INSTALLATION INSTRUCTIONS

Autopilot™ Automated Steering System

Claas Jaguar
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Version 5.00
Revision B
May 2015
Part number 54038-70-E05-B

Trimble

Legal Notices

Agriculture Business Area

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Westminster, CO 80021
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This is the May 2015 release (Revision B) of the Autopilot Automated Steering System Installation Instructions, part number 54038-70-E05-B. It applies to version 5.00 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.

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CHAPTER 1

Introduction

In this chapter:

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

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

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

Technical assistance

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

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

Manual system upgrade to Autopilot

CFX-750 display and FmX integrated display

Retain	Remove
CFX-750™ display: P/N 94000-xx Power cable CFX-750 display: P/N 77282 **FmX® integrated display: P/N 93100-xx** Power cable FmX display: P/N 66694 Antenna for display: P/N 60600-02 (DGPS) or 77038-00 (OmniSTAR®/RTK) Antenna to receiver cable: P/N 50449 Basic cable (both displays): P/N 67258	

Required components

Kits required	Special tools
Platform kit: P/N 54038-70 Hydraulic hose kit: P/N 77215	Drill $^{5}/_{16}$" drill bit ⅜-16 tap 2" hole saw

Antenna mounting kits

Kits required
AG-15 antenna mounting plate: P/N 62034 Bracket, GPS - V Base Plate indexing: P/N 62388-02

Autopilot hardware organization: As shipped

Hardware	Component	See...
Platform kit: P/N 54038-70	Hydraulic valve	Chapter 2
	Hydraulic manifold	
	Transducer flow switch	
	Manual override cable	
	Hydraulic brackets and bolt kits	
	Hydraulic valve cable	
	AutoSense™ steering device and cabling	Chapter 3
	AutoSense mounting bracket and hardware	
	Power switch	Chapter 6
	Bolt kit controller	Chapter 8
Hydraulic hose kit: P/N 77215	Hydraulic hoses	Chapter 2
	Hydraulic adaptors	
Roof bracket kit: AG-15 antenna mounting plate: P/N 62034 Bracket, GPS - V Base Plate indexing: P/N 62388-02	Roof brackets	Chapter 4
	Bolt kit, roof bracket	
GNSS receiver	GNSS receiver	Chapter 4
	GNSS antenna	
	GNSS receiver power/data cable	
	RTK radio, cable, and radio antenna	
Display	CFX-750 display	Chapter 5
	FmX integrated display	
	Display cable	
	Mounting bracket	
Common parts	Controller	Chapter 8
	Controller mounting bracket	
	Cable kit Main wiring harness Power bus auxiliary wiring harness Sonalert alarm	

Preparing the vehicle for installation

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

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

CHAPTER 2

Hydraulic Control Valve Installation

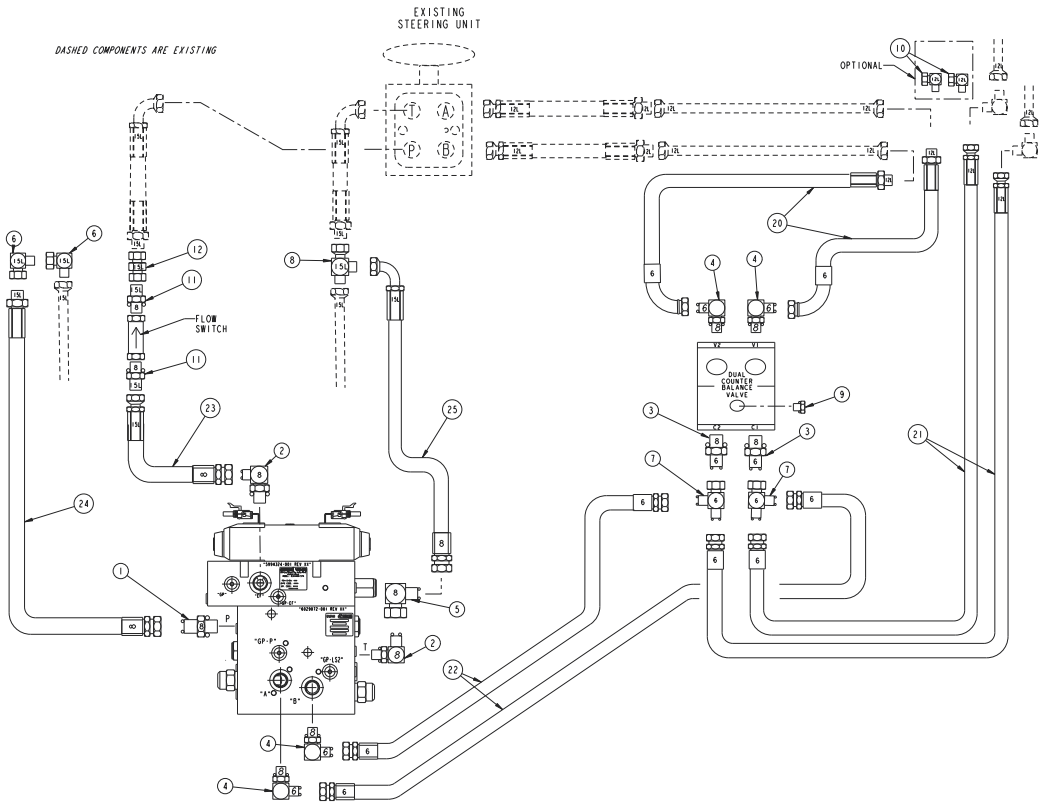
In this chapter:

- Hydraulic control valve components
- Prepare the Autopilot manifold, sandwich block, and control valve
- Preparing the counterbalance valve
- Mounting the Autopilot manifold and the counterbalance valve
- Connecting the hydraulic hoses
- Completing the electrical connections
- Checking the hydraulics

This chapter describes how to install the hydraulic control valve and hoses.

Hydraulic control valve components

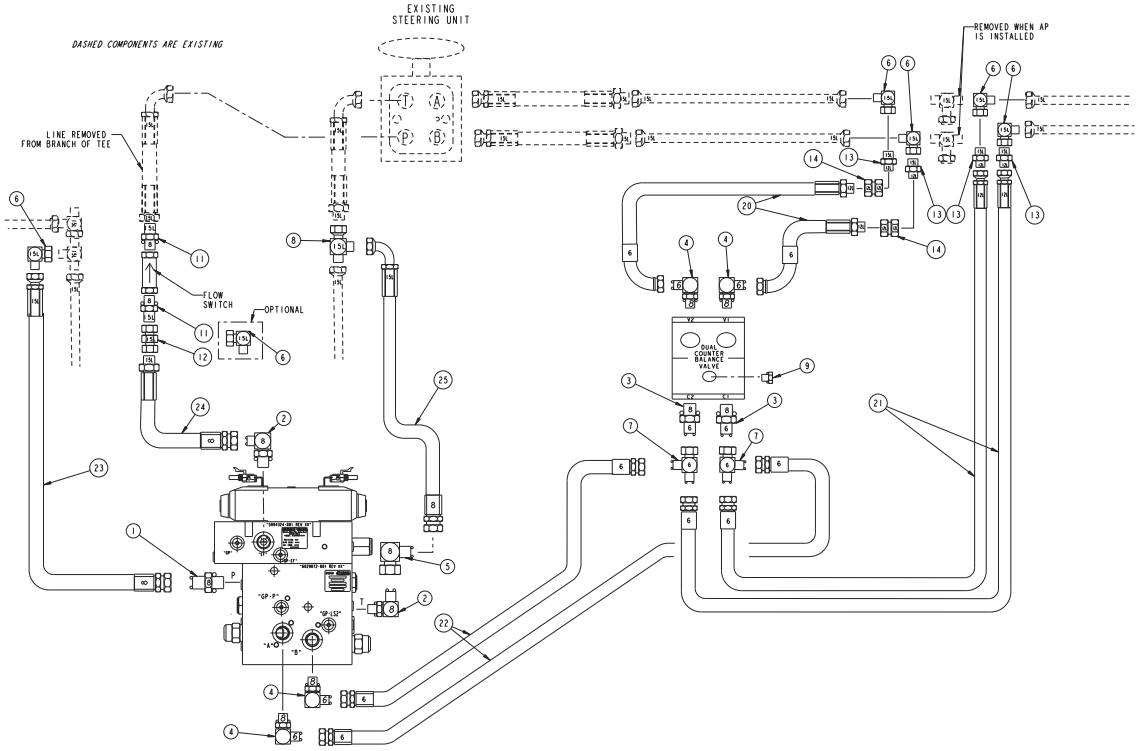
491, 492, 494 series machines



	Description	P/N
❶	Fitting (x1)	8 F5OLO
❷	Fitting (x2)	8 C5OLO
❸	Fitting (x2)	6-8 F5OLO
❹	Fitting (x4)	6-8 C5OLO
❺	Fitting (x1)	8 C6OLO
❻	Fitting (x6)	EW15L
❼	Fitting (x2)	6 R6LO
❽	Fitting (x1)	EL15L
❾	Fitting (x1)	4HP50N
❿	Fitting (x2)	EW12L
⓫	Fitting (x2)	GE15L3 / 4UNF
⓬	Fitting (x1)	GZ15L
⓭	Fitting (x4)	GR15 / 12L
⓮	Fitting (x2)	GZ12L

	Description	P/N
⓴	55" hose (x2)	451TCJ9D0-06-12L-06-55
㉑	55" hose (x2)	451TCJSC3-06-12L-06-55
㉒	24" hose (x2)	451TCJSJS-06-06-06-24
㉓	90" hose (x1)	451TCJSC3-08-15L-08-90
㉔	90" hose (x1)	451TCJSD0-08-15L-08-90
㉕	90" hose (x1)	451TCJSC5-08-15L-08-90

496, 497 series machines



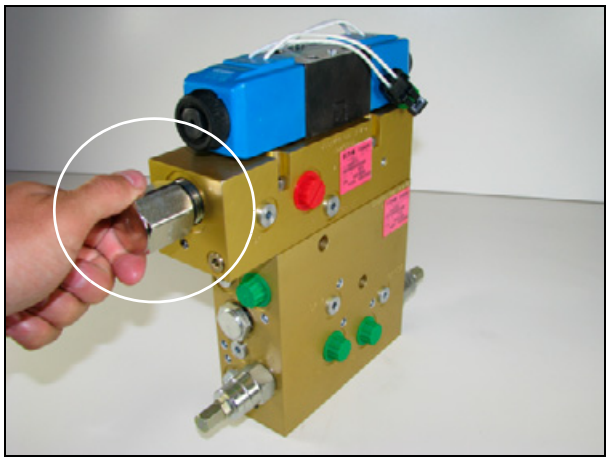
	Description	P/N
❶	Fitting (x1)	8 F5OLO
❷	Fitting (x2)	8 C5OLO
❸	Fitting (x2)	6-8 F5OLO
❹	Fitting (x4)	6-8 C5OLO
❺	Fitting (x1)	8 C6OLO
❻	Fitting (x6)	EW15L
❼	Fitting (x2)	6 R6LO
❽	Fitting (x1)	EL15L
❾	Fitting (x1)	4HP50N
❿	Fitting (x2)	EW12L
⓫	Fitting (x2)	GE15L3 / 4UNF
⓬	Fitting (x1)	GZ15L
⓭	Fitting (x4)	GR15 / 12L
⓮	Fitting (x2)	GZ12L

	Description	P/N
⓴	55" hose (x2)	451TCJ9D0-06-12L-06-55
㉑	55" hose (x2)	451TCJSC3-06-12L-06-55
㉒	24" hose (x2)	451TCJSJS-06-06-06-24
㉓	90" hose (x1)	451TCJSC3-08-15L-08-90
㉔	90" hose (x1)	451TCJSD0-08-15L-08-90
㉕	90" hose (x1)	451TCJSC5-08-15L-08-90

Prepare the Autopilot manifold, sandwich block, and control valve

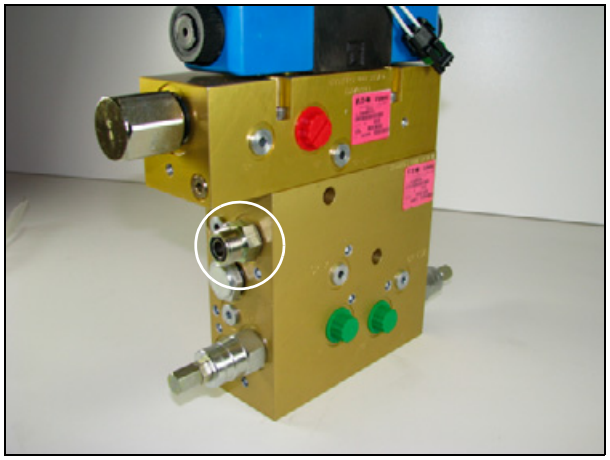
Step 1

Install the supplied PFRD cartridge into the PFRD port of the sandwich plate.



Step 2

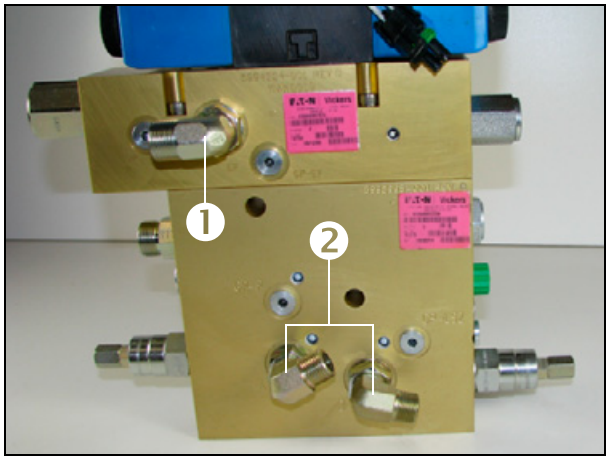
Install a -8 ORB–ORS straight fitting into the P port of the manifold.



Step 3

Install the following, orientated approximately as shown:

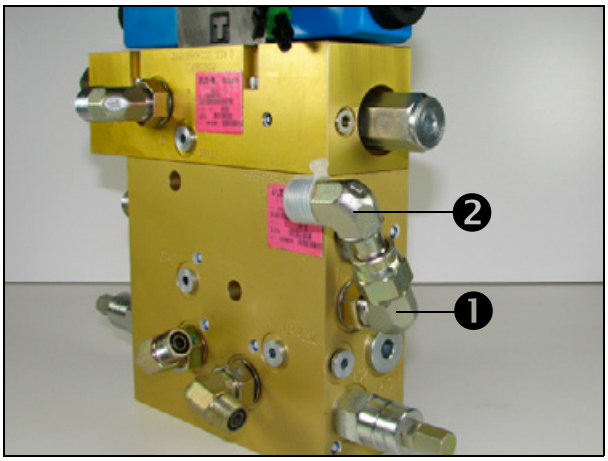
- An -8 ORB–ORS 90° fitting ❶ into the EF port on the manifold.
- Two -6–8 ORB–ORS 90° fittings ❷ into the A and B ports of the manifold.



Step 4

Install an -8 ORB–ORS 90° fitting ❶ into the T port on the manifold, orientated as shown, and then attach a -8 swivel 90° fitting ❷ to the T port fitting.

2 – Hydraulic Control Valve Installation

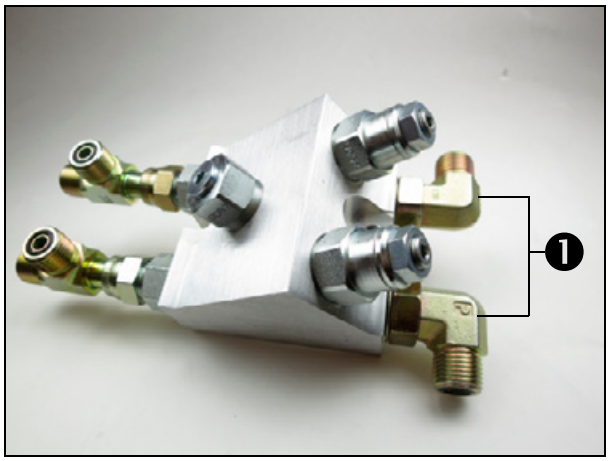


Preparing the counterbalance valve

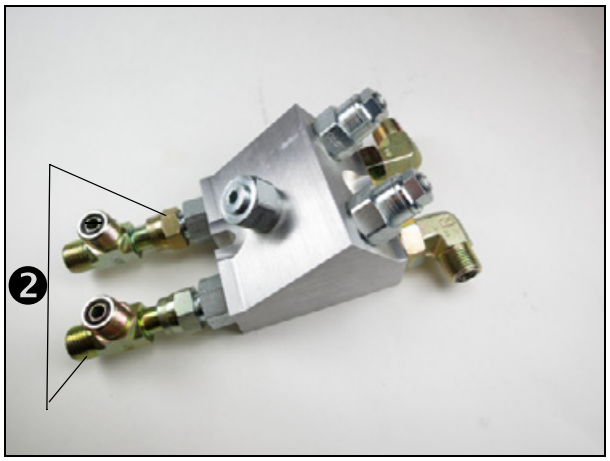
Step 1

Install the following to the counterbalance valve:

- Two -6–8 ORB–ORS 90° fittings ❶ to the V1 and V2 ports of the valve, orientated outwards as shown.

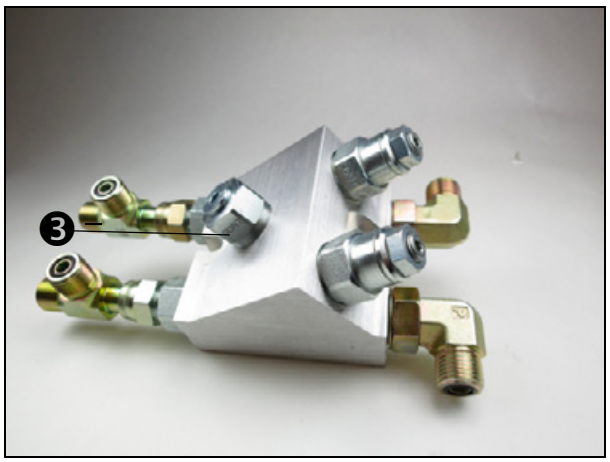


- Two -6–8 ORB–ORS straight fittings to the C1 and C2 ports of the valve, and then install the supplied -6 run T-fittings ❷ to the C1 and C2 fittings.



Step 2

Install the supplied -4 ORB plug into the manual override port on the DCBV ❸.



Mounting the Autopilot manifold and the counterbalance valve

The Autopilot manifold is mounted behind the panel nearest the stairs to the cab on the driver's left side of the machine, as shown.

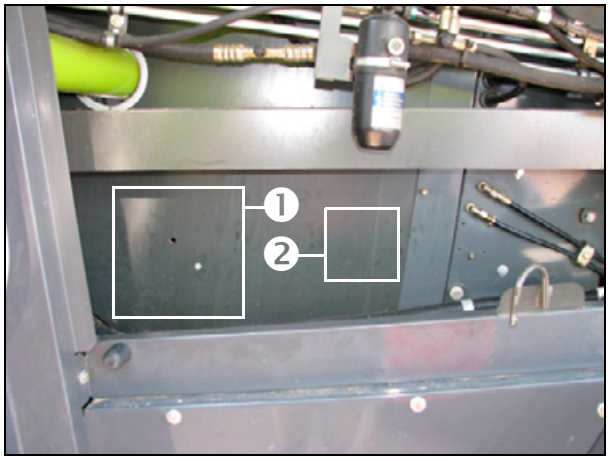


Step 1

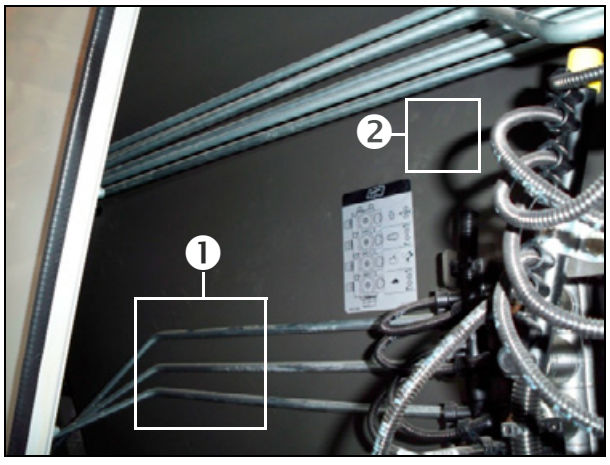
CAUTION – Be careful not to drill into the lines of the storage container for the central grease system. If required, you can temporarily detach the storage container from the machine to provide clearance.

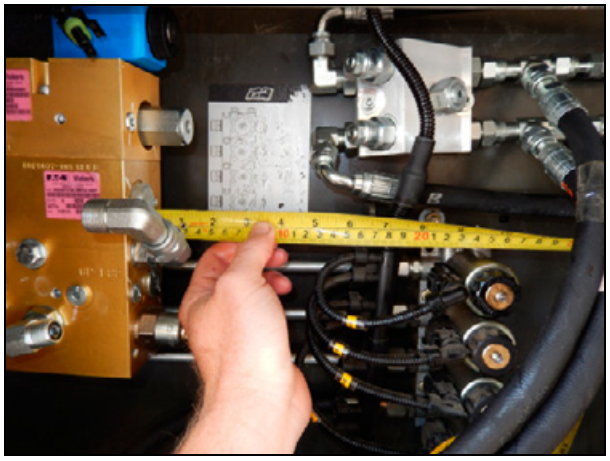
Use the Autopilot manifold ❶ and the counterbalance valve ❷ as templates to mark and drill two ¼" clearance holes for each device.

Early model mount locations (491 series machines)

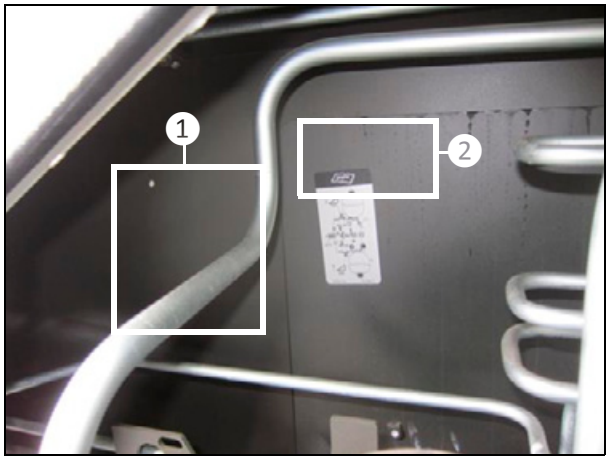


Middle model mount locations (492 and 494 machines)

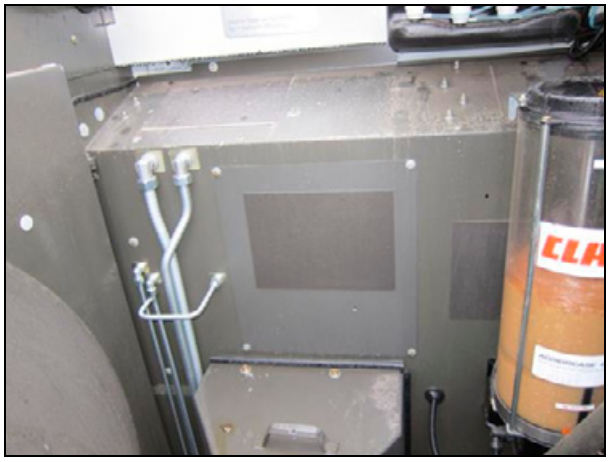




Late model mount locations (496 and 497 series machines)



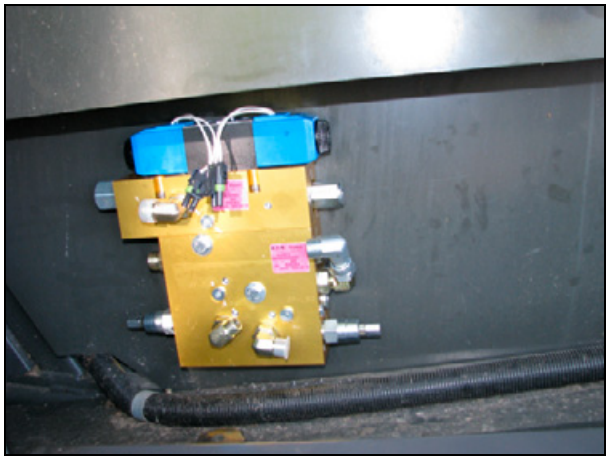
This image shows the central grease system. The holes for mounting the manifold and DCBV may be drilled from this side if required.



Step 2

Early model mounting (491 series machines)

Use the supplied hardware to mount the Autopilot manifold to the vehicle, in the location shown on the previous page.



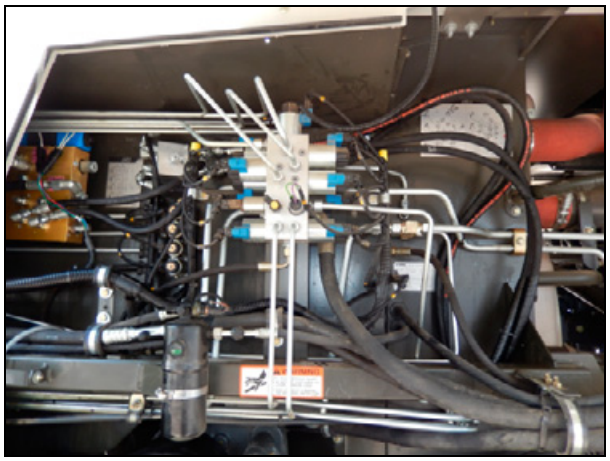
Step 3

Use the supplied hardware to mount the counterbalance valve to the vehicle.

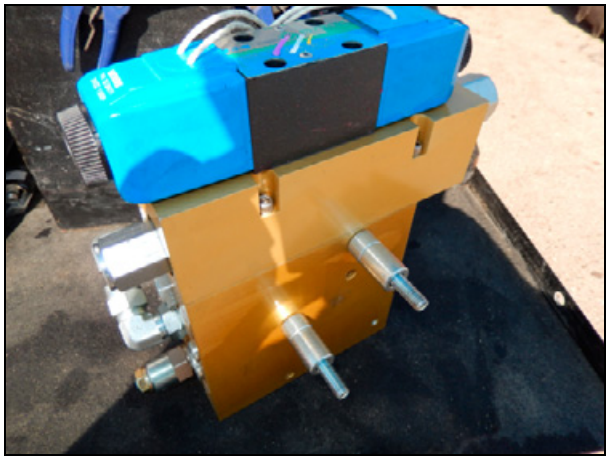


Middle model mounting (492 and 494 series machines)

This image shows the DCBV and Autopilot manifold mounted on a late model machine.



Note – *On middle model machines, use the 1" or 1.5" spacers to allow the steel hydraulics lines to run behind the manifold.*



Late model mounting (496 and 497 series machines)

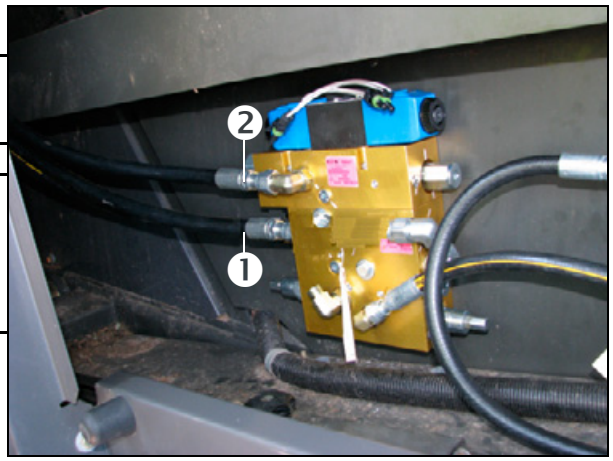
These images show the Autopilot manifold and counterbalance valve mounted on the 496 and 497 series machines.





Connecting the hydraulic hoses

Step 1



WARNING – Ensure the hoses do not contact any moving parts of the vehicle.

CAUTION – Check to make sure that the pressure and EF lines are connected to the appropriate connections. If this is not done, machine components may fail.

Connect the following hoses to the Autopilot manifold:

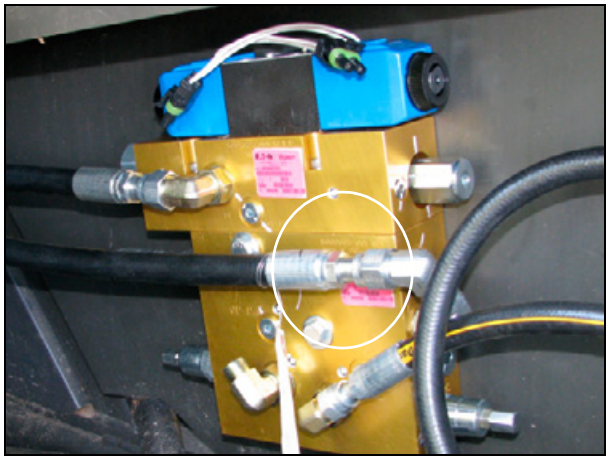
- 90" Pressure hose ❶ to the P port fitting.
- 90" EF hose ❷ to the EF port fitting.

Note – *Depending on the series machine, the P and EF line may be exchanged. 491, 492, and 494 machines use item 24 for pressure and item 23 for EF; 496 and 497 machines use item 23 for pressure and 24 for EF. See* *Hydraulic control valve components, page 12**.*

Route the hoses under the cab to the front of the vehicle.

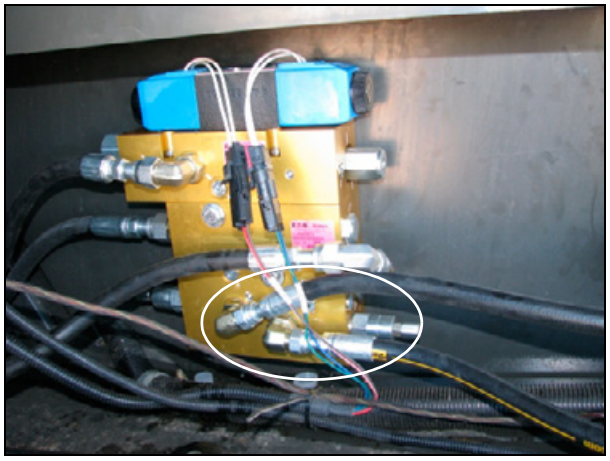
Step 2

Connect the 90" tank hose to the fittings on the T port of the Autopilot manifold.



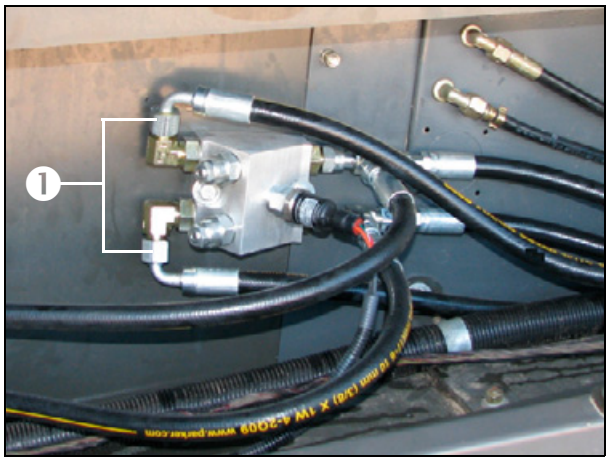
Step 3

Connect the 20" A hose and B hoses to the A and B port fittings on the Autopilot manifold and route them towards the counterbalance valve.



Step 4

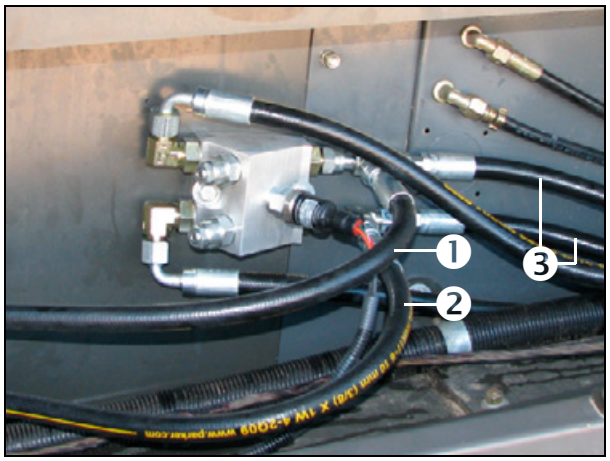
Attach the 90° end of the two 55" V1/V2 hoses ❶ to the 90° fittings on the V1 and V2 ports of the counterbalance valve and then route the hoses toward the lines coming from the existing steering hand pump at the rear of the vehicle.



Step 5

Attach the following to the counterbalance valve:

- The A hose ❶ to the branch of the T-fitting on the C1 port.
- The B hose ❷ to the branch of the T-fitting on C2 port.
- Two 55" C1/C2 hoses ❸ to the free end of the T-fittings on the C1 and C2 ports, and then route these hoses towards the rear of the vehicle.



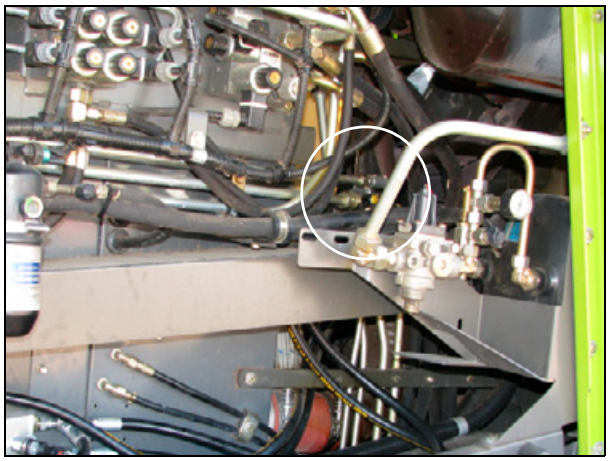
Step 6

Steering line hydraulic connections are located behind the side panel of the machine.

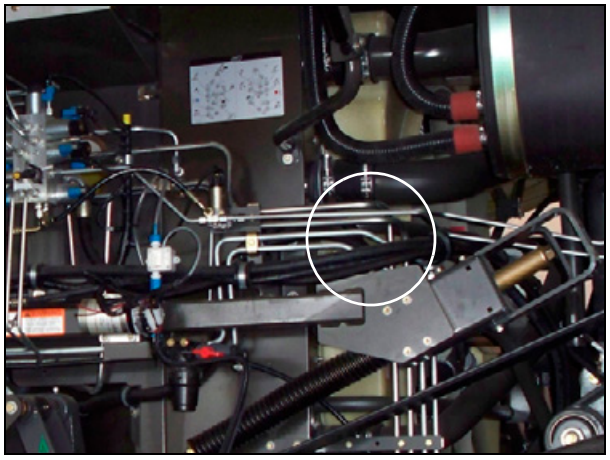


Identify the A and B steering lines that run towards the rear from the steering hand pump and then locate the 90° fittings on the A and B steering lines (run tee fittings on 496 and 497 series machines):

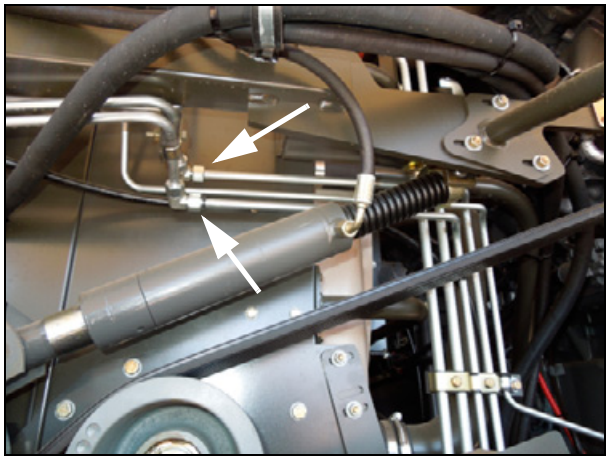
Line location 1
(primarily on 491 series machines)



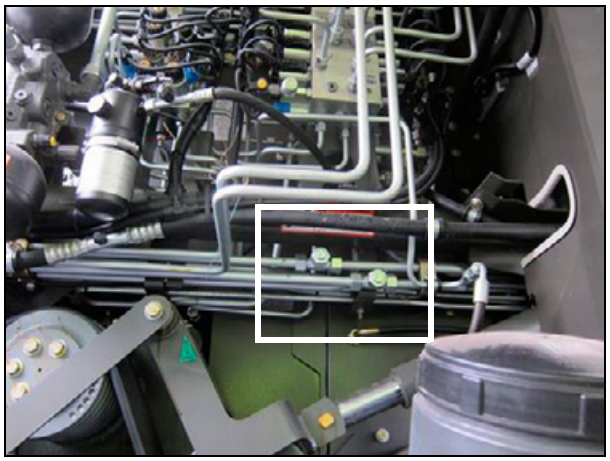
Line location 2
(primarily on 492 series machines)



Line location 3
(494 series machines)



Line location 4
(496 and 497 series machines)



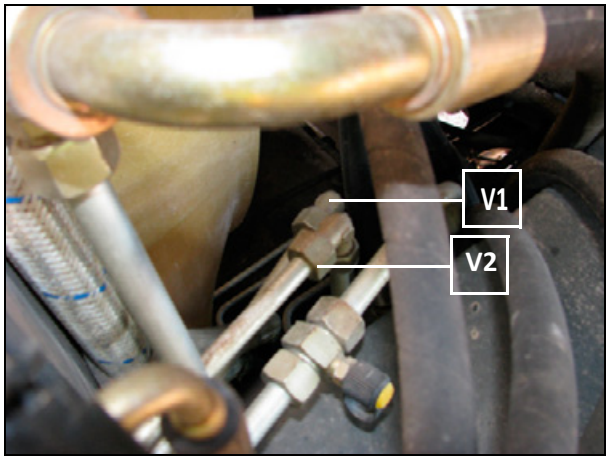


C and V line connections for line locations 1 - 3

Step 1

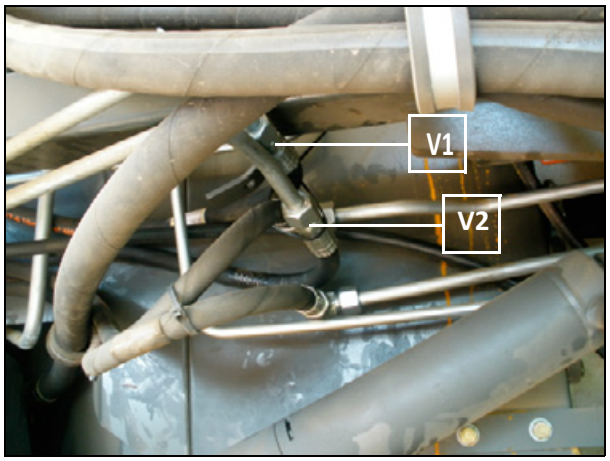
Disconnect the steering lines at the 90° fittings and then attach the following:

- Attach the end of the 55" V1 hose to the A line coming from the steering hand pump.
- Attach the end of the 55" V2 hose to the B line coming from the steering hand pump.



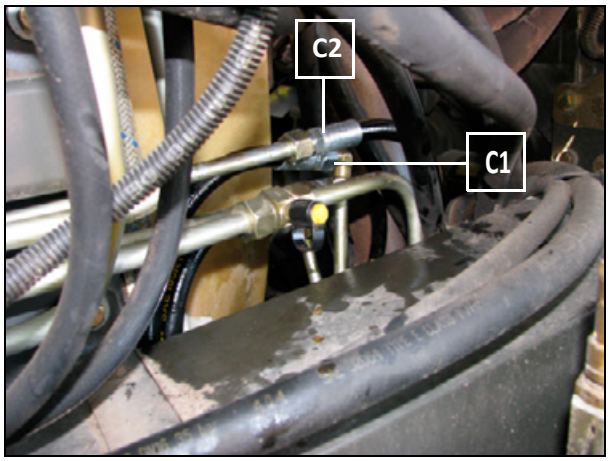
Step 2

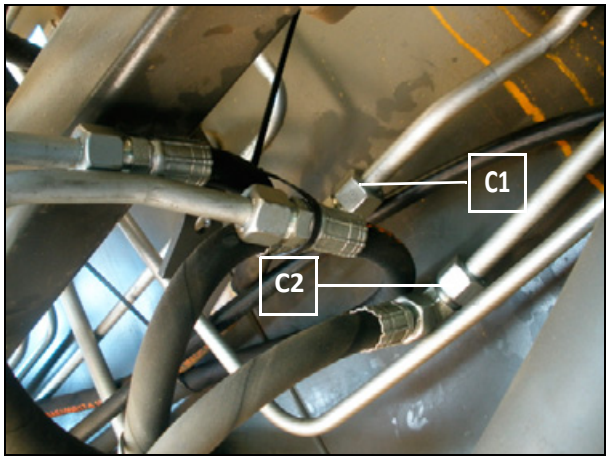
Two 12L swivel 90° fittings have been provided in the hose kit and may be used to easier route these hoses.



Step 3

- Attach the end of the 55" C1 hose to the 90° fitting on the cylinder side of the A steering line.
- Attach the end of the 55" C2 hose to the 90° fitting on the cylinder side of B steering line.





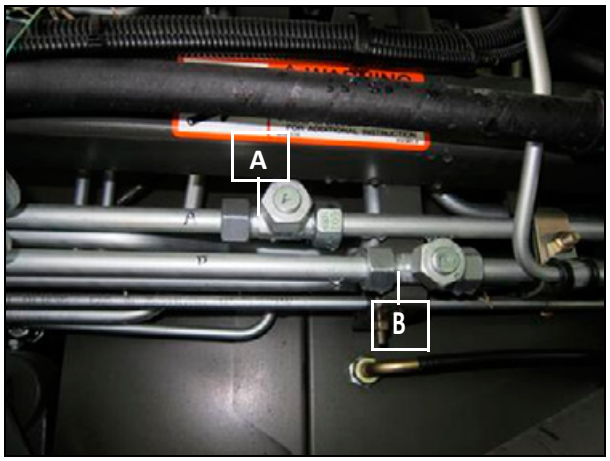
C and V line connections for line location 4 (496 and 497 series machines)

Step 1

Label both sides of the upper run tee as **A**, and both sides of the lower run tee as **B**.

V1 and C1 will attach to the A lines and V2 and C2 will attach to the B lines.

Remove the run tee fittings shown here.

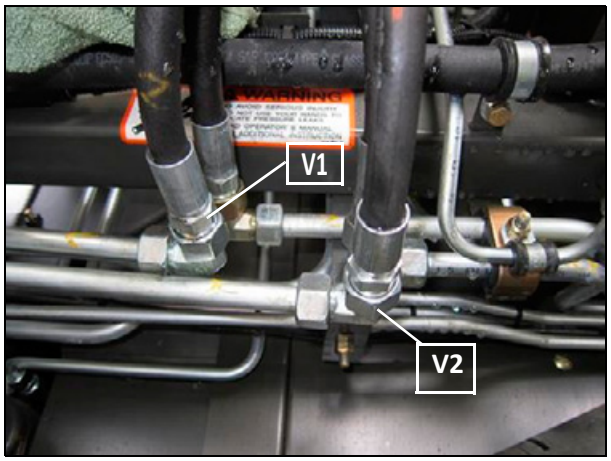


Step 2

Connect the provided 15L swivel 90° fittings to the lines going forward to the hand pump.

Connect the reducer 15/12L reducer union and 12L swivel union.

Connect the male end of the V1 hose to the line labeled A and the male end of the V2 hose to the line labeled B.

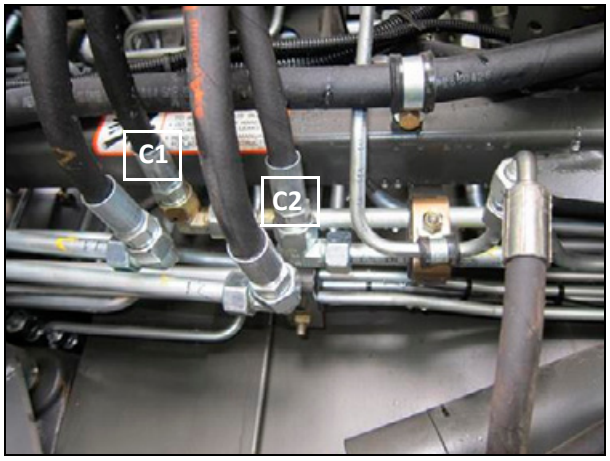


Step 3

Connect the provided 15L swivel 90° fittings to the lines going back to the cylinders.

Connect the reducer 15/12L reducer union

Connect the C1 line to the line labeled A and the C2 line to the line labeled B.



Pressure, EF, and tank connections

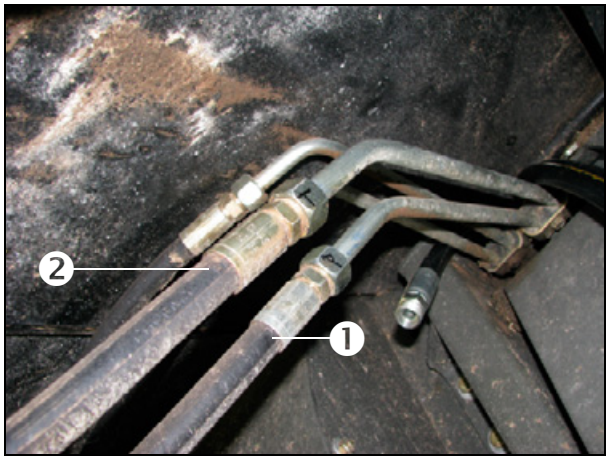
Step 1

The pressure, EF, and tank hydraulic connections points are found under the cab of the machine.

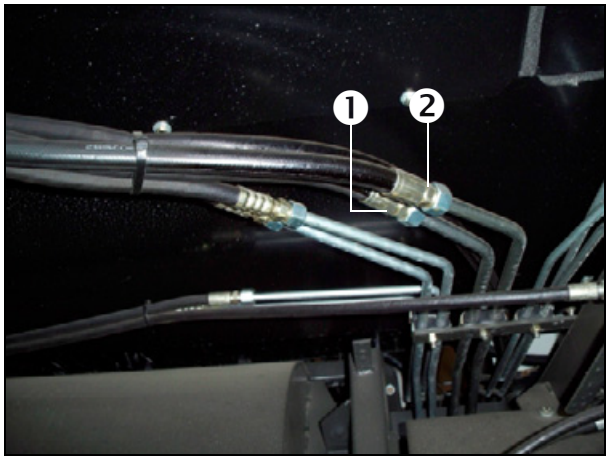


Locate and identify the pressure line ❶ and the and tank line ❷ that can be found under the cab of the vehicle.

Early model mounting (491 series machines)

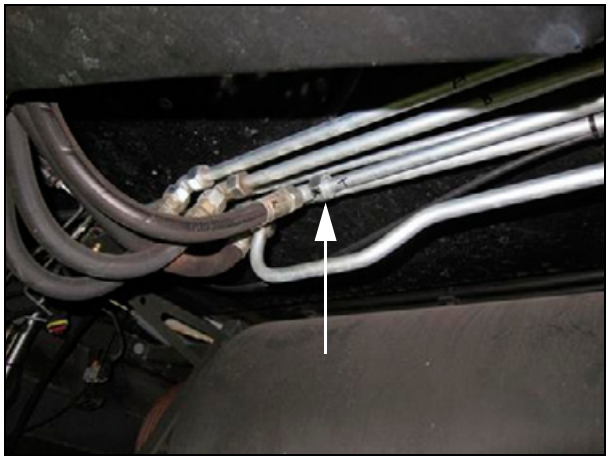


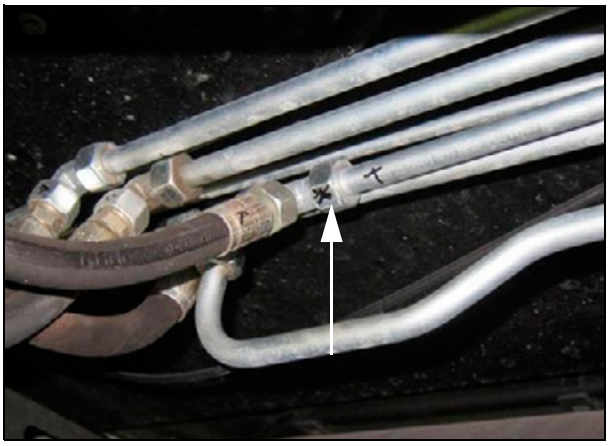
Middle model mounting (492 and 494 series machines)



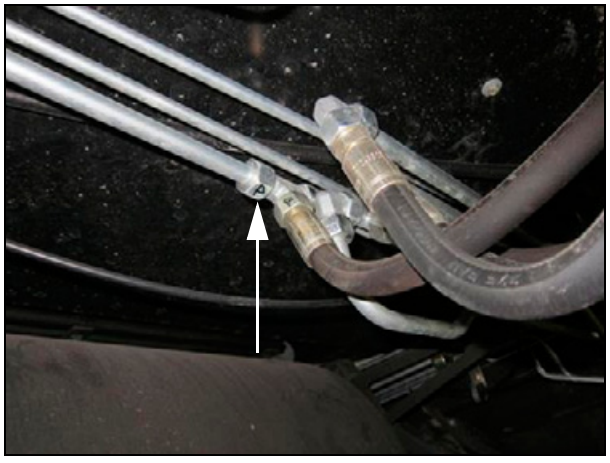
Late model mounting (496 series machines)

Locate the tank line shown here.



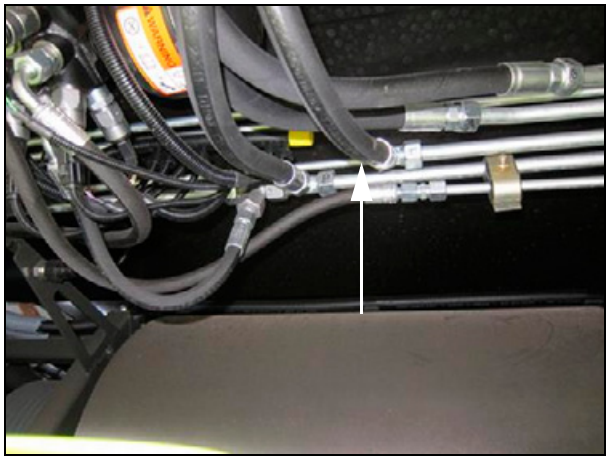


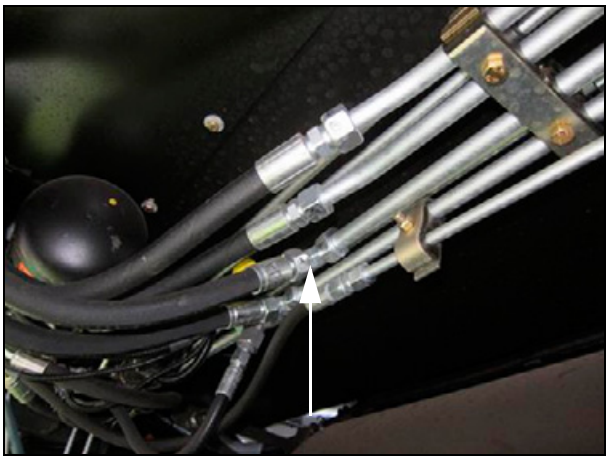
Locate the pressure line connection point shown here.



Pressure, EF, and tank line locations, 497 model machines

Locate the tank line shown here.





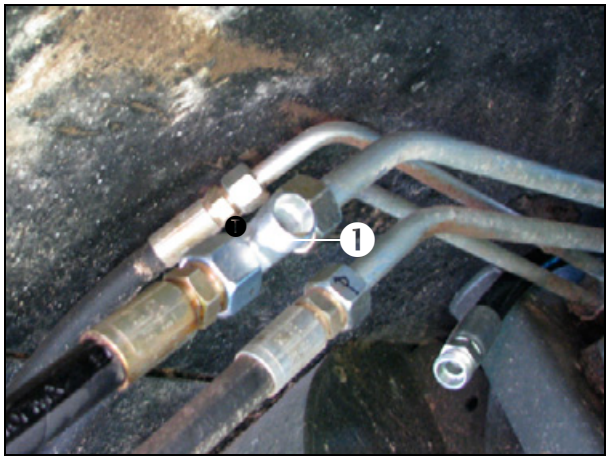
Locate the pressure line connection point shown here.



Connecting P, EF, and T lines on 491, 492, and 494 series machines

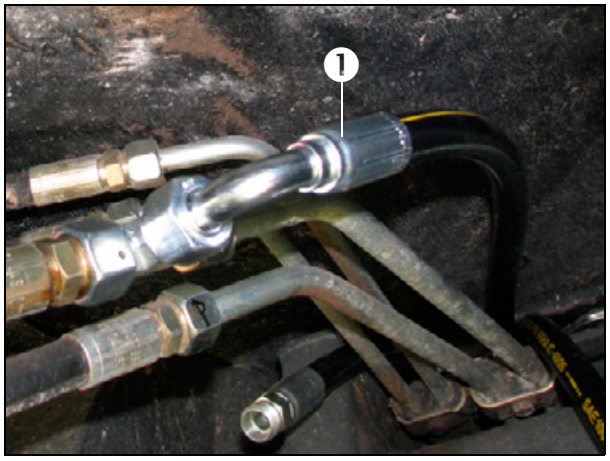
Step 1

Install the 15L run T-fitting ❶ into the tank line.



Step 2

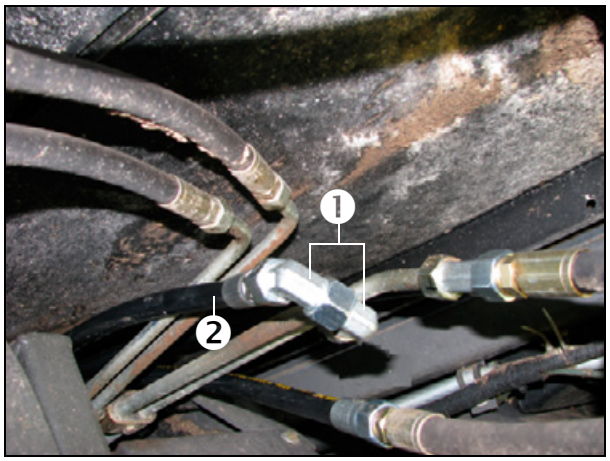
Connect the 90° end of the 90" tank hose ❶ to the branch of the T-fitting.



Step 3

Disconnect the pressure line where the soft line and hard line join and then install the two supplied 90° swivel fittings ❶ to the hard line.

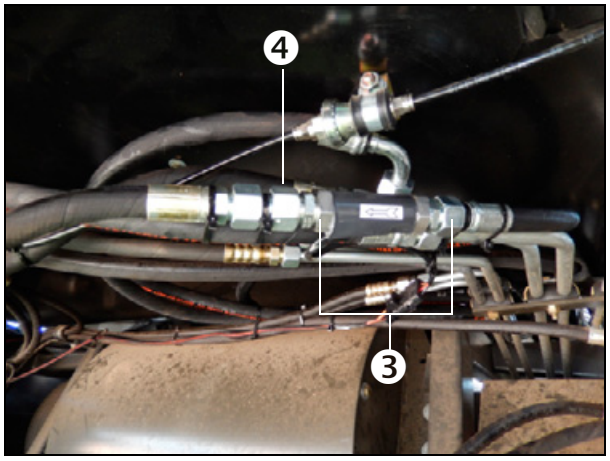
Attach the Autopilot 90" pressure line ❷ to the swivel on the hard line.



Step 4

Assemble the two provided -8ORB-15L fittings ❸ onto the ends of the flow switch P/N 95866 provided in the platform kit.

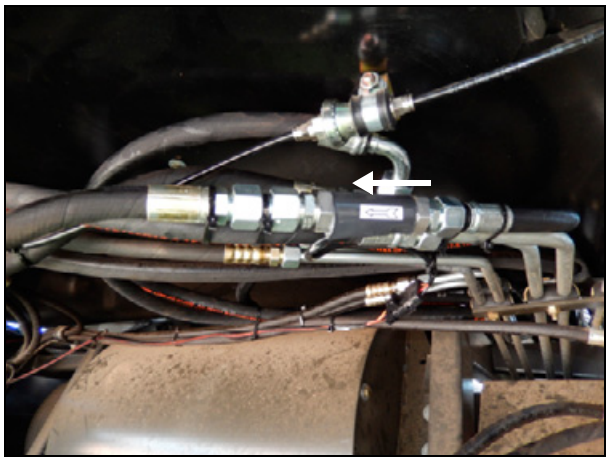
Assemble the 15L-15L coupler onto the side shown ❹.



Step 5

Install the flow switch assembly with the arrow pointing toward the hand pump.

Connect the flow switch to the Existing P hose coming from the hand pump. Then connect the EF line previously connected to the EF port on the Autopilot manifold.



Connecting the P line on 496 and 497 series machines

Step 1

Connecting the T line on 496 and 497 series machines

Remove the existing T line from the T connection point shown previously, then install the provided -15L run tee fitting between the hard line and the existing T line hose.



Connect the 90° end of the Autopilot T hose to the branch of the run tee fitting and route the line to the Autopilot manifold.

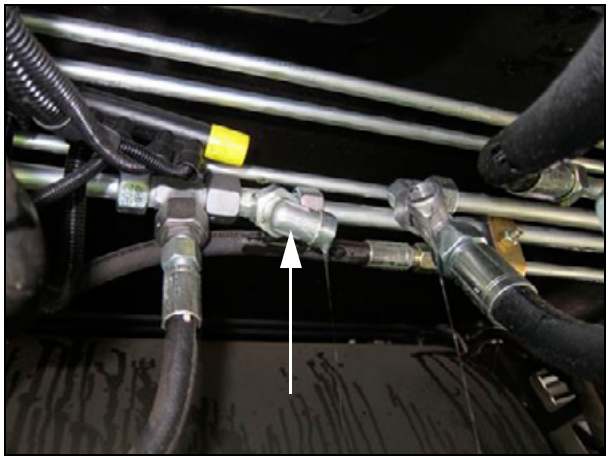


WARNING – Ensure the hoses do not contact any moving parts of the vehicle.

Step 2

Locate where the machine's P line connects to the hard line.

Remove the line and install the provided -15L swivel 90° as shown.



Step 3

Connect the straight metric end of the P line (hose 23 for 496 and 497 series machines) to the swivel 90° fitting.

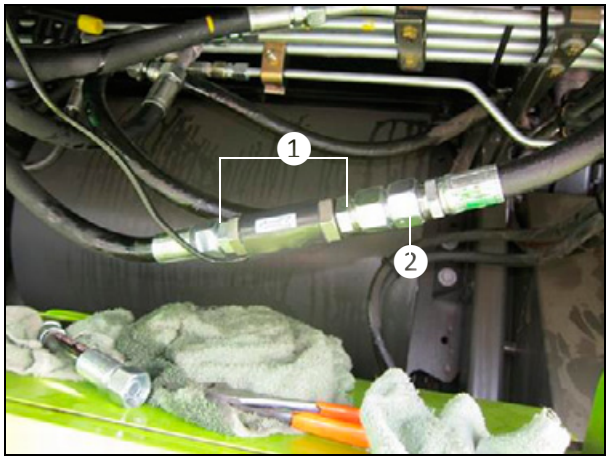
Route the fitting back to the Autopilot manifold and connect it to the P port.



Step 4

Assemble the two provided -8ORB-15L fittings ❶ onto the ends of the flow switch P/N 95866 provided in the platform kit.

Then attach the 15L coupler ❷ to the flow switch on the end.



Step 5

Install the flow switch to the pressure line going to the hand pump. This line was removed from the pressure line connection point previously.

Install the flow switch with the arrow pointed toward the hand pump.

Install the male end of the EF line (hose 24 for 496 and 497 series machines) to the 15L coupler on the end of the flow switch.

Route the other end of the line to the EF port on the Autopilot manifold.

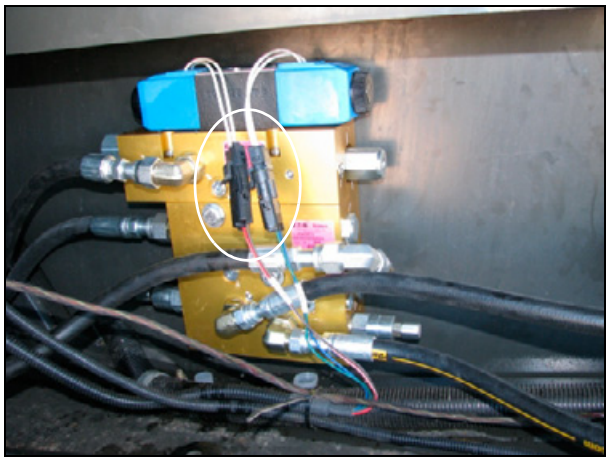


Completing the electrical connections

Step 1

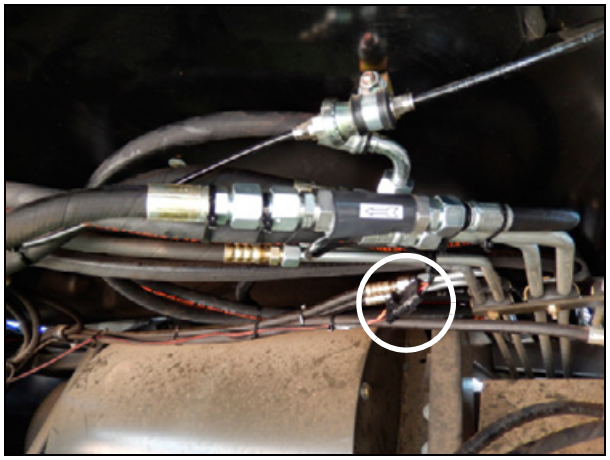
Connect the jumper marked "Right" to the B end of the hydraulic valve cable and then to the valve end "B".

Connect the jumper marked "Left" to the A end of the hydraulic valve cable and then to the valve end "A".



Step 2

Attach the manual override cable to the flow switch and then route the cable to the NavController II harness.



Checking the hydraulics

1. Make sure that all the hydraulic connections are tight.
2. Check the oil level in the hydraulic tank. If necessary, top it up.
3. Check for hydraulic leaks. Connect the battery and then start the machine. Once you complete the leak check, disconnect the battery.

CHAPTER 3

AutoSense Steering Device Installation

In this chapter:

- AutoSense steering device components
- Installing the AutoSense device
- Preparing the harness (P/N 54602 Rev C)

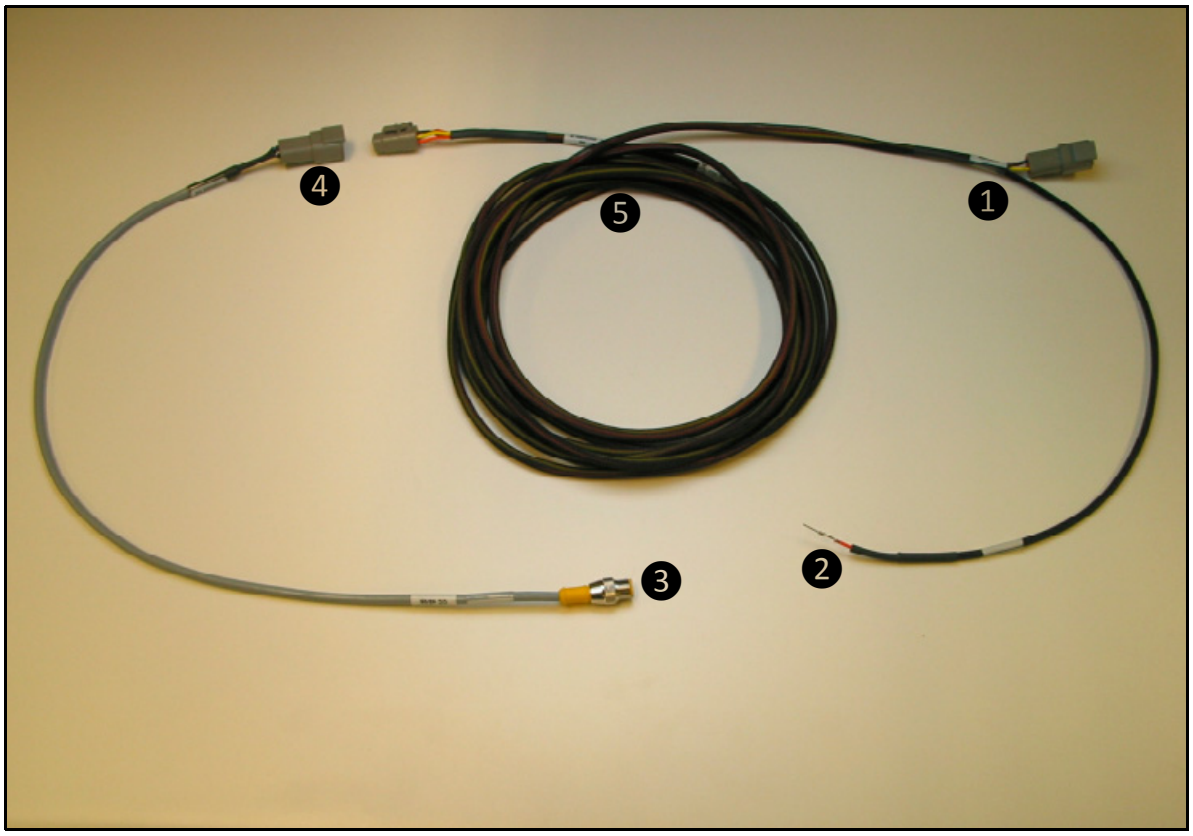
This chapter describes how to install the AutoSense™ steering device. If the required mounting location is not accessible, chose a different place. To ensure proper function, the AutoSense device must be located where it is free of obstructions and can rotate with the wheels when they turn.

On articulated vehicles, mount the AutoSense 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.

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

AutoSense steering device components



Item	Description	P/N
❶	P-6 connector	
❷	Power connector	
❸	AutoSense connector	
❹	Jumper cable	57560
❺	AutoSense steering cable	57885

Installing the AutoSense 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.

Step 1

Early models

Remove the top bolt from rear-wheel upright, attach the AutoSense bracket and then replace the bolt.

Use the supplied hardware to attach the AutoSense device to the bracket.

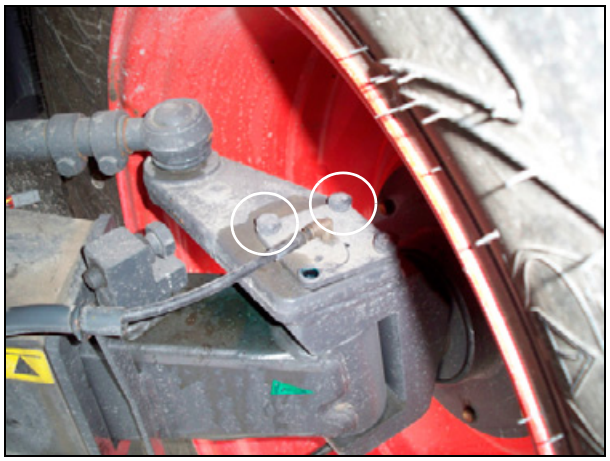
Note – *Either clean and glue the bracket to the cap, or secure the bracket with some small tack-welds to ensure the bracket moves with the cap.*



Middle and late models

Remove two bolts from the rear-wheel upright, attach the AutoSense bracket and then use the bolts to secure the bracket.

Use the supplied hardware to attach the AutoSense device to the bracket.



Step 2

Route the cable harness to the rear-wheel upright and then connect the cable to the AutoSense device.

Note – *Ensure the cable does not contact any moving parts and is secured to prevent it snagging on debris.*



Early models

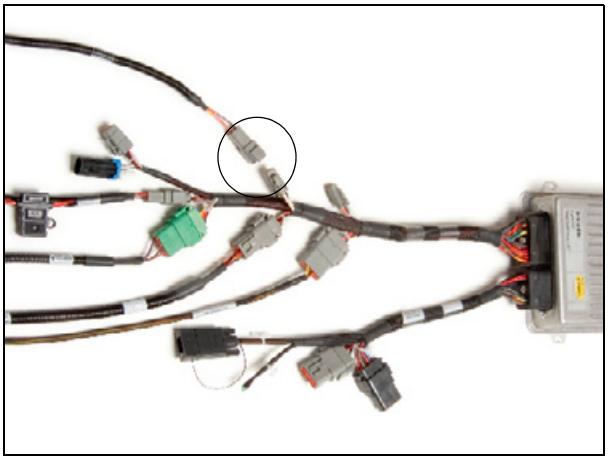




Late models

Step 3

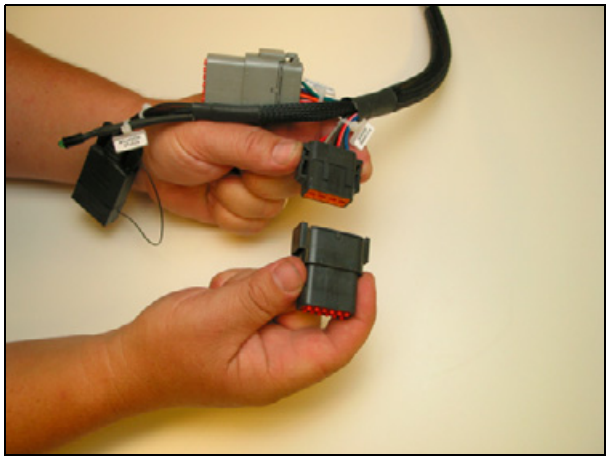
Connect the steering device cable connection to P-6 on the main wiring harness. P-6 is labeled “Steering Sensor”.



Preparing the harness (P/N 54602 Rev C)

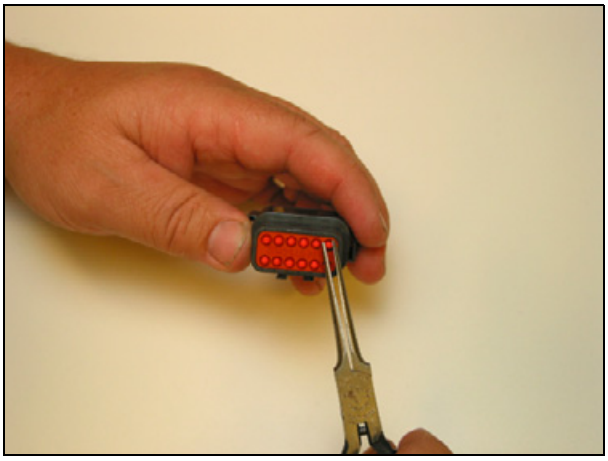
Step 1

Remove the black Deutsch DTM receptacle from the P-13 sensors leg of the auxiliary harness. See Chapter 8, Controller connections.



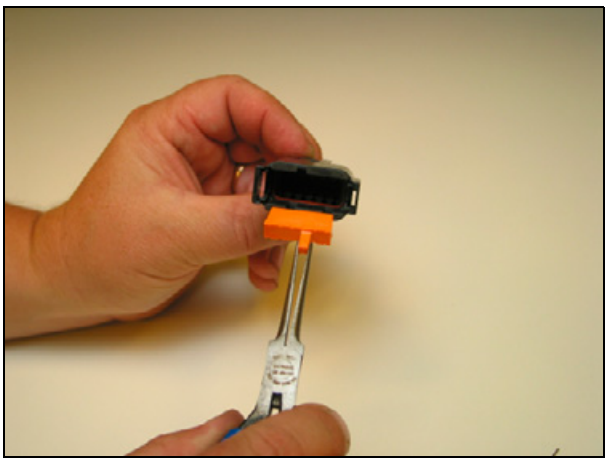
Step 2

Remove the plug from cavity number 1.



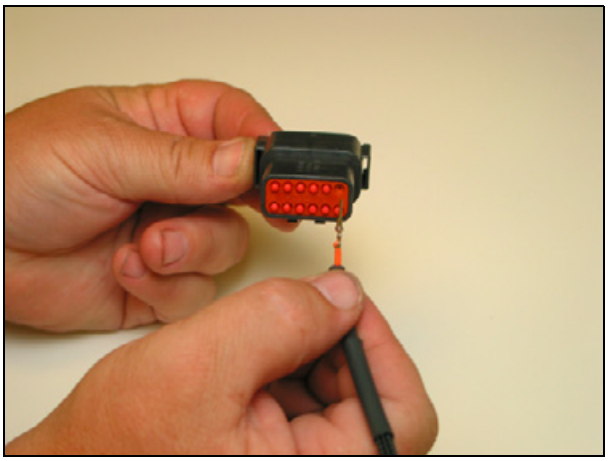
Step 3

Remove the wedge from the connector.



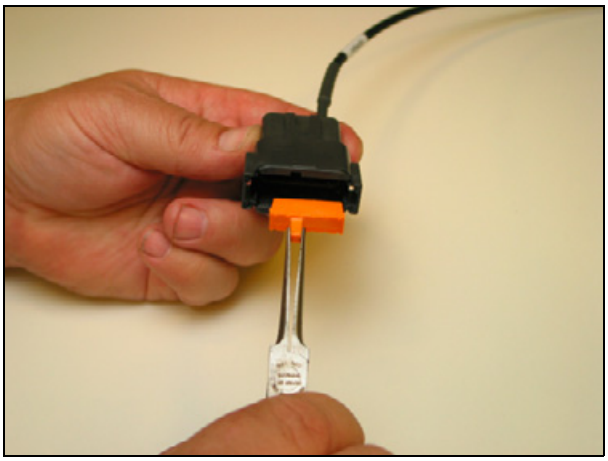
Step 4

Insert the DTM pin labeled “Cavity 1” into the connector.



Step 5

Pull back on the wire to seat the pin. Replace the wedge in the connector.



CHAPTER 4

Antenna/Receiver Installation

In this chapter:

- Antenna and receiver installation options
- AG-372 receiver with AgGPS 450/900 radio module (if equipped) components
- Installing the AG-372 GPS receiver with AgGPS 450/900 radio module (if equipped)
- Installing an AG-372 receiver with magnetic feet
- AgGPS 542 receiver components
- Installing the AgGPS 542 receiver

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

To install the antenna for the CFX-750 or FmX display, see Chapter 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 the AG-15 mounting plate P/N 62034 or a V plate directly to the roof with VHB (Very High Bond) adhesive for magnetic mounting. See page 45.
- **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; FmX integrated display	✓	✓
AG-372 receiver	✗	✓
*Ag*GPS® 542 receiver	✓	✓

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 mounting plate P/N 62034 is provided in most kits. You can use the VHB mounting method to attach either the 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 the 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.

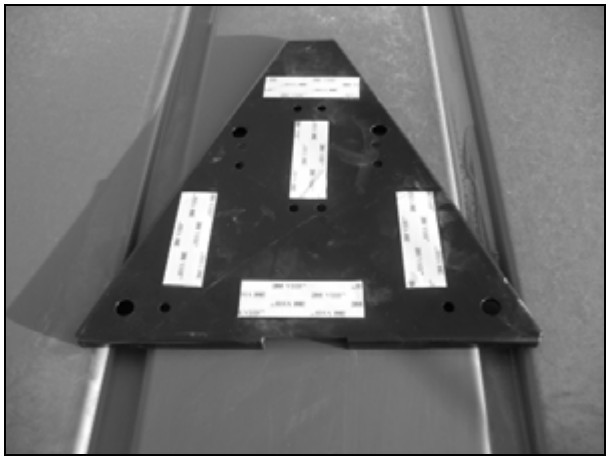


Step 2

V plate only

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

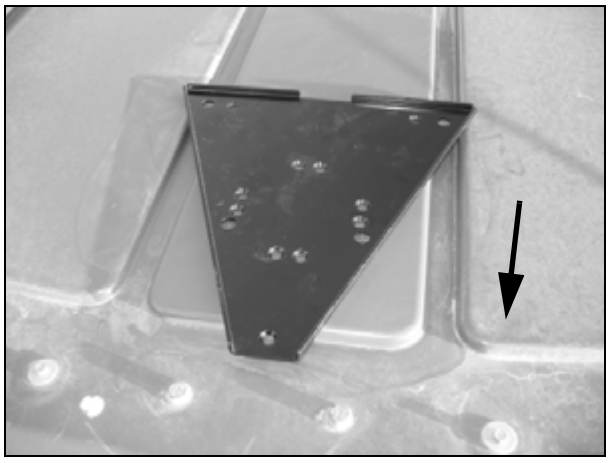
Note – *The VHB strips are pre-applied to the P/N 62034 plate.*



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.*

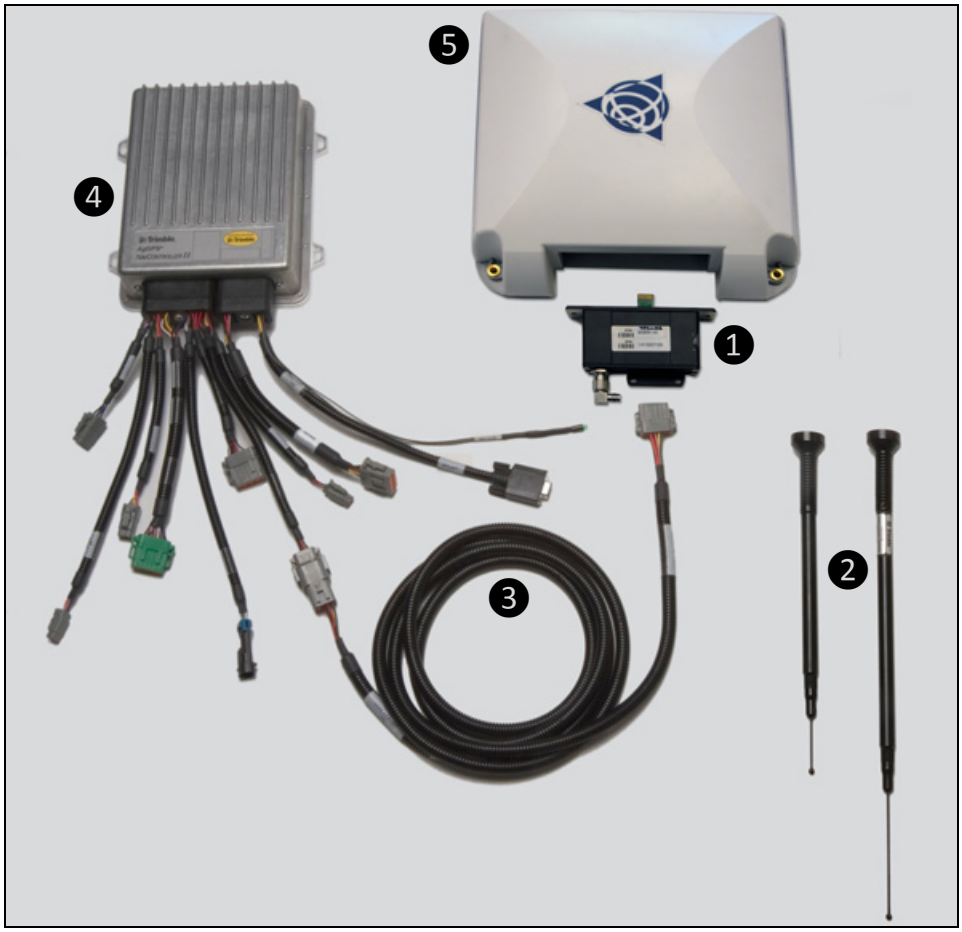


V plate



P/N 62034 plate

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



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

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

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

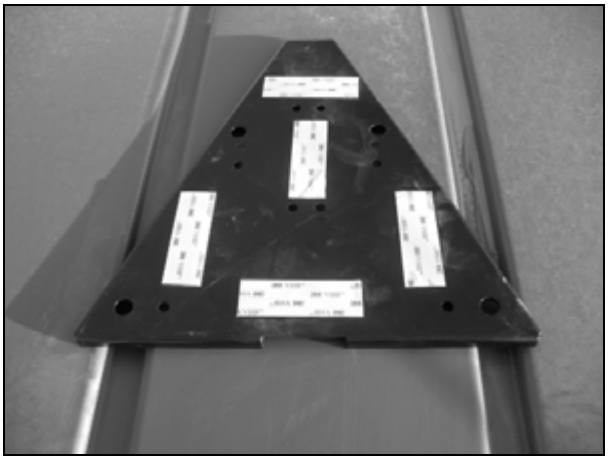
To attach the AG-372 receiver plate to the cab roof, do the following:

Removable installation

Step 1

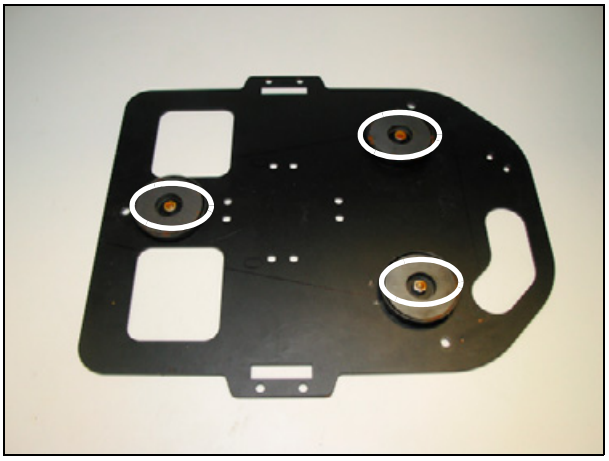
V plate

Attach the VHB strips to the bottom side of the V plate.



Mounting plate

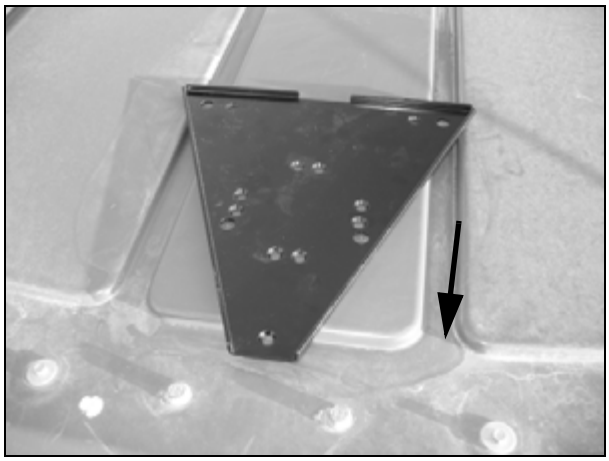
Attach the three provided magnets to the plate with the ¼" flathead screws and hardware provided.



Underside of plate

Step 2

Attach the V plate squarely on the centerline of the tractor cab. Make sure the nose of the V plate points to the front of the tractor.



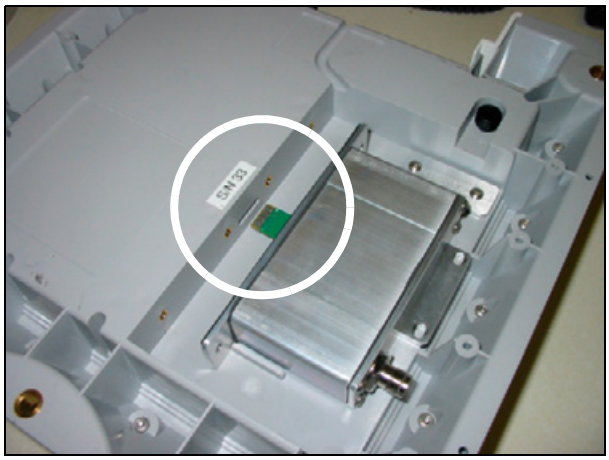
Step 3 - If a radio is to be installed

Remove the blanking plate and set it aside.



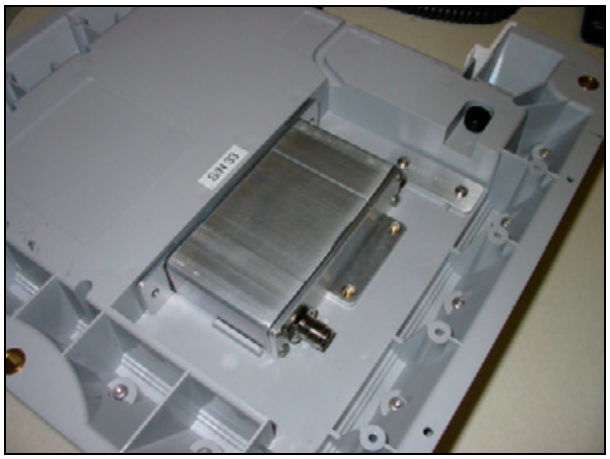
Step 4

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



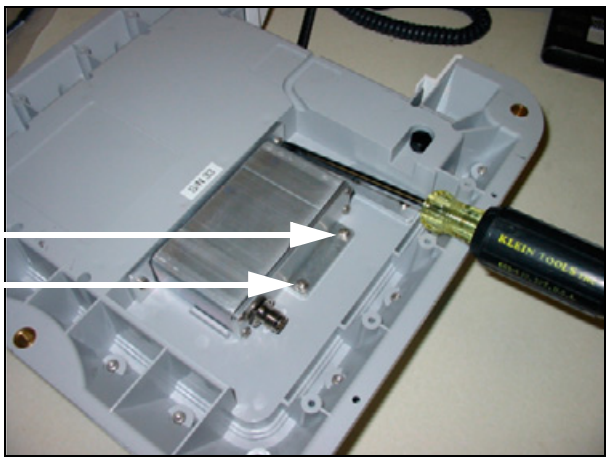
Step 5

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



Step 6

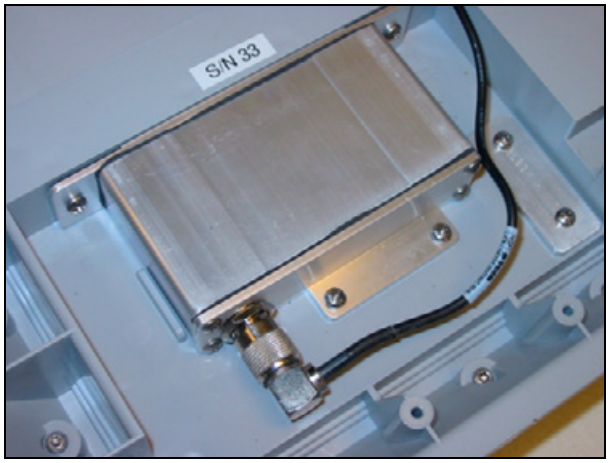
Use a #1 or #2 Phillips screwdriver and the supplied screws to install the integrated radio. First insert and tighten the two screws on the horizontal wall (arrowed), and then insert the remaining screws.



Step 7

Install the supplied antenna cable.

Notes: *The housing can accommodate a cable diameter of up to ¼".*

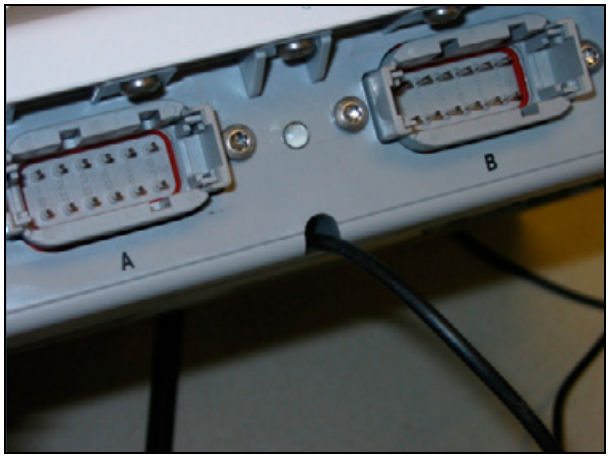


Step 8

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

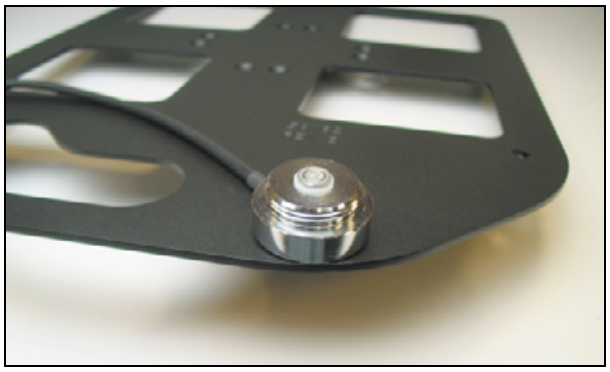


This image shows the unit with the cable routed through the channel.



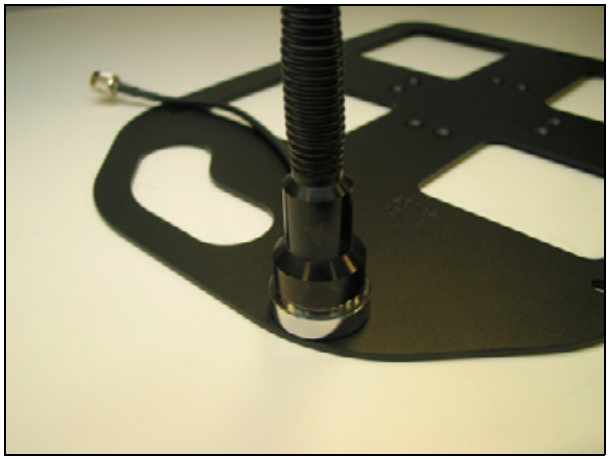
Step 9

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



Step 10

Attach the radio antenna to the antenna base.



Step 11

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



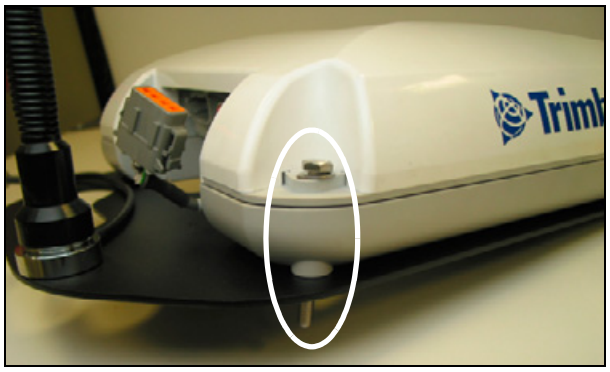
Step 12

Insert the nylon bushings provided.



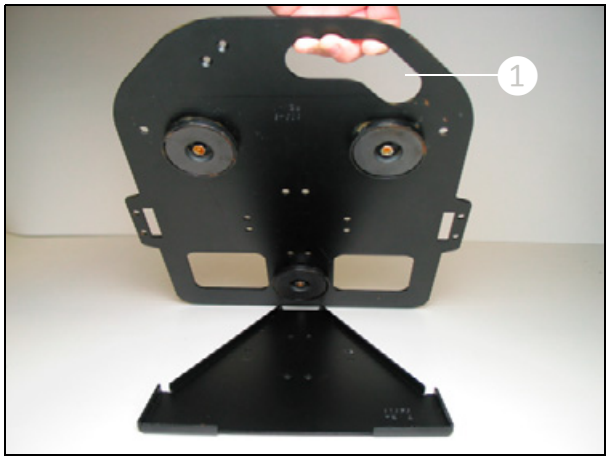
Step 13

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



Step 14

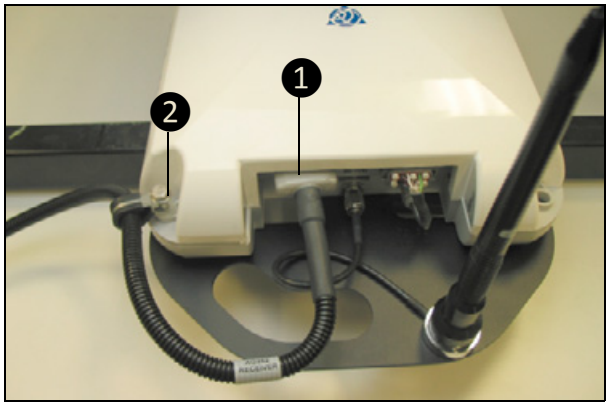
Place the receiver on the roof by aligning the magnets with the V plate. Ensure that the handle ❶ is toward the back of the vehicle.



Step 15

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

Route the cable into the cab and into the controller.



Installing an AG-372 receiver with magnetic feet

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

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

Step 1

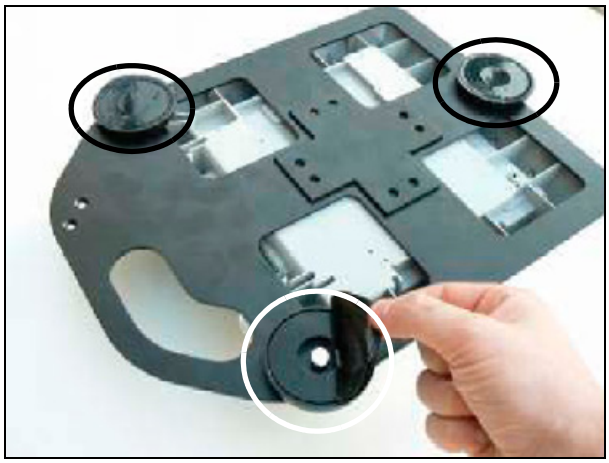
Attach the magnets to the receiver mounting plate. Use the three ¼" bolts to mount the AG-372 receiver.

Place the nuts on the receiver side.



Step 2

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

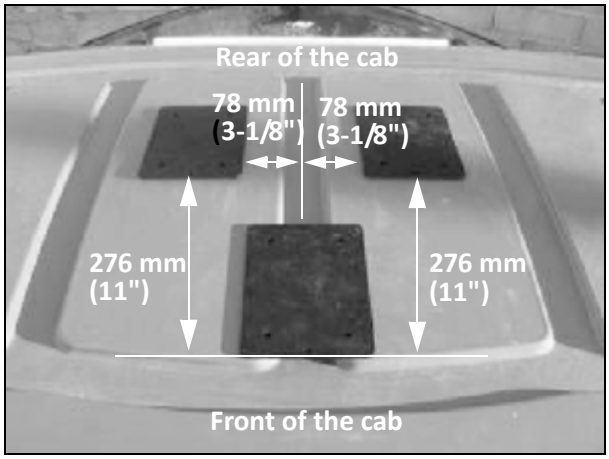


Step 3

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

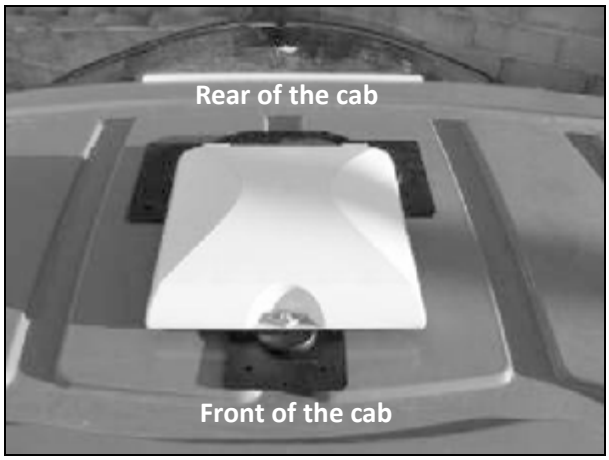
Remove the backing from the VHB strips and then apply the plates to the cab roof.

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



Step 4

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

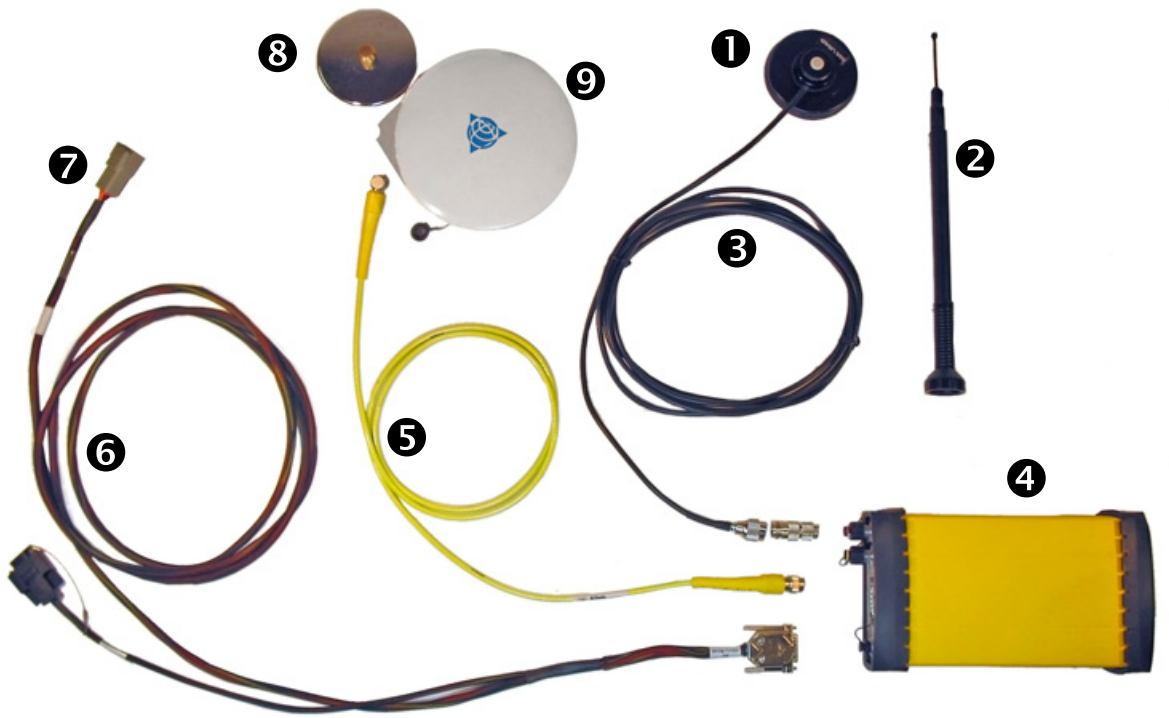


Step 5

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



*Ag*GPS 542 receiver components



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

Installing the *Ag*GPS 542 receiver

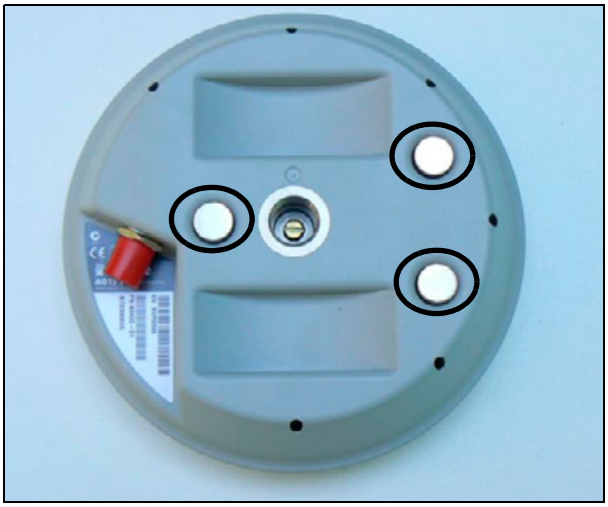
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

Step 1

Attach the large magnet with a ⅝" stud to the GPS antenna.



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



Step 2

GLONASS, RTK, OmniSTAR, DGPS applications

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



Step 3

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



Step 4

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

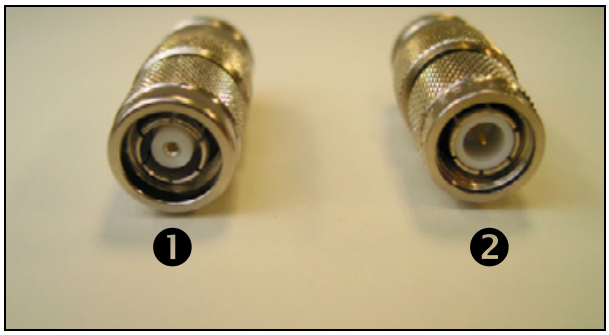


Step 5

Identify the correct adaptor for the radio connection:

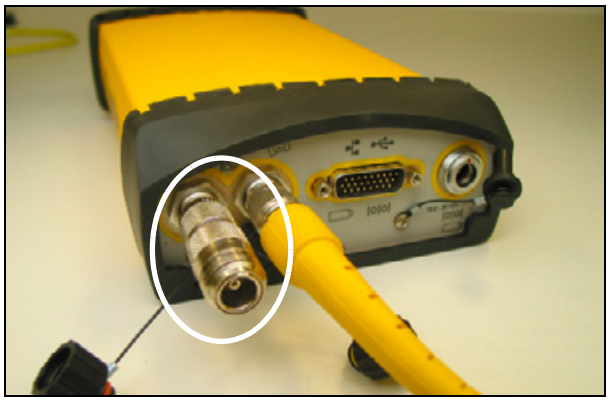
❶ Reverse polarity TNC-to-N for 900 MHz radios

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



Step 6

Attach the adaptor to the radio port.



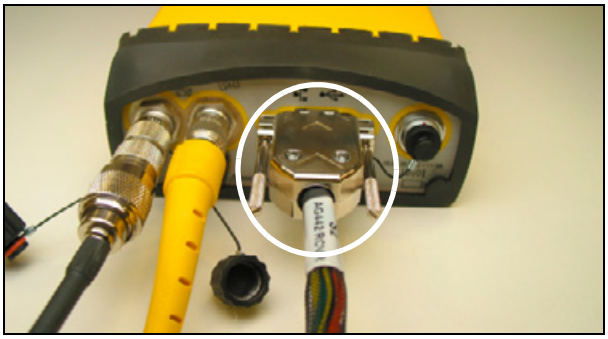
Step 7

Connect the radio antenna cable to the radio port adaptor.



Step 8

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



Step 9

Connect the radio antenna to the magnetic antenna base.



Step 10

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



CHAPTER 5

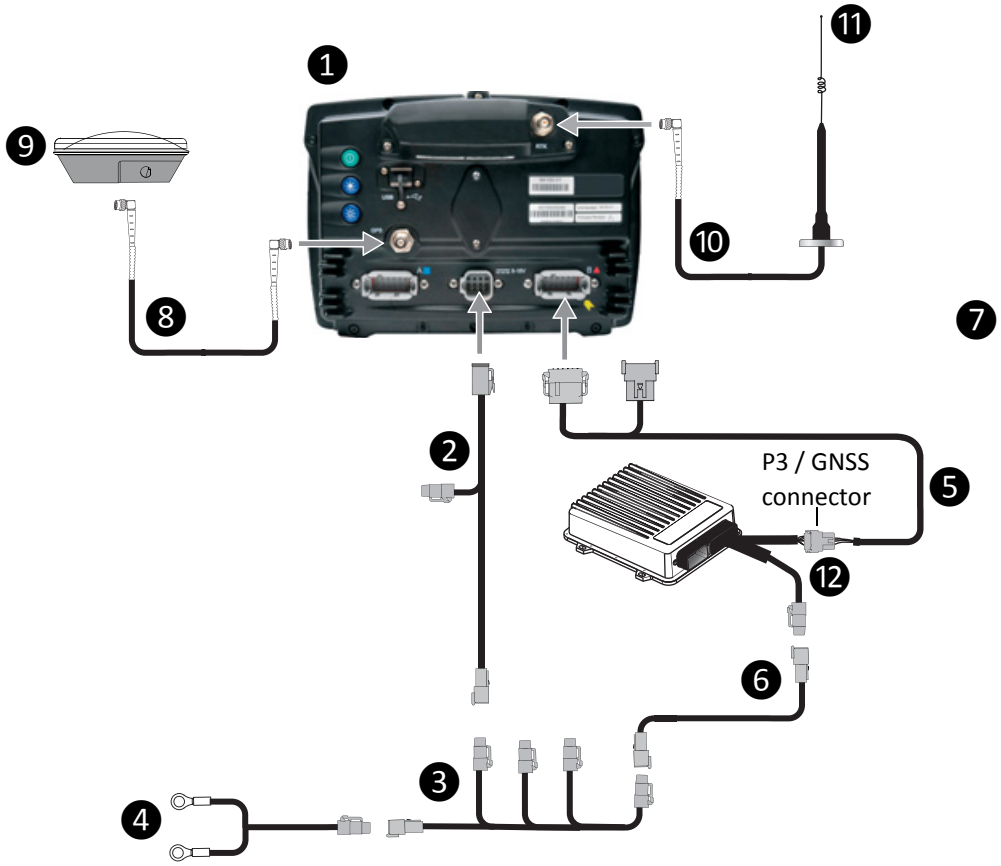
Display Installation

In this chapter:

- CFX-750 display components
- Preparing the CFX-750 display
- Installing the CFX-750 display
- CFX-750 display: Installing the wiring harness
- FmX integrated display components
- Preparing the FmX integrated display
- Installing the FmX integrated display
- FmX integrated display: Installing the wiring harness
- CFX-750 display and FmX integrated display: Connecting accessory options
- CFX-750 and FmX displays: Installing the GNSS antenna and plate
- CFX-750 and FmX displays: Installing the RTK radio antenna

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

CFX-750 display components



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

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

Preparing the CFX-750 display

Step 1

Locate the CFX-750 display, the RAM mount, and the RAM mount clamp.



Step 2

Use the provided metric hardware to attach the RAM mount to the rear of the display.



Step 3

Attach the RAM mount to the rear of the display.



Installing the CFX-750 display

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

Step 1

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

Attach the free end of the RAM mount to the bar mount and then tighten the clamp on the RAM mount so that the display is secure.

Step 2

Connect the cable to the B port of the CFX-750 display.

To connect power to the CFX-750 display, see Chapter 8, Controller Installation.



CFX-750 display: Installing the wiring harness

Step 1

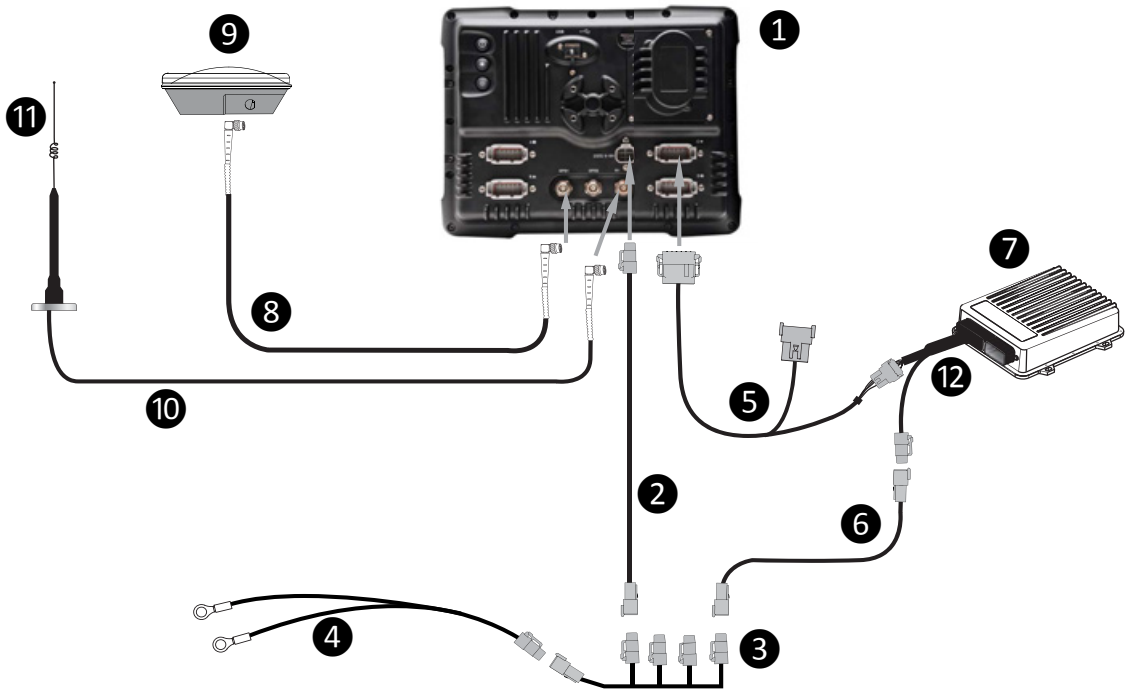
Locate the cable that connects the CFX-750 display to the NavController II.

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.



FmX integrated display components



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

Item	Description	Trimble part number
❶	FmX integrated display	93100-02
❷	FmX power cable	66694
❸	FmX power cable with relay and switch (power bus)	67259
❹	Basic power cable	67258
❺	FmX to NavController II cable with port replicator	75741
❻	2 pin DTM to 2 pin DT power adaptor	67095
❼	NavController II	55563-00
❽	8 m GNSS TNC/TNC RT angle cable	50449
❾	AG25 GNSS antenna	77038-00
❿	NMO to TNC 20ft antenna cable and base	72122
⓫	900 MHz radio antenna kit	22882-10
⓬	Main NavController II cable	54601

Preparing the FmX integrated display

Step 1

Locate the FmX integrated display, the RAM mount, and the RAM mount clamp.



Step 2

Use the provided metric hardware to attach the RAM mount to the rear of the display.



Step 3

Attach the RAM mount to the rear of the display.



Installing the FmX integrated display

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

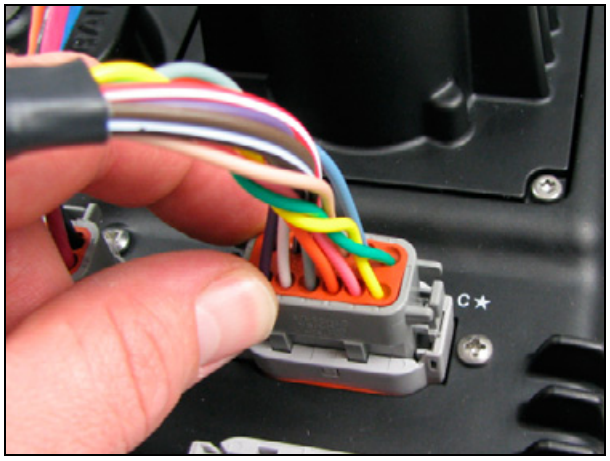
Step 1

Decide where you will mount the display in the vehicle cab and then use the provided bolts to attach the bar mount to the rail. Attach the free end of the RAM mount to the bar mount and then tighten the clamp on the RAM mount so that the display is secure.

Step 2

Connect the cable to the C port of the FmX integrated display.

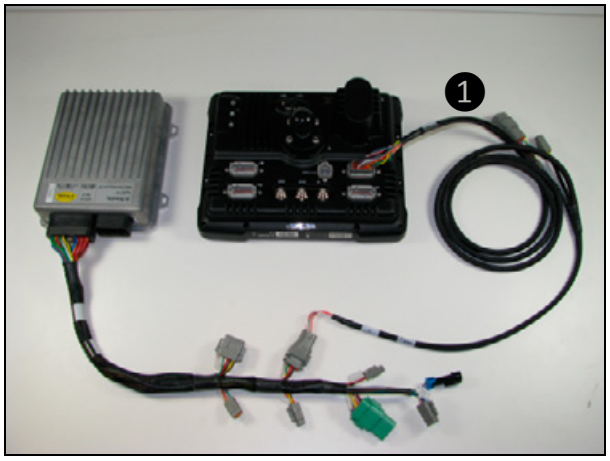
To connect power to the FmX integrated display, see Chapter 8, Controller Installation.



FmX integrated display: Installing the wiring harness

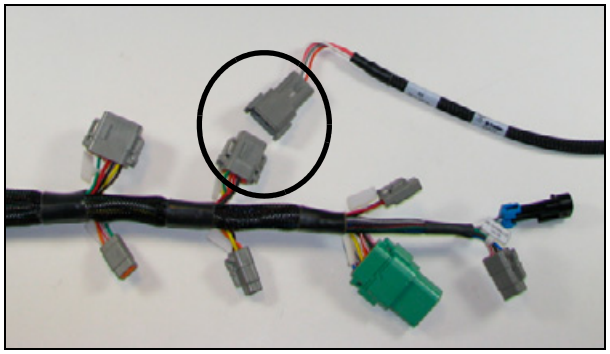
Step 1

Locate the cable that connects the FmX integrated display to the NavController II ❶.



Step 2

Connect the cable to the P3 connector on the NavController II main harness, and then route the cable from the NavController II to the mounting location on the FmX integrated display.



CFX-750 display and FmX integrated display: Connecting accessory options

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

AgCam

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

Step 1

Locate the AgCam and AgCam cable.

Step 2

Mount the AgCam in a secure location and then route the cable towards the display.



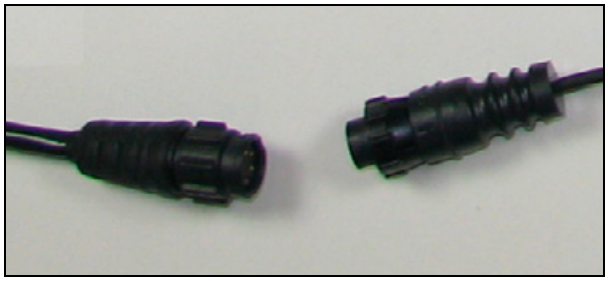
CFX-750 display



FmX display

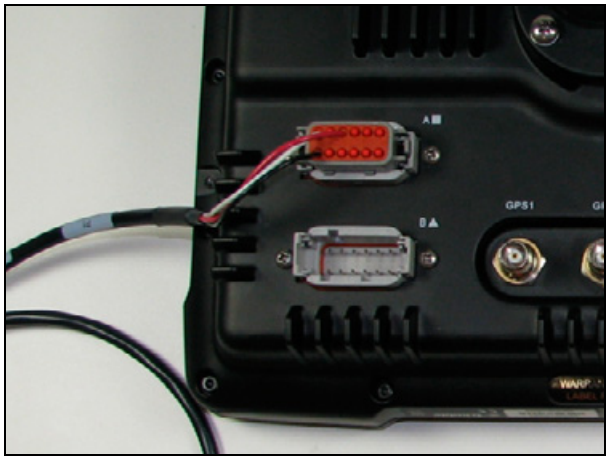
Step 3

Connect the AgCam cable to the display adaptor cable.



Step 4

Connect the display to AgCam adaptor cable to one of the open 12 pin connectors on the back of the display.



CFX-750 and FmX displays: Installing the GNSS antenna and plate

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

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

VHB adhesive method

Standard P/N 62034 plates are provided in most kits. You can use Very High Bond (VHB) to attach either a P/N 62034 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 P/N 62034 plate for simplified installation in applications where high accuracy is not critical.

Step 1

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

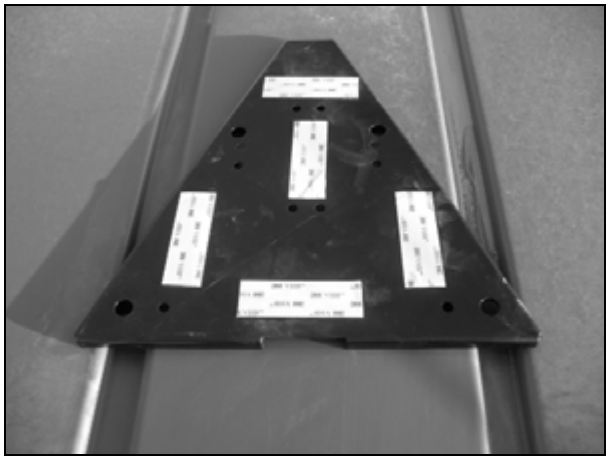


Step 2

V plate only

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

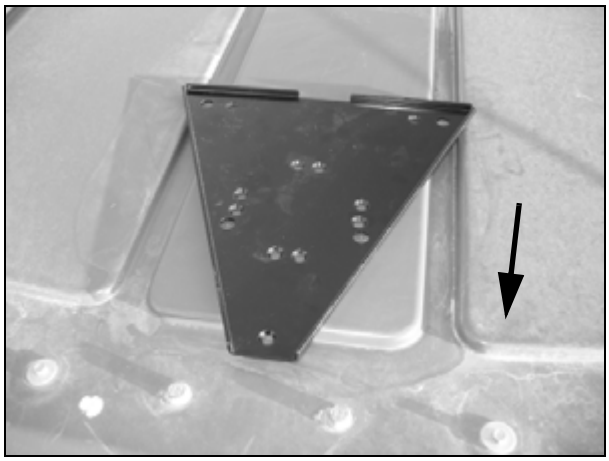
Note – *The VHB strips are pre-applied to the P/N 62034 plate.*



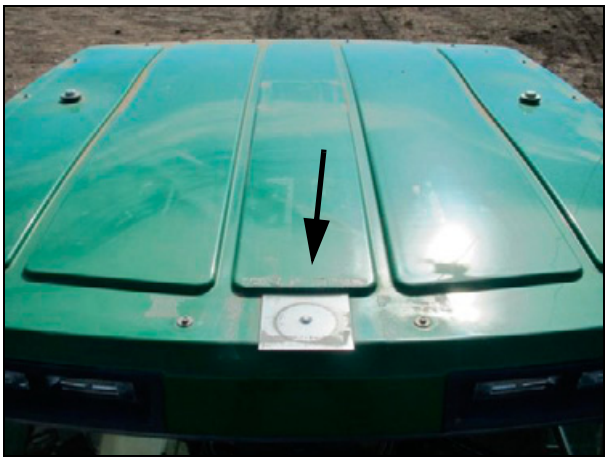
Step 3

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

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



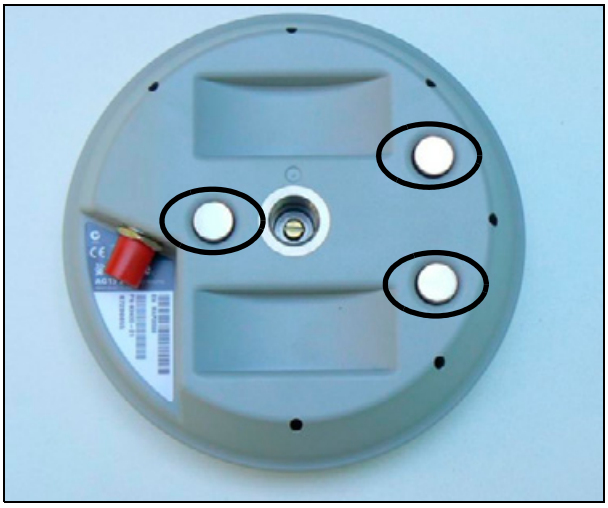
V plate



P/N 62034 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 P/N 62034 plate.



Step 6

Both models

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



CFX-750 and FmX displays: Installing the RTK radio antenna

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

Step 1

Connect the radio antenna to the magnetic antenna base



Step 2

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



Step 3

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

CHAPTER 6

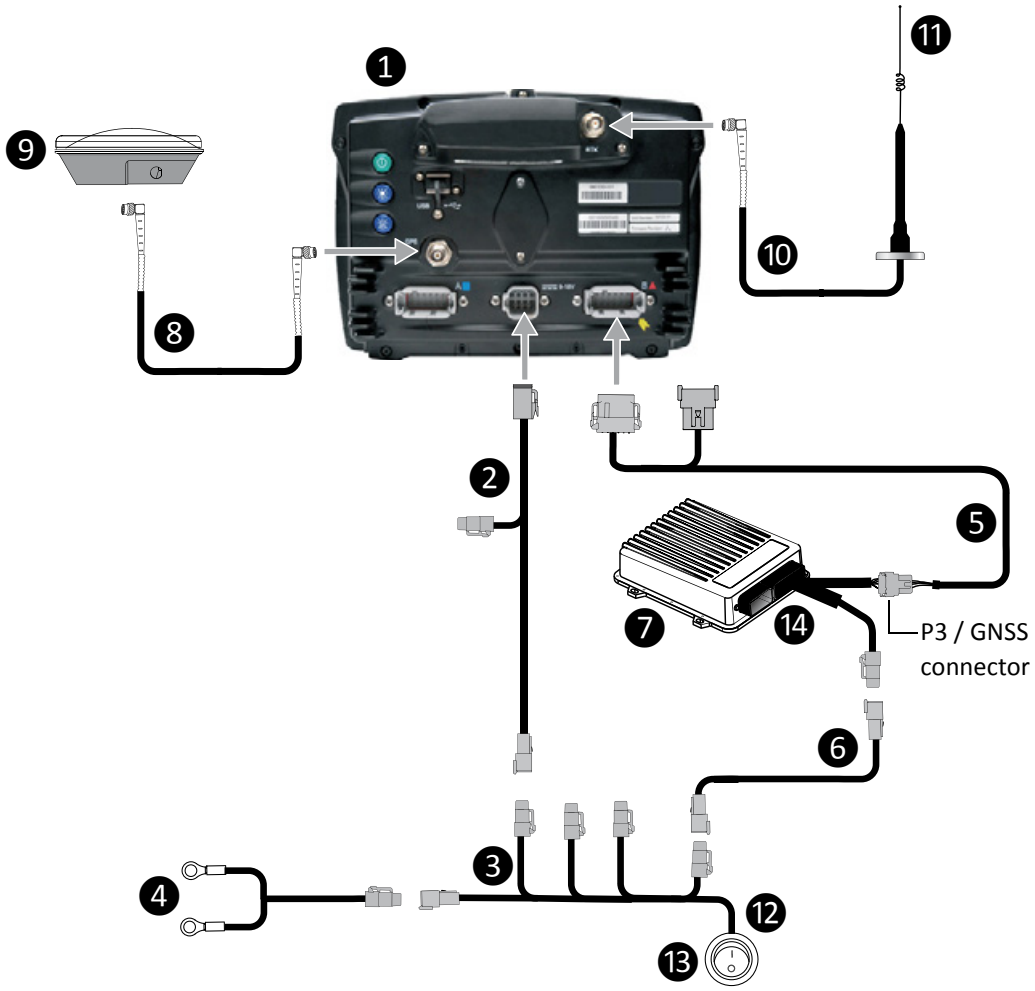
Power Harness Installation

In this chapter:

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

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

CFX-750 display components

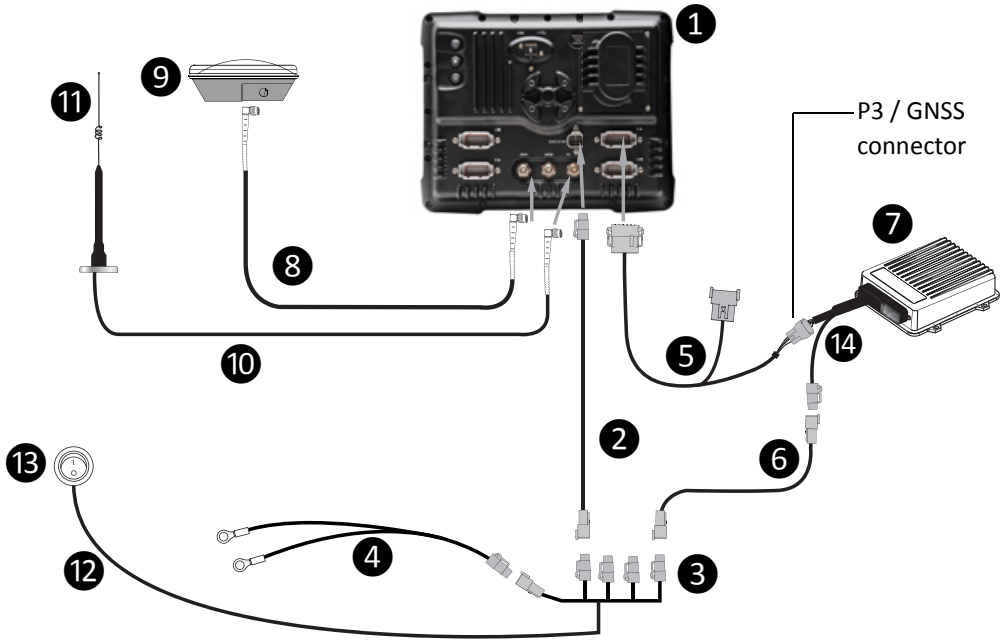


⚠ **CAUTION –** Connecting the Port Replicator on the FmX to NavController II cable ❺ to the P4 or P12 connector of the NavController II harness ⓬ will result in damage to the FmX / FM-1000 integrated display, and will void the warranty.

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

Item	Description	Trimble part number
❾	AG-25 GNSS antenna	77038-00
❿	NMO to TNC 20 ft antenna cable and base	72122
⓫	900 MHz radio antenna kit	22882-10
⓬	External switch cable included with kit	Part of P/N 67259
⓭	External switch included with kit	Part of P/N 67259
⓮	Main NavController II cable	54601

FmX integrated display components



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

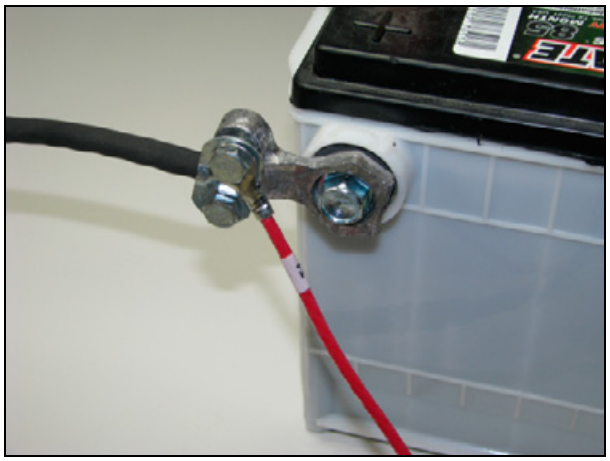
Item	Description	Trimble part number
❶	FmX integrated display	93100-02
❷	FmX power cable	66694
❸	FmX power cable with relay and switch (power bus)	67259
❹	Basic power cable	67258
❺	FmX to NavController II cable with port replicator	75741
❻	2 pin DTM to 2 pin DT power adaptor	67095
❼	NavController II	55563-00
❽	8 m GNSS TNC/TNC RT angle cable	50449
❾	AG25 GNSS antenna	77038-00
❿	NMO to TNC 20ft antenna cable and base	72122
⓫	900 MHz radio antenna kit	22882-10
⓬	External switch cable included with kit	Part of P/N 67259
⓭	Switch	67095
⓮	NavController II harness	54601

Installing the power harness for the display

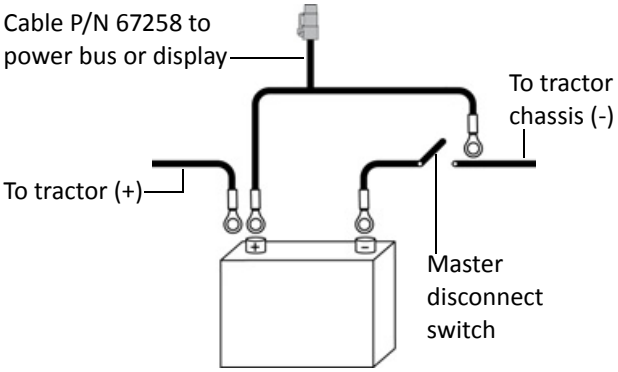
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

Step 1

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

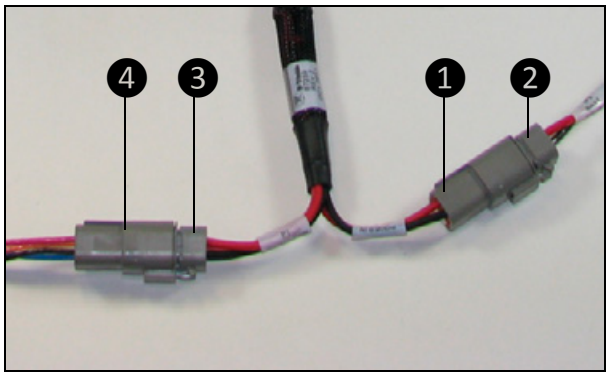


CAUTION – If the vehicle has a master electrical disconnect, make sure the basic power cable (P/N 67258) is ***not*** directly attached to the battery terminal that is disconnected by the master switch - the negative pole in this example.
Attach this terminal side just past the main disconnect so that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



Step 2

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

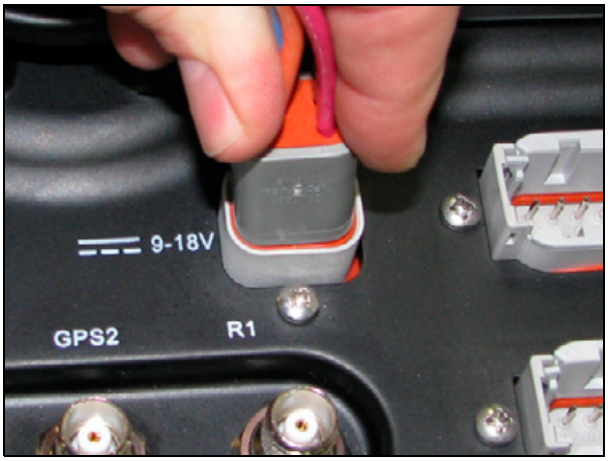


Step 3

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



CFX-750 display



FmX display

Configuring the power bus options for the display

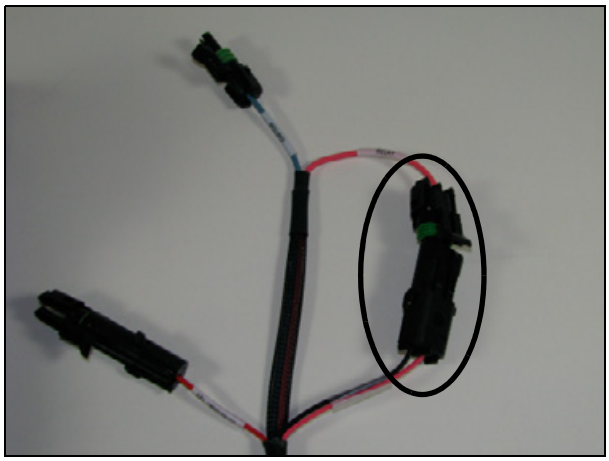
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

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

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

Display power button is used to turn on the Autopilot system

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

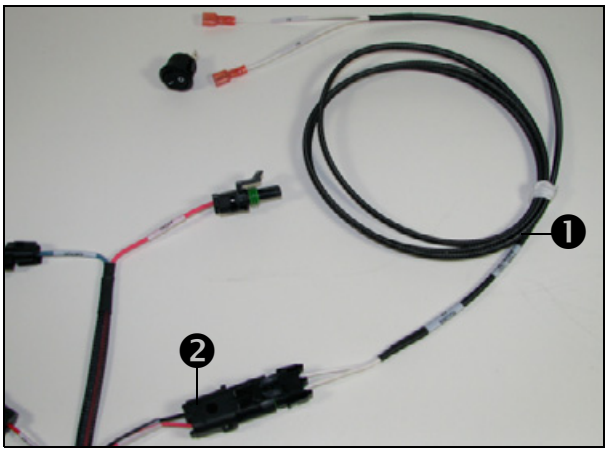


External switch is used to turn on the Autopilot system

Step 1

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

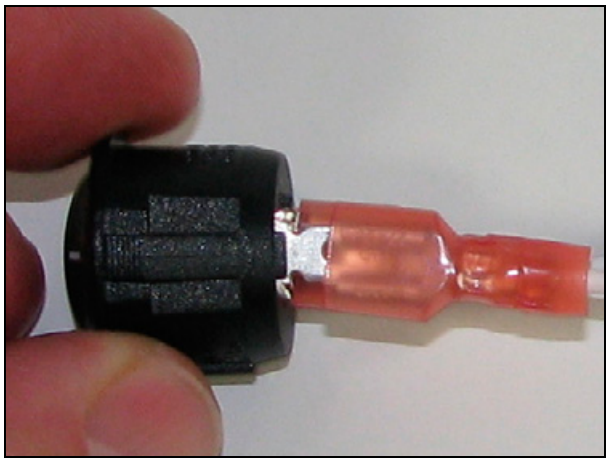
Note – *To install the switch provided, drill a ¾" hole.*



Step 2

Connect the cable labeled R7 to the switch pins.

Note – *Polarity is not important.*

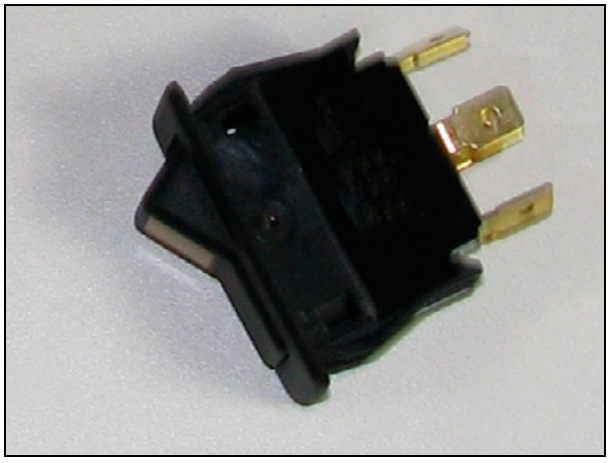


Installing the optional illuminated full or standard Euro switch

Step 1

Find an available knockout location on the vehicle console.

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

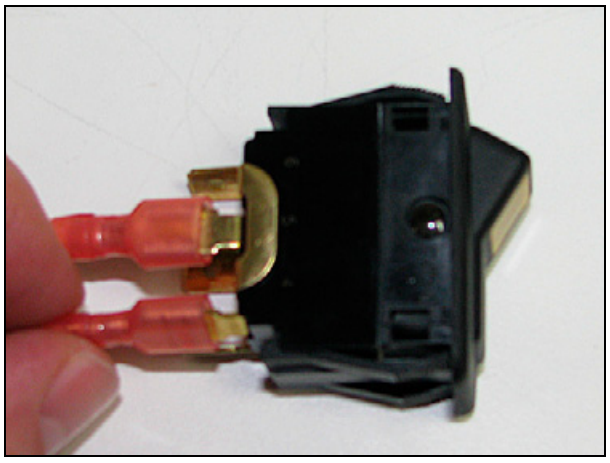


Step 2

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

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

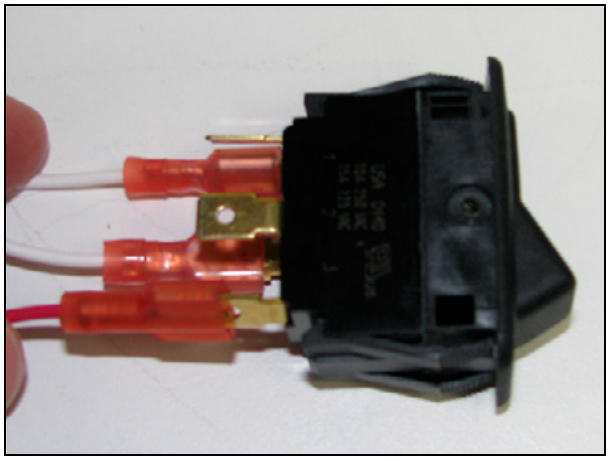
Note – *Polarity **is** important.*



Step 3

Connect a separate wire to pin 3 on the switch using a spade connector. Route the wire and then connect it to the vehicle switched power.

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

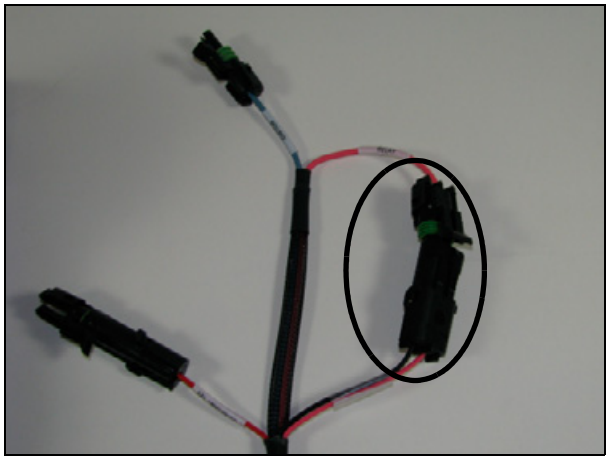


Ignition is used to turn on the Autopilot system

Note – *For more information on how to use the ignition sensing option, see the FmX Integrated Display User Guide.*

Step 1

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

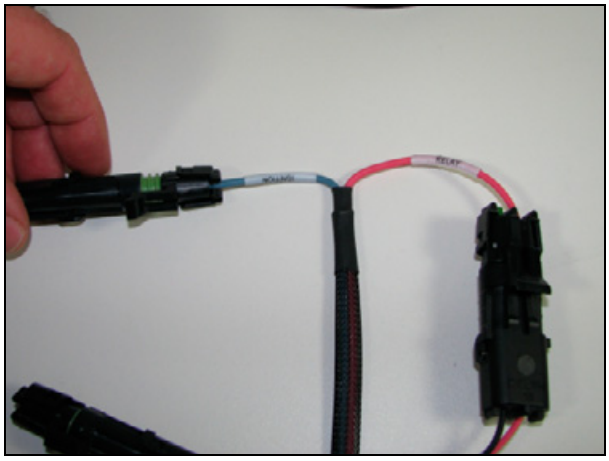


Step 2

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

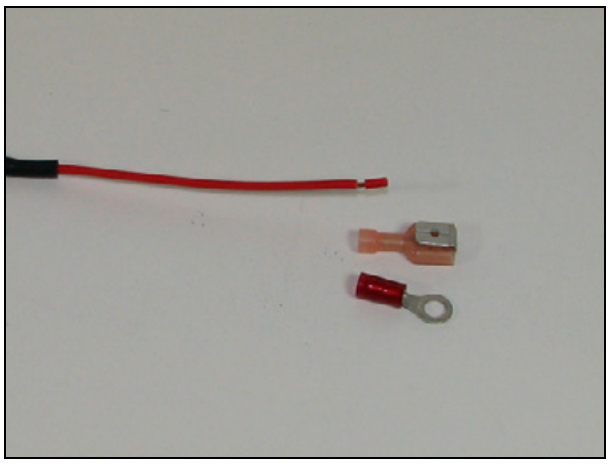
Step 3

Route the cable to the vehicles ignition.



Step 4

Connect the red ignition sense wire to the vehicle ignition using the spade or ring terminal provided.



CHAPTER 7

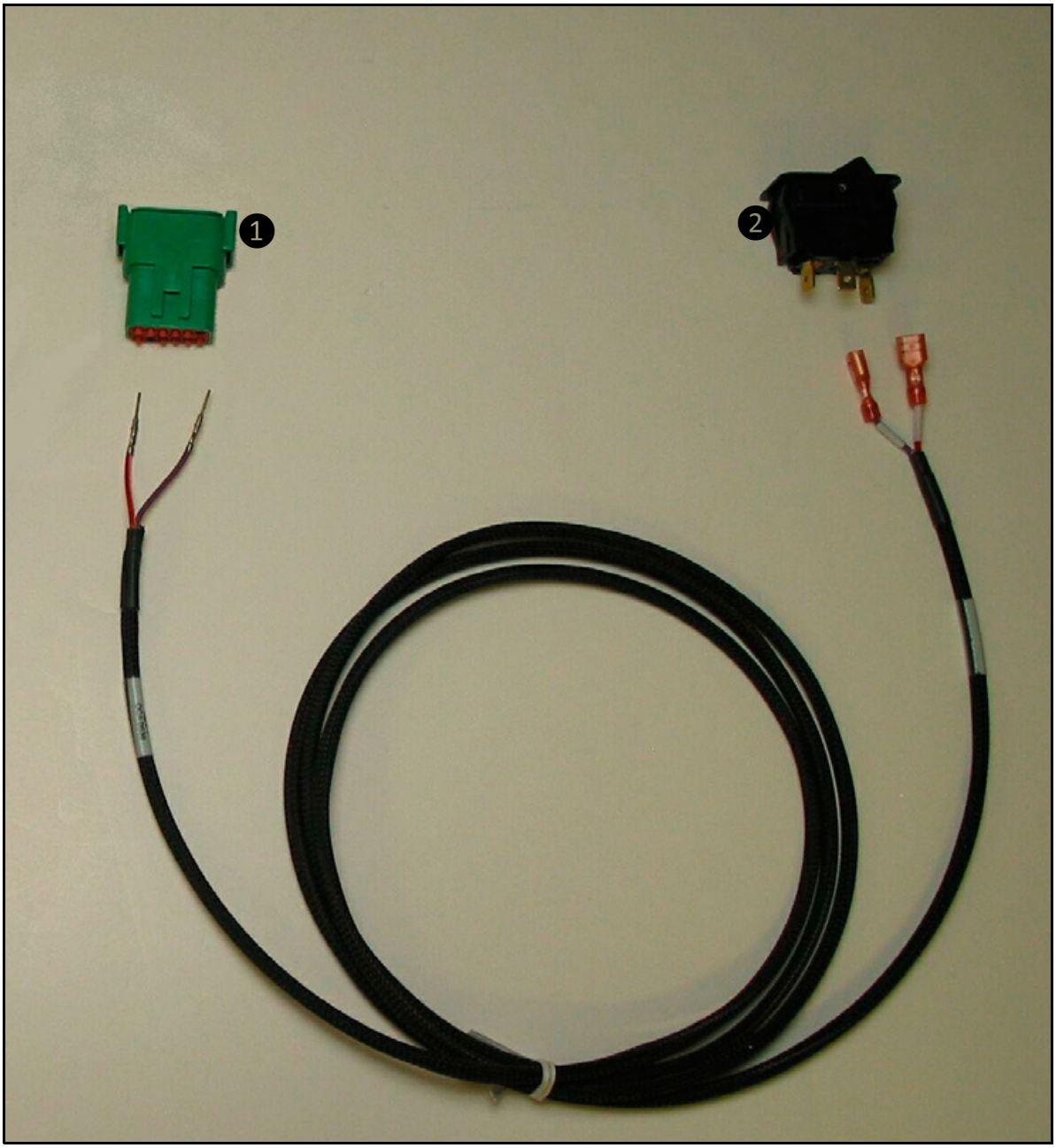
Remote Engage Switch Installation

In this chapter:

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

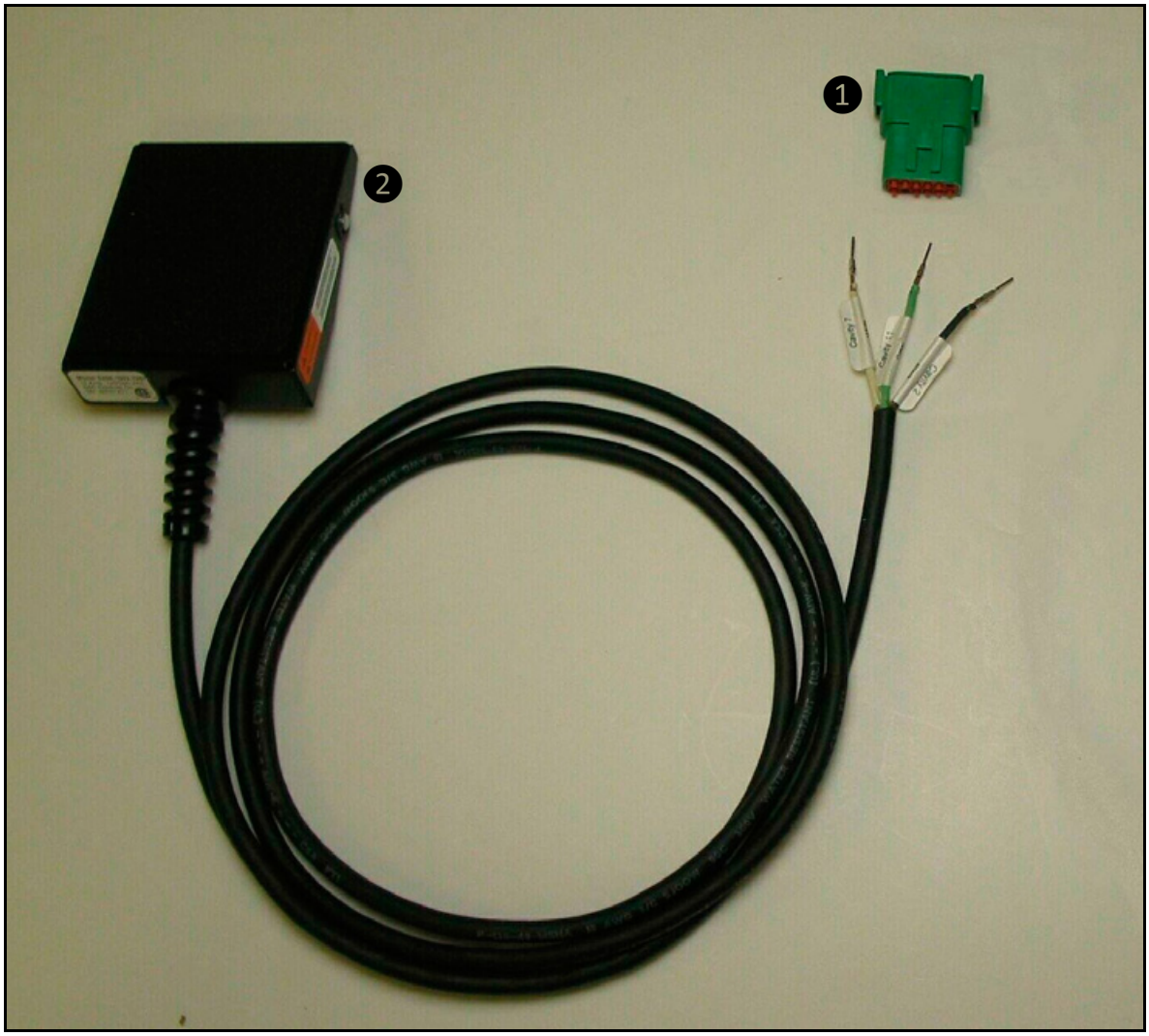
This chapter describes how to install the remote engage switch.

Remote engage switch components: Rocker switch



Item	Description
❶	DTM receptacle
❷	Remote engage rocker switch

Remote engage switch components: Foot switch

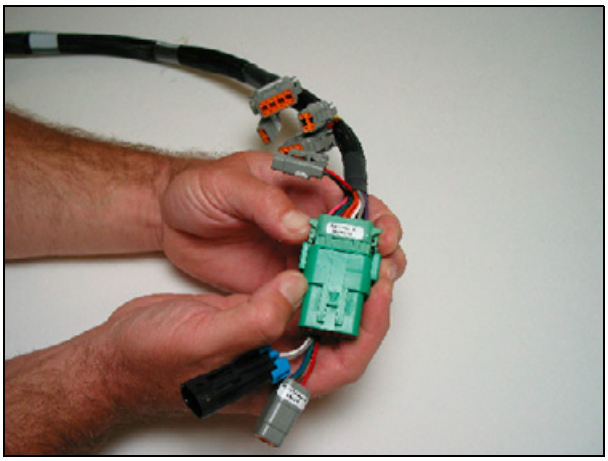


Item	Description
❶	DTM receptacle
❷	Remote engage rocker switch

Preparing the remote engage cable

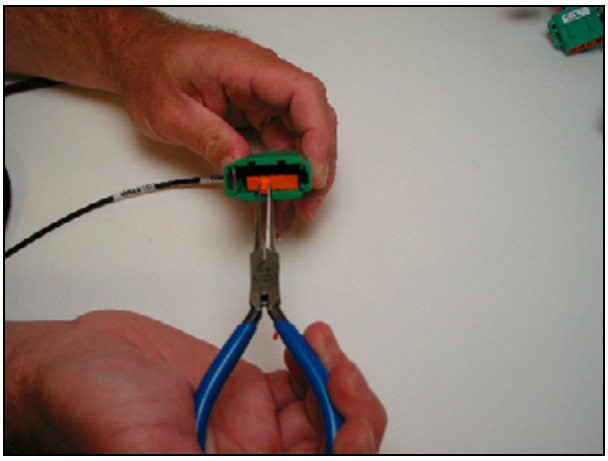
Step 1

Locate the green 12-pin Deutsch receptacle on the P-5 leg of the main controller harness. For more information, see Chapter 8, Controller Installation.



Step 2

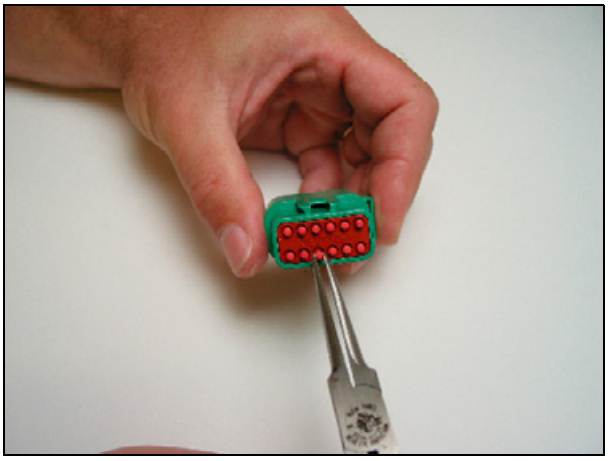
Remove the wedge from the connector.



Step 3

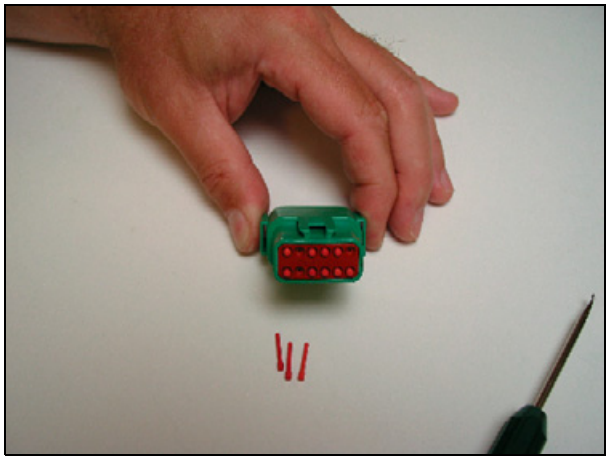
Rocker switch only

Remove the plugs from cavity 2 and cavity 7.



Foot switch only

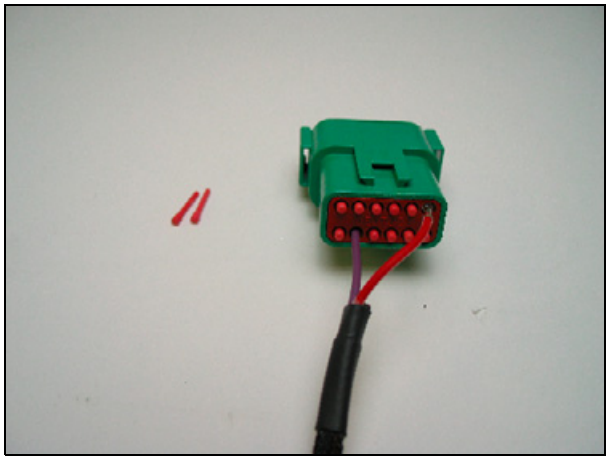
Remove the plugs from cavity 2, cavity 7, and cavity 11.



Step 4

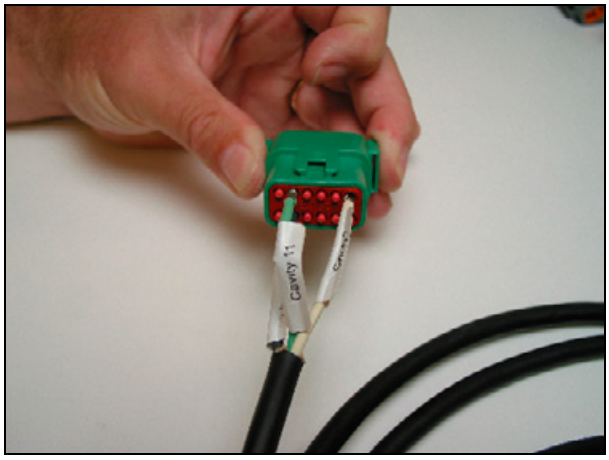
Rocker switch only

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



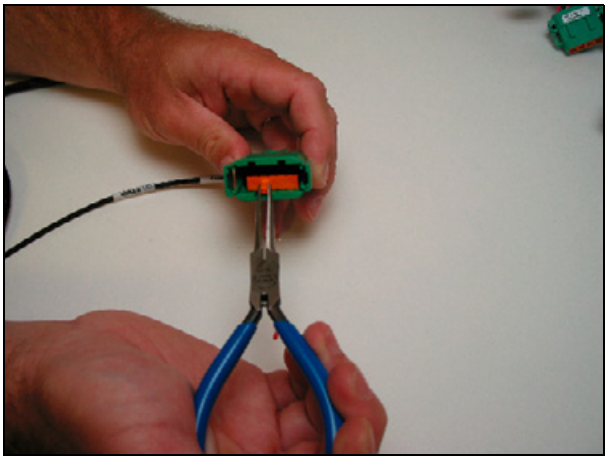
Foot switch only

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



Step 5

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



Step 6

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

Step 7

Rocker switch only

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



Foot switch only

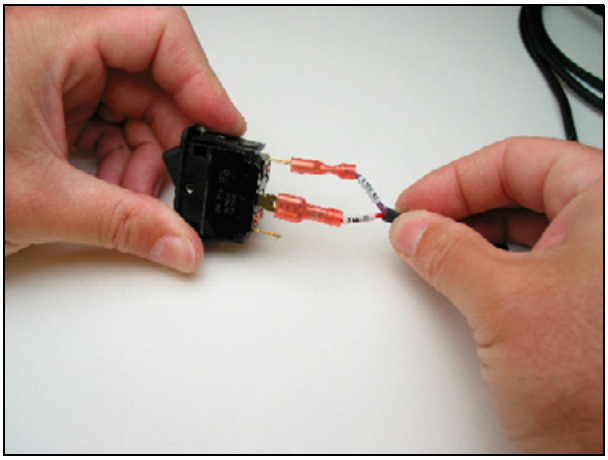
Run the cable to a clear location on the floor board. Use double-sided tape to secure the pedal. Route the cable under the floor mat.



Step 8

Rocker Switch Only

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



Step 9

Rocker Switch Only

Place the switch in the console.



Using the remote engage switch

To use NavController II to engage the system:

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

The system engages when you release the switch.

CHAPTER 8

Controller Installation

In this chapter:

- Installing the controller
- Controller connections

This chapter describes how to install the controller unit.

Installing the controller

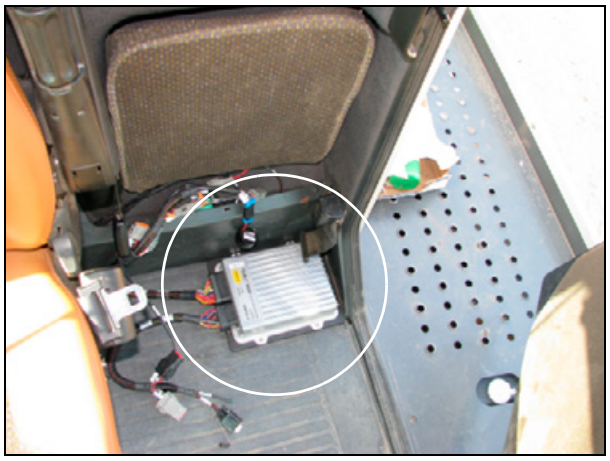
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

Early models

Step 1

Drill holes and use ¼" diameter bolts to secure the controller to the floor of the machine.

Note – *Ensure the controller mounting plate is mounted square to the machine.*



Late models

Option A: Machines without factory mounting holes

Step 1

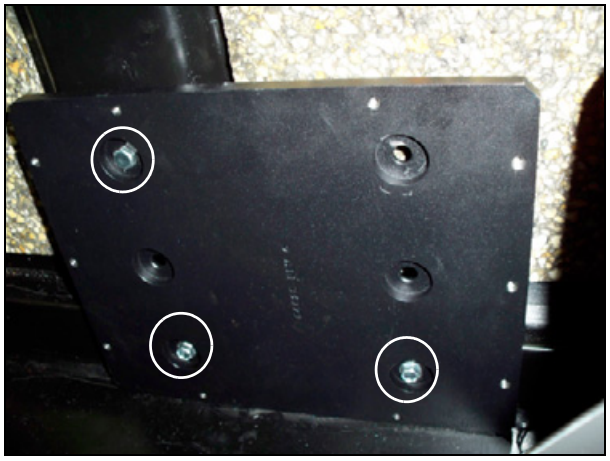
Remove the floor panel located behind the driver's seat in the cab. The NavController II will be installed under this panel.



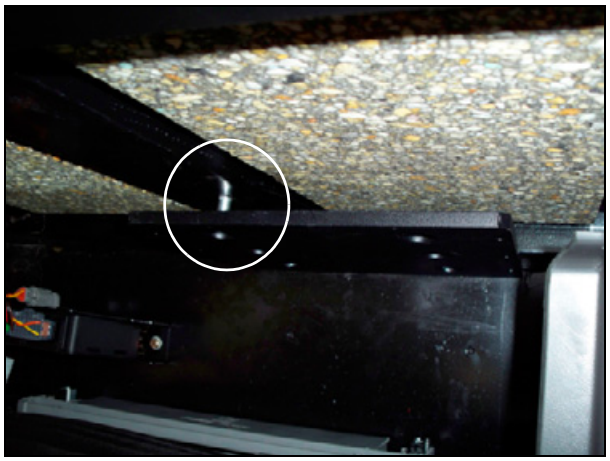
Step 2

Drill and tap three ¼" -20 holes to mount the controller mounting plate to the back wall of the cab of the machine.

Note – *Ensure the controller mounting plate is mounted square to the machine.*



Note – *Use the ¾" spacer provided for the top screw.*



Step 3

Use the screws provided to secure the controller to the controller mounting plate. Insert two ¼" -20 bolts (¾" long) in each of the bottom mounting holes. Insert one ¼" -20 bolt (1¼" long) in the top hole of the controller mounting plate.



Option B: Machines with factory mounting holes

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

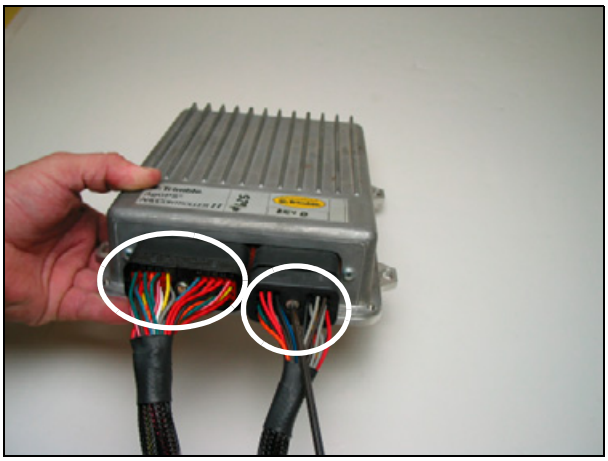
Step 1

The NavController II will be installed just behind the driver's seat, using the supplied mounting bracket (P/N 100241). Remove the plastic cover to gain access to the area.



Step 2

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



Step 3

Use the supplied #10-32 screws to secure the controller to the bracket. Then, use the existing drilled holes in the cab floor and the supplied hardware to mount the controller bracket.

If the machine does not have these threaded holes on the cab floor, use the supplied 5⁄16-18 self-tapping screws and washers to secure the bracket to the floor.

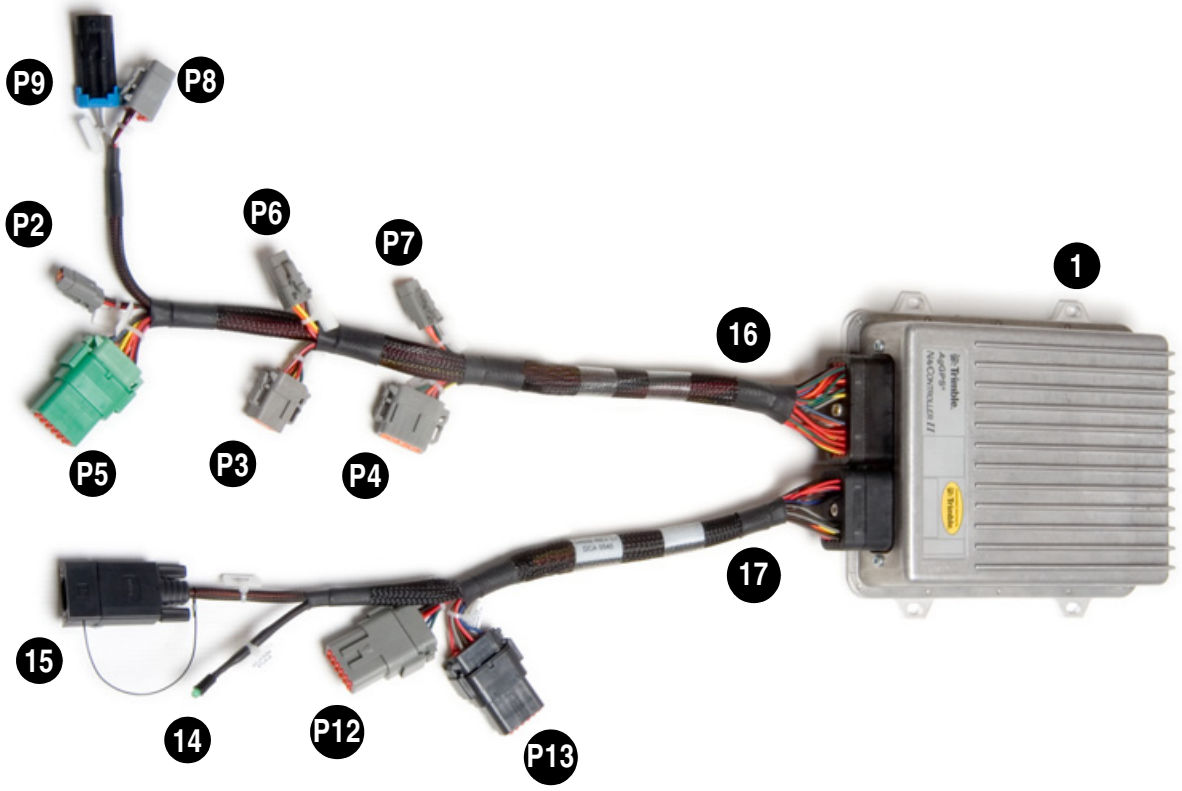
For ease of installation, drill two pilot holes for the bracket 14.75" apart, and approximately 2.3" behind the seat. The controller should have its labels facing forward, with the connectors pointing to the right.



Step 4

Replace the cover.

Controller connections



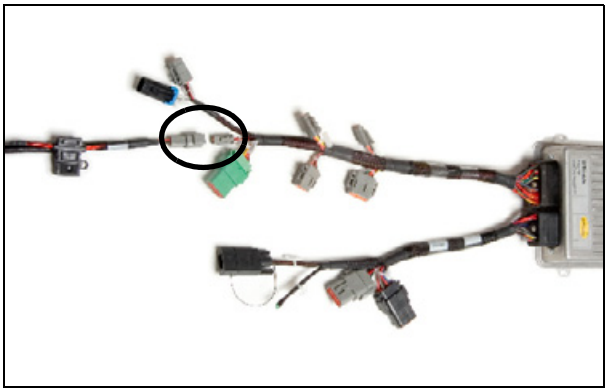
Item	Description
1	NavController II controller
P2	Power connector
P3	GNSS connector
P4	Display connector
P5	Vehicle sensors connector
P6	Steering sensor connector
P7	Manual override connector
P8	Hydraulic valve connector

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

Step 1

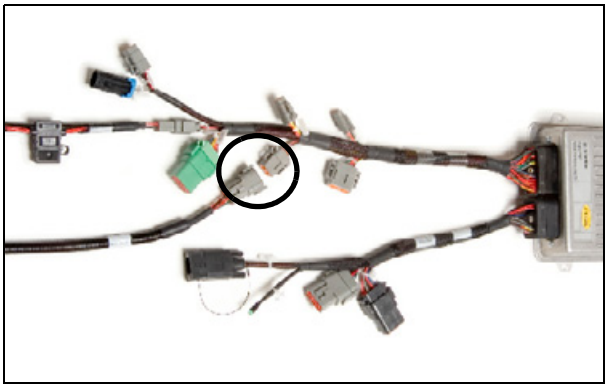
Connect the power cable connection to P-2, which is labeled “Power”. P-2 is located on the main wiring harness.

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



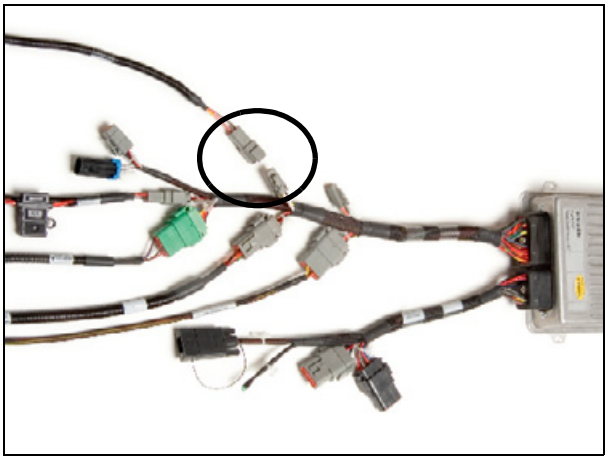
Step 2

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



Step 3

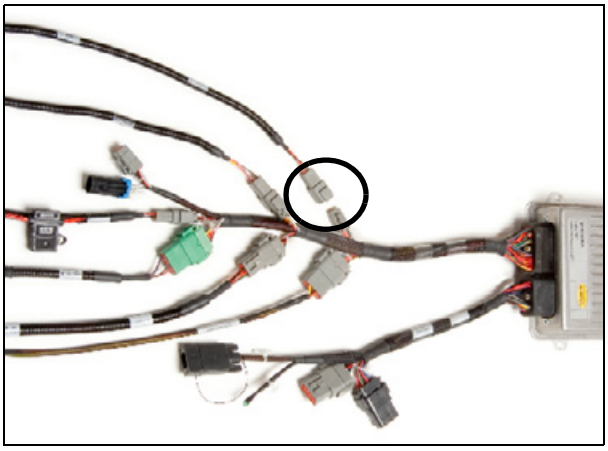
Connect the steering sensor cable connection to P-6, which is labeled “Steering Sensor”. P-6 is located on the main wiring harness.



Step 4

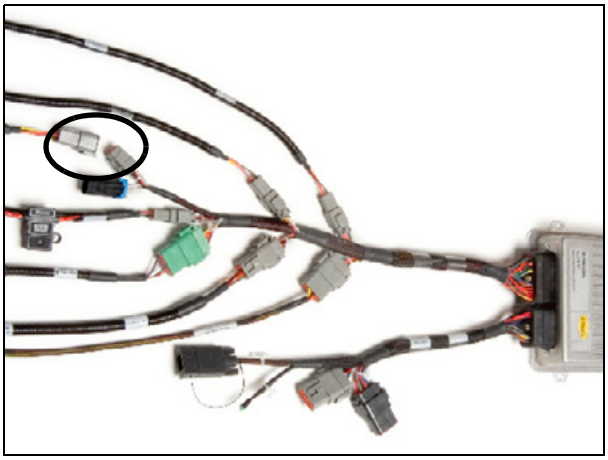
Connect the manual override cable connection to P-7, which is labeled “Manual Override”. P-7 is located on the main wiring harness.

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



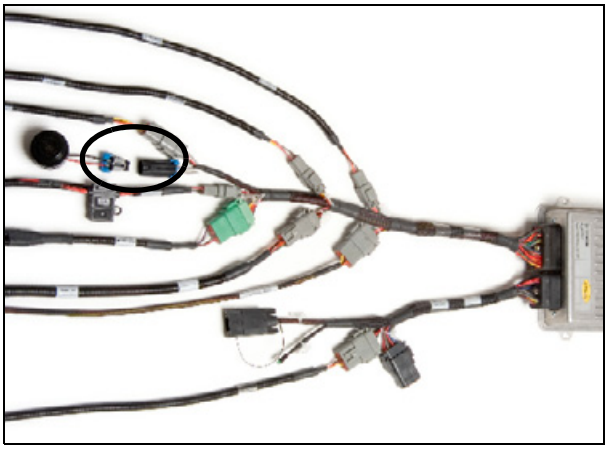
Step 5

Connect the hydraulic steering valve cable connection to P-8 that is labeled “Hydraulic Valve”. P-8 is located on the main wiring harness.



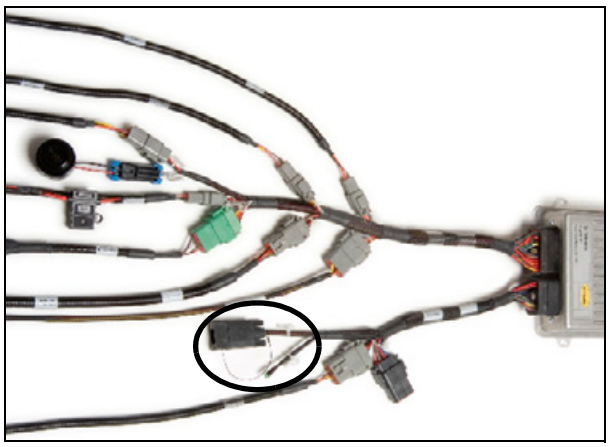
Step 6

Connect the Sonalert P-9 to the two-pin Delphi connector on the main wiring harness. Route the cable so the Sonalert warning device is in a position that is audible to the operator.



Step 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.

CHAPTER 9

Final Machine Check

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

To perform the final machine check:

1. Connect the battery.
2. 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://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 NavController II for the vehicle model being used.

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

   You can use Autopilot Toolbox II software version 2.92 or later 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 Autopilot Toolbox II software version 2.92 or later. Depending on your machine type, the following items must be calibrated before you can use the Autopilot system:
   - NavController II mounting orientation
   - Manual override
   - AutoSense mounting orientation
   - Valve deadzone
   - Autopilot P-gain
   - Antenna height/Antenna axle offset, and Roll offset