

2010 ENGINE

Engine Mechanical - 2.8L, 3.0L, 3.2L, or 3.6L - Repair Instructions - On Vehicle - Equinox & Terrain

OIL PUMP SUCTION PIPE AND SCREEN ASSEMBLY REPLACEMENT

REMOVAL PROCEDURE

1. Remove the oil pan. Refer to [Oil Pan Replacement](#) .

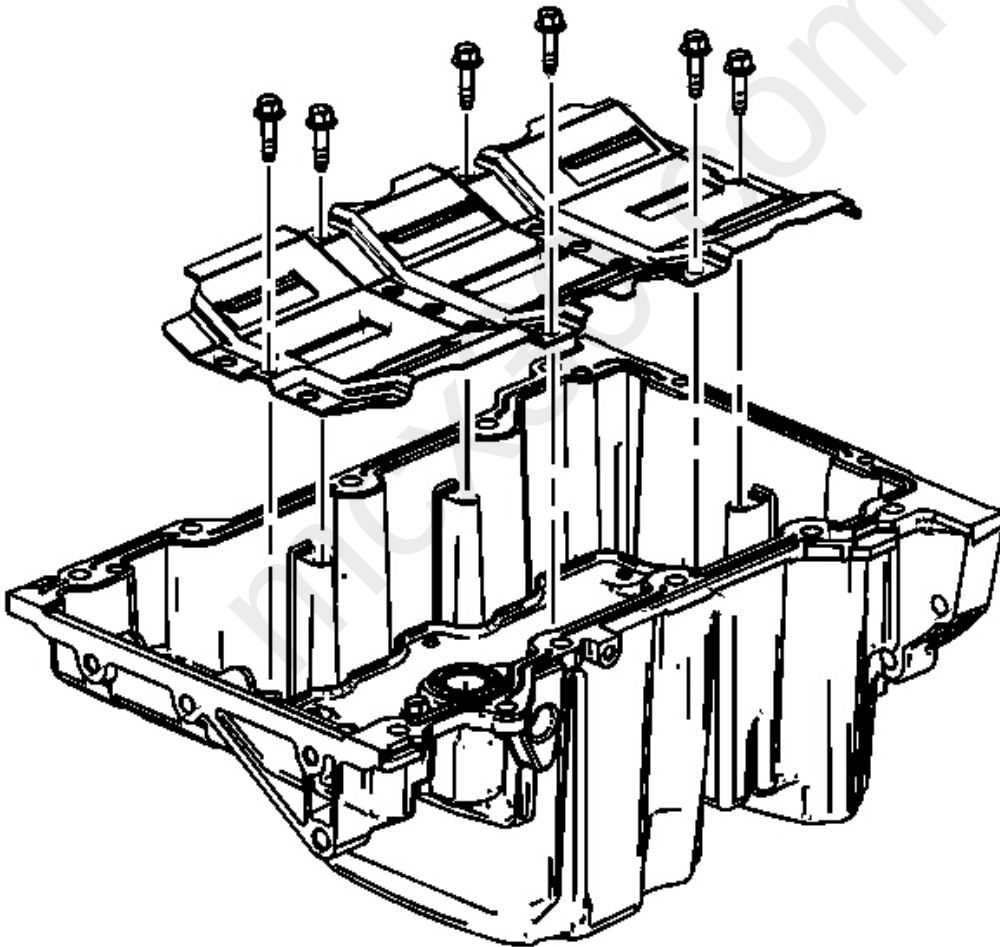


Fig. 1: View Of Oil Pan Scraper & Bolts
Courtesy of GENERAL MOTORS CORP.

2. Remove the oil pan scraper bolts.
3. Remove the oil pan scraper.

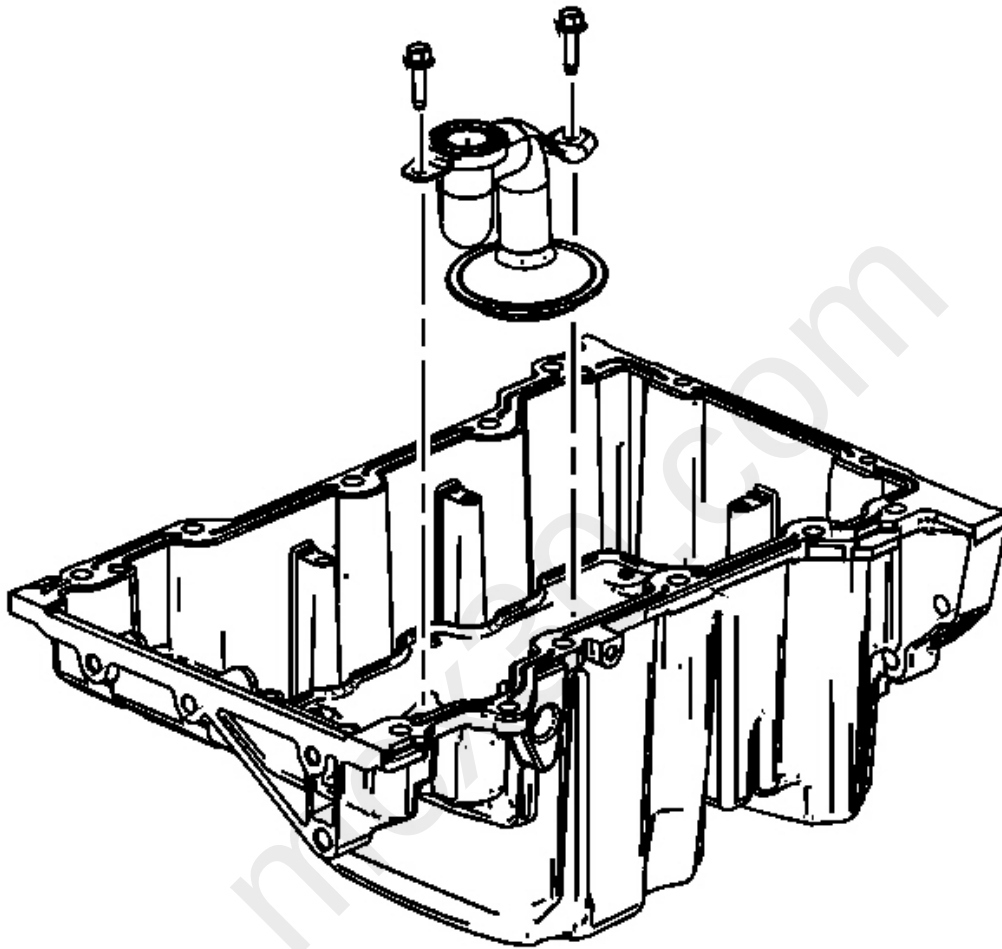


Fig. 2: View Of Oil Suction Pipe
Courtesy of GENERAL MOTORS CORP.

4. Remove the oil suction pipe bolts.
5. Remove the oil suction pipe.

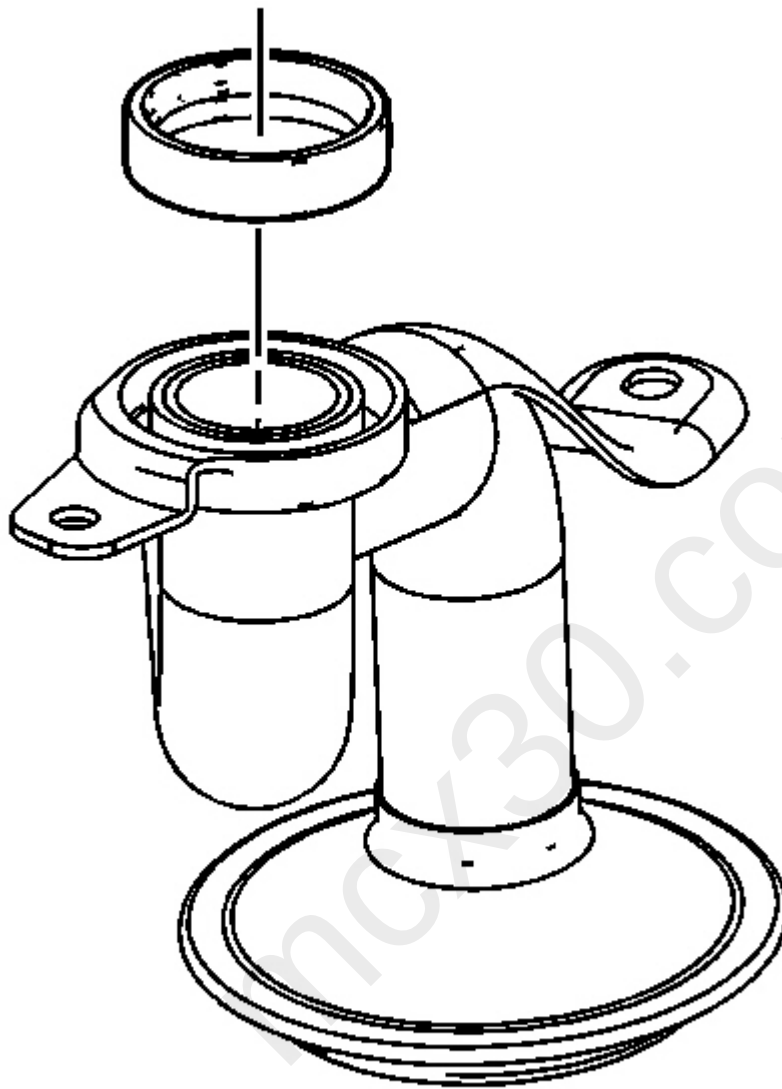


Fig. 3: View Of Oil Suction Tube Seal & Oil Suction Tube
Courtesy of GENERAL MOTORS CORP.

6. Remove the oil suction tube seal from the oil suction tube. Discard the oil suction tube seal.

INSTALLATION PROCEDURE

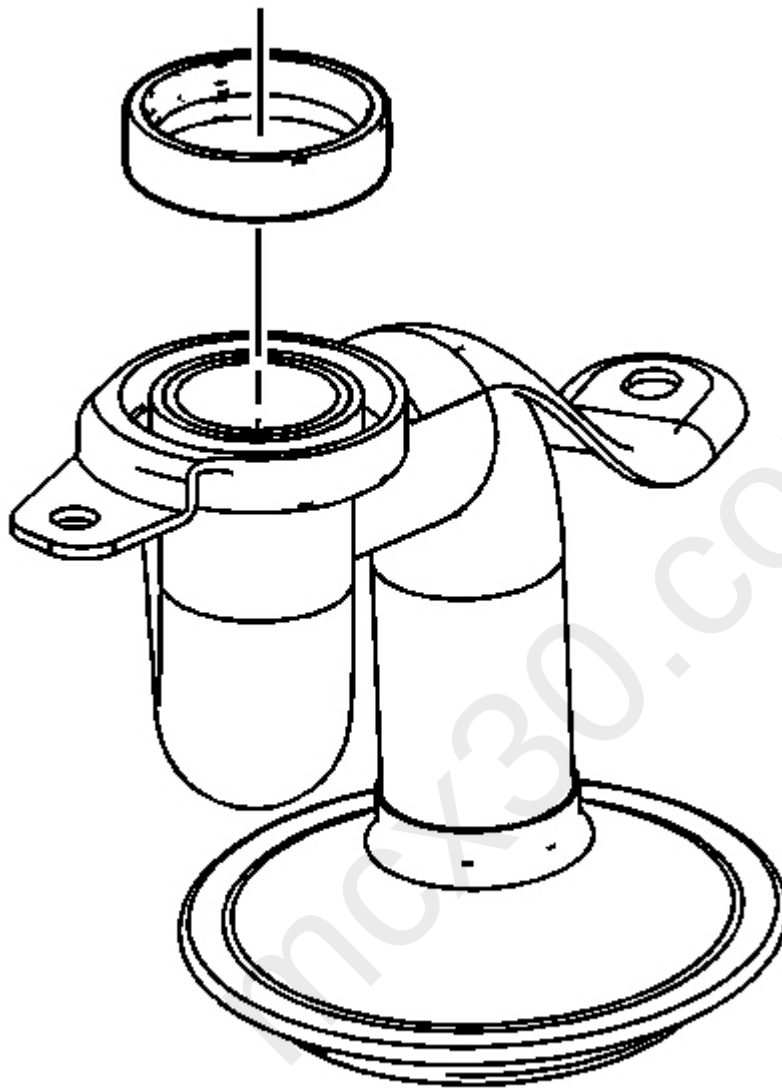


Fig. 4: View Of Oil Suction Tube Seal & Oil Suction Tube
Courtesy of GENERAL MOTORS CORP.

1. Install a NEW oil suction tube seal onto the oil suction tube. DO NOT reuse the old oil suction tube seal.

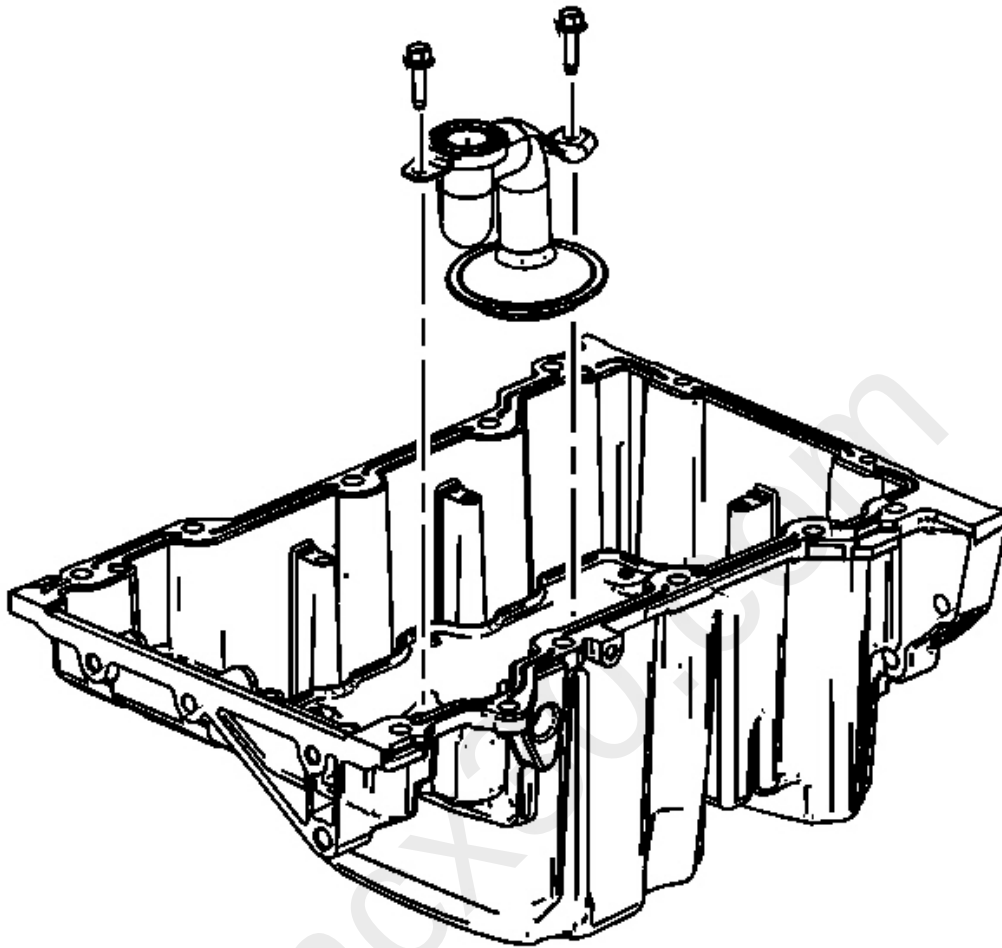


Fig. 5: View Of Oil Suction Pipe
Courtesy of GENERAL MOTORS CORP.

2. Install the oil suction pipe.

CAUTION: Refer to Fastener Caution .

3. Install the oil suction pipe bolts and tighten to 10 N.m (89 lb in).

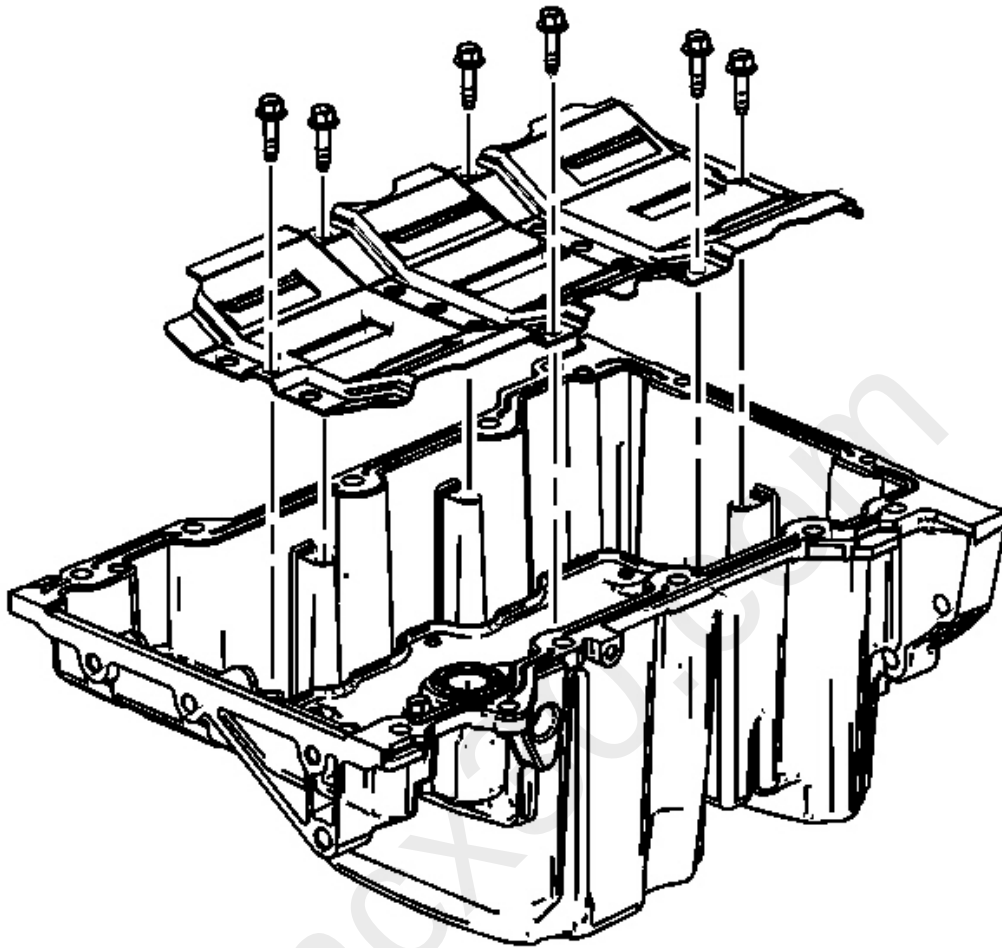


Fig. 6: View Of Oil Pan Scraper And Bolts
Courtesy of GENERAL MOTORS CORP.

4. Install the oil pan scraper.
5. Install the oil pan scraper bolts and tighten to 10 N.m (89 lb in).
6. Install the oil pan. Refer to **Oil Pan Replacement** .

ENGINE REPLACEMENT

REMOVAL PROCEDURE

1. Relieve the fuel pressure. Refer to **Fuel Pressure Relief** .
2. Remove negative battery cable from engine block. Refer to **Battery Negative Cable Replacement (LF1)**

or **Battery Negative Cable Replacement (LAF)**

3. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
4. Remove the intake manifold cover. Refer to **Intake Manifold Cover Replacement** .

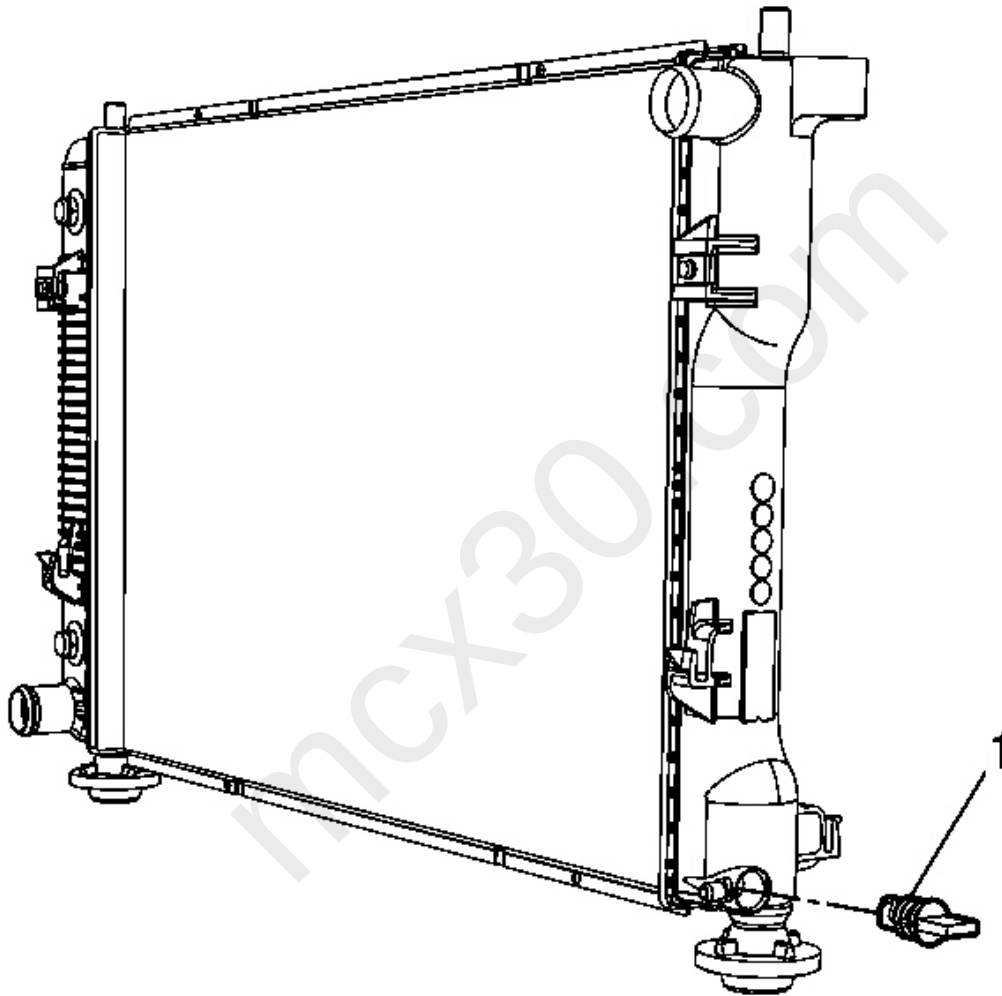


Fig. 7: Radiator Drain Cock

Courtesy of GENERAL MOTORS CORP.

5. Drain the cooling system. Refer to **Cooling System Draining and Filling (Static)** or **Cooling System Draining and Filling (GE 47716)** .
6. Drain the engine oil. Refer to **Engine Oil and Oil Filter Replacement (LF1)**.

7. Remove the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement** .
8. Remove the battery tray. Refer to **Battery Tray Replacement** .

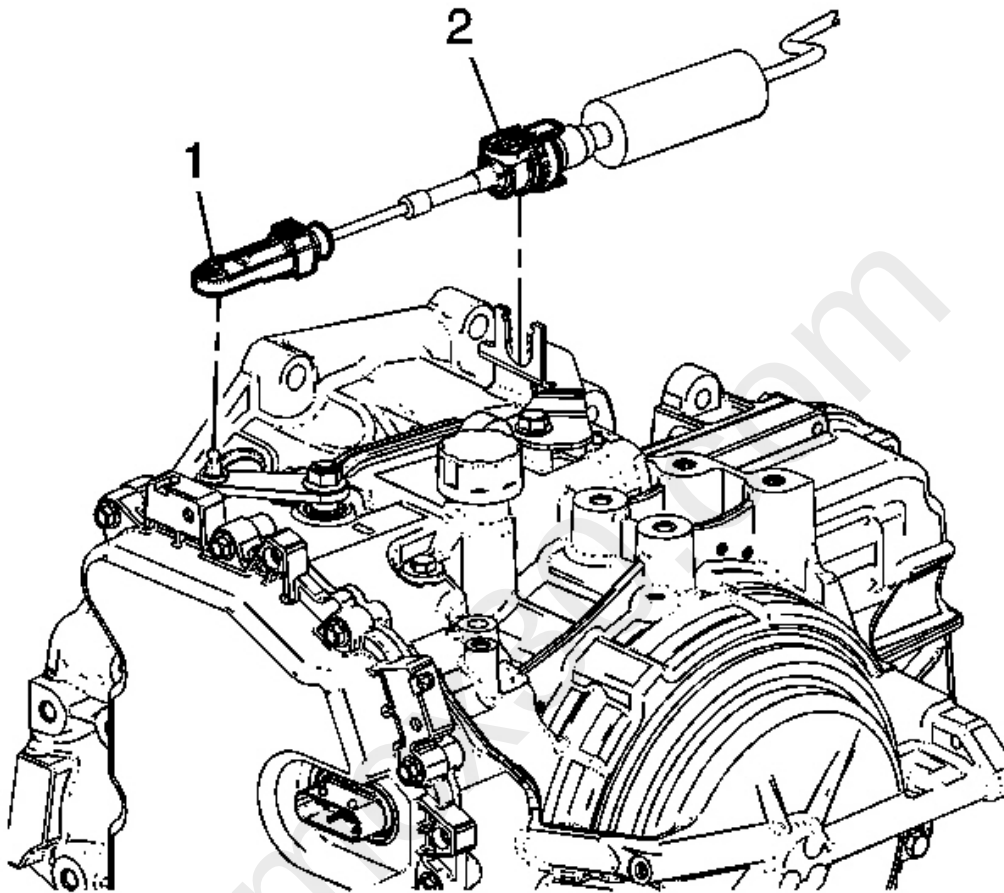


Fig. 8: View Of Transmission Range Selector Lever & Cable Connection
Courtesy of GENERAL MOTORS CORP.

9. Disconnect the range selector cable end (1) from the range selector lever.
10. Disconnect the range selector cable (2) from the range selector cable bracket.
11. Disconnect the wiring harness from the underhood junction block. refer to **Accessory Wiring Junction Block Replacement** .
12. Remove battery hold down retainer bracket.
13. Disconnect right side inline electrical connector.

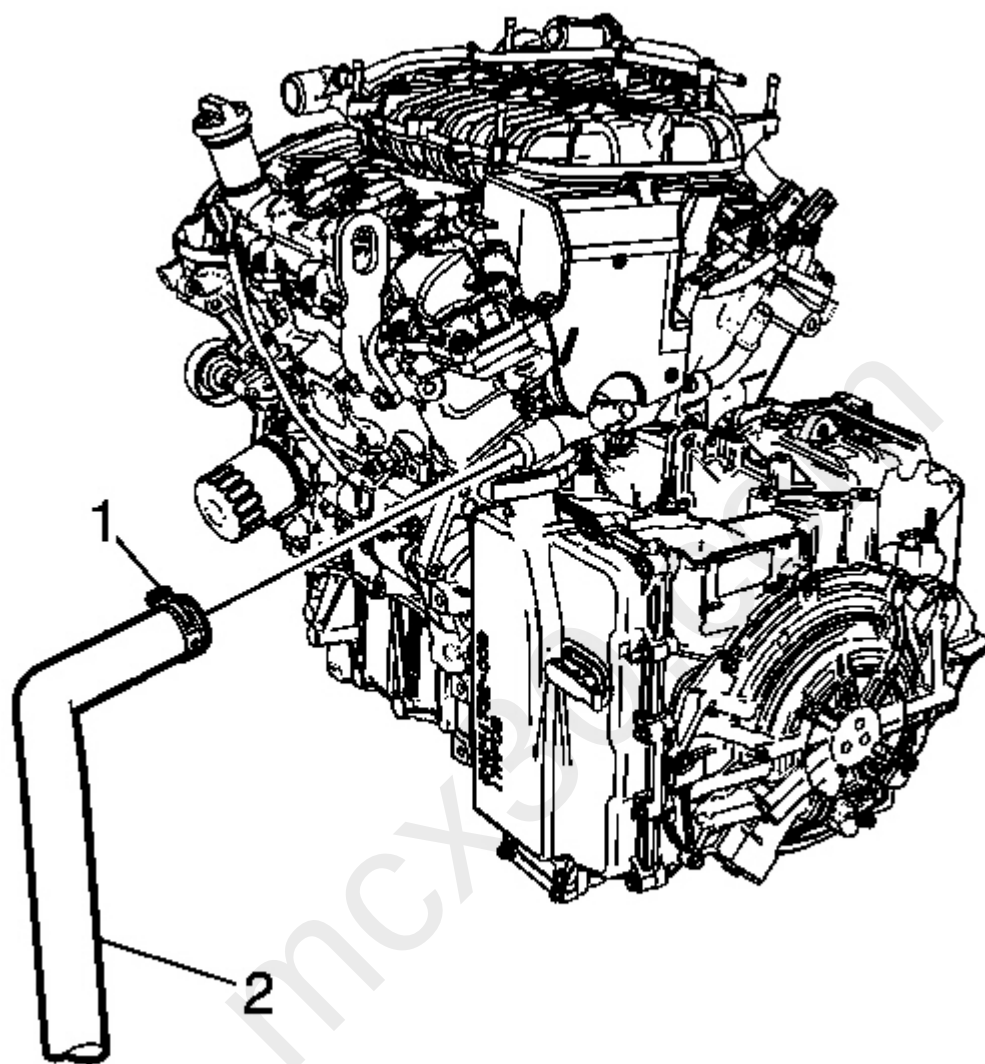


Fig. 9: Radiator Outlet Hose At Engine
Courtesy of GENERAL MOTORS CORP.

14. Disengage tension on the radiator outlet hose clamp (1) at the engine using **J-38185: Hose Clamp Pliers**.

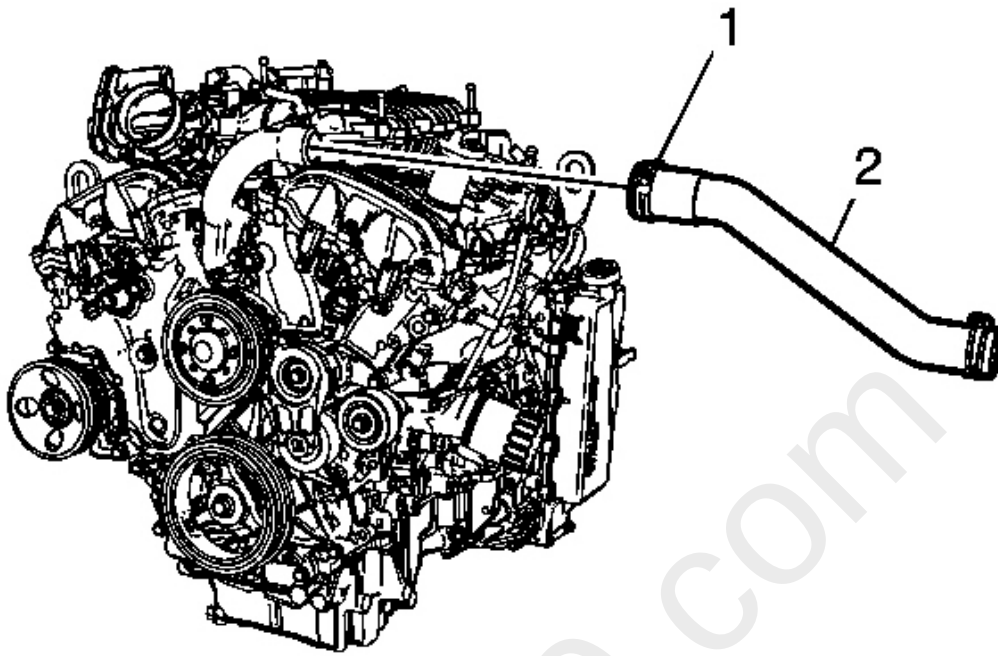


Fig. 10: Radiator Inlet Hose At Engine
Courtesy of GENERAL MOTORS CORP.

15. Remove the radiator inlet hose (2) from the engine.

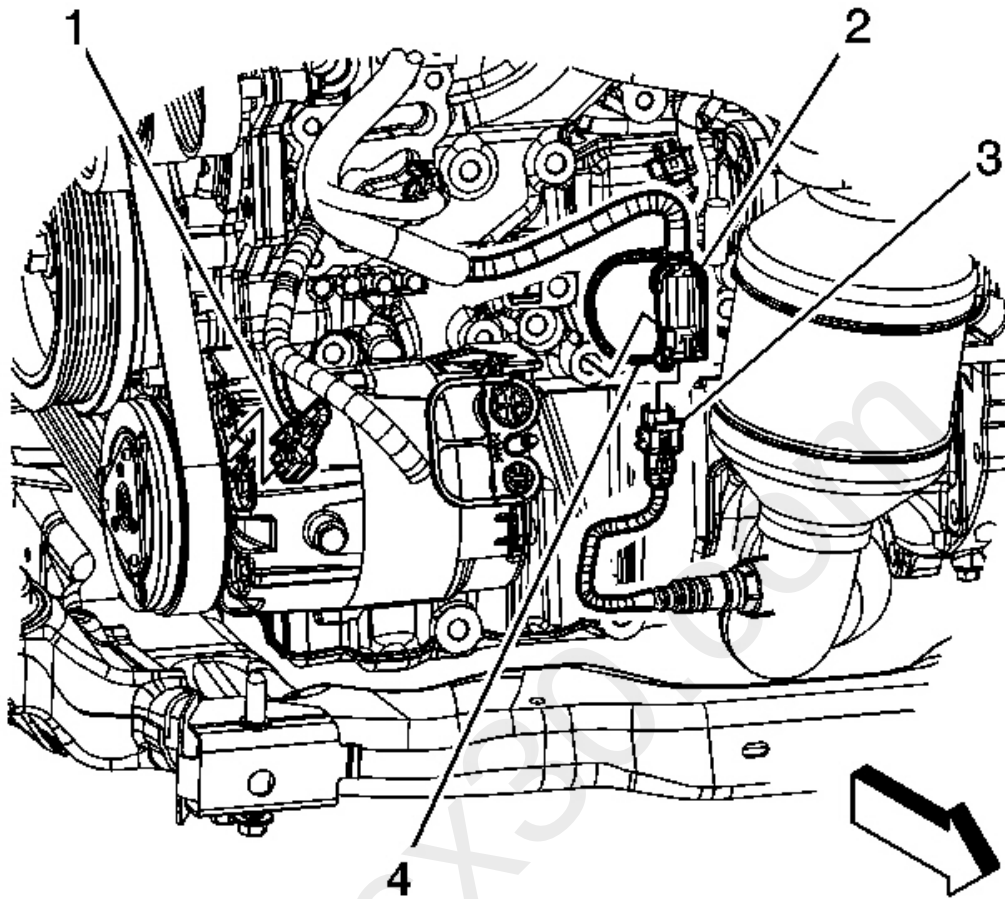


Fig. 11: Electrical Connectors - Left Side
Courtesy of GENERAL MOTORS CORP.

16. Disconnect the A/C compressor (1).
17. Disconnect the radiator outlet hose from the engine. Refer to **Radiator Outlet Hose Replacement (LAF)** or **Radiator Outlet Hose Replacement (LF1)** .
18. Disconnect the radiator inlet hose from the engine. Refer to **Radiator Inlet Hose Replacement (LAF)** or **Radiator Inlet Hose Replacement (LF1)** .

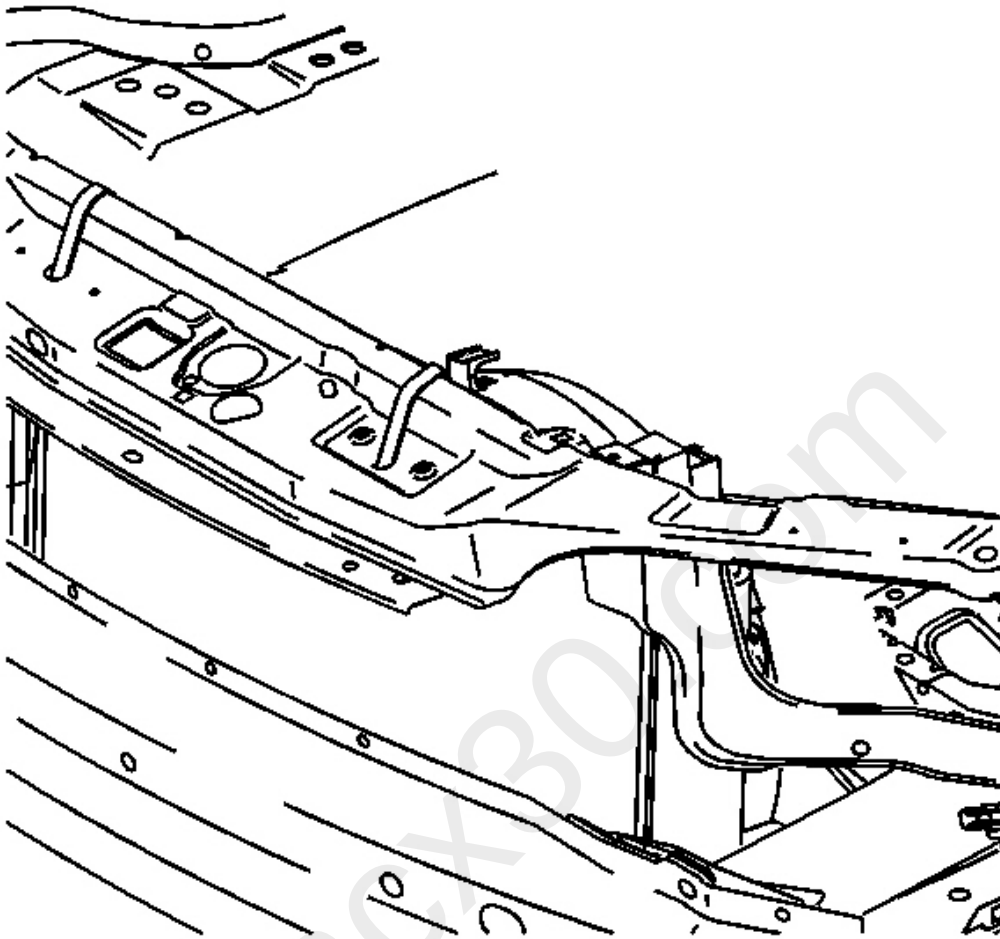


Fig. 12: View Of Cooling Module Secured To Upper Body Structure
Courtesy of GENERAL MOTORS CORP.

19. Secure the cooling module to the upper body structure
20. Remove the engine control module (ECM). Refer to **Engine Control Module Replacement** .
21. Support the engine in the cradle with wood blocks.
22. Remove right side engine mount. Refer to **Engine Mount Replacement - Right Side** .
23. Disconnect the A/C high pressure switch harness.
24. Discharge A/C system. Refer to **Refrigerant Recovery and Recharging** .
25. Disconnect the electrical connector from the air conditioning refrigerant pressure sensor valve.

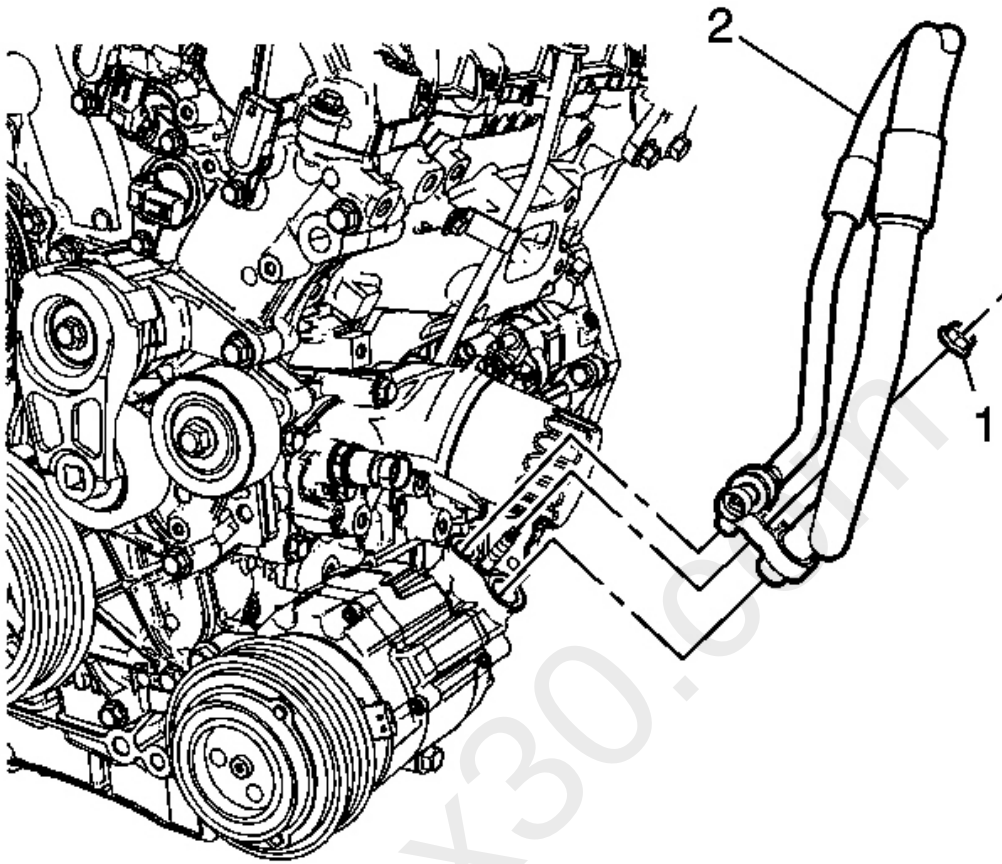


Fig. 13: Compressor Hose & Nut
Courtesy of GENERAL MOTORS CORP.

26. Remove the compressor hose nut (1) at the compressor
27. Remove the compressor hose (2) from the compressor.
28. Remove the A/C compressor hose from the compressor, then reposition the hose out of the way.
29. Disconnect the Coolant Recovery Reservoir Vent Hose. Refer to **Coolant Recovery Reservoir Vent Hose Replacement (LAF)** or **Coolant Recovery Reservoir Vent Hose Replacement (LF1)** .
30. Disconnect the Coolant Recovery Reservoir Outlet Hose. Refer to **Coolant Recovery Reservoir Outlet Hose Replacement (LAF)** or **Coolant Recovery Reservoir Outlet Hose Replacement (LF1)** .
31. Disconnect the heater inlet hose from the engine.
32. Disconnect the heater outlet hose from the engine.

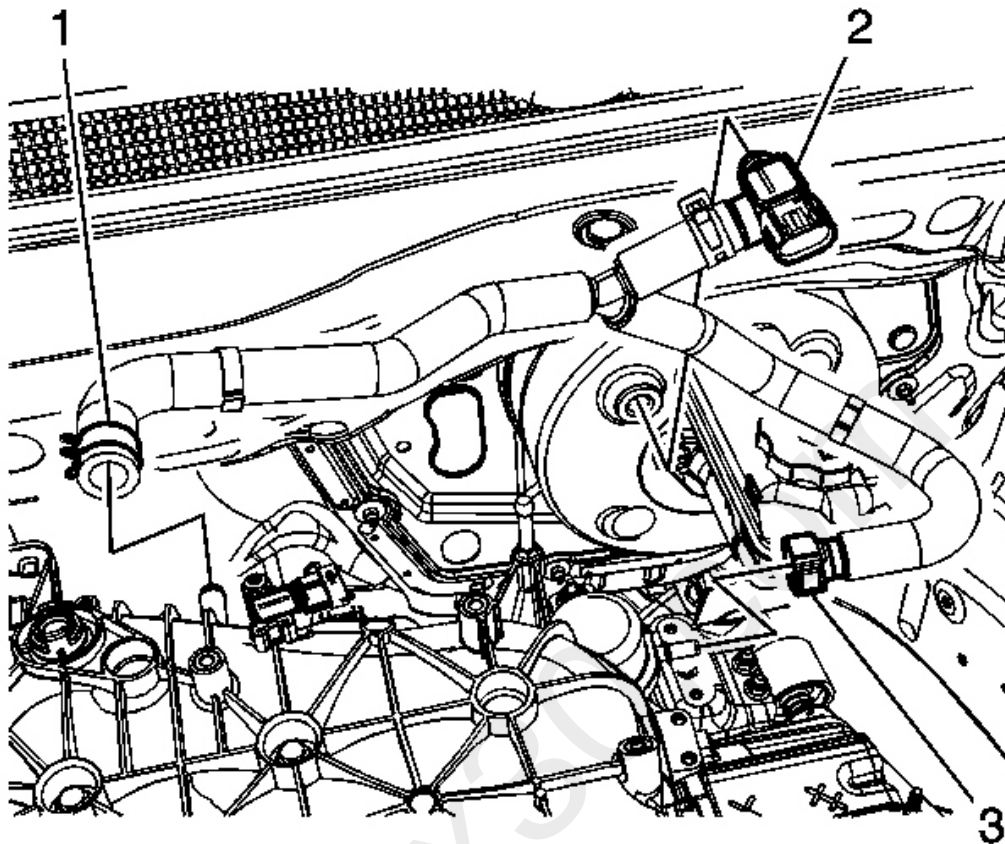


Fig. 14: Power Brake Booster Vacuum Hose Quick Connect, Spring Clamp & Vacuum Sensor
Courtesy of GENERAL MOTORS CORP.

33. Release the spring clamp (1) and remove the power brake booster vacuum hose from the intake manifold vacuum port.
34. Remove the power brake booster vacuum sensor (2) from the power vacuum brake booster.
35. Disconnect the fuel feed line. Refer to **Fuel Feed Pipe Replacement (LF1)** .
36. Disconnect the fuel EVAP emission line. Refer to **Plastic Collar Quick Connect Fitting Service** .
37. Disconnect the coolant reservoir hose from the engine to reservoir.
38. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
39. Remove the lower transaxle-to-engine bolts.
40. Remove the torque converter inspection cover.
41. Remove the starter. Refer to **Starter Replacement (LAF)** or **Starter Replacement (LF1)** .
42. Mark the relationship of the flywheel to the torque converter for reassembly.

43. Remove the torque converter to flywheel bolts.

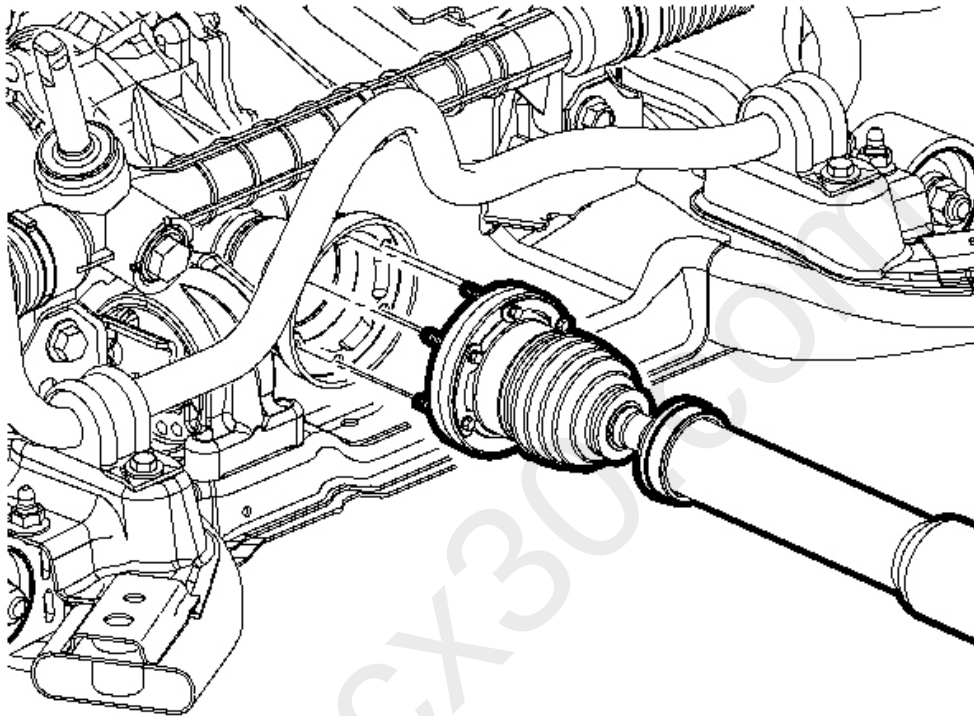


Fig. 15: View Of Propeller Shaft
Courtesy of GENERAL MOTORS CORP.

44. For AWD, remove the propeller shaft completely from the vehicle. Refer to **Propeller Shaft Replacement** .
45. For AWD, remove the transfer case. Refer to **Transfer Case Assembly Replacement** .
46. Remove the front wheels. Refer to **Tire and Wheel Removal and Installation** .
47. Remove the right and left engine splash shields.
48. Disconnect the transmission cooler lines from the radiator.
49. Disconnect the power steering hoses from the power steering cooler.

50. Remove the left and right tie rod ends from the steering knuckles. Refer to **Steering Linkage Outer Tie Rod Replacement** .
51. Remove the left and right stabilizer bar links. Refer to **Stabilizer Shaft Link Replacement** .
52. Disconnect the left and right lower ball joints. Refer to **Lower Control Arm Replacement** .
53. Disconnect the left and right axle shafts from the hubs. Refer to **Front Wheel Drive Shaft Replacement** .

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

54. Disconnect the steering shaft coupling from the steering gear. Refer to **Intermediate Steering Shaft Replacement** .
55. Remove the front exhaust pipe. Refer to **Catalytic Converter Replacement - Left Side (LF1)** and **Catalytic Converter Replacement - Right Side (LF1)** .
56. Support the engine in the cradle with wood blocks.
57. Remove the left engine mount. Refer to **Transmission Mount Replacement - Left Side**

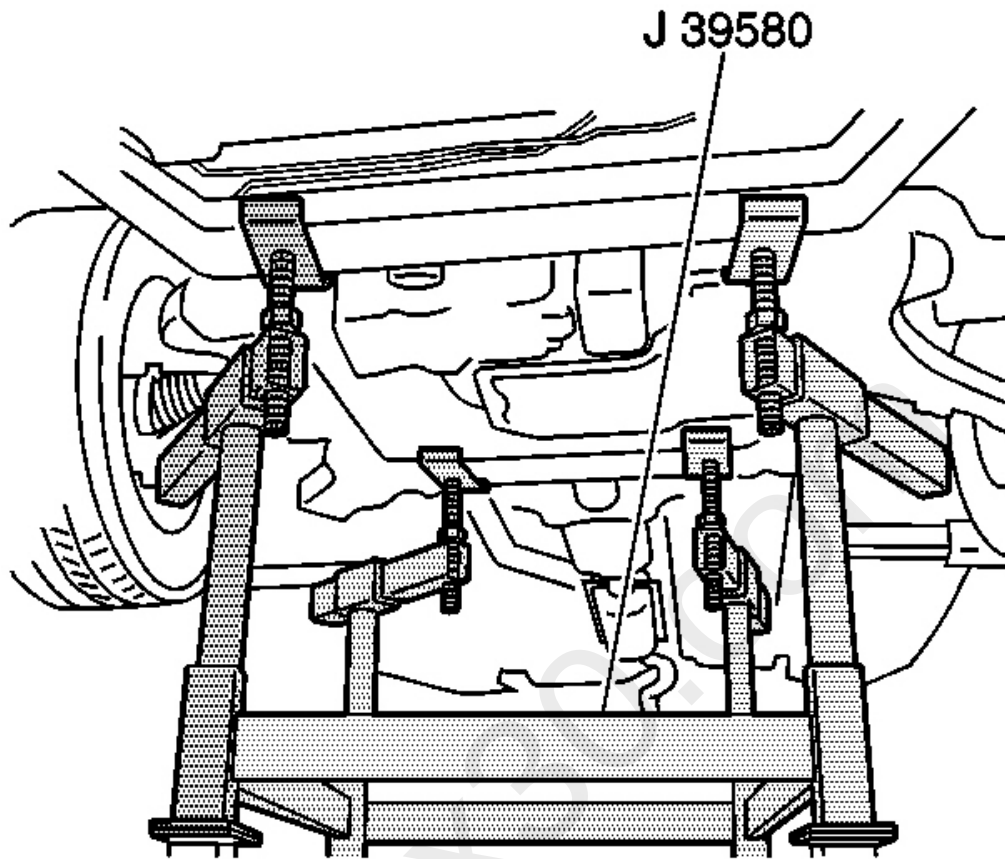


Fig. 16: Identifying Utility Stand
Courtesy of GENERAL MOTORS CORP.

58. Position the engine support table under the powertrain assembly.
59. With the table positioned, fully raise the table to contact with the powertrain assembly.
60. Remove the front crossmember support bracket to body bolts.
61. Remove the cradle bolts.

NOTE: **During the powertrain removal, support the vehicle body by placing a jack at the rear of the vehicle.**

62. Slowly raise the vehicle until the powertrain assembly is clear of the vehicle.
63. Remove the front transmission mount from the frame. Refer to **Transmission Front Mount Replacement**.
64. Separate the engine from the transmission.

65. Transfer parts as needed.

INSTALLATION PROCEDURE

1. Align the engine to the transmission.

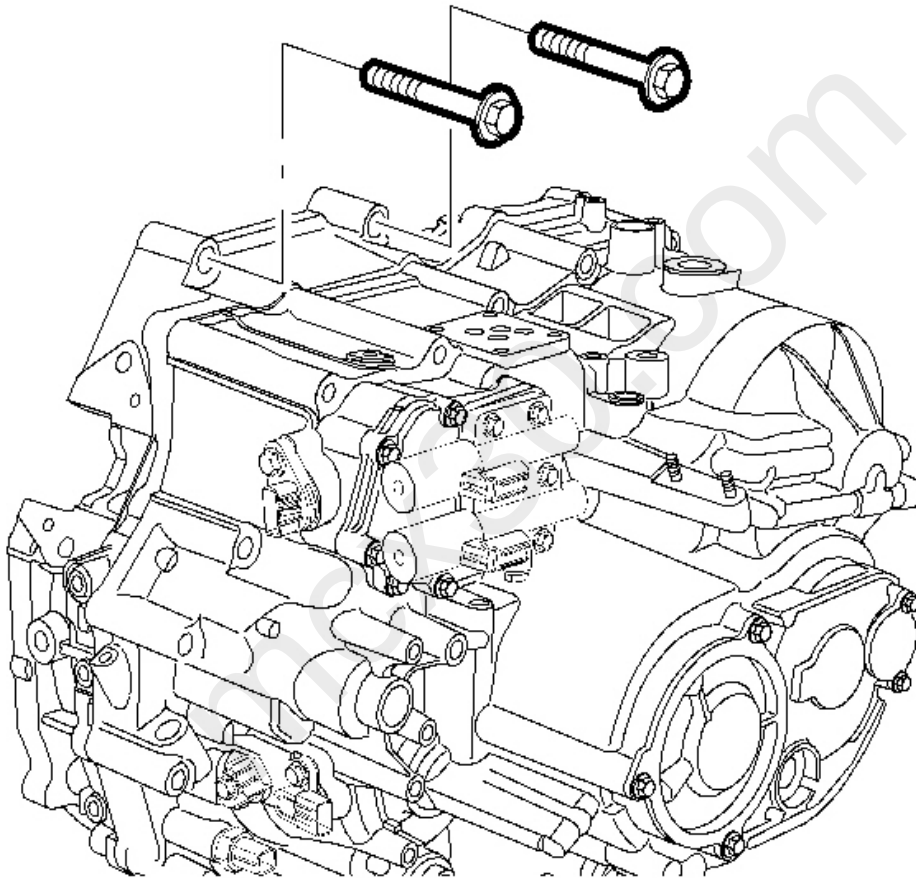


Fig. 17: View Of Transmission-To-Engine Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

CAUTION: Refer to Fastener Caution .

2. Install the transmission-to-engine mounting bolts. Tighten the bolts to 75 N.m (55 lb ft).

3. Install the right engine mount. Refer to **Engine Mount Replacement - Right Side** .
4. Install the front transmission mount to the engine. Refer to **Transmission Front Mount Replacement** .
5. Install the powertrain assembly to the vehicle.
6. Install the cradle bolts. Refer to **Drivetrain and Front Suspension Frame Replacement** .
7. Install the front crossmember support bracket to body bolts. Tighten the bolts to 50 N.m (37 lb ft)
8. Remove the engine support table.
9. Install the front transmission mount bolts to the body. Refer to **Transmission Front Mount Replacement** .
10. Remove the wood blocks from the cradle.
11. Install the lower transaxle-to-engine bolts and tighten to 75 N.m (55 lb ft).
12. For AWD, install the transfer case. Refer to **Transfer Case Assembly Replacement** .
13. Install the torque converter-to-flywheel bolts and tighten to 62 N.m (46 lb ft).
14. Install the starter. Refer to **Starter Replacement (LAF)** or **Starter Replacement (LF1)** .
15. Install the torque converter inspection cover.
16. Install the torque converter inspection cover and tighten the bolts to 12 N.m (106 lb in).
17. Install the front exhaust pipe. Refer to **Catalytic Converter Replacement - Left Side (LF1)** and **Catalytic Converter Replacement - Right Side (LF1)** .
18. Connect the steering shaft coupling from the steering gear. Refer to **Intermediate Steering Shaft Replacement** .
19. For AWD, install the propeller shaft. Refer to **Propeller Shaft Replacement** .
20. Install the left and right axle shaft nuts. Refer to **Front Wheel Drive Shaft Replacement** .
21. Connect the left and right lower ball joints. Refer to **Lower Control Arm Replacement** .
22. Install the left and right stabilizer bar links. Refer to **Stabilizer Shaft Link Replacement** .
23. Install the left and right tie rod ends to the steering knuckles. Refer to **Steering Linkage Outer Tie Rod Replacement** .
24. Connect the transmission cooler lines to the transmission.
25. Install the A/C compressor. Refer to **Air Conditioning Compressor Replacement (LAF)** or **Air Conditioning Compressor Replacement (LF1)** .
26. Install the right and left engine splash shields.
27. Connect the transmission cooler lines to the radiator.
28. Connect the power steering hoses to the power steering cooler.
29. Install the front tires. Refer to **Tire and Wheel Removal and Installation** .
30. Lower the vehicle.
31. Connect the range selector cable (2) to the range selector cable bracket.
32. Connect the wiring harness to the underhood junction block. refer to **Accessory Wiring Junction Block Replacement** .
33. Connect right side inline electrical connector.
34. Install the fuel EVAP line.
35. Connect the fuel feed line. Refer to **Fuel Feed Pipe Replacement (LF1)** .

36. Connect the heater inlet hose to the engine.
37. Connect the heater outlet hose to the engine.
38. Install the A/C compressor hose to the compressor.
39. Connect the transmission cooler lines to the radiator.
40. Connect the power steering hoses to the power steering cooler.
41. Connect the Coolant Recovery Reservoir Vent Hose. Refer to Coolant Recovery Reservoir Vent Hose Replacement (LAF) or Coolant Recovery Reservoir Vent Hose Replacement (LF1) .
42. Connect the Coolant Recovery Reservoir Outlet Hose. Refer to Coolant Recovery Reservoir Outlet Hose Replacement (LAF) or Coolant Recovery Reservoir Outlet Hose Replacement (LF1) .

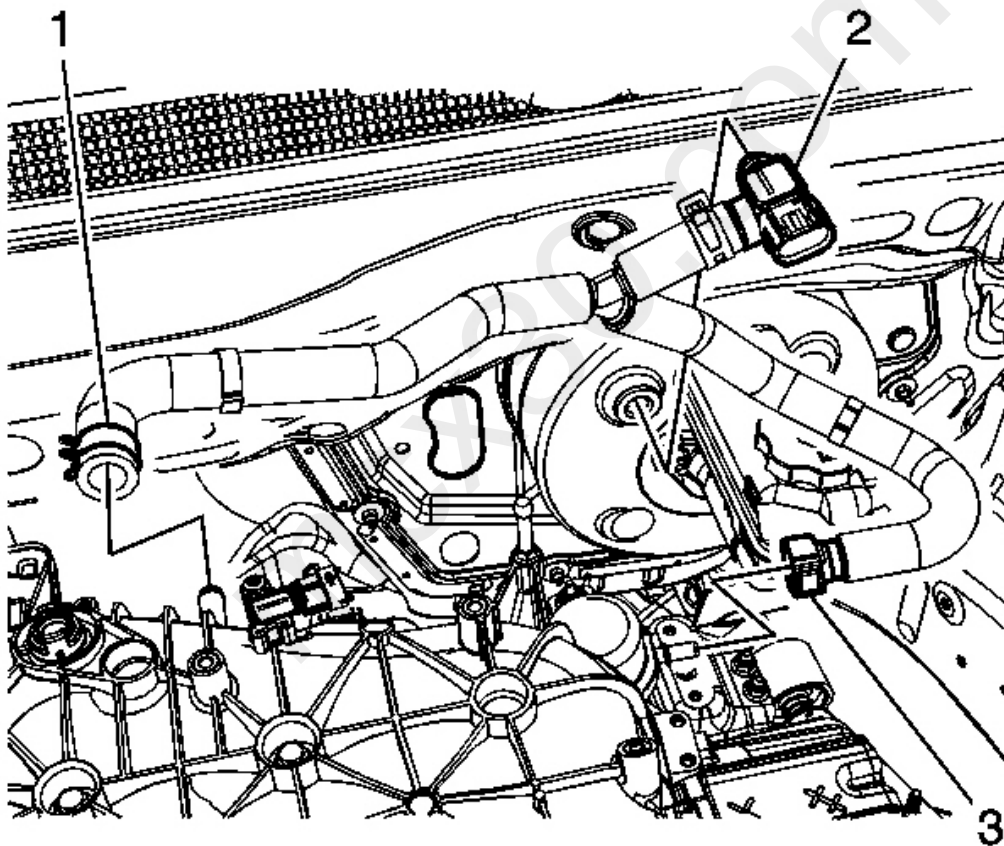


Fig. 18: Power Brake Booster Vacuum Hose Quick Connect, Spring Clamp & Vacuum Sensor
Courtesy of GENERAL MOTORS CORP.

43. Install the power brake booster vacuum sensor (2) to the power vacuum brake booster.
44. Install the starter positive cable and tighten to 10 N.m (89 lb in).

45. Connect the coolant reservoir hose from the engine to reservoir.
46. Connect the A/C high pressure switch harness.
47. Connect the electrical connector to the air conditioning refrigerant pressure sensor valve.
48. Connect the generator positive cable and nut and tighten to 12 N.m (106 lb in).
49. Install the ECM. Refer to **Engine Control Module Replacement** .
50. Connect the radiator outlet hose to the engine. Refer to **Radiator Outlet Hose Replacement (LAF)** or **Radiator Outlet Hose Replacement (LF1)** .
51. Connect the radiator inlet hose to the engine. Refer to **Radiator Inlet Hose Replacement (LAF)** or **Radiator Inlet Hose Replacement (LF1)** .
52. Fill the vehicle with coolant. Refer to **Cooling System Draining and Filling (Static)** or **Cooling System Draining and Filling (GE 47716)** .
53. Fill the vehicle with engine oil. Refer to **Engine Oil and Oil Filter Replacement (LF1)**.
54. Connect the wiring harness to the underhood junction block.
55. Connect the transmission shifter cable.
56. Remove the cooling module support.
57. Install the battery tray and battery. Refer to **Battery Tray Replacement** .
58. Install battery hold down retainer bracket.
59. Install the air cleaner assembly. Refer to **Air Cleaner Assembly Replacement** .
60. Install the intake manifold cover. Refer to **Intake Manifold Cover Replacement** .
61. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
62. Perform the throttle learn procedure. Refer to **Throttle/Idle Learn (LF1, LFW)** .

ENGINE OIL AND OIL FILTER REPLACEMENT (LF1)

REMOVAL PROCEDURE

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Place a drain pan under the oil pan drain plug.
3. Remove the oil pan drain plug. Allow the oil to drain completely.

CAUTION: Refer to Fastener Caution .

4. Install the oil pan drain plug and tighten to 20 N.m (15 lb ft).

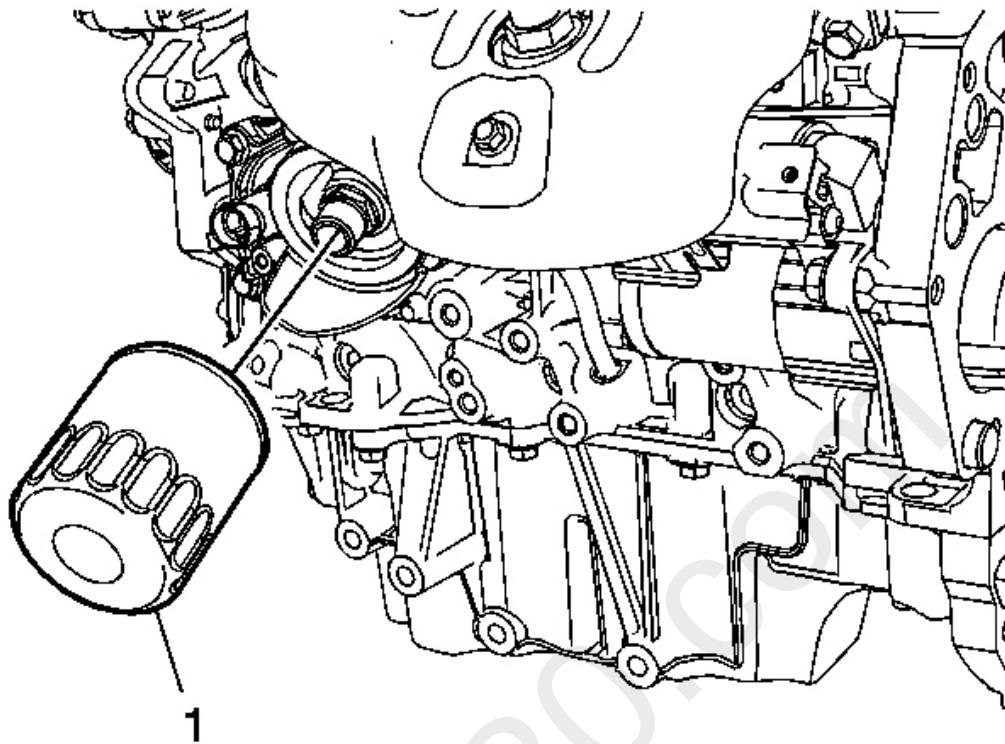


Fig. 19: Oil Filter

Courtesy of GENERAL MOTORS CORP.

WARNING: Refer to Hot Exhaust System Warning .

5. Place the drain pan under the oil filter (1).
6. Remove the oil filter. Allow the oil to drain completely.

INSTALLATION PROCEDURE

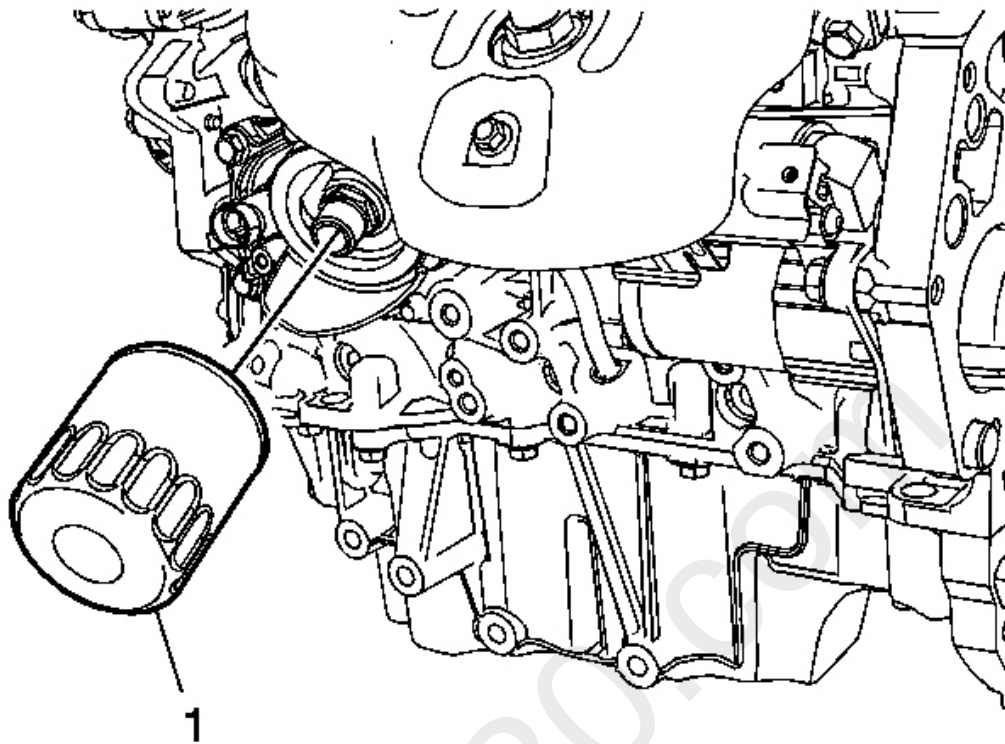


Fig. 20: Oil Filter

Courtesy of GENERAL MOTORS CORP.

1. Lubricate the NEW oil filter gasket with clean engine oil.
2. Tighten the oil filter (1) to 30 N.m (22 lb ft).
3. Lower the vehicle.
4. Refill the engine oil. Refer to **Approximate Fluid Capacities** .
5. Start the engine and inspect for leaks.