OpenROV

Trident Motor Replacement Guide

How to change Trident's motors.

Written By: OpenROV (Sofar)

INTRODUCTION

This guide will take you through the process of replacing Trident's three motors. It is not difficult, but attention to detail is important.

If you have any questions along the way, email us at support@openrov.com.

We also made a how-to video for this! Check it out here: https://youtu.be/CHMWF84_JAs

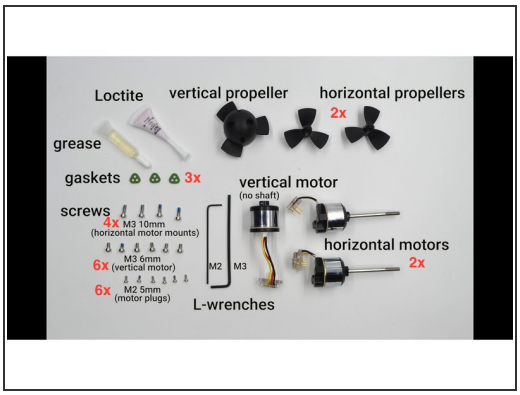
TOOLS:

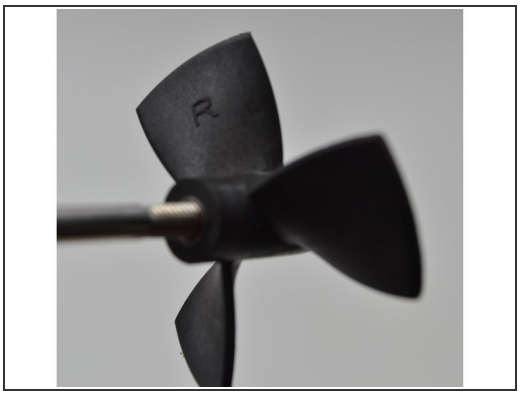
- Included in kit: L-wrench (M3) (1)
- Included in kit: L-wrench (M2) (1)
- Included in kit: grease (1)
  for creating waterproof seal on pass-throughs
- Included in kit: Loctite (1)
  threadlocker for attaching horizontal propellers to motor shafts
- Small phillips head screwdriver (1)
- Scissors or cutters (1)
  for opening Loctite
- Tweezers (1)
  for removing and placing small screws
- Isopropyl alcohol 99% or higher (1)
  for cleaning pass-throughs
- Cotton swabs (1)
  for cleaning pass-throughs
- Wipes (1)
  for cleaning pass-throughs
- Compressed air (1)
  for cleaning pass-throughs (if you don't have any, clean thoroughly and allow extra dry time)

PARTS:

- horizontal motor (2)
  left and right motors
- vertical motor (no motor shaft) (1)
- horizontal propeller (2)
  "L" and "R" designation (very important to place correctly)
- vertical propeller (1)
- M3x6mm screw (6)
  for vertical motor attachment and mounting (do not reuse old screws)
- M3x10mm screw (4)
  for horizontal motor mounts (do not reuse old screws)
- M2x5mm screw (6)
  for motor plugs (do not reuse old screws)
- gasket (3)
  for waterproof seal at pass-throughs (do not reuse old gaskets)

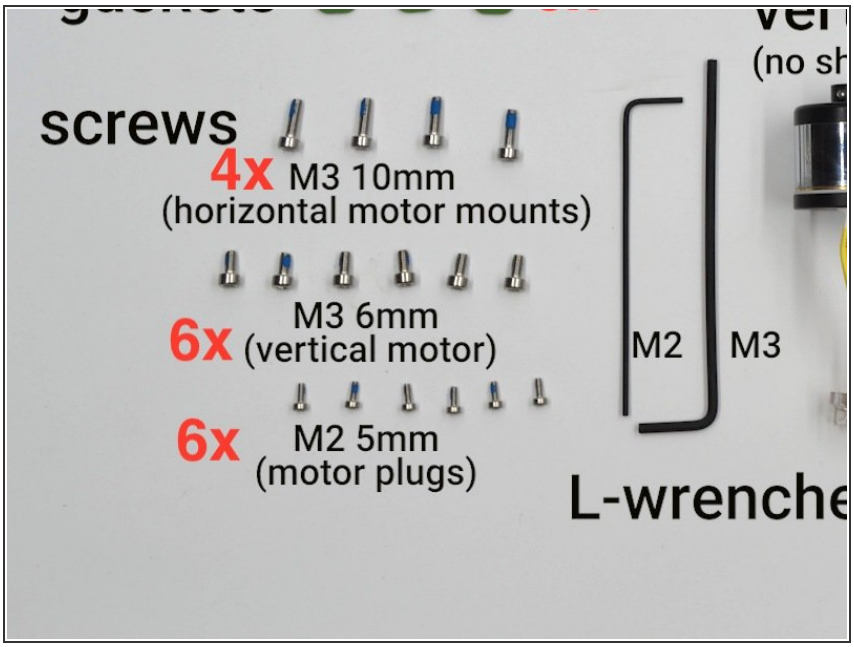
Step 1 — Examine motor replacement kit contents





- Inventory your motor replacement kit, making sure you have every item in the correct quantity.
- Check horizontal propellers for "L" and "R" designations.

Step 2 — A few notes about screws



There are three different sizes of screws in the kit. Pay close attention to the screws used in a particular step.

Use new screws in all cases, except for the horizontal motor covers (phillips head screws).

Over-tightening screws can cause serious damage to your Trident. Here's how to get it just right:

- Use the L-wrenches provided. They were chosen specifically to avoid over-torquing.
- Tighten a screw until you first begin to feel resistance, like it's almost tight. Then, turn an additional quarter-turn (90º). **Do not exceed a quarter-turn.**

Test connections by trying to gently wiggle the part. It should not feel loose at all. This will be referred to as the "wiggle test" :)

Step 3 — Gather additional tools

- Gather the additional tools shown here. A tool list is also at the top of this guide.

Compressed air can be omitted if cleaning is thorough and sufficient dry time is allotted.

Step 4 — Attach propellers to horizontal motors

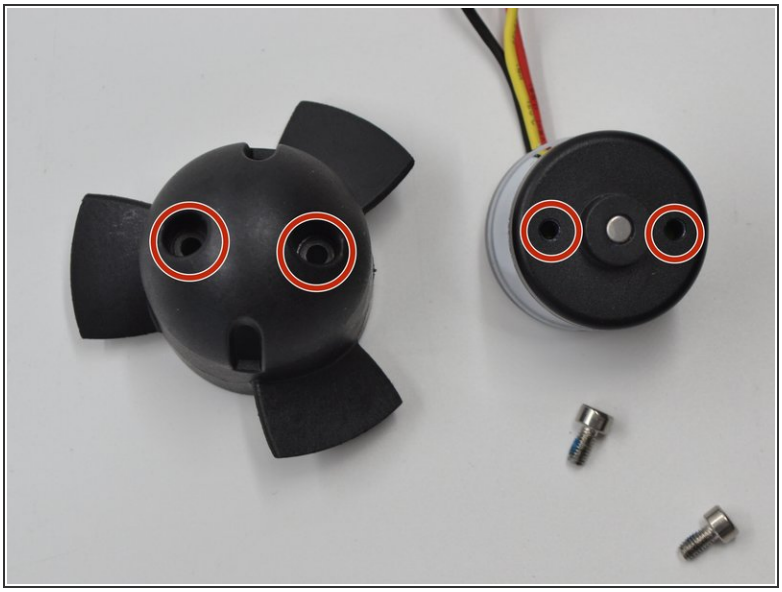
- Place a drop of Loctite into the threaded hole in the propeller.
- Place the propeller onto the motor shaft. Ensure the propeller is threaded straight on the shaft and tighten fully.

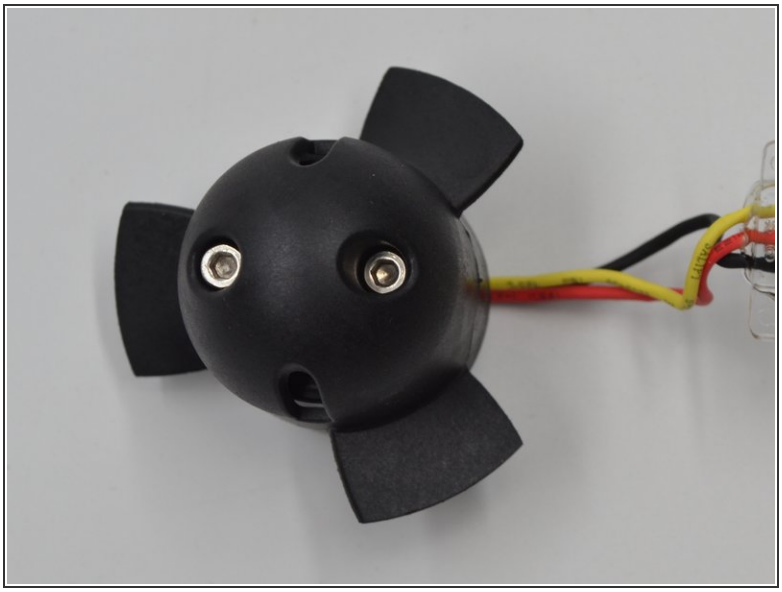
It helps to use your fingers around the motor bell and/or motor shaft to steady the motor while you tighten the propeller.

- Wipe off excess Loctite.
- Do this process for both horizontal motors and propellers.

Wait at least 5 minutes before handling motors/propellers. Allow 24 hours for loctite to cure before using Trident.

Step 5 — Attach vertical propeller to vertical motor





- Fit the vertical propeller on the vertical motor bell (the side without the wires). Line up the screw holes on each part.
- Attach the prop to the motor by running two **M3 6mm screws** through the prop into the motor.
- Tighten the first screw about halfway, then start the other screw.
- Turn screws until they begin to get tight. Then give an additional quarter turn (90º).

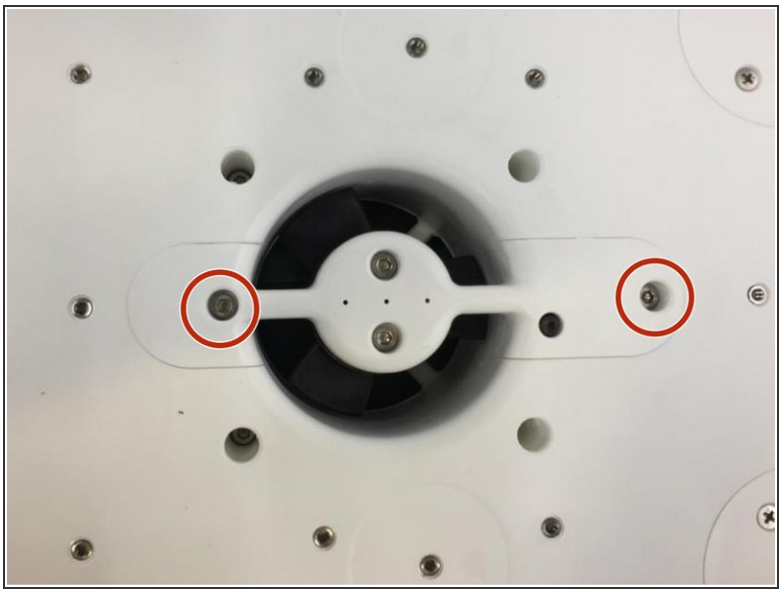
Step 6 — Remove horizontal motor covers

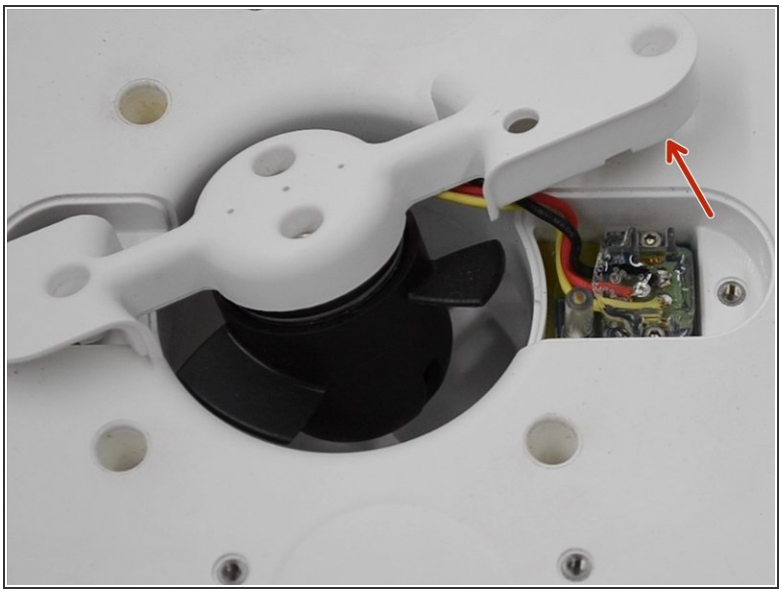
⚠ Make sure Trident is turned off (tether not connected) and not attached to the charger. There should be no cables attached to Trident.

- Flip Trident to view its underside.
- Remove the motor covers on the left and right motors. Each has a single **Phillips head screw**.

ⓘ Save these screws for reattachment at the end. **Replacements are not provided in the kit.**

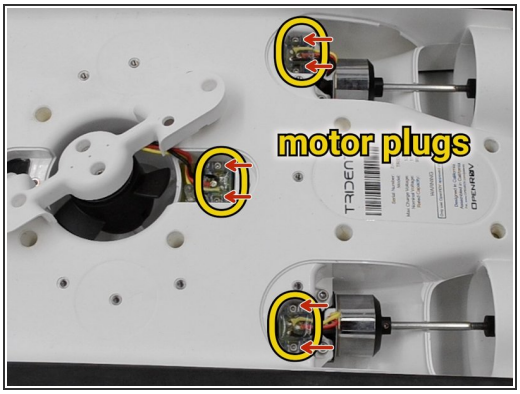
Step 7 — Detach vertical motor cover from Trident

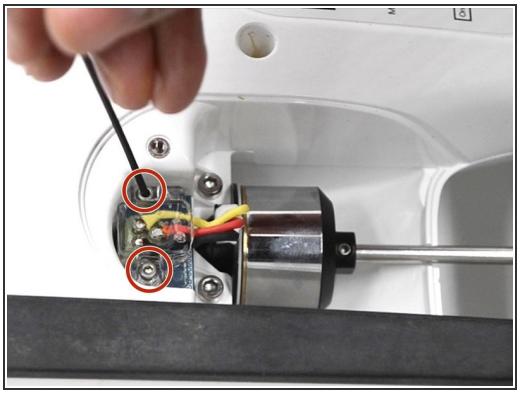


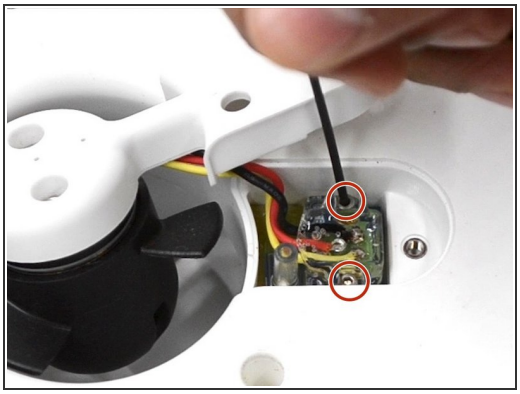


- Remove the two **M3 screws** from the vertical motor mount.
- The motor and motor plug are still attached. Set the cover off at an angle to expose the motor plug.

Step 8 — Remove motor plug screws



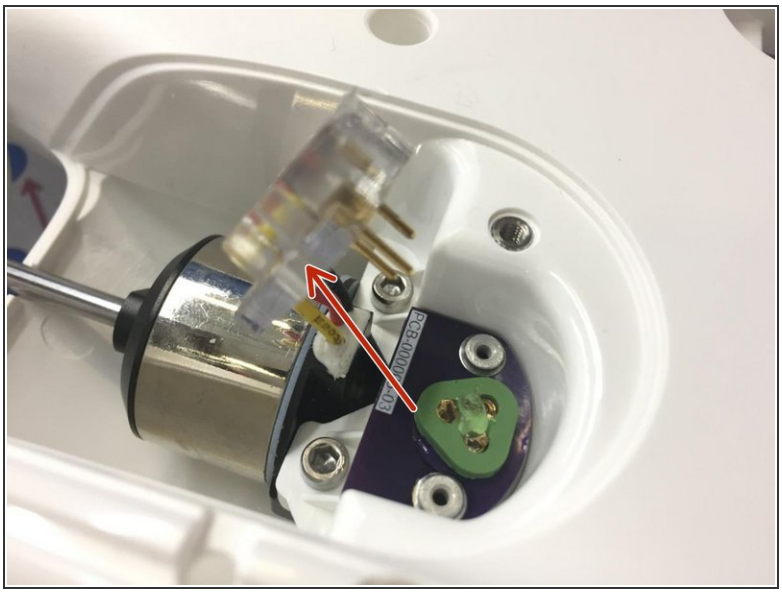


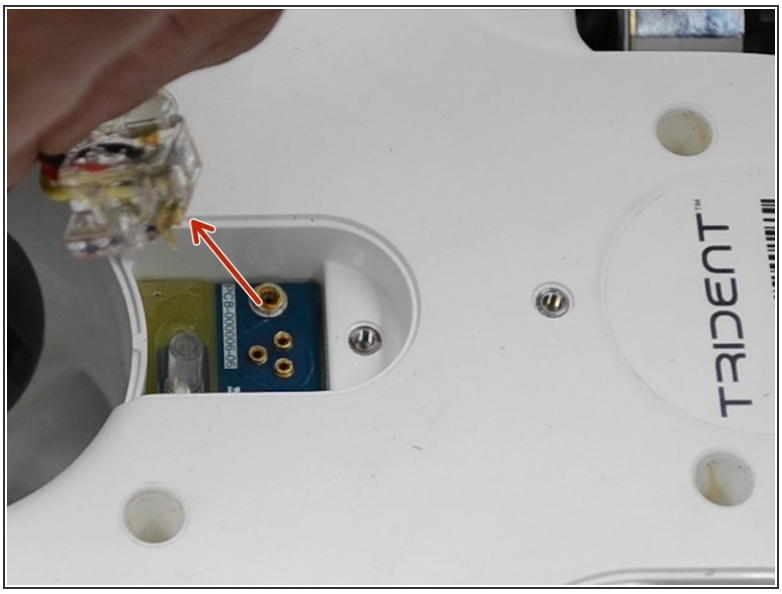


- Unscrew the **M2 screws** fastening the motor plugs to the pass-throughs.

ⓘ Each motor plug has 2, so you're removing and discarding **x6 M2 screws**.

Step 9 — Disconnect motor plugs





- Carefully unplug the motor plug from the pass-through on all three motors.

The vertical motor will be completely detached from Trident at this point. We will return to it later.

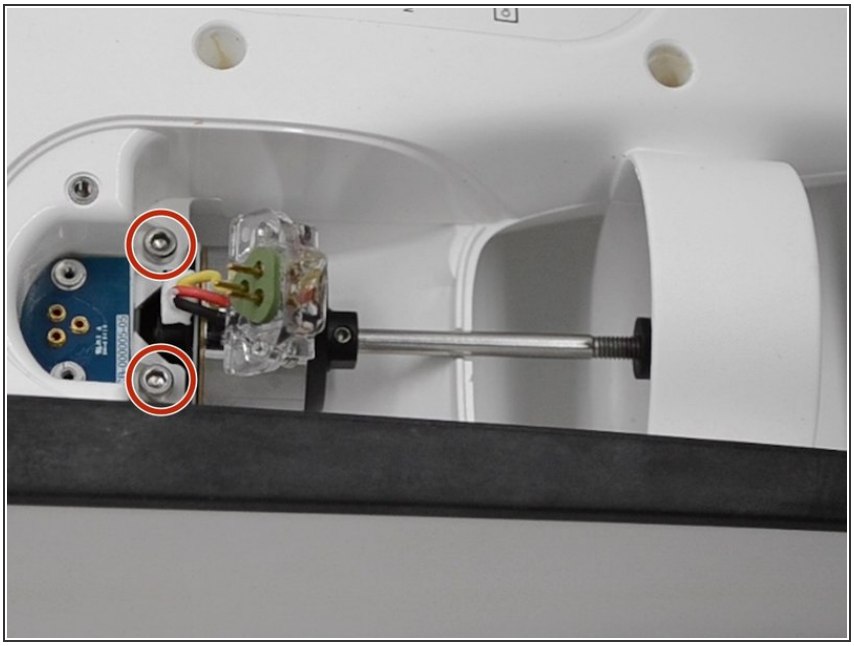
Step 10 — Remove motor plug gaskets

- Remove and discard the old motor plug gaskets (green rubber) from all three pass-throughs.

ⓘ Tweezers are great for this.

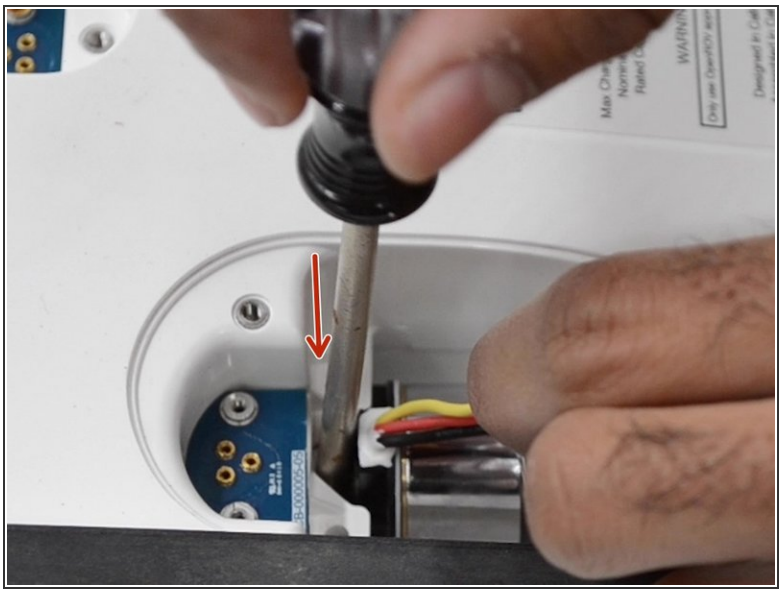
ⓘ Gaskets may have already come off as the motor plug was being removed.

Step 11 — Remove horizontal motor mount screws



- Remove the two **M3 screws** that hold the horizontal motor to the motor mount.
- Do this step for both horizontal motors.

Step 12 — Remove horizontal motors from Trident



- Insert a larger screwdriver into the space between Trident's body and the horizontal motor, as shown in the photo.

⚠ Be very careful to only make contact with Trident's body and the motor. Avoid the pass-throughs (where the motor plugs in).

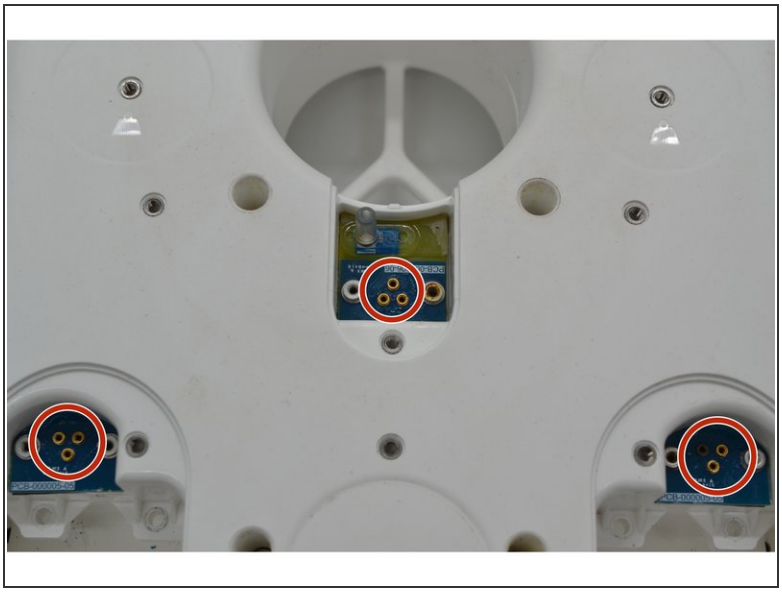
- When the screwdriver is in place, push the screwdriver handle toward the front of Trident. This will push the motor out of the mount.
- Fully remove the horizontal motor.
- Do this for both horizontal motors.

Step 13 — Disconnect vertical motor from motor cover

- Disconnect the vertical motor from the motor cover by unscrewing the two **M3 screws**.
- Set the motor cover aside for later.

⚠ Do not confuse the old vertical motor with the new one.

Step 14 — Clean pass-throughs

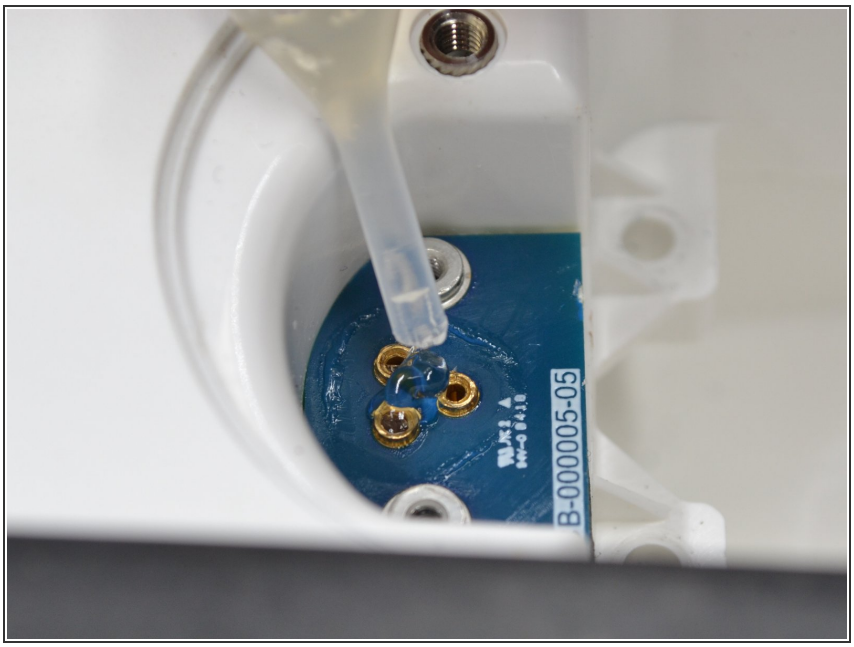


- Thoroughly clean the pass-throughs with cotton swabs, wipes, and isopropyl alcohol.
- Make sure the area is free of sand, grit, or other debris. Clean corrosion from the pass-through connection points.

ⓘ This is a good time to clean out hard-to-reach spaces in the motor compartments, not just at the pass-throughs.

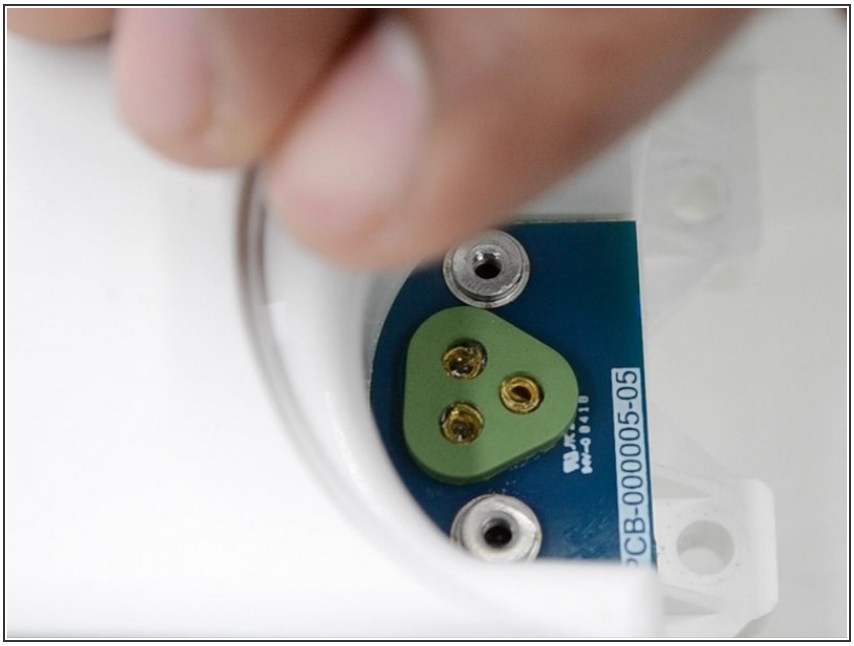
- Dry with compressed air, or allow ample time to dry (at least 10 minutes).

Step 15 — Apply grease to pass-throughs



- Apply a liberal amount of the supplied grease in the center of the pass-through as shown.
- Do this for all three pass-throughs.

Step 16 — Place gaskets on pass-throughs



- Line up the gasket holes with the pass-through holes, and place the gasket on top.
- Gently push down on the gasket.

ⓘ You will likely see a little grease squeeze out the sides of the gasket and through the holes in the gasket.

- Place gaskets on all three pass-throughs.

Step 17 — Apply more grease to top of gasket

- Apply a liberal amount of the supplied grease in the center of the pass-through as shown.
- Do this for all three gaskets.

ⓘ Now the passthrough is ready for plug-in of the motor.

Step 18 — Place the right horizontal motor in the starboard motor compartment

⚠ **The horizontal motors must go on the correct side.** Pay very close attention to detail in this step.

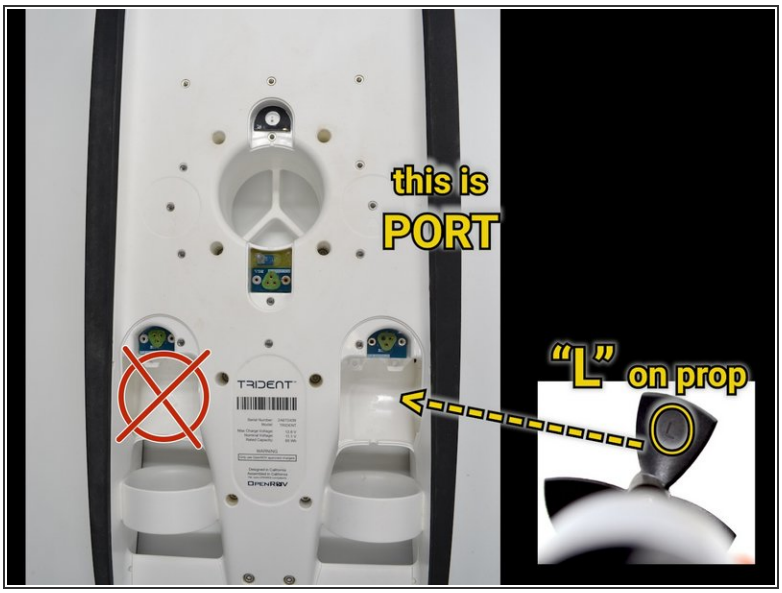
ⓘ The right motor has the letter "R" on the propeller.

ⓘ The right horizontal motor will be mounted on Trident's starboard side.

ⓘ We are viewing Trident upside-down, so from our view, the starboard side is on the left.

- Place the right horizontal motor in the starboard motor compartment.

Step 19 — Place the left horizontal motor in the port motor compartment



⚠ **The horizontal motors must go on the correct side.** Pay very close attention to detail in this step.

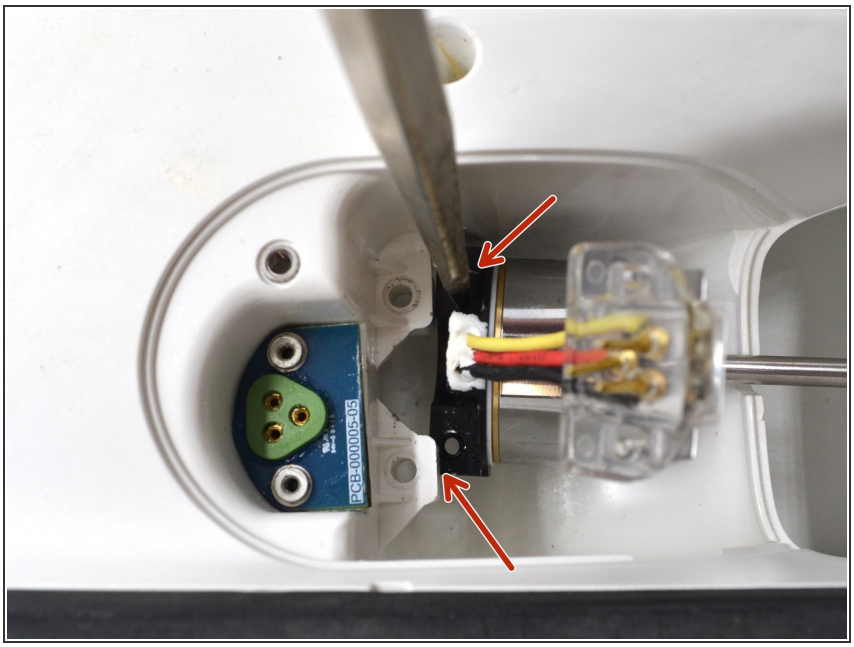
ⓘ The left motor has the letter "L" on the propeller.

ⓘ The left horizontal motor will be mounted on Trident's port side.

ⓘ We are viewing Trident upside-down, so from our view, the port side is on the right.

- Place the left horizontal motor in the port motor compartment.

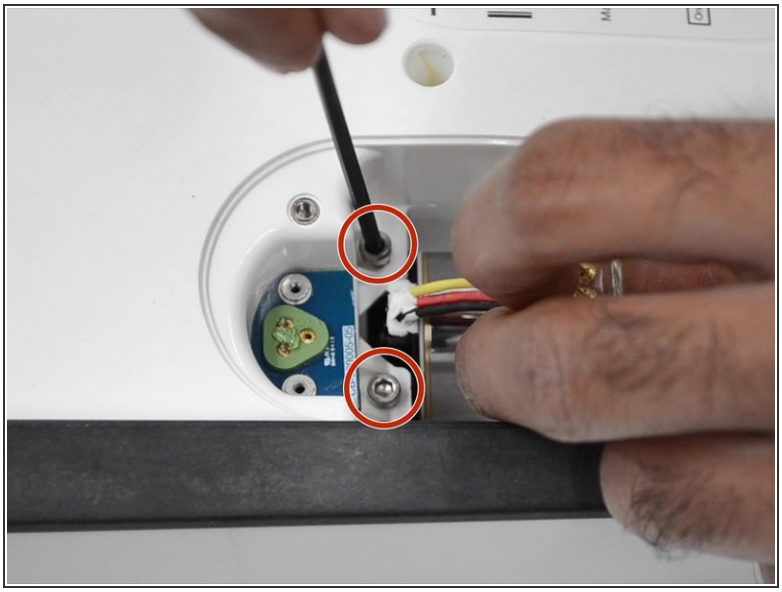
Step 20 — Position horizontal motors for mounting

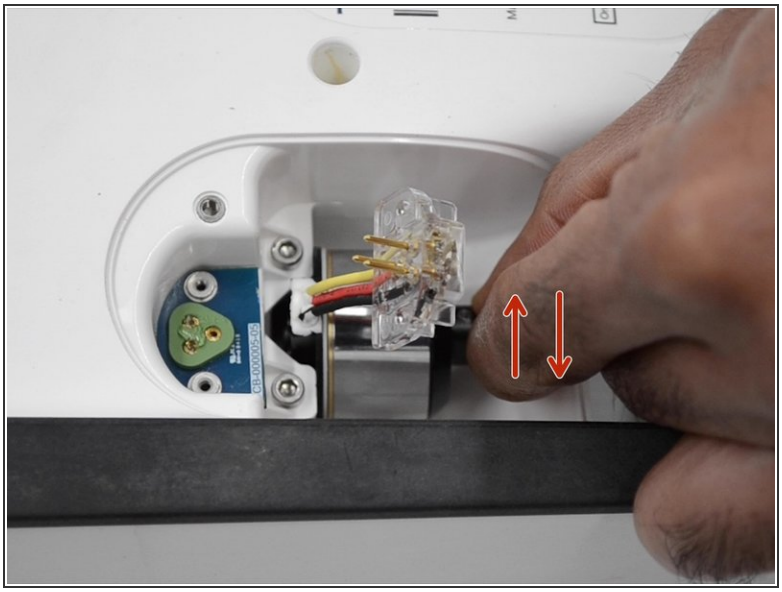


There is a simple trick to apply leverage in the right spot so the motors easily move into place, but **be very careful**. Avoid contact with wires and pass-throughs.

- Position the motor so that the mounting screw holes on the motor are as close as possible to the mounting screw holes on Trident's body.
- Slide one side of the motor's mounting part under the mounting part on Trident.
- Using a blunt screwdriver, press on the other side of the motor mounting part.
- The motor should be able to slide into place so that the mounting screw holes are aligned.
- Do this process for both horizontal motors.

Step 21 — Install horizontal motor mount screws





- Use two **M3 10mm** motor mount screws.
- On one motor mount, tighten the first screw about halfway, then start the other screw for that mount.
- Fully tighten the screws by turning until they begin to get tight. Then give an additional quarter turn (90º).

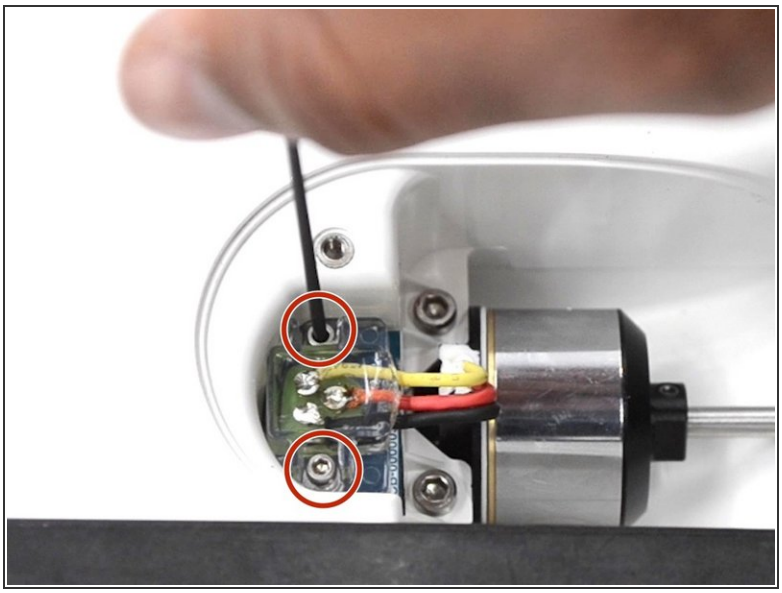
⚠ Do not over-tighten screws. Doing so can result in damage to your Trident that would require a return to OpenROV to repair.

- Do a wiggle test on the motor to make sure it is securely mounted.
- Do this step for both horizontal motors.

Step 22 — Insert horizontal motor plugs into pass-throughs

- Line up the pins on the motor plug with the holes on the pass-through.
- Gently push the motor plug all the way down.
- Do this for both horizontal motors.
- Don't plug in the vertical motor yet.

Step 23 — Install horizontal motor plug screws

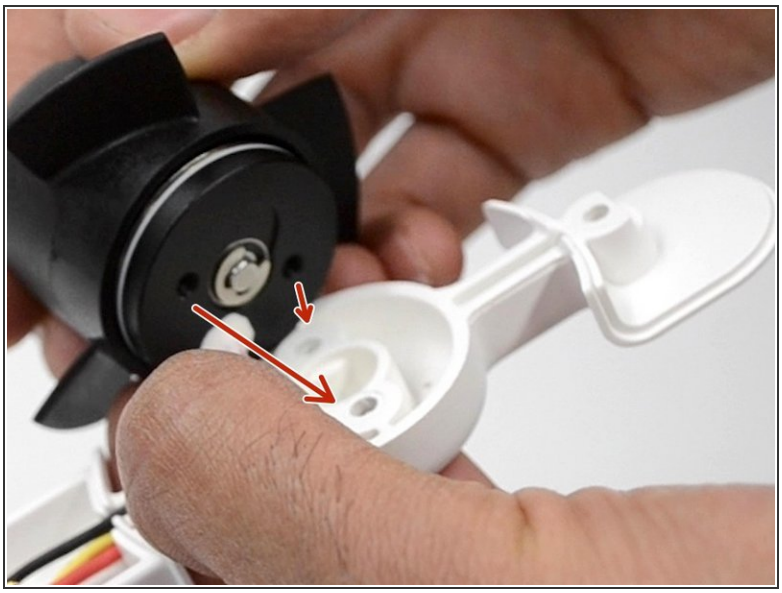


- Use **M2 5mm** screws.
- On one motor plug, tighten the first screw about halfway, then start the other screw for that plug.
- Fully tighten the screws by turning until they begin to get tight. Then give an additional quarter turn (90º).

⚠ **Do not over-tighten screws.** Doing so can result in damage to your Trident that would require a return to OpenROV to repair.

- Do a gentle wiggle test on the motor plug to make sure it is securely fastened.
- Do this step for both horizontal motor plugs.

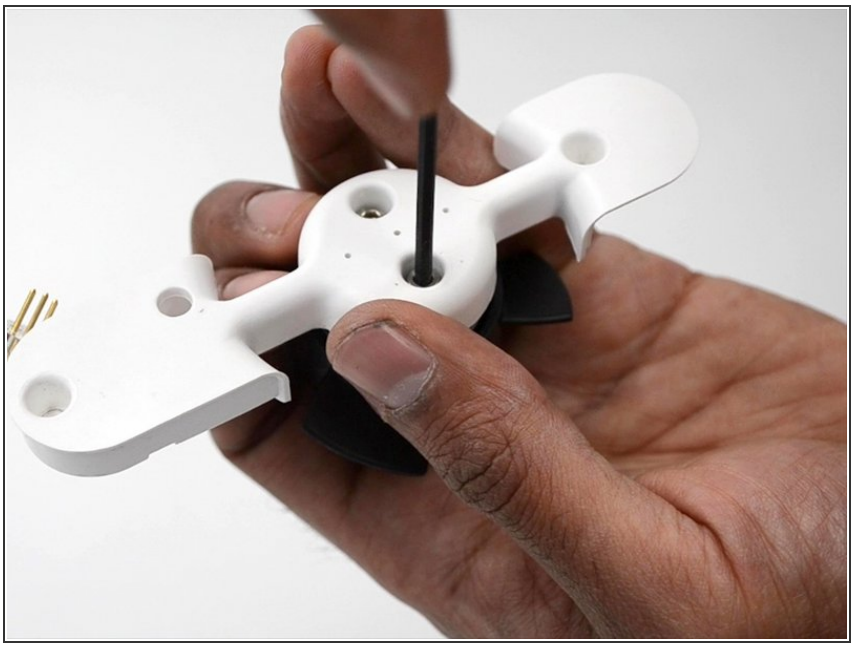
Step 24 — Position vertical motor wires in motor cover



- Holding the **new** vertical motor and the vertical motor cover, line up the screw holes. It doesn't have to be precise yet.
- Position the motor wires in the motor cover's slot so that all three wires fit within the space. The order of the wires does not matter.

This can be a little challenging. Be thorough so that the motor is precisely and securely mounted and no wires get pinched.

Step 25 — Attach vertical motor to motor cover

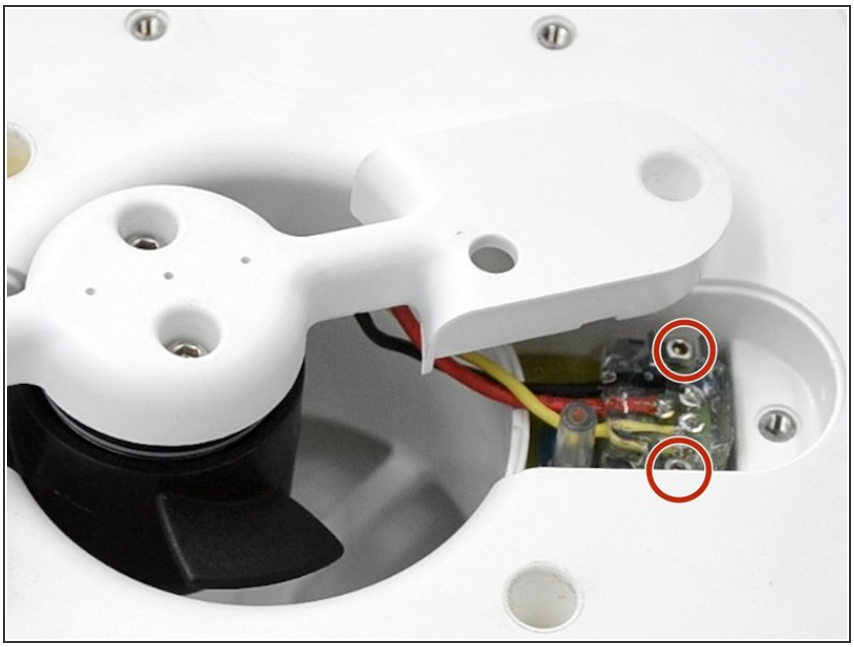


- Use **M3 6mm** screws.
- Tighten the first screw about halfway, then start the other screw.
- Fully tighten the screws by turning until they begin to get tight. Then give an additional quarter turn (90º).
- ⚠ Do not over-tighten screws. Doing so can result in damage to your Trident that would require a return to OpenROV to repair.
- Do a wiggle test to make sure it is the vertical motor is securely attached to the motor cover.

Step 26 — Insert vertical motor plug into pass-through

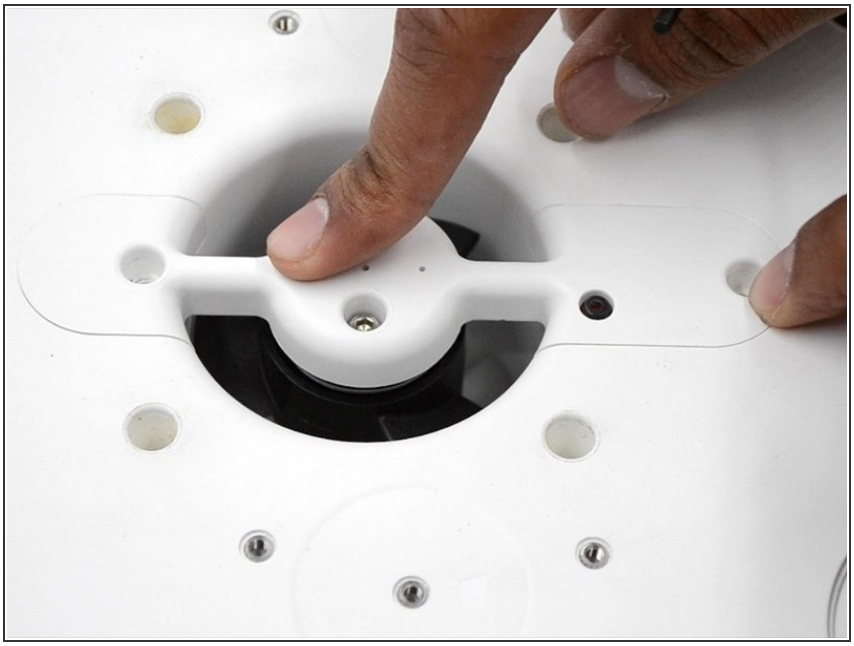
- Line up the pins on the motor plug with the holes on the pass-through.
- Gently push the motor plug all the way down.

Step 27 — Attach vertical motor plug



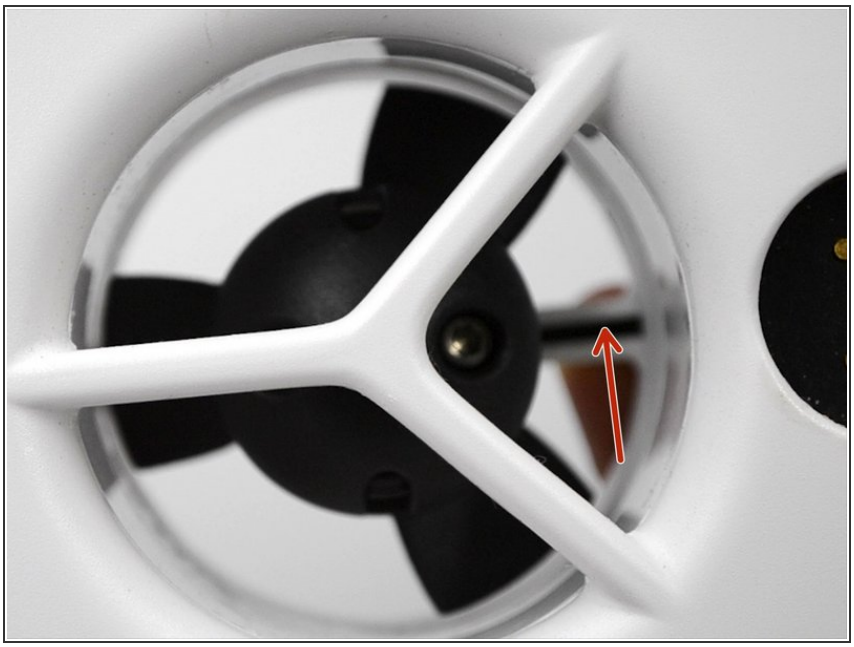
- Use **M2 5mm** screws.
- Tighten the first screw about halfway, then start the other screw.
- Fully tighten the screws by turning until they begin to get tight. Then give an additional quarter turn (90º).
- ⚠ Do not over-tighten screws. Doing so can result in damage to your Trident that would require a return to OpenROV to repair.
- Do a gentle wiggle test on the motor plug to make sure it is securely fastened.

Step 28 — Put vertical motor and motor cover in place on Trident



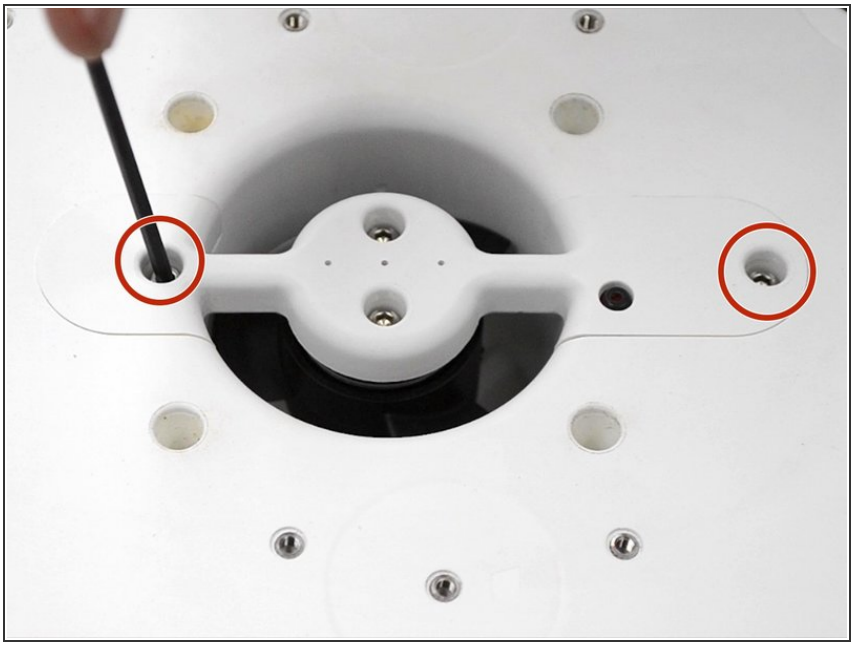
- Confirm that the vertical motor wires are still nested in the slot in the motor cover (see previous steps for details).
- Put the vertical motor cover in place, gently pressing to ensure the cover will sit flush with Trident's body.

Step 29 — Turn Trident over to check wire positioning



- Flip Trident over while holding the vertical motor cover in place, flush with Trident's body.
- Confirm again that the wires are running through the slot in the motor cover. Make sure they are not pinched.

Step 30 — Attach vertical motor cover to Trident



- Use **M3 6mm** screws.
- Turn screws until they begin to get tight. Then give an additional quarter turn (90º).

⚠ Do not over-tighten screws. Doing so can result in damage to your Trident that would require a return to OpenROV to repair.

- Do a wiggle test on the motor cover to make sure it is securely attached to Trident.

Step 31 — Reattach horizontal motor covers

- Use the **Phillips head screws** saved from disassembly.
- Match the tab on one side of the motor cover with the corresponding space on Trident's body. The covers will only fit properly when done correctly.
- Turn screws until they begin to become tight. Then give an additional quarter turn (90º).

⚠ Do not over-tighten screws. Doing so can result in damage to your Trident that would require a return to OpenROV to repair.

- Attach both horizontal motor covers.

Great job! Please allow 24 hours before diving so Loctite on propellers can fully cure. Contact support@openrov.com with any questions that arise.

Happy diving!