EXHAUST SYSTEM

CONTENTS

DESCRIPTION AND OPERATION

EXHAUST SYSTEM COMPONENTS

CATALYTIC CONVERTERS

California emissions vehicles incorporate two mini catalytic converters into the exhaust system. These catalytic converters are made of stainless steel designed to operate at extremely high temperatures.

OXYGEN SENSORS

The exhaust system uses oxygen sensors to detect exhaust gasses. These gasses are sampled to determine whether the system is rich (to much fuel) or lean (not enough fuel) then the Powertrain Control Module (PCM) makes the appropriate adjustment to the fuel system.

MUFFLER

Both the 4.0L and 4.7L engines use a galvanized steel muffler to control exhaust noise levels and exhaust back pressure.

TAILPIPE

The tail pipe is also made of galvanized steel and channels the exhaust out of the muffler and out from under the vehicle to control noise and prevent exhaust gas fumes from entering the passenger compartment.

EXHAUST SYSTEM

WARNING: THE NORMAL OPERATING TEMPERATURE OF THE EXHAUST SYSTEM IS VERY HIGH. THEREFORE, NEVER WORK AROUND OR ATTEMPT TO SERVICE ANY PART OF THE EXHAUST SYSTEM UNTIL IT IS COOLED. SPECIAL CARE SHOULD BE TAKEN WHEN WORKING NEAR THE CATALYTIC CONVERTER. THE TEMPERATURE OF THE CONVERTER RISES TO A HIGH LEVEL AFTER A SHORT PERIOD OF ENGINE OPERATION TIME.

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

The exhaust system uses a single muffler with a welded tail pipe.

The 4.0L and 4.7L Federal Emissions vheicles use a single catalytic converter, while the California models use two additional mini catalytic converters inline with the exhaust pipe below the exhaust manifolds.

The 4.0L and 4.7L exhaust manifolds are equipped with ball flange outlets to assure a tight seal and strain free connections.

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

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

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

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

DESCRIPTION AND OPERATION (Continued)

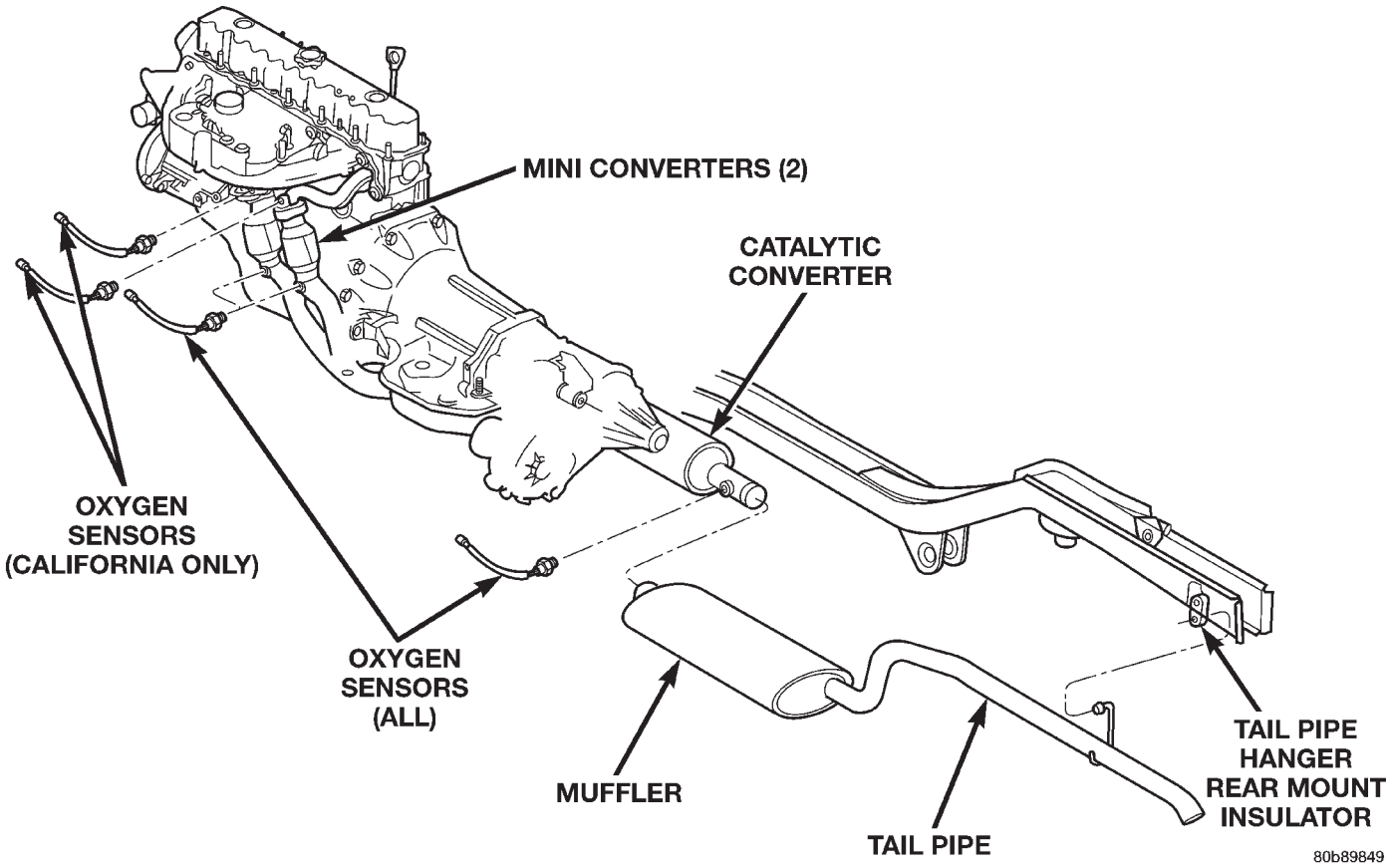

Fig. 1 Exhaust System—4.0L

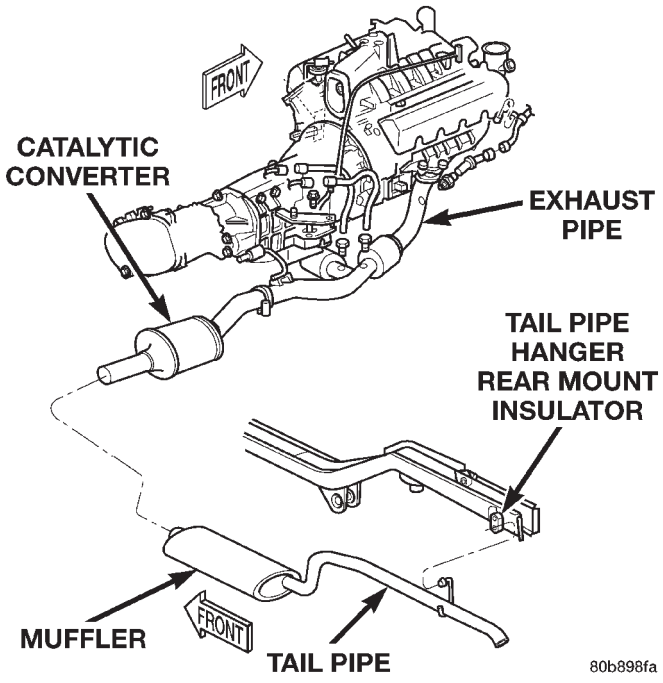

Fig. 2 Exhaust System—4.7L

CATALYTIC CONVERTER

WARNING: THE NORMAL OPERATING TEMPERATURE OF THE EXHAUST SYSTEM IS VERY HIGH. THEREFORE, NEVER WORK AROUND OR ATTEMPT TO SERVICE ANY PART OF THE EXHAUST SYSTEM UNTIL IT IS COOLED. SPECIAL CARE SHOULD BE TAKEN WHEN WORKING NEAR THE CATALYTIC CONVERTER. THE TEMPERATURE OF THE CONVERTER RISES TO A HIGH LEVEL AFTER A SHORT PERIOD OF ENGINE OPERATION TIME.

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

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

DESCRIPTION AND OPERATION (Continued)

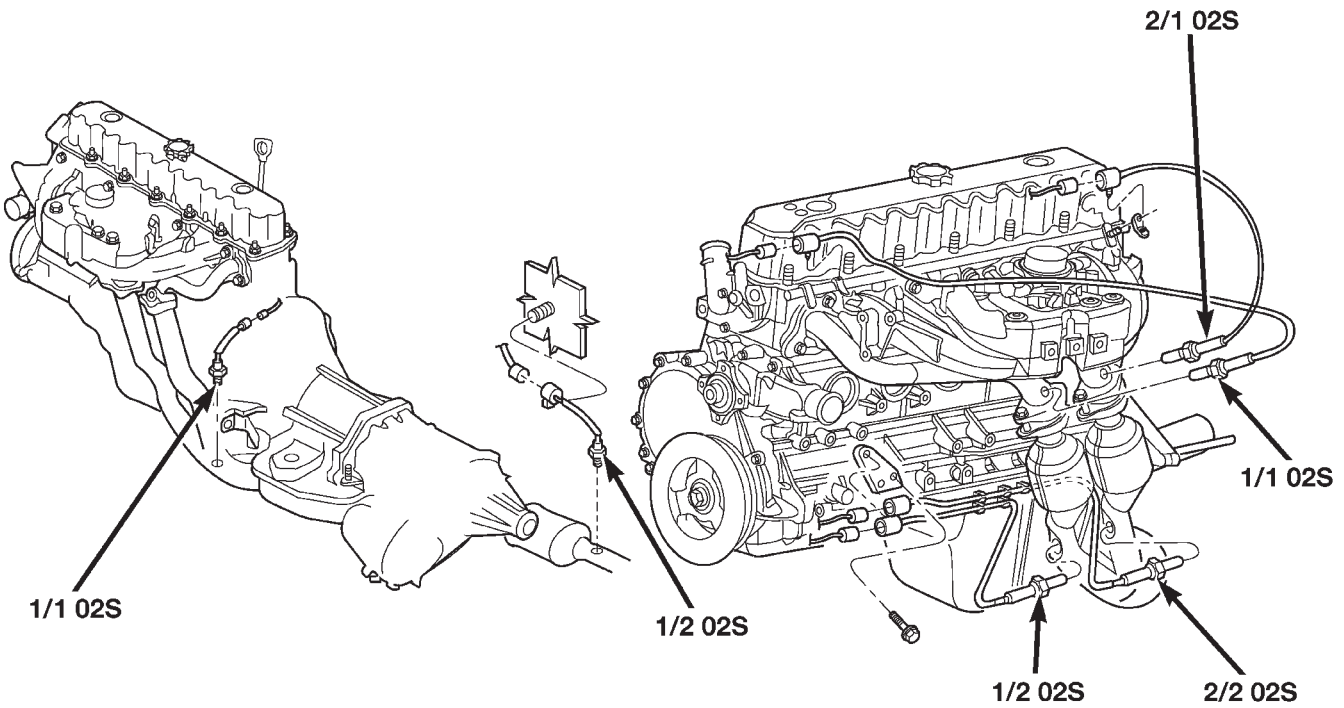

Fig. 3 4.0L Catalytic Converter and O2 Sensor Configuration—California and Federal Emissions

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

Federal emission vehicles use only one catalytic converter, However, California emission vehicles incorporate two mini catalytic converters located after the exhaust manifolds and before the inline catalytic converter (Fig. 3) (Fig. 4).

DESCRIPTION AND OPERATION (Continued)

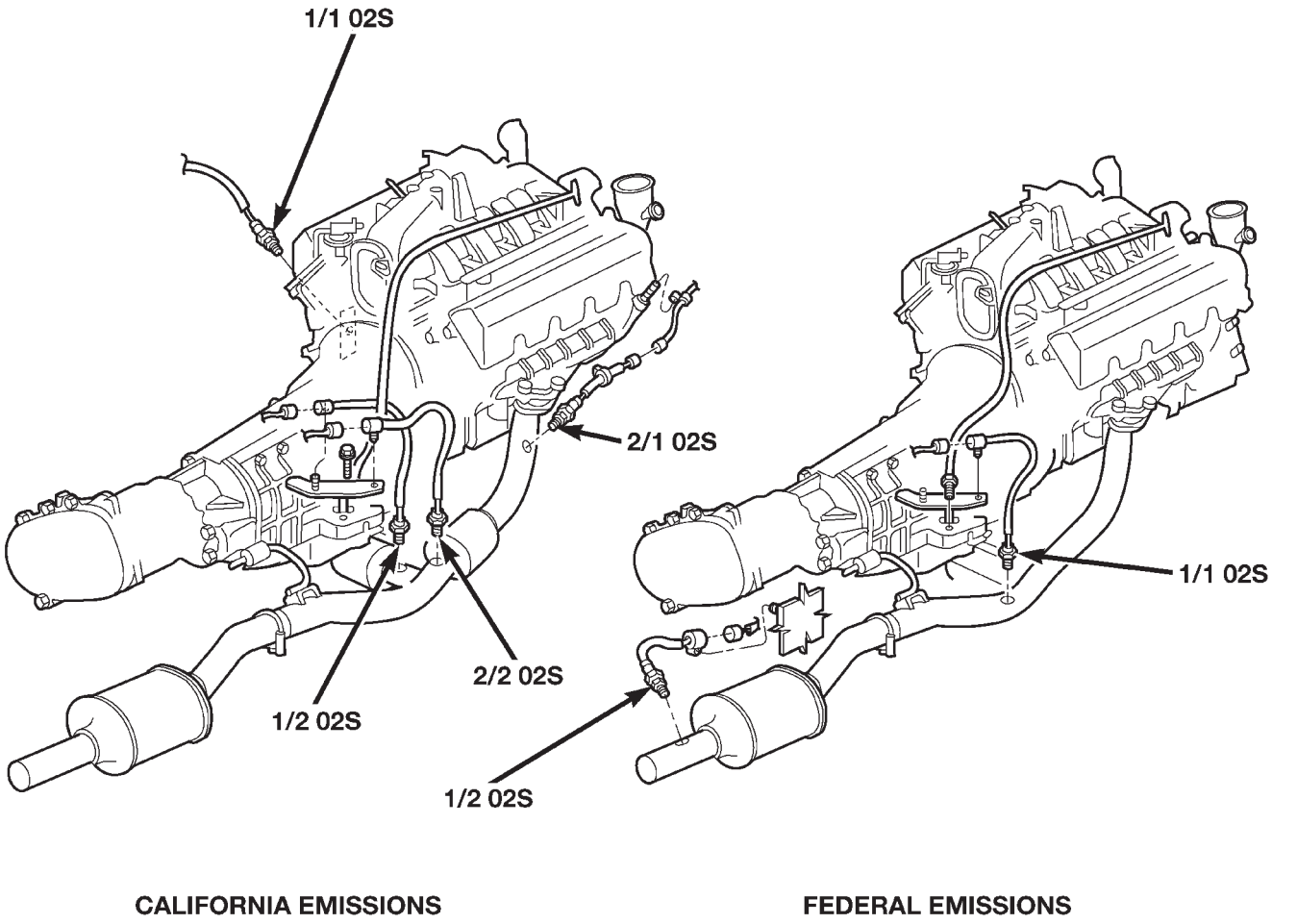

Fig. 4 4.7L Catalytic Converter and O2 Sensor Configuration—California and Federal Emissions

DESCRIPTION AND OPERATION (Continued)

HEAT SHIELDS

Heat shields are needed to protect both the vehicle and the environment from the high temperatures developed by the catalytic converter. The catalytic converter releases additional heat into the exhaust system. Under severe operating conditions, the temperature increases in the area of the converter. Such conditions can exist when the engine misfires or otherwise does not operate at peak efficiency (Fig. 5).

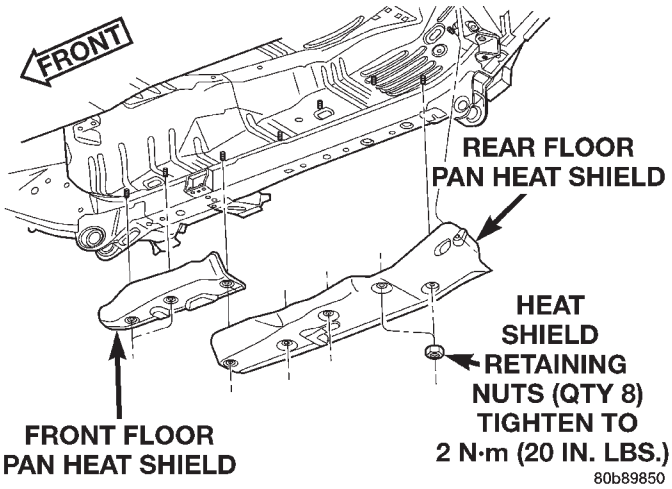

Fig. 5 Front and Rear Floor Pan Heat Shields

DIAGNOSIS AND TESTING

EXHAUST SYSTEM DIAGNOSIS

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

REMOVAL AND INSTALLATION

EXHAUST PIPE

REMOVAL

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

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(1) Raise and support the vehicle.

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

(3) Remove the oxygen sensor from the exhaust pipe (Fig. 6) (Fig. 7).

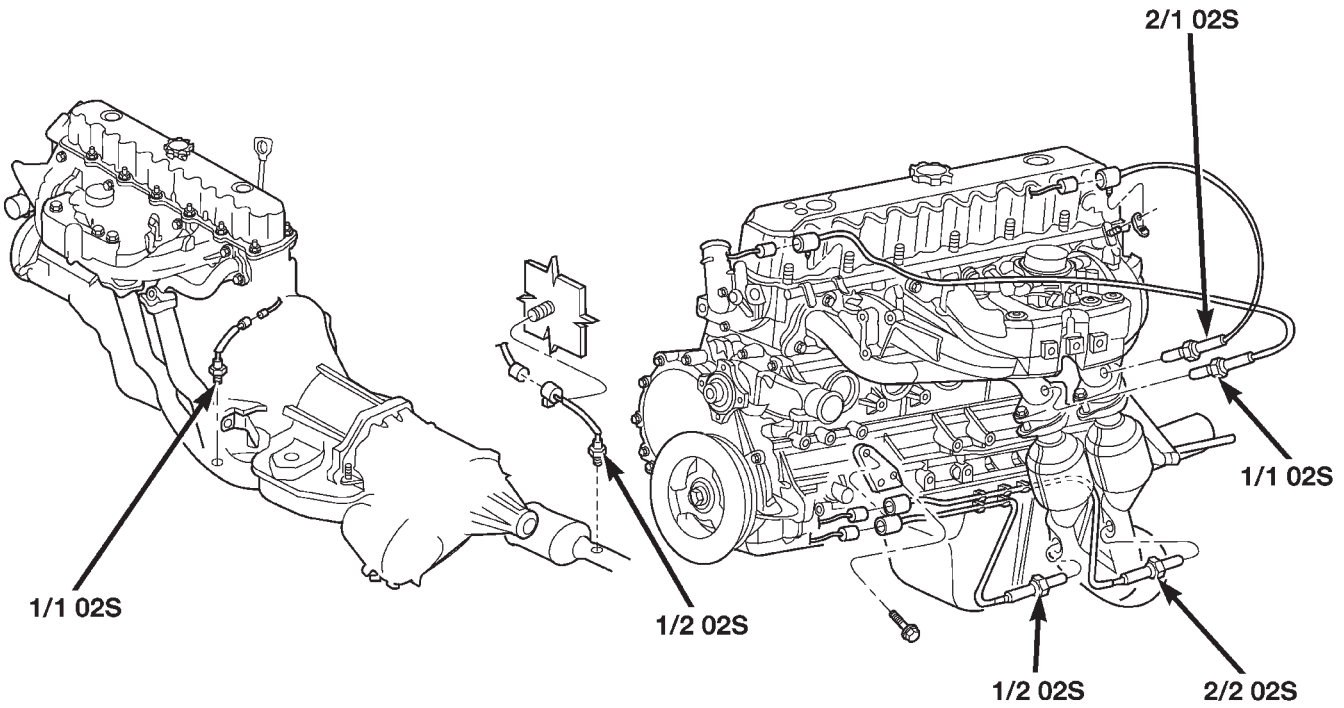

Fig. 6 O2 Sensor Location 4.0L

REMOVAL AND INSTALLATION (Continued)

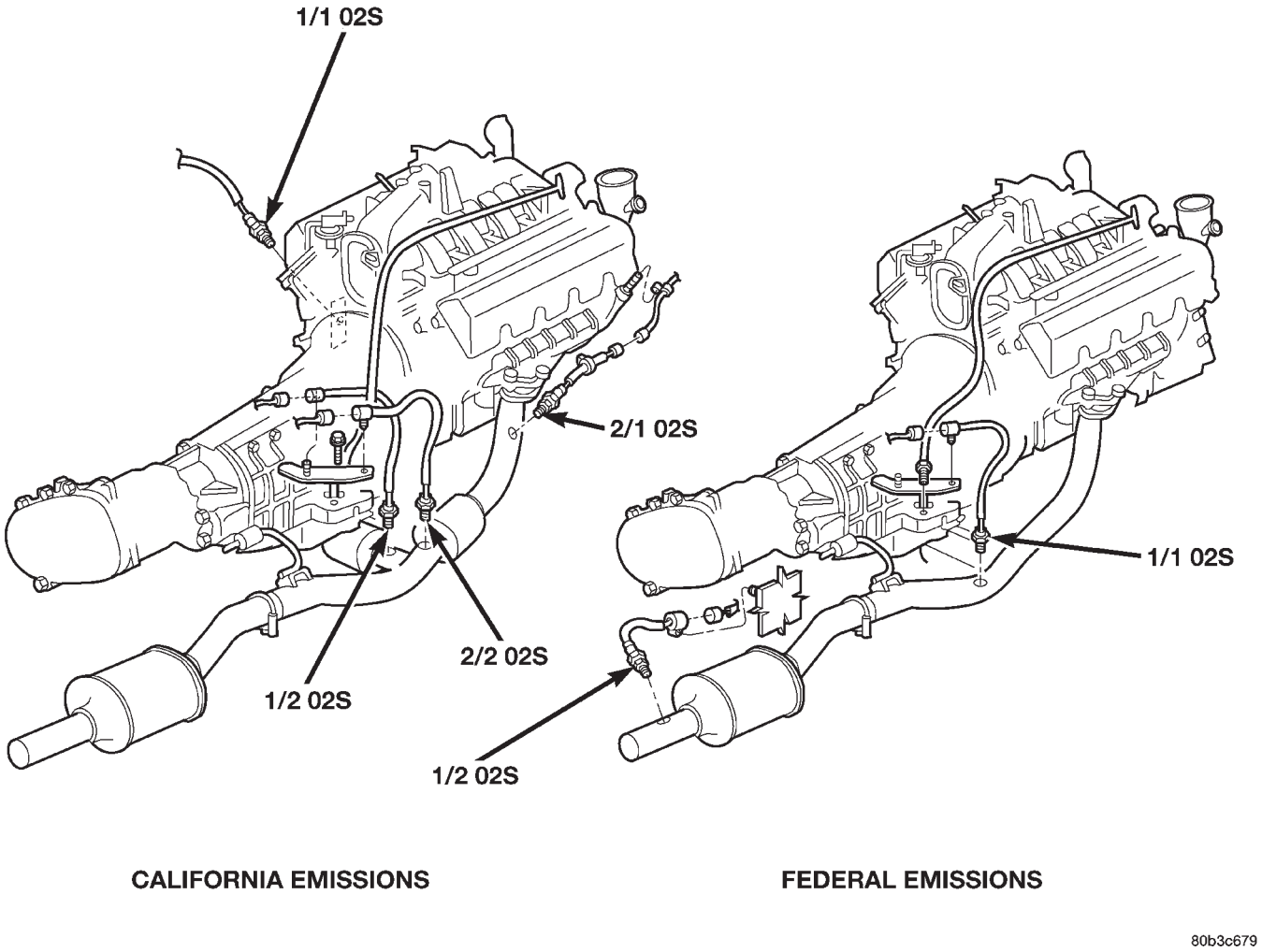

Fig. 7 O2 Sensor Location 4.7L

(4) Heat the exhaust pipe and catalytic converter connection with an torch until the metal becomes cherry red. While the metal is still cherry red, twist the catalytic converter back and forth to separate it from the exhaust pipe (Fig. 10).

(5) Disconnect the exhaust pipe from the exhaust manifold (Fig. 8) (Fig. 9).

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

REMOVAL AND INSTALLATION (Continued)

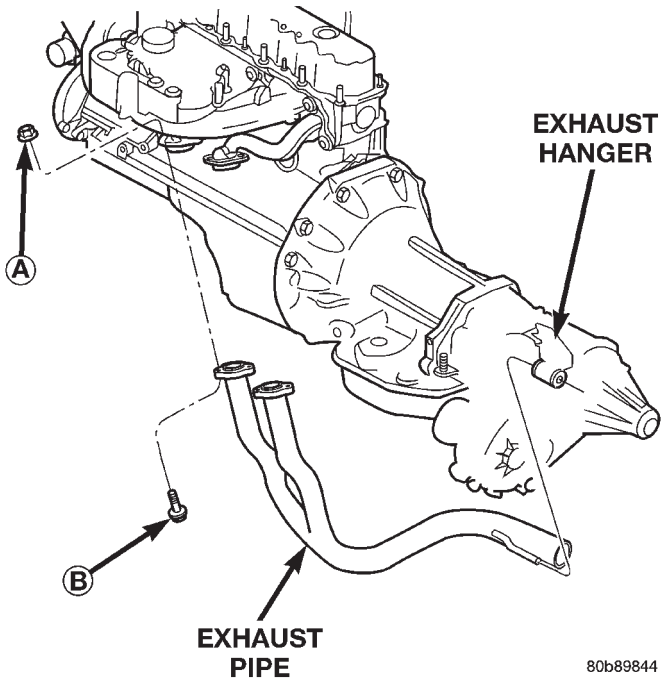

Fig. 8 Exhaust Pipe 4.0L

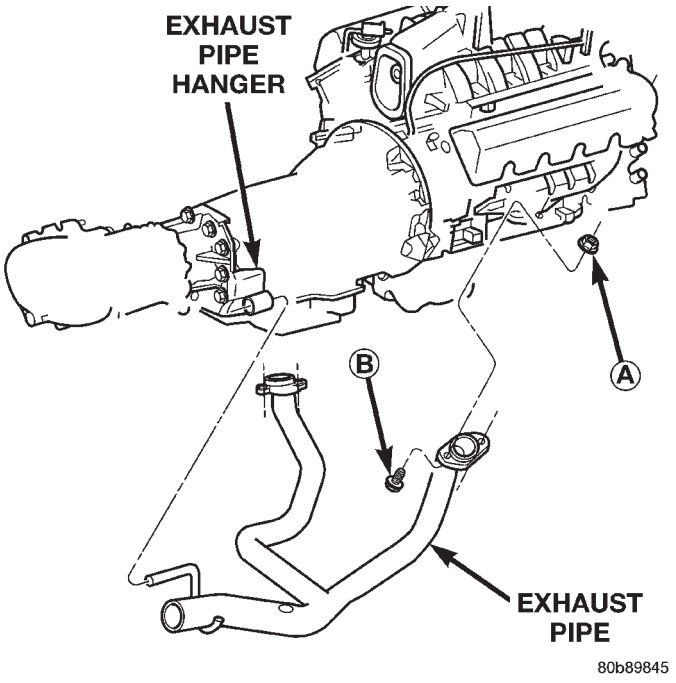

Fig. 9 Exhaust Pipe 4.7L

ITEM	DESCRIPTION
A	NUT Qty.4 Torque to 31 N·m (23 ft. lbs.)
B	BOLT Qty.4

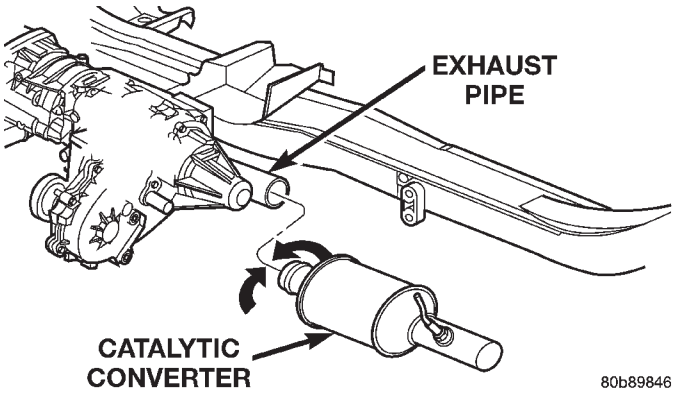

Fig. 10 Catalytic Converter—Removal

(7) Disconnect the tail pipe from the hanger (Fig. 11).

(8) Remove the muffler and tail pipe.

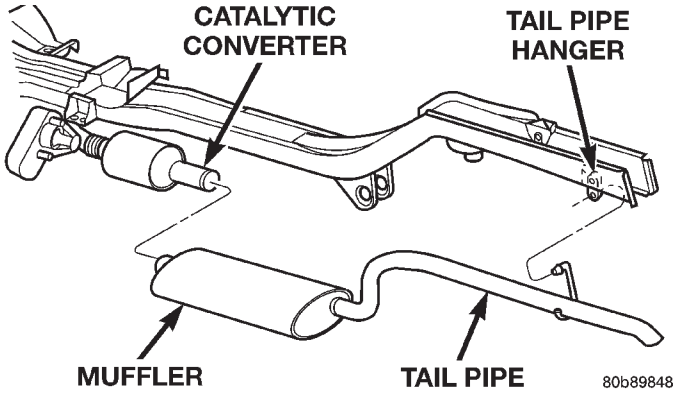

Fig. 11 Muffler and Tail Pipe

INSTALLATION

NOTE: When servicing the exhaust system, replace the factory installed uni-clamp with standard u-bolt clamps.

(1) If the catalytic converter was removed, Install the catalytic converter onto the exhaust pipe (Fig. 10).

(2) Position the muffler and tail pipe onto the catalytic converter.

(3) Connect the tail pipe hanger to the rear mount bracket insulator (Fig. 11).

(4) Connect the exhaust pipe to the engine exhaust manifold. Tighten the nuts to 31 N·m (23 ft. lbs.) (Fig. 8) (Fig. 9).

NOTE: When servicing the exhaust system, replace the factory installed uni-clamp with standard u-bolt clamps.

REMOVAL AND INSTALLATION (Continued)

(5) Position the exhaust clamp over the exhaust pipe/catalytic converter connection. Tighten clamp retaining nuts to (Fig. 12)

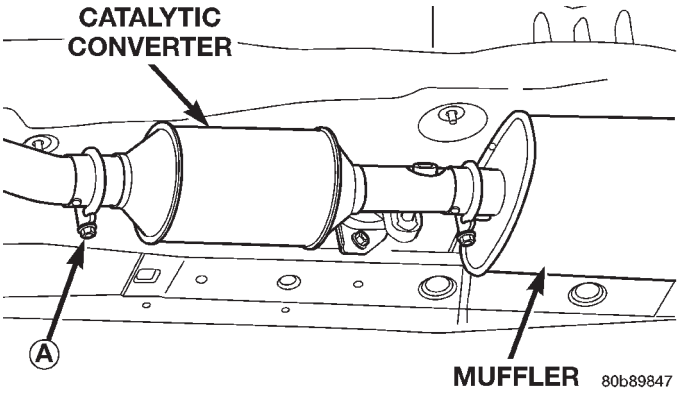

Fig. 12 Installing Exhaust Clamps

ITEM	DESCRIPTION
A	NUT. Torque to 61 N·m (45 ft. lbs.)

(6) Coat the oxygen sensor with anti-seize compound. Install the sensor and tighten the nut to 48 N·m (35 ft. lbs.) torque (Fig. 7) (Fig. 6).

(7) Lower the vehicle.

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

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

CATALYTIC CONVERTER

REMOVAL

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

(1) Raise and support the vehicle.

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

(3) Remove exhaust clamp from the catalytic converter and exhaust pipe connection (Fig. 13).

(4) Remove exhaust clamp from the catalytic converter and muffler connection (Fig. 13).

(5) Disconnect oxygen sensor wiring (Fig. 13).

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

(7) While the metal is still cherry red, twist the catalytic converter back and forth to separate it from the exhaust pipe and the muffler (Fig. 14).

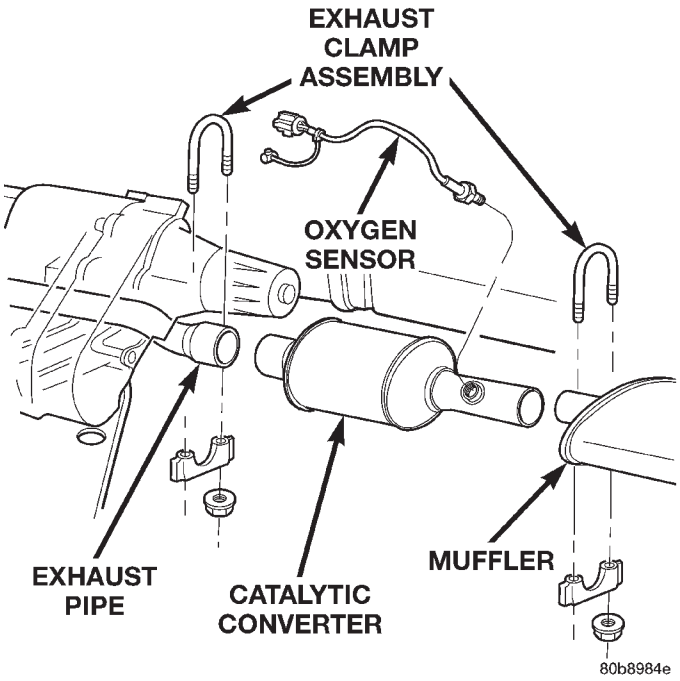

Fig. 13 Exhaust Pipe-to-Catalytic Converter-to-Muffler Connection

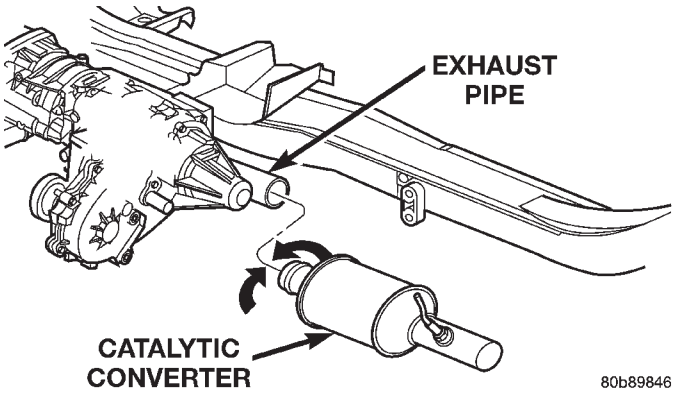

Fig. 14 Catalytic Converter—Removal

INSTALLATION

(1) Position the exhaust clamp over the exhaust pipe/catalytic converter connection (Fig. 13). Tighten the nuts to 61 N·m (45 ft. lbs.) torque.

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

(3) Install the exhaust clamp at the muffler and catalytic converter connection (Fig. 13). Tighten the clamp nuts to 61 N·m (45 ft. lbs.) torque.

(4) Connect oxygen sensor wiring (Fig. 13).

(5) Lower the vehicle.

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

REMOVAL AND INSTALLATION (Continued)

MUFFLER AND TAILPIPE

REMOVAL

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

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

(1) Raise and support the vehicle.

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

(3) Remove the exhaust clamp from the catalytic converter and muffler connection (Fig. 15).

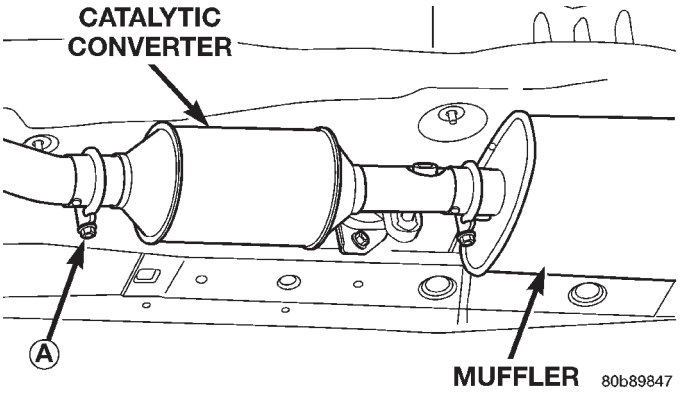

Fig. 15 Exhaust Pipe-to-Muffler Clamp

ITEM	DESCRIPTION
A	NUT Torque to 61 N·m (45 ft. lbs.)

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

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

(6) Remove the tailpipe from the tailpipe hanger (Fig. 16).

(7) Remove the tailpipe/muffler assembly (Fig. 16).

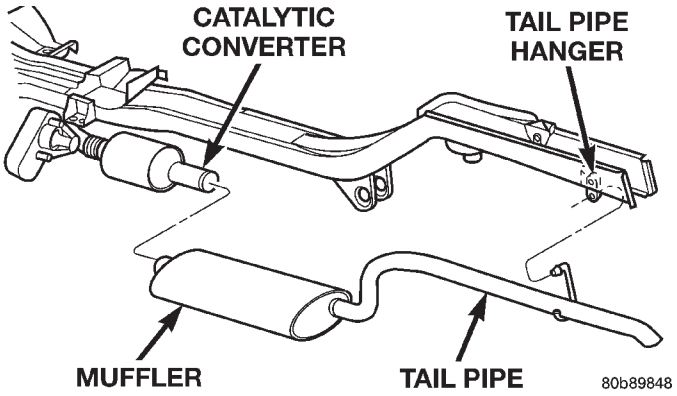

Fig. 16 Muffler and TailPipe Assembly

INSTALLATION

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

(2) Position the tailpipe and muffler onto the tailpipe hanger (Fig. 16).

(3) Install the muffler onto the catalytic converter. Make sure that the tailpipe has sufficient clearance from the floor pan. Install exhaust clamp and tighten the nuts to 61 N·m (45 ft. lbs.) torque (Fig. 15).

(4) Lower the vehicle.

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

SPECIFICATIONS

TORQUE

DESCRIPTION	TORQUE
Catalytic Converter-to-Exhaust Pipe	
U-bolt rod clamp	61 N·m (45 ft. lbs.)
Exhaust Pipe-to-Manifold	
Nuts	31 N·m (23 ft. lbs.)
Floor Pan Heat Shield	
Bolts/Nuts	2.5 N·m (20 in. lbs.)
Muffler-to-Catalytic Converter	
U-bolt rod clamp	61 N·m (45 ft. lbs.)
Oxygen Sensor	
Sensor	27 N·m (20 ft. lbs.)
Rear Tailpipe Hanger	
Bolts	22 N·m (192 in. lbs.)