EXHAUST SYSTEM AND INTAKE MANIFOLD

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GENERAL INFORMATION

EXHAUST SYSTEM

The exhaust systems are produced in several configurations, depending on engine and vehicle (Fig. 1). AWD vehicles have a catalytic converter mounted heat shield. The tailpipes, mufflers, and resonators are tuned to each vehicle/powertrain combination.

CATALYTIC CONVERTERS

There is no regularly scheduled maintenance on any Chrysler catalytic converter. If damaged, the converter must be replaced.

CAUTION: Due to exterior physical similarities of some catalytic converters with pipe assemblies, extreme care should be taken with replacement parts. There are internal converter differences required in some parts of the country.

The combustion reaction caused by the catalyst releases additional heat in the exhaust system. Causing temperature increases in the area of the reactor under severe operating conditions. Such conditions can exist when the engine misfires or otherwise does not operate at peak efficiency. **Do not** remove spark plug wires from plugs or by any other means short out cylinders of the exhaust system if equipped with

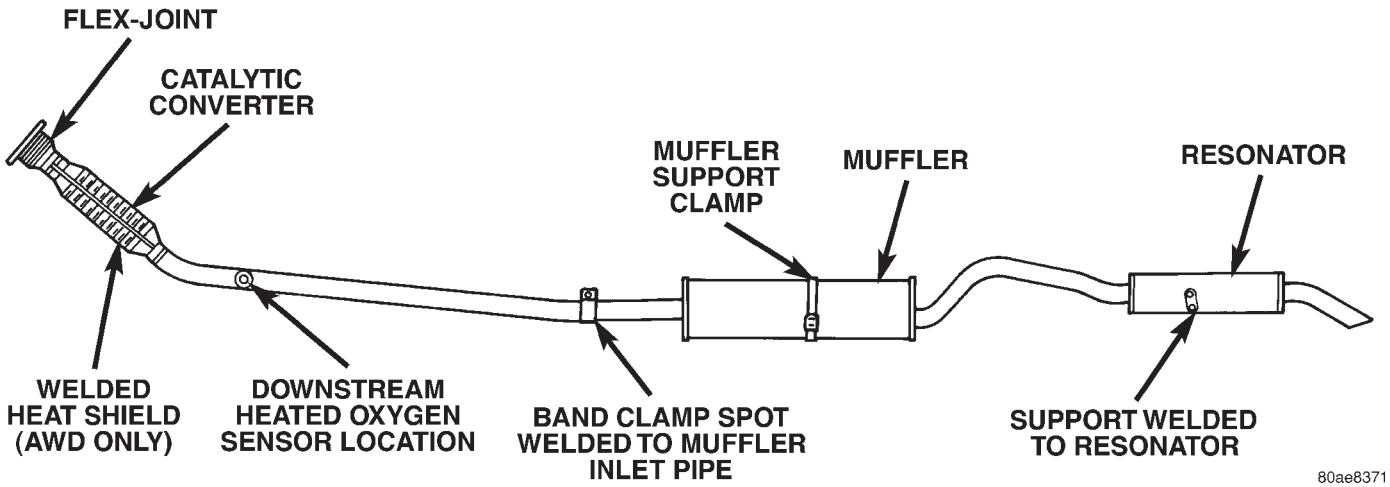

Fig. 1 Exhaust System—Typical (All Vehicles)

GENERAL INFORMATION (Continued)

a catalytic converter. Failure of the catalytic converter can occur due to temperature increases caused by unburned fuel igniting when passing through the converter.

The use of the catalysts also involves some non-automotive problems. Unleaded gasoline must be used to avoid poisoning the catalyst core. Do not allow engine to operate at fast idle for extended periods (over 5 minutes). This condition may result in excessive exhaust system and floor pan temperatures.

EXHAUST GAS RECIRCULATION (EGR)

To assist in the control of oxides of nitrogen (NOx) in engine exhaust, all engines are equipped with an exhaust gas recirculation system. The use of exhaust gas to dilute incoming air/fuel mixtures lowers peak flame temperatures during combustion, thus limiting the formation of NOx.

Exhaust gases are taken from opening in the exhaust manifold passage to the intake manifold. REFER TO SECTION 25 FOR A COMPLETE DESCRIPTION, DIAGNOSIS AND SERVICE PROCEDURES ON THE EXHAUST GAS RECIRCULATION SYSTEM AND COMPONENTS.

HEAT SHIELDS

Heat shields (Fig. 2) are needed to protect both the vehicle and the floor pan from the high temperatures developed near the catalytic converter and muffler.

Avoid application of rust prevention compounds or undercoating materials to exhaust system floor pan heat shields on cars so equipped. Light over spray near the edges is permitted. Application of coating will greatly reduce the efficiency of the heat shields resulting in excessive floor pan temperatures and objectionable fumes.

EXHAUST FLEX-JOINT COUPLING

A exhaust flex-joint coupling (Fig. 3) is used to secure the catalytic converter to the engine manifold. This living joint actually moves back and forth as the engine moves, preventing breakage that could occur from the back-and-forth motion of a transverse mounted engine.

The exhaust flex-joint has four bolts, four flag nuts and a gasket that are separate parts from the exhaust flex-joint. The flex-joint is welded to the catalytic converter.

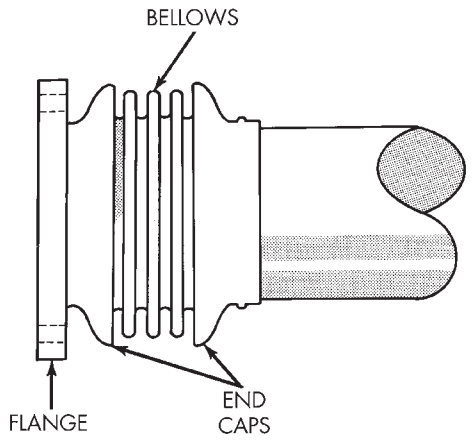

Fig. 3 Flex-Joint

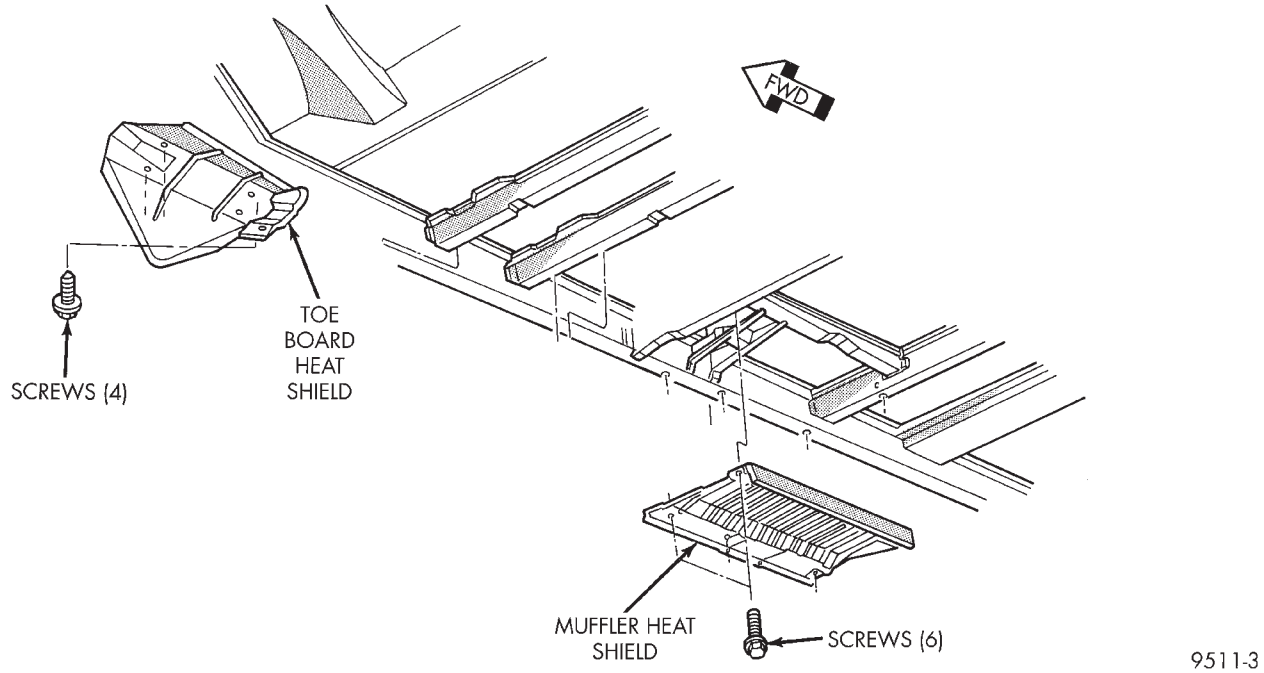

Fig. 2 Heat Shields

GENERAL INFORMATION (Continued)

CAUTION: When servicing, care must be exercised not to dent or bend the bellows of the flex-joint. Should this occur, the flex-joint will eventually fail and require the catalytic converter be replaced.

DESCRIPTION AND OPERATION

INTAKE/EXHAUST MANIFOLD—2.4L ENGINE

The intake manifold is a tuned two-piece aluminum casting with individual primary runners leading from a plenum to the cylinders. The manifold is designed to boost torque which is desired for excellent engine response and usable power output.

The exhaust manifold is made of nodular cast iron for strength and high temperatures.

INTAKE/EXHAUST MANIFOLD—3.0L ENGINE

The aluminum alloy manifold is a cross type with long runners to improve air flow. The runners, attaching below at the cylinder head, also attach above and support an air plenum. The air plenum chamber absorbs air pulsations created during the suction phase of each cylinder.

Both exhaust manifolds are a log style made of ductile cast iron. Exhaust gasses, collected from the front cylinder bank, leave the front manifold through an end outlet and are fed through an upper crossover tube to the rear manifold. The collected exhaust from both manifolds are combined at the exhaust outlet, to the exhaust pipe.

INTAKE/EXHAUST MANIFOLD—3.3/3.8L ENGINES

The intake manifold is a tuned two-piece semi-permanent mold aluminum casting with individual primary runners leading from a plenum to the cylinders. The manifold is designed to boost torque in the 3600 rpm range and contributes to the engine's broad, flat torque curve, which was desired for excellent engine tractability, response and usable power output.

The intake manifold is also cored with upper level EGR passages for balanced cylinder to cylinder EGR distribution.

The exhaust manifolds are log type with a crossover and are attached directly to the cylinder heads. They are made from nodular cast iron.

DIAGNOSIS AND TESTING

EXHAUST SYSTEM

CONDITION	POSSIBLE CAUSES	CORRECTION
EXCESSIVE EXHAUST NOISE (UNDER HOOD)	1. Exhaust manifold cracked or broken.	1. Replace manifold.
	2. Manifold to cylinder head leak.	2. Tighten manifold and/or replace gasket.
	3. EGR Valve to manifold gasket leakage.	3. Tighten fasteners or replace gasket.
	4. EGR Valve to EGR tube gasket leakage.	4. Tighten fasteners or replace gasket.
	5. EGR tube to manifold tube leakage.	5. Tighten tube nut.
	6. Exhaust flex-joint to manifold leak.	6. Tighten joint fasteners and/or replace gasket.
	7. Exhaust flex-joint.	7. Replace catalytic converter assembly.
	8. Pipe and shell noise from front exhaust pipe.	8. Characteristic of single wall pipe.
EXCESSIVE EXHAUST NOISE	1. Leak at exhaust pipe joints.	1. Tighten clamps at leaking joints.
	2. Burned or rusted out muffler assembly or exhaust pipe.	2. Replace muffler resonator tailpipe assembly or exhaust pipe with catalytic converter assembly.
	3. Burned or rusted out resonator.	3. Replace muffler resonator tailpipe assembly.
	4. Restriction in exhaust system.	4. Remove restriction, if possible, or replace as necessary.
	5. Converter material in muffler.	5. Replace muffler and converter assemblies. Check fuel injection and ignition systems for proper operation.

REMOVAL AND INSTALLATION

EXHAUST PIPES, MUFFLERS AND TAILPIPES

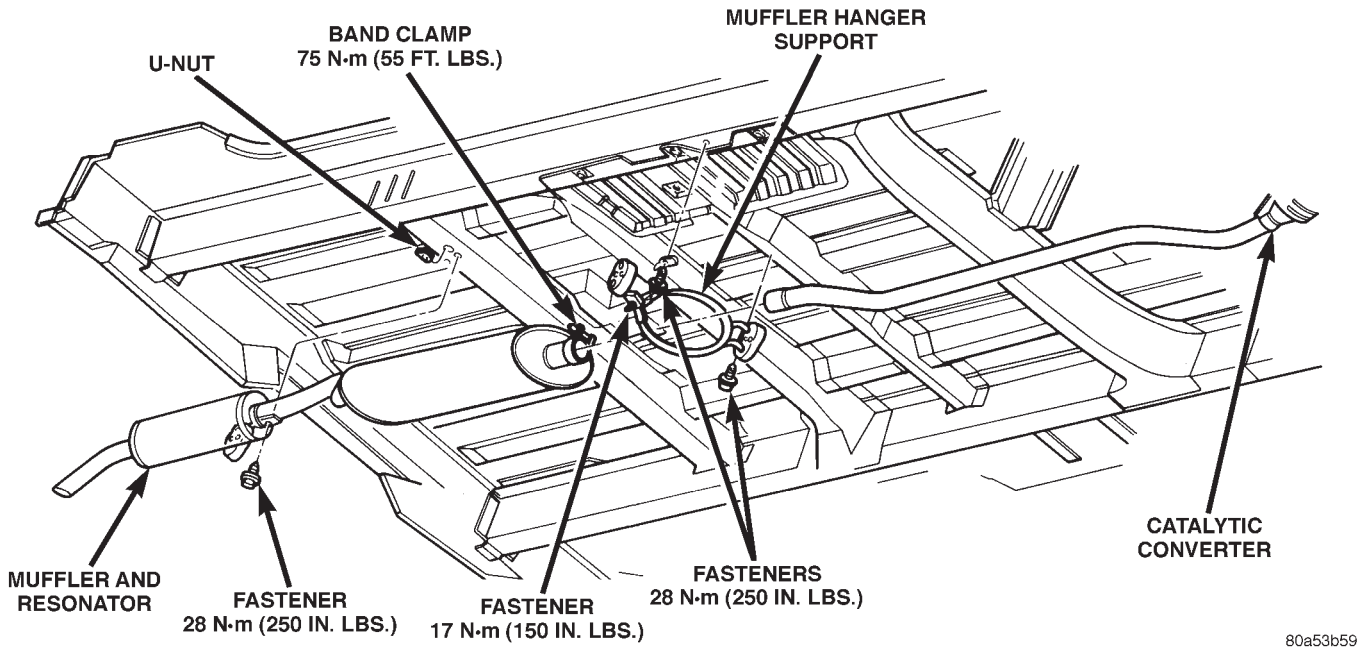

Fig. 4 Exhaust System Components

REMOVAL

(1) Raise vehicle on hoist and apply penetrating oil to clamp bolts and nuts of component being removed.

(2) Loosen clamps and supports (Fig. 5) and (Fig. 4) from exhaust system to permit alignment of parts during assembly.

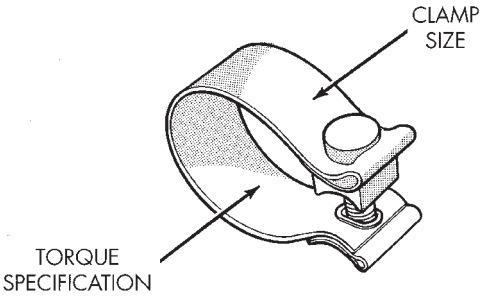

Fig. 5 Band Clamp

(3) When removing tailpipe, raise rear of vehicle to relieve body weight from rear springs to provide clearance between pipe and rear axle parts.

(4) Clean ends of pipes or muffler to assure mating of all parts. Discard broken or worn insulators, rusted clamps, supports and attaching parts. **When replacement is required on any component of the exhaust system. It is important that original equipment parts (or their equivalent) be used;**

- To insure proper alignment with other parts in the system.
- Provide acceptable exhaust noise levels and does not change exhaust system back pressure that could effect emissions and performance.

INSTALLATION

(1) Assemble pipes, muffler support and clamp loosely to permit alignment of all parts.

(2) Beginning at front of system, align and clamp each component to maintain position and proper clearance with underbody parts.

(3) Tighten the clamp and support to the proper torques and clearances (Fig. 4).

UPPER INTAKE MANIFOLD—2.4L ENGINE

REMOVAL

(1) Disconnect negative cable from battery.

(2) Disconnect air intake tube and resonator box from throttle body and remove.

(3) Remove connector from throttle position sensor (Fig. 6).

(4) Remove connector from idle air control motor (Fig. 6).

(5) Remove connector from MAP sensor (Fig. 11).

REMOVAL AND INSTALLATION (Continued)

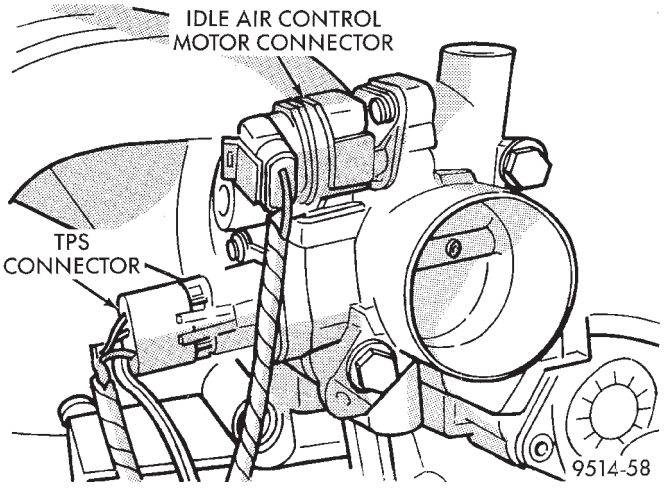

Fig. 6 Throttle Body Electrical Connectors

(6) Remove vacuum lines for purge solenoid and PCV valve at intake manifold (Fig. 7).

(7) Remove vacuum lines for power brake booster and speed control vacuum reservoir at upper intake manifold fittings (Fig. 8).

(8) Remove throttle cable and speed control cable (if equipped) from throttle lever (Fig. 9).

(9) Remove throttle cables from bracket by compressing retaining tabs.

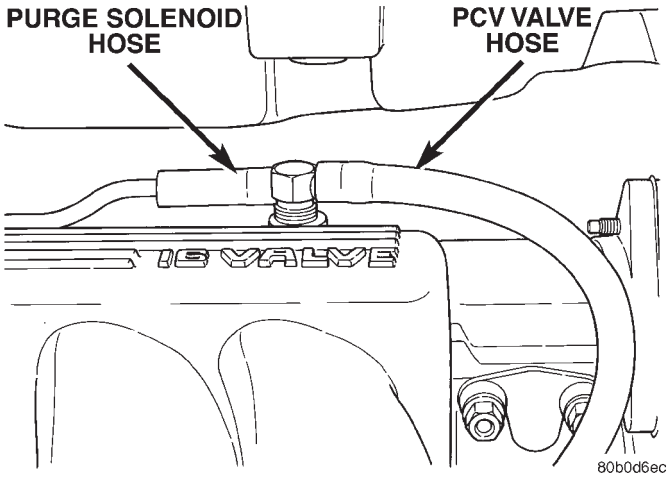

Fig. 7 Vacuum Line Connections

(10) Remove two top bolts from intake manifold to rear support bracket and spacer (Fig. 10).

(11) Remove upper bolt from intake manifold to front support bracket (Fig. 11).

(12) Remove dipstick.

(13) Remove dipstick tube.

CAUTION: Moving the dipstick tube will cause damage to the sealer, causing an oil leak. Dipstick tube must be sealed at cylinder block.

(14) Remove upper intake manifold bolts. Remove upper intake manifold.

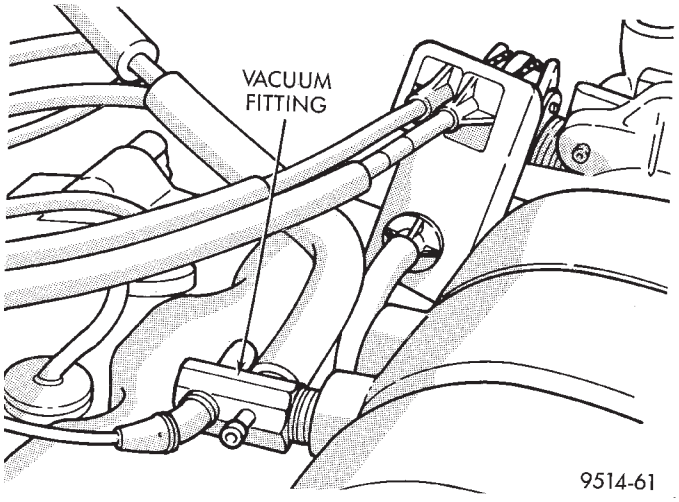

Fig. 8 Vacuum Fitting at Rear of Upper Intake Manifold

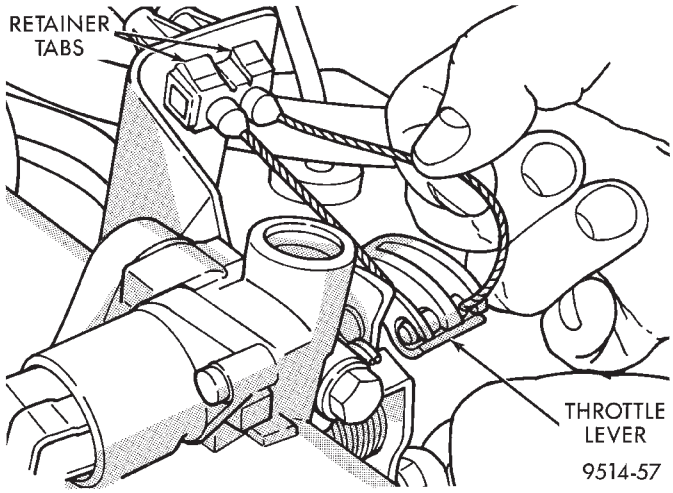

Fig. 9 Throttle Cable Attachment to Throttle Body

CAUTION: Cover intake manifold to prevent foreign material from entering engine.

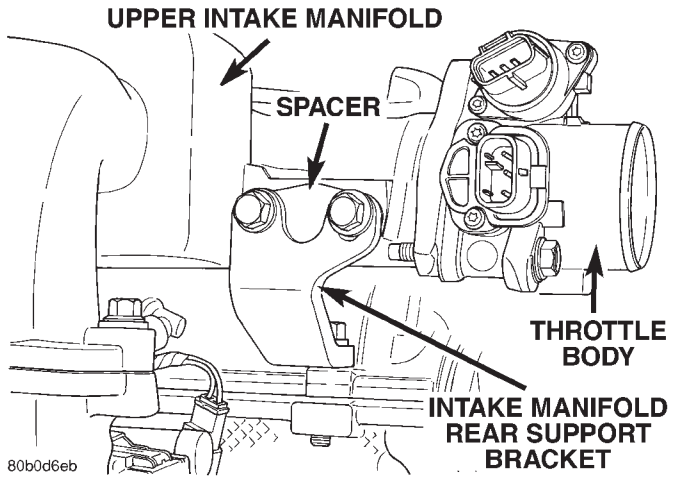

Fig. 10 Intake Manifold Rear Support Bracket

REMOVAL AND INSTALLATION (Continued)

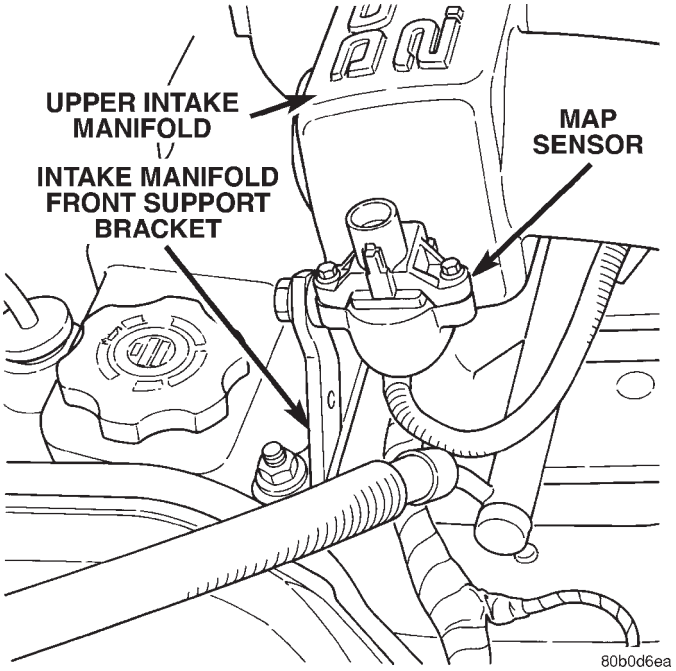

Fig. 11 Intake Manifold Front Support Bracket and Map Sensor

INSTALLATION

(1) Install new upper intake manifold gasket.

NOTE: Center outboard fastener is a double stud.

(2) Tighten upper intake manifold fasteners starting at center and progressing outward in both directions. Tighten bolts to 28 N·m (250 in. lbs.). Repeat this procedures until all fasteners are at specified torque.

(3) Install dipstick tube. Seal tube to cylinder block using Mopar® Stud N' Bearing Mount Adhesive. Tighten dipstick tube fastener to 12 N·m (105 in. lbs.)

(4) Install dipstick.

(5) Install upper bolt in intake manifold to front support bracket (Fig. 11). Torque to 28 N·m (250 in. lbs.).

(6) Install two top bolts at intake manifold to rear support bracket making sure bracket to manifold spacer is in place (Fig. 10). Tighten bolts to 28 N·m (250 in. lbs.)

(7) Install throttle cables in bracket.

(8) Install throttle cable and speed control cable (if equipped) to throttle lever.

(9) Install vacuum lines for power brake booster and speed control vacuum reservoir at upper intake manifold fittings.

(10) Install vacuum lines for purge solenoid and PCV valve.

(11) Install electrical connectors for MAP sensor, throttle position sensor, and idle air control motor.

(12) Install air intake tube and resonator box to throttle body.

(13) Connect negative cable to battery.

INTAKE MANIFOLD LOWER—2.4L ENGINE

WARNING: RELEASE FUEL SYSTEM PRESSURE BEFORE SERVICING FUEL SYSTEM COMPONENTS. SERVICE VEHICLES IN WELL VENTILATED AREAS AND AVOID IGNITION SOURCES. NEVER SMOKE WHILE SERVICING THE VEHICLE

To release fuel pressure, refer to the Fuel Delivery System Pressure Release section of Group 14 Fuel System for procedure.

REMOVAL

(1) Perform fuel system pressure release procedure **before attempting any repairs.**

(2) Remove upper intake manifold. Refer to procedure in this section.

CAUTION: Cover intake manifold to prevent foreign material from entering engine.

(3) Disconnect electrical connector from intake air temperature sensor (Fig. 12).

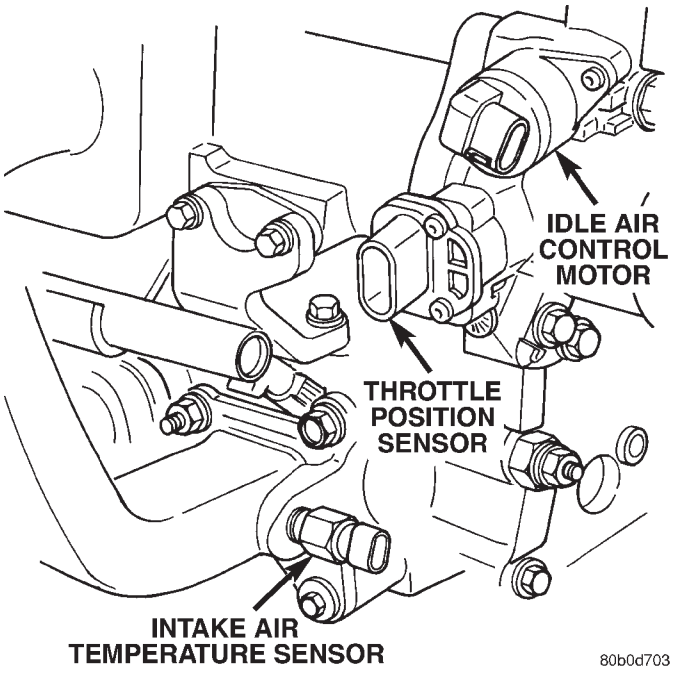

Fig. 12 Intake Air Temperature Sensor

(4) Remove fuel hose quick connect fitting from the chassis tube (Fig. 13). **Refer to Fuel Hoses, Clamps and Quick Connect Fittings in the Fuel Delivery Section of this Group.**

WARNING: WRAP A SHOP TOWEL AROUND HOSES TO CATCH ANY GASOLINE SPILLAGE.

REMOVAL AND INSTALLATION (Continued)

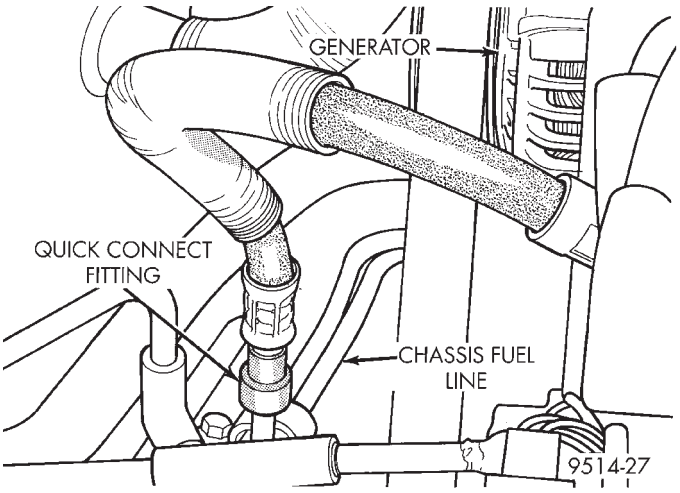

Fig. 13 Fuel Line Quick Disconnect

(5) Drain cooling system. Refer to Group 7, Cooling System for procedure.

(6) Remove heater, and upper radiator hoses at intake manifold.

(7) Disconnect coolant temperature sensor (Fig. 14).

(8) Remove the accessory drive belt. Refer to Accessory Drive belt Removal and Installation in Group 7, Cooling System for procedure.

(9) Remove fasteners attaching generator bracket to cylinder head, and block.

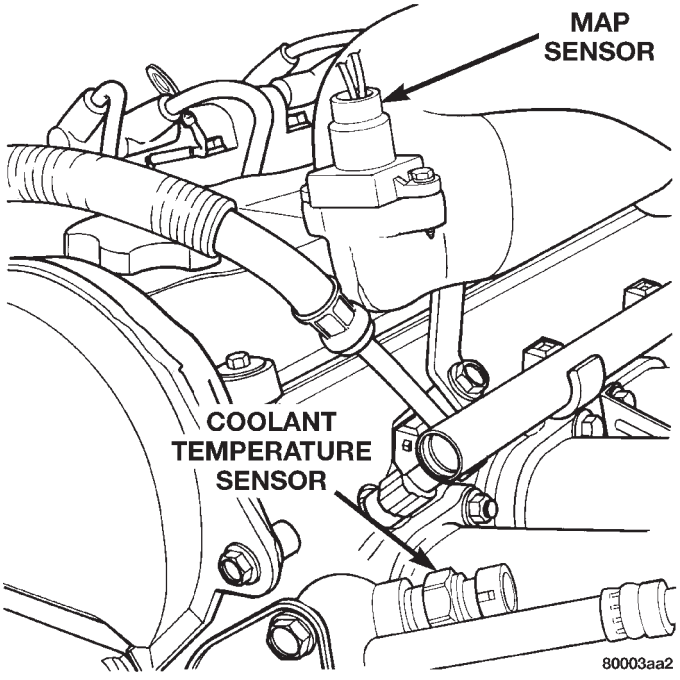

Fig. 14 Coolant Temperature Sensor—2.4L

(10) Remove intake manifold center support bracket bolts (Y bracket) (Fig. 15)

(11) Disconnect fuel injector harness.

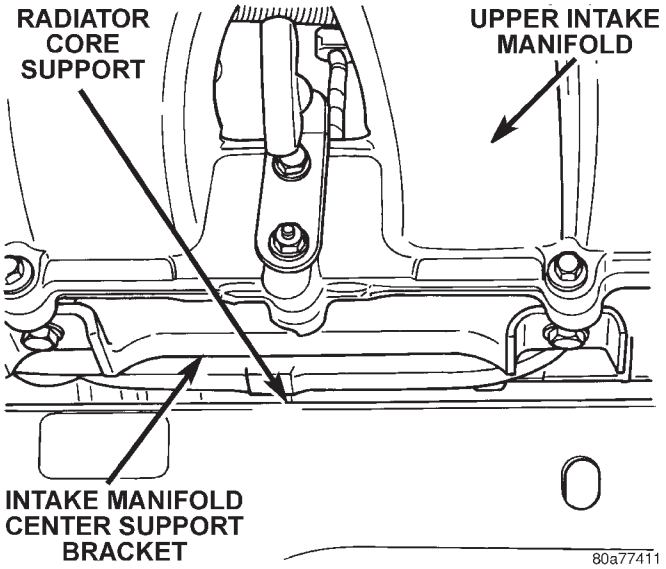

Fig. 15 Intake Manifold Center Support Bracket

(12) Remove lower intake manifold fasteners (Fig. 16). Remove the manifold from engine.

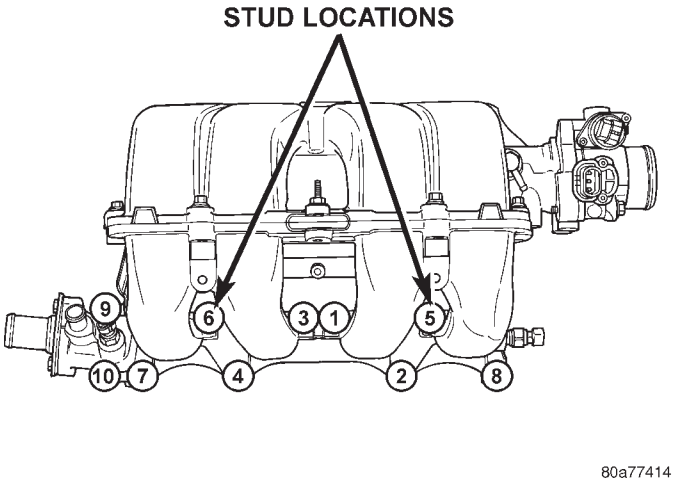

Fig. 16 Intake Manifold Fasteners

(13) Inspect and clean manifold. Refer to Cleaning and Inspection outlined in this section for procedures.

INSTALLATION

If the following items were removed, install and torque to:

- Fuel Rail Bolts 22 N·m (200 in. lbs.)
- Engine Outlet Connector Bolts 28 N·m (250 in. lbs.)
- Coolant Temperature Sensor 7 N·m (60 in. lbs.)
- Intake Air Temperature Sensor 28 N·m (250 in. lbs.)

(1) Using a new intake gasket, position intake manifold on the engine and install retaining bolts.

REMOVAL AND INSTALLATION (Continued)

(2) Tighten intake manifold fasteners in the following sequence (Fig. 16). Torque to 23 N·m (200 in. lbs.). Repeat this procedure until all bolts are at specified torque.

(3) Install intake manifold center support bracket bolts (Y bracket):

- Fastener to block 54 N·m (40 ft. lbs.)
- Fastener to intake 28 N·m (250 in. lbs.)

(4) Install fuel hose quick connector fitting to chassis tubes. **Refer to Fuel Hoses, Clamps and Quick Connect Fittings in Group 14, Fuel Delivery.** Push the fitting onto the chassis tube until it clicks into place. Pull on the fitting to ensure complete insertion.

(5) Reverse removal procedures 2 through 12 for installation.

CAUTION: When using the ASD Fuel System Test, the ASD relay and fuel pump relay remain energized for 7 minutes or until the test is stopped, or until the ignition switch is turned to the Off position.

(6) With the ignition key in ON position, access the DRB scan tool ASD Fuel System Test to pressurize the fuel system. Check for leaks.

EXHAUST MANIFOLD—2.4L ENGINE

REMOVAL

(1) Raise vehicle and disconnect exhaust pipe from the exhaust manifold at the flex-joint.

(2) Disconnect Oxygen Sensor lead wire at the rear exhaust manifold (Fig. 17).

(3) Remove the bolts attaching the manifold to the cylinder head. Remove manifold (Fig. 17).

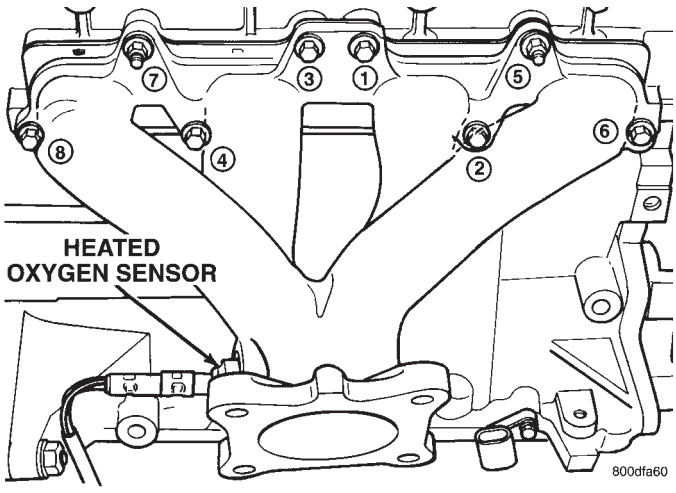

Fig. 17 Exhaust Manifold Attaching Points—2.4L Engine

(4) Inspect and clean manifold. Refer to Cleaning and Inspection outlined in this section for procedures.

INSTALLATION

(1) Install exhaust manifold with a new gasket and tighten attaching nuts in the order shown in (Fig. 17) to 20 N·m (175 in. lbs.).

(2) Attach exhaust pipe to exhaust manifold and tighten bolt to 28 N·m (250 in. lbs.).

(3) Connect heated oxygen sensor lead (Fig. 17).

INTAKE MANIFOLD—3.0L ENGINE

REMOVAL

(1) Perform fuel system pressure release procedure **(before attempting any repairs).** Refer to Group 14 Fuel System for procedure.

(2) Disconnect negative battery cable. Drain cooling system. See Cooling System, Group 7.

(3) Remove air inlet resonator to throttle body hose.

(4) Remove throttle cable and transaxle kickdown linkage (Fig. 18).

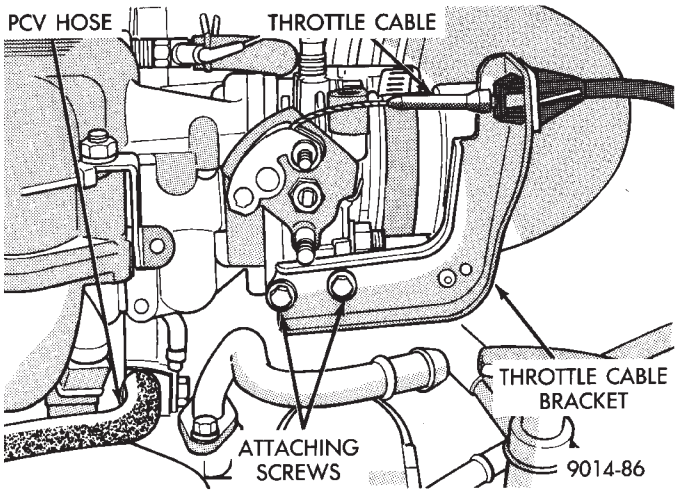

Fig. 18 Throttle Cable Attachment

(5) Remove automatic idle speed (AIS) motor and throttle position sensor (TPS) wiring connectors from throttle body (Fig. 19).

(6) Remove vacuum hose harness from throttle body.

(7) Remove PCV and Brake booster hoses from Air Intake Plenum.

(8) Remove Ignition Coil from Intake Plenum (Fig. 20).

(9) Remove wiring connectors from coolant temperature sensor (Fig. 21).

(10) Remove vacuum connections from Air Intake Plenum vacuum connector.

(11) Remove fuel hose from fuel rail (Fig. 21).

WARNING: WRAP SHOP TOWELS AROUND HOSES TO CATCH ANY GASOLINE SPILLAGE.

REMOVAL AND INSTALLATION (Continued)

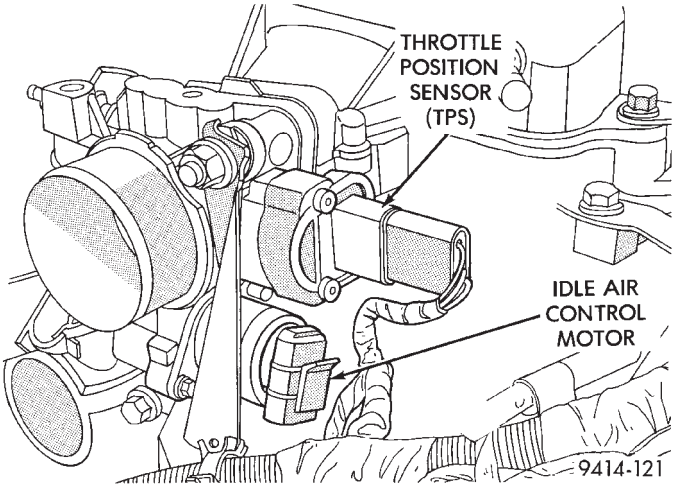

Fig. 19 Electrical and Vacuum Connections to Throttle Body

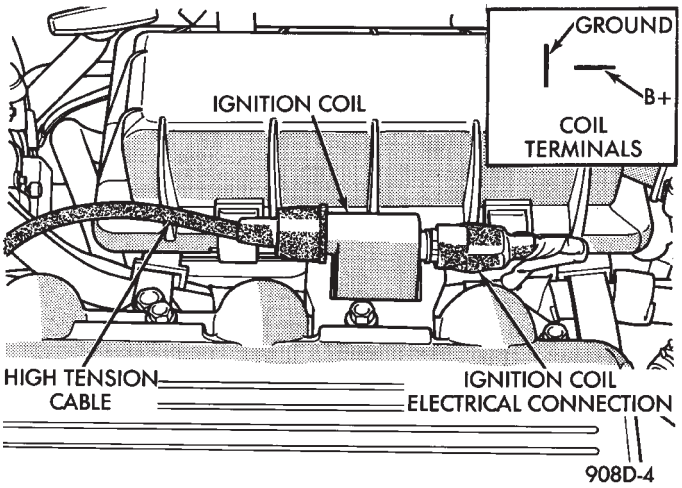

Fig. 20 Ignition Coil Removal

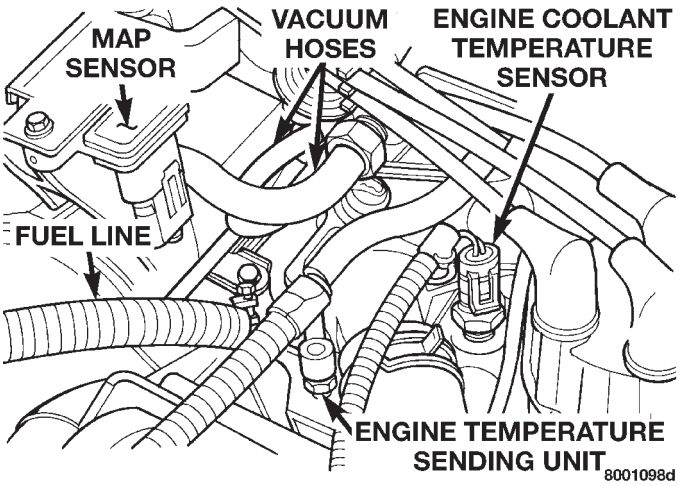

Fig. 21 Coolant Temperature Sensor Electrical Connections

(12) Remove fasteners from Air Intake Plenum to Intake Manifold (Fig. 22).

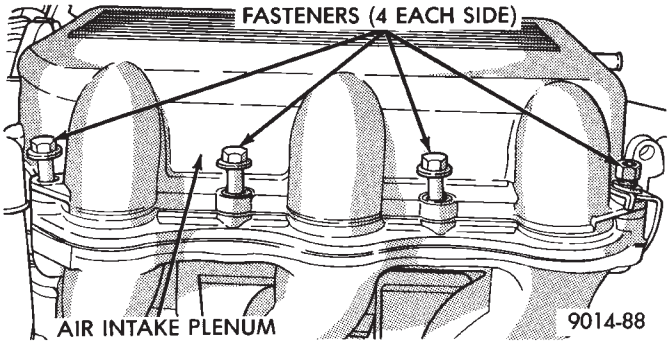

Fig. 22 Air Intake Plenum to Intake Manifold Attaching Bolts

(13) Remove Air Intake Plenum (Fig. 23).

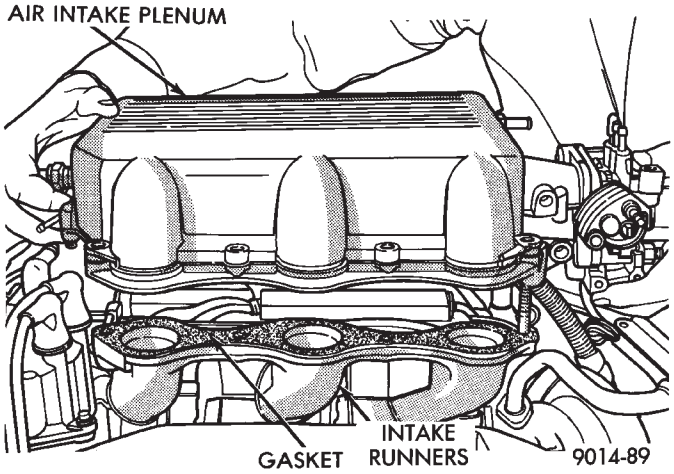

Fig. 23 Removing Air Intake Plenum

(14) Cover intake manifold with suitable cover when servicing (Fig. 24).

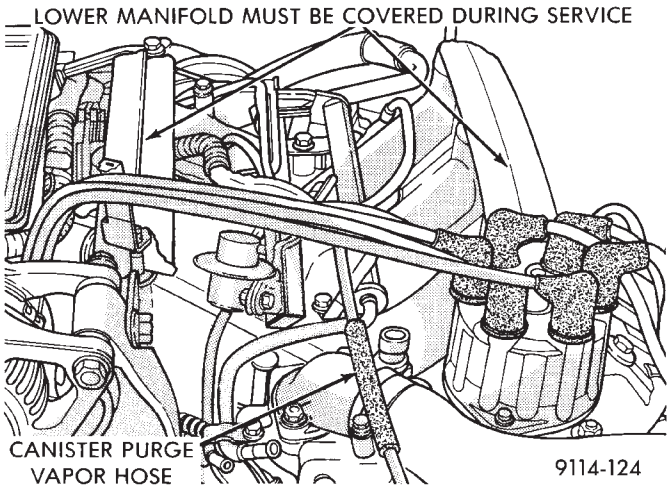

Fig. 24 Vacuum Connections for Fuel Rail and Fuel Pressure Regulator

(15) Disconnect Fuel Injector wiring harness from engine wiring harness.

REMOVAL AND INSTALLATION (Continued)

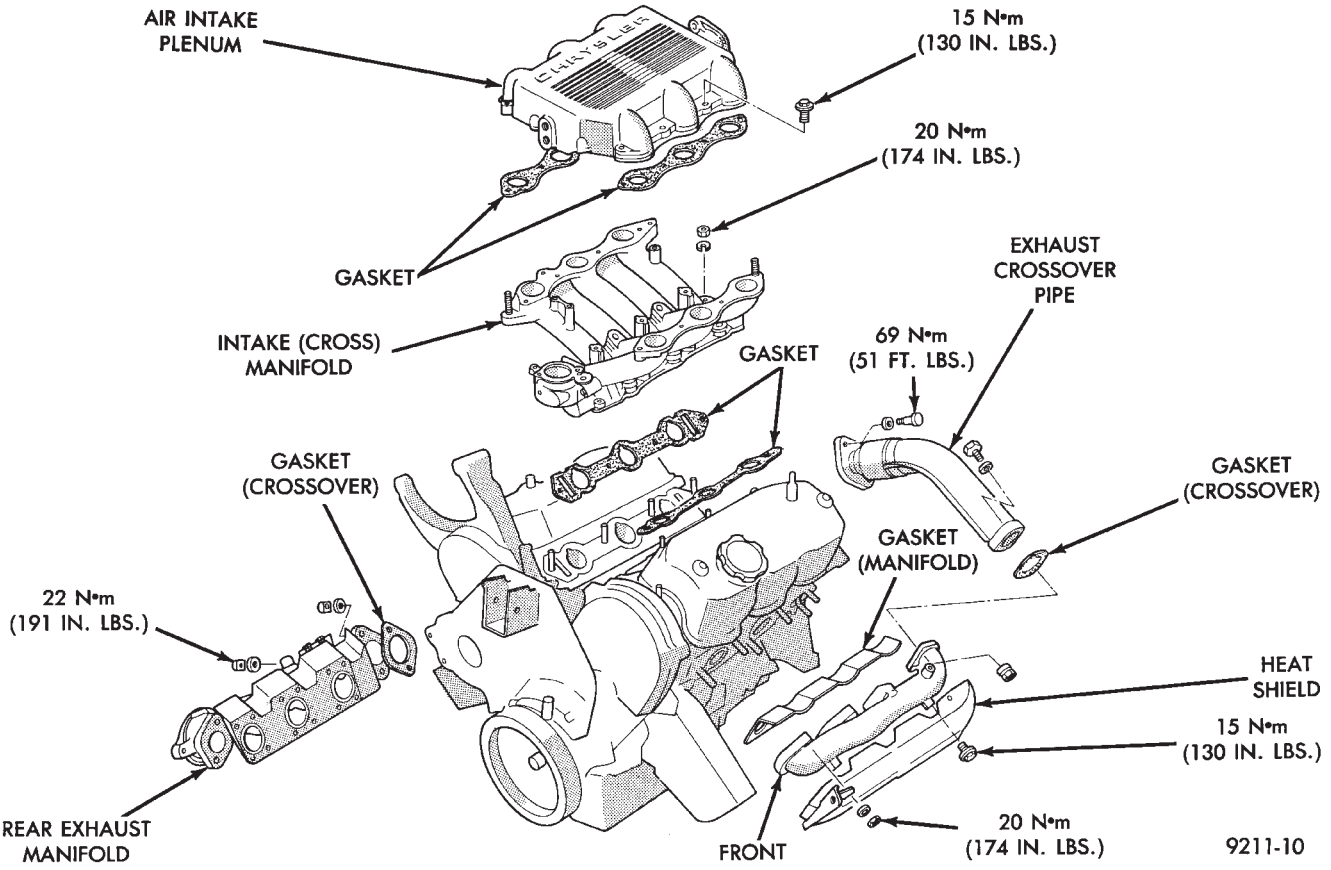

Fig. 25 Intake and Exhaust Manifolds — 3.0L Engine

(16) Remove fuel rail attaching bolts and lift fuel rail assembly from intake manifold.

(17) Separate radiator hose from thermostat housing and heater hose from heater pipe.

(18) Remove nut and washer assemblies and remove intake manifold (Fig. 25).

(19) Inspect and clean manifold. Refer to Cleaning and Inspection outlined in this section for procedures.

INSTALLATION

(1) Position new intake manifold gaskets on cylinder head and install intake (cross) manifold.

(2) Install nuts and washers and tighten in several steps in order shown in (Fig. 26) to 20 N·m (174 in. lbs.).

(3) Make sure the injector holes are clean and all plugs have been removed.

(4) Lube injector O-ring with a drop of clean engine oil to ease installation.

(5) Put the tip of each injector into their ports. Push the assembly into place until the injectors are seated in the ports.

(6) Install the fuel rail attaching bolts and torque to 13 N·m (115 in. lbs.).

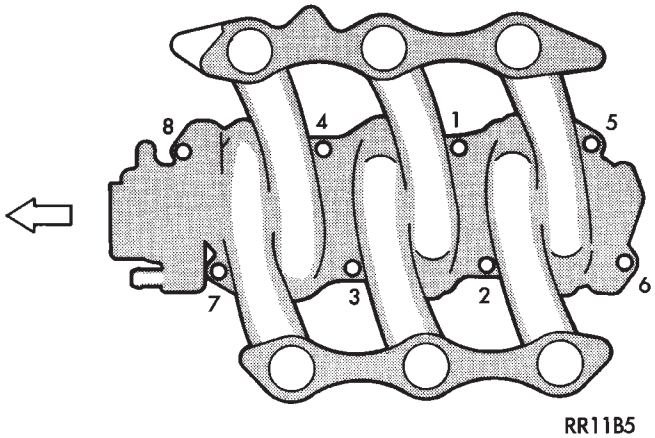

Fig. 26 Fastener Tightening Sequence for Intake (Cross) Manifold

(7) Install fuel supply and the vacuum crossover tube hold-down bolt and torque to 10 N·m (95 in. lbs.).

(8) Remove covering from lower intake manifold and clean surface.

(9) Place intake manifold gaskets **with beaded sealant side up** on lower manifold. Put air intake in place. Install attaching fasteners and tighten in several steps in sequence shown (Fig. 27) to 13 N·m (115 in. lbs.).

REMOVAL AND INSTALLATION (Continued)

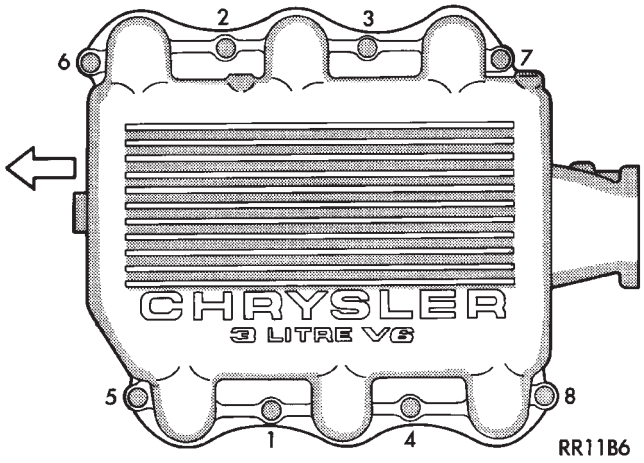

Fig. 27 Intake Plenum Tightening Sequence

(10) Connect fuel line to fuel rail (Fig. 21). Torque hose clamps to 1 N·m (10 in. lbs.).

(11) Connect vacuum harness to air intake plenum.

(12) Connect and coolant temperature sensor electrical connector to sensor (Fig. 21).

(13) Connect PCV and brake booster supply hose to intake plenum.

(14) Connect automatic idle speed (AIS) motor and throttle position sensor (TPS) electrical connectors (Fig. 19).

(15) Connect vacuum vapor harness to throttle body (Fig. 19).

(16) Install throttle cable and transaxle kickdown linkage (Fig. 18).

(17) Install air inlet resonator hose assembly to throttle body.

(18) Install radiator to thermostat housing hose and heater hose to heater pipe nipple.

(19) Fill cooling system. Refer to Filling the Cooling System outlined in Group 7 Cooling System for procedure.

(20) Connect negative battery cable.

(21) With the DRB Scan Tool use ASD Fuel System Test to pressurize system to check for leaks.

CAUTION: When using the ASD Fuel System Test, The Auto Shutdown (ASD) Relay will remain energized for 7 minutes or until the ignition switch is turned to the OFF position, or Stop All Test is selected.

EXHAUST MANIFOLD—3.0L ENGINE

REMOVAL

(1) Raise vehicle and disconnect exhaust pipe from rear (cowl side) exhaust manifold at the flex-joint.

(2) Disconnect Oxygen Sensor lead wire at the rear exhaust manifold (Fig. 28).

(3) Remove bolts attaching cross-over pipe to manifold (Fig. 30).

(4) Remove rear heat shield (Fig. 29).

(5) Remove nuts attaching rear manifold to cylinder head and remove manifold.

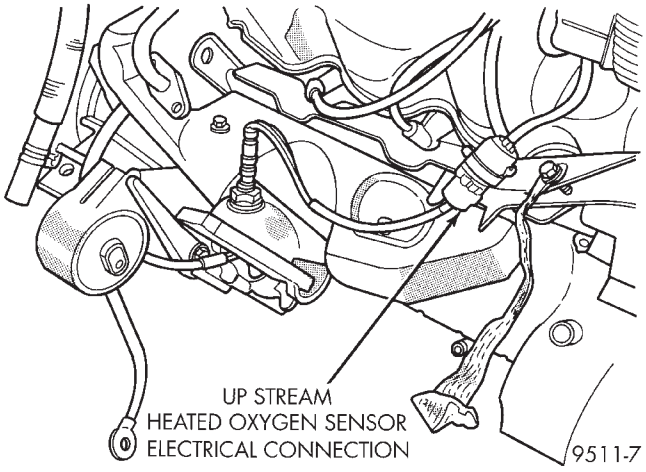

Fig. 28 Disconnect Up Stream Heated Oxygen Sensor Connection

(6) Lower vehicle and remove screws attaching front heat shield to front manifold (Fig. 31).

(7) Remove bolts fastening crossover pipe to front exhaust manifold and nuts fastening manifold to cylinder head. Remove assemblies.

(8) Inspect and clean manifolds. Refer to Cleaning and Inspection outlined in this section for procedures.

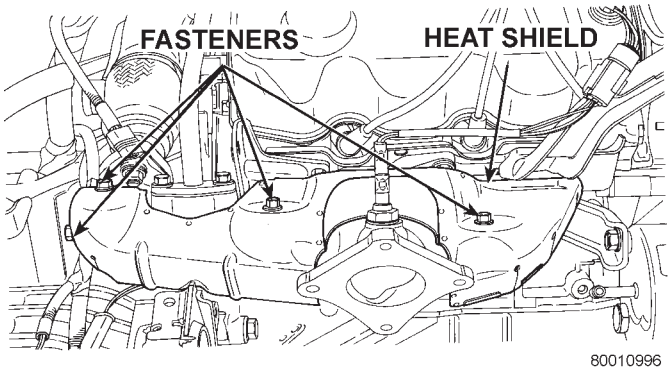

Fig. 29 Rear Exhaust Manifold Heat Shield

INSTALLATION

Install the gaskets with the numbers 1-3-5 embossed on the top on the rear bank and those with numbers 2-4-6 on the front (Radiator side) bank (Fig. 32).

(1) Install rear exhaust manifold and tighten attaching nuts to 20 N·m (175 in. lbs.).

REMOVAL AND INSTALLATION (Continued)

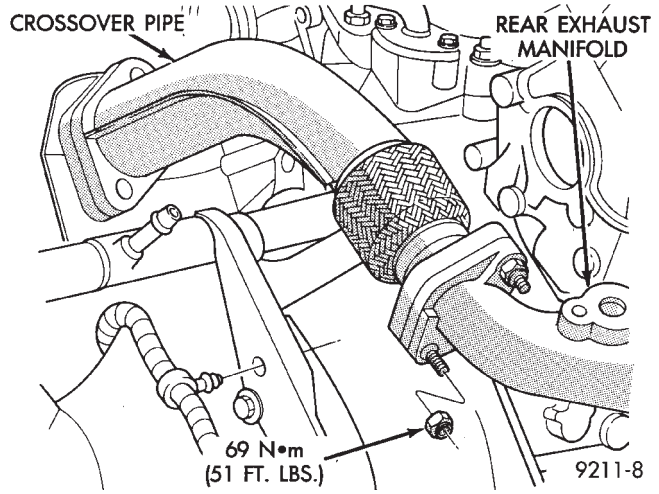

Fig. 30 Crossover Pipe

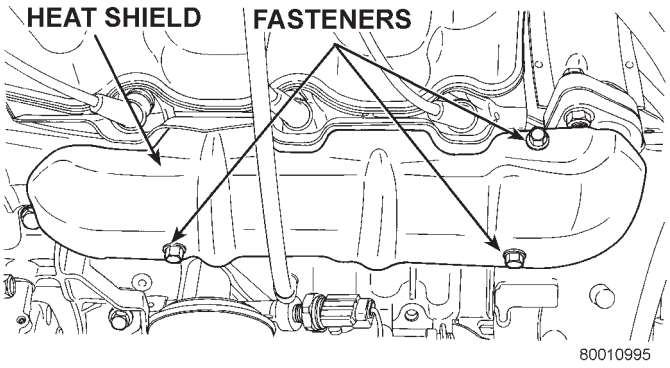

Fig. 31 Front Exhaust Manifold Heat Shield

(2) Attach exhaust pipe to exhaust manifold and tighten bolts to 28 N·m (250 in. lbs.)

(3) Attach crossover pipe to exhaust manifold and tighten bolt to 69 N·m (51 ft. lbs.)

(4) Install rear exhaust manifold heat shield (Fig. 29).

(5) Connect heated oxygen sensor lead (Fig. 28).

(6) Install front exhaust manifold and attach exhaust crossover.

(7) Install front exhaust manifold heat shield and tighten attaching screws to 15 N·m (130 in. lbs.) (Fig. 31).

INTAKE MANIFOLD—3.3/3.8L ENGINE

REMOVAL

(1) Remove windshield wiper module. Refer to Group 8K Windshield Wiper and Washer Systems for procedure.

(2) Perform fuel system pressure release procedure **(before attempting any repairs).** Refer to Group 14 Fuel System for procedure.

(3) Drain cooling system. See Cooling System, Group 7 for procedure.

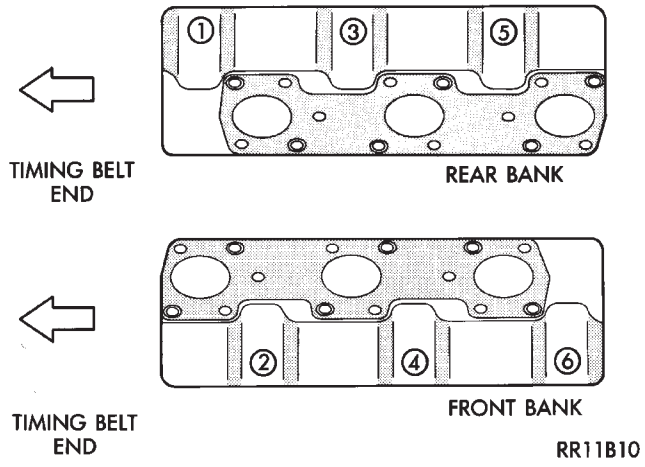

Fig. 32 Identify Exhaust Manifold Gaskets

(4) Remove air inlet resonator to throttle body hose assembly.

(5) Remove throttle cable. Refer to Group 14 Fuel Systems for procedure. Remove wiring harness from throttle cable bracket.

(6) Remove automatic idle speed (AIS) motor and throttle position sensor (TPS) wiring connectors from throttle body (Fig. 33).

(7) Remove EGR transducer connector.

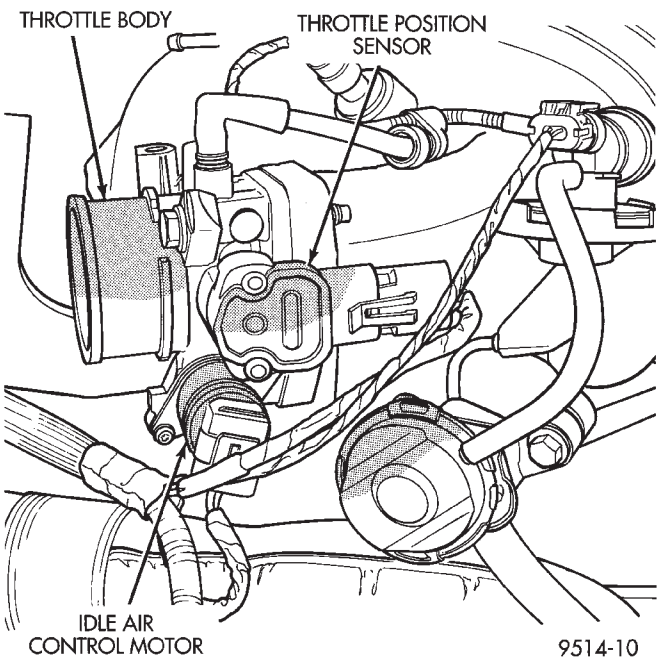

Fig. 33 Electrical and Vacuum Connection to Throttle Body

(8) Remove vacuum hose harness from throttle body (Fig. 33).

(9) Remove PCV and brake booster hoses from air intake plenum.

REMOVAL AND INSTALLATION (Continued)

(10) Disconnect MAP Sensor electrical connection (Fig. 34).

(11) Remove EGR tube flange from intake plenum.

(12) Remove vacuum harness connectors from intake plenum (Fig. 34).

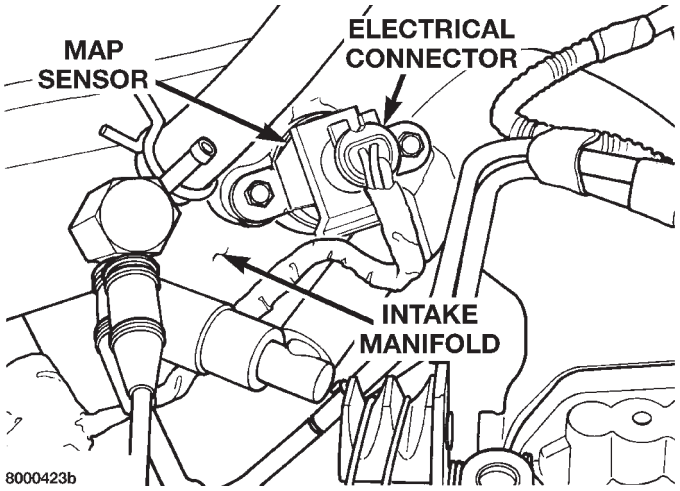

Fig. 34 Vacuum and Electrical Connections to Intake Manifold

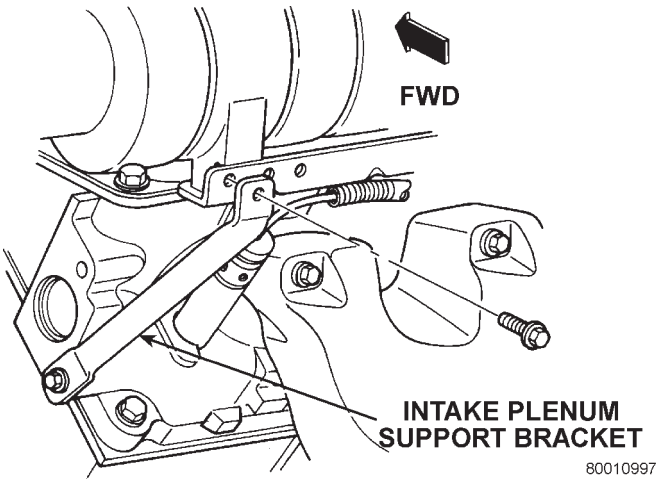

Fig. 35 Intake Manifold Plenum Support Bracket

(13) Remove cylinder head to intake plenum strut (Fig. 35)

(14) Remove the engine mounted ground strap.

(15) Remove the fuel hose quick connect fitting from the fuel line by using an open end wrench pushing in on the plastic ring located on the end of the fittings. Gently pull the fitting from the fuel line (Fig. 36).

WARNING: WRAP A SHOP TOWEL AROUND HOSES TO CATCH ANY GASOLINE SPILLAGE DURING REMOVAL.

(16) Remove direct ignition system (DIS) coils and generator bracket to intake manifold bolt (Fig. 37).

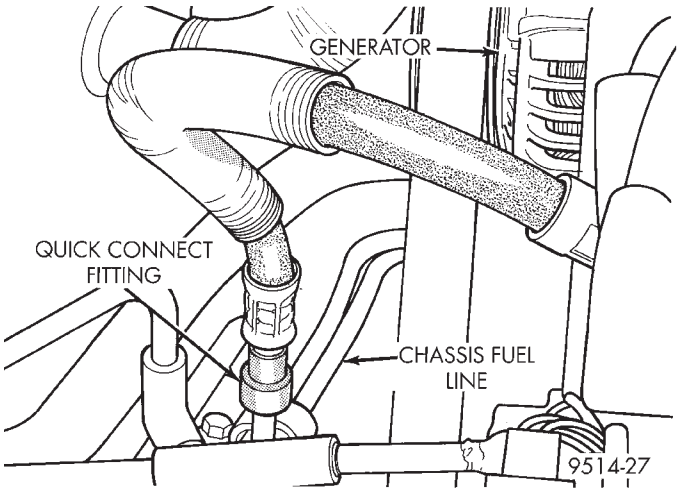

Fig. 36 Quick Connect Fuel Fitting to Fuel Line

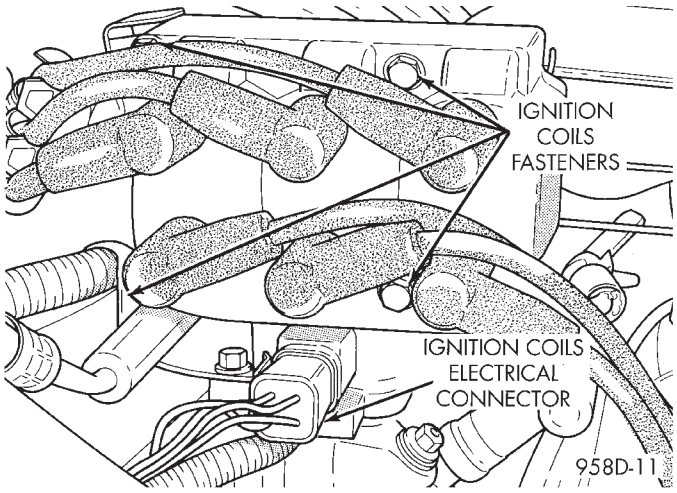

Fig. 37 Ignition Coils

(17) Remove bolts from generator to intake manifold bracket. Loosen top generator mounting bolt, and move bracket up so intake manifold can clear mounting studs (Fig. 38).

(18) Remove intake manifold bolts and remove the manifold (Fig. 38).

(19) Cover intake manifold with suitable cover when servicing (Fig. 39).

(20) Remove fuel tube retainer bracket screw and fuel rail attaching bolts (Fig. 39). Spread the retainer bracket to allow fuel tube removal clearance.

(21) Disconnect cam sensor and coolant temperature sensor (Fig. 40).

(22) Remove fuel injector wiring clip from intake manifold water tube.

(23) Remove fuel rail. Be careful not to damage the rubber injector O-rings upon removal from their ports (Fig. 41).

(24) Remove upper radiator hose, bypass hose and rear intake manifold hose (Fig. 42).

REMOVAL AND INSTALLATION (Continued)

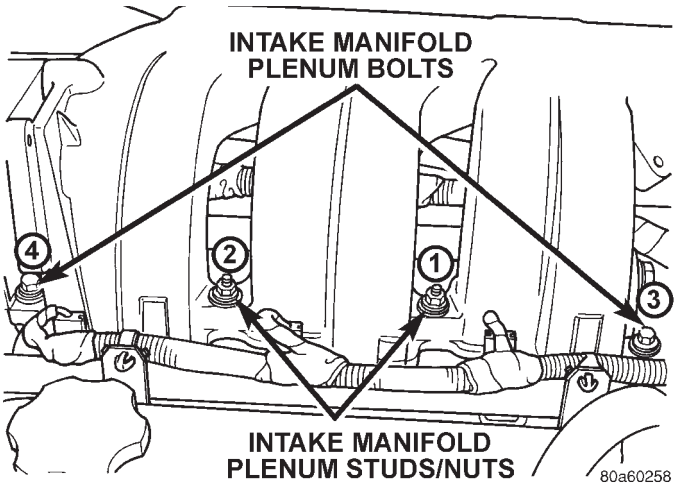

Fig. 38 Intake Manifold Plenum Bolts and Nuts

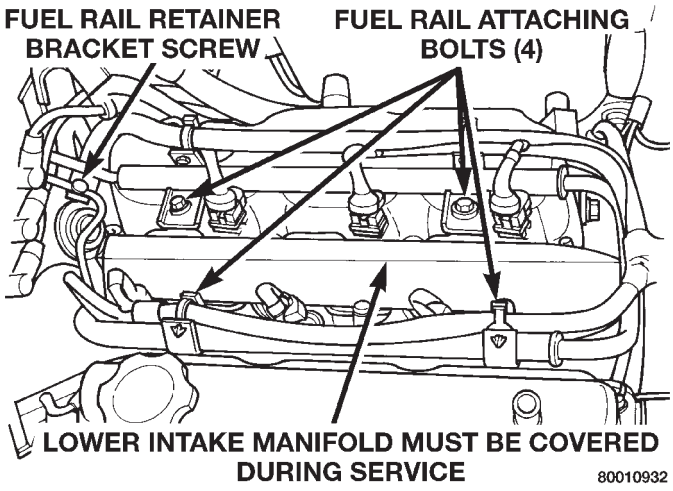

Fig. 39 Fuel Rail Attaching Bolts

(25) Remove intake manifold bolts. Remove intake manifold.

(26) Inspect and clean manifold. Refer to Cleaning and Inspection outlined in this section for procedures.

WARNING: INTAKE MANIFOLD GASKET IS MADE OF VERY THIN METAL AND MAY CAUSE PERSONAL INJURY, HANDLE WITH CARE.

(27) Remove intake manifold seal retainers screws (Fig. 43). Remove intake manifold gasket.

INSTALLATION

(1) Clean all surfaces of cylinder block and cylinder heads.

(2) Place a drop (approximately 1/4 in. diameter) of Mopar® Silicone Rubber Adhesive Sealant or equivalent, onto each of the **four** manifold to cylinder head gasket corners (Fig. 44).

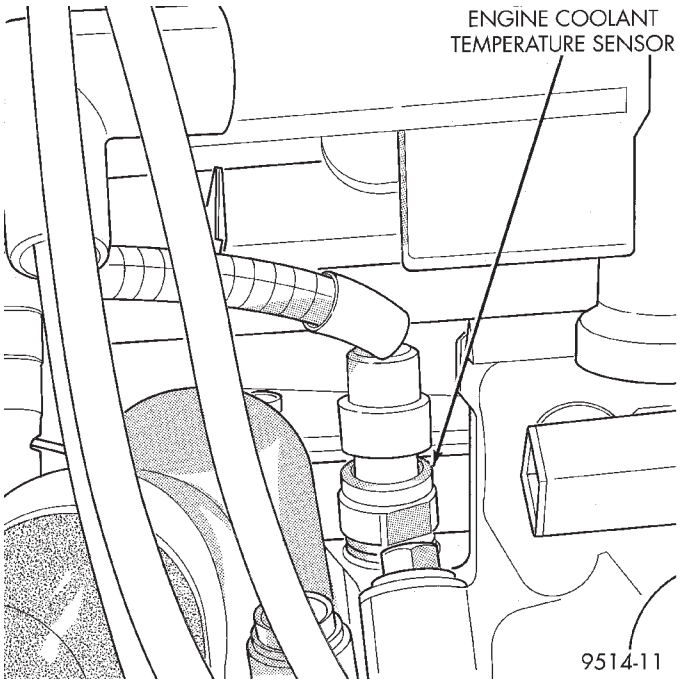

Fig. 40 Coolant Temperature Sensor Electrical Connector

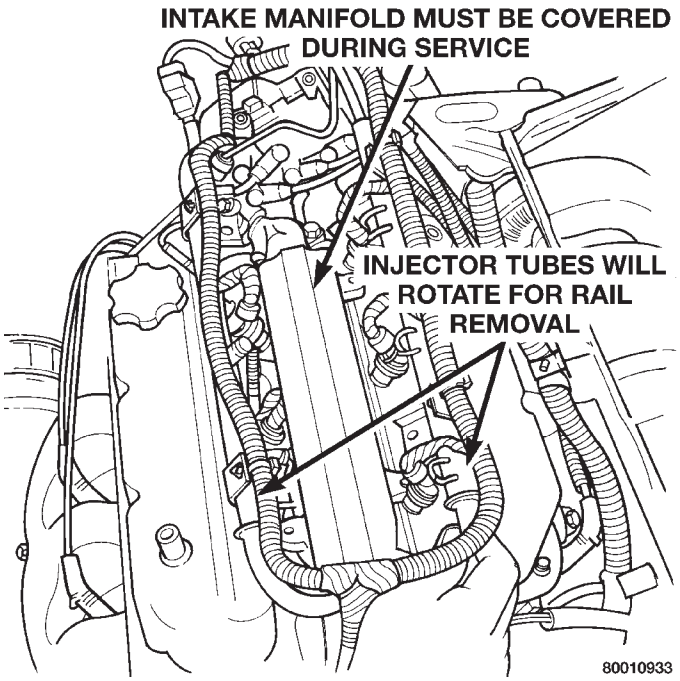

Fig. 41 Fuel Rail Removal

(3) Carefully install the new intake manifold gasket (Fig. 43). Torque end seal retainer screws to 12 N·m (105 in. lbs.).

(4) Install intake manifold and bolts and torque to 1 N·m (10 in. lbs.). Then torque bolts to 22 N·m (200 in. lbs.) in sequence shown in (Fig. 42). Then torque again to 22 N·m (200 in. lbs.). After intake manifold is in place, **inspect to make sure seals are in place.**

REMOVAL AND INSTALLATION (Continued)

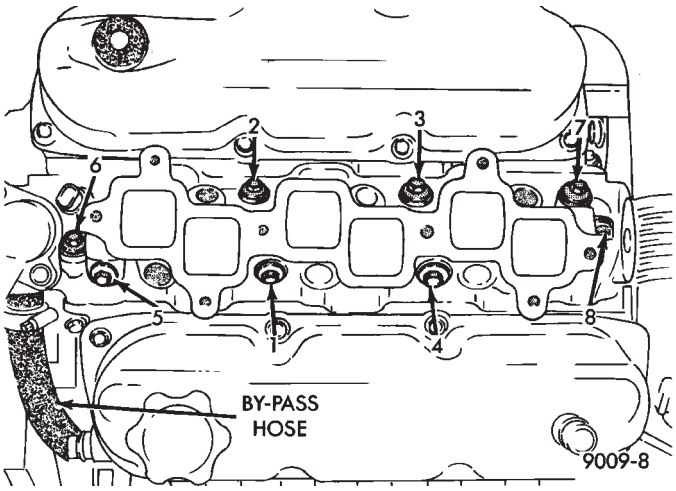

Fig. 42 Intake Manifold Removal and Installation

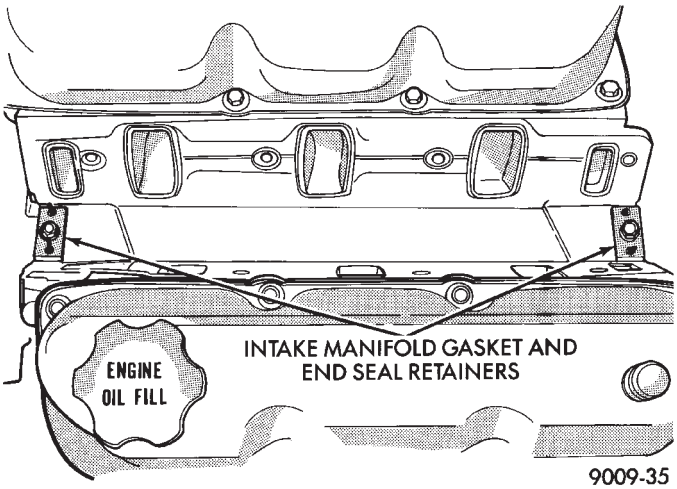

Fig. 43 Intake Manifold Gasket

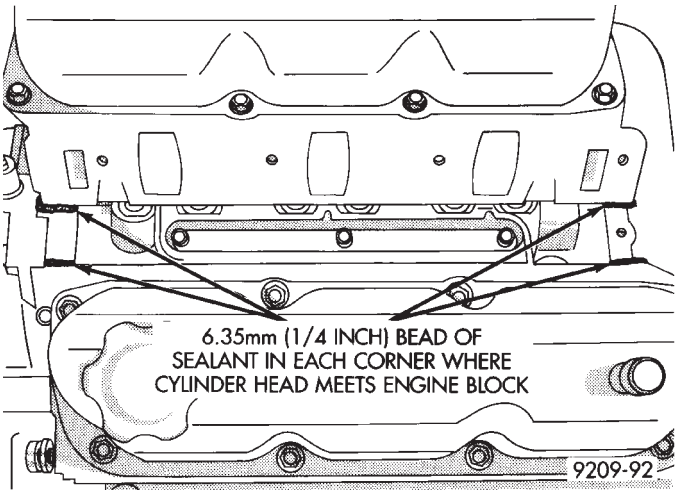

Fig. 44 Intake Manifold Gasket Sealing

(5) Make sure the injector holes are clean and all plugs have been removed.

(6) Lube injector O-ring with a drop of clean engine oil to ease installation.

(7) Put the tip of each injector into their ports. Push the assembly into place until the injectors are seated in the ports (Fig. 41).

(8) Install the fuel rail attaching bolts and torque to 22 N·m (200 in. lbs.) (Fig. 39).

(9) Install fuel tube retaining bracket screw and torque to 4 N·m (35 in. lbs.) (Fig. 39).

(10) Connect cam sensor and coolant temperature sensor (Fig. 40).

(11) Remove covering on lower intake manifold and clean surface.

(12) Place the new intake manifold gasket on lower manifold. Put upper manifold into place and install bolts and nuts finger tight.

NOTE: At no time should the studs be replaced with a bolt and washer.

(13) Install the generator bracket to intake manifold bolt and the cylinder head to intake manifold strut bolts. (Do not torque.)

(14) Torque intake manifold bolts to 28 N·m (250 in. lbs.) following torque sequence in (Fig. 38).

(15) Torque generator bracket to intake manifold bolt to 54 N·m (40 ft. lbs.).

(16) Torque the cylinder head to intake manifold strut bolts to 54 N·m (40 ft. lbs.) (Fig. 35).

(17) Connect ground strap and MAP sensor electrical connectors.

(18) Connect vacuum harness to intake plenum (Fig. 34).

(19) Using a new gasket, connect the EGR tube flange to the intake manifold and torque to 22 N·m (200 in. lbs.).

(20) Clip wiring harness into the hole in the throttle cable bracket.

(21) Connect the wiring connectors to the throttle position sensor (TPS) and Automatic Idle Speed (AIS) motor (Fig. 33).

(22) Connect vacuum harness to throttle body (Fig. 33).

(23) Install the direct ignition system (DIS) coils. Torque fasteners to 12 N·m (105 in. lbs.) (Fig. 37).

(24) Lubricate the end of the chassis fuel tube with 30 wt. oil. Connect fuel supply hose to chassis fuel tube assembly. Pull back on the quick connect fitting to ensure complete insertion (Fig. 36). (Refer to Fuel Hoses, Clamps and Quick Connect Fittings in Group 14 Fuel Systems).

(25) Install throttle cable. Refer to Group 14 Fuel System for procedure.

(26) Connect fuel injector wiring harness.

(27) Install air cleaner and hose assembly.

(28) Connect negative battery cable. Fill Cooling System. See Cooling System, Group 7.

(29) With the DRB Scan Tool use ASD Fuel System Test to pressurize system to check for leaks.

REMOVAL AND INSTALLATION (Continued)

CAUTION: When using the ASD Fuel System Test, The Auto Shutdown (ASD) Relay will remain energized for 7 minutes or until the ignition switch is turned to the OFF position, or Stop All Test is selected.

EXHAUST MANIFOLDS—3.3/3.8L ENGINE

REMOVAL

(1) Disconnect battery negative cable.

(2) Remove accessory drive belt. Refer to Accessory Drive section located in Group 7 Cooling System for procedure.

(3) Remove generator.

(4) Raise vehicle and disconnect exhaust pipe from rear (cowl side) exhaust manifold at flex-joint.

(5) Disconnect down stream oxygen sensor connector.

(6) Lower exhaust system to gain access to rear manifold.

(7) Separate EGR tube from rear manifold and disconnect Heated Oxygen Sensor lead wire (Fig. 45).

(8) Remove heat shield from rear engine mount.

(9) Remove Generator/Power Steering Support Strut (Fig. 45).

(10) Remove bolts attaching crossover pipe to manifold (Fig. 45).

(11) Disconnect up stream oxygen sensor connector.

(12) Remove bolts attaching rear manifold to cylinder head and remove manifold.

(13) Lower vehicle and remove screws attaching front heat shield to front manifold (Fig. 46).

(14) Remove bolts fastening crossover pipe to front exhaust manifold and nuts fastening manifold to cylinder head. Remove assemblies (Fig. 47).

(15) Inspect and clean manifold. Refer to Cleaning and Inspection outlined in this section for procedures.

INSTALLATION

(1) Install rear exhaust manifold and tighten attaching bolts to 23 N·m (200 in. lbs.).

(2) Install generator.

NOTE: Inspect crossover pipe fasteners for damage from heat and corrosion. Replace if necessary.

(3) Using new gasket attach crossover pipe to exhaust manifold and tighten bolts to 54 N·m (40 ft. lbs.) and connect oxygen sensor lead (Fig. 45).

(4) Install EGR Tube and Generator/Power Steering Strut (Fig. 45).

(5) Using new gaskets install front exhaust manifold and tighten attaching bolts to 23 N·m (200 in. lbs.).

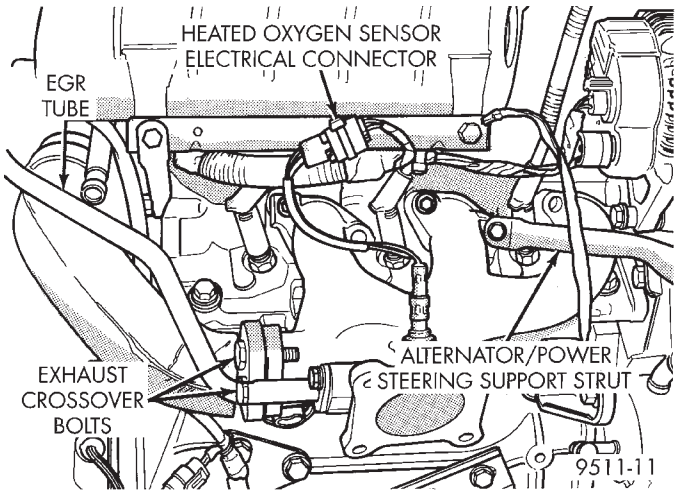

Fig. 45 EGR Tube, Heated Oxygen Sensor and Generator/Power Steering Strut

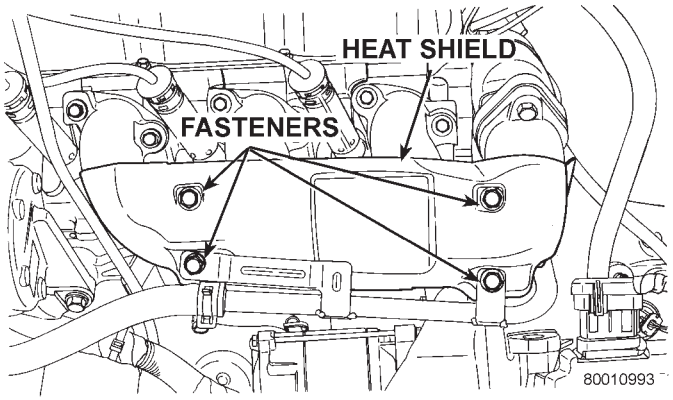

Fig. 46 Heat Shield—Front

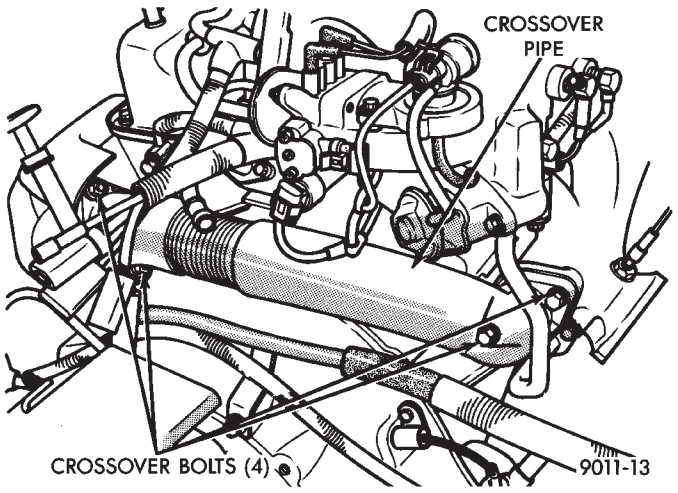

Fig. 47 Crossover Pipe

(6) Attach exhaust crossover with a new gasket and tighten fasteners to 54 N·m (40 ft. lbs.) (Fig. 47).

(7) Connect up stream oxygen sensor connector.

(8) Install exhaust system.

REMOVAL AND INSTALLATION (Continued)

(9) Attach exhaust pipe to exhaust manifold using new gasket and tighten bolts to 28 N·m (250 in. lbs.).

(10) Connect down stream oxygen sensor connector.

(11) Install front manifold heat shield and tighten attaching screws to 12 N·m (105 in. lbs.) (Fig. 46).

(12) Install accessory drive belt. Refer to Accessory Drive section located in Group 7 Cooling System for procedure.

(13) Connect battery negative cable.

CLEANING AND INSPECTION

INTAKE MANIFOLD

INSPECTION

Check for:

- Damage and cracks of each section.
- Clogged water passages in end cross-overs (if equipped).
- Check for cylinder head mounting surface distortion using a straightedge and thickness gauge. Refer to specifications for warpage specification.

CLEANING

Remove the gasket material from the manifold surfaces.

Be careful not to gouge or scratch the sealing surface.

EXHAUST MANIFOLD

INSPECTION

Inspect exhaust manifolds for damage or cracks and check distortion of the cylinder head mounting surface and exhaust cross-over mounting surface with a straightedge and thickness gauge (Fig. 48).

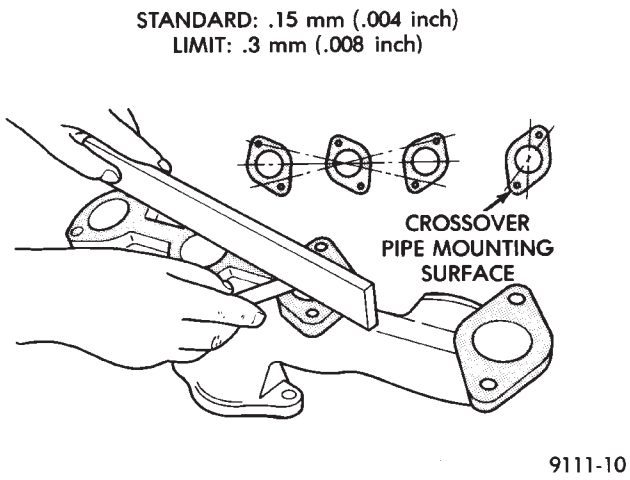

Fig. 48 Check Exhaust Manifold Mounting

CLEANING

Remove the gasket material from the manifold surfaces (if equipped). Be careful not to gouge or scratch the sealing surface.

SPECIFICATIONS

TORQUE CHART

DESCRIPTION	TORQUE
Band Clamp (Torca)	
Fastener	75 N·m (55 ft. lbs.)
Exhaust Manifold—2.4L	
Fastener	23 N·m (200 in. lbs.)
Exhaust Manifold—3.0L	
Nuts	22 N·m (191 in. lbs.)
Exhaust Manifold—3.3/3.8L	
Fastener	23 N·m (200 in. lbs.)
Exhaust Manifold—3.3/3.8L	
Stud	23 N·m (200 in. lbs.)
Exhaust Manifold Heat Shield—3.0L	
Fasteners	15 N·m (130 in. lbs.)
Exhaust Manifold Heat Shield—3.3/3.8L	
Fasteners	12 N·m (105 in. lbs.)
Exhaust Manifold Crossover—3.0L	
Bolts	69 N·m (51 ft. lbs.)
Exhaust Manifold Crossover—3.3/3.8L	
Fasteners	54 N·m (40 ft. lbs.)
Exhaust Manifold Flange (All)	
Fastener	28 N·m (250 in. lbs.)
Heat Shield—Muffler	
Fastener	2 N·m (23 in. lbs.)
Heat Shield—Toe Board	
Fastener	2 N·m (23 in. lbs.)
Insulator Mounting Bracket on Muffler to Body	
Bolts	28 N·m (250 in. lbs.)
Insulator Mounting Bracket on Resonator to Body	
Bolts	28 N·m (250 in. lbs.)
Intake Manifold Gasket Retainer	
Fastener	12 N·m (105 in. lbs.)
Intake Air Plenum—3.0L	
Bolts	15 N·m (130 in. lbs.)
Intake (Cross) Manifold—3.0L	
Bolts	20 N·m (174 in. lbs.)
Intake Plenum Support Bracket—3.3/3.8L	
Fastener	54 N·m (40 ft. lbs.)
Intake Manifold—2.4L	
Fastener	28 N·m (250 in. lbs.)
Intake Manifold Upper—2.4L	
Bolts	28 N·m (250 in. lbs.)
Intake Manifold—3.3/3.8L	
Fastener	23 N·m (200 in. lbs.)
Intake Manifold Plenum—3.3/3.8L	
Bolts	28 N·m (250 in. lbs.)
Muffler Hanger Support Clamp	
Fastener	17 N·m (150 in. lbs.)