Autopilot

AUTOMATED STEERING SYSTEM

INSTALLATION INSTRUCTIONS

CLAAS Axion 2013+ tractors

- 810 / 830 / 840 / 850

CLAAS Axion tractors

- 920 / 930 / 940 / 950/ 960

Version 8.00
Revision A
September 2019
P/N 54035-1185-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 September 2019 release (Revision A) of the *Autopilot Automated Steering System Installation Instructions*, part number 54035-1185-E08. It applies to version 8.00 of the Autopilot automated steering system.

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

Reorient or relocate the receiving antenna.

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

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

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Or

Mail a request for recycling instructions to:

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



Safety Information

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

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

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

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

Warnings

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

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

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

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

Cautions

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

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

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

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

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

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

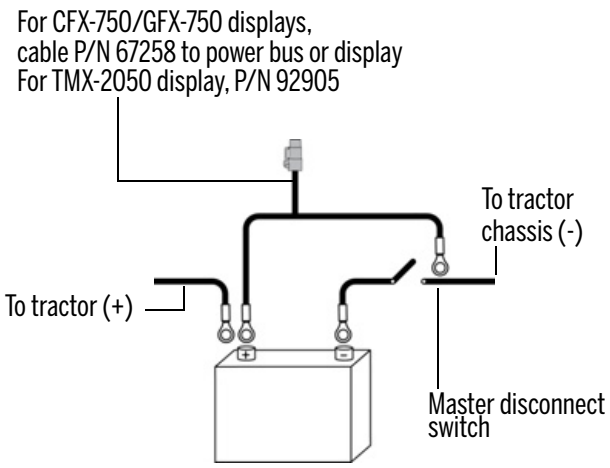


Set the hose pressure as low as practicable, and spray at a 45° to 90° angle. Keep the nozzle of the power washer away from the machine at the distance recommended by the manufacturer.

⚠ **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 54035-1185	10.5 mm drill bit
Hydraulic hose kit: P/N 93580-2000	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 54035-1185	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: • Main wiring harness • Power bus auxiliary wiring harness • 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: P/N 93580-2000	Hydraulic hoses	Chapter 2
	Hydraulic adapters	

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.

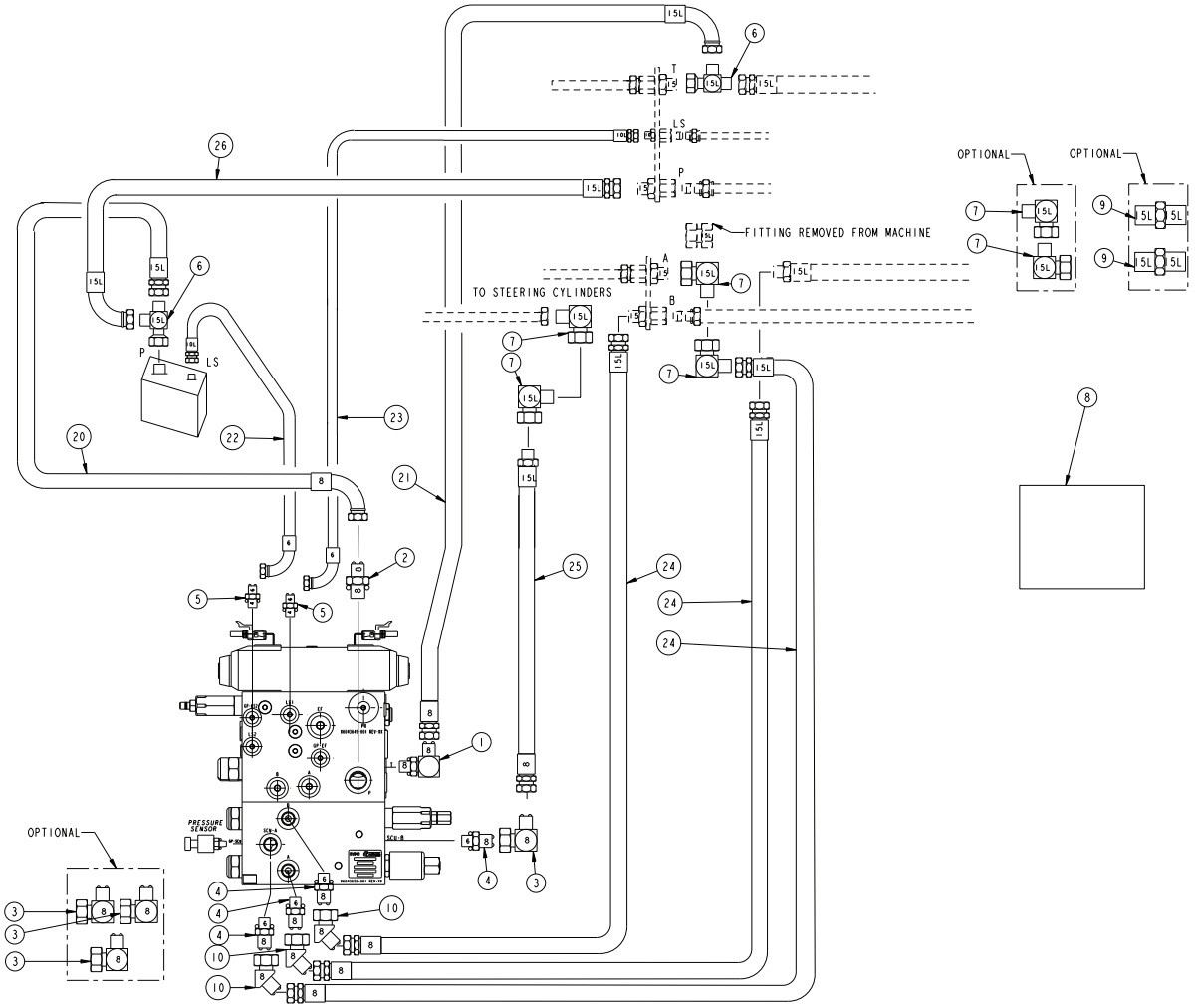
NOTE – The left and right sides of the vehicle are referenced while standing behind the unit, facing the normal direction of travel.

2

Hydraulic Control Valve Installation

- Hydraulic system components
- Assembling the hydraulic control valve
- Mounting the hydraulic manifold
- Connecting the hydraulic lines
- Cable connections on manifold

Hydraulic system components



Fittings

Item	Description	Part number	Quantity
1	Fitting	8 CSOLO	1
2	Fitting	8 FSOLO	1
3	Fitting	8 C6LO	4
4	Fitting	8-6 FSOLO	4
5	Fitting	6-4 FSOLO	2
6	Fitting	EL I SL	2
7	Fitting	EWISL	6
8	Fitting	SPIRAL BOUNDLING WRAP I0FT MCMASTER 7432K66 OR EQUIVALENT	1
9	Fitting	GISL	2
10	Fitting	8 V6LO	3

Hoses

Item	Description	Part number	Line	Quantity
20	65" hose	F451TCCAJ9-15L-08-08-65''	P	4
21	81" hose	F451TCJSCF-08-15L-08-81''	T	1
22	58" hose	F451TCCAJ9-1OL-06-06-58''	LS2	1
23	75" hose	F451TCCAJ9-1OL-06-06-75''	LS1	1
24	80" hose	F451TCCAJS-15-08-08-80''	A, B, SCU-A	1
25	80" hose	F451TCDOJS-15L-08-08-80''	SCU-B	1
26	55" hose	F451TCCACF-15L-15L-08-55''	Pr	1

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.

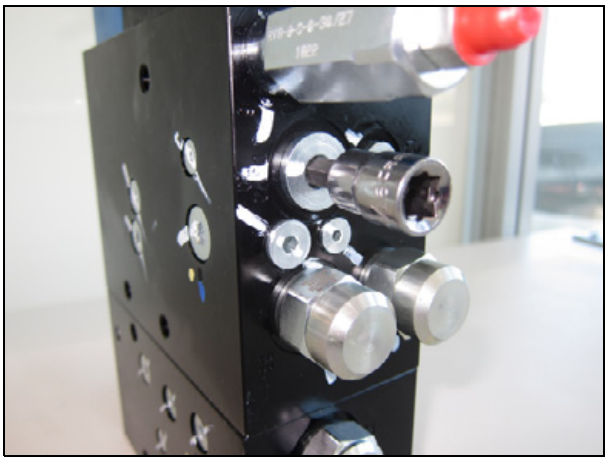
Gather the manifold, fittings and cartridges for preparing the manifold on a clean work surface.

Configuring the manifold for load sense line shuttling

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.

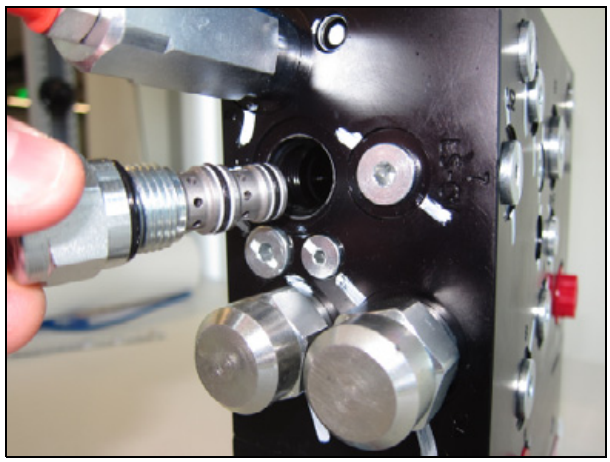


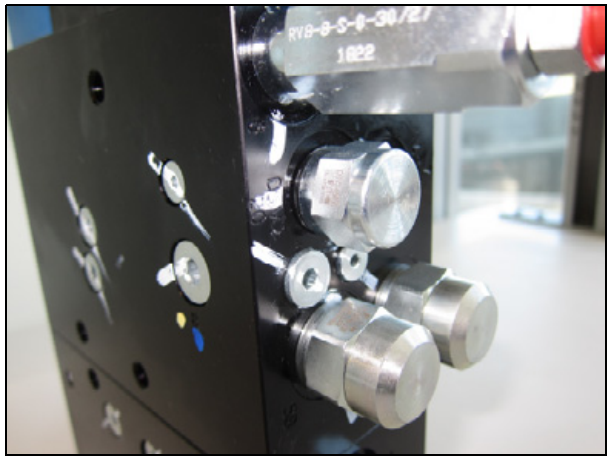
- 95 PSI DSV2, Trimble P/N 114165



Step 2

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

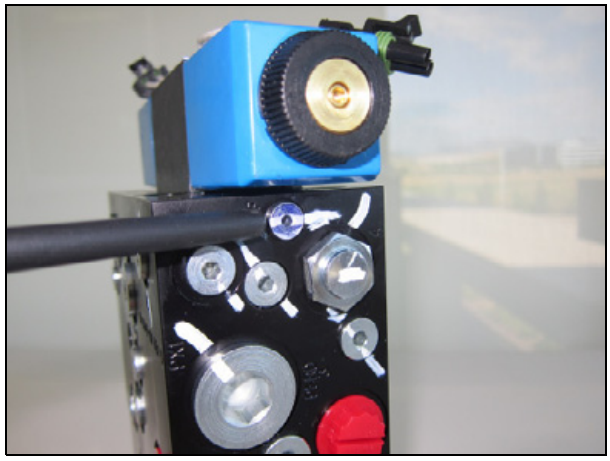




Configuring H4 for dynamic load sense flow

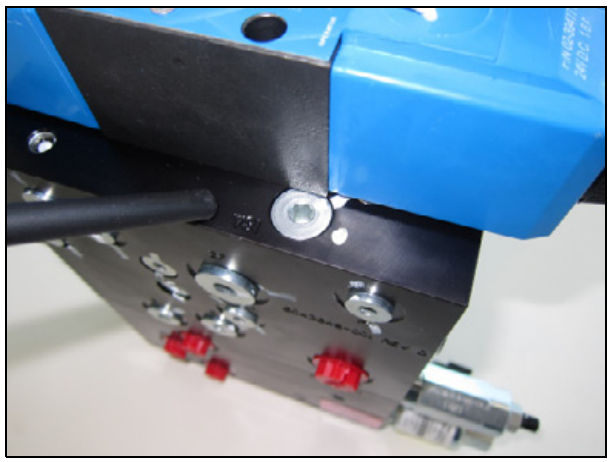
Step 1

Install the charge kit: Remove the orifice from the orifice parking space shown here.



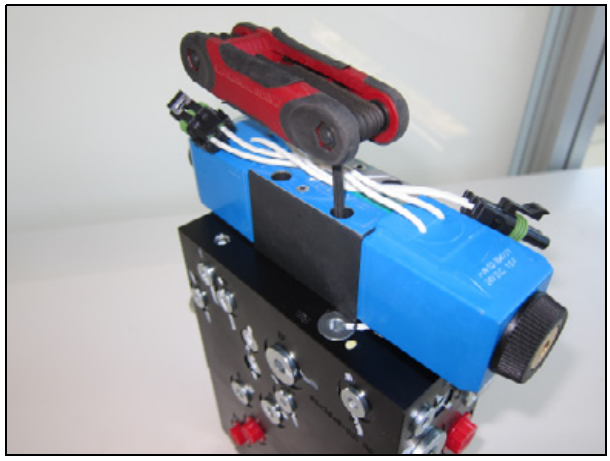
Step 2

Install the orifice plug behind the 18A plug, shown here.



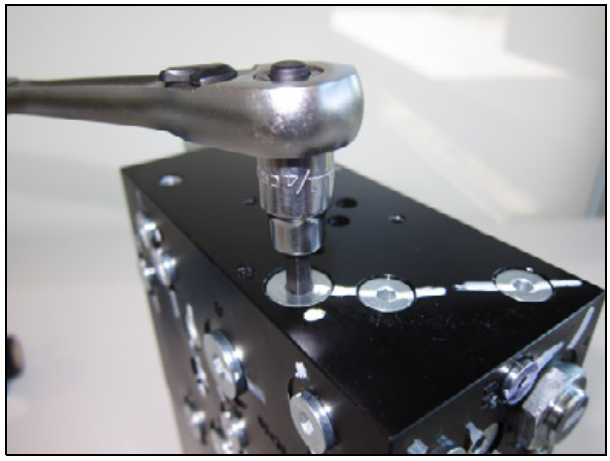
Step 3

To remove the 18A plug, first remove the valve from the top of the manifold by loosening the 4 bolts.



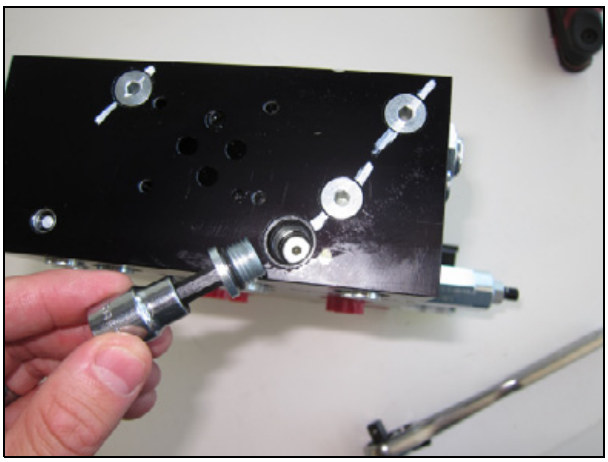
Step 4

Remove the plug from the 18A port as shown here.



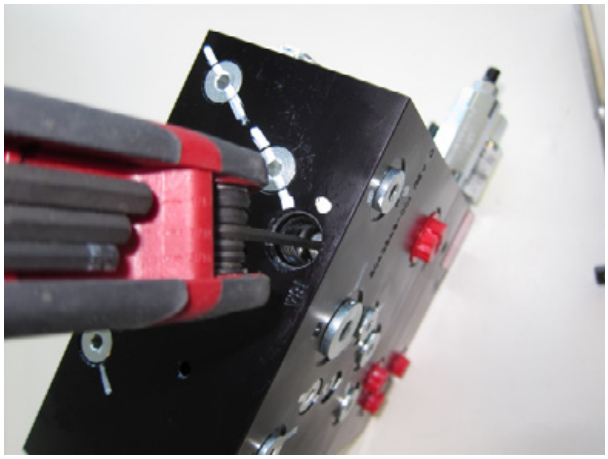
Step 5

With the 18A plug removed, the lower plug can be accessed and removed.



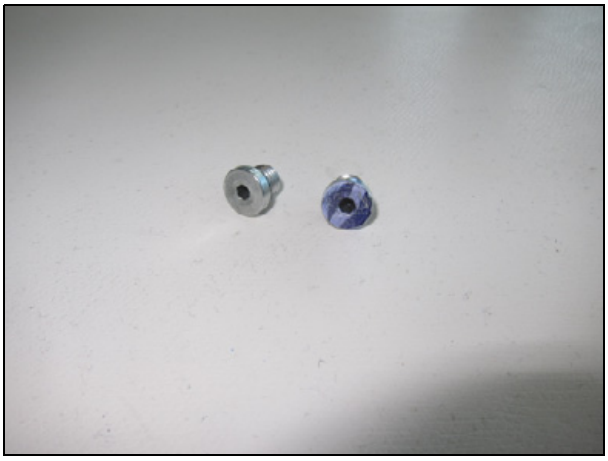
Step 6

Remove the solid plug shown.



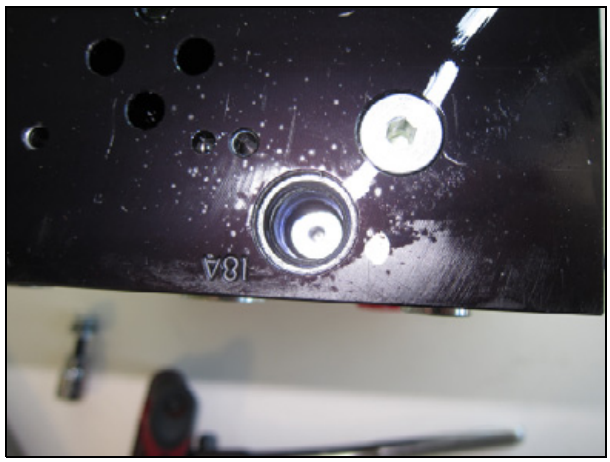
Step 7

Remove the solid plug and install the violet colored orifice plug.



Step 8

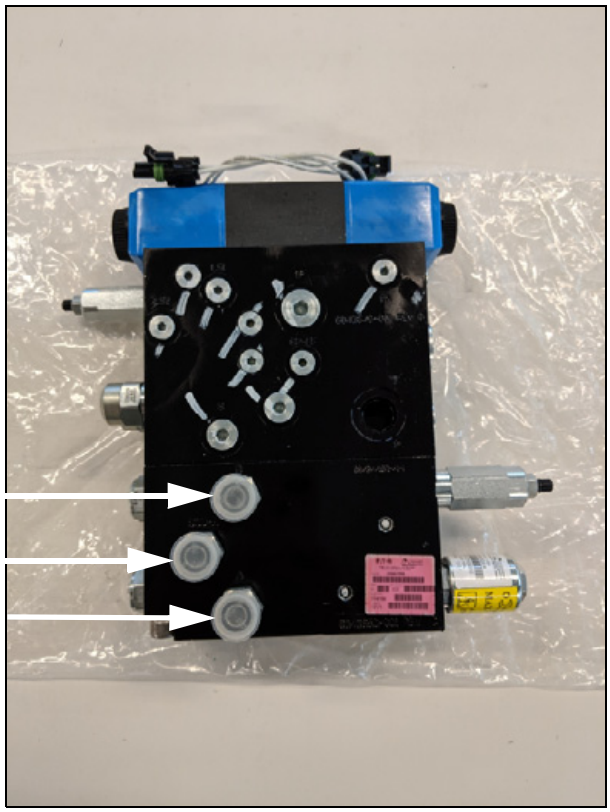
With the orifice plug installed, re-install the 18A plug and the valve using the 4-socket head cap screws.



Installing the fittings to the H4 manifold

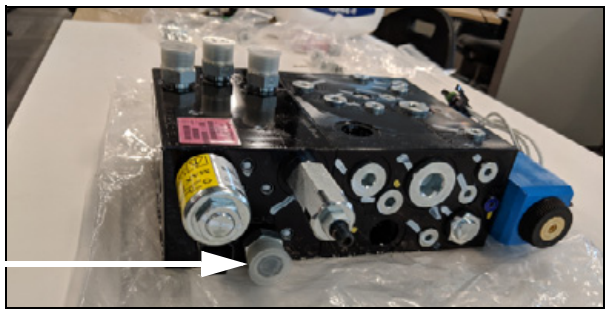
Step 1

Install a 06 ORB – 08 ORF straight fitting in the A, B, and SCU-A ports in the manifold as shown.



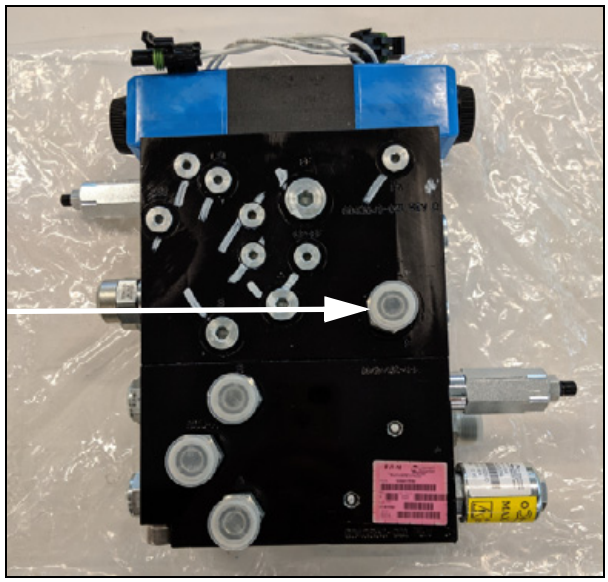
Step 2

Install a 06 ORB – 08 ORF straight fitting in the SCU-B port on the side of the manifold as shown.



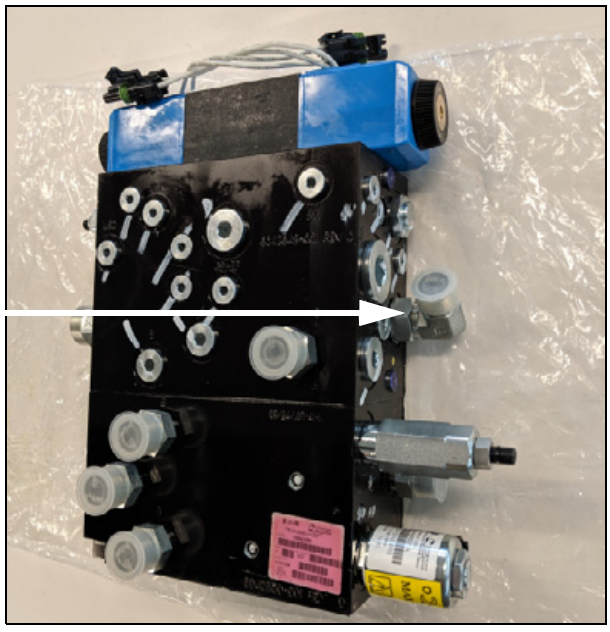
Step 3

Install a 08 ORB – ORF straight fitting in P port of the manifold as shown.



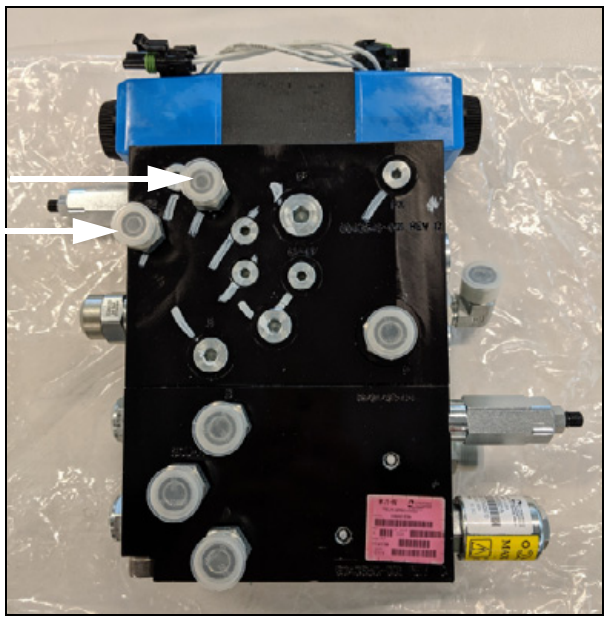
Step 4

Install a 08 ORB – ORF 90° fitting in the T port of the manifold as shown.



Step 5

Install a 04 ORB-06 ORF straight fitting in the LS1 and LS2 ports of the manifold as shown.



Mounting the hydraulic manifold

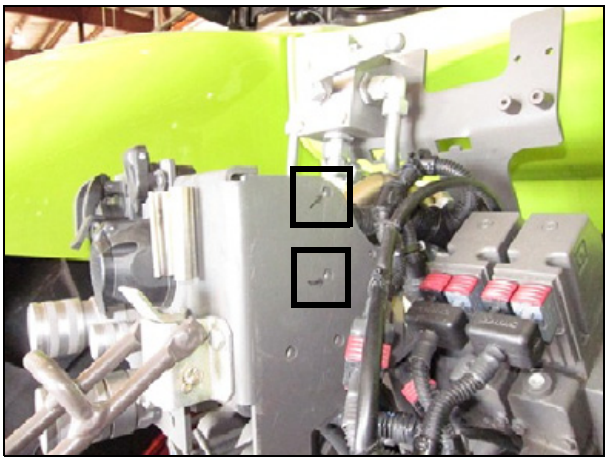
Step 1

Remove the safety sign.



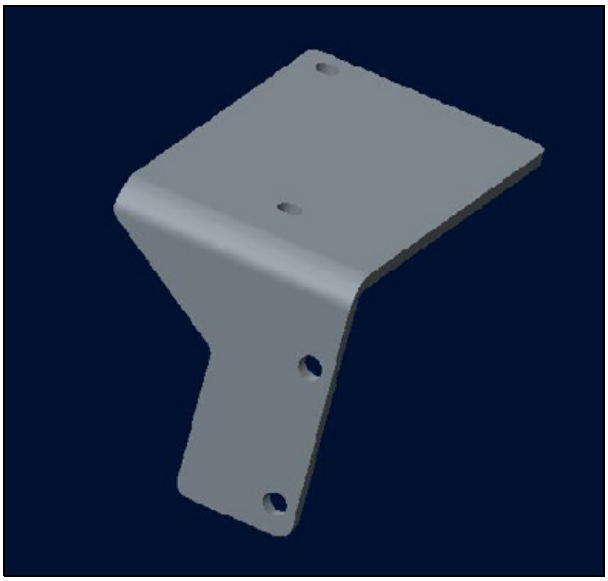
Step 2

Locate the two holes that will be used to mount manifold bracket (P/N 95381).



Step 3

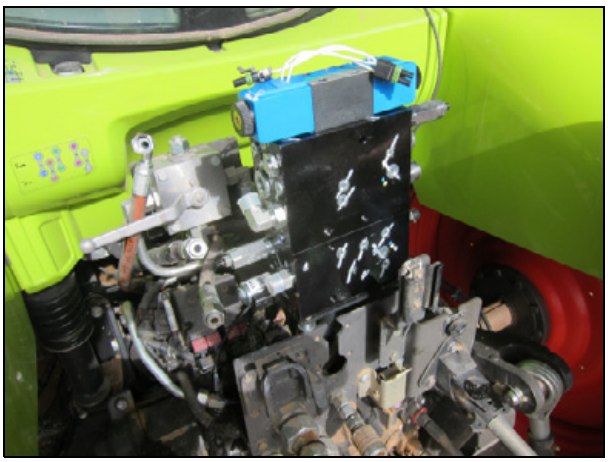
Locate the provided mounting bracket and hardware (P/N 95381).



Step 4

Use the provided metric bolts to attach the mounting bracket to the machine.

Then use the two provided 3/8" bolts to attach the manifold to the mounting bracket, as shown.



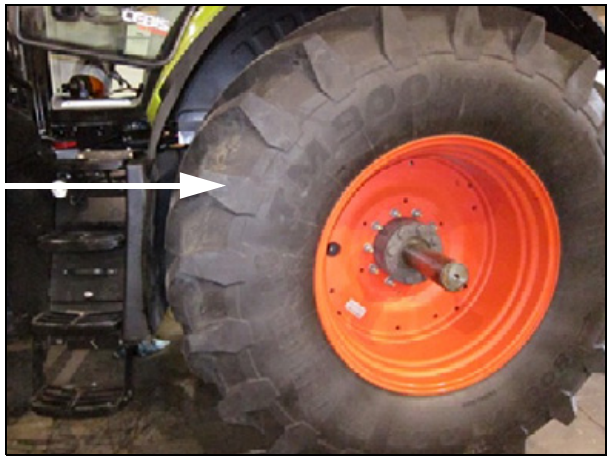
Connecting the hydraulic lines

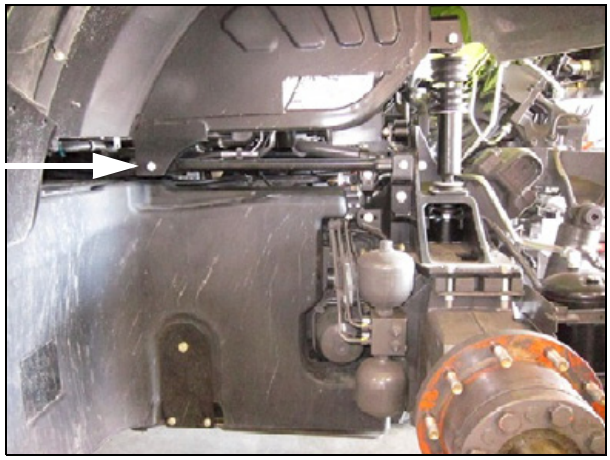
Machine hydraulic connections on Axion 800 series machines

Step 1

Locate the P, T, LS and A, B connections under the cab behind the wheel.

For easier access remove the wheel.

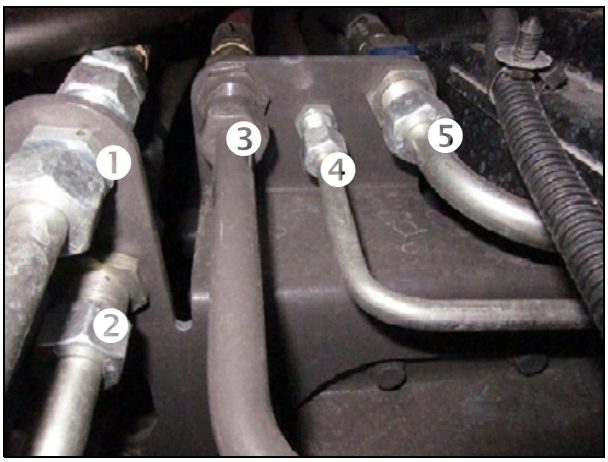


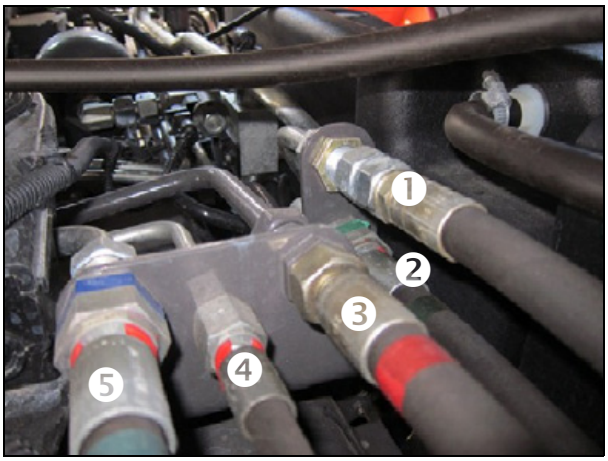


Step 2

Locate the A ❶, B ❷, Tank ❸, Load Sense ❹, and Pressure ❺ lines on the right side of the vehicle.

The image to the right shows underneath the machine, facing the normal direction of travel.





Step 3

Locate and then remove the Steel Pressure Line from the bulk head ❶.

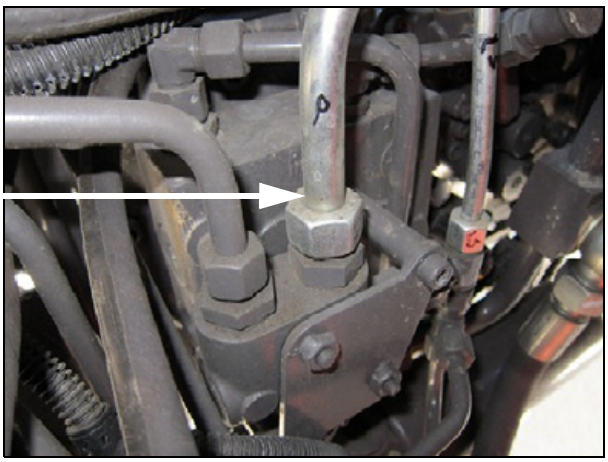
NOTE – The LS hard line ❷ will also be removed in subsequent steps. It may be easier to remove it now.





Step 4

The other end of the Steel Pressure Line is located on the right side of the machine behind the rear wheel. Remove this end of the Steel Pressure Line and then remove the line from the machine.



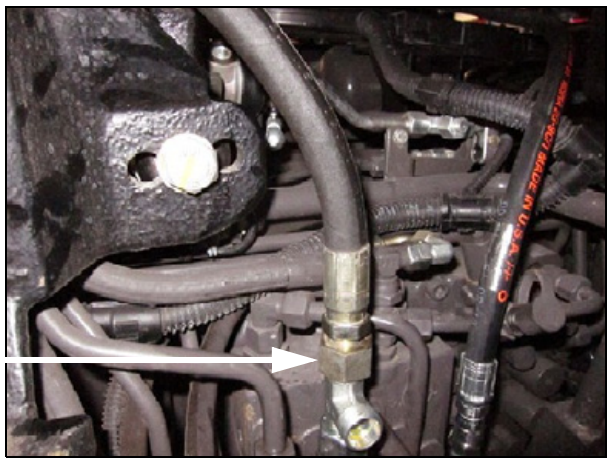
Step 5

Install the 15L tee fitting that is provided in hose kit, to where the line was previously removed from in Step 4.



Step 6

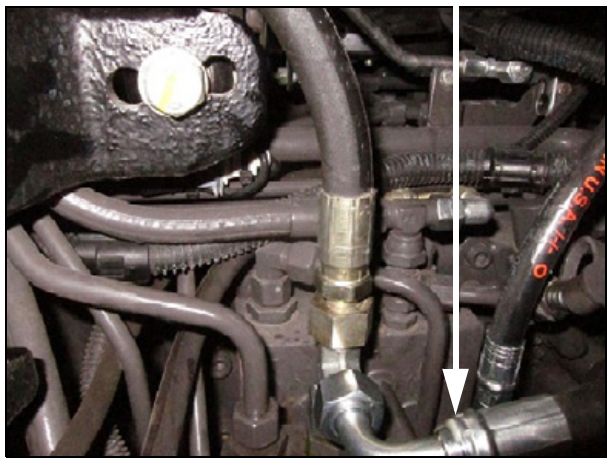
Install the straight end of the Pressure Line to end of run tee fitting on the machine. Then route the Pressure Line to the manifold.



Step 7

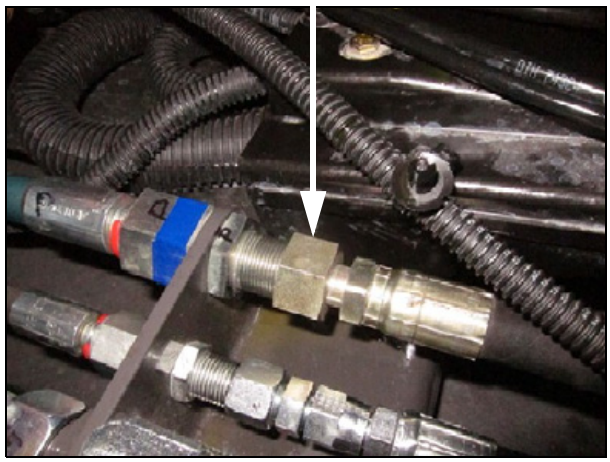
Replace the Steel Pressure Line that was removed in Step 3 and Step 4 with the supplied hydraulic hose "Item 26" from the hydraulic hose kit.

Attach the new Pressure Line to the branch of the run tee fitting as shown.



Step 8

Route the straight end of the Pressure Line back to where the Steel Pressure Line was connected in Step 3.

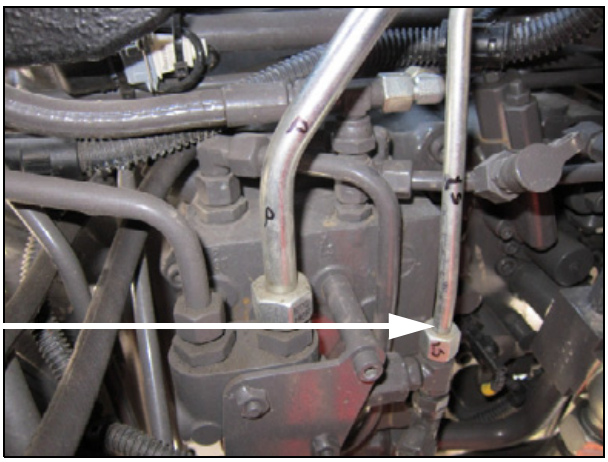


Step 9

LS line connection

Locate the LS hardline, near the P hardline.

Disconnect the hardline from the machine at the location as shown.



Step 10

Trace the LS hardline back to the bulkhead connection, as shown, and then disconnect the LS hardline from the bulkhead fitting. (The LS hardline bulkhead connection may have been disconnected in Step 3.)

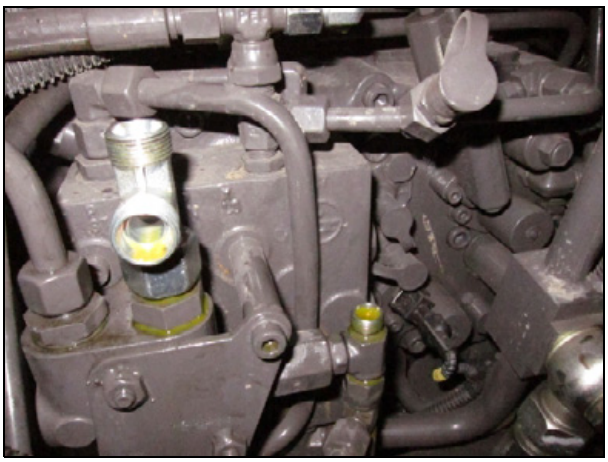
Once disconnected remove the hardline from the machine.



This photo shows the P and LS line connections at the bulkhead connection point.



This photo shows the P and LS line connections at the pump connection point



Step 11

Connect the straight end of the provided LS1 hose to the bulkhead fitting where the hard line was removed in Step 3 or Step 10).

Route the other end of the hose to the LS1 port on the Autopilot manifold.



Step 12

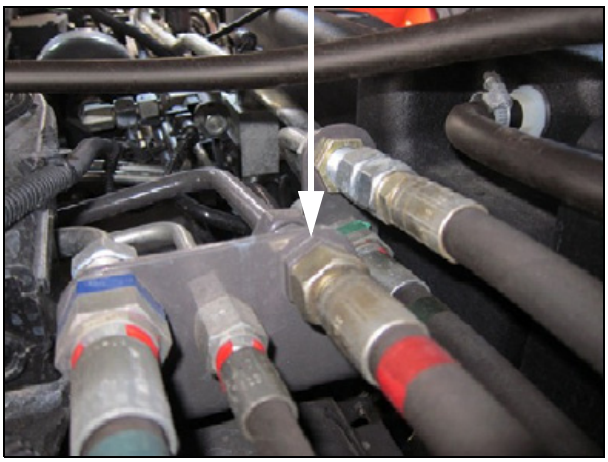
Connect the straight end of the provided LS2 hose to the pump fitting where the hard line was removed in Step 9).

Route the other end of the hose to the LS2 port on the manifold.



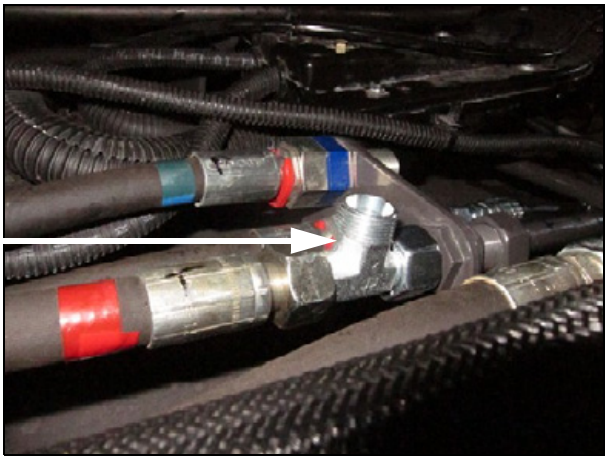
Step 13

Locate the Tank line.



Step 14

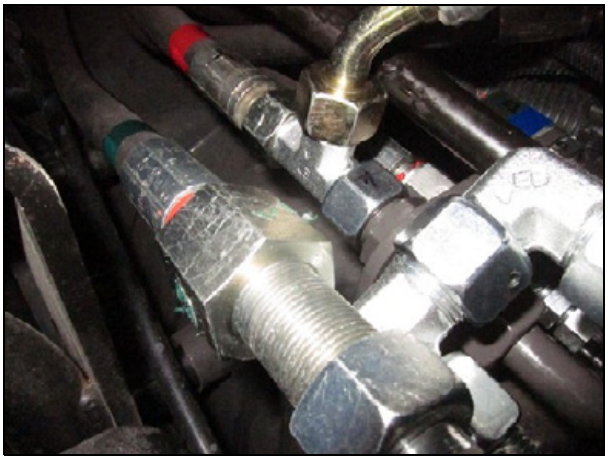
Disconnect the Tank line then add the provided 15L run tee fitting to the Tank line.



Step 15

Attach the 90° end of the tank hose to the branch of the run tee fitting.

NOTE – A hose with a 45° end is shown in the image to the right, but a hose with a 90° end is provided with the hose kit.



Step 16

Locate the A line hydraulic hose.



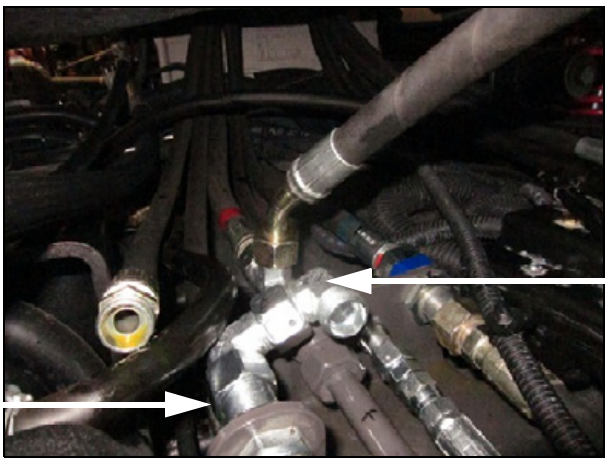
Step 17

Remove this fitting from the hose and bulkhead connection.



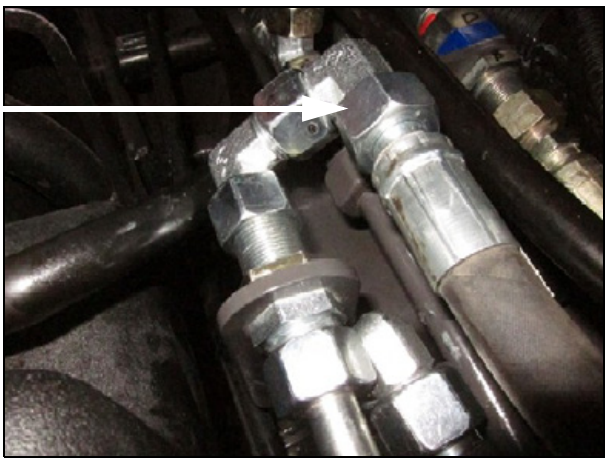
Step 18

Install two 90° swivel fittings, as shown.



Step 19

Connect the straight end of the SCU-A hydraulic hose and route it back to the manifold.



Step 20

Connect the straight end of the A hose to the A line hose previously removed in Step 17 from the bulkhead connection point.



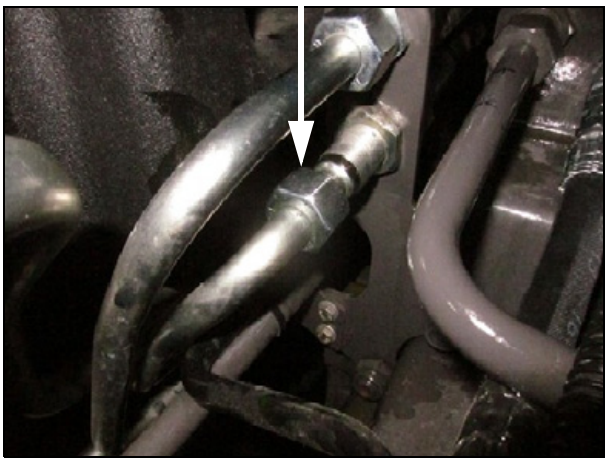
Step 21

Locate the B hydraulic line.



Step 22

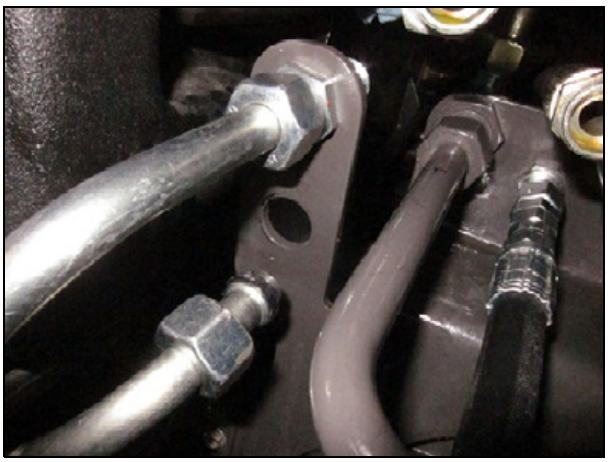
Disconnect the B line from the bulk head connector.



Step 23

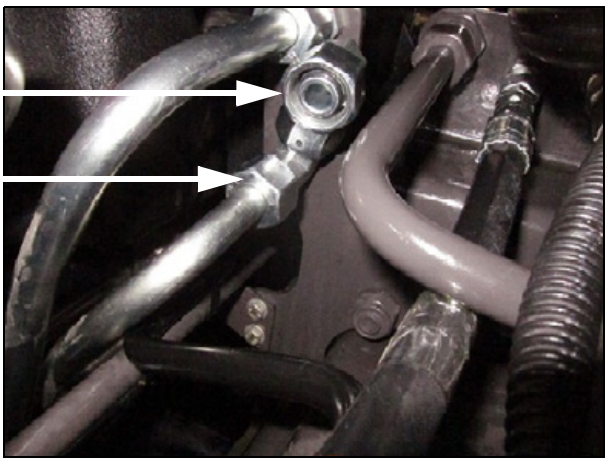
Remove the bulkhead connector from the plate: The jam nut is 30 mm in size and the bulkhead connector is a 32 mm.

The connector is removed from the bulkhead connection point to create space for attaching the SCU-B line to the hard line on the machine.



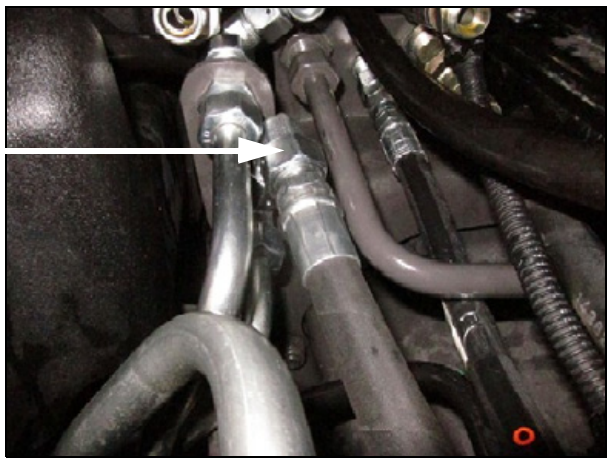
Step 24

Attach two 90° swivel fittings to the hard line on the machine as shown.



Step 25

Attach the straight end of the SCU-B hydraulic line to the open end of the second swivel 90° fitting attached in Step 24. Route the SCU-B line back to the manifold.



Step 26

Connect the B hose to bulkhead connector previously removed in Step 23 and Step 24, on the B line.





Machine hydraulic connections on Axion 900 series machines

Step 1

To access the hydraulic connection points on the machine remove the rear wheels.

⚠ **WARNING –** Make sure the machine is properly supported when the wheels are removed.



Step 2

Once you have removed the rear wheels, the machine hydraulic connection points can be accessed more easily.

The steering and tank line connection points are located in the area shown here on the left side of the machine near the front of the wheel opening.



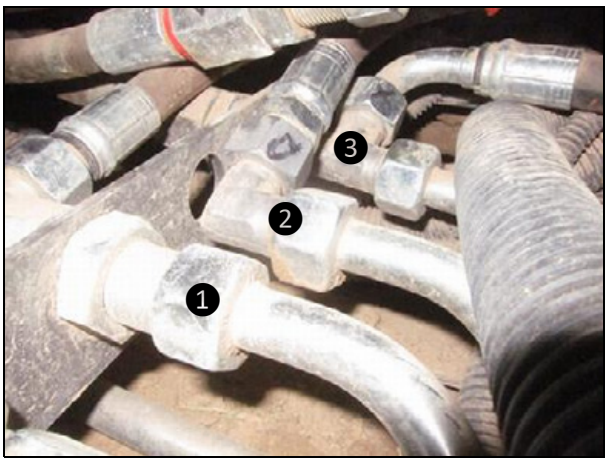
Step 3

Locate and label the SCU-A ❶, SCU-B ❷, and T ❸ lines at the bulkhead connection under the left side of the cab near the wheel opening.

The steering lines in front of the bulkhead connector will connect to the A and B Autopilot lines, the lines rearward of the bulkhead connector will connect to the SCU-A and SCU-B Autopilot lines.



This figure shows a completed installation: SCU-A ❶, SCU-B ❷, and T ❸ lines.

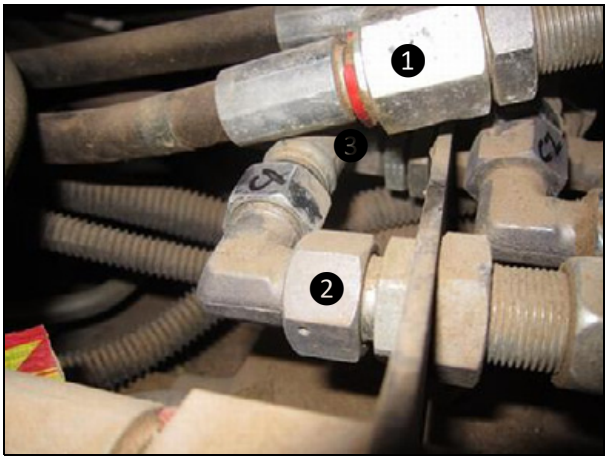


Step 4

Disconnect the hard line from the bulk head connector and remove the bulkhead connector from the steel plate ❶.

If needed use the union fitting then install the SCU-A line to the hard line on the machine ❷ using the provided swivel 90° fittings.

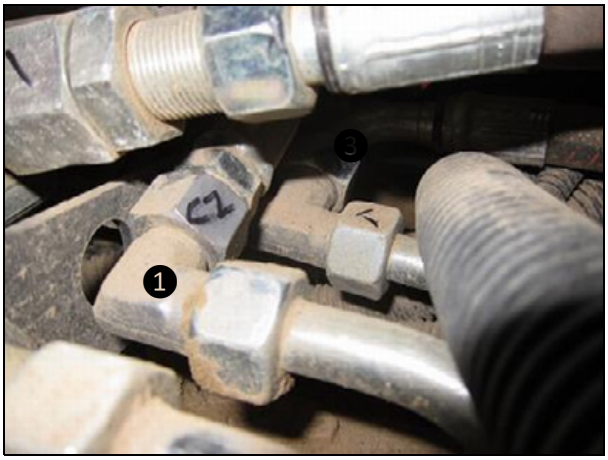
Extra fittings including M-M adapter fittings have been provided to route the lines.



Step 5

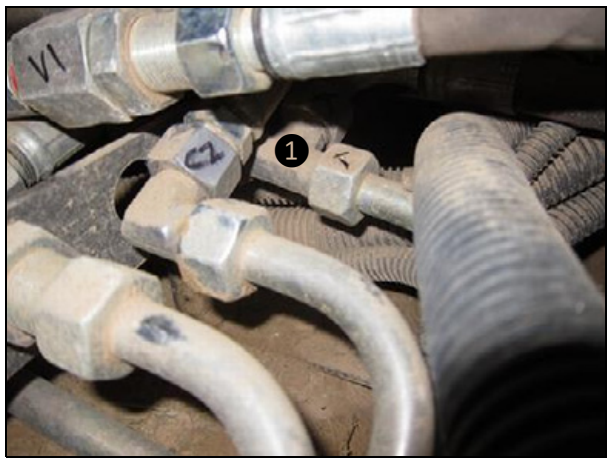
On the SCU-B line remove the hard line from the bulkhead connector, remove the bulkhead connector from the plate and then connect the provided swivel 90° fittings to the end of the hard line.

Connect the male end of the SCU-B line to the swivel 90° fittings ❶.



Step 6

On the tank line, disconnect the steel tank line from the bulkhead connector, flex the line back and then install the provided run tee fitting between those connections ❶.



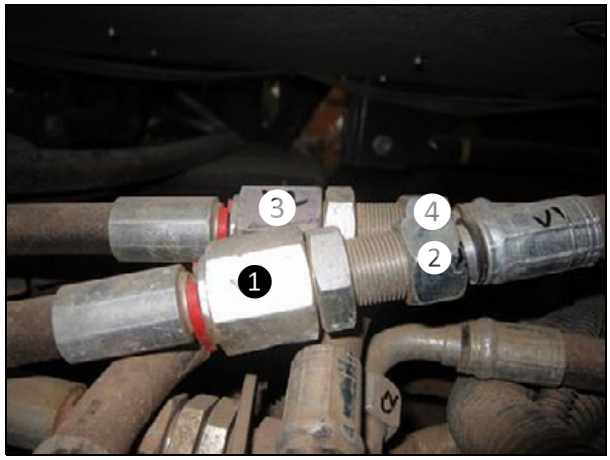
Attach the 90° end of the Autopilot tank line to the branch of the run tee fitting ❷.



Step 7

Connect the A line ❶ to the A bulkhead connector ❷ previously removed.

Connect the B line ❸ to the B bulkhead connector ❹ previously removed.



Step 8

Route the A and B, SCU-A and SCU-B lines to the manifold,

Route the T Line to the T port on the Autopilot manifold.



⚠ **CAUTION –** Ensure that the lines are routed so that they do not rub on any sharp edges and do not contact any moving parts. Hose wrap has been provided in the hose kit for any contact points.

Step 9

The pressure and LS line connections near the pump are located near the left axle of the machine in the location shown here.

The other connection point for these lines is on the other side of the machine shown in the following steps.



The other end of the pressure and EF lines that will be removed in subsequent steps are located on the right side of the machine near the front of the wheel opening.



Step 10

Disconnect the LS hard line on the machine at the location shown.

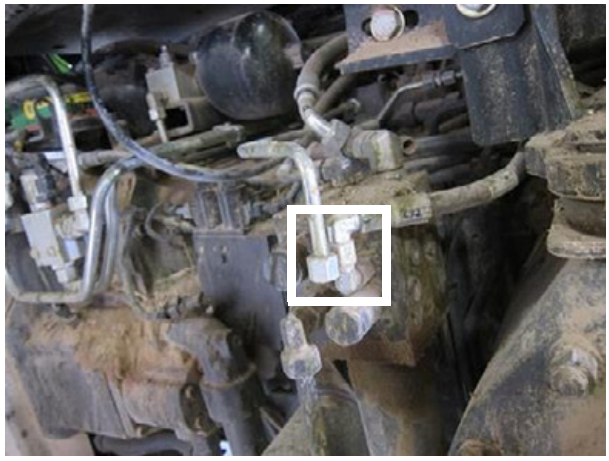
The Autopilot LS2 line will be installed in this location.



Step 11

The Autopilot LS2 line will be connected here where the hard line was removed. Connect the straight end of the LS2 line to the fitting on the hand pump (shown here with a 90° fitting)

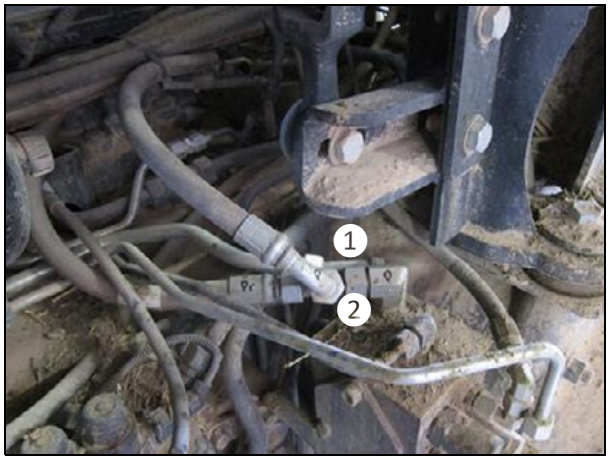
Before tightening this connection, you must first complete the next step.



Step 12

Remove the machines hard pressure line at the location shown ❶.

Install the provided run tee fitting ❷.

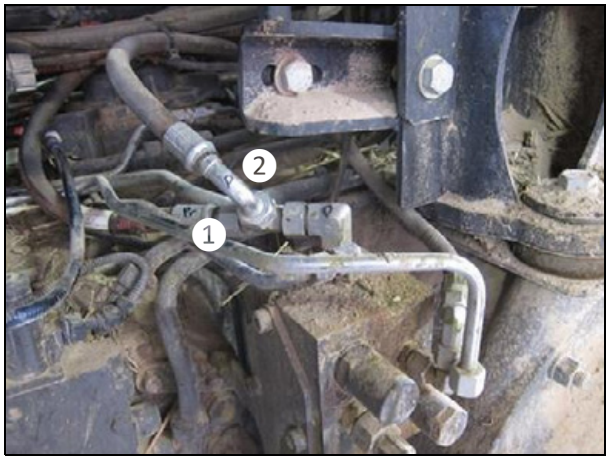


Step 13

Install the P line to the end of the run tee fitting ❶. Route this line to the P port on the Autopilot manifold.

Install the Pr line to the branch of the run tee fitting. Route this line with the hard line to the second connection point ❷ on the right side of the machine.

Extra swivel 90° fittings have been provided in the kit and can be used here to route the lines.



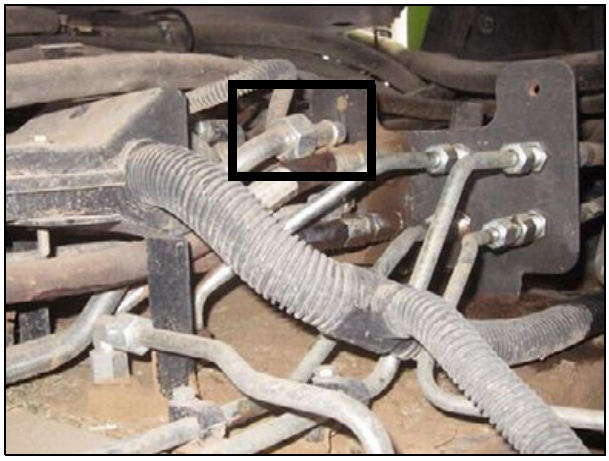
Step 14

Route the PR line along the hard line to the right side of the machine.

Disconnect the other end of the PR from the machine in this location.

Wait to connect the PR line.

The existing pressure hard line on the machine may be removed from the machine.

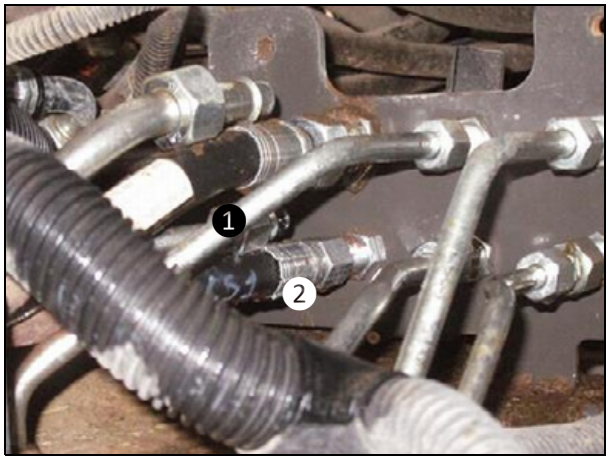


Step 15

The other end of the machine load-sense hard line is also in this location ❶.

Disconnect the LS line from the machine and attach the straight end of the LS1 line ❷ in the location shown here.

The existing pressure hard line on the machine may be removed from the machine.



Step 16

Connect the straight end of the PR line to the location where the hard line was disconnected in the previous step.

Tighten both ends of the hose.

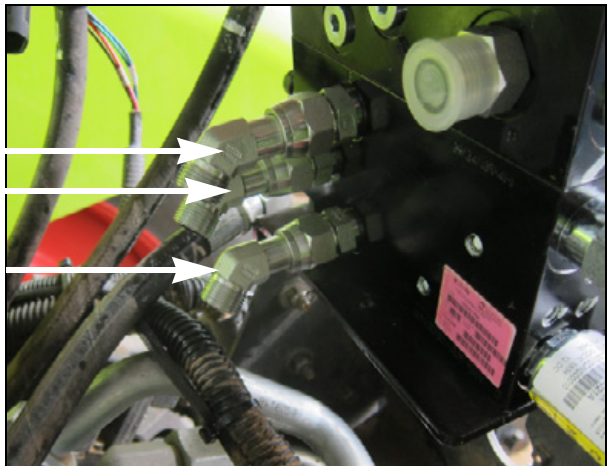


Connections on Autopilot manifold

⚠ **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.

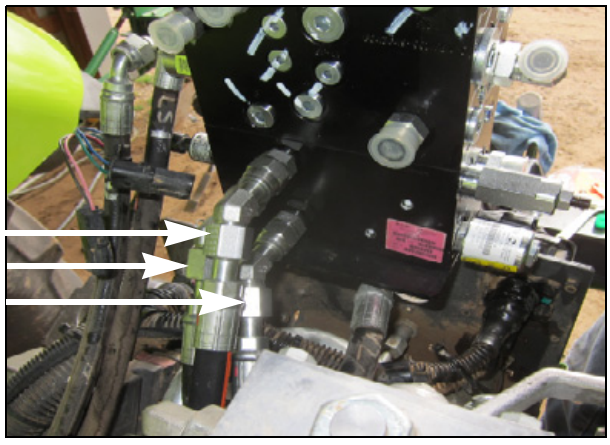
Step 1

Install a 08 Swivel 45° fitting onto the A, B, and SCU-A fittings as shown.



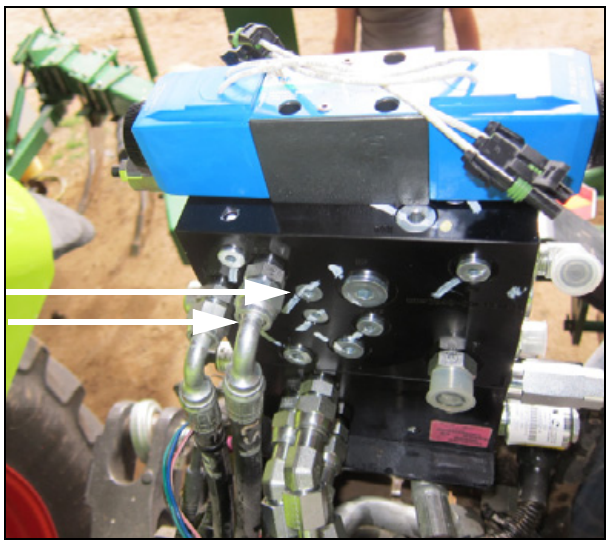
Step 2

Connect the A, B, and SCU-A hoses to their corresponding fittings as shown.



Step 3

Connect the LS1 and LS2 hoses to their respective ports on the manifold as shown.



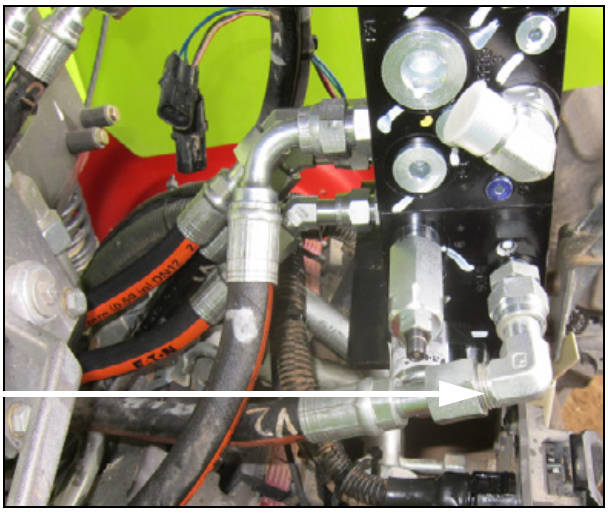
Step 4

Connect the P hose to the P port of the manifold as shown.



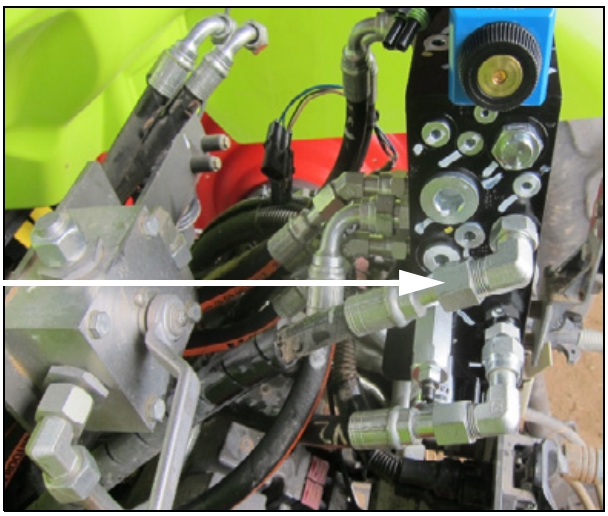
Step 5

Connect a 08 swivel 90° to the fitting in the SCU-B port of the manifold. Connect the SCU-B hose to the swivel 90°.



Step 6

Connect the T hose to the T fitting on the manifold.



Cable connections on manifold

Connect the manual override pressure transducer cabling and the valve cabling to the connections on the Autopilot manifold and then route the lines to the NavController III harness.

Make sure the cables are routed 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.

3

IMD-900 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.

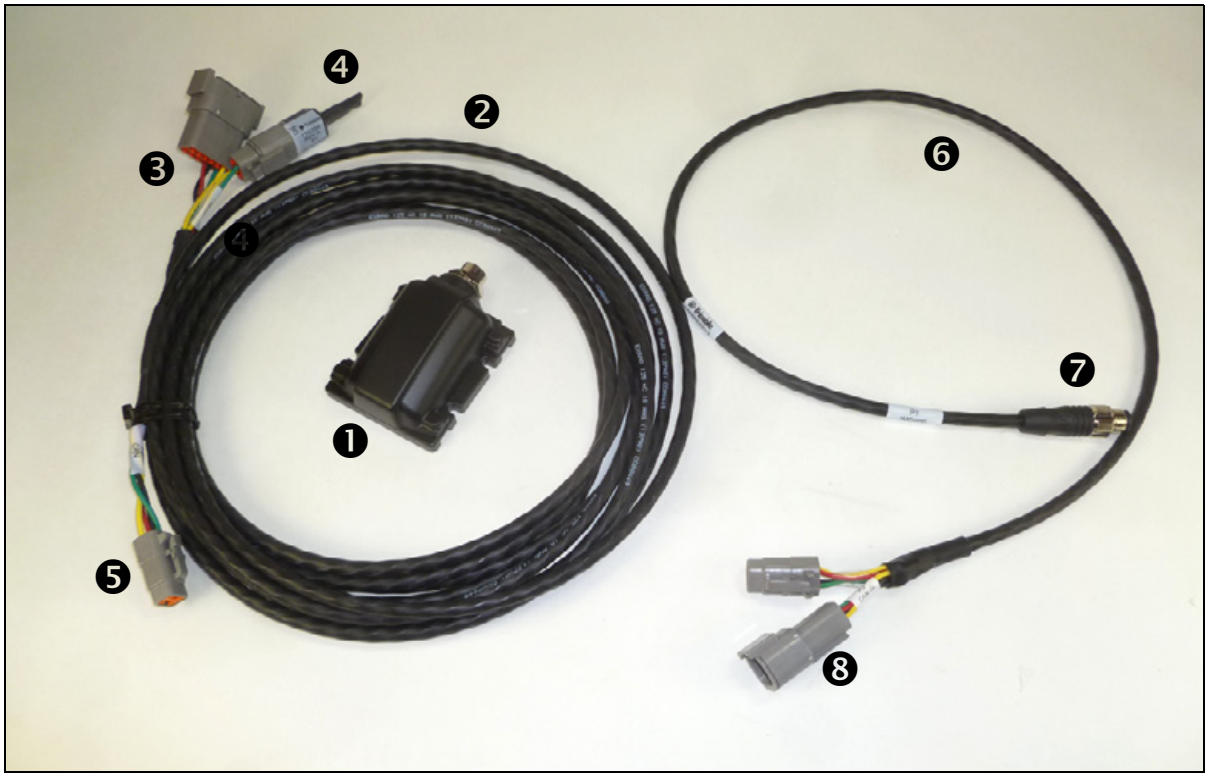
If the described mounting location is not accessible, chose a different place. To ensure proper function, the IMD-900 device must be located where it is free of obstructions and can rotate with the wheels when they turn.

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
1	IMD-900 steering sensor (P/N 109256-00)
2	Cable (P/N 114675)
3	R1-CAN connector
4	CAN terminal (× 2)
5	P3 CAN connector
6	Cable (P/N 112759)
7	P1-IMD-900
8	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.

Step 1

The IMD-900 device is installed at the left front of the machine.

Remove the two fender bolts as shown.



Step 2

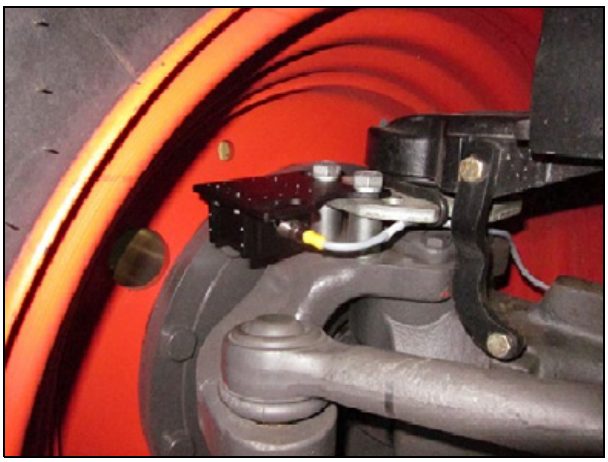
Attach the IMD-900 device to the mounting plate as shown.

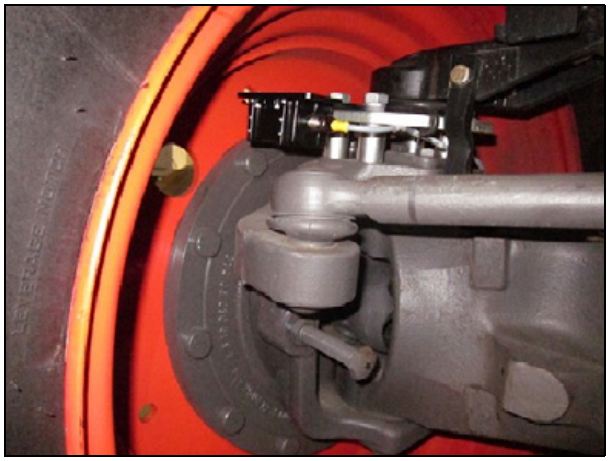
NOTE – The pictures show the AutoSense device but the IMD-900 will install in the same manner.



Step 3

Mount the IMD-900 device and plate to the machine as shown.





Step 4

Attach the IMD-900 device cabling to the IMD-900 device, and then route the sensor wiring to the NavController harness.

⚠ **CAUTION –** Make sure that the cable is not pinched or pulled as the wheels are steered from full right to full left and that the cabling doesn't contact any hot or moving components on the machine.

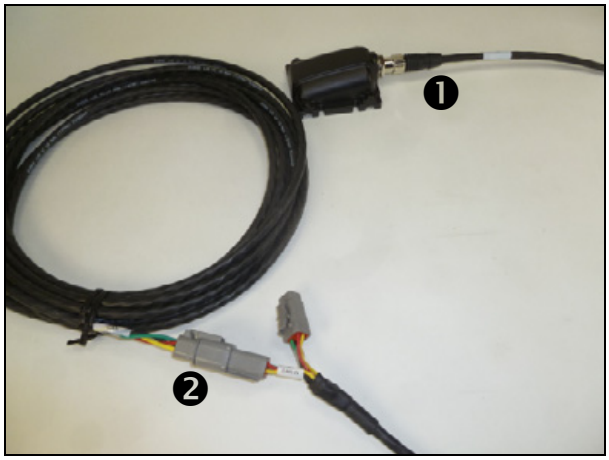


Connecting the IMD-900 harness to the 54602 harness

Step 1

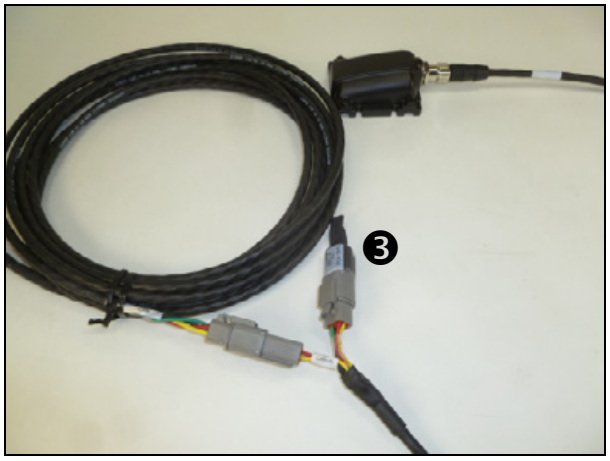
Connect the P1 connector of the 112759 cable to the IMD-900 ❶.

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
- 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 53.
- **Magnetic mounting** – Magnetic mounting for quick release is available for both VHB and spar type mounting.

Possible mounting methods

GNSS receiver	VHB mounted plate	VHB V mounted plate
CFX-750 display TM-200 module	✓	✓

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

Attaching the plate with VHB adhesive

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

Standard P/N 62034 plates are provided in most kits. You can use the VHB mounting method to attach either a P/N 62034 plate or a V plate.

- **RTK, OmniSTAR, DGPS, GLONASS applications** – To use this method for high accuracy, the surface must be rigid and free of "oil panning". For RTK or OmniSTAR HP corrections, the spar method is recommended. The V plate provides repeatable positioning of the antenna.
- **WAAS, EGNOS, OmniSTAR VBS, Beacon applications** – Use a P/N 62034 plate for simplified installation in applications where high accuracy is not critical.

Step 1

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

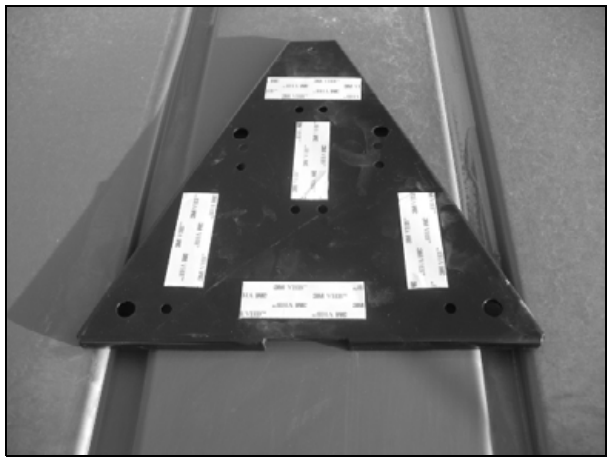


Step 2

V plate only

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

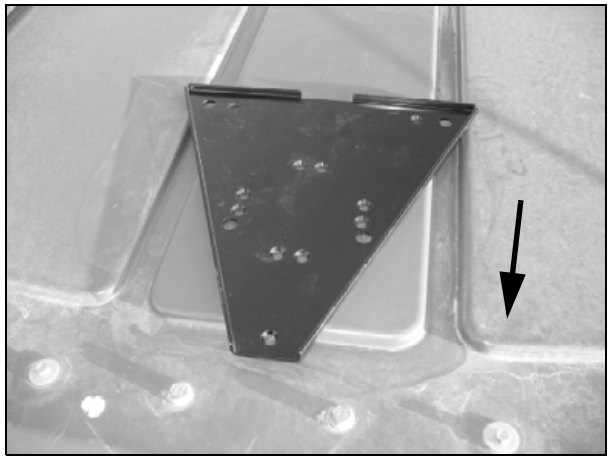
NOTE – The VHB strips are pre-applied to the P/N 62034 plate.



Step 3

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

NOTE – The arrow points to the front of the vehicle.



V plate



P/N 62034

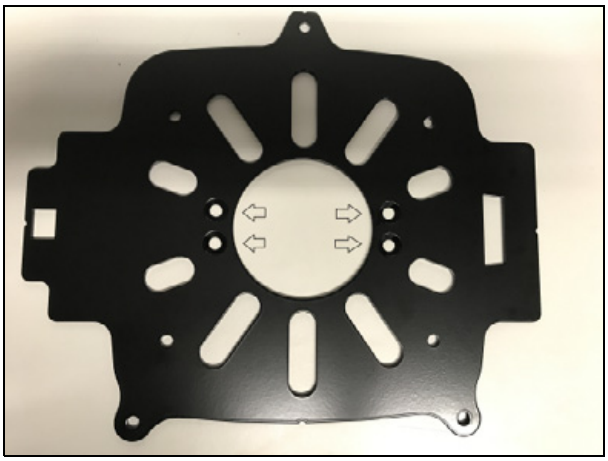
Installing the NAV-900 guidance receiver using a spar mount

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:



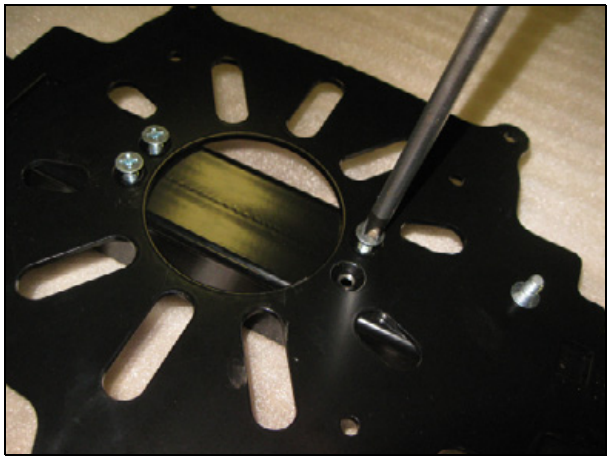
Step 1

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



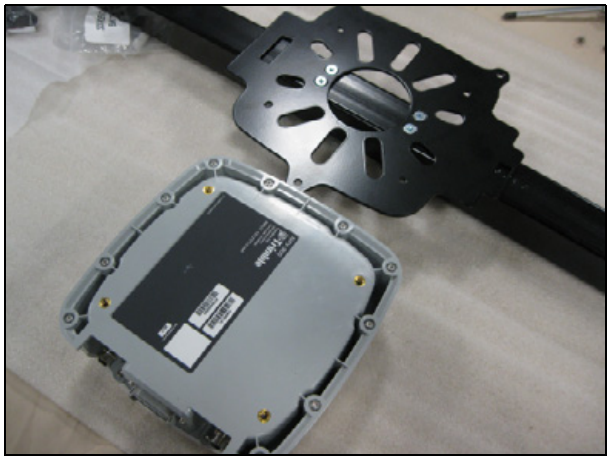
Step 2

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.

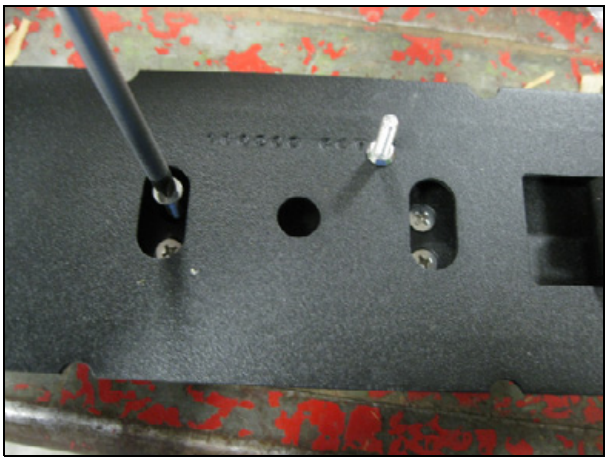




Optional: Using the P/N 110308 for quick release mounting of the NAV-900 from the spar

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

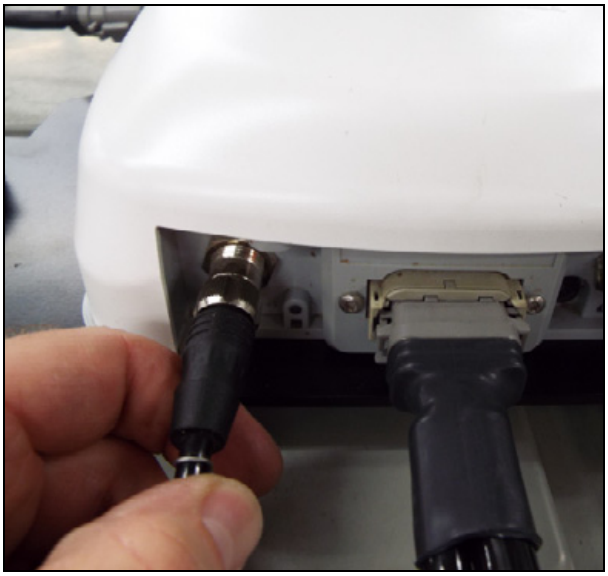
Plug the P1 connector on cable P/N 110550 into the back of the NAV-900 guidance receiver.





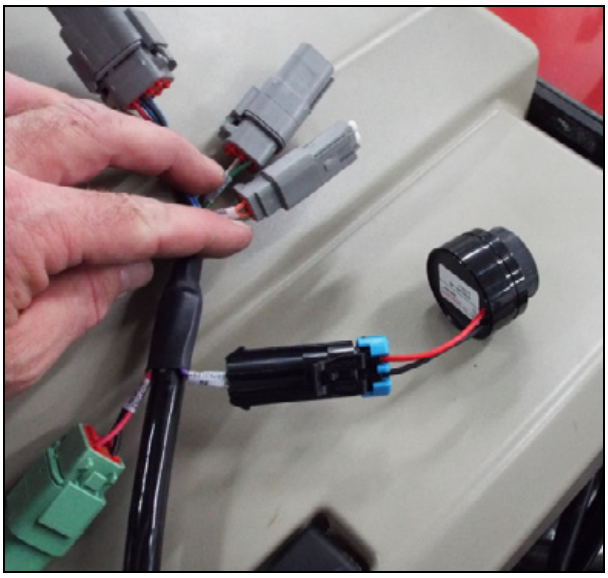
Step 2

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

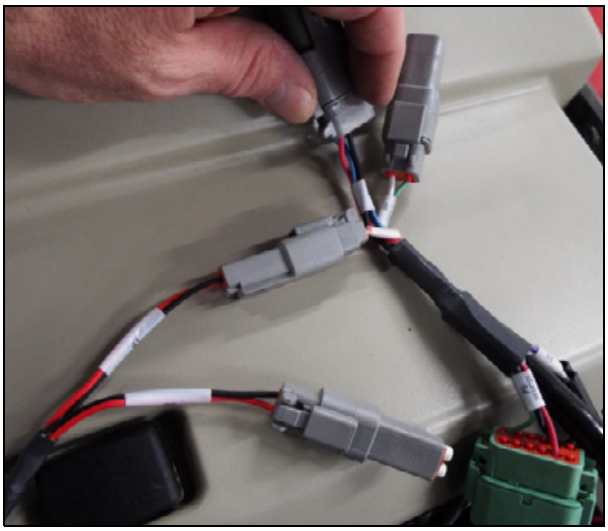


Step 3

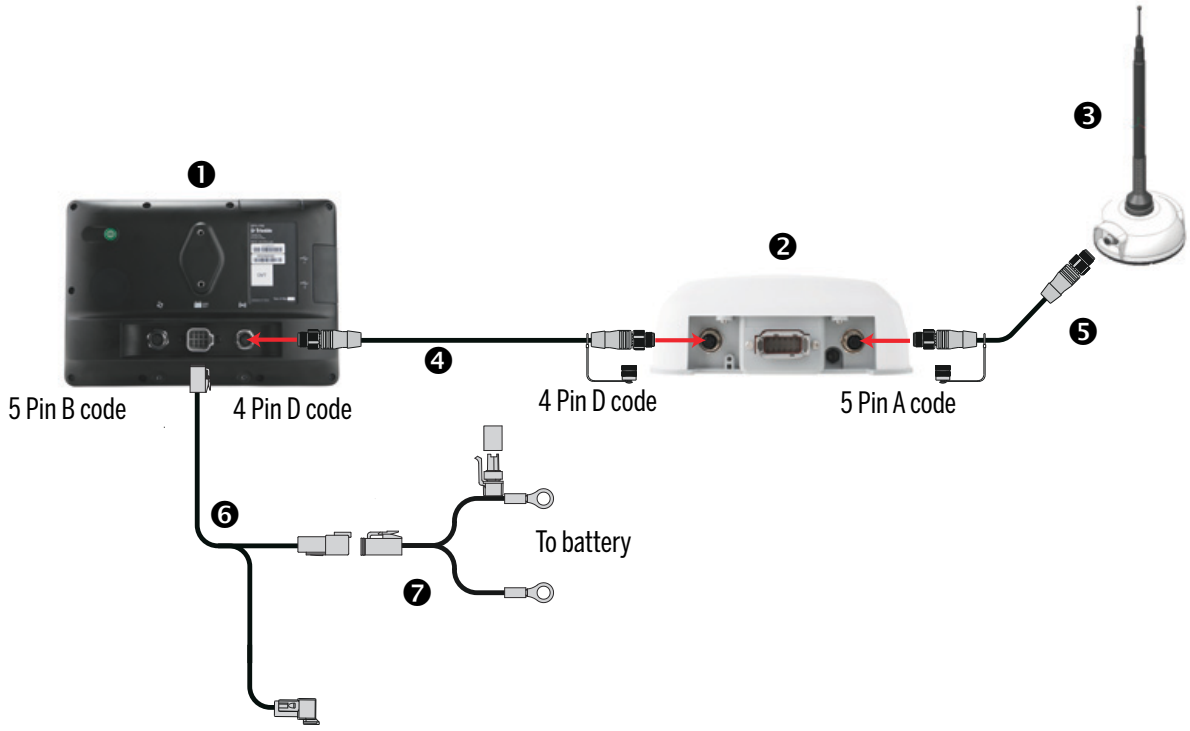
Connect the Sonalert to the cable P/N 110550.



Connect the NMEA output and modem power as needed.



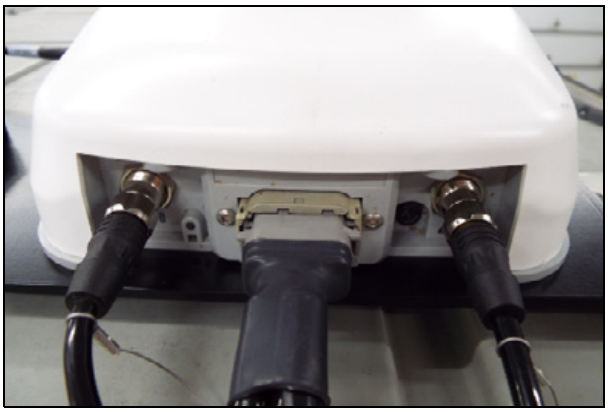
NAV-900 guidance receiver: Connecting an external radio (as required)



Item	Description	Trimble P/N
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 Ag-820 radio kit, 450-470 MHz Ag-820 radio kit, 900 MHz	123500-44 123500-46 123500-90
4	Cable Assy, NAV-900 to in-cab RTK Radio, DTM06, 4.5 m	110540
5	Cable Assy, NAV-900 to Ag-820	113295
6	Cable Assy, GFX-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.

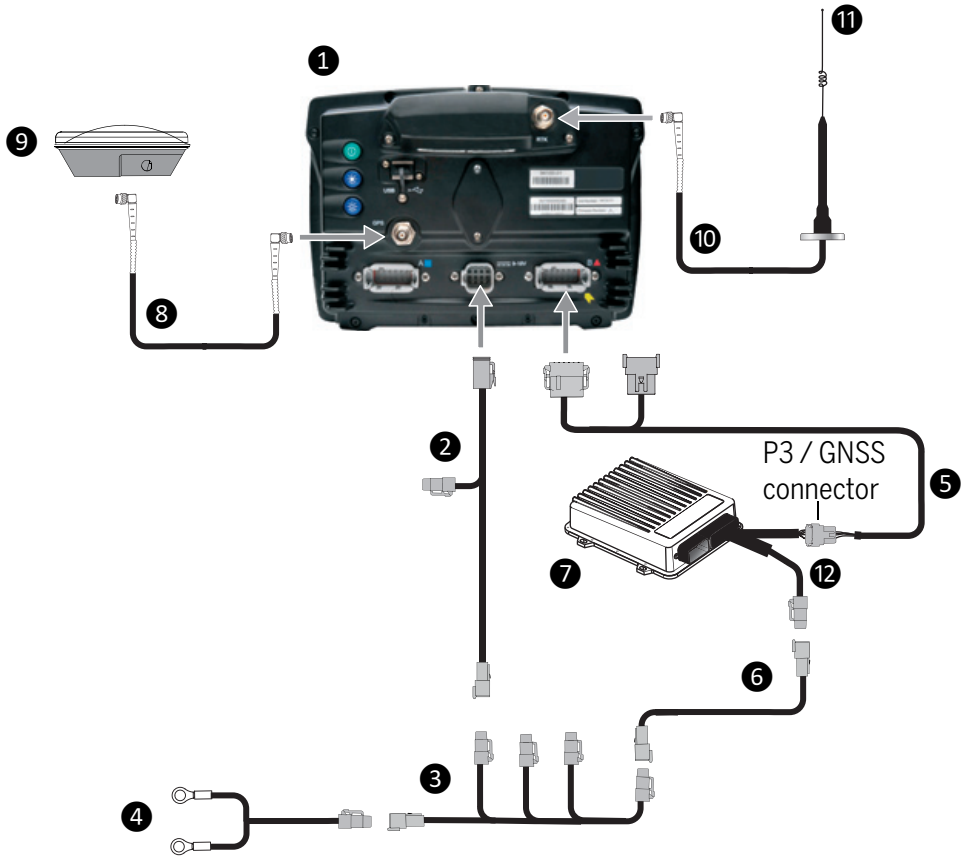


5

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 P/N
1	CFX-750 display **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 adapter	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

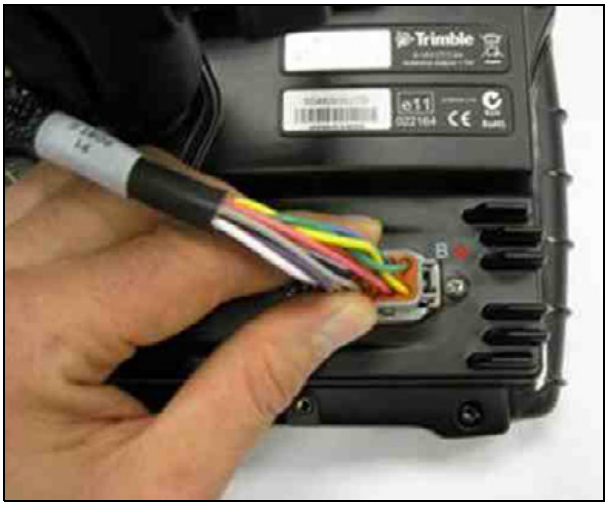
Decide where you will mount the display in the vehicle cab and then use the provided bolts to attach the bar mount to the rail.

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.

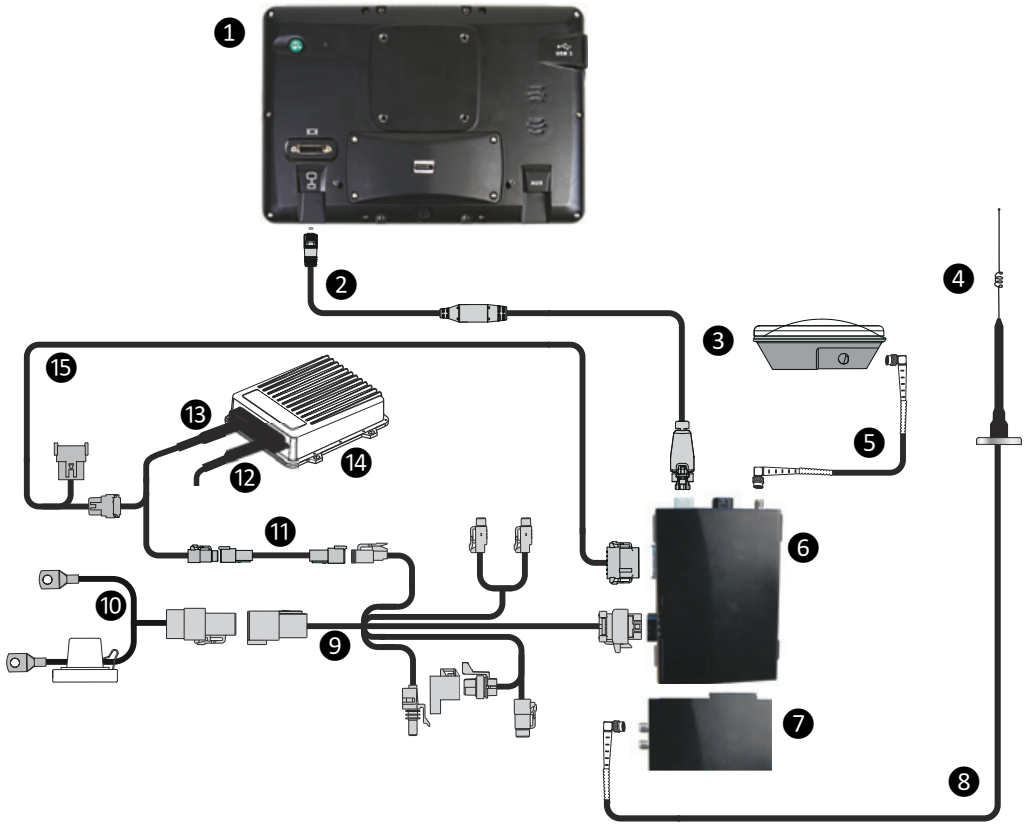
Step 2

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 P/N
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 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 ❸. Loosen the arm to let the display move on the mount.

Step 5

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

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

Step 6

Connect the display cable to the display.



Step 7

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



TMX-2050 display: Installing the wiring harness

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

Step 1

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

Step 2

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



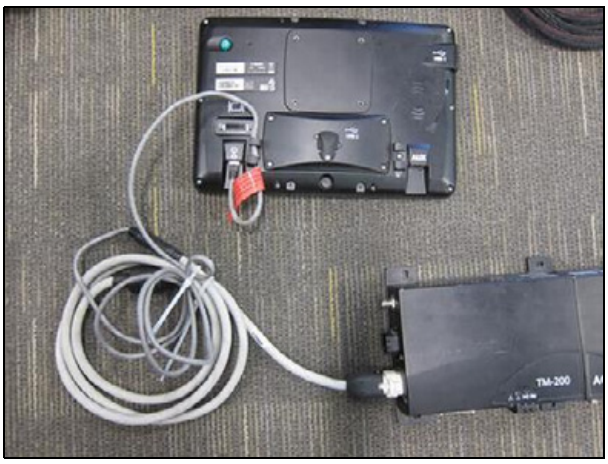
Step 3

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



Step 4

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



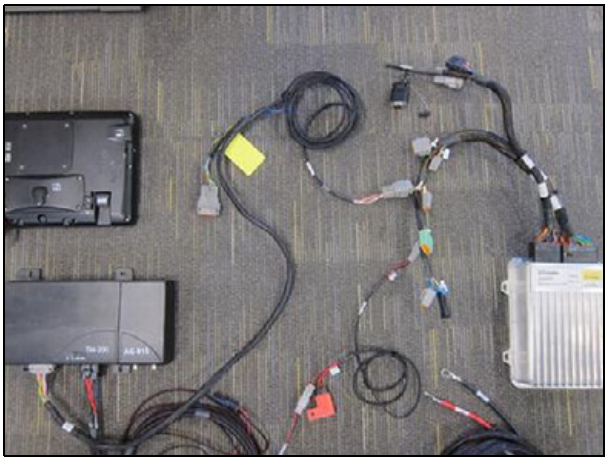
Step 5

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



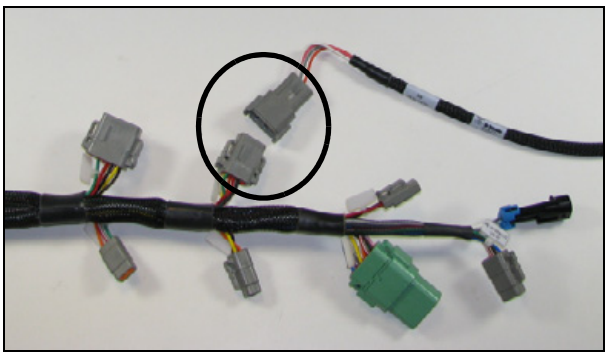
Step 6

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



Step 7

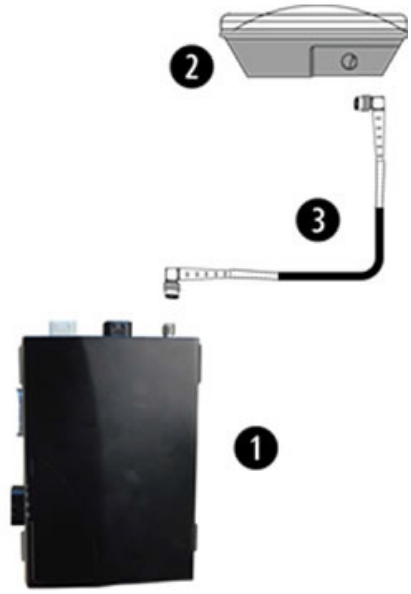
Connect the cable to the P3 connector on the NavController main harness.



TMX-2050 display: AG-25 GNSS antenna

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

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



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

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

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

CFX-750 and TMX-2050 displays: Installing the GNSS antenna and plate

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

NOTE – The V plate antenna bracket is available on the Autopilot price list. See Antenna mounting kits, page 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 53.

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.

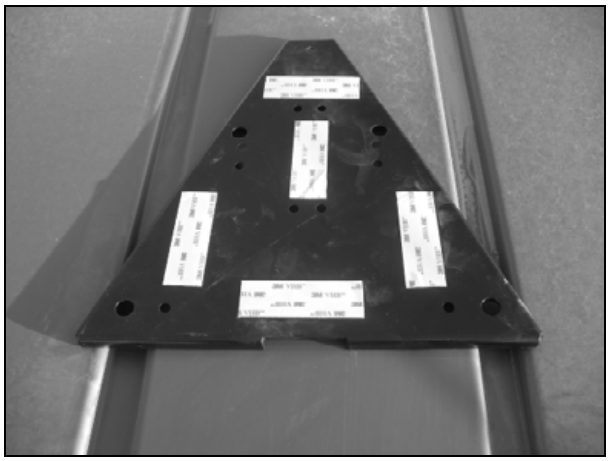


Step 2

V plate only

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

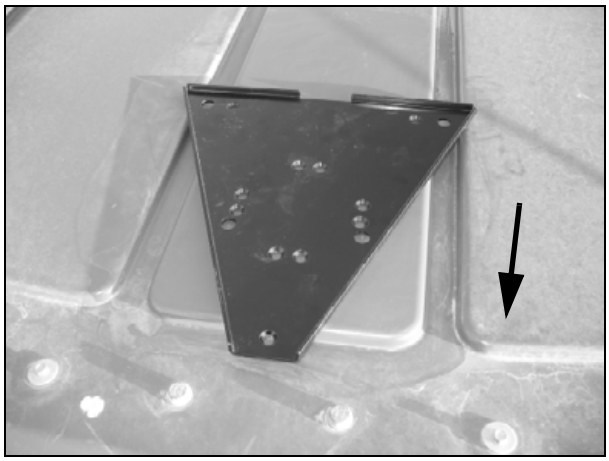
NOTE – The VHB strips are pre-applied to the 4" x 6" plate.



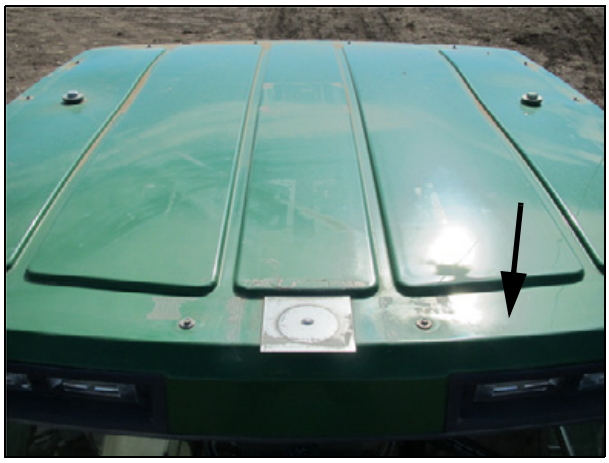
Step 3

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.



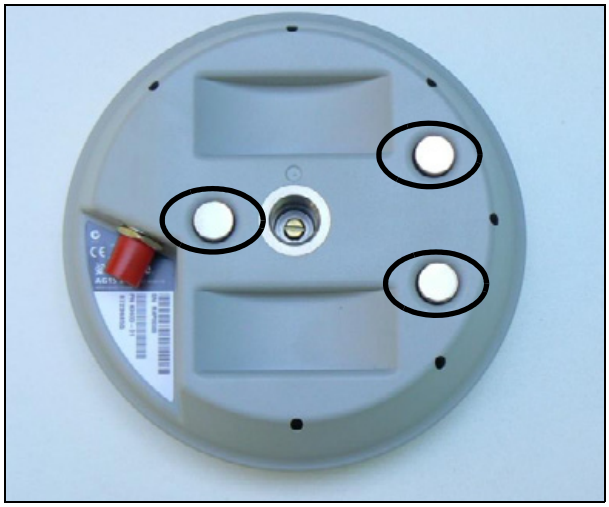
V plate



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.

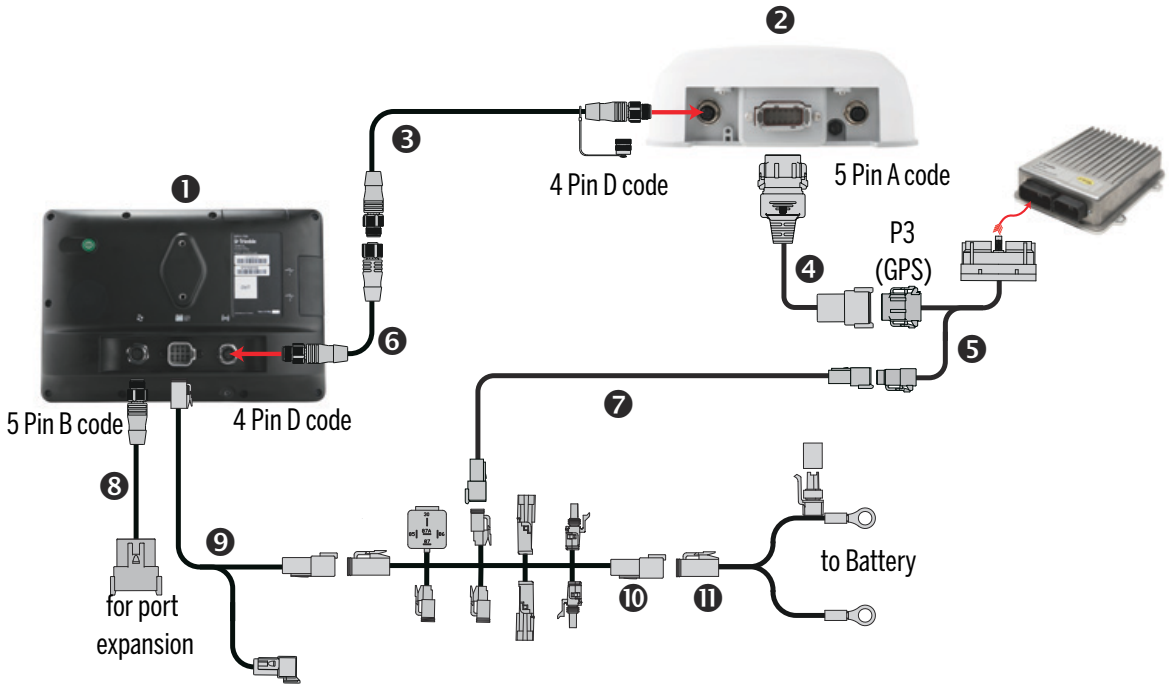
Step 4

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 P/N
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.



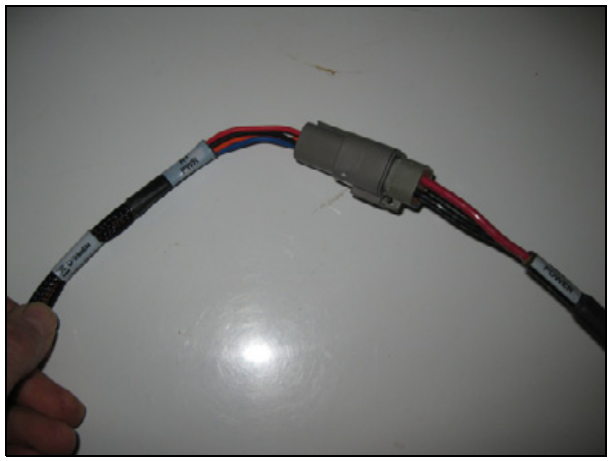
GFX-750/XCN-1050 display: Installing the wiring harness

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.



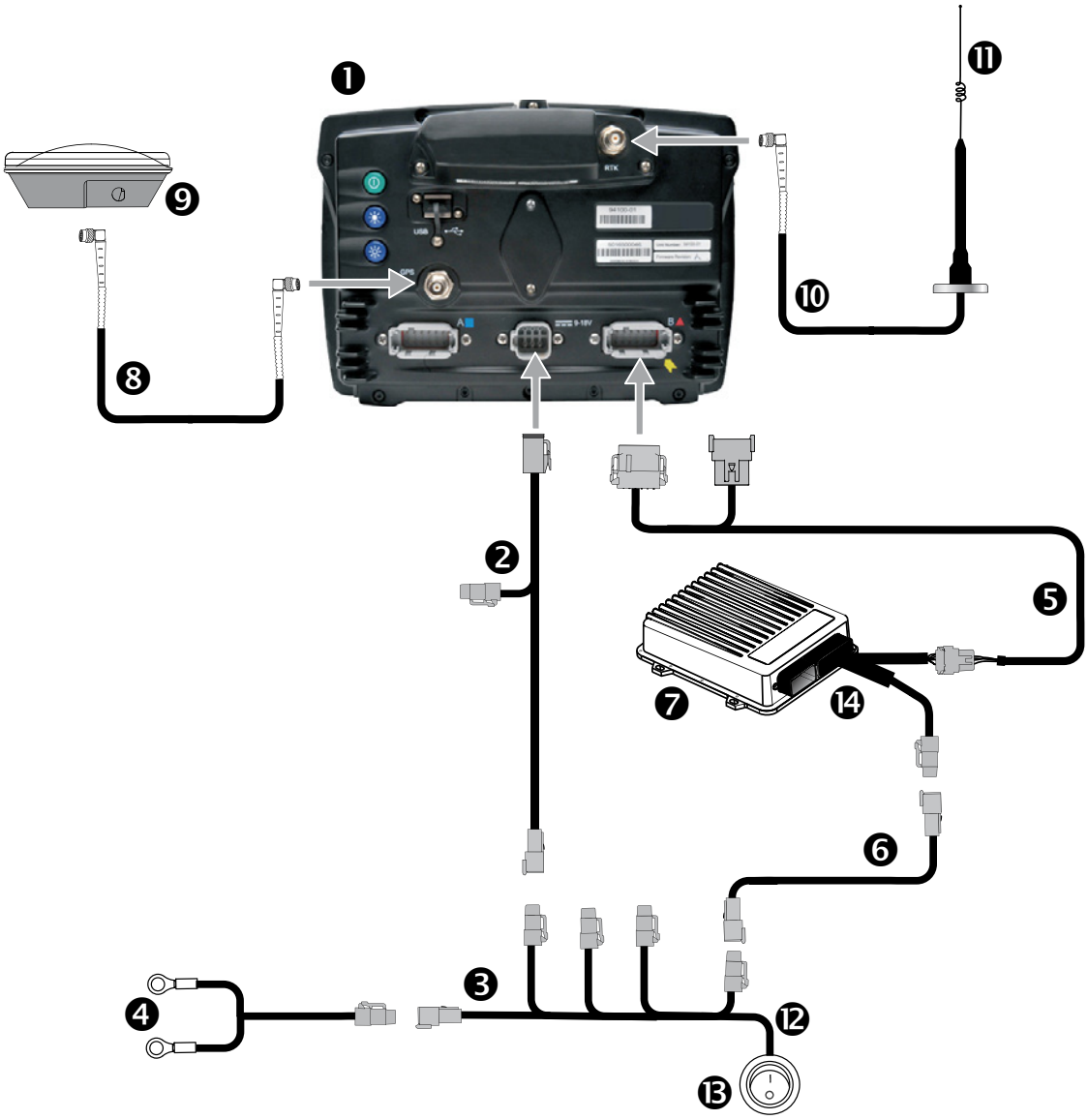


6

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



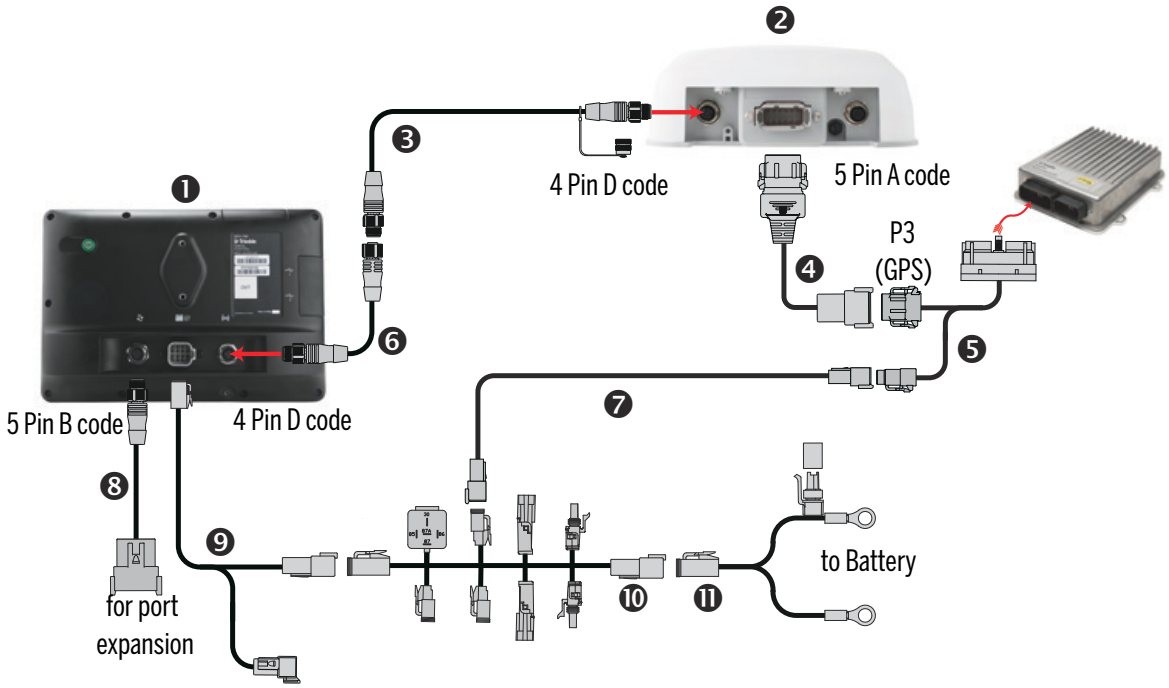
⚠ **CAUTION –** Connecting the Port Replicator on the CFX-750 display to NavController II cable ❺ to the P4 or P12 connector of the NavController II harness ⓮ will result in damage to the CFX-750 display and will void the warranty.

Item	Description	Trimble P/N
1	CFX-750 display **NOTE –** RTK password required.	94100-02
2	CFX-750 power cable	77282
3	CFX-750 power cable with relay and switch (power bus)	67259
4	Basic power cable	67258
5	CFX-750 to NavController II cable with port replicator	75741

Item	Description	Trimble P/N
6	2 pin DTM to 2 pin DT power adapter	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 P/N
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

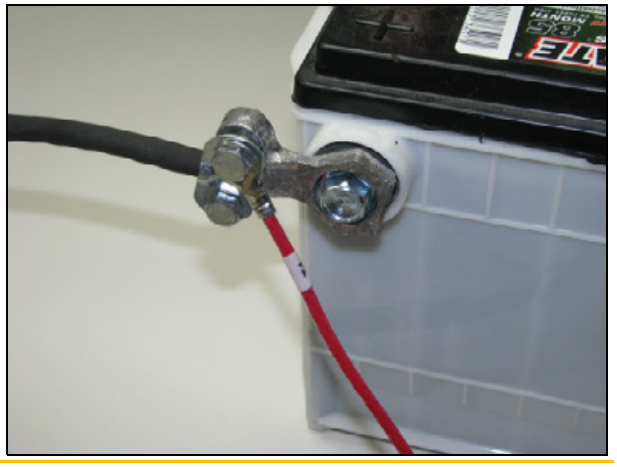
CFX-750 and GFX-750 displays: Installing the power harness

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.

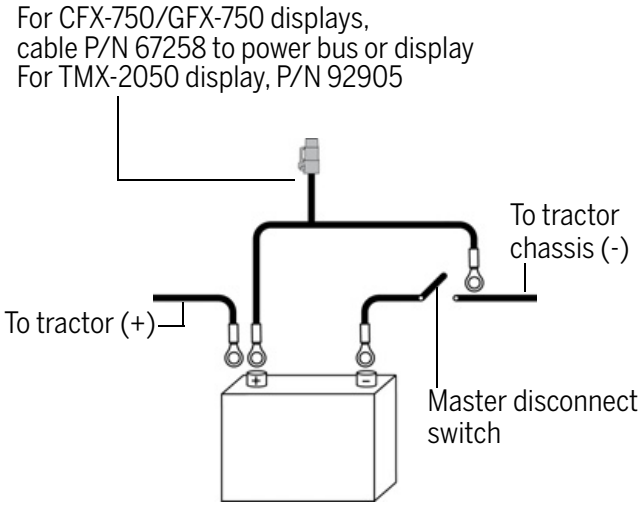
Step 1

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



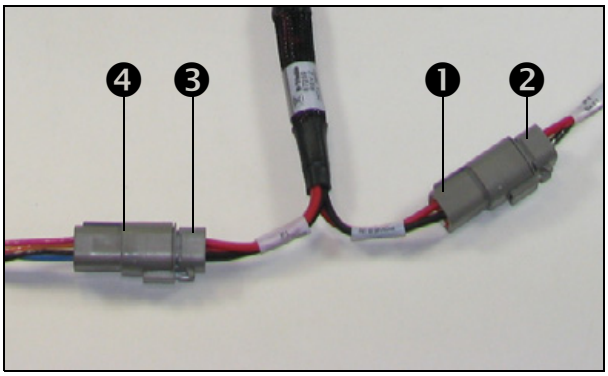
⚠ **CAUTION –** If the vehicle has a master electrical disconnect, make sure the basic power cable (P/N 67258 / 92905) is not directly attached to the battery terminal that is disconnected by the master switch— the negative pole in this example.

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 adapter.



Step 3

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



CFX-750 display

CFX-750 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.

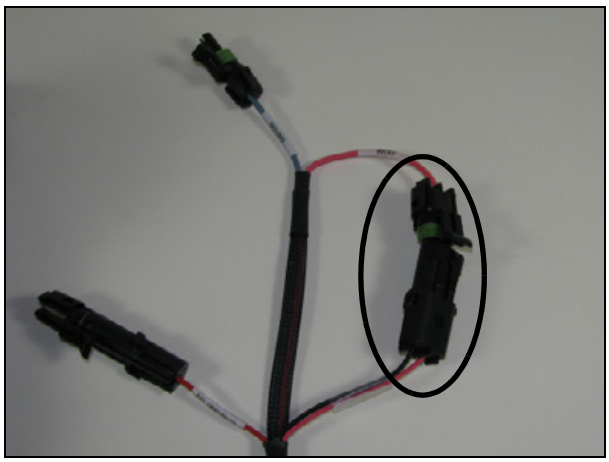
⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

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.

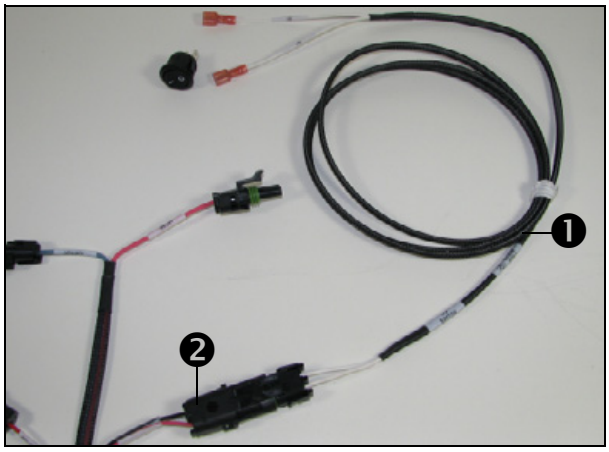


External switch is used to turn on the Autopilot system

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.

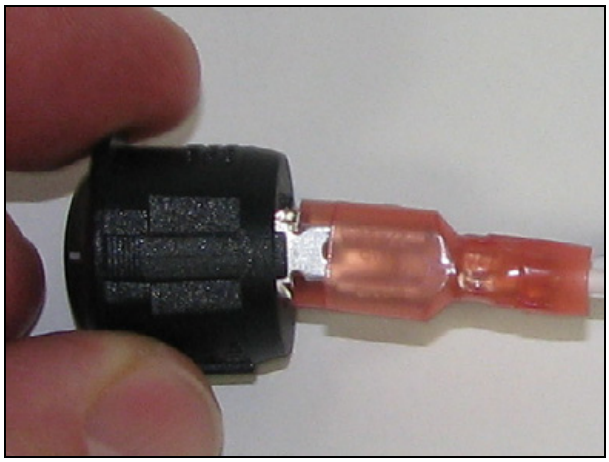
NOTE – To install the switch provided, drill a ¾" hole.



Step 2

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

NOTE – Polarity is not important.

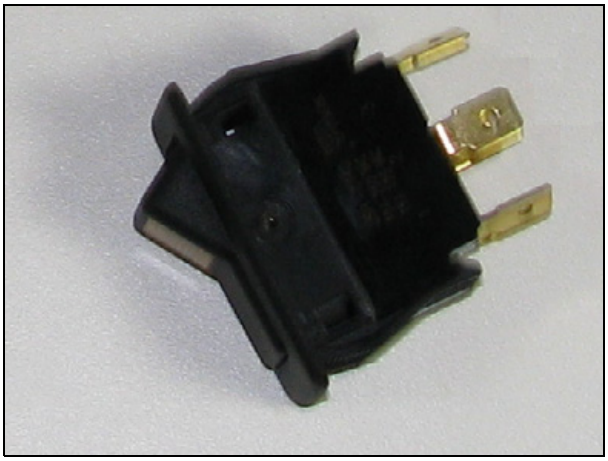


Installing the optional illuminated full or standard Euro switch

Step 1

Find an available knockout location on the vehicle console.

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

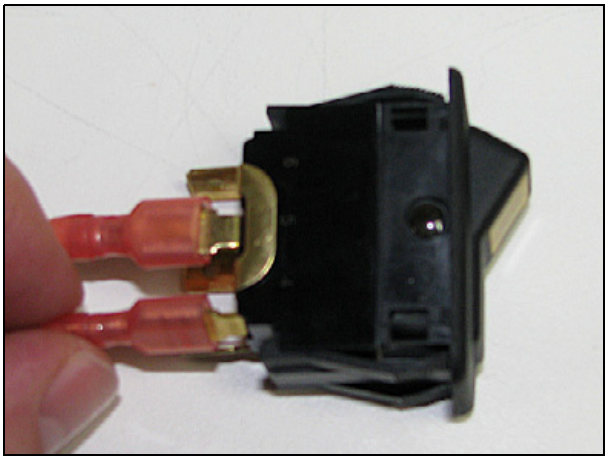


Step 2

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.

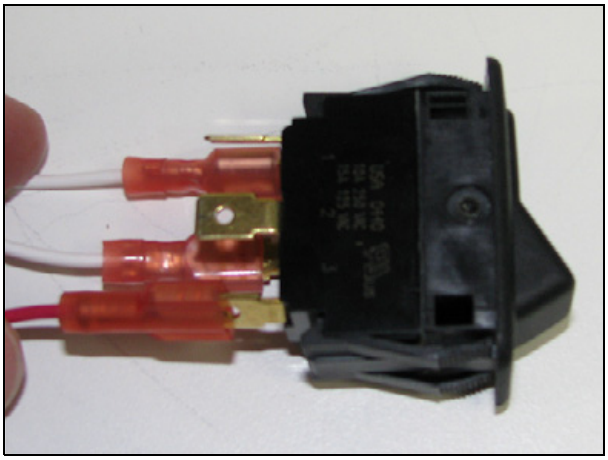
NOTE – Polarity is important.



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.

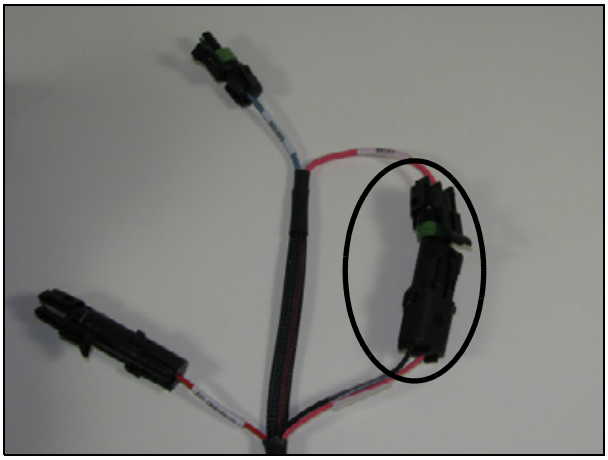
NOTE – This additional wire is required to allow the switch to illuminate.



Ignition is used to turn on the Autopilot system

Step 1

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

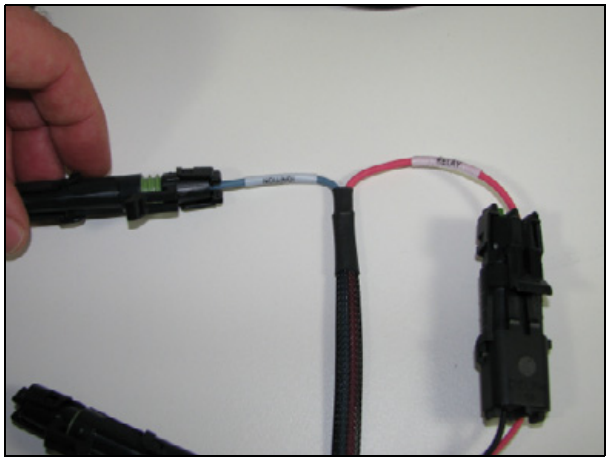


Step 2

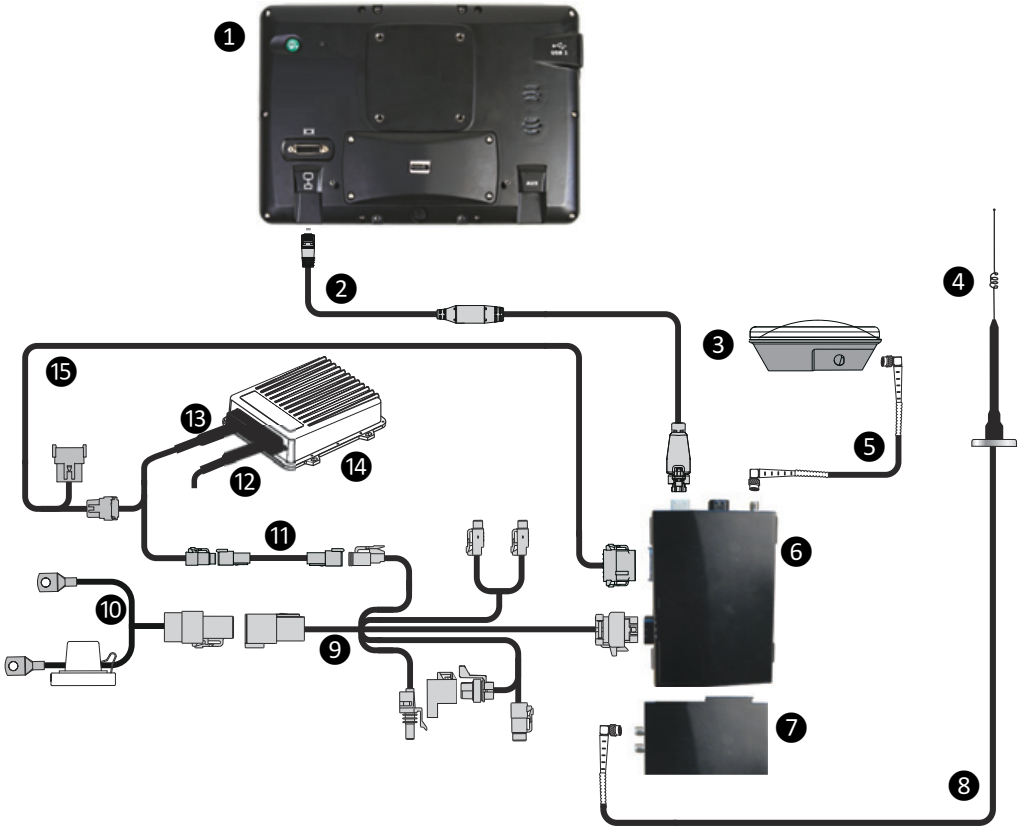
Connect the cable labeled **R8 Ignition** (included with the power bus) to connector **P3 Ignition** on the power bus.

Step 3

Route the cable to the vehicles ignition.



TMX-2050 display: Components



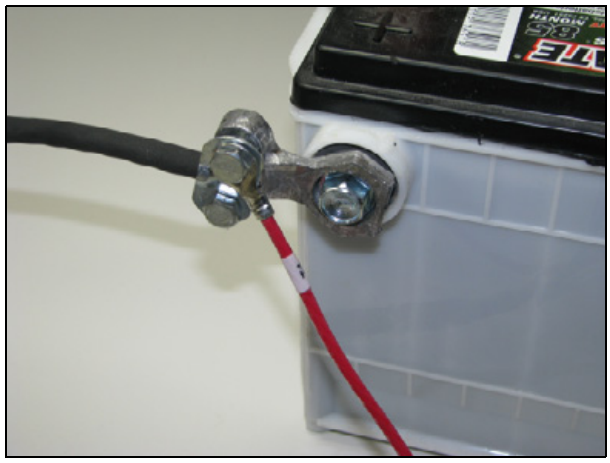
Item	Description	Trimble P/N
1	TMX-2050 display	96700-00
2	TM-200 Module to display cable	93843
3	AG-25 GNSS antenna	77038-00
4	900 MHz radio antenna kit	22882-10
5	8 m GNSS TNC/TNC RT angle cable	50449
6	TM-200 Module	95060-00
7	AG-815 radio	
8	NMO-to-TNC 20 ft antenna cable and base	72122
9	TM-200 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 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.

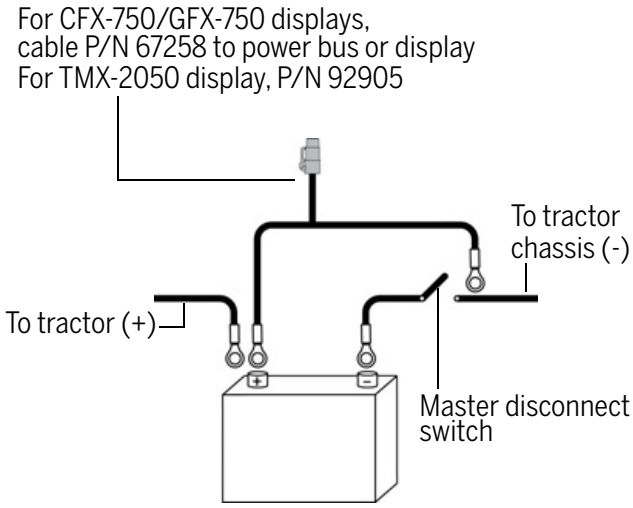
Step 1

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.



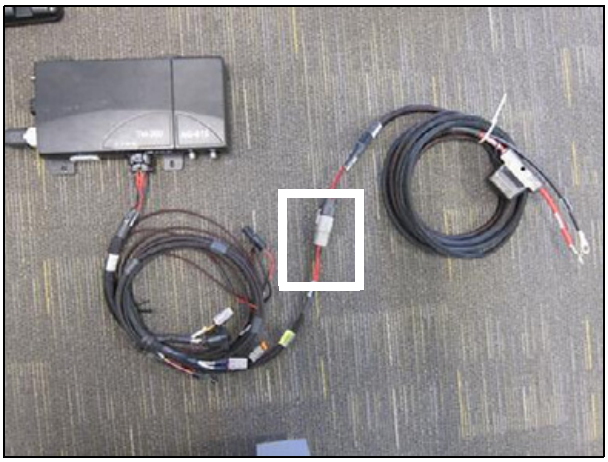
Step 2

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



Step 3

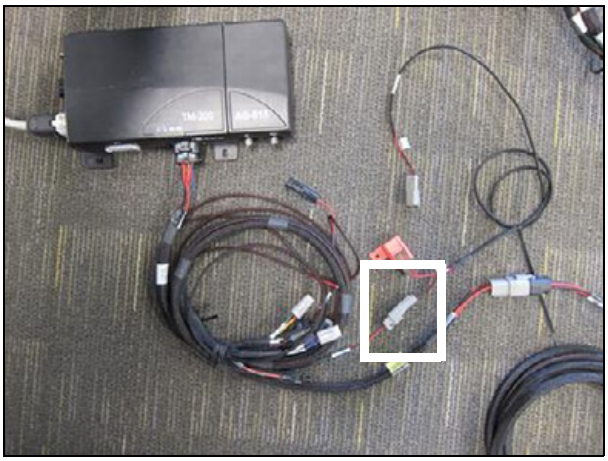
Route the power cable P/N 92905 that you previously connected to the battery and connect it to the R3 power in plug on the P/N 92676 cable.



Step 4

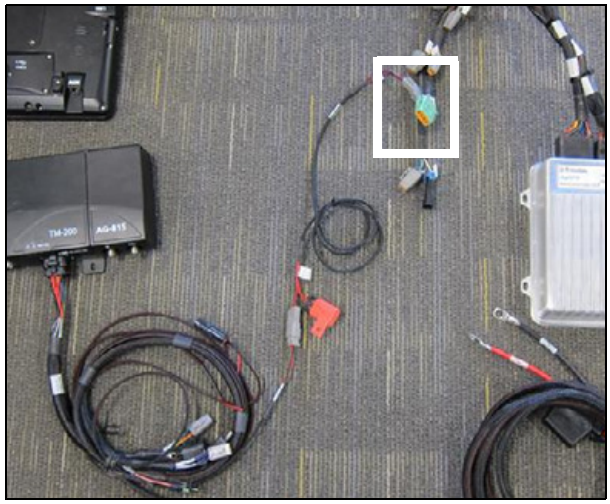
Connect the 2-pin DTM to 2-pin DT power adapter P/N 67095 to the P2 power out connector on the P/N 92676 cable.

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



Step 5

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



TMX-2050 display: Configuring the power options

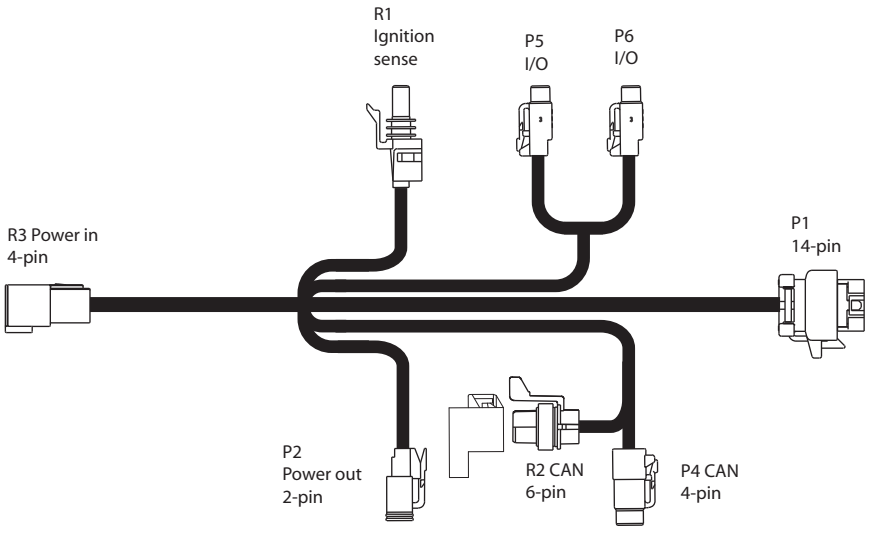
⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

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

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

Ignition sensing

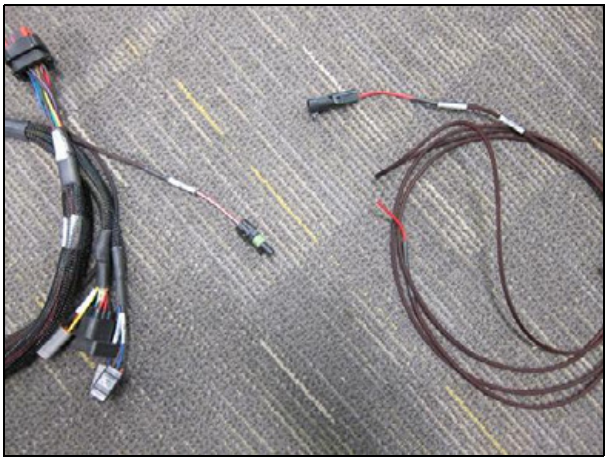
For ignition sensing with the TMX-2050 display, connect the ignition on the power supply to the R1 connector on the harness, P/N 92676.



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

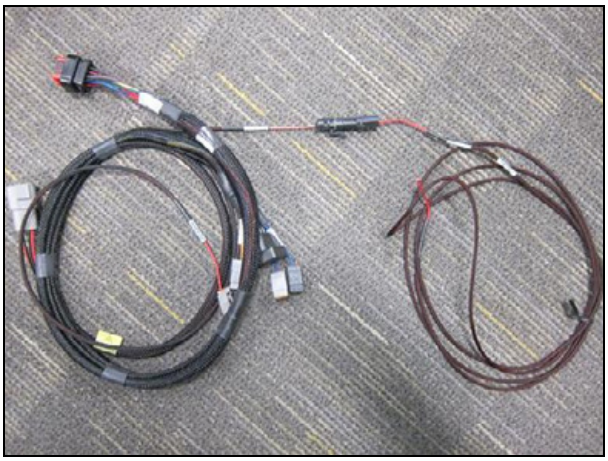
Step 1

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



Step 2

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



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

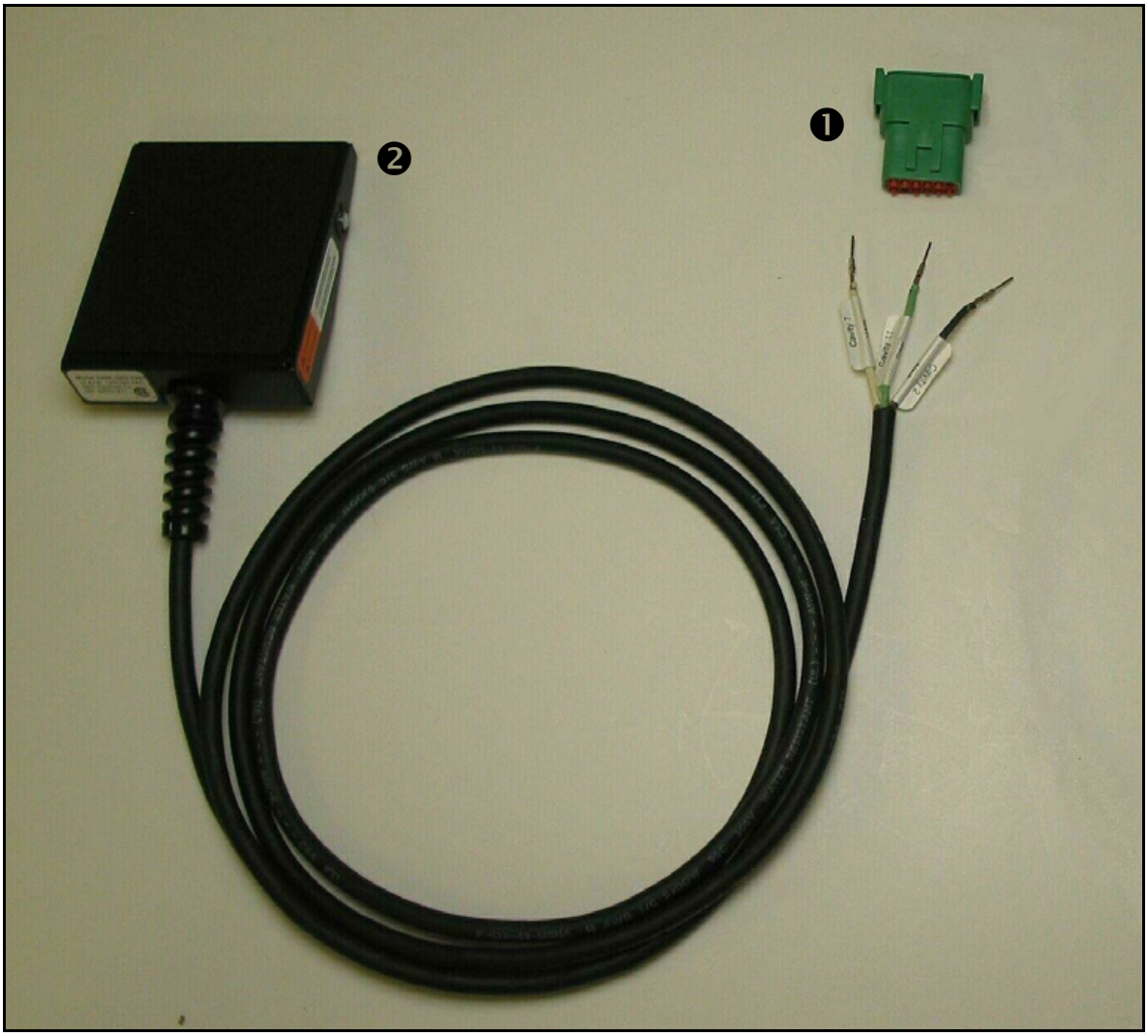
Remote engage switch components: Rocker switch



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

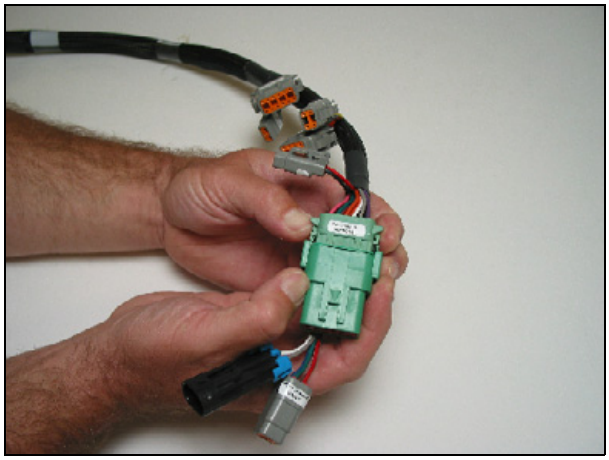


Item	Description
1	DTM receptacle
2	Remote engage foot switch

Preparing the remote engage cable

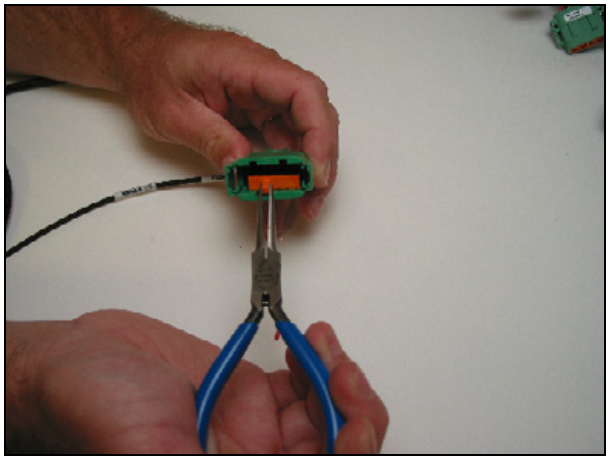
Step 1

Locate the green 12-pin Deutsch receptacle on the P-5 leg of the main controller harness. For more information, see Controller connections, page 120.



Step 2

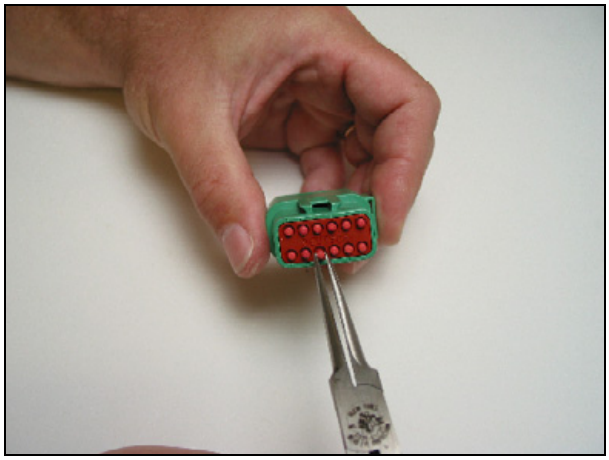
Remove the wedge from the connector.



Step 3

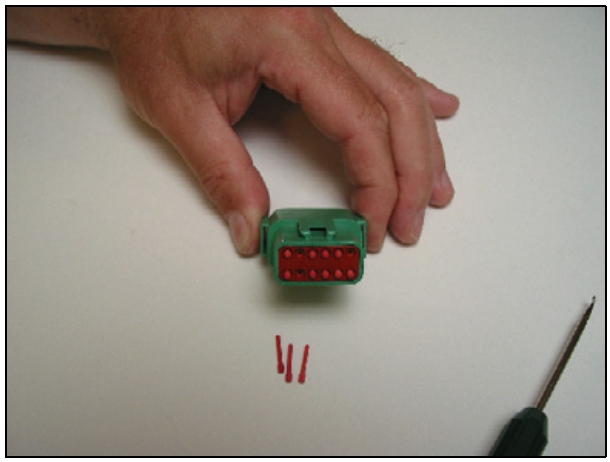
Rocker switch only

Remove the plugs from cavity 2 and cavity 7.



Foot Switch Only

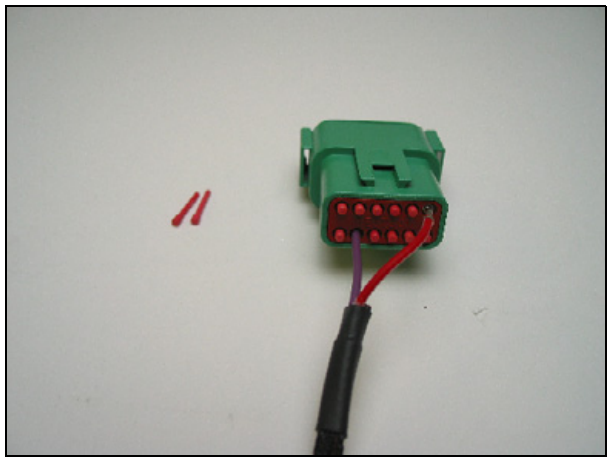
Remove the plugs from cavity 2, cavity 7, and cavity 11.



Step 4

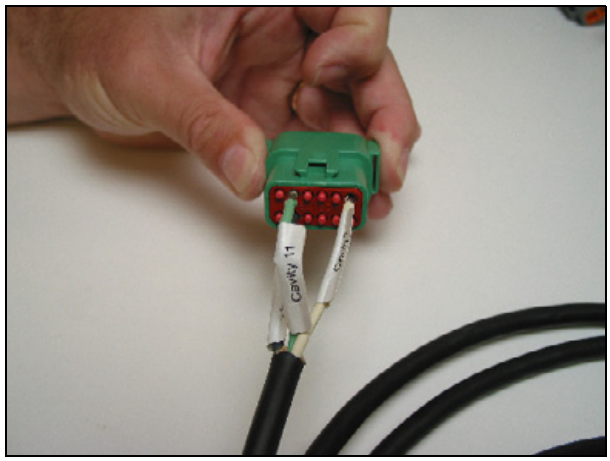
Rocker switch only

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



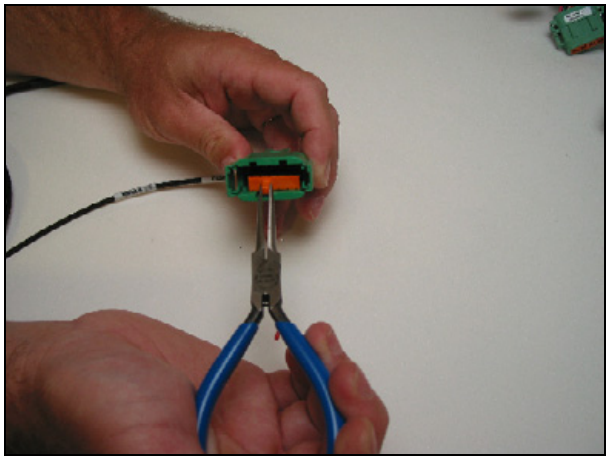
Foot switch only

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

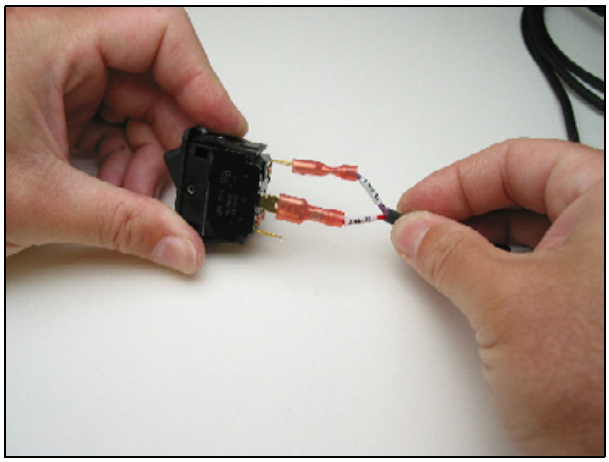
Run the cable to a clear location on the floor board. Use double-sided tape to secure the pedal. Route the cable under the floor mat.



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
- Controller connections

NOTE – The NavController orientation is different than the released VDB. Please update the NavController orientation prior to use.

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.

Step 1

Remove the screws from the left rear corner post cover and then remove the cover.



Step 2

Remove the screws from the cover behind the seat and then remove the cover.



Step 3

Remove the screws from the cover directly behind the seat and then remove the cover.



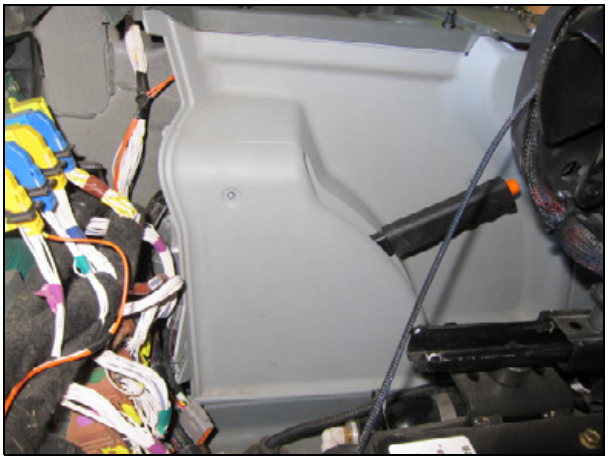
Step 4

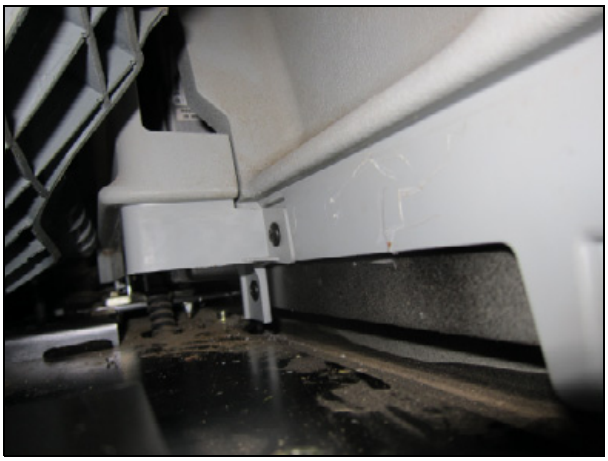
Remove the left corner cover.



Step 5

Remove the screws from the cover of the parking break. The floor pad must be lifted to access the lower screw near the left side of the seat.





Step 6

Remove the lower screws of the cover on the inside of the parking brake. The rear screw is accessed from behind the seat. There is also a screw below the buddy seat that must be removed prior to removal of the cover.



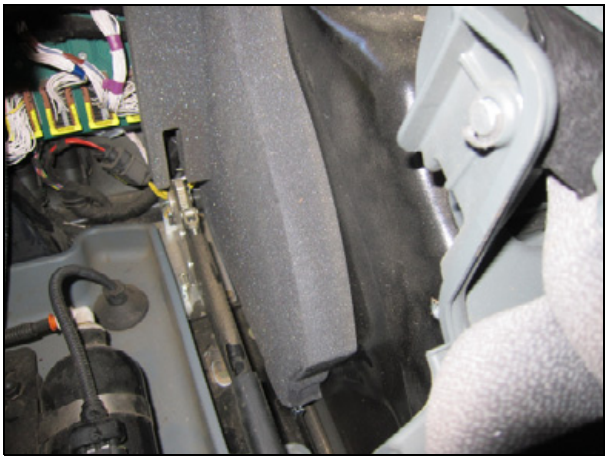


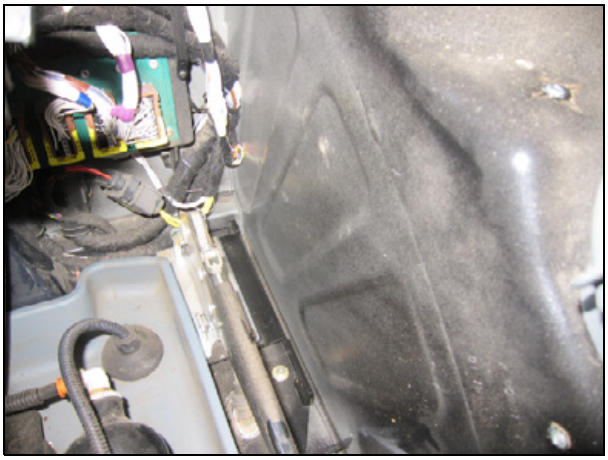


Step 7

Remove the foam between the parking brake and the fender well.

Retain the foam–trim it to allow the NavController to be installed and then replaced, to protect the wires at the rear of the parking brake handle.





Step 8

Place the NavController between the parking break and the fender well with the connectors pointing up.

Make sure the NavController is level and then mark the four mounting holes.

Make sure to leave enough room to allow the foam trimmed in the previous step to be replaced and protect the wires at the rear of the parking brake handle.

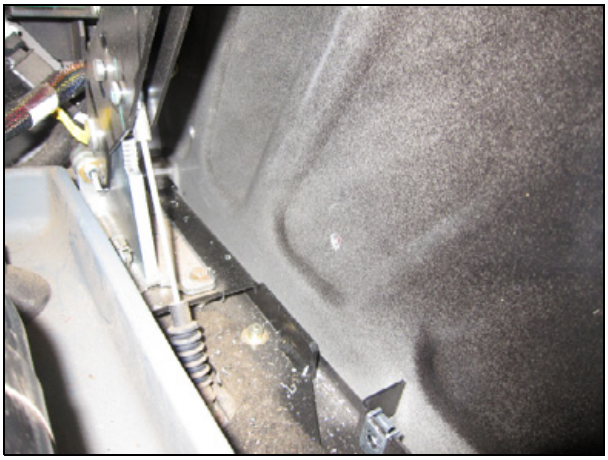




Step 9

Drill the four mounting holes.

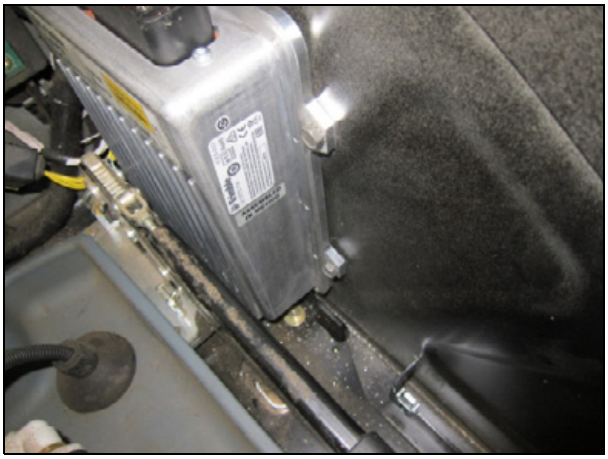


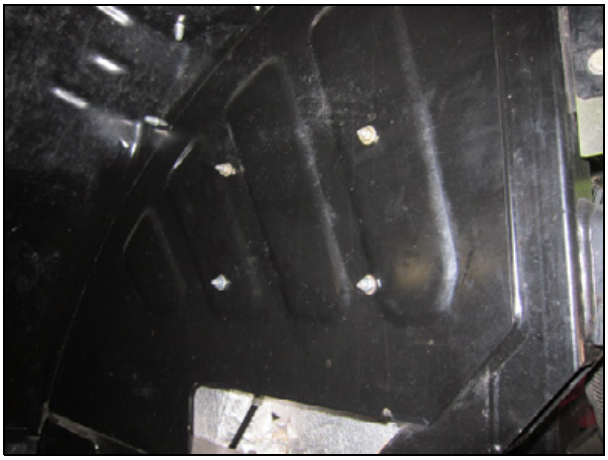




Step 10

Use the supplied hardware to secure the NavController to the fender well.





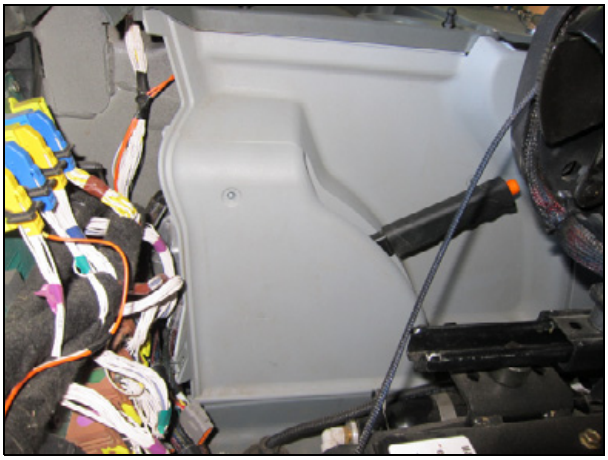
Step 11

Connect the P/N 54601 and 54602 cables to the NavController.



Step 12

Install the covers on the left side of the cab that were removed in the previous steps.
Route the NavController cables to the lower left corner behind the seats.



Step 13

Locate the lower rear cover removed in Step 3 and remove the cap from the lower left corner. If no hole is preset then drill a new hole large enough to pass the NavController cables through.





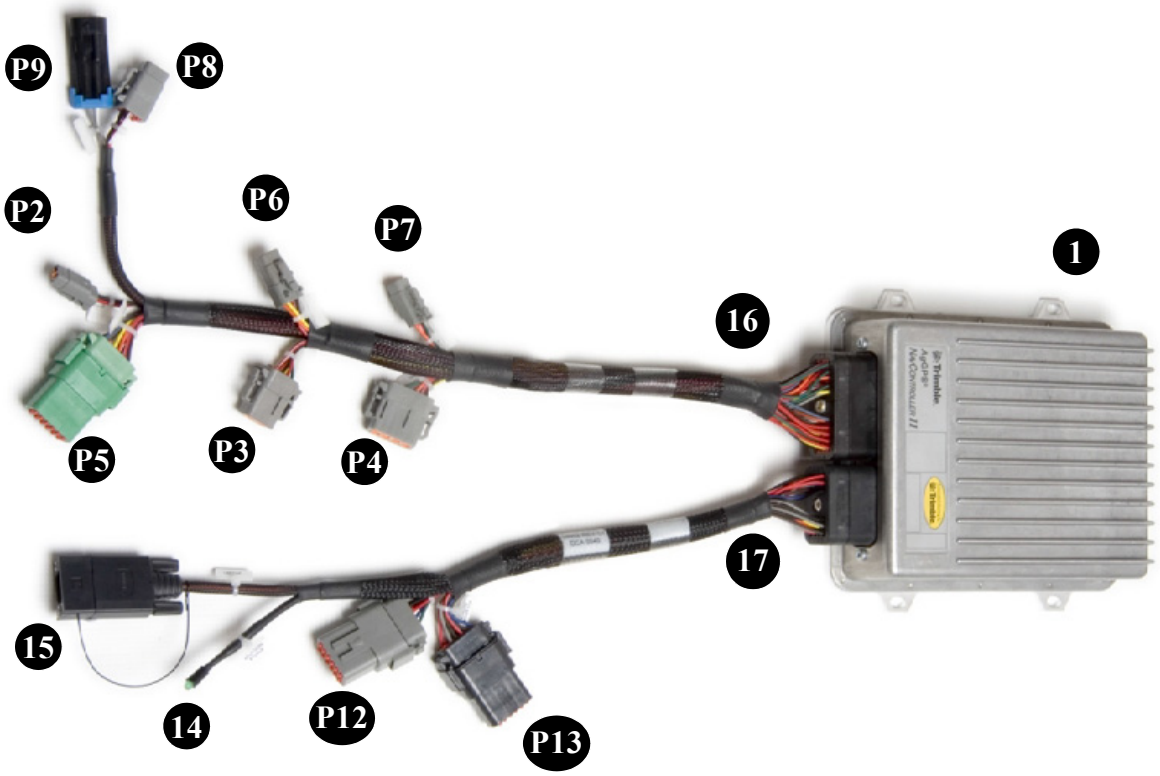
Step 14

Install the remaining covers removed in the earlier steps.

NOTE – The NavController orientation is different than the released VDB. Please update the NavController orientation prior to use.



Controller connections

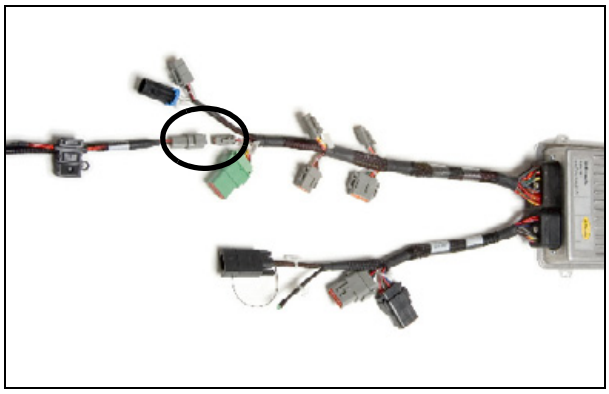


Item	Description	Item	Description
1	NavController	**P9**	Sonalert connector
P2	Power connector	**P12**	Lightbar/spare connector
P3	GPS connector	**P13**	Spare sensors connector
P4	Display connector	**14**	Status indicator
P5	Vehicle sensors connector	**15**	Laptop connector
P6	Steering sensor connector	**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**. P2 is located on the main wiring harness.

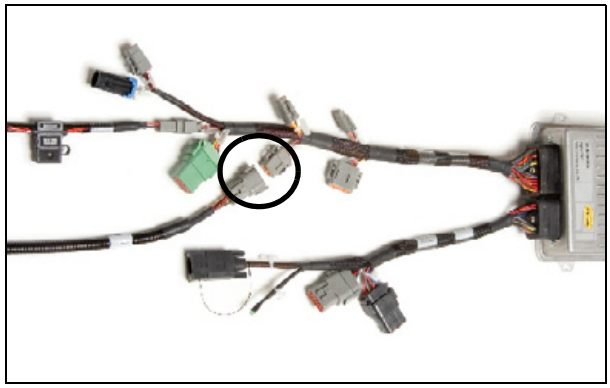
NOTE – The power connection supplies power through the controller to all connected devices, including GNSS and displays.



Step 2

Connect the GPS cable connection to P3, which is labeled **GPS**. P3 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

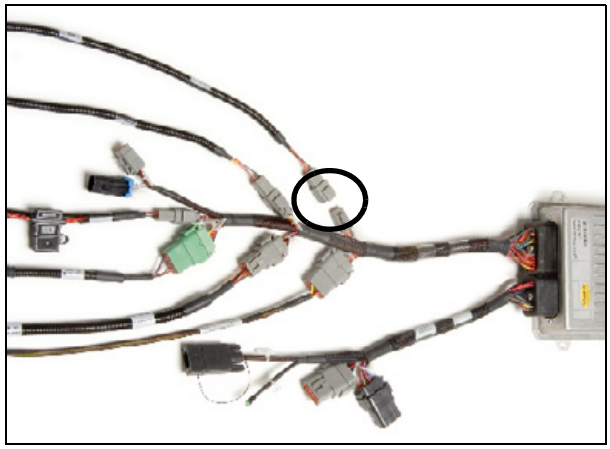
Connect the IMD-900 steering sensor: with the cable routed to the NavController, connect the R1 connector to the P12 connector, which is labeled **Steering Sensor**. P12 is located on the P/N 54602 harness, as shown.



Step 4

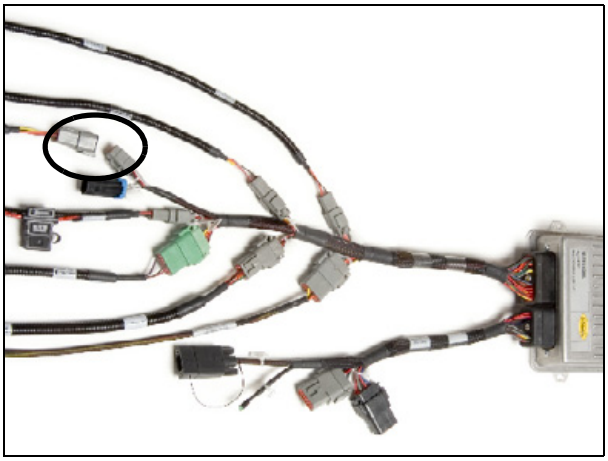
Connect the manual override cable connection to P7, which is labeled **Manual Override**. P7 is located on the main wiring harness.

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



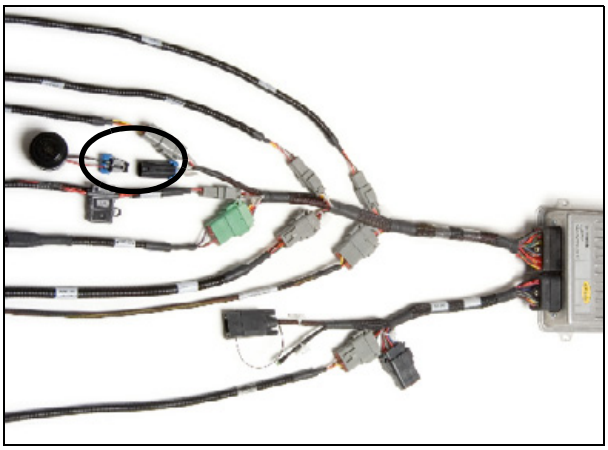
Step 5

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



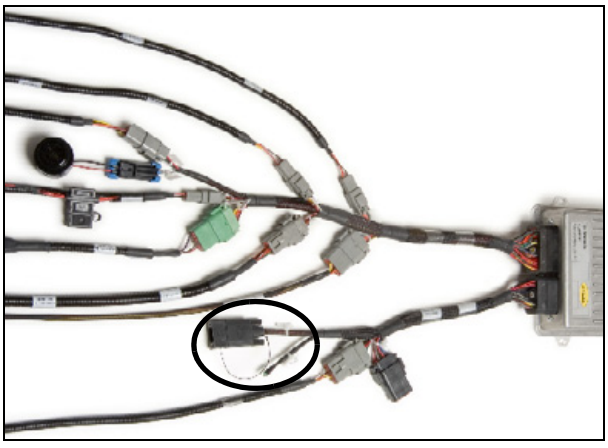
Step 6

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

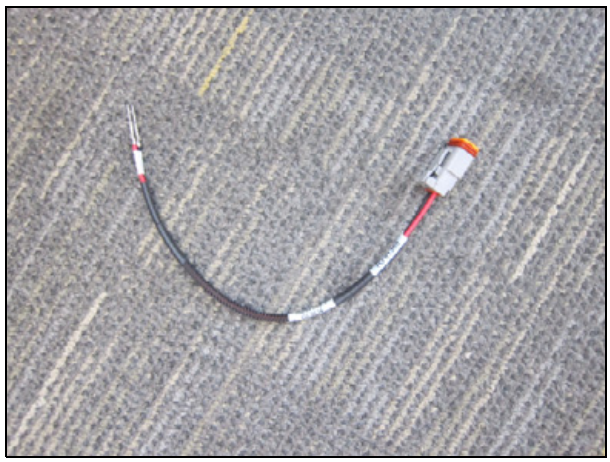
These instructions must only be completed by users familiar with operation of H4 manifold.

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)

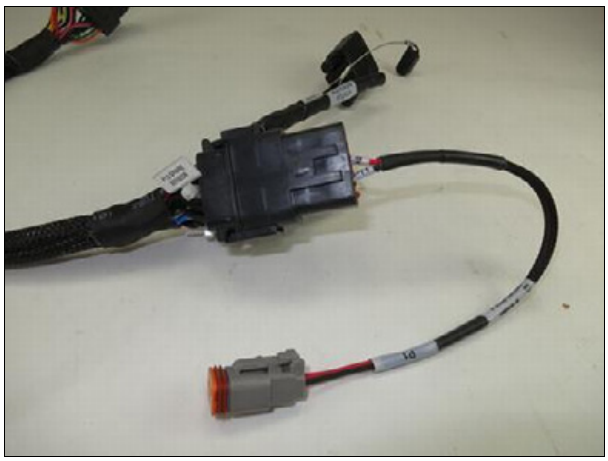
NOTE – This feature is not available with the NavController II.

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.

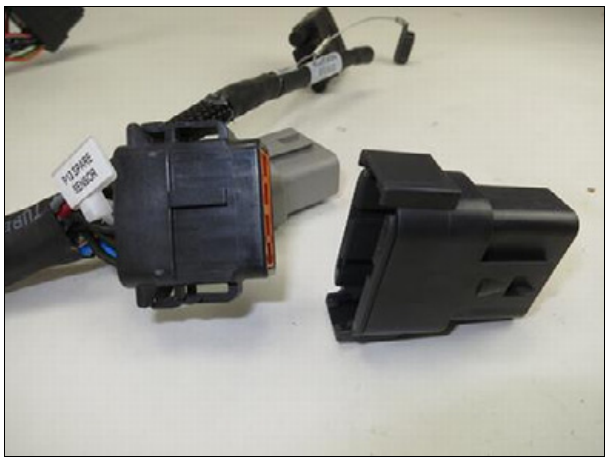
Step 1

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



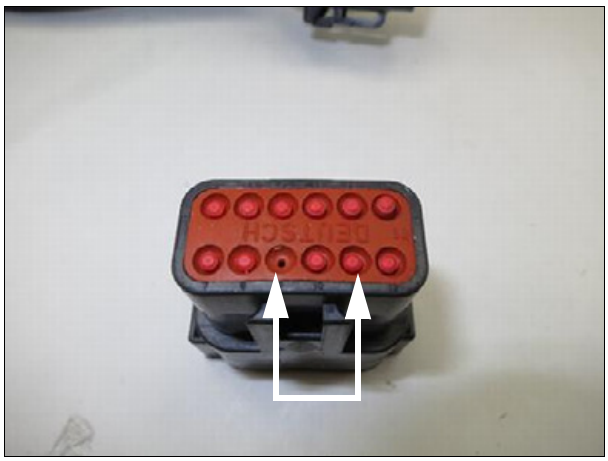
Step 2

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



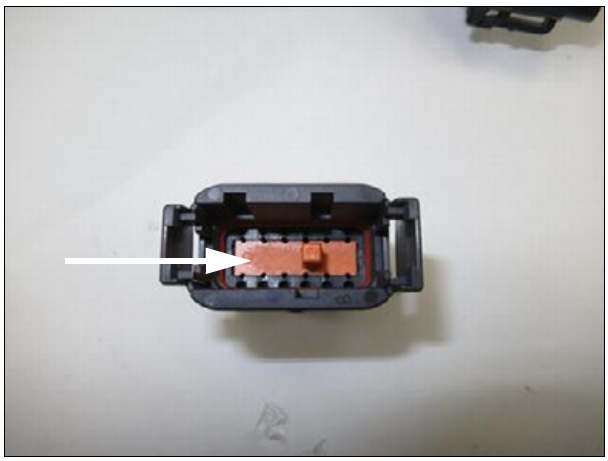
Step 3

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



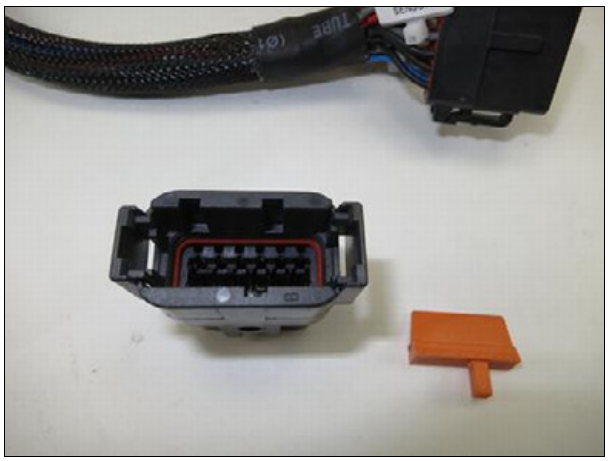
Step 4

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



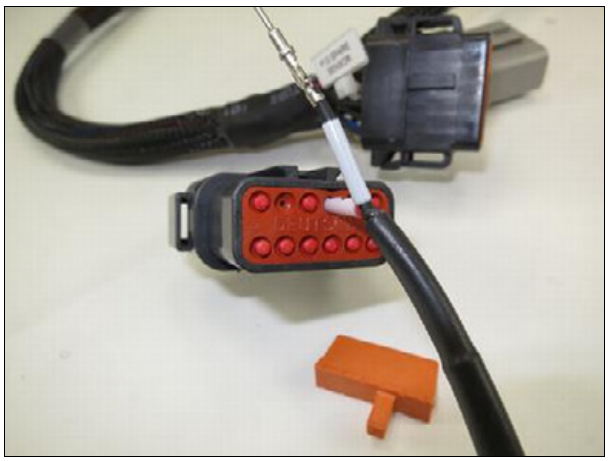
Step 5

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



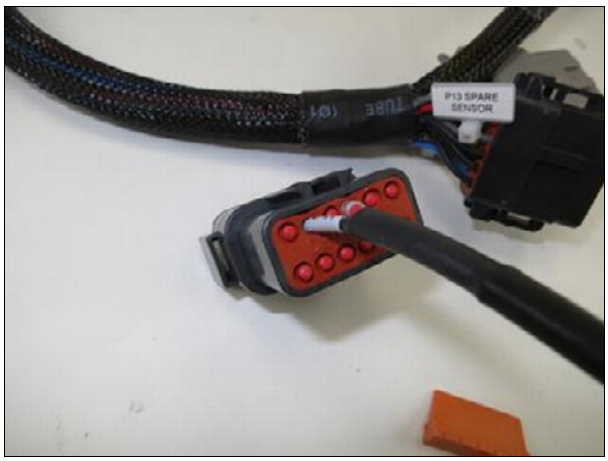
Step 6

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



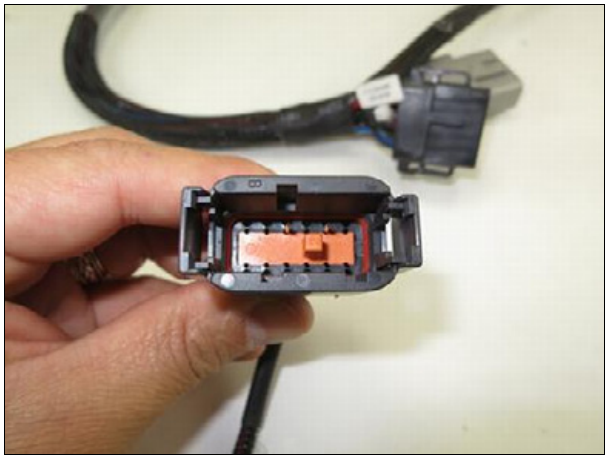
Step 7

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



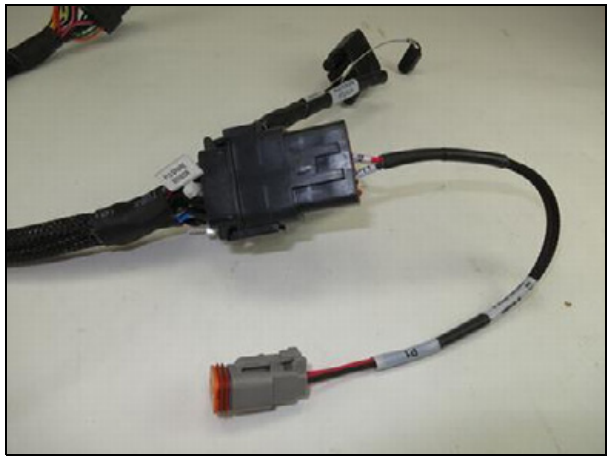
Step 8

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



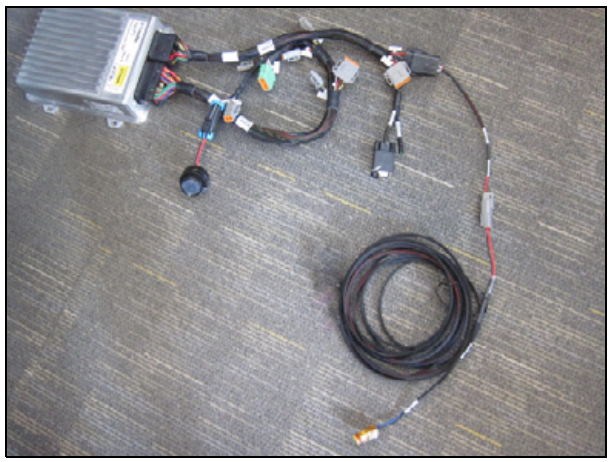
Step 9

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



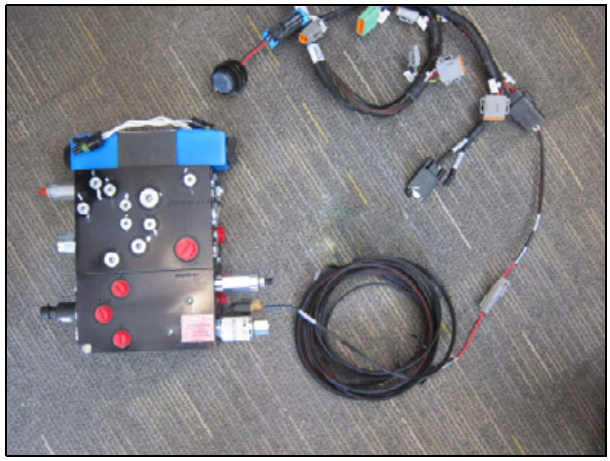
Step 10

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



Step 11 - Connecting to the solenoid

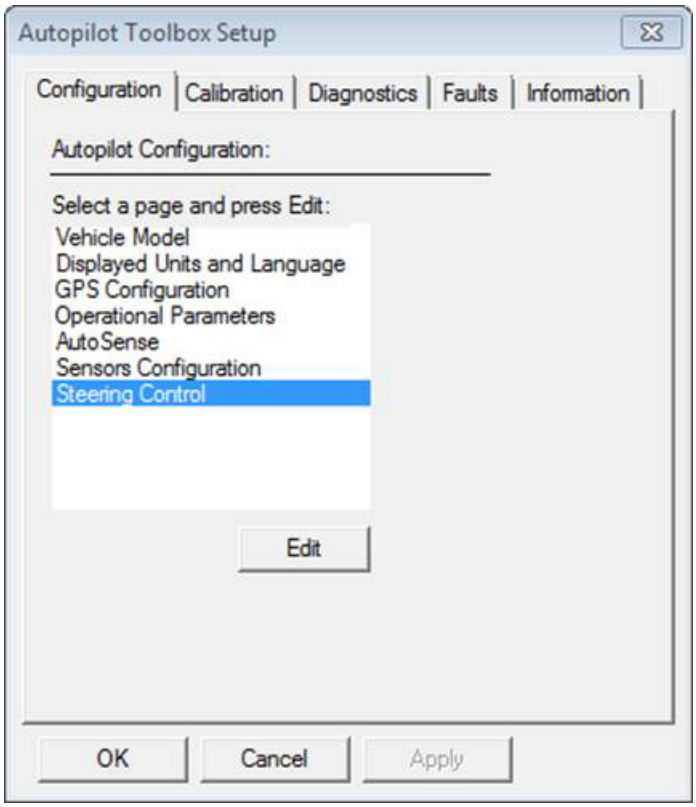
Route the P2 plug of cable P/N 103378 to the Autopilot manifold isolation solenoid and connect it as shown.



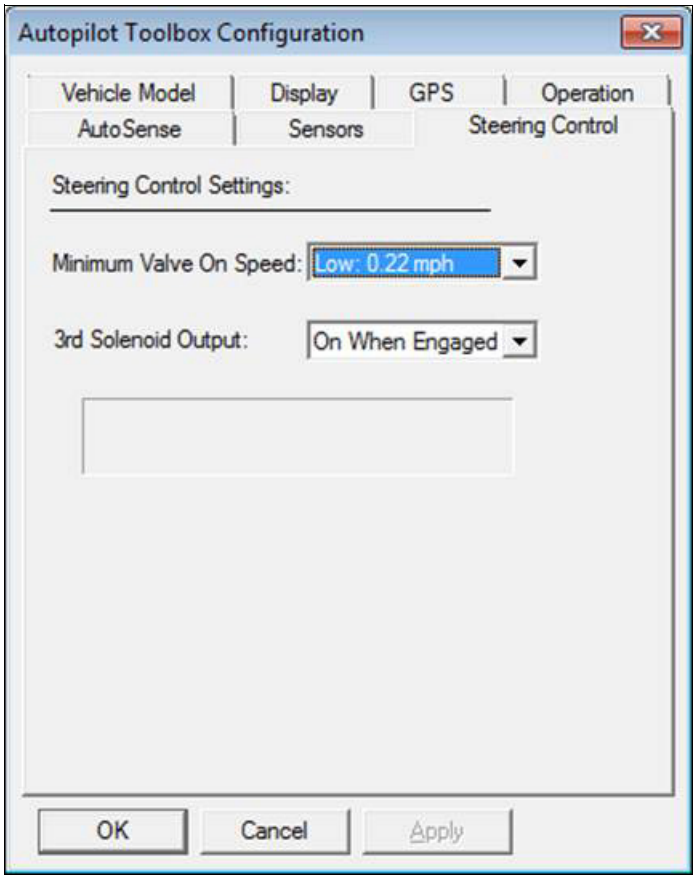


Configuring the NavController III to turn on the electronic isolation manifold

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.

Preparing to set the relief pressure

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

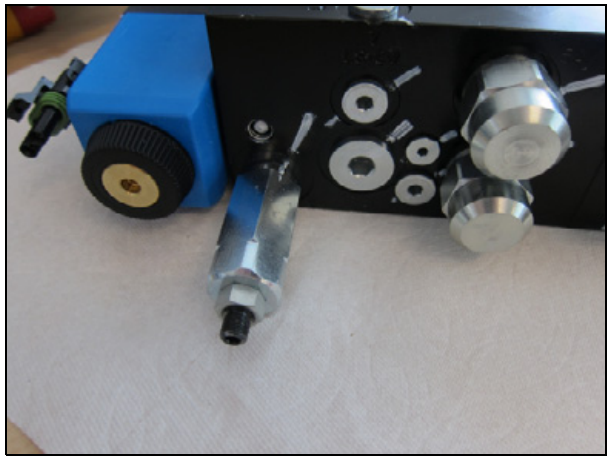
Connect the T line of the manifold to an oil tank or return line on the remote of a tractor.

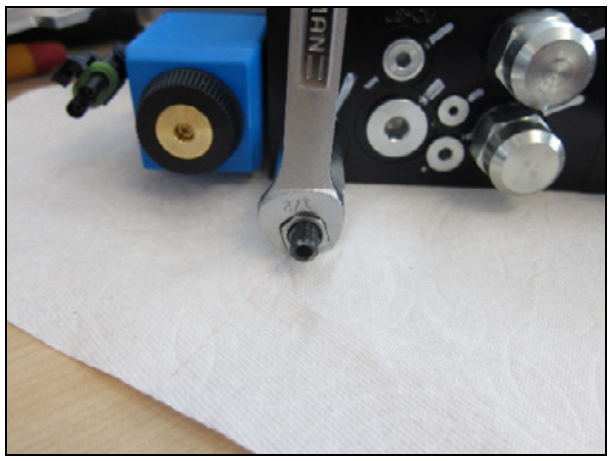
Step 4

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'

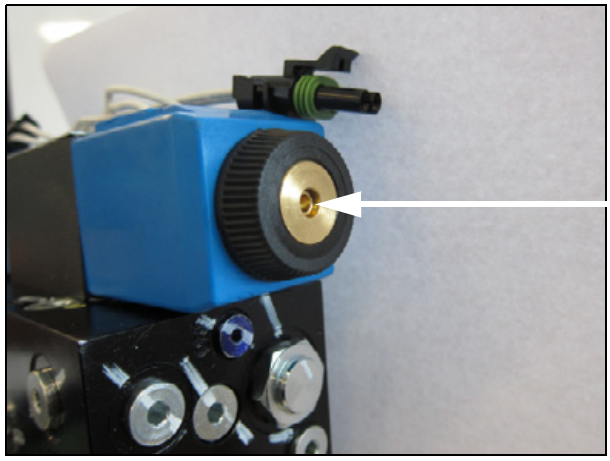




Step 6

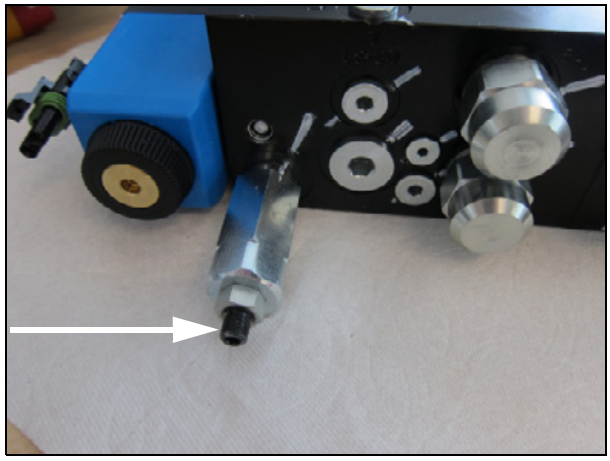
With pressure applied to the P port, press on one of the Detent overrides on the electro hydraulic valve. If the steering cylinders are present in the system, make sure to run the override until you hit and end stop to ensure you are at peak pressure.

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.

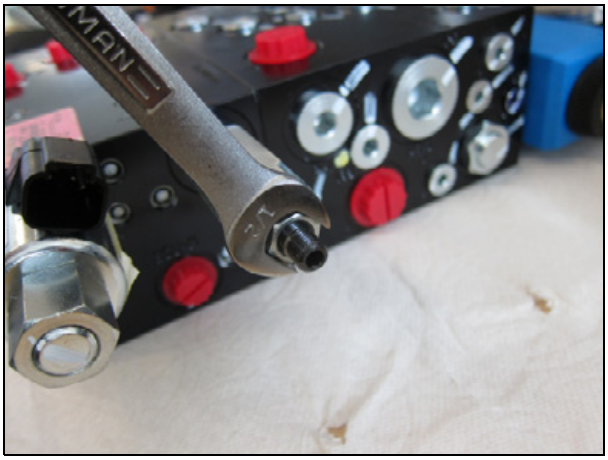
In some machines, it may be necessary to adjust the PRV setting in order to bias the cartridges more towards the manual steering or towards the Autopilot steering.

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 mounting orientation
   - Manual override
   - AutoSense/IMD-900 mounting orientation
   - Valve deadzone
   - Autopilot P-gain
   - Antenna height/Antenna axle offset, and Roll offset