



**S&S DIESEL®**  
MOTORSPORT

## **L5P Duramax CP3 Conversion**

Vehicle Fitment: 2017+ Chevy/GMC Truck -6.6L Duramax Diesel

### **Part Numbers:**

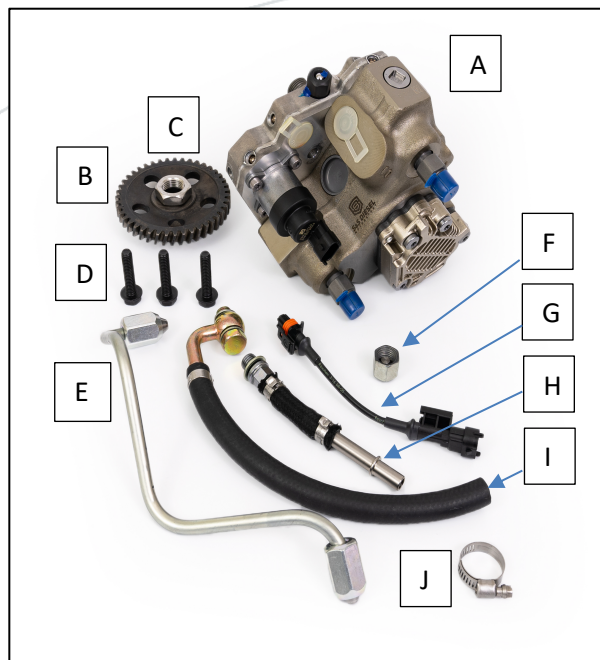
L5P-CP3-10, L5P-CP3-12, L5P-CP3-14

### **Installation Instructions**



## Parts Included in L5P CP3 Conversion Kit:

Please verify that all components stated below are included in the kit you received:



- S&S Cp3 High Pressure Pump x1 (A)
- High Pressure Pump Gear x1 (B)
- High Pressure Pump Gear Nut x1 (C)
- High Pressure Pump Flange Mounting Bolt x3 (D)
- HP Fuel Line for Passenger Side Pump Outlet to Rail x1 (E)
- Fuel Rail Cap x1 (F)
- Metering Unit Extension Harness x1 (G)
- Fuel Feed Line Adapter x1 (H)
- High Pressure Pump Return Line x1 (I)
- Fuel Return Line Hose Clamp x1 (J)
- Blue Dust Cap x3 (not pictured)

## Critical Torque Specifications:

Part Description	Standard	Metric
Pump Gear Nut	77 lb-ft	104 Nm
Pump Adapter Plate – 13mm Headed Bolts	25 lb-ft	34 Nm
Pump to Engine Bolts	18 lb-ft	24 Nm
High Pressure Fuel Rail Cap	45 lb-ft	61 Nm
Accessory Bracket Bolts/Nuts	37 lb-ft	50 Nm
Power Steering Bolts	16 lb-ft	22 Nm

## IMPORTANT NOTES:

- This installation was done on a 2025 Chevy 2500. Other models install may be slightly different.
- Before removing any components from the engine bay, use compressed air or low-pressure water to clean any debris out of the engine bay. During installation there will be the opportunity for contaminants to get into the engine's air, oil, and fuel circuits.

## **Tools Needed for Install:**

- 10mm, 13mm, 15mm, 17mm, & 19mm Wrenches
  - Short & Long 10mm & 13mm / 10mm, 13mm, & 15mm Ratchet Wrenches
- Assortment of Pliers
- Flush Cuts
- Medium Length Pry Bar
- Push Pin Removal Tool
- Harness Retention Tab Removal Pliers
- 1/2" Drive Extension - 4"
- 3/8" Drive Wobble Extension - 4", 2"
- 1/2" Drive Extension - 8", 3", & 2"
- 1/2" Drive Sockets – 1/4", 7mm, 8mm, 10mm, & 13mm
- 3/8" Drive Sockets – 10mm, 7/16", 13mm, 15mm, 16mm, & 17mm

- 3/8" to 1/4" Drive Adapter
- 1/2", 3/8", & 1/4" Drive Ratchets
- Air Hammer
- Small Line Bender
- L5P 52mm Fan Clutch Wrench
- Line Quick Disconnect Tools
- Coolant Hose Screwdriver

## **Gaskets Recommended to Replace:**

- Intake Manifold
- EGR
- HP4 O-Rings
- Thermostat "Y" Gaskets
- A/C Compressor Gasket
- Fuel Line Banjo Bolt Seals







Figure 1: Engine Component Diagram (2025 shown in graphic)

### **HP4 Removal Instructions:**

1. **Disconnect negative terminals from both batteries (labeled as A in Figure 1).**
2. **Drain coolant from passenger side petcock (labeled as A Figure 2).**
3. **Remove airbox and intake tube (labeled as B in Figure 1).**
  - a. 13mm hex head nut on silencer box above a/c compressor x1.
  - b. 7mm hex head worm clamp on turbo compressor inlet x1.
  - c. 8mm hex head screws x6 on airbox lid.
  - d. Remove air filter.
  - e. Remove lower intake box 10mm hex head nut x1.

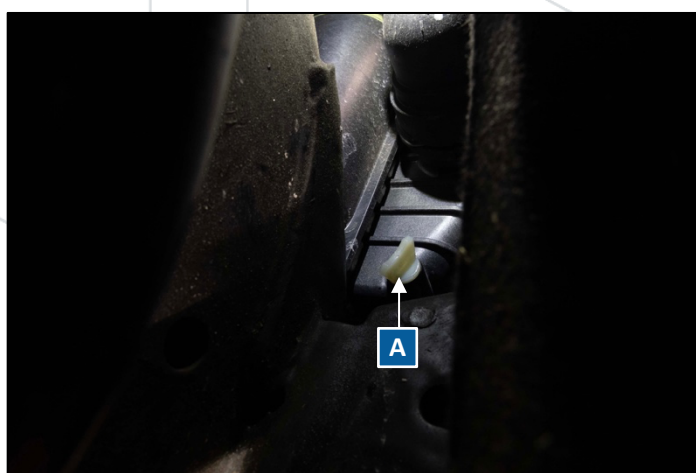


Figure 2: Passenger Side Petcock

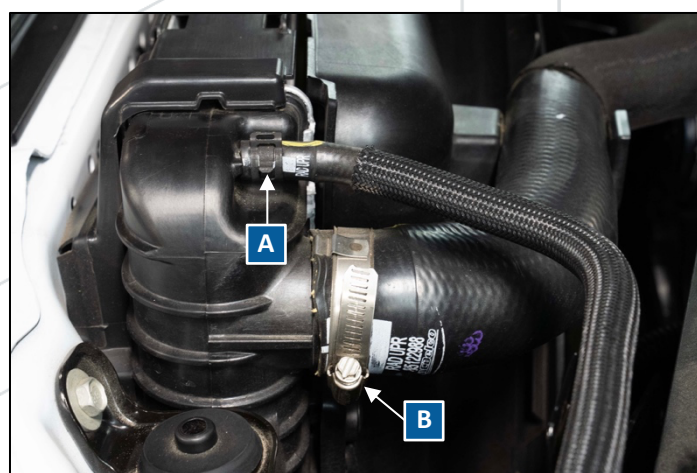


Figure 3: Upper Radiator Hose Clamps

4. **Remove upper fan shroud (labeled as C in Figure 1).**
  - a. Remove upper radiator hose from driver's side with spring clamp on engine side and 8mm hex head worm clamp on radiator (labeled as B in Figure 3).



- b. Remove radiator bleed hose with spring clamp at radiator and set to the side (labeled as A in Figure 3).
- c. Separate A/C line retention clip from shroud on passenger side (labeled as A in Figure 4).
- d. Remove six push pins from the radiator shroud. Two on each side towards the middle and one on each side near the top (labeled A in Figures 5 and 6).
- e. Remove upper portion of fan shroud (Figure 7).

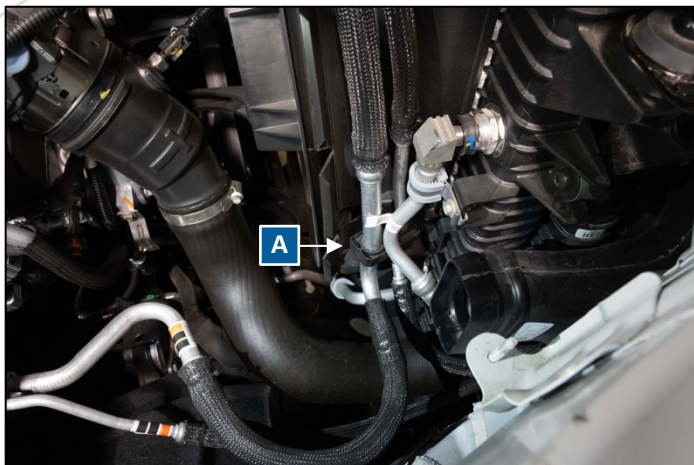


Figure 4: A/C Line Retention Clip

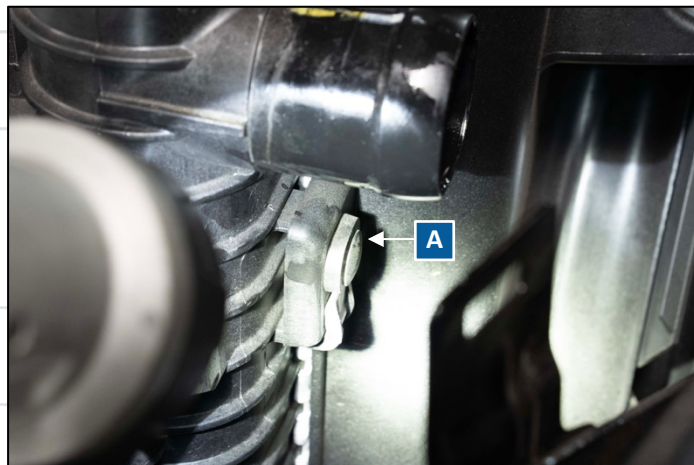


Figure 5: Radiator Shroud Push Pin



Figure 6: Radiator Shroud Push Pin

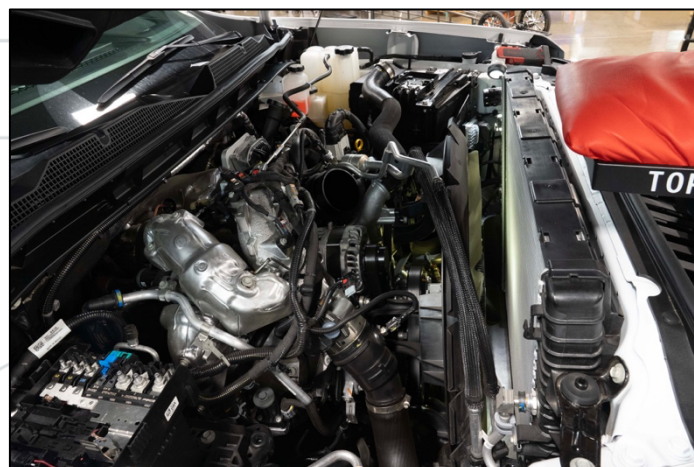


Figure 7: Upper Fan Shroud Removed

5. **Optional: Use a piece of cardboard or similar product, cut to 34.5" x 31" to place on radiator fins for protection.**
6. **Install cardboard.**
7. **Remove fan from clutch assembly by removing 13mm hex head nuts x 6 (Figure 8).**
8. **Unplug clutch fan connector and disconnect retention tab from inner shroud and separate ball socket harness bracket from engine (labeled as A and B in Figure 9).**
9. **Remove 13mm hex head bolts x4 from inner shroud and leave shroud in place.**
10. **Remove clutch fan assembly with 52mm clutch fan wrench.**
  - a. Older trucks with single belt are right hand thread.
  - b. Newer trucks with dual belt are left hand thread.
11. **Remove clutch fan assembly.**
12. **Remove Inner shroud assembly from step 9 that was left in place.**
13. **Remove fan drive belt by releasing tensioner with 16mm hex head stud (labeled as C in Figure 9).**
14. **Remove primary serpentine belt by releasing tensioner with 1/2" drive extension (labeled as D in Figure 9).**



**15. Remove belt tensioner 15mm hex head bolt on primary belt drive (fan drive tensioner can stay).**



Figure 8: Fan Removed

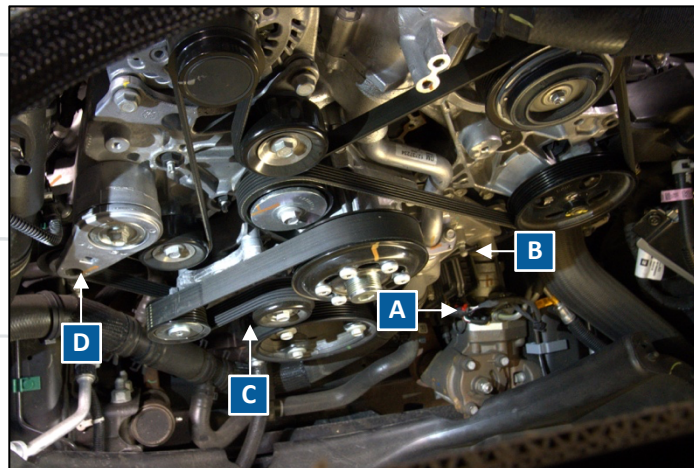


Figure 9: Accessory Drive Assembly

**16. Remove right center pulley, 15mm hex head bolt (labeled as A in Figure 12).**

**17. Remove large harness connector on bracket above A/C compressor (labeled as A in Figure 13).**

**18. Remove bracket from the top of A/C compressor, 13mm hex head nut x2 (labeled as B in Figure 13).**

**19. Unplug A/C clutch and A/C pressure connectors (labeled as C and D in Figure 13).**

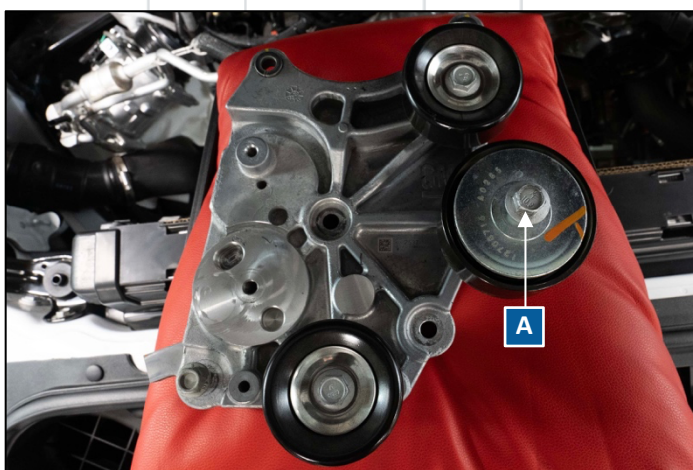


Figure 12: Accessory Bracket Removed for Reference

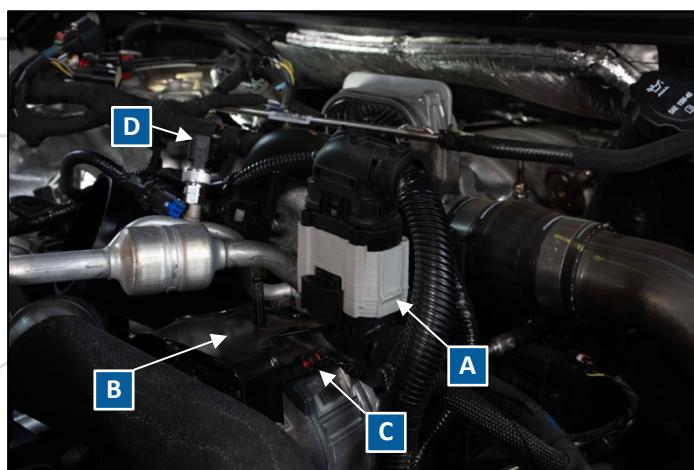


Figure 13: Top of A/C Compressor

**20. Remove A/C compressor (two options for removal).**

a. Option A:

- i. Remove freon properly.
- ii. Remove A/C lines from compressor, 13mm hex head nut and set lines to the side.
- iii. Remove A/C compressor mounting hardware, 15mm hex head bolt x4.
- iv. Remove A/C compressor.

b. Option B:

- i. Remove A/C compressor mounting hardware, 15mm hex head bolt x4.

**PRO TIP:** Back left bolt can be removed with wrench while lifting compressor. Bolt will stay with A/C compressor and lines.



- ii. Set A/C compressor and lines attached where airbox normally sits, while using caution to the lines and not letting them kink or fold (Figure 14).

**21. Unplug alternator connector and remove battery cable from alternator, 17mm hex head nut.**

**22. Remove alternator, 15mm hex head bolts x2.**

**23. Remove turbo compressor inlet 13mm hex head bolt x2 and hose clamp on positive crankcase ventilation oil separator (labeled as A and B in Figure 15).**



Figure 14: A/C Compressor Lines

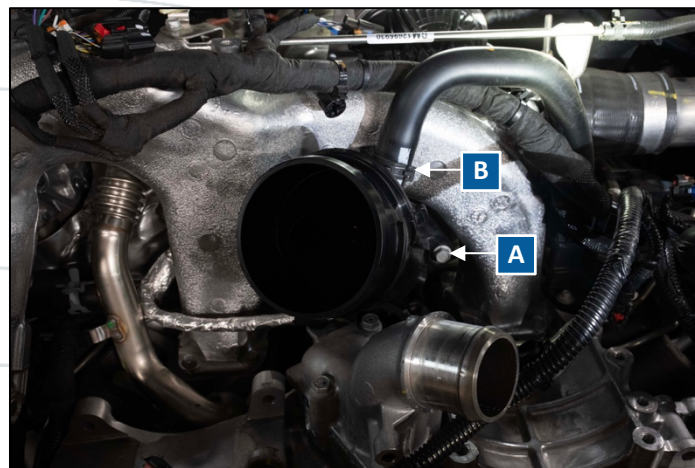


Figure 15: Turbo Compressor Inlet

**24. Remove upper EGR heat shield, 10mm hex head bolt x3 (labeled as A in Figure 16).**

**25. Unbolt EGR cold tube from upper Intake manifold 13mm hex head bolt x2 (labeled as A and B in Figure 18).**

**26. Un plug EGR bypass valve (labeled as C in Figure 18).**

**27. Remove EGR Cooler coolant bleed line 10mm hex head bolts x2, spring clamps x2 (labeled as D in Figure 18).**

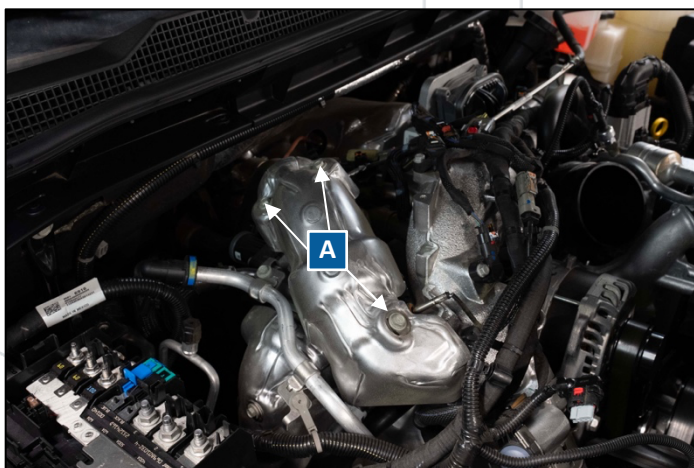


Figure 16: EGR Heat Shield

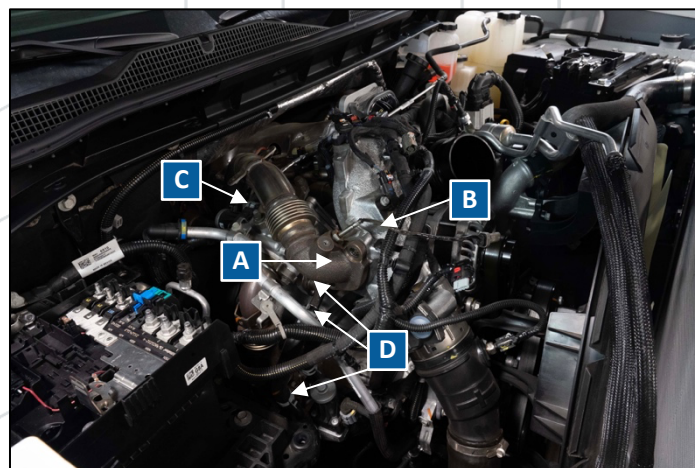


Figure 18: EGR Assembly

**28. Un plug IAT (Intake Air Temp) sensor on charge pipe from intercooler (labeled as A in Figure 19).**

**29. Remove charge pipe from intercooler to upper intake manifold by spreading retaining clips and set to the side (labeled as B in Figure 19).**

**30. Remove remaining electrical connectors and wire harness retention clips from upper intake manifold.**

**31. Unplug coolant temp sensor connector and retention clip near thermostat housing.**



**32. Remove upper intake manifold by removing 10mm hex head bolts x8. The picture shows the intake removed but where the bolt hole locations are (labeled as A in Figure 20).**

**PRO TIP:** There are two harness retention clips on back of upper intake manifold.

**33. Remove EGR temp module from rear EGR coolant tube, 10mm hex head nut (labeled as A in Figure 21).**

**34. Remove both EGR coolant tubes (labeled as B in Figure 20).**

- a. Front coolant tube: 10mm hex head bolt x2, 13mm hex head bolt, and spring clamp.
- b. Rear coolant tube: 10mm hex head bolt x2, spring clamp at return line and thermostat housing.

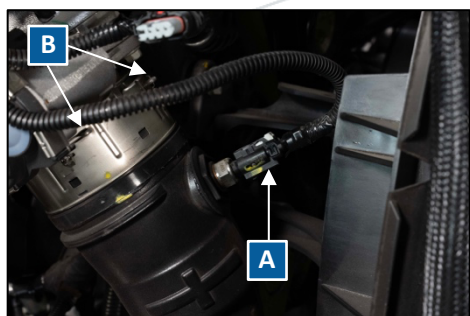


Figure 19: Charge Pipe

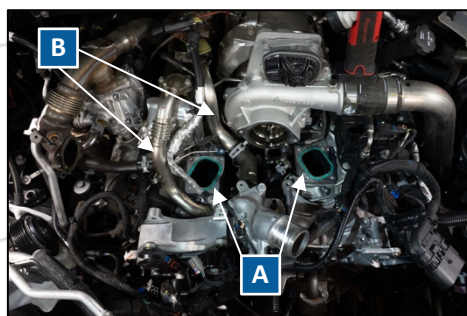


Figure 20: Upper Intake Manifold Removed



Figure 21: EGR Temp Module

**35. Remove passenger side accessory bracket (Figure 22).**

- a. Remove harness retention clips.
  - i. Two on bottom and two on side.
- b. Remove heater hose bracket on left side, 10mm hex head bolt.
- c. Remove 15mm hex head nut x2 and 15mm hex head bolt x1.
- d. Remove bracket.

**36. Remove Power Steering Pump (Labeled as A in Figure 23).**

- a. Remove harness retention clips.
- b. Remove harness bracket above P/S pump, 10mm hex head bolt x2.

**PRO TIP:** Use short ratcheting wrench.

- c. Remove bolt from rear of P/S pump, 13mm hex head bolt.
- d. Remove bolts from front of P/S pump through pulley, 13mm hex head bolt x3.
- e. Set P/S pump to the side.

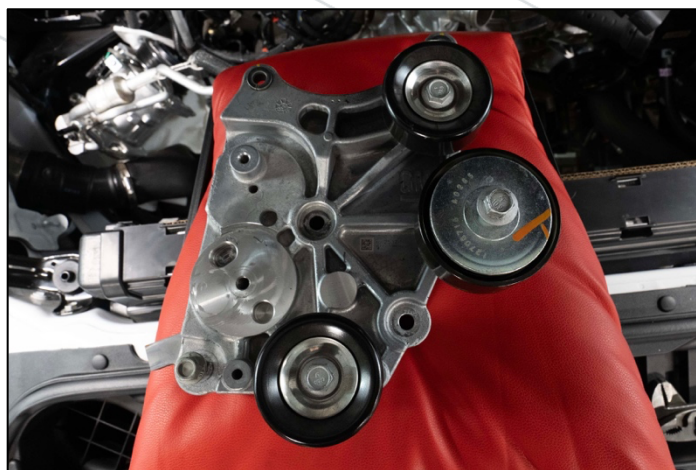


Figure 22: Accessory Bracket Removed

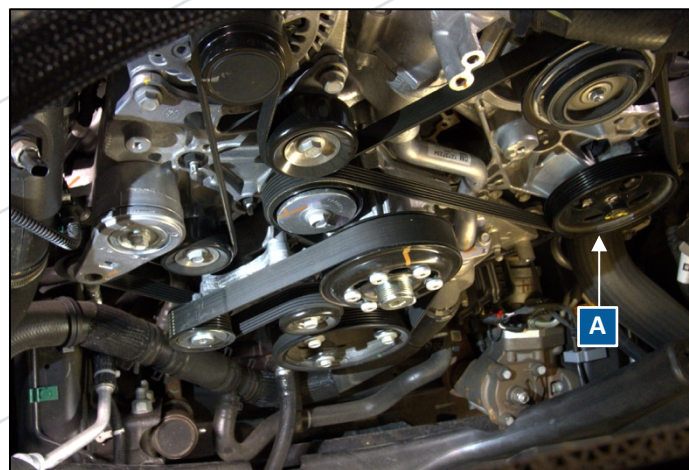


Figure 23: Accessory Drive Assembly

37. Remove driver side accessory bracket, 15mm hex head bolt x2 and 15mm hex head nut x2.
38. Remove thermostat housing Y.
  - a. Remove bolts from bottom of thermostat bypass pipe, 13mm hex head bolt x2.
  - b. Remove 13mm hex head bolt x4 and 13mm hex head nut from housing to cylinder heads x4.
  - c. Remove thermostat housing.
39. Remove charge air cooler pipe from turbo outlet, 11mm hex nut and set to the side (labeled as A in Figure 24).
40. Remove positive crankcase vent oil separator.
  - a. 10mm hex head bolt on the backside of the turbo outlet x2.

**PRO TIP:** Leave vent attached to PCVOS and only unbolt from turbo.

- b. 8mm hex head bolt from base x4 (bolt holes labeled as A in Figure 25).

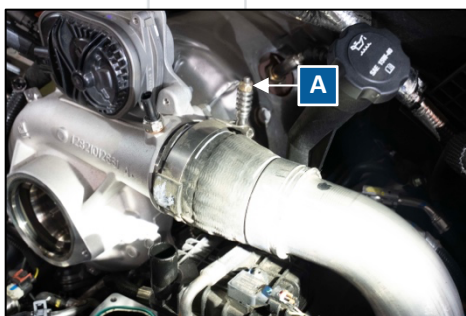


Figure 24: Charge Air Cooler Pipe

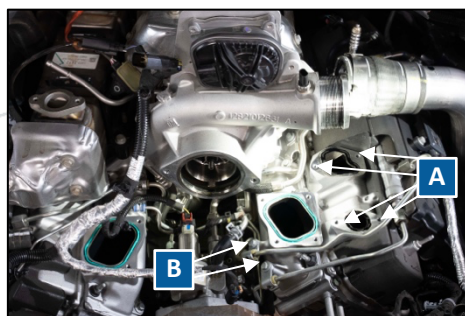


Figure 25: PCVOS Removed

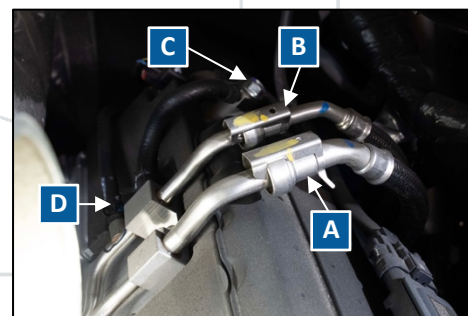


Figure 26: Fuel Feed and Return

41. Disconnect fuel feed (1/2") and return lines (3/8") (labeled A and B in Figure 26).

**PRO TIP:** Use rags to cover sound deadening material. If material gets fuel soaked it will need to be replaced as it would be a fire hazard.

42. Remove fuel return line banjo bolt at rear of driver side head, 13mm hex head bolt (labeled as C in Figure 26).
43. Remove injector return hose from line set, just below the banjo bolt hose (labeled as D in Figure 26).
44. Remove line set hold down, 10mm hex head bolt x 2 (labeled as B in Figure 25).
45. Remove fuel fitting bracket.
46. Disconnect fuel return & fuel injector return lines right above pump, spring clamp x2.
47. Disconnect HP4 IMV connector.
48. Disconnect pump feed by releasing clip retainer.
49. Remove feed/return line assembly from truck.
50. Remove HP line hold downs, 10mm hex head bolts x5.
51. Remove HP line from pump to driver side rail, 17mm wrench.
52. Remove HP crossover line from rail to rail and discard, 17mm wrench.
53. Install provided blue caps onto rail.
54. Disconnect rail pressure sensor plug and disconnect harness retention tab (labeled as A in Figure 27).
55. Remove passenger side injector return hold down bolt and set line to the side of the valley, 10mm hex head.
56. Remove HP4 mounting hardware, 13mm hex head bolt x4 (labeled as B in Figure 27).
57. Remove HP4 from the valley by sliding towards cab and lifting out.
58. Clean all coolant and fuel from valley.
59. Remove flange from HP4 to be reused with CP3.
  - a. Remove gear nut using gear holding tool and 19mm socket
  - b. Use three jaw puller or equivalent to separate gear from pump



- c. Remove flange mounting hardware, 6mm Allen head bolt x3 (labeled A in Figure 28).
- d. Clean HP4 flange and inspect o rings.

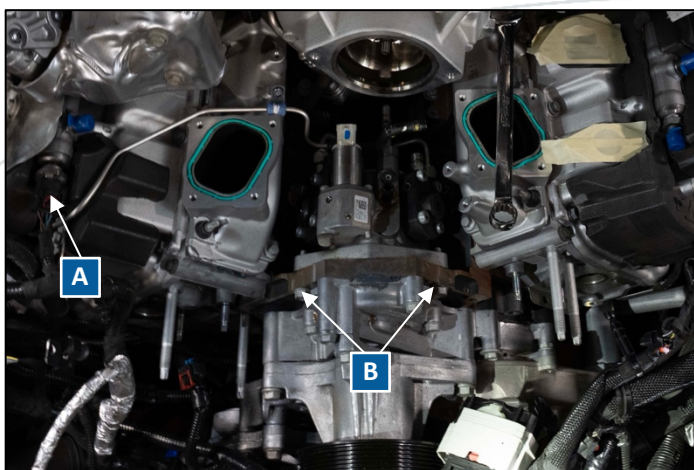


Figure 27: HP4 in the Valley

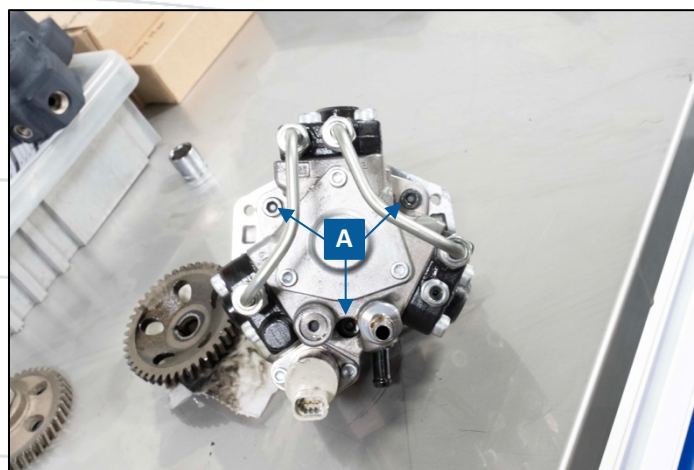


Figure 28: HP4 Flange Mounting Bolts



## S&S CP3 Pump Installation:

1. **Install HP4 flange on CP3 with supplied hardware (Figure 29) Lube O-rings with oil or equivalent.**
  - a. Use supplied 13mm bolts to secure flange to cp3, x3 (labeled D in parts diagram, page 2).
    - i. Ensure flange is flush with CP3 mounting surface.
    - ii. Torque to 25 lb-ft (34 Nm).
  - b. Install supplied gear and nut (labeled B and C in parts diagram, page 2).
    - i. Torque nut to 77 lb-ft (104 Nm).

**PRO TIP:** Using a gear holding tool as pictured will make torquing nut easier and ensure proper torque.



2. **Install fuel feed line adapter with seal (labeled H in parts diagram) into flange of CP3.**
3. **Place CP3 into valley and slide into place with IMV facing upwards (labeled as A in Figure 30).**
4. **Secure pump with 13mm hex head bolts x4 (labeled as B in Figure 30).**
  - a. Torque to 18 lb-ft (24 Nm).
5. **Install supplied HP line from pump to passenger rail, 19mm wrench (labeled as C in Figure 30).**
  - a. Torque to 30 lb-ft (41 Nm).

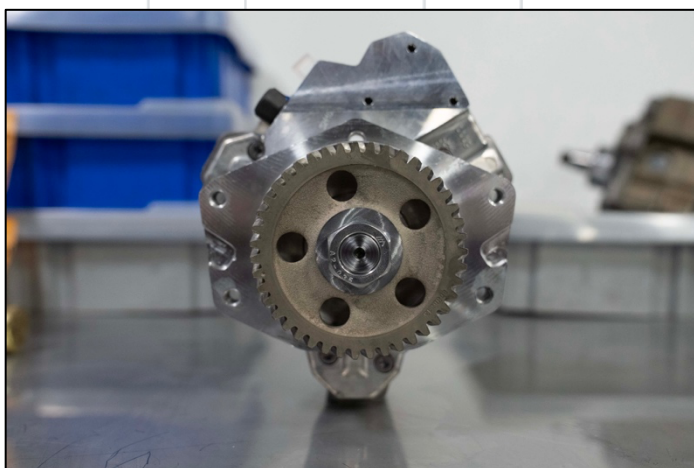


Figure 29: HP4 Flange on S&S CP3

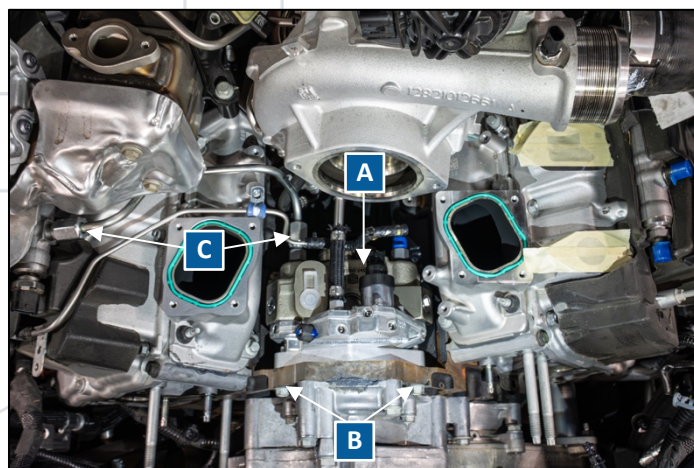


Figure 30: S&S CP3 in the Valley

6. **Make slight modifications to factory HP line from pump to driver side rail.**
  - a. At first bend from pump fitting, tighten bend by 15 degrees.
  - b. At second bend from pump, open bend by 15 degrees.
7. **After modifications are made, test fit and install line. The goal is to have the line seat without needing to push or pull on the line.**
8. **Install supplied rail cap to front of driver side rail and use 17mm socket.**
  - a. Torque to 30 lb-ft (41 Nm).
9. **Install factory feed/return line assembly and fasteners, 10mm hex head bolt x2.**
  - a. Torque to 89 lb-in (10 Nm)
10. **Reinstall return fitting banjo bolt on the back of the driver side cylinder head, 13mm hex head.**
  - a. Torque to 18 lb-in (2.03 Nm).
11. **Install supplied FCA extension harness.**
12. **Install supplied return hose to pump and leave disconnected from return line on engine.**
13. **Reinstall factory positive crankcase ventilation oil separator.**

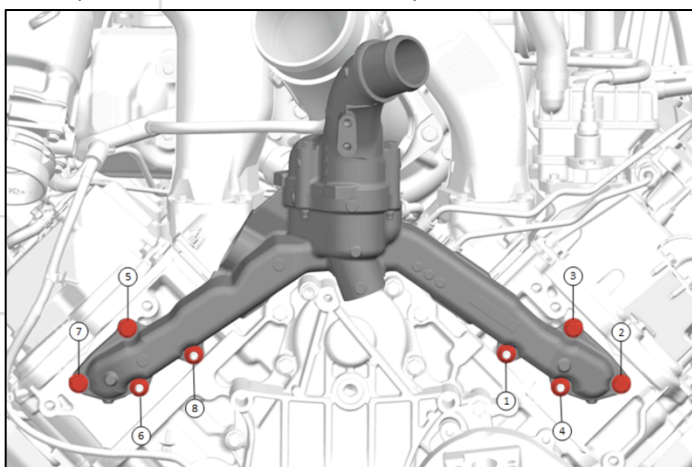
- a. Secure 8mm hex head bolts at base x4.
  - i. Torque to 80 lb-in (9.04 Nm).
- b. Secure Vent line to back of turbo 10mm hex head bolt x2.
  - i. Torque to 89 lb-in (10.06 Nm).
- c. Note: One port will be left open until intake tube is installed.

**14. Reinstall factory charge air cooler boost tube to turbo, 11mm hex nut on clamp.**

- a. Torque nut to 75 lb-in (8.5 Nm)

**15. Reinstall engine coolant thermostat housing.**

- a. Verify gaskets are in place.
- b. Place thermostat housing "Y" on studs.
- c. Secure coolant bypass pipe, 13mm hex head bolt x2.
  - i. Torque to 18 lb-ft (24 Nm).
- d. Secure thermostat housing with 13mm hex head bolt x 4 and 13mm hex nut x4 in sequence referenced below.
  - i. Torque to 18 lb-ft (24 Nm) in sequence shown below.



**16. Reinstall driver side accessory bracket with 15mm hex head bolt x2 and 15mm hex nut x2.**

- a. Torque to 37 lb-ft (50 Nm).

**17. Reinstall power steering pump.**

- a. 13mm hex head bolt x 3 through front pulley but do not tighten until fourth backside bolt is installed and started.
- b. 13mm hex head bolt on backside of pump.
  - i. After all bolts are started, torque to 16 lb-ft (22 Nm).

**18. Reinstall harness bracket above P/S pump, 10mm hex head bolt x2.**

- a. Torque to 80 lb-in (9.04 Nm).

**19. Reinstall harness retention clips on bracket.**

**20. Reinstall passenger side accessory bracket.**

- a. Secure with 15mm hex head bolt and 15mm hex nut x2.
  - i. Torque to 37 lb-ft (50 Nm).
- b. Reinstall center right pulley, 15mm hex head bolt.
  - i. Torque to 37 lb-ft (50 Nm).
- c. Resecure retention clips (2 on bottom and two on left side).
- d. Reinstall heater hose bracket on left side 10mm hex head bolt.

**21. Reinstall both EGR coolant tubes.**

- a. Rear tube 10mm hex head bolt x2.

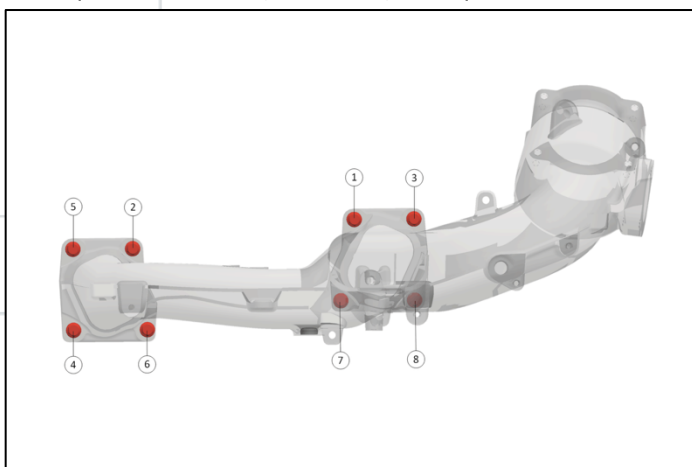
- i. Torque to 89 lb-in (10Nm)
  - ii. Hose clamp at return line and thermostat housing.
- b. Front tube 10mm hex head bolt x2
  - i. Torque to 89 lb-in (10Nm)
- c. 13mm hex head bolt, and spring clamp.
  - i. Torque to 18 lb-ft (25Nm)
- d. Reinstall temp module on top of rear tube with 10mm hex nut.
  - i. Torque to 80 lb-in (9.04 Nm)

**22. Secure pump return to factory return line looped over coolant hose and secure with provided worm clamp, 17mm socket and 1/4" clamp nut.**

- a. Banjo bolt-torque to 25 lb-ft (34 Nm)
- b. 1/4" clamp-torque to 10 lb-in (1.1 Nm)

**23. Reinstall upper intake manifold.**

- a. Secure upper intake manifold with 10mm hex head bolts x8.
  - i. Torque to 89 in-lbs (10.06 Nm) in sequence shown below.



**24. Reinstall harness retention clips on back of upper intake manifold.**

**25. Bolt EGR cold tube to upper intake manifold 13mm hex head bolt x2.**

- a. Torque to 24 lb-ft (33 Nm)

**26. Reinstall EGR coolant bleed line.**

- a. Secure with 10mm hex head bolt x2 & spring clamp.
  - i. Torque to 89 lb-in (10.06 Nm).

**27. Reinstall coolant temp sensor connector and harness retention clips.**

**28. Reinstall belt tensioner.**

- a. 15mm hex head bolt torqued to 43 lb-ft (58 Nm).

**29. Reinstall turbo compressor inlet 13mm hex head bolt x2.**

- a. Torque to 18 lb-ft (24 Nm).
- b. Secure hose with spring clamp at positive crankcase ventilation oil separator.

**30. Reinstall alternator**

- a. Secure alternator with 15mm hex head bolt x2.
  - i. Torque to 43 lb-ft (58 Nm).
- b. Connect battery cable to alternator, 17mm hex nut.
  - i. Torque to 124 lb-in (14.01 Nm).
- c. Reinstall A/C compressor.
  - i. Option A:



1. Secure A/C compressor with 15mm hex head bolts x4.
  - a. Torque to 43 lb-ft (58 Nm).
  - b. Re install A/C compressor lines.
- ii. Option B:
  1. Secure A/C Compressor and line set with 15mm hex head bolt x4.
    - a. Torque to 43 lb-ft (58 Nm).
- d. **Reconnect A/C compressor harness.**
- e. **Reinstall bracket on top of A/C compressor for harness mount, 13mm hex nut x2.**
  - i. Torque to 16 lb-in (1.81 Nm).
- f. **Reinstall main serpentine belt and fan drive belt (Figures 31 and 32).**

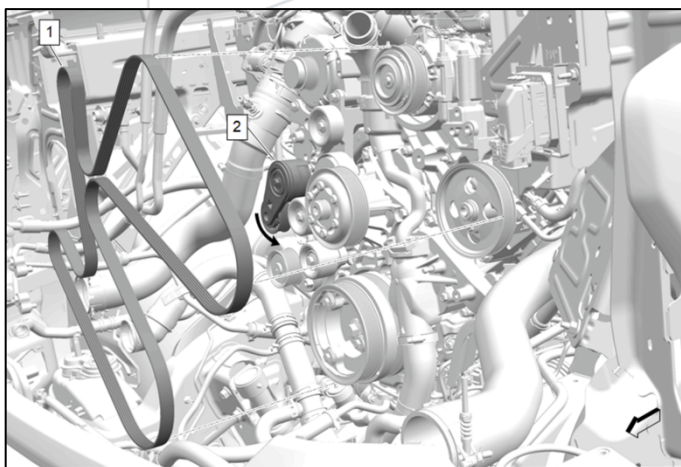


Figure 31: Main Serpentine Belt Routing

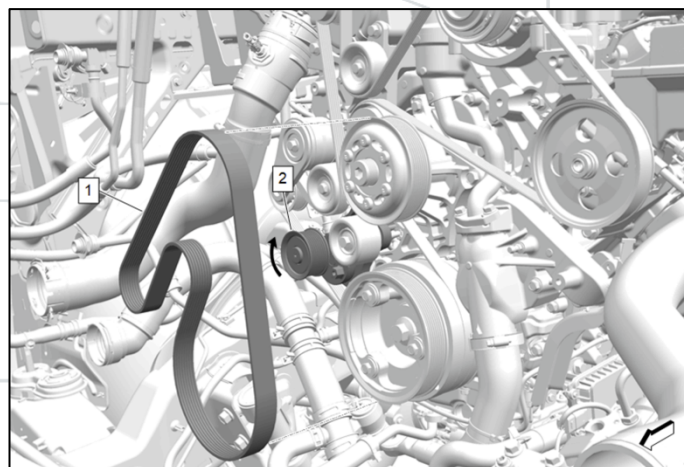


Figure 32: Fan Drive Belt Routing

31. **Reinstall lower plastic charge pipe to upper intake manifold snapping it into place, ensuring the retention clip is in its groove.**
32. **Connect IAT sensor on charge pipe.**
33. **Reinstall Inner fan shroud into place using alignment posts but leave unbolted.**
34. **Reinstall clutch fan assembly with 52mm fan clutch tool.**
  - a. Torque to 74 lb-in (8.36 Nm).
35. **Plug in fan clutch connector and resecure harness retention tab to inner shroud and ball socket on engine.**
36. **Secure inner shroud with 13mm hex head bolt x4.**
  - a. Torque to 16 lb-ft (22 Nm).
37. **Reinstall fan blade assembly to clutch fan with 13mm hex nut x6.**
  - a. Torque to 16 lb-ft (22 Nm).

Note: Fan blade will only attach one way.
38. **Reinstall upper fan shroud.**
  - a. Use locating pins on bottom and slots on top to align upper fan shroud. Ensure bottom shroud is still in its mounting slots.
  - b. Secure top of fan shroud with one push pin at the top front of shroud on both driver and passenger side.
  - c. Secure bottom of fan shroud with 2 push pins on both driver and passenger side securing shroud to bottom portion.
  - d. Reattach A/C line bracket with retention clip on passenger side of shroud.
39. **Resecure upper radiator hose on driver side.**
  - a. Secure with spring clamp on engine side.

- b. Secure 8mm hex head worm clamp on radiator side.

**40. Re install radiator bleeder/vent hose from reservoir to radiator with spring clamp.**

**41. Re install upper EGR heat shield with 10mm hex head bolt x3.**

- a. Torque to 80 lb-in (9.04 Nm).

**42. Install air intake.**

- a. **Secure lower air intake box with 10mm hex nut.**

- i. Lower box has locating pins on bottom and air ram vent in front for alignment.

**Note: If the rubber(s) pull out of the bracket, remove the rubbers from the air box and install into the bracket before trying to install lower box.**

- ii. Torque to 80 lb-in (9.04 Nm)

- b. Secure harness clip on back right of box.

- c. Reinstall air filter.

- d. Reinstall upper lid and tube / silencer box.

- i. 8mm hex head screw x6 secure lid.

- 1. Torque to 35 lb-in (4 Nm)

- ii. 7mm hex head worm clamp at compressor inlet.

- 1. Torque to 44 lb-in (5 Nm)

- iii. 13mm hex nut on top of A/C compressor bracket.

- 1. Torque to 80 lb-in (9 Nm)

- iv. Plug in MAF sensor.

**43. Refill coolant.**

**44. Reconnect batteries.**

**45. \*If freon was removed in disassembly step 18 properly re charge A/C system.**

**46. DO NOT attempt to start the engine without first priming the system by cycling the key multiple times.**

- a. Turn the key to the ON position for 30 seconds. Cycle the key on (for 30 seconds each time) and off, five times.
  - i. For vehicles equipped with a push-button start, press the button without your foot on the brake pedal.

**47. After cycling the key on and off at least five times for 30 second intervals each time, start the truck and inspect the high and low-pressure fuel fittings for leaks.**

**Thank you for choosing S&S, please share your experience with the world!**

