



Installation Manual v1.2:
LLY / LBZ/LMM Twin CP3 Kit
04.5-07.5 GM Duramax

Please read all instructions before installation.

This kit is not emissions legal in California. Kit is legal only on race vehicles that will not be used on public highways.

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

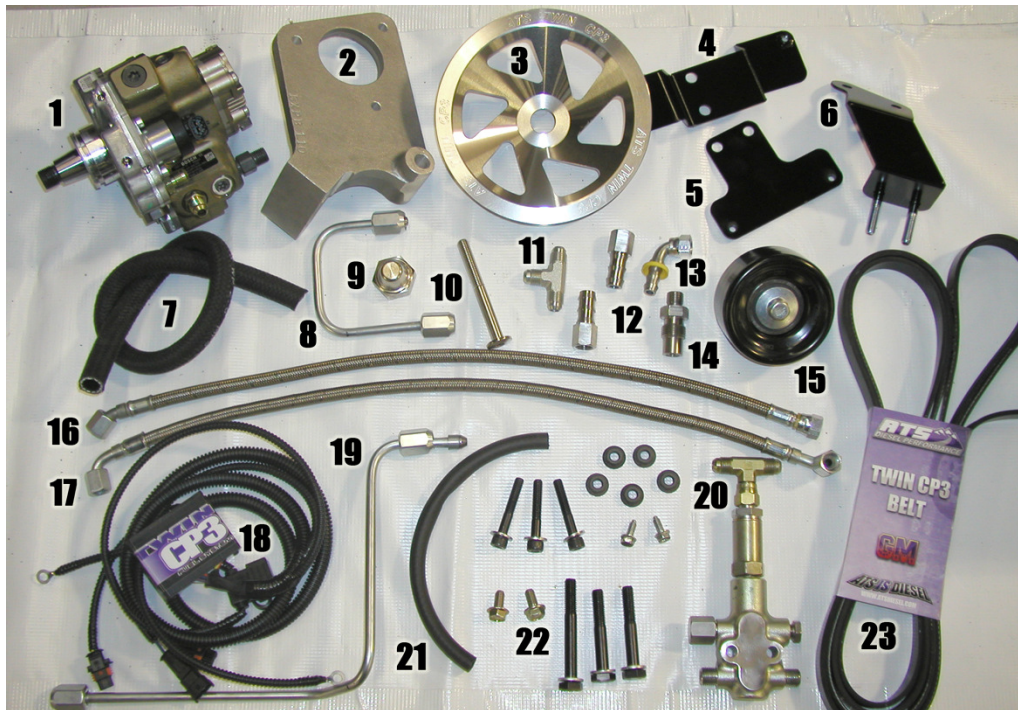


Figure 1: Complete LLY / LBZ Twin CP3 Kit

1. Please make sure no parts are missing out of the LLY / LBZ / LMM Twin CP3 Kit. The junction block (item 20 in Figure 1) will have different fittings attached as noted in the parts list. A complete corresponding list of parts can be found on pages 15 and 16.
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 Figure 2.

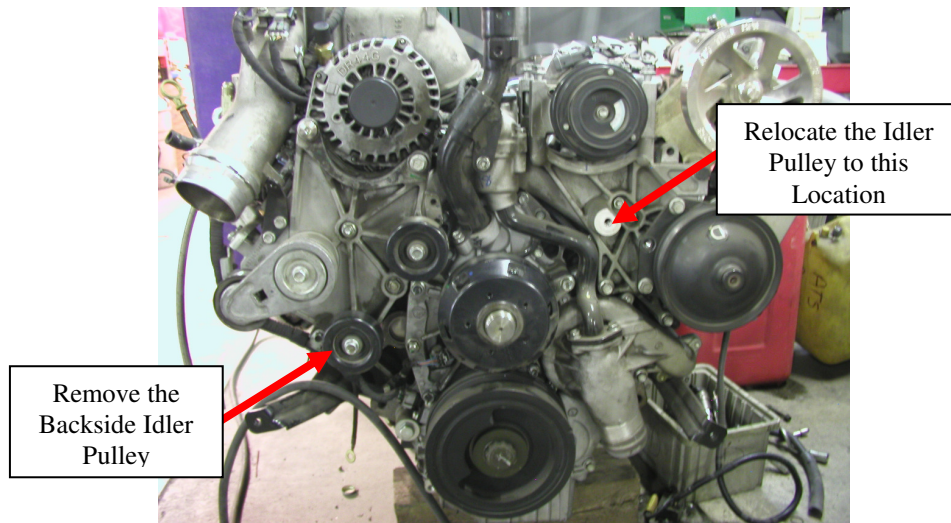


Figure 2: Backside Idler Pulley Location

6. Relocate the backside idler pulley to the mount under the AC compressor shown in Figure 2.
7. Find the glow plug controller (GPC) located towards the rear of the driver's side of the engine, Figure 3. Disconnect the two connectors. Using a 10mm socket, remove two 6mm bolts that hold the GPC to the bracket. Remove the GPC.

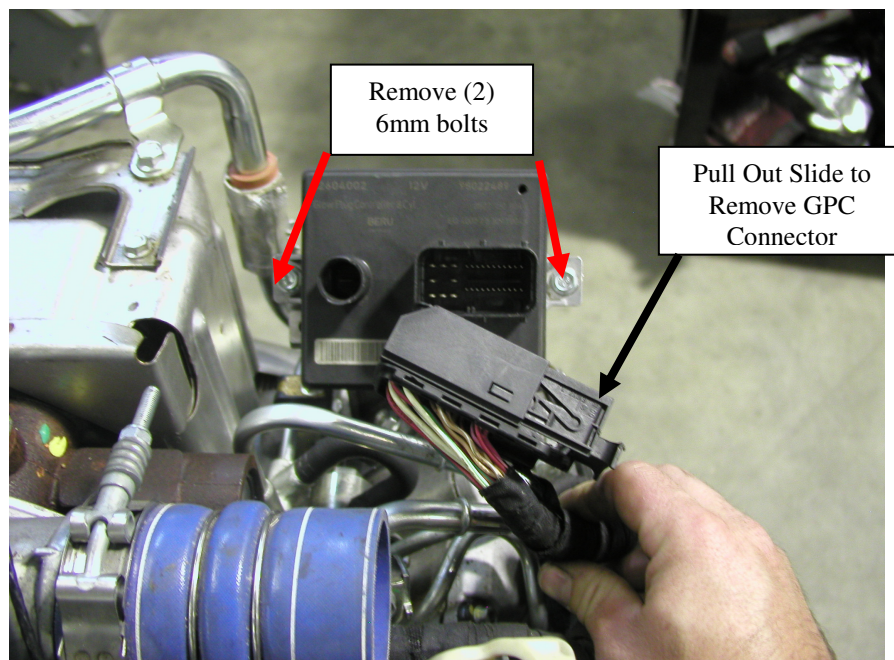


Figure 3: GPC Location and Connector

8. Remove the GPC bracket using a 12mm socket. On the LBZ there are three 8mm bolts that hold the bracket onto the valve cover, Figure 4. Once removed, discard the bracket.

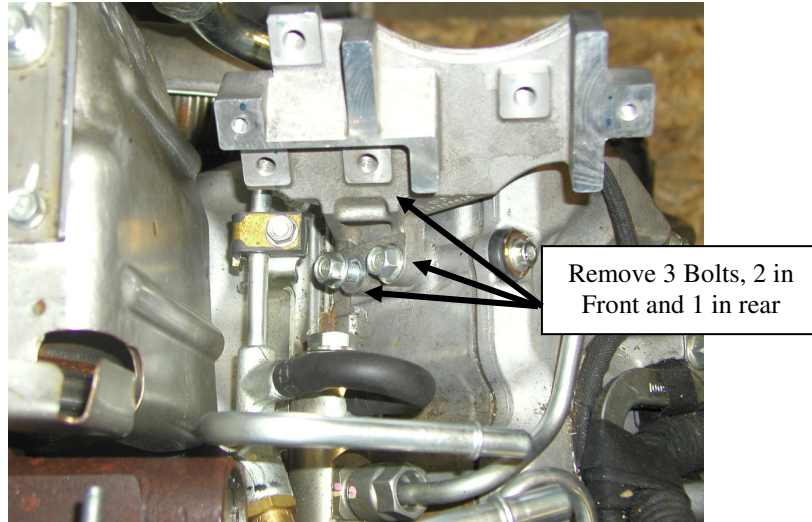


Figure 4: GPC Bracket

9. 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, Figure 5. Discard the bracket.



Figure 5: GPC Location for 04.5-06 LLY Engines

10. 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, Figure 5. A six-point socket will minimize the risk of rounding the hex plug. Use a 1/2" drive ratchet to break the plug free. **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 have to be replaced. **ATS will not provide a replacement fuel rail.**

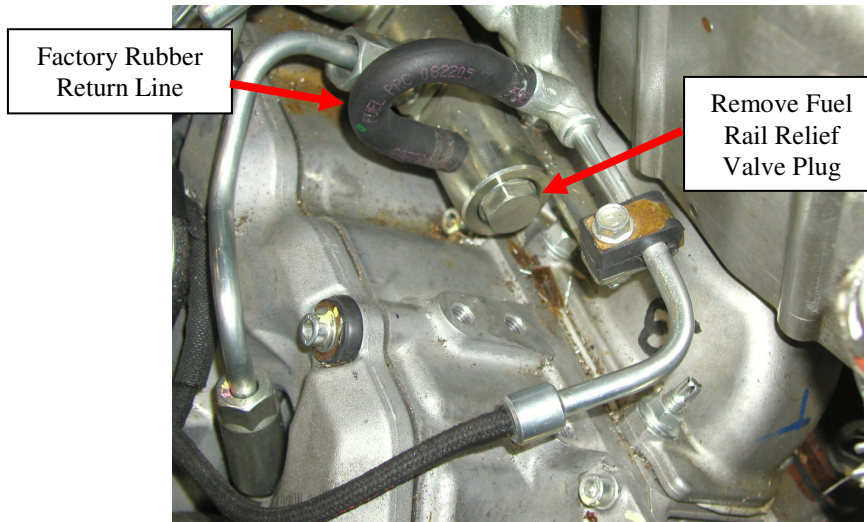


Figure 6: Fuel Rail Relief Plug

11. Once the rail relief plug is removed, install the supplied high-pressure rail fitting as shown in the picture below. Apply a liberal amount of Teflon sealant to the threads on the high-pressure fitting. Only apply the sealant to the threads that will contact the rail, Figure 7.

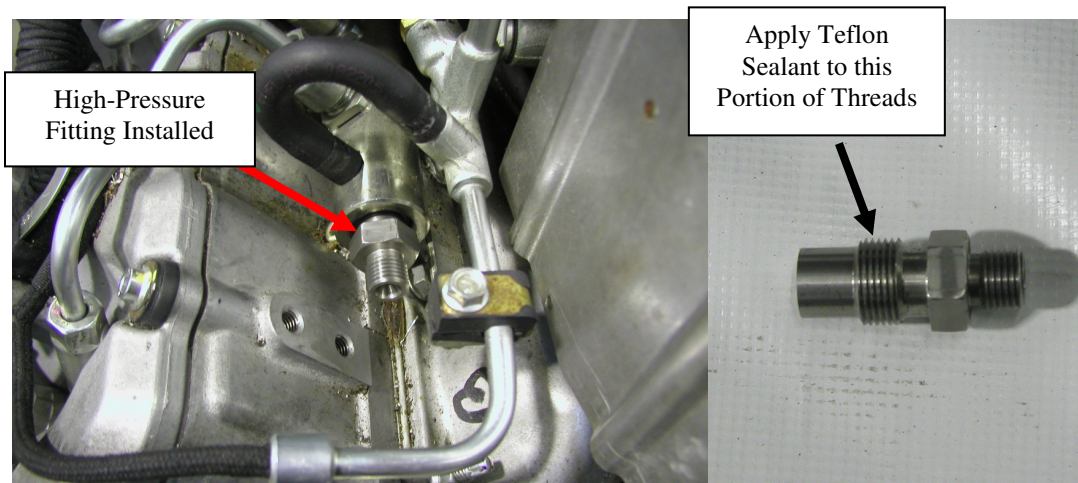


Figure 7: High-Pressure Fitting Installation

12. Install the junction block bracket, Figure 1, #6 using two 8mm X 1.25 X 16mm 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.

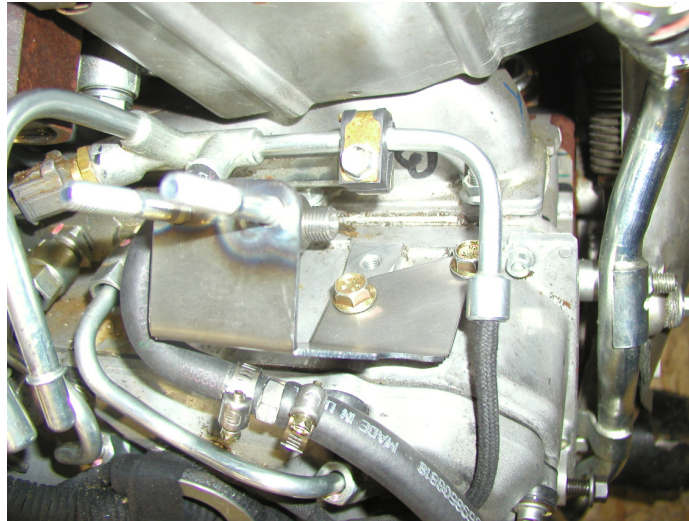


Figure 8: Junction Block Bracket Installed

13. Install the junction block and the short high-pressure fuel line. Orient the junction block so the smaller plug faces the firewall. Connect the short high-pressure line to the rail and the junction block, Figure 9. The junction block has a relief valve already installed to replace the system relief that was removed in step 10.

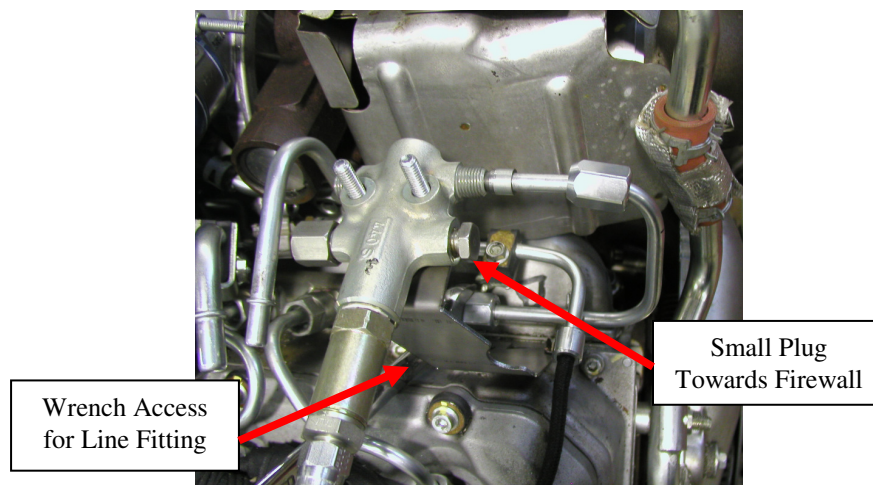


Figure 9: Junction Block Installed

14. Tighten the fittings on the short high-pressure line by inserting a $\frac{3}{4}$ " wrench in front of the junction block bracket, Figure 9.

15. Remove the factory rubber return line shown above in Figures 6 and 7. Retain the factory hose clamps. Push on the supplied 5/16" fuel line and secure with one factory spring clamp (or the supplied clamp). The rail port can be left open. The fitting installed in step 11 seals off this port from the inside of the rail.

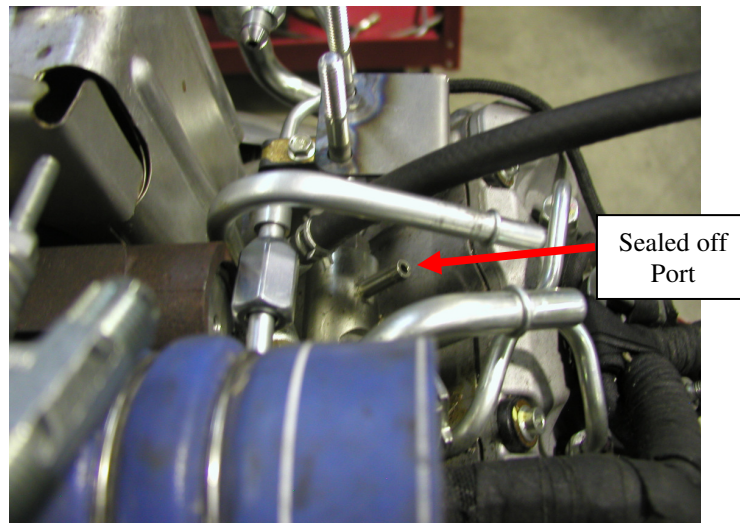


Figure 10: Return Line Ports

16. Cut the 5/16" fuel line to run to the barbed fitting on the junction block. Connect the fitting to the tee on the end of the junction block, Figure 11. Use factory hose clamp (or supplied clamp) to ensure a good seal.

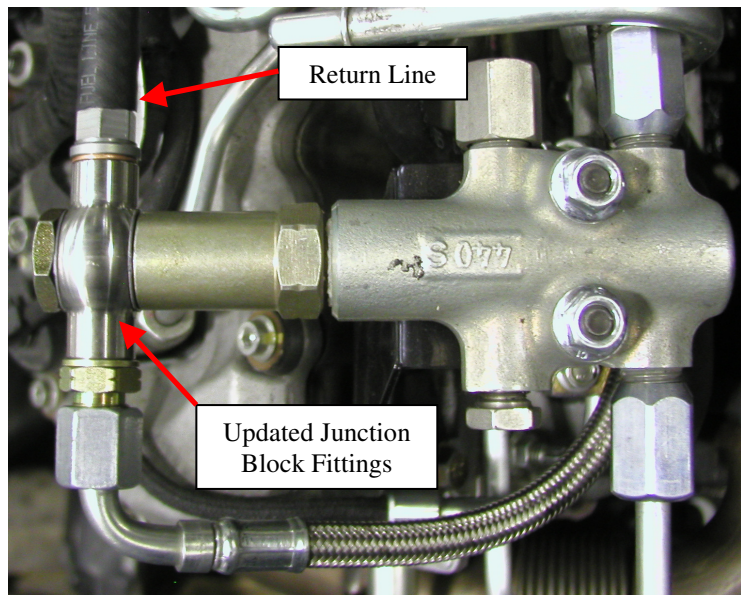


Figure 11: Rail Return Line Installed

17. Using the three 8mm X 1.5 X 50 socket cap bolts, washers and flange nuts install the pump on the pump-mounting bracket. The pump should be clocked on the bracket so the fittings are facing upwards. Using the three 10mm bolts and washers, install the bracket and pump on the engine mounts located next to the A/C compressor, Figure 12.

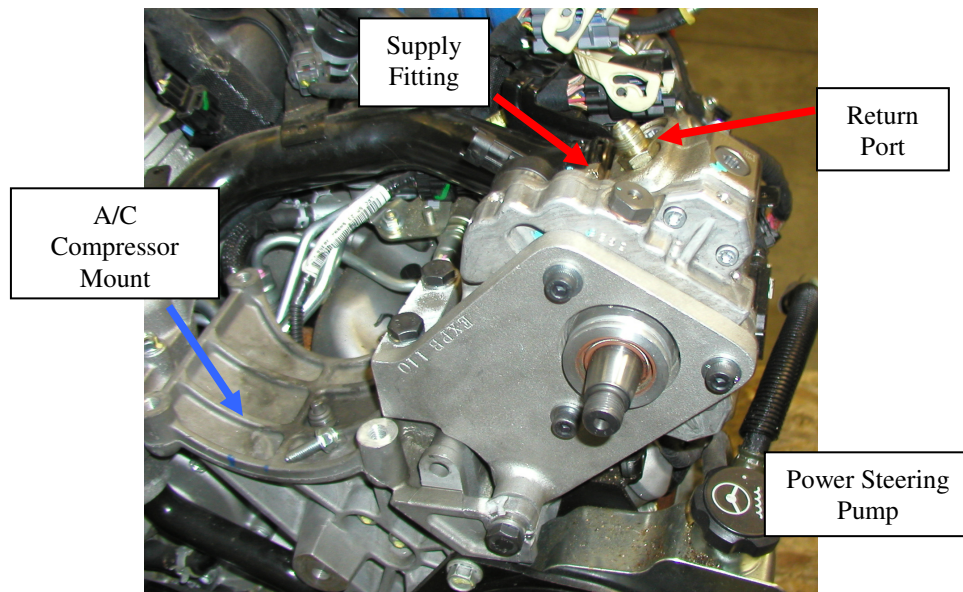


Figure 12: Correct Pump and Bracket Installation

18. Install the long high-pressure line (Figure 1, #19) from the pump to the junction block, Figure 13 (RED). Route the line under the crankcase vent and turbo housing. Following the rail to the junction block. Install the 26" steel braided fuel line from the pump return port to the open port on the junction block tee, Figure 13 (BLUE). Use Zip-Ties to secure lines. The top engine harness connector will interfere with the high-pressure line; 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.

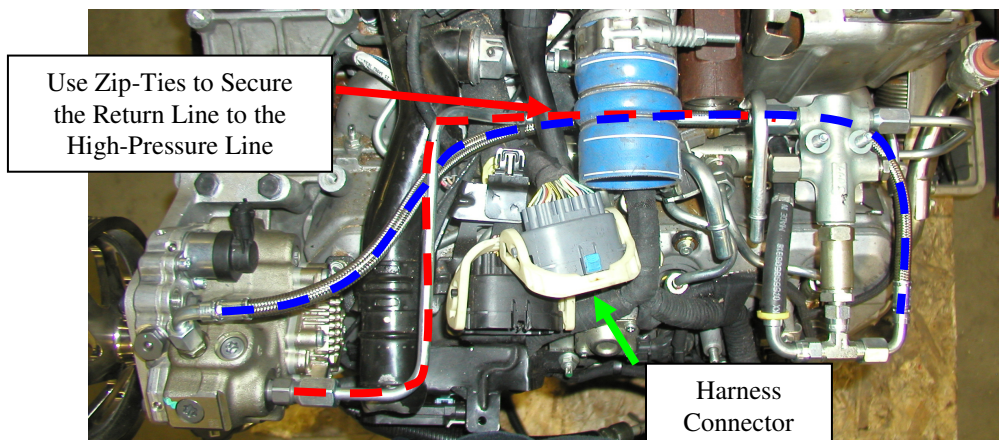


Figure 13: Return and High-Psi Line Installed

NOTE: If the tamper evident pain on the rear port high pressure fitting is broken, ATS will NOT warranty the pump.

19. Be sure to route all steel braided lines away from rubber hoses or aluminum tubing. The vibration from the engine will cause the steel braiding to wear through any soft material. Routing the return line under the junction block bracket will help minimize the risk of leaks caused by wear.
20. Using two 8mm flange nuts install one of the GPC brackets included in the kit onto the studs passing through the junction block. The bracket, labeled #4 in Figure 1, should be used on LBZ engines. The bracket, labeled #5 in Figure 1, should be used on LLY engines. When the new GPC bracket is mounted on the junction block, fasten the GPC to the bracket using two 6mm X 1.25 X 18 bolts. Reconnect the harness to the GPC, Figures 14 and 15.

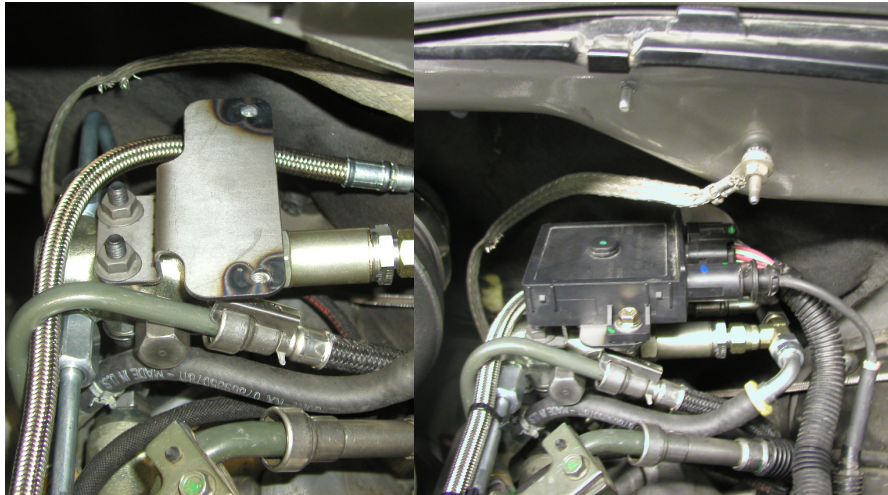


Figure 14: GPC Bracket and GPC Installed on LLY

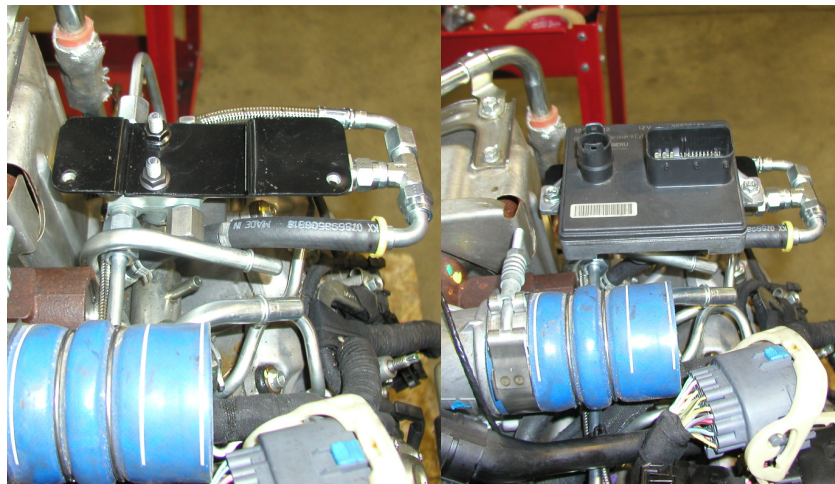


Figure 15: GPC Bracket and GPC Installed on LBZ

21. Find the factory fuel supply line from the filter housing located on the passenger side of the engine, Figure 16.

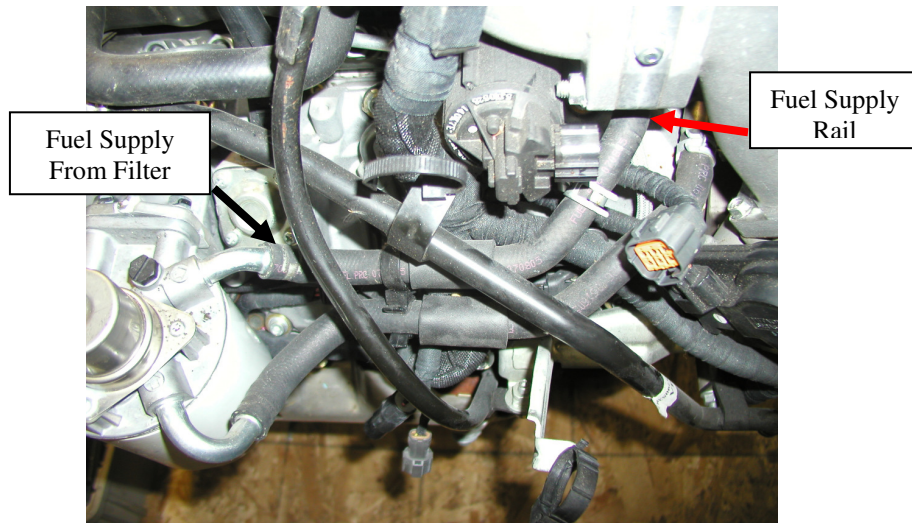


Figure 16: Factory Fuel Supply Line

22. Remove the fuel supply line located in the previous step. Use the 1/2" black fuel line supplied in the kit to share the fuel supply between the pumps. Cut a 2.5" section and push in one of the 1/2" barb fittings supplied in the kit (Figure 1 #12). Using the factory spring clamp connect the opposite end of the 2.5" line to the fuel supply rail. Thread the supplied -6 Tee (Figure 1 #11) into the open end of the barbed fitting. Use the remaining 1/2" fuel line and barbed fitting to connect the opposite end of the -6 Tee to the fuel filter housing, Figure 17. Install the 3/4" steel braided line from the supply fitting on the pump to the supply -6 Tee.



Figure 17: Fuel Supply Tee Installed

23. Unplug the fuel regulator connector on the factory CP3 pump located in the valley behind the thermostat housing. Removing the alternator will provide more access to the connector, Figure 18.

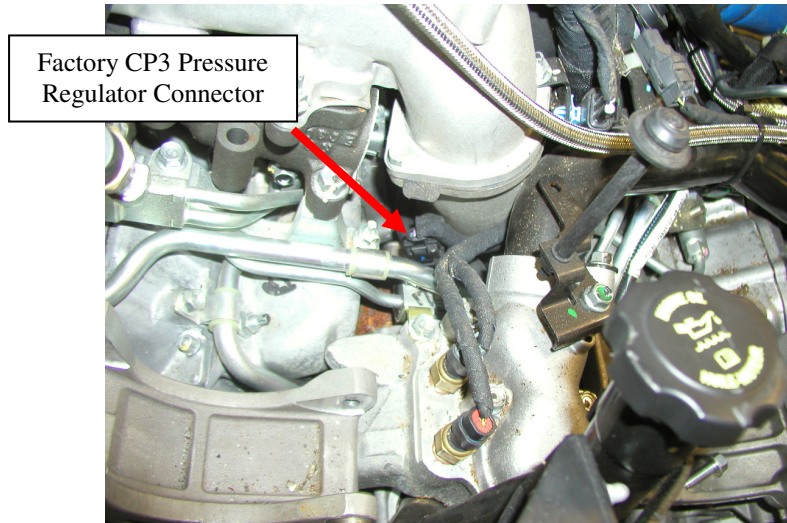


Figure 18: Factory CP3 Pressure Regulator Location

24. On the wiring harness provided in the kit there are four wire groups that extend out from the controller: one black lead with a ring terminal, one red lead with a fuse and a ring terminal, one lead with a single male two-pin connector, and one lead with a female and a male two-pin connector. Connect the female connector on the ATS Twin CP3 electronics to the harness to the connector that was disconnected in step 23. Connect the male connector to the factory pressure regulator. Connect the remaining two-pin male connector to the regulator on the new CP3 pump.

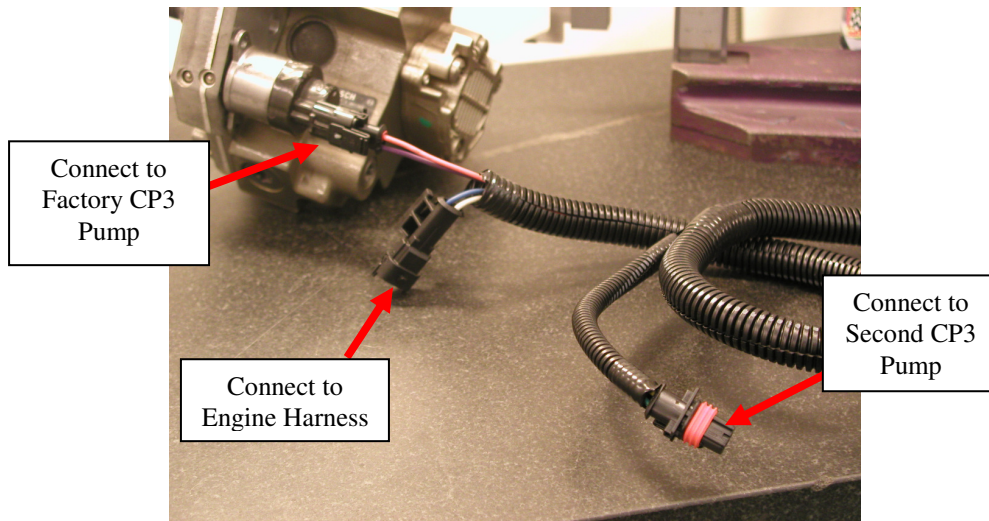


Figure 19: ATS Twin CP3 Harness Connections

25. 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 7.5 Amp fuse must be installed in the fuse holder.

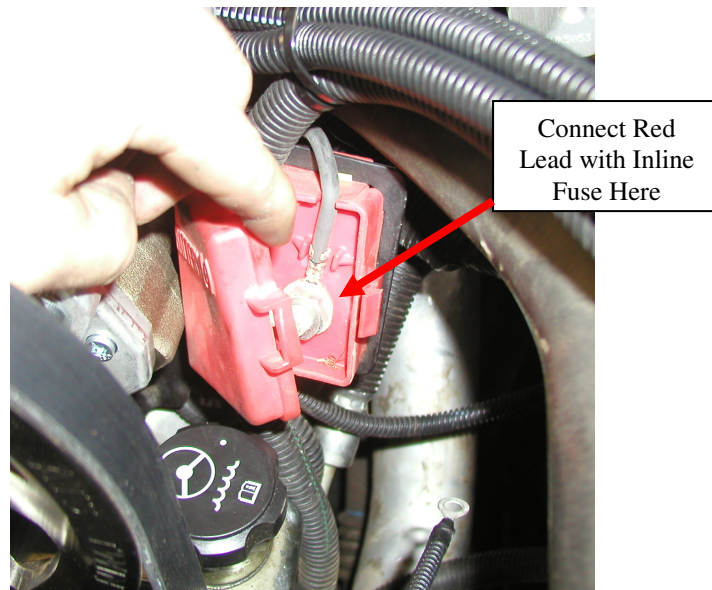


Figure 20: CP3 Harness (+) 12V Power Connection

26. 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.

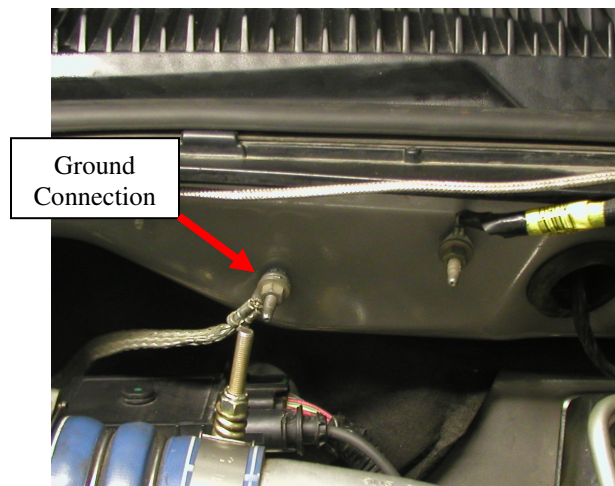


Figure 21: CP3 Harness (-) Ground Connection

27. 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, then extreme rail pressure will result. High rail pressure can cause starting failures.

28. Reinstall the alternator.

29. Install the ATS pulley and pulley nut on the second CP3 pump. Torque the pulley nut to **52 ft-lbs**.

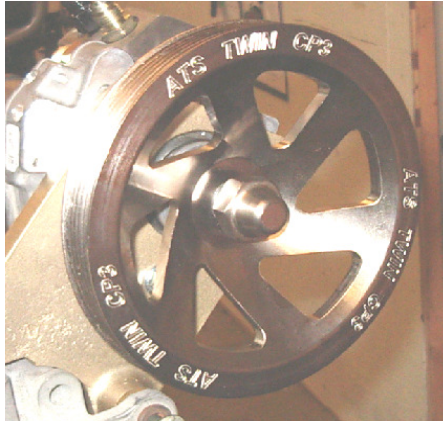


Figure 22: ATS Pulley Mounted on Pump

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

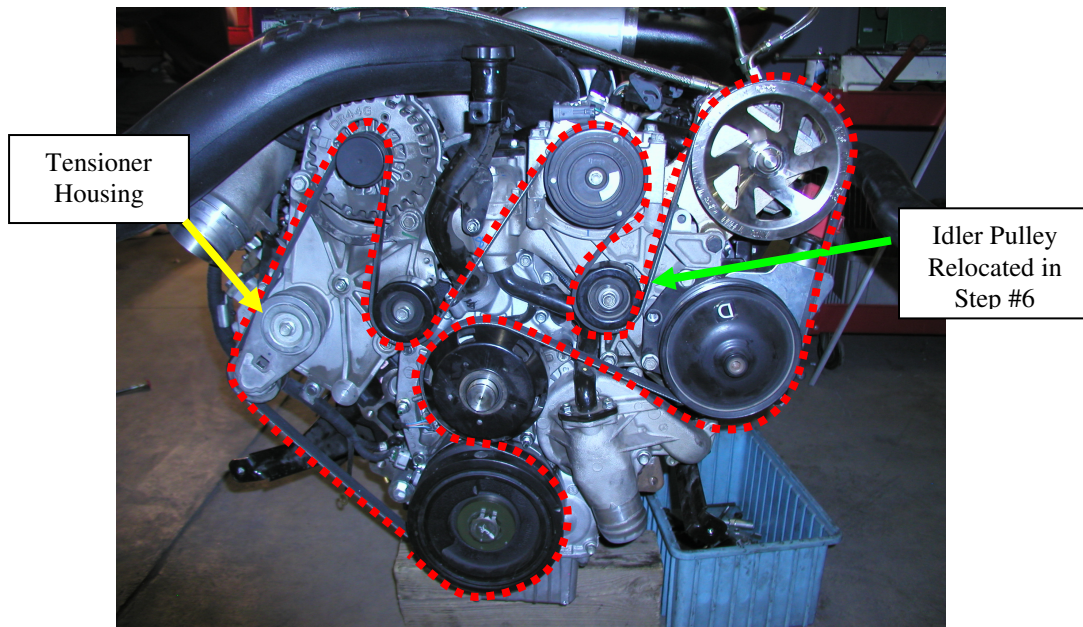


Figure 23: Belt Routing for ATS Twin CP3 Kit

31. If the belt touches the tensioner housing, use a 1/2" 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 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 then 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.

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 CP3 Pump Mounting Bracket 701-013-4248
3. (1) ATS CP3 Pump Pulley 701-014-4248
4. (1) ATS LBZ GPC Bracket 701-022-4308
5. (1) ATS LLY GPC Bracket 701-022-4290
6. (1) ATS Junction Block Mounting Bracket 701-015-4290
7. (36") Section of 1/2" Fuel Line 821FR-8
8. (1) ATS Secondary (Short) High Pressure Line 701-016-4290
9. (1) ATS Pulley Nut CP3 Pump 701-017-1000
10. Obsolete
11. (1) -6 Tee Male/Male/Male 6JTX-S
12. (2) 1/2" Barbed to -6 Female Fitting 701-004-1000
13. Obsolete
14. (1) ATS LLY / LBZ High Pressure Rail Fitting 701-005-4290
15. (1) Large Backside Idler Pulley 3C3Z-8678-BB
 - (2) 3/8 Flat Washers (included for spacing)
16. (1) Steel Braided Supply Line 701-023-4290
17. (1) Steel Braided Return Line 701-025-4290
18. (1) ATS Twin CP3 Electronic Controller Harness 701-019-4248
19. (1) ATS High Pressure Line 701-011-4290

20. High Pressure Junction Block with Relief 701-018-4290

- (1) High Pressure Relief Junction Block 97208076
- (1) High Pressure Cap and Ball installed
- (1) High Pressure Sensor Plug installed
- (1) 16mm Return Banjo 701-034-4290
- (1) 16mm Banjo Seal 97250485
- (1) 16mm Banjo Bolt AM-10
- (1) 12mm to -6 Fitting 7400-6-12
- (1) 12mm to 5/16" Barbed Fitting
- (2) 5/8" Hose Clamp 5324K14
- (1) 12mm Copper Sealing Washer 853009-12

21. Section of Rubber Fuel Line

- (24") 5/16" Fuel Line

22. Hardware Kit 701-001-4290

- (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

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

Not Pictured:

24. (12) 7.5" Zip-Ties

25. (2) 5/8" Hose Clamps

26. Section of Velcro to Attach Controller

27. Instruction Manual 701-900-4290 – INST

Note: Item 20; "High Pressure Junction Block with Relief" changed to simplify installation. The parts listed replaced the 16mm to JIC-6 fitting, -6 Tee Male/Female/Male, 3/8" Fuel Line and the 5/16" to 3/8" Rubber Line Adapter found in v1.0. If you need these parts or additional assistance, please refer to page 14 of this manual for contact information.