

2005 Ford Focus ZX5 S

2005 ENGINE Exhaust System - Focus

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Exhaust System - Focus

SPECIFICATIONS

GENERAL SPECIFICATIONS

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Item	Specification
High Temperature Nickel Anti-Seize Lubricant F6AZ-9L494-AA (in Canada CXG-2-B)	ESE-M12A4-A
Catalytic Converter Flange Surface Warpage (maximum)	0.76 mm (0.0295 in)

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

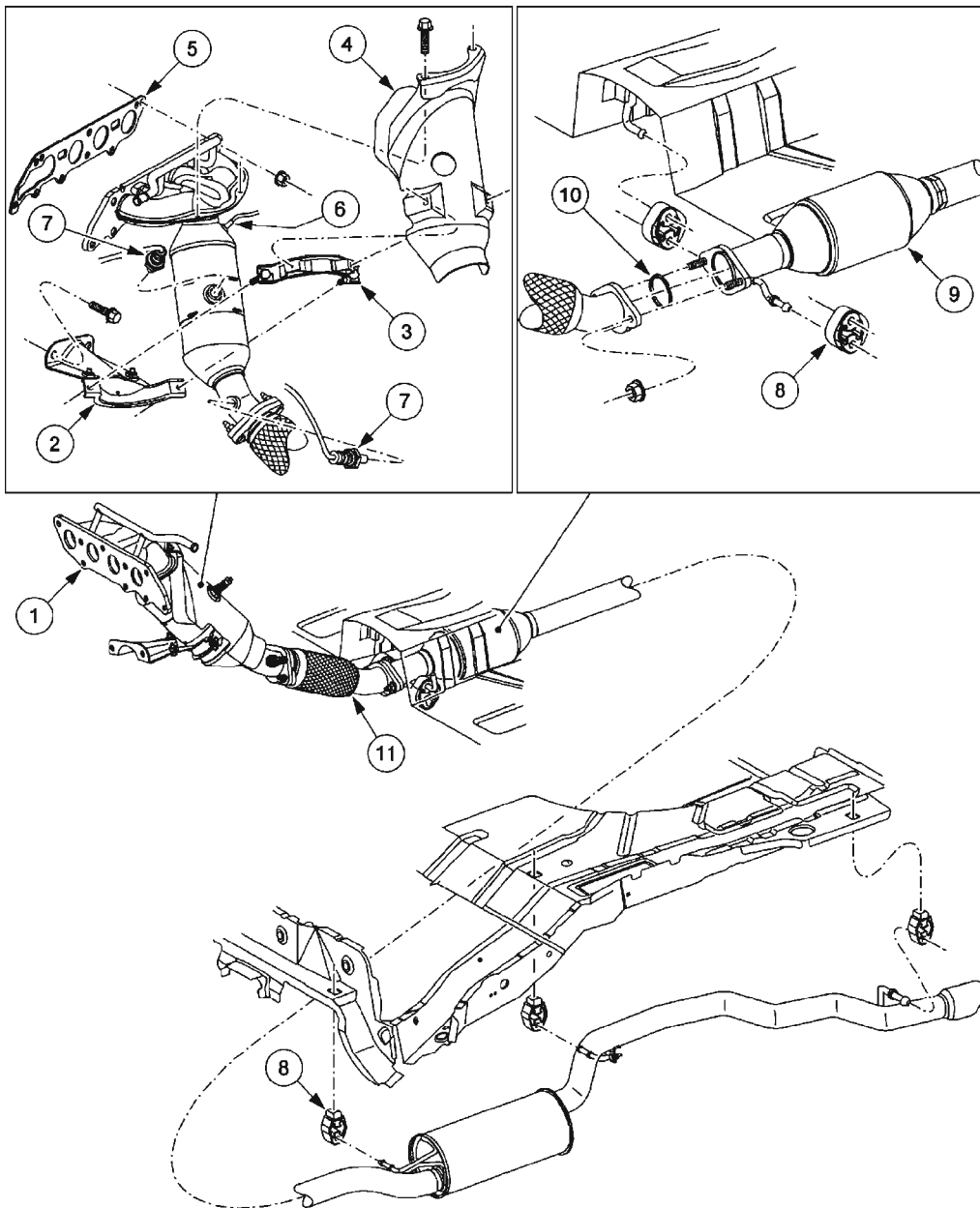
Description	Nm	lb-ft
Catalytic converter nuts	55	41
Catalytic converter-to-flex pipe nuts	47	35
Catalytic converter-to-muffler nuts	47	35
Muffler assembly flange nuts	47	35
Clamp nuts	47	35
Heated oxygen sensor (HO2S)	47	35
Catalyst monitor sensor (CMS)	47	35
Manifold heat shield bolts	11	8
Support bracket bolts	47	35
Catalytic converter-to-engine bracket bolts	47	35
Roll restrictor bolts	48	35
Lifting eye bolt	45	33

DESCRIPTION AND OPERATION

EXHAUST SYSTEM

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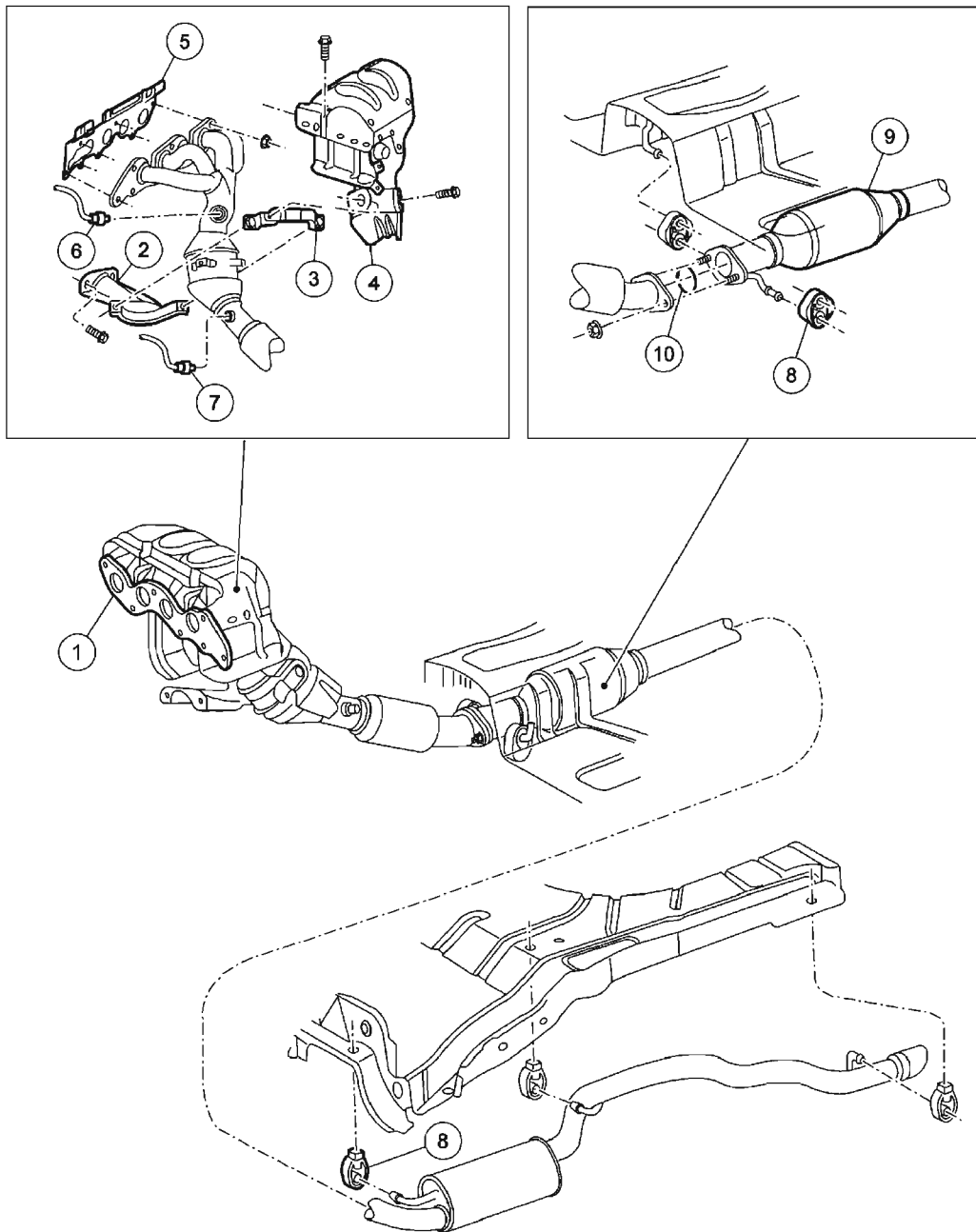
Item	Part Number	Description
1	5G232	Catalytic converter
2	5K222	Mounting bracket
3	5K291	Mounting bracket
4	5K282	Heat shield
5	9448	Gasket
6	9F472	Heated oxygen (HEGO) sensor

Item	Part Number	Description
7	9G444	Catalyst monitor sensor (CMS)
8	5A262	Isolator
9	5E292	Converter and muffler assembly
10	9451	Gasket
11	5G203	Flexible pipe

Fig. 1: Identifying Exhaust System Components - Vehicles With 2.0L PZEV Engine
Courtesy of FORD MOTOR CO.

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Item	Part Number	Description
1	5G232	Catalytic converter
2	5K222	Mounting bracket
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4	5K282	Heat shield
5	9448	Gasket
6	9F472	Heated oxygen (HEGO) sensor

Item	Part Number	Description
7	9G444	Catalyst monitor sensor (CMS)
8	5A262	Isolator
9	5E292	Muffler and converter assembly
10	9451	Gasket

Fig. 2: Identifying Exhaust System Components - Vehicles With 2.0L Zetec And 2.3L Engines

Courtesy of FORD MOTOR CO.

The exhaust systems are of a two-piece construction for production and five-piece construction for service.

Catalytic Converter

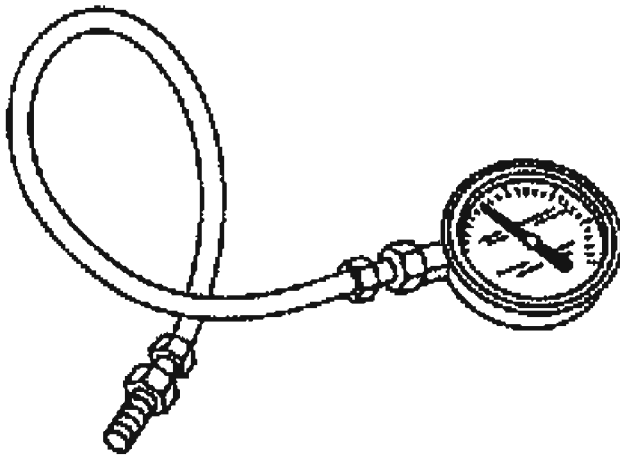
The catalytic converter plays a major role in the emission control system. The catalytic converter works as a gas reactor. It's catalytic function is to speed up the heat producing chemical reaction between components of the exhaust gases in order to reduce the air pollutants. Because of the high temperatures at which the catalytic converter operates, the vehicle body areas around the catalytic converter are protected by heat shields. The catalytic converter controls three emissions; Hydro carbons (HC), carbon monoxide (CO) and oxides of nitrogen (NOx).

DIAGNOSIS AND TESTING

EXHAUST SYSTEM

Special Tool(s)

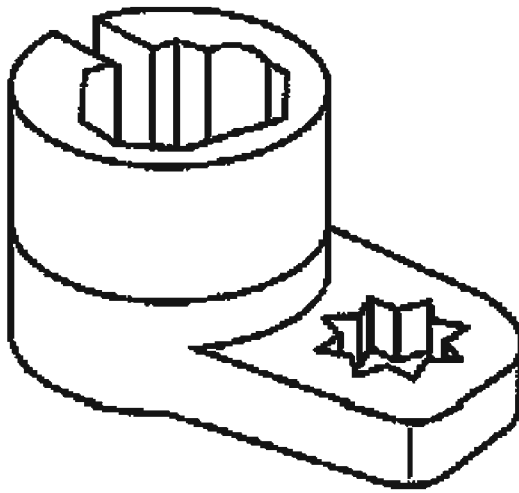
SPECIAL TOOLS



ST1493-A

Exhaust Back Pressure Gauge 309-D002 (D95L-6000-A) or equivalent

Socket, Exhaust Gas Oxygen Sensor 303-476 (T94P-9472-A)

**ST1447-A****Inspection and Verification**

1. Verify the concern by running the engine (with the vehicle on the ground) or road testing the vehicle to duplicate the condition.
2. Visually inspect the components of the exhaust system and related controls that may affect exhaust gas quality or loss of power.
3. Visually inspect for obvious signs of mechanical damage. Refer to the following chart.

VISUAL INSPECTION CHART

Mechanical
<ul style="list-style-type: none">• Exhaust pipe pinched or crushed• Damaged muffler• Broken or damaged exhaust hanger brackets• Damaged catalytic converter• Cracked exhaust manifold• Dirty engine air cleaner• Loose or damaged heat shields

4. Verify that the exhaust system is installed correctly, with clamps correctly located and tightened to specification.

5. If the fault is not visually evident, determine the symptom. GO to **SYMPTOM CHART**.

Symptom Chart

SYMPTOM CHART

Condition	Possible Sources	Action
<ul style="list-style-type: none"> • Rattle, squeaks or buzz type noise - from the bottom of vehicle 	<ul style="list-style-type: none"> • Loose or damaged heat shield • Loose or damaged exhaust isolators • Damaged exhaust isolator hanger bracket 	<ul style="list-style-type: none"> • INSPECT the exhaust system for loose or missing heat shields or foreign material trapped between the heat shields and the exhaust system components. If any heat shields are loose, INSTALL either worm gear clamp FOTZ-5A231-A or W705949-S300 and tighten to 7 Nm (62 lb-in). If the heat shields are missing, INSTALL new heat shields or exhaust system components as necessary. If a rattle, noise or buzz condition persists, INSTALL a new heat shield or component as necessary. • CHECK exhaust isolators are correctly installed. INSPECT the exhaust isolators for wear or damage. INSTALL new isolators as necessary. • INSPECT the exhaust system components for damage or broken hangers. INSTALL new components as necessary. CHECK for

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	<ul style="list-style-type: none"> Loose or damaged catalytic converter or muffler Exhaust grounded to chassis 	<p>loose or damaged exhaust hanger brackets or fasteners. TIGHTEN bolts to specification or INSTALL new components as necessary.</p> <ul style="list-style-type: none"> MOVE the exhaust system to simulate the bouncing action of the vehicle, checking for exhaust-to-body contact while moving the exhaust system. Using a rubber mallet, TAP on the exhaust components to duplicate the noise concern. Lightly TAP on the muffler, then the catalytic converter. Determine if there are loose or broken baffles in the muffler or a loose or broken element in the catalytic converter. REPAIR or INSTALL new components as necessary. INSPECT for signs of exhaust components-to-body contact. If necessary, CARRY OUT the <u>EXHAUST SYSTEM ALIGNMENT</u>.
<ul style="list-style-type: none"> Drone or clunk type noise - from bottom of vehicle 	<ul style="list-style-type: none"> Loose or damaged exhaust isolators Exhaust grounded to chassis 	<ul style="list-style-type: none"> INSPECT exhaust isolators for wear or damage. INSTALL new isolators as necessary. INSPECT for signs of exhaust components-to-

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		body contact. If necessary, CARRY OUT the <u>EXHAUST SYSTEM ALIGNMENT</u> .
<ul style="list-style-type: none">• Whistles, boom, hum or ticking type noise - noise tends to change as engine warms. Noises are often accompanied by exhaust fumes	<ul style="list-style-type: none">• Punctures in the muffler• Broken, loose or missing exhaust manifold fasteners or gaskets• Loose heated oxygen or catalyst monitor sensor• Exhaust system leak• Catalytic converter	<ul style="list-style-type: none">• REPAIR as necessary.• INSPECT the entire exhaust system for leaks. CHECK for punctures, loose or damaged clamps/fasteners, or broken welds. EXAMINE the chassis for grayish-white or black exhaust soot, which would indicate exhaust leakage at that point. To magnify a small leak, have an assistant hold a rag over the tailpipe outlet, while listening for a leak. REPAIR or INSTALL new components as necessary.• MOVE the exhaust system to simulate the bouncing action of the vehicle, checking for exhaust-to-body contact while moving the exhaust system. Using a rubber mallet, TAP on

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	<ul style="list-style-type: none">Exhaust muffler/resonator drain hole enlarged due to corrosion	<p>the exhaust components to duplicate the noise concern. Lightly TAP on the muffler, then the catalytic converter. Determine if there are loose or broken baffles in the muffler or a loose or broken element in the catalytic converter. REPAIR or INSTALL new components as necessary.</p> <p>NOTE: Check with vehicle on the ground, not on a hoist. CONFIRM drain holes are noise source. INSTALL new components as necessary.</p> <ul style="list-style-type: none">
<ul style="list-style-type: none">Hissing or rushing noise - high frequency sound. Vehicle performance is unaffected	<ul style="list-style-type: none">Exhaust system. Exhaust flow through pipes	<ul style="list-style-type: none">CHECK the exhaust system for leaks. Using a rubber mallet, TAP on the exhaust components to duplicate the noise concern. Lightly TAP on the muffler, then the catalytic converter. Determine if there are loose or broken baffles in the muffler or a loose or broken element in the catalytic converter. REPAIR or INSTALL new components as necessary.
<ul style="list-style-type: none">Pinging noise - occurs when exhaust system is hot, engine turned off	<ul style="list-style-type: none">Catalytic converter/exhaust system	<ul style="list-style-type: none">Cool down pinging is the exhaust system expanding and contracting during heating and cooling. Condition is normal.

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<ul style="list-style-type: none"> • Vibration - occurs at idle and at low speeds. Also accompanied by clunk or buzz type noise 	<ul style="list-style-type: none"> • Loose or damage exhaust isolator • Loose or damaged exhaust isolator hanger brackets • Damper broken or out of position if equipped • Exhaust system grounded to chassis 	<ul style="list-style-type: none"> • INSPECT the exhaust isolators for wear or damage. INSTALL new isolators as necessary. • INSPECT the exhaust isolator hanger brackets for wear or damage. INSTALL or REPAIR as necessary. • CHECK for the correct damper orientation in this article. RELOCATE to correct position and tighten nuts to specification. INSPECT for missing or damaged damper. INSTALL new components as necessary. • CARRY OUT the <u>EXHAUST SYSTEM ALIGNMENT</u>.
<ul style="list-style-type: none"> • Vehicle has low or no power - vehicle performance complaint 	<ul style="list-style-type: none"> • Exhaust pipe pinched or crushed • Damaged catalytic converter • Loose obstruction in exhaust • Restricted exhaust (possible frozen condensate in muffler) 	<ul style="list-style-type: none"> • See <u>INTRODUCTION - GASOLINE</u> article to test for restricted exhaust. • CHECK drain holes for foreign material. PARK the vehicle inside to thaw. TEST vehicle for normal operation. If concern is still present, See <u>INTRODUCTION - GASOLINE</u> article .
<ul style="list-style-type: none"> • Burning smell - usually occurs at idle, with possible traces of smoke 	<ul style="list-style-type: none"> • Foreign material caught in exhaust system 	<ul style="list-style-type: none"> • INSPECT the exhaust system for foreign material or missing heat shields. REPAIR or

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	<ul style="list-style-type: none">• Missing heat shields	INSTALL new components as necessary.
<ul style="list-style-type: none">• Odor - described as a sulfur or rotten egg smell	<ul style="list-style-type: none">• Catalytic converter• Rich fuel conditions• Miss-fire conditions• Excessive sulfur content in fuel	<ul style="list-style-type: none">• At times, a slight sulfur smell is normal for catalytic converters. The cause is the sulfur content in the gasoline being used. ADVISE customer, no repair required.• See <u>INTRODUCTION - GASOLINE</u> article .
<ul style="list-style-type: none">• Visible rust on surface of exhaust pipes	<ul style="list-style-type: none">• Catalytic converter/exhaust system	<ul style="list-style-type: none">• Surface rust is a characteristic of materials used on exhaust system. Exposure to heat or road salt may result in surface rust. INSPECT for perforations. If there are no perforations, condition is normal.

GENERAL PROCEDURES

EXHAUST SYSTEM ALIGNMENT

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING AND LIFTING** .
2. Loosen all fasteners joining the exhaust system components.
3. Beginning at the front of the vehicle, align the exhaust system to establish the maximum clearance. Make sure all fit pipes are pushed all the way into the preceding pipe and the notches are correctly lined up with the tabs.
4. Beginning at the front of the vehicle, tighten all fasteners and clamps to specification. For additional information, refer to **SPECIFICATIONS**.
5. Start the engine and check the exhaust system for leaks.

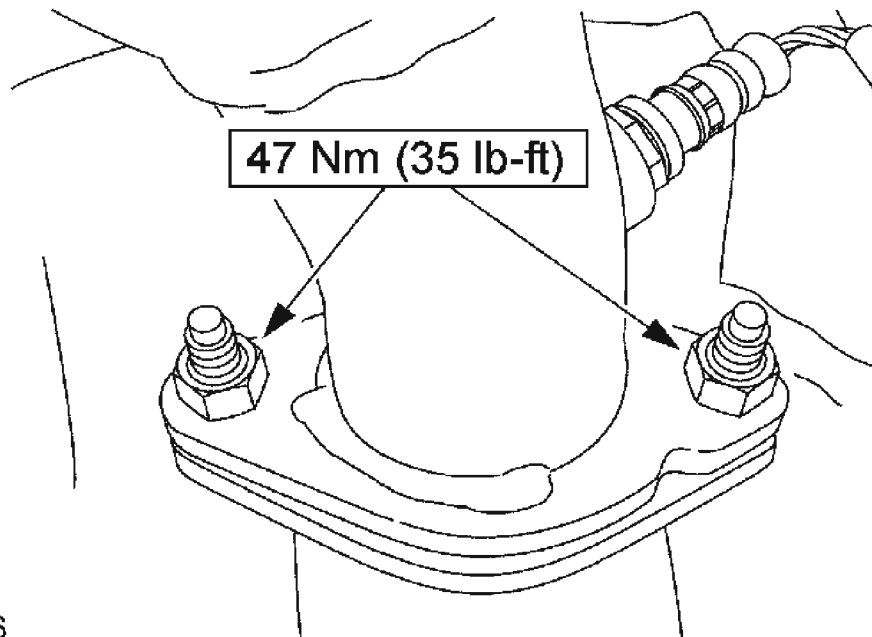
REMOVAL AND INSTALLATION

CATALYTIC CONVERTER - 2.0L PZEV**Material****MATERIAL SPECIFICATION**

Item	Specification
High Temperature Nickel Anti-Seize Lubricant XL-2 (in Canada CXG-2-B)	ESE-M12A4-A

Removal and Installation

1. Position the vehicle on a hoist. For additional information, refer to **JACKING AND LIFTING**.
2. Relieve the fuel system pressure. For additional information, refer to **FUEL SYSTEM-GENERAL INFORMATION**.
3. Remove the 2 catalytic converter-to-muffler assembly flange nuts. Discard the nuts.



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Fig. 3: Removing Catalytic Converter-To-Muffler Assembly Flange Nuts
Courtesy of FORD MOTOR CO.

4. Disconnect the catalyst monitor and the heated oxygen sensor (HO2S) electrical connectors.
5. Remove the 2 catalytic converter-to-engine bracket bolts.

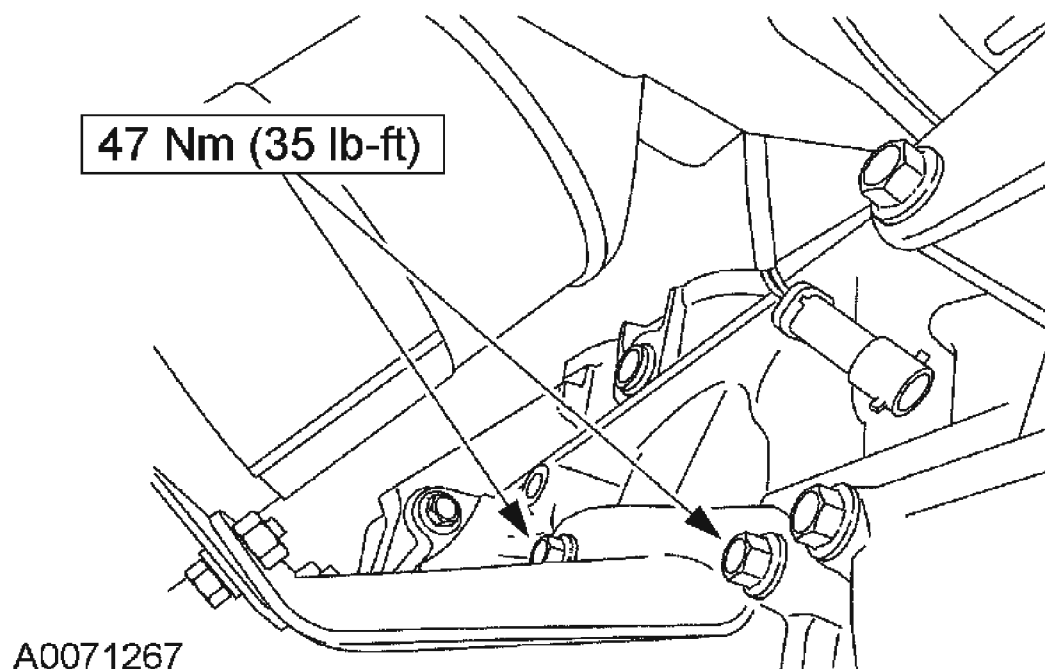


Fig. 4: Removing 2 Catalytic Converter-To-Engine Bracket Bolts
Courtesy of FORD MOTOR CO.

6. Remove the support bracket bolts.

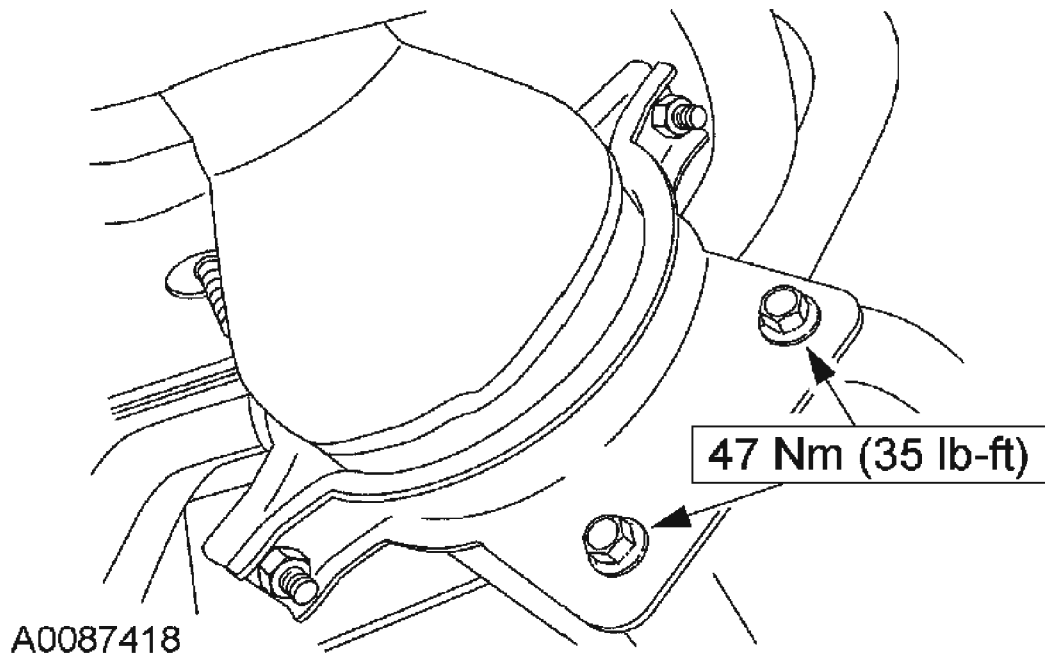


Fig. 5: Removing Support Bracket Bolts
Courtesy of FORD MOTOR CO.

7. Remove the 2 lower heat shield bolts.
8. Remove and discard the lower 4 catalytic converter nuts.

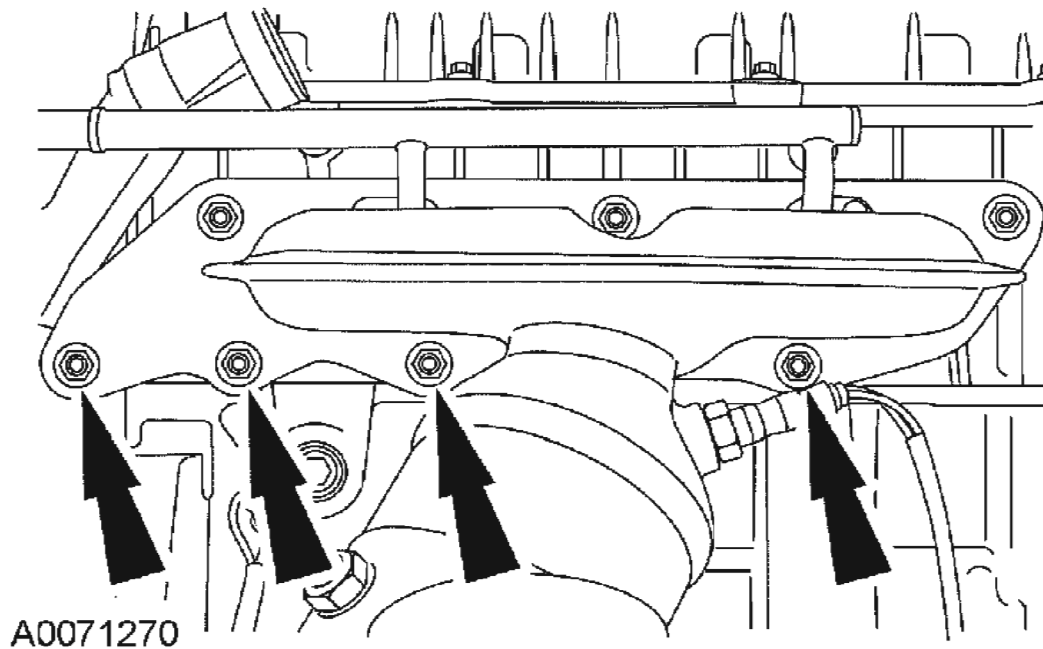


Fig. 6: Removing Lower 4 Catalytic Converter Nuts
Courtesy of FORD MOTOR CO.

9. Lower the vehicle.
10. Disconnect the upper HO2S electrical connector. Remove the wire harness from the retainer.

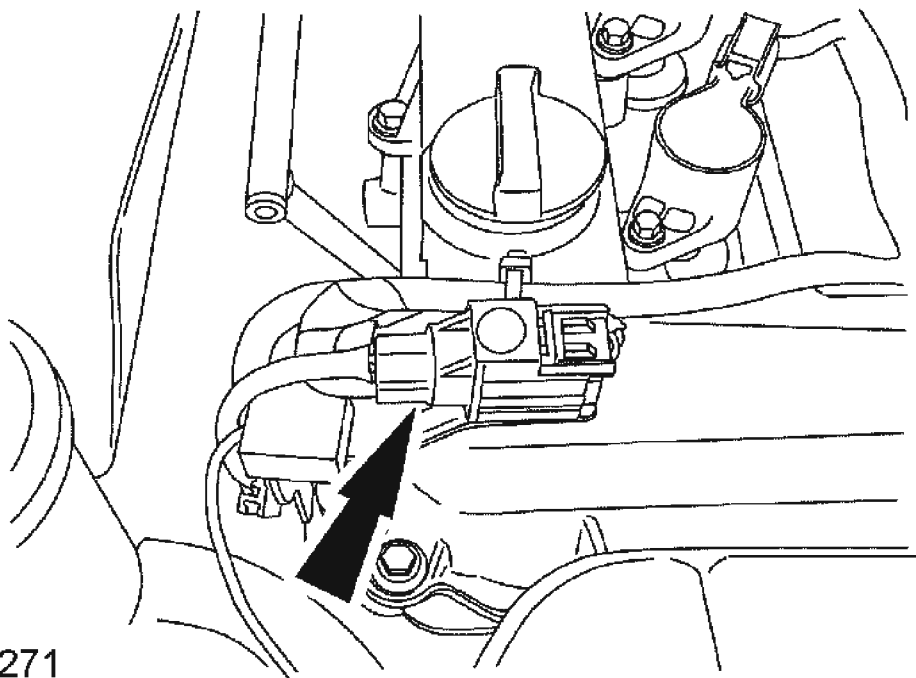
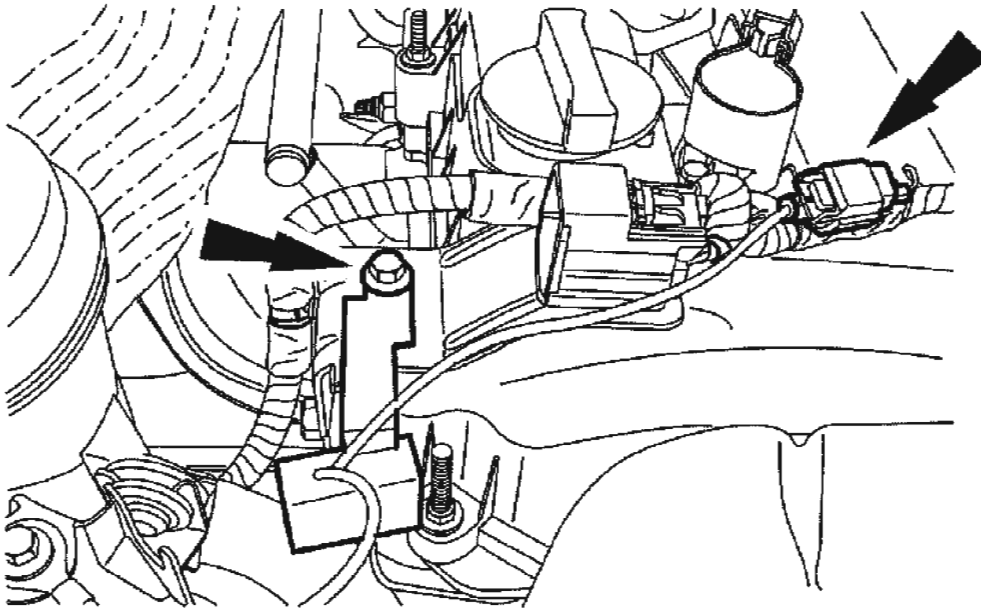


Fig. 7: Disconnecting Upper HO2S Electrical Connector
Courtesy of FORD MOTOR CO.

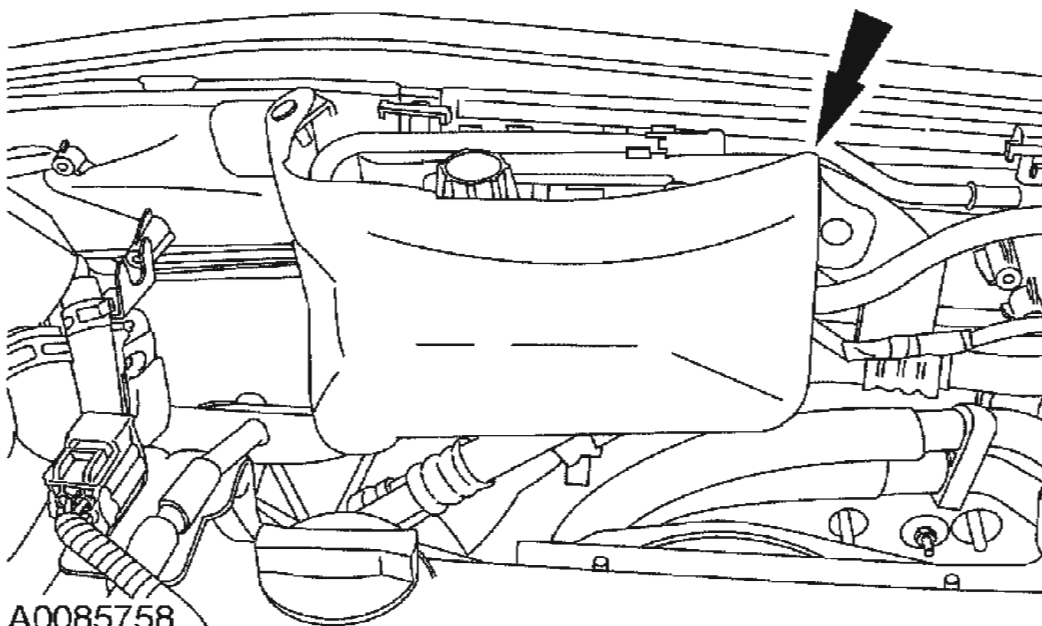
11. Disconnect the wiring connector, then remove the bolt and the bracket.



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Fig. 8: Disconnecting Wiring Connector And Removing Bolt And Bracket
Courtesy of FORD MOTOR CO.

12. Remove the vapor management valve (VMV) heat shield.



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Fig. 9: Removing Vapor Management Valve (VMV) Heat Shield
Courtesy of FORD MOTOR CO.

13. Disconnect the fuel lines then disconnect the VMV upper fuel line and the VMV lower fuel line.

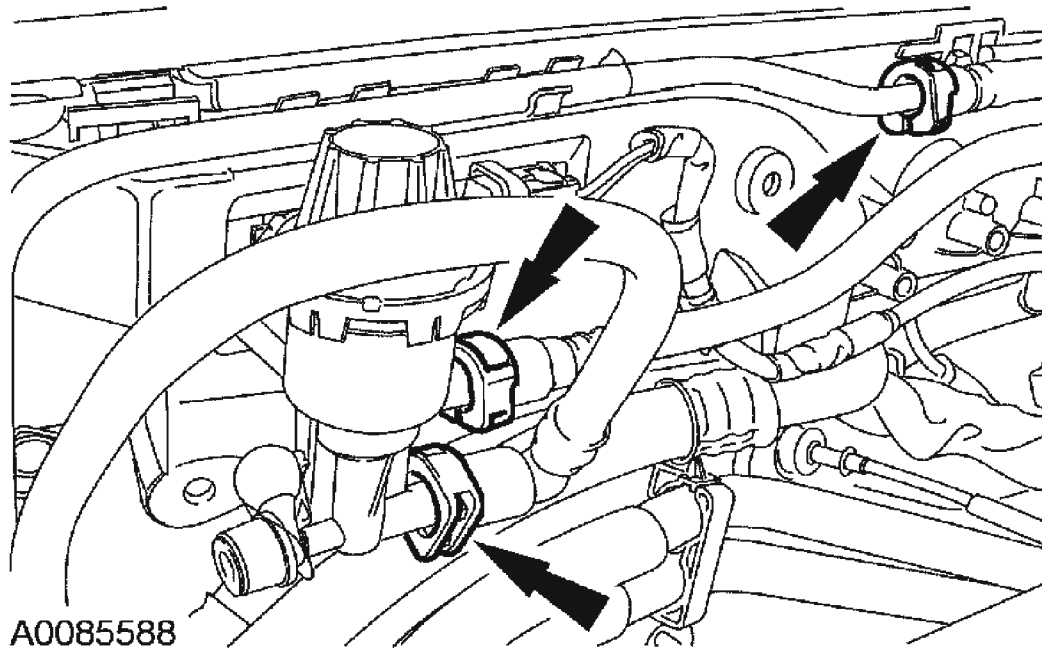


Fig. 10: Disconnecting Fuel Lines, VMV Upper Fuel Line And VMV Lower Fuel Line
Courtesy of FORD MOTOR CO.

14. Remove the VMV bolts. Position the VMV and bracket aside.

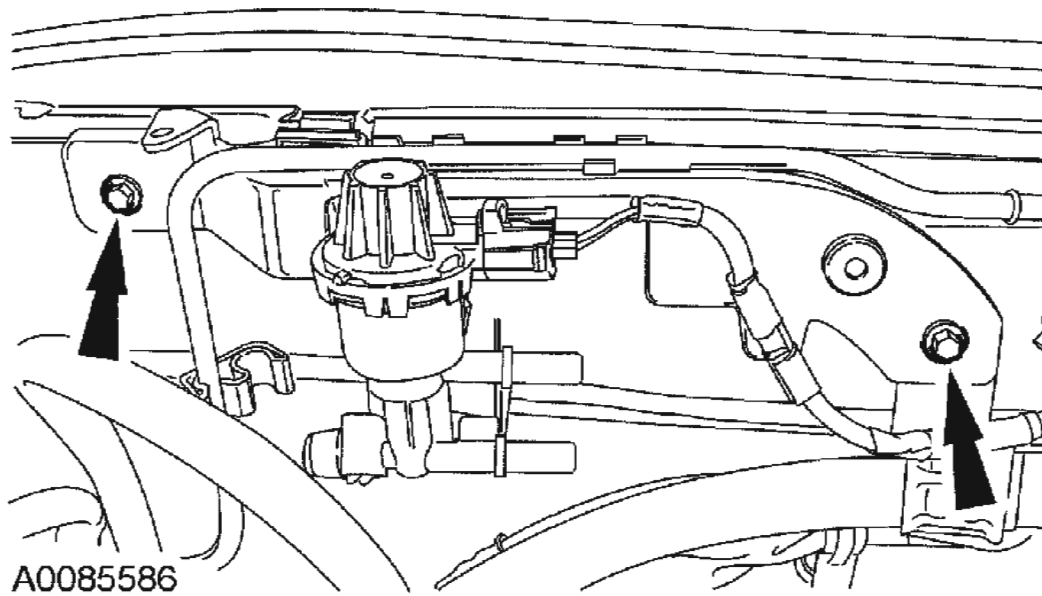


Fig. 11: Removing VMV Bolts
Courtesy of FORD MOTOR CO.

15. Remove the upper 3 catalytic converter nuts and studs. Discard the nuts.

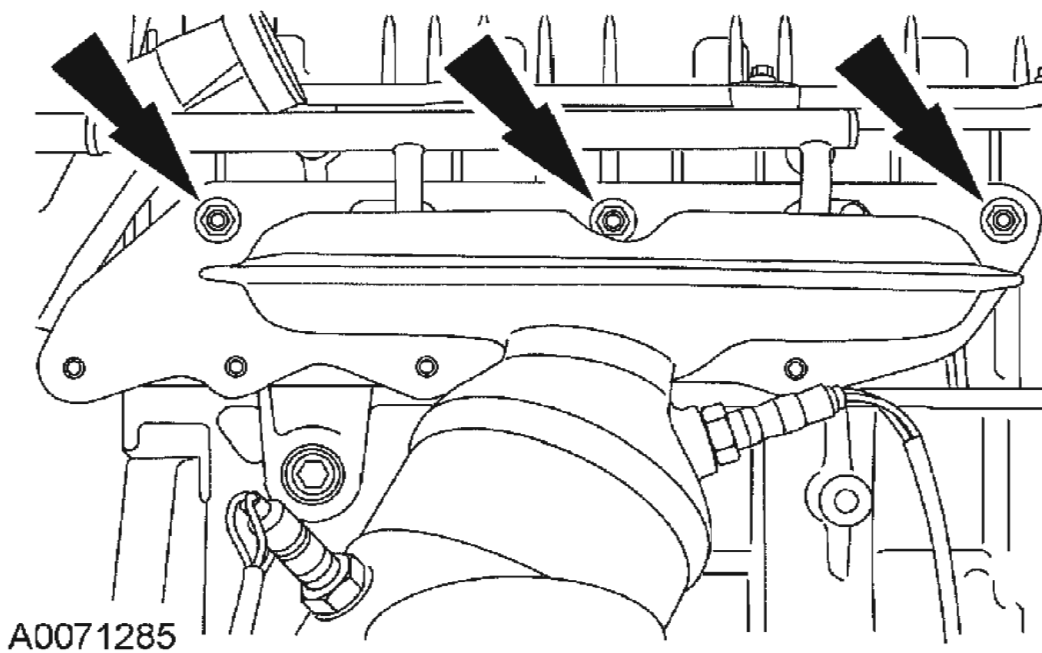
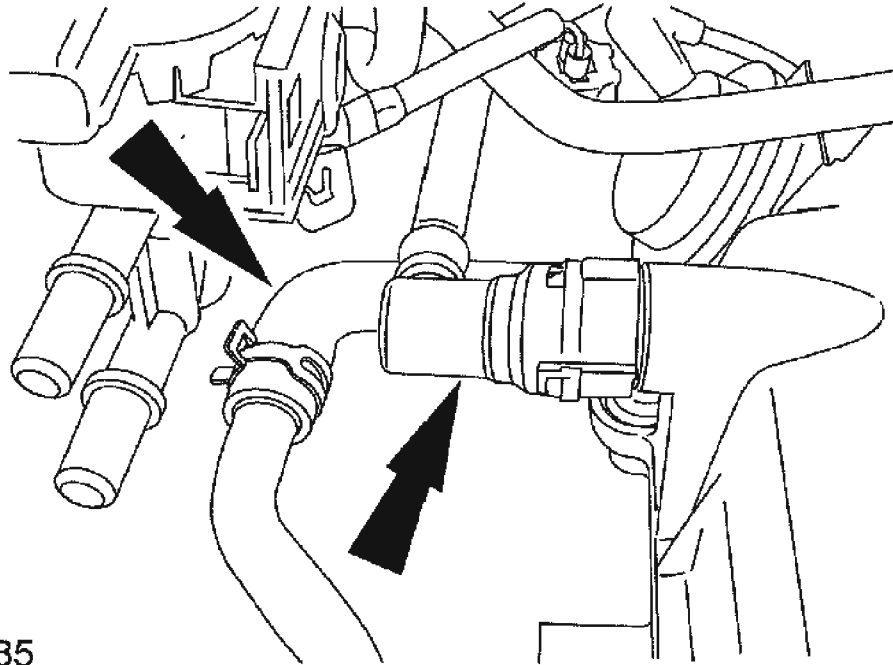


Fig. 12: Removing Upper 3 Catalytic Converter Nuts And Studs

Courtesy of FORD MOTOR CO.

16. Remove the PCV hose and the secondary air hose.



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Fig. 13: Removing PCV Hose And Secondary Air Hose
Courtesy of FORD MOTOR CO.

17. Remove the engine lifting eyelet.

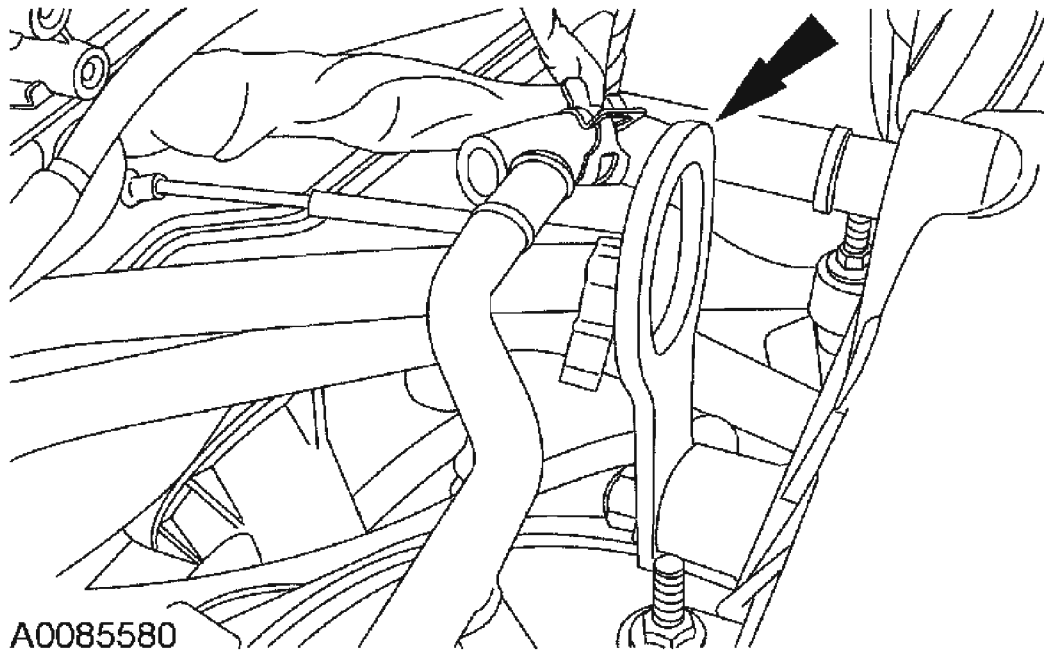


Fig. 14: Removing Engine Lifting Eyelet
Courtesy of FORD MOTOR CO.

18. Position the power steering reservoir aside.

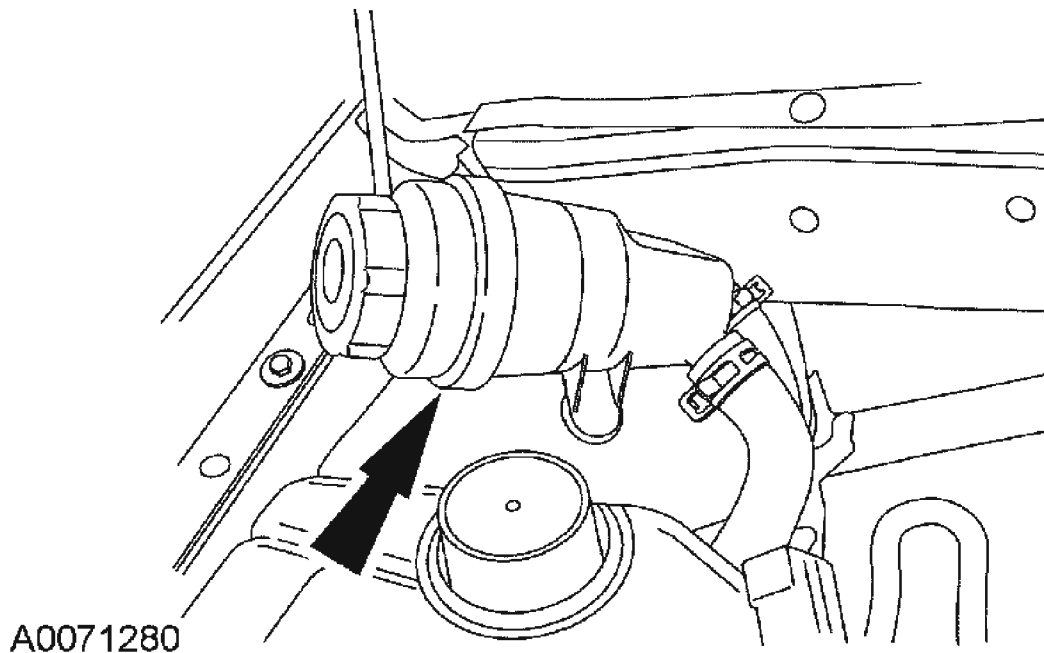


Fig. 15: Positioning Power Steering Reservoir Aside
Courtesy of FORD MOTOR CO.

19. Remove the catalytic converter.

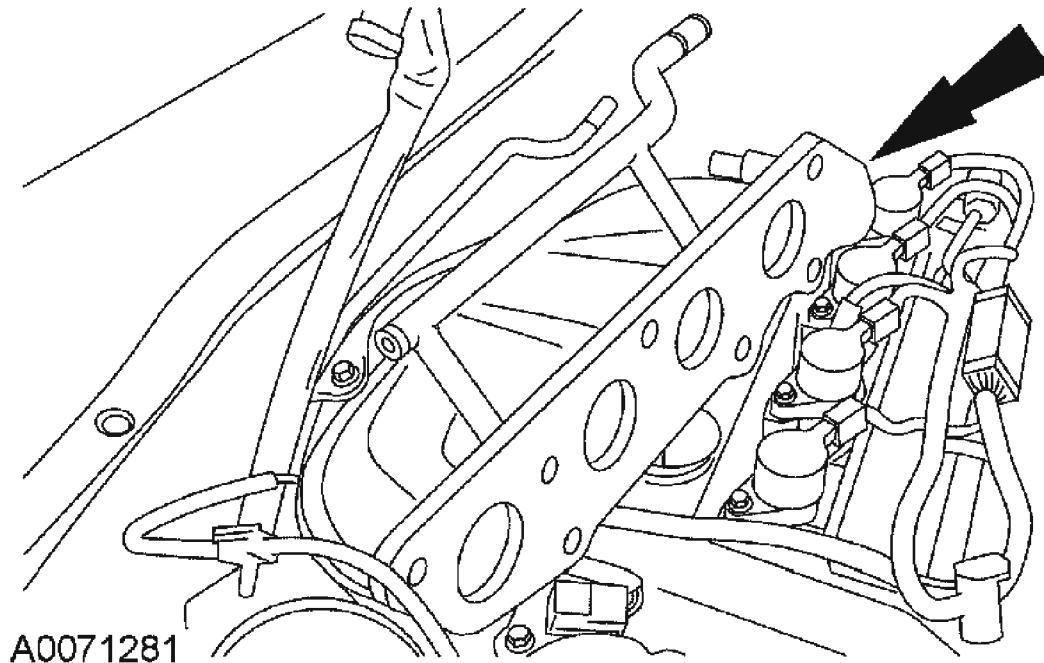
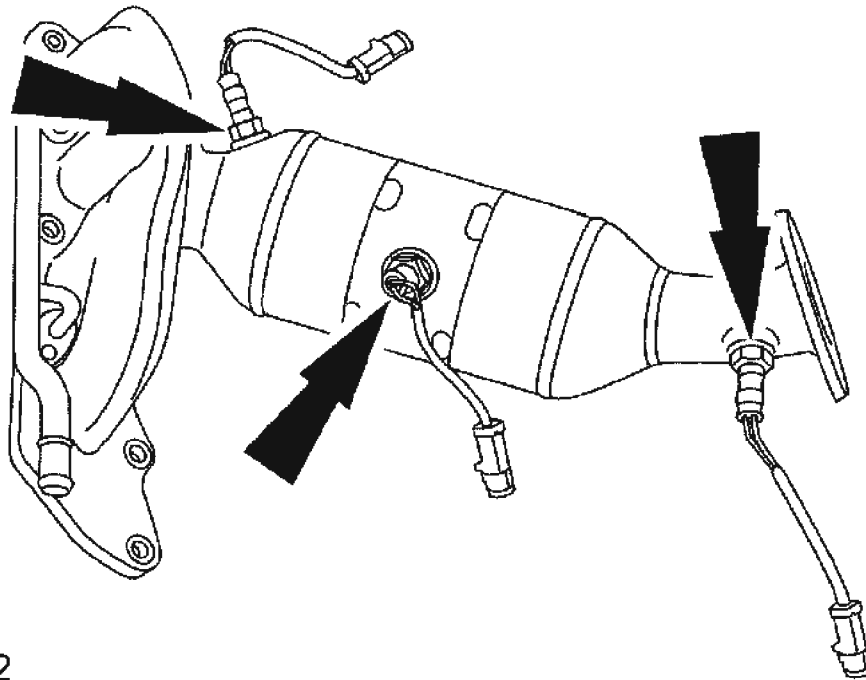


Fig. 16: Removing Catalytic Converter
Courtesy of FORD MOTOR CO.

NOTE: If installing a new converter, remove the catalyst monitor sensors.



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Fig. 17: Removing HO2S And Catalyst Monitor
Courtesy of FORD MOTOR CO.

20. Remove the HO2S and the catalyst monitor.

NOTE: Make sure to apply anti-seize lubricant to the threads of the sensor before installation.

NOTE: Clean the mating surfaces of the exhaust manifold and the catalytic converter mating surfaces.

NOTE: Always install new fasteners and gaskets.

NOTE: Do not tighten the fasteners until all components are assembled. Make sure to tighten all fasteners beginning at the front of the vehicle.

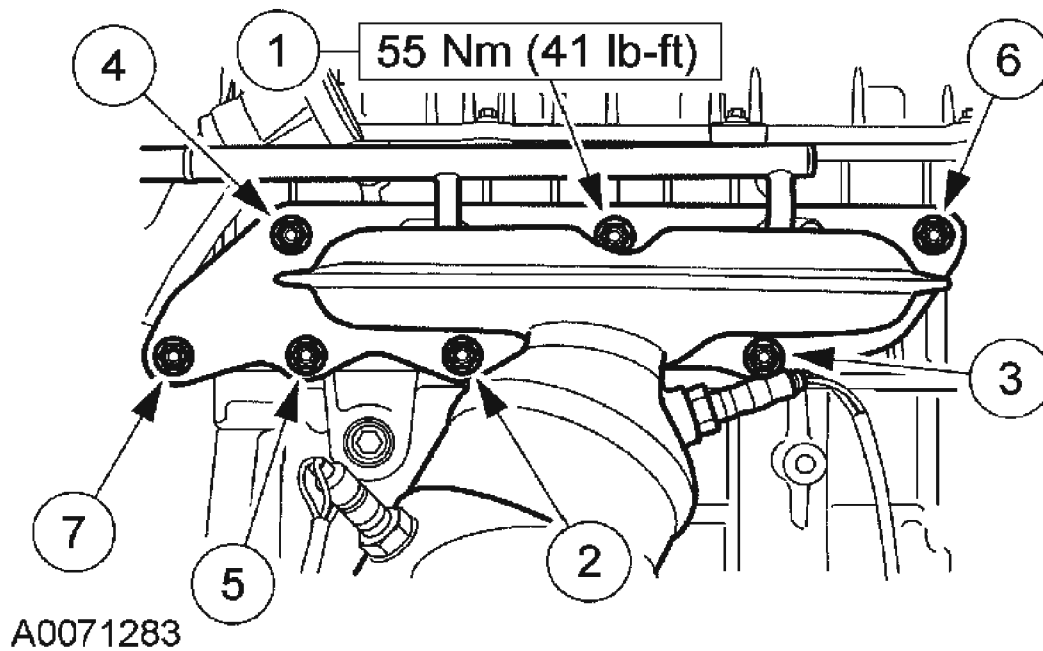
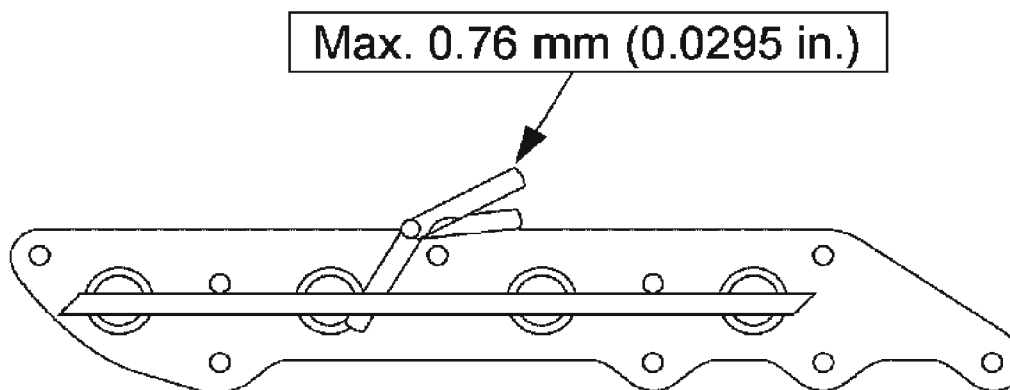


Fig. 18: Identifying Catalytic Converter Flange Nuts Tightening Sequence
Courtesy of FORD MOTOR CO.



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Fig. 19: Checking Catalytic Converter Flange For Warpage With Feeler Gauge
Courtesy of FORD MOTOR CO.

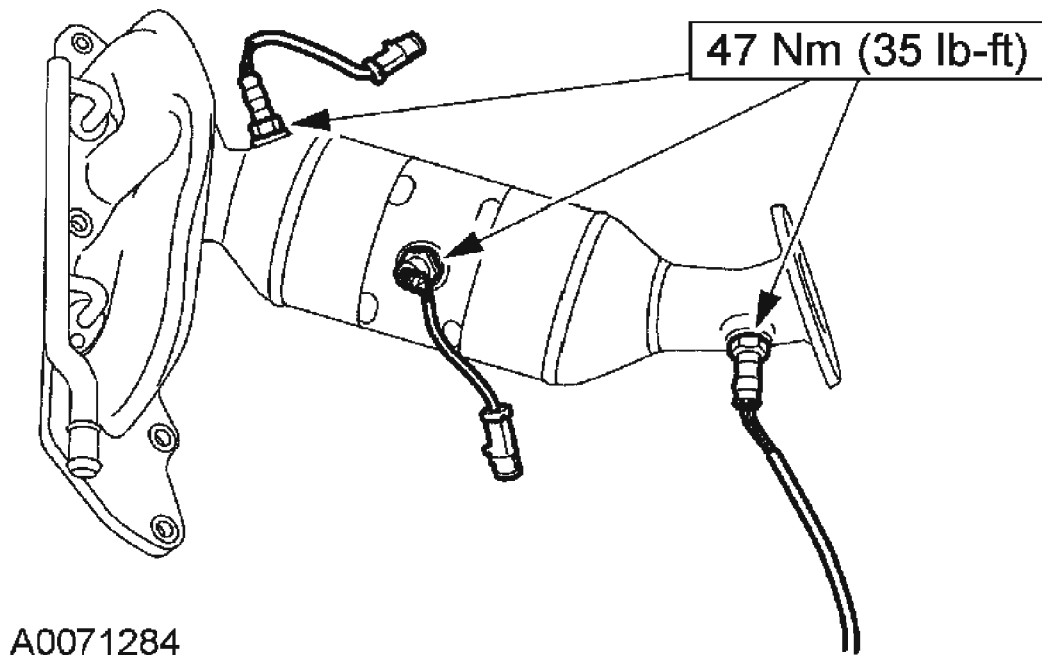


Fig. 20: Tightening Nuts To Specification
Courtesy of FORD MOTOR CO.

21. To install, reverse the removal procedure.
- Using a straightedge and feeler gauge, place the straightedge across the catalytic converter flange surface and check for warpage with the feeler gauge. If the reading is greater than the maximum specification, install a new catalytic converter, gasket and nuts.
 - Tighten the nuts to specification in the sequence shown.

CATALYTIC CONVERTER - 2.0L AND 2.3L

1. Relieve the fuel system pressure. For additional information, refer to **FUEL SYSTEM-GENERAL INFORMATION**.
2. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING AND LIFTING**.
3. Remove and discard the catalytic converter-to-muffler flange nuts.

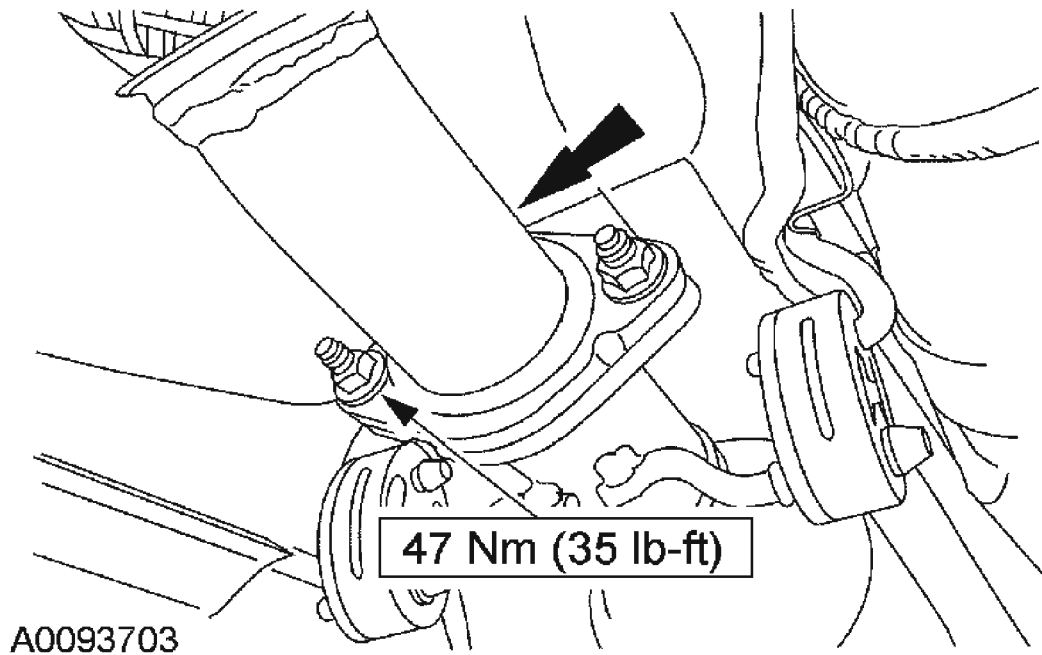


Fig. 21: Removing Catalytic Converter-To-Muffler Flange Nuts
Courtesy of FORD MOTOR CO.

4. Remove and discard the catalytic converter-to-muffler gasket.
5. Remove the 4 bolts and the support bracket.

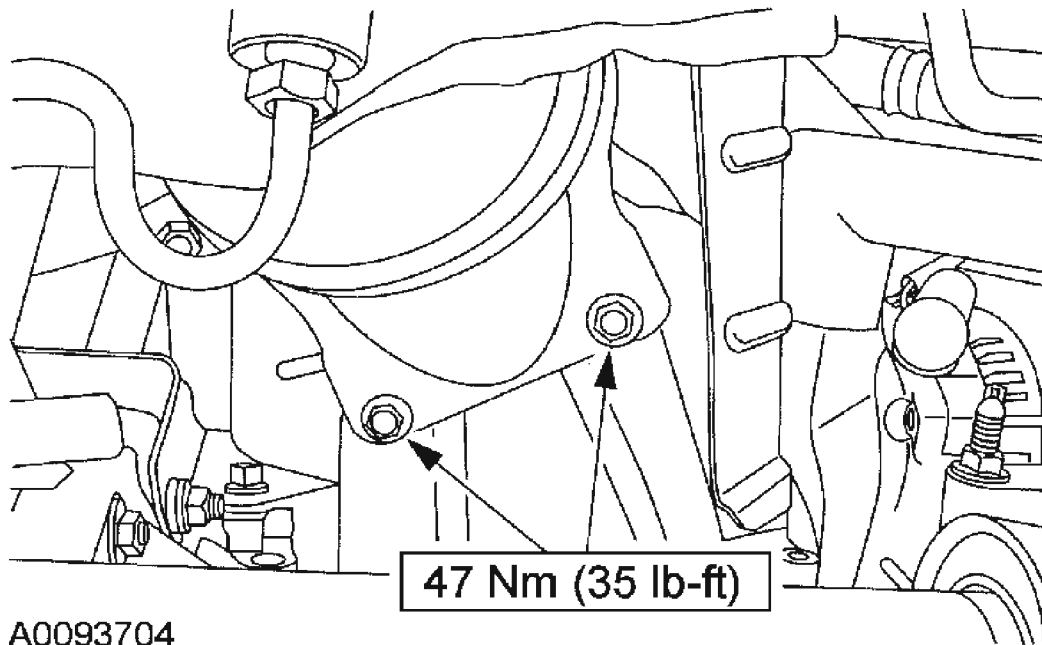


Fig. 22: Removing Bolts And Support Bracket (1 Of 2)
Courtesy of FORD MOTOR CO.

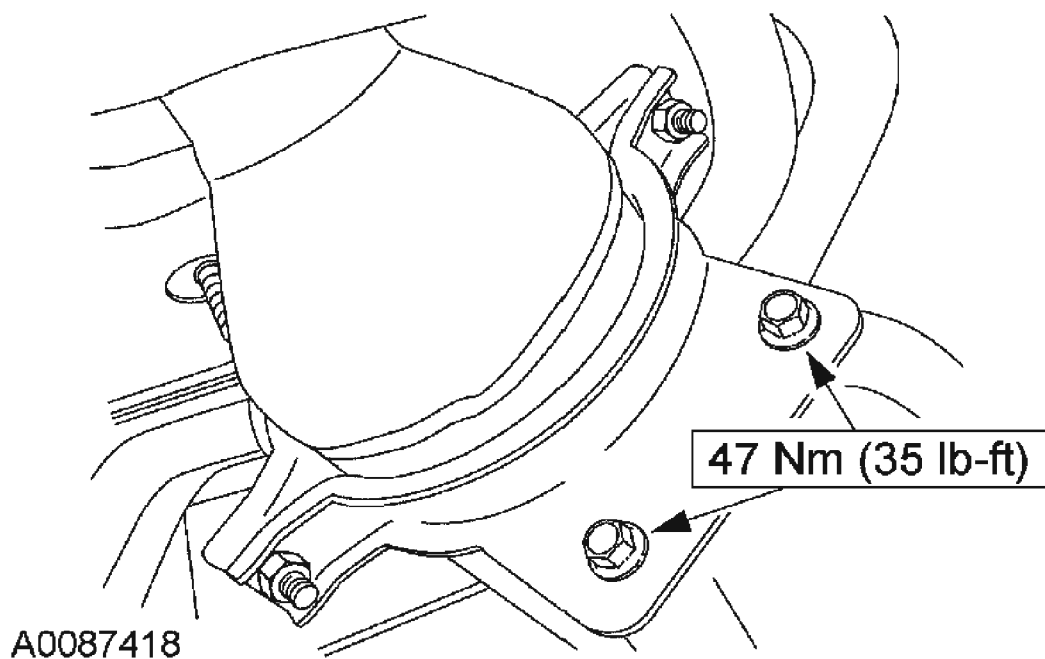


Fig. 23: Removing Bolts And Support Bracket (2 Of 2)

Courtesy of FORD MOTOR CO.

6. Remove the 2 retainer bolts and the 7 screws, then separate the lower heat shield from the upper heat shield

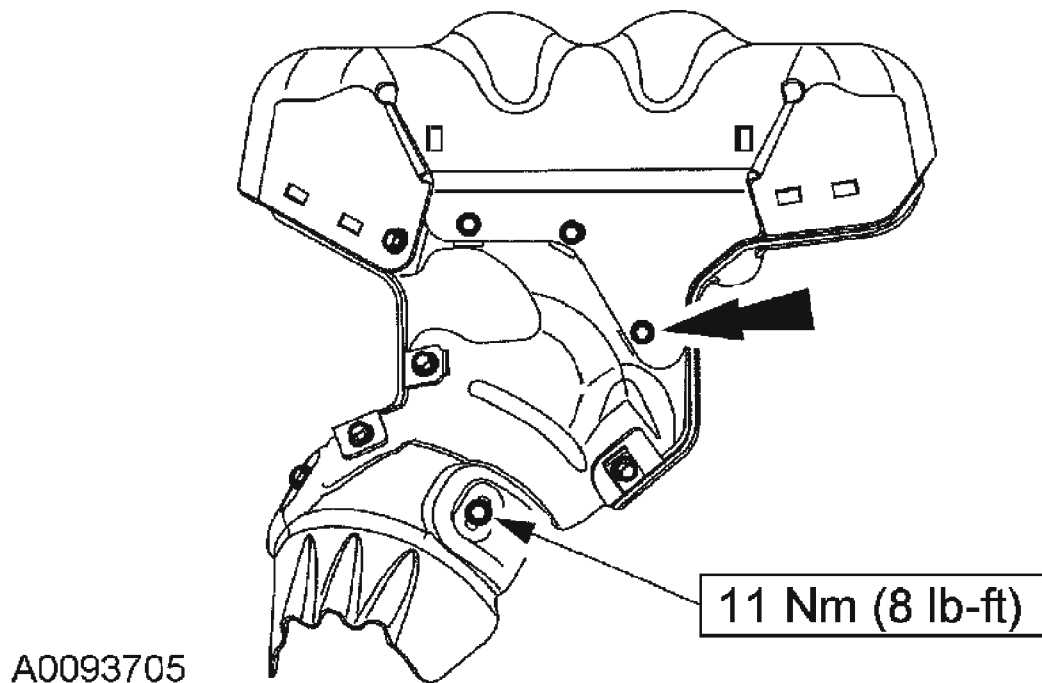


Fig. 24: Removing Retainer Bolts And Screws
Courtesy of FORD MOTOR CO.

7. Disconnect the catalyst monitor sensor (CMS) and heated oxygen sensor (HO2S) electrical connectors.
8. Remove the bolts and the roll restrictor.

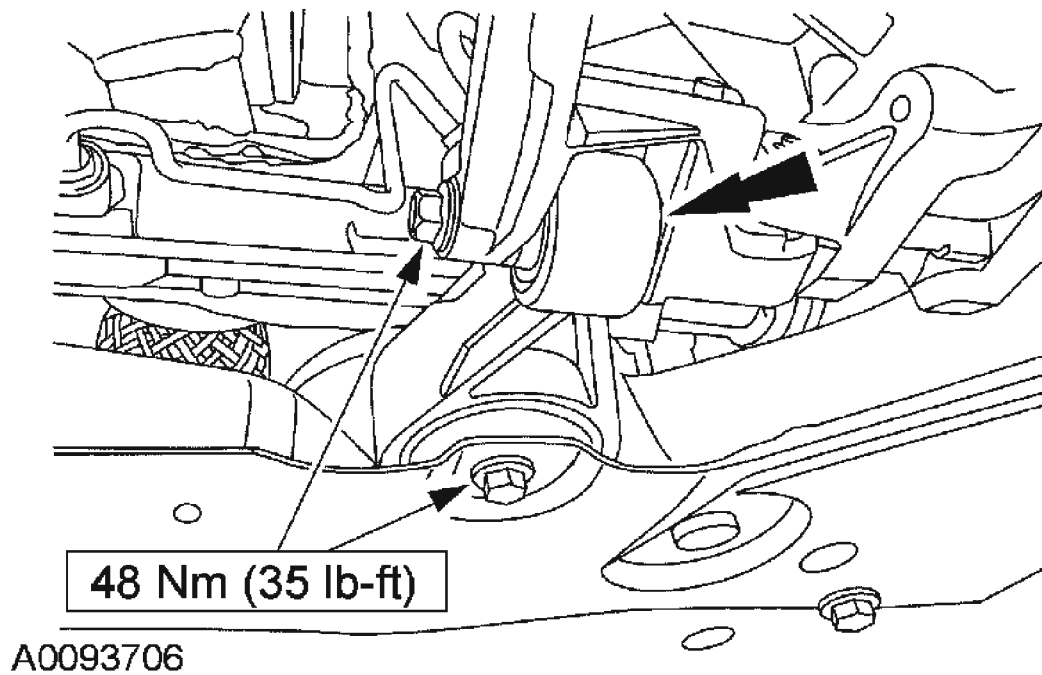


Fig. 25: Removing Bolts And Roll Restrictor
Courtesy of FORD MOTOR CO.

9. Lower the vehicle.
10. Disconnect the breather tube from the valve cover.

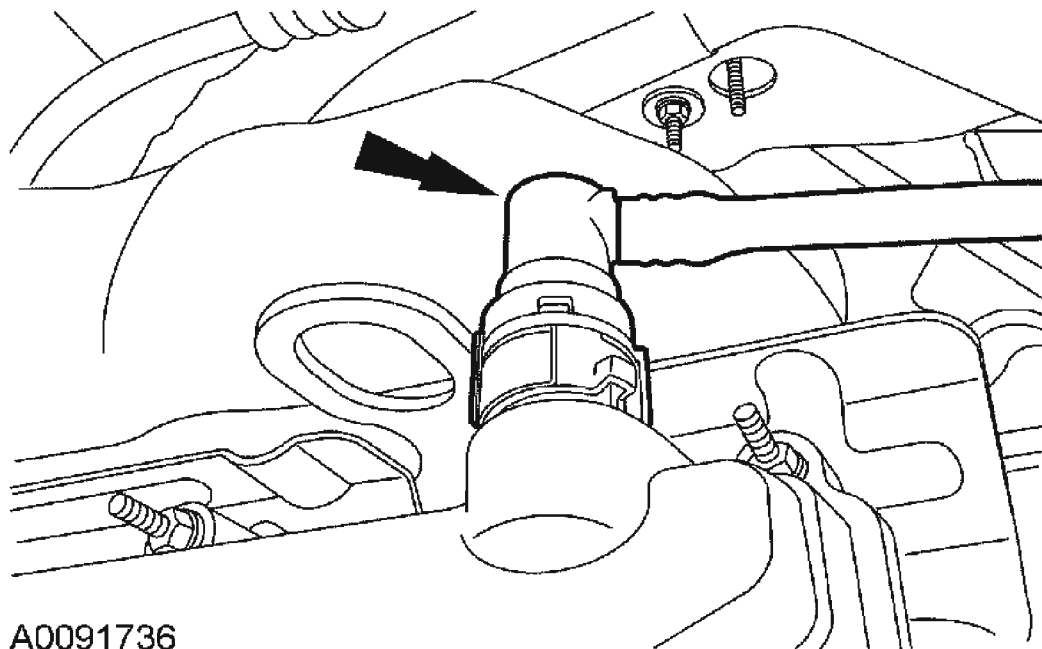


Fig. 26: Disconnecting Breather Tube From Valve Cover
Courtesy of FORD MOTOR CO.

11. Remove the upper heat shield bolts.

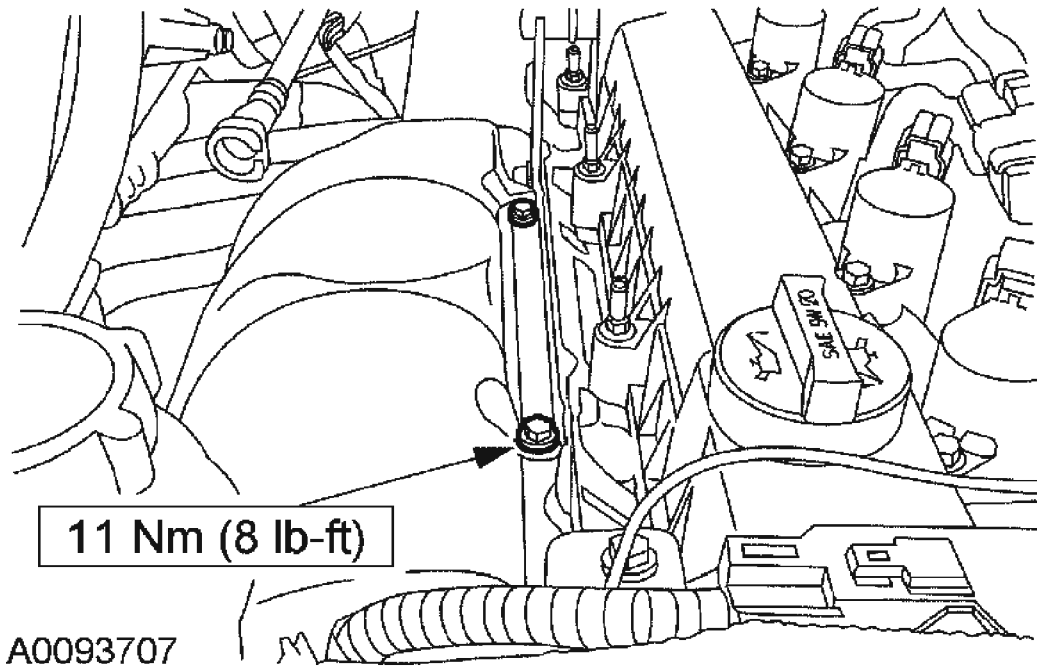


Fig. 27: Removing Upper Heat Shield Bolts
Courtesy of FORD MOTOR CO.

12. Remove the vapor management valve (VMV).
 1. Disconnect the electrical connector.
 2. Disconnect the upper fuel line.
 3. Disconnect the lower fuel line.

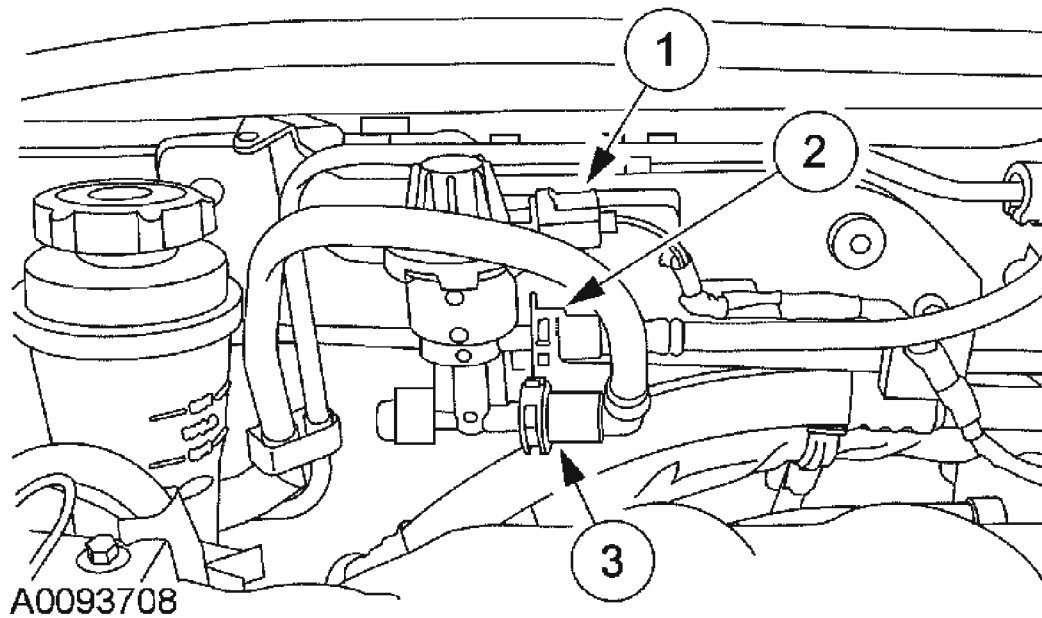


Fig. 28: Removing Vapor Management Valve (VMV)
Courtesy of FORD MOTOR CO.

13. Disconnect the other end of the upper fuel line and remove the fuel line.

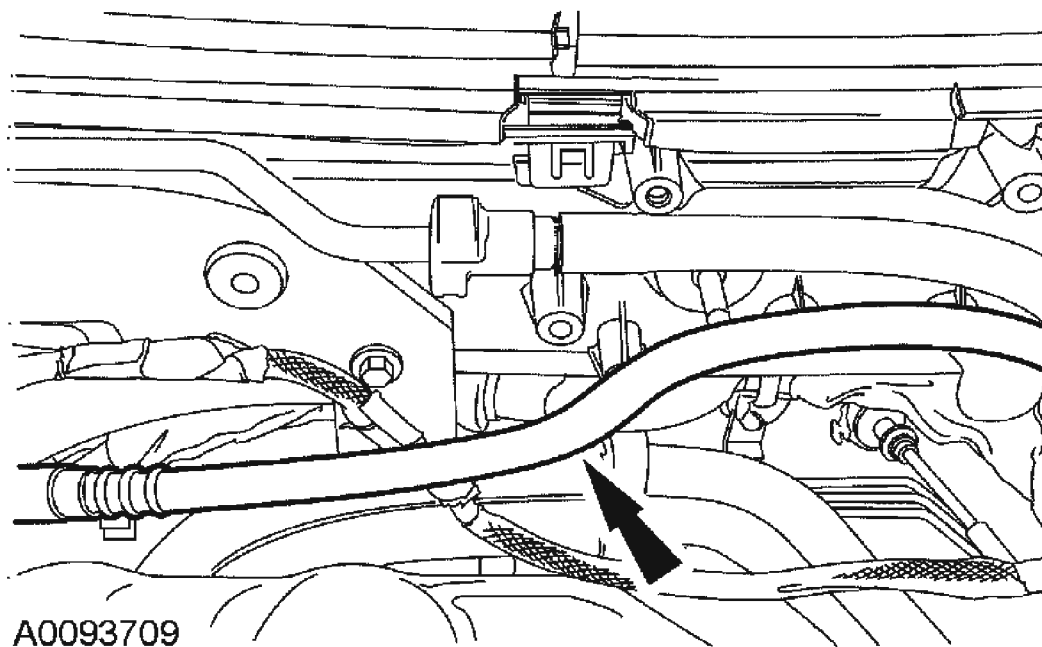


Fig. 29: Disconnecting Upper Fuel Line
Courtesy of FORD MOTOR CO.

14. Remove the bolts and the VMV bracket.

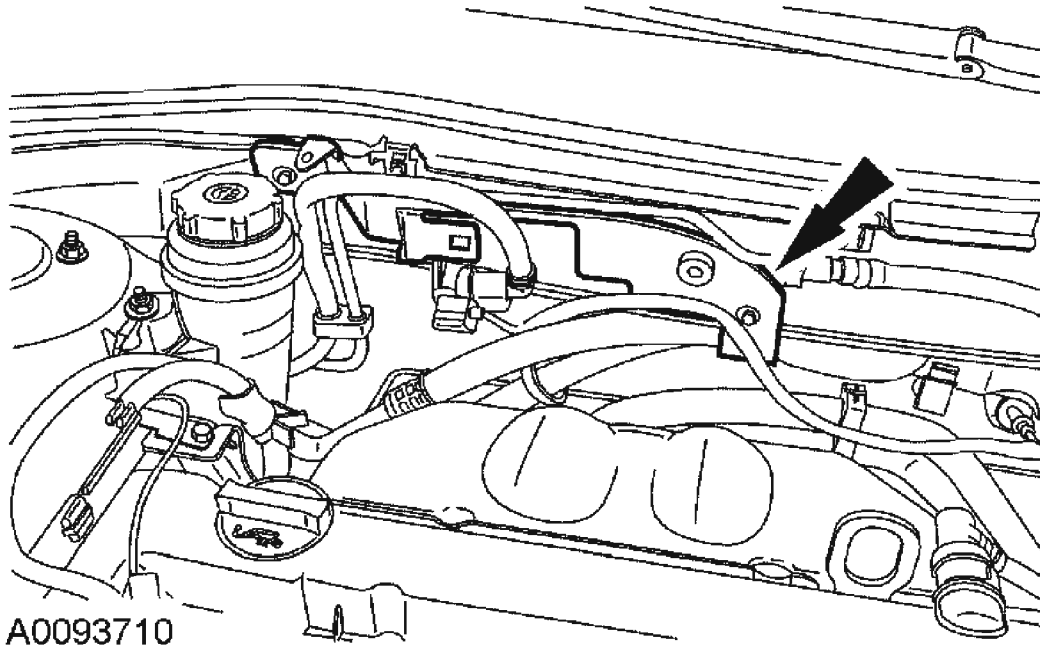


Fig. 30: Removing Bolts And VMV Bracket
Courtesy of FORD MOTOR CO.

15. Position aside the power steering reservoir.

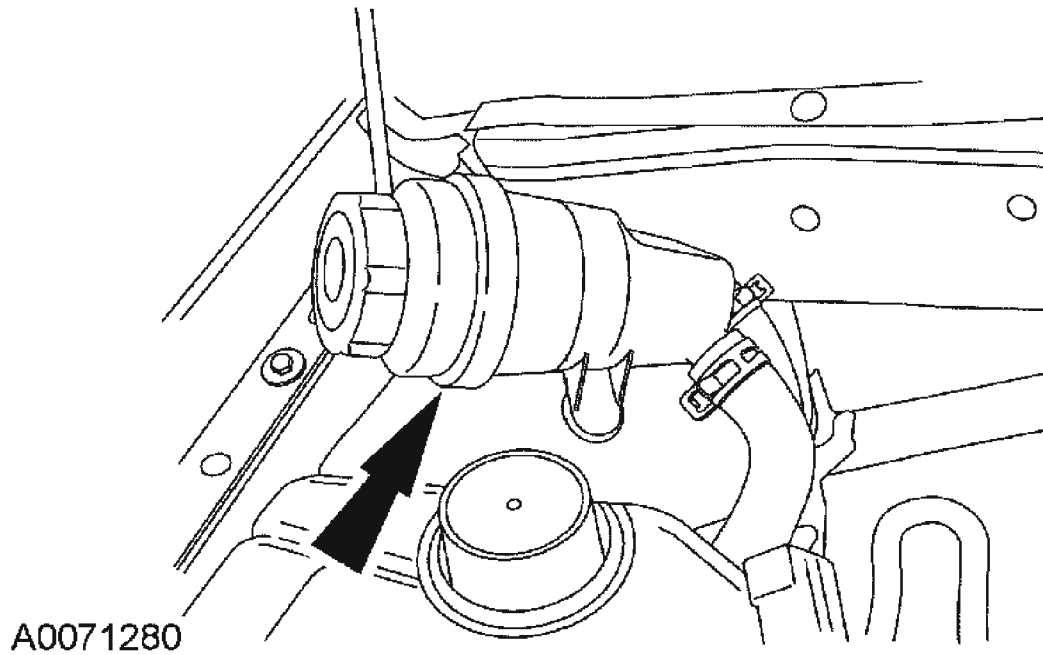
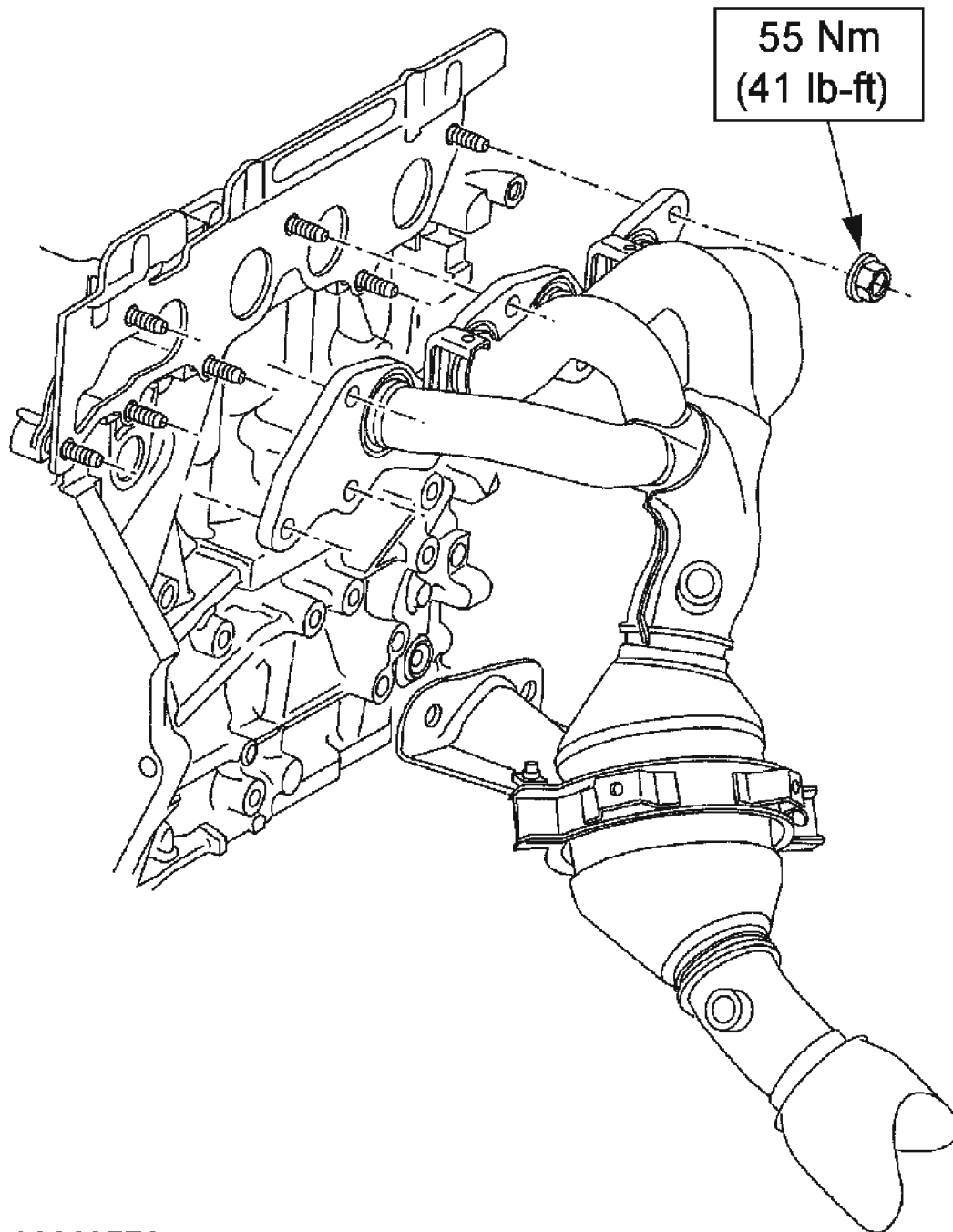


Fig. 31: Positioning Aside Power Steering Reservoir
Courtesy of FORD MOTOR CO.

16. Remove and discard the 7 catalytic converter-to-cylinder head nuts.



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Fig. 32: Removing Catalytic Converter-To-Cylinder Head Nuts
Courtesy of FORD MOTOR CO.

17. Remove the bolt and the radio capacitor and bracket. Disconnect the electrical connector.

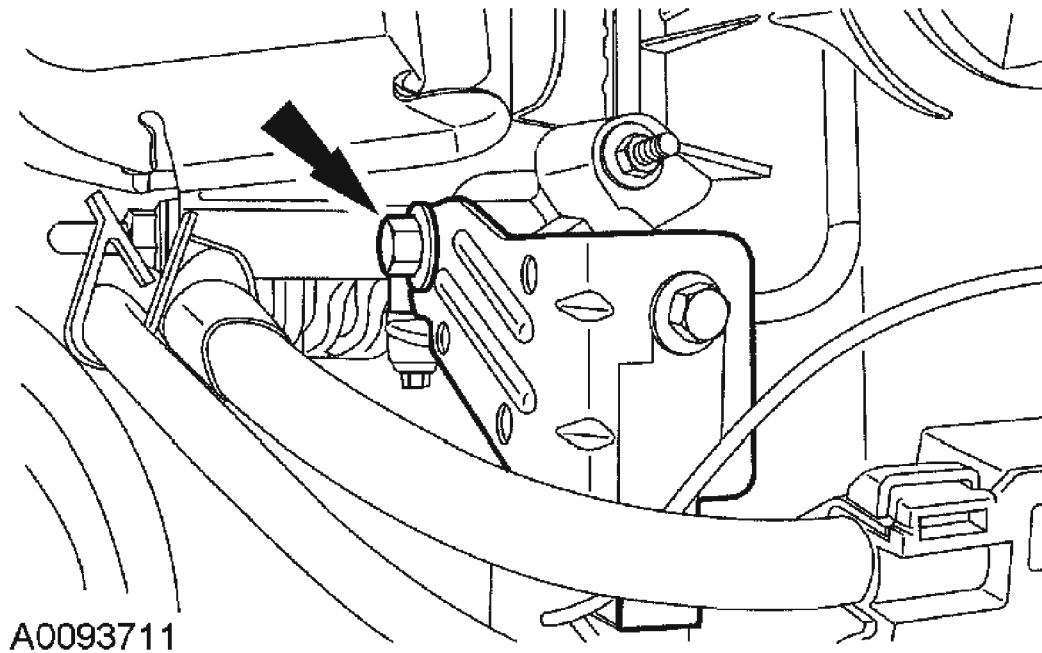


Fig. 33: Removing Bolt, Radio Capacitor And Bracket
Courtesy of FORD MOTOR CO.

18. Remove the bolt and the engine lifting eye.

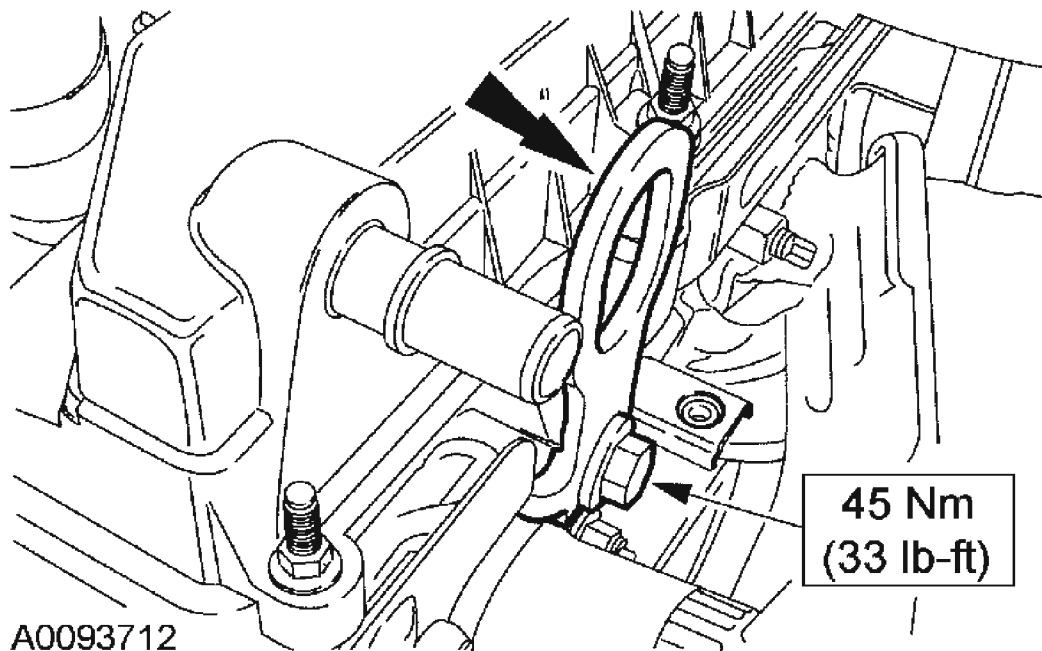
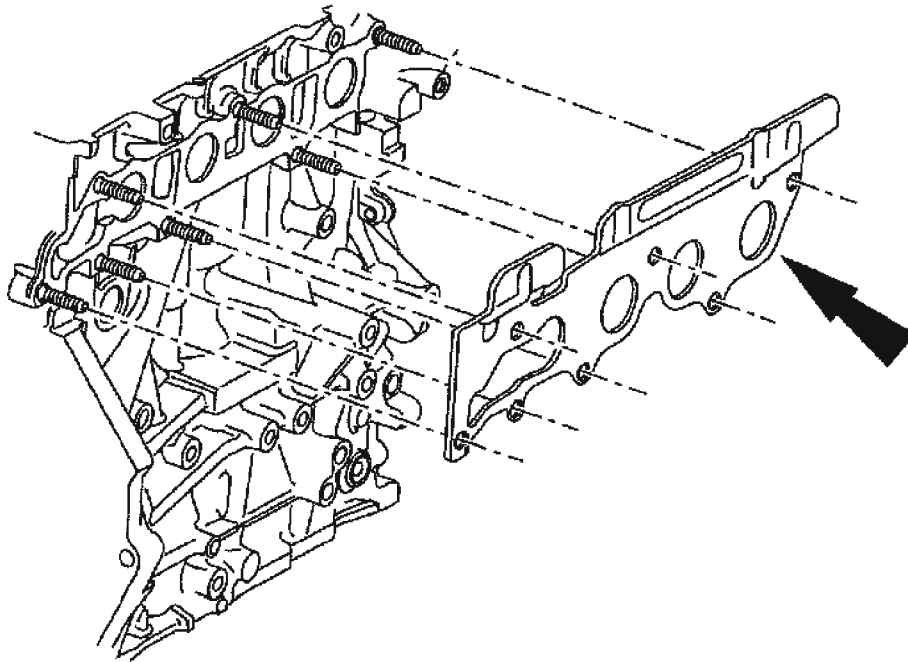


Fig. 34: Removing Bolt And Engine Lifting Eye
Courtesy of FORD MOTOR CO.

19. Remove and discard the catalytic converter gasket.



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Fig. 35: Removing Catalytic Converter Gasket
Courtesy of FORD MOTOR CO.

20. Remove the valve cover. For additional information, refer to ENGINE - 2.0L AND 2.3L .
 - Using shop towels, cover the cylinder head.

NOTE: An assistant will be needed to remove the catalytic converter and heat shield from the vehicle. Do not let the catalytic converter or the heat shield come in contact with the cylinder head.

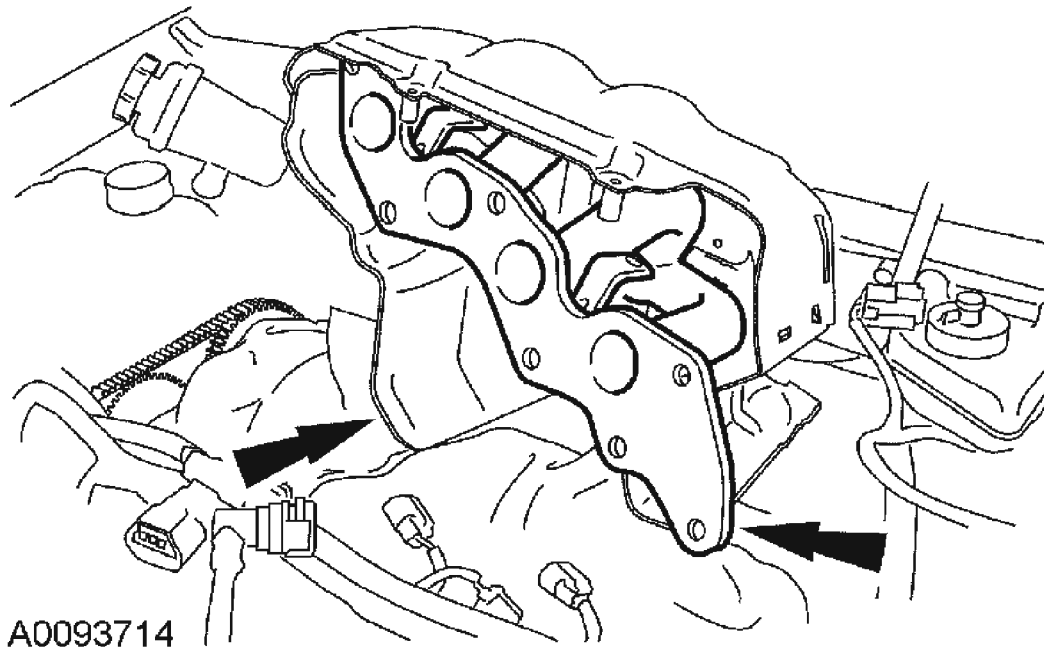


Fig. 36: Removing Catalytic Converter From Vehicle
Courtesy of FORD MOTOR CO.

21. Using a pry bar, move the engine forward. Carefully pull the catalytic converter and shield upward. Roll the shield off, towards the RH side of the vehicle. Remove the catalytic converter from the vehicle.

FRONT MUFFLER

Removal

NOTE: The exhaust system is a one-piece construction for production, and two or three piece construction for service exhaust systems.

1. It is necessary to cut the production exhaust system to enable the service section to be fitted. Before cutting any part of the exhaust system, check the position of the cut is correct in comparison to the service sections to be installed.
2. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING AND LIFTING**.

CAUTION: Do not excessively bend or twist the exhaust flexible pipe. Failure to follow these instructions may cause damage to the exhaust flexible pipe.

Support the exhaust flexible pipe with a support wrap or suitable splint.

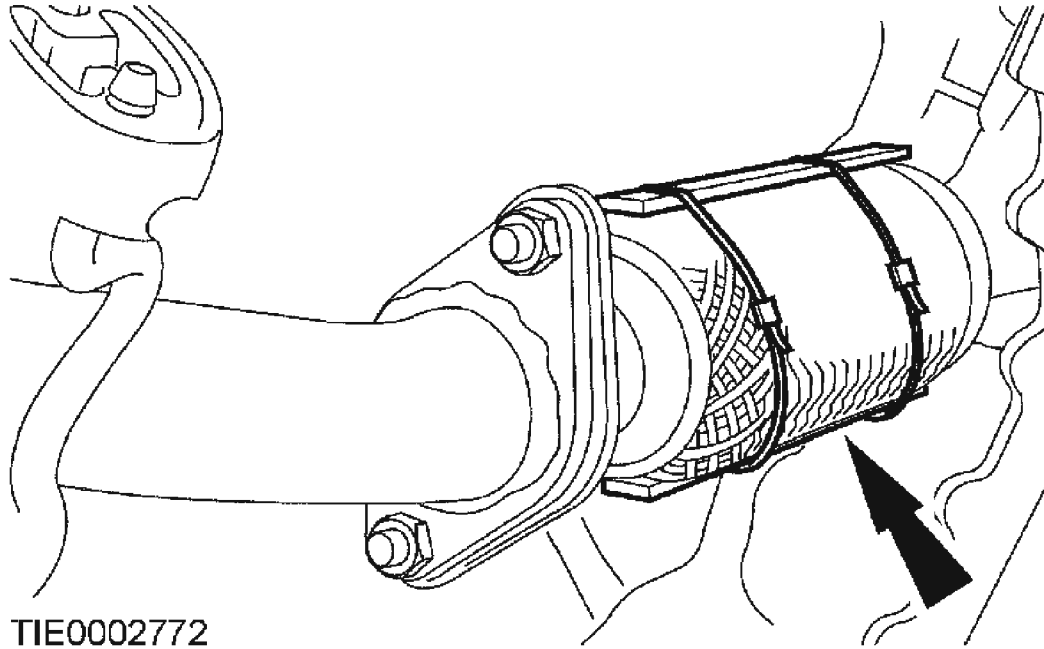


Fig. 37: Supporting Exhaust Flexible Pipe With A Support Wrap Or Suitable Splint

Courtesy of FORD MOTOR CO.

3. Remove the exhaust flexible pipe-to-muffler assembly nuts.
 - Discard the nuts and gasket. Install new studs, if necessary.

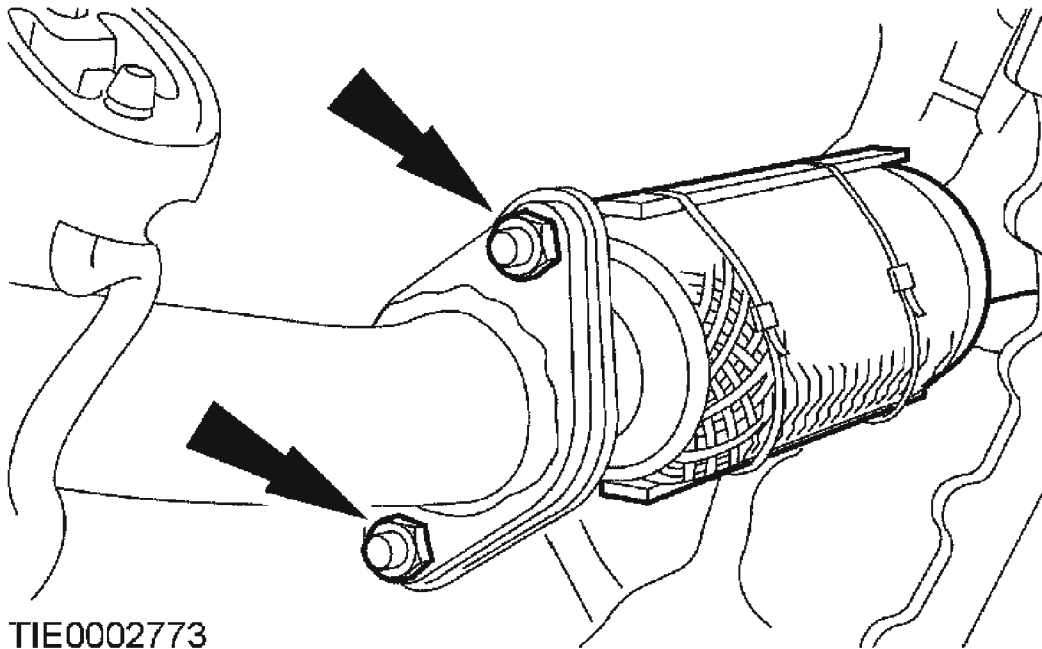


Fig. 38: Removing Exhaust Flexible Pipe-To-Muffler Assembly Nuts
Courtesy of FORD MOTOR CO.

4. Detach the tailpipe and muffler assembly from the front exhaust hanger insulators.

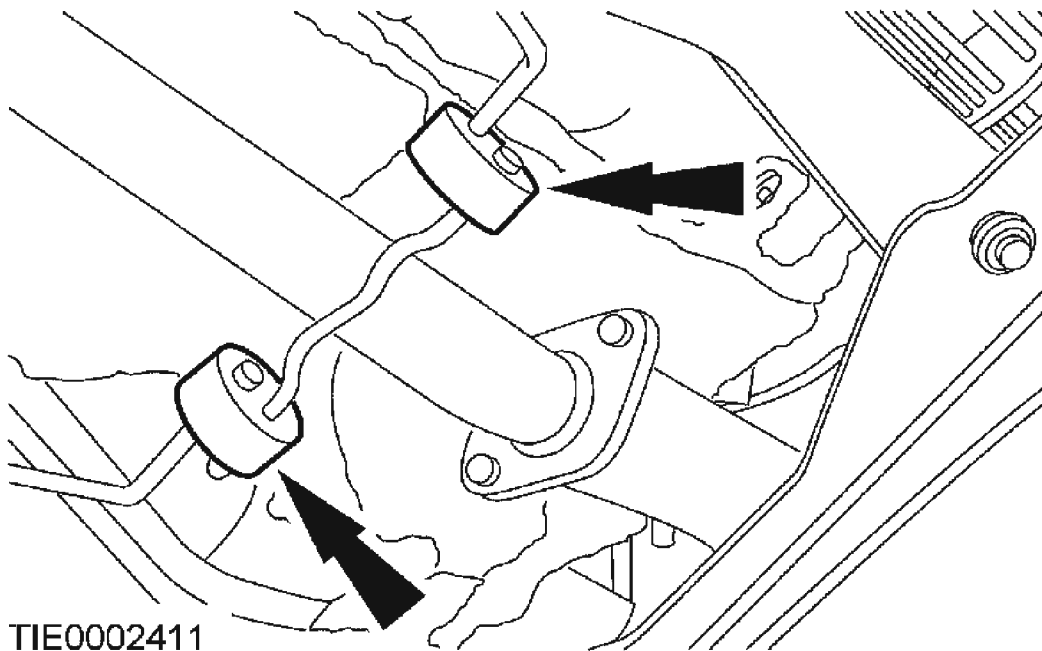


Fig. 39: Detaching Tailpipe And Muffler Assembly From Front Exhaust Hanger Insulators

Courtesy of FORD MOTOR CO.

5. Cut the exhaust system. For additional information, refer to **EXHAUST SYSTEM**.
6. Detach the front muffler from the front exhaust hanger insulator.

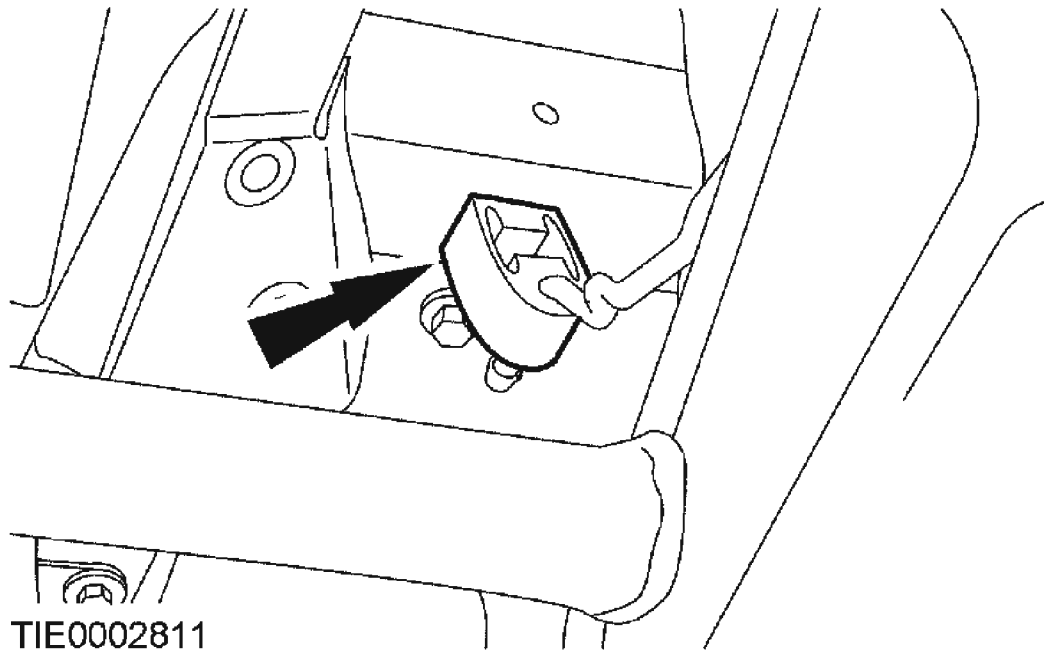


Fig. 40: Detaching Front Muffler From Front Exhaust Hanger Insulator

Courtesy of FORD MOTOR CO.

7. Detach the front muffler from the rear exhaust hanger insulator.

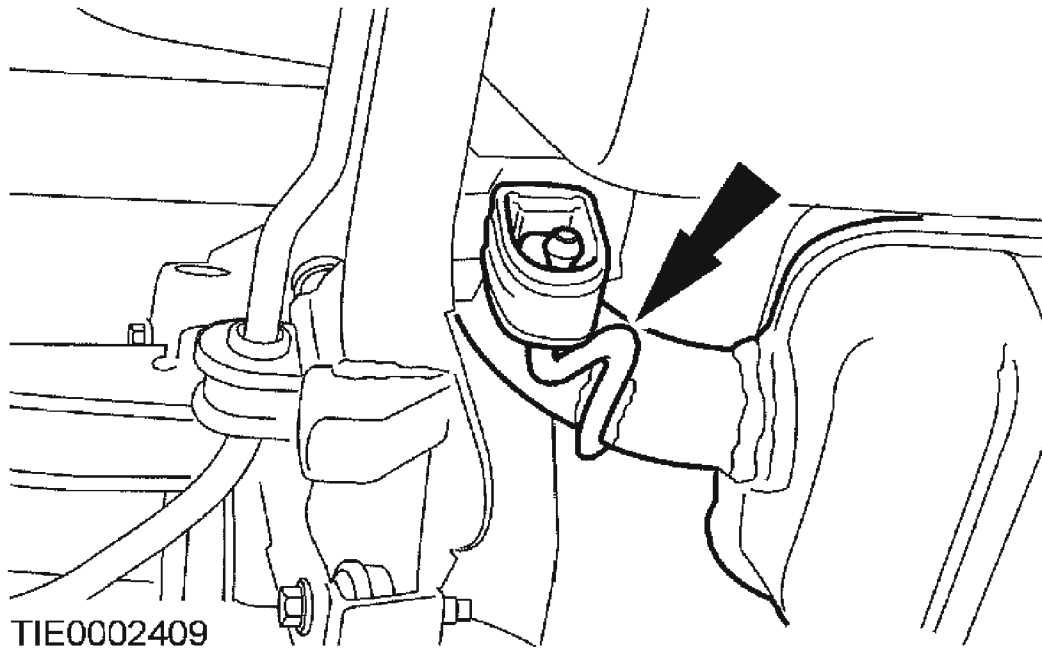


Fig. 41: Detaching Front Muffler From Rear Exhaust Hanger Insulator
Courtesy of FORD MOTOR CO.

8. Remove the muffler assembly.

Installation

CAUTION: The exhaust hanger insulators are constructed from a special material. Use only the correct specification exhaust hanger insulators.

1. Assemble the front muffler service section.

NOTE: Check the exhaust hanger insulator for damage and fatigue. Install new exhaust hangers as required.

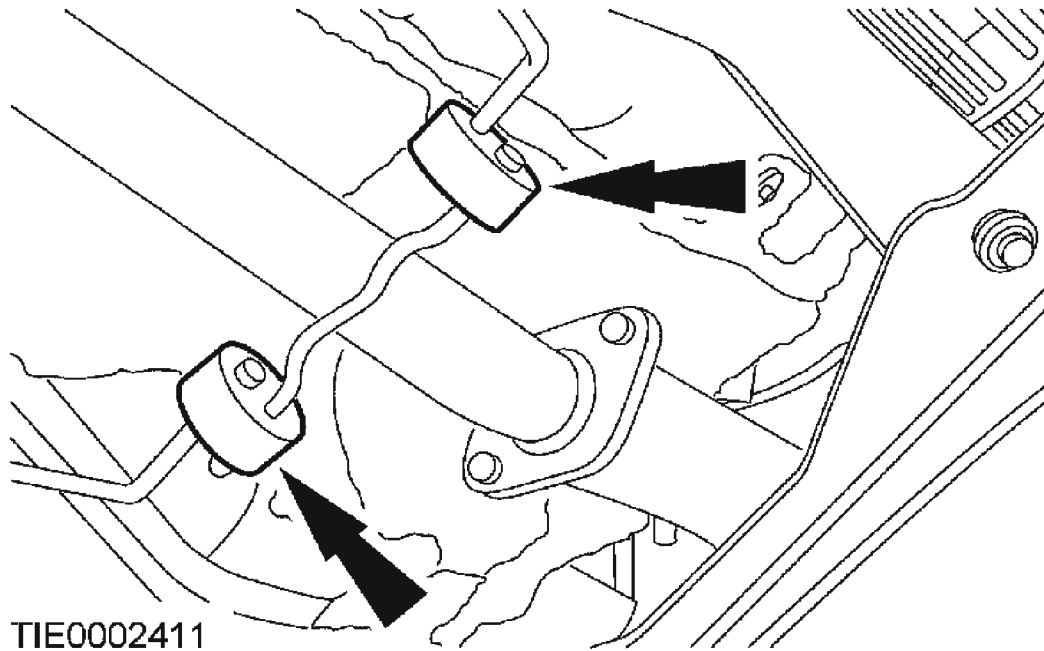


Fig. 42: Installing Tailpipe And Muffler Assembly To Front Exhaust System
Front Exhaust Hanger Insulators
Courtesy of FORD MOTOR CO.

2. Install the tailpipe and muffler assembly to the front exhaust system front exhaust hanger insulators.

NOTE: Check the exhaust hanger insulator for damage and fatigue.
Install new exhaust hangers as required.

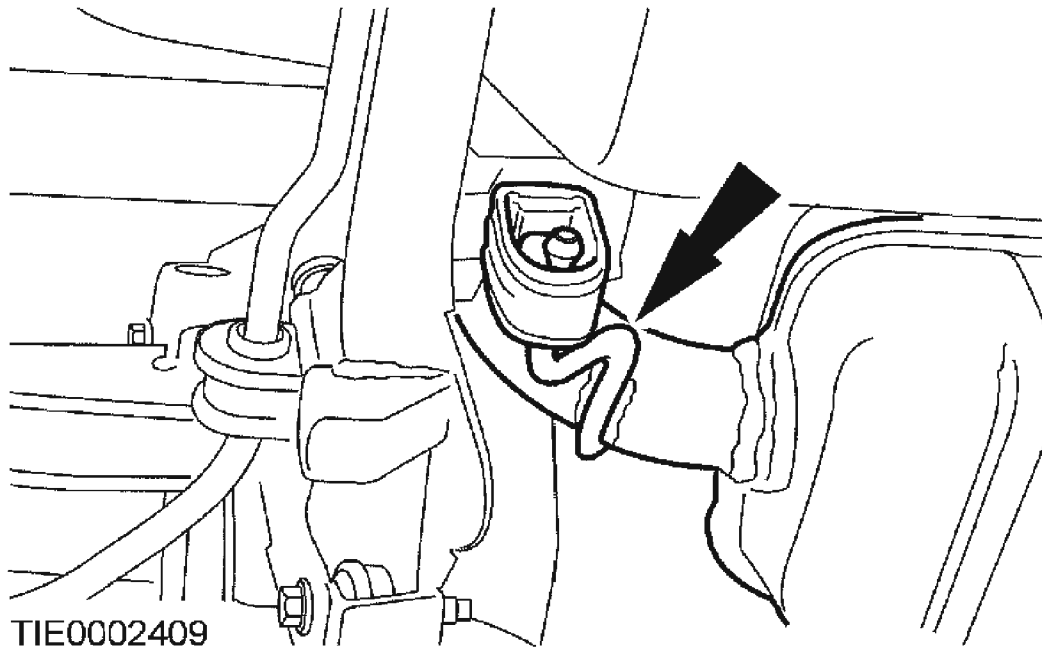


Fig. 43: Installing Front Muffler To Rear Exhaust Hanger Insulator
Courtesy of FORD MOTOR CO.

3. Install the front muffler to the rear exhaust hanger insulator.

NOTE: Check the exhaust hanger insulator for damage and fatigue.
Install new exhaust hangers as required.

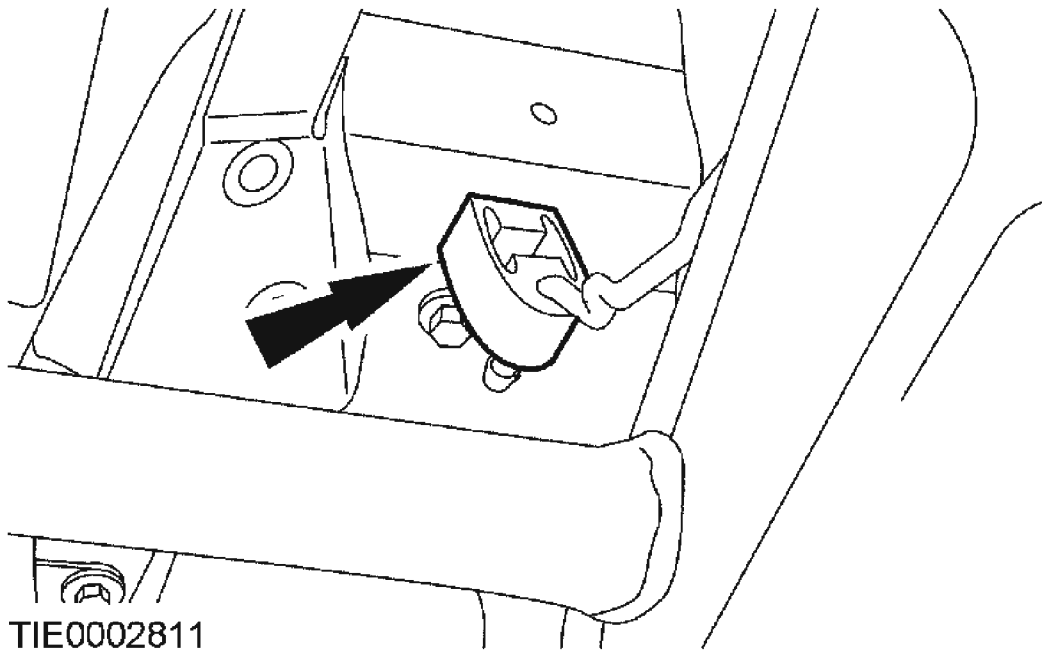


Fig. 44: Installing Front Muffler To Front Exhaust Hanger Insulator
Courtesy of FORD MOTOR CO.

4. Install the front muffler to the front exhaust hanger insulator.
5. Tighten the new service clamps.

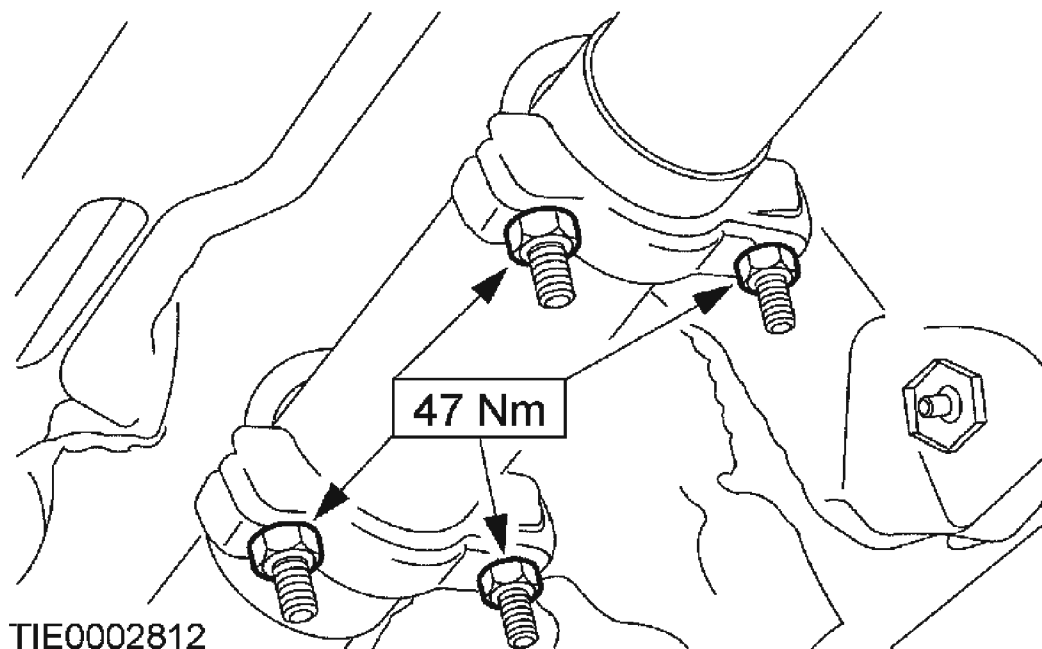


Fig. 45: Tightening Service Clamps
Courtesy of FORD MOTOR CO.

NOTE: Install a new gasket and new nuts.

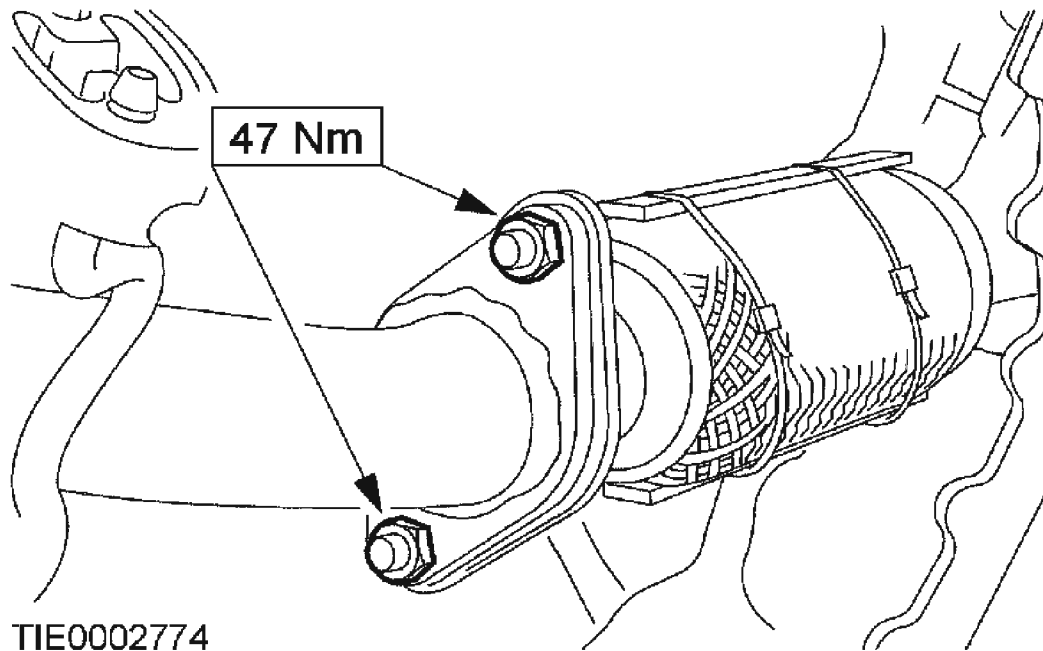


Fig. 46: Installing Exhaust Flexible Pipe To Tailpipe And Muffler Assembly
Courtesy of FORD MOTOR CO.

6. Install the exhaust flexible pipe to the tailpipe and muffler assembly.

CAUTION: Do not excessively bend or twist the exhaust flexible pipe. Failure to follow these instructions may cause damage to the exhaust flexible pipe.

7. Remove the exhaust flexible pipe support.
8. Lower the vehicle.