



**Hub Motor System
Installation Guide**

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- ▶ **EBO Electric Hub Motor**
- ▶ **EBO Li-Ion Battery**
- ▶ **EBO Battery Mount and Controller**
- ▶ **Battery Charger**
- ▶ **Display**
- ▶ **Throttle**
- ▶ **Pedal Assist System (PAS)**
- ▶ **E-Brakes or E-Brake Sensor**
- ▶ **2 Wiring Harnesses**
- ▶ **Zip Ties**

Recommended Tools

- ▶ **Metric Hex Wrenches**
- ▶ **Metric Box Wrenches or Adjustable Wrench**
- ▶ **Phillips Screwdriver**
- ▶ **Tire Lever**
- ▶ **Tire Pump**
- ▶ **Crank Puller**
- ▶ **Bottom Bracket Tools (varies depending on model)**
- ▶ **Cordless Drill and 3/32" Drill Bit**
- ▶ **More Zip-ties**

Dolphin

1. Locate the best position to mount the battery. In most cases this will be the down tube water bottle bosses on bicycles or a battery mounting tray designed specifically for your trike.
2. Mount the battery tray. Position the tray so the battery can be installed or removed and to allow access to the power button, lock, and charge port.
3. Place the battery in the battery tray track. Turn the key $\frac{1}{2}$ turn clockwise to lock it in position. Press the silver power button to turn the battery on and off.



Rack Style

1. Install the rear rack on the bike or trike using the supplied hardware.
2. Slide the battery onto the black plastic tray.
3. Insert the key into the lock, turn $\frac{1}{2}$ turn clockwise and remove the key.
4. Turn the battery power on by flipping the red switch on the bottom to the on position.

Rack Style (cont.)

5. Check the charge level by pressing the small square button near the rear light.
6. Turn the rear light on and off using the button on top of the light.



Controller

Integrated Controllers (350w Motors)

1. The 17 amp controllers for 350w motors usually come integrated in the battery mounting bracket for both Dolphin and Rack style batteries. No special steps need to be taken to mount the controller on standard Burly or Cruiser kits.

External Controllers (500w and 750w Motors)

1. Locate a location where the controller box can be securely mounted. The best mounting locations are usually on a rear rack, in a frame bag, or mounting to water bottle cage bosses.
2. Make sure that the box does not interfere with brake or shift cables, pedal rotation, or any other moving parts of the bicycle or trike.

External Controllers (cont.)

3. Secure the base of the controller box to the mounting location. In some cases you may need to drill additional holes, use longer bolts or zip ties, or even double sided tape to help mount the box to your preferred location.
4. Place the controller in the mounting box. Use the spare room in the box to hide any extra wire length. Be sure not to bend wires too sharply as this may damage the wire.
5. Install the controller box cover and secure it to the base with the supplied hardware.



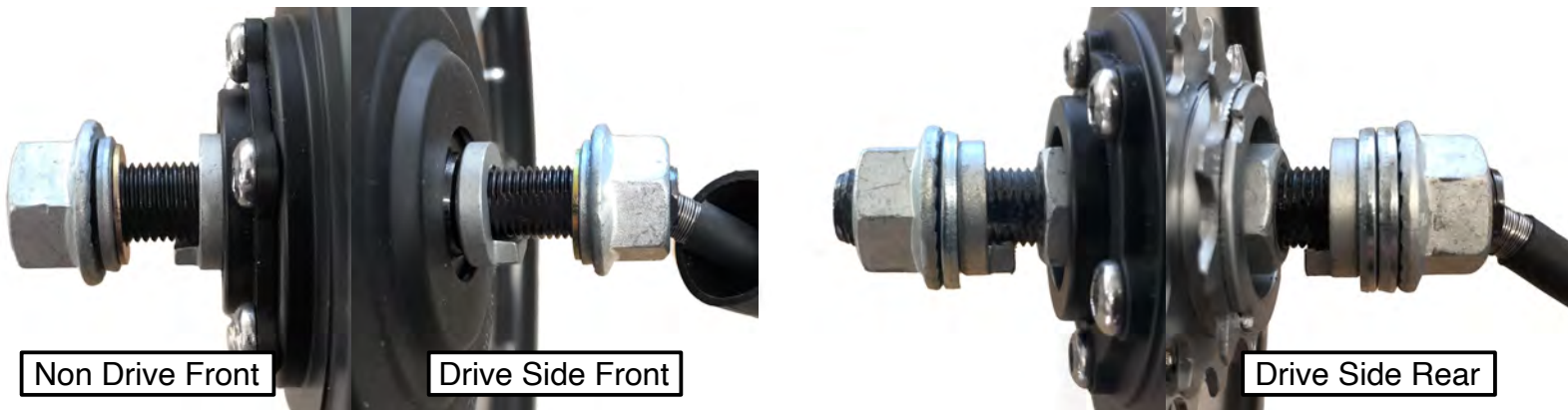
Motor Installation

350w, 500w, and 750w Motors

1. Remove the front or rear wheel of your bike. Remove the tire from your wheel and install it on your new EBO motor. Ensure the tread is facing the correct direction. The serial number will be on the drive side of the motor.
2. Install a freewheel on your motor if one did not come with your kit (rear motors only).

350w, 500w, and 750w Motors (Cont.)

3. If your bike has disc brakes, remove the plastic spacer and mount your brake rotor to your motor. DO NOT use longer brake rotor bolts than those supplied by EBO.
4. Install the motor into the frame dropouts. The motor wire should exit the bottom of the axle. Ensure the axle is seated completely in the frame.
5. Arrange the axle hardware so that the torque washer is closest to the frame, then the smooth washer, then the axle nut. For 500w and 750w motors install a torque arm according to the instructions in the following section.
6. Tighten the axle nuts firmly. Under tightening the nuts can cause the motor to slip out of the dropouts and cause damage to the frame and motor. Ensure that the frame or fork don't interfere with the motor's rotation.

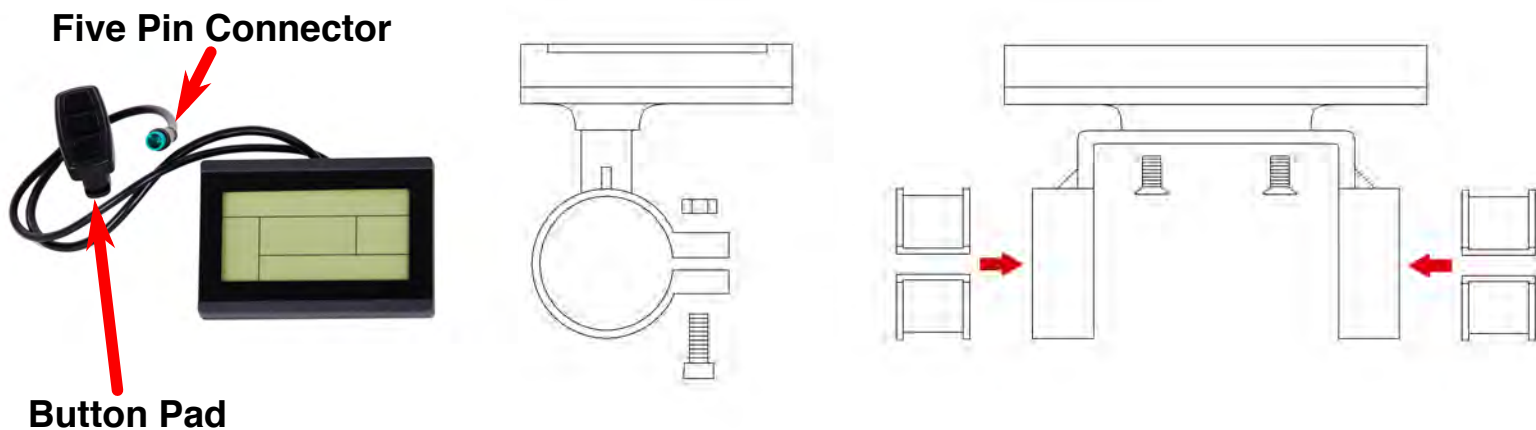


Torque Arm

1. Install the slotted tab on the axle between the torque washer and the axle nut. Orientation will vary depending on the design of the dropout. You can install the torque arm on either the drive side or the non-drive side.
2. Use the bolt and nut to attach the arm to the slotted tab.
3. Loop the strap around the chainstay or fork blade and through the slot on the arm.
4. Tighten down the strap and bolt before tightening the axle nut.

LCD3 and LCD8S

1. Attach the display mounting bracket to the screen using the supplied hardware. Overtightening the bolts can break the bracket.
2. Install the display on the handlebars or an accessory mount. Use the included rubber shims on handlebars that are smaller than 31.8mm in diameter. Trim the shims as needed.
3. Mount the display button pad in the desired location. The diameter should not exceed 22.2mm. Only tighten the bolt enough to keep it from slipping. Over tightening can cause the plastic band to break.
4. Plug the five pin green connector to the matching connector on the wiring harness.
5. Refer to LCD3 and LCD8S manuals for operation and settings instructions.



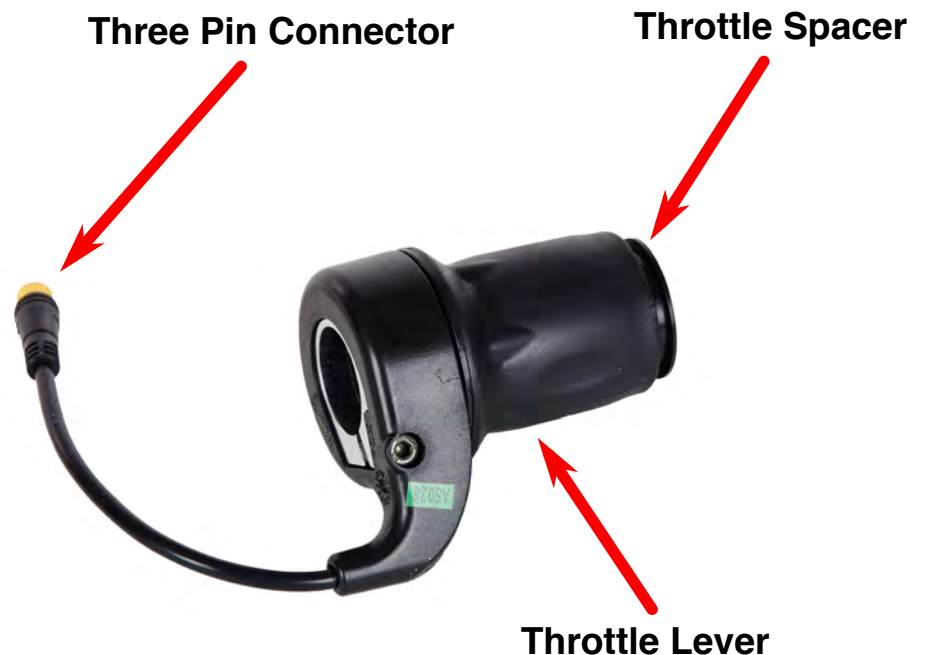
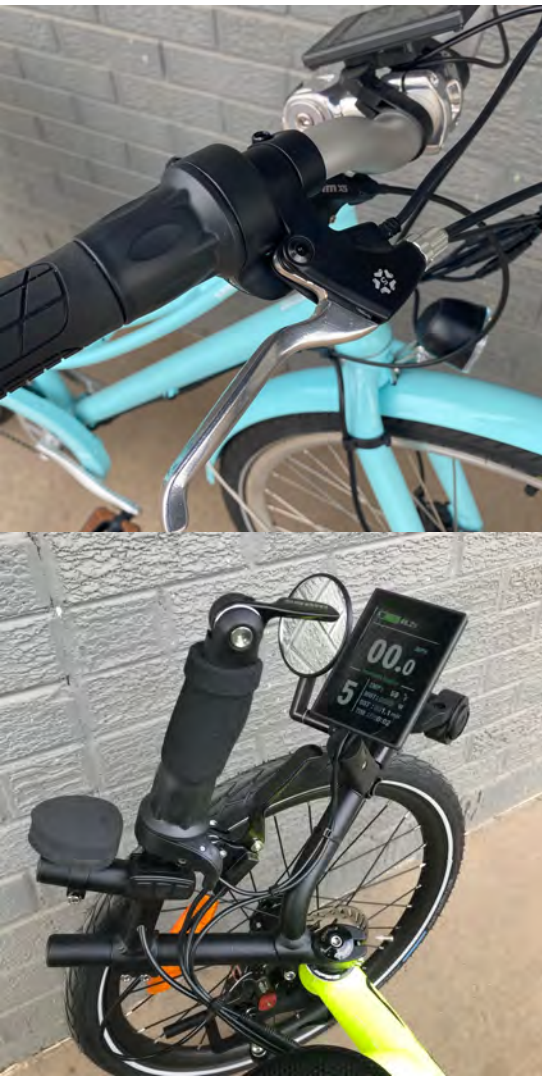
Thumb Throttle

1. Install the throttle on the handlebars in the desired position.
2. Tighten the pinch bolt with a 3mm wrench to lock the throttle in place. Ensure the throttle doesn't interfere with brake or shift lever operation.
3. Ensure the spacer is installed between the throttle and any adjacent components so the throttle lever does not stick in the "on" position. Test the throttle to make sure it returns to the "off" position when released.
4. Plug the three pin yellow connector into the corresponding connector on the controller wiring harness.



Twist Throttle

1. Slide the throttle onto the handlebars. On regular bicycle handlebars the throttle will be installed on the right.
2. Tighten the pinch bolt with a 3mm wrench to lock the throttle in place. Ensure the throttle doesn't interfere with brake or shift levers.
3. Install the spacer between the throttle and any other components so the throttle lever does not stick in the "on" position. Trim the handlebar grip to make room for the throttle or use twist shifter specific grips.
4. Test the throttle to make sure it returns to the off position when released.
5. Plug the three pin yellow connector into the corresponding connector on the controller wiring harness.



Square Taper Drive Side

1. The PAS sensor is designed to be installed on a square taper bottom bracket (BB) and can be installed on either the drive side or non-drive side BB shell.
2. Remove the crank arms from the BB spindle. Remove the BB from the frame.
3. Insert the drive side of the BB assembly through the PAS bracket and install the BB back in the frame. Orient the PAS bracket so that the sensor is at the 6 o'clock position and there are no sharp bends in the wire. Install the non-drive side cup.
4. Slide the magnet disc onto the BB spindle. Ensure that the rotation arrows are facing the correct direction. The gap between the sensor and the magnets should be about 1-5mm. If there isn't enough room on the spindle you may need to replace the BB.
5. Plug the PAS wire into the yellow connector on the controller and ensure that the system activates when the BB spindle rotates.
6. Reinstall the crank arms.



Square Taper Non-Drive Side

1. Remove the crank arms from the BB spindle.
2. Thoroughly clean the non-drive side BB shell face with isopropyl alcohol.
3. Use waterproof superglue to bond the silver bracket to the BB shell. Use clamps to hold the bracket in place until the glue is completely dried for best results.
4. Slide the magnet disc onto the non-drive side BB spindle. Ensure that the rotation arrows are facing the correct direction. The gap between the sensor and the magnets should be 1-5mm.
5. Plug the PAS wire into the yellow connector on the controller and ensure that the system activates when the bottom bracket spindle rotates.
6. Reinstall the crank arms.



Non Square Taper Cranksets

The PAS sensor is designed to be installed on a square taper BB but the PAS can be modified to work on many different crank and BB standards. Please refer to PAS Modification Appendix for recommendations for non square taper installations.

E-Brake Levers

1. Remove your current brake levers from the handlebars and uninstall the brake cable from the lever.
2. Install the EBO e-brake levers on your handlebars. Install the brake cables into the levers. Follow the brake manufacturer's instructions to ensure proper brake operation and test before riding.
3. Plug the red two pin connector into the matching connector on the controller wiring harness. Power on the display and pull the brake lever. The e-brake status indicator should appear and no power should go to the motor when present.

Barrel Adjuster

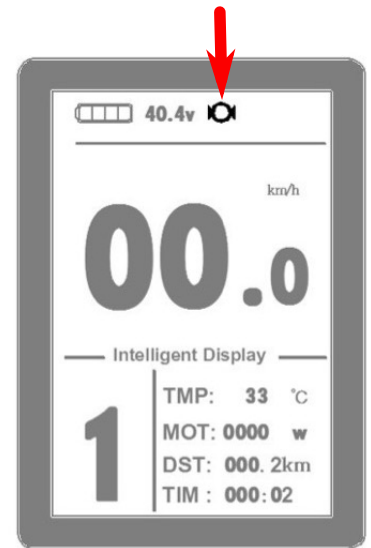


Two Pin Connector



Parking Brake Locking Arm

E-brake Status Indicator

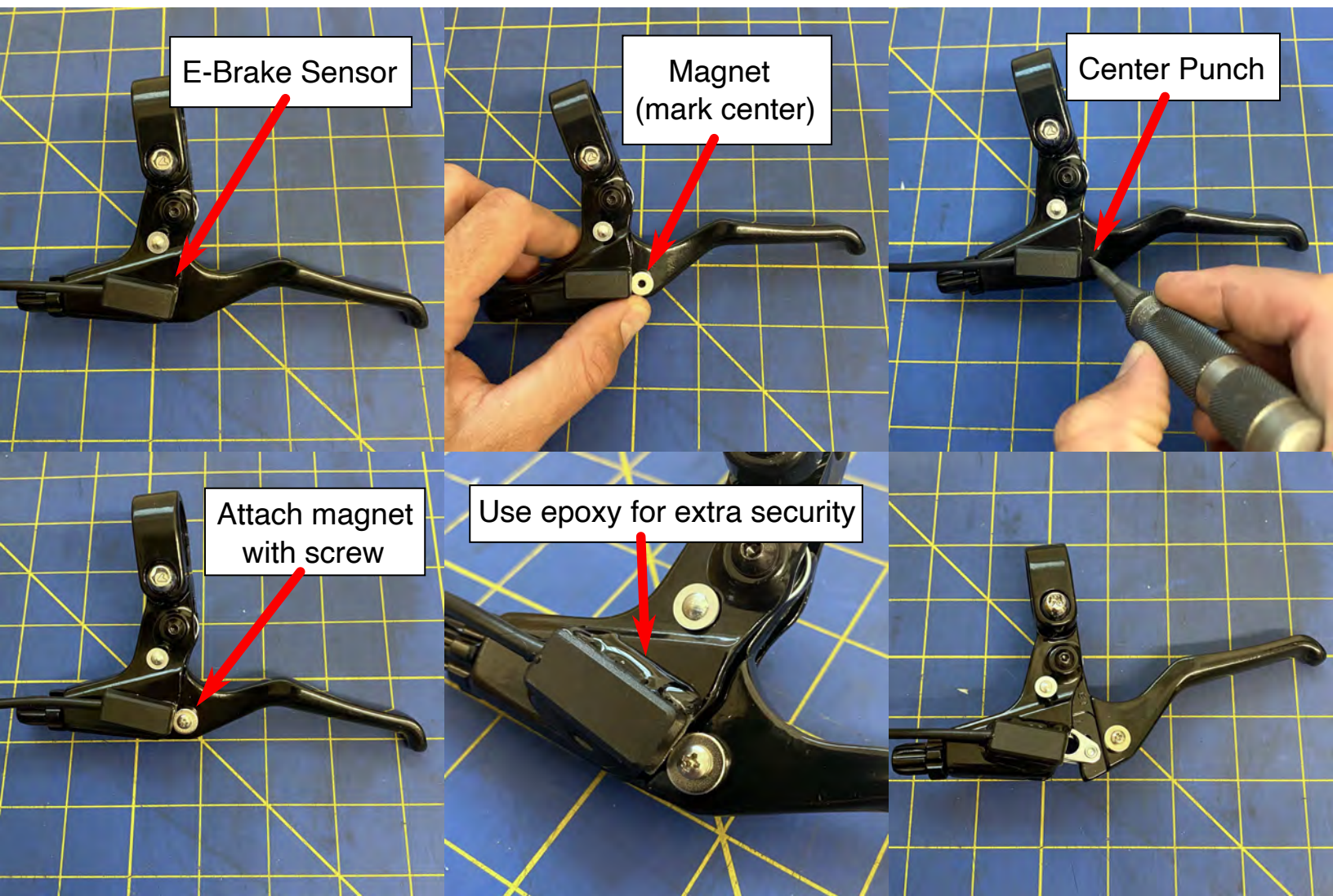


Parking Brakes

1. Locking e-brake levers are available for trikes that need parking brakes.
2. To activate the parking brake pull the lever to the handlebar and and move the locking arm into place.
3. To unlock the brake pull the lever and the locking arm will release automatically.

E-Brake Sensor

1. Clean your brake lever with alcohol. Remove the red backing from the e-brake sensor and attach it to the body of your brake lever. Plug the two pin red connector into the wiring harness.
2. Mark the center of the magnet where it is close enough to the end of the sensor that the >O< symbol disappears. Use a center punch to mark the position. Positioning will vary depending on the brake lever used.
3. Drill a 2.5mm (~3/32") hole roughly 6mm deep at the marked position. Thread the screw through the hole in the magnet into the hole in the lever.
4. Pull the brake lever to ensure that the >O< symbol appears on the display once the sensor and magnet are installed.



Connectors

1. The controller is the brain of the system and every piece of the conversion kit is connected to it via a wiring harness.
2. The wiring harnesses all use water resistant connectors that vary in shape, size, and color.
3. Ensure the alignment arrows match up and all pins are straight and sit in the appropriate position when joining connectors. Misalignment can bent pins and cause connectivity issues and errors.
4. Make sure male and female connectors are completely seated. Larger connectors require more effort to seat 100% than the smaller ones.



Controller to Battery

1. External controllers will attach to the battery using a two pin connector. Integrated controllers will plug directly into the battery via the mounting bracket.
2. Make sure that the battery is powered off when connecting the male and female two pin connector.
3. It is possible to wire the battery into the controller directly or with alternative connectors using the positive (red) and negative (black) wires on the controller. We recommend having this done by a qualified technician.

Controller to Components

1. Plug the 8 pin connector to the controller and run the wiring along the frame and cable housing up to the cockpit where the display, throttle, and brakes are installed.
2. Attach the wiring using zip ties. Make sure to leave enough slack in the wiring to allow for steering, folding, etc.
3. The connectors are color coded to the corresponding component. Use wiring extensions to fine tune the wiring length as necessary.
4. If any of the connectors are not utilized for the installation cap the connector with one of the supplied rubber caps. **DO NOT CUT OFF UNUSED CONNECTORS.**

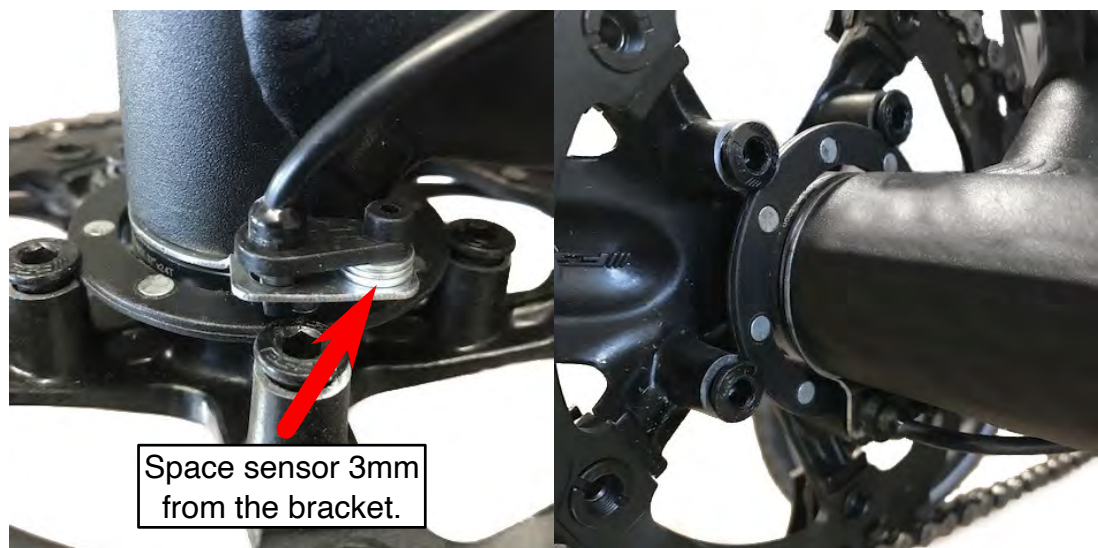
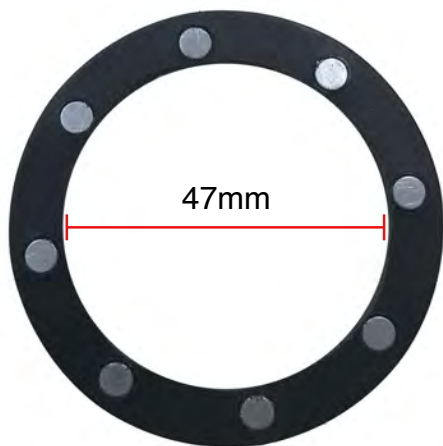


Controller to Motor

1. Plug the 9 pin connector into the controller and run the wiring along the frame and cable housing to the motor.
2. Route the wiring so that it doesn't rub on derailleur or shift cables and is away from the chain. Attach the wiring using zip ties.
3. Plug the female end of the wiring harness into the motor.

FSA Triple Mega Exo Cranksets (Catrikes and others)

1. Increase the inner diameter of the magnet disc to ~47mm or request a modified disc from EBO.
2. Remove the crankset and drive side bottom bracket cup.
3. Install the pedal assist sensor behind the drive side cup. Use the supplied washers and long screw to space the sensor inboard 3mm.
4. Remove the smallest chainring and use the chainring bolts to hold the modified magnet disc in its place. The open side of the magnets will face the sensor.
5. Use Loctite to help keep the chainring bolts from coming loose.
6. Reinstall the crankset without the spindle spacer and wavy washer that was installed on the non-drive side.
7. Make sure there is no contact with the chainring bolts and the sensor as the crank spins.
8. Check to see that rotating the crank activates the assist and adjust as necessary.



Shimano Cranks on ICE Trikes

1. Remove the crankset and bottom bracket from the frame.
2. Remove the pedal assist sensor wire from the metal bracket and install it from the opposite side so that the bend in the bracket brings the sensor outboard.
3. There should be 2-3 spacers between the bottom bracket cups and the frame. Remove 2 of the spacers and reinstall the bottom bracket into the frame with the pedal assist sensor mounted behind the non-drive side bottom bracket cup.
4. Install the drive side crank arm into the bottom bracket.
5. Increase the ID of the magnet disc to about 24mm so that it can slide over the crank spindle.
6. Slide the magnet disc onto the crank spindle with the rotation arrows in the reverse direction.
7. Reinstall the non-drive side crank arm. Make sure that the magnet disc spins with the crankset and does not rub the sensor. The gap between the magnets and pedal assist sensor should be $\sim 1-5\text{mm}$.



Insert the sensor through the opposite side of the bracket.

