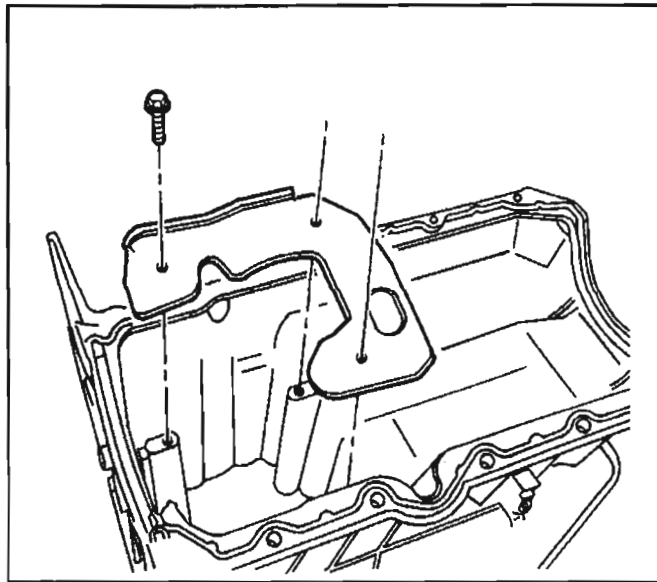


334509

Caution: Refer to *Safety Glasses Caution in Cautions and Notices*.

2. Clean the oil pan and oil pan baffle in cleaning solvent.
3. Dry the oil pan and oil pan baffle with compressed air.
4. Inspect the oil pan for the following:
 - Gouges or damage to the oil pan sealing surfaces (1)
 - Damage to the threaded holes (2)
 - Damaged oil pan drain hole threads (3)
 - Damage to the oil pan baffle
 - Damage to the exterior of the oil pan
 A damaged oil pan may interfere with the proper position of the oil pump screen, or may not distribute oil properly in the oil pan sump area.



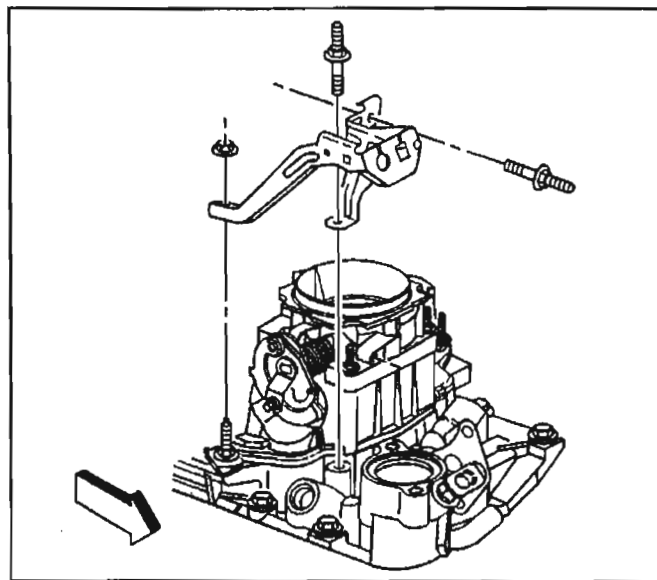
387763

Notice: Refer to *Fastener Notice* in Cautions and Notices.

5. Install the oil pan baffle and the bolts.

Tighten

Tighten the oil pan baffle bolts to 12 N·m (106 lb in).

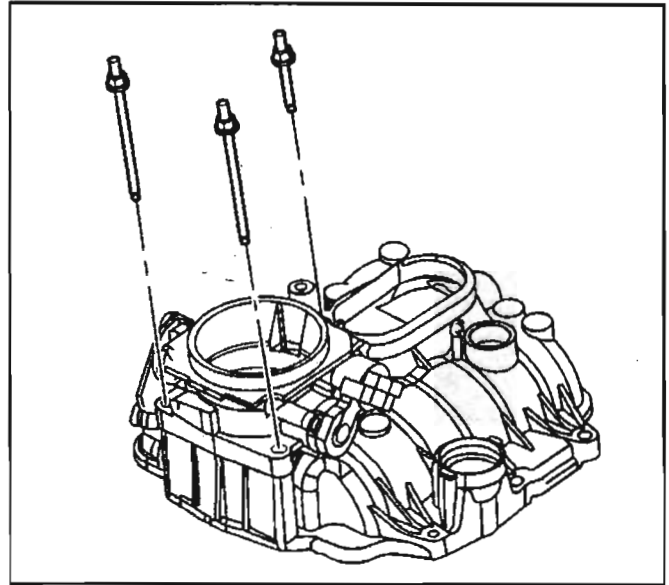


374902

Intake Manifold Disassemble

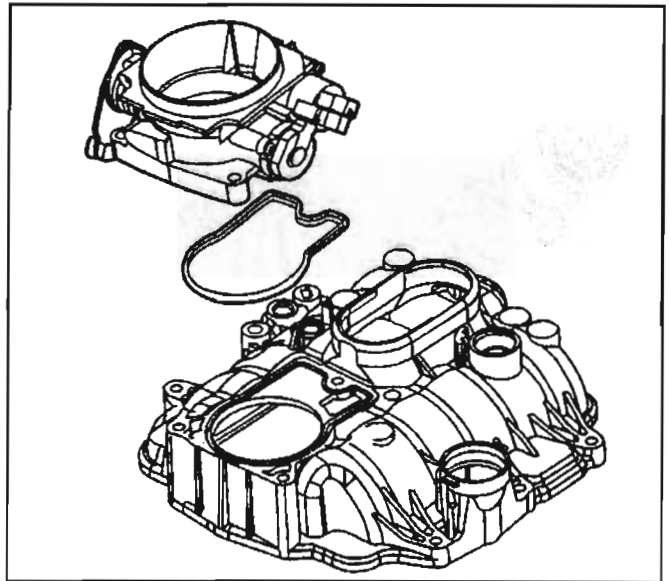
1. Remove the nuts, the studs, and the accelerator control cable bracket.

2. Remove the throttle body attaching studs.



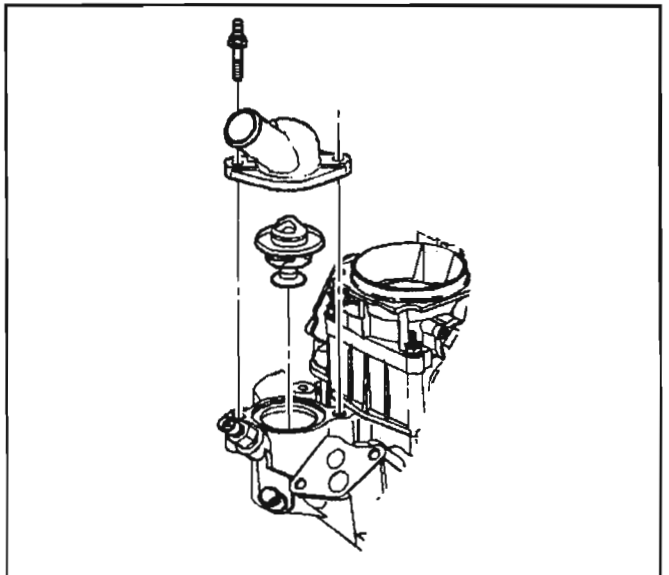
12852

- 3. Remove the throttle body.
- 4. Remove the throttle body to upper intake manifold gasket.
- 5. Discard the throttle body to upper intake manifold gasket.

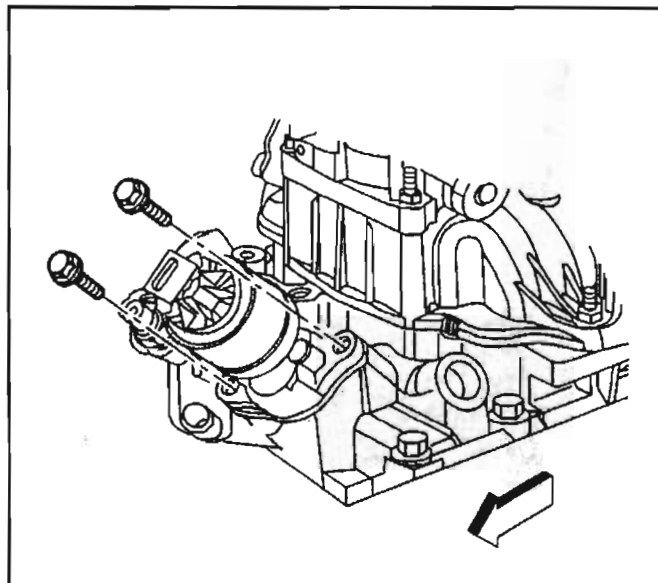


12853

- 6. Remove the water outlet studs.
- 7. Remove the water outlet.
- 8. Remove the engine coolant thermostat.



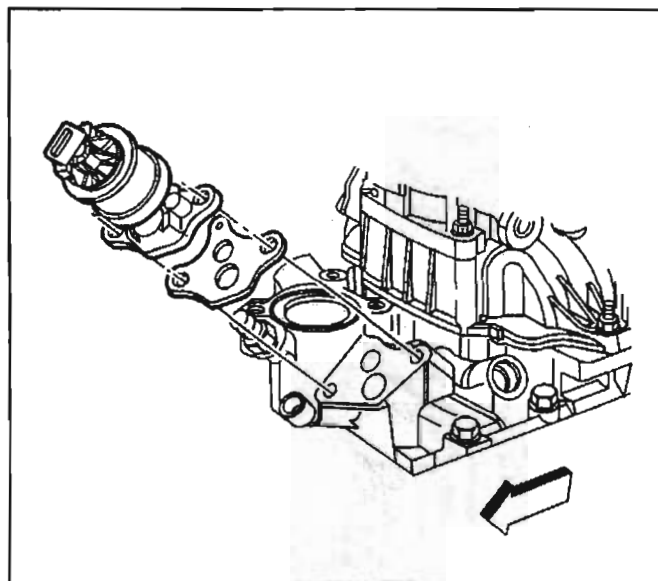
48323



22075

Important: Note the position and direction of the exhaust gas recirculation (EGR) valve before removal. It is possible to improperly install the EGR valve 180 degrees from the original position.

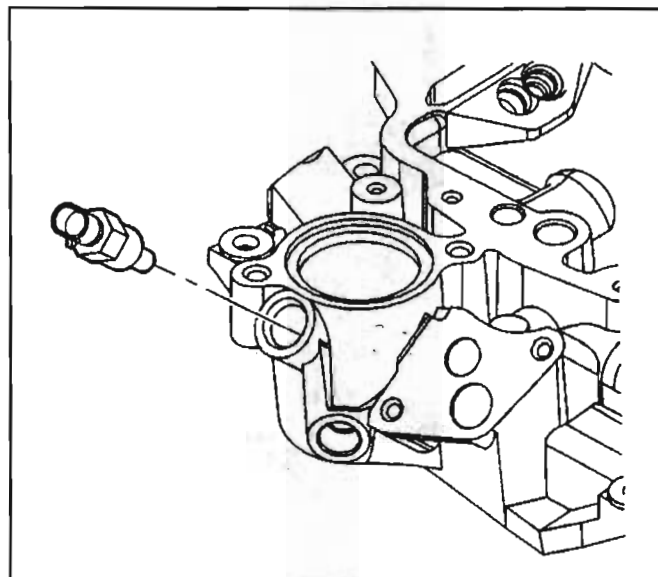
9. Remove the exhaust gas recirculation (EGR) valve bolts.



22078

Notice: The Linear EGR valve is an electrical component. DO NOT soak in any liquid cleaner or solvent because damage may result.

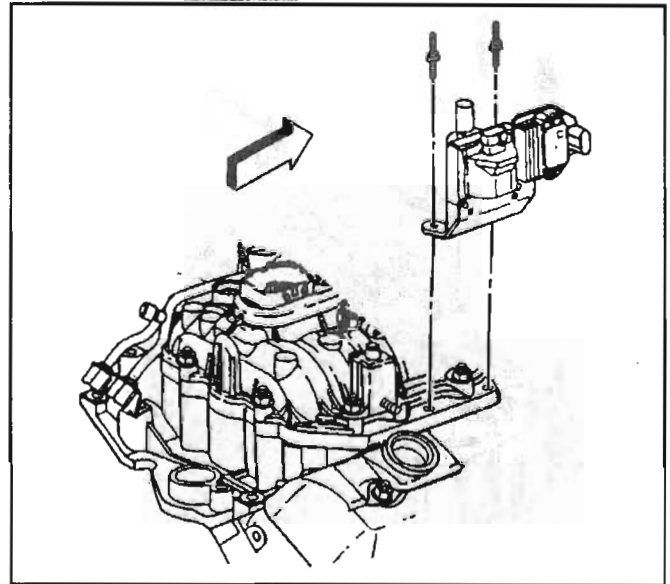
10. Remove the EGR valve and the EGR valve gasket from the lower intake manifold.
11. Discard the EGR valve gasket.



10932

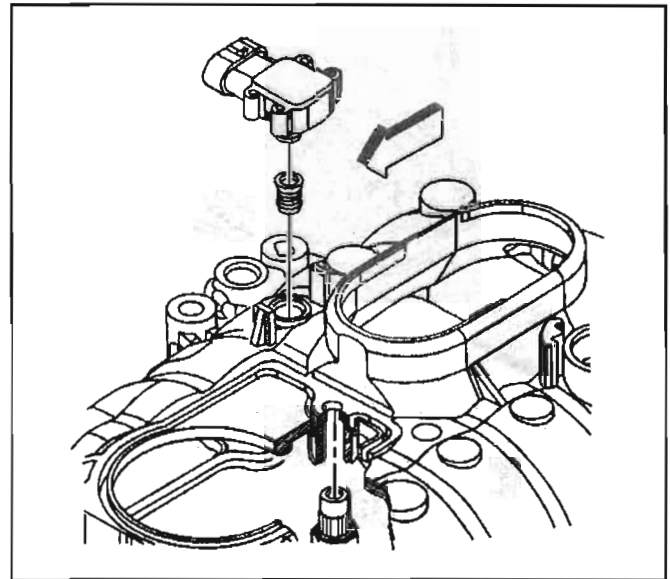
12. Remove the engine coolant temperature (ECT) sensor from the front of the lower intake manifold (if equipped).

- 13. Remove the studs and the ignition coil.



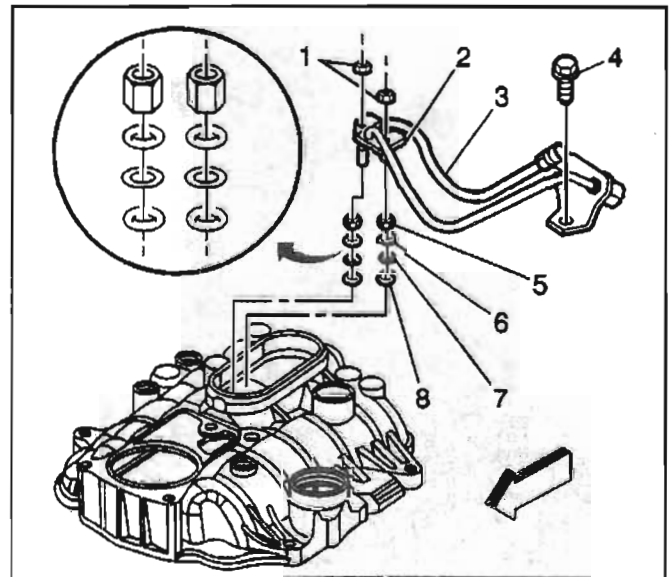
31466

- 14. Remove the manifold absolute pressure (MAP) sensor.
- 15. Remove the MAP sensor seal from the MAP sensor.
- 16. Discard the MAP sensor seal.

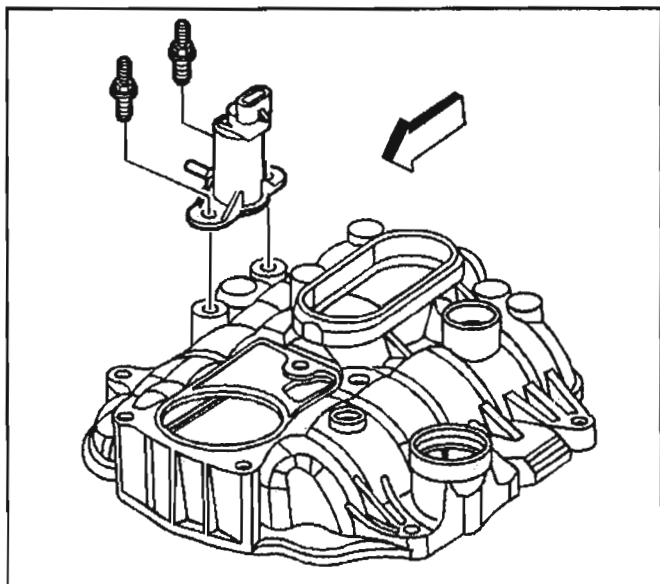


10933

- 17. Remove the fuel pipe bolt (4).
- 18. Remove the fuel pipe retainer nuts (1).
- 19. Remove the fuel pipe retainer (2).
- 20. Remove the fuel pipe (3).
- 21. Remove and discard the fuel seal retainers (5).
- 22. Remove and discard the fuel seals (6) (yellow O-rings).
- 23. Remove and discard the spacer rings (7) (flat washers).
- 24. Remove and discard the fuel seals (8) (black O-rings).

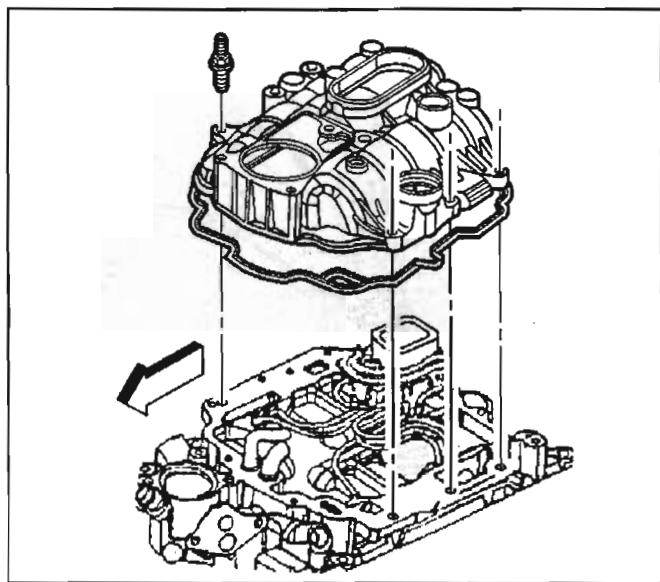


334517



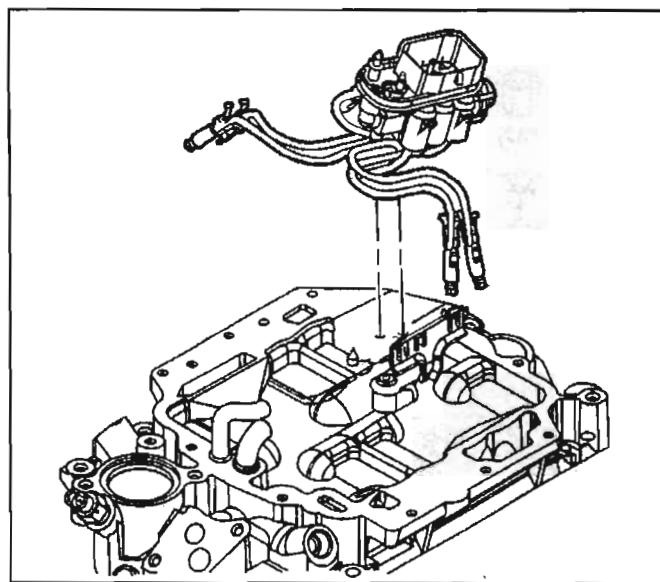
334511

25. Remove the studs and the evaporative emission (EVAP) canister purge solenoid valve.
26. Remove the nut and the engine wiring harness bracket.



334513

27. Remove the upper intake manifold attaching studs.
28. Remove the upper intake manifold.
29. Remove the upper intake manifold to lower intake manifold gasket.
30. Discard the upper intake manifold to lower intake manifold gasket.



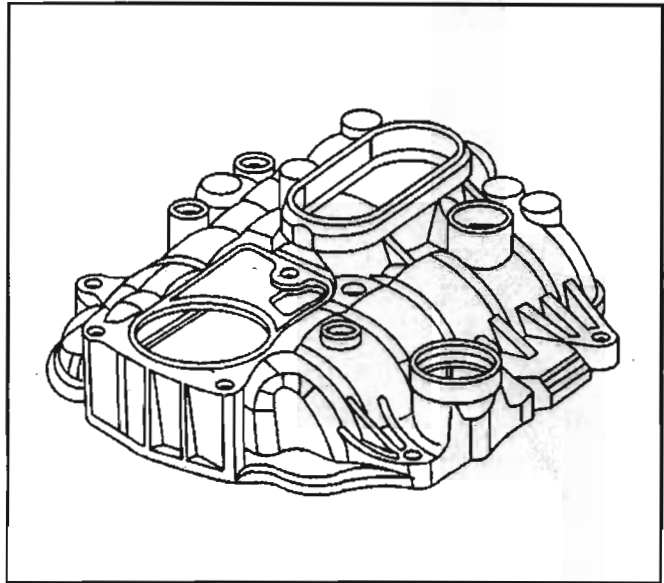
12867

31. Remove the fuel meter body seal and discard.
32. Remove the 6 poppet nozzles from the lower intake manifold bores.
33. Remove the fuel meter body.
34. Remove the bolt and the fuel meter body bracket.

Intake Manifold Clean and Inspect

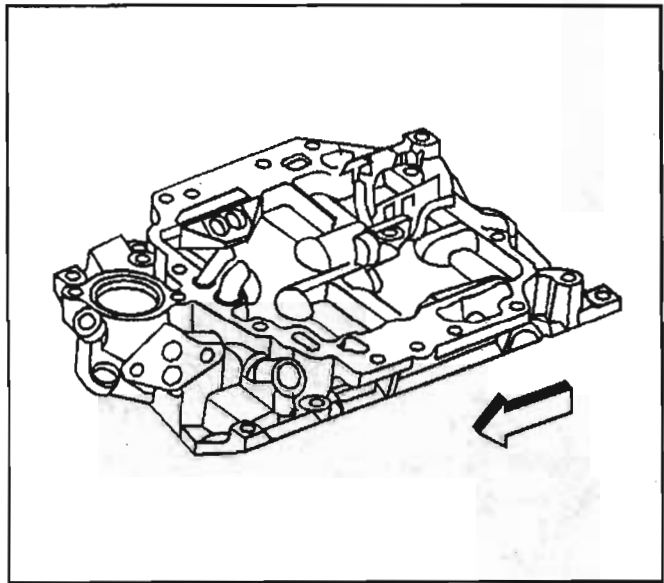
Caution: Refer to Safety Glasses Caution in Cautions and Notices.

1. Clean the upper intake manifold in cleaning solvent.
2. Dry the upper intake manifold with compressed air.



334515

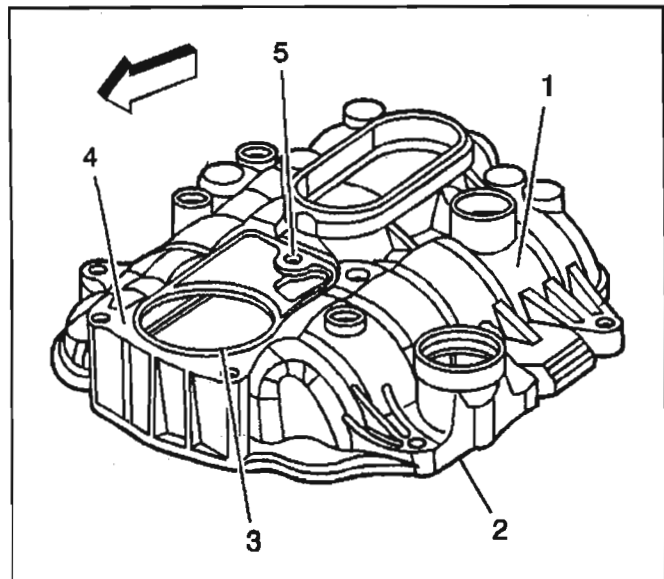
3. Clean the lower intake manifold in cleaning solvent.
4. Dry the lower intake manifold with compressed air.



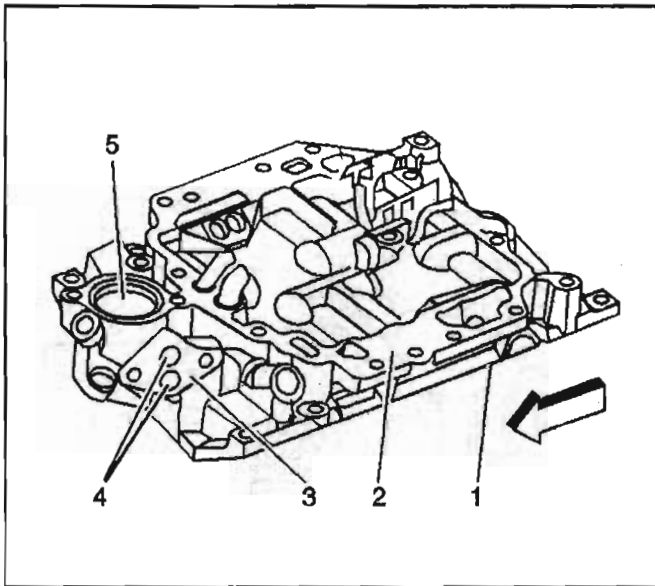
480568

5. Inspect the upper intake manifold for the following:

- Cracks or other damage to the exterior (1)
- Cracking or damage in the gasket grooves (2) and (3)
- Damage to the throttle body mounting surface (4)
- Loose or damaged bolt hole thread inserts (5)

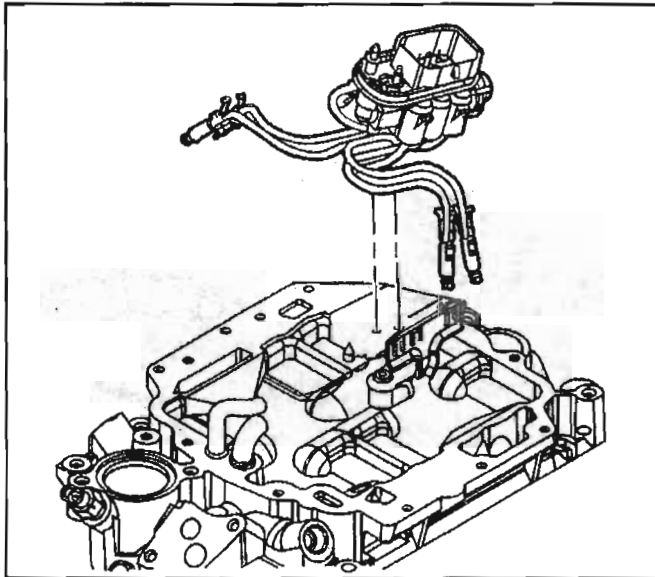


480569



480570

6. Inspect the lower intake manifold for the following:
 - Damage to the gasket sealing surfaces (1), (2) and (3)
 - Restricted exhaust gas recirculation (EGR) system passages (4)
 - Restricted cooling system passages (5)
 - Cracks or damage
 - Damage to the threaded bolt holes



12867

Intake Manifold Assemble

Notice: Refer to *Fastener Notice* in Cautions and Notices.

1. If reusing the fastener, apply threadlock GM P/N 12345382 or equivalent to the threads of the fuel meter body bracket bolt.
2. Install the fuel meter body bracket and bolt.

Tighten

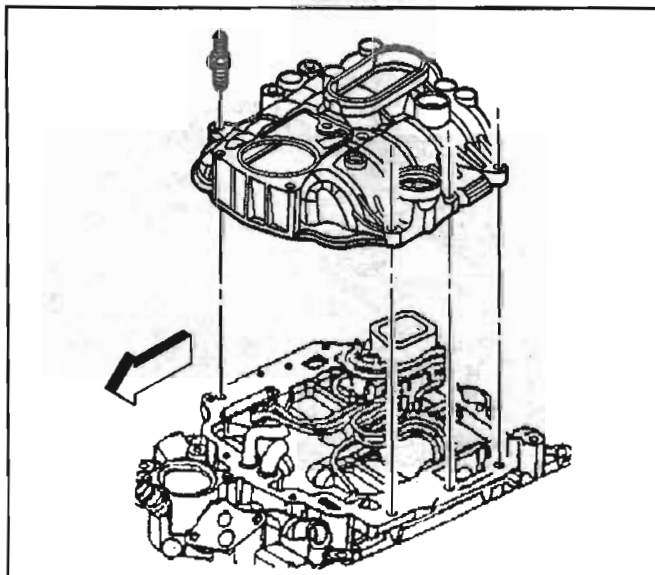
Tighten the fuel meter bracket bolt to 10 N·m (88 lb in).

3. Install the fuel meter body into the fuel meter body bracket.
4. Install the 6 poppet nozzles into the proper lower intake manifold bores.
5. Inspect the poppet nozzles in order to ensure that the poppet nozzles are firmly seated and locked in the lower intake manifold bores.
6. Install a NEW fuel meter body seal into the groove of the fuel meter body.
7. Install a NEW upper intake manifold to lower intake manifold gasket into the groove of the upper intake manifold.
8. Install the upper intake manifold onto the lower intake manifold.
9. If reusing the fasteners, apply threadlock GM P/N 12345382 or equivalent to the threads of the upper intake manifold attaching studs.
10. Install the upper intake manifold attaching studs.

Tighten

10.1. Tighten the upper intake manifold attaching studs on the first pass to 5 N·m (44 lb in).

10.2. Tighten the upper intake manifold attaching studs on the final pass to 9 N·m (80 lb in).

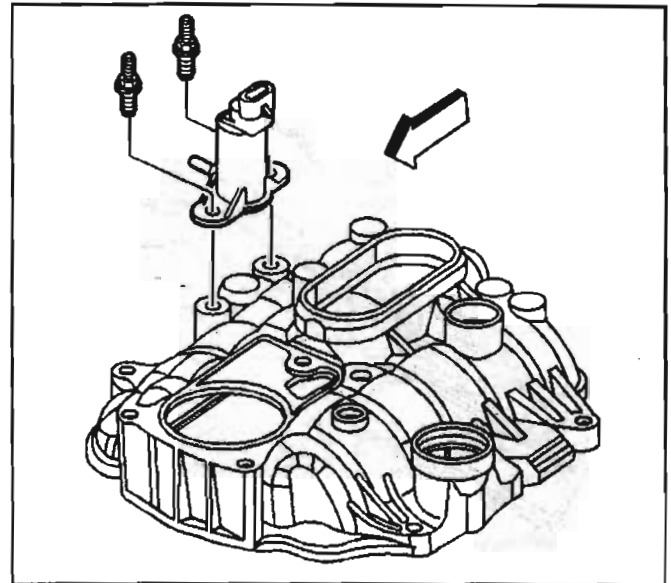


334516

11. If reusing the fasteners, apply threadlock GM P/N 12345382 or equivalent to the threads of the evaporative emission (EVAP) canister purge solenoid valve studs.
12. Install the EVAP canister purge solenoid valve and studs.

Tighten

Tighten the EVAP canister purge solenoid valve studs to 10 N·m (88 lb in).



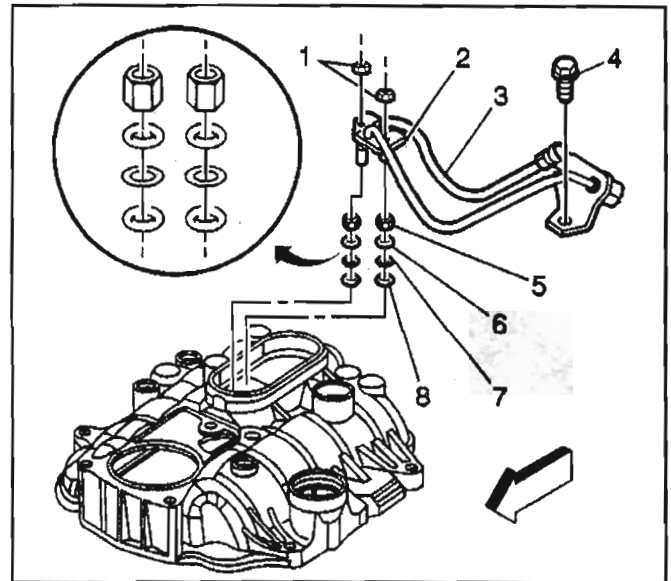
334511

13. Install the engine wiring harness bracket and nut.

Tighten

Tighten the engine wiring harness bracket nut to 12 N·m (106 lb in).

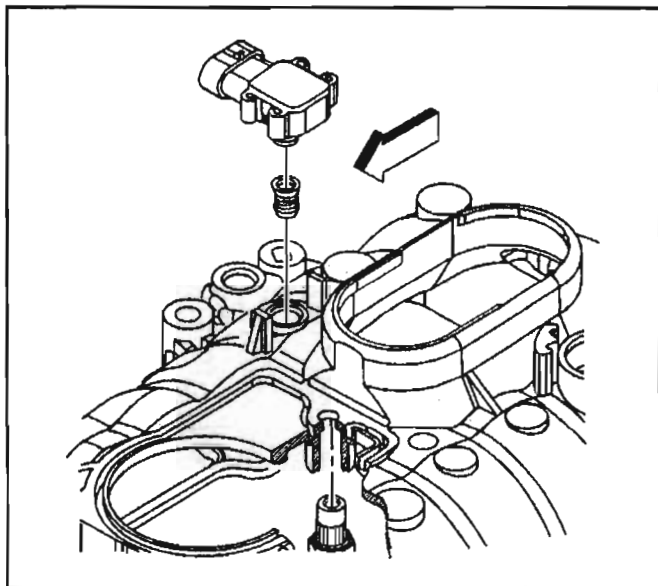
14. Install the NEW fuel seals (8) (black O-rings) into the fuel meter body.
15. Install the NEW spacer rings (7) (flat washers) into the fuel meter body.
16. Install the NEW fuel seals (6) (yellow O-rings) into the fuel meter body.
17. Install the NEW fuel seal retainers (5) into the fuel meter body.
18. Install the fuel pipe (3) into the fuel meter body.
19. Install the fuel pipe retainer bracket (2) onto the fuel pipe.
20. Install the fuel pipe retainer bracket nuts (1).
21. If reusing the fastener, apply threadlock GM P/N 12345382 or equivalent to the threads of the fuel pipe bolt.
22. Install the fuel pipe bolt (4).



334517

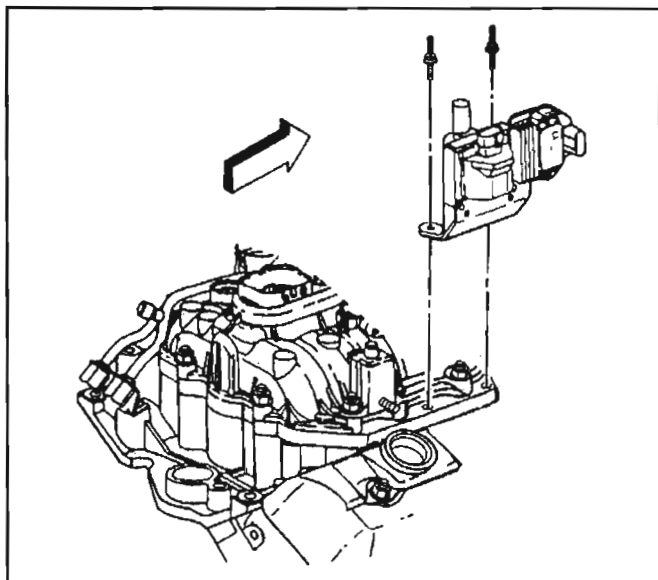
Tighten

- 22.1. Tighten the fuel pipe bracket nuts to 3 N·m (27 lb in).
- 22.2. Tighten the fuel pipe bolt to 6 N·m (53 lb in).



10933

23. Install a NEW manifold absolute pressure (MAP) sensor seal onto the MAP sensor.
24. Apply a small amount (1 drop) of clean engine oil to the MAP sensor seal.
25. Install the MAP sensor into the upper intake manifold.

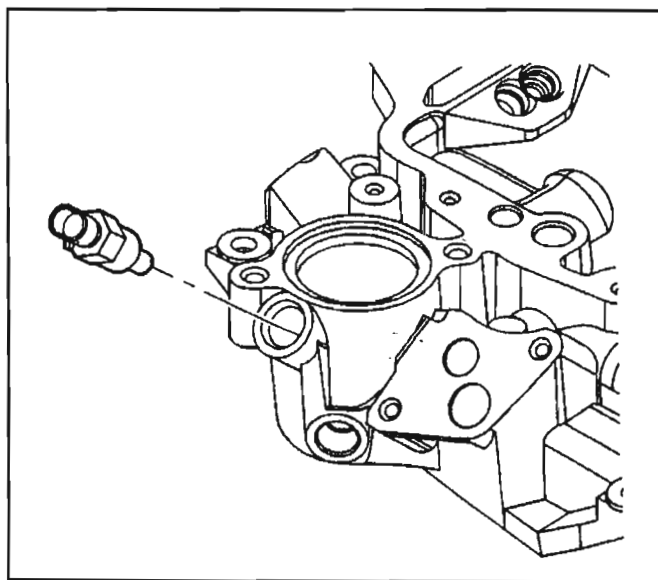


31466

26. Install the ignition coil and studs.

Tighten

Tighten the ignition coil studs to 12 N·m (106 lb in).



10932

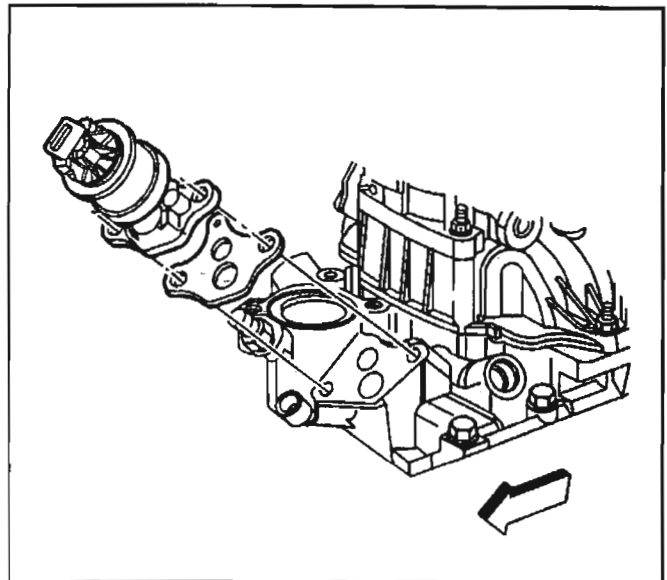
27. If reusing the engine coolant temperature (ECT) sensor (if equipped), apply sealant GM P/N 12346004 or equivalent to the threads of the ECT sensor.
28. Install the ECT sensor (if equipped) into the front of the lower intake manifold.

Tighten

Tighten the ECT sensor to 20 N·m (15 lb ft).

Important: The exhaust gas recirculation (EGR) valve must be installed in the original orientation.

29. Install a NEW EGR valve gasket and the EGR valve.

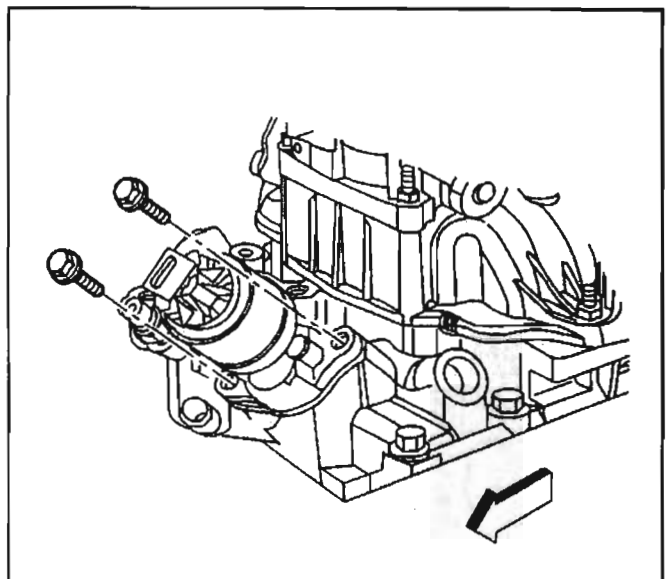


22078

30. Install the EGR valve bolts.

Tighten

- 30.1. Tighten the EGR valve bolts on the first pass to 7 N·m (62 lb in).
- 30.2. Tighten the EGR valve bolts on the final pass to 30 N·m (22 lb ft).

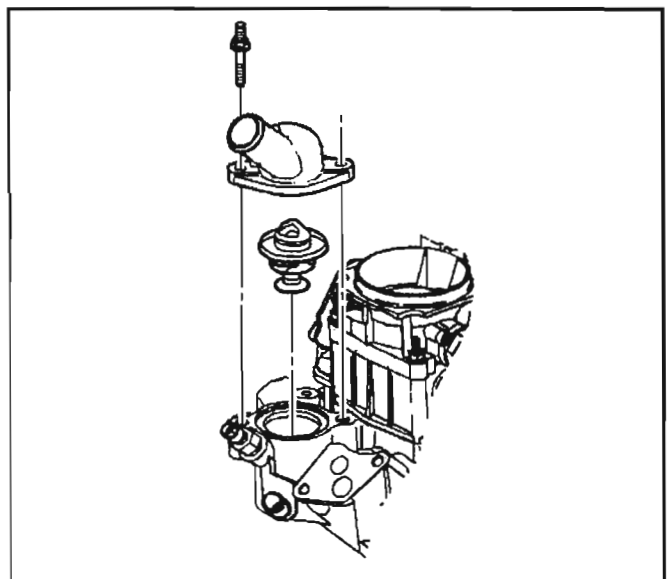


22075

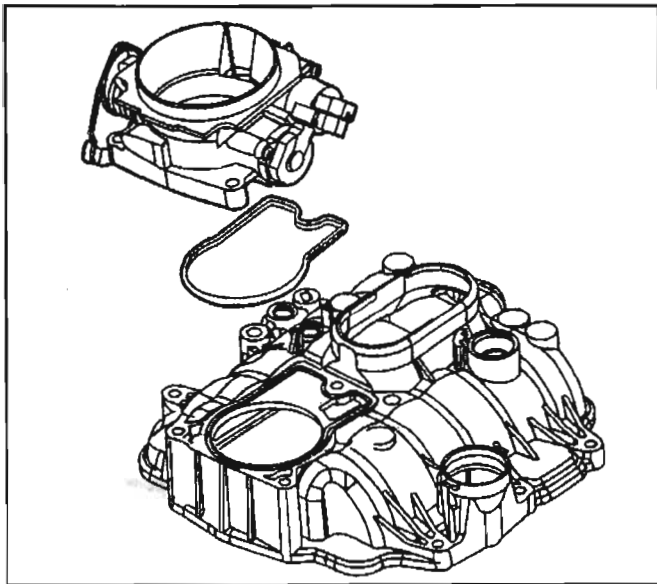
31. Install the engine coolant thermostat.
32. Install the water outlet.
33. Install the water outlet studs.

Tighten

Tighten the water outlet studs to 25 N·m (18 lb ft).

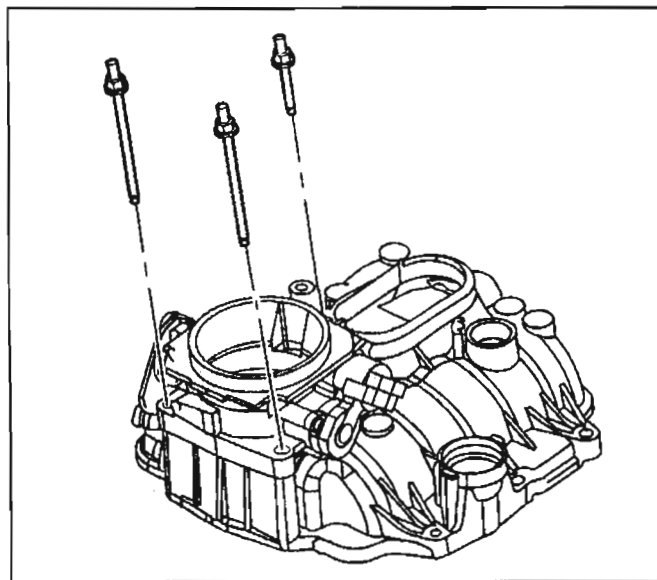


48323



12853

34. Install a NEW throttle body gasket into the groove in the upper intake manifold.
35. Install the throttle body onto the upper intake manifold.

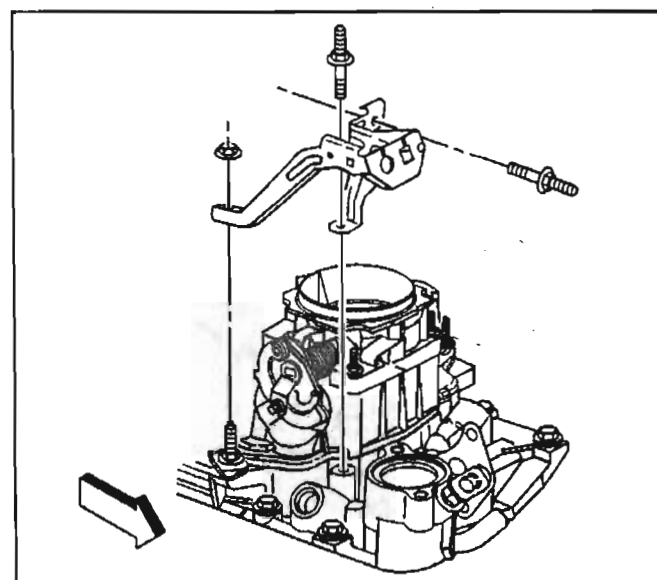


12852

36. If reusing the fasteners, apply threadlock GM P/N 12345382 or equivalent to the threads of the throttle body attaching studs.
37. Install the throttle body attaching studs.

Tighten

Tighten the throttle body attaching studs to 9 N·m (80 lb in).



374902

38. Install the accelerator control cable bracket, the studs, and the nuts.

Tighten

- 38.1. Tighten the accelerator control cable bracket stud to the intake manifold to 6 N·m (53 lb in).
- 38.2. Tighten the accelerator control cable bracket nuts to 12 N·m (106 lb in).
- 38.3. Tighten the accelerator control cable bracket stud to the throttle body to 12 N·m (106 lb in).