INSTALLATION INSTRUCTIONS

Trimble® Autopilot™ Automated Steering System

Buhler Versatile 4WD Tractors

- 350
- 400, 450
- 500, 550

Version 5.00
Revision B
September 2014
Part number 54036-90-E05-B

Trimble

Legal Notices

Agriculture Business Area

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

Copyright and Trademarks

© 1999–2014, Trimble Navigation Limited. All rights reserved.
Trimble, the Globe & Triangle logo, *Ag*GPS and FmX are trademarks of Trimble Navigation Limited, registered in the United States and in other countries. Autopilot, AutoSense, and CFX-750 are trademarks of Trimble Navigation Limited. Developed under a License of the European Union and the European Space Agency.
All other trademarks are the property of their respective owners.

Official Language

THE OFFICIAL LANGUAGE OF THESE TERMS AND CONDITIONS IS ENGLISH. IN THE EVENT OF A CONFLICT BETWEEN ENGLISH AND OTHER LANGUAGE VERSIONS, THE ENGLISH LANGUAGE SHALL CONTROL.

Release Notice

This is the September 2014 release (Revision B) of the Autopilot Automated Steering System Installation Instructions, part number 54036-90-E05-B. It applies to version 5.00 of the Autopilot automated steering system.

The following limited warranties give you specific legal rights. You may have others, which vary from state/jurisdiction to state/jurisdiction.

Product Limited Warranty

Trimble warrants that this Trimble product and its internal components (the "Product") shall be free from defects in materials and workmanship and will substantially conform to Trimble's applicable published specifications for the Product for a period of one (1) year, starting from the earlier of (i) the date of installation, or (ii) six (6) months from the date of product shipment from Trimble. This warranty applies only to the Product if installed by Trimble or a distributor authorized by Trimble to perform Product installation services.

Software Components and Enhancements

All Product software components (sometimes hereinafter also referred to as "Software") are licensed and not sold. Any Software accompanied by a separate End User License Agreement ("EULA") shall be governed by the terms, conditions, restrictions and limited warranty terms of such EULA notwithstanding the preceding paragraph. During the limited warranty period you will be entitled to receive, at no additional charge, such Fix Updates and Minor Updates to the Product software as Trimble may develop for general release, subject to the procedures for delivery to purchasers of Trimble products generally. If you have purchased the Product from an authorized Trimble distributor rather than from Trimble directly, Trimble may, at its option, forward the software Fix Update or Minor Update to the Trimble distributor for final distribution to you. Major Upgrades, new products, or substantially new software releases, as identified by Trimble are expressly excused from this enhancement process and limited warranty. Receipt of software updates shall not serve to extend the limited warranty period.
For purposes of this warranty the following definitions shall apply: (1) "Fix Update" means an error correction or other update created to fix a previous software version that does not substantially conform to its published specifications; (2) "Minor Update" occurs when enhancements are made to current features in a software program; and (3) "Major Upgrade" occurs when significant new features are added to software, or when a new product containing new features replaces the further development of a current product line. Trimble reserves the right to determine, in its sole discretion, what constitutes a significant new feature and Major Upgrade.

Warranty Remedies

Trimble's sole liability and your exclusive remedy under the warranties set forth above shall be, at Trimble's option, to repair or replace any Product that fails to conform to such warranty ("Nonconforming Product"), and/or issue a cash refund up to the purchase price paid by you for any such Nonconforming Product, excluding costs of installation, upon your return of the Nonconforming Product to Trimble in accordance with Trimble's standard return material authorization process. Such remedy may include reimbursement of the cost of repairs for damage to third-party equipment onto which the Product is installed, if such damage is found to be directly caused by the Product as reasonably determined by Trimble following a root cause analysis.

Warranty Exclusions and Disclaimer

These warranties shall be applied only in the event and to the extent that (i) the Products and Software are properly and correctly installed, configured, interfaced, maintained, stored, and operated in accordance with Trimble's relevant operator's manual and specifications, and; (ii) the Products and Software are not modified or misused. The preceding warranties shall not apply to, and Trimble shall not be responsible for defects or performance problems resulting from (i) the combination or utilization of the Product or Software with hardware or software products, information, data, systems, interfaces or devices not made, supplied or specified by Trimble; (ii) the operation of the Product or Software under any specification other than, or in addition to, Trimble's standard specifications for its products; (iii) the unauthorized, installation, modification, or use of the Product or Software; (iv) damage caused by accident, lightning or other electrical discharge, fresh or salt water immersion or spray; or (v) normal wear and tear on consumable parts (e.g., batteries). Trimble does not warrant or guarantee the results obtained through the use of the Product.

THE WARRANTIES ABOVE STATE TRIMBLE'S ENTIRE LIABILITY, AND YOUR EXCLUSIVE REMEDIES, RELATING TO PERFORMANCE OF THE PRODUCTS AND SOFTWARE. EXCEPT AS OTHERWISE EXPRESSLY PROVIDED HEREIN, THE PRODUCTS, SOFTWARE, AND ACCOMPANYING DOCUMENTATION AND MATERIALS ARE PROVIDED "AS-IS" AND WITHOUT EXPRESS OR IMPLIED WARRANTY OF ANY KIND BY EITHER TRIMBLE NAVIGATION LIMITED OR ANYONE WHO HAS BEEN INVOLVED IN ITS CREATION, PRODUCTION, INSTALLATION, OR DISTRIBUTION INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, TITLE, AND NONINFRINGEMENT. THE STATED EXPRESS WARRANTIES ARE IN LIEU OF ALL OBLIGATIONS OR LIABILITIES ON THE PART OF TRIMBLE ARISING OUT OF, OR IN CONNECTION WITH, ANY PRODUCTS OR SOFTWARE. SOME STATES AND JURISDICTIONS DO NOT ALLOW LIMITATIONS ON DURATION OR THE EXCLUSION OF AN IMPLIED WARRANTY, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

TRIMBLE NAVIGATION LIMITED IS NOT RESPONSIBLE FOR THE OPERATION OR FAILURE OF OPERATION OF GPS SATELLITES OR THE AVAILABILITY OF GPS SATELLITE SIGNALS.

Limitation of Liability

TRIMBLE'S ENTIRE LIABILITY UNDER ANY PROVISION HEREIN SHALL BE LIMITED TO THE AMOUNT PAID BY YOU FOR THE PRODUCT OR SOFTWARE LICENSE. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT SHALL TRIMBLE OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER UNDER ANY CIRCUMSTANCE OR LEGAL THEORY RELATING IN ANY WAY TO THE PRODUCTS, SOFTWARE AND ACCOMPANYING DOCUMENTATION AND MATERIALS, (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION, OR ANY OTHER PECUNIARY LOSS), REGARDLESS WHETHER TRIMBLE HAS BEEN ADVISED OF THE POSSIBILITY OF ANY SUCH LOSS AND REGARDLESS OF THE COURSE OF DEALING WHICH DEVELOPS OR HAS DEVELOPED BETWEEN YOU AND TRIMBLE. BECAUSE SOME STATES AND JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

NOTE: THE ABOVE LIMITED WARRANTY PROVISIONS MAY NOT APPLY TO PRODUCTS OR SOFTWARE PURCHASED IN THE EUROPEAN UNION. PLEASE CONTACT YOUR TRIMBLE DEALER FOR APPLICABLE WARRANTY INFORMATION.

Notices

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.

Notice to Our European Union Customers

For product recycling instructions and more information, please go to:
http://www.trimble.com/Corporate/Environmental_Compliance.aspx



Recycling in Europe: To recycle Trimble WEEE, Call +31 497 53 2430, and ask for the "WEEE Associate"
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.

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.

Contents

Legal Notices 2

Safety Information 3

Warnings 3

Cautions 3

1 Introduction 7

Technical assistance 7

Manual system upgrade to Autopilot 8

CFX-750 display and FmX integrated display 8

Required components 8

Antenna mounting kits 8

Accessory kits 8

Autopilot hardware organization: As shipped 9

Preparing the vehicle for installation 10

2 Hydraulic Control Valve Installation 11

Hydraulic control valve components 13

Preparing the hydraulic manifold for all models 14

Mounting the hydraulic manifold 16

Installing the hydraulic hoses 20

Securing the electrical connections for all models 28

Checking the hydraulics 30

3 AutoSense Steering Device Installation 31

AutoSense steering device components 32

Installing the AutoSense device 33

Preparing the harness: P/N 54602 Rev C 35

4 Antenna/Receiver Installation 37

Antenna and receiver installation options 38

Possible mounting methods 38

Mounting an adjustable spar to roof bolts 39

Attaching the plate with VHB adhesive 42

AG-372 receiver with AgGPS 450/900 radio module (if equipped) components 44

Installing the AG-372 GPS receiver with AgGPS 450/900 radio module (if equipped) 45

Removable installation 45

Permanent installation 46

Installing an AG-372 receiver with magnetic feet 51

AgGPS 542 receiver components 53

Installing the AgGPS 542 receiver 54

5 Display Installation 57

CFX-750 display components 58

FmX integrated display components 59

Preparing the CFX-750 display 60

Installing the CFX-750 display 61

CFX-750 display: Installing the wiring harness 62

Preparing the FmX integrated display 63

Installing the FmX integrated display 64

FmX integrated display: Installing the wiring harness 65
CFX-750 display and FmX integrated display: Connecting accessory options 66
AgCam 66
CFX-750 and FmX displays: Installing the GNSS antenna and plate 68
Spar mount method 68
VHB adhesive method 68
CFX-750 and FmX displays: Installing the RTK radio antenna 73

6 Power Harness Installation 75
CFX-750 display components 76
FmX integrated display components 78
Installing the power harness for the display 79
Configuring the power bus options for the display 81
The display power button 81
An external switch 81
Illuminated full or standard Euro switch 82
Ignition sensing 83

7 Remote Engage Switch Installation 85
Remote engage switch components: Rocker switch 86
Remote engage switch components: Foot switch 87
Preparing the remote engage cable 88
Using the remote engage switch 91

8 Controller Installation 92
Installing the controller 93
Controller connections 96

9 Final Machine Check 99

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 94110-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 54036-90 Hydraulic hose kit: P/N 92205	Allen wrench set (metric and SAE)

Antenna mounting kits

Kits required
Bracket, GPS Spar 36.5" - 46.5": P/N 53676, or VHB antenna mount (included with FmX or CFX-750 display): P/N 62034

Accessory kits

Kits required
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 54036-90	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 92205	Hydraulic hoses	Chapter 2
	Hydraulic adaptors	
Roof bracket kit: P/N 53676 (Spar)	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.

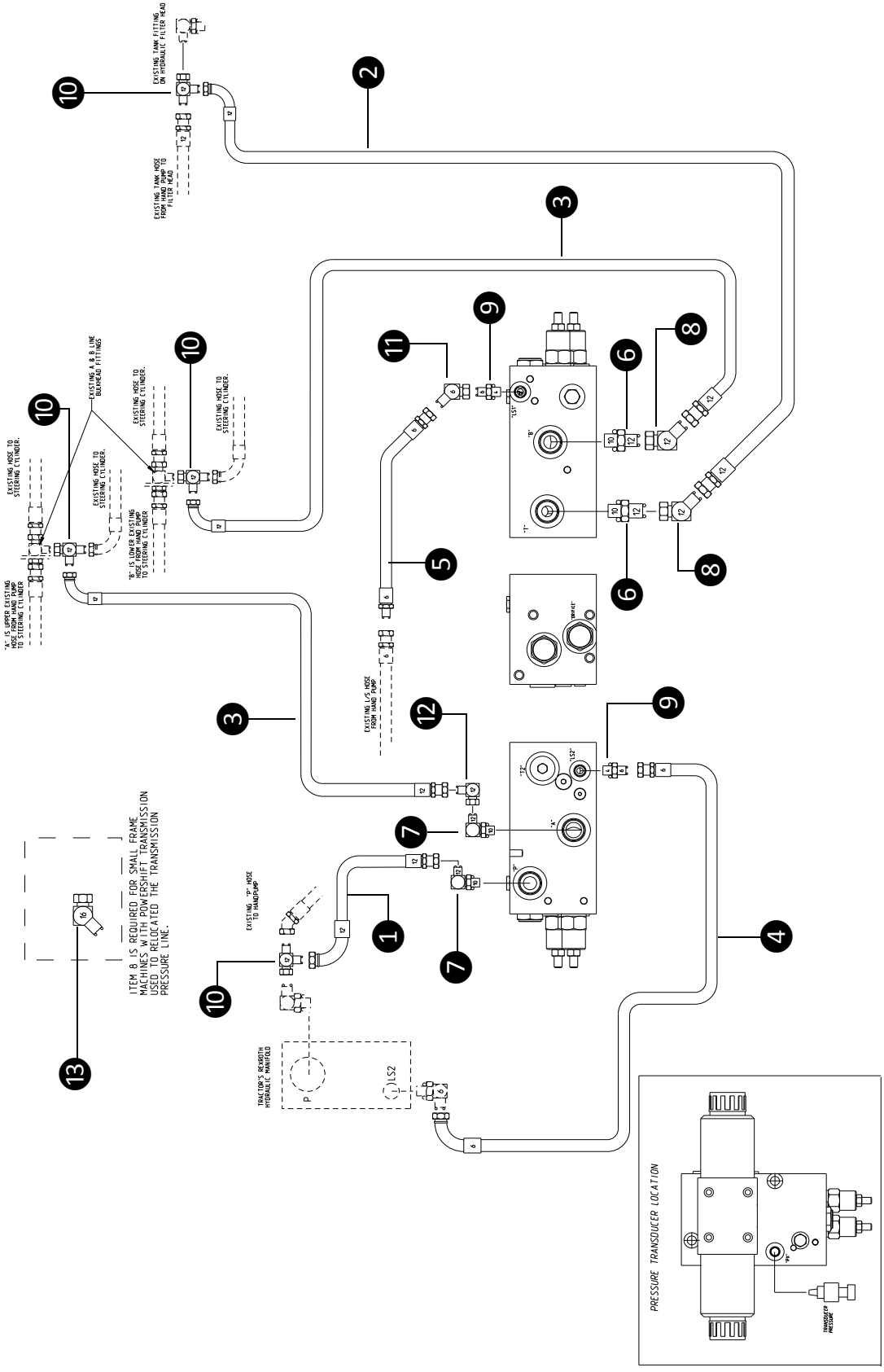
CHAPTER 2

Hydraulic Control Valve Installation

In this chapter:

- Hydraulic control valve components
- Preparing the hydraulic manifold for all models
- Mounting the hydraulic manifold
- Installing the hydraulic hoses
- Securing the electrical connections for all models
- Checking the hydraulics

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


EXISTING TANK FITTING ON HYDRAULIC FILTER HEAD
EXISTING TANK HOSE FROM HAND PUMP TO FILTER HEAD
EXISTING HOSE TO STEERING CYLINDER.
EXISTING HOSE TO STEERING CYLINDER.
EXISTING HOSE TO STEERING CYLINDER.
EXISTING A & B LINE BULKHEAD FITTINGS
"A" IS UPPER EXISTING HOSE FROM HAND PUMP TO STEERING CYLINDER.
"B" IS LOWER EXISTING HOSE FROM HAND PUMP TO STEERING CYLINDER.
EXISTING LS HOSE FROM HAND PUMP
EXISTING "P" HOSE TO HANDPUMP
TRACTOR'S BERGHOTH HYDRAULIC MANIFOLD
P
LS2
ITEM 8 IS REQUIRED FOR SMALL FRAME MACHINES WITH POWERSHIFT TRANSMISSION USED TO RELOCATED THE TRANSMISSION PRESSURE LINE.
PRESSURE TRANSDUCER LOCATION
TRANSDUCER PRESSURE

Hydraulic control valve components

Item	Description	P/N
❶	70 inch hose	F451TCJSJ9-12-12-12-70
❷	81 inch hose	F451TCJSJ9-12-12-12-81
❸	36 inch hose (x2)	F451TCJSJ9-12-12-12-36
❹	75 inch hose	F451TCJSJ9-06-06-06-75
❺	75 inch hose	F451TCJSJ0-06-06-06-75
❻	Fitting (x2)	12-10 F5OLO-S
❼	Fitting (x2)	12-10 C5OLO-S

Item	Description	P/N
❽	Fitting (x2)	12 V6LO-S
❾	Fitting (x2)	6-4 F5OLO-S
❿	Fitting (x4)	12 R6LO-S
⓫	Fitting	6 V6LO-S
⓬	Fitting	12 C6LO-S
⓭	Fitting	16 V6LO-S

Note – *Item 13 is for use only on small frame machines that have a powershift transmission.*

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

Preparing the hydraulic manifold for all models

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

Install and tighten the pressure sensor to the manifold PX port.



Step 2

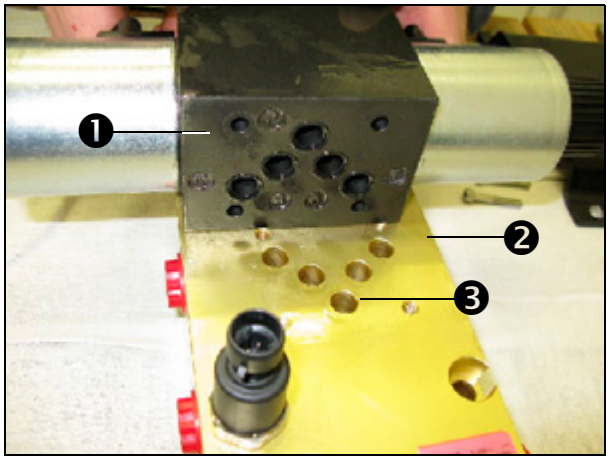
Note – *Place the hydraulic components from the kit on a clean work surface.*

Lubricate the O-rings and then connect the control valve (❶) to the manifold (❷) with four M6 x 40 or four ¼-20 x 1.5" bolts based on the block.
Test fit to determine which style of threads the block has. Both sets of bolts are provided in the kit.

Tighten the bolts to 14 –16 Nm (10 - 12 ft. lbs.).

Note – *Match the V pattern of the oil passages (❸) between the manifold (❷) and control valve (❶).*

Note – *This requires a 5 mm Allen wrench.*

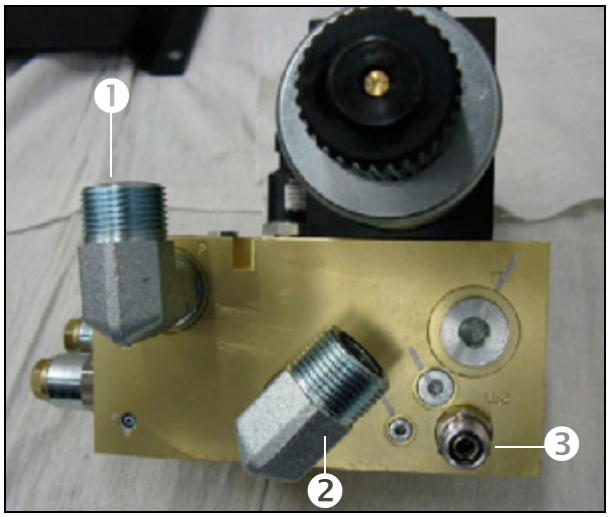


Step 3

With the manifold positioned as shown, install the fittings and orientate them as shown.

- 12–10 ORS-ORB 90° fitting (❶) to the P port
- 12–10 ORS-ORB 90° (❷) to the A port
- 4–4 ORS-ORB fitting (❸) to LS2 port

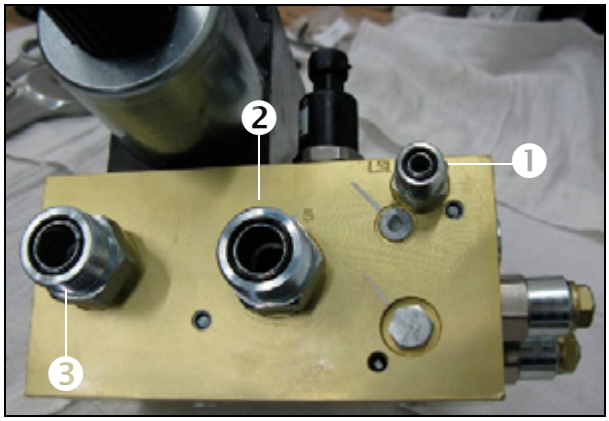
Note – *To make the installation easier, do not tighten the 90° fittings until the hoses are installed and routed.*



Step 4

With the manifold positioned as shown, install the fittings:

- 4–4 ORB fitting (❶) to LS1 port
- 12–10 ORS-ORB fitting (❷) to B port
- 112–10 ORS-ORB fitting (❸) to T port

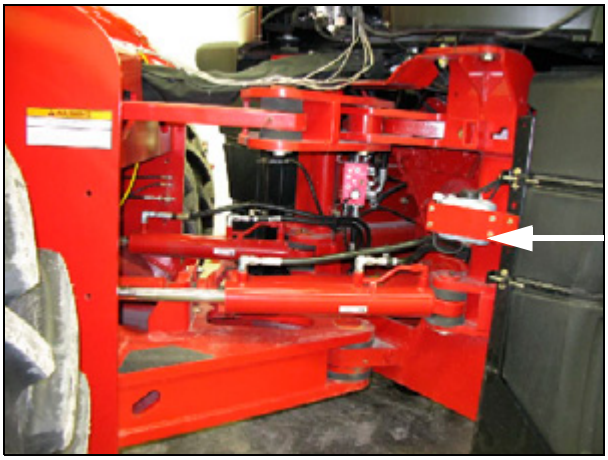


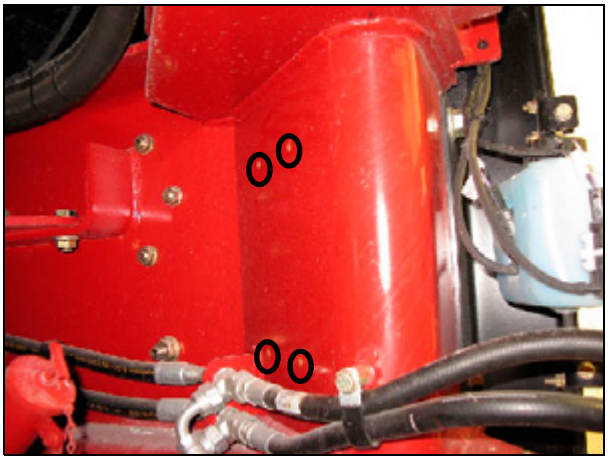
Mounting the hydraulic manifold

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

Identify the valve mounting location at the rear and below the cab on the right side.





Step 2

For small frame machines Trimble recommends to reorient the valve solenoid connections by 90° so that they face the top of the assembly. Loosen the plastic retaining nuts and pull the solenoid away from the valve body to disengage the lock key. Rotate the solenoid then slide it back against the valve body. Re-tighten the nut hand tight. Repeat for the second solenoid.

Trimble also recommends installing the A and B line Tees before hanging the valve assembly on the vehicle, due to the lack of working room once the valve is installed. (See Step 5 in Installing the hydraulic hoses.)





Step 3 - Only for small frame machines with the powershift transmission

On small frame machines with powershift transmissions it is necessary to add an additional fitting to the pressure line on the transmission to enable the hose to angle down to provide room to install the valve. See Hydraulic control valve components, page 13.

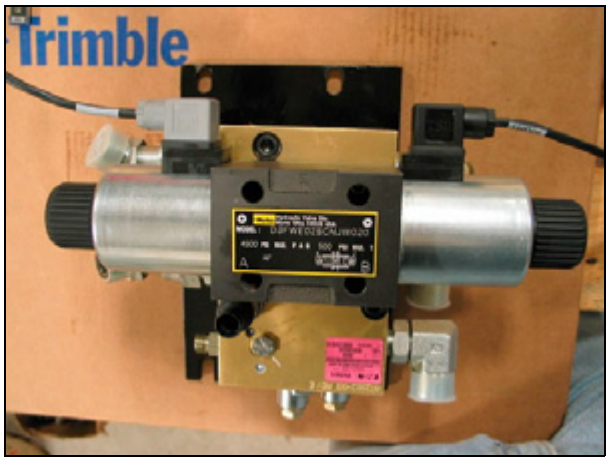




Step 4

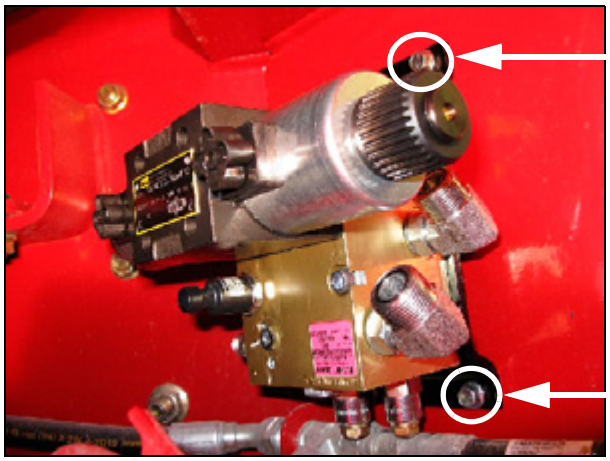
Attach the assembled valve and manifold assembly to the mounting bracket (P/N 92219).

Fit the electrical connectors onto the valve solenoids: ***Make sure*** to install the grey connector onto the **A** side of the valve, as shown.



Step 5

Loosely install the lower two ⅜-16 x ⅝" bolts in the tapped holes in the frame. Slide the slotted end of the valve/manifold mount plate under the bolt heads. Install the upper two bolts and then tighten all four.

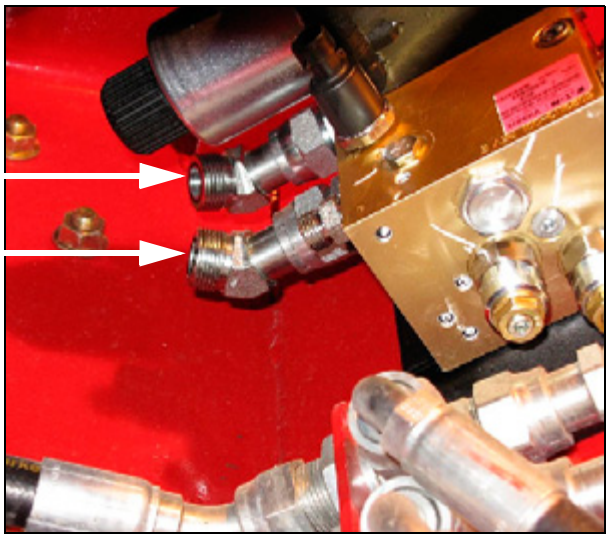


Installing the hydraulic hoses

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.

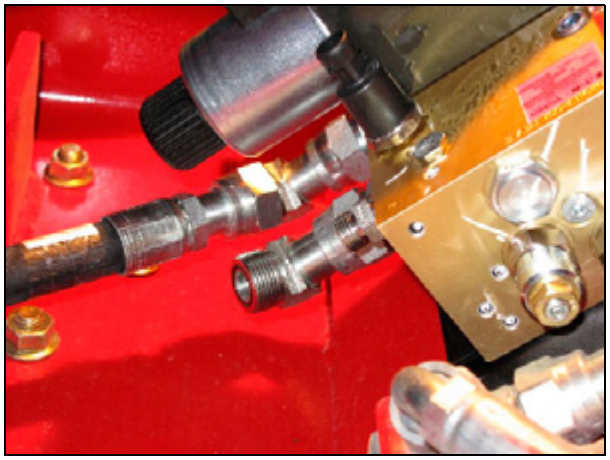
Step 1

Install two -12 45° ORS adapter fittings to the **T** and **B** port adapters on the control valve/manifold assembly.



Step 2

Connect the straight end of the 81" ***long*** **T** hose to the 45° adapter at the **T** port. Route the 90° end of the ***long*** **T** hose forward along the frame to the hydraulic system filter housing that is at the front of the vehicle (inside the right side of the frame). Leave the fitting at the control valve loose until the 90° end connection is made to aid orienting the fitting.



Step 3

The tank return connection is made at the fittings on the hydraulic oil filter housing. Separate the existing hose from the 90° ORS fitting on the housing. Install a -12 ORS run tee, and re-attach the existing hose to the run side of the tee and then connect the 90° hose end from the control valve to the branch of the tee.

Note – *This connection is below oil tank level and once opened the line will flow a significant quantity of oil.*



Step 4

Connect the straight end of the 36" long -12 **B** hose to the 45° ORS adapter at the **B** port.

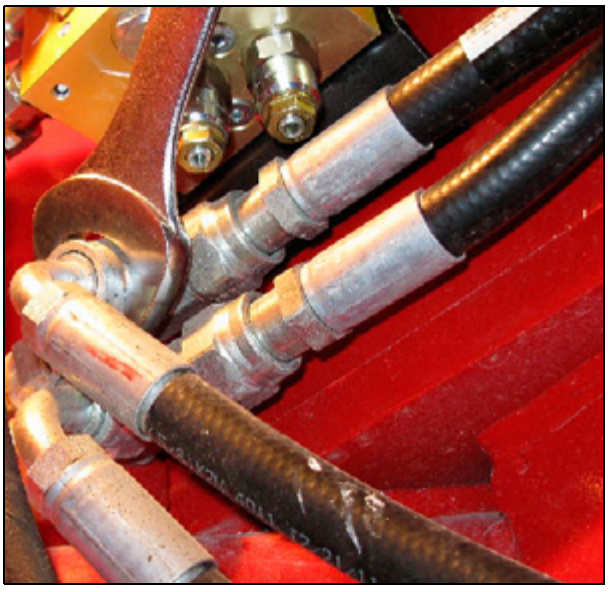


Step 5

Just below the valve assembly mounting location are two existing bulkhead tee fittings that connect the steering pump to the steering cylinders. Remove the two cylinder lines attached to the branches of the tees and then install a pair of -12 ORS run tees. Reconnect the existing cylinder lines to the run legs of the installed tees using care to reconnect the original top line to the top tee and the bottom to the lower tee.

Note – *For small frame machines, Trimble recommends that this step be performed* ***prior*** *to installing the valve and manifold assembly (see* *Step 2, Mounting the hydraulic manifold, page 16**).*





Step 6

Connect the hose from the **B** port to the branch of lower installed tee.



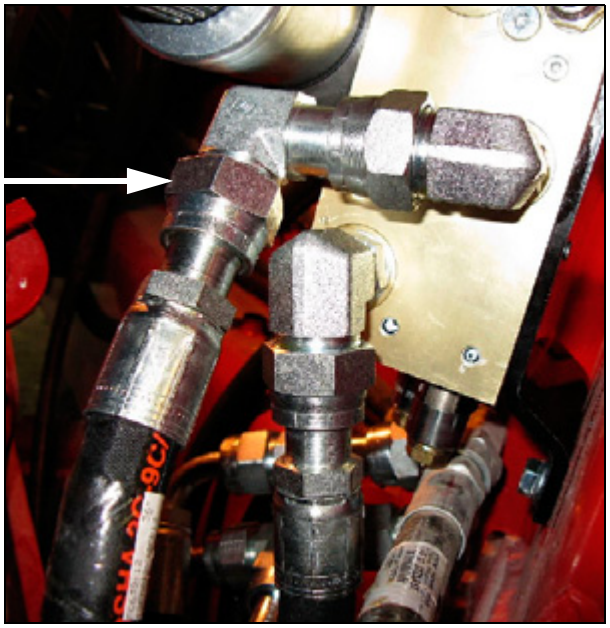
Step 7

Install a 90° -12 ORS adapter onto the 90° -12 adapter in the **A** port. Leave the fitting loose until after the hoses are attached and routed.



Step 8

Connect the straight end of the 36" **A** hose to the -12 90° ORS adapter leaving it loose until the 90° end of the hose is connected.



Step 9

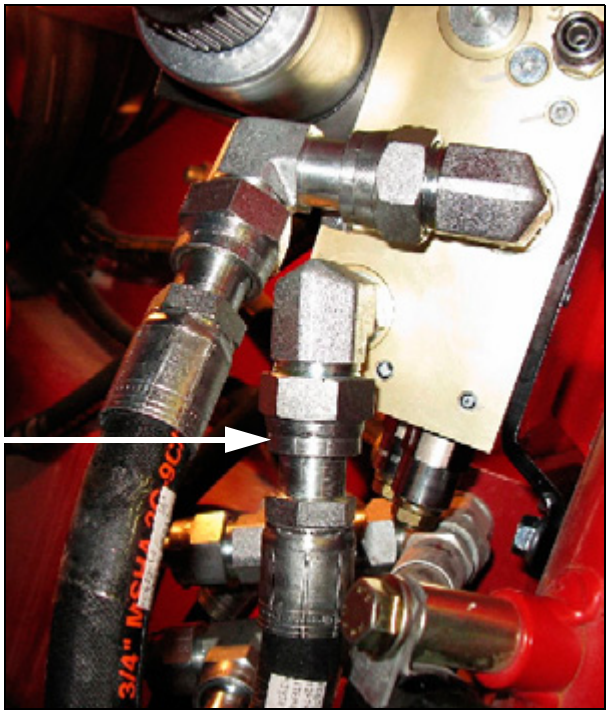
Route the **A** hose down to the remaining tee in the upper cylinder line. Connect the 90° hose end to the branch of the tee and work the hose into a position that will keep it tight against the machine and not foul when the tractor articulates.

Trimble recommends to orient the **A** and **B** tees in opposite directions, with the **A** tee pointing forward and the **B** tee pointing aft, as shown. This provides nice loops that route the hoses safely. Tighten both ends of the hoses.



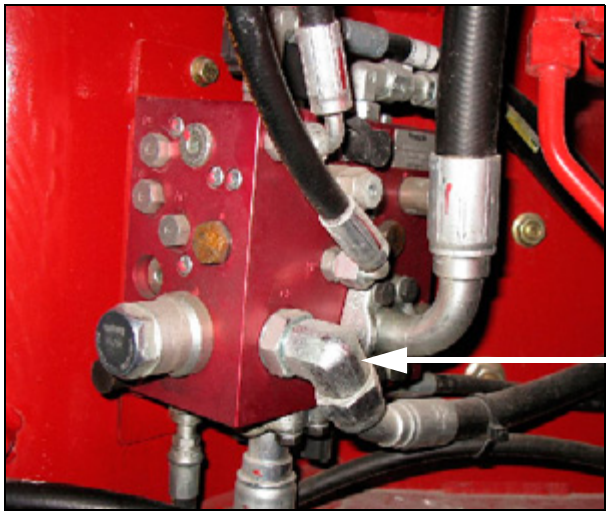
Step 10

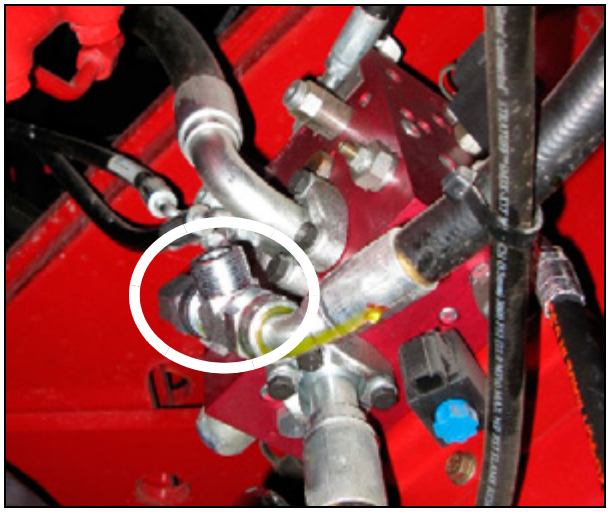
Connect the straight end of the 70" long -12 **P** hose to the 90° -12 adapter in the **P** port. Leave the fitting loose until the connection has been made at the opposite end. Route the hose down and across the frame to the left side of the vehicle to the existing Rexroth distribution manifold.



Step 11

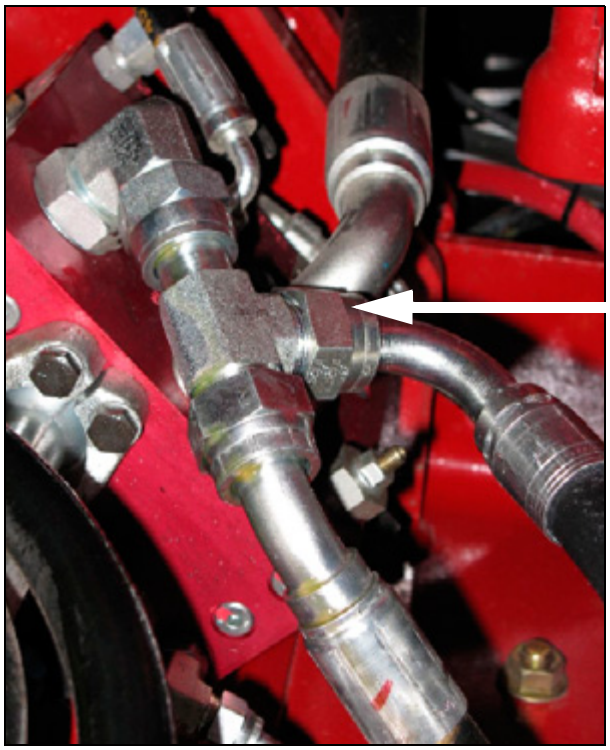
The pressure line connection is made at the 90° fitting labeled **CF** at the bottom corner of the existing Rexroth distribution manifold. Install a -12 run tee in the line from the 90° fitting.





Step 12

Connect the 90° end of the **P** hose to the branch of the tee fitting installed in the **CF** line. Tighten both ends.



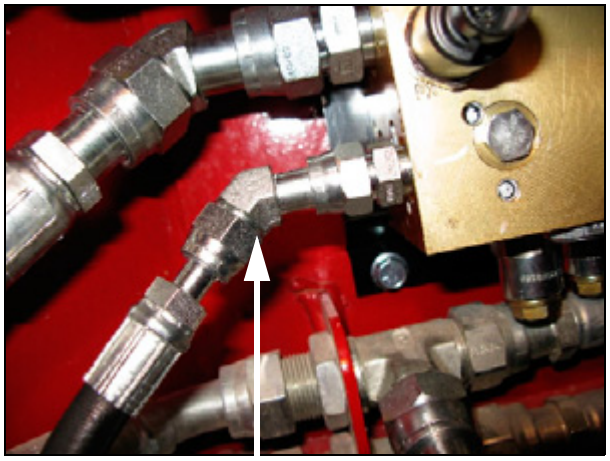
Step 13

Install a -4 45° ORS adapter fitting onto the -4 adapter in the **LS1** port of the control valve/manifold.



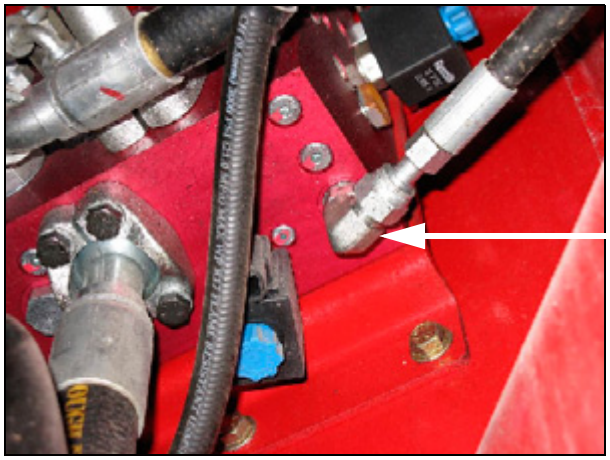
Step 14

Connect the female swivel end of the 75" -4 male to female **LS1** hose. Route the ***male*** end of the LS1 hose down and across the frame to the existing Rexroth distribution manifold.



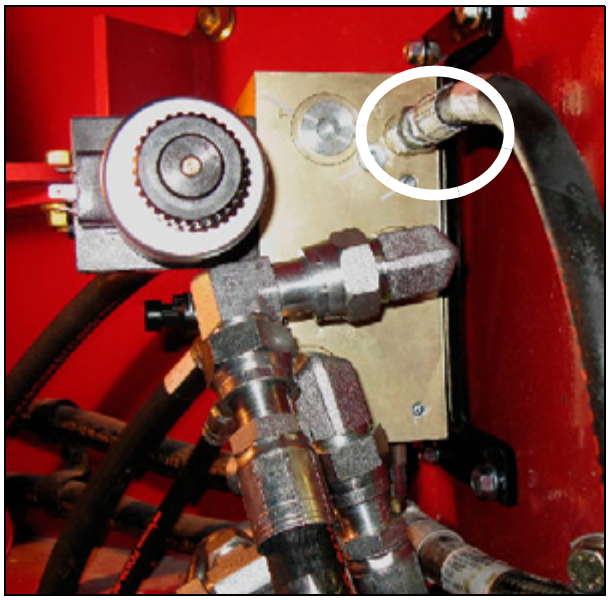
Step 15

Remove the existing **LS** hose from the -4 90° adapter on the bottom of the distribution manifold. Connect the ***female*** swivel from the existing **LS** hose to the ***male*** end of the **LS1** hose from the Autopilot control valve/manifold.



Step 16

Connect the straight end of the 75" -4 **LS2** hose to the -4 adapter in the **LS2** port of the control manifold. Leave the fitting loose until the opposite end has been connected. Route the hose down and across the frame to the Rexroth distribution manifold.



Step 17

Connect the 90° end of the **LS2** hose to the -4 90° adapter fitting at the bottom of the distribution manifold. Tighten both ends.



Securing the electrical connections for all models

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

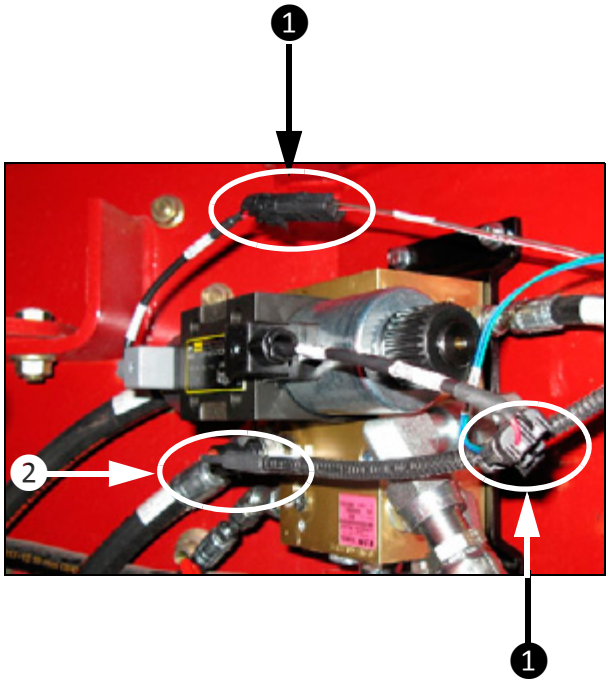
Route the cables through the right rear corner of the cab to the controller location.





Step 2

Connect and secure the left and right valve cables (❶) and the pressure transducer cable (❷).



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

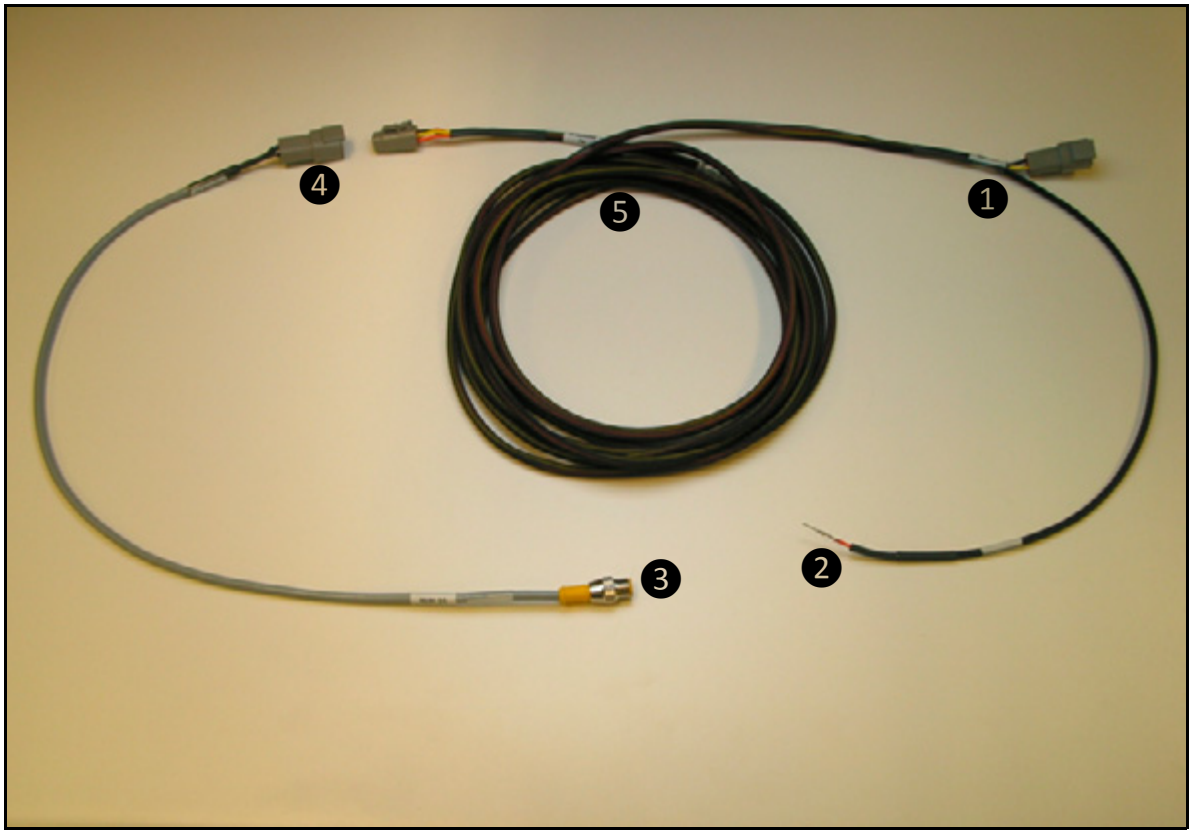
This chapter describes how to install the AutoSense™ steering device. If the required mounting location is not accessible, chose a different place. To ensure proper function, the AutoSense device must be located where it is free of obstructions and can rotate with the wheels when they turn.

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	P6 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

Locate the mounting position on the rear articulating structure. On the crossbar in front of the brake is a good location.



Step 2

Clean the mounting surface with the alcohol swab provided or an equally aggressive cleanser to remove all dust and oil. Use the VHB (Very High Bond) adhesive foam tape to secure the AutoSense mount plate to the crossbar. Attach the AutoSense unit to the mount with the included #6-32 socket head cap screws.



Step 3

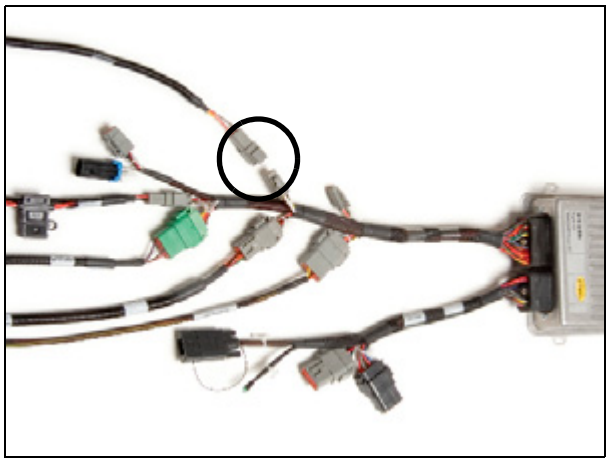
Route the steering sensor cable inside the canvas cover housing the hydraulic hoses and cables with the connector exiting the bundle at the top of the steel brake line. Connect the jumper cable to the steering device and to the sensor cable connector. Secure the jumper to the steel bake line with ty-wraps.



Step 4

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

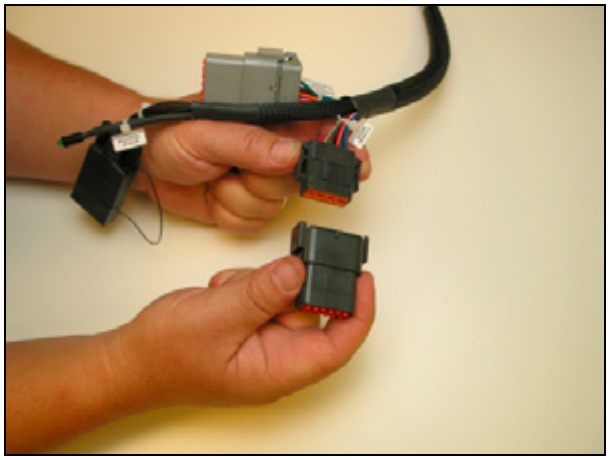
The P6 connector is labeled **Steering Sensor**.



Preparing the harness: P/N 54602 Rev C

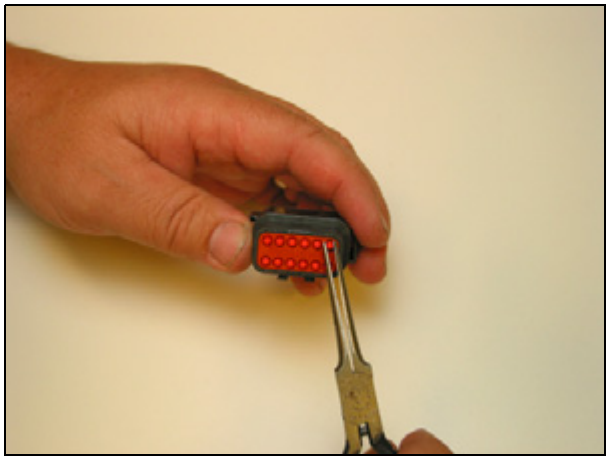
Step 1

Remove the black Deutsch DTM receptacle from the P13 sensors leg of the auxiliary harness. See Chapter 8, Controller Installation.



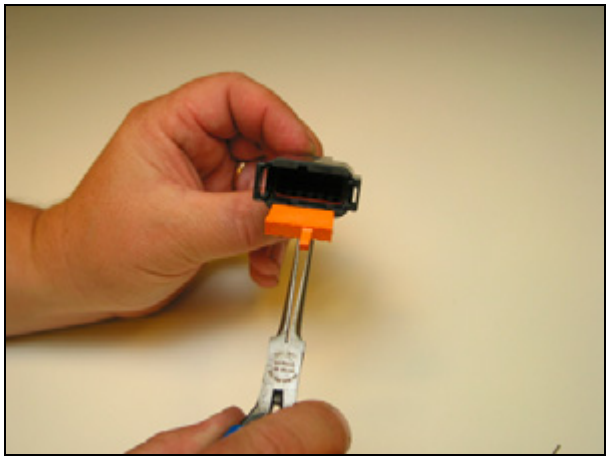
Step 2

Remove the plug from cavity number 1.



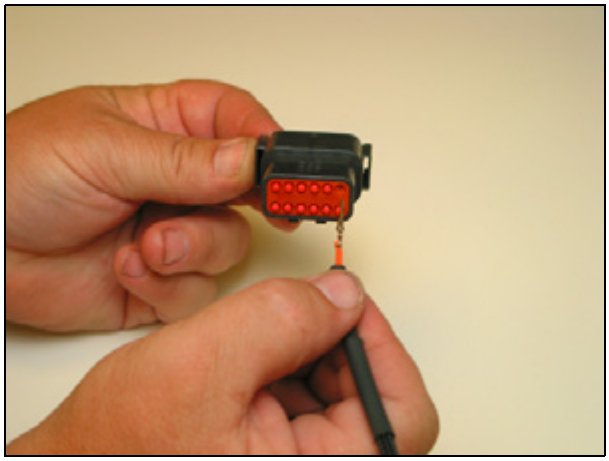
Step 3

Remove the wedge from the connector.



Step 4

Insert the DTM pin labeled **Cavity 1** into the connector.

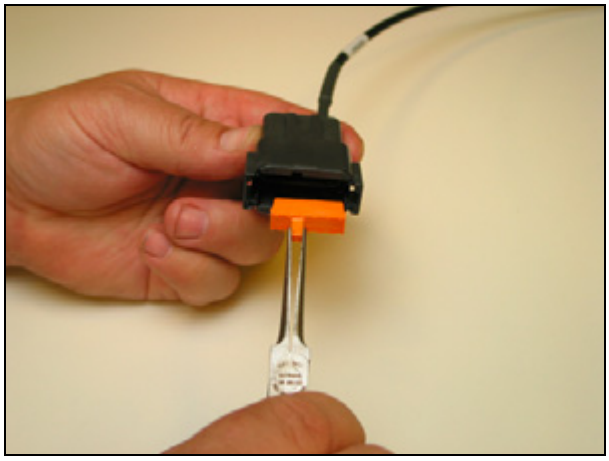


Step 5

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

Step 6

Plug the assembled Deutsch receptacle into the P13 sensors leg of the Autopilot controller auxiliary harness. See Chapter 8, Controller Installation.



CHAPTER 4

Antenna/Receiver Installation

In this chapter:

- Antenna and receiver installation options
- Mounting an adjustable spar to roof bolts
- 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:

- **Spar mount** – This bracket mounts directly to the roof bolts and is required for all high accuracy applications such as RTK and OmniSTAR. Trimble recommends this method for mounting an AG-372 receiver. Bolt a metal spar to the roof or to a light bracket and then attach either a V plate for magnetic mounting or an AG-372 receiver plate for permanent mounting.
- **VHB mount** – Attach a P/N 62034 plate or a V plate directly to the roof with VHB (Very High Bond) adhesive for magnetic mounting. See page 42.
- **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	Bolted to the spar mount
CFX-750 display; FmX integrated display	✓	✓	✓
AG-372 receiver	✘	✓	✓
*Ag*GPS 542 receiver	✓	✓	✓

Notes:

- *For quick release magnetic mounting with an AG-372 receiver, order the kit listed in Antenna mounting kits, page 8 and bolt the V plate to the spar.*
- *With all other antennas, bolt the V plate to the spar for high accuracy and repeatability.*
- *For WAAS, EGNOS, OmniSTAR VBS and DGPS applications, place either of the plates in a firm location using the VHB.*

Mounting an adjustable spar to roof bolts

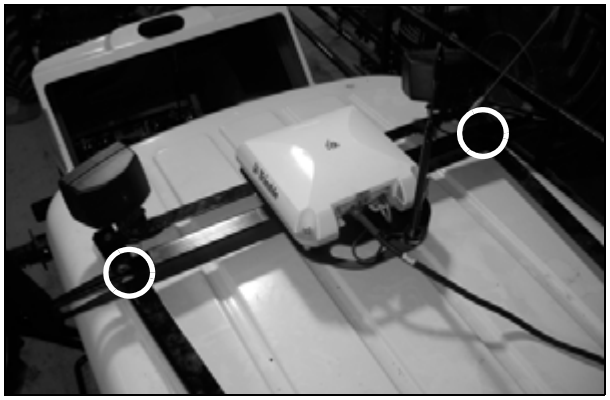
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

Step 1

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.



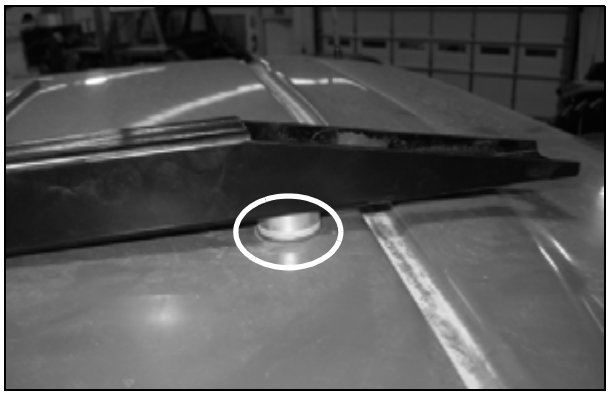
If you use the light bracket, drill two holes to match the spar width.



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 receiver is offset to the left or the right of the vehicle, 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.*



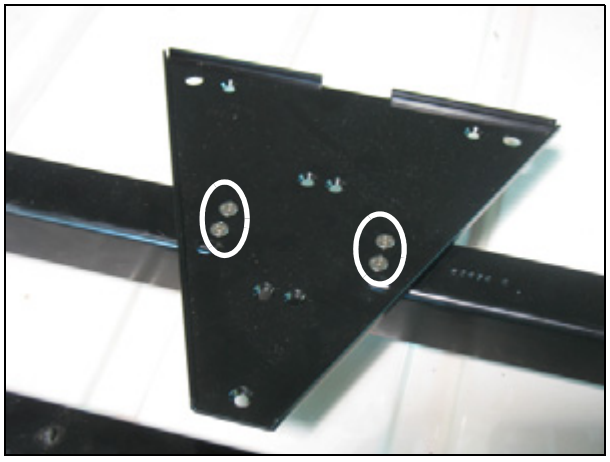
Step 4

For either of the following applications:

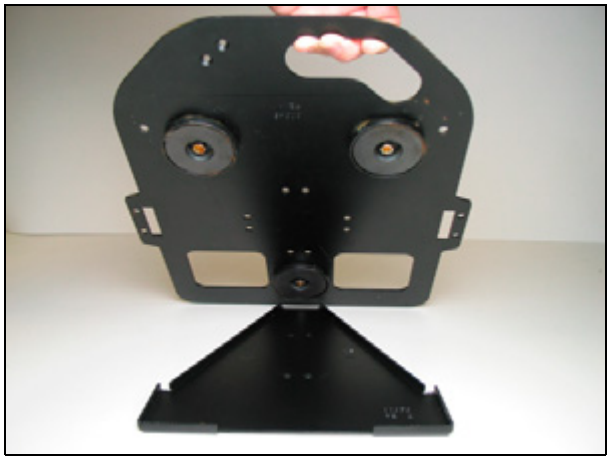
- A single magnet antenna mount
- An AG-372 receiver with magnetic option for quick removal

Attach a V plate with four ¼" flathead screws.

The narrow end points to the front of the vehicle.



V plate on the spar



Magnetic mount on the V plate

If you use a standard AG-372 plate for permanent mounting, install the radio antenna first. Use four ¼" flathead screws to attach the plate, with the handle toward the back of the vehicle.

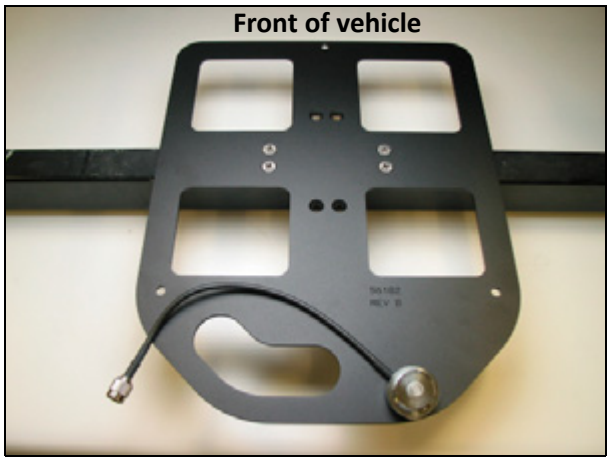


Plate on the spar

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.

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

- **RTK, RTX, 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, applications** – Use a P/N 62034 plate for simplified installation in applications where high accuracy is not critical.

Step 1

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

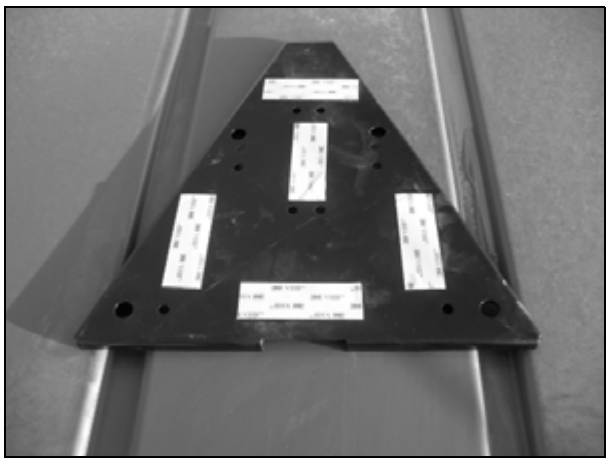


Step 2

V plate only

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

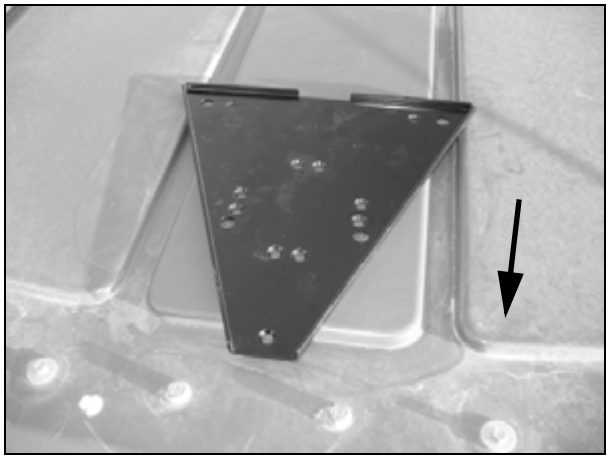
Note – *The VHB strips are pre-applied to the P/N 62034 plate.*



Step 3

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

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

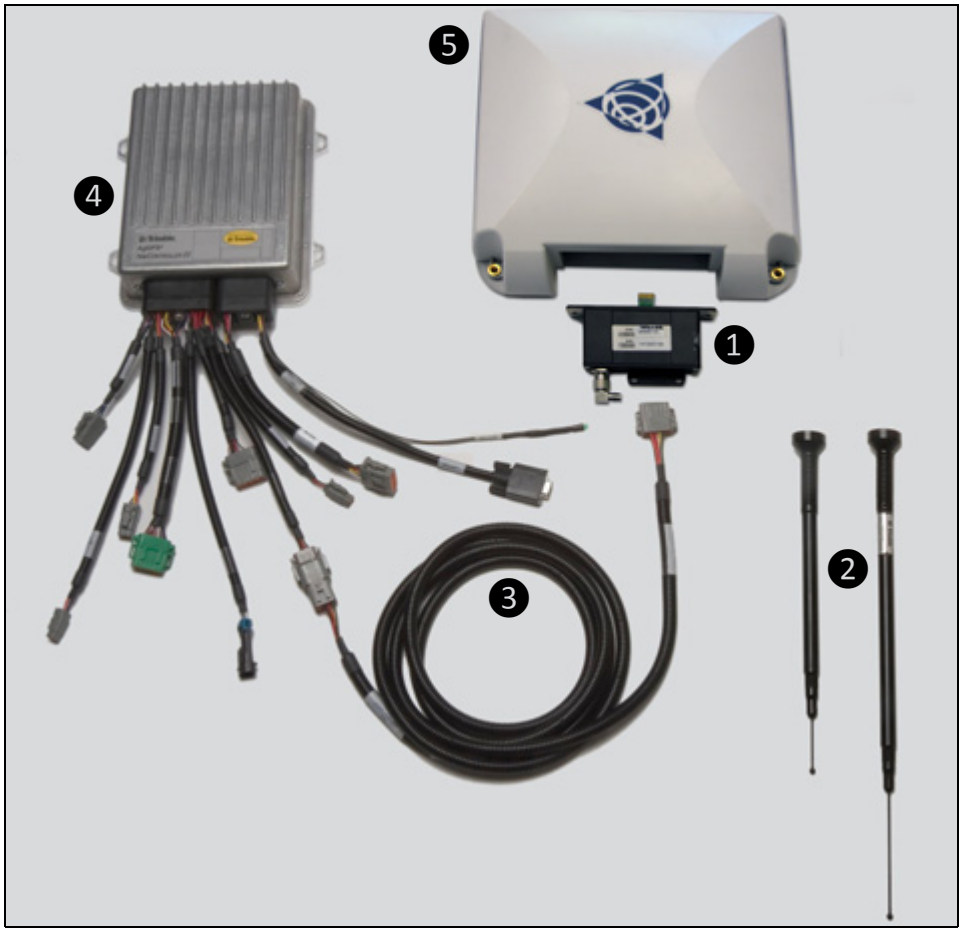


V plate



P/N 62034

AG-372 receiver with *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 one of the following:

- For a removable installation, attach a V plate to a spar and then stick the receiver plate to the V plate with magnets.
- For a permanent installation, bolt the receiver plate to a spar.

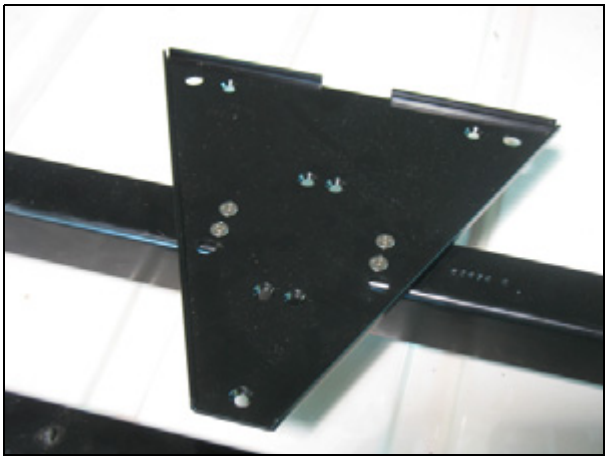
Removable installation

Step 1

V plate

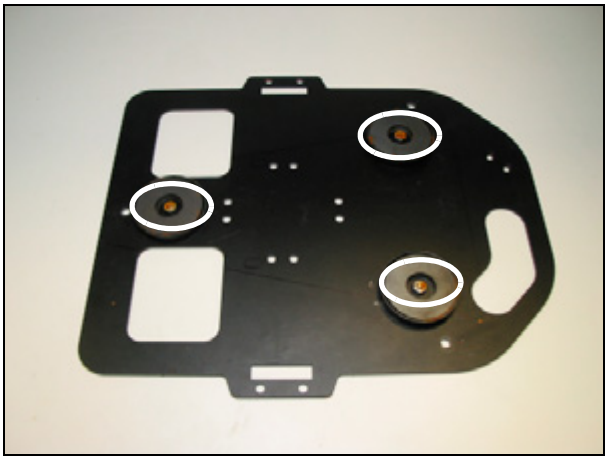
Attach the V plate to the spar using the ¼" flathead screws provided in the V plate bolt kit. Ensure that the narrow end points forward.

For spar mounting instructions, see page 39.



Mounting plate

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



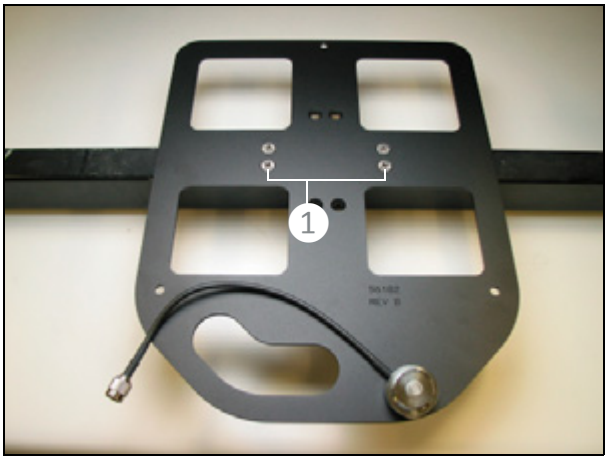
Underside of plate

Permanent installation

Step 1

Use the four provided ¼" flathead screws ❶ to attach the receiver mounting bracket to the spar.

For spar mounting instructions, see page 39.



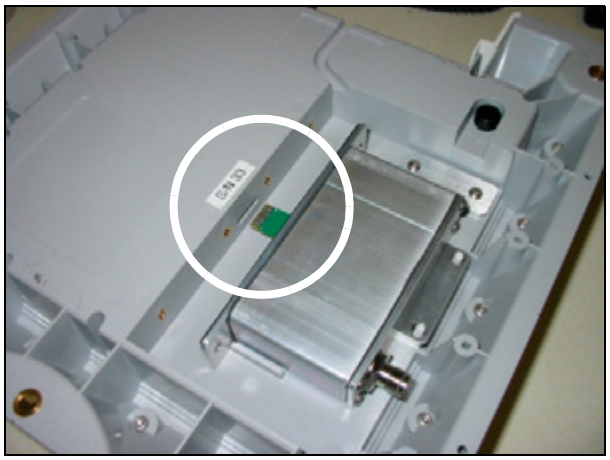
Step 2

Remove the blanking plate and set it aside.



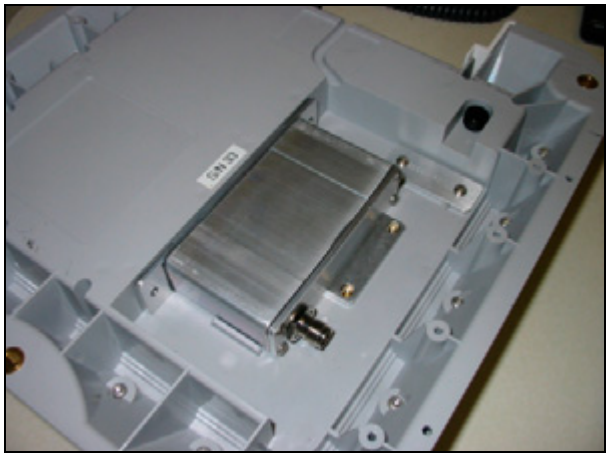
Step 3

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.



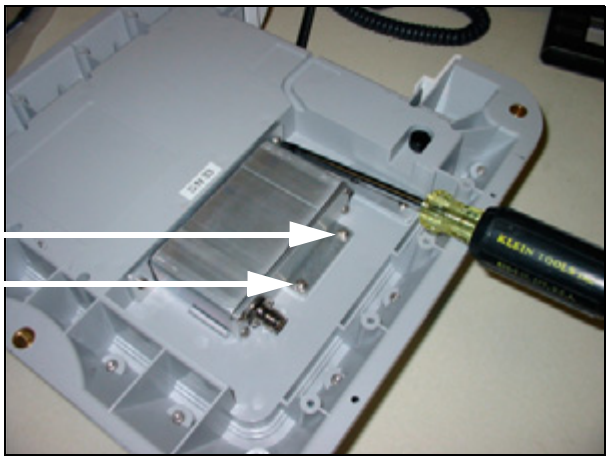
Step 4

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



Step 5

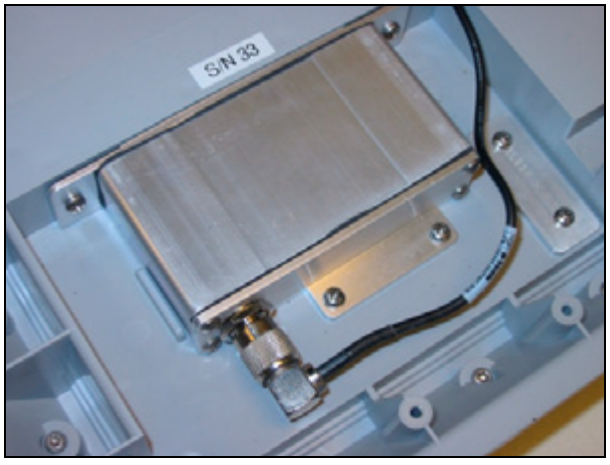
Use a #1 or #2 Phillips screwdriver and the supplied screws to install the integrated radio. First insert and tighten the two screws on the horizontal wall (arrowed), and then insert the remaining screws.



Step 6

Install the supplied antenna cable.

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

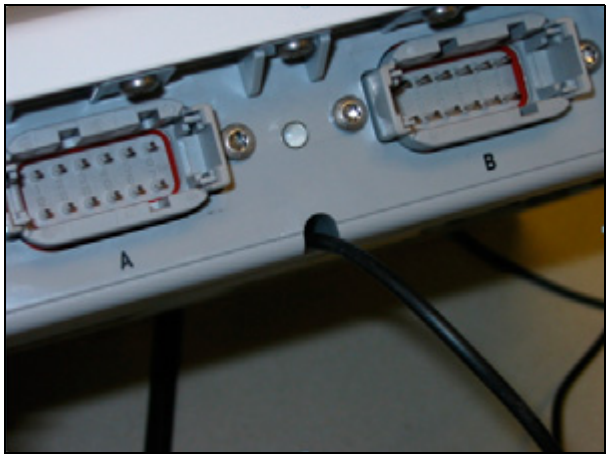


Step 7

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

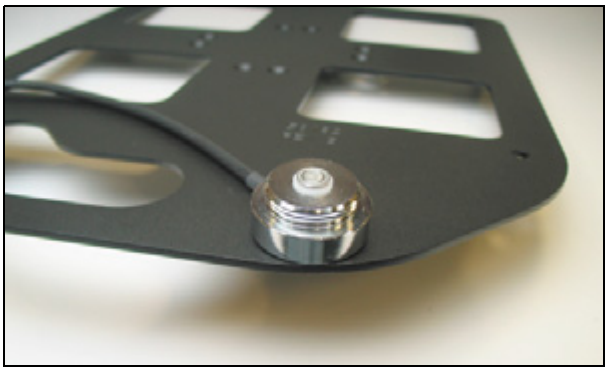


This image shows the unit with the cable routed through the channel.



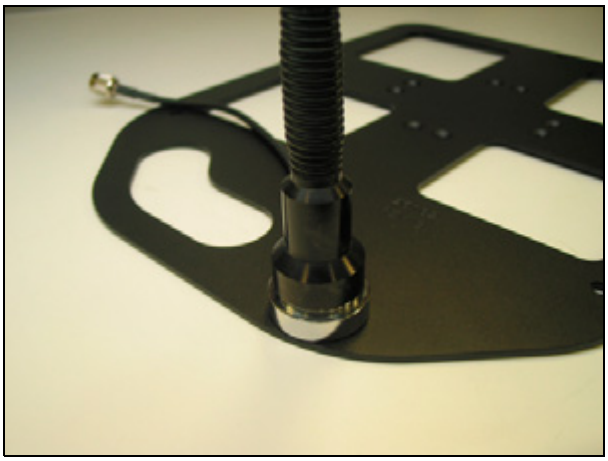
Step 8

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



Step 9

Attach the radio antenna to the antenna base.



Step 10

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.



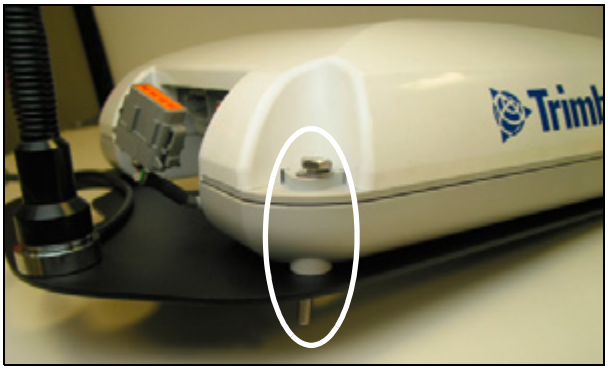
Step 11

Insert the nylon bushings provided.



Step 12

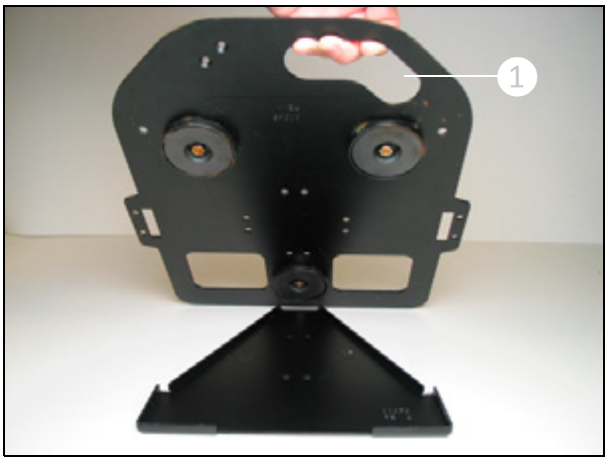
Insert the bolts through the receiver, radio, and mounting bracket. Place nuts on the bolt ends and then tighten them.



Step 13

Magnet method

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

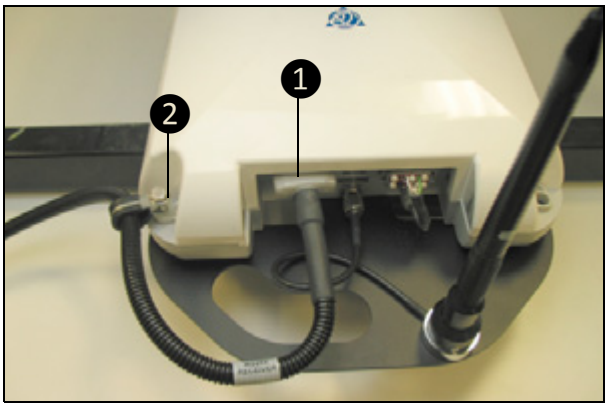


Step 14

Both methods

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

Route the cable into the cab and into the controller.



Installing an AG-372 receiver with magnetic feet

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

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

Step 1

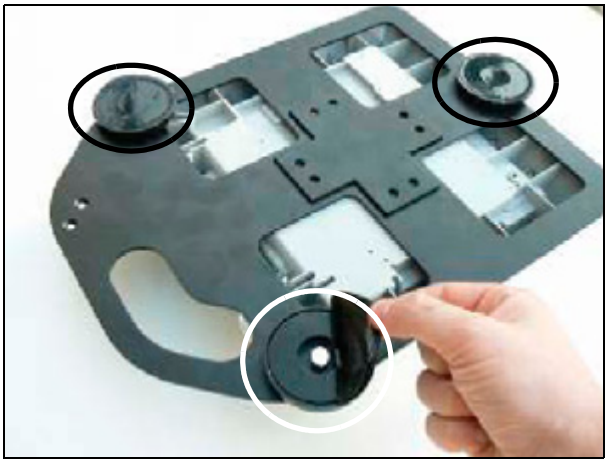
Attach the magnets to the receiver mounting plate. Use the three ¼" bolts to mount the AG-372 receiver.

Place the nuts on the receiver side.



Step 2

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

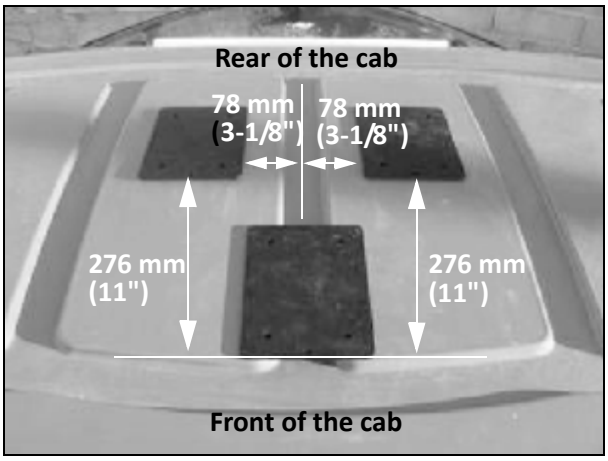


Step 3

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

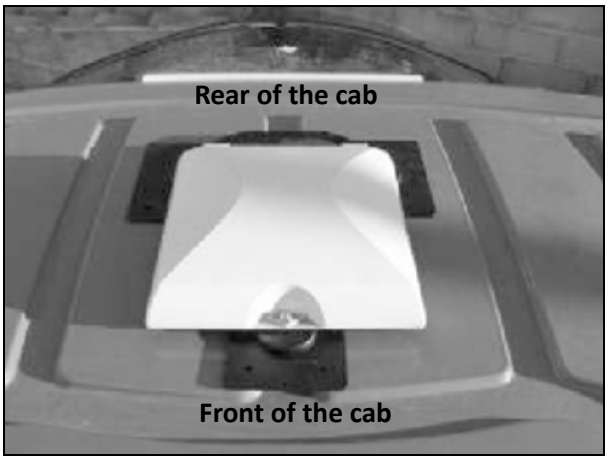
Remove the backing from the VHB strips and then apply the plates to the cab roof.

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



Step 4

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

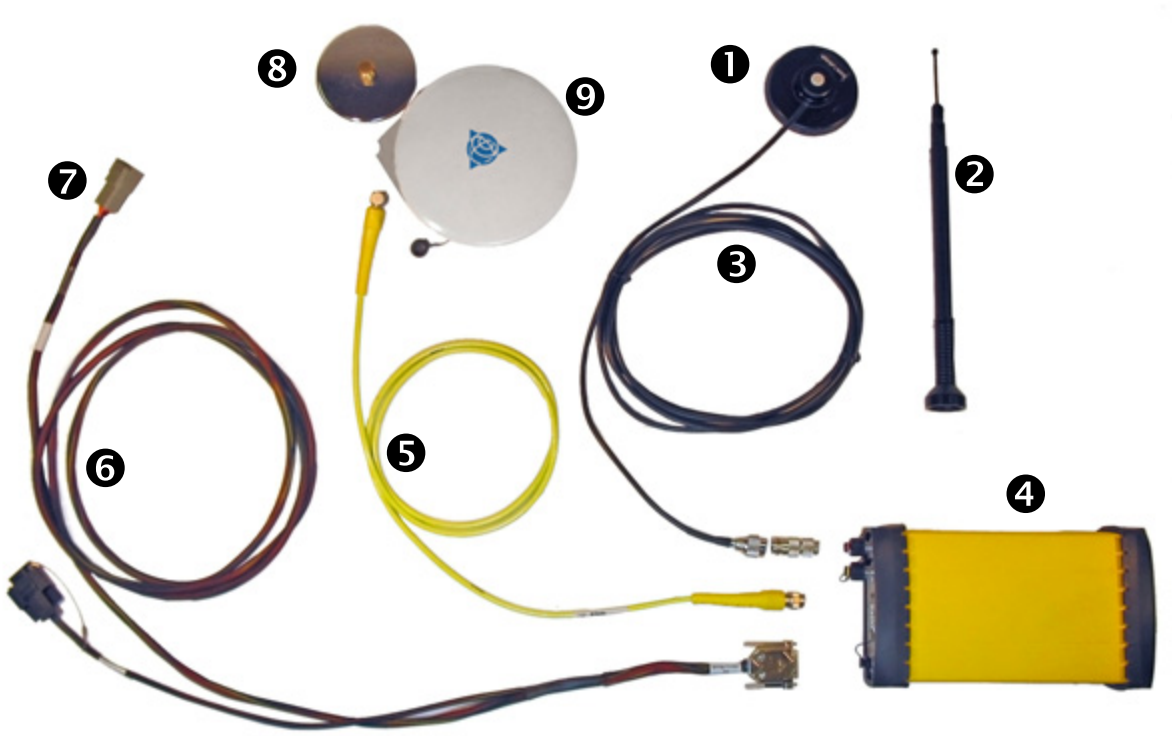


Step 5

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



*Ag*GPS 542 receiver components



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

Installing the *Ag*GPS 542 receiver

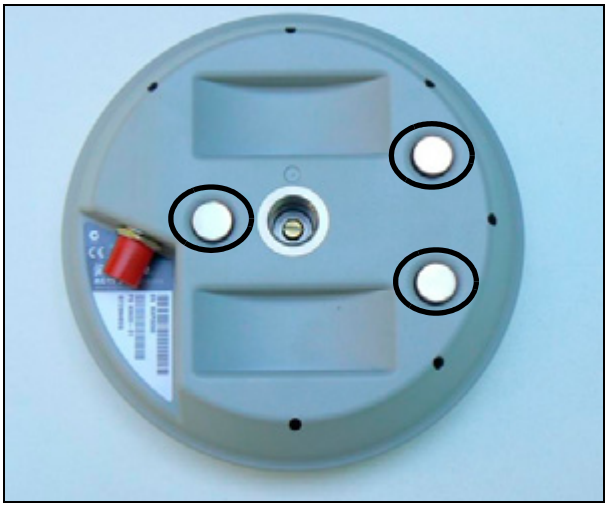
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

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.

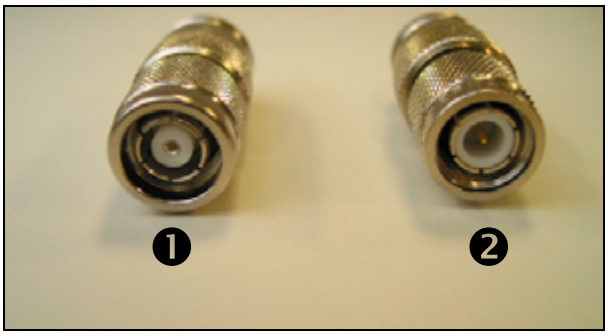


Step 5

Identify the correct adaptor for the radio connection:

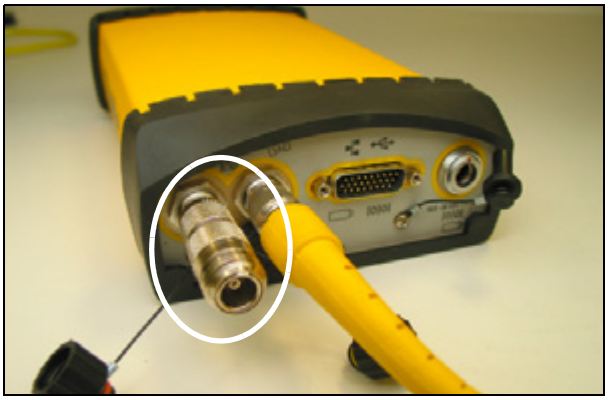
❶ Reverse polarity TNC-to-N for 900 MHz radios

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



Step 6

Attach the adaptor to the radio port.



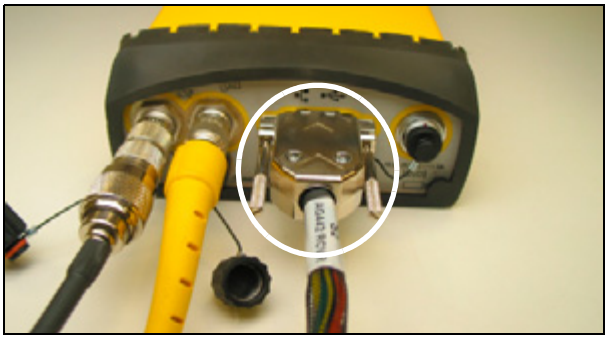
Step 7

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

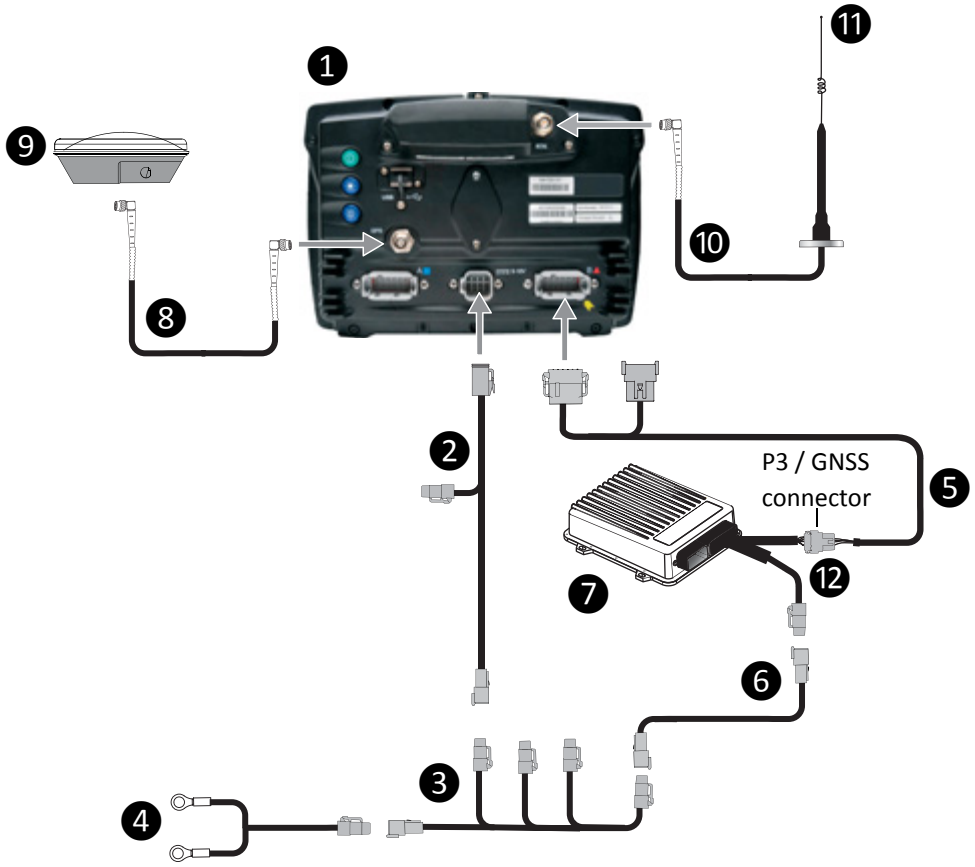
Display Installation

In this chapter:

- CFX-750 display components
- FmX integrated display components
- Preparing the CFX-750 display
- Installing the CFX-750 display
- CFX-750 display: Installing the wiring harness
- 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.

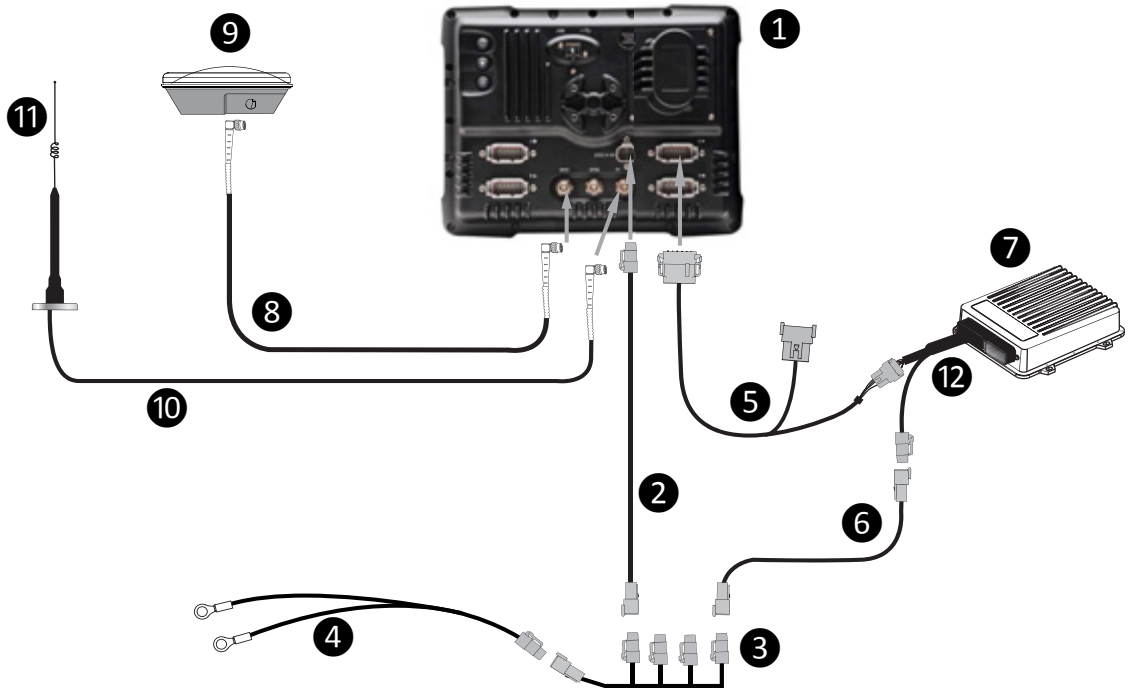
CFX-750 display components



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

Item	Description	Trimble part number
❶	CFX-750 display ***Note –*** *RTK password required.*	94110-xx
❷	CFX-750 power cable	77282
❸	CFX-750 power cable with relay and switch (power bus)	67259
❹	Basic power cable	67258
❺	Display 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

FmX integrated display components



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

Item	Description	Trimble part number
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	Display 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.



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.

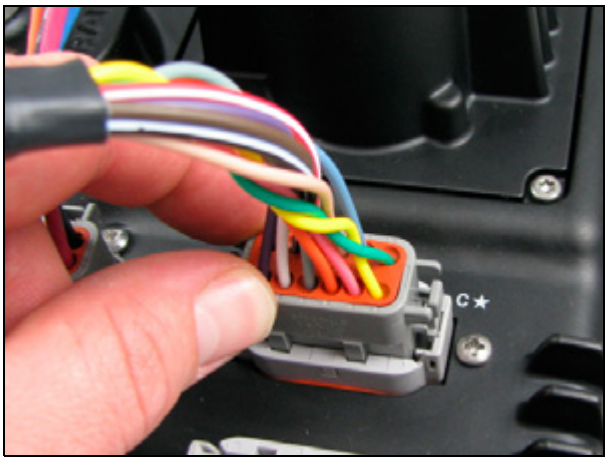
Step 1

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.

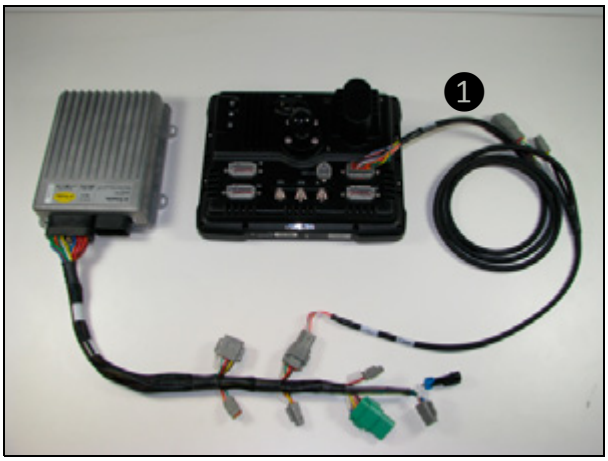
To connect power to the FmX integrated display, see Chapter 8, Controller Installation.



FmX integrated display: Installing the wiring harness

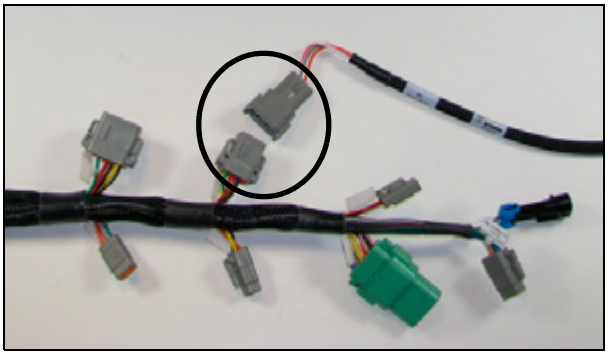
Step 1

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

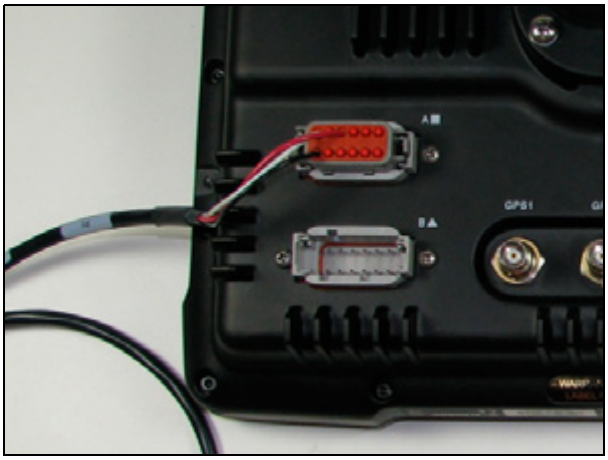
Step 3

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**.*

Use one of the following methods:

- Spar mount
- VHB adhesive

Spar mount method

Trimble recommends that you use this method for RTK and OmniSTAR operations. For more information, see Antenna and receiver installation options, page 38.

Use a ⅝" bolt to attach the AG-25 antenna to the spar. An example installation is shown on the right.



VHB adhesive method

Standard P/N 62034 plates are provided in both FmX and CFX-750 display 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 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.

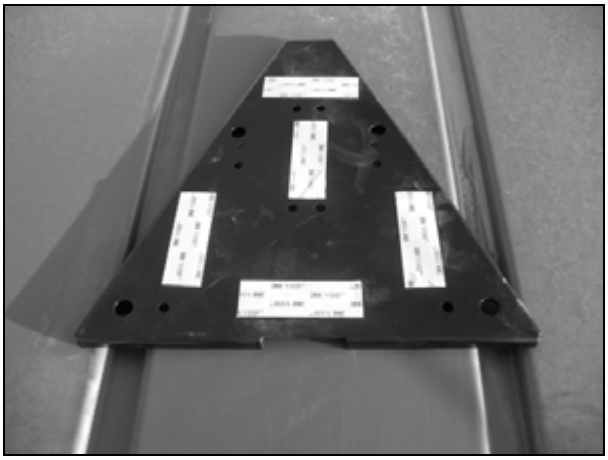


Step 2

V plate only

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

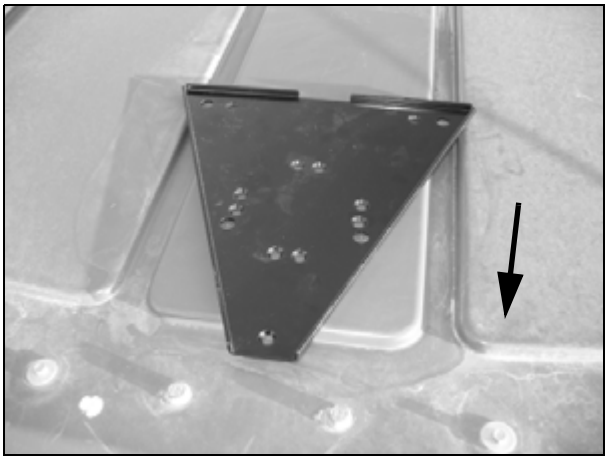
Note – *The VHB strips are pre-applied to the P/N 62034 plate.*



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.*



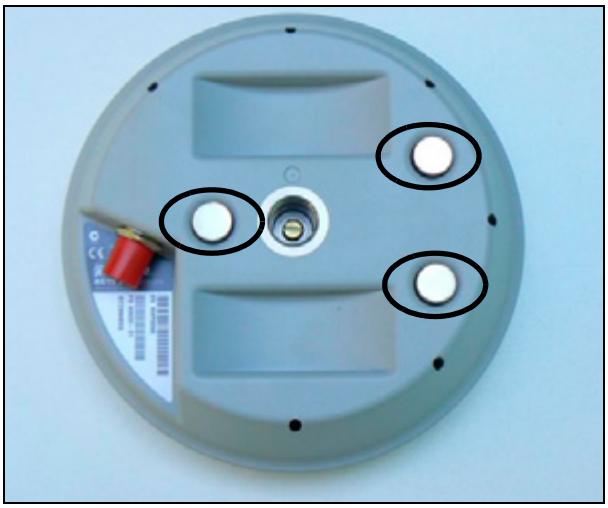
V plate



P/N 62034

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, RTX, OmniSTAR, DGPS, applications

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



WAAS, EGNOS, VBS 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

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 6

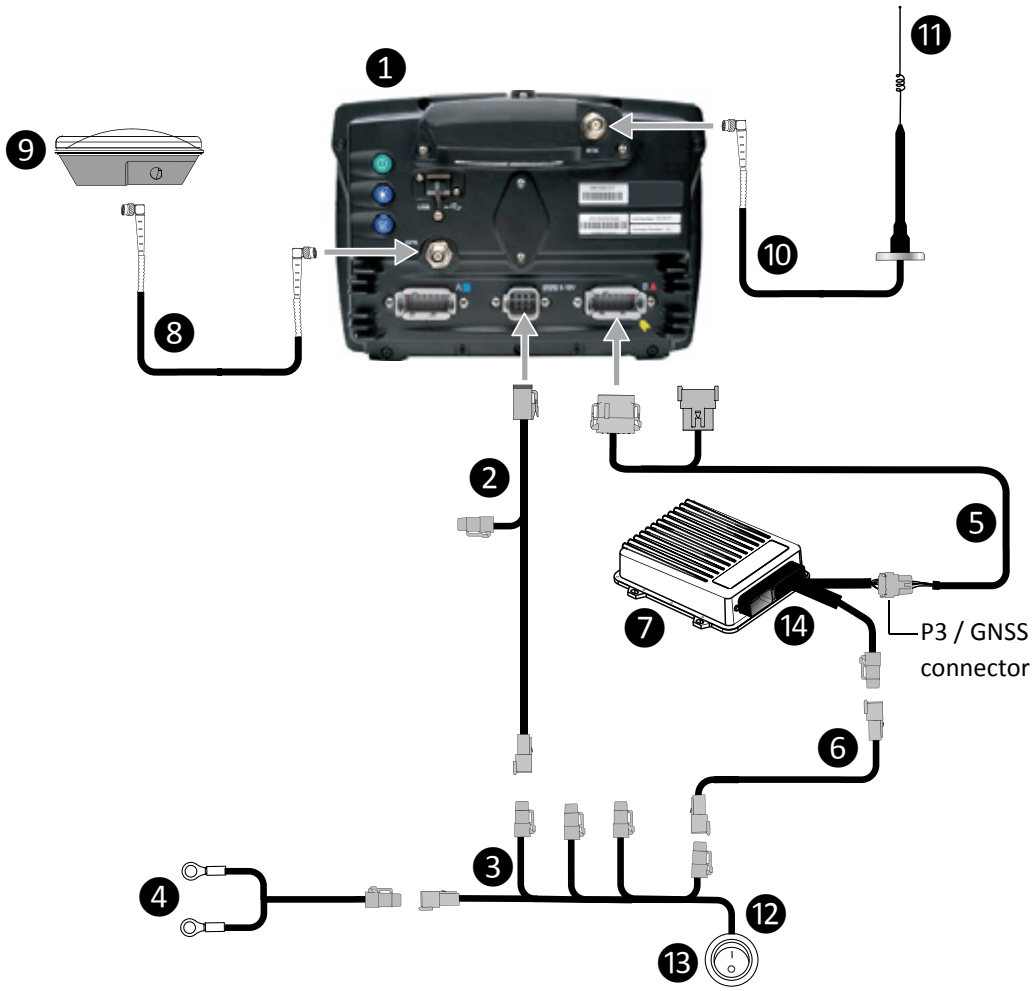
Power Harness Installation

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

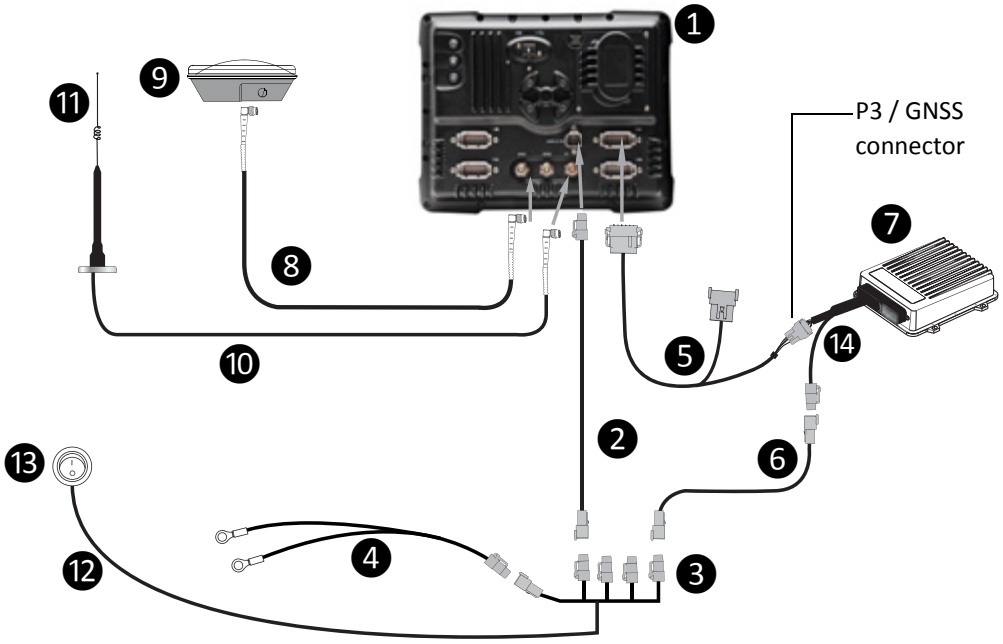


⚠ **CAUTION –** Connecting the Port Replicator on the display to NavController II cable ❺ to the P4 or P12 connector of the NavController II harness ⓮ will result in damage to the display, and will void the warranty.

Item	Description	Trimble part number
❶	CFX-750 display ***Note –*** *RTK password required.*	94110-xx
❷	CFX-750 power cable	77282
❸	CFX-750 power cable with relay and switch (power bus)	67259
❹	Basic power cable	67258
❺	Display to NavController II cable with port replicator	75741
❻	2-pin DTM to 2-pin DT power adaptor	67095

Item	Description	Trimble part number
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	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 display to NavController II cable ❺ to the P4 or P12 connector of the NavController II harness ⓮ will result in damage to the display, and will void the warranty.

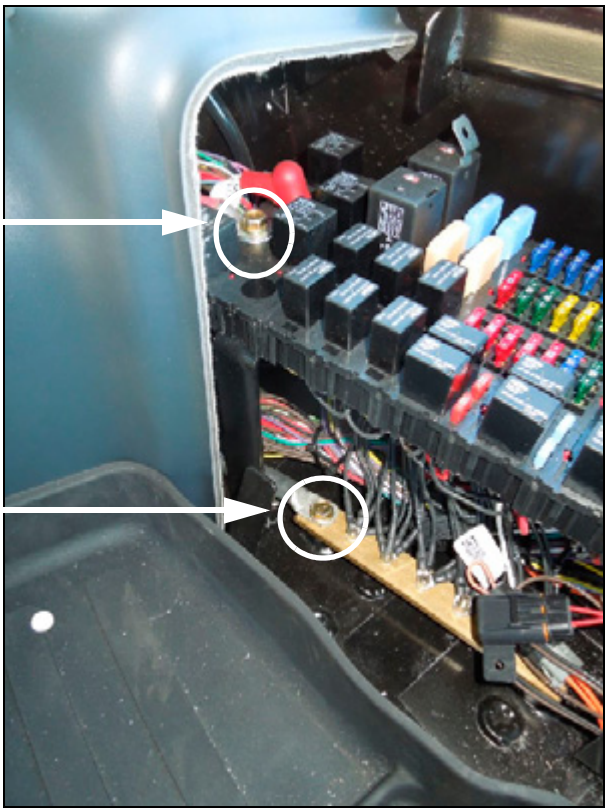
Item	Description	Trimble part number
❶	FmX integrated display	93100-02
❷	FmX power cable	66694
❸	FmX power cable with relay and switch (power bus)	67259
❹	Basic power cable	67258
❺	Display to NavController II cable with port replicator	75741
❻	2-pin DTM to 2-pin DT power adaptor	67095
❼	NavController 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	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

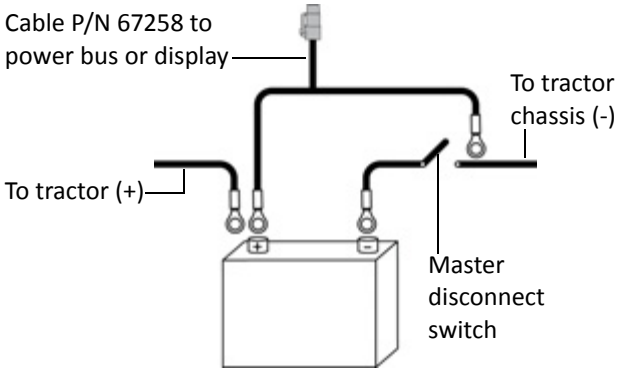
WARNING – To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

Step 1

The power for the display is best routed to the vehicle power bus, shown in the picture on the right.

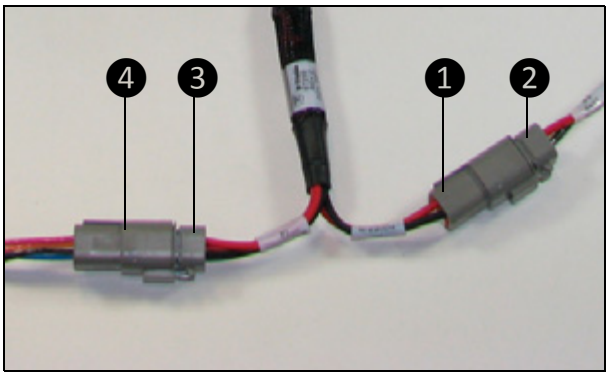


CAUTION – If the vehicle has a master electrical disconnect, make sure the basic power cable (P/N 67258) is ***not*** directly attached to the battery terminal that is disconnected by the master switch - the negative pole in this example.
Attach this terminal side just past the main disconnect so that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

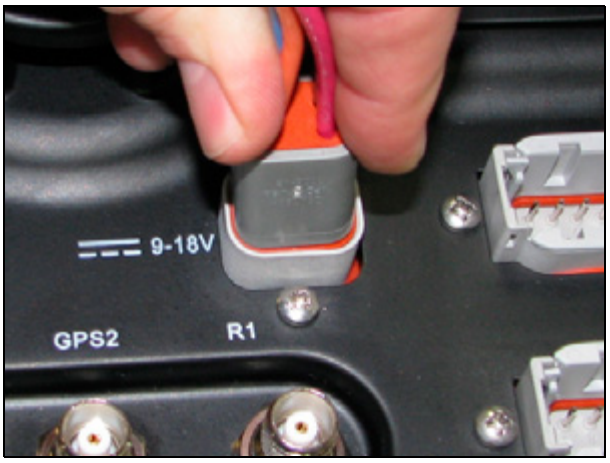


Step 3

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

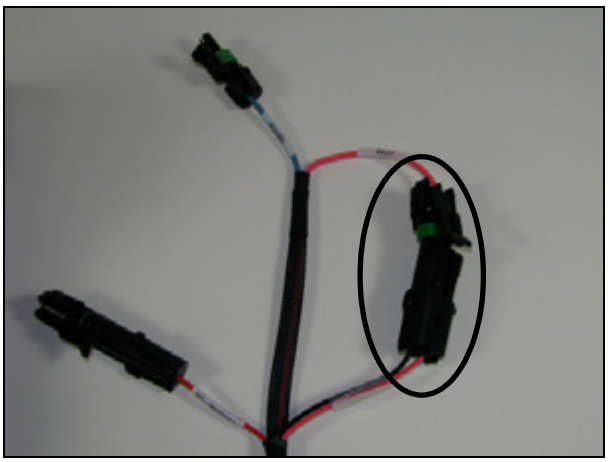
⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

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

- The display power button
- An external switch
- Ignition sensing

The display power button

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



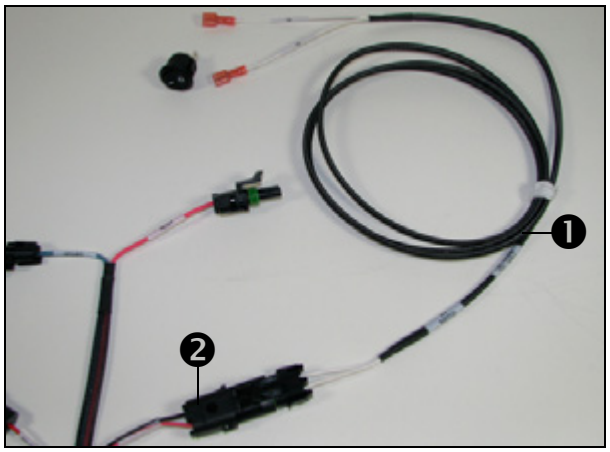
An external switch

Standard switch option

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.

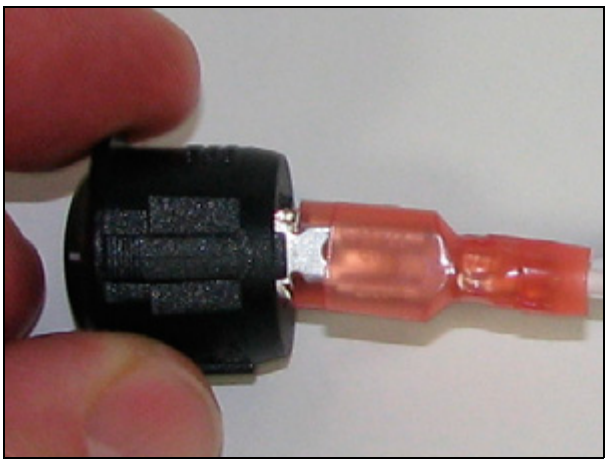
Note – *To install the switch provided, drill a ¾" hole.*



Step 2

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

Note – *Polarity is not important.*

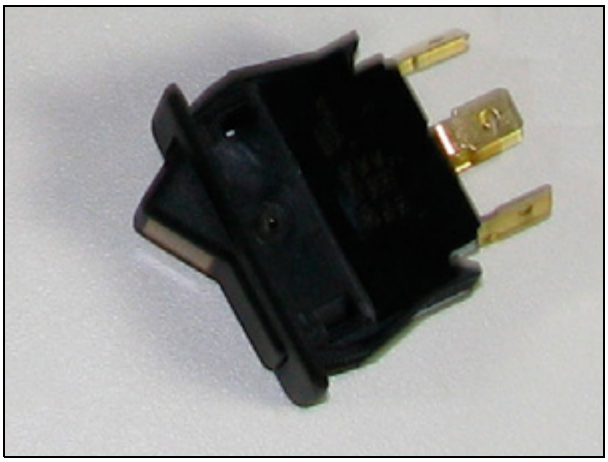


Illuminated full or standard Euro switch

Step 1

Find an available knockout location on the vehicle console.

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

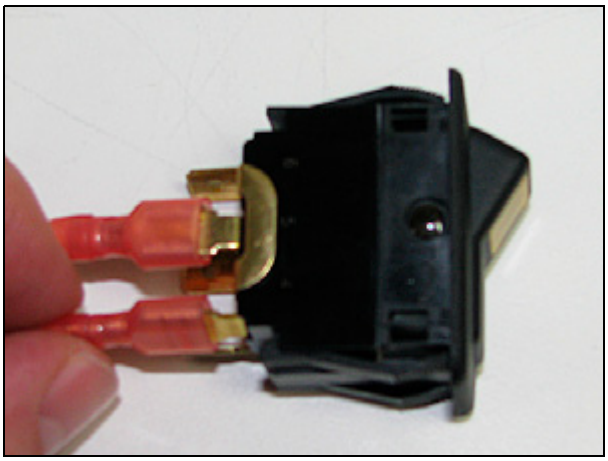


Step 2

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

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

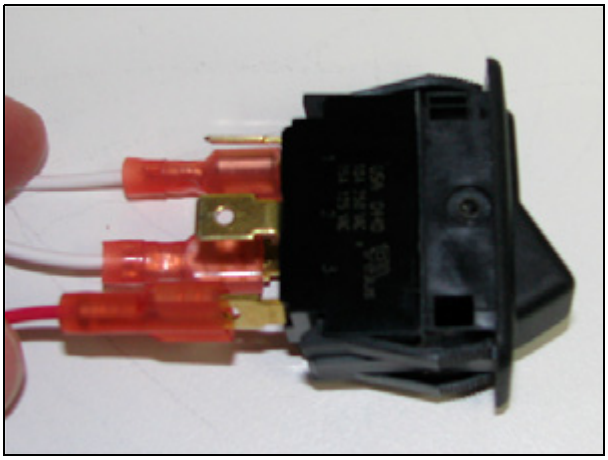
Note – *Polarity **is** important.*



Step 3

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

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

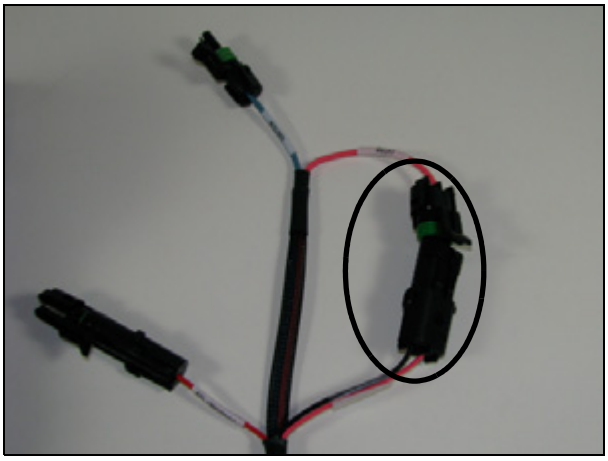


Ignition sensing

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.

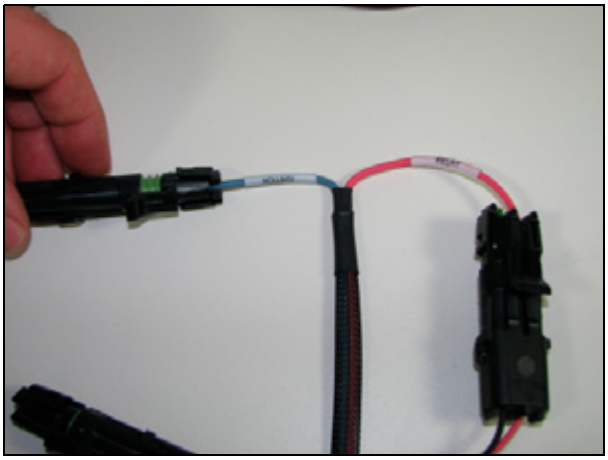


Step 2

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

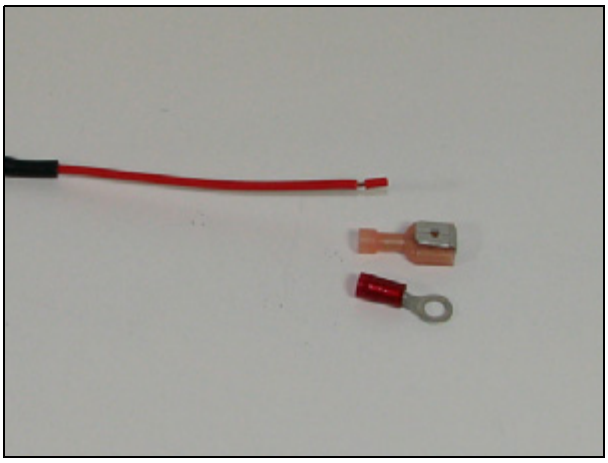
Step 3

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

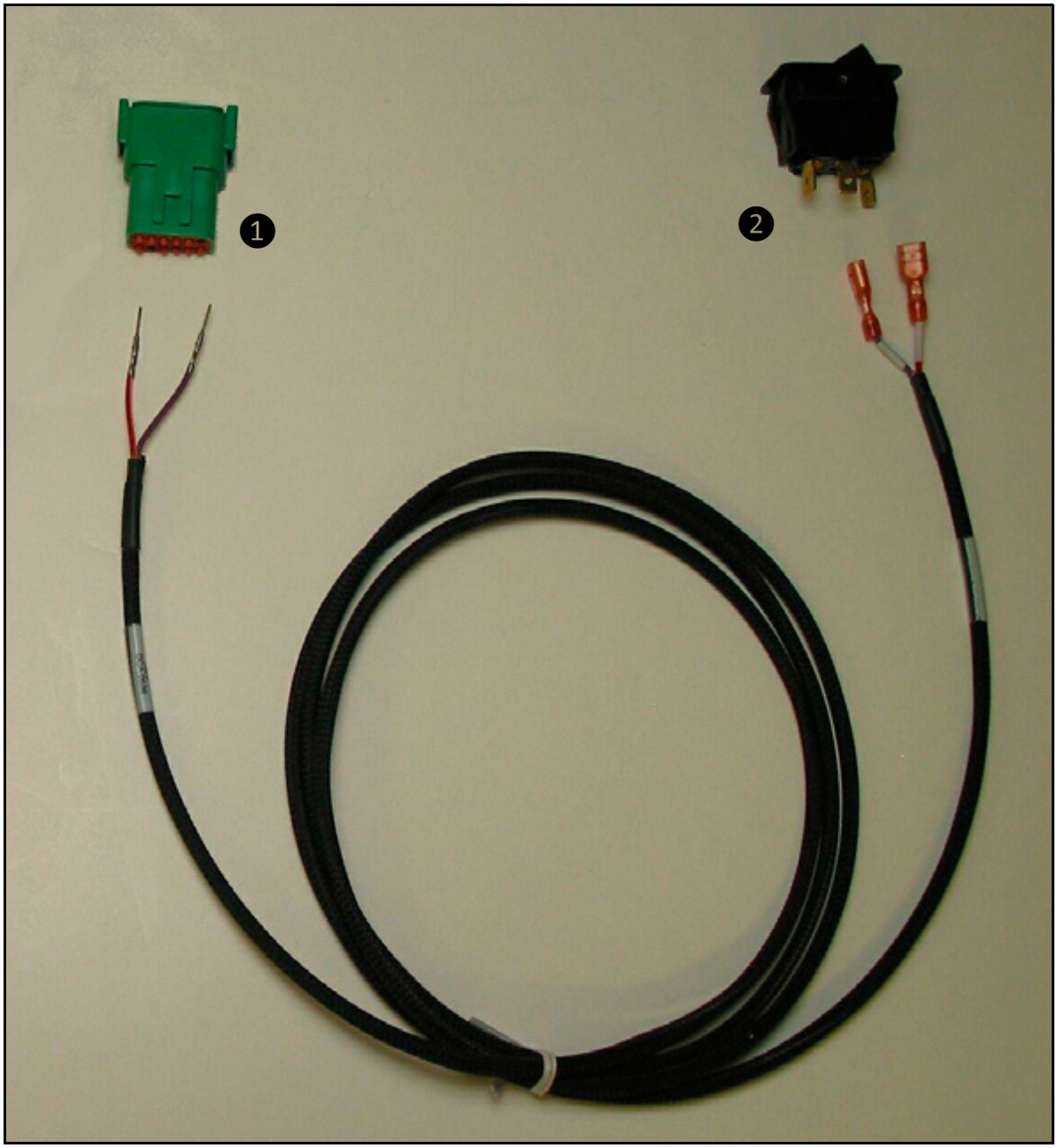
Remote Engage Switch Installation

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

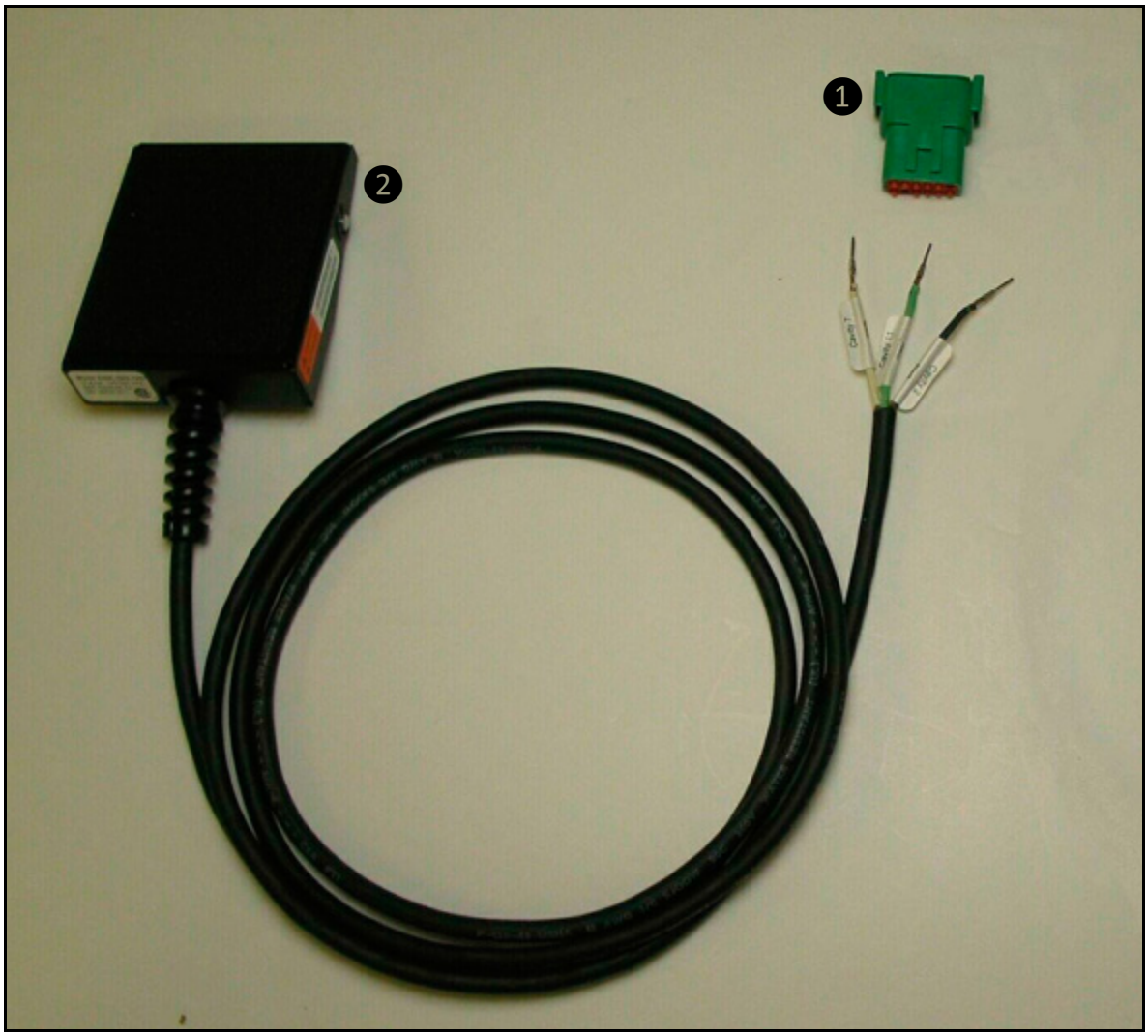
This chapter describes how to install the remote engage switch.

Remote engage switch components: Rocker switch



Item	Description
❶	DTM receptacle
❷	Remote engage rocker switch

Remote engage switch components: Foot switch

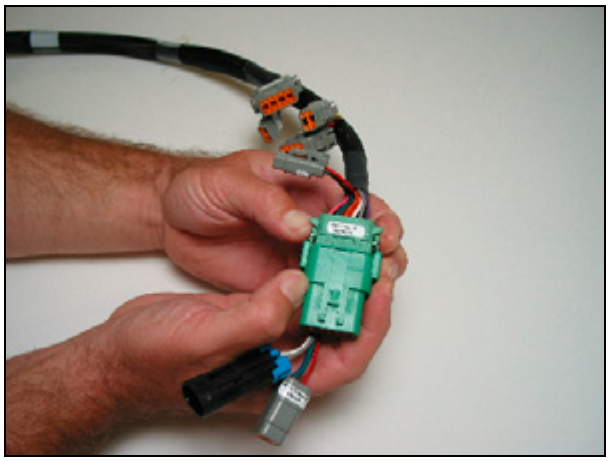


Item	Description
❶	DTM receptacle
❷	Remote engage foot switch

Preparing the remote engage cable

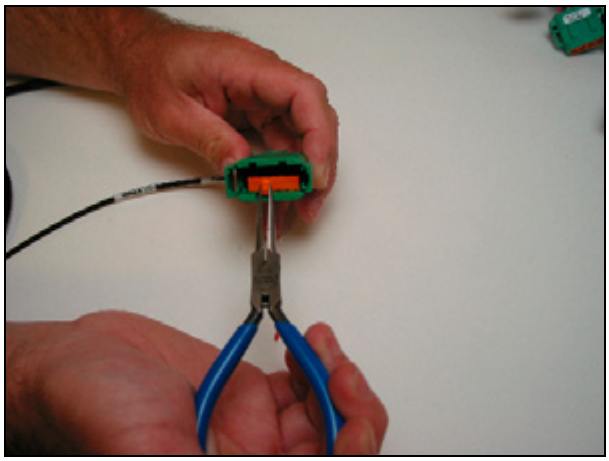
Step 1

Locate the green 12-pin Deutsch receptacle on the P5 leg of the main controller harness. For more information, see Chapter 8, Controller Installation.



Step 2

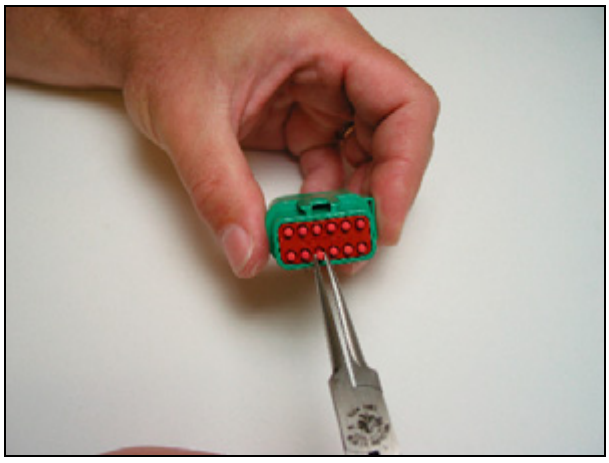
Remove the wedge from the connector.



Step 3

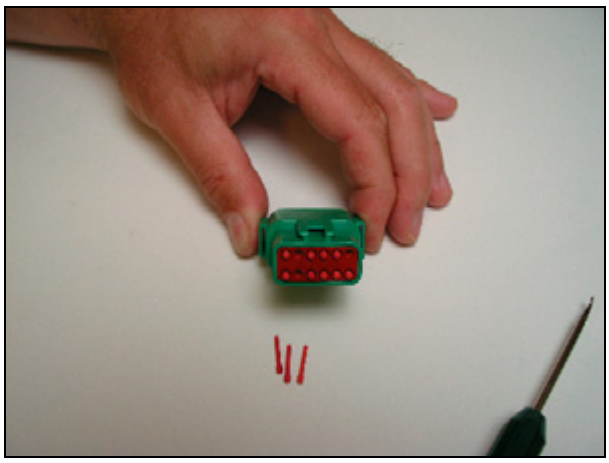
Rocker switch only

Remove the plugs from cavity 2 and cavity 7.



Foot Switch Only

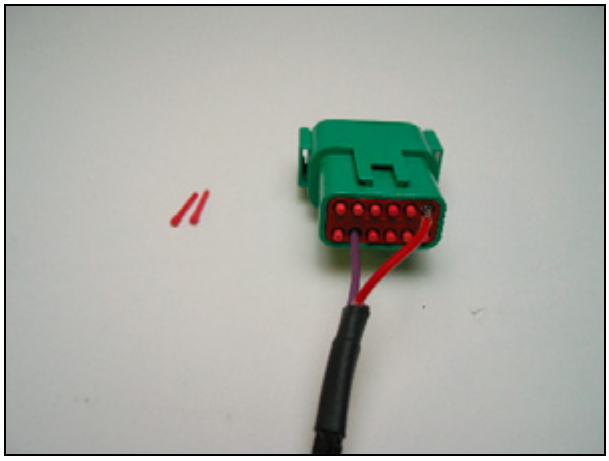
Remove the plugs from cavity 2, cavity 7, and cavity 11.



Step 4

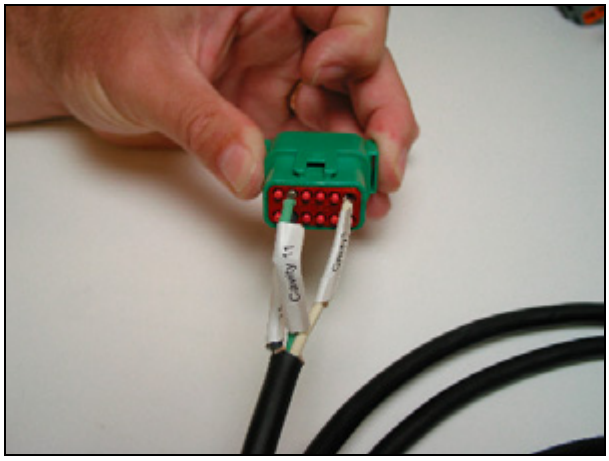
Rocker switch only

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



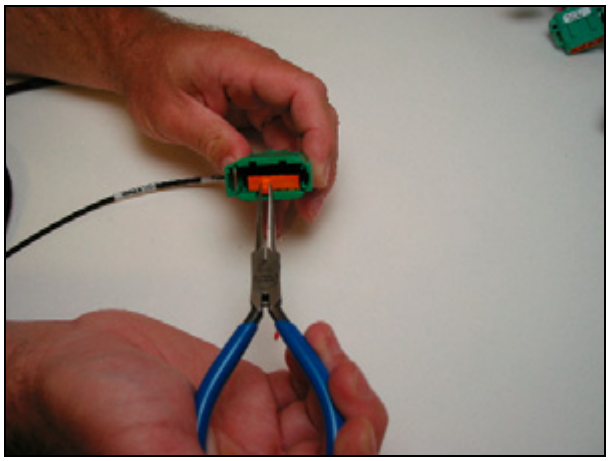
Foot switch only

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

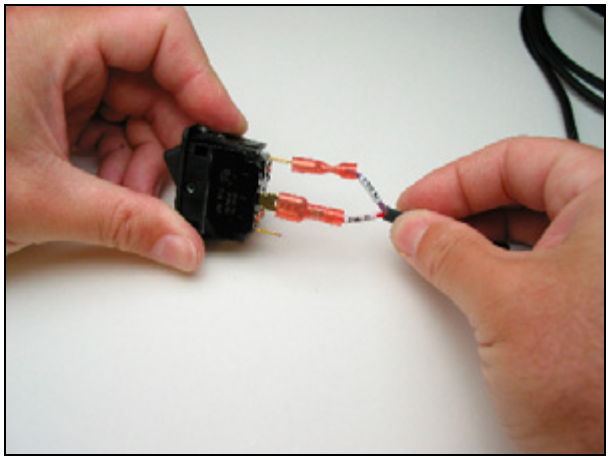
Run the cable to a clear location on the floor board. Use double-sided tape to secure the pedal. Route the cable under the floor mat.



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.

Step 1

Mount the controller to the right-side of the seat base.



Step 2

Some newer models have mounting holes. If they are present, use the supplied hardware to install the mount plate.

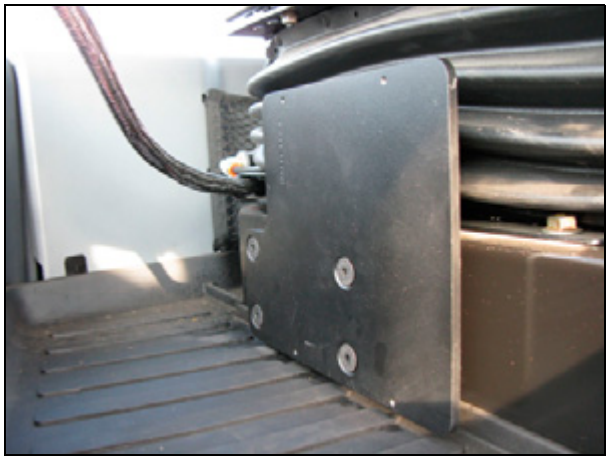
If the mounting holes are not present, use the mount plate as a template and match-drill four 10 mm clearance holes in the seat base.



Step 3

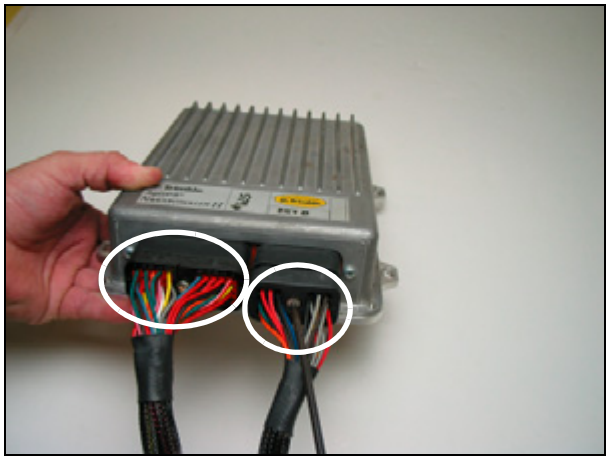
Use the four supplied M10 flat head bolts and four spacers to mount the plate to the seat base. The spacers provide additional clearance for the seat at its lowest adjustment. If the threaded holes are available, tighten the bolts securely. If the holes were drilled, install the supplied M10 Nylok nuts to secure the bracket to the seat base.





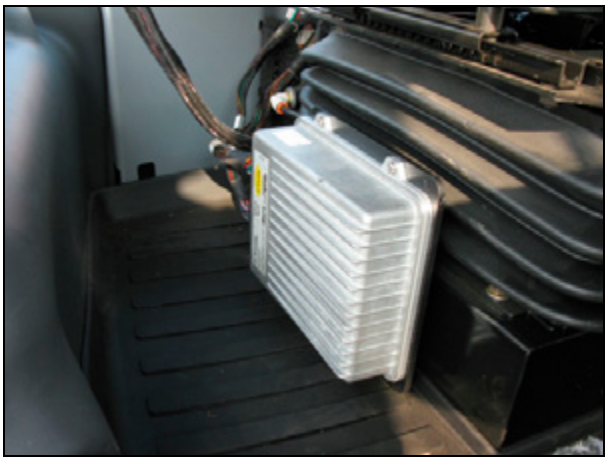
Step 4

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

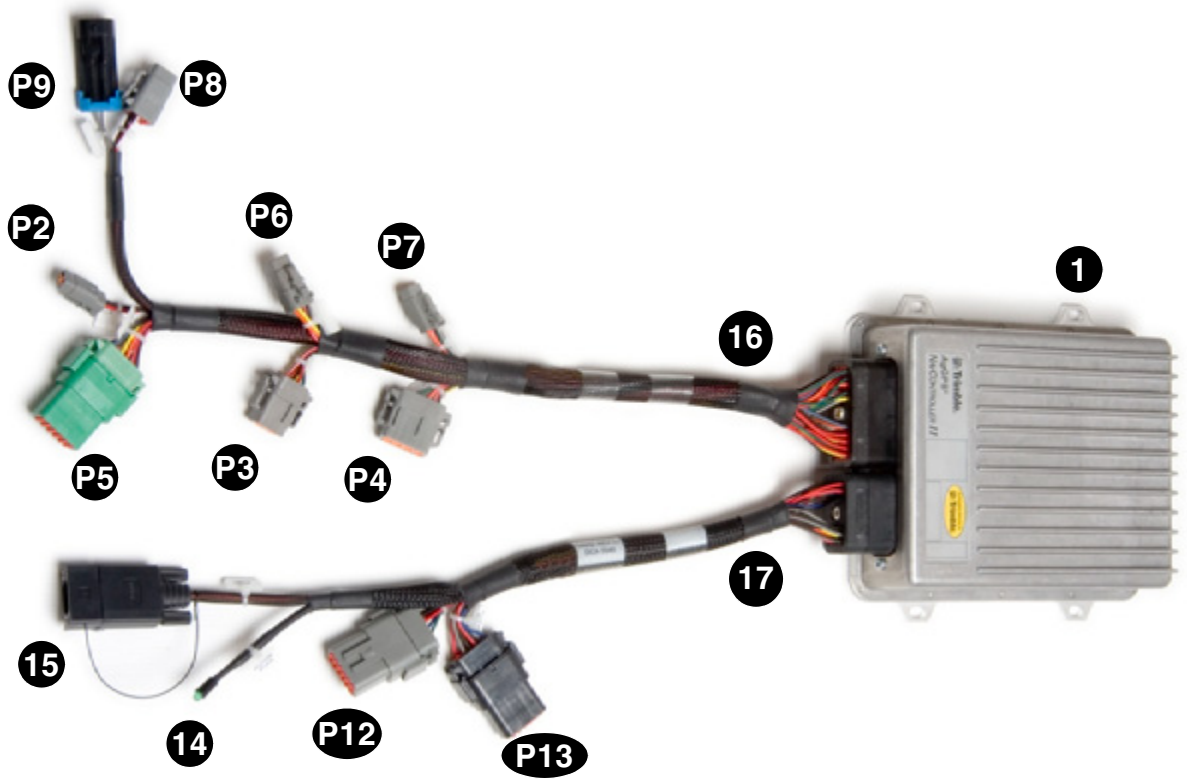


Step 5

Use the four #10 Phillips screws provided in the bolt kit to mount the controller to the bracket.



Controller connections



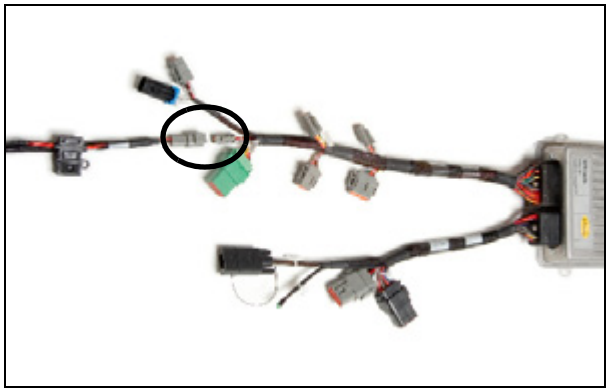
Item	Description
1	NavController II controller
P2	Power connector
P3	GNSS connector
P4	Display connector
P5	Vehicle sensors connector
P6	Steering sensor connector
P7	Manual override connector
P8	Hydraulic valve connector

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

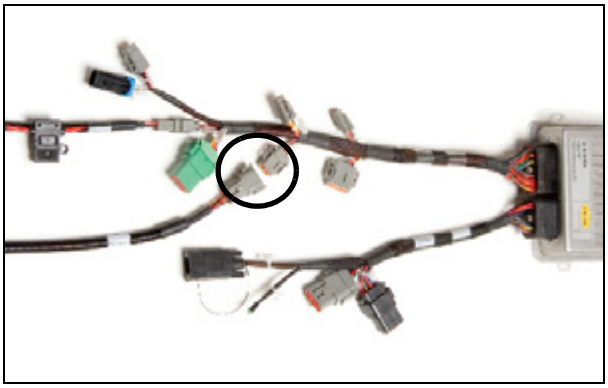
Connect the power cable connection to P2, which is labeled **Power**. P2 is located on the main wiring harness.

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



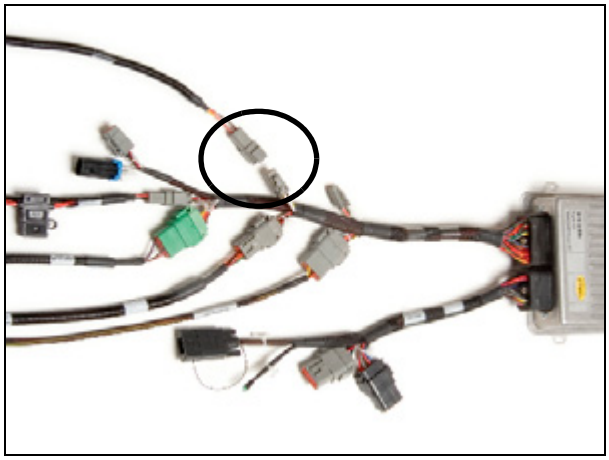
Step 2

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



Step 3

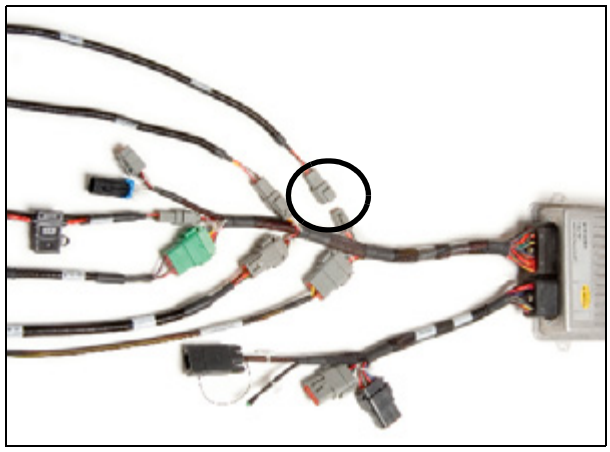
Connect the steering sensor cable connection to P6, which is labeled **Steering Sensor**. P6 is located on the main wiring harness.



Step 4

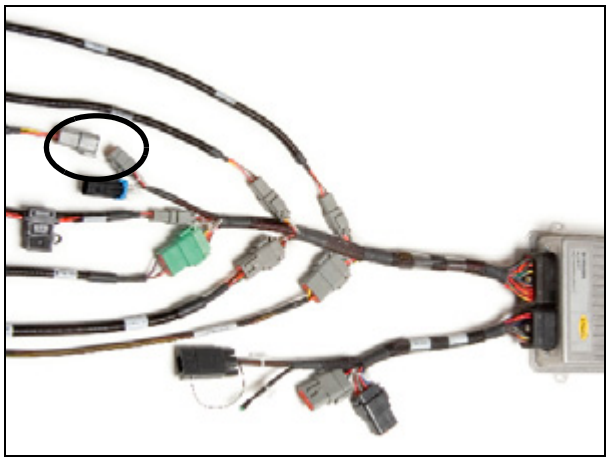
Connect the manual override cable connection to P7, which is labeled **Manual Override**. P7 is located on the main wiring harness.

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



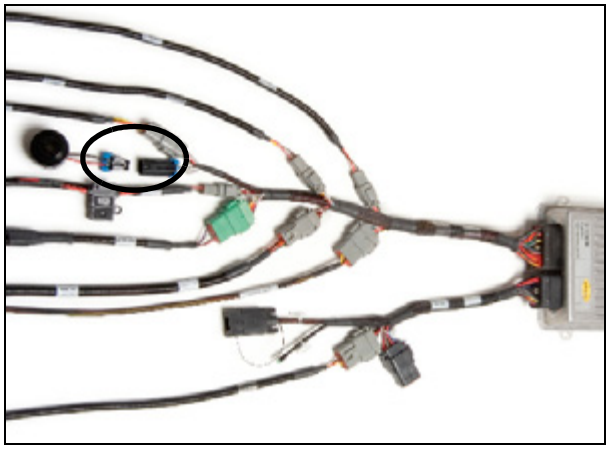
Step 5

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



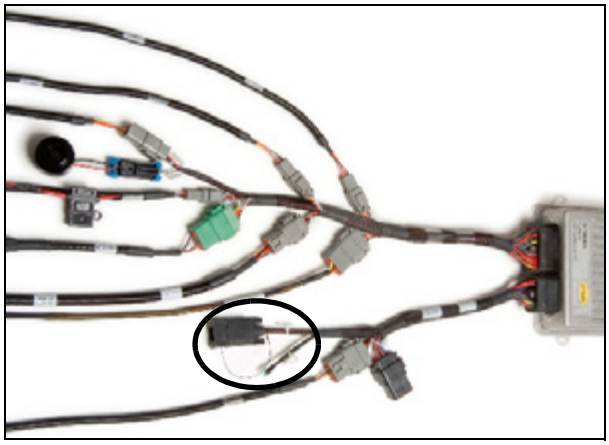
Step 6

Connect the Sonalert P9 to the 2-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 external vehicle 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