

Installation Guide for High Output Alternators

(adapted from original DC Power-provided guide)

This installation guide covers general installation procedures that apply to all of our alternators. Should you require assistance for your specific application, either contact FICMrepair.com directly (515-897-4459 or through the Contact Us link on the site) or contact the manufacturer directly. Proper installation of your new alternator is imperative to ensure that it works properly and delivers what we promise, as well as offering you the reliability that all of our high-output alternators are famous for! **Improper installation or use can hurt your new alternator and batteries and will void your warranty!**

As with any high power alternator, some care is in order. These higher power alternators will push themselves to their limits (even beyond their stated specifications in most cases!) to cover the amperage loads of all of your accessories.

What does this mean? It means that if you selected too small an alternator for your needs and you are continually pushing your new alternator to its design limits and beyond, it will rise to the occasion to the best of its ability. **This could mean it getting so hot as to burn out a stator (the copper windings around the perimeter of the alternator) – something NOT covered by warranty and something that typically takes 500 degrees or even more to do!** This wouldn't happen in a stock unit because it just doesn't have the ability to push that many electrons no matter what is asked of it, therefore it simply never gets that hot (and of course your accessories also don't get the amps that they need either).

Sadly, it's not so simple as even this. You may only run stock accessories and think this warning doesn't apply to you. If you have a bad ground or an electrical motor going bad, for example, the electrons may try to push themselves through the issue. The result is a dramatically higher amperage draw request for the alternator to offset.

While ideally you'd have a DC ammeter to check the amperages asked for by all your devices, you can also get a rough idea of what shape you're in by how hot the alternator gets during operation (you should be able to rest your hand on it after a 30 minute drive) and also by running voltages (you should be seeing 13.8+ volts pretty well at all times on the batteries after the engine has been running for more than just a couple minutes). If your running voltages are lower and you have installed one of our cable kits with the new alternator, things that can cause that include:

- too old of batteries (that are therefore generating too much resistance),
- discharged batteries
- one or more bad grounds
- one or more accessories simply pulling too large a load as a result of them going out, or
- too small an alternator.

If you are just now learning this and concerned that perhaps you have selected too small a unit, please contact us at 515-897-4459 before you install it.

Step 1: Remove BOTH negative (-) battery cables. Leave the positive battery cables connected.

Step 2: Verify the charge state of the batteries

It is critical that the batteries are fully charged before any load is applied to your new alternator. Disconnect the negatives from the batteries and allow time for them to stabilize (having them connected causes them to balance each other out).

Using a volt meter, **verify that the standing voltages of the batteries are 12.6 – 13.0 volts each**. Anything lower will require that the batteries get charged first. If your batteries require charging, it is a good idea to do this while you are performing the actual installation. Please refer to the manufacturer of your battery if in doubt how to correctly charge them. In no case allow your batteries to charge above 15.7 volts. If you do not have a volt meter, simply put your batteries on the charger before proceeding until they are charged.

If you are installing a FICM at the same time as your alternator, you must take things a step further by fully charging the batteries, **disconnecting them from everything for not less than 12 hours**, and then having them load tested using a method that tells you the CCA rating of each battery. For northern climates, batteries must each test out above 800CCA. For southern climates, batteries must test out above 700CCA. If one or both test out lower, replace both of them.

The reason for load testing your batteries is to positively ensure their health. **FICM's don't ever die on their own – they are always killed**. The purpose of load testing your batteries is to ensure that your batteries do not harm the replacement FICM. If you aren't replacing the FICM as part of your alternator install, but just want to better ensure the continued health of your existing FICM, load testing is a good choice.

Step 3: Remove the belt from the OEM alternator

Release tension on the belt. This can be done several ways, but most find it easiest to use a serpentine belt tool – available at many tool retailers. Alternatively (but with more effort), you can place a ½” ratchet into the tensioner pulley drive, allowing the ratchet handle to point up towards the alternator pulley (about the 11:30 position). Then, they use either half of their floor jack handle or perhaps 1” diameter steel water pipe and slide it over the ratchet, angling the pipe back towards the rear bumper to clear the fan shroud. Once attached, they just push the pipe towards the driver's side fender until the belt tension is loose enough to allow the belt to come off of the alternator pulley. Once slid off, they slowly release tension on the pipe, allowing it to go back to the passenger side until the tensioner is fully relaxed. Regardless of the method used to remove the belt, take care to prop it up so that it doesn't fall off of other pulleys which would result in the need to re-align everything – not a fun task.

This is an excellent time to inspect your belt. If the belt shows signs of excessive wear, cracking, has chunks of it missing, or has cords showing, this is a good time to replace it. OEM replacements as well as the squeak-free Gatorback belts are on FICMrepair.com!

Step 4: Remove the OEM alternator

Remove the charge lead first. The lead is typically an 8 AWG* red wire and will run from the alternator to the passenger side battery positive (+).

Remove the signaling cable end from the alternator.

Remove the three bolts that hold the OEM alternator in place. Put them in a safe place, as you will be re-using them to mount the DC Power alternator. If you are installing a Leece Neville alternator, the unit comes with the longer replacement bolts necessary.

Remove the OEM alternator from the vehicle.

**AWG stands for American Wire Gauge. We only recommend the use of cable that is AWG rated!*

Step 5: Install the Alternator

Mount the alternator in place of the OEM unit, **torqueing the three mounting bolts to 35 foot pounds**. Re-install the belt following the directions above for belt removal, but beginning with the ratchet handle around the 10:00 position on the tensioner (so that the ratchet head is pointing towards the passenger side of the truck) and once again slide a pipe over the handle and push the handle towards the driver's side until adequate belt slack exists to place the belt over the pulley. Once the belt is over the pulley, slowly release pressure on the pipe to allow it to come back to the passenger's side until the tensioner is once again fully engaged. **Before engaging the starter, CAREFULLY inspect all pulleys to positively ensure that the belt is fully installed on each pulley and not hanging over an outer edge.** Make corrections as necessary.

There is no need to 'shim up' the alternator to account for the smaller diameter pulley used with the alternator. If you have belt squeaking issues, a replacement belt and/or tensioner will resolve the issue.

If you have a separate grounding block on your alternator series, note that this goes on the passenger side of the alternator, with the "fat" side towards the rear bumper. The alternator rests on top of this grounding block.

Step 6: Connect factory charge lead and upgrade the charge lead

All DC Power and Leece Neville high-output alternators are capable of far greater output current than the OEM alternator that you are replacing. Therefore, it is recommended to upgrade the stock charge lead appropriately. This is critical for all units larger than the 185 amp OEM series, but beneficial for all alternators. FICMrepair.com uses a 1/0 wire in its kit for this purpose.

Depending on the series alternator that you purchased, you may have to slightly enlarge the ring terminal on the factory charge lead wire to have it fit over the stud – yes, **even if you are upgrading to a larger than factory charge lead wire, you still need to attach the factory charge lead. Failure to do so will result in the alternator losing voltage regulation, which will nearly certainly cause your batteries to out gas (boil over).** A file, moto-tool (Dremel, etc) fitted with a grinding wheel, or even a drill can be used for this purpose. If a drill is used, be sure to firmly attach the ring terminal to a sacrificial piece of wood to avoid the drill bit getting caught on the ring terminal and twisting it.

Install the factory charge lead and (if used) then slide on the additional charge lead wiring over it. If you are using the wiring kit from FICMrepair.com, review the many kit installation pictures on its product page at ficmrepair.com – just navigate to ficmrepair.com, then click on the Parts & Accessories link at the left, then select Alternators & Alternator Wiring, and then Alternator Wiring.

Tighten the charge lead (also known as the 'Generator B+ terminal nut' to 71 inch-pounds ONLY. DO NOT OVER TORQUE unless you want to hurt your alternator! THIS IS ONLY 5.91 foot-pounds (we're talking just snug with a 1/4" drive ratchet for those of you without torque wrenches) and that's IT.

If you have questions in regards to this step, **PLEASE CALL US!**

Step 7: Upgrade the return path

This is equally as critical as upgrading the charge lead. Keep in mind, as you are installing a high-output alternator that is capable of far more current than the stock unit, you will require an upgrade to the charging system return path for BOTH the alternator and the accessories. The below procedures cover both.

1. Choose an existing bolt on the frame near the OEM battery location, remove it, and clean the metal surface of any paint or rust with a wire brush or die grinder. If you cannot locate an existing bolt, then locate an existing hole in the frame that you can tap for at least a 5/16 – 18 bolt and do so. For 6.0 owners, a great spot is where the passenger side fender connects to the frame just behind the passenger side battery. See FICMrepair.com's wiring kit page for pictures as needed.

2. Use white lithium grease or other battery corrosion preventative on the bare metal to prevent rust or corrosion.
3. Using cable the same size as the upgraded charge lead, connect cables from the case of the alternator (mounting bracket bolts work great for this) to this point. The FICMrepair.com cable kit uses ring terminals to ease the installation. *Tighten this bolt securely, using torque appropriate for the location chosen. **This step is VERY important!***

Note: When adding your high current accessories, connect their grounds to the frame rail on the same side of the vehicle that you have made these connections to in the same fashion as above.

STEP 8: Connect the 6” ‘pigtail adapter’ wiring.

Connect the 6” pigtail adapter wiring to the alternator and the other end to the factory wiring harness plug.

STEP 9: Reconnect the negative (-) battery cables to each battery

The installation of your high-output alternator is now complete. You are now ready to test it for proper operation.

Testing Your High Output Alternator

Before dropping the hood and cruising, you **MUST** test your newly installed High-Output Alternator for proper operation. Remember, you can only do so with a fully charged battery. If you didn't charge your batteries before, do so NOW – BEFORE you start your engine. Refer to **STEP 2** in the installation instructions.

1. Connect a volt meter to the battery positive (+) and battery negative (-) posts and set it to read DC voltage (DCV or the V with the straight line over it). It should indicate *at least* 12.6 Volts DC.
2. Turn all accessories OFF, start the vehicle, and let the engine run.
3. The volt meter should indicate between 13.8 and 15.0 Volts DC at idle within three minutes of startup (note that the glow plugs run for up to two minutes on the Ford 6.0L motors, meaning that it is normal to not see the 13.8 voltage output immediately).

If the voltage is lower in either case, you may need to:

- Re-charge the battery and re-check.
- Double check that all cables are in good condition, are making good connection, and all terminations are solidly crimped – *hammers, vises, and pliers are NOT crimp tools! We do not recommend soldering in lieu of crimping.*
- Double check that the belt is tight and is not slipping – it takes power to make power and our high-output alternators *will absolutely require* that the belt is fresh and properly tensioned.

NOTES

As Ford 6.0L Diesels use two batteries, it's important to note that additional batteries actually increase the load on the alternator when it is in use – up to 10 amps for each fully charged battery depending on battery type (wet cell, AGM, etc) and condition. Therefore it is vitally important to maintain the batteries per the instructions of the battery manufacturer and NEVER run them flat. Alternator and/or FICM failure can occur in a multi-battery installation if the batteries are low and an additional load is applied on top of the discharged batteries!

High Powered Car Stereo Systems

We do not recommend using high-powered car stereo systems for any length of time without the engine running. This will quickly drain the batteries and cause excessive load on the alternator after the motor restarts. Our high-output alternators are designed to maintain fully charged batteries and are NOT battery chargers!