SUBJECT: LML Duramax CP3 Conversion Kit

FITMENT: 2011-2016 GMC Sierra and Chevrolet Silverado 2500/3500 equipped with 6.6L LML Duramax
KIT P/N: FPE-LML-CP3-NP, FPE-LML-CP3-WP, FPE-LML-CP3-10

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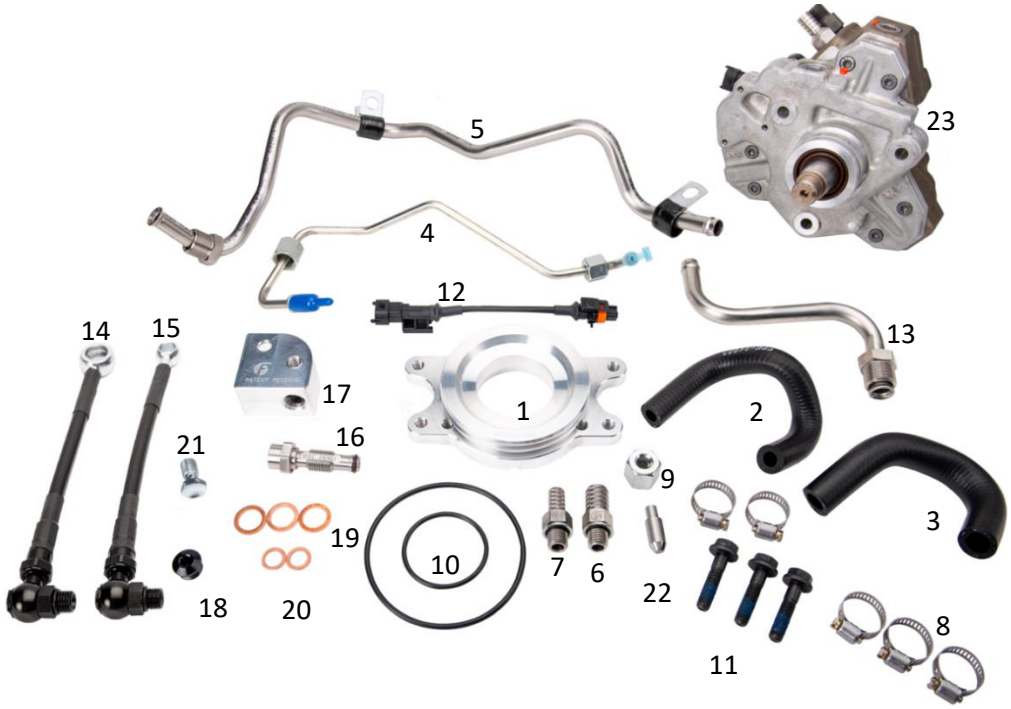
WARNINGS / IMPORTANT NOTES:

- THIS KIT MAY INCLUDE UPDATED COMPONENTS FROM PREVIOUS INSTALLATIONS YOU HAVE PERFORMED. FOLLOW ALL INSTRUCTIONS OUTLINED IN DOCUMENT FPE-2021-56. IF YOU HAVE QUESTIONS ON THE INSTALLATION, EMAIL US AT INFO@FLEECEPERFORMANCE.COM OR CALL US AT 317-286-3573.
- Thoroughly clean all fuel lines and components prior to installation with a solvent solution.
- 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 cause by the use or installation of this product.

KIT CONTENTS:

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	1
10	O-ring (block adapter and pump snout)	2
11	M8x1.25x35mm bolts	3
12	Regulator extension harness	1
13	Low pressure fuel line (S-line is an optional line for use only in trucks with an aftermarket lift pump)	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	2
21	10 mm x 1.0 banjo bolt	1
22	Fuel rail plug	1
23	CP3 Injection Pump – Only included in FPE-LML-CP3-WP and FPE-LML-CP3-10 (-10 shown)	1
24	CARB EO sticker (not shown)	1



RECOMMENDATIONS FOR INSTALLATION OF CP3 CONVERSION KITS

- Remove and inspect the high-pressure fuel regulator for debris. If debris is found in the high-pressure fuel regulator, we recommend replacing the regulator, the injector return lines, and the check valve assembly.

  GM Pressure Regulator: P/N 12611872
  GM Injector Return Lines and Regulator: P/N 12639000

- Inspect the sealing washer on the fuel temperature sensor for any damage, defects, or corrosion on the surface of the washer. The sealing washer is not individually replaceable, so the sensor assembly will need to be replaced if damage, defects, or corrosion are present. Inspect the banjo seal on the dosing injector feed line. Replace as necessary.

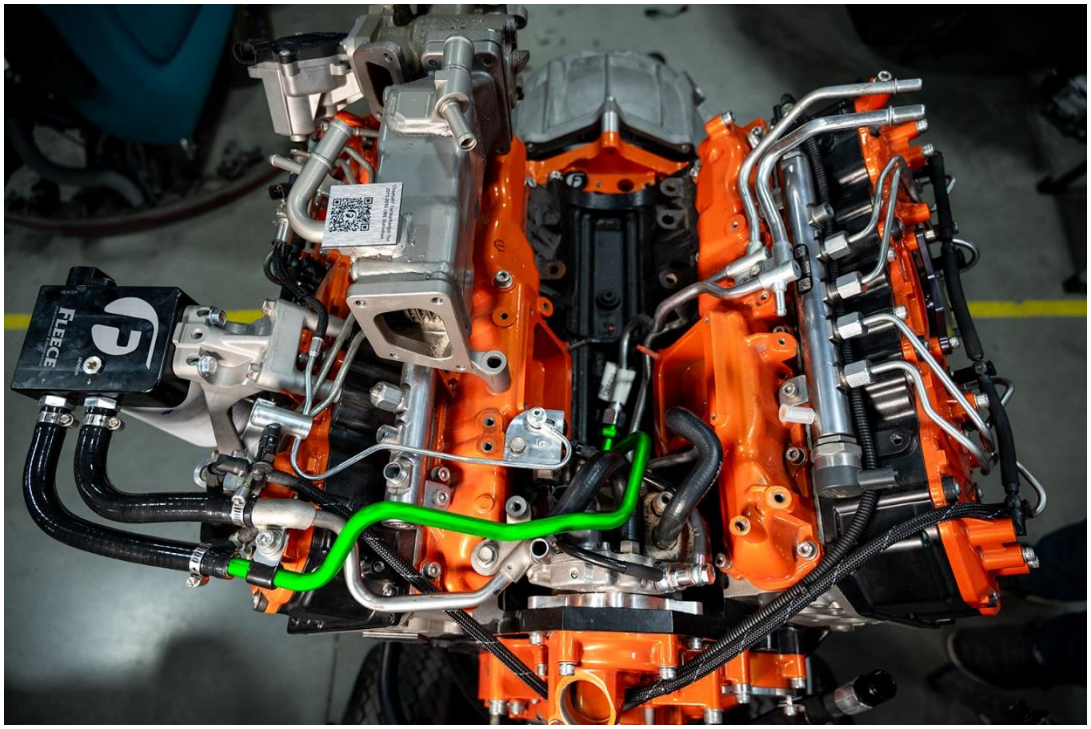
  GM Fuel Temperature Sensor: P/N 12643002
  GM Return Hose Banjo Seal P/N: 12630832
  GM Dosing Injector Feed Line P/N: 12656313

- Clean and lightly lubricate the low-pressure fuel feed tube compression fitting to ease installation in the valley. We recommend replacing the existing fuel feed pipe since leaks can occur due to deformation or corrosion on the mating surfaces of the compression fitting.

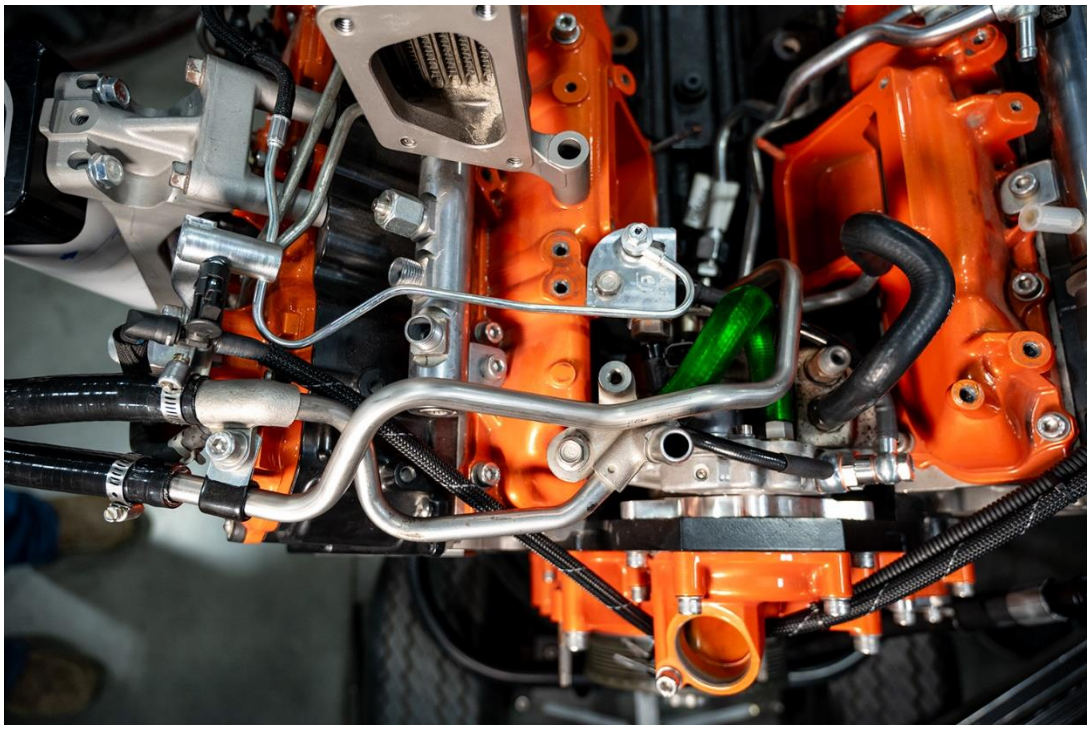
  GM Fuel Feed Pipe: P/N 12654066

LINE AND HOSE ROUTINGS FOR CP3 CONVERSION KITS

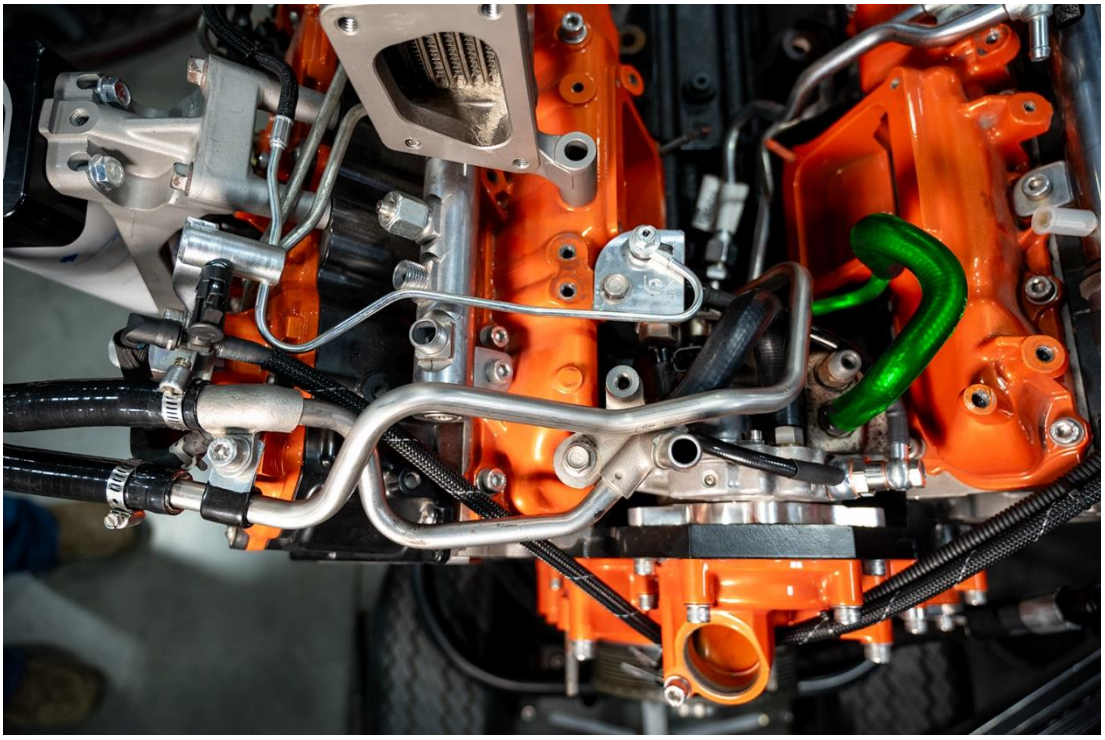
Low Pressure Fuel Feed Line: Item 5 in kit



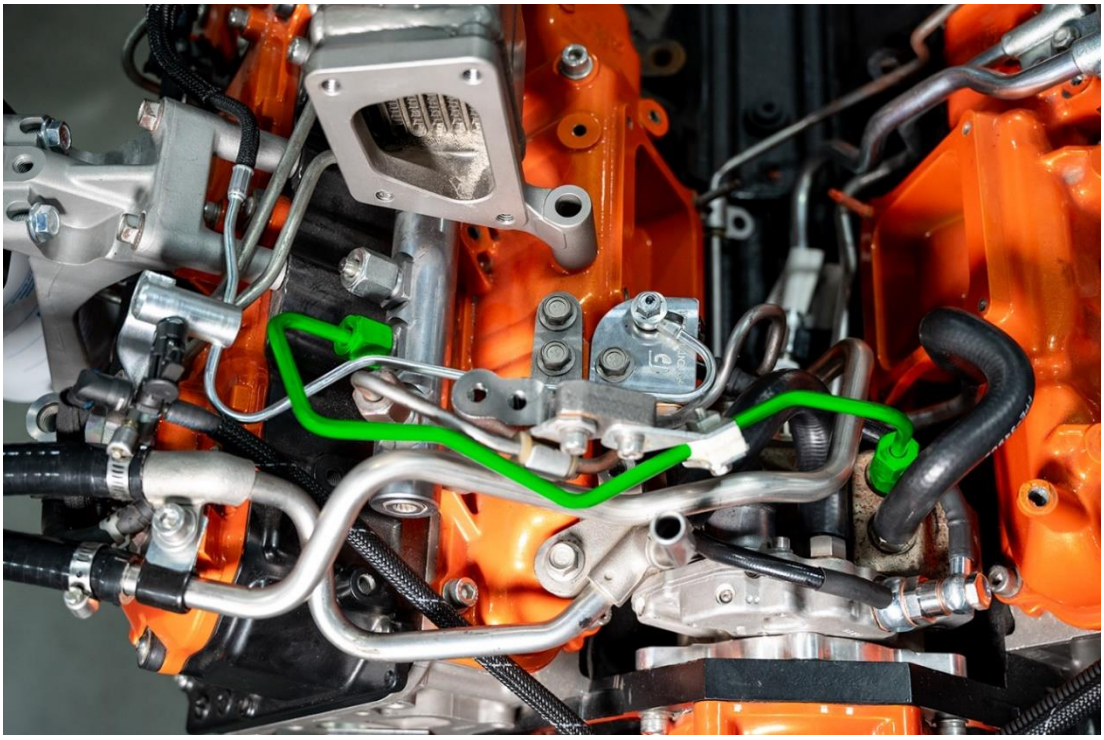
Fuel Feed Hose: Item 2 in kit



Fuel Return Hose: Item 3 in kit

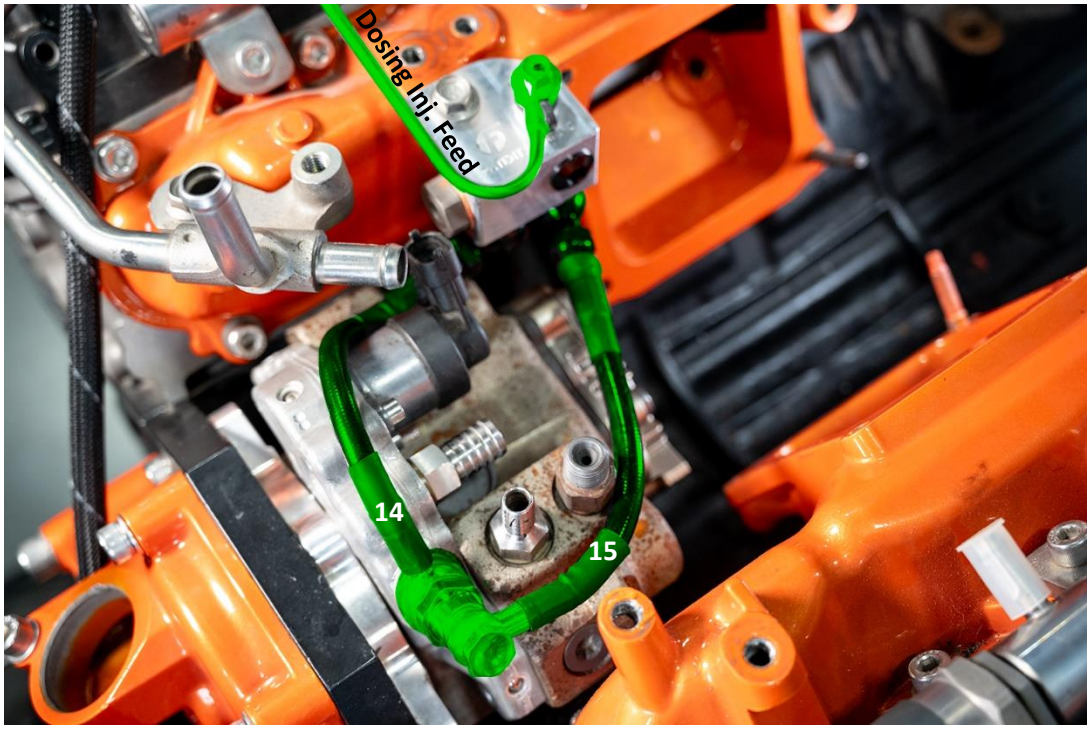


High Pressure Fuel Line: Item 4 in kit



Cascade Return and Feed Lines: Items 14 and 15 in kit

OE Dosing Injector Feed Line reused (GM P/N: 12656313)



IMPORTANT FUEL SUBSYSTEMS EXPLAINED

Fuel Control Actuator (FCA): The fuel control actuator regulates fuel from the CP3 to the high-pressure fuel rail and is located on the rear-facing side of the CP3. The FCA can also be called REG 1. Incorrect wiring or faulty connections can cause a no start condition. The connector should have a yellow wire and a black wire.

Fuel Pressure Regulator 2: Regulator 2 controls the pressure in the high-pressure fuel rail. It is located on the front of the driver's side fuel rail. The connector for the regulator should have a purple wire and a yellow wire. Failure of regulator 2 will cause the high-pressure fuel rail to not build adequate pressure for the vehicle to operate or even start.

Fuel Injector Return Regulator: The fuel injector return regulator is a constant pressure regulator and does not have any electrical connections. The return system requires at least 4 bar (58 psi) to be present before the injectors will begin working. If the return system cannot reach 58 psi when starting the engine, the return lines and regulator will need to be replaced. This component will normally be located near the thermostat housing on the engine. Image at right does not show the installed location.

GM Injector Return Lines and Regulator: P/N 12639000

TROUBLESHOOTING GUIDES

SYMPTOM: SURGING UNDER ACCELERATION

Step 1	Is the vehicle equipped with an aftermarket lift pump?	If yes, proceed to step 2	If no, proceed to step 3
Step 2	Measure the fuel feed pressure from the lift pump at the CP3. A fuel feed pressure in the range of 2-3 psi to the CP3 is recommend. If the fuel feed pressure is found to be above 5 psi, reduce the pressure to 2-3 psi and re-evaluate the surging under acceleration. Has the fuel feed pressure to the CP3 been verified to be below 5 psi?	If yes, proceed to step 3	
Step 3	Was a new injector return line and return regulator (constant pressure valve) installed during the CP3 conversion kit installation?	If yes, proceed to step 4	If no, replace the injector return lines and regulator, GM P/N 12639000
Step 4	Is the vehicle operating with any aftermarket tuning?	If yes, proceed to step 6	If no, proceed to step 5
Step 5	Contact Fleece Performance for further technical assistance.		
Step 6	Verify with your tuning source that the fuel control actuator (FCA) values are equivalent to the OEM stock values or utilize the values provided in the table below. If your values are equivalent to the stock calibration or the table below, inspect the FCA driver in the ECM. A faulty or weak driver can cause the engine to surge. Install a test ECM or replace the ECM if required.		

LABELS **Desired Flow Vs Current (ma)**

mm3 Per Sec	Value
-6700	1900
-4650	1750
-2300	1625
3110	1475
13730	1400
28260	1350
35700	1250
45620	1100
52660	1025
56000	700

SYMPTOM: CRANK NO START

Step 1	Verify that sufficient fuel is reaching the CP3 and cleared of any air entrapment in the fuel supply lines. Has sufficient fuel pressure to the CP3 been verified?	If yes, proceed to step 7	If no, proceed to step 2
Step 2	Connect the CP3 fuel feed line to a remote fuel source that bypasses the low-pressure fuel system. Try to start the vehicle. Does the vehicle start?	If yes, proceed to step 3	If no, proceed to step 7
Step 3	Is the vehicle equipped with an aftermarket lift pump? *A fuel feed pressure in the range of 2-3 psi to the CP3 is recommend.*	If yes, proceed to step 4	If no, proceed to step 6
Step 4	Is the lift pump achieving its rated operating pressure?	If yes, proceed to step 6	If no, proceed to step 5
Step 5	Repair low pressure lift pump. *A fuel feed pressure in the range of 2-3 psi to the CP3 is recommend.*		
Step 6	Inspect and repair the low-pressure fuel system. The following are potential failure points. Low pressure fuel lines: Inspect for cracks and/or broken lines. Fuel filter housing: Inspect for blockage of fuel flow or a cracked housing that allows for air ingress. Fuel primer bulb: Inspect for cracks allowing air ingress and failure to prime. Fuel line flange fitting in valley: Inspect for leaks and air ingress into fuel system. Low pressure feed hose on CP3: Inspect for cracks or leaks allowing air ingress.		
Step 7	Are all electrical connections to the CP3 and high-pressure fuel system correct? For the FCA and Regulator 2, refer to page 6 of this document. Verify that the fuel temperature sensor on the cascade block is connected and that all harness connections are properly made. Are all electrical connections correct?	If yes, proceed to step 9	If no, proceed to step 8
Step 8	Inspect and reconnect wires to their proper locations within the high-pressure fuel system.		
Step 9	Is the actual fuel rail pressure matching that of the commanded pressure? Rail pressure during cranking should be at least 1500 psi. Rail pressure during should be in the 4500 - 5000 psi range.	If yes, proceed to step 14	If no, proceed to step 10
Step 10	Is fuel returning rather than making it to the fuel rail?	If yes, proceed to step 11	If no, proceed to step 12
Step 11	Pressurize the return fuel system by connecting a test port to the 9th injector and pressurize the system with shop air. If the vehicle starts, replace the injector return lines and regulator (GM P/N 126390000).		

SYMPTOM: CRANK NO START (CONTINUED)

Step 12	Is the high-pressure fuel feed line from the CP3 to the fuel rail free of damage or leaks?	If yes, proceed to step 14	If no, proceed to step 13
Step 13	Replace the high-pressure fuel feed line and ensure that the polymer isolator has been properly installed. Vibration of the engine will damage the high-pressure line if the isolator has not been installed correctly. Reference the first image on page 5 of this document.		
Step 14	Is the fuel rail plug properly seated and is the nut torqued to 22 ft-lbs? A loose or improperly seated rail plug will allow air into the fuel rail and can cause a no-start condition. Has the fuel rail plug torque been verified?	If yes, proceed to step 16	If no, proceed to step 15
Step 15	Remove the nut, clean, and reseat the rail plug. Torque the nut to 22 ft-lbs. Does the crank no start persist?	If yes, proceed to step 16	
Step 16	Verify with your tuning source that the fuel control actuator (FCA) values are equivalent to the OEM stock values or utilize the values provided in the table on page 7. If your values are equivalent to the stock calibration or the table below, inspect the FCA driver in the ECM. A faulty or weak driver can cause the engine to surge. Install a test ECM or replace the ECM if required. Does the crank no start persist?	If yes, proceed to step 17	
Step 17	Contact Fleece Performance for additional technical support.		