

NorthWest Short Line

REPOWERING the:

Bachmann GE Dash 8-40C, 8-40CW and GP30 HO Diesel Locomotives

These instructions will guide you through the procedures necessary to replace the original motor with a high-efficiency NWSL motor with flywheel(s). You will also be able to replace the universal connectors and plastic cardan shafts. The original worms and truck gears are retained.

Use of the NWSL Athearn re-power kit #161-4 or #163-4 and a few other NWSL parts makes the job simple. The NWSL parts will replace the original failure-prone motor and noisy universal connectors/shafts (reported by several modelers) with precision parts designed for more power, quieter operation and long life.

Bachmann uses a split frame design on these HO locomotives, similar to the design most commonly found on many N scale locomotives, to deliver electrical current to the motor. Installation of the new motor is not difficult, but requires some skill and the careful use of a milling table or Dremel (or similar) hand tool with a high speed steel cutter.

- Tools required:** Small screwdriver, Standard pliers, tweezers, Dremel (or similar) hand tool with a high speed steel cutter, Small hacksaw or jeweler's saw
- Skills required:** This job assumes you have intermediate mechanical skill (grinding excess material from the frame is the only difficult part. Other than that step, the remainder of the steps required for the re-power are not difficult to perform for most modelers.)
- Time required:** About 2-3 hours (plus cure time if sealant is used to mount the motor)
- Parts required:** NWSL Athearn re-power kit #161-4 (for Dash 8-40CW and GP30)
or NWSL Athearn re-power kit #163-4 (for Dash 8-40C)
NWSL universal connector #488-6 (2.0mm/2.4mm)
NWSL #2020-4 2.0mm shaft stock
Silicon sealant (sold at hardware stores as bathtub/window caulk)-optional

1. Separate the superstructure from the frame and set the body shell aside. Remove the fuel tank casting and set it aside. Remove the trucks by removing the screws accessible on the top of the frame.
2. Remove the original motor by removing the screws on the right side of the frame that hold the two frame halves together. Separate the frame by pulling and wiggling the halves until they come apart (pry gently with a small screwdriver if necessary). Save the white nylon square(s) from the bottom of the frame and the two black plastic truck mounting brackets in the top of the frame.
3. Prepare your frame for the Sagami motor:
 - 3a. If you are remotoring the Dash 8-40C, use your pliers, grasp each of the four motor mounting lugs as close to the frame as possible and break them off by bending them forward and backward. They should come off easily and cleanly.
 - 3b. For the Dash 8-40CW and GP30, use a small hack saw or jewelers saw to remove the motor support on one end of the motor cavity. This will cut down on the amount of grinding required in the next step.
4. Mill or grind the motor cavity in both frame halves to accept the new (larger) Sagami motor. If you have access to a milling machine this operation is pretty straightforward. The material can also be removed with a high speed steel cutter in a hand tool, such as a Dremel Moto-Tool. Don't use a grinding stone, as it will quickly load with metal and could fail causing injury. Always use eye and face protection when using cutting tools of any kind. Remove metal equally from both ends of the motor cavity until it is a minimum of 1-1/2" long. The cavity also needs to be widened slightly to a least 3/4".

Square off (but don't cut material from) the top of the cavity. When done correctly, you should be able to fit the Sagami motor into the cavity without the motor touching any part of the frame. If the motor bridges the frame halves it will cause an electrical short.
5. For the Dash 8-40CW and GP30, grind enough material from the top and bottom of the frame on the end where the flywheel will be located so that the new flywheel will not touch the frame as it turns.
6. Add the slotted cups with the 2.4mm bore from the #488-6 set to each motor shaft. Press the cups on carefully and only until the motor shaft is seated in the end of the cup. Before installing the motor into the frame, we recommend placing a piece of electrical tape on the bottom and top of the motor case. The tape will help insure the motor case isn't able to cause a short between the frame halves. Test (dry fit) the motor in the frame cavity to make certain the motor and flywheels don't touch the frame.
7. The next step is best described as a three-hand operation. Before you secure the motor in the frame, take one of the motor leads and run it down between the frame halves. Place the bare wire end of the lead into the slot where the white nylon fuel tank mounting square fits. Holding the wire in position, press the tab into the slot, trapping the motor lead against the metal frame. Do the same with the other motor lead into the other frame half. In the samples we've dealt with, the right hand motor lead goes to the right-hand frame and the left lead to the left-hand side. Insert the two truck mounting brackets in the frame, then press the frame halves together with the plastic spacers in between (but don't screw the frame together yet).
8. Clip a pair of electrical leads from a power source to the frame (one to the right-hand side and one lead to the left-hand side of the frame). Holding the motor in it's approximate position (not allowing it to short on the metal frame), apply power and make sure the motor runs. This is the first of several checks for proper operation of the motor. Looking from the rear of the locomotive, the flywheel should turn clockwise when positive polarity is applied to the right-hand frame half. If in doubt about direction, clip a lead from the right-hand rail to the right-hand frame half and another lead from the left-hand rail to the left-hand frame half. With another locomotive on the track moving forward, the flywheel should turn clockwise on the Bachmann locomotive when viewed from the back.
9. Once the electrical connections check out, the frame screws can be installed to fasten the frame together. Now, the motor may be secured with the Quik-Mount material included with the #161-4 or #163-4 kit. A better method is to use a bead of silicon sealant to bed the motor in the frame. With either method, make sure the mounting material continues part way up the sides of the cavity to prevent the motor from shorting out on the frame. If you secure the motor with silicon, you need to temporarily shim the motor so that it is level, square and not touching any part of the frame. Check once more for electrical continuity, then let the silicon cure overnight.

10. Remove the two screws that hold the “cup” on top of each truck. Using a small screwdriver, carefully pry the original slotted cup from the worm shaft on each truck. If the shaft pulls out of the worm, just press it back after you’ve installed the new universal connector slotted cups. Press a slotted cup with a 2.0mm bore onto each shaft in place of the original ones. Re-attach the mounting cups to the top of the trucks. Temporarily mount each truck onto the frame. Cut two shafts from the #2020-4 shaft material about 1/32" shorter than the distance between the end of the motor shaft and the worm shaft (one for the forward truck and one for the rear—they are different lengths). Remove any burrs from the ends of the shafts. Press a horned ball (2.0mm bore) onto each end of each shaft. Trim the horns on the truck end ball so that they don’t stick out beyond the outside of the slotted cup or they will hit the two support posts on the truck. You may wish to carefully carve a little of the inside of each post for additional clearance, but it’s not necessary to do so if the horns are properly trimmed.
11. Remove the trucks, insert one end of the shaft into the motor cup and the other end into the worm shaft. Retaining the shafts in position, remount the trucks. Spin the flywheel by hand to check for binds/misalignment anywhere in the mechanism. When you’re sure that everything is in position and there are no binds, check once more with power, then go ahead and add the body shell and fuel tank to the frame. Make sure the motor leads clear the shell and don’t rub on the flywheels (the leads are long enough to position them as necessary. Lubricate as needed (don’t forget to add a drop of oil to each universal connector).

You will now be able to enjoy smoother, quieter and more powerful operation with your newly re-powered and upgraded Bachmann locomotive.

Installation 4-99 by Fred Hamilton