

## ***Hitachi Alternator Upgrade for Series I E-Types***

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The Hitachi alternator for a 1986 Nissan pickup is a perfect replacement for the Series I E-Type generator. It is small (roughly the same size as the Lucas alternator on 4.2L E-Types), internally regulated, readily available, and cheap. For about \$200, and a few hours of easy labor, any Series I E-Type can be upgraded, and banish charging problems forever. My own '64 OTS was plagued with charging problems before I made this modification. That was 2-1/2 years ago, and I haven't had a single problem since in almost 8000 miles of driving. This alternator can also be easily fitted to a Series II in place of the Lucas. If you want to try this, contact me for details.

Here's what mine looks like:



BTW - You can also see my \$200 aluminum radiator in the background.

I originally considered using a Delco alternator, as this is a common upgrade. However, the Delcos are considerably larger, and just don't look right in the E-Type engine bay. Also, I have the double-V belt drive. Using the Delco alternator would have required machining a pulley, as the shaft size is not the same as the generator. Changing to a single-V belt would require changing both the crankshaft and water pump pulleys, which would be **very** expensive. In addition, most Delco alternators are capable of putting out enough current to fry the wiring in an E-Type.

This upgrade, on the other hand, looks reasonably "correct", since the Hitachi alternator is so similar to the Lucas. You can use the generator pulley, and retain the double-V belt. All parts necessary to mount the Hitachi are readily available, so the only

fabrication that's required can be done with a hacksaw. There are **no** irreversible modifications to the car whatsoever, so the generator can be re-installed at any time.

***Warning: you must convert your car to negative ground before doing this conversion!! This is very easy to do, and instructions are given on the Classic Jaguar web site.***

Here's what you'll need:

Alternator: Lester/Rebuilders number 14231 – \$50-70, available from any auto parts store. Take your generator pulley with you, and make sure it fits the shaft on the alternator.

Universal alternator adjusting bracket - \$8 from most auto parts stores. This is the slotted bracket used for adjusting belt tension. The universal ones are made for Detroit V-8s, so they are **really** long, but you can cut off the excess. (See the photo below)

3.8 alternator mounting bracket - ~\$130, available only from XKs Unlimited. This is a bracket made for mounting the Lucas alternator on the 3.8 block, which does not have the cast-in alternator mounting bosses of the 4.2 block. If you're handy with a welder, you could easily make your own bracket.

Series 1 4.2 Alternator belt - ~\$20, available from XKs Unlimited. This is identical to the generator belt, except a few inches longer. If you have the double-V belt, this is just about the only belt you can use. The only alternative I'm aware of is using one or two 3/8" wide single-V belts, which are available from auto parts stores. This is what I used for the first few days, until the new double-V belt arrived.

A short 3/8" pipe nipple – available from any plumbing, hardware or home supply store. Cut a section 3/4" long. This is used to make a spacer for the lower mounting bolt to set the fore-aft position of the alternator, so the pulley lines up with the water pump pulley.

A 1/4" ring terminal – This will replace the 3/8" spade terminal on the large brown output wire from the generator. Find one suitable for at least a #8 wire.

Two 1/4" male spade terminals, and a short length of 12-14ga. wire.

A 5/16" x 5" hex bolt, two flat washers, one NyLock nut, for the alternator lower mounting bolt.

A 5/16" x 1" hex bolt, flat washer and split lock washer for the alternator upper mounting bolt

The first step is to disconnect your battery, then completely remove the generator, along with its mounting bracket, and belt. Remove the upper generator adjusting arm, which is held in by one of the timing cover bolts. Save the bolt and spacers.

Remove the voltage regulator, mounted under the heater. Make two modifications here. First, open the regulator (this **may** require drilling out the pop-rivets holding the plastic cover on. They can be replaced with small machine screws and Nylock nuts.

First we must establish a permanent connection from the alternator output terminal to the battery, through the heavy-gauge brown wire. Locate the cutout relay, which is the one towards the back of the regulator, and wedge a small piece of cardboard into the arm, so the relay is forced closed all the time. This is shown in the following pictures. The cardboard is the little blue thingy with the number "1" on it, on the right-most relay:



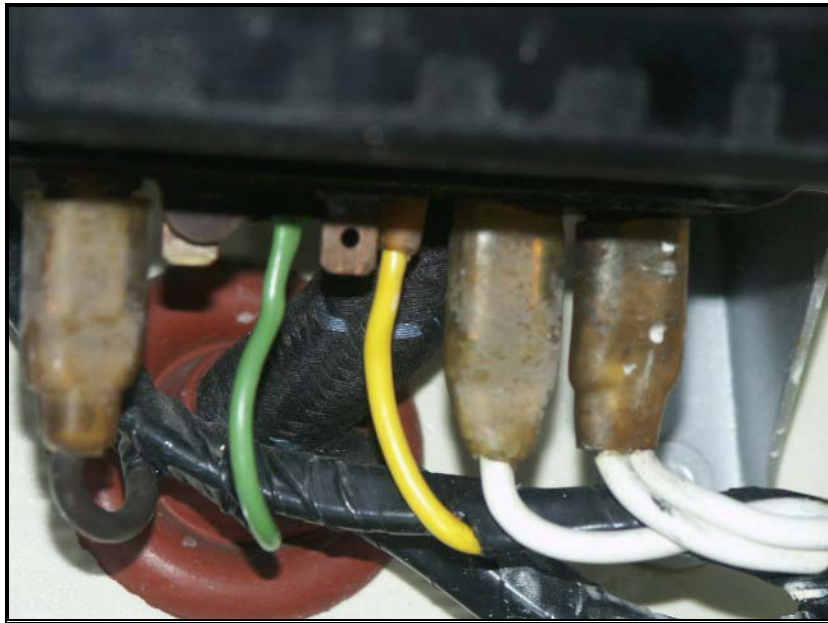
Here's a closeup of just the cutout relay, showing the cardboard more clearly:



Next, we need to create a connection from the old generator field wire to the idiot light in the speedometer. This will be used to drive the idiot light. Disconnect the green and yellow wires from the regulator. Using the two ¼" male spade connectors and 14ga. wire, make a short jumper, to connect these two wires together as shown in the following picture:



Now replace the cover, and re-mount the regulator, tucking the green and yellow wires behind the regulator, as shown here:

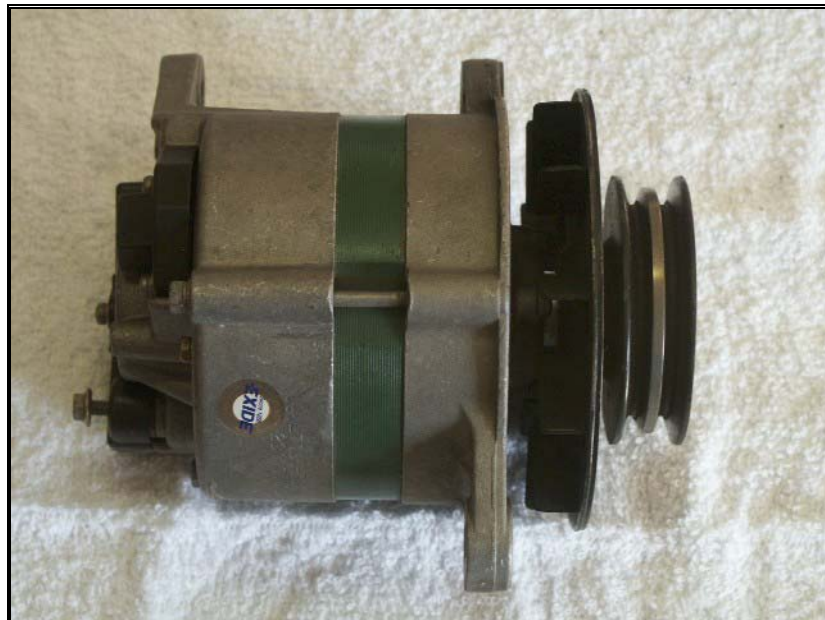


Remove the pulley and fan from your old generator. Re-use the bracket bolts to mount the new alternator bracket to the block.

On the new alternator, remove the nut securing the pulley to the shaft, and remove the pulley, fan, and the spacer tube behind the fan. Cut the spacer down to 3/8" length as shown in the following photo.



Re-install the spacer, then the fan and pulley, securing with a lock washer and nut. Tighten the nut securely, as we are depending entirely on friction to fasten the pulley and fan to the shaft, since the Hitachi shaft does not have a keyway. This may seem odd, but it works just fine. You can use Lock-tite if it will make you feel better, but it really isn't necessary. In fact, many Delco alternators mount the fan and pulley in exactly the same way. Here's what it **should** look like when you're done:



Mount the alternator to the bracket using the 5/16"x5" bolt, inserted from the rear. The bolt goes through the rear alternator flange, a 3/8"x 3/4" pipe spacer, the rear

mounting bracket flange, the front alternator flange then the front bracket flange. On the front end of the bolt, use a flat washer, followed by the Nylock nut. Once bolted together, make sure the pulley is lined-up properly with the water pump and crankshaft pulleys. If it is not, fabricate a new spacer from the 3/8" pipe to make it line up properly. Here's what it should look like when you're done. You can see the 3/8"x3/4" pipe spacer on the right:



Next, fit the belt (it will probably take some effort, as the belt is just a bit too short), and determine where to cut the universal alternator adjusting arm so it will fit. Then drill a 5/16" hole in the cut end, to be used to fasten the arm to the front of the engine, using the same bolt as was used for the generator adjusting arm. Here's what my arm looks like, after cutting and drilling:



This arm started out at least **twice** this long. Mount the arm to the front of the engine. I was able to re-use the same spacers that were used on the generator adjusting

arm. If that doesn't work for you, just stack washers on the mounting bolt to space the arm out so it lines up with the adjusting bolt flange on the alternator. Use the 5/16" x 1" bolt, flat washer and lock washer to fasten the arm to the alternator, adjust for proper belt tension, and tighten the bolt. Here's what it should look like:



All that's left now is the electrical connections. Remove the 3/8" spade terminal from the generator output wire, and replace it with the 1/4" ring terminal. Connect the ring terminal to the large threaded post on the back of the alternator. This is the output connection, which is now connected directly to the battery, so make sure it's not touching anything but the threaded post. Connect the green field wire to the L terminal on the alternator, which is the lower of the two connections on the left side. Here's a picture:



Re-connect your battery, and you should be in business! To make sure everything is OK, put a DVM on the battery terminals. It should be reading about 12.5V. Start the engine, and using the choke lever, raise the idle speed to about 1200-1500 RPM. The

battery voltage should increase to something in the neighborhood of 13.5-14.5V. If it does, you're good to go. If it does not increase when the engine is started, check all your electrical connections. If it rises much about 14.5V, check the wiring on the green wire, the jumper behind the alternator, and make sure your idiot light bulb is good.

If you have any problems or questions, or anything here is not clear, feel free to contact me. Good luck, and let me know how you make out!