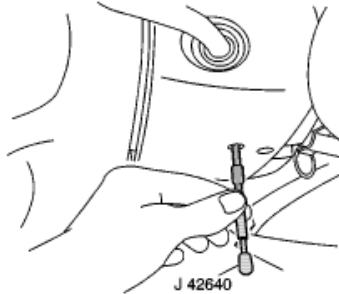


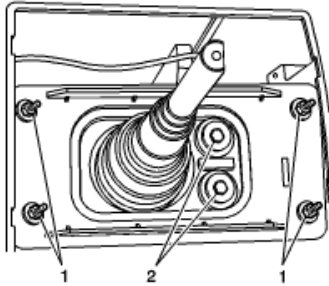
## Engine Replacement

- **Tools Required**
- J 42640 Steering Column Anti-rotation Pin

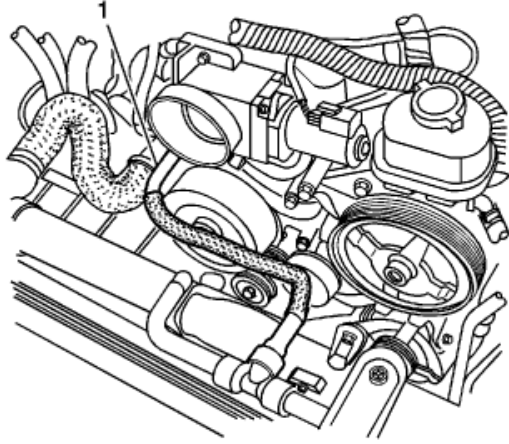
## Removal Procedure



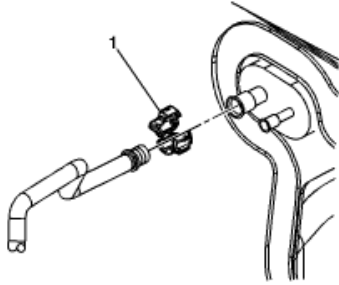
1. Install the J 42640 to the steering column. Refer to Intermediate Steering Shaft Replacement - Lower for the pin installation.



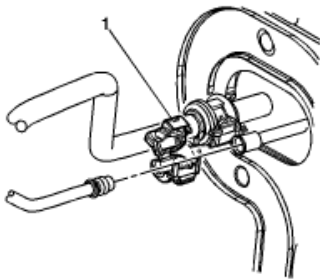
2. Remove the shifter assembly mounting bolts (2).
3. Disconnect the positive and negative battery cables from the battery.
4. Remove the cross vehicle brace.
5. Remove the fuel injector sight shield.
6. Remove the air cleaner assembly.



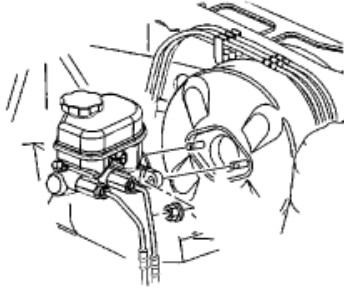
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7. Disconnect the throttle body heater outlet hose (1) from the throttle body and position the hose to the radiator.
  8. Evacuate the air conditioning system.



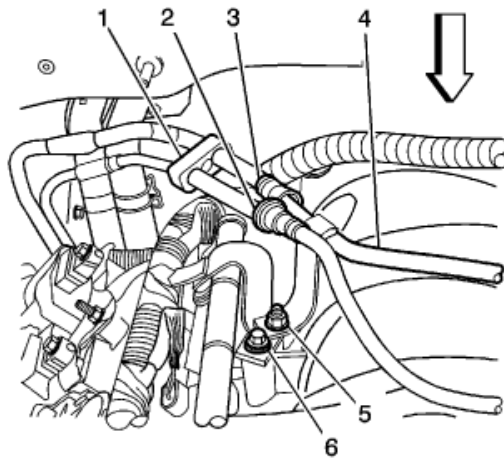
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9. Release the retainer (1) and disconnect the air conditioning suction hose from the evaporator.
  10. Remove the suction hose from the retaining feature (1) on the shock tower and position the hose to the engine.



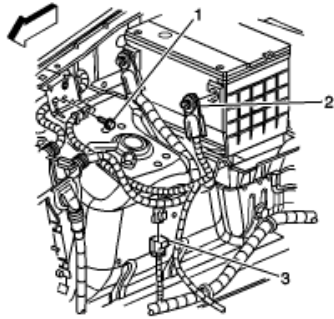
11. Release the retainer (1) and disconnect the air conditioning liquid line from the connector at the front of dash. Disconnect the line from the connector at the radiator fan shroud. Remove the liquid line from the vehicle.



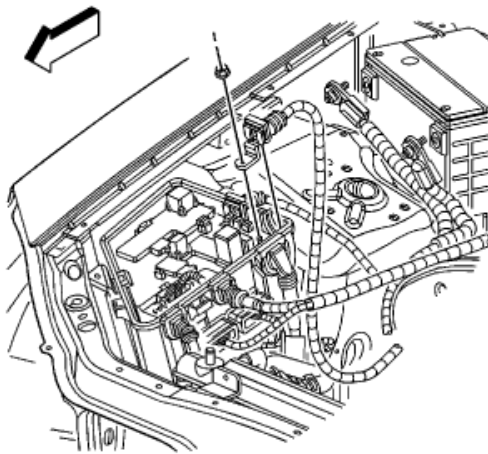
12. Disconnect the brake booster vacuum hose from the brake booster. Position the hose to the engine.
13. Disconnect the brake fluid level switch electrical connector from the master cylinder.
14. Remove the master cylinder mounting nuts.
15. Remove the master cylinder brake lines from the retainers located on the left shock tower.
16. Position the master cylinder to the engine. Hold the master cylinder in place using mechanic's wire. Do not disconnect the brake lines from the master cylinder.



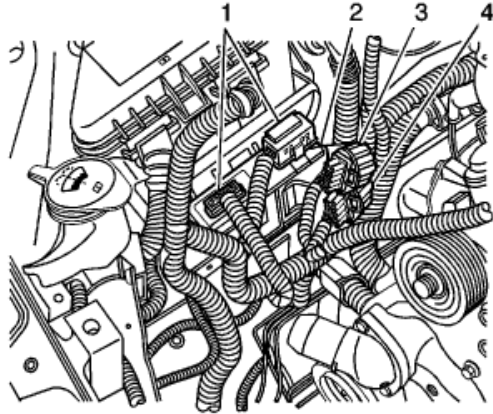
17. Disconnect the 2 electrical connectors, C105 and C107, at the left shock tower.
18. Relieve the fuel system pressure.
19. Disconnect the chassis fuel line (3) from the engine fuel line (4) at the right rear of the engine. Refer to Quick Connect Fitting(s) Service (Metal Collar).
20. Disconnect the chassis-to-engine evaporative emission (EVAP) pipe (2) at the right rear of the engine.
21. Disconnect the engine wiring harness connector C102 at the front of dash.



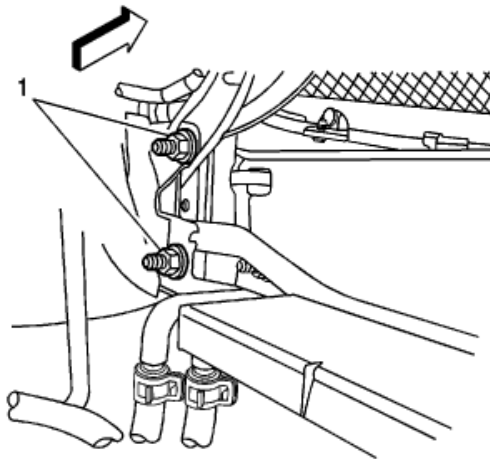
22. Disconnect the underhood fuse block connector C103 (3) located between the right shock tower and the cam cover.
23. Remove the underhood electrical center cover.
24. Remove the negative battery cable bolt (1) from the fender flange near the hood shock.
25. Remove the negative battery cable from the retaining feature on the right shock tower and position the cable to the engine.
26. Remove the battery from the vehicle.



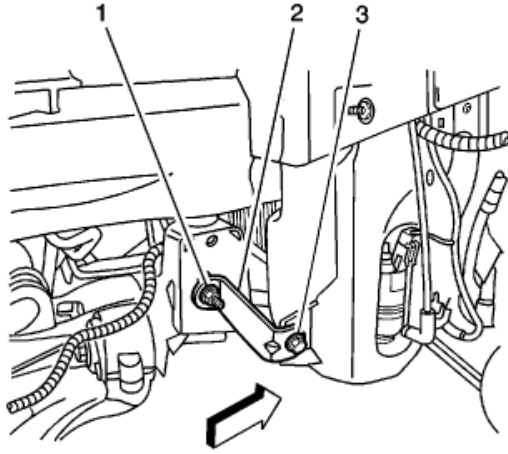
27. Remove the positive battery cable nut from inside the underhood electrical center. Remove the cable from the electrical center and position the cable to the engine.
28. Disconnect the chassis electrical connector at the top of the right shock tower. Position the wire to the engine.



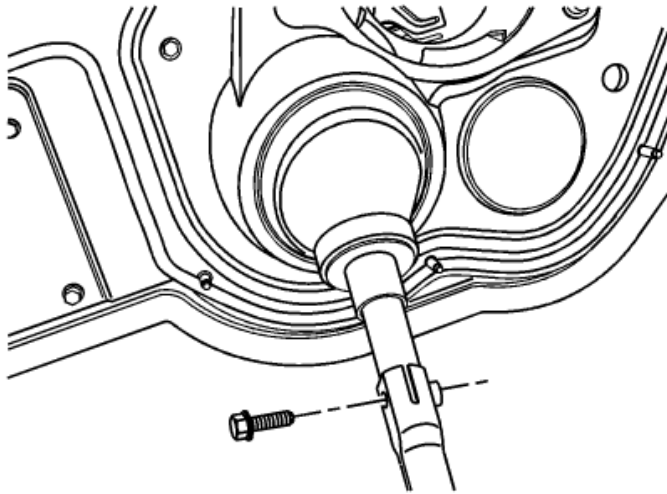
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29. Disconnect the electrical connectors (1) from the throttle actuator control (TAC) module (2).
  30. Remove the TAC module from the bracket mounted on the underhood electrical center.
  31. Disconnect and remove the harness connectors (3, 4) located on the TAC module bracket. Position the harness to the engine.
  32. Disconnect the engine wiring harness C5 connector from the inside of the underhood electrical center.
  33. Remove the ground strap bolt and strap from the right frame rail.
  34. Drain the [cooling system](#).



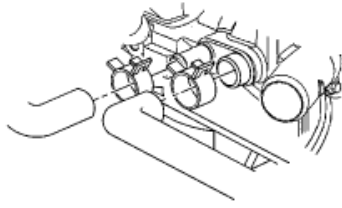
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35. Remove the electric cooling fan assembly.
  36. Remove the [radiator](#) assembly.
  37. Remove the air conditioner condenser assembly.
  38. Remove the power steering oil cooler mounting nuts (1) from the front frame assembly. Do not disconnect the lines from the cooler.
  39. Position the power steering hose and the air conditioning suction hose to the engine and hold in place with mechanic's wire.
  40. Remove the front tire and wheel assemblies.
  41. Remove the right front wheelhouse liner.



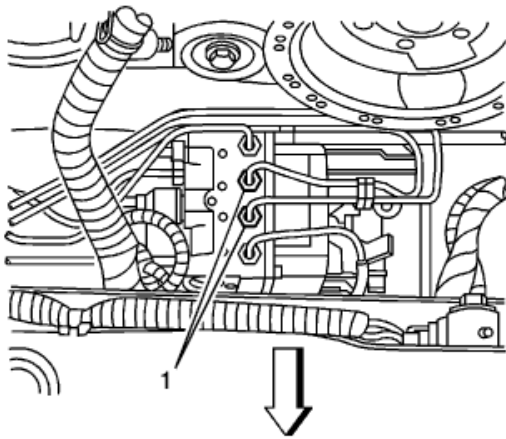
42. Working through the right wheelhouse opening, remove the windshield washer reservoir-to-frame brace (2).



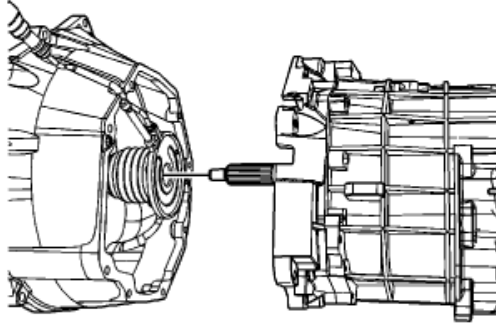
43. Remove the upper intermediate shaft to center intermediate shaft bolt.  
44. Separate the upper intermediate shaft from the center intermediate shaft.  
45. Lower the vehicle.



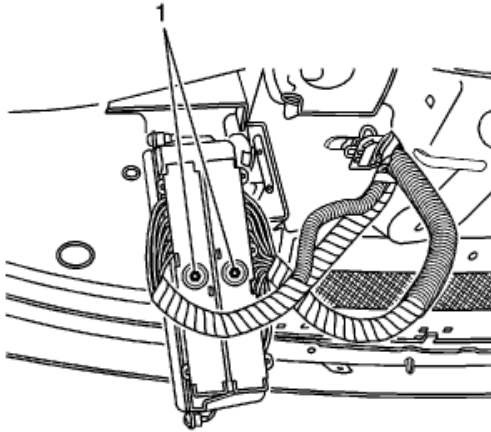
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46. Disconnect the heater hoses from the engine.



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47. Remove the 2 rear brake lines (1) from the brake pressure modulator valve (**BPMV**) .  
48. Pull the brake lines out from behind the wiring harness and secure the lines to the chassis with mechanic's wire.  
49. Raise the vehicle. Refer to Vehicle Lifting.

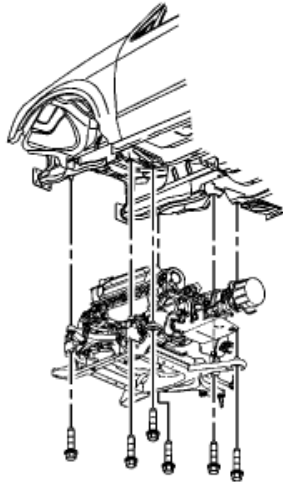


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50. Remove the transmission assembly.
  51. Remove the concentric slave cylinder.
  52. Remove the brake bundle clips from the right and left frame rails. Remove the rear brake lines from the clip on the right frame rail.



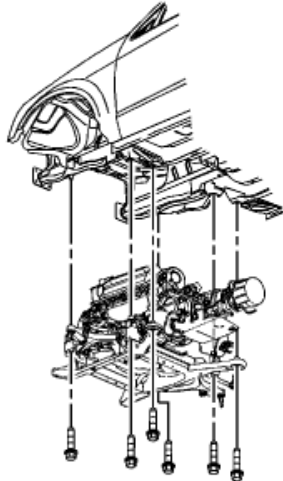
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53. Remove the powertrain control module (PCM) from the PCM housing.
  54. Remove the (PCM) wiring harness screws (1).
  55. Remove the PCM. Secure the PCM wiring harness to the engine.
  56. Lower the vehicle.
  57. Remove the right and left shock module upper mounting bolts.
  58. Secure the shock modules to the front frame to avoid stretching the front brake hoses.
  59. Raise the vehicle enough to place a suitable lift table under the engine, front frame, and front suspension assembly.
  60. **CAUTION:** To avoid any vehicle damage, serious personal injury or death when major components are removed from the vehicle and the vehicle is supported by a hoist, support the vehicle with jack stands at the opposite end from which the components are being removed. Support the rear of the vehicle with suitable jackstands.
  61. Raise the lift table, or lower the vehicle to preload the weight of the engine, front frame, and front suspension assembly.



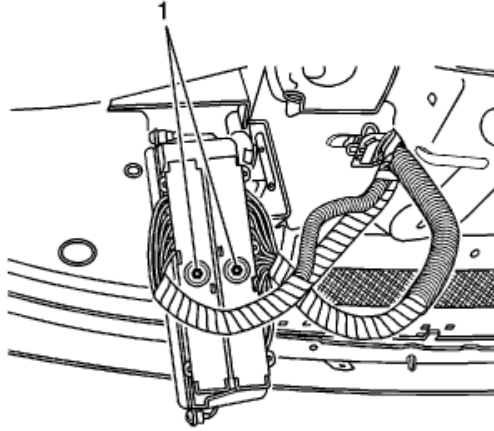


62. Remove the front frame bolts.
63. With the aid of an assistant, lower the table and/or raise the vehicle to remove the engine, front frame, and suspension assembly from the vehicle.
64. Ensure that all the hoses, wires, pipes, and shock modules clear the vehicle during the removal process.
65. Install the J 41798 to the engine.
66. Using a suitable engine lift, remove the engine from the front frame assembly.

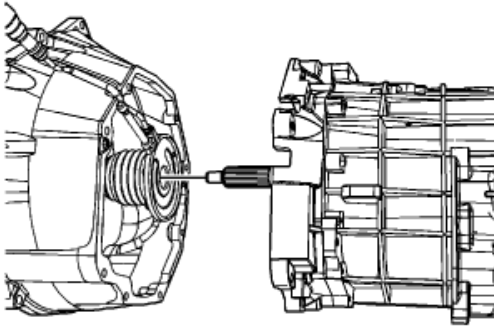
#### Installation Procedure



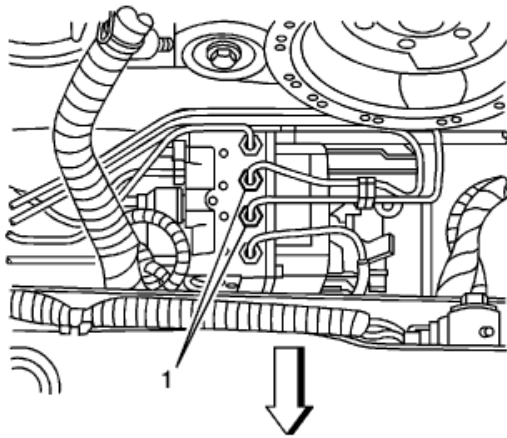
1. Install the engine to the front frame assembly.
2. Remove the J 41798 from the engine.
3. With the aid of an assistant, raise the table and/or raise the vehicle to install the engine, front frame, and suspension assembly to the vehicle.
4. Ensure that all the hoses, wires, pipes, and shock modules clear the vehicle during the installation process.
5. **Notice:** Refer to Fastener Notice in Service Precautions. Install the frame bolts. Tighten the frame bolts to **191 Nm (141 ft. lbs.)**.
6. Install the right and left shock module upper mounting bolts. Tighten the shock module bolts to **112 Nm (83 ft. lbs.)**.
7. Raise the vehicle and remove the lift table.



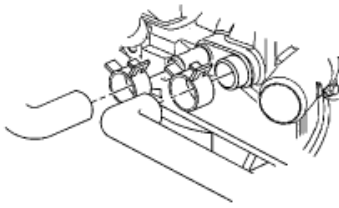
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8. Connect the wiring harness (1) to the PCM and install the PCM to the vehicle.
  9. Install the rear brake lines to the clip on the right frame rail. Install the brake bundle clips to the right and left frame rails.



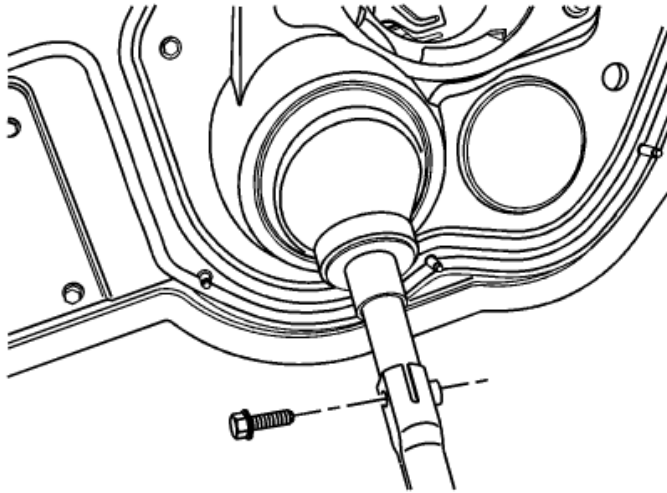
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10. Install the concentric slave cylinder.
  11. Install the transmission assembly.
  12. Lower the vehicle.



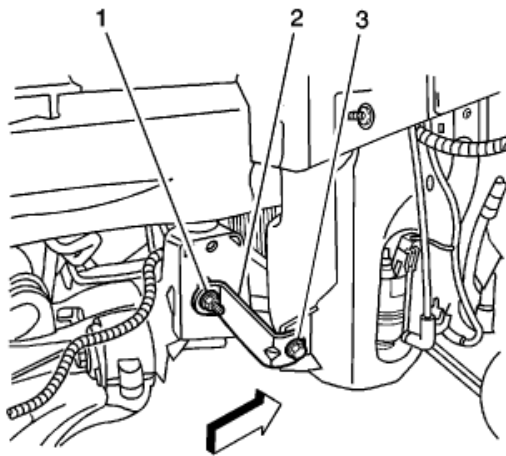
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13. Route the rear brake lines in front of the wiring harness. Install the 2 rear brake lines (1) to the BPMV.



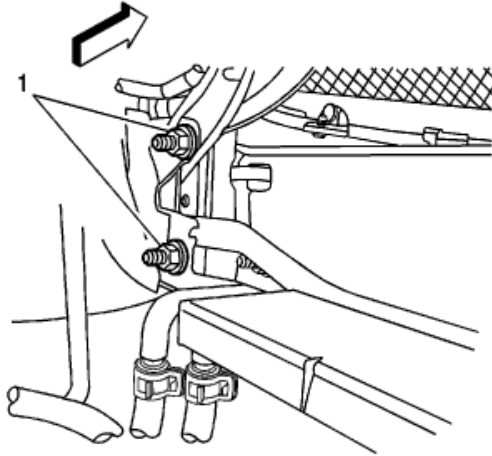
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14. Connect the **heater hoses** to the engine.  
15. Raise the vehicle. Refer to Vehicle Lifting.



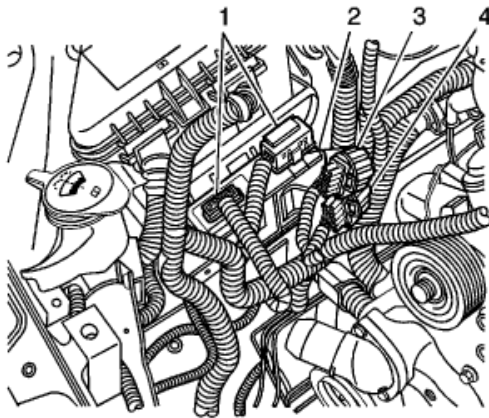
16. Install the upper intermediate shaft to center intermediate shaft.



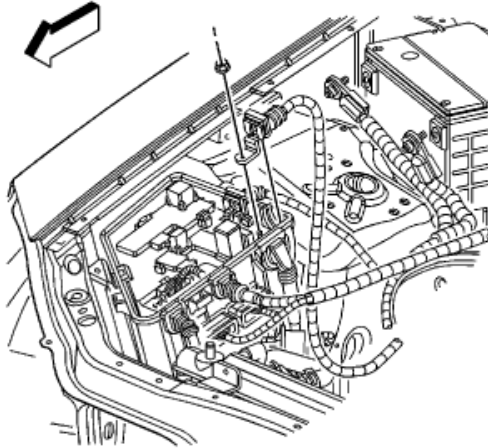
17. Install the windshield washer reservoir-to-frame brace (2).  
18. Install the right wheelhouse liner.  
19. Install the front tire and wheel assemblies.  
20. Install the power steering hose and air conditioning suction hose into the proper positions.



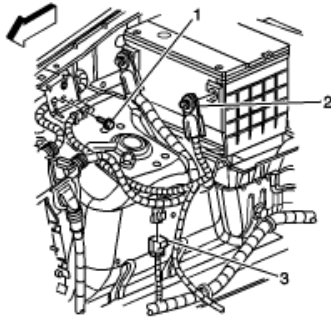
21. Install the power steering oil cooler and nuts (1) to the front frame.
22. Install the air conditioning condenser assembly.
23. Install the radiator assembly.
24. Install the electric cooling fan assembly.
25. Install the ground strap to the right front frame rail.
26. Connect the engine wiring harness C5 connector at the inside of the underhood electrical center.



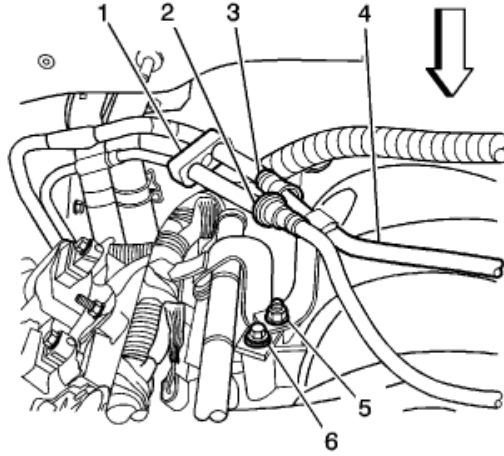
27. Connect the wiring harness connectors (3, 4) at the TAC module bracket.
28. Install the TAC module (2) to the bracket located near the underhood electrical center.
29. Connect the electrical connectors (1) to the TAC module.
30. Connect the chassis electrical connector located at the top of the right shock tower.



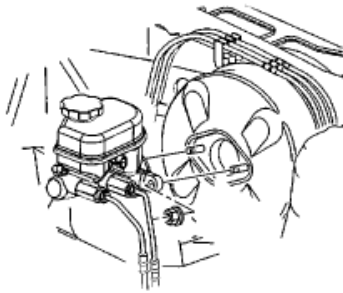
31. Install the positive battery cable and nut to the inside of the underhood electrical center.
32. Install the battery.
33. Install the negative battery cable to the retaining feature on the right shock tower.



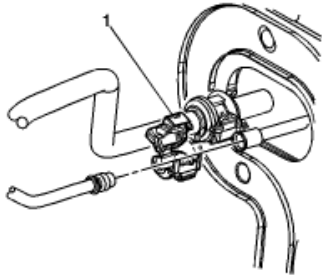
34. Install the negative battery cable and bolt (1) to the right fender flange.
35. Install the underhood electrical center cover.
36. Connect the engine wiring harness connector C102 at the front of dash.



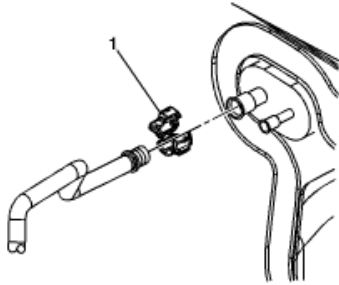
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37. Connect the chassis-to-engine EVAP pipe (2) at the right rear of the engine.
  38. Connect the chassis fuel line (3) to the engine fuel line (4) at the right rear of the engine.
  39. Connect the electrical connector C103 (3).
  40. Connect the electrical connectors, C105 and C107, at the left shock tower.



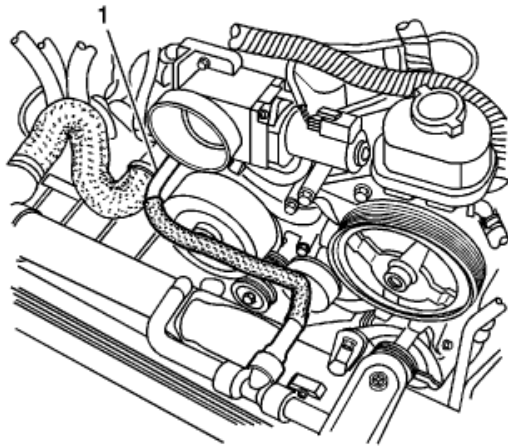
- 
41. Install the master cylinder.
  42. Install the master cylinder brake lines to the retainers at the left shock tower.
  43. Connect the brake fluid level switch electrical connector.
  44. Connect the brake booster vacuum line to the brake booster.



45. Install the air conditioning liquid line and retainer (1) to the vehicle.



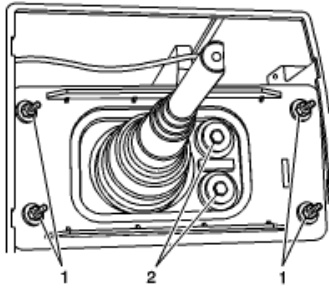
46. Install the air conditioning suction hose and retainer (1) to the front of dash and the retaining feature on the left shock tower.



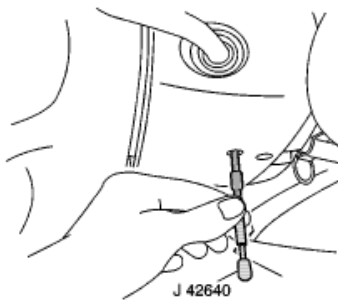
47. Connect the throttle body heater outlet hose (1) to the throttle body.



48. Install the air cleaner assembly.
49. Install the fuel injector sight shield.
50. Install the cross vehicle brace.
51. Connect the battery positive and negative cables to the battery.



- 
52. Install the shifter assembly mounting bolts (2).



- 
53. Remove the J 42640 from the steering column.
  54. Fill the engine with engine oil. Refer to Fluid and Lubricant Recommendations and Capacities - Approximate Fluid.
  55. Check the transmission fluid level and add fluid as necessary. Refer to Transmission Fluid Level Inspection.
  56. Fill the [cooling system](#).
  57. Recharge the HVAC system