

Installation Instructions

EZ-Pilot™ Steering System

Casell Floater	■ Titan 3020 / 3520 / 4020 / 4520
	■ FLX 3010 / 3510 / 4010 / 4510
Casell Tractor	■ Magnum 180 / 190 / 210 / 215 / 225 / 225 / 235 / 245 / 260 / 275 / 290 / 305 / 315 / 335 / 340
	■ MX 180 / 200 / 210 / 215 / 230 / 240 / 245 / 255 / 270 / 275 / 285
Casell Articulated Tracked Tractor	■ Quadtrac 385 / 435 / 450 / 485 / 500 / 535 / 550 / 600
	■ STX Quadtrac 375 / 425 / 450 / 500
Casell Sprayer	■ Patriot 3230 / 3330 / 4420
	■ SPX 4260 (Serial # JFG0004860 & above) / 4410 / 3230 / 3320 / 3330 / 4420
Casell Articulated Tractor	■ Steiger 330 / 335 / 350 / 385 / 400 / 435 / 450 / 485 / 500 / 535 / 550 / 600
	■ STX 275 / 280 / 325 / 330 / 375 / 380 / 425 / 430 / 440 / 450 / 480 / 500 / 530
New Holland Tractor	■ T8.275 / T8.300 / T8.330 / T8. 360 / T8.390
	■ T8010 / T8020 / T8030 / T8040 / T8050
	■ TG 210 / 215 / 230 / 245 / 255 / 275 / 285 / 305
New Holland Articulated Tractor	■ T9.390 / T9.450 / T9.505 / T9.560 / T9.615
	■ T9020 / T9030 / T9040 / T9050 / T9060
	■ TJ 275 / 325 / 440 / 375 / 425 / 450 / 500 / 530

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This is the October 2011 release (Revision A) of the *EZ-Pilot Steering System Installation Instructions*, part number 78100-02-RS-E05.

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Product Limited Warranty

Subject to the terms and conditions set forth herein, Trimble Navigation Limited ("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).

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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

If the Trimble Product fails during the warranty period for reasons covered by this Limited Warranty and you notify Trimble of such failure during the warranty period, Trimble at its option will repair OR replace the nonconforming Product, OR refund the purchase price paid by you for the Product, upon your return of the Product to Trimble in accordance with Trimble's standard return material authorization procedures.

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.

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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. NOTICE REGARDING PRODUCTS EQUIPPED WITH GPS TECHNOLOGY: TRIMBLE IS NOT RESPONSIBLE FOR THE OPERATION OR FAILURE OF OPERATION OF GPS SATELLITES OR THE AVAILABILITY OF GPS SATELLITE SIGNALS.

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Registration

To receive information regarding updates and new products, please contact your local dealer or visit the Trimble website at www.trimble.com/register. Upon registration you may select the newsletter, upgrade or new product information you desire.

Notice to Our European Union Customers

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

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



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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. 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.

Introduction

In this chapter:

- Technical assistance
- Required components
- Hardware organization
- Vehicle measurements

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. Go to the Trimble website (www.trimble.com).
2. Click the **Support & Training** link at the top of the screen, select *Support* and then select *Support A–Z list of products*.
3. Scroll to the bottom of the list.
4. Click the *submit an inquiry* link. A form appears.
5. Complete the form and then click **Send**.

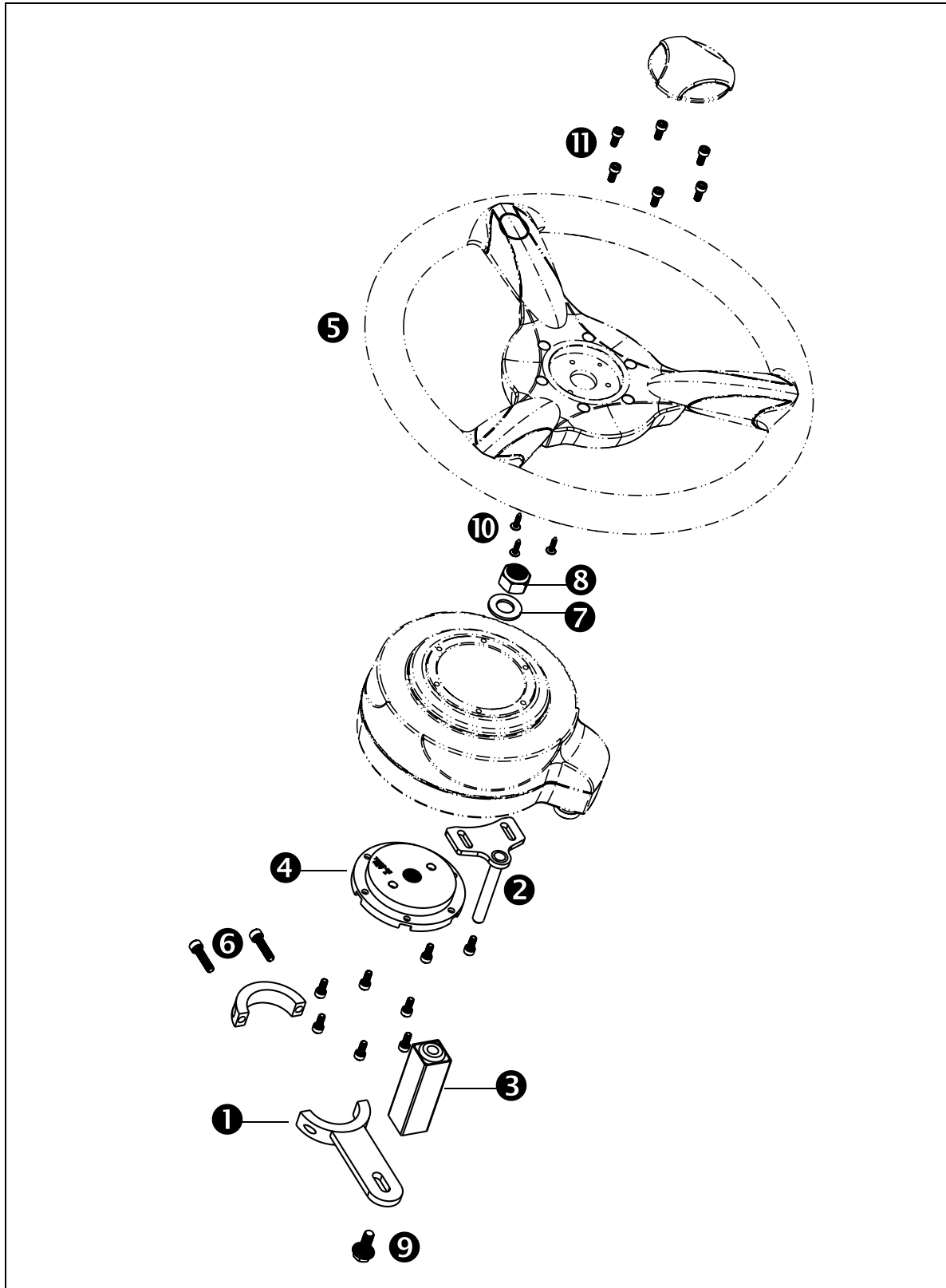
Required components

Kits required	Tools
EZ-Pilot platform kit: P/N 78100-02-RS	1/8" flat blade screwdriver 22 mm deep socket steering wheel puller (OEM tools P/N 27017) 5 mm hex wrench 4 mm hex wrench 13 mm socket or ratchet combination wrench 5/16"-24 blind hole thread tap

The following callouts refer to the graphic shown on the next page.

Hardware	Component
Platform kit (P/N 78100-02-RS)	❶ Anti-rotation bracket
	❷ 14 mm flat washer
	❸ Anti-rotation pin
	❹ 14 mm hex nut
	❺ Anti-rotation tube
	❻ 8 mm flange bolt
	❼ Lower shaft adaptor
	❽ Sheet metal screws
	❾ Trimble Steering Wheel
	❿ 5 mm hex socket head bolts
	⓫ 6 mm hex socket head bolts

Hardware organization



Vehicle measurements

CaselH

Model	Full Wheel Base	Antenna Height	Antenna/Axle Offset
Magnum	305 cm (120")	330.2 cm (130")	145 cm (57") ahead
MX	305 cm (120")	330.2 cm (130")	145 cm (57") ahead
Steiger	356 cm (140")	348 cm (137")	41 cm (16") behind
STX	356 cm (140")	348 cm (137")	406 cm (16") behind
Quadtrac	373.4 cm (147")	353.1 cm (139")	76.2 cm (30") behind
STX Quadtrac	373.4 cm (147")	353.1 cm (139")	76.2 cm (30") behind
Patriot	381 cm (150")	350.5 cm (138")	508 cm (200") ahead
SPX	381 cm (150")	350.5 cm (138")	508 cm (200") ahead
Titan 3020/3520	457.2 cm (180")	361 cm (142")	483 cm (190") ahead
Titan 4020/4520	457.2 cm (180")	361 cm (142")	483 cm (190") ahead
FLX	457.2 cm (180") 3	361 cm (142")	483 cm (190") ahead

New Holland

Model	Full Wheel Base	Antenna Height	Antenna/Axle Offset
TG	356 cm (140")	330.2 cm (130")	152.4 cm (60") ahead
TJ	363.2 cm (143")	381 cm (150")	51 cm (20") ahead
T8	330.2 cm (130")	330.2 cm (130")	152.4 cm (60") behind
T9	363.2 cm (143")	381 cm (150")	51 cm (20") behind
T80x0	330.2 cm (130")	330.2 cm (130")	152.4 cm (60") ahead
T90x0	363.2 cm (143")	381 cm (150")	51 cm (20") behind

Installing the EZ-Pilot Steering System

In this chapter:

- Preparing the vehicle
- Removing the steering wheel
- 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
- Removing the SAM-200 motor
- Additional information

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



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.

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.

Removing the steering wheel

Step 1

Use a $\frac{1}{8}$ " flat blade screwdriver to remove the center cap from the steering wheel.



Step 2

Use a 22 mm deep socket to remove the hex nut and flat washer. Use an electric or air impact tool.

**Step 3**

Soak the steering wheel splines with a spray penetrant. Trimble recommends PB Blaster, available at www.pbblaster.com or from a local automotive parts company.

**Step 4 Optional**

The threaded holes in the steering wheel hub might be covered with residual rubber mold material. Clean out the threads using a 5/16"-24 thread tap.



Step 5

Pull the steering wheel. Use the OEM tools steering wheel puller kit (P/N 27017), available from www.greatnecksaw.com.

Alternatively, you can purchase the steering wheel puller from AutoZone (United States), P/N 27017.

You will need Grade 8, 5/16"-24 x 3" long bolts. Apply a small amount of anti-seize to the bolt threads.



Step 6

Remove the steering wheel.



Installing the anti-rotation bracket

Step 1

Press the middle foot pedal to tilt the steering wheel half down. Telescope the steering wheel fully inward.



Step 2

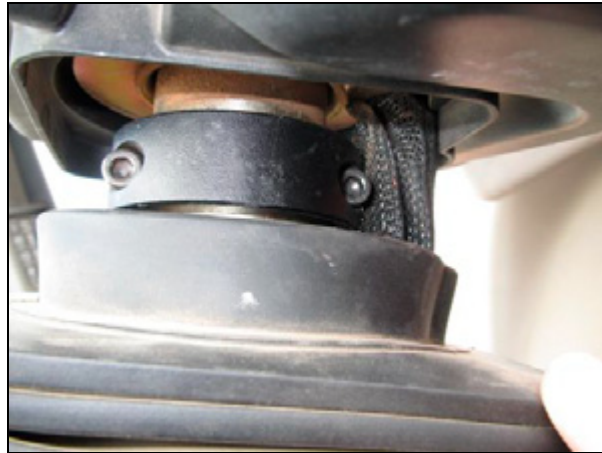
Pull down on the rubber boot below the steering wheel to expose the steering shaft tube.



Step 3

Attach the anti-rotation clamp bracket to the steering column tube at a 3 o'clock position, with the flat side of the bracket arm facing upward. Use the supplied 6 mm cap head bolts.

Tighten the bolts evenly using a 5 mm hex wrench with a ball end.



3 o'clock position



3 o'clock position

Assembling the SAM-200 EZ-Pilot drive motor

Step 1

Flip the motor upside-down with the motor's electrical connector pointed upward at a 12 o'clock position.

Step 2

Fasten the lower spline adapter to the bottom of the motor. Use the supplied 5 mm cap head bolts. Tighten bolts using a 4 mm hex wrench.

Step 3

Bolt the anti-rotation pin to the motor at a 11 o'clock position. Use the supplied 5 mm hex socket screws. Slide the pin fully inward and tighten the screws using a 4 mm hex wrench.



Installing the SAM-200 EZ-Pilot drive motor

Step 1

Apply anti-seize to the steering shaft spline, threads, and taper.



Step 2



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

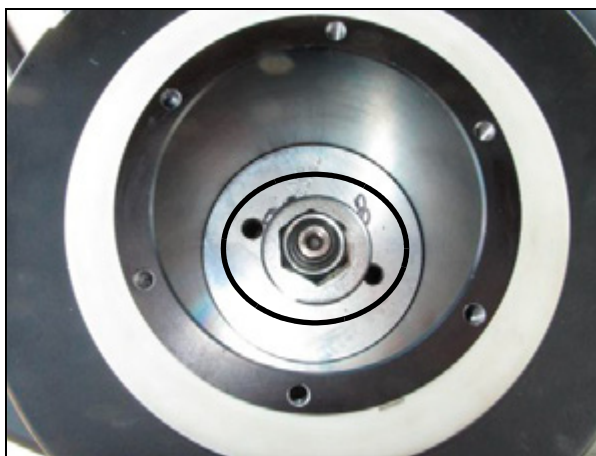
Set the SAM-200 motor assembly onto the steering shaft with the motor's electrical connector at a 1 o'clock position.





Step 3

Install the supplied 14 mm flat washer and nylock nut. Use a 22 mm deep socket and torque the nut to 33-40 ft-lbs (44-54 Newton-meters).



Step 4

Rotate the motor and then slide the square anti-rotation tube onto the pin.



Step 5

Rotate the motor and then fit the square post onto the anti-rotation bracket using the supplied M8 x 20 mm flange head bolt.



Tighten the M8 bolt using a 13 mm ratchet combination wrench or socket.



Installing the Trimble steering wheel

Step 1

Use the supplied #6 screws to fasten the steering wheel cap to the top of the steering wheel.

Use a #2 Philips screw driver to tighten the screws.



Step 2

Use the supplied 5 mm hex socket screws to fasten the steering wheel to the motor.

Use a 4 mm hex wrench to tighten the bolts.



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





Step 3

Find the supplied cable P/N 76351.
Plug connector P1 into the motor.



Removing the SAM-200 motor

If you need to remove the SAM-200 motor from the steering shaft, do the following.

Use the OEM tools steering wheel puller kit (P/N 27017), available from www.greatnecksaw.com.

Alternatively, you can purchase the steering wheel puller from AutoZone (United States), P/N 27017.

You will need grade 8.8 hex bolts, 8 mm x 1.25 mm x 120 mm, available from www.mcmaster.com, P/N 91280A567

Apply a small amount of anti-seize to the bolt threads.



Additional information

Refer to the documentation on www.trimble.com.

IMD-600 Unit Installation

In this chapter:

- Installing the IMD-600 unit

This chapter describes how to install the IMD-600 unit in the vehicle.

Installing the IMD-600 unit



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

Step 1

Fasten the provided sub plate to the IMD-600 unit (as shown) using the supplied 4 mm 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.





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. Nonorthogonal angles will cause performance degradation

Step 3

Place the IMD-600 unit in the right front corner of the operator's cab. The unit must be placed parallel to the centerline of the tractor.



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.



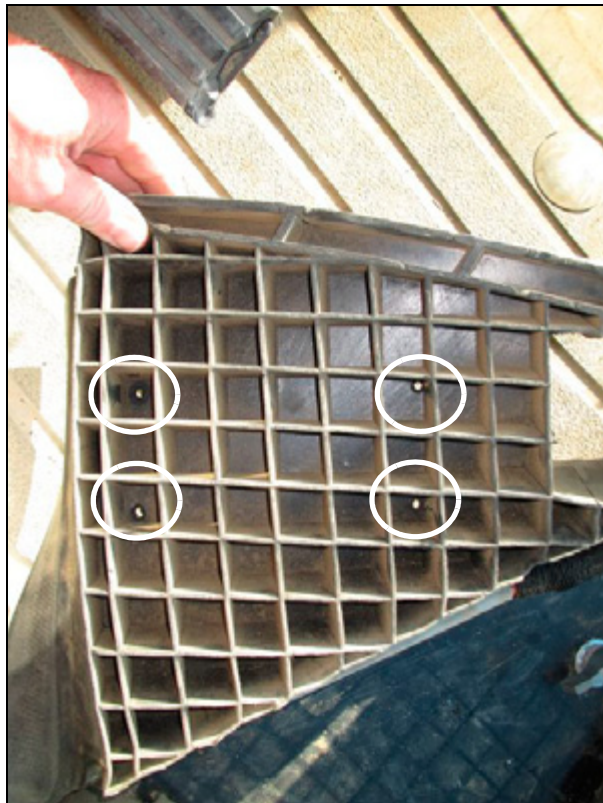
Under cab floor

Step 4

Use a 1/4" bit. Drill 4 holes through the floormat.



Do not drill into the metal cab floor.



Step 5

Use a 1/4" pilot bit and 3/4" hole saw. Drill 4 holes through the floormat at the same locations previously drilled.



Step 6

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.



Step 7

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



Step 8

Place the IMD-600 unit on top of the spacers. Fasten the IMD-600 unit to the floor using the provided 1/4" x 2.5" long self tapping bolts. Use an 8 mm or 5/16" deep socket.

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



Under cab floor

Step 9

Make sure that the bolts are tight. Mount the IMD-600 unit solidly so that it does not vibrate.

Find the supplied cable 76351.

Plug connector P3 into the IMD-600 unit.



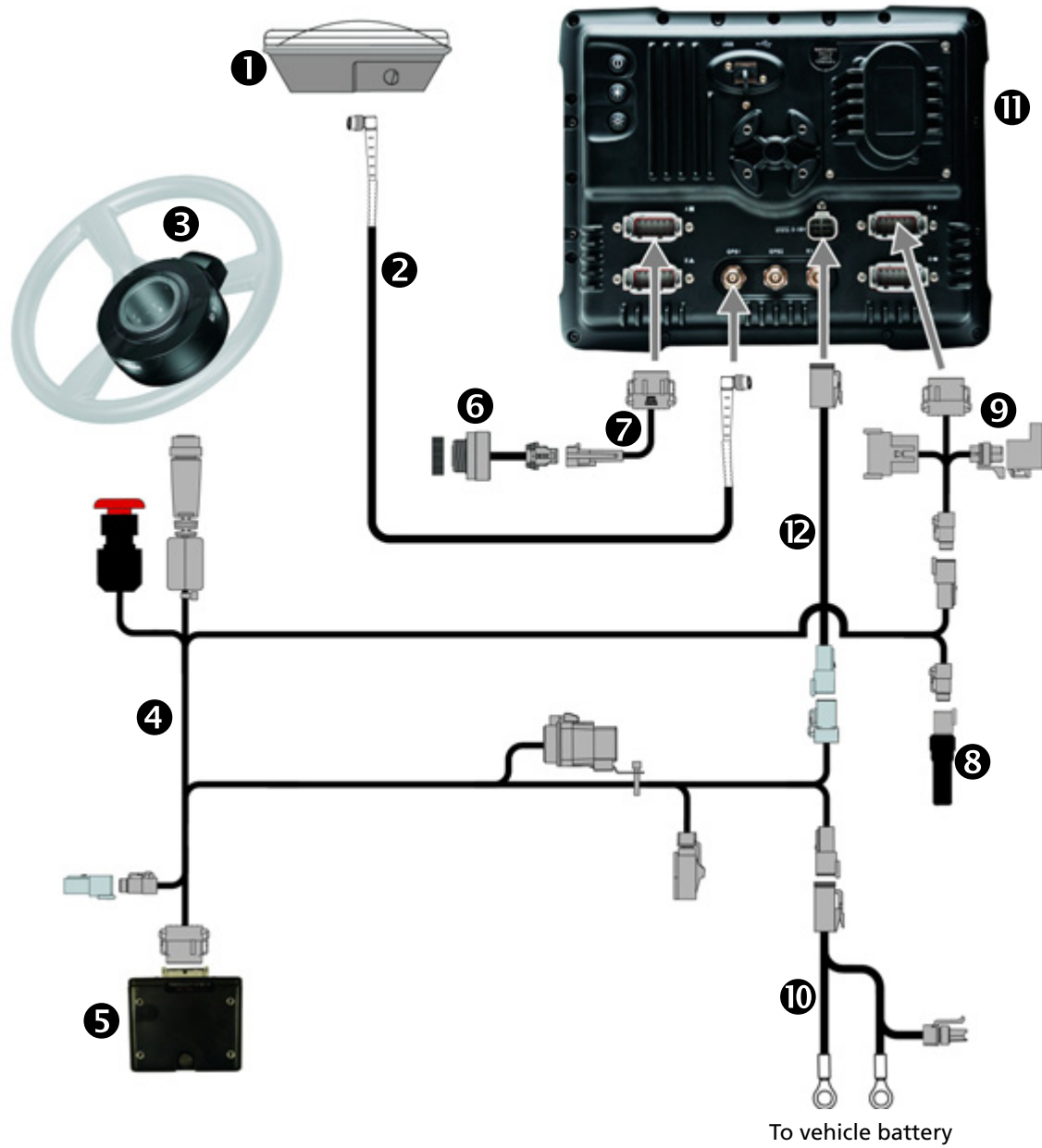
Display Connections

In this chapter:

- FmX integrated display
- CFX-750 display
- Connecting the EZ-Pilot system
- Installing the emergency stop switch

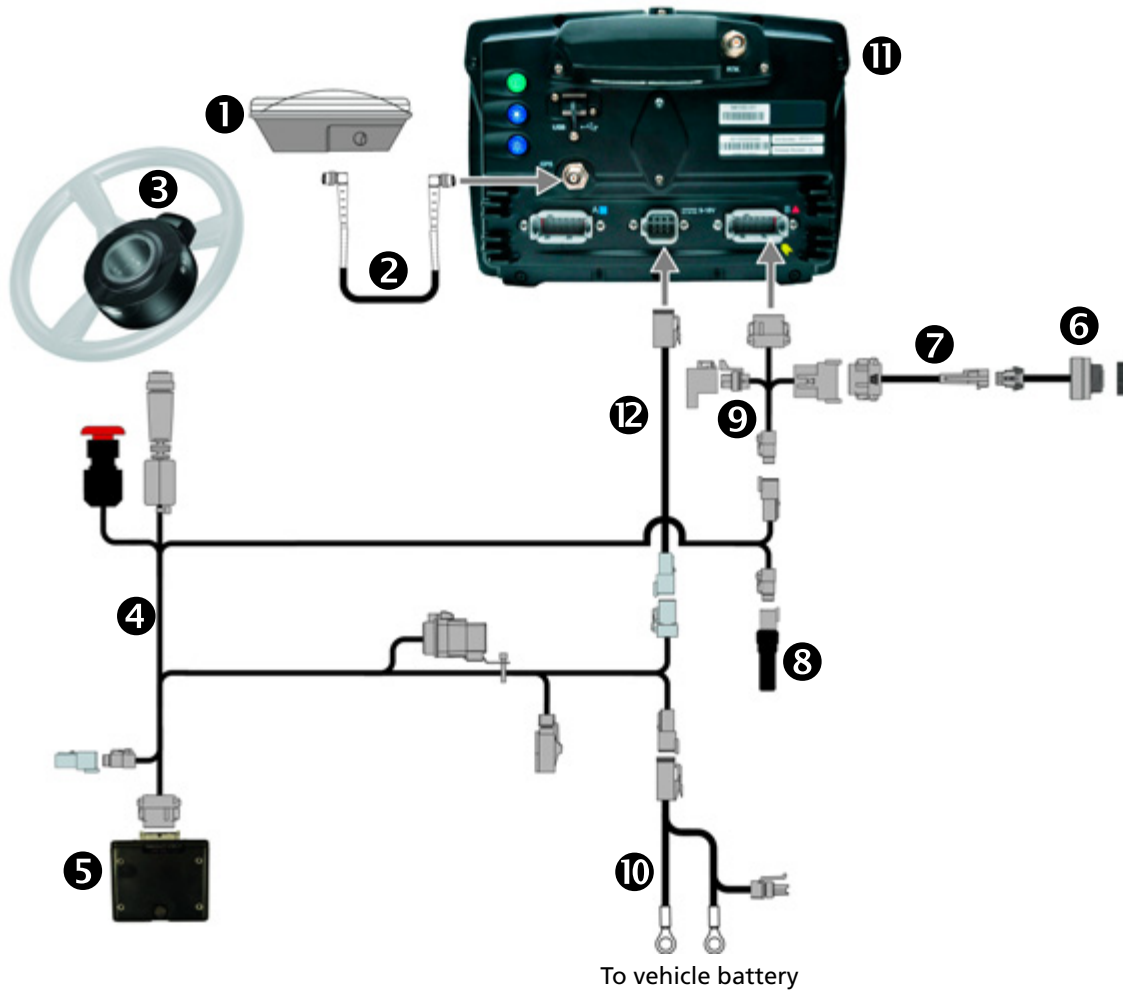
This chapter describes the cabling connections for the Trimble display.

FmX integrated display



Item	Description	P/N
❶	Antenna	77038-00
❷	Antenna cable	50449
❸	SAM-200 steering motor	83382-xx
❹	IMD-600 to SAM-200 to CAN power cable	76351
❺	IMD-600 unit	83390-xx
❻	Sonalert device	43104
❼	Display to Sonalert cable	84668
❽	CAN terminator	59783
❾	Display to Field-IQ™ cable	75834
❿	Basic power cable	67528
⓫	FmX® integrated display	93100-xx
⓬	Display power cable	66694

CFX-750 display

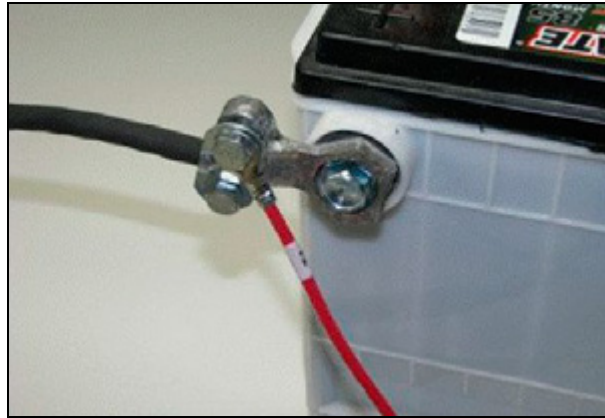


Item	Description	P/N
❶	Antenna	77038-00
❷	Antenna cable	50449
❸	SAM-200 steering motor	83382-xx
❹	IMD-600 to SAM-200 to CAN power cable	76351
❺	IMD-600 unit	83390-xx
❻	Sonalert device	43104
❼	Display to Sonalert cable	84668
❽	CAN terminator	59783
❾	Display to Field-IQ cable	75834
❿	Basic power cable	67528
⓫	CFX-750™ display	94100-xx
⓬	Display power cable	77282

Connecting the EZ-Pilot system

Step 1

Connect the power cable to the battery

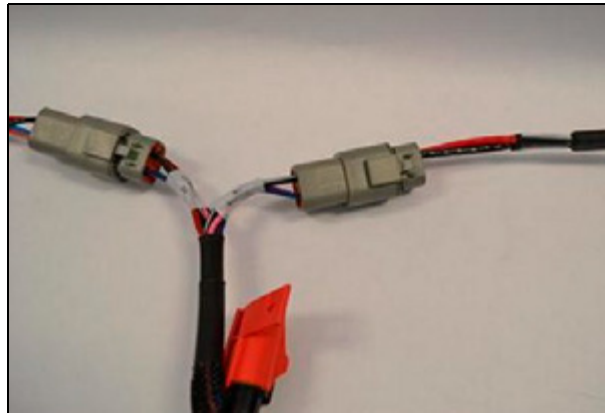


Step 2

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

Also connect one of the following:

- FmX power cable (P/N 66694)
- CFX-750 power cable (P/N 77282)



Step 3

Connect the power cable to the display.

FmX integrated display



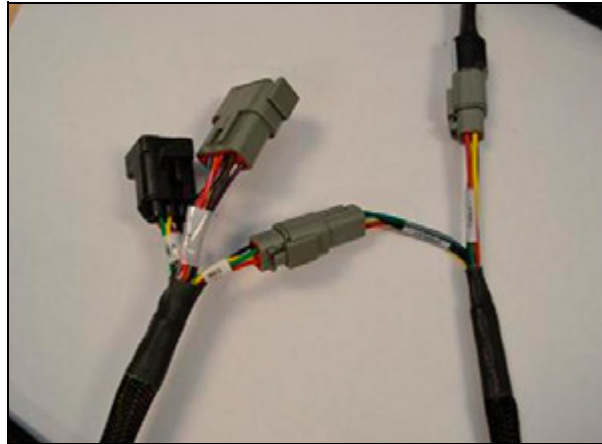
CFX-750 display**Step 4**

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

FmX display: Port C or D*CFX-750 display: 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

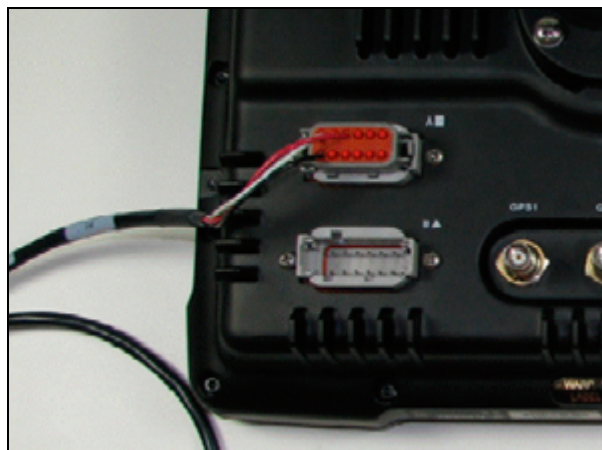
Connect the black 12-pin plug to the IMD-600 unit.



Step 7 Connecting the Sonalert device

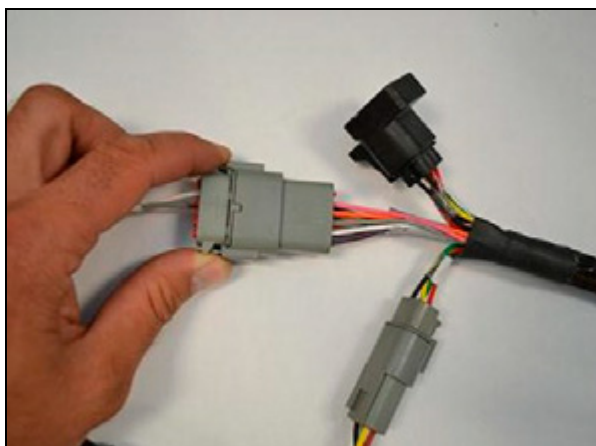
FmX display

Plug the Sonalert adapter into port A.

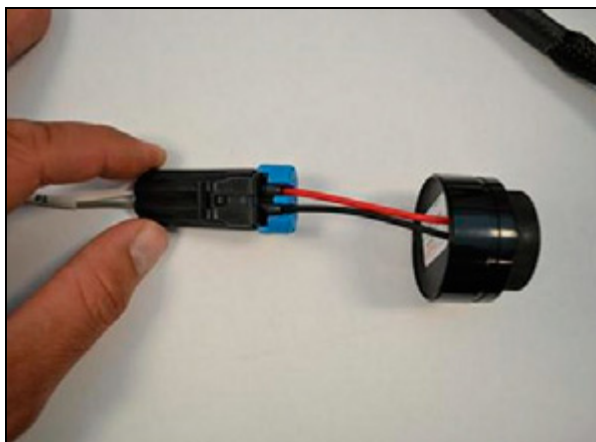


CFX-750 display

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

***Both displays***

Connect the Sonalert device to the adapter cable.

**Step 8**

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



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.

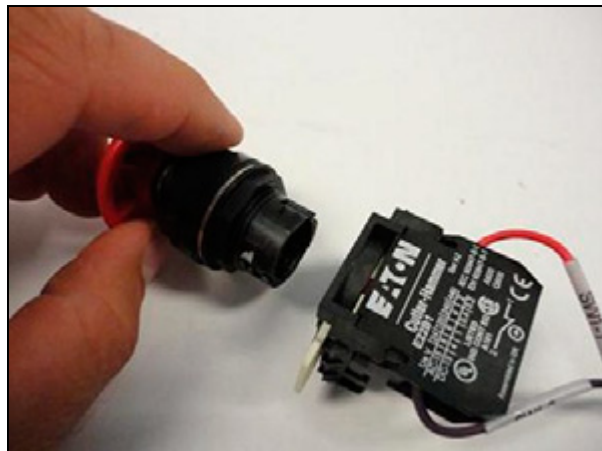
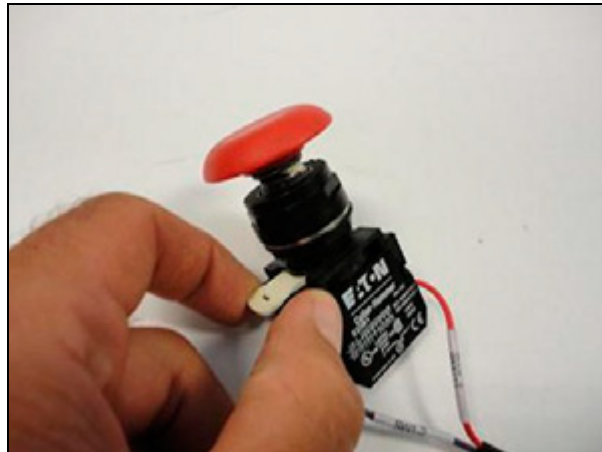
Step 1

Locate the emergency stop switch.



Step 2

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



Step 3

Remove the nut and washer.

**Step 4**

In the selected prominent location, drill a 7/8" hole and then mount the switch with the washer and nut.

**Step 5**

Route the switch wires and then reattach the lower housing.

Final Machine Check

In this chapter:

- Performing the final machine check

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

Performing the final machine check



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

1. Connect the battery.
2. Update the Trimble display, IMD-600 unit, and SAM-200 motor to the latest firmware from <http://www.agpartners.trimble.com> or from www.trimble.com (Support and Training / Support A-Z).
3. Configure the EZ-Pilot system through the Trimble display.
Depending on your machine type, the following items must be calibrated **before** you can use the EZ-Pilot system for autosteering:
 - IMD-600 unit mounting orientation
 - Antenna height, Antenna axle offset, and Roll offset
 - Machine type, Machine Wheelbase
 - Angle per Turn left, Angle per Turn right
 - Motor Speed, Override Sensitivity