REPOWERING ‘O’ GAUGE DIESELS FROM CHINA: MTH, ATLAS, LIONEL, K-LINE, WEAVER, ETC.

This motor replacement using NWSL 2940 size motor provides performance improvement for these fine models – smoother, quieter, slower, more powerful operation than the original 28 x 38mm motor (usually marked “RS-385PH” or similar) found vertically mounted in China-built ‘O’ locomotives. We here describe the general method we used which can be accomplished in about 60 minutes if proper materials and tools are on hand.

Why replace the original motor? To replace a failed or a poor performing motor (must replace both motors to assure matched operation), To increase the power of the locomotive, To reduce the amp draw and operating speed of the locomotive.
Tools required: Miniature screwdrivers, 2.6mm tap, 2.0mm tap drill (#3076-5), soldering tool
Skill required: This job assumes you have reasonable proficiency in soldering and disassembly/ assembly of mechanical devices. If not, your learning experience here will be valuable despite problems you may encounter in achieving quick and satisfactory completion.
Time required: About 2 hours.
Parts required: NWSL motor #29409-9 (approx. same operating speed) or #29401-9 (25% speed reduction) according to your speed preference

1. Remove locomotive superstructure from chassis (after conducting an investigative search for the retaining screws!).

2. Identify the vertical motor. It is secured to a mounting bracket which is itself screwed to the truck frame (body). In most units, this motor/bracket assembly can be removed without further truck disassembly (which of course makes it easier to get everything back together). Look at the recess in the truck underside for a single screw. Loosen that screw until the motor/bracket assembly releases from the truck. CAUTION—work on only one truck at a time… so you have an assembled sample in the event things get troublesome or confusing during reassembly.

3. Disconnect the motor terminal wires from the motor and retain for attachment to the new motor. Study the motor mount bracket for the two screws down in their slots. Loosen these screws to separate the motor from the bracket..

4. If you plan to retain the flywheel, remove it from the motor and retain for installation on the new motor. Salvage the motor
shaft worm for installation on the new motor.

5. The motor end-mount screw holes are spaced 19mm on the NWSL motor whereas the bracket screws are spaced 16mm. This means that new mount holes must be carefully added to the new motor. To do so, set the bracket on the new motor and determine where the motor mount holes are located, then turn the bracket 90 degrees or so to provide a location for the new screw holes. We don’t want drilling chips in the motor, so dip the drill in heavy oil or wax to hopefully trap any chips. Drill the tap holes in the motor end slowly and carefully so you can feel the “go through” and stop the drill from entering the motor more than 3mm (1/8”) and possibly damaging it.

6. Tapping: oil or wax the tap (to hold chips from falling into the motor) and then proceed similar to the drilling precautions above (NWSL likes to tap with a reversible Skil (or similar) battery screwdriver—they run slowly and are instantly reversible plus you eliminate the twisting (and thus tap breakage) that happens when using a tap handle tool with these miniature taps.

7. Test the tapped hole and attach the motor mount bracket.

8. Attach the motor terminal wires (you will later test for polarity (operating direction) and may have to reverse the wires). Install salvaged worm and flywheel, cut off unneeded motor shaft extension.

9. Lubricate the worm and wormgear, then install the motor/bracket and bench test for proper operation. Adjust as necessary and then fasten the bottom bracket securing screw. Test again. When satisfied, proceed to the other motor.

10. Reassemble model and test operate on powered track. Check operating direction (polarity) against another locomotive; if wrong, reverse the terminal wiring connections at wiper wires.

11. Lubricate motor and wormgear.

12. Have (more) fun!