

# NorthWest Short Line

## REPOWERING the:

### NWSL SP#1 G.E. 50-ton diesel HO and HOn3 Gauge

This motor replacement using NWSL #16306-9 size motor provides performance improvement for this fine model - resolving the driveline problems and providing smoother, quieter, slower operation with improved power. We here describe the general method we used which can be accomplished in about 60 minutes (plus overnight bond set time) if proper materials and tools are on hand.

- Tools required:** Miniature screwdrivers  
Hand motor tool (Dremel, etc.), cut-off disk and grinding bit  
Soldering tool, small
- 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 achieving quick, satisfactory completion.
- Time required:** About 60 minutes (plus cure time for bonding agent).
- Parts required:** #16306-9 NWSL 16x30mm can motor (2.0mm shaft)  
#10001-9 or similar hook-up wire  
#489-6 NWSL u-joint set.  
#153-4 NWSL adapter bushing 2.0 to 2.4mm  
#1073-6 NWSL 0.4 x 13T brass spur gear  
Silicon sealant—we prefer clear (usually sold as bathtub sealant).

1. Remove original motor. Do NOT remove geared truck from chassis.
2. Salvage the flywheel carefully for re-use (loosen set screw and slip flywheel off motor shaft).
3. Cut motor shaft to 8.0mm (5/16") length from motor. Save cut-off shaft to balance flywheel.
4. Place 2.0mm shaft into flywheel. Carefully use two straight edges such as single-edge razor blades placed wide enough to allow flywheel to turn freely between them, let shaft ends run on straight edges. When flywheel stops, mark top center with felt marker pen or similar. Roll flywheel several more times. If it stops consistently in same location, use a 1/8" or similar size drill to drill a small hole opposite the mark and then repeat until satisfied that the flywheel is balanced.
5. Remove 2.0mm shaft and cut to .350" (11/32") length. Plastic gear is usually cracked and will be replaced—unscrew gearbox plate and remove top gear and shaft. Press 2.0mm x .350" shaft into #1073-6 brass gear and re-assemble into gearbox with shaft extending toward the motor (center of chassis), close gearbox.
6. Press u-joint cup onto gearshaft. Make sure everything turns freely, fiddle and adjust as necessary.
7. Press the bushings on the motor shaft—do NOT press against motor, be sure to press on shaft end only!!
8. Flywheel should fit on bushed motor shaft rather freely, locate it as close to motor as possible without drag.
9. Place u-joint "dogbone" in place with motor/flywheel assembly held in trial location. Run motor to check operation.
10. When satisfied, lay bead of silicon sealant on chassis under motor location about length of motor—keeping sidemount screw holes out of sealant, carefully press motor into sealant to desired alignment (as close to straight line as possible) to u-joint with about 1.0mm (3/64") space between u-joint cup and flywheel. Let sealant cure for 24 hours before proceeding.
11. Hook up the wiring to the motor terminals, test polarity (direction of travel – reverse wires if necessary).
12. Lubricate (lightly) motor bearings with light oil such as LaBelle #108 and gear teeth with gear oil #102 or similar.

*Installation by F R Martin*