# 2011-2016 LML DURAMAX CP3 CONVERSION KIT

Covers Installation of PN: WCF100260

**Estimated Install time:** 12-14 Hours

**Tools Required:** ½" fuel disconnect, 3/8" fuel disconnect, 3/8" ratchet, metric socket set, metric wrench set, 1 1/16" socket, 27mm socket, 3/8" socket extensions, fan clutch removal tool, 3/8" and ½" torque wrench, ¼" and 5/16" nut driver, pliers, 7/8" wrench, 15/16" wrench, pry bar, hose pick, vise, scan tool.

# Removal/Install Overview

**Stock CP4 Removal:**

1. Start by disconnecting battery terminals on each battery, then drain all coolant and remove air intake.
2. Next, air box and coolant tank bracket will need to be removed.
3. Disconnect passenger side intercooler pipe from throttle body and driver side intercooler pipe from turbo.
4. Undo quick connect fittings at back of engine for chassis fuel lines.
5. Release accessory drive belt tensioner and remove turbo air resonator.
6. Disconnect the A/C compressor and alternators and move aside.
7. Cooling fan on the front of engine needs to be unbolted and moved aside.
8. Remove intake tube.
9. Next, disassemble and remove EGR bypass pipe, valve and front cooler.
10. Uninstall y-bridge and intake horn and remove from engine.
11. Remove coolant return line with banjo tube off turbo.
12. Remove fuel lines and disconnect 9$^{th}$ injector.
13. Remove stock CP4 pump and fuel temperature sensor from pump.
14. Swap CP4 gear and nut onto new CP3 pump.

**CP3 Pump Installation:**

1. Install CP3 in reverse order of CP4 removal.
2. Remove CP3 cascade overflow valve and install it into supplied cascade block.
3. Install supplied cascade banjo bolt, cascade block and both fuel feed lines.
4. Secondary high pressure rail plug can now be installed.
5. Remove anchor bracket for old high-pressure pump line from rail-to-rail high pressure line.
6. Swap out low-pressure fuel supply tube with new tube and install on engine.
7. Install 9$^{th}$ injector feed line into cascade block.
8. Reinstall y-bridge, EGR cooler and turbo air inlet adapter.
9. Reinstall EGR bypass pipe valve and intake pipe.
10. Install turbo coolant banjo pipe along with a new seal.
11. Reinstall alternator(s), A/C compressor and cooling fan assembly.
12. Reassemble drive belt and turbo air resonator.
13. Reinstall passenger and driver side intercooler pipes.
14. Reconnect air intake and filter, chassis fuel line connections and both batteries.
15. Top off coolant, prime fuel system and initiate DPF regeneration with scan tool to purge air form hydrocarbon injector and lines.

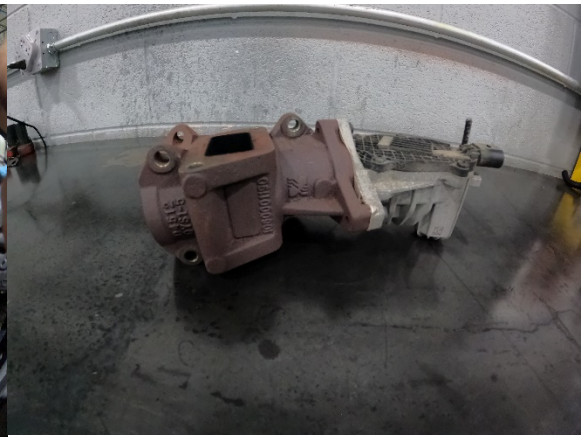
**CP4 Pump Removal:**

1. Start by disconnecting both batteries, draining coolant system and removing air intake.
    - It is best to drain coolant from lower radiator hose into a large bucket under the truck.
    - Air intake filter can be removed first by loosening the clamps and gently pulling off the intake pipe. Intake box can be removed by lifting it up and out of engine bay. NOTE: Be careful not to damage A/C line during removal.
2. Disassemble the airbox and coolant surge tank bracket as well as the black plastic cold side intercooler pipe from the throttle body.
    - A screwdriver can be used to push lock ring counterclockwise. As it rotates, cold side pipe can be gently pulled out and removed.
    - Remove intercooler pipe from turbo.
3. Disconnect chassis fuel lines from quick connect fittings at back of engine by using a quick connect removal collar tool. You will need a 3/8" and ½" fuel disconnect tool to do this.
4. Remove all four cooling fan shroud bolts.
    - **2015-2016 Trucks**: it isn't necessary to remove fan shroud. Gently position shroud towards radiator to provide access to cooling fan center.
    - **2011-2014**: Fan shroud is a two-piece design that is easier to remove.
    - Unbolt cooling fan mount from front of engine by loosening three 15mm bolts and two stud nuts. Then remove fan from the drive pulley using a fan removal tool. This should be done before removing belt.
5. Rotate tensioner using a ½" drive socket wrench to release tension on the accessory drive belt. Intake manifold cover can be removed by both 10mm bolts holding it to intake pipe. Lastly, the alternator bracket can be removed.
6. Unbolt A/C compressor and move aside. Refrigerant does not need to be evacuated. Alternator(s) can be removed and put aside.
7. Remove upper crossover pipe and start by loosening two 13mm bolts holding it in place to y-bridge near MAP sensor. Then, loosen oil dipstick tube bracket bolts and hidden 10mm bolt holding intake air heater ground bracket to crossover pipe.

8. Remove intake horn from turbo compressor cover.

9. Remove EGR bypass pipe, valve, and front cooler.
    - Remove EGR bypass pipe that connects EGR bypass valve to EGR valve.

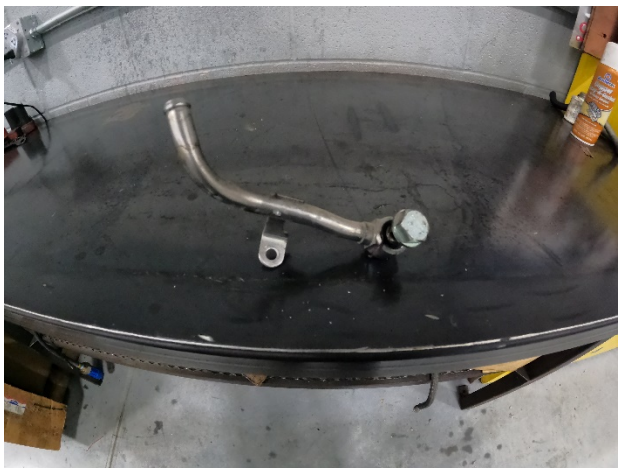
    - Remove EGR valve by loosening the four bolts that attach it to intake manifold.



- At this point, the four front EGR cooler bolts can be accessed by carefully threading through a ¼” drive socket extension and a swivel socket.

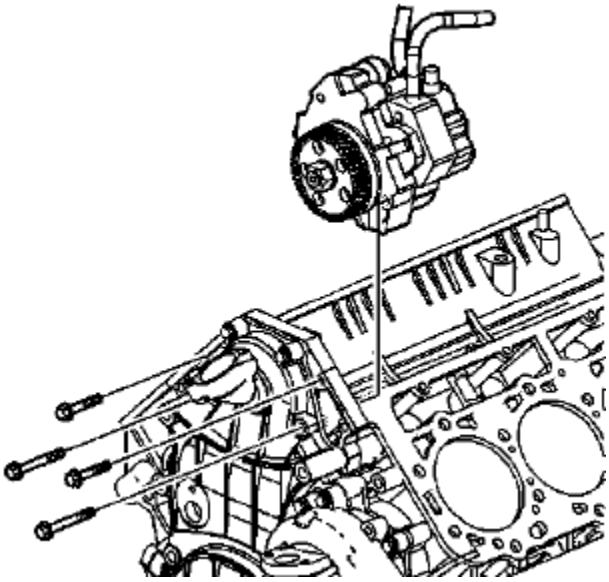
10. Remove intake horn from turbo compressor cover.

11. Remove coolant return banjo pipe from turbo.



12. Remove high- and low-pressure fuel lines.

13. Disconnect electrical harness connectors for fuel injection pump temp sensor and pressure regulator.
14. Uninstall four bolts that secure CP4 to cylinder block and remove it from engine.

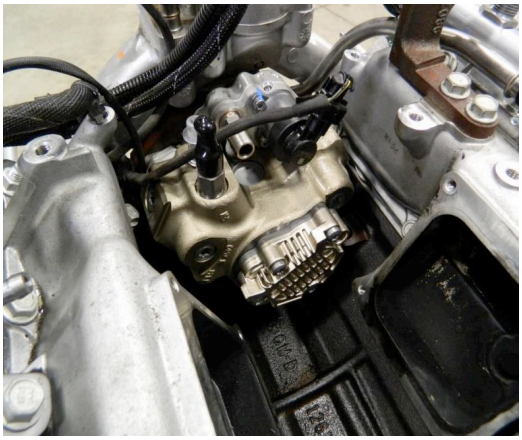


**CP3 Prep For Install:**

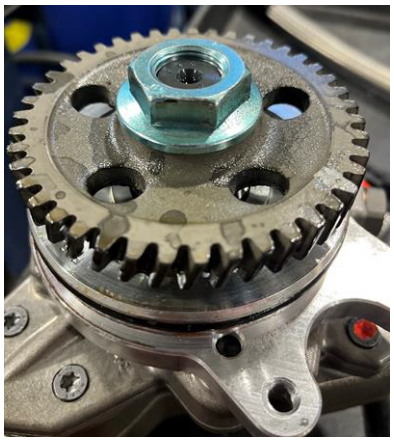
1. Remove green fuel temp sensor from old CP4 to be reinstalled into new cascade block.
2. Use a vice with soft jaws to hold old CP4 by the drive gear to remove nut and gear from shaft and then clean all mating surfaces.

3. Install CP3 engine block adapter to new injection pump with three supplied bolts in kit. Make sure flange O-ring is lubricated well with engine oil before installing it, or a leak could occur. **Bolts need to be torqued to 20 FT-LB**.

4. Install gear and torque gear nut to 75 FT-LB **MAKING SURE NOT TO OVER TORQUE THEM**.
5. Remove original Bosch CP3 feed and return fitting from pump and install new high flow CP3 feed and return fitting onto CP3 pump.



**NOTE: CP4 nut is longer than CP3 nut, however, it will not interfere with the front cover.** It will also provide the same amount of thread engagement. That shaft of the CP3 will be below the nut surface and this is okay as shown below.



**CP3 Pump Installation:**

**NOTE: It is recommended to remove fuel pressure regulator on your old CP4 pump and inspect for debris. If debris is found in fuel pressure regulator, we recommend replacing the regulator, injector return line and check valve assembly.**

GM Pressure Regulator P/N: 12611872
GM Injector Return System P/N: 12639000

Lubricate O-rings on new CP3 pump adapter with engine oil and install them on the cylinder block. The CP3 **does not** need to be timed to camshaft. **All four bolts must be torqued to 18 FT-LB. DO NOT** Draw pump into block using attachment bolt or it may result in stripping out aluminum mounting plate. **It must be pushed into position.**

**Routing & Installing Cascade Block & 9th injector Fuel Line:**

1. Area around the cascade overflow valve on top of CP3 pump must be thoroughly cleaned using brake cleaner or solvent to remove all dirt/debris. Remove the cascade overflow valve from CP3 pump using a 19mm socket or wrench. When removing valve, make sure no debris enters the pump and carefully clean surrounding area after valve has been removed.

2. Clean fuel should be used to lubricate O-ring on cascade overflow valve that was removed from CP3 pump. Then, install the cascade overflow valve along with a new 14mm copper washer into supplied cascade block. **Cascade overflow valve fitting must be torqued to 20 FT-LB.**

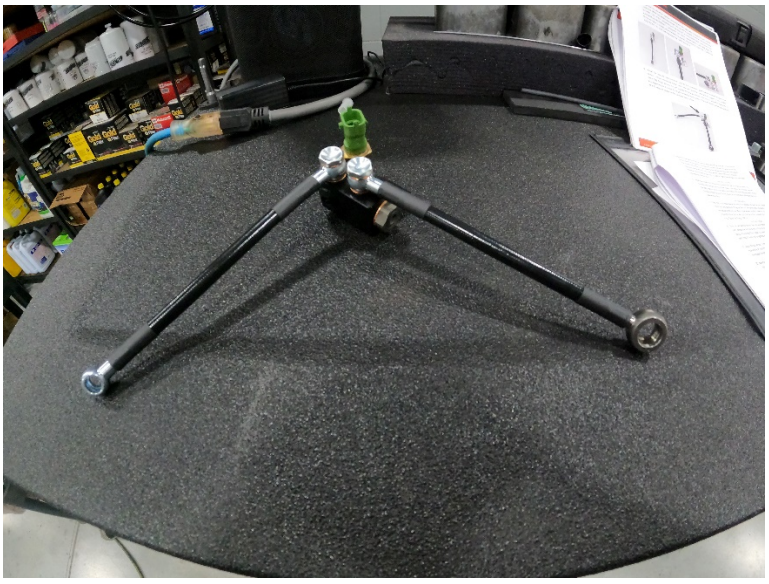
3. The 9/16" O-ring plug that comes in the kit can now be installed into cascade block and be **tightened to 10 FT-LB.**

4. Fuel temp sensor that was removed from the CP4 may now be installed into bottom of cascade block and be **torqued to 20 FT-LB.**

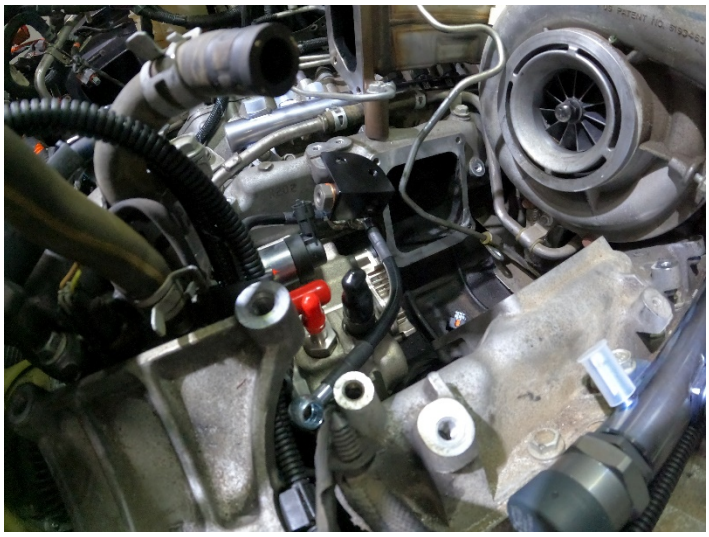
**NOTE:** Inspect sealing washer on temp sensor for any damage, defect, or excessive corrosion on surface of washer. Sealing washer is not individually serviceable, so entire sensor assembly must be replaced if damaged, defects or corrosion are present.

5. Install cascade return fuel line with large banjo fitting to port on the underside of cascade block nearest to the top of cascade overflow valve previously installed. Smaller banjo fitting will be attached to cascade block using one of supplied banjo bolts, along with two 10mm copper washers. Align the fitting so it is straight downward and **torque banjo bolt to 120 IN-LB. Tighten the banjo bolt at this point before proceeding to the next step.**

6. Install the cascade feed line into secondary port next to fuel temp sensor. Supplied banjo bolt and two new 10mm copper crush washers will be utilized. Snug down banjo bolt but do not fully tighten yet to allow for flexibility in alignment of the line during install process. Line should be facing outward at a 90-degree angle to cascade return line.

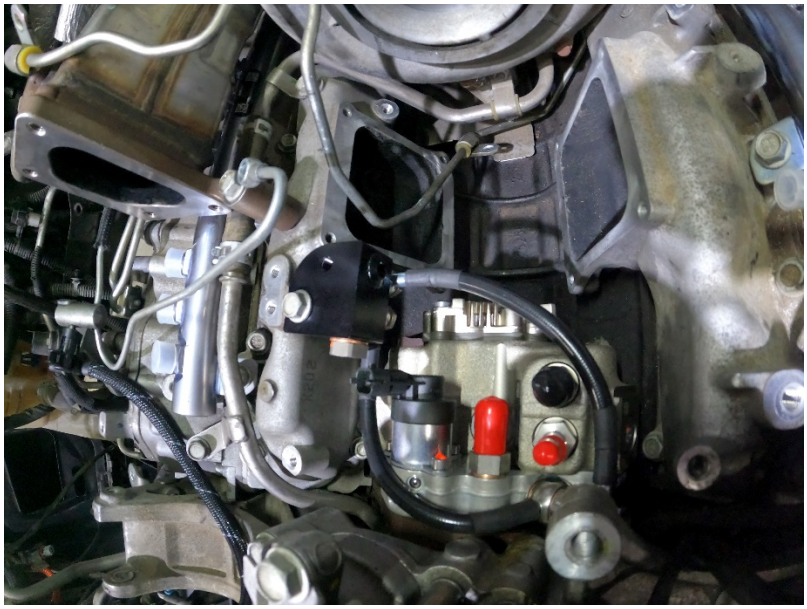


7. O-ring on the new cascade bolt needs to be lubricated with clean fuel prior to assembly. Route large banjo bolt fitting over top of the injection pump and install new CP3 cascade banjo bolt and two 14mm copper washers supplied in the kit into bore on CP3 pump. Route cascade return fuel line so that it is parallel to the front face of CP3 pump. **Tighten fitting to 20 FT-LB.**

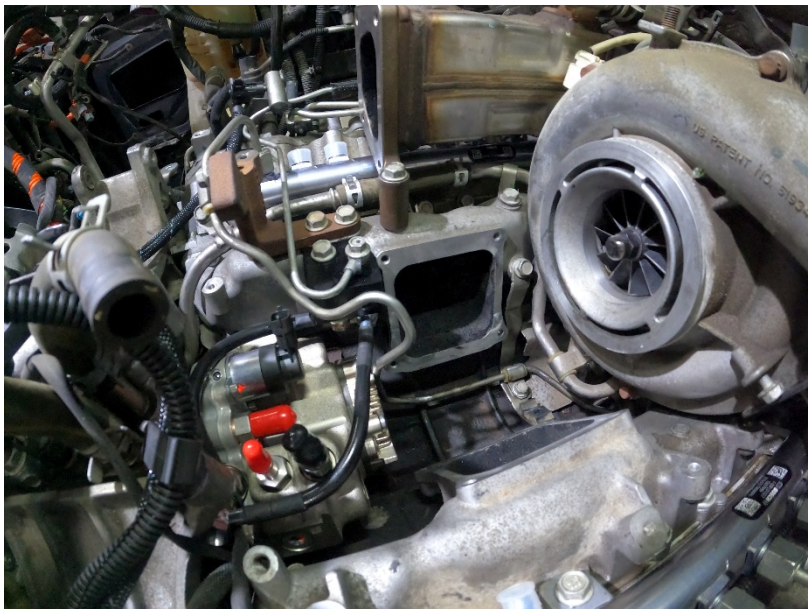


8. Route cascade feed line with small banjo fitting to top of the new CP3 cascade bolt. Connect feed line to the top of new cascade bolt using one of the supplied banjo bolts and two 10mm copper crush washers. Snug banjo bolt, but do not tighten it. Both ends of this line will be tightened after cascade block is firmly mounted in place.

9. Attach cascade block to the engine by securing it with the M8 bolt that originally retained 9th injector feed line from CP4. With cascade block now in place, **tighten the snugged banjo bolts on either end of the cascade feed line to 120 IN-LB.**



10. Now that cascade block is in place, install banjo bolt for 9th injector supply line into cascade block and **torque to 89 IN-LB.**



**NOTE: Before reinstalling rail-to-rail cross-over high-pressure fuel line, remove high-pressure line clamp/bracket**. This is most easily performed with the bracket held in a vice and it can be separated with a small pry or heel bar. **Be careful not to nick or damage the high-pressure line.** Install cross-over high-pressure line and secondary high-pressure rail plug and **torque fittings to 22 FT-LB.** High-pressure rail plug provided in kit goes towards open feed port toward rear of vehicle while new supplied high-pressure feed line from CP3 goes toward front.

**IMPORTANT: TORQUE SPECS ARE CRITICAL. Under or over torquing will result in fuel leak.**

Replace low-pressure fuel supply line with new extension and install to engine. **Torque the compression fitting to 26 FT-LB.**

**IMPORTANT:** Clean and lightly lubricate low pressure feed tube compression fitting with fuel to ease installation in the valley.

Attach supplied fuel hose to OEM fuel pump supply pipe and secure with constant tension clamps. Next, install new fuel return hose and make sure it doesn't rub against the high-pressure fuel line.

Install new high-pressure line from pump outlet to RH rail and **torque connection fittings to 28 FT-LB and rail connection to 22 FT-LB.**

**Engine Component Re-Assembly, Priming, and Test:**

1. Reinstall the turbo coolant banjo pipe and **torque to 26 FT-LB.**
2. Reinstall the y-bridge and **torque all nuts and bolts to 89 IN-LB.**
3. Install the turbo intake horn and **torque clamp to 89 IN-LB.**
4. Install EGR cooler and hand start each fastener before **torquing to 18 FT-LB.**
5. Install EGR bypass pipe and EGR valve and **torque bolts to 18 FT-LB.**
6. Install intake tube to engine and **torque fasteners to 18 FT-LB.**
7. Reinstall alternator(s) and **torque bolts to 43 FT-LB.** Battery cable nut will be **torqued to 106 IN-LB.**
8. Reinstall A/C compressor and **torque to 43 FT-LB.**
9. Reinstall drive belt and center intake manifold cover.
10. Reinstall cooling fan/pulley assembly and **toque to 30 FT-LB.**
11. Reinstall fan shroud assembly and **torque fan shroud bolts to 71 IN-LB.**
12. Reconnect passenger side pipe air cooler duct and driver side pipe.
13. Reconnect air filter.
14. Reconnect chassis fuel line connections.
15. Reconnect battery cables and **toque to 44 IN-LB.**
16. Refill coolant using vacuum fill system or GM static fill procedure. Be sure to fill slowly so overflow side of tank is at least ½ full.
17. Replace fuel filter cartridge. New GM AC Delco P/N 12664429 is recommended to ensure reliability of fuel system.
18. Prime fuel system:
    - Pump the priming pump repeatedly until it becomes hard.
    - Loosen bleeder screw until fuel flows freely with no air present.
    - Check fuel system for leaks.
    - Crank engine for 10 seconds or until engine fires.
    - If engine does not start and no leaks occur, pump priming pump repeatedly until it becomes hard again. Crank engine for 10 second intervals until it starts. May take 3-4 priming cycles to get engine started.
    - **The hydrocarbon injector (HCI) and line must be purged**. If injector is not purged, residual fuel and air at the injector can cause choking and may cause injector to stick. To purge air, initiate a DPF regeneration with scan tool. During forced regeneration, injector will be activated, and air will be purged from 9$^{th}$ injector feed line 9$^{th}$ injector.

Any Questions, Comments, or Feedback?
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