

Shortening MinnKota Riptide Trolling Motors Series 06

Problem:

Trolling motors are made with shafts that are too long for small boats like canoes.

The motor shown here is running too deep, causing a lot of extra drag when cruising. And motoring into shallow waters is impossible.

Solution:

Cut the motor shaft down to a good length for small boats.

Follow the instructions here to shorten the shaft without damaging the motor, electronics, or wires.



Raise the motor up until it is at the proper depth.

The motor cowl (that flat plastic piece just above the motor) should be about one inch below the water surface with the boat loaded and trimmed. It may need to be deeper if it hits the boat during tight turns.

Decide if you want to use the standard shaft clamp that is included with the motor. If you would like the motor control handle as low as possible, omit this clamp (raise it up out of the way.)



Mark the shaft for cutting.

With the motor adjusted to the desired running depth, the motor control handle will now be too high for comfortable use. The upper part of the shaft must be cut down to proper length.

Mark the shaft as shown.

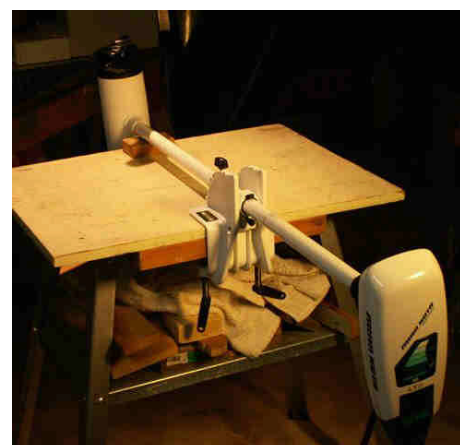
Here the shaft is being marked with the shaft clamp in place. If the clamp is not to be used, mark the shaft at the top of the motor mounting bracket.



Clamp the motor horizontally.

Bring the motor into the workshop and clamp it to a small worktable using the motor mount as a clamp.

Holding the motor horizontally like this prevents chips and other junk from getting down into the motor and causing trouble later.



Remove the screws to access the motor controller.

The plastic case should open without force once all screws are removed. There are six screws on this model.

Save the screws (and all other loose parts) in a safe place for later re-assembly.



Check out the electronics and wiring.

Draw a simple diagram showing what wires go to which terminals. This will be important for later assembly. Wire color is important as it shows polarity pos or neg.

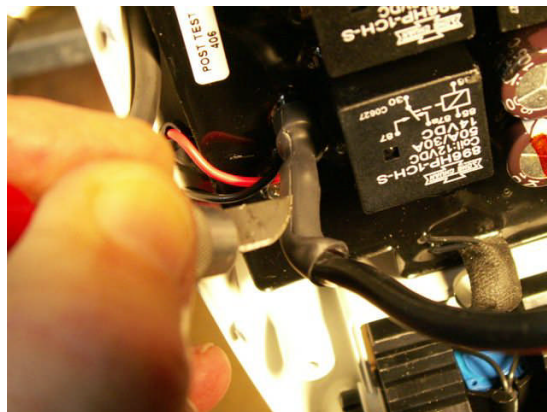
Note the smaller wires that go to the control handle. The electronics module and the handle should be removed as a unit. Do NOT cut these small wires.

A second set of wires goes to the battery "idiot lights" (if installed). Do not damage these wires.



Prepare big wires for removal.

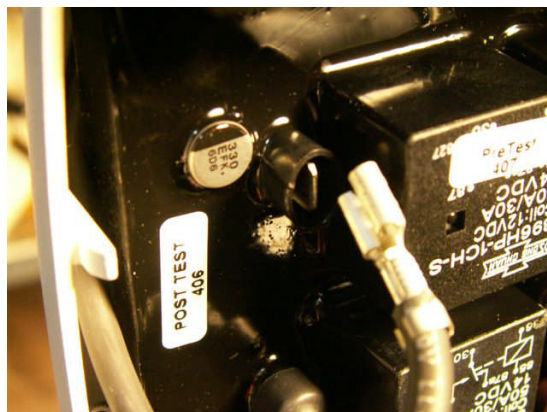
Use a knife to carefully slit the protective heat-shrink tubing covering the wire terminals.



Disconnect the big wires.

Underneath the heat-shrink tubing are standard "push-on" connectors.

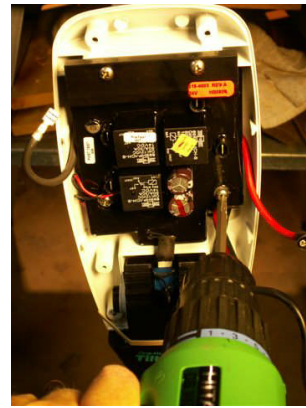
Pull straight up on the wire to remove the connector.



Unscrew the electronics module.

With the big wires disconnected, remove the screws (4) that hold the electronics module in place.

Note the rubber band holding the control handle. This prevents it from dangling and causing damage to the small wires.



Set aside the electronics assembly.

Carefully remove the electronics to avoid damage to the small connecting wires.

Save all screws and other small pieces in a safe place.

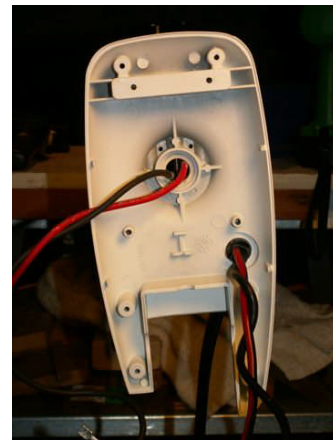


Base of motor controller should now be empty.

The base is made of cast aluminum.

The two big wires going down the shaft carry the power directly to the motor. There are no electronics at the motor.

The other two big wires bring the power from the battery. If they are to be replaced with longer or thicker wires, remove them now by pinching the plastic strain relief and pushing it out of the hole in the case.



Remove bottom of case from shaft.

The center screw goes through the shaft and has a nut on the other side. Unscrew it completely, and save the screw and nut.

The two screws on the sides hold an aluminum clamp piece that tightens on the shaft. Loosen the screws (they do not need to be fully removed) and remove the case from the shaft.



Cut connectors off motor wires.

The motor wires will be shortened in a later step.

Cut off the connectors so they don't get in the way in later steps. Discard the used connectors.

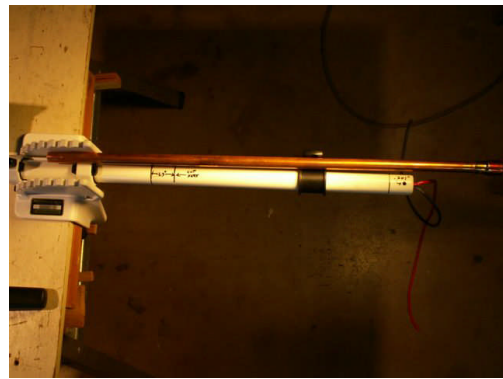


Prepare a guard tube to protect wires during cutting.

A simple "Guard Tube" can be made from a length of 1/2-inch copper plumbing pipe. An optional 1/2-to-3/4 connector soldered to one end keeps the tube from being inserted too far.

Measure the pipe as shown. It should extend 6 to 12 inches beyond where the cut is to be made.

Be sure to de-burr the pipe ends so the wires will not be damaged.

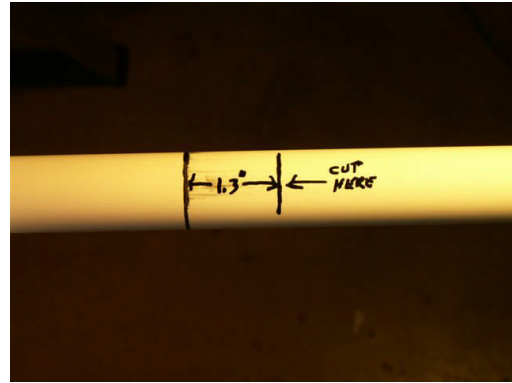


Measure where to make the cut.

The mark at the left on this drawing is the original mark made with the motor held at the proper depth. The motor is on the left (out of the picture).

An additional 1.3 inches (1-5/16") is needed for insertion into the base of the motor controller case.

The new mark is the site for the cut.



Insert wires through guard tube.

Start by straightening the wires and inserting them into the tube. A twisting motion helps feed in the wires.

If the wires stick in the guard tube, pull the tube completely off, then apply a thin coat of silicone (spray, etc.) on them. Try the insertion again.



Insert guard tube into motor shaft.

Continue to twist the guard tube while inserting it into the motor shaft. No force should be needed.

When complete, it should look like this photo.

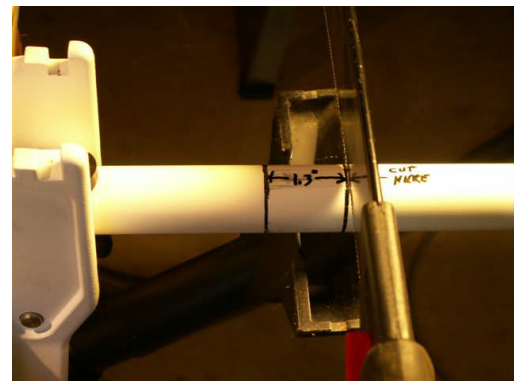


Cut the motor shaft.

CAUTION: Fiberglass dust is a lung and skin hazard. Cut slowly by hand to reduce dust, and use proper ventilation and protective equipment. Note the vacuum dust collector under the cutting area.

A carbide blade is best for cutting fiberglass, but a good hacksaw will do.

Rotate the motor and shaft to cut all around the guard tube.



Complete the cut.

Saw all the way around the shaft, then pull the cut apart about a half-inch.

Keep the vacuum on to collect any debris.



Blow air down the guard tube.

Blow shop air down the guard tube to expell any chips or dust out of the motor shaft. Keep the vacuum collector running during this step.

Then remove the guard tube and the cut-off portion of the motor shaft and set them aside.

The motor shaft is now cut to the correct length.



Modify the Motor Mount for Breakaway Action (Optional)

Skip to the next section if the motor mount is not to be modified.

Mark the teeth to be modified.

The picture shows the teeth marked to be cut or edge-filed for quick raising or lowering of the motor.

The motor will snap into place when raised or lowered fully.



Remove the Motor Mount.

Pull the motor and shaft out of the mount and set them aside. Cover the cut shaft end with cloth and rubber bands for protection.

If using a bandsaw to cut off the teeth, remove one transom clamp with an allen wrench as shown. Then the mount will lie flat on the bandsaw table.

If cutting the teeth off by hand, do not remove the transom clamp.



Using a bandsaw to cut the motor mount teeth.

Use a coarse blade suitable for cutting cast aluminum.

Both left and right teeth can be cut at one time using the method shown.



Clamp the motor mount for hand modification of teeth.

Clamp a 2x4 with a table vise as shown, then clamp the motor mount to the wood piece.

This provides a sturdy mount for hand cutting or filing of the teeth.



Sawing the teeth by hand.

If a bandsaw is not available, use this method to cut the teeth.

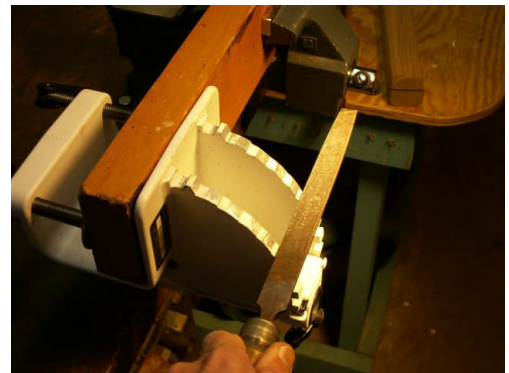
With the motor mount securely clamped, use a hack saw to remove the marked teeth.



File the rough-cut edges.

Use a good metal file or grinder to smooth off the rough edges of the saw cuts.

Also bevel the edges of selected teeth if a snap-and-lock action is desired at the full up or down positions. Be careful not to bevel too much off the tooth that keeps the motor locked down..

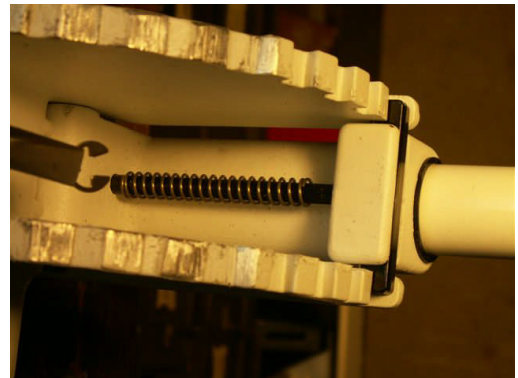


Remove the release latch for modification.

Pull off the retaining clip as shown to release the spring and "T-Bar" release latch.

Then pull the T-Bar out for modification.

Save the spring and other parts for re-assembly.

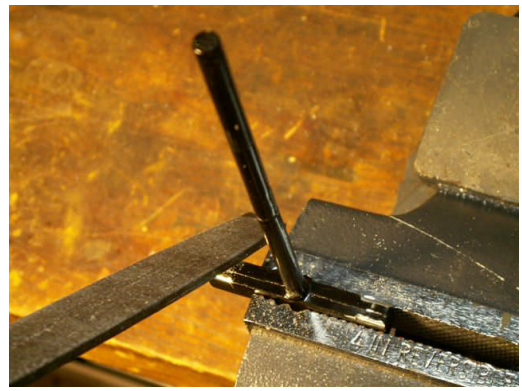


File the corners off the "T-Bar" release latch.

Clamp the T-Bar and round off the corners of the bar where it contacts the motor mount teeth.

Do not take off too much metal, just enough to allow a smooth action.

Then put the bar back into the mount and replace the spring and retaining clip.

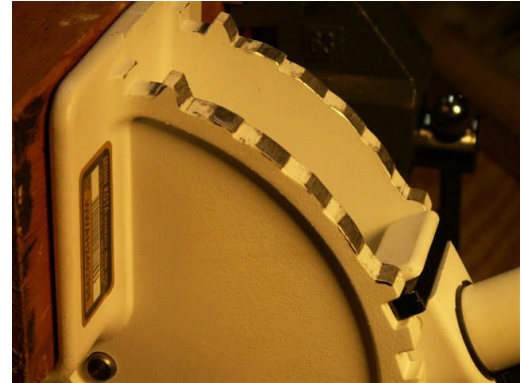


Check the motor mount for use.

Re-assemble the motor mount. Be sure to replace any small plastic bushings or parts at this point. Insert the cut-off piece of motor shaft into the mount.

Make sure the release latch works as desired. Check the release and catch action. Make any modifications before going to the next step.

When all is right, clamp the mount to the small work table as before and insert the motor shaft back into the mount.



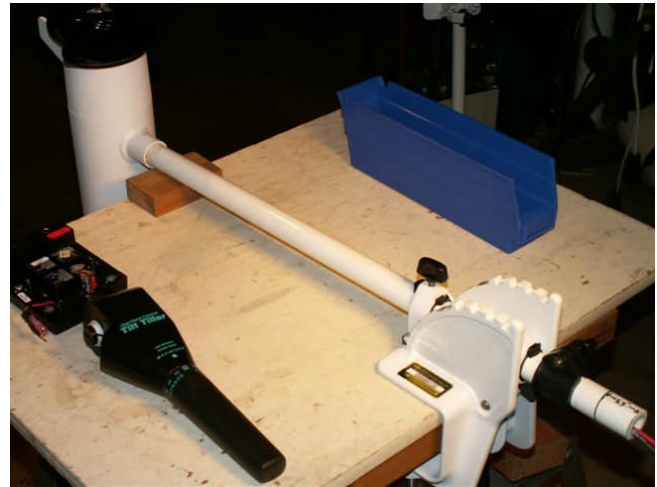
Modifying and Assembling the Shortened Motor Shaft

Prepare for re-attaching the motor control unit.

Note the small block of wood under the shaft to support the motor end.

Be sure the motor mount is fully assembled and all small parts are in place.

If the shaft clamp is to be used, insert it on the shaft now as shown.

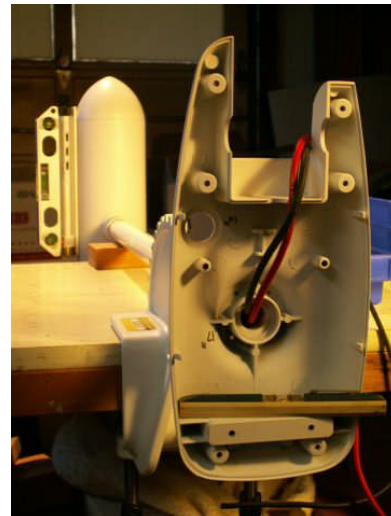


Replace and align the motor controller base.

Use a bubble level to align the motor with prop DOWN. Clamp it into position with the clamp screw on the motor mount.

Replace the aluminum motor controller base on the shortened shaft. Use a small level to align the base as shown.

When in proper alignment, tighten the two clamp screws on the bottom of the base. This will hold the base in position for drilling the shaft.

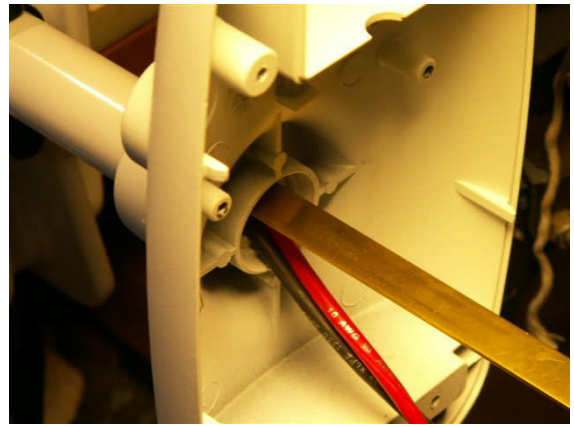


Drill first hole for shaft screw.

Be sure motor and the motor controller based are aligned and clamped.

Insert a thin metal piece (here a 1/2" brass piece) above the wires to protect them during drilling.

Using the center hole in the bottom of the aluminum base as a guide, drill a 0.201" hole through the top wall (only) of the shaft. Vacuum out any chips.



Drill second hole for shaft screw.

Loosen the motor mount clamp and rotate the motor and motor control base half a turn so the opposite side of the shaft is UP.

Move the metal wire protector so it is above the wires.

Drill a second 0.201" hole through the top shaft wall only. This hole will be aligned with the other drilled hole.

Note the vacuum nozzle removing any chips. Use the vacuum at the end of the shaft when removing the metal protector piece.



Replace the shaft screw.

Align the two big wires so that the screw goes between them and they are not pinched.

Then tighten the screw. Apply a drop of thread-lock if needed.

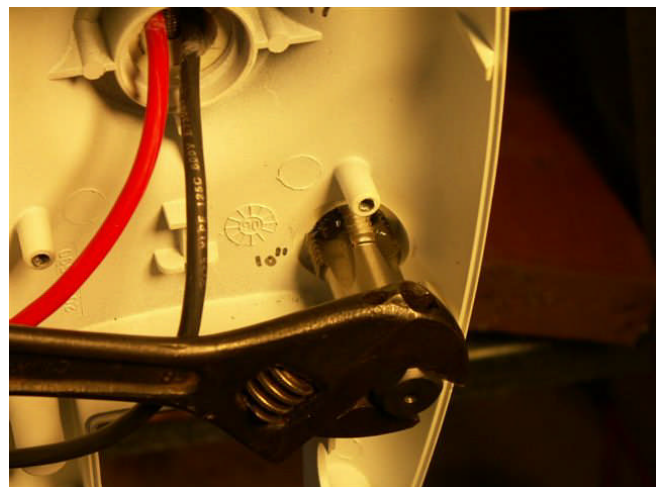
The mechanical modifications to the shaft are now complete.

Modifying and Assembling the Motor Controller

Upgrading the power wires.

If using the original wires, grip them in the plastic strain relief and press it into the mounting hole until it clicks into place.

To replace the wires with 8-ga marine cables, tap the mounting hole with a 1/2"-NPT thread (shown).



Clamp the Wires in place.

The 1/2" wire clamp is screwed into the motor controller base fully.

Note the heat-shrink tubing over the wires for extra strain relief.

Tighten the clamp to secure the power wires.



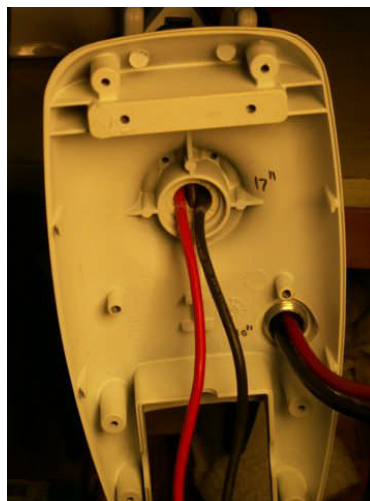
Prepare the wire ends and connectors.

Cut the motor wires 17" long.

Cut the power wires 10" long.

For best connection, crimp and solder 0.250" push-on female connectors to all four wires.

Protect the crimp and wire end with heat-shrink tubing.



Prepare for final wiring.

The motor wires should run under the electronics module as shown. Fasten the module with four screws.

Hold the handle assembly in place with a rubber band.

Slip lengths of 1/2" heat-shrink tubing over the wires.

Then push the connectors onto their respective terminals fully.

Connect a battery to the power wires and test the motor at this point. Be sure the motor turns in the right direction. Disconnect the battery.



Final wiring.

If the wire hookup is correct, slide the larger heat-shrink tubing down over the connections and carefully shrink them into position.

Bend and adjust the wires so they clear the plastic top of the motor control unit.



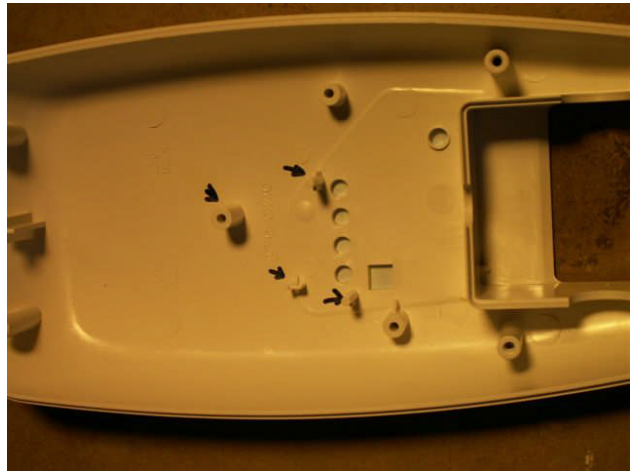
Replace the plastic top of the control unit.

If your motor does not have battery "idiot lights," if needed, cut off the plastic lugs shown here so that the lugs do not obstruct the new wires.

Be sure the small bent-metal piece that holds the tiller handle in place is in correctly. Remove the rubber band.

Carefully close the case, adjusting the wires if needed to prevent pinching.

Then replace all the case screws.



Fasten the cowl in place.

Now that the motor is shorter, you will need a cowl to prevent "motorboating" noise and prop splash.

Place the cowl against the shaft and insert one of the strap clamps. Tighten it loosely so the cowl can still be adjusted.

Adjust the cowl so that it is straight in line with the motor and 3/4" to 1" above the tip of the prop. Tighten the clamp.

insert the second strap clamp and tighten it. Do not overtighten! It is possible to strip the clamp threads!



The finished motor with shortened shaft

A 24-inch rule shows the motor size.

