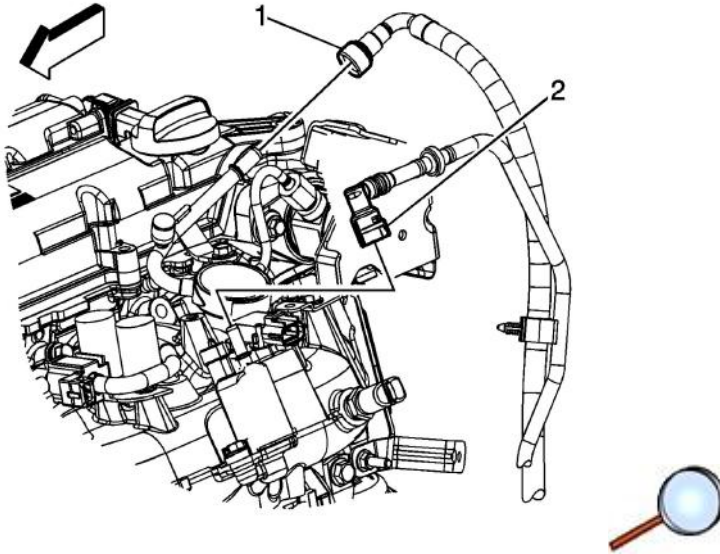
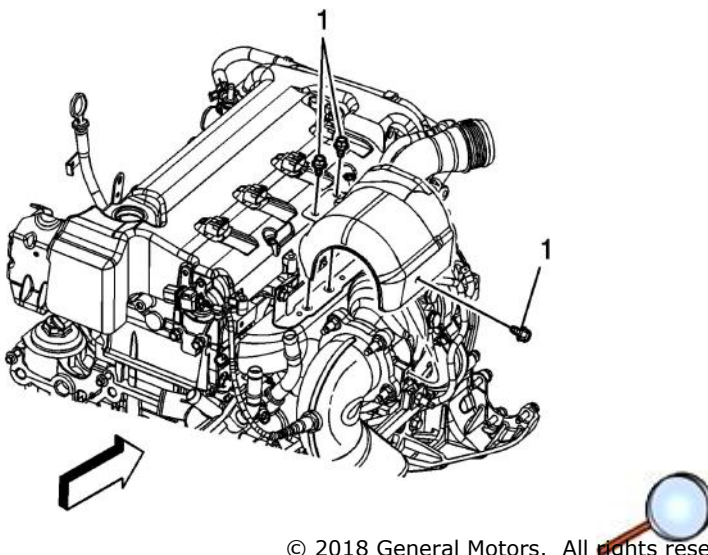


Engine Replacement

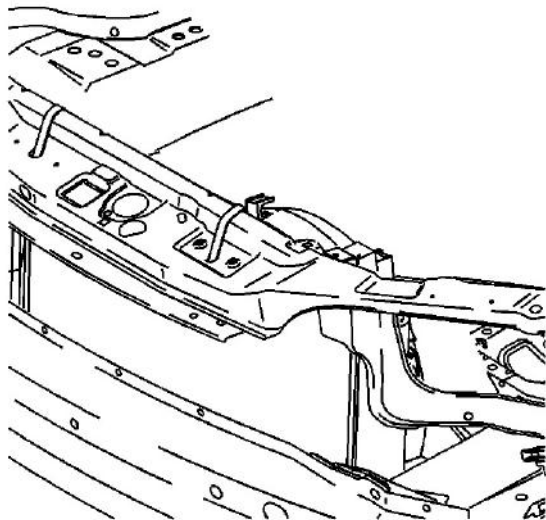
Removal Procedure



1. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).
2. Remove the air cleaner assembly. Refer to [Air Cleaner Assembly Replacement](#).
3. Remove the charge air cooler inlet and outlet pipes. Refer to [Charge Air Cooler Inlet Pipe Replacement](#) and [Charge Air Cooler Outlet Pipe Replacement](#).
4. Relieve the fuel system pressure. Refer to [Fuel Pressure Relief](#).
5. Disconnect the evaporative emission (EVAP) canister purge solenoid tube from the valve (2). Refer to [Plastic Collar Quick Connect Fitting Service](#).
6. Disconnect the fuel feed pipe (1) from the fuel line. Refer to [Metal Collar Quick Connect Fitting Service](#).

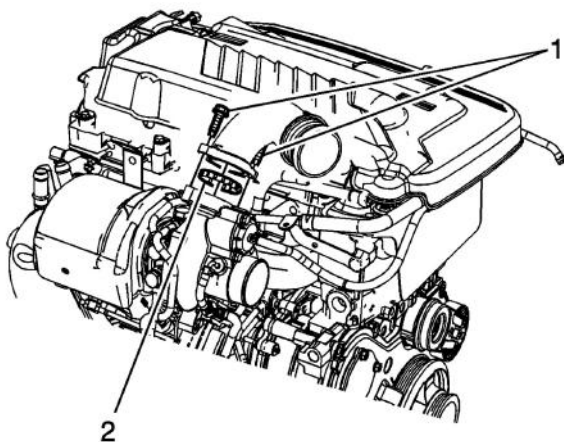


7. Remove the turbocharger heat shield bolts (1) and shield.



8. Secure the cooling module to the upper body structure.

9. Remove the engine drive belt. Refer to [Drive Belt Replacement](#).



10. Remove the charge air cooler pipe to turbocharger bolts (1).

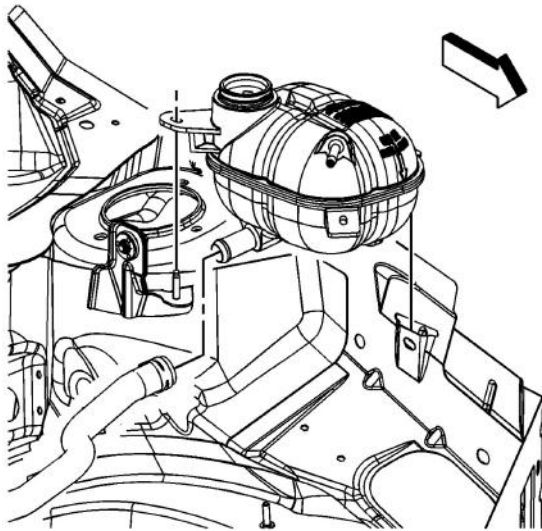
11. Remove the charge air cooler pipe and gasket (2) from the turbocharger.

12. Cap or plug the turbocharger opening.

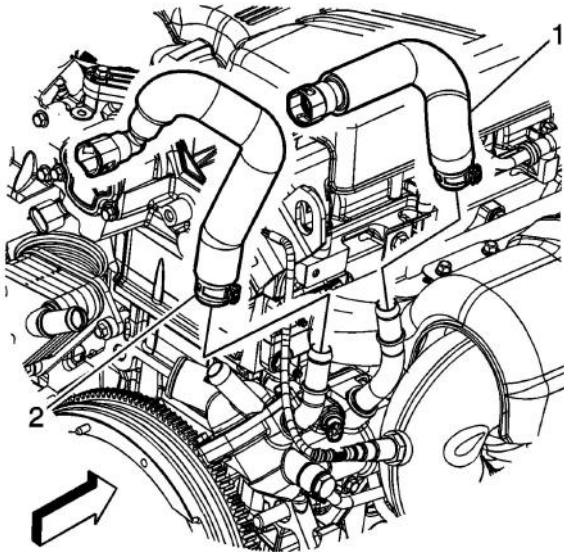
13. Remove the radiator inlet hose. Refer to [Radiator Inlet Hose Replacement](#).

14. Remove the radiator outlet hose. Refer to [Radiator Outlet Hose Replacement](#).

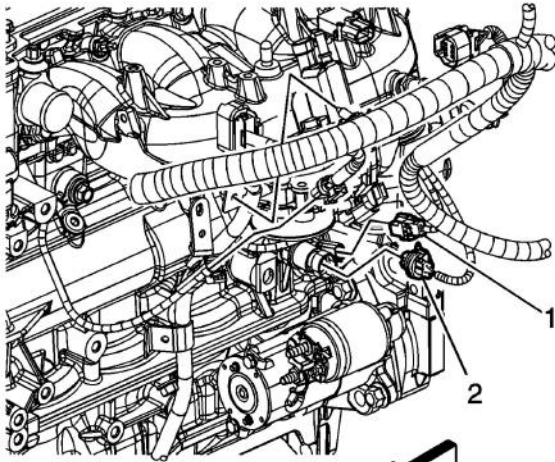
15. Lower the vehicle.



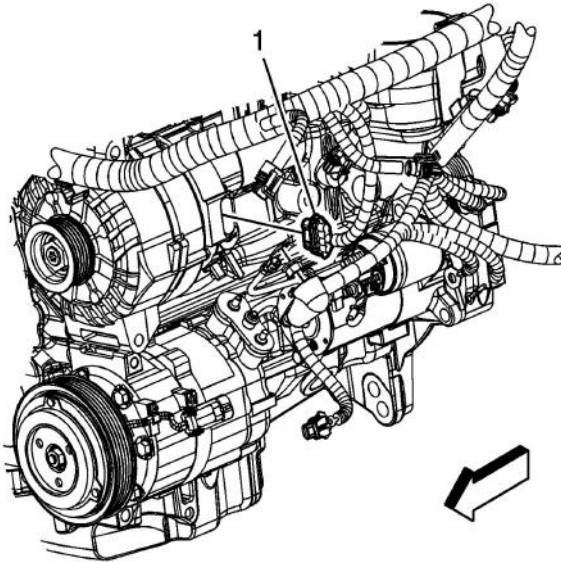
- 16. Reposition the surge tank outlet hose clamp at the surge tank.
- 17. Remove the surge tank outlet hose from the surge tank.



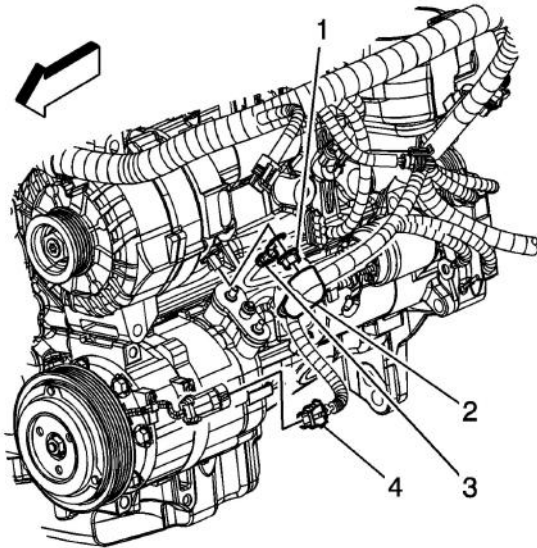
- 18. Reposition the heater inlet and outlet hose clamps at the thermostat housing.
- 19. Remove the heater inlet (1) and outlet (2) hoses from the thermostat housing.



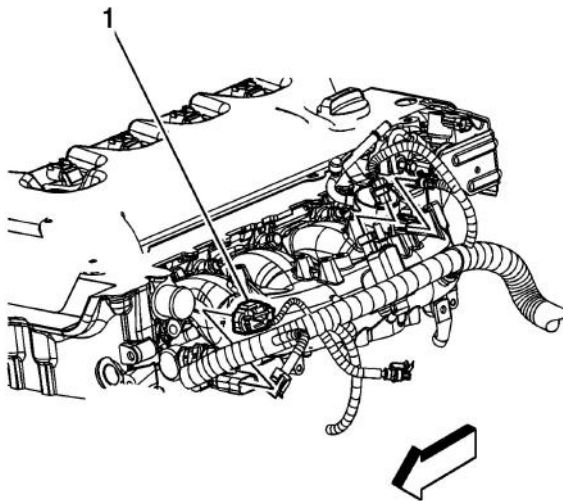
20. Disconnect the engine wiring harness electrical connector (1) from the crankshaft position (CKP) sensor.
21. Disconnect the engine wiring harness electrical connector (2) from the oil pressure sensor.



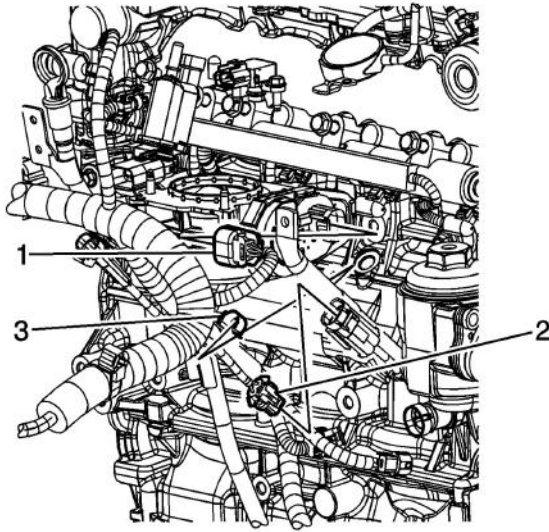
22. Disconnect the engine wiring harness electrical connector (1) from the generator.



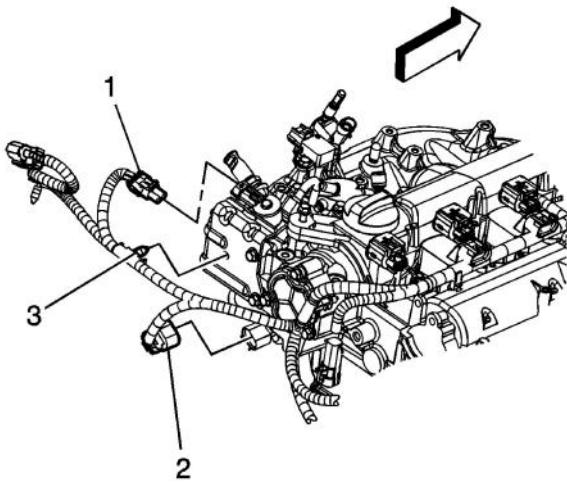
23. Reposition the positive battery cable terminal boot (2).
24. Remove the generator terminal nut (1).
25. Remove the positive battery cable terminal (3) from the generator.
26. Disconnect the engine wiring harness electrical connector (4) from the A/C compressor.



27. Disconnect the engine wiring harness electrical connector (1) from the fuel injector jumper electrical connector.



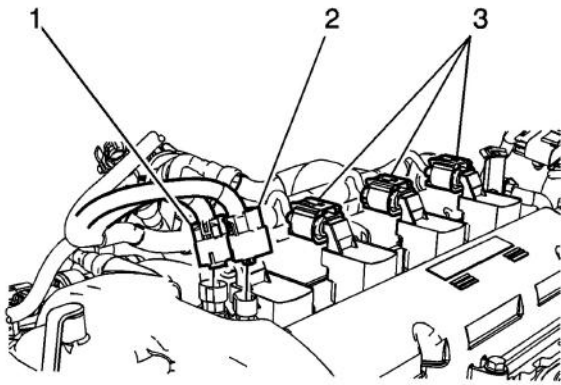
28. Disconnect the engine wiring harness electrical connector (2) from the knock sensor.



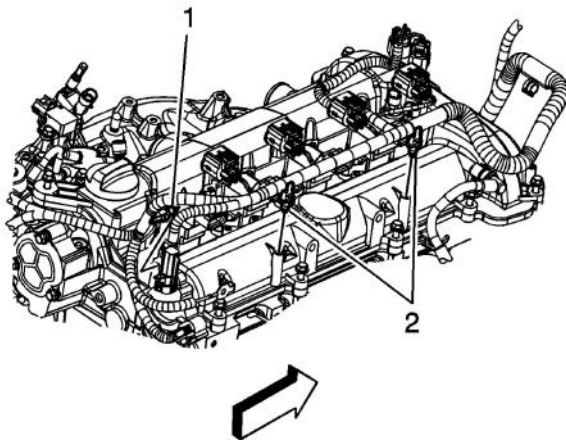
29. Disconnect the engine wiring harness electrical connector (2) from the intake camshaft position (CMP) sensor.

30. Disconnect the engine wiring harness electrical connector (1) from the high pressure fuel pump.

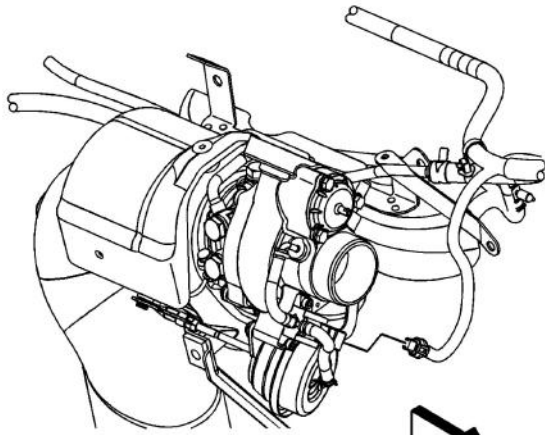
31. Remove the engine wiring harness clip (3) from the high pressure fuel pump bracket.



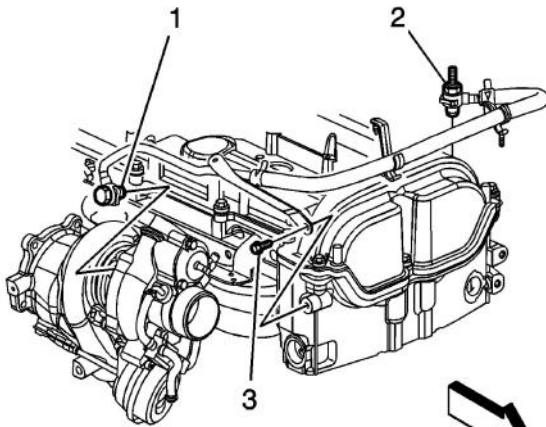
- 32. Disconnect the engine wiring harness electrical connector (2) from the intake CMP actuator.
- 33. Disconnect the engine wiring harness electrical connector (1) from the exhaust CMP actuator.
- 34. Disconnect the ignition coil electrical connectors (3) from the ignition coils.



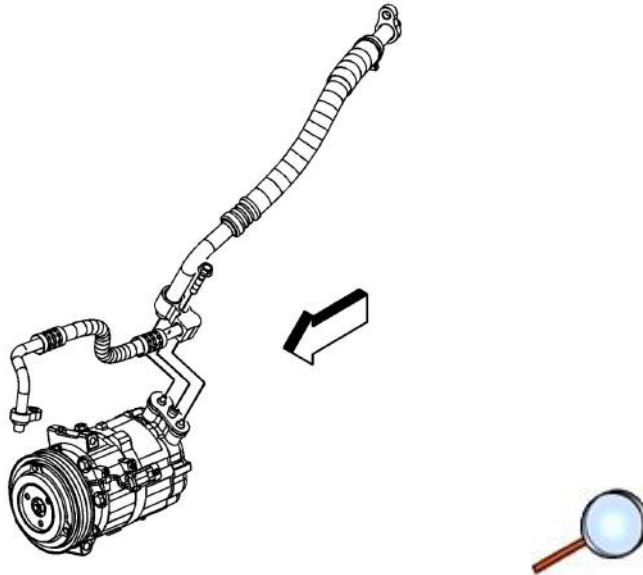
- 35. Disconnect the engine harness clips (2) from the camshaft cover.
- 36. Disconnect the engine harness clip (1) from the camshaft cover.



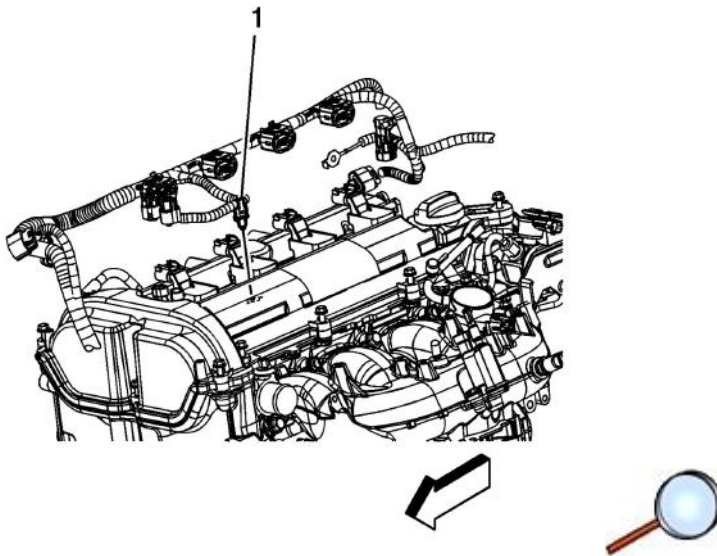
37. Disconnect the engine wiring harness electrical connector from the boost sensor.



38. Remove the turbocharger coolant feed pipe bolt (1) at the turbocharger.
39. Remove the turbocharger coolant feed pipe fitting (2) from the cylinder head.
40. Remove the turbocharger coolant feed pipe bracket bolt from the cylinder head.
41. Remove the turbocharger coolant feed pipe bracket from the vehicle.



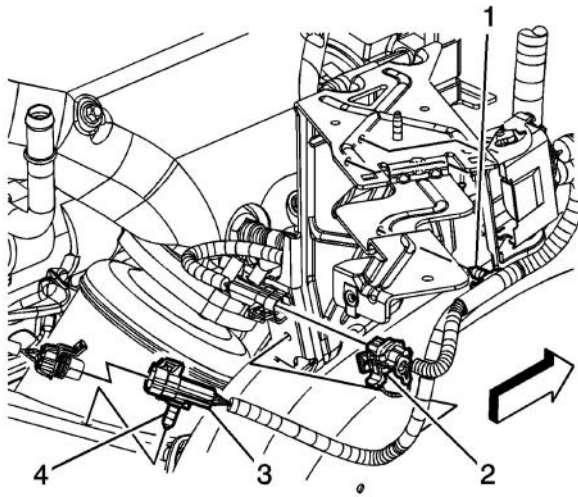
42. Remove the A/C compressor line bolt and reposition the line off to the side.



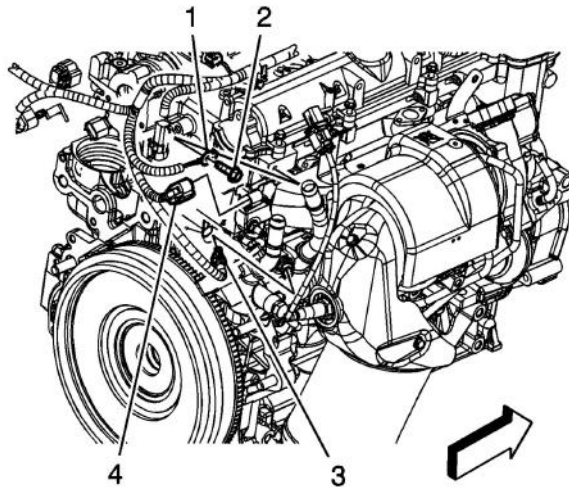
43. Remove the engine harness clip (1) from the camshaft cover.

44. Raise and suitably support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).

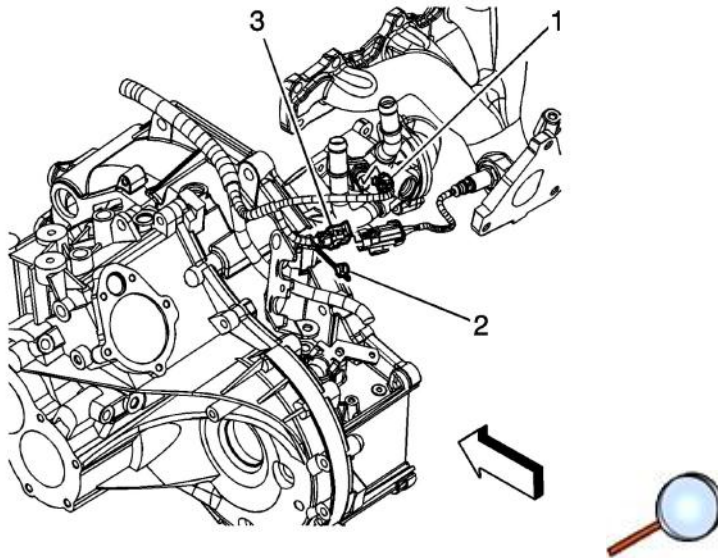
45. Drain the engine oil.



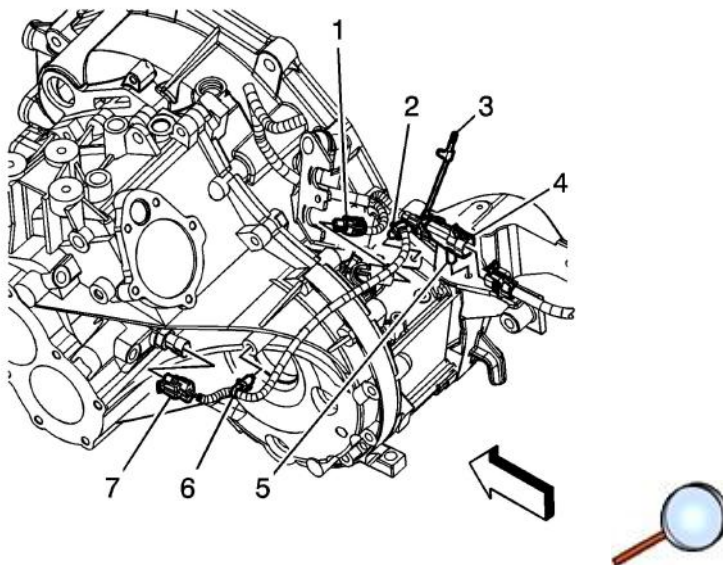
46. Disconnect the engine wiring harness electrical connector (1) from the heated oxygen sensor (HO2S) (3).



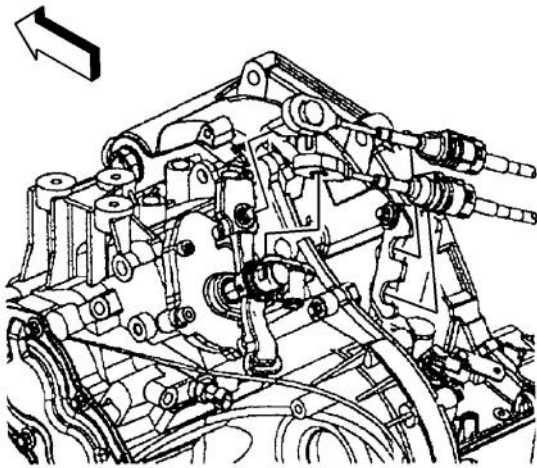
- 47. Disconnect the engine wiring harness electrical connector (4) from the exhaust CMP sensor.
- 48. Remove the engine harness ground terminal bolt (2) and reposition the engine harness ground terminal (1).
- 49. Disconnect the engine wiring harness electrical connector (3) from the engine coolant temperature (ECT) sensor.



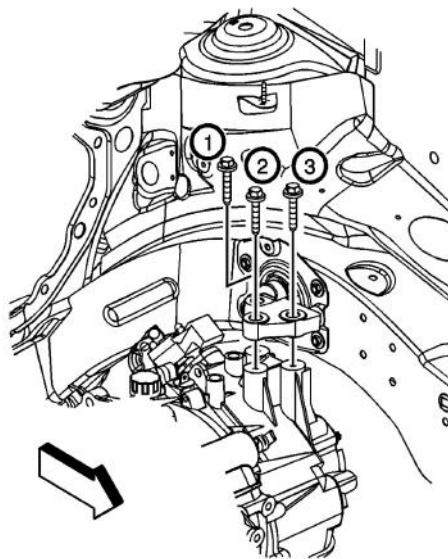
50. Disconnect the ECT sensor electrical connector (1).
51. Remove the CPA retainer (2).
52. Disconnect the engine harness electrical connector (3) from the HO2S.



53. Disconnect the engine harness electrical connector (1) from the VSS.
54. Remove the engine harness clip (2) from the transaxle.
55. Remove the CPA retainer (3).
56. Remove the engine harness electrical connector clip (5) from the transaxle rear mount bracket.
57. Disconnect the engine harness electrical connector (4) from the HO2S.
58. Disconnect the engine harness electrical connector (7) from the back up lamp switch.
59. Remove the engine harness clip (6) from the transaxle.
60. Gather all engine harness branches and reposition the harness off to the side, out of the way.

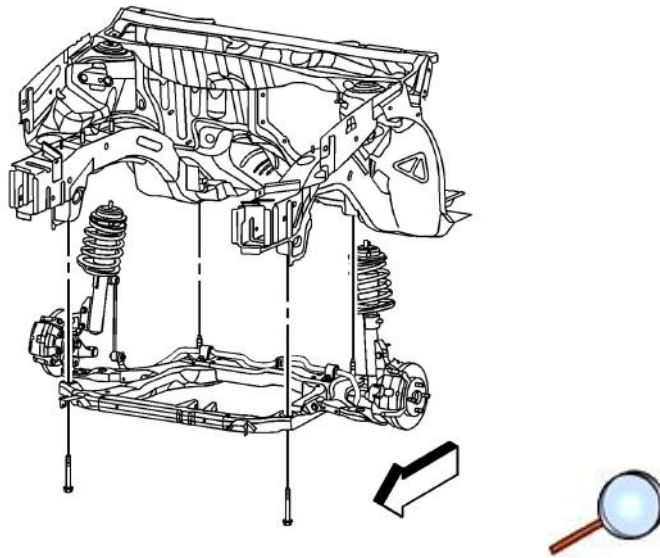


61. Disconnect the range selector and shift lever cables from the transaxle levers.
62. Remove the range selector and shift lever cables from the transaxle bracket.
63. Remove the catalytic converter. Refer to [Catalytic Converter Replacement](#).
64. Lower the vehicle.
65. Insert blocks of wood between the powertrain and the frame, in order to support the powertrain.
66. Remove the engine mount. Refer to [Engine Mount Replacement](#).

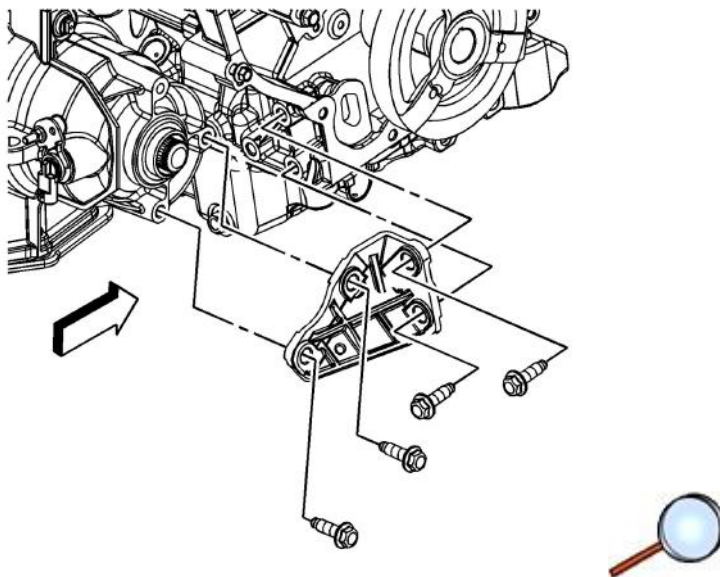


67. Remove the transaxle mount to transaxle bolts.
68. Raise the vehicle.
69. Disconnect the stabilizer links from the stabilizer bar. Refer to [Stabilizer Shaft Link Replacement](#).
70. Disconnect the outer tie rod ends from the steering knuckles. Refer to [Steering Linkage Outer Tie Rod Replacement](#).
71. Disconnect the intermediate shaft from the steering gear. Refer to [Intermediate Steering Shaft Replacement](#).
72. Disconnect the lower control arms from the steering knuckles. Refer to [Lower Control Arm Replacement](#).

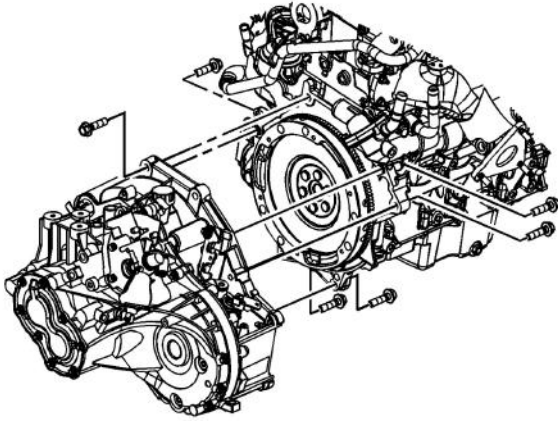
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73. Using a paint pen or magic marker, mark the frame to body position.
74. Lower the vehicle to about 3 feet off the ground.
75. Position a engine lift table under the frame.
76. Place wood blocks on top of the lift table between the table and the frame.
77. Lower the vehicle until the frame is resting on the blocks of wood.
78. Slowly loosen/remove the frame bolts using the following sequence:
 - 78.1. Loosen/remove the front frame bolts.
 - 78.2. Loosen/remove the rear frame bolts.
79. Slowly raise the vehicle away from the powertrain assembly.
80. Slide the lift table out from under the vehicle.
81. Attach the engine lift hoist to the engine lift hooks.
82. Remove the starter. Refer to [Starter Removal](#).

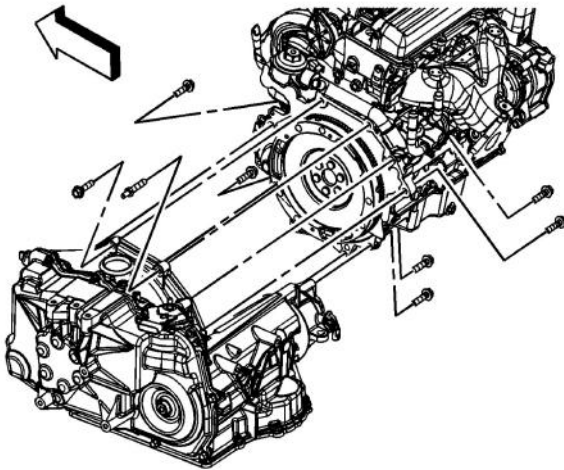


83. Remove the transaxle brace bolts and brace.



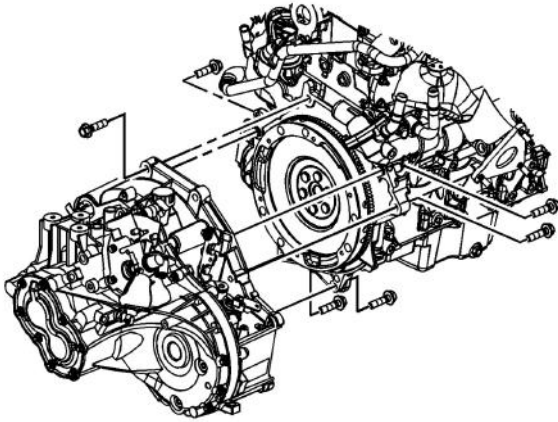
84. Remove the transaxle to engine bolts/stud.
85. Remove the clutch pressure plate and disc. Refer to [Clutch Pressure and Driven Plate Replacement](#).
86. Remove the following components:
 - The engine mount bracket
 - The engine block heater
 - The generator
87. Using a engine hoist, install the engine to a engine stand.

Installation Procedure



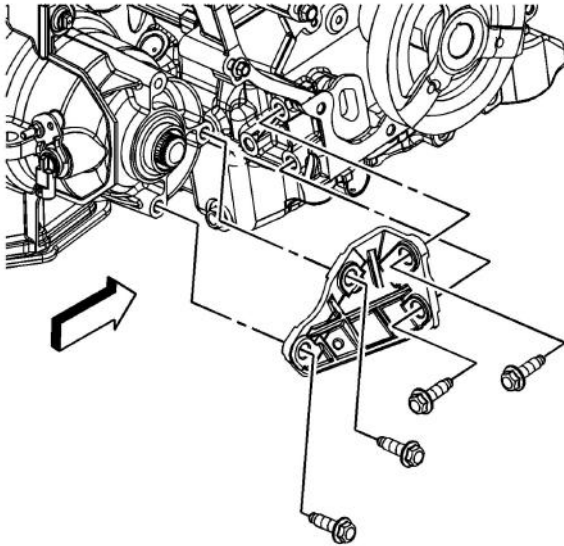
1. Using a engine hoist, remove the engine from the engine stand.
2. Install the following components:
 - The engine mount bracket
 - The engine block heater
 - The generator

3. Install the clutch pressure plate and disc. Refer to [Clutch Pressure and Driven Plate Replacement](#).
4. Install the engine to the transaxle.

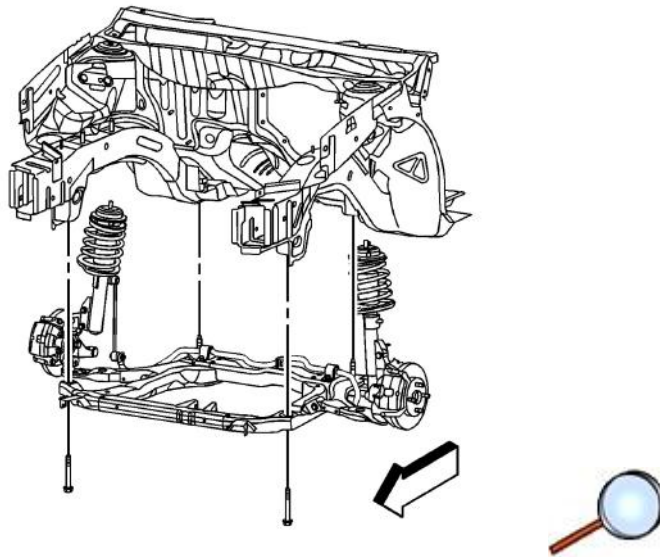


Caution: Refer to [Fastener Caution](#).

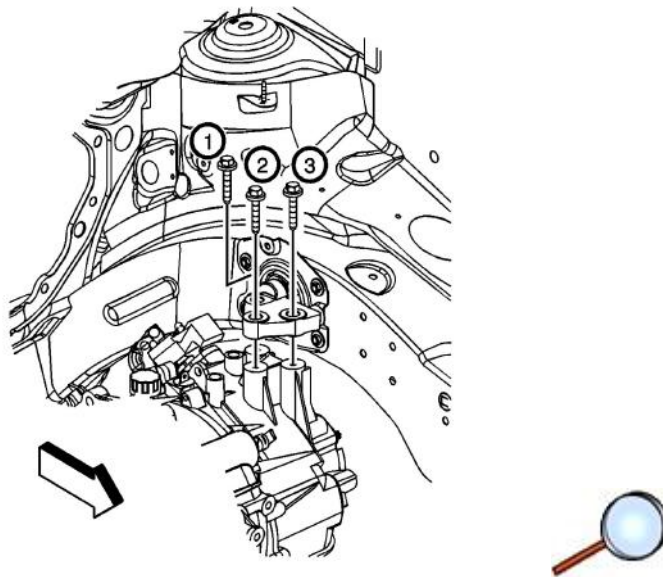
5. Install the transaxle to engine bolts/stud and tighten to **75 N•m (55 lb ft)**.



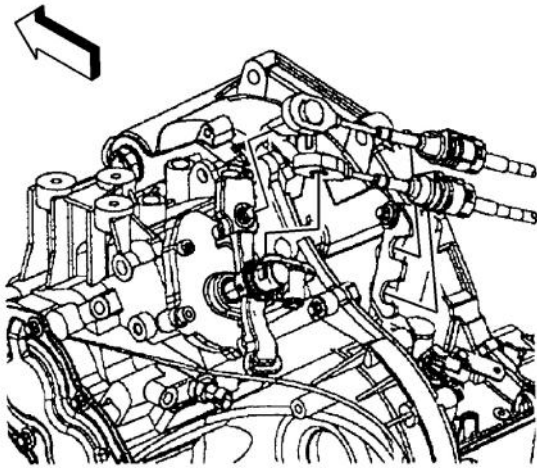
6. Install the transaxle brace and bolts and tighten to **50 N•m (37 lb ft)**.
7. Install the starter. Refer to [Starter Installation](#).



8. Remove the engine lift hoist from the engine lift hooks.
9. Slide the lift table under the vehicle.
10. Slowly lower the vehicle until it aligns with the alignment marks made during the removal.
11. Tighten/install the frame bolts to **100 N•m (74 lb ft) plus and additional 180 degrees**.
12. Raise the vehicle until the lift table can be removed from under the vehicle.
13. Remove the lift table.



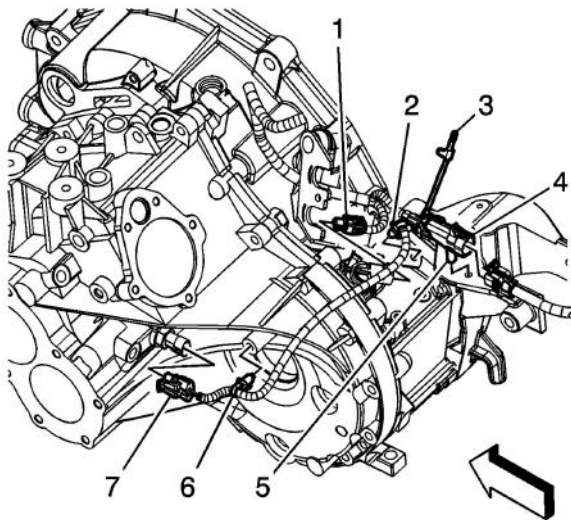
14. Connect the lower control arms to the steering knuckles. Refer to [Lower Control Arm Replacement](#).
15. Connect the intermediate shaft to the steering gear. Refer to [Intermediate Steering Shaft Replacement](#).
16. Connect the outer tie rod ends to the steering knuckles. Refer to [Steering Linkage Outer Tie Rod Replacement](#).
17. Connect the stabilizer links to the stabilizer bar. Refer to [Stabilizer Shaft Link Replacement](#).
18. Lower the vehicle.
19. Install the transaxle mount to transaxle bolts and tighten to **45 N•m (33 lb ft)**.



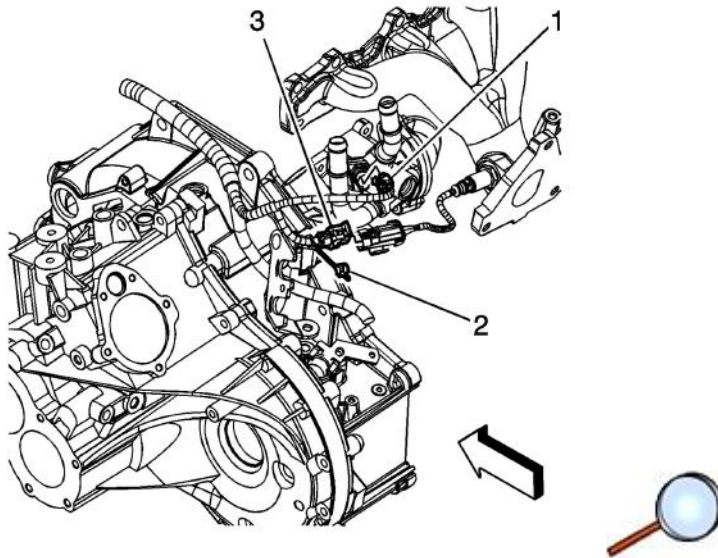
20. Install the engine mount. Refer to [Engine Mount Replacement](#).
21. Remove the blocks of wood from between the powertrain and the frame.
22. Install the catalytic converter. Refer to [Catalytic Converter Replacement](#).
23. Lower the vehicle.

Note: Ensure that the black cable is installed in the top notch of the transaxle bracket and the white cable is installed in the bottom notch of the transaxle bracket.

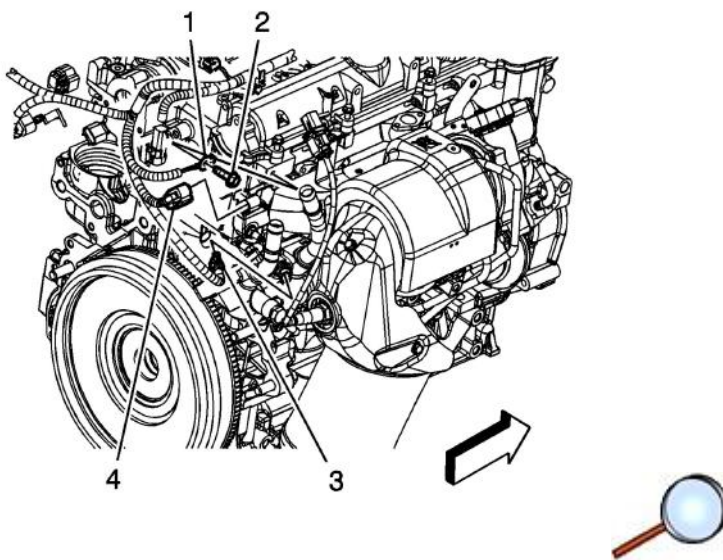
24. Install the range selector and shift lever cables to the transaxle bracket.
25. Connect the range selector and shift lever cables to the transaxle levers.



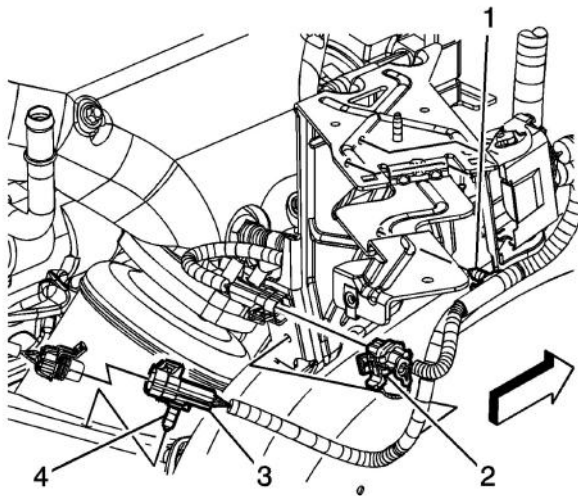
26. Gather all engine harness branches and position the harness over the engine.
27. Install the engine harness clip (6) to the transaxle.
28. Connect the engine harness electrical connector (7) to the back up lamp switch.
29. Connect the engine harness electrical connector (4) to the HO2S.
30. Install the engine harness electrical connector clip (5) to the transaxle rear mount bracket.
31. Install the engine harness clip (2) to the transaxle.
32. Install the CPA retainer (3).
33. Connect the engine harness electrical connector (1) to the VSS.



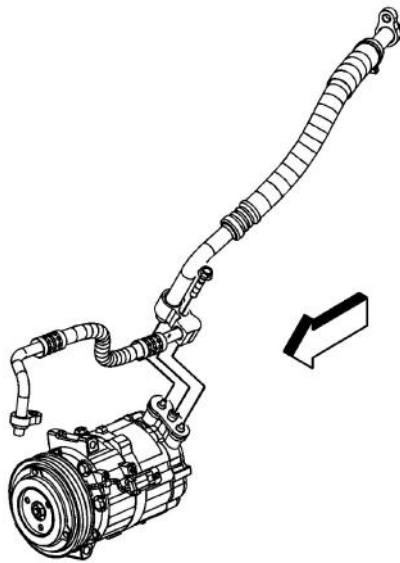
34. Connect the engine harness electrical connector (3) to the HO2S.
35. Install the CPA retainer (2).
36. Connect the ECT sensor electrical connector (1).



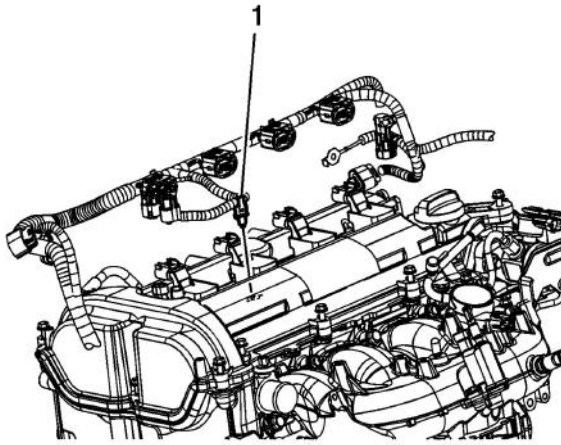
37. Connect the engine wiring harness electrical connector (4) to the exhaust CMP sensor.
38. Connect the engine wiring harness electrical connector (3) to the ECT sensor.
39. Position the engine harness ground terminal (1) and install the engine harness ground terminal bolt (2).
Tighten the bolt to **25 N·m (18 lb ft)**.



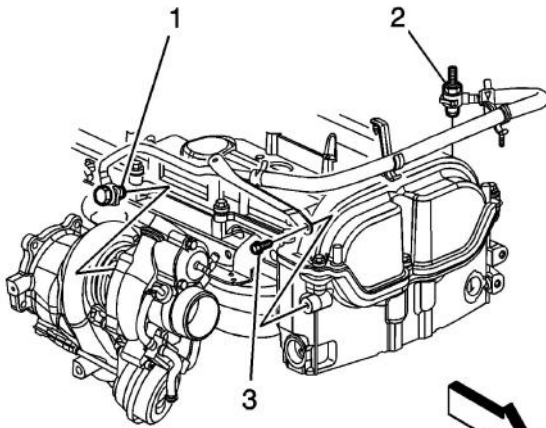
40. Connect the engine wiring harness electrical connector (1) to the HO2S (3).



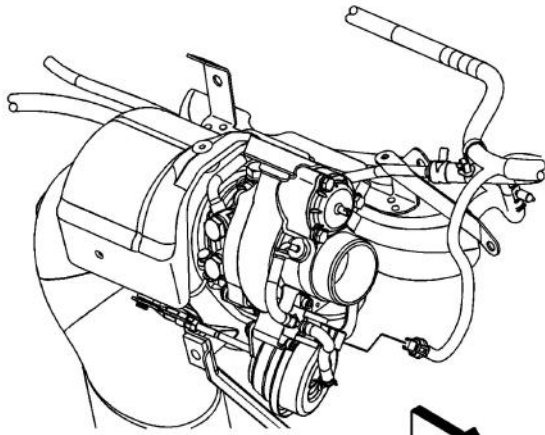
41. Position the A/C compressor line and install the bolt. Tighten the bolts to **22 N•m (16 lb ft)**.



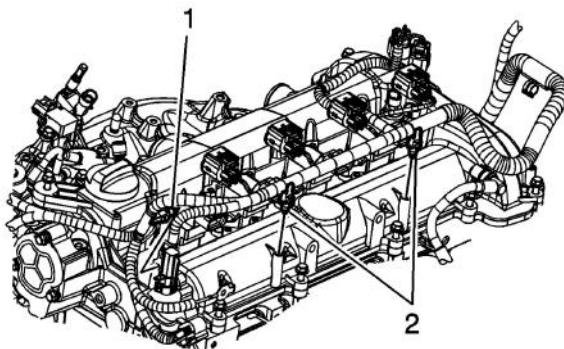
42. Lower the vehicle.
43. Install the engine harness clip (1) to the camshaft cover.



44. Position the turbocharger coolant feed pipe to the vehicle.
45. Install the turbocharger coolant feed pipe bracket bolt (3) to the cylinder head and tighten to **10 N•m (89 lb in)**.
46. Install the turbocharger coolant feed pipe fitting (2) to the cylinder head and tighten the fitting to **35 N•m (26 lb ft)**.
47. Install the turbocharger coolant feed pipe bolt (1) at the turbocharger and tighten to **35 N•m (26 lb ft)**.
48. Install the charge air bypass valve vacuum solenoid.
49. Install the charge air bypass valve vacuum hose to the turbocharger coolant feed pipe clips.
50. Position the charge air bypass valve vacuum hose clamp at the turbocharger.
51. Place the charge air bypass valve solenoid out of the way.

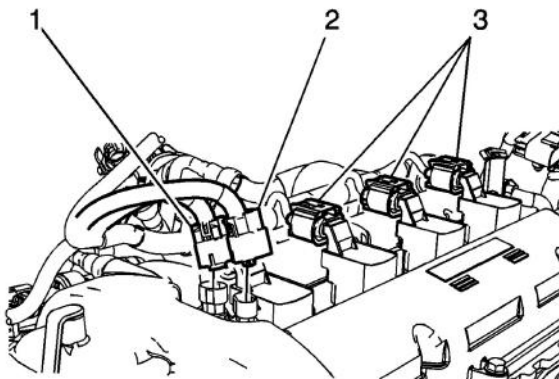


52. Connect the engine wiring harness electrical connector to the boost sensor.

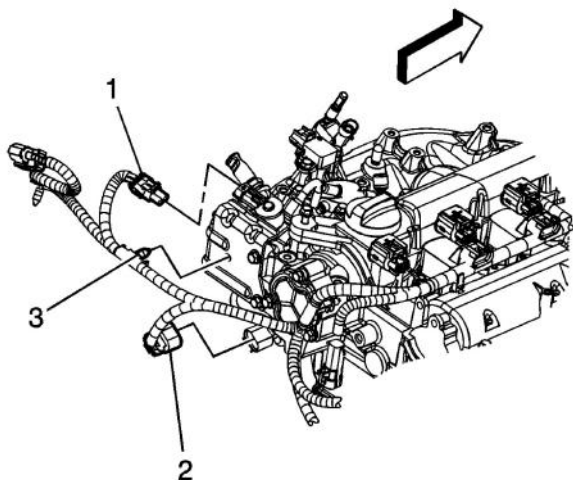


53. Connect the engine harness clips (2) to the camshaft cover.

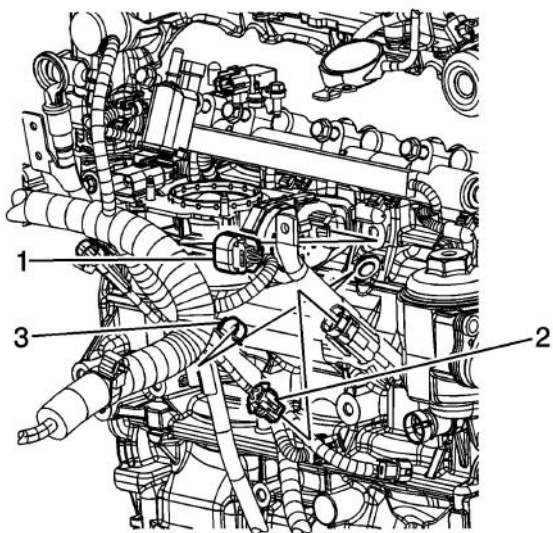
54. Connect the engine harness clip (1) to the camshaft cover.



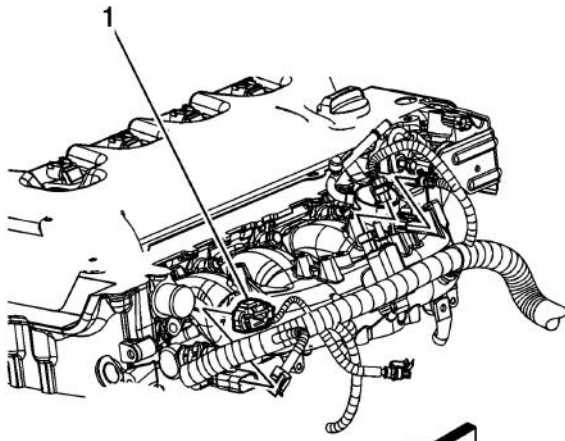
55. Connect the engine wiring harness electrical connectors to the ignition coils.
56. Connect the engine wiring harness electrical connector (2) to the intake CMP actuator.
57. Connect the engine wiring harness electrical connector (1) to the exhaust CMP actuator.



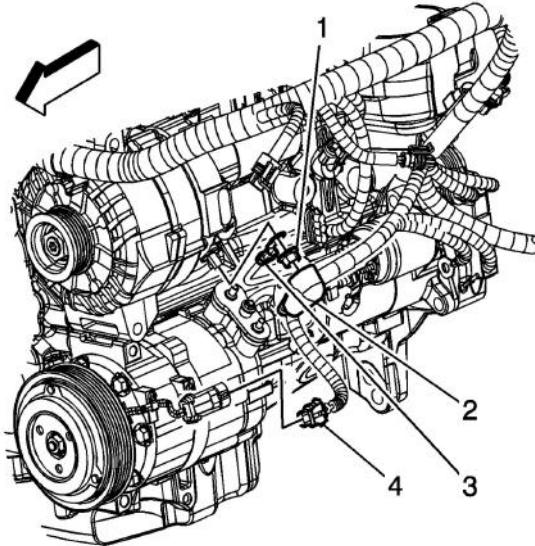
58. Connect the engine wiring harness electrical connector (1) to the high pressure fuel pump.
59. Install the engine wiring harness clip (3) to the high pressure fuel pump bracket.



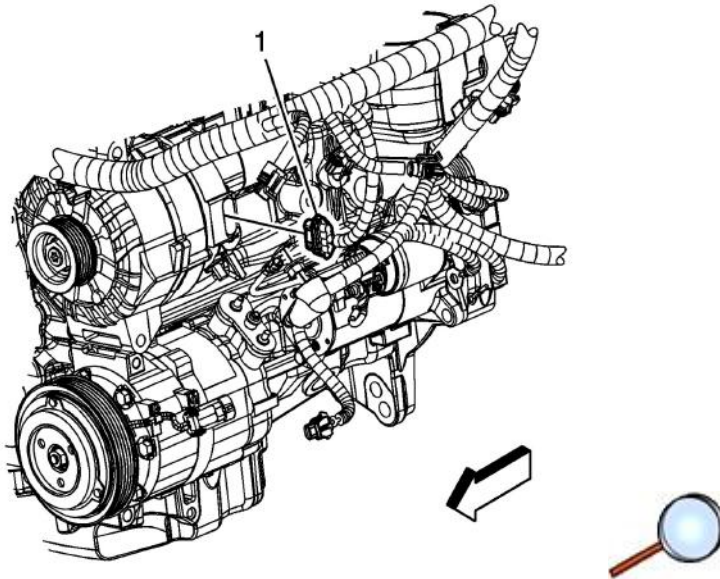
60. Connect the engine wiring harness electrical connector (2) to the knock sensor.



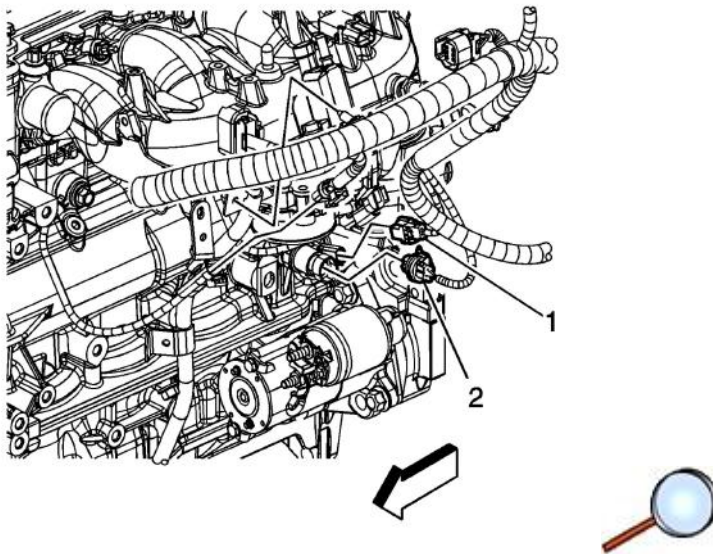
61. Connect the engine wiring harness electrical connector (1) to the fuel injector jumper electrical connector.



- 62. Install the positive battery cable terminal (3) to the generator.
- 63. Install the generator terminal nut (1) and tighten to **20 N•m (15 lb ft)**.
- 64. Position the positive battery cable terminal boot (2).
- 65. Connect the engine wiring harness electrical connector (4) to the A/C compressor.



66. Connect the engine wiring harness electrical connector (1) to the generator.

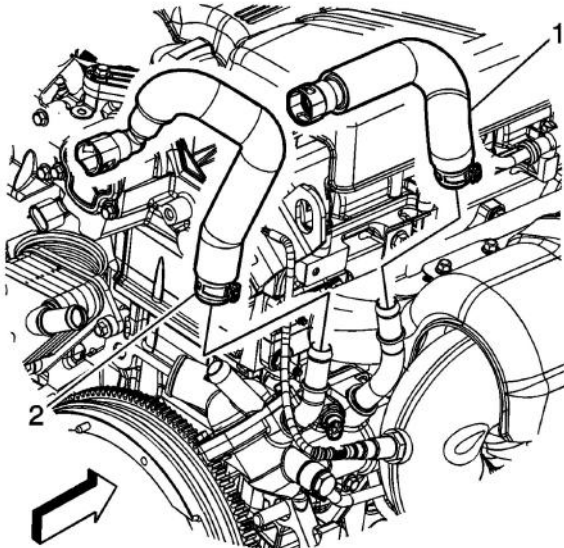


67. Install the catalytic converter. Refer to [Catalytic Converter Replacement](#).

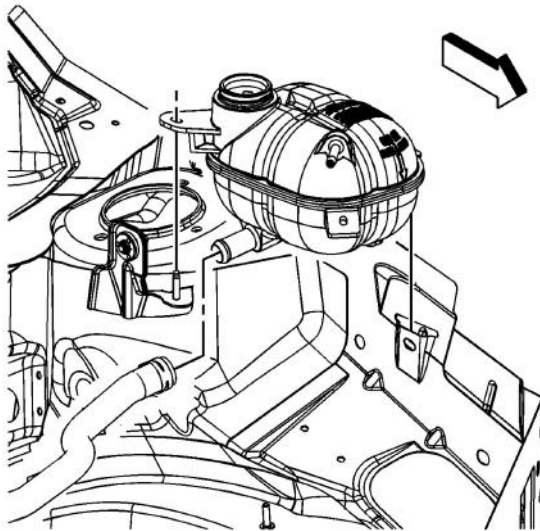
68. Connect the engine wiring harness electrical connector (1) to the CKP sensor.

69. Connect the engine wiring harness electrical connector (2) to the oil pressure sensor.

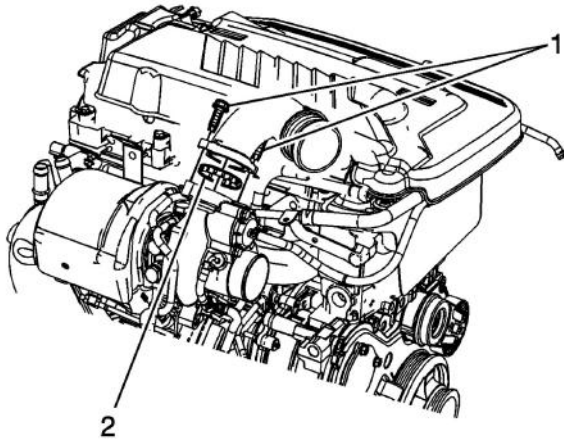
70. Lower the vehicle.



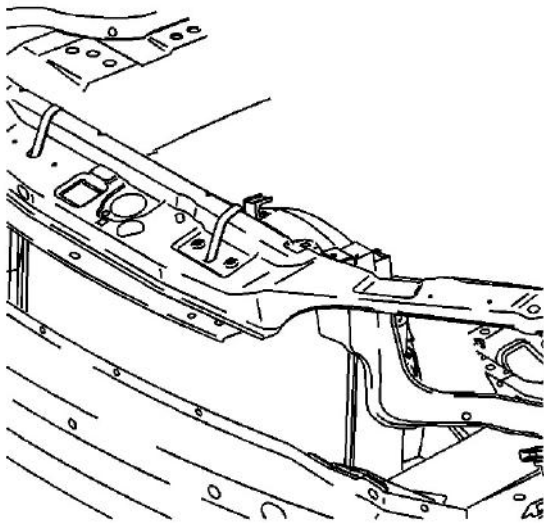
71. Install the heater inlet (1) and outlet (2) hoses to the thermostat housing.
72. Position the heater inlet and outlet hose clamps at the thermostat housing.



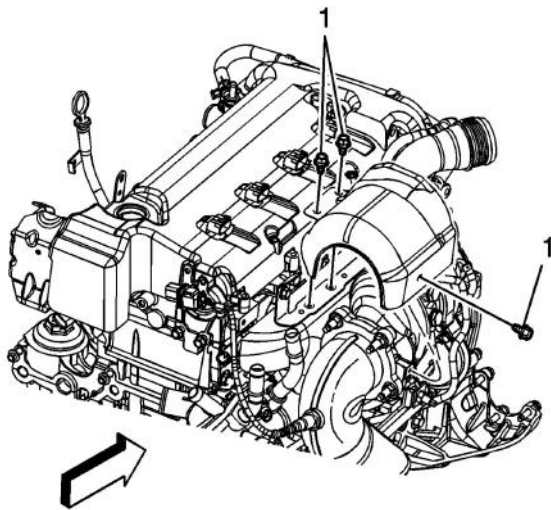
73. Install the surge tank outlet hose to the surge tank.
74. Position the surge tank outlet hose clamp at the surge tank.
75. Install the radiator outlet hose. Refer to [Radiator Outlet Hose Replacement](#).
76. Install the radiator inlet hose. Refer to [Radiator Inlet Hose Replacement](#).



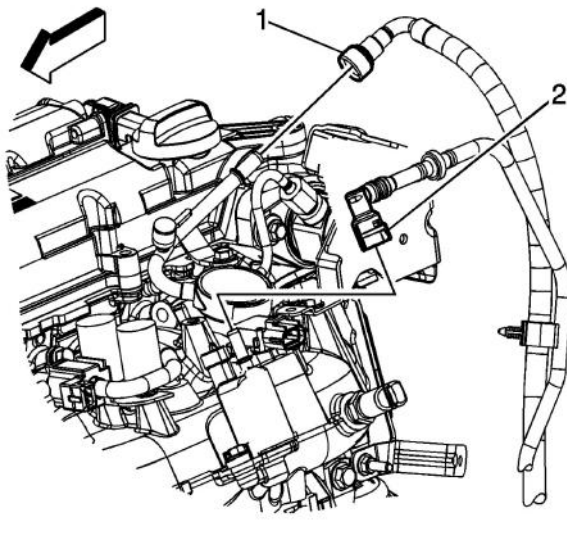
77. Remove the cap or plug from the turbocharger opening.
78. Install the charge air cooler pipe to the turbocharger.
79. Install the charge air cooler pipe to turbocharger bolts (1) and tighten to **22 N•m (16 lb ft)**.



80. Install the engine drive belt. Refer to [Drive Belt Replacement](#).
81. Unsecure the cooling module from the upper body structure.
82. Fill the cooling system. Refer to [Cooling System Draining and Filling](#).



83. Install the turbocharger heat shield and bolts (1) and tighten to **10N•m (89 lb in)**.



84. Connect the fuel feed pipe (1) to the fuel line. Refer to [Metal Collar Quick Connect Fitting Service](#).

85. Connect the EVAP canister purge solenoid tube to the valve (2). Refer to [Plastic Collar Quick Connect Fitting Service](#).

86. Install the charge air cooler inlet and outlet pipes. Refer to [Charge Air Cooler Inlet Pipe Replacement](#) and [Charge Air Cooler Outlet Pipe Replacement](#).

87. Install the air cleaner assembly. Refer to [Air Cleaner Assembly Replacement](#).

88. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).

Note: **Prelube is necessary if the engine is replaced or overhauled.**

89. If the engine is replaced with a new engine or has been overhauled, perform the Engine Prelubing procedure. Refer to [Engine Prelubing](#).

90. Fill the engine with oil.