MINN KOTA®

SERVICE PROVIDER REPAIR MANUAL

QUEST SERIES MOTOR REPAIR

ULTREX QUEST 2023-PRESENT
ULTERRA QUEST 2023-PRESENT
RIPTIDE INSTINCT QUEST 2023-PRESENT
TERROVA QUEST 2023-PRESENT
RIPTIDE TERROVA QUEST 2023-PRESENT

REVISED 13 February 2025

NOTICES, CAUTIONS, AND WARNINGS

Minn Kota has over 1000 Authorized Service Providers, equipped to properly repair your Minn Kota Product. Repairs completed by Authorized Service Providers receive a 90-day warranty which covers the parts and labor of the necessary repair if the paid repair fails. Purchased parts have no warranty and cannot be returned. For additional details on Minn Kota parts warranty, see https://minnkota.johnsonoutdoors.com/us/support/warranty.
Johnson Outdoors Marine Electronics, Inc. disclaims all warranties, express and implied, except for those set forth at the above link.

NOTICE: You should only use this guide if:

1. The motor has no factory warranty. Improperly performing many of the operations suggested in this guide may void any remaining factory warranty on your Minn Kota product. If the product is within the factory warranty, the product should be delivered to an Authorized Service Provider for Repairs.
2. You have verified correct voltage and amperage to the product. This means more than just checking voltage. The deep cycle batteries must have been load tested and all connections must have been inspected and are clean and tight. Bad deep cycle batteries or loose or corroded connections may not prevent a voltmeter from obtaining a correct reading and those conditions may prevent your Minn Kota product working properly.
3. You have a complete understanding of and access to the necessary tools including a VOM/Volt Ohm Meter/Multi-meter, an Amp Meter capable of approximately 0.1-amp accuracy and reading up to 60 amps DC, and basic hand tools.

⚠ WARNING!

ALWAYS WEAR SAFETY GLASSES AND GLOVES. DISCONNECT ALL POWER TO THE MINN KOTA PRODUCT BEFORE BEGINNING AND WORK OR MAINTENANCE. JOHNSON OUTDOORS MARINE ELECTRONICS, INC. IS NOT RESPONSIBLE FOR ANY DAMAGE DUE TO IMPROPER RIGGING OR INSTALLATION. IF YOU DO NOT HAVE THE SKILLS, EXPERIENCE, AND TOOLS TO PERFORM THE LISTED OPERATIONS, SEEK THE HELP OF A MINN KOTA AUTHORIZED SERVICE PROVIDER.

⚠ CAUTION!

READ ALL PRODUCT MANUALS, SERVICE INSTRUCTIONS AND WARNINGS CAREFULLY BEFORE BEGINNING AND DETERMINE WHETHER OR NOT YOU UNDERSTAND AND ARE PREPARED TO COMPLETE THE OPERATION. MINN KOTA TECHNICAL SUPPORT STAFF ARE NOT ABLE TO ASSIST BEYOND THE INCLUDED INSTRUCTIONS. ATTEMPTING THESE REPAIRS AND THEN TAKING THE PRODUCT TO AN AUTHORIZED SERVICE PROVIDER MAY RESULT IN ADDITIONAL TIME FOR THEM TO DIAGNOSE AND REPAIR DISASSEMBLED PRODUCTS (WHICH WILL INCREASE THE COST OF REPAIRS).

Minn Kota and Cannon Parts available at https://motors.johnsonoutdoors.com.

Buy Parts Online

MOTOR SPECIFICATIONS

ULTREX QUEST

MOTOR TYPE

Freshwater, Hybrid Cable/Electric Steer
Brushless Lower Unit

OPERATING VOLTAGE

Nominal 24 or 36 Volts
Below 18 Volts will issue Low Voltage Error (1.2)
Above 48 Volts will issue High Voltage Error (1.1)

THRUST

90 Pounds of Thrust at ~24V
115 Pounds of Thrust at ~36V

SHAFT LENGTHS

45”, 54”, 60”

NOTICE

IF THE MOTOR IS NOT ON THE MOTOR RESTS WHEN STOWED THE MOTOR WILL BE DAMAGED EVENTUALLY. 60” MOTORS REQUIRE READJUSTING THE DEPTH SETTING IF BEING OPERATED NEAR FULL DEPTH.

NOTICE

SHAFT LENGTH CHANGES ARE MOSTLY IMPRACTICLE. IT IS NOT POSSIBLE TO CHANGE THE LENGTH THE MOTOR COMMUNICATION WIRE AND SONAR CABLE, SO MOST SHAFT LENGTH CHANGES ARE BEST ACCOMPLISHED WITH A NEW LOWER UNIT ASSEMBLY DUE TO LACK OF SPACE IN THE CONTROL BOX OR INABILITY TO LENGTHEN THESE CABLES TO REACH THE CONTROL BOX. CHANGING TO A SHAFT LENGTH LESS THAN 45” OR MORE THAN 60” VOIDS ALL WARRANTIES ON THE MOTOR.

CONTROL

Built in foot pedal assembly.

- Cables are different from non-Quest Ultrex
- Cables do not cross in cable Jacket (left is left at the foot pedal and at the Steering Housing)

Included Micro Remote (MR).

Compatible with the One Boat Network App.

- Full Controls and Updates using an Android or iOS Device.

Compatible with the “full” Advanced GPS Wireless Remote (WR) (Purchased Seperately)

BUILT IN SONAR OPTIONS

DSC (Dual Spectrum Chirp)(Humminbird Transducer, works with other brands via adapter cable)

MSI (Mega Side Imaging)(Exclusively works with Humminbird)

SCAN OR CLICK FOR DSC COMPATIBILITY PAGE

PROPELLER

Description	Service Part #	Accessory Item #
MKP-39 Weedless Prop	1378162	1865039
MKP-40 Power Prop	1378171	1865040

Both Propellers are included with Ultrex Quest.

CRITICAL TORQUE VALUES

Component	Torque in-lbs	Torque Nm	Bit
Phase Leads to Invertor Board	15	1.7	T20 or #2 Phillips/7mm Socket
Power Leads to Inverter Board	15	1.7	T20 or #2 Phillips/7mm Socket
Strain Relief to Motor	30	3.4	T25
Strain Relief Top Cast	18	2.0	#2 Phillips
Sonar/Plain End to Motor	30	3.4	T25
Clamp Plate/Motor Shaft Seal	40	4.5	4mm Hex
Control Board Power Lugs	15	1.7	3mm Hex
Control Board Motor Lugs	15	1.7	3mm Hex

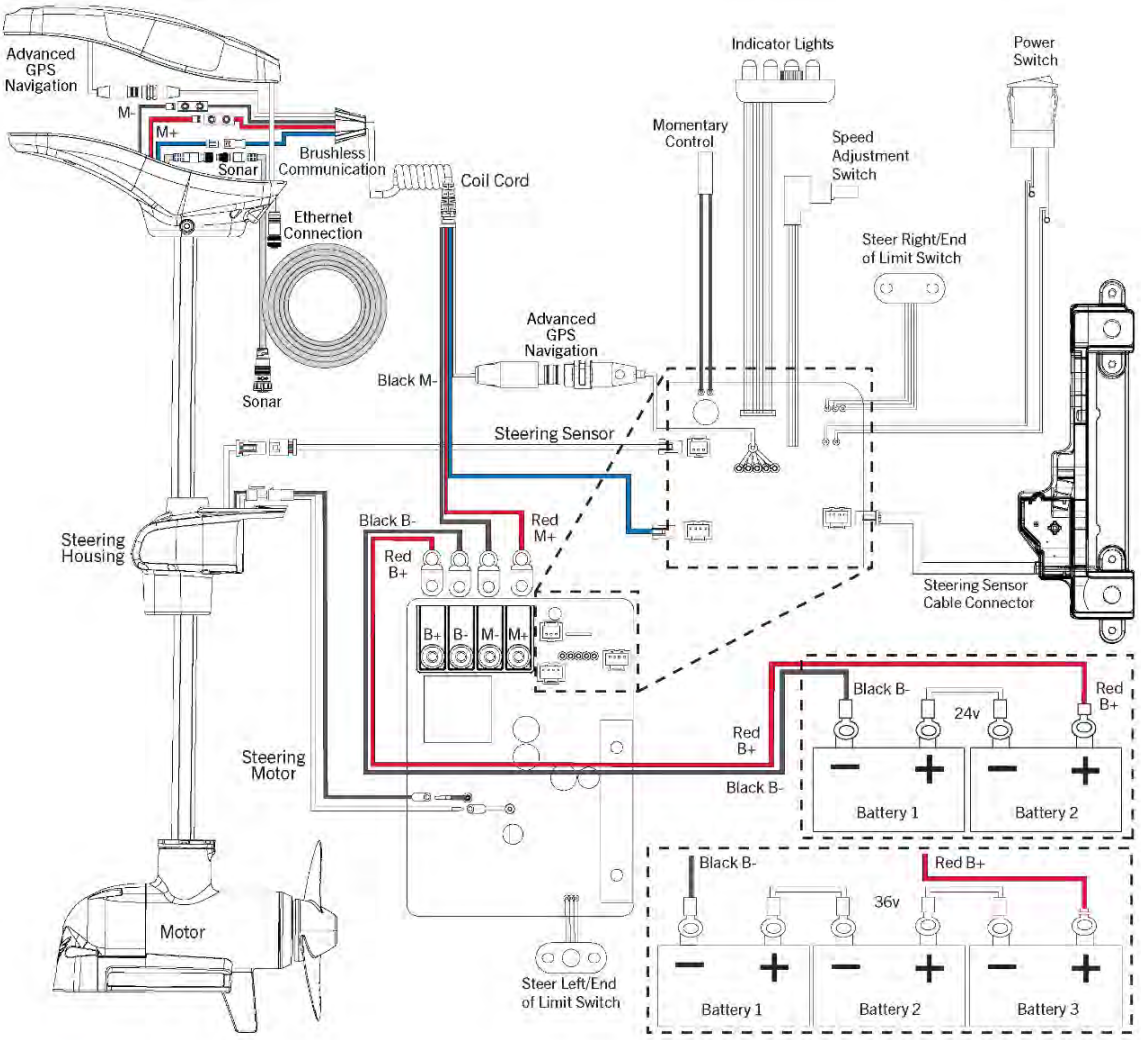
NOTICE

TORQUE VALUES ARE CRITICAL TO OPERATION, OVER-TIGHTENING MAY DAMAGE COMPONENTS, FAILURE TO TIGHTEN FULLY AND EVENLY WILL RESULT IN MALFUNCTIONS OR WATER INTRUSION MALFUNCTIONS

WIRING DIAGRAM

ULTREX QUEST

The following Motor Wiring Diagram applies to all Ultrex QUEST models that come factory installed with Advanced GPS Navigation, a Foot Pedal and Sonar. Sonar is either Dual Spectrum CHIRP or Built-in MEGA Side Imaging.



NOTICE: This is a multi-voltage diagram. Double-check your motor's voltage for proper connections. Over-Current Protection Devices are not shown in this illustration.

ULTERRA QUEST

MOTOR TYPE

Freshwater, Auto Stow/Deploy
Brushless Lower Unit

OPERATING VOLTAGE

Nominal 24 or 36 Volts
Below 18 Volts will issue Low Voltage Error (1.2)
Above 48 Volts will issue High Voltage Error (1.1)

THRUST

90 Pounds of Thrust at ~24V
115 Pounds of Thrust at ~36V

SHAFT LENGTHS

45”, 60”, 72”

NOTICE

SHAFT LENGTH CHANGES ARE MOSTLY IMPRACTICLE. IT IS NOT POSSIBLE TO CHANGE THE LENGTH THE MOTOR COMMUNICATION WIRE AND SONAR CABLE, SO MOST SHAFT LENGTH CHANGES ARE BEST ACCOMPLISHED WITH A NEW LOWER UNIT ASSEMBLY DUE TO LACK OF SPACE IN THE CONTROL BOX OR INABILITY TO LENGTHEN THESE CABLES TO REACH THE CONTROL BOX. CHANGING TO A SHAFT LENGTH LESS THAN 45” OR MORE THAN 72” VOIDS ALL WARRANTIES ON THE MOTOR.

CONTROL

Included foot pedal assembly.

Included Wireless Remote (WR).

Compatible with the One Boat Network App.

- Full Controls and Updates using an Android or iOS Device.

Compatible with the Micro Remote (MR) for steering, speed control and Spot-Lock (Purchased Seperately)

MOBILE APP CONTROL

ONE-BOAT NETWORK

BUILT IN SONAR OPTIONS

DSC (Dual Spectrum Chirp)(Humminbird Transducer, works with other brands via adapter cable)

MSI (Mega Side Imaging)(Exclusively works with Humminbird)

SCAN OR CLICK FOR DSC COMPATIBILITY PAGE

BELT LENGTH

Lengths are +/- one tooth, always cut in the valley between belt teeth.

45” Motor Shaft:	59.9”	1.520 Meters
60” Motor Shaft:	73.6”	1.870 Meters
72” Motor Shaft:	85.0”	2.160 Meters

PROPELLER

Description	Service Part #	Accessory Item #
MKP-39 Weedless Prop (Optional)	1378162	1865039
MKP-40 Power Prop (Included)	1378171	1865040

CRITICAL TORQUE VALUES

Component	Torque in-lbs	Torque Nm	Bit
Phase Leads to Invertor Board	15	1.7	T20 or #2 Phillips/7mm Socket
Power Leads to Inverter Board	15	1.7	T20 or #2 Phillips/7mm Socket
Strain Relief to Motor	30	3.4	T25
Strain Relief Top Cast	18	2.0	#2 Phillips
Sonar/Plain End to Motor	30	3.4	T25
Clamp Plate/Motor Shaft Seal	40	4.5	4mm Hex
Control Board Power Lugs	15	1.7	#2 Phillips
Control Board Motor Lugs	15	1.7	#2 Phillips

NOTICE

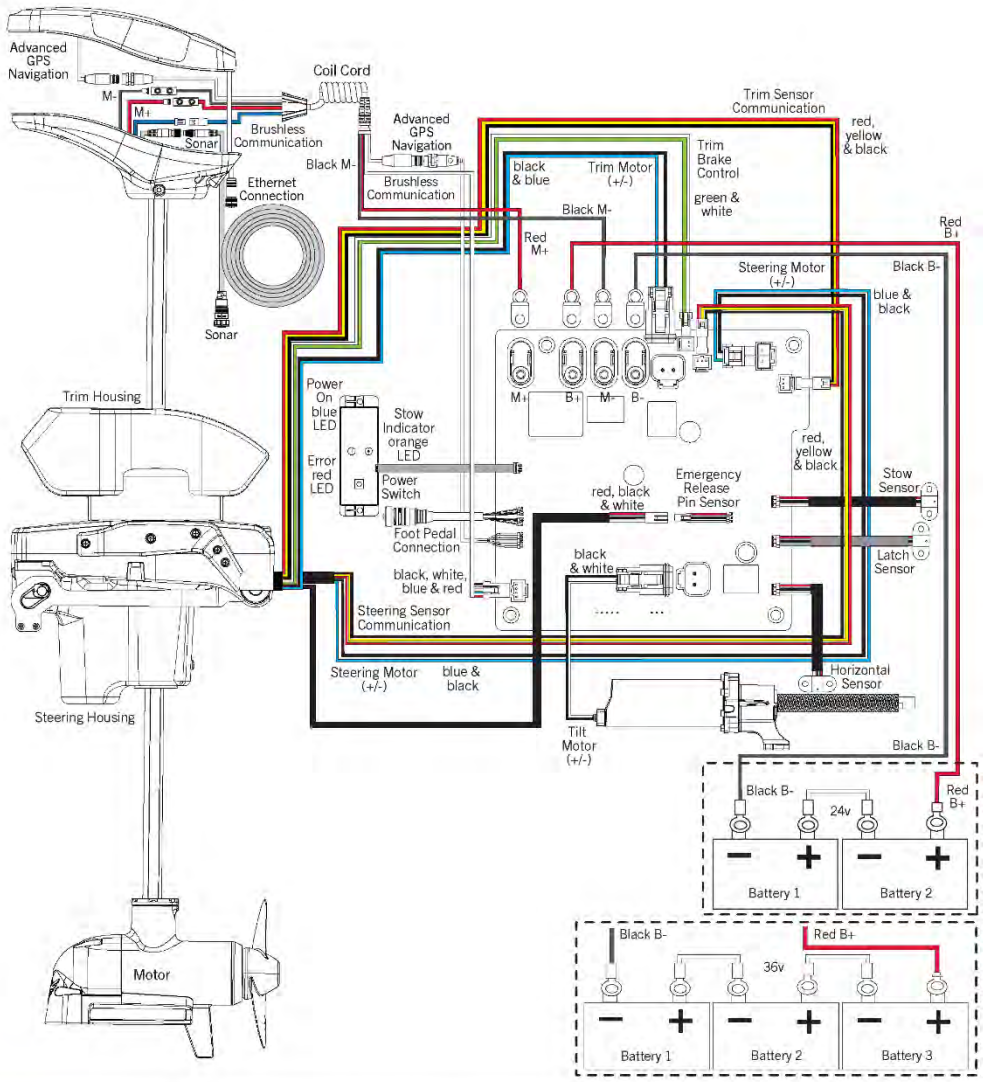
TORQUE VALUES ARE CRITICAL TO OPERATION, OVER-TIGHTENING MAY DAMAGE COMPONENTS, FAILURE TO TIGHTEN FULLY AND EVENLY WILL RESULT IN MALFUNCTIONS OR WATER INTRUSION MALFUNCTIONS

WIRING DIAGRAM

MOTOR WIRING DIAGRAM

ULTERRA QUEST

The following Motor Wiring Diagram applies to all Ulterra QUEST models. Sonar is either Dual Spectrum CHIRP or Built-in MEGA Side Imaging.



NOTICE: This is a multi-voltage diagram. Double-check your motor's voltage for proper connections. Over-Current Protection Devices are not shown in this illustration.

RIPTIDE INSTINCT QUEST

MOTOR TYPE
Saltwater, Auto Stow/Deploy
Brushless Lower Unit

OPERATING VOLTAGE
Nominal 24 or 36 Volts
Below 18 Volts will issue Low Voltage Error (1.2)
Above 48 Volts will issue High Voltage Error (1.1)

THRUST
90 Pounds of Thrust at ~24V
115 Pounds of Thrust at ~36V

SHAFT LENGTHS
60”, 72”, 87”, 100”

NOTICE

SHAFT LENGTH CHANGES ARE MOSTLY IMPRACTICLE. IT IS NOT POSSIBLE TO CHANGE THE LENGTH THE MOTOR COMMUNICATION WIRE AND SONAR CABLE, SO MOST SHAFT LENGTH CHANGES ARE BEST ACCOMPLISHED WITH A NEW LOWER UNIT ASSEMBLY DUE TO LACK OF SPACE IN THE CONTROL BOX OR INABILITY TO LENGTHEN THESE CABLES TO REACH THE CONTROL BOX. CHANGING TO A SHAFT LENGTH LESS THAN 60” OR MORE THAN 100” VOIDS ALL WARRANTIES ON THE MOTOR.

CONTROL
Included Wireless Remote (WR).

Compatible with the One Boat Network App.

- Full Controls and Updates using an Android or iOS Device.
- Optional foot pedal assembly (Purchased Seperately.)
- Compatible with the Micro Remote (MR) for steering, speed control and Spot-Lock (Purchased Seperately)

BUILT IN SONAR OPTIONS
No Built-In Sonar. No Sonar End Assemblies are Saltwater Rated/compatible.

BELT LENGTH

Lengths are +/- one tooth, always cut in the valley between belt teeth.

60” Motor Shaft:	73.6”	1.870 Meters
72” Motor Shaft:	85.0”	2.160 Meters
87” Motor Shaft:	100.0”	2.540 Meters
100” Motor Shaft:	113.0”	2.870 Meters

PROPELLER

Description	Service Part #	Accessory Item #
MKP-39 Weedless Prop (Optional)	1378162	1865039
MKP-40 Power Prop (Included)	1378171	1865040

CRITICAL TORQUE VALUES

Component	Torque in-lbs	Torque Nm	Bit
Phase Leads to Invertor Board	15	1.7	T20 or #2 Phillips/7mm Socket
Power Leads to Inverter Board	15	1.7	T20 or #2 Phillips/7mm Socket
Strain Relief to Motor	30	3.4	T25
Strain Relief Top Cast	18	2.0	#2 Phillips
Sonar/Plain End to Motor	30	3.4	T25
Clamp Plate/Motor Shaft Seal	40	4.5	4mm Hex
Control Board Power Lugs	15	1.7	#2 Phillips
Control Board Motor Lugs	15	1.7	#2 Phillips

NOTICE

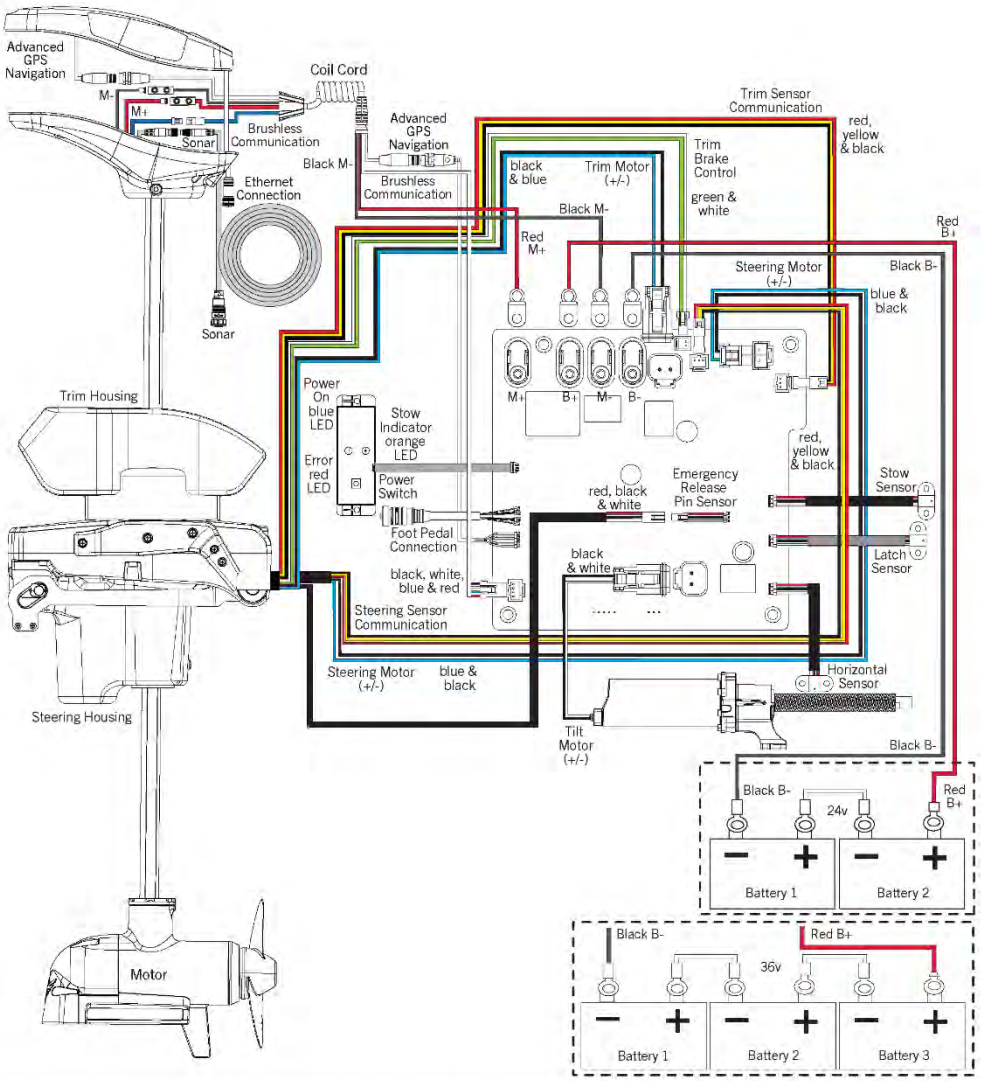
TORQUE VALUES ARE CRITICAL TO OPERATION, OVER-TIGHTENING MAY DAMAGE COMPONENTS, FAILURE TO TIGHTEN FULLY AND EVENLY WILL RESULT IN MALFUNCTIONS OR WATER INTRUSION MALFUNCTIONS

WIRING DIAGRAM

MOTOR WIRING DIAGRAM

ULTERRA QUEST

The following Motor Wiring Diagram applies to all Ulterra QUEST models. Sonar is either Dual Spectrum CHIRP or Built-in MEGA Side Imaging.



NOTICE: This is a multi-voltage diagram. Double-check your motor's voltage for proper connections. Over-Current Protection Devices are not shown in this illustration.

TERROVA QUEST

MOTOR TYPE

Freshwater Electric Steer, Manual Stow/Deploy
Brushless Lower Unit

OPERATING VOLTAGE

Nominal 24 or 36 Volts
Below 18 Volts will issue Low Voltage Error (1.2)
Above 48 Volts will issue High Voltage Error (1.1)

THRUST

90 Pounds of Thrust at ~24V
115 Pounds of Thrust at ~36V

SHAFT LENGTHS

45”, 60”, 72”

NOTICE

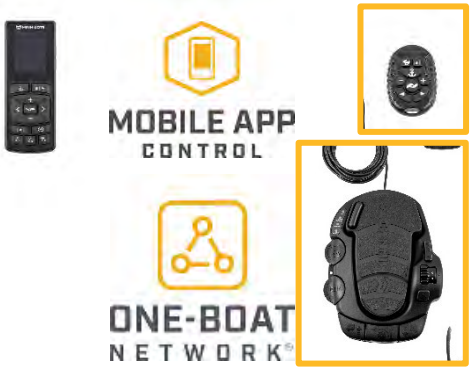
SHAFT LENGTH CHANGES ARE MOSTLY IMPRACTICLE. IT IS NOT POSSIBLE TO CHANGE THE LENGTH THE MOTOR COMMUNICATION WIRE AND SONAR CABLE, SO MOST SHAFT LENGTH CHANGES ARE BEST ACCOMPLISHED WITH A NEW LOWER UNIT ASSEMBLY DUE TO LACK OF SPACE IN THE CONTROL BOX OR INABILITY TO LENGTHEN THESE CABLES TO REACH THE CONTROL BOX. CHANGING TO A SHAFT LENGTH LESS THAN 45” OR MORE THAN 72” VOIDS ALL WARRANTIES ON THE MOTOR.

CONTROL

Included Wireless Remote (WR).

Compatible with the One Boat Network App.

- Full controls and updates using an Android or iOS Device.
- Optional Foot Pedal Assembly (Purchased Seperately.)
- Compatible with the Micro Remote (MR) for steering, speed control and Spot-Lock (Purchased Seperately)



BUILT-IN SONAR OPTIONS

DSC (Dual Spectrum Chirp)(Humminbird Transducer, works with other brands via adapter cable)

MSI (Mega Side Imaging)(Exclusively works with Humminbird)

SCAN OR CLICK FOR DSC COMPATIBILITY PAGE

PROPELLER

Description	Service Part #	Accessory Item #
MKP-39 Weedless Prop (Optional)	1378162	1865039
MKP-40 Power Prop (Included)	1378171	1865040

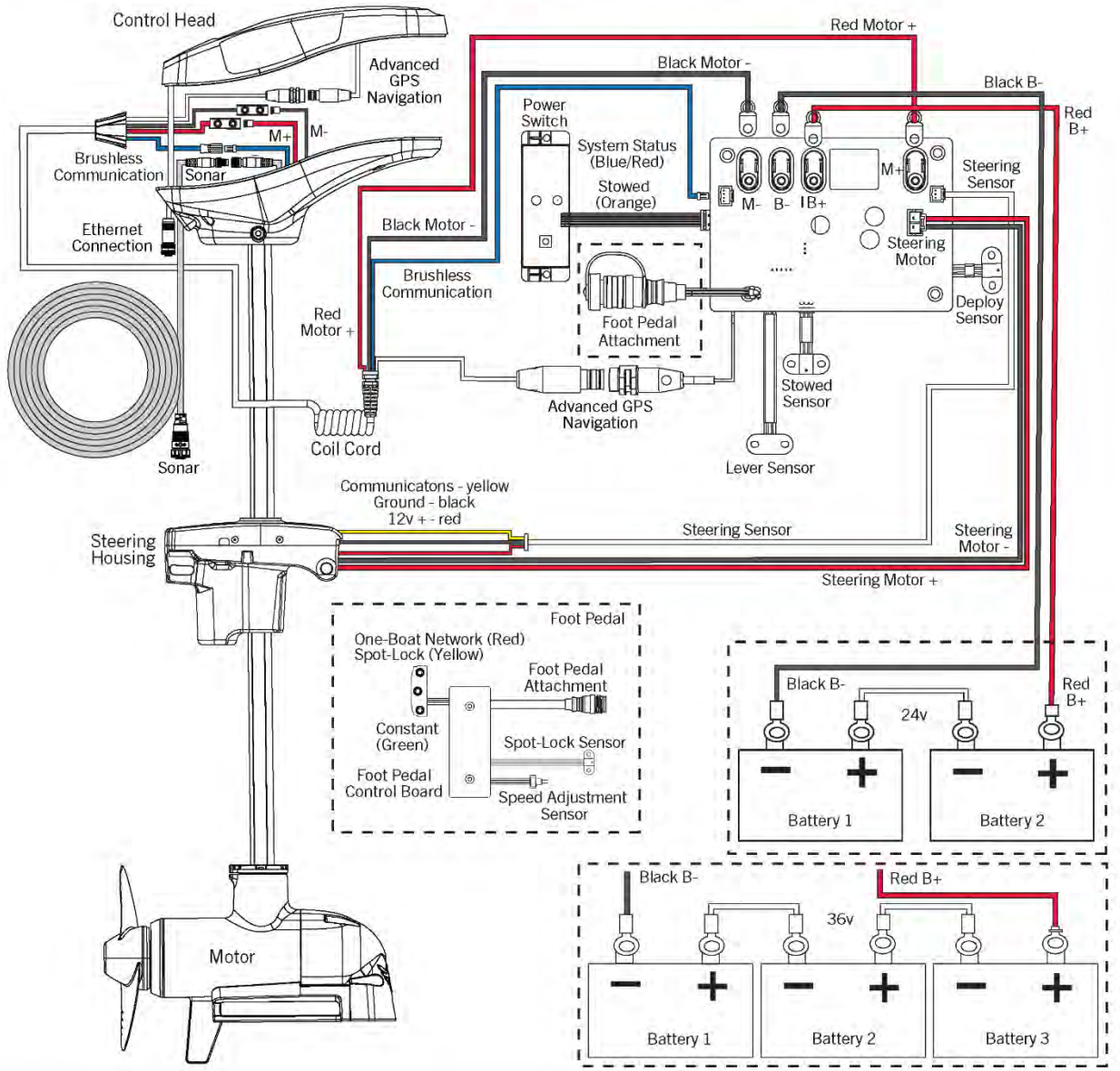
CRITICAL TORQUE VALUES

Component	Torque in-lbs	Torque Nm	Bit
Phase Leads to Invertor Board	15	1.7	T20 or #2 Phillips/7mm Socket
Power Leads to Inverter Board	15	1.7	T20 or #2 Phillips/7mm Socket
Strain Relief to Motor	30	3.4	T25
Strain Relief Top Cast	18	2.0	#2 Phillips
Sonar/Plain End to Motor	30	3.4	T25
Clamp Plate/Motor Shaft Seal	40	4.5	4mm Hex
Control Board Power Lugs	15	1.7	#2 Phillips
Control Board Motor Lugs	15	1.7	#2 Phillips

WIRING DIAGRAM

TERROVA QUEST

The following Motor Wiring Diagram applies to all QUEST series Terrova trolling motor models that come factory installed with Advanced GPS Navigation, a Foot Pedal and Sonar. Sonar is either Dual Spectrum CHIRP or Built-in MEGA Side Imaging.



NOTICE: This is a multi-voltage diagram. Double-check your motor's voltage for proper connections. Over-Current Protection Devices are not shown in this illustration.

RIPTIDE TERROVA QUEST

MOTOR TYPE
Freshwater Electric Steer, Manual Stow/Deploy
Brushless Lower Unit

OPERATING VOLTAGE
Nominal 24 or 36 Volts
Below 18 Volts will issue Low Voltage Error (1.2)
Above 48 Volts will issue High Voltage Error (1.1)

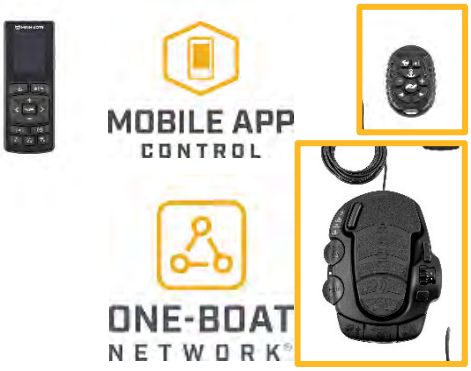
THRUST
90 Pounds of Thrust at ~24V
115 Pounds of Thrust at ~36V

SHAFT LENGTHS
60”, 72”, 87” and 100”

CONTROL
Included Wireless Remote (WR).

Compatible with the One Boat Network App.

- Full Controls and Updates using an Android or iOS Device.
- Optional foot pedal assembly (Purchased Seperately.)
- Compatible with the Micro Remote (MR) for steering, speed control and Spot-Lock (Purchased Seperately)



BUILT-IN SONAR OPTIONS
No Built-In Sonar. No Sonar End Assemblies are Saltwater Rated/compatible.

PROPELLER

Description	Service Part #	Accessory Item #
MKP-39 Weedless Prop (Optional)	1378162	1865039
MKP-40 Power Prop (Included)	1378171	1865040

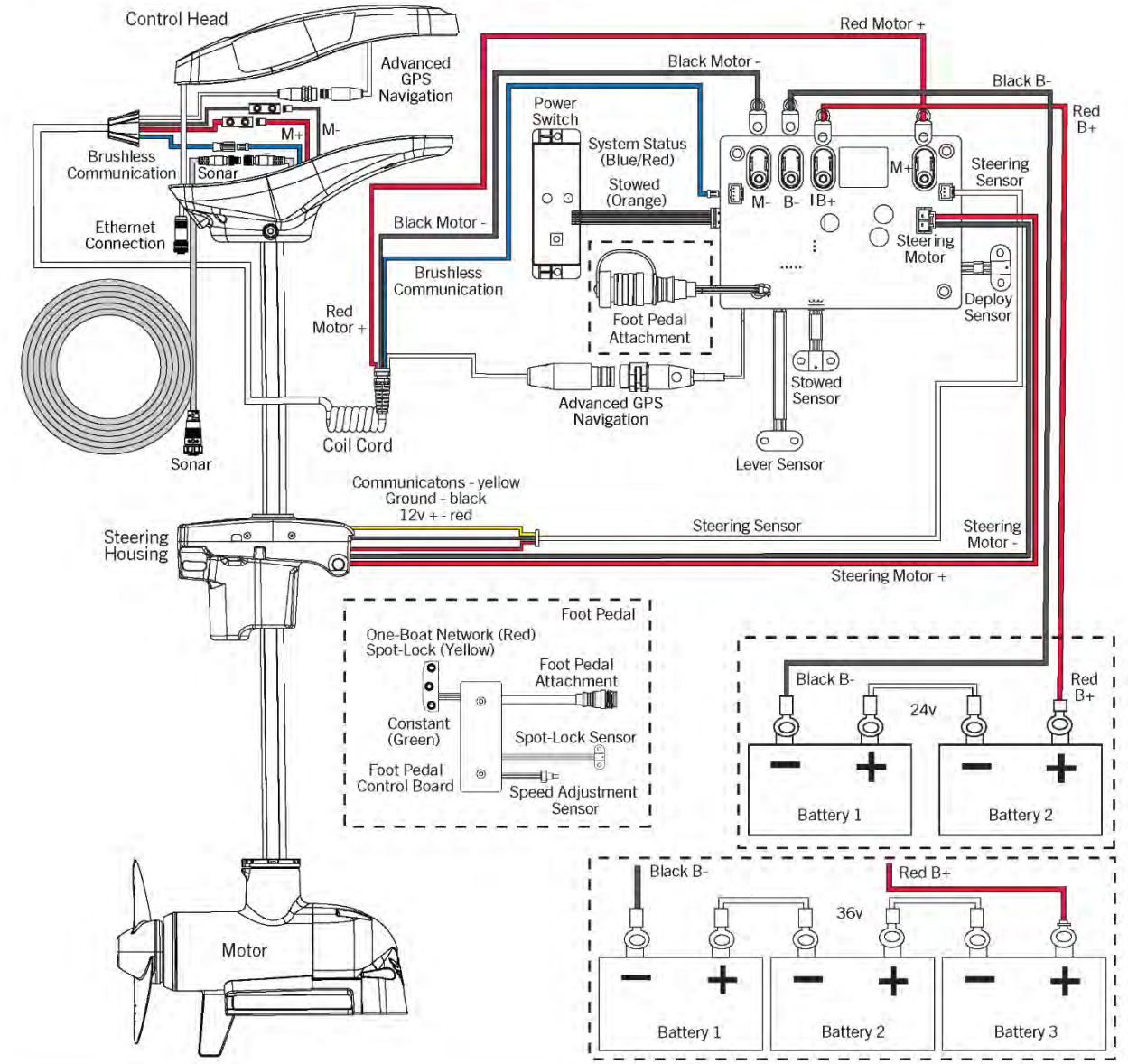
CRITICAL TORQUE VALUES

Component	Torque in-lbs	Torque Nm	Bit
Phase Leads to Invertor Board	15	1.7	T20 or #2 Phillips/7mm Socket
Power Leads to Inverter Board	15	1.7	T20 or #2 Phillips/7mm Socket
Strain Relief to Motor	30	3.4	T25
Strain Relief Top Cast	18	2.0	#2 Phillips
Sonar/Plain End to Motor	30	3.4	T25
Clamp Plate/Motor Shaft Seal	40	4.5	4mm Hex
Control Board Power Lugs	15	1.7	#2 Phillips
Control Board Motor Lugs	15	1.7	#2 Phillips

WIRING DIAGRAM

TERROVA QUEST

The following Motor Wiring Diagram applies to all QUEST series Terrova trolling motor models that come factory installed with Advanced GPS Navigation, a Foot Pedal and Sonar. Sonar is either Dual Spectrum CHIRP or Built-in MEGA Side Imaging.



NOTICE: This is a multi-voltage diagram. Double-check your motor's voltage for proper connections. Over-Current Protection Devices are not shown in this illustration.

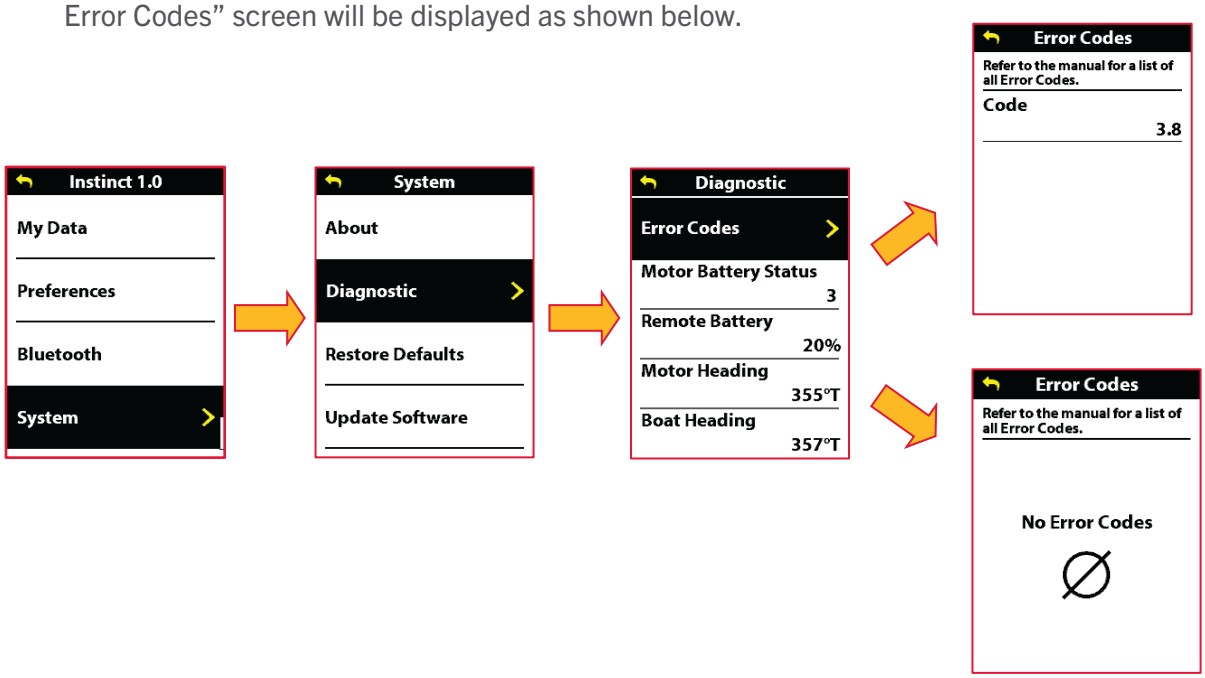
TROUBLESHOOTING

Quest Series Motors do not allow for as much direct testing of components as Brushed Permanent Magnet Motors allowed. Checking for Error Codes is the critical step to determine what component failed. A malfunction without a corresponding Error Code most likely means a loss of connection to the affected component (i.e. a motor that will not steer and does not present an Error Code most likely has an unplugged Steering Motor, or the Steering Motor has failed "Open" somehow.)

To access Error Codes you'll need a full Wireless Remote, or mobile device equipped with the One Boat Network App, paired to the Motor.

FINDING ERROR CODES WITH A WIRELESS REMOTE

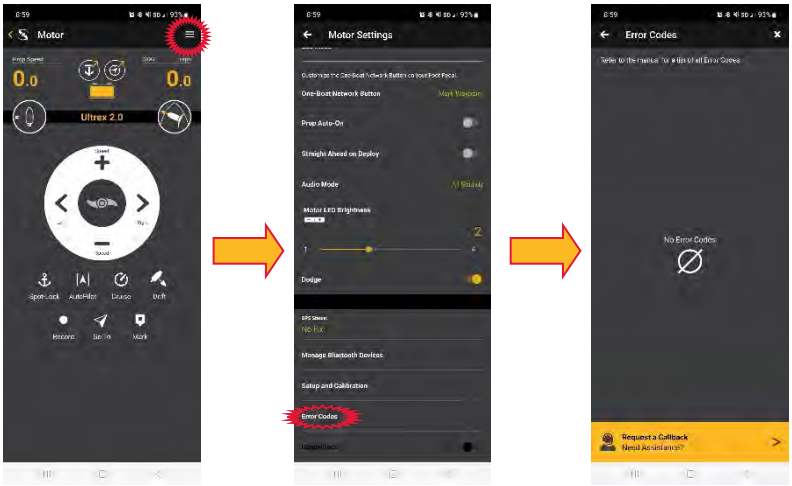
Step 1. With the Motor and paired Remote powered on, press the Menu Button on the Remote.
Step 2. Use the + and - Buttons on the Wireless Remote to scroll up and down until "System" is highlighted.
Step 3. Press the Right Arrow to select "System"
Step 4. Use the + and - Buttons on the Wireless Remote to scroll up and down until "Diagnostic" is highlighted.
Step 5. Press the Right Arrow to select "Diagnostic"
Step 6. Use the + and - Buttons on the Wireless Remote to scroll up and down until "Error Codes" is highlighted.
Step 7. Press the Right Arrow to select "Error Codes"
Step 8. If an Error Code is present it will be displayed on the screen, if no Error Codes are Present a "No Error Codes" screen will be displayed as shown below.



FINDING ERROR CODES WITH THE ONE BOAT NETWORK APP

Step 1. With the Android or iOS device paired to the Motor and on the Motor Control Screen, press the Menu Button.

Step 2. Scroll Down to “Error Codes” and select “Error Codes”, with this selection made the Error Code Screen will be displayed.



READING ERROR CODES

The first number of the Error Code is its “Category”, the table below lists the category description. The number after the “.” can be 1-31 (13 is the highest number currently in use). 3.1 and 3.10 are different Error Codes.

CATEGORY	DESCRIPTION	COUNT
1	CRITICAL	9
2	LOWER UNIT/INVERTOR	3
3	SENSOR	13
4	SMALL MOTOR (STEERING ETC)	8
5	UNASSIGNED/FUTURE USE	0
6	UNASSIGNED/FUTURE USE	0
7	UNASSIGNED/FUTURE USE	0

1.1 HIGH MOTOR INPUT VOLTAGE

DEFINITION: Input Voltage, as read by the Motor’s Main Control Board, exceeds 48.0 Volts

MOTOR STATUS: Flashing red LED, prop control and steering disabled.

RESET STEPS: Cycle power to reset. Verify voltage provided to the motor is ~24 Volts or ~36 Volts.

CONSUMER TROUBLESHOOTING:

ULTREX: Turn the Motor off, then back on. If the Error Code returns or persists double check input voltage. If voltage is less than 48 Volts at all times take the Motor to an Authorized Service Provider.

ULTERRA/INSTINCT: Turn the Motor off, then back on. If the Error Code returns or persists double check input voltage. If voltage is less than 48 Volts at all times take the Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Turn the Motor off, then back on. If the Error Code returns or persists double check input voltage. If voltage is less than 48 Volts at all times take the Motor to an Authorized Service Provider.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Verify the Error Code is present when the Motor is connected to a known good power supply. Replace the Main Control Board. ULTREX MAIN CONTROL BOARD REPLACEMENT, Page 63

ULTERRA/INSTINCT: Verify the Error Code is present when the Motor is connected to a known good power supply. ULTERRA/RIPTIDE INSTINCT MAIN CONTROL BOARD REPLACEMENT, Page 87

TERROVA/RT TERROVA: Verify the Error Code is present when the Motor is connected to a known good power supply. TERROVA/RIPTIDE TERROVA MAIN CONTROL BOARD REPLACEMENT, Page 117

1.2 LOW MOTOR INPUT VOLTAGE

DEFINITION: Input Voltage, as read by the Motor's Main Control Board, is less than 15.0 Volts for an Ultrex or Terrova, less than 17.0 Volts for Ulterra or Instinct.

MOTOR STATUS: Flashing red LED, prop control and steering disabled. On Instinct Trim and Tilt are also Disabled.

RESET STEPS: Cycle power to reset. Verify voltage provided to the motor is ~24 Volts or ~36 Volts.

CONSUMER TROUBLESHOOTING:

ULTREX: Turn the Motor off, then back on. If the Error Code returns or persists double check input voltage. If voltage is greater than 15 Volts at all times take the Motor to an Authorized Service Provider.

ULTERRA/INSTINCT: Turn the Motor off, then back on. If the Error Code returns or persists double check input voltage. If voltage is greater than 17 Volts at all times take the Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: T Turn the Motor off, then back on. If the Error Code returns or persists double check input voltage. If voltage is greater than 15 Volts at all times take the Motor to an Authorized Service Provider.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Verify the Error Code is present when the Motor is connected to a known good power supply. Replace the Main Control Board. ULTREX MAIN CONTROL BOARD REPLACEMENT, Page 63

ULTERRA/INSTINCT: Verify the Error Code is present when the Motor is connected to a known good power supply. Replace the Main Control Board. ULTERRA/RIPTIDE INSTINCT MAIN CONTROL BOARD REPLACEMENT, Page 87

TERROVA/RT TERROVA: Verify the Error Code is present when the Motor is connected to a known good power supply. Replace the Main Control Board. TERROVA/RIPTIDE TERROVA MAIN CONTROL BOARD REPLACEMENT, Page 117

1.3 STEERING CIRCUIT FAILURE

DEFINITION: E-Fuse in the Steering Circuit is tripped and cannot reset itself. May also be caused by steering during high or low voltage conditions.

MOTOR STATUS: Flashing red LED, prop control and steering disabled.

RESET STEPS: Cycle power to reset.

CONSUMER TROUBLESHOOTING:

ULTREX: Turn the Motor off, then back on. If the Error Code returns or persists, take motor to an Authorized Service Provider.

ULTERRA/INSTINCT: Turn the Motor off, then back on. If the Error Code returns or persists, take motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Turn the Motor off, then back on. If the Error Code returns or persists, take motor to an Authorized Service Provider.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Verify the Error Code is present when motor is connected to a known good power supply.

Step 1. Inspect the Steering Wires from the Main Control Board to the Steering Housing looking for any places the wires may be pinched and shorted to each other. If there are pinch points replace or splice the Steering Wires to eliminate the short at the pinch point.

Step 2. Replace the Steering Housing. ULTREX STEERING HOUSING REPLACEMENT, Page 76

ULTERRA/INSTINCT: Verify the Error Code is present when motor is connected to a known good power supply.

Step 1. Inspect the Steering Wires from the Main Control Board to the Steering Housing looking for any places the wires may be pinched and shorted to each other. If there are pinch points replace or splice the Steering Wires to eliminate the short at the pinch point.

Step 2. Replace the Steering Housing. ULTERRA/ RIPTIDE INSTINCT STEERING HOUSING REPLACEMENT, Page 103

TERROVA/RT TERROVA: Verify the Error Code is present when motor is connected to a known good power supply.

Step 1. Inspect the Steering Wires from the Main Control Board to the Steering Housing looking for any places the wires may be pinched and shorted to each other. If there are pinch points replace the cable or splice the wires to eliminate the short at the pinch point.

Step 2. Replace the Steering Housing. TERROVA/RIPTIDE TERROVA STEERING HOUSING, Page 125

1.4 INVERTER OVER TEMPERATURE FAULT

DEFINITION: Temperature at the inverter exceeds 80°C/176°F.

MOTOR STATUS: Flashing red LED, prop control and steering disabled. If Inverter has not been allowed to cool down the error will persist.

RESET STEPS: Cycle power to reset. Allow some time (preferably with the lower unit in the water) to cool down.

CONSUMER TROUBLESHOOTING:

ULTREX: Turn the Motor off, then back on. Clear any obstructions from the Motor, remove the Prop to eliminate anything gathered under the Prop. Do not run the Motor for extended periods when not under water. If the Error Code repeats without visible obstructions take the Motor to an Authorized Service Provider.

ULTERRA/INSTINCT: Turn the Motor off, then back on. Clear any obstructions from the Motor, remove the Prop to eliminate anything gathered under the Prop. Do not run the Motor for extended periods when not under water. If the Error Code repeats without visible obstructions take the Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Turn the Motor off, then back on. Clear any obstructions from the Motor, remove the Prop to eliminate anything gathered under the Prop. Do not run the Motor for extended periods when not under water. If the Error Code repeats without visible obstructions take the Motor to an Authorized Service Provider.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Verify the Error Code is present when the Motor is connected to a known good power supply, run in test tank if possible to verify. Follow INVERTER REPLACEMENT on Page 58 to verify all the wire connections at the Inverter are tight, the Strain Relief Casting is holding the Inverter tightly to the surface beneath and there is nothing between the Inverter and the surface it attaches to. If no issues found at the Inverter replace the Lower Unit Assembly, COMPOSITE SHAFT REPLACEMENT/LOWER UNIT ASSEMBLY REPLACEMENT on Page 50.

ULTERRA/INSTINCT: Verify the Error Code is present when the Motor is connected to a known good power supply, run in test tank if possible to verify. Follow INVERTER REPLACEMENT on Page 58 to verify all the wire connections at the Inverter are tight, the Strain Relief Casting is holding the Inverter tightly to the surface beneath and there is nothing between the Inverter and the surface it attaches to. If no issues found at the Inverter replace the Lower Unit Assembly, COMPOSITE SHAFT REPLACEMENT/LOWER UNIT ASSEMBLY REPLACEMENT on Page 50.

TERROVA/RT TERROVA: Verify the Error Code is present when the Motor is connected to a known good power supply, run in test tank if possible to verify. Follow INVERTER REPLACEMENT on Page 58 to verify all the wire connections at the Inverter are tight, the Strain Relief Casting is holding the Inverter tightly to the surface beneath and there is nothing

between the Inverter and the surface it attaches to. If no issues found at the Inverter replace the Lower Unit Assembly, COMPOSITE SHAFT REPLACEMENT/LOWER UNIT ASSEMBLY REPLACEMENT on Page 50.

1.5 EXCESSIVE DC INPUT CURRENT (HIGH AMPS AT LOWER UNIT)

DEFINITION: Current draw of the Lower Unit exceeds 90 amps.

MOTOR STATUS: Flashing red LED, prop control and steering disabled.

RESET STEPS: Cycle power to reset. Clear any obstructions from around/behind the Prop.

CONSUMER TROUBLESHOOTING:

ULTREX: Turn the Motor off, then back on. Clear any obstructions from the Motor, remove the Prop to eliminate anything gathered under the Prop. Check rigging for a properly installed 60-amp circuit breaker. If error repeats without visible obstructions take the Motor to an Authorized Service Provider.

ULTERRA/INSTINCT: Turn the Motor off, then back on. Clear any obstructions from the Motor, remove the Prop to eliminate anything gathered under the Prop. Check rigging for a properly installed 60-amp circuit breaker. If error repeats without visible obstructions take the Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Turn the Motor off, then back on. Clear any obstructions from the Motor, remove the Prop to eliminate anything gathered under the Prop. Check rigging for a properly installed 60-amp circuit breaker. If error repeats without visible obstructions take the Motor to an Authorized Service Provider.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Inspect the Motor Power Wires at all readily visible locations (near the Control Board, in the Control Box) for potential short between the Red and Black Lower Unit Power Wires. Verify the Error Code is present when motor is connected to a known good power supply when run in test tank. Follow INVERTER REPLACEMENT on Page 58 to verify the Red and Black Motor Power Wires are not shorted to each other, replace the Inverter if the wires are not shorted.

ULTERRA/INSTINCT: Inspect the Motor Power Wires at all readily visible locations (near the Control Board, in the Control Box) for potential short between the Red and Black Lower Unit Power Wires. Verify the Error Code is present when motor is connected to a known good power supply when run in test tank. Follow INVERTER REPLACEMENT on Page 58 to verify the Red and Black Motor Power Wires are not shorted to each other, replace the Inverter if the wires are not shorted.

TERROVA/RT TERROVA: Inspect the Motor Power Wires at all readily visible locations (near the Control Board, in the Control Box) for potential short between the Red and Black Lower Unit Power Wires. Verify the Error Code is present when motor is connected to a known good power supply when run in test tank. Follow INVERTER REPLACEMENT on Page 58 to verify the Red and Black Motor Power Wires are not shorted to each other, replace the Inverter if the wires are not shorted.

1.6 EXCESSIVE DC INPUT CURRENT WITH PROP OFF

DEFINITION: Current draw of the Lower Unit without the Prop running is higher than expected.

MOTOR STATUS: Flashing red LED, prop control and steering disabled.

RESET STEPS: Cycle power to reset.

CONSUMER TROUBLESHOOTING:

ULTREX: Turn the Motor off, then back on. If the Error Code repeats take the Motor to an Authorized Service Provider.

ULTERRA/INSTINCT: Turn the Motor off, then back on. If the Error Code repeats take the Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Turn the Motor off, then back on. If the Error Code repeats take the Motor to an Authorized Service Provider.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Inspect the Motor Power Wires at all readily visible locations (near the Control Board, in the Control Box) for potential short between the Red and Black Lower Unit Power Wires. Verify the Error Code present when Motor is connected to a known good power supply. Follow INVERTER REPLACEMENT on Page 58 to verify the Red and Black Motor Power Wires are not shorted to each other, replace the Inverter if the wires are not shorted.

ULTERRA/INSTINCT: Inspect the Motor Power Wires at all readily visible locations (near the Control Board, in the Control Box) for potential short between the Red and Black Lower Unit Power Wires. Verify the Error Code present when Motor is connected to a known good power supply. Follow INVERTER REPLACEMENT on Page 58 to verify the Red and Black Motor Power Wires are not shorted to each other, replace the Inverter if the wires are not shorted.

TERROVA/RT TERROVA: Inspect the Motor Power Wires at all readily visible locations (near the Control Board, in the Control Box) for potential short between the Red and Black Lower Unit Power Wires. Verify the Error Code present when Motor is connected to a known good power supply. Follow INVERTER REPLACEMENT on Page 58 to verify the Red and Black Motor Power Wires are not shorted to each other, replace the Inverter if the wires are not shorted.

1.7 PRE-CHARGE FAILED

DEFINITION: Power source did not raise the voltage at the Lower Unit sufficiently to engage the Motor Relay.

MOTOR STATUS: Flashing red LED, prop control and steering disabled.

RESET STEPS: Cycle power to reset.

CONSUMER TROUBLESHOOTING:

ULTREX: Verify the power supply (load test the batteries, check all connections between the batteries and the motor). Turn the Motor off, then back on. If the Error Code repeats take the Motor to an Authorized Service Provider.

ULTERRA/INSTINCT: Verify the power supply (load test the batteries, check all connections between the batteries and the motor). Turn the Motor off, then back on. If the Error Code repeats take the Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Verify the power Supply (load test the batteries, check all connections between the batteries and the motor). Turn the Motor off, then back on. If the Error Code repeats take the Motor to an Authorized Service Provider.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Verify the Error Code is present when motor is connected to a known good power supply. Inspect the Motor Power Wires at all readily visible locations (near the Control Board, in the Control Box) for reversing of, or potential short between, the Red and Black Lower Unit Power Wires. Follow INVERTER REPLACEMENT on Page 58 to verify the Red and Black Motor Power Wires are not shorted to each other, replace the Inverter if the wires are not shorted.

ULTERRA/INSTINCT: Verify the Error Code is present when motor is connected to a known good power supply. Inspect the Motor Power Wires at all readily visible locations (near the Control Board, in the Control Box) for reversing of, or potential short between, the Red and Black Lower Unit Power Wires. Follow INVERTER REPLACEMENT on Page 58 to verify the Red and Black Motor Power Wires are not shorted to each other, replace the Inverter if the wires are not shorted.

TERROVA/RT TERROVA: Verify the Error Code is present when motor is connected to a known good power supply. Inspect the Motor Power Wires at all readily visible locations (near the Control Board, in the Control Box) for reversing of, or potential short between, the Red and Black Lower Unit Power Wires. Follow INVERTER REPLACEMENT on Page 58 to verify the Red and Black Motor Power Wires are not shorted to each other, replace the Inverter if the wires are not shorted.

1.8 STOW AND HORIZONTAL SENSORS ACTIVE AT THE SAME TIME

DEFINITION: The Cam/Pin Sensor attached to the Base Extrusion and Horizontal Sensor attached to the Tilt Motor are both reporting as “Active” (magnet near them) at the same time.

MOTOR STATUS: This indicates an Instinct or Ulterra that is either stowed with a stuck Cam/Pin Sensor, or deployed with the Tilt Knuckle disconnected from the Steering Housing allowing the magnet in the Tilt Nut to remain at the Horizontal Sensor.

RESET STEPS: Check for obvious correctable obstructions.

CONSUMER TROUBLESHOOTING:

ULTREX: Error Code not possible on Ultrex.

ULTERRA/INSTINCT: If the Motor is deployed, complete the Emergency Stow Procedure; take the Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Error Code not Possible on Terrova/RT Terrova.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Error Code not Possible on Ultrex.

ULTERRA/INSTINCT: Undo the Emergency Stow, follow the TILT ACTUATOR OR TILT BRACKET ASSEMBLY REPLACEMENT OR ADJUSTMENT instructions on Page 110, to verify the Tilt Knuckle and Quick Disconnect Pin are properly installed. Remove the Right Sideplate and Right Motor Rest to inspect the Cam/Pin Sensor Actuator, if it is stuck remove the obstructions, replace the Actuator and Plastic Shoulder Bolt if necessary.

TERROVA/RT TERROVA: Error Code not Possible on Terrova/RT Terrova.

1.9 SMALL MOTOR PRECHARGE FAILURE

DEFINITION: Power source did not raise the voltage at the lower sufficiently to engage one of the small motor relays.

MOTOR STATUS: Flashing red LED, prop control and steering disabled.

RESET STEPS: Cycle power to reset.

CONSUMER TROUBLESHOOTING:

ULTREX: Verify the power supply (load test the batteries, check all connections between the batteries and the Motor). Turn the Motor off, then back on. If the Error Code repeats take the Motor to an Authorized Service Provider.

ULTERRA/INSTINCT: Verify the power supply (load test the batteries, check all connections between the batteries and the Motor). Turn the Motor off, then back on. If the Error Code repeats take the Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Verify the power supply (load test the batteries, check all connections between the batteries and the Motor). Turn the Motor off, then back on. If the Error Code repeats take the Motor to an Authorized Service Provider.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Verify the Error Code is present when the Motor is connected to a known good power supply. Inspect the Battery Leads to the Main Control Board, if damaged or not securely connected to the Main Control Board repair the Battery Leads. Replace the Main Control Board. ULTREX MAIN CONTROL BOARD REPLACEMENT, Page 63

ULTERRA/INSTINCT: Verify the Error Code is present when the Motor is connected to a known good power supply. Inspect the Battery Leads to the Main Control Board, if damaged or not securely connected to the Main Control Board repair the Battery Leads. Replace the Main Control Board. ULTERRA/RIPTIDE INSTINCT MAIN CONTROL BOARD REPLACEMENT, Page 87

TERROVA/RT TERROVA: Verify the Error Code is present when the Motor is connected to a known good power supply. Inspect the Battery Leads to the Main Control Board, if damaged or not securely connected to the Main Control Board repair the Battery Leads. Replace the Main Control Board. TERROVA/RIPTIDE TERROVA MAIN CONTROL BOARD REPLACEMENT, Page 117

2.1 PHASE OVER-CURRENT TRIP

DEFINITION: Current draw of a Stater Phase exceeded 119 amps as an instantaneous reading.

MOTOR STATUS: Lower Unit Disabled until Prop On/Off is cycled.

RESET STEPS: Clear any obstructions from around/behind the Prop. Cycle Prop On/Off.

CONSUMER TROUBLESHOOTING:

ULTREX: Turn the Motor off, then back on. Clear any obstructions from the Motor, remove the Prop to eliminate anything gathered under the Prop. Check rigging for a properly installed 60-amp circuit breaker. If the Error Code repeats without visible obstructions take Motor to an Authorized Service Provider.

ULTERRA/INSTINCT: Turn the Motor off, then back on. Clear any obstructions from the Motor, remove the Prop to eliminate anything gathered under the Prop. Check rigging for a properly installed 60-amp circuit breaker. If the Error Code repeats without visible obstructions take Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Turn the Motor off, then back on. Clear any obstructions from the Motor, remove the Prop to eliminate anything gathered under the Prop. Check rigging for a properly installed 60-amp circuit breaker. If the Error Code repeats without visible obstructions take Motor to an Authorized Service Provider.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Inspect the Motor Power Wires at all readily visible locations (near the Control Board, in the Control Box) for potential short between the Red and Black Lower Unit Power Wires. Verify the Error Code is present when the Motor is connected to a known good power supply when run in test tank. Follow INVERTER REPLACEMENT on Page 58 to verify the Red and Black Motor Power Wires are not shorted to each other, replace the Inverter if the wires are not shorted.

ULTERRA/INSTINCT: Inspect the Motor Power Wires at all readily visible locations (near the Control Board, in the Control Box) for potential short between the Red and Black Lower Unit Power Wires. Verify the Error Code is present when the Motor is connected to a known good power supply when run in test tank. Follow INVERTER REPLACEMENT on Page 58 to verify the Red and Black Motor Power Wires are not shorted to each other, replace the Inverter if the wires are not shorted.

TERROVA/RT TERROVA: Inspect the Motor Power Wires at all readily visible locations (near the Control Board, in the Control Box) for potential short between the Red and Black Lower Unit Power Wires. Verify the Error Code is present when the Motor is connected to a known good power supply when run in test tank. Follow INVERTER REPLACEMENT on Page 58 to verify the Red and Black Motor Power Wires are not shorted to each other, replace the Inverter if the wires are not shorted.

2.2 LOSS OF PHASE SYNCHRONIZATION

DEFINITION: Rotor position and Phase operation as read by the Inverter Board is not with the range of expected values.

MOTOR STATUS: Lower Unit Disabled until Prop On/Off is cycled.

RESET STEPS: Clear any obstructions from around/behind the Prop. Cycle Prop On/Off.

CONSUMER TROUBLESHOOTING:

ULTREX: Turn the Motor off, then back on. Clear any obstructions from the Motor, remove the Prop to eliminate anything gathered under the Prop. Check rigging for a properly installed 60-amp circuit breaker. If the Error Code repeats without visible obstructions take Motor to an Authorized Service Provider.

ULTERRA/INSTINCT: Turn the Motor off, then back on. Clear any obstructions from the Motor, remove the Prop to eliminate anything gathered under the Prop. Check rigging for a properly installed 60-amp circuit breaker. If the Error Code repeats without visible obstructions take Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Turn the Motor off, then back on. Clear any obstructions from the Motor, remove the Prop to eliminate anything gathered under the Prop. Check rigging for a properly installed 60-amp circuit breaker. If the Error Code repeats without visible obstructions take Motor to an Authorized Service Provider.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: This error has not been observed in the field. Please Contact Minn Kota Customer Service for Replacement Motor if Error 2.2 is confirmed.

ULTERRA/INSTINCT: This error has not been observed in the field. Please Contact Minn Kota Customer Service for Replacement Motor if Error 2.2 is confirmed.

TERROVA/RT TERROVA: This error has not been observed in the field. Please Contact Minn Kota Customer Service for Replacement Motor if Error 2.2 is confirmed.

2.3 LOSS OF COMMUNICATION TO THE INVERTER

DEFINITION: Main Control Board does not get a response from the Inverter for 0.03 seconds, after 0.5 seconds without communication the Lower Unit will shut itself off.

MOTOR STATUS: Lower Unit disabled until communication is reestablished.

RESET STEPS: No reset actions needed. When communication is reestablished, the Error Code will clear, the presence of this Error Code indicates the Motor Communication Cable is “Open”/disconnected somewhere.

CONSUMER TROUBLESHOOTING:

ULTREX: Turn the Motor off, then back on. If the Error Code repeats take the Motor to an Authorized Service Provider.

ULTERRA/INSTINCT: Turn the Motor off, then back on. If the Error Code repeats take the Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Turn the Motor off, then back on. If the Error Code repeats take the Motor to an Authorized Service Provider.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Inspect the Motor Communication Cable for bad connections or damage.

Step 1. Look for any signs of damage to the Motor Communication Cable or indications the Coil Cord is unusually stretched or damaged. If any indications of damage are present replace the damaged section of wiring.

Step 2. Verify the Motor Communication Cable is properly plugged into the Main Control Board. *The Plugs Connecting the Steering Sensor Board and the Motor Communication Cable to the Main Control Board can be reversed, the result will be Error 2.3.*

Step 3. Verify the Motor Communication Cable Connection in the Control Box is secure. This may require removing the Heat Shrink to inspect properly.

Step 4. Follow INVERTER REPLACEMENT on Page 58 to verify the Motor Communication Cable is properly plugged into the Inverter Board.

Step 5. If the Motor Communication Cable is free of apparent damage and properly connected at all points, replace the Inverter. INVERTER REPLACEMENT on Page 58

ULTERRA/INSTINCT: Inspect the Motor Communication Cable for bad connections or damage.

Step 1. Look for any signs of damage to the Motor Communication Cable or indications the Coil Cord is unusually stretched or damaged. If any indications of damage are present replace the damaged section of wiring.

Step 2. Verify the Motor Communication Cable is properly plugged into the Main Control Board.

Step 3. Verify the Motor Communication Cable Connection in the Control Box is secure. This may require removing the Heat Shrink to inspect properly.

Step 4. Follow INVERTER REPLACEMENT on Page 58 to verify the Motor Communication Cable is properly plugged into the Inverter Board.

Step 5. If the Motor Communication Cable is free of apparent damage and properly connected at all points, replace the Inverter. INVERTER REPLACEMENT on Page 58

TERROVA/RT TERROVA: Inspect the Motor Communication Cable for bad connections or damage.

Step 1. Look for any signs of damage to the Motor Communication Cable or indications the Coil Cord is unusually stretched or damaged. If any indications of damage are present replace the damaged section of wiring.

Step 2. Verify the Motor Communication Cable is properly plugged into the Main Control Board.

Step 3. Verify the Motor Communication Cable Connection in the Control Box is secure. This may require removing the Heat Shrink to inspect properly.

Step 4. Follow INVERTER REPLACEMENT on Page 58 to verify the Motor Communication Cable is properly plugged into the Inverter Board.

Step 5. If the Motor Communication Cable is free of apparent damage and properly connected at all points, replace the Inverter. INVERTER REPLACEMENT on Page 58

3.1 LOSS OF COMMUNICATION TO THE STEERING POSITION SENSOR

DEFINITION: No data, or invalid data from the Steering Position Sensor to the Main Control Board.

MOTOR STATUS: Steering speed is limited, Auto Park and Straight Ahead on Deploy are disabled.

RESET STEPS: No reset actions needed. When communication is reestablished, the Error Code will clear, the presence of the Error Code indicates the Steering Sensor Cable is "Open"/disconnected somewhere.

CONSUMER TROUBLESHOOTING:

ULTREX: Turn the Motor off, then back on. If the Error Code repeats without visible obstructions take motor to an Authorized Service Provider.

ULTERRA/INSTINCT: Turn the Motor off, then back on. If the Error Code repeats without visible obstructions take motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Turn the Motor off, then back on. If the Error Code repeats without visible obstructions take motor to an Authorized Service Provider.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Inspect the Steering Sensor Cable for bad connections or damage.

Step 1. Look for any signs of damage to the Steering Sensor Cable. If any indications of damage are present replace that section of cable.

Step 2. Verify the Steering Sensor Cable is properly plugged into the Main Control Board. (WIRING DIAGRAM, Page 7)

Step 3. Verify the Steering Sensor Cable connection at the Steering Housing, under the Wrap Drum Cover is secure.

Step 4. If the Steering Sensor Cable is free of apparent damage and properly connected at all points, replace the Steering Housing. ULTREX STEERING HOUSING REPLACEMENT on Page 76

ULTERRA/INSTINCT: Inspect the Steering Sensor Cable for bad connections or damage.

Step 1. Look for any signs of damage to the Steering Sensor Cable. If any indications of damage are present replace that section of cable.

Step 2. Verify the Steering Sensor Cable is properly plugged into the Main Control Board. (WIRING DIAGRAM, Page 10)

Step 3. If the Steering Sensor Cable is free of apparent damage and properly connected at all points, replace the Steering Housing. ULTERRA/ RIPTIDE INSTINCT STEERING HOUSING REPLACEMENT on Page 103

TERROVA/RT TERROVA: Inspect the Steering Sensor Cable for bad connections or damage.

Step 1. Look for any signs of damage to the Steering Sensor Cable. If any indications of damage are present replace that section of cable.

Step 2. Verify the Steering Sensor Cable is properly plugged into the Main Control Board. (WIRING DIAGRAM, Page 16)

Step 3. If the Steering Sensor Cable is free of apparent damage and properly connected at all points, replace the Steering Housing. STEERING HOUSING REMOVAL on Page 125

3.2 LOSS OF COMMUNICATION TO THE TRIM POSITION SENSOR

DEFINITION: No data, or invalid data from the Trim Position Sensor to the Main Control Board.

MOTOR STATUS: Manual Trim for 2 Second Intervals. Stow/Deploy disabled.

RESET STEPS: No reset actions needed. When communication is reestablished, the error will clear, the presence of this Error Code indicates the Steering Sensor Cable is "Open"/disconnected somewhere.

CONSUMER TROUBLESHOOTING:

ULTREX: Instinct/Ulterra Error only

ULTERRA/INSTINCT: Turn the Motor off and then back on. If the Error Code returns manually stow/emergency stow the Motor and take the Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Instinct/Ulterra Error Only.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Instinct/Ulterra Error Only

ULTERRA/INSTINCT:

Step 1. Check the Trim Position Sensor is securely plugged into the Main Control Board. WIRING DIAGRAM Page 10.

Step 2. Inspect for any damage to the connecting cable between the Control Board and the Trim Housing.

Step 3. If no connection issues can be found/identified replace the Trim Housing. TRIM HOUSING REMOVAL, Page 97.

TERROVA/RT TERROVA: Instinct/Ulterra Error Only

3.3 STEERING POSITION SENSOR – LOSS OF MAGNET

DEFINITION: There is no data, or invalid, data from the Steering Position Sensor to the Main Control Board.

MOTOR STATUS: Steering speed limited, Auto Park and Straight Ahead on Deploy disabled.

RESET STEPS: Cycle Power to Reset.

CONSUMER TROUBLESHOOTING:

ULTREX: Turn the Motor off, then back on. If the Error Code repeats without visible obstructions take motor to an Authorized Service Provider.

ULTERRA/INSTINCT: Turn the Motor off, then back on. If the Error Code repeats without visible obstructions take motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Turn the Motor off, then back on. If the Error Code repeats without visible obstructions take motor to an Authorized Service Provider.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Inspect the Steering Sensor Cable for bad connections or damage.

Step 1. Look for any signs of damage to the Steering Sensor Cable. If any indications of damage are present replace that section of cable.

Step 2. Verify the Steering Sensor Cable is properly plugged into the Main Control Board.

Step 3. Verify the Steering Sensor Cable at the Steering Housing, under the Wrap Drum Cover is securely made. This may require removing the Heat Shrink to inspect properly.

Step 4. Replace the Steering Housing. ULTREX STEERING HOUSING REPLACEMENT, Page 76.

ULTERRA/INSTINCT: Inspect the Steering Sensor Cable for bad connections or damage.

Step 1. Look for any signs of damage to the Steering Sensor Cable. If any indications of damage are present replace that section of cable.

Step 2. Verify the Steering Sensor Cable is properly plugged into the Main Control Board (WIRING DIAGRAM on Page 10).

Step 3. Replace the Steering Housing (REMOVE THE STEERING HOUSING, Page 104)

TERROVA/RT TERROVA: Inspect the Steering Sensor Cable for bad connections or damage.

Step 1. Look for any signs of damage to the Steering Sensor Cable. If any indications of damage are present replace that section of cable.

Step 2. Verify the Steering Sensor Cable is properly plugged into the Main Control Board (WIRING DIAGRAM on Page 18).

Step 3. Replace the Steering Housing (STEERING HOUSING REMOVAL, Page 125)

3.4 TRIM SENSOR – LOSS OF MAGNET

DEFINITION: No data or invalid data from the Trim Position Sensor to the Main Control Board.

MOTOR STATUS: Instinct/Ulterra Error only. Manually trim for 2 seconds at a time, Stow and Deploy disabled.

RESET STEPS: Cycle Power to Clear.

CONSUMER TROUBLESHOOTING:

ULTREX: Instinct/Ulterra Only.

ULTERRA/INSTINCT: Turn the Motor off, then back on. If the Error Code repeats without visible obstructions manually stow/emergency stow the Motor and take the Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Instinct/Ulterra Only.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Instinct/Ulterra Only.

ULTERRA/INSTINCT:

Step 1. Check the Trim Position Sensor is plugged into the Control Board. WIRING DIAGRAM Page 10.

Step 2. Inspect for any damage to the connecting cable between the Control Board and the Trim Housing.

Step 3. If no connection issues can be found/identified replace the Trim Housing. TRIM HOUSING REMOVAL, Page 97.

TERROVA/RT TERROVA: Instinct/Ulterra Only.

3.5 BOTH DEPLOY AND STOW SENSORS ACTIVE AT THE SAME TIME

DEFINITION: Terrova/RT Terrova has both the Stowed and Deployed Sensors active.

MOTOR STATUS: Terrova/RT Terrova Error only. Manually trim for 2 seconds at a time, Stow and Deploy disabled.

RESET STEPS: Cycle power to clear.

CONSUMER TROUBLESHOOTING:

ULTREX: Terrova/RT Terrova Only.

ULTERRA/INSTINCT: Terrova/RT Terrova Only.

TERROVA/RT TERROVA: If deployed and the Ramps are in the "up" position try pushing down on the Stow/Deploy Lever and pushing the Ramps into the deployed position. Remove the Right Sideplate to inspect for debris limiting the movement of the arm connecting the Stow/Deploy Lever to the Motor Ramps.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Terrova/RT Terrova Only.

ULTERRA/INSTINCT: Terrova/RT Terrova Only.

TERROVA/RT TERROVA: Inspect Stow/Deploy Arm for free movement, check for magnets in the Magnet assembly. Also inspect the Sensor on the left side of the Base Extrusion and the Actuator attached to the Steering Housing on the Left Side. Replace the Main Control Board. TERROVA/RIPTIDE TERROVA MAIN CONTROL BOARD REPLACEMENT on Page 117.

3.6 BOTH DEPLOY AND HORIZONTAL SENSORS ACTIVE AT THE SAME TIME

DEFINITION: Ulterra/Riptide Instinct, both the Deploy Sensor and Horizontal Sensor are active at the same time.

MOTOR STATUS: Instinct/Ulterra Error Code only. Error Code displays on the remote, Stow, Deploy, and Trim functions limited or disabled.

CONSUMER TROUBLESHOOTING:

ULTREX: Instinct/Ulterra Only.

ULTERRA/INSTINCT: Turn the Motor off, then back on. If the Error Code repeats without visible obstructions take the Motor to an Authorized Service Provider. This is likely the consequence of having removed the Tilt Quick Disconnect Pin and then reinstalled it incorrectly.

TERROVA/RT TERROVA: Instinct/Ulterra Only.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Instinct/Ulterra Only.

ULTERRA/INSTINCT: Check sensor/magnet positions. The Horizontal Sensor is installed on the Tilt Actuator Assembly. The Deploy Sensor is the Cam/Pin Sensor, under the Right Motor Rest, the actuator is attached to the Base Extrusion with the Plastic Shoulder Bolt.

If Deployed: Verify the Emergency Stow Quick Disconnect Pin is inserted through the Steering Housing Casting, Tilt Brackets and Tilt Knuckle Assembly back into the Steering Housing Casting. Verify the Tilt Actuator, TILT ACTUATOR OR TILT BRACKET ASSEMBLY REPLACEMENT OR ADJUSTMENT on Page 110.

If Stowed: Remove the Right Sideplate and Motor Ramp. Check the position of the Deploy or Pin/Cam Actuator to verify it moves freely and is only over the Sensor when the Motor is in the deployed position.

If both of Actuators are not aligned with the Sensors and the Error Code persists replace the Control Board. ULTERRA/RIPTIDE INSTINCT MAIN CONTROL BOARD REPLACEMENT Page 87.

TERROVA/RT TERROVA: Instinct/Ulterra Only.

3.7 EMERGENCY RELEASE PIN SENSOR INACTIVE

DEFINITION: No input signal from the Sensor detecting the Emergency Stow Quick Disconnect Pin.

MOTOR STATUS: Instinct/Ulterra Error Code only. Error Code displays on the Remote, Stow, Deploy, and Tilt functions disabled.

CONSUMER TROUBLESHOOTING:

ULTREX: Instinct/Ulterra Only.

ULTERRA/INSTINCT: Turn the Motor off, then back on. If the Error Code repeats without visible obstructions take motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Instinct/Ulterra Only.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Instinct/Ulterra Only.

ULTERRA/INSTINCT: Check the Emergency Stow Quick Disconnect Pin for proper installation.

Step 1. Verify the Emergency Stow Quick Disconnect Pin is inserted through the Steering Housing Casting, Tilt Brackets and Tilt Knuckle Assembly back into the Steering Housing Casting. TILT ACTUATOR OR TILT BRACKET ASSEMBLY REPLACEMENT OR ADJUSTMENT on Page 110.

Step 2. Check the Pin Sensor is properly plugged into the Main Control Board. WIRING DIAGRAM Page 13.

Step 3. If the Emergency Stow Quick Disconnect Pin is installed, the Pin Sensor is properly plugged into the Main Control Board, and the Error Code persists, replace the Steering Housing. ULTERRA/ RIPTIDE INSTINCT STEERING HOUSING REPLACEMENT on Page 103.

TERROVA/RT TERROVA: Instinct/Ulterra Only.

3.8 BOTH FOOT PEDAL END-OF-TRAVEL SENSORS ACTIVE AT THE SAME TIME

DEFINITION: Ultrex Only. Active input from both End Of Travel Sensors. These are the sensors in the base of the Foot Pedal that are actuate by magnets in the Foot Pedal Rocker.

MOTOR STATUS: Steering Disabled

CONSUMER TROUBLESHOOTING:

ULTREX: Check for loose magnets in contact with the sensors. Cycle power, if the Error Code remains take the Motor to an Authorized Service Provider.

ULTERRA/INSTINCT: Ultrex Only.

TERROVA/RT TERROVA: Ultrex Only

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Double check no magnets are positioned over the Sensors; replace the Main Control Board. ULTREX MAIN CONTROL BOARD REPLACEMENT Page 63.

ULTERRA/INSTINCT: Ultrex Only.

TERROVA/RT TERROVA: Ultrex Only.

3.9 FOOT PEDAL PRESSURE SENSOR LOW OUTPUT VOLTAGE

DEFINITION: Ultrex Only. Voltage through the steering sensor is too low, below 0.45V.

MOTOR STATUS: Steering Disabled

CONSUMER TROUBLESHOOTING:

ULTREX: Cycle power, If the Error Code remains take to an Authorized Service Provider.

ULTERRA/INSTINCT: Ultrex Only.

TERROVA/RT TERROVA: Ultrex Only.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Verify the Sensor Board is properly plugged into the Main Control Board (WIRING DIAGRAM, Page 7). If it is properly plugged in, replace the Steering Sensor Board. STEERING SENSOR BOARD REPLACEMENT Page 71.

ULTERRA/INSTINCT: Ultrex Only.

TERROVA/RT TERROVA: Ultrex Only.

3.10 BOTH STOW AND LEVER SENSORS ACTIVE AT THE SAME TIME

DEFINITION: Terrova/RT Terrova has both the Stowed and Deployed Sensors active.

MOTOR STATUS: Terrova/RT Terrova Error only. Prop Disabled.

RESET STEPS: Cycle power to clear the Error Code.

CONSUMER TROUBLESHOOTING:

ULTREX: Terrova/RT Terrova Only.

ULTERRA/INSTINCT: Terrova/RT Terrova Only.

TERROVA/RT TERROVA: If deployed and the Ramps are in the "up" position try pushing down on the Stow/Deploy Lever and pushing the Ramps into the deployed position. May remove the Right Sideplate to inspect for debris limiting the movement of the arm connecting the Stow/Deploy Lever to the Motor Ramps.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Terrova/RT Terrova Only.

ULTERRA/INSTINCT: Terrova/RT Terrova Only.

TERROVA/RT TERROVA: Inspect Stow/Deploy Arm for free movement, check for magnets in the Magnet assembly. Replace the Main Control Board. TERROVA/RIPTIDE TERROVA MAIN CONTROL BOARD REPLACEMENT on Page 117.

3.11 DEPLOY, STOW, AND LEVER SENSORS ACTIVE AT THE SAME TIME

DEFINITION: Terrova/RT Terrova has all the Lever, Stowed and Deployed Sensors active.

MOTOR STATUS: Terrova/RT Terrova Error only. Prop Disabled, Steering may also be disabled depending on exact GPS Navigation State.

RESET STEPS: Cycle power to clear the Error Code.

CONSUMER TROUBLESHOOTING:

ULTREX: Terrova/RT Terrova Only.

ULTERRA/INSTINCT: Terrova/RT Terrova Only.

TERROVA/RT TERROVA: If deployed and the Ramps are in the "up" position try pushing down on the Stow/Deploy Lever and pushing the Ramps into the deployed position. May remove the Right Sideplate to inspect for debris limiting the movement of the arm connecting the Stow/Deploy Lever to the Motor Ramps.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Terrova/RT Terrova Only.

ULTERRA/INSTINCT: Terrova/RT Terrova Only.

TERROVA/RT TERROVA: Inspect Stow/Deploy Arm for free movement, check for magnets in the Magnet assembly. Replace the Main Control Board. TERROVA/RIPTIDE TERROVA MAIN CONTROL BOARD REPLACEMENT on Page 117.

3.12 STEERING CALIBRATION INVALID

DEFINITION: Steering Calibration information is missing from the Main Control Board.

MOTOR STATUS: Steering Range is limited.

RESET STEPS: Complete Steering Calibration.

CONSUMER TROUBLESHOOTING:

ULTREX: Do a Steering Limit Calibration. ULTREX STEERING LIMIT CALIBRATION Page 84.

ULTERRA/INSTINCT: Do a Steering Limit Calibration. ULTERRA/RIPTIDE INSTINCT STEERING LIMIT CALIBRATION, Page 86.

TERROVA/RT TERROVA: Do a Steering Limit Calibration. TERROVA/RIPTIDE TERROVA STEERING LIMIT CALIBRATION Page 116.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: If Calibration did not work replace the Main Control Board. ULTREX MAIN CONTROL BOARD REPLACEMENT, Page 63.

ULTERRA/INSTINCT: If Calibration did not work replace the Main Control Board. ULTERRA/RIPTIDE INSTINCT MAIN CONTROL BOARD REPLACEMENT, Page 87.

TERROVA/RT TERROVA: If Calibration did not work replace the Main Control Board. TERROVA/RIPTIDE TERROVA MAIN CONTROL BOARD REPLACEMENT, Page 117.

3.13 NO CHANGE IN VALUES FROM THE TRIM POSITION SENSOR

DEFINITION: No change in value from the Trim Position Sensor when the Trim Motor is running.

MOTOR STATUS: Trim limited to manual operation 2 seconds at a time.

RESET STEPS: Cycle power to clear the Error Code.

CONSUMER TROUBLESHOOTING:

ULTREX: Instinct/Ulterra Only.

ULTERRA/INSTINCT: Turn the Motor off, then back on. If the Error repeats without visible obstructions take the Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Instinct/Ulterra Only.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Instinct/Ulterra Only.

ULTERRA/INSTINCT:

Step 1. Check the Trim Position Sensor is plugged into the Control Board. WIRING DIAGRAM Page 10.

Step 2. Inspect for any damage to the connecting cable between the Control Board and the Trim Housing.

Step 3. If no connection issues can be found/identified replace the Trim Housing. TRIM HOUSING REMOVAL, Page 97.

TERROVA/RT TERROVA: Instinct/Ulterra Only.

4.1 STEERING MOTOR IS IN CURRENT LIMIT

DEFINITION: High Amp Draw from the Steering Motor. Only displays while Steering command is being sent.

MOTOR STATUS: Steering disabled until steering command stops and then is reinitiated.

RESET STEPS: Stop Steering for a moment.

CONSUMER TROUBLESHOOTING:

ULTREX: Check for external obstacles to steering. If anything external is limiting motor movement remove that obstacle, if no external cause take the Motor to an Authorized Service Provider.

ULTERRA/INSTINCT: Check for external obstacles to steering. If anything external is limiting motor movement remove that obstacle, if no external cause take the Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Check for external obstacles to steering. If anything external is limiting motor movement remove that obstacle, if no external cause take the Motor to an Authorized Service Provider.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Test the motor on a known good power supply to confirm the error. Inspect the Steering Motor Wires for any damage. If the Error Code is still present and there is no wire damage to correct, replace the Steering Housing. ULTREX STEERING HOUSING REPLACEMENT, Page 76.

ULTERRA/INSTINCT: Test the motor on a known good power supply to confirm the error. Inspect the Steering Motor Wires for any damage. If the Error Code is still present and there is no wire damage to correct, replace the Steering Housing. ULTERRA/ RIPTIDE INSTINCT STEERING HOUSING REPLACEMENT, Page 103.

TERROVA/RT TERROVA: Test the motor on a known good power supply to confirm the error. Inspect the Steering Motor Wires for any damage. If the Error Code is still present and there is no wire damage to correct, replace the Steering Housing. TERROVA/RIPTIDE TERROVA STEERING HOUSING ,Page 125.

4.6 TRIM MOTOR IS IN CURRENT LIMIT

DEFINITION: High Amp Draw from the Trim Motor.

MOTOR STATUS: Trim Disabled.

RESET STEPS: Trim the opposite direction.

CONSUMER TROUBLESHOOTING:

ULTREX: Ulterra/Instinct Only.

ULTERRA/INSTINCT: Check for external obstacles to Trimming. If anything external is limiting motor movement remove that obstacle, if no external cause take the Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Ulterra/Instinct Only.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Ulterra/Instinct Only.

ULTERRA/INSTINCT: Test the motor on a known good power supply to confirm the error. Inspect the Trim Motor Wires for any damage. If the Error Code is still present and there is no wire damage to correct, replace the Trim Housing. TRIM HOUSING REMOVAL, Page 97.

TERROVA/RT TERROVA: Ulterra/Instinct Only.

4.8 TILT MOTOR IS IN CURRENT LIMIT

DEFINITION: High Amp Draw from the Tilt Motor.

MOTOR STATUS: Motor Paused during Stow/Deploy.

RESET STEPS: Reinitiate the Stow/Deploy.

CONSUMER TROUBLESHOOTING:

ULTREX: Ulterra/Instinct Only.

ULTERRA/INSTINCT: Check for external obstacles to tiltin. If anything external is limiting motor movement remove that obstacle, if no external cause take the Motor to an Authorized Service Provider.

TERROVA/RT TERROVA: Ulterra/Instinct Only.

SERVICE PROVIDER TROUBLESHOOTING:

ULTREX: Ulterra/Instinct Only.

ULTERRA/INSTINCT: Test the motor on a known good power supply to confirm the error. Inspect the Tilt Actuator Wires for any damage. If the Error Code is still present and there is no wire damage to correct, replace the Tilt Actuator. TILT ACTUATOR OR TILT BRACKET ASSEMBLY REPLACEMENT OR ADJUSTMENT Page 110.

TERROVA/RT TERROVA: Ulterra/Instinct Only.

ULTREX FAULTS WITHOUT ERROR CODES

RED STATUS LIGHT IS FLASHING, PROP, STEERING AND/OR OTHER FUNCTIONS SEEM TO BE DISABLED

CAUSE: This is the motor indicating an error/fault condition.

Step 1. Pair Android or iOS device with the One Boat Network App installed on it, or a full wireless remote, to the motor to read the error code. If an Error Code is displayed proceed to that Error Code case, if not proceed to step 2.

Step 2. If no Error Code Shows use an Android or iOS device with the One Boat Network app to Update the motor. The flashing light fully establishes that there is an error, early software did not display error codes on the remote. Once the software is updated read the error code in the app or on a full wireless remote and proceed to that Error Code Case.

ADVANCED GPS NAVIGATION FEATURES DO NOT WORK, STRAIGHT AHEAD ON DEPLOY DOES NOT FUNCTION, AUTO-PARK DOES NOT FUNCTION, PROP AND STEERING FUNCTION

This is normal behavior if the motor is not fully deployed. Prop and Steering function are enabled for "stump jumping," supporting the motor above the stowed position to clear obstacles, all GPS related functions are disabled though.

FIGURE 1

The motor is not registering that it is fully deployed. A magnet embedded in the underside of the Motor Ramp (2993900 Motor Ramp with Magnet, Figure 1) is "read" by a sensor in the steering housing. Aftermarket motor ramps (especially those that function as light mounts) do not have this magnet.

MOTOR WILL NOT STEER VIA FOOT PEDAL (NO ERROR)

A - REMOTE FUNCTIONS NORMAL

Corrective Action: Control Board is not acknowledging the signals from the Foot Pedal Steering Sensor Board. Verify the Sensor Board is properly plugged into the Control Board, if plug connection was secure replace the Steering Sensor Board. STEERING SENSOR BOARD REPLACEMENT on Page 71.

B - NO REMOTE FUNCTION, NO FOOT PEDAL FUNCTION

Cause: This indicates either a Steering Module failure, a lost connection between the Control Board and the Steering Module, or no output from the Control Board.

NOTICE: NO ERROR, if there is an error code diagnose and proceed based on that error code.

Step 1. Inspect the Steering Cable Connector under the Wrap Drum Cover. If Steering Housing side of the connector is damaged replace the Steering Housing, if the Cable side of the Connector is damaged replace the cable. If the cable and connector are good proceed to step 2.

Step 2. Apply 12 volts directly to the steering motor, if the steering motor does not run replace the steering motor; if it runs normally proceed to step 3.

Step 3. Use a VOM to check continuity end to end for the Black and White Wires. If either wire lacks continuity replace the cable, if the wires test good replace the control board.

C - MOTOR STEERS ALL THE WAY TO THE TOE OR HEEL AS SOON AS POWER IS TURNED ON, THEN WILL NOT RESPOND WITH REMOTE OR FOOT PEDAL SIGNALS.

Cause: The motor is receiving a steering signal, probably from the Steering Sensor Board.

Corrective Action:

Step 1. Disconnect the Steering Sensor Board from the Control Board (small white plug entering the Control Board), test for normal steering functions using the Advanced GPS Navigation Remote or Smart Phone OBN App.

A. If normal steering functions exist with Steering Sensor disconnected then replace Steering Sensor Board. STEERING SENSOR BOARD REPLACEMENT on Page 71 Test motor for proper operation.

B. If normal functions are not restored with the Steering Sensor disconnected, then proceed to Step 2.

Step 2. Disconnect the Advance GPS Navigation system (black plug with yellow dots) either at the Control Board in the Footpedal or in the control box.

A. If motor steers all the way to the toe or heel as power is turned ON, replace the Control Board. ULTREX MAIN CONTROL BOARD REPLACEMENT on Page 63. Test motor for proper operation.

B. If motor does not steer on its own all the way to the toe or heel as power is turned ON, reconnect Steering Sensor Board, leave the Advanced GPS Navigation system disconnected, and cycle power to the Ultrex motor. Proceed to Step 3.

Step 3. If the above steps results in normal steering functions with the Advanced GPS Navigation system disconnected then the Advance GPS Navigation system is incorrectly sending a continuous steering signal. Verify all remotes are powered OFF (a paired Micro Remote will need the battery removed), reconnect the Advance GPS Navigation system, and then power Ultrex ON.

A. If motor does steer on its own all the way to the toe or heel as power is turned ON, replace the Advance GPS Navigation system.

B. If the motor does not steer on its own when immediately when powered ON, then one of the remotes is sending a continuous steer signal. Turn remotes on one-by-one until the faulty remote is discovered. It will need to be replaced. Test motor for proper operation.

D - FOOT PEDAL IS LOOSE/MOVES FREELY, MOTOR MAY STEER VIA REMOTE.

Cause: This indicates a broken Steering Cable(s).

Corrective Action:

Step 1. Remove the Wrap Drum Cover and examine the Steering Cables.

A. As long as black and white wires running to the Steering Module are undamaged, replace Steering Cables).

Note: Unlike other Brushed Ultrex motors, the Steering Cables on Ultrex Quest Motors do not cross between the Foot Pedal and the motor.

B. If the black and white wires were damaged between the Plug and the Steering Module, replace the Steering Module in addition to the Steering Cable.

C. If the black and white wires going to the steering module have been damaged on the Foot Pedal side of the plug replace the Foot Pedal Cable Wire Harness Assembly.

ULTREX WILL NOT STEER VIA REMOTE

A - ULTREX WILL NOT STEER VIA REMOTE AND ALSO WILL NOT STEER VIA FOOT PEDAL.

Disconnect the Advanced GPS Controller and test with Foot Pedal Only. If the motor operates via Foot Pedal with Controller Disconnected replace the Advanced GPS Controller. If Foot Pedal does not steer the motor review B - NO REMOTE FUNCTION, NO FOOT PEDAL FUNCTION on Page 41.

B - ULTREX WILL NOT STEER WITH THE REMOTE BUT WILL STEER VIA FOOT PEDAL.

Use a known good Advanced GPS Control Remote or OBN App operating device and pair it to the Motor to determine whether the Remote or Controller of the Advanced GPS Control System. If a known good remote does not allow steering the Controller needs to be replaced.

MOTOR DOES NOT RUN WHEN THE MOMENTARY BUTTON IS PRESSED; MOTOR DOES RUN VIA REMOTE OR WHEN CONSTANT MODE IS ACTIVE.

Step 1. Perform the MOMENTARY SWITCH CALIBRATION on Page 84. If unable to complete that process proceed to Step 2.

Step 2. Inspect the Push Button to verify its magnet is still installed. If magnet is missing replace the Push Button Assembly. If magnet is present and Calibration does not work consider installing Reed Switch Replacement Kit, P/N 2884019.

Step 3. If unresolved by replacing the Reed Switch the Main Control Board must be replaced. ULTREX MAIN CONTROL BOARD REPLACEMENT on Page 63.

WITH SPEED SELECTOR SET 10-100% AND CONSTANT NOT ENGAGED, MOTOR RUNS WHITHOUT THE MOMENTARY BUTTON DEPRESSED.

Perform the MOMENTARY SWITCH CALIBRATION on Page 84.

PHYSICAL LOWER UNIT DAMAGE/BROKEN SKAG

If damaged the Sonar/Plain End may be replaced as a separate part, follow the instructions for COMPOSITE SHAFT REPLACEMENT/LOWER UNIT ASSEMBLY REPLACEMENT on Page 50 in the Repair Operations section of this manual.

A broken skag, bent prop, or other damage to the back end of the Motor Lower Unit will require replacement of the Motor Lower Unit.

CUSTOMER COMPLAINT THAT SPOT-LOCK TURNS OFF UNEXPECTEDLY

NOTICE: Any user input should override automated function. Adjusting speed or giving a steering input should disable Spot-Lock. Anything contacting the Foot Pedal in operation may be seen as a user input, rule out interference from the foot pedal well in the boat.

Check for proper operation of the End-of-Limit Sensors following the instructions under on EVALUATING ULTREX LIMIT SENSORS, Page 75. If the End-of-Limit Sensors function normally the reasons the motor would exit Spot-Lock are physical interference with the pedal or voltage changes. Consumer should check their foot pedal well for clearance, load test their batteries and inspect all electrical connections to the motor. The

Advanced GPS Controller may be replaced once to rule out any oddities within the Controller, but typically this issue is caused by the boat.

PROP SPINS BACKWARDS MORE THAN 1-2 REVOLUTIONS, PROP "FLUTTERS" OR VIBRATES WITHOUT SPINNING IN SPOT LOCK

NOTICE: It is not unusual for a motor to start in the wrong direction, it is only an issue if the motor runs multiple revolutions backwards or fails to spin the prop at all.

Step 1. Verify the consumer is describing enough of a delay that motor performance is affected, the prop may be observed running backwards one or two revolutions on a properly operating motor. The symptom is very difficult to reproduce, so the consumer description must be trusted.

Step 2. Replace the Inverter. INVERTER REPLACEMENT, Page 58.

Tolerance on components can allow the position sensing aspect of the Inverter Board to fail when connected to 24 Volts. Inverter Software was changed to prevent these issues from happening, so motors built after serial number 24180M##### should not experience these issues.

ULTERRA/RIPTIDE INSTINCT FAULTS WITHOUT ERROR CODES

RED STATUS LIGHT IS FLASHING, PROP, STEERING AND/OR OTHER FUNCTIONS SEEM TO BE DISABLED

CAUSE: This is the Motor indicating an error/fault condition.

Step 1. Pair Android or iOS device with the One Boat Network App installed on it, or a full wireless remote, to the motor to read the error code. If an Error Code is displayed proceed to that Error Code case, if not proceed to step 2.

Step 2. If no Error Code Shows, use an Android or iOS device with the One Boat Network app to update the Motor. The Red LED flashing fully establishes that there is an error. Software versions prior to 2.2 did not display Error Codes. When the Software update has been completed the Error Code will display on the Wireless Remote or the One Boat Network App.

PHYSICAL LOWER UNIT DAMAGE/BROKEN SKEG

If damaged the Sonar/Plain End may be replaced as a separate part, follow the instructions for COMPOSITE SHAFT REPLACEMENT/LOWER UNIT ASSEMBLY REPLACEMENT on Page 50 in the Repair Operations section of this manual.

A broken skeg, bent prop, or other damage to the back end of the Motor Lower Unit will require replacement of the Motor Lower Unit.

MOTOR DOES NOT TILT, NO ERROR CODE

This may be a motor that on deploy feeds out 6” then stops moving, or on Stow Trims up to the point it should begin tilting and stops, or a motor that in while tilting stops and does not resume movement until external movement (“helping the motor”) restores the connection to finish tilting.

Cause: Indicates lost connection between the Main Control Board and the Tilt Motor.

Step 1. Verify the Tilt Actuator Assembly is Plugged into the Main Control Board.

Step 2. Inspect the wires from the Tilt Motor to the Main Control Board for any points the wires may be broken.

Step 3. If the Tilt Motor is properly plugged in the indication is that a break in connection exists inside the Tilt Actuator; replace the Tilt Actuator Assembly. TILT ACTUATOR OR TILT BRACKET ASSEMBLY REPLACEMENT OR ADJUSTMENT, Page 110

MOTOR DOES NOT TRIM, NO ERROR CODE

Cause: Indicates lost connection between the Main Control Board and the Trim Motor, if the motor connections were good the Trim system would exceed amp limit.

Step 1. Verify the Trim Motor is Plugged in.

Step 2. Inspect the wires from the Trim Motor to the Main Control Board for any points the wires may be broken.

Step 3. Replace the Trim Motor. TRIM HOUSING REMOVAL, Page 97

QUICK RELEASE PIN CANNOT BE REINSERTED IN THE DEPLOYED POSITION

Reposition the Tilt Bracket Assembly on the Tilt Actuator. TILT ACTUATOR OR TILT BRACKET ASSEMBLY REPLACEMENT OR ADJUSTMENT, Page 110.

QUICK RELEASE PIN WAS PULLED WITH THE MOTOR IN THE STOWED POSITION

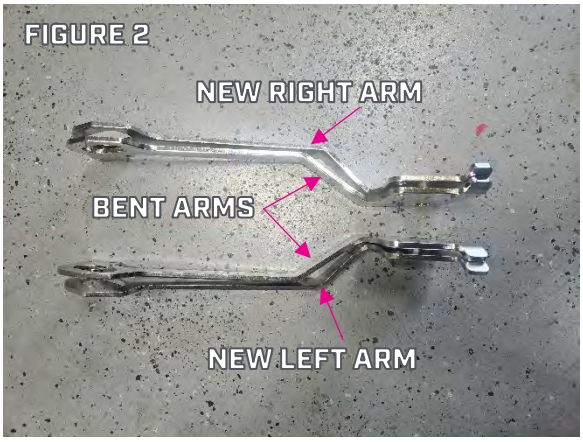
Reinsertion is possible, but must be done by feel. If very familiar with the Tilt Bracket, Tilt Arm and Steering Housing Alignment with the Quick Release Pin reinsert the Quick Release Pin. Otherwise pull the Trim Release Lever to allow the motor to be manually trimmed, trim the Motor Lower Unit off of the Ramps and then tilt the motor into the deployed position. Use TILT ACTUATOR OR TILT BRACKET ASSEMBLY REPLACEMENT OR ADJUSTMENT, Page 110 to reposition the Tilt Bracket allowing reinsertion of the Quick Release Pin in a normal Motor Position.

DAMAGED/BROKEN TILT NUT (TILT KNUCKLE)

Replace the Tilt Bracket Assembly. TILT ACTUATOR OR TILT BRACKET ASSEMBLY REPLACEMENT OR ADJUSTMENT, Page 110.

TRIM AND STEERING DISABLED, MOTOR DOES NOT REGISTER AS "DEPLOYED"

Any of the physical geometry around the latch and steering housing may be responsible for the Latch Bar failing to actuate the Deploy Sensor. The most likely component to be bent without other obvious damage is the Tilt Arms, an impact during deploy can stretch the bends in the Tilt Arms, as shown in Figure 2, in this state the Tilt Arms do not pull the Latch Pin Back far enough to actuate the Deploy Sensor.



A bent Base Extrusion, Latch Pin or Pivot Pin may also have the same result, it is unlikely for those components to be bent without obvious signs of damage.

To Replace the Tilt Arms remove the Quick Release Pin, Latch Pin and Pivot Pin, Lift the Steering housing enough to remove each Tilt Arm. Position the new Tilt Arms and reinstall the Pins.

MOTOR WILL NOT DEPLOY, STAYS ON RAMPS

The Stow Dead Stop Pad may be "curled" upward causing extra pressure between the Motor Lower Unit and the Ramps. The Stow Dead Stop Pad is the composite block installed to the Base Extrusion immediately behind the Steering Housing.

The motor stuck to the ramps may also be damaged ramps, a bent Base Extrusion, or a bent Pivot Pin.

PROP SPINS BACKWARDS MORE THAN 1-2 REVOLUTIONS, PROP "FLUTTERS" OR VIBRATES WITHOUT SPINNING IN SPOT LOCK

NOTICE: It is not unusual for a motor to start in the wrong direction, it is only an issue if the motor runs multiple revolutions backwards or fails to spin the prop at all.

Step 1. Verify the consumer is describing enough of a delay that motor performance is affected, the prop may be observed running backwards one or two revolutions on a properly operating motor. The symptom is very difficult to reproduce, so the consumer description must be trusted.

Step 2. Replace the Inverter. INVERTER REPLACEMENT, Page 58.

Tolerance on components can allow the position sensing aspect of the Inverter Board to fail when connected to 24 Volts. Inverter Software was changed to prevent these issues from happening, so motors built after serial number 24180M##### should not experience these issues.

TERROVA/RIPTIDE TERROVA FAULTS WITHOUT ERROR CODES

RED STATUS LIGHT IS FLASHING, PROP, STEERING AND/OR OTHER FUNCTIONS SEEM TO BE DISABLED

CAUSE: This is the motor indicating an error/fault condition.

Step 1. Pair Android or iOS device with the One Boat Network App installed on it, or a full wireless remote, to the motor to read the error code. If an Error Code is displayed proceed to that Error Code case, if not proceed to step 2.

Step 2. If no Error Code Shows use an Android or iOS device with the One Boat Network app to Update the motor. The flashing light fully establishes that there is an error, early software did not display error codes on the remote. Once the software is updated read the error code in the app or on a full wireless remote and proceed to that Error Code Case.

PROP SPINS BACKWARDS MORE THAN 1-2 REVOLUTIONS, PROP "FLUTTERS" OR VIBRATES WITHOUT SPINNING IN SPOT LOCK

NOTICE: It is not unusual for a motor to start in the wrong direction, it is only an issue if the motor runs multiple revolutions backwards or fails to spin the prop at all.

Step 1. Verify the consumer is describing enough of a delay that motor performance is affected, the prop may be observed running backwards one or two revolutions on a properly operating motor. The symptom is very difficult to reproduce, so the consumer description must be trusted.

Step 2. Replace the Inverter. INVERTER REPLACEMENT, Page 58.

Tolerance on components can allow the position sensing aspect of the Inverter Board to fail when connected to 24 Volts. Inverter Software was changed to prevent these issues from happening, so motors built after serial number 24180M##### should not experience these issues.

PHYSICAL LOWER UNIT DAMAGE/BROKEN SKEG

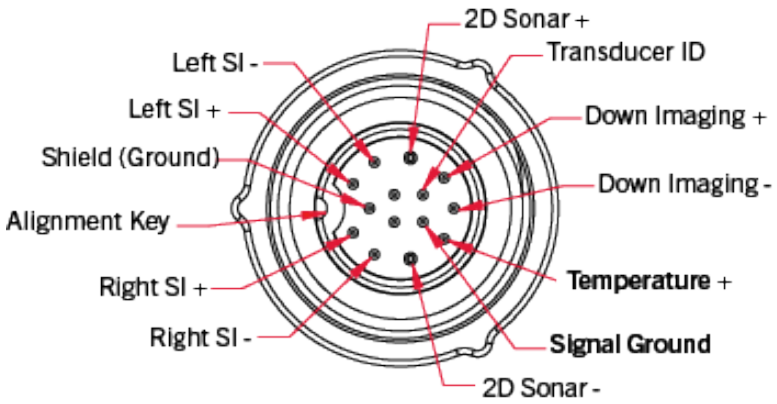
If damaged the Sonar/Plain End may be replaced as a separate part, follow the instructions for COMPOSITE SHAFT REPLACEMENT/LOWER UNIT ASSEMBLY REPLACEMENT on Page 50 in the Repair Operations section of this manual.

A broken skeg, bent prop, or other damage to the back end of the Motor Lower Unit will require replacement of the Motor Lower Unit.

BUILT IN SONAR TROUBLESHOOTING

BUILT-IN DUAL SPECTRUM CHIRP NOT RECOGNIZED BY HUMMINBIRD SOLIX OR APEX UNIT.

When a Solix/Apex does not properly detect a transducer, the unit will disable the pinging of the transducer. The component for transducer identification is in the cable that extends from the Motor Control Box to the depth finder (490575-2, CABLE, ADPTR, 14 PIN, 175"-DSC or 490575-3, CABLE, ADPTR, 14 PIN, 110"-DSC). Prior to replacing the Transducer suspect the extension cable. With the cable disconnected at the Motor Control Box only Pins 10 (2D Sonar +) and 14 (Signal Ground) should have connection with 5.11 kΩ of resistance between them. If connections exist between any of the other pins, or the resistance value differs by more than 0.05 kΩ or 50 Ω replace the extension cable.



If the Extension Cable tests good the issue may be the Transducer Assembly or the Solix/Apex. Test the Transducer by connecting a known good depth finder to it or Test the Solix/Apex by connecting the Unit to a known good transducer.

> If the Transducer is suspected bad replace the transducer assembly in the Motor, SONAR END REPLACEMENT, page 54.

If the unit is suspect contact Humminbird Customer Service to arrange repair of the Solix/Apex Unit (Support@humminbird.zendesk.com).

REPAIR OPERATIONS

LOWER UNIT/SHAFT (ULTREX, ULTERRA, RIPTIDE INSTINCT, TERROVA & RIPTIDE TERROVA)

COMPOSITE SHAFT REPLACEMENT/LOWER UNIT ASSEMBLY REPLACEMENT

COMPOSITE SHAFT REMOVAL

Step 1. Remove the Lower Unit and shaft from the motor. This varies depending on the motor model.
   a. Disconnect Motor and Sonar Wires in the Control Box
   b. Disconnect Depth Collar or Belt
   c. Slide Lower Unit and Shaft out from the Steering Housing

Step 2. Use a 4mm Hex Bit/Allen Wrench to remove the six screws that secure the Clamp Plate to the Motor Bung. (Figure 11).

NOTICE: The Screws Securing the Clamp Plate do have Blue Loctite applied, a secure engagement of the screws by the removal tool is critical to remove the screws without damaging the heads of the screws.


FIGURE 11


FIGURE 12

Step 3. Slide the clamp plate up the shaft to give easy access to the shaft plug and motor bung.

Step 4. Remove the Motor Shaft and Shaft Plug from the Motor Bung. This will be firmly engaged and will need some persuasion to separate; suggest tapping the edge of bung on alternating sides with soft face hammer or mallet. (Figure 12)

Step 5. Slide the shaft the rest of the way off of the wires. (Figure 13)


FIGURE 13

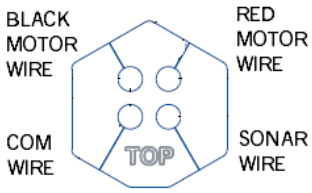
COMPOSITE SHAFT INSTALLATION

Prior to installing the shaft in Lower Unit verify the Shaft O-ring (Figure 14) and Wire Seal (Figure 15) are in place.

- A new O-ring should be used in reassembly, p/n 2294630. While there are two O-ring Groves only one is needed to fully seal the Lower Unit, that O-ring may be installed in either O-ring Groove.
- New Lower Unit Assemblies will include a new Gummy Seal. If replacing the shaft and reusing the Lower Unit a new Gummy Seal should be installed.
    - o 880-040 Clear Motor with Built-In Mega Side Imaging
    - o 880-041 Black Motor with Built-In Dual Spectrum Chirp
    - o 880-042 Gray No Sonar

Step 1. Lay the Lower Unit out so the wires are fully extended. Place the O-ring on the Shaft Plug and position the shaft so the end with the plug is near the ends of the wires pointed toward the Lower Unit.

Step 2. Install the Wire Seal. The word “TOP” should be facing up, so it is legible. Wires must go through the Wire Seal in the correct position as shown below and not be crossed on the way into the gummy seal. A small amount of dielectric grease may be used to make it easier to move the Wire Seal on the wires.



Step 3. Starting at the Motor Bung, comb/straighten the four wires coming from the Lower Unit so they do not cross. If the wires cross they will not fit through the Shaft of the Motor. (Figures 16 &17)

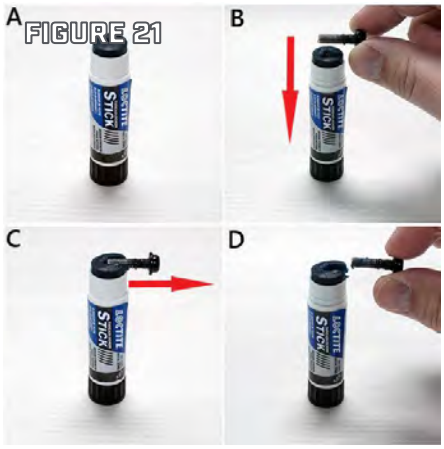
NOTICE: It may be helpful to tape the wires together. Taping the wires together every 8-12” will prevent the wires crossing or tangling. Begin with a ring of tape a few inches from the bung, as you apply each ring keep the wires stretched, if a wire is taped and bunches up that will also prevent successful assembly of the shaft to the Lower Unit.

Step 4. Feed the wires into the shaft and slide the shaft assembly down the wires until the shaft plug is in contact with the motor bung. (Figures 18 &19)

Step 5. Slide the clamp plate on to the shaft. Reposition the motor to the a vertical orientation. In this position the weight of the shaft is helping the connection into place, this will help prevent cross threading any of the bolts that secure the clamp plate. (Figure 20)

Step 6. Apply Loctite 248 to the threads of one of the Clamp Plate Screws, (Figure 21)

a. Loctite 248, Blue Medium Strength, Primerless Threadlocker Stick.
b. Push the strain relief screw into the tip of the Loctite stick sideways.
c. Draw the strain relief screw straight across the Loctite stick, capturing Loctite in the threads.
d. Loctite captured in threads of the strain relief screw.



Step 7. Place the screw through the clamp collar into the threaded holes in the bung of the Lower Unit.

Step 8. Tighten the screw until the head of the screw is in contact with the clamp collar.

Step 9. Repeat steps 7-9 for the other 5 clamp screws. (Figure 22)

Step 10. Use a torque wrench set to 40 in-lbs or 4.5 Nm to finish tightening the clamp screws. Tighten a screw to the correct torque, then do the same for the screw directly across from it, torque a different pair, then do the last pair. (Figures 23 & 24)

FIGURE 23

FIGURE 24

Step 11. Let the Lower Unit and Shaft Assembly rest for 10 seconds without contact, then re-torque all 6 bolts a second time. (Figures 25 & 26)

FIGURE 25

FIGURE 26

Step 12. Return the Lower Unit/Shaft to the Motor Assembly.

SONAR END REPLACEMENT

Begin by completing shaft removal, COMPOSITE SHAFT REMOVAL on Page 50.

NOTICE!

THIS INSTRUCTION IS FOR REPLACEMENT OF DAMAGED OR MALFUNCTIONING TRANSDUCER ASSEMBLIES. OTHER COMPONENT CHANGES MAKE CHANGING SONAR TYPE IMPRACTICAL. CHANGING SONAR TYPE ON A MOTOR IS AN UNAPPROVED MODIFICATION.

REMOVE SONAR END

Step 1. Once the Shaft is removed position the motor on a stable support with the prop shaft down and the sonar end up. (Figure 31).

Step 2. Remove the gummy seal from the bung of the Lower Unit. (Figure 32).


FIGURE 31

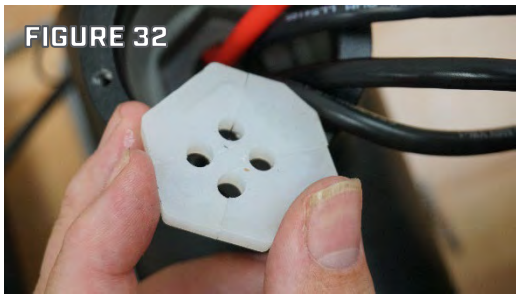


FIGURE 32

Step 3. Use a T25 tool to remove the 4 bolts that secure the sonar end to the motor assembly. (Figure 33)


FIGURE 33

Step 4. Remove the Sonar End from the Motor Assembly.

Step 5. Use a #2 Phillips to remove the two screws securing the Strain Relief top. (Figure 34)

Step 6. Cut the zip tie securing the Ferrite Bead to the Strain Relief

Step 7. Disconnect the com wire from the Inverter, use a small flat blade screwdriver or a pick to depress the lock on the connector, do not force the connector. (Figure 35)

Step 8. Use a T25 tool to remove the screws securing the Strain Relief Body and remove the strain relief from the Motor Assembly.

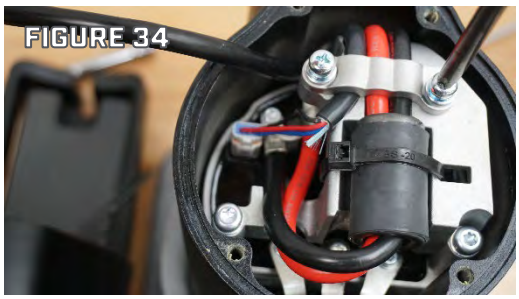


FIGURE 34

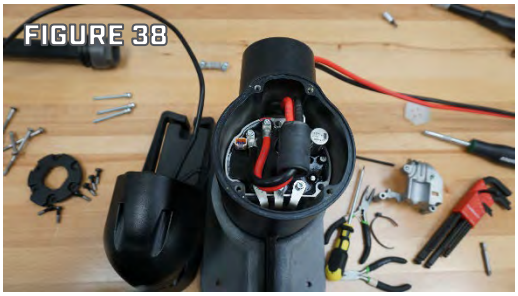
NOTICE: One of the screws securing the Strain Relief body is under the Com Wire.


FIGURE 35


FIGURE 36

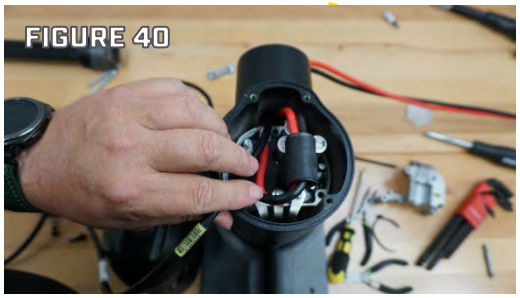
Step 9. Feed the Com Wire out of the Lower Unit Assembly to make space for the Sonar Connector to pass through the Bung. (Figure 37)

Step 10. Feed the Transducer wire through the Bung and out of Lower Unit. (Figure 38)

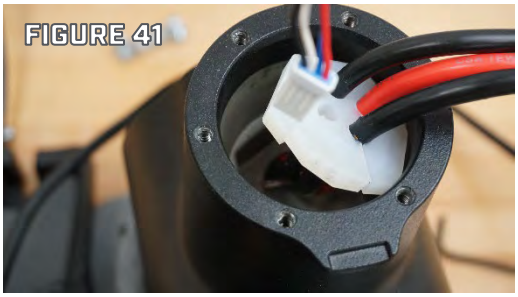


INSTALL NEW SONAR END

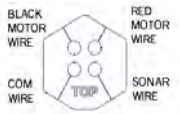
Step 1. Feed the Transducer wire past the Inverter Board through the bung and out. (Figure 39 & 40)



Step 2. Feed the Motor Communication Wire through the bung into the front end of the Motor Assembly. (Figures 41 &42)



NOTICE: Use the Gummy Seal to properly align the wires. Any tangles, overlaps or twists will prevent the motor from being assembled correctly.

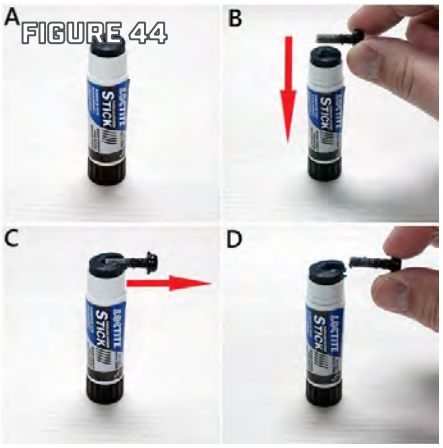


NOTICE: The Phase Leads should have remained connected to the Inverter Board throughout this process, thus the Inverter Board stayed securely against the surface of Lower Unit Assembly. It is critical that the Invertor Board have good full contact with the surface of the Lower Unit Assembly; if there is any chance contaminants got under the Inverter Board remove the Inverter Board and Clean the surface under the Inverter Board Before Continuing the Assembly of the Lower Unit.

Step 3. Place the Strain Relief over the Inverter Board so the wire tracks are toward the bung, the flat surface is in contact with the Inverter Board and the screw holes are aligned and no wires are caught or pinched. (Figure 43)

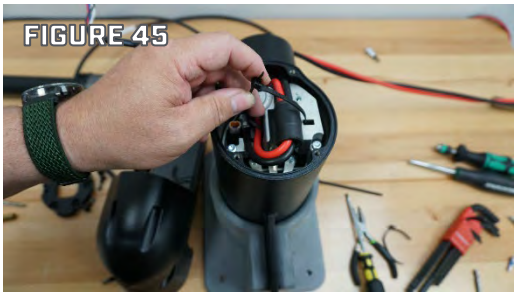
Step 4. Apply Loctite to the threads of the three screws securing the Strain Relief to the Motor Housing. (Figure 44)

a. Loctite 248, Blue Medium Strength, Primerless Threadlocker Stick.
b. Push the strain relief screw into the tip of the Loctite stick sideways.
c. Draw the strain relief screw straight across the Loctite stick, capturing Loctite in the threads.
d. Loctite captured in threads of the strain relief screw.

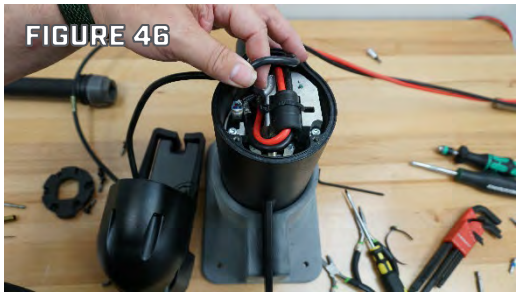


Step 5. Use a Torque Driver with a T25 bit Set to 30 in-lbs (3.4 Nm) to properly tighten the three screws that hold the strain relief in place.

Step 6. Apply a zip tie securing the ferrite bead to the strain relief. (Figure 45)



Step 7. Position the Com Wire in its groove in the strain relief. And push the connector into its spot on the inverter board. Be sure to push the connector in until the locking tab clicks in, check to verify the connector is secure. (Figure 46 & 47)



Step 8. Position the Red Motor Lead in its groove in the strain relief.
Step 9. Position the Black Motor Lead in its groove in the strain relief.

Step 10. Position the Top Cast of the Strain Relief over the wires and use a #2 Phillips Driver to tighten the two screws that secure the Top Cast to 18 in-lbs (2.0 Nm). (Figure 48)


FIGURE 48

Step 11. Pull the Transducer wire through so no excess wire is in the front end of the Lower Unit Assembly when the Transducer Assembly is close to the rest of the Lower Unit Assmbly

Step 12. Double Check the Placement of the Front End Seal. Place the Transducer Assembly in contact with the body of the Lower Unit Assembly.

Step 13. Use a T25 Bit to Torque the 4 Screws that secure the Transducer Assembly to the Lower Unit Assembly to 30 in-lbs (3.4 Nm). The screws can be reused, do not apply additional Loctite. The O-Rings should be replaced every disassembly.

Step 14. Complete the Repair by Installing the Motor Shaft. COMPOSITE SHAFT INSTALLATION on Page 51.

INVERTER REPLACEMENT

NOTICE: It is not necessary to remove the Lower Unit from the Motor to complete Inverter replacement.

Step 1. Use a T25 Tool to remove the 4 Screws Securing the Sonar End or Plain End to the Motor Assembly.
Step 2. Position the Sonar/Plain End to the side so you have access to the interior Front End of the Motor. (Figure 51)


FIGURE 51

Step 3. Use a #2 Phillips to remove the two screws securing the Top Cast to the Strain Relief
Step 4. Disconnect communications cable from the inverter. Use a pick or small flat blade screwdriver to disengage the locking tab on the connector. Do not force it apart. (Figure 52)


FIGURE 52

NOTICE: The screws securing the phase leads and power leads may either be T20 (830-120) or #2 Phillips (830-123). The #2 Phillips screws may also be driven with a 7mm Socket, but due to close clearance standard 7mm sockets may not be used at all screw locations.

Step 5. Use an appropriate driver to disconnect the red and black wires from the inverter.
Step 6. Clip the Zip Tie that secures the wires and Ferrite Bead to the Strain Relief. (Figure 53).
Step 7. Move these out of the way. The ferrite cable core can remain on the cables. (Figure 54)
Step 8. Use an appropriate driver to remove the 3 phase screws from the inverter.


FIGURE 53

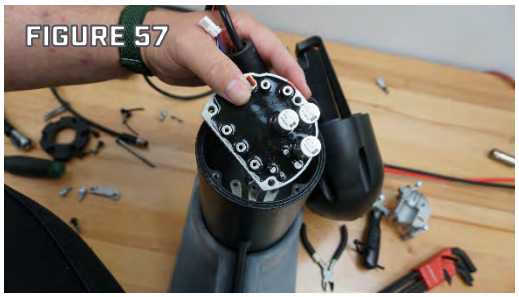
NOTICE: The screws securing the phase leads and power leads may either be T20 (830-120) or #2 Phillips (830-123). The #2 Phillips screws may also be driven with a 7mm Socket, but due to close clearance standard 7mm sockets may not be used at all screw locations.


FIGURE 54

Step 9. Remove the 3 screws that hold the strain relief to the motor with T25 driver.
Step 10. Remove strain relief. (Figure 55)


FIGURE 55

Step 11. Remove inverter. Tip the inverter up away from the phase leads for removal. (Figures 56 & 57)

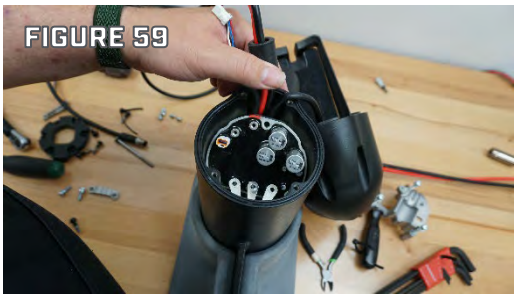


Step 12. Remove any foreign material from the mounting surface of the Inverter Board. Figure 58 shows a cleaned mounting surface.

NOTICE

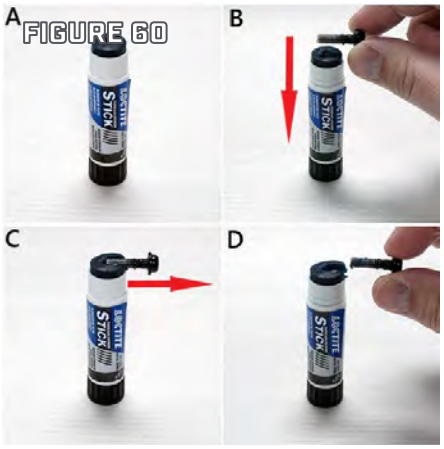
A CLEAN MOUNTING SURFACE FOR THE INVERTER BOARD IS CRITICAL TO COOLING. THE MOTOR WILL NOT OPERATE PROPERLY IF CONTAMINANTS ARE BETWEEN THE INVERTER BOARD AND THE SURFACE THE INVERTER BOARD MOUNTS TO.

Step 13. Slide the new Inverter Board under tabs for the Phase Leads. (Figure 59)



Step 14. Apply Loctite to the threads of the two screws securing the Strain Relief Casting to the Motor body. (Figure 60)

a. Loctite 248, Blue Medium Strength, Primerless Threadlocker Stick.
b. Push the strain relief screw into the tip of the Loctite stick sideways.
c. Draw the strain relief screw straight across the Loctite stick, capturing Loctite in the threads.
d. Loctite captured in threads of the strain relief screw.

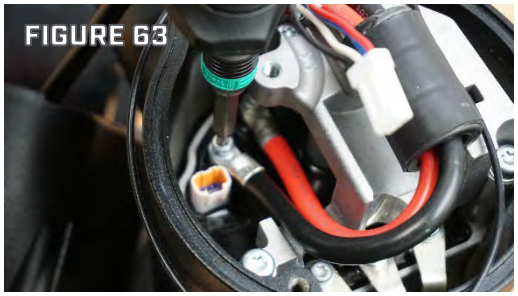


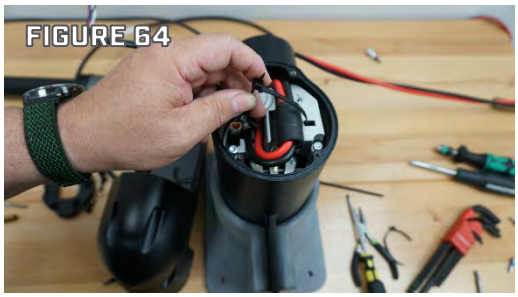
Step 15. Place the Strain Relief over the Inverter Board. Be sure not to capture any wires under the Strain Relief.
Step 16. Use a T25 Tool set to 30 in-lbs (3.4 Nm) to tighten the three screws that secure the Strain Relief and Inverter Board. (Figure 61)

Step 17. Install the Terminals to the Phase Leads, Use an appropriate Driver Bit and a torque driver set to 15 in-lbs (1.7 Nm) to install the terminal Screws. (Figure 62)

NOTICE: The screws securing the phase leads and power leads may either be T20 (830-120) or #2 Phillips (830-123). The #2 Phillips screws may also be driven with a 7mm Socket, but due to close clearance standard 7mm sockets may not be used at all screw locations.

Step 18. Install the Terminal Screw in the Red Power Wire using an appropriate Driver Bit and a torque driver set to 15 in-lbs (1.7 Nm). (Figure 63)
Step 19. Install the Terminal Screw in the Black Power Wire using an appropriate Driver Bit and a torque driver set to 15 in-lbs (1.7 Nm).
Step 20. Install the Zip Tie securing the Ferrite and Power Wires to the Inverter (Figure 64)
Step 21. Place the Com Wire, the Red Power Wire, and the Black Power wire in their grooves in the strain relief.
Step 22. Plug the Com Wire into the Port in the Inverter Board.





Step 23. Position the Strain Relief Top over the three wires and use a #2 Phillips Tool set to 18 in-lbs (2.0 Nm) to install the two screws that secure the Top Cast. (Figure 65)

Step 24. Double Check the Placement of the Front-End Seal. Place the Transducer Assembly in contact with the body of the Lower Unit Assembly.

Step 25. Use a T25 Bit to Torque the 4 Screws that secure the Transducer Assembly to the Lower Unit Assembly to 30 in-lbs (3.4 Nm).

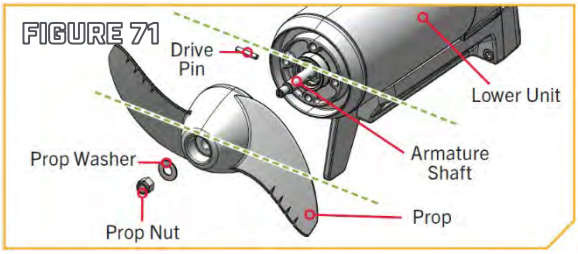

FIGURE 65

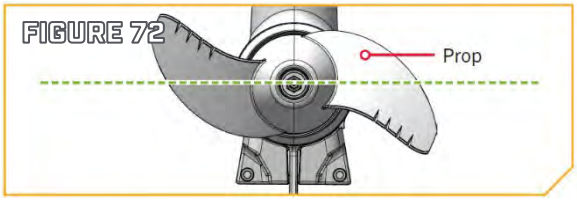
PROP REPLACEMENT

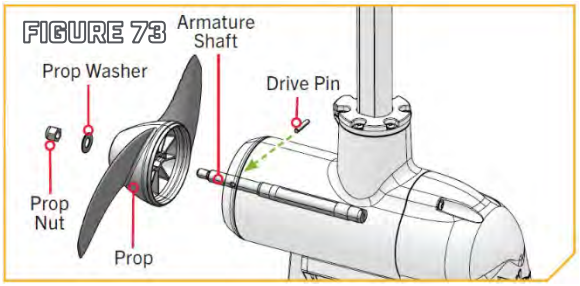
Step 1. Disconnect the motor from all sources of power prior to changing the Prop.

Step 2. Hold the Prop and loosen the Prop Nut with a pliers or a wrench. (Figure 71 & 73)

NOTICE: If the Drive Pin is sheared or broken, you will need to hold the shaft stationary with a flat blade screwdriver pressed into the slot on the end of the shaft while you loosen the Prop Nut.







Step 3. Remove the Prop Nut and Prop Washer.

Step 4. Turn the old Prop horizontally and pull it straight off. (Figure 72)

Step 5. Align the new Prop with the Drive Pin. (Figure 71 & 73)

NOTICE

IF THE PROP DOES NOT READILY SLIDE OFF, TAKE CARE NOT TO BEND THE PROP SHAFT WHILE REMOVING THE PROP BY PULLING THE PROP EVENLY OFF THE PROP SHAFT.

Step 6. Install the Prop Washer and Prop Nut.

NOTICE

DO NOT OVER-TIGHTEN AS THIS CAN DAMAGE THE PROP.

Step 7. Tighten the Prop Nut to 25-35 inch-lbs with a 9/16" Deep Well Socket.

ULTREX

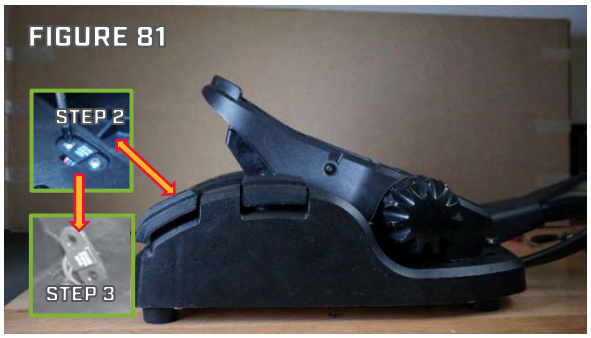
ULTREX MAIN CONTROL BOARD REPLACEMENT

ULTREX MAIN CONTROL BOARD REMOVAL

Step 1. With the motor deployed, position the Motor Lower Unit so the Foot Pedal is “Toe Down” as Shown in Figure 81. If the foot pedal is not in the toe down position, use the Lower Unit or Control Box to manually rotate the foot pedal.

Step 2. Use the #1 Phillips driver to remove the two, #4-24 x 1/4” screws from the sensor at the heel, in the base of the foot pedal. Set the two screws aside, they will be reused during reassembly. (Figure 81, Step 2)

Step 3. Tip the sensor to slide it into the opening in the foot pedal base. (Figure 81, Step 3)



Step 4. Rotate the Motor Lower Unit/Control Box so the Foot Pedal is positioned “Toe Up” as Shown in Figure 82.

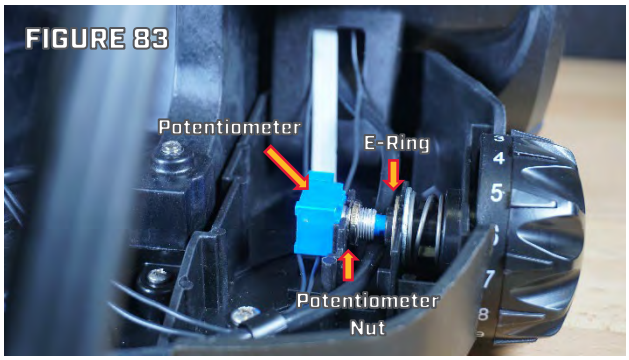
Step 5. Use a #1 Phillips driver to remove the two #4-24 x 1/4” screws from the sensor adjacent to the steering cables, in the base of the foot pedal. Set the two screws aside, they will be reused during reassembly. (Figure 82, Step 5)

Step 6. Tip the sensor to slide it into the opening in the foot pedal base. (Figure 82, Step 6)

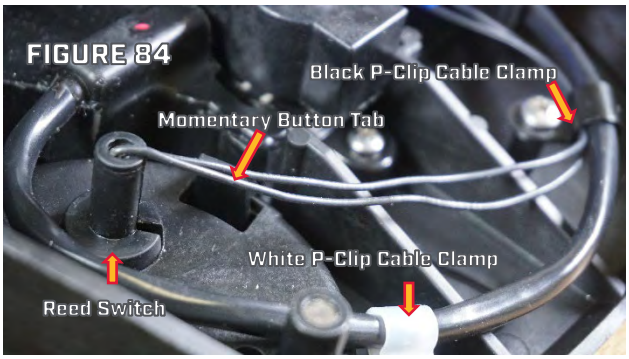
NOTICE: Figures 3 & 4 show the pedal upside down.

Step 7. Use the needle-nose pliers to firmly grasp the E-ring securing the speed selector knob (shown in Figure 83) and pull the E-ring off of the speed knob. With the E-ring removed the knob and spring will pull straight out the side of the pedal; set the E-ring, knob, and spring aside for reuse during reassembly.

Step 8. Use a 1/2” wrench to loosen the nut on the potentiometer (blue shaft and housing that the speed selector knob was connected to). With the nut loose the potentiometer assembly can be slid off its mounting location on the pedal. (Figure 83)



Step 9. The wires from the Reed Switch to the control board follow the Steering Sensor Board wire (See Figure 84). To guide the Reed Switch wires they are routed within one of P-Clip Cable Clamps. Use a #2 Phillips driver to remove the Screw

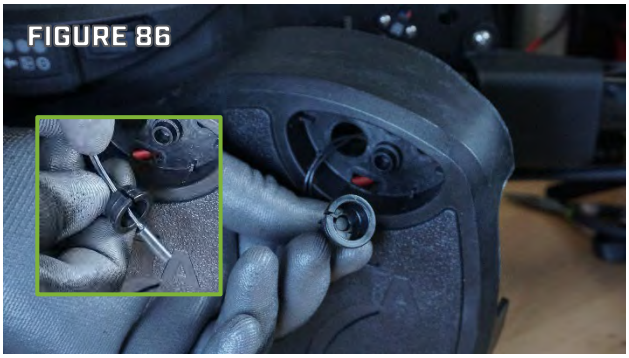


securing the black P-clip then remove the two small Reed Switch wires from the Black P-Clip Cable Clamp. Keep the screw with the P-clip, this is the only 2301310, SCREW-#8-18 X 1/2, that will be accessed during this repair do not use this screw in a different location.

Step 10. Remove the momentary button by pushing the exposed tab on the underside of the foot pedal upper (the tab is visible in Figure 84) so it unlatches, then lift the button until it clears the Button cavity (Figure 85).

Step 11. Remove the Reed Switch and Reed Switch Clip from the Foot Pedal Upper by squeezing the Reed Switch Clip with needle-nose pliers at the underside of the Foot Pedal Upper and pushing the Reed Switch Clip up through the Foot Pedal Upper. Figure 84 shows the reed switch clip, Figure 86 shows the reed switch and clip pushed out of the pedal rocker.

Step 12. Slide the Reed Switch out of the Reed Switch Clip by pushing the bottom edge of the Reed Switch with a small flat blade screwdriver upward through the slot in the side of the Reed Switch Clip. See inset in Figure 86.



Step 13. Pull the reed switch through the hole the reed switch clip was secured. The reed switch and the potentiometer should be loose under the foot pedal rocker.

Step 14. Turn the Foot Pedal Assembly over to expose the Bottom Plate. Use the #2 Phillips driver to remove all the screws in the Bottom Plate. Note that there are two types of Screws used here, the (2) #10-32 x 1/2” Machine Screws that secure the control board to the Bottom Plate and the (12) #8-18 x 5/8” Thread Cutting Screws that hold the Bottom Plate to the Foot Pedal Base. See Figure 87.

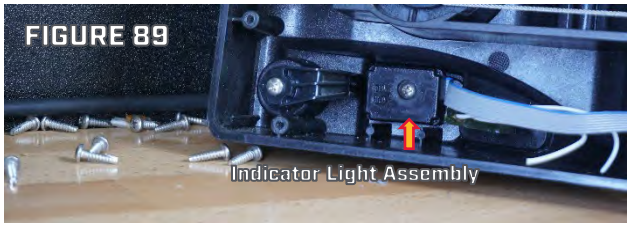
Step 15. Cut the two white leads from the power switch as close to the connectors as possible. (Figure 88)

Step 16. Cut the cable tie that secures the White Power Switch wires, End of Limit Sensor Wires, and Indicator Light Board ribbon cable. (Figure 88)

Step 17. Remove and set aside the conduit from the power switch and the sensor wires. (Figure 88)

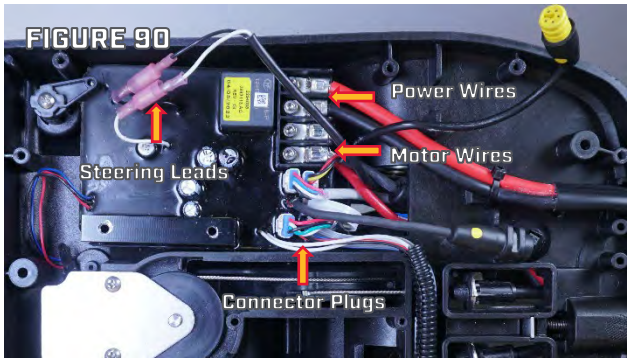
Step 18. Use the #2 Phillips driver to remove the screw securing the Indicator Light Assembly to the Foot Pedal Base. Set this screw aside, it will be reused during reassembly. (Figure 89)

NOTICE: The #8-18 x 3/4" screw securing the Indicator Light Assembly is the same thread size as the #8-18 x 5/8" screws securing the bottom plate but is slightly longer. The #8-18 x 3/4" screw must be used in this location at assembly.



Step 19. Use 3mm Hex Key/Allen Wrench to remove the lugs securing the Power and Motor Wires. (Figure 90)

Step 20. Disconnect the Steering Leads (the white and black leads connected by bullet connectors). (Figure 90)



Step 21. The three connector plugs are closely grouped in the corner of the control board. Use a small flat-blade screwdriver or pick to depress the locking tab on each while pulling the plug body free of the control board. Be aware that the motor communications wire and the steering sensor wire use the same type of plug. The motor will not function if these are reversed during assembly. Refer to the included Wiring Diagram for connector locations.

a. Remove the connector for the Steering Position Sensor from the Control Board.
b. Remove the connector for the Motor Communication Wire from the Control Board.
c. Remove the Steering Sensor Plug from the Control Board.

NOTICE

TAKE EXTRA CARE DISCONNECTING THE ACCESSORY ATTACHMENT, STEERING SENSOR CABLE CONNECTOR, MOTOR COMMUNICATION CABLE AND STEERING POSITION SENSOR CABLE; DAMAGING TO THESE WILL REQUIRE REPLACING ADDITIONAL COMPONENTS.

Step 22. Remove the accessory connector plug. (Figure 91)

a. Lift the accessory plug out of its slot in the foot pedal.
b. Remove the heat shrink from the connector
c. Pull the connector apart, pull straight apart, and do not twist.

NOTICE: The safest way to remove heat shrink is to score the heat shrink with a utility knife and then apply heat using a heat gun. The heat shrink will contract and split open where it was scored allowing the shrink to be removed. Trying to cut completely through the shrink cold you may damage the wire or slip off of the material with the knife which may result in cutting yourself.

Step 23. Remove the old control board from the foot pedal assembly. Guide the wires for the disconnected components out of the foot pedal, this should include the potentiometer ribbon cable, the reed switch, and the end of limit sensors.

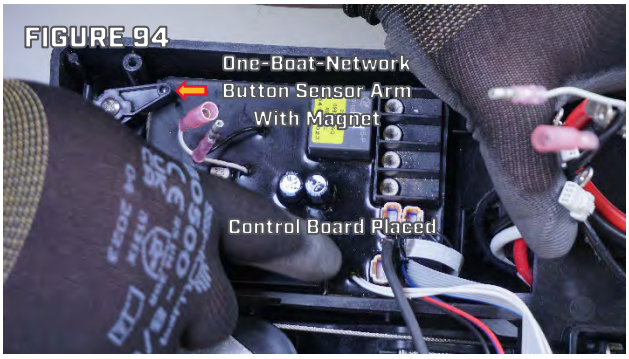
Figure 92 shows the pedal with the control board removed.


FIGURE 92

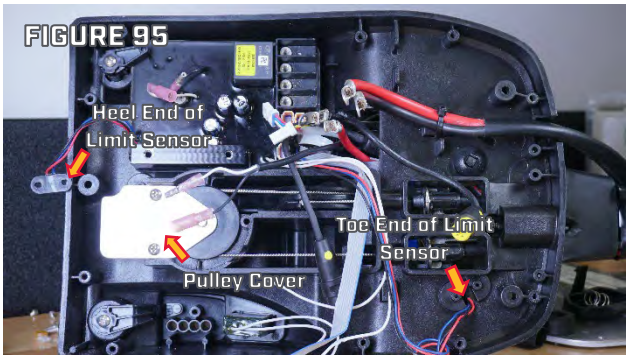
ULTREX MAIN CONTROL BOARD INSTALLATION

Step 1. Guide the Potentiometer through the upper opening in the Foot Pedal Base, then guide the Reed Switch through that same opening. There are two openings in the foot pedal base, it is necessary for all the connectors routed to the foot pedal rocker to go through the upper opening Figure 93 is a fully assembled pedal shown to illustrate where the opening is located.

Step 2. Slide the Control Board under the One-Boat-Network Button Sensor Arm with Magnet and place the Control Board in the Foot Pedal Base Assembly. (Figure 94)

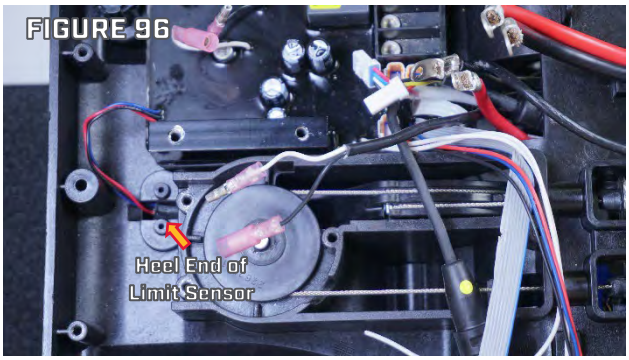


Step 3. Routing the End of Limit Sensors. The two End of Limit Sensors are the Hall Effect Sensors attached to the Control Board. One of the two Hall Effect Sensors will have a mark on the back side of the sensor. The marked sensor is the Left End of Limit Sensor and is installed at the heel end of the pedal. The toe/Right End of Limit Sensor is also closer to the toe side of the control board than the heel/left sensor (Figure 95).



a. Place the Steer Right End of Limit Sensor (Unmarked) through the opening next to the cables toward the toe end of the Foot Pedal Base. (Figure 95)

b. Use #2 Phillips driver to remove the two screws retaining the Pulley Cover and remove the Pulley Cover. Place the Steer Left End of Limit Sensor (the sensor with a mark on the back side) through the opening at the heel end of the Foot Pedal Base. Reinstall the Pulley Cover and the two #8-18 x 3/8" Screws that retain it. (Figure 96)



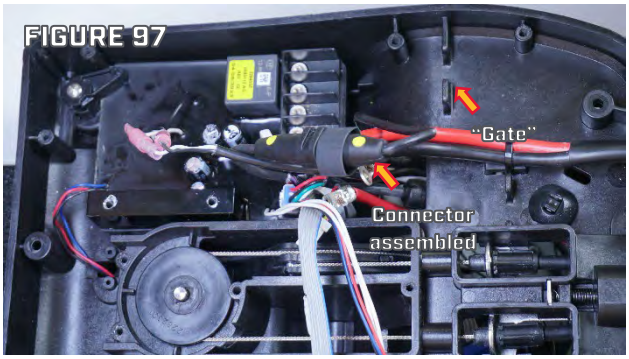
NOTICE: Be sure to push the End of Limit Sensors through the foot pedal base so they will not fall back through when you turn the Foot Pedal Assembly over.

NOTICE: Verify wiring with the included (Page 7). The wire installation locations can change, do not assume the included control board is an exact match to the one being removed.

Step 4. Follow Steps a-d to properly connect the accessory plug and place the connected assembly in the foot pedal.

a. Slide the included heat shrink, 2205414, over one side of the Accessory connector.

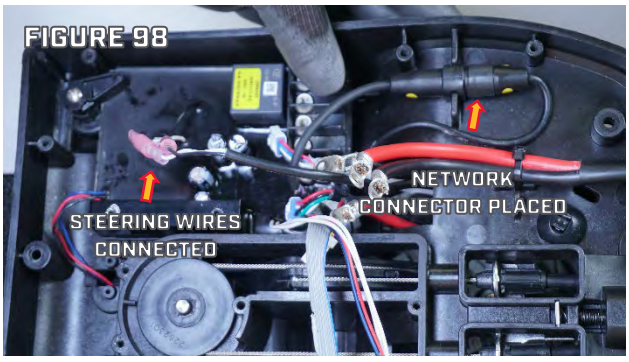
b. Align the two sides of the connector and then push them straight together until they are fully seated (no yellow showing between the two connector halves, the connector should "click" twice as you push it together.)



c. Position the heat shrink so it covers the seam between the two plug halves and use a heat gun to shrink the heat shrink sealing the connection. Figure 97 shows the heat shrink in place ready to apply heat.

d. Place the Accessory Plug in the "Gate" just toward the toe end of the Pedal from the Control Board.

Step 5. Connect the white and black wires from the steering motor to the white and black leads with bullet connectors on the control board. (Figure 98)



The connectors are close together in the corner of the board, use the WIRING DIAGRAM (Page 7) to properly locate the three connectors.

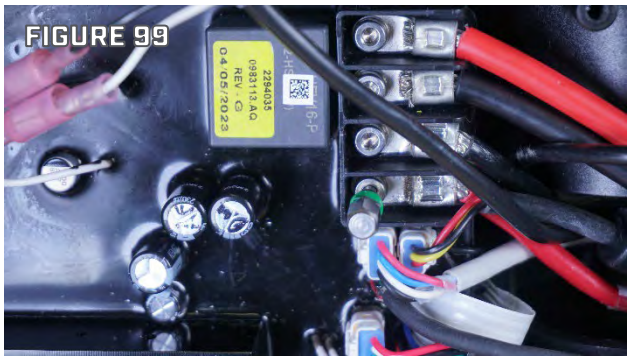
Step 6. Plug the connector from the steering sensor board into its receptacle on the control board.

Step 7. Plug the motor communication wire into its receptacle on the control board.

Step 8. Plug the Steering Position Wire into its receptacle on the control board.

Step 9. Use a torque driver set to 15 in-lbs/1.7 Nm to install the lugs and secure the motor leads in the position indicated in the included wiring diagram. (Figure 99)

Step 10. Use a torque driver set to 15 in-lbs/1.7 Nm to install the lugs and secure the power leads in the position indicated in the included wiring diagram. (Figure 99)



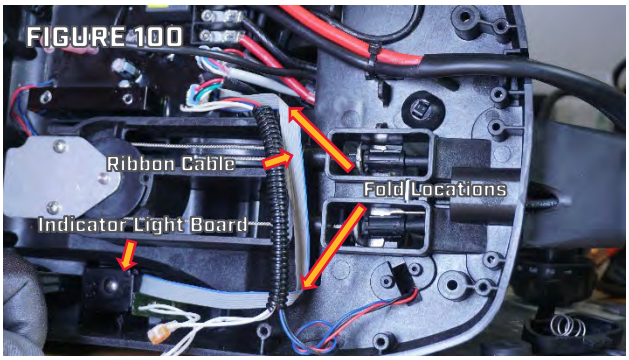
NOTICE

FAILURE TO TIGHTEN THE LUGS TO THE CORRECT TORQUE MAY DAMAGE THE CONTROL BOARD OR LEAVE THE LUGS LOOSE RESULTING IN MOTOR MALFUNCTIONS

Step 11. Position the Indicator Light Assembly so the LEDs are in the light tubes and the screw hole is aligned with the screw receptacle in the Foot Pedal Base. (Figure 100)

Step 12. Fold the ribbon cable to the Indicator Light Assembly so the ribbon cable lies flat in the bridge between the Control Board Area and the Power Switch side of the Foot Pedal Base. (Figure 100)

Step 13. Use the #8-18 x 3/4" (this screw is 1/8" longer than the ones for the Base Plate) to secure the Indicator Light Assembly in Place. (Figure 100)

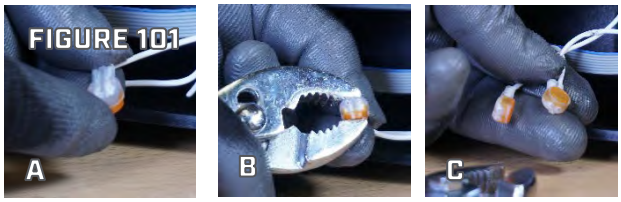


Step 14. Connect the two white wires from the control board to the power switch using the included 2040340 Scotchlok connectors. Figure 101 shows connector installation steps.

a. The white wires should not be stripped, push one wire from the control board and one wire from the switch into the holes of one 2040340 Scotchlok Connector

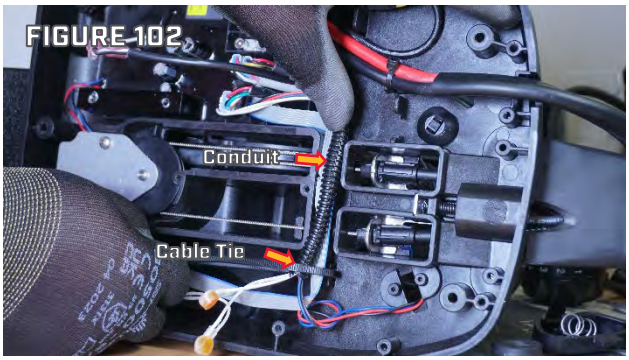
b. Make sure the white wires are fully inserted to the back of the 2040340 Scotchlok Connector, then use a slip jaw pliers to close the connector onto the wires. When fully closed grease will push out of the holes around the wires and the button will be flush with the body of the switch.

c. Repeat for the other white wires and other 2040340 Scotchlok Connector.



Step 15. Place the two white wires to the power switch and the red, black and blue wires from the Right End of Limit Sensor in the section of conduit and position the conduit on the bridge between the Control Board and Power Switch. (Figure 102)

Step 16. Install the included Cable Ties so that it secures the wires for the Power Switch and Right End of Limit Sensor and the Ribbon Lead for the Indicator Light Assembly. (Figure 102)



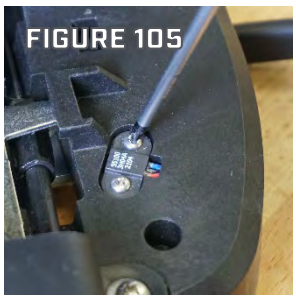
Step 17. Position the Bottom Plate over the Foot Pedal Base. (Figure 103)

Step 18. Using the two new #10-32 x 1/2" Screws included in this kit Secure the Control Board to the Bottom Plate. In Figure 103, 10-32 x 1/2" Screw locations are indicated by arrows. One location has a screw getting inserted.

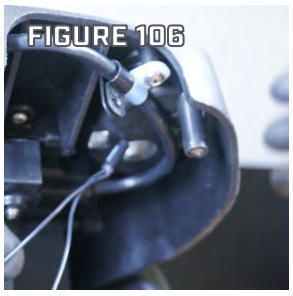
Step 19. Install the 12 #8-18 x 5/8" Screws securing the Bottom Plate to the Foot Pedal Base. These are the 12 unmarked holes in figure 103. Use hand tools and take care to follow the threads that were created on first installation of the screws to avoid damaging the foot pedal lower.

Step 20. Turn the Foot Pedal over so the Base is down. Rotate the Control Head/Lower Unit to place the Foot Pedal in the "Toe Up" position. (Figure 104)

Step 21. Place the Right End of Limit sensor in the recess next to the cable assemblies with the printing on the sensor facing up (visible). Use the #1 Phillips driver to install the two #4-24 x 1/4" Screws securing the sensor. (Figure 105)



Step 22. Guide the Reed Switch up through the opening at the bottom of the momentary button cavity. (Figure 106)



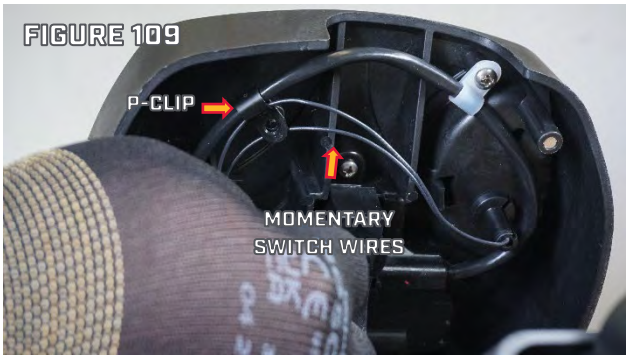
Step 23. Slide the wires for the Reed Switch into the slot in the side of the Reed Switch Clip so the wires exit the narrower end of the Reed Switch Clip, and the Reed Switch is at the wider end of the Reed Switch Clip. Push the Reed Switch to the bottom of the Reed Switch Clip. (Figure 107)

Step 24. Push the Reed Switch Clip with the Reed Switch installed in it into the round opening at the base of the momentary button cavity until it snaps into place.

Step 25. Place the momentary button spring onto the protrusion that supports the spring in the Momentary Button Cavity. Place the shorter tab of the Momentary Button into the corresponding slot adjacent to the Momentary Button Cavity, guide the longer tab onto the opposite wall of the Momentary Button Cavity then push the Momentary Button down until the longer tab catches. (Figure 108)

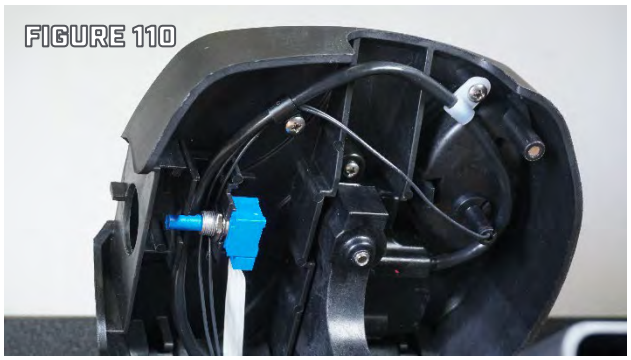
The Calibration section will have a description of positioning the reed switch for proper function, for now the switch should be at the bottom of the Reed Switch Clip. MOMENTARY SWITCH CALIBRATION, Page 84

Step 26. Secure the Wires going to the Reed Switch. Remove the screw from the Black P-Clip Cable Clamp, position the Reed Switch Wires inside the P-Clip with the Steering Sensor Board Wire, and then Re-install the screw securing the P-Clip Cable Clamp to the Foot Pedal Upper. (Figure 109)

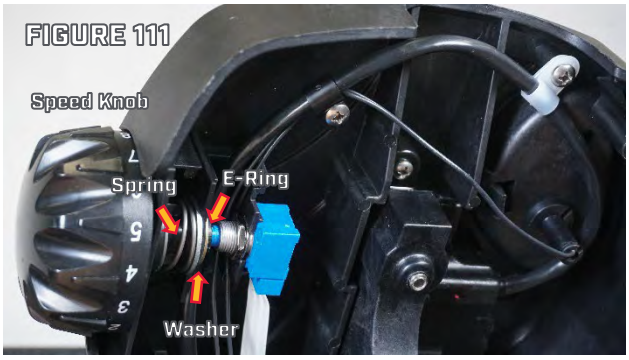


Step 27. Loosen the 1/2” nut on the Potentiometer. Slide the Shaft of the Potentiometer into the bracket next to the Speed Knob so the body of the Potentiometer is toward the midline of the Foot Pedal Assembly with the ribbon cable pointed straight toward the heel end of the pedal, and the nut and star washer on the Speed Knob side of the bracket.

Step 28. Use the 1/2” wrench to tighten the Potentiometer Nut. (Figure 110)



Step 29. Make sure the spring is still installed on the Speed Selector Knob. Align the flat side of the “D” shape in the Speed Selector Knob with the flat side of the Potentiometer shaft and Push the Speed Selector Knob through the openings in the side of the Foot Pedal Assembly and onto the Potentiometer Shaft. (Figure 111)



Step 30. Push the E-ring onto the groove of the Speed Selector Knob to secure the Speed Selector Knob in place. (Figure 111)

Step 31. Reposition the Motor Lower Unit so the Foot Pedal Assembly is positioned “Toe Down”. (Figure 112)

Step 32. Position the Left End of Limit Sensor in the cavity at the heel of the pedal with the printing facing up. Use the #1 Phillips driver to install the two #4-4-24 that secure the Left End of Limit Sensor. (Figure 113)

STEERING SENSOR BOARD REPLACEMENT

SENSOR BOARD REMOVAL

Step 1. Disconnect the motor from power and with the motor deployed, rotate the motor Lower Unit to place the foot pedal rocker in a level position. Turn the foot pedal over and use the #2 Phillips screwdriver to remove the twelve, #8-18x5/8” screws and the two, #10-32x1/2” machine screws from the bottom plate. (See Figure 121)

Step 2. Using a small flat-blade screwdriver, disconnect the steering sensor board plug (with four wires red, white, green, and black) from the main control board. (See Figure 122)

Step 3. Rotate/steer the Motor Lower Unit to the left, placing the foot pedal in a “toe up” orientation.

NOTICE: Be Careful to not damage the control board connector socket. When the locking tab is properly depressed the plug will release with little force.

Step 4. Using the #2 Phillips screwdriver, remove the two, #8-18x1/2” screws from the cable clamps that hold the steering sensor board cable (see Figure 123). If a zip tie secures the two black momentary reed switch leads to the steering sensor board cable use the side cutter to remove the zip tie. (See Figure 124) If the motor has a black cable clamp that cable clamp secures the reed switch wires and there is no zip tie.

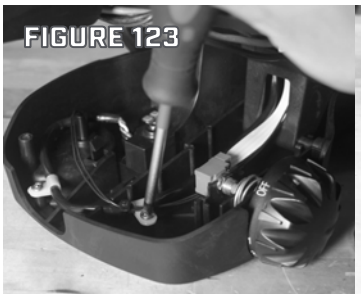


FIGURE 123

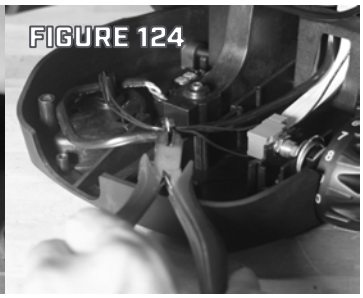


FIGURE 124

Step 5. Disconnect the control board potentiometer from the speed control knob, loosen the potentiometer nut completely using a 1/2” open-end wrench, and slide it out. (See Figures 125 & 126)

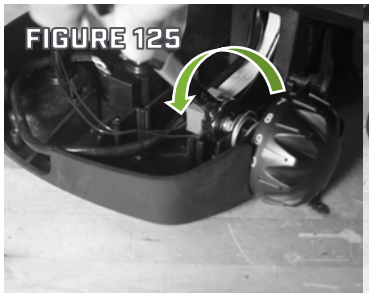


FIGURE 125

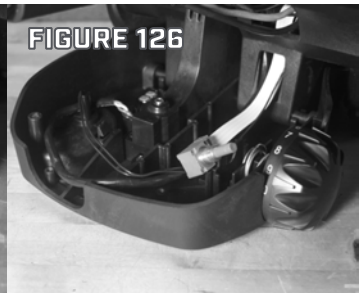


FIGURE 126

NOTICE

MISHANDLING (BENDING, TWISTING, ETC.) THE RIBBON CABLE DAMAGING THE CONDUCTORS WITHIN WILL REQUIRE MAIN CONTROL BOARD REPLACEMENT

Step 6. Turn the foot pedal back over and locate the knurled side of the pivot pin. Use a hammer and a 3/16” punch to drive the pin out towards the knurled end. (See Figure 127)

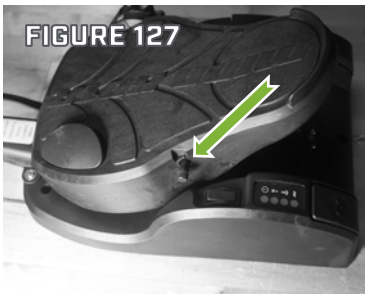
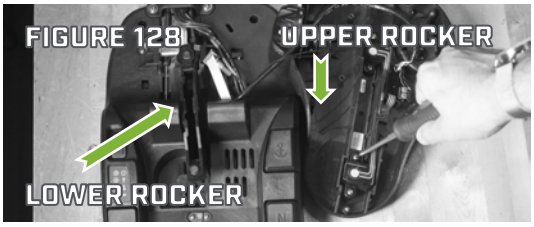


FIGURE 127

Step 7. Place the foot pedal upper rocker on a flat surface so the underside is visible. The Lower Rocker, still connected to the steering cables, stays in the foot pedal base (As shown in Figure 128).

NOTICE: The rubber bumpers in the lower rocker are critical to operation, make sure they are not removed. The toe side bumper is in a block that may fall out if the foot pedal assembly is tipped while the upper rocker is not installed.



Step 8. Use a #2 Phillips screwdriver to remove the four, #6-20x3/8” screws from the steering sensor board and remove the Steering Sensor Board with cable. (see Figure 129)

SENSOR BOARD INSTALLATION

Step 1. Place the replacement steering sensor board in the foot pedal upper rocker and secure it in place with the four, #6-20x3/8” screws using a #2 Phillips screwdriver (see Figure 129).

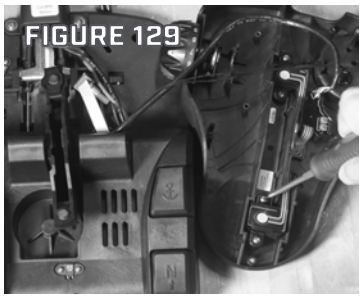


FIGURE 129

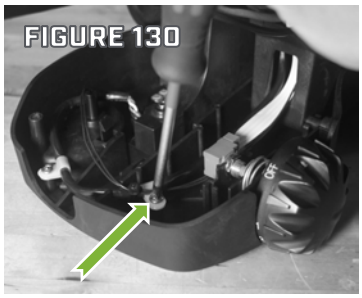


FIGURE 130

Step 2. Attach the two cable clamps to the steering sensor board cable using a #2 Phillips screwdriver and the two #8-18x1/2” screws. If both P-Clip/Cable Clamps were white discard the P-Clip/Cable Clamp that was closest to the Speed Wheel (indicated with the Green Arrow in Figure 130) and use the 2290840 P-CLIP, ULTREX FOOT PEDAL, Black P-Clip Cable Clamp that was included in this kit. The two wires connecting the Momentary Switch to the Main Control board should be captured within the Black P-Clip/Cable Clamp with the Cord for the Sensor Board.

Step 3. Route the steering sensor board cable through the small opening where the potentiometer ribbon cable and reed switch wires are located.

Step 4. Place the foot pedal upper rocker on the lower rocker and align the holes the pivot pin goes through using a #2 Phillips screwdriver as a guide pin (See Figure 131). Insert the pivot pin, tapered end first, and tap into place with the hammer and 3/16” punch until the knurled portion is flush with the foot pedal top with magnets.


FIGURE 131

Step 5. Insert the potentiometer back into the speed selector knob, with the ribbon cable facing the heel side of the foot pedal. Ensure that the lock washer is on the same side as the nut. Tighten the potentiometer nut in place using a 1/2” open-end wrench. (See Figure 133)

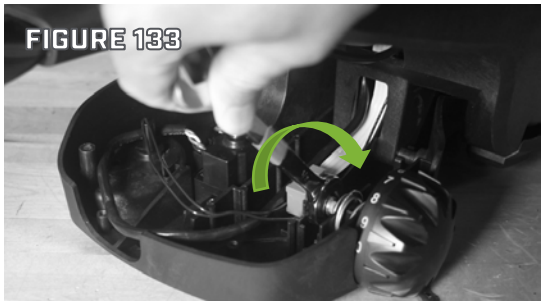


FIGURE 133

Step 6. Turn the foot pedal back over and connect the steering sensor board connector to the main control board, ensuring it clicks into place. (See Figure 134). Refer to the wiring diagrams to ensure proper installation location of the sensor plug.

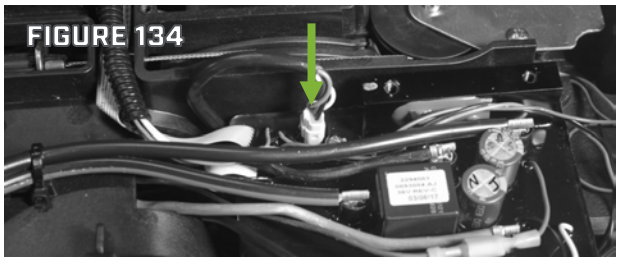


FIGURE 134

Step 7. Position the bottom plate onto the foot pedal base and install the two #10-32x1/2” machine screws with a #2 Phillips screwdriver to secure the main control board to the bottom plate. (Labeled 1 and 2 in Figure 135.

Step 8. Install the remaining twelve #8-18x5/8” screws into the bottom plate with a #2 Phillips screwdriver. (See Figure 135)

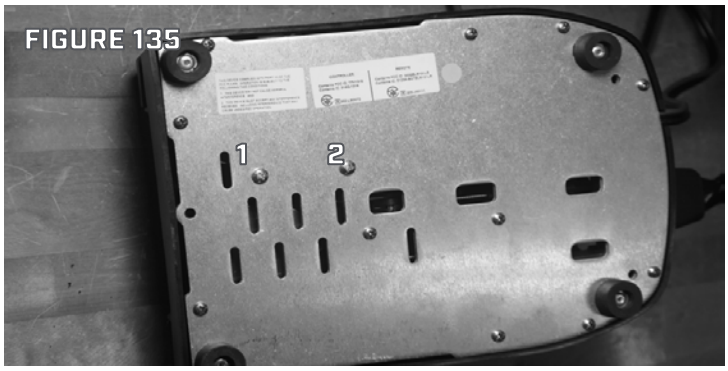


FIGURE 135

NOTICE: Ensure that the wires in the foot pedal are properly routed and will not be pinched or damaged while installing the bottom plate.

SENSOR BOARD SET SCREW ADJUSTMENT

The Ultrex foot pedal should have no Free Play for ideal steering responsiveness in all conditions. Free Play refers to any rocking that may be detected when testing the pedal by hand. Free Play in the foot pedal can affect the quality of the motor’s responsiveness. An adjustment Set Screw, located under the Toe Free of the Foot Pedal, is factory set to maintain the proper amount of contact pressure between the foot pedal and the steering sensors that control the electric functions of the foot pedal.

Before determining if the Free Play of the Foot Pedal needs adjusting, make sure that the cables controlling the steering are under proper tension. To review how to check cable tension please review the “Adjusting the Steering Cable” portion in the user manual.

Step 1. To determine if excessive Free Play has developed in the foot pedal, test the top of the foot pedal by rocking the pedal back and forth (heel-to-toe) by applying minimal pressure using only your fingertips. (See Figure 136)

Step 2. In the most severe cases, the foot pedal will rock no more than 1/16 of an inch when tested. If your foot pedal exceeds 1/16” of movement when rocked proceed to step 3.

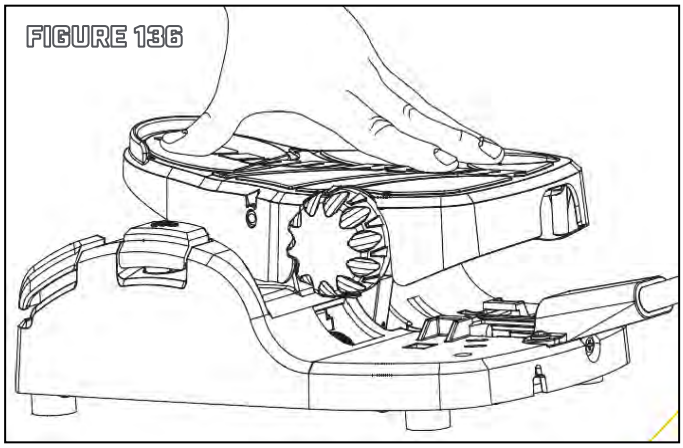
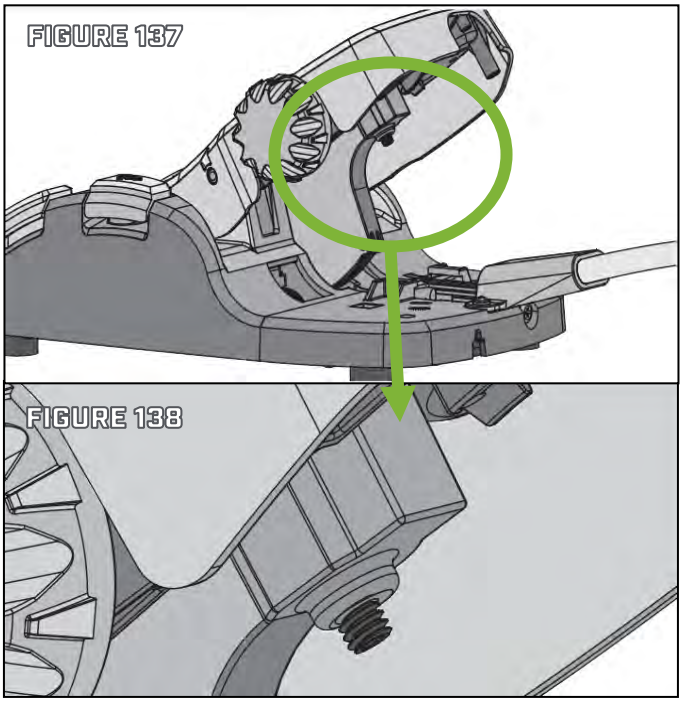


FIGURE 136

Step 3. If Free Play is detected when tested, put the motor in the deployed position. Position/Steer the motor so the foot pedal toe end is raised as shown in Figure 137.

Step 4. Locate the Set Screw and adjust it using a 1/8" Hex Key. (Wide view Figure 137, Close up Figure 138). When turning the Set Screw, tighten by turning clockwise using 1/8 turns incrementally. Manually test the Free Play on the top of the Foot Pedal with your fingertips between each 1/8 turn, as described in the test procedure above.

Step 5. Only tighten the Set Screw so that the Free Play of the foot pedal is removed, any force on the sensor board from the set screw will alter the function of the sensor board and may damage the sensor board.



NOTICE!

USE EXTREME CARE WHEN ADJUSTING THE SET SCREW. OVER TIGHTENING THIS SCREW MAY CAUSE SIGNIFICANT AND IRREPARABLE DAMAGE TO THE ELECTRICAL COMPONENTS OF THE UNIT AND WILL SEVERELY DIMINISH THE EXPECTED RANGE OF PERFORMANCE.

EVALUATING ULTREX LIMIT SENSORS

In automated steering modes (AP, Spot-Lock, Follow-the-Contour) when the Ultrex reaches the steering limit in one direction the motor should cut the prop off (if it was on) and do a quick 360 degree turn then turn the prop back on and continue steering from there to reach the intended heading.

Since Heading Lock AutoPilot only uses the compass (no GPS input), Heading Lock AutoPilot is the best mode to test the Limit Sensors. (Ensure there are no external ferrous materials that could affect the internal compass.)

Step 1. Set the AutoPilot Mode to Legacy in the i-Pilot or i-Pilot Link Options menu of the remote. (If there is no GPS satellite reception (indoors) the system will default to Legacy.)
Step 2. With the motor deployed steer almost to the full heel down position.
Step 3. Engage Heading Lock AutoPilot. Wait 5 seconds to ensure the system has settled on a heading.
Step 4. Note the heading direction, you will need to be able to compare this direction later; placing a piece of masking tape on the floor matching the direction of the Lower Unit is a good way to make it easy to compare the heading direction later.

Step 5. Rotate the base of the motor/Steering Housing clockwise as you are looking down on the motor, as you do this the motor should steer left to maintain its heading and reach the heel down limit shortly after you start rotating the base.

a. Once it does reach the steering limit it should quickly steer the opposite direction until the Foot pedal is almost fully Toe Down.

Step 6. Rotate the base of the motor/Steering Housing counter-clockwise as you are looking down on the motor. The motor should reach the toe down limit shortly after you start rotating the base.

a. Once it does reach the toe down steering limit it should quickly steer the opposite direction until the Foot pedal is almost fully heel down.

Step 7. Verify the heading has been maintained through this process.

If the motor fails to react as described above in either direction the magnet/sensor combination to that direction is not working properly. If the heading is not maintained through this process it is likely caused by the sensor failing to react prior to physical pressure on the Steering Sensor Board. These cases will cause Spot-Lock and other automatic steering functions to disengage.

If the test does find an error in the limit sensors review, check that corresponding magnets are still present in the upper rocker of the Foot pedal, and look for other obstructions within the Peda, if none of these identify a cause this would then indicate a defective Control Board.

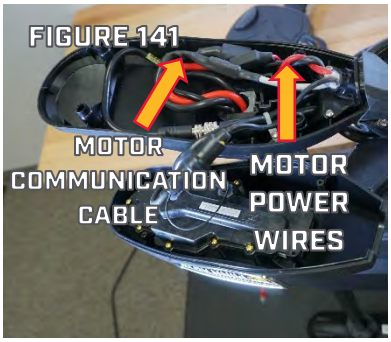
ULTREX STEERING HOUSING REPLACEMENT

ULTREX STEERING HOUSING REMOVAL

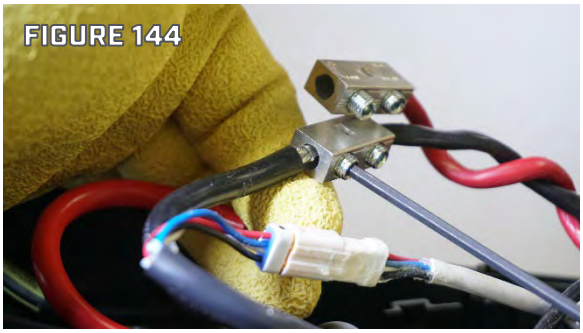
Step 1. From the bottom of the Control Box, use a #2 Phillips Screwdriver to remove the four Screws that secure the Control Box Cover/Advanced GPS Controller to the Control Box. Set these four Screws aside, they will be reused during installation. (Figure 141)

Step 2. Remove the Heat Shrinks from the Red and Black Motor Power Wires and Motor Communication Cable. (Figures 142 & 143)

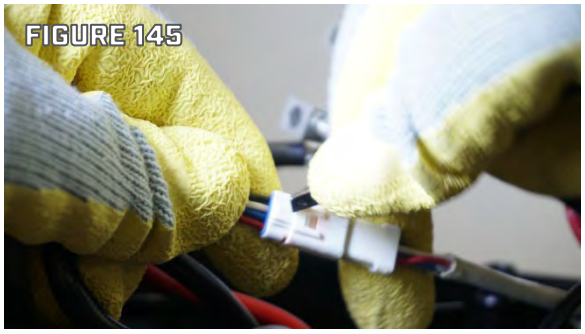
NOTICE: The safest way to remove Heat Shrink is to score the Heat Shrink with a Utility Knife (Figure 142) and then apply heat with a Heat Gun (Figure 143). The Heat Shrink will shrink further and split where it was scored allowing the Heat Shrink to be peeled away. Trying to cut completely through the shrink cold you may damage the wire or slip off of the material with the knife which may result in cutting yourself.



Step 3. Use a 1/8” Hex Key or Allen Wrench to loosen one of the Set Screws in the Splicer on the Black Motor Power Wire and repeat for the Red Motor Power Wire, allowing the Motor Power Wires to be removed from the Splicers. (Figure 144)

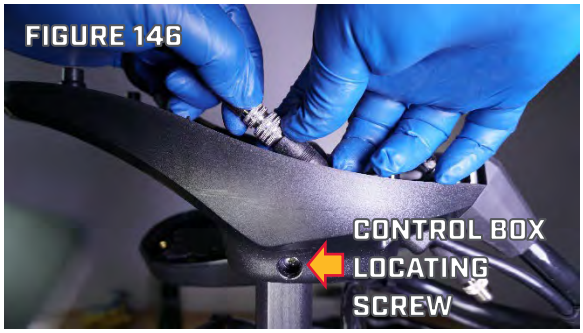


Step 4. Use a Pick or Small Flat Blade Screwdriver to depress the locking tab on White Motor Communication Plug and pull to disconnect the Plug. (Figure 145)



Step 5. Disconnect the Sonar Connector in the Control Box. Grip both sides of the Connector and turn them counterclockwise relative to each other to loosen the locking feature of the Sonar Connector, after connectors are loose pull the Sonar Connector apart. (Figure 146)

Step 6. Use a #2 Phillips Screwdriver remove the Control Box Locating Screw that secures the Control Box to the top of the Motor Shaft. (Figure 146)



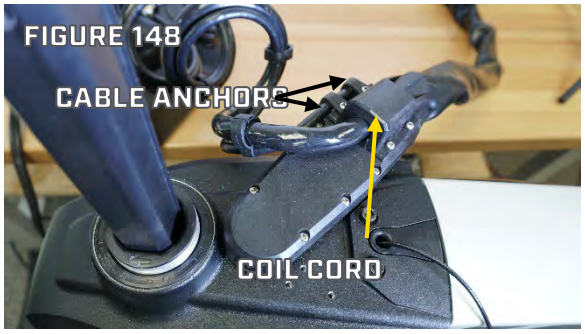
Step 7. Remove the Control Box by sliding it off the top of the Motor Shaft.

NOTICE: You can leave the Advanced GPS Controller Connected to the Coil Cord. If the motor is equipped with Built-in Side Imaging, you can leave the ground connection from the Advanced GPS Controller to the Sonar Wire.

Step 8. To prevent the Shaft/Lower unit from falling, make sure it is supported before opening the Cam Arm on the Depth Collar. Pull the Cam Arm on the Depth Collar into the Open Position. Be aware of the spring in the collar assembly, do not lose the Spring while removing the screw from the collar. Use a #3 Phillips Screwdriver to remove the screw from the Depth Collar opening the Depth Collar completely. Removing the depth collar from the Steering Housing. (Figure 147)

Step 9. Set the Depth Collar Assembly aside and reassemble the screw and spring to the depth collar so these parts are not mis-placed.

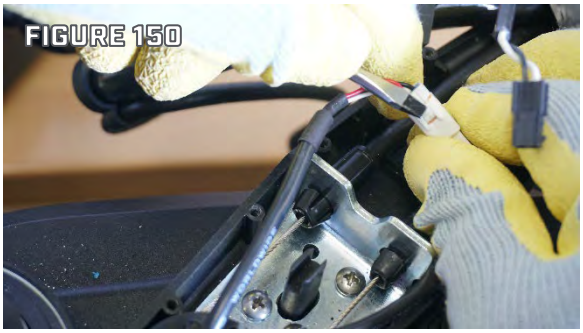
Step 10. Use a #2 Phillips Screwdriver to remove the four screws that fasten the Coil Cord Retainer and retain the two Cable Anchors. Set the Screws, Cable Anchors, and Coil Cord Retainer aside to reuse during assembly. Make note of which side of the Coil Cord Retainer the Cable Anchors are installed on, this is a user preference so the Cable Anchors should get installed on the same side during installation. (Figure 148)



Step 11. Use a #2 Phillips Screwdriver to remove the eight Screws fastening the Top Cable Housing. Lift the Top Cable Housing off of the Cable Housing Bottom and set the Screws and Housing aside for reuse during reassembly. (Figure 149)

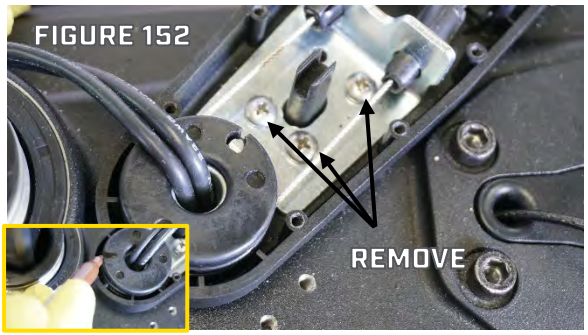
Step 12. Disconnect the Steering Motor Wires (Black Connector)

Step 13. Disconnect the Steering Position Sensor Cable (White Connector, Figure 150).



Step 14. On the toe end of the Foot Pedal Assembly, use a #3 Phillips Screwdriver to loosen the Cable Tension Screw several turns. The tension must be loosened to allow removal of the wrap drum from the steering output. Be careful to not fully remove the Cable Tension Screw. (Figure 151)

Step 15. Make note of which side of the Steering Housing the Foot Pedal Assembly is installed on (Left/Right). With the motor pointed straight ahead use a marker on the Wrap Drum and Cables Housing Bottom to record current alignment. Cable orientation may be changed by the user, the marks will be used during reassembly to maintain the user setting.



Step 16. Use #2 Phillips Screwdriver to remove the three Screws from the Cable Anchor Bracket. After the three screws are removed, the Cable Anchor Bracket, Cable Housing Bottom, and Wrap Drum can be removed as one unit. Tape the cables to the wrap drum to make reassembly easier. Set the screws aside for use during reassembly. (Figure 152)

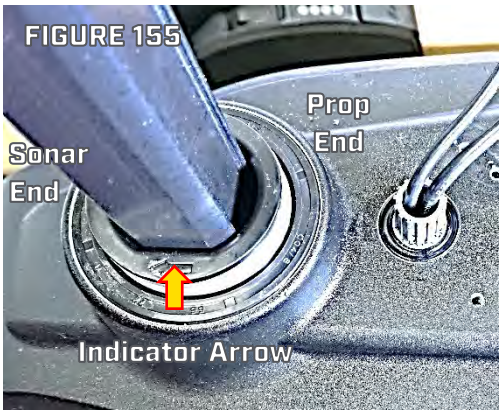
⚠ WARNING!

IF THE LATCH IS UNDONE WHILE THE MOTOR IS NOT ATTACHED TO THE MOUNT THE MOUNT WILL OPEN RAPIDLY. ANYONE IN THE PATH OF THE MOUNT MAY BE INJURED. DO NOT PULL THE LATCH CABLE OR ATTEMPT TO "TRICK"/ACTUATE THE SAFETY LATCH WHILE THE MOTOR IS NOT CONNECTED TO THE MOUNT.

Step 17. Use a ¼" Hex Bit/Allen Key to remove the two 5/16-18 x 2.25 Screws that secure the Steering Housing to the Motor Mount. Lift the Steering Housing off the Motor Mount and slide the Steering Housing up the Motor Shaft and off of the Motor Assembly. Set the Screws aside with their Lock Washers to use in reassembly. (Figure 153)

ULTREX STEERING HOUSING INSTALLATION

Step 1. Slide the new Steering Housing Assembly down the Motor Shaft, oriented so the Motor is pointed toward the front of the steering assembly. (Figure 155)



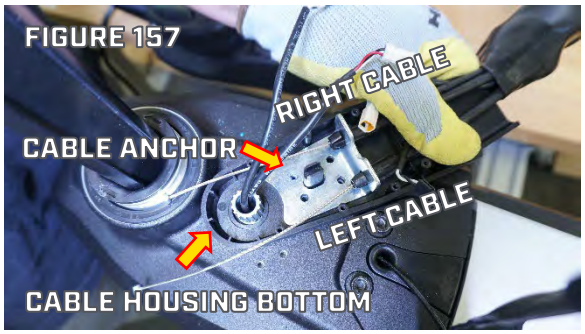
Step 2. Slide the Steering Housing onto the Motor Mount. After the Steering housing has been positioned onto the Motor Mount use ¼" Hex Key/Allen Wrench to install the two 5/16-18 x 2.25 Screws with a Lock Washer Assembly on each screw. (Figure 156)

NOTICE: The Foot Pedal Assembly may be installed from the left or right of the Steering Housing based on user preference. Use the same orientation that was in use on the replaced steering housing. As shown is from the right; this is the factory standard orientation.

Step 3. Place the metal Cable Anchor Bracket in the plastic Cable Housing Bottom and place these two components on the Steering Housing such that the pass-through holes are aligned with the #10-24 tapped holes in the Steering Housing as Shown in Figure 157.

Step 4. Use #2 Phillips Screwdriver to install the three #10-24 Screws Securing the Cable Anchor Bracket and Cable Housing Bottom to the Steering Housing. (Figure 157)

Step 5. Verify the cables are installed on the Wrap Drum. If the cables came off, reinstall them. The left cable clips into the bottom of the wrap drum, right cable into the top of the Wrap Drum, install one cable, turn the wrap drum nearly 1 full turn guiding the cable in the slot then install the other cable. (Figure 158)



Step 6. Verify the Motor Assembly is pointed Straight ahead. Slide the Wrap Drum onto the Cable Gear in the same orientation as when removed from the replaced Steering Housing. Utilize the mark made on the Wrap Drum during disassembly to align the Wrap Drum to the user's setting. (Figure 159)

Step 7. Use a #3 Phillips Screwdriver to tighten the Tension Screw in the foot pedal. Tighten the screw until slack is removed from the cables, do not add tension beyond removing slack. (Figure 160)

Step 8. Connect the Steering Position Sensor Cable (White Plug).

Step 9. Connect the Steering Motor Wires (Black Connector) (It is possible to force this connector on backwards so do verify it is aligned White to White, Black to Black.) (Figure 161)

Step 10. Place the Steering Positing Sensor Cable and Steering Motor Wire Cable in the support yoke that part of the Cable Housing Bottom, then route both cables in the depression in the upper rim of the Cable Anchor Bracket between the Foot Pedal Cables. Verify the screw bosses are clear so no cables will be pinched when the Cable Housing Cover is installed. (Figure 162)


FIGURE 162

Step 11. Place the Cable Housing Top over the Cables, Wrap Drum, Steering Motor Wires Connection, and Steering Sensor Connection. Use #2 Phillips Screwdriver to install the eight #6-19 x 1” Screws that secure the Cable Housing Top. (Figure 163)

FIGURE 163

Step 12. Position the Coil Cord Strain Relief in the detail of the Cable Housing Top with “UP” visible. (Figure 164)

FIGURE 164

Step 13. Place the Coil Cord Retainer over the Coil Cord Strain Relief and use #2 Phillips Screwdriver to install two #6-19 x 1” Screws in the Coil Cord Retainer on the side without the Cable Anchor Clips. (Figure 165)

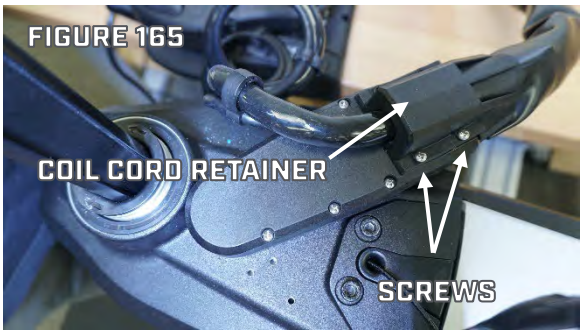


FIGURE 165

Step 14. On the other side of the Coil Cord Retainer position a Cable Anchor Clip and use a #2 Phillips Screwdriver to install a #6-19 Screw securing the Cable Anchor Clip and Coil Cord Retainer. Repeat this for the other Cable Anchor Clip and last #6-19 Screw that was set aside during disassembly. (Figure 166)

FIGURE 166

Step 15. Make sure the Nut for the Control Box Locating Screw is in the detail that captures the Nut on the right side of the Control Box. From the Left Side of the Control Box, slide the Control Box Locating Screw through the Control Box and Motor Shaft into the Nut. Use #2 Phillips Screwdriver to tighten the Control Box Locating Screw. (Figure 167)


FIGURE 167

Step 16. Position the Depth Collar onto the Steering Housing. Slide the Screw through the Depth Collar Bolt Half and Spring. Close the Depth Collar Cam Half over the Spring and Screw. Verify the Cam Lock Pin is within the Cam Lock Lever, align the threads of the Cam Lock Pin with the Screw, use #3 Phillips Screwdriver to start the Screw into the Cam Lock Pin. Do not Fully tighten the collar. (Figure 168)


FIGURE 168

Step 17. After the Screw is three to four turns into the Cam Lock Pin close the Cam Lock Lever and use the #3 Phillips Screwdriver to fully tighten the Screw and Cam Lock Collar. Figure 169)

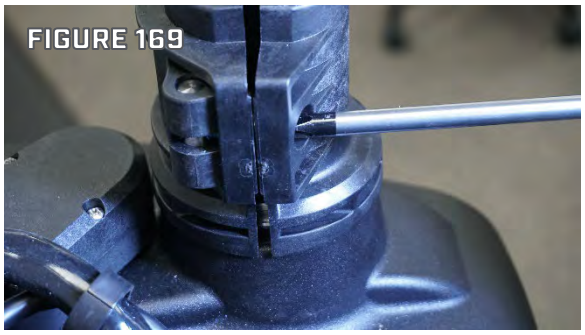


FIGURE 169

NOTICE

DO NOT TIGHTEN THE COLLAR WITH THE CAM LEVER OPEN. TIGHTENING THE COLLAR WITH THE LEVER OPEN ALLOWS OVERTIGHTENING; THE MOST LIKELY CAUSE OF A BROKEN COLLAR IS OVERTIGHTENING BY ADDING PRESSURE WITH THE LEVER OPEN.

Step 18. Slide the 5” long Heat Shrink over one side of the Motor Communication Cable. (Figure 170)

Step 19. Push the two halves of the Motor Communication Cable Connector together until the locking tab engages. (Figure 171)

Step 20. Center the Heat Shrink on the connector, the ends of the Heat Shrink should be on the outer jacket of the cable, no small conductors should be visible.

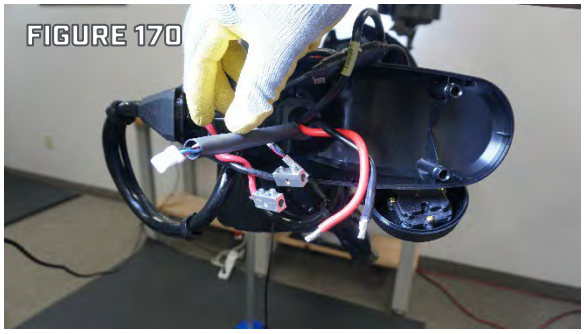


FIGURE 170

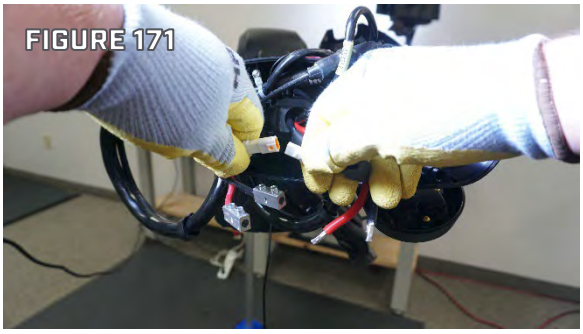


FIGURE 171

Step 21. Slide the two 2 ¼" long Heat Shrinks over the Motor Power Wires, one on the Red Wire, one on the Black Wire. (Figure 172)

Step 22. For both Motor Power Wires, matching Red to Red and Black to Black, Insert the wire end that was removed from the Splicer during disassembly into the open end of the Splicer and use 1/8" Allen Key to tighten the set screw of the Splicer securing the Wire. (Figure 173)

Step 23. Center the Heat Shrinks over the Splicers.

Step 24. Use a Heat Gun to seal the Shrinks. (Figure 174)

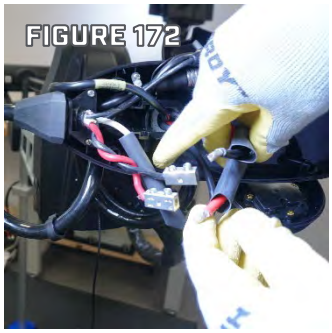


FIGURE 172


FIGURE 173

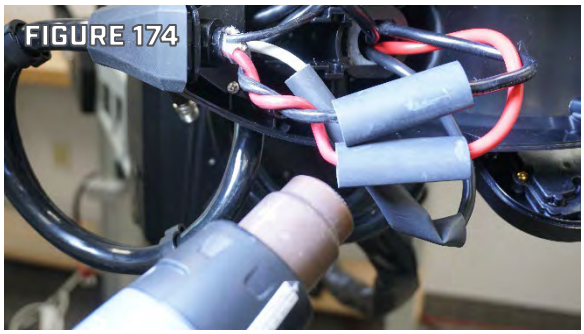


FIGURE 174

Step 25. Reconnect the Sonar Cable, align the connectors and fully tighten the locking collar.

Step 26. Position all the wires such that none of the wires intersect a screw boss or the outer rim of the Control Box. (Figure 175)

Step 27. Place the Advanced GPS Controller onto the Control Box and use a #2 Phillips Screwdriver to reinstall the 4 screws that were removed during disassembly.


FIGURE 175

ULTREX STEERING LIMIT CALIBRATION

NOTICE: This step is necessary to give full steering function to the repaired motor.

1. Turn motor power off
2. Stow motor on Motor Ramps so prop/prop shaft is pointing left (Figure 181)
3. Press and hold both Spot-Lock and OBN buttons on Foot Pedal (Figure 182)
4. While holding buttons, turn motor power switch on
5. As normal, all four lights on the pedal will turn on for about one second.
6. After that, only the Red and Green lights should remain lit
    a. If this doesn't happen, then the calibration process did not begin and the user should start over
7. Release the Spot-Lock and OBN buttons on the Foot Pedal.
8. The Red light should turn off and the Green light should flash
    a. If the Green light turns off and the Red light flashes, something caused the calibration to fail – see below for possible reasons
9. Turn motor power switch off to complete the process
10. Motor can now be used as normal


FIGURE 181


FIGURE 182

Reasons why the Red LED would flash:

1. Motor is not stowed
2. Steering Position Sensor (located in Steering Housing) could have any of the below issues:
    a. Rotational magnet not present
    b. Sensor not responding
        i. Damaged or un-plugged steering position sensor cable
        ii. Defective sensor

MOMENTARY SWITCH CALIBRATION

Step 1. Turn the motor on, Deploy the Motor, Position the Foot Pedal "toe up". (Figure 191)

Step 2. Push the Momentary Button all the way down. (Figure 192)

Step 3. Use a small Flat Blade Screwdriver to slowly push the Momentary Reed switch up in the Reed Switch Clip, as soon as the prop starts running stop. (Figure 193)

Step 4. Release the button, and test the Momentary Function by pressing and releasing the button. If the momentary is too slow to engage push farther up as in step 3. If momentary will not disengage remove the button, push the switch back down in the reed switch clip, return the button and repeat step 3.


FIGURE 191

FIGURE 192

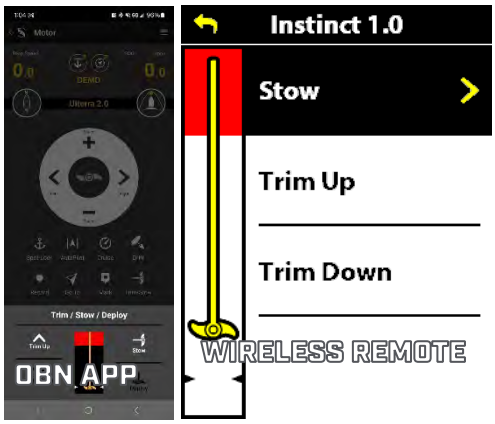
FIGURE 193

ULTERRA/RIPTIDE INSTINCT

TRIM HOUSING CALIBRATION

The Calibration Procedure requires the Composite Shaft and lower unit to move up and down unobstructed while in the deployed position. The Lower Unit, Shaft, and Control Box will be trimmed up to the point where the Lower Unit contacts the bottom of the Steering Housing, overhead space must accommodate this, depending on the ceiling height of the workspace it is likely some motors will require setting up outdoors to Calibrate the Steering Housing.

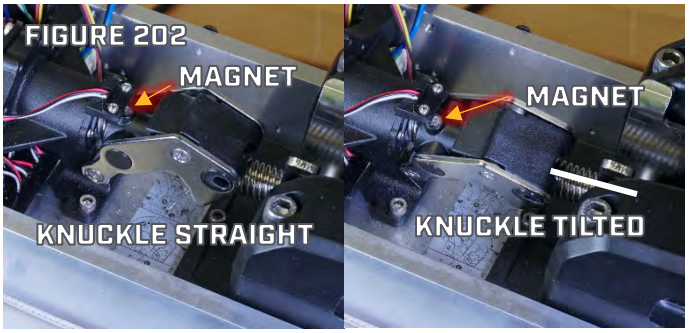
FIGURE 201



Step 1. Connect the Motor to Power (24 or 36 Volts DC).
Step 2. Verify the motor is in the deployed position.

NOTICE: If the Tilt Disconnect Pin has been pulled you may need to push down on the Tilt Bracket to engage the Latch Pin to the point the Latch Sensor is engaged. When the sensor is properly located the Ulterra or Instinct menu in the OBN App or Wireless Remote, will have options “Trim Up, Trim Down, and Stow”, “Deploy” will not be present on the remote and will not be selectable in the OBN App (FIGURE 201)

FIGURE 202



NOTICE: If the Tilt Disconnect Pin is not installed the Horizontal Sensor may be tripped. This will result in error 3.6, the red light on the motor will flash. The error code can be viewed via the OBN app or Wireless Remote. To proceed rotate the Tilt Knuckle so the magnet is slightly away from the Stow Sensor. (Figure 202)

Step 3. Turn the Motor On, wait 3 seconds.
Step 4. Press the Power Button 3 times within 2 seconds.

The blue LED will flash, the motor will:

- Steer to the park position.
- Trim up until the Lower Unit contacts the bottom of the Steering Motor
- Trim Back Down 6”.

When the Motor stops after trimming back down 6” the Trim Housing Calibration is completed. Disconnect the Motor from Power.

ULTERRA/RIPTIDE INSTINCT STEERING LIMIT CALIBRATION

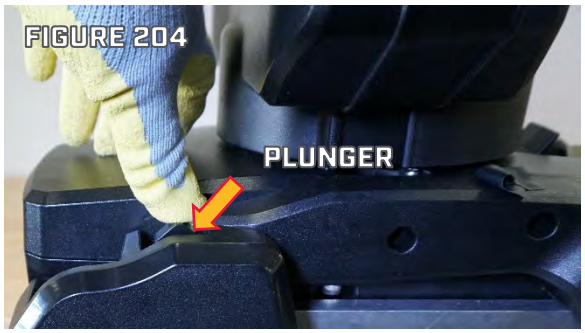
Step 1. Connect the Motor to power. Turn the Motor on via the Power Button. (Figure 203)

Step 2. Deploy the Motor using the Foot Pedal, Wireless Remote, or OBN App.

Step 3. Power the Motor off.

Step 4. Depress the Plunger in the Left Motor Ramp (Figure 204). Turn the Motor on as you continue to hold the Plunger.

NOTICE: The most likely reason the motor will not progress into Steering Limit Calibration Mode is the Plunger being depressed too far, a portion of the Plunger will be visible above the Motor Ramp when the Plunger is in the correct Position.



- After the Motor powers up the Blue LED should turn off and the Red LED should illuminate.

Step 5. Release the Plunger

Step 6. Steer the Motor left using the Foot Pedal, Wireless Remote, or OBN App, until the Motor stops turning. The Motor steering will slow dramatically at a point, continue steering to the stop.

Step 7. Press and release the Power Button

- The Red LED should turn off and Orange LED should illuminate.

Step 8. Steer the Motor right using the Foot Pedal, Wireless Remote, or OBN App, until the motor stops turning. The Motor steering will slow dramatically at a point, continue steering to the stop.

Step 9. Press and release the Power Button.

- Blue LED will flash as confirmation, then the Blue LED will illuminate solid indicating the Motor is powered on and ready to use.

Steering Calibration completes the Steering Housing installation process.

ULTERRA/RIPTIDE INSTINCT SHAFT LENGTH SETTING

PLEASE DO NOT SHARE THIS MENU TRAVEL. FOR SERVICE PROVIDERS ONLY.

Step 1. Put a Paired and Connected Wireless Remote in “super-user mode” by holding the Spot Lock Button and tapping the Cruise Control Button twice.

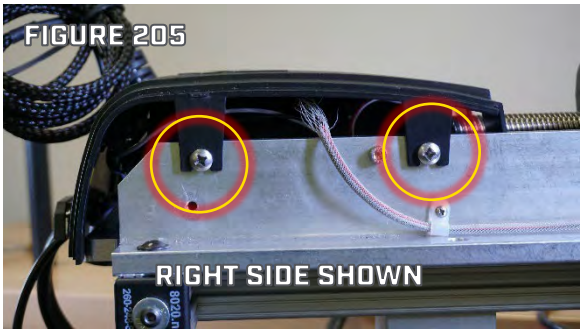
Step 2. Navigate to the System Menu, then select “About” from the System Menu.

Step 3. The “About Page” now has menu option, from this menu select “Administration” then the shaft length setting. Choose the desired shaft length from the options available.

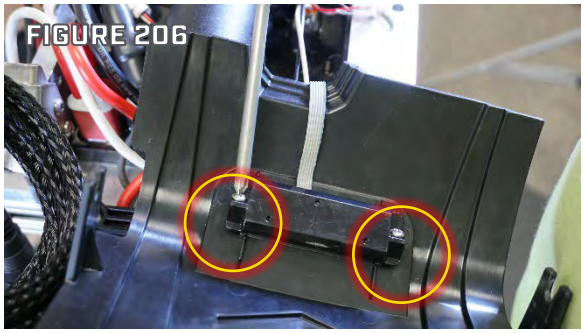
ULTERRA/RIPTIDE INSTINCT MAIN CONTROL BOARD REPLACEMENT

MAIN CONTROL BOARD REMOVAL

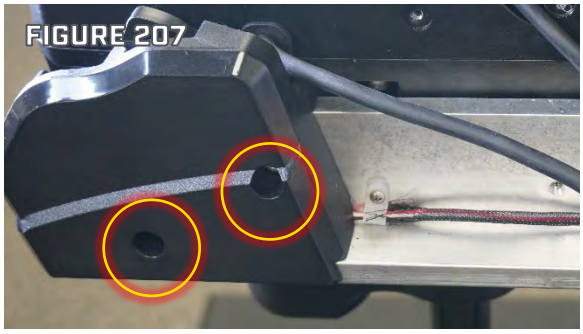
Step 1. Use a #3 Phillips Screwdriver to loosen the four Screws fastening Control Housing to the Base Extrusion one to two full turns. It is not necessary to remove these four screws, only loosen them. (Figure 205)



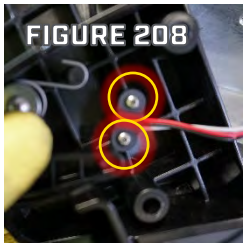
Step 2. Use a #2 Phillips Screwdriver to remove the two Screws that fasten the Power Button/LED Board to the Control Housing. Set the Screws and Control Housing aside for use in reassembly. (Figure 206)



Step 3. Use a 3/16” Allen Key to remove the two Screws that fasten the Left Motor Ramp to the Base Extrusion. (Figure 207)

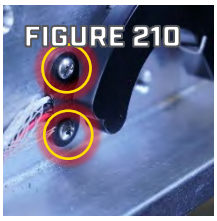


Step 4. Use #1 Phillips Screwdriver to remove the two Screws that fasten the Plunger Sensor to the inside of the Left Motor Ramp. Set the Screws aside for use during reassembly. (Figure 208)

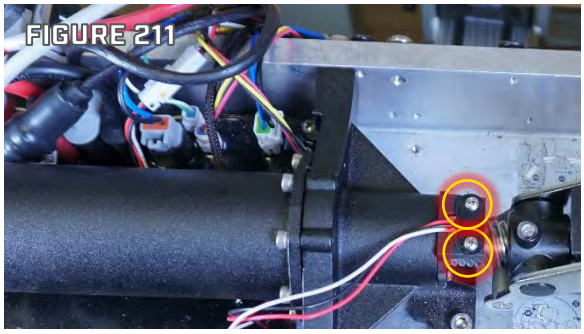


Step 5. Use a 3/16” Allen Key to remove the two Screws that fasten the Right Motor Ramp to the Base Extrusion. Set the Motor Ramp and Screws aside for use during reassembly. (Figure 209)

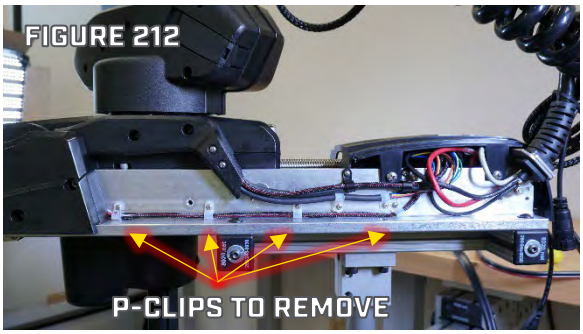
Step 6. Use a #1 Phillips Screwdriver to Remove the two Screws that fasten the Cam/Pin Sensor to the Base Extrusion. Set the Screws aside for use during reassembly. (Figure 210)



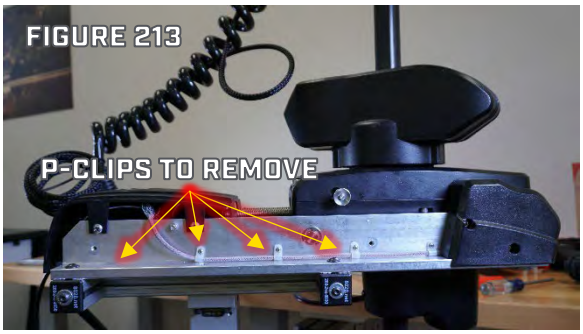
Step 7. Use a #1 Phillips Screwdriver to remove the two Screws that fasten the Tilt Position Sensor to the Tilt Actuator Assembly. (Figure 211)



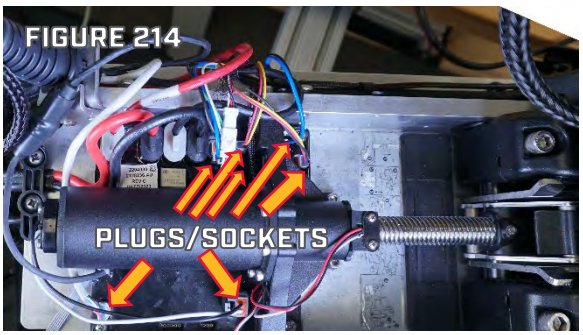
Step 8. Remove the four P-Clips on the left side of the Base Extrusion that retain the wires for the Plunger Sensor. Set the P-Clips and Screws aside for use during reassembly. It is not necessary to remove any of the P-Clips from the Steeering and Trim Cables. (Figure 212)



Step 9. Remove the P-Clips on the Right side of the Base Extrusion that retain the wires for the Cam/Pin Sensor. Set the
P-Clips and Screws aside for use during reassembly. (Figure 213)



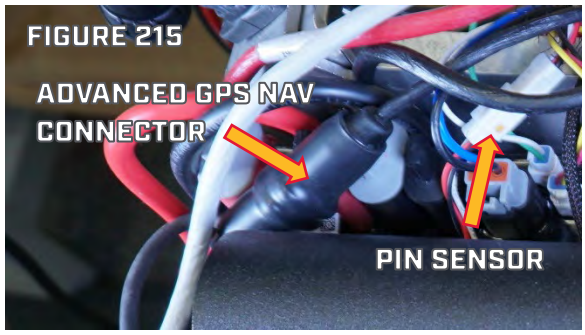
Step 10. At the Main Control Board unplug the Motor Communication Cable Plug, Tilt Motor Plug, Steering Motor Plug, Trim Motor Plug, Steering Position Sensor Plug, Trim Position Sensor Plug, and Trim Motor Brake Plug. Use a small flat blade screwdriver or pick to actuate the locking tabs on the smaller connectors. See the WIRING DIAGRAM on Page 10. (Figure 214)



NOTICE: If the Trim Position Sensor Plug does not have a visible red mark use a Red Permanent Marker to add a visible Red Mark to the Plug. The Trim Position Sensor Plug and Steering Position Sensor Plug are identical other than that mark, mixing them up during reassembly may result in damage to the motor during calibration.

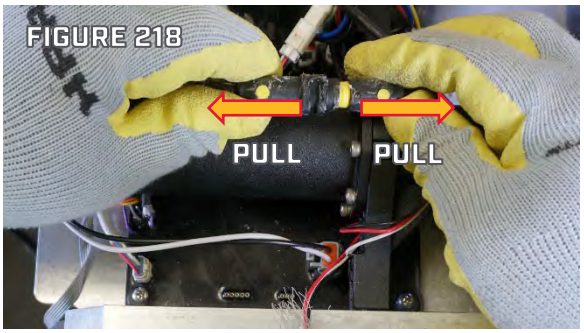
Step 11. Disconnect the Pin Sensor connector. Use a small flat blade screwdriver or pick to disengage the locking tab allowing the halves of the connector to separate. (Figure 15).

Step 12. Remove the Heat Shrink from the Advanced GPS Connector. (Figure 215, 216, 217)



NOTICE: The safest way to remove Heat Shrink is to score the Heat Shrink with a Utility Knife (Figure 216) and then apply heat with a Heat Gun (Figure 217). The Heat Shrink will shrink further and split where it was scored allowing the Heat Shrink to be peeled away. Trying to cut completely through the shrink cold you may damage the wire or slip off of the material with the knife which may result in cutting yourself.

Step 13. Pull the Advanced GPS connector apart, pull straight on the two halves of the connector separating it, do not twist or pry the connector halves. (Figure 218)



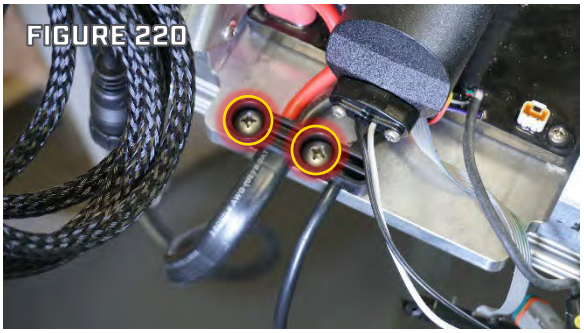
⚠ CAUTION!

Verify the Power Leads are not connected to a Power Source. The next few steps will have the power Leads unconnected which could allow them to short.

Step 14. Slide the Terminal Seals up their respective wires giving access to the pockets for each wire. (Figure 219)

Step 15. Use a #2 Phillips Screwdriver to remove the Lug Screws from each of the Motor Lead Wires and Power Lead Wires.

Step 16. Use a #3 Phillips Screwdriver to remove the two Screws from the Strain Relief for the Power Wire and Foot Pedal Connector. Set the Screws and Strain Relief Aside for use in Reassembly. (Figure 220)



Step 17. Use a #2 Phillips Screwdriver to remove the four Screws fastening the Main Control Board to the Base Extrusion. Set these four Screws aside for use during reassembly.
(Indicated by circles if Figure 221)

Step 18. Slide the Main Control Board out from under the Tilt Actuator Assembly to remove the Main Control Board.
(Figure 221)

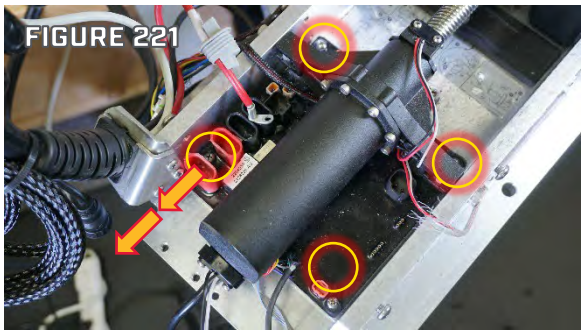


FIGURE 221

MAIN CONTROL BOARD INSTALLATION

NOTICE!

Use the WIRING DIAGRAM on Page 13 to verify correct placement of each lead and connector plug. Incorrect connections may result in damage to the Control Board.

Step 1. Slide the Replacement Control Board under the Tilt Actuator Assembly. (Figure 222)

Step 2. Use a #2 Phillips Screwdriver to install the four screws fastening the Control Board to the Base Extrusion. (Figure 222)

Step 3. Place a Lug Screw through the Terminal of one of the Battery Power Leads. Use a #2 Phillips Bit and Torque Driver set to 15 in-lbs (1.6 Nm) to install the Lug Screw into the pocket in the Control Board.
(Figure 223)

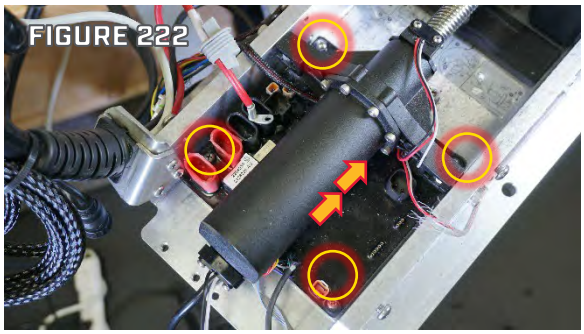


FIGURE 222

NOTICE!

The torque of the Lugs to the Control Board is critical. Slightly too loose the Lugs will loosen over time and not maintain a good connection; slightly too tight and the Control Board can be stripped out damaging the Control Board.


FIGURE 223

Step 4. Place the Strain Relief over Battery Power Lead Wire and the Foot Pedal Connector Cord. Use a #3 Phillips Screwdriver to reinstall the Two Screws that Fasten the Strain Relief to the Base Extrusion.
(Figure 224)


FIGURE 224

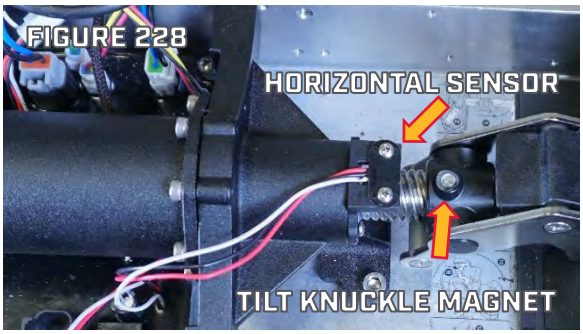
Step 5. Place a Lug Screw through the Terminal of one of the Motor Power Leads. Use a #2 Phillips Bit and Torque Driver set to 15 in-lbs (1.6 Nm) to install the Lug Screw into the pocket in the Control Board. (Figure 225)

Step 6. Apply dielectric grease over each of the Battery Power Leadwire and Motor Power connections to completely cover the metal components of the connection. (Figure 226)

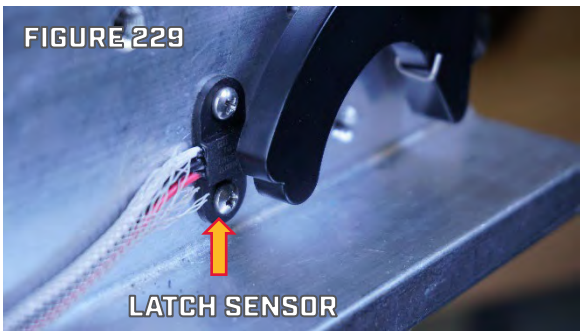
Step 7. For each of the Motor Power Leads and Battery Power Leads slide the Terminal Seals down the wire and seat them in the Terminal Pocket. (Figure 227)

Step 8. The Hall Effect Sensor with the shortest wires is the Horizontal Sensor, place the Horizonal Sensor on the Sensor Bracket attached to the Tilt Actuator Assembly with the raised detail/writing on the sensor facing down, toward the Tilt Screw. Use the two Screws set aside during disassembly to attach the Horizontal Sensor to the Sensor Bracket. (Figure 228)

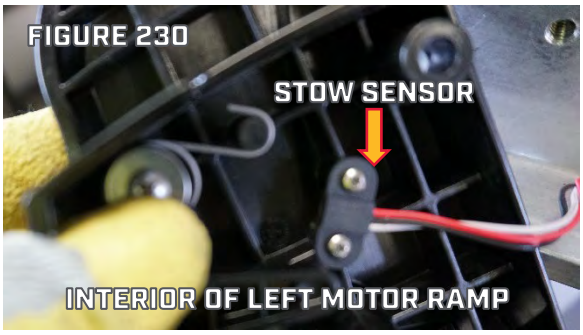
NOTICE: Route the sensor wires as shown in Figure 228. Over the Tilt Actuator. This routing avoids any pinch points the wires otherwise may contact.



Step 9. The Hall Effect Sensor with the gray jacket is the Latch Sensor. Route the Latch Sensor down the right side of the Base Extrusion and use the two Screws set aside during disassembly to attach the Sensor to the Base Extrusion, with the raised detail/writing facing out/legible. (Figure 229)



Step 10. The Hall Effect Sensor with longer wires and black jacketing is the Plunger Sensor/Stow Sensor. Use the two Screws set aside during disassembly to attach the Sensor to the Left Motor Ramp with the Raised Detail/Writing facing up. (Figure 230)

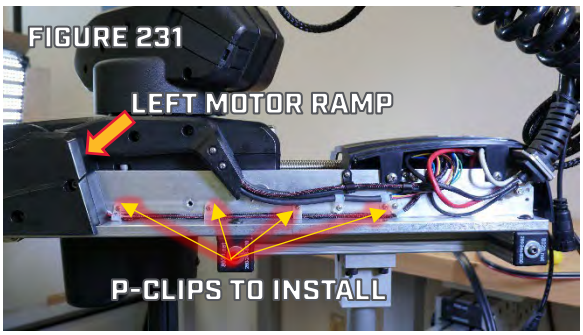


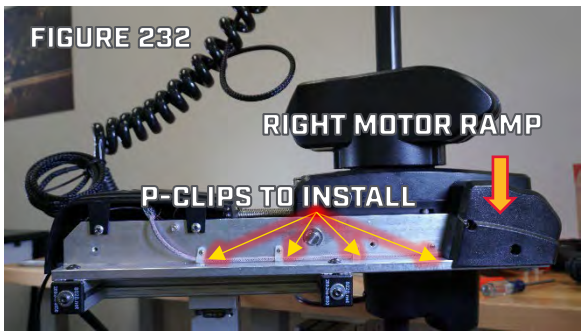
NOTICE: The raised detail and writing on the face of a Hall Effect Sensor indicate the direction of the Hall Effect Sensor. The Sensor is activated by the South Pole of Magnet arriving in close enough proximity to the Hall Effect Sensor. The directions above point the Sensor in the direction the magnet that actuates the Sensor will approach from. Double check that at each of the three Sensors the Sensors are facing the associated Magnets.

Step 11. Reinstall the P-Clips on both sides of the Base Extrusion to keep the Hall Effect Sensor Wires properly routed along the base of the Base Extrusion. (Figures 231 and 232)

Step 12. Use a 3/16" Hex Key/Allen Wrench to Reinstall the Left Motor Ramp. (Figure 231)

Step 13. Use a 3/16" Hex Key/Allen Wrench to Reinstall the Left Motor Ramp. (Figure 232)



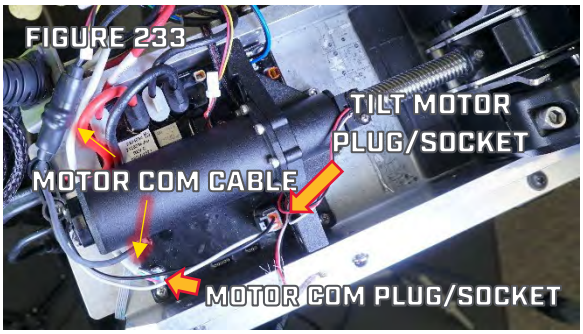


NOTICE!

Use the WIRING DIAGRAM on Page 13 to verify correct placement of each lead and connector plug. Incorrect connections may result in damage to the Control Board.

Step 14. Plug the Tilt Motor Plug into its Socket on the Main Control Board. (Figure 233)

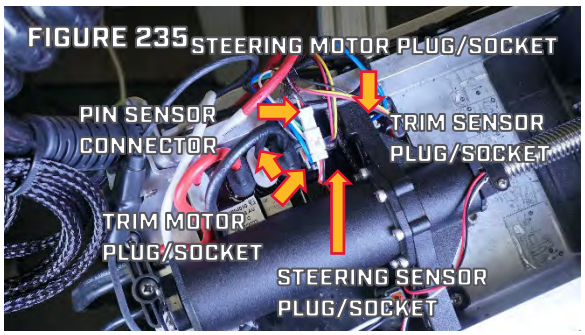
Step 15. Route the Motor Communication Cable under the Tilt Motor and plug the Motor Communication Plug into its Socket. (Figure 233)



Step 16. Slide the included Heat Shrink onto one side of the Advanced GPS Navigation Connector. Push the two halves of the Advanced GPS Navigation Connector together, fully seating them together, there should be no yellow visible at the point the connectors join. Center the Heat Shrink on the Advanced GPS Navigation Connector and use a Heat gun to seal the Connector with the Heat Shrink. (Figure 234)

Step 17. Plug the Steering Motor Plug and Steering Position Sensor Plug into their Sockets in the Control Board. (Figure 235)

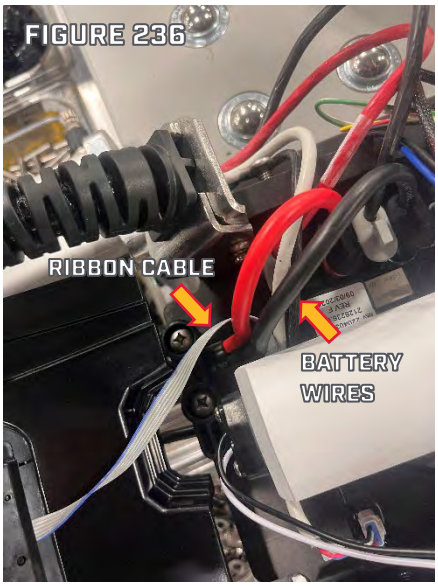
Step 18. Plug the Trim Motor Plug, Trim Position Sensor Plug, and Trim Brake Plug into their respective Sockets in the Control Board. (Figure 235)



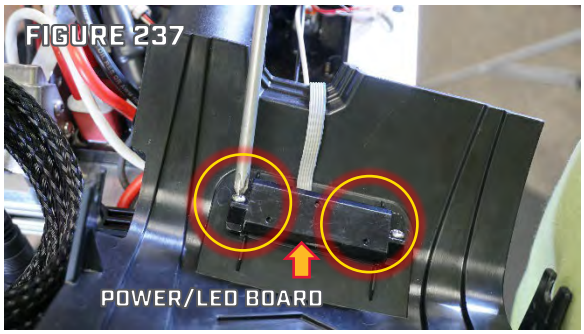
Step 19. Connect the Pin Sensor Connection.

Step 20. Route the Ribbon Cable for the Power Button Board behind the Battery Wires, as shown in Figure 236, this routing is critical to divert the ribbon cable away from any pinch points.

Step 21. Place the Power Button Board in the Control Housing so the two LEDs fit into their openings and the Power Button is extending into its opening. Install the two Screws that were set aside during disassembly to fasten the Power Button Board to the Control Housing. (Figure 237)



Step 22. Place the Control Housing over the Control board and tighten the Screws that fasten the Control Housing to the Base Extrusion.



To Complete the Installation do ULTERRA/RIPTIDE INSTINCT SHAFT LENGTH SETTING on Page 86, ULTERRA/RIPTIDE INSTINCT STEERING LIMIT CALIBRATION on Page 86, and TRIM HOUSING CALIBRATION on Page 85

CONTROL BOX REMOVAL/UPPER BELT DISCONNECT

Step 1. From the bottom of the Control Box, use a #2 Phillips Screwdriver to remove the four Screws that secure the Control Box Cover/Advanced GPS Controller to the Control Box. Set these four Screws aside, they will be reused during reassembly.

Step 2. Remove the Heat Shrinks from the Red and Black Motor Power Wires and Motor Communication Cable. (Figures 238, 239, and 240)

NOTICE: The safest way to remove Heat Shrink is to score the Heat Shrink with a Utility Knife (Figure 238) and then apply heat with a Heat Gun (Figure 239). The Heat Shrink will shrink further and split where it was scored allowing the Heat Shrink to be peeled away. Trying to cut completely through the shrink without scoring and heating may damage the wire or the Utility Knife may slip off of the material which may result in cutting yourself.

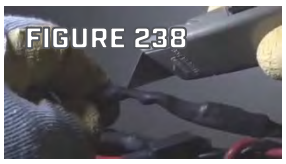
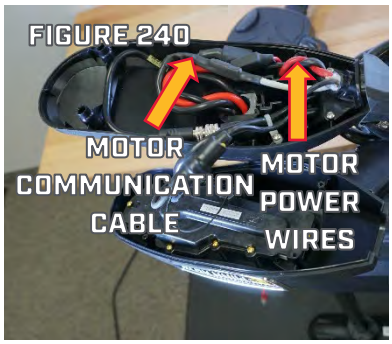


FIGURE 238


FIGURE 239



Step 3. Use a 1/8” Hex Key or Allen Wrench to loosen one of the Set Screws in the Splicer on the Black Motor Power Wire and repeat for the Red Motor Power Wire, allowing the Motor Power Wires to be removed from the Splicers. (Figure 241)

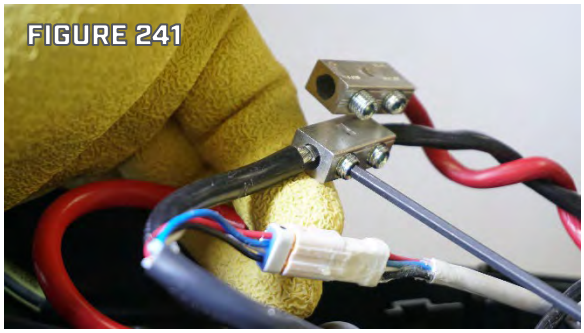
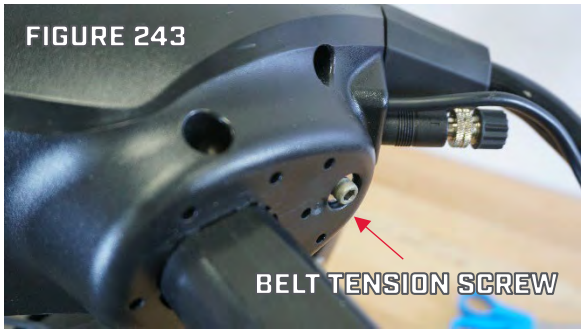


FIGURE 241

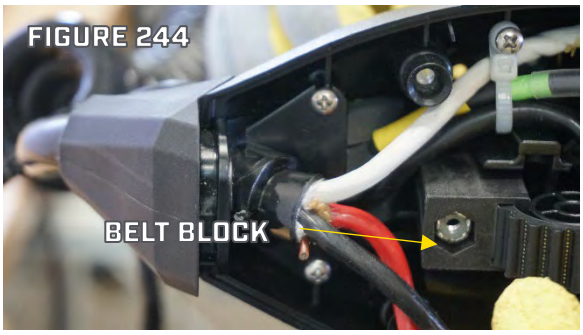
Step 4. Use a Pick or Small Flat Blade Screwdriver to depress the locking tab on White Motor Communication Plug and pull to disconnect the Plug. (Figure 242)


FIGURE 242

Step 5. From the underside of the Control Box use a 5/32” Hex Key/Allen Wrench to remove the Belt Tension Screw. Set the Belt Tension Screw and Washer aside for use in reassembly (Figure 243)



Step 6. With the Belt Tension Screw removed pull the Belt Block Pulley Wheel and Dowel Pin out the Control Box. The Motor Power Wires, Communication Cable and Transducer Cable will likely need to be moved out of the way to complete this process. (Figure 244).

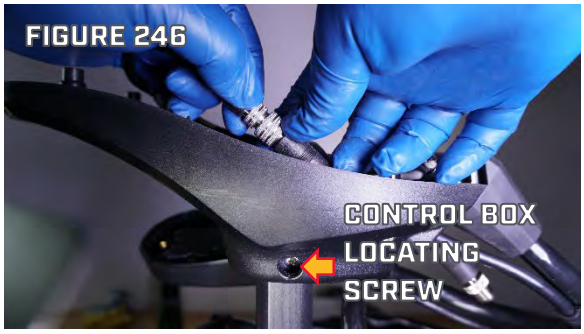


Step 7. Set the Pulley Wheel and Dowel Pin aside for use in reassembly. (Figure 245).

Step 8. Push the Belt out of Belt Block to access the Belt Rack, remove the Belt Rack, then remove the Belt from the Belt Block. (Figure 245).

Step 9. For Ulterra Models disconnect the Sonar Connector in the Control Box. Grip both sides of the Connector and turn them counterclockwise relative to each other to loosen the locking feature of the Sonar Connector, after connectors are loose pull the Sonar Connector apart. (Figure 246)

Step 10. Remove the Control Box Locating Screw and then remove the Control Box from the top of the Motor Shaft.



LOWER BELT DISCONNECT

Step 1. With one hand, grasp the Motor Shaft and lift upward slightly to offset the weight of the lower unit relieving the pressure on the Trim Release; with your other hand, pull the Trim Release Lever to disengage the trim motor drive. Lower the Lower Unit and Motor Shaft slowly so the skeg rests on the floor. (Figure 247)

Step 2. Pull the belt downward creating at least 4” of Belt slack between the Steering Housing and Lower Unit, this slack is necessary for step 16. If the belt will not travel freely through the Trim Housing pull the Trim Release Lever back open. (Figure 248)

Step 3. Push Down/toward the Motor Lower Unit on the Belt to force the Lower Belt Block and the end of the Belt out of the Lower Unit Clamp Collar. If the Belt and Belt Block will not exit the Lower Unit Clamp by only pushing the belt a small pliers may be used to grip the end of the Belt and pull (Figure 248).

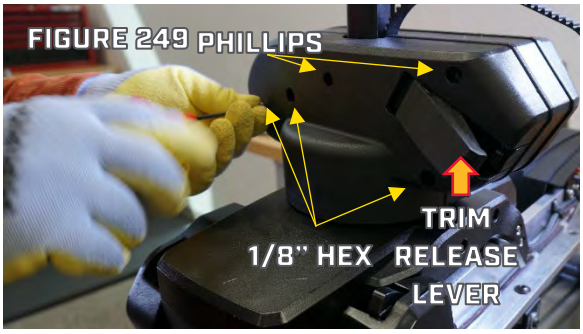
NOTICE!

IF ANY OF THE CLAMP COLLAR SCREWS ARE LOOSENED ALL SIX NEED TO REMOVED AND REINSTALLED TO CORRECT TORQUE WITH LOCTITE 248 THREAD-LOCKER APPLIED. THIS MUST COMPLETED PRIOR TO INSTALLATION STEPS CAN BE DONE. SEE THE COMPOSITE SHAFT REPLACEMENT/LOWER UNIT ASSEMBLY REPLACEMENT ON PAGE 50

TRIM HOUSING REMOVAL

Complete CONTROL BOX REMOVAL/UPPER BELT DISCONNECT on Page 93, and LOWER BELT DISCONNECT on Page 95 before proceeding to Step 1.

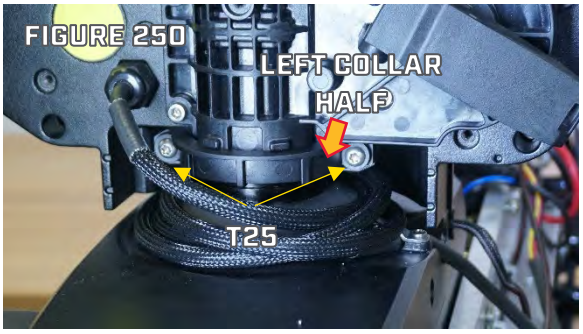
Step 1. With one hand, grasp the Motor Shaft and lift upward slightly to offset the weight of the lower unit relieving the pressure on the Trim Release; with your other hand, pull the Trim Release Lever to disengage the trim motor drive. Lower the Lower Unit and Motor Shaft slowly so the skeg rests on the floor.



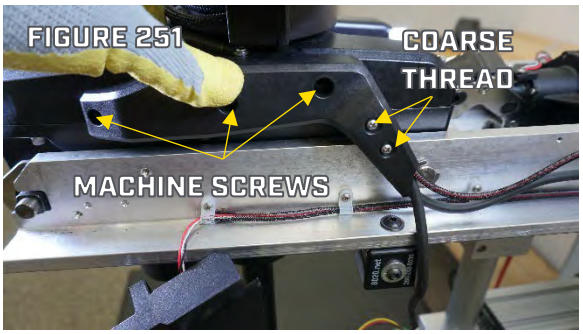
Step 2. Use a #2 Phillips Screwdriver to remove the upper two screws fastening the plastic cover to the Trim Housing. Use a 1/8" Hex Key/Allen wrench to remove the bottom three Machine Screws from the cover. Make note of which screws go in which holes for reassembly. (Figure 249).

Step 3. Remove the plastic cover from the Trim Housing.

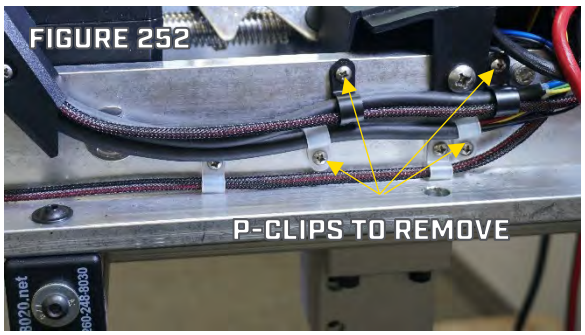
Step 4. Use a T25 Driver to remove the two Torx head screws from the Trim Steer Clamp Collar, that secures the Trim Housing to the Steering Housing. Set the Left and Right Collar Halves and Screws aside for use in reassembly, the Nuts will stay captive in the Right Collar Half.
(Figure 250).



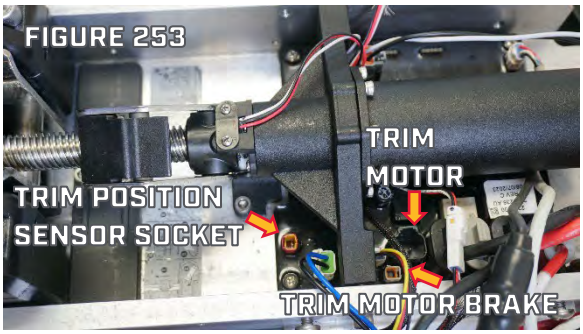
Step 5. Use #2 Phillips Screwdriver to remove the three Machine Screws and the two Coarse Thread Screws from Cable Cover. Set the Cable Cover and Screws aside for use in reassembly, make note of which screws are used in each location. (Figure 251)

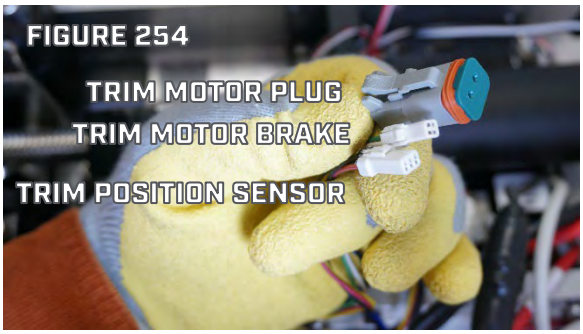


Step 6. Use a #2 Phillips Screwdriver to remove the four screws from the four
P-Clips holding the cables to the Base Extrusion. Set the P-Clips and the Screws aside for use in reassembly. (Figure 252)

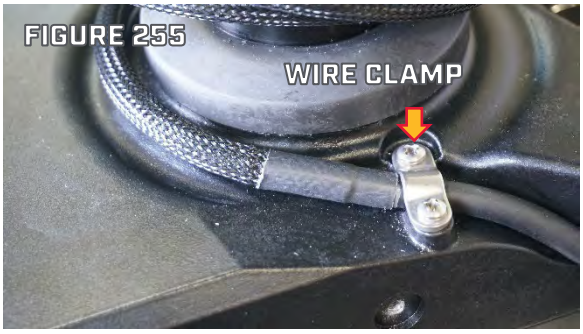


Step 7. Disconnect the Trim Motor Plug (Larger Gray Plug with Blue and Black Wires), the Trim Brake Plug (Smallest White Plug with Green and White Wires), and the Trim Position Sensor Plug (White Plug with Red, Black, and Yellow Wires). The Trim Position Sensor plug is identical to the Steering Position Sensor plug therefore, verify the correct plug Position using the WIRING DIAGRAM on Page 13. (Figures 253 and 254).

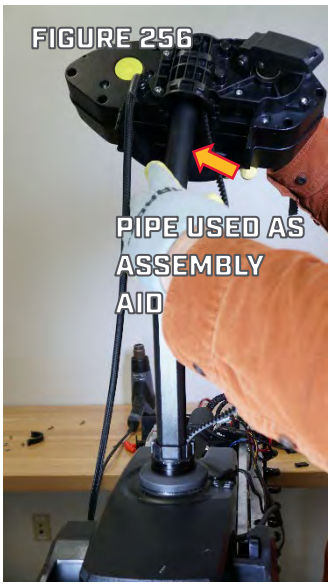




Step 8. Use a #2 Phillips Screwdriver to remove the Screws from the Wire Clamp Securing the Trim Housing Cable to the Steering Housing. Set the Wire Clamp and Screws aside for use in reassembly. (Figure 255)



Step 9. Slide the Trim Module upward to remove it from the Motor Shaft. (Figure 256) ½”-3/4” PVC Pipe 6-12” used as a disassembly/assembly aid.



To continue with replacing the Trim Housing continue to INSTALL TRIM HOUSING TO MOTOR on Page 99.

To install a new belt proceed to SWAP BELT METHOD 2; BELT NOT USABLE TO FEED REPLACEMENT on page 108, before returning to INSTALL TRIM HOUSING TO MOTOR on Page 99.

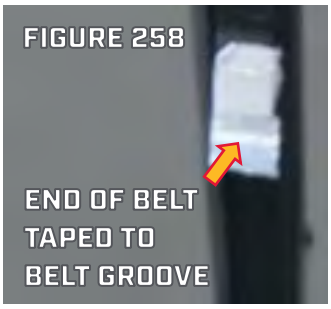
To replace the Steering Housing proceed to ULTERRA/ RIPTIDE INSTINCT STEERING HOUSING REPLACEMENT on Page 103. Complete both REMOVE THE STEERING HOUSING on Page 104 and INSTALL THE STEERING HOUSING TO THE BASE EXTRUSION on Page 105, before returning to INSTALL TRIM HOUSING TO MOTOR on Page 99.

INSTALL TRIM HOUSING TO MOTOR

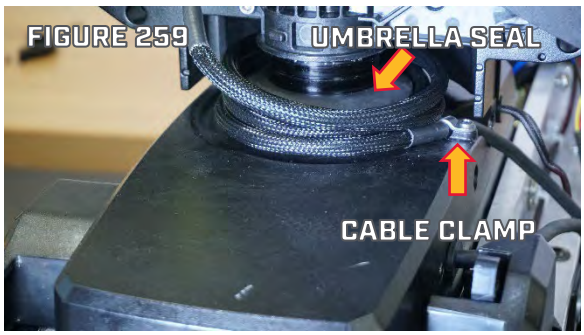
Step 1. Slide the new Trim Housing over the top of the Motor Shaft, positioning the Belt in the Belt Groove of the Motor Shaft. (Figure 257)

NOTICE: A 6-12” piece of ½”-3/4” pipe can be used to manage the wires from the motor shaft, this will make getting the Trim Housing in place significantly easier as shown in Figure 257.

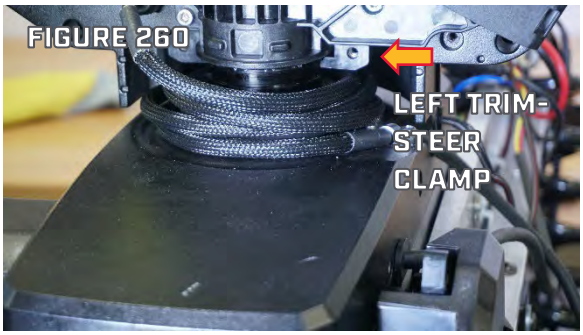
Step 2. Lift the Motor Lower Unit and Motor Shaft 15”. Tape the end of the Belt to the Motor Shaft in the Belt Groove just above the Steering Housing. Return the Motor Lower Unit/Motor Shaft to the floor, the Belt will be pulled though the steering housing by the Masking Tape. (Figure 258). Remove the Masking Tape.



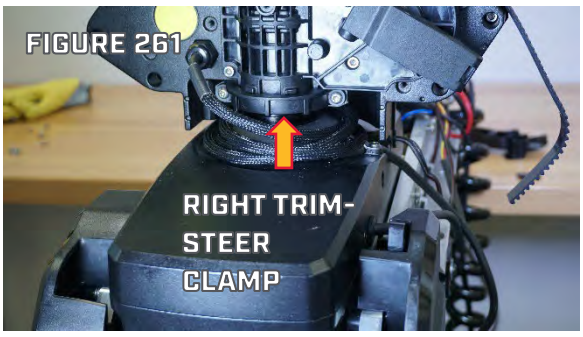
Step 3. Loosely wrap the Trim Housing Cord around the shaft at least three times before continuing out the cord detail on the top of the steering housing. When properly routed, the Trim Housing Cord will be around the Umbrella Seal, not on top of the Umbrella Seal, to prevent damaging the Umbrella Seal. Install the Cable Clamp over the Trim Housing Cord. (Figure 259).



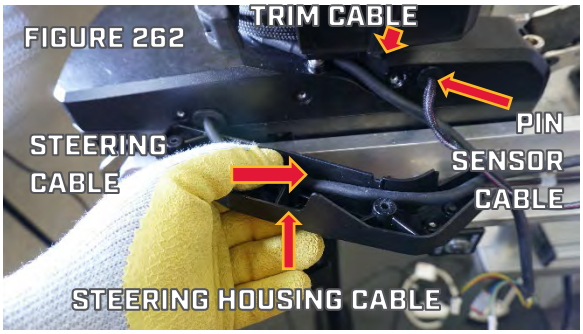
Step 4. Position the Left Trim-Steer Clamp Collar Half under the Trim Housing, such that the Left Trim-Steer Clamp Half engages both the Steering Housing Output and the ring at the base of the Trim Module. (Figure 260)

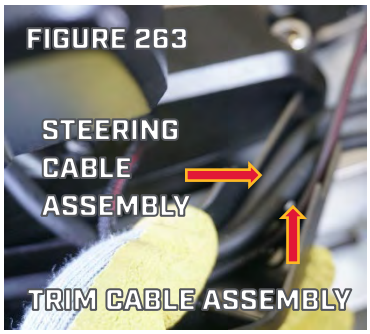


Step 5. Place the Right Trim-Steer Clamp Collar Half over the Steering Output Tube and ring at the Base of the Trim Module. Use a T25 Driver to install the two Screws that fasten the Right Trim-Steer Clamp and Left Trim-Steer Clamp into the Trim Steer Clamp. (Figure 261)

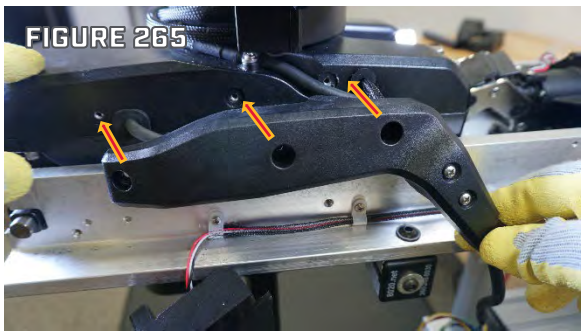


Step 6. Place the Steering Cable Assembly into the Steering Housing Cable Cover (Figure 262). Place the Trim Housing Cable Assembly and the Pin Sensor Cable into the Steering Housing Cable Cover (Figure 263). Install the Cable Cover Backing (Figure 264) into the Steering Housing Cable Cover and secure with the two Course Thread Screws from the outside (Figure 264).



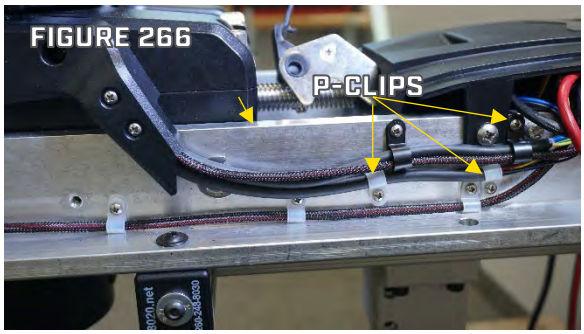


Step 7. Attach the Cable Cover to the Steering Housing using the three Machine Screws that were removed during Disassembly step 17. (Figure 265)

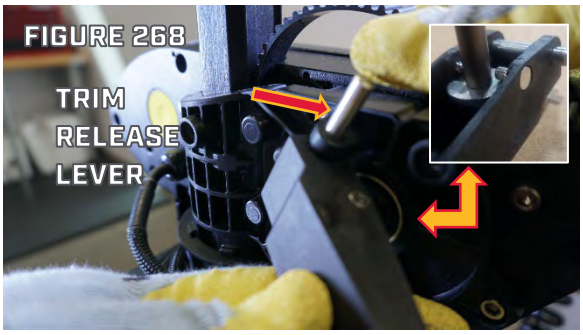


Step 8. Route the Trim Housing and Steering Housing Cable Assemblies in the Four P-Clips then use a #2 Phillips Screwdriver to fasten the P-Clips to the Base Extrusion.
(Figure 266).

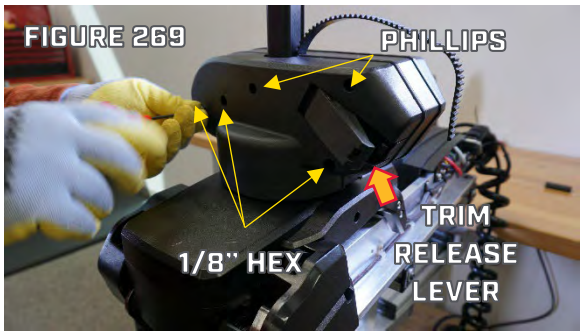
Step 9. Connect the Plug Ends for the Trim Position Sensor, Trim Motor, and Trim Brake Wires to their respective sockets on the Main Control Board (See Included WIRING DIAGRAM on Page 13 for correct placement on the Main Control Board).



Step 10. If the Trim Release Lever fell off of the Trim Housing, slide the Trim Release Lever over the washer so the pins in Trim Release Lever are behind the Washer. Install the Trim Release Lever Dowel pin. (A small amount of Marine Grease on the Pin may be applied to keep it from falling out while installing the cover.) (Figures 267 and 268)



Step 11. Place the Plastic Cover over the open side of the Trim Module, install the two Phillips Head Screws in the upper two holes, the three Machine Screws installed with a 1/8" Hex Key in the bottom 3 holes. (Figure 269)

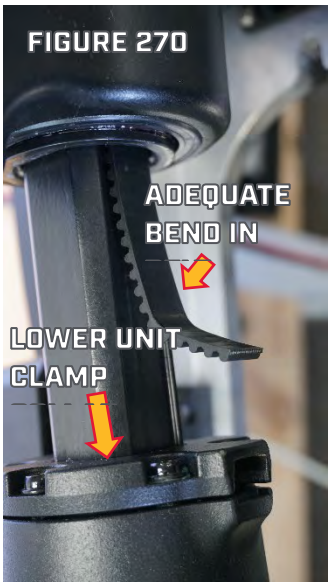


CONNECT BELT TO LOWER UNIT

Step 1. At the end of the belt next to the Lower Unit, curl the Belt back on itself to make it more likely to bend away from the Motor Shaft (Figure 270).

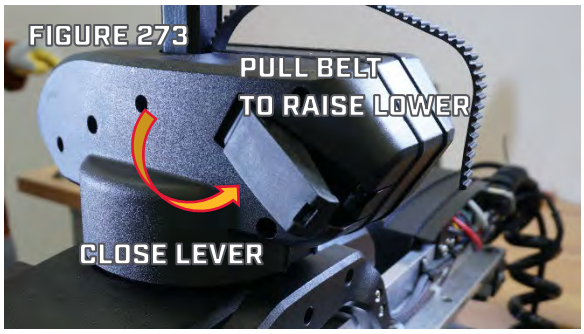
Step 2. Push the tip of the Belt into Lower Unit Clamp Collar, applying pressure to the Belt in the direction of the Lower Unit to get the Belt to slip through the Lower Unit Clamp Collar and out of the back of the Lower Unit Clamp Collar. Position the Belt Block so the thicker end of the Belt Block is toward the Prop and the thinner end is toward the Motor Shaft and the teeth are facing up. (Figure 271)

Step 3. Align the Belt and Belt Block so there is one Belt tooth in each slot in the Belt Block, pull the Belt and Belt Block into the Lower Unit Clamp Collar (Figures 272).



Step 4. Remove the Belt slack below the Steering Housing by Pulling the Belt through the Trim Housing until the Lower Unit starts to raise up. If the Belt does not move freely, pull the Release Lever to disengage the Trim Motor. (Figure 273)

Step 5. Close the Trim Release Lever to lock the Belt in place. (Figure 273)



INSTALL CONTROL BOX, MAKE UPPER BELT CONNECTION

Step 1. Place the Control Box Assembly with the Coil Cord and Advanced GPS Controller onto the top of the Motor Shaft. (Figure 274).

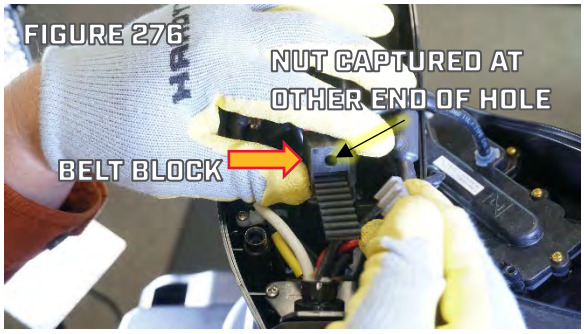
Step 2. Place the Nut that was removed from the Control Box during disassembly in the hex shaped detail on the right side of the Control Box. Insert the Control Box Locating Screw through the Control Box and the hole in the Motor Shaft and tighten the control Box Locating Screw into the Nut. (Figure 274).

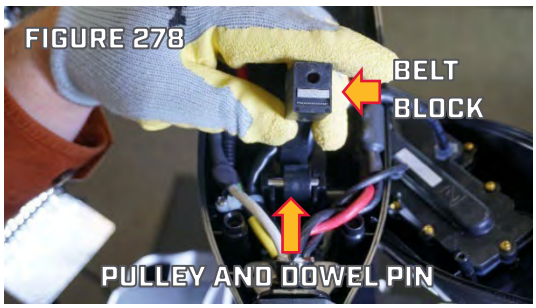
Step 3. Push the Belt into the Control Box via the space between the Control Box and the Shaft along the flat channel in the Composite Shaft. (Figure 275).

Step 4. Insert the Belt into the Upper Belt Block from the end with the captured Nut and with the teeth of the Belt facing up. Feed the Belt completely through the Belt Block. (Figure 276)

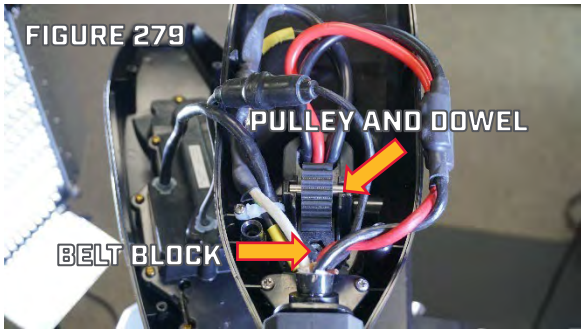
Step 5. Place the Belt Rack so the raised edge lines up with the end of the Belt, and each groove of the Belt Rack has a Belt Tooth in it. (Figure 277)

Step 6. Pull the Belt and Belt Rack into the Belt Block so they are flush with the end of the Belt Block. (Figure 278)





Step 7. Place the Pulley on the Dowel Pin. Place the Pulley and Dowel Pin so it rests in the groove in the Control Box (Figure 278). Feed the Belt Block Assembly down into the space between the Power and Communication Wires coming from the Coil Cord. (Figure 279)



Step 8. Insert the Belt Tensioning Screw with Washer through the hole in the bottom of the Control Box. Engage the Belt Tensioning Screw into the Nut in the Belt Block. It may help to hold the Belt Block down with a free hand to get the Tensioning Screw Started into the Nut. Use a 5/32" Hex Key to tighten the Belt Tensioning Screw to a torque of 10 in-lbs/1.1nM. (Figure 280).

Step 9. Slide the 5" long Heat Shrink over one side of the Motor Communication Cable. (Figure 281)

Step 10. Push the two halves of the Motor Communication Cable Connector together until the locking tab engages. (Figure 282)

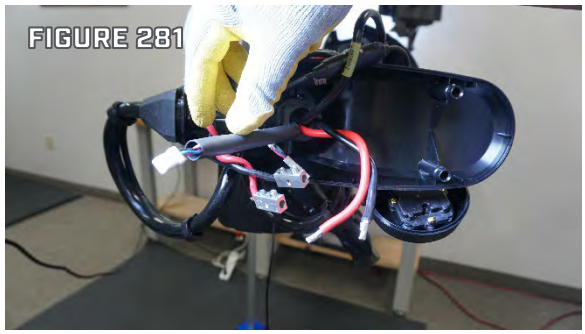
Step 11. Center the Heat Shrink on the connector, the ends of the Heat Shrink should be on the outer jacket of the cable, no small conductors should be visible.

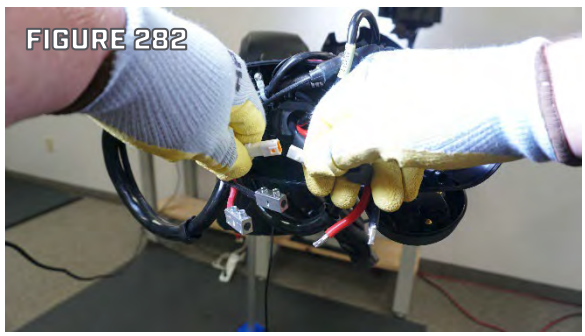
Step 12. Slide the two 2 ¼" long Heat Shrinks over the Motor Power Wires, one on the Red Wire, one on the Black Wire.

Step 13. For both Motor Power Wires, matching Red to Red and Black to Black, Insert the wire end that was removed from the Splicer during disassembly into the open end of the Splicer and use 1/8" Allen Key to tighten the set screw of the Splicer securing the Wire.

Step 14. Center the Heat Shrinks over the Splicers.

Step 15. Use a Heat Gun to seal the Shrinks.





ULTERRA/ RIPTIDE INSTINCT STEERING HOUSING REPLACEMENT

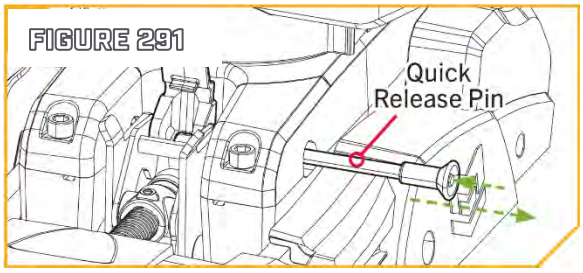
The following instructions assume CONTROL BOX REMOVAL/UPPER BELT DISCONNECT on Page 93, LOWER BELT DISCONNECT on Page 95 and TRIM HOUSING REMOVAL on Page 97 have been completed prior to proceeding.

REMOVE THE STEERING HOUSING

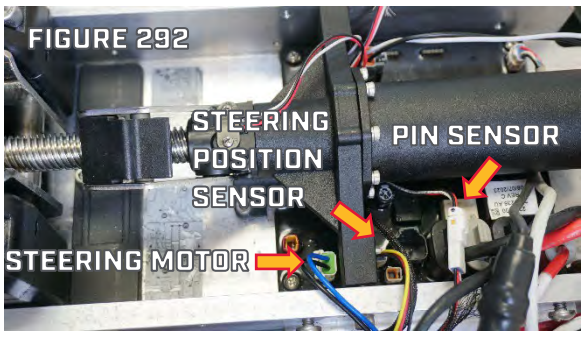
Step 1. If installed, remove the Quick Release Pin. (Figure 291)

a. Press and hold the button within the Quick Release Pin

b. Pull the Quick Release Pin out of the Steering Housing



Step 2. Disconnect the Steering Motor Plug, Steering Position Sensor Plug, and Pin Sensor Connector from the Control Board. The Steering Motor Plug and Steering Position Sensor plug sockets in the Control Board, the Pin Sensor Connector has a couple inches of wire between it and the Control Board. (Figure 292)

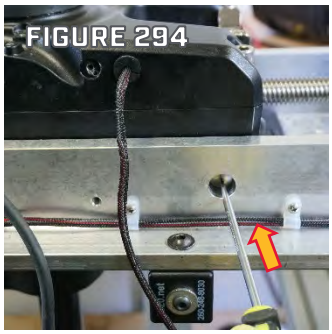


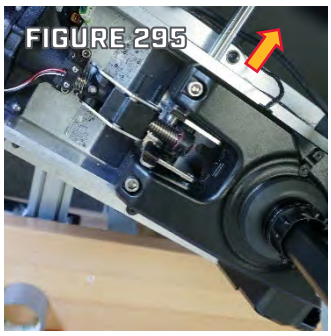
⚠ CAUTION!

With the Pivot Pin removed the Steering Housing and Shaft/Lower Unit Assembly are not attached to anything, as a group these parts are heavy enough to injure a toe or other sensitive body part if dropped. Always control the Steering Housing and Lower Unit/Shaft.

Step 3. Use a Flat Blade Screwdriver, Pick, or small Prybar to remove the E-Ring from one end of the Pivot Pin for the Steering Housing Assembly. (Figure 293)

Step 4. Drive the Pivot Pin out of the Base Extrusion with a punch or screwdriver. (Figures 294 & 295)





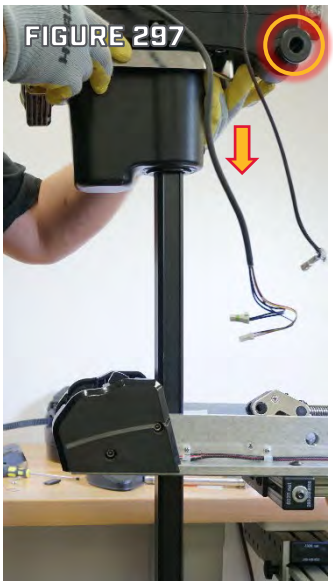
Step 5. With the Pivot Pin Removed, lift the Steering Housing off of the Lower Unit/Shaft Assembly. (Figure 296)

INSTALL THE STEERING HOUSING TO THE BASE EXTRUSION

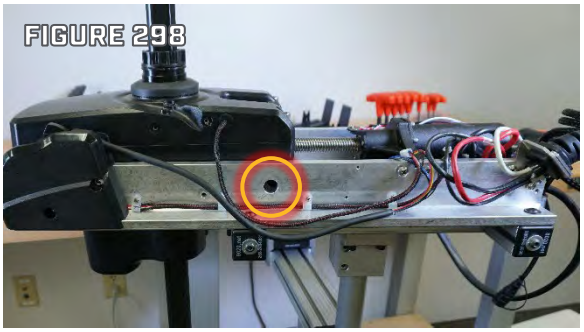
Step 1. Transfer the Pivot Bushings from the replaced Steering Housing to the new Steering Housing. (Circled in Figure 297)

Step 2. Slide the Steering Housing onto the Motor Shaft (Figure 297), the Lower Unit must be oriented “Prop Left”.
Prop Left is to Port, left as you are in the boat facing forward.

NOTICE: A 6-12” piece of pipe can be used to manage the wires from the motor shaft, this will make getting the Steering Housing and Trim Module in place significantly easier as shown in Figure 296.



Step 3. Align the holes at the back of the Steering Housing Assembly with holes in the Base Extrusion and push the Pivot Pin through the Base Extrusion, Steering Housing, and Tilt Arms. (Figures 298 and 299)

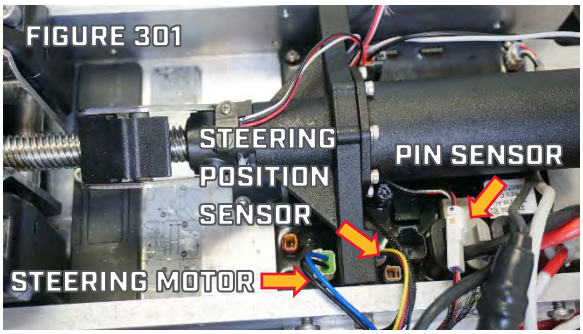


Step 4. Reinstall the E-Ring. Verify the E-Ring Fully seats in the groove of the Pivot Pin, as shown in Figure 300.

NOTICE!

The Steering Position Sensor and the Trim Position Sensor have identical plugs. Verify the correct plug location on the WIRING DIAGRAM on Page 13. Reversing the plugs will cause inconsistent operation during calibration and may result in damage to the Tilt Knuckle or other components.

Step 5. Insert the Steering Motor Plug and Steering Position Sensor Plug into the correct sockets on the Control Board. Connect the Pin Sensor to the Main Control Board. Note the Steering Position Sensor Plug is identical to the Trim Position Sensor Plug. (Figure 301)



With the Steering Housing installed to the Base Extrusion, proceed to INSTALL TRIM HOUSING TO MOTOR on Page 99, CONNECT BELT TO LOWER UNIT on Page 101 and INSTALL CONTROL BOX, MAKE UPPER BELT CONNECTION on Page 102, to complete the installation.

LIFT BELT REPLACEMENT

PREPARE THE BELT

For motors with less than 100" Motor Shaft the Belt must be cut to length. The cut points are marked with a line on a piece of masking tape that corresponds to the shaft length written on the masking tape.

Step 1. Locate the masking tape label with the corresponding shaft length being worked upon.

Step 2. Use a sharp Scissors to cut the belt in the "valley" (low point between two Belt Teeth) that is closest to the line marked on tape and on the longer side of the mark. The marks are in sequence 45, 60, 72, 87, the longer side is in the direction of the next longer mark or farther from the previous shorter mark. (Figure 302).

Step 3. The section of Belt to be used is "shorter" direction from the cut point. Remove the tape remaining on the section to be used. Discard the belt in the "Longer" direction from the cut point.

SWAP BELT METHOD 1; OLD BELT STILL INSTALLED IN TRIM HOUSING

For this method to work the Belt being replaced must move freely through the Trim Housing and both ends must be accessible. This method is a short cut, if it is not possible to connect to the old Belt, or the new Belt does not feed successfully into final position, proceed to SWAP BELT METHOD 2; BELT NOT USABLE TO FEED REPLACEMENT on Page 108.

Complete CONTROL BOX REMOVAL/UPPER BELT DISCONNECT on Page 93 and LOWER BELT DISCONNECT on Page 95, then proceed to Step 1.

Step 1. Set the new Belt and old Belt end to end in a Belt Block to set the spacing on the teeth. If the spacing of the teeth does not match, when engaging the output gear in the Trim Housing, the Belt will hang up and break the tape. (Figure 304).

Step 2. Prepare two strips of duct tape less than ½" wide, and at least 4" long.

Step 3. Apply a strip of duct tape with its length running parallel to the Belts, across the old and new Belt linking them together. (Figure 305).

Step 4. Flip the joined Belts over, remove the Belt Block, and apply the other strip of tape to the toothed side of the two Belts, beginning at the seam between the belts and working towards the ends of the strip of tape press the tape into the teeth. (Figure 306).

Step 5. Pull the Trim Release Lever out disengaging the Drive Shaft. Pull the old Belt out from the end without the new Belt attached, which will pull the new Belt through the Trim Housing. If any tension is felt on the Belt pull the Trim Release Lever out to release it. If tension develops before the taped seam exits the Trim Housing, and the Trim Release Lever is fully in the open position try backing out and verify the tape is not peeling away from the Belt.
(Figure 307).

Step 6. After the new Belt has passed through the Trim housing, remove the duct tape from both sides of the Belts. Discard the old Belt.

Proceed to CONNECT BELT TO LOWER UNIT on Page 101 and INSTALL CONTROL BOX, MAKE UPPER BELT CONNECTION on Page 102 to complete the installation.

SWAP BELT METHOD 2; BELT NOT USABLE TO FEED REPLACEMENT

Before proceeding to step 1, CONTROL BOX REMOVAL/UPPER BELT DISCONNECT on Page 93, LOWER BELT DISCONNECT on Page 95, and TRIM HOUSING REMOVAL on Page 97.

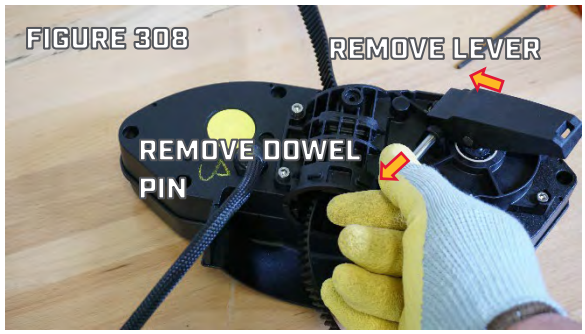
PLACE BELT IN TRIM HOUSING

Step 1. Place the Trim Housing on a work surface, with the plastic Output Collar facing up.

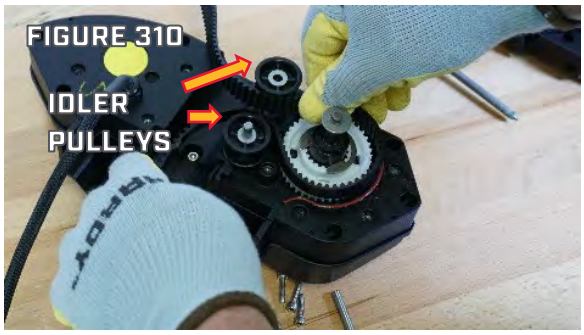
Step 2. Press the Dowel Pin out of the Trim Release Lever then pull the Dowel Pin out of the Trim Release Lever. (Figure 308).

Step 3. Slide the Trim Release Lever out from under the washer attached to Trim Gear Output Shaft.
(Figure 308).

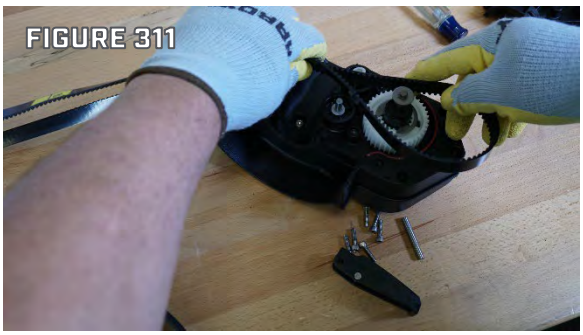
Step 4. Use a 5/32” Hex Key to remove six Screws securing the Output Collar to the body of the Trim Housing. Lift the Output Collar off of the body of the Trim Housing. (Figure 309).



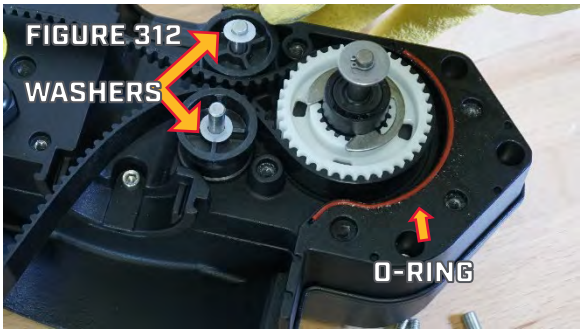
Step 5. Lift the two Idler Pulleys and the old Belt Up until the Belt is freed from the Drive Pulley. Remove the old Belt.
(Figure 310).



Step 6. Fold the new Belt in half with a loop towards the Drive Gear. Then, position it between the Idler Pulleys and lower the Idler Pulleys and Belt into the Trim Housing, ensuring the Belt lines up with the Drive Gear, with one belt tooth per gear tooth. (Figure 311)



Step 7. If the Idler Pulleys were lifted far enough to displace the white plastic Washers reinstall the Washers on the Pulley Shafts. One Washer on each side of each Idler Pulley, the Washers under the Idler Pulleys should not have moved during this operation. (Figure 312)



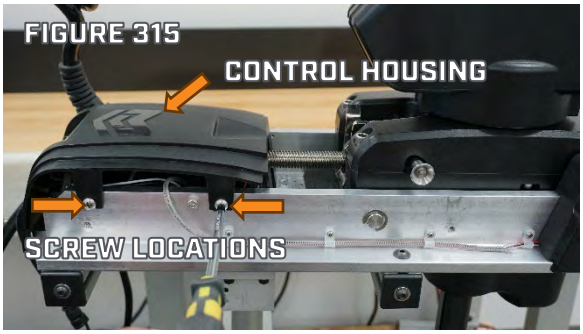
Step 8. Verify the O-Ring is in place next to the Output Gear. If the O-Ring is not sitting in its groove a small amount of
Mystic JT-6 Hi-Temp Grease or other tacky marine grease may be used to keep the O-ring down while installing the Output Collar. (Figure 312).

Step 9. Place the Output Collar over the Belt and Pulleys then use a 5/32” Hex Key to reinstall the six Screws that secure the Collar to the body of the Trim Housing. (Figure 313)

TILT ACTUATOR OR TILT BRACKET ASSEMBLY REPLACEMENT OR ADJUSTMENT

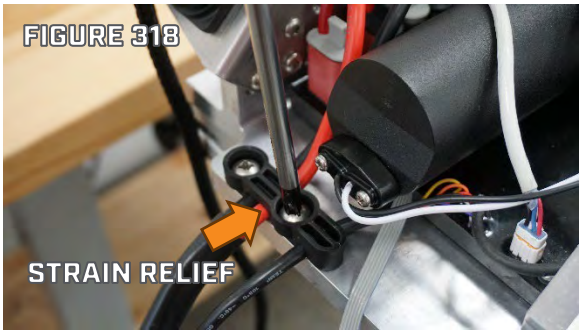
Step 1. Use a #3 Philips Screwdriver to remove the two Screws on the Port and Starboard Sideplates. Set the Screws and Sideplates aside for reuse during installation. (Figure 314)

Step 2. Using a #3 Philips Screwdriver, loosen the four Screws that secure the Control Housing to the Base Extrusion by 1-2 turns. The Screws only need to be loosened and not completely removed. Carefully lift the Control Housing from the Base Extrusion to prevent damaging the Ribbon Cable for the Power Button. The four Screws can remain installed in the Base Extrusion. (Figure 315 & 316)

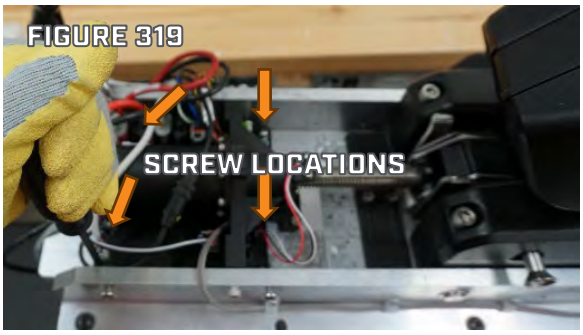


Step 3. Use a #2 Philips Screwdriver, remove the two Screws that attach the LED/Power Button Board to the Control Housing. (Figure 317)

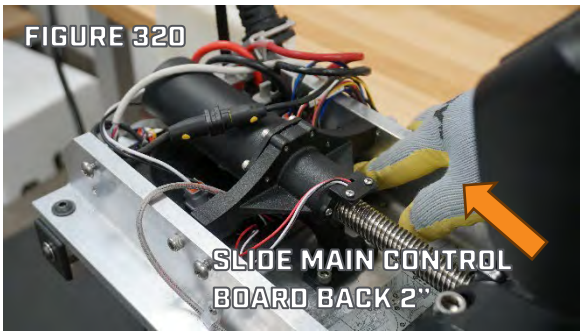
Step 4. Use a #3 Philips Screwdriver to remove the two Screws securing the Strain Relief to the Base Extrusion. (Figure 318)



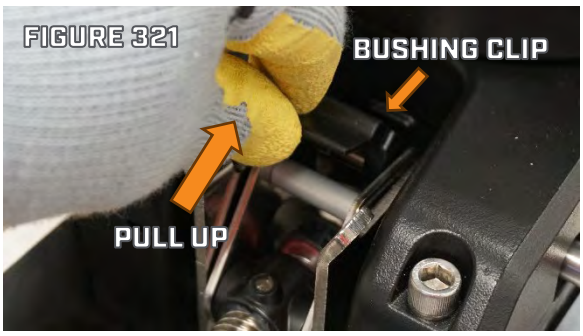
Step 5. Use a #2 Philips Screwdriver to remove the four Screws securing the Main Control Board to the Base Extrusion. Set the Screws aside for reuse during installation. (Figure 319)



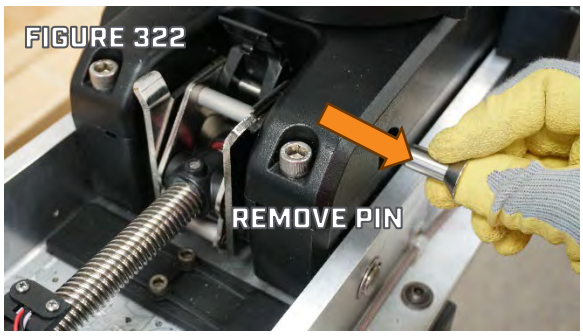
Step 6. Slide the Main Control Board away from the Steering Housing 2” to leave enough clearance to remove the Tilt Actuator Assembly. Leave all connections and wire harnesses intact when pushing the Main Control Board back. (Figure 320)



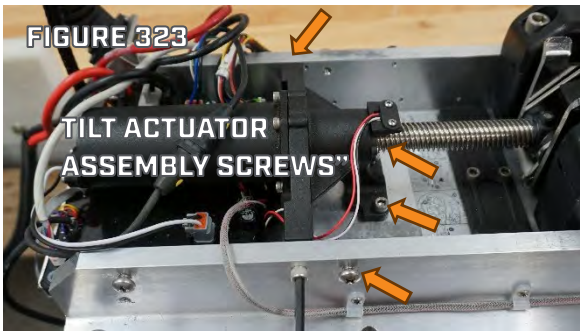
Step 7. Pull up on the Bushing Clip that secures the Quick Release Pin to the Tilt Bracket Assembly (Figure 321)



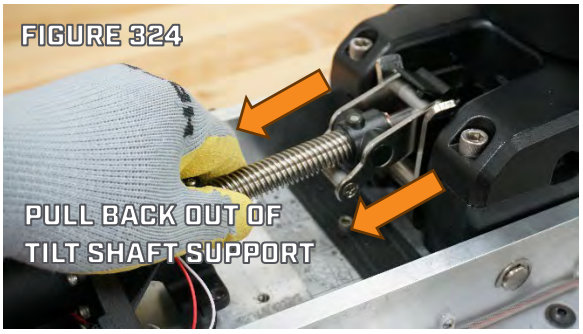
Step 8. Remove the Quick Release Pin by pushing in the center of the Pin and pulling out the Pin completely. Set aside the Pin for reuse during installation. (Figure 322)



Step 9. Using a 3/16” Hex Key/Allen Wrench remove the four Screws that hold the Tilt Actuator Assembly to the Base Extrusion. (Figure 323)

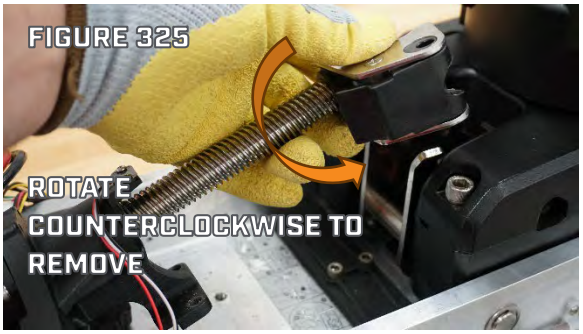


Step 10. Pull back on the Tilt Actuator Assembly to remove it from the Tilt Shaft Support. (Figure 324)



If adjusting the Tilt Bracket to allow for undoing an emergency stow, skip to Step 13.

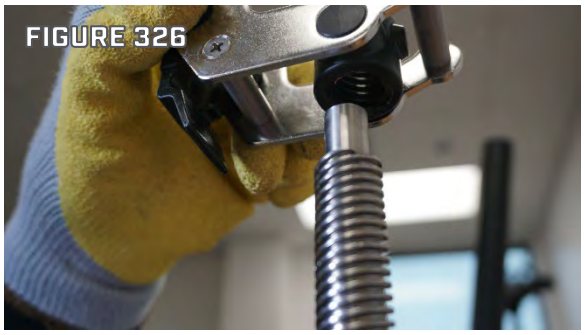
Step 11. With the Tilt Actuator Assembly and the Tilt Bracket Assembly free of the Tilt Shaft Support, rotate the Tilt Bracket Assembly counterclockwise as viewed from the end of the Tilt Actuator Screw, to remove the Tilt Bracket Assembly from the threaded shaft of the Tilt Actuator Assembly. (Figure 325)

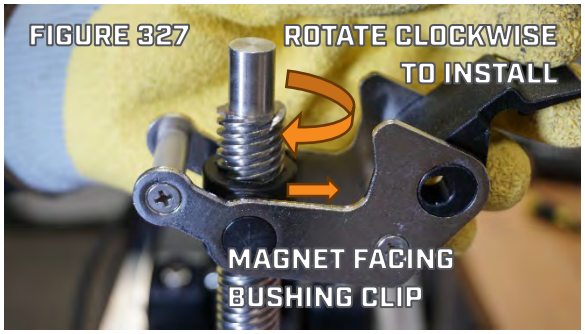


If replacing the Tilt Actuator Assembly, unplug the Tilt Actuator from the Main Control Board, discard the replaced Tilt Actuator Assembly, Plug the new Tilt Actuator Assembly into the Main Control Board.

Step 12. The Tilt Actuator threaded shaft has a quad thread pattern and it requires lining up all four threads on the Tilt Bracket Assembly to the threaded shaft. Damage will occur to the new Tilt Bracket Assembly if not properly lined up.

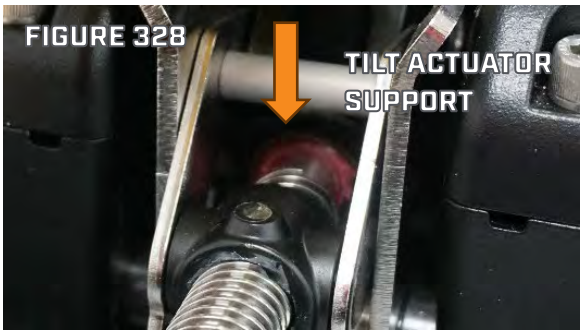
Step 13. With the threads properly aligned rotate the Tilt Bracket Assembly clockwise, as viewed from the end of the Tilt Bracket Screw, until five threads are fully engaged on the threaded shaft of the Tilt Actuator Assembly. This will allow proper installation of the Quick Release Pin.
(Figures 326 & 327)



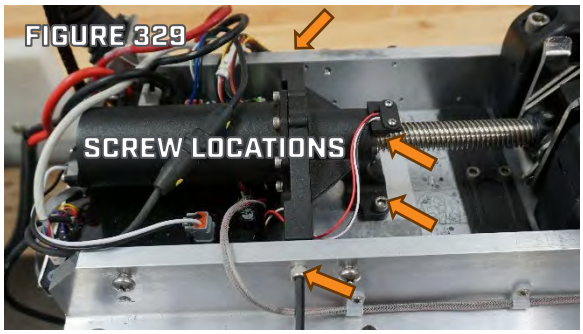


NOTICE: Figure 327 and 336 show the magnet facing up toward the Bushing Clip which is the correct orientation on the Tilt Bracket Assembly. If the magnet isn't facing up the Motor will not trim back onto the Motor Ramps during the stow sequence. The Motor will stay trimmed out 6" until the magnet is correctly oriented.

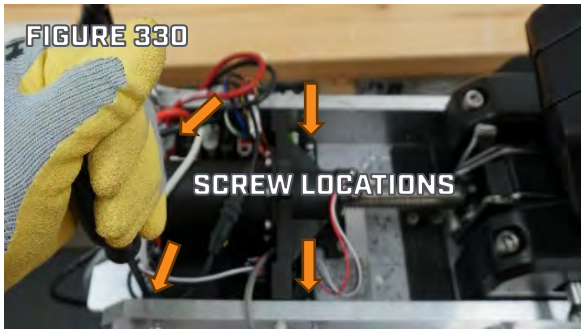
Step 14. Ensure the machined end of the Tilt Actuator Assembly is inserted into the Tilt Actuator Support before inserting the Quick Release Pin. (Figure 328)



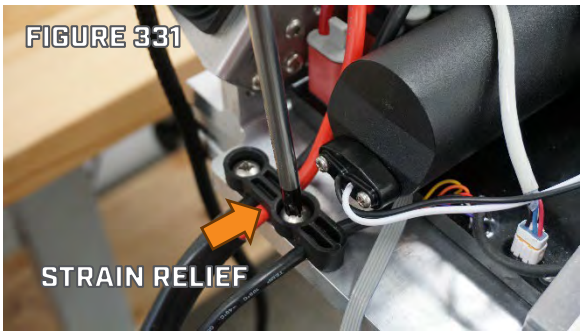
Step 15. Using a 3/16” Hex Key/Allen Wrench reinstall the four Screws that hold the Tilt Actuator Assembly to the Base Extrusion. (Figure 329)



Step 16. Slide the Main Control Board back to the original position, as it was pushed back 2” during removal. Use a #2 Philips Screwdriver to reinstall the four Screws securing the Main Control Board to the Base Extrusion. The Main Control Board is not visible as it is under the Tilt Actuator Assembly. (Figure 340)



Step 17. Use a #3 Philips Screwdriver to reinstall the two Screws securing the Strain Relief to the Base Extrusion. (Figure 331)



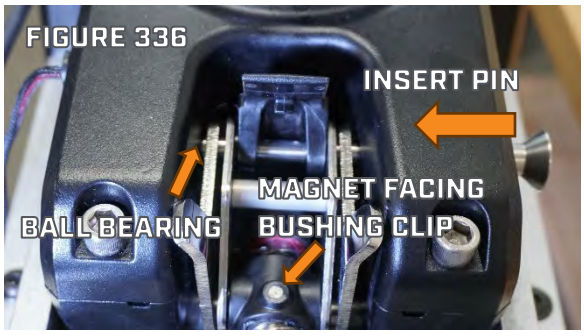
Step 18. Use a #2 Philips Screwdriver to reinstall the two Screws that attach the LED/Power Button Board to the Control Housing. (Figure 332)

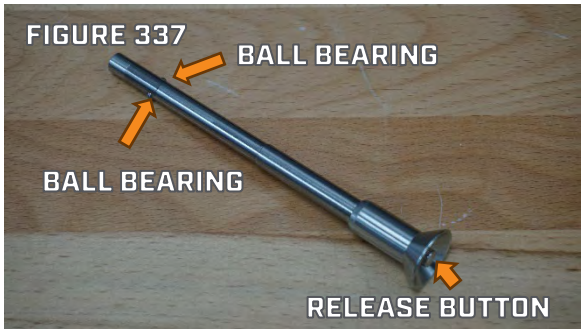
Step 19. Line up and slide the slots in the Control Housing onto the Screws in the Base Extrusion if not removed in Step 2. Use a #3 Philips Screwdriver to tighten the four Screws that were previously loosened 1-2 turns in Step 2. (Figures 333 & 334)

Step 20. Use a #3 Philips Screwdriver to reinstall the Port and Starboard Sideplates. (Figure 335)

Step 21. Push the Release Button on the end of the Quick Release Pin, insert the Quick Release Pin into the Steering Housing through the five openings in the two Tilt Arms, Steering Housing, and Tilt Bracket Assembly. DO NOT use a mallet to force the pin into the other side of the Steering Housing as that will damage the Pin Sensor. (Figures 336 & 337)

NOTICE: The ball bearing on the Quick Release Pin (Figure 126) should sit between the Steering Housing and left Tilt Arm when inserted properly. Figure 337 shows the ball bearing on the Quick Release Pin.





Step 22. Push down on the Bushing Clip to secure the Quick Release Pin and the Tilt Bracket Assembly together. (Figure 338)

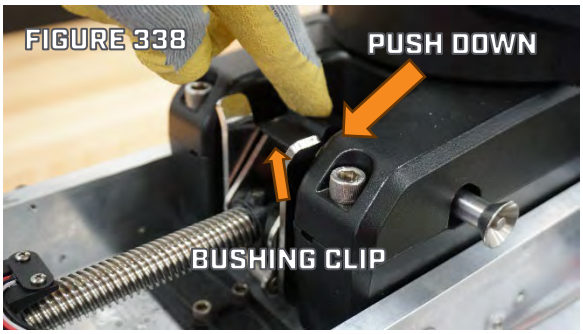
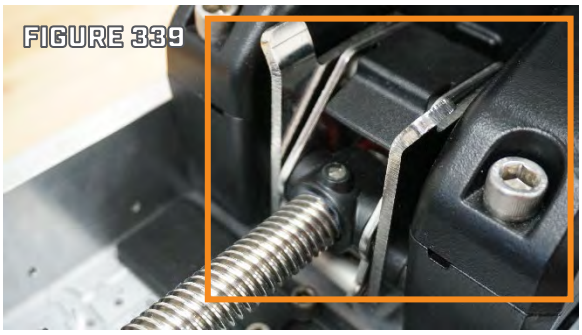


Figure 339 shows the Tilt Bracket Assembly has been properly installed onto the Tilt Actuator Assembly. Connect the Motor to power (24 or 36 volts DC), use the Remote, Foot Pedal, or OBN app to send a Stow command. If the motor doesn't stow with the Quick Release Pin inserted properly, the Pin Sensor may be defective.



TERROVA/RIPTIDE TERROVA

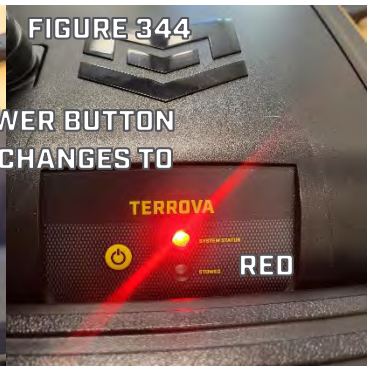
TERROVA/RIPTIDE TERROVA STEERING LIMIT CALIBRATION

Verify the Motor is connected to power and is currently Off. Use either a Foot Pedal or paired Remote to perform Steering Calibration.

Step 1. Place the Motor in the Deployed Position. Make sure the Motor is free to steer. (Figure 341)

Step 2. Reposition the Motor Ramps so they are in the Stowed Position. (Figure 342)

Step 3. Turn Motor Power On. The Motor should power up normally for a short time, then the Blue Light should go off and the Status LED should turn on Red. (Figure 343 & 344)



Step 4. Steer Left until the Motor stops steering. (Figure 345)

Step 5. Press and release the power Button, the Status LED should turn from Red to Orange. (Figure 346)

Step 6. Steer Right until the Motor Stops. (Figure 346)

Step 7. Press the Power Button to complete the process. Blue Light will flash to confirm the process is completed. (Figure 347)

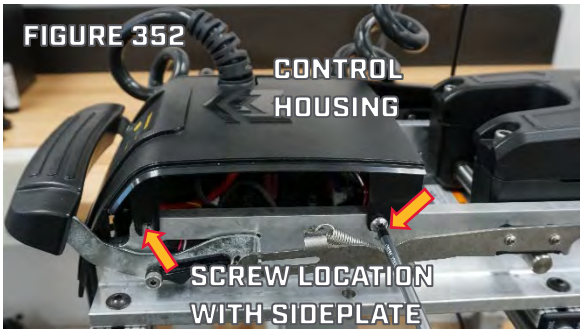
Step 8. Return the Motor Ramps to the Deployed Position, the Latch Pin will be in the way of freely repositioning the Motor Ramps. Error 3.5 will be present between completing the Steering Calibration process and returning the Ramps to the deployed position, this error will clear as soon as the Motor Ramps are returned to the Deployed Position.

TERROVA/RIPTIDE TERROVA MAIN CONTROL BOARD REPLACEMENT

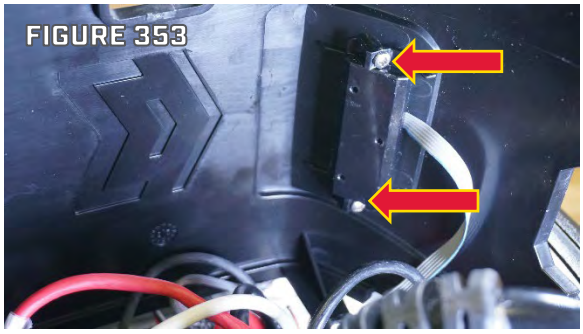
MAIN CONTROL BOARD REMOVAL

Step 1. Use #3 Phillips Screwdriver to remove the Screws retaining the Sideplates. Set the Screws and Sideplates aside for use in reassembly. (Screw locations indicated by arrows in Figure 351)

Step 2. Use a #3 Phillips Screwdriver to loosen the two Screws securing the Control Housing. It is not necessary to remove these Screws, loosening about two turns will allow the Control Housing to be removed. (Figure 352)

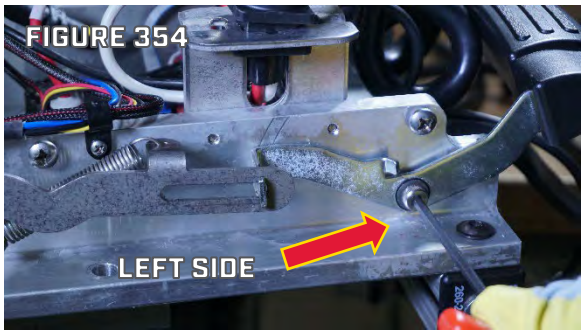


Step 3. Use #2 Phillips Screwdriver to remove the two Screws securing the Power Button Assembly to the Control Housing. Set these Screws and the Control Housing aside for use during reassembly. (Figure 353)

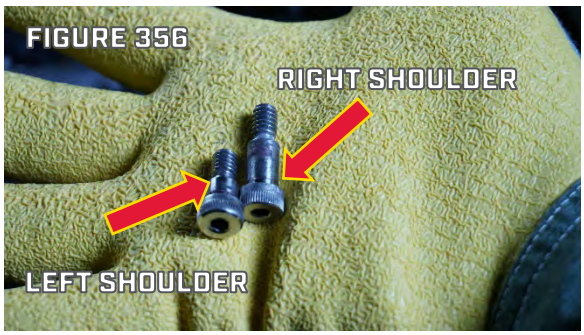


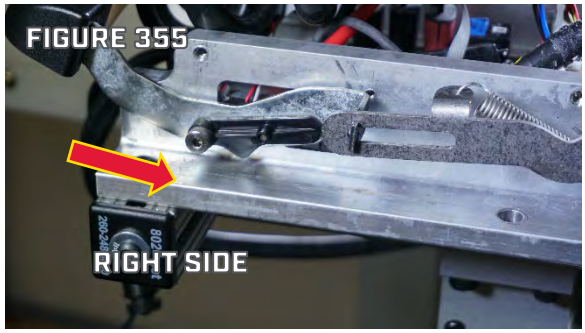
Step 4. Remove the Stow/Deploy Lever to access the two Sensors. The following steps explain removal of the handle assembly.

a. Verify the Motor Ramps are tilted forward in the deployed position as shown in Figure 351.



b. Use the 5/32” Hex to remove the Shoulder Bolts that act as pivots for the Stow/Deploy Lever. Note that the Left Shoulder Bolt is shorter than the Right Shoulder Bolt. Set the Shoulder Bolts aside for use in reassembly. Figure 354, 355, and 356.



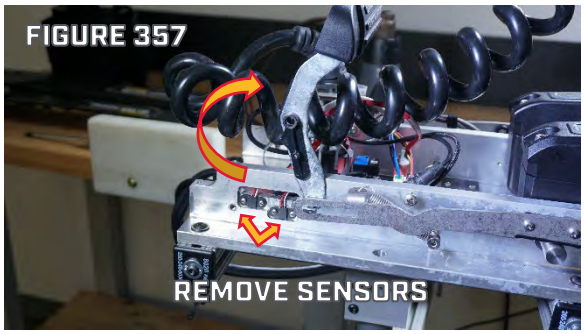


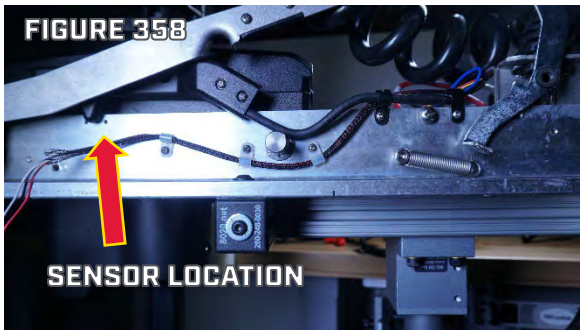
c. Tip the Stow/Deploy Lever forward until the tabs of the Handle Assembly are in line with the slots in the Release Arms. Once aligned slide one Release Arm off of the Stow/Deploy Lever, and repeat on the other side to fully remove the Stow/Deploy Lever. (Figure 357)

d. Use the appropriate driver, T10 Torx Bit or #1 Phillips, to remove the Screws retaining the Sensors. Replacement Screws are included in this kit, the removed Screws may be discarded. (Figure 358)

e. Use the diagonal cutter or utility knife to cut the tie wrap securing the sensor wires.

f. Move the Sensors from the outside wall of the Base Extrusion to the interior so they are ready to be removed with the board.





Step 5. Use the appropriate driver, T10 Torx Driver or #1 Phillips, to remove the two Screws that secure the Sensor on the left side of the Base Extrusion. Use #2 Phillips Screwdriver to remove the Screws from the five P-Clips that route wires down the left side of the Base Extrusion. Set the Screws aside for reassembly, leave the P-Clips on the wire bundle for use during reassembly. Remove the Sensor wire from P-Clips freeing the Sensor to be removed with the Main Control Board.

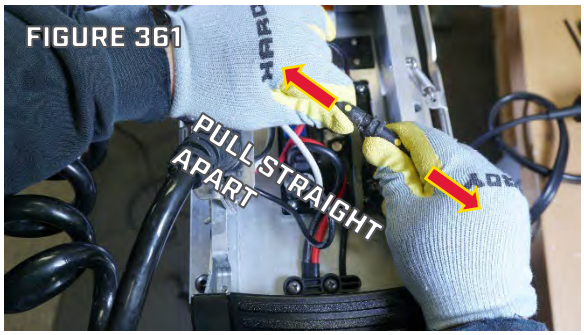
Step 6. Remove the Heat Shrink from the Accessory Connector.

NOTICE: The safest way to remove Heat Shrink is to score the Heat Shrink with a Utility Knife (Figure 359) and then apply heat with a Heat Gun (Figure 360). The Heat Shrink will shrink further and split where it was scored allowing the Heat Shrink to be peeled away. Trying to cut completely through the shrink cold you may damage the wire or slip off of the material with the knife which may result in cutting yourself.

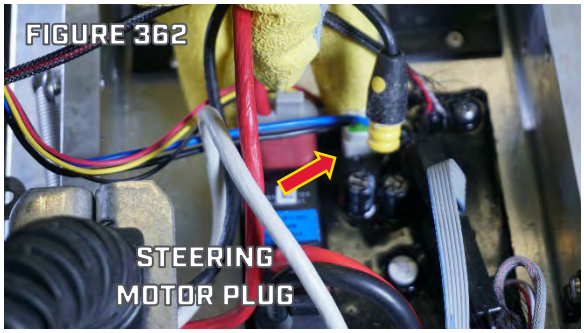
Step 7. Cut the tie wrap securing the Accessory Connector to the side of the Base Extrusion.

NOTICE: Early Terrova Quest Motors only have one zip tie pad, on these motors a single zip tie secures the Stow Sensor, Handle Sensor and Accessory connector.

Step 8. Disconnect the Accessory Connector by pulling the two sides of the connector straight apart. Do not twist the connector, it is a straight pull. (Figure 361)



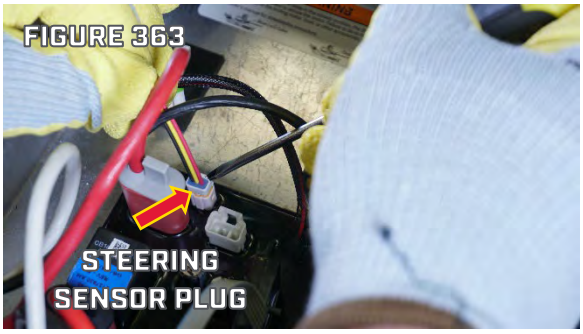
Step 9. Depress the locking tab on the Plug for the Steering Motor, then pull the Steering Motor Plug from the Control Board. (Figure 362). This Plug's locking tab can be released by hand, without tools.



⚠ WARNING!

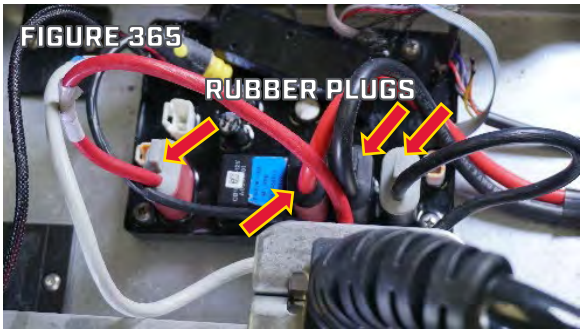
DOUBLE CHECK THAT POWER IS DISCONNECTED TO THE MOTOR, THE NEXT STEPS WILL EXPOSE THE POWER WIRES SO ANY RISK OF SHORT CIRCUITS DAMAGING MOTOR COMPONENTS OR HEATING METAL PARTS THAT BRIDGE THE POSITIVE AND NEGATIVE CONNECTIONS IS ELEVATED.

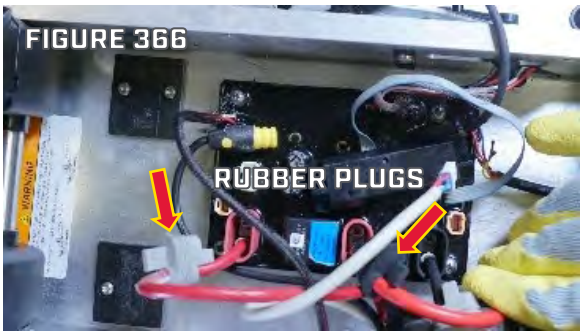
Step 10. Use a small Flat Blade Screwdriver or Pick to depress the locking tab on the plug for the Steering Position Sensor, then pull the Steering Position Sensor Plug from the Main Control Board. (Figure 363)



Step 11. Use a Small Flat Blade Screwdriver or Pick to depress the locking tab on the plug for the Motor Communication Cable, then pull the Motor Communication Cable Plug from the Main Control Board. (Figure 364)

Step 12. Pull the four rubber plugs out of the wire pockets that surround each of the motor wire and power wire lugs. (Figures 365 & 366)





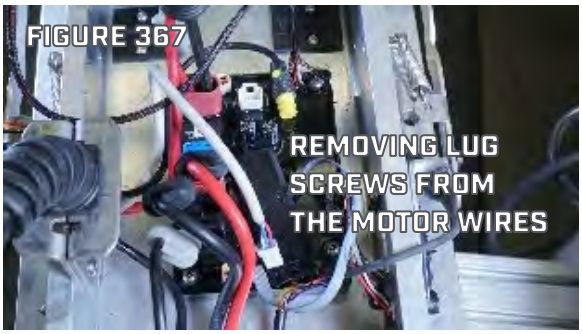
Step 13. Use #2 Phillips Screwdriver to remove the Lug Screws from the motor wires. Remove wires from the wire pocket and reposition so the wires are clear of the Main Control Board. (Figure 367)

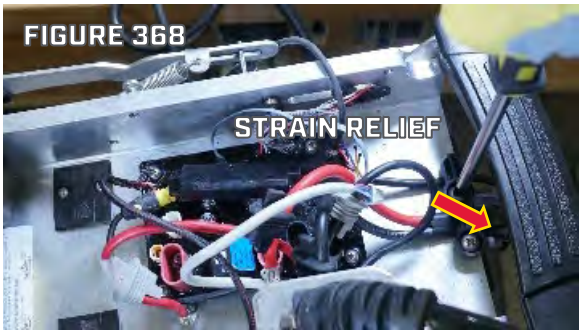
Step 14. Use #2 Phillips Screwdriver to remove the Lug Screws from the power wires. Remove wires from the wire pocket and reposition so the wires are clear of the Main Control Board.

Step 15. Use #3 Phillips Screwdriver to remove the two Screws from the Strain Relief Block, set the Strain Relief Block and the Screws aside for reassembly. (Figure 368)

Step 16. Use #2 Phillips Screwdriver to remove the four Screws that secure the Main Control Board to the Base Extrusion and remove the Main Control Board. Set the Screws aside for use during installation.

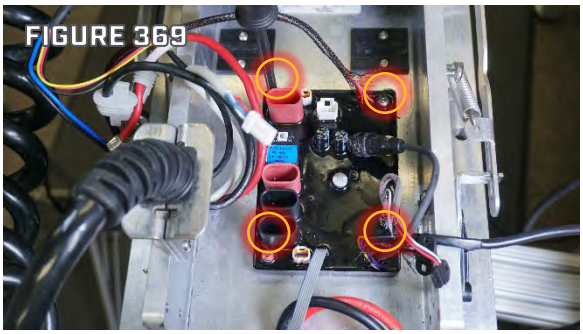
Step 17. The Main Control Board is fully disconnected, remove it from the Terrova Base Extrusion.





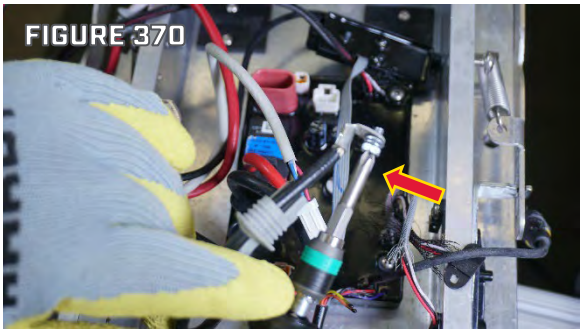
MAIN CONTROL BOARD INSTALLATION

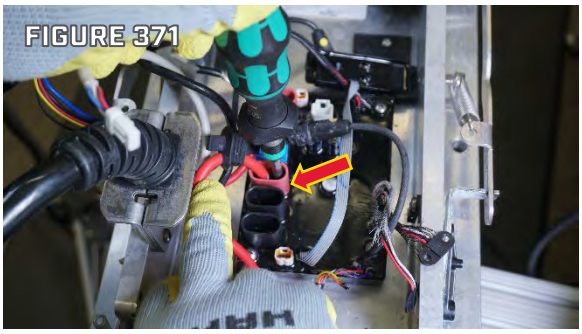
Step 1. Place the new Main Control Board in the Base Extrusion, align the mounting holes in the Main Control Board with the holes in the Base Extrusion for the Main Control Board Screws. Install the four Screws through the Main Control Board into the Base Extrusion. (Figure 369)



Step 2. Use the WIRING DIAGRAM on Page 18 to locate the correct wire pocket for the Battery + (Red) and Battery - (Black) Power Wires. Use a #2 Phillips Screwdriver Bit with a Torque Driver set to 15 in-lbs/1.7Nm to install the Lug Screws through each of the Power Wire Terminals into the Main Control Board. (Figure 369 & 370)

Step 3. Use the WIRING DIAGRAM on Page 18 to locate the correct wire pocket for the Motor + (Red) and Motor - (Black) Coil Cord Wires. Use a #2 Phillips Screwdriver Bit with a Torque Driver set to 15 in-lbs/1.7Nm to install the Lug Screws through the each of the Motor Wire Terminals into the Main Control Board. (Figure 370 & 371)





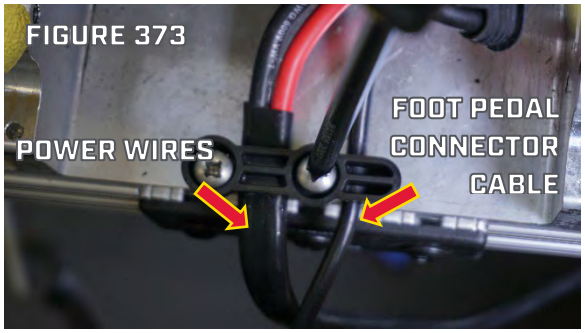
Step 4. Apply dielectric grease to fully cover the metal of each terminal. (Figure 372)

Step 5. For each of the Motor Wires, slide the Rubber Plug down the wire seating it in the wire pocket to finish sealing the connections.

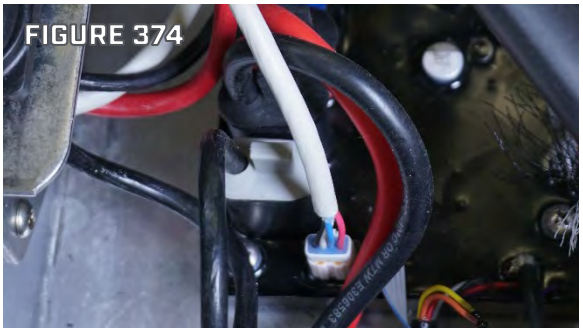
NOTICE

FAILURE TO TIGHTEN THE LUGS TO THE CORRECT TORQUE MAY DAMAGE THE CONTROL BOARD OR LEAVE THE LUGS LOOSE RESULTING IN MOTOR

Step 6. Position the Foot Pedal Connector Cable and the Power Wire Assembly in the Strain Relief Block so there is no tension on the wires between the Strain Relief Block and the Main Control Board, and there is not an excess of wire on the Main Control Board side of the Strain Relief Block, then use a #3 Phillips Screwdriver to install the Screw through the Strain Relief Block into the Base Extrusion. (Figure 373)



Step 7. Plug the Motor Communication Wire from the Coil Cord into its wire pocket on the Main Control Board. (Figure 374)



NOTICE

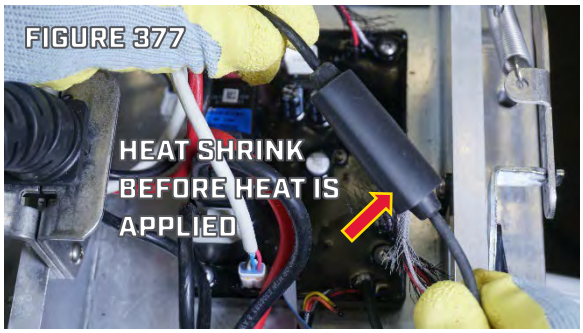
TWISTING DURING INSTALL WILL DAMAGE THE CONNECTOR. LINE UP THE KEY/KEYWAY AND PUSH THE CONNECTOR HALVES STRAIGHT TOGETHER

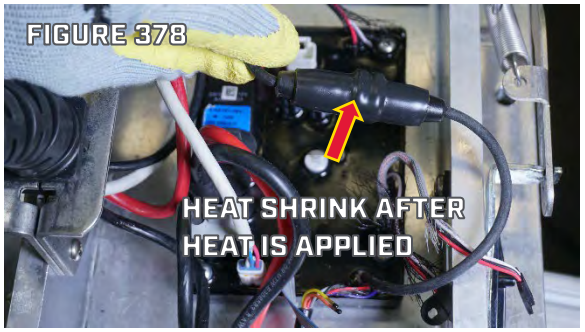
Step 8. Follow Steps a-c to properly connect the Accessory Connector.

a. Slide the included Heat Shrink, 2205412, over one side of the Accessory Connector. (Figure 375)

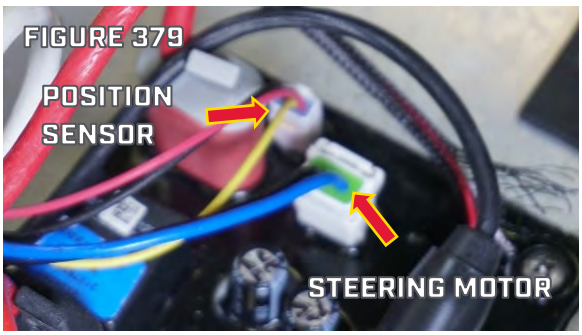
b. Align the two sides of the Accessory Connector and then push them straight together until they are fully seated (no yellow showing between the two connector halves, the connector should "click" twice as you push it together.) (Figure 376)

c. Position the Heat Shrink so it covers the seam between the two Plug halves and use a heat gun to shrink the Heat Shrink sealing the connection. (Figures 377 & 378)



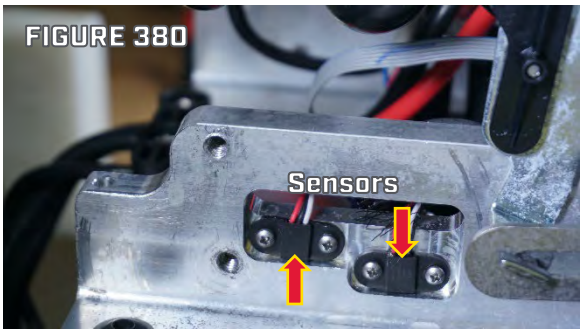


Step 9. Plug the Steering Sensor and Steering Motor wires into their respective wire pockets. The wire pockets are completely different, each wire can only plug into one wire pocket. (Figure 379)

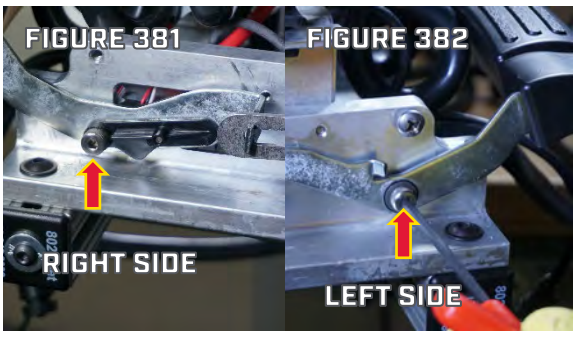


Step 10. Route the Lever Sensor, and the Stowed Sensor through the opening in the right side of the Base Extrusion. The Lever Sensor has a gray jacket, longer wires, and is installed closer to the rear of the Motor (Left in Figure 30). The Stowed Sensor has a black jacket, shorter wires, and is on right in Figure 380.

Step 11. Use a T10 driver to install the #4-40 Screws, two to each Sensor, that secure the Sensors to the Base Extrusion.
(Figure 380) **Phillips Screws shown from an early production motor**

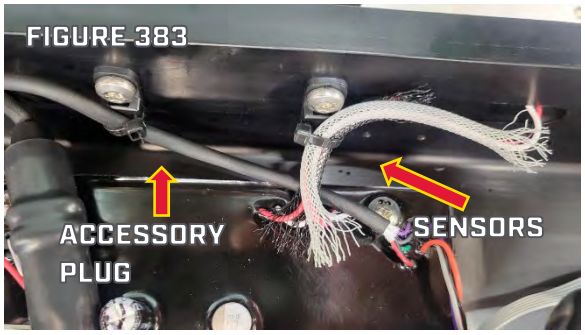


Step 12. Return the Stow/Deploy Lever to its operating position. Reinstall the Shoulder Bolts fastening the Stow/Deploy Lever assembly to the Base Extrusion. The longer of the two Shoulder Bolts belongs on the right, going through the Magnet Holder as well as the Stow/Deploy Lever. (Figures 381 & 382)

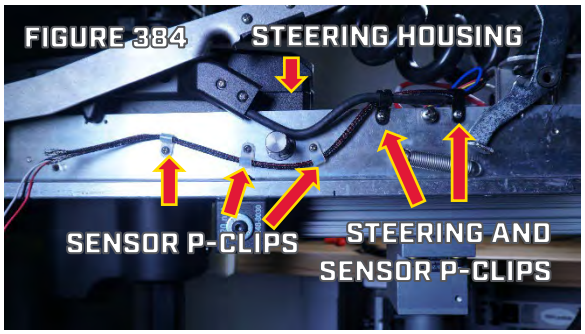


Step 13. Use the included Tie Wraps to secure the Sensors and Accessory Plug to the Tie Wrap Anchors installed to the Base Extrusion. (Figure 383)

NOTICE: Early production motors only have one Tie Wrap Anchor, on these motors use a single Tie Wrap to secure all three wires (the two sensors and the Accessory Plug) to that Anchor.

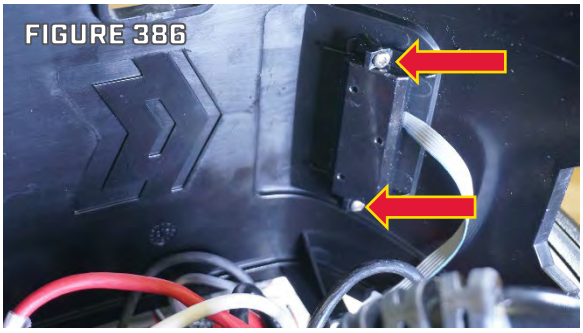


Step 14. Route the Deploy Sensor to its location on the left side of the Base Extrusion. Insert the wire from the Deploy Sensor in the two Black P-Clips that house the cable from the Steering Housing. Insert the Sensor Wire into the three White P-Clips. Use a #2 Phillips Screwdriver to install the screws securing all five of the P-Clips to the Base Extrusion. (Figure 384)



Step 15. Use a T10 driver to install two of the #4-40 Screws included in this kit through the Deploy Sensor, securing it to the Base Extrusion. (Figure 385) **Phillips Screws shown from an early production motor**

Step 16. Position the Power Button Assembly in the Control Housing, use a #2 Phillips Driver to install the two Screws that were set aside during disassembly for retaining the Power Button Assembly in the Control Housing. (Figure 386)



Step 17. Position the Control Housing, with the Power Button Assembly installed in it, onto the Base Extrusion over the Main Control Board so the four spades of the Control Housing are under the heads of the two Screws that were left installed loose in the Base Extrusion, tighten those two Screws to secure the Control Housing.

Step 18. Reinstall the Sideplates.

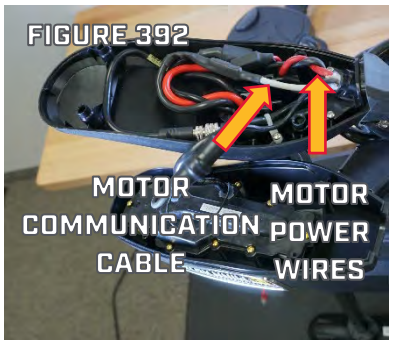
TERROVA/RIPTIDE TERROVA STEERING HOUSING

STEERING HOUSING REMOVAL

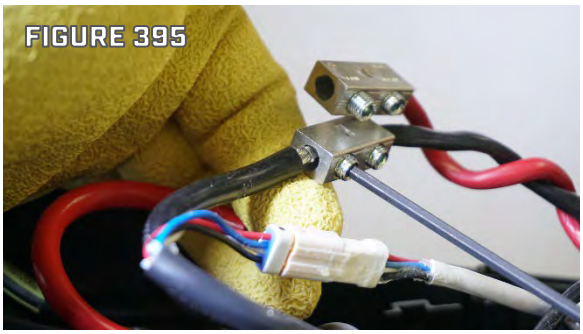
Step 1. From the bottom of the Control Box, use a #2 Phillips Screwdriver to remove the four Screws that secure the Control Box Cover/Advanced GPS Controller to the Control Box. Set these four Screws aside, they will be reused during installation. (Figure 392)

Step 2. Remove the Heat Shrinks from the Red and Black Motor Power Wires and Motor Communication Cable. (Figures 393 & 394)

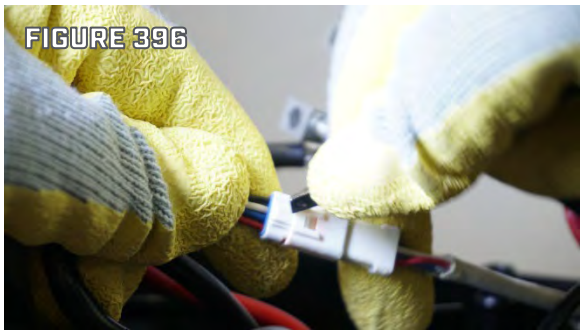
NOTICE: The safest way to remove Heat Shrink is to score the Heat Shrink with a Utility Knife (Figure 3) and then apply heat with a Heat Gun (Figure 4). The Heat Shrink will shrink further and split where it was scored allowing the Heat Shrink to be peeled away. Trying to cut completely through the shrink cold you may damage the wire or slip off of the material with the knife which may result in cutting yourself.



Step 3. Use a 1/8” Hex Key or Allen Wrench to loosen one of the Set Screws in the Splicer on the Black Motor Power Wire and repeat for the Red Motor Power Wire, allowing the Motor Power Wires to be removed from the Splicers. (Figure 395)

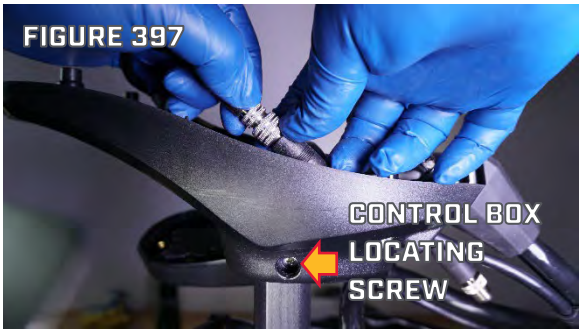


Step 4. Use a Pick or Small Flat Blade Screwdriver to depress the locking tab on White Motor Communication Plug and pull to disconnect the Plug. (Figure 396)



Step 5. Disconnect the Sonar Connector in the Control Box. Grip both sides of the Connector and turn them counterclockwise relative to each other to loosen the locking feature of the Sonar Connector, after connectors are loose pull the Sonar Connector apart. (Figure 397)

Step 6. Use a #2 Phillips Screwdriver remove the Control Box Locating Screw that secures the Control Box to the top of the Motor Shaft. (Figure 397)



Step 7. Remove the Control Box by sliding it off the top of the Motor Shaft.

NOTICE: You can leave the Advanced GPS Controller Connected to the Coil Cord. If the motor is equipped with Built-in Side Imaging, you can leave the ground connection from the Advanced GPS Controller to the Sonar Wire.

Step 8. Grasp the Shaft with one hand, to offset the weight of the Lower Unit and use the other hand to open the Cam Arm. Lower the Shaft and Lower Unit until the Skeg rests on the floor. #3 Phillips Screwdriver to remove the Screw from the Depth Collar opening the Depth Collar completely. Removing the Depth Collar from the Steering Housing Be aware of the Spring in the collar assembly, do not lose the Spring while removing the Screw from the Depth Collar. (Figure 398)

Step 9. Set the Depth Collar Assembly aside and reassemble the Screw and Spring to the Depth Collar so these parts are not misplaced.

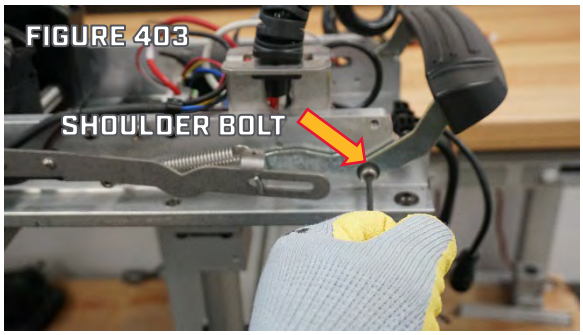
Step 10. Models that have a 72”, 87”, or 100” Shaft will need to have the Stow Lock Collar removed. Place the Locking Tab into the straight forward position. Use a #2 Philips Screwdriver to remove the four Screws, and take care to make sure the four Nuts don’t fall out of the back half of the Stow Lock Collar. Set aside for reuse during installation. (Figure 399)

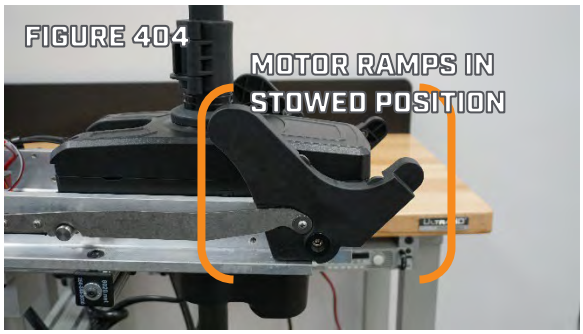
Step 11. Use a #3 Philips Screwdriver to remove the Screws holding the Port and Starboard Sideplates. (Figure 400)

Step 12. Using a #3 Philip Screwdriver loosen the Screws one or two turns, that secure the Control Housing to the Base Extrusion. There is only one Screw on each side as the other two Screws are removed when the Sideplates are taken off. (Figure 401)

Step 13. Use a #2 Philips Screwdriver to remove the two Screws that secure the Ribbon Cable Power Button to the Control Housing. (Figure 402)

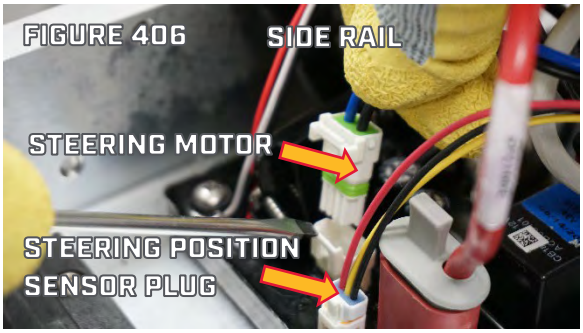
Step 14. With the Stow Deploy Lever in the vertical position use a 5/32” Allen Wrench to remove the Shoulder Bolts on the Port and Starboard side of the Stow Deploy Lever. The Shoulder Bolt on the Starboard side is the longer of the two. Push the Motor Ramps up into the stowed position, so the Latch Pin doesn’t engage with the Base Extrusion later in the process of removing the Steering Housing. (Figure 403 & 404)



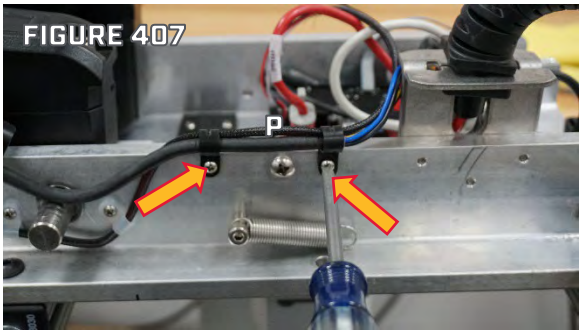


Step 15. While holding onto the Side Rail use a Needle Nose Pliers to remove the Rail Spring, on the Port and Starboard sides of the Base Extrusion. After removal of both Rail Springs let the Side Rail hang off to the side of the Base Extrusion. (Figure 405)

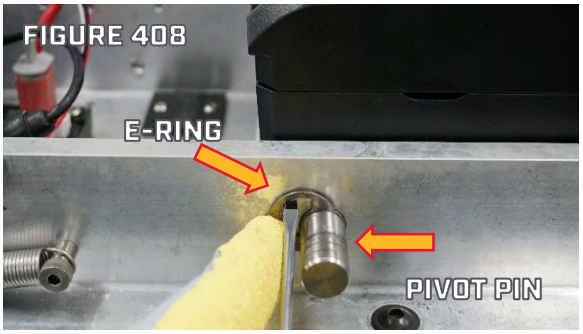
Step 16. Use a Small Flat Blade Screwdriver or Pick to depress the tabs on the Steering Motor Plug and Steering Position Sensor Plug to remove from the Control Board. (Figure 406)



Step 17. Use a #2 Philips Screwdriver to remove the two P Clips securing the wires from the Steering Housing to the Base Extrusion. (Figure 407)

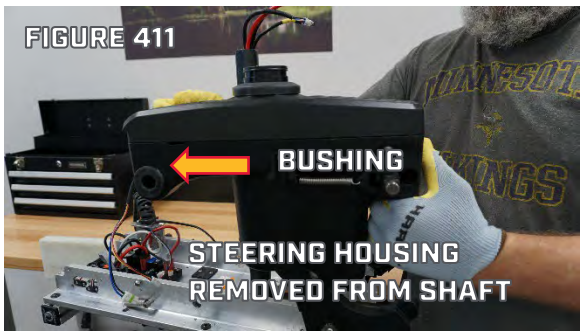


Step 18. Using a Small Flat Blade Screwdriver or Pick remove the E-ring from the Pivot Pin. After the E-ring is removed use a Mallet or Hammer with a Large Punch to remove the Pivot Pin from the Steering Housing. Set the E-ring aside for reuse during installation. (Figure 408 & 409)

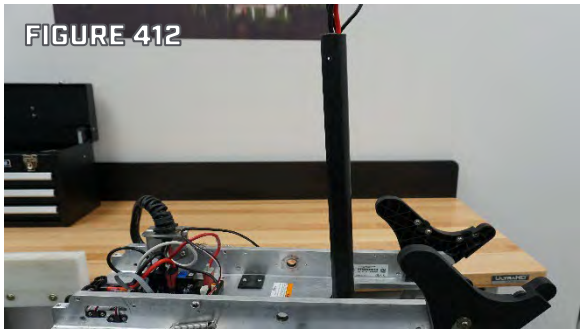


Step 19. After removing the Pivot Pin, slide the Steering Housing up and off of the Shaft. The Steering Housing has two Bushings, one on each side of the Steering Housing, where the Pivot Pin was removed. Set the Bushings aside for reuse during installation. (Figure 410 & 411)

NOTICE: The Bushings (Part #2207311) are a wear part and will eventually need to be replaced. Before installing the two Bushings (Figure 411) into the Steering Housing, look over the two Bushings set aside during removal for any wear or damage. Replace the two Bushings if necessary.

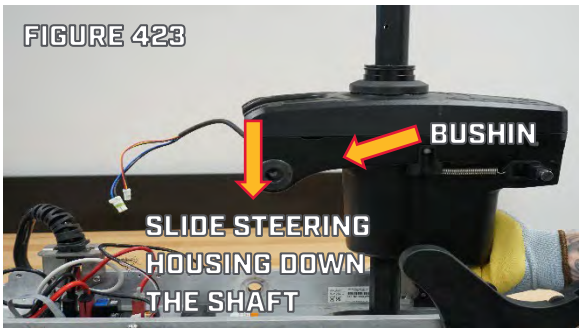


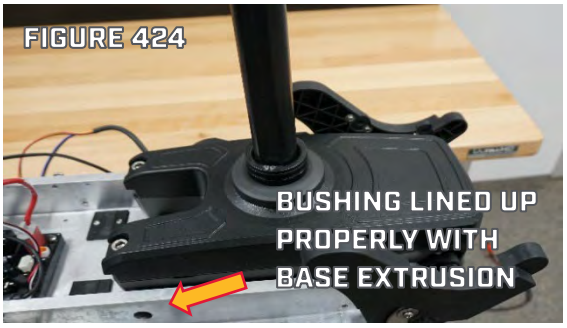
Step 20. Figure 412 shows the Steering Housing successfully removed from the Shaft.



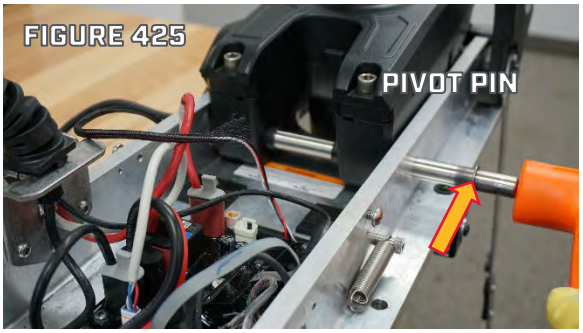
STEERING HOUSING INSTALLATION

Step 1. Insert the two Bushings that were set aside during removal, into the replacement Steering Housing. Slide the Steering Housing down the Shaft and into place. Make sure the Bushings line up with the holes in the Base Extrusion so the Pivot Pin can be inserted properly. (Figure 423 & 424)

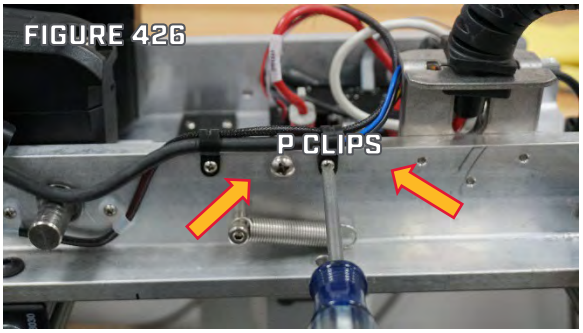




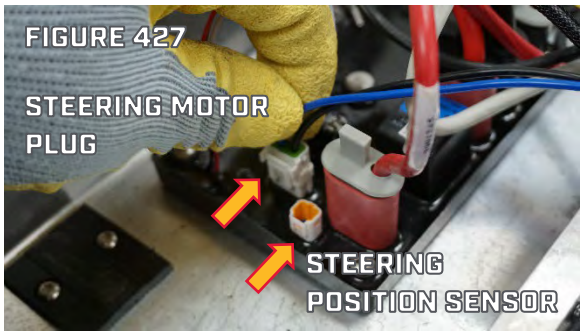
Step 2. Using a Mallet or Hammer with a Large Punch drive the Pivot Pin through the Base Extrusion and Steering Housing. Start reinstalling with a Mallet or Hammer first. Remember to install the E-ring that was set aside during removal onto the Pivot Pin. (Figure 425)



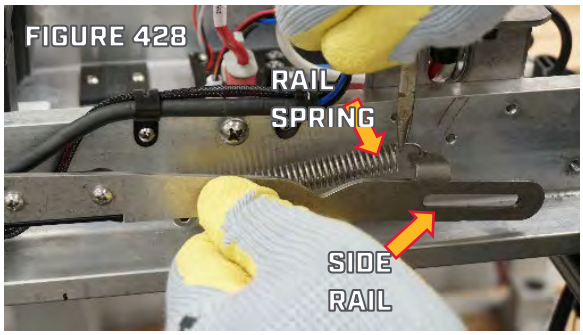
Step 3. Using a #2 Philips Screwdriver reinstall the P Clips that secure the wires from the Steering Housing to the Base Extrusion. (Figure 426)



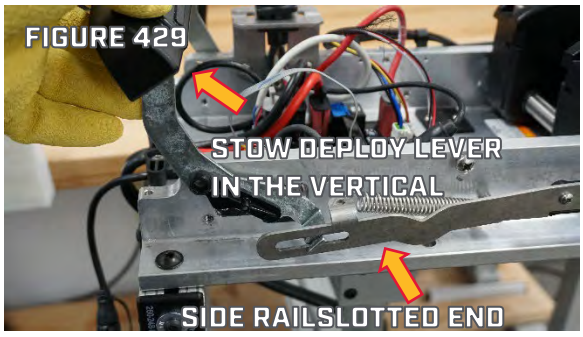
Step 4. Reinstall the Steering Motor Plug and Steering Position Sensor Plug into their respective connectors on the Control Board. (Figure 427)

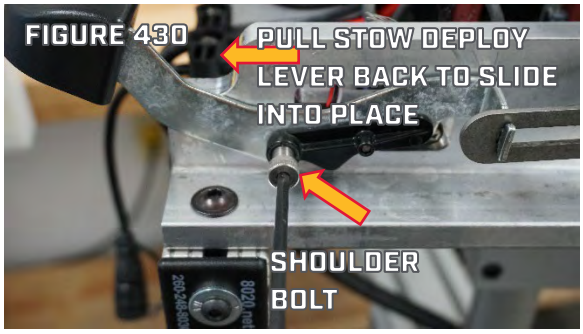


Step 5. Use a Needle Nose Pliers to reinstall the Rail Spring onto the Side Rail, on the Port and Starboard sides of the Base Extrusion. (Figure 428)



Step 6. With the Stow Deploy Lever in the vertical position, slide the ends of the Stow Deploy Lever into the slotted ends of the Side Rails on the Port and Starboard sides of the Base Extrusion. The longer of the two Shoulder Bolts goes on the Starboard of the Stow Deploy Lever. After the Stow Deploy Lever is installed, reinstall the Shoulder Bolts using a 5/32" Allen Wrench through the Stow Deploy Lever into the Base Extrusion. There will be tension on the Side Rails so you will need to pull back on the Stow Deploy Lever to install the Shoulder Bolts. (Figure 429 & 430)





Step 7. Use a #2 Philips Screwdriver to install the two Screws that secures the Ribbon Cable Power Button to the inside of the Control Housing. (Figure 431)

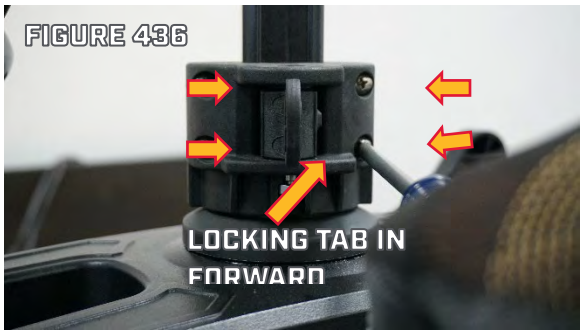
Step 8. Line up and slide the slots in the Control Housing onto the loosened Screws in the Base Extrusion. (Figure 432)

Step 9. Using a #3 Philips Screwdriver tighten the two Screws one or two turns to the Base Extrusion, if not removed in Step 11. The other two Screws will be reinstalled when the Sideplates are fastened to the mount. (Figure 433)

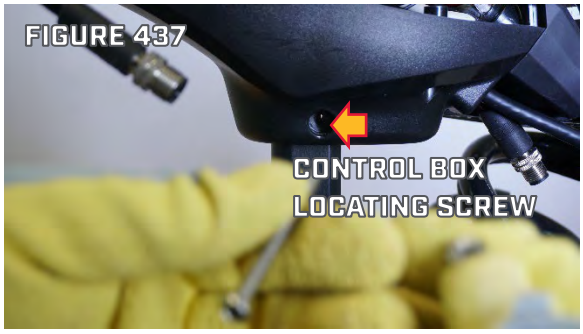
Step 10. Using a #3 Philips Screwdriver reinstall the Screws holding the Sideplates on the Port and Starboard sides of the Base Extrusion. (Figure 434)

Step 11. Remove the Spring and Screw you reassembled in Step 9 of the removal process to install the Depth Collar around the shaft. With the Cam Arm open use a #3 Philips Screwdriver to start tightening the Screw. After the Screw has been started, close the Cam Arm and finish tightening the Screw down. This is to make sure the Cam Arm is not over tightened which may cause damage. (Figure 435).

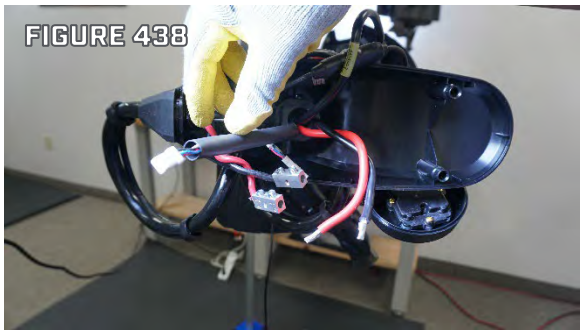
Step 12. Models that have a 72”, 87”, or 100” Shaft will need to have the Stow Lock Collar reinstalled. The Locking Tab will need to be in the straight forward position. Use a #2 Philips Screwdriver to tighten the four Screws. The back half of the Stow Lock Collar has four Nuts you will want to make sure didn’t fall out. (Figure 436)



Step 13. Make sure the Nut for the Control Box Locating Screw is
in the detail that captures the Nut on the right side of the Control Box. From the Left Side of the Control Box, slide the Control Box Locating Screw through the Control Box and Motor Shaft into the Nut. Use #2 Phillips Screwdriver to tighten the Control Box Locating Screw. (Figure 437)



Step 14. Slide the 5” long Heat Shrink over one side of the Motor Communication Cable. (Figure 438)



Step 15. Push the two halves of the Motor Communication Cable Connector together until the locking tab engages. (Figure 439)

Step 16. Center the Heat Shrink on the connector, the ends of the Heat Shrink should be on the outer jacket of the cable, no small conductors should be visible.

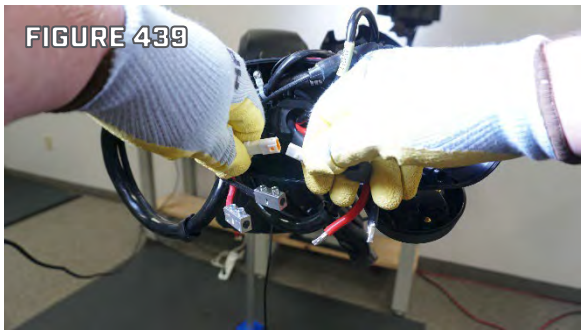


FIGURE 439

Step 17. Slide the two 2 ¼" long Heat Shrinks over the Motor Power Wires, one on the Red Wire, one on the Black Wire. (Figure 440)

Step 18. For both Motor Power Wires, matching Red to Red and Black to Black, insert the wire end that was removed from the Splicer during disassembly into the open end of the Splicer and use 1/8" Allen Key to tighten the set screw of the Splicer securing the Wire. (Figure 441)

Step 19. Center the Heat Shrinks over the Splicers.

Step 20. Use a Heat Gun to seal the Shrinks. (Figure 442)

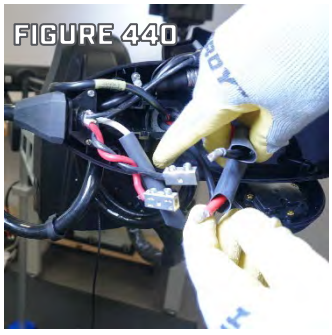


FIGURE 440


FIGURE 441

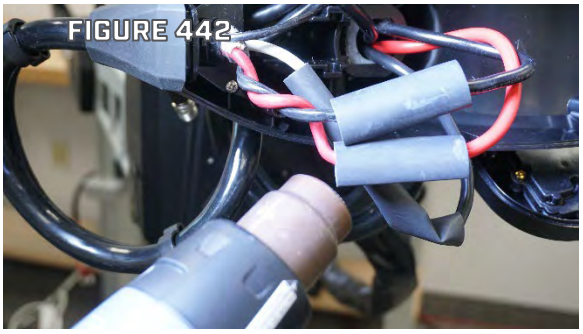


FIGURE 442

Step 21. Reconnect the Sonar Cable, align the connectors and fully tighten the locking collar.

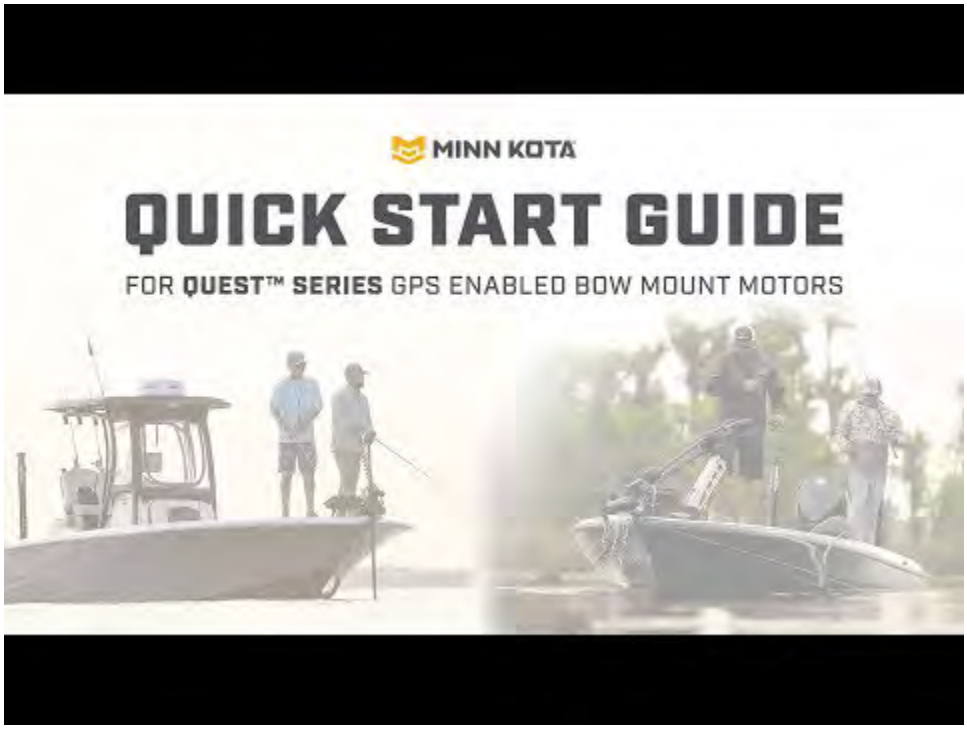
Step 22. Position all the wires such that none of the wires intersect a screw boss or the outer rim of the Control Box. (Figure 443)

Step 23. Place the Advanced GPS Controller onto the Control Box and use a #2 Phillips Screwdriver to reinstall the 4 screws that were removed during disassembly.


FIGURE 443

APPENDIXES

VIDEOS RELEVANT TO ALL QUEST MODELS



ULTREX QUEST VIDEOS

INSTINCT QUEST – ULTERRA QUEST VIDEOS

TERROVA – RIPTIDE TERROVA VIDEOS