eDrive VSi Installation Guide

Kit: eDTC / eDX VSi - C8900

P/Ns 911-1017-000 (TC), 911-4014-000 (eDX)

Fits Case IH Magnum Tractor Models:

7110	**7210**	**8910**
7120	**7220**	**8920**
7130	**7230**	**8930**
7140	**7240**	**8940**
7150	**7250**	**8950**

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 Hemisphere GPS' control, the installer may have to adapt this kit to your distinct situation.

The items in the kits are detailed in the table that follows the safety warnings starting below. 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.

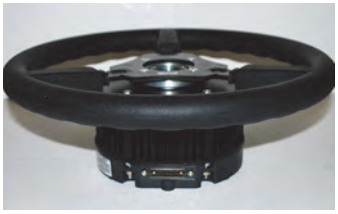
Before attempting to install any of the components:

- 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

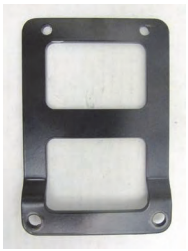
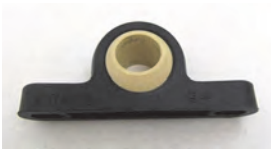
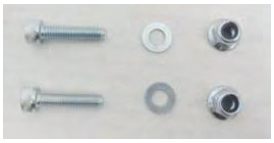
Before you perform any drilling, cutting or fastening, ensure that no other machine components, such as electrical wiring, will be damaged. Failure to follow this warning may cause physical injury and/or damage to the machine.

Kit Contents - eDriveTC and eDriveX

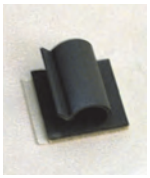
Unpack the supplied kit and identify the required parts as shown. Kit items, which are applicable to both VSi/eDriveTC and VSi/eDriveX installations, are referenced as A, B, C etc. with the item references being used in the step-by-step installation sections of this guide.

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)	
D		1	Anti-rotation (a/r) T-bar (Attach to A using E)	

Kit Contents - eDriveTC and eDriveX *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
E		2	Bolt, M6 x 16, hex head, ZP	
		2	Washer, M6 spring	
			(Attach D to A)	
F		1	Linchpin	
			(Retain D)	
G		1	Anti-rotation (a/r) bracket	
			(Mount I)	
H		(1)	U-bolt assembly comprising:	
		1	U-bolt and saddle	
		2	Washer, 8M flat, ZP	
		2	Washer, 8M spring, ZP	
		2	Nut, 8M plain, ZP	
			(Attach G to steering column)	
I		1	Pillow block assembly	
			(Attach to G using J)	
J		2	Bolt, M6 x 25, ZP	
		2	Washer, M6 plain, ZP	
		2	Nut, M6 nylock, flanged, ZP	
			(Attach I to G)	
K		1	Special nut, M20	
			(Attach A to steering shaft - replaces machine's steering wheel nut)	
L		1	Steering wheel center cover	

Kit Contents - eDriveTC and eDriveX *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
M		1	Column telescoping actuator	
N		2	Column telescoping actuator plate (Place on steering shaft before and after L)	
O		1	Column telescoping actuator center cap	
P	750-8003-000	1	VSi power cable	
Q	750-8002-000	1	VSi junction box	
R		1	Junction box mounting bracket	
S	750-8005-000	1	CAN bus terminator	
T		1	Junction box comms cable clip	

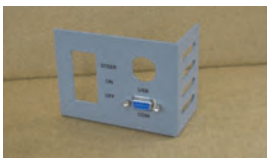
Kit Contents - eDriveTC Only

Unpack the supplied kit and identify the required parts as shown. Only item TC is referenced in the step-by-step installation sections of this guide. For information of the installation of the other items, refer to “Installing the eDriveTC” in Chapter 2 of the **Outback eDrive User Guide**.

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
	051-0166-000	1	CAN-PWR cable (Use 054-0123 to connect to battery)	
	054-0123-000	1	Battery terminal cable (Connect CAN-PWR cable to battery)	
	806-1007-03A	1	ECU, eDriveTC	
	054-0044-003	1	Power cable, eDriveTC	
TC	051-0259-000	1	CAN bus harness, eDriveTC	

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, EH etc. (from **E**CU - see Note after EA) with the item references being used in the step-by-step installation sections of this guide.

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
EA	051-0226-000#	1	Main cable	
Note: Cables 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)	
EH	051-0166-000	1	CAN-PWR cable (Use with EI to connect to battery)	
EI	054-0123-000	1	Battery terminal cable (Connect EH to battery)	
EJ	640-0091-000	1	Mounting bracket (Mount EK)	
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	675-1192-000	4	Screw, self-drilling, #10-16 x 3", Hex, ZP (Attach EJ to cab floor, use with EM)	
EM	680-1091-000	4	Spacer, 0.438"ID x 2-1/8", ZP (Use with 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, 11" heavy duty	

VSi Installation Procedure

NOTE: *On a clean surface lay out all the components and check them against the "Kit Contents - eDriveTC and eDriveX" table on pages 2 to 4. 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 14 or "Appendix B - eDriveX VSi Connections" on page 15).*

1. Prepare the VSi electric steering wheel.

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

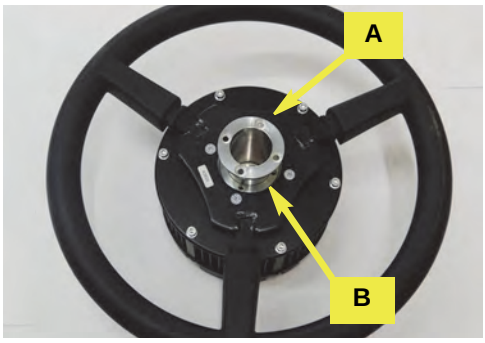


Figure 1a: Installing the shaft adapter

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

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

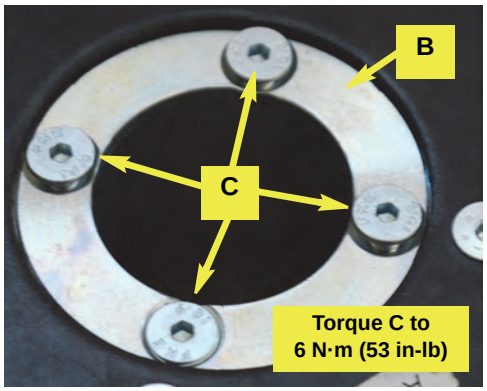


Figure 1b: Securing the shaft adapter

When completing this step, ensure that you (i) use only the bolts provided, (ii) use the washers provided and (iii) do not fully tighten the bolts.

c. Turn the steering wheel assembly over and set the comms port toward you. Using bolts **E** (do not tighten yet), attach the anti-rotation T-bar **D** to the right side of the base of the steering wheel assembly (Figure 1c).

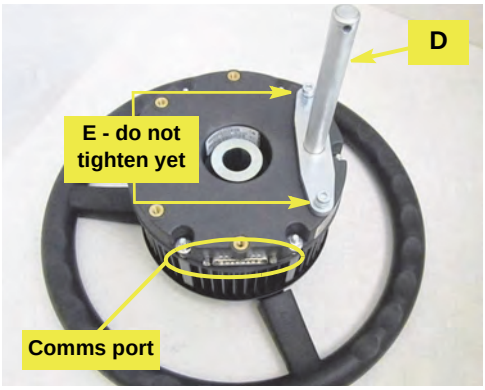


Figure 1c: Anti-rotation T-bar installed

2. Prepare the anti-rotation bracket assembly.

Install U-bolt assembly **H** and pillow block assembly **I** on anti-rotation bracket **G** as follows:

- Install U-bolt assembly **H** with its saddle loosely against the inner face of the step in bracket **G**.
- Install pillow block assembly **I** on the outer face of bracket **G** using hardware **J** (do not fully tighten **J** yet).

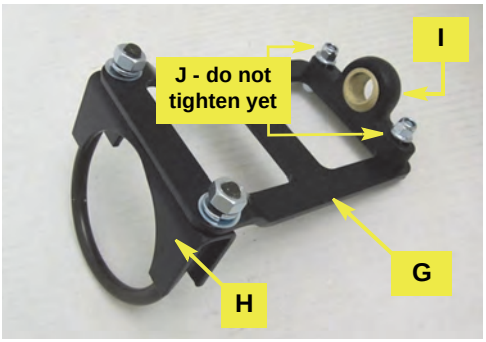


Figure 2: Prepared anti-rotation bracket assembly

3. Remove the machine's steering wheel and prepare the steering column.

Remove the center cap from the telescoping actuator (not shown) then remove the actuator nut (you will reuse this) and the telescoping actuator (Figures 3-a and 3-b).

Remove the steering wheel nut (you will not reuse this) and the steering wheel (3-b and 3-c - see note following).

Remove the steering column shroud (to facilitate installation of the anti-rotation assembly - you will reinstall it - 3d).

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

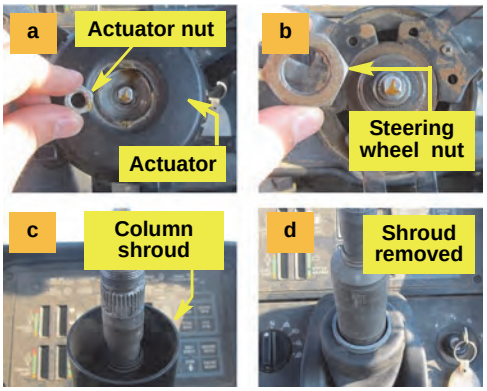


Figure 3 (a-d): Preparing the steering column

4. Install the anti-rotation bracket assembly.

With the pillow block and bracket on the driver's side, lower the anti-rotation bracket assembly (prepared at step 2) over the steering shaft/column. Position the U-bolt around the wide base (the steering column cap) of the exposed steering column (push the dust boot down) and fasten. Reinstall the column shroud (Figure 4).

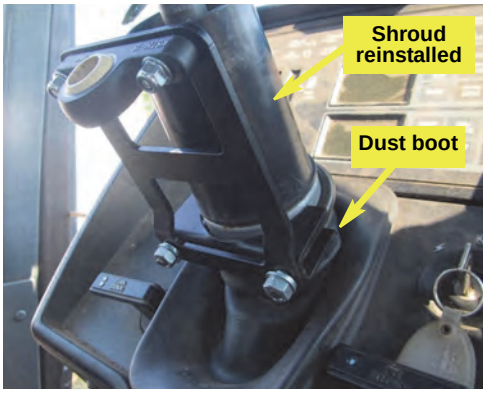


Figure 4: Anti-rotation assembly installed

5. Install the steering wheel assembly.

a. Apply a small amount of an anti-seize compound (not supplied) to the splines of shaft adapter **B** (Figure 5, top inset), then, carefully aligning the splines with those on the steering shaft, slide the steering wheel assembly onto the shaft while guiding T-bar **D** through the pillow block bushing. Insert and lock linchpin **F** (Figure 5).

Using special nut **K**, secure the steering wheel (Figure 5, bottom inset).

NOTE: *Torque special nut K to the machine manufacturer's specification.*

At the next step, tighten bolts E in the base of the steering wheel assembly only until the spring washers are fully compressed, that is, to no more than ***5 N·m (44 in-lb)***

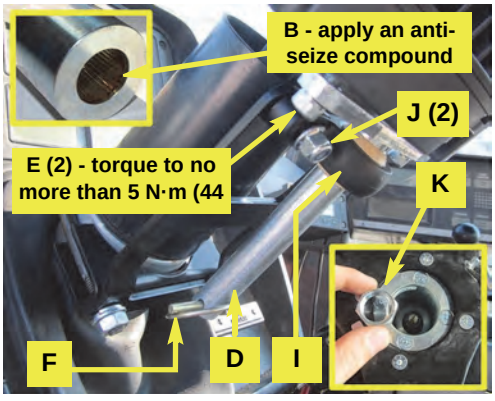


Figure 5 with insets: Steering wheel assembly installed

b. Center T-bar shaft **D** and pillow block **I** for smooth operation then secure them by tightening **E** and **J** respectively (Figure 5 - see the preceding warning about tightening **E**).

6. Install the column telescoping actuator.

a. Install:

- The steering wheel center cover **L** over the steering wheel hub (Figure 6a-a).
- One of the actuator plates **N** on the actuator extension of the steering shaft (6a-b).
- The column telescopic actuator **M** (6a-c).
- The second actuator plate **N** (6a-d).

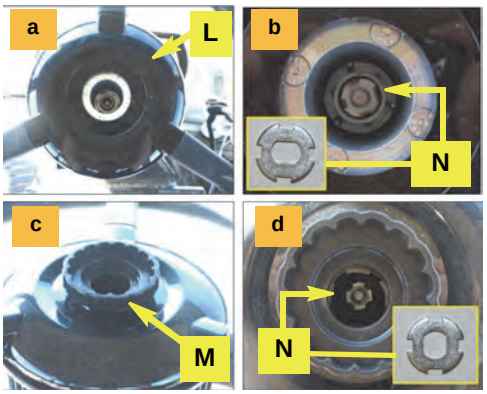


Figure 6a (a-d): Column telescoping acutator installation

6. Install the column telescoping actuator *(continued)*.

b. Using the original actuator assembly retaining nut you removed at step 3-a, secure the column telescoping actuator assembly (Figure 6b inset).

c. Install the column telescoping actuator center cap **O** (Figure 6b). Telescoping movement is now enabled.

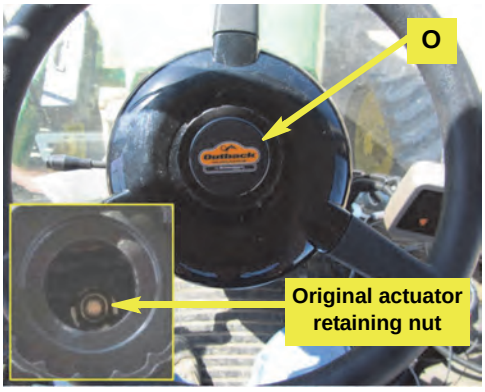


Figure 6b with inset: Actuator retaining nut and center cap installed

7. Install and connect the electric steer junction box.

NOTE: *Before continuing, refer again to "Appendix A - eDriveTC VSi Connections" on page 14 or "Appendix B - eDriveX VSi Connections" on page 15.*

a. Route the power supply cable **P** from the battery into the cab to where you will mount the junction box **Q** at steps 7b and 7c. Ensure the cable will not be a trip hazard. Connect the ring terminals to the battery (not shown).

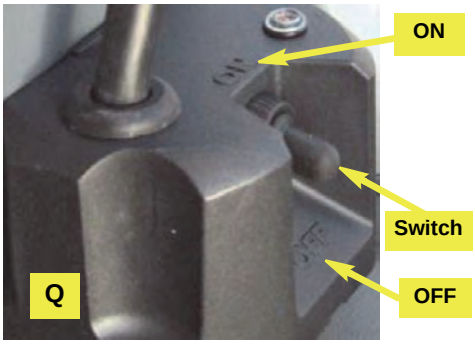


Figure 7a: Junction box ON/OFF switch - within easy reach of the operator

When mounting the junction box in the following steps, ensure that the ON/OFF switch on the junction box is within easy reach of the operator. See Figure 7a. 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 **R** (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 **Q** into place on its bracket **R** (neither shown) then connect **Q**'s 15-pin connector cable to the communications port on the steering wheel assembly (Figure 7b). Use clip **T** suitably (not shown).

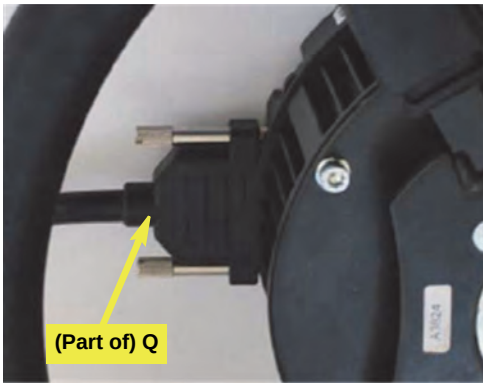


Figure 7b: Junction box comms cable connected to steering wheel assembly

d. Connect the gray connector of the power cable **P** (routed into the cab at step 7a) to the gray cable from the junction box **Q** (Figure 7c).

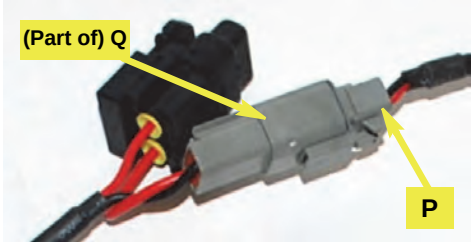


Figure 7c: Power cable to junction box cable

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

e. Connect the threaded 5-pin connector on the CAN bus harness **TC** (eDriveTC) or **EO** (eDriveX) to either of the threaded connectors on the junction box **Q**. Connect the CAN bus terminator **S** to the other threaded connector on the junction box (Figure 7d).

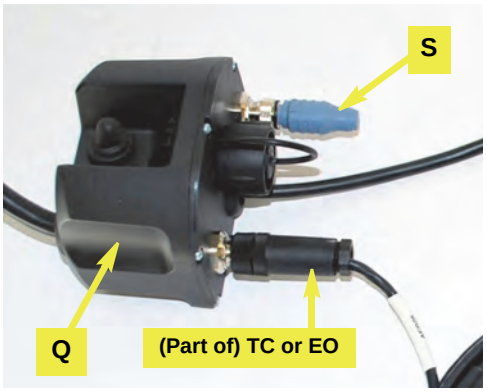


Figure 7d: CAN harness and terminator connected to junction box

f. ***eDriveTC:*** Connect the two other connectors on CAN cable **TC** to the 'eDrive TC' (as labeled) and the terminal/receiver (Figure 7e-i).

Figure 7e-i: CAN cables to eDriveTC and terminal/receiver

eDriveX: Connect CAN cable **EO** to the eDriveX main cable's (EA) branch cable labeled 'STEERING CONTROLLER' (Figure 7e-ii - you will install EA in the next section).

Figure 7e-ii: CAN cable to eDriveX

Installation - Electronic Control Unit (ECU)

NOTE: *The high precision guidance capability of eDriveX depends, in part, on the exact installation of the ECU as detailed in this section. For details on installing an eDriveTC, refer to "Installing the eDriveTC" in Chapter 2 of the* ***Outback eDrive User Guide.***

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 underfloor cabling compartment.

Figure 1: Example pre-drilling check

1. Install the ECU.

NOTE: *Ensure that when installed, the bracket will be perpendicular to the front of the machine, that is, parallel to the machine's fore/aft centerline. Also, use a small level to set the bracket as level as possible - see step following.*

a. Identify the ECU mounting location to the left of the driver's seat on the cab floor (Figure 1a).

Facing the one-inch tabs of bracket **EJ** toward the driver's seat, align the bracket parallel to the machine fore/aft centerline. Set the bracket 5½″ from the side of the seat frame and 3½″ from the back cab wall (Figure 1a).

Using the bracket as a template mark the location of the four mounting holes in the floor mat and foam underneath the mat (Figure 1a).

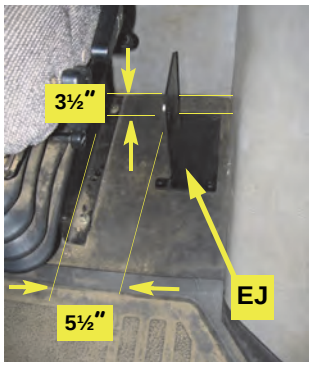


Figure 1a: Using ECU bracket as a template

b. Set aside the rubber floor mat and use a 1″ drill bit to drill out the foam in the location of the four mounting holes. Do not drill through the metal. Insert spacers **EM** into the foam (Figure 1b).

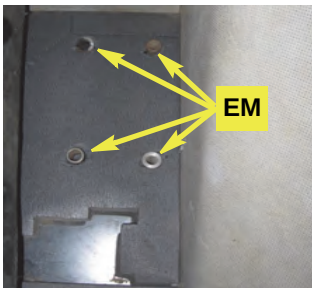


Figure 1b: Drilled foam and installed spacers

NOTE: *At then next step, do not overtighten the self drilling screws. Overtightening could cause the fastener to fail.*

c. Replace the rubber floor mat and align bracket **EJ** with the marked mounting holes. Using self-drilling screws **EL** fasten the bracket to the cab floor. Use a small level (not shown) to check the level of the bracket. Adjust accordingly (Figure 1c).

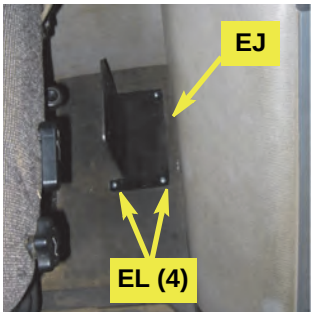


Figure 1c: Installed ECU bracket

1. Install the ECU *(continued)*.

d. Using screws **EN** (not visible) attach ECU **EK** to the outer face of bracket **EJ**. Have the wire connections to the rear of the machine (so the power and communications indicators at the bottom - Figure 1d).

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 15. Use cable ties **EP** as required.

a. Connect cable **EA** to ECU **EK** using an Allen wrench to secure the cable. The **EA** connector will only fit the ECU socket that is in line with the power and communications indicators at the opposite end of the ECU—the bottom socket in this installation (Figures 2a-i and 2a-ii).

b. Routing cables suitably, attach cable **EA**'s connector labeled ‘STEERING CONTROLLER’ to cable **EO** connected to the VSi junction box **Q** (see ***eDriveX***, step 7f, page 11).

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 f below.*

d. Install CAN-PWR cable **EH** between **EA**'s open connection labeled ‘TERMINAL/RECEIVER’ and the guidance terminal. Route the cable in the cab so that it is clear of any machine operation controls.

e. Install battery terminal cable **EI** between **EH**'s remaining connector and the machine's 12V battery.

⚠WARNING:

*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 to the machine's battery at the next step.*

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

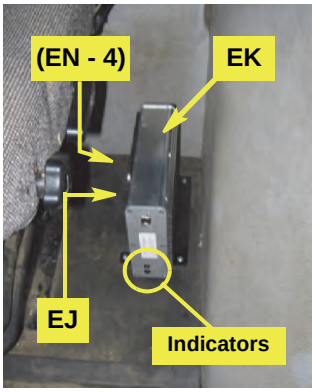
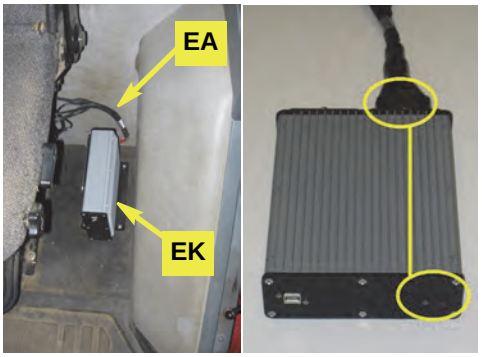
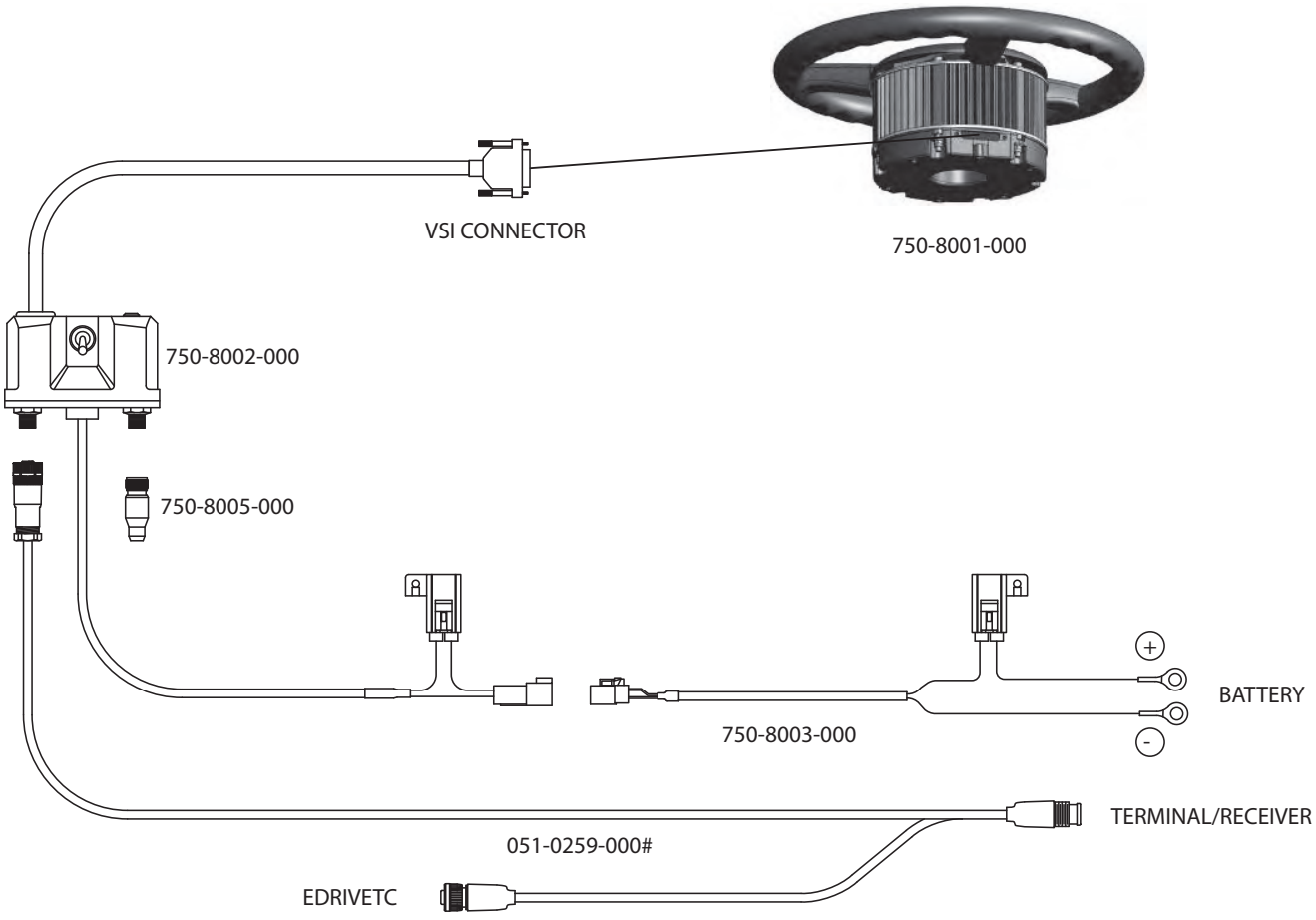


Figure 1d: Installed ECU



Figures 2a-i and 2a-ii: ECU main cable connected to ECU

Appendix A - eDriveTC VSi Connections



Appendix B - eDriveX VSi Connections