EXHAUST SYSTEM AND INTAKE MANIFOLD

CONTENTS

GENERAL INFORMATION

EXHAUST SYSTEM

The basic exhaust system consists of exhaust manifold(s), exhaust pipe with oxygen sensor, catalytic converter, heat shield(s), muffler and tailpipe (Fig. 1) (Fig. 2).

The exhaust system uses a single muffler with a single monolithic-type catalytic converter.

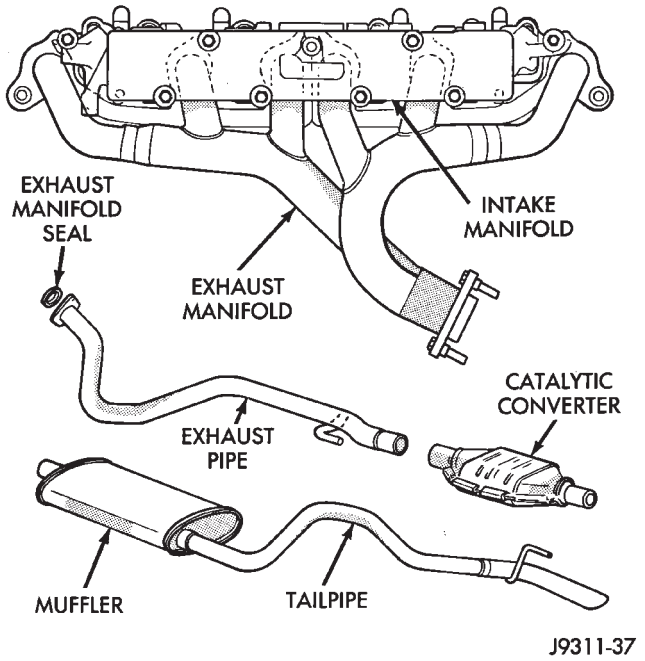

Fig. 1 Exhaust System—4.0L

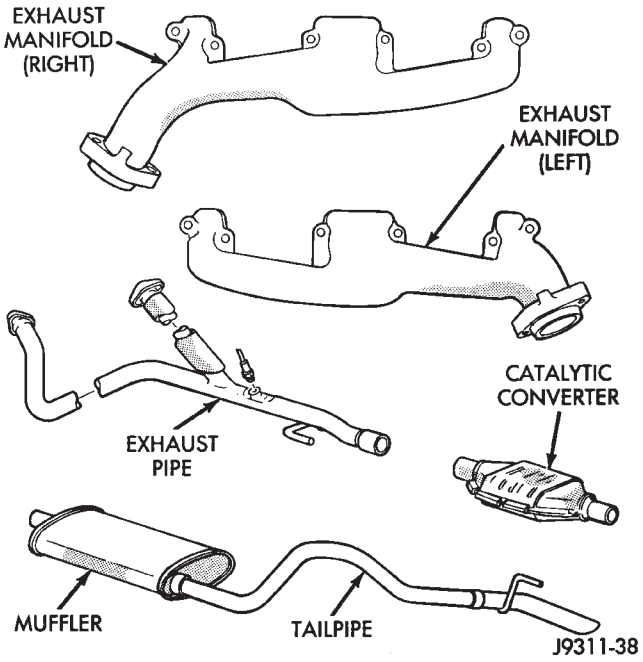

Fig. 2 Exhaust System—5.2L/5.9L

The 4.0L engines use a seal between the exhaust manifold and exhaust pipe to assure a tight seal and strain free connections.

The 5.2L/5.9L exhaust manifolds are equipped with ball flange outlets to assure a tight seal and strain free connections.

The exhaust system must be properly aligned to prevent stress, leakage and body contact. If the system contacts any body panel, it may amplify objectionable noises originating from the engine or body.

When inspecting an exhaust system, critically inspect for cracked or loose joints, stripped screw or

GENERAL INFORMATION (Continued)

bolt threads, corrosion damage and worn, cracked or broken hangers. Replace all components that are badly corroded or damaged. DO NOT attempt to repair.

When replacement is required, use original equipment parts (or their equivalent). This will assure proper alignment and provide acceptable exhaust noise levels.

CAUTION: Avoid application of rust prevention compounds or undercoating materials to exhaust system floor pan heat shields. Light over spray near the edges is permitted. Application of coating will result in excessive floor pan temperatures and objectionable fumes.

CATALYTIC CONVERTER

CAUTION: DO NOT remove spark plug wires from plugs or by any other means short out cylinders. Failure of the catalytic converter can occur due to a temperature increase caused by unburned fuel passing through the converter.

The stainless steel catalytic converter body is designed to last the life of the vehicle. Excessive heat can result in bulging or other distortion, but excessive heat will not be the fault of the converter. If unburned fuel enters the converter, overheating may occur. If a converter is heat-damaged, correct the cause of the damage at the same time the converter is replaced. Also, inspect all other components of the exhaust system for heat damage.

Unleaded gasoline must be used to avoid contaminating the catalyst core.

HEAT SHIELDS

Heat shields are needed to protect both the vehicle and the environment from the high temperatures developed by the catalytic converter (Fig. 3) (Fig. 4). The catalytic converter releases additional heat into the exhaust system. Under severe operating conditions, the temperature increases in the area of the converter. Such conditions can exist when the engine misfires or otherwise does not operate at peak efficiency.

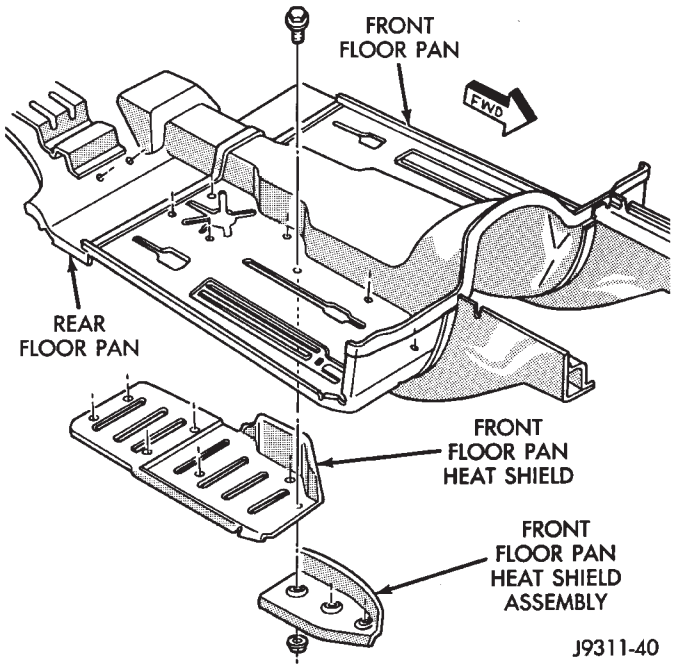

Fig. 3 Front Floor Pan Heat Shield

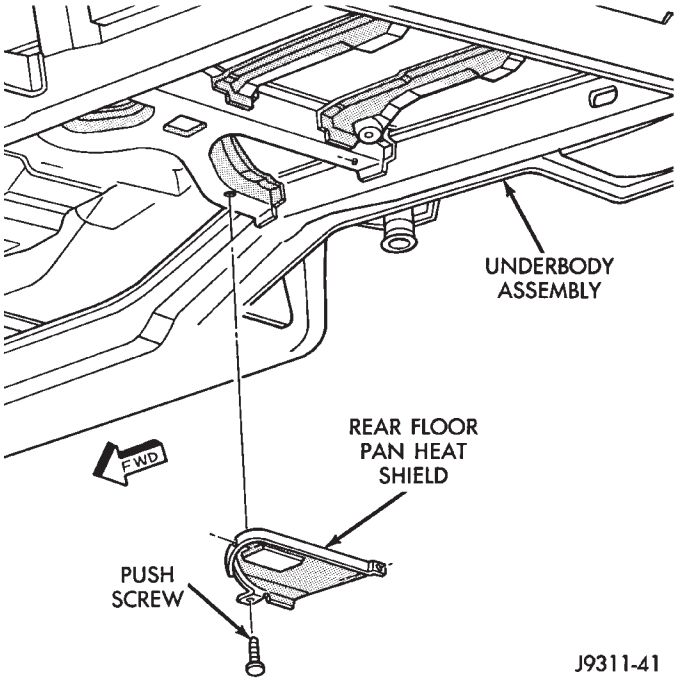

Fig. 4 Rear Floor Pan Heat Shield

DIAGNOSIS AND TESTING

EXHAUST SYSTEM DIAGNOSIS

CONDITION	POSSIBLE CAUSE	CORRECTION
EXCESSIVE EXHAUST NOISE	1. Leaks at pipe joints.	1. Tighten clamps at leaking joints.
	2. Burned or blown out muffler.	2. Replace muffler assembly. Check exhaust system.
	3. Burned or rusted-out exhaust pipe.	3. Replace exhaust pipe.
	4. Exhaust pipe leaking at manifold flange.	4. Tighten connection attaching nuts.
	5. Exhaust manifold cracked or broken.	5. Replace exhaust manifold.
	6. Leak between exhaust manifold and cylinder head.	6. Tighten exhaust manifold to cylinder head stud nuts or bolts.
	7. Restriction in muffler or tailpipe.	7. Remove restriction, if possible. Replace muffler or tailpipe, as necessary.
	8. Exhaust system contacting body or chassis.	8. Re-align exhaust system to clear surrounding components.
LEAKING EXHAUST GASES	1. Leaks at pipe joints.	1. Tighten/replace clamps at leaking joints.
	2. Damaged or improperly installed gaskets.	2. Replace gaskets as necessary

REMOVAL AND INSTALLATION

EXHAUST PIPE

REMOVAL

WARNING: IF TORCHES ARE USED WHEN WORKING ON THE EXHAUST SYSTEM, DO NOT ALLOW THE FLAME NEAR THE FUEL LINES.

CAUTION: When servicing exhaust system components, disconnect the oxygen sensor connector(s). Allowing the exhaust system to hang by the oxygen sensor harness will damage the sensor and/or wiring.

(1) Raise and support the vehicle.

(2) Saturate the bolts and nuts with heat valve lubricant. Allow 5 minutes for penetration.

(3) Remove the oxygen sensor from the exhaust pipe (Fig. 5) (Fig. 6).

(4) Disconnect the exhaust pipe from the engine exhaust manifold. On 4.0L engines, discard the exhaust manifold seal (Fig. 5).

(5) Remove the exhaust clamp from the exhaust pipe and catalytic converter connection (Fig. 5) (Fig. 6). Disconnect the exhaust pipe from the catalytic converter. If needed:

(a) Heat the exhaust pipe and catalytic converter connection with an torch until the metal becomes cherry red.

(b) While the metal is still cherry red, twist the exhaust pipe back and forth to separate it from the catalytic converter.

(6) Disconnect the exhaust pipe hanger from the rear mount bracket insulator.

(7) Remove the exhaust pipe.

INSTALLATION

(1) Position the exhaust pipe onto the catalytic converter.

(2) Connect the exhaust pipe hanger to the rear mount bracket insulator.

(3) On 4.0L engines, install a new seal between the exhaust pipe and the engine exhaust manifold (Fig. 5). Connect the exhaust pipe to the engine exhaust manifold. Tighten the nuts to 31 N·m (23 ft. lbs.) torque.

(4) Position the exhaust clamp over the exhaust pipe/catalytic converter connection (Fig. 5) (Fig. 6). Tighten the nuts to 48 N·m (35 ft. lbs.) torque.

(5) Coat the oxygen sensor with anti-seize compound. Install the sensor and tighten the nut to 30 N·m (22 ft. lbs.) torque.

(6) Lower the vehicle.

(7) Start the engine and inspect for exhaust leaks and exhaust system contact with the body panels. Adjust the alignment, if needed.

(8) After initial start-up, check the exhaust manifold to pipe nuts for proper torque.

REMOVAL AND INSTALLATION (Continued)

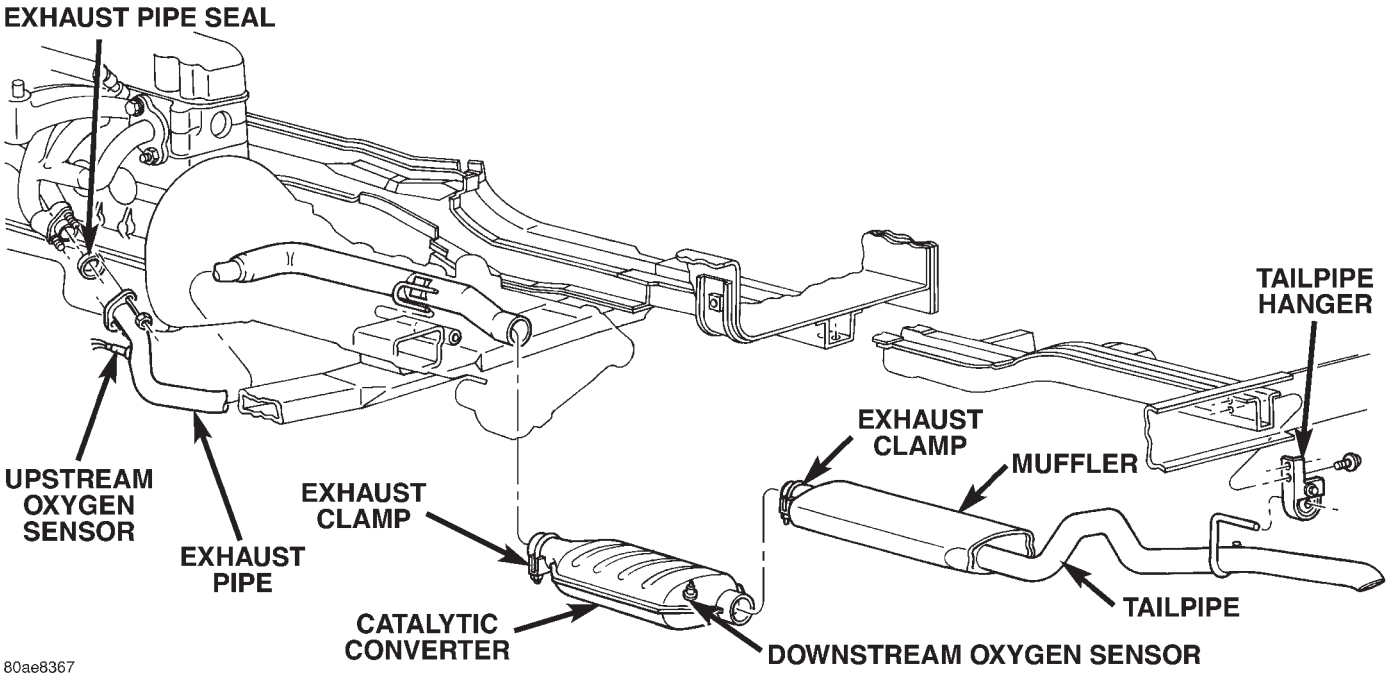

Fig. 5 Exhaust System—4.0L Engine

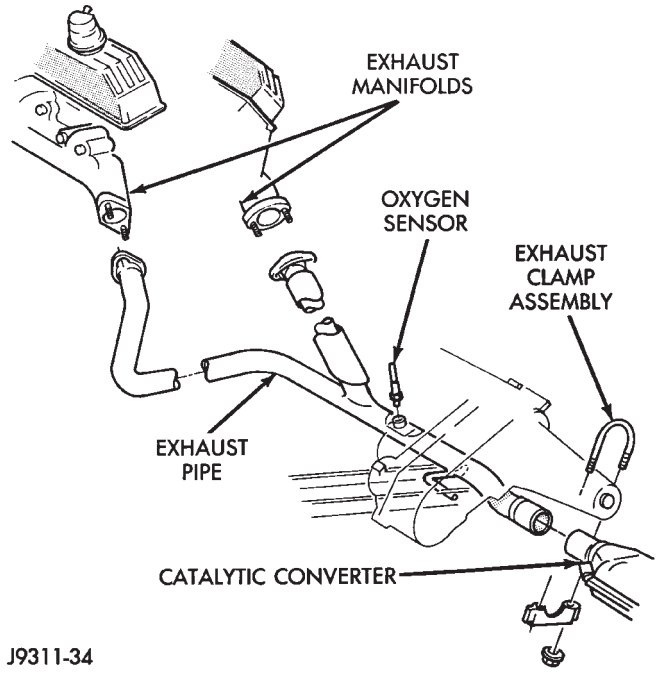

Fig. 6 Exhaust Pipe—5.2L/5.9L Engines

CATALYTIC CONVERTER

REMOVAL

WARNING: IF TORCHES ARE USED WHEN WORKING ON THE EXHAUST SYSTEM, DO NOT ALLOW THE FLAME NEAR THE FUEL LINES.

(1) Raise and support the vehicle.

(2) Saturate the bolts and nuts with heat valve lubricant. Allow 5 minutes for penetration.

(3) Remove exhaust clamp from the catalytic converter and exhaust pipe connection (Fig. 7).

(4) Remove exhaust clamp from the catalytic converter and muffler connection (Fig. 7).

(5) Disconnect oxygen sensor wiring.

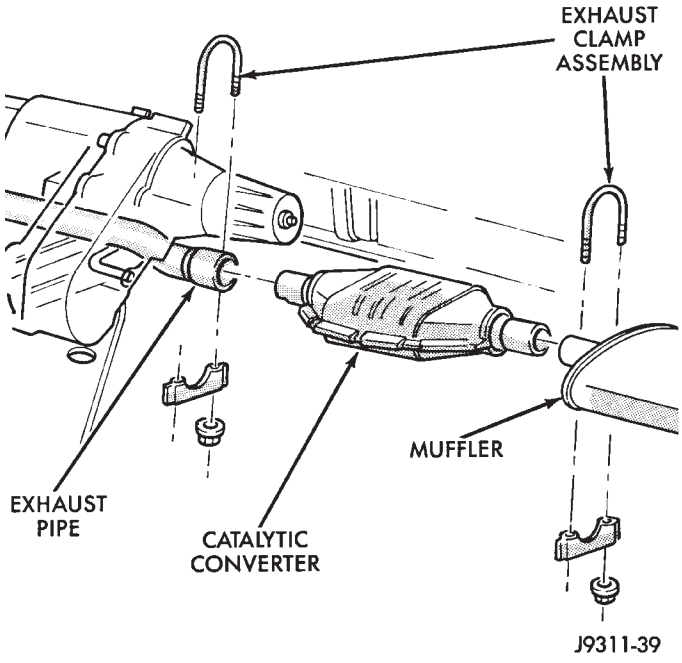

Fig. 7 Exhaust Pipe-to-Catalytic Converter-to-Muffler Connection

(6) Heat the exhaust pipe, catalytic converter and muffler connections with an torch until the metal becomes cherry red.

REMOVAL AND INSTALLATION (Continued)

(7) While the metal is still cherry red, twist the catalytic converter back and forth to separate it from the exhaust pipe and the muffler.

INSTALLATION

(1) Position the exhaust clamp over the exhaust pipe/catalytic converter connection (Fig. 7). Tighten the nuts to 61 N·m (45 ft. lbs.) torque.

(2) Install the muffler onto the catalytic converter until the alignment tab is inserted into the alignment slot.

(3) Install the exhaust clamp at the muffler and catalytic converter connection (Fig. 7). Tighten the clamp nuts to 61 N·m (45 ft. lbs.) torque.

(4) Connect oxygen sensor wiring.

(5) Lower the vehicle.

(6) Start the engine and inspect for exhaust leaks and exhaust system contact with the body panels. Adjust the alignment, if needed.

MUFFLER AND TAILPIPE

REMOVAL

All original equipment exhaust systems are manufactured with the tailpipe welded to the muffler. Service replacement mufflers and tailpipes are either clamped together or welded together.

WARNING: IF TORCHES ARE USED WHEN WORKING ON THE EXHAUST SYSTEM, DO NOT ALLOW THE FLAME NEAR THE FUEL LINES.

(1) Raise and support the vehicle.

(2) Saturate the bolts and nuts with heat valve lubricant. Allow 5 minutes for penetration.

(3) Remove the exhaust clamp from the catalytic converter and muffler connection (Fig. 7).

(4) Heat the catalytic converter-to-muffler connection with an torch until the metal becomes cherry red.

(5) While the metal is still cherry red, remove the tailpipe/muffler assembly from the catalytic converter.

(6) Remove the tailpipe from the tailpipe hanger (Fig. 8).

(7) Remove the tailpipe/muffler assembly.

INSTALLATION

(1) If the tailpipe hanger assembly was removed, install the hanger to the frame. Tighten the bolts to 22 N·m (192 in. lbs.) torque.

(2) Position the tailpipe and muffler onto the tailpipe hanger (Fig. 8).

(3) Install the muffler onto the catalytic converter. Make sure that the tailpipe has sufficient clearance from the floor pan. Install exhaust clamp and tighten the nuts to 61 N·m (45 ft. lbs.) torque.

(4) Lower the vehicle.

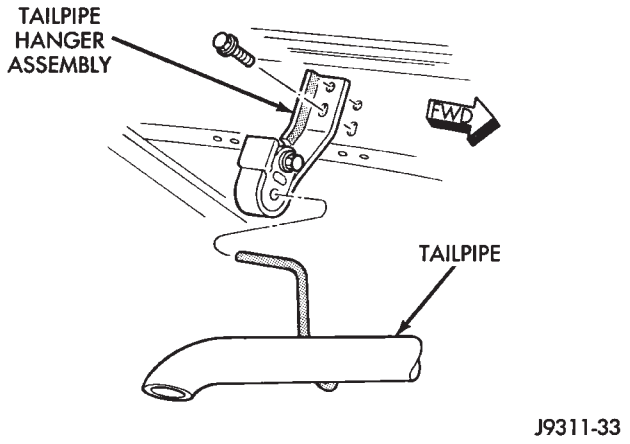

Fig. 8 Tailpipe Hanger

(5) Start the engine and inspect for exhaust leaks and exhaust system contact with the body panels. Adjust the alignment, if needed.

INTAKE AND EXHAUST MANIFOLD—4.0L ENGINE

REMOVAL

NOTE: THE ENGINE INTAKE AND EXHAUST MANIFOLD MUST BE REMOVED AND INSTALLED TOGETHER. THE MANIFOLDS USE A COMMON GASKET AT THE CYLINDER HEAD.

(1) Disconnect the battery negative cable.

(2) Remove air cleaner inlet hose from throttle body assembly.

(3) Remove the air cleaner assembly.

(4) Remove the throttle cable, vehicle speed control cable (if equipped) and the transmission line pressure cable.

(5) Disconnect the following electrical connections and secure their harness out of the way:

- Throttle Position Sensor
- Idle Air Control Motor
- Coolant Temperature Sensor (at thermostat housing)
- Intake Air Temperature Sensor
- Oxygen Sensor
- Crank Position Sensor
- Six (6) Fuel Injector Connectors

(6) Disconnect the Map Sensor, HVAC, and Brake Booster vacuum supply hoses at the intake manifold.

(7) Perform the fuel pressure release procedure. (Refer to Group 14, Fuel Systems for correct procedure)

(8) Disconnect and remove the fuel system supply line from the fuel rail assembly. (Refer to Group 14, Quick Connect Fittings for correct procedures)

(9) Loosen the accessory drive belt (refer to Group 7, Cooling System). Loosen the tensioner.

(10) Remove the power steering pump and bracket from the intake manifold and set aside.

REMOVAL AND INSTALLATION (Continued)

(11) Raise the vehicle.

(12) Disconnect the exhaust pipe from the engine exhaust manifold. Discard the seal.

(13) Lower the vehicle.

(14) Remove the intake manifold and engine exhaust manifold.

INSTALLATION

If the manifold is being replaced, ensure all the fitting, etc. are transferred to the replacement manifold.

(1) Install a new engine exhaust/intake manifold gasket over the alignment dowels on the cylinder head.

(2) Position the engine exhaust manifold to the cylinder head. Install fastener Number 3 and finger tighten at this time (Fig. 9).

(3) Install intake manifold on the cylinder head dowels.

(4) Install washer and fastener Numbers 1, 2, 4, 5, 8, 9, 10 and 11 (Fig. 9).

(5) Install washer and fastener Numbers 6 and 7 (Fig. 9).

(6) Tighten the fasteners in sequence and to the specified torque (Fig. 9).

- Fastener Numbers 1 through 5—Tighten to 33 N·m (24 ft. lbs.) torque.
- Fastener Numbers 6 and 7—Tighten to 31 N·m (23 ft. lbs.) torque.
- Fastener Numbers 8 through 11—Tighten to 33 N·m (24 ft. lbs.) torque.

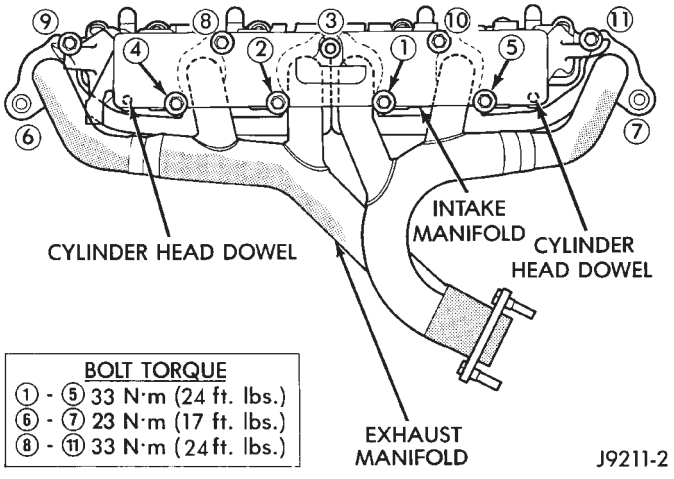

Fig. 9 Engine Exhaust/Intake Manifold

(7) Install the power steering pump and bracket to the intake manifold. Tighten the belt to specification. (Refer to Group 7, Cooling System for the correct procedures)

(8) Install the fuel system supply line to the fuel rail assembly. **Before connecting the fuel supply line to the fuel rail inspect the O-rings and replace if necessary. Refer to Group 14, Fuel System for the correct procedure.**

(9) Connect all electrical connections on the intake manifold.

(10) Connect the vacuum hoses previously removed.

(11) Install throttle cable, vehicle speed control cable (if equipped).

(12) Install the transmission line pressure cable (if equipped). Refer to Group 21, Transmission for the adjustment procedures.

(13) Install air cleaner assembly.

(14) Connect air inlet hose to the throttle body assembly.

(15) Raise the vehicle.

(16) Using a new exhaust manifold seal, connect the exhaust pipe to the engine exhaust manifold. Tighten the bolts to 31 N·m (23 ft. lbs.)

(17) Lower the vehicle.

(18) Connect the battery negative cable.

(19) Start the engine and check for leaks.

INTAKE MANIFOLD—5.2/5.9L ENGINE

REMOVAL

The aluminum intake manifold is a single plane design with equal length runners. The manifold is sealed by flange side gaskets with front and rear cross-over gaskets. The intake manifold has internal EGR.

(1) Disconnect the battery negative cable.

(2) Drain the cooling system (refer to Group 7, Cooling System for the proper procedures).

(3) Remove the generator (refer to Group 8B Battery/Starting/Charging Systems).

(4) Remove the air cleaner.

(5) Remove the fuel supply line and fuel rail (refer to Group 14, Fuel System).

(6) Disconnect the accelerator linkage and, if so equipped, the speed control and transmission kickdown cables.

(7) Remove the distributor cap and wires.

(8) Disconnect the coil wires.

(9) Disconnect the heat indicator sending unit wire.

(10) Disconnect the heater hoses and bypass hose.

(11) Remove the closed crankcase ventilation and evaporation control systems.

(12) Remove the A/C compressor bolts and set the compressor on the fan shroud.

(13) Remove the support bracket from the intake manifold and the mounting bracket.

(14) Remove intake manifold bolts.

(15) Lift the intake manifold and throttle body out of the engine compartment as an assembly.

(16) Remove and discard the flange side gaskets and the front and rear cross-over gaskets.

REMOVAL AND INSTALLATION (Continued)

(17) Remove the throttle body bolts and lift the throttle body off the intake manifold. Discard the throttle body gasket.

(18) Remove the plenum pan as follows:

(a) Turn the intake manifold upside down. Support the manifold.

(b) Remove the bolts and lift the pan off the manifold. Discard the gasket.

INSTALLATION

(1) Install the plenum pan, if removed, as follows:

(a) Turn the intake manifold upside down. Support the manifold.

(b) Place a new plenum pan gasket onto the seal rail of the intake manifold. Position the pan over the gasket. Align all the gasket and pan holes with the intake manifold.

(c) Hand start all bolts.

(d) Tighten the bolts, in sequence (Fig. 10), as follows:

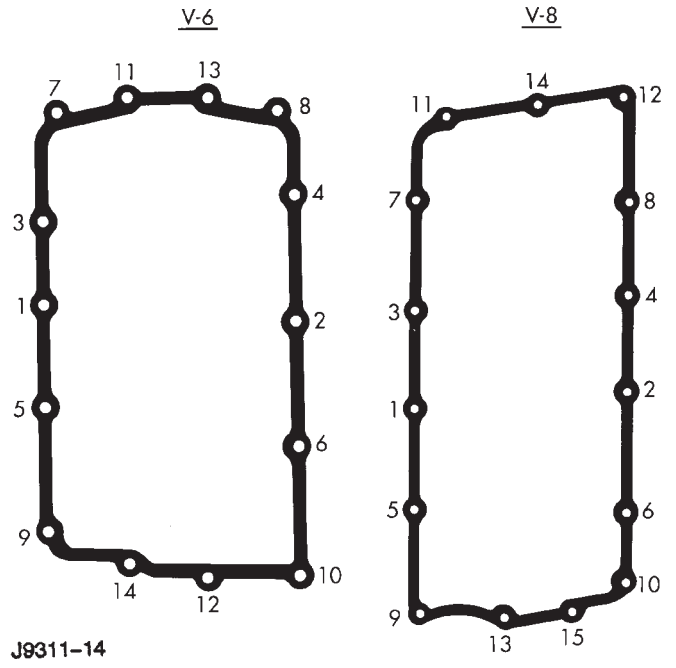

Fig. 10 Plenum Pan Bolt Tightening Sequence

- Step 1—Tighten bolts to 2.7 N·m (24 in. lbs.) torque.
- Step 2—Tighten bolts to 5.4 N·m (48 in. lbs.) torque.
- Step 3—Tighten bolts to 9.5 N·m (84 in. lbs.) torque.
- Step 4—Check that all bolts are tighten to 9.5 N·m (84 in. lbs.) torque.

(2) Using a new gasket, install the throttle body onto the intake manifold. Tighten the bolts to 23 N·m (200 in. lbs.) torque.

(3) Place the 4 plastic locator dowels into the holes in the block (Fig. 11).

(4) Apply Mopar® Silicone Rubber Adhesive Sealant, or equivalent, to the four corner joints. An excessive amount of sealant is not required to ensure a leak proof seal. However, an excessive amount of sealant may reduce the effectiveness of the flange gasket. The sealant should be slightly higher than the cross-over gaskets, approximately 5 mm (0.2 in).

(5) Install the front and rear cross-over gaskets onto the dowels (Fig. 11).

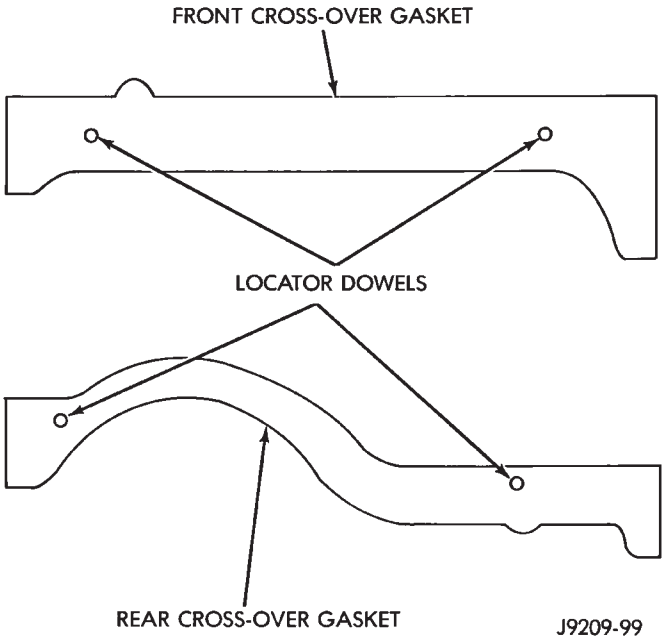

Fig. 11 Cross-Over Gaskets and Locator Dowels

(6) Install the flange gaskets. Ensure that the vertical port alignment tab is resting on the deck face of the block. Also the horizontal alignment tabs must be in position with the mating cylinder head gasket tabs (Fig. 12). The words MANIFOLD SIDE should be visible on the center of each flange gasket.

(7) Carefully lower intake manifold into position on the cylinder block and cylinder heads. Use the alignment dowels in the cross-over gaskets to position the intake manifold. After intake manifold is in place, inspect to make sure seals are in place.

(8) The following torque sequence duplicates the expected results of the automated assembly system (Fig. 13).

- Step 1—Tighten bolts 1 through 4, in sequence, to 8 N·m (72 in. lbs.) torque. Tighten in alternating steps 1.4 N·m (12 in. lbs.) torque at a time.
- Step 2—Tighten bolts 5 through 12, in sequence, to 8 N·m (72 in. lbs.) torque.
- Step 3—Check that all bolts are tighten to 8 N·m (72 in. lbs.) torque.
- Step 4—Tighten all bolts, in sequence, to 16 N·m (12 ft. lbs.) torque.
- Step 5—Check that all bolts are tighten to 16 N·m (12 ft. lbs.) torque.

REMOVAL AND INSTALLATION (Continued)

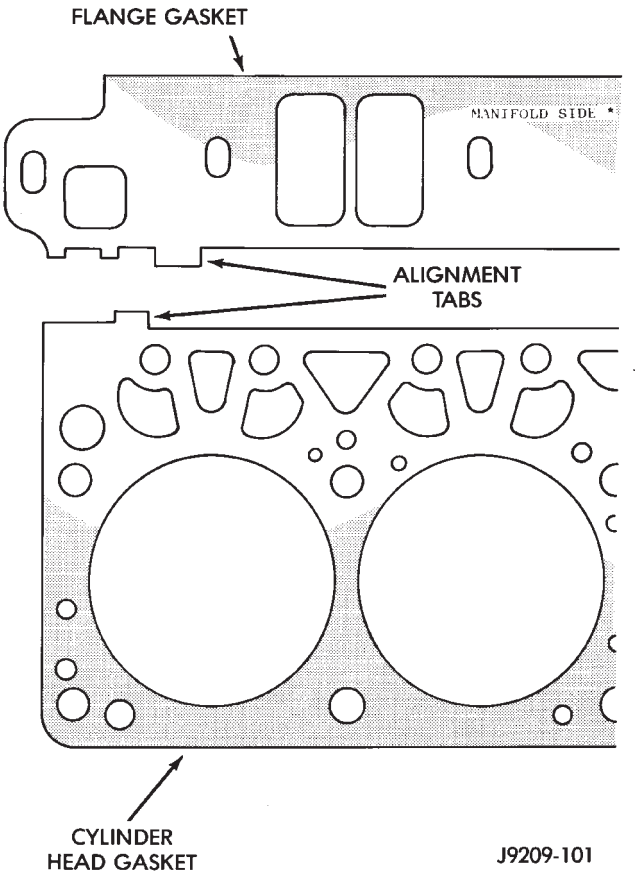

Fig. 12 Intake Manifold Flange Gasket Alignment

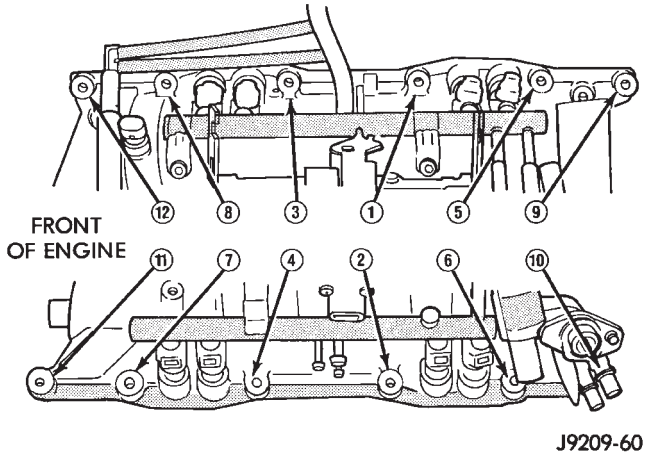

Fig. 13 Intake Manifold Bolt Tightening Sequence

(9) Install closed crankcase ventilation and evaporation control systems.

(10) Install the coil wires.

(11) Connect the heat indicator sending unit wire.

(12) Connect the heater hoses and bypass hose.

(13) Install distributor cap and wires.

(14) Hook up the return spring.

(15) Connect the accelerator linkage and, if so equipped, the speed control and transmission kickdown cables.

(16) Install the fuel lines and fuel rail (refer to Group 14, Fuel System).

(17) Install the support bracket to the intake manifold and the mounting bracket.

(18) Install the generator and drive belt. Tighten generator mounting bolt to 41 N·m (30 ft. lbs.) torque. Tighten the adjusting strap bolt to 23 N·m (200 in. lbs.) torque. Refer to Group 7, Cooling System for the proper adjusting of belt tension.

(19) Install the A/C compressor on the mounting bracket (refer to Group 24, Heating and Air Conditioning).

(20) Install the air cleaner.

(21) Fill cooling system (refer to Group 7, Cooling System for the proper procedure).

(22) Connect the battery negative cable.

EXHAUST MANIFOLD—5.2/5.9L ENGINE

REMOVAL

Exhaust manifolds are LOG type with balanced flow.

(1) Disconnect the negative cable from the battery.

(2) Remove the exhaust manifold heat shields (Fig. 14).

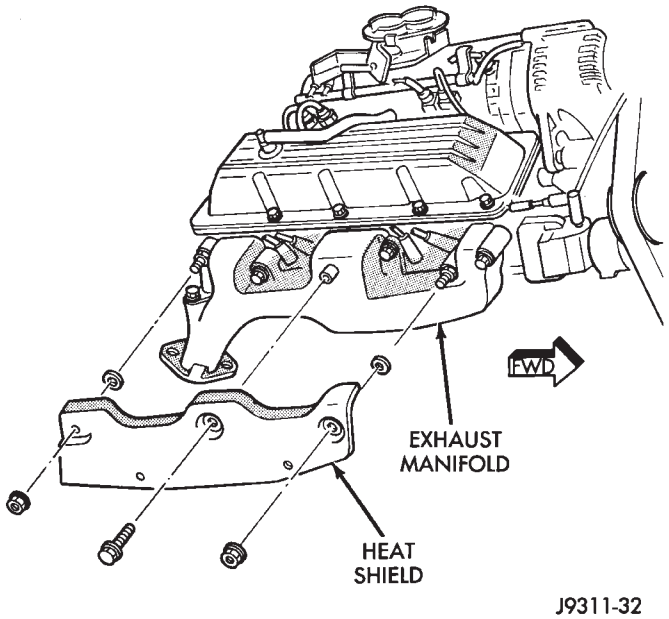

Fig. 14 Exhaust Manifold Heat Shields (Left Shield Shown)

(3) Remove the EGR tube (refer to Group 25, Emission Control Systems).

(4) Raise the vehicle.

(5) Remove the bolts and nuts attaching the exhaust pipe to the exhaust manifold.

(6) Lower the vehicle.

(7) Remove bolts, nuts and washers attaching manifold to cylinder head.

(8) Remove manifold from the cylinder head.

REMOVAL AND INSTALLATION (Continued)

INSTALLATION

CAUTION: If the studs came out with the nuts when removing the exhaust manifold, install new studs.

(1) Position the exhaust manifolds on the two studs located on the cylinder head. Install conical washers and nuts on these studs (Fig. 15).

(2) Install new bolt and washer assemblies in the remaining holes (Fig. 15). Start at the center arm and work outward. Tighten the bolts and nuts to 27 N·m (20 ft. lbs.) torque.

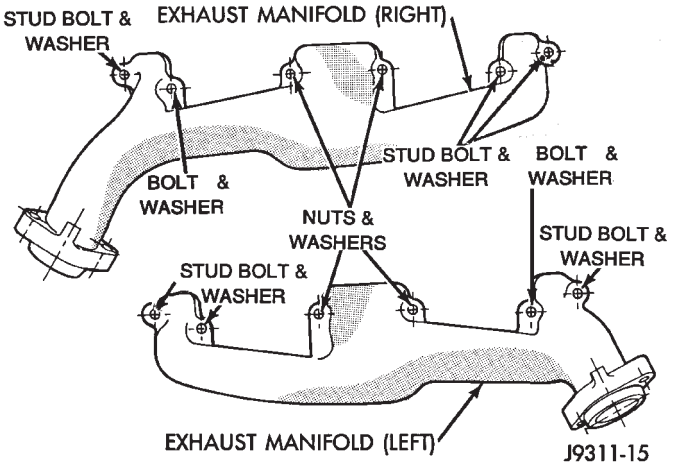

Fig. 15 Exhaust Manifold

(3) Raise the vehicle.

(4) Assemble the exhaust pipe to the exhaust manifold and secure with bolts, nuts and washers. Tighten these nuts to 31 N·m (23 ft. lbs.) torque.

(5) Lower the vehicle.

(6) Install the EGR tube (refer to Group 25, Emission Control Systems).

CAUTION: The exhaust manifold heat shields MUST be installed to protect the underhood components.

(7) Install the exhaust manifold heat shields. Tighten the nuts to 27 N·m (20 ft. lbs.) torque.

(8) Connect the negative cable to the battery.

CLEANING AND INSPECTION

INTAKE AND EXHAUST MANIFOLD—4.0L ENGINE

Clean the mating surfaces of the cylinder head and the manifold if the original manifold is to be installed.

INTAKE MANIFOLD— 5.2/5.9L ENGINE

CLEANING

Clean manifold in solvent and blow dry with compressed air.

Clean cylinder block front and rear gasket surfaces using a suitable solvent.

The plenum pan rail must be clean and dry (free of all foreign material).

INSPECTION

Inspect manifold for cracks.

Inspect mating surfaces of manifold for flatness with a straightedge.

EXHAUST MANIFOLD—5.2/5.9L ENGINE

CLEANING

Clean mating surfaces on cylinder head and manifold, wash with solvent and blow dry with compressed air. Inspect manifold for cracks.

INSPECTION

Inspect mating surfaces of manifold for flatness with a straight edge. Seal surfaces must be flat within 0.1 mm (0.004 inch) overall.

SPECIFICATIONS

TORQUE

DESCRIPTION	TORQUE
Catalytic Converter to Exhaust Pipe	
Exhaust Clamp	48 N·m (35 ft. lbs.)
Exhaust Pipe to Manifold	
Nuts	31 N·m (23 ft. lbs.)
Exhaust Manifold Heat Shield–(5.2L/5.9L)	
Nuts	27 N·m (20 ft. lbs.)
Exhaust Manifold–(5.2L/5.9L)	
Nuts/Bolts	27 N·m (20 ft. lbs.)
Floor Pan Heat Shield	
Bolts/Nuts	5 N·m (45 in. lbs.)
Generator Mounting	
Bolts	41 N·m (30 ft. lbs.)
Intake/Exhaust Manifold—(4.0L)	
Intake/Exhaust Manifold Nuts/Bolts #1,2,4,5,8–11	33 N·m (24 ft.lbs.)
Exhaust Manifold Bolt #3	33 N·m (24 ft. lbs.)
Exhaust Manifold Nuts #6&7	31 N·m (23 ft. lbs.)
Intake Manifold–(5.2L/5.9L)	
Bolts	Refer to Procedure in This Section
Muffler to Catalytic Converter	
Exhaust Clamp	48 N·m (35 ft. lbs.)
Oxygen Sensor	
Sensor	30 N·m (22 ft. lbs.)
Plenum Pan–(5.2L/5.9L)	
Bolts	Refer to Procedure in This Section
Rear Tailpipe Hanger	
Bolts	22 N·m (192 in. lbs.)