INSTALLATION INSTRUCTIONS

Autopilot™ Automated Steering System

New Holland Tractors

- **TB 100/110/120**
- **TS 6000/6020/6030**

Version 5.00
Revision A
February 2012
Part Number 54035-158-E05

Trimble

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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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For product recycling instructions and more information, please go to: www.trimble.com/ev.shtml

Recycling in Europe: To recycle Trimble WEEE, Call

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Or

Mail a request for recycling instructions to:

Trimble Europe BV
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.

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CHAPTER

1

Introduction

In this chapter:

- Technical assistance
- 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 Systems (GNSS) products before, Trimble recommends that you spend some time reading this manual to learn about the special features of this product. If you are not familiar with 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. Go to the Trimble website (www.trimble.com).
2. Click the **Support & Training** link at the top of the screen, select *Support* and then select *Support A–Z list of products*.
3. Scroll to the bottom of the list.
4. Click the *submit an inquiry* link. A form appears.
5. Complete the form and then click **Send**.

Required components

Kits required	Special tools
Platform kit: P/N 54035-158 Hydraulic hose kit: • For TB tractors: P/N 84196 • For TS tractor: P/N 84279	

Antenna mounting kits

Antenna options
Antenna V-plate mount, P/N 62388-01. See Chapter 4, Antenna Installation.
Antenna spar mount, P/N 53676

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

Autopilot hardware organization: As shipped

Hardware	Component	See...
Platform kit (P/N 54035-158)	Hydraulic valve	Chapter 2
	Hydraulic manifold	Chapter 2
	Transducer flow switch	Chapter 2
	Manual override cable	Chapter 2
	Hydraulic brackets and bolt kits	Chapter 2
	Hydraulic valve cable	Chapter 2
	AutoSense™ steering device and cabling	Chapter 3
	AutoSense mounting bracket and hardware	Chapter 3
	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
Antennas	GNSS antenna and cable	Chapter 4
	GNSS antenna mounting plate	Chapter 4
	RTK antenna and cable	Chapter 4
	RTK antenna mounting plate	
Display	EZ-Guide 500 display	Chapter 5
	FmX integrated display	Chapter 5
	CFX-750 display	Chapter 5
	Display cable	Chapter 5
	Mounting bracket	Chapter 5
Hydraulic hose kit: • For TB tractors: P/N 84196 • For TS tractor: P/N 84279	Hydraulic hoses	Chapter 2
	Hydraulic adaptors	Chapter 2

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.*

CHAPTER

2

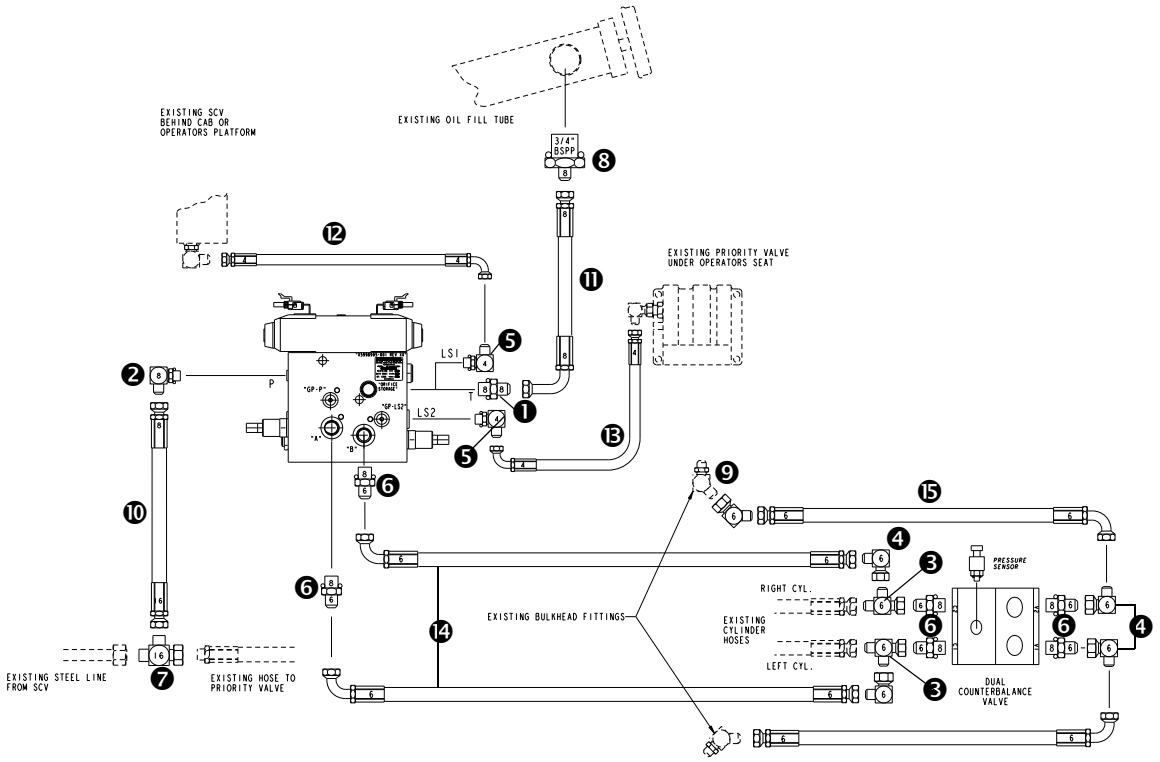
Hydraulic Control Valve Installation

In this chapter:

- Hydraulic control valve components: TB tractors
- Hydraulic control valve components: TS tractors
- Prepare the Autopilot manifold and control valve
- Preparing the dual counterbalance valve
- Installing the dual counterbalance valve
- Installing the hydraulic hoses for the dual counterbalance valve
- Installing the hydraulic manifold
- Installing the hydraulic hoses for the Autopilot manifold
- Securing the electrical connectors

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

Hydraulic control valve components: TB tractors

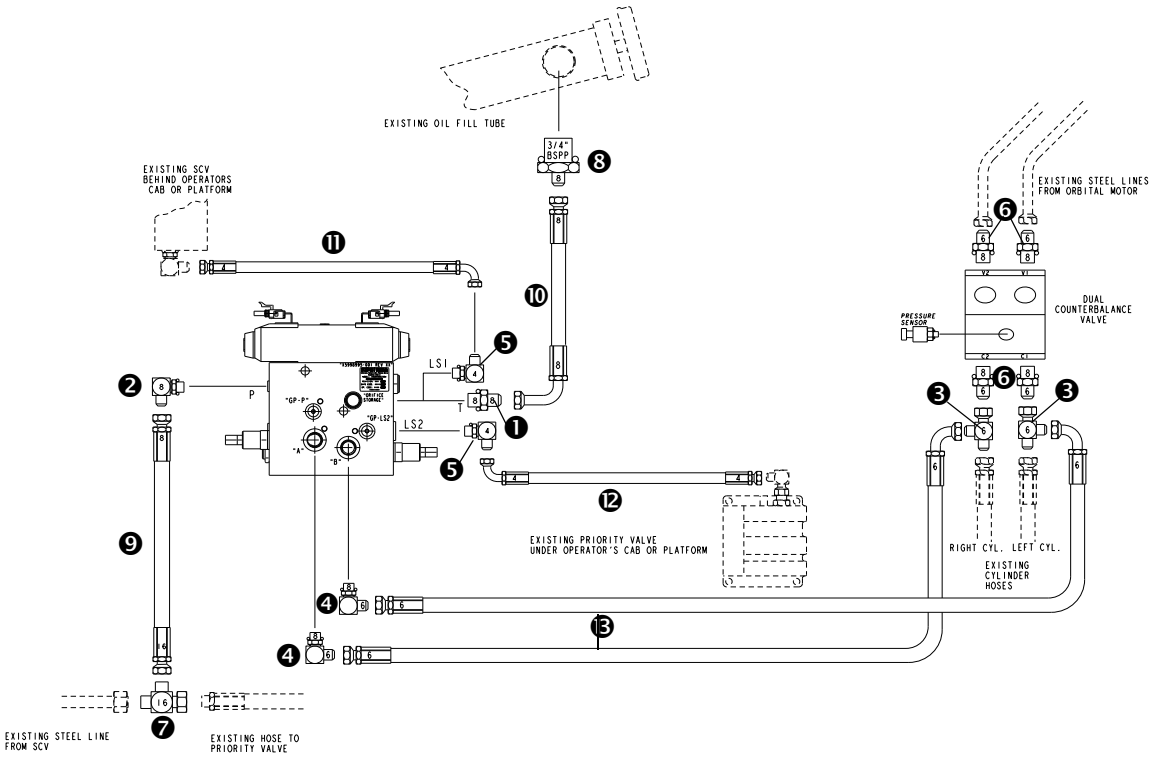


Item	Description	Part number
❶	Fitting	8 F50X-S
❷	Fitting	8 C50X-S
❸	Fitting (x2)	6 R6X
❹	Fitting (x4)	6-8 C50X
❺	Fitting (x2)	4 C50X
❻	Fitting (x6)	6-8 F50X
❼	Fitting	EL16S
❽	Fitting	8-12F42EDMX
❾	Fitting	6 V6X-S

Item	Description	Part number
❿	12" hose	F451TCC906-16-08-08-12
⓫	7" hose	F451TC0641-08-08-08-7
⓬	16" hose	F451TC0639-04-04-04-16
⓭	28" hose	F451TC0639-04-04-04-28
⓮	99" hose (x2)	F451TC0639-06-06-06-99
⓯	24" hose (x2)	F451TC0639-06-06-06-24

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

Hydraulic control valve components: TS tractors



Item	Description	Part number
❶	Fitting	8 F50X-S
❷	Fitting	8 C50X-S
❸	Fitting (x2)	6 RX
❹	Fitting	6-8 C50X
❺	Fitting (x2)	4 C50X
❻	Fitting (x4)	6-8 F50X
❼	Fitting	EL16S
❽	Fitting	8-12F42EDMX

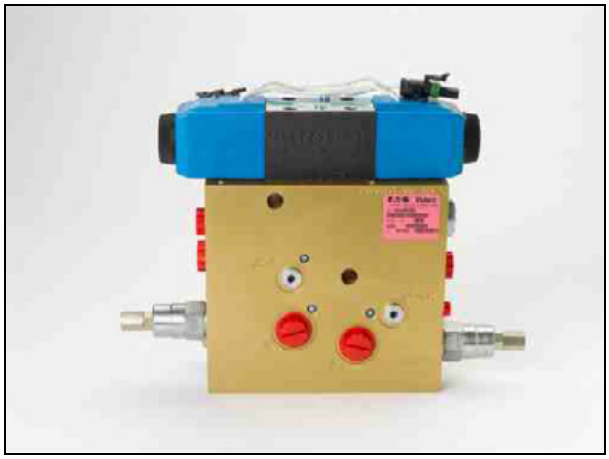
Item	Description	Part number
❾	12" hose	F451TCC906-16-08-08-12
❿	7" hose	F451TC0641-08-08-08-7
⓫	16" hose	F451TC0639-04-04-04-16
⓬	28" hose	F451TC0639-04-04-04-28
⓭	107" hose (x2)	F451TC0639-06-06-06-107

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

Prepare the Autopilot manifold and control valve

Step 1

Locate the Autopilot manifold and place it on a clean work surface.



Step 2

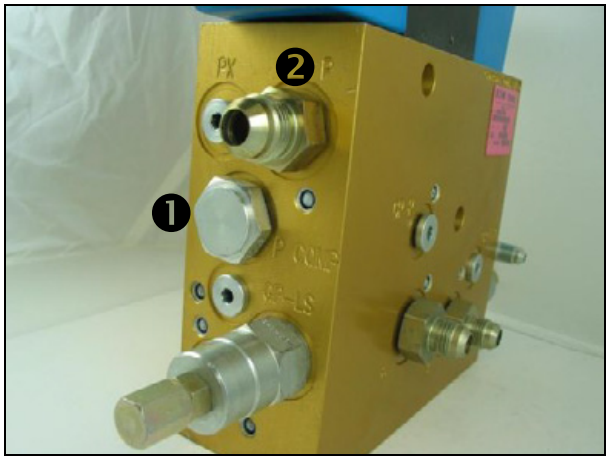
Locate the cavity plug stamped **2186484**.



Step 3

Install the cavity plug ❶ into the P-Comp port.

Install an 8-8 ORB-JIC straight adaptor ❷ in the P port.



Step 4

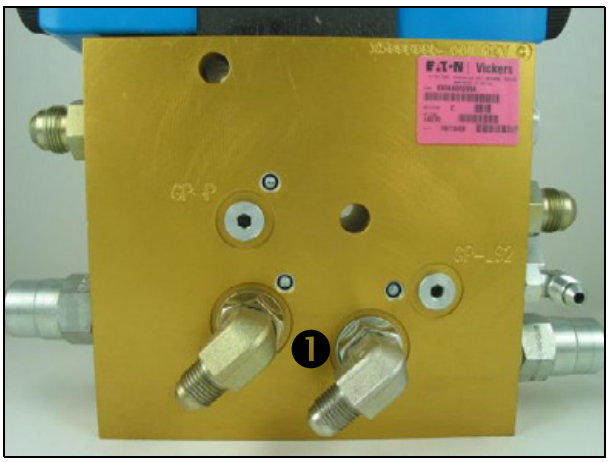
TB 100/110/120 tractors

On the front face of the manifold, install a pair of 8-6 ORB-JIC straight adaptors ❶ into the A and B ports.



TS 6000/6020/6030 tractors

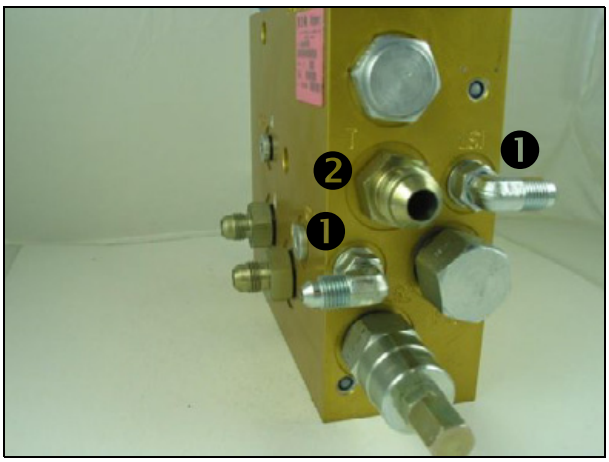
On the front face of the manifold, install a pair of 8-6 ORB-JIC 90° elbow adaptors ❶ into the A and B ports.



Step 5

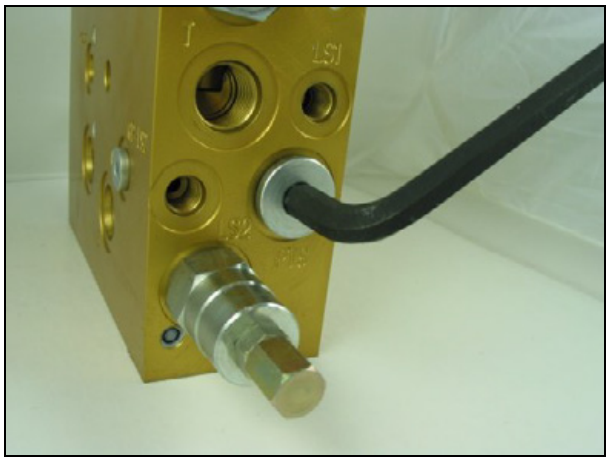
Install 4-4 ORB-JIC 90° adaptors ❶ in the LS1 and LS2 ports.

Install an 8-8 ORB-JIC straight adaptor ❷ in the "T" port.



Step 6

Remove the plug from the PTS port.



Step 7

Locate the pilot-to-shift cartridge stamped **PTS3-10-0-40** on its hexagonal head.



Step 8

Install the pilot-to-shift cartridge in the PTS port.



Preparing the dual counterbalance valve

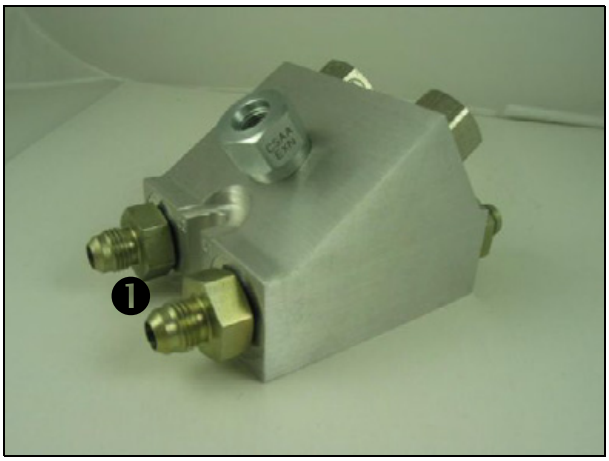
Step 1

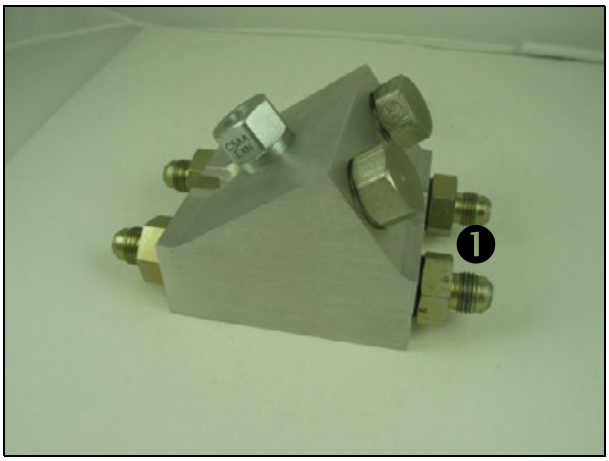
Locate the dual counterbalance valve.



Step 2

Install 8-6 ORB-JIC straight fittings into the V1, V2, C1, and C2 ports ❶.





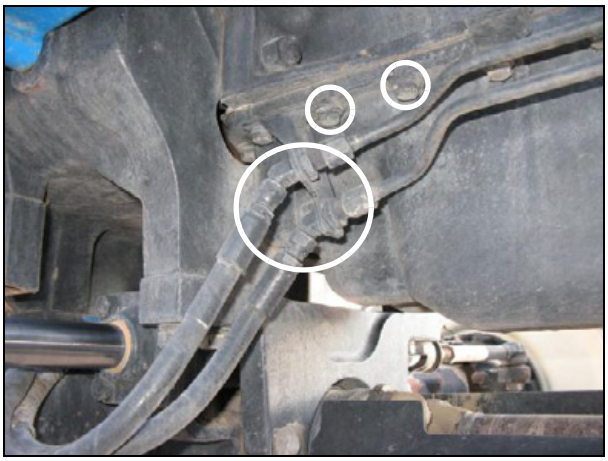
Installing the dual counterbalance valve

TB 100/110/120 models

Step 1

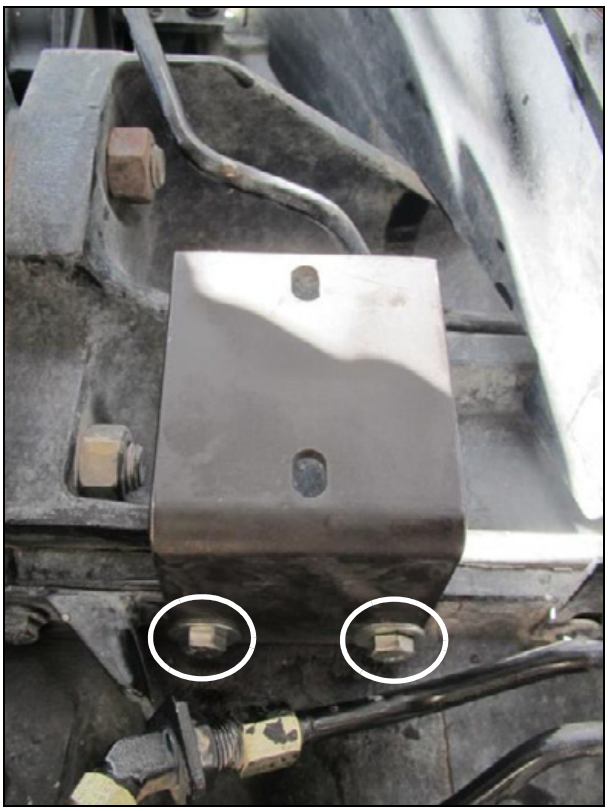
Disconnect the steering cylinder hoses.

Remove the bracket and existing bolts on the front left side of the tractor.



Step 2

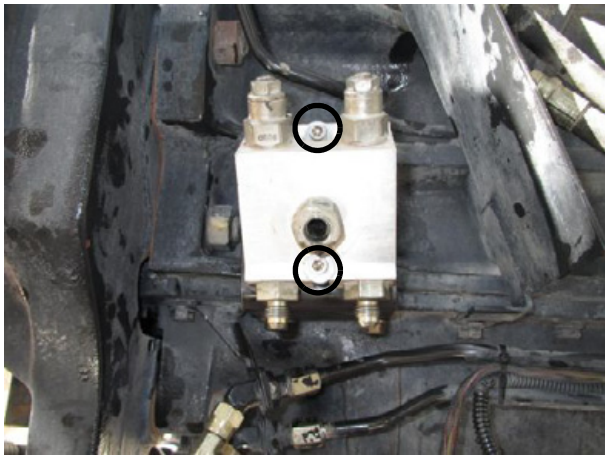
Install the supplied bracket. Reuse the existing mounting bolts.



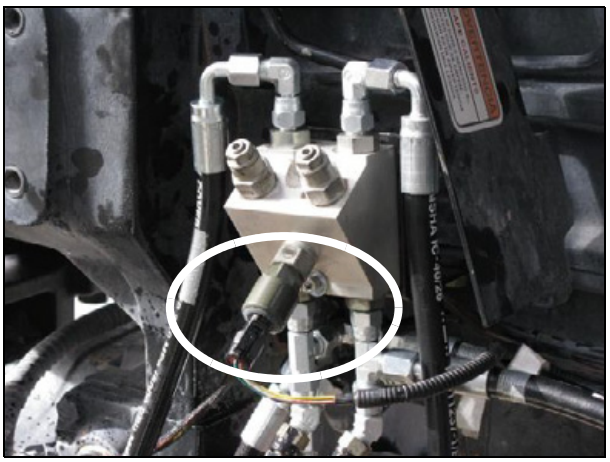
Step 3

Use the two provided ¼" x 1.75" cap head bolts, flat washers, and nuts to attach the counterbalance valve to the bracket.

Attach the valve with the C1 and C2 ports pointed down.



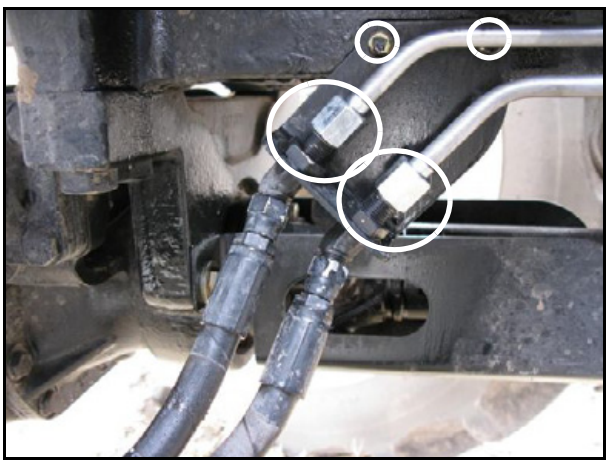
Connect the pressure sensor to the counterbalance block.



TS 6000/6020/6030 models

Step 1

Disconnect the steering lines. Remove the existing bracket.



Step 2

Install the supplied bracket. Reuse the existing mounting bolts.



Step 3

Use the two provided ¼" x 1.75" cap head bolts, flat washers, and nuts to attach the counterbalance valve to the bracket.

Attach the original steel lines to the V1 and V2 ports.

Connect the pressure sensor to the counterbalance valve.



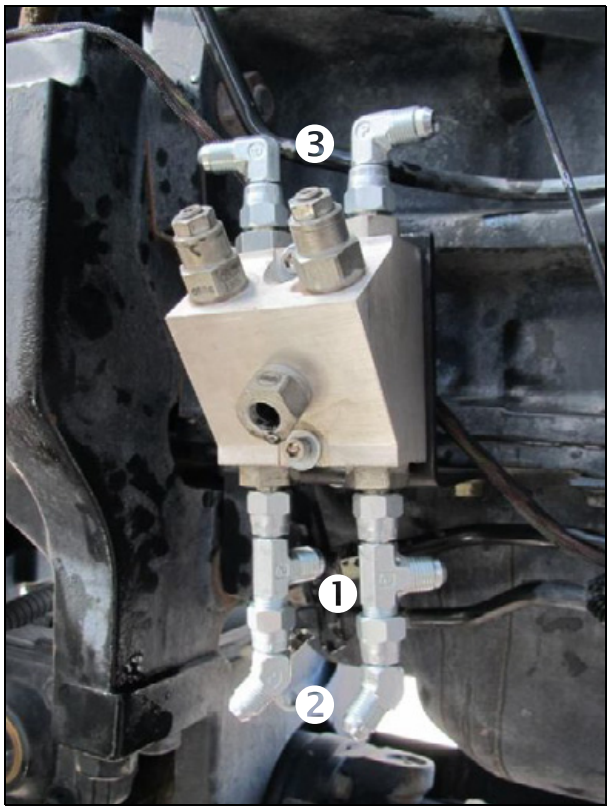
Installing the hydraulic hoses for the dual counterbalance valve

TB 100/110/120 models

Step 1

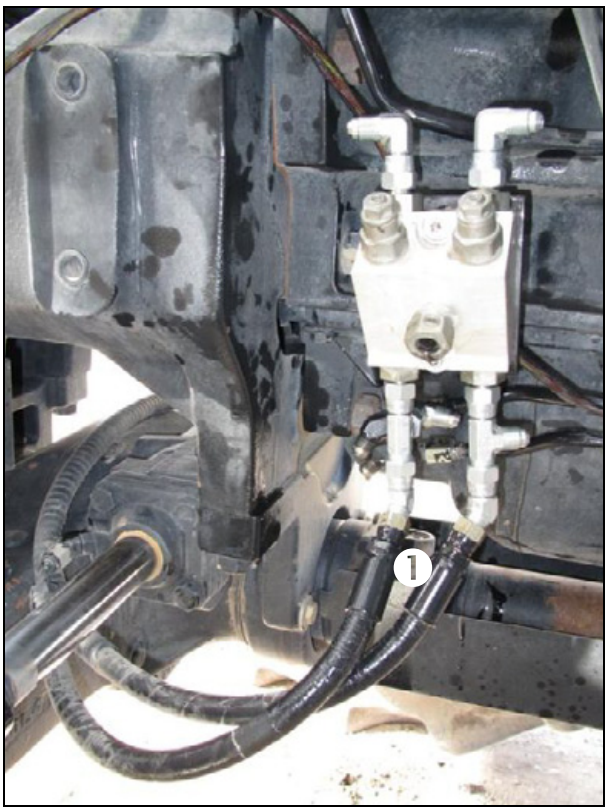
Attach the hydraulic fittings to the counterbalance valve:

- -6 JIC run tees to the C1 and C2 ports ❶
- -6 JIC 45° elbows onto the end of each run tee ❷
- -6 JIC 90° elbows onto the V1 and V2 ports ❸



Step 2

Connect the original steering hoses to the C1 and C2 run tees ❶.

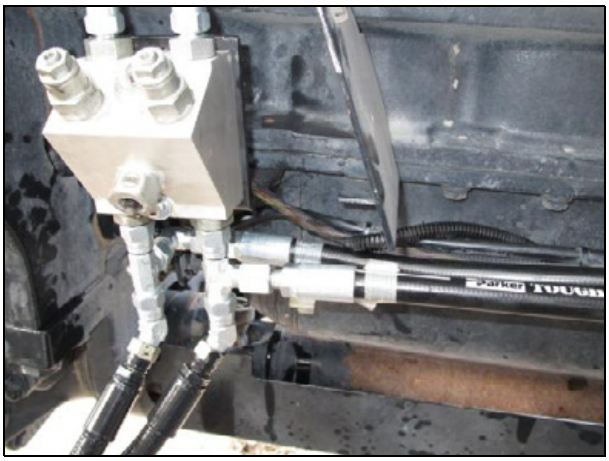


Step 3

Attach a -6 JIC 90° elbow onto the branch of the C2 tee.

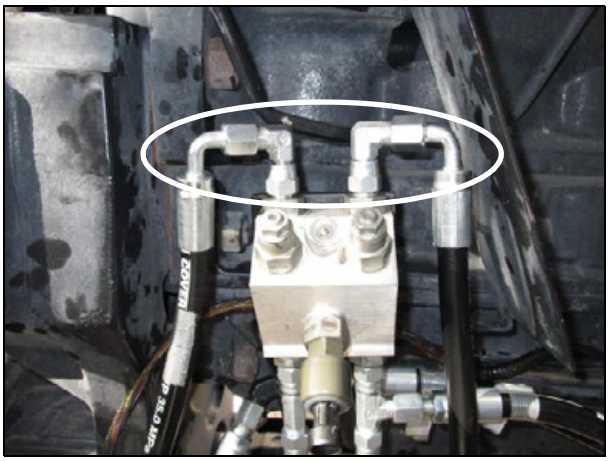


Connect the 99" A & B lines from the Autopilot manifold to the C1 and C2 run tees.



Step 4

Connect the 90° end of both 25" hoses to the V1 and V2 ports.



Step 5

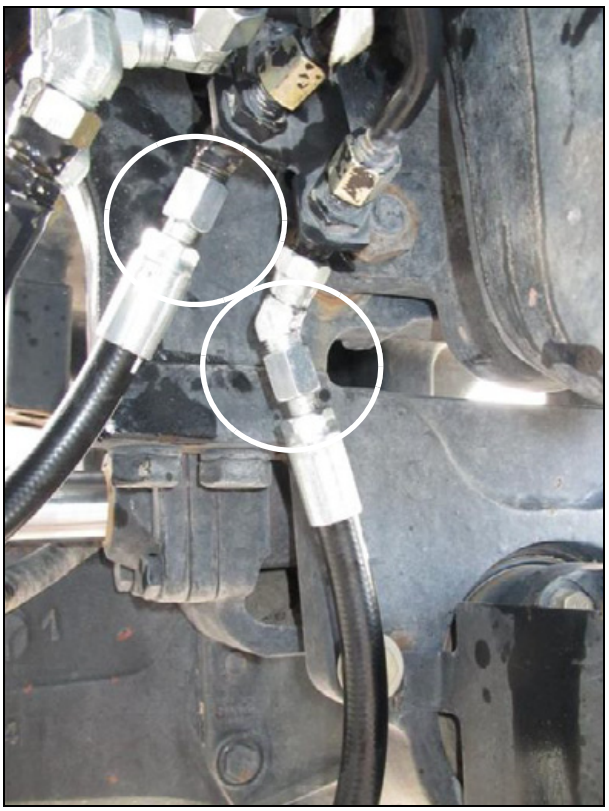
Connect a -6 JIC 45° elbow to the existing lower steel line.



Step 6

Connect the straight end of the V1 hose to the top steel steering line.

Connect the straight end of the V2 hose to the bottom steel steering line.



TS 6000/6020/6030 models

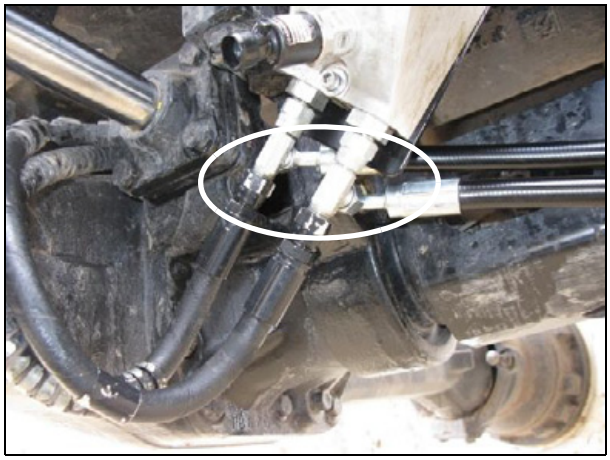
Step 1

Attach -6 JIC run tees to the C1 and C2 ports.



Step 2

Connect the 90° female end of each 107" hose to the branch ports of the C1 and C2 run tees.



Step 3

Connect the original steering hoses:

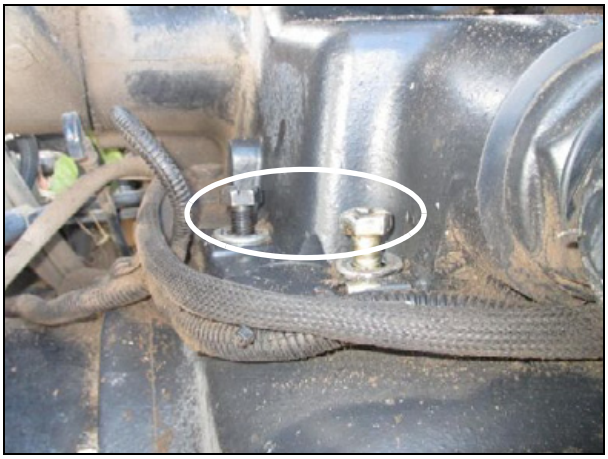
- The steering hose connected to the right side of the cylinder attaches to the C2 run tee.
- The steering hose connected to the left side of the cylinder attaches to the C1 run tee.



Installing the hydraulic manifold

Step 1

Loosen the bolts shown on the left rear of the tractor.



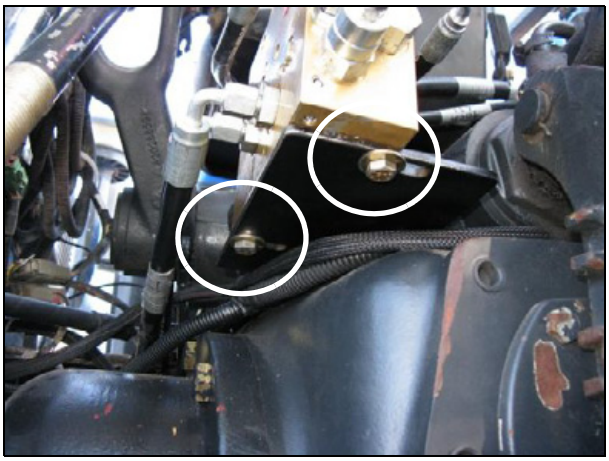
Step 2

Install the supplied bracket P/N 84110 using the existing bolts.



Step 3

Attach the assembled Autopilot manifold to the bracket. Use the supplied 3/8" x 1" bolts and the flat washers.

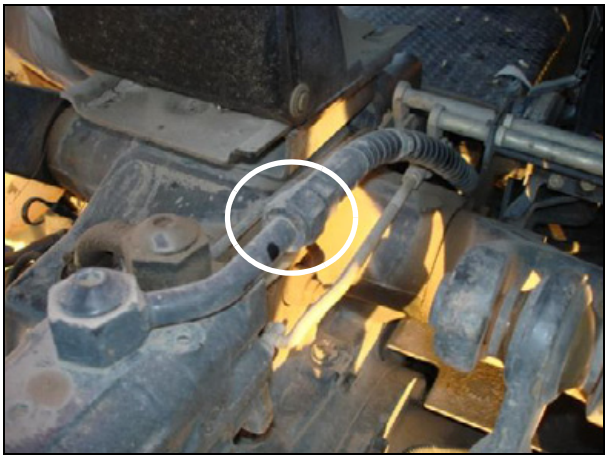




Installing the hydraulic hoses for the Autopilot manifold

Step 1

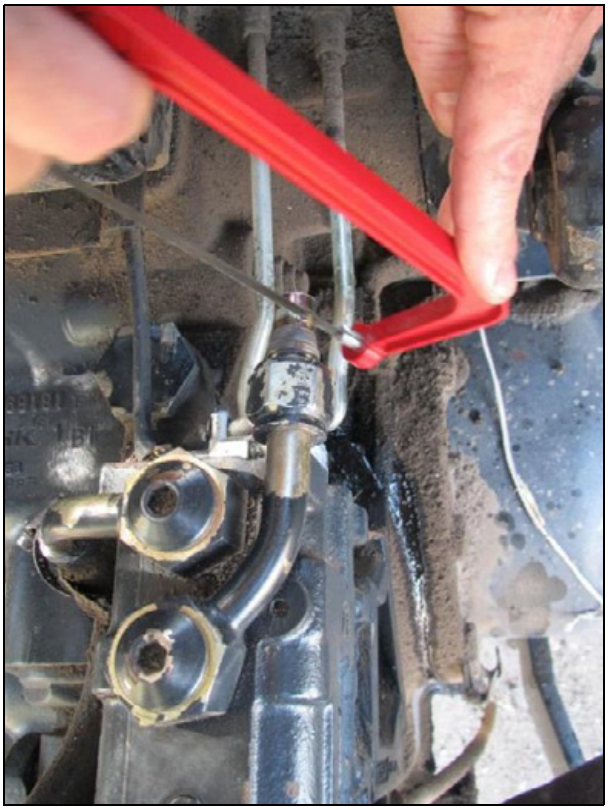
Disconnect the pressure line shown.



Step 2

Measure 3/8"-13/32" from the end of the existing steel tube.

Use a hacksaw to trim the existing steel tube.



Step 3

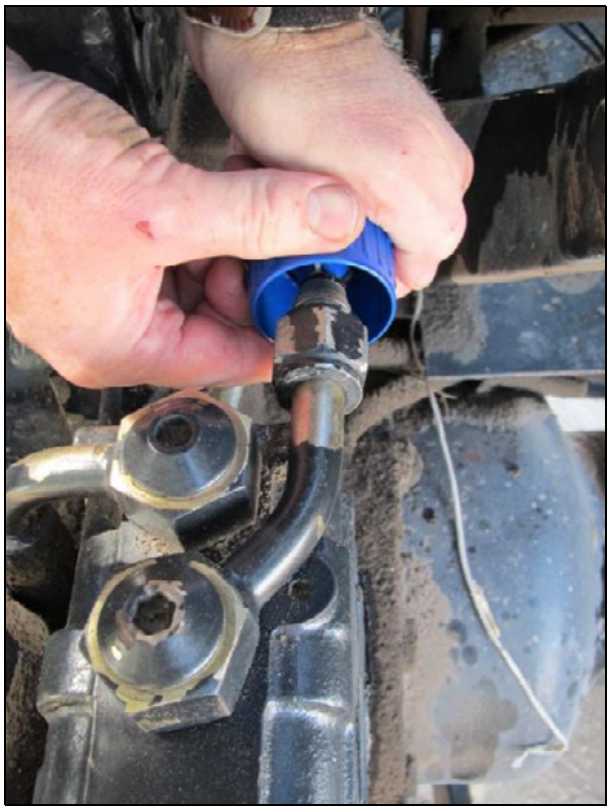
Ream the outside and inside of the steel tube.

For an example of the tool used, go to www.homedepot.com and then search for:

BrassCraft model #T085

Internet # 202097512

Store SKU # 949398



Step 4

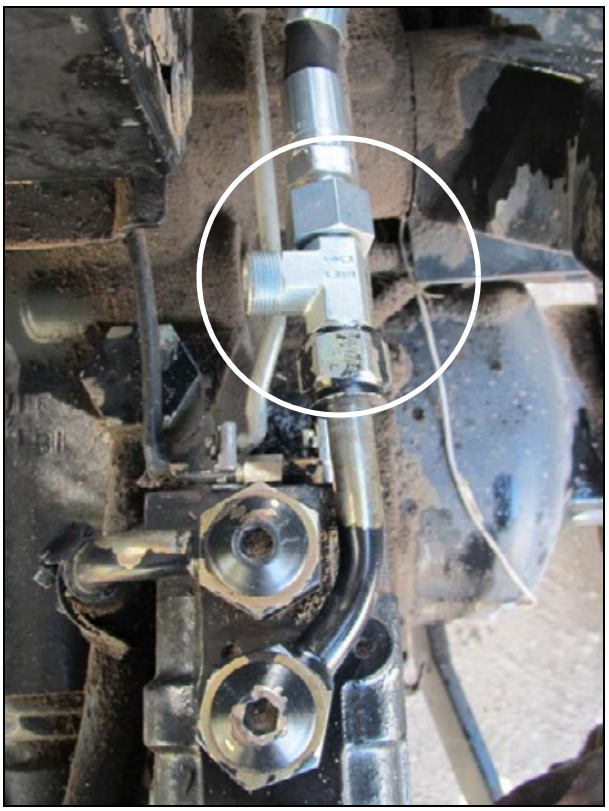
Use a 3/8" hex wrench to remove the steel tube.

Flush the tube with brake cleaner to remove dirt and metal particles (from cutting) and then reinstall it.



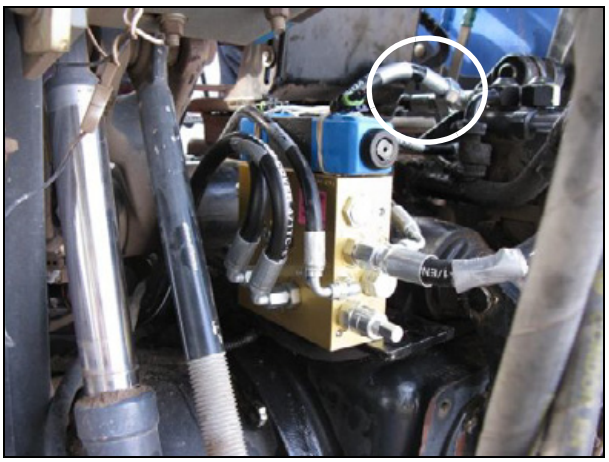
Step 5

Install the supplied -16 EO run tee and reconnect the original pressure hose.



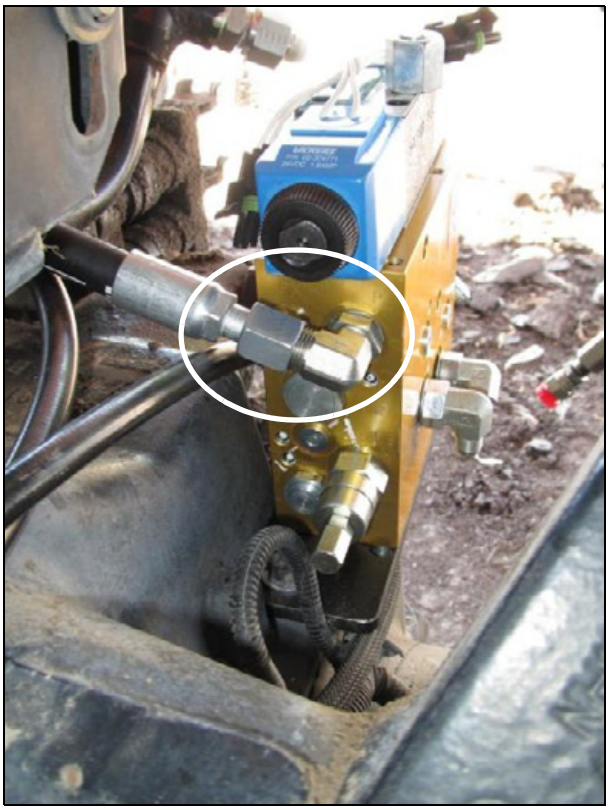
Step 6

Connect the -16 EO male end of the 12" hose to the branch port of the run tee.



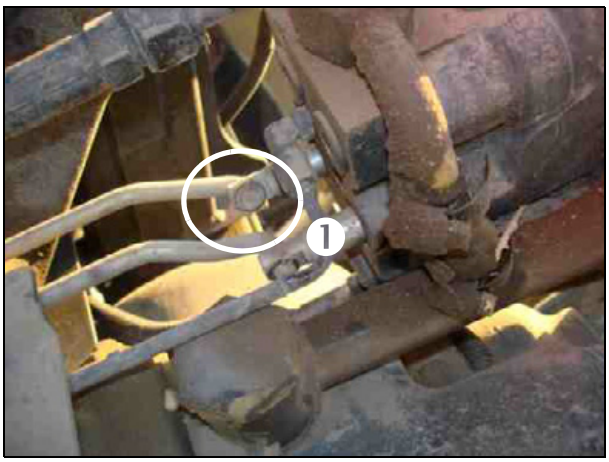
Step 7

Connect the -8 JIC straight female end of the 12" hose to the P port of the Autopilot manifold.

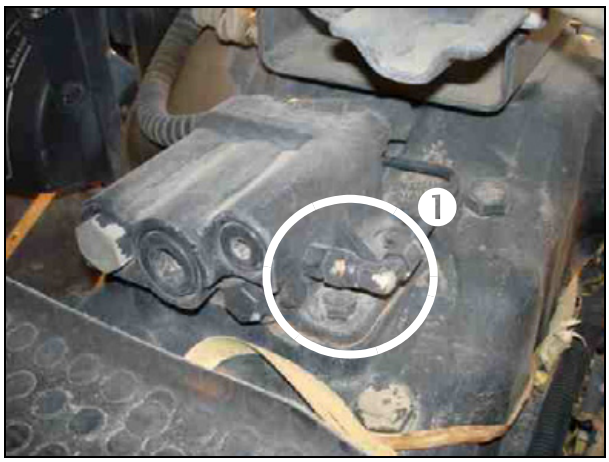


Step 8

Remove the tractor's existing steel LS tube ❶, located between the SCV and priority valve.



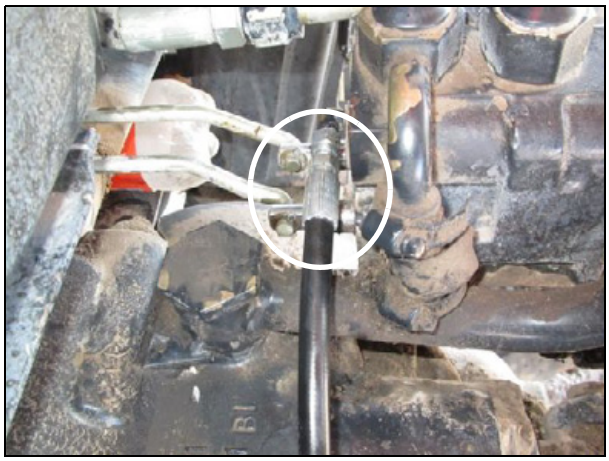
Rear of selective control valves



Priority valve under operator's seat

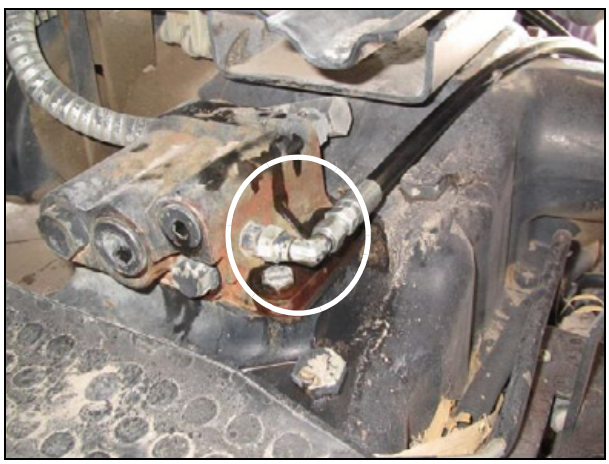
Step 9

Connect the -4 JIC straight female end of the 16" hose to the rear of the SCV.



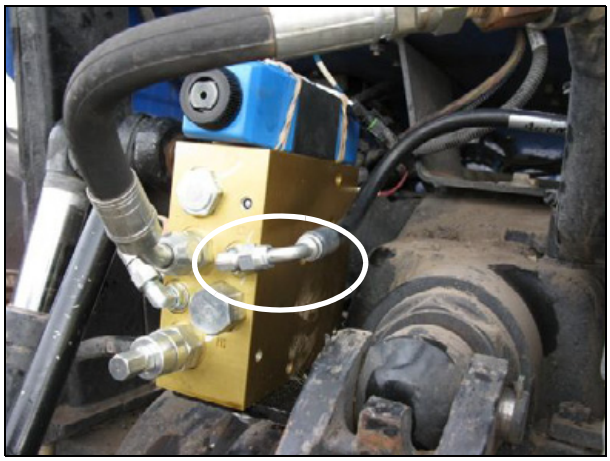
Step 10

Connect the -4 JIC straight female end of the 28" hose to the priority valve.



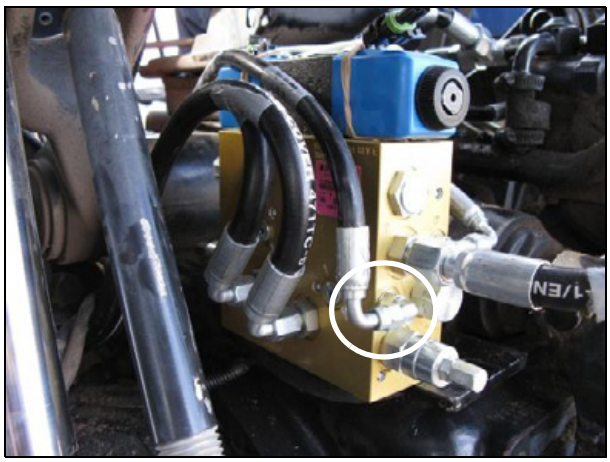
Step 11

Connect the -4 JIC 90° female end of the 16" hose to LS1.



Step 12

Connect the -4 JIC 90° female end of the 28" hose to LS2.

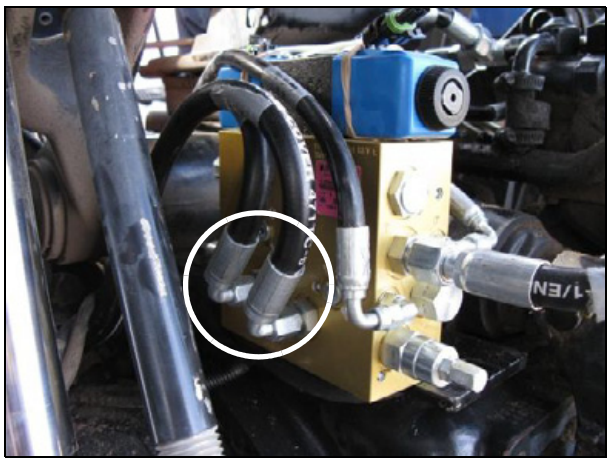


Step 13

TB 100/110/120

Connect the 90° female end of the 99" hoses to the A and B ports of the Autopilot manifold.

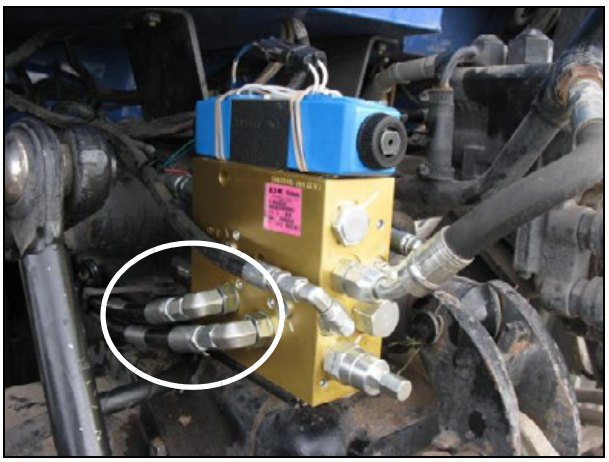
Route the hoses along the left side of the machine, under the operator's platform, forward to the front axle.



TS 6000 / 6020 / 6030

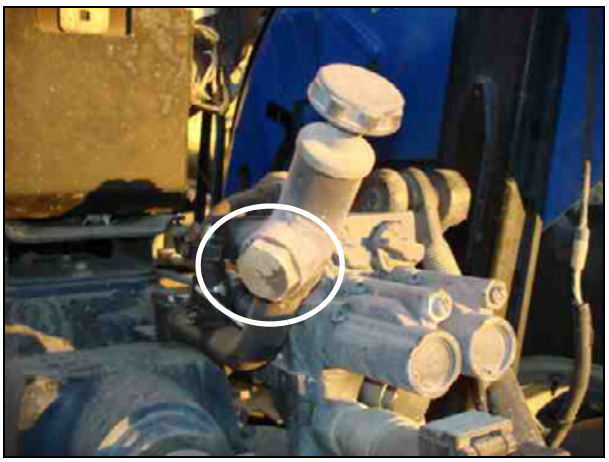
Connect the straight female end of the 107" hoses to the A and B ports of the Autopilot manifold.

Route the hoses along the left side of the machine, under the operator's platform, forward to the front axle.



Step 14

Remove the hex plug from the oil fill tube on the rear of the tractor.



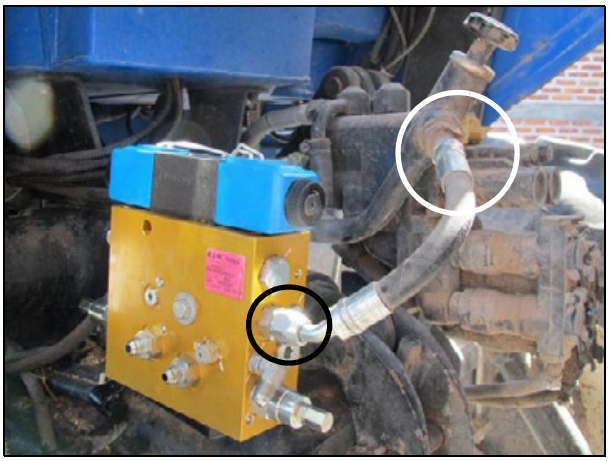
Install the supplied 3/4"-8, British Pipe-JIC straight adapter.



Step 15

Attach the -8 JIC 90 female end of the 7" hose to the T port of the Autopilot manifold.

Attach the -8 JIC straight female end of the 7" hose to the oil fill tube.



Step 16

Check and tighten all the fittings.

Refill the hydraulic reservoir if necessary.

Start the engine and then have an assistant turn the steering from full left lock to full right lock to check for leaks. If the tractor steers backwards, reverse the orbital motor hoses on the left side of the tractor at the C1 and C2 ports of the counterbalance block.

Securing the electrical connectors

Step 1

Locate the 54617 control valve cable.

Plug the weatherpack connectors from the control valve cable into the control valve.

Route the cable towards the Autopilot controller, following the existing hoses and steel lines.

Secure the harness with tie straps along the path.

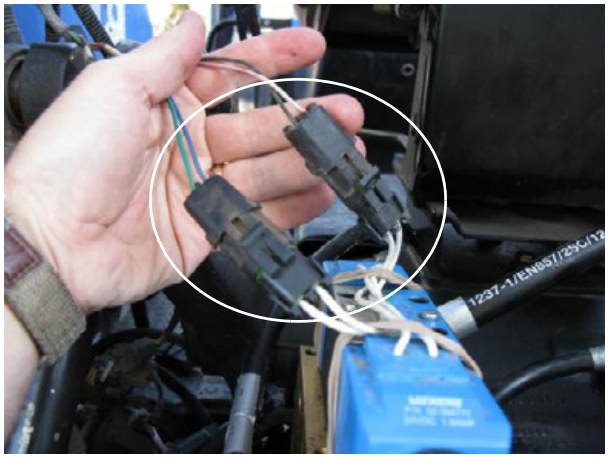
Step 2

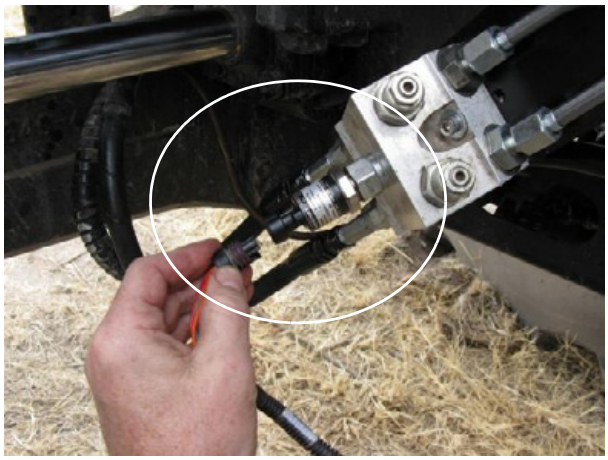
Locate the pressure transducer cable (P/N 54618).

Plug the cable into the pressure sensor located at the manifold block.

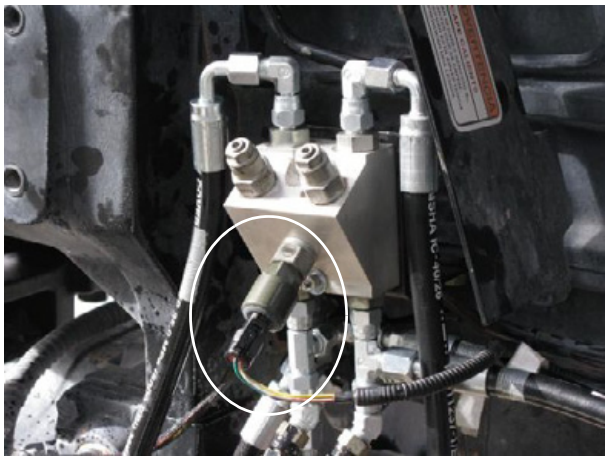
Route the cable towards the Autopilot controller following the existing hoses and steel lines.

Secure the harness with tie straps along the path.





TS series tractors



TB series tractors

CHAPTER

3

AutoSense Steering Device Installation

In this chapter:

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

This chapter describes how to install the AutoSense™ steering device.

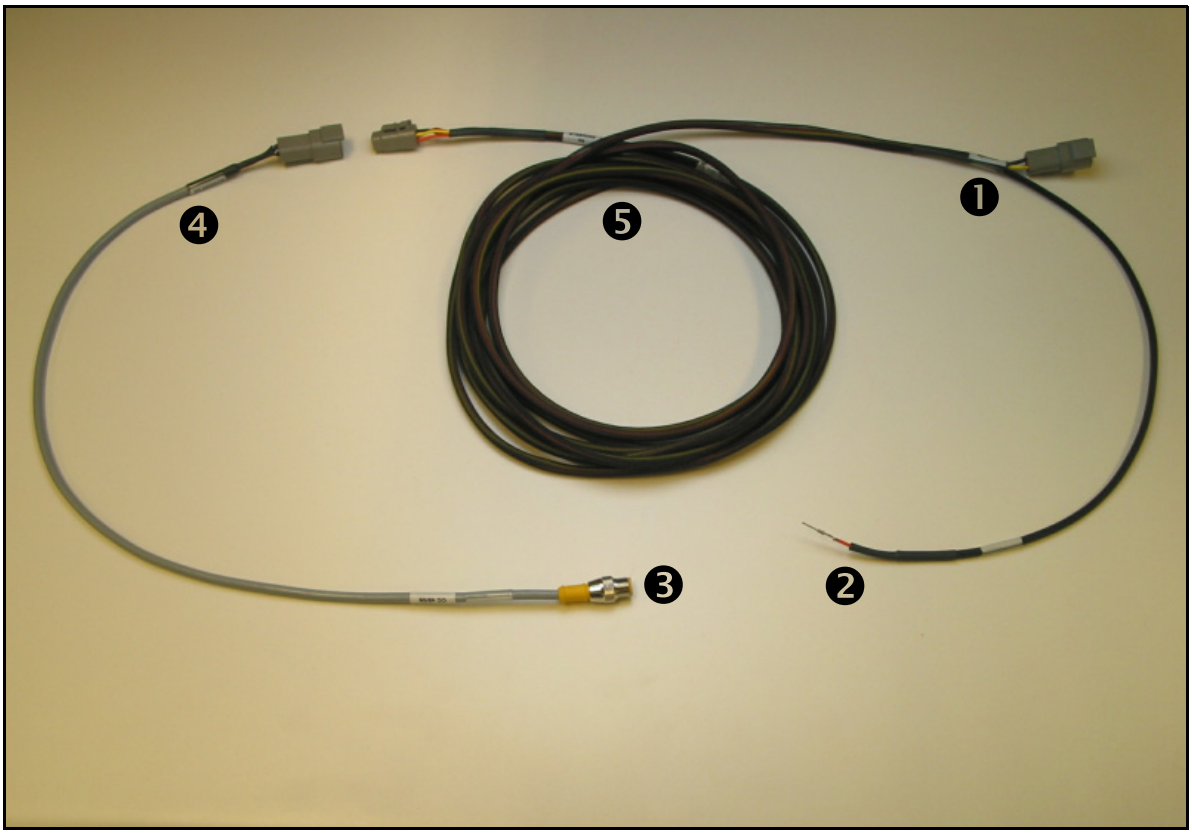
If the required mounting location is not accessible, chose a different place. To ensure proper function, the AutoSense device must be located where it is free of obstructions and can rotate with the wheels when they turn.

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	Trimble part number
❶	P-6 connector	
❷	Power connector	
❸	AutoSense connector	
❹	Jumper cable	57560
❺	AutoSense steering cable	57885

Installing the AutoSense 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.

Step 1

Find the mounting location on top of the right or left side of the front axle.

Remove the existing bolts shown.



Step 2

Place the supplied spacers onto the front axle.



Step 3

Attach the AutoSense device to the plate P/N 84840 using the included #6-32 screws.



Step 4

Attach the mounting plate to the front axle. Use the supplied 12mm x 50mm bolts.

Note – *The AutoSense connector points towards the axle.*



CAUTION – To operate correctly, the AutoSense device ***must*** be mounted level. If necessary, bend the 58715 bracket downward.

Step 5

Connect the 57560 jumper cable to the steering device.

Leave adequate length on the service loop to avoid stretching the cable.

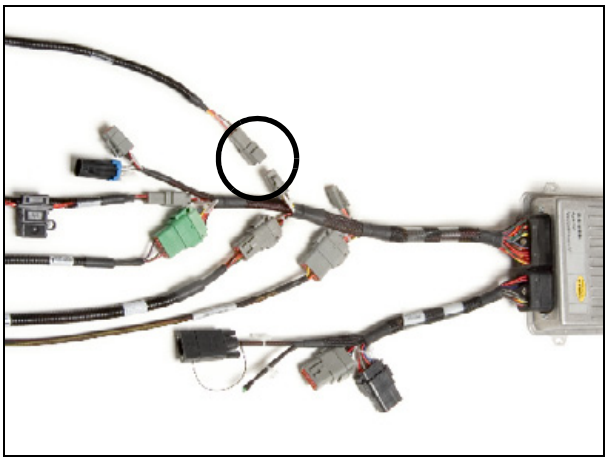
Connect the 57885 steering cable to the 57560 jumper cable.



Step 6

Plug the steering sensor cable to P-6 on the Autopilot controller main wiring harness.

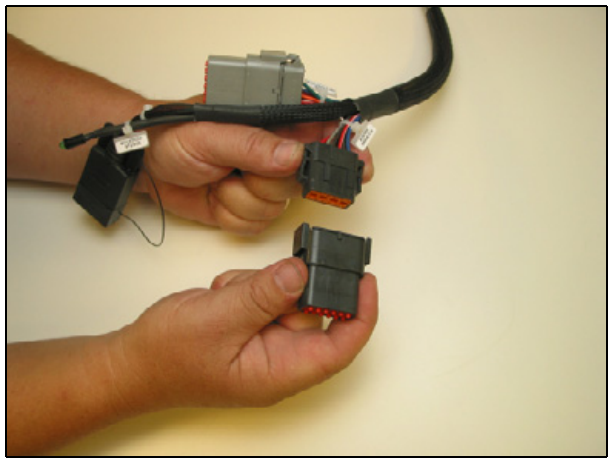
The P6 connector is labeled **Steering Sensor**.



Preparing the harness: P/N 54602 Rev C

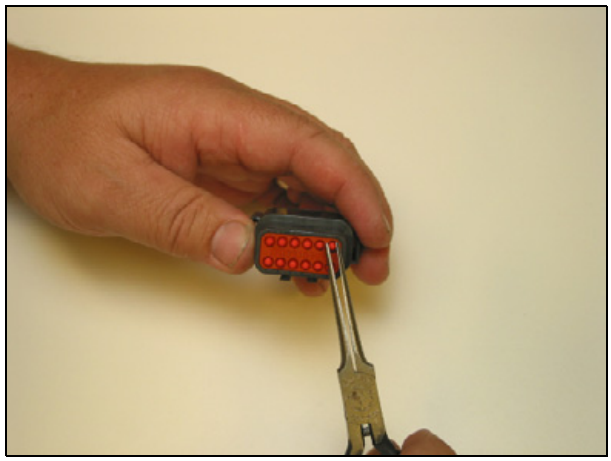
Step 1

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



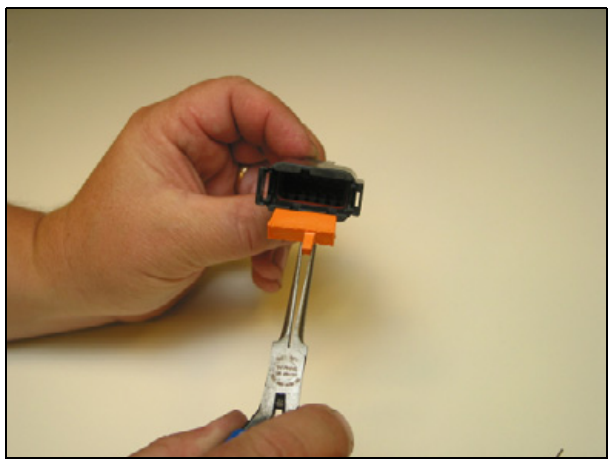
Step 2

Remove the plug from cavity number 1.



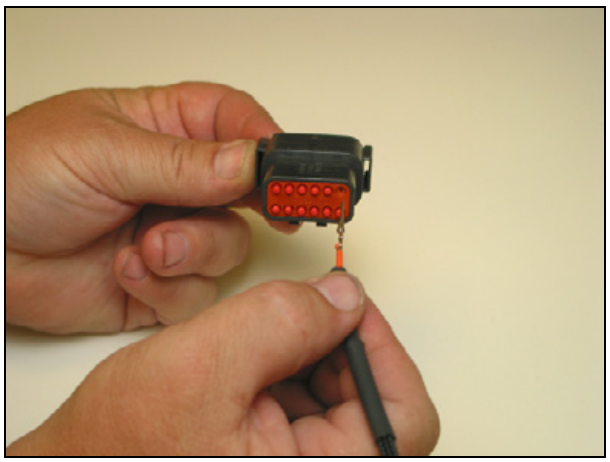
Step 3

Remove the wedge from the connector.



Step 4

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

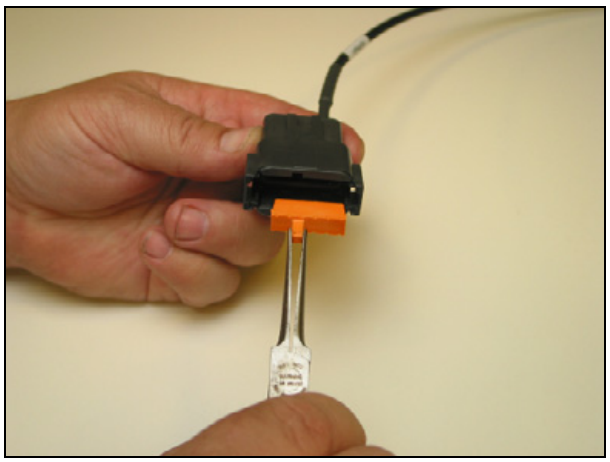


Step 5

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

Step 6

Plug the assembled Deutsch receptacle into the P-13 sensors leg of the AutoPilot controller auxiliary harness. See Chapter 8, Controller Installation.



CHAPTER

4

Antenna Installation

In this chapter:

- Antenna installation options
- Mounting an adjustable spar to roof bolts

This chapter describes how install a GNSS antenna and/or RTK radio antenna.

Antenna installation options

There are several options for mounting components (GNSS antenna or RTK radio antenna) on the cab roof depending on the accuracy required and the antenna type:

- **Spar mount**: This bracket mounts directly to the cab roof bolts and is required for all high-accuracy applications such as RTK, RTX, and OmniSTAR XP/HP. Bolt a metal spar to the roof or to a light bracket and then attach a V-plate for magnetic mounting.
- **VHB (Very High Bond) mount:** Attach a 5" x 5" plate or a V-plate directly to the roof for WAAS, EGNOS, and OminSTAR VBS applications. See page 49.
- **Magnetic mounting:** Magnetic mounting for quick release is available for both VHB and spar type mounting.

Possible mounting methods

GPS receiver	V-plate on spar (removable)	VHB plate on roof (removable)	Ag15 / Ag25 / Zephyr™ antenna bolted to spar mount
FmX integrated display CFX-750 display EZ-Guide 500 display	Yes	Yes	Yes
*Ag*GPS 252 / 262 receiver	Yes	Yes	

Note – *The V-plate antenna bracket is available separately. See Antenna mounting kits, page 8.*

Mounting an adjustable spar to roof bolts

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.

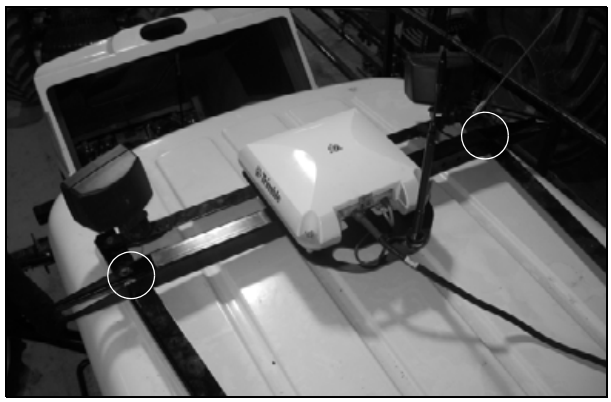
Step 1

Locate the cab bolts on the roof of the vehicle (if installed).

Alternatively, position the cab bolts on the roof of the vehicle.



If a light bracket already occupies the roof studs, mount the spar directly onto the light bracket.



Step 2

If required, replace the existing bolts with longer bolts.



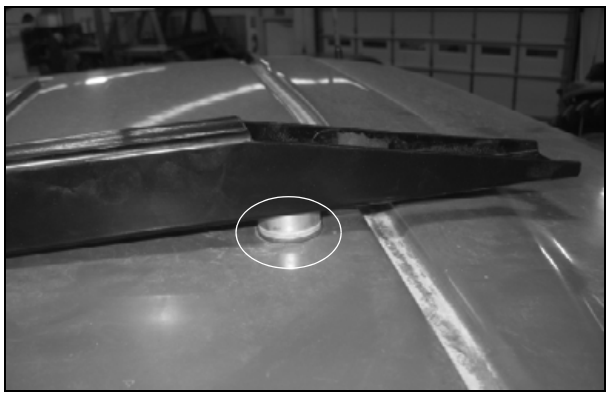
If you use the light bracket, drill two holes to match the spar width.



Step 3

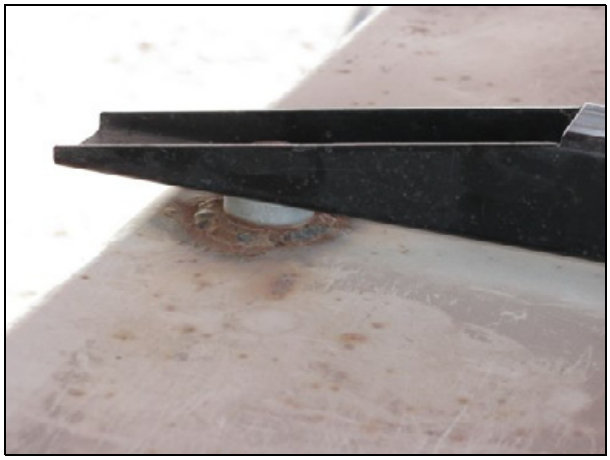
Use the slotted holes to center the spar and then tighten the bolts. If required, use the spacers and flat washers provided to secure the spar.

Note – *If the GNSS receiver is offset to the left or the right of the vehicle center line, the Autopilot system performance may be affected. Before you tighten the cab bolts, make sure that the GNSS antenna is aligned with the center of the vehicle.*



Example of a spar installation on a TB series tractor





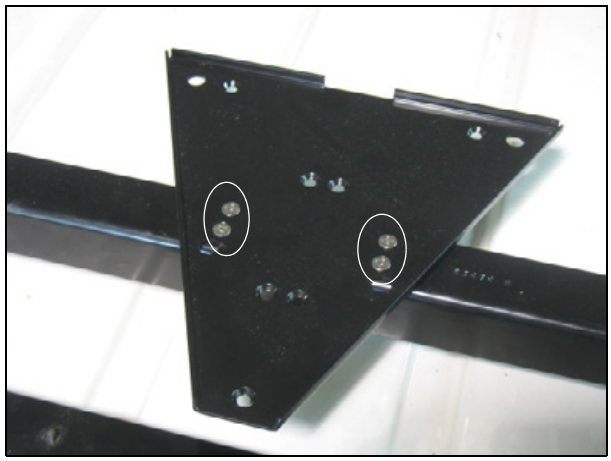


Step 4

For either of the following applications, use a single magnet antenna mount.

Attach a V-plate with four ¼" flathead screws.

The narrow end points to the front of the vehicle.



V-plate on the spar

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 chapter.

You can use the VHB mounting method to attach either a 5" x 5" plate or a V-plate.

- **GLONASS, RTK, RTX, and OmniSTAR XP/HP applications**: The spar method is recommended. The V-plate provides repeatable positioning of the antenna.
- **WAAS, EGNOS, OmniSTAR VBS applications:** Use a 5" x 5" plate for simplified installation in applications where high accuracy is not critical.

Step 1

Pick a location on the cab roof where the GNSS antenna will be mounted level. Push down on the roof to find a firm location.

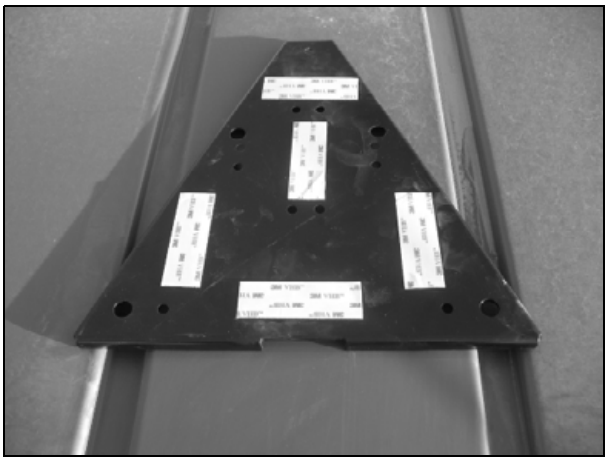
Clean the antenna location on the roof of the cab with a light solvent to remove oil and dust.



Step 2

V-plate only

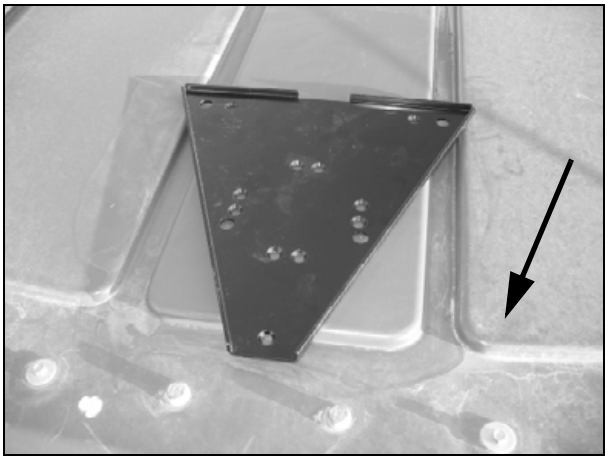
Remove the backing from one side of the VHB strips provided and then apply the strips to the V-plate.



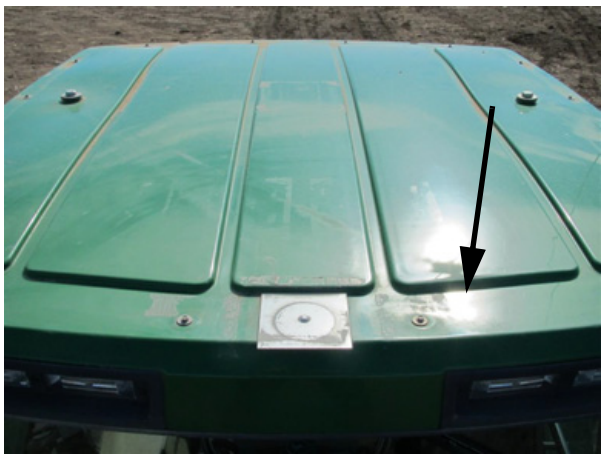
Step 3

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



5" x 5" plate

CHAPTER

5

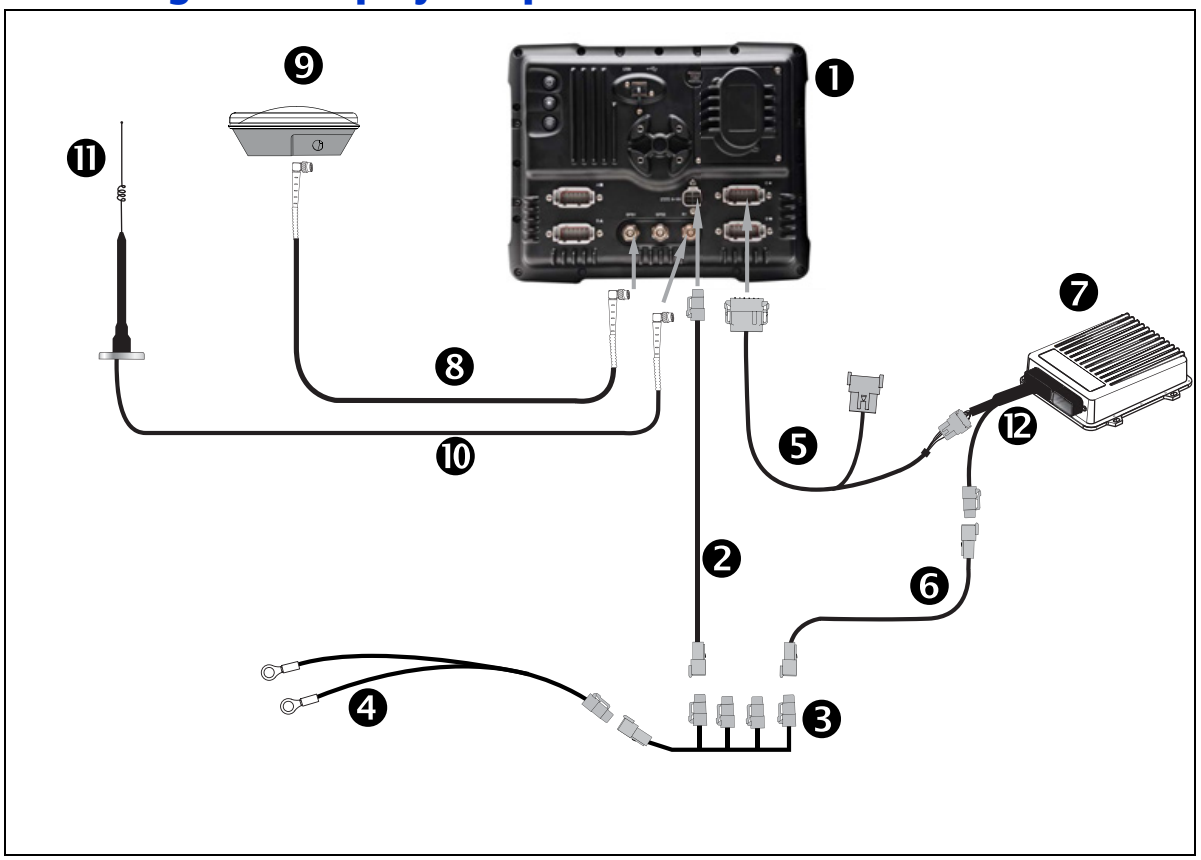
Display Installation

In this chapter:

- FmX integrated display components
- CFX-750 display components
- EZ-Guide 500 display components: With SNB900 radio for RTK corrections (if equipped)
- Preparing the FmX integrated display
- Installing the FmX integrated display
- FmX integrated display: Installing the wiring harness
- Preparing the CFX-750 display
- Installing the CFX-750 display
- CFX-750 display: Installing the wiring harness
- FmX integrated display and CFX-750 display: Connecting accessory options
- Preparing the EZ-Guide 500 display
- Connecting the EZ-Guide 500 display cables
- Installing the EZ-Guide 500 display
- EZ-Guide 500, CFX-750 and FmX displays: Installing the GNSS antenna and plate
- SNB900 radio, CFX-750 and FmX displays: Installing the RTK radio antenna

This chapter describes and how to install and connect the FmX integrated display, CFX-750 display, or the EZ-Guide 500 lightbar in the vehicle.

FmX integrated display components

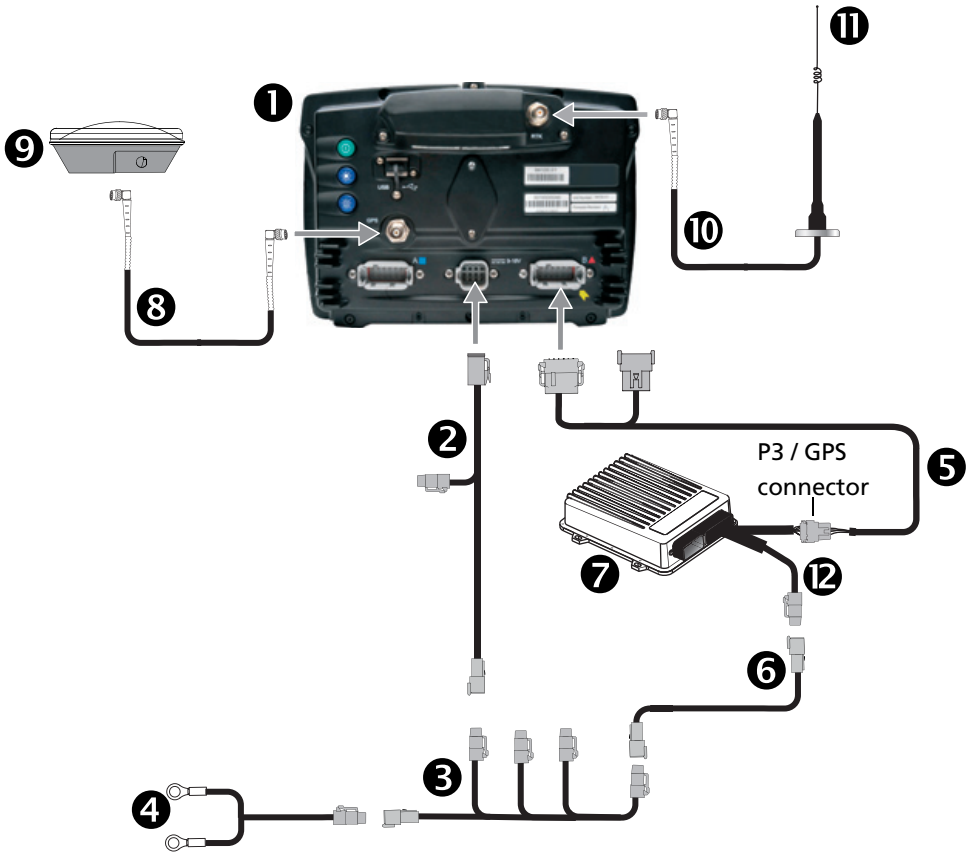


CAUTION – Connecting the Port Replicator on the FmX to NavController II cable ❺ to the P4 or P12 connector of the NavController II harness ⓬ will result in damage to the FmX / FM-1000 integrated display, and will void the warranty.

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 GPS TNC/TNC RT angle cable	50449
❾	AG25 GNSS antenna	77038-00
❿	NMO to TNC 20ft antenna cable and base	62120

Item	Description	Trimble part number
⓫	900 MHz radio antenna kit	22882-10
⓬	Main NavController II cable	54601

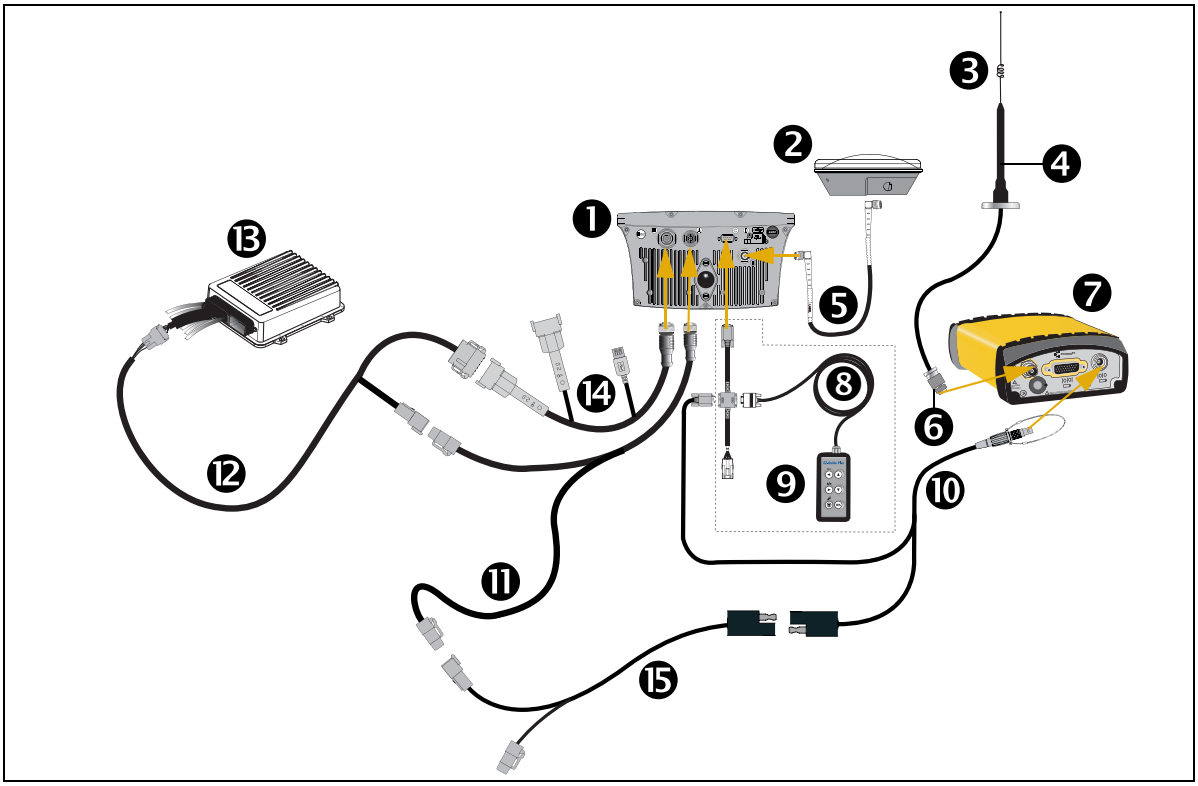
CFX-750 display components



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 ⓬ will result in damage to the CFX-750 display and will void the warranty.

Item	Description	Trimble part number
c	CFX-750 display ***Note –*** *RTK password required.*	94100-01
d	CFX-750 power cable	77282
e	CFX-750 power cable with relay and switch (power bus)	67259
f	Basic power cable	67258
g	CFX-750 to NavController II cable with port replicator	75741
h	2 pin DTM to 2 pin DT power adaptor	67095
i	NavController II	55563-00
j	8 m GPS TNC/TNC RT angle cable	50449
k	AG25 GNSS antenna	77038-00
l	NMO to TNC 20ft antenna cable and base	62120
m	900 MHz radio antenna kit	22882-10
n	Main NavController II cable	54601

EZ-Guide 500 display components: With SNB900 radio for RTK corrections (if equipped)



Item	Description	Trimble part number
❶	EZ-Guide 500 lightbar	
❷	GPS antenna	57200-00
❸	SNB900 radio antenna	22882-00
❹	SNB900 radio antenna magnetic mount	62109
❺	GPS antenna cable	50449
❻	N Female to REV. POL TNC Male	62114
❼	SNB900 radio	X8480-X0
❽	Remote keypad (optional)	66030-00
❾	External interface cable	62749
❿	Radio power/data cable	61158
⓫	EZ-Guide 500 power cable	62817
⓬	EZ-Guide 500-to-Autopilot cable	62754
⓭	NavController II	55563-00
⓮	Port expansion cable	62609
⓯	Power tap to PDL radio	63185

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 chapter.

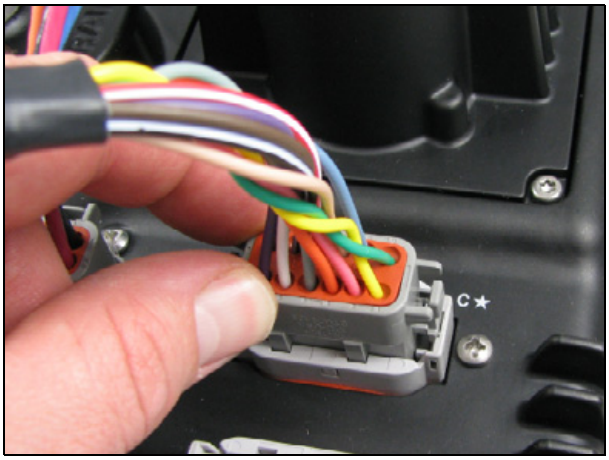
Step 1

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.

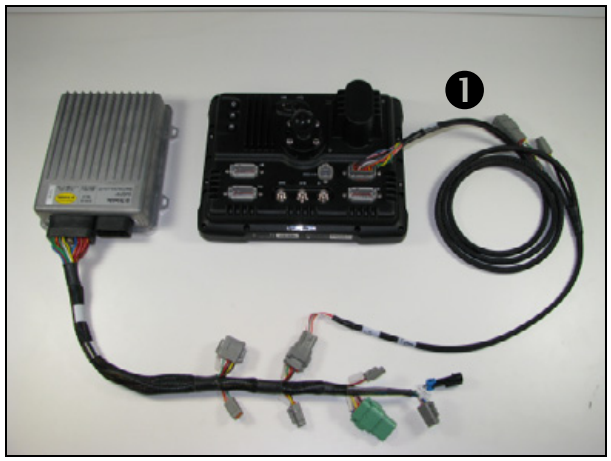
To connect power to the FmX integrated display, see Chapter 6, Power Harness Installation.



FmX integrated display: Installing the wiring harness

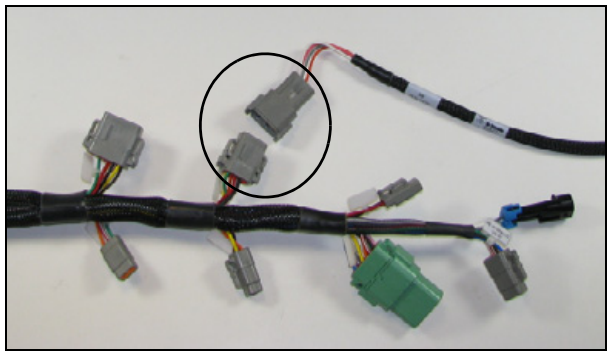
Step 1

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.



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 chapter.

Step 1

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

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

Step 2

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

To connect power to the CFX-750 display, see Chapter 6, Power Harness 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 and CFX-750 display: Connecting accessory options

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

AgCam

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

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.



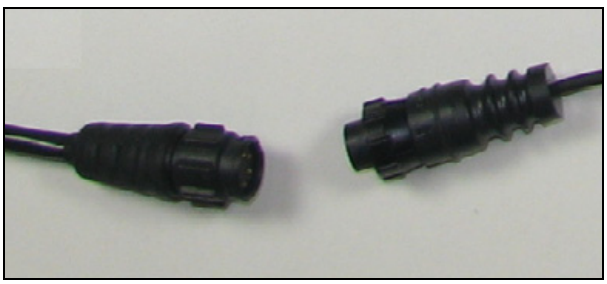
FmX display



CFX-750 display

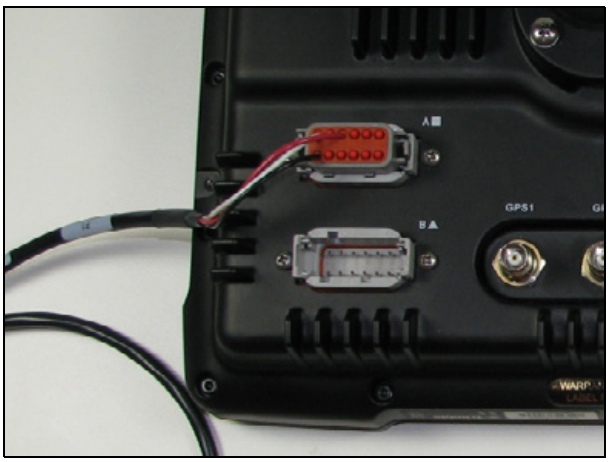
Step 3

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.



Preparing the EZ-Guide 500 display

Note – *Before you attach the display to the RAM mount, connect the EZ-Guide 500 cables to the back of the lightbar.*

Step 1

Locate the EZ-Guide 500 display, the RAM mount and hardware, and the RAM mount clamp.



Step 2

Attach the RAM mount diamond base to the display using the hardware provided.

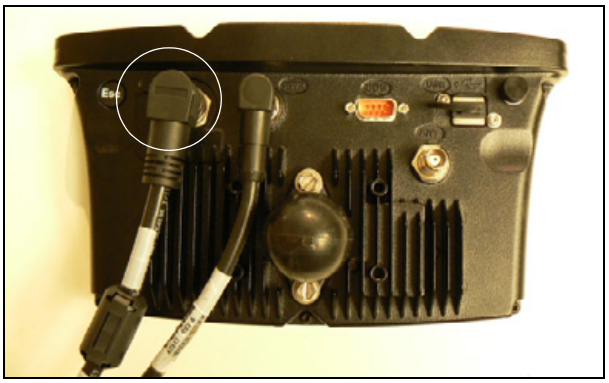


Connecting the EZ-Guide 500 display cables

Note – *Before you attach the lightbar to the RAM mount, connect the EZ-Guide 500 cables to the back of the display.*

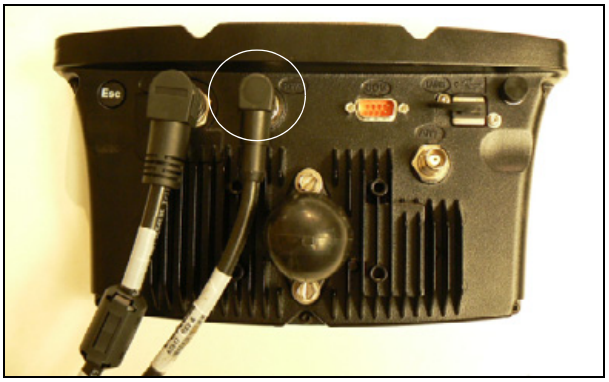
Step 1

Connect the port expansion cable (P/N 62609) to the AUX port on the back of the lightbar.



Step 2

Connect the EZ-Guide 500 power cable (P/N 62817) to the PWR port on the back of the lightbar.



Step 3

Connect the 2-pin connector on the port expansion cable and the 12-pin connector on the power cable to the matching connectors on the EZ-Guide 500-to-Autopilot cable (P/N 62754).

Step 4

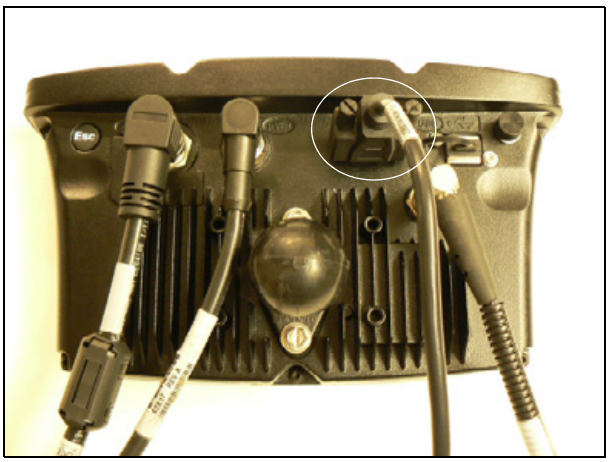
Feed the GPS antenna cable into the cab and then connect it to the antenna port on the back of the lightbar.



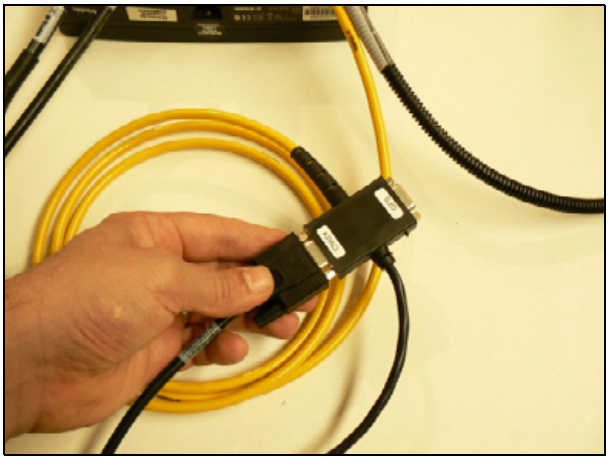
Step 5

With keypad

Connect the external interface cable (P/N 66030-00) to the serial port on the back of the lightbar.

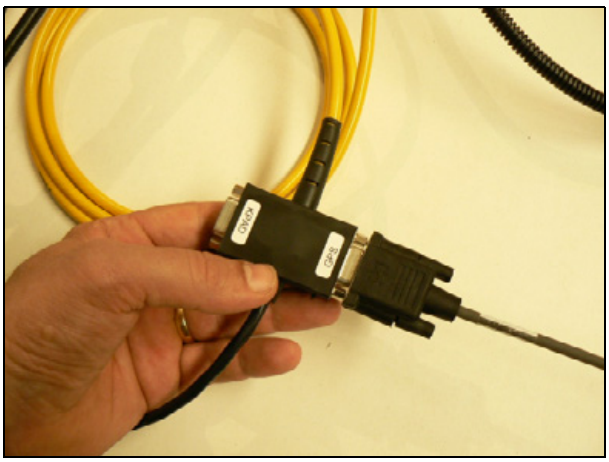


Connect the remote keypad to the KPAD serial port on the external interface cable.



Connect the appropriate cable to the GPS serial port on the interface cable:

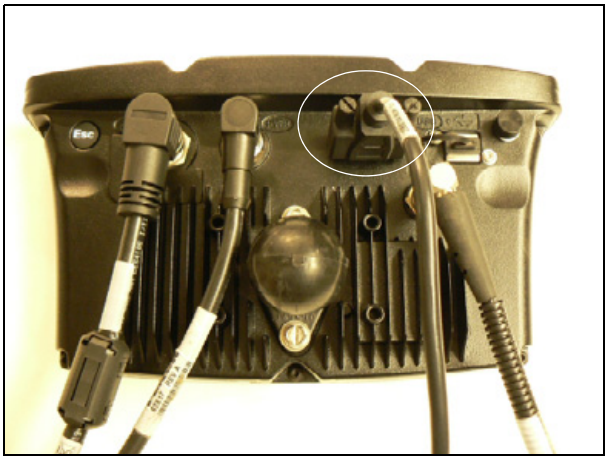
Radio type	Cable to connect
SNB900 radio	EZ-Guide 500-to-radio cable (P/N 61158)
PDL 450 radio	PDL radio power/data cable (P/N 51861-00)



Without keypad

Connect the appropriate cable to the serial port on the back of the lightbar:

Radio type	Cable to connect
SNB900 radio	EZ-Guide 500-to-radio cable (P/N 61158)
PDL 450 radio	PDL radio power/data cable (P/N 51861-00)



Step 6

Connect the other end of the radio cable to the radio.

Step 7

Connect the remaining connector on the PDL radio power/data cable to the matching connector on the power tap cable (P/N 63185).

Connect the connector at the other end of the power tap cable to the EZ-Guide 500 power cable.

Installing the EZ-Guide 500 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

Test a location for the lightbar in the cab (there must be a bar that the RAM mount can be attached to); sit in the driver's seat and hold the lightbar in place.

Note – *Make sure the position allows comfortable access to the display buttons and does not obstruct instruments.*



Step 2

Attach the RAM mount to the ball on the rear of the lightbar.



Step 3

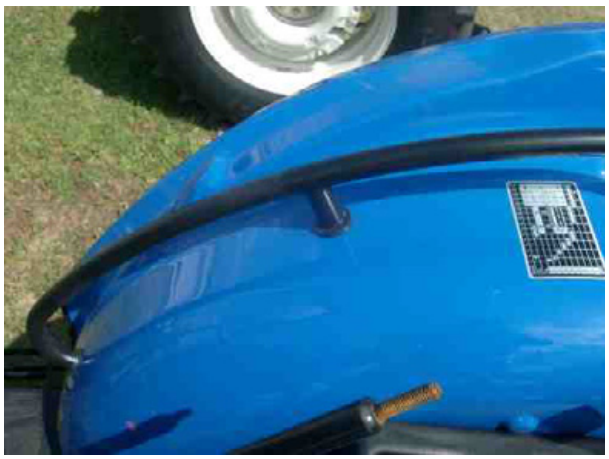
Attach the free end of the RAM mount to the bar mount, tighten the clamp on the RAM mount so that the lightbar is held securely in place and then adjust the angle of the RAM mount for ease of use.



Installing the display

Step 1

Find the mounting location on the right side hand rail.



Step 2

Clamp the supplied Ram mount to the hand rail.





Alternative method: Non-Trimble

The pole mount option shown here is not available from Trimble.

For more information, contact: Laser y GPS (Mexico) 462-690-0000









EZ-Guide 500, 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 chapter.

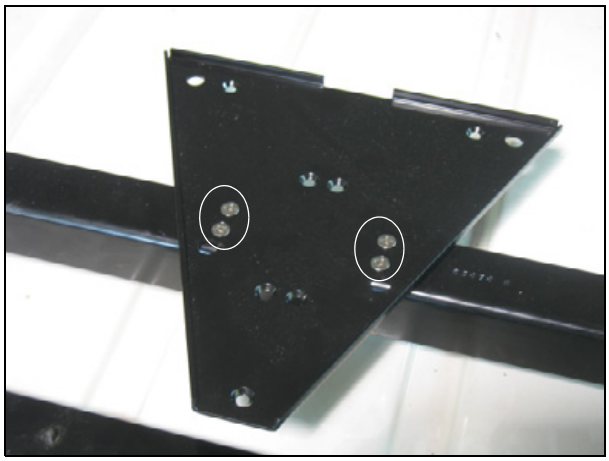
Use one of the following methods:

- Spar mount
- VHB adhesive

Spar mount method

Trimble recommends that you use this method for RTK, RTX, and OmniSTAR XP/HP operations. For more information, see Antenna installation options, page 46.

Attach the V-plate to the spar with the four supplied ¼"-20 flathead screws as shown. The narrow end points forward.



VHB adhesive method

You can use Very High Bond (VHB) to attach either a 5" x 5" plate or a V-plate.

- **GLONASS, RTK, RTX, and OmniSTAR XP/HP applications:** The spar method is recommended. The V-plate provides repeatable positioning of the antenna.
- **WAAS, EGNOS, and OmniSTAR VBS applications:** Use a 5" x 5" plate for simplified installation in applications where high accuracy is not critical.

Step 1

Pick a location on the cab roof where the GNSS antenna will be mounted level. Push down on the roof to find a firm location.

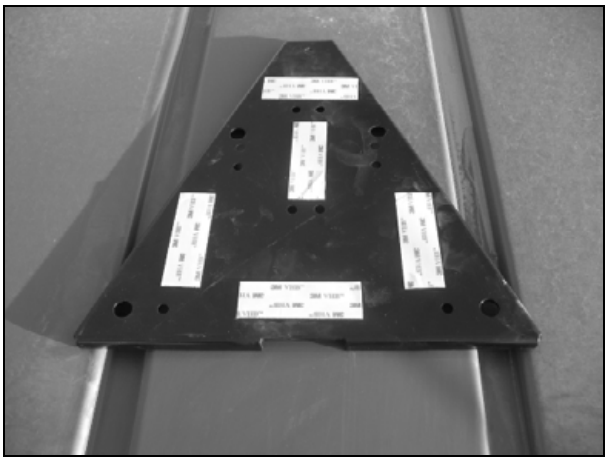
Clean the antenna location on the roof of the cab with a light solvent to remove oil and dust.



Step 2

V-plate only

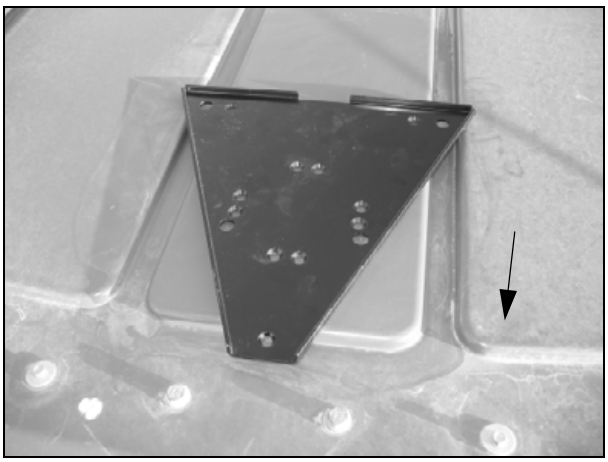
Remove the backing from one side of the VHB strips provided and then apply the strips to the plate.



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.*



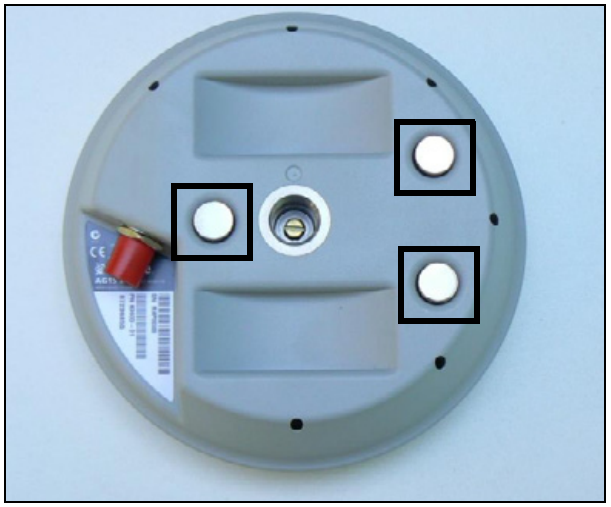
V-plate



5" x 5" plate on tractor

Step 4

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



Otherwise, attach the large magnet with a $^{5}/_{8}$" stud to the GNSS antenna.



Step 5

GLONASS, RTK, RTX, OmniSTAR XP/HP applications

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



WAAS, EGNOS, OmniSTAR VBS applications

Attach the antenna to the center of the 5" x 5" plate.



5'' x 5'' plate on tractor

Step 6

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.





Antenna on TS series tractor

Installing the antenna: Alternative method (non-Trimble)

The post mount option shown here is not available from Trimble.

For more information, contact Laser y GPS (Mexico) 462-690-0000.







SNB900 radio, 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 chapter.

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 a 5" x 5" plate (P/N 62034) to relocate the antenna.



Step 3

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

CHAPTER

6

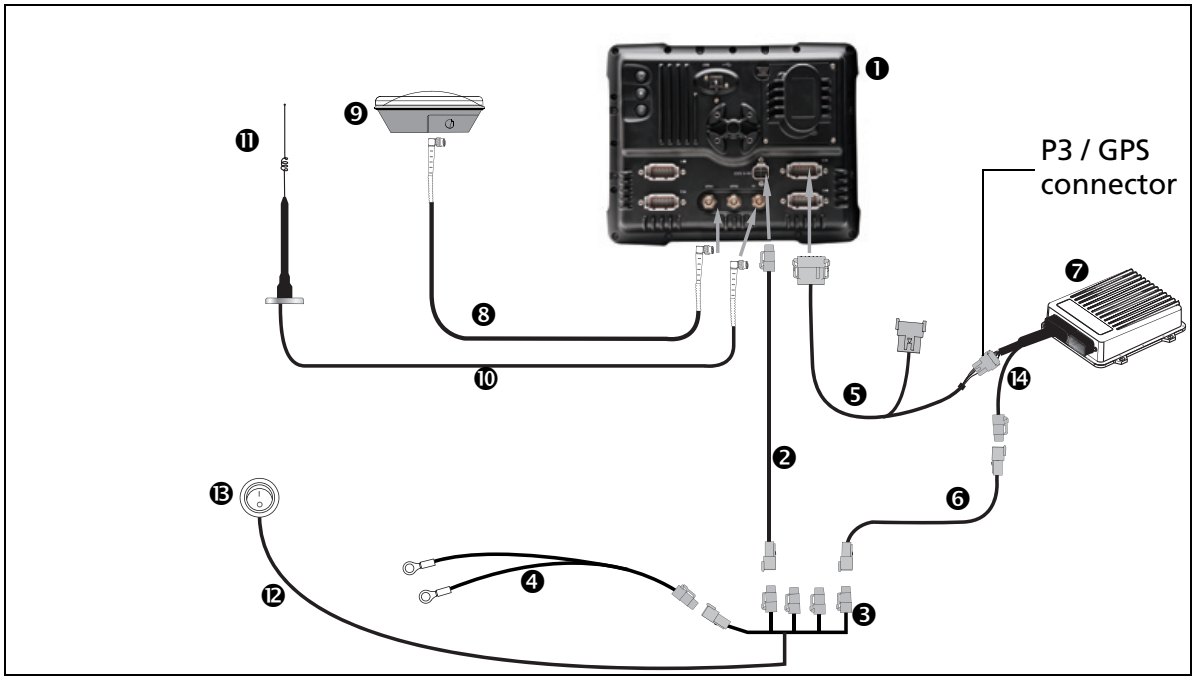
Power Harness Installation

In this chapter:

- FmX integrated display components
- CFX-750 display components
- EZ-Guide 500 display components
- Installing the power harness for the display
- Configuring the power bus options for the display
- Configuring the power bus options for the EZ-Guide 500 display

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

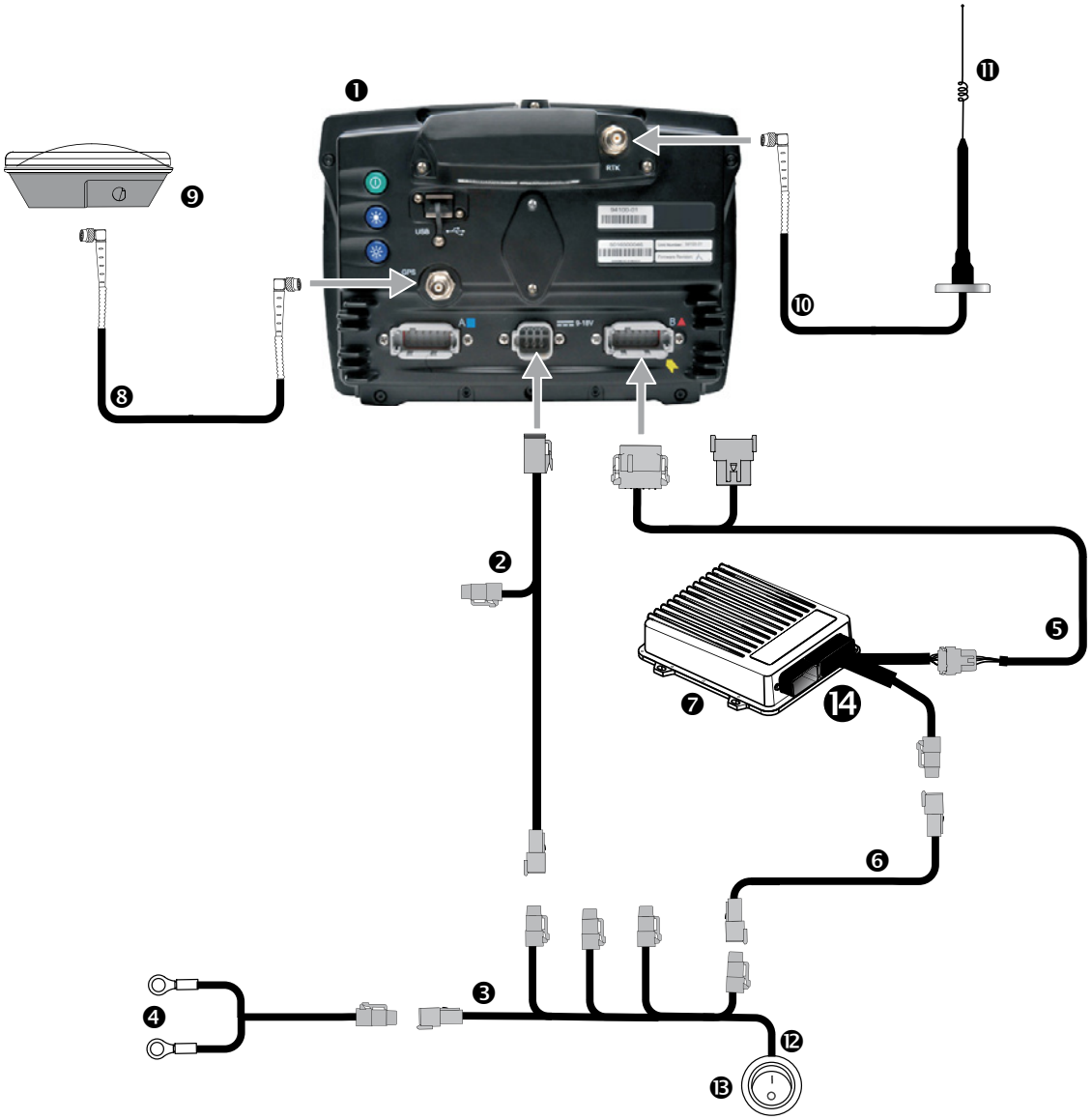
FmX integrated display components



CAUTION – Connecting the Port Replicator on the FmX to NavController II cable ❺ to the P4 or P12 connector of the NavController II harness ⓮ 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 GPS TNC/TNC RT angle cable	50449
❾	Ag25 GNSS antenna	77038-00
❿	NMO to TNC 20ft antenna cable and base	62120
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

CFX-750 display components

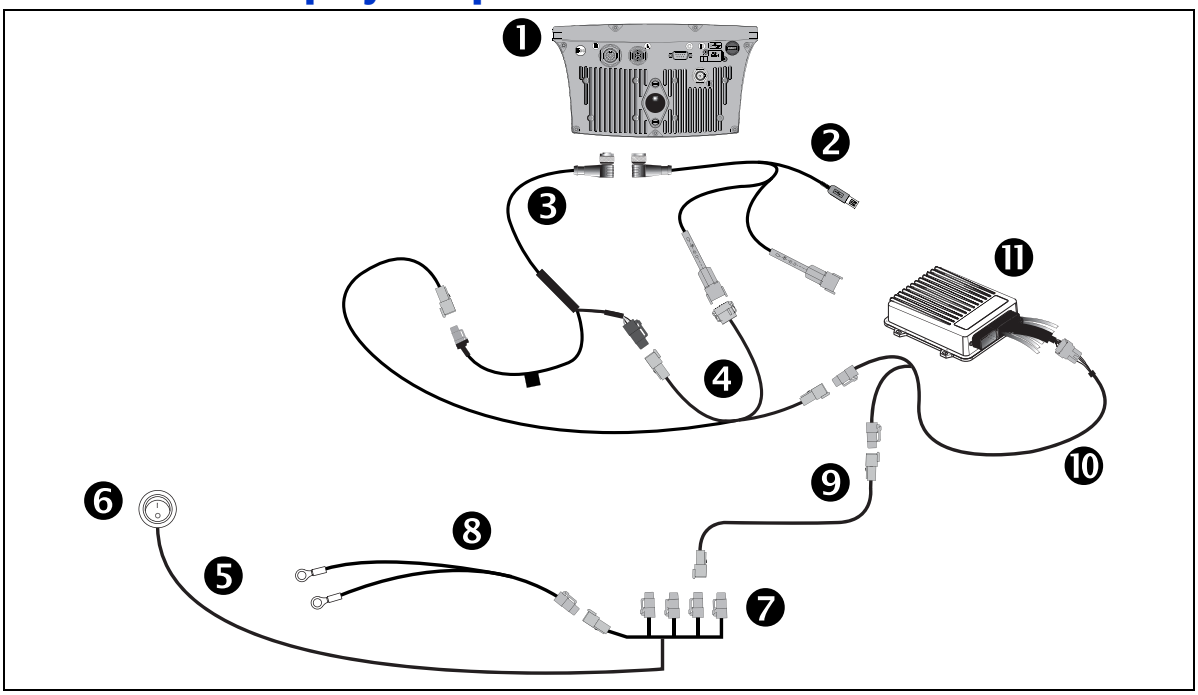


CAUTION – Connecting the Port Replicator on the CFX-750 display to NavController II cable ❺ to the P4 or P12 connector of the NavController II harness ⓮ will result in damage to the CFX-750 display and will void the warranty.

Item	Description	Trimble part number
❶	CFX-750 display ***Note –*** *RTK password required.*	94100-02
❷	CFX-750 power cable	77282

Item	Description	Trimble part number
❸	CFX-750 power cable with relay and switch (power bus)	67259
❹	Basic power cable	67258
❺	CFX-750 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 GPS TNC/TNC RT angle cable	50449
❾	Ag25 GNSS antenna	77038-00
❿	NMO to TNC 20ft antenna cable and base	62120
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

EZ-Guide 500 display components



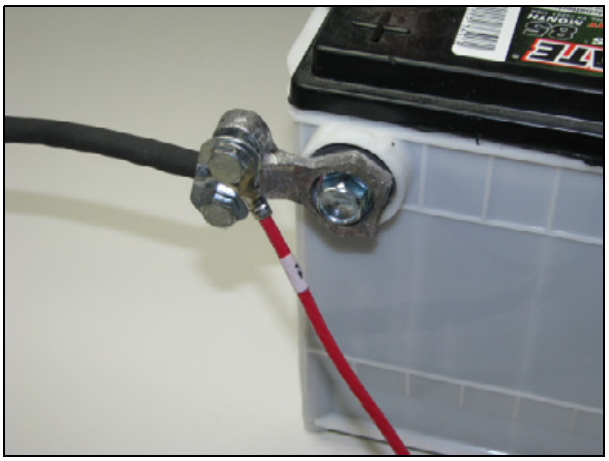
Item	Description	Trimble part number
❶	EZ-Guide 500 display	
❷	EZ-Guide 500 display 19 pin port expansion cable	62069
❸	EZ-Guide 500 display/CAN 90° 5 pin connector	62817
❹	EZ-Guide 500 display port A to NavController II cable	62754
❺	Switch cable	Part of 67259
❻	Switch	67095
❼	FmX power cable with relay and switch	67259
❽	FmX basic power cable	67258
❾	2 pin DTM to 2 pin 2 DT power adaptor	67095
❿	NavController II main cable	54601
⓫	NavController II	55563-00

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 chapter.

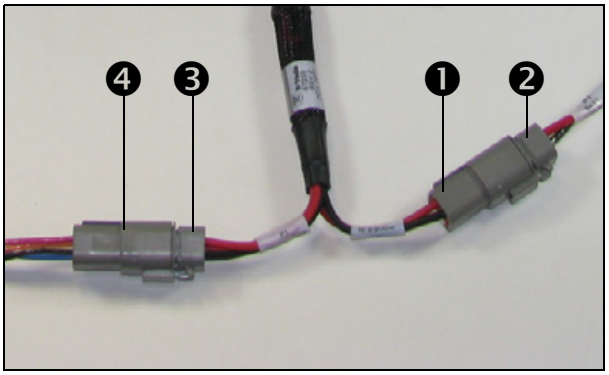
Step 1

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



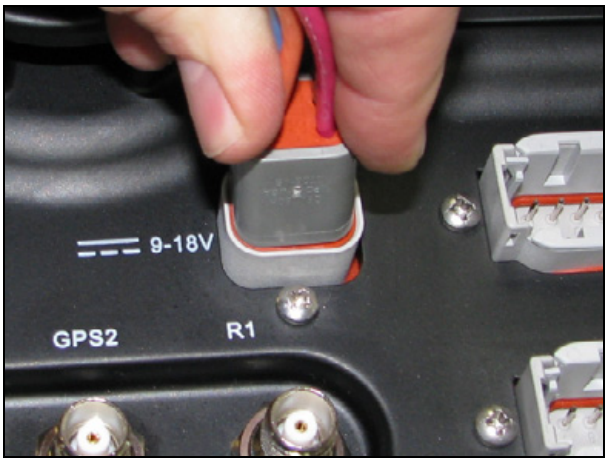
Step 2

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.



FmX display



CFX-750 display

Configuring the power bus options for the display

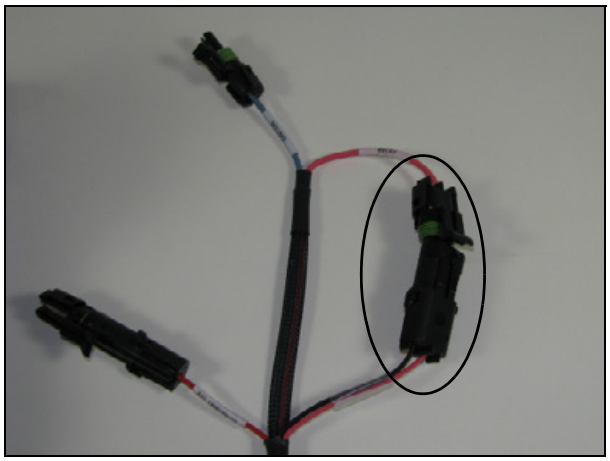
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

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.

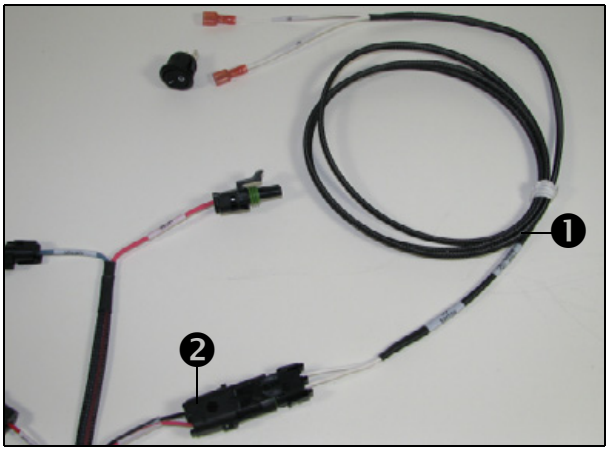


External switch is used to turn on the Autopilot system

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.

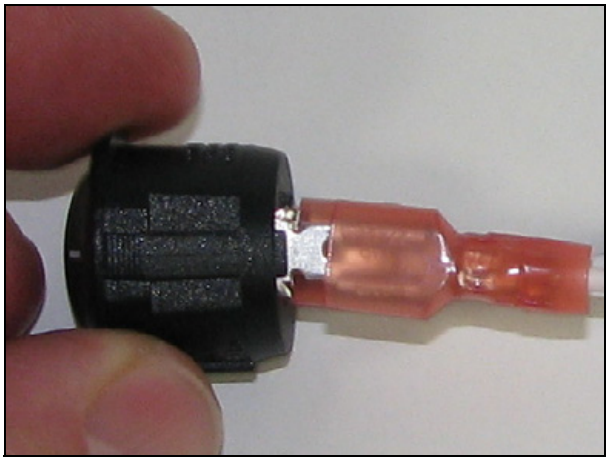
Note – *To install the switch provided, drill a ¾" hole.*



Step 2

Connect the cable labeled R7 to the switch pins.

Note – *Polarity is not important.*

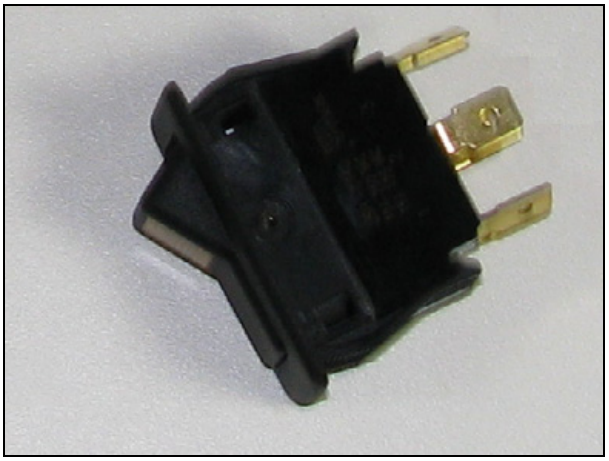


Installing the optional illuminated full or standard Euro switch

Step 1

Find an available knockout location on the vehicle console.

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

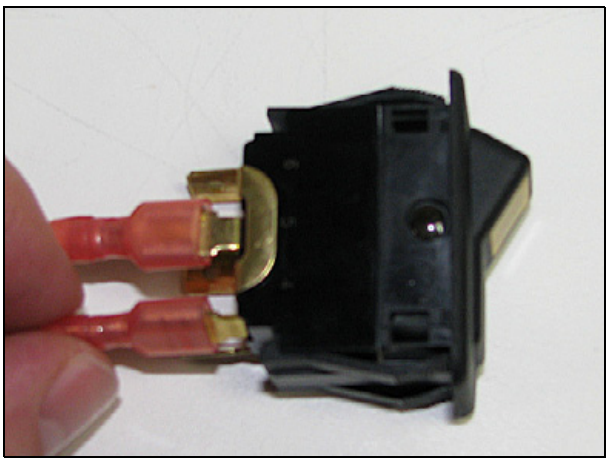


Step 2

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

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

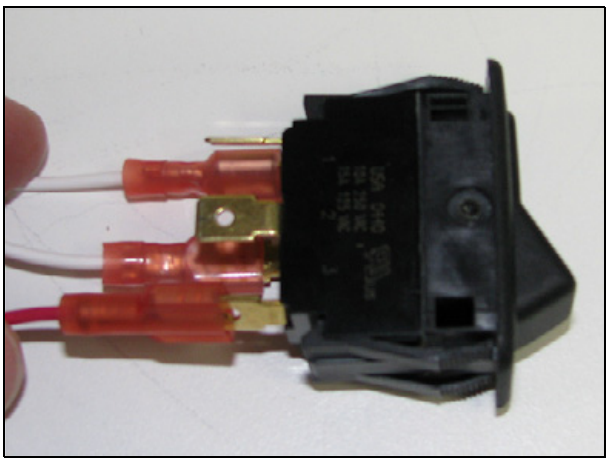
Note – *Polarity* ***is*** *important.*



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.*

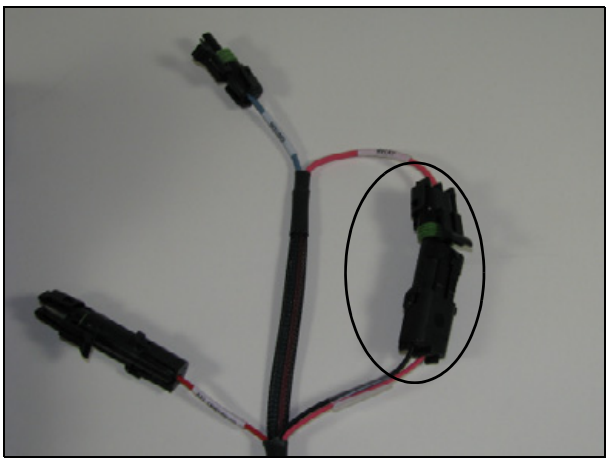


Ignition is used to turn on the Autopilot system

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

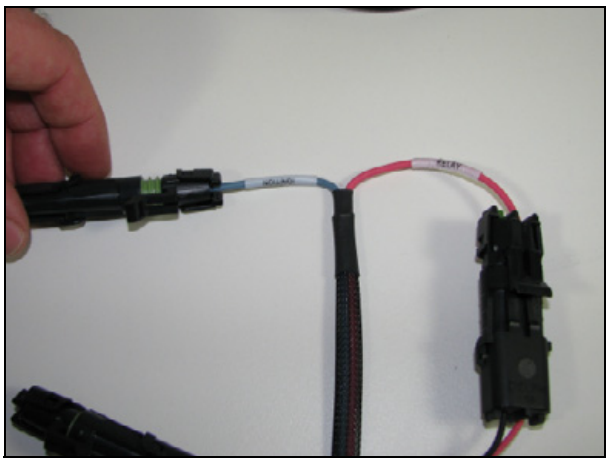
Step 1

Note – *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.

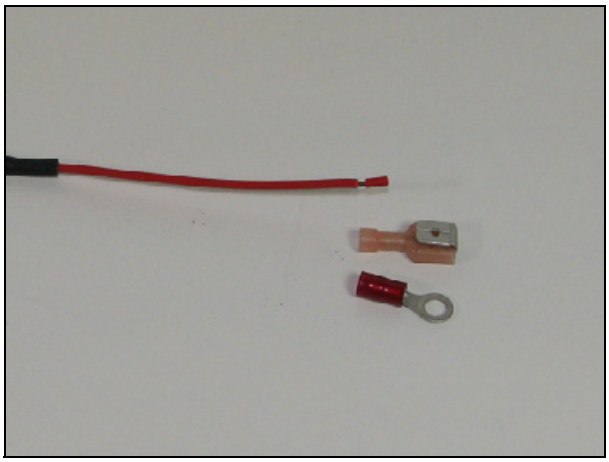


Step 3

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.



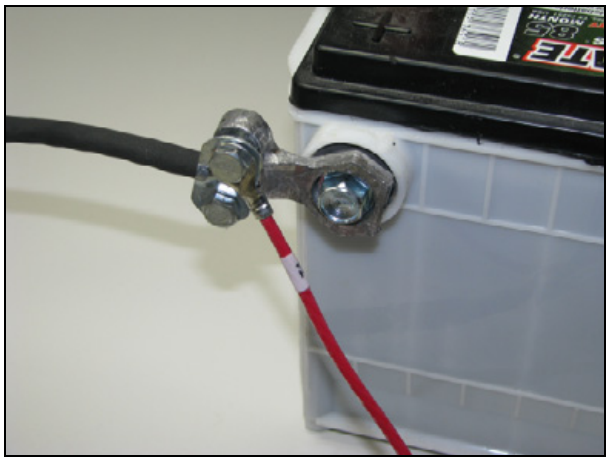
Configuring the power bus options for the EZ-Guide 500 display

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.

Note – *For the EZ-Guide 500 display cable installation instructions see,* *EZ-Guide 500 display components, page 83.*

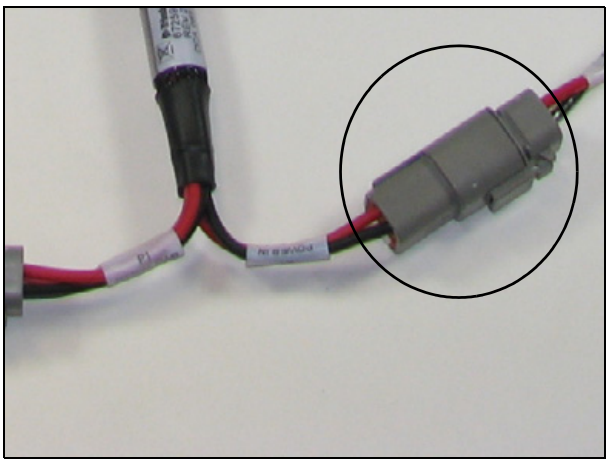
Step 1

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



Step 2

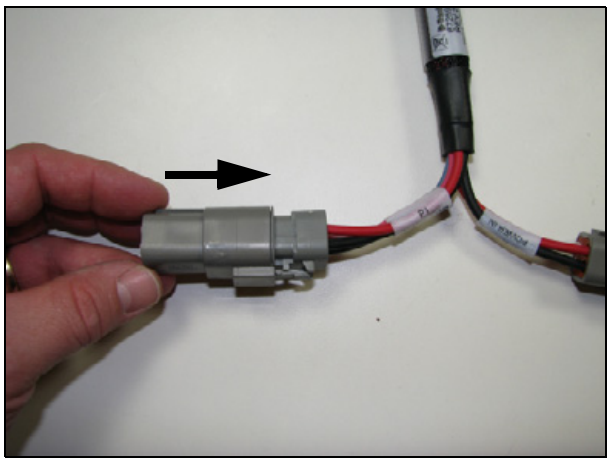
Locate and connect the 4-pin Deutsch DTP receptacle on the power bus to the 4-pin Deutsch DTP plug on the basic power cable.



Step 3

Verify that the protective receptacle is installed on the power bus.

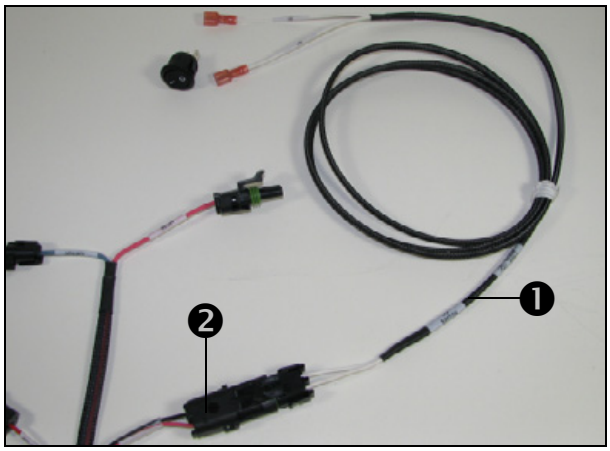
Note – *Damage to the system may result if the protective receptacle is not in place.*



Step 4

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.

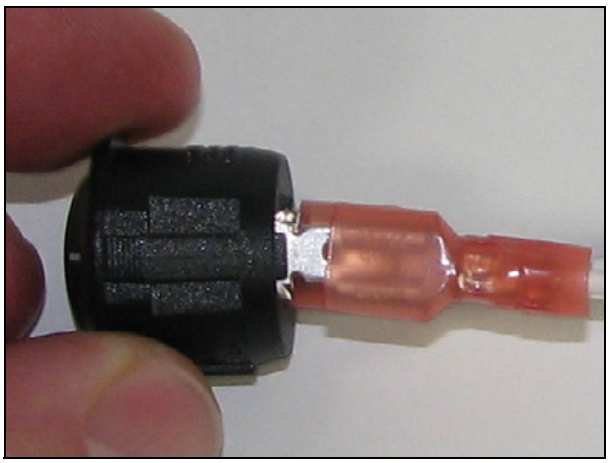
Note – *To install the switch provided, drill a ¾" hole.*



Step 5

Connect cable labeled R7 to the switch pins

Note – *Polarity is not important.*

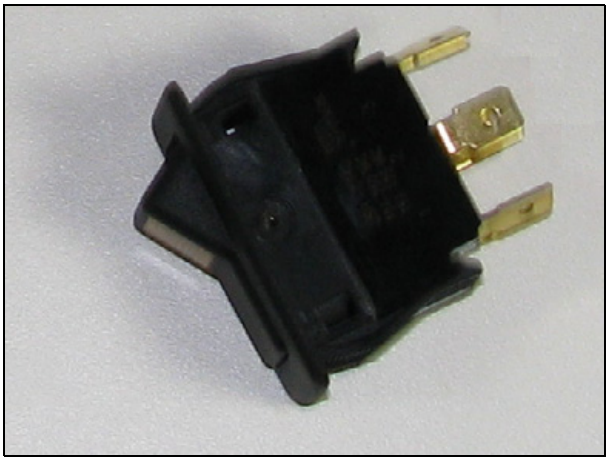


Installing the optional illuminated full or standard Euro switch

Step 1

Find an available knockout location on the vehicle console.

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

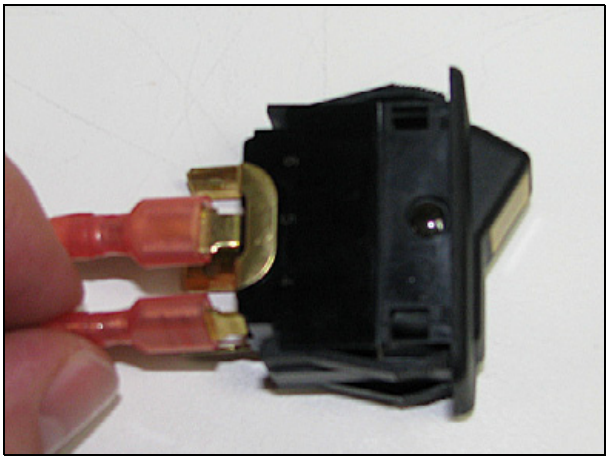


Step 2

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.

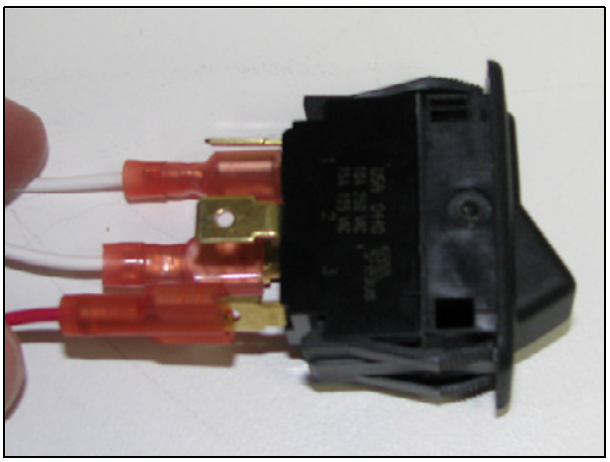
Note – *Polarity* ***is*** *important.*



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 vehicles switched power.

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



CHAPTER

7

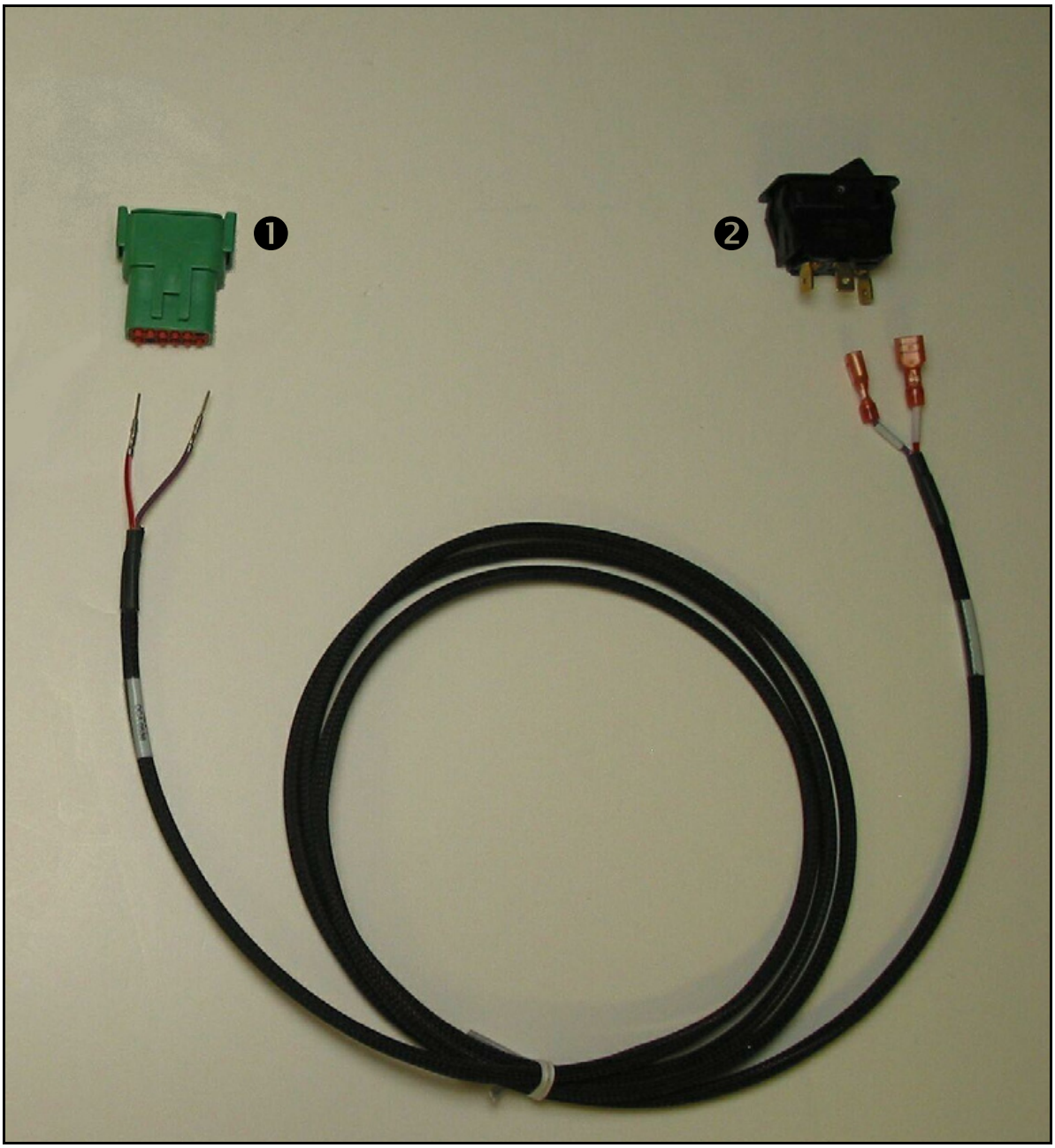
Remote Engage Switch Installation

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.

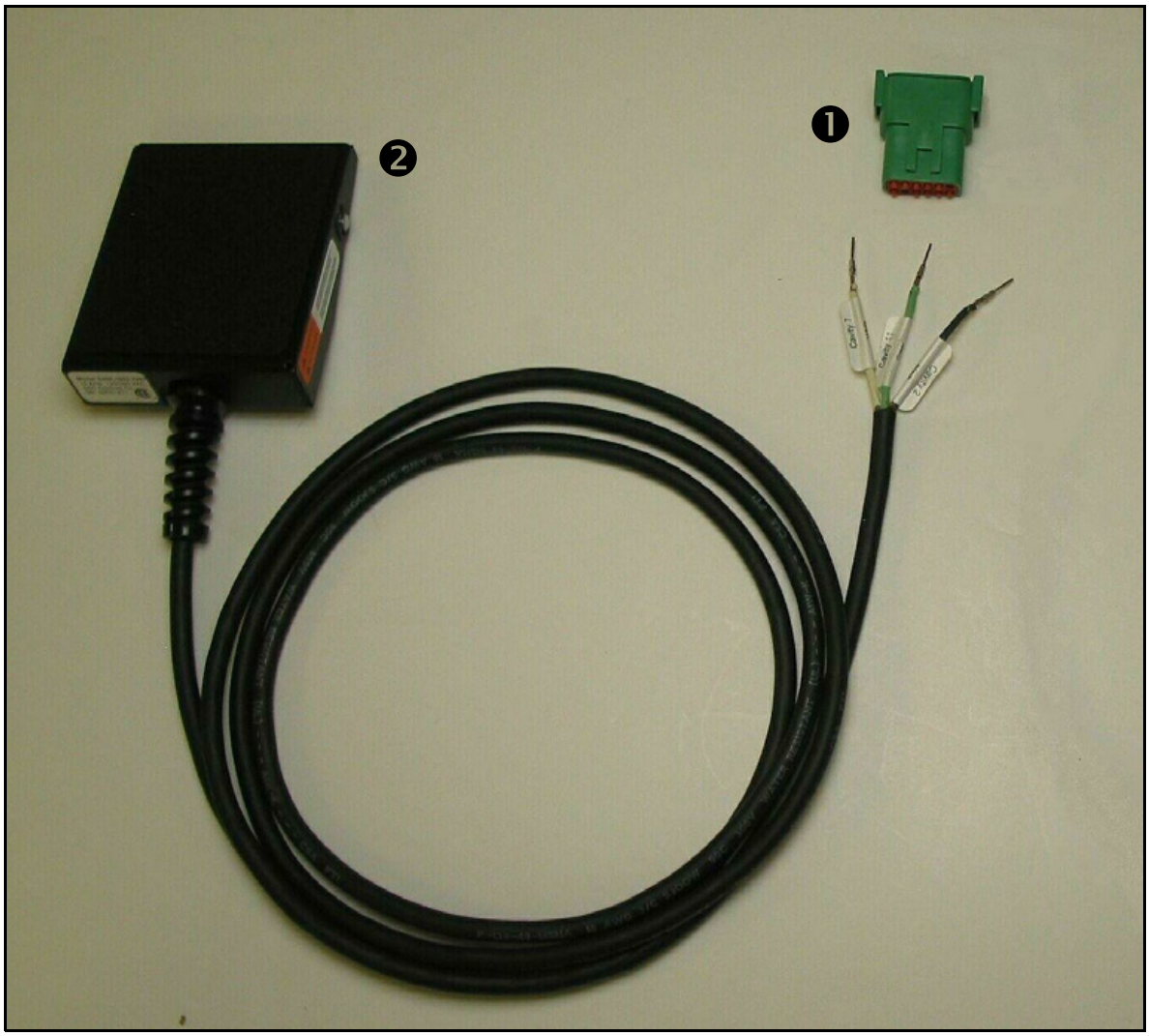
Remote engage switch components: Rocker switch



Item	Description
❶	DTM receptacle
❷	Remote engage rocker switch

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

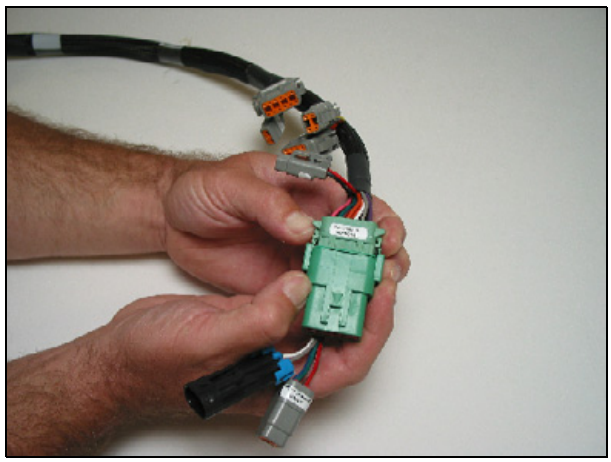
Remote engage switch components: Foot switch



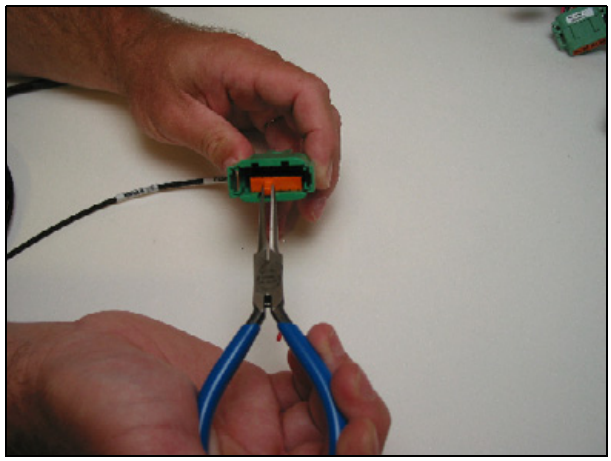
Item	Description
❶	DTM receptacle
❷	Remote engage foot switch

Preparing the remote engage cable

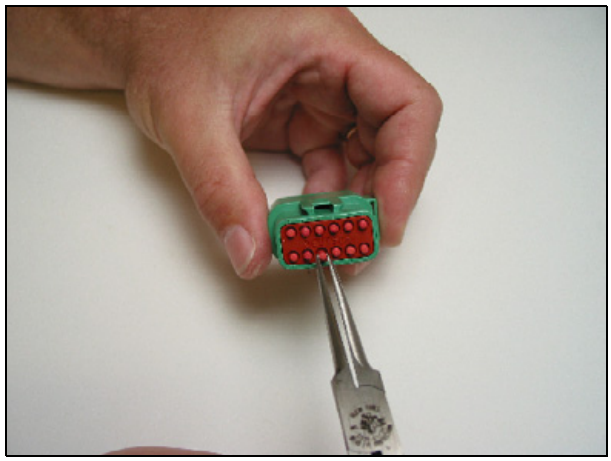
1. Locate the green 12-pin Deutsch receptacle on the P-5 leg of the main controller harness. For more information, see Chapter 8, Controller Installation.



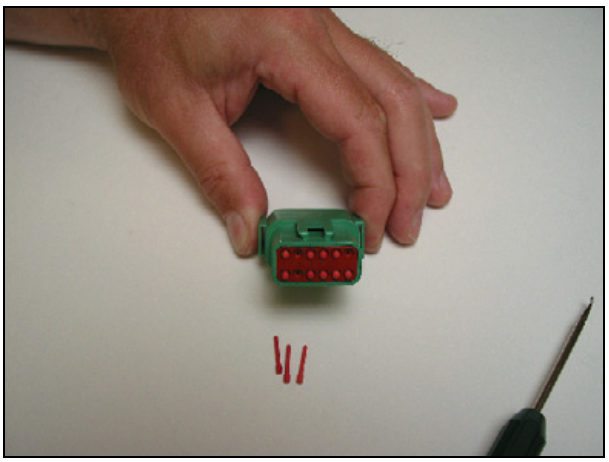
2. Remove the wedge from the connector.



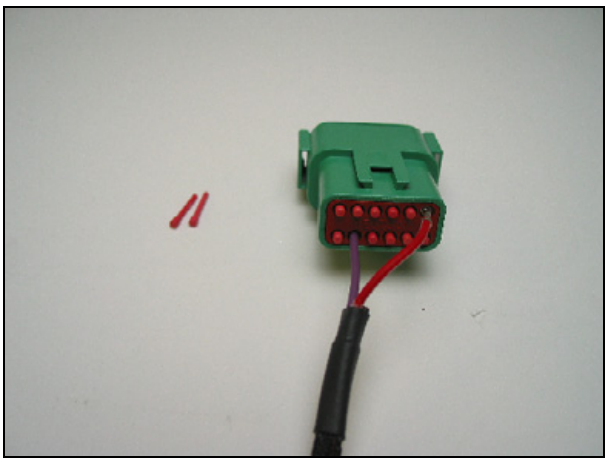
3. ***Rocker switch only***: Remove the plugs from cavity 2 and cavity 7.



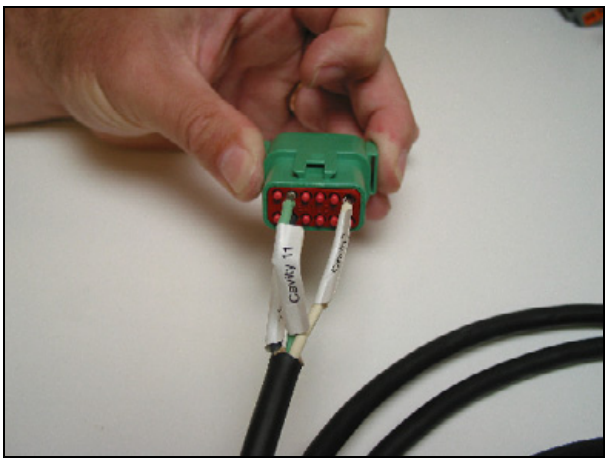
4. ***Foot Switch Only:*** Remove the plugs from cavity 2, cavity 7, and cavity 11.



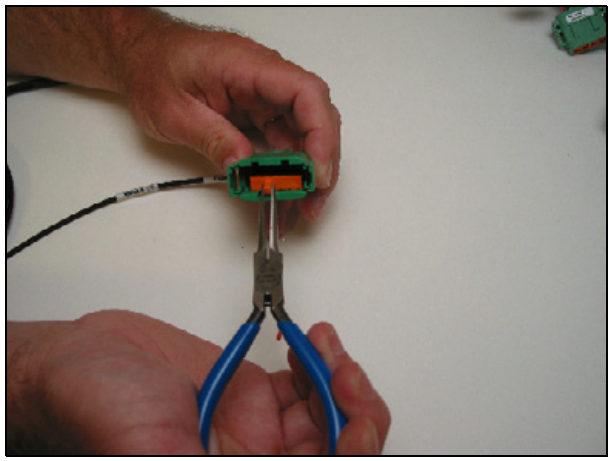
5. ***Rocker switch only***: Insert the DTM pins into cavity 2 and cavity 7, according to the labels on the wires.



6. ***Foot switch only***: Insert the DTM pins into cavity 2, cavity 7, and cavity 11, according to the labels on the wires.



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



8. Plug the assembled Deutsch receptacle into the P-5 leg of the Autopilot controller harness. See Chapter 8, Controller Installation.

9. ***Rocker switch only***: Run the spade ends of the cable to a knockout location in the operator console.



10. ***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.

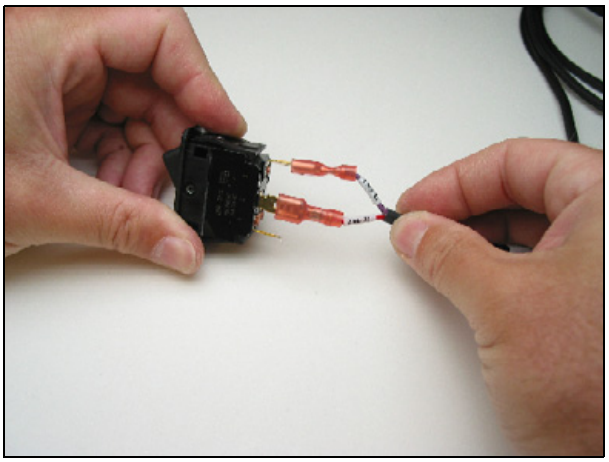
11. ***Rocker Switch Only:*** Connect the wires to the switch. Match the print on the switch body with the labels on the wires.



Step 8



12. ***Rocker Switch Only:*** Place the switch in the console.



Using the remote engage switch

1. Hold the switch down for at least 0.5 seconds.

Note – *Holding the switch for less than 0.5 seconds will not engage the system.*

2. Release the switch between 0.5 and 4.0 seconds. When you release the switch, the vehicle will engage.

CHAPTER

8

Controller Installation

In this chapter:

- Installing the controller
- Controller connections

This chapter describes how to install the controller unit.



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.

Installing the controller

Step 1

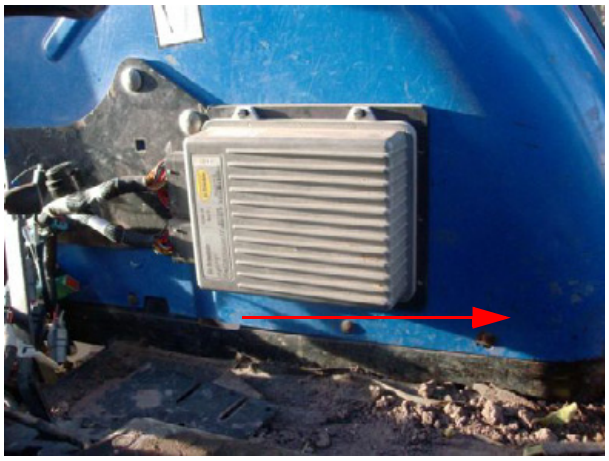
Find the left side fender beside the operator's seat.



Step 2 .

Place the controller mounting plate against the fender's wall.

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

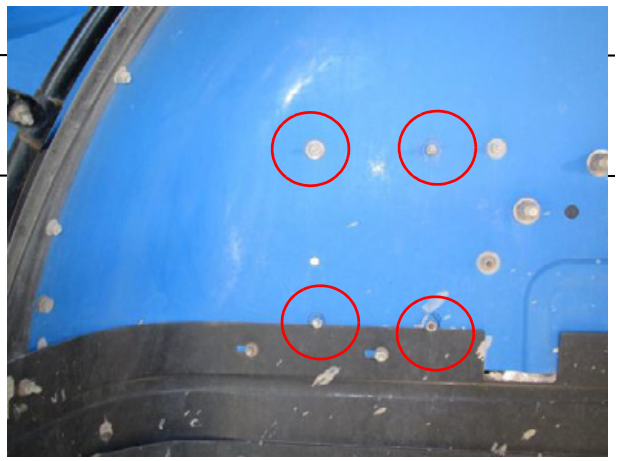


Step 3

WARNING – Before drilling, inspect the back of the fender for electrical cables.

The plate must be level when attached to the tractor.

Using the mounting plate as a template, drill four 5/16" holes and then fasten the plate using the ¼" hardware provided.



Step 4

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

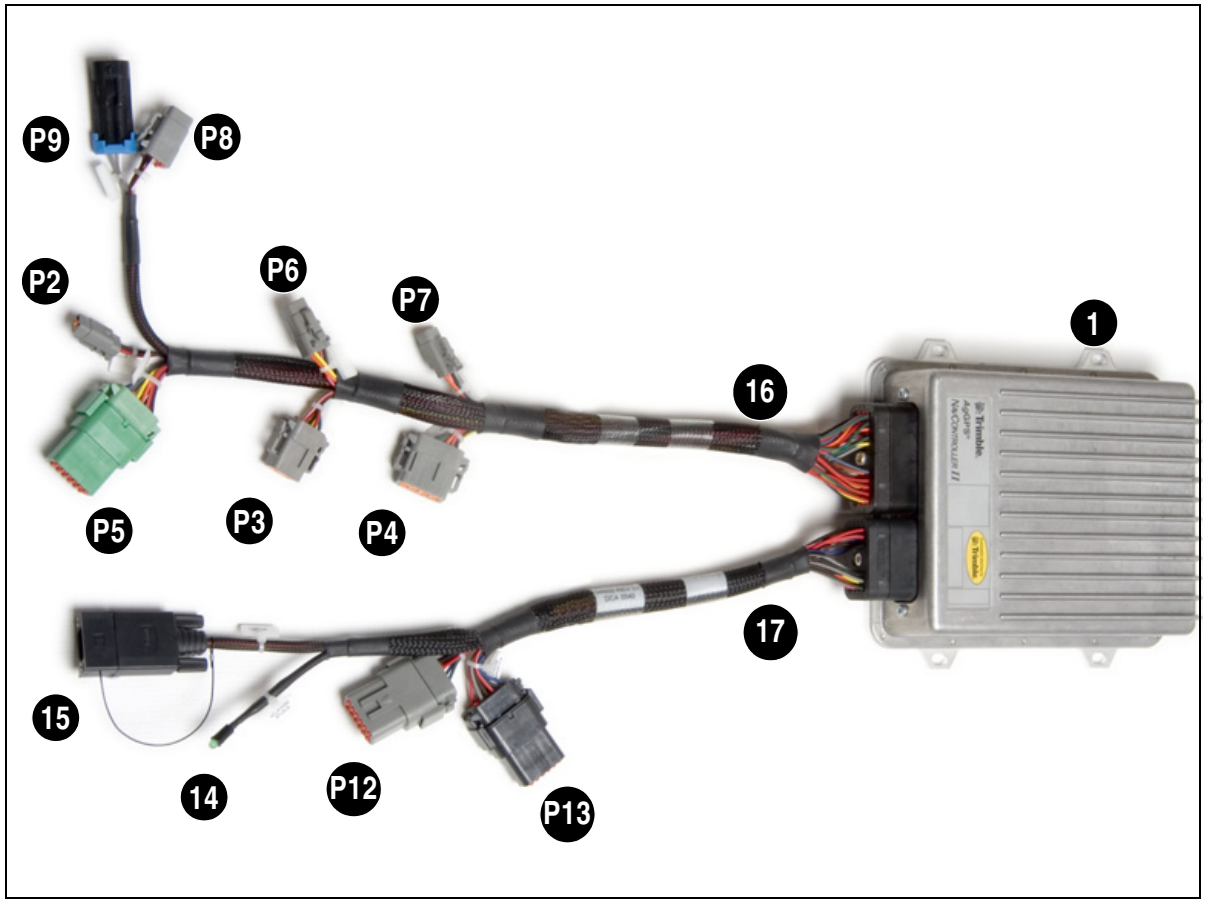


Step 5

Install the controller with the connectors pointing to the back of the tractor. Use the four #10-32 screws provided.



Controller connections



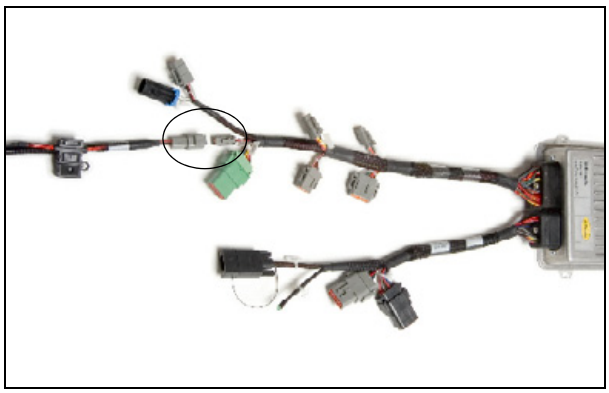
Item	Description
1	NavController II controller
P2	Power connector
P3	GPS connector
P4	Display connector
P5	Vehicle sensors connector
P6	Steering sensor connector
P7	Manual override connector
P8	Hydraulic valve connector

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

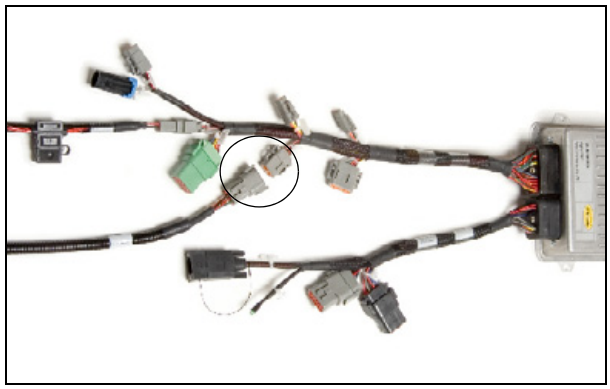
Connect the power cable connection to P-2, which is labeled “Power”. P-2 is located on the main wiring harness.

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



Step 2

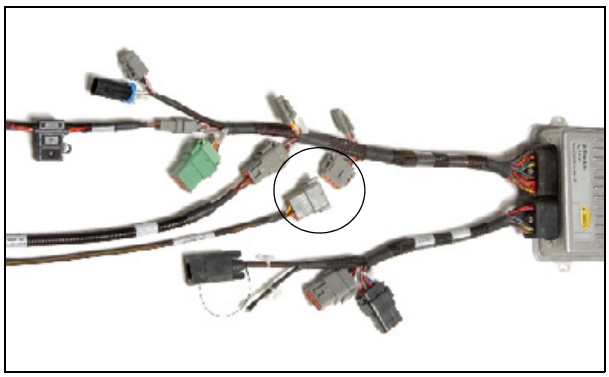
Connect the GPS cable connection to P-3, which is labeled “GPS”. P-3 is located on the main wiring harness. If you are using a CFX-750 or FmX display, plug the display cable in here.



Step 3

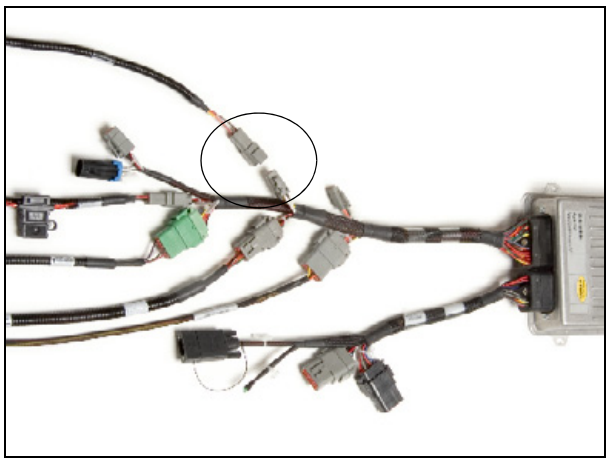
Connect the primary display cable connection to P-4, which is labeled “Display”. P-4 is located on the main wiring harness. Do not use this connection for CFX-750 or FmX display installations

Note – Do not *connect the cable to the connector labeled “Spare” on the auxiliary harness.*



Step 4

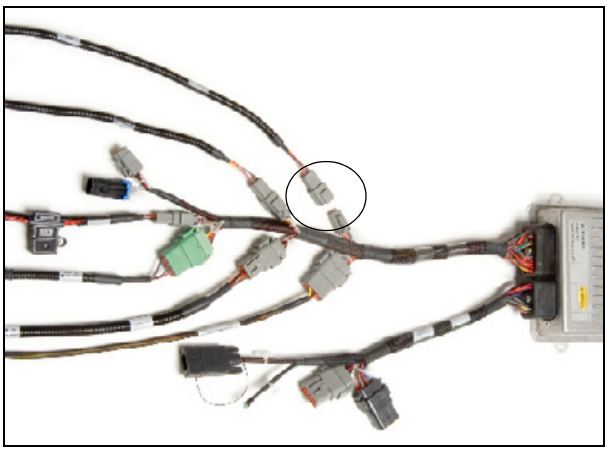
Connect the steering sensor cable connection to P-6, which is labeled “Steering Sensor”. P-6 is located on the main wiring harness.



Step 5

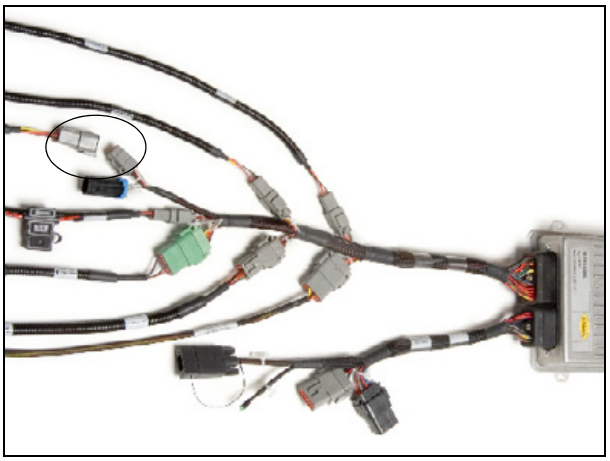
Connect the manual override cable connection to P-7, which is labeled “Manual Override”. P-7 is located on the main wiring harness.

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



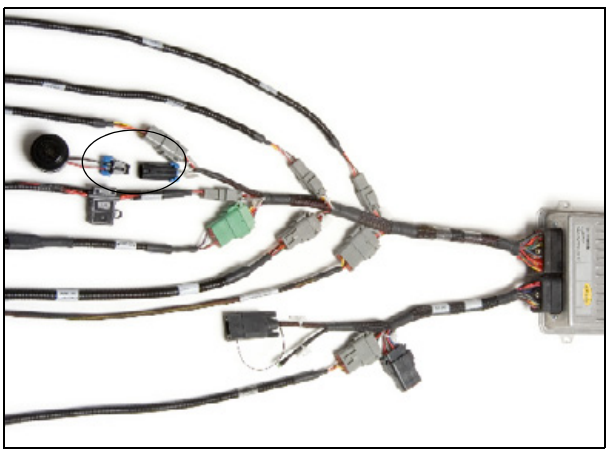
Step 6

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



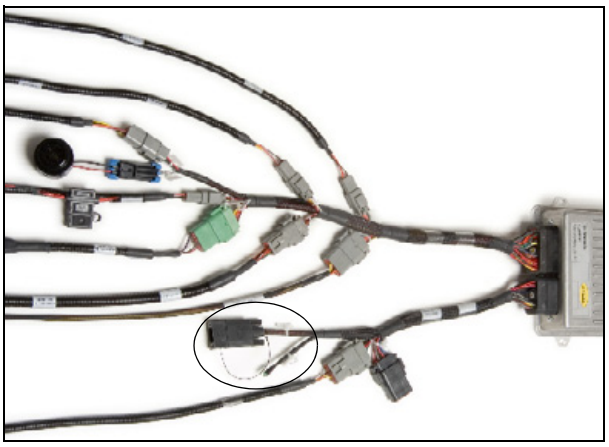
Step 7

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 8

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 9

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

In this chapter:

- Performing the final machine check

This chapter describes how to perform a final check of the vehicle.

Performing the 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. Start the machine and check for hydraulic leaks. Correct as needed.
2. Update the Trimble display and the 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.
3. Load the correct configuration file into the NavController II for the machine model being used.

   Download the latest set of External Vehicle Profile files from http://www.agpartners.trimble.com.

   You can use Autopilot Toolbox II software version 2.90 to load the configuration file into the Autopilot controller. You can download the AutoPilot Toolbox II software from http://agpartners.trimble.com.
4. Calibrate the Autopilot system using the Trimble display or Autopilot Toolbox II software version 2.90. 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