Installation Manual v1.3:
LLY / LBZ/LMM Twin Fueler Kit
04.5-10 GM Duramax

Please read all instructions before installation.

Note: DO NOT remove any high pressure fittings from the pump. Doing so can result in damage to the internal components.

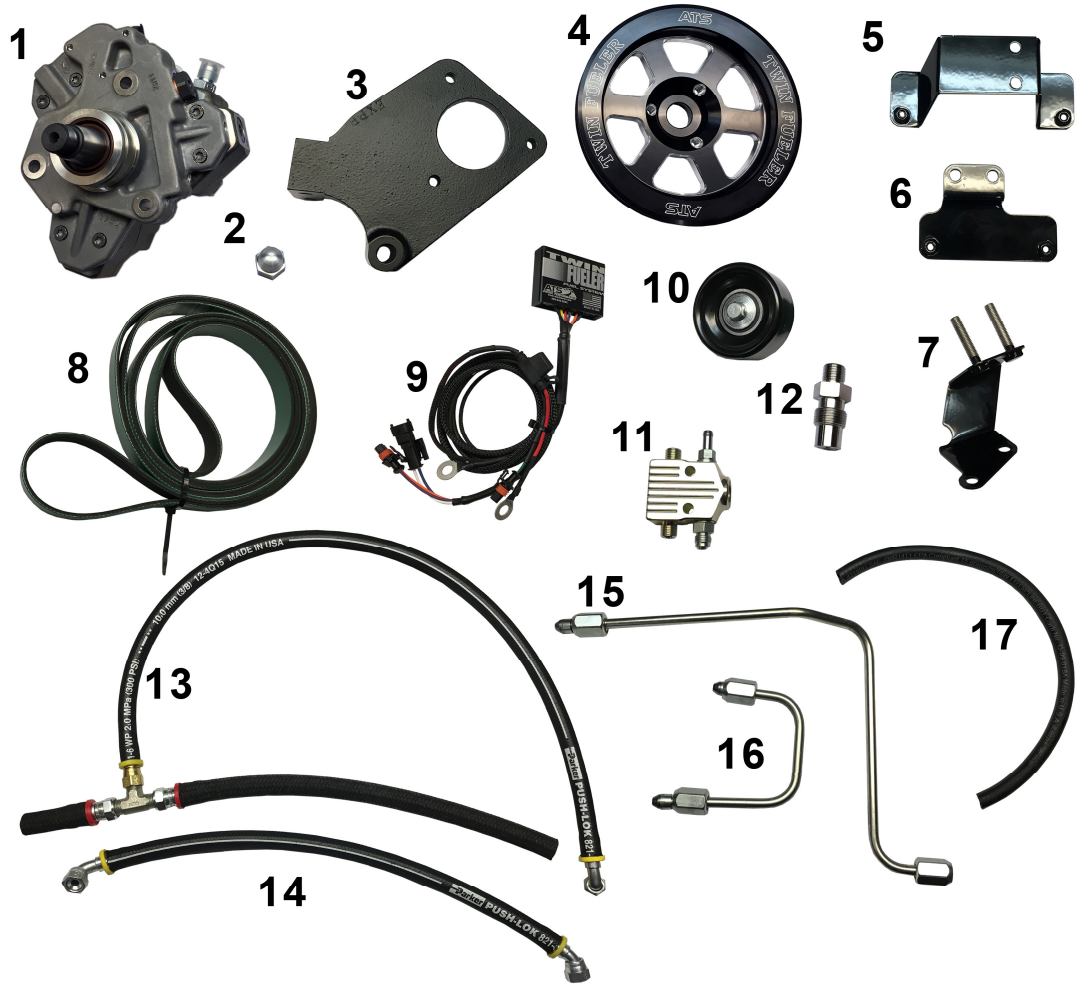


Figure 1: LLY / LBZ / LMM Twin Fueler Kit Large Parts

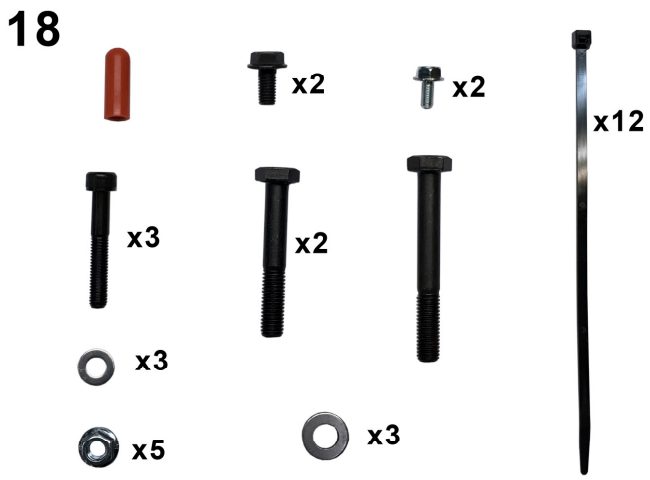


Figure 2 - Hardware Kit

1. Please make sure no parts are missing out of the LLY / LBZ / LMM Twin CP3 Kit.

2. Disconnect both negative (-) battery terminals.

3. Remove the upper section of the fan shroud and remove the fan to gain access to the belt and idler pulley.

4. Remove the serpentine belt by releasing the belt tensioner.

5. Remove the backside idler pulley shown in Fig. 3 and relocate it to the mount under the A/C compressor.

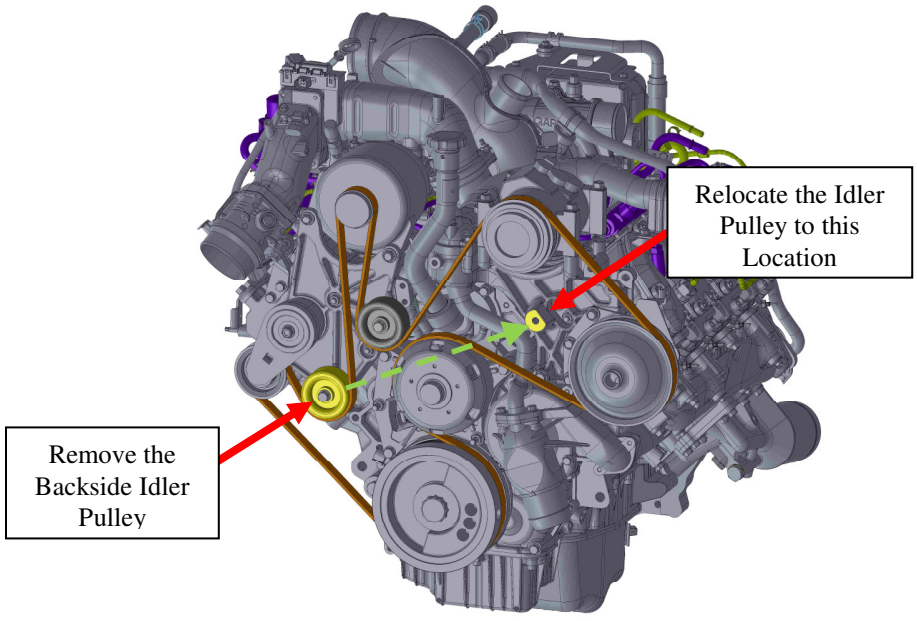


Figure 3: Backside Idler Pulley Location

6. Find the glow plug controller (GPC) located towards the rear of the driver's side of the engine. Disconnect the two connectors. Using a 10mm socket, remove two 6mm bolts that hold the GPC to the bracket. Remove the GPC.

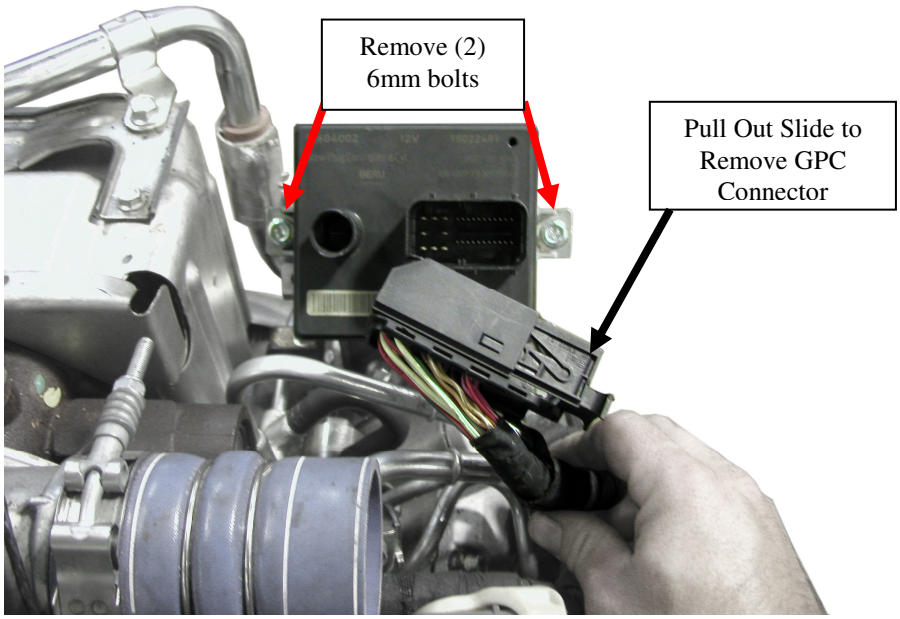


Figure 4: GPC Location and Connector

7. Remove the GPC bracket using a 12mm socket. On the **LBZ/LMM** there are three 8mm bolts that hold the bracket onto the valve cover. Once removed, save the bracket. It is not needed in the Twin Fueler installation but will be handy if the truck ever needs to be returned to a stock configuration.

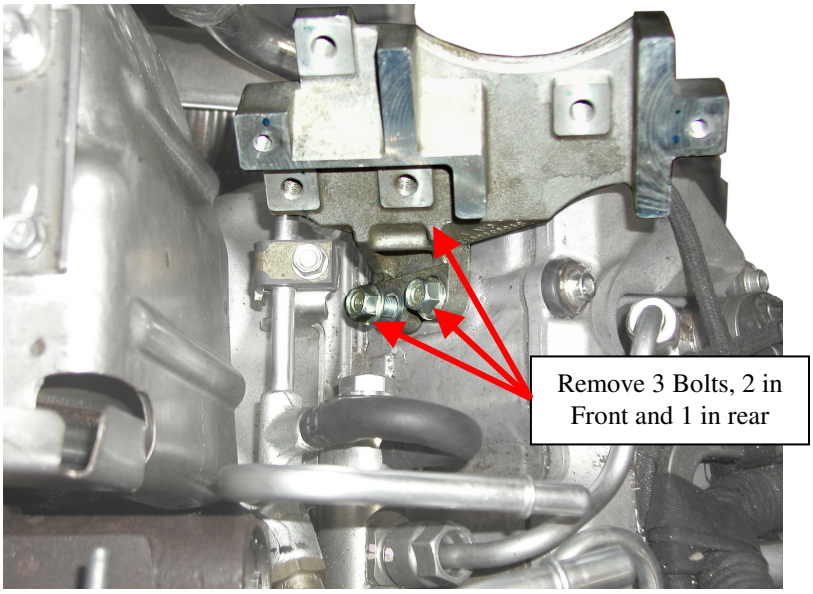


Figure 5: GPC Bracket

8. On the **LLY** engines the GPC bracket is fixed to the valve cover with two 8mm bolts. Remove the two 6mm bolts that hold the GPC to the bracket and the two bolts that hold the bracket to the valve cover. Once removed, save the bracket. It is not needed in the Twin Fueler installation but will be handy if the truck ever needs to be returned to a stock configuration.

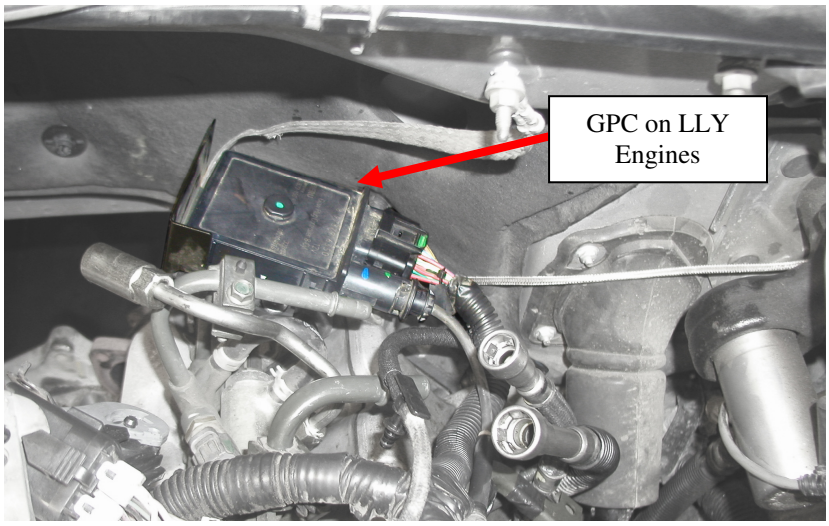


Figure 6: GPC Location for 04.5-06 LLY Engines

9. With the GPC and bracket out of the way, the relief plug in the rear of the fuel rail can be accessed. The plug requires an **18mm** socket. A six-point socket will minimize the risk of rounding the hex. Use a ½" drive ratchet to break the plug free. Make sure the socket is straight before applying force on the ratchet. **CAUTION:** The relief plug is very tight. Damaging the relief plug will require the fuel rail to be removed from the vehicle. If the plug cannot be removed with the rail out of the vehicle, the fuel rail will require replacement. **ATS will not provide a replacement fuel rail.** Set the plug aside as it will be installed in the supplied junction block.

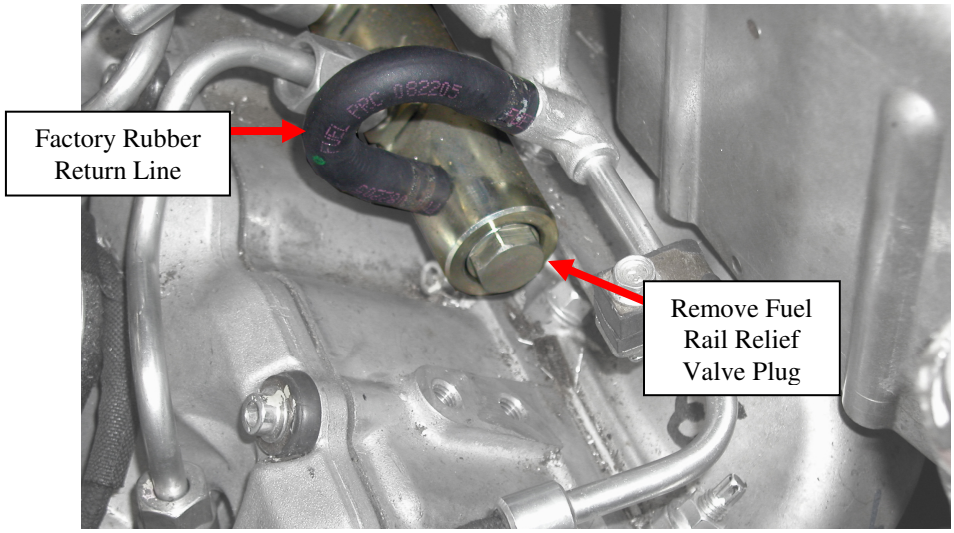


Figure 7: Fuel Rail Pressure Relief Plug

10. Once the rail relief plug is removed, install the supplied high-pressure rail fitting (Fig. 1, #12) as shown in the picture below. Add a small amount of clean grease or engine oil to the sealing surface and torque the fitting to **64-68 ft-lbs** using a torque wrench.

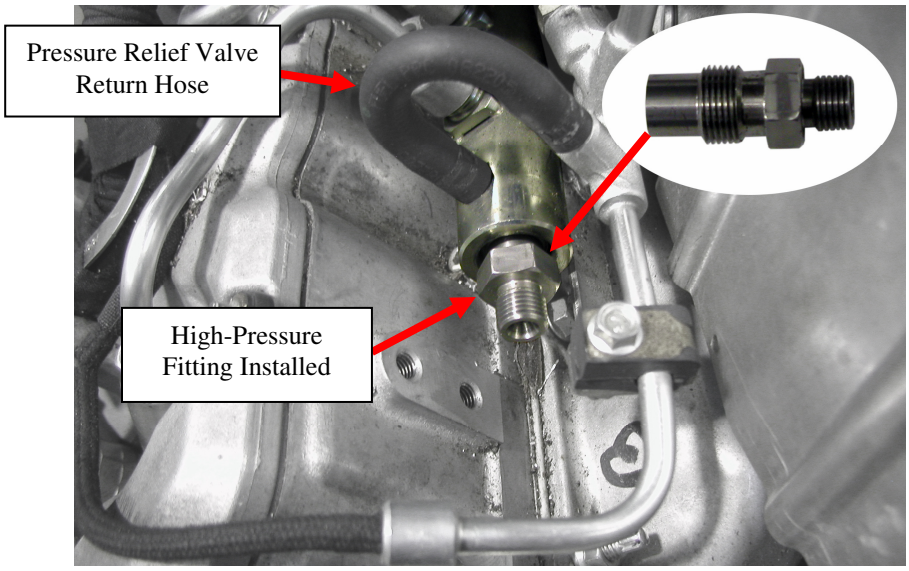


Figure 8: High-Pressure Fitting Installation

11. Remove the pressure relief valve return hose. Save the clamps as they will be reused. Place the red silicone cap (Fig. 2) over the port on the fuel rail and install the 5/16" hose (Fig. 1, #17) on the return rail, reusing the factory clamp.

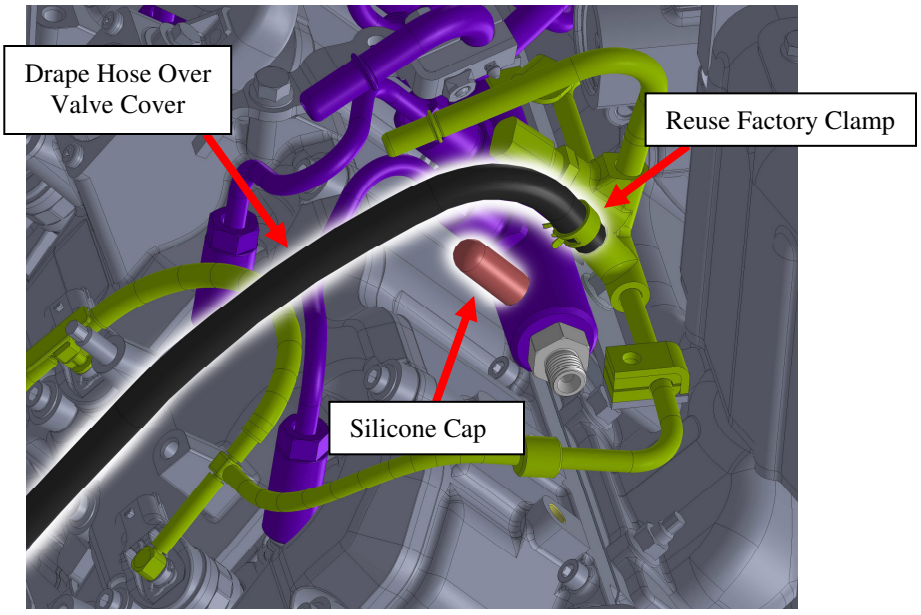


Figure 9 - Return Hose and Silicone Cap

12. Install the junction block bracket (Fig. 1, #7) using two M8-1.25x16mm bolts supplied in the kit. Do not use the factory bolts previously removed. The factory bolts are too long and will damage the valve cover.

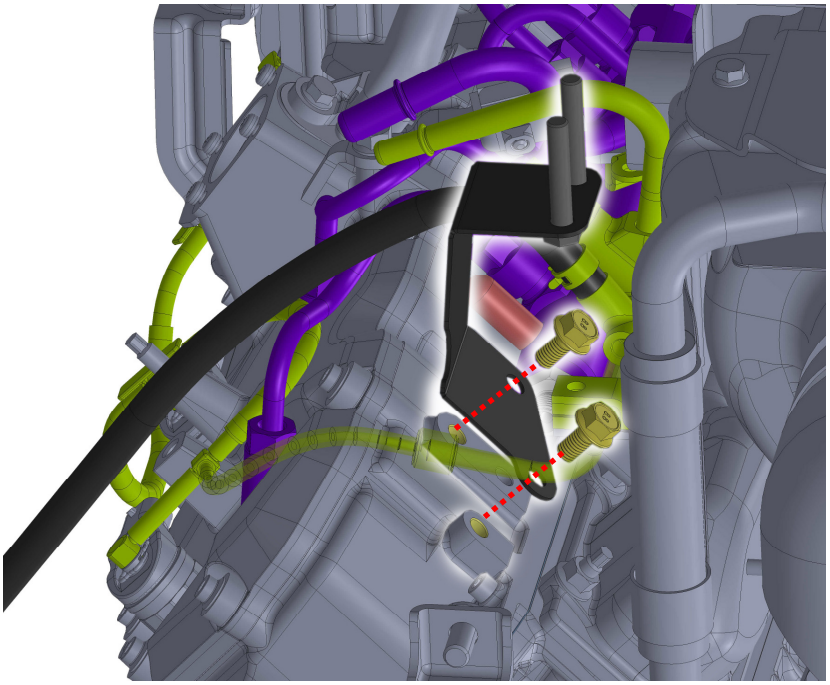


Figure 10: Junction Block Bracket Installation

13. Install the pressure relief plug in the supplied junction block (Fig 1, #11). Apply a small amount of clean grease or engine oil to the seal surface and torque to **64-68 ft-lbs**. If you plan on running higher fuel pressure where the relief plug will be an issue, install an aftermarket plug.

Figure 11: Pressure Relief Valve Torque

14. Install the junction block and the short high-pressure fuel line (Fig 1, #16). Orient the junction block so the 5/16" barbed fitting faces the firewall. Connect the short high-pressure line to the rail and the junction block.

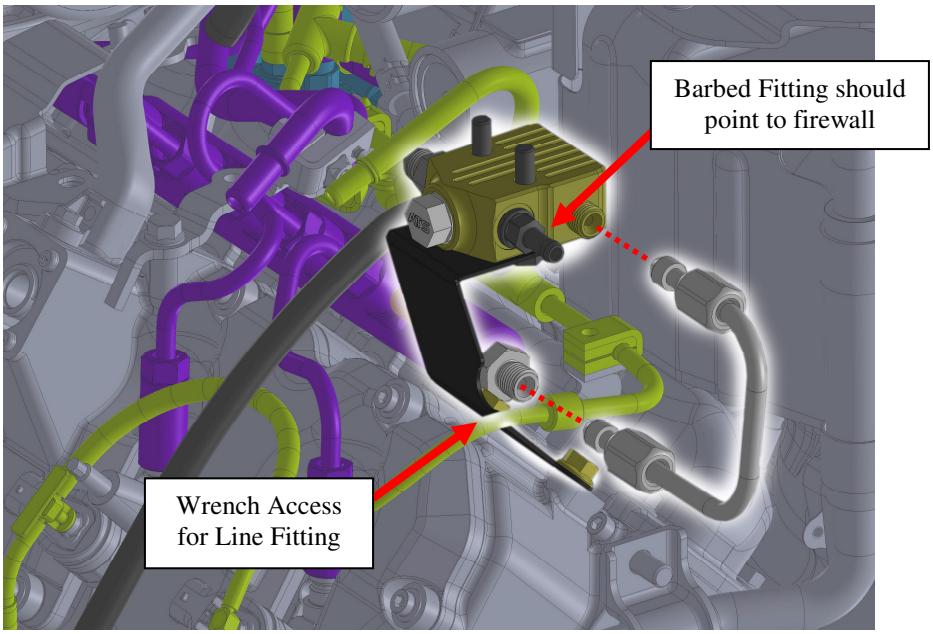


Figure 12: Junction Block Installed

15. Tighten the fittings on the short high-pressure line by inserting a ¾" (or 19mm) wrench in front of the junction block bracket.

16. Route the 5/16" fuel line from the return line to the barbed fitting on the junction block. Use the remaining factory hose clamp to ensure a good seal. Avoid kinking the hose when routing.

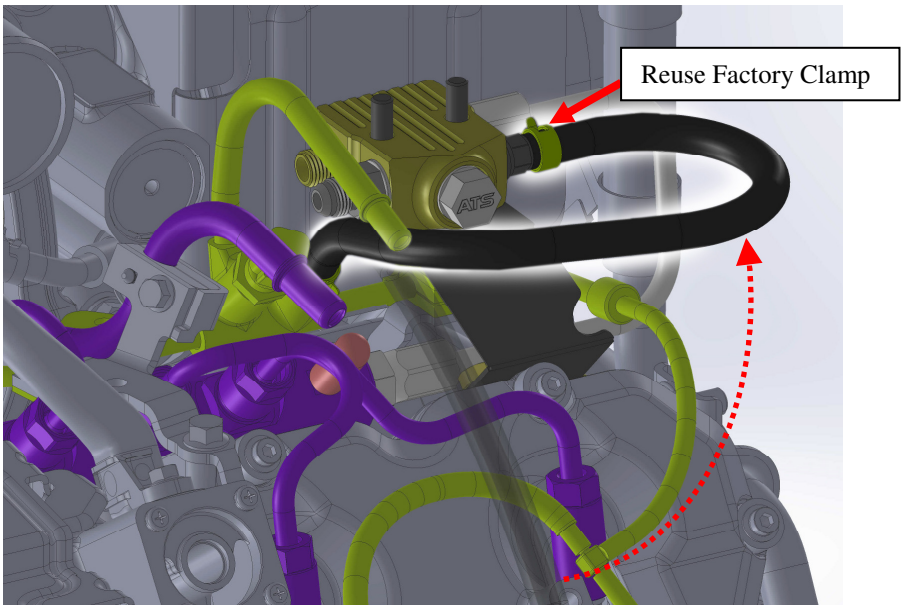


Figure 13: Rail Return Line Installed

17. Using the three M8-1.25x50mm socket head cap screws, M8 washers and M8-1.25 flange nuts install the pump on the pump-mounting bracket. The pump should be clocked on the bracket so the fittings are facing upwards. Install the new pulley using the nut provided. Torque to **53 ft-lbs**. Using the three 10mm bolts and washers, install the bracket and pump on the engine mounts located next to the A/C compressor.

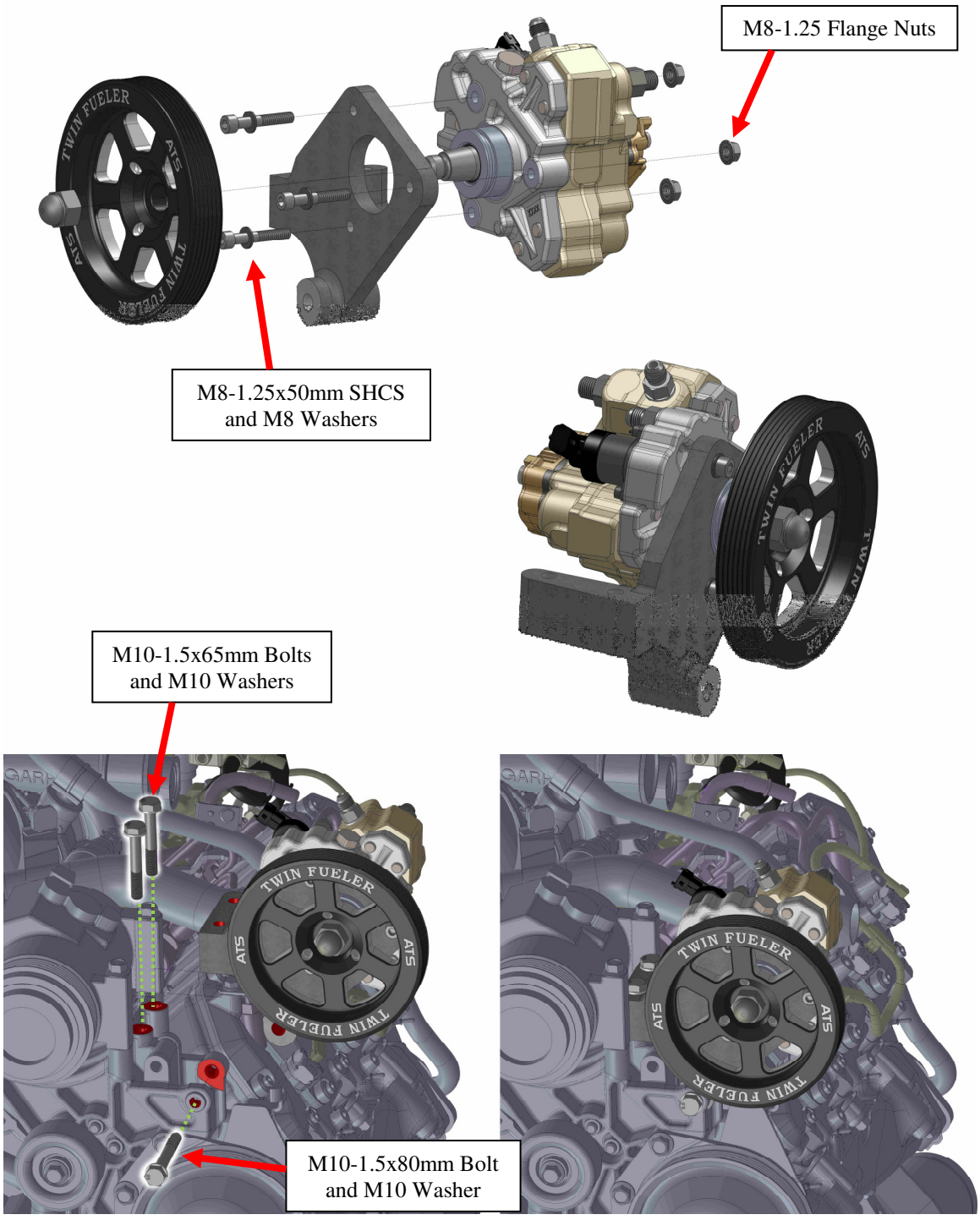


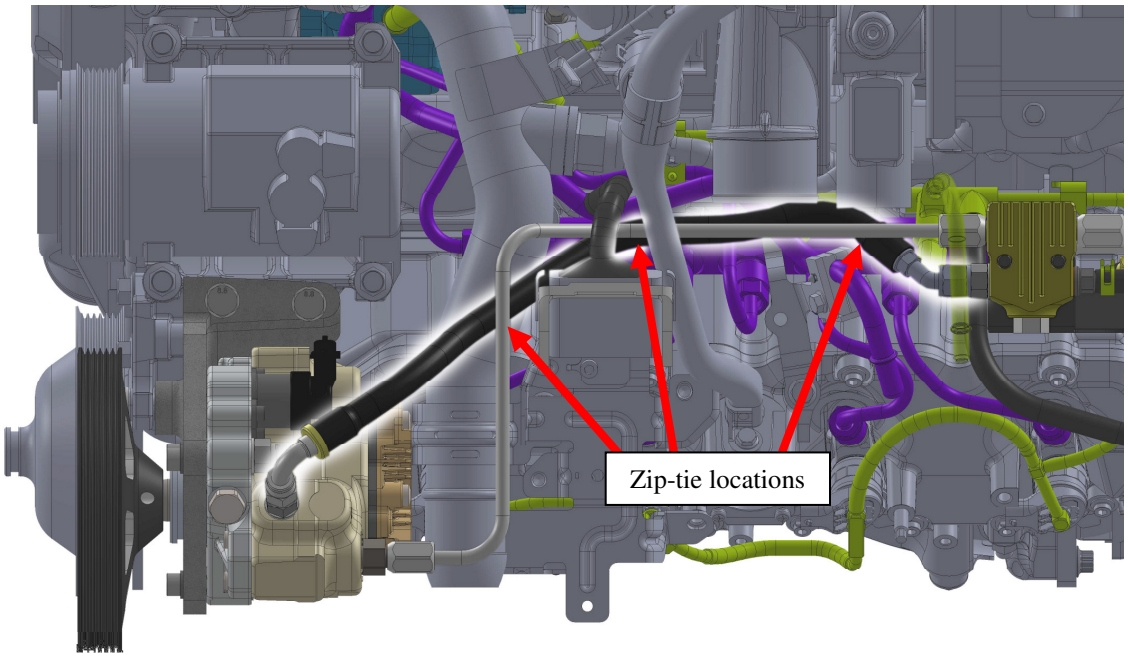
Figure 14: Correct Pump and Bracket Installation

18. Install the long high-pressure line (Fig. 1, #15) from the pump to the junction block. Route the line under the crankcase vent and turbo housing following the rail to the junction block.

Figure 15: High-Psi Line Installed

19. The top engine harness connector can interfere with the high-pressure line. If it does, remove the fastener that holds the connector to the bracket. Relocate the connector by drilling a new hole in the bracket or securing with zip-ties.

20. Install the 16.5” fuel return line (Fig 1, #14) from the pump return port to the open port on the junction block. Use Zip-Ties to secure the return hose to the high pressure fuel supply line, away from heat sources.



21. Using two 8mm flange nuts install one of the GPC brackets included in the kit onto the studs passing through the junction block. On LLY engines, use the bracket labeled "#6". On LBZ and LMM engines, use the "#5" bracket. When the new GPC bracket is mounted on the junction block, attach the GPC to the bracket using two M6-1.0x12mm bolts. Reconnect the harness to the GPC.

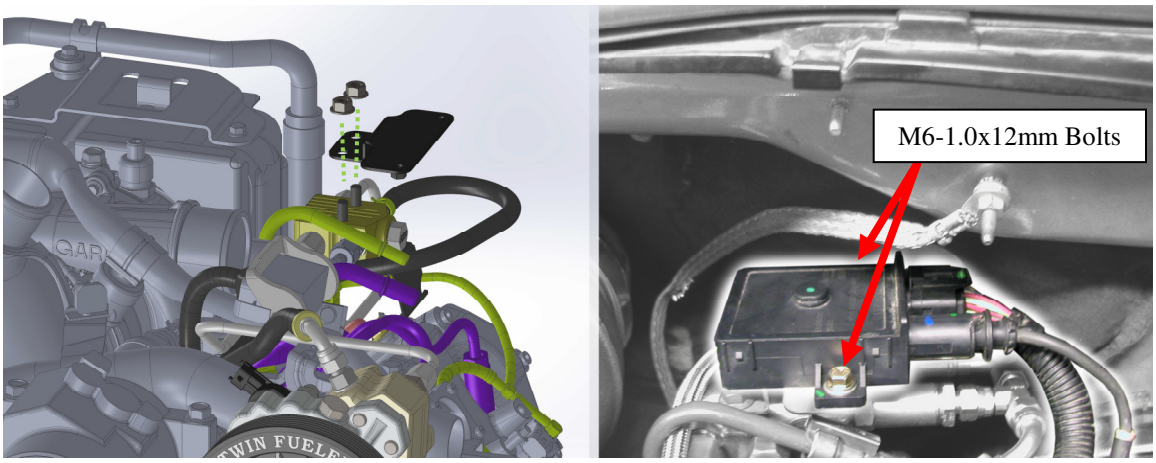


Figure 16: GPC Bracket and GPC Installed on LLY

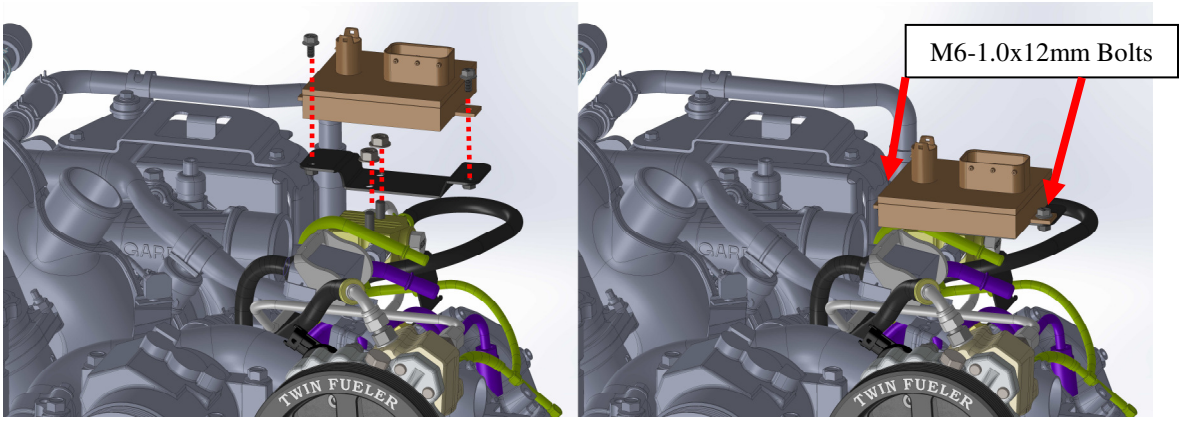


Figure 17: GPC Bracket and GPC Installed on LBZ/LMM

22. Find the factory fuel supply line from the filter housing located on the passenger side of the engine (shown in red). Remove the clamps and save them as they will be reused.

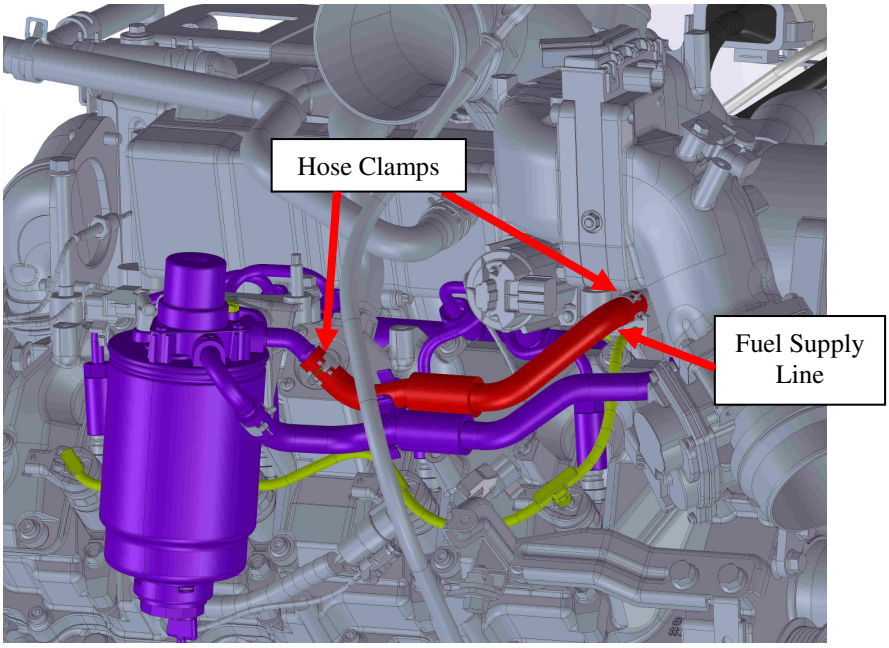


Figure 18: Factory Fuel Supply Line

23. Locate the fuel supply hose (Fig. 1, #13). Using a factory hose clamp, attach the short 1/2" hose side to the fuel supply rail under the intake. Route the other 1/2" hose to the fuel filter housing and attach it using a factory clamp. Route the 3/8" hose over the intake and behind the alternator as shown to the CP3 pump and attach the 90° fitting to the supply port on the pump. Note: for a cleaner appearance, it is often possible to route the 3/8" section under the intake and coolant pipe. If you choose to do this, be sure to secure the hose away from sources of high heat or any moving components.

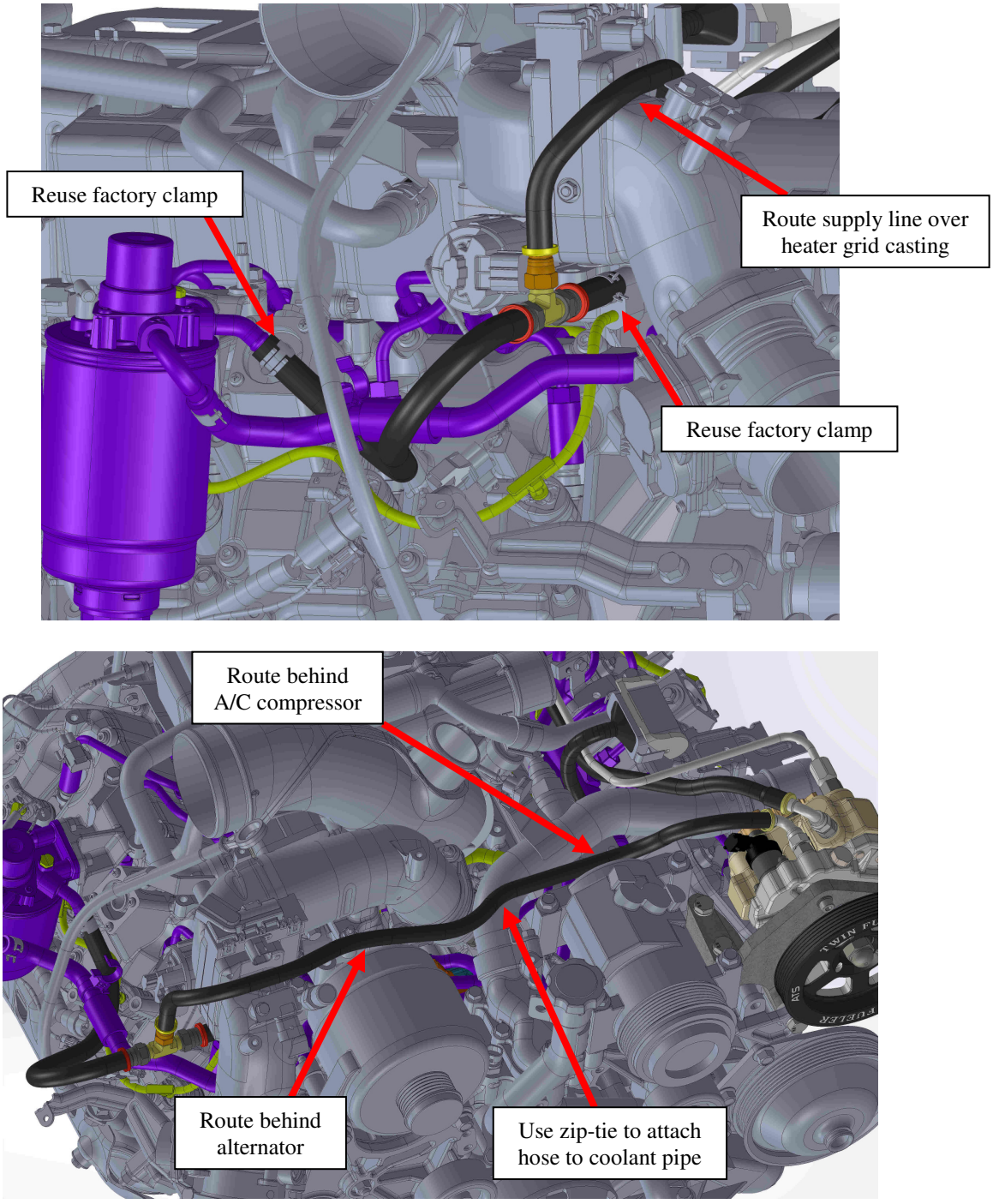


Figure 19: Fuel Supply Tee Installed

24. Unplug the FCA connector on the factory CP3 pump. The FCA is located in the valley behind the thermostat housing (shown in orange). Removing the alternator will provide more access to the connector but is not absolutely necessary.

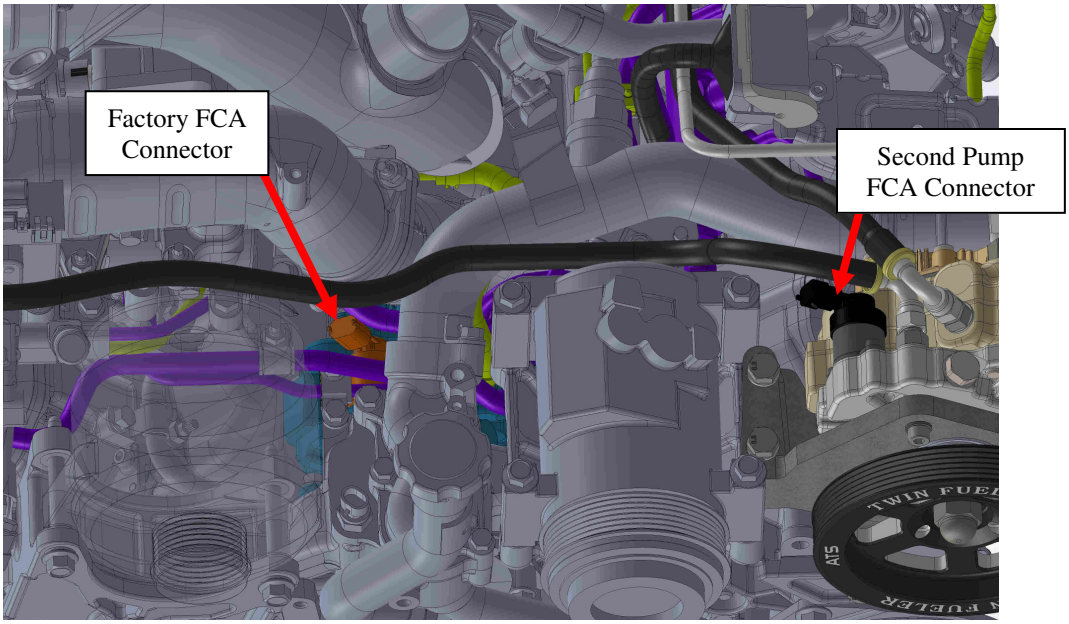


Figure 20: Factory CP3 Fuel Control Actuator Location

25. On the wiring harness provided in the kit there are four wire groups that extend out from the controller:
    - Black lead with a ring terminal - Ground
    - Red lead with a fuse and a ring terminal - 12V Power Supply
    - Single two-pin connector - New CP3 FCA Connection
    - Female and a male two-pin connector - Factory Harness Interface

    Connect the single 2-pin connector to the new CP3 pump. Connect the other section of harness in-line with the factory pump and harness.

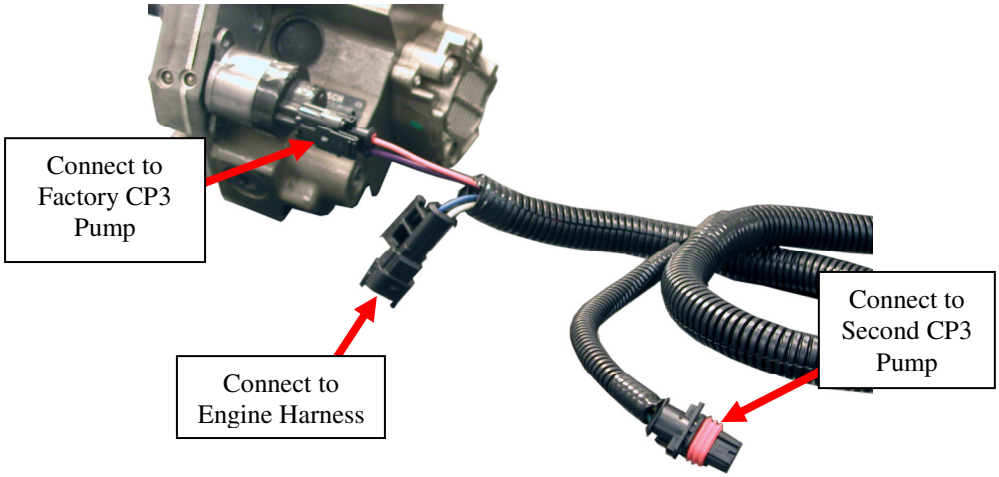


Figure 21: ATS Twin CP3 Harness Connections

26. Connect the 10mm ring terminal on the red lead to the (+) 12V power terminal in the red box labeled (+) Battery located on the driver's side of the engine. To power the CP3 electronics a 10 Amp fuse must be installed in the fuse holder.

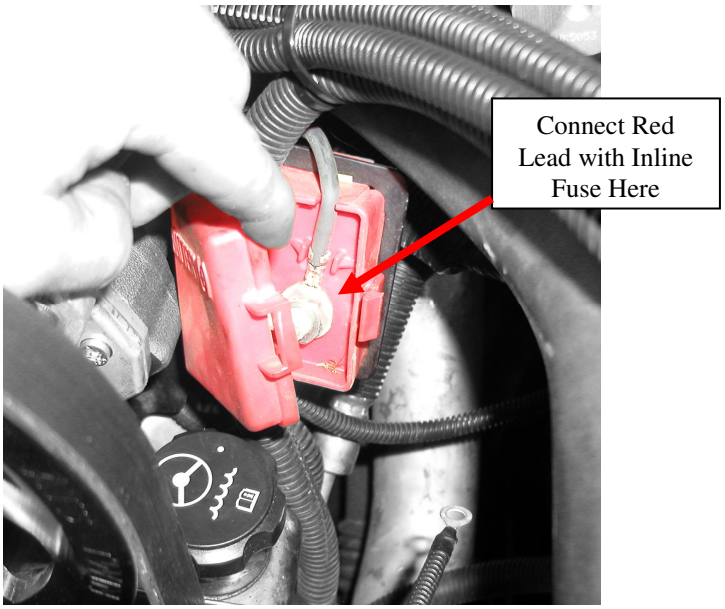


Figure 22: CP3 Harness (+) 12V Power Connection

27. Connect the ring terminal of the black lead to the (-) ground terminal on the firewall. Use zip-ties to secure the wires away from heat sources and sharp edges.

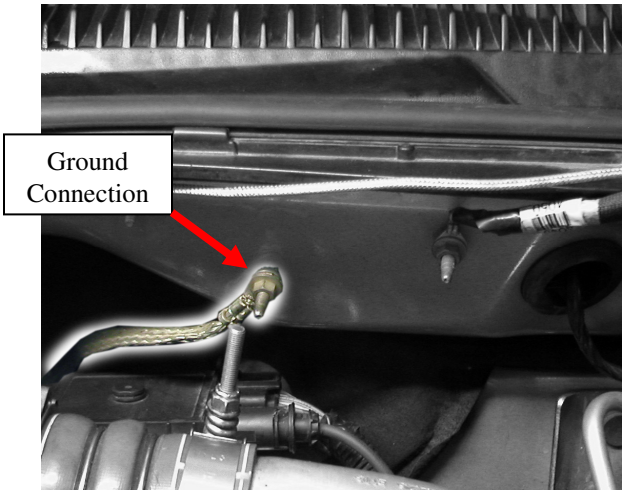


Figure 23: CP3 Harness (-) Ground Connection

28. If the power and ground leads are not connected as suggested above make sure the alternate source provides power when engaging the starter. If power is not supplied during startup, extreme rail pressure will result. High rail pressure can cause starting failures.

29. Reinstall the alternator if it was removed previously.

30. Install the belt provided in the kit using the routing shown in Figure 23.

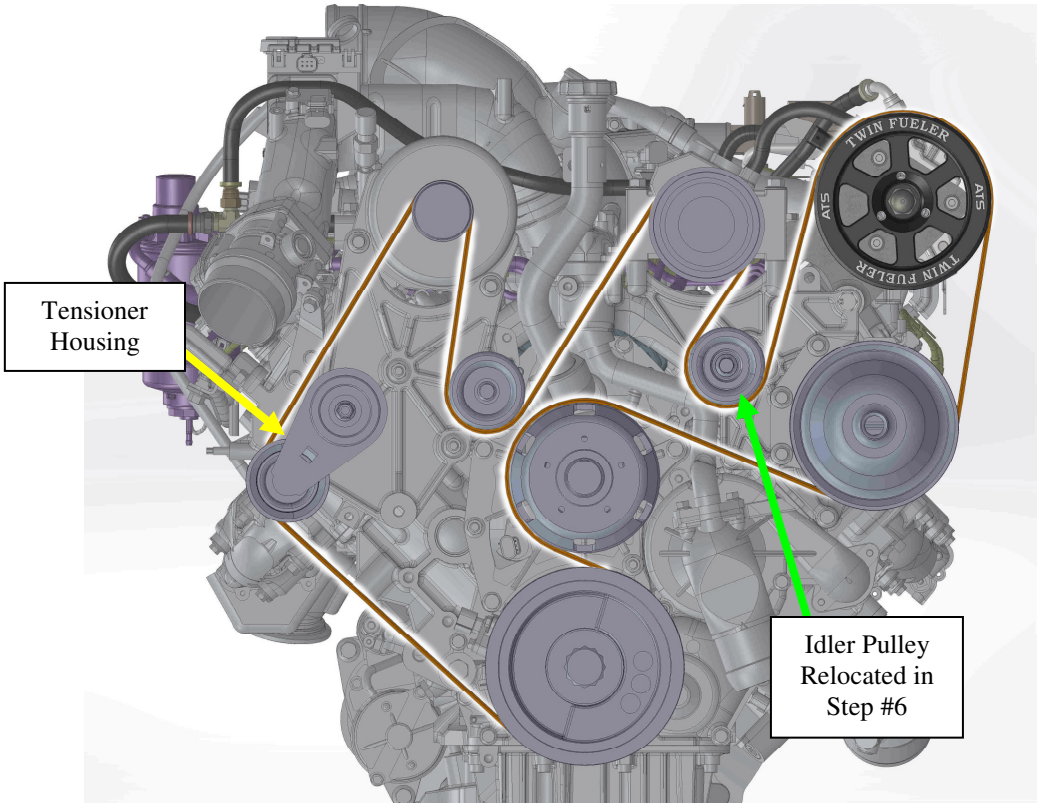


Figure 23: Belt Routing for ATS Twin CP3 Kit

31. If the belt touches the tensioner housing, use a ½" drive ratchet to turn the tensioner out against the belt until the belt stretches enough to clear the tensioner housing. After approximately 100 miles or so the belt may stretch enough to cause the tensioner to clatter. If the belt stretches to this point, install the larger idler pulley (Fig.1, #10) provided in the kit to remove the slack in the serpentine system. Make sure the two washers are used with the large idler pulley to ensure proper belt alignment.

32. Reinstall the fan and fan shroud.

33. Reinstall any parts or components removed to gain access during the installation.

34. Reconnect the (-) negative battery terminals.

35. Turn key to the ON position without starting the vehicle. Check for fuel leaks. If no leaks are present, start vehicle. Check for fuel leaks. If no leaks are present drive throughout the throttle range. Check for fuel leaks. If no leaks are present the installation is complete.

Have Any Questions?

Thank you for purchasing the Twin Fueler kit for LLY/LBZ/LMM. Please check our website at http://www.atsdiesel.com for technical support and other performance products such as the 5-Star™ torque converter, ATS High Performance Valve Body and ATS High Performance Transmission. Please call or e-mail our Technical Service Department, 8:00am to 5:30pm Mountain Standard Time, Monday through Friday.

Contact Information

Toll Free: 800-949-6002
Local: 303-431-7973
Fax: 303-431-0135
Website: www.ATSDiesel.com
Email: info@ATSDiesel.com

We strive to make our instructions as clear and complete as possible. To achieve this, our instructions are under constant construction. We encourage you to visit our website to check for the most up-to-date manuals and diagrams as well as other information. If you have any suggestions as to how we can improve this installation manual, let us know at mailto:Suggestions@ATSDiesel.com.

Bill of Materials

1. LBZ Twin CP3 Injection Pump 701-030-4290
   (2) 12mm to –6 Fittings 7400-6-12
   (1) Rear Port High Pressure Fitting 701-002-1000
   (1) High Pressure Port Plug 701-026-1000
   (1) Injection Pump 97361315

2. (1) ATS Pulley Nut CP3 Pump 701-017-1000

3. (1) ATS CP3 Pump Mounting Bracket 701-013-4248

4. (1) ATS CP3 Pump Pulley 701-029-4248

5. (1) ATS LBZ/LMM GPC Bracket 701-022-4308

6. (1) ATS LLY GPC Bracket 701-022-4290

7. (1) ATS Junction Block Mounting Bracket 701-015-4290

8. (1) Serpentine Belt 701-033-4248

9. (1) ATS Twin CP3 Electronic Controller Harness 701-019-4248

10. (1) Large Backside Idler Pulley 3C3Z-8678-BB
    (2) 3/8 Flat Washers (included for spacing)

11. High Pressure Junction Block with Relief 701-018-4290
    (1) High Pressure Relief Junction Block
    (1) 12mm to JIC-6 Fitting 7400-6-12
    (1) 12mm to 5/16" Barbed Fitting
    (1) 12mm Copper Sealing Washer 853009-12

12. (1) ATS LLY / LBZ High Pressure Rail Fitting 701-005-4290

13. Low Pressure Fuel Supply Line (Preassembled) 701-023-4290A
    (1) -6 Tee Male/Male/Male 6JTX-S
    (2) JIC-6 to 1/2" Push Lok Fitting
    (1) JIC-6 to 3/8" Push Lok Fitting 30682-6-6B
    (1) JIC-6 to 3/8" 90° Push Lok Fitting 33982-6-6
    (2.5") 1/2" Fuel Line 821-8
    (14.25") 1/2" Fuel Line 821-8
    (31.25") 3/8" Fuel Line 821-6

14. Preassembled Fuel Return Line (Preassembled) 701-025-4290A
    (1) JIC-6 to 3/8" 90° Push Lok Fitting 33982-6-6
    (1) JIC-6 to 3/8" 45° Push Lok Fitting 33782-6-6
    (16.5") 3/8" Fuel Line 821-6

15. (1) ATS High Pressure Line 701-011-4290

16. (1) ATS Secondary (Short) High Pressure Line 701-016-4290

17. Section of Rubber Fuel Line
    (16”) 5/16” Fuel Line

18. Hardware Kit 701-001-4290
    (1) 5/16" Silicone Cap (92805K9)
    (3) 8mm X 1.25 X 50 Socket Head Cap Screw
    (5) 8mm X 1.25 Flange Nuts
    (3) 8mm Flat Washers
    (2) 6mm X 1.0 X 12 Hex Head Flange Bolts
    (2) 8mm X 1.25 X 16 Hex Head Flange Bolts
    (2) 10mm X 1.5 X 65 Hex Head Bolts
    (1) 10mm X 1.5 X 80 Hex Head Bolt
    (3) 10mm Flat Washers
    (12) 7" Zip Ties

Not Pictured:

25. Instruction Manual 701-900-4290 – INST

26. ATS Warranty www.atsdiesel.com/warranty