LOWER INTAKE MANIFOLD ASSEMBLY REPLACEMENT

Removal Procedure

1. Disconnect the battery.

2. Turn off the fuel supply and fuel return valves located on the fuel tank.

3. Drain the coolant from the engine.

   Note: If there is a hard metal tube running from the top of the air compressor to the left-rear portion of the engine compartment, drain the air tanks.

4. Remove the metal tube from the top of the air compressor if equipped and move it out of the way.

5. Remove the upper intake. Refer to Upper Intake Replacement.

6. Remove the top radiator hose at the thermostat housing.

7. Remove the thermostat housing and thermostats.

8. Reposition the spring clamp on the 1” bypass hose by moving it up off the tube in the water pump. When the front of the intake is pried upwards, the bypass hose should remain on the lower intake.

9. Move the air compressor hose clamp out of the way and remove the 1/2” coolant hose from the rear of the air compressor.

10. Remove the wire ties retaining the engine harness to the intake near the thermostat housing and on the top left side at the coolant crossover.

11. Remove the electrical connector from the fuel bypass solenoid at the rear of the intake manifold.

WARNING: Always wear hand and eye protection when working with LPG fuel line connections to prevent serious personal injury. Always keep away any open flames and any source of ignition when working with the fuel lines. Keep the work area well ventilated.

CAUTION: Use caution when removing the fuel line as residual LPG may be present in the line and under pressure. Carefully loosen the connections to allow any residue to escape before removing the lines.

12. Crack the fuel supply line to relieve residual pressure. The supply line is on the driver side and is the larger of the two that connect to the rear of the intake manifold.

13. When the pressure has been relieved disconnect the fuel system supply line Refer to Fuel Supply Replacement in the OEM Service Manual.

14. Crack the fuel return line to relieve residual pressure.

15. When the pressure has been relieved disconnect the fuel system return line Refer to Fuel Supply Replacement in the OEM Service Manual.

16. Disconnect the chassis harness from the engine harness by rotating the retaining ring and move the chassis harness out of the way.

17. Remove the coolant hose from the tube on the passenger side of the intake.

18. Remove the bolts retaining the engine harness connector support bracket to the
lower intake manifold and move the bracket out of the way.

19. Disconnect the ten way LPG injector electrical connector from the engine harness (left side of the lower intake in the middle).

20. Remove the twelve manifold securing bolts from both sides of the lower intake manifold and discard them.

21. Use a suitable pry tool gently pry up the front of the lower intake manifold. **Use caution**, do not damage sealing surfaces.

22. Using a utility knife to cut through the sealant at the front of the lower intake manifold if needed. One or more of the front-end accessory brackets will have to be removed to do this.

23. Once the seal at the front of the lower intake manifold is broken, continue to lift until the seal at the rear of the intake is broken.

24. Remove the lower intake manifold from the engine.

25. Wipe up any coolant or debris that has spilled into the valley.

26. Place a protective covering in the valley of the engine block to prevent debris from entering the engine.

27. Remove the lower intake manifold gaskets and discard.

28. Block all the openings on the cylinder heads to prevent debris from entering the engine.

29. Clean all of the mounting surfaces to remove any residual sealant, gasket material and debris from the sealing surfaces of the lower intake, cylinder heads and engine block.

30. Clean debris/leftover thread sealant out of the bolt holes in the cylinder heads.

31. Clean the sealing surfaces of the block, heads, and intake manifold with alcohol and a clean lint free cloth to remove any contaminants.

32. Inspect all the sealing surfaces for damage or imperfections.
Installation Procedure

1. Remove the protective covering from the cylinder head intake ports.

   • **Note:** The lower intake requires a thick and thin gasket on each head face. The thin gasket goes against the cylinder head faces. The tabs of the thick gasket will engage in the head gasket slots by themselves. Both gaskets should be aligned with each other and with the bolt holes in the heads.

2. Apply RTV in the four corners and on the front & rear walls prior to installing the gaskets. The bead should be about 3-4mm tall and must not extend along the cylinder head faces.

3. Install the thin gasket against the cylinder head faces. The tabs of the thick gasket will engage in the head gasket slots. Both gaskets should be aligned with each other and with the bolt holes in the heads.

4. Starting at the joint where the cylinder heads, intake gaskets and engine block meet, apply sealant to the to the engine block wall. Be sure to overlap slightly onto the intake gaskets to properly seal the joint.

5. Lower the intake onto the engine block using the bolt holes to align the intake to the engine block.

6. Note: Four passes are required to properly torque the lower intake manifold bolts. Use the new intake bolts provided (grade 5 – if already grade 5, refresh the thread sealant on the threads).

7. Hand-start all the bolts starting with the outboard fasteners first to make sure the gaskets are in the correct location. Hand-start the bolts by 2 turns to ensure the bolts are engaged.

8. Run the bolts down on the lower intake using the torque sequence until the bolt flanges are contacting the intake spot-faces.

9. Tighten the intake manifold bolts (1–12) in sequence, using four passes. The sequence is shown below:

   • Tighten the intake manifold bolts (1–12) in sequence to **20 Nm (15 ft lb)** on the first pass.

   • Tighten the intake manifold bolts (1–12) in sequence to **33 Nm (25 ft lb)** on the second pass.

   • Tighten the intake manifold bolts (1–12) a final pass in sequence to **47 Nm (35 ft lb)**.
8.0 Liter Lower Intake Manifold Assembly Replacement

- Tighten the intake manifold bolts (1–12) a final pass in sequence to 47 Nm (35 ft lb) again.

10. Connect the ten way LPG injector connector to the engine harness (left side of manifold).

11. Align the engine harness connector support bracket to the lower intake manifold and install the retaining bolts. Torque to 28 Nm (21 ft-lb)

12. Attach the coolant hose to the tube on the left side of the intake manifold.

13. Align the connector for the chassis harness to the connector for the engine harness and connect to the engine harness by rotating the retaining ring.

**WARNING:** Always wear hand and eye protection when working with LPG fuel line connections to prevent serious personal injury. Always keep away any open flames and any source of ignition when working with the fuel lines. Keep the work area well ventilated.

**CAUTION:** Use caution when removing the fuel line as residual LPG may be present in the line and under pressure. Carefully loosen the connections to allow any residue to escape before removing the lines.

14. Connect the fuel supply and return lines.

15. Open the fuel supply and return valves at the LPG fuel tank.

16. Inspect for leaks at the fuel supply and return lines at the rear of the lower intake manifold.

17. Install the electrical connector to the bypass solenoid at the rear of the intake manifold.

18. Install the wire ties retaining the engine harness to the intake near the thermostat housing and on the top left side at the coolant crossover.

19. Install the bypass hose to the water pump and intake manifold. Make sure the spring clamps are over the tube sealing beads and will not interfere with the accessory belt.

20. Install the thermostat housing and thermostats. Torque the four bolts to 11 Nm (100 lb-in).

21. Install the top radiator hose at the thermostat housing.

22. Replace the upper intake. Refer to Upper Intake Replacement.

23. Fill the engine with coolant.

24. Reconnect the air discharge tube to the top of the air compressor (if necessary).

25. Close the valves on the air tanks, if necessary.

26. Connect the battery.

27. Start the engine and check for leaks.

28. Let the engine cool down and top off coolant as necessary.