

24v Injector removal and Replacement

This information was compiled from postings to mail lists and the TDR.

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Posted to the TDRoundtable by Chad Sheets

- 275hp RV injectors reduced the ETC engine's 0-60 time from 17 sec. to 14.5 sec.
- Available from TST.
- Available from Cummins - BOSCH part# is 0 432 193 635, cost is \$80 each plus shipping, instructions are not included.
- Installation time: approximately 1 to 4 hrs. depending on experience (it's not difficult)

Tools Needed:

- 19mm open end wrench, to loosen/tighten HP fuel lines running to the cylinder head (some use 3/4").
- 19mm wrench or 3/4 crow foot - used to torque the HP fuel lines down to the torque of 28 ft. lbs.
 - Some suggest cutting 1/4 of the side out of a 19mm deep socket forming a tubing wrench style of socket, it makes it a lot easier to get the injector tubes tight and you can use a torque wrench on them much easier than a crowfoot wrench
- 15mm socket, for the valve cover and rear engine hoist bracket
- 8mm wrench - used for some of the HP fuel line clamps and fuel injector hold down bolt (89 in lbs)
- 8mm shallow socket - used for some of the HP fuel line clamps
- 8mm deep socket
- ratchet wrench
- (1/4 and 3/8) ratchet extensions
- 10mm socket - needed to remove intake air heater assembly (these four bolt are torque to 18 ft lbs)
- 2 torque wrenches (One for in lb measurements)
- Home made injector removal tool - 1" shallow socket, 8mm x 60 or 80mm bolt, 8mm nut
- small flat tip screw driver - to get the HP fuel line to injector tubes out and to remove the old O-rings from the tube.

The installation:

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A [pdf installation instruction set](#) is posted on the Bully Dog site.

Installation isn't too difficult. The hardest part is getting to the #5 and #6 HP fuel lines at the head. #1 and #2 require the removal of the intake heated grid assembly.

1. Disconnect the intercooler hose to air intake plenum, then remove the plenum. Makes it much easier to reach cylinder #2. Put a rag in the hole to keep stuff out of the intake, and be careful of the heater grid & wiring. Some find it easier to disconnect the heater grid wires and totally remove the heater grid because you have to move it out of the way to get at #2, & maybe #3.

2. Remove valve cover. First remove the rear hoist bracket from off the intake manifold (bolts may be very tight!). Then it is easy to remove the valve cover. Rock and slide it out toward the Driver's side. No need to remove the hose to the heater, will make a big mess with coolant that you dont need - just kink the rubber heater hose down & out of the way. When reinstalling, put the rear bolt in first because you can't once the valve cover is back in place. You can leave the hoist bracket off.

3. Break loose all the injector line nuts at the cylinder head. Then remove fuel line clamp at whatever cylinder you're working on, one at a time, start at #1, and work back. Work on one injector at a time. Once the HP fuel line and quite a few fuel line clamps are disconnected, remove the tube in the head (if you dont remove this tube before the injector you could end up ruining the tubes and injectors). Use a small flat tip screw driver to pry them out (very little force required).

Note from Joe Donnelly: Loosen the injector lines, and pull out the connectors about 1/4" to 1/2".

Note from Vaughn MacKenzie: What I do is remove all the fuel line bracket pieces at the same time and mark an X on the lines exactly where the blue pieces go. That way you don't have to stop & undo them between each injector. Don't have to remove the ones closer to the injection pump. If you don't have an end wrench 8mm to do cylinder #1 it is easy just to undo the 3 bolts holding down the throttle assy.

4. Unscrew cyl. head fitting and pull back out of the way just far enough so that you can back out the gray aluminum fuel delivery nozzle. Gently prying on this with a small flatblade screwdriver will loosen it, then it slides out easily. Just pull back an inch, don't remove. Be careful not to let dirt/debris get into this fitting! NOTE: This injector tube is about 3.5" long and connects the high pressure injector line to the injector. You MUST pull this small tube out to remove the injector. If you don't, you will damage the tube. Another person used a small flatblade screwdriver and pulled the injector tube out a bit (prob. 1.5 cm) or so.

Note from Vaughn MacKenzie: Here's one I do a little different, there is no need to losen the rear holddown bolt at all, just remove the front one and the bracket will slip

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right out. Also it will ensure correct torquing and the bracket is level when you install the new injector.

5. Remove the injector retaining bar. Only loosen the rear bolt, and remove the front bolt and it slides right out. The service manual very specifically says not to remove the bolt on the slotted end.

6. Using a 10mm x 1.25 bolt from the air plenum, screw it into the injector to facilitate removal. Use something to gently pry on the bolt, to remove the injector. Alternative: use Al's home made injector puller (described above) . Make sure the copper washer comes out with the injector.

7. Oil the new injector's O-ring; then install the injector; A dab of grease/Vaseline will hold the copper washer in place. Wipe some engine oil or Vaseline on the large O-ring and stick it in. Gently push the new injector in, making sure the port is facing the fuel line. You can move the injector into alignment after it is seated by gently twisting it (put something in the slot to twist it).

Note from Vaughn MacKenzie: End of an end wrench works great to square the injector up with the fuel tube.

8. Reinstall hold-down bar and torque it down to 89 in lbs. Press fuel delivery nozzle back into place (reposition fuel line against it and push, it will reseat easily). Screw the fuel line nut back into the cyl. head, making sure it screws in easily without excessive resistance or binding and torque to 28 ft lbs.

Note from Vaughn MacKenzie: Here Diesel Dynamics recommends torquing down the injector hold down bracket and the injector line nut in 2-3 alternating steps, instead of totally torquing down the injector then doing the line nut. Helps ensure the tube mates up snug & square with the fuel inlet hole.

9. Reinstall fuel line clamps. Clean up anything that may have gotten in the valvetrain area and intake. Reinstall valve cover, then intake plenum.

Note from Vaughn MacKenzie: The torque value for the fuel line nuts is 28ft/lbs which Cummins says is critical. The injector hold down bracket bolts are 8 ft/lbs.

10. Fire it up! It will take several seconds of cranking and will run rough a couple seconds then smooth right out. It'll probably smoke a lot, but it clears out.

Note from Vaughn MacKenzie: Rob likes to crack a couple lines and cycle the lift pump a few cycles, that will help with initial bleeding so it'll save some on cranking.

11. Check for leaks around the fuel lines, and you're done!!

Problems:

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1. Takes a while to get the engine fired back up (made me kind of nervous) bled the air out of the #3 and #4 fuel lines.
2. Couldn't get to #6 fuel line with a torque wrench (had to guess the torque)
3. After bleeding #3 and #4 and getting the engine started there seems to be a very small amount of fuel seeping through the threads on the HP fuel lines. Haven't had much of a chance to put some real miles on it to see if the seeping stops. I am assuming that when I bled these line some of the fuel went between the cylinder head and the fuel tube. I am hoping that is all it is. After I drove it it seemed that it leaked less. I have probably put about 30 miles on it so far and still if I run my finger under the HP fuel line connection to the head it gets a slight amount of fuel on it. Thursday night I tightened these two lines a little more, still have to take it for a drive and check it out. If this doesn't fix it I will just drive for a while and see if it stops, if not I will try reseating the hp fuel lines. Has anyone else that replaced these injectors on the ISB had this problem?