

Terrova / RipTide Terrova

All Terrova & Riptide Terrova motors rely on a microprocessor based network serving as the communication link between the main control board and network accessories such as the foot pedal, AutoPilot compass control board, CoPilot receiver board, i-Pilot controller, and i-Pilot Link controller (if the motor is so equipped). Any failure in this communication link can cause problems for the Terrova motor. At power-up (power ON via power button on 2017 and later motors, when the motor is deployed for pre-2017 models) the microprocessor on the main control board checks for any network accessories (foot pedal, AutoPilot, CoPilot, i-Pilot, or i-Pilot Link) that could be connected to the main control board. If the microprocessor on the main board is getting an incorrect reading at this time, or if the AutoPilot, CoPilot, or i-Pilot network accessory is not properly connected, the microprocessor will not “recognize” the accessory and that accessory function will not be enabled. Also, if the microprocessor recognizes both an i-Pilot and a CoPilot network accessory it will ignore CoPilot. A faulty network accessory can also cause Terrova motor malfunctions due to network interference. When servicing Terrova motors (disassembling/removing/adding network accessories) power to the motor should be disconnected and/or the motor should be powered down (green system ready LED not lit).

We recommend having known good foot pedals (with and without Spot-Lock buttons on the pedal) to aid in troubleshooting. For i-Pilot and i-Pilot Link troubleshooting please refer to the chapters regarding those accessories.

Click on blue Case to jump to the linked discussion/resolution:

Case I. Motor is non-functional / all functions dead.

Case II. The motor runs at full speed when switched “ON” regardless of the speed setting. Motor will also run at full speed when the speed control is at “0” or “OFF”.

Case III. For Bluetooth enabled motors (2017 and later) with i-Pilot or i-Pilot Link installed - Motor runs (prop spins) when the motor is in the stowed position.

Case IV. System Ready LED is ON when the motor is stowed. (Pre-2017 models only.)

Case V. Terrova motor functions are intermittent / work erratically (sometimes they work and sometimes they don't).

Case VI. Motor does not steer right/left.

Case VII. Motor steers properly, but motor lower unit does not run.

Case VIII. AutoPilot is nonfunctional. (Liquid-filled compass models only, does not apply to AutoPilot derived from an i-Pilot accessory.)

Case IX. AutoPilot function is erratic and doesn't maintain a heading. (Liquid-filled compass models only, does not apply to AutoPilot derived from an i-Pilot accessory.)

Case X. AutoPilot turns itself off shortly after it is turned on.

Case XI. Motor does not stow/latch properly.

Case XII. The motor (lower unit) is loose while in the stowed position.

Case XIII. Terrova motor equipped with CoPilot, but CoPilot doesn't work.

Case XIV. The lift-assist spring on a 2017 or later model needs replacing.

(As of October 2020 all Lift Assist Housings will be black in color. A material change was implemented to improve impact resistance and reduce damage from misuse, the new material is not available in white. After careful review it was decided the benefit of the new material was worth the cosmetic change to the motor.)

Case XV. Customer complains that in rough water conditions the lift-assist raises the motor and disengages steering functionality. (The lift assist steering engagement dog loses contact with the steering housing output tube.) If motor has an i-Pilot system installed this situation may turn off Spot Lock.

Composite Shaft Replacement

Footpedal Cleaning Procedure

Terrova / RipTide Terrova

Case I. Motor is non-functional / all functions dead.

- Step 1.** A 2017 and later Terrova motor must be switched ON and deployed for full function (System Ready Light lit and the motor in a vertical position). 2016 and earlier motors are automatically powered ON when deployed. A 2017 and later i-Pilot or i-Pilot Link equipped motor will prevent steering or prop function when the motor is in the stowed position.
- Step 2.** Check to ensure proper voltage and polarity at battery. Inspect all battery connections, trolling motor plug (if installed), and any butt splice connections in battery leadwire for corrosion and security. Visually check to see that all wires are attached to the proper control board terminals. Consult the appropriate wiring diagram for the model and board being tested. The “Push-to-Test” battery meter can be used to verify polarity and voltage to the motor. Clean / rewire, if necessary.
- Step 3. (For 2017 and later motors)** Remove the center cover from over the control board, remove the screws that secure the battery meter and power button in the center cover to directly access the power button and verify that it is correctly installed.
- (For 2016 and earlier motors)** The “ON” function is controlled by the reed switch connected to the board and installed in the right side of the extrusion. A magnet in the release handle cover actuates the reed switch; confirm that the magnet is not staying too close to the reed switch by holding the release handle all the way down for a few seconds, if the system ready light comes on disassemble the release handle inspecting for any bent components.
- A.** Cut the two white leads going to the reed switch. If the system ready light comes on replace the reed switch using part number 2884050 reed switch repair kit and test motor for proper operation.
- Step 4.** Replace the control board.

Case II. The motor runs at full speed when switched “ON” regardless of the speed setting. Motor will also run at full speed when the speed control is at “0” or “OFF”.

Cause: This is an indication of a control board failure requiring replacement of the control board assembly. However, if the board was just replaced and the new board being tested is found to be running at full speed when switched “on”, the cause could be the inadvertent reversal of the black battery negative (B-) wire and the black motor negative (M-) wire. If these two wires are accidentally reversed when installing the new replacement board the motor will run at 100% (full power) when switched “on”. If this occurs, re-check the wiring by comparing it to the diagram included with the replacement control board. Correct any wiring mistakes and re-test the motor for proper operation.

Corrective Action: The corrective action for the motor running at full speed when switched “on” is replacement of the main control board assembly located in the foot pedal, base extrusion, or control box (depending on the model being repaired). Be sure to follow the wiring diagram and any special instructions for the board installation that are included with the replacement control board. Test run the motor to confirm proper operation.

Case III. For Bluetooth enabled motors (2017 and later) with i-Pilot or i-Pilot Link installed - Motor runs (prop spins) when the motor is in the stowed position.

Cause: When the Terrova motor is in the stowed position the propeller should be disabled. The prop spinning while the motor is stowed indicates a failure with the i-Pilot or i-Pilot Link controller (head assembly).

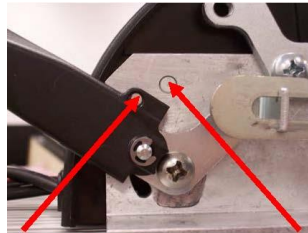
Corrective Action:

- Step 1.** Replace the i-Pilot or i-Pilot Controller (whichever accessory is installed on the Terrova).

Case IV. For pre-2017 motors only - System Ready LED is ON when the motor is stowed. (2017 and later Terrova models allow for the motor to be switched ON when stowed.)

- Step 1.** Ensure the release handle is fully latched and locked into the stowed position.
- Step 2.** Check to ensure the system ready reed switch (small plastic cylinder with two wires going to control board) is positioned in the side of the base extrusion. (Remove the right sideplate for viewing.) (see **Picture 1, below**)
- Step 3.** Inspect the release handle cover, p/n 2320215, for the presence of the magnet. Replace handle cover if magnet is missing.
- Step 4.** If the reed switch and magnet are in place, but system ready LED remains lit when the motor is stowed, the reed switch is faulty. You can verify this by bypassing the reed switch (cut off the reed switch and connect the wires together). If the reed switch is determined to be faulty, replace the reed switch with Minn Kota p/n 2884050.

Picture 1



This illustration shows the magnet in the handle cover and the system ready reed switch located in the extrusion. When the handle is in the “deployed” position (magnet away from reed switch) the system ready light will be on.

Case V. Terrova motor functions are intermittent / work erratically (sometimes they work and sometimes they don’t).

- Step 1.** Check all network accessory plug connections (foot pedal, AutoPilot, and/or CoPilot – depending on how motor is equipped) for security and full engagement of the male/female plug ends. Examine the plug pins and sleeves. Pins should be straight and neither pins nor sleeves should show signs of corrosion. **NOTE:** Be sure to disconnect power to motor (or stow motor to interrupt power) when disconnecting and reconnecting network accessory plugs. Reconnect power (or deploy motor) after connecting, or changing network accessories.
- Step 2.** Test network accessories one at a time to determine which component may be faulty.
- A.** Disconnect power to motor or, if it is a 2017 or later model, switch it OFF to disable / turn off the system ready LED. Disconnect the network accessories from the main control board (foot pedal, AutoPilot, and CoPilot – if motor is so equipped). (see **Picture 3, page 5**) Connect known good (test) foot pedal and reconnect power or deploy motor to enable / turn on the system ready LED. Test for proper operation.
 - A-1.** If motor fails to function properly, main control board is faulty and needs to be replaced.
 - A-2.** If motor works properly with test pedal, proceed to **Step 2B**.
 - B.** Disconnect power to motor or switch it OFF to disable / turn off the system ready LED. Disconnect test pedal and connect customer’s pedal to motor. Reconnect power or deploy motor and retest for proper operation.
 - B-1.** If motor now malfunctions with customer foot pedal, pedal is faulty and needs to be replaced, but first check for foreign debris per the Foot Pedal Cleaning Procedure at the end of this chapter.
 - B-2.** If motor functions check okay, suspect a faulty network accessory (AutoPilot or CoPilot depending on how motor is equipped). Proceed to **Step 2C**.
 - C.** Disconnect power to motor or switch motor OFF to disable / turn off the system ready LED. If the motor is AutoPilot equipped (see **Case VIII on page 4** to determine or confirm that motor is AutoPilot equipped), connect the AutoPilot network accessory plug to the network plug from the main control board. (**NOTE:** If there are two network plug leads from the main control board they are common / either lead can be connected to AP or CoPilot accessory.) Reconnect power or deploy motor to enable / turn on the system ready LED and test motor for proper operation.
 - C-1.** If motor AutoPilot functions do not operate, go to **Case VIII on page 4** pertaining to AutoPilot malfunction.
 - C-2.** If some other motor function now fails to operate suspect network interference from a faulty AutoPilot network accessory. Replace AutoPilot compass control board and retest.
 - C-3.** If motor functions properly and it is CoPilot equipped, proceed to **Step 2D**.

- D.** Disconnect power to motor or switch motor OFF to disable / turn off the system ready LED. Connect the CoPilot network accessory to the network plug from the main control board, if motor is so equipped. Reconnect power or switch motor ON to enable / turn on the system ready LED and test motor for proper operation with foot pedal.
 - D-1.** If motor now fails to respond to foot pedal commands or malfunctions in some other way, the CoPilot receiver board is causing network interference and needs to be replaced.
 - D-2.** If motor functions properly with foot pedal but fails to function or respond to the remote transmitter see **Case VI** on **page 3**.

Case VI. Motor does not steer right/left.

Step 1. Check motor with known good test foot pedal.

- A.** If test pedal properly steers motor:
 - A-1.** On the customer's pedal: inspect actuators on underside of foot pedal for sand/dirt/grit. See **page 11** for *Foot Pedal Cleaning Procedure*. Disassemble and remove debris while also inspecting for missing magnets. The Terrova foot pedal needs to be cleaned periodically. Stones, twigs, sand, and other debris can cause pedal buttons to stick and function abnormally. Re-assemble pedal and re-test steering of motor.
 - A-2.** If cleaning the customer's pedal doesn't correct steering, replace foot pedal, if necessary.
- B.** If test pedal does not properly steer motor, check the drive housing.
 - B-1.** Terrova/ST motors use drive housings that are specific to the voltage of the motor. For example, a Terrova 55/ST 55 uses a 12-volt drive housing, a Terrova 80/ST 80 uses a 24-volt drive housing, and a Terrova 101 & Terrova 112/ST 101 & ST 112 use a 36-volt drive housing. To properly test the drive housing apply the voltage appropriate for the model directly to the drive housing leads while observing the drive housing amp draw. The amp draw under bench test, no load, conditions should be less than 2 amps for a 12-volt drive housing, and less than 1.5 amps for 24-volt and 36-volt drive housings. (**NOTE:** Reverse the polarity at the drive housing leads to check amp draw in both clockwise and counterclockwise rotation.) If the drive housing amp draw exceeds the values listed (2 amps for 12-volt drive housings or 1.5 amps for 24-or 36-volt drive housings) suspect that the drive housing has taken out the steering circuit on the main control board. (**NOTE:** When this has occurred the drive housing must be repaired or replaced prior to replacing the main board. If the higher than normal amp draw of the drive housing is not corrected the steering circuit on the new/replacement main control board will also fail.)
 - B-2.** To repair the drive housing open the drive housing case by removing the six screws on the underside of the drive housing, separate the case halves, and inspect the steering motor, drive gears, and bearings/bushings for binding, rust/corrosion, or lack of lubrication. We have seen instances where the black, molybde grease "migrates" into the steering motor contaminating the motor brushes and commutator causing intermittent high amp draw. (If the grease is green/blue this should not be an issue.) If you notice the black grease, please clean out as much of the grease as possible, replace the steering motor, and re-lube the steering housing with the recommended Bel Ray grease (p/n 3397709). If the sealed bearings on the output shaft are dry, rough, binding, or rusty replace them with p/n 2327308. (**NOTE:** Current production Riptide Terrova drive housings use bushings in place of bearings on the output shaft.)
 - B-3.** After servicing the drive housing to correct any malfunction, retest the drive housing amp draw. Only after verifying that the amp draw of the repaired drive housing falls within the values indicated in **Step 1, B-1** should the drive housing be connected to the main control board and tested for steering function. If steering function does not operate in one or both directions the steering circuit of the main control board has failed (or been damaged by the drive housing) and needs to be replaced. See the following information on main board replacement.

Case VII. Motor steers properly, but motor lower unit does not run.

- Step 1.** Check for proper voltage and polarity *at the control board input terminals*. Visually check to see that all wires are attached to proper control board terminals. Consult appropriate wiring diagram for the model and board being tested. Check for corroded connections. Clean/rewire properly, if necessary.
- Step 2.** Check motor with known good test foot pedal.
- A. If test pedal properly controls all motor functions the original foot pedal is faulty. Replace foot pedal.
 - B. If motor lower unit does not run properly with test pedal proceed to **Step 3**.
- Step 3.** Check to see if lower unit runs properly.
- A. Connect 12 volts directly to the red and black brush leads at the top of the motor shaft (in the control box). The motor should run. If not, a problem exists in the lower unit. Check the lower unit for voltage at the brushes, water in the lower unit, worn brushes, or an open or shorted armature. Repair as necessary. If the motor operates properly, proceed to **Step 4**.
- Step 4.** If **Steps 1, 2, and 3** test okay, the main control board is faulty and needs to be replaced.

Case VIII. AutoPilot is nonfunctional. (Liquid-filled compass models only, does not apply to AutoPilot derived from an i-Pilot accessory.)

Step 1. Determine if the motor is AutoPilot equipped. Not all Terrova motors are AutoPilot models, but all Terrova motors (whether they have AutoPilot or not) share the same foot pedal, CoPilot remote, and main control boards (12-v or 24/36-v). This means that all Terrova motors have an AutoPilot button on the foot pedal and CoPilot remote, as well as an AutoPilot red LED on the motor base, but unless it has the AutoPilot compass control board (network accessory) installed in the control box at the top of the shaft it is not AutoPilot equipped.

NOTE: i-Pilot and i-Pilot Link motors do add AutoPilot function; for troubleshooting autopilot issues on i-Pilot and i-Pilot Link equipped motors please reference the i-Pilot and i-Pilot Link repair manual chapters.

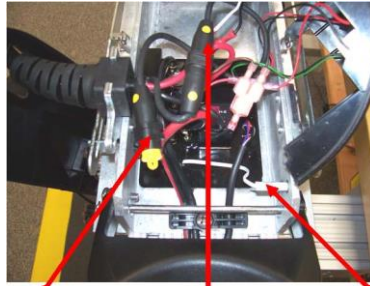
- A. All 2016 and earlier Terrova motors that leave the factory with the AutoPilot feature installed will indicate this on the control box cover decal. (see **Picture 2**) All Terrova motors made after 2009 will indicate their model information on the serial number decal, this will be the best indicator on 2017 and Later motors.

Picture 2



- B. Because all Terrova motors are AutoPilot capable (with the addition of the AutoPilot compass control board to the network), a Terrova motor that originally left the factory as a non-AutoPilot model can be converted to AutoPilot at a later date. (AutoPilot accessory is being sold as a marine accessory “upgrade kit”.) A Terrova motor converted to AutoPilot would not have the AutoPilot icon on the cover decal. To determine if the motor is AutoPilot equipped, remove the control box cover to see if an AutoPilot compass control board is installed.
- Step 2.** Test with known good foot pedal. If AP button on test pedal works correctly then inspect the customer’s pedal per the Foot Pedal Cleaning Instructions at the end of this chapter, replace foot pedal if necessary.
- Step 3.** If it was determined in **Step 1A** or **1B** that the motor is AutoPilot equipped check to ensure that the network accessory plugs for the AutoPilot compass control board (in the control box at the top of the motor shaft) and at the main control board (on the motor base plate) are clean, show no signs of corrosion, have no bent pins, and are fully engaged and properly seated together. (see **Pictures 3 & 4**)
- Step 4.** Reconnect motor to power and/or deploy motor to turn on the system ready LED (this allows the main board microprocessor to “recognize” the AutoPilot network accessory). Check for AutoPilot function. If AutoPilot still fails to operate then replace the AutoPilot compass control board assembly.
- NOTE:** The compass may not work when it is not covered as the optical sensors can be overloaded by sunlight or bright fluorescent lighting.

Picture 3



not being used connected to AutoPilot network plug system ready reed switch

(In 2014 some control boards may only have 1 network cable plug.) **This picture is showing 2 network cables coming off control board. In this case, one is connected to the compass board network plug and the other is not being used. (No CoPilot attached, so yellow cap still on plug.)** NOTE: if there are 2 network plug leads from the main control board they are common / either lead can be connected to either accessory.

Picture 4



AutoPilot network plug

This picture is showing the control box with AutoPilot Compass Control board and network cable plugs.

Case IX. AutoPilot function is erratic and doesn't maintain a heading. (Liquid-filled compass models only, does not apply to AutoPilot derived from an i-Pilot accessory)

- Step 1.** Make sure motor is mounted within 5 degrees of level (the compass card with the graduated markings must be floating level) and there are no ferrous metal objects near the motor that may be affecting the compass (including screws/nuts). While maintaining a level compass, spin the control box and observe the compass card. The card should remain stationary (i.e. card should not have lost its system ready north reference) as the control box is turned. If the compass card sticks or “hangs up” it is faulty, and the compass assembly needs to be replaced.
- A.** Inspect oil level in compass capsule looking for a leaky capsule. NOTE: Examine the red compass grommets. If the compass has leaked fluid the grommets will be swollen almost double their normal size.
 - B.** If any sign of compass fluid leakage is evident, replace the compass control board assembly.
- Step 2.** Check motor for excessive vibration. Inspect propeller and propeller shaft for damage. (Excessive vibration can cause the AutoPilot compass to oscillate causing erratic operation.)
- Step 3.** Check for proper voltage to motor while motor is under load. AutoPilot steering is susceptible to erratic operation in low voltage situations. (Use wire of adequate gauge in boat or for any leadwire extension to avoid voltage drop / low voltage to the motor. Also check for an inadequate or a corroded battery leadwire plug / plug receptacle.) Correct any low voltage issues and retest.
- Step 4.** If the complaint is that the motor steers a few degrees while the motor speed is being adjusted (small direction changes with speed changes are normal), you can twist the red and black motor leads in the control box a few times to minimize the magnetic field around these wires that may be affecting the compass.
- Step 5** If in previous steps no problems were noted, but AutoPilot still does not function properly then replace the compass control board assembly.

Case X. AutoPilot turns itself off shortly after it is turned on.

Step 1. Suspect corroded bearings in the drive housing that may be causing the steering motor to draw excess amperage. Open the drive housing for inspection and repair/replace, as necessary.

NOTE: The AutoPilot is designed to shut off after approximately 6 seconds of continuous steering in one direction. (This is so the coil cord will not wrap around the shaft of the motor. Actual “on-the-water” use should never result in continuous steering in one direction.)

Case XI. Motor does not stow/latch properly.

NOTE: On 2017 and later models the handle presses straight down to release the motor into the deployed position. On pre-2017 models the handle had to be pressed in and then down to deploy the motor.

- Step 1.** Try stowing the motor in the opposite direction. (Propeller to the port or starboard side.) If this corrects the issue then the bung on the lower unit may have been welded a little offset to one side. You will need to replace the shaft and lower unit assembly to correct this issue.
- Step 2.** Lubricate the composite shaft with a silicone spray or Armor All®.
- Step 3.** Ensure there is no debris under the steering housing that is restricting the pivot travel of the stowed steering housing.
- Step 4.** Inspect release handle and verify that it is not bent or otherwise damaged. On pre-2017 models inspect the handle follower pin. Remove the follower pin and inspect; if it is bent you should assume the handle is also bent. This condition is usually from forcing the handle down (or stepping on the release handle) rather than pushing in and then down.
- Step 5.** Inspect the motor ramps. Move ramps through an arc between the stowed and deployed positions, watching for straight travel. Replace parts, as necessary.
- Step 6.** Check the release arms (both left and right) to ensure they are flat. They should run parallel with the base extrusion. Replace arms, if needed.

Case XII. The motor (lower unit) is loose while in the stowed position.

Step 1. If the lower unit movement is forward and back as indicated by the arrows in **Picture 5** or a range of twisting movement as indicated in **Picture 6** then install shim kit p/n 2881721. (instructions are included with shim kit)

Picture 5



Picture 6



Case XIII. Terrova motor equipped with CoPilot, but CoPilot doesn't work.

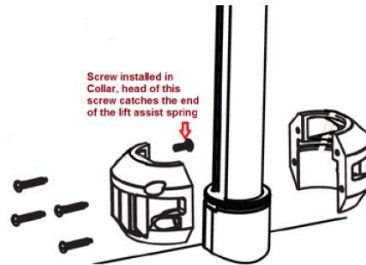
- Step 1.** Remove right motor sideplate and inspect network connection from CoPilot receiver board to main control board. Check to ensure that the plug pins are not bent and that the plug connection is fully engaged and properly seated.
- NOTE:** When fully engaged, no yellow space will be seen between the plug ends and the plug connection will “snap” twice as they are pushed together. Reconnect power to motor or switch motor ON to turn on the system ready LED and enable the system. Test for motor function using CoPilot remote transmitter. If motor does not function proceed to **Step 2**.
- Step 2.** Test motor with known good corded foot pedal. If motor functions properly with test pedal, the CoPilot remote transmitter may be faulty. Disassemble the transmitter to check battery voltage (battery is 3-volt lithium coin cell). Replace battery if voltage is low. Inspect the gold plated switch contacts on the transmitter circuit board for corrosion. If any corrosion is noted, replace the transmitter. Clean the conductive rubber contacts on the transmitter switch pads with rubbing alcohol. Reassemble and retest.
- A.** If motor still does not respond to the remote transmitter try “relearning” the receiver to the transmitter.
 - B.** If motor still does not respond, then reprogram/relearn the receiver to a known good remote transmitter.
 - C.** If the CoPilot responds properly, the customer’s transmitter is faulty and needs to be replaced.
 - D.** If, after “learning” or programming the receiver to the “test” transmitter it still does not function, the CoPilot receiver board is faulty and needs to be replaced.

Case XIV. The lift-assist spring on 2017 or later model needs replacing.

NOTE: These instructions assume the motor is disconnected from its power source and that the control box cover and control box have been removed from the upper end of the shaft.

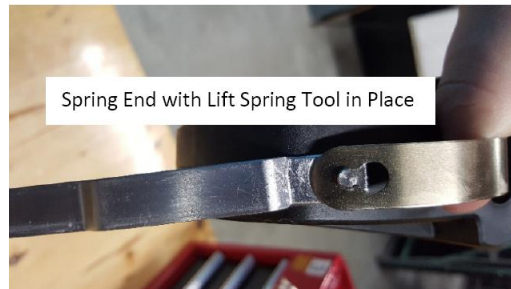
Step 1. Place the motor in the stowed position. This limits the distance the spring will travel and the damage it can cause if you would happen to lose control of it.

Step 2. With one hand, maintain pressure on the two collar halves so they do not release when the four screws holding the collar together are removed. Remove the four screws that hold the collar halves together.



Step 3. Gently allow the collar halves to separate and allow the back collar half (the part that is connected to the lift spring) to retract until it is resting against the bottom edge of the steering housing.

Step 4. Deploy the motor. Pull the spring out 6-8 inches, firmly grasp the spring, remove the lower collar from the spring by pushing it up until the screw head moves from the narrow portion of the keyhole slot to the open area. Then disconnect the spring from the screw/collar, and attach your lift spring assembly tool (p/n 2888800) to the spring by positioning the post of the tool into the keyhole slot. **NOTE:** The tool will install from the side of the spring assembly opposite from the side the collar was attached. The raised/offset portion of the tool will be oriented away from the shaft when properly attached.



Step 5. Position the tool flat against the flat side of the Terrova Shaft. If the tool was installed correctly, the post of the tool will be facing out with the flat surface of the tool against the shaft.

Step 6. Allow the tool to slide up through the steering housing until there is no pressure on it.



Step 7. Support the motor's lower unit (if it is not contacting the floor) then remove the depth collar. Note the orientation of the collar for proper reassembly later (the steering "drive" portion of the depth collar goes down against the mating "drive" of the Lift Assist Spring Assembly).

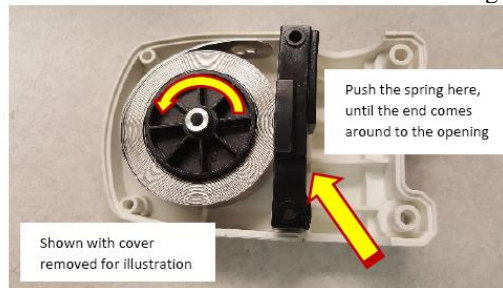


Step 8. Slide the Lift Assist Spring Assembly and the tool up and then off of the shaft.



Step 9. Prepare the replacement Lift Assist Spring Assembly: The spring usually has 3-4 inches of spring extending from the housing, but due to vibration when shipping it may be fully retracted inside the housing. If it is fully retracted you will need to gain access to the spring by reaching into the shaft opening from the bottom end and pushing upward on the spring assembly until the end comes around to the opening. Once the end is at the opening it will be possible to use the lift spring assembly tool (or a hook-shaped pick tool) to hook the end of the spring and pull it out of the housing.

(As of October 2020 all Lift Assist Housings will be black in color. A material change was implemented to improve impact resistance and reduce damage from misuse, the new material is not available in white. After careful review it was decided the benefit of the new material was worth the cosmetic change to the motor.)



Step 9. Attach the lift spring tool to the end of the replacement Lift Assist Spring Assembly per the following picture. **NOTE:** As you position the tool and lift spring housing to slide them onto the shaft, do not allow the tool to be retracted completely into the lift spring housing or there may be a clearance issue when sliding the complete assembly on the shaft and then the tool and spring down through the steering housing in the following steps.



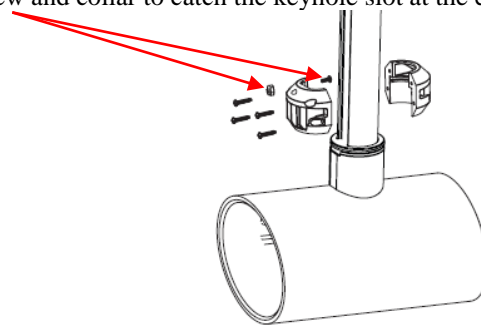
Step 10. Place the handle end of the tool against the flat side of the Terrova Shaft with the raised portion/offset oriented away from the shaft.



Step 11. Slide the tool down the shaft, keeping it tight to the shaft and guiding the tool through the steering housing. As the top of the tool reaches the top of the shaft, guide the lift spring housing onto the flat of the motor shaft.



Step 12. Prepare the lower collar: Install the machine screw through the rear collar and into the nyloc nut. Verify that the screw in the inside diameter of the back half of the lower collar is installed with nyloc nut and that there is enough of a gap between the screw and collar to catch the keyhole slot at the end of the spring assembly in the next step.

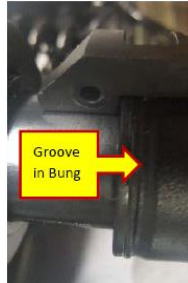


Step 13. Pull the handle of the lift spring tool down toward the lower unit until 4-5 inches of the lift spring is extended beyond the bottom of the steering housing. Firmly grasp the lift spring, remove the lift spring tool from the end of the lift spring, and attach the back half of the lower collar to the end of the lift spring. Use a #2 Phillips Screwdriver to tighten the machine screw that passes through the keyhole slot in the lift spring, through the rear collar, then into the nyloc nut.



Step 14. Allow the back collar half to rest against the bottom of the steering housing. Stow the motor.

Step 15. With the motor stowed, place the front collar half against the motor bung so that the raised detail on the inside diameter of the collar is in the groove of the motor bung (groove is located at the top of the bung, just below the plastic bung cap).



Step 16. Pull the back collar half and spring down from the steering housing and place the collar half on the motor bung so it aligns with the front collar half. Install and tighten the four screws that secure the lower collar in place.



Step 17. Complete the installation by reinstalling the depth collar, control box, and control box cover.

Case XV. Customer complains that in rough water conditions the lift-assist raises the motor and disengages steering functionality. (The lift assist steering engagement dog loses contact with the steering housing output tube.) If motor has an i-Pilot system installed this situation may turn off Spot Lock.

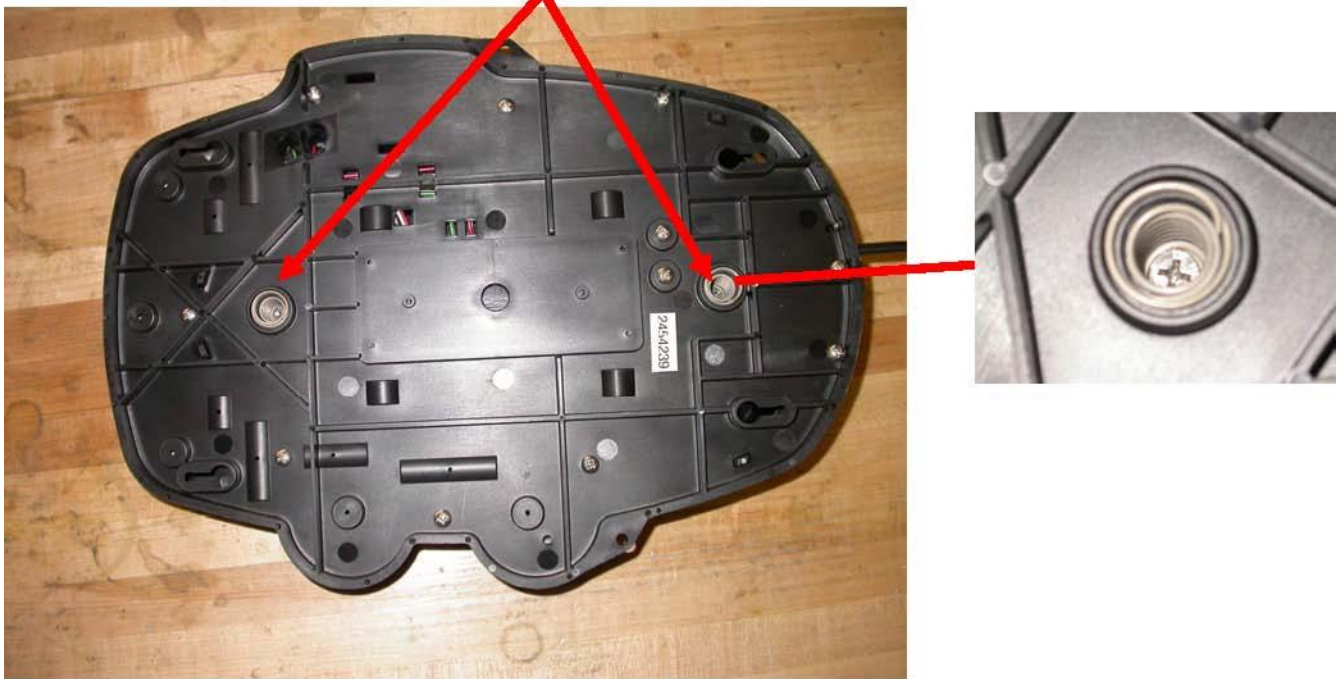
Step 1. Replace lift assist assembly.

Composite Shaft Replacement

The Terrova or Riptide Terrova shaft is not a replaceable item like most other Minn Kota motors. The shaft is bonded into the center section with magnets. (Most other models utilize threaded shafts and are adhered with LocTite®.) Terrova and Riptide Terrova shafts are available as a shaft and center section assembly or a shaft and complete lower unit assembly. Consult the appropriate parts list for part numbers.

Foot Pedal Cleaning Procedure

Step 1. Turn the foot pedal upside down and remove the two screws shown with a #2 Phillips screwdriver.



Step 2. Flip foot pedal over and lift heel/toe pedal off.



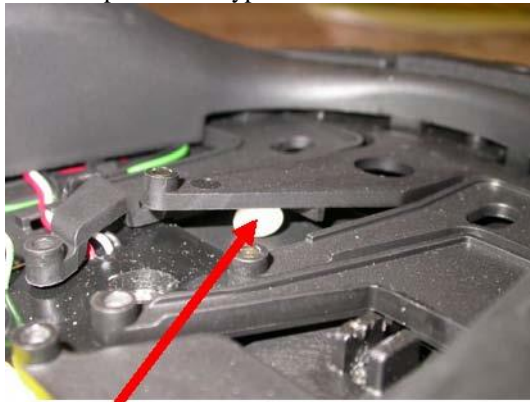
Step 3. Check for rocks, twigs, sand, or other debris that may be lodged under buttons or button arms. The foot pedal is water proof and can be sprayed off or submerged in water to remove any foreign objects such as sand and rocks.



Check for debris stuck between buttons and pedal cover

Check for debris under button arms

Below are pictures of typical locations debris can reside which may cause undesirable foot pedal operation



Rock stuck under button arm.



Rock stuck between button and cover.

Step 4. Once the foot pedal is clean the heel/toe pedal can be reinstalled with the original springs and Phillips screws.