

## 2003 Saturn ION

Submodel: | Engine Type: L4 | Liters: 2.2

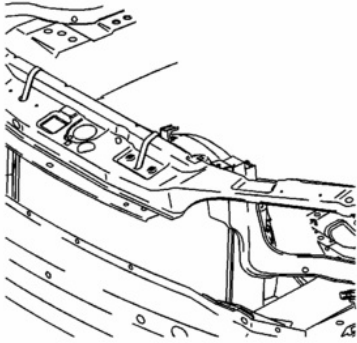
Fuel Delivery: FI | Fuel: GAS

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### Engine Replacement

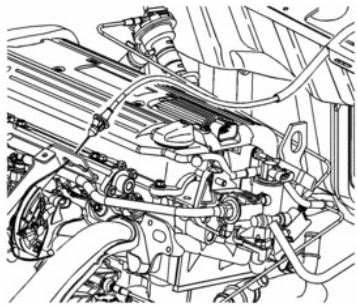
#### Removal Procedure

1. With the tires in the straight forward position, remove the key from the ignition.
2. Disconnect the negative battery cable. Refer to Battery Negative Cable Disconnect/Connect Procedure in Engine Electrical.
3. Remove the air inlet duct and resonator . Refer to Air Cleaner Outlet Resonator Replacement in Engine Controls - 2.2L (L61).



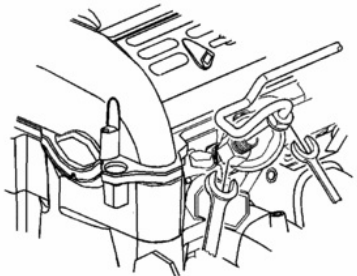
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4. Secure the cooling module to the upper body structure.



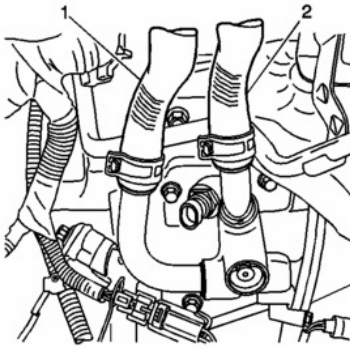
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5. Disconnect the accelerator cable. Refer to Accelerator Controls Cable Replacement in Engine Controls - 2.2L (L61).
6. Relieve the fuel system pressure. Refer to Fuel Pressure Relief Procedure in Engine Controls - 2.2L (L61).



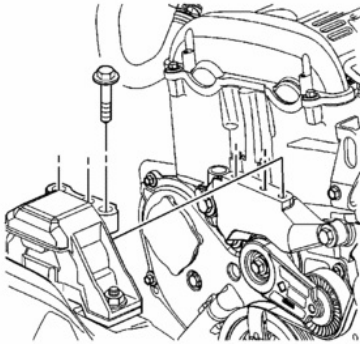
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7. Disconnect the fuel lines from the fuel rail.
8. Drain the cooling system. Refer to Draining and Filling Cooling System in Engine Coding.
9. Remove the radiator inlet hose. Refer to Radiator Hose Replacement - Inlet in Engine Coding.
10. Remove the surge tank to cylinder head hose. Refer to Surge Tank Hose/Pipe Replacement - Inlet and Surge Tank Hose/Pipe Replacement - Outlet in Engine Coding.
11. Remove the radiator outlet hose. Refer to Radiator Hose Replacement - Outlet in Engine Coding.



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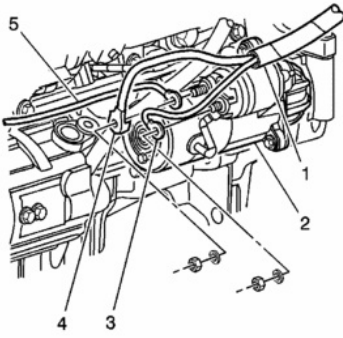
12. Remove the inlet (1) and outlet (2) heater hoses. Refer to Heater Hose Replacement - Inlet and to Heater Hose Replacement - Outlet in Heating, Ventilation and Air Conditioning.



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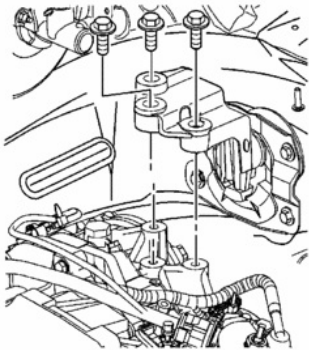
13. Disconnect the following harness connectors:

- IAC motor
  - TPS
  - Map sensor
  - Crankshaft sensor
  - Oil pressure sensor
  - Purge solenoid
  - Ignition coil and module assembly
  - O2 sensor
  - Vehicle speed sensor
  - Engine temperature sensor
  - Back-up lamp switch
14. Raise and suitably support the vehicle. Refer to Lifting and Jacking the Vehicle in General Information.
15. Remove the engine drive belt. Refer to Drive Belt Replacement .
16. Remove the AC compressor bolts and set the compressor aside.



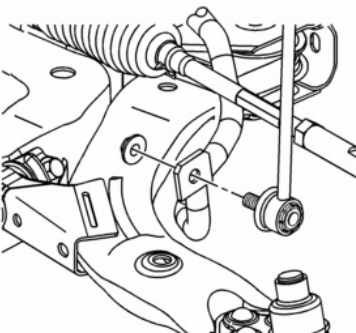
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17. Disconnect the starter harness connectors (3,4,5,).
18. Disconnect the generator harness connectors.
19. Drain the engine oil.
20. Disconnect the front exhaust pipe from the exhaust manifold. Refer to Exhaust Manifold Replacement in Engine Exhaust.
21. Disconnect the transmission harness connectors.
22. Disconnect the transmission shift cable from the transmission.
23. Use blocks of wood to support the powertrain assembly between the frame and the powertrain.
24. Remove the engine mount. Refer to Engine Mount Replacement .



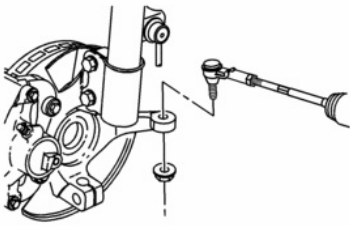
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25. Remove the side transmission mount. Refer to the following:
  - Transmission Mount Replacement - Side in Automatic Transaxle - AF23-5
  - Transmission Mount Replacement - Side in Automatic Transaxle - VT25-E
  - Transmission Mount Replacement - Side in Manual Transmission - M86 Getrag



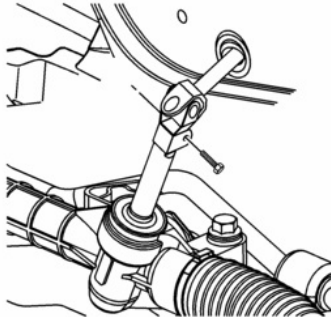
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26. Disconnect the stabilizer links from the stabilizer bar. Refer to Stabilizer Shaft Link Replacement in Front Suspension.



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27. Disconnect the outer tie rod ends from the steering knuckles. Refer to Rack and Pinion Outer Tie Rod End Replacement in Power Steering System.

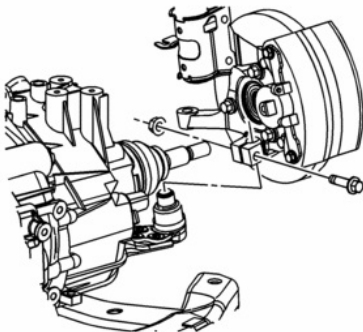


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**Important**

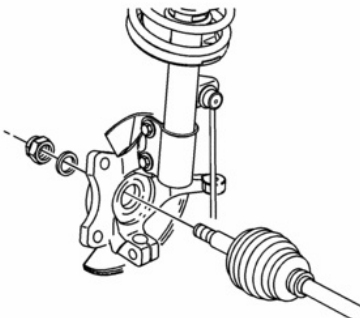
In order to prevent possible SIR system deployment, do not attempt to rotate the steering shaft.

28. Disconnect the intermediate shaft from the steering gear. Refer to Intermediate Steering Shaft Replacement in Steering Wheel and Column.



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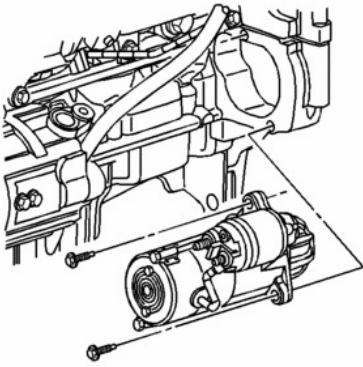
29. Disconnect the lower control arms from the steering knuckles. Refer to Lower Control Arm Replacement in Front Suspension.



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30. Disconnect the drive axles from the steering knuckle. Refer to Wheel Drive Shaft Replacement in Wheel Drive Shafts.
31. Use a paint pen or magic marker in order to mark the frame to body position.
32. Lower the vehicle to about 3 feet off the ground in order to position the lift table under the frame.
33. Use wood blocks as necessary between the lift table and the frame to support the assembly.
34. Slowly remove the frame bolts using the following sequence:

- A. Remove the front frame bolts.
  - B. Partially unscrew the rear frame bolts until 1.5 inches of bolt shank is exposed.
35. Slowly lower the table to the floor with the cradle and powertrain assembly.
  36. Attach the engine lift hoist to the engine lift hooks.



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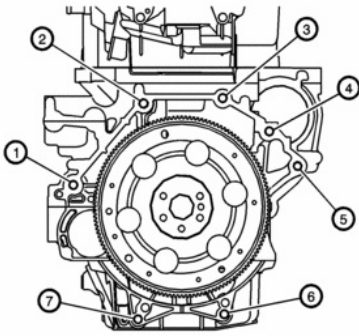
37. Remove the starter.
38. If applicable, remove the torque converter to flywheel bolts.
39. Remove the transmission to engine bolts.
40. Separate the engine from the transmission.
41. If applicable, remove the clutch pressure plate and disk.
42. Remove the following components:
  - Exhaust manifold
  - Exhaust manifold studs
  - Engine mount bracket
  - Engine block heater
  - Thermostat housing and feed pipe
  - Generator
43. Remove the engine from the engine lift.

## Installation Procedure

1. Attach the engine lift hoist to the engine lift hooks.
2. Install the following components:
  - Exhaust manifold Refer to Exhaust Manifold Replacement in Engine Exhaust.
  - Engine mount bracket Refer to Engine Mount Bracket Replacement .
  - Fuel rail Refer to Fuel Rail Assembly Replacement in Engine Controls - 2.2L (L61).
  - Engine block heater, if equipped. Refer to Coolant Heater Replacement in Engine Cooling.
  - Drive belt tensioner Refer to Drive Belt Tensioner Replacement .
  - Thermostat housing and feed pipe Refer to Thermostat Replacement in Engine Cooling.
  - Generator Refer to Generator Replacement .
  - Flywheel Refer to Engine Flywheel Replacement .
3. If applicable, install the clutch pressure plate and disk.
4. Align the engine to the transmission.

### Caution!

Refer to Fastener Notice in Cautions and Notices.



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**Important**

The number 3 bolt location is not used.

5. Secure the engine to the transmission.

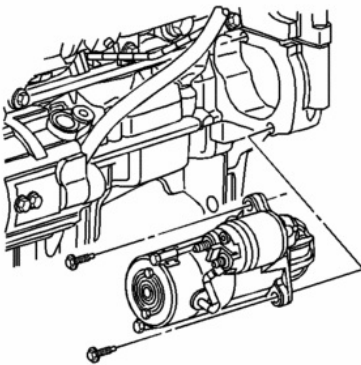
**Tighten**

Tighten the transmission to engine bolts to 75 N·m (55 lb ft).

6. If applicable, install the torque converter bolts.

**Tighten**

Tighten the bolts to 60 N·m (44 lb ft).



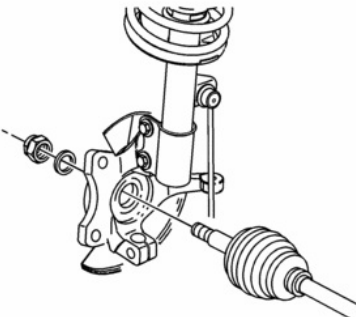
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7. Install the starter. Refer to Starter Motor Replacement in Engine Electrical.
8. Remove the engine lift from the engine.
9. Raise and position the frame and powertrain assembly to the vehicle.
10. Hand start all the frame bolts while aligning the frame to the paint marks.
11. Tighten the frame bolts.

**Tighten**

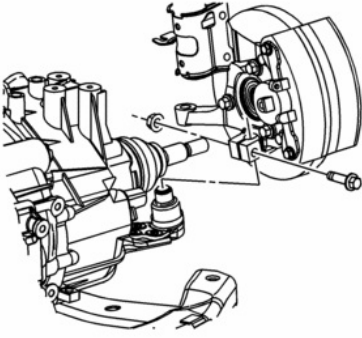
Tighten the frame bolts to 100 N·m (74 lb ft +180 degrees).

12. Remove the lift table.



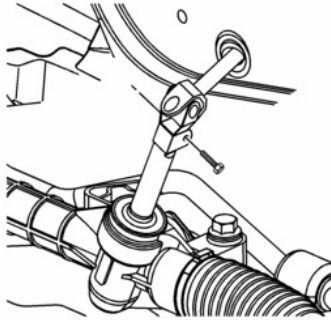
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13. Connect the drive axles to the steering knuckles. Refer to Wheel Drive Shaft Replacement in Wheel Drive Shafts.



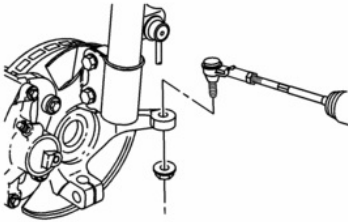
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14. Connect the lower control arm to the steering knuckle. Refer to Lower Control Arm Replacement in Front Suspension.



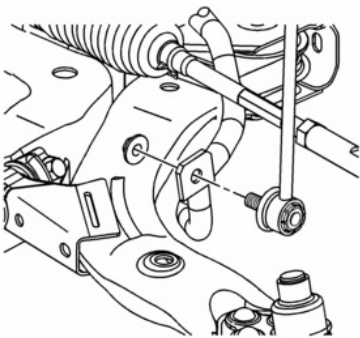
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15. Connect the intermediate steering shaft to the steering gear. Refer to Power Steering Gear Replacement in Power Steering System.



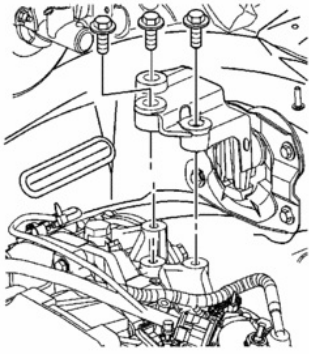
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16. Connect the outer tie rod ends to the steering knuckles. Refer to Rack and Pinion Outer Tie Rod End Replacement in Power Steering System.



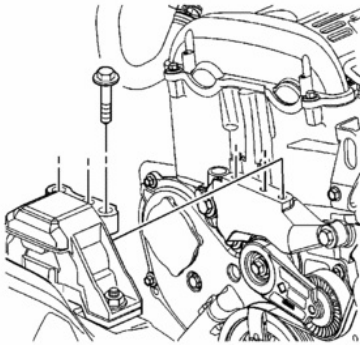
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17. Connect the stabilizer links to the stabilizer bar. Refer to Stabilizer Shaft Link Replacement in Front Suspension.



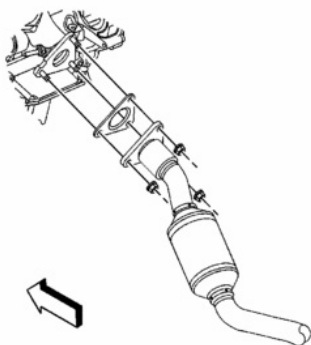
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18. Install the side transmission mount. Refer to the following:
- Transmission Mount Replacement - Side in Automatic Transaxle - AF23-5
  - Transmission Mount Replacement - Side in Automatic Transaxle - VT25-E
  - Transmission Mount Replacement - Side in Manual Transmission - M86 Getrag



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19. Install the engine mount. Refer to Engine Mount Replacement .
20. Remove the wood blocks between the powertrain and frame.
21. Connect the transmission shift cable to the transmission.
22. Connect the transmission harness connector.



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23. Connect the exhaust takedown pipe to the exhaust manifold.

**Tighten**

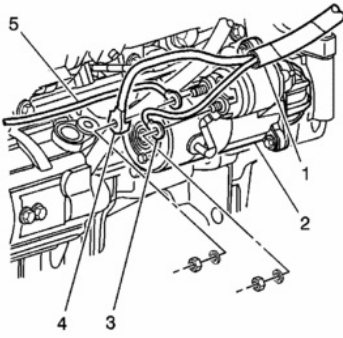
Tighten the nuts to 30 N·m (22 lb ft).

24. Connect the generator harness connectors.

**Tighten**

Tighten the generator terminal nut to 20 N·m (15 lb ft).





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25. Connect the starter harness connectors (3,4,5).

**Tighten**

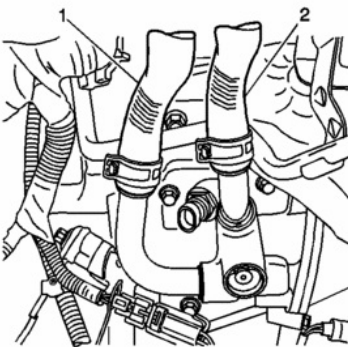
Tighten the battery terminal nut to 17 N·m (13 lb ft).

**Tighten**

Tighten the S-terminal nut to 3 N·m (27 lb in).

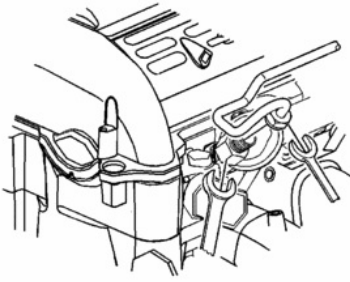
26. Install the AC compressor to the engine. Refer to Compressor Replacement in Heating, Ventilation and Air Conditioning.  
 27. Install the engine drive belt. Refer to Drive Belt Replacement .  
 28. Connect the following harness connectors:

- IAC motor
- TPS
- Map sensor
- Crankshaft sensor
- Oil pressure sensor
- Purge solenoid
- Ignition coil and module assembly
- O2 sensor
- Vehicle speed sensor
- Engine temperature sensor



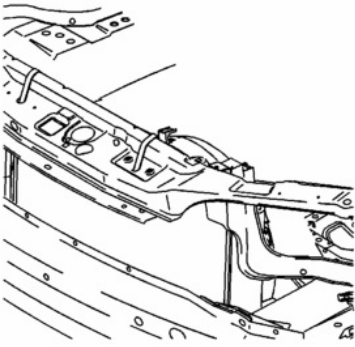
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29. Install the inlet heater hose (1) and outlet heater hose (2). Refer to Heater Hose Replacement - Inlet and Heater Hose Replacement - Outlet in Heating, Ventilation and Air Conditioning.  
 30. Install the radiator outlet hose. Refer to Radiator Hose Replacement - Inlet in Engine Coding.



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31. Connect the fuel line to the fuel rail.
32. Connect the brake booster hose at the brake booster.
33. Connect the accelerator cable. Refer to Accelerator Controls Cable Replacement in Engine Controls - 2.2L (L61).



[Click to Enlarge](#)

34. Release the cooling module from the upper body structure.
35. Install the air inlet duct and resonator. Refer to Air Cleaner Outlet Resonator Replacement in Engine Controls - 2.2L (L61).
36. Connect the negative battery cable. Refer to Battery Negative Cable Disconnect/Connect Procedure in Engine Electrical.
37. Fill the engine with engine oil to the proper level. Refer to Fluid and Lubricant Recommendations in Maintenance and Lubrication.
38. Fill the cooling system. Refer to Draining and Filling Cooling System in Engine Cooling.
39. Road test the vehicle.