eDrive VSi Installation Guide

Kit: eDTC / eDX VSi - V550

P/Ns 911-1025-000 (TC), 911-4022-000 (eDX)

Fits Versatile Tractor Models:

350	**400**	**500**
375	**450**	**550**

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 tables that follow 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

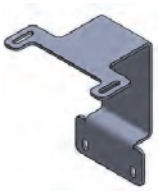
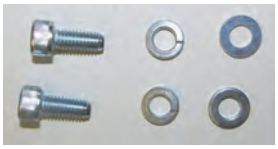
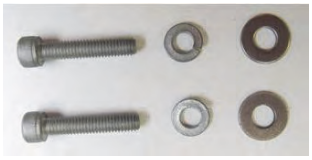
Before you perform any drilling, cutting or fastening, ensure that no other machine components, such as electrical wiring, will be damaged. Failure to follow this warning may cause physical injury and/or damage to the machine.

Kit Contents - eDriveTC and eDriveX

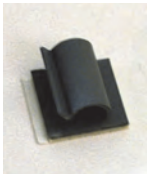
Unpack the supplied kit and identify the required parts as shown. Kit items, which are applicable to both VSi/eDriveTC and VSi/eDriveX installations, are referenced as A, B, C etc. with the item references being used in the step-by-step installation sections of this guide.

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
A	750-8001-000	1	VSi steering wheel	
B		1	Shaft adapter (Use in A with D)	
C		4	Screw, M5 x 10 flat head socket cap screws (Attach B to A)	
D		1	Spline adaptor (Use with B)	
E		3	Screw, M5 x 16 hex head (Attach D to B)	

Kit Contents - eDriveTC and eDriveX *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
F	640-1020-000	1	Anti-rotation bracket (Attach to A using G, steering column using I)	
G	675-1263-000 678-1059 678-1073-000	2 2 2	Bolt, M6 x 16, HHS, ZP Washer, spring Washer, flat (Attach F to A)	
N/A		1	Anti-rotation bracket - *not used in this installation - use F*	
N/A		 2 (ea)	Anti-rotation bracket hardware - *not used in this installation - use G* Bolt, M6 x 14, hex head; washer, spring; washer, flat	
H		1	Special nut, M18 (Attach A to steering shaft - replaces machine's steering wheel nut)	
I	675-1264-000 678-1059 678-1073-000	2 2 2	Bolt, M6 x 30, SHC, ZP Washer, spring Washer, flat (Attach F to steering column)	
J		1	Steering wheel center cover	
K		1	Column telescoping actuator	
L		2	Column telescoping actuator plate (Place on machine's telescopic actuator shaft - before and after K - and see M)	

Kit Contents - eDriveTC and eDriveX *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
M		1	Column telescoping actuator spacer (Place above [on] first-installed actuator plate L)	
N		1	Actuator center cap	
O	750-8003-000	1	VSi power cable	
P	750-8002-000	1	VSi junction box	
Q		1	Junction box mounting bracket	
R	750-8005-000	1	CAN bus terminator	
S		1	Junction box comms cable clip	

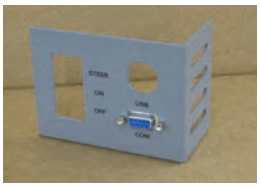
Kit Contents - eDriveTC Only

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 on 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 051-0166 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 - but 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: 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)	
EH	051-0166-000	1	CAN-PWR cable (Use EI to connect to battery)	
EI	054-0123-000	1	Battery terminal cable (Connect EH to battery)	
Bag E1 of 1 contains EJ, EK and EL				
EJ	675-1197-000	4	Screw, self-drilling, #10-16 x 2-1/2", hex, ZP (Attach EM to cab floor - or use EK)	
EK	675-1192-000	4	Screw, self-drilling, #10-16 x 3", hex, ZP (Attach EM to cab floor - or use EJ)	

Kit Contents - eDriveX only *(continued)*

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
EL	675-1188-000	4	Screw, mach, M6 x 12mm, PPH, ZP (Attach EN to EM)	
EM	640-0091-000	1	ECU (EN) mounting bracket	
EN	806-1031-000	1	ECU, eDriveX	
EO	051-0316-000	1	CAN bus harness, eDriveX	
EP	677-2002	20	Tie strap, 7" releasable	

Installation - VSi

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).

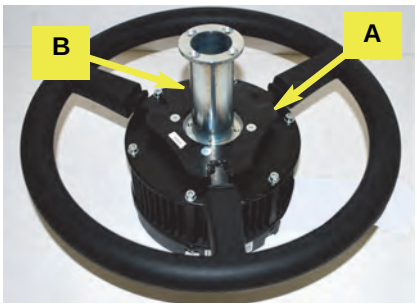


Figure 1a: Shaft adapter installation

At steps 1b and 1c following, tighten the screws to the specified torque only. DO NOT OVER-TIGHTEN - DAMAGE MAY OCCUR.

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).

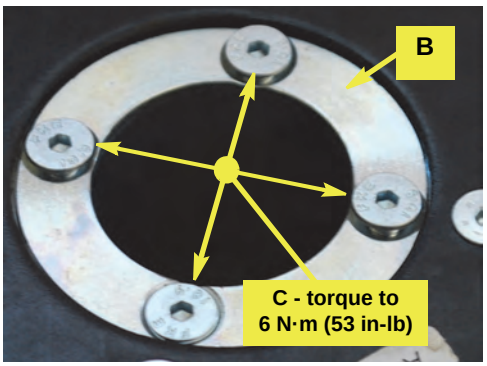


Figure 1b: Shaft adapter installed

c. Flip the wheel over and, using the three hex head screws **E**, install spline adapter **D** on the bottom of shaft adapter **B**. Torque screws **E** to **6 N·m (53 in-lb)** (Figure 1c with inset).

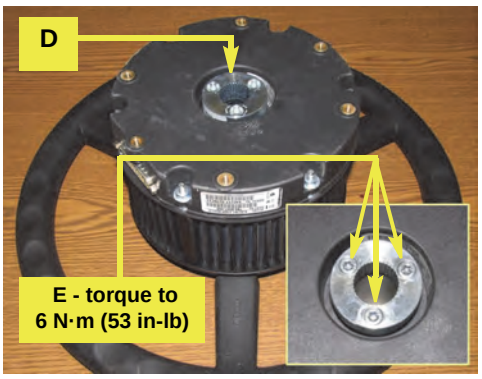


Figure 1c with inset: Spline adapter installed on shaft adapter

2. Install the anti-rotation bracket on the wheel assembly.

When completing this step, ensure that you (i) use only the fasteners provided, (ii) use all the washers provided and (iii) leave the screws loose enough to be able to adjust the bracket when securing it against the steering column.

NOTE: *Figure 2 (and Figures 4a and 4b, next page) show a prototype anti-rotation bracket (F). Install your supplied item the same way.*

Using hardware **G** through the slotted holes in its wider flange, attach anti-rotation bracket **F**, bends outward, on the steering wheel assembly opposite the comms port. *Do not fully tighten yet* (Figure 2).

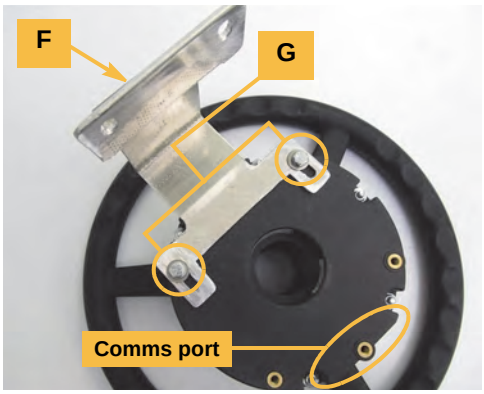


Figure 2: Anti-rotation bracket installed

3. Remove the machine's steering wheel.

Remove the machine's steering wheel as follows:

- Remove the center cap from the telescoping actuator and remove the actuator nut which you will reuse (Figures 3-a and 3-b).
- Remove the telescoping actuator to reveal the steering wheel nut. Remove the nut which you will not reuse (3-b and 3-c).
- Remove the steering wheel (3-d).

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

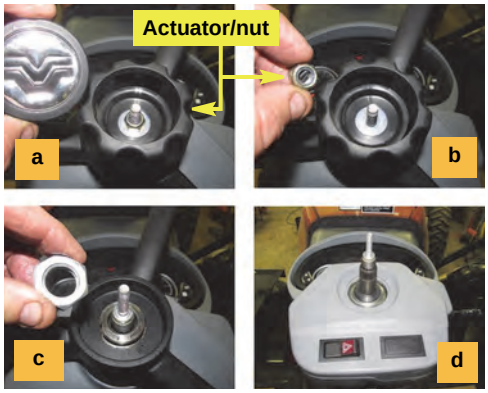


Figure 3 (a-d): Steering wheel removal

4. Install the steering wheel assembly and secure the anti-rotation bracket.

a. Remove the lower screws in the driver's side of the steering console (you will secure the anti-rotation bracket **F** using hardware **I** in these holes - Figure 4a bottom right inset).

Apply a small amount of an anti-seize compound (not supplied) to the splines of shaft adapter **B** (Figure 4a bottom left inset), then, with the anti-rotation bracket **F** on the driver's side, carefully align the splines with those on the steering shaft and slide the steering wheel assembly onto the shaft (Figure 4a). The comms port will be at the front (Figure 4a top left inset).

Using special nut **H**, secure the steering wheel (Figure 4a top right inset).

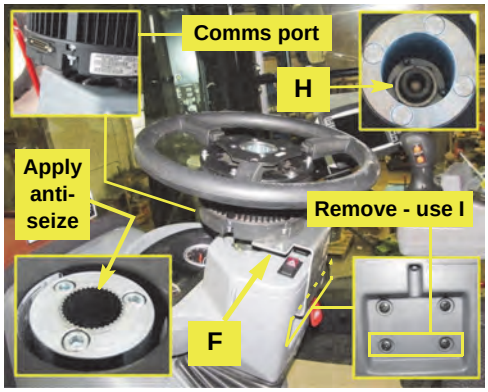


Figure 4a with insets: Steering wheel assembly installed

NOTE: *Torque the steering wheel nut to the machine manufacturer's specification.*

b. Carefully position anti-rotation bracket **F** and, using hardware **I**, attach it to the steering console (Figure 4a bottom right inset and Figure 4b). Tighten hardware **G** in the base of the wheel assembly (not visible) to no more than **8 N·m (70.8 in-lb).**

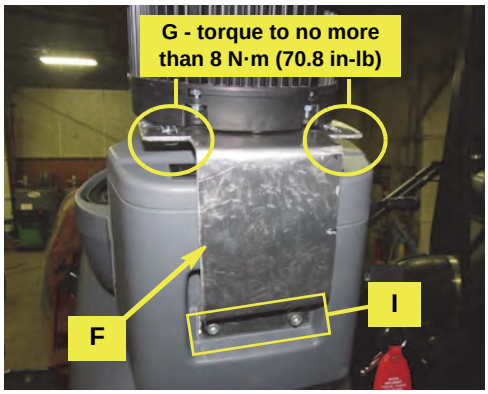


Figure 4b: Anti-rotation bracket installation completed

5. Install the steering wheel cover, telescoping actuator and center cap.

Install the telescoping components, cover and cap as follows:

- Install one telescoping actuator plate **L** on the actuator shaft inside the steering wheel assembly (Figure 5-a). Install spacer **M** on the plate (Figure 5-a insets).
- Install the steering wheel cover **J** (5-b) then actuator **K** into the wheel assembly (5-b inset).
- Install the second actuator plate **L** locating its slots on the actuator's lugs (Figure 5-c).
- Install the original actuator nut ('Org. nut', 5-d) and the steering wheel center cap **N** (5-d inset).

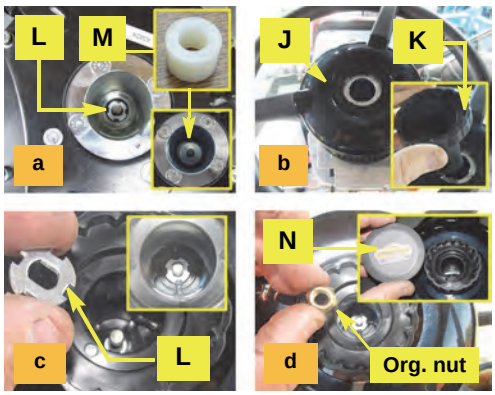


Figure 5 (a-d): Telescoping actuator installed

6. 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 **O** from the battery into the cab to where you will mount the junction box **P** at steps 6b and 6c. Ensure the cable will not be a trip hazard. Connect the ring terminals to the battery (not shown).

⚠ *When mounting the junction box N in the following steps, ensure that the ON/OFF switch on the junction box is within easy reach of the operator. See Figure 6a. 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 **Q** (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 **P** into place on its bracket **Q** (neither shown) then connect **P**'s 15-pin connector cable to the communications port on the steering wheel assembly (Figure 6b). Use clip **S** suitably (not shown).

d. Connect the gray connector of the power cable **O** (routed into the cab at step 6a) to the gray cable from the junction box **P** (Figure 6c).

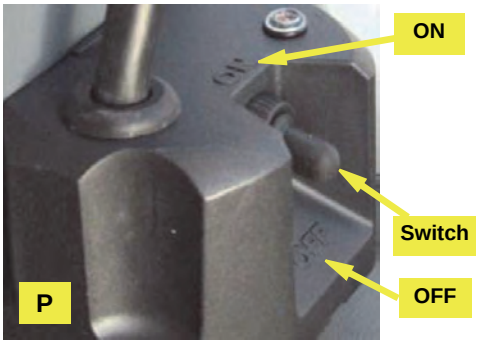


Figure 6a: Junction box ON/OFF switch - within easy reach of the operator

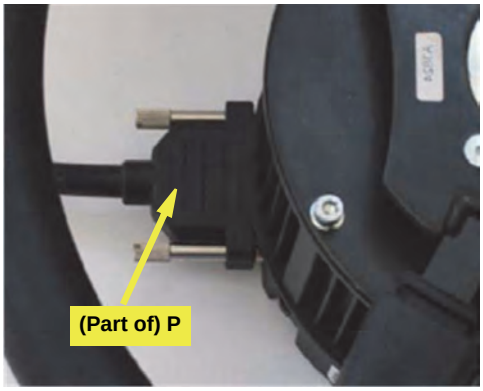


Figure 6b: Junction box comms cable connected to steering wheel assembly

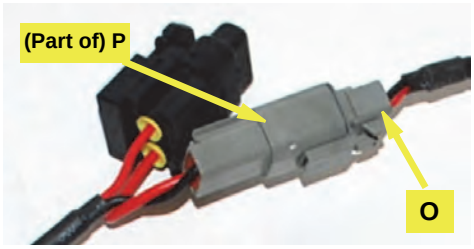


Figure 6c: Power cable connected to junction box cable

6. 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 **P**. Connect the CAN bus terminator **R** to the other threaded connector on the junction box (Figure 6d).

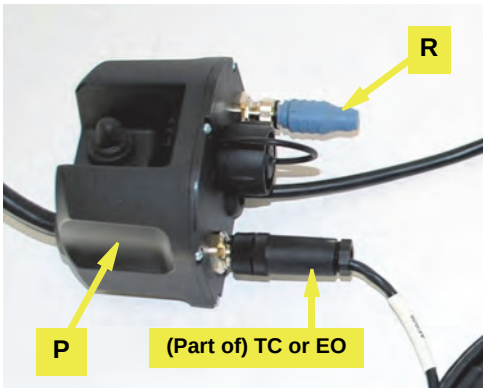


Figure 6d: CAN harness and terminator connected to junction box

f. ***eDriveTC:*** Connect, according to the cable labeling, the two other connectors on CAN cable **TC** to the EDRIVETC and the TERMINAL/RECEIVER (Figure 6e-i).

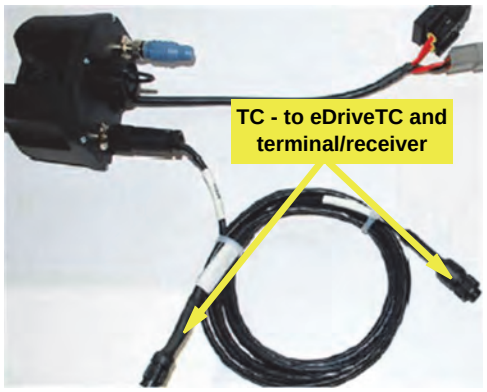


Figure 6e-i: CAN cables to eDriveTC and terminal/receiver

eDriveX: Connect CAN cable **EO** to the eDriveX main cable's (**EA**) branch cable labeled 'STEERING CONTROLLER' (Figure 6e-ii).

Figure 6e-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 by 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.

1. Install the ECU.

NOTE: *Although measurements and floor mat references provide an accurate guide, ensure that when installed, the bracket will be parallel to the machine's fore/aft center line (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. Identify the ECU mounting location on the cab floor to the right of the driver's seat (Figure 1a).

Facing the one-inch tabs of bracket **EM** toward the right window, align the bracket parallel to the fore/aft centerline of the machine, then set:

- The front edge of the bracket 3″ back from a line extended from the front of the driver's seat base.
- Both inward corners of the bracket 4″ from the driver's seat base (Figure 1a).

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

b. Using self-drilling screws **EJ** or **EK** (depending on the floor thickness—see warning above) fasten bracket **EM** to the cab floor (Figure 1a). Ensure the bracket is level.

c. Using hardware **EL** attach ECU **EN** to the inner face of bracket **EM**. Face the wire connectors toward the rear of the machine (Figure 1c).

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 the ECU **EN** 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 (Figure 2a).

Figure 1: Example pre-drilling check

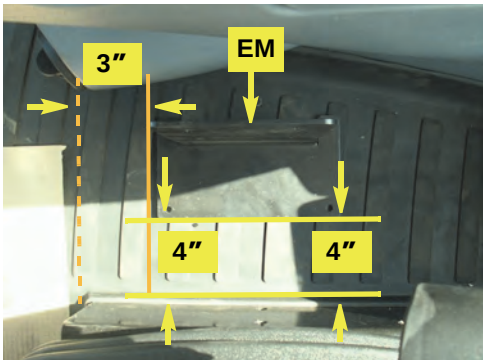


Figure 1a: ECU mounting bracket installation

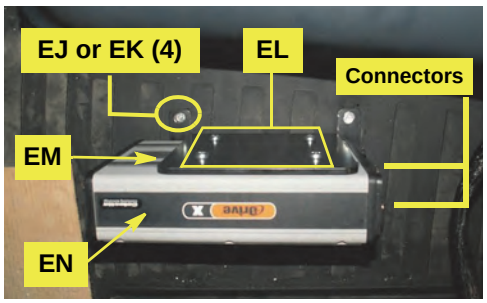


Figure 1c: ECU installed

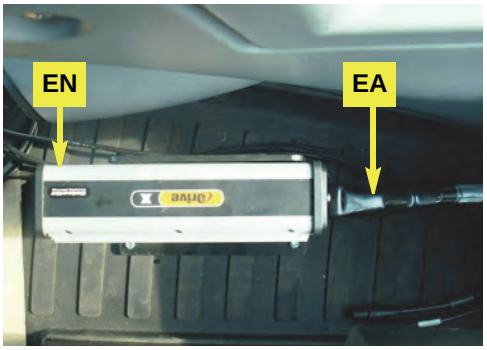


Figure 2a: ECU main cable connected (to bottom socket of ECU)

2. Assemble and install the cables *(continued)*.

b. Attach cable **EA**'s connector labeled 'STEERING CONTROLLER' to cable **EO** connected to the VSi junction box **P** (see ***eDriveX***, step 6f, 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.

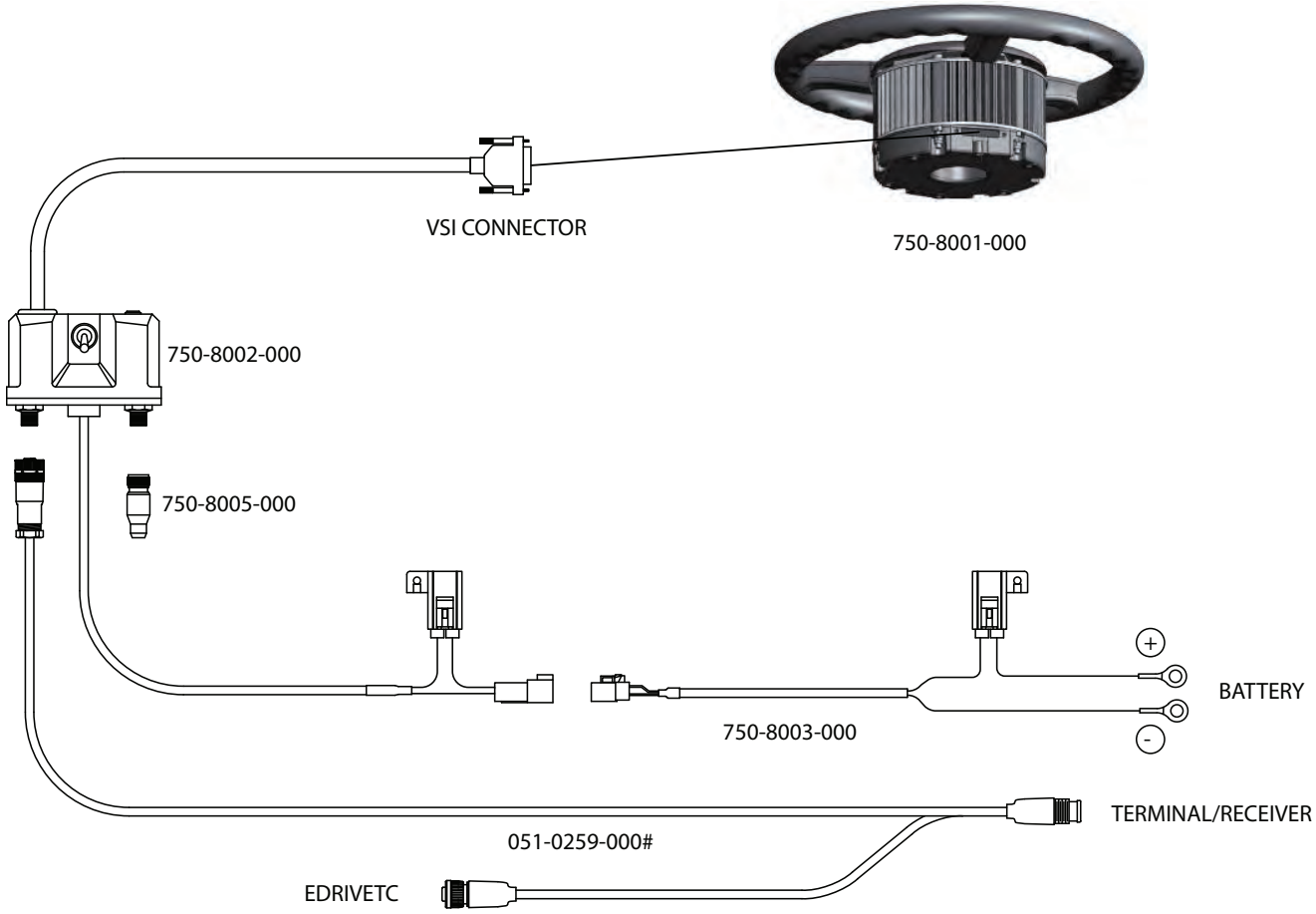
e. Install battery terminal cable **EI** between **EH**'s remaining connector and the machine's 12V battery.

⚠WARNING:

*Ensure you have connected main cable **EA** to the ECU (step 2a, page 12) 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.

Appendix A - eDriveTC VSi Connections



Appendix B - eDriveX VSi Connections