

eDrive ESi Installation Guide

Kit: Kubota M5, M6 and M6s ESi for eDriveXC or eDriveXD

P/N: 912-0002-01

Fits Kubota Models:

M5 M6 M6S

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 ESi electric steering wheel and either eDriveXC or eDriveXD. 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 kit are detailed in the table that follows the safety warnings starting below. After the kit table there are step-by-step installation instructions.

Read this manual thoroughly before beginning the installation.

WARNING:

The ESi 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 ESi 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

Unpack the supplied kit and identify the required parts as shown. Kit items, which are applicable to both ESi/eDriveXC and ESi/eDriveXD 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	750-0170-000 (wheel) 806-2019-000 (motor)	1	ESi steering wheel/motor assembly (From kit 910-4022-000 - comes assembled)	
B	506-0169-01	1	Shaft adapter (Use in A)	
C	675-1300-000	4	Screw, M5 x 8 flat head socket cap screws, ZP (Attach B to A)	
D	607-0024-01	2	Anti-rotation bracket (ARB) (Attach to base of A using E)	

Kit Contents (continued)

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
E	515-0143-01	4	Screw, flanged, M6x1x12, Gr 10.9, ZP (Attach D to A - use with F)	
F	516-0002-01	2	Washers (Use with E)	
G	600-1440-000#	1	Steering wheel center cap (Install using H)	
H	675-1312-000#	5	Center cover screws (Install G)	
I	054-0202-000#	1	ESi main cable (Through L, connects A to J [and battery] - from kit 910-4022-000)	
J	051-0377-000# <i>or</i> 050-0016-01	1 1	Main cable (at right) <i>or</i> Main cable (has an added Ethernet port for connection to a REBEL terminal) (You will receive one or the other with your kit.)	
K	051-0364-000#	1	Power cable ('battery terminal cable'), 4.5 m (Connects J to battery)	
L	054-0204-000#	1	Steering controller adapter cable (Connects—adapts—ECU main cable J's 'VALVES' connector to ESi main cable I)	
M	051-0397-000#	1	Steering remote engage cable/switch (Connects to J)	

Kit Contents (continued)

REF	PART NUMBER	QTY	DESCRIPTION	PHOTOGRAPH
N	054-0168-000#	1	Three-position power switch and cable (Connects to J - can mount using O)	
O	640-0180-000	1	Switch bracket (Mount N if applicable/necessary, using P)	
P	675-1019-000#	2	Screw, 8-32, 5/16", SS	
	678-1052-000#	2	Washer, split-lock, #8 (Mount O if used)	
Q	640-0091-000	1	ECU mounting bracket (Mount T using U, secure with R or S)	
R	675-1190-000#	4	Screw, self-drilling, #10-16 x 1-1/2", hex, ZP (Attach Q to seat platform - M5 and M6S)	
S	675-1197-000	4	Screw, self-drilling, #10-16 x 2-1/2", hex, ZP (Attach Q to cab floor - M6)	
T	806-1044-000# <i>or</i> 806-1046-000#	1 1	eDriveXC controller (ECU) <i>or</i> eDriveXD controller (ECU - XD shown) (Mount on Q using U)	
U	675-1188-000	3	Screw, mach, M6 x 12mm, PPH, ZP (Mount T on Q)	
V	677-2002	20	Tie straps, 7" releasable	

ESi Installation Procedure

NOTE: On a clean surface lay out all the components and check them against the “Kit Contents” table on pages 2 to 4. Become familiar with the components and where they are to be installed before proceeding with the installation (see the Appendix, page 10).

1. Prepare the ESi electric steering wheel.

NOTE: The steering shaft adapter has three holes in its splined end. They correspond to short, identically spaced studs in the vehicle’s turn signal self-cancelling ring. The holes/studs are not equally spaced—they are at 12, 5 and 7 o’clock. The cancelling ring’s 12 o’clock stud is marked with a red spot. When installing the shaft adapter in the following steps, start with the wheel in what will be the straight ahead position and install the shaft so that its ‘top’ hole (the 12 o’clock hole) will be toward the front when the wheel assembly is installed. (Alignment does not have to be exact because the cancelling ring will depress enabling the studs to spring into the holes when they align.)

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



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

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

2. Install the anti-rotation brackets on motor base.



When completing this step, ensure that you (i) use only the screws provided, (ii) use washers with the screws, (iii) at step 4d, page 6, tighten the screws to the specified torque only. **DO NOT OVERTIGHTEN - DAMAGE CAN OCCUR.**

- a. Invert the steering wheel assembly and set the comms port toward you (it will be to the front when installed - Figure 2).
- b. On the motor base, arrange brackets **D** as follows (Figure 2):
 - i. ‘Horizontal’ to yourself, their short, padded legs to your left and upward.
 - ii. Aligned with the farthest and nearest pair of threaded holes in the base.
- c. Using screws **E** with washers **F**, loosely attach brackets **D** to the motor base with the tapered end of the long slot against the bolt in the right-side holes (as viewed): this aligns the second cross-slot of each bracket with the left-side holes. Set the cross slots with their inner edges against their respective bolt (making the brackets diverge slightly toward the left - Figure 2).

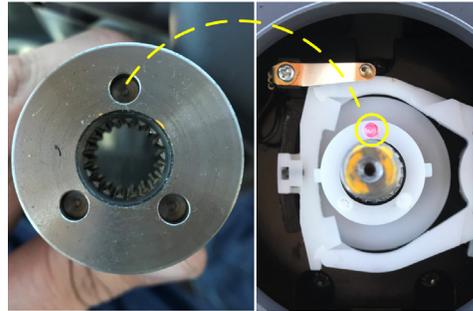


Figure 1: Shaft adapter and self-cancelling ring

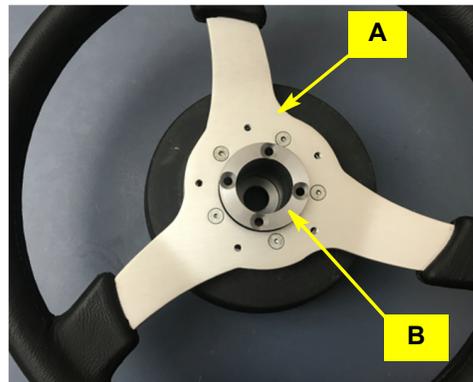


Figure 1a: Installing the shaft adapter

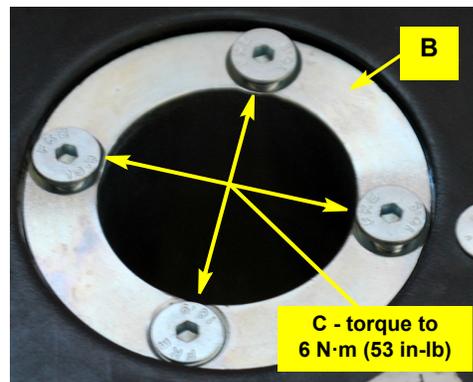


Figure 1b: Securing the shaft adapter

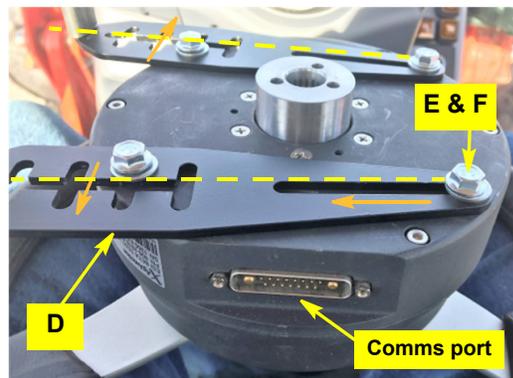


Figure 2: Installing the anti-rotation brackets

3. **Remove the steering wheel.**

Carefully remove the steering wheel's center cap (Figure 3a), disconnecting the horn wires (Figures 3b/3c). Remove the steering wheel nut (3c/3d - you will reuse the nut) and the steering wheel.

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

4. **Install the ESi steering wheel assembly.**

a. Apply a small amount of an anti-seize compound (not supplied) to the splines of shaft adapter B. Invert the prepared steering wheel assembly and slide it onto the steering shaft with the comms port to the front (Figure 4a).

b. Using the original nut, secure the steering wheel assembly on the steering shaft (not shown). When you rotate the wheel, the turn signal self-cancelling ring will engage with the base of the shaft adapter.

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

! At step 4d, **DO NOT OVERTIGHTEN - DAMAGE CAN OCCUR.**

c. Adjust the two ARBs D—now on the left—to make firm contact with the plastic shift housing, the contact being where the housing has leveled after the curved rise from the steering column (Figure 4b).

d. Tighten the bracket screws E to **5 N·m (44 in-lb): DO NOT OVERTIGHTEN.**

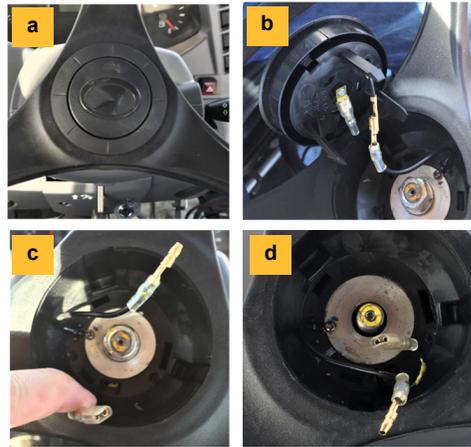
5. **Install the steering wheel center cap.**

Place center cap G in the center of the wheel assembly and secure with screws H (Figure 5).

6. **Connect the ESi main cable.**

Connect ESi main cable I to the comms port (Figure 6). Route the cable connectors to the ECU main cable J and the machine's battery.

For further information on connecting I to J, see the next section.



Figures 3a-3d: Removing the steering wheel



Figure 4a: Wheel assembly installed - comms port to the front

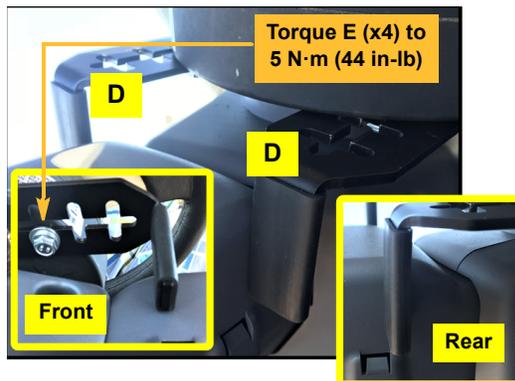


Figure 4b: AR brackets adjusted and tightened



Figure 6: ESi main cable in comms port



Figure 5: Center cap in wheel

Installation - Electronic Control Unit (ECU) and Cables

See the Appendix (page 10) for a schematic of the cable connections.

⚠ WARNING:

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 under-floor cabling compartment.

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

1. Install the ECU mounting bracket and the ECU.

NOTE: The ECU is mounted differently on the three models covered by this installation guide. Follow the instructions under the applicable subheading (in blue) following.

M5 ECU Mounting

- Set ECU bracket **Q** to the left of the operator's seat near the front wheel assist engagement lever, with:
 - Its mounting face toward the seat.
 - Its front edge 1" from the edge of the seat platform; its long side 3/4" from the edge of the seat mount (Figure 1a - M5).
- Using screws **R** (the shorter screws), attach **Q** to the platform (Figure 1a - M5, **R** indicated).
- Using bolts **U**, attach ECU **T**, connector rearward, to **Q** (Figure 1b - M5).
- Connect the ECU's main cable **J** to **T** (Figure 1b - M5, inset).

For more information on cabling and cabling connections, see "Appendix - ESi and ECU Connections" on page 10.

M6 ECU Mounting

- Set ECU bracket **Q** in the front right area of the cab, with:
 - Its mounting face inward.
 - Its back edge along the back of the floor mat.
 - Its rear fastener tab 3.25" from the right edge of the mat; its front fastener tab 2.5" from the right edge of the mat (Figure 1a - M6).
- Using screws **S** (the longer screws), attach **Q** to the floor (Figure 1a - M6, **S** indicated).



Figure 1: Example pre-drilling check

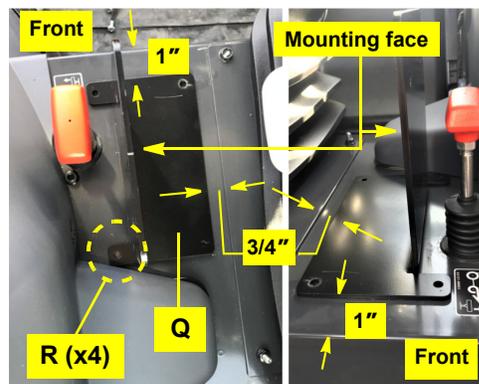


Figure 1a - M5: ECU bracket location (two views)

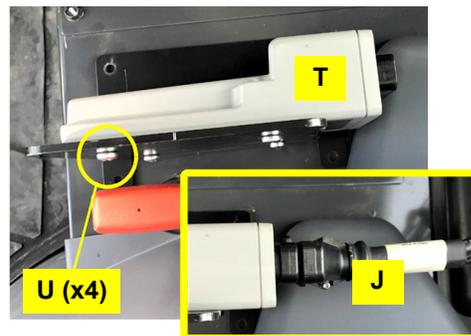


Figure 1b - M5: ECU installed, cable connected

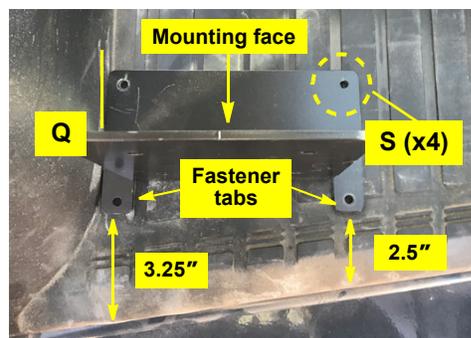


Figure 1a - M6: ECU bracket location

1. **Install the ECU mounting bracket and the ECU - M6 (continued).**
- c. Using bolts **U**, attach ECU **T**, connector rearward, to **Q** (Figure 1b - M6).
- d. Connect the ECU's main cable **J** to **T** (Figure 1b - M6, inset).

For more information on cabling and cabling connections, see "Appendix - ESI and ECU Connections" on page 10.

M6S ECU Mounting

NOTE:

The ECU/bracket assembly is installed very close to the inner fender. Attach the ECU to its bracket before installing them as an assembly.

- a. Using bolts **U**, attach ECU **T**, connector rearward, to the mounting face of **Q** (Figure 1a - M6S).
- b. Set ECU/bracket assembly **T/Q** to the right of the operator's seat with:
 - i. The ECU toward the seat (connector rearward).
 - ii. The bracket's front left (right as viewed) fastener hole in line with the front right seat bolt (Figure 1a - M6S inset).
- c. Using screws **R** (the shorter screws), attach **Q** to the seat platform (Figure 1a - M6S inset, **R** indicated).
- d. Connect the ECU's main cable **J** to **T** (Figure 1b M6S).

For more information on cabling and cabling connections, see "Appendix - ESI and ECU Connections" on page 10.

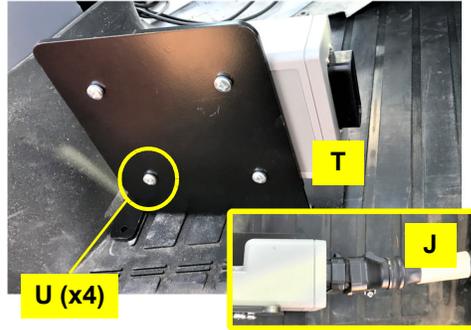


Figure 1b - M6: ECU installed, cable connected

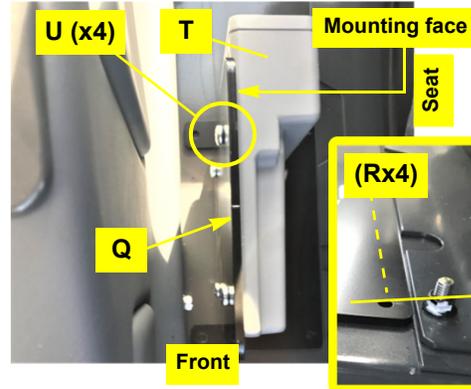


Figure 1a - M6S: ECU installed, assembly location

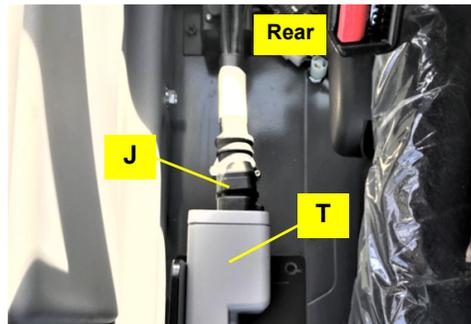


Figure 1b - M6S: ECU cable connected

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 - ESi and ECU Connections” on page 10. Use cable ties **V** as required.

- a. Using adapter cable **L**, connect ESi main cable **I** to ECU cable **J**'s ‘VALVES’ connector.
- b. Connect **I**'s battery connectors to the machine's 12 V battery.
- c. Attach power switch **N** to **J**'s ‘PWR_SWITCH’ connector. Some machines are equipped with pop out tabs that you can remove and replace with switch **N**. If no tab is available, you can use bracket **O**, mounting it in the cab at the operator's preferred location.

NOTE:

*Set switch **N** to OFF before connecting **J/K** to the battery at step **g** below.*

- d. Connect **J**'s ‘RMT_ENGAGE’ connector to **M**.
- e. **For MAX/STX terminals:** connect **J**'s ‘TERMINAL’ connection to your terminal.
For REBEL terminals: connect **J**'s ‘GNSS’ connection to your terminal.
- f. Route the cable in the cab so that it is clear of any machine operation controls.

⚠ WARNING:

*Ensure main cable **J** is connected to ECU (**T** - any step **1d** in the preceding ECU mounting sections) before you connect power cable **K** to the machine's battery at the next step.*

- g. Connect **J**'s ‘EXT_PWR’ connector to battery terminal cable **K** (and **K** to machine's 12 V battery).

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Appendix - ESI and ECU Connections

