roof bracket	

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

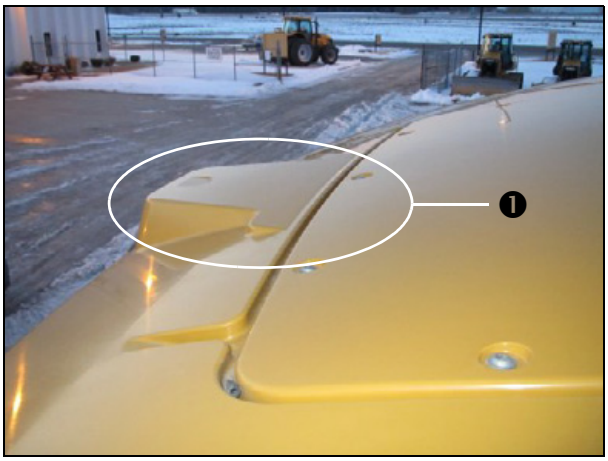
- Antenna mounting location
- Installing the antenna
- Routing the antenna cables
- Antenna and receiver installation options
- Attaching the plate with VHB adhesive
- Installing the NAV-900 guidance receiver using the CLAAS NAV-900 mount bracket P/N 2669092.3
- Installing the NAV-900 guidance receiver using a spar mount
- Optional: Using the P/N 110308 for quick release mounting of the NAV-900 from the spar
- NAV-900 guidance receiver: Connecting the cables
- NAV-900 guidance receiver: Connecting an external radio (as required)

This chapter describes how to install the required receiver and antenna, and radio module (if used). To install the antenna for the display, see Chapter 3, Display Installation.

Antenna mounting location

Step 1

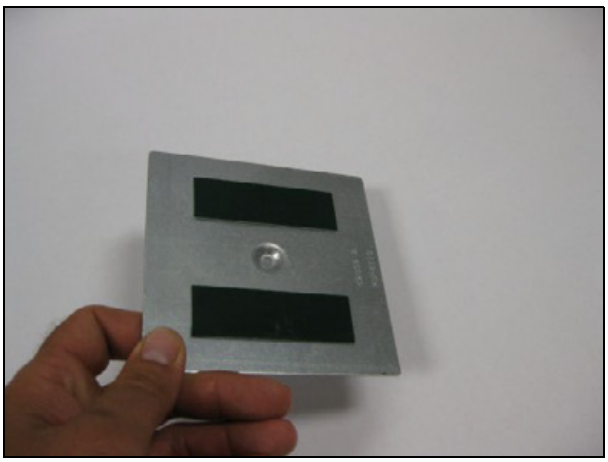
Locate the flat mounting location ❶ on the front of the cab. On some machines, a metal mounting plate may already be in place.



Step 2

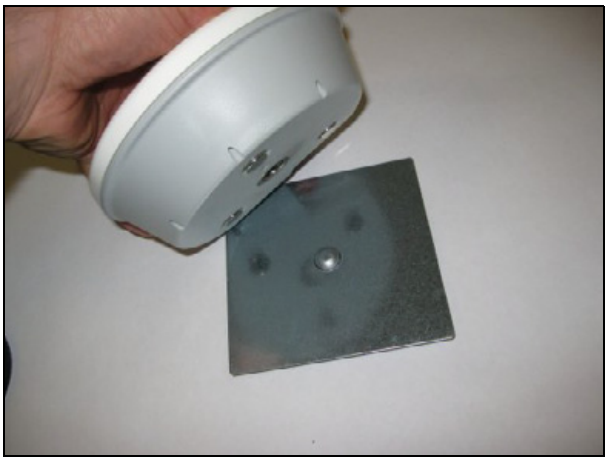
If a mounting plate is not present, use the 4" x 6" antenna mounting plate supplied with the display, and Very High Bond (VHB) adhesive to attach the plate to the flat mounting location.

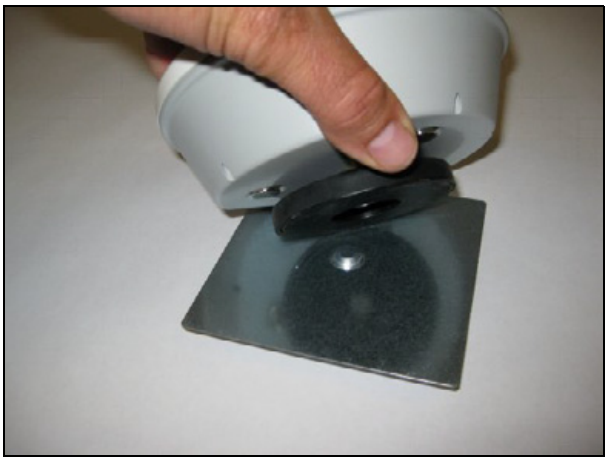
NOTE – Make sure to align the plate with the center line of the machine.



Installing the antenna

To attach the antenna to the mounting plate, use either the magnets on the antenna or the optional magnet mounting stud.







Routing the antenna cables

Step 1

Remove the right front light benzel.





Step 2

Drill a 1" hole on the right rear of the flat mounting location. Make sure that the antenna cable can be fed through the hole. Use a rubber grommet to seal the hole.



Step 3

Feed the cable through the grommet. To feed the cable into the cab, remove one of the knock outs behind the name plate.



Step 4

Remove the front cab headliner, route the cable to the corner pillar and then exit it through the access hole. On some machines, you may have to drill the access hole.



Step 5

Replace the headliner and light benzel.



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:

- **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. See page 17.
- **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 display TM-200 module	✓	✓

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

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 P/N 62034 plates are provided in most kits. You can use the VHB mounting method to attach either a P/N 62034 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 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. Apply force to the roof to find a firm location.

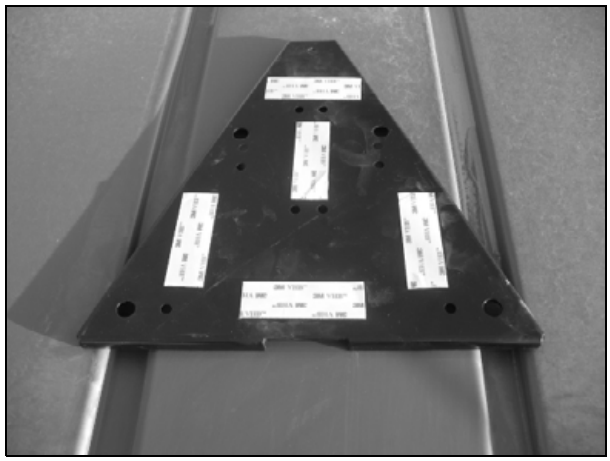


Step 2

V plate only

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

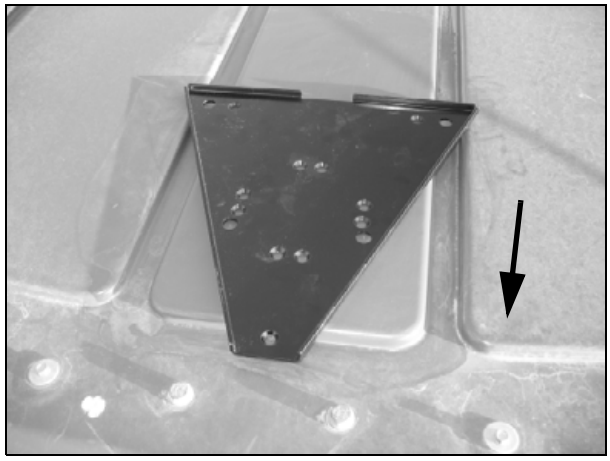
NOTE – The VHB strips are pre-applied to the P/N 62034 plate.



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 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



P/N 62034

Installing the NAV-900 guidance receiver using the CLAAS NAV-900 mount bracket P/N 2669092.3

Step 1

Locate the CLAAS NAV-900 bracket located in the front of the grain tank.

NOTE – If the bracket is not previously installed, a CLAAS NAV-900 Mount Bracket P/N 2669092.3 will be required.



Step 2

Use the 4 provided M6 bolts in the NAV-900 pack-out to attach the bracket to the bottom of the NAV-900 controller.



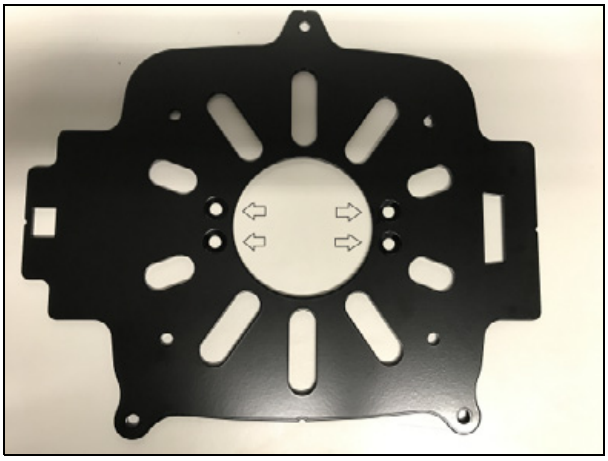
Installing the NAV-900 guidance receiver using a spar mount

For vehicles that do not have factory mounting methods or the factory mounting method is already in use, spar mounts are available to span between rigid bolts on the roof.

Lengths available are:

- P/N 64898: 16.5” – 28.5”
- P/N 55349: 27.5” – 37.5”
- P/N 53676: 36.5” – 46.5”
- P/N 55348: 45” – 55”
- P/N 66774: 54” – 64”

The guidance controller plate has a four-bolt pattern that directly attaches to the spar mounts:



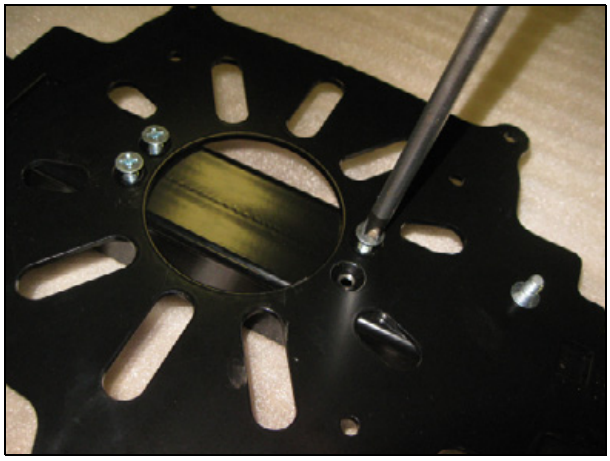
Step 1

Remove the spar from the box and lay out the hardware.



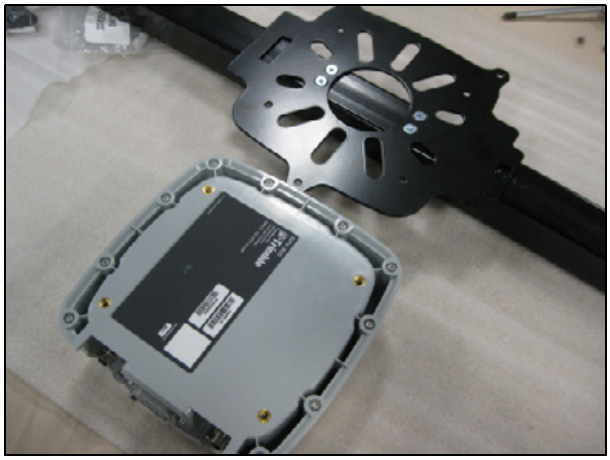
Step 2

Align the four holes on the base mounting plate with the four holes in the spar. Install the supplied ¼-20 × ½" countersunk bolts and tighten appropriately.



Step 3 .

Lay the guidance controller on its top.



Step 4

Lay the mounting plate with spar attached over on top. Attach the plate to the guidance controller with the four 6 mm bolts and lock washers. Tighten the four M6 fasteners to 7.0 ± 0.4ft-lbs (10.0 ± 0.5 N-m). Take care not to over-tighten the bolts as damage may result.







Step 5

Loosen and remove the large bolts on the cab that are to be used to fasten down the spar.



Step 6

Place the supplied spacer on the cab mounting point. The thickness of the spacer will vary by kit.



Step 7

Locate the provided longer bolts to be use for securing the spar. Put both the original washer and the larger provided washer on the bolt.



Step 8

Place the spar on the space and insert the bolt.



Step 9

Insert the bolt on the other side of the cab. Center the spar on the cab using a measuring tape. Then tighten the bolts.



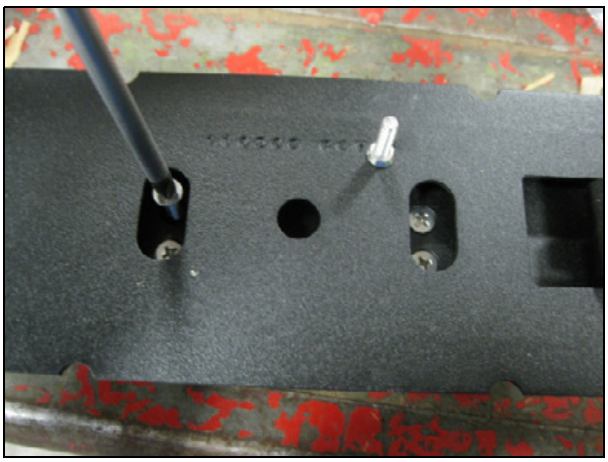




Optional: Using the P/N 110308 for quick release mounting of the NAV-900 from the spar

Step 1

Using the 4 bolts in the GFX-750 display kit, mount the Quick release bracket to the spar.



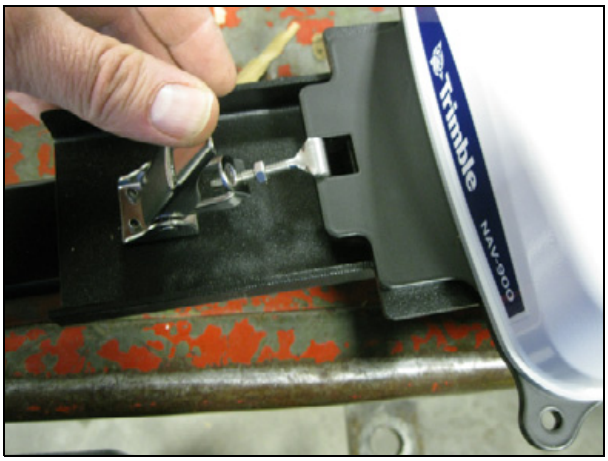
Step 2

Attach the NAV-900 base plate to the NAV-900 controller.

Step 3

Slip the slot of the base plate over the tang on the bracket and then use the latch to secure the receiver.



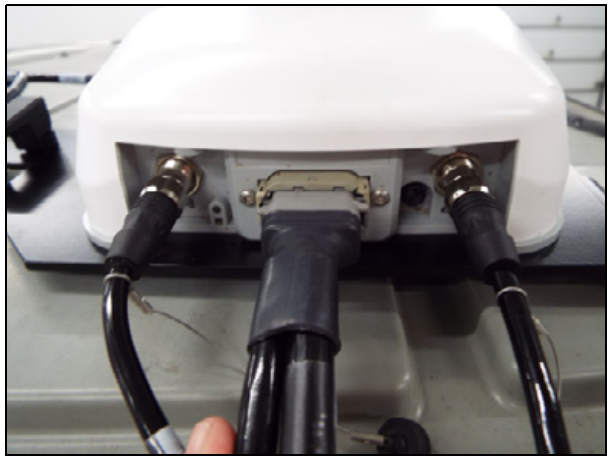


NAV-900 guidance receiver: Connecting the cables

Step 1

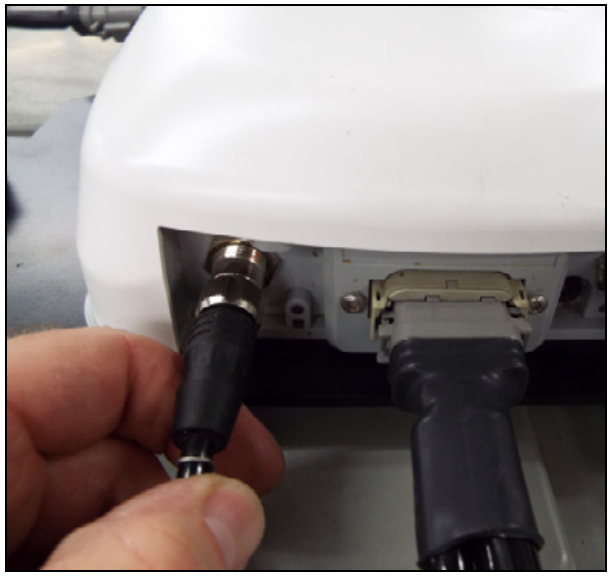
Plug the P1 connector on cable P/N 110550 into the back of the NAV-900 guidance receiver.





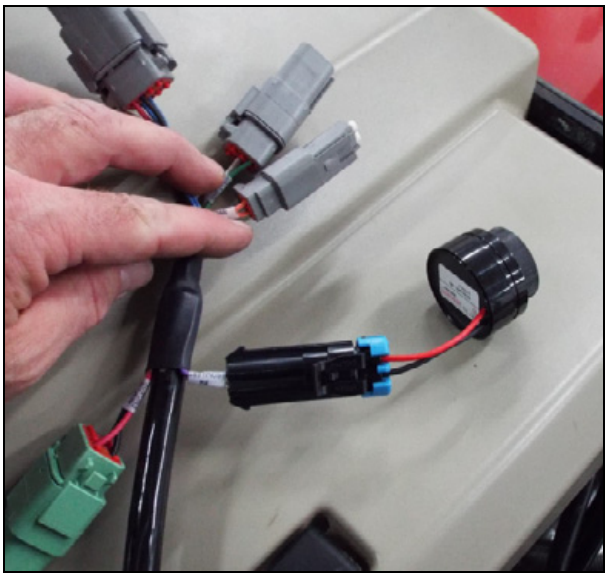
Step 2

Connect P2 of the P/N 110540 cable to the 4-pin M12 connector on the left side of the NAV-900 controller.

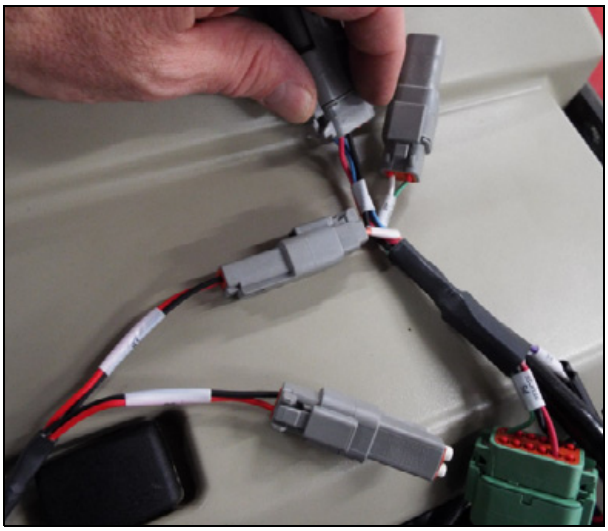


Step 3

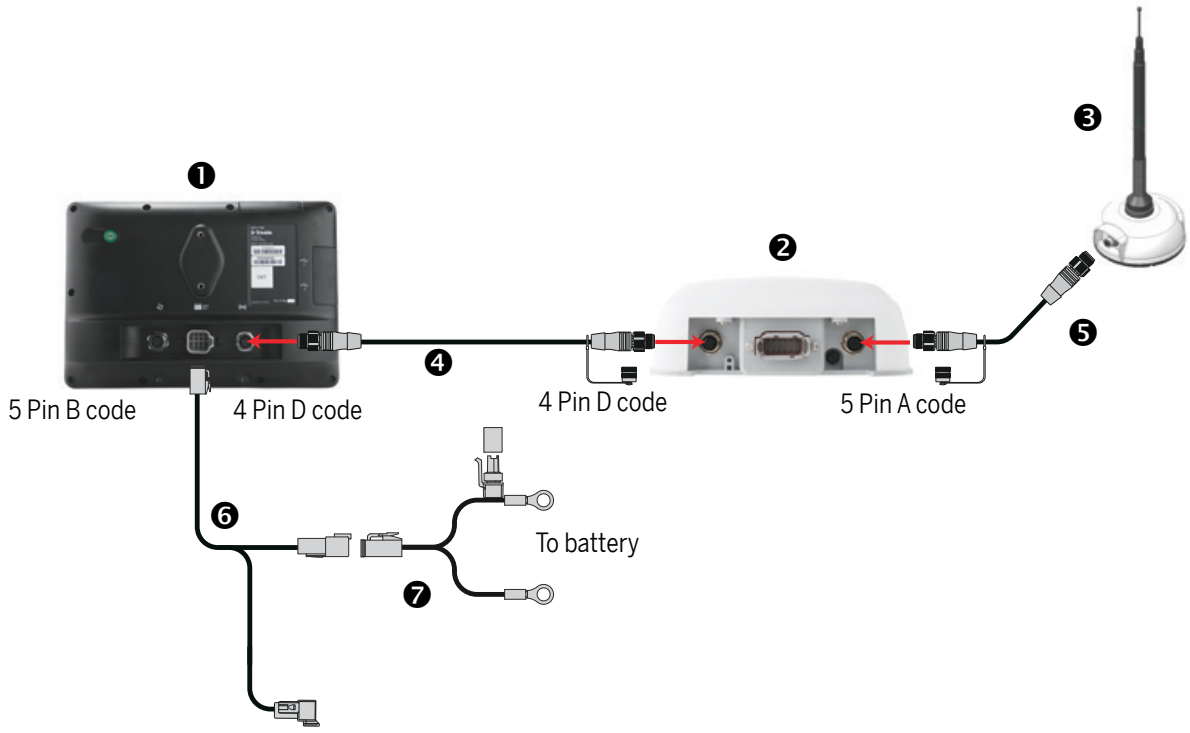
Connect the Sonalert to the cable P/N 110550.



Connect the NMEA output and modem power as needed.



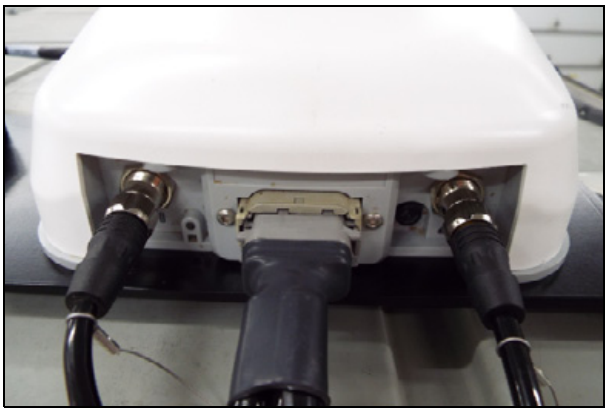
NAV-900 guidance receiver: Connecting an external radio (as required)



Item	Description	Trimble part number
1	GFX-750/XCN-1050 display, with Precision-IQ™ App	13x000-01
2	NAV-900 Guidance Controller	108993-05
3	Ag-820 radio kit, 430-450 MHz Ag-820 radio kit, 450-470 MHz Ag-820 radio kit, 900 MHz	123500-44 123500-46 123500-90
4	Cable Assy, NAV-900 to in-cab RTK Radio, DTM06, 4.5 m	110540
5	Cable Assy, NAV-900 to Ag-820	113295
6	Cable Assy, GFX/XCN-1050, Power to display, CAN, 2.5 m	110551
7	Cable Assy, GFX-750/CFX-750/FM-750/XCN-1050/ FmX®/FM-1000™ Basic Power, 4 m	67258

Step 1

Connect the radio interface cable (P/N 113295) to the right 5-pin M12 connector on the NAV-900 controller.



Step 2

Attach the radio to the roof or bracket in a secure fashion.



3

Display Installation

- CFX-750 display: Preparation
- CFX-750 display: Installation
- CFX-750 display: Installing the wiring harness
- TMX-2050 display: Preparation
- TMX-2050 display: Installing the wiring harness
- TMX-2050 display: AG-25 GNSS antenna
- CFX-750 and TMX-2050 displays: Installing the GNSS antenna and plate
- CFX-750 and TMX-2050 displays: Installing the RTK radio antenna
- GFX/XCN display: Preparation
- GFX/XCN display: Installation
- GFX/XCN display: Installing the wiring harness

CFX-750 display: Preparation

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.



CFX-750 display: Installation

⚠ **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

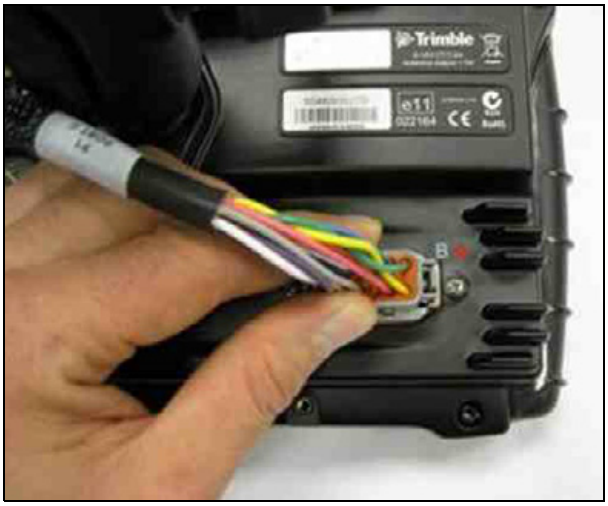
Decide where you will mount the display in the vehicle cab and then use the provided bolts to attach the bar mount to the rail.

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 6, Controller Installation.



CFX-750 display: Installing the wiring harness

Step 1

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

Step 2

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



TMX-2050 display: Preparation

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.

Installing the display and mount

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

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.

.

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



Step 1

Locate the TMX-2050 display and the Zircona mount and mounting hardware.



Step 2

Use the provided hardware to attach the Zircona mount to the display as shown





Step 3

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



Step 4

The Zircona mount has a tightening arm ❸. Loosen the arm to let the display move on the mount.

Step 5

Adjust the TMX-2050 display until it is positioned where you want it.

Turn the tightening arm clockwise to tighten the Zircona mount and lock the display in the desired position.

Step 6

Connect the display cable to the display.



Step 7

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



TMX-2050 display: Installing the wiring 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

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

Step 2

On the TM-200 module locate the display connection point.



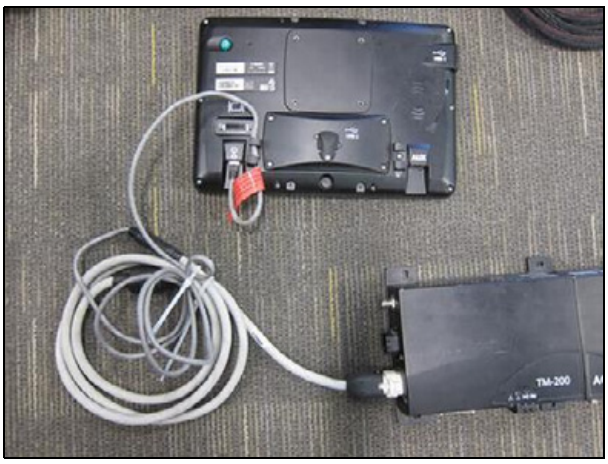
Step 3

Connect the display cable P/N 93843 to the TM-200 module.



Step 4

Route the cable between the TMX-2050 display and the TM-200 module.



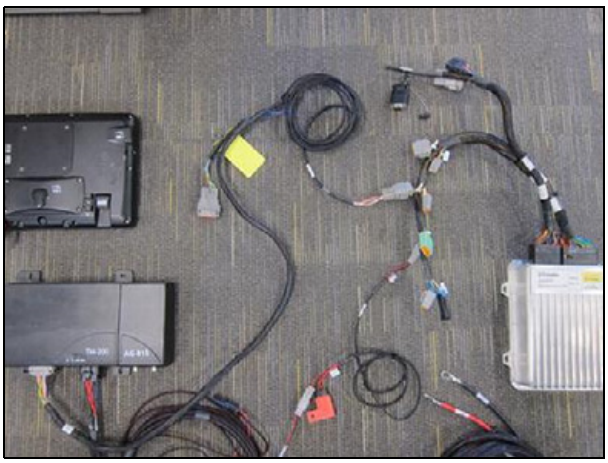
Step 5

Locate the Port labeled **A** on the TM-200 module and then connect NavController connection cable, P/N 75741.



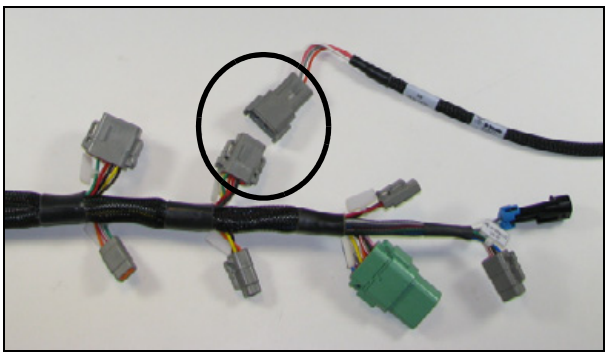
Step 6

Route the other end of the P/N 75741 cable to the plug on the P/N 54601 harness labeled **GPS**.



Step 7

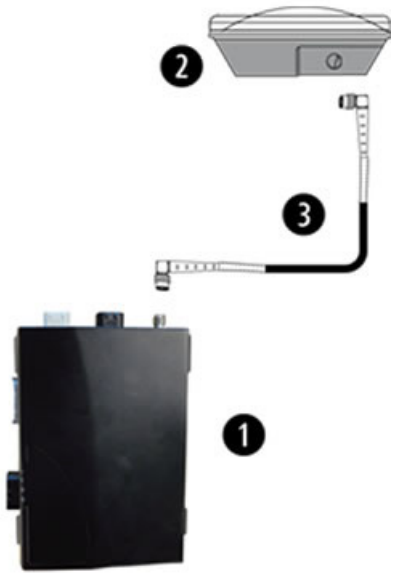
Connect the cable to the P3 connector on the NavController main harness.



TMX-2050 display: AG-25 GNSS antenna

The AG-25 GNSS antenna is required for all correction services. It enables the GNSS receiver in the TM-200 module to receive GPS / GNSS corrections. The antenna connects to the antenna connector on the TM-200 module.

⚠ **CAUTION –** Wireless cellular radio and GNSS signals can interfere with each other. For best performance, mount antennas at least 1 meter away from each other.



Item	Description
1	TM-200 module
2	AG-25 GNSS antenna
3	AG-25 antenna to TM-200 module cable

The AG-25 GNSS antenna has integrated magnets for easy installation. To attach the antenna to a non-metal surface, use the mounting plate.

NOTE – If you are using the AG-25 GNSS antenna with a steering system, refer to the installation instructions for the steering system to determine the correct location for mounting the antenna.

CFX-750 and TMX-2050 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 10.

Use one of the following methods:

- Spar mount
- VHB adhesive

Spar mount method

Trimble recommends that you use this method for RTK and OmniSTAR operations. For more information, see Antenna and receiver installation options, page 17.

Use a ⅝" bolt to attach the AG-25 antenna to the spar, as shown.

Measure the length between the bolts on the roof of the vehicle and order the appropriate spar:

- Spar 36.5" - 46.5": P/N 53676
- Spar 54" - 64": P/N 66774



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.

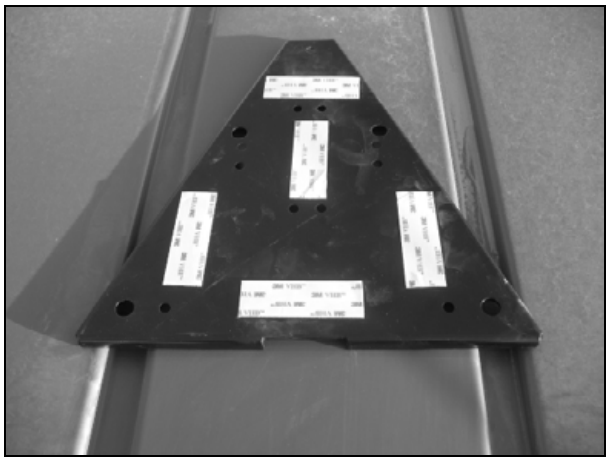


Step 2

V plate only

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

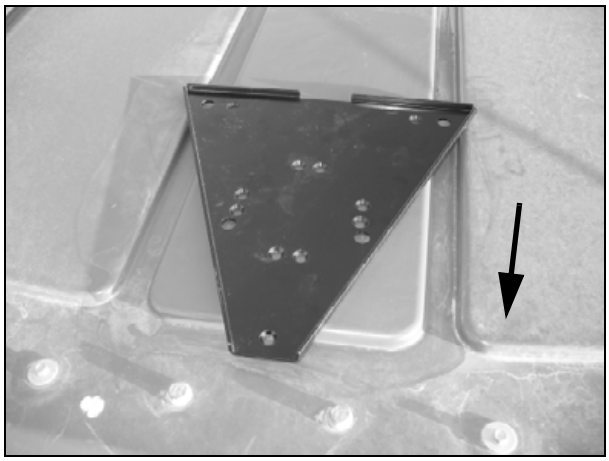
NOTE – The VHB strips are pre-applied to the 4" x 6" plate.



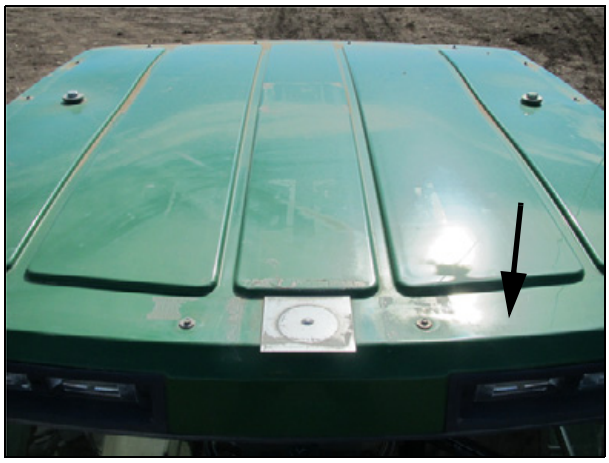
Step 3

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.



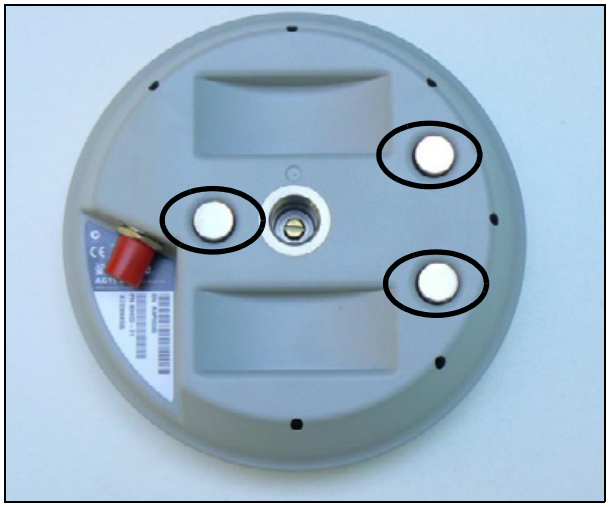
V plate



4" x 6" plate

Step 4

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



Otherwise, attach the large magnet with a ⅝" 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 TMX-2050 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

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 4

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

GFX/XCN display: Preparation

The GFX/XCN display utilizes the RAM mount system.



Attach the diamond-based ram mount to the back of the display using the provided fasteners.



GFX/XCN display: Installation

Step 1

Use the supplied V bolts or alternate (not supplied) hardware to affix the RAM base mount to the desired location in the cab. Ideally this position should be readily viewable and within easy reach of the operator.

Alternatively, you can use self tapping screws to attach the base mount to the cab in the desired location.



Step 2

Use the supplied RAM clamp to connect the RAM base mount to the RAM ball attached to the display.



Step 3

Position the display as desired and then tighten the clamp.



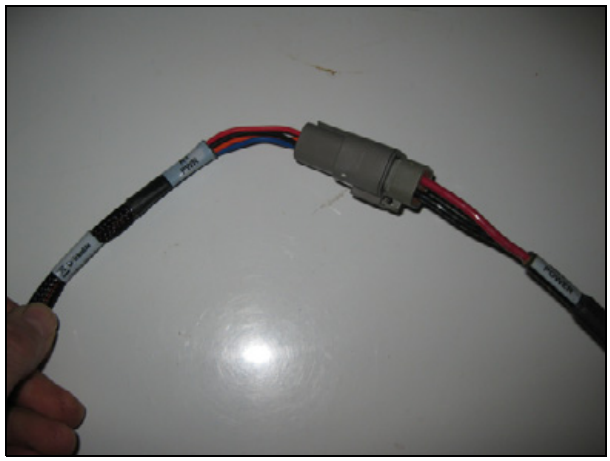
GFX/XCN display: Installing the wiring harness

The GFX-/XCN display requires a nominal 12 volt power source. The P/N 67258 cable has ring terminal leads for connecting to a battery or other cable mount point.

⚠ **WARNING –** If the machine has a master electrical disconnect, ensure that the display/receiver is disconnected from the battery when the master disconnect is used. Failure to do so may result in hardware damage and void warranty. Additionally, it is suggested to utilize power terminals located within the cab of the vehicle that ground in the same location as the cab components to avoid ground shifts between the display and any vehicle ECUs.

Step 1

Connect the other 4-pin Deutsch connector of cable P/N 110551 to the P/N 67258 base power cable.



Step 2

Connect the 6-pin DT power/CAN cable P/N 110551 to the middle port of the display.



Step 3

Connect the 4-pin M12 connector to the 4-pin receiver connector. Note the Keying and number of pins.



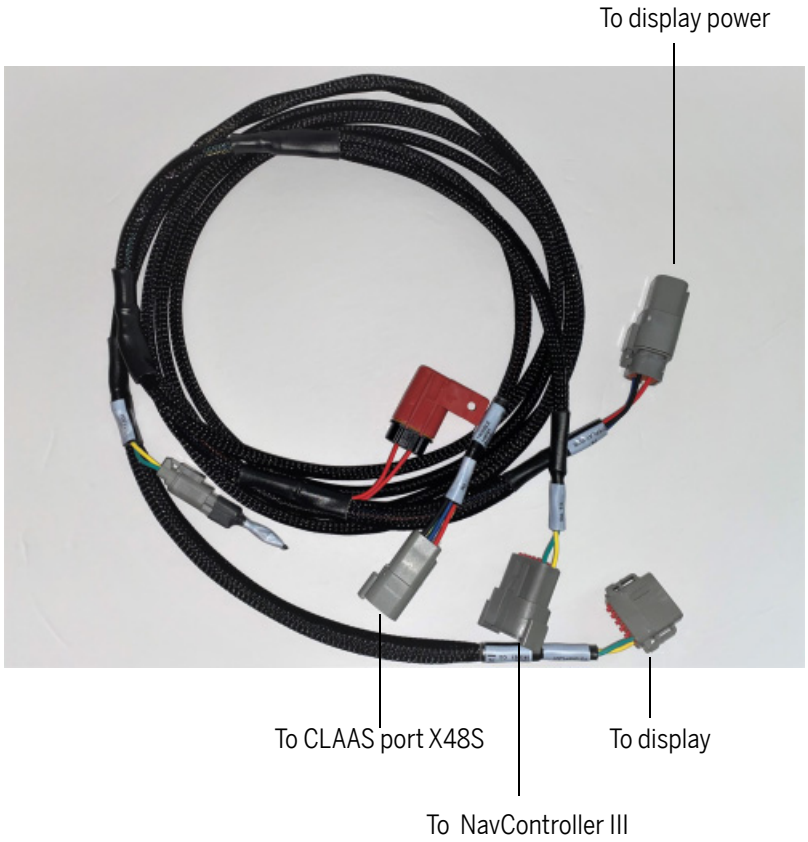


4

CLAAS CAN and Power Harness Installation

- CLAAS CAN cable – P/N 108791
- Connecting the CLAAS CAN connection
- Routing the cables to the display
- CFX-750 display: Components
- GFX/XCN display: Components
- CFX-750 and GFX/XCN displays: Installing the power harness
- CFX-750 displays: Configuring the power bus options
- TMX-2050 display: Components
- TMX-2050 display: Installing the power harness
- TMX-2050 display: Configuring the power options

CLAAS CAN cable – P/N 108791



Connecting the CLAAS CAN connection

Step 1

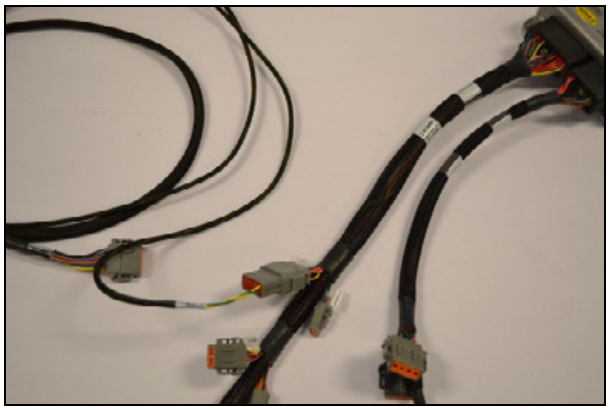
Locate the CLAAS CAN connector near the NavController III mounting plate. It is a 6-pin Deustch DT plug towards the end of a single harness, labeled **X48S**.



Step 2

Connect the CLAAS adapter cable to the CAN connection and then to the P4 connector on the NavController III.





Step 3

Connect P2 on cable P/N 108791 to the display power cable.



Routing the cables to the display

You can route the power and communication cables between the CLAAS harness, the NavController III and the display through the pillars in the cab.

Step 1

Remove the right rear door pillar.





Step 2

Remove the upper door molding.

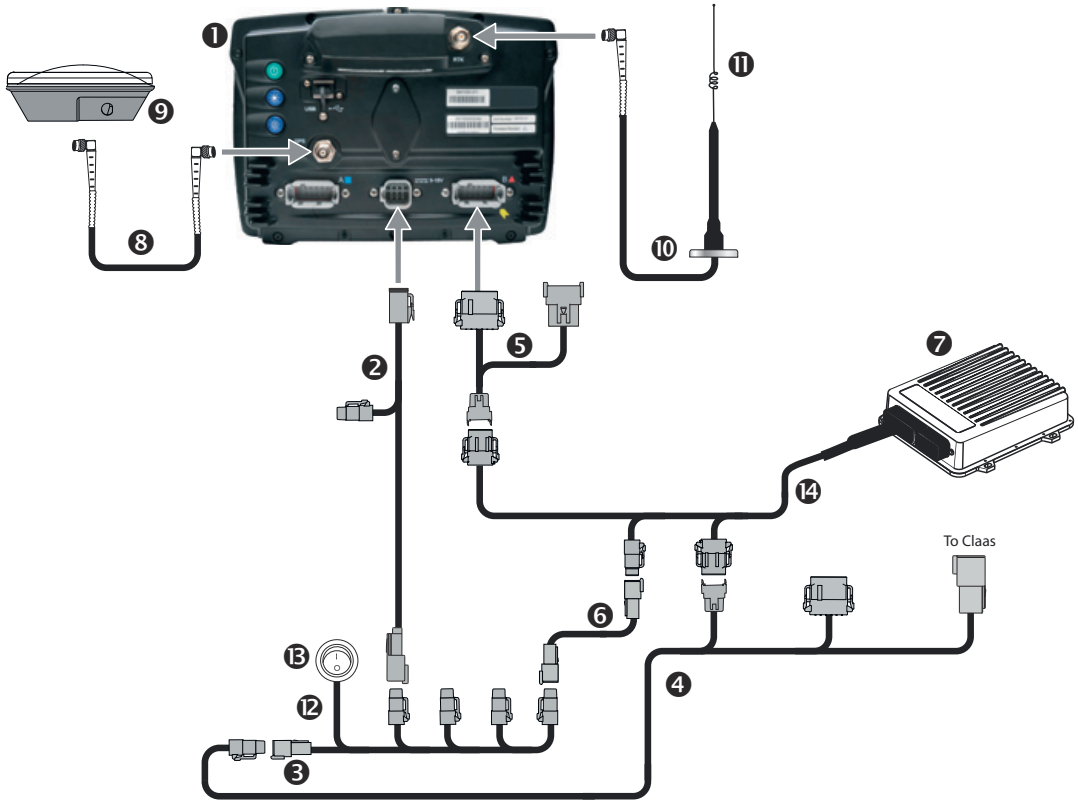


Step 3

Route the power, Autopilot system, and CAN connection cable (if using Yield Monitoring) through the hole in the upper right pillar to the back of the display.



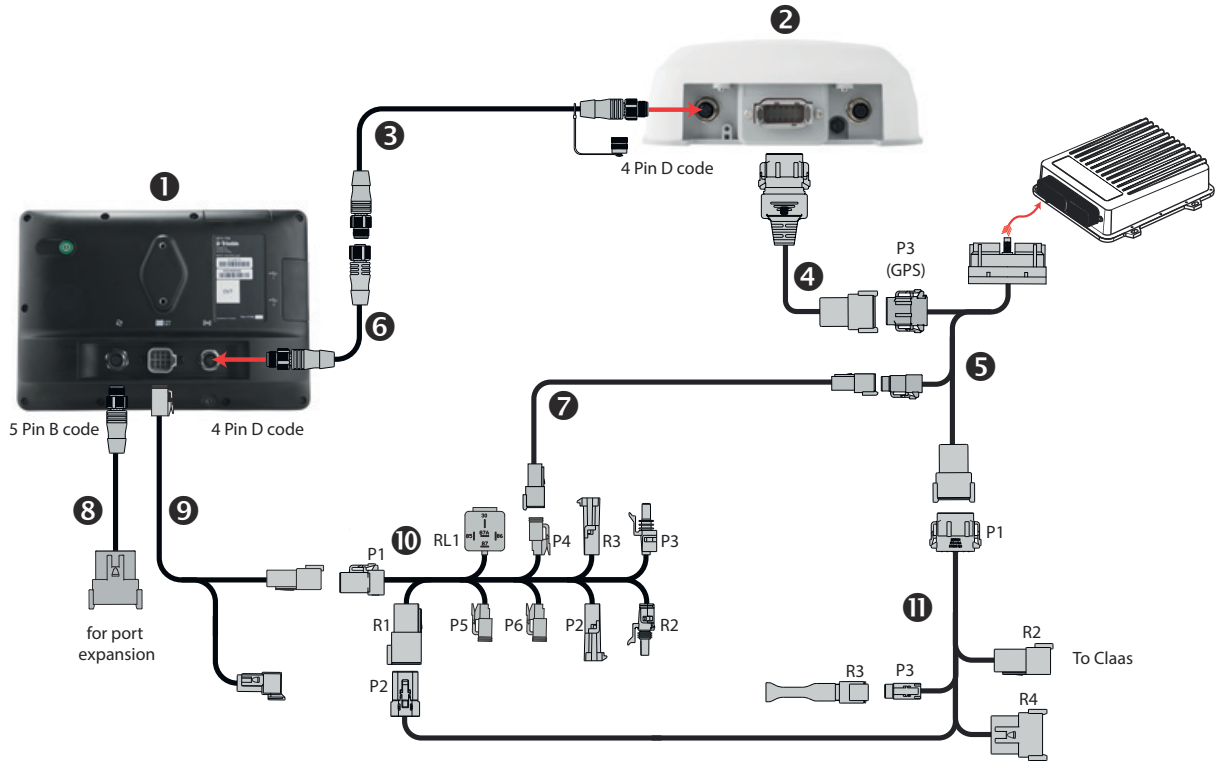
CFX-750 display: Components



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

Item	Description	Trimble part number
1	CFX-750 display **NOTE –** RTK password required.	94100-02
2	CFX-750 power cable	77282
3	CFX-750 power cable with relay and switch (power bus)	67259
4	Cable Assy, Autopilot and YM, Claas CAN interface	108791
5	Cable Assy, CFX-750/FMX/FM-750/FM-1000 to Nav II w/ Port Replicator	75741
6	2 pin DTM to 2 pin DT power adaptor	67095
7	NavController III	55566-00
8	8 m GPS TNC/TNC RT angle cable	50449
9	AG-25 GNSS antenna	77038-00
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 cable	54601

GFX/XCN display: Components



Item	Description	Trimble P/N
1	GFX/XCN display, with PIQ App	13x000-01
2	NAV-900 Guidance controller	108993-05
3	Cable Assy, GFX/XCN to NAV-500/900, Power/Ethernet (BRR), 5m	110540
4	Cable Assy, NAV-900 to Nav II/III, Autopilot	110547
5	Cable, NavController III, Main	54601
6	Cable Assy, GFX/XCN to NAV-500/900, Power/Ethernet (BRR) Extension, 2.5m Optional extension for large vehicles	112082
7	Cable Assy, 2 PIN DTM to 2 PIN DT Power Adapter	67095
8	Cable Assy, GFX/XCN, Expansion Port Basic, RS232, Dig I/O, 2.5m	110545
9	Cable Assy, GFX/XCN, Power to display, CAN, 2.5m	110551
10	Cable Assy, GFX/CFX/FM-750/XCN/FmX/FM-1000 Power with Relay and Switch (Acc)	67259
11	Cable Assy, Autopilot and YM, Claas CAN interface	108791

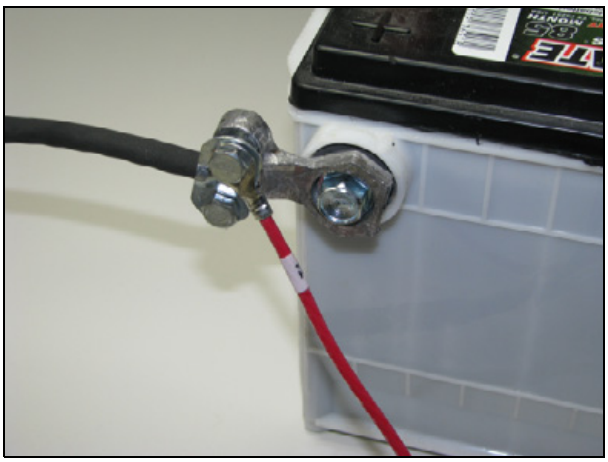
CFX-750 and GFX/XCN displays: Installing the power harness

⚠ **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 chapter.

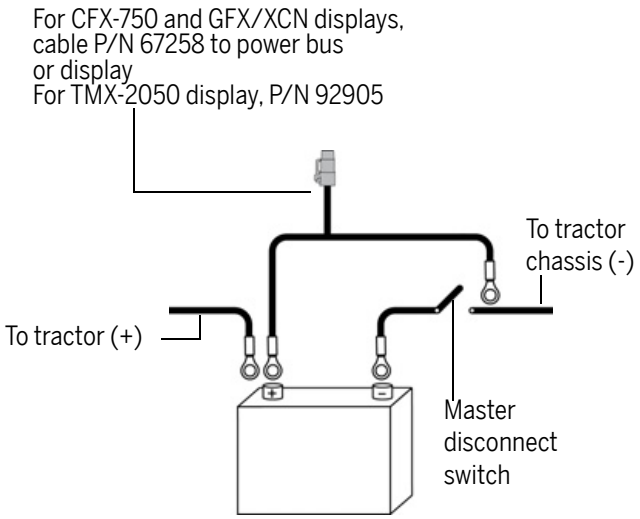
Step 1

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

Additionally, a connection to the power strip in the cab may be used. Adapter cables can be purchased at the local implement dealer.

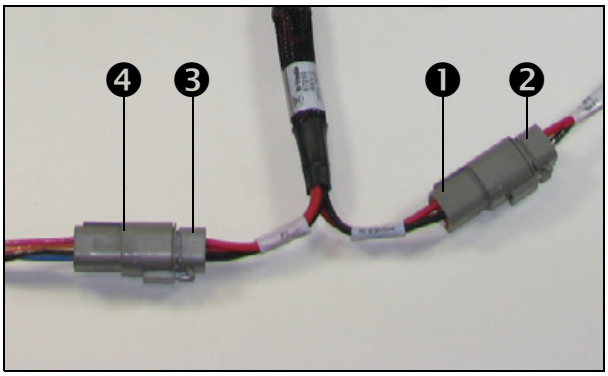


⚠ **CAUTION –** If the vehicle has a master electrical disconnect, make sure the basic power cable (P/N 67258 / 92905) is not directly attached to the battery terminal that is disconnected by the master switch - the negative pole in this example.
Attach this terminal side just past the main disconnect 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 adapter.



Step 3

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



CFX-750 display

CFX-750 displays: Configuring the power bus options

NOTE – Unless otherwise stated, instructions for "the display" refer to either the CFX-750 display.

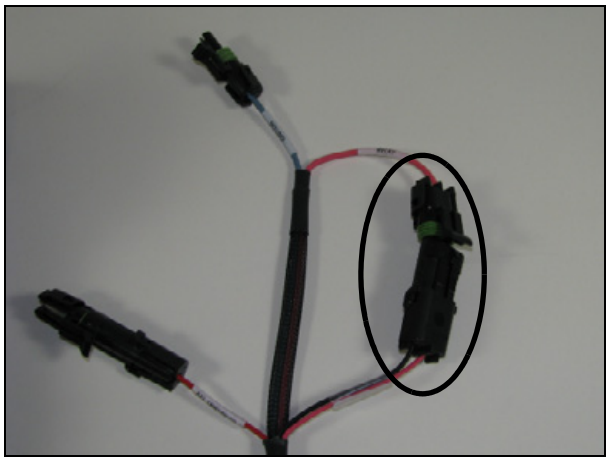
⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

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

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

Display power button is used to turn on the Autopilot system

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

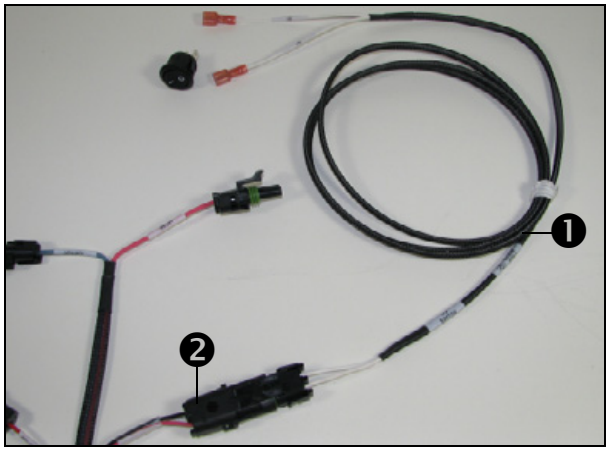


External switch is used to turn on the Autopilot system

Step 1

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

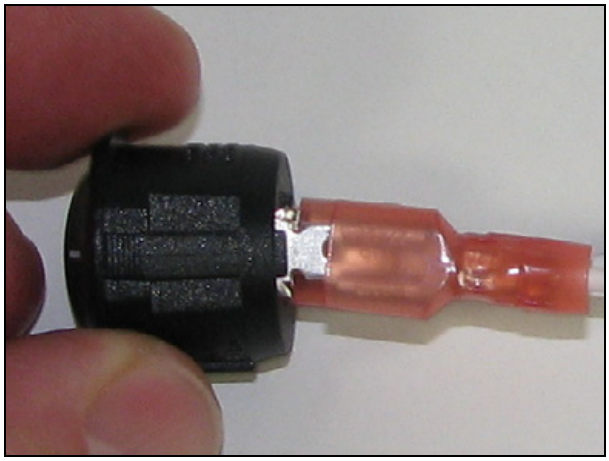
NOTE – To install the switch provided, drill a ¾" hole.



Step 2

Connect the cable labeled **R7** to the switch pins.

NOTE – Polarity is not important.

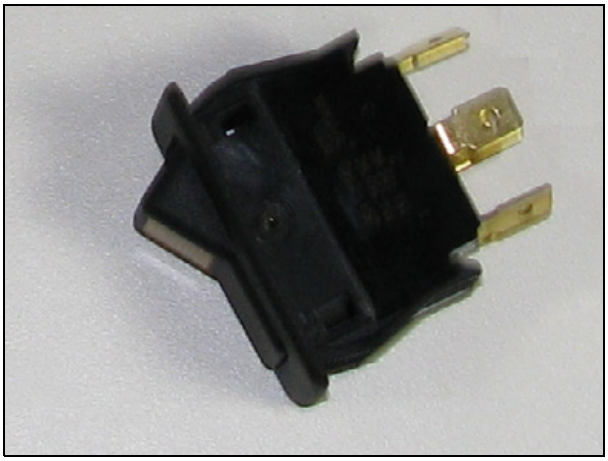


Installing the optional illuminated full or standard Euro switch

Step 1

Find an available knockout location on the vehicle console.

NOTE – An alternative location is required for the switch provided.

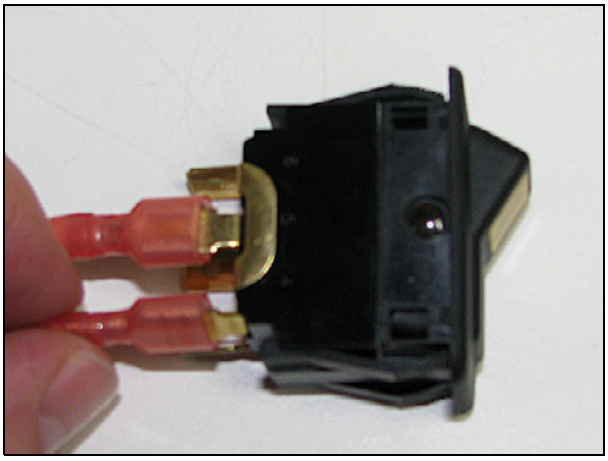


Step 2

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

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

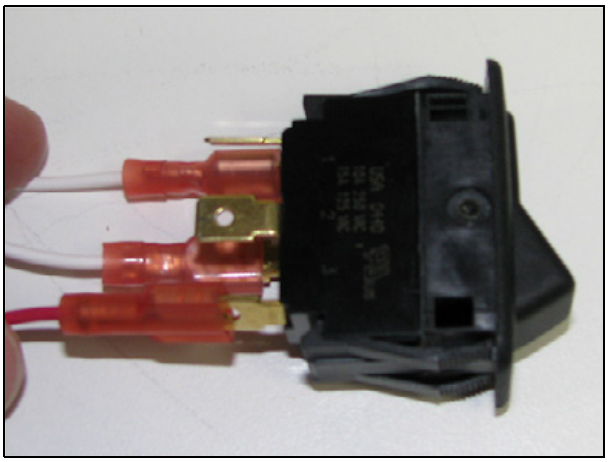
NOTE – Polarity is important.



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.

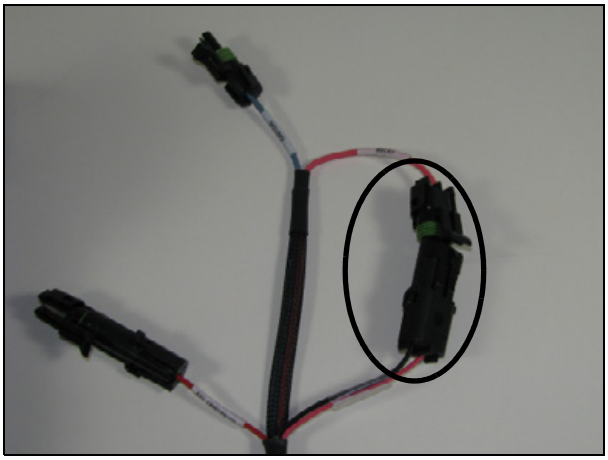
NOTE – This additional wire is required to allow the switch to illuminate.



Ignition is used to turn on the Autopilot system

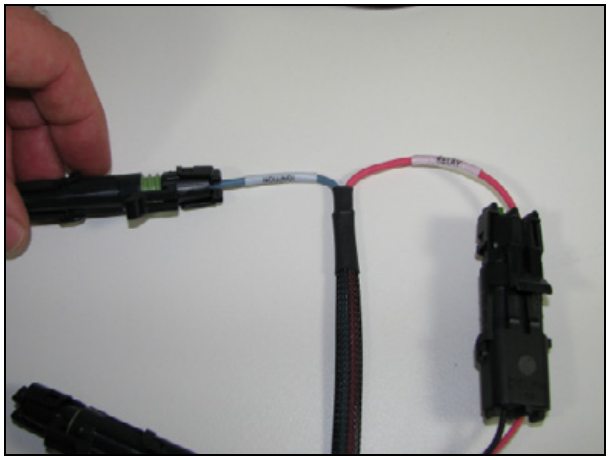
Step 1

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.

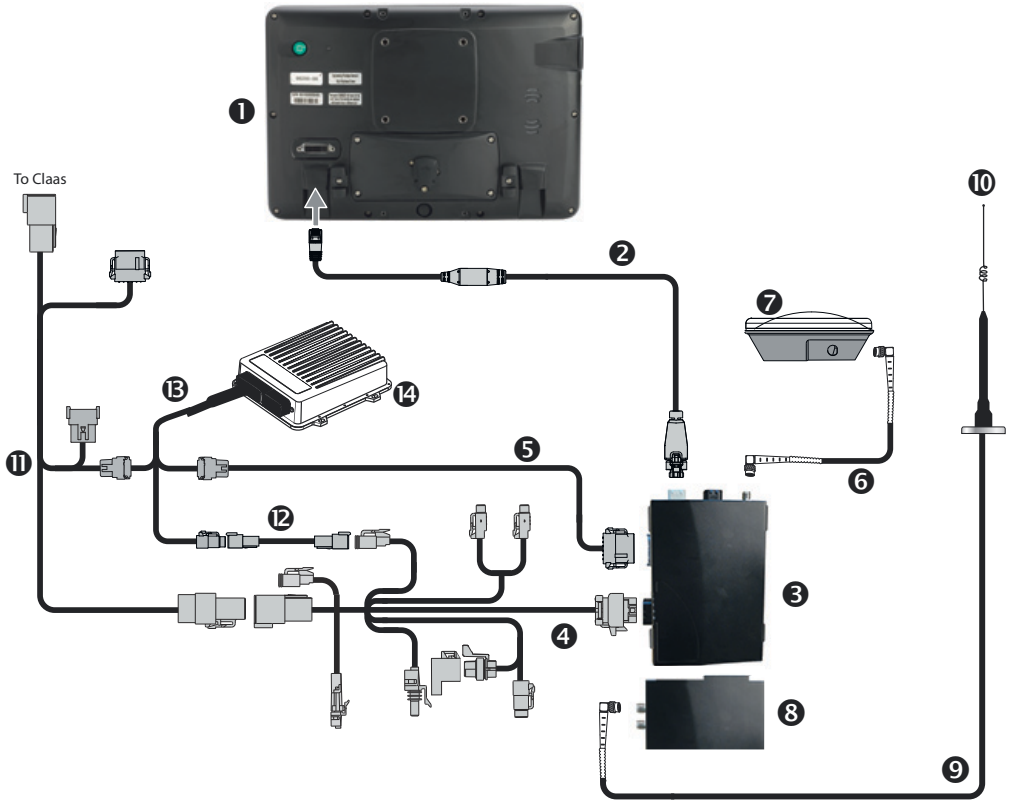


Step 3

Route the cable to the vehicles ignition.

TMX-2050 display: Components

This graphic shows how to connect the TM-200 module and the Autopilot system for after-market installations.



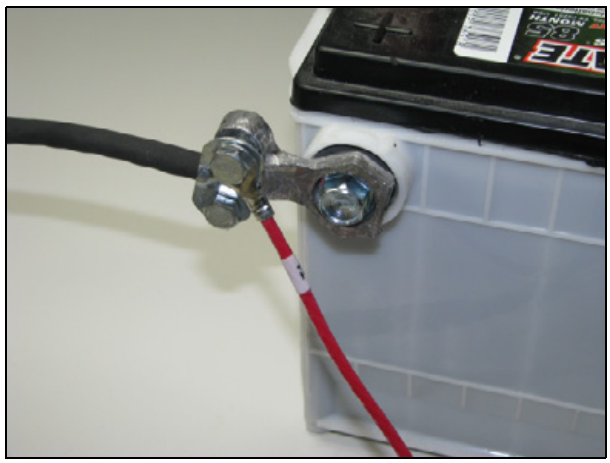
Item	Description	Trimble part number
1	TMX-2050 display	96700-00
2	TM-200 module to display cable	93843
3	TM-200 module	95060-00
4	TM-200 module power and I/O cable	92676
5	Cable Assy, CFX-750/FMX/FM-750/FM-1000 to Nav II w/ Port Replicator	75741
6	8 m GNSS TNC/TNC RT angle cable	50449
7	AG-25 GNSS antenna	77038-00
8	AG-815 radio	
9	NMO-to-TNC 20 ft antenna cable and base	72122
10	900 MHz radio antenna kit	22882-10
11	Cable Assy, Autopilot and YM, Claas CAN interface	108791
12	2-pin DTM to 2-pin DT power adapter cable	67095
13	Main NavController cable	54601
14	NavController III	55566-00

TMX-2050 display: Installing the power harness

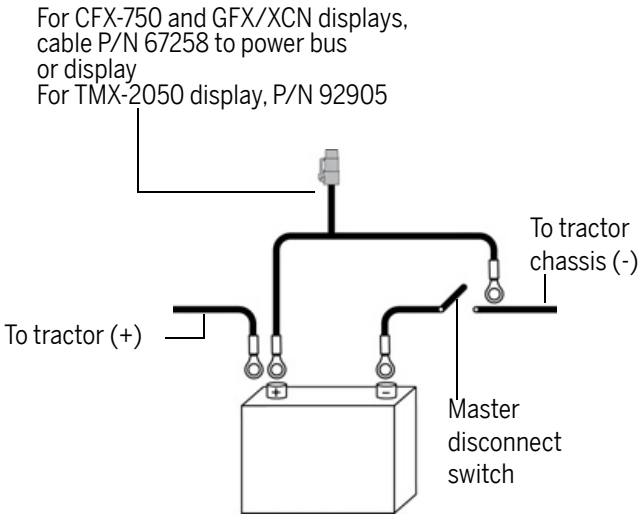
⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

Step 1

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 / 92905) 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.



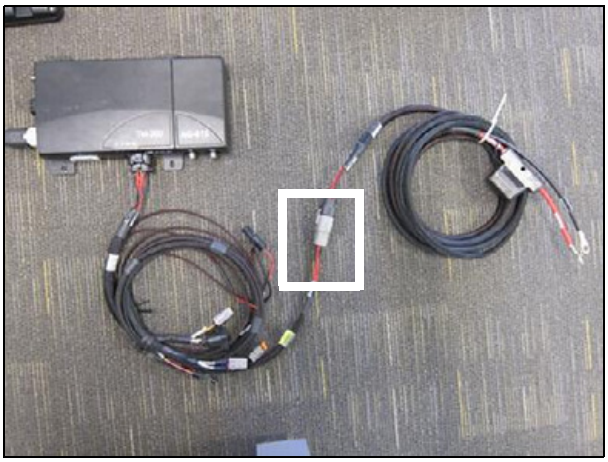
Step 2

Connect the power I/O cable P/N 92676 to the power port on the TM-200 module.



Step 3

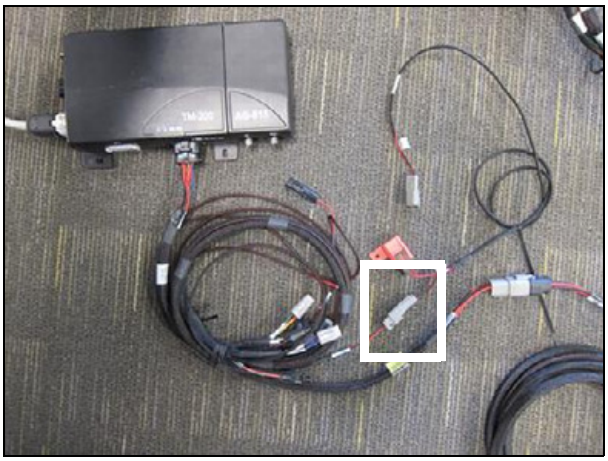
Route the power cable P/N 92905 that you previously connected to the battery and connect it to the R3 power in plug on the P/N 92676 cable.



Step 4

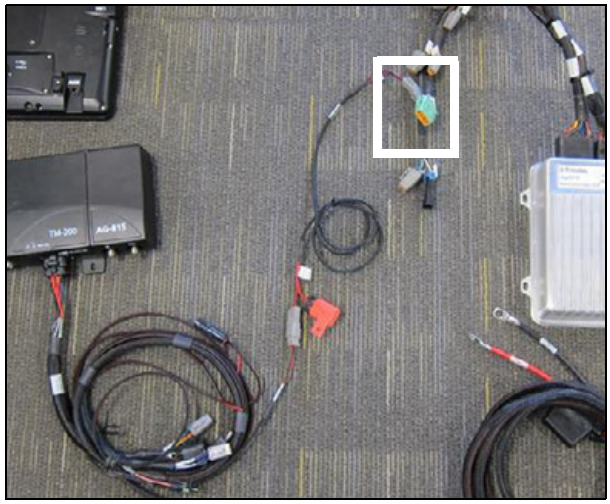
Connect the 2-pin DTM to 2-pin DT power adapter P/N 67095 to the P2 power out connector on the P/N 92676 cable.

Route the other end to the NavController harness P/N 54601.



Step 5

Connect the other end of the P/N 67095 cable to the P2 power plug on the P/N 54601 cable.



TMX-2050 display: Configuring the power options

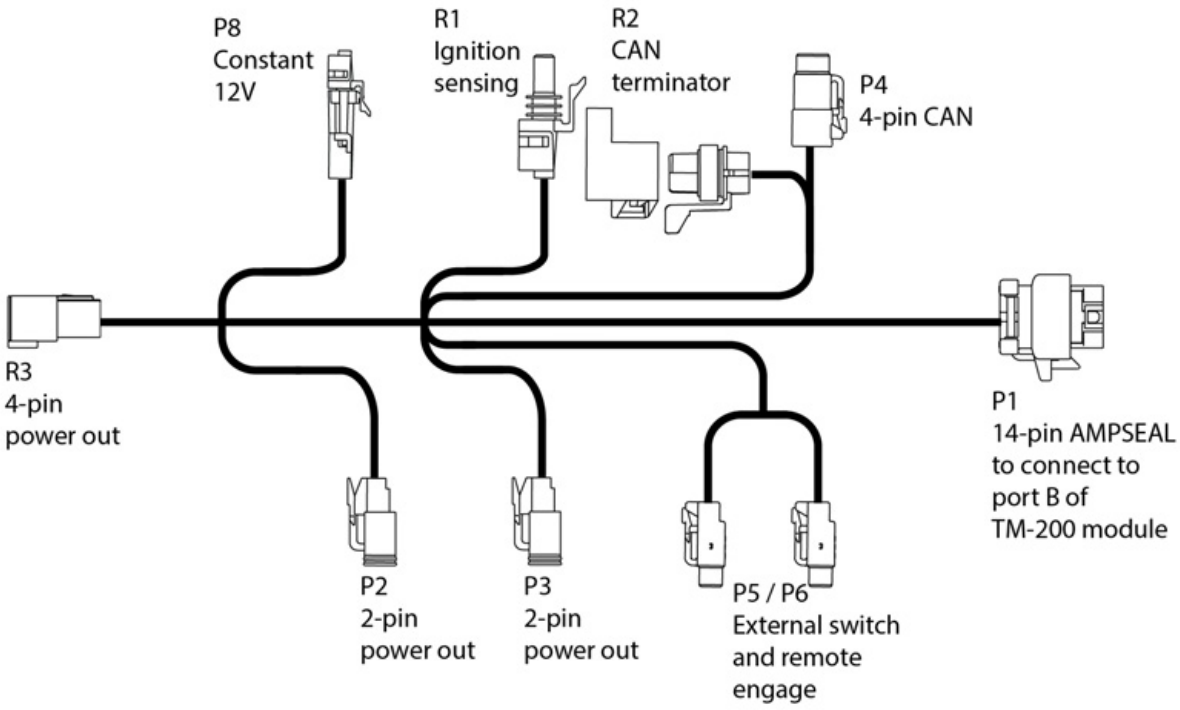
⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

When you use the power bus cable, use one of the following methods to turn on the Autopilot system on the Trimble TMX-2050 displays:

- The display power button. No further changes need to be made to the power cables.
- Ignition sensing. See below.

Ignition sensing

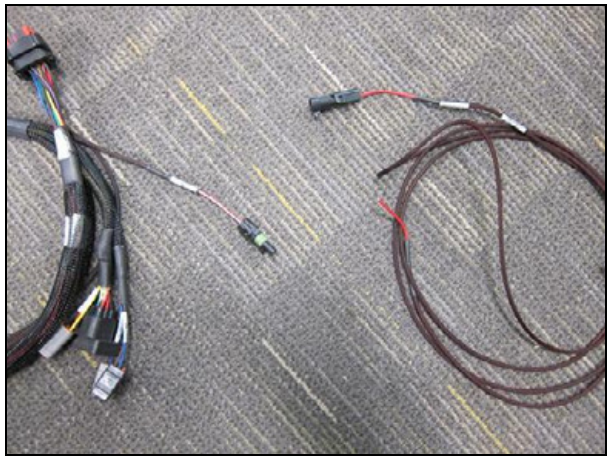
For ignition sensing with the TMX-2050 display, connect the ignition on the power supply to the R1 connector on the harness, P/N 92676.



For more information on how to use the ignition sensing option, refer to the *TMX-2050 Display User Guide*.

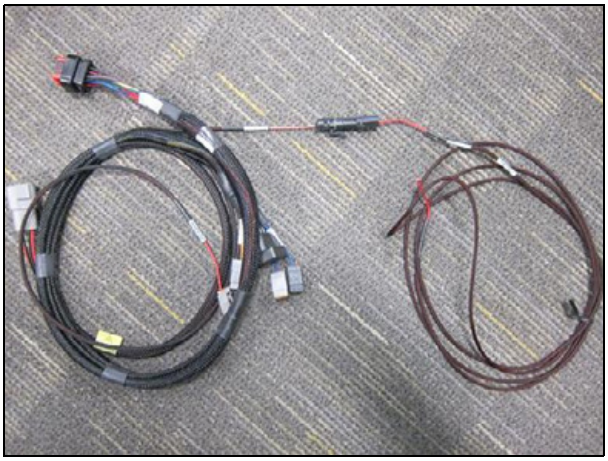
Step 1

Locate the R1 ignition sensing plug on the P/N 92676 cable; also locate the ignition sensing wire provided with the P/N 92676 cable.



Step 2

Connect the red ignition sense wire to the vehicle ignition source then route to the plug on the harness and then connect it.



5

Remote Engage Switch Installation

- Remote engage switch components: Rocker switch
- Remote engage switch components: Foot switch
- Preparing the remote engage cable
- Installing the Remote Engage push button (P/N 101250)
- Using the remote engage switch

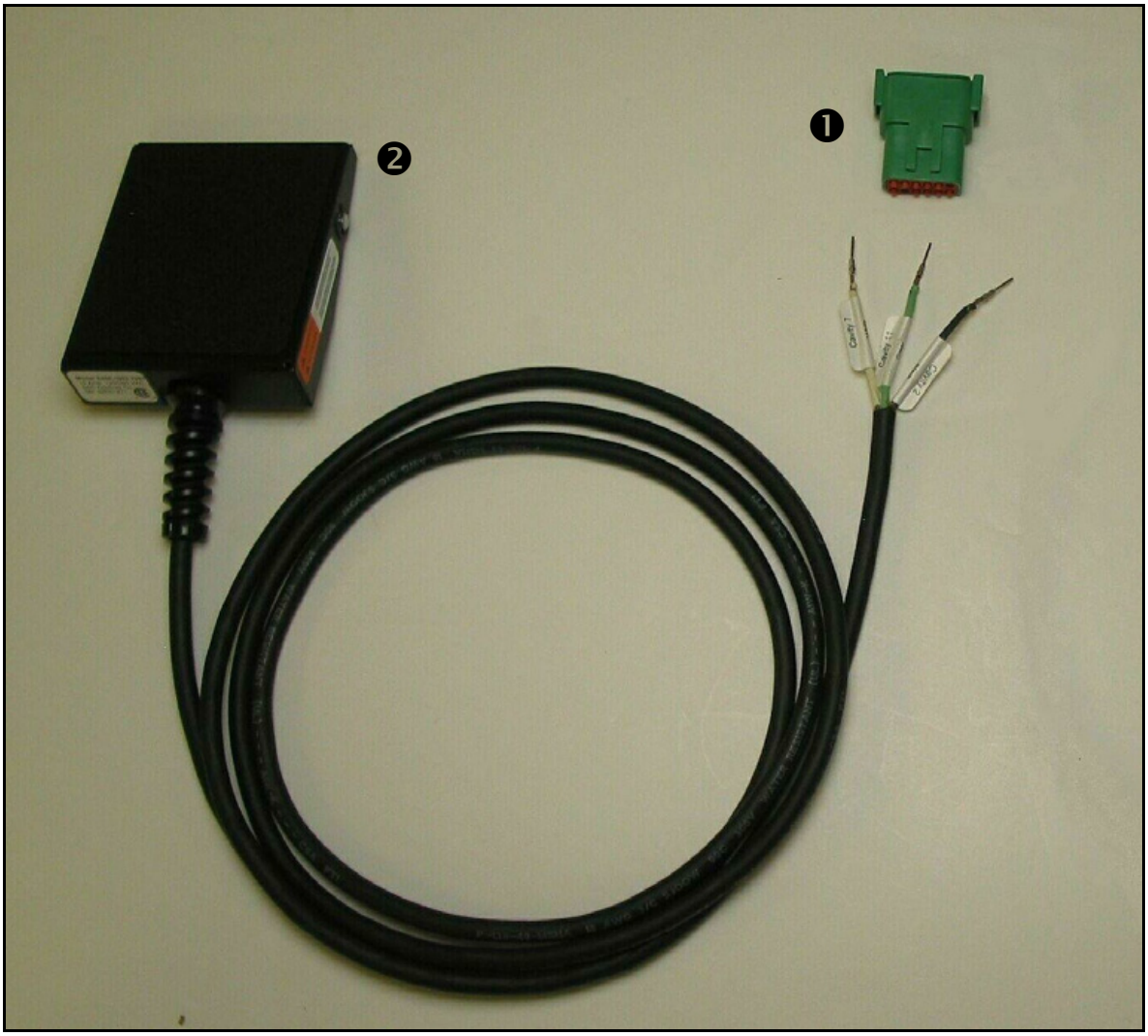
Remote engage switch components: Rocker switch



Item	Description
1	DTM receptacle
2	Remote engage rocker switch

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

Remote engage switch components: Foot switch

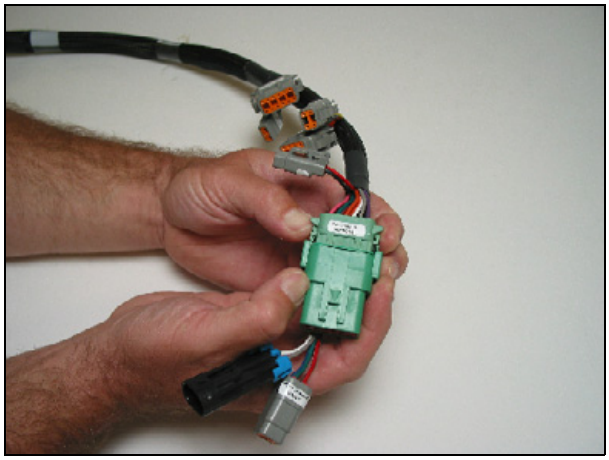


Item	Description
1	DTM receptacle
2	Remote engage foot switch

Preparing the remote engage cable

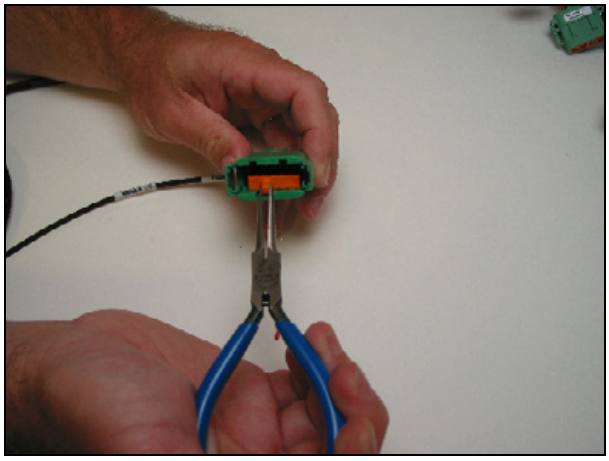
Step 1

Locate the green 12-pin Deutsch receptacle on the P5 leg of the main controller harness. For more information, see Chapter 6, Controller Installation.



Step 2

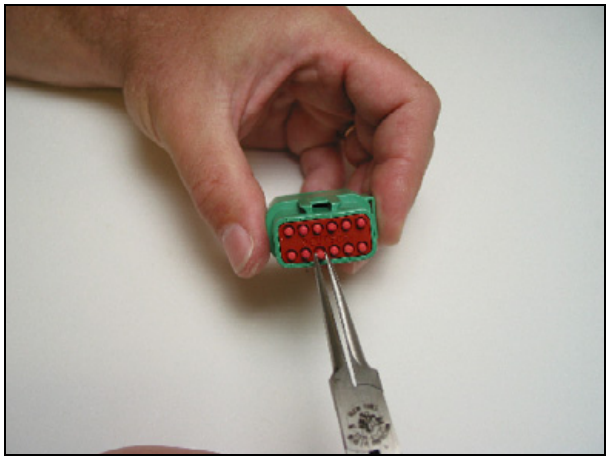
Remove the wedge from the connector.



Step 3

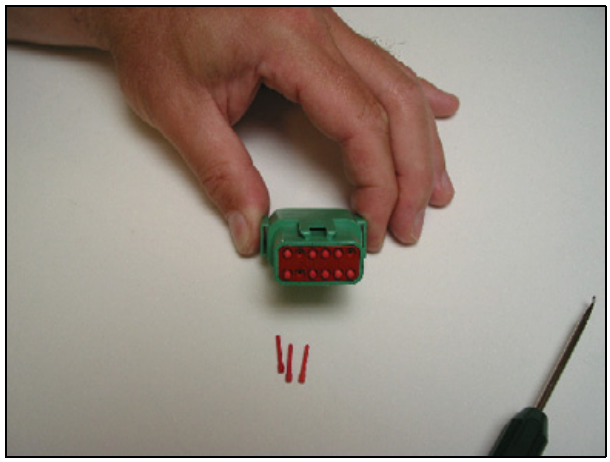
Rocker switch only

Remove the plugs from cavity 2 and cavity 7.



Foot switch only

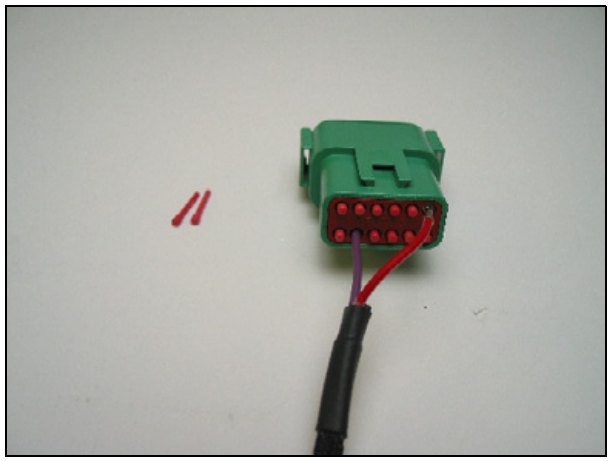
Remove the plugs from cavity 2, cavity 7, and cavity 11.



Step 4

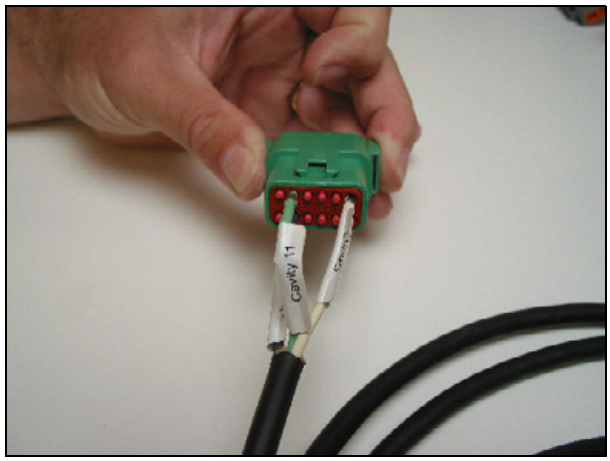
Rocker switch only

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



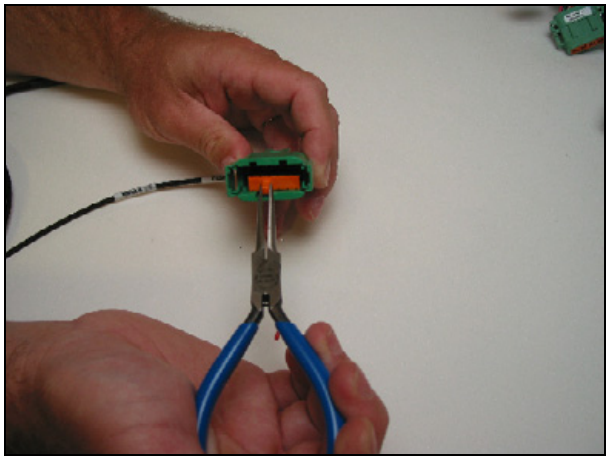
Foot switch only

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 harness.

Step 7

Rocker switch only

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



Foot switch only

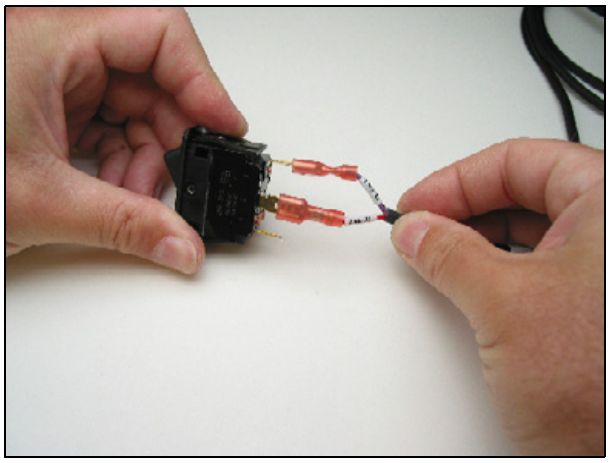
Run the cable to a clear location on the floor board. Use double-sided tape to secure the pedal. Route the cable under the floor mat.



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

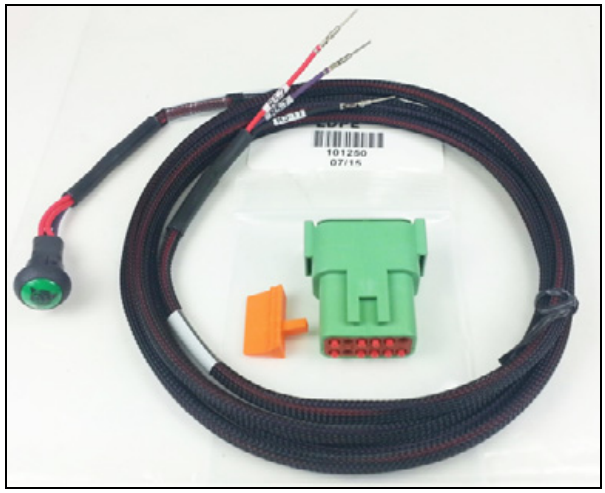
Place the switch in the console.



Installing the Remote Engage push button (P/N 101250)

Step 1

Locate the push button cable assembly (P/N 101250) and verify that the 12-pin green Deutsch connector, wedgelock, and seal are included in the small Ziploc bag.



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 from the desired installation location to verify that there is adequate clearance for the switch and cable. Take care 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.



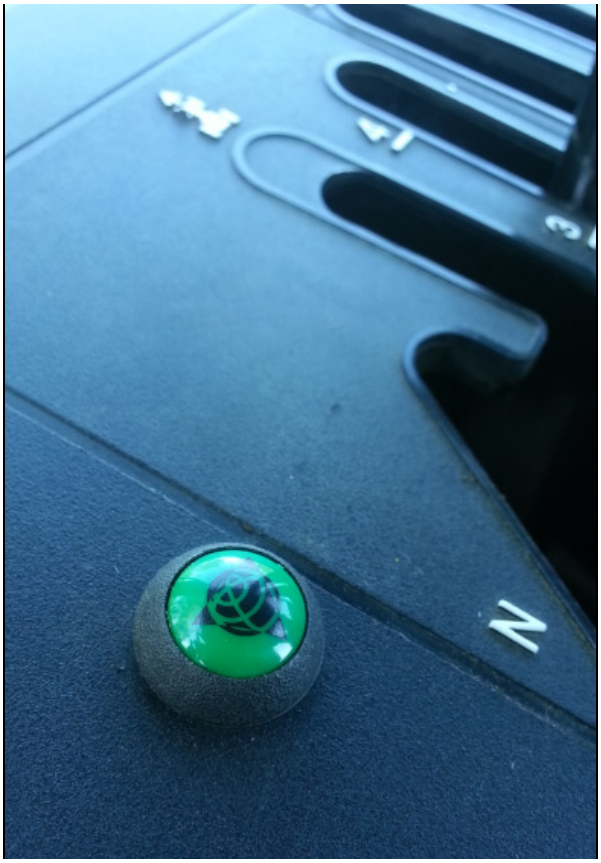
Step 6

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.



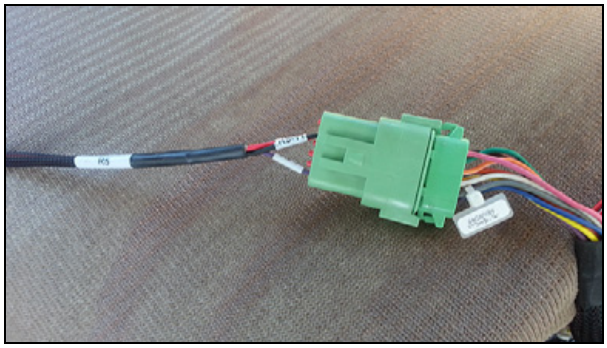
Step 8

Route the cable as desired, and insert the contacts into the 12-pin connector as labeled.



Step 9

Plug the 12-pin receptacle into the mating green plug (P5) on the NavController main harness (P/N 54601). Verify that the button works properly before proceeding. In dim lighting, the button has an LED backlight which will be visible whenever the NavController is powered on.



Step 10

Reinstall the panel and secure loose cables with wire ties.



Using the remote engage switch

To engage a system using NavController do one of the following:

- Firmware versions 5.20 and earlier: Hold down the remote engage switch for longer than 0.5 seconds and less than 4 seconds.
- 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.

6

Controller Installation

- Installing the controller—CLAAS Lexion models
- Installing the controller—CLAAS Trion models
- Controller connections
- Connecting the cables to the controller

Installing the controller—CLAAS Lexion models

Step 1

Locate the panel behind the seat in the cab ❶ and the panel under the armrest console ❷. Remove these.

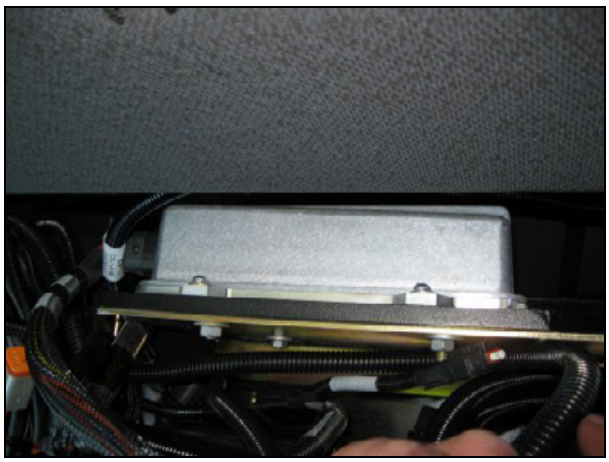






Step 2

Behind the seat is a mounting plate. Use a 13 mm wrench to remove the two bolts that secure the plate.
Use four M8x25 mm bolts to mount the NavController III mounting plate to the CLAAS mounting plate.



Step 3

Use the four supplied 10/32 screws to attach the NavController III to mounting plate. Make sure that the fins on the NavController face toward the rear of the cab, and the connectors face toward the right.



Step 4

Replace the CLAAS mounting plate behind the seat with the previously removed bolts.



Step 5

Before you install the controller, attach the main and auxiliary cable harnesses. Use an Allen wrench to secure the connectors to the controller.



Installing the controller—CLAAS Trion models

Step 1

Remove the plastic cover from the area behind the seat.



Step 2

Locate the CLAAS NavController III mounting bracket. If the bracket is not present, use the CLAAS bracket P/N 2925 872.0, available from a CLAAS dealer.

Attach the NavController III controller to the back side of the bracket. If using a TMX-2050 display, the TM-200 module can be attached to the front side of the bracket.

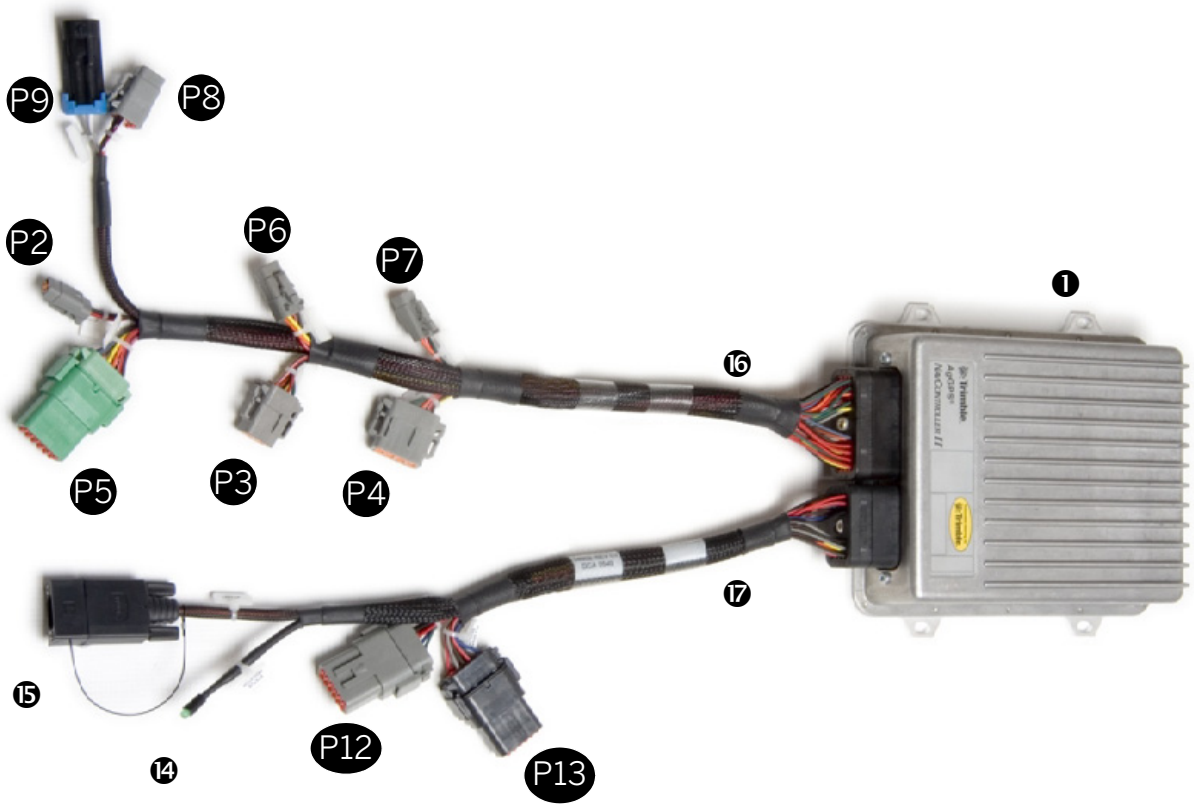


Step 3

Before you install the controller, attach the main and auxiliary cable harnesses. Use an Allen wrench to secure the connectors to the controller.



Controller connections



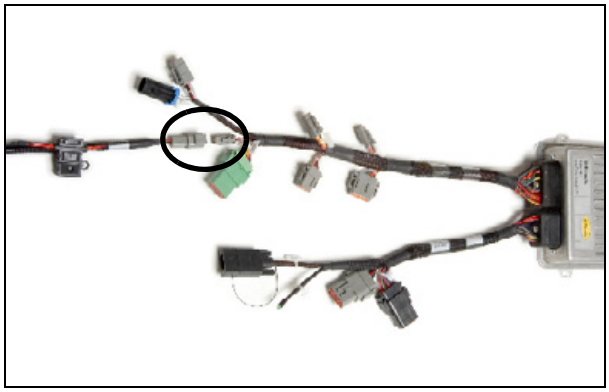
Item	Description	Item	Description
1	NavController III controller	**P9**	Sonalert connector
P2	Power connector	**P12**	Lightbar/spare connector
P3	GPS connector	**P13**	Spare sensors connector
P4	Display connector	**14**	Status indicator
P5	Vehicle sensors connector	**15**	Laptop connector
P6	Steering sensor connector	**16**	Main harness
P7	Manual override connector	**17**	Auxiliary harness
P8	Hydraulic valve connector		

Connecting the cables to the controller

Step 1

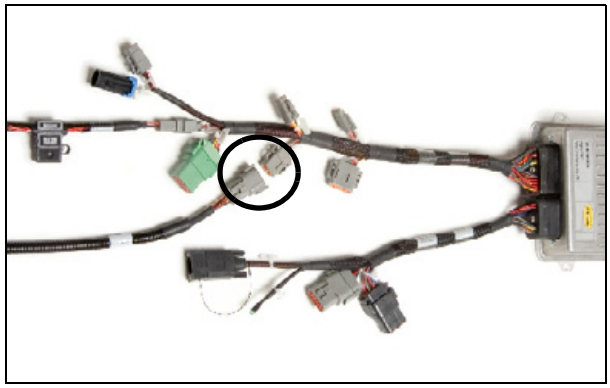
Connect the power cable connection to P2, which is labeled **Power**. P2 is located on the main wiring harness.

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



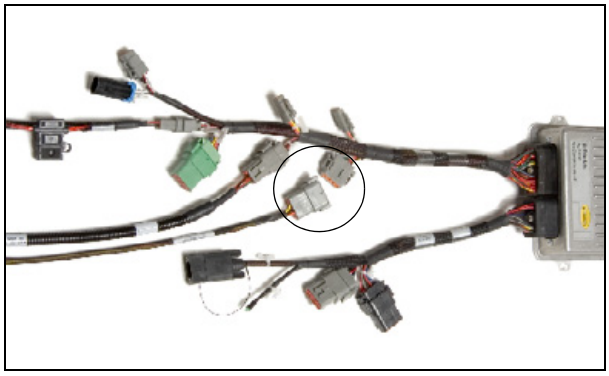
Step 2

Connect the CFX-750 display to P3, which is labeled **GPS**. P3 is located on the main wiring harness.



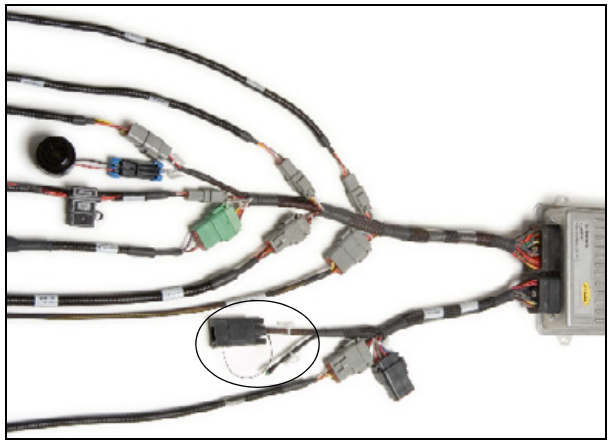
Step 3

Connect the CLAAS CAN cable to the P4 connector labeled **Display**. P4 is located on the main wiring harness.



Step 4

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 5

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.

7

Final Machine Check

- Perform machine check
- Setting up the CLAAS CEBIS unit for Trimble Autopilot—NON open steering interface
- Setting up the CLAAS display for Trimble Autopilot—Trion and open steering interface systems

Perform 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. Update the Trimble display and the Autopilot NavController III to the latest firmware from agpartners.trimble.com.

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

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

   You can use Autopilot Toolbox II software version 4.02 or later to load the configuration file into the Autopilot controller. You can download the Autopilot Toolbox II software from agpartners.trimble.com.
4. Calibrate the Autopilot system using the Trimble display or Autopilot Toolbox II software version 4.02 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/Antenna axle offset, and Roll offset
5. Set up the CLAAS CEBIS unit. See Setting up the CLAAS CEBIS unit for Trimble Autopilot—NON open steering interface, page 92.
6. Set up the CLAAS display. See Setting up the CLAAS display for Trimble Autopilot—Trion and open steering interface systems, page 94.

Setting up the CLAAS CEBIS unit for Trimble Autopilot—NON open steering interface

To enable CAN communications and steering function, the CLAAS machine must be set up to receive commands from the NavController III.

Step 1

Locate the selection knob on the machine console.

Use both the selector knob and the ESC key to navigate on the CEBIS display.



Step 2

Use the selection knob on the console to select **Steering** and then **Autopilot**.



Step 3

Turn the Master Switch to On:

Turn the selector knob to highlight **Master switch** and then press the selector knob to edit.

Highlight **On** and press the knob again.

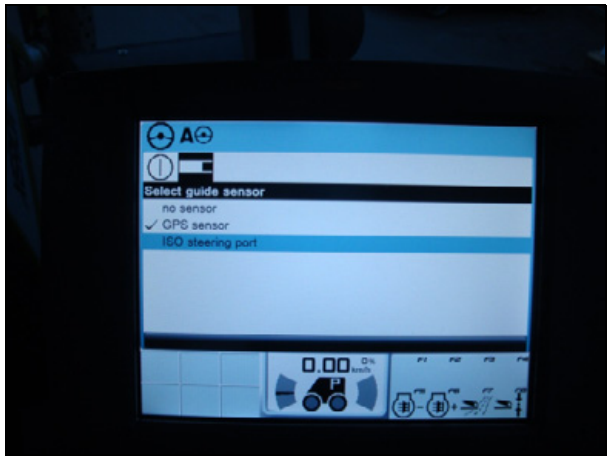


Step 4

Change the active guidance switch to ISO steering port:

Highlight the **Active guidance sensor** with the selector knob and push the knob down to edit.

Highlight **ISO steering port** and press the knob again.



The checkmark now appears next to **ISO steering port**.



Step 5

The machine displays the new configuration, enabling the Autopilot system to steer.

Press ESC until the CEBIS display is back at the main menu.



Setting up the CLAAS display for Trimble Autopilot—Trion and open steering interface systems

To enable CAN communications and steering function, the CLAAS machine must be set up to receive commands from the NavController III.

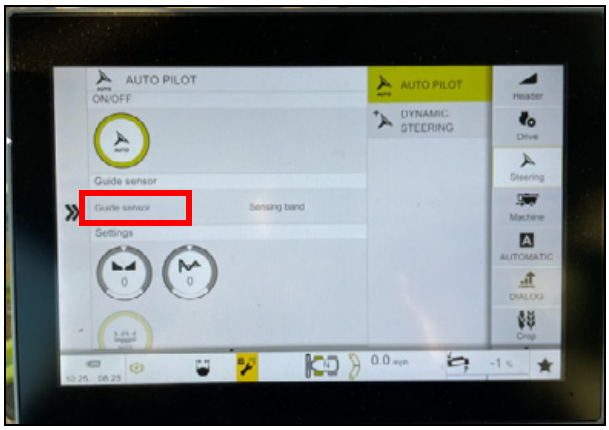
Step 1

Tap the **Steering** button on the right side of the screen.



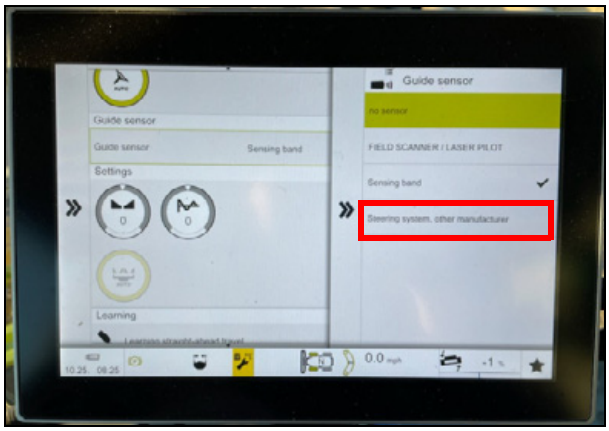
Step 2

Tap **Guide Sensor** to change the selection.



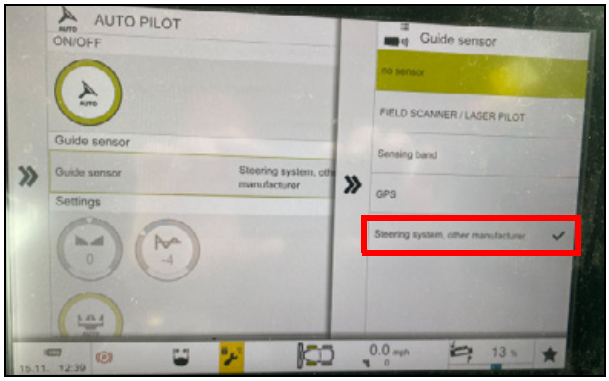
Step 3

Select **Steering system, other manufacturer** to move the check mark to that selection.



Step 4

Verify the check mark is next to the **Steering system, other manufacturer** and then return to the main screen by pressing the double black arrows.



Trimble. Agriculture