

## INSTALLATION INSTRUCTIONS

**SUBJECT:** CHEETAH® TURBOCHARGER FOR 2004.5-2010 6.6L DURAMAX

FPE-2023-107  
Revised November 2023

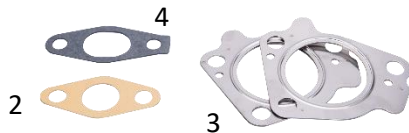
**FITMENT:** 2004.5-2010 GM/GMC 6.6L Duramax

**P/N:** FPE-VNT63-STREET

**ESTIMATED INSTALLATION TIME:** 6-8 hours

### KIT CONTENTS:

Item	Description	Qty
1	Turbocharger assembly	1
2	Turbo oil drain gasket	1
3	Up pipe gaskets	2
4	Lower drain tube gasket	1



### IMPORTANT NOTICES:

For California customers: An E.O. identification label is required for Smog Check inspection. The E.O. identification label included with your turbocharger MUST be placed near the turbocharger in the engine compartment so that smog check technicians can verify the E.O. number.

# INSTALLATION INSTRUCTIONS

## GUIDELINES AND CHECKLIST:

**IMPORTANT:** If a turbocharger has failed, clean all turbocharger debris and/or oil from the charge air cooler system before installing the new turbocharger. Failure to clean debris from the charge air cooler system will cause severe turbocharger and engine damage upon startup. Failure to clean excessive oil from the charge air cooler system may cause an engine runaway condition on startup, resulting in severe engine damage. It is the responsibility of the installer to verify cleanliness of the system prior to re-assembly and startup.

**IMPORTANT:** If a turbocharger failure is thought to be caused due to lack of oil, the camshaft bearing should be checked. The number 4 camshaft bearing bore feeds the turbocharger oil supply (feed) pipe. If this camshaft bearing spins in the bore, the turbocharger will be starved for oil. This will cause a failure of the turbocharger. Failure to diagnosis this condition will result in repeat turbocharger failures.

1. Inspect the intake and exhaust system leading to and from the turbocharger to ensure they are free of all debris. If the vehicle has experienced a turbocharger failure that resulted in mechanical damage to the compressor wheel prior to installation of a new turbocharger, a new intake air filter **MUST** be installed. Debris from a failed turbocharger can become lodged in the original filter and easily drawn into the new turbocharger. Small particles will cause severe damage at high speeds.
2. Use new gaskets at all air, oil, and exhaust connections. Never use silicone sealants on intake components. Silicone can become loose and become ingested into the turbocharger causing damage.
3. Use high temperature anti-seize compound on all threaded fasteners connected to the turbocharger.
4. Ensure the drain port tilt is no more than 20 degrees from the bottom center in either direction. Excessive tilt can create leakage on both the turbine and compressor seals.
5. Fill the oil inlet port with clean engine oil before connecting the oil feed hose to the turbocharger.
6. Before connecting the oil drain hose, crank the engine without starting it until a steady stream of oil flows from the drain port.
7. Operate the engine at low idle for at least three minutes after completing the installation of any turbocharger. This will prevent oil starvation damage to the bearing system and will tend to purge any residual contaminants from the bearings housing.

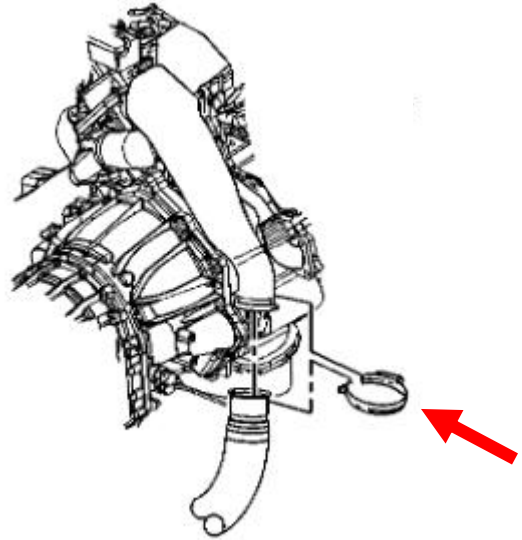
## FACTORS AFFECTING TURBOCHARGER SERVICE LIFE:

An analysis of turbochargers indicated that approximately 40% of the failures are due to foreign material going through either the turbine or the compressor. An additional 40% are due to lubrication issues. The remaining 20% are of a miscellaneous nature. Some of the foreign material damage is the result of pieces of burned or broken valves, improperly installed gaskets, casting fins that may break out of the manifold, pieces of the air cleaner, and in small cases nuts or bolts that were dropped into the intake system. Undersized or plugged oil lines are the most common lubrication issue. It is essential to have an adequate supply of oil at full engine oil pressure.

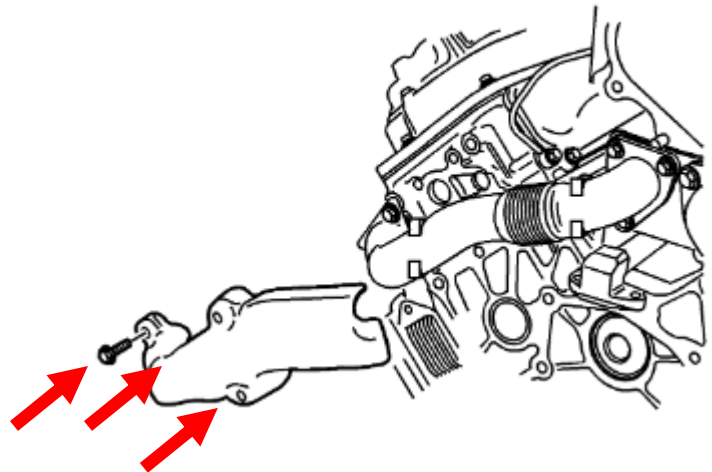
# INSTALLATION INSTRUCTIONS

## TURBOCHARGER REMOVAL:

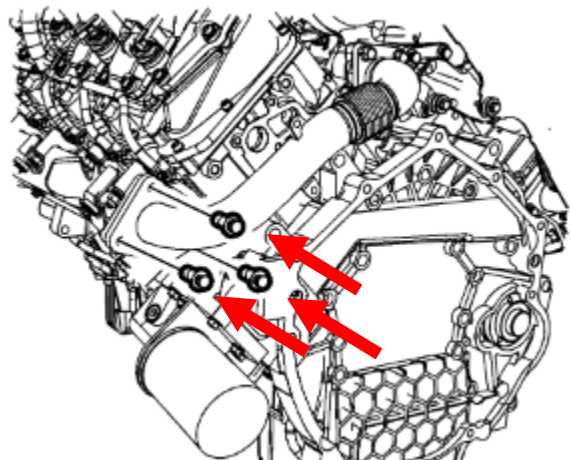
1. Disconnect the negative battery cables.
2. To allow for improved access to the engine, remove the driver's side and passenger's side wheel well liners.
3. From the passenger side of the vehicle, loosen the exhaust pipe clamp and slide it down the exhaust pipe. This clamp will be reused.



4. Remove the left side exhaust pipe heat shield bolts and remove the heat shield.

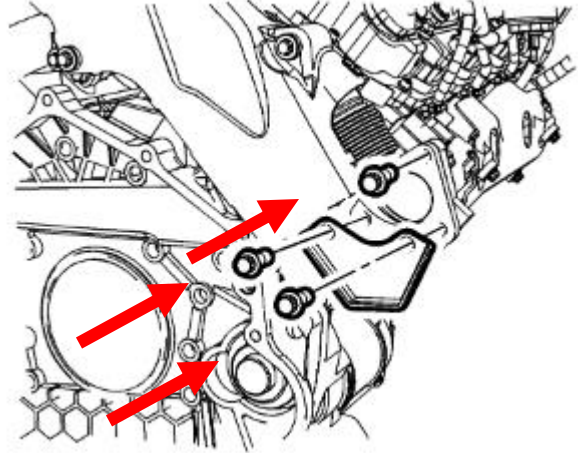


5. Remove the left side exhaust pipe to exhaust manifold lower bolts only.

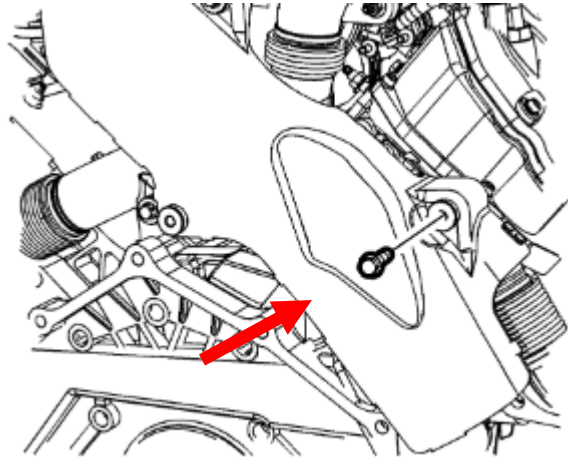


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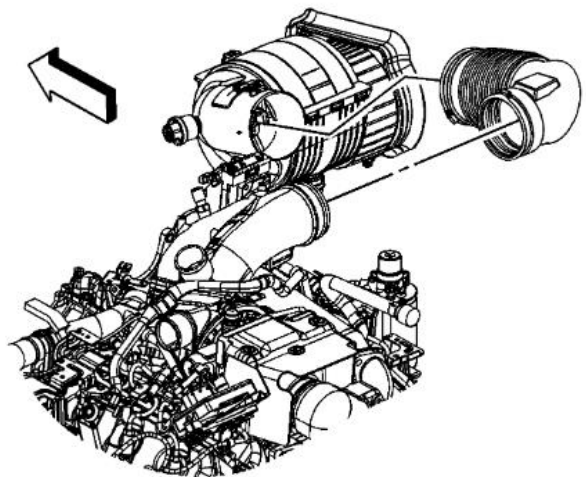
6. Remove the right side exhaust pipe to exhaust manifold lower bolts only.



7. Remove the lower bolt for the right side exhaust outlet shield.



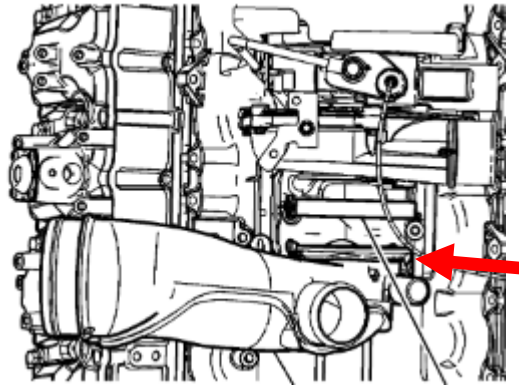
8. Drain the cooling system.
9. Loosen the clamps at the air cleaner assembly and the turbocharger. Remove the air cleaner outlet duct. The clamps will be reused.



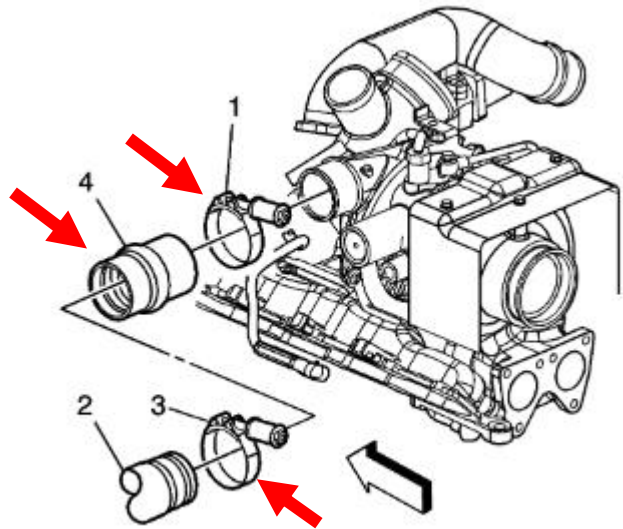


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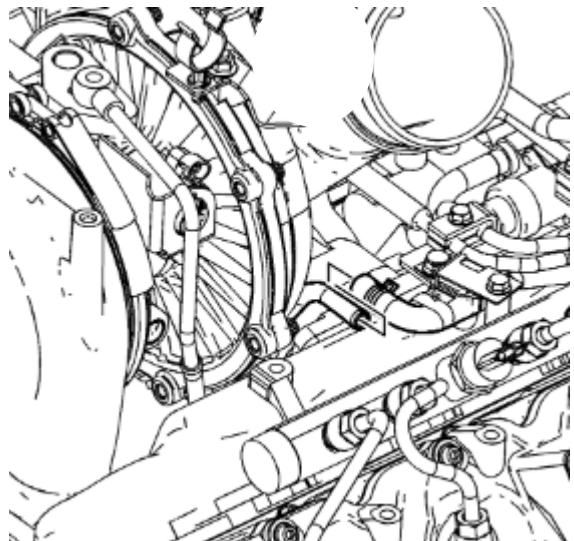
10. Loosen the air intake pipe to turbocharger clamp and remove the air intake pipe from the turbocharger. The clamp will be reused.



11. Remove the charged air cooler inlet duct from the intake by loosening the clamps (1,3) and removing the hose adapter (4). Do not use a screwdriver or other tool to pry the hose loose. The hose can be torn or damaged, loosen the hose by twisting.

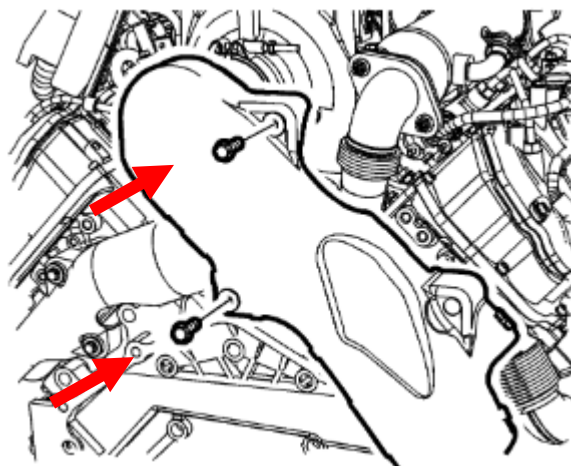


12. Remove the turbocharger inlet coolant hose from the turbocharger coolant bypass valve.
13. Remove the turbocharger outlet coolant hose from the turbocharger. Remove the turbocharger outlet coolant pipe banjo bolt and washers.
14. Remove the positive crankcase ventilation (PCV) hose/pipe.



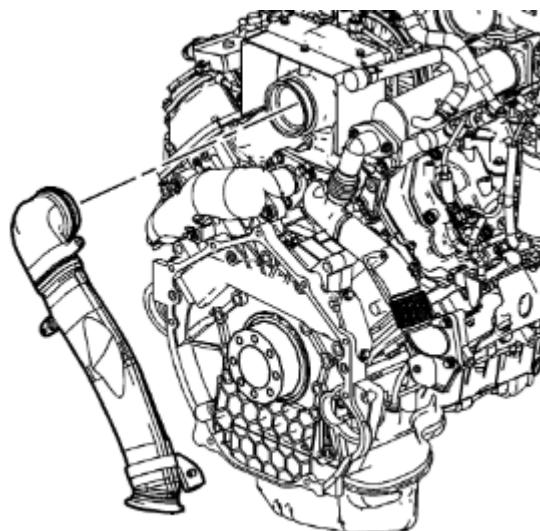
## INSTALLATION INSTRUCTIONS

15. Remove the turbocharger upper heat shield bolts and remove the turbocharger upper heat shield.



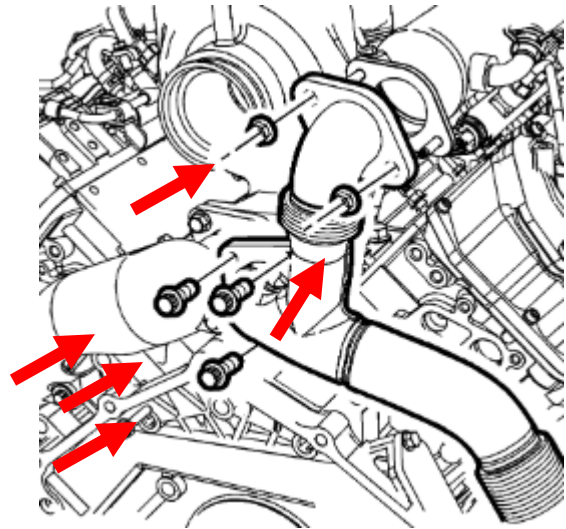
16. Remove the remaining exhaust outlet heat shield upper bolts and remove the exhaust heat shield.

17. Loosen the exhaust outlet clamp and remove the exhaust outlet from the turbocharger. The clamp will be reused.

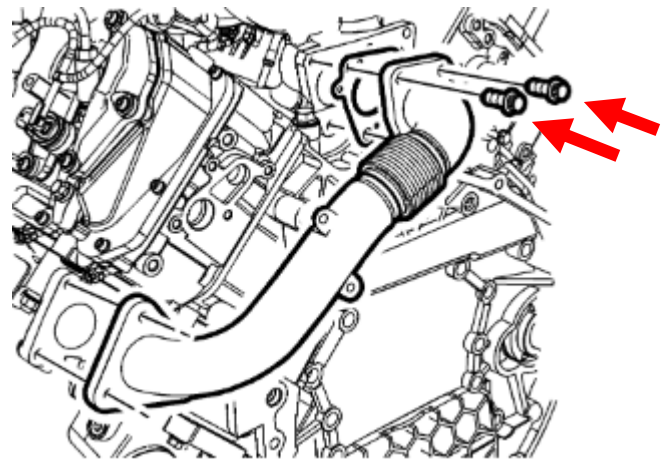


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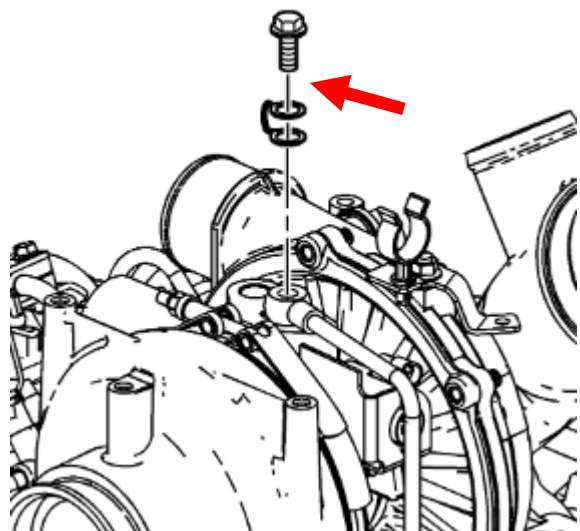
- 18. Remove the right exhaust pipe to turbocharger bolts and Exhaust Gas Recirculation (EGR) nuts.
- 19. Remove the right exhaust pipe.



- 20. Remove the left exhaust pipe to turbocharger upper bolts. Remove the left exhaust pipe.



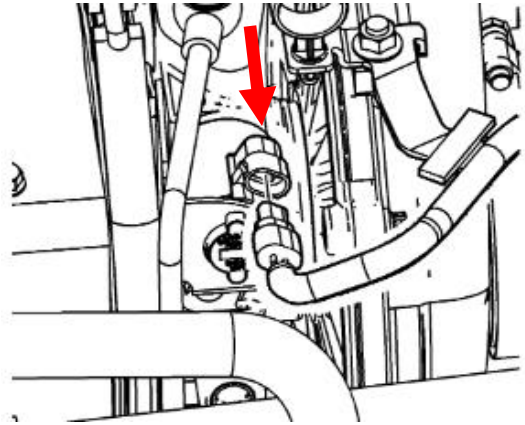
- 21. Remove the turbocharger oil feed pipe banjo bolt and washer. Reposition the oil feed pipe out of the way.
- 22. Remove the turbocharger oil return pipe nuts at the top of the flywheel housing.



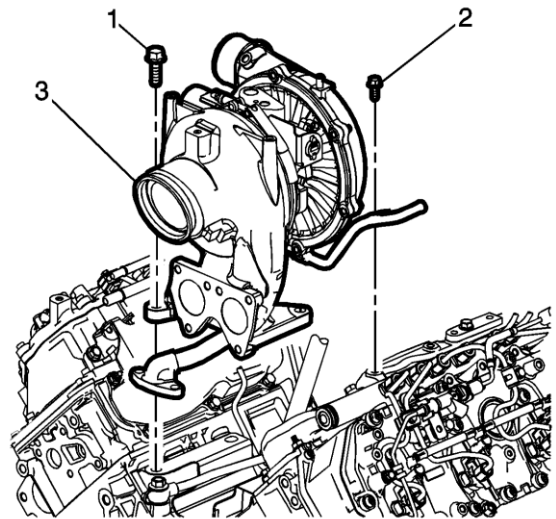


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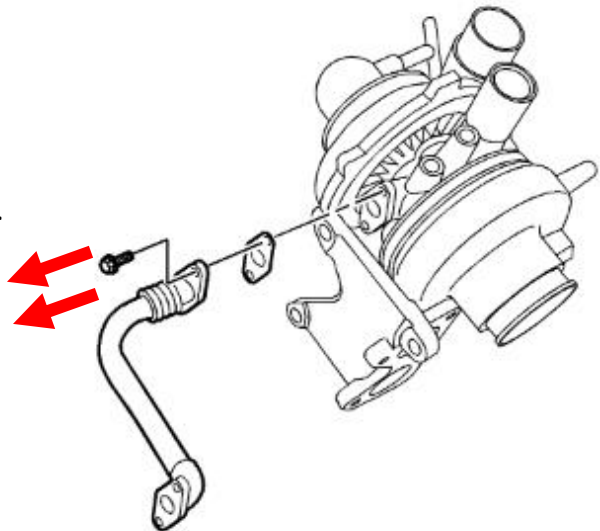
23. Disconnect the turbocharger vane control solenoid valve electrical connector and vane position sensor.



24. Remove the turbocharger oil return pipe fasteners (1).
25. Remove the turbocharger mounting bolts.
26. Remove the turbocharger (with the oil return pipe).
27. Remove and discard the turbocharger oil return pipe gasket at the flywheel housing. The new gasket (item 4) included in the kit will be used during reassembly.



28. Remove the oil return pipe bolts, pipe and gasket. Discard the gasket, a new gasket (item 2) is included in the kit and will be used during reassembly.

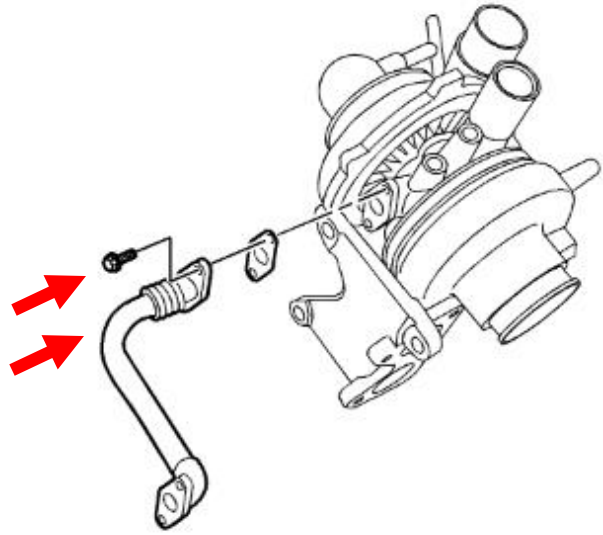




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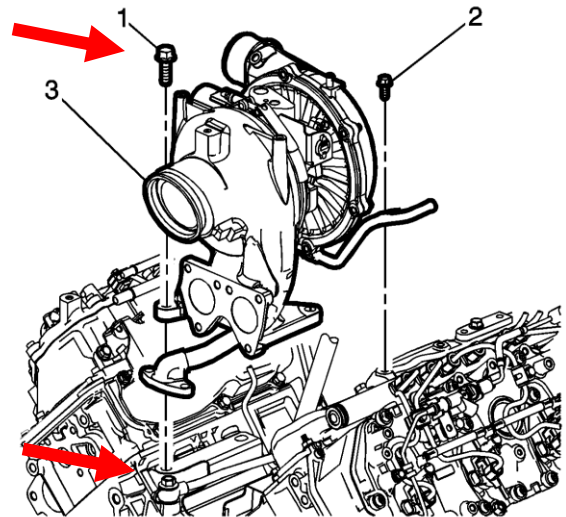
## TURBOCHARGER INSTALLATION:

29. Reinstall the turbocharger oil drain pipe onto the turbocharger using the new oil drain gasket (item 2) provided in the kit. Tighten the oil drain pipe bolts to 15 ft lbs.

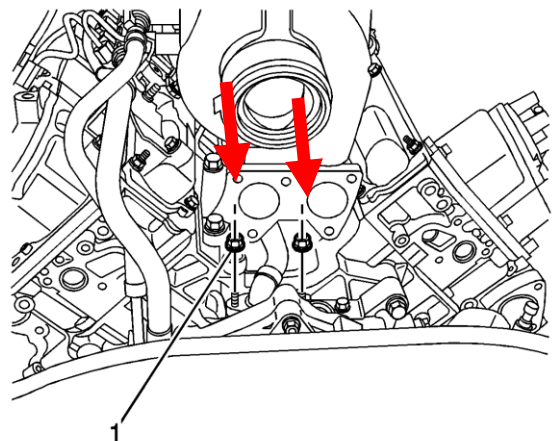


30. Install the turbocharger mounting bolts (1) and tighten the bolts to 80 ft lbs.

31. Install the new lower oil drain tube gasket (item 4) at the flywheel housing.

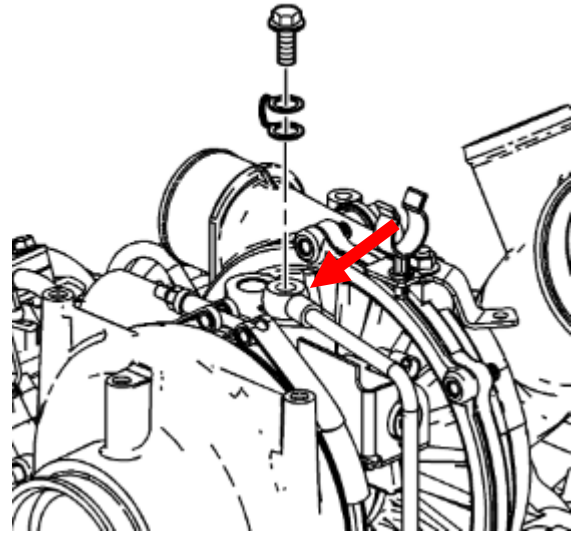


32. Install the turbo oil return tube fasteners (1) and tighten to 18 ft lbs.

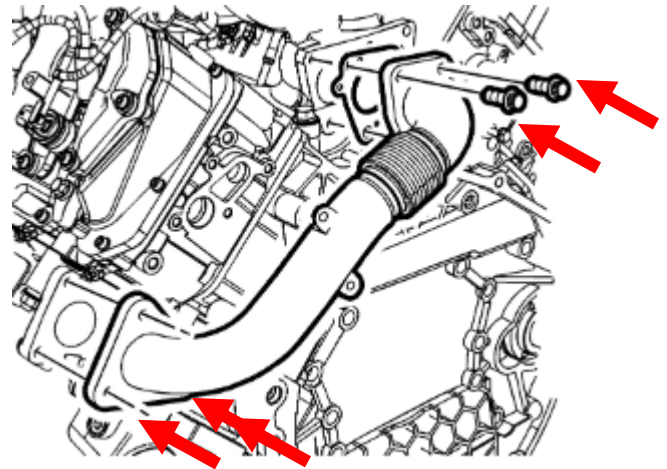


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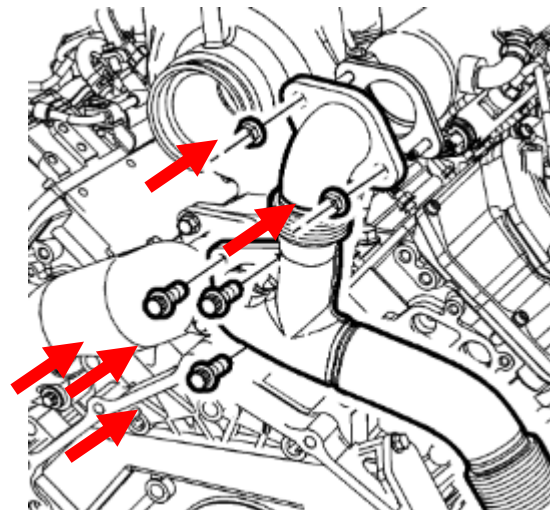
33. With the turbo mounted and the oil drain attached add 4–5 oz of clean engine oil into the turbocharger oil feed pipe opening while rotating the impeller by hand to prime the turbocharger bearings with oil.
34. Position the oil feed pipe to the turbocharger and install. Install the turbocharger oil feed pipe eye bolt and washers. Tighten the eye bolt to 19 ft lbs.
35. Re-connect the turbocharger vane control solenoid valve and vane position sensor electrical connection.



36. Install the left side exhaust pipe and a new up-pipe gasket (item 3) included in the kit. Torque the bolts to 39 ft lbs.

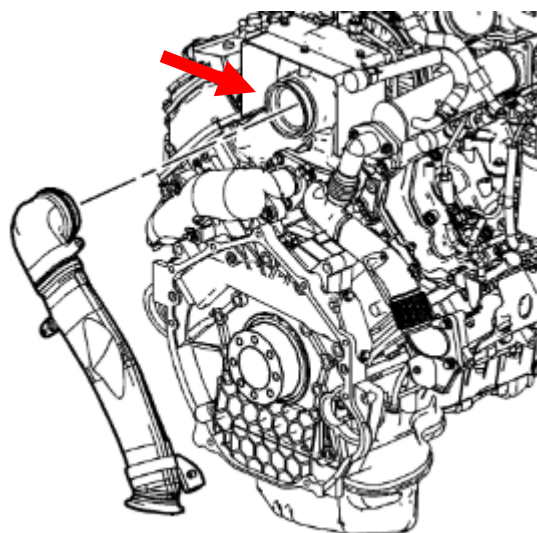


37. Install the right side exhaust pipe and a new up-pipe gasket (item 3) included in the kit. Torque the bolts to 39 ft lbs.
38. Install the right exhaust pipe to turbocharger bolts and EGR nuts. Torque the bolts to 39 ft lbs.

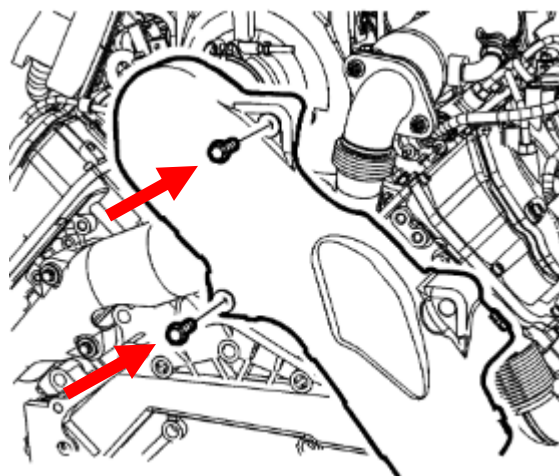


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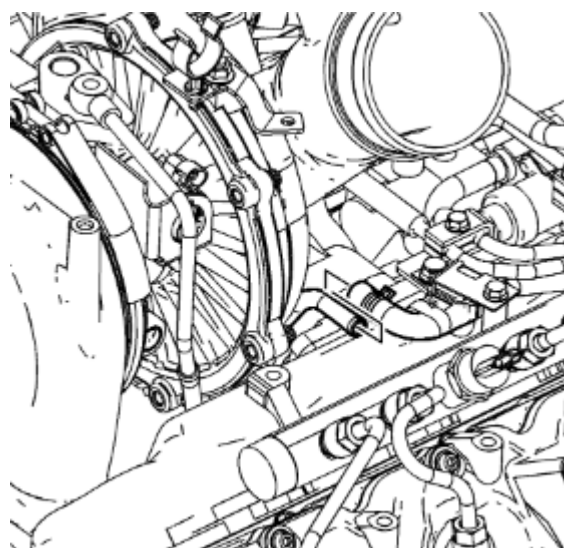
39. Install the exhaust outlet and tighten the exhaust outlet clamp. Torque to 11 ft lbs.



40. Install the exhaust outlet heat shield. Torque the two retaining bolts to 71 in lbs.



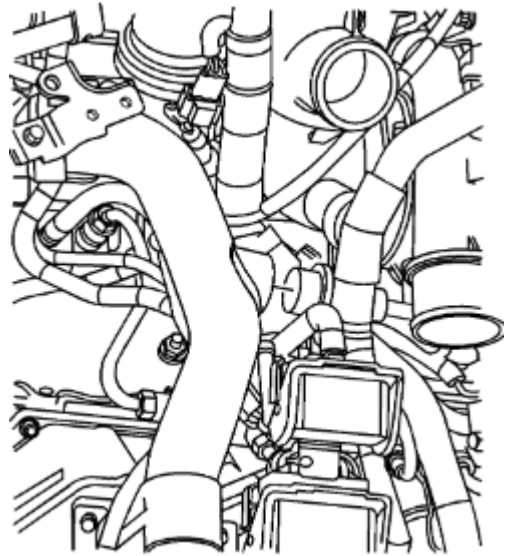
41. Install the PCV hose/pipe. Install the turbocharger outlet coolant pipe banjo bolt and washers.



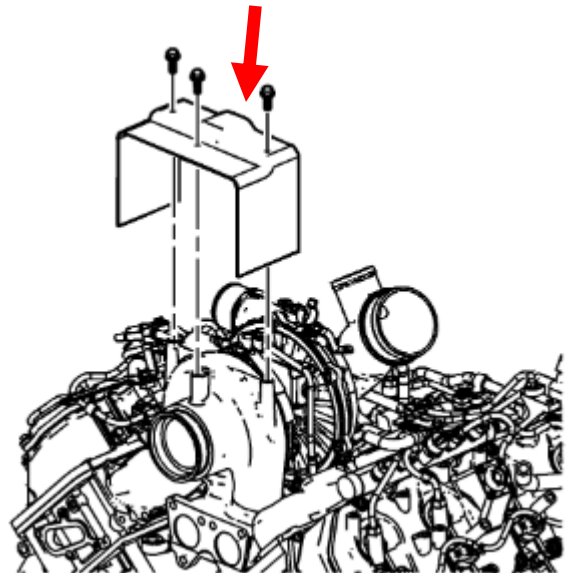


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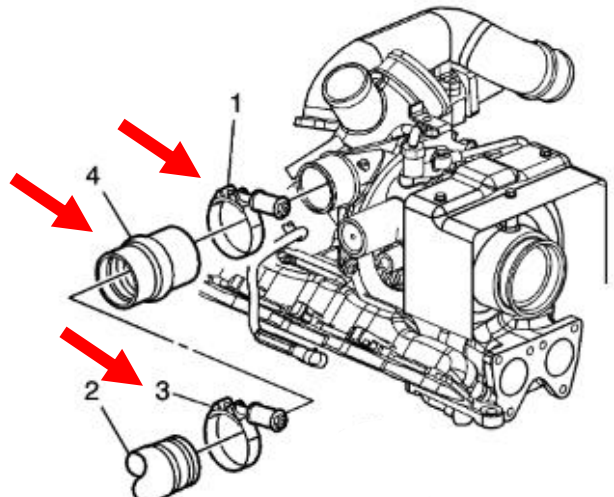
42. Install the turbocharger outlet coolant hose to the turbocharger and position the hose clamp. Install the turbocharger inlet coolant hose to the turbocharger coolant bypass valve.



43. Install the turbocharger upper heat shield and heat shield bolts. Torque the bolts to 80 in lbs.



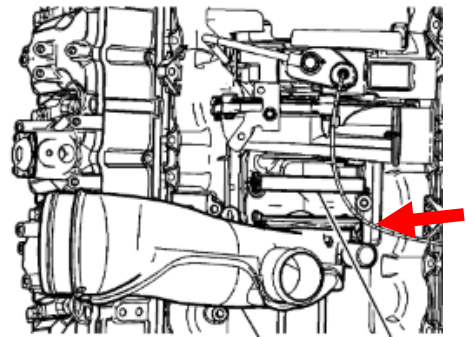
44. Install the charged air cooler inlet duct connector (4) to the turbocharger. Tighten the charged air cooler inlet duct connector to turbocharger clamps (1, 3). Tighten the clamps to 53 in lbs.



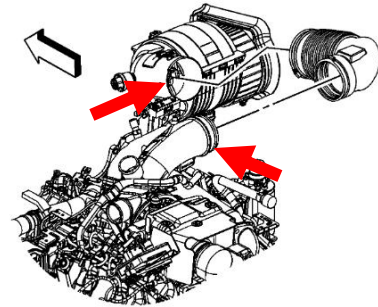


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45. Clean the mating surfaces on the air intake pipe and turbocharger. Install the air intake pipe to the turbocharger and tighten the intake pipe to turbocharger clamp to 41 in lbs.

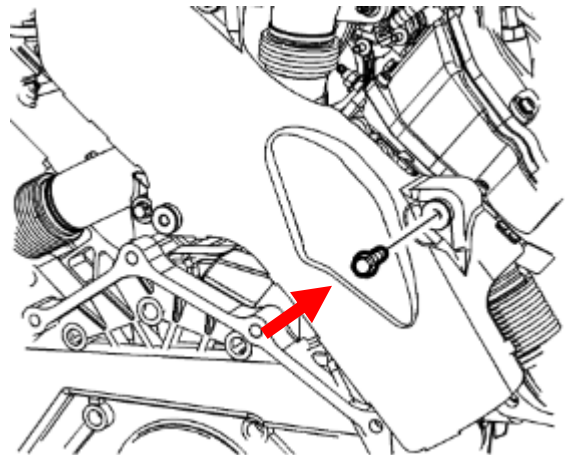


46. Install the air cleaner outlet duct between the turbocharger and air cleaner. Tighten the two clamps to 35 in lbs.

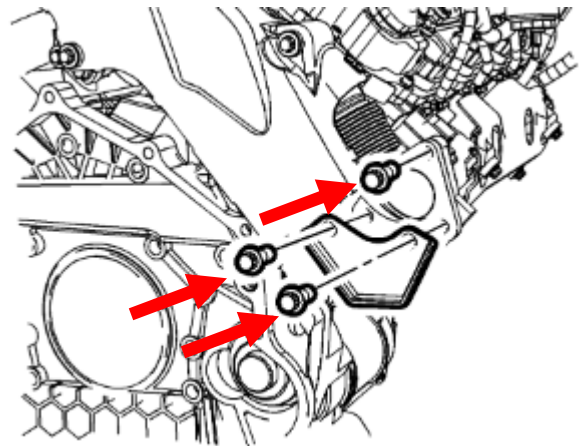


47. Fill the cooling system and verify no leaks are present.

48. Install the lower bolt for the exhaust outlet shield and tighten to 71 in lbs.

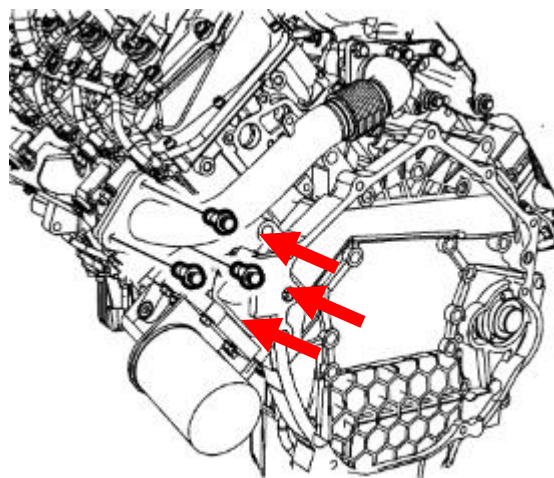


49. Install the right-side exhaust pipe to exhaust manifold bolts and torque to 39 ft lbs.

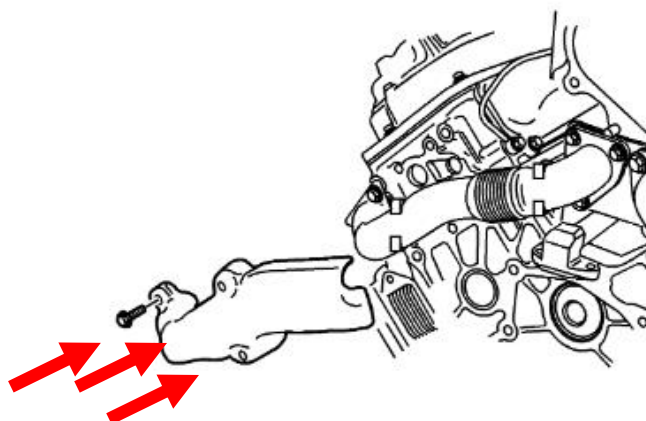


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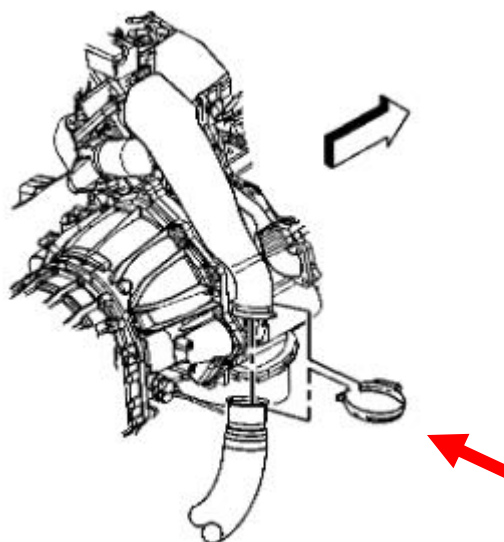
50. Install the left side exhaust pipe to exhaust pipe to exhaust manifold bolts. Torque to 39 ft lbs.



51. Install the left side heat shield and heat shield bolts. Torque to 71 in lbs.



52. Slide the clamp back up onto the exhaust pipe. Tighten the clamp to 11 ft lbs.



# INSTALLATION INSTRUCTIONS

- 53. Re-install the wheel well liners.
- 54. Connect the negative battery cables.
- 55. Prior to the first start up, we recommend performing an oil change and installation of a new oil filter.
- 56. CA RESIDENTS: Affix the E.O. identification label included with your turbocharger near the turbocharger in the engine compartment so that smog check technicians can verify the E.O. number.
- 57. Start the engine and check for any cooling or exhaust leaks. Operate the engine at low idle for at least three minutes. This will prevent oil starvation damage to the bearing system and purge any residual contaminants from the bearings housing.
- 58. Road test the vehicle in normal operation. Following road test, inspect for oil, coolant, and exhaust system leaks.