

EXHAUST SYSTEM AND INTAKE MANIFOLD

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GENERAL INFORMATION

EXHAUST SYSTEM

The exhaust system (Fig. 1) consist of two front close coupled catalytic converters. Both converters attach directly to the exhaust manifold using a V-Band clamp. The exhaust down pipes exit the converters and connect into the front resonator. The front resonator, intermediate pipe, and muffler are one single module. The rear resonator and tailpipe connect to the muffler outlet. The upstream oxygen sensors are located in each exhaust manifold. The downstream oxygen sensors are located at the rear of each catalytic converter.

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 entire 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 vehicles built for a State with strict emission requirements).

EXHAUST GAS RECIRCULATION (EGR)

To assist in the control of oxides of nitrogen (NO_x) 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 NO_x.

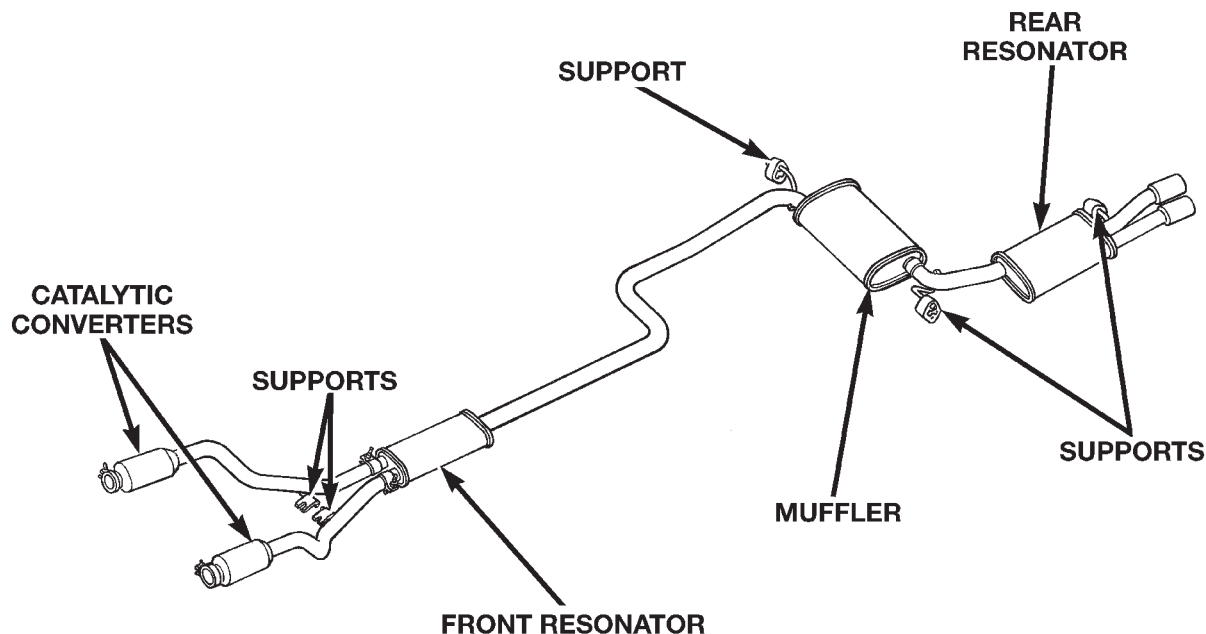
Exhaust gases are routed through a tube from the exhaust manifold to the intake manifold adaptor. Where they are metered by the EGR valve into the intake system. Refer to section 25, Emission Control Systems for a complete description, diagnosis and the proper service procedures.

HEAT SHIELDS

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

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

GENERAL INFORMATION (Continued)



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Fig. 1 Exhaust System—3.5L Engine

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.

DESCRIPTION AND OPERATION

INTAKE MANIFOLD

The intake manifold is made of a composite material and is a cross-flow type with long runners to improve air charge inertia. An active Short Runner Valve (SRV) opens during certain operating conditions to improve top end performance. A Manifold Tuning Valve (MTV) connect the plenums at specific engine speeds to maximize low RPM torque without reducing high RPM power.

EXHAUST MANIFOLDS

The exhaust manifolds are a log type design. The manifolds are made of nodular cast iron. The outlets are designed for V-Band clamp attachment of close coupled catalytic converters.

DIAGNOSIS AND TESTING

EXHAUST SYSTEM

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

REMOVAL AND INSTALLATION

EXHAUST SYSTEM

REMOVAL

It is easier to service the exhaust system module components (Fig. 2), when system is removed from the vehicle.

- (1) Raise vehicle on hoist.
- (2) Apply penetrating oil and loosen band clamps at resonator connector.
- (3) Separate exhaust module at front resonator from the converter downpipes.

CAUTION: At this time, the exhaust system is held by only isolators. Support the exhaust system underneath the front resonator 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) Support exhaust system with jack stand.
- (5) Remove the rubber isolators from the rear suspension crossmember and support brackets on body (Fig. 4) and (Fig. 3).
- (6) Lower exhaust system and lay on the ground.

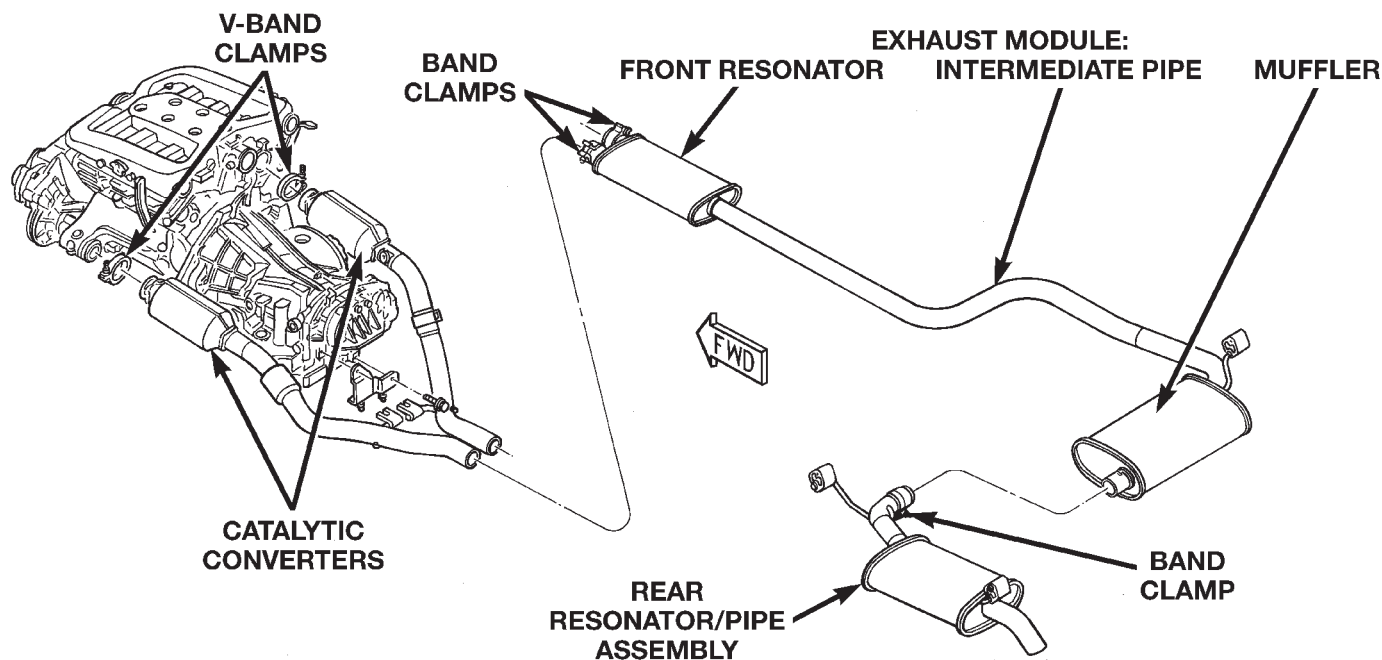
NOTE: When replacement is required on any component of the exhaust system, it is most important that original equipment parts be used.

- 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 resonator to the converter pipes.

REMOVAL AND INSTALLATION (Continued)



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Fig. 2 Exhaust System Components

component to maintain position and proper clearance with underbody parts.

- (5) Tighten band clamps to the proper torque.
- (6) Lower the vehicle.

MUFFLER AND FRONT RESONATOR**REMOVAL**

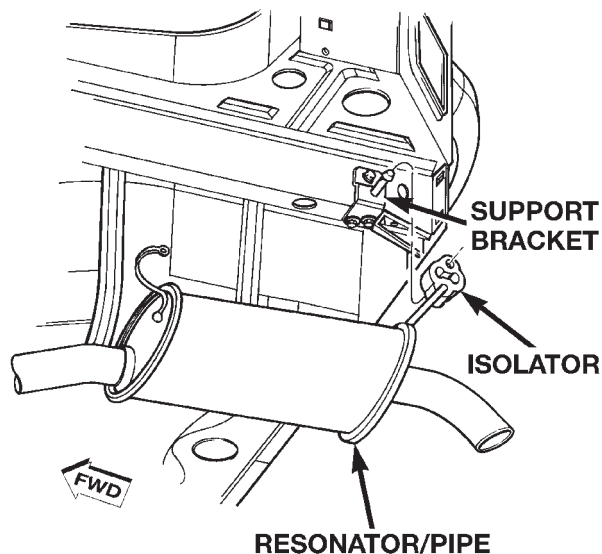
- (1) Remove exhaust system. Refer to procedure in this section.
- (2) Loosen clamp and separate rear resonator/pipe from muffler and front resonator (Fig. 2).

INSTALLATION

- (1) Install rear resonator/pipe onto new muffler/resonator (Fig. 2), but do not tighten clamp until exhaust system is installed on vehicle.
- (2) Install exhaust system. Refer to procedure in this section.
- (3) Tighten all exhaust band clamps to 61 N·m (45 ft. lbs.).

TAILPIPE/REAR RESONATOR

- (1) With the exhaust system removed, loosen the clamp of the tailpipe/rear resonator assembly to the rear module (Fig. 2).
- (2) Install the correct tailpipe/resonator assembly onto the rear module and loose assemble the accompanying clamp.
- (3) Install exhaust system. Refer to procedure outlined in this section.
- (4) Tighten all band clamps to 61 N·m (45 ft. lbs.).

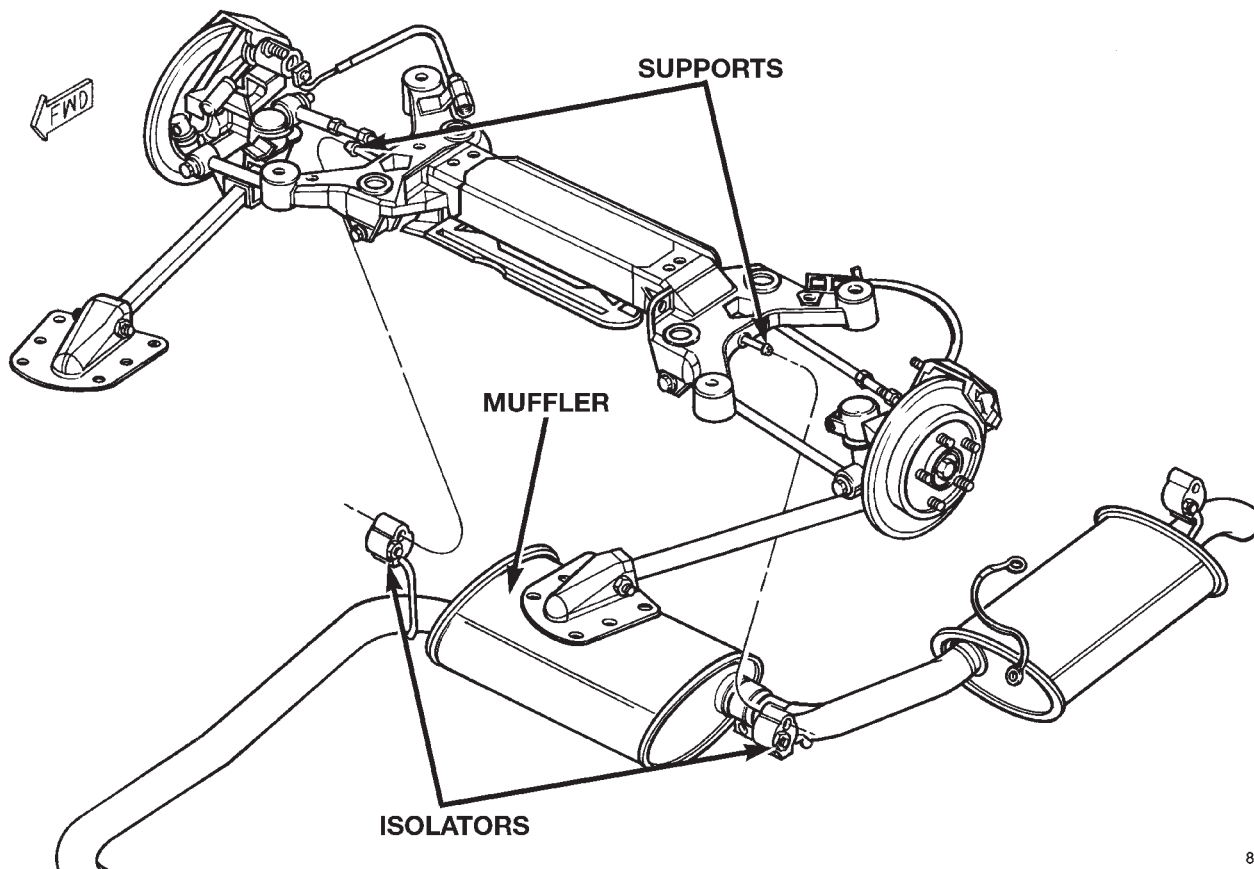


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Fig. 3 Rubber Isolator Hanger to Body Support Bracket

- (2) Place the exhaust system on two supports (one on side of muffler, one behind the resonator). Connect the system to the converter pipes.
- (3) Install the system's rubber isolators onto the support 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

REMOVAL AND INSTALLATION (Continued)



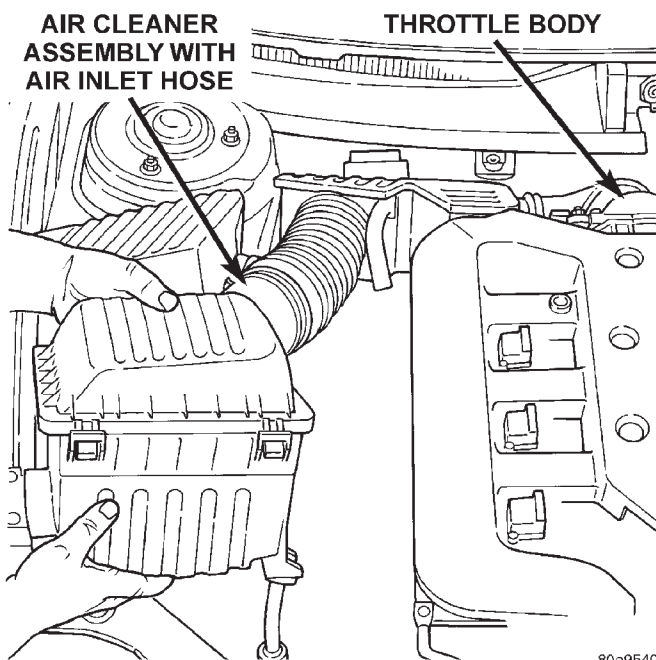
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*Fig. 4 Exhaust Module Supports***CATALYTIC CONVERTERS****RIGHT CATALYTIC CONVERTER****REMOVAL**

- (1) Raise vehicle on hoist.
- (2) Remove exhaust system. Refer to procedure in this section.
- (3) Loosen or remove nut attaching right pipe to transaxle bracket.
- (4) Loosen extension pipe band clamp.
- (5) Remove right side converter extension pipe (Fig. 6).
- (6) Lower vehicle.
- (7) Remove air cleaner assembly with air inlet hose (Fig. 5).
- (8) Remove SRV (Single Runner Valve) vacuum reservoir and control valve assembly at right rear of engine. (3.2/3.5L Engine Only)
- (9) Disconnect downstream oxygen sensor connector and remove sensor from converter pipe.
- (10) Loosen and remove V-Band clamp at exhaust manifold.

NOTE: Do not reuse V-Band clamp.

- (11) Remove converter from engine compartment.



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*Fig. 5 Air Cleaner With Inlet Hose***INSTALLATION**

- (1) Position a NEW V-Band clamp onto the exhaust manifold outlet. DO NOT latch the clamp's T-bolt at this time.

REMOVAL AND INSTALLATION (Continued)

(2) Install catalytic converter. If necessary, stretch open the V-Band clamp to allow the converter to engage the manifold outlet.

(3) Latch the V-Band clamp T-bolt.

(4) Raise vehicle on hoist.

(5) Install right side converter extension pipe (Fig. 6), but do not tighten clamp at this time.

(6) Lower vehicle on hoist.

NOTE: Check for proper alignment and clearance to underbody and engine compartment components before tightening clamps.

(7) Tighten V-Band clamp to 11 N·m (100 in. lbs.).

(8) Install downstream oxygen sensor and connect electrical connector.

(9) Install SRV (Single Runner Valve) vacuum reservoir and control valve assembly at right rear of engine. (3.2/3.5L Engine Only)

(10) Install air cleaner assembly with air inlet hose.

(11) Raise vehicle on hoist.

(12) Tighten extension pipe band clamp to 61 N·m (45 ft. lbs.) (Fig. 6).

(13) Install and/or tighten nut attaching extension pipe to transaxle bracket to 47 N·m (35 ft. lbs.).

(14) Install exhaust system.

(15) Lower vehicle.

(4) Disconnect downstream oxygen sensor electrical connector and remove sensor from converter pipe.

(5) Loosen or remove nut attaching left pipe to transaxle bracket (Fig. 6).

CAUTION: Care should be taken when removing converter not to damaged driveshaft boot.

(6) Remove converter from below vehicle.

INSTALLATION

(1) Install converter.

(2) Attach a NEW V-Band clamp and tighten to 11 N·m (100 in. lbs.) (Fig. 6).

(3) Install and/or tighten nut attaching pipe to transaxle bracket to 47 N·m (35 ft. lbs.) (Fig. 6).

(4) Install downstream oxygen sensor and connect electrical connector.

(5) Install exhaust system.

(6) Lower vehicle.

INTAKE MANIFOLD—UPPER

REMOVAL

(1) Disconnect negative cable from remote jumper terminal.

(2) Remove air cleaner housing and inlet hose (Fig. 7).

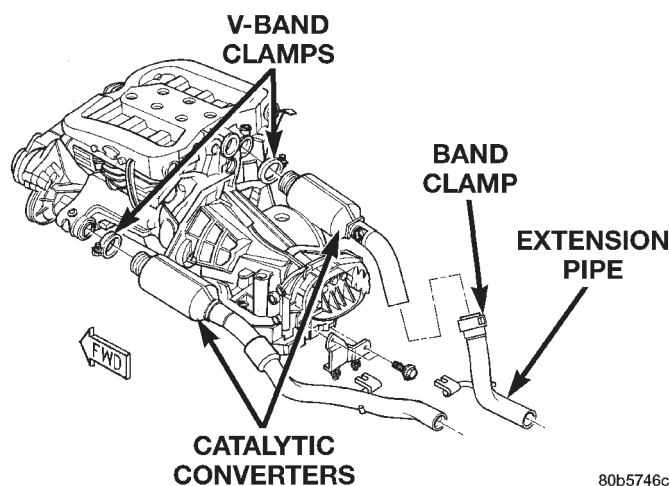


Fig. 6 Catalytic Converters

LEFT CATALYTIC CONVERTER

REMOVAL

(1) Loosen and remove V-Band clamp at exhaust manifold joint (Fig. 6).

NOTE: Do not reuse V-Band clamp.

(2) Hoist vehicle.

(3) Remove exhaust system. Refer to procedure in this section.

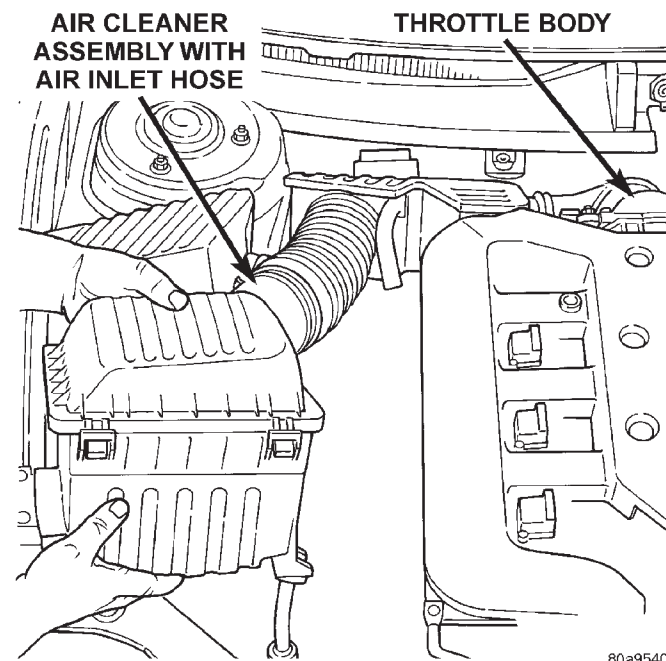


Fig. 7 Air Cleaner Housing and Inlet Hose

(3) Remove throttle and speed control cables from throttle arm and bracket.

(4) Disconnect electrical connectors from the following sensors and actuators (Refer to Group 14, Fuel System for component locations):

REMOVAL AND INSTALLATION (Continued)

- Secondary Runner Valve (SRV)
- Manifold Tuning Valve (MTV)
- Throttle Position Sensor (TPS)
- Idle Air Control (IAC)
- Intake Air Temperature/Manifold Absolute Pressure (TMAP)

(5) Disconnect vacuum hoses from the following:

- Secondary Runner Valve (SRV) Reservoir
- Speed Control Reservoir
- Positive Crankcase Ventilation (PCV) Valve

(6) Remove right (Fig. 8) and left side (Fig. 9) intake manifold supports.

(7) Remove support brackets at intake manifold front corners and at MTV (Fig. 10).

(8) Loosen upper fastener attaching throttle body to support bracket.

(9) Remove clips attaching EGR tubes to intake manifold. Refer to Group 25, Emission Control System.

(10) Remove bolts attaching intake manifold and remove manifold.

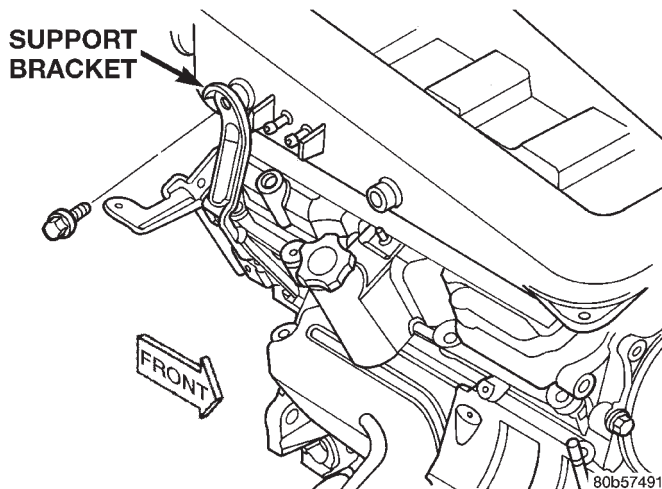


Fig. 8 Intake Manifold Support—Right Side

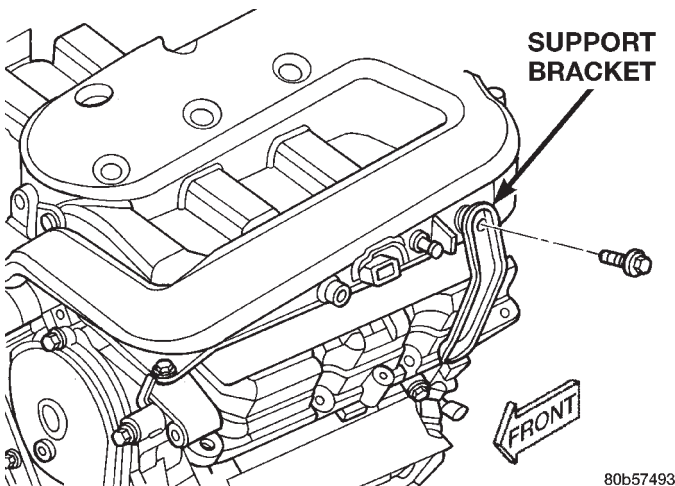
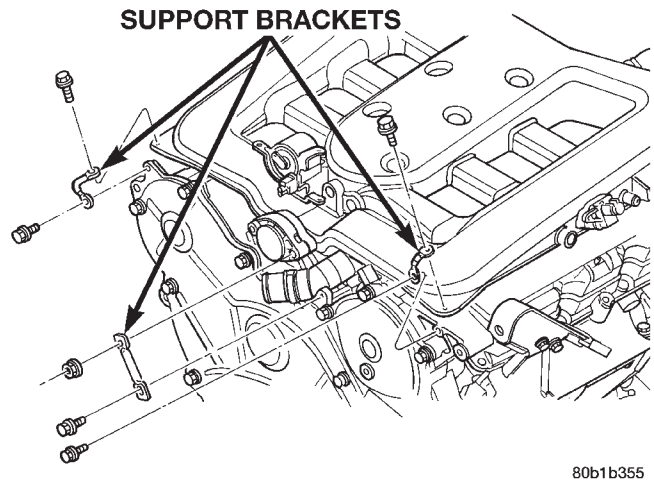


Fig. 9 Intake Manifold Support—Left Side



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Fig. 10 Intake Manifold Supports—Front

INSTALLATION

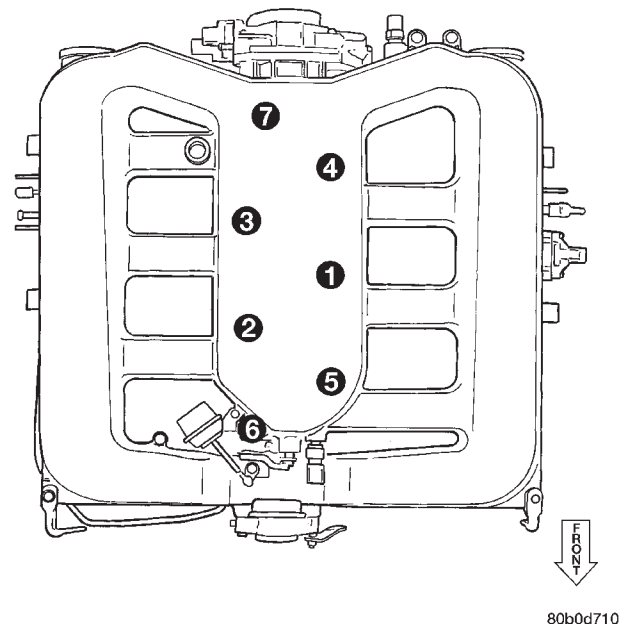
(1) Clean and inspect gasket sealing surfaces.

NOTE: Intake gaskets can be reused, provided they are free of cuts or tears.

(2) Inspect gasket for cuts, tears, or deformation. Replace gaskets as necessary.

(3) Install intake manifold and hand start all attaching bolts.

(4) Tighten bolts gradually in sequence shown in (Fig. 11) until a torque of 12 N·m (105 in. lbs.) is obtained.



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Fig. 11 Upper Intake Manifold Tightening Sequence

(5) Install right (Fig. 8) and left side (Fig. 9) intake manifold supports.

REMOVAL AND INSTALLATION (Continued)

(6) Install manifold support brackets at front corners and at MTV (Fig. 10).

(7) Tighten fastener attaching throttle body to support bracket.

(8) Connect vacuum lines to: Secondary Runner Valve, Speed Control Reservoir, and Positive Crankcase Ventilation (PCV) Valve.

(9) Connect electrical connectors to: Intake Air Temperature/Manifold Absolute Pressure (TMAP), Idle Air Control (IAC), Throttle Position Sensor (TPS), and Manifold Tuning Valve (MTV).

(10) Install EGR tubes to intake manifold. Refer to Group 25, Emission Control System.

(11) Install throttle and speed control cables to bracket and throttle arm.

(12) Install air cleaner housing and inlet tube.

(13) Connect negative cable to remote jumper terminal.

INTAKE MANIFOLD—LOWER

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

REMOVAL

(1) Perform fuel pressure release. Refer to Group 14, Fuel System for procedure.

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

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

(4) Disconnect electrical connectors to fuel injectors and coolant temperature sensor.

(5) Disconnect heater hose quick connect tee from heater tube at rear of manifold.

(6) Disconnect fuel supply hose from fuel rail.

(7) Remove screw attaching fuel rail support bracket to the throttle body support bracket.

(8) Remove bolts attaching fuel rail.

(9) Remove fuel rail and injectors as an assembly.

(10) Remove bolts attaching lower intake and remove intake manifold.

INSTALLATION

(1) Clean all sealing surfaces.

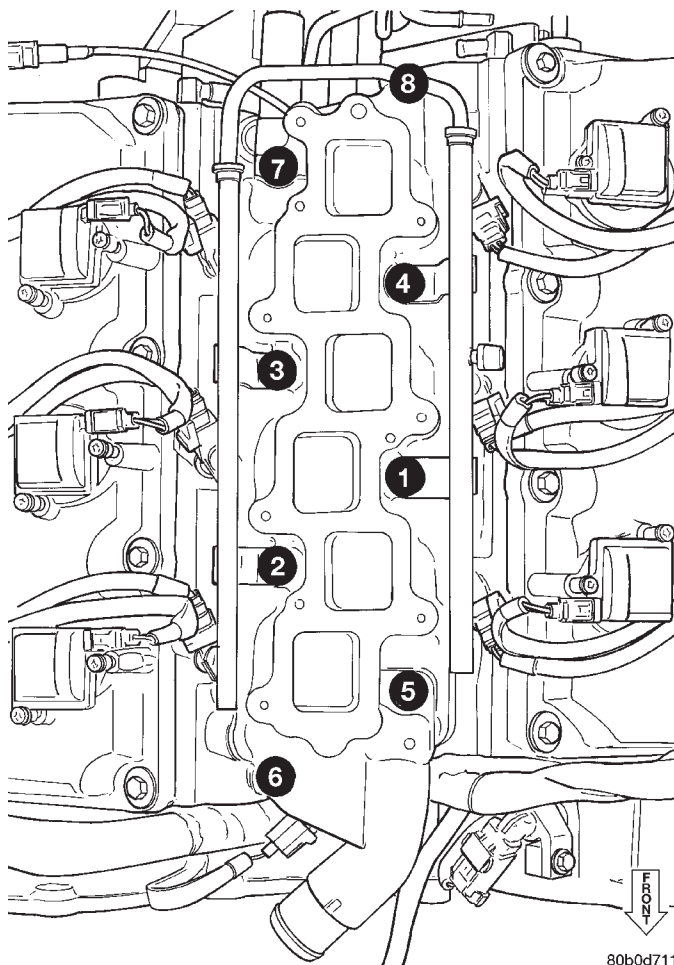
NOTE: Gaskets can be reused provided they are free of tears or cuts.

(2) Inspect gaskets for tears or cuts. Replace as necessary.

(3) Position gasket and intake manifold on cylinder head surfaces.

(4) Install fuel rail with injectors.

(5) Install intake manifold bolts, and gradually tighten in sequence shown in (Fig. 12) until a torque of 28 N·m (250 in. lbs.) is obtained.



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Fig. 12 Lower Intake Manifold Tightening Sequence

(6) Install screw attaching fuel rail support bracket to the throttle body support bracket.

(7) Connect fuel supply hose to fuel rail.

(8) Connect heater hose quick connect tee to heater tube at rear of manifold.

(9) Connect electrical connectors to fuel injectors and coolant temperature sensor.

(10) Install upper intake manifold. Refer to procedure outlined in this section.

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

(12) With the DRB scan tool use ASD Fuel System Test to pressurize system to check for leaks.

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

REMOVAL AND INSTALLATION (Continued)

EXHAUST MANIFOLDS*RIGHT EXHAUST MANIFOLD***REMOVAL**

- (1) Disconnect negative cable from remote jumper terminal.
- (2) Raise vehicle on hoist.
- (3) Remove exhaust system. Refer to procedure in this section.
- (4) Loosen converter pipe support attaching bolt at transaxle mount.
- (5) Remove A/C belt. Refer to Group 7, Cooling System for procedure.
- (6) Lower vehicle.
- (7) Remove air cleaner housing and air inlet tube.
- (8) Loosen and remove V-Band clamp at exhaust manifold connector.

NOTE: Do not reuse V-Band clamp.

- (9) Remove A/C compressor attaching bolts and set compressor aside.
- (10) Remove engine oil dipstick tube.
- (11) Remove air conditioning compressor bracket.
- (12) Disconnect oxygen sensor electrical connector and remove sensor.
- (13) Remove heat shield attaching bolts and remove heat shield (Fig. 13).
- (14) Remove exhaust manifold attaching bolts (Fig. 13).
- (15) Remove exhaust manifold.

INSTALLATION

- (1) Install exhaust manifold. Tighten bolts starting at the center working outward to 23 N·m (200 in. lbs.) (Fig. 13).
- (2) Install heat shields and tighten attaching bolts to 12 N·m (105 in. lbs.).
- (3) Install oxygen sensor to manifold and connect electrical connector.
- (4) Install air conditioning compressor mounting bracket.
- (5) Install engine oil dipstick tube.
- (6) Install air conditioning compressor and drive belt. Refer to Group 7, for belt installation procedure.
- (7) Install a new V-Band clamp and tighten to 11 N·m (100 in. lbs.).
- (8) Raise vehicle on hoist.
- (9) Install exhaust system. Refer to procedure in this section.
- (10) Install and/or tighten nut attaching converter pipe supports to transaxle brackets to 47 N·m (35 ft. lbs.).
- (11) Lower vehicle and install air cleaner housing and air inlet tube.
- (12) Connect negative cable.

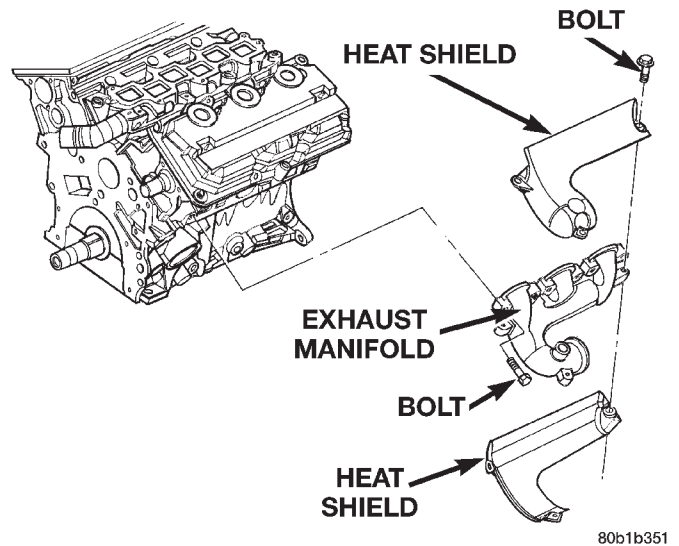


Fig. 13 Exhaust Manifold—3.5L Engine

*LEFT EXHAUST MANIFOLD***REMOVAL**

- (1) Disconnect negative cable from remote jumper terminal.
- (2) Raise vehicle on hoist.
- (3) Remove exhaust system. Refer to procedure in this section.
- (4) Loosen converter pipe support attaching bolt at transaxle mount.
- (5) Lower vehicle.
- (6) Loosen and remove V-Band clamp at exhaust manifold connector.

NOTE: Do not reuse V-Band clamp.

- (7) Remove electrical connector harness bracket.
- (8) Disconnect oxygen sensor electrical connector. Remove sensor from manifold.
- (9) Remove heat shield attaching bolts. Remove heat shield.
- (10) Remove manifold attaching bolts.
- (11) Remove manifold.

INSTALLATION

- (1) Install exhaust manifold. Tighten bolts starting at the center working outward to 23 N·m (200 in. lbs.).
- (2) Install heat shields and tighten bolts to 12 N·m (105 in. lbs.).
- (3) Install oxygen sensor to manifold and connect electrical connector.
- (4) Attach electrical connector bracket to brace.
- (5) Install a new V-Band clamp and tighten to 11 N·m (100 In. lbs.).
- (6) Raise vehicle on hoist.

REMOVAL AND INSTALLATION (Continued)

- (7) Install and/or tighten nut attaching converter pipe supports to transaxle brackets to 47 N·m (35 ft. lbs.).
- (8) Install exhaust system. Refer to procedure in this section.
- (9) Lower vehicle and connect negative cable.

CLEANING AND INSPECTION

INTAKE MANIFOLD

- Check for:
- Damage and cracks of each section.
 - Clogged water passages in end cross over and clogged gas passages.

EXHAUST MANIFOLDS

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

SPECIFICATIONS

TORQUE CHART

DESCRIPTION	TORQUE
Band (Torca) Clamp	
Fastener	61 N·m (45 ft. lbs.)
Exhaust Manifold to Catalytic Converter	
V-Band Clamp	11 N·m (100 in. lbs.)
Exhaust Manifold Mounting	
Fasteners	23 N·m (200 in. lbs.)
Exhaust Manifold Heat Shield Mounting	
Fasteners	12 N·m (105 in. lbs.)
Exhaust Support to Body Bracket	
Fasteners	25 N·m (215 in. lbs.)
Exhaust Support Bracket to Transaxle	
Fasteners	47 N·m (35 ft. lbs.)
Intake Manifold—Lower 3.5L	
Bolts	28 N·m (250 in. lbs.)
Intake Manifold Plenum—Upper 3.5L	
Fasteners	12 N·m (105 in. lbs.)
Intake Manifold Plenum Supports	
Side Supports	
Fasteners—M8	28 N·m (250 in. lbs.)
Front Support	
Fasteners—M6	12 N·m (105 in. lbs.)