# Autopilot

## AUTOMATED STEERING SYSTEM

# INSTALLATION INSTRUCTIONS

Fendt tractors

- 712, 714, 716, 718
- 818, 820
- 2005 and older

Version 8.00
Revision A
April 2019
P/N 54035-1140-E08



Trimble

## Legal Notices


### Agriculture Business Area

Trimble Agriculture Division
10368 Westmoor Drive
Westminster, CO 80021-2712
USA
www.trimble.com



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This is the April 2019 release (Revision A) of the *Autopilot Automated Steering System Installation Instructions*, part number 54035-1140-E08. It applies to version 8.00 of the Autopilot automated steering system.

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Reorient or relocate the receiving antenna.

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

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

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Or

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c/o Menlo Worldwide Logistics
Meerheide 45
5521 DZ Eersel, NL



# Safety Information

Always follow the instructions that accompany a Warning or Caution. The information they provide is intended to minimize the risk of personal injury and/or damage to property. In particular, observe safety instructions that are presented in the following format:

⚠ **WARNING –** This alert warns of a potential hazard, which, if not avoided, can cause severe injury.

⚠ **CAUTION –** This alert warns of a hazard or unsafe practice which, if not avoided, can cause injury or damage.

**NOTE –** An absence of specific alerts does not mean that there are no safety risks involved.

## Warnings

⚠ **WARNING –** When you are working on the vehicle's hydraulic systems, vehicle attachments that are suspended can drop. If you are working around the vehicle, you could suffer serious injury if an attachment dropped on you. To avoid this risk, lower all vehicle attachments to the ground before you begin work.

⚠ **WARNING –** If someone else attempts to drive the vehicle while you are working on or under it, you can suffer serious or fatal injuries. To avoid this possibility, install a lockout box on the battery terminal to prevent the battery from being reconnected, remove the key from the vehicle's ignition switch, and attach a "Do not operate" tag in the cab.

⚠ **WARNING –** Agricultural chemicals can pose serious health risks. If the vehicle has been used to apply agricultural chemicals, steam clean the vehicle to remove any chemical residue from the areas of the vehicle where you will be working.

⚠ **WARNING –** Vehicle cabs can be quite high in the air. To avoid potentially serious injury through falling from this height, always use the steps and handrails, and face the vehicle, when you enter or exit it.

## Cautions

⚠ **CAUTION –** When the vehicle has been running, parts of the vehicle, including the engine and exhaust, can become extremely hot and can cause serious burns. To avoid burns, allow hot machine parts to cool before you begin working on them.

⚠ **CAUTION –** The system installation may bring you into contact with chemical substances, such as oil, which can cause poisoning. Wash your hands thoroughly after you finish working on the system.

⚠ **CAUTION –** Battery posts, terminals, and related accessories contain lead and lead compounds, which can cause serious illness. To avoid ingesting lead, wash your hands thoroughly after touching the battery.

⚠ **CAUTION –** Always wear protective equipment appropriate to the job conditions and the nature of the vehicle. This includes wearing protective glasses when you use pressurized air or water, and correct protective welder's clothing when welding. Avoid wearing loose clothing or jewelry that can catch on machine parts or tools.

⚠ **CAUTION –** Parts of the vehicle may be under pressure. To avoid injury from pressurized parts, relieve all pressure in oil, air, and water systems before you disconnect any lines, fittings, or related items. To avoid being sprayed by pressurized liquids, hold a rag over fill caps, breathers, or hose connections when you remove them. Do not use your bare hands to check for hydraulic leaks. Use a board or cardboard instead.

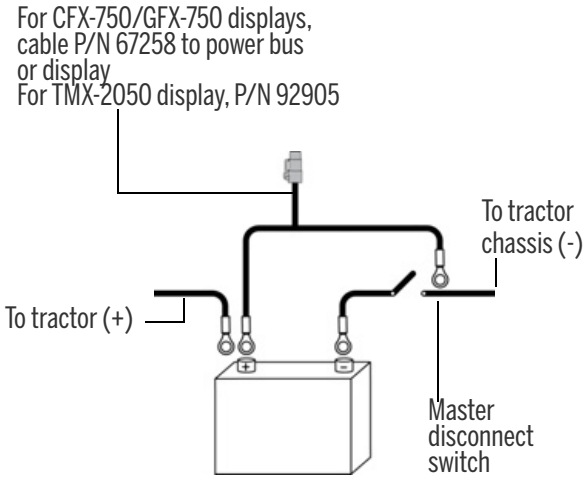
⚠ **CAUTION –** Do not direct pressurized water at:
- Electronic or electrical components or connectors
- Bearings
- Hydraulic seals
- Fuel injection pumps
- Any other sensitive parts or components



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

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

⚠ **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.



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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 Navigation Satellite System (GNSS) such as the United States', 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 GNSS, visit the Trimble website (www.trimble.com) for an interactive look at Trimble and GNSS.

## Technical assistance

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

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

# Manual system upgrade to Autopilot

## Trimble displays

| Retain |
|---|
| **CFX-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 (CFX-750 display): P/N 67258 |
| **TMX-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-750™/XCN-1050: P/N 121000-XX** |
| Power cable GFX-750/XCN-1050: P/N 110551 |
| Base power cable: P/N 67258 |
| NAV-900 guidance controller: P/N 108993-05 |
| GFX-750 to NAV-900 Comms cable: P/N 110540 |

# Required components

| Kits required | Special tools |
|---|---|
| Platform kit: P/N 54035-1140 | 10.5 mm drill bit |
| Hydraulic hose kit: P/N 82297-2000 | Allen wrench set (metric and imperial) |

## Antenna mounting kits

| Kits required |
|---|
| Ag15 antenna mounting plate: P/N 62034 |
| 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 |

## Accessory kits

| Accessory options |
|---|
| Remote engage switch assembly – standard Euro: P/N 57227-10 |
| Remote engage switch assembly – full Euro: P/N 57227-20 |
| Remote engage foot pedal: P/N 57259 |
| Remote engage push button: P/N 101250 |

# Autopilot hardware organization: As shipped

| Hardware | Component | See... |
|---|---|---|
| Platform kit: P/N 54035-1140 | Hydraulic valve | Chapter 2 |
| | Hydraulic manifold | |
| | Transducer flow switch | |
| | Manual override cable | |
| | Hydraulic brackets and bolt kits | |
| | Hydraulic valve cable | |
| | IMD-900 steering device and cabling | Chapter 3 |
| | IMD-900 mounting bracket and hardware | |
| | Power switch | Chapter 6 |
| | Bolt kit controller | Chapter 8 |
| Common parts | Controller | Chapter 8 |
| | Controller mounting bracket | Chapter 1 |
| | Cable kit:<br>• Main wiring harness<br>• Power bus auxiliary wiring harness<br>• Sonalert alarm | Chapter 8 |
| GNSS receiver | GNSS receiver | Chapter 4 |
| | GNSS antenna | |
| | GNSS receiver power/data cable | |
| | RTK radio, cable, and radio antenna | |
| Display | CFX-750 display, GFX-750 display | Chapter 5 |
| | TMX-2050 display | |
| | Display cable | |
| | Mounting bracket | |
| Hydraulic hose kit for all machines:<br>P/N 82297-2000 | Hydraulic hoses | Chapter 2 |
| | Hydraulic adaptors | |

| Hardware | Component | See... |
|---|---|---|
| Roof bracket kit: P/N 62388-02 | Roof brackets | Chapter 4 |
| Bracket, GPS spar 36.5" - 46.5": P/N 53676 | Bolt kit, roof bracket | |
| Bracket, GPS spar 54" - 64": P/N 66774 | | |

# Preparing the vehicle for installation

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

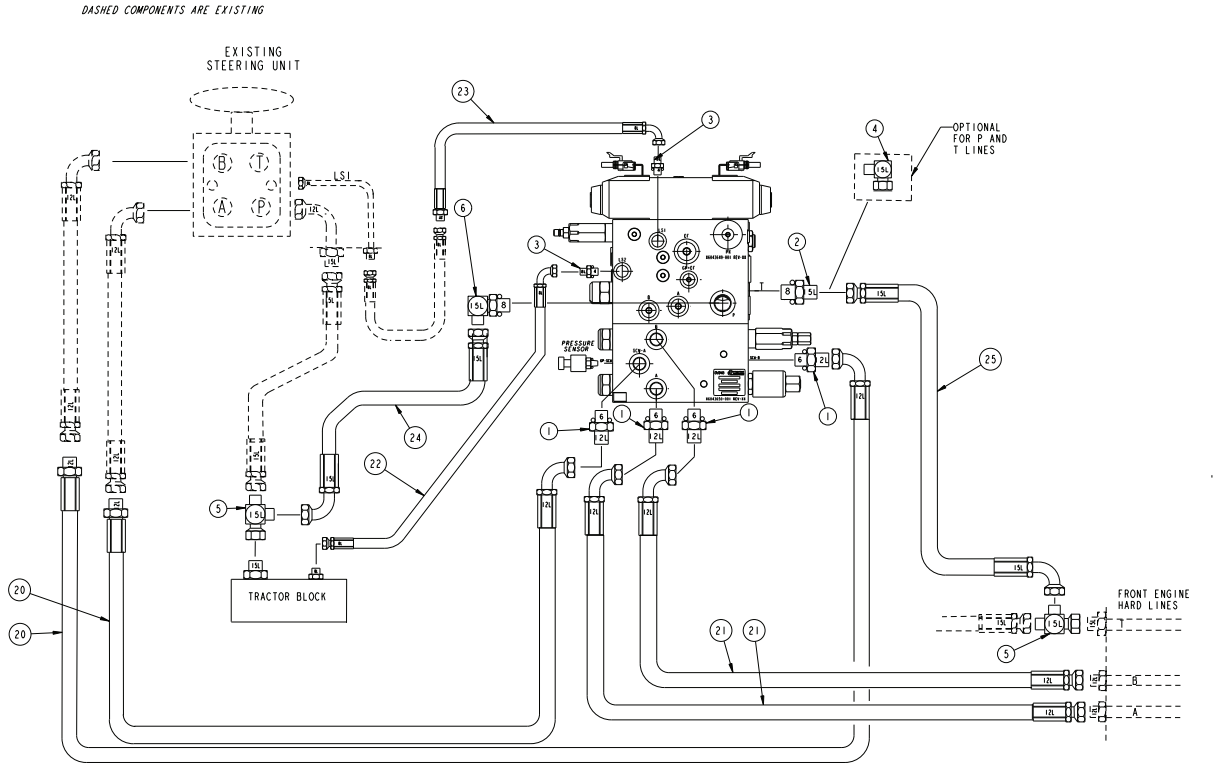
**NOTE –** The left and right sides of the vehicle are referenced while standing behind the unit, facing the normal direction of travel.

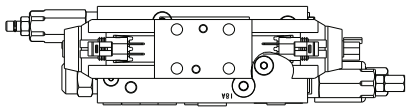
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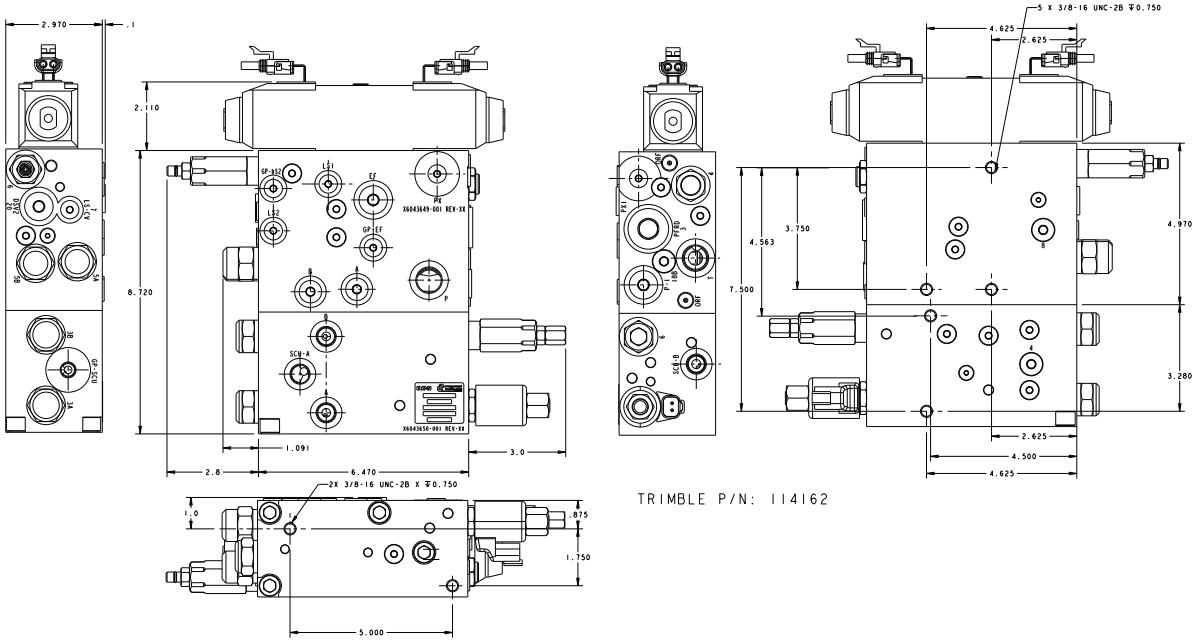
# Hydraulic Control Valve Installation

- Hydraulic system components
- Assembling the hydraulic control valve
- Mounting the hydraulic manifold to the mounting bracket
- Connecting the hydraulic lines
- Connecting the cables to the manifold

# Hydraulic system components






TRIMBLE P/N: 114162

### Fittings

| Item | Description | Part number |
|---|---|---|
| **1** | Fitting (x4) | GE12L9/16UNF |
| **2** | Fitting | 8 GE15L3/4UNF |
| **3** | Fitting (x2) | GE08L7/16UNF |
| **4** | Fitting | EWISL |
| **5** | Fitting (x2) | ELISL |
| **6** | Fitting | WEE15L3/4UNF |

### Hoses

| Item | Description | Part number | Line |
|---|---|---|---|
| **20** | 70" hose (x2) | 451TCC5D0-12L-12L·06·70" | SCU - A, SCU - B |
| **21** | 100" hose (x2) | 451TCC5C3· 12L· 12L-06· 100" | A, B |
| **22** | 95" hose | 451TCC3C5-08L-08L-04-95" | LS2 |
| **23** | 83" hose | 451TCC5D0-08L-08L-04·83" | LS1 |
| **24** | 85" hose | 451TCC3C5-15L-15L-08-85" | P |
| **25** | 115" hose | 451TCC3C5·15L-15L-08·115' | T |

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

# Assembling the hydraulic control valve

⚠ **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.

Gather the manifold, fittings and cartridges for preparing the manifold on a clean work surface.

## Connecting the manual override pressure transducer to the H4 manifold

The GP-SCU port should be used for the manual override pressure transducer.



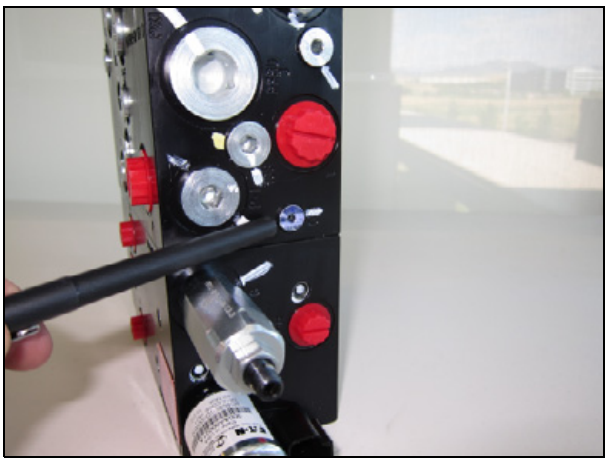

The manual override pressure transducer is installed into the GP-SCU port as shown.



## Pressure compensation and open center priority flow with PFRD cartridge

### Step 1

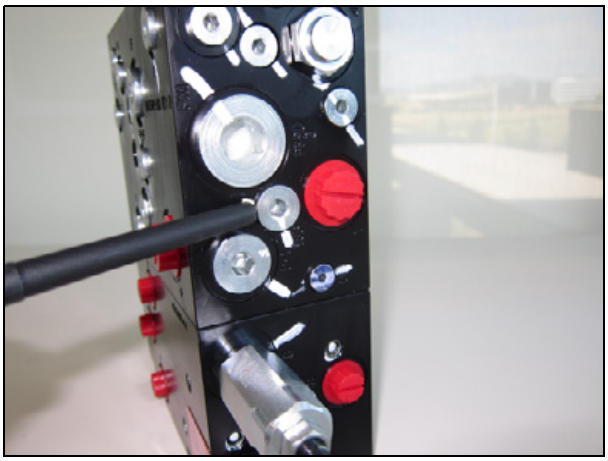
Locate and remove the orifice plug from its parking location shown here.

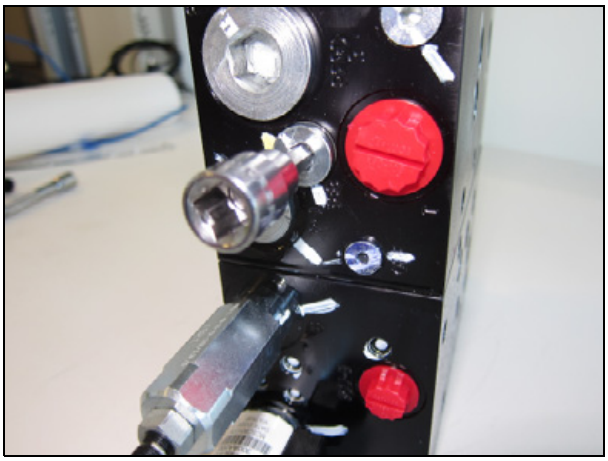


### Step 2

Remove the plug from the 18B location (shown).

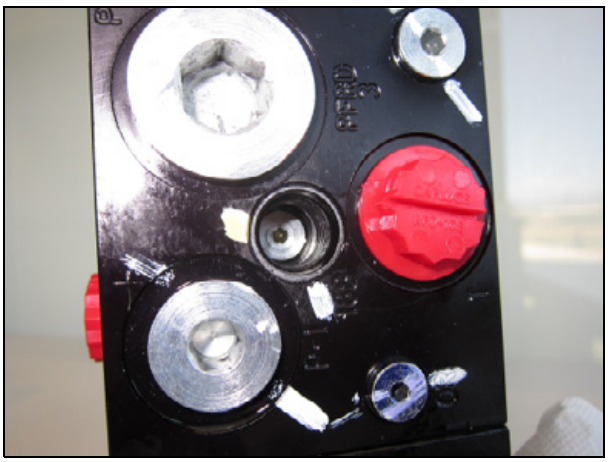
The orifice plug should be installed behind this plug.





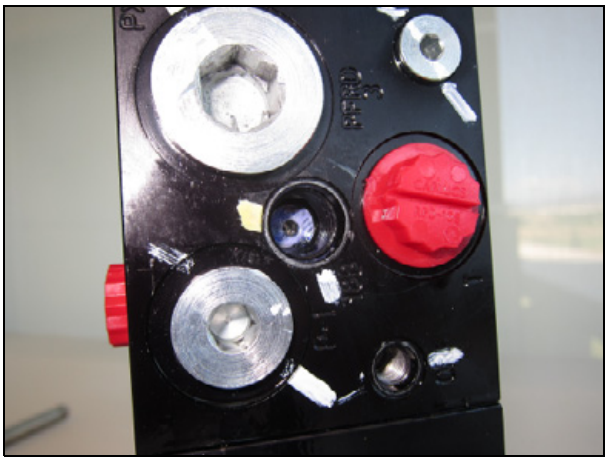
### Step 3

Remove the solid plug located behind the 18B plug previously removed.



### Step 4

Install the orifice plug in the location behind the 18B plug.



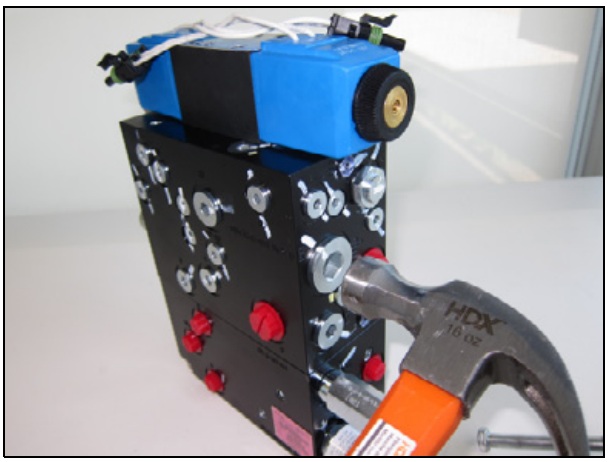
The solid plug may be stored in the parking location.



### Step 5

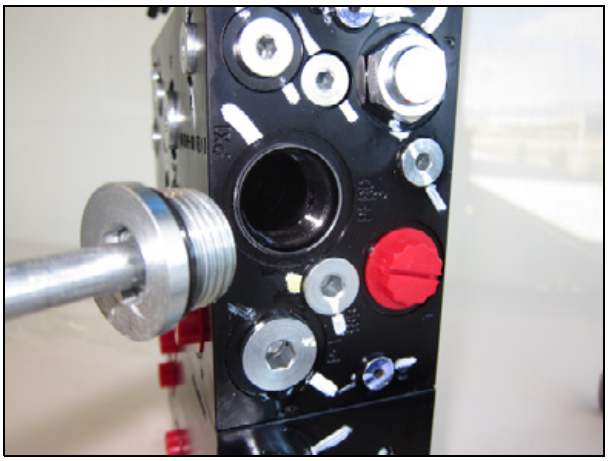
The PFRD cartridge is used as a pressure compensation cartridge.

**TIP –** Tapping on the plug with a hammer can make the plug easier to loosen.




### Step 6

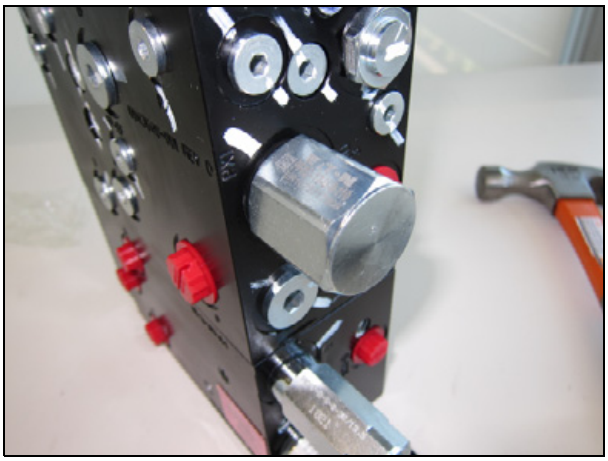
Remove the plug from the PFRD port.



### Step 7

Install the PFRD cartridge as shown here.

- 110 PSI PFRD, Trimble P/N  66113



**Notes on PFRD pressure**

When used as a pressure compensator, the PFRD cartridge will control the pressure drop across the electro-hydraulic valve:

- A higher pressure will result in a higher flow,
- A lower pressure will result in a lower flow.



## Configuring the manifold for load sense line shuttling

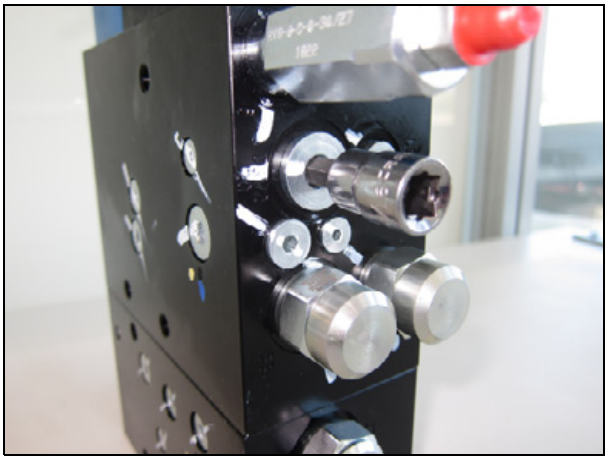
The H4 manifold no longer uses a PTS cartridge for an LS shuttle, it now uses a DSV2 cartridge. This DSV2 cartridge is used in the same situations where the PTS cartridge was used in the previous manifold.

The higher the pressure rating of the DSV2, the more the system is biased towards the LS1 pressure dictating LS output. If the Autopilot is unable to command LS, then a lower DSV2 value is required. If manual steering is difficult after the Autopilot has steered the machine, a higher DSV2 pressure may be required. Trimble P/N 114165 95 PSI DSV2 has been included with the kit.

### Step 1

To install the DSV2 cartridge remove the plug from the DSV2 port as shown.

**TIP –** If the plug is tight, tapping on the plug with a hammer before attempting to loosen may help.

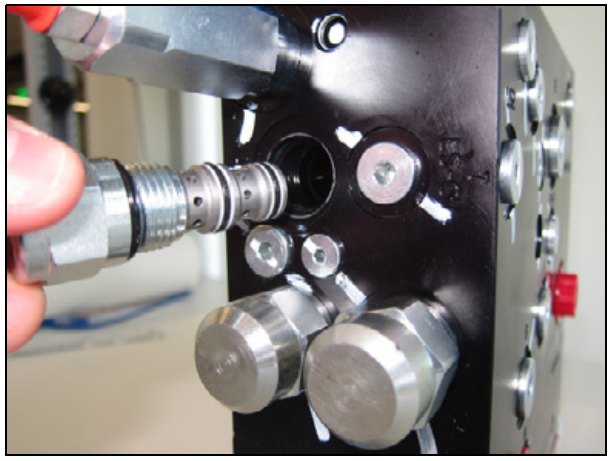


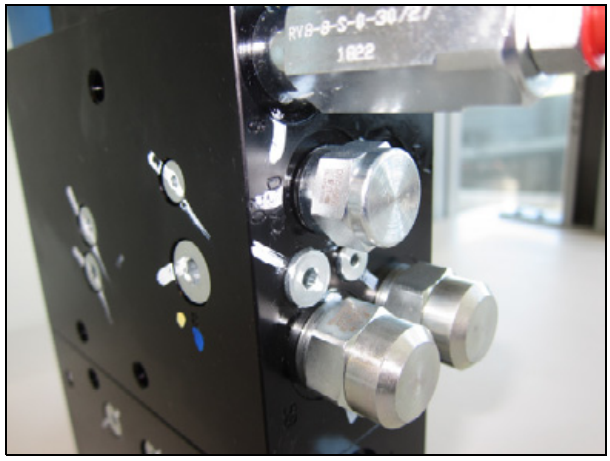
- 95 PSI DSV2, Trimble P/N 114165



### Step 2

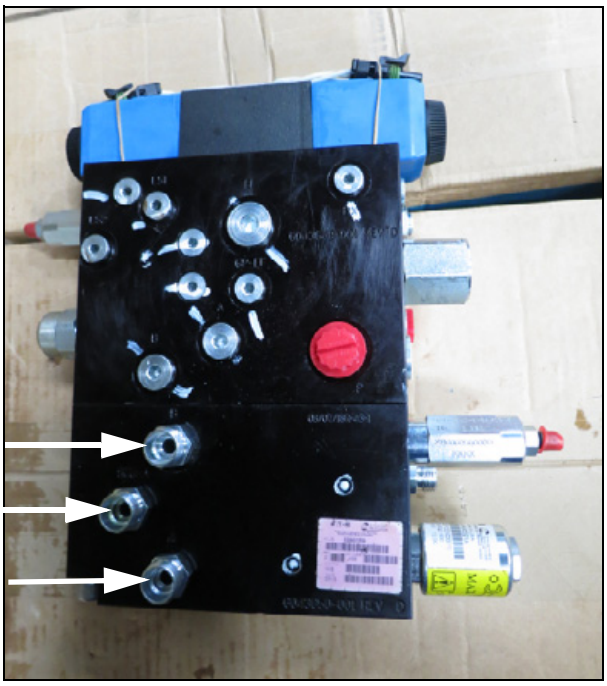
Install the DSV2 cartridge into the port labeled **DSV2** as shown.





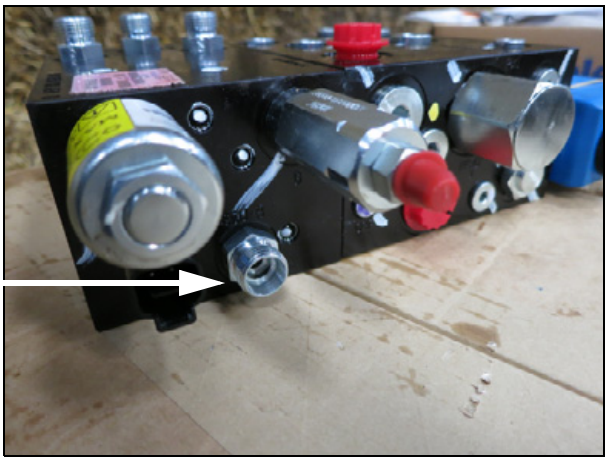
### Step 3

Insert a -06-12L straight fitting into the A, B, and SCU-A ports on the manifold as shown.



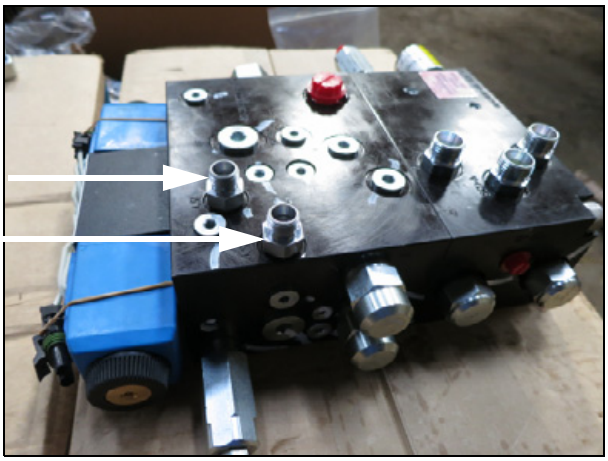
### Step 4

Insert a -06-12L straight fitting into the SCU-B port on the manifold as shown.



### Step 5

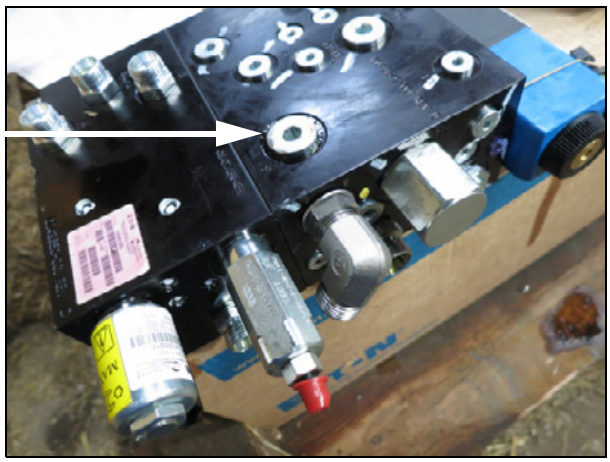
Insert a -04-8L straight fitting into the LS1 and LS2 ports on the manifold as shown.



### Step 6

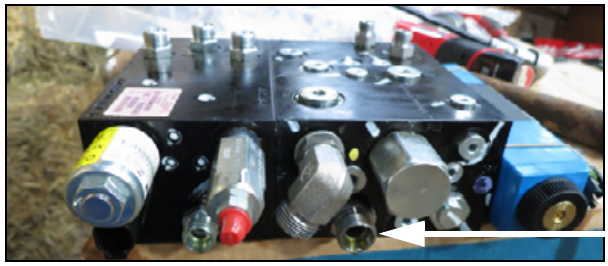
Insert a -08-16L 90° fitting into the P port on the front of the manifold.

**NOTE –** The fitting is pictured in the P-1 port on the side of the manifold. The P and P-1 ports are interchangeable.



### Step 7

Insert a -08-16L straight fitting into the T port on the side of the manifold.

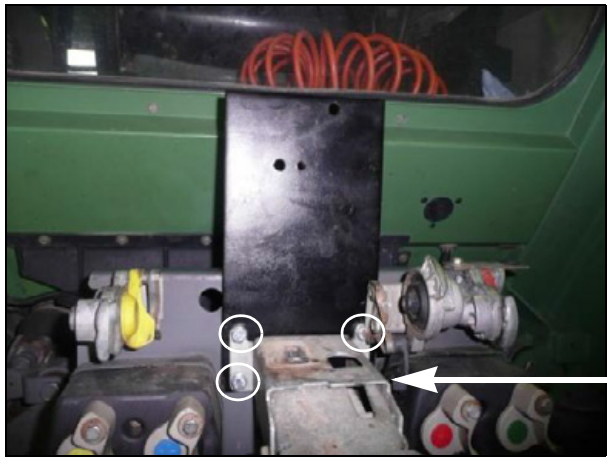


# Mounting the hydraulic manifold to the mounting bracket

## Step 1

Locate the existing bracket at the rear of the machine used to hold the center 3pt link.

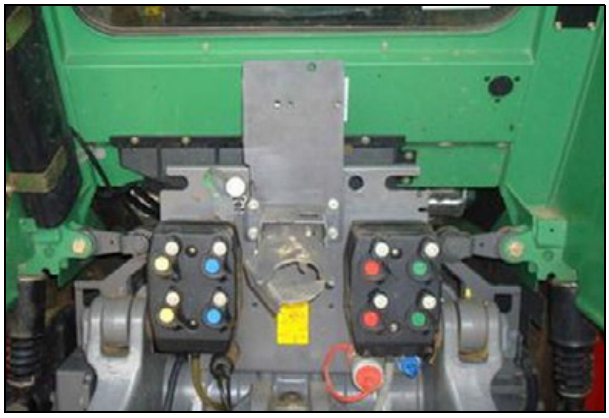
Remove the four bolts holding this bracket onto the machine. This is where you will install the Autopilot manifold.



## Step 2

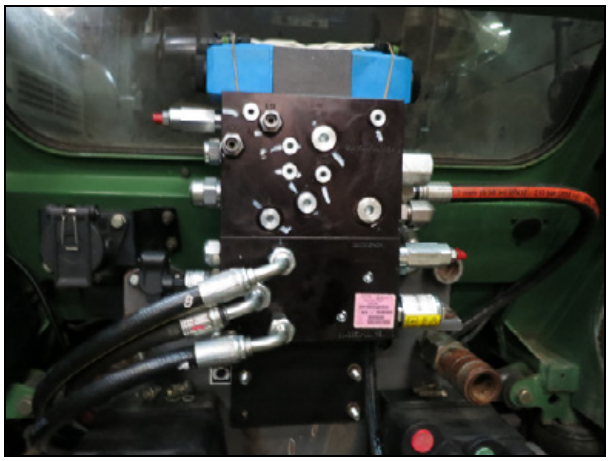
Install the Autopilot manifold bracket between the removed bracket and the existing bracket.

Reattach the two brackets to the machine using the provided M8 hardware and spacers.



## Step 3

Attach the manifold to the bracket using the provided 3/8" bolts.



# Connecting the hydraulic lines

## Step 1

On the left side of the machine, locate the Pressure (P) ❶ and Loadsense (LS) ❷ lines.



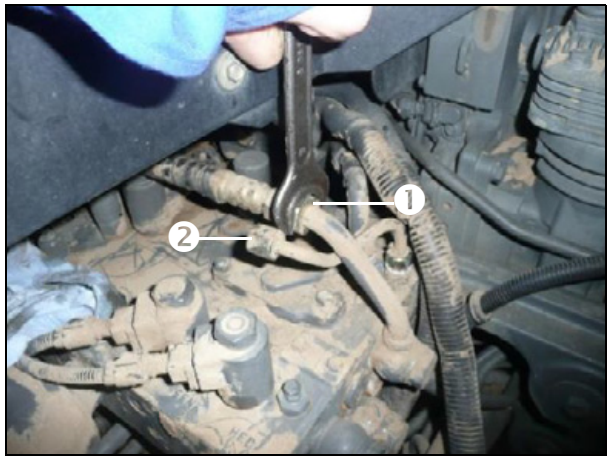

## Step 2

Remove the hose guide that holds the P and LS lines together.



## Step 3

Unhook the existing P ❶ and LS ❷ soft lines from where they meet the hard-lines.



### Step 4

In the P line, install the EL15L run tee fitting ❶ provided in the hydraulic kit.

Reattach the existing P line to the end of the run tee fitting.

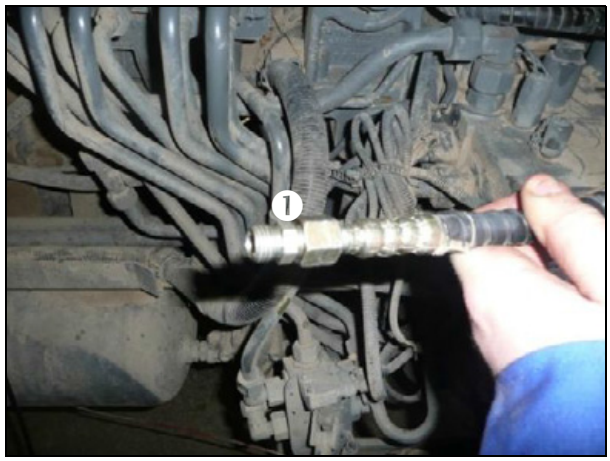



### Step 5

Connect the provided LS1 hose to the end of the LS line that you removed previously ❶.

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

Before you tighten the LS1 line, orientate it to the Autopilot manifold.






### Step 6

Attach the 90° end of the P line provided in the hydraulic kit to the branch of the run tee fitting.

Route the P ❶ line back to the Autopilot manifold for connection to the P port on the Autopilot manifold.

Attach the LS2 ❷ line to the connector shown.

Route the LS2 line to the Hydraulic manifold.

Before you tighten the LS2 line, orientate it to the Autopilot manifold.




## Connecting the A, B, and Tank lines

### Step 1

On the left side of the machine, in front of the cab, locate and remove the plate ❶ over the T, A, and B lines. so that you can access the hoses ❷.

If necessary, disconnect the hose ❸ for clearance.

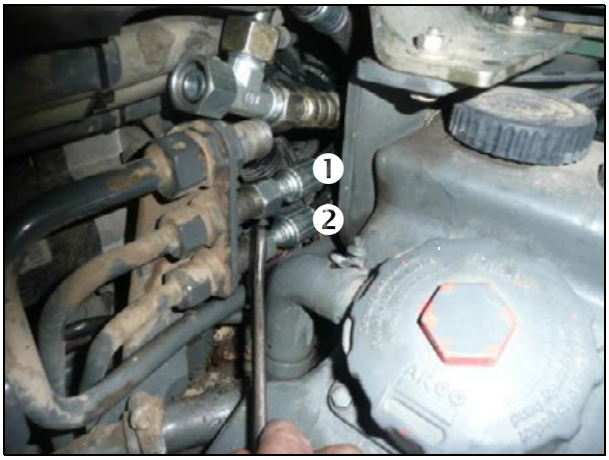



### Step 2

Disconnect the A and B hoses, connect the provided SCU-A and SCU-B hoses to the ends of the removed hoses and then route those hoses to the SCU-A and SCU-B ports on the manifold.

Before you tighten the hoses, orientate them to the Autopilot manifold.

Connect the straight 12L ends of the A and B hoses to the A and B ports on the machine (❶ and ❷).



### Step 3

Disconnect the Tank (T) line and then install the 15L run tee ❶ provided in the hose kit into the T line.

Reconnect the existing line to the end of the run tee fitting.

Attach the provided swivel 90° ❷ fitting to the branch of the run tee fitting.

Connect the straight end of the T line hose to the swivel 90° fitting and then route the line to the T port on the Autopilot manifold.

Before you tighten the T line, orientate it to the Autopilot manifold.

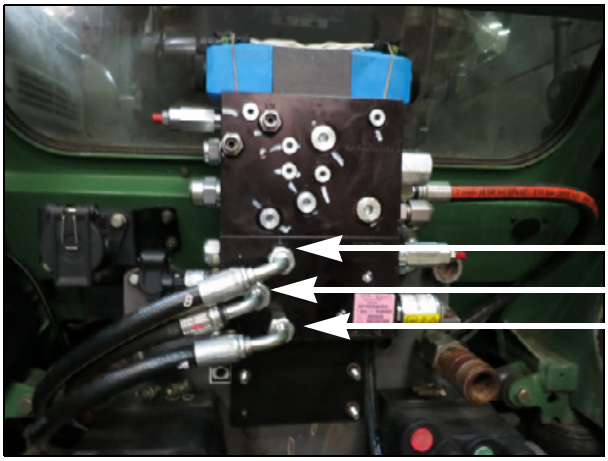



## Connections on Autopilot manifold

⚠ **CAUTION –** Ensure all of the lines are routed so they are not pinched or pulled and do not contact any moving parts on the machine.

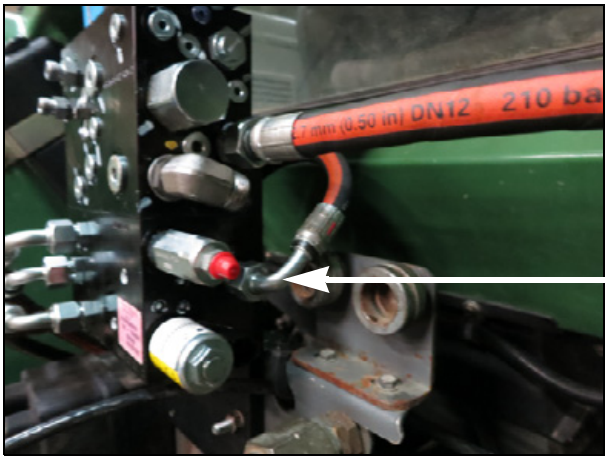
### Step 1

Route the A, B, and SCU-A hoses to the manifold and attach to their respective ports as shown.



### Step 2

Route the SCU-B hose to the manifold and connect it to the SCU-B port as shown.

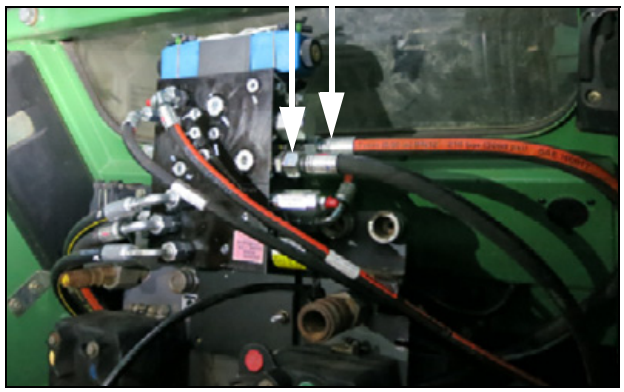


### Step 3

Route the Tank and Pressure lines to the manifold and connect them to their respective ports as shown.

**NOTE –** The Pressure hose is pictured with similar routing but connected with a straight fitting in the P-1 port.

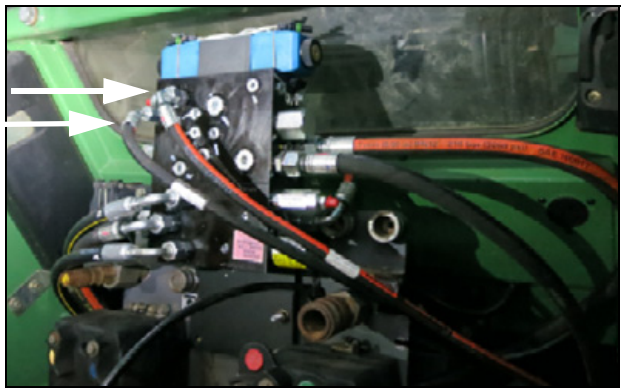
**NOTE –** An extra Swivel 90 fitting is included as an optional connection for either of these hoses.



### Step 4

Route the LS1 and LS2 lines to the manifold and connect them to their respective ports.

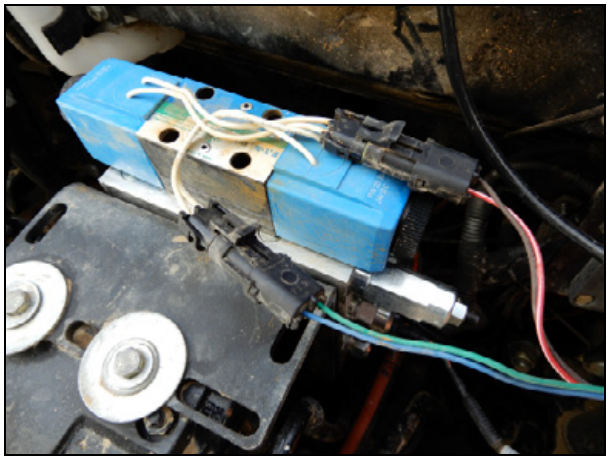
**NOTE –** The LS2 hose is pictured with a 45° hose fitting.



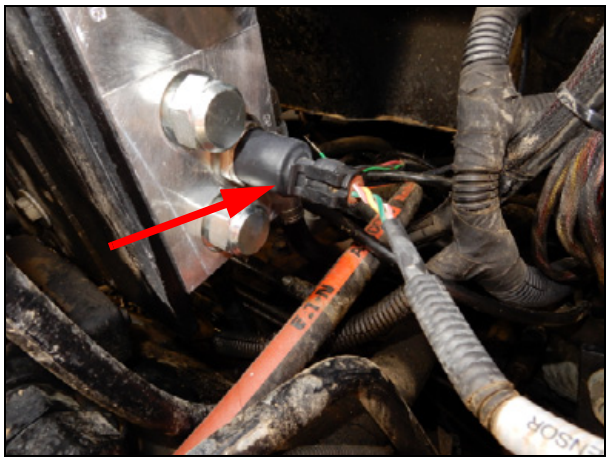
# Connecting the cables to the manifold

Connect the valve cable, the manual override pressure transducer cabling, and the isolation solenoid cabling to the connections on the Autopilot manifold and then route the lines to the controller harness.

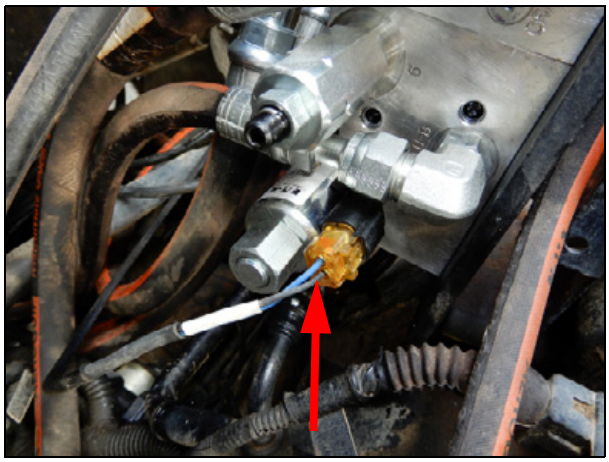
⚠ **CAUTION –** Make sure the cables are routed there in a way that they do not contact any moving parts and are not pinched or pulled as the machine is steered left or right.



**Valve cable**



**Manual override pressure transducer cabling**



**Isolation solenoid cabling**

3

# AutoSense Steering Device Installation


- IMD-900 steering device components
- Installing the IMD-900 steering device
- Connecting the IMD-900 harness to the 54602 harness


This chapter describes how to install the IMD-900 module steering device.

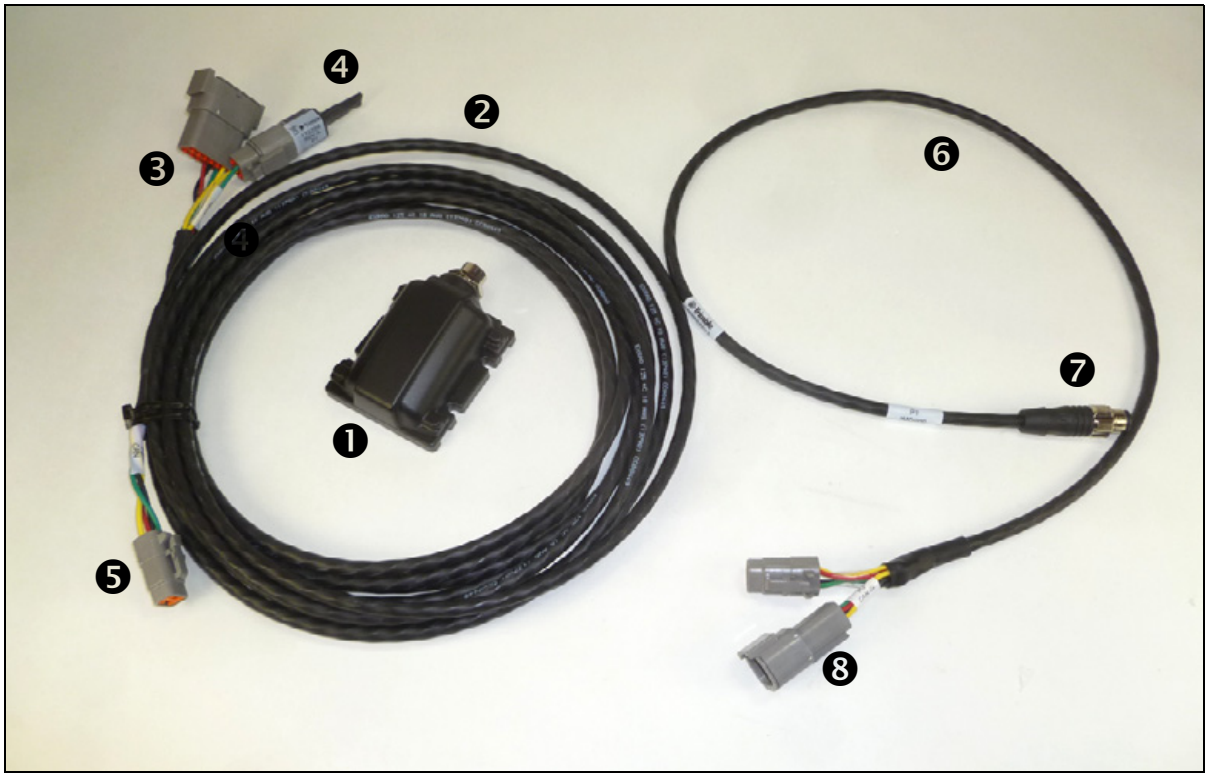
If the described mounting location is not accessible, chose a different place. To ensure proper function, the IMD-900 device must be located where it is free of obstructions and can rotate with the wheels when they turn.

On articulated vehicles, mount the IMD-900 device on the opposite side of the pivot point to the Autopilot controller.

Mount the device base down or base up so that it maintains a level orientation. Do not mount it on its side. An angle of up to 10° in any direction is acceptable, but as flat as possible is recommended.

To avoid stretching the cable, leave adequate length on the service loop.

# IMD-900 steering device components




| Item | Description |
|---|---|
| ❶ | IMD-900 steering sensor (P/N 109256-00) |
| ❷ | Cable (P/N 114675) |
| ❸ | R1-CAN connector |
| ❹ | CAN terminal (× 2) |
| ❺ | P3 CAN connector |
| ❻ | Cable (P/N 112759) |
| ❼ | P1-IMD-900 |
| ❽ | P3/R3 CAN out/CAN in |

# Installing the IMD-900 steering device

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

The new IMD-900 steering device is shown on the right. Install it using the following steps.



**NOTE –** The photos show the AutoSense™ mounting but the new IMD-900 steering sensor will mount in the same manner.

Depending on the front fender configuration of your Fendt vehicle, use one of the following mounting options.

## Option 1

### Step 1

Remove the two front bolts holding the fender to the wheel upright. Assemble the AutoSense mounting plate using these two bolts.



### Step 2

Attach the AutoSense device to the bracket using the provided hardware.

Connect the cabling.

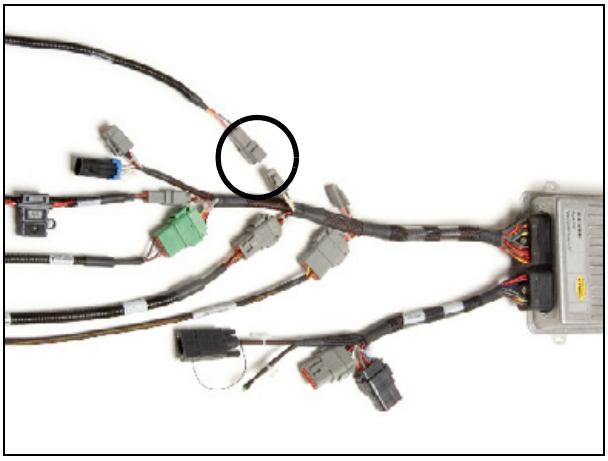
Make sure that it does not touch any moving parts, and is not pinched as the wheel steers from right to left.



### Step 3

Plug the steering sensor cable to P6 on the Autopilot controller main wiring harness.

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



## Option 2

### Step 1

Remove the two front bolts holding the fender to the wheel upright.

Attach the AutoSense mounting plate using these two bolts.



### Step 2

Attach the AutoSense device to the bracket using the provided hardware.

Connect the cabling.

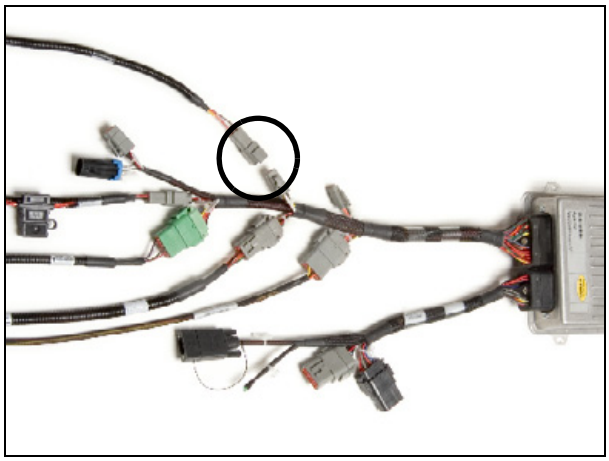
Make sure that it does not touch any moving parts, and is not pinched as the wheel steers from right to left.



### Step 3

Plug the steering sensor cable to P6 on the Autopilot controller main wiring harness.

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

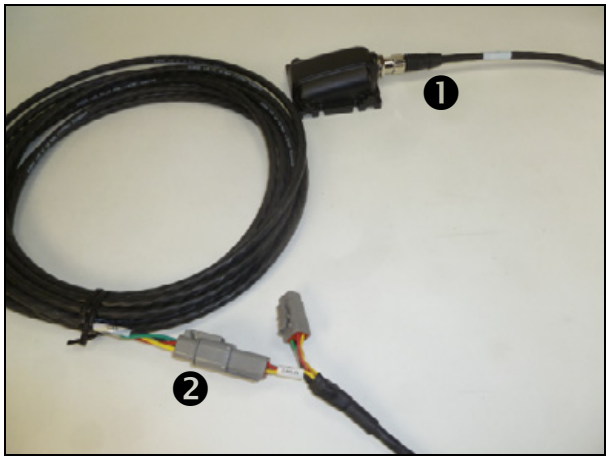


# Connecting the IMD-900 harness to the 54602 harness

## Step 1

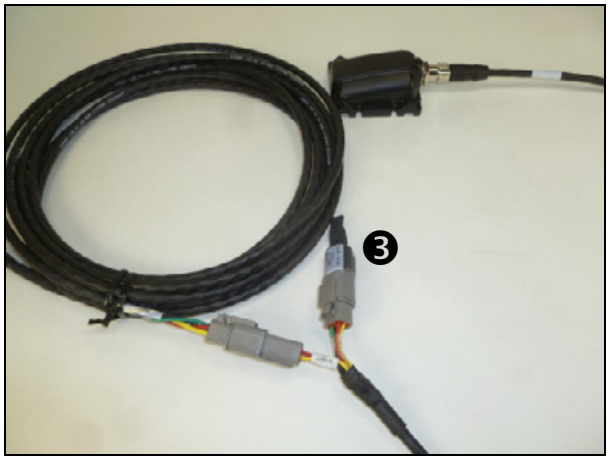
Connect the P1 connector of the 112759 cable to the IMD-900 ❶.

Connect the R3 connector to the 114675 cable ❷.




## Step 2

Connect the CAN terminal to the P3 connector of the 112759 cable ❸.




## Step 3

With the cable routed to the NavController, connect the R1 connector to the P12 connector on the 54602 harness on the NavController as shown.

Attach a terminator next to the P12 connection.



# 4

# Antenna/Receiver Installation


- Antenna and receiver installation options
- Attaching the plate with VHB adhesive
- AG-372 receiver with AgGPS 450/900 radio module components (if equipped)
- Installing the AG-372 GPS receiver with AgGPS 450/900 radio module (if equipped)
- Installing an AG-372 receiver with magnetic feet
- AgGPS 542 receiver components
- Installing the AgGPS 542 receiver
- 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 - both methods
- 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 5, 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:

- **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 39.
- **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<br>TM-200 module | ✓ | ✓ |
| AG-372 receiver | ✘ | ✓ |
| *Ag*GPS® 542 receiver | ✓ | ✓ |

**NOTE –** For quick release magnetic mounting with an AG-372 receiver, order the kit listed in Antenna mounting kits, page 10 and use VHB to attach the V plate to the roof.

**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.

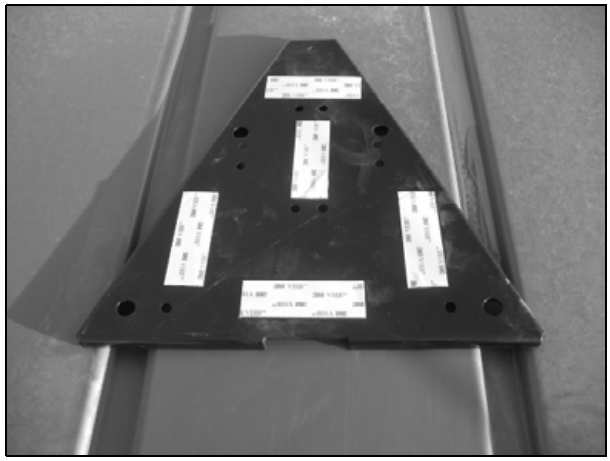


### Step 2

*V plate only*

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

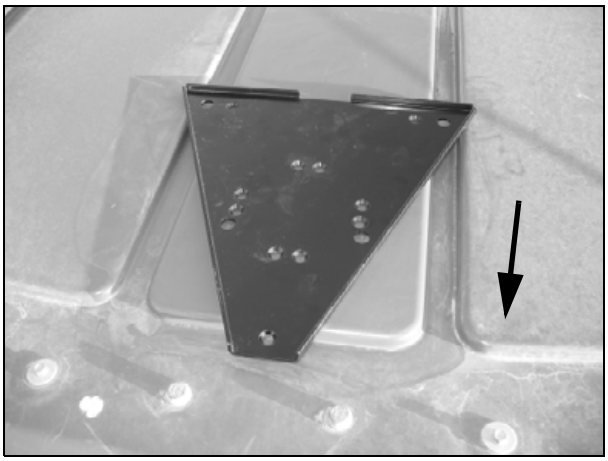
**NOTE –** The VHB strips are pre-applied to the P/N 62034 plate.



### 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.

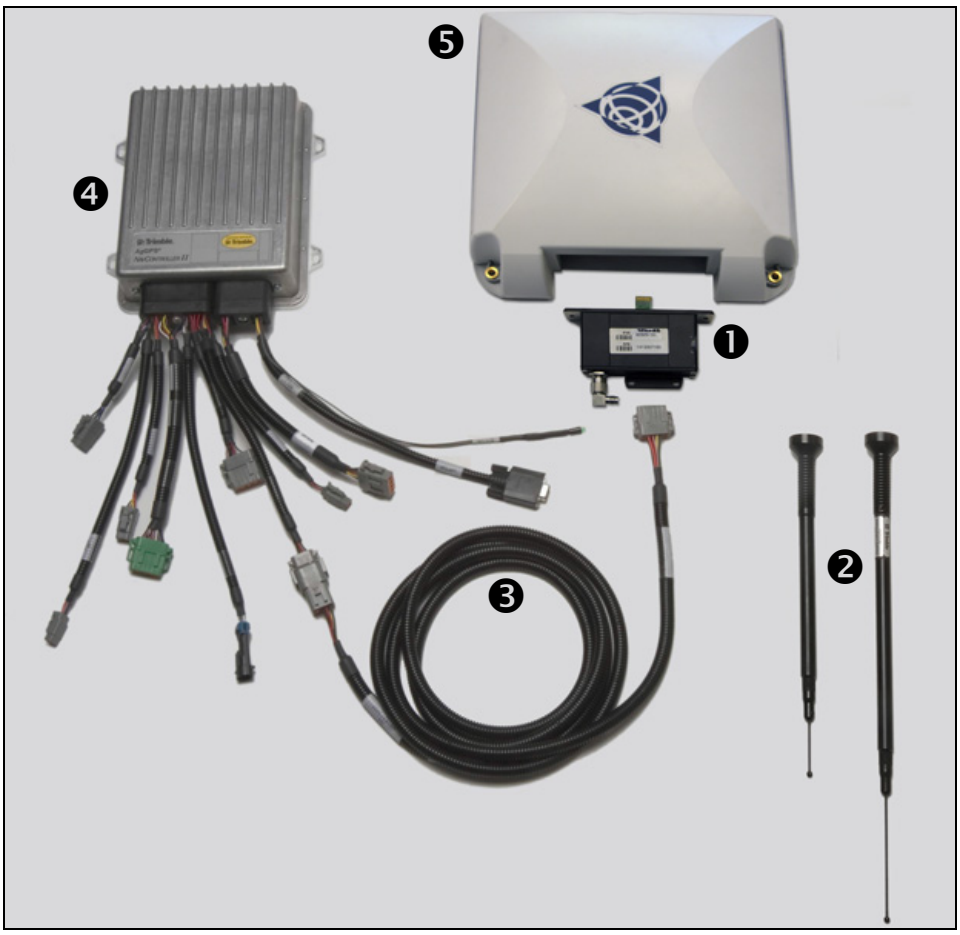


**V plate**



**P/N 62034**

# AG-372 receiver with AgGPS 450/900 radio module components (if equipped)




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

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

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

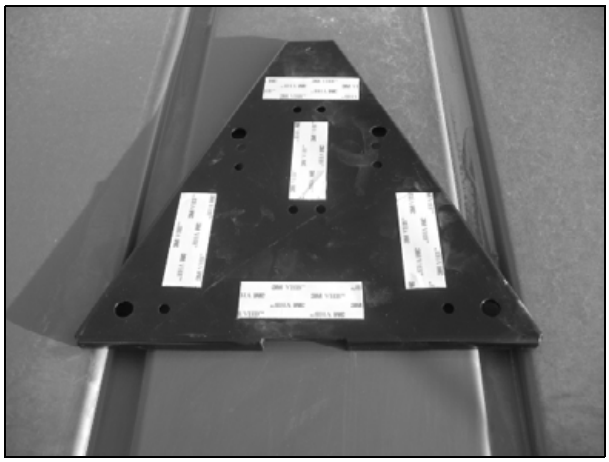
To attach the AG-372 receiver plate to the cab roof so that it can be removed if required, attach a V plate to the roof with VHB and then stick the receiver plate to the V plate with magnets.

## Removable installation

### Step 1

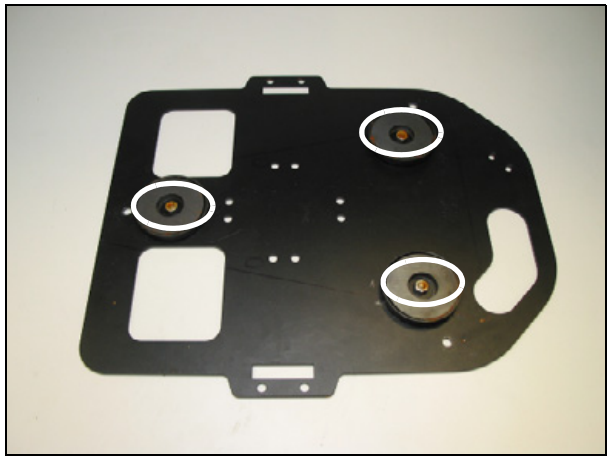
*V plate*

Attach the V plate roof using the supplied VHB. Ensure that the narrow end points forward.



*Mounting plate*

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



**Underside of plate**

# Installing the RTK radio (if required)

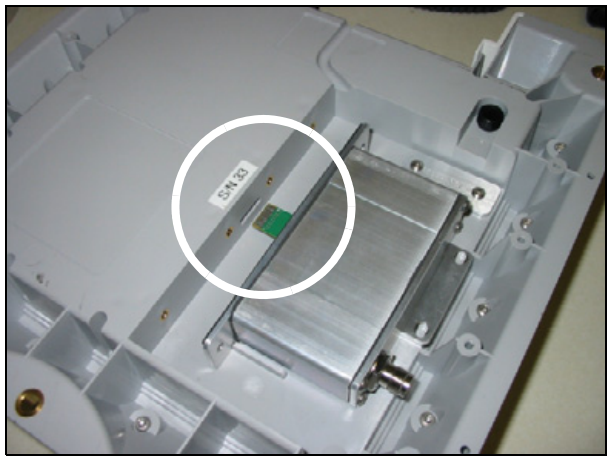
## Step 1

Remove the blanking plate and set it aside.



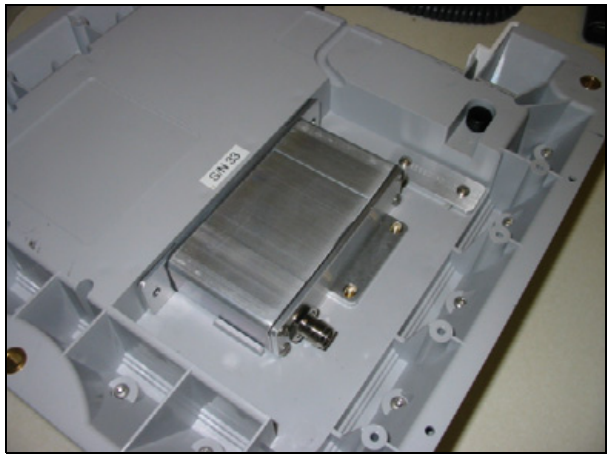
## Step 2

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



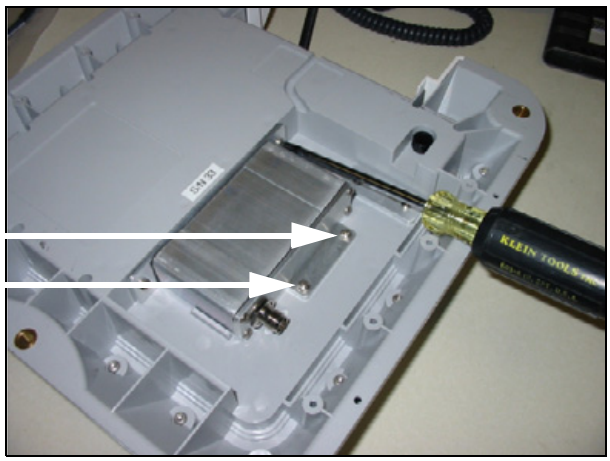
## Step 3

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



### Step 4

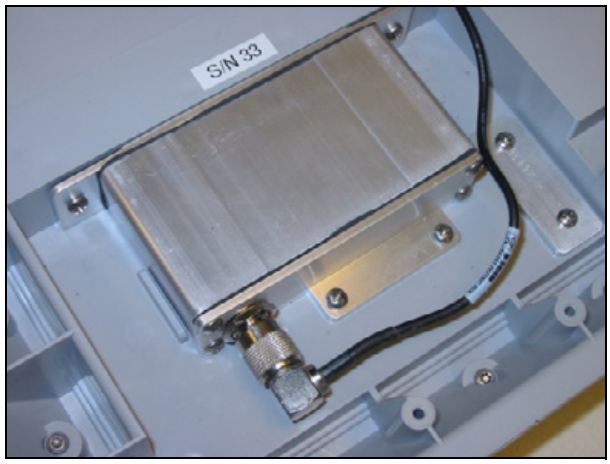
Use a #1 or #2 Phillips screwdriver and the supplied screws to install the integrated radio. First insert and tighten the two screws on the horizontal wall (arrowed), and then insert the remaining screws.



### Step 5

Install the supplied antenna cable.

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

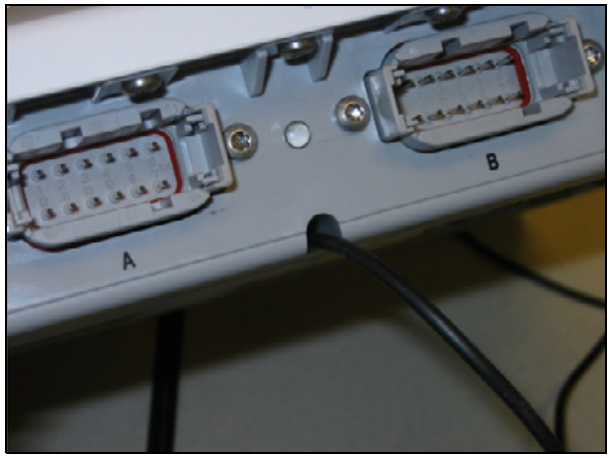



### Step 6

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

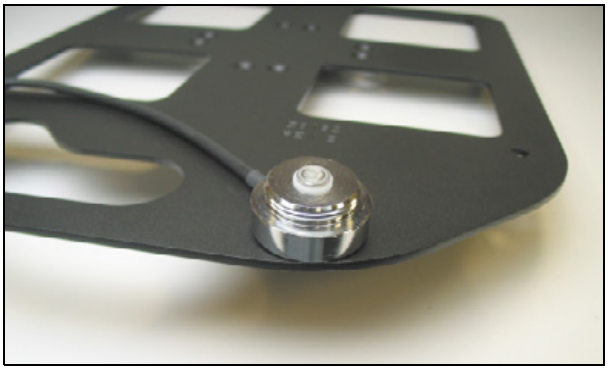


This image shows the unit with the cable routed through the channel.



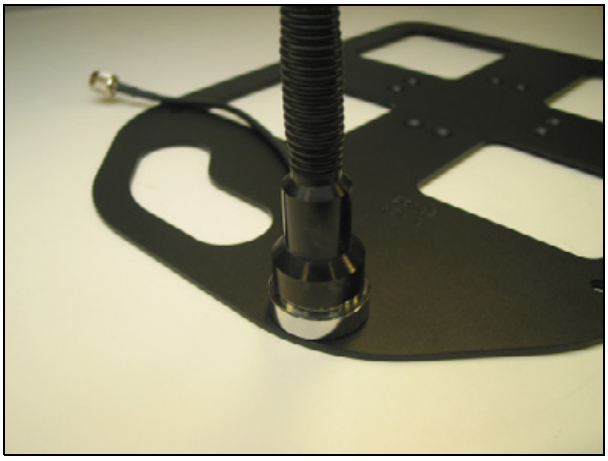

### Step 7

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



### Step 8

Attach the radio antenna to the antenna base.



### Step 9

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



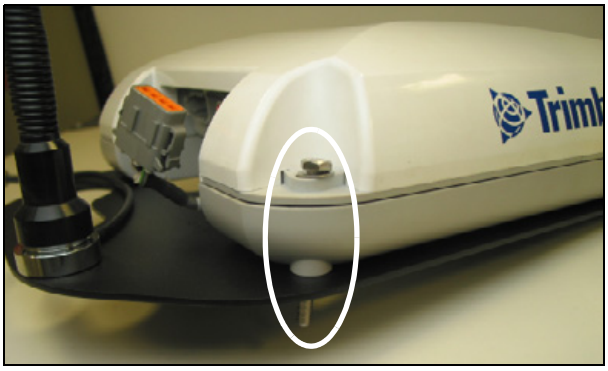

### Step 10

Insert the nylon bushings provided.




### Step 11

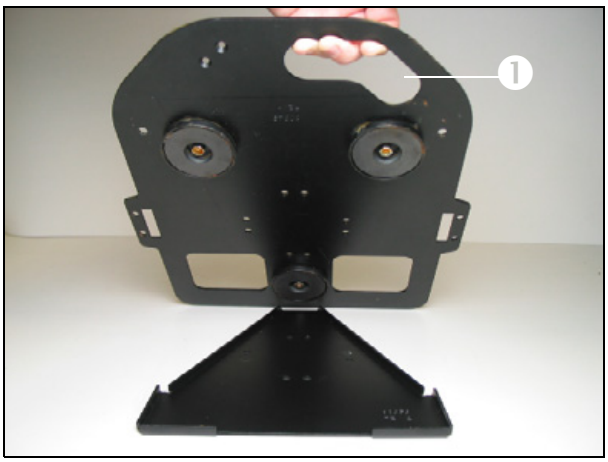
Insert the bolts through the receiver, radio, and mounting bracket. Place nuts on the bolt ends and then tighten them.



### Step 12

*Magnet method*

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

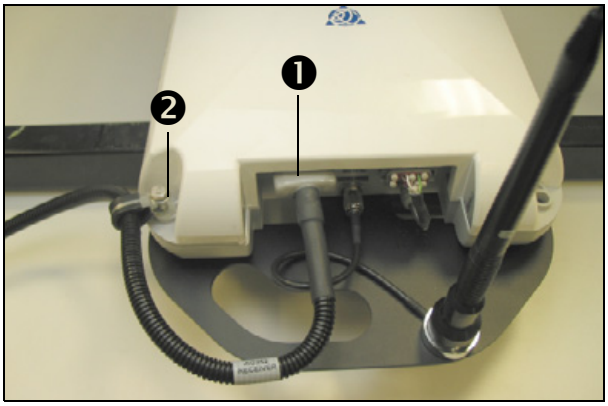



### Step 13

*Both methods*

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

Route the cable into the cab and into the controller.



# Installing an AG-372 receiver with magnetic feet

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

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

## Step 1

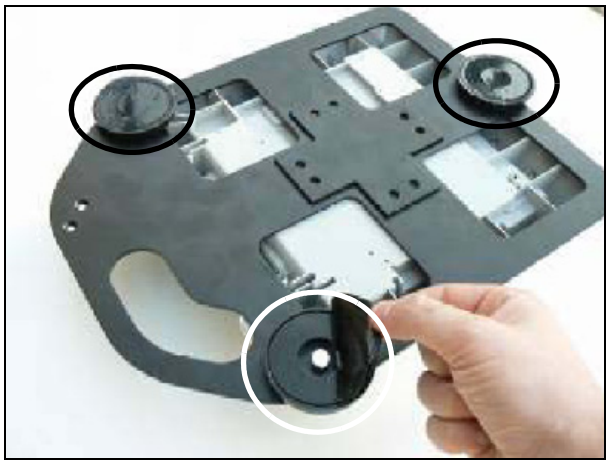
Attach the magnets to the receiver mounting plate. Use the three ¼" bolts to mount the AG-372 receiver.

Place the nuts on the receiver side.



## Step 2

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

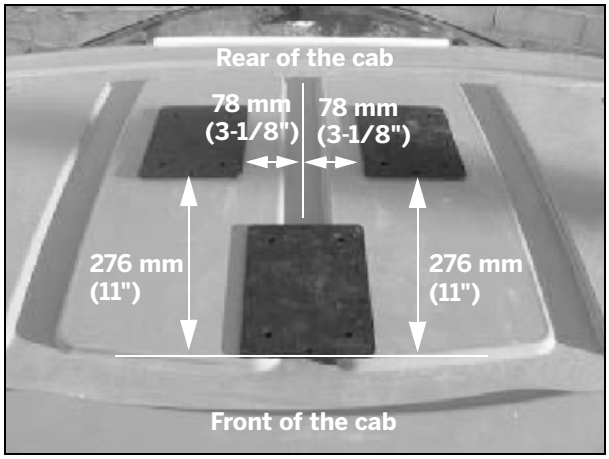


### Step 3

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

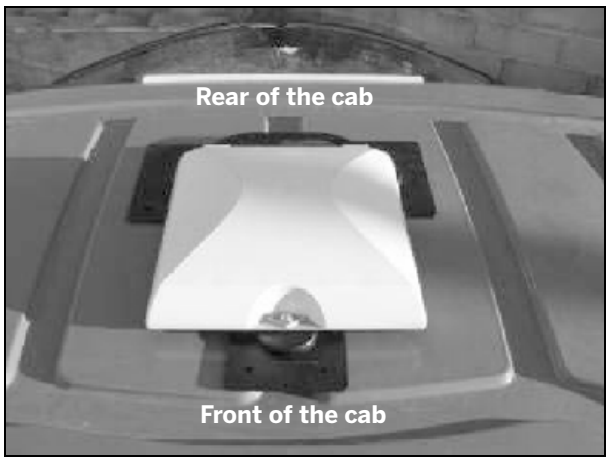
Remove the backing from the VHB strips and then apply the plates to the cab roof.

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



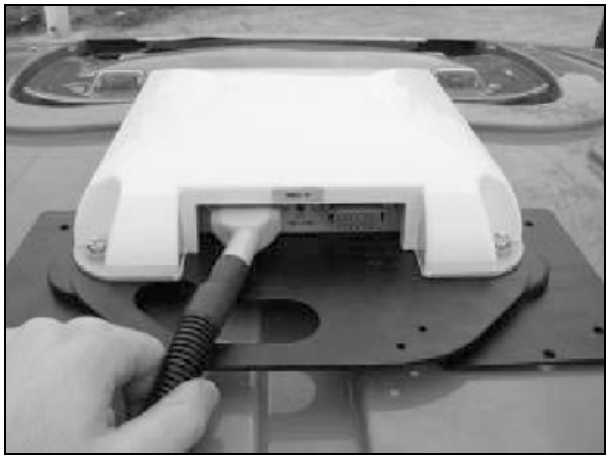

### Step 4

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

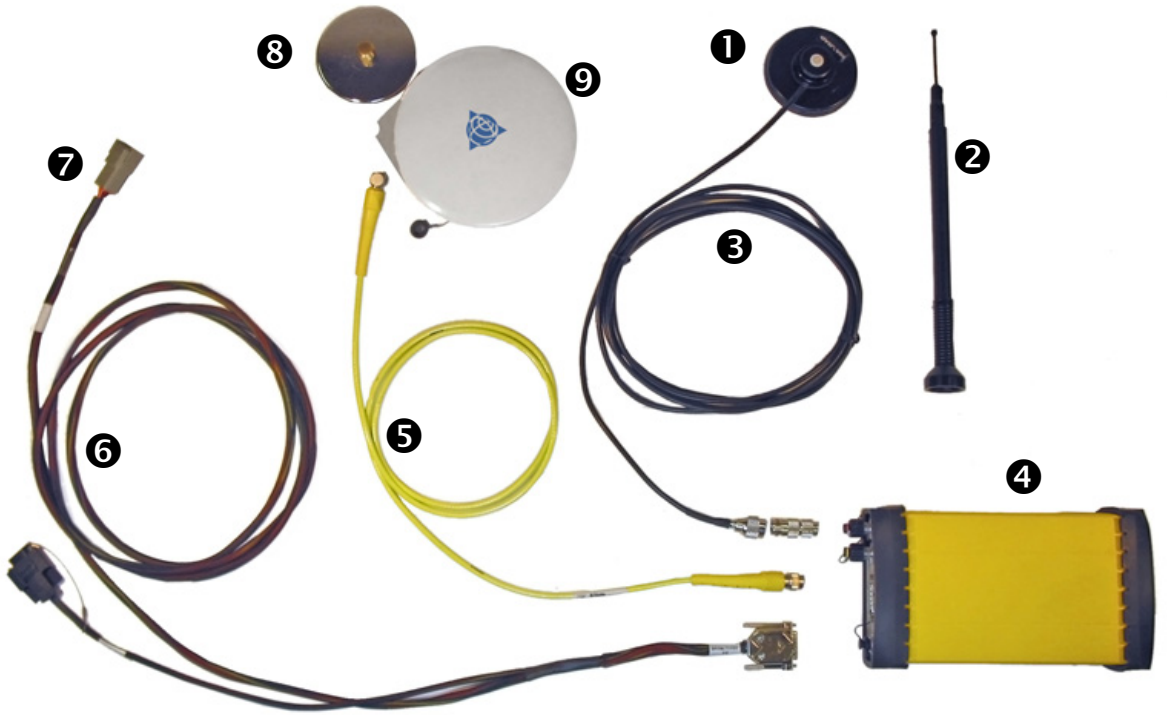



### Step 5

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



# *Ag*GPS 542 receiver components




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

# Installing the AgGPS 542 receiver

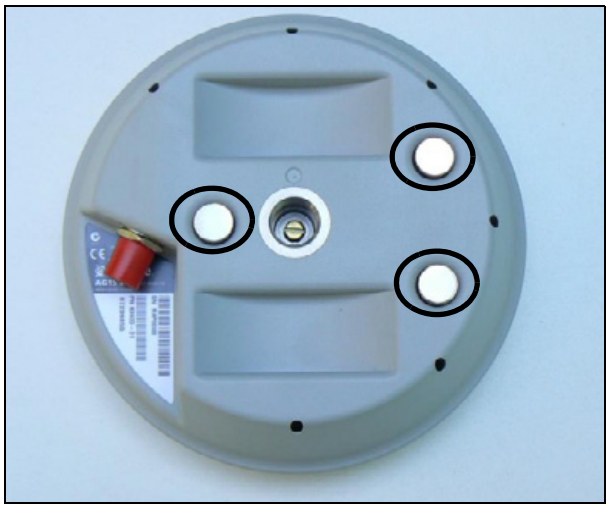
⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

## Step 1

Attach the large magnet with a $^{5}/_{8}$" stud to the GPS antenna.



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



## Step 2

*GLONASS,RTK, OmniSTAR, DGPS applications*

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



### Step 3

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



### Step 4

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

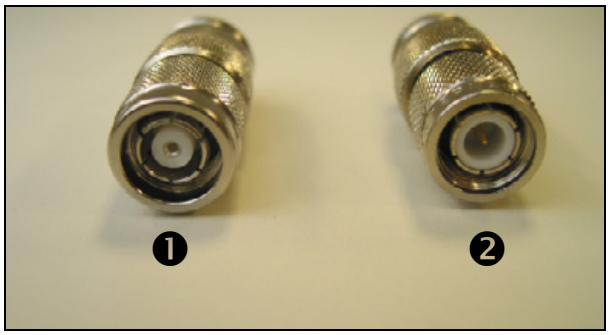


### Step 5

Identify the correct adaptor for the radio connection:

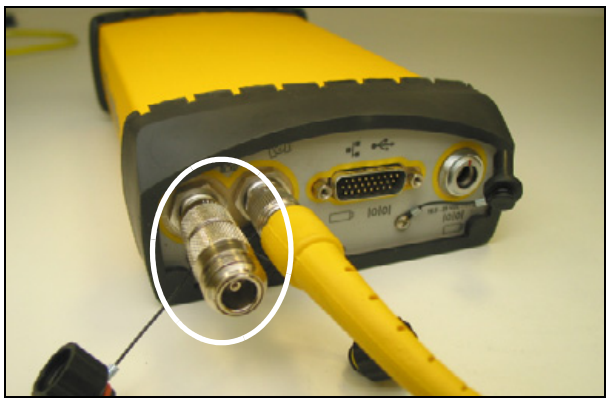
❶ Reverse polarity TNC-to-N for 900 MHz radios

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




### Step 6

Attach the adaptor to the radio port.



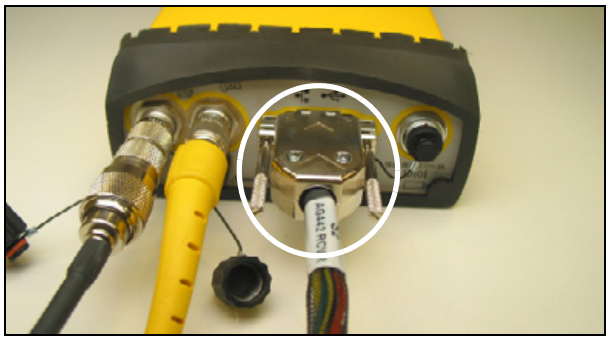
### Step 7

Connect the radio antenna cable to the radio port adaptor.



### Step 8

Connect the controller cable to the 26-pin connector of the receiver. Controller cable connections will be completed in Chapter 8, Controller Installation.



### Step 9

Connect the radio antenna to the magnetic antenna base.



### Step 10

Attach the magnetic radio antenna base to the rear of the V plate on the roof. If the cable does not reach the V plate, use the 4" x 6" plate with the VHB provided to relocate the antenna.



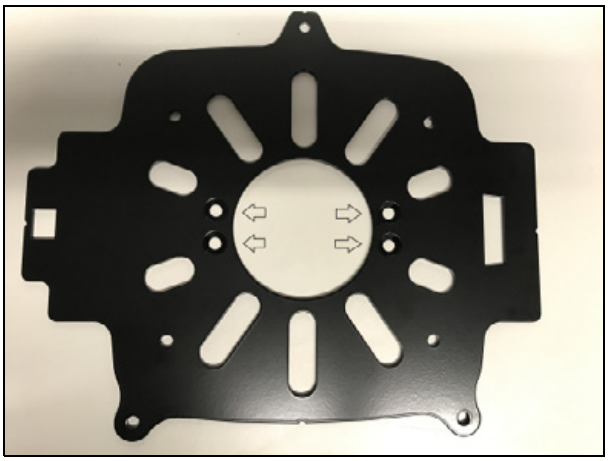
# Installing the NAV-900 guidance receiver using a spar mount

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:



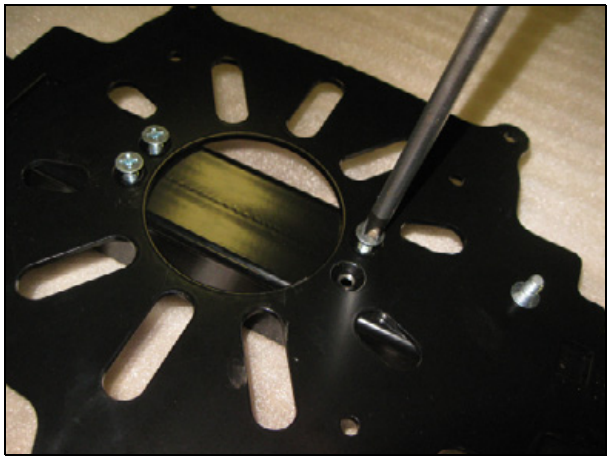
## Step 1

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



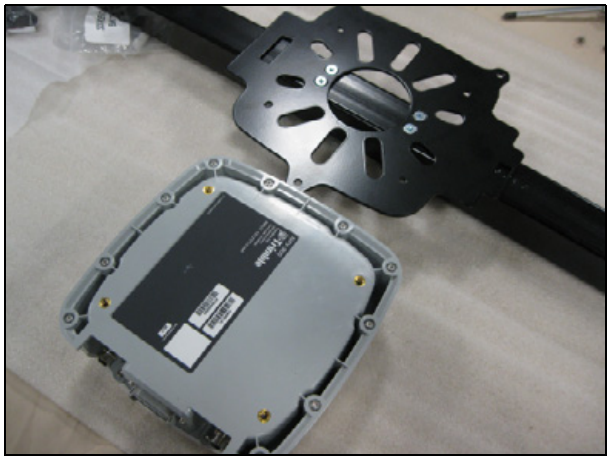
### Step 2

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 bolts. 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.

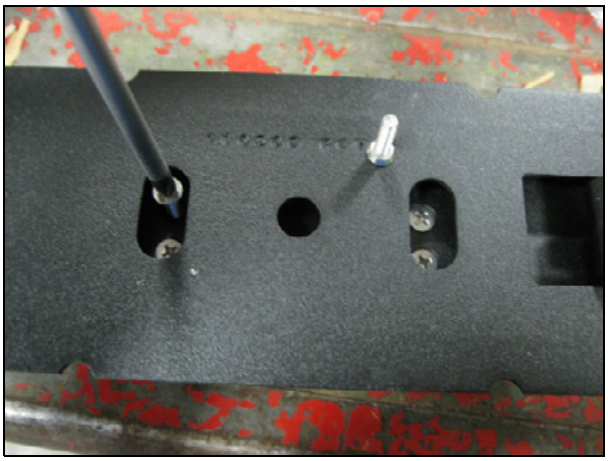




# Optional: Using the P/N 110308 for quick release mounting of the NAV-900 from the spar

### 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 - both methods

## Step 1

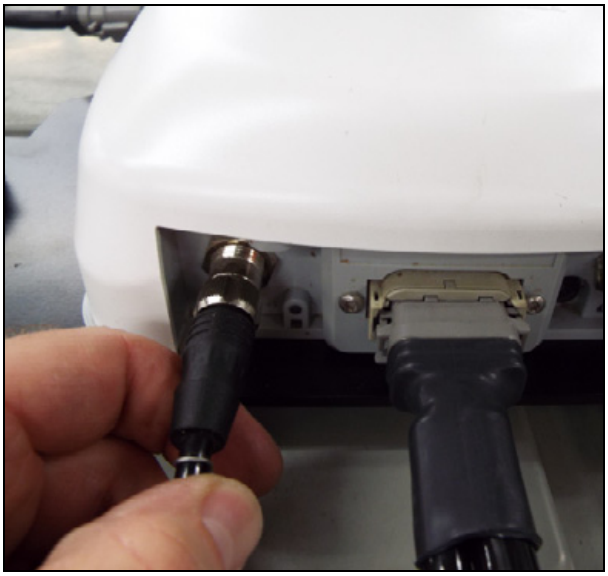
Plug the P1 connector on cable P/N 110550 into the back of the NAV-900 guidance receiver.





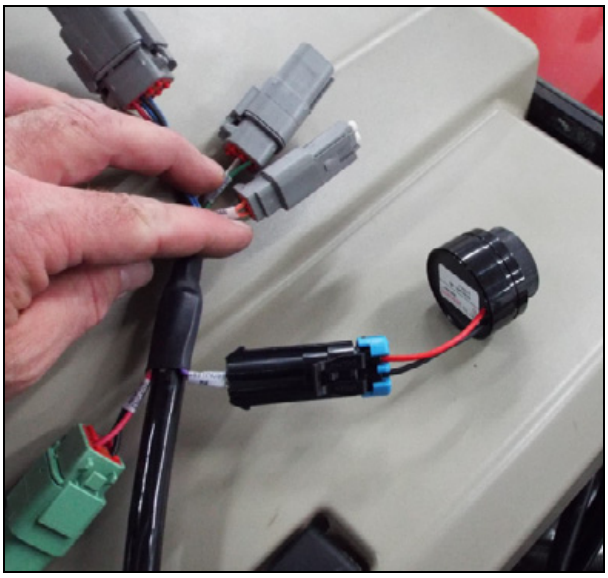
## Step 2

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

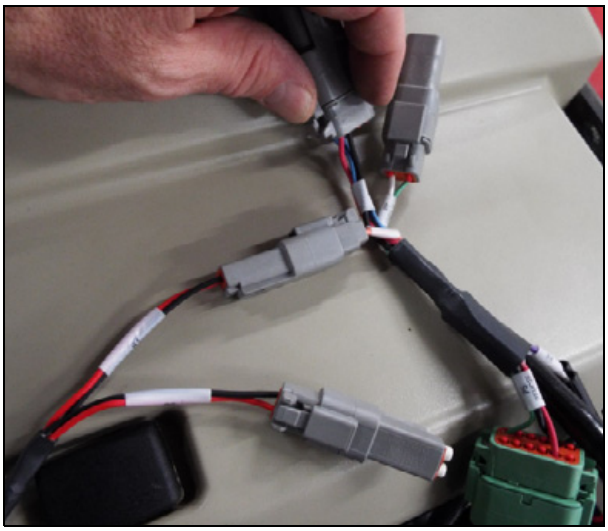


### Step 3

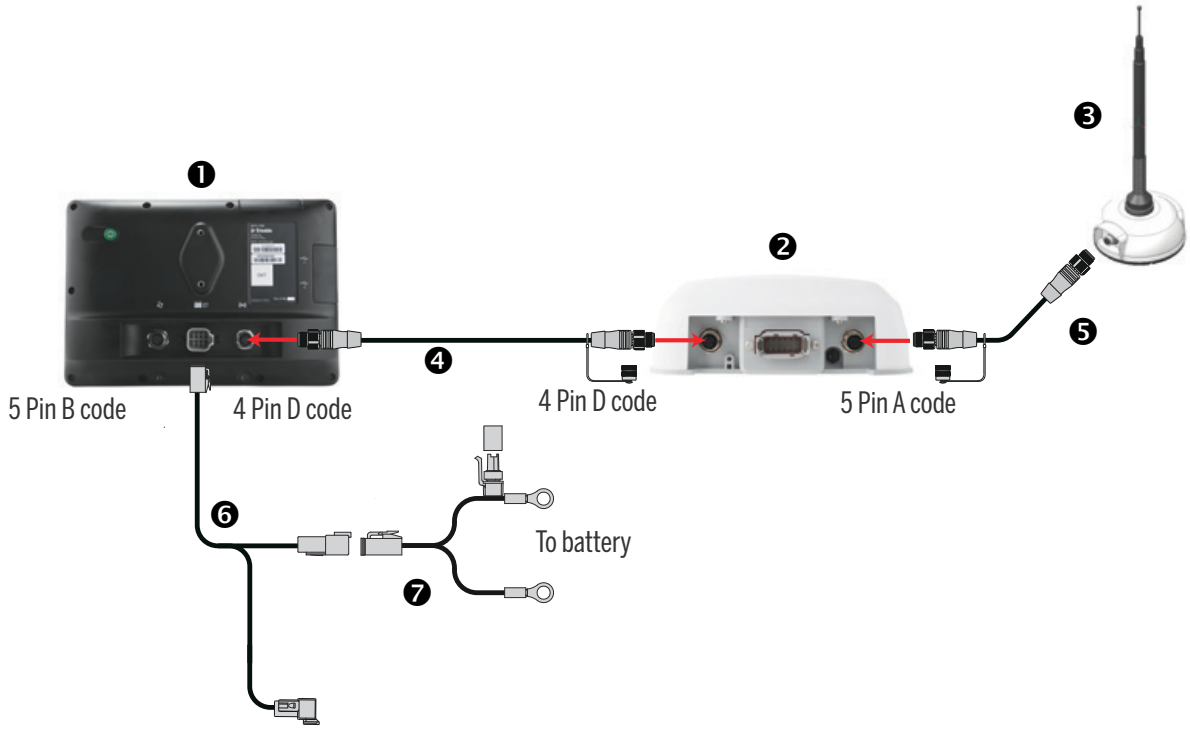
Connect the Sonalert to the cable P/N 110550.



Connect the NMEA output and modem power as needed.



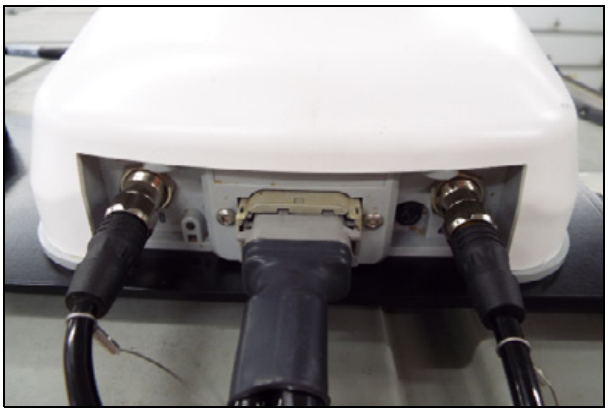
# NAV-900 guidance receiver: Connecting an external radio (as required)




| Item | Description | Trimble part number |
|---|---|---|
| **1** | GFX-750/XCN-1050 display, with PIQ App | 121000-XX |
| **2** | NAV-900 Guidance Controller | 108993-05 |
| **3** | Ag-820 radio kit, 430-450 MHz<br>Ag-820 radio kit, 450-470 MHz<br>Ag-820 radio kit, 900 MHz | 123500-44<br>123500-46<br>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-750/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.

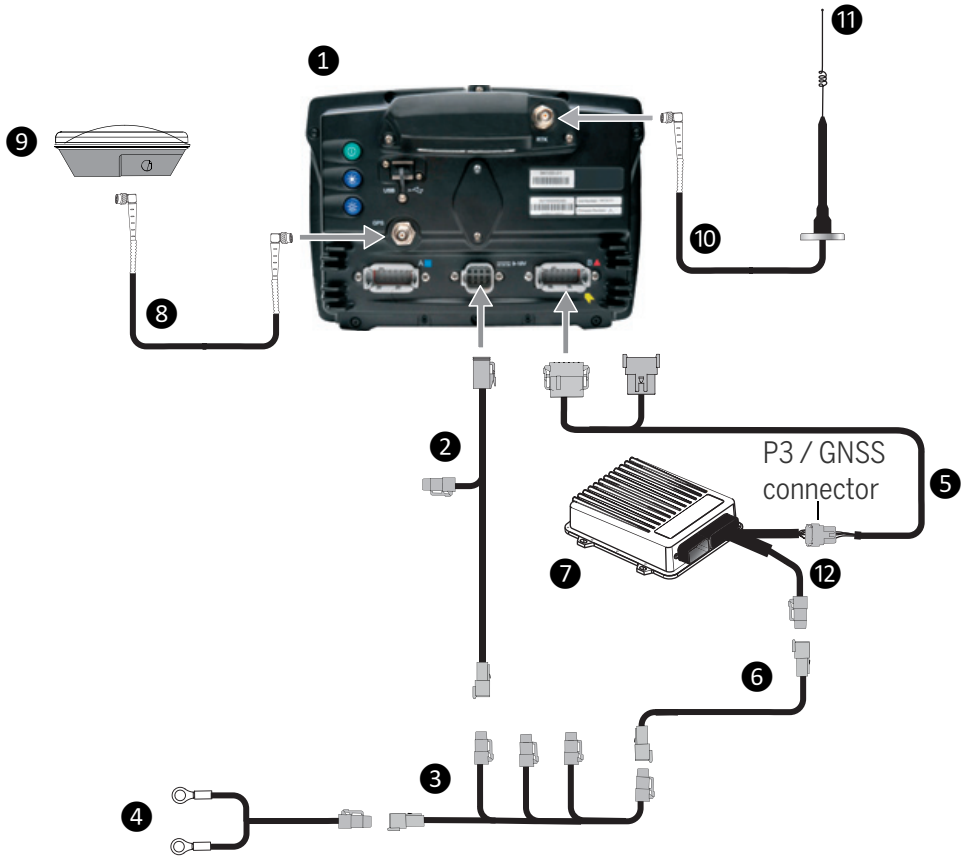


5

# Display Installation


- CFX-750 display: Components
- CFX-750 display: Preparation
- CFX-750 display: Installation
- CFX-750 display: Installing the wiring harness
- TMX-2050 display: Components
- 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-750/XCN-1050 display: Components
- GFX-750/XCN-1050 display: Preparation
- GFX-750/XCN-1050 display: Installation
- GFX-750/XCN-1050 display: Installing the wiring harness

# CFX-750 display: Components




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

| Item | Description | Trimble part number |
|---|---|---|
| **1** | CFX-750 display<br>**NOTE –** RTK password required. | 93100-02 |
| **2** | CFX-750 power cable | 66694 |
| **3** | CFX-750 power cable with relay and switch (power bus) | 67259 |
| **4** | Basic power cable | 67258 |
| **5** | CFX-750 to NavController II cable with port replicator | 75741 |
| **6** | 2 pin DTM to 2 pin DT power adaptor | 67095 |
| **7** | NavController II | 55563-00 |
| **8** | 8 m GNSS TNC/TNC RT angle cable | 50449 |
| **9** | AG25 GNSS antenna | 77038-00 |
| **10** | NMO to TNC 20ft antenna cable and base | 72122 |
| **11** | 900 MHz radio antenna kit | 22882-10 |
| **12** | Main NavController II cable | 54601 |

# 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

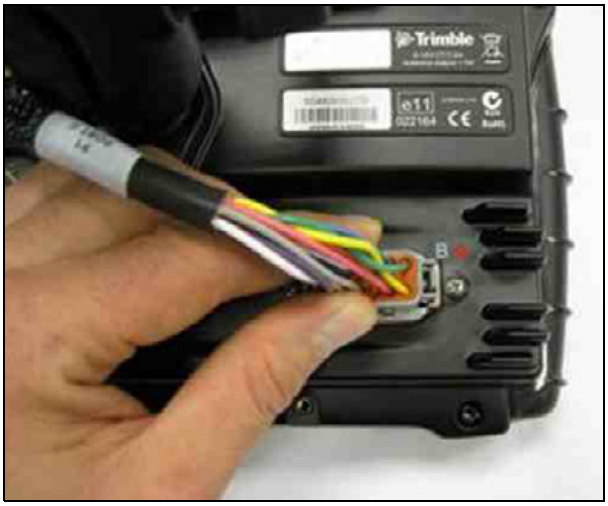
Decide where you will mount the display in the vehicle cab and then use the provided bolts to attach the bar mount to the rail.

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 8, Controller Installation.




# CFX-750 display: Installing the wiring harness

### Step 1

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

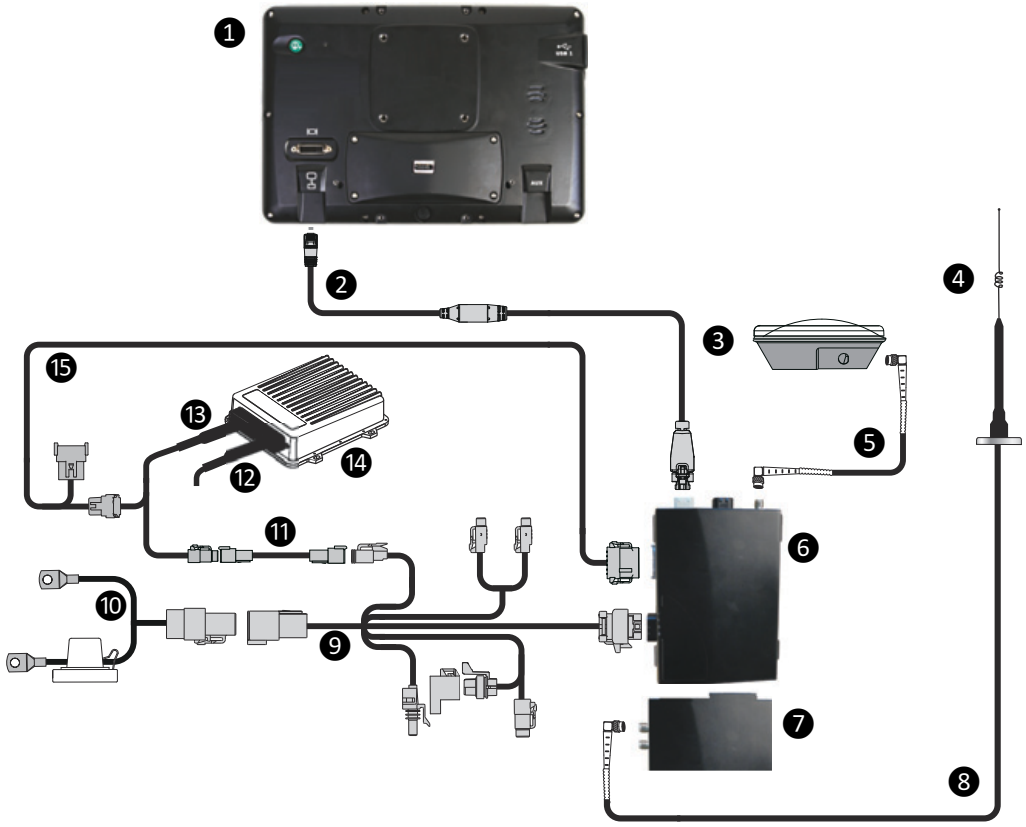
### Step 2

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



# 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** | AG-25 GNSS antenna | 77038-00 |
| **4** | 900 MHz radio antenna kit | 22882-10 |
| **5** | 8 m GNSS TNC/TNC RT angle cable | 50449 |
| **6** | TM-200 Module | 95060-00 |
| **7** | AG-815 radio | |
| **8** | NMO-to-TNC 20 ft antenna cable and base | 72122 |
| **9** | TM-200 Module power and I/O cable | 92676 |
| **10** | Cable, battery | 92905 |
| **11** | 2-pin DTM to 2-pin DT power adapter cable | 67095 |
| **12** | Cable, NavController diagnostic | 54602 |
| **13** | Main NavController cable | 54601 |
| **14** | NavController | 55563-00<br>55566-00 |
| **15** | TM-200 Module to NavController cable with port replicator | 75741 |

# 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.

⚠ **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.

.

| 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 3. 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.



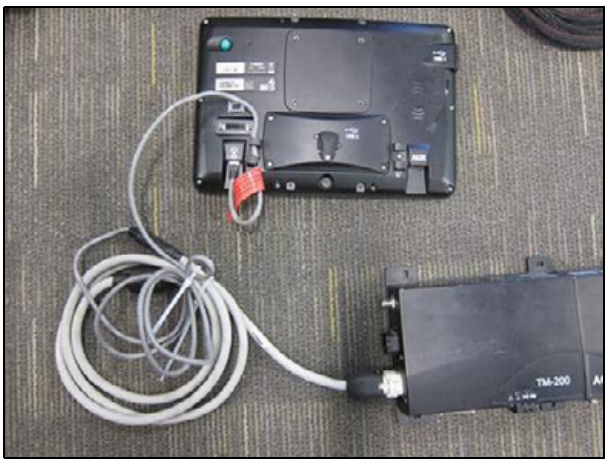
### Step 3

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.



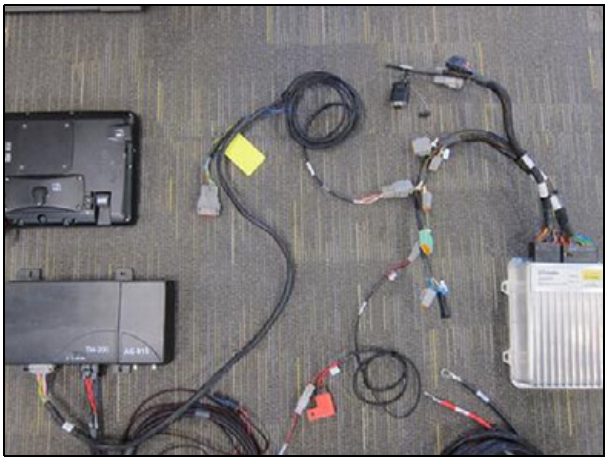
### Step 5

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



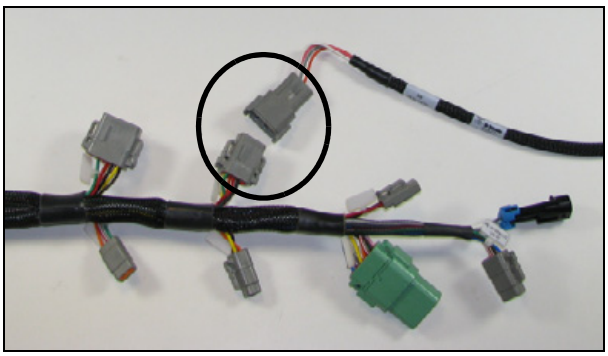

### Step 6

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



### Step 7

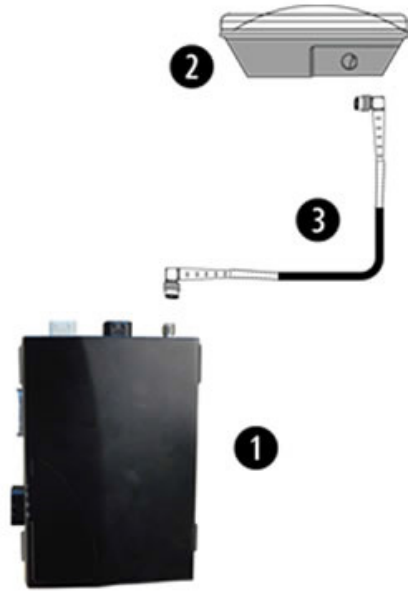
Connect the cable to the P3 connector on the NavController main harness.



# 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 11.

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 39.

Use a ⅝" bolt to attach the AG25 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.

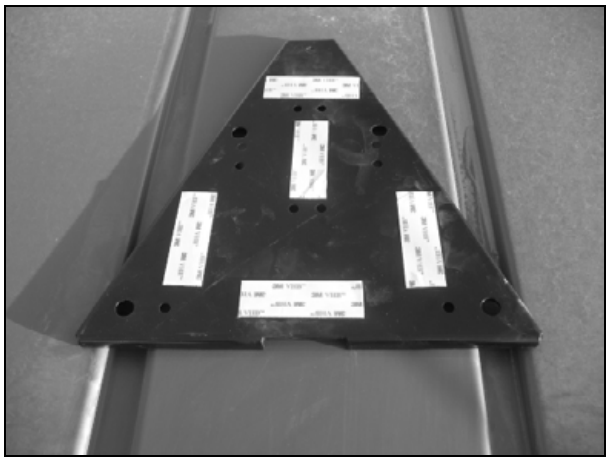


### Step 2

*V plate only*

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

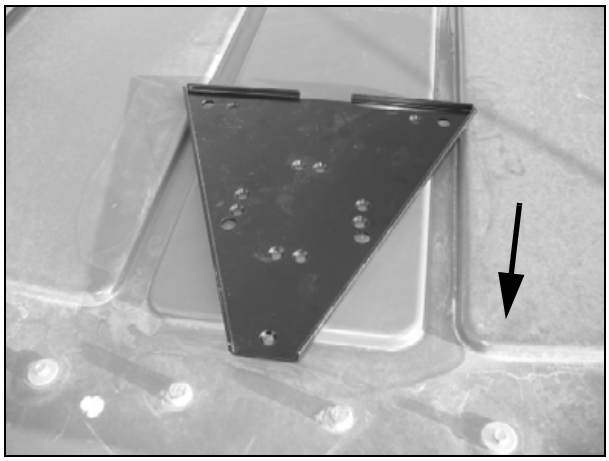
**NOTE –** The VHB strips are pre-applied to the 4" x 6" plate.



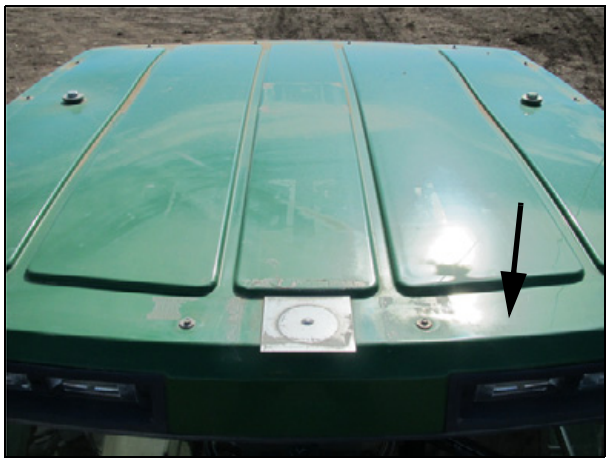
### Step 3

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.



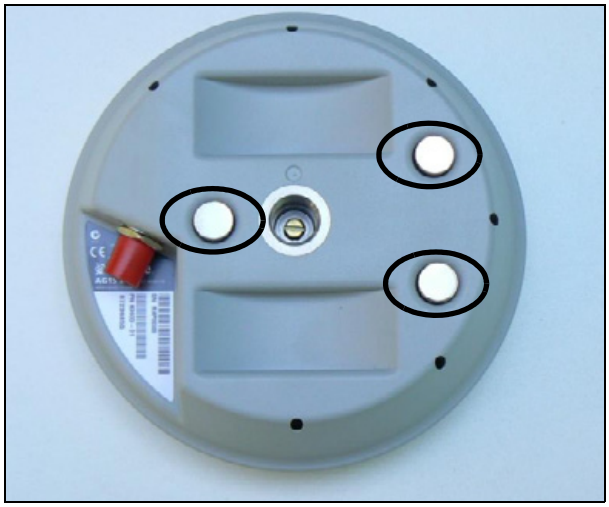
**V plate**



**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.

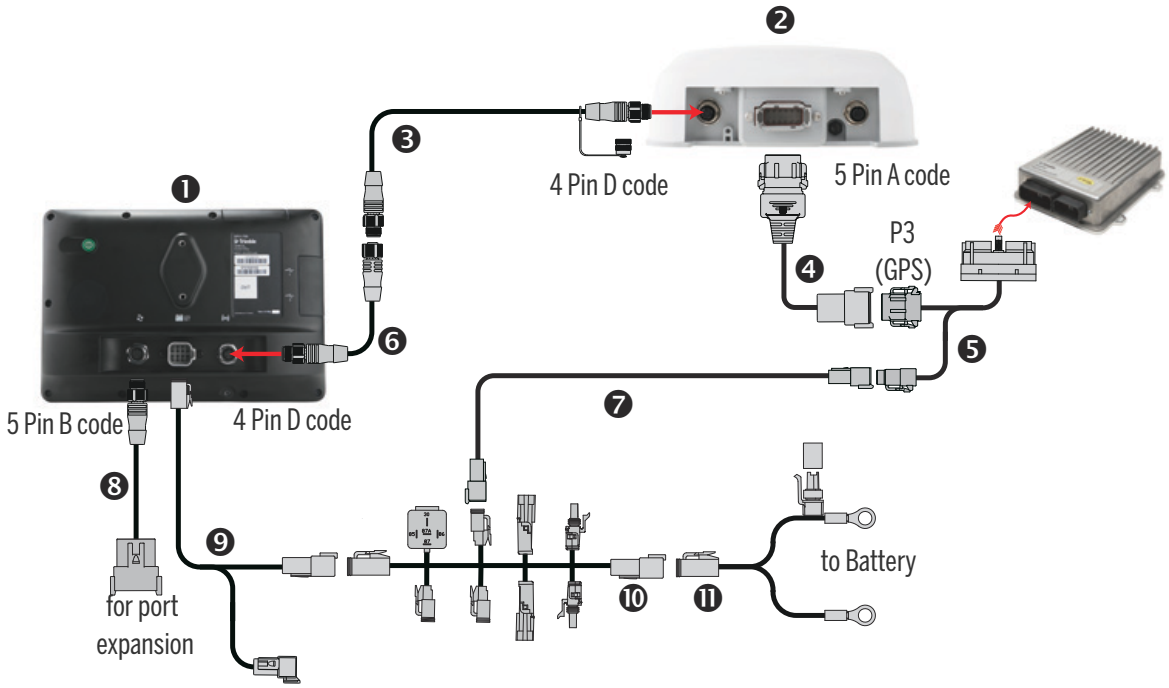
### Step 4

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



# GFX-750/XCN-1050 display: Components

This graphic shows the Autopilot system using NAV-900 as an external guidance device.




| Item | Description | Trimble part number |
|---|---|---|
| **1** | GFX-750/XCN-1050 display, with PIQ App | 121000-XX |
| **2** | NAV-900 Guidance controller | 108993-05 |
| **3** | Cable Assy, GFX-750/XCN-1050 to NAV-900, Power/Ethernet (BRR), 5 m | 110540 |
| **4** | Cable Assy, NAV-900 to Nav II/III, AutoPilot™ | 110547 |
| **5** | Cable, NavController II/III, Main | 54601 |
| **6** | Cable Assy, GFX-750/XCN-1050 to NAV-900, Power/Ethernet (BRR) Extension, 2.5 m. Optional extension for large vehicles | 112082 |
| **7** | Cable Assy, 2 PIN DTM to 2 PIN DT Power Adapter | 67095 |
| **8** | Cable Assy, GFX-750/XCN-1050, Expansion Port Basic, RS-232, Dig I/O, 2.5 m | 110545 |
| **9** | Cable Assy, GFX-750/XCN-1050, Power to display, CAN, 2.5 m | 110551 |
| **10** | Cable Assy, GFX-750/CFX-750/FM-750/XCN-1050/FmX/FM-1000 Power with Relay and Switch (Acc) | 67259 |
| **11** | Cable Assy, GFX-750/CFX-750/FM-750/XCN-1050/FmX/FM-1000 Basic Power, 4 m | 67258 |

# GFX-750/XCN-1050 display: Preparation

The GFX-750/XCN-1050 display utilizes the RAM mount system.



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



# GFX-750/XCN-1050 display: Installation

## Step 1

Use the supplied V bolts or alternate (non-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.



## 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.



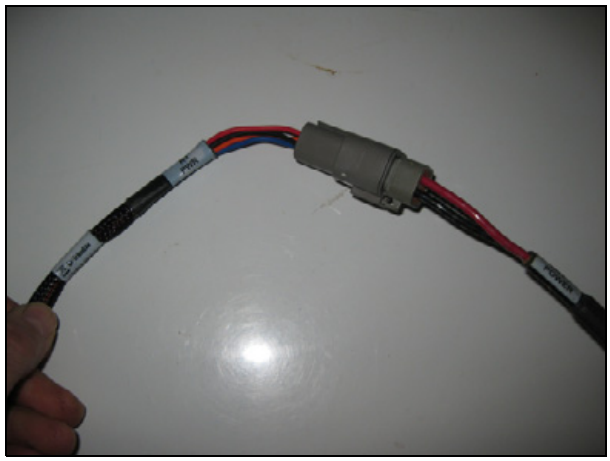
# GFX-750/XCN-1050 display: Installing the wiring harness

The GFX-750 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 will be 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.



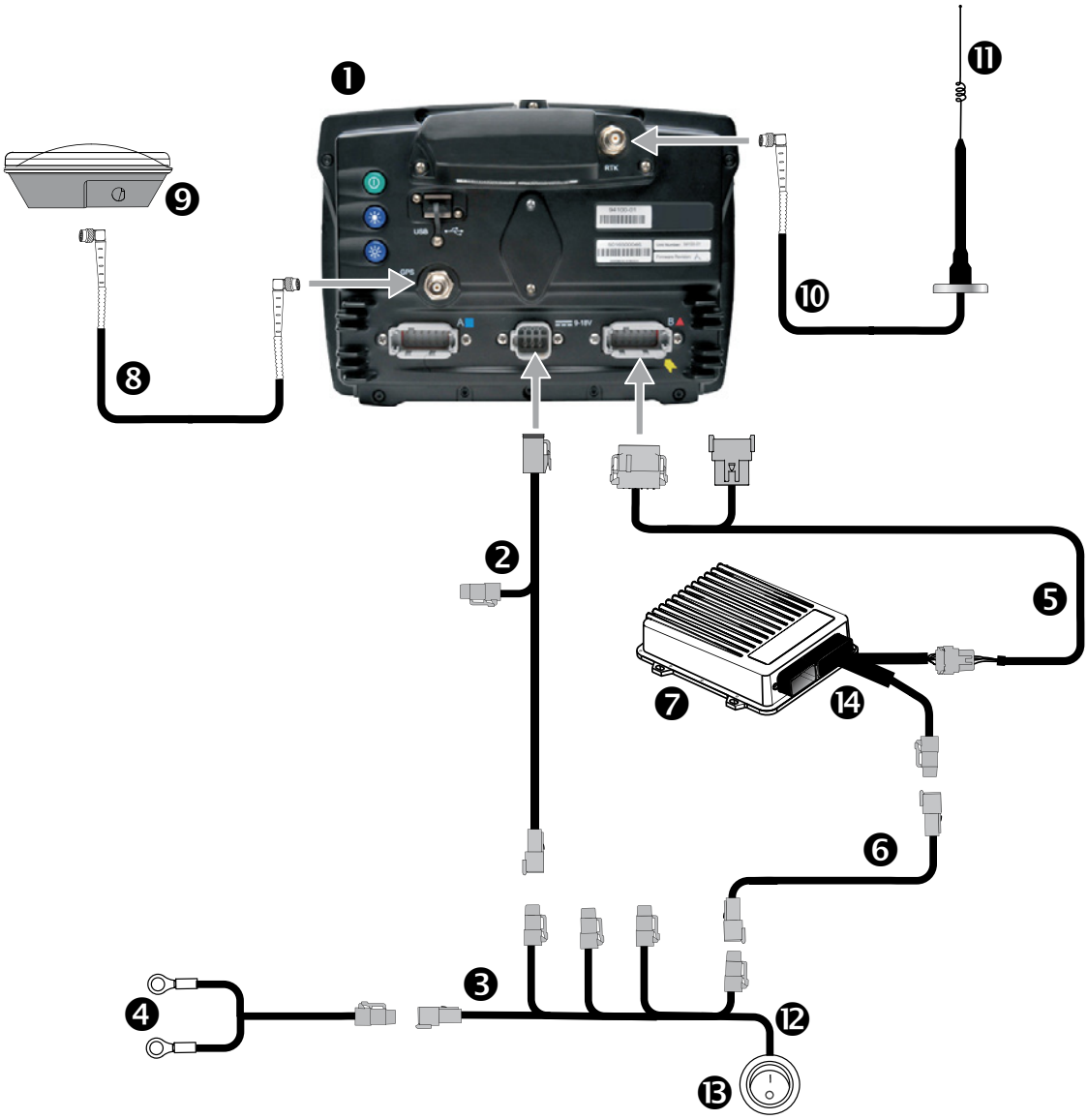


# 6

# Power Harness Installation


- CFX-750 display: Components
- GFX-750/XCN-1050 display: Components
- CFX-750 and GFX-750 displays: Installing the power harness
- CFX-750 and GFX-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

# CFX-750 display: Components



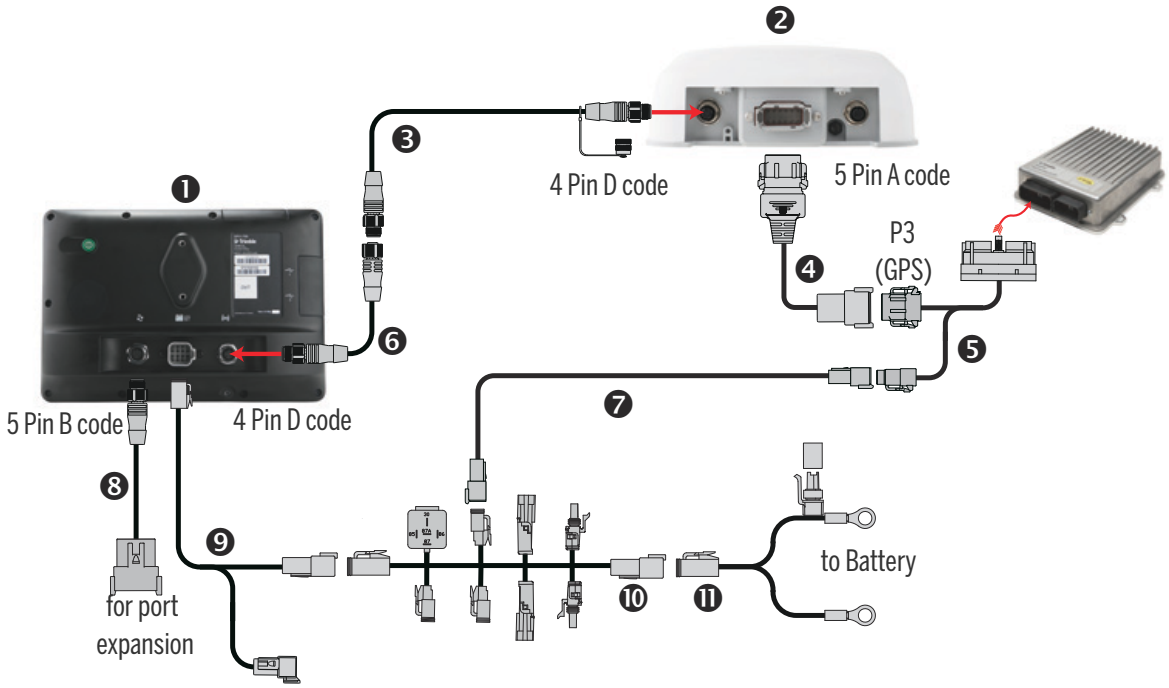

⚠ **CAUTION –** Connecting the Port Replicator on the CFX-750 display to NavController II cable ❺ to the P4 or P12 connector of the NavController II harness ⓮ will result in damage to the CFX-750 display and will void the warranty.

| Item | Description | Trimble part number |
|---|---|---|
| **1** | CFX-750 display<br>**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** | Basic power cable | 67258 |
| **5** | CFX-750 to NavController II cable with port replicator | 75741 |

| Item | Description | Trimble part number |
|---|---|---|
| **6** | 2 pin DTM to 2 pin DT power adaptor | 67095 |
| **7** | NavController II | 55563-00 |
| **8** | 8 m GPS TNC/TNC RT angle cable | 50449 |
| **9** | AG25 GNSS antenna | 77038-00 |
| **10** | NMO to TNC 20ft antenna cable and base | 62120 |
| **11** | 900 MHz radio antenna kit | 22882-10 |
| **12** | External switch cable included with kit | Part of P/N 67259 |
| **13** | External switch included with kit | Part of P/N 67259 |
| **14** | Main NavController II cable | 54601 |

# GFX-750/XCN-1050 display: Components

This graphic shows the Autopilot system using NAV-900 as an external guidance device.




| Item | Description | Trimble part number |
|---|---|---|
| **1** | GFX-750/XCN-1050 display, with PIQ App | 121000-XX |
| **2** | NAV-900 Guidance controller | 108993-05 |
| **3** | Cable Assy, GFX-750/XCN-1050 to NAV-900, Power/Ethernet (BRR), 5 m | 110540 |
| **4** | Cable Assy, NAV-900 to Nav II/III, AutoPilot™ | 110547 |
| **5** | Cable, NavController II/III, Main | 54601 |
| **6** | Cable Assy, GFX-750/XCN-1050 to NAV-900, Power/Ethernet (BRR) Extension, 2.5 m. Optional extension for large vehicles | 112082 |
| **7** | Cable Assy, 2 PIN DTM to 2 PIN DT Power Adapter | 67095 |
| **8** | Cable Assy, GFX-750/XCN-1050, Expansion Port Basic, RS-232, Dig I/O, 2.5 m | 110545 |
| **9** | Cable Assy, GFX-750/XCN-1050, Power to display, CAN, 2.5 m | 110551 |
| **10** | Cable Assy, GFX-750/CFX-750/FM-750/XCN-1050/FmX/FM-1000 Power with Relay and Switch (Acc) | 67259 |
| **11** | Cable Assy, GFX-750/CFX-750/FM-750/XCN-1050/FmX/FM-1000 Basic Power, 4 m | 67258 |

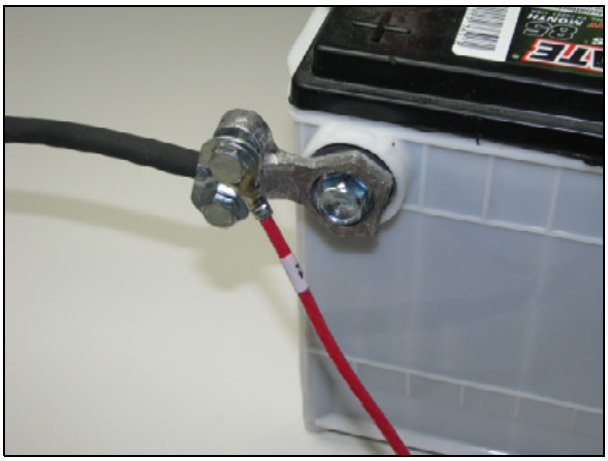
# CFX-750 and GFX-750 displays: Installing the power harness

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

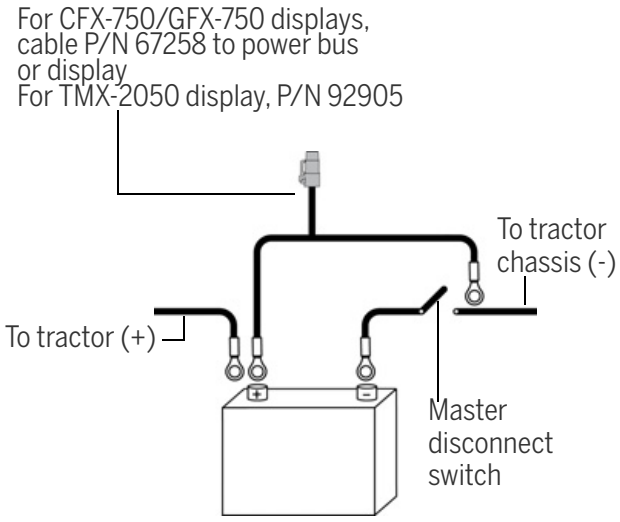
⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

## Step 1

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

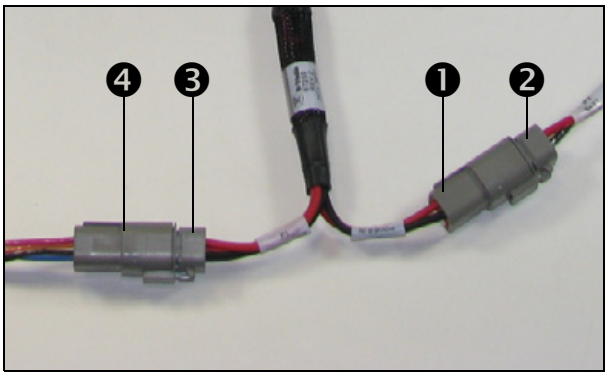


⚠ **CAUTION –** If the vehicle has a master electrical disconnect, make sure the basic power cable (P/N 67258 / 92905) is not directly attached to the battery terminal that is disconnected by the master switch - the negative pole in this example.
Attach this terminal side just past the main disconnect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




### Step 3

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




**CFX-750 display**

# CFX-750 and GFX-750 displays: Configuring the power bus options

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

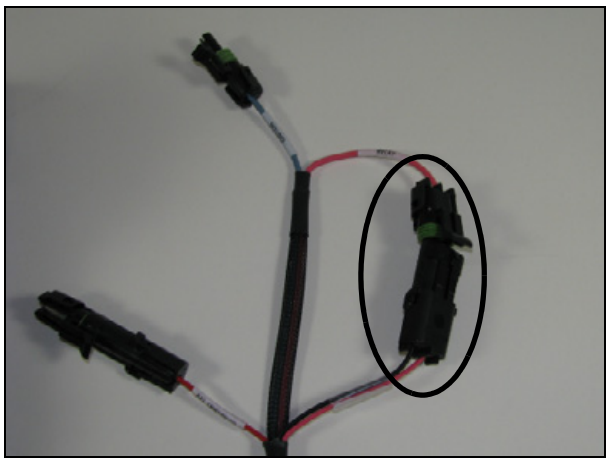
⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

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

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

## Display power button is used to turn on the Autopilot system

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

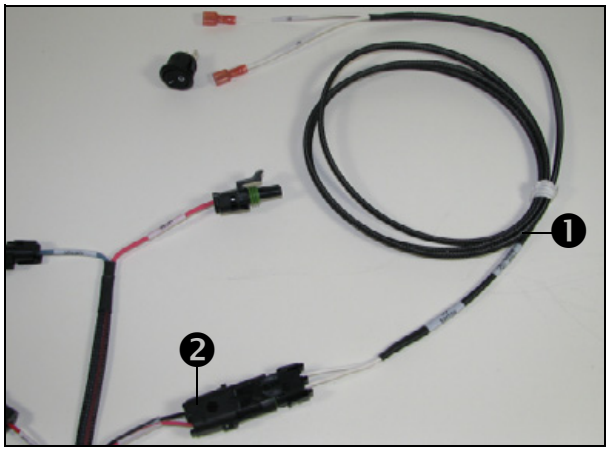


## External switch is used to turn on the Autopilot system

### Step 1

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

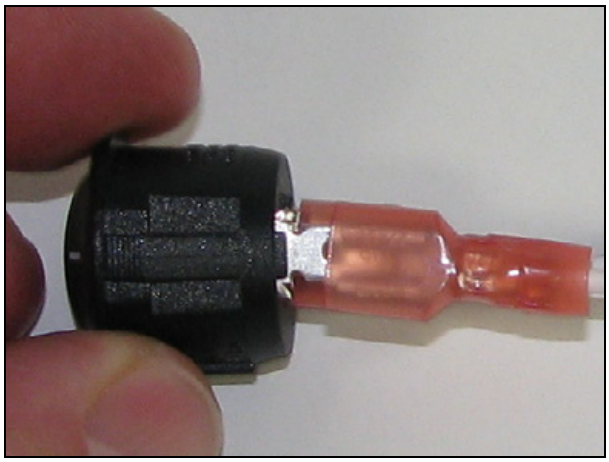
**NOTE –** To install the switch provided, drill a ¾" hole.



### Step 2

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

**NOTE –** Polarity is not important.

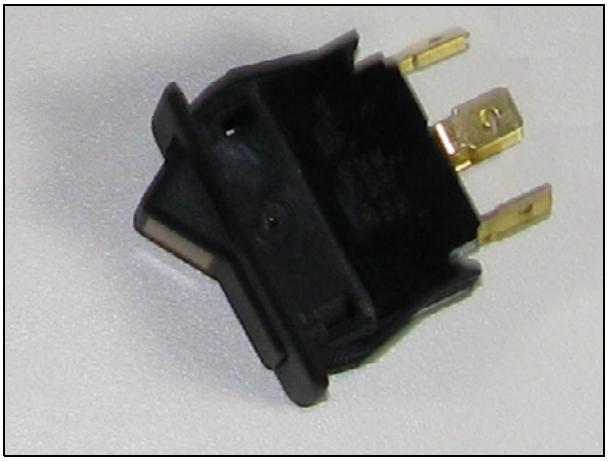


## Installing the optional illuminated full or standard Euro switch

### Step 1

Find an available knockout location on the vehicle console.

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

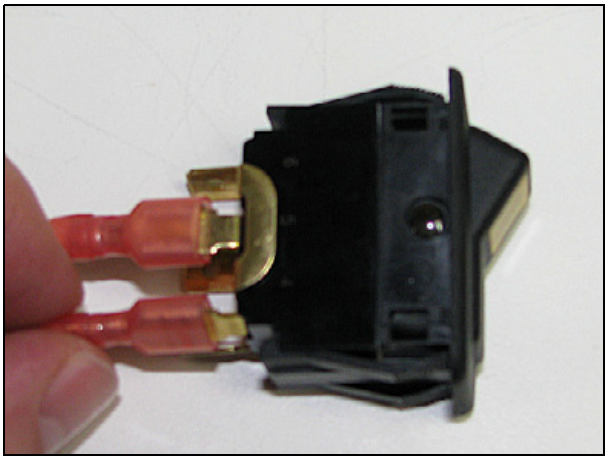


### Step 2

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

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

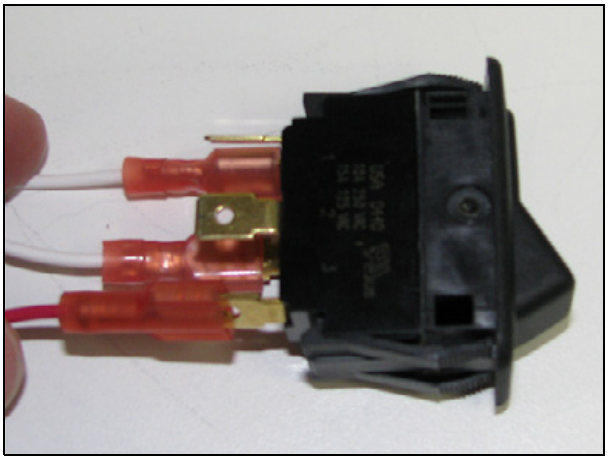
**NOTE –** Polarity is important.



### 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.

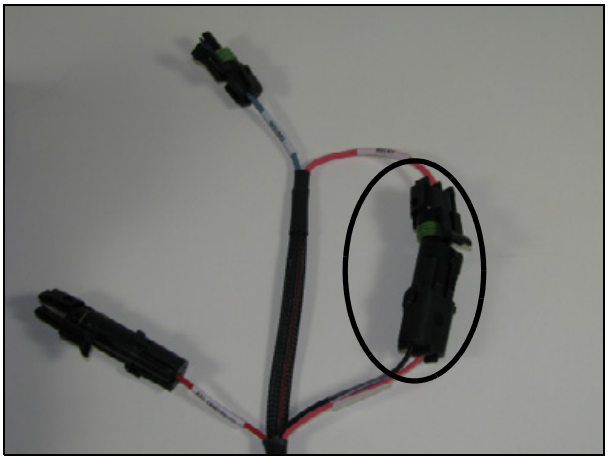
**NOTE –** This additional wire is required to allow the switch to illuminate.



## Ignition is used to turn on the Autopilot system

### Step 1

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

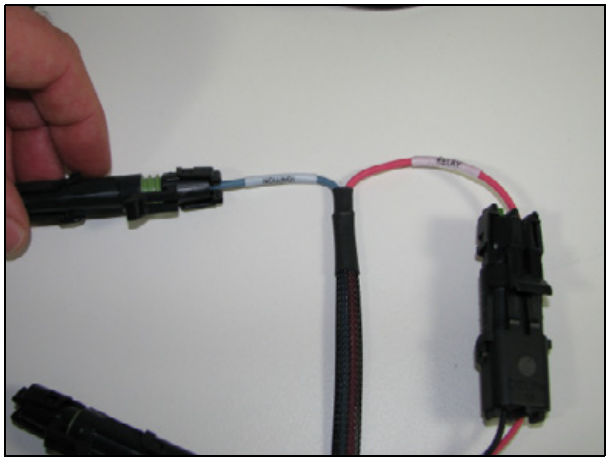


### Step 2

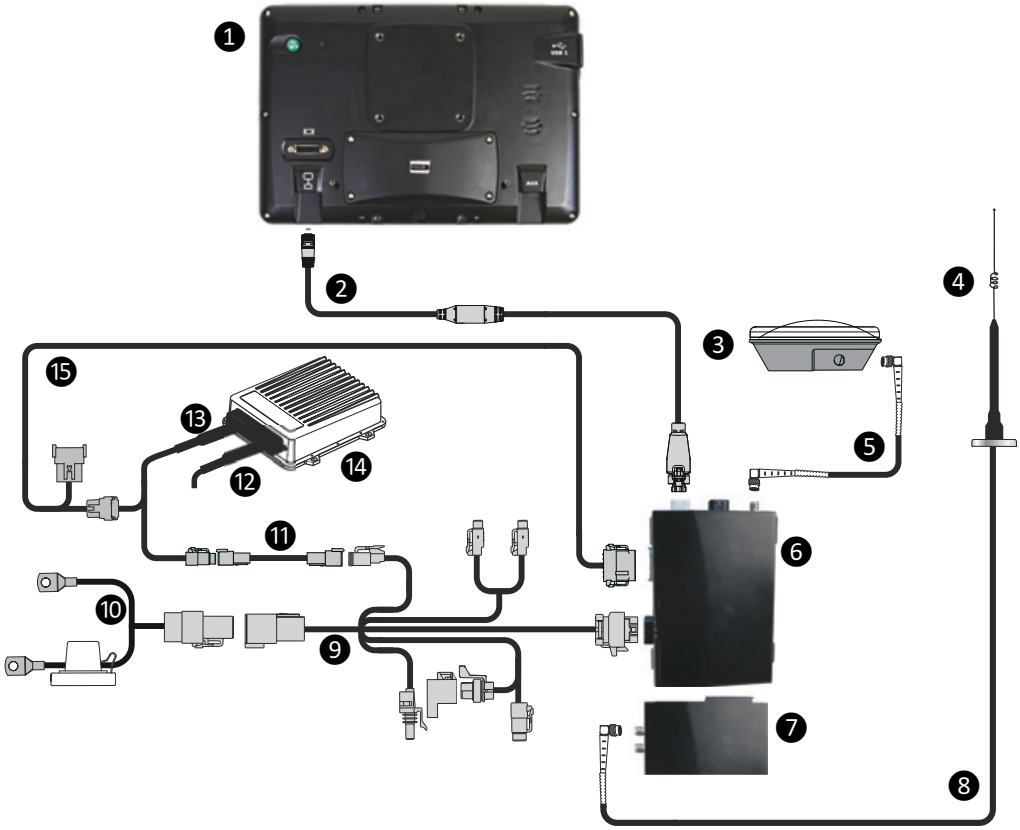
Connect the cable labeled **R8 Ignition** (included with the power bus) to connector **P3 Ignition** on the power bus.

### Step 3

Route the cable to the vehicles ignition.



# TMX-2050 display: Components



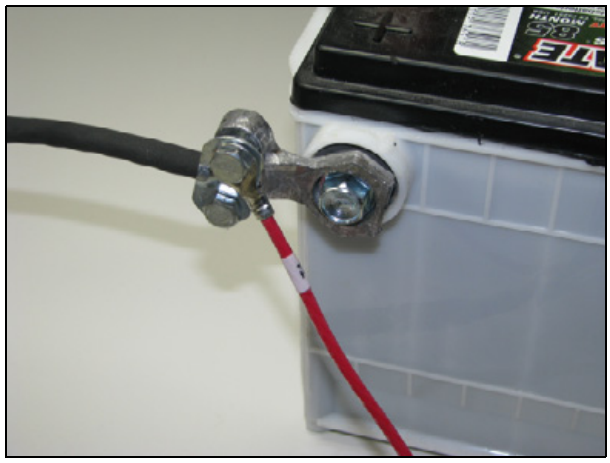

| Item | Description | Trimble part number |
|---|---|---|
| **1** | TMX-2050 display | 96700-00 |
| **2** | TM-200 Module to display cable | 93843 |
| **3** | AG-25 GNSS antenna | 77038-00 |
| **4** | 900 MHz radio antenna kit | 22882-10 |
| **5** | 8 m GNSS TNC/TNC RT angle cable | 50449 |
| **6** | TM-200 Module | 95060-00 |
| **7** | AG-815 radio | |
| **8** | NMO-to-TNC 20 ft antenna cable and base | 72122 |
| **9** | TM-200 Module power and I/O cable | 92676 |
| **10** | Cable, battery | 92905 |
| **11** | 2-pin DTM to 2-pin DT power adapter cable | 67095 |
| **12** | Cable, NavController diagnostic | 54602 |
| **13** | Main NavController cable | 54601 |
| **14** | NavController | 55563-00<br>55566-00 |
| **15** | TM-200 Module to NavController cable with port replicator | 75741 |

# TMX-2050 display: Installing the power harness

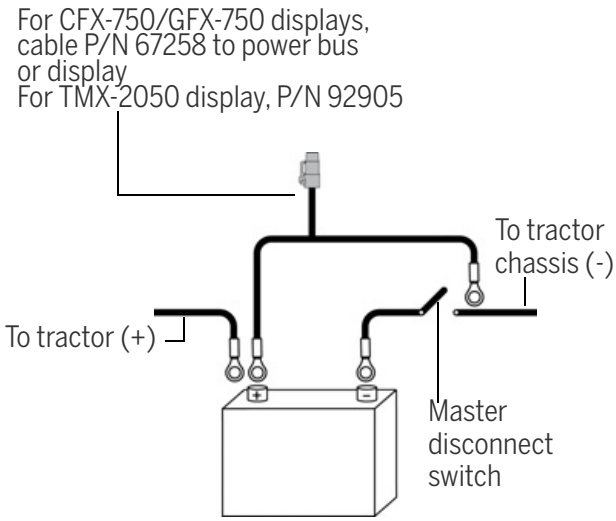
⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

## 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.



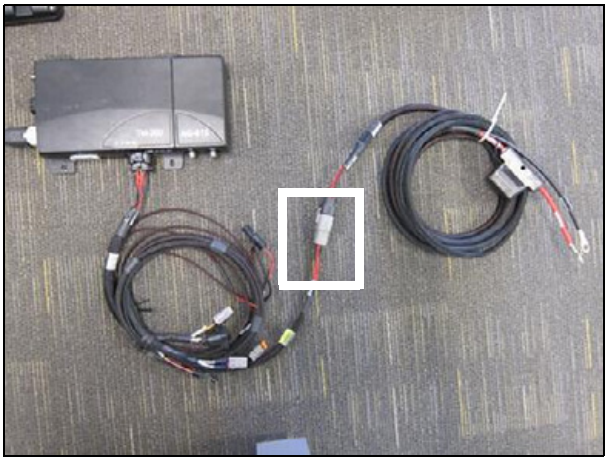
### Step 2

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




### Step 3

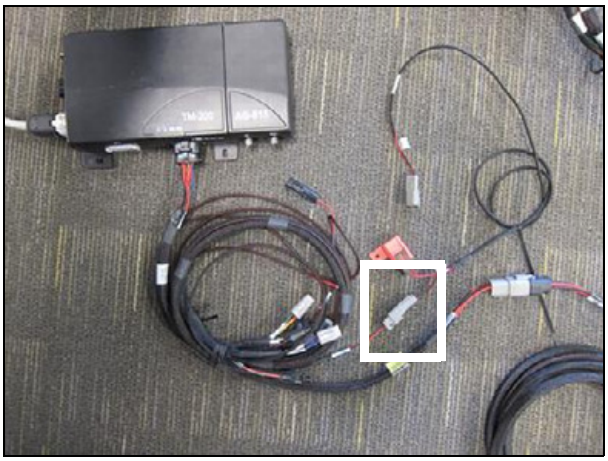
Route the power cable P/N 92905 that you previously connected to the battery and connect it to the R3 power in plug on the P/N 92676 cable.



### Step 4

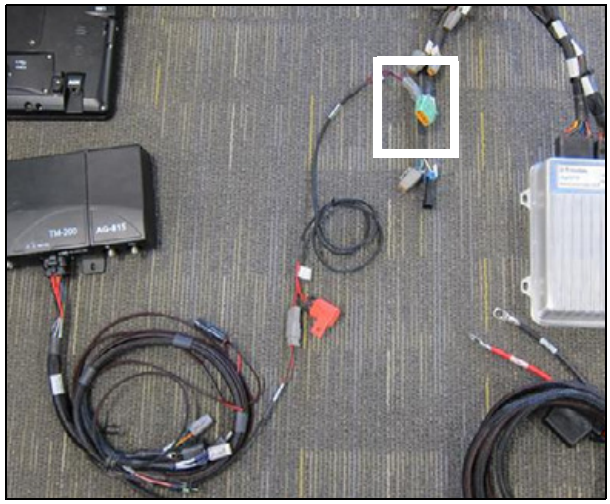
Connect the 2-pin DTM to 2-pin DT power adaptor P/N 67095 to the P2 power out connector on the P/N 92676 cable.

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

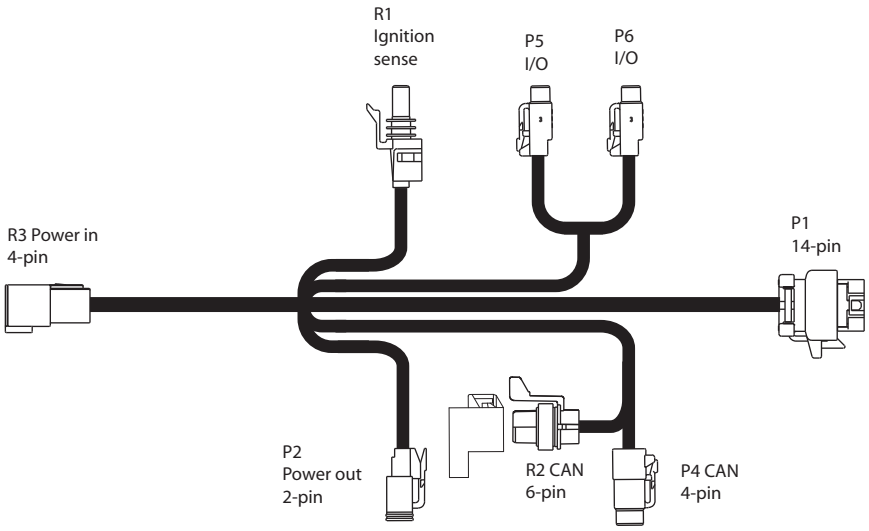
⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

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

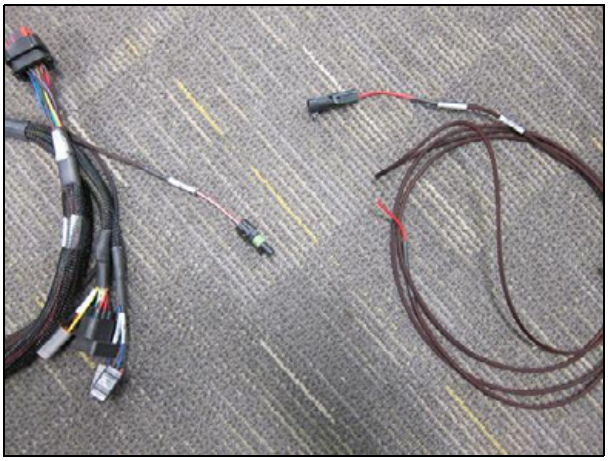
For ignition sensing with the TMX-2050 display, connect the ignition on the power supply to the R1 connector on the harness, P/N 92676.




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

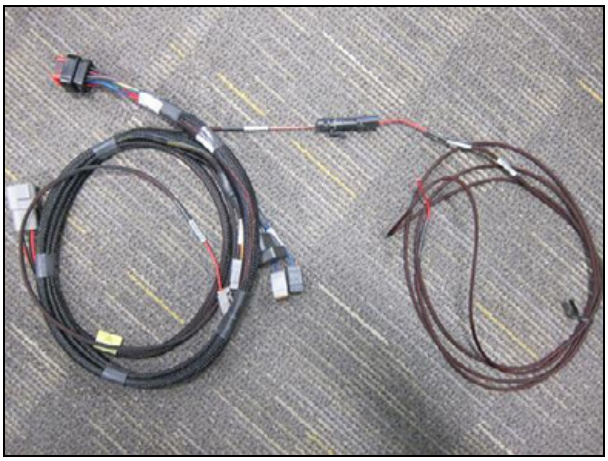
### Step 1

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.



7

# Remote Engage Switch Installation


- Remote engage switch components: Rocker switch
- Remote engage switch components: Foot switch
- Preparing the remote engage cable
- Using the remote engage switch

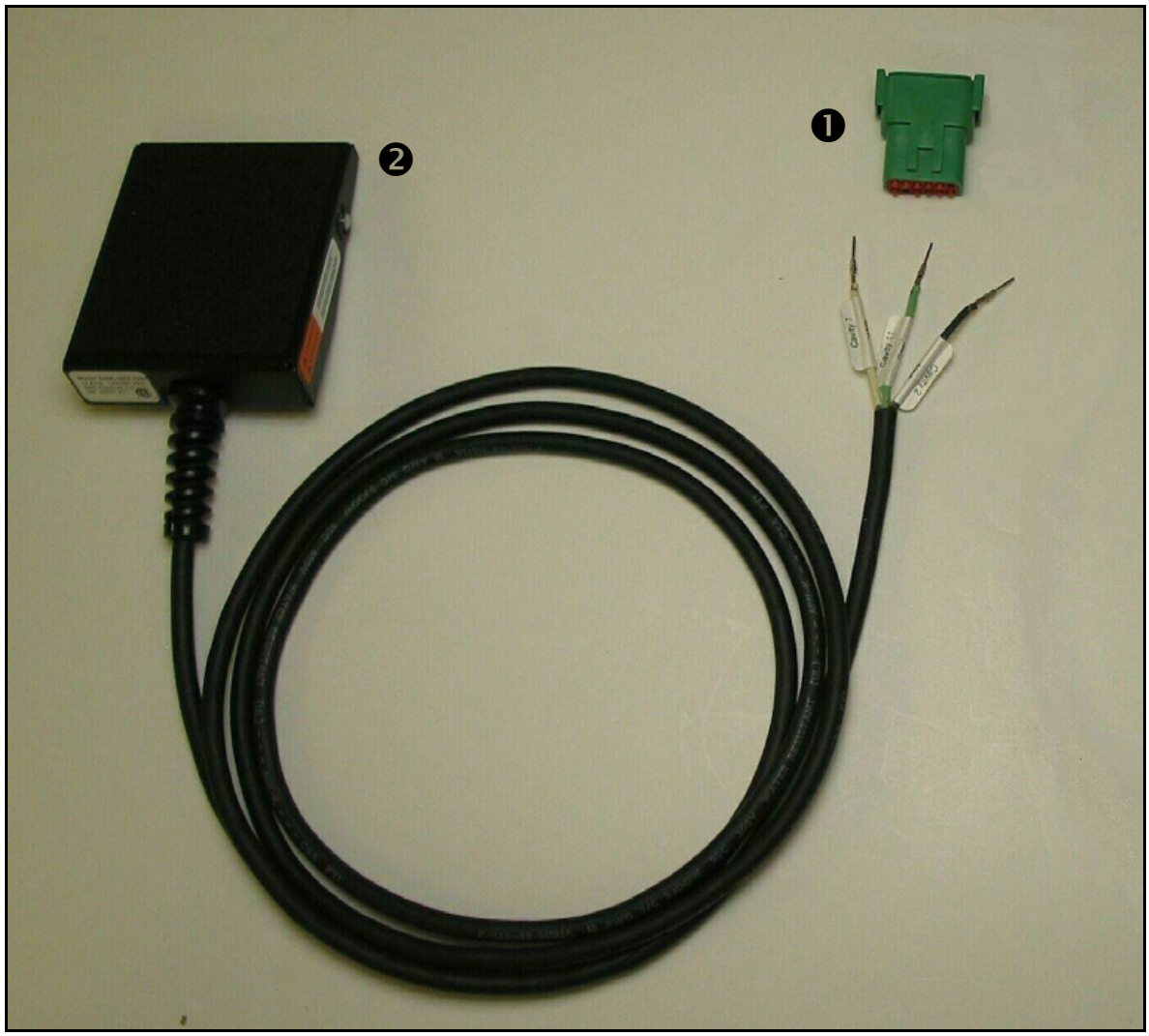
# Remote engage switch components: Rocker switch




| 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

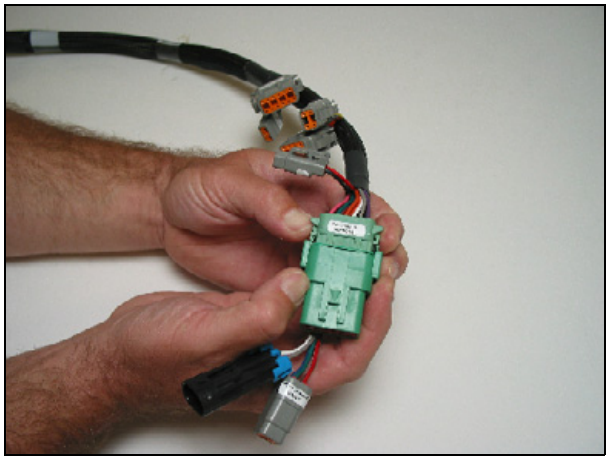



| Item | Description |
|---|---|
| **1** | DTM receptacle |
| **2** | Remote engage foot switch |

# Preparing the remote engage cable

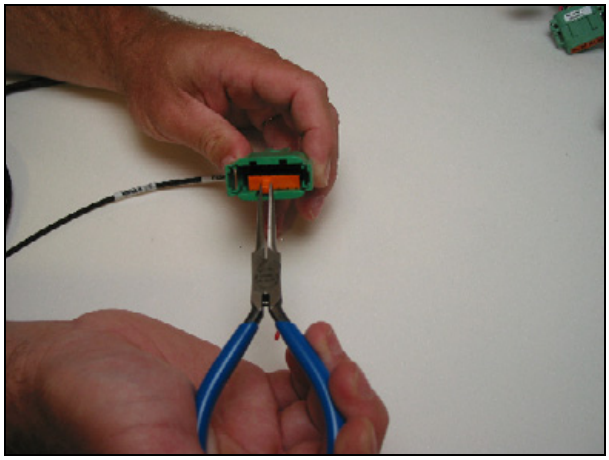
### Step 1

Locate the green 12-pin Deutsch receptacle on the P-5 leg of the main controller harness. For more information, see Controller connections, page 114.



### Step 2

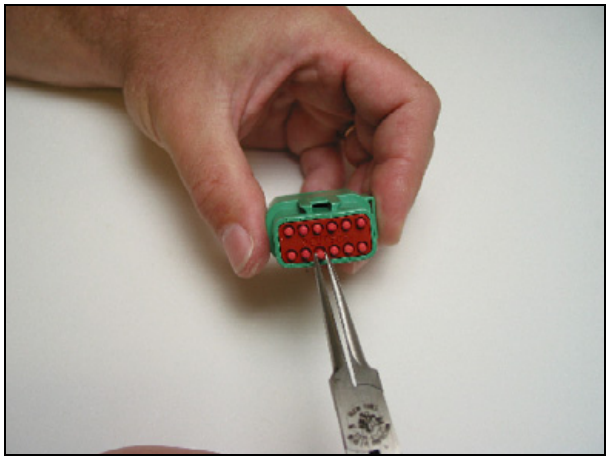
Remove the wedge from the connector.



### Step 3

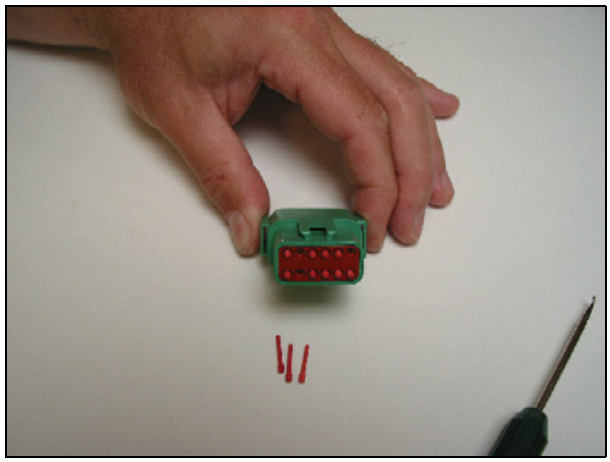
*Rocker switch only*

Remove the plugs from cavity 2 and cavity 7.



*Foot Switch Only*

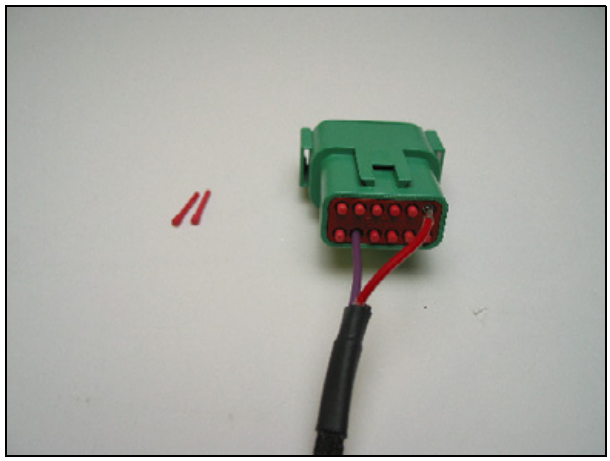
Remove the plugs from cavity 2, cavity 7, and cavity 11.



## Step 4

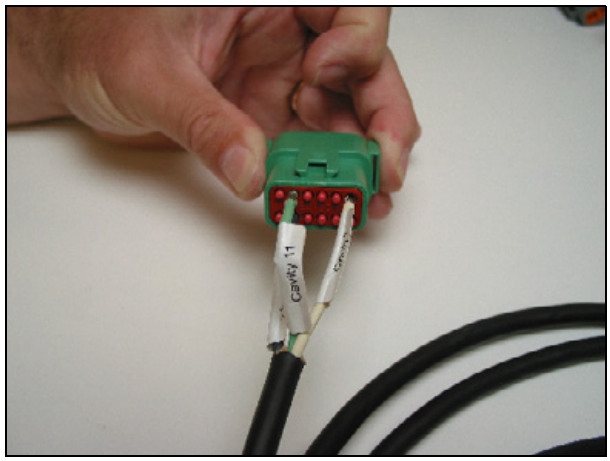
*Rocker switch only*

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



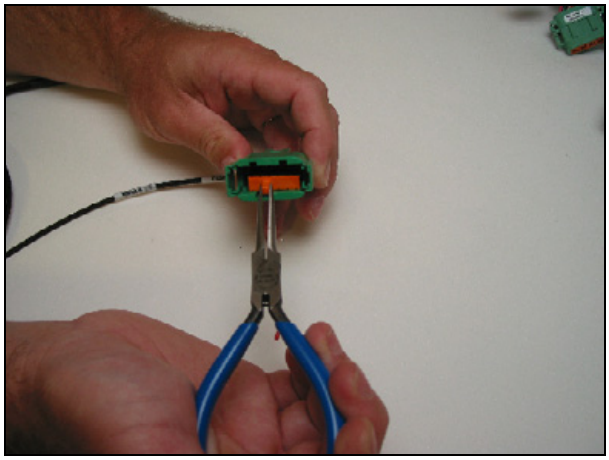
*Foot switch only*

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



### Step 5

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



### Step 6

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

### Step 7

*Rocker switch only*

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



*Foot switch only*

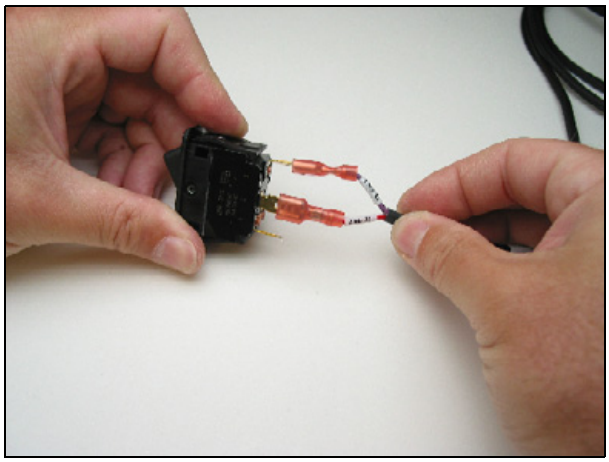
Run the cable to a clear location on the floor board. Use double-sided tape to secure the pedal. Route the cable under the floor mat.



### Step 8

*Rocker Switch Only*

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



### Step 9

*Rocker Switch Only*

Place the switch in the console.



## Using the remote engage switch

To engage a system using NavController II 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.

8

# Controller Installation


- Installing the controller
- Installing the controller cables
- Controller connections


## Installing the controller

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

The process below describes how to install the NavController III next to the seat, along the wall of the machine, as shown.

The orientation is:

- Yaw: 270
- Pitch: 90
- Roll: 0





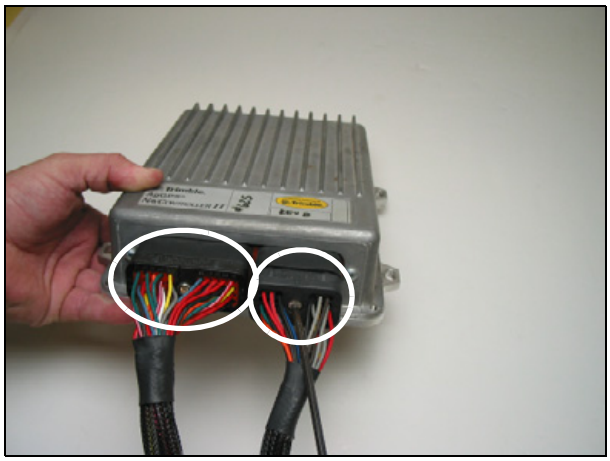
### Step 1

Using the NavController bracket as a template, carefully level the bracket then mark and drill four 5/16" holes for fixing the bracket to the machine.

Then, use the provided ¼" hardware to attach the bracket to the machine.

### Step 2

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



### Step 3

Use the four provided 10-32 screws to attach the NavController to the mounting bracket.

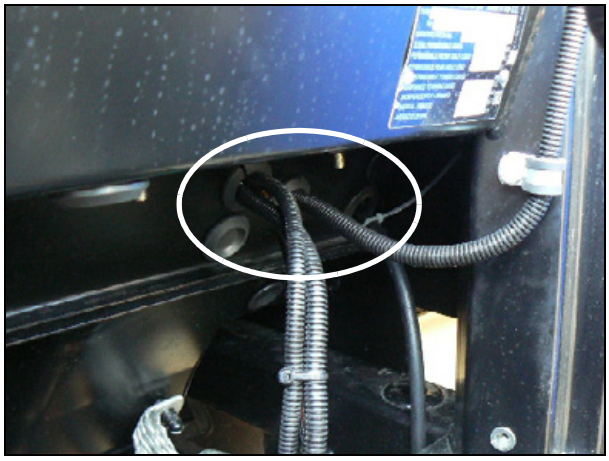




# Installing the controller cables

## Step 1

Locate the existing pass-through at the right corner of the cab and then pass all the Autopilot cables through it.



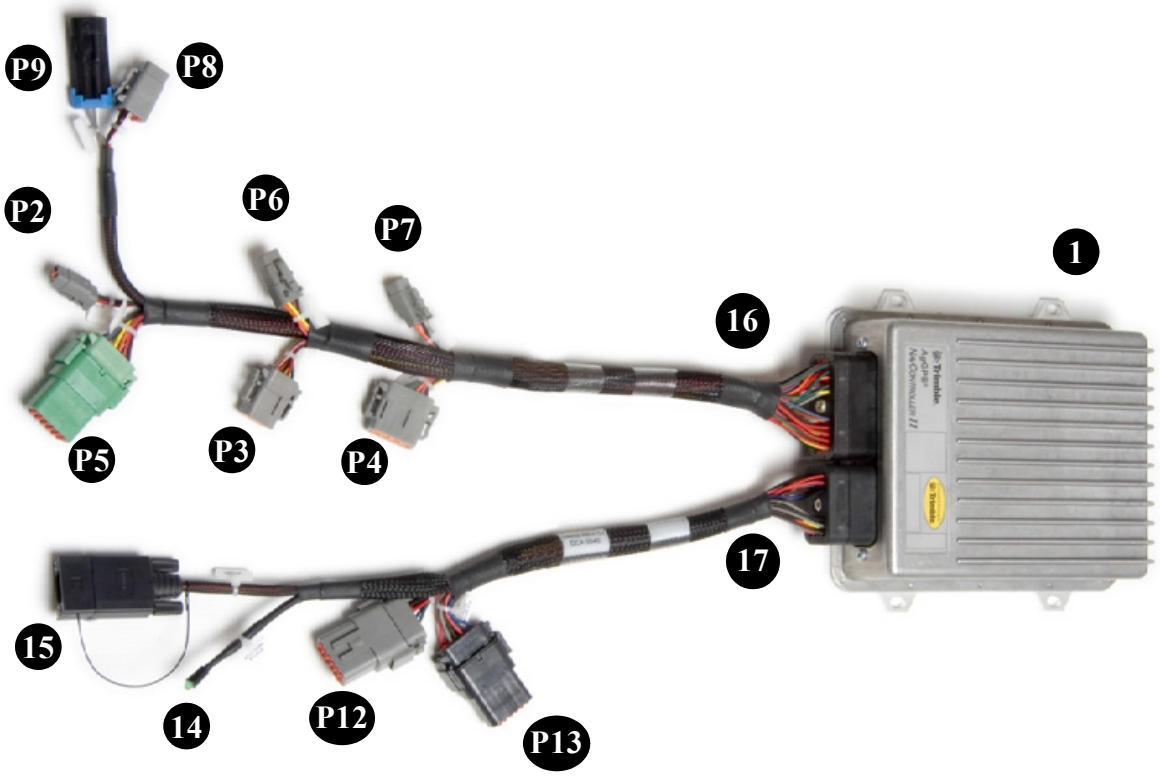
## Step 2

Coil the excess cables and then secure them with some cable ties behind the rear panel.

Protect the cables where they are in contact with any cutting edges at the pass-through at the back of the cab.



# Controller connections

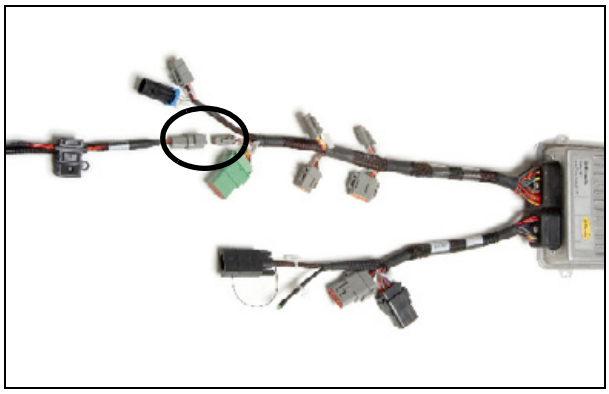



| Item | Description | Item | Description |
|---|---|---|---|
| **1** | NavController II controller | **P9** | Sonalert connector |
| **P2** | Power connector | **P12** | Lightbar/spare connector |
| **P3** | GPS connector | **P13** | Spare sensors connector |
| **P4** | Display connector | **14** | 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 | | |

### Step 1

Connect the power cable connection to P2, which is labeled **Power**. P-2 is located on the main wiring harness.

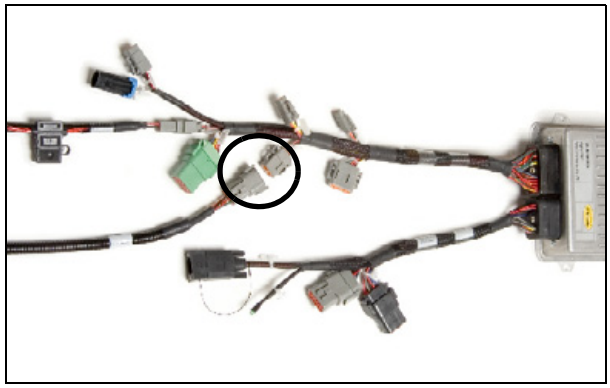
**NOTE –** The power connection supplies power through the controller to all connected devices, including GNSS and displays.



### Step 2

Connect the GPS cable connection to P3, which is labeled **GPS**. P-3 is located on the main wiring harness.

**NOTE –** If you are using a TMX-2050 or CFX-750 display, attach the main display cable here, P/N 75741.



### Step 3

With the cable routed to the NavController, the R1 connector will connect to the P12 connector on the 54602 harness on the NavController as shown.



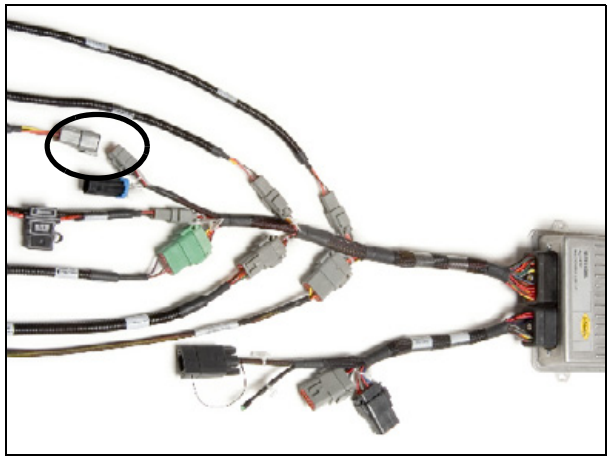
### Step 4

Connect the manual override cable connection to P7, which is labeled **Manual Override**. P7 is located on the main wiring harness.

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

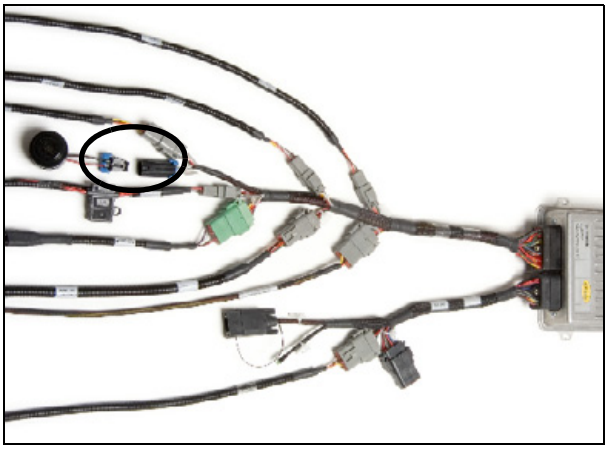
### Step 5

Connect the hydraulic steering valve cable connection to P8, which is labeled **Hydraulic Valve**. P8 is located on the main wiring harness.



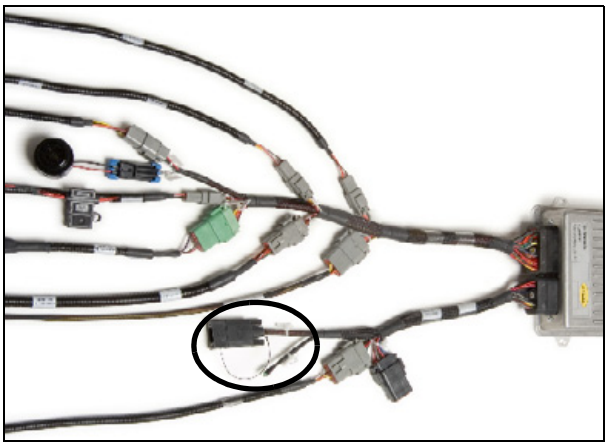
### Step 6

Connect the Sonalert P9 to the two pin Delphi connector on the main wiring harness. Route the cable so the Sonalert warning device is in a position that is audible to the operator.



### Step 7

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 8

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.

# 9

# Isolation Models Setup Instructions

- Connecting the isolation solenoid cable
- Configuring the NavController III to turn on the electronic isolation manifold
- Advanced setup instructions

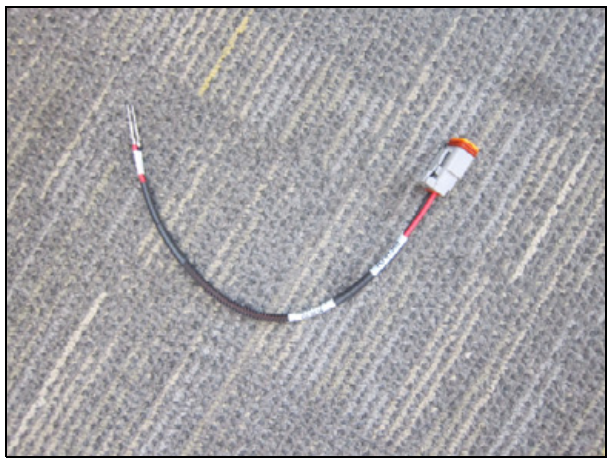
*These instructions must only be completed by users familiar with operation of H4 manifold.*

# Connecting the isolation solenoid cable

Connect the P/N 100199 and 103378 cables to provide power to the Autopilot cut-off coil.

Locate the supplied P/N 103378 and 100799 isolation manifold cable in the isolation manifold kit.





## Isolation manifold power connection (available only with NavController III)

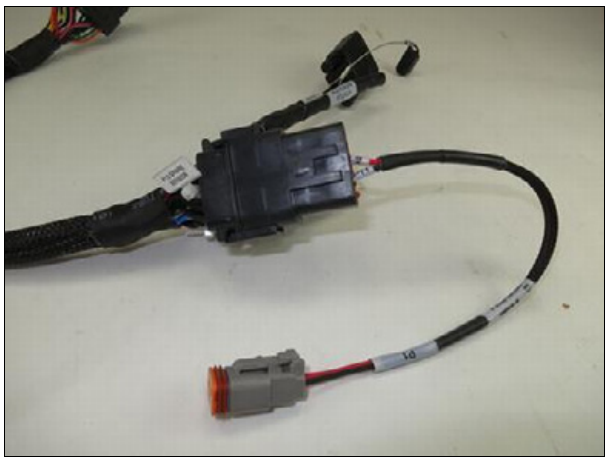
**NOTE –** This feature is not available with the NavController II.

**NOTE –** This connection type activates the isolation manifold automatically, using the third solenoid drive function of the NavController III.

Follow this procedure to connect the P/N 100199 cable to the NavController III harness, P/N 54602.

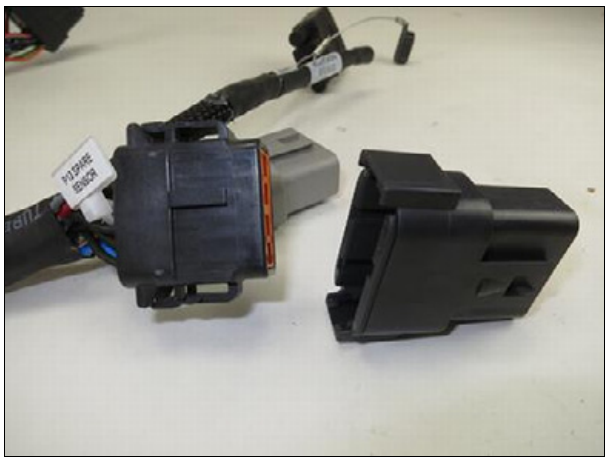
### Step 1

Locate the supplied P/N 100199 cable in the isolation manifold kit.



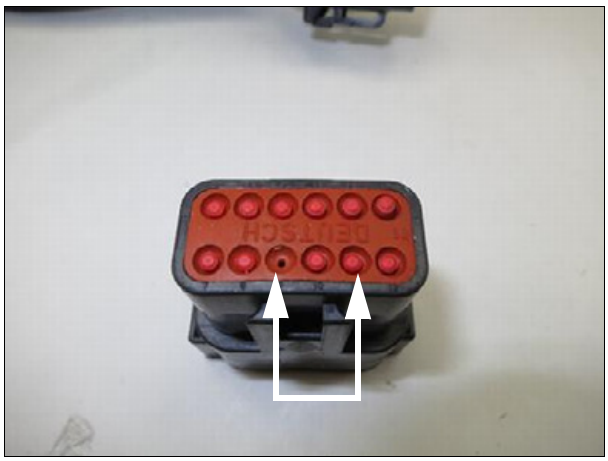
### Step 2

Locate and remove the connector plug from the P/N 54602 P13 connector.



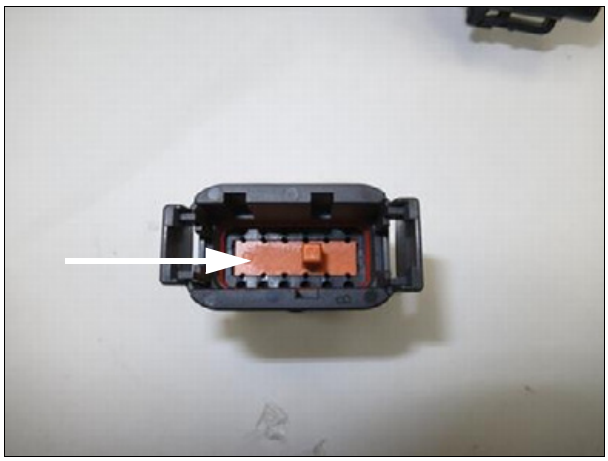
### Step 3

On the rear of the plug, remove the sealing pins from the 9 and 11 sockets.



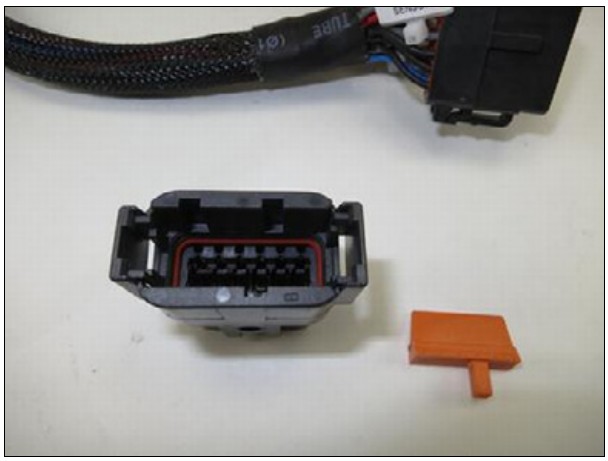
### Step 4

On the inside of the connector, locate the orange wedge lock.



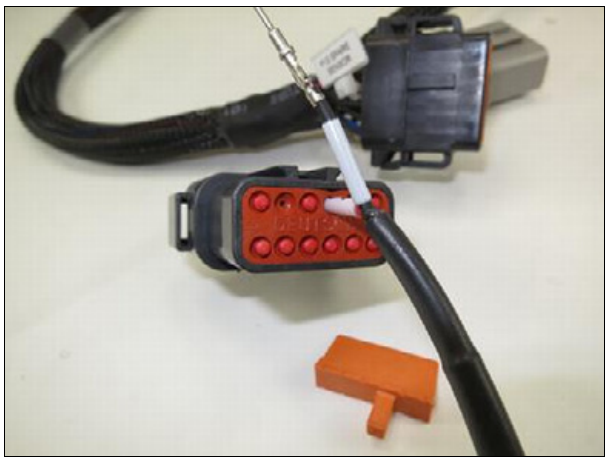
### Step 5

Use needle-nose pliers to remove the wedge lock by pulling it straight out of the plug connector.



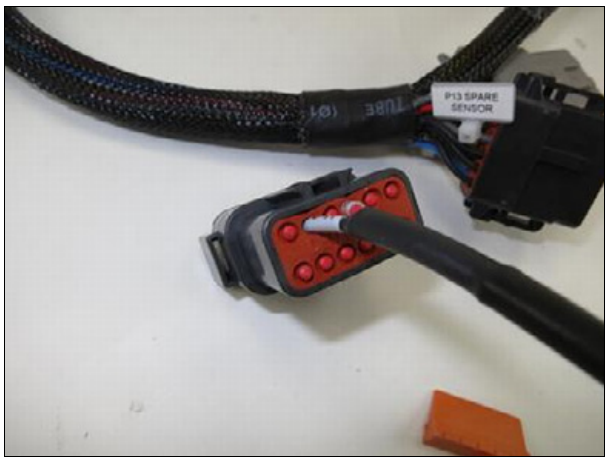
### Step 6

Insert the pin labeled **to p13-9** into the 9-pin location on the connector plug.



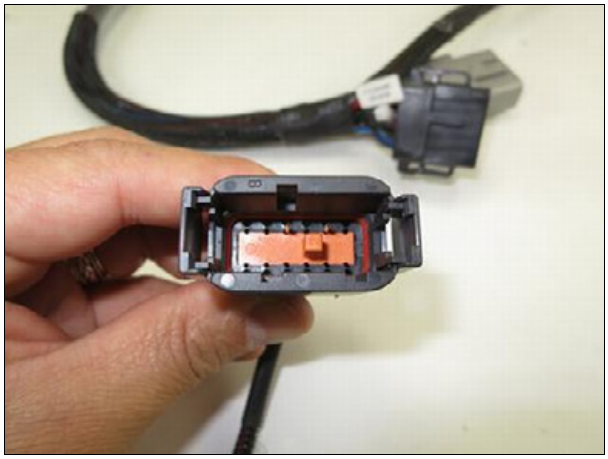
### Step 7

Insert the pin labeled **to p13-11** into the 11-pin location on the connector plug.



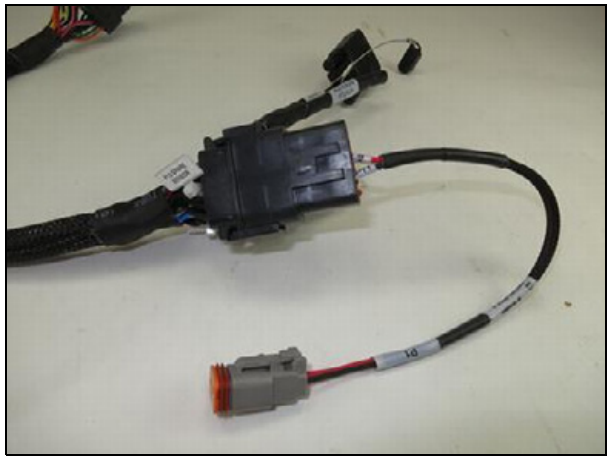

### Step 8

Re-install the orange wedge lock into the connector plug.



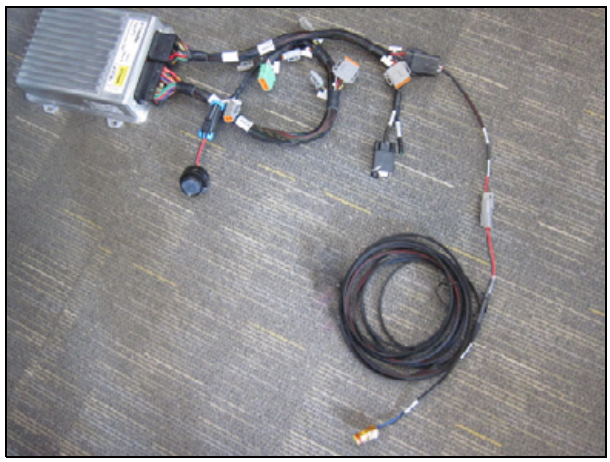
### Step 9

Connect the P13 plug to the P/N 54602 harness on the NavController III.



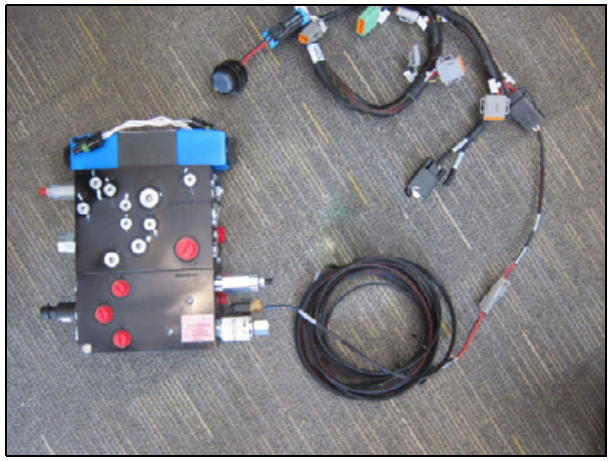
### Step 10

Connect the R1 connector on cable P/N 103378 to the P1 connector on cable P/N 100799.



### Step 11 - Connecting to the solenoid

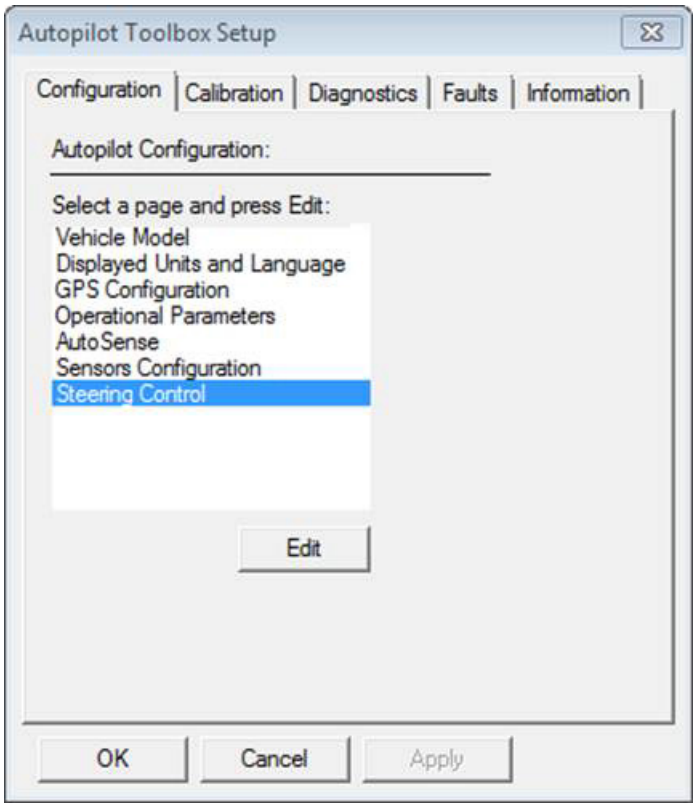
Route the P2 plug of cable P/N 103378 to the Autopilot manifold isolation solenoid and connect it as shown.



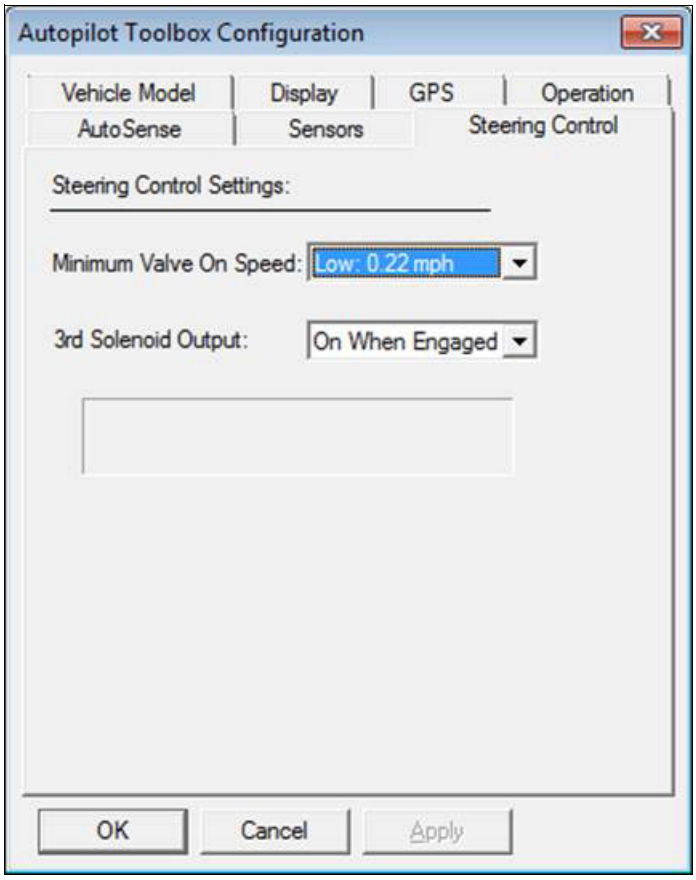


# Configuring the NavController III to turn on the electronic isolation manifold

1. In Autopilot Toolbox version 3.3 or later, in the Setup screen, click the **Configuration** tab, select **Steering Control** and then click **Edit**:



2. From the **3rd Solenoid Output** drop-down list, select **On When Engaged** and then click **OK**:




**NOTE –** The **Minimum Valve On Speed** applies also to the third solenoid valve. The third solenoid will not be active until the set speed is reached. If the vehicle drops below the selected speed, the third solenoid will no longer be active.

In v5.61 of FMX+ or PIQ firmware, UI is available to enable the **3rd Solenoid Output** field. Note that this functionality is not available when using NextSwath Connect.

# Advanced setup instructions

## Setting the load sense relief pressure

The Load sense relief pressure should be set approximately 100 psi lower than the system relief pressure to allow margin in the adjustment and to fully protect the system. The default setting of the LS relief valve is 2700 psi. If a lower pressure is required, these instructions will provide a procedure for adjusting the LS relief pressure. The relief pressure should not be increased above 2700 psi.

### Step 1

Install a pressure gauge into the LS2 port; if no DSV2 cartridge is present, the PX ports can also be used.

### Step 2

Connect the P line of the manifold to a 3000 psi pressure source such as a remote on a tractor.

### Step 3

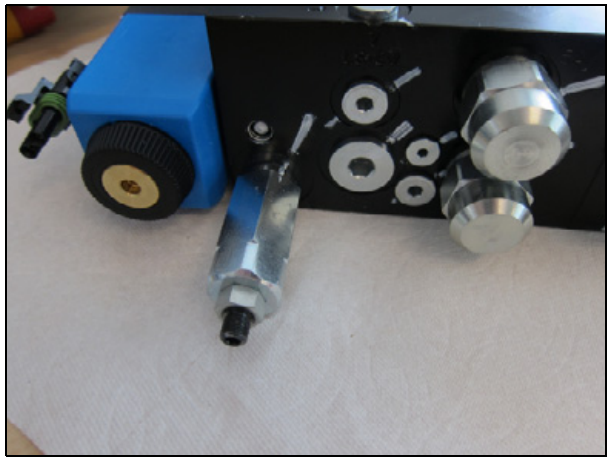
Connect the T line of the manifold to an oil tank or return line on the remote of a tractor.

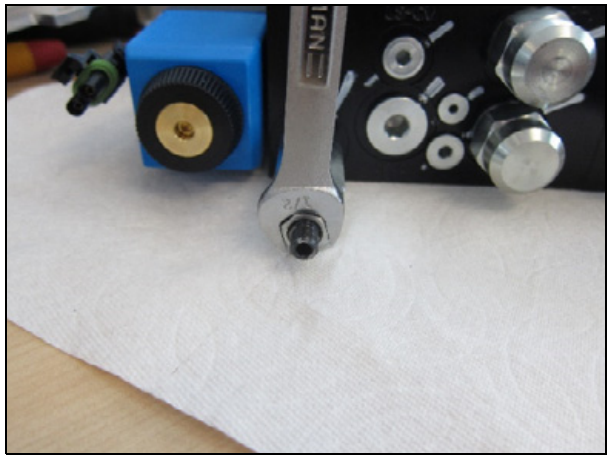
### Step 4

The A and B / SCU-A, SCU-B lines: May be either connected to the steering cylinders / orbitrol or capped off for this test.

### Step 5

Loosen the jam nut on the LS relief valve.

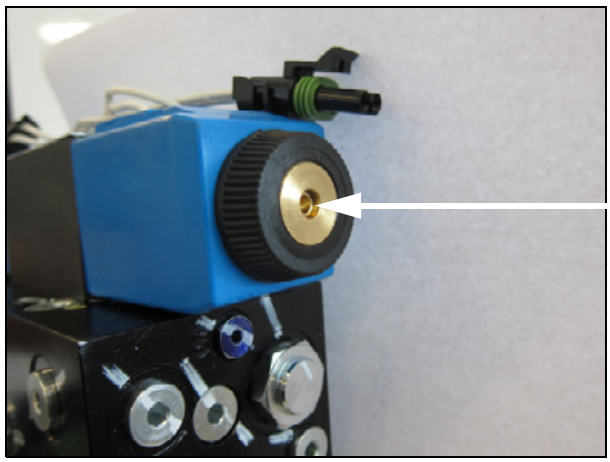




### Step 6

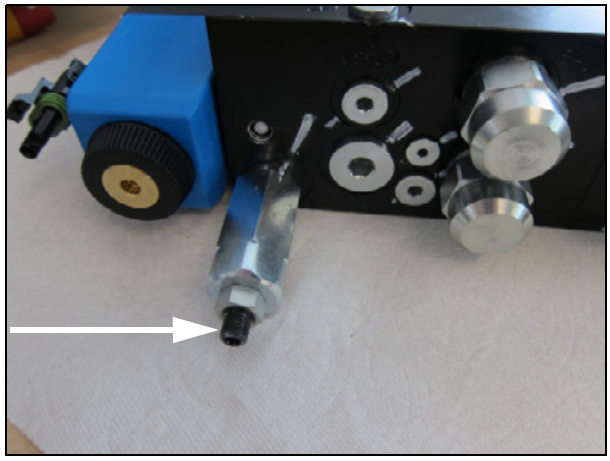
With pressure applied to the P port, press on one of the Detent overrides on the electro hydraulic valve. If the steering cylinders are present in the system, make sure to run the override until you hit and end stop to ensure you are at peak pressure.

**NOTE –** For systems with the isolation block, the isolation solenoid must be enabled.



### Step 7

With the override pressed, turn the relief valve in or out and watch the gauge to set the LS relief pressure.



## Adjusting the isolation manifold pressure reducing valve (PRV)

⚠ **CAUTION –** Increasing the pressure setting of the PRV can lead to the loss of ability to mechanically override the autopilot steering.

The isolation sandwich on the H4 manifold uses spring-biased pilot to shift cartridges to toggle between manual steering and Autopilot steering. The manual steering pressure adds to the spring cavity to pilot the cartridges open even in situations where the isolation solenoid were to remain on.

A Pressure reducing valve is present in the system to ensure that the isolation valve pilot pressure can always be overcome by the spring force **+** the manual steering pressure.

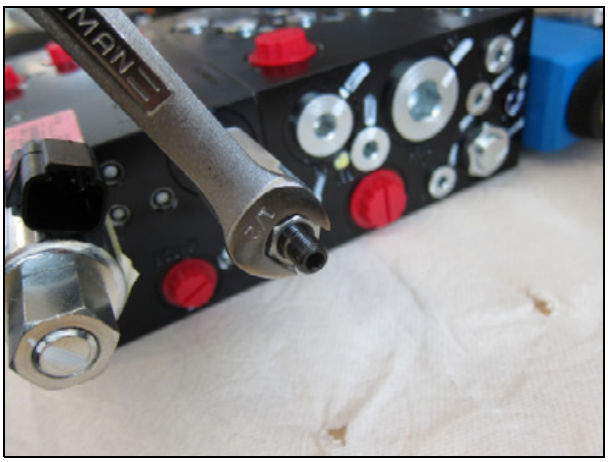
In some machines, it may be necessary to adjust the PRV setting in order to bias the cartridges more towards the manual steering or towards the Autopilot steering.

*For the system to function as intended, manual steering should always overcome Autopilot steering. To test this function the P/N 103378 cable can be connected to the power bus or other 12 V source, with the switch on and 12 V being supplied to the cut-off coil. Manually steering the machine should result in movement of the wheels*.

In the state where the isolation valve is powered when you are not steering manually, the Autopilot should be able to steer the machine; this means that if you were to press on the detent valve overrides you should be able to actuate wheel movement.

### Step 1

Locate and loosen the jam nut on the PRV cartridge.



### Step 2

Adjust the PRV valve by turning the screw with a hex wrench.

**NOTE –** Screwing the screw clockwise / inward will *add* pressure to the PRV setting, resulting in an increased bias towards Autopilot steering. This should be done if the Autopilot is sometimes not steering the machine.

Screwing the screw counterclockwise / outward will *reduce* pressure from the PRV, biasing the system more towards the manual steering side. The PRV setting should be decreased if the isolation solenoid is powered and manual steering is sometimes not possible.

# 10

# Final Machine Check

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

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

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

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

   You can use Autopilot Toolbox II software version 4.02 to load the configuration file into the Autopilot controller. You can download the Autopilot Toolbox II software from http://agpartners.trimble.com.
5. Calibrate the Autopilot system using the Trimble display or the Autopilot Toolbox II software. Depending on your machine type, the following items must be calibrated before you can use the Autopilot system:
   - NavController II mounting orientation
   - Manual override
   - AutoSense mounting orientation
   - Valve deadzone
   - Autopilot P-gain
   - Antenna height/Antenna axle offset, and Roll offset