eDrive VSi Installation Guide

Kit: eDTC / eDX VSi - C9300

P/Ns 911-1011-000 (TC), 911-4007-000 (eDX)

Fits CaseIH/Steiger, Versatile and Caterpillar Models:

CaseIH/Steiger *

9110	9210	9310
9130	9230	9330
9150	9250	9350
9170	9270	9370
9180	9280	9380
9190		9390

***** *(i) eDriveX only.*

(ii) On row crop special models, you must lock the front axle for eDriveX to provide accurate guidance.

Versatile Designation 6

836	846	856	876
936	946	956	976

Caterpillar

65C	65D	65E
70C	75D	75E
75C	85D	85E
85C		95E

Read and Follow Safety Messages

- In these instructions, you will see the heading WARNING and the safety alert symbol ⚠. They indicate a hazardous situation that, if not avoided, could result in death or serious injury. The safety messages provide information to identify a hazard associated with potential injury.
- Do not allow anyone to operate without instruction.
- Keep these instructions and all related safety information with the manuals for your machine and other implements.

If you have questions or need assistance, contact your local dealer or distributor.

Overview

This is a general guideline for the installation of the VSi electric steering wheel and either eDriveTC or eDriveX. Every effort has been made to verify the following installation procedure. However, due to the manufacturing process outside of AgJunction's control, the installer may have to adapt this kit to your distinct situation.

The items in the kits are detailed in the tables that follow the safety warnings on the next page. After the kit tables there are step-by-step installation instructions.

Please read this manual thoroughly before beginning the installation.

⚠WARNING:

The VSi Electric Steering Wheel is designed as a driver aid for precision agriculture applications. At all times the driver is fully responsible for the safe operation of the vehicle. It is not intended for and must not be enabled for use on roadways.

⚠WARNING:

To avoid serious injury or death during machine operation, install the appropriate kit for your make and model.

Machine Preparation

⚠WARNING:

Inspect the machine and perform any needed maintenance before installing the VSi kit (for example, adjust the steering linkage so that the machine drives straight ahead without manual steering). This kit cannot perform as intended on a machine that is not maintained properly. Errors in performance increase the risk of operator and bystander injury or death.

Failure to maintain properly adjusted steering linkage can cause loss of directional control resulting in serious injury or death.

Turn off the machine and power off all components when installing or performing maintenance.

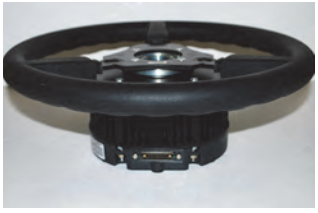
Before attempting to install any of the components:

- Park the machine on a clean level floor
- Ensure adequate clearance to work all around
- Lower all implements and headers to the ground
- Apply the park brake and chock the wheels

Before you perform any drilling, cutting or fastening, ensure that no other machine components, such as electrical wiring, will be damaged. Failure to follow this warning may cause physical injury and/or damage to the machine.

Kit Contents - eDriveTC and eDriveX

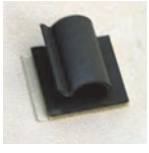
Unpack the supplied kit and identify the required parts as shown. Kit items, which are applicable to both VSi/eDriveTC and VSi/eDriveX installations, are referenced as A, B, C etc. with the item references being used in the step-by-step installation sections of this guide.

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
A	750-8001-000	1	VSi steering wheel	
B		1	Shaft adapter (Use in A)	
C		4	Screw, M5 x 10 flat head socket cap screws (Attach B to A)	

Kit Contents - eDriveTC and eDriveX *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
D		1	Anti-rotation (a/r) 'T' bar mount (Attach to A)	
E		3 3	Bolt, M6 x 16, hex head Washer, spring (Attach D to A)	
F		1	Anti-rotation (a/r) 'T' bar (Attach to D)	
G		2	Nut, M6 nylock, flanged (Attach F to D. See also H)	
H			Anti-rotation pillow block/U-bolt assembly: (Restrains F)	
		1 1 4	U-bolt and saddle Pillow block Nut, M6 nylock, flanged (same as G)	
I		1	Column telescoping actuator	
J		1 1 1	Screw, M8 x 40 hex head Washer, M8 spring Column telescoping acutator plate (For inside I)	

Kit Contents - eDriveTC and eDriveX *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
K		1 1 1	Washer, M8 flat Washer, M8 spring Nut, M8 plain (For outside I)	
L		1	Steering wheel center cover	
M		1	Telescoping actuator center cap	
N	750-8003-000	1	VSi power cable	
O	750-8002-000	1	VSi junction box	
P		1	Junction box mounting bracket	
Q	750-8005-000	1	CAN bus terminator	
R		1	Junction box comms cable clip	

Kit Contents - eDriveTC Only

Unpack the supplied kit and identify the required parts as shown. Kit items, which are applicable to VSi/eDriveTC installations only, are referenced as TA, TB and TC, with the item references being used in the step-by-step eDriveTC installation section of this guide.

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
TA	054-0044-003	1	Power cable, eDriveTC	
TB	051-0259-000	1	CAN bus harness, eDriveTC	
TC	806-1007-03A	1	ECU, eDrive TC	

Kit Contents - eDriveX Only

Unpack the supplied kit and identify the required parts as shown. Kit items, which are applicable to VSi/eDriveX installations only, are referenced as EA, EG, EJ etc. (from ECU - see Notes after EA and EGa) with the item references being used in the eDriveX step-by-step installation section of this guide.

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
EA	051-0226-000#	1	Main cable	
Note: Items EB to EF are not used in this installation				
EG	054-0117-000	1	Power switch (Use EGa to mount if necessary)	
EGa	726-1093-000	1	Switch bracket (Mount EG, if necessary)	
Note: Items EH and EI are not used in this installation				
EJ	640-0091-000	1	ECU (EK) mounting bracket	
EK	806-1031-000	1	ECU, eDriveX	

Kit Contents - eDriveX only *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
Bag E1 of 1 contains EL, EM and EN				
EL	675-1197-000	4	Screw, self-drilling, #10-16 x 2-1/2", hex, ZP (Attach EJ to cab floor - or use EM)	
EM	675-1192-000	4	Screw, self-drilling, #10-16 x 3", hex, ZP (Attach EJ to cab floor - or use EL)	
EN	675-1188-000	4	Screw, mach, M6 x 12mm, PPH, ZP (Attach EK to EJ)	
EO	051-0316-000	1	CAN bus harness, eDriveX	
EP	677-2002	20	Tie straps, 7" releaseable	

eDrive VSi Installation Procedure

NOTE: *On a clean surface lay out all the components and check them against the "Kit Contents - eDriveTC and eDriveX" on page 2. Become familiar with the components and where they are to be installed before proceeding with the installation (see "Appendix A - eDriveTC VSi Connections" on page 16 or "Appendix B - eDriveX VSi Connections" on page 17).*

1. Prepare the VSi electric steering wheel.

a. Place the VSi steering wheel assembly **A** on a clean surface with the wheel facing up. Insert shaft adapter **B** into steering wheel **A** (Figure 1a).

⚠ *At step 1b following, tighten the screws to the specified torque only. DO NOT OVERTIGHTEN - DAMAGE MAY OCCUR.*

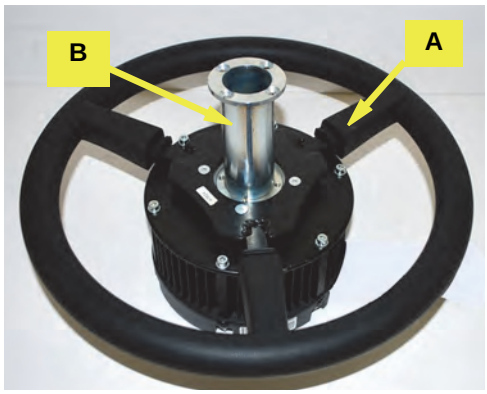


Figure 1a: Inserting shaft adapter into steering wheel

b. Using the four countersunk screws **C**, secure the shaft adapter **B** in the steering wheel. Torque the screws to **6 N·m (53 in-lb)** (Figure 1b).

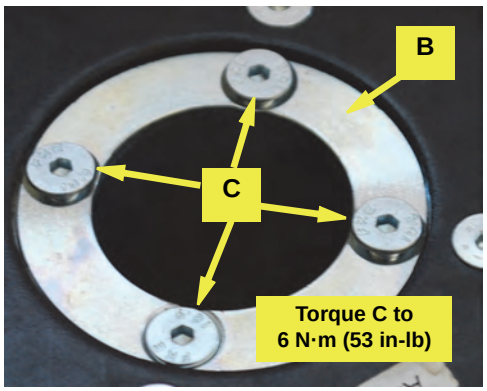


Figure 1b: Securing the shaft adapter

2. Install the anti-rotation 'T' bar.

⚠ *When completing this step, ensure that you (i) use only the bolts (E) provided, (ii) use the washers provided and (iii) tighten the bolts only until the spring washers are compressed, that is, to no more than the specified torque. DO NOT OVERTIGHTEN OR OMIT WASHERS - DAMAGE WILL OCCUR.*

a. Using hardware **E**, attach the anti-rotation 'T' bar mount **D** (studs upward) to the base of the steering wheel assembly on the same side as the communications port (Figure 2a).

b. Using nuts **G** attach 'T' bar **F** to **D**. Torque all fasteners to **8 N·m (71 in-lb)** (Figures 2a and 2b).

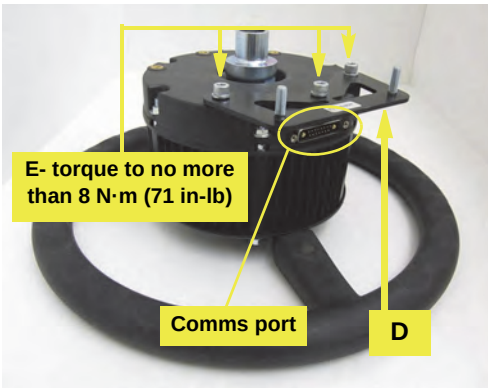


Figure 2a: 'T' bar mounting installed

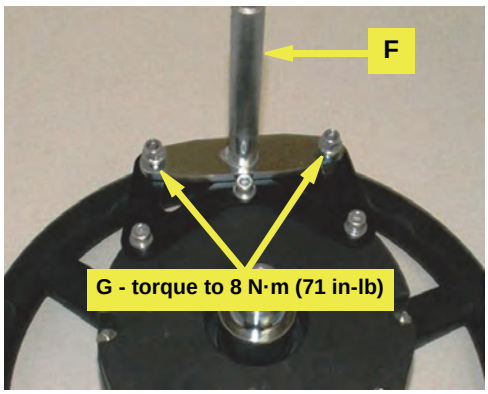


Figure 2b: T' bar installed

3. Remove the machine's steering wheel.

a. Remove the steering wheel center cap (Figure 3a-a, inset) and spring assembly (push down until you feel resistance then twist 90° left or right and release). Remove center cap retainer (four screws - Figure 3a-a). Remove the two screws from the telescoping actuator 'star' screw (take special care not to drop the screws into the wheel - Figure 3a-b). Remove the 'star' screw (Figure 3a-c) and remove the actuator lever/hub (Figure 3a-d).

NOTE: *You will not reuse the center cap retainer, the 'star' screw or the actuator in this installation.*

b. Remove the steering wheel retaining nut (you will reuse this - Figure 3b inset) and remove the steering wheel (Figure 3b).

NOTE: *Consult your equipment dealer if you are unsure of the correct procedure for removing the steering wheel.*

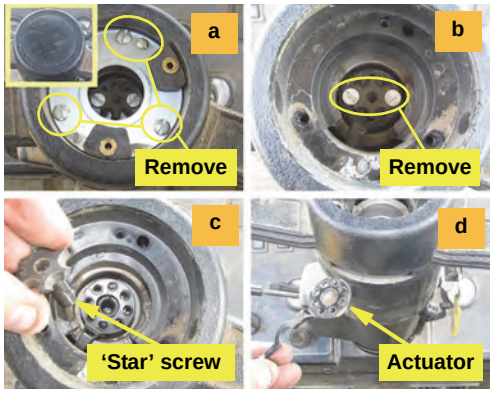


Figure 3a-a to 3a-d: Steering wheel removal preparation

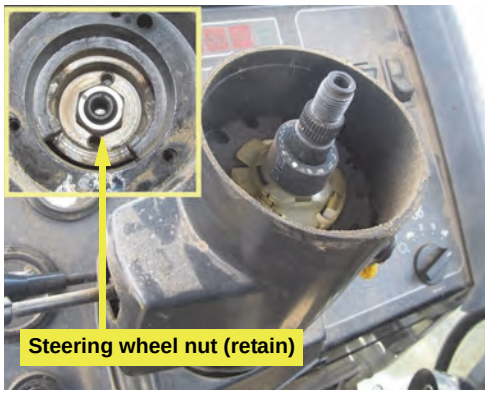


Figure 3b with inset: Steering wheel removed

4. Assemble the anti-rotation pillow block and U-bolt/saddle assembly.

a. From hardware **H**, using two of the nuts, attach the pillow block to the U-bolt saddle. Do not fully tighten the nuts yet (Figure 4a).

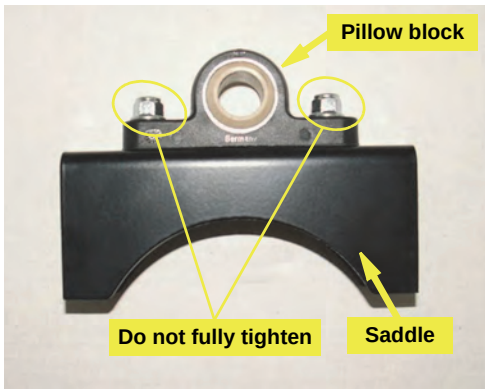


Figure 4a: Attaching the pillow block to the U-bolt saddle

b. Using the second two nuts, assemble the U-bolt in its saddle. Again, do not fully tighten the nuts yet (Figure 4b).


Figure 4b: Completing the anti-rotation assembly

5. Install the anti-rotation assembly.

Place the anti-rotation assembly over the steering column - set the pillow block toward the front and the top face of the saddle about 3/4″ down from the top of the column (Figures 5 and 6). Tighten the U-bolt nuts evenly until the assembly cannot rotate on the column. Do not overtighten the nuts and distort the cylindrical column.

6. Install the VSi steering wheel assembly.

Apply a small amount of an anti-seize compound (not supplied) to the splines of shaft adapter **B** (Figure 6 inset), then, carefully aligning **B**'s splines with those on the steering shaft, slide the steering wheel assembly onto the shaft while guiding the 'T' bar shaft into the pillow block bushing (Figure 6).

Using the original steering wheel retaining nut, secure the steering wheel assembly on the steering shaft. Consult your equipment dealer for the correct torque specification.

Check that the 'T' bar moves smoothly through the pillow block bushing during telescoping then tighten the pillow block nuts.

NOTE: *There is no need for a lynch pin in the end of the 'T' bar because at the upper telescoping limit the base of the 'T' bar will not be close to the pillow block.*

7. Install the column telescoping actuator.

a. Insert hardware **J** into the telescoping actuator **I**. The slotted washer is last on the cap screw and its slots must align with the ribs in the base of the actuator (Figure 7a, top inset).

Add hardware **K** onto **J**'s screw at the bottom of the actuator (Figure 7a, bottom inset). Tighten to **15 N·m (133 in-lb) only** (Figure 7a). **DO NOT OVERTIGHTEN.**

b. Snap the steering wheel center cover **L** into place (Figure 7b) and thread the telescoping actuator assembly into place in the center of the steering wheel (Figure 7b). Telescoping movement is now enabled.

c. Install the center cap **M** (Figure 7b inset).

Figure 5: Anti-rotation assembly installed

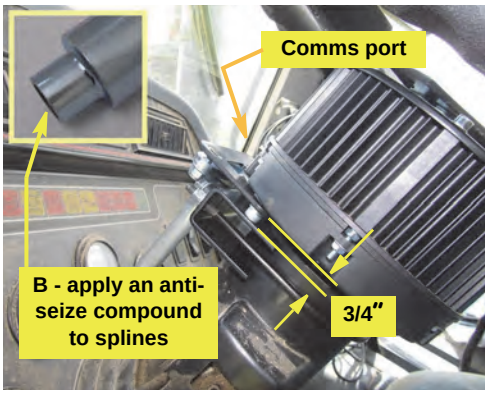


Figure 6 with inset: Steering wheel assembly installed

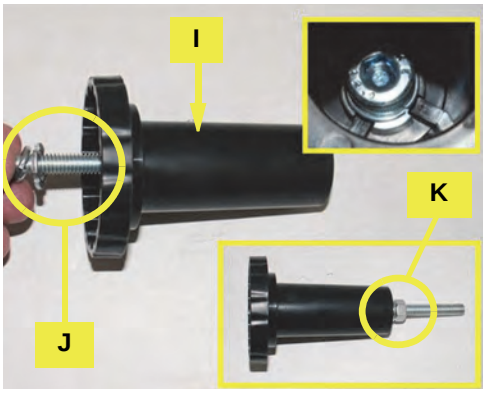


Figure 7a with insets: Assembling the telescoping acutator

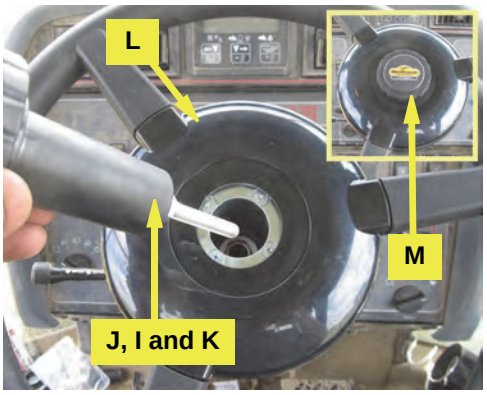


Figure 7b with insets: Center cover, telescoping acutator and center cap installed

8. Install and connect the electric steer junction box.

NOTE: *Before continuing, refer again to "Appendix A - eDriveTC VSi Connections" on page 16 or "Appendix B - eDriveX VSi Connections" on page 17.*

a. Route the power supply cable **N** from the battery into the cab to where you will mount the junction box **O** at steps 8b and 8c. Ensure the cable will not be a trip hazard. Connect the ring terminals to the battery (not shown).

When mounting junction box O in the following steps, ensure that its ON/OFF switch is within easy reach of the operator. See Figure 8a. The switch must be in the OFF position when the vehicle is not under field guidance or on a road.

Ensure that the mounted junction box cannot interfere with movement of the steering column or visibility to the work area. Also keep in mind the location of the steering wheel assembly's comms port.

b. Mount the electric steer junction box bracket **P** (not shown) on the steering column or windscreen using your preferred method, for example fasteners, double-sided tape, nylon ties (not provided).

If drilling the steering column, ensure nothing inside the column can be damaged.

c. Clip the junction box **O** into place on its bracket **P** (neither shown) then connect **O**'s 15-pin connector cable to the communications port on the steering wheel assembly (Figure 8b). Use clip **R** suitably (not shown).

d. Connect the gray connector of the power cable **N** (routed into the cab at step 8a) to the gray cable from the junction box **O** (Figure 8c).

e. Connect the threaded 5-pin connector on the CAN bus harness **TB** (eDriveTC) or **EO** (eDriveX) to either of the threaded connectors on the junction box **O**. Connect the CAN bus terminator **Q** to the other threaded connector on the junction box (Figure 8d).

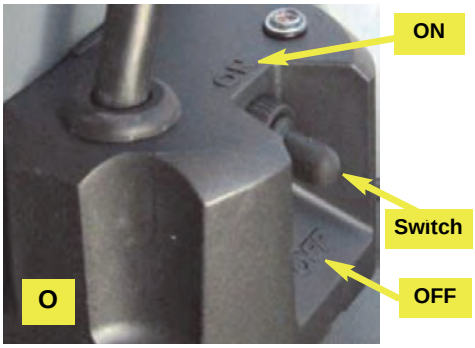


Figure 8a: Junction box ON/OFF switch - within easy reach of the operator

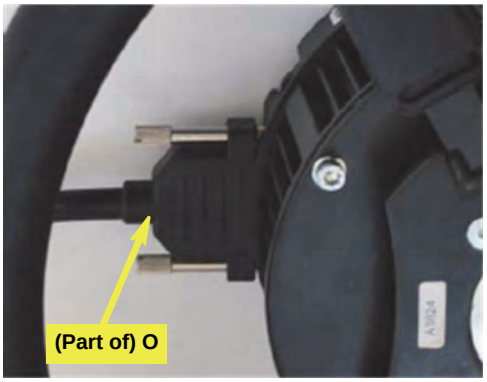


Figure 8b: Junction box comms cable connected to steering wheel assembly

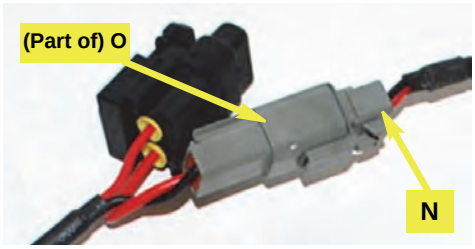


Figure 8c: Power cable to junction box cable

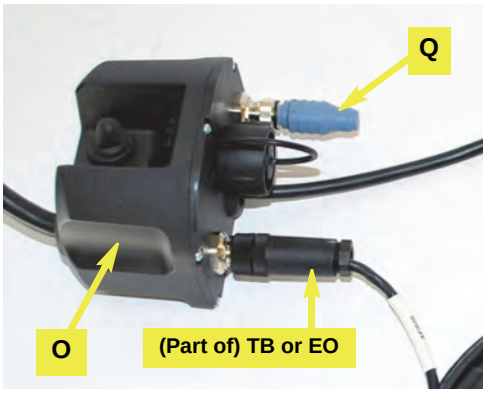


Figure 8d: CAN harness and terminator connected to junction box

8. Install and connect the electric steer junction box *(continued)*.

f. ***eDriveTC:*** Route CAN cable **TB** to the terminal (MAX or STX) and the eDriveTC ECU **TC** (Figure 8e-i). For further connection information, see step 1c of “Installation - Electronic Control Unit (ECU) - eDriveTC” on page 13.

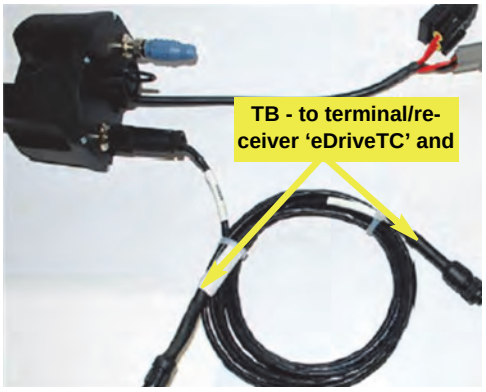


Figure 8e-i: CAN cables to eDriveTC and terminal/receiver

eDriveX: Route CAN cable **EO** to the eDriveX ECU’s main cable, **EA** (Figure 8e-ii). For further connection information, see step 2b of “Installation - Electronic Control Unit (ECU) - eDriveX” page 15.

Figure 8e-ii: CAN cable to eDriveX

Installation - Electronic Control Unit (ECU) - eDriveTC

NOTE: *The guidance capability of eDriveTC depends, in part, on the installation of the ECU as detailed in this section.*

⚠WARNING:

Before drilling (or using self-drilling screws) in the cab, make sure there is nothing that can be damaged by the drilling or any self-drilling screws used to secure the ECU mounting bracket. Secure anything that could be damaged away from where the screws come through. See Figure 1 for an example of a pre-drilling check; it shows an under-floor cabling compartment.

Figure 1: Example pre-drilling check

1. Install the ECU.

a. Through its end flanges, install the ECU **TC** on a level surface in the machine's cab. The unit must be 'UP' (see label), parallel to the fore/aft centerline of the machine, and pointing forward as indicated by the yellow label (Figure 1a). (The power switch and cable connectors will be inward with the unit installed on the right side of the cab.)

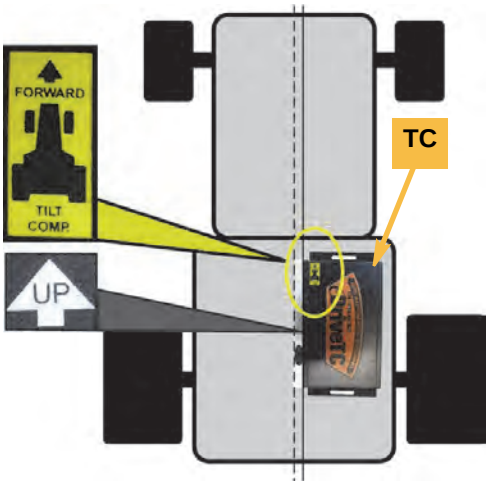


Figure 1a: ECU mounting location

b. Install power cable **TA** between the PWR IN port on the ECU **TC** and the machine's battery (Figure 1b with inset).

c. Routing cables suitably, complete CAN cable **TB*** connections as follows (***connected to the VSi junction box at step 8e):

- Connect **TB**'s branch cable labeled "eDriveTC" to the CAN port on the ECU **TC** (Figure 1c with inset)
- Connect **TB**'s remaining branch cable to your terminal's cable labeled either 'eDriveX' (MAX) or 'EDRIVE' (STX)

Figure 1b with inset: Power cable connection at ECU

Figure 1c with inset: CAN cable connection at ECU

Installation - Electronic Control Unit (ECU) - eDriveX

NOTE: *The high precision guidance capability of eDriveX depends, in part, on the exact installation of the ECU as detailed in this section.*

⚠WARNING:

Before drilling (or using self-drilling screws) in the cab, make sure there is nothing that can be damaged by the drilling or any self-drilling screws used to secure the ECU mounting bracket. Secure anything that could be damaged away from where the screws come through. See Figure 1 for an example of a pre-drilling check; it shows an under-floor cabling compartment. See also the note about installing the ECU.

1. Install the ECU.

NOTE: *Although measurements or floor mat references provide an accurate guide to the bracket location, ensure that when installed, the ECU mounting bracket will be parallel to the machine's fore/aft centerline, that is, perpendicular to the front of the machine. Also, use a small level to set the bracket as level as possible - see steps following.*

a. Install ECU mounting bracket **EJ** in the location specified for your model. Use the appropriate length screws **EL** or **EM** (depending on the floor thickness - see warning above and note following) to fasten the bracket to the cab floor (Figures 1a-i to 1a-iii).

NOTE: *Do not overtighten the self-drilling screws. Over-tightening could cause the fastener to fail.*

(i) CaseIH/Steiger: On the left of the driver's seat, facing the one-inch tabs of bracket **EJ** toward the seat, set the bracket parallel to the machine's fore/aft centerline. Position the bracket with the outside edges of the one-inch tabs 3″ from the side of the seat frame and its front edge 4″ back from the front of the seat frame (Figure 1a-i).

(ii) Versatile - VD6: On the right of the driver's seat, facing the one-inch tabs of bracket **EJ** toward the seat, set the bracket parallel to the machine's fore/aft centerline. Position the bracket with its front edge in line with the front of the seat mounting box and the outer edges of the one-inch tabs ½″ from the side of the seat mounting box (Figure 1a-ii).

(iii) Caterpillar: On the right of the driver's seat, facing the one-inch tabs of bracket **EJ** toward the seat, set the bracket parallel to the machine's fore/aft centerline. Position the bracket so that its rear edge is 7″ from the front edge of the park brake mount and the outer edge of the rear one-inch tab is 5½″ from the base of the seat mount (Figure 1a-iii).

NOTE: *There are hex bolts beneath the floor mat for the transmission access plate. Ensure that your self-drilling screws will miss these.*

Figure 1: Example pre-drilling check

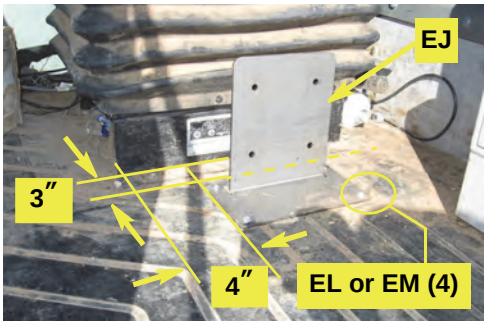


Figure 1a-i: ECU bracket installed - *Case*

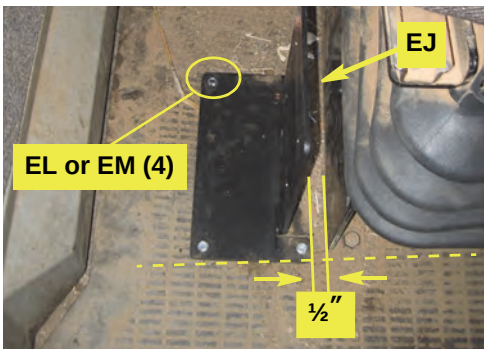


Figure 1a-ii: ECU bracket installed - *Versatile*

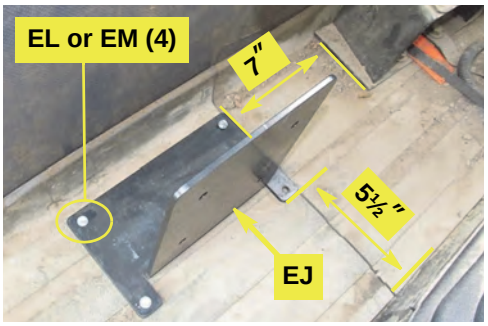


Figure 1a-iii: ECU bracket installed - *Caterpillar*

1. Install the ECU (*continued*).

b. ***All models:*** Using screws **EN** attach ECU **EK** against the non-tab side of bracket **EJ**. For all machines, have the wire connections toward the rear. For *Versatile and Caterpillar* machines this puts the power and communications indicators at the top (Figure 1b), for *Case* machines, at the bottom (Figure 1b inset).

2. Assemble and install the cables.

On a clean surface lay out all the cables and become familiar with the connections and where they are to be placed. See “Appendix B - eDriveX VSi Connections” on page 17. Use cable ties **EP** as required.

a. Attach main cable **EA** to the socket at the back of **EK** that is in line with the communications indicators (the only one it will fit - Figure 2).

b. Routing cables suitably, attach cable **EA**’s connector labeled ‘STEERING CONTROLLER’ to cable **EO** (connected to the VSi junction box at step 8f, page 12).

c. Attach power switch **EG** to **EA**’s connector labeled ‘SWITCH’. Some machines are equipped with pop out tabs that you can remove and replace with switch **EG**. If no tab is available, you can use bracket **EGa** mounting it in the cab at the operator’s preferred location.

NOTE: *Set switch EG to OFF before connecting EA to the battery at step e below.*

d. On your terminal (MAX/STX) cabling, locate the connector labeled ‘eDriveX’ (MAX) or ‘EDRIVE’ (STX). Connect (either) to **EA**’s connection labeled ‘TERMINAL/RECEIVER’. Route all cables in the cab so that they are clear of any machine operation controls.

Ensure you have connected main cable EA to the ECU (step 2a) and reconnected EA’s power cable (after routing in/out of the cab) before you connect the machine’s battery at the next step.

e. Route **EA**’s power cable to the machine’s 12V battery and connect it.

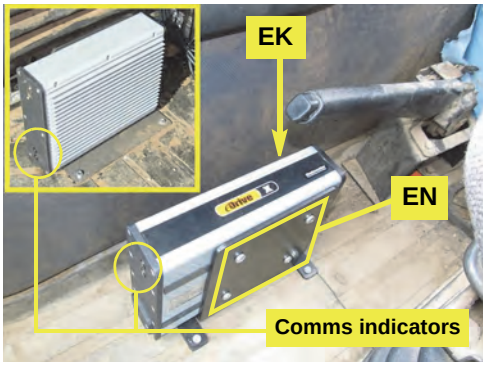


Figure 1b with inset: ECU installed (*Caterpillar installation - Case installation inset*)

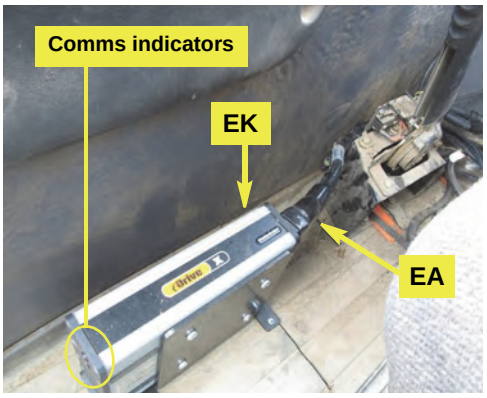
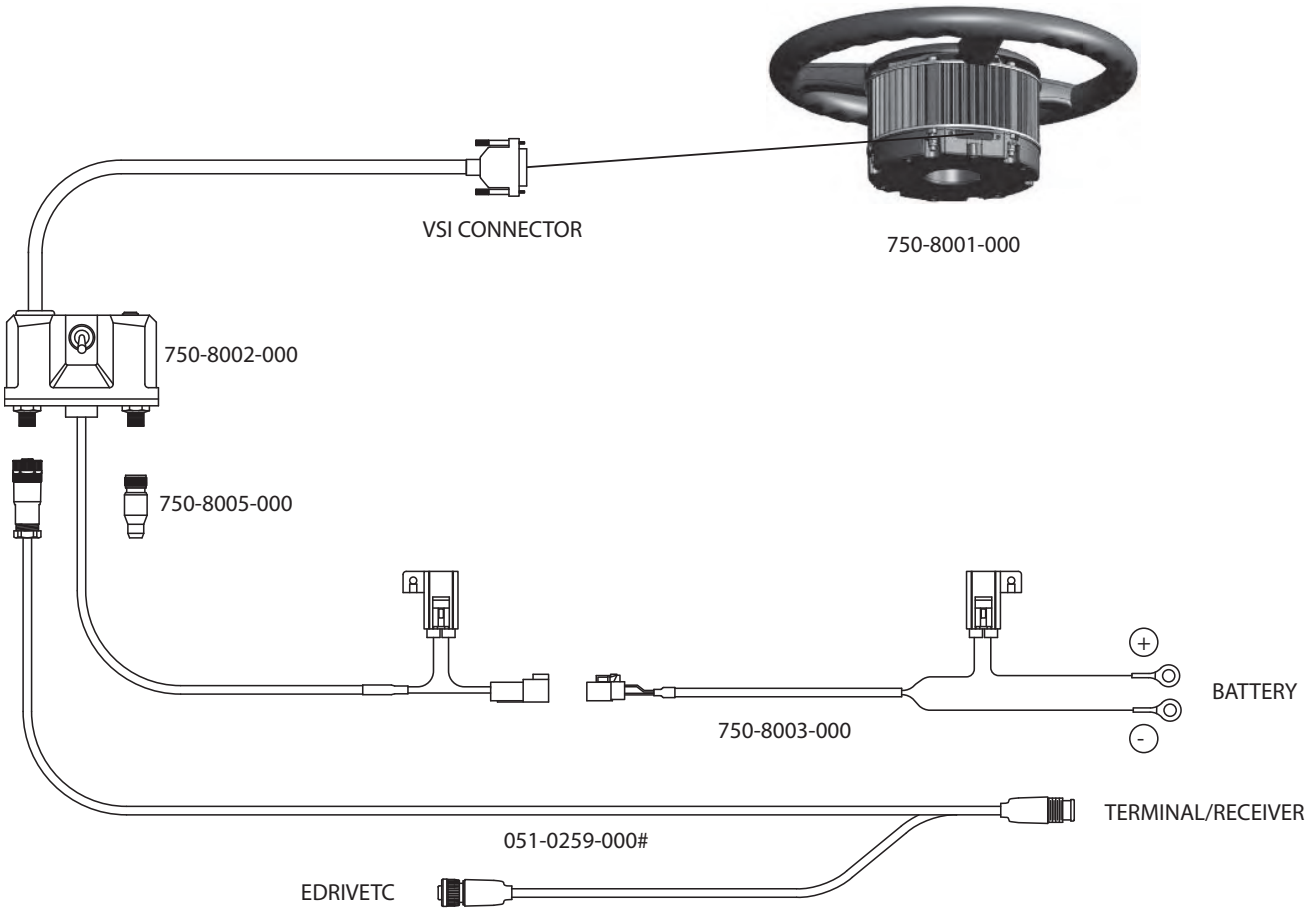


Figure 2: ECU main cable connected - (*Caterpillar installation*)

Appendix A - eDriveTC VSi Connections



Appendix B - eDriveX VSi Connections