Checking Thruster operation and changing parts as required.
No Thrust, before replacing parts do the following easy checks

- Is Power On, Correct Fuse fitted & O.K. If fuse blown check prop rotates, if boat in the water, remove 4 motor bolts and motor to get access to input shaft.
- Voltage at motor when operated should be at least 10v / 21.5v. If volts are low then battery isn’t charged or cables are to small.
- Check motor polarity at same time, if pos+ & neg- are reversed, electronics will be ‘blown’.
- Start deeper investigation.
Both controller types have, red wire pos+, black neg-, blue thrust port, grey thrust starboard. Some control leads have 4 numbers black wires.
Confirm fault is with black box or Motor by checking Thruster operation using a simple switch into black box socket.

- One wire into Black lead and one into Blue. Operate.
- Change Blue connection into Grey. Operate.
- If Thruster works in both directions fault is with controller or connecting leads. Replace each in turn and. Test.
- If no Thrust then fault is with motor or black box.
At this stage the Thruster operation can be checked using a simple switch.

- Disconnect black box wires from solenoid and motor
- Connect a lead from Solenoid pos+ feed to a coil bottom connection.
- Connect Black wire from Motor Thermal trip to the switch & then to a solenoid coil top connection. Operate.
- Swap leads to opposite coil for other direction. Operate.
- If no Thrust or only Thrust in one direction replace motor assembly.
- If Thruster operates change black box
Motor assembly or black box replacement

- Switch off main power
- Disconnect power leads
- Remove 4 bolts & lift off motor.
- Replace with new motor assembly. Test.
- Or take motor to bench.
Undo 2 screws and remove cover. Make a note of all wire and cable positions. Picture is typical, each Motor size will have different connections.
Remove clip, note wires are between bracket and solenoid, remove old black box. Remove diodes assemblies from solenoid terminals if fitted (Mk1 black box). If diodes had red at top this would have caused fault. Discard both items. Assemble new black box with wires between bracket and solenoid. If removed, bolt motor back on to saddle.
Connect as follows, Mk2 black boxes have diodes built in, 90deg connectors and are stamped 2.

- White wire Top R.H
- Mauve wire Top L.H
- Red wires to Bottom terminals.
- Red ring to rear pos+ stud.
- Black to motor thermal switch.
- Black with ring to Motor neg- stud.
- Complete assembly. Test
# Recommended spare parts

<table>
<thead>
<tr>
<th>Thruster</th>
<th>Motor ass.</th>
<th>Black box</th>
<th>Anode kit</th>
<th>Prop/s</th>
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