# Fastener Tightening Specifications

| Application | Specification | |
|---|---|---|
| | Metric | English |
| Coolant Pump Mounting Bolts | 10 N·m | 89 lb in |
| Electric Cooling Fan Assembly Mounting Bolts | 4 N·m | 35 lb in |
| Electric Cooling Fan Motor Nut | 3.2 N·m | 28 lb in |
| Electric Cooling Fan Motor Retaining Screws | 4 N·m | 35 lb in |
| Negative Battery Terminal Retainer Bolt | 15 N·m | 11 lb ft |
| Surge Tank Attaching Bolt | 10 N·m | 89 lb in |
| Thermostat Housing Mounting Bolts | 20 N·m | 15 lb ft |
| Upper Left Radiator Retaining Bolt | 7 N·m | 62 lb in |
| Upper Right Radiator Retaining Bolt | 7 N·m | 62 lb in |

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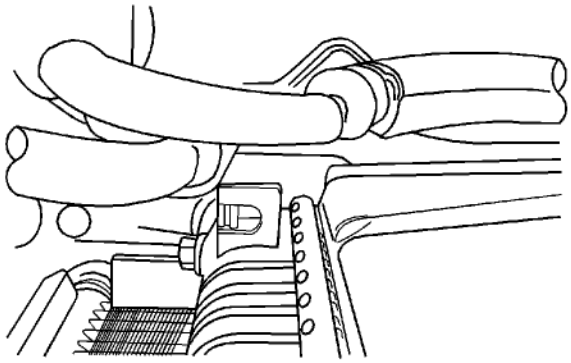
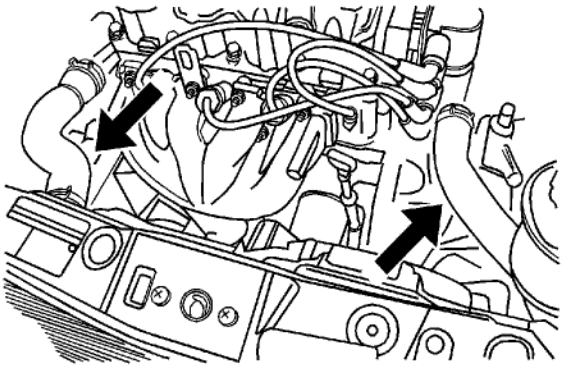
# Cooling System Draining and Filling

**Warning:** As long as there is pressure in the cooling system, the temperature can be considerably higher than the boiling temperature of the solution in the radiator without causing the solution to boil. Removal of the pressure cap while the engine is hot and pressure is high will cause the solution to boil instantaneously -- possibly with explosive force -- spewing the solution over the engine, fenders and the person removing the cap.



1. Place a pan below the vehicle to catch the draining coolant.
2. Remove the surge tank cap.
3. Unplug the drain cock.



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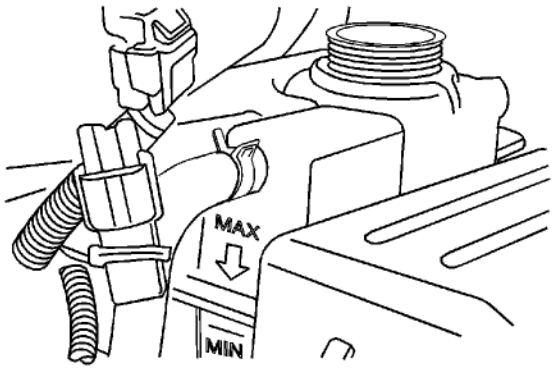
**Warning:** When enabling the SIR system, be extremely careful when installing the fuse and/or turning the ignition switch on. Stand clear of the inflator module and verify no loose objects are directly in front of the inflator modules. Possible personal injury or vehicle damage could result if an accidental deployment were to occur.

4. Catch the escaping fluid in a drain pan.
5. Remove all sludge and dirt from inside the surge tank. Refer to Radiator Surge Tank Replacement.
6. Plug the drain cock.
7. Add clean water to the surge tank.
8. Fill the tank slowly so that the upper reservoir hose remains above the water line. This allows the air inside the cooling system to escape.
9. Start the engine.
10. Run the engine until the thermostat opens. You can tell the thermostat is open when both radiator hoses are hot to the touch.




11. Stop the engine.
12. Repeat steps 1-9 until the drained water is clear and free of coolant and rust.

**Note:** To avoid damaging the vehicle, never use an antifreeze mixture more concentrated than 60 percent antifreeze to 40 percent water. The solution freezing point increases above this concentration.

13. Fill the cooling system through the surge tank with a mixture of ethylene glycol antifreeze and water. The mixture must be at least 50 percent antifreeze, but not more than 60 percent antifreeze for cold weather operation.
14. Fill the surge tank to the specified MAX fill mark on the outside of the tank.

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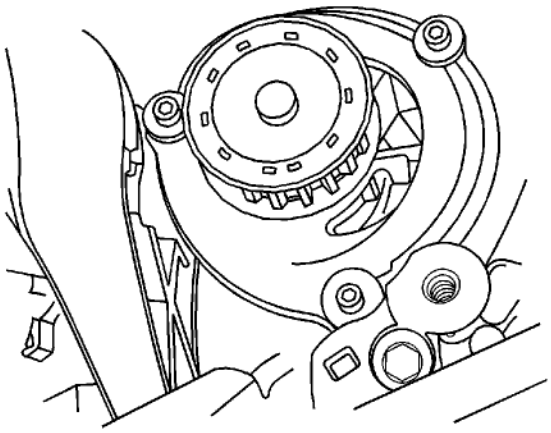
# Coolant Pump Replacement (1.5L)

## Removal Procedure



1. Drain the engine cooling system to a level below the thermostat housing. Refer to Cooling System Draining and Filling.
2. Remove the timing belt rear hood.
3. Remove the coolant pump mounting bolts.
4. Remove the coolant pump from the cylinder block.
5. Remove the ring seal from the coolant pump.

## Coolant Pump Cleaning and Inspection

**Warning:** Refer to Safety Glasses Warning in the Preface section.

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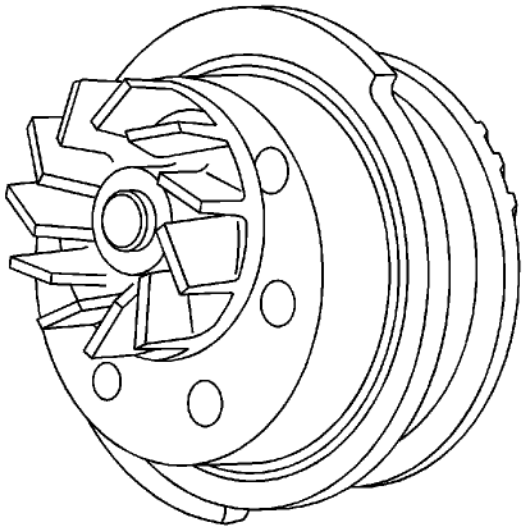
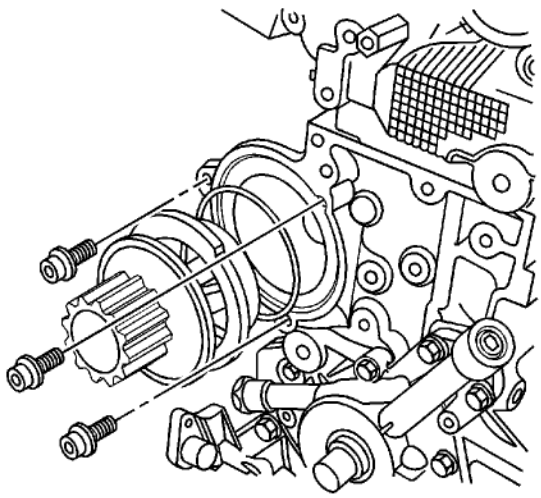


1. Inspect the coolant pump body for cracks and leaks.
2. Inspect the coolant pump bearing for play or abnormal noise.
3. Inspect the coolant pump pulley for excessive wear. If the coolant pump is defective, replace the coolant pump as a unit.
4. Clean the mating surfaces of the coolant pump and cylinder block.

## Installation Procedure



1. Install a new ring seal to the coolant pump.
2. Coat the sealing surface of the ring seal with Lubriplate®.
3. Install the coolant pump to the engine block.

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**Caution:** Refer to Fastener Caution in the Preface section.

4. Secure the coolant pump to the engine block with the mounting bolts.

   **Tighten**
   Tighten the coolant pump mounting bolts to 10 N·m (89 lb in).

5. Install the rear timing belt rear hood.
6. Refill the engine cooling system. Refer to Cooling System Draining and Filling.

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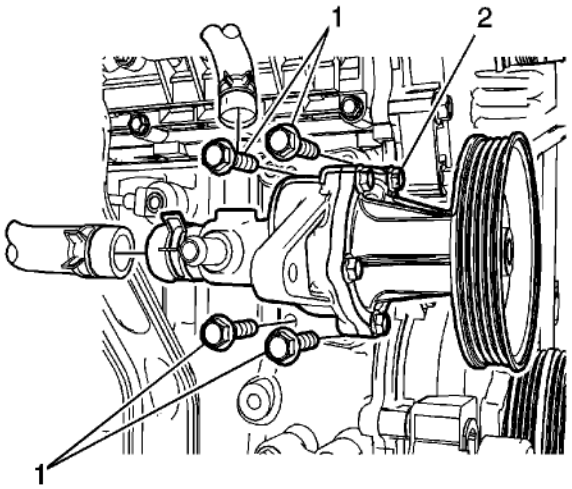
# Coolant Pump Replacement (1.2L DOHC)

## Removal Procedure

1. Drain the coolant. Refer to Cooling System Draining and Filling.
2. Remove the accessory belt. Refer to Drive Belt Replacement.
3. Remove the generator. Refer to Generator Replacement.



4. Remove the water pump retaining nuts, bolts (1).
5. Remove the water pump (2).
6. Remove the ring seal from the water pump.
7. Inspect the water pump for cracks, leaks or abnormal noises.
8. Cleaning the mating surfaces of the water pump and the cylinder head.

## Installation Procedure

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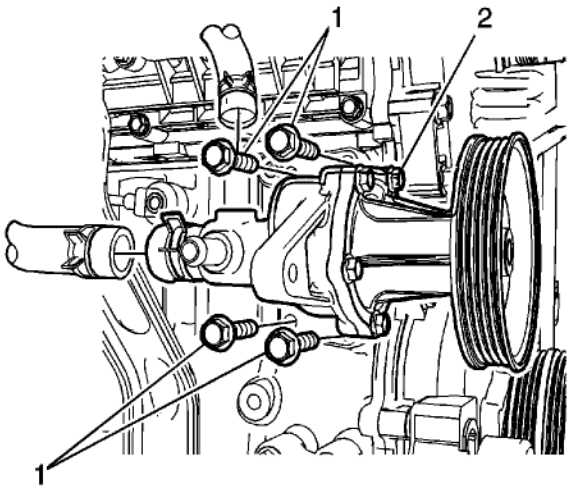


1. Install the new ring seal to the water pump.

   **Caution:** Refer to Fastener Caution in the Preface section.

2. Install the water pump (2) to the engine block.

   **Tighten**
   Tighten the water pump retaining bolts (1) and nuts to 10 N·m (89 lb in).

3. Install the generator. Refer to Generator Replacement.
4. Install the accessory belt. Refer to Drive Belt Replacement.
5. Refill the engine cooling system. Refer to Cooling System Draining and Filling.

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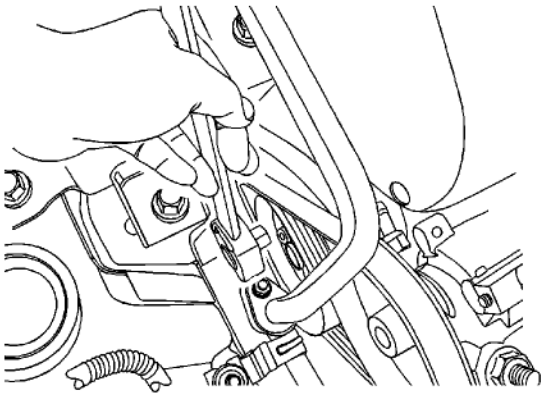
# Coolant Pump Replacement (1.4L LDT/1.6 LXV)

## Special Tools

- EN-48356 Engine Fixture
- EN-49201 Water Pump Pulley Remover/Installer

## Removal Procedure

1. Drain the coolant. Refer to Cooling System Draining and Filling.
2. Remove the air cleaner assembly. Refer to Air Cleaner Assembly Replacement and Air Cleaner Assembly Replacement.
3. Remove the RH head lamp assembly. Refer to Headlamp Replacement.



4. Disconnect the A/C pipe retainer and let the A/C pipe could be moved.
5. Remove the water pump pulley retaining bolts using *EN-48356* fixture .
6. Remove the accessory belt. Refer to Drive Belt Replacement and Drive Belt Replacement.
7. Fix the engine using *EN-48356* fixture .
8. Remove the engine mount.

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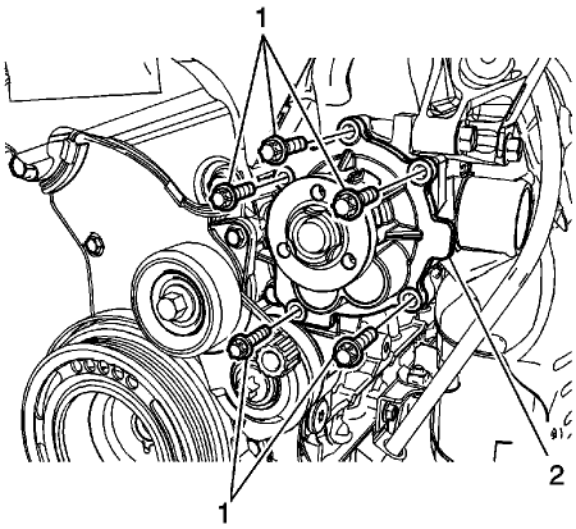
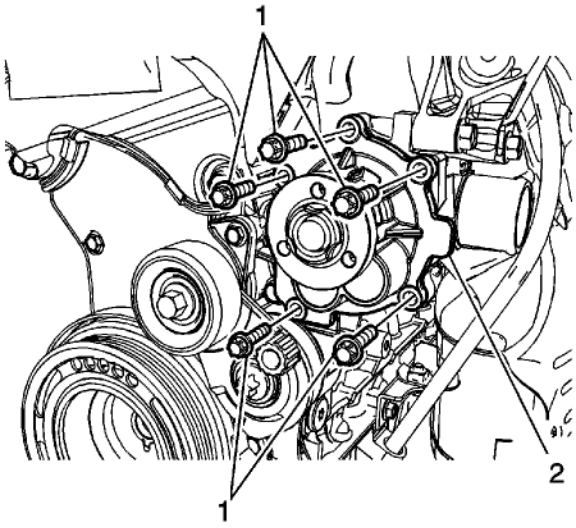



9. Remove the water pump pulley.
10. Remove the water pump retaining bolts (1).
11. Remove the water pump (2).
12. Remove the ring seal from the water pump.
13. Inspect the water pump for cracks, leaks or abnormal noise.
14. Cleaning the mating surfaces of the water pump and the cylinder head.

## Installation Procedure




1. Install a new ring seal to the water pump.

**Caution:** Refer to Fastener Caution in the Preface section.

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2. Install the water pump (2) to the engine front cover.

   **Tighten**
   Tighten the water pump retaining bolts (1) to 10 N·m (89 lb in).

3. Install the water pump pulley.
4. Install the engine mount.
5. Install the accessory belt. Refer to Drive Belt Replacement and Drive Belt Replacement.
6. Connect the A/C pipe retainer and fix the A/C pipe.
7. Install the RH head lamp assembly. Refer to Headlamp Replacement.
8. Install the air cleaner assembly. Refer to Air Cleaner Assembly Replacement and Air Cleaner Assembly Replacement.
9. Refill the engine cooling system. Refer to Cooling System Draining and Filling.

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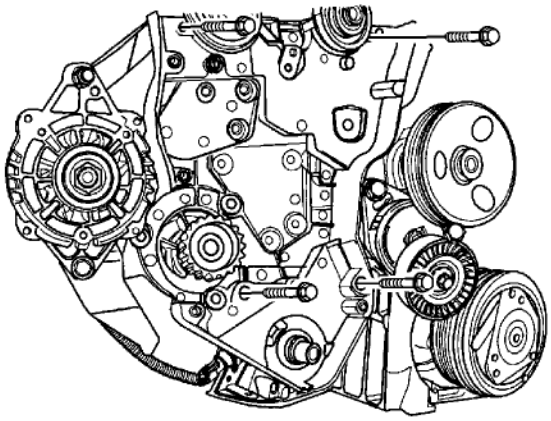
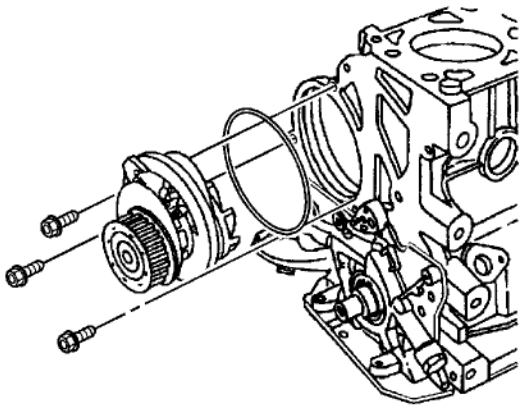
# Coolant Pump Replacement (1.4L / 1.6L DOHC)

## Removal Procedure

**Warning:** Refer to Battery Disconnect Warning in the Preface section.



1. Disconnect the battery negative cable. Refer to Battery Negative Cable Disconnection and Connection
2. Drain the coolant. Refer to Cooling System Draining and Filling.
3. Remove the rear timing belt cover. Refer to Timing Belt Cover Replacement for the 1.4L DOHC engine, or Timing Belt Cover Replacement for the 1.6L (L91) engine.



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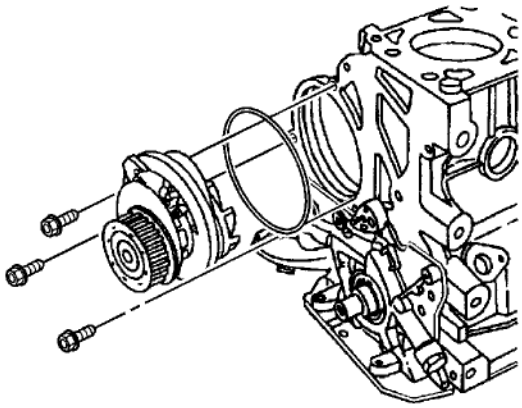
4. Remove the coolant pump mounting bolts.
5. Remove the coolant pump.
6. Remove the seal ring from the coolant pump.

## Installation Procedure



1. Install a new seal ring to the coolant pump.
2. Coat the sealing surface of the seal ring with Lubriplater®.

**Caution:** Refer to Fastener Caution in the Preface section.

3. Install the coolant pump to the engine block with the flange aligned with the recess of the rear timing belt cover.
4. Install the coolant pump mounting bolts and tighten to **10 N·m (89 lb in)**.

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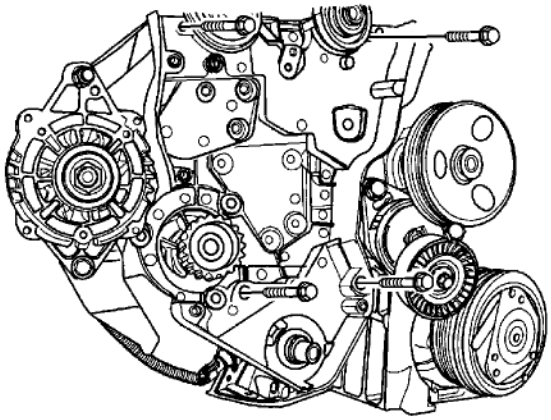

5. Install the rear timing belt cover. Refer to Timing Belt Cover Replacement for the 1.4 DOHC engine, or Timing Belt Cover Replacement for the 1.6L (L91) engine.
6. Fill the engine cooling system. Refer to Cooling System Draining and Filling.
7. Connect the battery negative cable. Refer to Battery Negative Cable Disconnection and Connection

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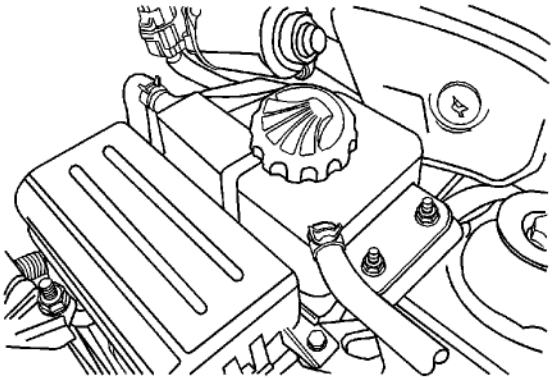
# Radiator Surge Tank Replacement

## Removal Procedure

**Warning:** Refer to Radiator Cap Removal Warning in the Preface section.



1. Drain the engine coolant to below the level of the surge tank.
2. Loosen the overflow hose clamps and disconnect the overflow hose from the top of the surge tank.
3. Remove the tank attaching nuts.
4. Remove the tank from the vehicle.
5. Clean the inside and the outside of the surge tank and the surge tank cap with soap and water.
6. Rinse the surge tank and the cap thoroughly.

## Installation Procedure

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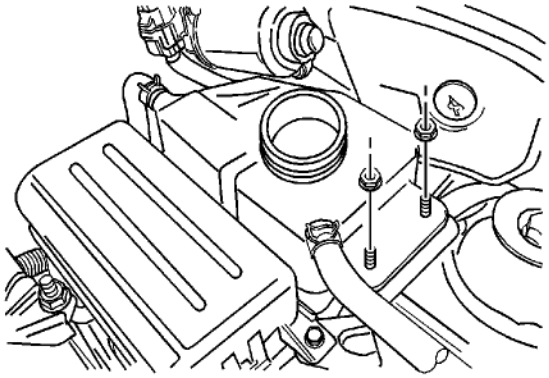

1. Install the surge tank to the vehicle.

   **Caution:** Refer to Fastener Caution in the Preface section.

2. Secure the surge tank with the attaching nuts and tighten to **10 N·m (89 lb in)**.
3. Connect the overflow hose to the surge tank.
4. Secure the overflow hose to the surge tank with the hose clamps.
5. Fill the surge tank with the coolant to the center ridge, or to the MAX mark.

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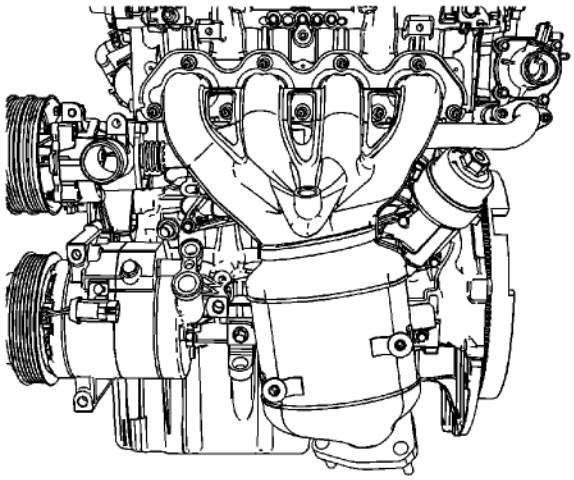
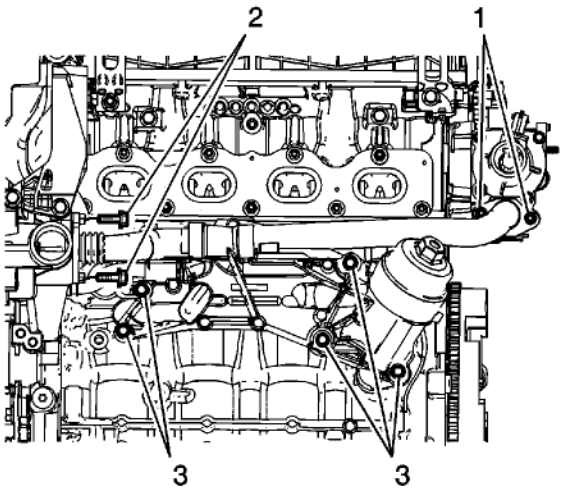
# Engine Oil Cooler Replacement

## Removal Procedure

1. Drain the engine coolant. Refer to Cooling System Draining and Filling.
2. Drain the engine oil. Refer to Engine Oil and Oil Filter Replacement.



3. Remove the exhaust manifold. Refer to Exhaust Manifold Replacement.




4. Remove the coolant pipe bolts from the engine coolant distributor case (1).
5. Remove the coolant pipe bolts from the engine front cover (2).
6. Remove the oil cooler tightening bolts (3).

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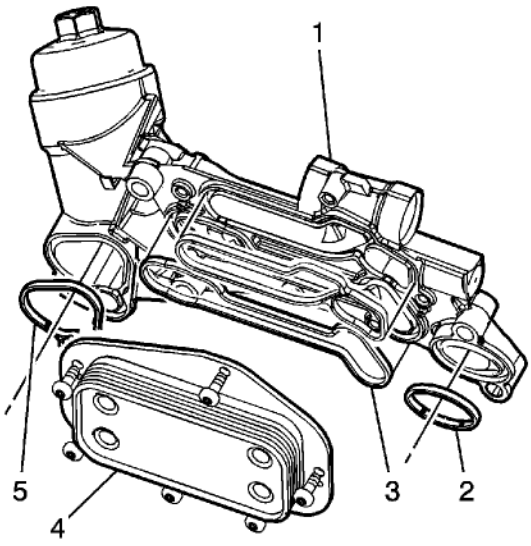
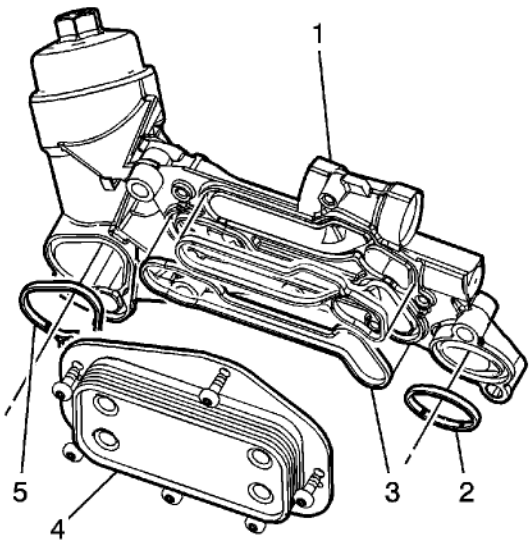



7. Remove the heat exchanger (4) with the gasket.

## Installation Procedure

**Caution:** Refer to Fastener Caution in the Preface section.




**Note:** Check for damage or leakage on the oil cooler gaskets. If damage or leakage, replace the related gasket with a new one.

1. Install the heat exchanger (4) with the gasket to the oil cooler housing.

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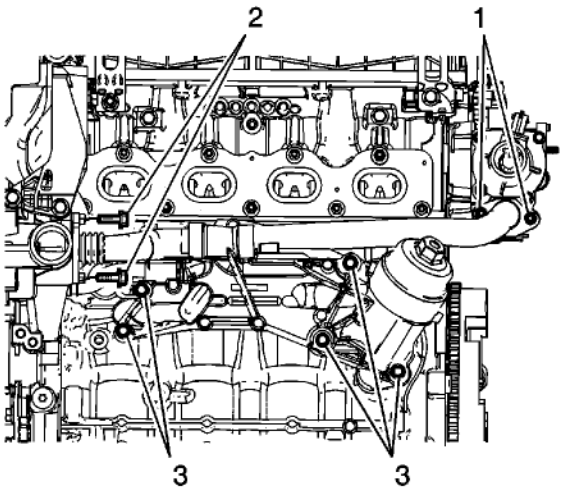
**Tighten**
Tighten the heat exchanger bolts to 8 N·m(70.8 lb in).




2. Insert the coolant pipes to the oil cooler housing with the gasket.
3. Install the oil cooler tightening bolts (3).

**Tighten**
Tighten the oil cooler tightening bolts to 25 N·m (18.4 lb ft).

4. Install the coolant pipe bolts to the engine front cover (2).

**Tighten**
Tighten the coolant pipe bolts to 8 N·m (70.8 lb in).

5. Install the coolant pipe bolts to the engine coolant distributor case (1).

**Tighten**
Tighten the coolant pipe bolts to 8 N·m (70.8 lb in).

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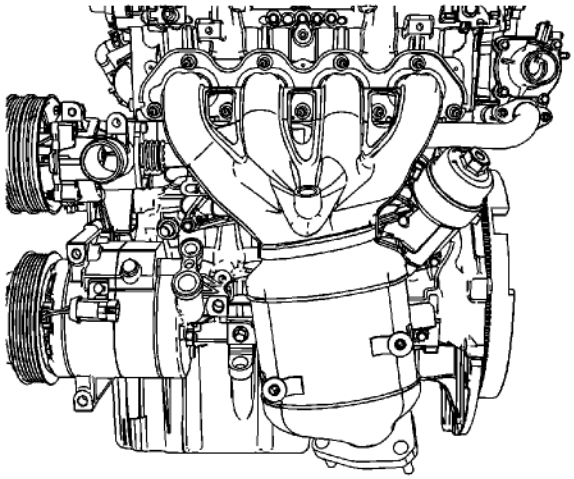

6. Remove the exhaust manifold. Refer to Exhaust Manifold Replacement.

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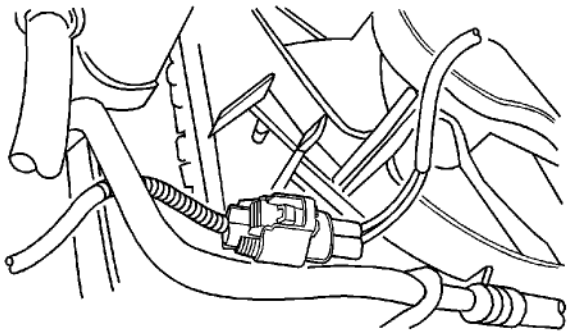
# Engine Coolant Fan Replacement

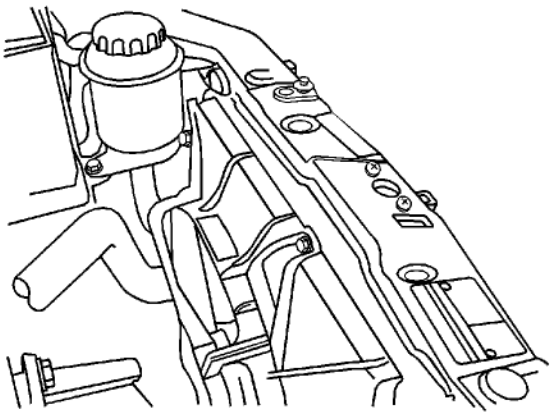
## Removal Procedure

**Warning:** Refer to Electric Coolant Fan Warning in the Preface section.

**Warning:** Refer to Battery Disconnect Warning in the Preface section.



1. Disconnect the negative battery cable.
2. Disconnect the cooling fan electrical connector(s).



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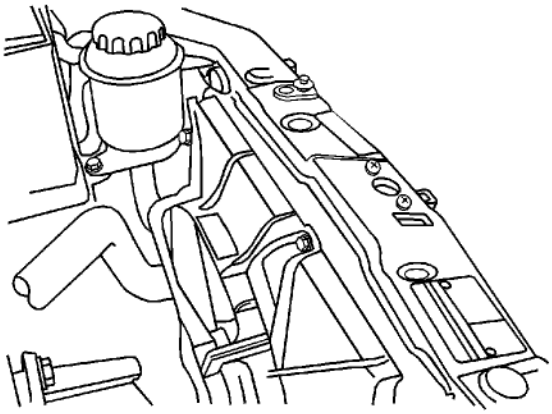
3. Remove the electric cooling fan mounting bolts.
4. Remove the electric cooling fan.

## Installation Procedure



**Warning:** If a fan blade is bent or damaged in any way, do not repair or reuse the damaged part. Always replace a bent or damaged fan blade. Fan blades that have been damaged can not be assured of proper balance and could fail and fly apart during subsequent use. This creates an extremely dangerous situation.

The fan blades must remain in proper balance. You cannot assure fan blade balance once a fan blade has been bent or damaged. A fan blade that is not in proper balance could fail and fly apart during use, creating an extremely dangerous situation.

1. Install the electric cooling fan.

**Caution:** Refer to Fastener Caution in the Preface section.

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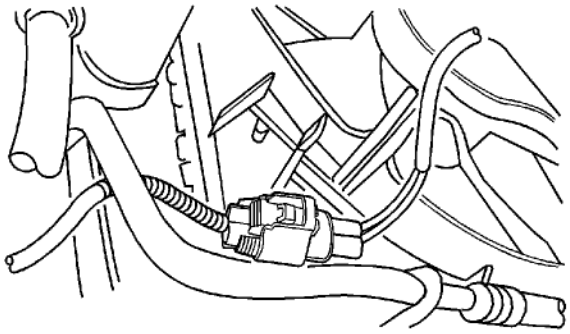

2. Install the electric cooling fan mounting bolts and tighten to **4 N·m (35 lb in)**.
3. Connect the cooling fan electrical connector.

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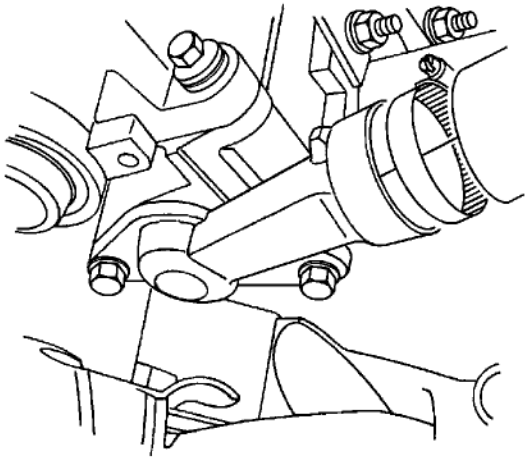
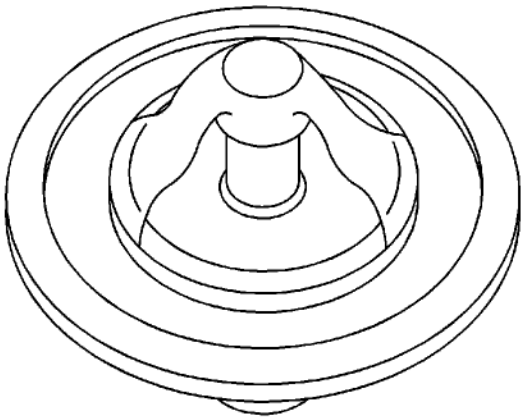
# Engine Coolant Thermostat Replacement (1.5L)

## Removal Procedure

**Warning:** To avoid being burned, do not remove the radiator cap or surge tank cap while the engine is hot. The cooling system will release scalding fluid and steam under pressure if radiator cap or surge tank cap is removed while the engine and radiator are still hot.



1. Drain the coolant. Refer to Cooling System Draining and Filling.
2. Remove the timing belt rear hood.
3. Loosen the hose clamp on the upper radiator hose at the thermostat housing.
4. Disconnect the upper radiator hose from the thermostat housing.



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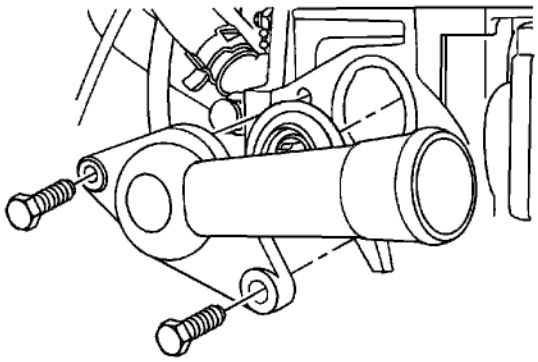
5. Remove the mounting bolts that hold the thermostat housing to the cylinder head.
6. Remove the thermostat housing from the cylinder head.
7. Remove the thermostat from its recess in the cylinder head.
8. Inspect the valve seat for foreign matter that could prevent the valve from sealing properly.
9. Clean the thermostat housing and the cylinder head mating surfaces.

## Installation Procedure



1. Install the thermostat into the cylinder head recess.
2. Install the thermostat housing.

   **Caution:** Refer to Fastener Caution in the Preface section.

3. Secure the thermostat housing to the cylinder head with the mounting bolts.

   **Tighten**
   Tighten the thermostat housing mounting bolts to 20 N·m (15 lb ft).

4. Install the timing belt rear hood.
5. Connect the upper radiator hose to the thermostat housing.
6. Secure the upper radiator hose to the thermostat housing with a hose clamp.
7. Refill the engine cooling system. Refer to Cooling System Draining and Filling.

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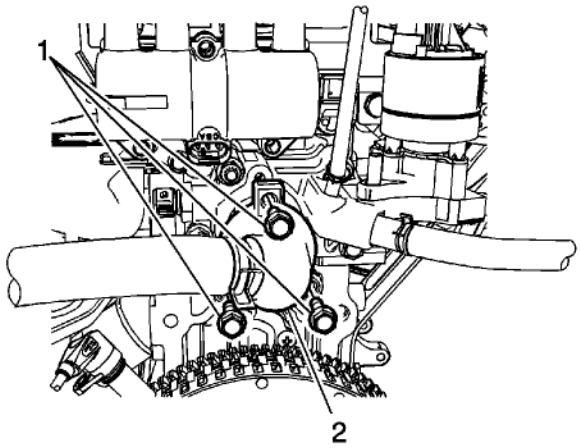
# Engine Coolant Thermostat Replacement (1.2L DOHC)

## Removal Procedure

**Warning:** Refer to Radiator Cap Removal Warning in the Preface section.




1. Drain the coolant. Refer to Cooling System Draining and Filling.
2. Remove the thermostat housing retaining bolts (1).
3. Remove the thermostat housing (2).
4. Remove the thermostat.
5. Inspect the thermostat for proper operation.
6. Clean the thermostat housing and the cylinder head mating surfaces.

## Installation Procedure

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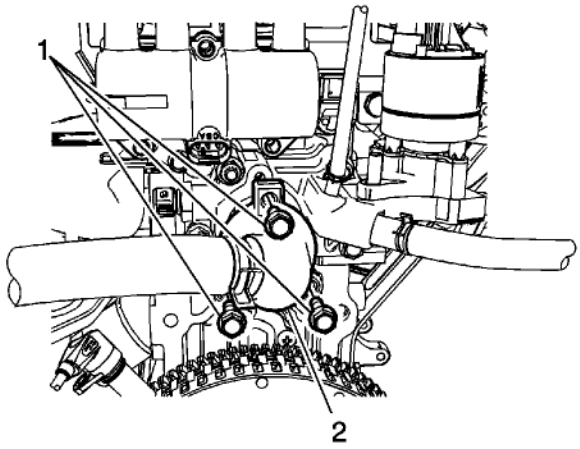


1. Install the thermostat into the cylinder head recess.

   **Caution:** Refer to Fastener Caution in the Preface section.

2. Install the thermostat housing (2).

   **Tighten**
   Tighten the thermostat housing retaining bolts (1) to 10 N·m (89 lb in).

3. Refill the engine cooling system. Refer to Cooling System Draining and Filling.

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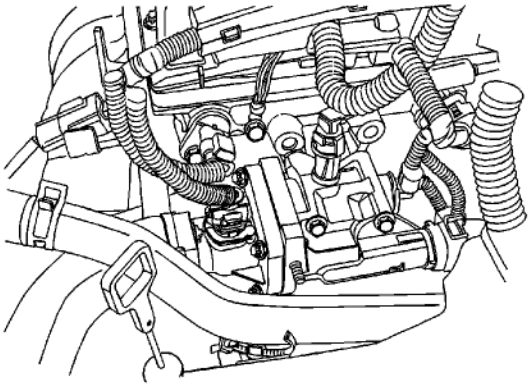
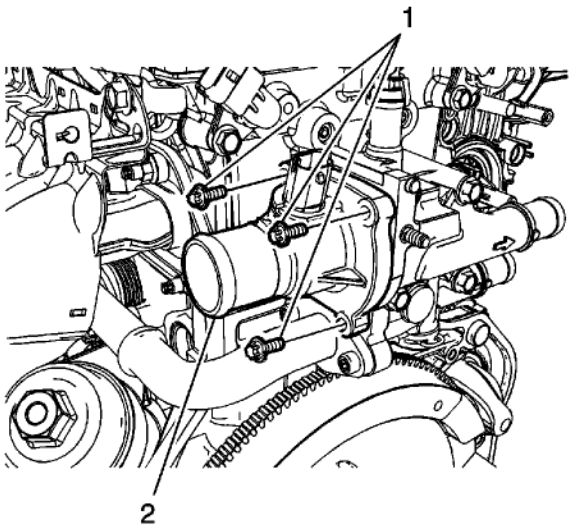
# Engine Coolant Thermostat Replacement (1.4L LDT/1.6 LXV)

## Removal Procedure

**Warning:** Refer to Battery Disconnect Warning in the Preface section.



1. Disconnect the battery negative cable. Refer to Battery Negative Cable Disconnection and Connection.
2. Drain the coolant. Refer to Cooling System Draining and Filling.
3. Remove the upper radiator hose from the thermostat housing.

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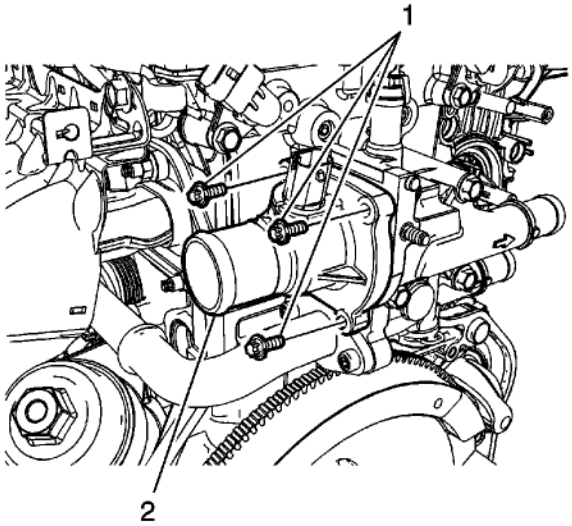
4. Disconnect the thermostat wiring harness plug.
5. Remove the thermostat housing retaining bolts (1).
6. Remove the thermostat housing (2).
7. Inspect the thermostat for proper operation. Refer to Thermostat Diagnosis.
8. Clean the thermostat housing and the cylinder head mating surfaces.

## Installation Procedure




**Note:**

- Do not use fallen parts. Plastic housing is very brittle and the fallen part may have internal crack that cause coolant leak.
- Do not reuse rubber gaskets.
- Check a coolant leak after the part replacement.

1. Fit the thermostat housing to the coolant distributor and use the NEW gasket.

   **Caution:** Refer to Fastener Caution in the Preface section.

2. Install the thermostat housing (2).

   **Tighten**
   Tighten the thermostat housing retaining bolt (1) to 8 N·m (5.9 lb ft).

3. Connect the thermostat wiring harness plug.
4. Install the upper radiator hose from the thermostat housing.
5. Refill the engine cooling system. Refer to Cooling System Draining and Filling.
6. Connect the battery negative cable. Refer to Battery Negative Cable Disconnection and

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Connection.

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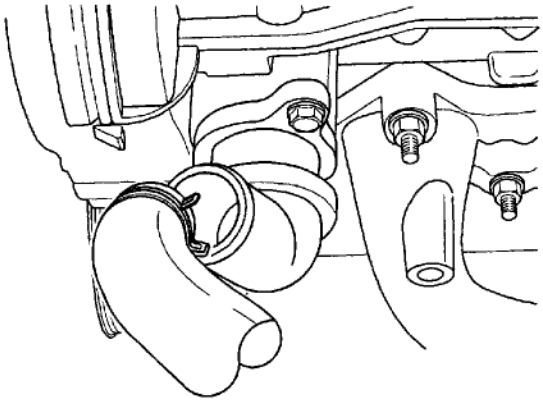
# Engine Coolant Thermostat Replacement (1.4L/1.6L DOHC)

## Removal Procedure



**Warning:** As long as there is pressure in the cooling system, the temperature can be considerably higher than the boiling temperature of the solution in the radiator without causing the solution to boil. Removal of the pressure cap while the engine is hot and pressure is high will cause the solution to boil instantaneously -- possibly with explosive force -- spewing the solution over the engine, fenders and the person removing the cap.

1. Drain the coolant. Refer to Cooling System Draining and Filling.
2. Disconnect the upper radiator hose from the thermostat housing.
3. Disconnect the throttle body coolant inlet hose from the thermostat housing.

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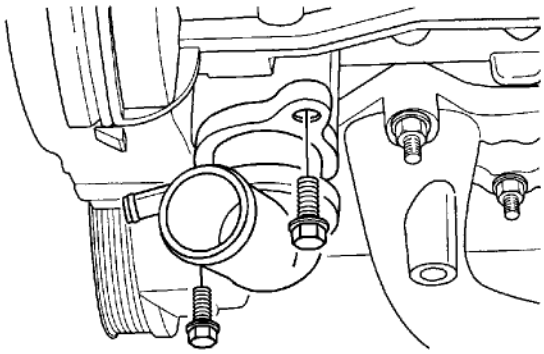
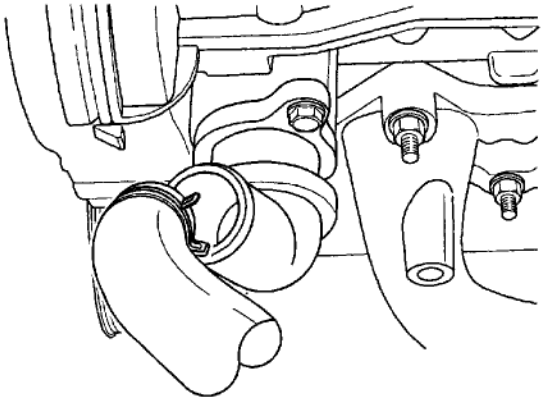


4. Remove the thermostat bolts.
5. Remove the thermostat housing.
6. Remove the thermostat with the gasket.
7. Inspect the gasket for cracks or other damage.
8. Inspect the valve seat for foreign matter that could prevent the valve from seating properly.
9. Clean the thermostat housing and mating surface.

## Installation Procedure

**Caution:** Refer to Fastener Caution in the Preface section.



1. Install the thermostat with the bolts and the thermostat housing and tighten to **20 N·m**

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**(15 lb ft).**

2. Secure the upper radiator hose to the thermostat housing with a hose clamp.
3. Connect the throttle body coolant inlet hose to the thermostat housing.
4. Refill the engine cooling system. Refer to Cooling System Draining and Filling.

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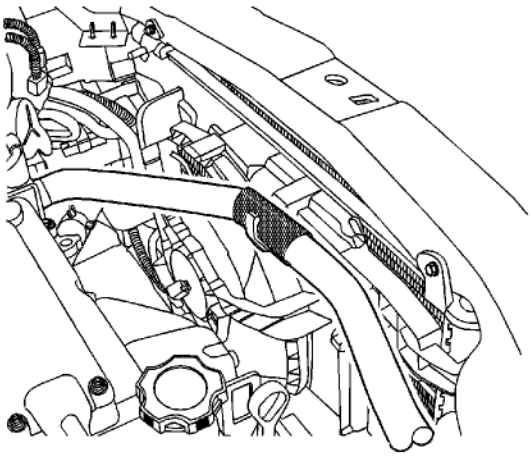
# Radiator Replacement (1.2L DOHC)

## Removal Procedure

**Warning:** Refer to Radiator Cap Removal Warning in the Preface section.



1. Disconnect the battery negative cable. Refer to Battery Negative Cable Disconnection and Connection.
2. Remove the power steering oil tank. Refer to Power Steering Fluid Reservoir Replacement.
3. Drain the coolant. Refer to Cooling System Draining and Filling.
4. Remove the electric cooling fans. Refer to Engine Coolant Fan Replacement.
5. Disconnect the upper cooling fan hose from the radiator.
6. Disconnect the lower radiator hose from the radiator.

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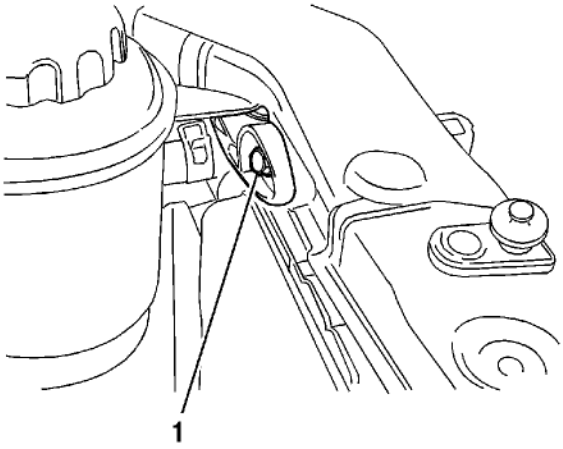
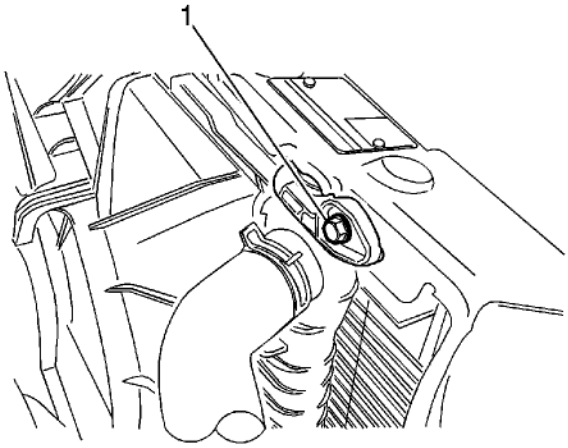



7. Remove the return hose from the surge tank at the radiator.
8. Remove the left upper radiator retaining bracket (1).




9. Remove the right upper radiator retaining bracket (1).

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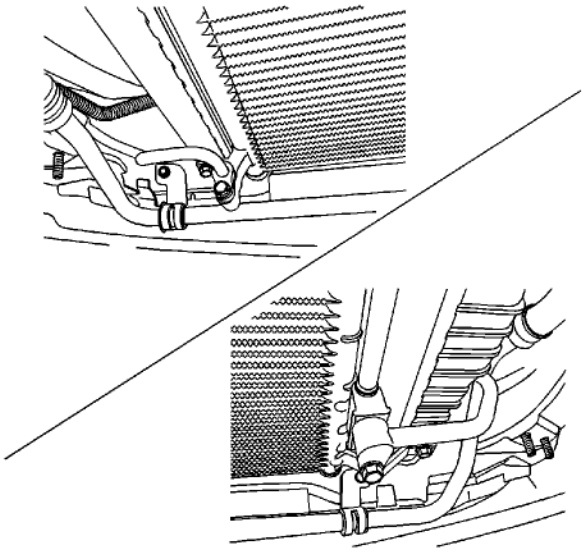
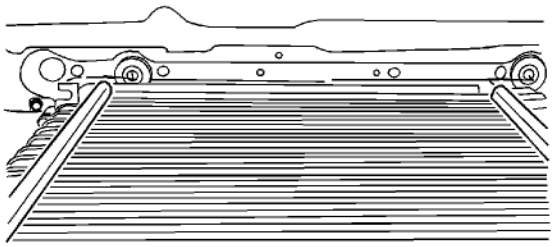


10. Remove the A/C gas. Refer to Refrigerant Recovery and Recharging.
11. Remove the high pressure pipe bolt from both sides of the A/C condenser. Refer to Refrigerant Recovery and Recharging.



12. Remove up the radiator from the vehicle with the A/C condenser.

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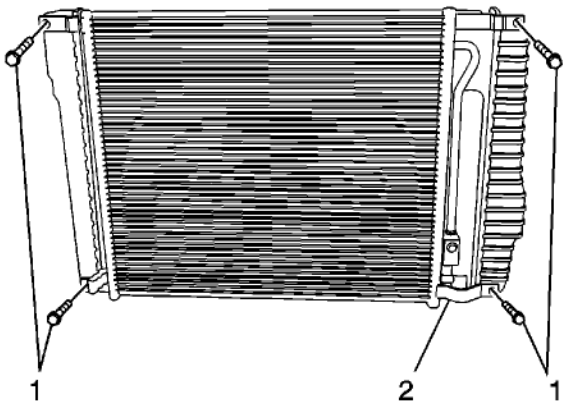
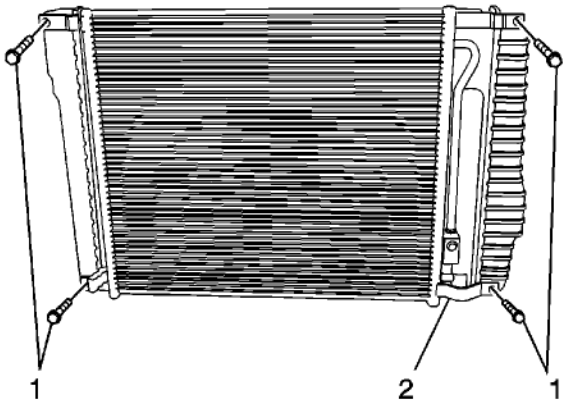



13. Remove the A/C condenser retaining bolts (1) and clips (2) from the radiator.

## Installation Procedure




1. Install the A/C condenser to the radiator. Secure with clips (2) and bolts (1)..

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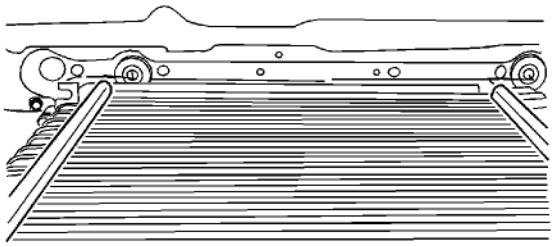
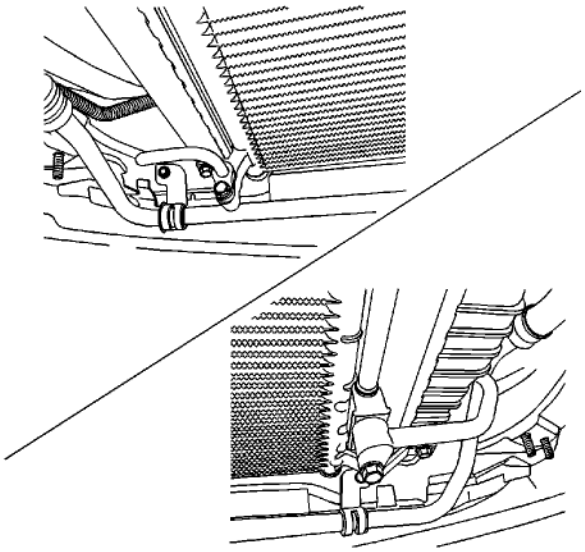


2. Install the radiator with the A/C condenser.



3. Install the high pressure pipe bolt from both sides of the A/C condenser.
4. Refill the A/C gas. Refer to Refrigerant Recovery and Recharging.

**Caution:** Refer to Fastener Caution in the Preface section.

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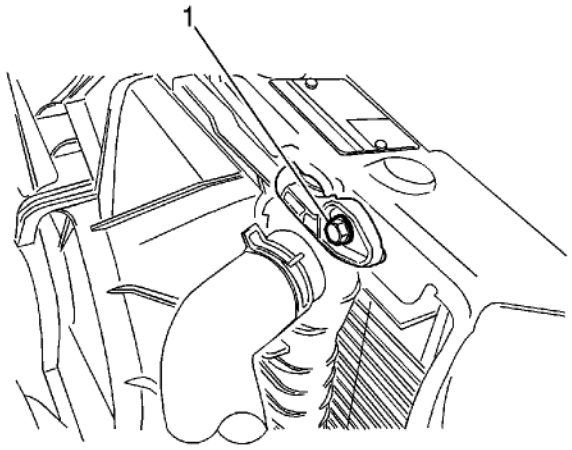
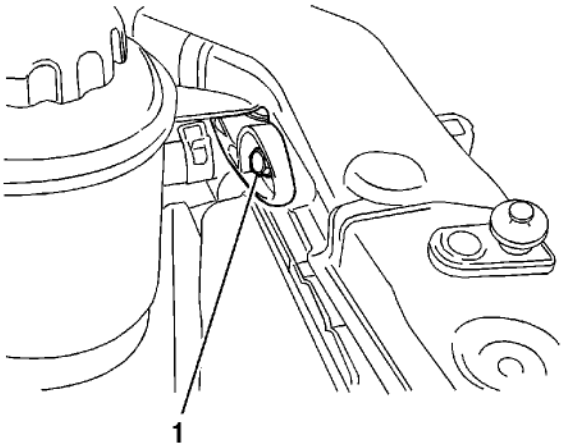



5. Install the right upper radiator retaining bracket.

**Tighten**
Tighten the upper right radiator retaining bracket bolt (1) to 10 N·m (89 lb in).




6. Install the left upper radiator retaining bracket.

**Tighten**
Tighten the left radiator retaining bracket bolt (1) to 10 N·m (89 lb in).

7. Install the return hose from the surge tank at the radiator.
8. Connect the lower radiator hose from the radiator.

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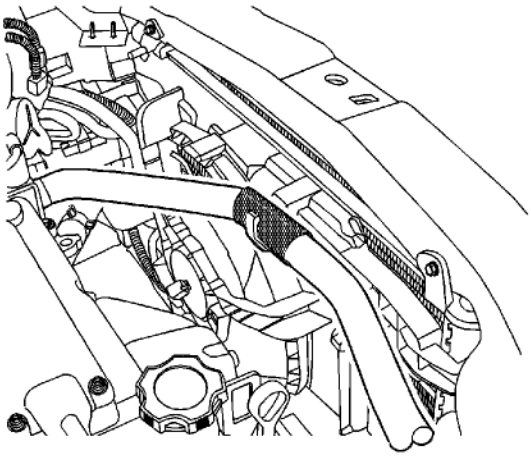

9. Connect the upper cooling fan hose from the radiator.
10. Install the electric cooling fan. Refer to Engine Coolant Fan Replacement.
11. Refill the engine cooling system. Refer to Cooling System Draining and Filling.
12. Install the power steering oil tank. Refer to Power Steering Fluid Reservoir Replacement.
13. Connect the negative battery cable. Refer to Battery Negative Cable Disconnection and Connection.

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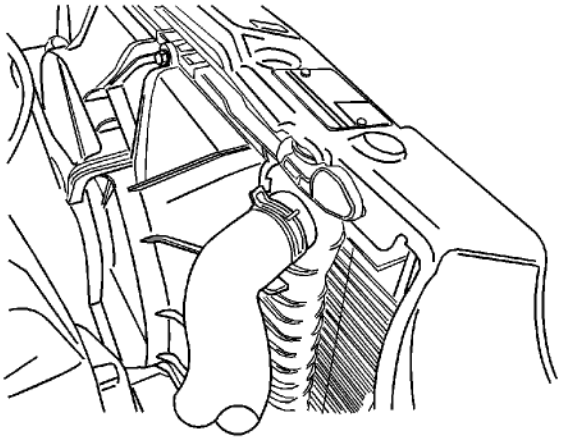
# Radiator Replacement (1.4L/1.5L/1.6L)

## Removal Procedure

**Warning:** Refer to Battery Disconnect Warning in the Preface section.



1. Disconnect the battery negative cable. Refer to Battery Negative Cable Disconnection and Connection.
2. Drain the engine cooling system. Refer to Cooling System Draining and Filling.
3. Remove the electric cooling fans. Refer to Engine Coolant Fan Replacement.
4. Remove the upper radiator hose clamp.
5. Disconnect the upper radiator hose from the radiator.

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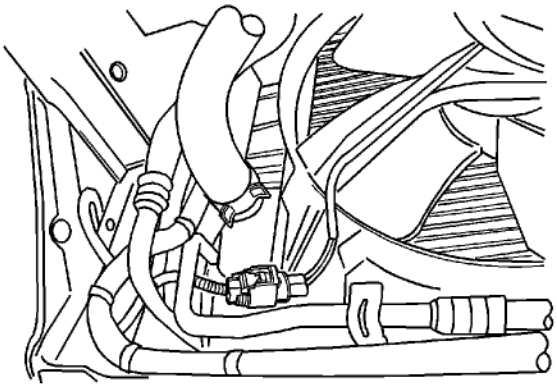
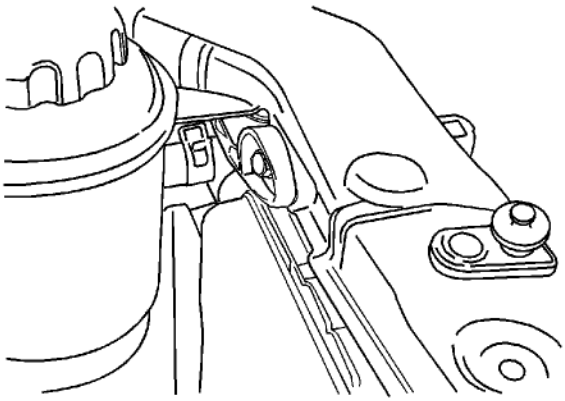


6. Disconnect the lower radiator hose from the radiator.
7. Remove the lower radiator hose clamp.



8. Remove the hose clamp from the surge tank hose at the radiator.
9. Disconnect the surge tank hose from the radiator.
10. Remove the left upper radiator retaining bolt.
11. Remove the left upper radiator retaining bracket.

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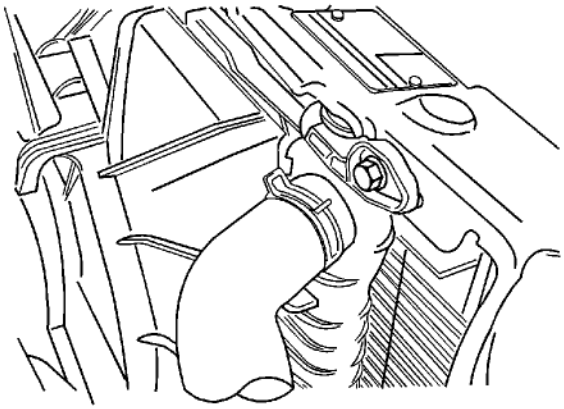
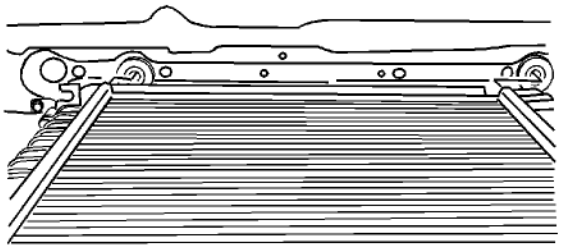


12. Remove the right upper radiator retaining bolt.
13. Remove the right upper radiator retaining bracket.



**Note:** The radiator still contains a substantial amount of coolant. Drain the remainder of the coolant from the radiator into a drain pan.

14. Remove the radiator from the vehicle.

## Installation Procedure

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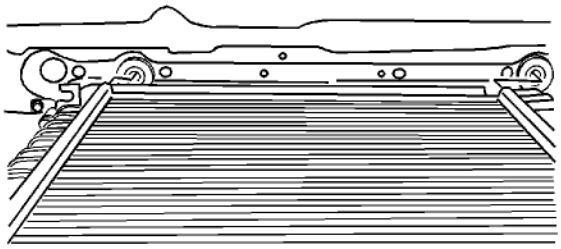
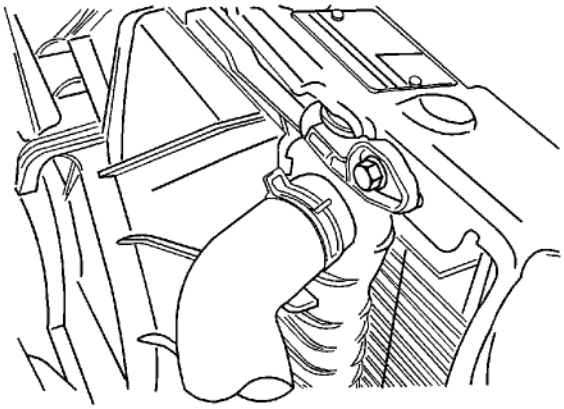


1. Set the radiator into place in the vehicle with the radiator bottom posts in the rubber shock bumpers.



2. Position the radiator retainers in place.
3. Install the upper right radiator retaining bracket.

**Caution:** Refer to Fastener Caution in the Preface section.

4. Install the upper right radiator retaining bolt and tighten to **7 N·m (62 lb in)**.

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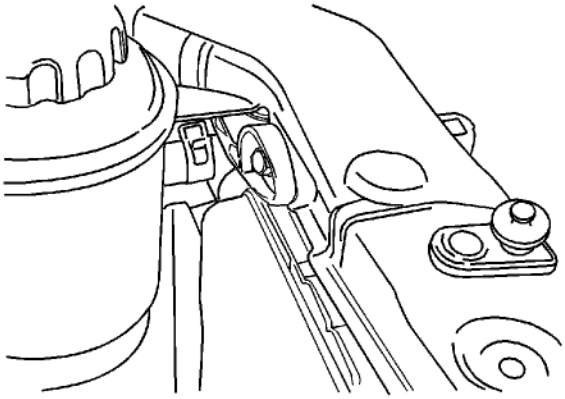
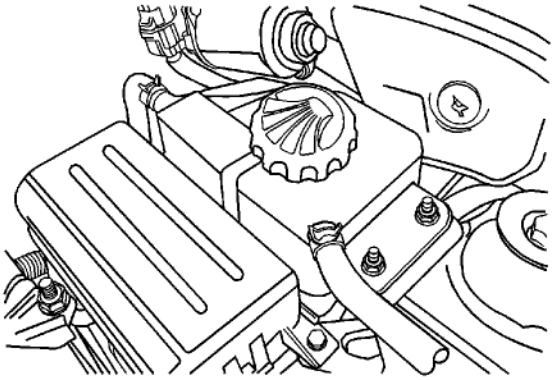


5. Install the upper left radiator retaining bracket.
6. Install the upper left radiator retaining bolt and tighten to **7 N·m (62 lb in)**.



7. Connect the surge tank hose to the radiator.
8. Secure the surge tank hose with a hose clamp.

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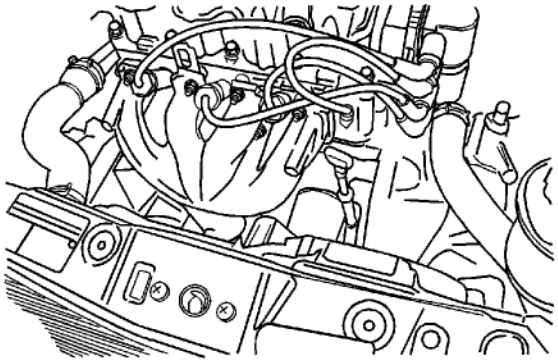

9. Connect the upper radiator hose and the lower radiator hose to the radiator.
10. Secure each hose with a hose clamp.
11. Install the electric cooling fans. Refer to Engine Coolant Fan Replacement.
12. Refill the engine cooling system. Refer to Cooling System Draining and Filling.
13. Connect the battery negative cable. Refer to Battery Negative Cable Disconnection and Connection.

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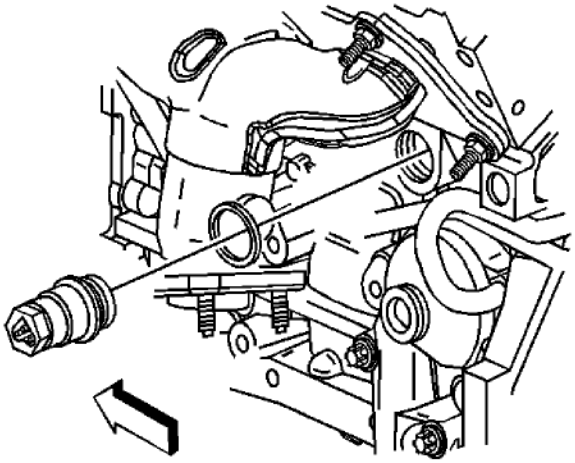
# Coolant Heater Replacement

## Removal Procedure



1. Drain the cooling system. Refer to Cooling System Draining and Filling.

   **Note:** A residual amount of coolant will drain from engine block.

2. Disconnect the coolant heater power supply cord from the coolant heater.
3. Remove the coolant heater and seal from the engine block.

## Installation Procedure

**Caution:** Refer to Fastener Caution in the Preface section.

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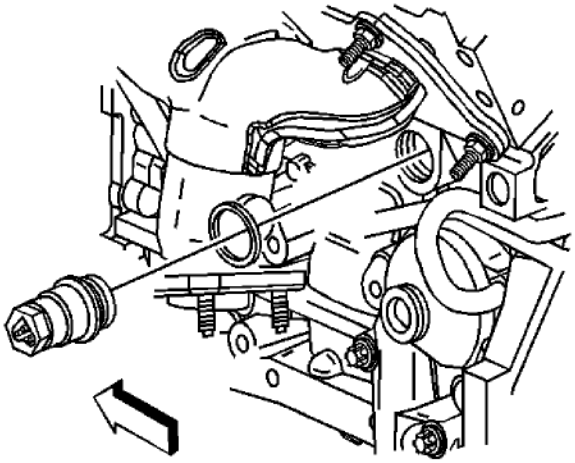

1. Install the seal to the coolant heater.
2. Install the coolant heater in to the engine block and tighten to **60 N·m (44 lb ft)**.
3. Connect the coolant heater power supply cord to the coolant heater.
4. Fill the cooling system. Refer to Cooling System Draining and Filling.

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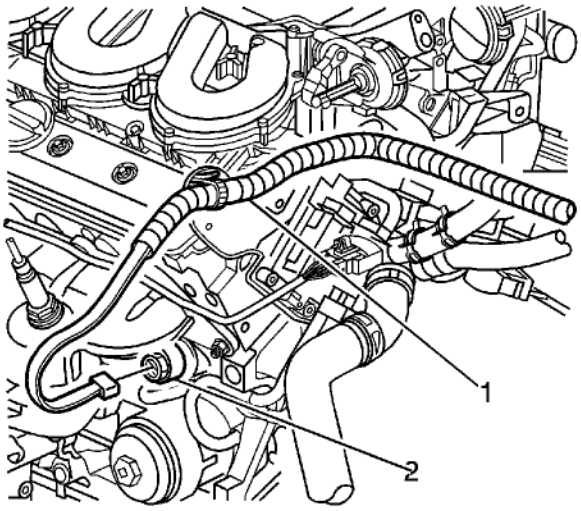
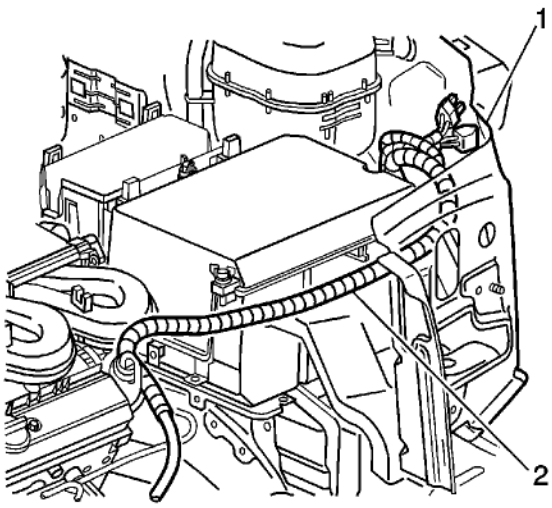
# Coolant Heater Cord Replacement

## Removal Procedure




1. Disconnect the coolant heater power supply cord from the coolant heater (2).
2. Disconnect the coolant heater cord clip (1) from the engine lift bracket.




3. Disconnect the coolant heater cord from between the washer bottle and the coolant reservoir (1).
4. Remove the coolant heater cord from the vehicle.

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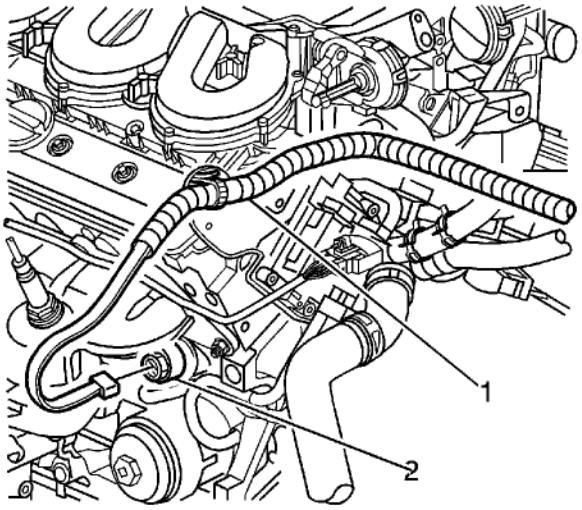
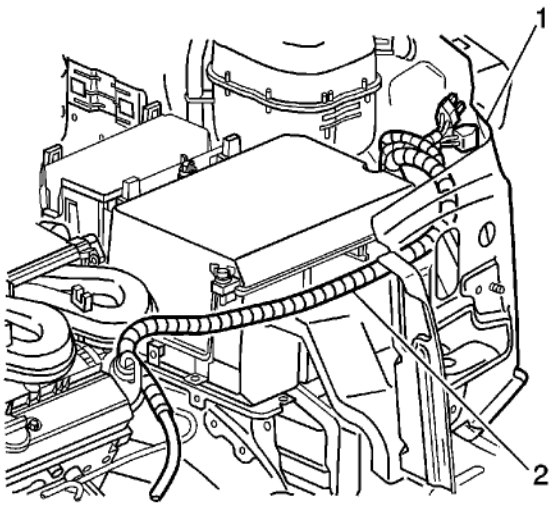
## Installation Procedure




1. Connect the coolant heater cord to the coolant heater (2).
2. Secure the coolant heater cord clip (1) to the engine lift bracket.




3. Route the coolant heater cord along the battery (2).
4. Secure the coiled power cord between the washer fluid bottle and the coolant reservoir (1).

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