EXHAUST SYSTEM AND INTAKE MANIFOLD

CONTENTS

GENERAL INFORMATION

EXHAUST SYSTEMS

The exhaust systems consists of two front exhaust pipes equipped with close coupled metallic catalytic converts and the exhaust module. The exhaust module is a one piece welded module consisting of a underfloor ceramic catalytic converter, muffler and a resonator for the 3.5L vehicle only (Fig. 1).

The exhaust system must be properly aligned to prevent undue stress, leakage and body contact. If the system contacts any other vehicle component, it may amplify objectionable noises originating from the engine or other components. These contacts could also be detrimental to the performance of the affected component.

When inspecting an exhaust system, inspect for cracked or loose joints, stripped threads, corrosion damage, and worn, cracked or broken hangers. Replace all components that are badly corroded or damaged. Do not attempt to repair.

CATALYTIC CONVERTERS

There is no regularly scheduled maintenance on any Chrysler catalytic converter. Excessive heat may cause bulging or other distortion, but excessive heat will not be the fault of the converter. A fuel system or ignition system malfunction that permits unburned fuel to enter the converter will usually cause overheating. **If a converter is heat damaged, correct the cause of the damage at the same time the converter is replaced. The converter must be replaced.** Inspect all other components of the exhaust system for heat damage. Unleaded gasoline must be used to avoid damage to the catalyst core.

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

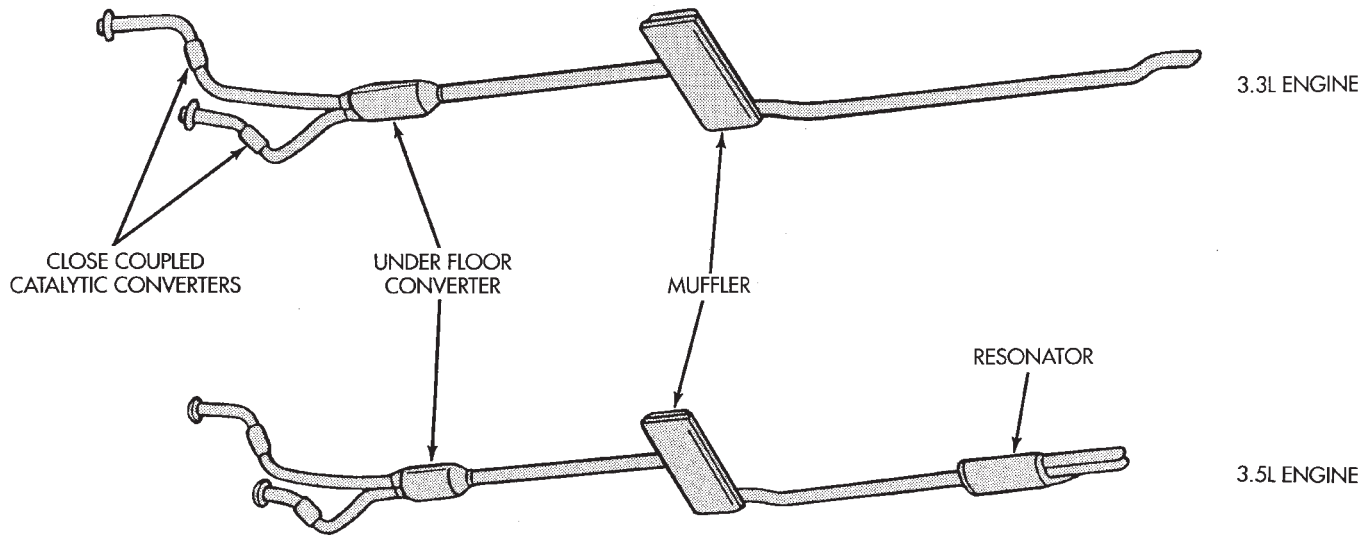

Fig. 1 Exhaust System

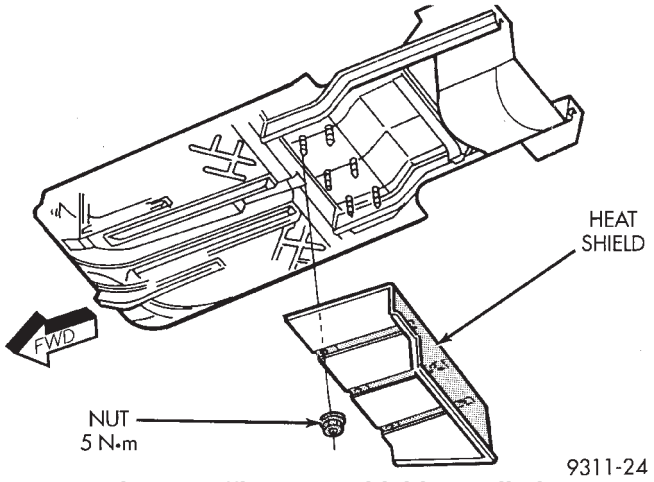

Fig. 2 Muffler Heat Shield Installation

EXHAUST GAS RECIRCULATION (EGR) SYSTEM

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

Exhaust gases are routed through a tube from the exhaust manifold to the intake manifold adaptor. Where they are metered by the EGR valve into the intake system. REFER TO SECTION 25, EMISSION CONTROL SYSTEMS FOR A COMPLETE DESCRIPTION, DIAGNOSIS AND THE PROPER SERVICE PROCEDURES.

HEAT SHIELDS

Heat shields (Fig. 2) are needed to protect both the car and the environment from the high temperatures developed in the vicinity of the catalytic converters and muffler. Each catalytic converter has a intergal heat shield attached to it and are not to be removed.

Refer to Body and Sheet Metal, Group 23 for service procedures.

CAUTION: Avoid application of rust prevention compounds or undercoating materials to exhaust system heat shields on cars if equipped. Light overspray 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.

The combustion reaction caused by the catalyst releases additional heat in the exhaust system. Causing the temperature to increase 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 if exhaust system is equipped with catalytic converter. Failure of the catalytic converter can occur due to temperature increases caused by unburned fuel 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 above 1200 RPM in neutral for extended periods over 5 minutes. This condition may result in excessive exhaust system/floor pan temperatures because of no air movement under the vehicle.

EXHAUST SYSTEM DIAGNOSIS

Condition	Possible Cause	Correction
EXCESSIVE EXHAUST NOISE (UNDER HOOD)	(a) Exhaust manifold cracked or broken	(a) Replace manifold
	(b) Manifold to cylinder head leak	(b) Tighten manifold and/or replace gasket
	(c) EGR Valve Leakage a, EGR Valve to Manifold Gasket b, EGR Valve to EGR Tube Gasket c, EGR Tube to Manifold Tube Nut	(c) a, Tighten nuts or replace gasket b, Tighten nuts or replace gasket c, Tighten tube nut
	(d) Exhaust Joint	(d) Inspect for cracks, leaks. Replace parts if necessary. Tighten joint nuts if no cracks found.
	(e) Pipe and shell noise from front exhaust pipe	(e) Possible failure of closed-coupled converter. Possible loosening of welded heat shield. Check for loose parts, leaks, and replace parts as needed.
EXCESSIVE EXHAUST NOISE	(a) Leaks at pipe joints	(a) Tighten clamps at leaking joints
	(b) Burned or blown or rusted out muffler, tailpipe of exhaust pipe.	(b) Replace muffler or muffler tailpipe or exhaust pipe.
	(c) Burned or blown or rusted out resonator	(c) Replace resonator and exhaust spouts
	(d) Restriction in exhaust module	(d) Remove restriction, if possible, or replace as necessary
	(e) Converter material in muffler, resonator	(e) Replace exhaust module. Check fuel injection and ignition systems for proper operation.

9411-26

SERVICE PROCEDURES

INDEX

EXHAUST SYSTEM

REMOVAL

It is easier to service any portion of the exhaust system if the entire exhaust system (except the exhaust manifolds) is removed from the vehicle.

(1) Raise vehicle on swing arm hoist.

(2) Apply penetrating oil and remove to the front down pipes to exhaust manifolds nuts (Fig. 4).

(3) Apply penetrating oil and remove the front down pipes to transmission intermediate support bracket bolts.

CAUTION: At this time,the exhaust system is held by only isolators. Support the exhaust system underneath the underfloor convertor and the muffler while the isolators are being removed. Do not use any tools to remove the isolators, remove by hand only. Soapy water or silicone-based spray may be used to assist removal. DO NOT USE A PETROLEUM-BASED LUBRICANT ON THE ISOLATORS, This will damage the rubber material.

(4) Remove the rubber isolators from the welded exhaust system rod wire hangers (Fig. 3).

(5) Carefully maneuver the front down pipes past the engine, engine support cradle, and transmission. Lay the exhaust system on the ground.

When replacement is required on any component of the exhaust system, it is most important that original equipment parts 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 affect emissions and performance.

INSTALLATION

(1) Install and loose assemble the front pipes to the exhaust manifolds and the transmission support bracket.

(2) Place the exhaust module onto two supports (one under the underfloor catalytic convertor, one under the muffler). Slide the module forward onto the front pipes until the front of the underfloor convertor inlet bushings are touching the dimples on the front pipes.

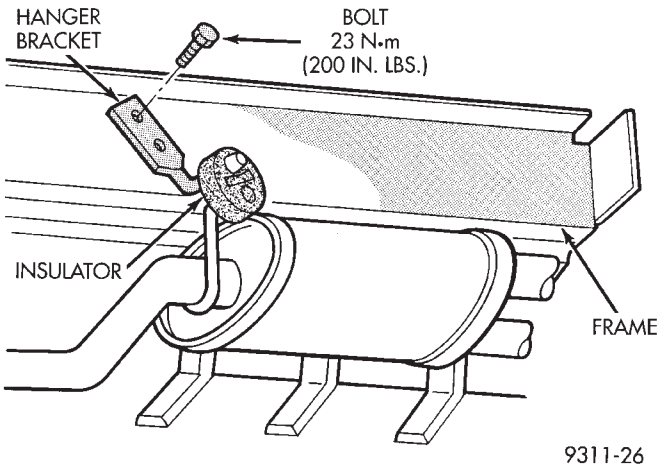

Fig. 3 Rubber Insulator Hanger (Typical)

(3) Install the module's rubber isolators onto the body brackets.

(4) Visually inspect the isolators. They should be straight when viewing from front to back of the vehicle. Working from the front of system, align each component to maintain position and proper clearance with underbody parts.

(5) Orientate and tighten all clamps and supports to the proper torques and clearances (Fig. 5).

(6) Lower the vehicle.

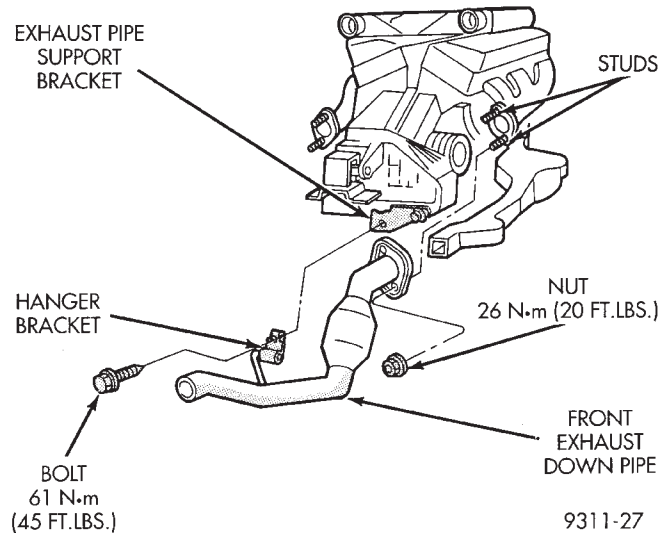

Fig. 4 Front Exhaust Down Pipes Connection

FRONT EXHAUST DOWN PIPES

REMOVAL

(1) Remove the exhaust system. Refer to procedure outlined in this section.

(2) Apply penetrating oil and loosen the U-bolt clamps that fasten the front pipes to the inlet bushings of the underfloor convertor (Fig. 5).

(3) Remove front pipes from the slip joints. Heat may be required to allow removal from the front bushing.

INSTALLATION

(1) Install and loose assemble the front pipes to the exhaust manifolds and the transmission support bracket.

(2) Install exhaust system. Refer to procedure outlined in this section.

EXHAUST MODULE

There are three service components available for each vehicle when servicing the module:

- Underfloor catalytic convertor
- Muffler assembly
- Tailpipe assembly (3.3L engine) or Resonator assembly (3.5l engine)

There are different muffler assemblies and resonator assemblies, dependent on the type of vehicle being serviced. Be certain to select the proper assembly for the vehicle being serviced.

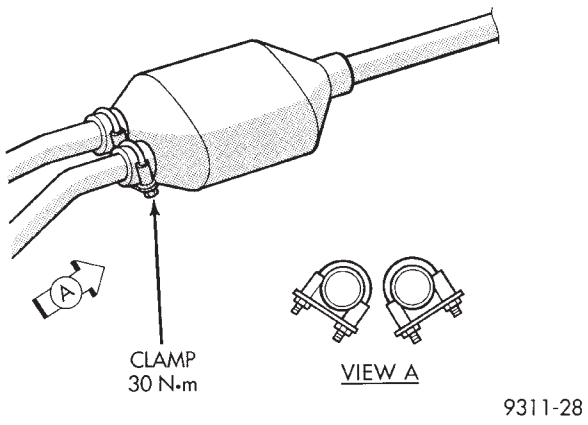

Fig. 5 Exhaust Down Pipe to Catalytic Converter Clamp Orientation

REMOVAL

(1) Remove the exhaust system. Refer to procedure outlined in this section.

(2) Remove front down pipes. Refer to procedure outlined in this section.

UNDERFLOOR CONVERTOR SERVICE

(1) With the exhaust module removed, cut the convertor to muffler intermediate pipe just in front of the muffler (Fig. 6).

(2) Install the new convertor onto the remainder of the intermediate pipe and loose assembly the accompanying clamp.

(3) Install front down pipes. Refer to procedure outlined in this section.

(4) Install exhaust system. Refer to procedure outlined in this section.

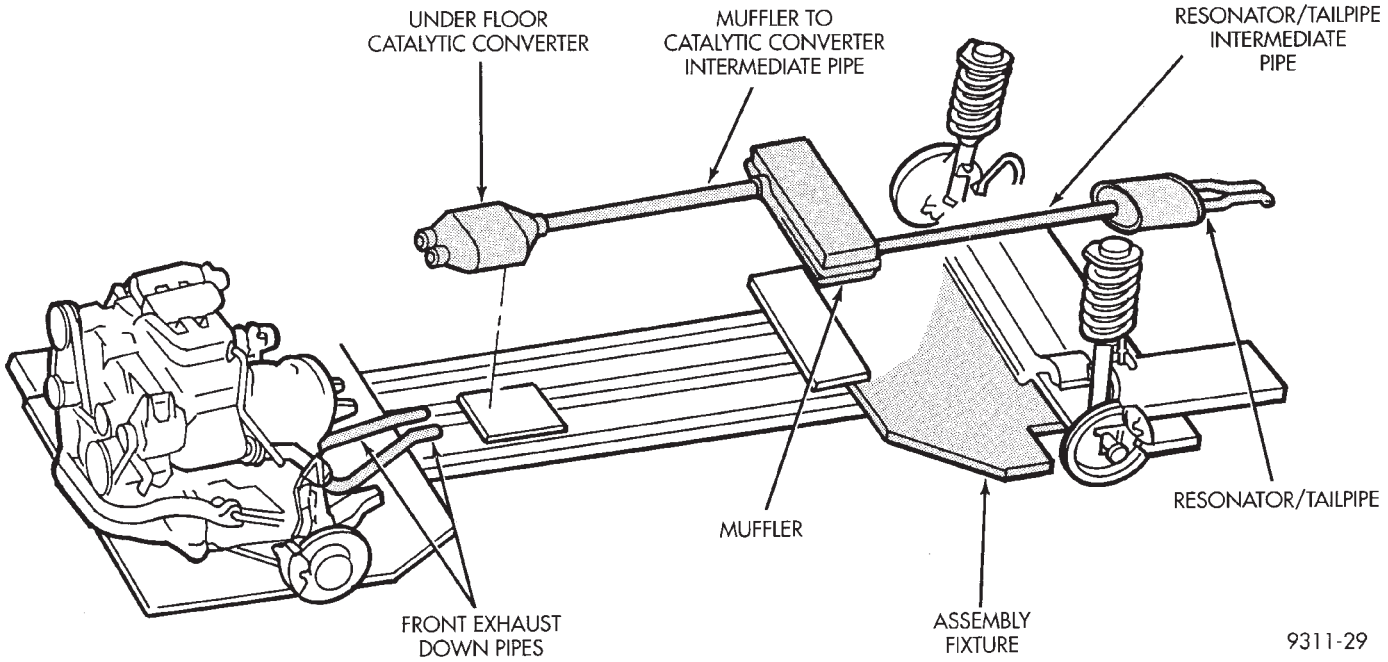

Fig. 6 Underfloor Catalytic Converter and Muffler Assembly Service Locations

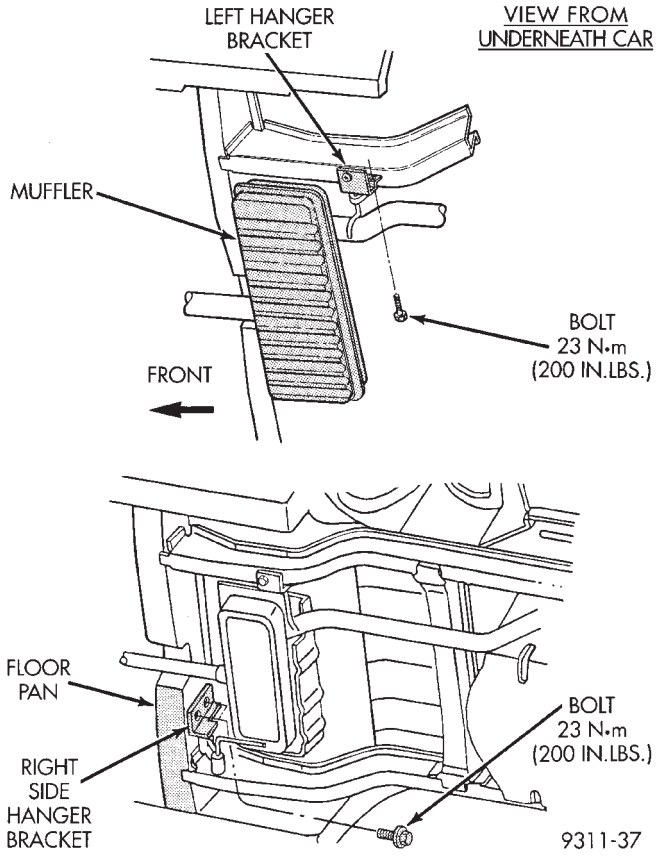

Fig. 7 Muffler Assembly Support Bracket Locations

MUFFLER ASSEMBLY SERVICE

(1) With the exhaust system removed, cut the convertor to muffler intermediate pipe just in behind the convertor (Fig. 6).

(2) Install the new muffler assembly onto the remainder of the intermediate pipe and loose assembly the accompanying clamp.

(3) Remove the exhaust support brackets from the vehicle (Fig. 7).

(4) Install new exhaust support brackets found on the replacement muffler assembly onto vehicle in the same location the old ones were removed (Fig. 7).

(5) Install exhaust system. Refer to procedure outlined in this section.

TAILPIPE/RESONATOR ASSEMBLY SERVICE

(1) With the exhaust system removed, cut the tailpipe/or resonator assembly intermediate pipe next to the rear suspension crossmember (Fig. 8).

(2) Install the correct tailpipe/resonator assembly onto the remainder of the intermediate pipe/tailpipe and loose assembly the accompanying clamp.

(3) Remove the exhaust support bracket(s) from the vehicle (Fig. 8).

(4) Install new exhaust support bracket(s) found on the replacement tailpipe/resonator assembly onto vehicle in the same location the old ones were removed (Fig. 8).

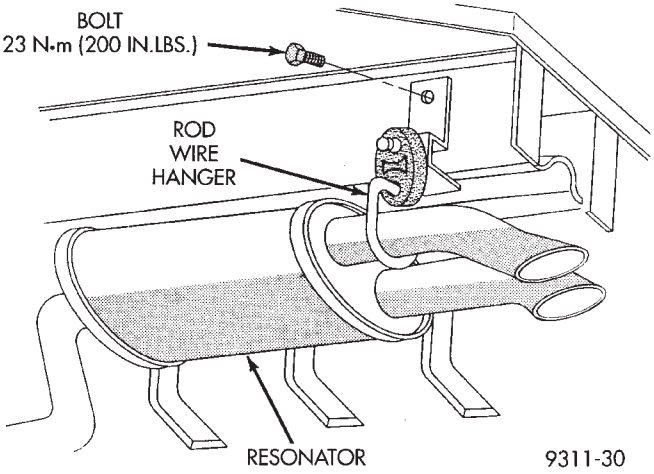

Fig. 8 Tailpipe/Resonator Support Brackets

(5) Install exhaust system. Refer to procedure outlined in this section.

INTAKE/EXHAUST MANIFOLD SERVICE—3.3L ENGINES

INTAKE MANIFOLD

REMOVAL

(1) Release fuel system pressure. Refer to Fuel System Pressure Release Procedure in this section.

(2) Drain cooling system. Refer to Cooling System, Group 7.

Disconnect negative cable from battery.

FUEL SYSTEM PRESSURE RELEASE PROCEDURE

(a) Disconnect negative cable from battery.

(b) Remove fuel filler cap.

(c) Remove the protective cap from the fuel pressure test port on the fuel rail (Fig. 1 or Fig. 2).

(d) Place the open end of fuel pressure release hose, tool number C-4799-1, into an approved gas-

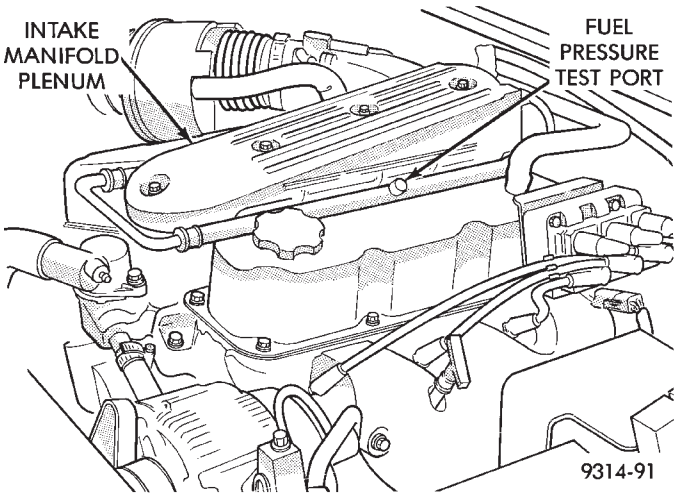

Fig. 1 Fuel Pressure Test Port—3.3L Engine

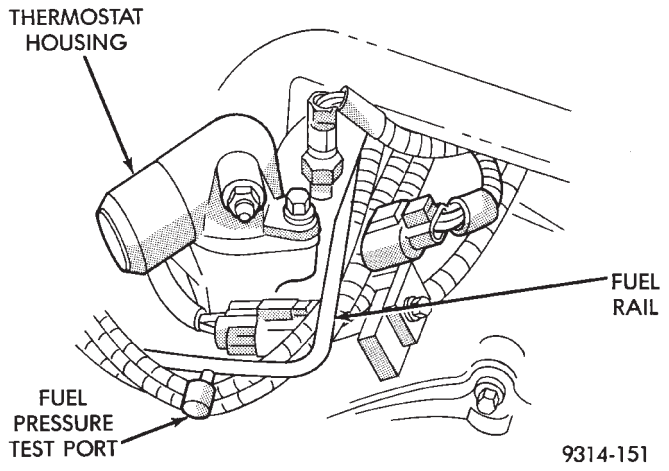

Fig. 2 Fuel Pressure Test Port—3.5L Engine

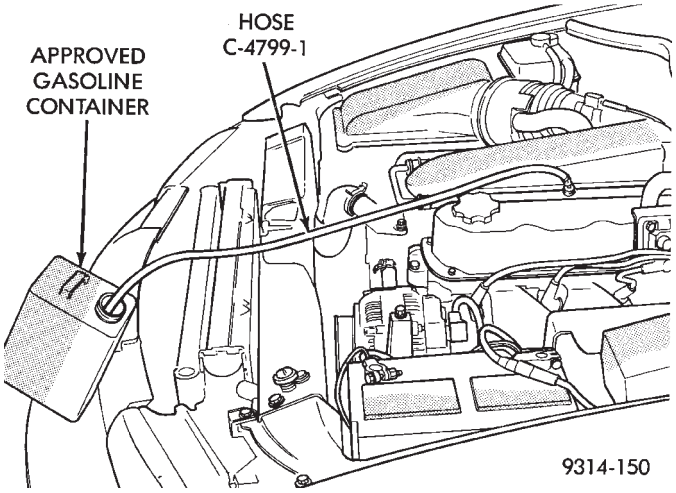

Fig. 3 Releasing Fuel Pressure—Typical

oline container. Connect the other end of hose C-4799-1 to the fuel pressure test port (Fig. 3). Fuel pressure will bleed off through the hose into the gasoline container. Fuel gauge C-4799-A contains hose C-4799-1.

(3) Disconnect air tube from air cleaner and throttle body.

(4) Hold throttle lever in wide-open position. Remove throttle cable and speed control cable from lever.

(5) Compress locking tabs on throttle cable and speed control cable and remove them from bracket (Fig. 13).

(6) Disconnect electrical connector from solenoid on EGR valve transducer (Fig. 14).

(7) Disconnect electrical connector from MAP sensor (Fig. 14). Disconnect the Intake Air Temperature sensor electrical connector on Flexible Fuel Vehicles (FFV) only.

(8) Disconnect hose from PCV valve at rear of intake manifold plenum. Disconnect brake booster hose from nipple at rear of intake manifold plenum. Disconnect vacuum line from fuel pressure regulator.

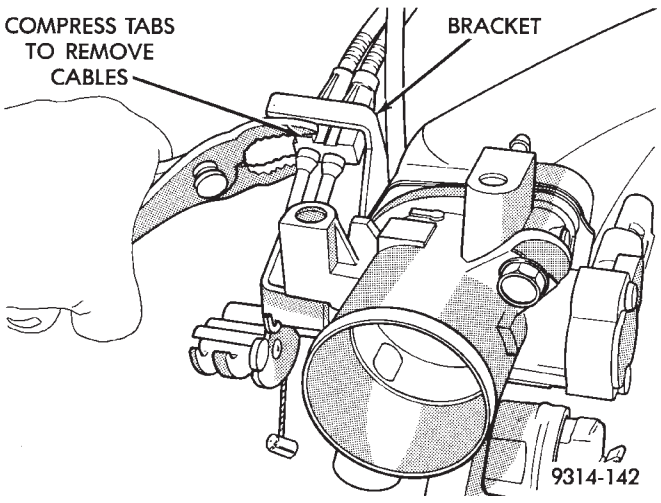

Fig. 4 Removing Throttle Cable and Speed Control Cable

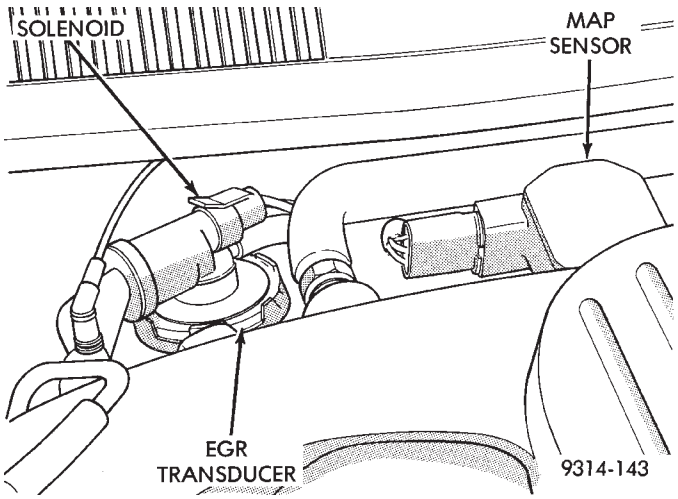

Fig. 5 EGR Transducer

(9) Disconnect purge hose from throttle body. Disconnect electrical connector from throttle position sensor and idle air control motor (Fig. 6).

(10) Remove EGR tube mounting screws at intake manifold plenum (Fig. 15).

(11) Remove intake manifold plenum mounting bolts. Lift Plenum up off of engine. Cover intake manifold to prevent foreign material from entering engine.

(12) Disconnect fuel supply and return tube quick connect fittings at the rear of intake manifold (Fig. 16). Refer to Quick Connect Fittings in the Fuel Delivery Section of this Group.

(13) Remove screw from fuel tube clamp (Fig. 16). Separate fuel tubes from bracket.

(14) Rotate injectors toward center of engine. Tag the injector connectors with their cylinder number. Disconnect electrical connector from injectors.

(15) Remove fuel rail mounting bolts (Fig. 17).

(16) Lift fuel rail straight up, off of engine. Cover fuel injector openings in intake manifold.

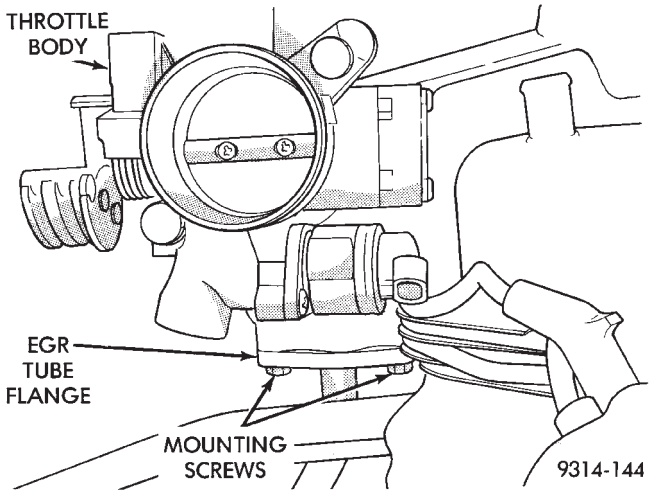

Fig. 6 EGR Tube

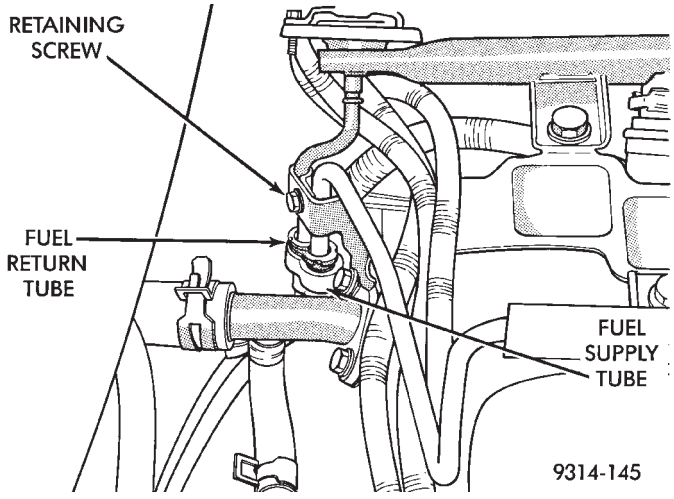

Fig. 7 Fuel Supply and Return Tubes

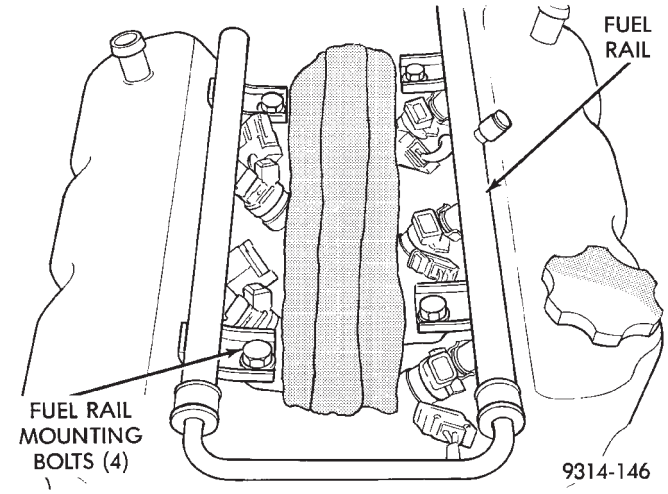

Fig. 8 Fuel Rail

(17) Remove upper radiator hose, bypass hose and rear intake manifold hose (Fig. 13).

(18) Remove intake manifold bolts. Remove intake manifold.

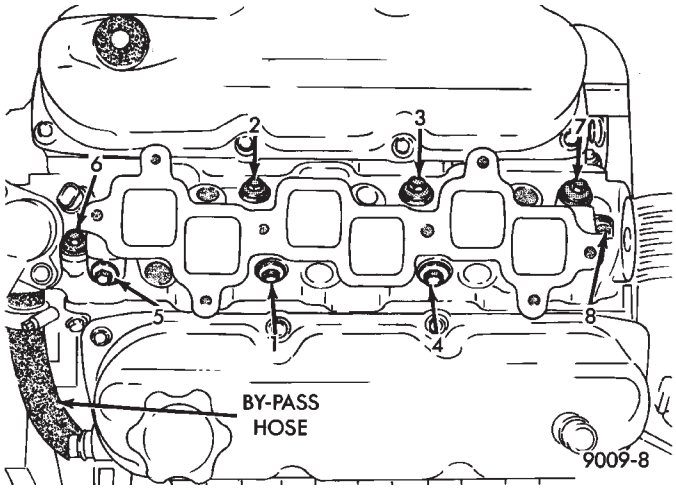

Fig. 9 Intake Manifold Removal and Installation

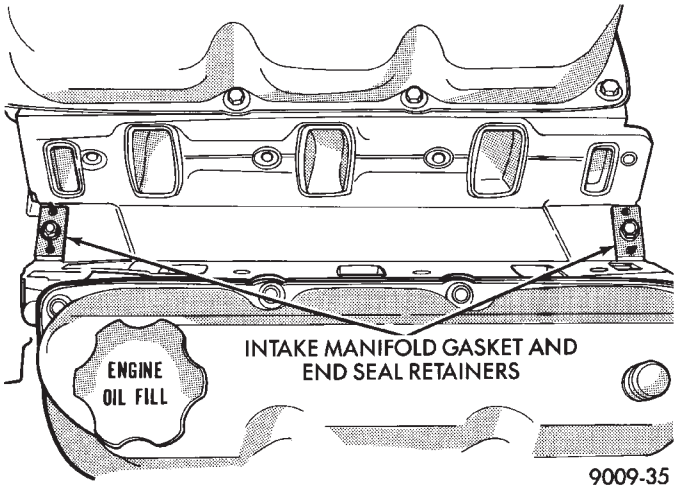

Fig. 10 Intake Manifold Gasket

(19) Remove intake manifold seal retainers screws (Fig. 14). Remove intake manifold gasket.

INSPECTION

Check for:

- Damage and cracks of each section.
- Clogged water passages in end cross overs and clogged gas passages.

INSTALLATION

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

(2) Place a drop (about 1/4 in. diameter) of Mopar Silicone Rubber Adhesive Sealant or equivalent, onto each of the **four** manifold to cylinder head gasket corners (Fig. 15).

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

(3) Carefully install the intake manifold gasket (Fig. 14). Tighten end seal retainer screws to 12 N·m (105 in. lbs.) torque.

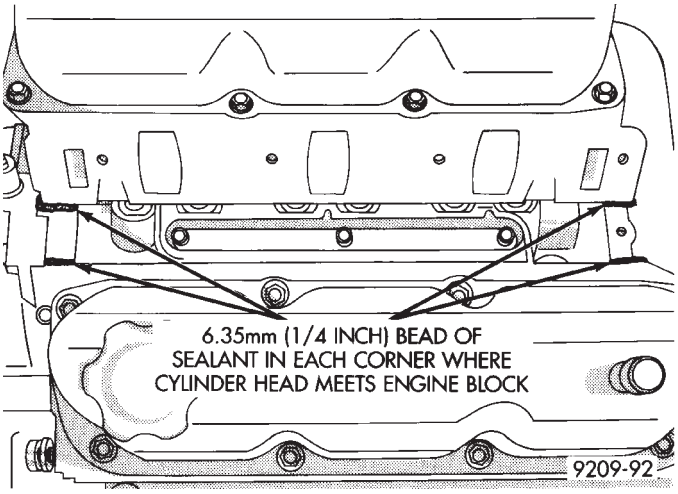

Fig. 11 Intake Manifold Gasket Sealing

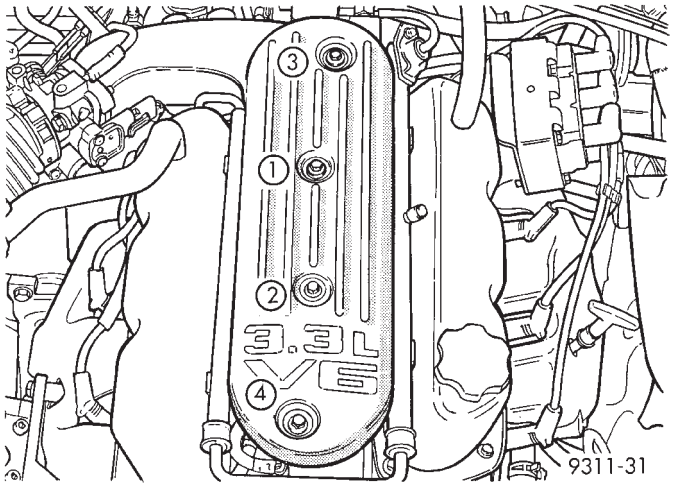

Fig. 12 Intake Manifold Plenum Tightening Sequence

(4) Install intake manifold and (8) bolts and tighten to 1 N·m (10 in. lbs.) torque. Then tighten bolts to 22 N·m (200 in. lbs.) torque in sequence shown in (Fig. 11). Then tighten again to 22 N·m (200 in. lbs.) torque. After intake manifold is in place, **inspect to make sure seals are in place.**

(5) Apply a light coating of clean engine oil to the O-ring on the nozzle end of each injector.

(6) Insert fuel injector nozzles into openings in intake manifold. Seat the injectors in place. Tighten fuel rail mounting screws to 22 N·m (200 in. lbs.) torque.

(7) Attach electrical connectors to fuel injectors.

(8) Connect fuel supply and return tubes to fuel rail. Refer to Quick Connect Fittings in the Fuel Delivery Section of this Group. Place clamp over fuel tubes and install retaining screw.

(9) Remove cover from intake manifold. Place plenum with new gasket on intake manifold. Loosely install mounting bolts.

(10) Place a new gasket on the EGR tube flange. Loosely install EGR tube mounting screws.

(11) Tighten Intake Manifold Plenum mounting bolts to 28 N·m (250 in. lbs.) in sequence as shown in (Fig. 12).

(12) Tighten EGR tube mounting screws.

(13) Connect hoses to PCV valve and brake booster nipple.

(14) Attach electrical connectors to the MAP sensor and EGR transducer solenoid. Connect the Intake Air Temperature sensor electrical connector on Flexible Fuel Vehicles (FFV) only.

(15) Attach electrical connectors to throttle position sensor and idle air control motor.

(16) Install throttle cable and speed control cable in bracket.

(17) Hold throttle body lever in wide-open position. Install throttle and speed control cables.

(18) Connect purge hose to throttle body.

(19) Connect air tube from air cleaner and throttle body.

(20) Fill cooling system. Refer to Cooling System, Group 7 for procedure.

EXHAUST MANIFOLDS

REMOVAL

(1) Raise vehicle and disconnect exhaust pipe from the exhaust manifold.

(2) Separate EGR tube from the manifold and disconnect Heated Oxygen Sensor lead wire (Fig. 13).

(3) Remove screws attaching heat shield to manifold (Fig. 13).

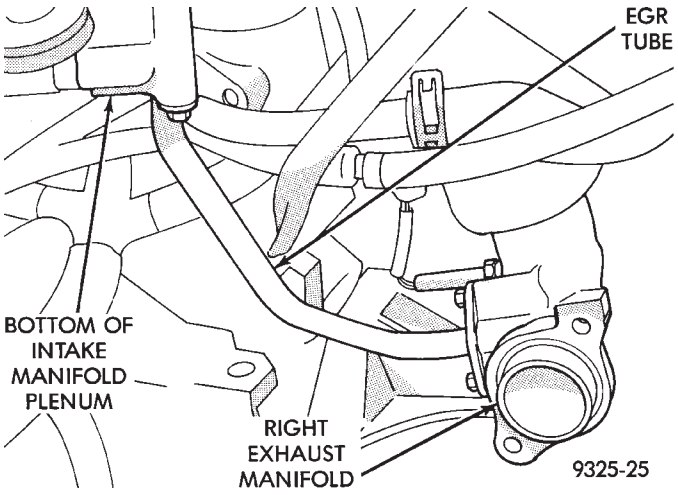

Fig. 13 EGR Tube to Exhaust Manifold

(4) Remove bolts attaching the manifold to cylinder head and remove manifold.

INSPECTION

Inspect exhaust manifolds for damage or cracks and check distortion of the cylinder head mounting surface mounting surface with a straightedge and thickness gauge.

EXHAUST MANIFOLD

INSTALLATION

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

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

(3) Install EGR Tube (Fig. 13).

(4) Install manifold heat shield and tighten attaching screws to 23 N·m (200 in. lbs.) torque (Fig. 14).

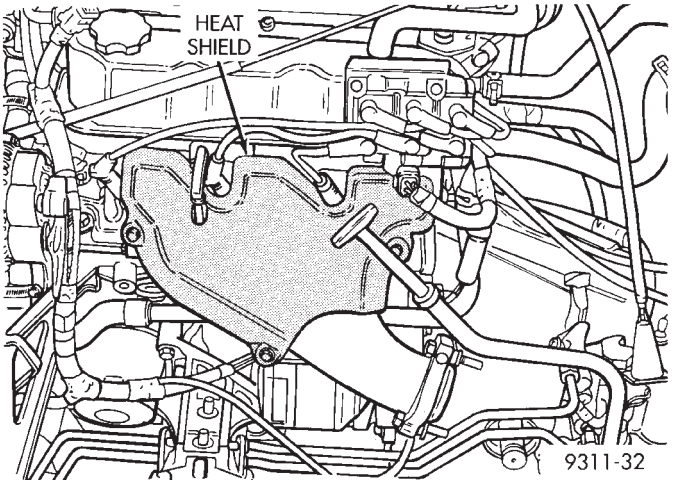

Fig. 14 Heat Shield

INTAKE/EXHAUST MANIFOLD SERVICE—3.5L ENGINE

The intake system has a large air intake plenum of aluminum alloy and a cross type intake manifold.

REMOVAL

(1) Release fuel system pressure. Refer to Fuel System Pressure Release Procedure in this section.

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

(3) Remove engine cover from top of intake manifold plenum.

(4) Remove accelerator cable and speed control cable from throttle arm (Fig. 1).

(5) Disconnect electrical connector from idle air control motor (Fig. 2).

(6) Disconnect electrical connector from intake air temperature sensor (Fig. 2).

(7) Remove ground screw from intake manifold (Fig. 2).

(8) Disconnect vacuum hose from manifold tuning valve (Fig. 2).

(9) Disconnect electrical connector from manifold absolute pressure (MAP) sensor (Fig. 3).

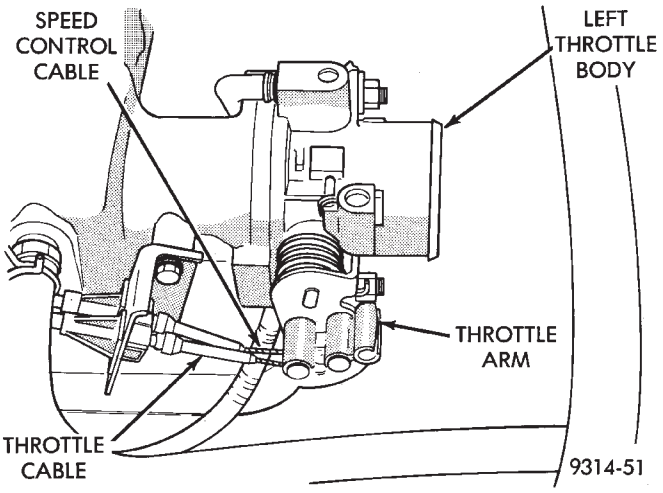

Fig. 1 Throttle Lever—3.5L Engine

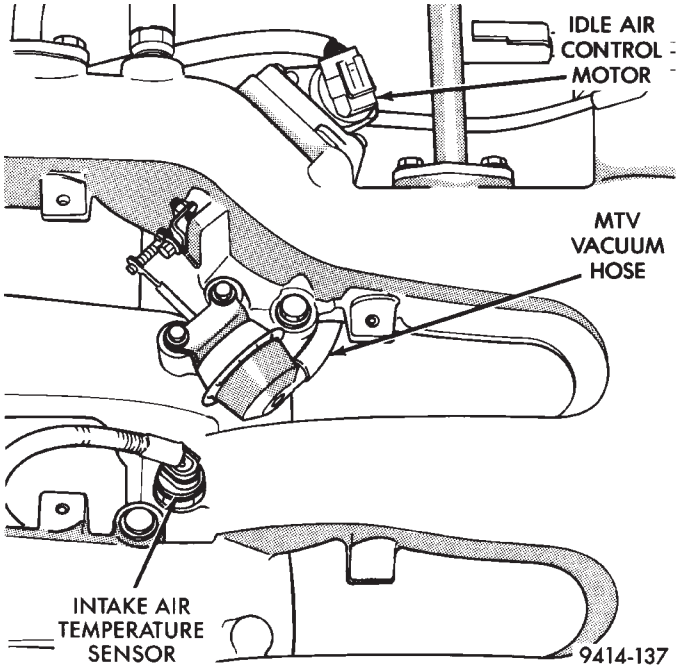

Fig. 2 Idle Air Control Motor

(10) Disconnect electrical connector from throttle position sensor (Fig. 4).

(11) Disconnect purge hose from throttle bodies (Fig. 4).

(12) Disconnect PCV make-up air hose and idle air control motor supply hose (part of air inlet plenum). Remove air inlet plenum from behind manifold (Fig. 5).

(13) Disconnect PCV hose, brake booster hose and vacuum hoses from intake manifold.

(14) Remove EGR tube mounting bolts at intake manifold plenum (Fig. 6). Discard gaskets.

(15) Remove air plenum support bracket bolt on each side of manifold (Fig. 7).

(16) Remove intake manifold plenum mounting bolts. The plenum uses two different length bolts.

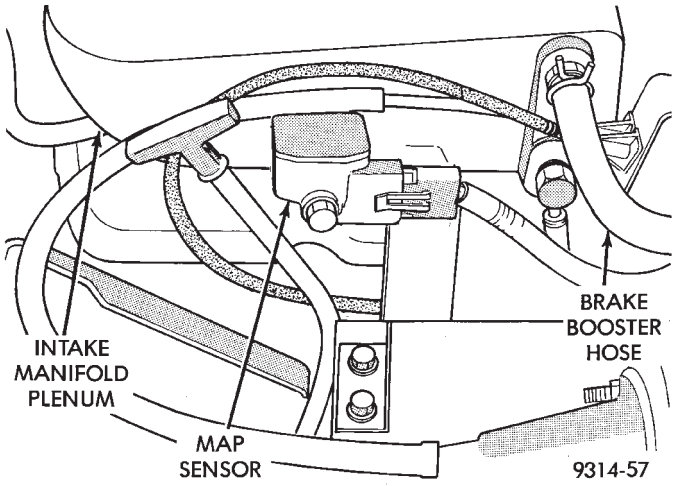

Fig. 3 MAP Sensor

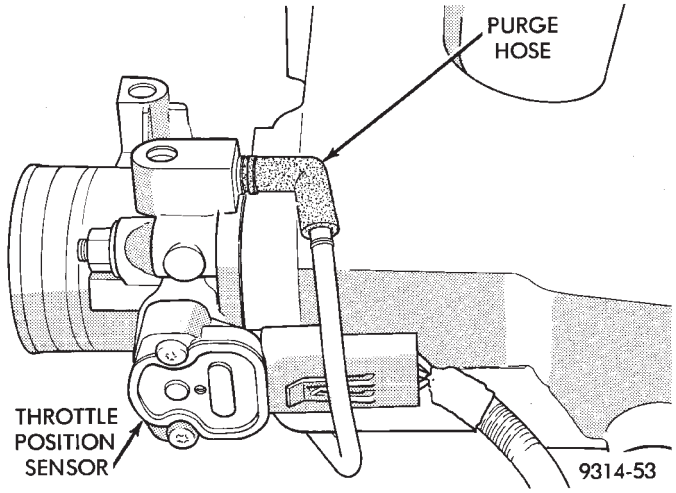

Fig. 4 Throttle Position Sensor

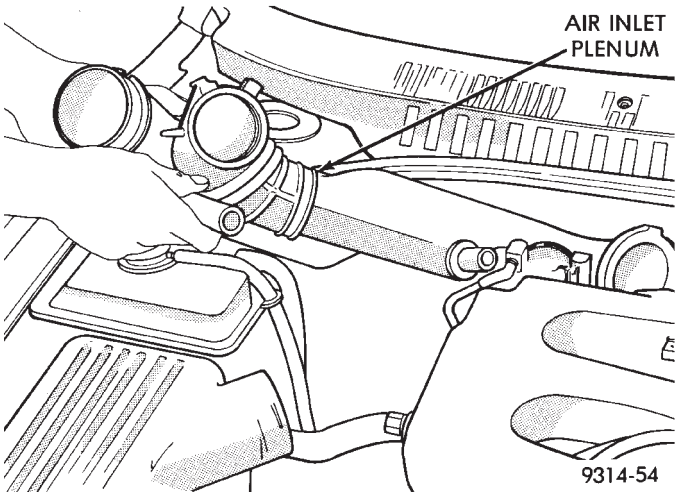

Fig. 5 Air Inlet Plenum

(17) Remove intake manifold plenum. Discard gaskets. Cover the intake manifold openings with tape.

(18) Remove upper radiator hose from thermostat housing and heater hose from rear of intake manifold.

(19) Remove intake manifold attaching bolts (Fig. 9).

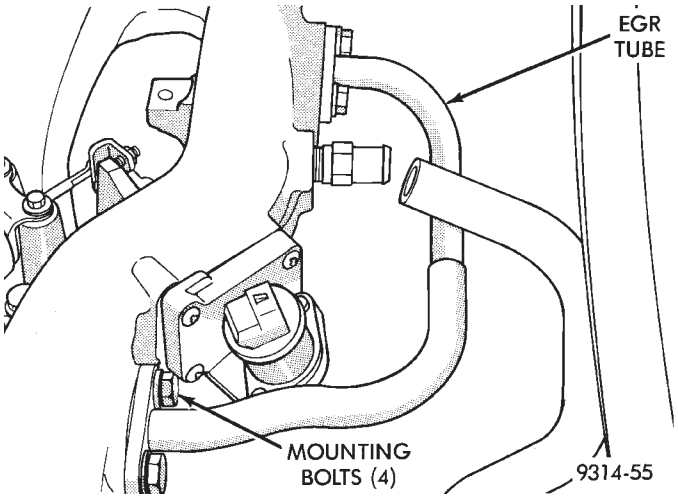

Fig. 6 EGR Tube Top Mounting Bolts

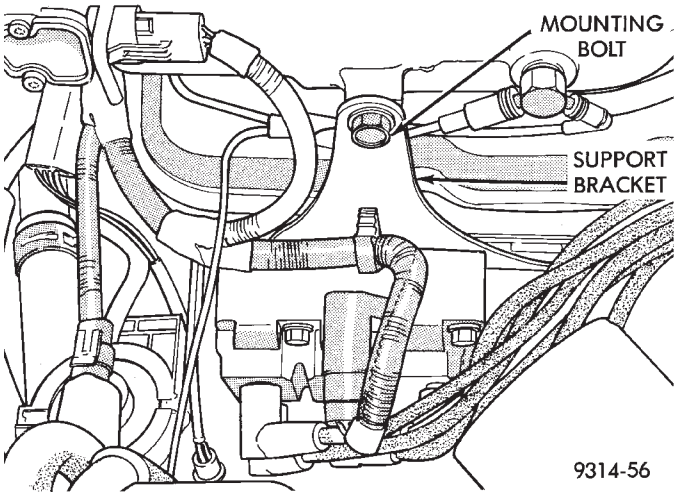

Fig. 7 Intake Manifold Plenum Support (Right Side)

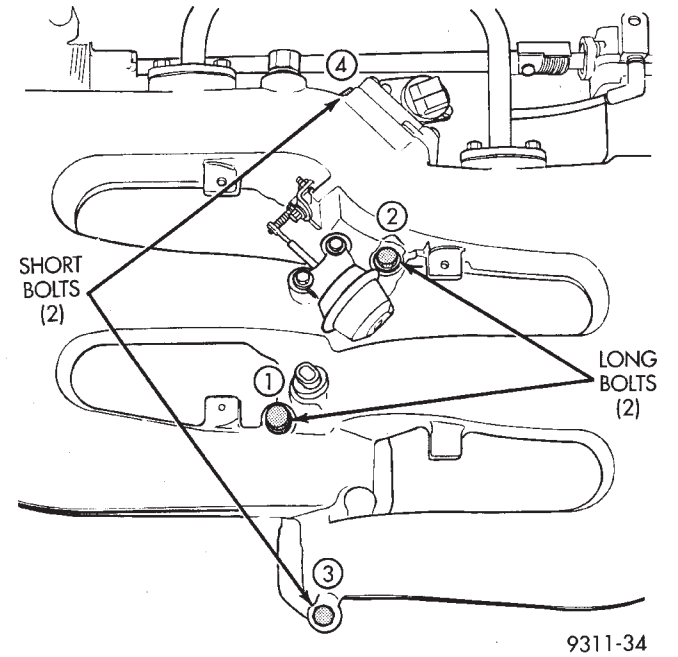

Fig. 8 Intake Manifold Plenum

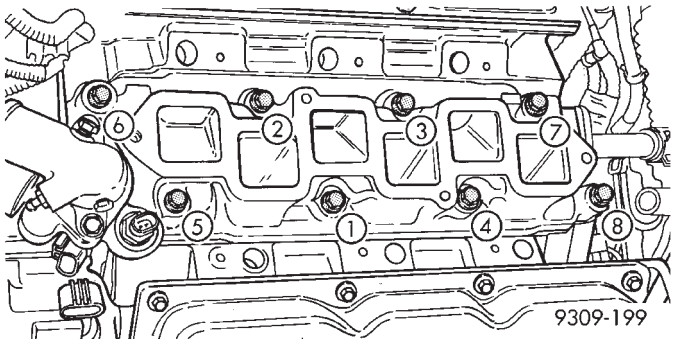

Fig. 9 Intake Manifold Tightening Sequence

INSTALLATION

(1) Install intake manifold with new gaskets. Tighten in sequence shown in (Fig. 9) to 28 N·m (250 in. lbs.).

(2) Connect upper radiator hose and heater hose at the rear of intake manifold.

(3) Ensure that ignition cables are routed correctly so they will not be pinched when plenum is installed.

(4) Install intake manifold plenum with new gaskets. Tighten in sequence shown in (Fig. 8) to 28 N·m (250 in. lbs.).

(5) Install and tighten support bracket bolts.

(6) Attach electrical connectors to MAP Sensor, TPS, idle air control motor and intake air temperature sensor.

(7) Connect vacuum hose to manifold tuning valve diaphragm.

(8) Install EGR tube. Refer to Group 25 for EGR tube tightening sequence and specifications.

(9) Rotate throttle arm to wide open throttle position and install the speed control cable and throttle cable.

(10) Connect hose to PCV valve.

(11) Install air cleaner plenum.

(12) Install air cleaner to plenum hose.

(13) Attach ground wire to intake manifold plenum.

(14) Connect brake booster hose to fitting on intake manifold plenum.

(15) Connect purge tubes to fittings on throttle bodies.

(16) Install cover on intake manifold plenum.

(17) Connect negative cable to battery.

(18) Fill cooling system. Refer to Cooling System Group 7 for procedure.

EXHAUST MANIFOLDS

REMOVAL

(1) Raise vehicle and disconnect exhaust pipes from the exhaust manifold.

(2) Disconnect Oxygen Sensor lead wire at the exhaust manifold (Fig. 11).

(3) Lower vehicle and remove screws attaching heat shields from the manifolds (Fig. 10).

(4) Remove bolts attaching the manifold to cylinder head and remove manifold.

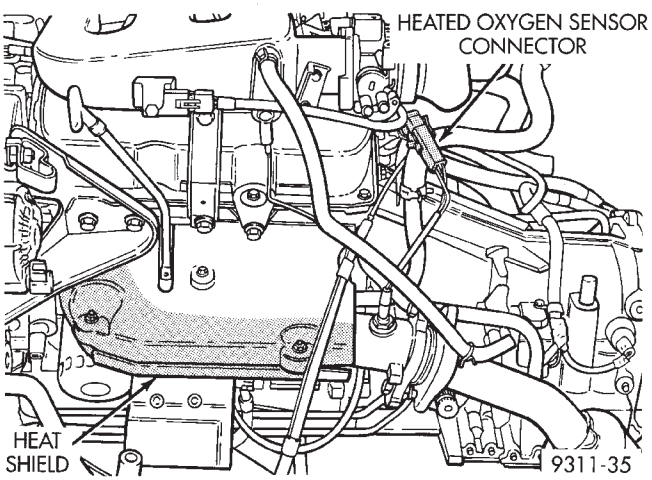

Fig. 10 Heat Shield and Oxygen Sensor Wire Connection

INSPECTION

Inspect exhaust manifolds for damage or cracks and check distortion of the cylinder head mounting surface with a straightedge and thickness gauge.

INSTALLATION

(1) Install the gasket and manifold.

(2) Tighten attaching bolts to 20 N·m (175 in. lbs.).

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

(4) Connect heated oxygen sensor lead (Fig. 10).

(5) Install manifold heat shield and tighten attaching screws to 15 N·m (130 in. lbs.) (Fig. 10).

TORQUE SPECIFICATION

Exhaust Manifold Nuts to Front Down Pipes (All)	27 N·m (20 ft. lbs.)
Exhaust Manifold Mounting Screws 3.3L	23 N·m (200 in. lbs.)
Heat Shield Mounting Screws 3.3L	23 N·m (200 in. lbs.)
Intake Manifold Attaching Screws 3.3L	23 N·m (200 in. lbs.)
Intake Plenum Attaching Screws 3.3L	28 N·m (250 in. lbs.)
Intake Manifold Gasket Retainer Screws 3.3L	12 N·m (105 in. lbs.)
Muffler Heat Shield Mounting Nuts	5 N·m (45 in. lbs.)
Insulator Mounting Bolts	23 N·m (200 in. lbs.)
Exhaust U-Bolt in Front of Underfloor Converter Nut	33 N·m (24 ft. lbs.)
Intake Manifold Screws 3.5L	28 N·m (250 in. lbs.)
Intake Plenum Attaching Screws 3.5L	28 N·m (250 in. lbs.)
Exhaust Manifold Mounting Screws 3.5L	23 N·m (200 in. lbs.)
Exhaust Module Body Bracket Support	25 N·m (18 ft. lbs.)
Exhaust Support Bracket to Transmission Screw	47 N·m (35 ft. lbs.)
Exhaust Front Down Pipes to Exhaust Support Bracket Screw	47 N·m (35 ft. lbs.)
Exhaust Manifold Heat Shield Mounting Screws	15 N·m (130 in. lbs.)

9311-36