Autopilot

AUTOMATED STEERING SYSTEM

INSTALLATION INSTRUCTIONS

John Deere Tractor,
Mid-year 2014+ models

- 5090R / 5100R / 5115R / 5125R
- 7210R / 7230R / 7250R / 7270R / 7290R
- 8245R / 8270R / 8295R / 8320R / 8345R / 8370R

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July 2021
P/N 78100-88-RS-E08

Trimble

Legal Notices

Agriculture Business Area

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Release Notice

This is the July 2021 release (Revision A) of the *EZ-Pilot Steering System Installation Guide*, part number 78100-88-RS-E08.

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.

Limited Warranty Terms and Conditions

Product Limited Warranty

Subject to the terms and conditions set forth herein, Trimble Inc. ("Trimble") warrants that this 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 original Product shipment from Trimble.

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Product software, whether built into hardware circuitry as firmware, provided as a standalone computer software product, embedded in flash memory, or stored on magnetic or other media, is licensed and not sold. If accompanied by a separate end user license agreement, use of any such software will be subject to the terms of such end user license agreement (including any differing limited warranty terms, exclusions and limitations), which shall control over the terms and conditions set forth in this limited warranty).

Software Updates

During the limited warranty period you will be entitled to receive such Fix Updates and Minor Updates to the Product software that Trimble releases and makes commercially available and for which it does not charge separately, 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 excluded from this update 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

ITrimble'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 confirm 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 cause by the Product as reasonably determine by Trimble following a root cause analysis. Where *Trimble* elects to replace a Product or parts, repair parts and replacement Products will be provided on an exchange basis and will be either new, equivalent to new, or reconditioned.

How to Obtain Warranty Service

To obtain warranty service for the Product, please contact your Trimble dealer. Alternatively, you may contact Trimble to request warranty service at +1-408-481-6940 (24 hours a day) or e-mail your request to trimble_support@trimble.com. Please be prepared to provide:

- your name, address, and telephone numbers
- proof of purchase
- this Trimble warranty card
- a description of the nonconforming Product including the model number
- an explanation of the problem.

The customer service representative may need additional information from you depending on the nature of the problem.

Warranty Exclusions and Disclaimer

This Product limited warranty shall only apply in the event and to the extent that (i) the Product is properly and correctly installed, configured, interfaced, maintained, stored, and operated in accordance with Trimble's applicable operator's manual and specifications, and; (ii) the Product is not modified or misused. This Product limited warranty 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 with hardware or software products, information, data, systems, interfaces or devices not made, supplied or specified by Trimble; (ii) the operation of the Product 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; (iv) damage caused by: accident, lightning or other electrical discharge, fresh or salt water immersion or spray; or exposure to environmental conditions for which the Product is not intended; 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.

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Notice to Our European Union Customers

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

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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 XPO Logistics
De Schakel 39-41
5651 GM Eindhoven
The Netherlands



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.

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⚠ **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.Add the following warnings.

⚠ **WARNING –** THE EZ-Pilot ASSISTED STEERING SYSTEM IS SOLELY INTENDED FOR AGRICULTURAL USE IN AN OPEN FIELD ENVIRONMENT WITH AGRICULTURAL VEHICLES APPROVED BY THE MANUFACTURER FOR USE WITH THE EZ-PILOT SYSTEM, AND SHOULD NOT BE USED WITH ANY OTHER TYPE OF VEHICLE OR FOR ANY OTHER PURPOSE.
Contact your local EZ-Pilot system reseller or check www.trimble.com to confirm that the EZ-Pilot system has been tested and approved by the manufacturer for use with your vehicle make and model. The EZ-Pilot system should not be installed on a vehicle not approved by the manufacturer for such use. Installation of the EZ-Pilot system on an unapproved vehicle will invalidate the product warranty.

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 avoid malfunctions, or damage to cables:
- route cables away from areas where they may be pinched or rubbed.
- do not alter cable lengths and connections. If you must alter the length of the power cable do not remove the fuse or fuse holder from the cable.

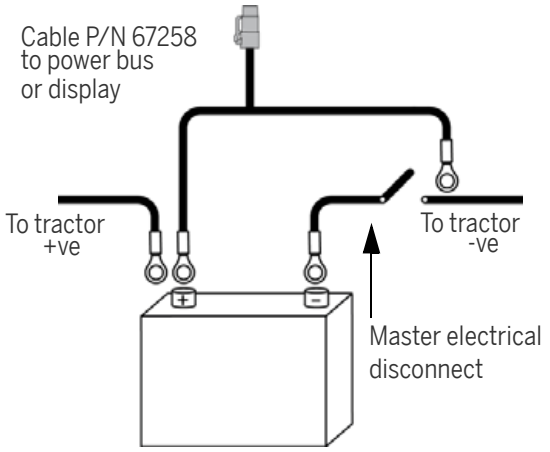
⚠ **CAUTION –** When using the EZ-Pilot steering system, telescope the steering inward as far as possible to comfortably operate the machine. Excessive steering column extension may reduce auto steer accuracy and degrade the SAM-200 motor performance when engaged.

⚠ **CAUTION –** Do not mount the IMD-600 unit outside the cab.

Mount the IMD-600 unit inside the cab:
- where it will not be covered by hand tools, tool boxes, chains, tow ropes, food or drink coolers, and so on. Objects placed on top of the unit may cause vibration, which will degrade the steering accuracy.
- where the electrical connector and cable will not be stepped on. If the unit is pushed out of alignment from its original mounting orientation, steering accuracy will be degraded.
- either in-line with or at 90° angles to the vehicle's forward travel direction. Non-orthogonal angles will cause performance degradation.

⚠ **CAUTION –** To avoid injury, handle sharp knives with care.

⚠ **CAUTION –** If the vehicle has a master electrical disconnect, make sure that 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. Failure to do so can result in damage to the display.



⚠ **CAUTION –** Make sure the vehicle power is off when you are connecting system components.

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1

Introduction

- Technical assistance
- Required components
- Hardware organization

This manual describes how to install the Trimble® EZ-Pilot® assisted steering system.

Even if you have used another Global Navigation Satellite System (GNSS), such as the United States' Global Positioning System (GPS) 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:

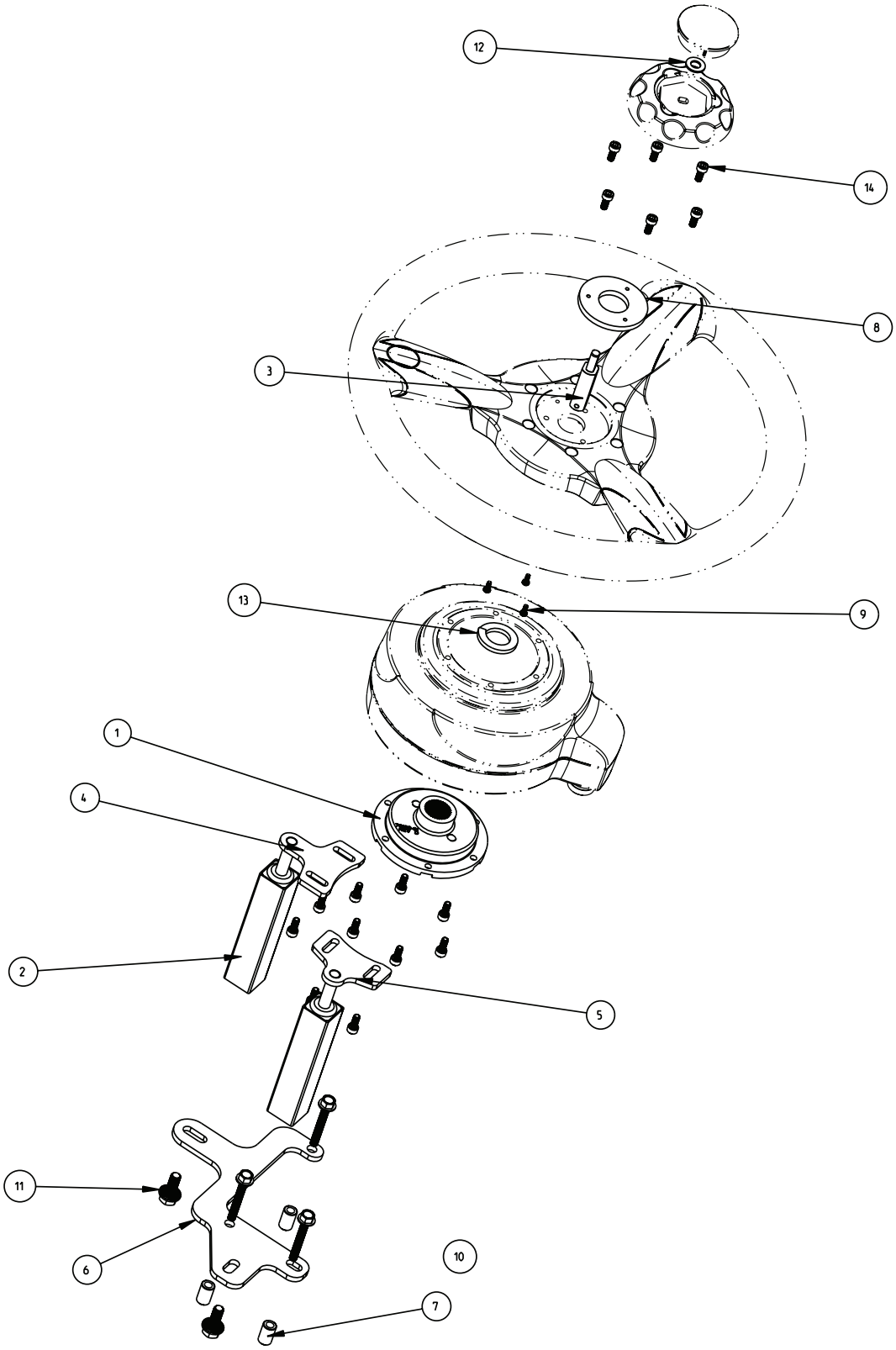
1. Log into http://agpartners.trimble.com.
2. Click the **Feedback** link at the right of the screen.
3. Complete the form and then click **Submit Feedback**.

Required components

Kits required	Tools
EZ-Pilot platform kit: P/N 78100-88-RS	1/8" flat blade screwdriver 30 mm deep socket 4 mm L-shaped hex key
Trimble steering wheel kit: P/N 78200-00	4 mm T-handle hex wrench 10 mm ratchet combination wrench 13 mm deep socket ¼" cold chisel 13 mm ratchet combination wrench 3 mm stubby L-shaped hex key

Hardware		Component	Part Number	Qty
Platform kit: P/N 78100-88-RS	**1**	Lower steering shaft adapter JD 8K	78102-01	1
	2	Anti-rotation post, 120 mm	78120-26	2
	3	Telescopic lock extension PLA sprayer	78121-47	1
	4	Bracket, anti-rotation slide, 110 mm pin	78202-86	1
	5	Bracket, anti-rotation slide, 110 mm pin	78202-88	1
	6	Bracket, column mount JD 8000R Series		1
	7	Spacer, 11 mm OD x 6.5 mm ID x 18 mm LG		3
	8	Lock knob spacer		1
	9	Pan Head, M3 x 0.5 mm screw		3
	10	Serrated Hex cap M6 x 1 x 45 mm STL, ZN PL screw		3
	11	Serrated Hex cap M8 x 1.25 x 20 STL, ZN PL screw		2
	12	M8 STL, ZN PL lock washer		1
	13	M20 split lock washer		1
	14	M5 x .8 x 12 mm SKT head screw		16
	15	Installation manual (not shown)		1

Hardware organization



2

Installing the EZ-Pilot Steering System

- Preparing the vehicle
- Installing the anti-rotation bracket
- Assembling the SAM-200 EZ-Pilot drive motor
- Installing the SAM-200 EZ-Pilot drive motor
- Installing the Trimble steering wheel

This chapter describes how to how to install the anti-rotation bracket and drive motor for the EZ-Pilot assisted steering system.

Preparing the vehicle

1. Park the vehicle on a hard, level surface.
2. Engage the park brake and then remove the ignition key.
3. On an articulated vehicle, install the articulation locks.
4. Remove all dirt and debris from the areas of the vehicle where the system is to be installed.
5. Open all kit boxes and lay all of the parts out on a clean workbench.
6. Check the contents of the boxes against the packing lists.

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

Installing the anti-rotation bracket

Step 1

Loosen the lock knob in the center of the steering wheel. Telescope the steering wheel outward. Tighten the lock knob to hold the telescope position.



Step 2

Use a 5 mm hex socket driver to remove the three bolts from the internal column frame.

Example tool:

www.snapon.com, P/N TMAMXS5E





Step 3

Insert supplied 18 mm spacers into each hole.

NOTE – Shorter spacers shown in pictures.





Step 4

Attach the supplied anti-rotation bracket to the column frame using the provided three M6 x 45 mm serrated flange head bolts.

Use 10 mm ratchet combination wrench to tighten the bolts.

Do not overtighten the bolts or the threads will strip out.

Example tool:

www.snapon.com, P/N SOEXRM10





NOTE – For 5xxxR series, insert the M8 bolt through the left slot prior to installing the 45 mm flange screws.



Step 5

Slide the steering column fully inward.

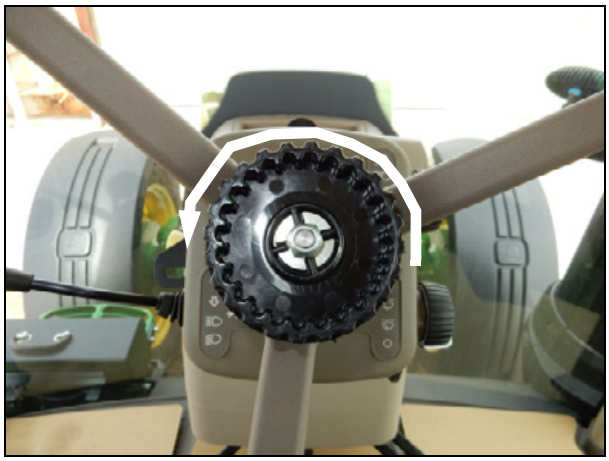


Use a 1/8" flat blade screwdriver to remove the top cap in the center of the steering wheel.



Step 6

Turn the lock knob fully counter-clockwise until it stops. This is in preparation for a later installation step.



Step 7

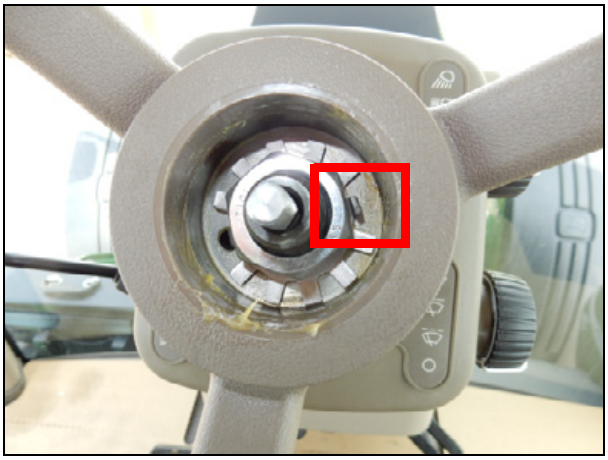
Hold the lock knob stationary. Use a 13 mm deep socket to remove the lock nut.

Remove the top washer, lock knob, and lower washer.



Step 8

Use a ¼" cold chisel and ball peen hammer to bend the tabs of the star washer downward.





Use a 30 mm deep socket to remove the large hex nut.

Example tool:

www.snapon.com, P/N TSM30



Step 9

Pull off the steering wheel.



Steering wheel removed:
8xxxR series tractors

Step 10

Slide the steering column fully inward.

Insert M8 bolts through the slots. Rotate each square tube and thread onto each bolt. Finger tighten.







Finger-tighten bolts

Step 11

Check clearance between the 9:00 tube and the turn signal lever. If necessary, rotate the tube.



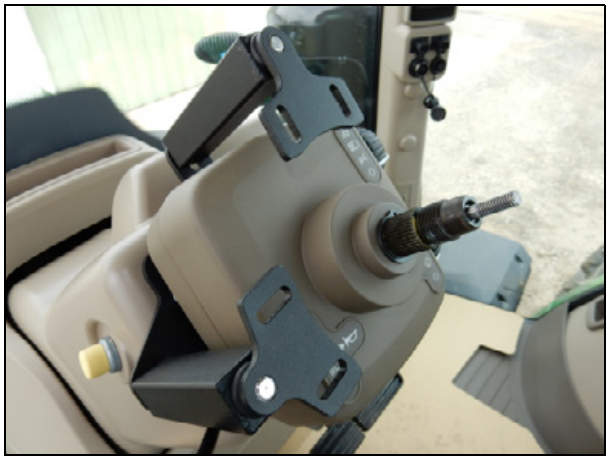
Check clearance - 7xxxR tractors



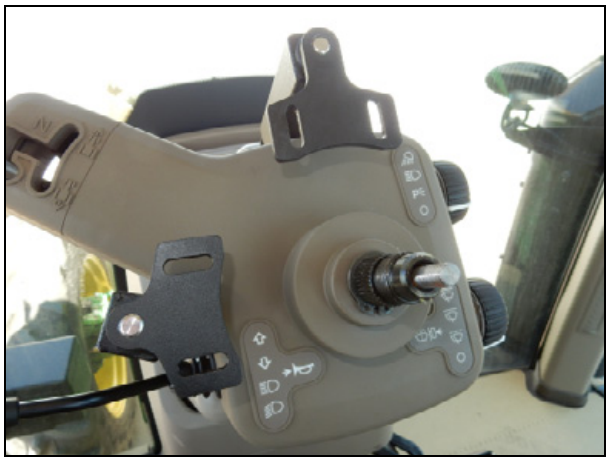
Check clearance - 8xxxR tractors

Step 12

Insert supplied pins into each tube as shown.



8xxxR tractors



7xxxR tractors

Assembling the SAM-200 EZ-Pilot drive motor

Step 1

Flip the motor upside-down. Fasten the lower spline adapter to the bottom of the motor. Use the supplied 5 mm hex socket head screws. Tighten bolts using a 4 mm T-handle hex wrench.

Example tool:

www.bondhus.com, part number 15260

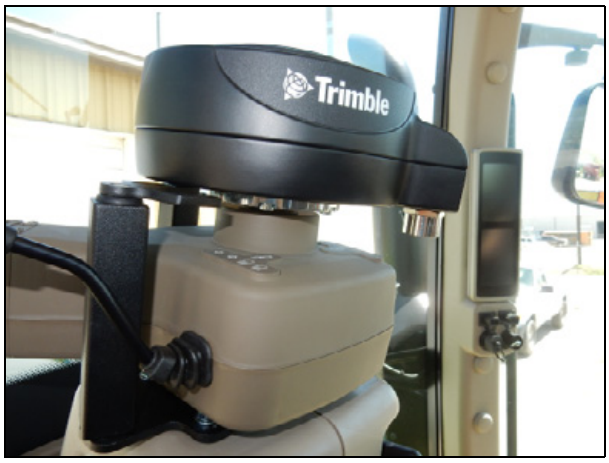


Installing the SAM-200 EZ-Pilot drive motor

Step 1

Set the SAM-200 motor onto the steering shaft. The motor's electrical connector will be located at a 5:30 position.

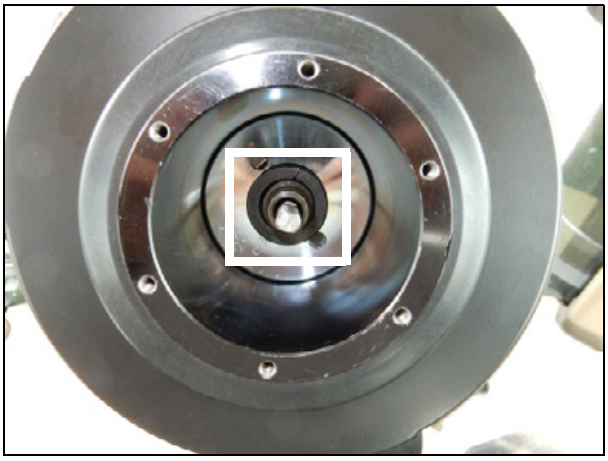
⚠ **CAUTION –** The splines of the lower adapter and steering shaft must align. Do not force the motor onto the steering shaft. Wiggle the motor while gently pushing downward.



Step 2

Install the supplied 20 mm split lock washer and original hex nut. Use a 30 mm deep socket to tighten the nut.

Torque the nut to 33–40 ft-lbs (44–54 newton-meters).



Lock washer



Hex nut

Step 3

Slide both pins upwards against the bottom of the motor. Align slots with threaded holes. Install supplied 4mm socket head screws and tighten using a stubby 4mm L-shaped hex wrench.

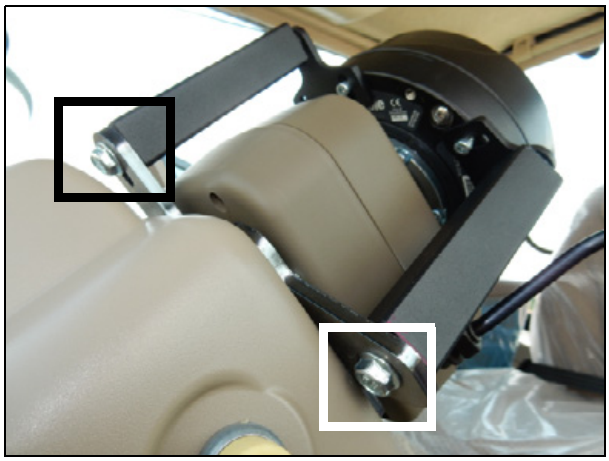
Example tool:
www.bondhus.com, P/N SBLX7MB



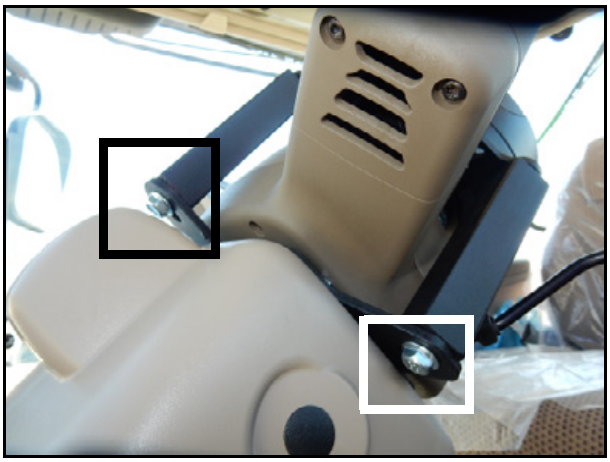
7xxxR tractors

Step 4

Use a 13 mm ratchet combination wrench to tighten the M8 bolts.



8xxxR series tractors



7xxxR series tractors



5xxxR series tractors

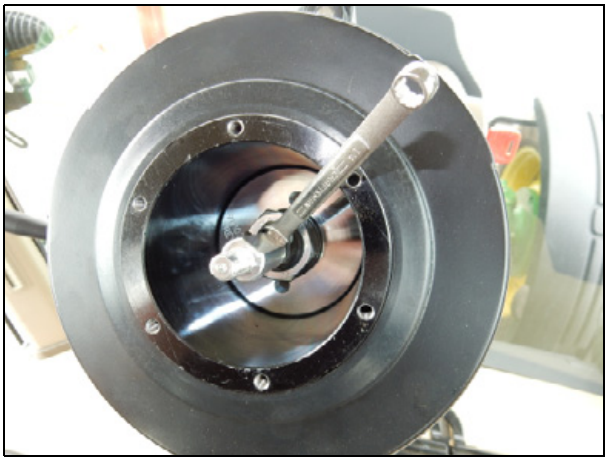
Step 5

Turn the existing telescopic lock shaft fully *counter-clockwise* until it stops. Thread the new extension shaft clockwise onto the existing shaft until it stops.

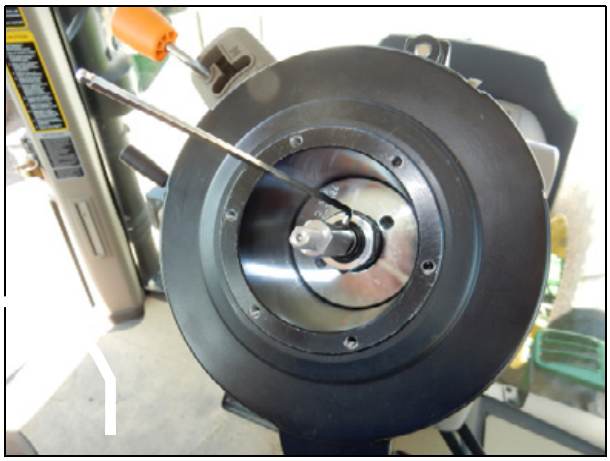
Use a ¼" wrench to hold the existing shaft in place while installing the supplied extension shaft.

Align the set screw of the new extension shaft with the flat face of the existing shaft. Use a 3 mm stubby L-shaped hex key to tighten the set screw.

Example tool:
www.bondhus.com, P/N SBLX7MB



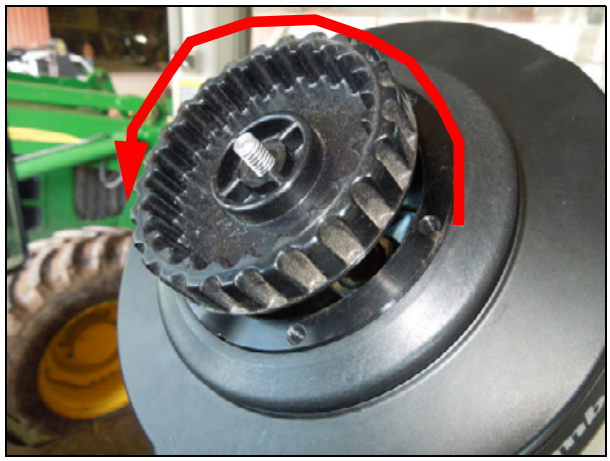
¼" wrench



3 mm stubby L-shaped hex key

Step 6

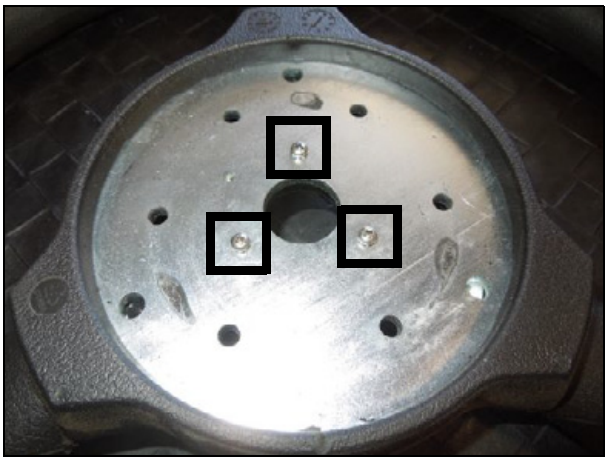
Rotate the extension rod assembly fully counter-clockwise in preparation for the steering wheel installation. Reuse the existing lock knob.



Installing the Trimble steering wheel

Step 1

Fasten the supplied round spacer to the center of the Trimble steering wheel. Use the supplied 3 mm screws and a #2 Phillips screwdriver.





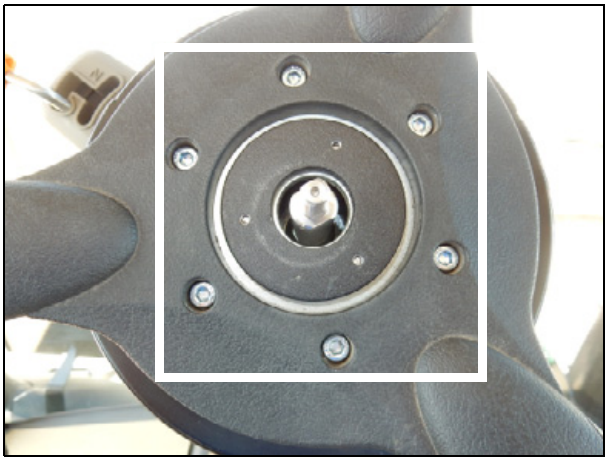
Step 2

Fasten the supplied Trimble steering wheel to the motor. Use the supplied 5 mm hex socket head screws. Tighten the screws using a 4 mm T-handle hex wrench.

Example tool:

www.bondus.com, P/N 15260





Step 3

Install the supplied Trimble lock knob, supplied M8 flat washer, and original hex nut. Use a 13 mm deep socket to tighten the nut.



Step 4

Install the Trimble lock knob center cap.



The following images show the installed SAM-200 motor, Trimble steering wheel and anti-rotation bracket.

CAUTION – When using the EZ-Pilot steering system, telescope the steering inward as far as possible to comfortably operate the machine. Excessive steering column extension may reduce auto steer accuracy and degrade the SAM-200 motor performance when engaged.



8xxxR series tractors



8xxxR series tractors



8xxxR series tractors



8xxxR series tractors



7xxxR series tractors



7xxxR series tractors

3

Installing the IMD-600 unit

- Preparing the IMD-600 unit for installation
- Mounting the IMD-600 unit in the cab

Preparing the IMD-600 unit for installation

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

Step 1

Fasten the provided sub plate to the IMD-600 unit (as shown) using the supplied #8-32 screws.

Tighten the screws using a #2 Phillips screwdriver.



Step 2

Fasten the IMD-600 assembly to the mounting plate using the supplied 5 mm screws.

Tighten the screws using a #2 Phillips screwdriver.

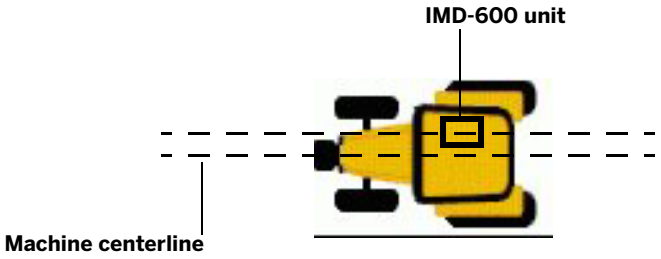


Mounting the IMD-600 unit in the cab

⚠ **CAUTION –** Do not mount the IMD-600 unit outside the cab.

Mount the IMD-600 unit inside the cab:
- where it will not be covered by hand tools, tool boxes, chains, tow ropes, food or drink coolers, and so on. Objects placed on top of the unit may cause vibration, which will degrade the steering accuracy.
- where the electrical connector and cable will not be stepped on. If the unit is pushed out of alignment from its original mounting orientation, steering accuracy will be degraded.
- either in-line with or at 90° angles to the vehicle's forward travel direction. Non-orthogonal angles will cause performance degradation.

NOTE – For best accuracy, mount the IMD-600 unit level and parallel to the machine's center line:



To mount the IMD-600 unit inside the operator's cab use metal spacers or self-tapping screws, as described below.

Using metal spacers or screws to mount the IMD-600 unit

Step 1

Look under the floor mat for any cab wiring. Check under the cab floor for any obstructions, such as hydraulic lines/hoses, air ducts, A/C evaporators, diesel fuel tanks, hydraulic fluid tanks, and so on.



Right side of the operator's seat

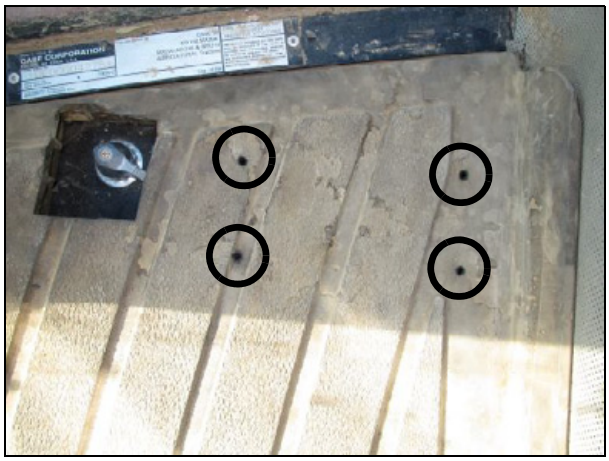


Right side of the operator's seat

Step 2

Optional mounting method using metal spacers

a. Use a ¼" bit to drill four holes through the floormat.



Example: Floormat

Do not drill into the metal cab floor.



Example: Floormat

b. Use a ¼" pilot bit and ¾" hole saw. Drill four holes through the floormat at the same locations previously drilled.





Example: Floormat

c. Use a very sharp box knife to cut away the floor mat webbing from around each newly created hole.

⚠ **CAUTION –** To avoid injury, handle sharp knives with care.



Example: Floormat



Example: Floormat

d. Place the floormat back onto the cab floor and then insert the provided standoff spacers into the newly created holes.



Example: Floormat

e. Place the IMD-600 unit on top of the spacers. Fasten the IMD-600 unit to the floor using the provided ¼" x 2.5" long self tapping bolts. Use an 8 mm or $^{5}/_{16}$" deep socket.

   Check under the cab floor to make sure that no obstructions were pierced or damaged by the self-tapping screws.



Example: Mounting in the operator's cab



Example: Under the operator's cab

Step 3

Optional mounting method using only self-tapping screws

Use the included 2.5 cm (1.0") self-tapping screws to mount the IMD-600 unit to a solid location that will not vibrate.

Make sure that the bolts are torqued tight. The IMD-600 unit must be mounted at a right angle, parallel to the center line of the tractor in the roll, pitch and yaw axis.

TIP – Mount the IMD-600 unit inside the cab where it will not be covered by hand tools, tool boxes, chains, tow ropes, food or drink coolers, and so on. Objects placed on top of the unit may cause vibration, which will degrade the steering accuracy.



Under operator's seat right side console

Step 4

Find the supplied cable P/N 76351.

Plug connector P3 into the IMD-600 unit.

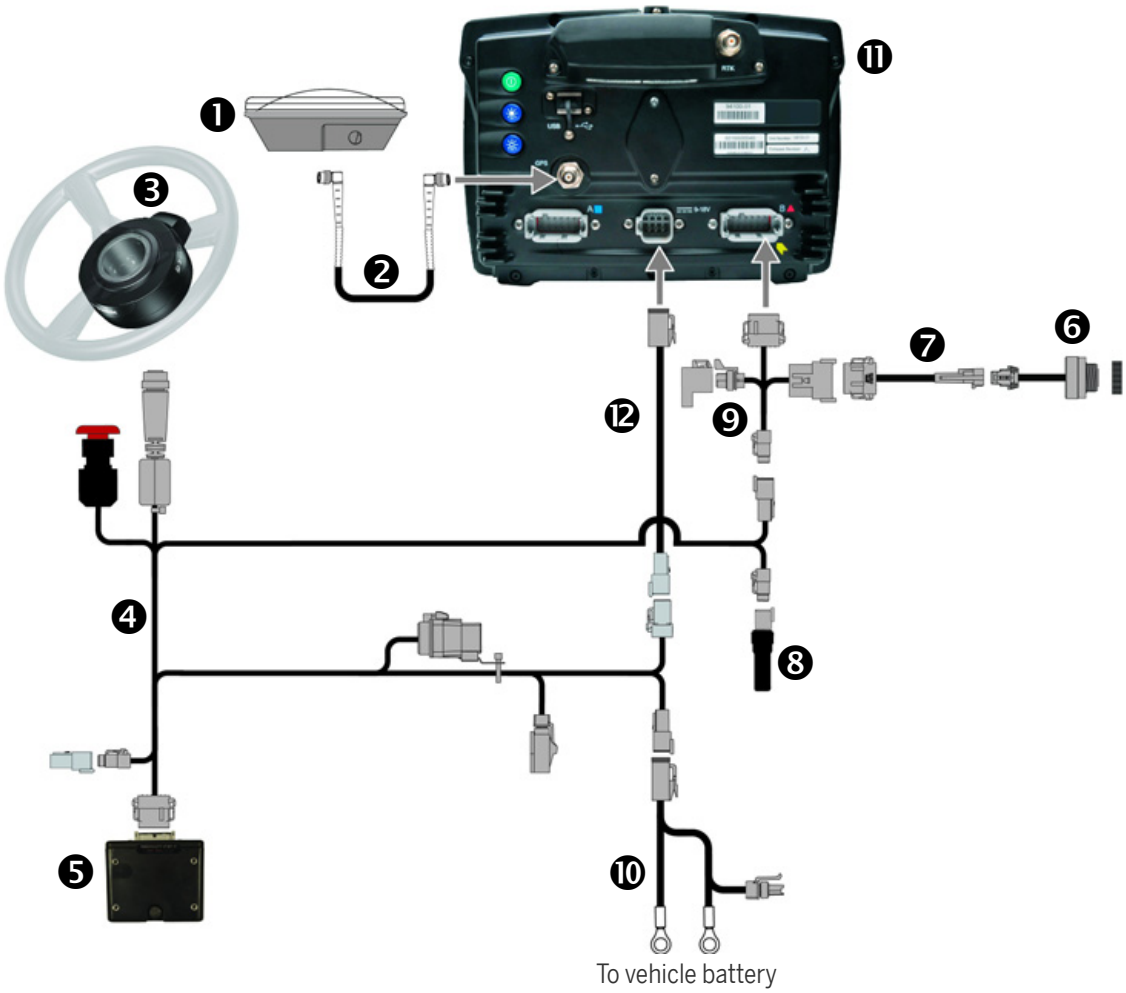


4

Display Connections

- CFX-750 display
- TMX-2050 display
- GFX-750 Display
- Installing the emergency stop switch

CFX-750 display

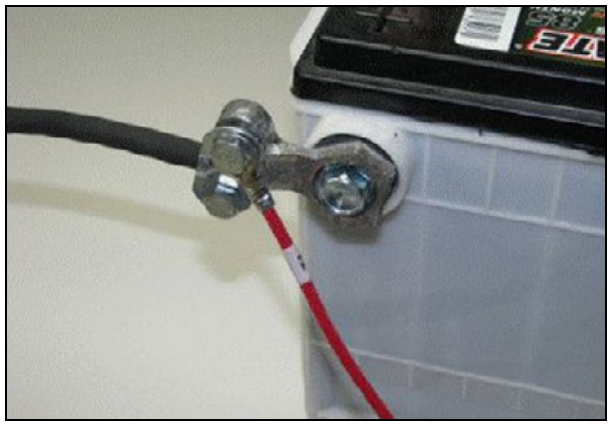


Item	Description	P/N
1	Antenna	77038-00
2	Antenna cable	50449
3	SAM-200 steering motor	83382-xx
4	IMD-600 to SAM-200 to CAN power cable	76351
5	IMD-600 unit	83390-xx
6	Sonalert device	43104
7	Display to Sonalert cable	84668
8	CAN terminator	59783
9	Display to Field-IQ cable	75834
10	Basic power cable	67528
11	CFX-750™ display	94100-xx
12	Display power cable	77282

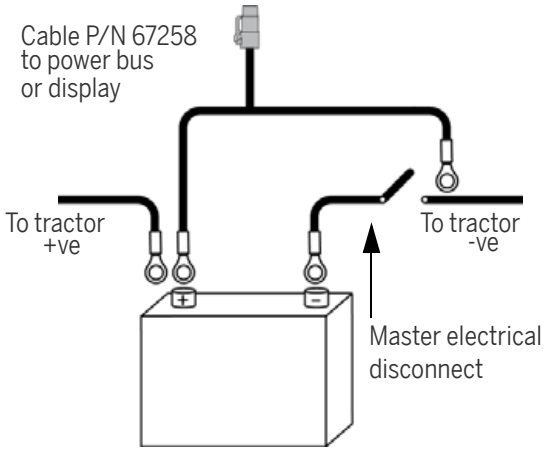
CFX-750 display: Connecting the EZ-Pilot system

Step 1

Connect the power cable to the battery.



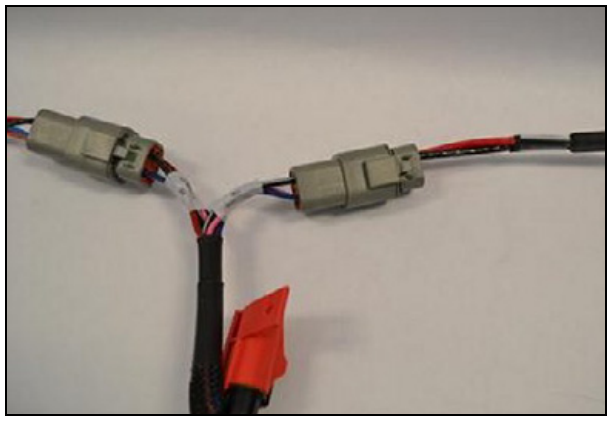
⚠ **CAUTION –** If the vehicle has a master electrical disconnect, make sure that the basic power cable (P/N 67258), is not directly attached to the battery terminal that is disconnected by the master switch - the negative pole in this example.
Attach this terminal side just past the main disconnect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



Step 2

Connect the basic power cable to the cable P/N 76351.

Also connect the CFX-750 power cable (P/N 77282).



Step 3

Connect the power cable to the display.



Step 4

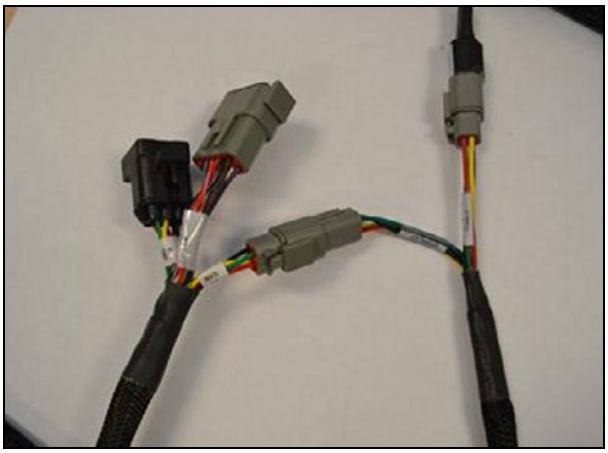
Plug in the 12-pin CAN connection on P/N 75834:

Port B



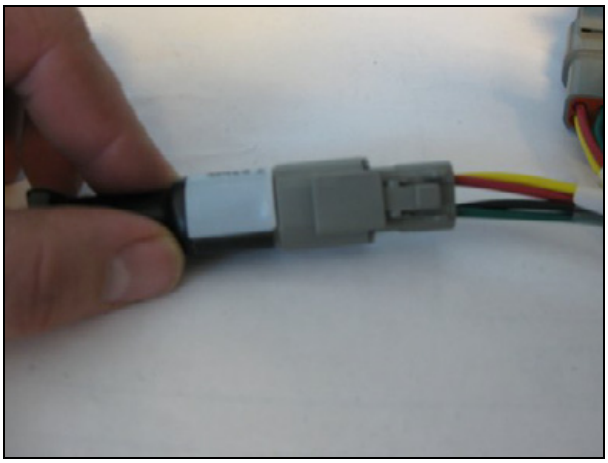
Step 5

Connect the 4- pin CAN plug on P/N 75834 to the 4-pin CAN receptacle on P/N 76351.



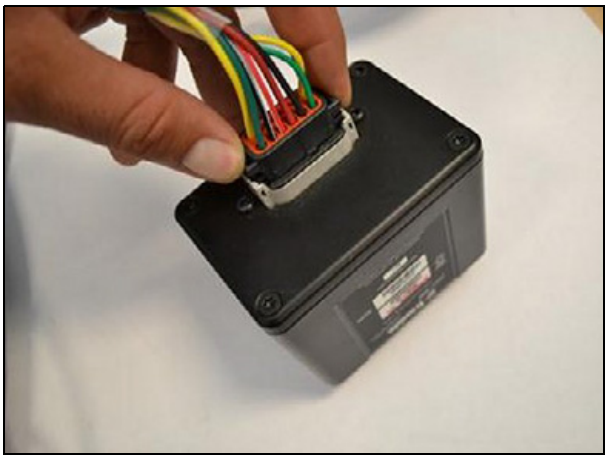
Step 6

Connect the CAN terminator P/N 59783 to the cable P/N 76351.



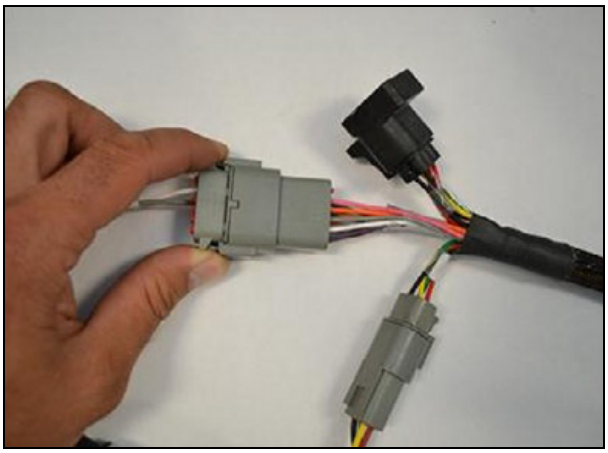
Step 7

Connect the black 12-pin plug to the IMD-600 unit.

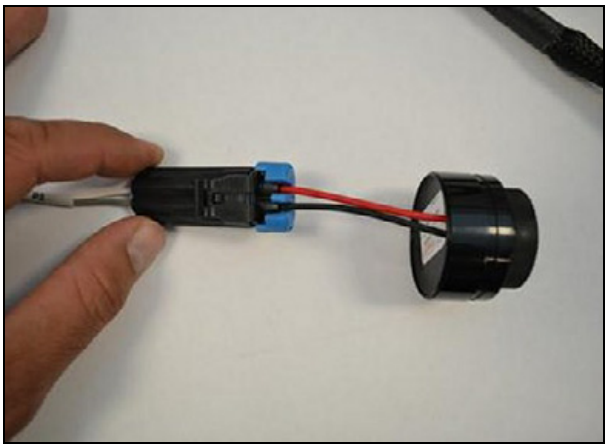


Step 8 Connecting the Sonalert device

Connect the Sonalert adapter 12-pin plug the cable P/N 75834.



Connect the Sonalert device to the adapter cable.



Step 9

Plug the round SAM-200 connector into the SAM-200 motor.



CFX-750 display: Installing the GNSS antenna and mounting plate

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.

Trimble recommends that you install the antenna directly over the drive tires of the machine.

Make sure to keep the antenna mounted level.

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

Use an adhesive promoter to increase the bonding between the foam tape and the plastic cab roof. Any surface with adhesive promotor applied will attract dirt. Apply the chemical to a very small area.

Example adhesive:

http://www.3m.com, 3M tape primer 94, P/N 24216

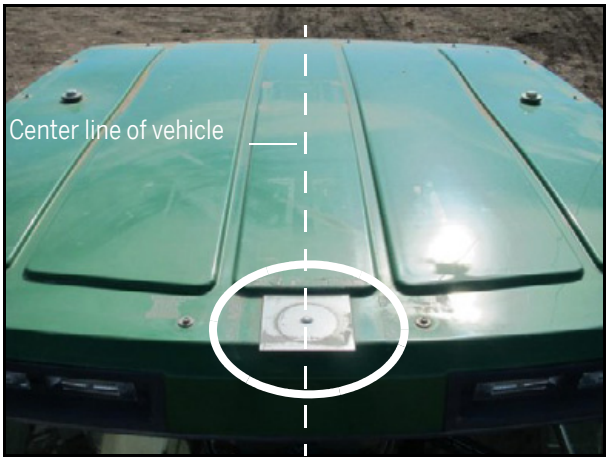


Step 2

Allow the adhesive promotor to dry.

Remove the backing tape from the foam strips and then apply the plate to the cab roof *exactly on the center line of the machine*.

Ensure that the foam strips make even contact with the surface. Apply pressure and then leave for approximately 30 minutes to adhere.



Example antenna mount

Step 3

Attach the GNSS antenna to the center of the 5" x 5" plate (P/N 62034).



CFX-750 display: Installing the RTK radio antenna

Step 1

Connect the RTK radio antenna to the magnetic antenna base



Step 2

Pick a location on the cab roof where the RTK antenna will be a minimum of 3 feet (1 m) from the GNSS antenna. Push down on the roof to find a firm location.

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

Use an adhesive promoter to increase the bonding between the foam tape and the plastic cab roof. Any surface with adhesive promotor applied will attract dirt. Apply the chemical to a very small area.

Example adhesive:
http://www.3m.com, 3M tape primer 94, P/N 24216



Step 3

Allow the adhesive promoter to dry.

Remove the backing tape from the foam strips and then apply the plate to the cab roof. Ensure that the foam strips make even contact with the surface. Apply pressure and then leave for approximately 30 minutes to adhere.



Step 4

Attach the magnetic radio antenna base to a 5" x 5" plate (P/N 62034).

Step 5

Route the RTK antenna's coaxial cable into the cab, and connect the cable to the Trimble display. Secure the cable along the route.

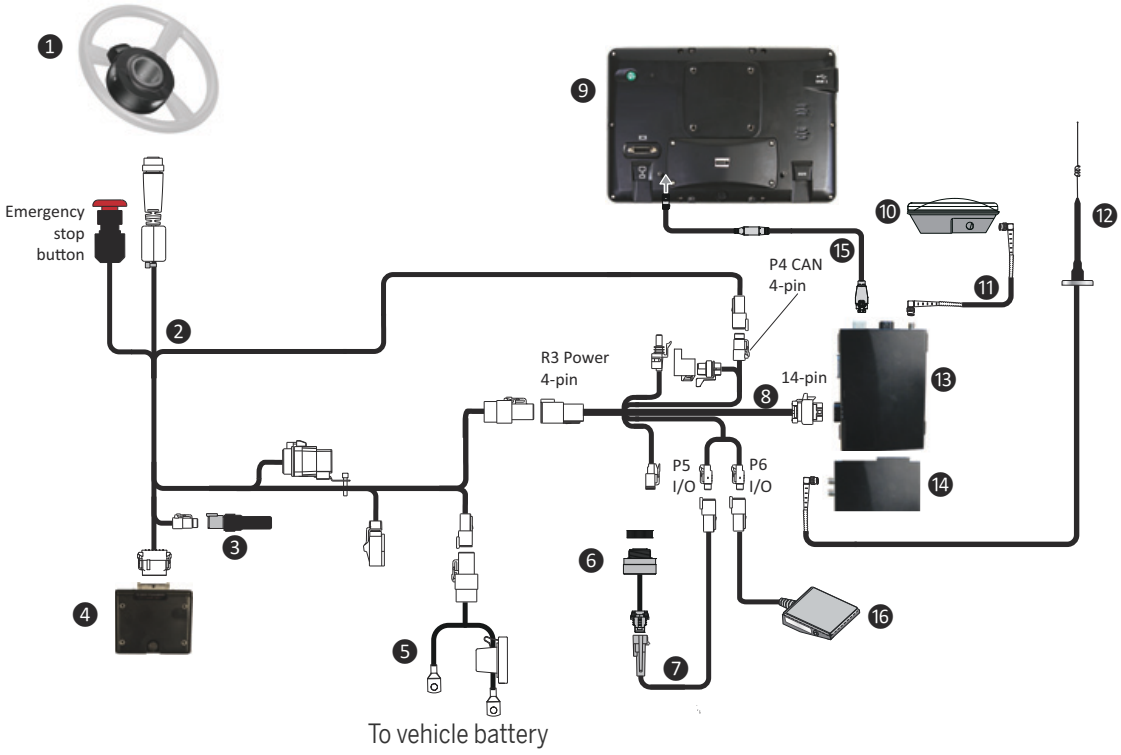


TMX-2050 display

TMX-2050 display: Connecting the display system to the EZ-Pilot system harness

After-market installation

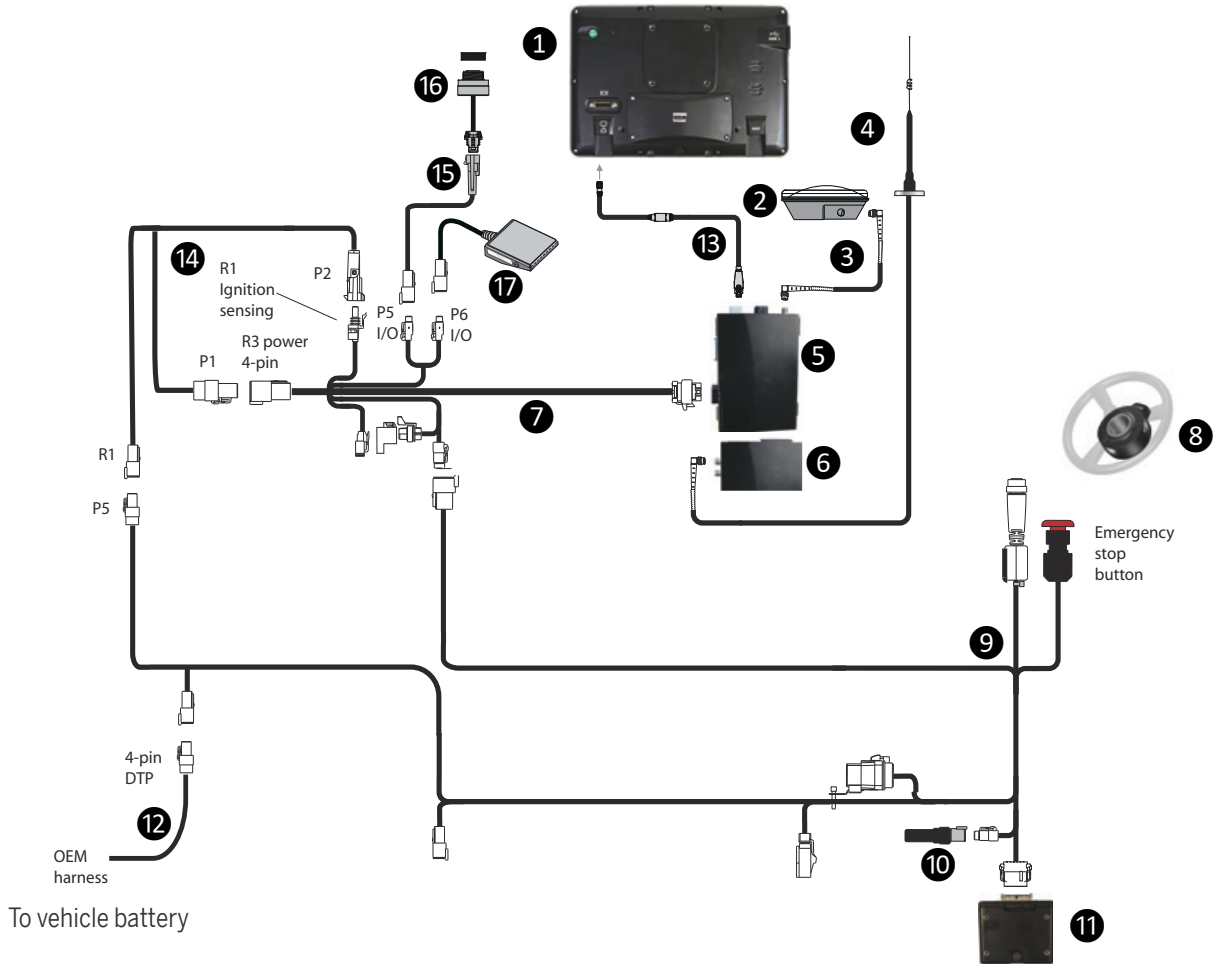
This diagram shows how perform an after-market install to connect the TM-200 Module with the EZ-Pilot system:



Item	Description	P/N	Item	Description	P/N
1	SAM-200 motor	83382-00	**9**	TMX-2050 display	96700-00
2	IMD-600 unit to SAM-200 motor to CAN and power cable	76351	**10**	AG-25 GNSS antenna	77038-00
3	CAN bus terminator	59783	**11**	8 m GNSS TNC/TNC RT angle cable	50449
4	IMD-600 unit	83390-00	**12**	900 MHz radio antenna kit	22882-10
5	TM-200 Module battery power cable	92905	**13**	TM-200 Module	95060-00
6	Sonalert	43104	**14**	AG-815 radio	
7	Display to Sonalert cable	84668	**15**	TMX-2050 display to TM-200 cable	93843
8	TM-200 Module power and I/O cable	92676	**16**	EZ-Pilot system foot switch remote engage (P6 connector only)	78150-00

OEM install

This diagram shows how connect the EZ-Pilot system to a vehicle with an existing OEM harness.



Item	Description	P/N	Item	Description	P/N
1	TMX-2050 display	96700-00	**10**	CAN bus terminator	59783
2	AG-25 GNSS antenna	77038-00	**11**	IMD-600 unit	83390-00
3	8 m GNSS TNC/TNC RT angle cable	50449	**12**	OEM harness	
4	900 MHz radio antenna kit	22882-10	**13**	TMX-2050 display to TM-200 Module	93843
5	TM-200 Module	95060-00	**14**	Cable, power adapter	95918
6	AG-815 radio		**15**	Display to Sonalert cable	84668
7	TM-200 Module power and I/O cable	92676	**16**	Sonalert	43104
8	SAM-200 motor	83382-00	**17**	EZ-Pilot system foot switch remote engage (P6 connector only)	78150-00
9	IMD-600 unit to SAM-200 motor to CAN and power cable	76351			

TMX-2050 display: Preparation

Step 1

Use the provided hardware to attach the RAM mount to the display as shown.





TMX-2050 display: Installation

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 a tube rail inside the operator's cab.

Cut the u-bolts to the required length and then re-thread using 1/4"-20 die.

Apply anti-seize paste, otherwise the stainless steel u-bolts might gall.



Example

Step 2

The mount has a tightening arm. Loosen the arm to let the display move on the mount.

Hold the display in the selected location and make sure that it:

- Is easy to see, but does not block the driver's view.
- Is within the driver's reach so that the USB drive is easy to remove and replace.
- Does not interfere with the driver getting in or out of the cab, or any other activities.



Example

Step 3

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

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



Example

TMX-2050 display: Installing the display wiring

⚠ **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.

⚠ **CAUTION –** Make sure the vehicle power is off when you are connecting system components.

Step 1

Connect P1 from the P/N 92676 power and I/O cable to port B to the TM-200 Module.



Step 2

Connect the GNSS antenna cable to the TNC connector at Port 1 of the TM-200 Module.



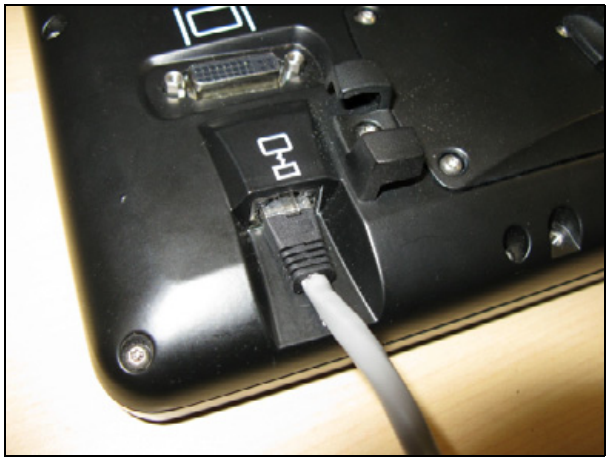
Step 3

Connect the 8-pin Ampseal connector on the display cable P/N 93843 to the white display port on the TM-200 Module.



Step 4

Connect the other end of the display cable (P/N 93843) to the RJ45 connector on the TMX-2050 display.



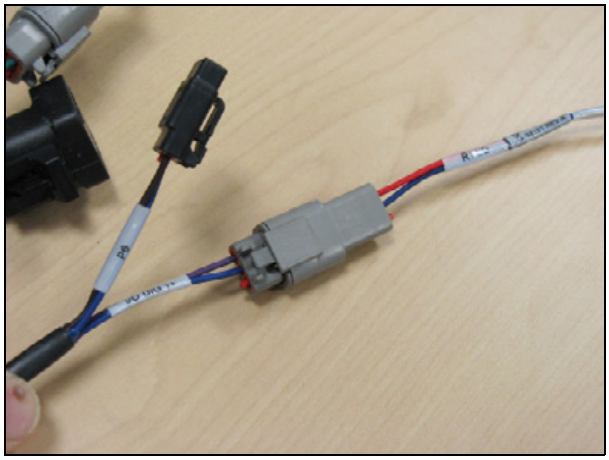
Step 5

Connect the Sonalert to the P/N 94121 Sonalert cable.



Step 6

Connect P5 from the P/N 92676 power and I/O cable to the P/N 94121 Sonalert cable.



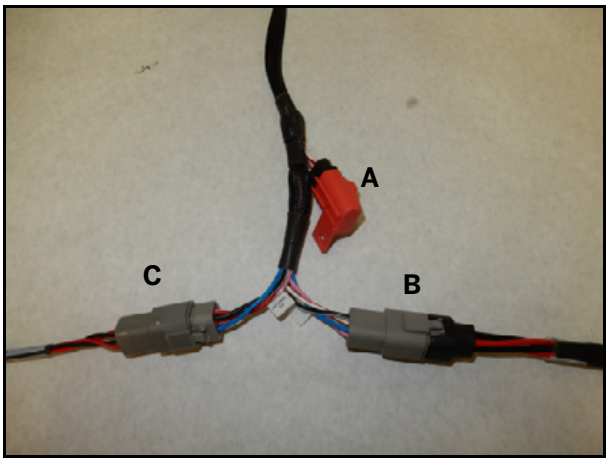
TMX-2050 display: Connecting the display system to the EZ-Pilot system harness

Step 1

Connect the P/N 92905 battery power cable (B) to EZ-Pilot cable P/N 76351 (A).

Step 2

Connect the P/N 92676, TM200 module power cable (C) to EZ-Pilot cable P/N 76351 (A).



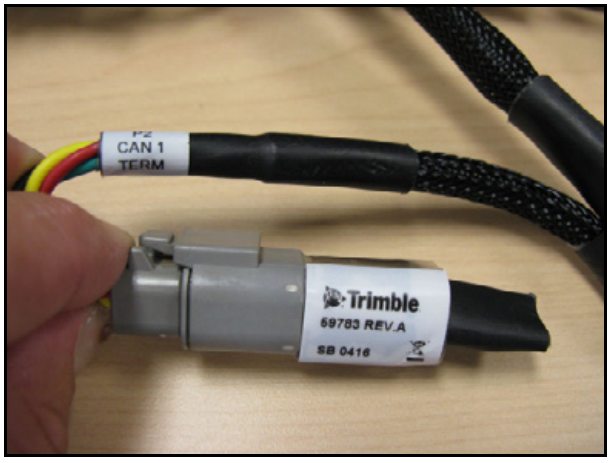
Step 3

Connect R2 from the P/N 92676 power and I/O cable to P4 of the P/N 76351 EZ-Pilot system main harness.



Step 4

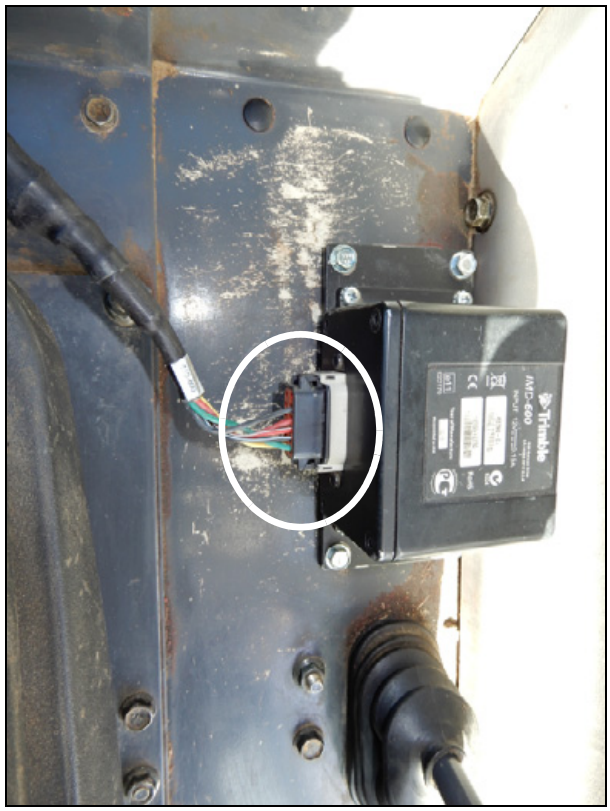
Connect the supplied CAN Terminator P/N 59783 to P5 of the P/N 76351 EZ-Pilot system main harness.



Step 5

Find the supplied cable P/N 76351.

Connect the black 12-pin plug labeled **P3** to the IMD-600 unit.



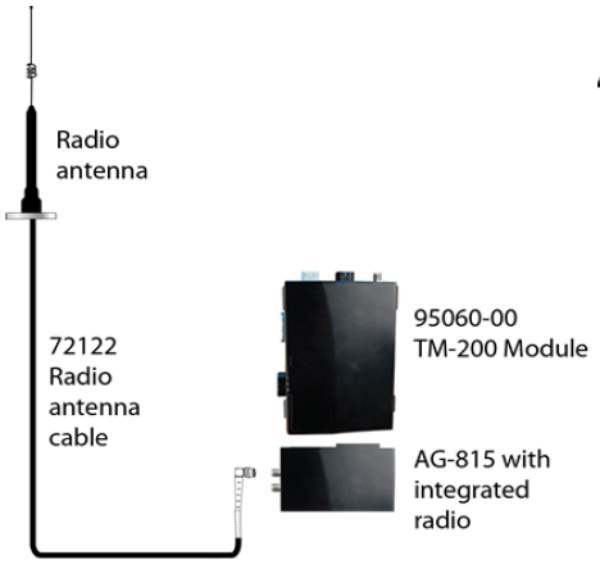
Step 6

Plug the connector labeled **P1 SAM200** into the motor.



TMX-2050 display: Installing the RTK radio antenna

NOTE – This section applies to the TMX-2050 display with optional AG-815, 900 MHz radio module.



Step 1

Connect the RTK radio antenna to the magnetic antenna base



Step 2

Pick a location on the cab roof where the RTK antenna will be a minimum of 0.3 m (1 foot) from the GNSS antenna. Push down on the roof to find a firm location.

Clean the antenna's mounting location on the roof of the cab with denatured alcohol to remove oil and dust.



Step 3

Locate the provided P/N 62034 metal plate. Remove the backing tape from the foam strips and then apply the plate to the cab roof.

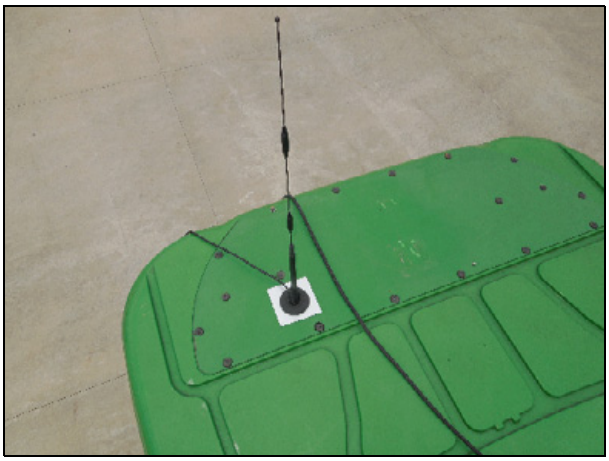
Make sure that the foam strips make even contact with the surface. Apply pressure to adhere.



Example installation

Step 4

Attach the magnetic radio antenna base to the plate.



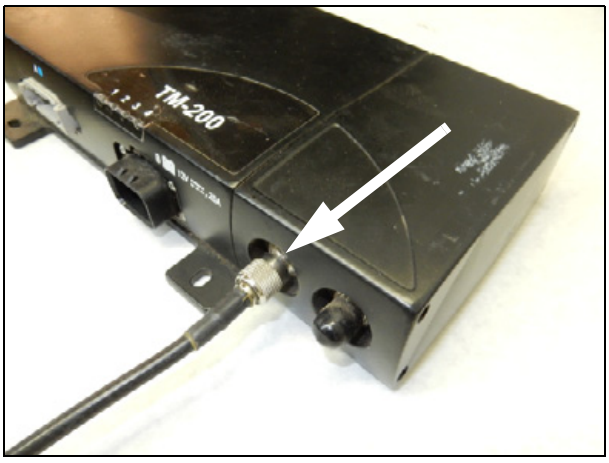
Example installation

Step 5

Route the RTK antenna's coaxial cable into the cab.

Connect the cable to the Trimble display.

Secure the cable along the route.



Step 6

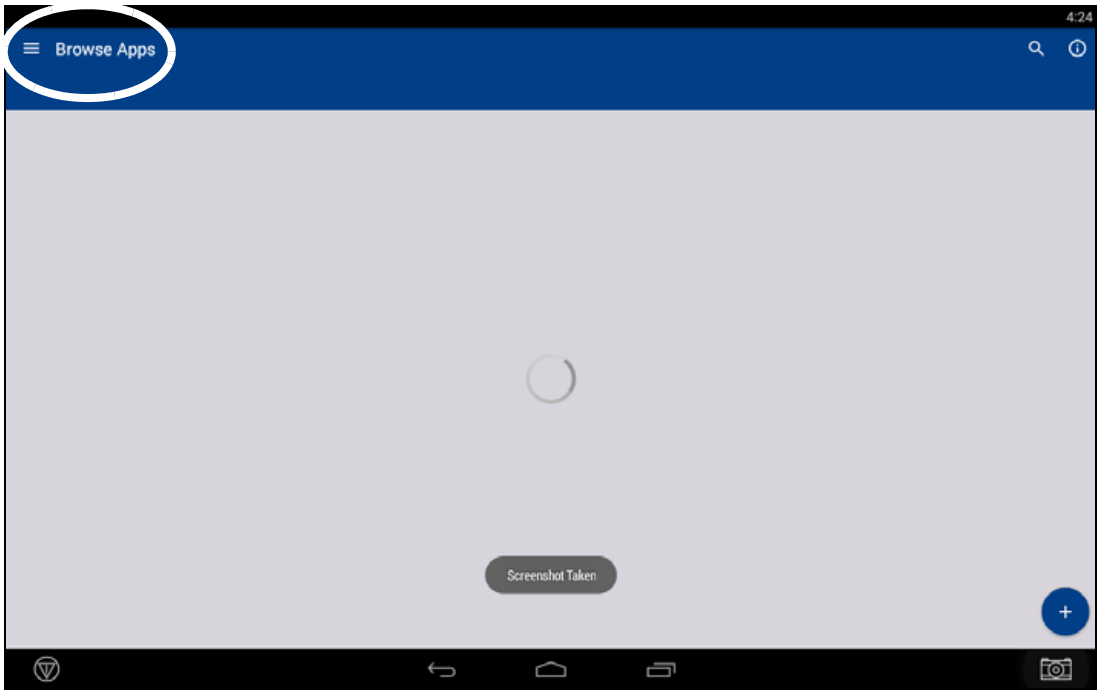
TIP – To receive RTK corrections, the display must have a High Accuracy license installed. If this is not installed, contact your Trimble Agriculture reseller.

Do the following to check your display for the **High Accuracy** option:

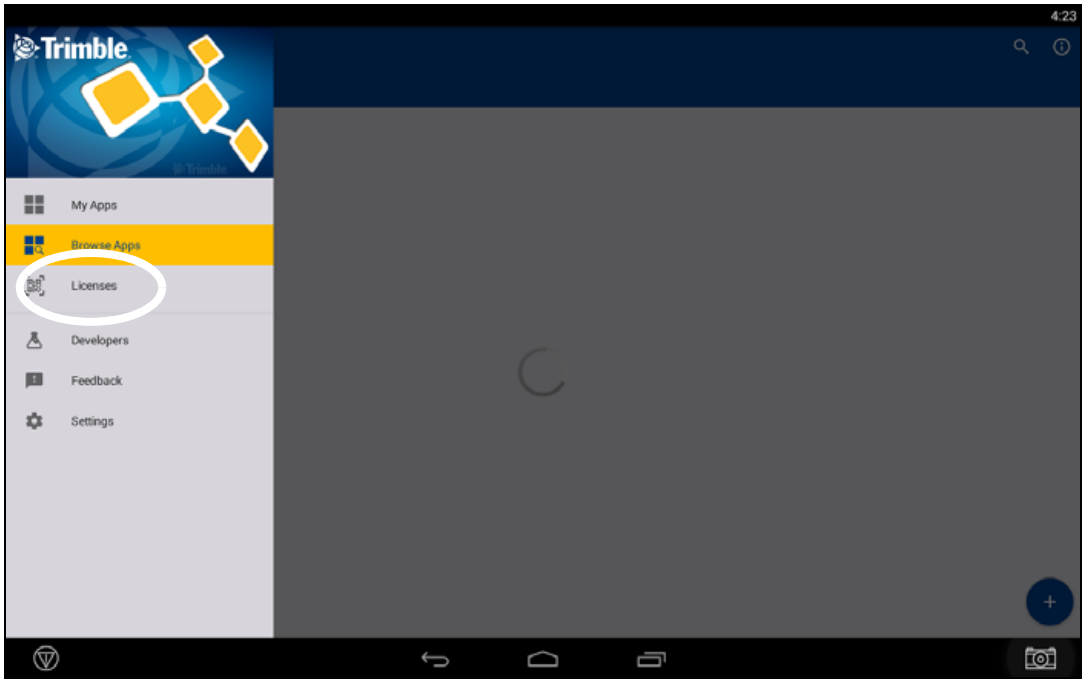
a. In the Home screen, tap **App Central**.



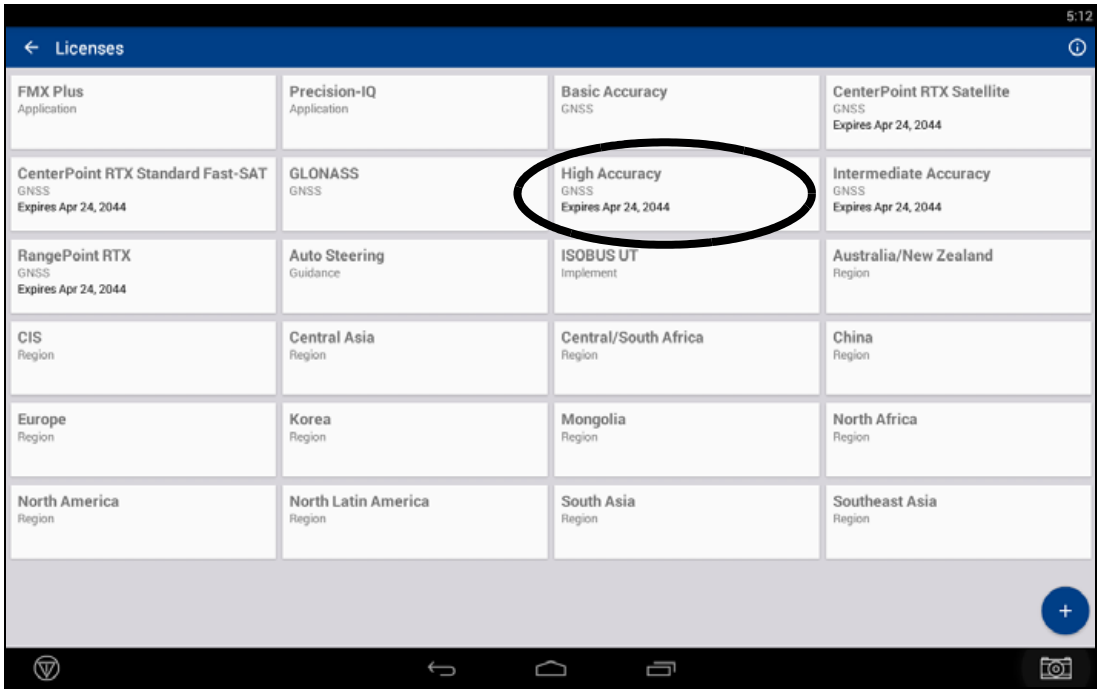
b. In the **App Central** screen, tap **Browse.**



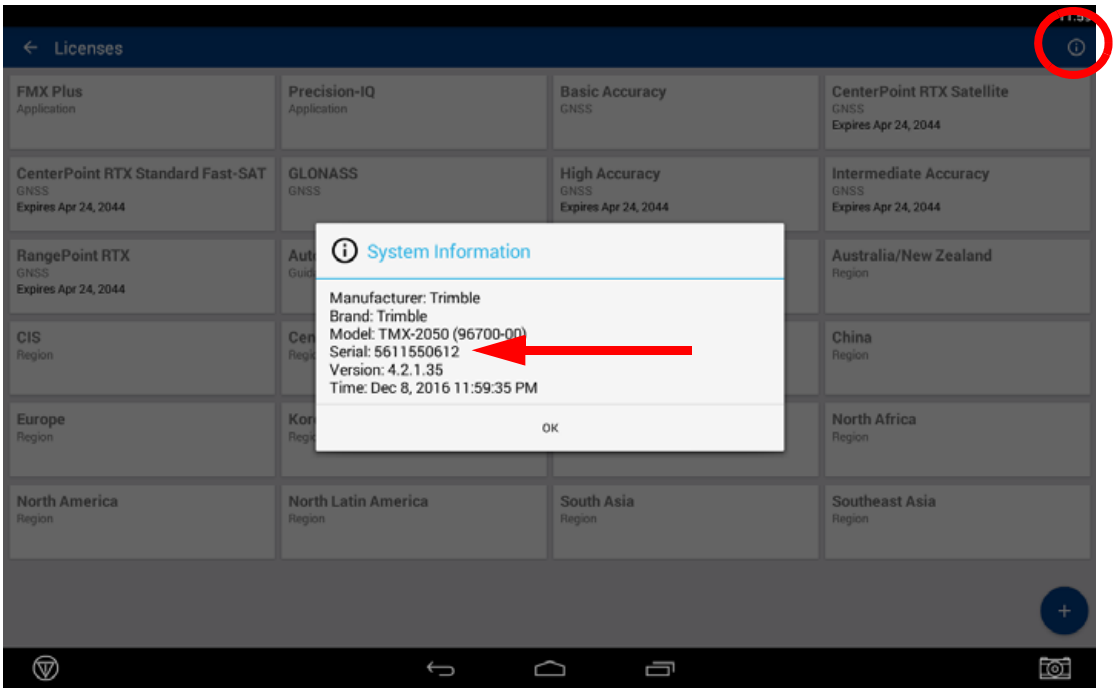
c. Tap **Licenses**.



d. Look for the High Accuracy license listed on-screen. If it is not shown, contact your Trimble Agriculture reseller:.



e. **Optional.** If you choose purchase a high accuracy license, the display serial number is required. Tap the information symbol.



GFX-750 Display

Attaching the Controller/Antenna to the vehicle roof may be accomplished either by using the optional John Deere Quick Release Mount Trimble P/N 111342 or by using the provided sheet metal mount plates.

Step 1

JD quick release

To use the quick mount adapter, attach the NAV-900 controller to the adapter P/N 111342. Then mount to the factory Deere bracket.



JD Quick Release Adapter

Step 1

Trimble supplied roof mount

Clean a large area of the cab roof near the center rear of the cab.



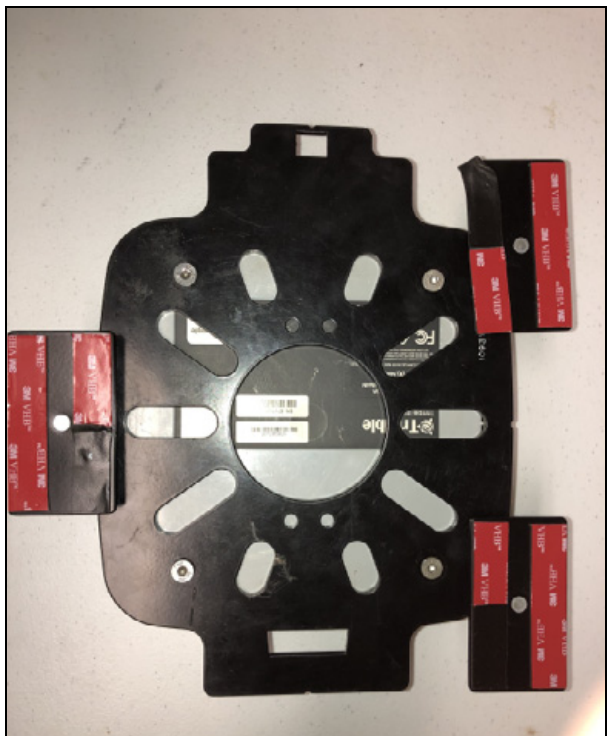
Step 2

Attach the NAV-900 to the supplied mounting bracket.



Step 3

Attach the three VHB plates to the mounting plate using the hardware provided.



Step 4

Place the NAV-900 controller on the center line of the tractor and at the rear of the cab.

Step 5

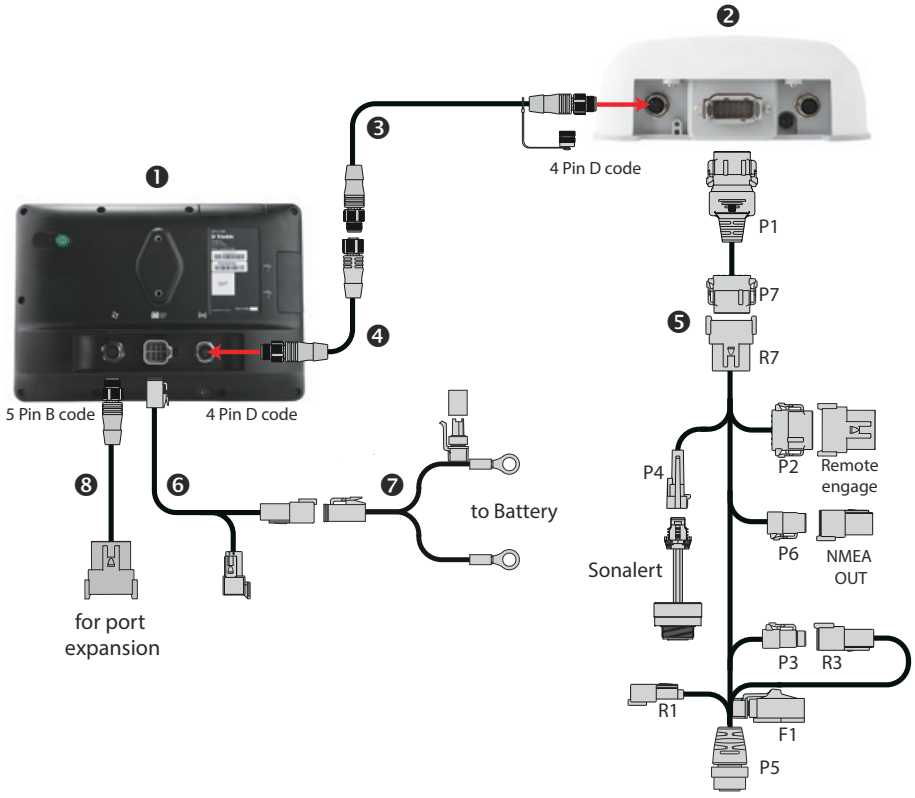
Connect the P1 connector from cable P/N 119713-2 to the NAV-900 controller.

Connect cable P/N 110540 to the NAV-900.

Route the remainder of the cable into the cab through the pass-thru on the right lower side of the rear window and then connect it to the display.



GFX-750/XCN-1050 display: Components



Item	Description	Trimble part number
1	GFX-750™/XCN-1050™ display, with PIQ App	121000-XX
2	NAV-900 Guidance controller	108993-05
3	Cable Assy, GFX-750/XCN-1050 to NAV-900, Power/Ethernet (BRR), 5 m	110540
4	Cable Assy, GFX-750/XCN-1050 to NAV-900, Power/Ethernet (BRR) Extension, 2.5 m. Optional extension for large vehicles.	112082
5	Cable Assy, NAV-900 to APMD	110549
6	Cable Assy, GFX-750/XCN-1050, Power to display, CAN, 2.5 m	110551
7	Cable Assy, GFX-750/CFX-750™/FM-750™/XCN-1050/ FmX®/FM-1000™ Basic Power, 4m	67258
8	Cable Assy, GFX-750/XCN-1050, Expansion Port Basic, RS232, Dig I/O, 2.5m	110545

GFX-750/XCN-1050 display: Mounting the display

For mounting the GFX-750/XCN-1050 display, see the TMX-2050 display mounting instructions starting on page 54.

Step 1

Connect the 4-pin M12 connector to the 4-pin receiver connector. Note the Keying and number of pins.



Step 2

Plug the P1 connector on the P/N 110551 cable into the port shown.



Installing the emergency stop switch

Mount the stop switch in a prominent location in the cab, where it is easily accessible in case of an emergency.

NOTE – There are two versions of the emergency stop switch. The version that you have will depend on the date when you purchased the EZ-Pilot kit. The updated (smaller) version is shown on the left; the original (larger) version is shown on the right. Make sure that you know which switch you have **before** you drill any holes for mounting.



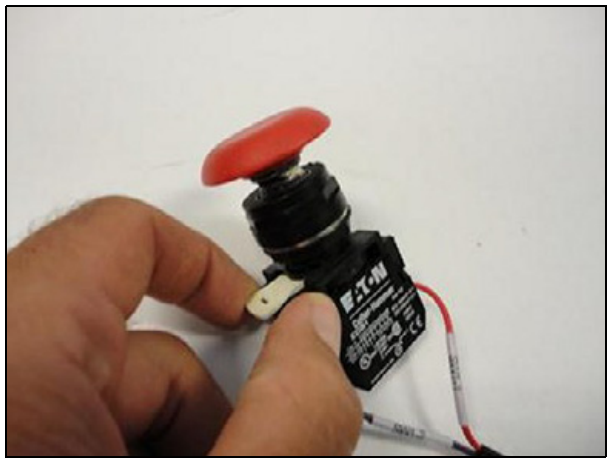
Step 1

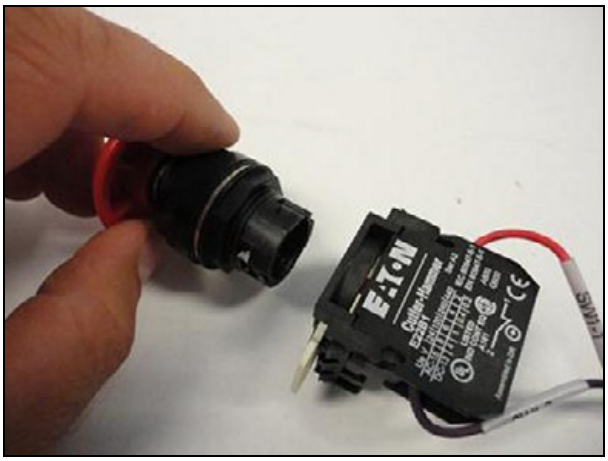
Locate the emergency stop switch.



Step 2

Push the white release button to remove the top half of the switch.





The smaller switch has a small tab—push this to separate the full switch.



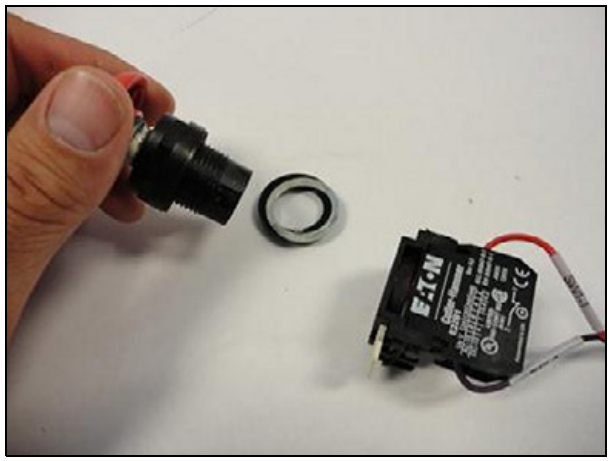
Screwdriver used to separate switch



Switch separated

Step 3

Remove the nut and washer.



Step 4

In the selected prominent location, drill a ⅞" hole for the larger switch, or a ⅝" hole for the smaller switch and then mount the switch with the provided washer and nut.



Step 5

Route the switch wires and then reattach the lower housing.





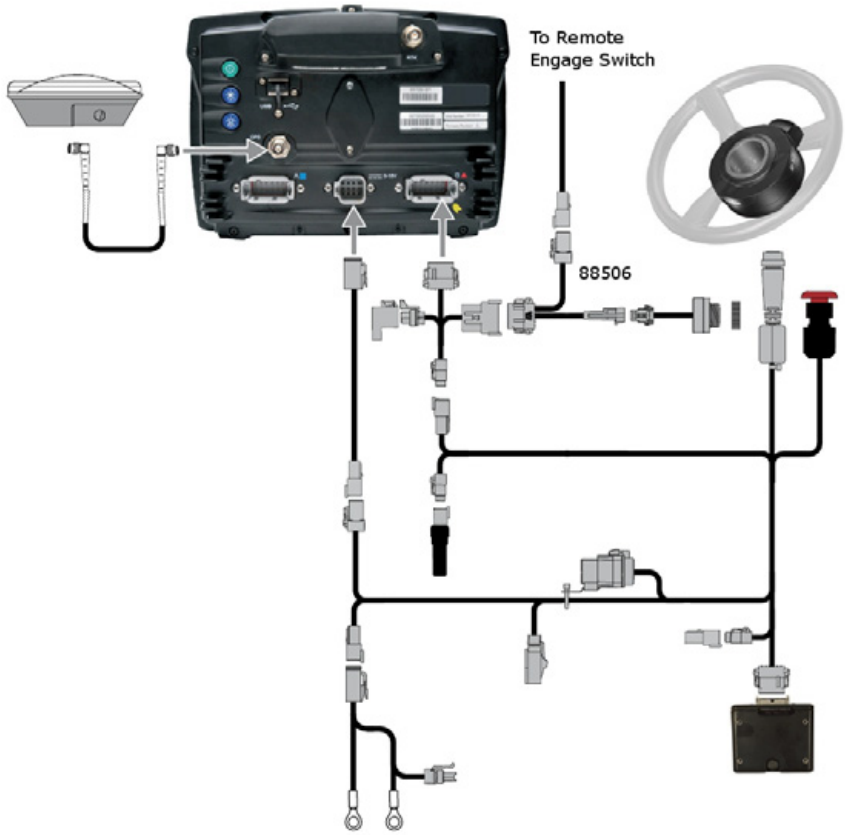
Example: New E-STOP mounted

5

Remote Engage

- CFX-750 display: Installing the remote engage switch
- CFX-750 display: Setting up the remote engage
- GFX-750/NAV-900 System: Installing the remote engage switch

CFX-750 display: Installing the remote engage switch



To engage the EZ-pilot system, you can use one of these methods:

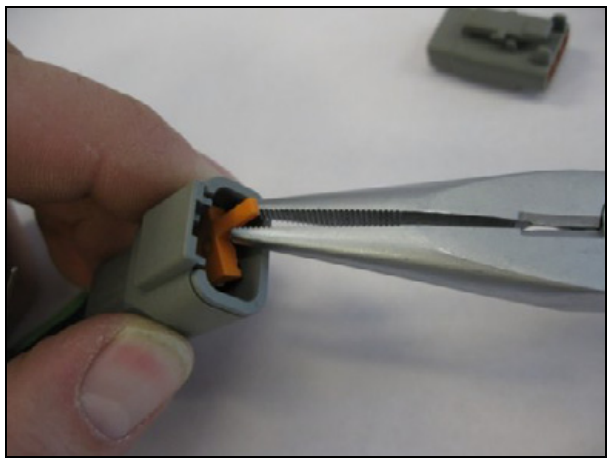
- Press the engage button on the screen.
- Press the EZ-Remote Engage button.
- Press an external foot switch, rocker switch, or the green button on the machine's hydrostat handle if this has been wired.

Step 1

Foot / rocker switch: Locate the foot or momentary rocker switch that will be used. Locate the remote engage adapter cable (P/N 88506) that is included with the foot switch kit (P/N 78150-00) or purchased separately.

Step 2

Remove the wedge from the receptacle 3-pin Deutsch DTM that is included with the P/N 88506 remote engage cable.

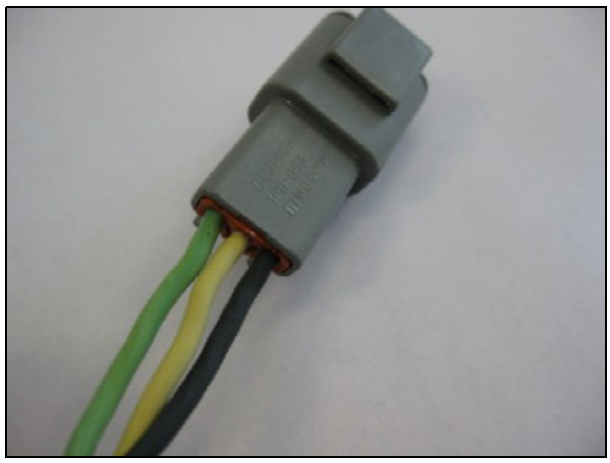


Step 3

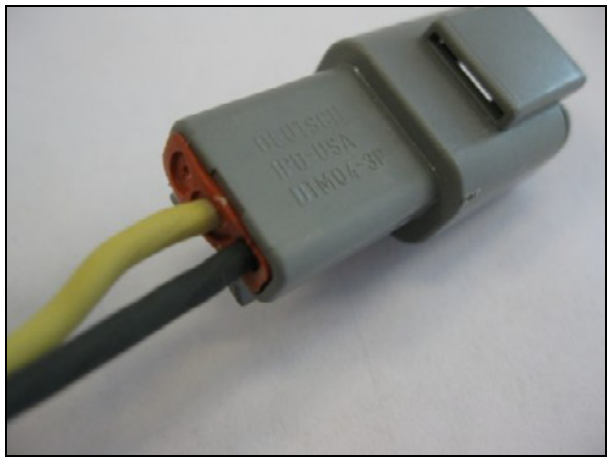
a. **Foot switch:** Hold the receptacle with the lock facing upward.

   Insert the black wire on the right side, the white wire in the middle, and the green wire on the left.

   NOTE – If you purchased P/N 78150, the correct connector is already attached.

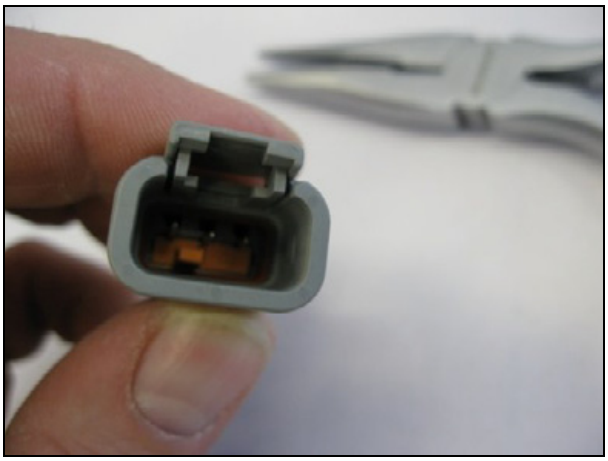


b. **Hydrostat button and rocker switch:** Insert the wires into the right and middle sockets. The orientation does not matter.



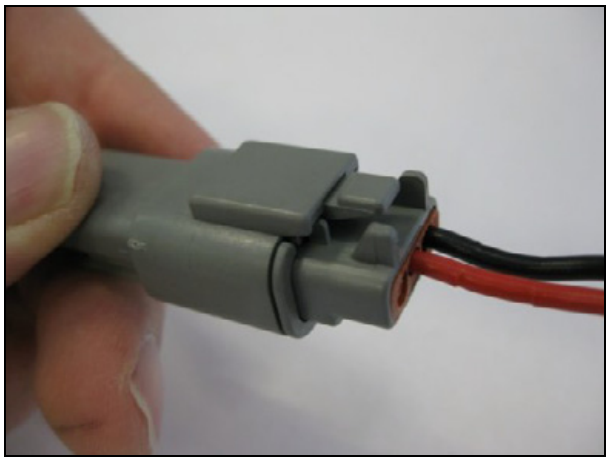
Step 4

Re-insert the wedge into the receptacle.



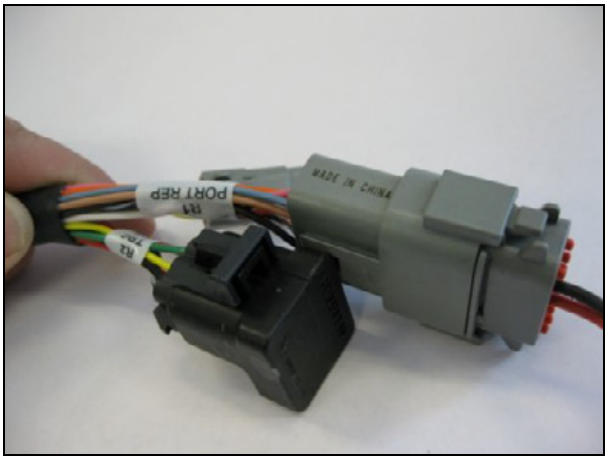
Step 5

Connect the attached receptacle to the 3-pin DTM plug on the remote engage adapter cable.

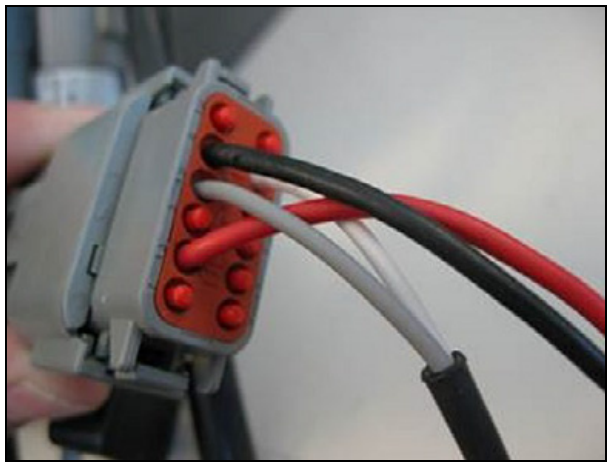


Step 6

Plug the other end of the remote engage adapter cable into the port replicator (pins 10 and 11) on the EZ-Pilot cable connected to one of the CFX-750 display, port B



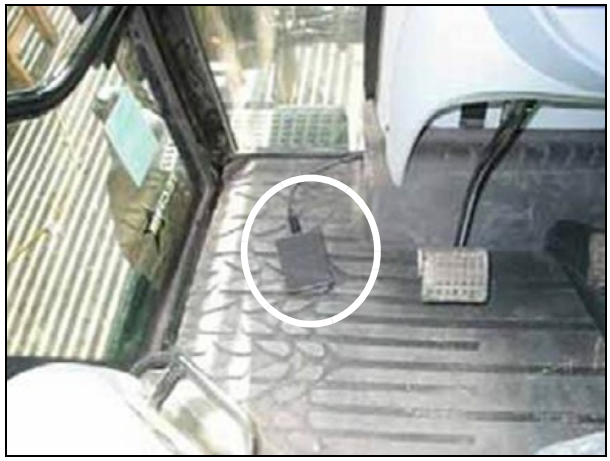
NOTE – For CFX-750 installations with a Sonalert, you must plug the ground wire from pin 10 into pin 8 (the red wire in this example).



Step 7

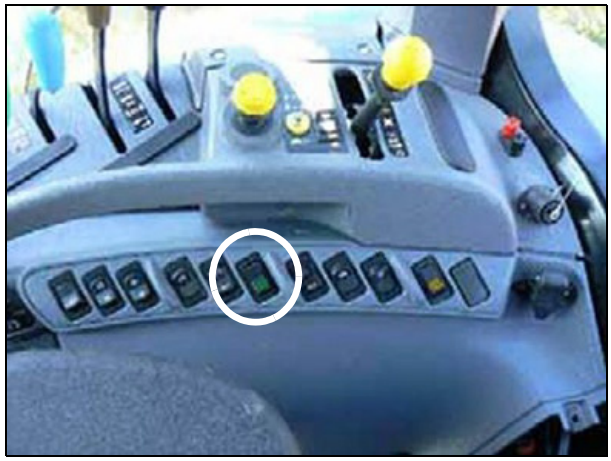
Route the cables to the required location.

Foot switch



Example installation

Rocker switch



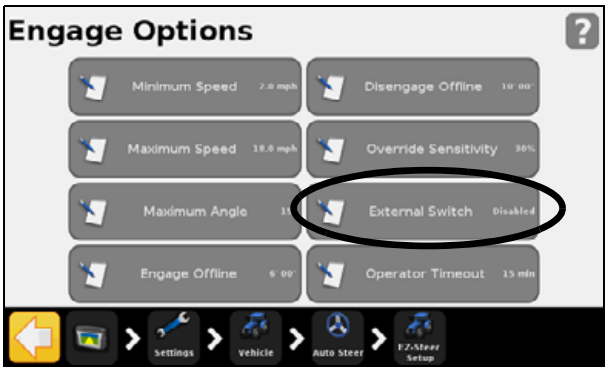
Example installation

CFX-750 display: Setting up the remote engage

Step 1

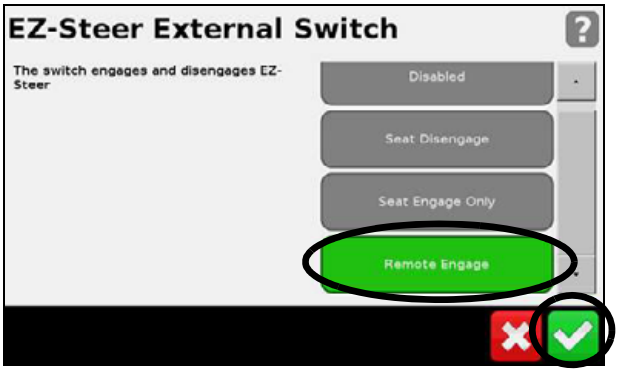
On the display, go to Settings, Vehicle, Auto Steer, EZ-Pilot Setup.

Press **External Switch**.

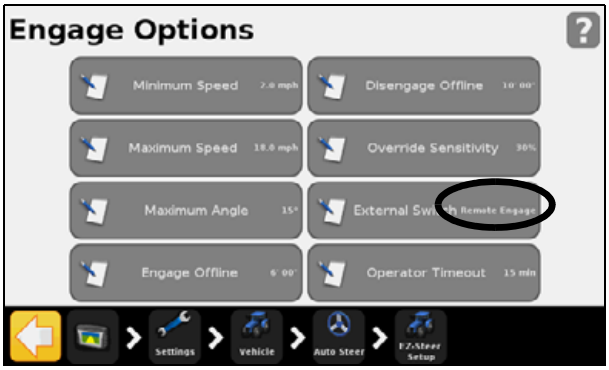


Step 2

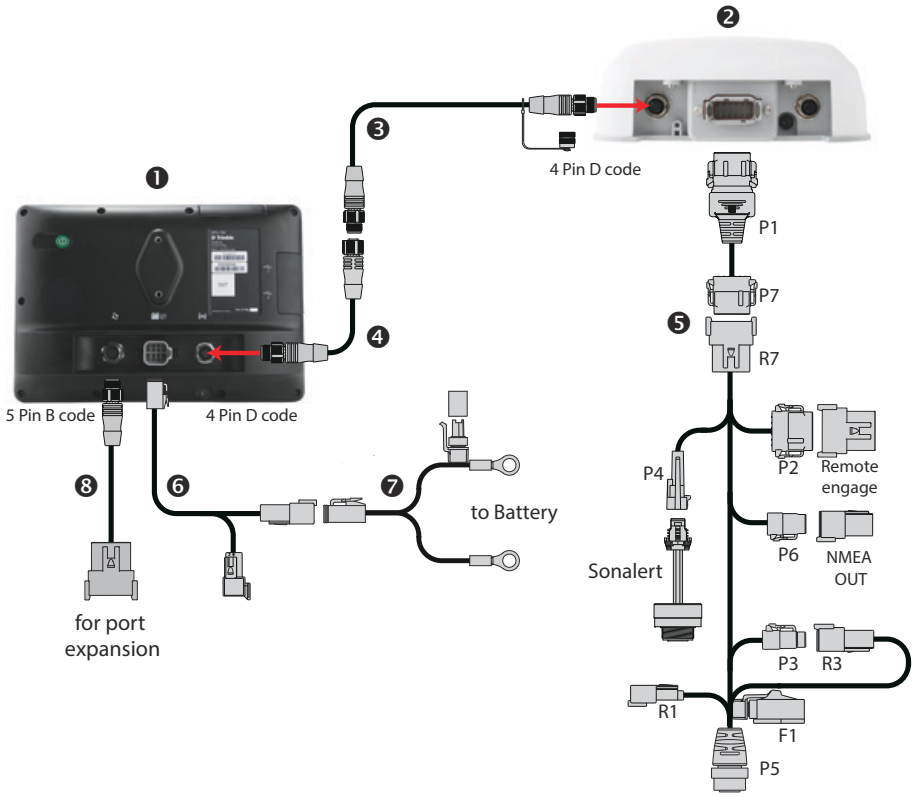
Select **Remote engage** and then press the **Checkmark**.



The **External Switch** now shows *Remote Engage*, and is ready to use.



GFX-750/NAV-900 System: Installing the remote engage switch



To engage the EZ-pilot system, you can use one of these methods:

- Press the engage button on the screen
- Press an external foot or rocker switch

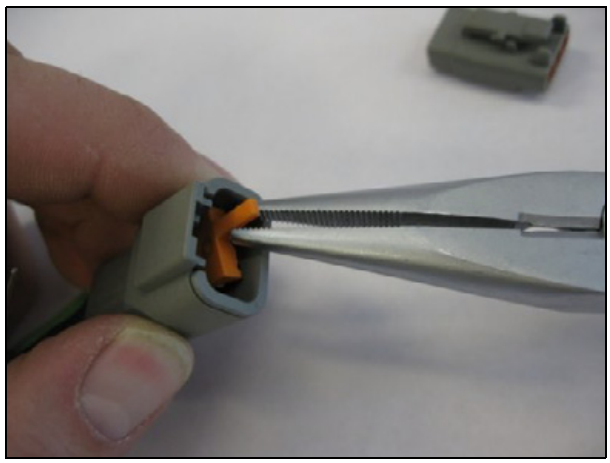
These instructions cover the method for the foot or rocker switch.

Step 1

Locate the foot or momentary rocker switch that will be used.

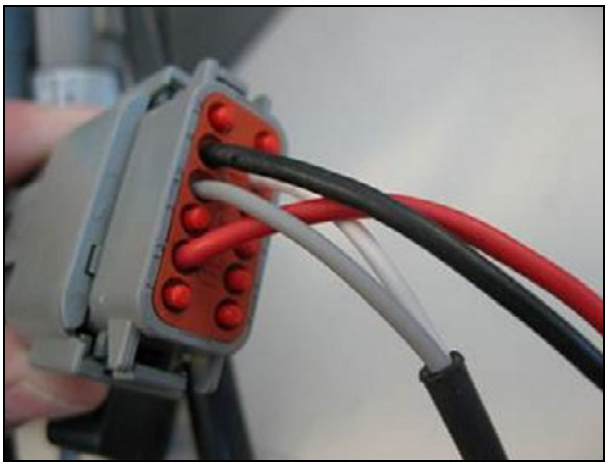
Step 2

Remove the wedge from the receptacle 3-pin Deutsch DTM.



Step 3

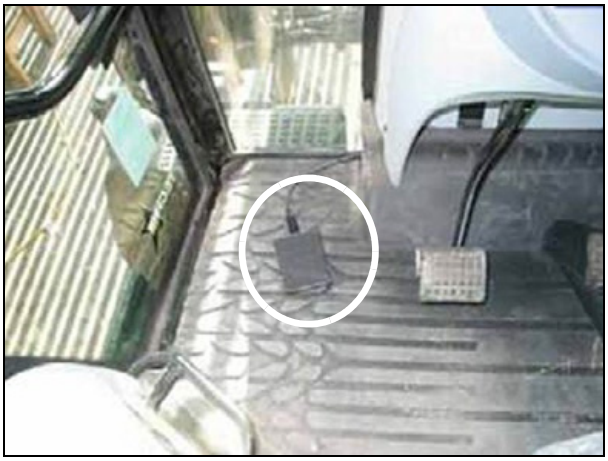
Insert the GND in position 11, PWR Out in position 2 and Remote Engage In in position 7 of the P2 connector on EZ-Pilot cable P/N 110549.



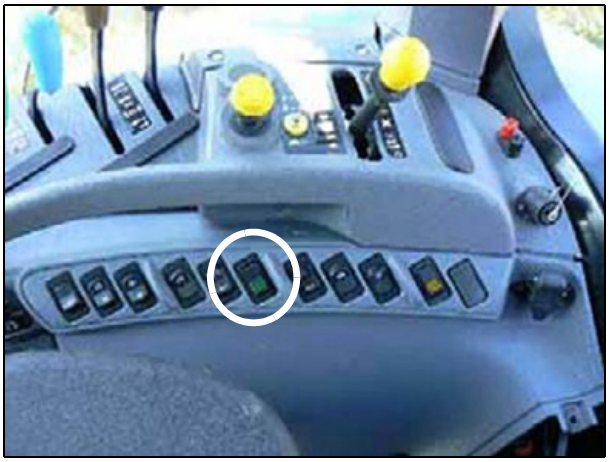
Step 4

Route the cables to the required location.

Foot switch



Rocker switch



6

Final Machine Check

- Performing the final machine check
- Calibration tips
- Calibration values
- Vehicle measurements

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. Make sure that the emergency stop switch **is not depressed**. If the switch is depressed, the SAM-200 motor **will not communicate** with the Trimble display and the EZ-Pilot system will not engage for auto steering.
2. Download the latest firmware for the Trimble display from http://agpartners.trimble.com. At the AgPartners website, select *Products A-Z* and choose *FmX Integrated display* or *CFX-750 display*.
   - CFX-750 display, version 7.70 (or higher) is required for the EZ-Pilot motor drive.
   - FmX display, version 9.25 (or higher) is required for the EZ-Pilot motor drive.

   For details on how to install the firmware onto your Trimble display, refer to the ***EZ-Pilot Getting Started Guide,*** at http://agpartners.trimble.com. On AgPartners, select *Products A-Z / EZ-Pilot Steering System / Technical Support*.
3. Make sure that IMD-600 unit is solidly mounted. If the IMD-600 unit vibrates, the SAM-200 drive motor will oscillate when engaged, causing the anti-rotation pin to damage the rubber grommet.
4. Set the GPS correction source to be used. For details, refer to the ***EZ-Pilot Getting Started Guide,*** at http://agpartners.trimble.com. On AgPartners, select *Products A-Z / EZ-Pilot Steering System / Technical Support*.
5. Calibrate the EZ-Pilot system and save the new display configuration. For details, refer to the ***EZ-Pilot Getting Started Guide,*** at http://agpartners.trimble.com. On AgPartners, select *Products A-Z / EZ-Pilot Steering System / Technical Support*.

Calibration tips

- If the EZ-Pilot system consistently steers to one side on an AB line, adjust the left or right side freeplay individually. Use values of 0.1 - 0.2 to balance the steering accuracy either side of the AB line you are following.
- If the EZ-Pilot system exhibits a swimming motion while engaged, the IMD-600 unit may be experiencing subtle vibration. Pick a different mounting location and/or hard mount the IMD-600 unit using the screws and spacers provided and then check if the IMD-600 mounting calibration that is selected in the Trimble display is correct. You may need to recalibrate the IMD-600 roll offset.
- If the anti-rotation pin is bouncing against the rubber grommet or if the steering column is shaking, *reduce the motor speed or the approach aggressiveness or the steering acceleration limit.*
- If the calibrated Angle per Turn value is not close in value to the number in the table shown below, check the IMD-600 mounting orientation selected in the Trimble display.

Calibration values

Front wheel steer tractors

EZ-Pilot calibration values are from a John Deere 5115R tractor traveling on a gravel road. Travel speeds were 2-9 mph. The GFX-750 display was running software version 11.0..

Item	Value
Vehicle type	2WD / MFWD tractor
Motor speed	High
Angle per turn, left or right	20
Online aggressiveness	100%
Approach aggressiveness	100%
Override sensitivity	35%
Freeplay left or right	0
Minimum engage speed	1.1 mph
Maximum engage angle	35 degrees

Advanced parameters

Item	Value
Estimate steering angle bias	On
Dynamic approach angle	Off
Steering slew limit	40 deg/sec
Steering acceleration limit	90 deg/sec^2

EZ-Pilot calibration values are from a John Deere 8235R tractor traveling on a gravel road. Travel speeds were 2-9 mph. The CFX-750 display was running software version 7.70.

Item	Value
Vehicle type	2WD / MFWD tractor
Motor speed	High
Angle per turn, left or right	14.2
Online aggressiveness	125%
Approach aggressiveness	150%
Override sensitivity	35%
Freeplay left or right	0
Minimum engage speed	1.1 mph
Maximum engage angle	35 degrees

Advanced parameters

Item	Value
Estimate steering angle bias	On
Dynamic approach angle	Off
Steering slew limit	40 deg/sec
Steering acceleration limit	90 deg/sec^2

EZ-Pilot calibration values are from a John Deere 7230R tractor traveling on a gravel road. Travel speeds were 2-8 mph. The CFX-750 display was running software version 7.70

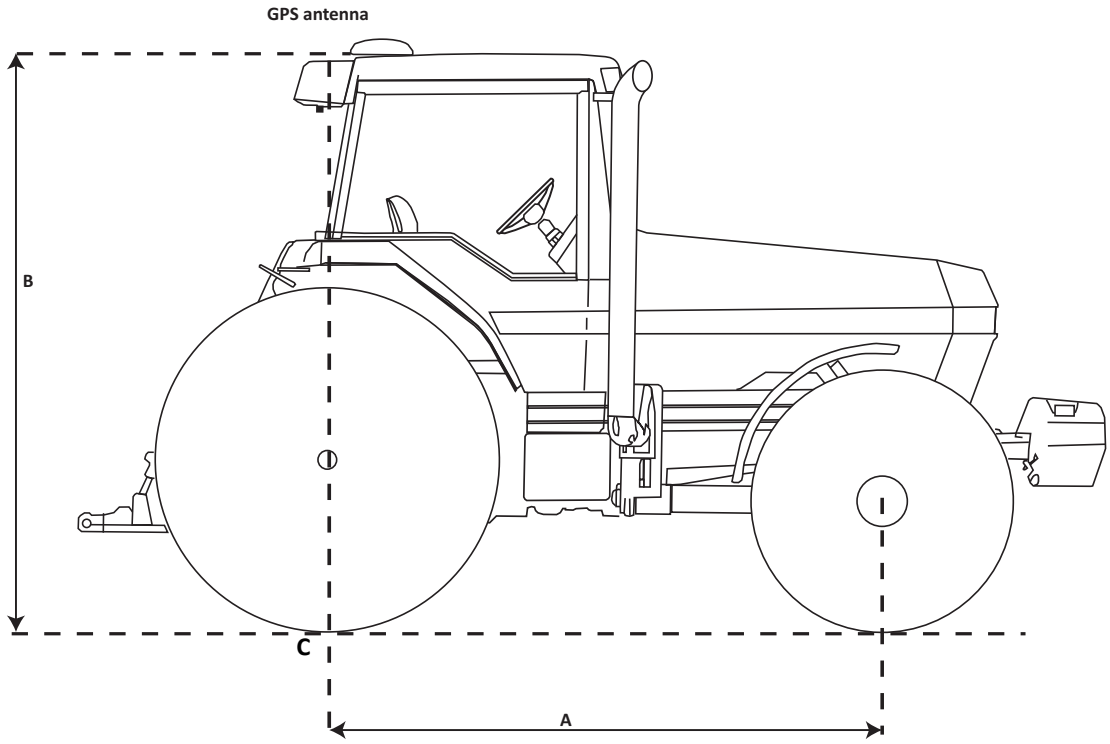
Item	Value
Vehicle type	2WD / MFWD tractor
Motor speed	High
Angle per turn, left or right	16.2
Online aggressiveness	130%
Approach aggressiveness	150%
Override sensitivity	35%
Freeplay left or right	0
Minimum engage speed	1.1 mph
Maximum engage angle	35 degrees

Advanced parameters

Item	Value
Estimate steering angle bias	On
Dynamic approach angle	Off
Steering slew limit	40 deg/sec
Steering acceleration limit	90 deg/sec^2

Vehicle measurements

⚠ **CAUTION –** These measurements are provided as an example only. You must check the dimensions against your machine.



Models: John Deere 5090R / 5100R / 5115R / 5125R

Wheel base MFWD (A)	Antenna height (B)	Antenna/Axle offset (C)
228 cm (90“)	270 cm (106“)	0 cm (0“) forward

Models: John Deere 7200R / 7215R / 7230R / 7260R / 7280R

Wheel base MFWD (A)	Antenna height (B)	Antenna/Axle offset (C)
299 cm (118“)	330 cm (130“)	0 cm (0“) forward

Models: John Deere 8235R / 8260R / 8285R / 8310R / 8335R / 8360R

Wheel base MFWD (A)	Antenna height (B)	Antenna/Axle offset (C)
307 cm (121“)	335 cm (132“)	0 cm (0“) forward