Toyota Epic E21, E22, X22

Installation guide for

Accuski 2000, 8.0.8

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Please carefully read the entire instruction booklet before starting installation.

1. Tools needed:

- 1/4" wrench
- Phillips head screwdriver
- 5/16" wrench
- 1/8" Allen wrench
- 3/16" Allen wrench
- Two 3/8" wrenches
- Two 7/16" wrenches.
- Snipping Pliers
- 14mm Socket
- 3/8" Drive Ratchet

2. <u>Parts Supplied</u>:

- AccuSki Control Module (MMDC) and mounting screws
- Timing Sensor



- Servo Bracket Assembly with servo & cam
- Wiring Harness
- Safety Horn



- Throttle cable bracket

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• Cable with coupler nut and swivel bolt



• Foot switch with 2 screws



• Neutral safety switch Gear Mount



- Stay-lock tape, Tie wraps, Pitot hose, and wire connectors
- Mounting bolts, washers, and lock nuts

II. Installation

1. <u>Mount MMDC</u> in the trunck aganst the rear seat backrest. Measure 20 inches from the Stbd side of the rear seat backrest. MMDC is centered on the mark and mounted as high as possible. Secure with (4) 10x1" SS Phillips, Pan Head SMS and (4) #10 SS Flat Washers.



 <u>Attach Timing sensor</u> -Lay the timing sensor on either the port or starboard side of the boat next to the front seats, depending on which side the magbuoys are in your slalom course. Run the timing sensor wire toward the back of the boat under the gunwale. Insert the 8 pin round plug into its socket in the MMDC. Tiewrap the timing sensor's wire up under the gunwale.



3. <u>Lay out the Wiring Harness</u> -along the starboard gunwale. Feed the wiring harness end having the 18-pin and 5- pin plugs under the gunwale back to the MMDC. Feed the other end forward to under the dash. Insert the 18-pin plug into its socket in the MMDC, noting the keying of the socket. Be careful that you do not place the plug in backwards. Insert the 5-pin plug into its socket in the MMDC, also noting that the plug is keyed.



- 4. <u>Attach Safety/Trick Horn</u> -Two plug locations are available for the safety horn. One approximately 30" forward of the MMDC and the second near the end of the wiring harness by the dashboard. Pick a suitable location near one of the plug locations and mount the safety horn with tie wraps. Connect its plug to the socket labeled "horn".
- 5. <u>Run Servo supply wire</u> -Feed the servo supply wire that originates about 2' from the MMDC in the wiring harness from the back of the boat under the rear floorboard into the engine compartment.
- 6. <u>Install Neutral Safety Switch</u> –Review the photos below of the hand throttle for the proper switch orientation and installation, noting carefully the orientation of the switch and the cam. There are

three cams with the kit; they fit (1) Teleflex shifters, (2) reverse lever Morse shifters, and (3) Standard Morse shifters. Discard plastic cams and



Install the cam and the switch as shown in the photo, with the supplied 2 small #4x5/8" screws. Apply Blue LockTite removable thread lock



Do NOT use brass colored existing cam, remove it and replace with supplied metal cam



• Make sure switch closes when hand throttle is in forward gear Switch opens when throttle is in neutral



and reverse.

Remove the existing cam and install new supplied aluminum cam as shown in photos. Do NOT use the existing brass colored cam; it works reverse of the desired action.



7. <u>Mount Foot Switch</u> - Separate the base from the top of the foot switch by inserting a flat blade screwdriver and twisting in the circumferential slot. The top will unsnap. Screw the base of the foot switch to the footrest using the two screws supplied. A battery powered screw gun works best. Position the bottom height of the foot switch about 4"-5" above the floor. Line up the springs and snap the foot switch cover on to the base. Connect the foot switch plug to the plug labeled "foot switch" at the end of the wiring harness.





8. <u>Mount Optional Fall Switch</u> – Attach to the gunwale with stay-lock tape and connect its plug to the socket labeled "fall switch" at the end of the wiring harness. Needed for tournament tow boats only.



9. Servo bracket- Mount the servo with the bracket to the Stbd side Engine Mount Boss. Connect servo supply plug from the MMDC to the servo. Route the cable around the ECM to the manifold and throttle linkage.





Direct Drive Closed Cooling Bolt used for Servo mount

Part # 91512-B1016

Bolt M10 - 1.25, 18mm, 2ea.

10. <u>Install throttle cable bracket</u>. Install the throttle cable bracket in place of the existing throttle cable L clip or other similar bracket that holds the throttle cable to the engine. Install Throttle Cable Bracket to the Cable Hold Down/ Rain Cap Stud bracket using the existing bolts.

Make sure the throttle cable bracket is mounted far enough back that when the throttle cable is clipped into place on the bracket that the end of the throttle cable with the coupler nut and cable attached, is at least 2 inches from the throttle lever on the throttle body.

Remove the lock nut off of the throttle cable end and slide the dust cover off the throttle cable.Insert the throttle cable through the left hole on the throttle cable bracket. Lock the throttle cable down in the (detent) with the throttle cable clamping bracket which is located on the back of the throttle cable bracket. Replace the dust boot by sliding in back over the end of the throttle cable. Replace the lock nut on the end of the cable

Remove the ball joint bolt from the throttle arm. Insert the supplied throttle arm swivel bolt assembly into the throttle arm. Using the same hole the ball joint bolt came out of, attach with lock nut but leave loose for now.

11. Thread the 5/16" nut back on to the end of the throttle cable; then thread the AccuSki supplied coupler nut (it has a 8" galvanized cable attached through a hole and crimped) onto the end of the throttle cable. Thread the free end of the cable through the swivel bolt hole.

Tie away any wires in the engine compartment away from the servo and the servo cable assembly to avoid interference

- 12. <u>Adjust Proper Cable Slack VERY IMPORTANT STEP</u>. This step involves setting the AutoThrottle cable with the correct slack.
 - 12.1.Put the hand throttle at the driver's seat in the forward in gear position (about an inch forward in the detent, but not past the detent).
 - 12.2. Turn the Auto Throttle power on; select the slalom event, go to the slalom screen (where you input speed, skier weight, crew weight, etc.), and press the red Arm button, the horn should beep and the servo cam should lock in the idle position.
 - 12.3.Pull both cables through the hole in the swivel bolt so that there is just a little slack in the cable from the throttle arm to the throttle cable and so there is no slack in the cable from the servo cam to the throttle arm. SEE PHOTOS BELOW
 - 12.4. Tighten the lock nut against the swivel bolt head using two 7/16" wrenches. GENTLY tighten the lock nut against the bolt head so as to clamp the two cables. There should be no slack in the servo cable and just a little slack in the throttle cable. DO NOT OVER TIGHTEN. This will shear the bolt; it is made of soft aluminum. Snug enough to clamp the two cables, no more.
 - 12.5.Tighten the lock nut on the backside of the throttle arm plate, leaving it loose enough that the bolt swivels easily on the throttle arm plate. Do not tighten this lock nut hard against the throttle arm.
 - 12.6.Check to see that the swivel bolt rotates freely.
 - 12.7.Turn off the Auto Throttle power.







13. Cable Tray- Remove the

forward Stbd Manifold bolt and install Cable Tray. Re-install bolt and torque to 18 NM (13 ft. lbs.).**The cable tray must be installed. If the cable tray is not installed, cables can hang up with the manifold brackets and wiring, causing a runaway engine.



Special Notes

Trouble Shooting

"Speedo Calibration Error, Unit needs Service" - Unit really does not need service. This can be corrected two ways. First and the easiest, from the Home screen go to the setup screen, press T, at "Restore Factory Defaults" press E twice. This will restore the speedo calibration. Your other settings will be erased, so either write them down first or use the 2nd method to fix this error. 2nd Method: From the Home screen, go to Setup, press E, press T, at the "Restore Factory Defaults" screen press the up arrow until just "Factory" is highlighted, then press E. Five rows of numbers will be on the screen. Place the highlight on the first row, press E, then use the up or down arrows to make the 4th number on the 1st row match the 2nd number on the 1st row, then press E to lock it in. Repeat for the 2nd row of numbers. Then press H.

"Speed Table is Corrupt, return for service" - Again, no need to return for service. This error occurs when the baseline rpm for a higher speed has been erroneously set lower than that for a lower speed. To fix you can go to the Calibrate menu and then to "Edit Tables" and find the offending speed and fix it. Or, simply reload the baseline table for your particular boat using the 3rd line of the Calibration menu. You will then need to run autocalibrate again to fine tune the baselines.

Speed Oscillations. If you experience speed oscillations while locked on or the speed greatly overshoots during the pull up, move the clevis on the servo arm in one hole at a time toward the servo, until the problem goes away. The clevis snaps apart and turns to lengthen or shorten the distance to the servo arm. First loosen the 1/4" lock nut that is against the clevis. Surging or speed oscillations can also be caused by a poor ground connection. Connect a wire directly from the ground wire of the system to the boat's battery ground.

Doesn't reach "RPM Lock" or gets slow segment times after getting actual one balls. The servo has probably reached the limit of its travel and is probably not opening up the throttle far enough. Simply move the clevis on the servo arm out, one hole at a time until speed lock is reached. Going out too far may cause speed oscillations. Alternatively, you may have too much slack in the cable going from the servo arm to the throttle lever arm. If there is too much slack, the servo arm uses up part of its travel taking up the slack instead of opening up the throttle. To take up the slack, disconnect the small clevis from the servo arm by snapping it apart and rotating the 1/4" locknut and small clevis clockwise. This will shorten the cable. Reattach the small clevis.

System resets or shuts down in hard turns or over wakes. Your power wire connections are probably loose or are connected poorly. Make sure the connections all make good contact. The ground connection must be secure. Improper non-noise suppression spark plug wires or non-resistor spark plugs can also cause power shut downs and glitches.

Times are not consistent, speed seems to wander, speed slows down in middle of course, speed surges. This is usually caused by a bad ground connection. Even if all appears that you have a good solid ground connection, run a ground jumper wire from the wire labeled "ground" directly to the negative ground post on the boat's battery. This will solve the problem.

Tach wire error message displayed. This is caused by a loose tach wire connection. Recheck the connection. This message is also displayed if you attempt to engage the system with the engine not running.

Erratic Times. Unusual times are usually caused by upside down magnets. Listen to the engine and watch the tach gage. If the engine does not change by more than 50-100 rpm in the course and sounds steady the AutoThrottle is working properly and the magbouys are probably upside down or cracked.

Surging or speed oscillations in tricks. The pitot hoses may have water. Disconnect the hoses and blow the water out. Also, you may have the limits set too high in the trick setup screen; try lower numbers.

Servo Voltage Error. If you see this error message, your boat's electrical system voltage has fallen below 10.0 volts or gone above 15.0 volts, causing the speed control to shut off. The voltage encountered will be displayed in the lower right hand corner. This error is normally caused by a faulty alternator, voltage regulator, or battery. It can also be caused by a loose alternator belt. It can be caused by running too many electrical items at once that causes a voltage drop.

Abnormal Reset Error. If you see this message, simply turn the power off and turn the power back on. This error can be caused by a glitch in the boat's electrical system or radio interference that causes the system to reset. Simply cycle the power off and then back on to correct.. This error will also occur if water is sitting on top of the 18 pin plug on the MMDC. Turn the power off, let it dry then recycle the power.

Timer Displays "Timing Error" Insure that you have the correct number of segments set. This value is set in the "SETUP SCREEN" [refer to the operation guide] One segment is for full course time only, Two segments is for 1st & 2nd Segment timing, Three segments for 1st buoy, 1st & 2nd Segments, and Seven segments is for all buoy timing.

Timer does not pick up any magnets, or only does for low speeds: AccuSki 2000 does not register magbuoy "hits" until the system is within 450 rpm of the RPM set point. This feature is to prevent picking up erroneous timing hits before entering the slalom course. If the boat does get within 450 rpm of the set point before the entrance gates the timer will not pick up the magbuoys. Possible cause for not achieving set point are: 1) servo clevis on the wrong hole in servo arm. 2) Too much slack in cable to servo arm. 3) Pivot bolt placement on Throttle arm is too far from throttle shaft, 1.5 inches is the norm 4) Pick up rate is too low

Transmission does not shift properly, Note occasionally after removing and replacing the shifter, the transmission shift linkage may get out of adjustment. At the end of installation, be sure and check that the transmission goes into reverse and forward gears properly without the application of throttle. If not, adjust the coupler at the end of the cable at the transmission shift lever in the engine compartment so that the shifting occurs without application of throttle.

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