

2007 ENGINE

Engine Exhaust - Avalanche, Escalade, Suburban, Tahoe & Yukon

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

| Application | Specification | |
|--|---------------|----------|
| | Metric | English |
| Catalytic Converter to Exhaust Manifold Nut | 50 N.m | 37 lb ft |
| Engine Shield Bolt | 20 N.m | 15 lb ft |
| Exhaust Heat Shield Nut | 9 N.m | 80 lb in |
| Exhaust Manifold Bolt | | |
| • First Pass in Sequence | 15 N.m | 11 lb ft |
| • Final Pass in Sequence | 20 N.m | 15 lb ft |
| Exhaust Muffler to Right Catalytic Converter Nut | 45 N.m | 33 lb ft |
| Exhaust Pipe Clamp at Left Catalytic Converter | 44 N.m | 32 lb ft |
| Exhaust Pipe Hanger Bracket Bolt | 25 N.m | 18 lb ft |
| Heated Oxygen Sensor (HO2S) | 42 N.m | 31 lb ft |
| Muffler to Catalytic Converter Nut | 45 N.m | 33 lb ft |
| Stabilizer Shaft Link to Frame Bolt/Nut | 65 N.m | 48 lb ft |
| Oil Pan Skid Plate Bolt | 28 N.m | 21 lb ft |
| Rear Axle Tie Rod Bolt/Nut (Left Side) | 105 N.m | 77 lb ft |
| Rear Shock Absorber Lower Bolt/Nut | 95 N.m | 70 lb ft |

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - ENGINE EXHAUST

Begin the system diagnosis by reviewing the system Description and Operation. Reviewing the information will help you determine the correct symptom diagnostic procedure when a malfunction exists. It will also help you determine if the condition described by the customer is normal operation. Refer to **Symptoms - Engine Exhaust** in order to identify the correct procedure for diagnosing the system.

SYMPTOMS - ENGINE EXHAUST

- Review the Exhaust System Description and Operation in order to familiarize yourself with the system functions. Refer to **Exhaust System Description**.
- All diagnostics on a vehicle should follow a logical process. Strategy Based Diagnostics is a uniform approach for repairing all systems. The diagnostic flow is the place to start when repairs are necessary and may always be used in order to resolve a system problem. For a detailed explanation, refer to

Strategy Based Diagnosis .

Visual/Physical Inspection

- Inspect for aftermarket or non-OEM devices such as, but not limited too; tailpipe extensions, headers, and exhaust cutouts. This could affect the operation and proper performance of the exhaust system.
- Verify the exact operating conditions under which the concern exists. Note factors such as engine RPM, engine temperature, engine load, and frequency of concern.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause any symptom.

Intermittent

Test the vehicle under the same conditions that the customer reported in order to verify the system is operating as designed.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- Loss of power. Refer to **Restricted Exhaust**.
- Poor acceleration. Refer to **Restricted Exhaust**.
- Poor fuel economy. Refer to **Restricted Exhaust**.
- Exhaust hissing noise. Refer to **Exhaust Leakage**.
- Exhaust popping noise. Refer to **Exhaust Leakage**.
- Exhaust rattle noise. Refer to **Exhaust Noise**.
- Loud exhaust noise. Refer to **Exhaust Noise**.
- Exhaust buzz, groan, hum noise. Refer to **Exhaust Noise**.

RESTRICTED EXHAUST

Test Description

CAUTION: While engine is operating, the exhaust system will become extremely hot. To prevent burns avoid contacting a hot exhaust system.

The numbers below refer to the step numbers in the diagnostic table.

- 3:** The exhaust system has very low back pressure under normal conditions. If the exhaust system is restricted, a significant increase in the exhaust pressure is noticed on the **J 35314-A** Exhaust Back Pressure Gage. See **Special Tools**. Removing the heater oxygen sensor (HO2S) may set a diagnostic trouble code (DTC). When finishing this diagnostic table, be sure to clear all codes.
- 4:** This step will isolate the catalytic converter from the remainder of the exhaust system.
- 7:** Confirming that the condition has been fixed is essential. If the symptom still exists and the vehicle has

a dual exhaust system, proceed to Step 2 and repeat the diagnostic procedure on the opposite exhaust pipe.

Restricted Exhaust

| Step | Action | Value(s) | Yes | No |
|------|---|-------------------|---------------------|---|
| 1 | Did you verify the customers complaint? | - | Go to Step 2 | - |
| 2 | Did you review the exhaust symptoms diagnostic information and perform the necessary inspections? | - | Go to Step 3 | Go to <u>Symptoms - Engine Exhaust</u> |
| 3 | <ol style="list-style-type: none"> 1. Remove the heated oxygen sensor (HO2S) that is in front of and closest to the catalytic converter. Refer to <u>Heated Oxygen Sensor Replacement - Bank 1 Sensor 1 (1500 Series)</u> or <u>Heated Oxygen Sensor Replacement - Bank 1 Sensor 1 (2500 Series)</u> or <u>Heated Oxygen Sensor Replacement - Bank 2 Sensor 1 (1500 Series)</u> or <u>Heated Oxygen Sensor Replacement - Bank 2 Sensor 1 (2500 Series)</u> . 2. Install the J 35314-A Exhaust Back Pressure Gage in place of the HO2S sensor. See <u>Special Tools</u>. 3. Start the engine. 4. Increase and monitor the engine speed at 2,000 RPM. 5. Observe the exhaust system back pressure reading on the gage. <p>Does the reading exceed the specified value?</p> | 3.4 kPa (0.5 psi) | Go to Step 4 | Go to Step 7 |
| | <ol style="list-style-type: none"> 1. Turn the engine OFF and place the ignition in the lock position. 2. Remove the J 35314-A . See <u>Special Tools</u>. 3. Re-install the HO2S sensor. Refer to <u>Heated Oxygen Sensor Replacement - Bank 1 Sensor 1 (1500 Series)</u> or <u>Heated Oxygen Sensor Replacement - Bank 1 Sensor 1 (2500 Series)</u> or <u>Heated Oxygen Sensor Replacement - Bank 2 Sensor 1 (1500 Series)</u> or <u>Heated Oxygen Sensor Replacement - Bank 2 Sensor 1 (2500 Series)</u> . | | | |

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|---|---|-------------------|--|---|
| 4 | <p>4. Remove the post-catalyst HO2S sensor. Refer to <u>Heated Oxygen Sensor Replacement - Bank 1 Sensor 2 (1500 Series)</u> or <u>Heated Oxygen Sensor Replacement - Bank 1 Sensor 2 (2500 Series)</u> or <u>Heated Oxygen Sensor Replacement - Bank 2 Sensor 2 (1500 Series)</u> or <u>Heated Oxygen Sensor Replacement - Bank 2 Sensor 2 (2500 Series)</u> .</p> <p>5. Install the J 35314-A in place of the post HO2S sensor. See <u>Special Tools</u>.</p> <p>6. Start the engine.</p> <p>7. Increase and monitor the engine speed at 2,000 RPM.</p> <p>8. Observe the exhaust system back pressure reading on the gage.</p> <p>Does the reading exceed the specified value?</p> | 3.4 kPa (0.5 psi) | | Go to Step 5 Go to Step 6 |
| 5 | <p>Inspect the exhaust system for the following conditions:</p> <ul style="list-style-type: none"> • Damage in the exhaust pipe • Debris in the exhaust pipe • Muffler internal failure • Two-layer exhaust pipe separation <p>Did you find and correct the condition?</p> | - | | - Go to Step 7 |
| 6 | <p>Replace the catalytic converter. Refer to <u>Catalytic Converter Replacement (1500 Series)</u>.</p> <p>Did you find and correct the condition?</p> | - | | - Go to Step 7 |
| 7 | <p>1. Remove the J 35314-A . See <u>Special Tools</u>.</p> <p>2. Re-install the HO2S sensor. Refer to <u>Heated Oxygen Sensor Replacement - Bank 1 Sensor 2 (1500 Series)</u> or <u>Heated Oxygen Sensor Replacement - Bank 1 Sensor 2 (2500 Series)</u> or <u>Heated Oxygen Sensor Replacement - Bank 2 Sensor 2 (1500 Series)</u> or <u>Heated Oxygen Sensor Replacement - Bank 2 Sensor 2 (2500 Series)</u> .</p> | - | | |

| | | | |
|---|--|-----------|---------------------|
| <p>3. Clear any codes.</p> <p>4. Road test the vehicle in order to verify the repair.</p> <p>Did you correct the condition?</p> | | System OK | Go to Step 2 |
|---|--|-----------|---------------------|

EXHAUST LEAKAGE

Exhaust Leakage

| Problem | Action |
|---|--|
| <p>CAUTION: While engine is operating, the exhaust system will become extremely hot. To prevent burns avoid contacting a hot exhaust system.</p> <p>DEFINITION: An exhaust leak may show stains at the area of the leak. The leak may be felt by holding a hand close to the suspected areas or using a smoke pencil. The leak may make a popping or hissing noise. Refer to Symptoms - Engine Exhaust prior to beginning this table.</p> | |
| <p>Misaligned or improperly installed exhaust system components.</p> | <ul style="list-style-type: none"> Align and tighten the components to the specifications. Refer to Fastener Tightening Specifications. Ensure the exhaust hangers are in the proper locations and not loose. |
| <p>Exhaust leaks at the following connections:</p> <ul style="list-style-type: none"> Exhaust manifold to pipe Flanges Pipe clamps | <p>Tighten the components to the specifications. Refer to Fastener Tightening Specifications.</p> |
| <p>Seals or gaskets leaking.</p> <ul style="list-style-type: none"> Exhaust manifold to cylinder head Exhaust pipes to exhaust manifold Catalytic converter connection EGR connections, if equipped | <p>Replace the leaking seal or gasket. Refer to the affected components procedure for service.</p> |
| <p>Irregularities at the mating surfaces on the flange connections.</p> | <p>Repair as required or replace the affected component. Refer to the affected components procedure for service.</p> |
| <p>Exhaust manifold cracked or broken.</p> | <p>Replace the exhaust manifold. Refer to:</p> <ul style="list-style-type: none"> Exhaust Manifold Replacement - Left Side |

| | |
|--|--|
| | <ul style="list-style-type: none"> • <u>Exhaust Manifold Replacement - Right Side.</u> |
| Exhaust system component connection welds leaking. | Replace the leaking component. Refer to the affected component's procedure for service. |
| Muffler damaged or leaking at the seams. | Replace the affected muffler. Refer to <u>Muffler Replacement (1500 - w/RPO L92)</u> or <u>Muffler Replacement (1500 - w/RPOs LC9/LMG/LY5/L76)</u> or <u>Muffler Replacement (1500 - w/RPOs LMG/LY2/LY5)</u> or <u>Muffler Replacement (2500).</u> |

EXHAUST NOISE

Exhaust Noise

| Condition | Action |
|---|--|
| <p>CAUTION: While engine is operating, the exhaust system will become extremely hot. To prevent burns avoid contacting a hot exhaust system.</p> <p>DEFINITION: An audible or physical noise due to a faulty component or damaged components causing a loose or misaligned exhaust system resulting in a rattle or vibration noise (buzz, groan, hum). Refer to <u>Symptoms - Engine Exhaust</u> prior to beginning this table.</p> | |
| Popping or hissing noise | Exhaust leak. Refer to <u>Exhaust Leakage.</u> |
| Loud exhaust | <ol style="list-style-type: none"> 1. Compare to a known good vehicle. 2. Inspect for a damaged or failed muffler or resonator. 3. Replace the faulty muffler. Refer to <u>Muffler Replacement (1500 - w/RPO L92)</u> or <u>Muffler Replacement (1500 - w/RPOs LC9/LMG/LY5/L76)</u> or <u>Muffler Replacement (1500 - w/RPOs LMG/LY2/LY5)</u> or <u>Muffler Replacement (2500).</u> |
| External rattle or vibration noise | <ol style="list-style-type: none"> 1. Inspect for a bent or loose hanger, loose heat shield, or loose clamp. 2. Inspect for a exhaust pipe causing interference. 3. Repair or replace the affected component. Refer to the affected component's service procedure. |
| Internal rattle | <ol style="list-style-type: none"> 1. Test the components by tapping with a rubber mallet to confirm a rattle. 2. Replace the faulty catalytic converter, or muffler. Refer to one of the following procedures: <ul style="list-style-type: none"> • <u>Catalytic Converter Replacement (1500 Series)</u> • <u>Muffler Replacement (1500 - w/RPO L92)</u><u>Muffler Replacement (1500 - w/RPOs LC9/LMG/LY5/L76)</u><u>Muffler Replacement (1500 - w/RPOs LMG/LY2/LY5)</u><u>Muffler Replacement (2500)</u> |

REPAIR INSTRUCTIONS

EXHAUST MANIFOLD REPLACEMENT - LEFT SIDE

Removal Procedure

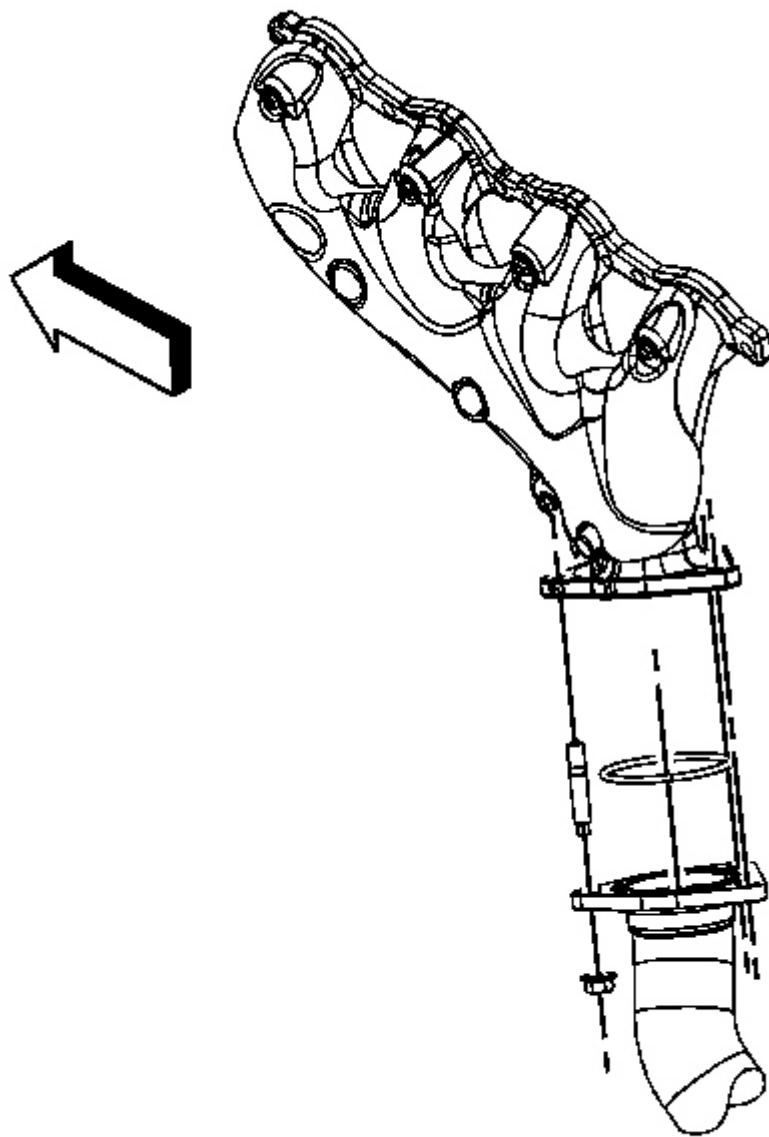


Fig. 1: View Of Exhaust Manifold, Gasket & Catalytic Converter
Courtesy of GENERAL MOTORS CORP.

1. Remove the ignition coils. Refer to **Ignition Coil Replacement** .
2. Remove the spark plugs. Refer to **Spark Plug Replacement** .
3. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
4. Remove the catalytic converter to exhaust manifold nuts. (1500 series shown, 2500 series similar).
5. Lower the vehicle.

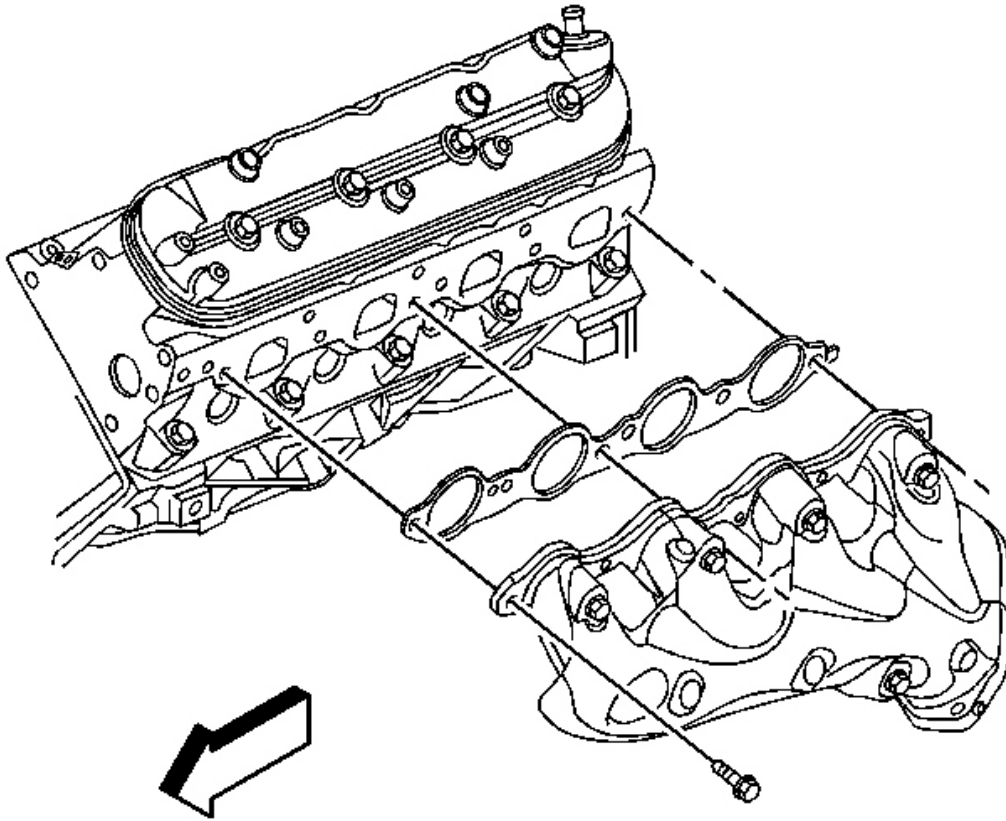


Fig. 2: View Of Exhaust Manifold, Manifold Bolts & Gasket
Courtesy of GENERAL MOTORS CORP.

6. Remove the exhaust manifold bolts, and exhaust manifold.
7. Remove and discard the exhaust manifold gasket.

Installation Procedure

IMPORTANT: • Tighten the exhaust manifold bolts as specified in the service procedure.

Improperly installed and/or leaking exhaust manifold gaskets may affect vehicle emissions and/or On-Board Diagnostic (OBD) II system performance.

- The cylinder head exhaust manifold bolt hole threads must be clean and free of debris or threadlocking material.
- Do not apply sealant to the first 3 threads of the bolt.

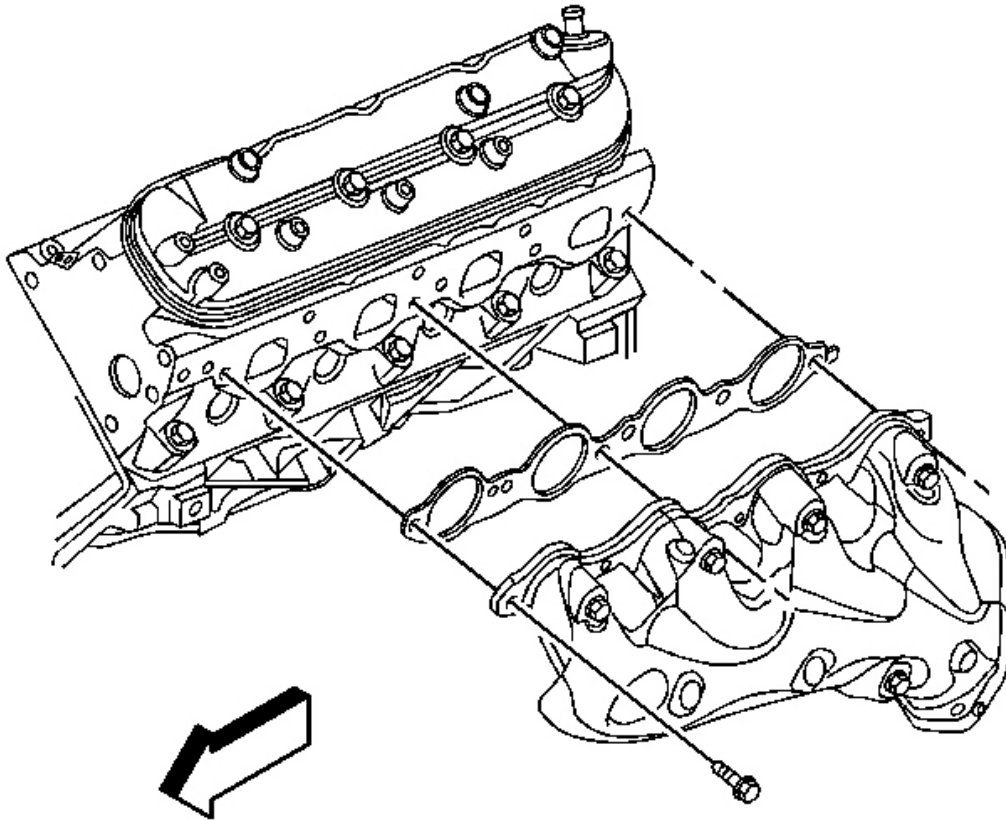


Fig. 3: View Of Exhaust Manifold, Manifold Bolts & Gasket
Courtesy of GENERAL MOTORS CORP.

1. Apply a 5 mm (0.2 in) wide band of threadlock GM P/N 12345493 (Canadian P/N 10953488), or equivalent to the threads of the exhaust manifold bolts.
2. Position the NEW exhaust manifold gasket and exhaust manifold to the cylinder head.

NOTE: Refer to Fastener Notice .

3. Install the exhaust manifold bolts.

Tighten:

1. Tighten the bolts a first pass to 15 N.m (11 lb ft). Tighten the exhaust manifold bolts beginning with the center 2 bolts. Alternate from side-to-side, and work toward the outside bolts.
 2. Tighten the bolts a final pass to 20 N.m (15 lb ft). Tighten the exhaust manifold bolts beginning with the center 2 bolts. Alternate from side-to-side, and work toward the outside bolts.
4. Using a flat punch, bend the gasket tab at the rear of the gasket around the cylinder head edge.
5. Raise the vehicle.

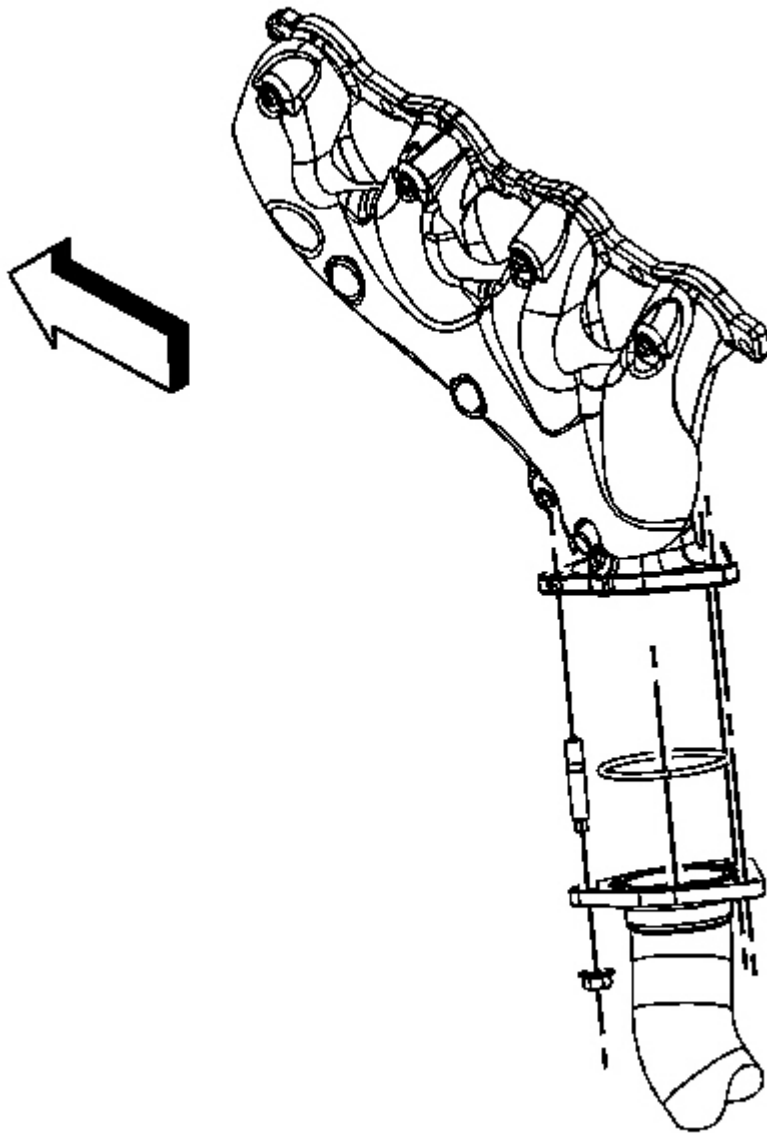


Fig. 4: View Of Exhaust Manifold, Gasket & Catalytic Converter
Courtesy of GENERAL MOTORS CORP.

6. Ensure that the exhaust seal is seated in the catalytic converter.
7. Install the catalytic converter to exhaust manifold nuts. (1500 series shown, 2500 series similar).

Tighten: Tighten the nuts to 50 N.m (37 lb ft).

8. Lower the vehicle.
9. Install the spark plugs. Refer to **Spark Plug Replacement** .
10. Install the ignition coils. Refer to **Ignition Coil Replacement** .

EXHAUST MANIFOLD REPLACEMENT - RIGHT SIDE

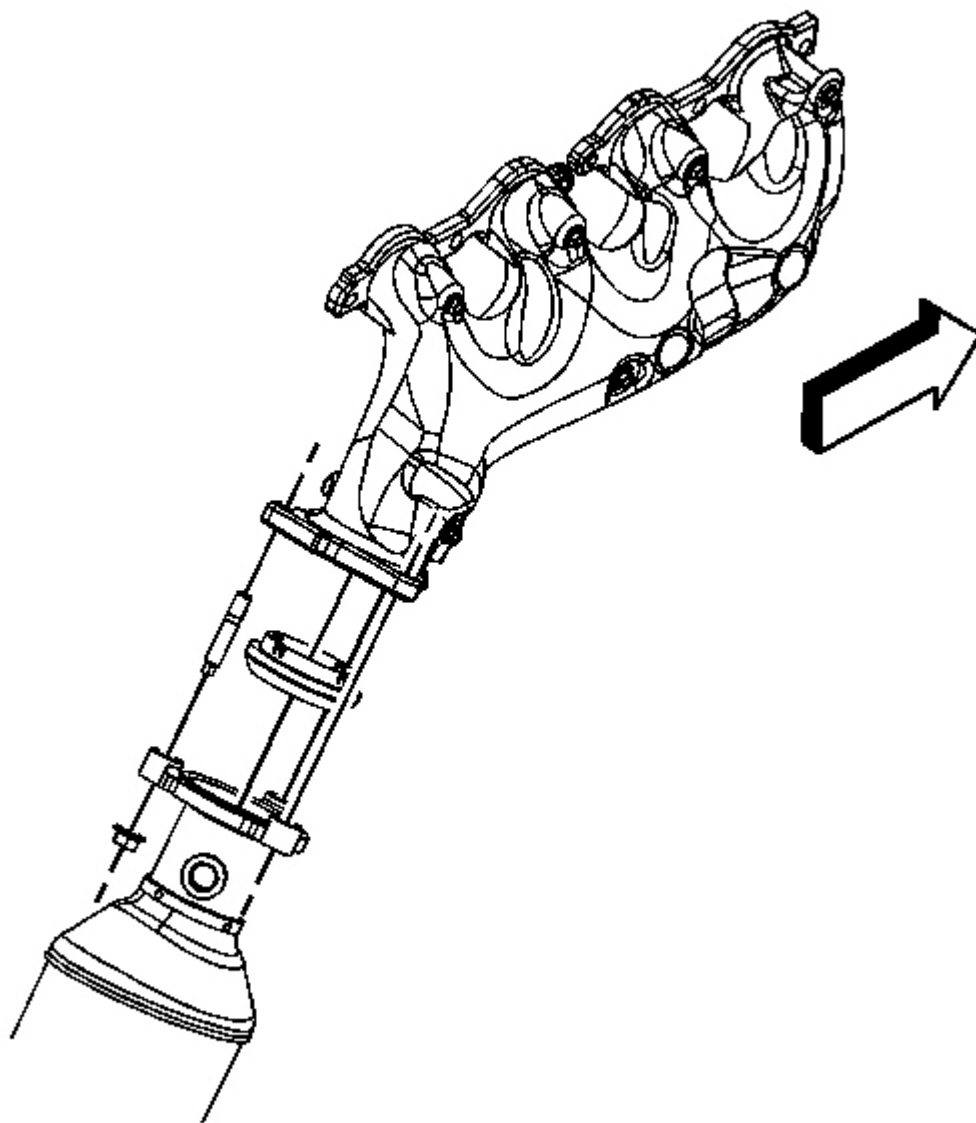


Fig. 5: View Of Exhaust Manifold, Gasket & Catalytic Converter

Courtesy of GENERAL MOTORS CORP.

1. Drain the cooling system, if equipped with rear air conditioning (A/C). Refer to **Draining and Filling Cooling System** .
2. Remove the ignition coils. Refer to **Ignition Coil Replacement** .
3. Remove the spark plugs. Refer to **Spark Plug Replacement** .
4. Remove the oil level indicator tube. Refer to **Oil Level Indicator and Tube Replacement** .
5. Remove the heated oxygen sensor (HO2S). Refer to **Heated Oxygen Sensor Replacement - Bank 2 Sensor 1 (1500 Series)** or **Heated Oxygen Sensor Replacement - Bank 2 Sensor 1 (2500 Series)** .
6. Remove the catalytic converter to exhaust manifold nuts. (1500 series shown, 2500 series similar).
7. Lower the vehicle.

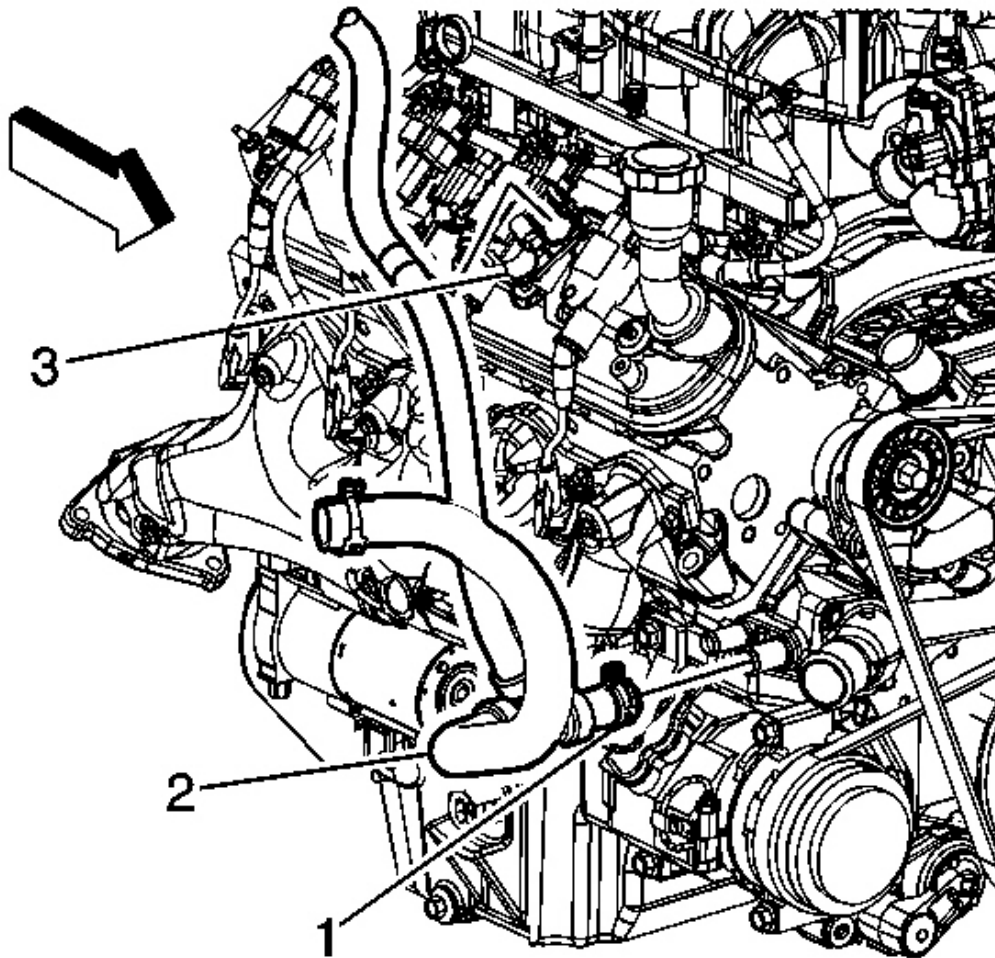


Fig. 6: View Of Radiator Surge Tank Outlet Hose, Clamp & Water Pump
Courtesy of GENERAL MOTORS CORP.

8. If equipped with rear A/C perform the following steps, otherwise proceed to step 15.
9. Reposition the radiator surge tank outlet hose clamp at the water pump (1).
10. Remove the radiator surge tank outlet hose (2) from the water pump.
11. Reposition the outlet hose out of the way.

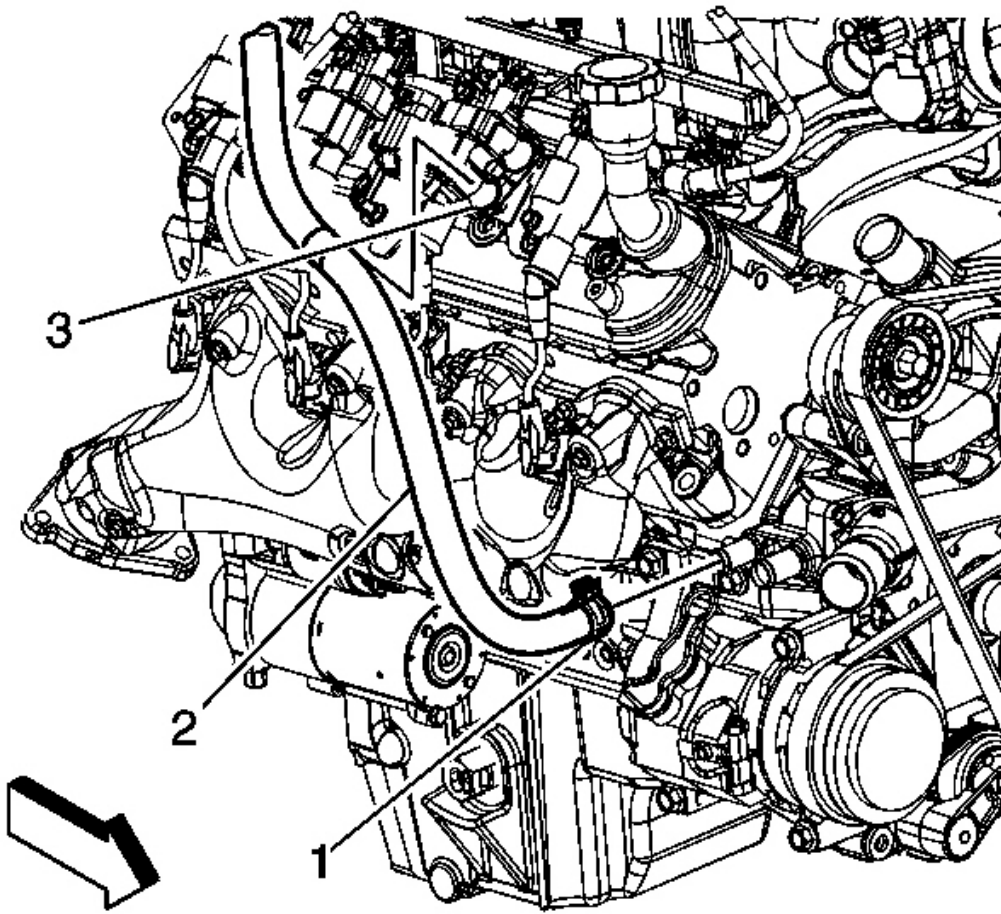


Fig. 7: View Of Heater Inlet Hose, Clamp & Waterpump
Courtesy of GENERAL MOTORS CORP.

12. Reposition the heater inlet hose clamp (1) at the water pump.
13. Remove the heater inlet hose (2) from the water pump.
14. Reposition the inlet hose out of the way.

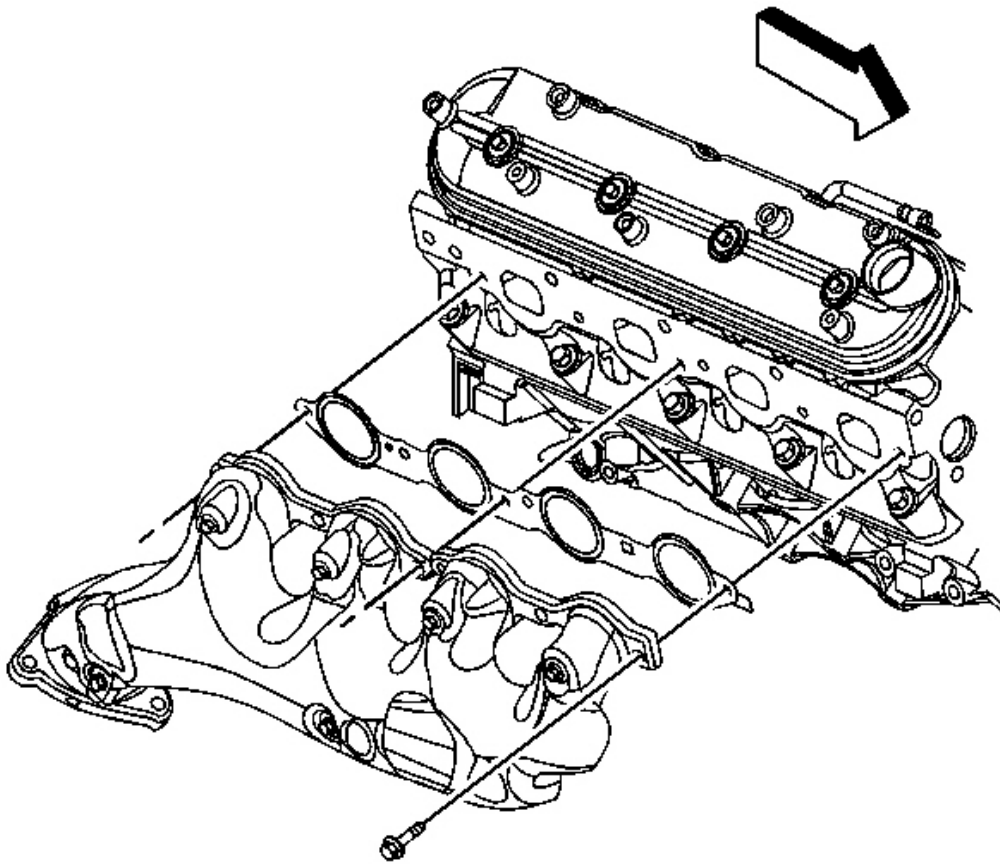


Fig. 8: View Of Exhaust Manifold, Gasket & Bolts
Courtesy of GENERAL MOTORS CORP.

15. Remove the exhaust manifold bolts and exhaust manifold.
16. Remove and discard the exhaust manifold gasket.
17. Remove the exhaust seal from the exhaust manifold.

Installation Procedure

IMPORTANT:

- Tighten the exhaust manifold bolts as specified in the service procedure. Improperly installed and/or leaking exhaust manifold gaskets may affect vehicle emissions and/or On-Board Diagnostics (OBD) II system performance.
- The cylinder head exhaust manifold bolt hole threads must be clean and free of debris or threadlocking material.

- Do not apply sealant to the first 3 threads of the bolt.

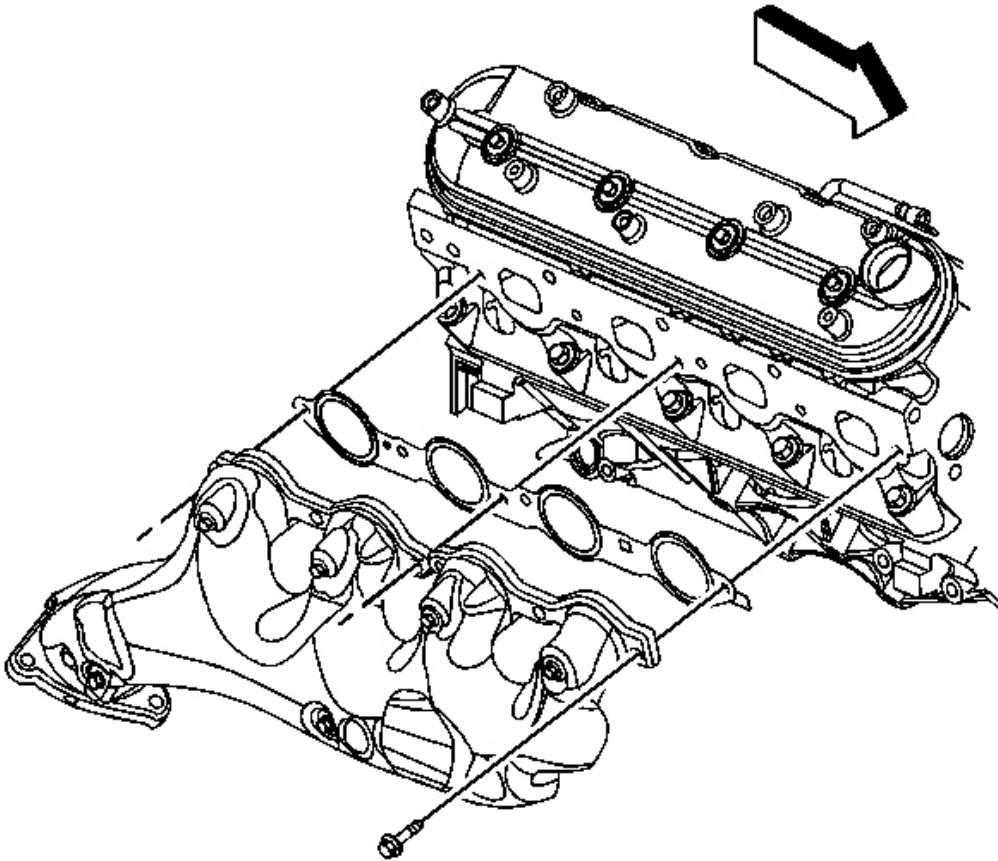


Fig. 9: View Of Exhaust Manifold, Gasket & Bolts
Courtesy of GENERAL MOTORS CORP.

1. Install the exhaust seal to the exhaust manifold.
2. Apply a 5 mm (0.2 in) wide band of threadlock GM P/N 12345493 (Canadian P/N 10953488), or equivalent to the threads of the exhaust manifold bolts.
3. Position the NEW exhaust manifold gasket and exhaust manifold to the cylinder head.

NOTE: Refer to Fastener Notice .

4. Install the exhaust manifold bolts.

Tighten:

1. Tighten the bolts a first pass to 15 N.m (11 lb ft). Tighten the exhaust manifold bolts beginning with the center 2 bolts. Alternate from side-to-side, and work toward the outside bolts.
 2. Tighten the bolts a final pass to 20 N.m (15 lb ft). Tighten the exhaust manifold bolts beginning with the center 2 bolts. Alternate from side-to-side, and work toward the outside bolts.
5. Using a flat punch, bend the gasket tab at the rear of the gasket around the cylinder head edge.

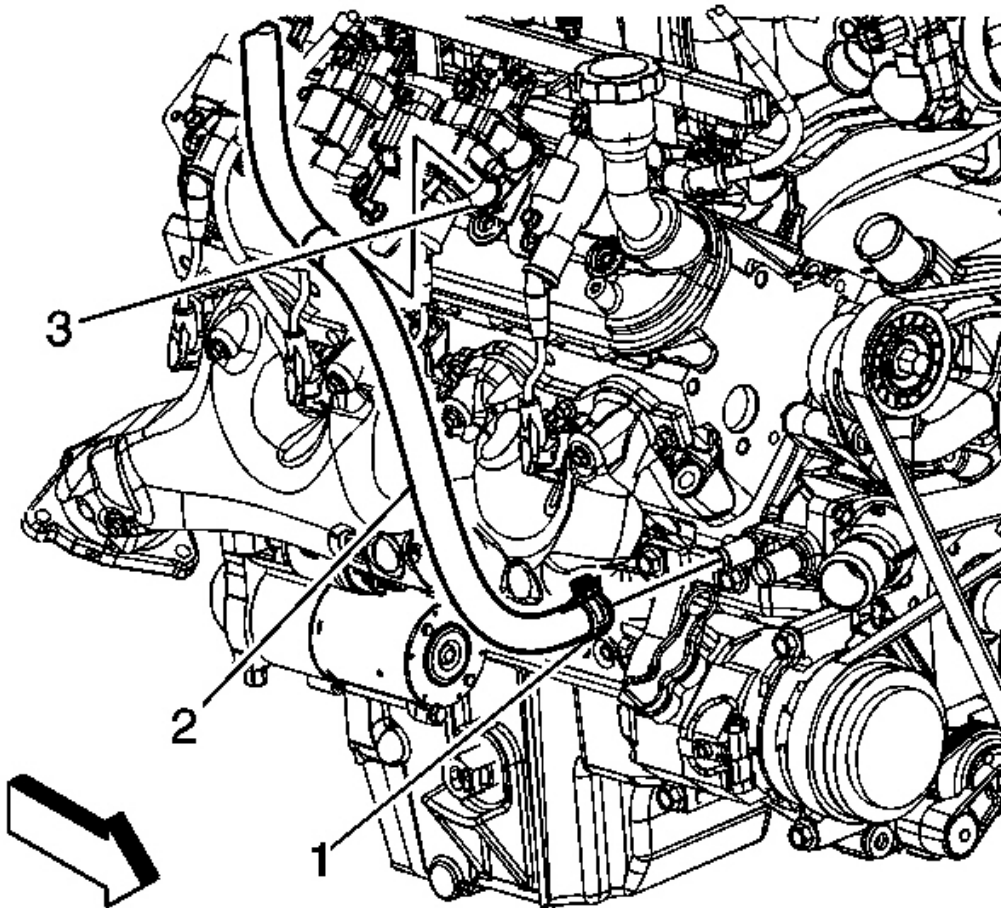


Fig. 10: View Of Heater Inlet Hose, Clamp & Waterpump
Courtesy of GENERAL MOTORS CORP.

6. If equipped with rear A/C perform the following steps, otherwise proceed to step 15.
7. Position the inlet hose.

8. Install the heater inlet hose (2) to the water pump.
9. Position the heater inlet hose clamp (1) at the water pump.

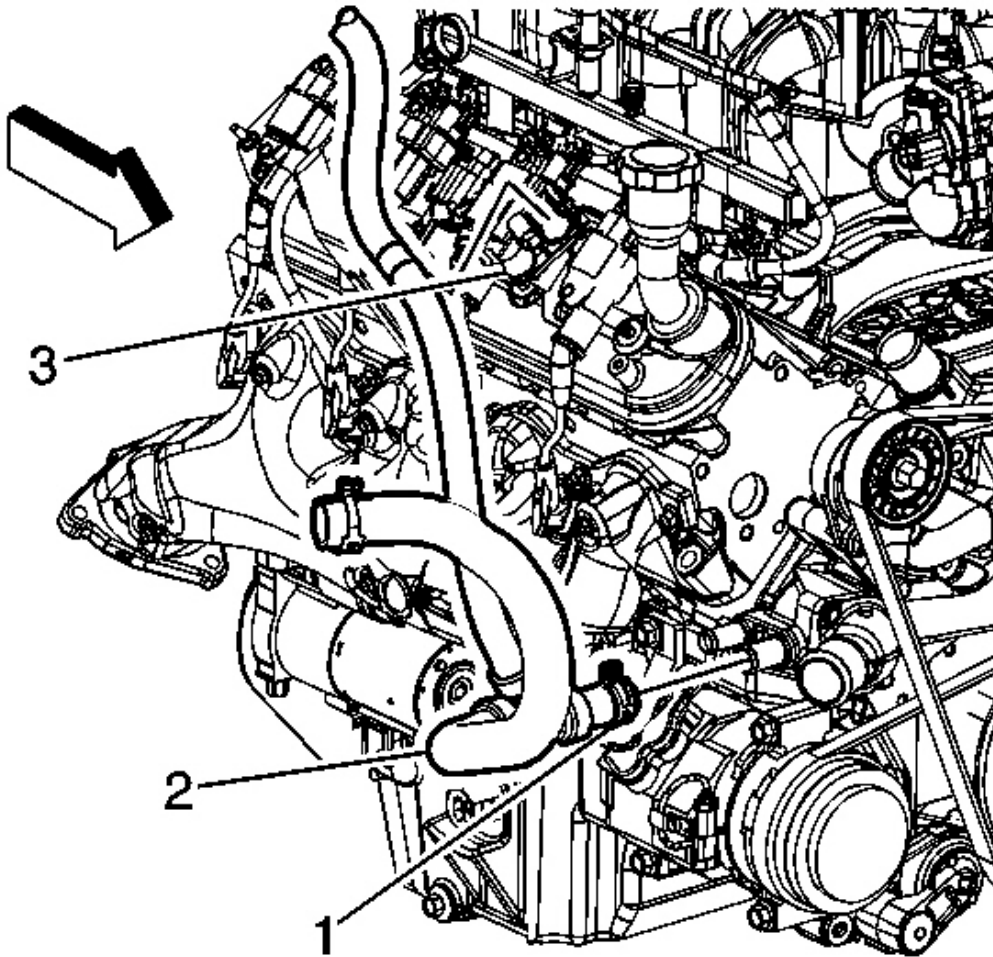


Fig. 11: View Of Radiator Surge Tank Outlet Hose, Clamp & Water Pump
Courtesy of GENERAL MOTORS CORP.

10. Position the outlet hose.
11. Install the radiator surge tank outlet hose (2) to the water pump.
12. Position the radiator surge tank outlet hose clamp at the water pump (1).
13. Raise and support the vehicle.

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