

EXHAUST SYSTEM AND INTAKE MANIFOLD

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GENERAL INFORMATION

Throughout this group, references may be made to a particular vehicle by letter or number designation. A chart showing the breakdown of these designations is included in the Introduction Section at the front of this service manual.

EXHAUST SYSTEMS

The exhaust systems are produced in several configurations, depending on engine and car line (Fig. 1). One system has an underfloor catalytic converter, other systems require front mounted catalytic converters. Some turbocharged engines require, an underfloor converter/resonator assembly. Tail pipes, mufflers, and resonators are sized and tuned to each vehicle/powertrain combination (Fig. 2).

EXHAUST BALL JOINT COUPLING

A exhaust ball joint coupling (Fig. 3) is used to secure the exhaust pipe 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 ball joint consists of two bolts, two springs, and a ball joint seal ring which is a separate part from the exhaust pipe.

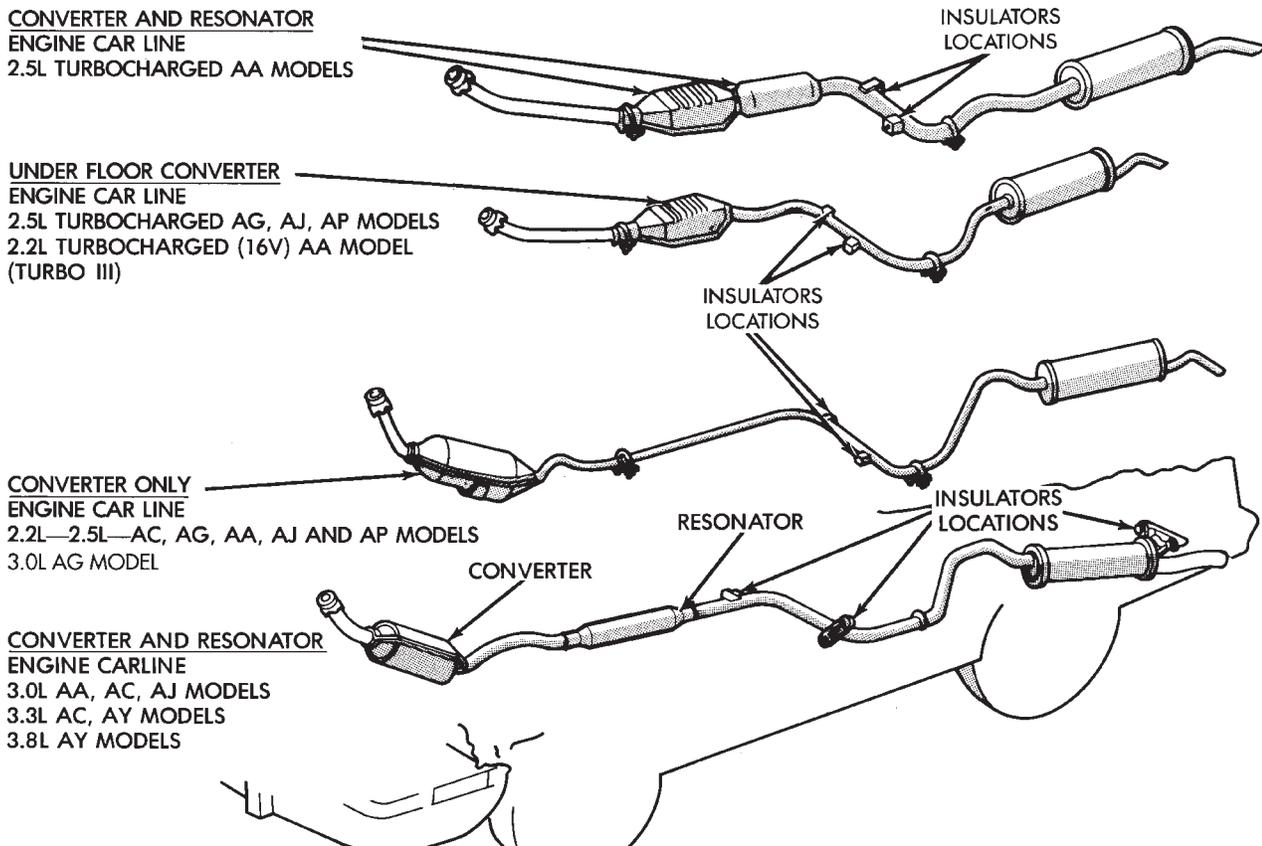
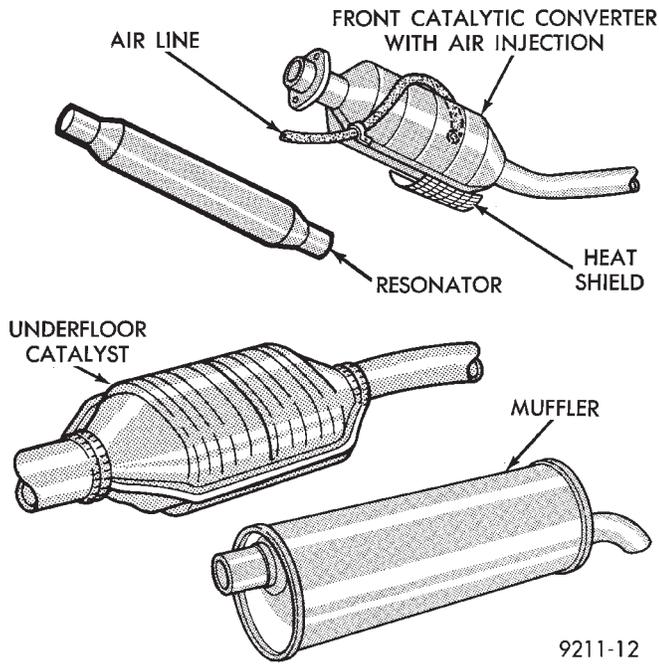


Fig. 1 Exhaust System

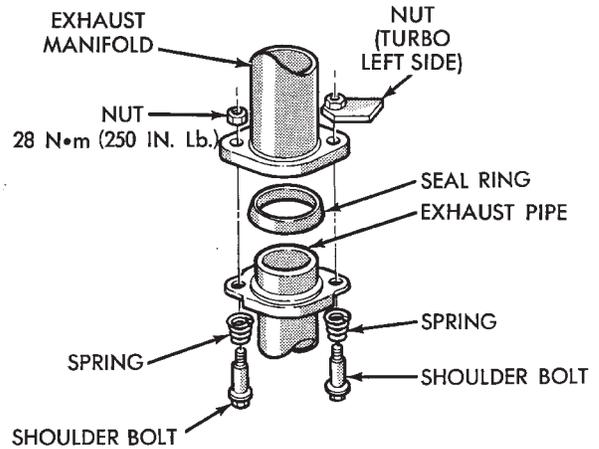


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Fig. 2 Exhaust System Components

CATALYTIC CONVERTER

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



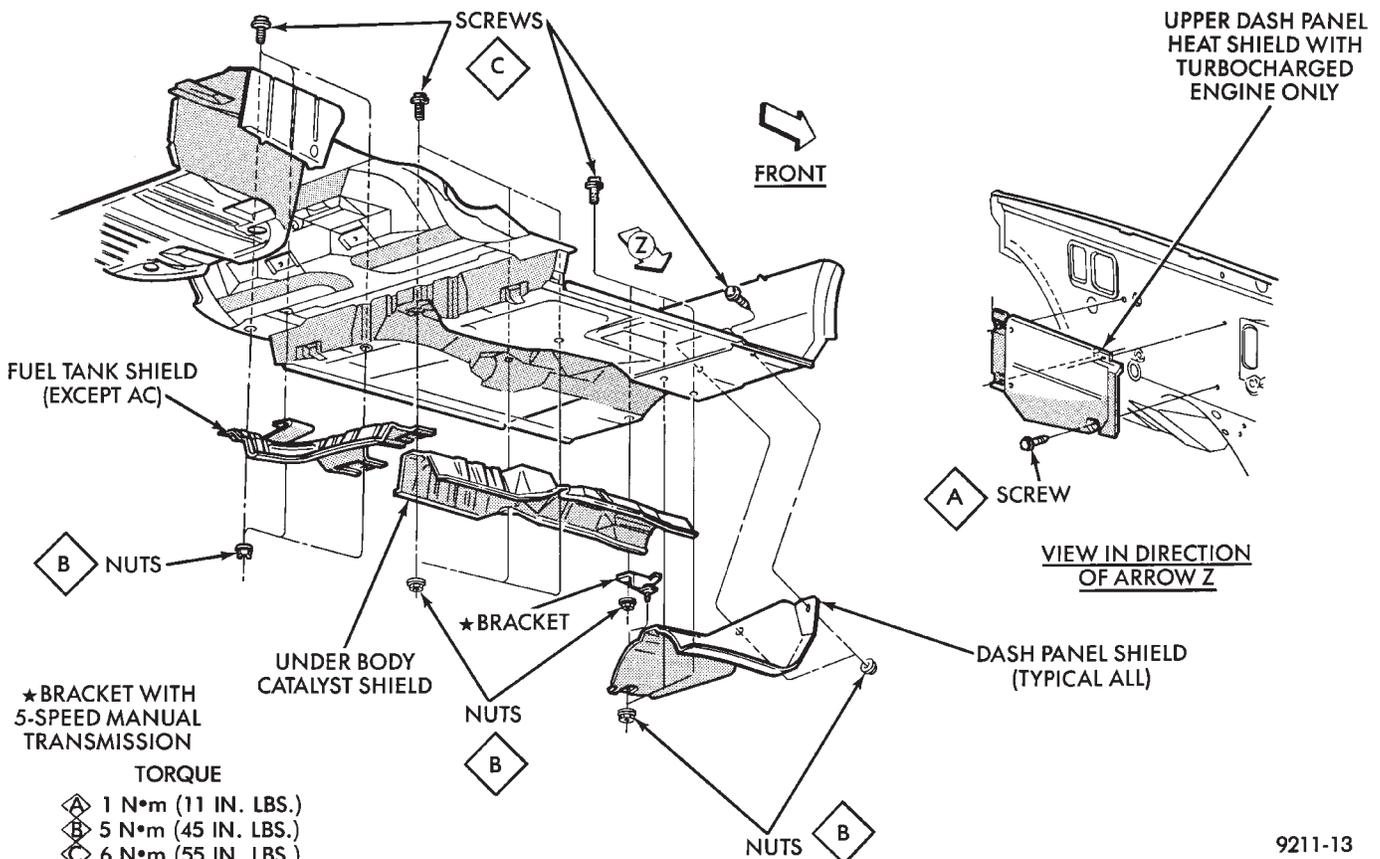
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Fig. 3 Ball Joint Connection

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). The 2.2/2.5L engines equipped with a manual transmission will have an adaptor for a air injection tube.

HEAT SHIELDS

Heat shields (Fig. 4) are needed to protect both the car and the environment from the high temperatures



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Fig. 4 Heat Shield Installation

developed in the vicinity of the catalytic converters. 2.2/2.5L engines equipped with manual transmission where air is injected into the catalytic converter's, a heat shield is welded on the front converter.

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

CAUTION: Avoid application of rust prevention compounds or undercoating materials to exhaust system floor pan 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 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 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 GAS RECIRCULATION (EGR) SYSTEM

To assist in the control of oxides of nitrogen (NOx) in engine exhaust, some 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 openings in the exhaust gas crossover passage in the intake manifold. REFER TO SECTION 25 EMISSION SYSTEMS FOR A COMPLETE DESCRIPTION, DIAGNOSIS AND SERVICE PROCEDURES ON THE EXHAUST GAS RECIRCULATION SYSTEM AND COMPONENTS.

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	(c)
	a, EGR Valve to Manifold Gasket	a, Tighten nuts or replace gasket
	b, EGR Valve to EGR Tube Gasket	b, Tighten nuts or replace gasket
	c, EGR Tube to Manifold Tube Nut	c, Tighten tube nut
	(d) Exhaust Flex Joint	(d)
	a, Spring height, installed not correct	a, Check spring height, both sides (specification is 32.5 mm, 1.28 inch) look for source of spring height variation if out of specification.
	b, Exhaust sealing ring defective	b, Inspect seal for damage on round spherical surface. If no damage is evident, check for exhaust obstruction causing high back pressure on heavy acceleration.
	(e) Pipe and shell noise from front exhaust pipe	(e) Characteristic of single wall pipes.
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) Restriction in muffler or tailpipe	(c) Remove restriction, if possible or replace as necessary.
	(d) Converter material in muffler	(d) Replace muffler and converter assemblies. Check fuel injection and ignition systems for proper operation.

SERVICE PROCEDURES

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EXHAUST PIPES, MUFFLERS AND TAILPIPES

REMOVAL

- (1) Raise vehicle on hoist and apply penetrating oil to clamp bolts and nuts of component being removed.
- (2) Tail pipes are integral with the muffler (Fig. 5). Remove clamp at slip joint. Separate at slip joint.
- (3) Remove clamps and supports (Figs. 6, 7, 8, and 9) from exhaust system to permit alignment of parts during assembly.
- (4) When removing tailpipe, raise rear of vehicle to relieve body weight from rear springs to provide clearance between pipe and rear axle parts.
- (5) Clean ends of pipes and/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 most 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 affect emissions and performance.

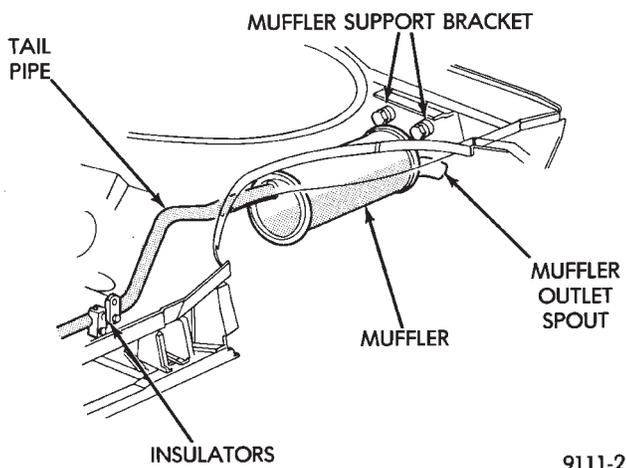


Fig. 5 Tail Pipe with Muffler—Typical

INSTALLATION

- (1) Assemble ball joint connection pipes, supports and clamps loosely to permit alignment of all parts.

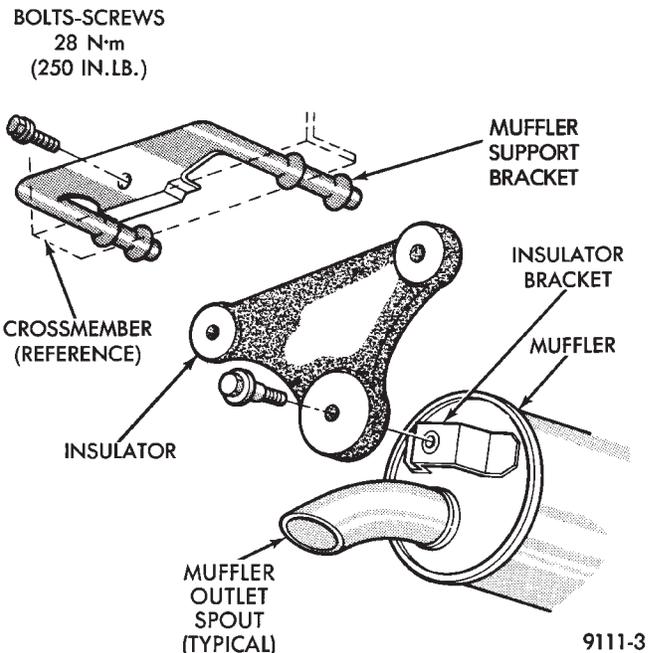


Fig. 6 Insulator Tail Pipe and Muffler Support

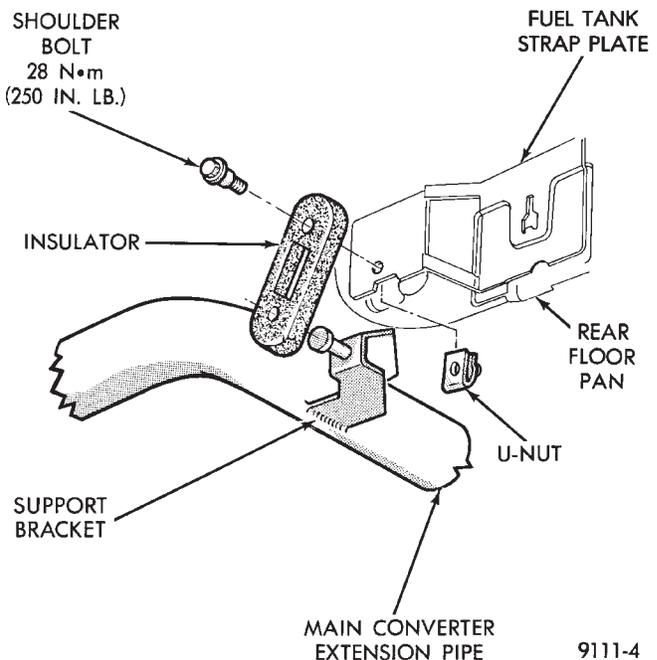
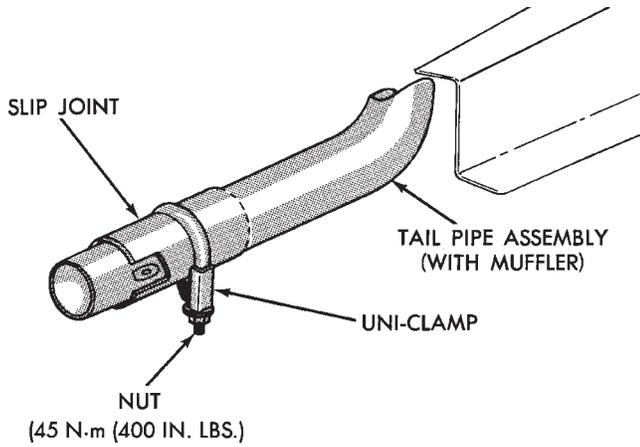


Fig. 7 Underfloor Converter or Extension Pipe Support—2 Places



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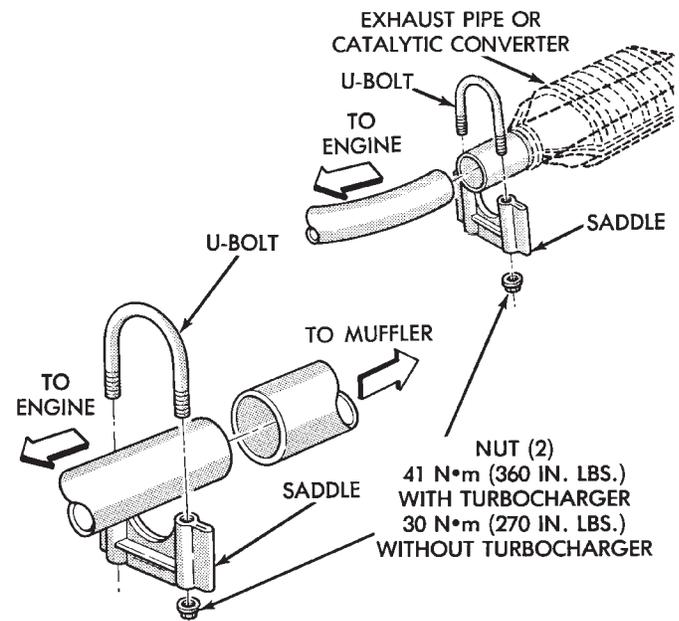
Fig. 8 Front Tail Pipe Uni-Clamp

- (2) Beginning at the ball joint, align and torque shoulder bolts (Fig. 3).
- (3) Working from the front of system, align and clamp each component to maintain position and proper clearance with underbody parts (Fig. 10).
- (4) Tighten all clamps and supports to the proper torques and clearances.

INTAKE AND EXHAUST MANIFOLDS—TBI ENGINE

INTAKE MANIFOLD

Naturally Aspirated Die-cast aluminum long-branch fan design with remote plenum. The throttle body is installed on the upper plenum of the manifold.



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Fig. 9 First Slip Joint Connection

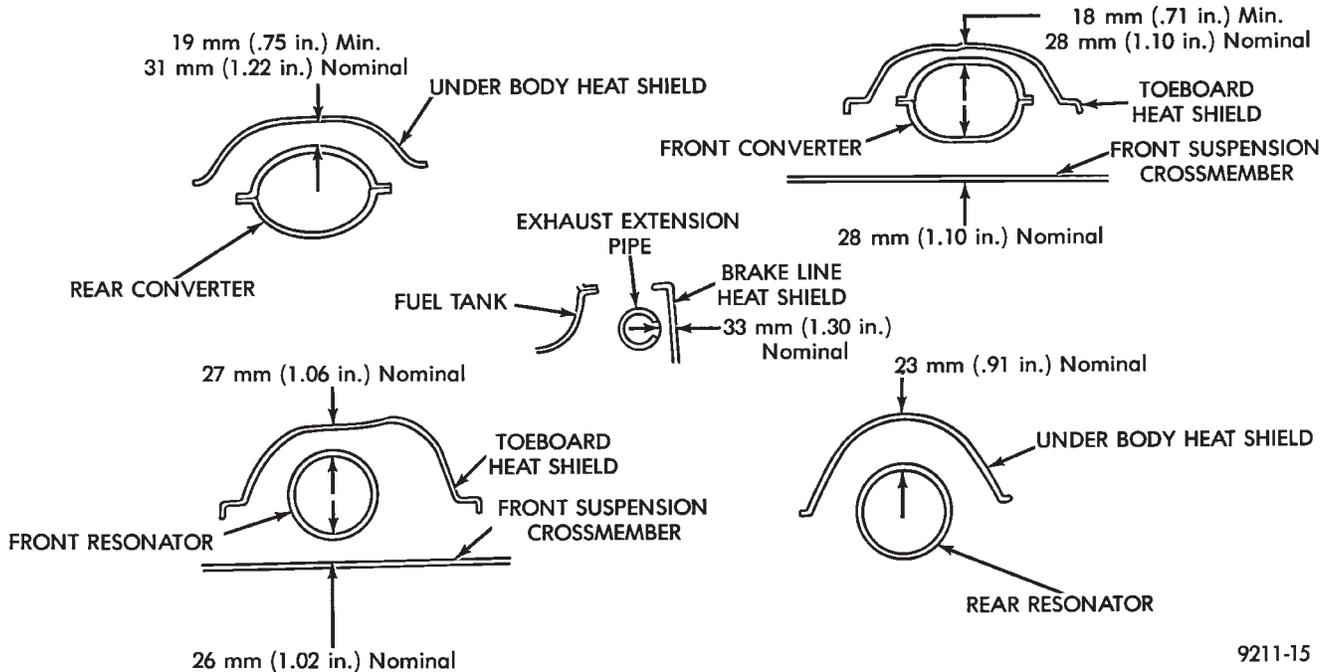
EXHAUST MANIFOLD

All high strength iron casting that intermesh with the intake manifold. For standard engines a four branch design collects and directs exhaust gases to the conical (articulated joint connection) outlet.

THROTTLE BODY AIR HEATER

The throttle body air heater (Fig. 1) is attached to the exhaust manifold and is removable.

Inspect air heater connector tube; replace if damaged. Refer to Emission Control Systems Group 25,



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Fig. 10 Exhaust Clearance

for diagnostic and service procedures on the air control valve and temperature sensor located in the air cleaner.

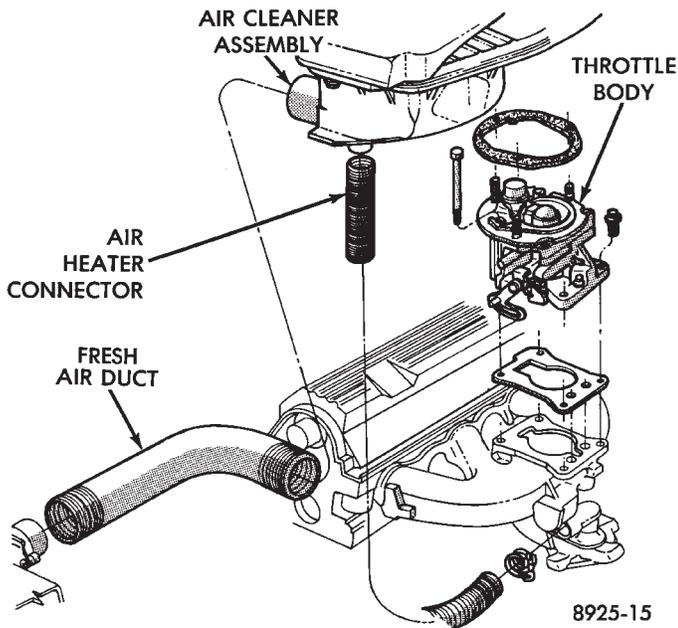


Fig. 1 Air Heater—TBI Engine

INTAKE AND EXHAUST MANIFOLDS SERVICE—TBI ENGINE

Intake and exhaust manifolds use a one piece gasket. Service procedures requiring removal and installation (of either) must include both manifolds.

FUEL SYSTEM PRESSURE RELEASE PROCEDURE

The Fuel System is under a constant pressure of at least 265 kPa (39 psi). Before servicing the fuel pump, fuel lines, fuel filter, throttle body or fuel injector, the fuel system pressure must be released.

- (a) Loosen fuel filler cap to release fuel tank pressure.
- (b) Disconnect injector wiring harness from engine harness.
- (c) Connect a jumper wire to ground terminal Number 1 of the injector harness (Fig. 2) to engine ground.
- (d) Connect a jumper wire to the positive terminal Number 2 of the injector harness (Fig. 2) and touch the battery positive post for no longer than 5 seconds. This releases system pressure.
- (e) Remove jumper wires.
- (f) Continue fuel system service.

REMOVAL

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

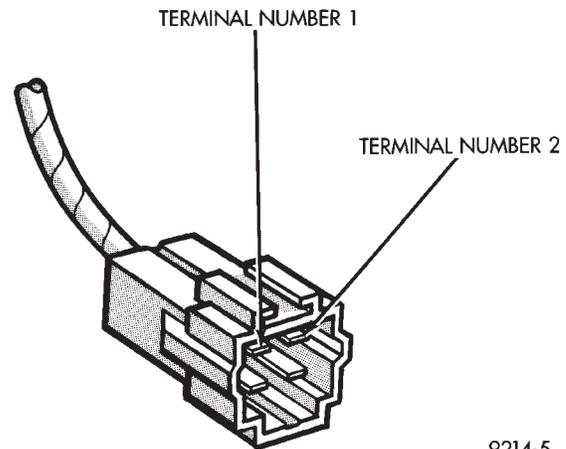


Fig. 2 Injector Harness Connector

- (2) Disconnect negative battery cable. Drain cooling system. Refer to Cooling System, Group 7 for procedure.
- (3) Remove air cleaner and disconnect all vacuum lines, electrical wiring and fuel lines from throttle body.
- (4) Remove throttle linkage.
- (5) Loosen power steering pump and remove belt.
- (6) Remove power brake vacuum hose from intake manifold.
- (7) Disconnect EGR tube from intake manifold and remove water hoses from water crossover.
- (8) Raise vehicle and remove exhaust pipe from manifold.
- (9) Remove power steering pump assembly and set aside.
- (10) Remove intake manifold retaining screws (Fig. 3).
- (11) Lower vehicle and remove intake manifold.
- (12) Remove exhaust manifold retaining nuts (Fig. 3).
- (13) Remove exhaust manifold.

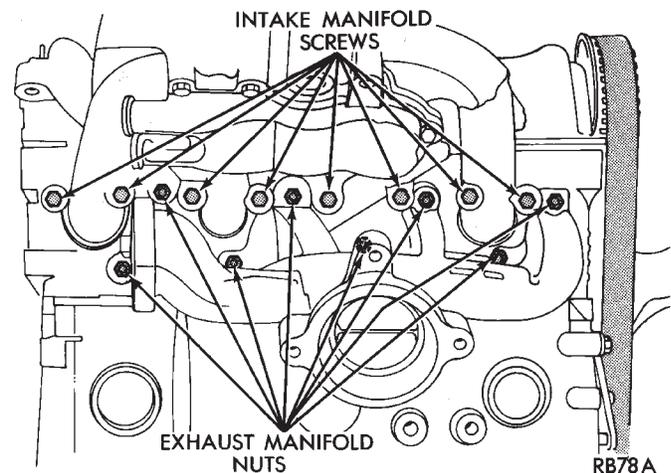


Fig. 3 Intake and Exhaust Manifold Attaching Points—2.2/2.5L Engines

CLEANING AND INSPECTION

- (1) Discard gaskets and clean all gasket surfaces on both manifolds and on cylinder head.
- (2) Test gasket surfaces of manifolds for flatness with a straight edge. Surfaces must be flat within 0.15mm per 300mm (.006 in. per foot) of manifold length.
- (3) Inspect manifolds for cracks and distortion.

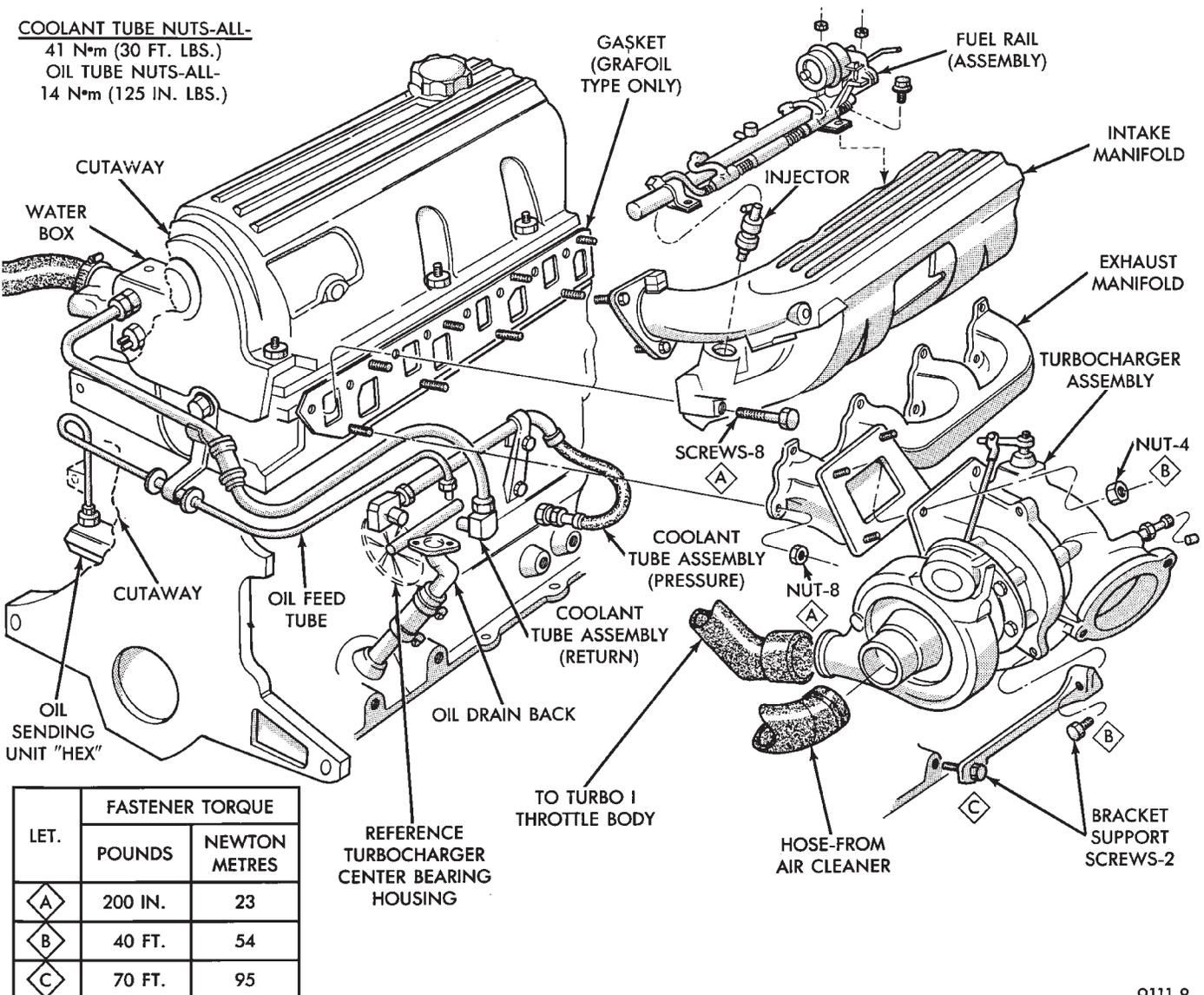
INSTALLATION

- (1) Install a new intake and exhaust manifold gasket. Coat steel gasket lightly with Gasket Sealer on manifold side. **Do not** coat composition gasket with (any) sealer.
- (2) Set exhaust manifold in place. Tighten retaining nuts starting at center and progressing outward in both directions to 23 N•m (200 in. lbs.) torque. Repeat this procedure until all nuts are at specified torque.

- (3) Set intake manifold in place.
- (4) Raise vehicle and tighten retaining screws starting at center and progressing outward in both directions to 23 N•m (200 in. lbs.) torque (Fig. 3). Repeat this procedure until all screws are at specified torque.
- (5) Reverse removal procedures 1-9 for installation.
- (6) With the DRB II 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.

COOLANT TUBE NUTS-ALL-
41 N•m (30 FT. LBS.)
OIL TUBE NUTS-ALL-
14 N•m (125 IN. LBS.)



LET.	FASTENER TORQUE	
	POUNDS	NEWTON METRES
A	200 IN.	23
B	40 FT.	54
C	70 FT.	95

Fig. 4 Turbocharged Engine Components

INTAKE/EXHAUST MANIFOLDS AND TURBO-CHARGER SERVICE—TURBO I ENGINES

INTAKE MANIFOLD

The manifold is die-cast aluminum with upper plenum and 4 tubes lower runners. These attach to the cylinder head, with each runner leading directly to a cylinder.

The manifold is also machined for fuel rail attachment and injector installation. The throttle body is installed on the upper plenum of the manifold.

EXHAUST MANIFOLD

The turbocharger equipped engine exhaust manifold is a modified log- type design with a machined outlet to match and retain the turbocharger assembly. Exhaust gases, passed directly to the turbocharger exit through a conical articulated joint connection outlet machined into the turbocharger housing.

Intake and exhaust manifolds use a one piece gasket. Service procedures requiring removal and installation of either must include both manifolds.

INTAKE MANIFOLD

REMOVAL

- (1) Perform fuel system pressure release procedure **before attempting any repairs.**
- (2) Disconnect negative battery cable. Drain cooling system. See Cooling System, Group 7.
- (3) Remove air cleaner hose clamp to throttle body and remove air cleaner assembly (Fig. 5).

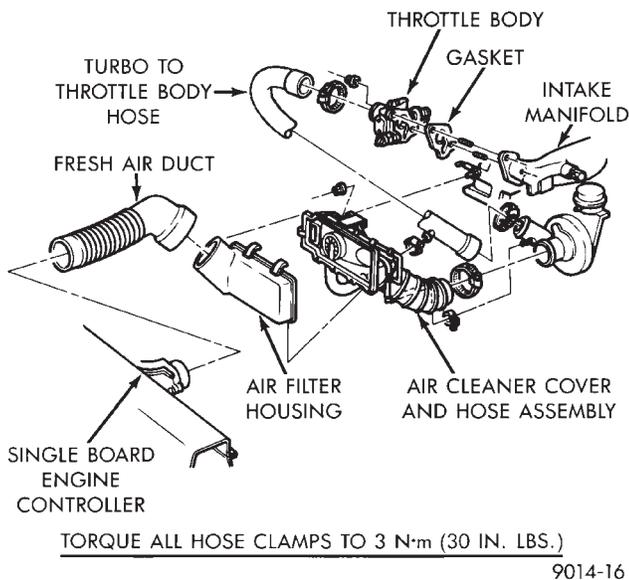


Fig. 5 Air Cleaner and Throttle Body Assembly—Turbo I Engine

- (4) Remove accelerator and speed control cables.
- (5) Disconnect automatic idle speed (AIS) motor and throttle position sensor (TPS) wiring connectors.
- (6) Disconnect vacuum hoses from throttle body.
- (7) Disconnect Detonation Sensor, Fuel Injector Wiring Connector, Wiring Connector.
- (8) Remove supply and return hose at fuel tube assembly (Fig. 6).

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

- (9) Using 2 wrenches, one on the fuel pressure regulator and the other on the fuel return tube nut loosen tube nut. Open fuel tube clip and remove fuel tube.
- (10) Disconnect fuel pressure regulator vacuum hose from regulator.
- (11) Remove fuel pressure regulator to fuel rail attaching nuts (2).
- (12) Remove fuel pressure regulator from fuel rail.
- (13) Remove PCV vacuum harness, brake booster, and vacuum vapor harness from intake manifold (Fig. 6).

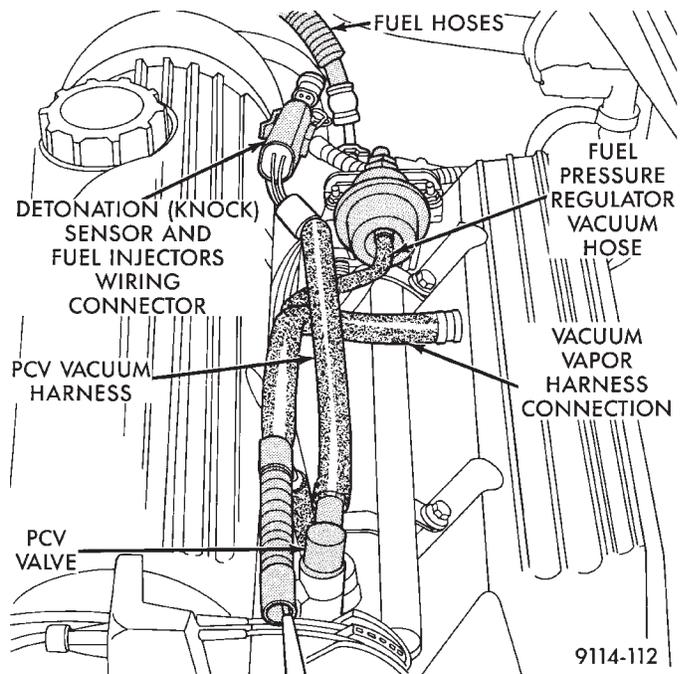


Fig. 6 Electrical and Vacuum Hose Connection

- (14) Disconnect Detonation (Knock) Sensor Electrical Connector (Fig. 7).
- (15) Remove fuel rail to intake manifold attaching screws (Fig. 7).
- (16) Remove fuel rail and injector assembly by pulling rail so that the injectors come straight out of their ports.
- (17) Be careful not to damage the rubber injector O-rings upon removal from the ports.
- (18) Remove fuel rail assembly from vehicle.

(19) Cover injector ports with suitable covering while injectors are being serviced (Fig. 8).

(20) Do not remove fuel injectors until fuel rail assembly has been completely removed from vehicle.

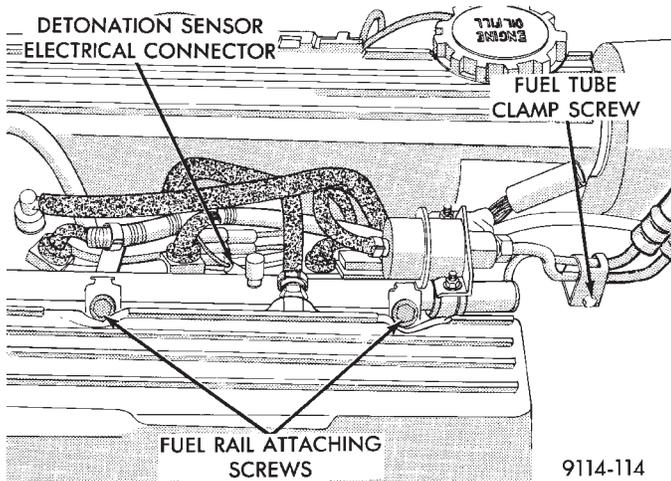


Fig. 7 Fuel Rail Attaching Screws

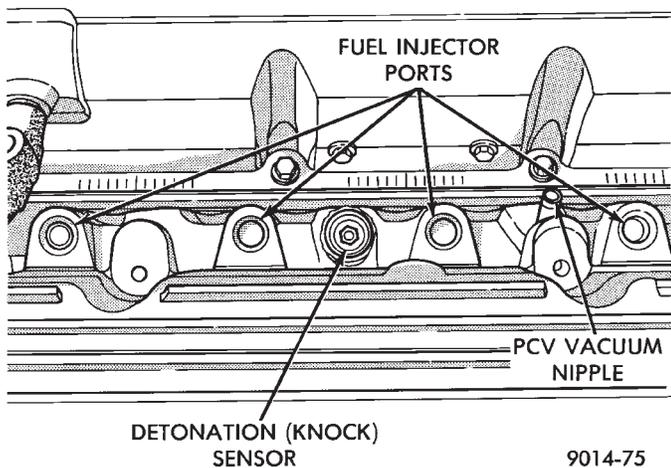


Fig. 8 Detonation (Knock Sensor) and PCV Vacuum Nipple

TURBOCHARGER

REMOVAL

Turbochargers are removed from below the vehicle. Cylinder head removal for component accessibility is not required.

(1) **From Above:** Remove front engine mount through bolt and rotate engine (top) forward away from cowl. Refer to Engine, Group 9 and see (Fig. 3) in Engine Removal section.

(2) Separate coolant line from water box and turbocharger housing (Fig. 4). Remove line and fitting from turbocharger.

(3) Separate oil feed line from turbocharger housing.

(4) Remove waste gate rod-to-gate retaining clip.

(5) Remove three two upper and one lower driver's side nuts retaining turbocharger to manifold. Disconnect O_2 sensor lead wire and vacuum lines.

(6) **From Below:** Remove right front wheel and tire assembly.

(7) See Suspension, Group 2, and remove right driveshaft assembly.

(8) Remove turbocharger to block support bracket (Fig. 4).

(9) Separate oil drain back tube fitting from turbocharger housing and remove fitting and hose.

(10) Remove remaining turbocharger to manifold retaining nut.

(11) Disconnect articulated exhaust pipe joint from turbocharger housing.

(12) Remove lower coolant line and turbocharger inlet fitting.

(13) Lift turbocharger off manifold mounting studs and lower assembly down and out of vehicle.

INTAKE/EXHAUST MANIFOLDS—TURBO ENGINE

REMOVAL

Remove 8 intake manifold screws and washer assemblies and remove intake manifold (Fig. 9).

Remove 8 exhaust manifold retaining nuts and remove exhaust manifold (Fig. 9).

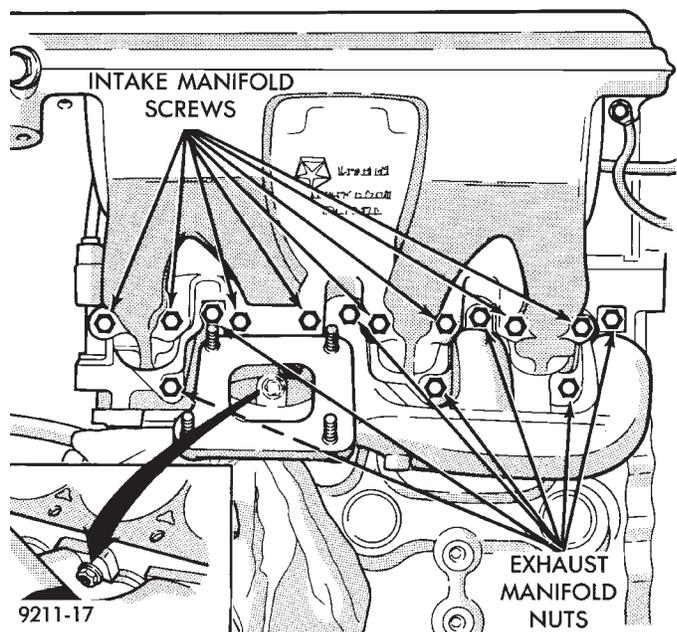


Fig. 9 Intake and Exhaust Manifolds—Turbocharged Engines

CLEANING AND INSPECTION

(1) Discard gasket and clean all gasket surfaces of manifolds and cylinder head.

(2) Test gasket surfaces for flatness with straight edge. Surface must be flat within 0.15 mm per 300 mm (.006 in. per foot) of manifold length.

(3) Inspect manifolds for cracks or distortion.

INTAKE/EXHAUST MANIFOLDS—TURBO ENGINE

INSTALLATION

(1) Install new two-sided grafoil or equivalent intake/exhaust manifold gasket. DO NOT APPLY SEALER.

(2) Position intake manifold, install, and tighten 8 retaining screws starting at center and progressing outward in both directions to 23 N•m (200 in. lbs.) torque. Repeat this procedure until all screws are at specified torque (Fig. 9).

(3) Set exhaust manifold in place. Install and tighten retaining nuts, starting at center and progressing outward in both directions to 23 N•m (200 in. lbs.) torque. Repeat this procedure until all nuts are at specified torque.

(4) Install cowl mounted heat shield.

TURBOCHARGER

INSTALLATION

(1) Position turbocharger on exhaust manifold. Apply antiseize compound, to threads and install one lower passenger side retaining nut. Retaining nuts tightening torque is 54 N•m (40 ft. lbs.).

(2) Apply thread sealant to lower inlet coolant line fitting and install fitting into turbocharger housing.

(3) Install lower coolant line.

(4) Install oil drain back tube and fitting with new gasket to turbocharger housing.

(5) Install and tighten turbocharger to block support bracket and install screws finger tight. Tighten block screw FIRST to 54 N•m (40 ft. lbs.) torque, then tighten screw to turbocharger housing to 27 N•m (20 ft. lbs.) torque.

(6) Reposition exhaust pipe. Tighten articulated joint shoulder bolts to 28 N•m (250 in. lbs.) torque.

(7) See Suspension, Group 2, and install right driveshaft and wheel and tire assembly.

(8) **From Above:** Install three turbocharger to manifold retaining nuts. Tighten to 54 N•m (40 ft. lbs.) torque.

(9) Reconnect O₂ sensor electrical connection and vacuum lines and install waste gate rod-to-gate retaining clip.

(10) Attach oil feed line to turbocharger bearing housing. Tighten fitting to 14 N•m (125 in. lbs.) torque.

(11) Apply thread sealant to water box/turbocharger, return coolant line end fittings. Install coolant line and tighten fittings to 41 N•m (30 ft. lbs.) torque.

(12) Align front engine mount in crossmember bracket. Install through bolt and tighten to 54 N•m (40 ft. lbs.) torque.

FUEL RAIL

INSTALLATION

(1) Be sure injectors are seated into the receiver cup, with lock ring in place.

(2) Install injector wiring harness to injectors and fasten into wiring clips.

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

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

(5) Install the injector assembly into their holes and install the 2 attaching bolts and ground straps. Fuel rail assembly must be drawn into the intake manifold evenly making sure each injector enters its own hole. Once all injectors are seated tighten bolts to 22.5 N•m (200 in. lbs.) torque (Fig. 7).

(6) Lube O-ring of fuel pressure regulator with a drop of clean engine oil and install into the receiver cup on fuel rail.

(7) Install attaching nuts and tighten to 7 N•m (65 in. lbs.) torque.

(8) Install PCV system hose harness and vacuum hose harness (Fig. 6).

(9) Reconnect accelerator linkage. Install brake booster vacuum supply hoses.

(10) Install air cleaner hoses and air cleaner assembly.

(11) Reconnect vacuum hose from fuel pressure regulator.

(12) Connect fuel return tube to fuel pressure regulator and tighten tube nut to 28 N•m (250 in. lbs.) torque (Fig. 7). Close fuel tube clip around fuel tubes and install fastener.

(13) Lubricate the ends of the chassis fuel tubes with 30 wt oil. Connect fuel supply and return hoses to chassis fuel tube assembly. pull back on the quick connect fitting to ensure complete insertion. (Refer to Fuel Hoses, Clamps and Quick Connect Fittings in Group 14 Fuel Systems).

(14) Connect fuel injector, detonation (knock) sensor wiring connector (Fig. 6).

(15) Fill cooling system. See Drain and Refill in Cooling System, Group 7.

(16) Reconnect negative battery cable.

(17) With the DRB II 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.

TURBO BYPASS VALVE SERVICE

- (1) Remove vacuum hose from valve.
- (2) Apply 15 in. Hg of vacuum to valve. If vacuum holds, bypass valve OK (Fig. 10). If vacuum leaks replace air cleaner assembly (Fig. 11).

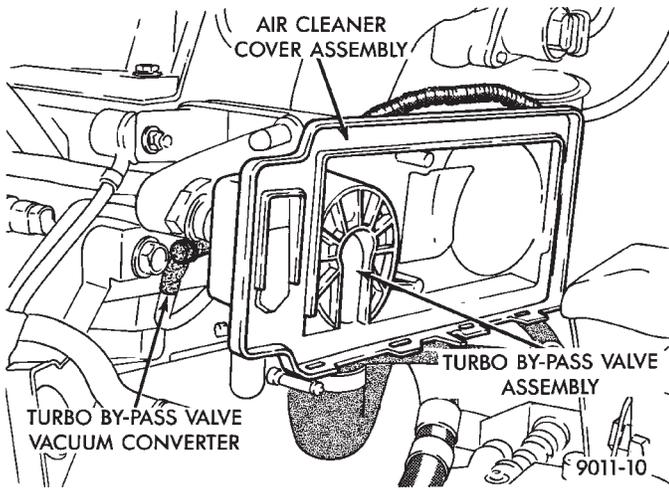


Fig. 10 Turbo Air Cleaner Bypass Valve

TORQUE ALL HOSE CLAMPS TO 3 N·m (30 IN. LBS.)

TORQUE ALL HOSE CLAMPS TO 3 N·m (30 in. lbs.)

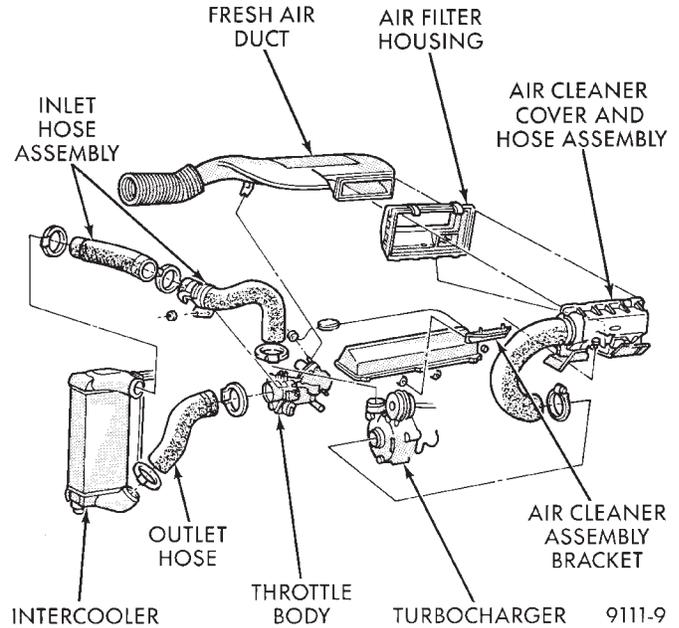


Fig. 1 Air Cleaner and Throttle Body Assembly—Turbo III Engine

- (4) Remove radiator hose to cylinder head (Fig. 2).
- (5) Remove DIS Ignition Coils from intake manifold (Fig. 3).
- (6) Remove accelerator and speed control cables (Fig. 4).
- (7) Disconnect Intercooler to throttle body outlet hose. Disconnect vacuum hoses from throttle body and remove harness (Fig. 5).

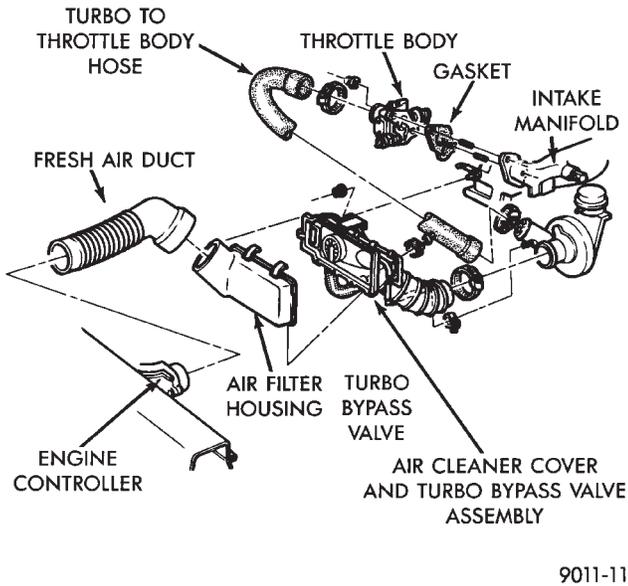


Fig. 11 Bypass Valve and Air Cleaner Assembly

INTAKE/EXHAUST MANIFOLDS AND TURBO-CHARGER SERVICE—TURBO III ENGINE

INTAKE MANIFOLD

REMOVAL

- (1) Perform fuel system pressure release procedure **before attempting any repairs.**
- (2) Disconnect negative battery cable. Drain cooling system. Refer to Cooling System, Group 7.
- (3) Remove fresh air duct from air filter housing. Remove inlet hose from the intercooler (Fig. 1).

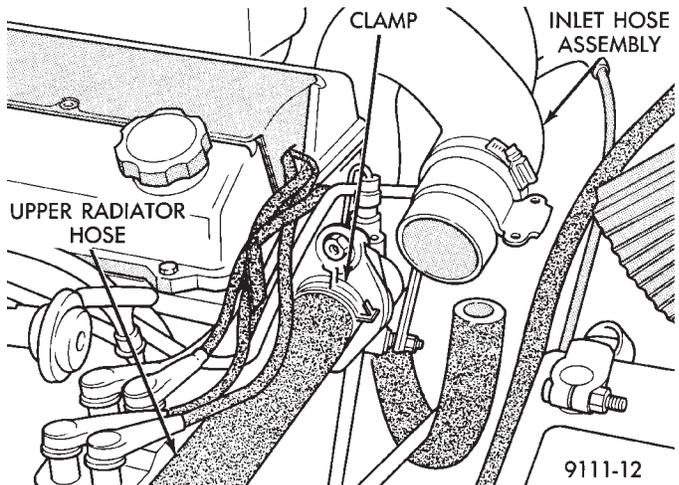


Fig. 2 Radiator to Cylinder Head Hose

- (8) Disconnect automatic idle speed (AIS) motor and throttle position sensor (TPS) wiring connectors (Fig. 6).
- (9) Remove PCV Breather/Separator box and vacuum harness assembly. Remove brake booster, vacuum vapor harness and fuel pressure regulator harness from intake manifold (Fig. 7).

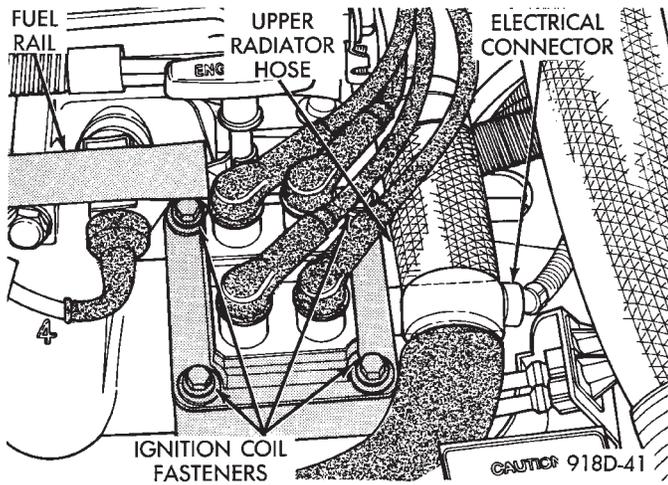


Fig. 3 Distributorless Ignition Coil (DIS) Location

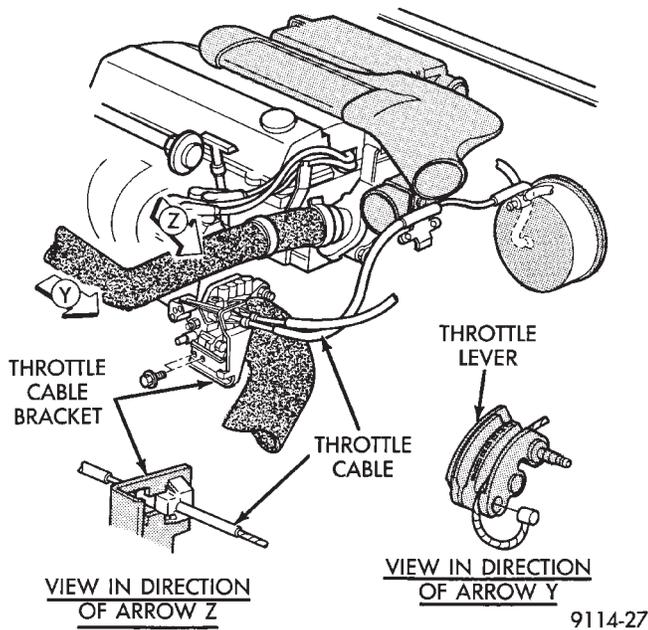


Fig. 4 Accelerator and Speed Control Cables

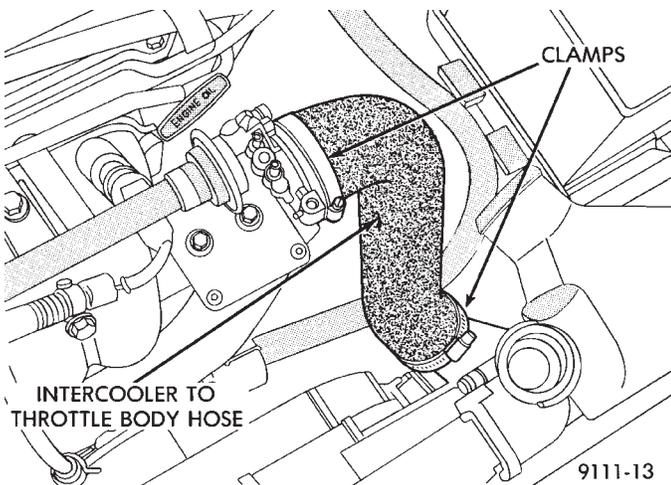


Fig. 5 Intercooler to Throttle Body Hose

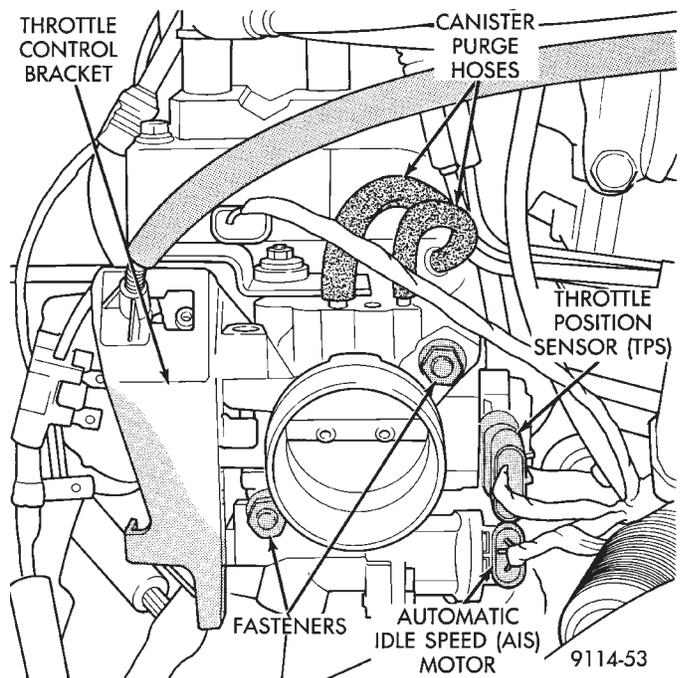


Fig. 6 Automatic Idle Speed (AIS) Motor and Throttle Position Sensor (TPS) Wiring Connectors

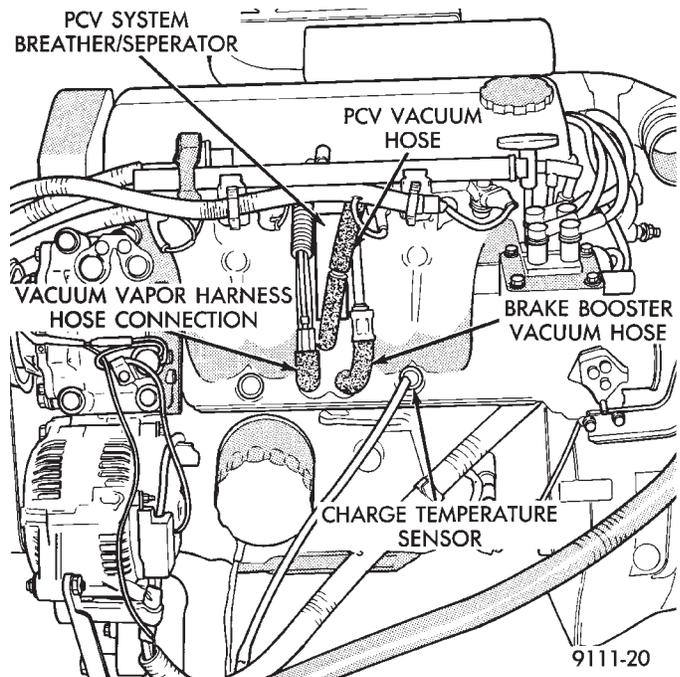


Fig. 7 Intake Manifold Electrical and Vacuum Hose Connections

(10) Disconnect Fuel Injector Wiring Connector (Fig. 8). Charge Temperature Wiring Connector (Fig. 7).

(11) Remove fuel supply and return hose quick connect at fuel tube assembly (Fig. 9).

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

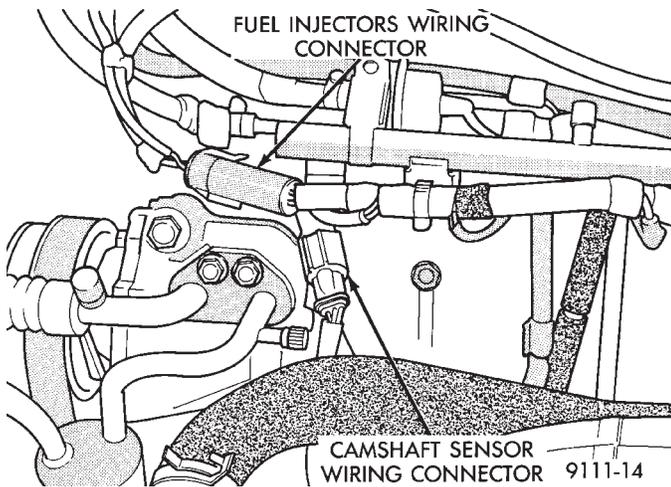


Fig. 8 Camshaft Sensor and Fuel Injectors Wiring Connectors

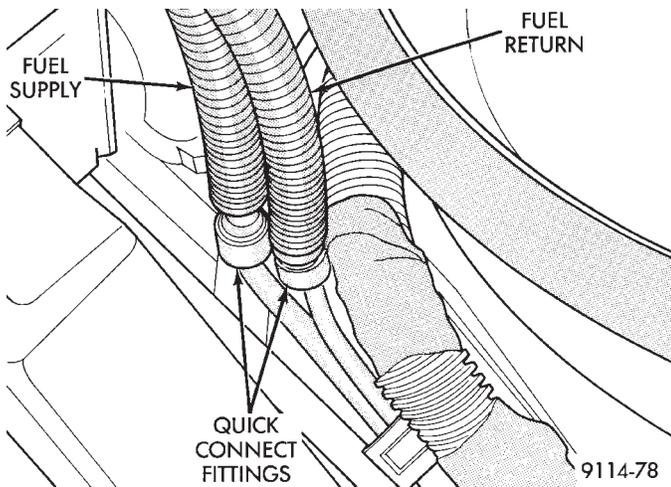


Fig. 9 Fuel Supply and Return Hose Connections

(12) Remove 8 intake manifold screws and washer assemblies and remove intake manifold (Fig. 10).

INSTALLATION

Before installing manifold. Refer to Cleaning and Inspection of this section to check manifold for damage.

(1) Install new intake manifold gasket and intake manifold onto cylinder head and tighten fasteners to 23 N•m (200 in. lbs.) torque (Fig. 10).

(2) Install PCV Breather/Separator box and vacuum harness assembly. Connect brake booster, vacuum vapor harness and vacuum hose to fuel pressure regulator (Fig. 7).

(3) Inspect quick connect fittings for damage, replace if necessary Refer to Fuel System, Group 14 for procedure. Lube tube with clean 30w engine oil, Connect fuel supply and return hoses to chassis tube assembly. Check connection by pulling on connector to insure it locked into position (Fig. 9).

(4) Connect Fuel Injector (Fig. 8), and Charge Temperature Sensor wiring connectors (Fig. 7).

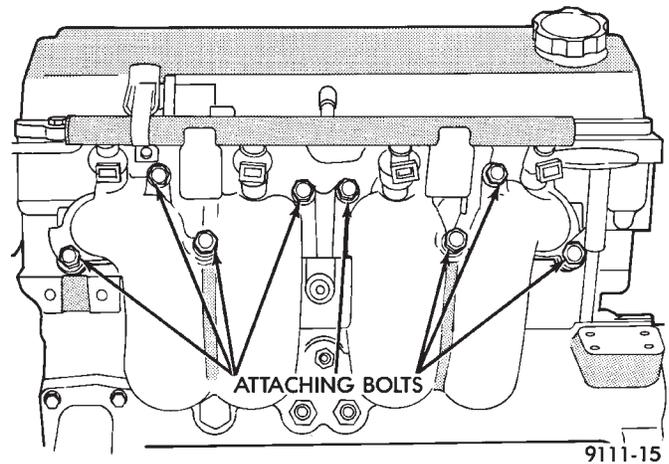


Fig. 10 Intake Manifold Attaching Bolts.

INTAKE MANIFOLD

(5) Connect Automatic Idle Speed (AIS) and Throttle Position Sensor (TPS) wiring connectors (Fig. 6).

(6) Connect vacuum hoses to throttle body (Fig. 5).

(7) Install intercooler to throttle body hose and clamp. Torque clamp to 3 N•m (30 in. lbs.) (Fig. 5).

(8) Connect accelerator and speed control cables (Fig. 4).

(9) Install DIS Ignition Coil pack. Tighten fasteners to 12 N•m (105 in. lbs.) torque (Fig. 3).

(10) Install upper radiator hose and spring clamps (Fig. 2). Fill Cooling System, Refer to Cooling System, Group 7.

(11) Install fresh air duct to air filter housing. Install inlet hose assembly to Intercooler. Tighten clamp to 3 N•m (30 in. lbs.) torque (Fig. 1).

(12) Connect negative battery cable.

(13) With the DRB II 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.

TURBOCHARGER

REMOVAL

Turbochargers are removed from below the vehicle. Cylinder head removal for component accessibility is not required.

(1) Disconnect negative battery cable. Remove Air Cleaner assembly (Fig. 1).

(2) **From Above:** Remove front engine mount through bolt and rotate engine (Top) forward away from cowl. Refer to Engine Removal in Engine, Group 9.

(3) Remove Air Cleaner Support (Fig. 1).

(4) Disconnect O₂ sensor lead wire and vacuum lines.

(5) Separate coolant return line from water box and turbocharger housing (Fig. 11). Remove return line from turbocharger.

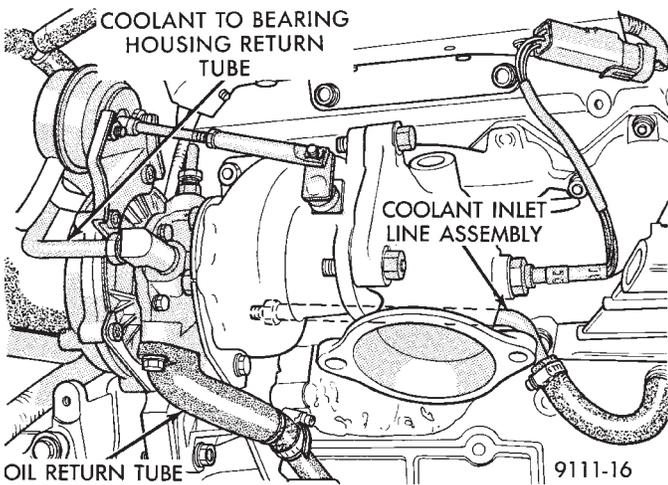


Fig. 11 Coolant Tube Routing

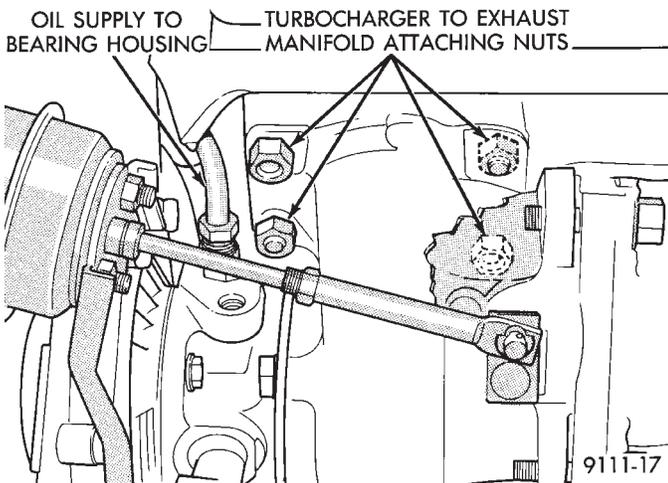


Fig. 12 Turbocharger Attaching Nuts

(6) Separate oil feed line from turbocharger housing (Fig. 12).

(7) Remove three (two upper and one lower driver's side) nuts retaining turbocharger to manifold (Fig. 12).

(8) **From Below:** Remove right front wheel and tire assembly.

(9) See Suspension, Group 2, and remove right driveshaft assembly. Air deflector may need to be removed from crossmember.

(10) Separate oil drain back tube fitting from turbocharger housing and remove fitting and hose (Fig. 13).

(11) Remove turbocharger to block support bracket (Fig. 13).

(12) Remove one remaining turbocharger to manifold retaining nut (Fig. 12).

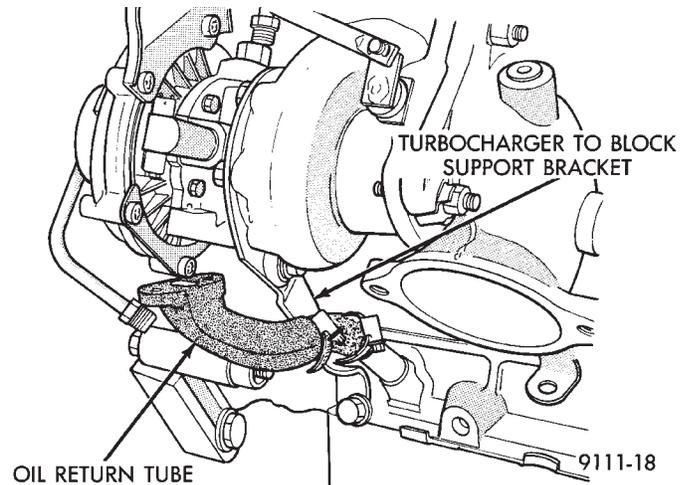


Fig. 13 Oil Return Tube and Support Bracket

(13) Disconnect articulated exhaust pipe joint from turbocharger housing.

(14) Remove turbocharger coolant inlet line assembly from engine (Fig. 11).

(15) Lift turbocharger off manifold mounting studs and lower assembly down and out of vehicle.

EXHAUST MANIFOLD

REMOVAL

Remove 9 exhaust manifold retaining fasteners and remove exhaust manifold (Fig. 14).

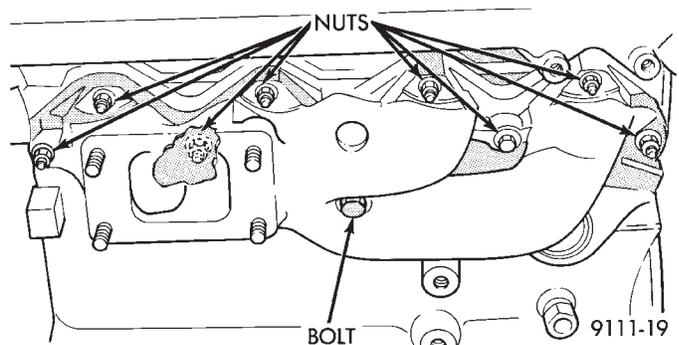


Fig. 14 Exhaust Manifold—Turbo III Engine

CLEANING AND INSPECTION

(1) Discard gasket and clean all gasket surfaces of manifolds and cylinder head.

(2) Test manifold gasket surfaces for flatness with straight edge. Surface must be flat within 0.15 mm per 300 mm (.006 in. per foot) of manifold length.

(3) Inspect manifolds for cracks or distortion. Replace manifold if necessary.

EXHAUST MANIFOLD

INSTALLATION

(1) Install new manifold gasket. **DO NOT APPLY SEALER.**

(2) Set exhaust manifold in place. Tighten retaining nuts and bolt, starting at center and progressing outward in both directions to 23 N•m (200 in. lbs.) torque. Repeat this procedure until all fasteners are at specified torque (Fig. 14).

TURBOCHARGER

INSTALLATION

(1) Position turbocharger on exhaust manifold. Apply antiseize compound to threads and install the lower (passenger side) retaining nut (Fig. 12). Tighten nut to 54 N•m (40 ft. lbs.) torque.

(2) Apply thread sealant to lower (inlet) coolant line fitting and install fitting into turbocharger housing (Fig. 11).

(3) Install lower coolant line assembly to engine (Fig. 11).

(4) Install oil drain back tube and fitting (with new gasket) to turbocharger housing (Fig. 13).

(5) Install turbocharger to block support bracket and install screws finger tight (Fig. 13). Tighten block screw FIRST to 54 N•m (40 ft. lbs.) torque, then tighten screw to turbocharger housing to 27 N•m (20 ft. lbs.) torque.

(6) Reposition exhaust pipe. Tighten articulated joint shoulder bolts to 28 N•m (250 in. lbs.) torque.

(7) See Suspension, Group 2, and install right driveshaft and wheel and tire assembly. Install air deflector on crossmember.

(8) **From Above:** Install three turbocharger to manifold retaining nuts. Tighten to 54 N•m (40 ft. lbs.) torque (Fig. 12).

(9) Reconnect O₂ sensor electrical connection and vacuum lines.

(10) Attach oil feed line to turbocharger bearing housing. Tighten fitting to 14 N•m (125 in. lbs.) torque (Fig. 12).

(11) Install coolant line and tighten fittings to 41 N•m (30 ft. lbs.) torque (Fig. 11).

(12) Install Air Cleaner support (Fig. 1).

(13) Align front engine mount in crossmember bracket. Install through bolt and tighten to 54 N•m (40 ft. lbs.) torque.

(14) Install Air Cleaner assembly (Fig. 1).

(15) Fill Cooling System. Refer to Cooling System, Group 7 for procedure.

INTAKE/EXHAUST MANIFOLD SERVICE—3.0L ENGINE

The intake system has a large air intake plenum of aluminum alloy and a cross type intake manifold (Fig. 2).

The exhaust manifolds are made of ductile cast iron with the front bank and rear bank independent of each other. The exhaust from the front bank exhaust manifold is led through on exhaust crossover

pipe to be combined with the rear bank exhaust at the exhaust outlet to the exhaust pipe (Fig. 2).

INTAKE PLENUM/MANIFOLD

REMOVAL

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

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

(3) Remove air cleaner to throttle body hose (Fig. 4).

FUEL SYSTEM PRESSURE RELEASE PROCEDURE

The MPI fuel system is under a constant pressure of about 330 kPa (48 psi). Before servicing the fuel pump, fuel lines, fuel filter, throttle body or fuel injector, the fuel system pressure must be released.

(a) Loosen fuel filler cap to release fuel tank pressure.

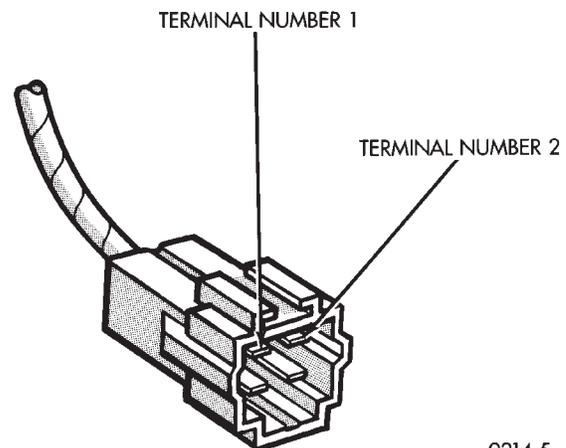
(b) Disconnect injector wiring harness from engine harness.

(c) Connect a jumper wire to ground terminal Number 1 of the injector harness (Fig. 3) to engine ground.

(d) Connect a jumper wire to the positive terminal Number 2 of the injector harness (Fig. 3) and touch the battery positive post for no longer than 5 seconds. This releases system pressure.

(e) Remove jumper wires.

(f) Continue fuel system service.



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Fig. 1 Injector Harness Connector

(4) Remove throttle cable and transaxle kickdown linkage (Fig. 5).

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

(6) Remove vacuum hose harness from throttle body (Fig. 6).

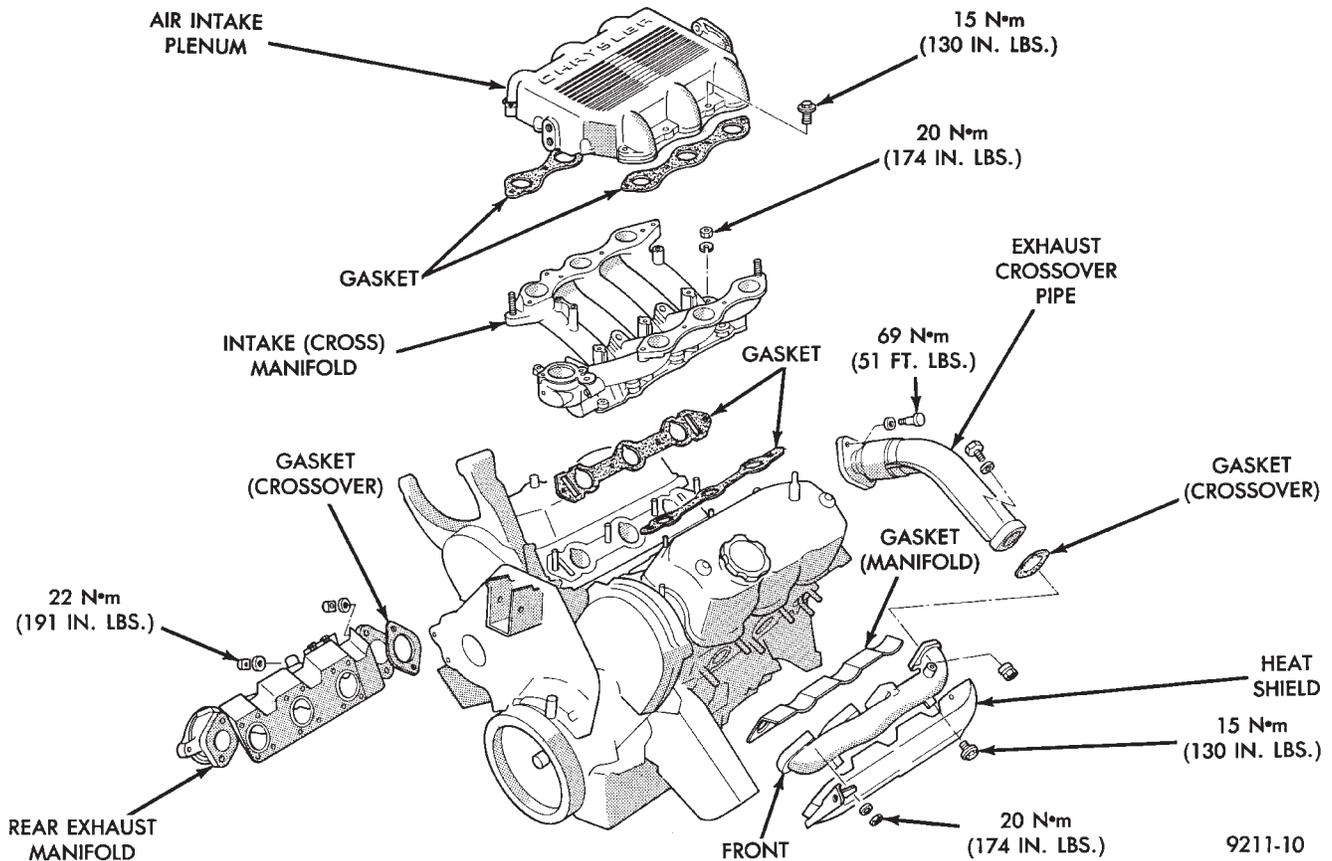


Fig. 2 Intake and Exhaust Manifolds— 3.0L Engine

- (7) Remove PCV and Brake booster hoses from Air Intake Plenum.
- (8) Remove Ignition Coil from Intake Plenum (Fig. 7).
- (9) Remove wiring connectors from coolant temperature sensor (Fig. 8).
- (10) Remove vacuum connections from Air Intake Plenum vacuum connector.
- (11) Remove fuel hoses from fuel rail (Fig. 8).

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

- (12) Remove (8) Fasteners from Air Intake Plenum to Intake Manifold (Fig. 9).
- (13) Remove Air Intake Plenum (Fig. 10).
- (14) Cover intake manifold with suitable cover when servicing.
- (15) Remove vacuum hoses from fuel rail and fuel pressure regulator (Fig. 11).
- (16) Disconnect Fuel Injector wiring harness from engine wiring harness (Fig. 12).
- (17) Remove fuel pressure regulator attaching bolts and remove regulator from rail (Fig. 13). **Be careful not to damage the rubber injector O-rings upon removal from the ports.**
- (18) Remove fuel rail attaching bolts and lift fuel rail assembly from intake manifold.

- (19) Separate radiator hose from thermostat housing and heater hose from heater pipe.
- (20) Remove (8) nut and washer assemblies and remove intake manifold (Fig. 1).

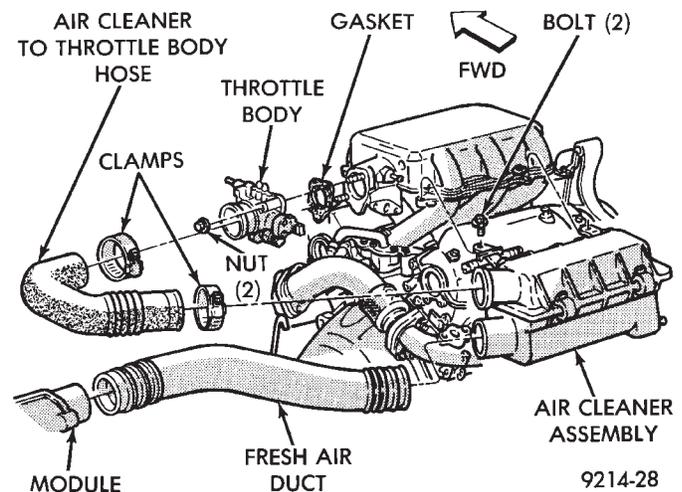


Fig. 3 Throttle Body Assembly 3.0L

INSPECTION

- Check for:
- Damage and cracks of each section (Fig. 13).
 - Clogged water passages in end cross overs.

- Check for distortion of the cylinder head mounting surface using a straightedge and thickness gauge (Fig. 14). Refer to (Fig. 15) for Specifications.

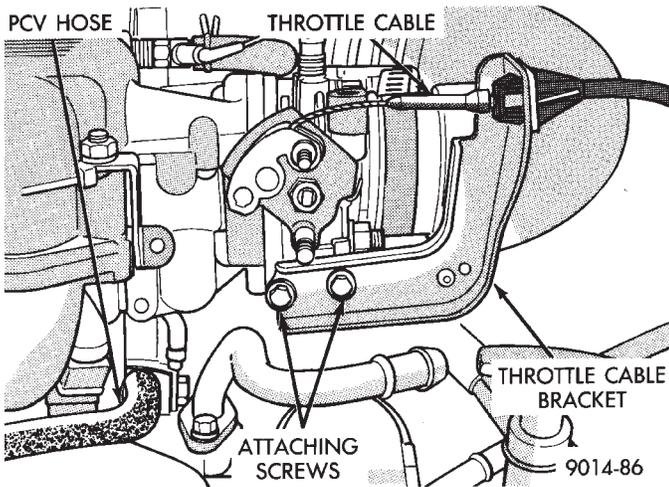


Fig. 4 Throttle Cable Attachment

INSTALLATION

- (1) Position new intake manifold gaskets on cylinder head and install intake (cross) manifold.
- (2) Install (8) nuts and washers and tighten in several steps in order shown in (Fig. 16) 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 (3) fuel rail attaching bolts and torque to 13 N•m (115 in. lbs.).
- (7) Install fuel pressure regulator onto fuel rail. Install attaching bolts to intake manifold. Torque regulator nuts and bracket bolts to 10 N•m (95 in. lbs.) (Fig. 12).
- (8) Install fuel supply and return tube hold-down bolt and the vacuum crossover tube hold-down bolt and torque to 10 N•m (95 in. lbs.).
- (9) Connect fuel injector wiring harness to engine wiring harness (Fig. 11).
- (10) Connect vacuum harness to fuel pressure regulator and fuel rail assembly (Fig. 10).
- (11) Remove covering from lower intake manifold and clean surface.
- (12) Place intake manifold gaskets **with beaded sealant side up** on lower manifold. Put air intake in place. Install attaching fasteners (8) and tighten in several steps in sequence shown (Fig. 17) to 13 N•m (115 in. lbs.).
- (13) Connect fuel line to fuel rail (Fig. 7). Torque hose clamps to 1 N•m (10 in. lbs.).

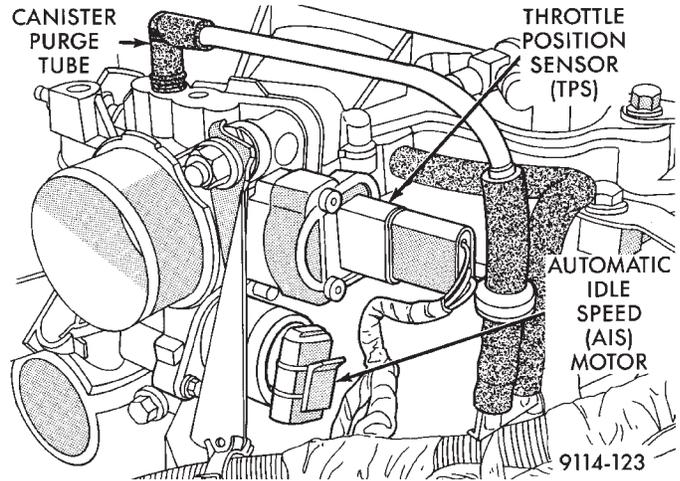


Fig. 5 Electrical and Vacuum Connections to Throttle Body

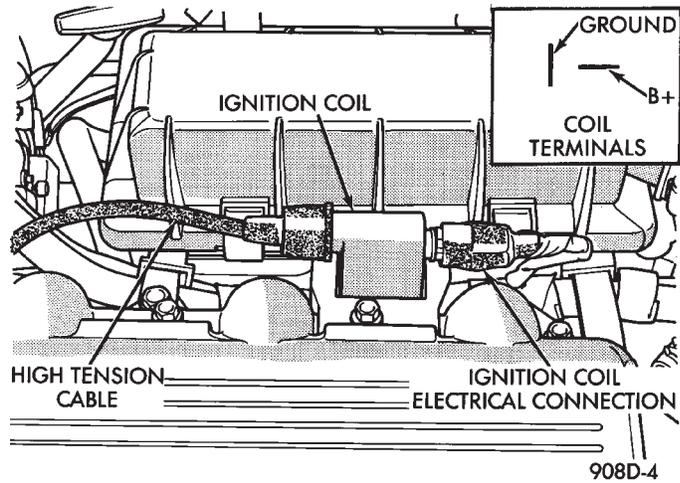


Fig. 6 Ignition Coil Removal

- (14) Connect vacuum harness to air intake plenum.

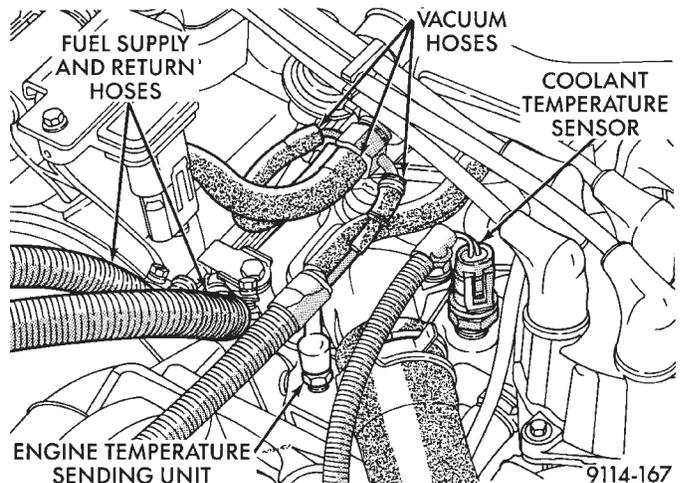


Fig. 7 Coolant Temperature Sensor Electrical Connections

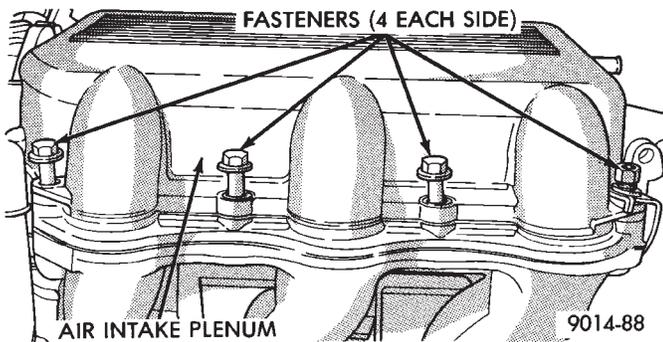


Fig. 8 Air Intake Plenum to Intake Manifold Attaching Bolts

(15) Connect coolant temperature sensor electrical connector to sensor (Fig. 7).

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

(17) Connect automatic idle speed (AIS) motor and throttle position sensor (TPS) electrical connectors (Fig. 5).

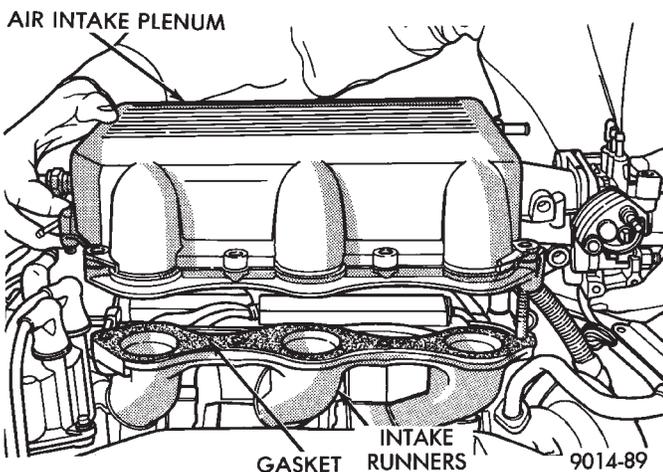


Fig. 9 Removing Air Intake Plenum

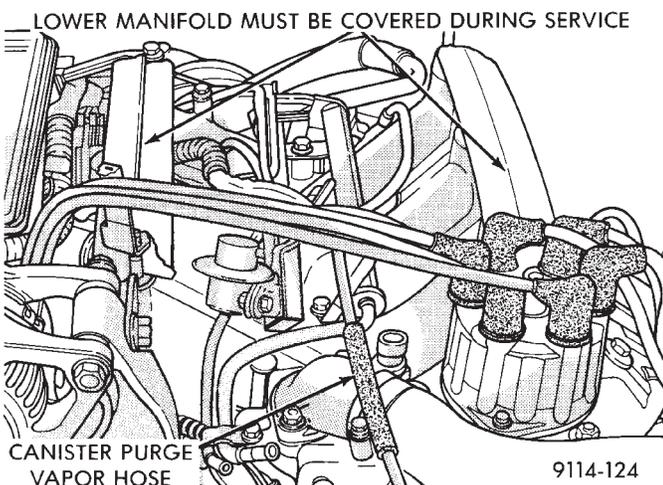


Fig. 10 Vacuum Connections for Fuel Rail and Fuel Pressure Regulator

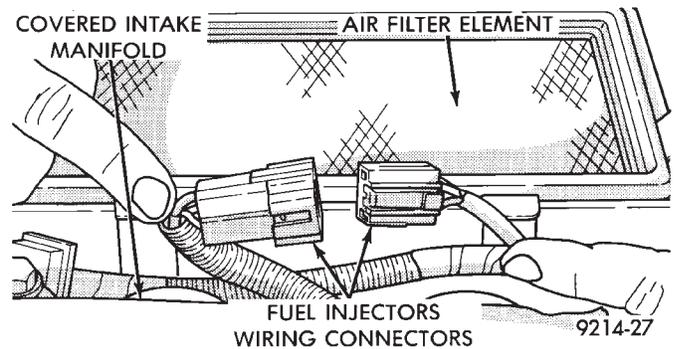


Fig. 11 Fuel Injector Wiring Harness

(18) Connect vacuum vapor harness to throttle body (Fig. 5).

(19) Install throttle cable and transaxle kickdown linkage (Fig. 4).

(20) Install air inlet hose assembly (Fig. 3).

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

(22) Fill cooling system, see Refilling System in Cooling, Group 7.

(23) Connect negative battery cable.

(24) With the DRB II 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.

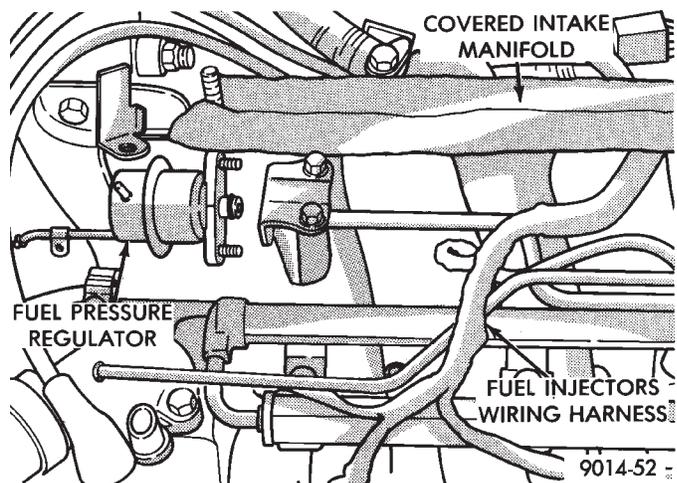


Fig. 12 Fuel Pressure Regulator to Fuel Rail Assembly

EXHAUST MANIFOLDS

REMOVAL

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

(2) Disconnect Oxygen Sensor lead wire at the rear exhaust manifold (Fig. 18).

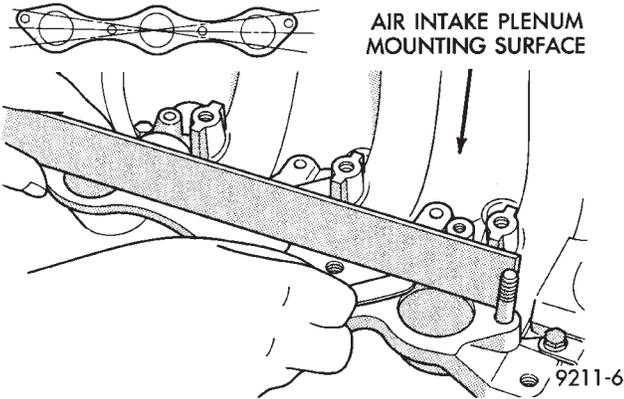
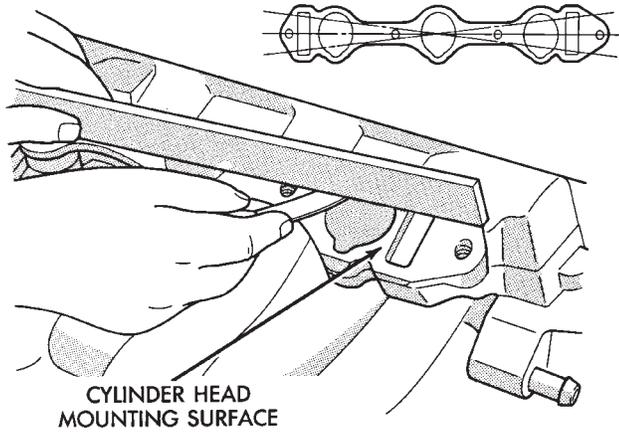


Fig. 13 Check Intake (Cross) Manifold Mounting Surface

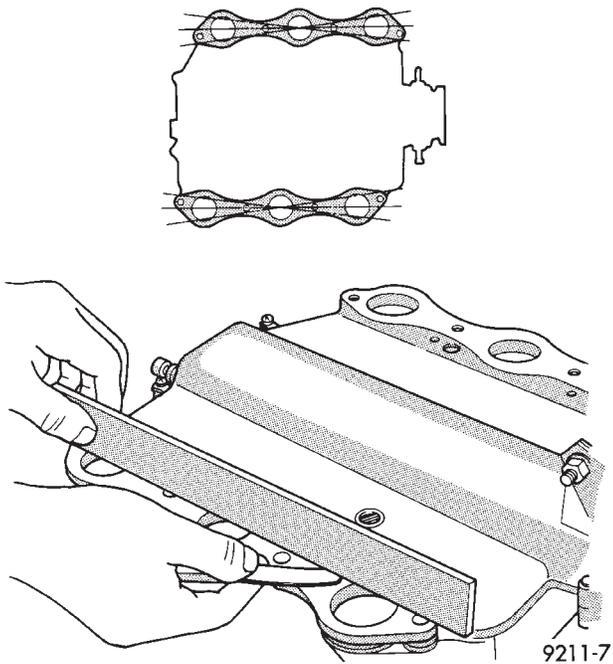


Fig. 14 Check Intake Plenum Mounting Surfaces

- (3) Remove bolts attaching cross-over pipe to manifold (Figs. 2 and 19).
- (4) Remove nuts attaching rear manifold to cylinder head and remove manifold.

<p>Intake Plenum Mounting Surface Standard: .15mm (.004 inch.) Maximum: .30mm (.008 inch.)</p>
<p>Cylinder Head Mounting Surface Standard: .10mm (.003 inch.) Maximum: .20mm (.005 inch.)</p>

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Fig. 15 Intake Plenum and Cylinder Head Mounting Surface Specifications

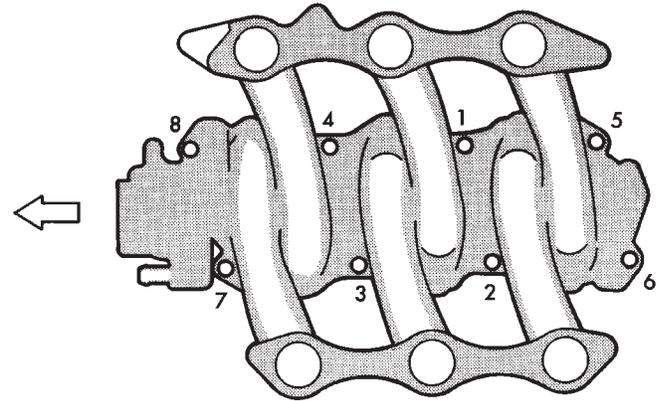


Fig. 16 Nut Tightening Sequence for Intake (Cross) Manifold

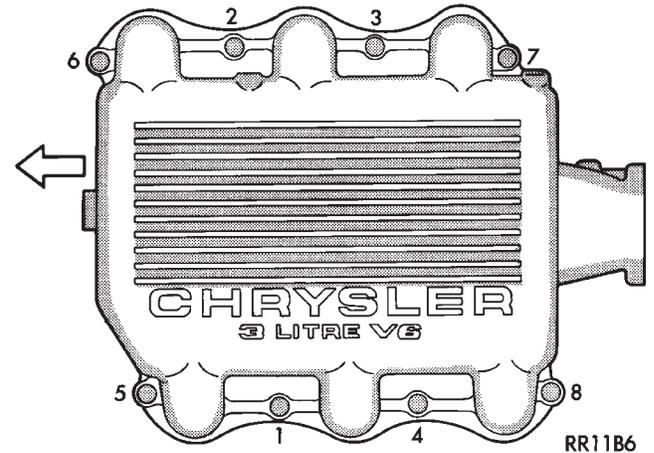


Fig. 17 Intake Plenum Tightening Sequence

- (5) Lower vehicle and remove screws attaching front heat shield to front manifold (Fig. 2).
- (6) Remove bolts fastening crossover pipe to front exhaust manifold and nuts fastening manifold to cylinder head. Remove assemblies.

INSPECTION

Inspect exhaust manifolds for damage or cracks and check distortion of the cylinder head mounting

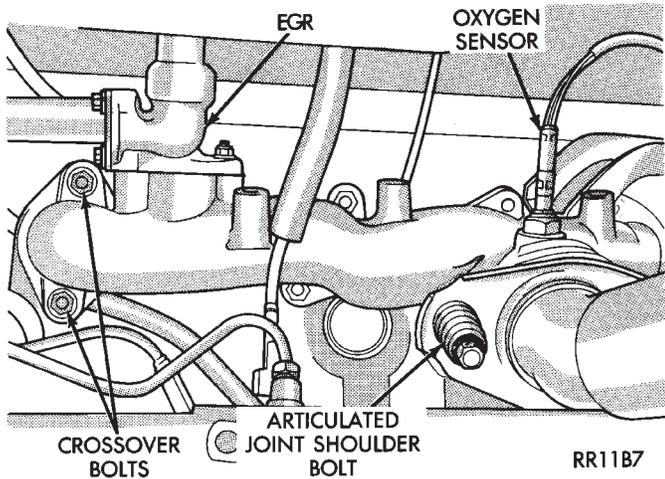


Fig. 18 Separate Articulated Joint, Disconnect Oxygen Sensor Wire

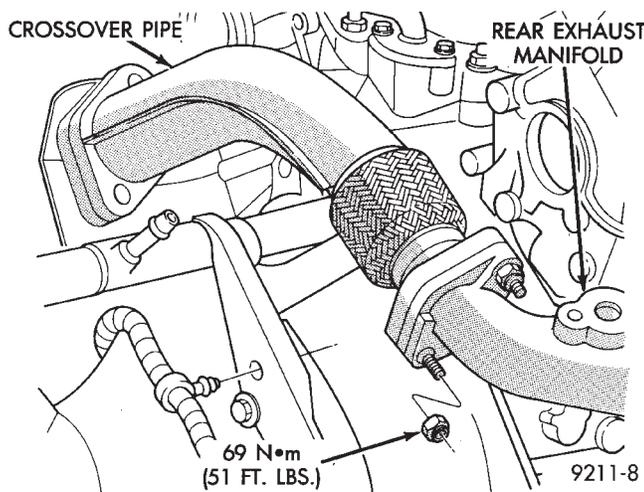


Fig. 19 Crossover Pipe

STANDARD: .15 mm (.004 inch)
LIMIT: .3 mm (.008 inch)

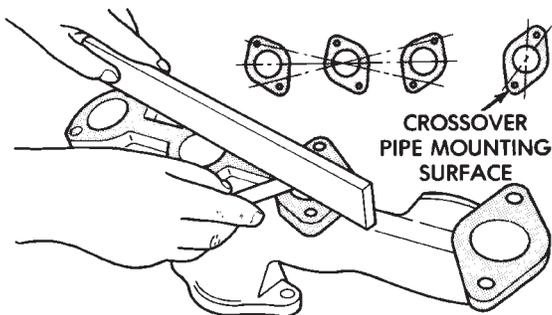


Fig. 20 Check Exhaust Manifold Mounting Surface and exhaust crossover mounting surface with a straightedge and thickness gauge (Fig. 20).

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. 21).

- (1) Install rear exhaust manifold and tighten attaching nuts to 20 N•m (175 in. lbs.).
- (2) Attach exhaust pipe to exhaust manifold and tighten shoulder bolt 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) Connect heated oxygen sensor lead (Fig. 18).
- (5) Install front exhaust manifold and attach exhaust crossover.
- (6) Install front manifold heat shield and tighten attaching screws to 15 N•m (130 in. lbs.) (Fig. 2).

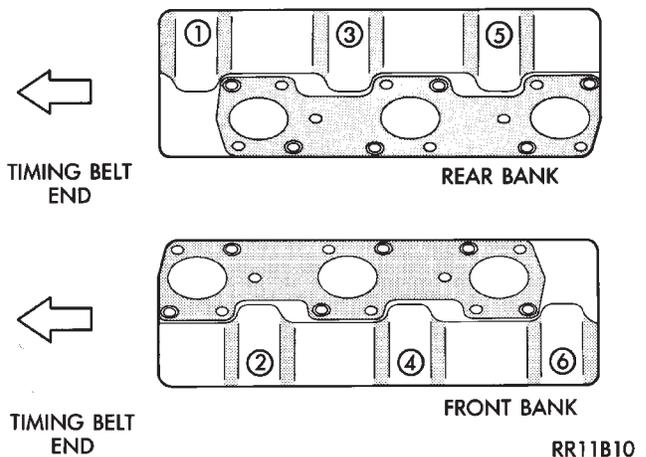


Fig. 21 Identify Exhaust Manifold Gaskets

INTAKE/EXHAUST MANIFOLD SERVICE—3.3/3.8L ENGINES

INTAKE MANIFOLD

REMOVAL

- (1) Perform fuel system pressure release procedure, **Before attempting any repairs.**
- (2) Disconnect negative battery cable. Drain cooling system. Refer to Cooling System, Group 7.

FUEL SYSTEM PRESSURE RELEASE PROCEDURE

The MPI fuel system is under a constant pressure of about 330 kPa (48 psi). Before servicing the fuel pump, fuel lines, fuel filter, throttle body or fuel injector, the fuel system pressure must be released.

- (a) Loosen fuel filler cap to release fuel tank pressure.
- (b) Disconnect injector wiring harness from engine harness.
- (c) Connect a jumper wire to ground terminal Number 1 of the injector harness (Fig. 1) to engine ground.

(d) Connect a jumper wire to the positive terminal Number 2 of the injector harness (Fig. 1) and touch the battery positive post for no longer than 5 seconds. This releases system pressure.

(e) Remove jumper wires.

(f) Continue fuel system service.

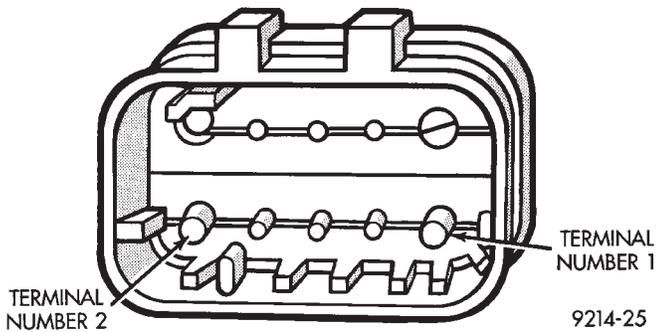


Fig. 1 Injector Harness Connectors

(3) Remove air cleaner to throttle body hose assembly (Fig. 2).

(4) Remove throttle cable (Fig. 3). Remove wiring harness from throttle cable bracket.

(5) Remove automatic idle speed (AIS) motor and throttle position sensor (TPS) wiring connectors from throttle body (Fig. 4).

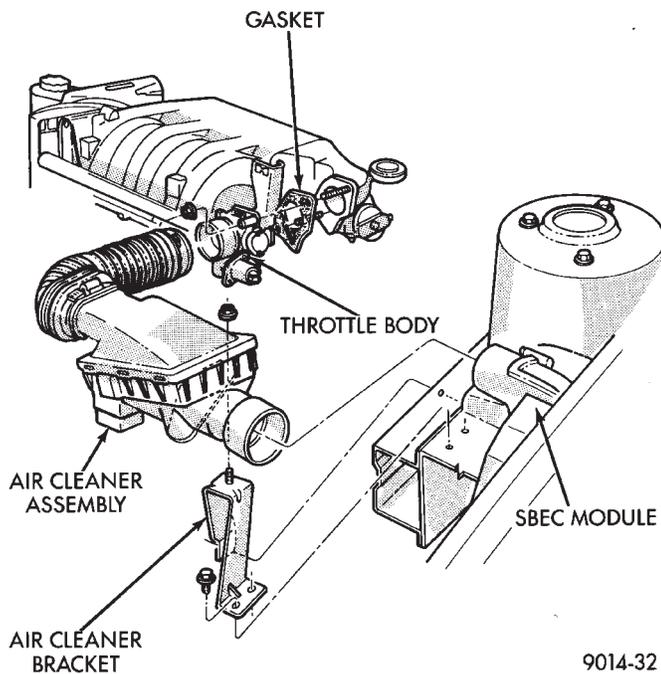


Fig. 2 Throttle Body Assembly—3.3/3.8L Engines

(e) Remove jumper wires.

(f) Continue fuel system service.

(6) Remove vacuum hose harness from throttle body (Fig. 4).

(7) Remove PCV and brake booster hoses from air intake plenum (Fig. 5).

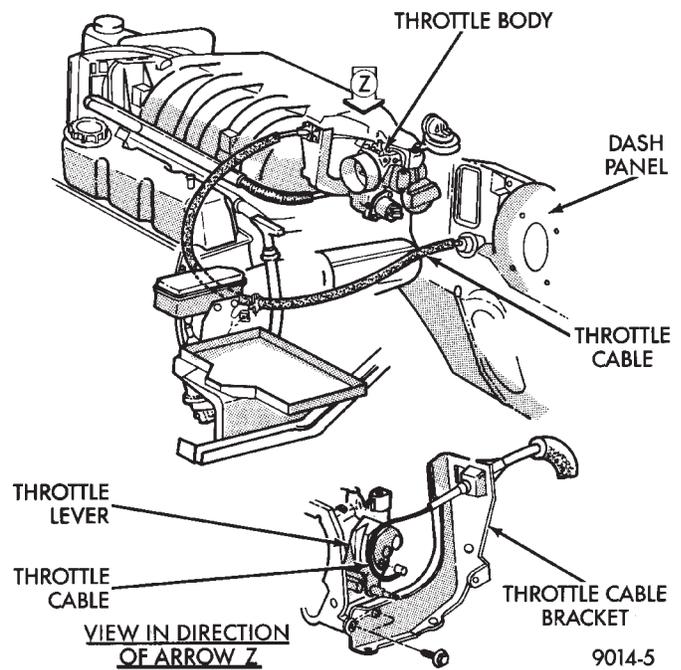


Fig. 3 Throttle Cable Attachment

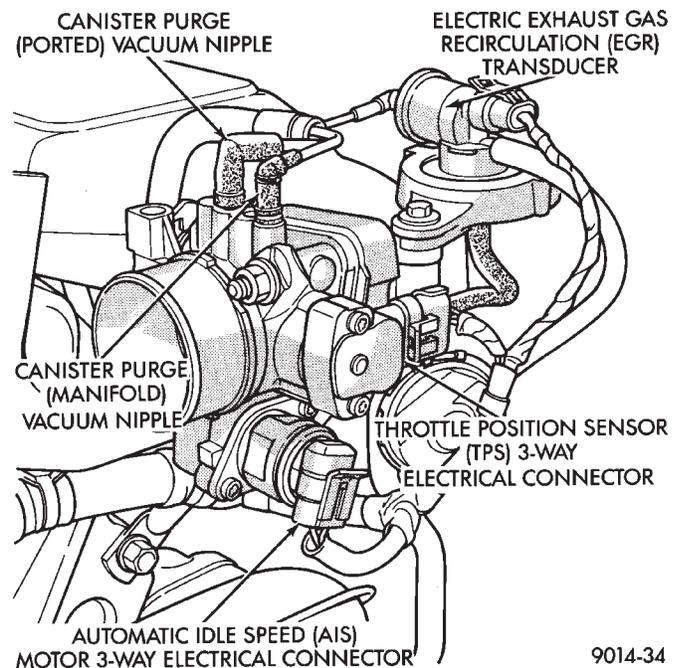


Fig. 4 Electrical and Vacuum Connection to Throttle Body

(8) Remove EGR tube flange from intake plenum (Fig. 5).

(9) Disconnect Charge Temperature Sensor electrical connector. Remove vacuum harness connectors from Intake Plenum (Fig. 5).

(10) Remove cylinder head to intake plenum strut (Fig. 5).

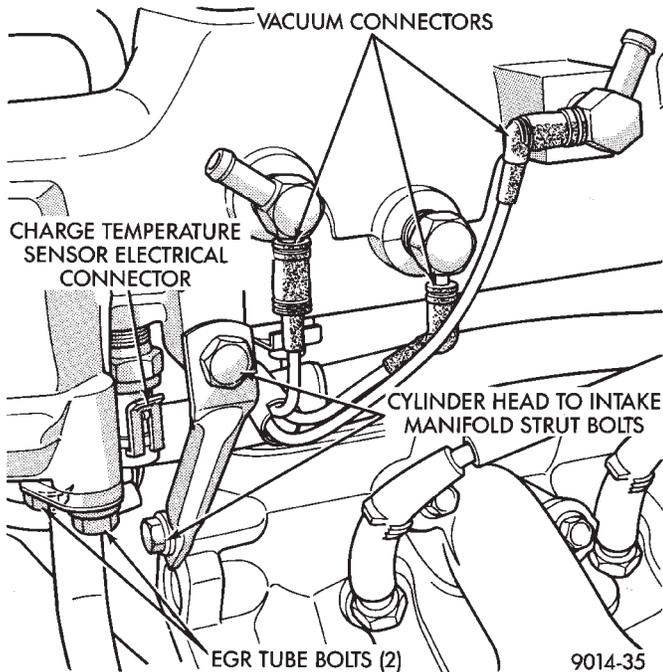


Fig. 5 Electrical and Vacuum Connections To Intake Manifold

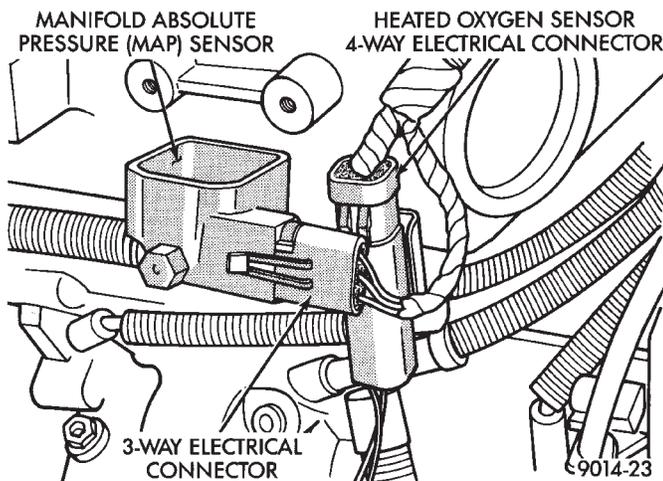


Fig. 6 MAP Sensor Electrical Connector

(11) Disconnect MAP Sensor and heated Oxygen Sensor electrical connection. Remove the engine mounted ground strap (Fig. 6).

(12) Remove the fuel hose quick connect fittings from the fuel rail using an open end wrench to push in on the plastic ring located on the end of the fittings. Gently pull the fittings from the fuel rail (Fig. 7).

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

(13) Remove direct ignition system (DIS) coils and alternator bracket to intake manifold bolt (Fig. 8).

(14) Remove intake manifold bolts and rotate manifold back over rear valve cover (Fig. 9).

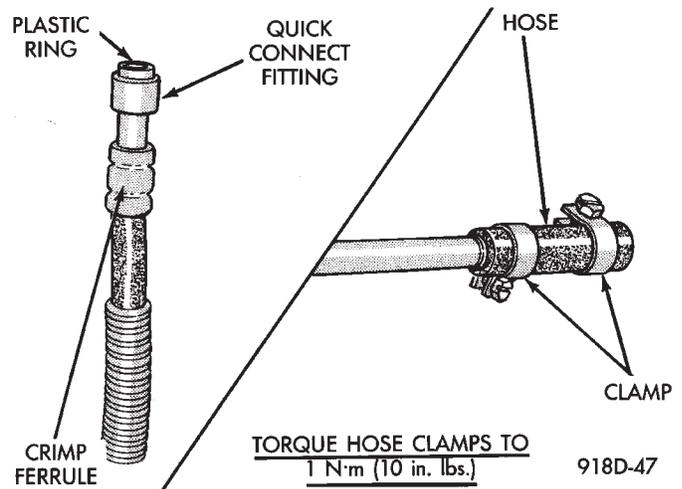


Fig. 7 Quick Connect Fuel Fittings to Fuel Rail

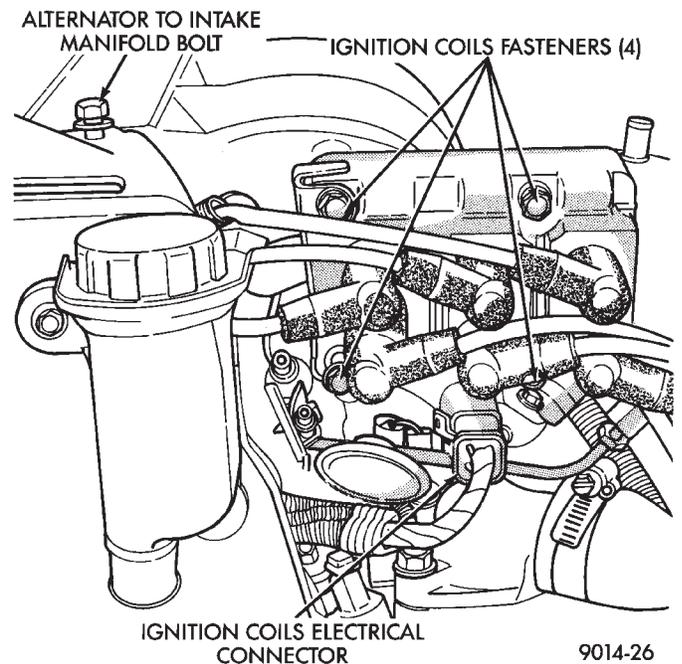


Fig. 8 Ignition Coils

(15) Cover intake manifold with suitable cover when servicing (Fig. 10).

(16) Remove vacuum harness connector from Fuel Pressure Regulator.

(17) Remove fuel tube retainer bracket screw and fuel rail attaching bolts (Fig. 10). Spread the retainer bracket to allow fuel tube removal clearance.

(18) Remove fuel rail injector wiring clip from the alternator bracket (Fig. 11).

(19) Disconnect cam sensor, coolant temperature sensor, and engine temperature sensors.

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

(21) Remove fuel rail. Be careful not to damage the rubber injector O-rings upon removal from their ports (Fig. 12).

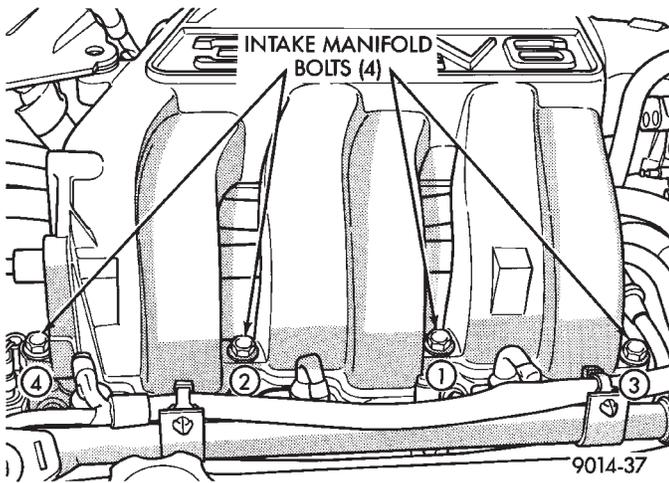


Fig. 9 Intake Manifold Bolts

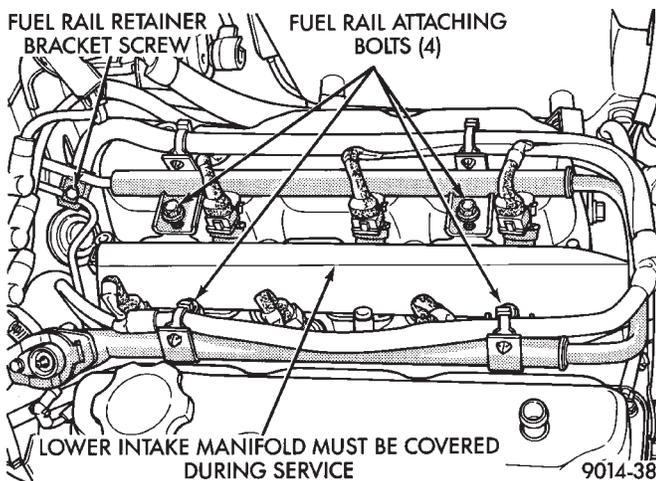


Fig. 10 Fuel Rail Attaching Bolts

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

(23) Remove intake manifold bolts. Remove intake manifold.

(24) 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.

INTAKE MANIFOLD

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).

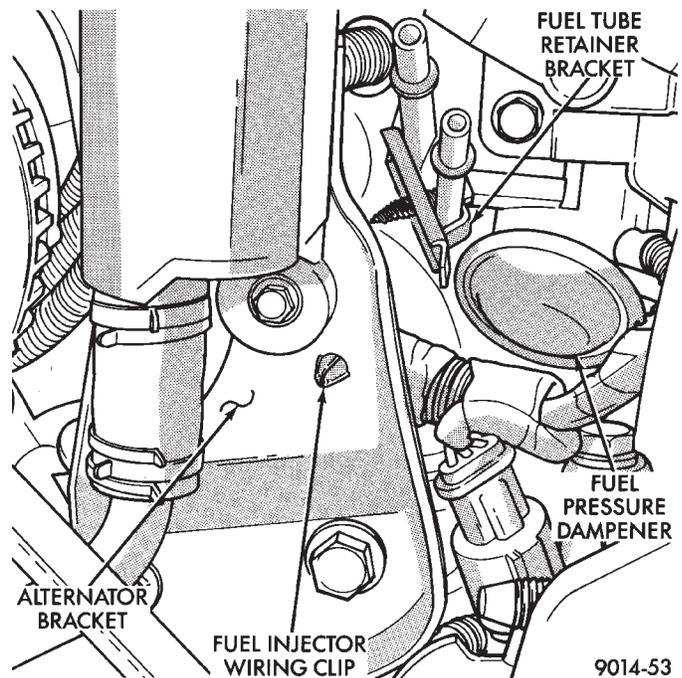


Fig. 11 Fuel Injector Wiring Clip

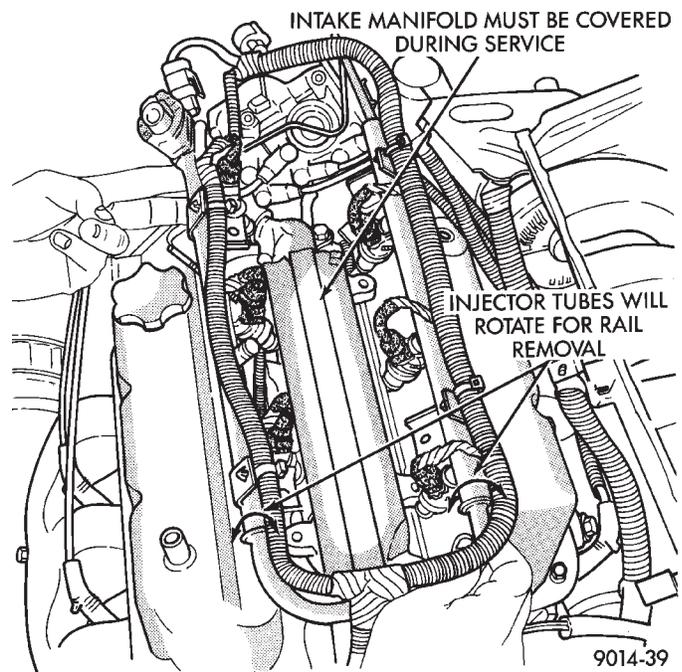


Fig. 12 Fuel Rail Removal

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.

(4) Install intake manifold and (8) bolts and tighten to 1 N•m (10 in. lbs.) torque. Then retighten bolts to 22 N•m (200 in. lbs.) torque in sequence shown in (Fig. 13). Then retighten again to 22 N•m

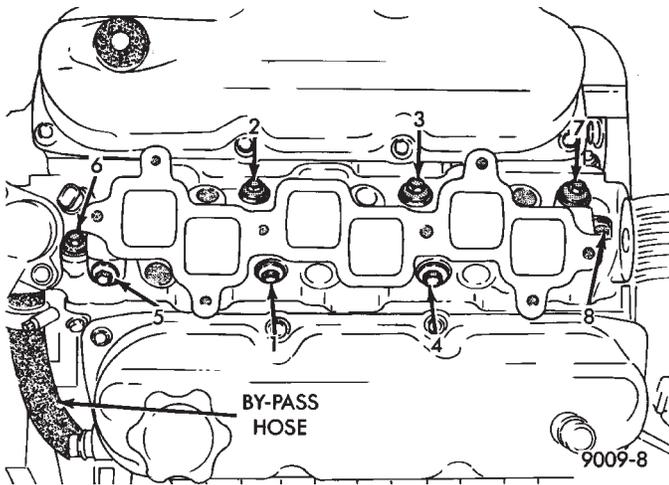


Fig. 13 Intake Manifold Removal and Installation

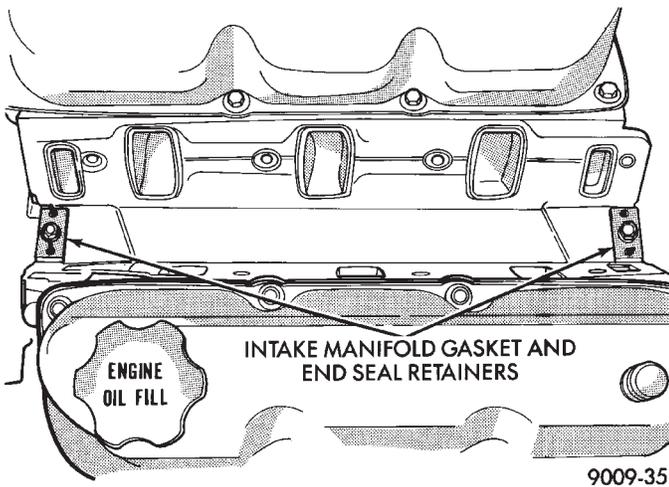


Fig. 14 Intake Manifold Gasket

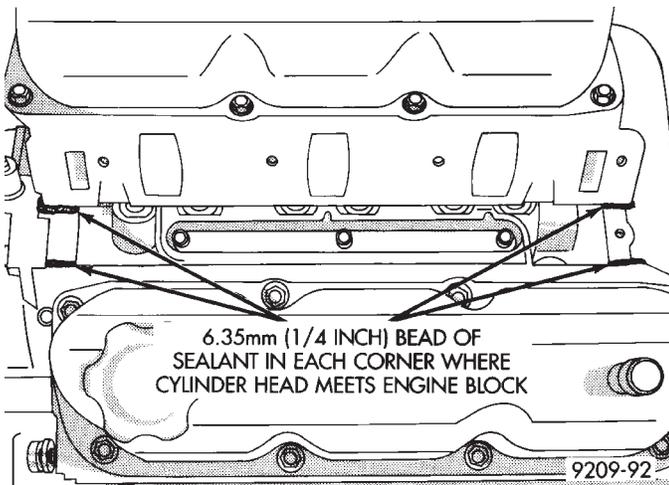


Fig. 15 Intake Manifold Gasket Sealing

(200 in. lbs.) torque. After intake manifold is in place, **inspect to make sure seals are in place.**

(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. 12).

(8) Install the (4) fuel rail attaching bolts and tighten to 22 N•m (200 in. lbs.) torque (Fig. 10).

(9) Install fuel tube retaining bracket screw and tighten to 4 N•m (35 in. lbs.) torque (Fig. 10).

(10) Reconnect cam sensor, coolant temperature sensor and engine temperature sensors (Fig. 11).

(11) Install fuel injector harness wiring clips on the alternator bracket and intake manifold water tube (Fig. 11).

(12) Connect fuel pressure regulator vacuum line.

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

(14) Place intake manifold gasket on lower manifold. Put upper manifold into place and install bolts finger tight.

(15) Install the alternator bracket to intake manifold bolt and the cylinder head to intake manifold strut bolts. **Do not torque.**

(16) Tighten intake manifold bolts to 28 N•m (250 in. lbs.) torque in the sequence shown in (Fig. 9).

(17) Tighten alternator bracket to intake manifold bolt to 54 N•m (40 ft. lbs.) torque (Fig. 8).

(18) Tighten the cylinder head to intake manifold strut bolts to 54 N•m (40 ft. lbs.) torque (Fig. 5).

(19) Connect ground strap, MAP and heated oxygen sensor electrical connectors (Fig. 6).

(20) Connect charge temperature sensor electrical connector (Fig. 5).

(21) Connect vacuum harness to intake plenum (Fig. 5).

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

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

(24) Connect the wiring connectors to the throttle position sensor TPS and automatic idle speed AIS motor (Fig. 4).

(25) Connect vacuum harness to throttle body (Fig. 4).

(26) Install the direct ignition system DIS coils. Tighten fasteners to 12 N•m (105 in. lbs.) torque (Fig. 8).

(27) Lubricate the ends of the chassis fuel tubes with 30 wt oil. Connect fuel supply and return hoses to chassis fuel tube assembly. pull back on the quick connect fitting to ensure complete insertion (Fig. 7). (Refer to Fuel Hoses, Clamps and Quick Connect Fittings in Group 14 Fuel Systems).

(28) Install throttle cable (Fig. 3).

(29) Connect fuel injector wiring harness.

(30) Install air cleaner and hose assembly (Fig. 2).

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

(32) With the DRB II 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 MANIFOLDS

REMOVAL

- (1) Raise vehicle and disconnect exhaust pipe from rear cowl side exhaust manifold at articulated joint.
- (2) Separate EGR tube from rear manifold and disconnect Heated Oxygen Sensor lead wire (Fig. 16).
- (3) Remove Alternator/Power Steering Support Strut (Fig. 16).
- (4) Remove bolts attaching cross-over pipe to manifold (Fig. 16).

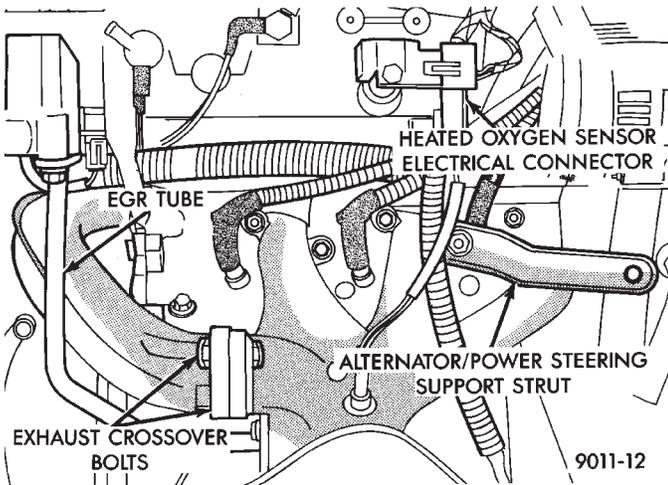


Fig. 16 EGR Tube, Heated Oxygen Sensor and Alternator/Power Steering Strut

- (5) Remove bolts attaching rear manifold to cylinder head and remove manifold.
- (6) Lower vehicle and remove screws attaching front heat shield to front manifold (Fig. 17).
- (7) Remove bolts fastening crossover pipe to front exhaust manifold and nuts fastening manifold to cylinder head. Remove assemblies (Fig. 18).

INSPECTION

Inspect exhaust manifolds for damage or cracks and check distortion of the cylinder head mounting surface and exhaust crossover mounting surface with a straightedge and thickness gauge (Fig. 19).

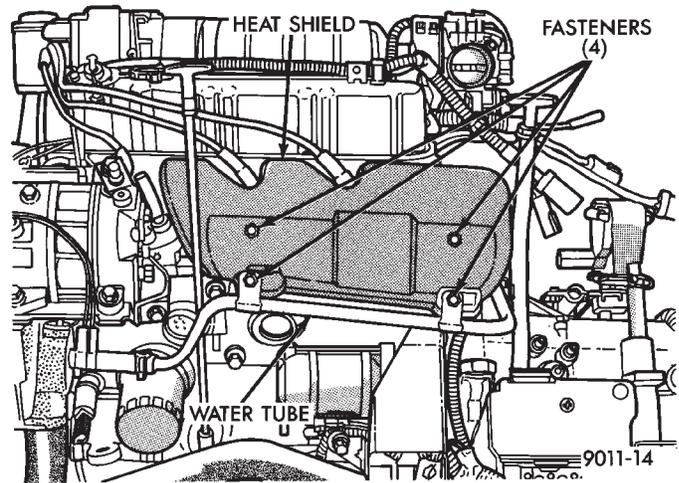


Fig. 17 Heat Shield

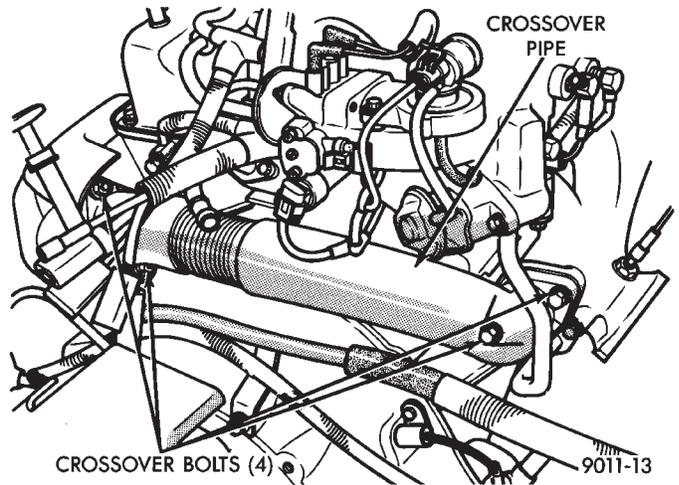


Fig. 18 Crossover Pipe

STANDARD: .15 mm (.004 inch)
LIMIT: .3 mm (.008 inch)

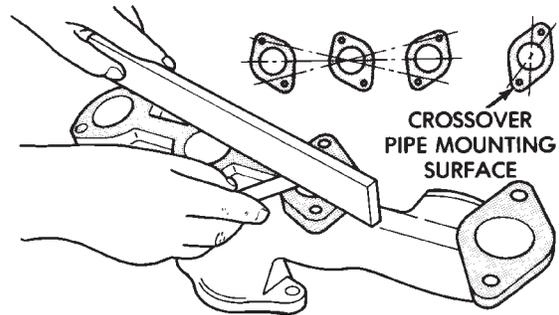


Fig. 19 Check Exhaust Manifold Mounting Surface EXHAUST MANIFOLD

INSTALLATION

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

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

(3) Attach crossover pipe to exhaust manifold and tighten bolt to 33 N•m (25 ft. lbs.) torque and connect heated oxygen sensor lead (Fig. 16).

(4) Install EGR Tube and Alternator/Power Steering Strut (Fig. 16).

(5) Install front exhaust manifold and attach exhaust crossover (Fig. 18).

(6) Install front manifold heat shield and tighten attaching screws to 23 N•m (200 in. lbs.) torque (Fig. 17).

TORQUE SPECIFICATION

DESCRIPTION	TORQUE
Heat Shield Mounting Screws	6 N•m (55 in. lbs.)*
Heat Shield Mounting Nuts	5 N•m (45 in. lbs.)
Insulator Mounting Bolts	28 N•m (250 in. lbs.)
U-Bolt Nuts and Uni-Clamp Nut	30 N•m (270 in. lbs.)**
Intake Manifold Screws (All)	23 N•m (200 in. lbs.)
Exhaust Manifold Nuts and Screws (All)	23 N•m (200 in. lbs.)
Exhaust Flange Nuts	28 N•m (250 in. lbs.)
Turbocharger-to-Exhaust Manifold Nuts – 2.2/2.5L engine	54 N•m (40 ft. lbs.)
Turbocharger Heat Shield Screws – 2.2/2.5L engine	12 N•m (105 in. lbs.)
Turbocharger Fuel Rail Screws – 2.2/2.5L engine	28 N•m (250 in. lbs.)
Coolant Tube Nuts (All) – 2.2/2.5L engine	41 N•m (30 ft. lbs.)
Oil Line Tube Nuts (All) – 2.2/2.5L engine	14 N•m (125 in. lbs.)
Bracket Screws (Turbocharger Housing Support)***	
Upper – 2.2/2.5L engine	54 N•m (40 ft. lbs.)
Lower – 2.2/2.5L engine	8.5 N•m (70 in. lbs.)

DESCRIPTION	TORQUE
Air Intake Plenum Screws – 3.0L	15 N•m (130 in. lbs.)
Intake (Cross) Manifold – 3.0L	20 N•m (174 in. lbs.)
Exhaust Manifold Nuts – 3.0L	22 N•m (191 in. lbs.)
Exhaust Manifold Heat Shield Screws – 3.0L	15 N•m (130 in. lbs.)
Crossover Bolt – 3.0L	69 N•m (51 ft. lbs.)
Exhaust Manifold Mounting Stud 3.3/3.8L	23 N•m (200 in. lbs.)
Exhaust Manifold Mounting Screws 3.3/3.8L	23 N•m (200 in. lbs.)
Exhaust Manifold Crossover Bolts 3.3/3.8L	33 N•m (25 ft. lbs.)
Exhaust Manifold Crossover Nuts 3.3/3.8L	33 N•m (25 ft. lbs.)
Heat Shield Mounting Screws 3.3/3.8L	23 N•m (200 in. lbs.)
Intake Manifold Attaching Screws 3.3/3.8L	23 N•m (200 in. lbs.)
Intake Manifold Upper/Lower Attaching Screws	28 N•m (250 in. lbs.)
Intake Manifold-to-Cylinder Head Strut 3.3/3.8L	54 N•m (40 ft. lbs.)
Intake Manifold Gasket Retainer Screws 3.3/3.8L	12 N•m (105 in. lbs.)

*1 N•m (11 in. lbs.) if equipped with Turbocharger upper dash panel shield.

**41 N•m (360 in. lbs.) if equipped with turbocharger.

***See text for procedure.