Swamp's Diesel Performance
Competition Parts For Your Diesel
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Tips to help remove and install 6.0L Power Stroke injectors, 2003-2007 E-Series, F-Series, & Excursion & International VT365 equipped chassis.

Removal:

After removing the air intake/filter components, remove passenger side intercooler pipe, unbolt the coolant reservoir on the drivers side firewall, disconnect the 3 plugs from the FICM on the drivers side valve cover, unbolt & remove the valve covers; you will see one of two styles of high pressure oil rails that sit on top of the four injectors in each cylinder head.

The early 2003-2004 6.0L Power Stroke engine utilized a “log” style oil rail, where the 2004.5-2007 6.0L engines used a “web” style oil rail.

Regardless of oil rail styles (log or web)…the rail is bolted into the cylinder head with (9) bolts. The “log” style rail (2003-2004) use (9) 8mm bolts to secure the rail to the head. The later (2004.5-2007) trucks, with the “web” style oil rail, use (9) Torx-30 bolts to secure the web style rail to the cylinder head.

On **2003-2004** engines, equipped with the log style oil rail; it is necessary to disconnect the high-pressure oil line from the “log” prior to removing any of the (9) 8mm bolts. Simply unscrew the large 24mm fitting from the log, allowing the flexible stainless braided oil feed line to be moved away from the oil rail.

On **2004.5-2007** engines, the high-pressure oil rail, is fed from underneath, through a solid tube, up into the bottom side of the web style rail. As you are pulling up on the web style oil rail, this feed tube (underneath the web) may become dislodged from its' internal seat, and can simply be reinstalled by pushing it back down through the head. It is not bolted separate from the web style rail, and is sealed by o-ring seals on both ends.

For all years, once the oil rail is unbolted, pull the cast iron oil rail off the top of the 4 injectors on that cylinder head. Be prepared for some small amount of oil (contained within the rail) to trickle out of the rail. Keep this oil rail in a clean area, and do not allow contaminants (dust or debris) to contaminate the rail, or those contaminants will be immediately introduced into the new injectors.

The procedure for removing the injectors from the head (any year) is as follows.

Disconnect the (engine side) electrical harness from each injector by depressing the stainless steel metal clip, and pull the harness toward the center of the engine.

To release the injector harness from the cylinder head, you will need a 12pt, 19mm socket (a 6pt socket will not work), which will be pressed into the hole in the aluminum head spacer to release the plastic clips (of the harness) from the aluminum spacer (on the head).

Use a ~3" long Torx-40 bit, in a ratchet to loosen the injector hold down. As you unscrew this T-40 bolt, the injector will be pulled up and out of the injector cup, and the injector & the hold down clamp will be ready to be removed from the head.

Once the injectors are removed from the head, carefully inspect the nozzle end of the injector to ensure that the crush washer (stainless or copper) came out with the old injectors! If you have an injector that is missing a crush washer, you must remove it from the injector cup prior to installing the new injectors, such that they will seal to the injector cup (in the head) properly.

Once the injectors have been inspected, carefully set the used injectors aside to be returned to us as cores. **Take care in packaging them securely for return shipping**

Installation:

Carefully unwrap the new injectors from their packaging (one at a time to prevent contamination from your working environment), and inspect each one to ensure that the copper crush washer is pushed all the way onto the injector nozzle. You may notice a small amount of thick grease on the crush washer, which we placed there to prevent the washer from moving around during shipping, and to ensure that the washer stays in place as you invert the injector to install into the cylinder head.

If you receive your injectors with O-rings on them, they are brand new ones. If you are installing the O-rings yourself, follow the directions included with them.

Your injectors will come to you numbered 1-8; please install them in their corresponding cylinder: driver's side is even-numbered, starting from the front to the rear, 2,4,6,8 and passenger's side is odd, 1,3,5,7. *All the injectors are identical*, but we keep track of the injector serial number during our work, and number them for ease of tracking.

We will appreciate it if you number your old injectors with their cylinder number.

All of our injectors are packaged immediately after we remove them from our injector flow bench. If the injector o-rings are not still oily from our test fluid, lightly coat the injector O-rings with clean engine oil before installation, and make sure the injector is free from any grit or contaminants.

Orient the injector with the wiring harness toward the center of the engine, and carefully set the injector into the cup in the head. Next, carefully align the hold down clamp into the notch on the side of the injector, and get the bolt (Torx-40) threads started into the female threads in the head by hand.

As you tighten the hold down bolt, you will be able to rotate the body of the injector to clear any valve train components, such as the rocker arms & valve springs.

Tighten the Torx-40 headed hold down bolt until it doesn’t turn. This bolt is being tightened into the cast iron area of the head, so stripping threads is NOT A CONCERN. If you are using the long Torx-40 driver on a ¼” drive ratchet, you will have to exert moderate to significant force on the ratchet to adequately secure the injector into the head. During this process (of tightening the hold down bolt) you are actually crushing the copper/stainless steel crush washer against the injector cup inside the cylinder head. You will begin to feel significant resistance PRIOR to the injector actually being installed 100% completely! Do not be concerned with over tightening this hold down bolt! The factory torque specification for this fastener is 24lb ft. HOWEVER; we **strongly** suggest that you exceed the factory torque specification.

The single biggest mistake while installing injectors is not having the injector fully seated, and failing to fully tighten the hold-down bolts. IF the crush washer is NOT fully "crushed" then you will be re-doing this entire process in a few weeks time.

*You cannot damage the injector by over-tightening the bolts, but you can seriously damage both the injector and the engine if the injector is not **securely bolted down** because raw fuel will leak into the cylinder.*

When we are doing the installation, we torque the injector down as described above, then gently tap the metal (top) portion of the injector with a clean brass hammer, and triple check the hold down bolts, to ensure that we can't get another quarter turn with the ratchet.

Repeat this process for the remaining 7 injectors, and then recheck the hold down bolts.

Once all injectors are installed, and all 8 of the hold down bolts are tight, you may now install each injector's round wiring harness into the hole in the cast aluminum spacer on the head. You may have to rotate the injector connector within the aluminum head spacer to get the tab & notch to align properly. Also, ensure that the harness from each injector will adequately clear any moving parts, such as the rocker arms.

Next is the installation of the oil rail.

On the **2003-2004** engines with the log style oil rail, gently set the (clean) rail onto the top of the injectors, ensuring that the nipples (on the bottom of the rail) are allowed to mate properly with the hole (oil inlet) in the top of each injector, as well as line up with the (9) bolt holes which will secure the oil rail to the cylinder head. Take precaution that the nipples are not being driven into the electrical solenoids on the sides of the injectors…make sure the nipples are seating properly into the oil inlet hole in the top of each injector.

Start all (9) bolts by hand, prior to tightening any of them. These (9) 8mm bolts which secure this rail to the head, are threading into an aluminum portion (spacer) on the head, so **do not** over tighten these (9) bolts. Double-check them to ensure that they are tightened. Also reinstall the large 24mm o-ring fitting from the braided stainless steel oil feed line onto the cast iron rail.

On the **2004.5-2007** engines, with the web style oil rail, gently set the (clean) rail onto the top of the injectors, ensuring that the feed tube mates properly with the bottom of the oil rail, & that the nipples (on the bottom of the rail) are allowed to mate properly with the hole (oil inlet) in the top of each injector, as well as line up with the (9) bolt holes which will secure the oil rail to the cylinder head. Take precaution that the nipples are not being driven into the electrical solenoids on the sides of the injectors…make sure the nipples are seating properly into the oil inlet hole in the top of each injector.

Start all (9) Torx-30 bolts by hand, prior to tightening any of them. These (9) 8mm bolts which secure this rail to the head, are threading into an aluminum portion (spacer) on the head, so **do not** over tighten these (9) bolts. Double-check them to ensure that they are tightened.

Now you are ready to reinstall the valve covers, FICM & Glow Plug controller, double check any wiring connections, secure the coolant reservoir, as well as reinstall the intercooler pipe & air filter components.

The valve cover bolts are also threading into the cast aluminum head spacer, so take care in not over torqueing the bolts, which secure the valve, cover to the head.

Prior to starting the engine:

Turn the key to the “on” position (do not crank), which will allow the electric fuel pump to refill the fuel passages in the cylinder head with fuel. Repeat the ‘key on’ procedure 3-4 times, with 15 seconds between key cycles.

If you are unsure as to whether or not you have weak batteries or a weak starter…you are about to find out! : D

It typically takes us 6 or so cranking cycles (20 seconds continuous with 2 minutes cool down time) to get the engine to build enough high-pressure oil to mechanically fire the injectors. If your batteries are weak, you may need to hook up a battery charger, or (worse-case) use jumper cables connected to another vehicle.

Once the engine fires, it is completely normal to have excessive amounts of white smoke exiting the exhaust pipe. This is from the small amount of fuel that was allowed into the cylinders during the injector swap. It is also completely normal for the engine to run rough for up to 20 miles after starting. This is caused from large amounts of air that have been introduced into both the fuel & high-pressure oil systems. **Extended idle time will not purge these systems of the air. You will need to drive the truck for 20 miles minimum.**

It is also expected that the engine will be slow to fire (during cranking) until all of the air has been purged.

Congratulations!

If you have problems during installation do not hesitate to call us at 1-866-595-8724. If you specifically state that you are having problems and need injector installation assistance, you will get it immediately.

Your injector cores are due back to the address below by the date written on the package. Typically 14-21 days after you receive them.

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We take care in packaging your injectors to ensure a quality product, and recommend for you to reuse our packaging methods, materials, & boxes to ensure your injectors are not damaged during their return travels.

By installing these injectors, you agree to be responsible for any damage to your (core) injectors.

If your Power Stroke was running well prior to installing these injectors, then you should not expect to be charged for internal injector damage.

However, if your core injectors are found to have been damaged by water in the fuel, gasoline in the fuel, severe engine fire, etc; there will be an additional charge to repair your cores for the next customer.

High mileage injectors, or injectors which have normal wear, can be repaired by machining some internal components, and you will not be charged a core charge.

Damaged Wiring, Connectors or Electrical Solenoids are $25/injector

Damaged (leaky, broken, or clogged) stock nozzles are of no consequence, as we replace them with brand new OEM quality replacements.

If you fail to return a rebuildable set of injectors, you will be charged $1000.

These injectors have been built to the highest standards. All internal clearances and specifications have been measured to the nearest ten thousandths of an inch!

Every single 6L injector we build is not shipped until it has been flow tested (minimum 3000 firings), and precisely matched to others in its ‘set’. We keep meticulous records of every injector we build, and should you have any problem (in or out of our 1 year warranty), feel confident that any replacement injector will precisely match the others.