

SUBJECT: LML CP3 CONVERSION KIT FOR 2011-2016 DURAMAX

October 2022

IMPORTANT NOTICE: THIS KIT INCLUDES UPDATED COMPONENTS THAT MAY BE DIFFERENT FROM THE IMAGES AND INSTRUCTIONS PUBLISHED ON OUR WEBSITE. THE UPDATED COMPONENTS ARE OUTLINED IN THE IMAGE ON PAGE 2 AND DESCRIBED ON PAGES 7-11. FOLLOW ALL ADDITIONAL INSTRUCTIONS OUTLINED IN THIS DOCUMENT. IF YOU HAVE QUESTIONS ON THE INSTALLATION, EMAIL US AT INFO@FLEECEPERFORMANCE.COM OR CALL US AT 317-286-3573. FOR A LINK TO THE COMPLETE INSTRUCTIONS FOR THE KIT USE THE QR CODE AT RIGHT.



WARNINGS:

- Thoroughly clean all fuel lines and components prior to installation with a solvent solution.
- For optimal performance, if the truck is equipped with a lift pump, the feed pressure to the CP3 should not exceed 11 psi. Engine surging may be experienced at lift pump pressures over 11 psi.
- The purchaser and end user releases, indemnifies, discharges, and holds harmless Fleece Performance Engineering, Inc. from any and all claims, damages, causes of action, injuries, or expenses resulting from or relating to the use or installation of this product that is in violation of the terms and conditions on this page, the product disclaimer, and/or the product installation instructions. Fleece Performance Engineering, Inc. will not be liable for any direct, indirect, consequential, exemplary, punitive, statutory, or incidental damages or fines caused by the use or installation of this product.

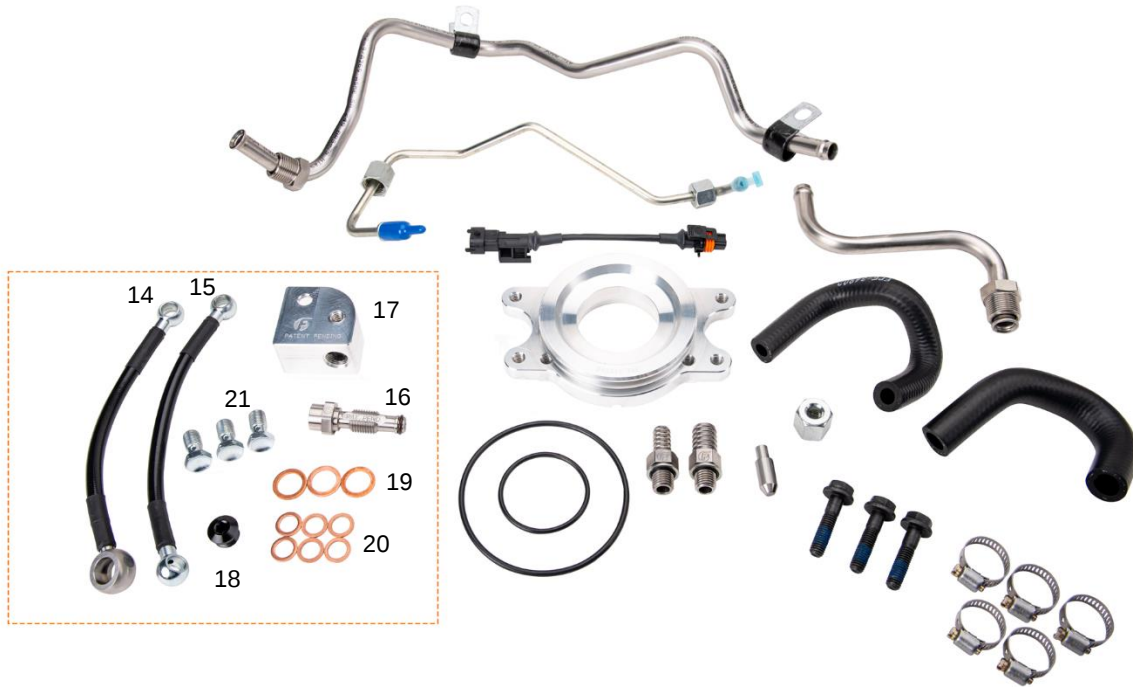
FITMENT: 2011–2016 GMC Sierra and Chevrolet Silverado 2500/3500

P/N: FPE-LML-CP3-NP

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.

ITEM LIST

ITEM	DESCRIPTION	QTY
1	CP3 to engine block adapter	1
2	Fuel feed hose	1
3	Fuel return hose	1
4	High-pressure fuel line	1
5	Low pressure fuel feed line	2
6	CP3 feed fitting & sealing washer	1
7	CP3 return fitting & sealing washer	1
8	Hose clamps	5
9	Fuel rail nut and plug	1
10	O-rings (block adapter and pump)	2
11	M8x1.25x35mm bolts	3
12	Regulator extension harness	1
13	CARB EO Label (not pictured)	1
14	Cascade return fuel line	1
15	Cascade feed fuel line	1
16	CP3 cascade banjo bolt	1
17	Cascade block	1
18	9/16" O-ring plug	1
19	14 mm copper washer	3
20	10 mm copper washer	6
21	10 mm x 1.0 banjo bolt	3



GENERAL OVERVIEW

Removal of the stock fuel injection pump involves the following key steps:

1. Disconnect both batteries, drain coolant system and remove air cleaner.
2. Remove intake air box and coolant surge tank bracket.
3. Disconnect black plastic cold side charge air cooler tube from throttle body and blue hot side charge air cooler pipe from turbocharger.
4. Disconnect chassis fuel lines from quick connect fittings at rear of engine.
5. Release accessory drive belt tensioner and remove turbocharger air resonator.
6. Unbolt and move aside A/C compressor and alternator(s).
7. Unbolt cooling fan from front of engine, move aside.
8. Remove intake manifold tube.
9. Remove EGR bypass pipe, valve and front cooler.
10. Remove center intake manifold (Y bridge) and turbo air inlet adapter.
11. Remove turbocharger coolant return banjo pipe.
12. Remove high and low-pressure fuel lines. Disconnect the dosing injector feed line.
13. Remove stock injection pump. Remove fuel temperature sensor from the pump.
14. Swap gear and nut from the old CP4 injection pump to the new CP3 injection pump.

Installation of the new CP3 pump is as follows:

1. Install new injection pump (does not need to be timed).
2. Remove the cascade overflow valve from the CP3.
3. Install the CP3 cascade overflow valve and fuel temperature sensor into the supplied cascade block.
4. Install the new supplied cascade banjo bolt, cascade block, and two fuel feed lines.
5. Install secondary high-pressure rail plug.
6. Remove old high-pressure pump line anchor bracket from rail-to-rail high-pressure line.
7. Replace low pressure fuel supply tube with new tube and install to engine.
8. Install new supplied low pressure fuel supply hose and high-pressure fuel lines. Install new low-pressure feed and return hoses.
9. Install dosing injector feed line to the cascade block.
10. Install center intake manifold, EGR cooler, turbocharger air inlet adapter.
11. Install EGR bypass pipe, valve and intake manifold tube.
12. Reinstall turbocharger coolant banjo pipe w/ new seal.
13. Reinstall cooling fan assembly, alternator(s) and A/C compressor.
14. Install drive belt and turbocharger air resonator.
15. Reconnect cold side charge air cooler duct and hot side charge air cooler pipe.
16. Reconnect air cleaner, chassis fuel line connections, batteries.
17. Refill coolant.
18. Prime fuel system.
19. Initiate DPF Regeneration with scan tool to purge air from the hydrocarbon injector and the lines.

PREPARE CP3 INJECTION PUMP FOR INSTALLATION

1. Remove the green fuel temperature sensor from the OLD injection pump and reconnect it to the proper engine wiring harness connector. Install the sensor into the provided fuel sensor block. It will be mounted near the AC compressor during final assembly later.
2. Hold the OLD injection pump by the drive gear in a vice with soft jaws.
3. Remove nut and gear from shaft.
4. Clean all mating surfaces.
5. Install the CP3 to engine block adapter to the new injection pump with the 3 bolts supplied in the kit. Be sure to lubricate the flange O-ring with engine oil prior to installation or an oil leak could occur. Torque the bolts to 20 ft-lb.
6. Install the gear and torque the gear nut to 75 ft-lb. DO NOT OVERTORQUE.
7. Remove the original Bosch CP3 feed and return fittings from the pump and install the new high flow CP3 feed and return fittings onto the CP3 pump. See Fig. 1.

IMPORTANT NOTE: The CP4 nut is longer than the CP3 nut, however, it will not interfere with the front cover. It will also provide the same amount of thread engagement. The shaft of the CP3 will be below the nut surface – THIS IS OK, SEE Fig. 2

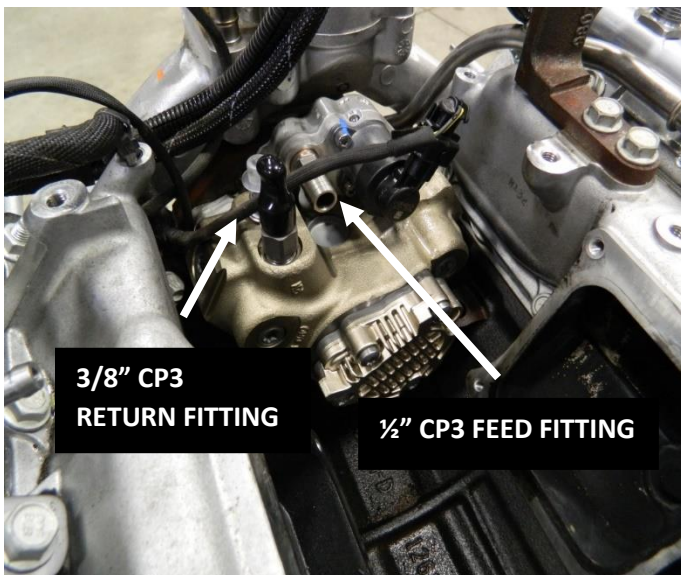


Fig. 1: Install the CP3 feed and return fittings



Fig. 2: Install the CP4 nut onto the CP3

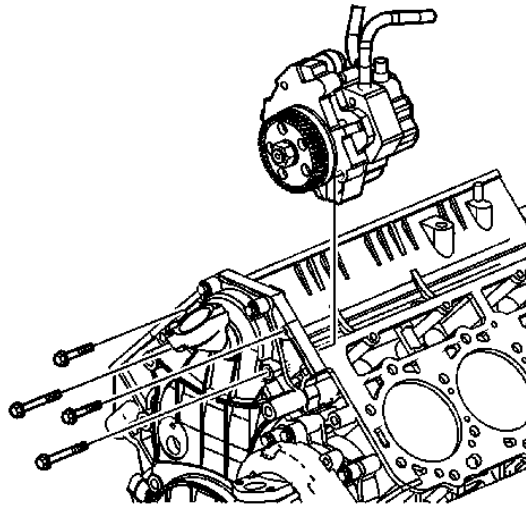
INSTALLATION OF NEW CP3 PUMP

IMPORTANT NOTE: We recommend removing and inspecting the high-pressure regulator and inspecting it for debris. If debris is found in the high-pressure regulator, we recommend replacing the regulator, the injector return line and check valve assembly.

GM Pressure Regulator P/N: 12611872

GM Injector Return System P/N: 12639000

1. Lubricate the O-rings on the new injection pump adapter with engine oil and install onto the cylinder block. Note the CP3 pump does not need to be timed to the camshaft. Torque the four bolts to 18 ft-lbs. Do not draw the pump into the block using the attachment bolts or they may strip out of the aluminum mounting plate, it must be pushed into position.



Before re-installing the rail-to-rail cross-over high-pressure fuel line, remove the high-pressure line clamp/bracket. This is most easily performed with the bracket held in a vice and separated with a small pry or heel bar. Do not nick or damage the high-pressure line in any way. Install cross-over high-pressure line and secondary high-pressure rail plug and torque fittings to 30 Nm (22 ft-lb). The high-pressure rail plug provided goes towards the open feed port toward rear of vehicle while the NEW supplied high-pressure feed line from the CP3 goes toward the front.

IMPORTANT NOTE: Torque is critical. Under or over torque will result in fuel leaks.



Fig. 3: Carefully remove high pressure line bracket

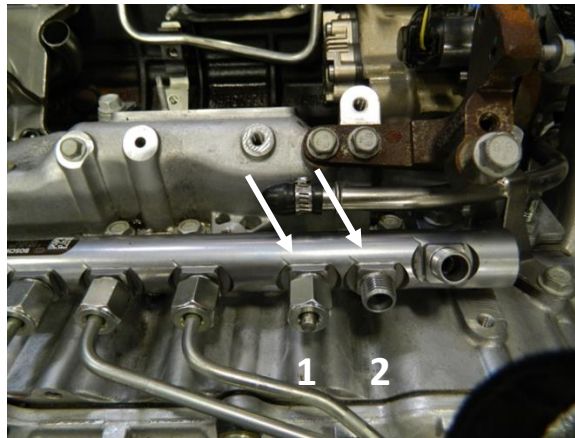


Fig. 4: Fuel rail nut (1) and high-pressure line (2)

2. Replace low pressure fuel supply line with new extension and install to engine. Torque the compression fitting to 35 Nm (26 ft-lb).

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

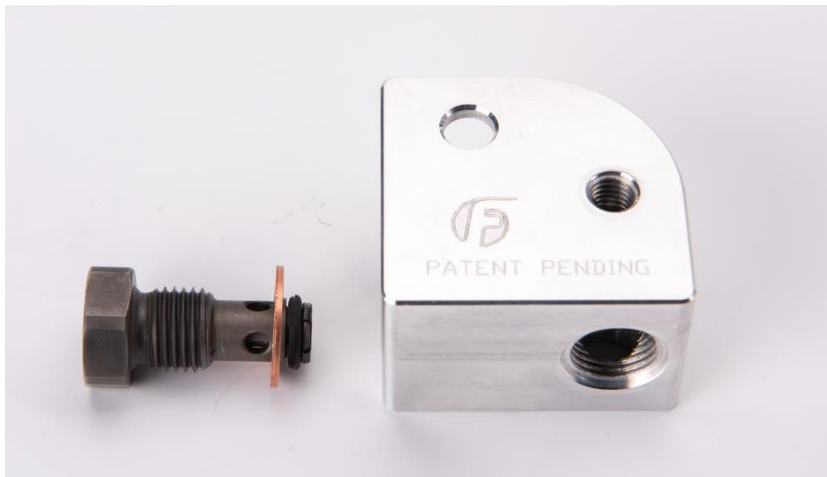
3. Attach supplied fuel hose to the OEM fuel pump supply pipe and secure with constant tension clamps. Install the new fuel return hose. Be sure the return hose does not make contact with the high-pressure fuel line.
4. Install new high-pressure line from pump outlet to RH rail. Torque pump connection fittings to 38 Nm (28 ft-lb) and rail connection fitting to 30 Nm (22 ft-lb).

ROUTE AND INSTALL THE CASCADE BLOCK AND DOSING INJECTOR FUEL LINE

Thoroughly clean the area around the cascade overflow valve on the top of the CP3 pump using brake clean or other solvent to remove all dirt or debris. Remove the cascade overflow valve from the CP3 injection pump using a 19mm socket or wrench. Ensure no debris enters the pump during removal of the valve. Carefully clean the surrounding area after removal of the valve.



Using clean fuel, lubricate the O-ring on the cascade overflow valve removed from the CP3 pump. Install the cascade overflow valve along with a new 14mm copper washer into the supplied cascade block. Tighten the cascade overflow valve fitting to 20 ft-lbs.



Install the 9/16" O-ring plug included with the kit into the cascade block. Tighten to 10 ft-lbs.



Install the fuel temperature sensor removed from the CP4 into the bottom of the cascade block. Torque to 20 ft-lbs.



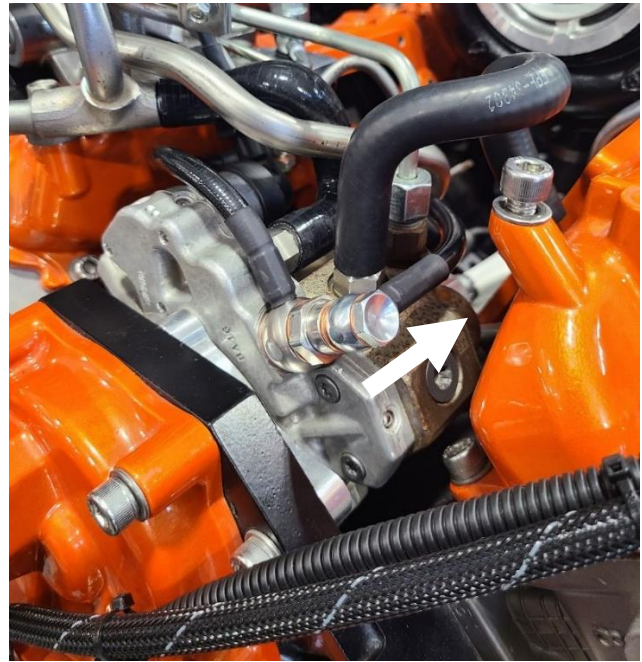
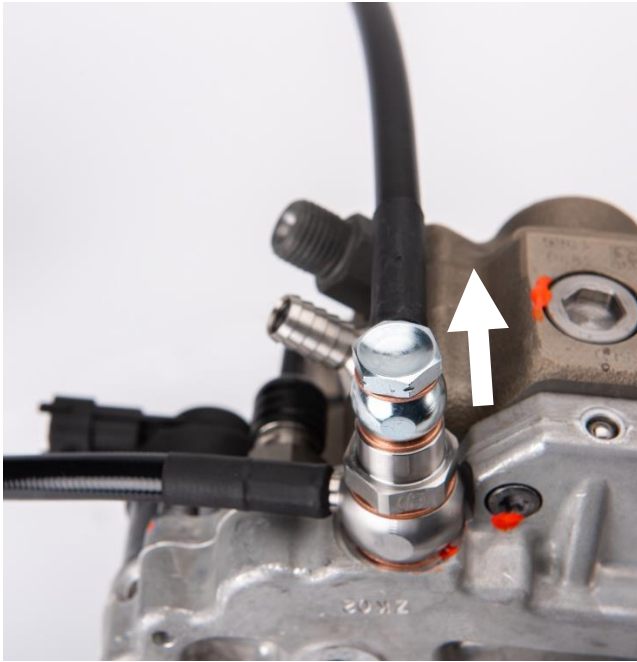
Install the cascade return fuel line with the large banjo fitting to the port on the underside of the block nearest to the top of the cascade overflow valve. The smaller banjo fitting will be attached to the cascade block along with two copper washers. Align the fitting so that it is straight downward and torque the banjo bolt to 120 in-lbs.



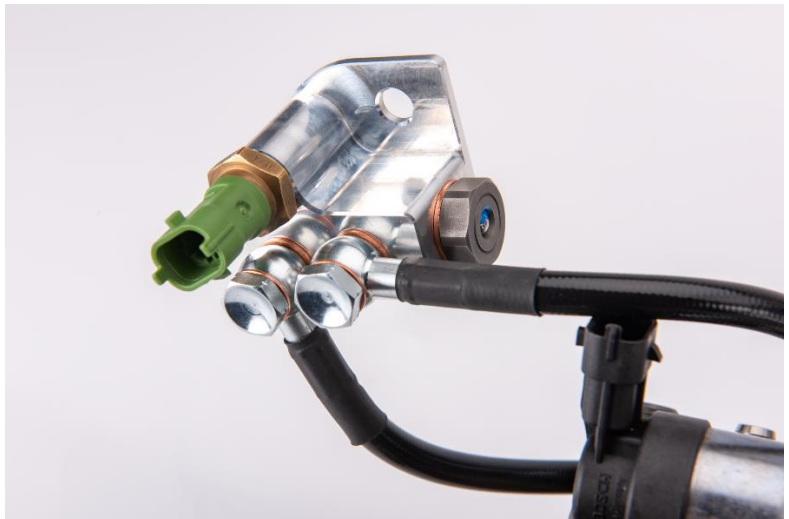
Lubricate the O-ring on the cascade banjo bolt with clean fuel prior to assembly. Route the large banjo fitting over the top of the injection pump and install the new CP3 cascade banjo bolt and two 14mm copper washers supplied in the kit into the bore on the CP3 pump. Route the cascade return fuel line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



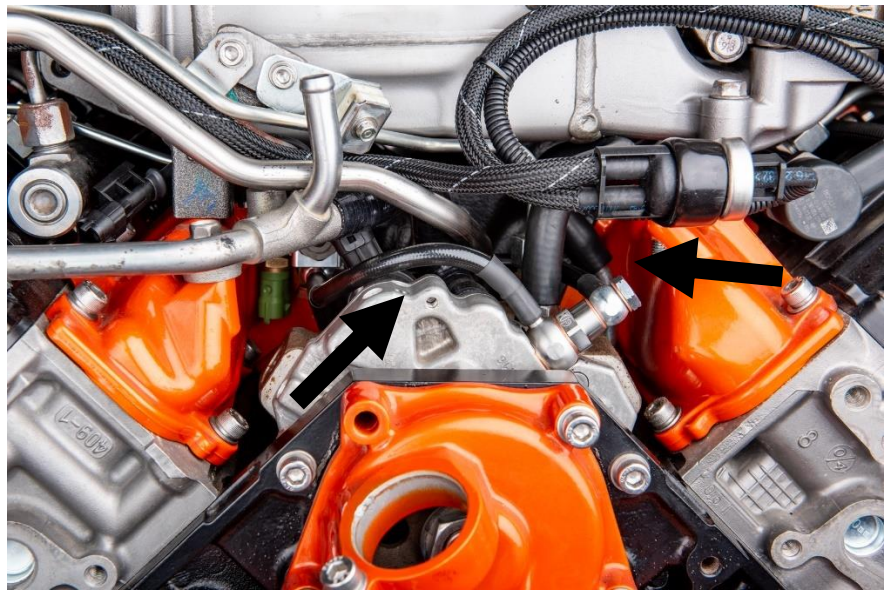
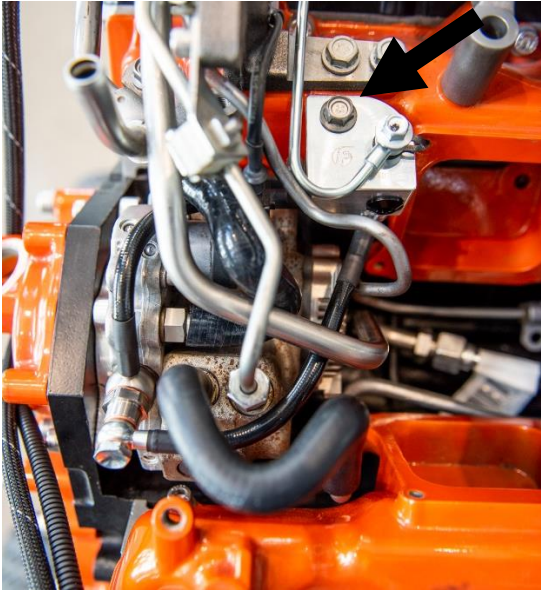
Install the CP3 cascade fuel feed line, banjo bolt, and two 10mm copper washers onto the new CP3 cascade bolt that is installed into the CP3. Route this line directly towards the rear of the engine. Snug, but do not yet tighten the banjo bolt.



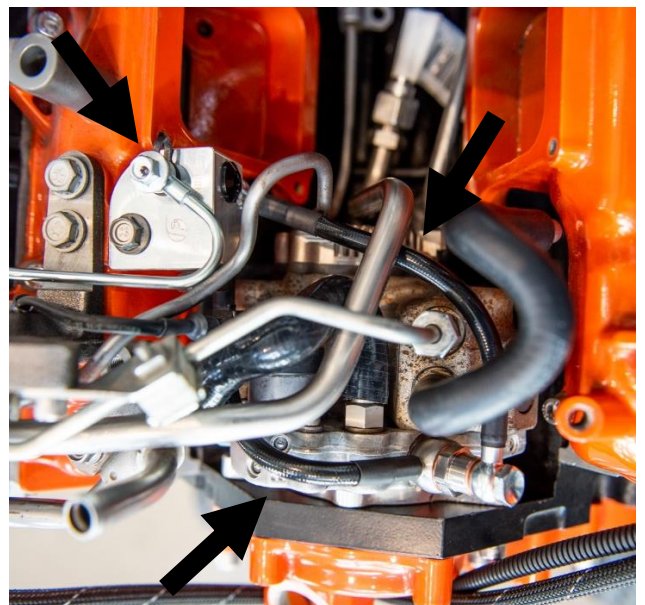
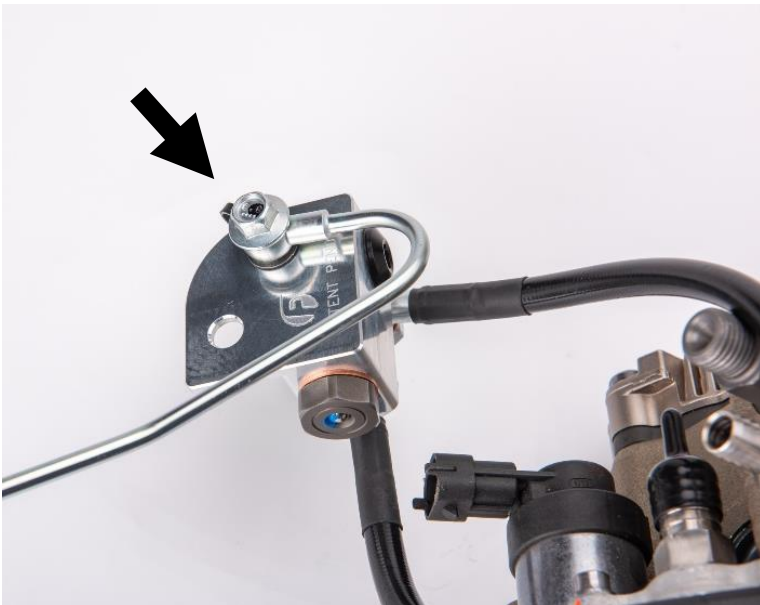
Route the cascade fuel feed line with the small banjo fitting (attached to the top of the new CP3 cascade bolt) over the top of the injection pump and connect it to the port on the bottom, rear of the cascade block using the supplied 10mm banjo bolt and two 10mm copper washers. Snug the fitting, but do not tighten it.



Retain the cascade block to the engine by securing it with the M8 bolt that originally retained the dosing injector feed line from the CP4. With the cascade block in place, route all fuel lines as shown in the images and tighten all banjo bolts to 120 in-lbs.



Install the banjo bolt for the dosing injector supply line to the cascade block. Torque to 89 in-lbs. Verify all fuel line routings.



ENGINE COMPONENT RE-ASSEMBLY, PRIMING, AND TEST

1. Reinstall turbo coolant banjo pipe. Torque to 35 Nm (26 ft-lb).
2. Install center manifold (Y-bridge). Torque bolts and nuts to 10 Nm (89 in-lb).
3. Install turbocharger air inlet adapter. Torque clamp to 10 Nm (89 in-lb).
4. Install EGR cooler. TIP: hand-start all EGR fasteners prior to tightening. Torque bolts to 25 Nm (18 ft-lb).
5. Install EGR bypass pipe and EGR valve. Torque all EGR bolts to 25 Nm (18 ft-lb).
6. Install intake manifold tube to engine. Torque all fasteners to 25 Nm (18 ft-lb).
7. Reinstall alternator(s) Torque generator bolts to 58 Nm (43 ft-lb). Battery cable nut should be torqued to 12 Nm (106 in-lb).
8. Reinstall A/C compressor. Torque bolts to 58 Nm (43 ft-lb).
9. Install drive belt and center intake manifold cover.
10. Reinstall cooling fan / pulley assembly. Torque to 41 Nm (30 ft-lb).
11. Reinstall fan shroud assembly. Torque fan shroud bolts to 8 Nm (71 in-lb).
12. Reconnect cold side charge air cooler duct and hot side charge air cooler pipe.
13. Reconnect air cleaner.
14. Reconnect chassis fuel line connections.
15. Reconnect battery cables. Torque to 5 Nm (44 in-lb).
16. Refill coolant using vacuum fill system or GM static fill procedure. Be sure to fill slowly so that overflow side of tank is at least $\frac{1}{2}$ full.
17. Replace fuel filter cartridge. NEW GM AC DELCO P/N 12664429 is recommended to ensure reliability of the fuel system.
18. Affix the CARB EO decal included with the kit in a clearly visible location in the engine bay.
19. Prime fuel system:
 - a. Pump the priming pump repeatedly until it becomes hard.
 - b. Loosen the bleeder screw until fuel flows freely with no air present.
 - c. Check the fuel system for leaks.
 - d. Crank the engine for 10 secs or until the engine fires.
 - e. If the engine does not start and no leaks are observed, pump the priming pump repeatedly until it becomes hard again. Crank engine again for 10 second intervals until the engine starts. It may take 3-4 priming events to get the engine started.
20. The hydrocarbon injector (HCI) and line must be purged. If the injector is not purged, the residual fuel and air at the injector can cause coking and may cause the injector to stick. To the purge the air, initiate a DPF Regeneration Enable with a scan tool. During the forced regeneration the injector will be activate and air will be purged from the dosing injector feed line and dosing injector.