

2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer

2006 ENGINE**Engine - 4.0L SOHC - Explorer & Mountaineer****SPECIFICATIONS****GENERAL SPECIFICATIONS****GENERAL SPECIFICATIONS**

Item	Specification
Lubricants and Sealants	
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada, Motorcraft SAE 5W-30 Super Premium Motor Oil CXO-5W30-LSP12) or equivalent	WSS-M2C929-A
Motorcraft Premium Gold Engine Coolant VC-7-A (in California, Oregon and New Mexico VC-7-B, in Canada CVC-7-A) or equivalent (yellow color) ⁽¹⁾	WSS-M97B51-A1
Motorcraft Metal Surface Prep ZC-31	-
Silicone Gasket Remover ZC-30	-
Silicone Gasket and Sealant TA-30	WSE-M4G323-A4
Silicone Brake Caliper Grease and Dielectric Compound XG-3-A (Canada CXG-2-B)	ESE-M1C171-A
Threadlock and Sealer TA-25	WSK-M2G351-A5
Engine	
Displacement	4.0L (244 CID)
Number of cylinders	6
Bore	100.4 mm (3.953 in)
Stroke	84.4 mm (3.32 in)
Firing order	1-4-2-5-3-6
Oil pressure minimum at 2,000 RPM (engine at normal operating temperature)	103 kPa (15 psi)
Oil capacity	4.73 liters (5 quarts) with filter
Cylinder Head and Valve Train	
Cylinder head gasket surface flatness	0.08 mm (0.003 in) total
Combustion chamber volume	65.197 ± 2.068-2.018 cc
Valve arrangement (front to rear) - LH	I-E-I-E-I-E
Valve arrangement (front to rear) - RH	E-I-E-I-E-I
Valve guide bore diameter	7.00-7.018 mm (0.276 in)
Valve stem diameter - intake	6.965-6.98 mm (0.274-0.275 in)
Valve stem diameter - exhaust	6.95-6.965 mm (0.27-0.274 in)
Valve stem-to-guide clearance - intake	0.020-0.053 mm (0.001-0.002 in)
Valve stem-to-guide clearance - exhaust	0.035-0.068 mm (0.001-0.003 in)
Valve head diameter - intake	45.9-46.1 mm (1.807-1.815 in)

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Valve head diameter - exhaust	38.9-39.1 mm (1.531-1.539 in)
Valve face runout	0.03 mm (0.001 in)
Valve face angle	45 degrees
Valve seat width - intake	1.273-2.121 mm (0.05-0.083 in)
Valve seat width - exhaust	1.556-2.404 mm (0.061-0.095 in)
Valve seat runout	0.059 mm (0.002 in)
Valve seat angle	45 degrees
Valve spring free length	43.1 mm (1.7 in)
Valve spring squareness	± 1.5 deg
Valve spring compression pressure at specified height (lbs)	275-305 Nm at 35.9-36.7 mm (202.84-224.968 lb-ft at 1.413-1.445 in)
Valve spring installed height	39.86-40.86 mm (1.569-1.609 in)
Valve spring installed pressure	320 newtons (72 lb)
Roller follower ratio	1.98:1
Camshaft	
Theoretical valve lift @ Diameter	11.93 mm (0.472 in)
Lobe lift	6.584 mm (0.259 in)
Allowable lobe lift loss	0.127 mm (0.005 in)
Journal diameter	27.935-27.96 mm (1.099-1.101 in)
Camshaft journal bore inside diameter	28.0-28.03 mm (1.102-1.104 in)
Camshaft journal-to-bearing clearance	0.04-0.095 mm (0.002-0.004 in)
Runout	0.05 mm (0.002 in)
End play	0.075-0.185 mm (0.003-0.007 in)
Cylinder Block	
Cylinder bore diameter	100.4 mm (3.953 in)
Cylinder bore maximum taper	0.025 mm (0.001 in)
Cylinder bore maximum out-of-round	0.025 mm (0.001 in)
Main bearing bore inside diameter	60.620-60.634 mm (2.387-2.387 in)
Head gasket surface flatness	0.1 mm (0.004 in) overall
Crankshaft	
Main bearing journal diameter	56.980-57.0 mm (2.243-2.244 in)
Main bearing journal maximum taper	0.008 mm (0.0003 in)
Main bearing journal maximum out-of-round	0.008 mm (0.0003 in)
Main bearing journal-to-cylinder block clearance	0.008-0.062 mm (0.0003-0.0024 in)
Connecting rod journal diameter	53.98-54.0 mm (2.125-2.126 in)
Connecting rod journal maximum taper	0.008 mm (0.0003 in)
Connecting rod journal maximum out-of-round	0.008 mm (0.0003 in)
Crankshaft maximum end play	0.05-0.32 mm (0.002-0.0126 in)

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Main Bearings

Clearance to crankshaft	0.021-0.039 mm (0.0008-0.0015 in)
Clearance to crankshaft allowable	0.013-0.048 mm (0.0005-0.002 in)
Bearing wall thickness	1.8-1.806 mm (0.0709-0.0711 in)

Piston and Connecting Rod

Piston diameter - coded standard	100.380-100.400 mm (3.952-3.9528 in)
Piston diameter - coded 0.5	100.880-100.900 mm (3.971-3.972 in)
Piston diameter - coded 1.0	101.390-101.400 mm (3.991-3.992 in)
Piston-to-cylinder bore clearance	0.030-0.050 mm (0.0012-0.002 in)
Piston ring end gap - top	0.200-0.450 mm (0.008-0.018 in)
Piston ring end gap - bottom	0.40-0.60 mm (0.016-0.024 in)
Piston ring groove width - top	1.23-1.25 mm (0.0484-0.0492 in)
Piston ring groove width - bottom	1.52-1.54 mm (0.0598-0.0606 in)
Piston ring groove width - oil ring	3.01-3.03 mm (0.1185-0.1193 in)
Piston ring width - top	1.175-1.190 mm (0.0463-0.0469 in)
Piston ring width - bottom	1.475-1.490 mm (0.0581-0.0587 in)
Piston ring-to-groove clearance - top	0.040-0.075 mm (0.0016-0.0030 in)
Piston ring-to-groove clearance - bottom	0.030-0.065 mm (0.0012-0.0026 in)
Piston pin bore diameter	23.958-23.976 mm (0.943-0.944 in)
Piston pin diameter (red)	23.994-23.997 mm (0.9446-0.9448 in)
Piston pin diameter (blue)	23.997-24.000 mm (0.9448-0.9449 in)
Piston pin length	72.0-72.8 mm (2.835-2.866 in)
Piston pin-to-piston fit	0.01-0.016 mm (0.0004-0.0006 in)
Piston pin-to-connecting rod clearance	0.01-0.016 mm (0.0004-0.0006 in)
Connecting rod pin bore diameter	23.958-23.976 mm (0.943-0.944 in)
Connecting rod length (center-to-center)	145.965-146.035 mm (5.747-5.749 in)
	0.013 mm (0.0005 in) per 25.4

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Connecting rod maximum allowed bend	mm (1.000 in)
Connecting rod maximum allowed twist	0.038 mm (0.0015 in) per 25.4 mm (1.000 in)
Connecting rod bearing bore diameter	56.82 mm - 56.84 mm (2.237 in - 2.238 in)
Connecting rod bearing-to-crankshaft clearance	0.008-0.061 mm (0.0003-0.0024 in)
Connecting rod side clearance	0.092-0.268 mm (0.0036-0.0106 in)
(1) The addition of Cooling System Stop Leak Pellets, VC-6, darkens Motorcraft Premium Gold Engine Coolant from yellow to golden tan.	

TORQUE SPECIFICATIONS**TORQUE SPECIFICATIONS**

Description	Nm	lb-ft	lb-in
A/C line fitting nuts	15	11	-
A/C tube bracket nut	10	-	89
Accessory drive bracket bolts	42	31	-
Accessory drive belt tensioner bolt	47	35	-
Balance shaft bolts	29	21	-
Balance shaft chain guide bolts	10	-	89
Balance shaft chain tensioner bolts	29	21	-
Battery cable retainer bracket-to-frame nut	15	11	-
Battery cable-to-power distribution box nut	12	9	-
Camshaft bearing cap bolts ⁽¹⁾	-	-	-
Camshaft sprocket bolt	85	63	-
Camshaft sprocket bolt (w/SST)	61	45	-
Cassette-to-cylinder block bolt	19	14	-
Cassette-to-cylinder head bolt, RH	10	-	89
Cassette-to-cylinder head bolt, LH	12	9	-
Connecting rod bolts ⁽¹⁾	-	-	-
Coolant expansion tank bolts	7	-	62
Coolant pump bolts	10	-	89
Coolant pump pulley bolts	25	18	-
Crankshaft pulley bolt ⁽¹⁾	-	-	-
Crossmember bolts	103	76	-
Cylinder block cradle bolts (inside)	-	-	-
Cylinder block cradle bolts with washers and nuts (outside)	10	-	89
Cylinder block cradle bolts without washers (outside)	14	10	-
Cylinder block cradle inserts	3	-	27

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Cylinder block cradle Torx® bolts	8	-	71
Cylinder head bolts ⁽¹⁾	-	-	-
Electrical harness-to-rear of engine bolts	47	35	-
Engine front cover bolts	19	14	-
Engine lifting eye bolts (service)	37	27	-
Engine support insulator through bolt	103	76	-
Engine support insulator nuts	90	66	-
Exhaust manifold-to-exhaust gas recirculation (EGR) system module tube fittings	34	25	-
Exhaust manifold nuts	22	16	-
Exhaust manifold studs	12	9	-
Exhaust manifold-to-converter nuts	40	30	-
Flexplate bolts ⁽¹⁾	-	-	-
Front axle housing bolts	66	49	-
Front stabilizer bar bracket bolts	55	41	-
Fuel rail bolts	24	18	-
Fuel supply tube bracket-to-valve cover bolt	6	-	53
Fuel supply tube-to-fuel rail bolts	6	-	53
Generator bracket bolts	42	31	-
Generator wire nut	9	-	80
Oil pressure switch	13	10	-
Oil pump bolts	19	14	-
Oil pump drive bolt	19	14	-
Oil pump screen cover and tube bolts	10	-	89
Power steering fluid reservoir bolt	7	-	62
Power steering fluid reservoir-to-power steering pump hose bracket bolt	11	8	-
Power steering pressure hose bracket bolt	11	8	-
Power steering pump bolts	25	18	-
Power steering pump pulley bolts	25	18	-
Radiator fan shroud bolts	7	-	62
Starter B-terminal nut	12	9	-
Starter S-terminal nut	6	-	53
Thermostat housing bolts	11	8	-
Transmission cooler tube bracket nut	23	17	-
Transmission-to-cylinder block cradle bolts	47	35	-
Valve cover bolts	10	-	89
Wiring harness-to-front cover bracket nut	20	15	-
Wiring harness-to-RH cylinder head bracket bolt	47	35	-
Wiring harness-to-throttle body bracket nut	9	-	80
Ground strap-to-RH cylinder head bolt	10	-	89
Ground wire nut	9	-	80
Heater hose tube bracket rear bolt	23	17	-

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Heater hose tube bracket front bolt	34	25	-
Hood hinge bolts	12	9	-
Hydraulic camshaft tensioner	44	32	-
Ignition coil bracket bolts	10	-	89
Intake manifold bolts	11	8	-
Jackshaft chain guide bolts	19	14	-
Jackshaft chain tensioner bolts	10	-	89
Jackshaft rear sprocket bolt ⁽¹⁾	-	-	-
Jackshaft front sprocket bolt ⁽¹⁾	-	-	-
Jackshaft thrust plate bolt	11	8	-
Knock sensor (KS) bolt	20	15	-
Main bearing cap bolts	97	72	-
Oil filter	13	10	-
Oil cooler hose bracket bolt	25	18	-
Oil cooler insert	57	42	-
Oil filter adapter bolt	57	42	-
Oil filter adapter insert	33	24	-
Oil level indicator tube bracket bolt	10	-	89
Oil pan bolts	9	-	80
Oil pan drain plug	26	19	-
(1) Refer to the appropriate procedure.			

DESCRIPTION AND OPERATION

ENGINE

The 4.0L SOHC engine consists of the following:

- Single overhead camshafts
- Sequential multiport fuel injection (SFI)
- Distributorless ignition system
- Aluminum cylinder heads
- Cast iron, 60-degree V cylinder block
- Balance shaft
- Jackshaft
- Unique engine timing configuration
- Electronic throttle body
- Electronic returnless fuel system with pressure and temperature sensing

For quick identification, refer to the vehicle control information decal mounted under the hood.

- Refer to **IDENTIFICATION CODES** .

An engine identification label is attached to the engine. The label:

- Identifies the symbol code for determining parts usage. Refer to **IDENTIFICATION CODES** .

DIAGNOSIS AND TESTING

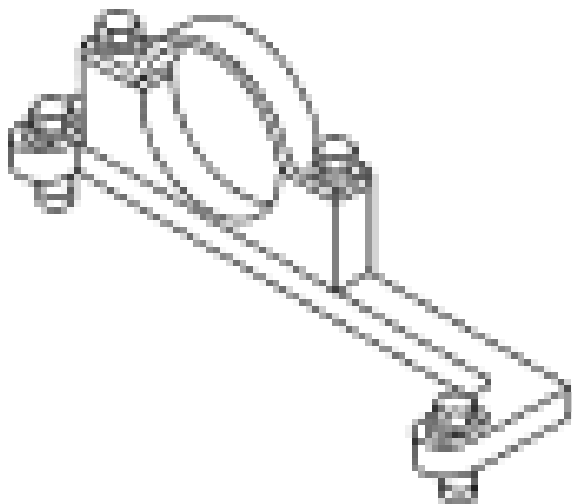
ENGINE

Refer to **ENGINE SYSTEM-GENERAL INFORMATION** .

GENERAL PROCEDURES

CAMSHAFT TIMING

SPECIAL TOOLS

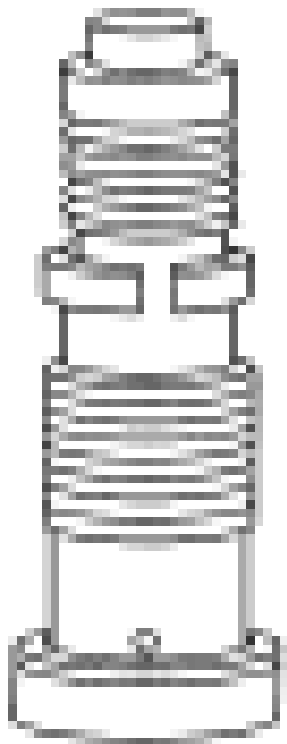


ST1777-A

Holding Tool, Camshaft Sprocket
303-564 (T97T-6256-B)

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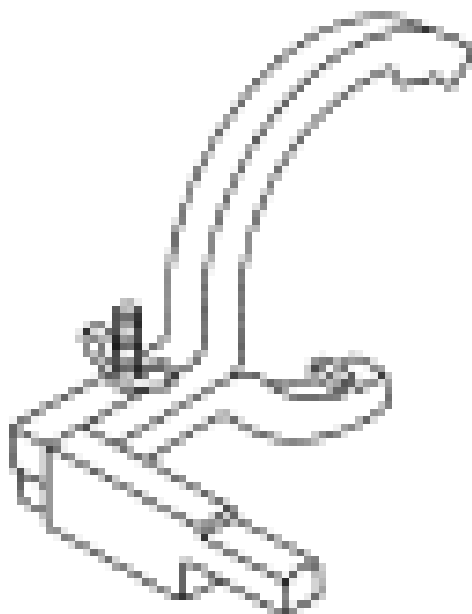
ST1774-A

Tensioner, Timing Chain
303-571 (T97T-6K254-A)

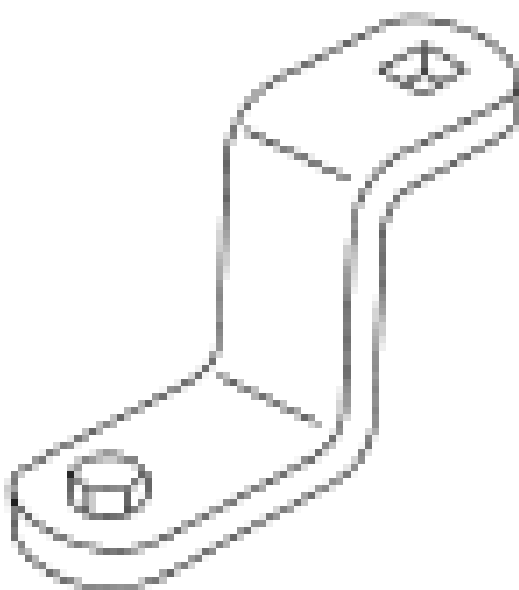
Timing Tool, Crankshaft TDC
303-573 (T97T-6303-A)

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ST1775-A

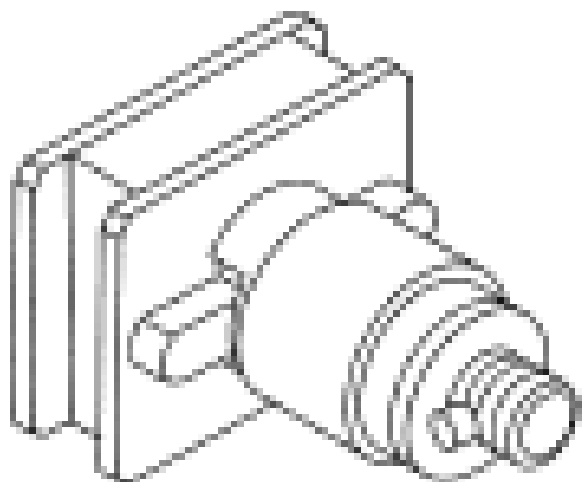


ST1780-A

Extension, Torque Wrench
303-575 (T97T-6256-F)

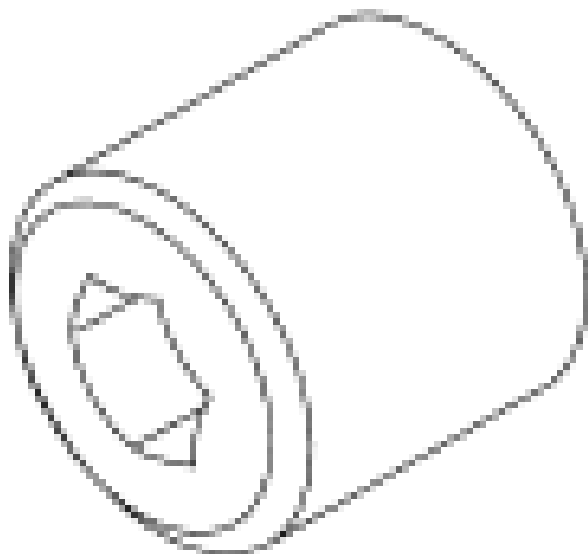
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ST1779-A

Adapter for 303-577
303-576 (T97T-6256-D)

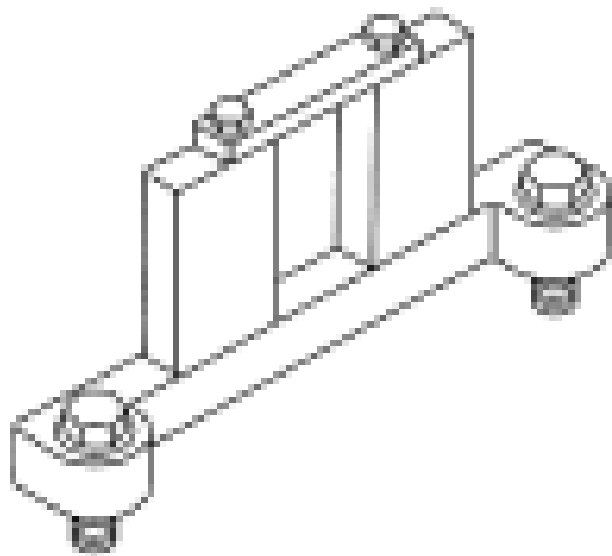


ST1781-A

Socket, Camshaft Sprocket Nut
303-565 (T97T-6256-G) or equivalent

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ST1778-A

Holding Tool, Camshaft
303-577 (T97T-6303-C)



ST1776-A

Adapter for 303-564
303-578 (T97T-6256-C)

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada	WSS-

Motorcraft SAE 5W-30 Super Premium Motor Oil CXO-5W30-LSP12) or equivalent

M2C929-A

1. Remove the camshaft roller followers. For additional information, refer to **CAMSHAFT ROLLER FOLLOWER**.
2. If necessary, rotate the accessory drive belt tensioner counterclockwise and remove the accessory drive belt.

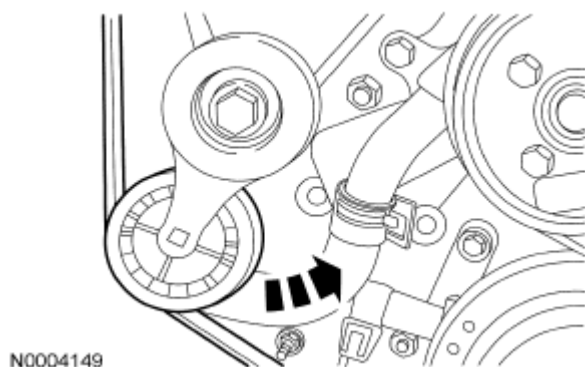


Fig. 1: Rotating Accessory Drive Belt Tensioner
Courtesy of FORD MOTOR CO.

3. If necessary, remove the bolts and position the generator aside.

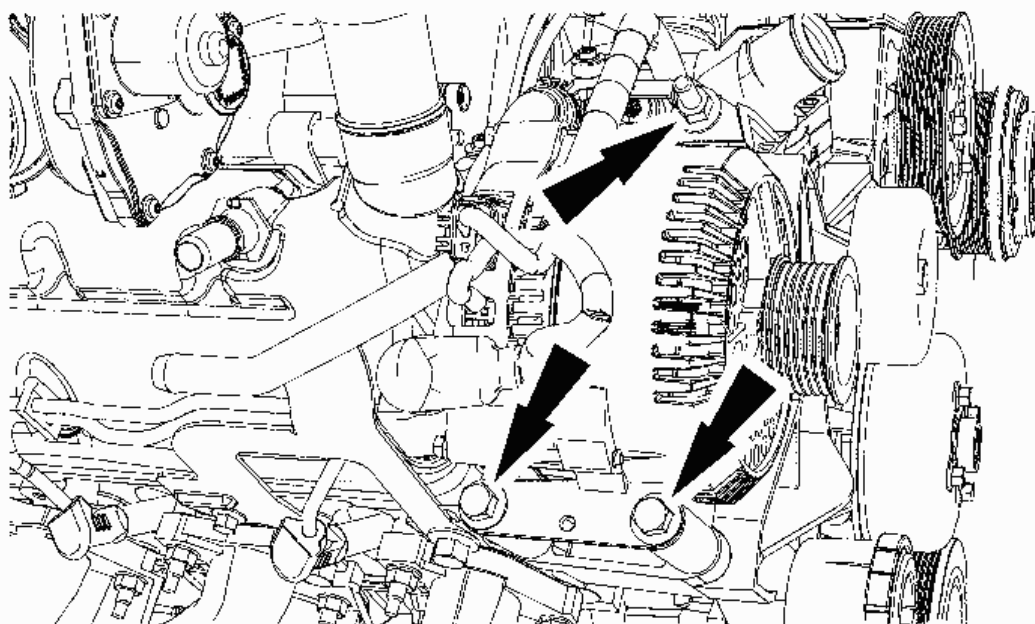


Fig. 2: Locating Generator Bolts
Courtesy of FORD MOTOR CO.

4. If necessary, remove the bolts and position the A/C compressor and power steering pump bracket aside.

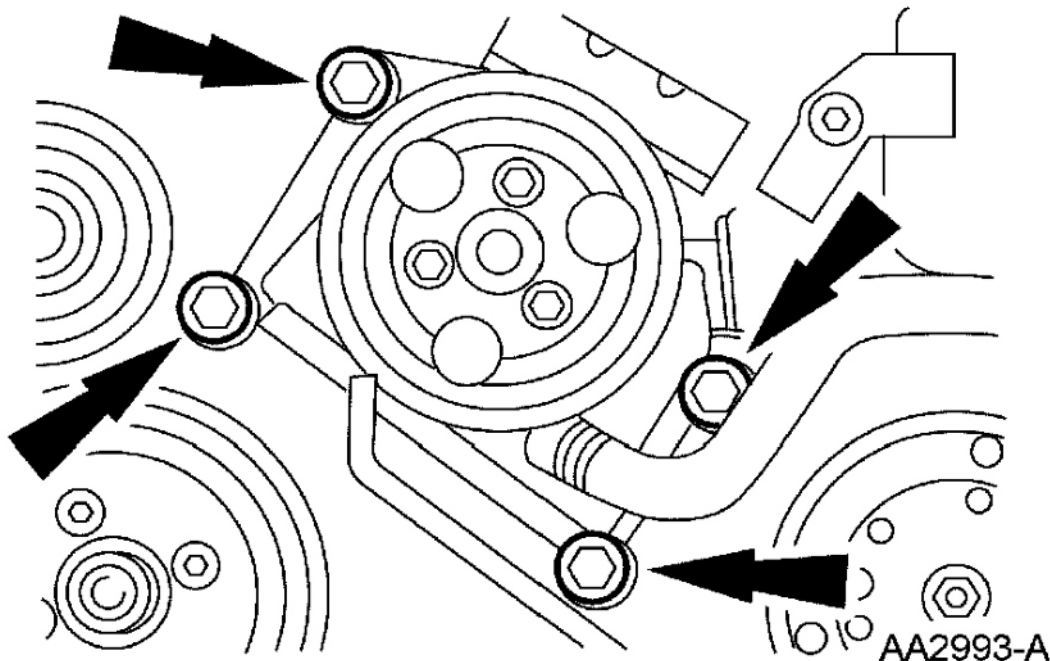


Fig. 3: Locating Accessory Bracket Bolts
Courtesy of FORD MOTOR CO.

NOTE: You must retune the LH and RH camshafts when either camshaft is disturbed.

5. Turn the crankshaft clockwise to position the No. 1 cylinder at top dead center (TDC).
6. Remove the nut and position the wiring harness aside.

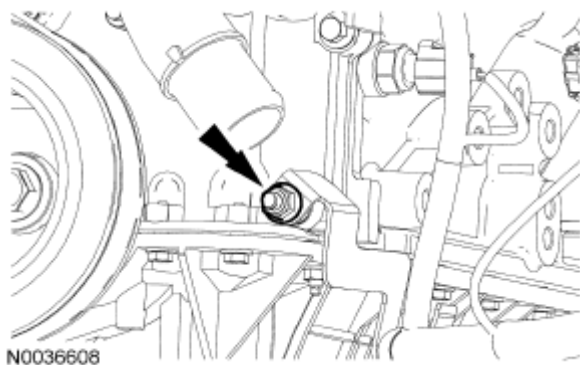


Fig. 4: Locating Nut

Courtesy of FORD MOTOR CO.

CAUTION: Do not rotate the engine counterclockwise. Rotating the engine counterclockwise will result in incorrect timing of the engine.

NOTE: The special tool must be installed on the damper and should contact the engine block, this positions the engine at TDC.

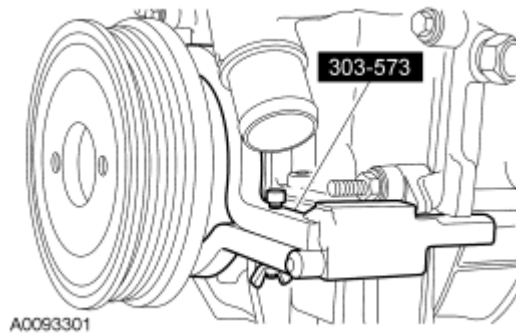


Fig. 5: Identifying Special Tool (303-573)
Courtesy of FORD MOTOR CO.

7. Install the special tool.

NOTE: Late build vehicles shown, early build vehicles similar.

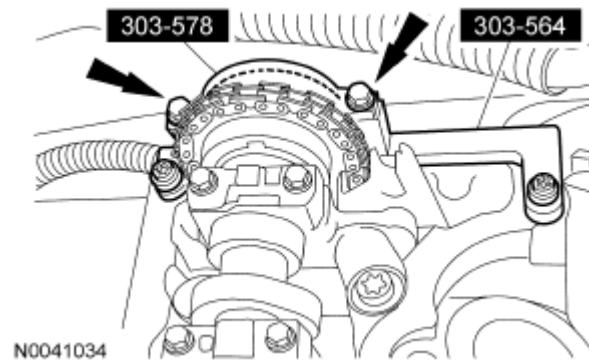


Fig. 6: Identifying Special Tools And Top Clamp Bolts
Courtesy of FORD MOTOR CO.

8. Install the special tools to the RH cylinder head and tighten the 2 top clamp bolts to 10 Nm (89 lb-in).

CAUTION: The RH camshaft sprocket bolt is a LH-threaded bolt. Turning the bolt in the wrong direction can damage the engine.

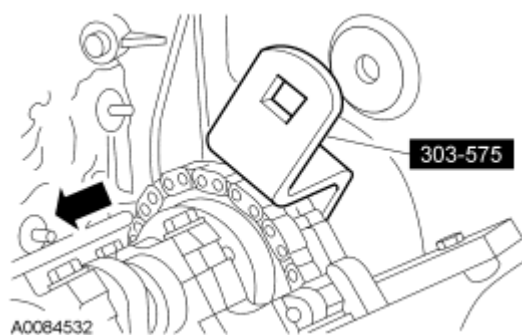


Fig. 7: Identifying Special Tool (303-575)
Courtesy of FORD MOTOR CO.

9. Using the special tool with the Camshaft Sprocket Nut Socket 303-565, loosen the RH camshaft sprocket bolt.

NOTE: Late build vehicles shown, early build vehicles similar.

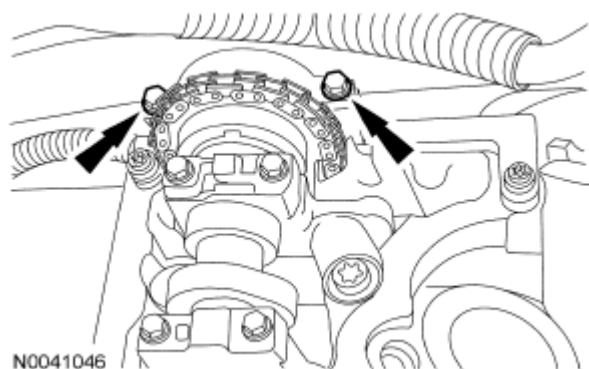


Fig. 8: Identifying Special Tool Clamp Bolts
Courtesy of FORD MOTOR CO.

10. Loosen the top 2 special tool clamp bolts.

NOTE: The camshaft timing slots are off-center.

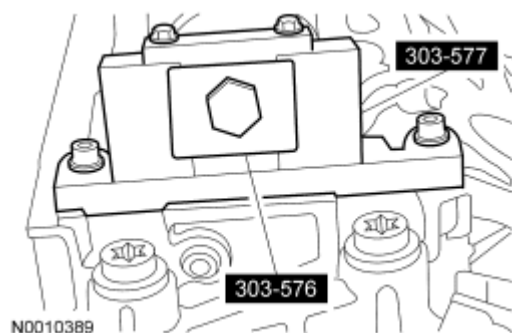


Fig. 9: Identifying Special Tools (303-576, 303-577)

Courtesy of FORD MOTOR CO.

11. Position the camshaft timing slots below the centerline of the camshaft to correctly fit the special tools and install the special tools on the front of the RH cylinder head.
12. Remove the RH hydraulic camshaft tensioner.

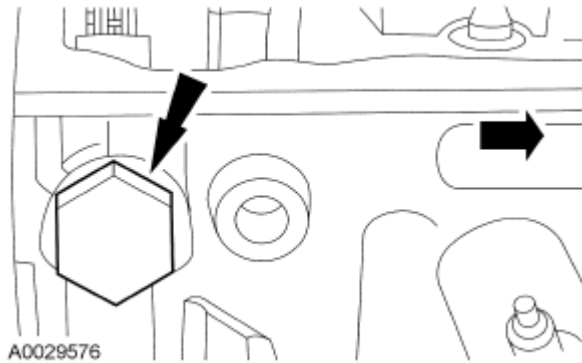


Fig. 10: Identifying RH Hydraulic Camshaft Tensioner
Courtesy of FORD MOTOR CO.

13. Install the special tool.

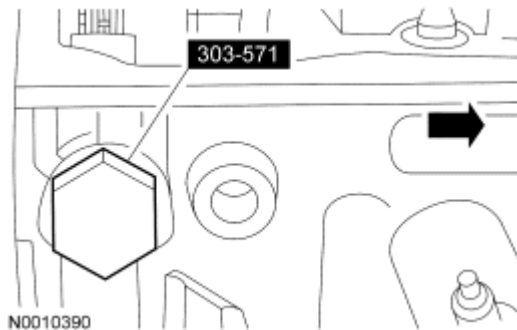


Fig. 11: Identifying Special Tool (303-571)
Courtesy of FORD MOTOR CO.

CAUTION: The RH camshaft sprocket bolt is a LH-threaded bolt. Turning the bolt in the wrong direction can damage the engine.

14. Tighten the bolts.
 1. Tighten the special tool top 2 clamp bolts to 10 Nm (89 lb-in).
 2. Using the special tool with the Camshaft Sprocket Nut Socket 303-565, tighten the camshaft bolt to 61 Nm (45 lb-ft).

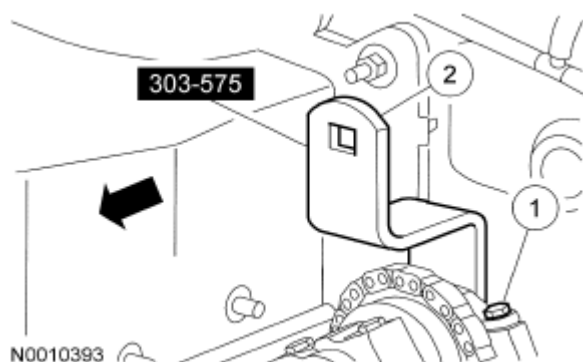


Fig. 12: Identifying Special Tool And Clamp Bolts
Courtesy of FORD MOTOR CO.

15. Remove the special tool.

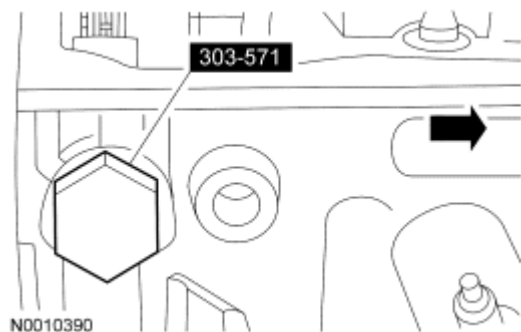


Fig. 13: Identifying Special Tool (303-571)
Courtesy of FORD MOTOR CO.

NOTE: Install a new O-ring seal on the tensioner and lubricate with clean engine oil.

16. Install the RH hydraulic camshaft tensioner.
- Tighten to 44 Nm (32 lb-ft).

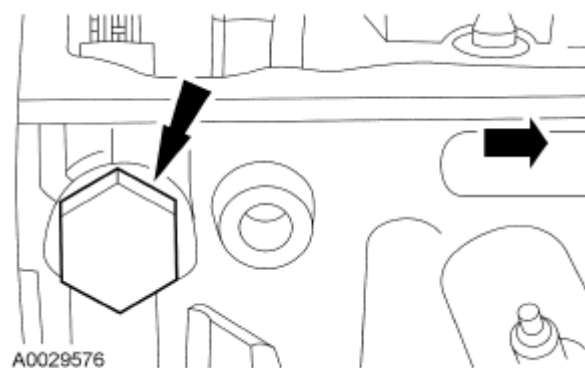


Fig. 14: Identifying RH Hydraulic Camshaft Tensioner

Courtesy of FORD MOTOR CO.

17. Remove the special tools from the RH cylinder head.

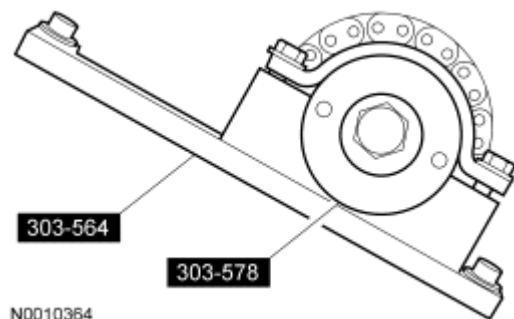


Fig. 15: Identifying Special Holding Tool
Courtesy of FORD MOTOR CO.

18. Install the special tools on the front of the LH cylinder head and tighten the top 2 clamp bolts to 10 Nm (89 lb-in).
19. Loosen the LH camshaft sprocket bolt.

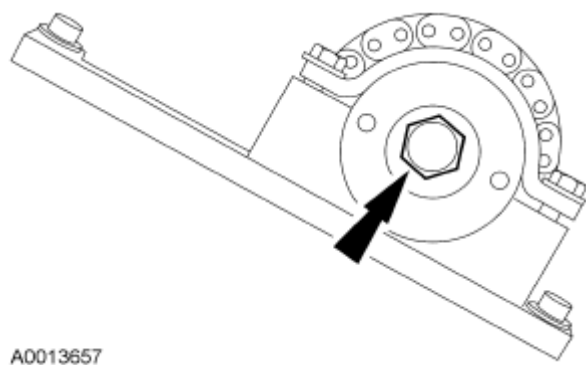


Fig. 16: Identifying LH Camshaft Sprocket Bolt
Courtesy of FORD MOTOR CO.

20. Loosen the top 2 clamp bolts on the special tool to allow the camshaft sprocket to rotate freely.

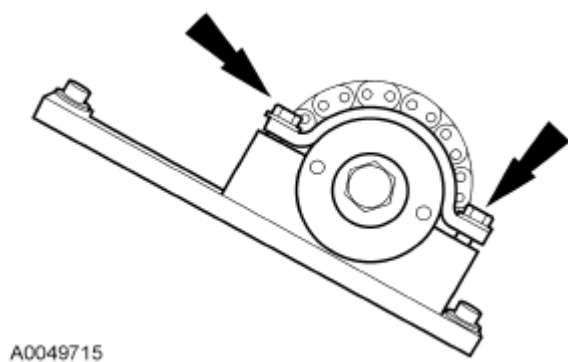


Fig. 17: Identifying Clamp Bolts
Courtesy of FORD MOTOR CO.

NOTE: The camshaft timing slots are off-center.

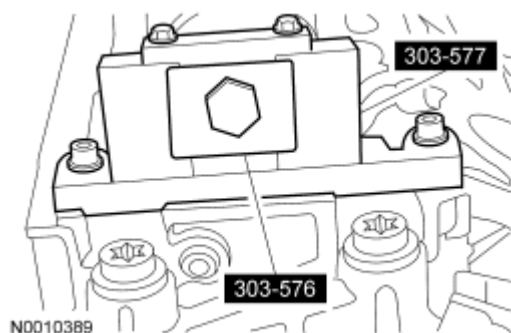


Fig. 18: Identifying Special Tools (303-576, 303-577)
Courtesy of FORD MOTOR CO.

21. Position the camshaft timing slots below the centerline of the camshaft to correctly fit the special tools, and install the special tools on the rear of the LH cylinder head.
22. Remove the LH hydraulic camshaft tensioner.

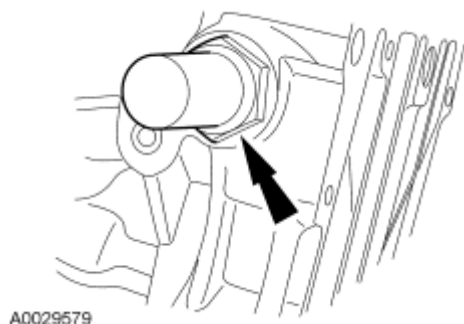


Fig. 19: Locating Camshaft Tensioner
Courtesy of FORD MOTOR CO.

23. Install the special tool.



Fig. 20: Identifying Special Tool
Courtesy of FORD MOTOR CO.

24. Tighten the bolts.
 1. Tighten the special tool top 2 clamp bolts to 10 Nm (89 lb-in).
 2. Tighten the LH camshaft bolt to 85 Nm (63 lb-ft).

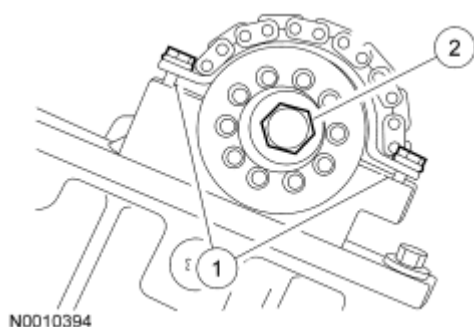


Fig. 21: Identifying Camshaft Bolt & Clamp Bolts
Courtesy of FORD MOTOR CO.

25. Remove the special tool.



Fig. 22: Identifying Special Tool
Courtesy of FORD MOTOR CO.

NOTE: Install a new O-ring seal on the tensioner and lubricate with clean engine oil.

26. Install the LH hydraulic camshaft tensioner.
 - Tighten to 44 Nm (32 lb-ft).

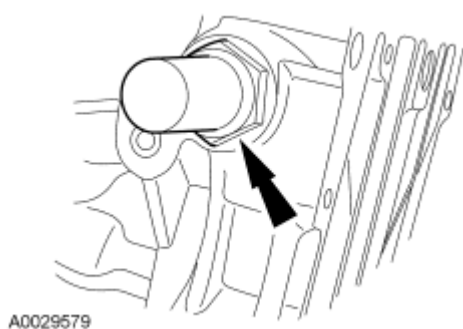


Fig. 23: Locating Camshaft Tensioner
Courtesy of FORD MOTOR CO.

27. Remove the special tools from the LH cylinder head.
28. Remove the special tool.

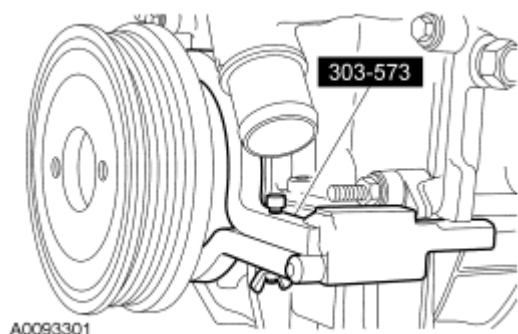


Fig. 24: Identifying Special Tool (303-573)
Courtesy of FORD MOTOR CO.

29. Position the wiring harness and install the nut.
 - Tighten to 20 Nm (15 lb-ft).

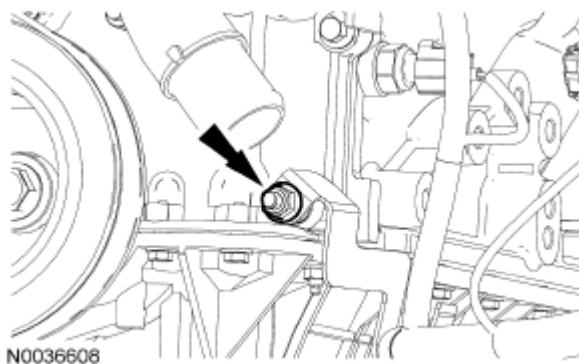


Fig. 25: Positioning Wiring Harness Nut
Courtesy of FORD MOTOR CO.

30. If necessary, position the A/C compressor and power steering pump bracket and install the bolts.

- Tighten to 42 Nm (31 lb-ft).

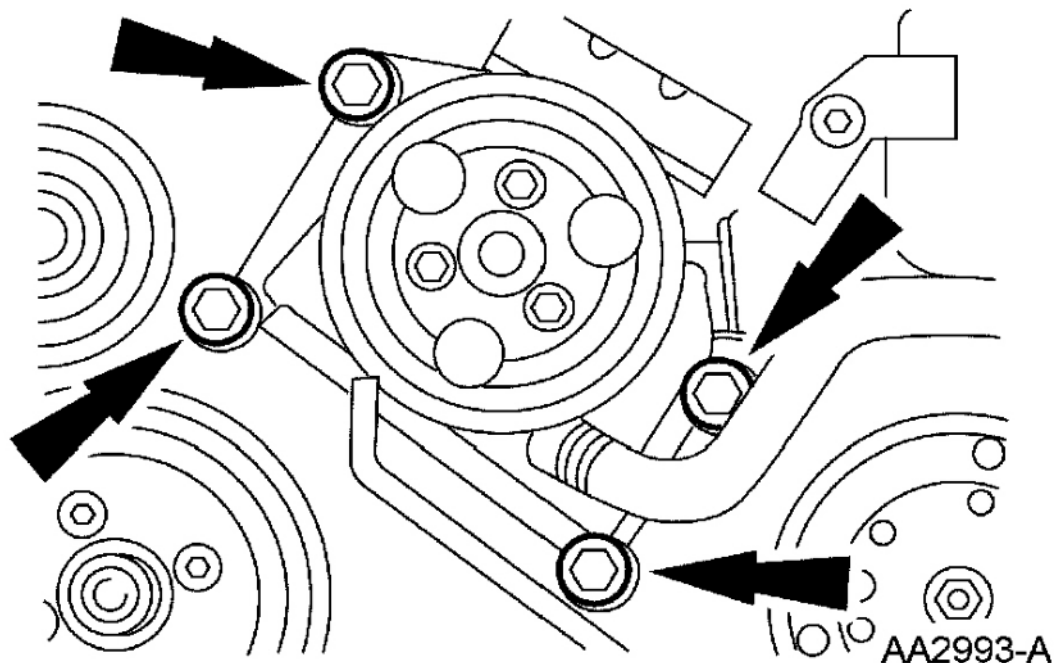
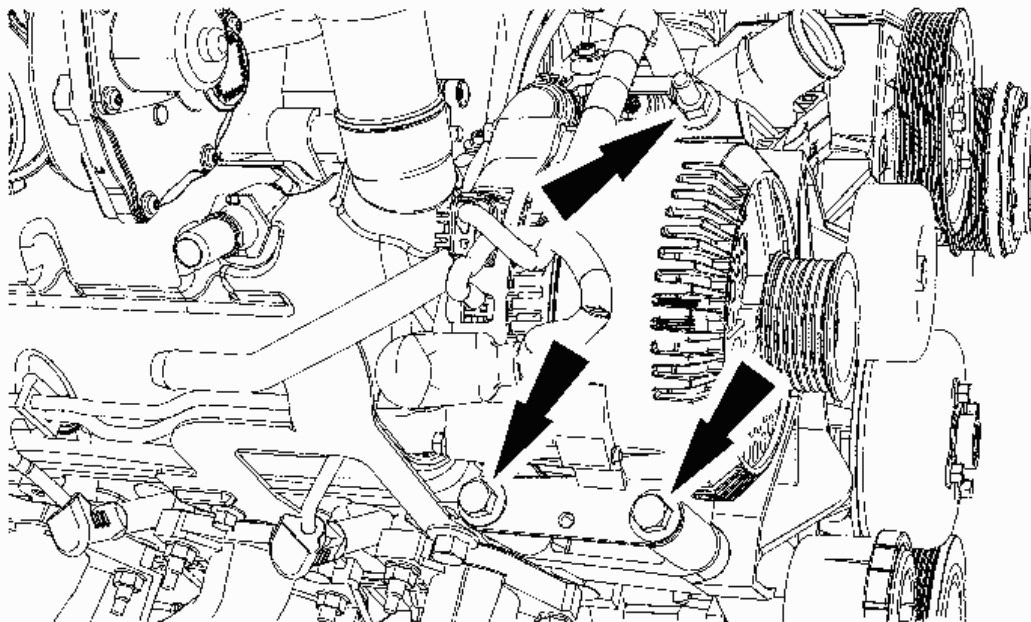


Fig. 26: Locating Accessory Bracket Bolts
Courtesy of FORD MOTOR CO.

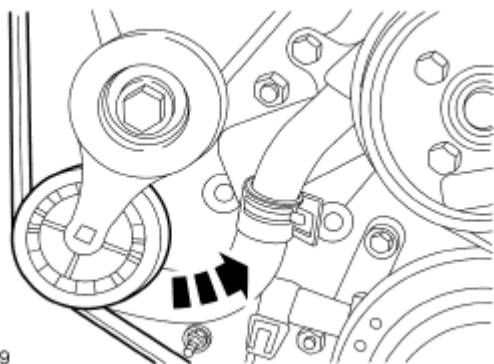
31. If necessary, position the generator and install the bolts.
- Tighten to 47 Nm (35 lb-ft).



N0062791

Fig. 27: Locating Generator Bolts
Courtesy of FORD MOTOR CO.

32. If necessary, rotate the accessory drive belt tensioner counterclockwise and install the accessory drive belt.



N0004149

Fig. 28: Rotating Accessory Drive Belt Tensioner
Courtesy of FORD MOTOR CO.

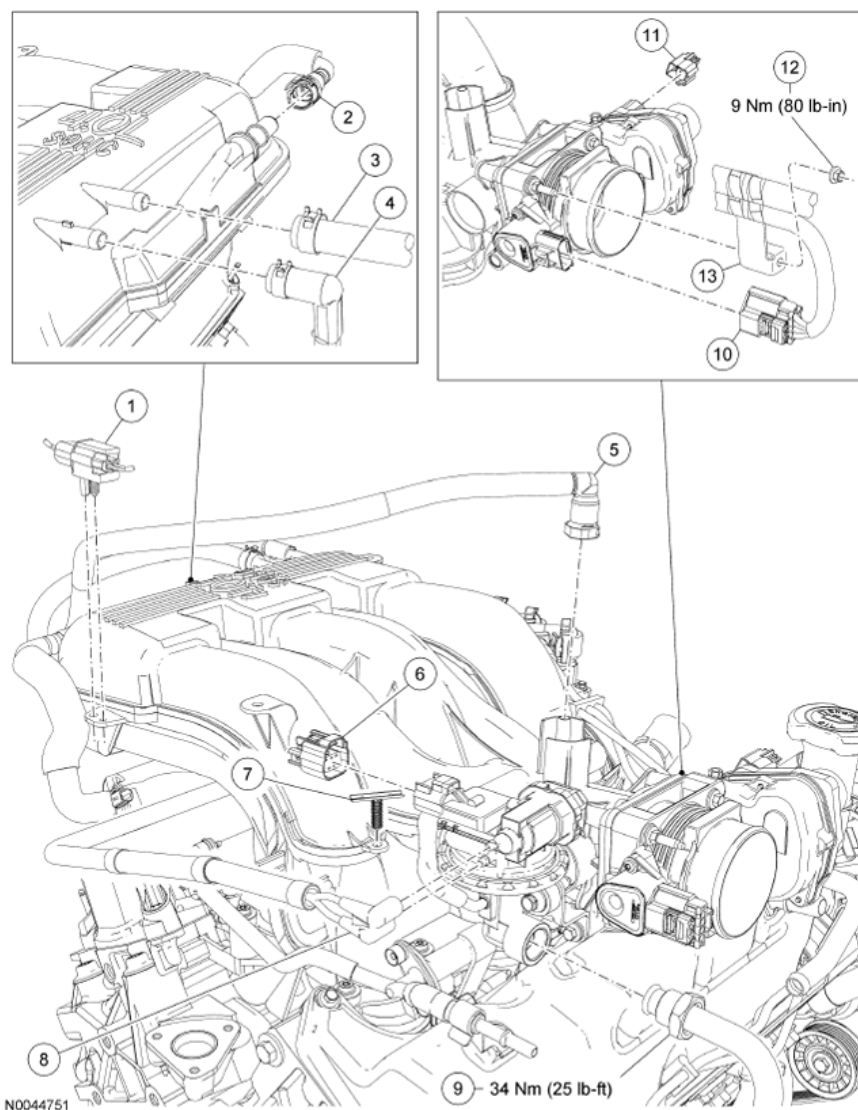
33. Install the camshaft roller followers. For additional information, refer to **CAMSHAFT ROLLER FOLLOWER**.

IN-VEHICLE REPAIR

INTAKE MANIFOLD

2006 Mercury Mountaineer

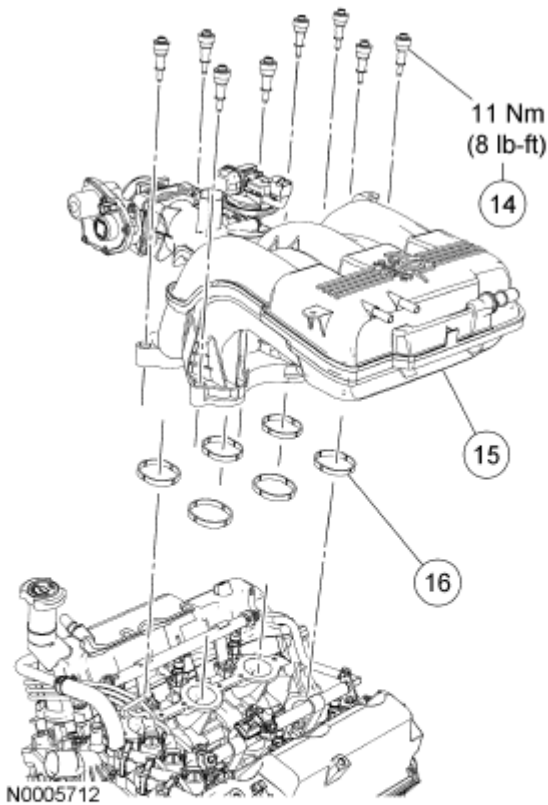
2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



Item	Part Number	Description
1	—	Knock sensor (KS) electrical connector
2	6K817	Positive crankcase ventilation (PCV) tube
3	9C482	Brake booster vacuum supply hose
4	9E499	Engine main vacuum harness-to-intake manifold fitting (part of 9E498)
5	9D289	Evaporative emissions (EVAP) tube
6	14A464	Exhaust gas recirculation (EGR) system module electrical connector (part of 12B637)

Item	Part Number	Description
7	—	Wiring harness pin-type retainer (part of 12B637)
8	9E499	EGR system module vacuum fitting (part of 9E498)
9	9J471	EGR tube fitting (part of 9E469)
10	14A464	Throttle position (TP) sensor electrical connector (part of 12B637)
11	14A464	Electronic throttle body (TB) electrical connector (part of 12B637)
12	—	Wiring harness nut
13	—	Wiring harness bracket

Fig. 29: Identifying Intake Manifold Components With Torque Specifications (Items 1-13)
 Courtesy of FORD MOTOR CO.



Item	Part Number	Description
14	9K479	Intake manifold bolt (8 required)
15	9424	Intake manifold
16	9461	Intake manifold gasket (6 required)

Fig. 30: Identifying Intake Manifold Components With Torque Specifications (Items 14-16)
 Courtesy of FORD MOTOR CO.

Removal and Installation

1. Remove the air cleaner outlet pipe. For additional information, refer to **INTAKE AIR DISTRIBUTION & FILTERING**.
2. Detach the knock sensor (KS) electrical connector from the intake manifold.
3. Disconnect the positive crankcase ventilation (PCV) tube from the intake manifold.
4. Disconnect the brake booster vacuum hose from the intake manifold.
5. Disconnect the main vacuum harness fitting from the intake manifold.
6. Disconnect the evaporative emissions (EVAP) tube from the intake manifold.
7. Disconnect the exhaust gas recirculation (EGR) system module electrical connector.
8. Detach the wiring harness retainer.

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9. Disconnect the EGR system module vacuum fitting.
10. Loosen the fitting and disconnect the exhaust manifold-to-EGR system module tube from the EGR system module.
 - To install, tighten to 34 Nm (25 lb-ft).
11. Disconnect the throttle position (TP) sensor electrical connector.
12. Disconnect the electronic throttle body (TB) electrical connector.
13. Remove the nut and detach the wiring harness bracket from the electronic TB.
 - To install, tighten to 9 Nm (80 lb-in).
14. Remove the bolts, the intake manifold and the gaskets.
 - To install, tighten to 11 Nm (8 lb-ft).

CAUTION: Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools can cause scratches and gouges which can make leak paths. Use a plastic scraping tool to remove all traces of the old intake manifold gaskets

15. Clean the sealing surfaces and inspect the gaskets. Install new gaskets if necessary.
16. To install, reverse the removal procedure.

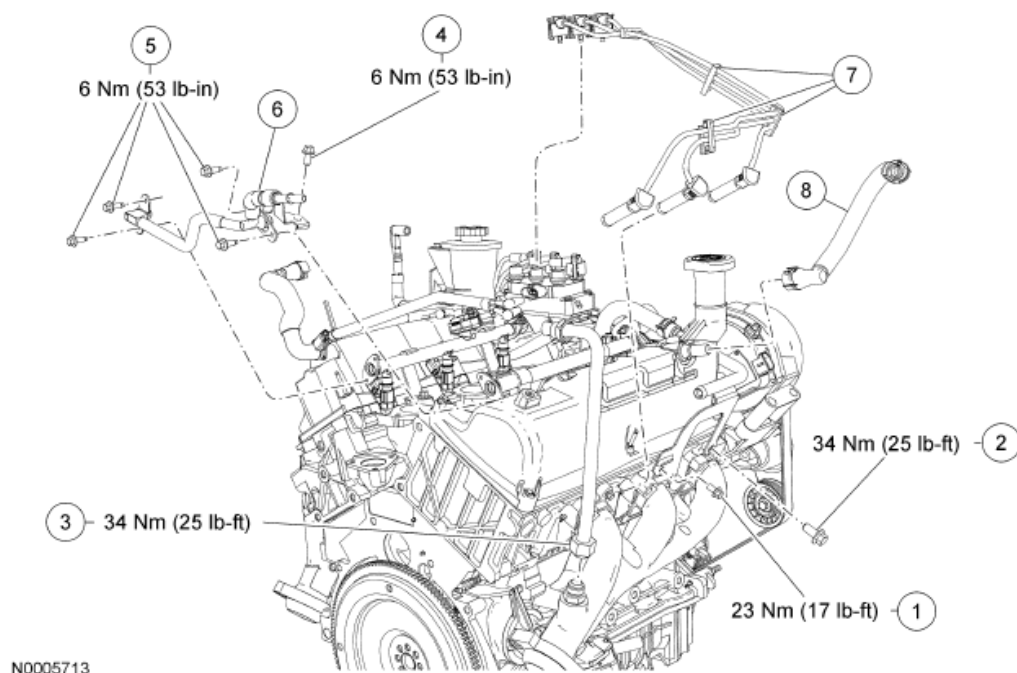
VALVE COVER - RH

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada Motorcraft SAE 5W-30 Super Premium Motor Oil CXO-5W30-LSP12) or equivalent	WSS-M2C929-A

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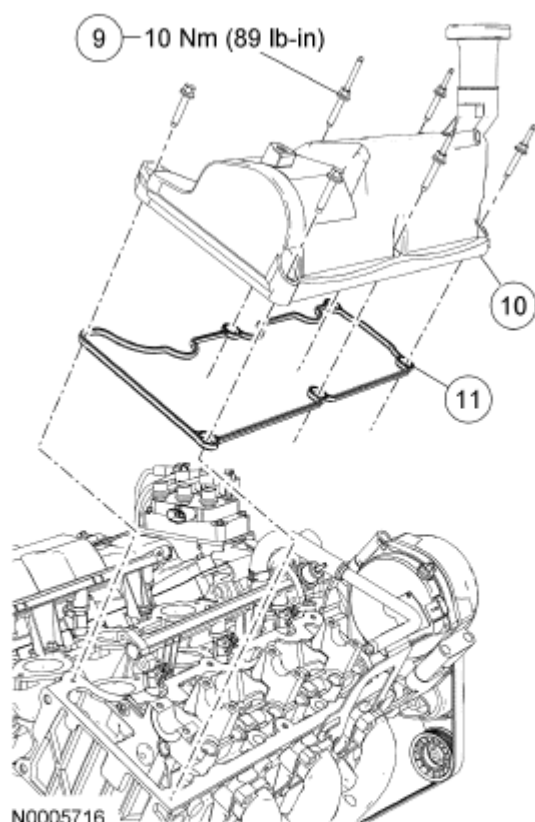
2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



Item	Part Number	Description
1	W500023	Heater hose tube bracket rear bolt
2	W500041	Heater hose tube bracket front bolt
3	9E469	Exhaust gas recirculation (EGR) system module tube fitting

Item	Part Number	Description
4	W500204	Fuel manifold-to-valve cover mounting bolt
5	W708086	Fuel supply tube mounting bolts (4 required)
6	9E964	Fuel supply tube
7	12297	Spark plug wire retainers
8	6758	Crankcase ventilation tube

Fig. 31: Identifying Valve Cover - RH Components With Torque Specifications (Items 1-8)
Courtesy of FORD MOTOR CO.



Item	Part Number	Description
9	6C519	RH valve cover fastener (6 required)
10	6582	RH valve cover
11	6584	RH valve cover gasket

Fig. 32: Identifying Valve Cover - RH Components With Torque Specifications (Items 9-11)
Courtesy of FORD MOTOR CO.

Removal and Installation

1. Disconnect the spring lock coupling from the fuel supply tube. For additional information, refer to **FUEL SYSTEM-GENERAL INFORMATION**.
2. Remove the intake manifold. For additional information, refer to **INTAKE MANIFOLD**.
3. Remove the heater hose tube bracket rear bolt.
 - To install, tighten to 23 Nm (17 lb-ft).
4. Remove the heater hose tube bracket front bolt.
 - To install, tighten to 34 Nm (25 lb-ft).
5. Loosen the exhaust manifold-to-exhaust gas recirculation (EGR) system module tube lower fitting and remove the tube.
 - To install, tighten to 34 Nm (25 lb-ft).

CAUTION: Use O-ring seals that are made of special fuel-resistant material. Use of ordinary O-ring seals can cause the fuel system to leak.

6. Remove the fuel supply tube-to-valve cover bracket bolt, the fuel supply tube-to-fuel rail bolts and the fuel supply tube. Remove and discard the O-ring seals.
 - Install new O-ring seals and lubricate them with clean engine oil.
 - To install, tighten to 6 Nm (53 lb-in).
7. Detach the spark plug wire retainers and position the spark plug wires aside.
8. Remove the crankcase ventilation tube.
9. Remove the bolts and the valve cover.
 - To install, tighten to 10 Nm (89 lb-in).

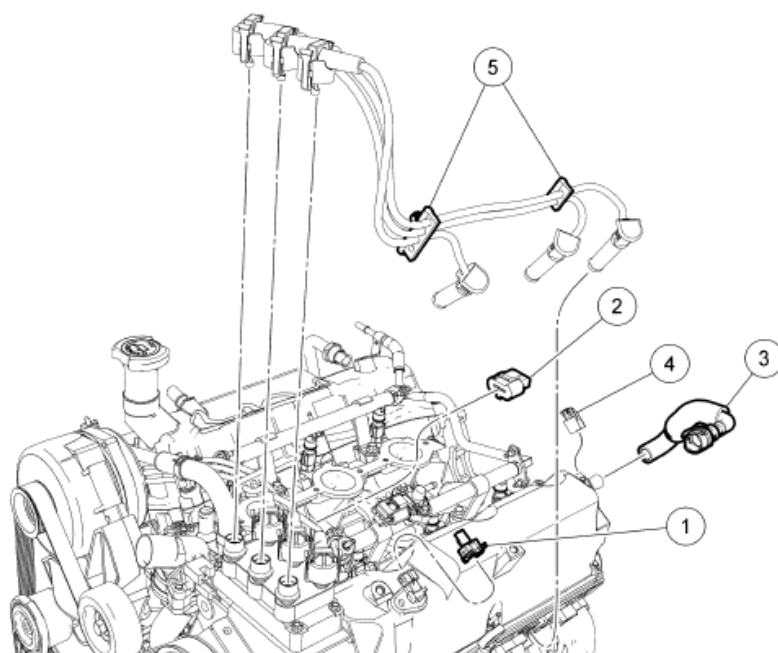
CAUTION: Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean sealing surfaces. These tools cause scratches which make leak paths. Use a plastic scraping tool to remove all traces of the old valve cover gasket.

10. Clean and inspect the sealing surfaces and the gasket. Install a new gasket if necessary.
11. To install, reverse the removal procedure.

VALVE COVER - LH

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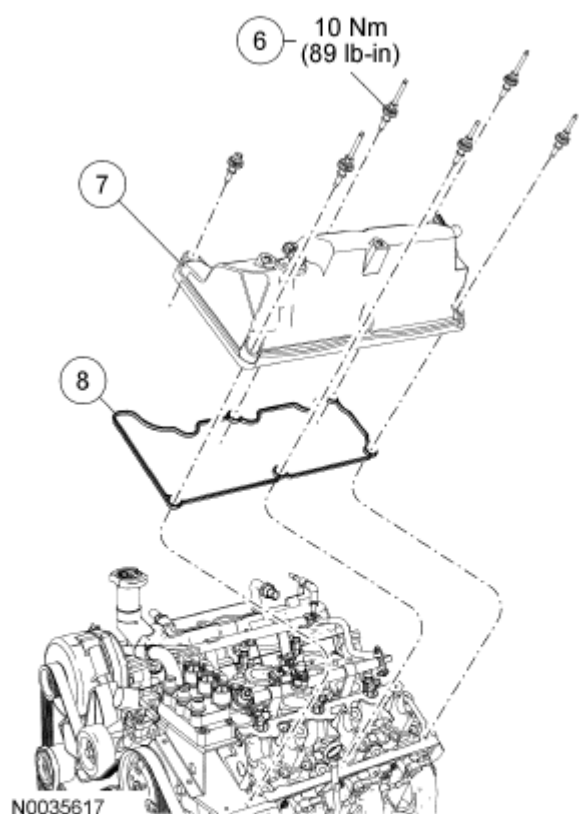


N0005720

Item	Part Number	Description
1	14A464	Camshaft position (CMP) sensor electrical connector (part of 180101)
2	12B637	Ignition coil electrical connector

Item	Part Number	Description
3	6K817	Positive crankcase ventilation (PCV) valve tube
4	14A464	PCV valve electrical connector (part of 12A580)
5	—	Spark plug wire retainers

Fig. 33: Identifying Valve Cover - LH Components (Items 1-5)
Courtesy of FORD MOTOR CO.



Item	Part Number	Description
6	6C519	Valve cover fastener (6 required)
7	6A505	LH valve cover
8	6584	LH valve cover gasket

Fig. 34: Identifying Valve Cover - LH Components With Torque Specifications (Items 6-8)
 Courtesy of FORD MOTOR CO.

Removal and Installation

1. Remove the intake manifold. For additional information, refer to **INTAKE MANIFOLD**.
2. Disconnect the camshaft position (CMP) sensor electrical connector.
3. Disconnect the ignition coil electrical connector. Detach the wiring harness retainer.
4. Disconnect the fuel injector electrical connectors. Detach the wiring harness retainers.

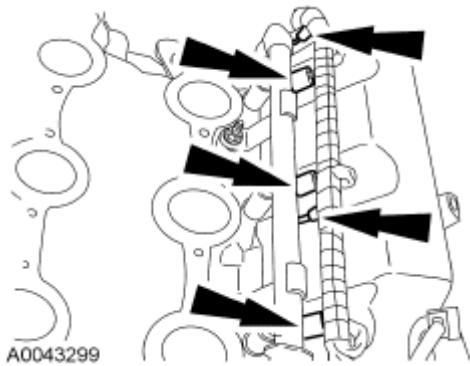


Fig. 35: Identifying Electrical Connectors
Courtesy of FORD MOTOR CO.

5. Remove the positive crankcase ventilation (PCV) valve tube.
6. Disconnect the PCV valve electrical connector.
7. Detach the spark plug wire retainers.
8. Remove the bolts and the valve cover.
 - To install, tighten to 10 Nm (89 lb-in).

CAUTION: Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean sealing surfaces. These tools cause scratches and gouges which make leak paths. Use a plastic scraping tool to remove all traces of the old valve cover gasket.

9. Clean and inspect the sealing surfaces and the gasket. Install a new gasket if necessary.
10. To install, reverse the removal procedure.

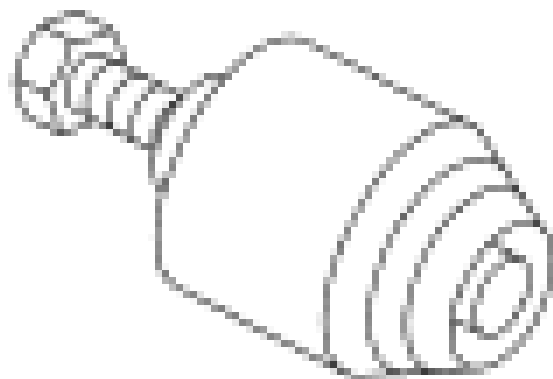
CRANKSHAFT FRONT SEAL

SPECIAL TOOLS

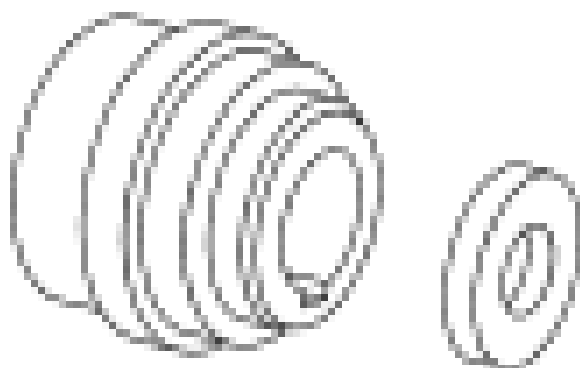
Remover, Crankshaft Front Oil Seal
303-107 (T74P-6700-A)

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ST1288-A



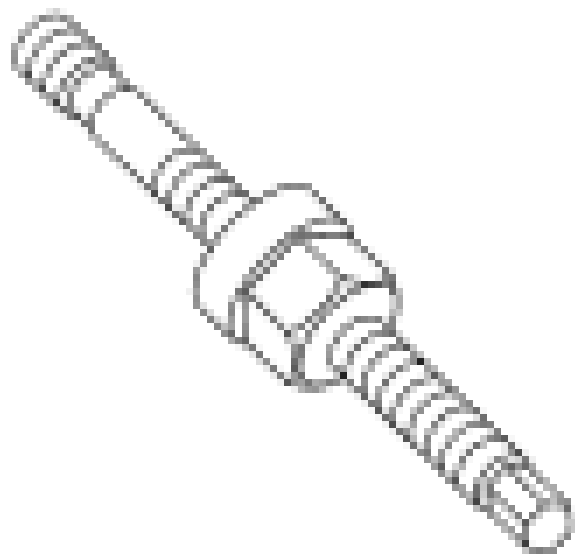
ST2439-A

Aligner, Front Cover
303-093 (T74P-6019-A)

Installer, Crankshaft Vibration Damper
303-102 (T74P-6316-B)

2006 Mercury Mountaineer

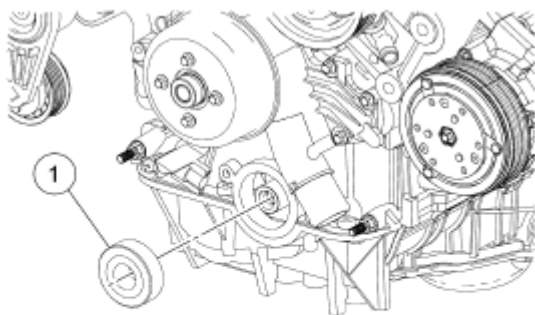
2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST2428-A

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada	WSS-M2C929-
Motorcraft SAE 5W-30 Super Premium Motor Oil CXO-5W30-LSP12)	A



Item	Part Number	Description
1	6700	Front crankshaft seal

Fig. 36: Locating Crankshaft Front Oil Seal
Courtesy of FORD MOTOR CO.

Removal

1. Remove the crankshaft pulley. For additional information, refer to **CRANKSHAFT PULLEY**.
2. Using the special tool, remove and discard the crankshaft front seal.

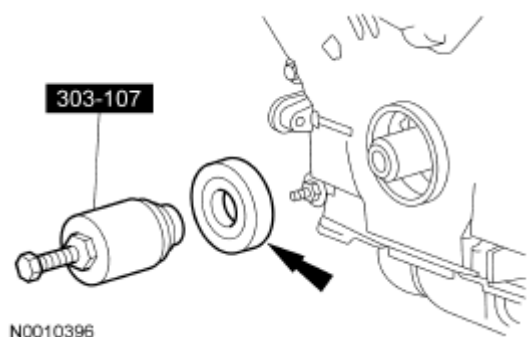


Fig. 37: Identifying Crankshaft Front Seal And Special Tool
Courtesy of FORD MOTOR CO.

Installation

NOTE: Lubricate the new front seal with clean engine oil.

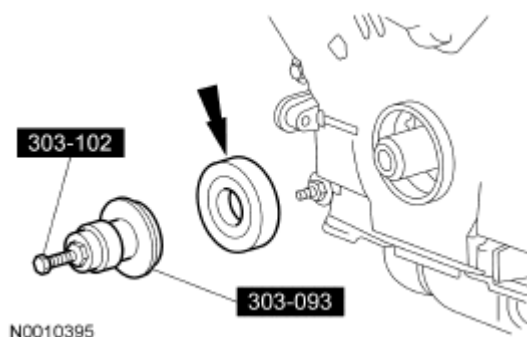


Fig. 38: Identifying Crankshaft Front Seal And Special Tools
Courtesy of FORD MOTOR CO.

1. Using the special tools, install a new crankshaft front seal.
2. Install the crankshaft pulley. For additional information, refer to **CRANKSHAFT PULLEY**.

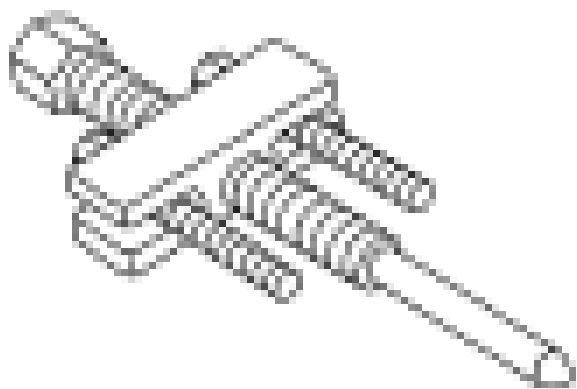
CRANKSHAFT PULLEY

SPECIAL TOOLS

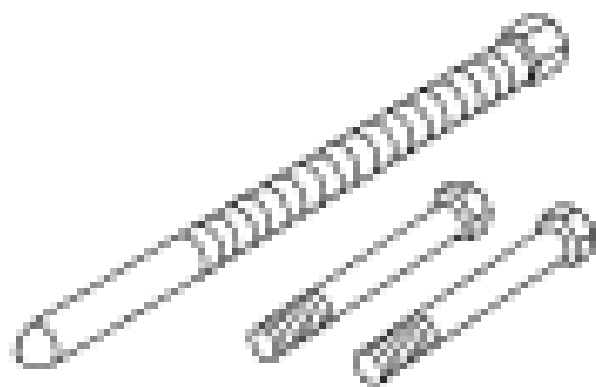
Remover, Crankshaft Vibration Damper
303-101 (T74P-3616-A)

2006 Mercury Mountaineer

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ST1784-A

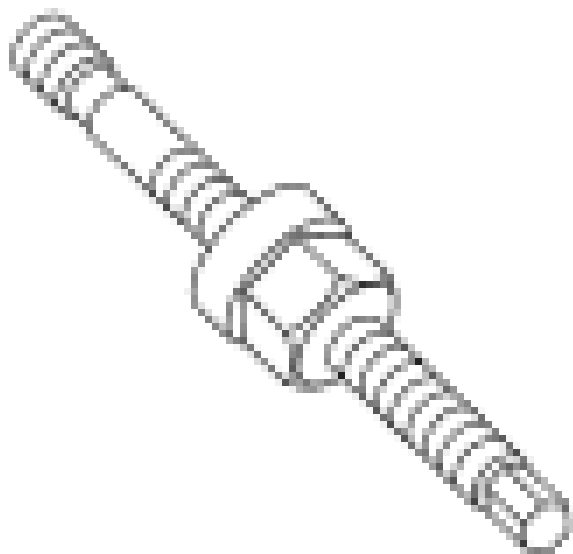


ST2897-A

Remover, Crankshaft Vibration Damper
303-773

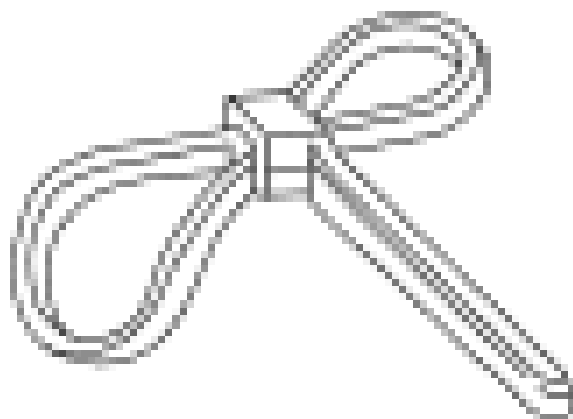
2006 Mercury Mountaineer

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ST2428-A

Installer, Crankshaft Vibration Damper
303-102 (T74P-6316-B)

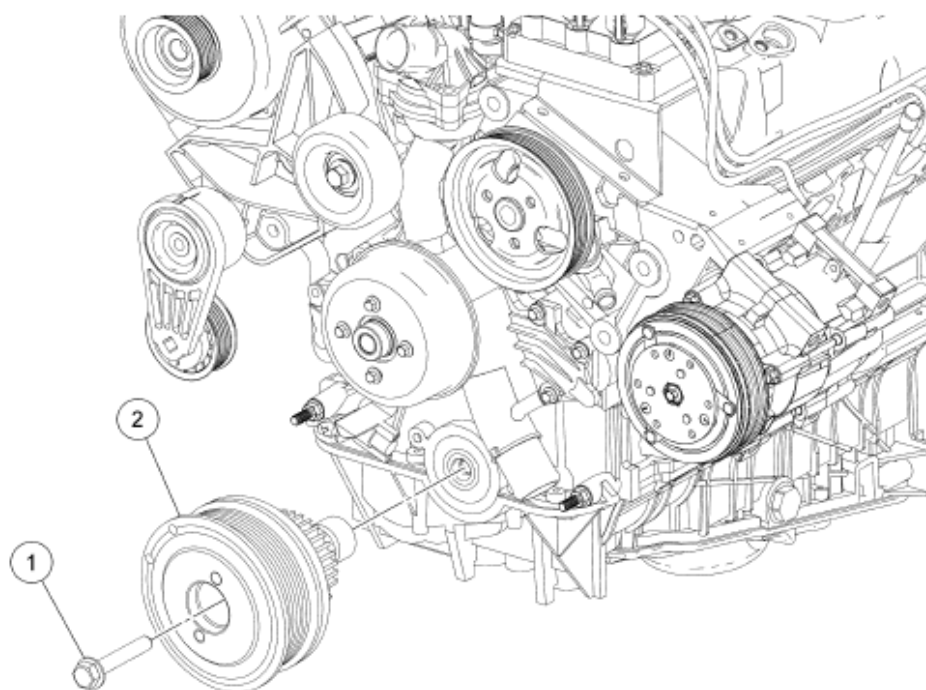


ST1438-A

Strap Wrench
303-D055 (D85L-6000-A) or equivalent

GENERAL EQUIPMENT REFERENCE

8-mm x 1.25 x 100-mm bolts (2 required)



N0005727

Item	Part Number	Description
1	E800511	Crankshaft pulley bolt
2	6B321	Crankshaft pulley

Fig. 39: Identifying Crankshaft Pulley And Bolt
Courtesy of FORD MOTOR CO.

Removal

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.
2. Remove the fan shroud. For additional information, refer to **ENGINE COOLING**.
3. Remove the accessory drive belt. For additional information, refer to **ACCESSORY DRIVE**.

NOTE: This bolt is torque-to-yield and cannot be reused.

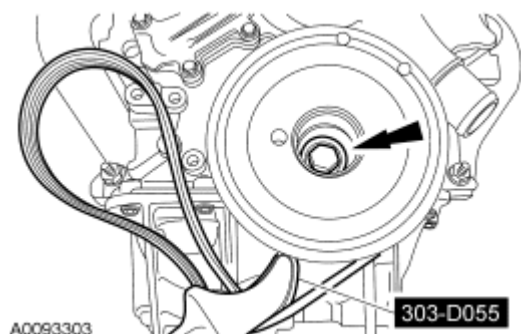


Fig. 40: Holding Crankshaft Pulley Using Special Tool
Courtesy of FORD MOTOR CO.

4. Using the special tool to hold the crankshaft pulley, remove the bolt.

NOTE: If the pulley bolt is not installed, the tool will bottom out before the pulley is off.

5. Install the crankshaft pulley bolt 2 to 3 turns. Using the special tools and the two 8-mm bolts, remove the crankshaft pulley.
 - Discard the crankshaft pulley bolt.

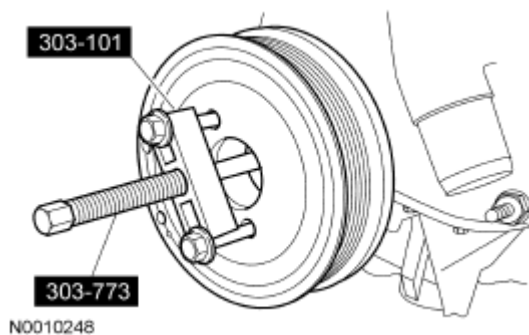


Fig. 41: Identifying Special Tools And Crankshaft Pulley
Courtesy of FORD MOTOR CO.

Installation

1. Using the special tool, install the crankshaft pulley.



Fig. 42: Identifying Special Tool And Crankshaft Pulley.
Courtesy of FORD MOTOR CO.

2. Using the special tool to hold the crankshaft pulley, install a new crankshaft pulley bolt. Tighten the bolt in 2 stages.
 - Stage 1: Tighten to 45 Nm (33 lb-ft).
 - Stage 2: Tighten an additional 85 degrees.

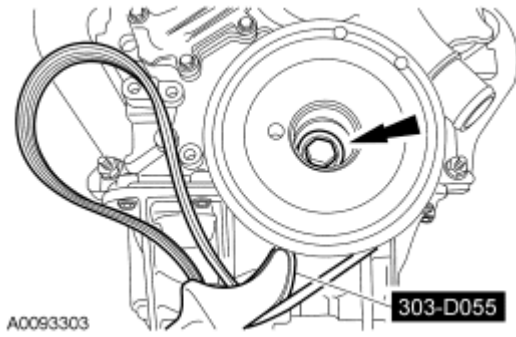
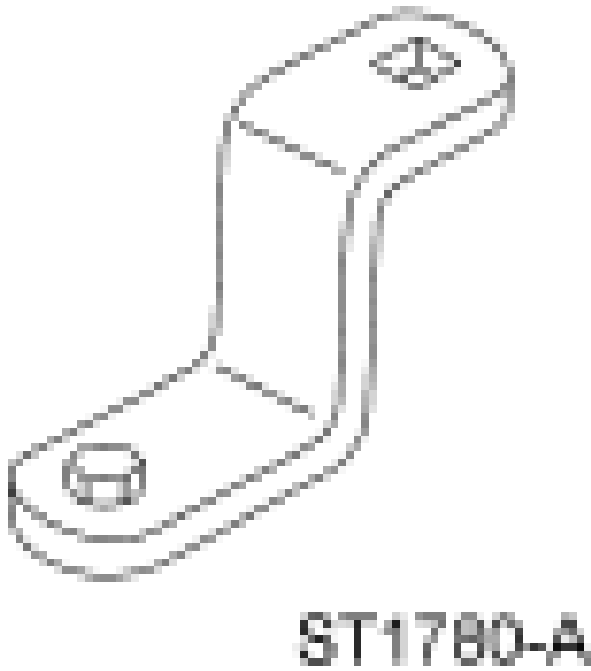


Fig. 43: Holding Crankshaft Pulley Using Special Tool
Courtesy of FORD MOTOR CO.

3. Install the accessory drive belt. For additional information, refer to **ACCESSORY DRIVE** .
4. Install the fan shroud. For additional information, refer to **ENGINE COOLING** .

CYLINDER HEAD

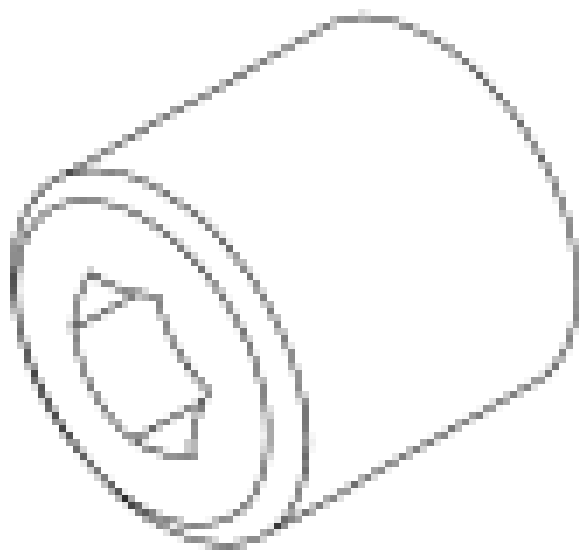
SPECIAL TOOLS



Torque Wrench Extension
303-575 (T97T-6256-F) or equivalent

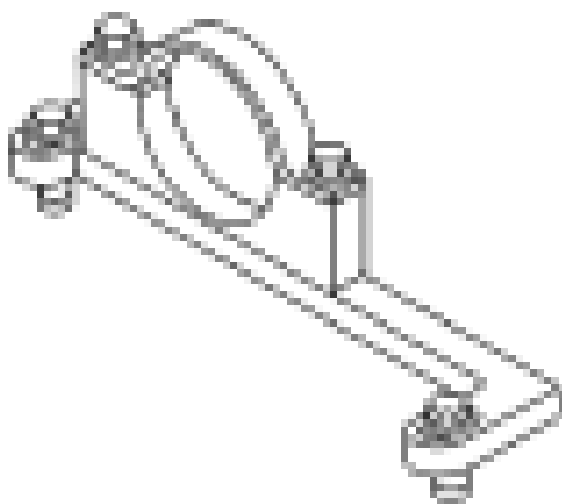
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ST1781-A

Socket, Camshaft Sprocket Nut
303-565 (T97T-6256-G) or equivalent



ST1777-A

Holding Tool, Camshaft Sprocket
303-564 (T97T-6256-B) or equivalent

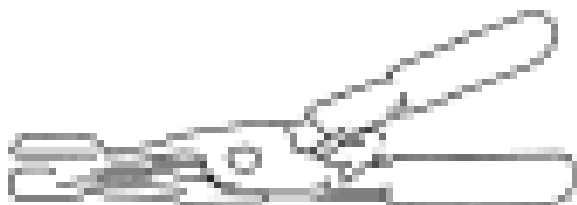
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ST1776-A

Adapter for 303-564
303-578 (T97T-6256-A) or equivalent

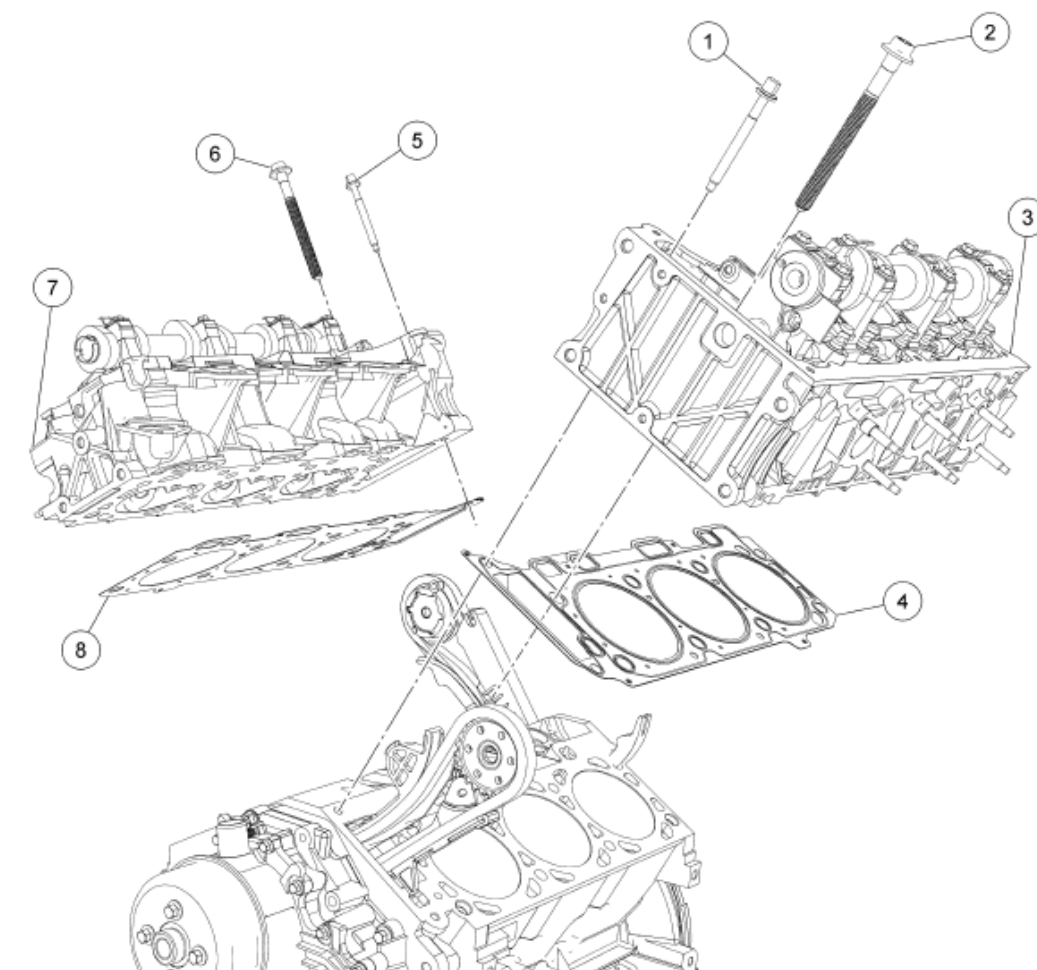


ST1394-A

Remover, Spark Plug Wire
303-106 (T74P-6666-A)

MATERIAL SPECIFICATIONS

Item	Specification
Silicone Brake Caliper Grease and Dielectric Compound XG-3-A (Canada CXG-2-B)	ESE-M1C171-A



N0041105

Item	Part Number	Description
1	6065	LH cylinder head bolt (M8) (2 required)
2	6065	LH cylinder head bolt (M12) (8 required)
3	6M099	LH cylinder head
4	6083	LH cylinder head gasket
5	6065	RH cylinder head bolt (M8) (2 required)
6	6065	RH cylinder head bolt (M12) (8 required)

Item	Part Number	Description
7	6049	RH cylinder head
8	6051	RH cylinder head gasket

Fig. 44: Identifying Cylinder Head Components

Courtesy of FORD MOTOR CO.

Removal

Both sides

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.

2. Drain the engine cooling system. For additional information, refer to **ENGINE COOLING** .
3. Remove the roller followers. For additional information, refer to **CAMSHAFT ROLLER FOLLOWER**.
4. Rotate the accessory drive belt tensioner counterclockwise and remove the drive belt.

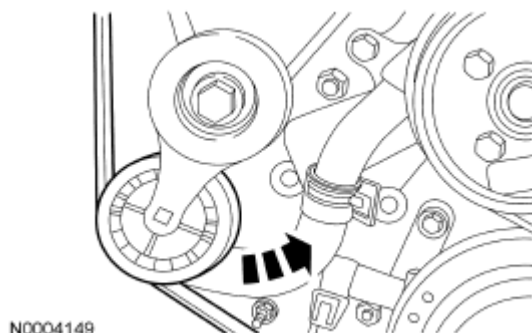


Fig. 45: Rotating Accessory Drive Belt Tensioner
Courtesy of FORD MOTOR CO.

RH side

5. Remove the bolts and position the heater hose tube bracket aside.

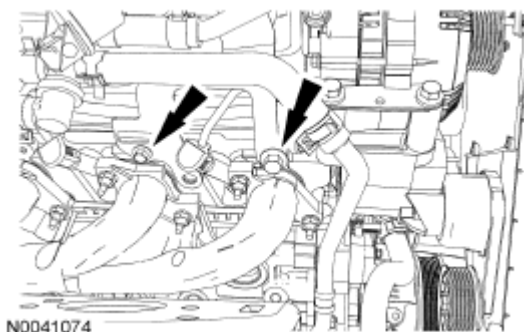


Fig. 46: Locating Heater Hose Tube Bracket Bolts
Courtesy of FORD MOTOR CO.

6. Disconnect the battery ground cable. For additional information, refer to **BATTERY, MOUNTING AND CABLES** .
7. Disconnect the generator electrical connections and disconnect the pushpin.

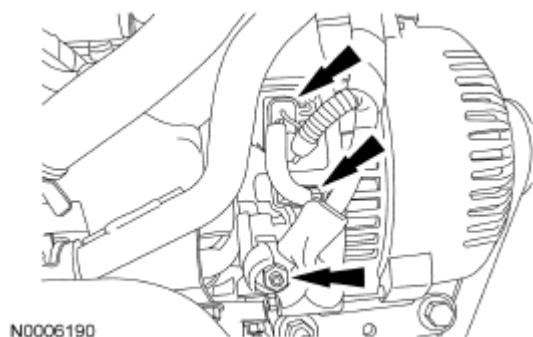


Fig. 47: Locating Generator Electrical Connections
Courtesy of FORD MOTOR CO.

8. Remove the bolt and the accessory drive belt tensioner.

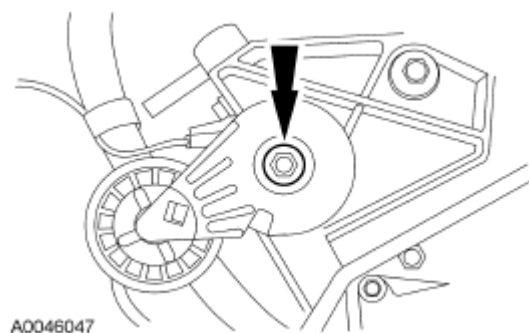


Fig. 48: Locating Accessory Drive Belt Tensioner Bolt
Courtesy of FORD MOTOR CO.

9. Remove the generator mounting bracket assembly.

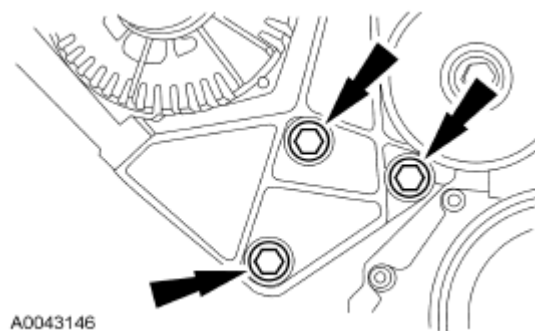


Fig. 49: Locating Generator Mounting Bracket Assembly Bolts
Courtesy of FORD MOTOR CO.

10. Remove the heater hose from the thermostat housing.

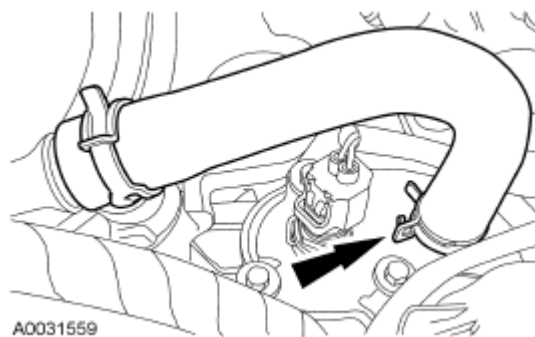


Fig. 50: Locating Heater Hose
Courtesy of FORD MOTOR CO.

11. Disconnect the engine coolant temperature (ECT) sensor electrical connector.

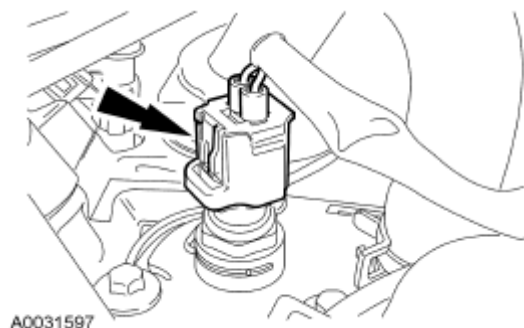


Fig. 51: Locating Engine Coolant Temperature Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

12. Disconnect the upper radiator hose.

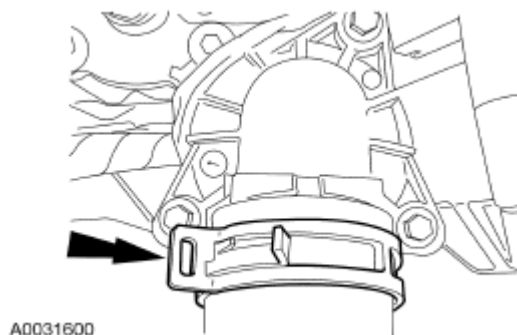


Fig. 52: Locating Upper Radiator Hose Clamp
Courtesy of FORD MOTOR CO.

13. Position the coolant bypass hose clamp aside.

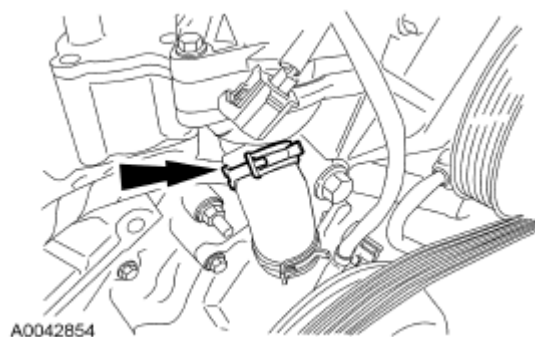


Fig. 53: Locating Coolant Bypass Hose Clamp
Courtesy of FORD MOTOR CO.

14. Remove the bolts and the thermostat housing.

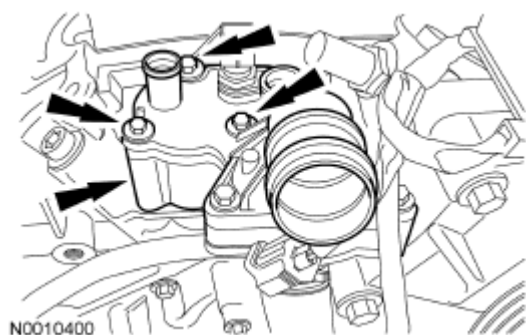


Fig. 54: Locating Thermostat Housing And Bolts
Courtesy of FORD MOTOR CO.

15. Remove the bolt and position the engine wiring harness aside.

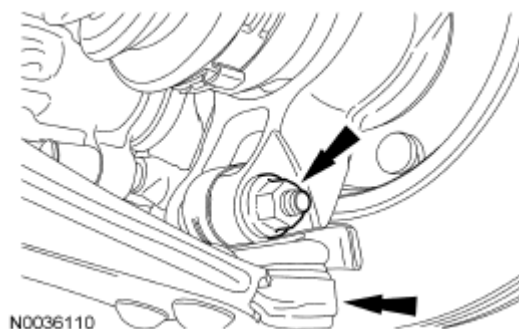


Fig. 55: Locating Engine Wiring Harness And Bolt
Courtesy of FORD MOTOR CO.

16. Remove the engine ground strap.

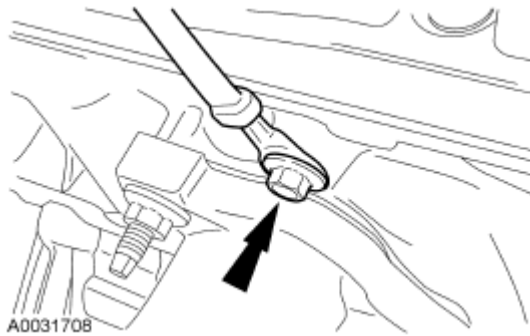


Fig. 56: Locating Engine Ground Strap
Courtesy of FORD MOTOR CO.

CAUTION: It is important to twist the spark plug wire boot while pulling upward to avoid damage to the spark plug wire.

NOTE: Spark plug wires must be connected to the correct spark plug. Mark the spark plug wires for installation reference.

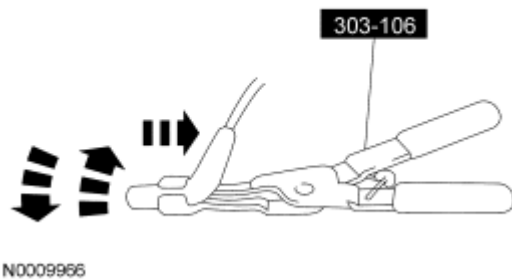


Fig. 57: Pulling Spark Plug Wire Off Spark Plug
Courtesy of FORD MOTOR CO.

17. With a twisting motion, use the special tool to pull the spark plug wires from the RH spark plugs.
18. Remove the catalytic converter-to-RH exhaust manifold nuts.

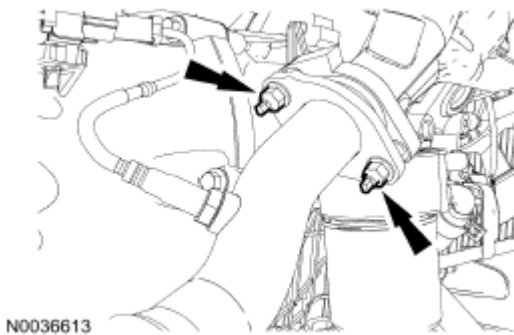


Fig. 58: Locating Catalytic Converter-To-RH Exhaust Manifold Nuts

Courtesy of FORD MOTOR CO.

19. Remove the nuts, the RH exhaust manifold and the gasket.
 - Discard the nuts and the gasket.

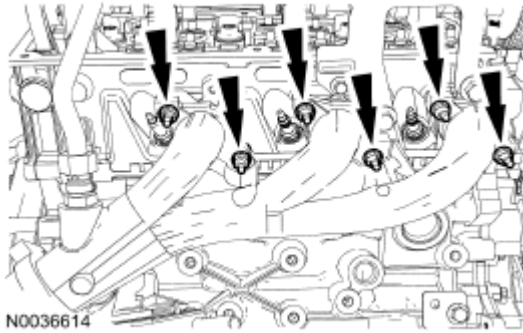


Fig. 59: Locating RH Exhaust Manifold Nuts
Courtesy of FORD MOTOR CO.

20. Remove and discard the 6 RH exhaust manifold studs.

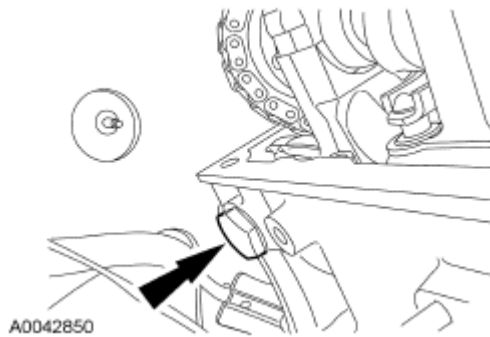


Fig. 60: Locating RH Exhaust Manifold Studs
Courtesy of FORD MOTOR CO.

21. Remove the RH side hydraulic chain tensioner.

NOTE: Late build vehicles shown, early build vehicles similar.

22. Install the special tools.
 - Tighten to 10 Nm (89 lb-in).

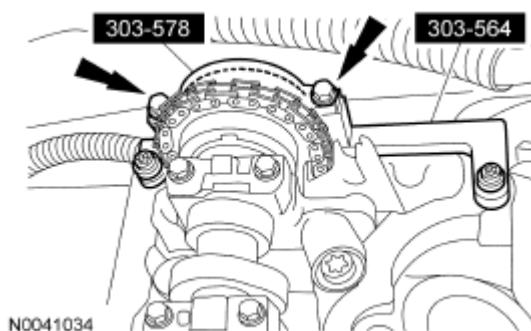


Fig. 61: Identifying Special Tools And Bolts
Courtesy of FORD MOTOR CO.

23. Using the special tool with the Camshaft Sprocket Nut Socket 303-565, remove the RH camshaft bolt.

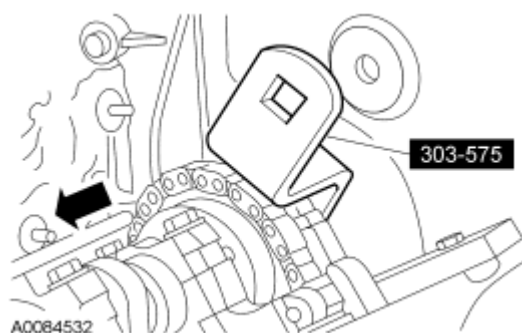


Fig. 62: Identifying Special Tool (303-575)
Courtesy of FORD MOTOR CO.

NOTE: Late build vehicles shown, early build vehicles similar.

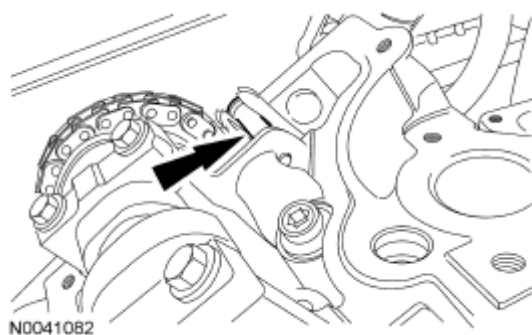


Fig. 63: Locating RH Side Cassette Bolt
Courtesy of FORD MOTOR CO.

24. Remove the RH side cassette bolt.

CAUTION: Remove the camshaft sprocket from the timing chain to gain clearance to remove the cylinder head. Leaving the sprocket in place

can damage the cassette and prevent the cylinder head from being removed.

NOTE: Hold the timing chain and cassette with a rubber band to aid in removal and to prevent the timing chain from falling into the cylinder block.

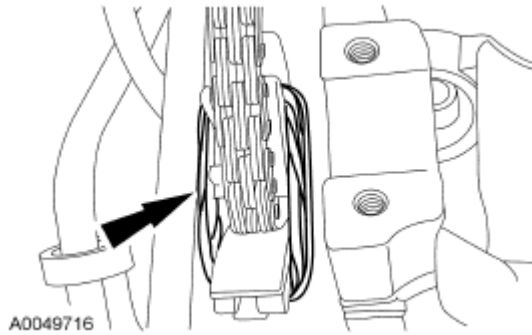


Fig. 64: Locating RH Camshaft Sprocket
Courtesy of FORD MOTOR CO.

25. Remove the RH camshaft sprocket from the timing chain. Install a rubber band around the cassette and the timing chain.

LH side

26. Disconnect the radio ignition interference capacitor electrical connector.

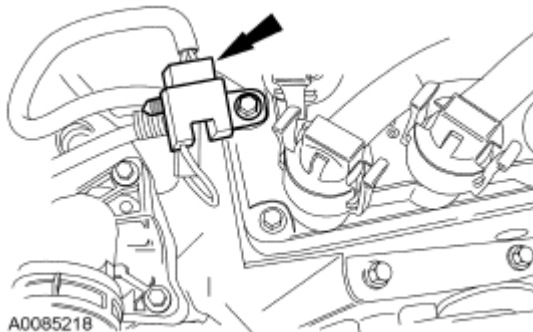


Fig. 65: Locating Radio Ignition Interference Capacitor Electrical Connector
Courtesy of FORD MOTOR CO.

27. Remove the bolts.

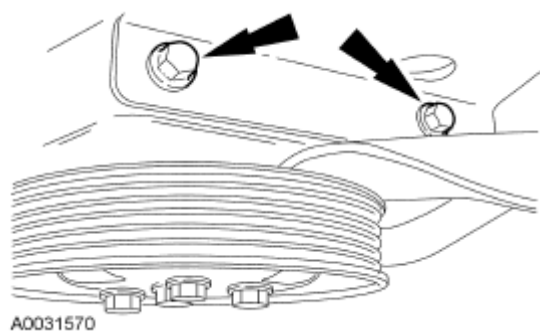


Fig. 66: Locating Bolts
Courtesy of FORD MOTOR CO.

28. Remove the bolts and position the A/C compressor and power steering pump bracket aside.

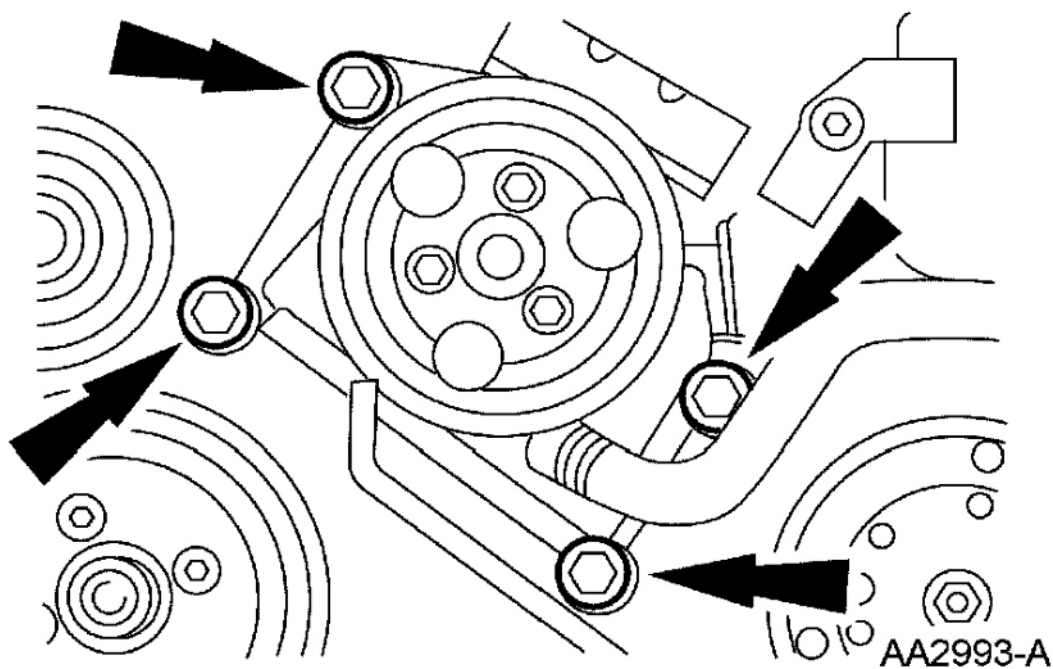


Fig. 67: Locating Accessory Bracket Bolts
Courtesy of FORD MOTOR CO.

29. Remove the bolts and the coil bracket.

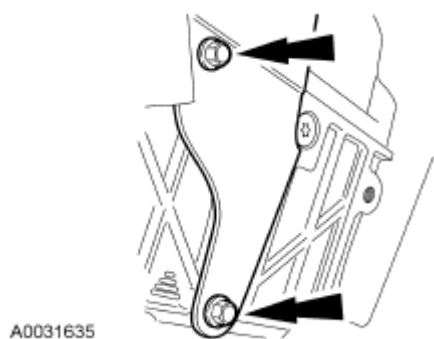


Fig. 68: Locating Coil Bracket Bolts
Courtesy of FORD MOTOR CO.

30. Remove the oil level indicator tube.

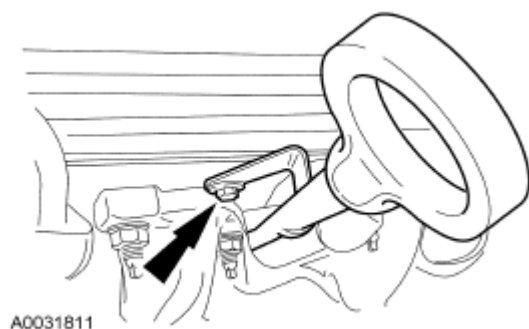


Fig. 69: Locating Oil Level Indicator Tube
Courtesy of FORD MOTOR CO.

31. Remove the catalytic converter-to-LH exhaust manifold nuts.

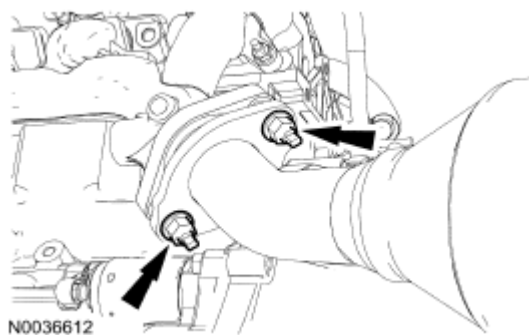


Fig. 70: Locating Catalytic Converter-To-LH Exhaust Manifold Nuts
Courtesy of FORD MOTOR CO.

32. Remove the nuts, the LH exhaust manifold and the gasket.
- Discard the nuts and the gasket.

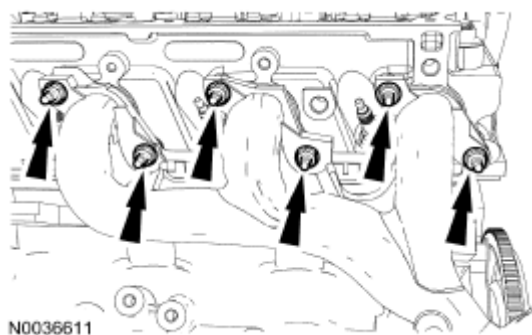


Fig. 71: Locating LH Exhaust Manifold Nuts
Courtesy of FORD MOTOR CO.

33. Remove and discard the 6 LH exhaust manifold studs.
34. Remove the LH side hydraulic chain tensioner.

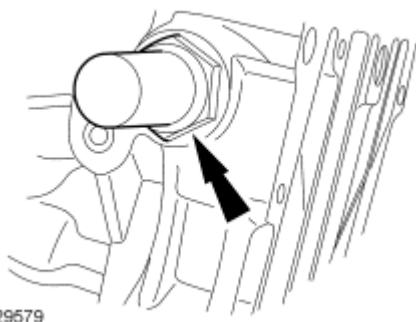


Fig. 72: Locating Camshaft Tensioner
Courtesy of FORD MOTOR CO.

35. Install the special tools.
 - Tighten the top clamp bolts to 10 Nm (89 lb-in).

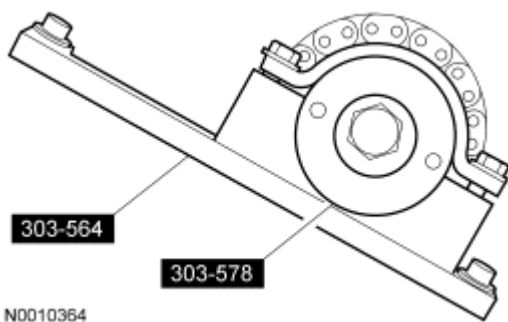
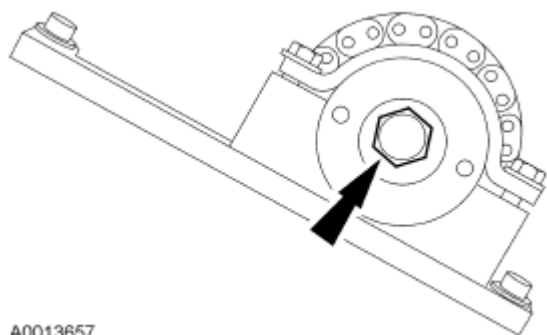


Fig. 73: Identifying Special Holding Tool
Courtesy of FORD MOTOR CO.

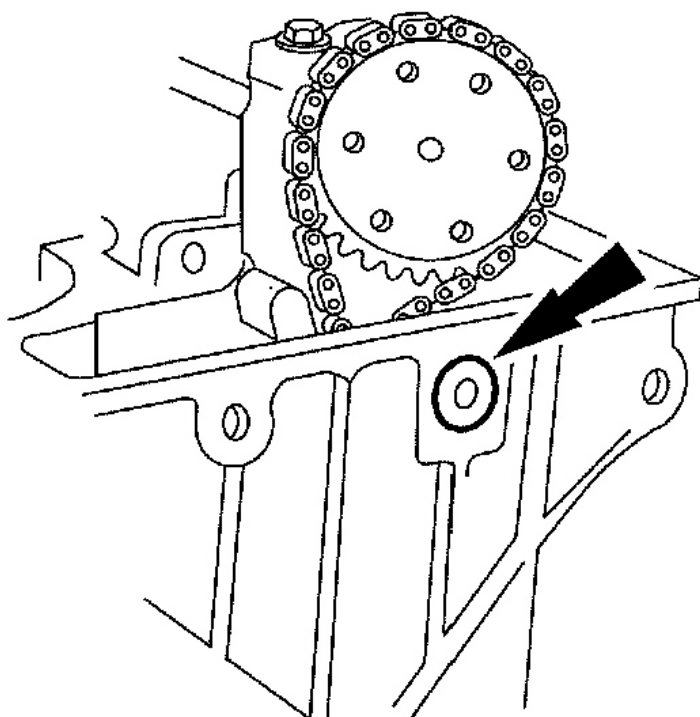
36. Remove the LH side camshaft sprocket bolt.



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Fig. 74: Locating LH Side Camshaft Sprocket Bolt
Courtesy of FORD MOTOR CO.

37. Remove the LH side cassette bolt.



GA1670-A

Fig. 75: Identifying LH Cassette Upper Bolt
Courtesy of FORD MOTOR CO.

CAUTION: Remove the camshaft sprocket from the timing chain to gain clearance to remove the cylinder head. Leaving the sprocket in place can damage the cassette and prevent the cylinder head from being

removed.

NOTE: Hold the timing chain and cassette with a rubber band to aid in removal and to prevent the timing chain from falling into the cylinder block.

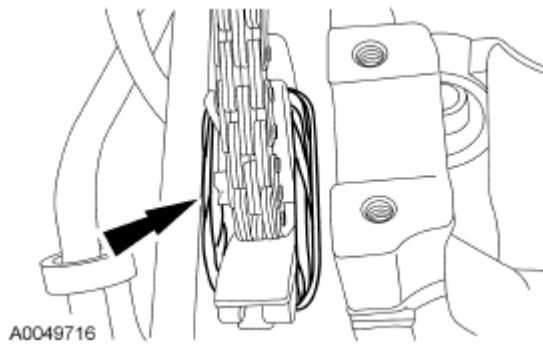


Fig. 76: Locating LH Camshaft Sprocket
Courtesy of FORD MOTOR CO.

38. Remove the LH camshaft sprocket from the timing chain. Install a rubber band around the cassette and the timing chain.

Both sides

CAUTION: To avoid damage to the timing chain cassette, an assistant will be required to help lift the cylinder head from the vehicle.

CAUTION: On the RH side, when lifting the cylinder head, be careful to avoid contacting the A/C tube or the A/C tube can be damaged.

NOTE: New cylinder head bolts must be installed. They are a torque-to-yield design and cannot be reused.

NOTE: Late build vehicles shown, early build vehicles similar.

39. Remove the cylinder heads.
- Remove the cylinder head bolts in the sequence shown. Discard all bolts.
 - Remove and discard the head gasket.

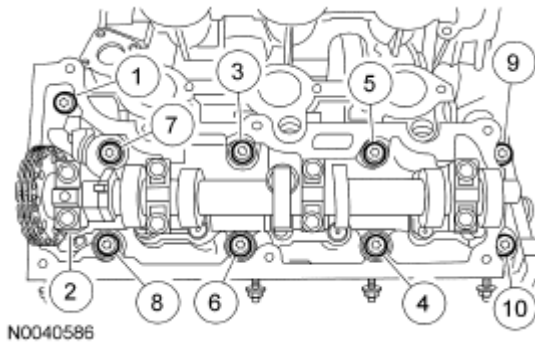


Fig. 77: Identifying Cylinder Head Bolts Removal Sequence
Courtesy of FORD MOTOR CO.

CAUTION: Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges that make leak paths. Use a plastic scraping tool to remove all traces of the head gasket.

40. Clean and inspect the mating surfaces.
41. Inspect the cylinder head and the cylinder block for flatness. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION .

Installation

Both sides

1. Clean the cylinder head bolt holes in the cylinder block. Make sure all coolant, oil or other foreign material is removed.
2. Position the cylinder head gasket on the block.

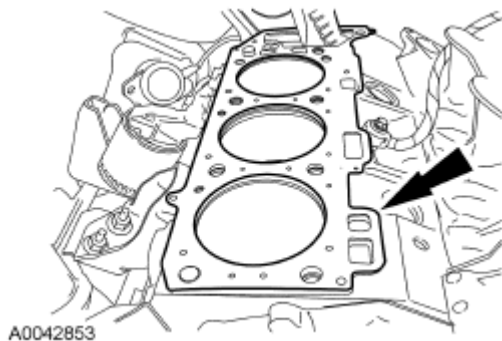


Fig. 78: Locating Cylinder Head Gasket
Courtesy of FORD MOTOR CO.

CAUTION: To avoid damage to the timing chain cassette, an assistant will be required to help position the cylinder head in the vehicle.

CAUTION: On the RH side, when lifting the cylinder head, be careful to avoid contacting the A/C tube or the A/C tube can be damaged.

NOTE: New cylinder head bolts must be installed. They are a torque-to-yield design and cannot be reused.

NOTE: Late build vehicles shown, early build vehicles similar.

NOTE: If a new cylinder head must be installed on an early build engine, a kit that contains the cylinder head without an oil supply tube and with 6 new roller followers must be used.

3. Install the cylinder head. Install 8 new 12-mm bolts and tighten in the sequence shown in 2 stages.

- Stage 1: Tighten to 12 Nm (9 lb-ft).
- Stage 2: Tighten to 25 Nm (18 lb-ft).

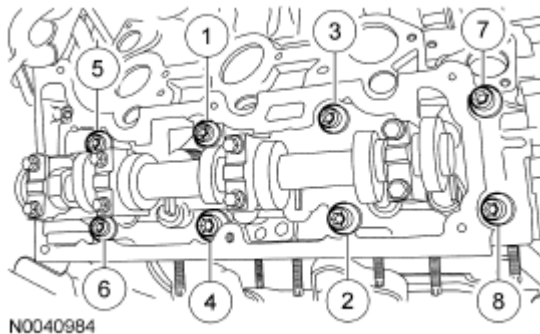


Fig. 79: Identifying Tightening Sequence Of Cylinder Head Bolts
Courtesy of FORD MOTOR CO.

4. Install 2 new 8-mm bolts.

- Tighten to 32 Nm (24 lb-ft).

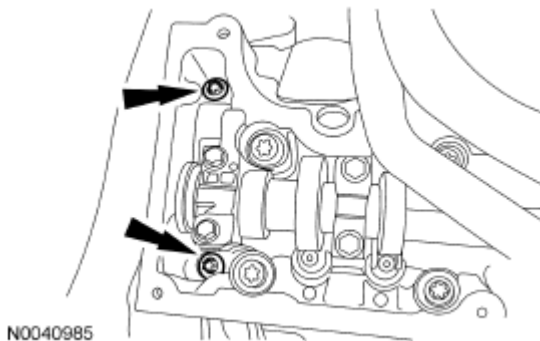


Fig. 80: Locating 8-Mm Bolts
Courtesy of FORD MOTOR CO.

5. Tighten the eight 12-mm bolts in the sequence shown in 2 stages.
- Stage 1: Tighten 90 degrees.
 - Stage 2: Tighten an additional 90 degrees.

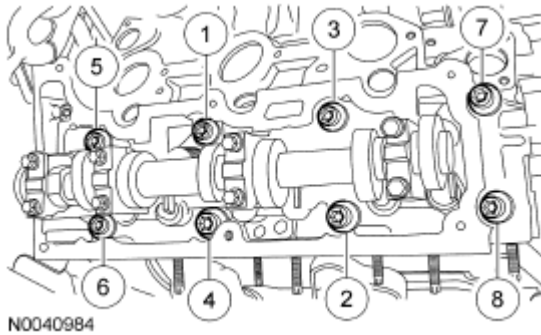


Fig. 81: Identifying Tightening Sequence Of 12-MM Bolts
Courtesy of FORD MOTOR CO.

CAUTION: The camshaft gear must turn freely on the camshaft. **DO NOT** tighten the bolt at this time. Tightening the bolt can result in incorrect engine timing.

NOTE: Late build vehicles shown, early build vehicles similar.

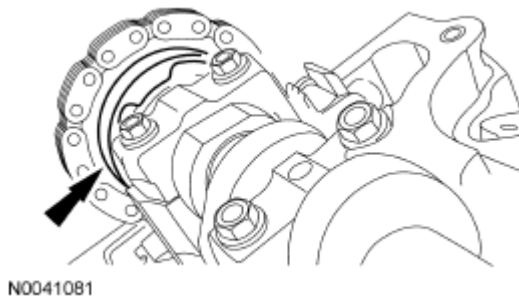


Fig. 82: Identifying Camshaft Sprocket
Courtesy of FORD MOTOR CO.

6. Remove the rubber band. Install the camshaft sprocket and bolt.

NOTE: Late build vehicles shown, early build vehicles similar.

7. Install the RH side cassette bolt.
- Tighten to 10 Nm (89 lb-in).

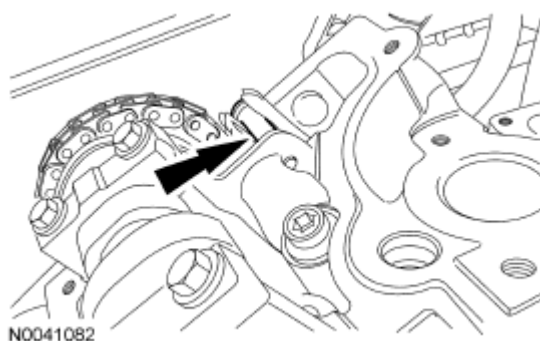


Fig. 83: Identifying RH Side Cassette Bolt
Courtesy of FORD MOTOR CO.

8. Inspect the RH exhaust manifold gasket mating surfaces for flatness. For additional information, refer to **ENGINE SYSTEM-GENERAL INFORMATION**.
9. Install 6 new RH exhaust manifold studs.
 - Tighten to 12 Nm (9 lb-ft).
10. Position a new gasket, the RH exhaust manifold and the new nuts.
 - Tighten to 22 Nm (16 lb-ft).

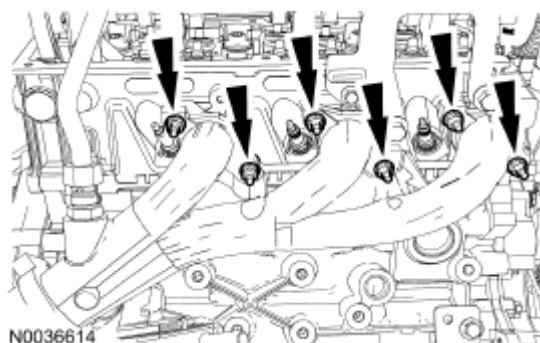


Fig. 84: Locating RH Exhaust Manifold Nuts
Courtesy of FORD MOTOR CO.

11. Install the catalytic converter-to-RH exhaust manifold nuts.
 - Tighten to 40 Nm (30 lb-ft).

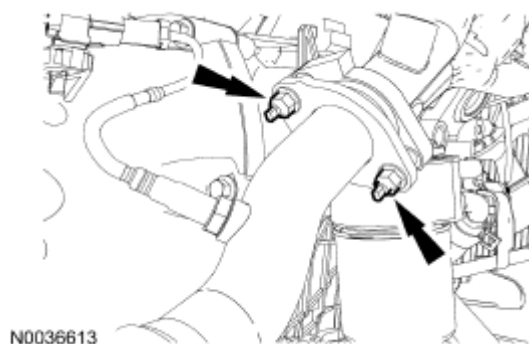


Fig. 85: Locating Catalytic Converter-To-RH Exhaust Manifold Nuts
Courtesy of FORD MOTOR CO.

NOTE: Apply silicone brake caliper grease and dielectric compound to the inside of the spark plug boots.

12. Connect the spark plug wires to the RH spark plugs.
13. Install the engine ground strap and the bolt.
 - Tighten to 10 Nm (89 lb-in).

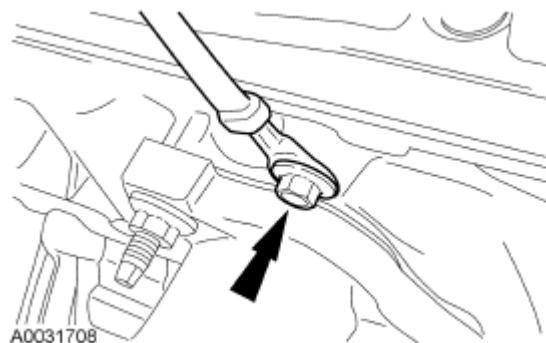


Fig. 86: Locating Engine Ground Strap Bolt
Courtesy of FORD MOTOR CO.

14. Position the engine wiring harness and install the bolt.
 - Tighten to 47 Nm (35 lb-ft).

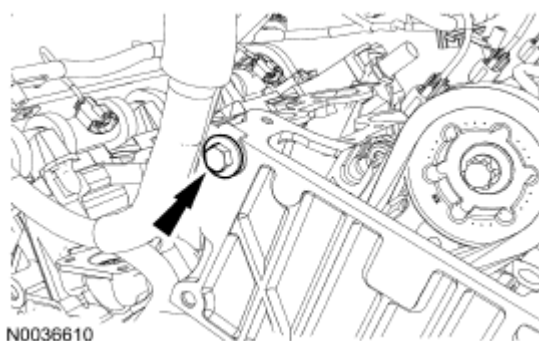


Fig. 87: Locating Engine Wiring Harness Bolt
Courtesy of FORD MOTOR CO.

NOTE: Inspect the O-ring seal. Install a new O-ring seal if necessary.

15. Install the thermostat housing and the bolts.
 - Tighten to 11 Nm (8 lb-ft).

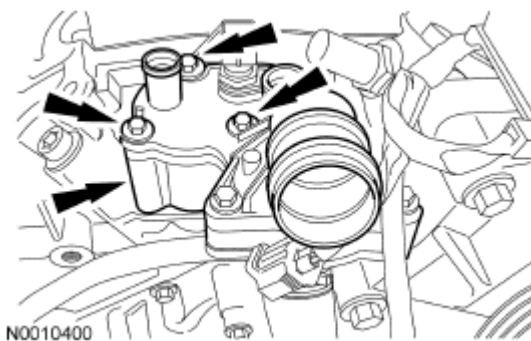


Fig. 88: Locating Thermostat Housing And Bolts
Courtesy of FORD MOTOR CO.

16. Position the coolant bypass hose clamp.

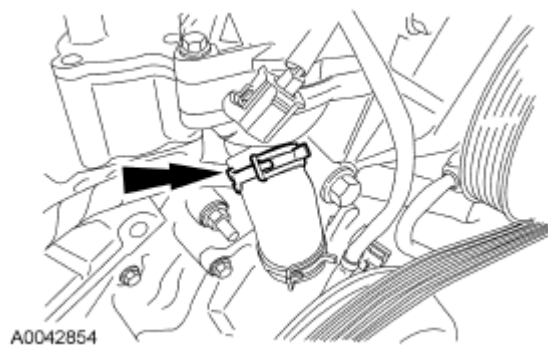


Fig. 89: Locating Coolant Bypass Hose Clamp
Courtesy of FORD MOTOR CO.

17. Install the upper radiator hose.

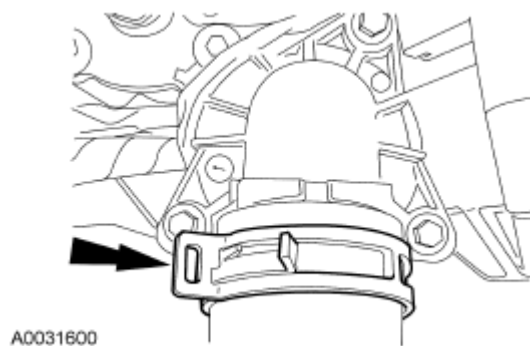


Fig. 90: Locating Upper Radiator Hose Clamp
Courtesy of FORD MOTOR CO.

18. Connect the engine coolant temperature (ECT) sensor electrical connector.

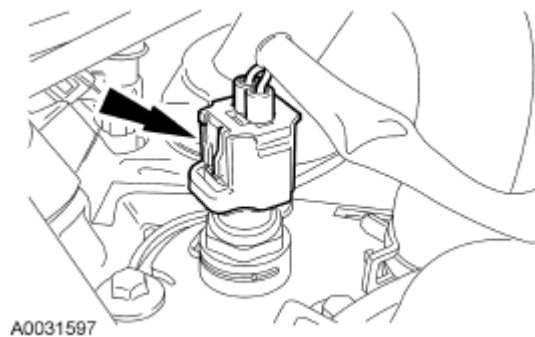


Fig. 91: Locating Engine Coolant Temperature Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

19. Install the heater hose to the thermostat housing.

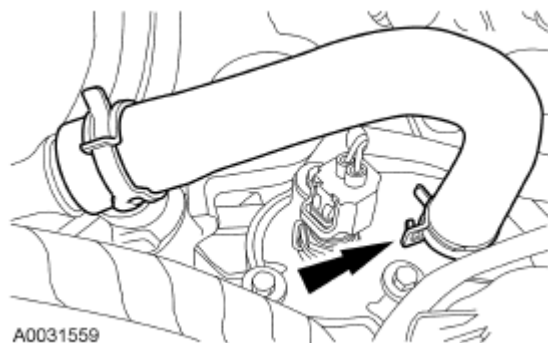


Fig. 92: Locating Heater Hose
Courtesy of FORD MOTOR CO.

LH side

CAUTION: To avoid damage to the timing chain cassette, an assistant will be required to help position the cylinder head in the vehicle.

NOTE: New cylinder head bolts must be installed. They are a torque-to-yield design and cannot be reused.

NOTE: Late build vehicles shown, early build vehicles similar.

NOTE: If a new cylinder head must be installed on an early build engine, a kit that contains the cylinder head without an oil supply tube and with 6 new roller followers must be used.

20. Install the cylinder head. Install 8 new 12-mm bolts and tighten in the sequence shown in 2 stages.

- Stage 1: Tighten to 12 Nm (9 lb-ft).
- Stage 2: Tighten to 25 Nm (18 lb-ft).

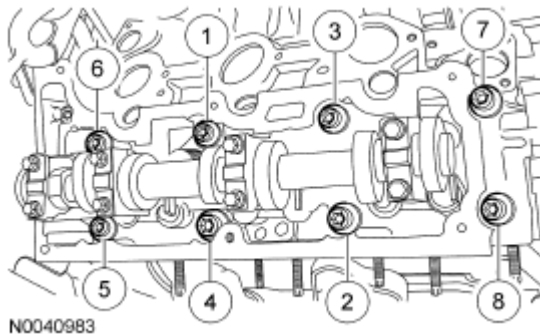


Fig. 93: Identifying Tightening Sequence Of Cylinder Head Bolts
Courtesy of FORD MOTOR CO.

NOTE: Late build vehicles shown, early build vehicles similar.

21. Install 2 new 8-mm bolts.

- Tighten to 32 Nm (24 lb-ft).

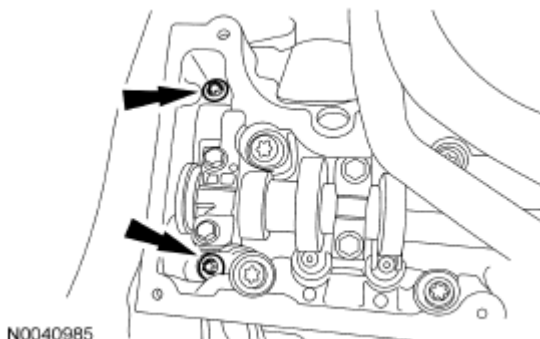


Fig. 94: Locating 8-MM Bolts
Courtesy of FORD MOTOR CO.

NOTE: Late build vehicles shown, early build vehicles similar.

22. Tighten the eight 12-mm bolts in the sequence shown in 2 stages.
- Stage 1: Tighten 90 degrees.
 - Stage 2: Tighten an additional 90 degrees.

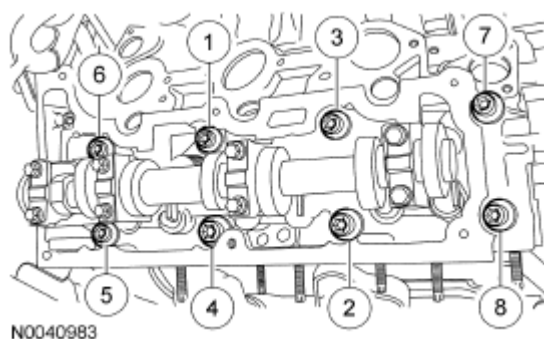
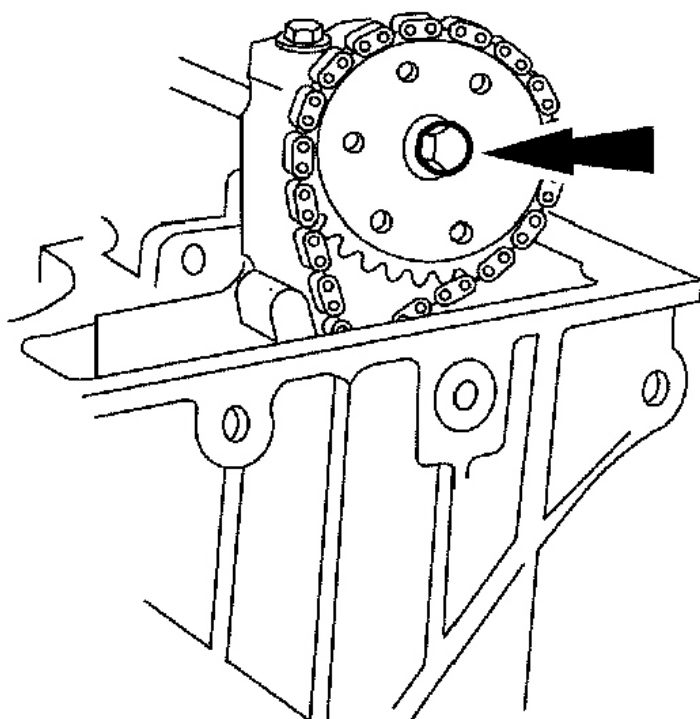


Fig. 95: Locating Tightening Sequence Of 12-Mm Bolts
Courtesy of FORD MOTOR CO.

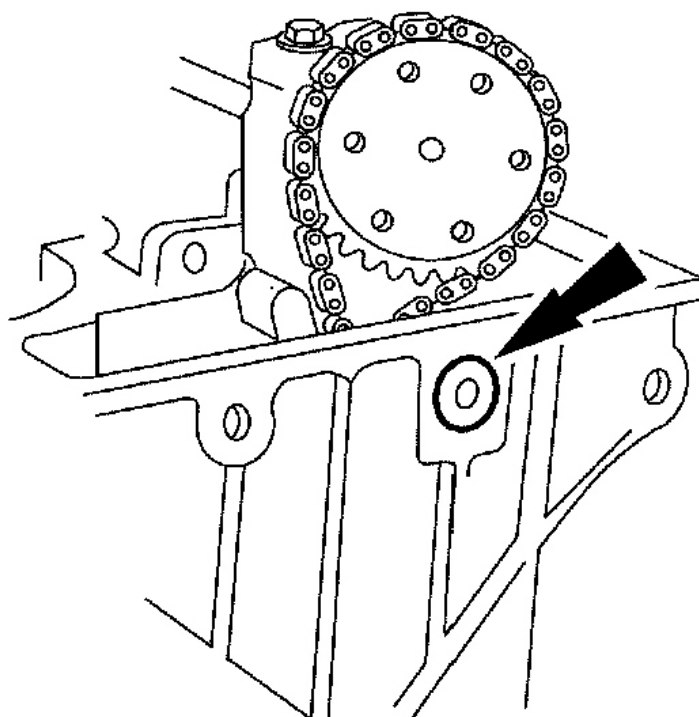
CAUTION: The camshaft gear must turn freely on the camshaft. **DO NOT** tighten the bolt at this time. Tightening the bolt can result in incorrect engine timing.



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Fig. 96: Identifying LH Camshaft Sprocket Bolt
Courtesy of FORD MOTOR CO.

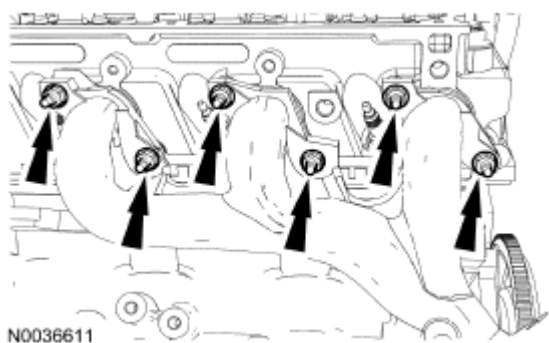
23. Remove the rubber band. Install the camshaft sprocket and bolt.
24. Install the LH side cassette bolt.
 - Tighten to 12 Nm (9 lb-ft).



GA1670-A

Fig. 97: Identifying LH Cassette Upper Bolt
 Courtesy of FORD MOTOR CO.

25. Inspect the LH exhaust manifold gasket mating surfaces for flatness. For additional information, refer to **ENGINE SYSTEM-GENERAL INFORMATION**.
26. Install 6 new LH exhaust manifold studs.
 - Tighten to 12 Nm (9 lb-ft).
27. Position a new gasket, the LH exhaust manifold and install the new nuts.
 - Tighten to 22 Nm (16 lb-ft).



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Fig. 98: Identifying LH Exhaust Manifold Nuts
Courtesy of FORD MOTOR CO.

28. Install the catalytic converter-to-LH exhaust manifold nuts.
- Tighten to 40 Nm (30 lb-ft).

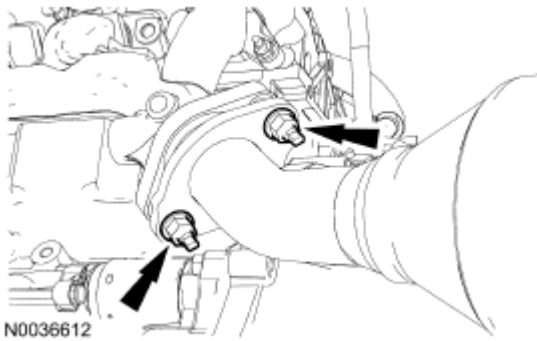


Fig. 99: Locating Catalytic Converter-To-LH Exhaust Manifold Nuts
Courtesy of FORD MOTOR CO.

NOTE: Apply silicone brake caliper grease and dielectric compound to the inside of the spark plug boots.

29. Connect the spark plug wires to the LH spark plugs.
30. Install the oil level indicator tube and bolt.
- Tighten to 10 Nm (89 lb-in).

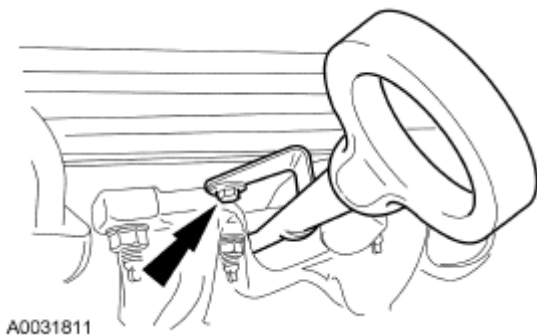


Fig. 100: Locating Oil Level Indicator Tube Bolt
Courtesy of FORD MOTOR CO.

Both sides

31. Time the camshafts. For additional information, refer to **CAMSHAFT TIMING**.

RH side

32. Install the generator mounting bracket assembly and the bolts.

- Tighten to 42 Nm (31 lb-ft).

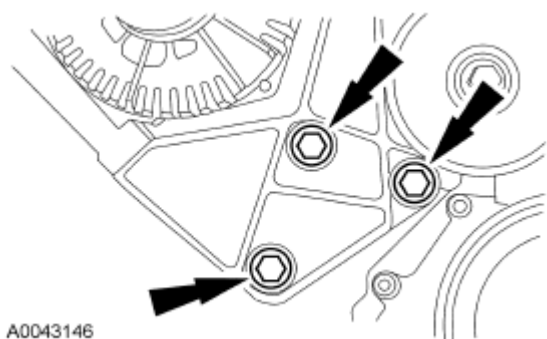


Fig. 101: Identifying Generator Mounting Bracket Assembly Bolts
Courtesy of FORD MOTOR CO.

33. Position the accessory drive belt tensioner and install the bolt.
- Tighten to 47 Nm (35 lb-ft).

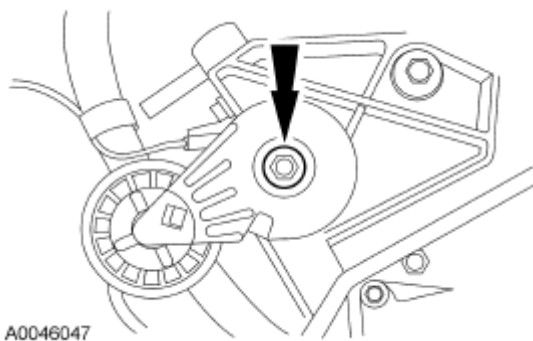


Fig. 102: Accessory Drive Belt Tensioner And Install Bolt
Courtesy of FORD MOTOR CO.

34. Connect the generator electrical connections and install the pushpin.
- Tighten to 8 Nm (71 lb-in).

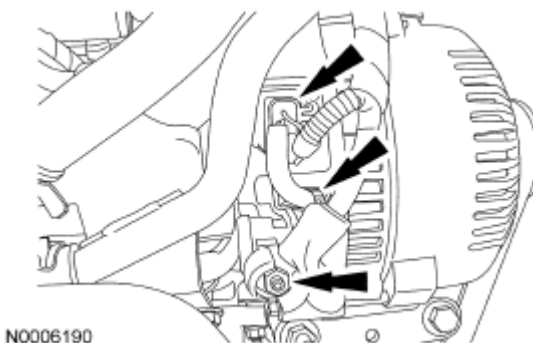


Fig. 103: Locating Generator Electrical Connections

Courtesy of FORD MOTOR CO.

35. Connect the battery ground cable. For additional information, refer to **BATTERY, MOUNTING AND CABLES**.
36. Position the heater hose tube bracket and install the bolts.
 - Tighten the rear bolt to 23 Nm (17 lb-ft).
 - Tighten the front bolt to 34 Nm (25 lb-ft).

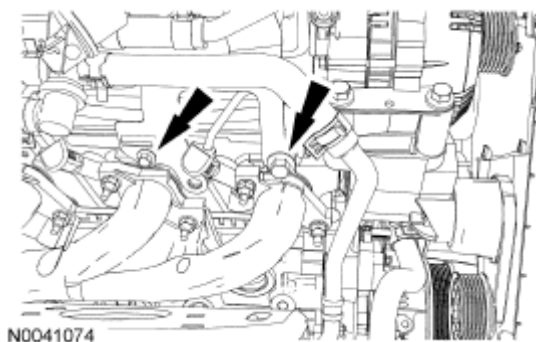


Fig. 104: Locating Heater Hose Tube Bracket Bolts
Courtesy of FORD MOTOR CO.

LH side

37. Install the ignition coil bracket and the bolts.
 - Tighten to 10 Nm (89 lb-in).

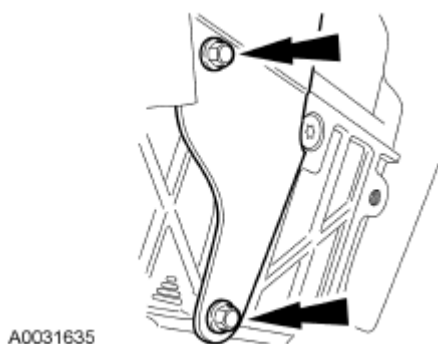


Fig. 105: Locating Ignition Coil Bracket And Bolts
Courtesy of FORD MOTOR CO.

38. Install the A/C compressor and power steering pump bracket and the bolts.
 - Tighten to 42 Nm (31 lb-ft).

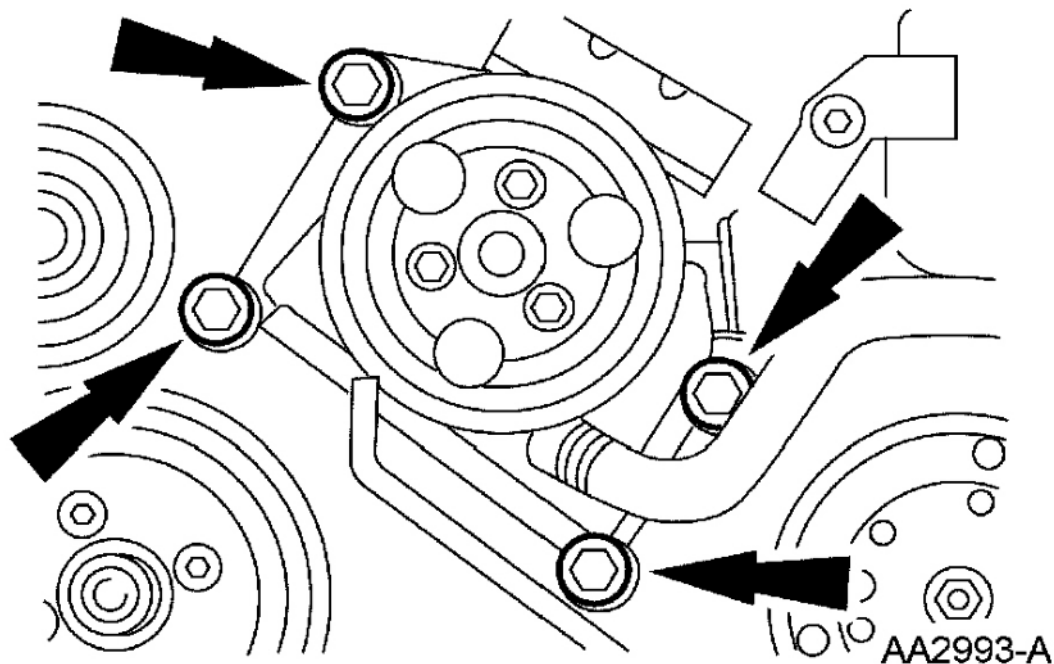


Fig. 106: Locating Accessory Bracket Bolts
Courtesy of FORD MOTOR CO.

39. Install the ignition coil bracket-to-accessory drive bracket bolts.
- Tighten to 10 Nm (89 lb-in).

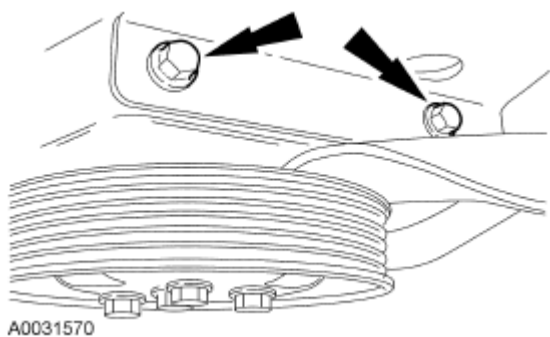


Fig. 107: Locating Ignition Coil Bracket-To-Accessory Drive Bracket Bolts
Courtesy of FORD MOTOR CO.

40. Connect the radio ignition interference capacitor electrical connector.

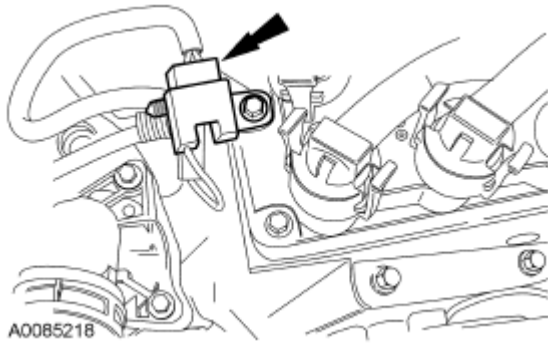


Fig. 108: Locating Radio Ignition Interference Capacitor Electrical Connector
Courtesy of FORD MOTOR CO.

Both sides

41. Rotate the accessory drive belt tensioner counterclockwise and install the accessory drive belt.

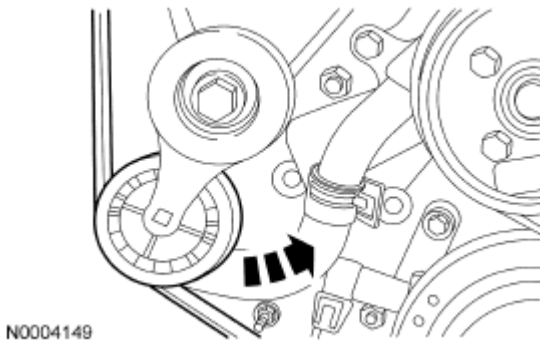


Fig. 109: Rotating Accessory Drive Belt Tensioner
Courtesy of FORD MOTOR CO.

42. Fill and bleed the engine cooling system. For additional information, refer to **ENGINE COOLING**.

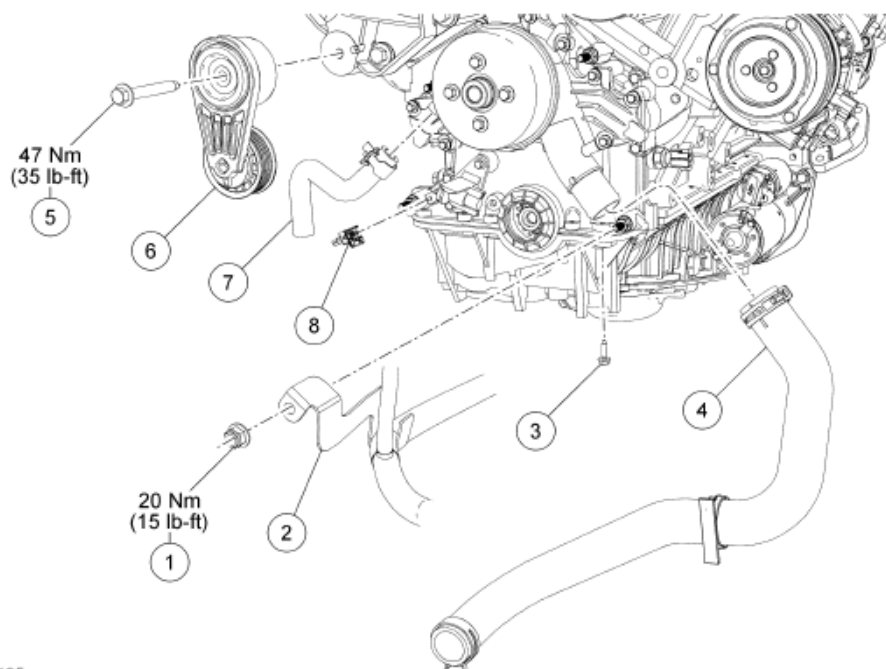
ENGINE FRONT COVER

MATERIAL SPECIFICATIONS

Item	Specification
Silicone Gasket and Sealant TA-30	WSE-M4G323-A4
Silicone Gasket Remover ZC-30	-
Motorcraft Metal Surface Prep ZC-31	-

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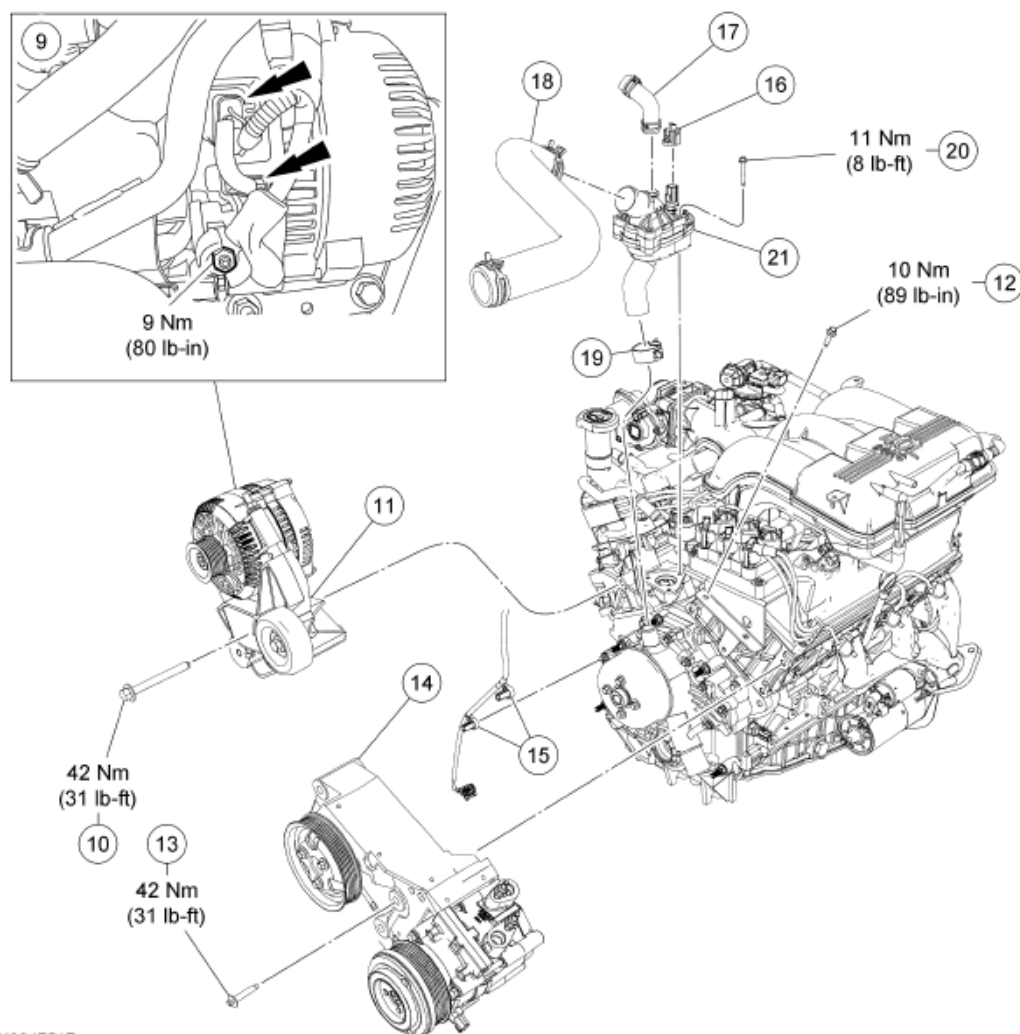


N0041125

Item	Part Number	Description
1	W520102	Wiring harness bracket nut
2	10A779	Wiring harness bracket (part of 14A280)
3	W503275	Oil pan-to-front cover bolt (5 required)
4	8260	Lower radiator hose

Item	Part Number	Description
5	—	Accessory drive belt tensioner bolt
6	6B209	Accessory drive belt tensioner
7	—	Heater hose
8	14A464	Crankshaft position sensor electrical connector

Fig. 110: Identifying Engine Front Cover Components With Torque Specifications (Items 1-8)
Courtesy of FORD MOTOR CO.

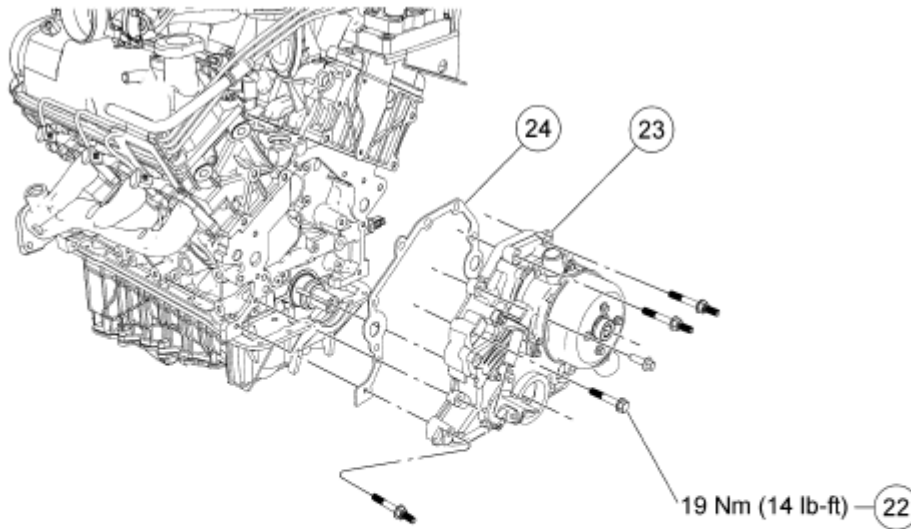


N0047517

Item	Part Number	Description
9	—	Generator wiring connections
10	—	Generator bracket bolts (3 required)
11	—	Generator bracket
12	—	Ignition coil bracket-to-LH accessory drive bracket bolt
13	—	LH accessory drive bracket bolt (4 required)
14	—	LH accessory drive bracket
15	—	Wiring harness routing clips

Item	Part Number	Description
16	—	Engine coolant temperature (ECT) sensor electrical connector
17	18472	Heater hose
18	8260	Upper radiator hose
19	—	Bypass hose clamp
20	—	Thermostat housing bolt (3 required)
21	—	Thermostat housing

Fig. 111: Identifying Engine Front Cover Components With Torque Specifications (Items 9-21)
 Courtesy of FORD MOTOR CO.



N0036694

Item	Part Number	Description
22	—	Engine front cover bolts (10 required)
23	—	Engine front cover
24	—	Gasket

Fig. 112: Identifying Engine Front Cover Components With Torque Specifications (Items 22-24)
Courtesy of FORD MOTOR CO.

Removal

1. Disconnect the battery ground cable. For additional information, refer to **BATTERY, MOUNTING AND CABLES**.
2. Drain the cooling system. For additional information, refer to **ENGINE COOLING**.
3. Remove the crankshaft front seal. For additional information, refer to **CRANKSHAFT FRONT SEAL**.
4. Remove the nut and detach the wiring harness bracket from the front cover.
5. Remove the 5 oil pan-to-front cover bolts.
6. Disconnect the lower radiator hose.
7. Remove the bolt and the drive belt tensioner.
8. Disconnect the heater hose from the coolant pump.
9. Disconnect the crankshaft position (CKP) sensor electrical connector.
10. Disconnect the generator electrical connectors and the wiring harness retainer.
11. Remove the 3 generator bracket bolts and the generator bracket.
12. Remove the coil bracket-to-LH accessory drive bracket bolt.
13. Remove the 4 bolts and the LH accessory drive bracket.
14. Remove and discard the CKP sensor wiring harness retainers.
15. Disconnect the engine coolant temperature (ECT) sensor electrical connector.

16. Disconnect the upper radiator hose from the thermostat housing.
17. Disconnect the heater hose from the thermostat housing.

NOTE: The bypass hose will be removed with the thermostat housing.

18. Release the bypass hose clamp from the coolant pump end.
19. Remove the 3 bolts and the thermostat housing.

NOTE: Note the positions of the stud bolts for installation reference.

20. Remove the 10 bolts, the engine front cover and the gasket. Discard the gasket.

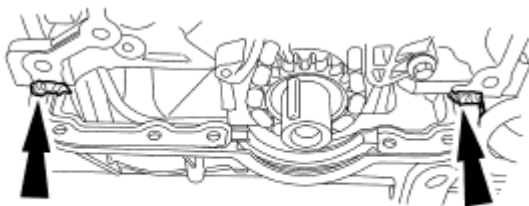
Installation

CAUTION: Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean sealing surfaces. These tools cause scratches and gouges which make leak paths. Use a plastic scraping tool to remove all traces of the old front cover gasket and the silicone sealer

1. Clean and inspect the gasket mating surfaces. Use silicone gasket remover and metal surface prep and a plastic scraping tool. Follow the directions on the packaging.
2. Position the front cover gasket.

CAUTION: If not secured within 4 minutes, the sealant must be removed and the sealing area cleaned. To clean the sealing area, use silicone gasket remover and metal surface prep. Follow the directions on the packaging. Failure to follow this procedure can cause future oil leakage.

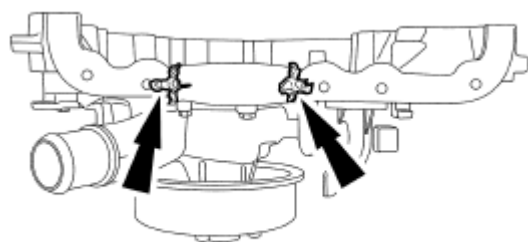
3. Apply silicone gasket and sealant to the oil pan and engine block mating surfaces.



A0029570

Fig. 113: Locating Engine Block Mating Surfaces Sealant Areas
Courtesy of FORD MOTOR CO.

4. Apply silicone gasket and sealant to the front cover in 2 places.



A0029571

Fig. 114: Locating Silicone Gasket And Sealant Areas
Courtesy of FORD MOTOR CO.

NOTE: Make sure the stud bolts are installed in their original positions.

5. Position the engine front cover and install the 10 bolts.
 - Tighten to 19 Nm (14 lb-ft).

NOTE: Make sure the coolant bypass hose is attached to the coolant pump.

6. Position the thermostat housing and install the 3 bolts.
 - Tighten to 11 Nm (8 lb-ft).
7. Position the bypass hose clamp.
8. Connect the upper radiator hose to the thermostat housing.
9. Connect the heater hose to the thermostat housing.
10. Connect the ECT sensor electrical connector.
11. Install new wiring harness retainers and position the CKP sensor wiring.
12. Connect the CKP sensor electrical connector.
13. Position the LH accessory drive bracket and install the 4 bolts.
 - Tighten to 42 Nm (31 lb-ft).
14. Install the ignition coil bracket-to-LH accessory drive bracket bolt.
 - Tighten to 10 Nm (89 lb-in).
15. Position the generator bracket and install the 3 bolts.
 - Tighten to 42 Nm (31 lb-ft).
16. Connect the generator electrical connectors and the wiring harness retainer.
 - Tighten to 9 Nm (80 lb-in).
17. Connect the heater hose to the coolant pump.
18. Position the accessory drive belt tensioner and install the bolt.
 - Tighten to 47 Nm (35 lb-ft).
19. Connect the lower radiator hose.

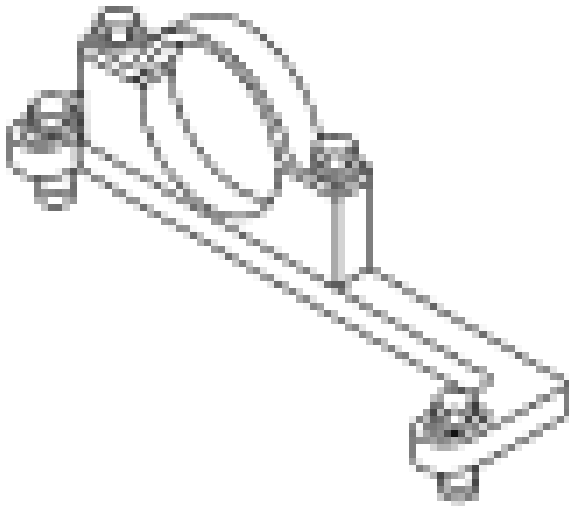
NOTE: The 5 bolts may or may not have washers. All the bolts should be of the

same type.

20. Install the 5 cylinder block cradle-to-front cover bolts.
 - Tighten bolts with washers to 10 Nm (89 lb-in).
 - Tighten bolts without washers to 14 Nm (10 lb-ft).
21. Position the wiring harness bracket and install the nut.
 - Tighten to 20 Nm (15 lb-ft).
22. Install the crankshaft front seal. For additional information, refer to **CRANKSHAFT FRONT SEAL**.
23. Connect the battery ground cable. For additional information, refer to **BATTERY, MOUNTING AND CABLES**.
24. Fill the engine cooling system For additional information, refer to **ENGINE COOLING**.

CAMSHAFT DRIVE CASSETTE - LH

SPECIAL TOOLS REFERENCE



ST1777-A

Holding Tool, Camshaft Sprocket
303-564 (T97T-6256)

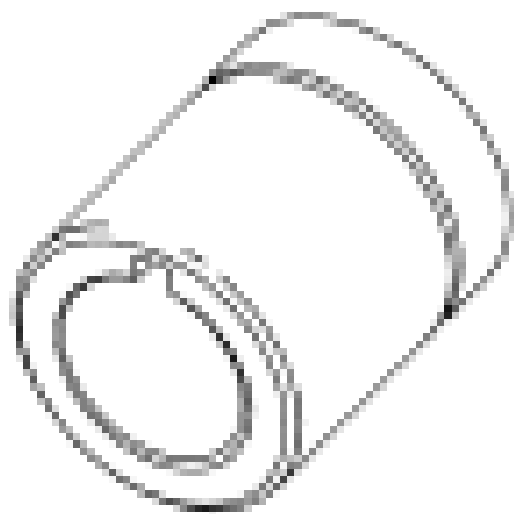
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ST1776-A

Adapter for 303-564
303-578 (T97T-6256-A)

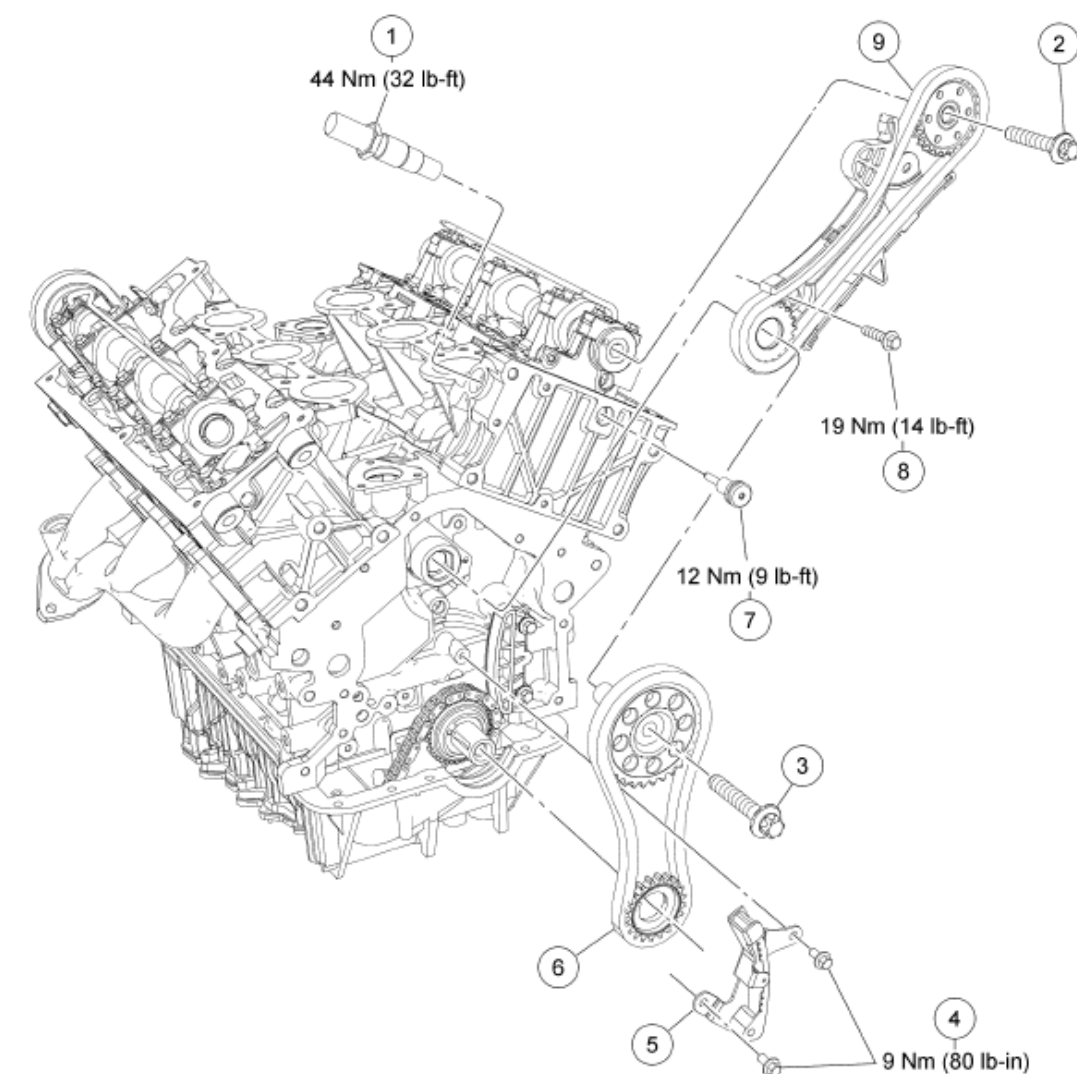


ST2694-A

Holding Tool, Crankshaft
303-674

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N0005744

Item	Part Number	Description
1	6K254	Hydraulic chain tensioner
2	6M276	Camshaft sprocket bolt
3	6M276	Jackshaft sprocket bolt
4	W500011	Primary chain tensioner bolts (2 required)
5	6M271	Primary chain tensioner
6	—	Primary chain and sprocket assembly
7	6U001	LH cassette upper bolt
8	W500110	LH cassette lower bolt
9	6M289	LH cassette

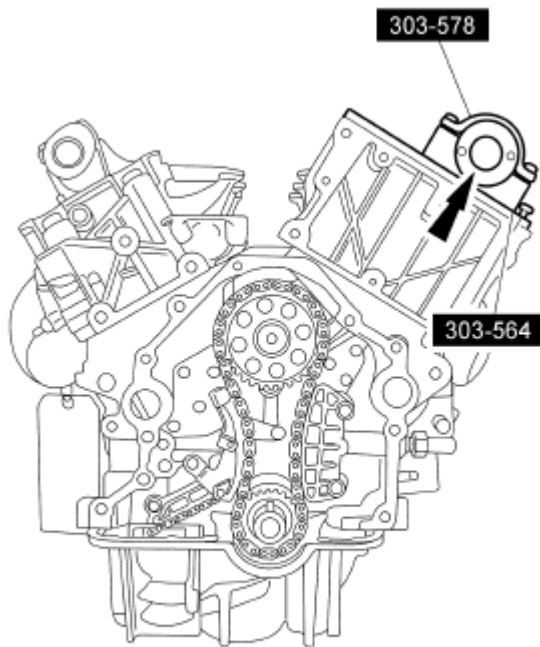
Fig. 115: Identifying Camshaft Drive Cassette - LH Components With Torque Specifications
Courtesy of FORD MOTOR CO.

Removal

1. Remove the valve covers. For additional information, refer to **VALVE COVER - RH** and **VALVE COVER - LH**.
2. Remove the fuel rail. For additional information, refer to **FUEL CHARGING & CONTROLS - 4.0L SOHC**.
3. Remove the engine front cover. For additional information, refer to **ENGINE FRONT COVER**.
4. Remove the thermostat housing. For additional information, refer to **ENGINE COOLING**.
5. Remove all of the roller followers. For additional information, refer to **CAMSHAFT ROLLER FOLLOWER**.

NOTE: **You must retime the LH and RH camshafts when either camshaft is disturbed.**

6. Turn the crankshaft clockwise to position the number one cylinder at top dead center (TDC).
7. Remove the LH hydraulic chain tensioner.
8. Remove the LH camshaft sprocket bolt.
 - Install the special tools and tighten the bolts to 10 Nm (89 lb-in).
 - Remove the LH camshaft sprocket bolt.



A0083332

Fig. 116: Identifying Special Tools And Bolts
Courtesy of FORD MOTOR CO.

9. Using the special tool to prevent the crankshaft from turning, remove the jackshaft sprocket bolt.

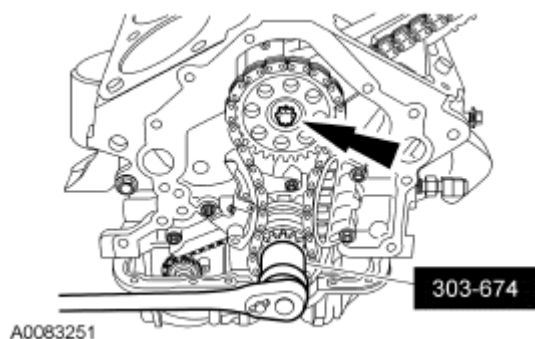


Fig. 117: Tightening Jackshaft Sprocket Bolt
Courtesy of FORD MOTOR CO.

10. Remove the bolts and the primary chain tensioner.

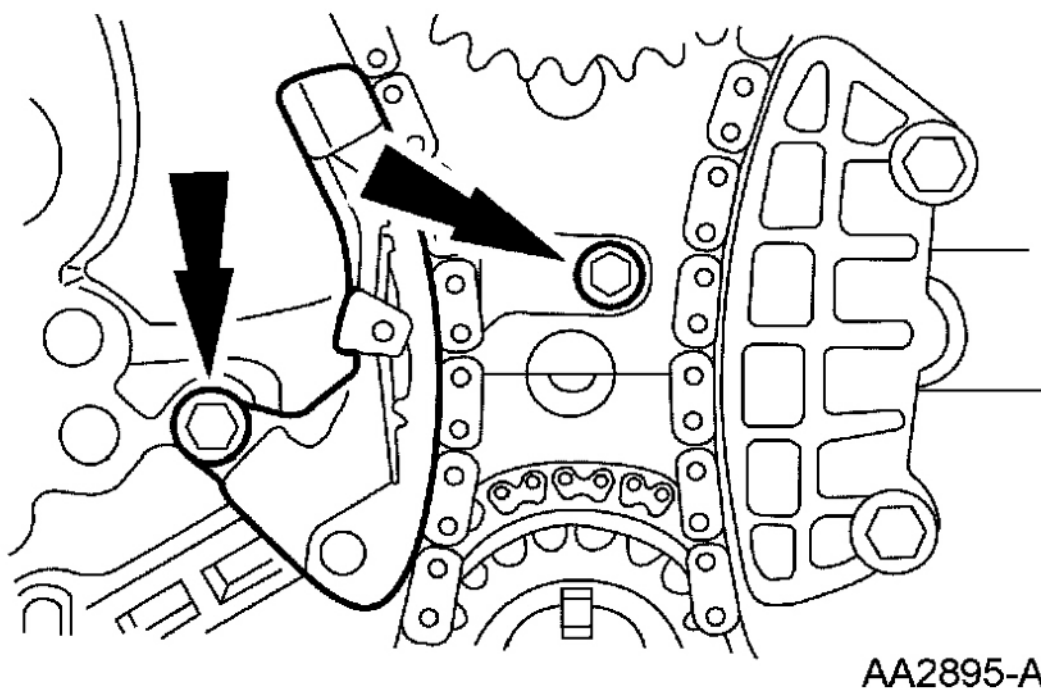


Fig. 118: Locating Jackshaft Chain Tensioner Bolts
Courtesy of FORD MOTOR CO.

11. Remove the primary chain and sprockets as an assembly.

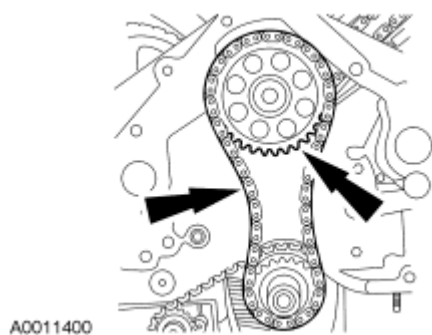
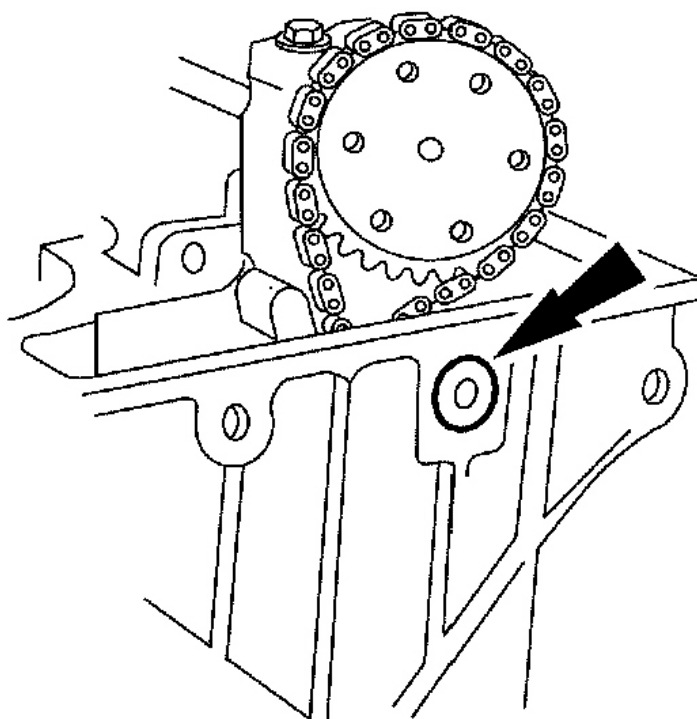


Fig. 119: Locating Jackshaft Chain And Sprockets
Courtesy of FORD MOTOR CO.

12. Remove the LH cassette upper bolt.



GA1670-A

Fig. 120: Identifying LH Cassette Upper Bolt
Courtesy of FORD MOTOR CO.

13. Remove the LH cassette lower bolt and the LH cassette.

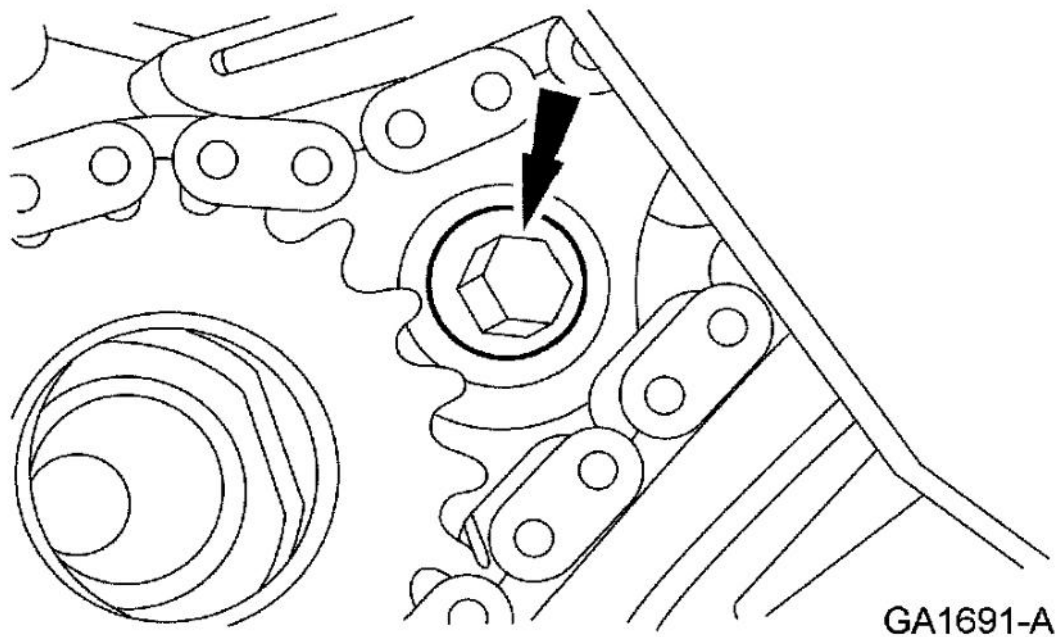
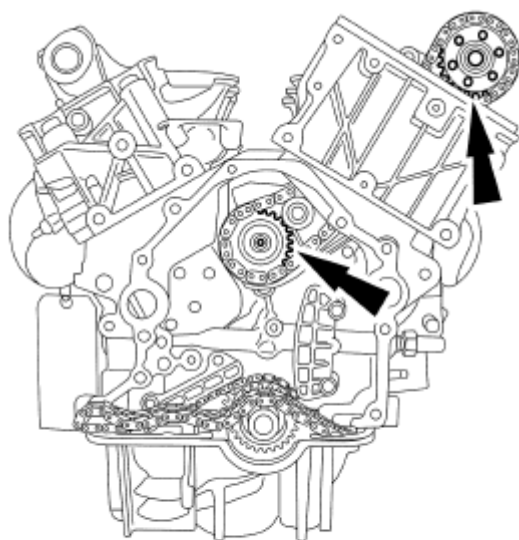


Fig. 121: Locating Cassette Bolt
Courtesy of FORD MOTOR CO.

Installation

NOTE: The camshaft chain sprockets must be oriented correctly.



A0029678

Fig. 122: Locating Camshaft Chain Sprockets
Courtesy of FORD MOTOR CO.

1. Position the LH cassette.
2. Install the LH cassette lower bolt.
 - Tighten to 19 Nm (14 lb-ft).

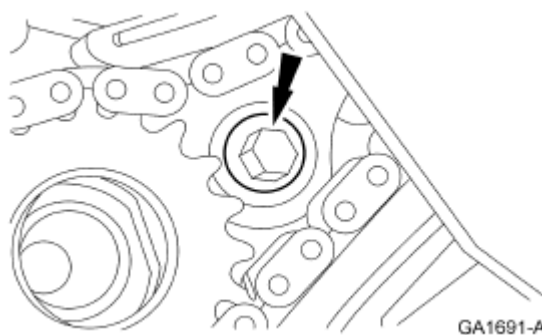
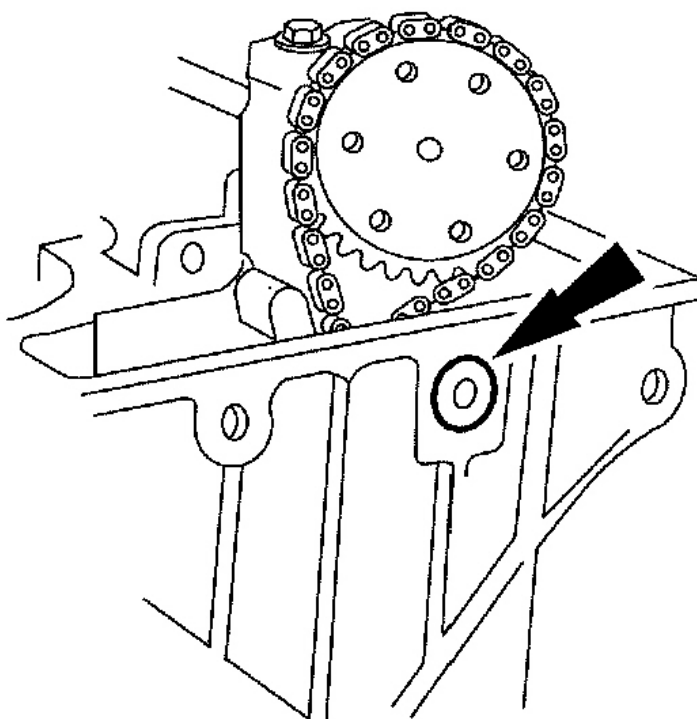


Fig. 123: Locating LH Cassette Lower Bolt
Courtesy of FORD MOTOR CO.

3. Install the LH cassette upper bolt.
 - Tighten to 12 Nm (9 lb-ft).



GA1670-A

Fig. 124: Identifying LH Cassette Upper Bolt
Courtesy of FORD MOTOR CO.

4. Install the jackshaft chain and sprockets as an assembly.

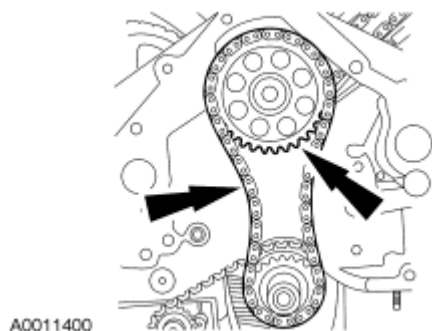


Fig. 125: Locating Jackshaft Chain And Sprockets
Courtesy of FORD MOTOR CO.

5. Install the jackshaft chain tensioner and the bolts.
 - Tighten to 9 Nm (80 lb-in).

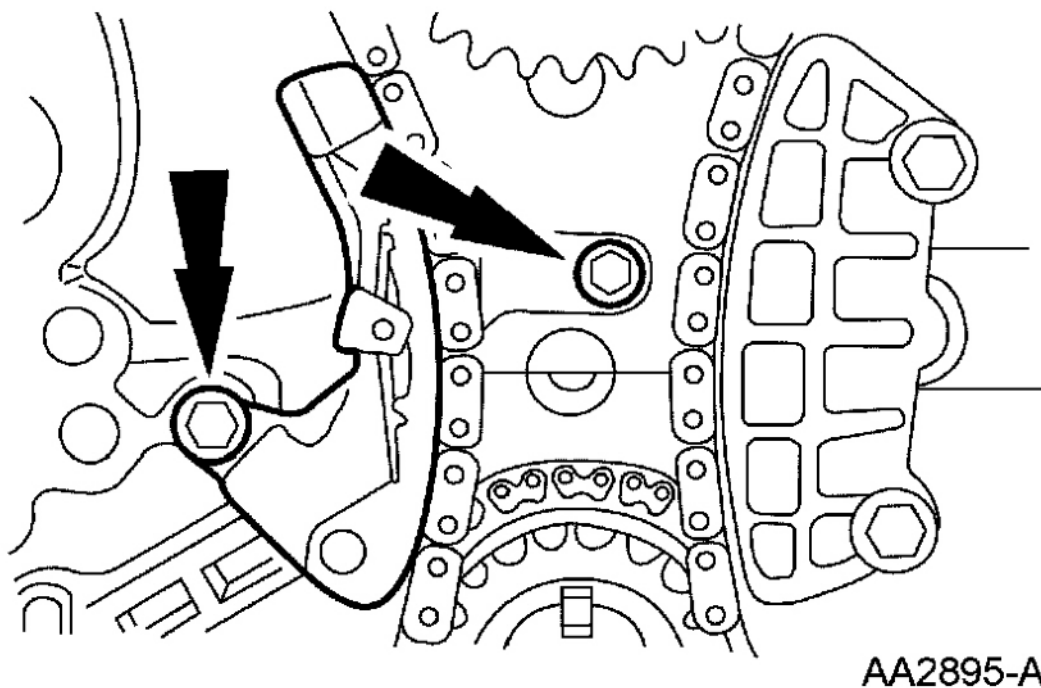


Fig. 126: Locating Jackshaft Chain Tensioner Bolts
Courtesy of FORD MOTOR CO.

6. Using the special tool to prevent the crankshaft from turning, tighten the jackshaft sprocket bolt in 2 stages.
 - Stage 1: Tighten to 45 Nm (33 lb-ft).
 - Stage 2: Tighten an additional 90 degrees.

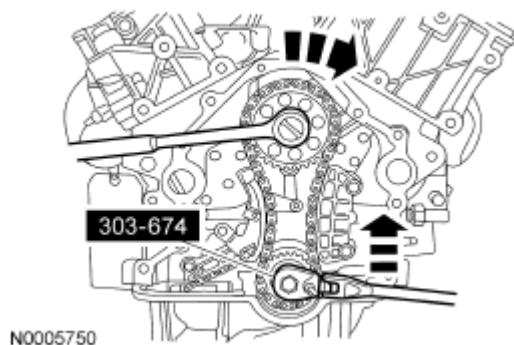


Fig. 127: Using Special Tool To Prevent Crankshaft From Turning
Courtesy of FORD MOTOR CO.

7. Loosely install the camshaft sprocket bolt.

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NOTE: You must retime the LH and RH camshafts when either camshaft is disturbed.

NOTE: Install the LH hydraulic chain tensioner during camshaft timing.

8. Retime the LH and RH camshafts. For additional information, refer to CAMSHAFT TIMING.
9. Install the camshaft roller followers. For additional information, refer to CAMSHAFT ROLLER FOLLOWER.
10. Install the thermostat housing. For additional information, refer to ENGINE COOLING.
11. Install the engine front cover. For additional information, refer to ENGINE FRONT COVER.
12. Install the fuel rail. For additional information, refer to FUEL CHARGING & CONTROLS - 4.0L SOHC.
13. Install the valve covers. For additional information, refer to VALVE COVER - RH and VALVE COVER - LH.

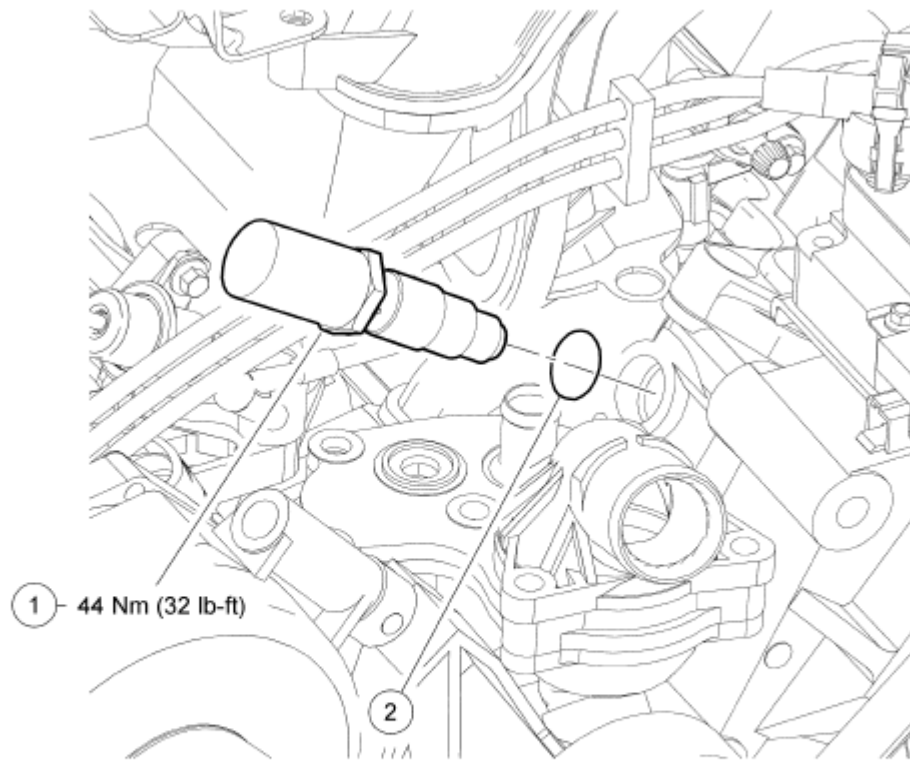
TIMING DRIVE COMPONENTS - CAMSHAFT DRIVE CASSETTE, RH

NOTE: For Timing Drive Components - Camshaft Drive Cassette, RH service information, see ENGINE under **DISASSEMBLY**.

HYDRAULIC TIMING CHAIN TENSIONER - LH

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (US); Motorcraft SAE 5W-30 Super Premium Motor Oil CXO-5W30-LSP12 (Canada); or equivalent	WSS- M2C929-A



Item	Part Number	Description
1	6K524	LH hydraulic chain tensioner
2	—	LH hydraulic chain tensioner O-ring seal

Fig. 128: Identifying Hydraulic Timing Chain Tensioner - LH With Torque Specifications
Courtesy of FORD MOTOR CO.

Removal and Installation

1. Remove the hydraulic chain tensioner.
 - To install, tighten to 44 Nm (32 lb-ft).

NOTE: Lubricate the new O-ring seal with clean engine oil.

2. Remove and discard the O-ring seal.
3. To install, reverse the removal procedure.

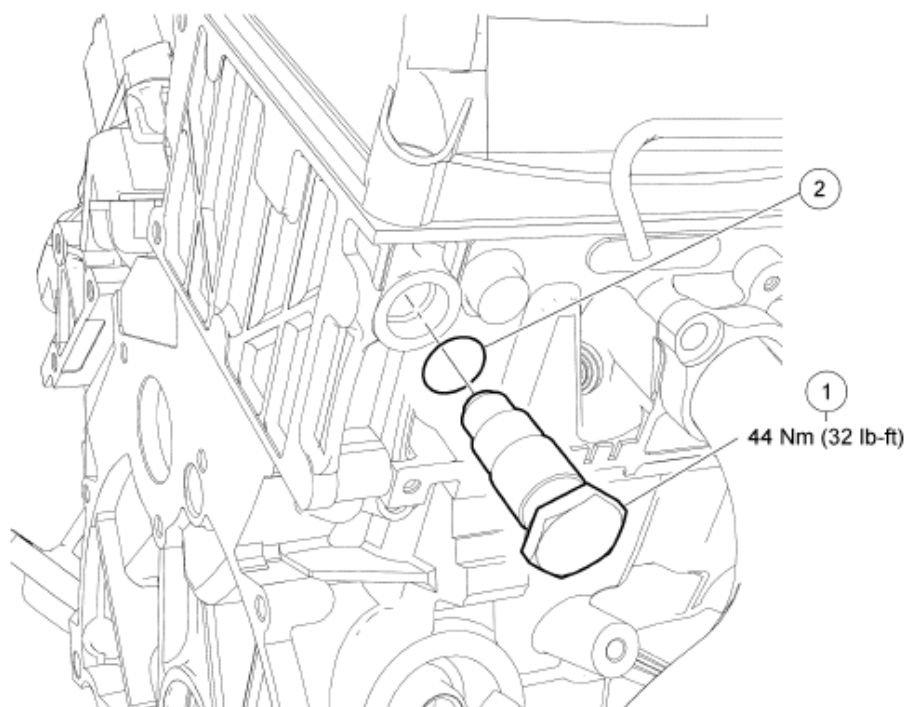
HYDRAULIC TIMING CHAIN TENSIONER - RH

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (US); Motorcraft SAE 5W-30 Super Premium Motor Oil CXO-5W30-LSP12 (Canada); or	WSS-

equivalent

M2C929-A



Item	Part Number	Description
1	6K254	RH hydraulic chain tensioner
2	—	RH hydraulic chain tensioner O-ring seal

Fig. 129: Identifying Hydraulic Timing Chain Tensioner And Oil-Ring Seal - RH With Torque Specifications

Courtesy of FORD MOTOR CO.

Removal and Installation

1. Remove the hydraulic chain tensioner.
 - To install, tighten to 44 Nm (32 lb-ft).

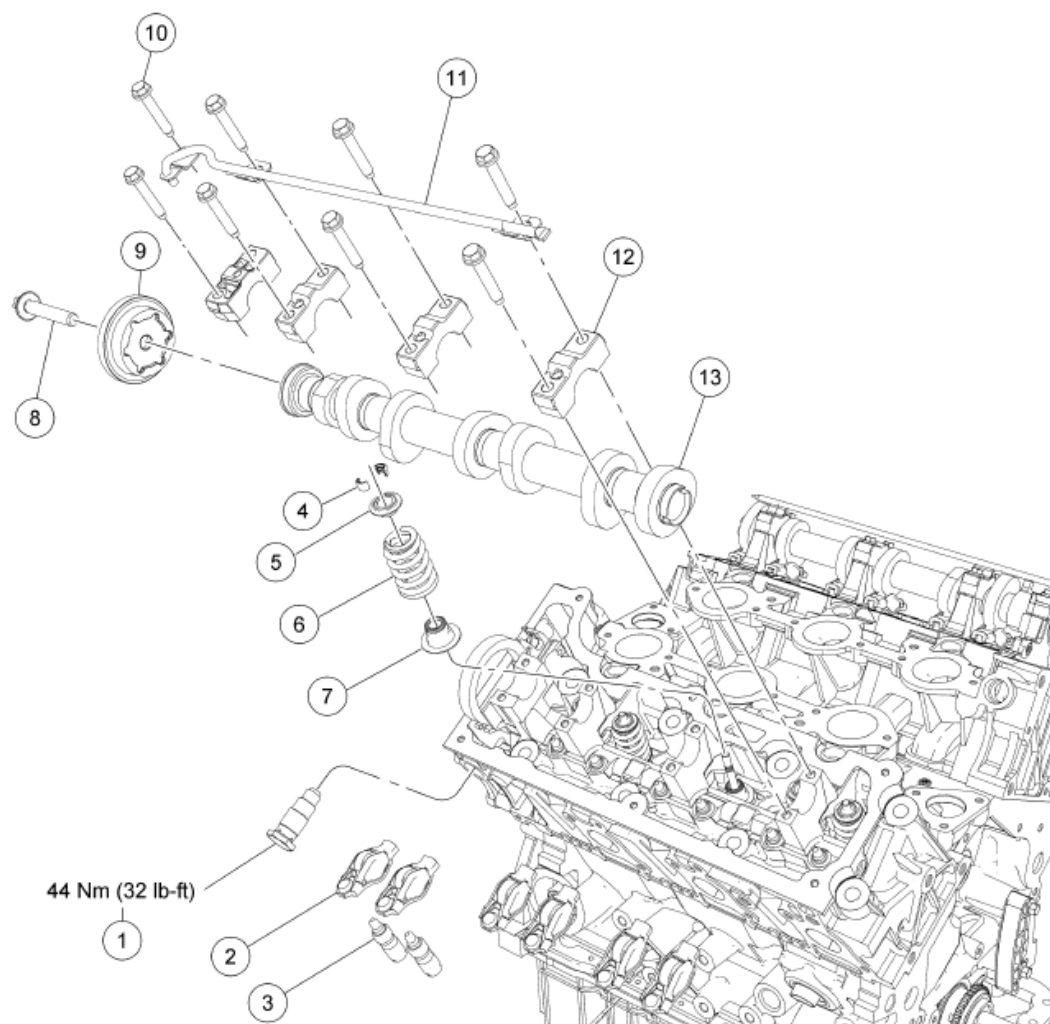
NOTE: Lubricate the new O-ring seal with clean engine oil.

2. Remove and discard the O-ring seal.
3. To install, reverse the removal procedure.

VALVE TRAIN COMPONENTS - EXPLODED VIEW

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2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



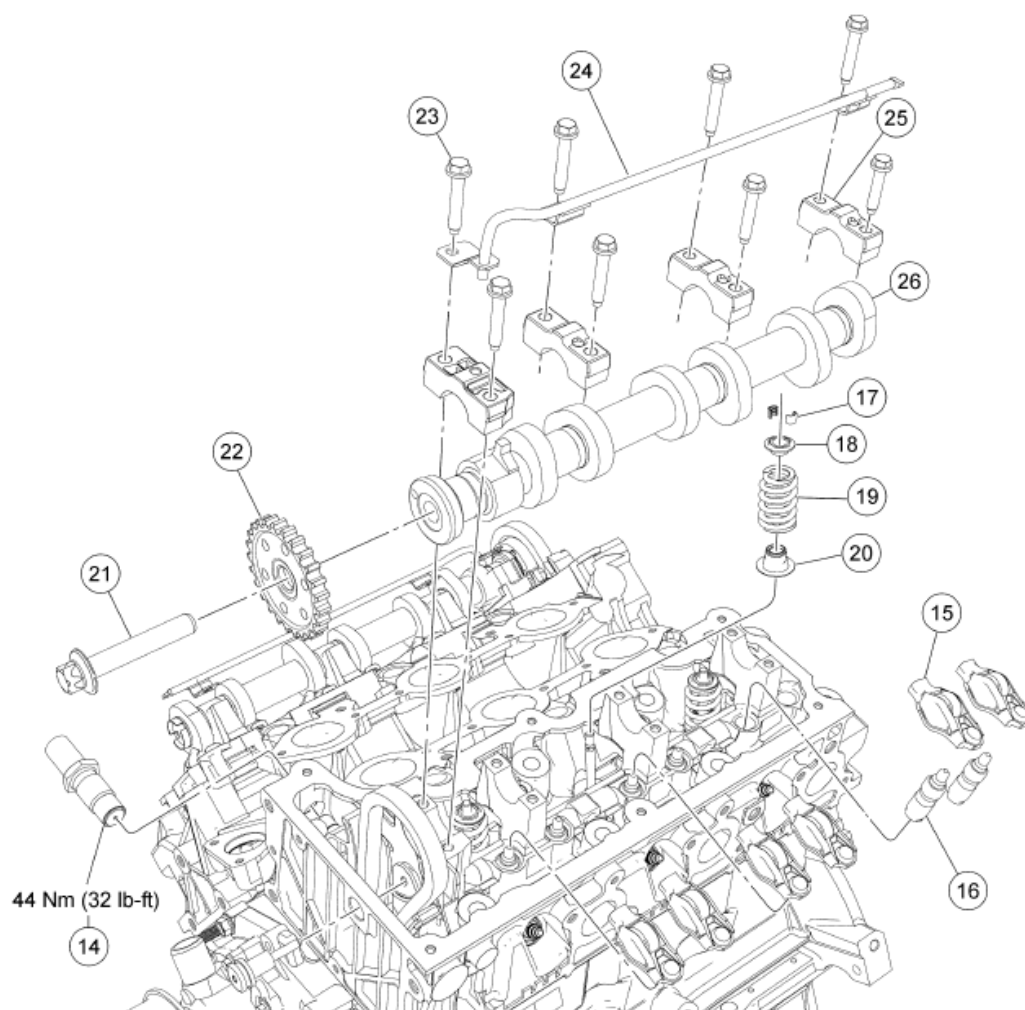
Item	Part Number	Description
1	6K254	RH hydraulic chain tensioner
2	6529	Camshaft roller follower (6 required)
3	6C501	Hydraulic lash adjuster
4	6518	Valve spring retainer key (12 required)
5	6A536	Valve spring retainer (6 required)
6	6513	Valve spring (6 required)
7	6571	Valve seals (6 required)
8	6M276	RH camshaft sprocket bolt

Item	Part Number	Description
9	6256	RH camshaft sprocket
10	W702341	Camshaft bearing cap bolt (8 required)
11	6578	Oil supply tube (early build vehicles only)
12	6A258	Camshaft bearing cap (4 required)
13	6250	RH camshaft

Fig. 130: Exploded View Of Valve Train Components (With Torque Specifications) (Items 1-13)
Courtesy of FORD MOTOR CO.

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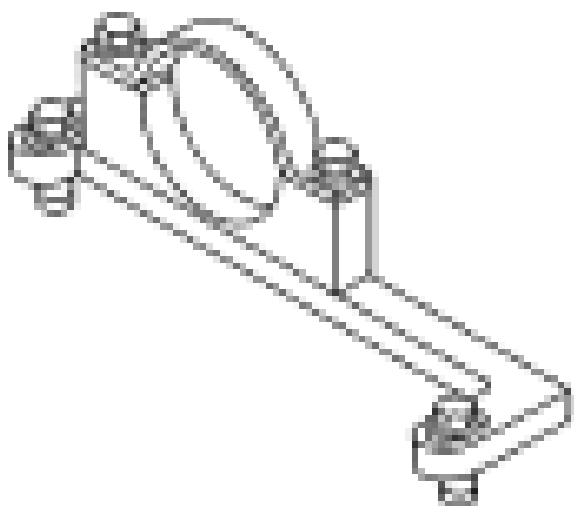
Item	Part Number	Description
14	6K254	LH hydraulic chain tensioner
15	6529	Camshaft roller follower (6 required)
16	6C501	Hydraulic lash adjuster
17	6518	Valve spring retainer key (12 required)
18	6A536	Valve spring retainer (6 required)
19	6513	Valve spring (6 required)
20	6571	Valve seal (6 required)
21	6M276	LH camshaft sprocket bolt

Item	Part Number	Description
22	6M267	LH camshaft sprocket
23	W702341	Camshaft bearing cap bolt (8 required)
24	6578	Oil supply tube (early build vehicles only)
25	6A258	Camshaft bearing cap (4 required)
26	6A274	LH camshaft

Fig. 131: Exploded View Of Valve Train Components (With Torque Specifications) (Items 14-26)
Courtesy of FORD MOTOR CO.

1. For additional information, refer to the appropriate procedure.

CAMSHAFTS

SPECIAL TOOLS**ST1777-A**

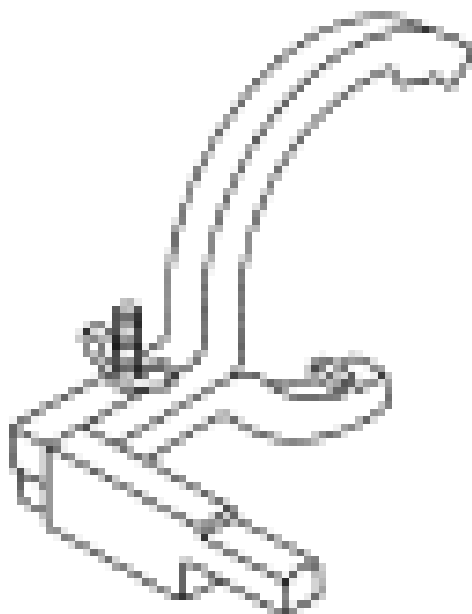
Holding Tool, Camshaft Sprocket
303-564 (T97T-6256-B) or equivalent

**ST1776-A**

Adapter for 303-564
303-578 (T97T-6256-A) or equivalent

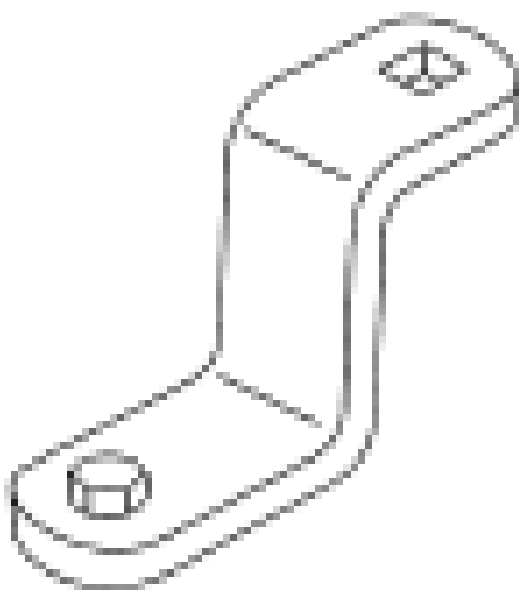
2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



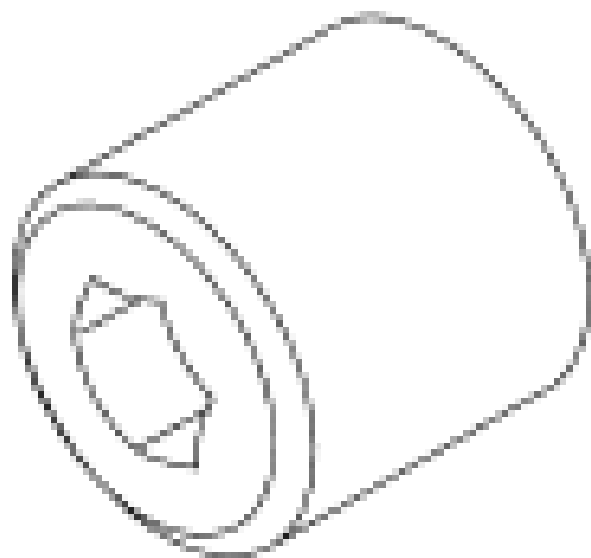
ST1775-A

Timing Tool, Crankshaft TDC
303-573 (T97T-6303-A) or equivalent



ST1780-A

Extension, Torque Wrench
303-575 (T97T-6256-F) or equivalent



ST1781-A

Socket, Camshaft Sprocket Nut
303-565 (T97T-6256-G)

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada Motorcraft SAE 5W-30 Super Premium Motor Oil CXO-5W30-LSP12) or equivalent	WSS-M2C929-A

Removal

Both sides

1. Remove the camshaft roller followers. For additional information, refer to **CAMSHAFT ROLLER FOLLOWER**.
2. Remove the nut and position the wiring harness bracket aside.

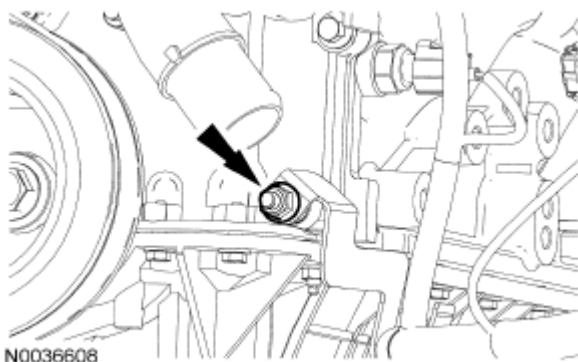


Fig. 132: Locating Wiring Harness Bracket Nut

Courtesy of FORD MOTOR CO.

NOTE: You must carry out the RH and LH camshaft timing procedure when either camshaft is serviced.

3. Rotate the crankshaft clockwise to position the No. 1 cylinder at top dead center (TDC).

CAUTION: Do not rotate the engine counterclockwise. Rotating the engine counterclockwise will result in incorrect timing of the engine.

NOTE: The special tool must be installed on the damper and should contact the engine block. This positions the piston at TDC.

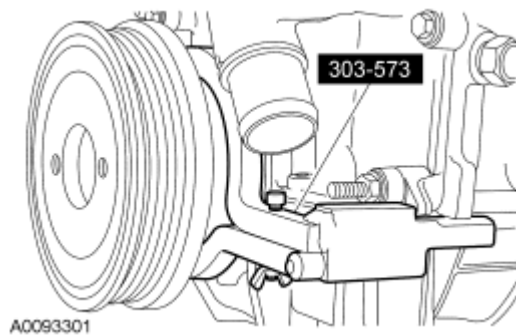


Fig. 133: Identifying Special Tool (303-573)
Courtesy of FORD MOTOR CO.

4. Install the special tool.

RH side

5. Remove the RH hydraulic timing chain tensioner.

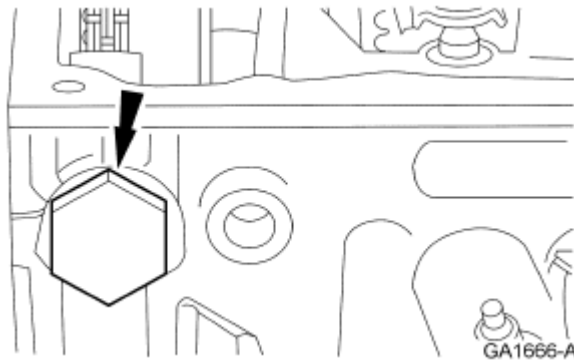


Fig. 134: Identifying RH Hydraulic Timing Chain Tensioner
Courtesy of FORD MOTOR CO.

NOTE: Late build vehicles shown, early build vehicles similar.

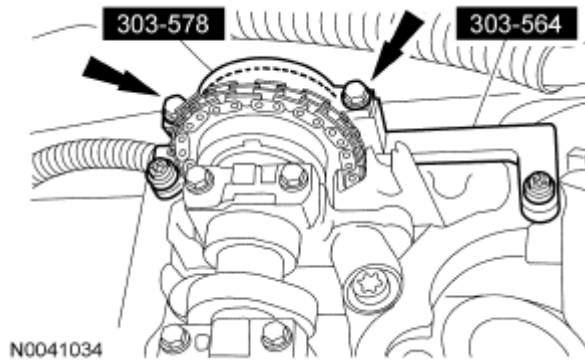


Fig. 135: Identifying Special Tools And Clamp Bolts
Courtesy of FORD MOTOR CO.

6. Install the special tools on the rear of the RH cylinder head and tighten the top 2 clamp bolts to 10 Nm (89 lb-in).

CAUTION: The RH camshaft sprocket is a LH-threaded bolt. Turning the bolt in the wrong direction can damage the engine.

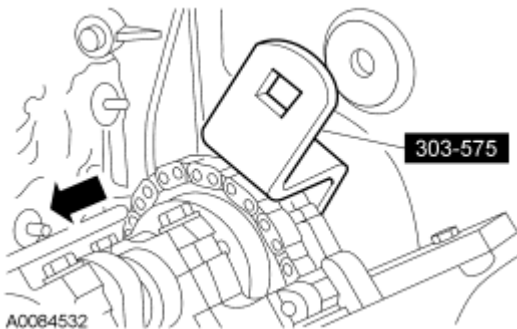


Fig. 136: Identifying Special Tool (303-575)
Courtesy of FORD MOTOR CO.

7. Using the special tool and the Camshaft Sprocket Nut Socket, loosen the camshaft sprocket bolt.
8. Remove the bolt and position the camshaft sprocket aside.

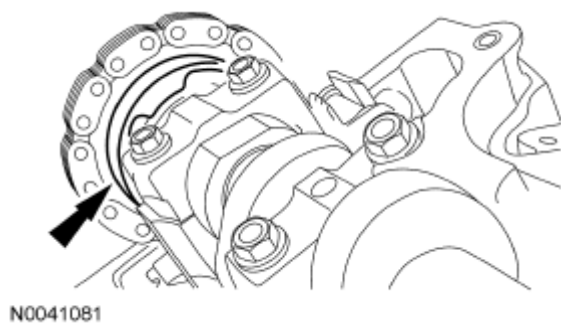


Fig. 137: Identifying Position Camshaft Sprocket
Courtesy of FORD MOTOR CO.

LH side

9. Remove the LH hydraulic timing chain tensioner.

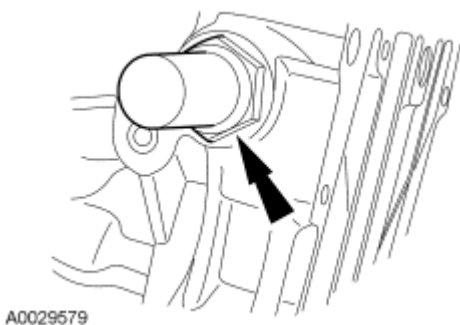


Fig. 138: Locating Camshaft Tensioner
Courtesy of FORD MOTOR CO.

10. Rotate the accessory drive belt tensioner counterclockwise and detach the accessory drive belt from the A/C compressor and power steering pump pulleys.

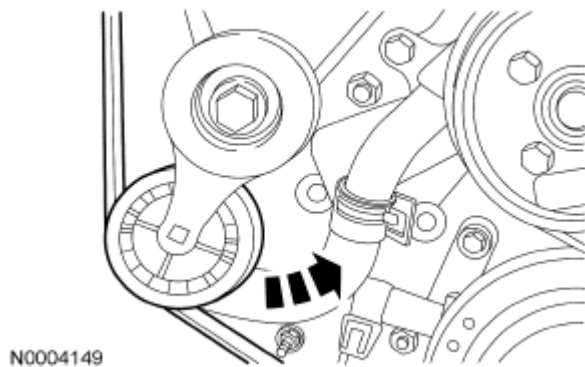


Fig. 139: Rotating Accessory Drive Belt Tensioner
Courtesy of FORD MOTOR CO.

11. Remove the bolts and position the A/C compressor and power steering pump bracket aside.

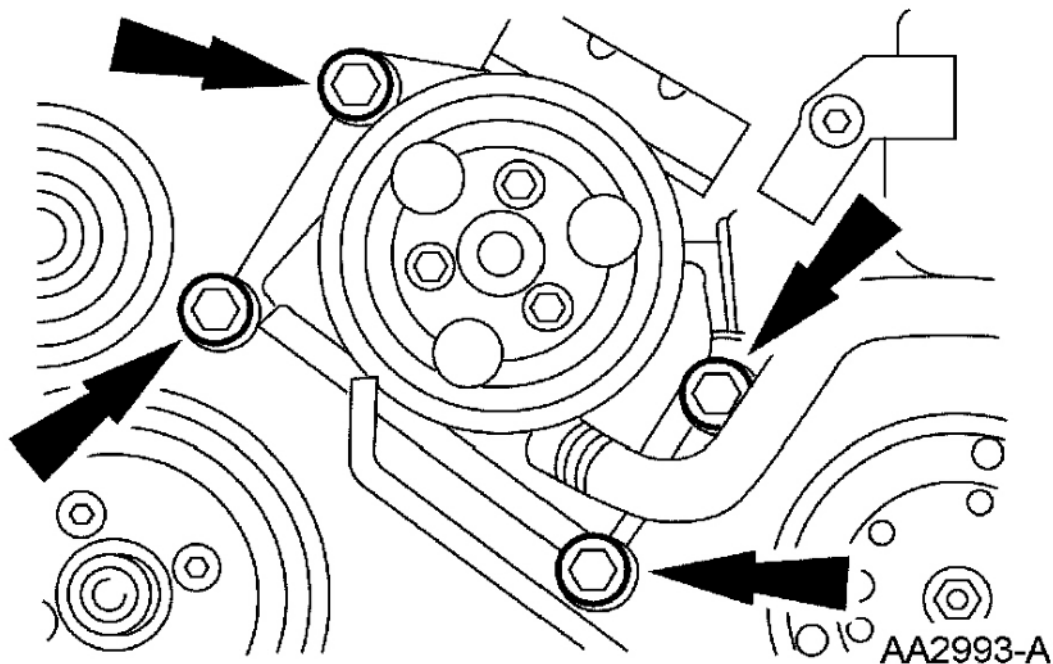


Fig. 140: Locating Accessory Bracket Bolts
Courtesy of FORD MOTOR CO.

12. Install the special tools on the front of the LH camshaft and tighten the 2 top clamp bolts to 10 Nm (89 lb-in).

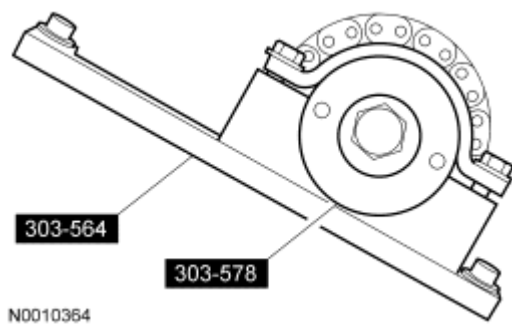
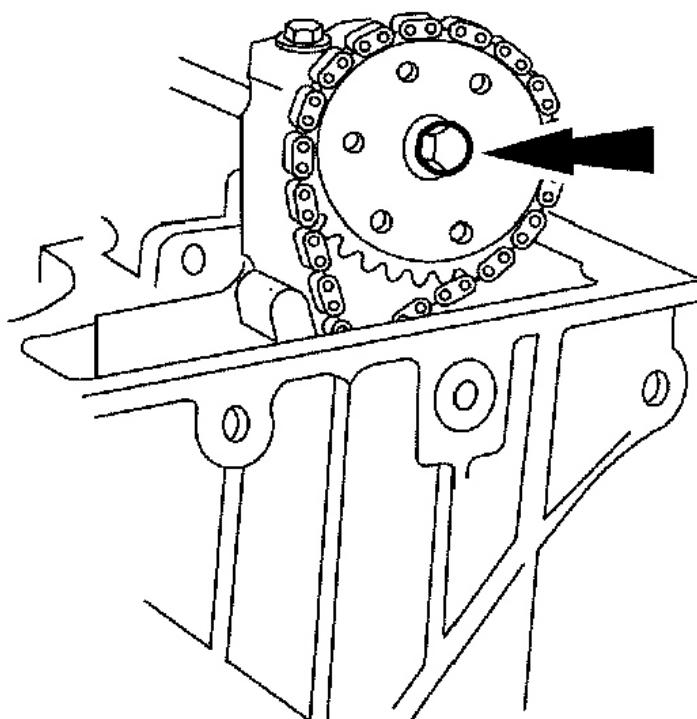


Fig. 141: Identifying Special Holding Tool
Courtesy of FORD MOTOR CO.

13. Loosen the bolt.



GA1669-A

Fig. 142: Identifying LH Camshaft Sprocket Bolt
Courtesy of FORD MOTOR CO.

14. Remove the bolt and position the camshaft sprocket aside.

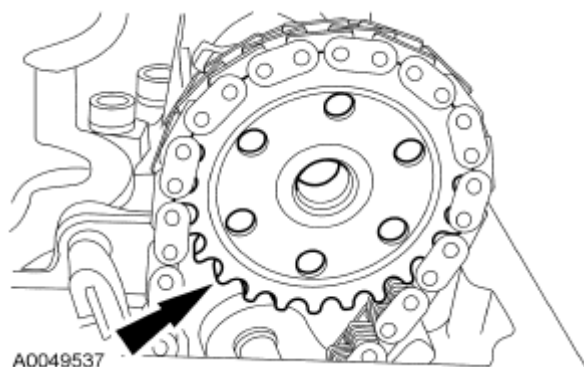


Fig. 143: Locating Camshaft Sprocket
Courtesy of FORD MOTOR CO.

Both sides

NOTE: Mark the position of the camshaft bearing caps so they can be installed in their original positions.

NOTE: Late build vehicles shown, early build vehicles similar.

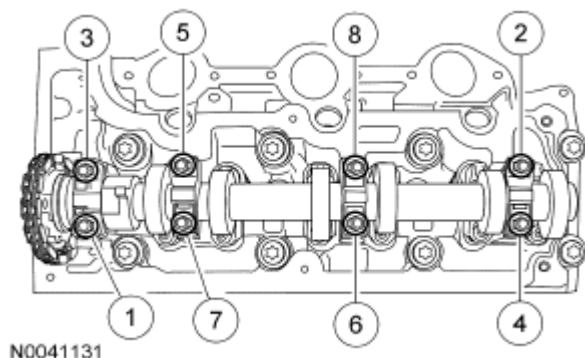


Fig. 144: Identifying Camshaft Bearing Caps Bolts Removing Sequence
Courtesy of FORD MOTOR CO.

15. Remove the bolts in the sequence shown and remove the camshaft bearing caps and, if equipped, the oil supply tube.
16. Remove the camshaft.

Installation

NOTE: Lubricate the camshaft journal bearing surfaces on the cylinder head, the camshaft journals and the camshaft bearing caps with clean engine oil.

Both sides

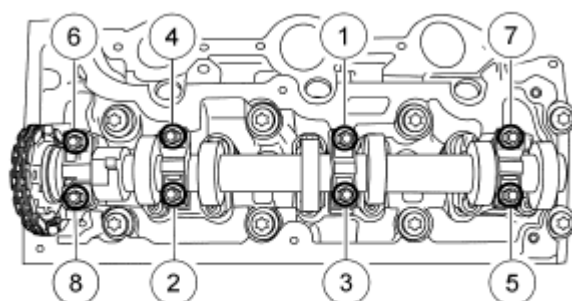
1. Install the camshaft.

NOTE: The camshaft bearing caps must be installed in their original positions.

NOTE: After installing the bolts, check the camshaft for free rotation.

NOTE: Late build vehicles shown, early build vehicles similar.

2. Position the oil supply tube, if equipped, the camshaft bearing caps and the bolts.
 - Tighten the bolts in the sequence shown in 2 stages.
 - Stage 1: Tighten to 6 Nm (53 lb-in).
 - Stage 2: Tighten to 16 Nm (12 lb-ft).



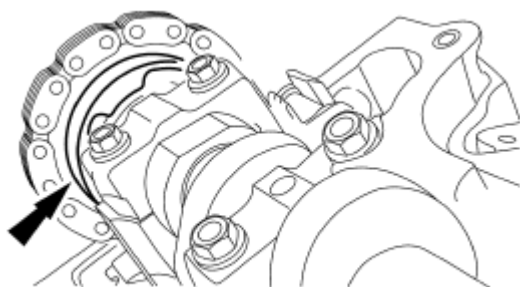
N0041132

Fig. 145: Identifying Camshaft Bearing Caps Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

RH side

CAUTION: The camshaft gear must turn freely on the camshaft. **DO NOT** tighten the bolt at this time. Tightening the bolt can result in incorrect engine timing.

NOTE: Late build vehicles shown, early build vehicles similar.



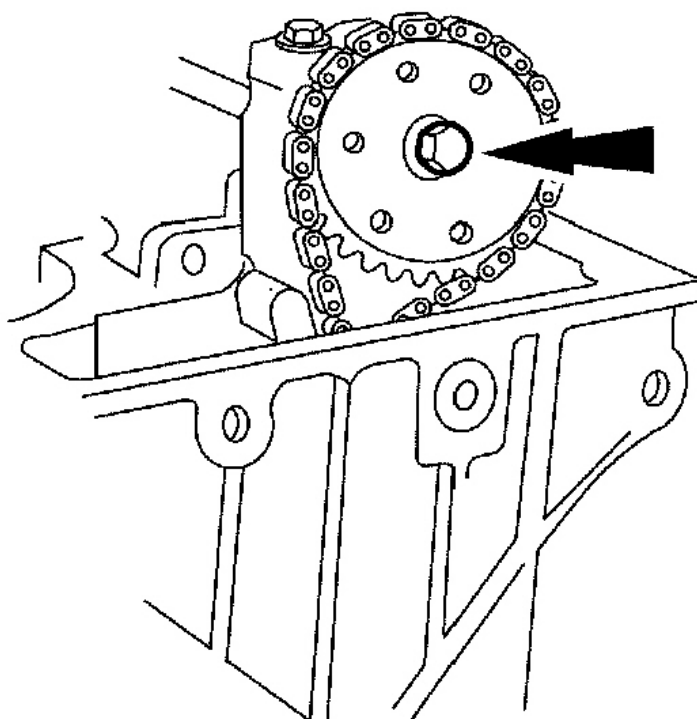
N0041081

Fig. 146: Identifying Camshaft Sprocket
Courtesy of FORD MOTOR CO.

3. Install the camshaft sprocket and loosely install the bolt.

LH side

CAUTION: The camshaft gear must turn freely on the camshaft. **DO NOT** tighten the bolt at this time. Tightening the bolt can result in incorrect engine timing.



GA1669-A

Fig. 147: Identifying LH Camshaft Sprocket Bolt
Courtesy of FORD MOTOR CO.

4. Install the camshaft sprocket and loosely install the bolt.

Both sides

5. Time the camshafts. For additional information, refer to **CAMSHAFT TIMING**.

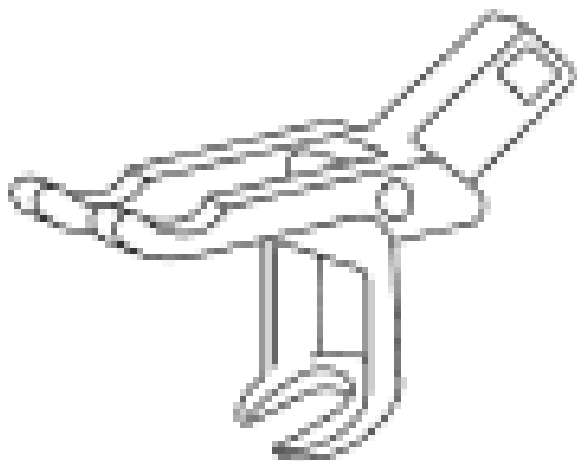
CAMSHAFT ROLLER FOLLOWER

SPECIAL TOOLS

	Compressor, Valve Spring
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2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST1330-A

303-581 (T97T-6565-A)

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada Motorcraft SAE 5W-30 Super Premium Motor Oil CXO-5W30-LSP12) or equivalent	WSS-M2C929-A

Removal and Installation

1. Remove the LH and RH valve covers. For additional information, refer to **VALVE COVER - RH** and **VALVE COVER - LH**.
2. Remove the fuel rail. For additional information, refer to **FUEL CHARGING & CONTROLS - 4.0L SOHC**.
3. Remove the cooling fan. For additional information, refer to **ENGINE COOLING**.

NOTE: Late build vehicles shown, early build vehicles similar.

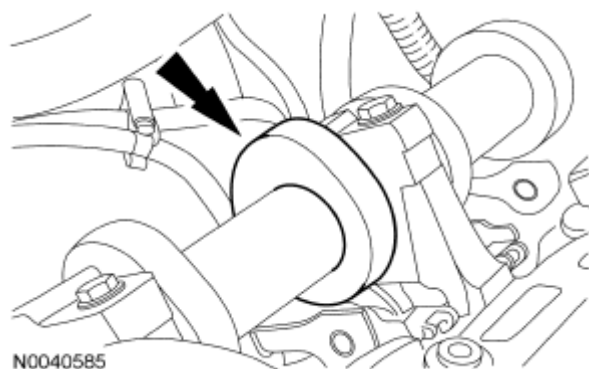


Fig. 148: Locating Crankshaft Lobe
Courtesy of FORD MOTOR CO.

4. Rotate the crankshaft until the camshaft for the cylinder being serviced is at base circle.

NOTE: Mark each camshaft roller follower to make sure it is returned to its original position.

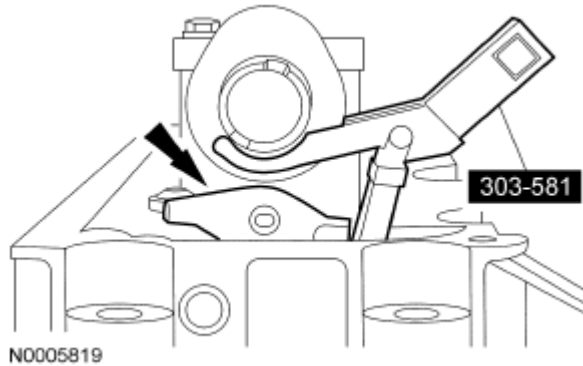


Fig. 149: Locating Camshaft Roller Followers And Special Tools
Courtesy of FORD MOTOR CO.

5. Using the special tool, remove the camshaft roller followers.

NOTE: If a new roller follower is being installed, install the same type of roller follower that was removed. Engines with an oil supply tube and engines without an oil supply tube use different roller followers.

NOTE: The camshaft roller followers must be installed in their original positions.

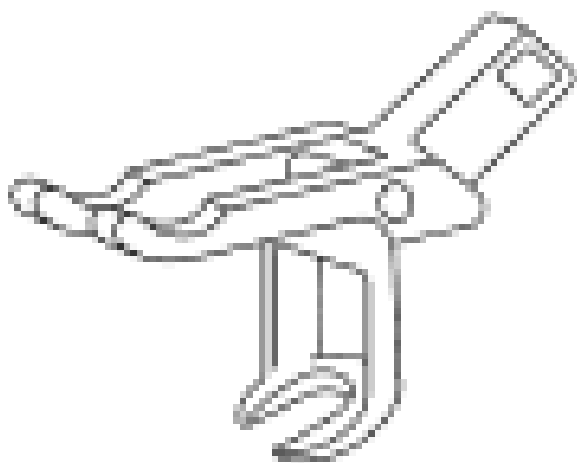
NOTE: Lubricate the camshaft roller followers with clean engine oil.

6. To install, reverse the removal procedure.

VALVE SPRINGS

SPECIAL TOOLS

--	--



ST1330-A

Compressor, Valve Spring
303-581 (T97T-6565-A)

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada Motorcraft SAE 5W-30 Super Premium Motor Oil CXO-5W30-LSP12) or equivalent	WSS-M2C929-A

Removal and Installation

1. Remove the camshaft roller followers. For additional information, refer to **CAMSHAFT ROLLER FOLLOWER**.
2. Position the piston of the cylinder being serviced at top dead center (TDC).

CAUTION: If air pressure has forced the piston to the bottom of the cylinder, any loss of air pressure will allow the valve to fall into the cylinder. If air pressure must be removed, support the valve prior to removal.

3. Hold the valves in the cylinder head.
 - Remove the spark plug of the cylinder being serviced.
 - Use a suitable tool to apply air pressure to the cylinder.
4. Using the special tool, remove the valve spring retainer keys, valve spring retainers and the valve springs.



Fig. 150: Locating Special Tool, Valve Spring Retainer Keys, Valve Spring Retainers And Valve Springs

Courtesy of FORD MOTOR CO.

NOTE: Lubricate the valve springs, retainers and retainer keys with clean engine oil.

5. To install, reverse the removal procedure.

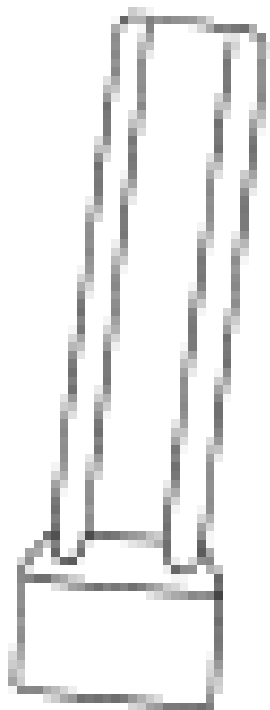
VALVE SEALS

SPECIAL TOOLS

Installer, Valve Stem Seal
303-370 (T90T-6571-A)

2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST1824-A

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada Motorcraft 5W-30 Super Premium Motor Oil CXO-5W30-LSP12) or equivalent	WSS-M2C929-A

Removal

1. Remove the valve springs. For additional information, refer to **VALVE SPRINGS**.
2. Remove the valve seals.

Installation

NOTE: Lubricate the valve seals with clean engine oil.

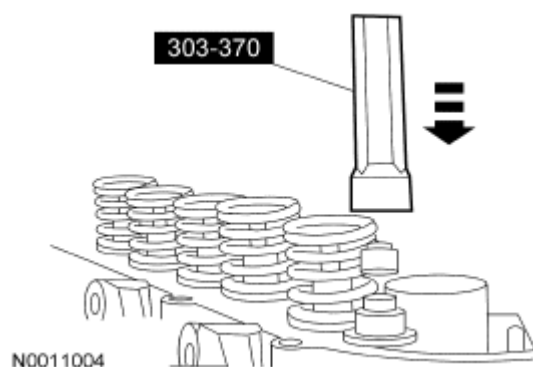


Fig. 151: Using Special Tool To Install Valve Seal
 Courtesy of FORD MOTOR CO.

1. Using the special tool, install the valve seal.
2. Install the valve springs. For additional information, refer to VALVE SPRINGS.

HYDRAULIC LASH ADJUSTER

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada Motorcraft SAE 5W-30 Super Premium Motor Oil CXO-5W30-LSP12) or equivalent	WSS-M2C929-A

Removal and Installation

1. Remove the camshaft roller followers. For additional information, refer to CAMSHAFT ROLLER FOLLOWER.

NOTE: Mark each hydraulic lash adjuster to make sure it is returned to its original position.

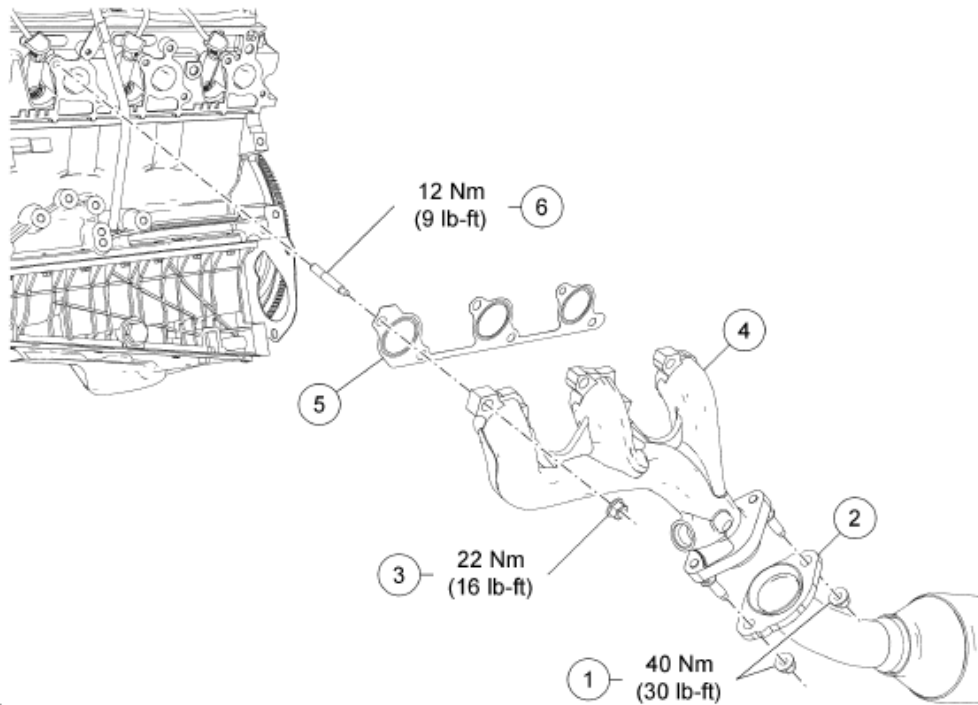
2. Remove the hydraulic lash adjusters.

NOTE: The hydraulic lash adjusters must be installed in their original positions.

NOTE: Lubricate the hydraulic lash adjusters with clean engine oil.

3. To install, reverse the removal procedure.

EXHAUST MANIFOLD - LH



N0043715

Item	Part Number	Description
1	W701706	Exhaust manifold-to-dual converter Y-pipe nuts (4 required)
2	5F250	Dual converter Y-pipe
3	W701706	LH exhaust manifold nut (6 required)
4	9431	LH exhaust manifold
5	9448	LH exhaust manifold gasket
6	W705495	LH exhaust manifold stud (6 required)

Fig. 152: Identifying Exhaust Manifold - LH Components With Torque Specifications
Courtesy of FORD MOTOR CO.

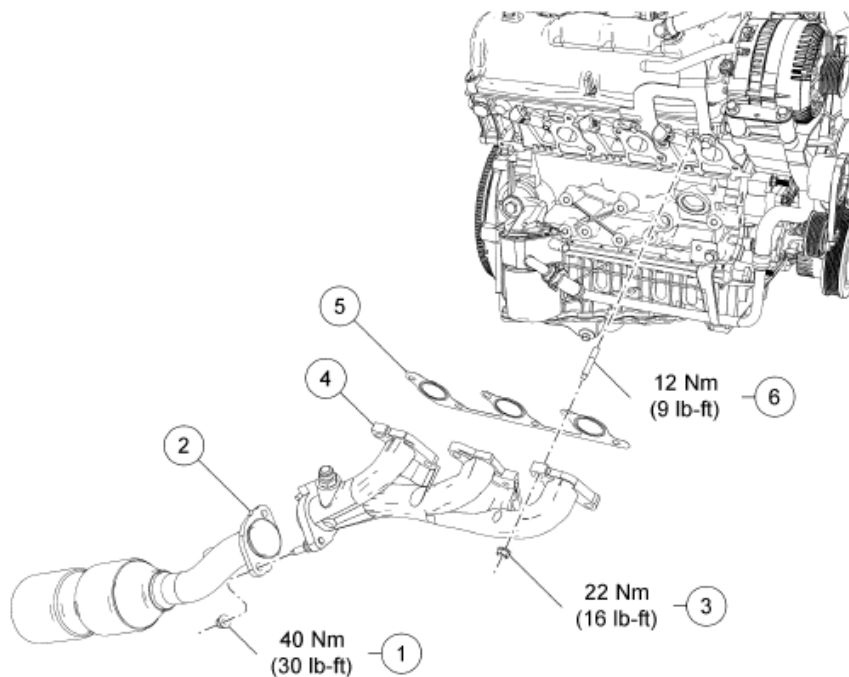
Removal

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.
2. Remove the 4 exhaust manifold-to-dual converter Y-pipe nuts and position the dual converter Y-pipe aside.
3. Remove the 6 nuts, the LH exhaust manifold and the gasket.
 - Discard the nuts and the gasket.
4. Remove and discard the 6 LH exhaust manifold studs.

Installation

1. Inspect the LH exhaust manifold gasket surfaces for flatness. For additional information, refer to **ENGINE SYSTEM-GENERAL INFORMATION**.
2. Install 6 new LH exhaust manifold studs.
 - Tighten to 12 Nm (9 lb-ft).
3. Position a new gasket, the LH exhaust manifold and install 6 new nuts.
 - Tighten to 22 Nm (16 lb-ft).
4. Position the dual converter Y-pipe and install the 4 nuts.
 - Tighten to 40 Nm (30 lb-ft).

EXHAUST MANIFOLD - RH



N0043716

Item	Part Number	Description
1	W701706	Exhaust manifold-to-dual converter Y-pipe nut (4 required)
2	5F250	Dual converter Y-pipe
3	W701706	RH exhaust manifold nut (6 required)
4	9430	RH exhaust manifold
5	9448	RH exhaust manifold gasket
6	W705495	RH exhaust manifold stud (6 required)

Fig. 153: Identifying Exhaust Manifold Components With Torque Specifications
 Courtesy of FORD MOTOR CO.

Removal

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING** .
2. Remove the exhaust gas recirculation (EGR) tube. For additional information, refer to **ENGINE EMISSION CONTROL** .
3. Remove the 4 exhaust manifold-to-dual converter Y-pipe nuts and position the dual converter Y-pipe aside.
4. Remove the 6 nuts, the RH exhaust manifold and the gasket.
 - Discard the nuts and the gasket.
5. Remove and discard the 6 RH exhaust manifold studs.

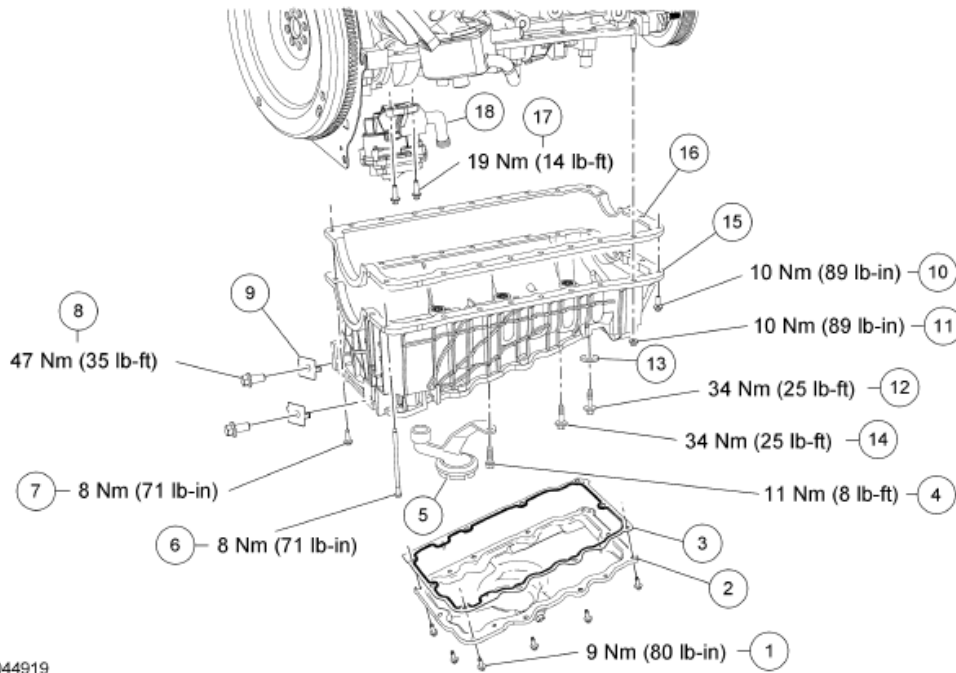
Installation

1. Inspect the RH exhaust manifold gasket surfaces for flatness. For additional information, refer to **ENGINE SYSTEM-GENERAL INFORMATION** .
2. Install 6 new RH exhaust manifold studs.
 - Tighten to 12 Nm (9 lb-ft).
3. Position a new gasket, the RH exhaust manifold and install 6 new nuts.
 - Tighten to 22 Nm (16 lb-ft).
4. Position the dual converter Y-pipe and install the 4 nuts.
 - Tighten to 40 Nm (30 lb-ft).
5. Install the EGR tube. For additional information, refer to **ENGINE EMISSION CONTROL** .

ENGINE LUBRICATION COMPONENTS - EXPLODED VIEW

2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



N0044919

Item	Part Number	Description
1	E802185	Oil pan bolt (12 required)
2	6675	Oil pan
3	6710-A	Oil pan gasket
4	W500214	Oil pump pickup tube bolt
5	6617	Oil pump pickup tube
6	E804588	Cylinder block cradle bolt
7	W709198-S437	Cylinder block cradle bolt
8	E802185	Bell housing-to-lower block cradle bolt (2 required)
9	6C629	Bell housing-to-lower block cradle spacer (2 required)
10	W503275	Lower block cradle bolt (20 required)

Item	Part Number	Description
11	E822125	Lower block cradle nut (2 required)
12	W702323	Lower block cradle bolt (2 required)
13	6734	Washer (2 required)
14	W702323	Lower block cradle bolt (6 required)
15	6F092	Cylinder block cradle
16	6710	Cylinder block cradle gasket
17	W708582	Oil pump bolt (2 required)
18	6600	Oil pump

Fig. 154: Exploded View Of Engine Lubrication Components With Torque Specifications
Courtesy of FORD MOTOR CO.

1. For additional information, refer to the appropriate procedure.

OIL PAN

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada Motorcraft 5W-30 Super Premium Motor Oil CXO-5W30-LSP12) or equivalent	WSS-M2C929-A

Removal and Installation

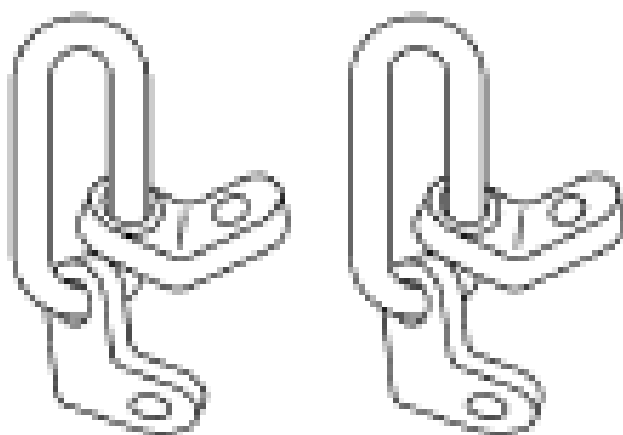
1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.
2. Remove the drain plug and drain the engine oil.
 - To install, tighten to 26 Nm (19 lb-ft).
3. Remove the bolts, the oil pan and the gasket. Discard the gasket.
 - To install, tighten to 9 Nm (80 lb-in).

CAUTION: Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean sealing surfaces. These tools cause scratches and gouges which make leak paths. Use a plastic scraping tool to remove all traces of the old oil pan gasket.

4. Clean and inspect the sealing surfaces.
5. To install, reverse the removal procedure.
6. Fill the engine with clean engine oil.

CYLINDER BLOCK CRADLE

SPECIAL TOOLS

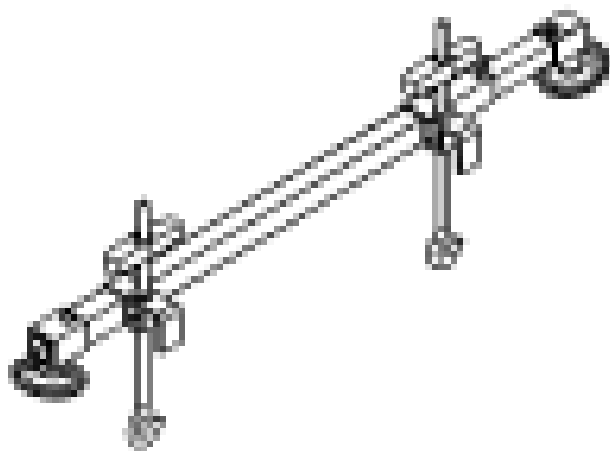


ST1595-A

Lifting Bracket
303-050 (T70P-6000)

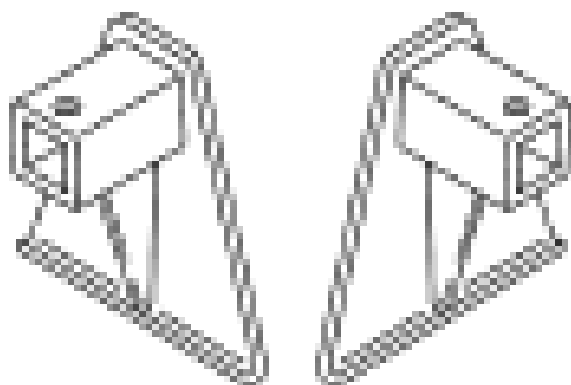
2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST2363-A

Support Bar, Engine
303-290A



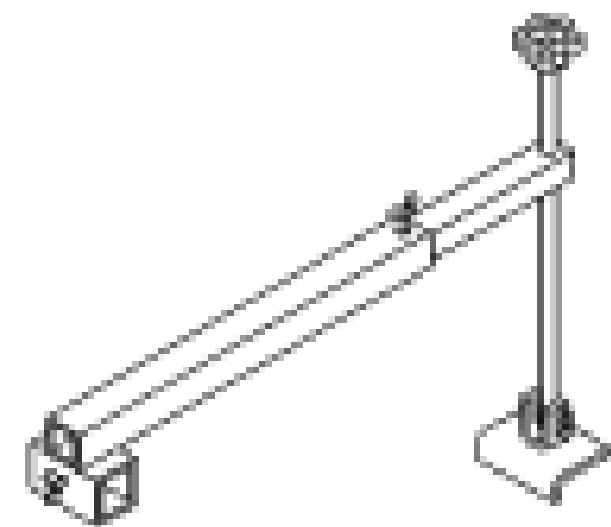
ST2378-A

Adapter for 303-290A
303-290-01

Adapter for 303-290A
303-290A-03A

2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST2379-A

MATERIAL SPECIFICATIONS

Item	Specification
Silicone Gasket Remover ZC-30	-
Motorcraft Metal Surface Prep ZC-31	-
Silicone Gasket and Sealant TA-30	WSE-M4G323-A4

Removal

All vehicles

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING** .
2. Disconnect the battery ground cable. For additional information, refer to **BATTERY, MOUNTING AND CABLES** .
3. Remove the air cleaner outlet tube. For additional information, refer to **INTAKE AIR DISTRIBUTION & FILTERING** .
4. Remove the starter. For additional information, refer to **STARTING SYSTEM** .
5. Remove the oil pan. For additional information, refer to **OIL PAN**.
6. Remove the weatherstrip.

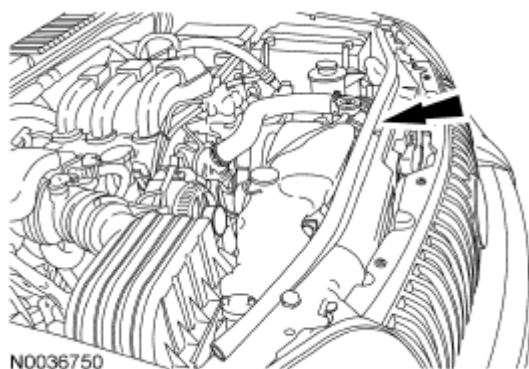


Fig. 155: Locating Weatherstrip
Courtesy of FORD MOTOR CO.

7. Remove the bolt and position the power steering fluid reservoir aside.

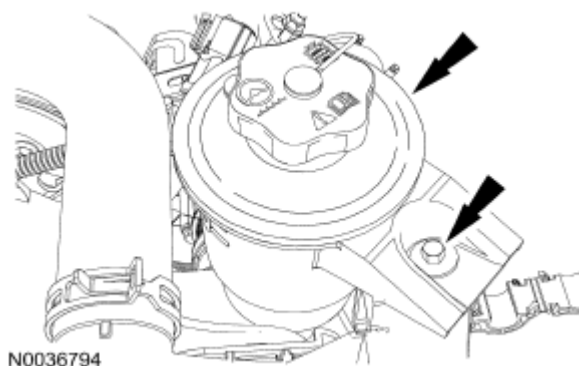


Fig. 156: Locating Power Steering Fluid Reservoir
Courtesy of FORD MOTOR CO.

CAUTION: Allow the engine to cool before removing the coolant expansion tank. The radiator draws coolant from the coolant expansion tank as the engine cools. If the coolant expansion tank is removed before the engine cools, the radiator will draw air into the system, resulting in possible engine damage.

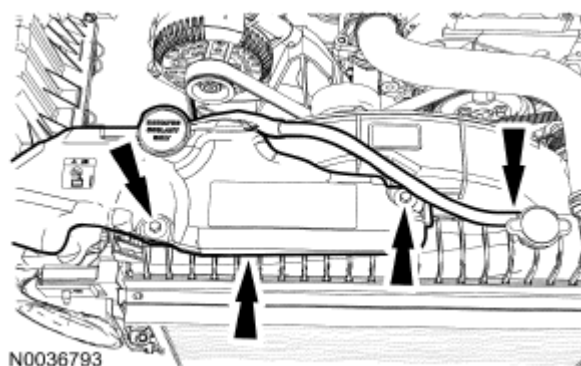
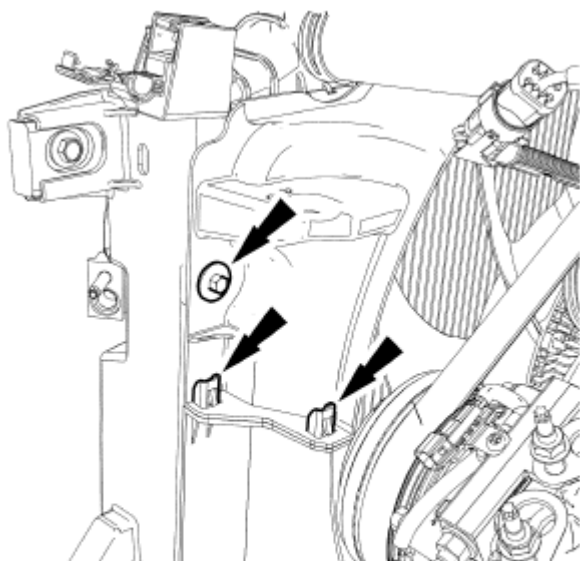


Fig. 157: Locating Coolant Overflow Hose, Bolts And Coolant Expansion Tank
Courtesy of FORD MOTOR CO.

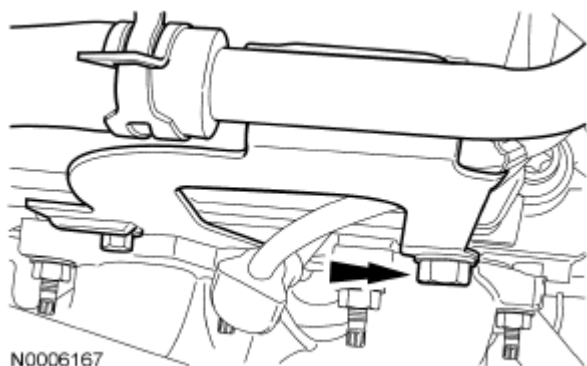
8. Disconnect the coolant overflow hose. Remove the bolts and the coolant expansion tank.
9. Remove the bolts, unclip the clips and remove the upper fan shroud.



N0036752

Fig. 158: Locating Upper Fan Shroud Bolts And Clips
Courtesy of FORD MOTOR CO.

10. Remove the bolt.



N0006167

Fig. 159: Locating Bolt
Courtesy of FORD MOTOR CO.

11. Install the special tool using the previously removed bolt.

- Tighten to 23 Nm (17 lb-ft).

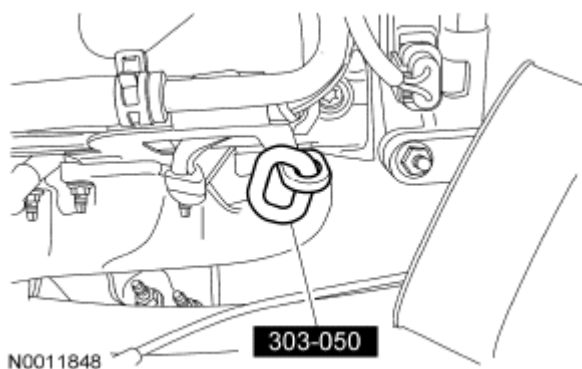


Fig. 160: Locating Special Tool
Courtesy of FORD MOTOR CO.

NOTE: This is not a typical setup. Only the right side of the engine will be raised.

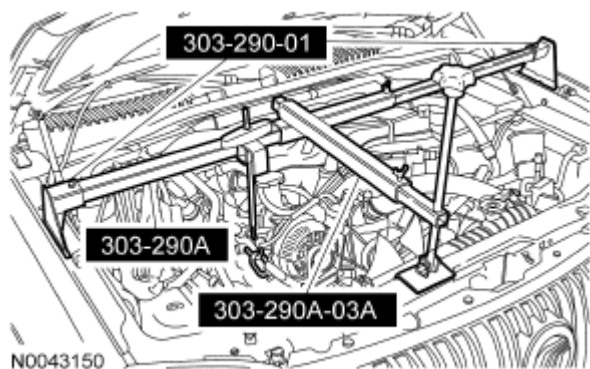


Fig. 161: Identifying Special Tools
Courtesy of FORD MOTOR CO.

12. Install the special tools.

AWD vehicles

13. Remove the bolts and the stabilizer bar brackets.

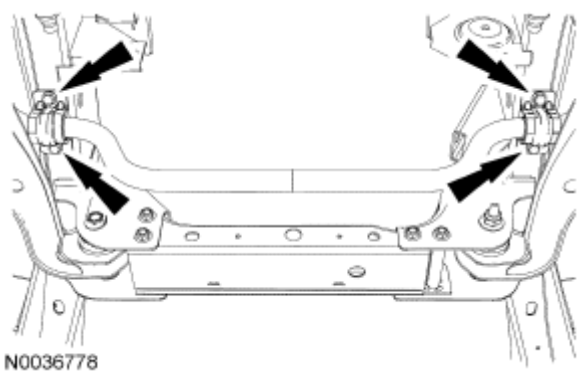


Fig. 162: Locating Bolts And Stabilizer Bar Brackets
Courtesy of FORD MOTOR CO.

14. Remove the bolts and the crossmember.

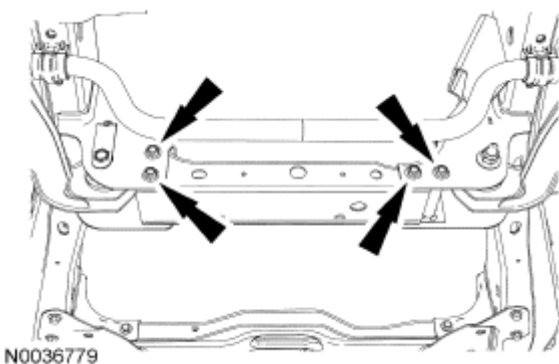


Fig. 163: Locating Crossmember Bolts
Courtesy of FORD MOTOR CO.

All vehicles

15. Remove the RH engine support insulator nut.

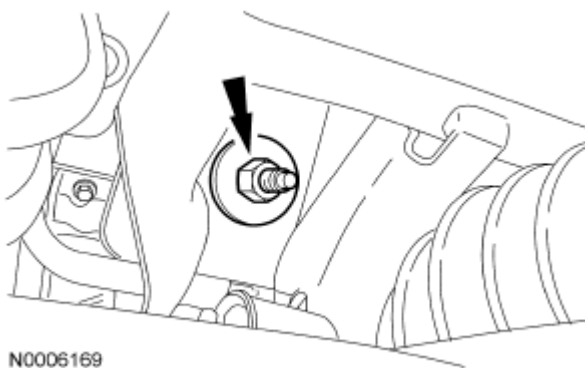


Fig. 164: Locating RH Engine Support Insulator Nut
Courtesy of FORD MOTOR CO.

16. Remove the LH engine support insulator through bolt.

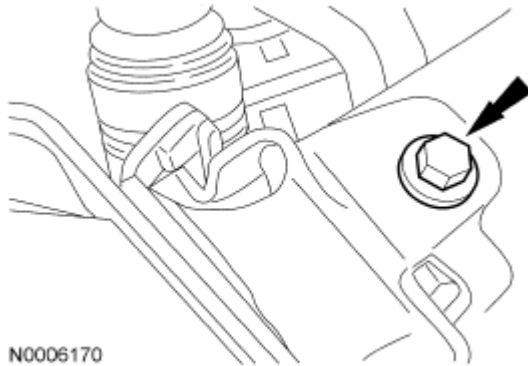


Fig. 165: Locating LH Engine Support Insulator Through Bolt
Courtesy of FORD MOTOR CO.

17. Remove the 2 transmission-to-cylinder block cradle bolts.

NOTE: Cylinder block cradle is shown removed for clarity. Note the location of the 2 Torx® head bolts at the rear of the cylinder block cradle.

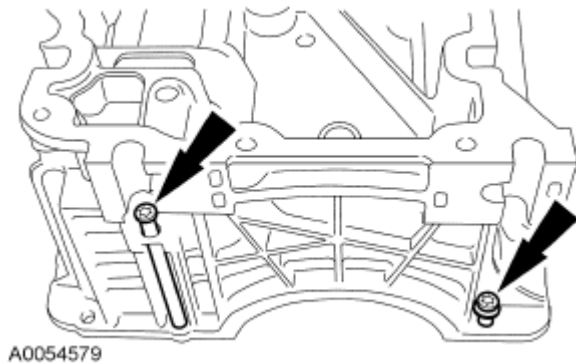


Fig. 166: Locating Cylinder Block Cradle Rear Bolts
Courtesy of FORD MOTOR CO.

18. Remove the cylinder block cradle rear bolts.
19. Remove the 20 bolts and 2 nuts along the outside of the cylinder block cradle.

NOTE: Note the location of the 2 silver-colored bolts that have washer seals. They must be installed in the same position with new washer seals.

20. Remove the 8 cylinder block cradle inner bolts and the 2 washer seals.
• Discard the washer seals.
21. Raise the engine.

AWD vehicles

WARNING: Secure the axle to the jack with a safety strap. Failure to follow these instructions may result in personal injury.

22. Support the front axle with a suitable jack stand.
23. Disconnect the vent hose from the differential housing vent tube.

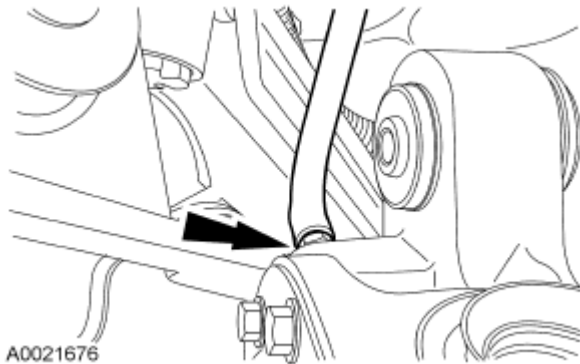


Fig. 167: Locating Vent Hose
Courtesy of FORD MOTOR CO.

24. Remove and discard the axle housing bolts and nuts. Lower the axle.

All vehicles

25. Remove the cylinder block cradle.

Installation**All vehicles**

CAUTION: Failure to back off the set screws can result in damage to the cylinder block cradle.

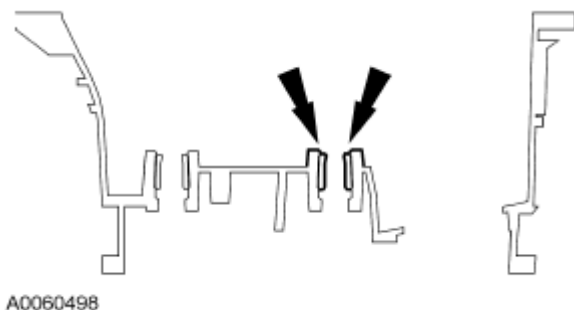


Fig. 168: Locating Cylinder Block Cradle Boss

Courtesy of FORD MOTOR CO.

1. Back the set screws off until they are below the cylinder block cradle boss.

CAUTION: Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges which make leak paths. Use a plastic scraping tool to remove all traces of the old cylinder block cradle gasket and sealant.

NOTE: Gasket material as well as silicone sealant may be present in the cavities in the main bearing cap. This material must be removed completely prior to assembly.

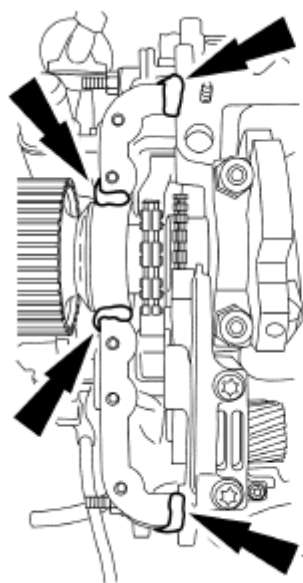


A0082981

Fig. 169: Locating Rear Main Bearing Cap
Courtesy of FORD MOTOR CO.

2. Clean the gasket mating surfaces, making sure all the sealant is removed from the cavities on the rear main bearing cap. To clean the sealing area, use a plastic scraping tool, silicone gasket remover and metal surface prep. Follow the directions on the packaging.

NOTE: If not secured within 4 minutes, the sealant must be removed and the sealing area cleaned. To clean the sealing area, use silicone gasket remover and metal surface prep. Follow the directions on the packaging. Failure to follow this procedure can cause future oil leakage.



A0082980



Fig. 170: Locating Sealing Areas
Courtesy of FORD MOTOR CO.

3. Apply silicone in the 6 places shown.
4. Position a new gasket and the cylinder block cradle. Install the outer 20 bolts and 2 nuts finger tight.
5. Install the 2 cylinder block cradle rear Torx® bolts finger tight.
6. Install the 2 transmission-to-cylinder block cradle bolts.
 - Tighten to 47 Nm (35 lb-ft).

NOTE: **The 20 bolts may or may not have washers. All the bolts should be of the same type.**

7. Tighten the outer 20 bolts and 2 nuts.
 - Tighten the bolts with washers and the nuts to 10 Nm (89 lb-in).
 - Tighten the bolts without washers to 14 Nm (10 lb-ft).
8. Tighten the 2 cylinder block cradle rear Torx® bolts.
 - Tighten to 8 Nm (71 lb-in).

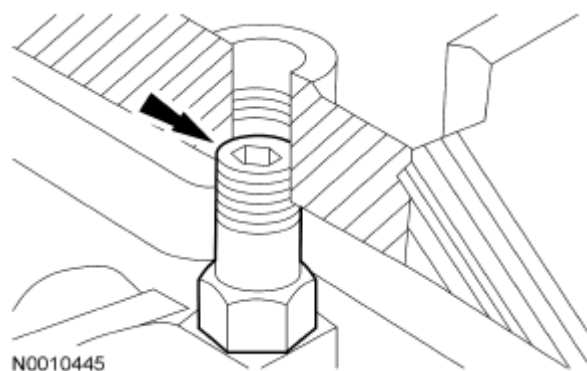


Fig. 171: Locating Cylinder Block Cradle Rear Torx® Bolts
Courtesy of FORD MOTOR CO.

9. Tighten the 8 inserts.
 - Tighten to 3 Nm (27 lb-in).
10. Install the 2 silver-colored bolts and new washer seals finger tight.

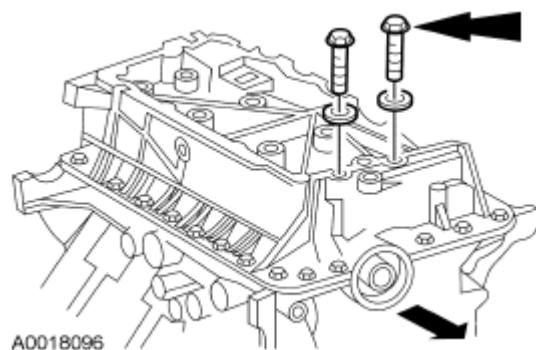


Fig. 172: Locating Silver-Colored Bolts And New Washer Seals
Courtesy of FORD MOTOR CO.

11. Install the 6 remaining inner bolts finger tight.
12. Tighten the 8 inner bolts in the sequence shown in 2 stages.
 - Stage 1: Tighten to 15 Nm (11 lb-ft).
 - Stage 2: Tighten to 34 Nm (25 lb-ft).

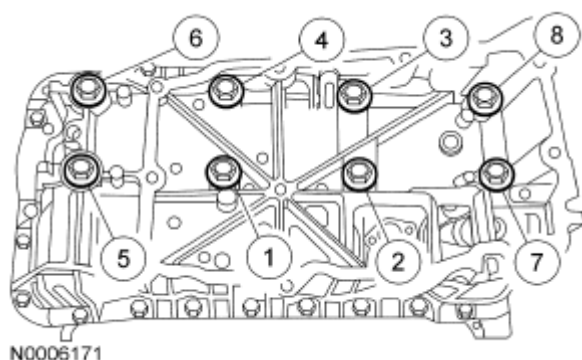


Fig. 173: Identifying Inner Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

ADW vehicles

13. Raise the axle into position and install new bolts and nuts.
 - Tighten to 66 Nm (49 lb-ft).
14. Connect the vent hose to the differential housing vent tube.

All vehicles

15. Lower the engine and remove the special tools.

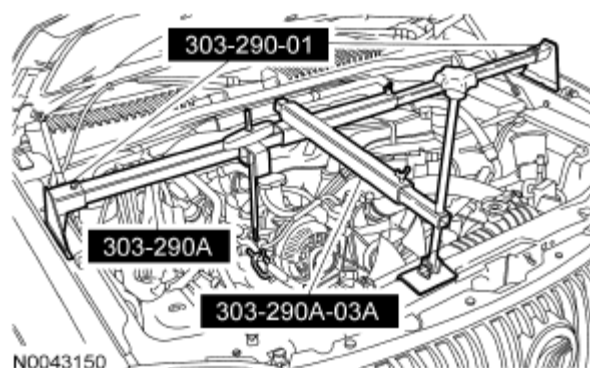


Fig. 174: Identifying Special Tools
Courtesy of FORD MOTOR CO.

16. Install the LH engine support insulator through bolt and nut.
 - Tighten to 103 Nm (76 lb-ft).

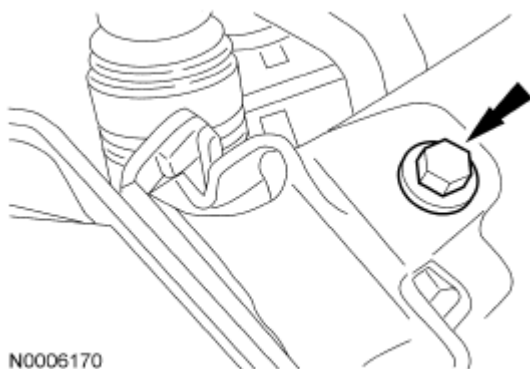


Fig. 175: Locating LH Engine Support Insulator Bolt And Nut
Courtesy of FORD MOTOR CO.

17. Install the RH engine support insulator nut.
- Tighten to 90 Nm (66 lb-ft).

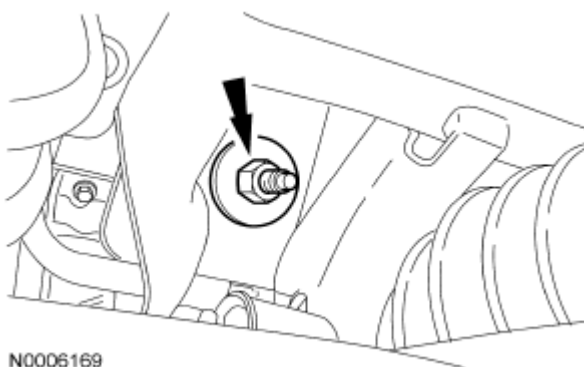


Fig. 176: Locating RH Engine Support Insulator Nut
Courtesy of FORD MOTOR CO.

AWD vehicles

18. Position the crossmember and install the bolts.
- Tighten to 103 Nm (76 lb-ft).

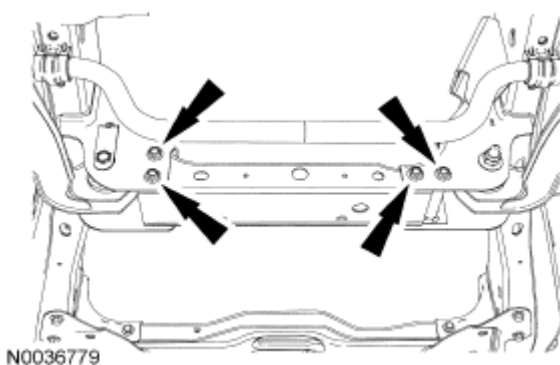


Fig. 177: Locating Crossmember Bolts
Courtesy of FORD MOTOR CO.

19. Position the stabilizer bar brackets and install the bolts.
 - Tighten to 55 Nm (41 lb-ft).

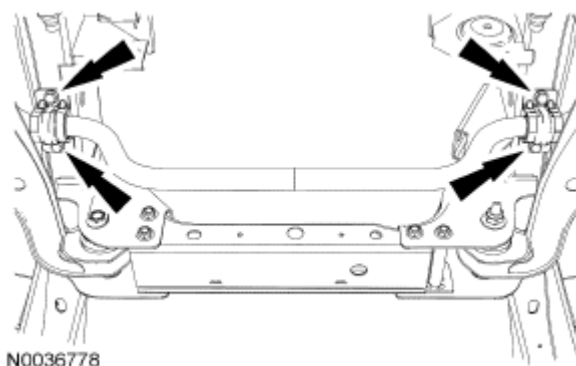


Fig. 178: Locating Stabilizer Bar Bracket Bolts
Courtesy of FORD MOTOR CO.

All vehicles

20. Install the oil pump screen and pickup tube. For additional information, refer to **OIL PUMP SCREEN AND PICKUP TUBE**.
21. Install the starter. For additional information, refer to **STARTING SYSTEM**.
22. Remove the special tool.

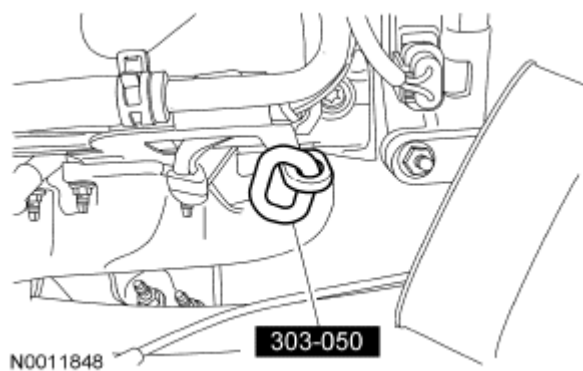


Fig. 179: Locating Special Tool
Courtesy of FORD MOTOR CO.

23. Install the heater hose tube bracket front bolt.
 - Tighten to 34 Nm (25 lb-ft).

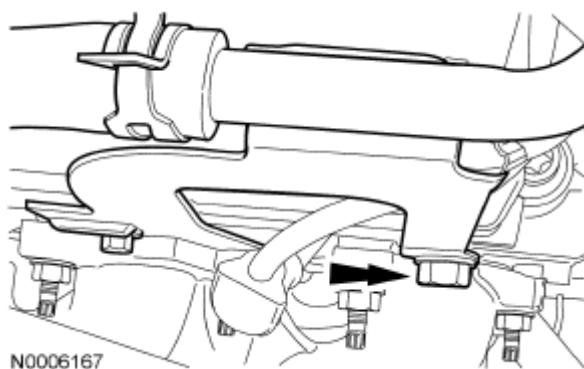


Fig. 180: Locating Heater Hose Tube Bracket Front Bolt
Courtesy of FORD MOTOR CO.

24. Position the upper fan shroud and install the bolts.
- Tighten to 7 Nm (62 lb-in).

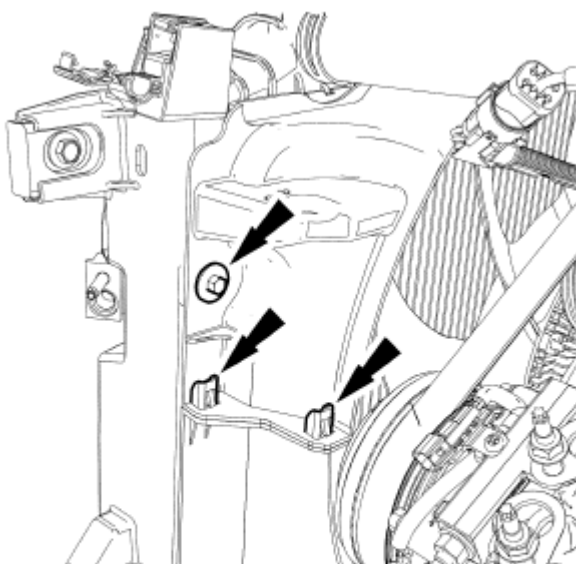


Fig. 181: Locating Upper Fan Shroud Bolts
Courtesy of FORD MOTOR CO.

25. Position the coolant expansion tank, install the bolts and connect the coolant overflow hose.
- Tighten to 7 Nm (62 lb-in).

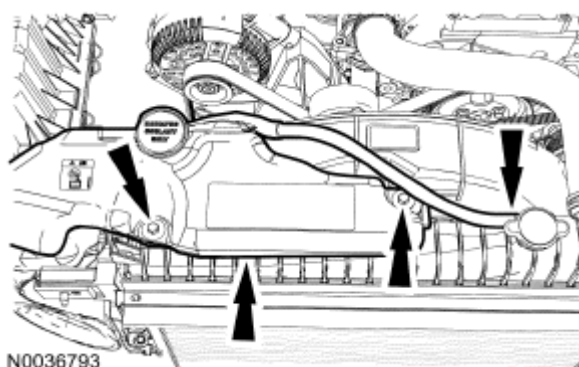


Fig. 182: Identifying Coolant Expansion Tank, Bolts And Coolant Overflow Hose
Courtesy of FORD MOTOR CO.

26. Position the power steering fluid reservoir and install the bolt.
 - Tighten to 7 Nm (62 lb-in).

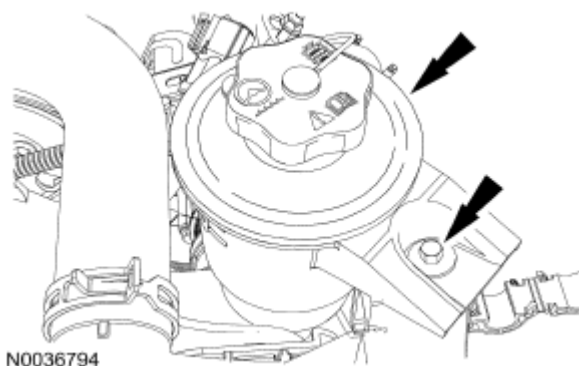


Fig. 183: Identifying Power Steering Fluid Reservoir And Bolt
Courtesy of FORD MOTOR CO.

27. Install the weatherstrip.

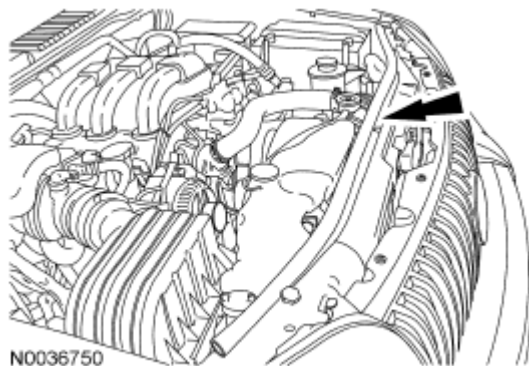


Fig. 184: Identifying Weatherstrip
Courtesy of FORD MOTOR CO.

28. Install the air cleaner outlet pipe. For additional information, refer to **INTAKE AIR DISTRIBUTION & FILTERING**.
29. Connect the battery ground cable. For additional information, refer to **BATTERY, MOUNTING AND CABLES**.

OIL PUMP

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada Motorcraft SAE 5W-30 Super Premium Motor Oil CXO-5W30-LSP12) or equivalent	WSS-M2C929-A

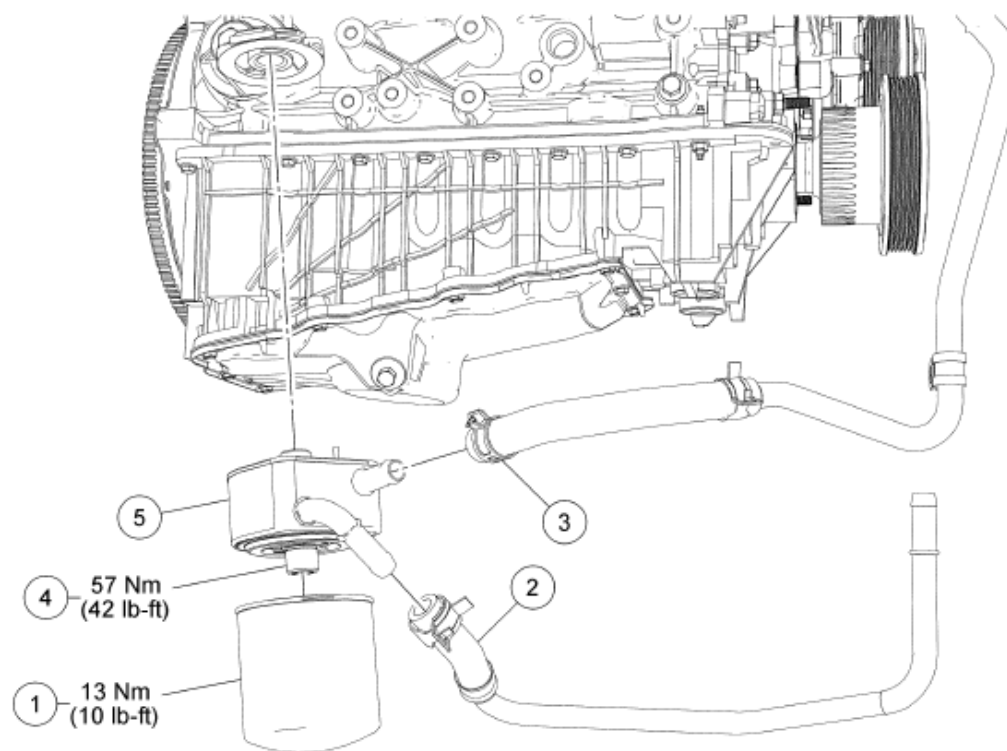
1. Remove the cylinder block cradle. For additional information, refer to **CYLINDER BLOCK CRADLE**.
2. Remove the bolts and the oil pump.
 - To install, tighten to 19 Nm (14 lb-ft).
3. To install, reverse the removal procedure.

OIL PUMP SCREEN AND PICKUP TUBE

Removal and Installation

1. Remove the oil pan. For additional information, refer to **OIL PAN**.
2. Remove the bolt and the oil pump screen and pickup tube.
 - To install, tighten to 10 Nm (89 lb-in).
3. To install, reverse the removal procedure.

OIL COOLER



Item	Part Number	Description
1	6714	Oil filter
2	6N867	Oil cooler inlet hose
3	84947	Heater hose
4	—	Oil cooler threaded insert (part of 6A642)
5	6A642	Oil cooler

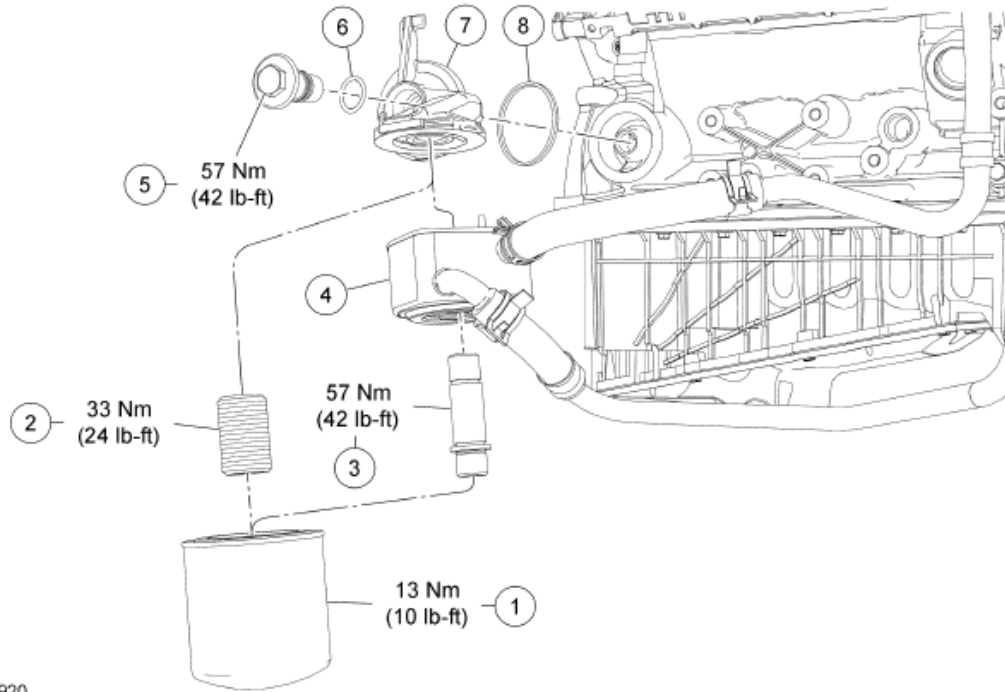
Fig. 185: Identifying Oil Cooler With Torque Specifications
 Courtesy of FORD MOTOR CO.

Removal and Installation

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.
2. Drain the cooling system. For additional information, refer to **ENGINE COOLING**.
3. Remove and discard the oil filter.
 - To install, tighten to 13 Nm (10 lb-ft).
4. Disconnect the oil cooler inlet hose from the oil cooler.
5. Disconnect the heater hose from the oil cooler.
6. Loosen the threaded insert and remove the oil cooler.
 - To install, tighten to 57 Nm (42 lb-ft).
7. To install, reverse the removal procedure.

- Install a new oil filter.
- Check the engine oil and fill as necessary.

OIL FILTER ADAPTER



N0044920

Item	Part Number	Description
1	6714	Oil filter
2	6890	Oil filter adapter threaded insert (vehicles without an oil cooler)
3	—	Oil cooler threaded insert (part of 6A642) (oil cooler equipped vehicles only)
4	6A642	Oil cooler (oil cooler equipped vehicles only)
5	6895	Oil filter adapter bolt
6	E853188	Oil filter adapter bolt O-ring seal
7	6884	Oil filter adapter
8	6L621	Oil filter adapter gasket

Fig. 186: Identifying Oil Filter Adapter With Torque Specifications
Courtesy of FORD MOTOR CO.

Removal and Installation

All vehicles

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.
2. Remove and discard the oil filter.
 - To install, tighten to 13 Nm (10 lb-ft).

Vehicles equipped with an oil cooler

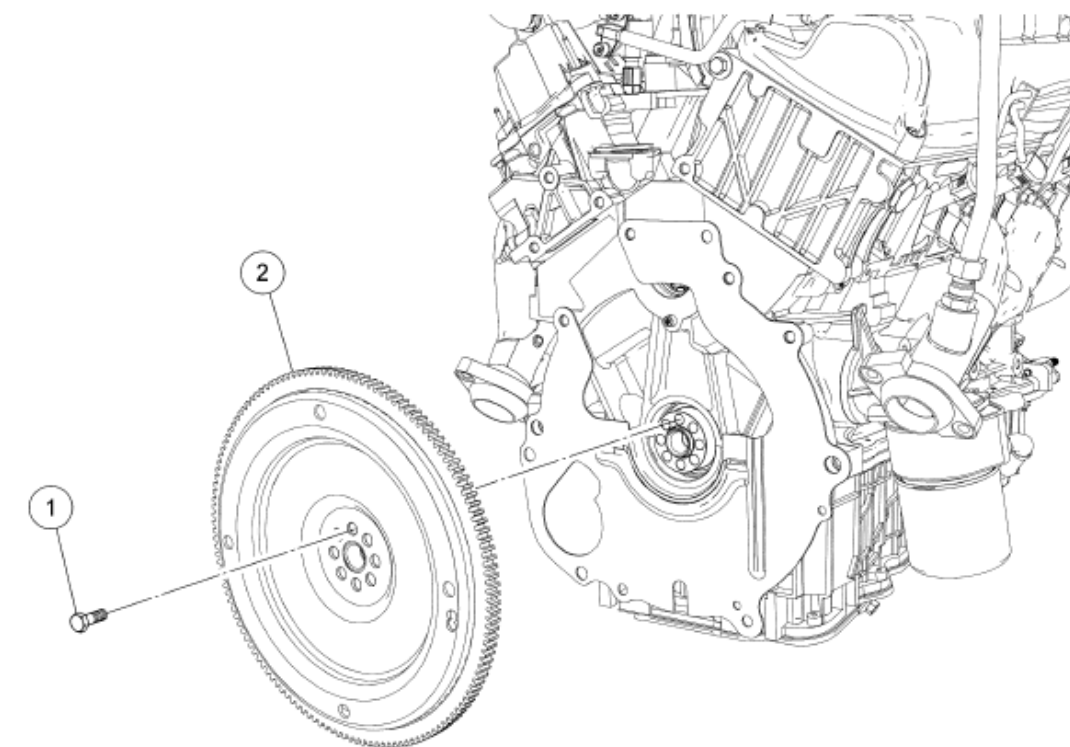
NOTE: **The oil cooler threaded insert is part of the oil cooler and is not removed.**

3. Loosen the oil cooler threaded insert and position the oil cooler aside.
 - To install, tighten to 57 Nm (42 lb-ft).

All vehicles

4. Remove the bolt and the oil filter adapter.
 - To install, tighten to 57 Nm (42 lb-ft).
5. To install, reverse the removal procedure.
 - Install a new oil filter.
 - Check the engine oil and fill as necessary.

FLEXPLATE



N0036792

Item	Part Number	Description
1	6379	Flexplate bolt (8 required)
2	6375	Flexplate

Fig. 187: Identifying Flexplate And Bolts
Courtesy of FORD MOTOR CO.

Removal

1. Remove the transmission. For additional information, refer to **AUTOMATIC TRANSAXLE/TRANSMISSION - 5R55S**.
2. Remove the bolts and the flexplate.

Installation

NOTE: Special bolts are used for flexplate installation. Do not use standard bolts.

1. Install the flexplate. Tighten the bolts in 2 stages in the sequence shown.
 - Stage 1: Tighten to 13 Nm (10 lb-ft).
 - Stage 2: Tighten to 71 Nm (52 lb-ft).

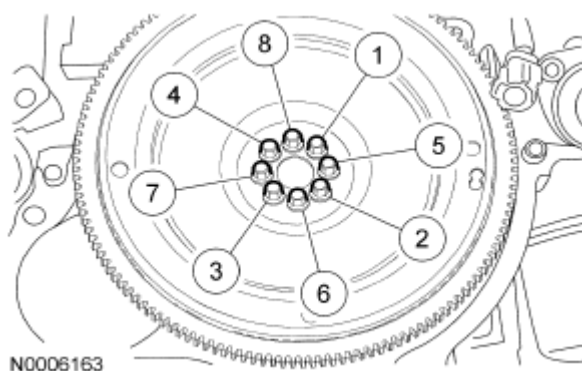


Fig. 188: Identifying Flexplate Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

2. Install the transmission. For additional information, refer to **AUTOMATIC TRANSAXLE/TRANSMISSION - 5R55S**.

CRANKSHAFT REAR SEAL

SPECIAL TOOLS



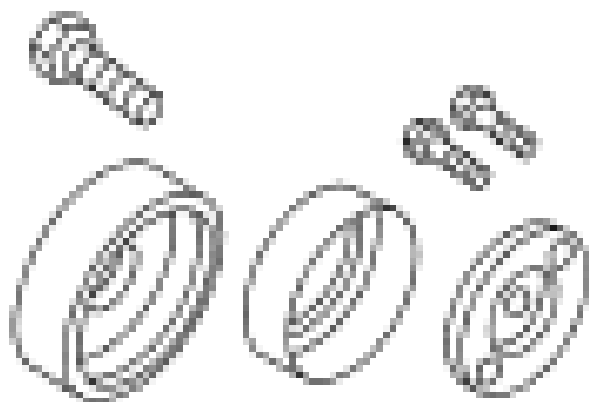
ST1385-A

Remover, Oil Seal
303-409 (T92C-6700-CH)

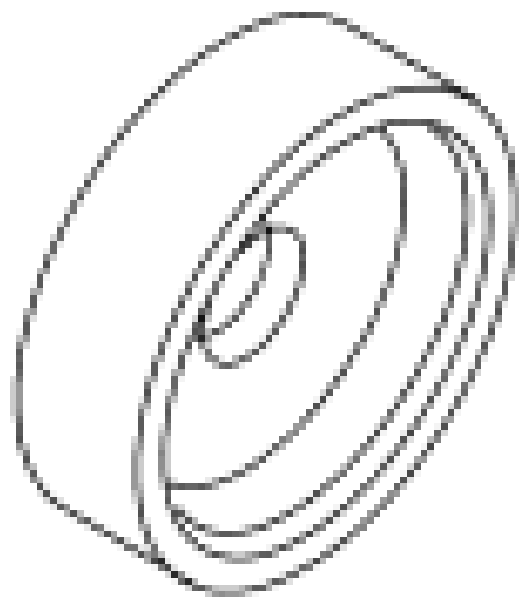
Service Set, Crankshaft Rear Oil Seal
303-S524 (T95T-6701-AR)

2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST1785-A



ST2132-A

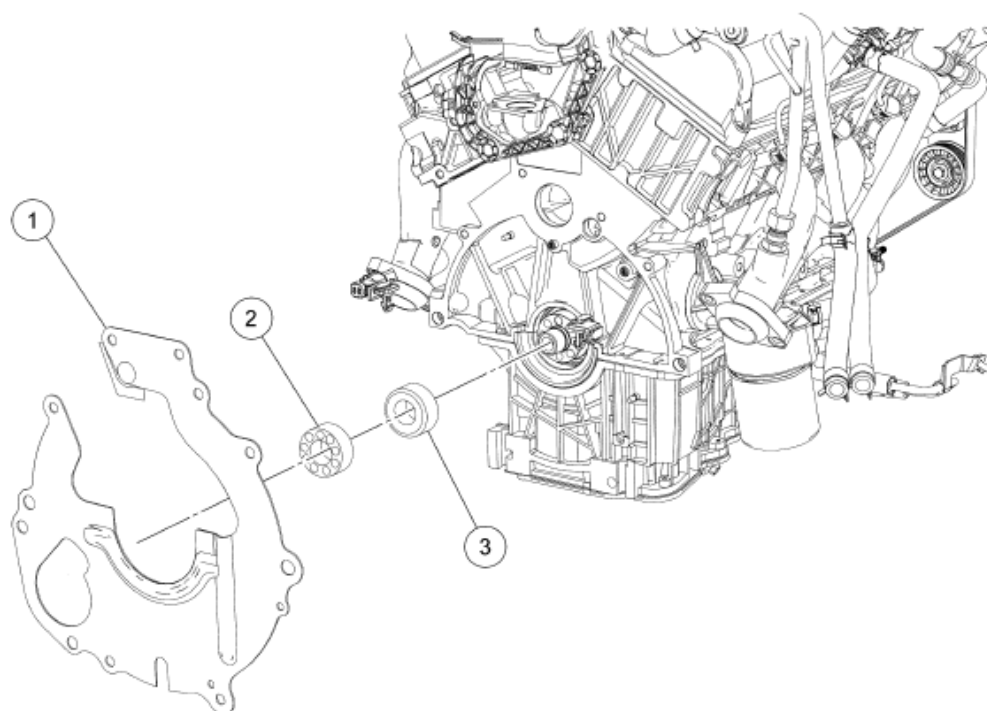
Installer, Crankshaft Rear Oil Seal
303-579 (T97T-6701-A)

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada	WSS-

Motorcraft SAE 5W-30 Super Premium Motor Oil CXO-5W30-LSP12) or equivalent

M2C929-A



N0005875

Item	Part Number	Description
1	6A373	Spacer plate
2	6434	Flexplate-to-crankshaft spacer
3	6701	Crankshaft rear seal

Fig. 189: Identifying Crankshaft Rear Seal Components

Courtesy of FORD MOTOR CO.

Removal

1. Remove the flexplate. For additional information, refer to **FLEXPLATE**.
2. Remove the spacer plate.
3. Remove the flexplate-to-crankshaft spacer.

NOTE: The crankshaft rear seal may have a metal speedy sleeve. This sleeve must be removed before attempting to remove the seal.

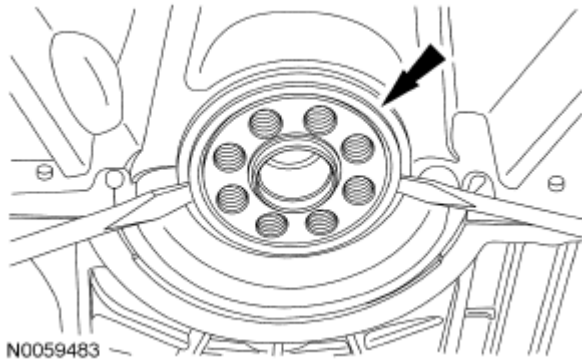


Fig. 190: Locating Speedy Sleeve
Courtesy of FORD MOTOR CO.

4. If necessary, remove the speedy sleeve using 2 screwdrivers or small pry bars.

CAUTION: Avoid scratching or damaging the crankshaft rear seal running surface during removal of the crankshaft rear seal.

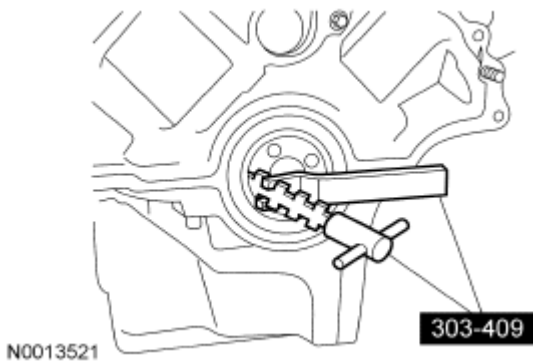


Fig. 191: Identifying Special Tool
Courtesy of FORD MOTOR CO.

5. Using the special tool, remove the crankshaft rear seal.

Installation

NOTE: Be sure the crankshaft rear sealing surface is clean and free of any rust or corrosion. To clean the crankshaft rear seal surface area, use extra-fine emery cloth or extra-fine 0000 steel wool with metal surface prep.

1. Lubricate the crankshaft rear oil seal with clean engine oil.
2. Install the special tools.

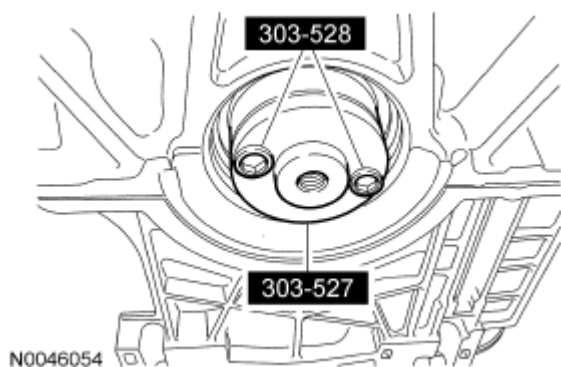


Fig. 192: Identifying Special Tools
Courtesy of FORD MOTOR CO.

3. Position the crankshaft rear seal.

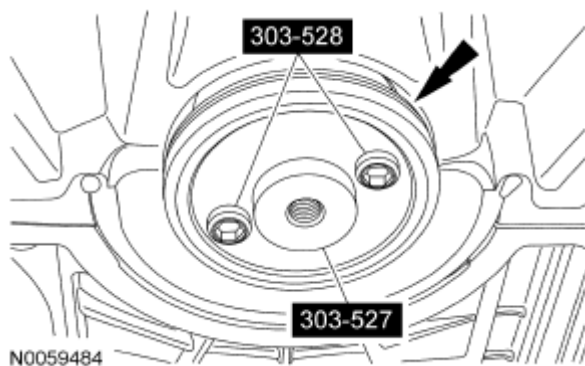


Fig. 193: Identifying Crankshaft Rear Seal
Courtesy of FORD MOTOR CO.

4. Using the special tool, install the crankshaft rear seal.

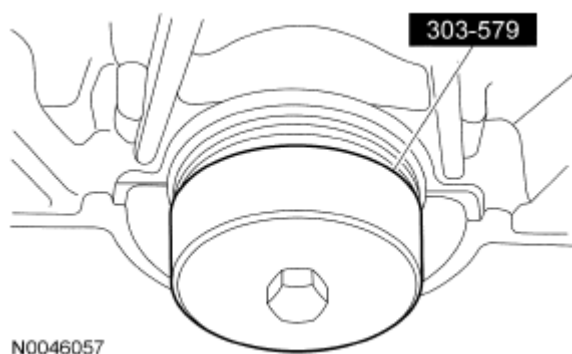


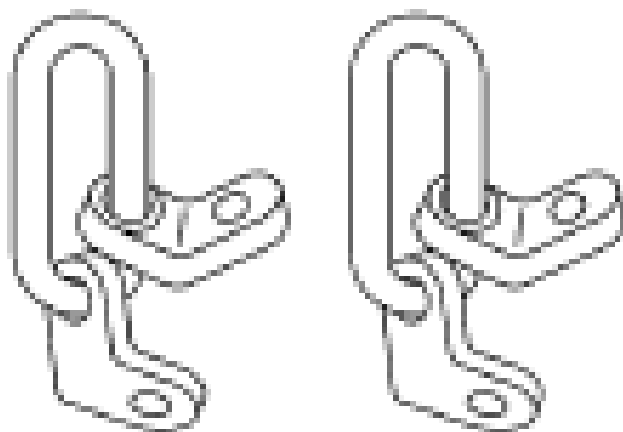
Fig. 194: Identifying Crankshaft Rear Seal
Courtesy of FORD MOTOR CO.

5. Install the flexplate-to-crankshaft spacer.

6. Install the spacer plate.
7. Install the flexplate. For additional information, refer to **FLEXPLATE**.

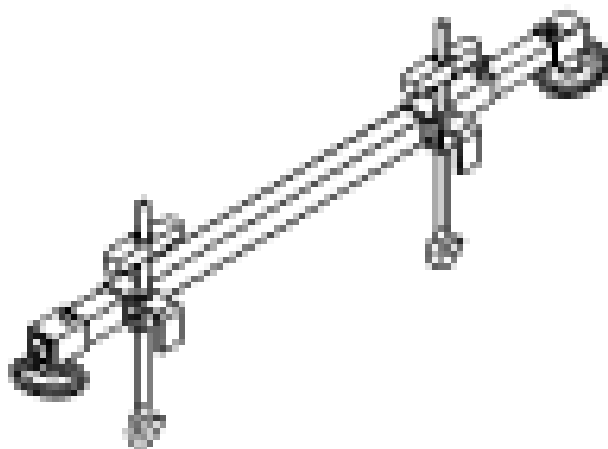
ENGINE SUPPORT INSULATORS

SPECIAL TOOLS



ST1595-A

Lifting Bracket
303-050 (T70P-6000)

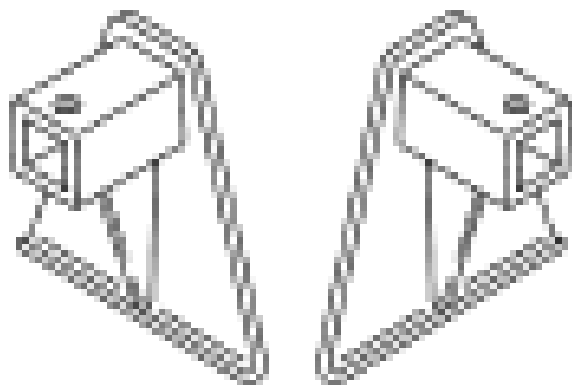


ST2363-A

Support Bar, Engine
303-290A

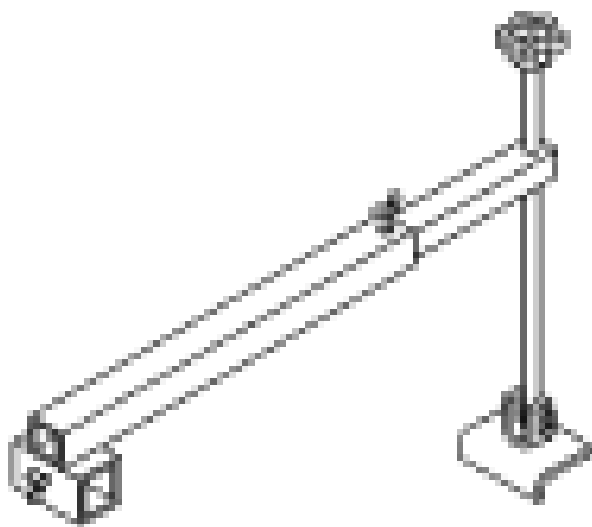
2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST2378-A

Adapter for 303-290A
303-290-01

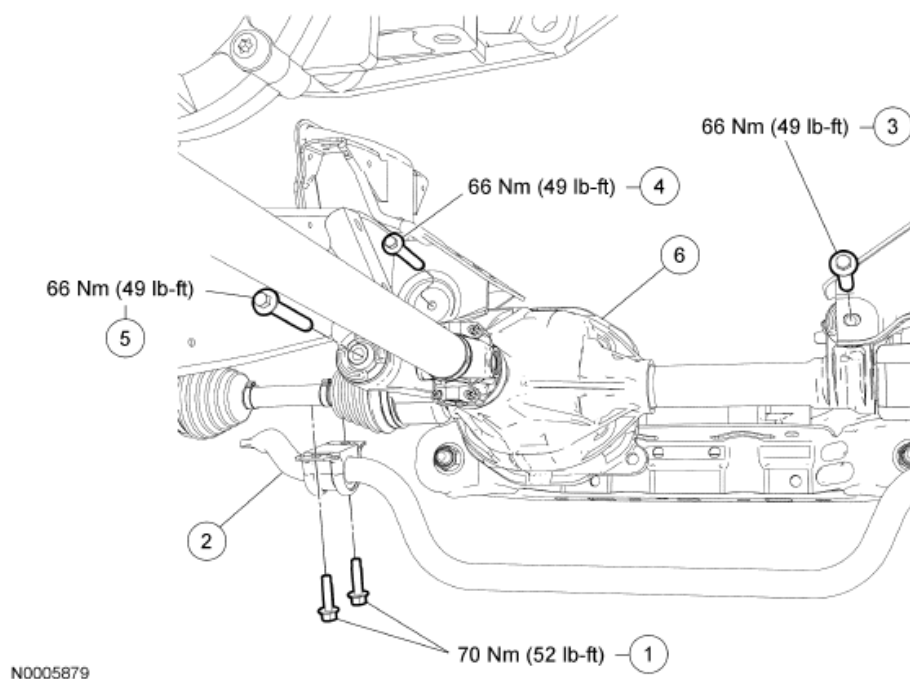


ST2379-A

Adapter for 303-290A
303-290A-03A

2006 Mercury Mountaineer

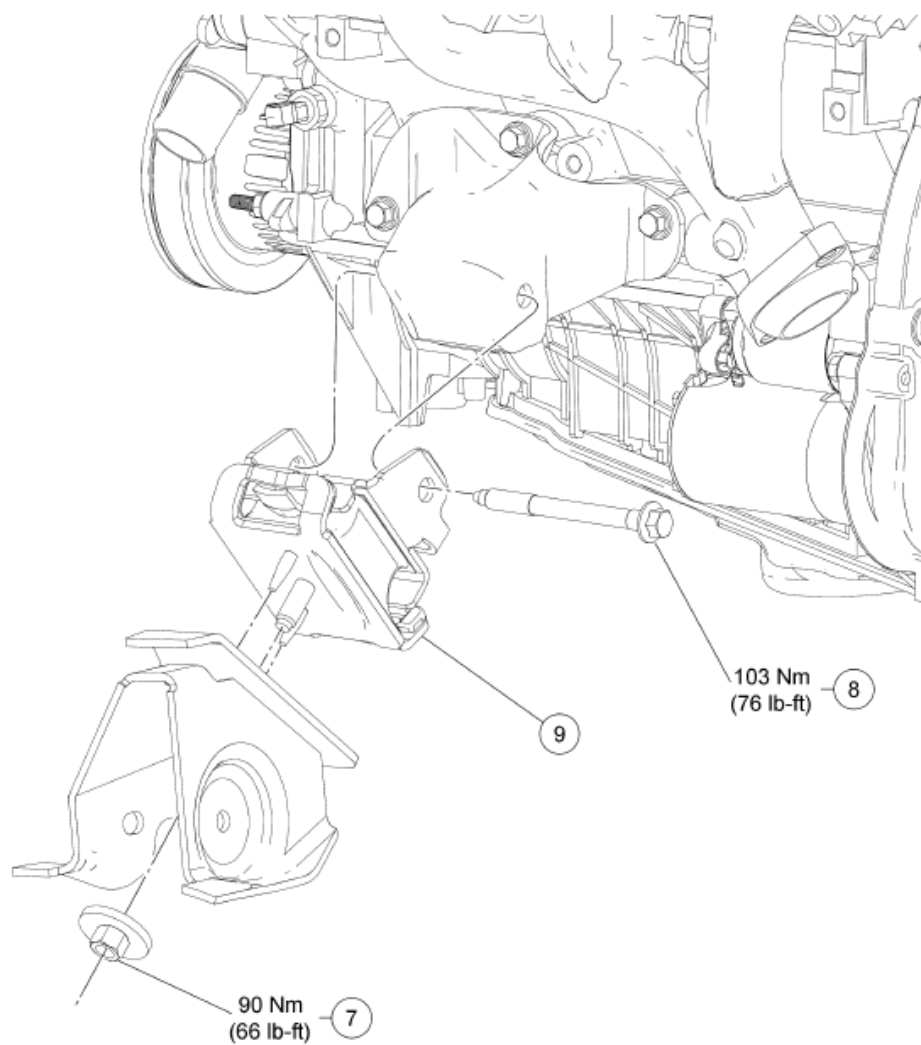
2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



Item	Part Number	Description
1	W707472	Stabilizer bar bracket bolts (4 required)
2	5482	Stabilizer bar
3	—	Axle housing bolt

Item	Part Number	Description
4	—	Axle housing bolt
5	—	Axle housing bolt
6	3010	Axle housing

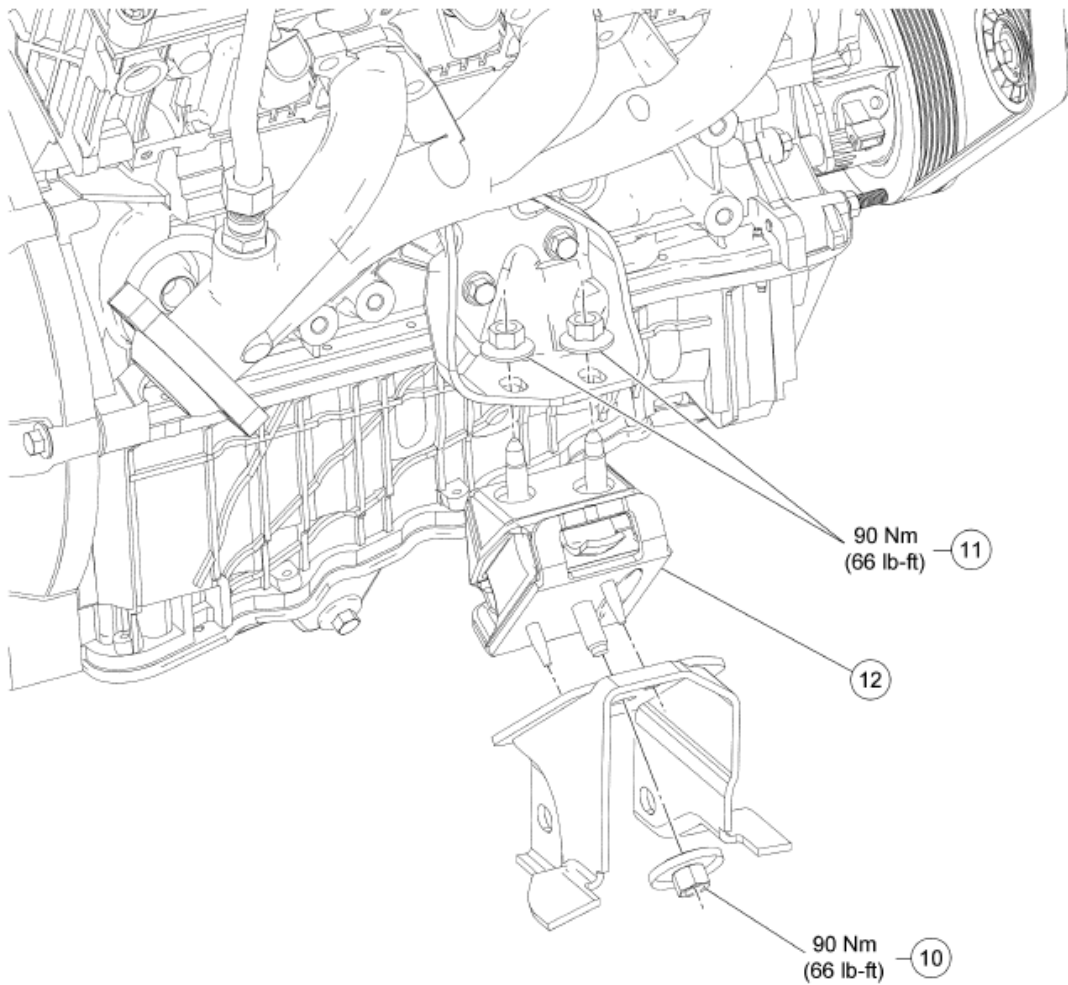
Fig. 195: Identifying Engine Support Insulators - Four Wheel Drive
Courtesy of FORD MOTOR CO.



N0005878

Item	Part Number	Description
7	N802330	LH engine support insulator nut
8	W705694	LH engine support insulator through bolt
9	6038B	LH engine support insulator

Fig. 196: Identifying Engine Support Insulators (With Torque Specifications) - All Vehicles (Items 7-9)
 Courtesy of FORD MOTOR CO.



N0005877

Item	Part Number	Description
10	N802330	RH engine support insulator lower nut
11	N802653	RH engine support insulator upper nuts (2 required)
12	6038A	RH engine support insulator

Fig. 197: Identifying Engine Support Insulators (With Torque Specifications) - All Vehicles (Items 10-12)
 Courtesy of FORD MOTOR CO.

Removal and Installation

CAUTION: Any time bolts, washers, spacers or nuts are loosened in the differential support for any reason, install new components to prevent damage.

All vehicles

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.
2. Disconnect the battery ground cable. For additional information, refer to **BATTERY, MOUNTING AND CABLES**.
3. Remove the weatherstrip.

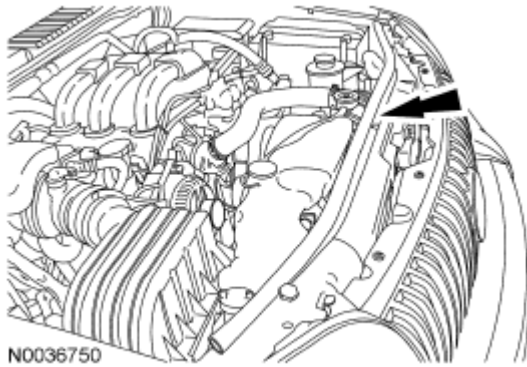


Fig. 198: Locating Weatherstrip
Courtesy of FORD MOTOR CO.

4. Remove the bolt and position the power steering fluid reservoir aside.
 - To install, tighten to 7 Nm (62 lb-in).

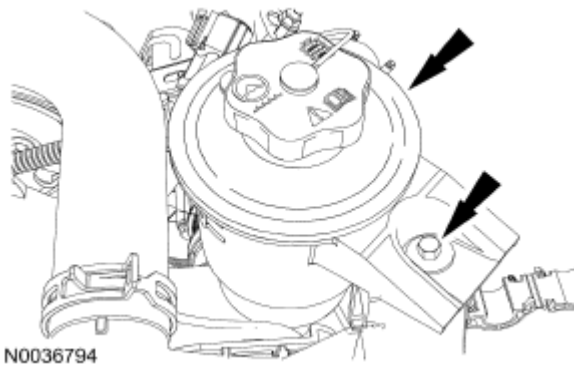


Fig. 199: Identifying Power Steering Fluid Reservoir
Courtesy of FORD MOTOR CO.

CAUTION: Allow the engine to cool before removing the coolant expansion tank. The radiator draws coolant from the coolant expansion tank as the engine cools. If the coolant expansion tank is removed before the engine cools, the radiator will draw air into the system, resulting in possible engine damage.

5. Disconnect the coolant overflow hose. Remove the bolts and the coolant expansion tank.
 - To install, tighten to 7 Nm (62 lb-in).

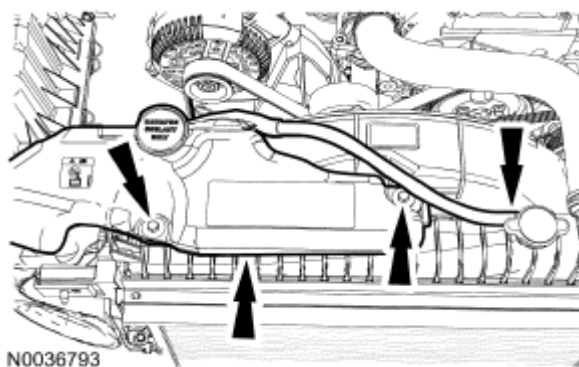


Fig. 200: Locating Coolant Overflow Hose, Bolts And Coolant Expansion Tank
Courtesy of FORD MOTOR CO.

6. Remove the bolts, unclip the clips and remove the upper fan shroud.
 - To install, tighten to 7 Nm (62 lb-in).

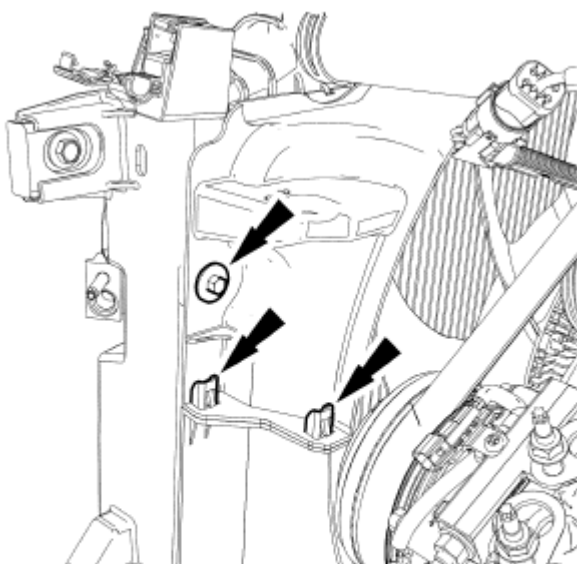


Fig. 201: Locating Upper Fan Shroud Bolts And Clips
Courtesy of FORD MOTOR CO.

7. Remove the bolt and install the lifting eye.

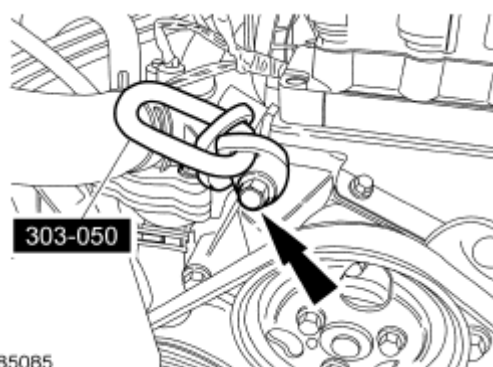


Fig. 202: Locating Bolt And Special Tool
Courtesy of FORD MOTOR CO.

8. Install the special tools.

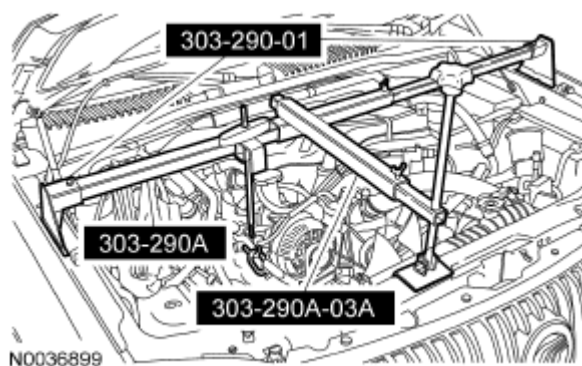


Fig. 203: Identifying Special Tools
Courtesy of FORD MOTOR CO.

9. Remove the LH engine support insulator through bolt.
 - To install, tighten to 103 Nm (76 lb-ft).
10. Remove the pushpins and the RH inner fender splash shield.

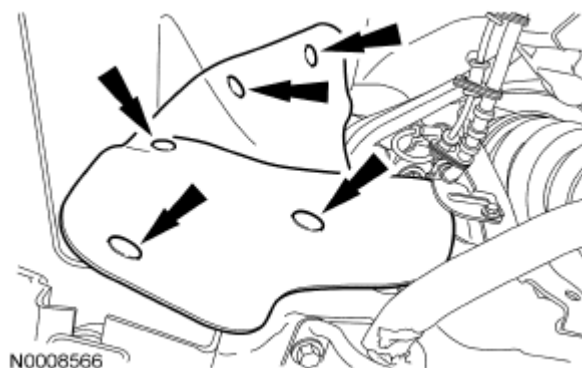


Fig. 204: Locating RH Inner Fender Splash Shield Pushpins
Courtesy of FORD MOTOR CO.

11. Remove the RH engine support insulator nuts.
 - To install, tighten to 90 Nm (66 lb-ft).
12. Raise the engine approximately 60 mm (2.36 in).
13. Remove the RH engine support insulator.

AWD vehicles

14. Remove the bolts and the stabilizer bar brackets. Allow the stabilizer bar to hang freely.

WARNING: Secure the axle to the jack with a safety strap. Failure to follow these instructions may result in personal injury.

15. Support the axle with a suitable jack stand.
16. Disconnect the vent hose from the differential housing vent tube.

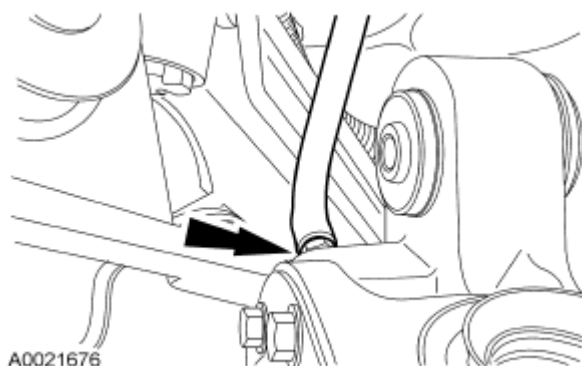


Fig. 205: Locating Vent Hose
Courtesy of FORD MOTOR CO.

17. Remove and discard the axle housing bolts. Lower the axle housing approximately 25 mm (1 in).
 - To install, tighten to 66 Nm (49 lb-ft).

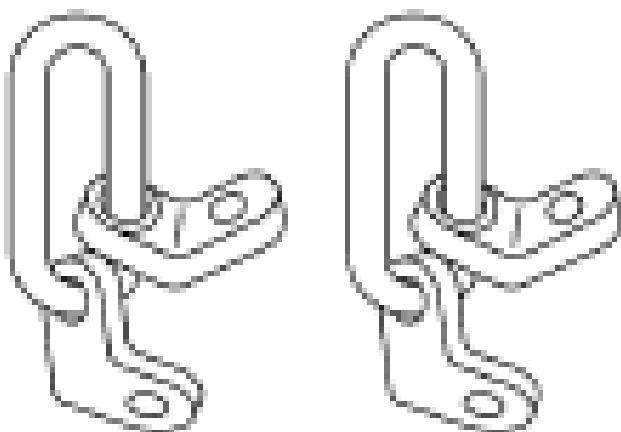
All vehicles

18. Remove the nut and the LH engine support insulator.
 - To install, tighten to 90 Nm (66 lb-ft).
19. To install, reverse the removal procedure.

REMOVAL**ENGINE****SPECIAL TOOLS**

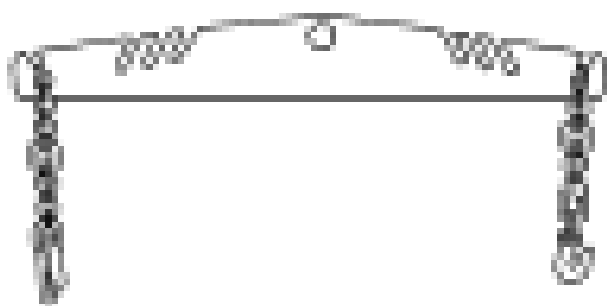
2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST1595-A

Lifting Brackets
303-050 (T70P-6000) or equivalent



ST2673-A

Spreader Bar
303-D701 or equivalent

Removal

CAUTION: If the fuel rail is used as a leverage device, it can be damaged. Care must be taken when working around the fuel rail.

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.
2. Disconnect the fuel supply tube spring lock coupling. For additional information, refer to **FUEL SYSTEM-GENERAL INFORMATION**.
3. Disconnect the battery cables. For additional information, refer to **BATTERY, MOUNTING AND**

CABLES .

4. Remove the nut and disconnect the ground wire.

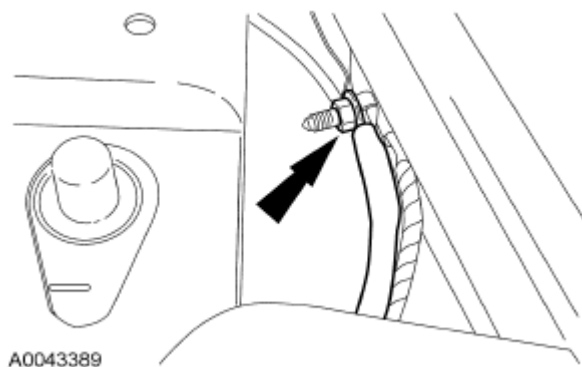


Fig. 206: Locating Ground Wire Nut
Courtesy of FORD MOTOR CO.

5. Disconnect the electrical connector and detach the wiring harness retainers.

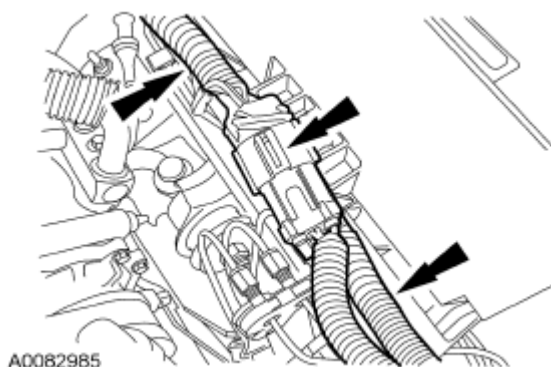


Fig. 207: Locating Electrical Connector And Wiring Harness Retainers
Courtesy of FORD MOTOR CO.

6. Lift the cover, remove the nuts and disconnect the battery cable connector.
 - Lay the wiring harness on top of the engine.

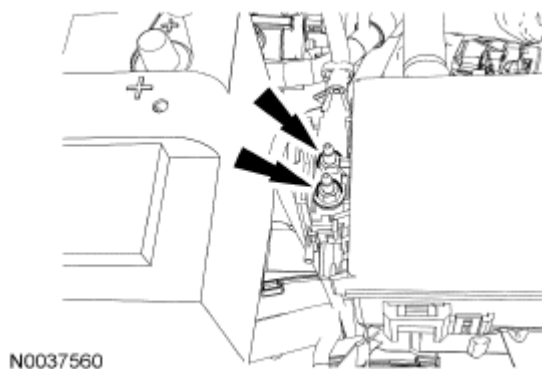


Fig. 208: Identifying Nuts
Courtesy of FORD MOTOR CO.

7. Recover the A/C system. For additional information, refer to **CLIMATE CONTROL SYSTEM-GENERAL INFORMATION AND DIAGNOSTICS** .
8. Drain the cooling system. For additional information, refer to **ENGINE COOLING** .
9. Remove the cooling fan. For additional information, refer to **ENGINE COOLING** .
10. Remove the air cleaner and the air cleaner outlet pipe. For additional information, refer to **INTAKE AIR DISTRIBUTION & FILTERING** .
11. Disconnect the windshield washer hose.

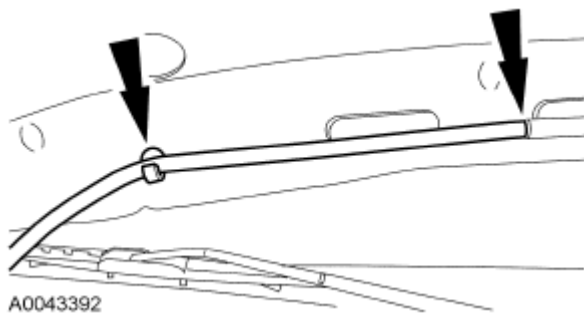


Fig. 209: Locating Windshield Washer Hose
Courtesy of FORD MOTOR CO.

NOTE: Mark the hinge locations for installation reference.

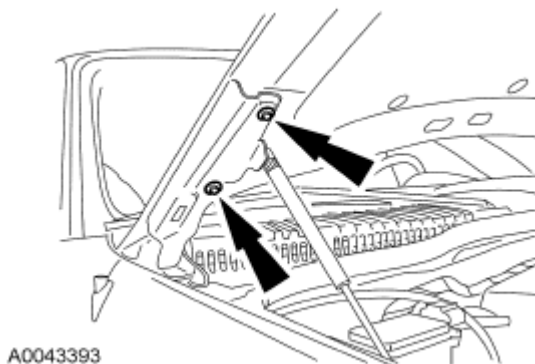
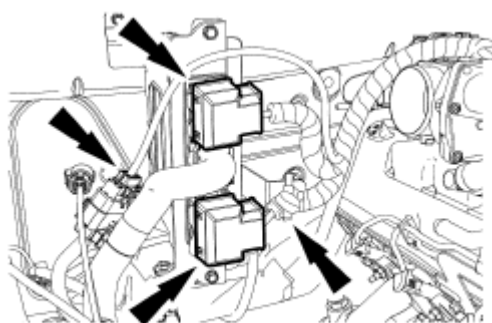


Fig. 210: Locating Hood Hinge Bolts
Courtesy of FORD MOTOR CO.

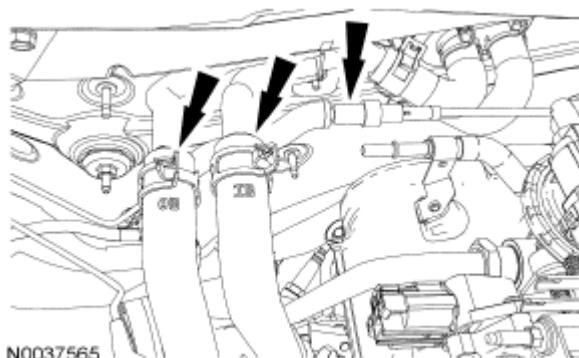
12. Remove the 4 bolts and the hood.
13. Disconnect the wiring harness electrical connector and the engine wiring harness-to-powertrain control module (PCM) electrical connectors. Detach the wiring harness retainer.



N0039898

Fig. 211: Locating Powertrain Control Module Electrical Connectors, Wiring Harness Electrical Connector And Wiring Harness Retainer
Courtesy of FORD MOTOR CO.

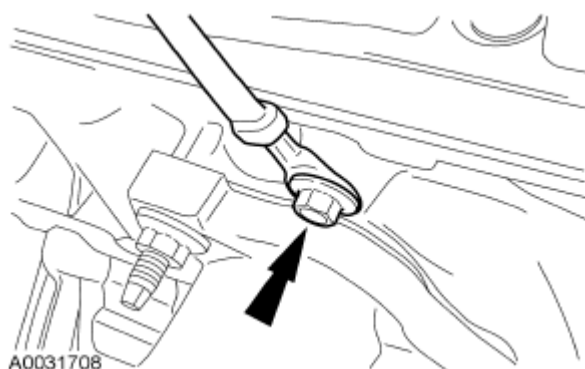
14. Disconnect the heater hoses and the vacuum hose.
 - Disconnect the heater control valve vacuum hose.



N0037565

Fig. 212: Locating Heater Control Valve Vacuum Hoses
Courtesy of FORD MOTOR CO.

15. Remove the bolt and position the ground wire aside.



A0031708

Fig. 213: Locating Ground Wire Bolt
Courtesy of FORD MOTOR CO.

16. Disconnect the evaporative emissions (EVAP) hose.

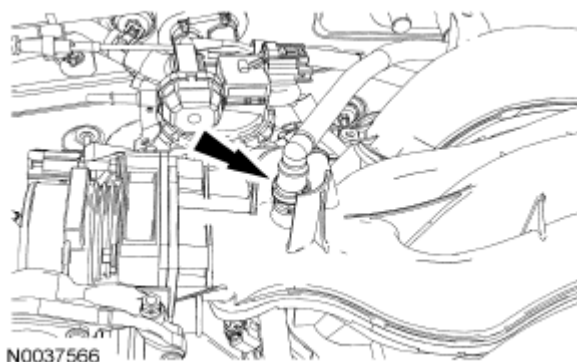


Fig. 214: Locating Evaporative Emissions Hose
Courtesy of FORD MOTOR CO.

17. Remove the upper radiator hose.

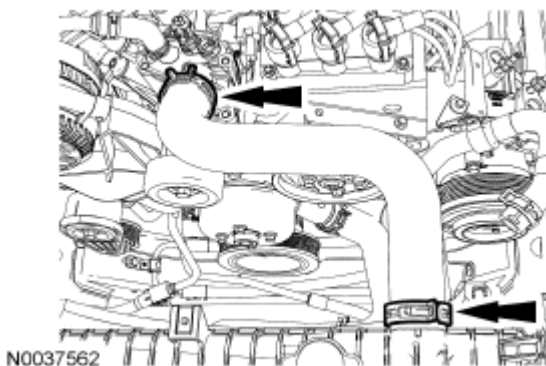


Fig. 215: Locating Upper Radiator Hose Clamps
Courtesy of FORD MOTOR CO.

18. Loosen the power steering pump pulley bolts.

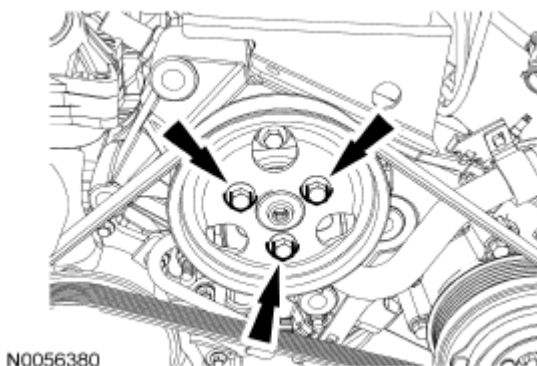


Fig. 216: Identifying Power Steering Pump Pulley Bolts
Courtesy of FORD MOTOR CO.

19. Rotate the accessory drive belt tensioner counterclockwise and remove the accessory drive belt.

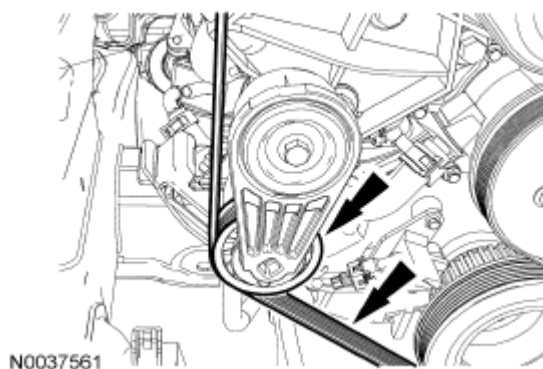


Fig. 217: Identifying Accessory Drive Belt Tensioner And Accessory Drive Belt
Courtesy of FORD MOTOR CO.

20. Remove the bolts and the power steering pump pulley.



Fig. 218: Locating Power Steering Pump Pulley And Bolts
Courtesy of FORD MOTOR CO.

21. Disconnect the lower radiator hose from the coolant pump.

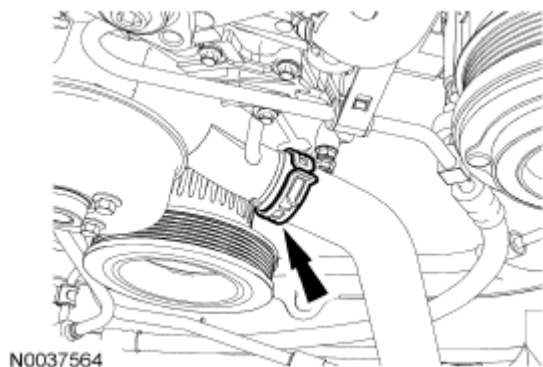


Fig. 219: Locating Lower Radiator Hose Clamp
Courtesy of FORD MOTOR CO.

22. Disconnect the power steering pressure (PSP) switch electrical connector.

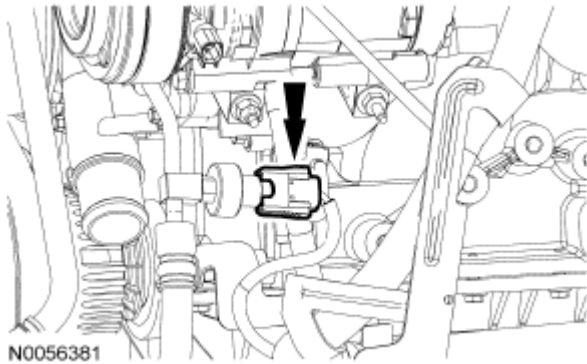


Fig. 220: Locating Power Steering Pressure Switch Electrical Connector
Courtesy of FORD MOTOR CO.

NOTE: A/C compressor shown removed for clarity.

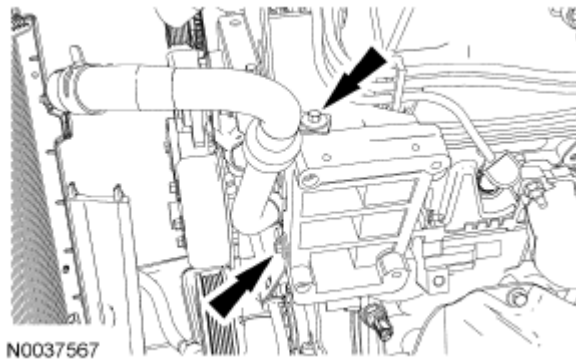


Fig. 221: Locating Steering Pump Supply Hose Bracket Bolts
Courtesy of FORD MOTOR CO.

23. Remove the power steering pressure (PSP) hose and the power steering reservoir-to-power steering pump supply hose bracket bolts.
24. Remove the bolts and position the power steering pump aside.

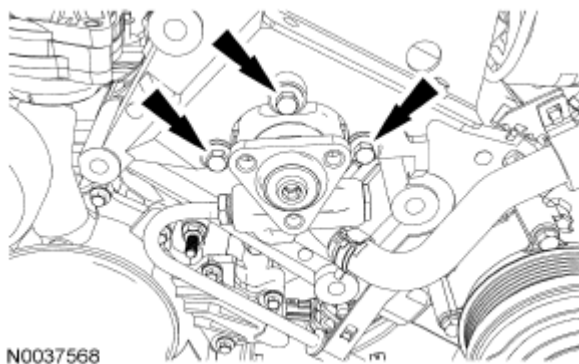


Fig. 222: Locating Power Steering Pump Bolts
Courtesy of FORD MOTOR CO.

25. Disconnect the brake booster vacuum hose.

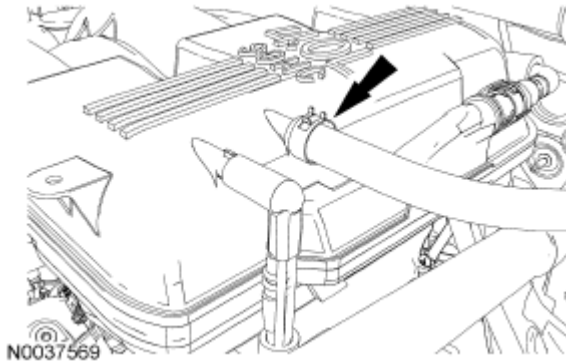


Fig. 223: Locating Brake Booster Vacuum Hose Clamp
Courtesy of FORD MOTOR CO.

26. Disconnect the EVAP canister purge valve electrical connector. Disconnect and remove the EVAP hose.

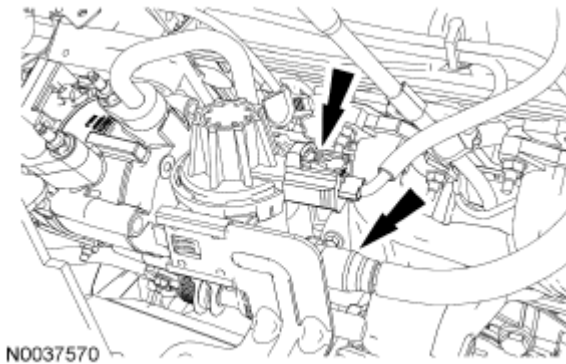


Fig. 224: Locating EVAP Canister Purge Valve Electrical Connector And EVAP Hose
Courtesy of FORD MOTOR CO.

27. Remove the nuts and detach the A/C tubes.

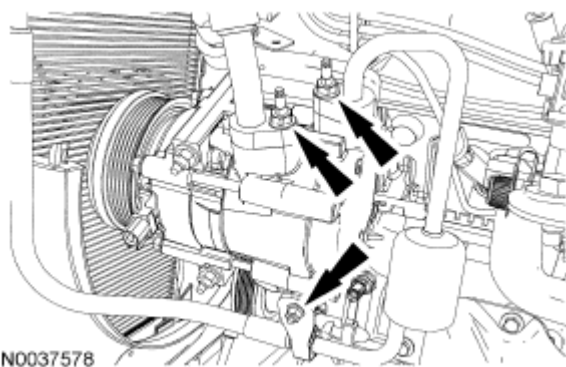


Fig. 225: Identifying A/C Tube Nuts
Courtesy of FORD MOTOR CO.

28. Disconnect the A/C high pressure switch, remove the nut, open the retaining clip and remove the A/C tube.

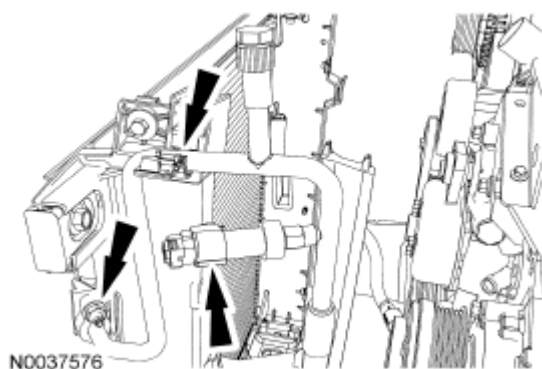


Fig. 226: Locating A/C High Pressure Switch, Retaining Clip And A/C Tube
Courtesy of FORD MOTOR CO.

29. Remove the transmission. For additional information, refer to **AUTOMATIC TRANSAXLE/TRANSMISSION - 5R55S**.
30. Remove the terminal cover. Remove the nuts, detach the wires and remove the starter.

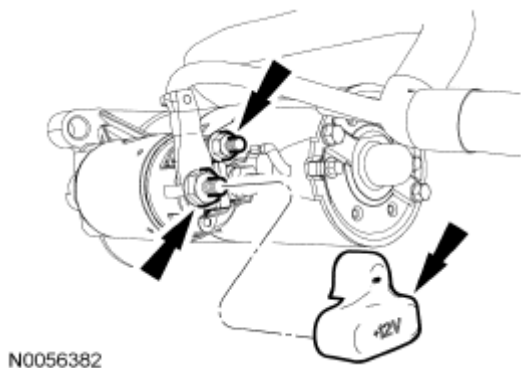


Fig. 227: Locating Terminal Cover And Nuts

Courtesy of FORD MOTOR CO.

31. Remove the oil filter.

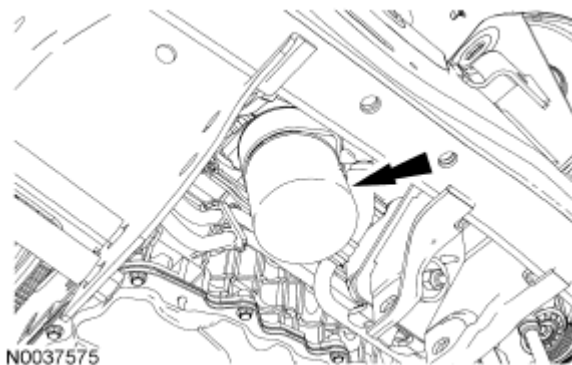


Fig. 228: Locating Oil Filter

Courtesy of FORD MOTOR CO.

32. Remove the nut and detach the transmission cool tube bracket.
- Support the transmission cooler tubes with mechanic's wire.

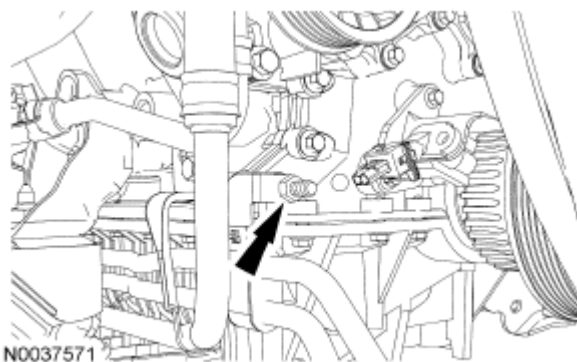
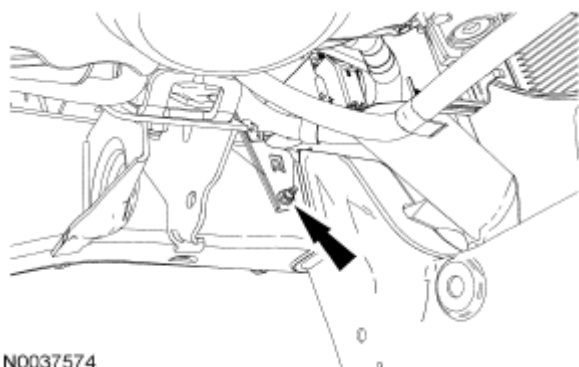


Fig. 229: Locating Transmission Cool Tube Bracket Nut

Courtesy of FORD MOTOR CO.

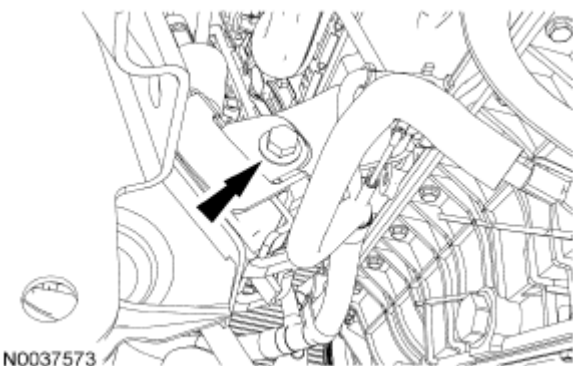
33. Remove the nut and detach the battery cable harness bracket from the frame rail.



N0037574

Fig. 230: Locating Battery Cable Harness Bracket Nut
Courtesy of FORD MOTOR CO.

34. Remove the LH engine support insulator through bolt.



N0037573

Fig. 231: Locating LH Engine Support Insulator Through Bolt
Courtesy of FORD MOTOR CO.

35. Remove the RH engine support insulator nuts.



N0037572

Fig. 232: Locating RH Engine Support Insulator Nuts
Courtesy of FORD MOTOR CO.

36. If equipped, disconnect the block heater electrical connector and wiring harness retainer.

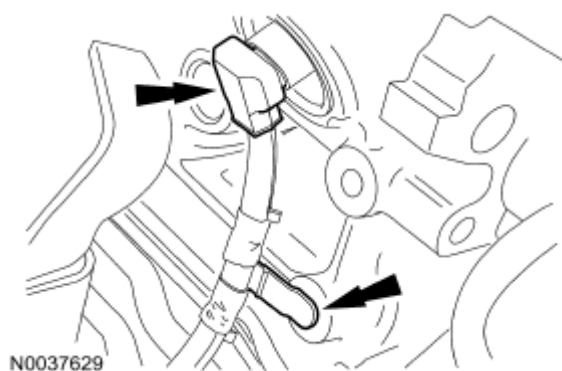


Fig. 233: Locating Block Heater Electrical Connector And Wiring Harness Retainer
Courtesy of FORD MOTOR CO.

37. Remove the heater tube bracket bolt.

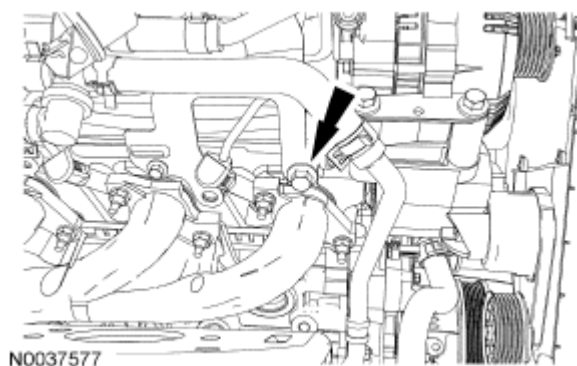


Fig. 234: Locating Heater Tube Bracket Bolt
Courtesy of FORD MOTOR CO.

38. Install the special tool on the RH side of the engine.
- Tighten to 37 Nm (27 lb-ft).

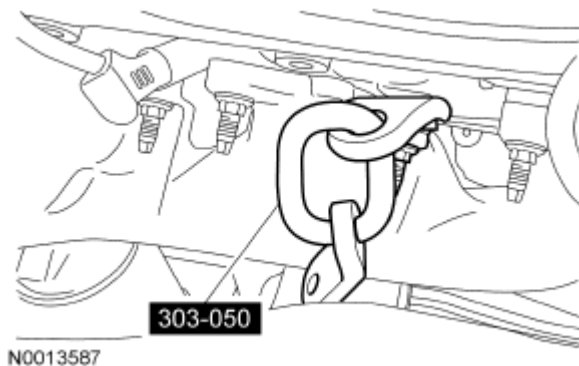


Fig. 235: Identifying Special Tool
Courtesy of FORD MOTOR CO.

39. Install the special tool on the LH side of the engine.

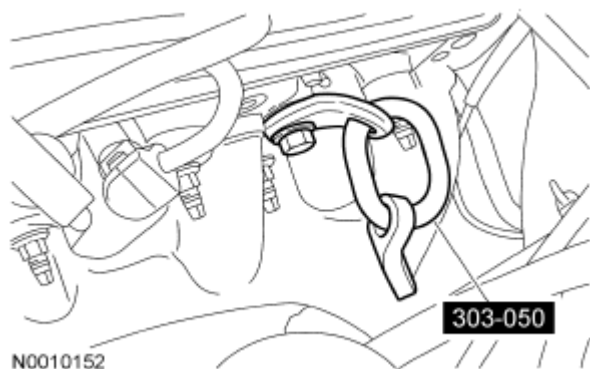


Fig. 236: Identifying Special Tool
Courtesy of FORD MOTOR CO.

40. Attach the special tool and using a suitable floor crane, remove the engine.

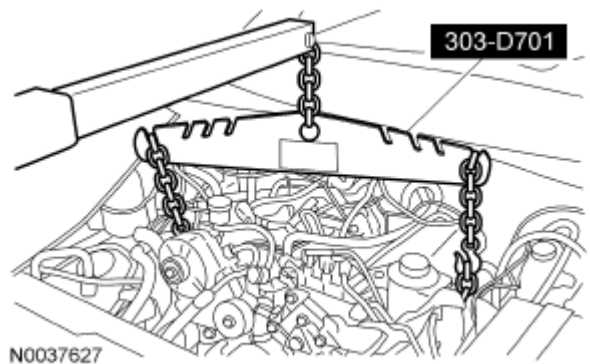


Fig. 237: Identifying Special Tool
Courtesy of FORD MOTOR CO.

DISASSEMBLY

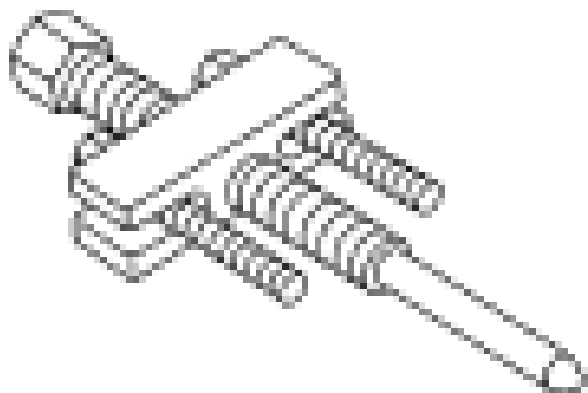
ENGINE

SPECIAL TOOLS

Remover, Crankshaft Vibration Damper

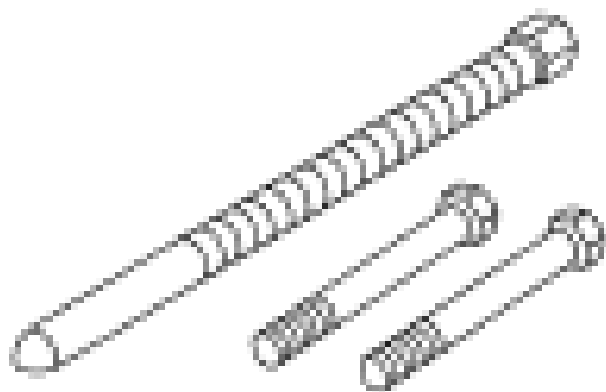
2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST1784-A

303-101 (T74P-3616-A)



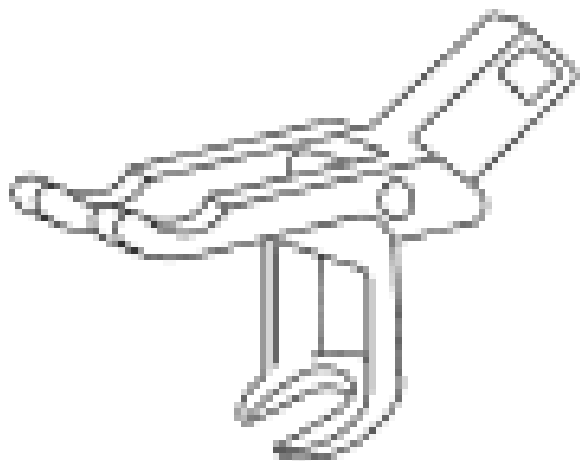
ST2897-A

Remover, Crankshaft Vibration Damper
303-773

Compressor, Valve Spring

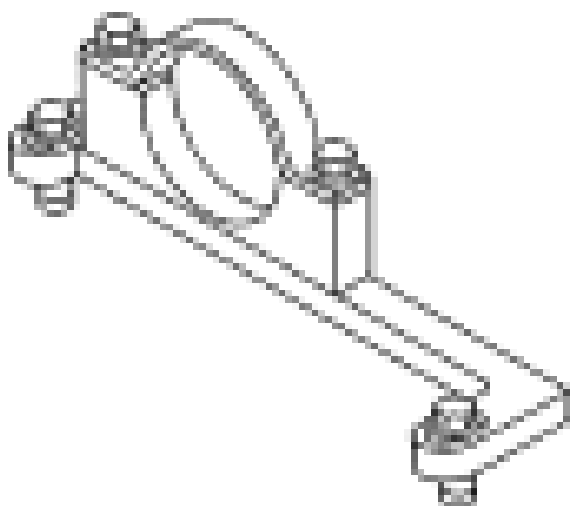
2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST1330-A

303-581 (T97T-6565-A)



ST1777-A

Holding Tool, Camshaft Sprocket
303-564 (T97T-6256-B)

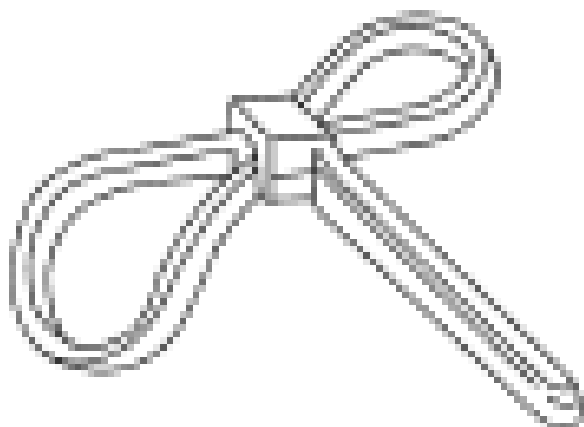
2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST1776-A

Adapter for 303-564
303-578 (T97T-6256-A)

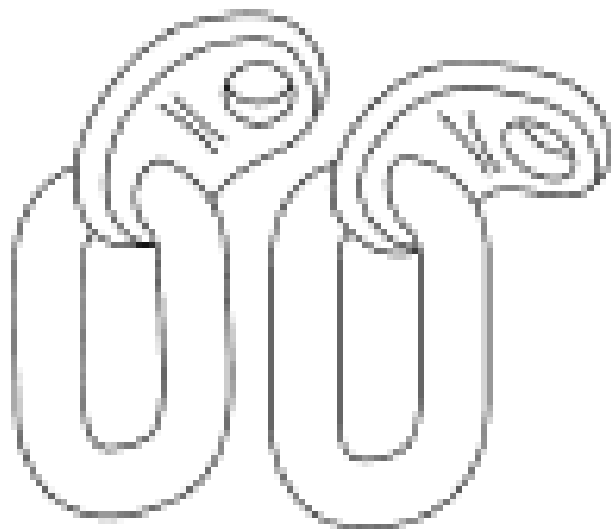


ST1438-A

Strap Wrench
303-D055 (D85L-6000-A) or equivalent

2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST1831-A

Lifting Eyes
303-050 (D81L-6001-D) or equivalent

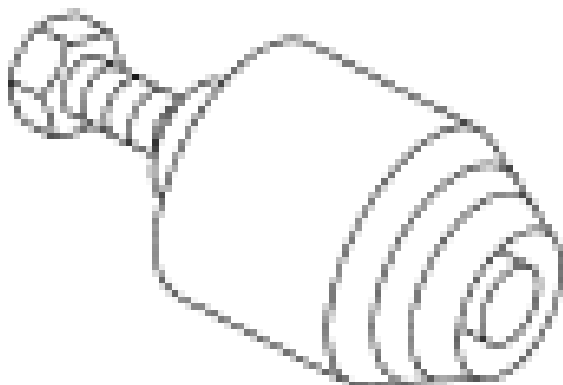


ST2741A

Crankshaft Socket
303-674

2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST1288-A

Remover, Crankshaft Front Oil Seal
303-107 (T74P-6700-A)



ST1394-A

Remover, Spark Plug Wire
303-106 (T74P-6666-A)

GENERAL EQUIPMENT

8-mm x 1.25 x 100-mm bolts (2 required)

CAUTION: Remove the cylinder heads before removing the crankshaft. Failure to do so can result in engine damage.

CAUTION: If the fuel rail is used as a leverage device, it can be damaged. Care must be taken when working around the fuel rail.

NOTE: During the repair or replacement of fuel-related components, cap, tape or

otherwise appropriately protect all liquid and vapor fuel openings to prevent the ingress of dirt or foreign material. Remove all caps, tape and other protective materials prior to installation.

NOTE: For additional information, refer to the exploded views under **ENGINE ASSEMBLY**.

All vehicles

1. Remove the bolts and the flexplate.

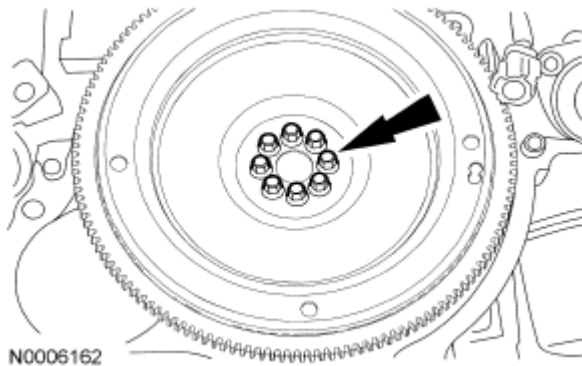


Fig. 238: Locating Flexplate Bolts
Courtesy of FORD MOTOR CO.

2. Remove the spacer plate and the flexplate spacer.

NOTE: The crankshaft rear seal may have a metal speedy sleeve. This sleeve must be removed before attempting to remove the seal.

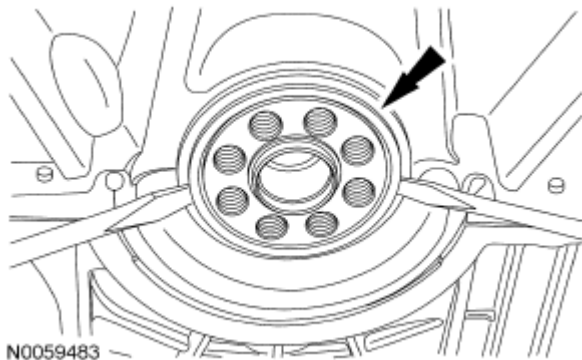


Fig. 239: Identifying Speedy Sleeve
Courtesy of FORD MOTOR CO.

3. If necessary, remove the speedy sleeve using 2 screwdrivers or small pry bars.
4. Install the engine on a suitable stand. Remove the engine lifting equipment and the special tools.

5. Remove the bolt.

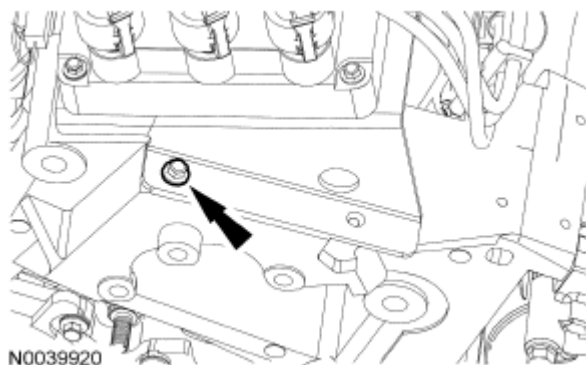


Fig. 240: Identifying Bolt
Courtesy of FORD MOTOR CO.

6. Disconnect the A/C compressor electrical connector and wire harness retainer.

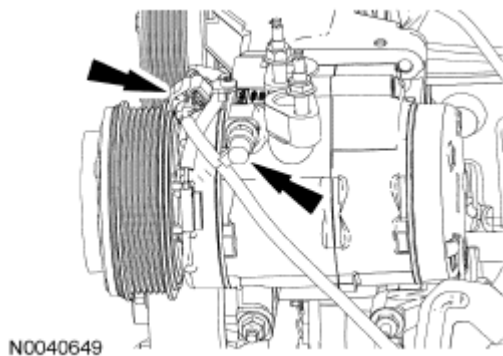


Fig. 241: Identifying A/C Compressor Electrical Connector And Wire Harness Retainer
Courtesy of FORD MOTOR CO.

7. Remove the bolts and the accessory bracket.

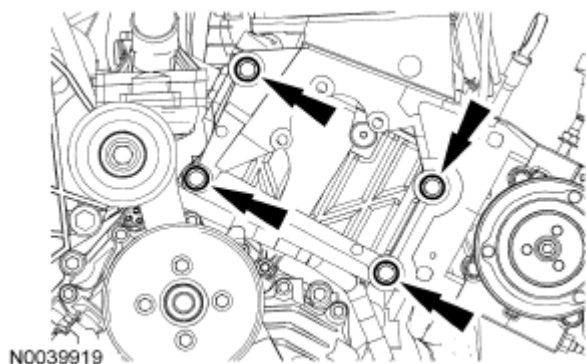


Fig. 242: Locating Accessory Bracket Bolts
Courtesy of FORD MOTOR CO.

8. Disconnect the generator electrical connectors and wire harness retainer.

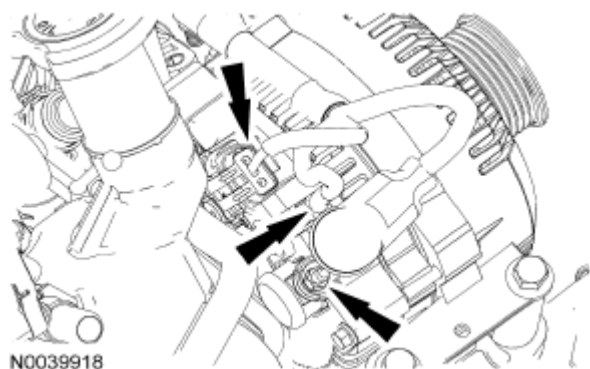


Fig. 243: Identifying Generator Electrical Connectors And Wire Harness Retainer
Courtesy of FORD MOTOR CO.

9. Remove the generator mounting bracket.
1. Remove the bolt and the drive belt tensioner.
 2. Remove the generator mounting bracket bolts.

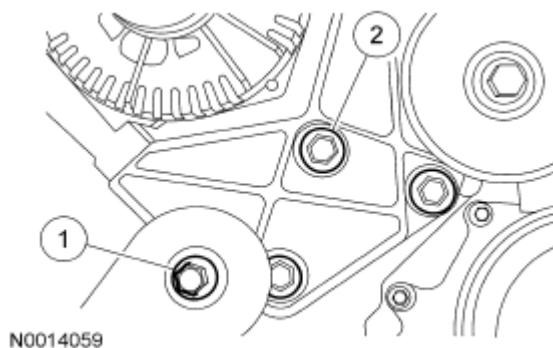


Fig. 244: Locating Generator Mounting Bracket Bolts
Courtesy of FORD MOTOR CO.

10. Disconnect the heater hose from the thermostat housing.

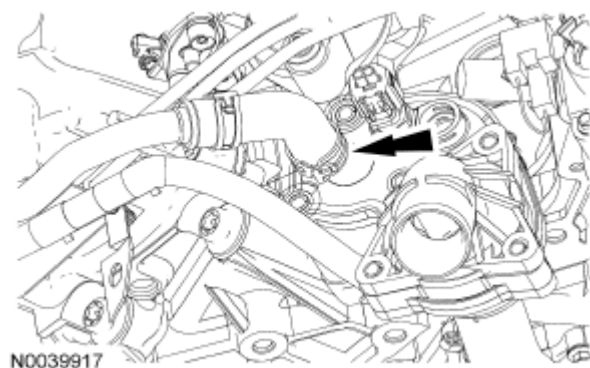


Fig. 245: Locating Heater Hose Clamp
Courtesy of FORD MOTOR CO.

11. Disconnect the hose from the oil cooler.

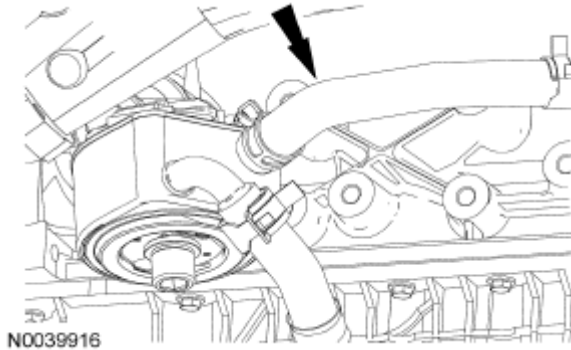


Fig. 246: Locating Oil Cooler Hose
Courtesy of FORD MOTOR CO.

12. Remove the bolt, the heater hose tube bracket and the hoses as an assembly.

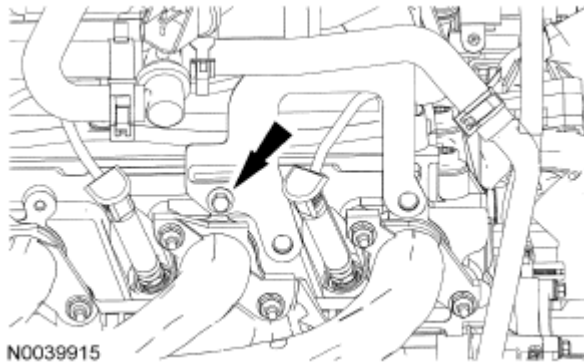
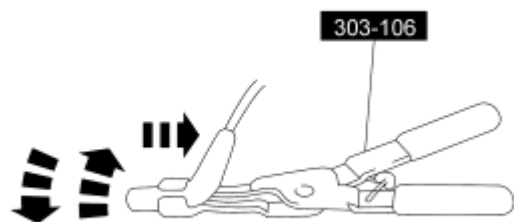


Fig. 247: Locating Heater Hose Tube Bracket Bolt
Courtesy of FORD MOTOR CO.

CAUTION: It is important to twist the spark plug wire boots while pulling upward to avoid possible damage to the spark plug wires.

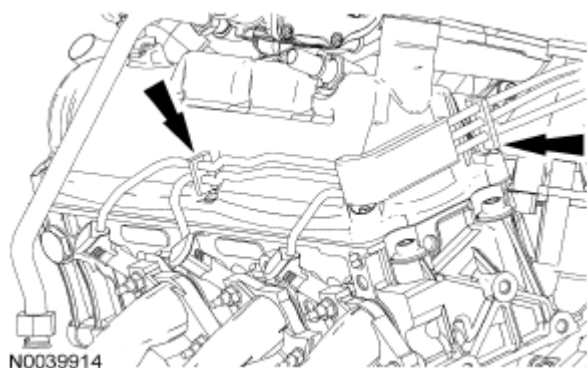
NOTE: Spark plug wires must be connected to the correct ignition coil terminal. Mark spark plug wire locations before removing them.



N0009966

Fig. 248: Pulling Spark Plug Wire Off Spark Plug
Courtesy of FORD MOTOR CO.

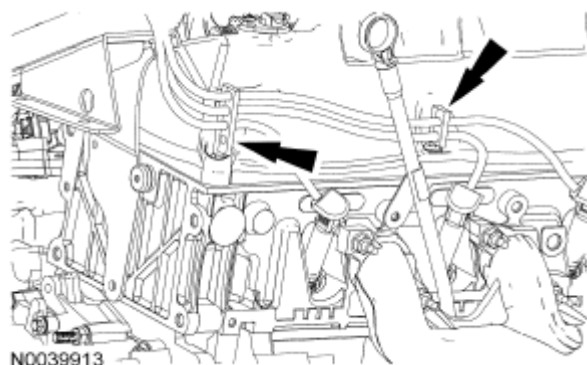
13. Using the special tool, disconnect the spark plug wires from the spark plugs.
14. Detach the RH spark plug wire retainers.



N0039914

Fig. 249: Locating RH Spark Plug Wire Retainers
Courtesy of FORD MOTOR CO.

15. Detach the LH spark plug wire retainers.



N0039913

Fig. 250: Locating LH Spark Plug Wire Retainers
Courtesy of FORD MOTOR CO.

NOTE: RH spark plug wires shown removed for clarity.

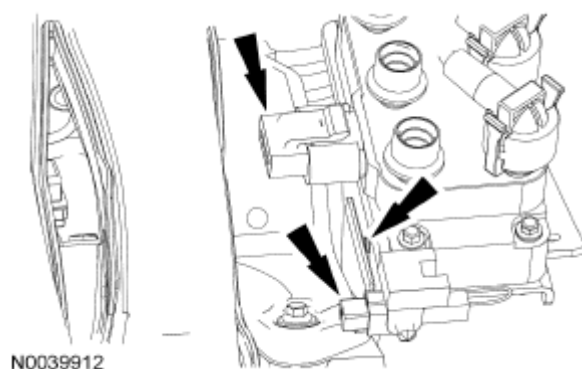


Fig. 251: Locating Radio Interference Capacitor Electrical Connectors And Wiring Harness Retainer

Courtesy of FORD MOTOR CO.

16. Disconnect the coil and the radio interference capacitor electrical connectors and detach the wiring harness retainer.
17. Remove the bolts and the coil, bracket and spark plug wires as an assembly.

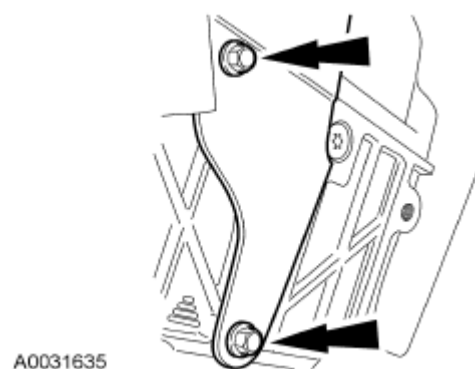


Fig. 252: Locating Bracket Bolts

Courtesy of FORD MOTOR CO.

18. Remove the oil cooler hose bracket bolt, if equipped. Disconnect the oil cooler or heater hose.

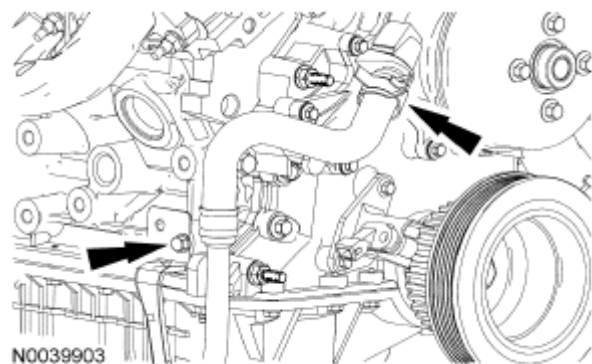


Fig. 253: Locating Oil Cooler Hose Bracket Bolt And Heater Hose Clamp

Courtesy of FORD MOTOR CO.

19. If equipped, remove the oil cooler and hose.

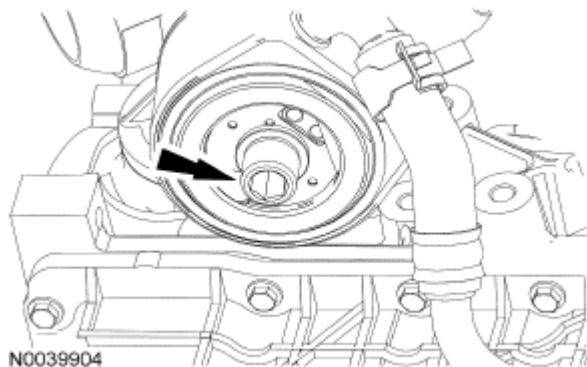


Fig. 254: Locating Oil Cooler And Hose
Courtesy of FORD MOTOR CO.

20. Disconnect the vacuum and positive crankcase ventilation (PCV) hoses from the intake manifold.

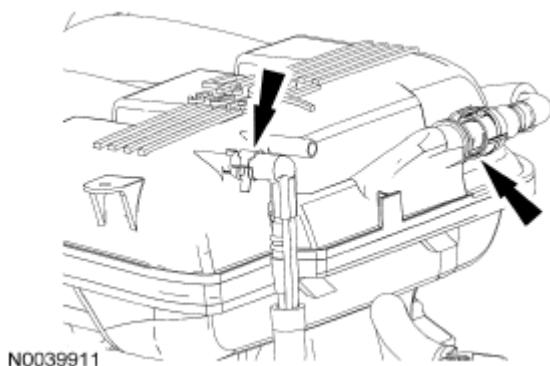


Fig. 255: Identifying Vacuum And Positive Crankcase Ventilation Hoses
Courtesy of FORD MOTOR CO.

21. Disconnect the knock sensor (KS) electrical connector.
- Detach the wiring harness pin-type retainer.

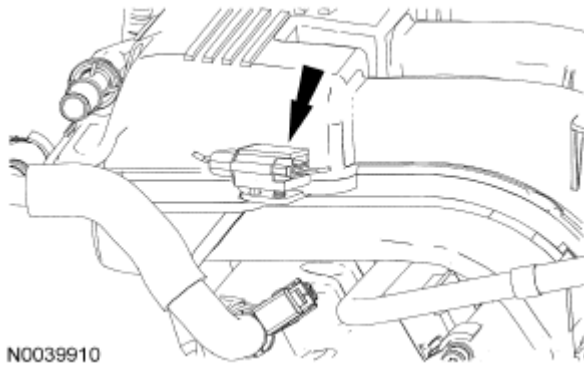


Fig. 256: Locating Knock Sensor (KS) Electrical Connector
Courtesy of FORD MOTOR CO.

22. Disconnect the exhaust gas recirculation (EGR) system module vacuum hose and electrical connector. Detach the wiring harness pin-type retainer.

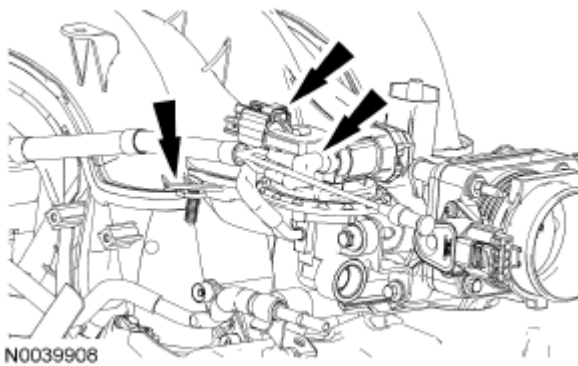


Fig. 257: Identifying Exhaust Gas Recirculation (EGR) System Module Vacuum Hose, Electrical Connector And Wiring Harness Pin-Type Retainer
Courtesy of FORD MOTOR CO.

23. Disconnect the electronic throttle body (TB) and throttle position (TP) sensor electrical connectors. Remove the nut and detach the wiring harness bracket.

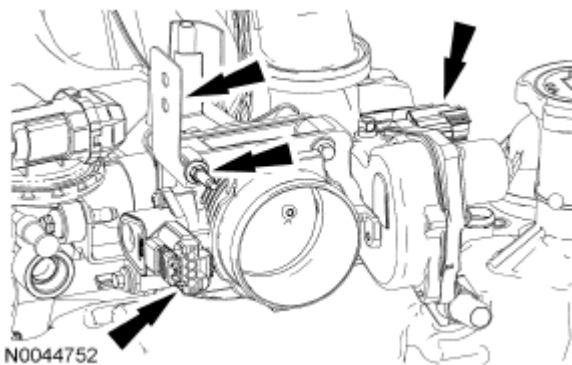


Fig. 258: Identifying Electronic Throttle Body (TB), Throttle Position (TP) Sensor Electrical

Connectors And Wiring Harness Bracket
Courtesy of FORD MOTOR CO.

24. Remove the exhaust manifold-to-EGR system module tube.

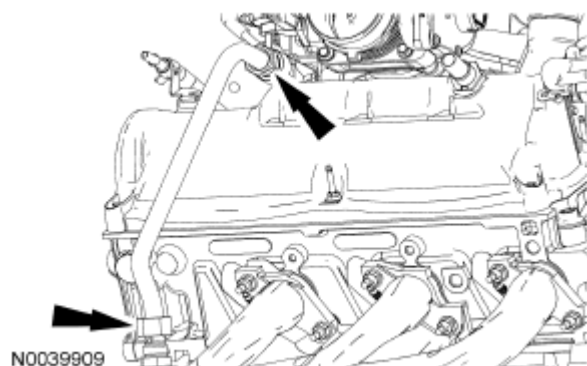


Fig. 259: Identifying Exhaust Manifold-To-EGR System Module Tube
Courtesy of FORD MOTOR CO.

25. Remove the bolts and the intake manifold and gaskets.

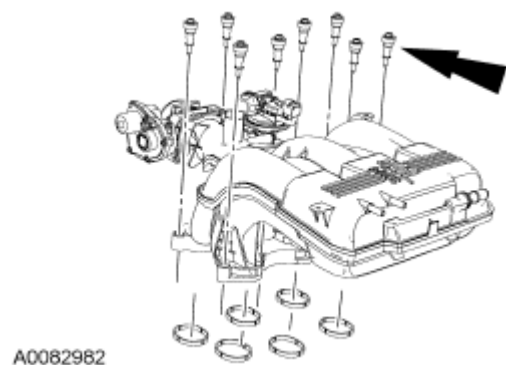


Fig. 260: Locating Intake Manifold Bolts
Courtesy of FORD MOTOR CO.

26. Disconnect the 6 fuel injector electrical connectors and detach the wiring harness retainers.

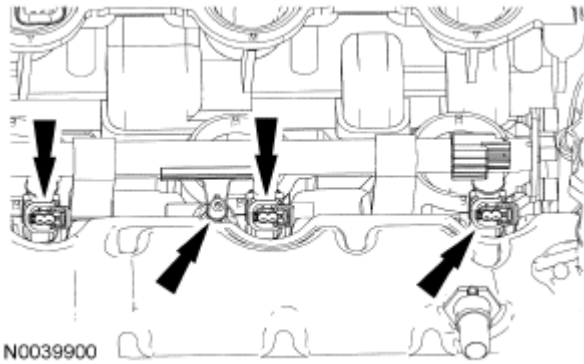


Fig. 261: Locating Fuel Injector Electrical Connectors And Wiring Harness Retainers
Courtesy of FORD MOTOR CO.

27. Disconnect the crankshaft position (CKP) sensor electrical connector and the wiring anchors. Discard the wiring anchors.

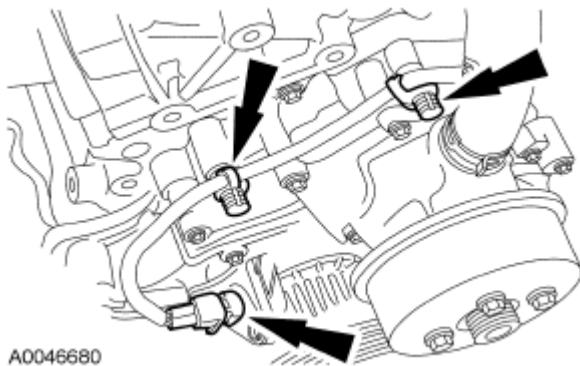


Fig. 262: Locating Crankshaft Position Sensor Electrical Connector And Wiring Anchors
Courtesy of FORD MOTOR CO.

28. Disconnect the fuel rail pressure and temperature sensor and camshaft position sensor electrical connectors.

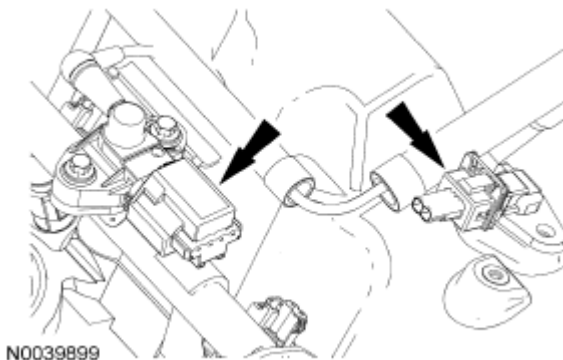


Fig. 263: Locating Fuel Rail Pressure & Temperature Sensor And Camshaft Position Sensor Electrical Connectors

Courtesy of FORD MOTOR CO.

29. Disconnect the engine coolant temperature (ECT) sensor electrical connector.

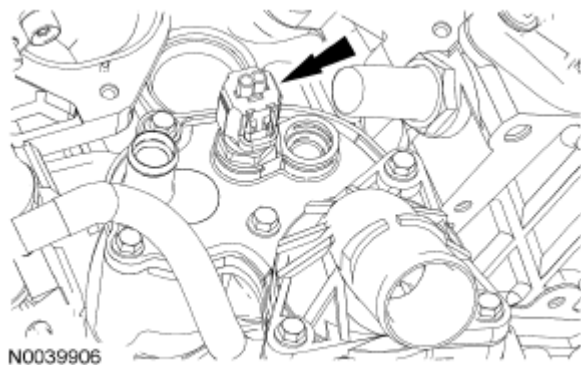


Fig. 264: Locating Engine Coolant Temperature Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

30. Remove the engine wiring harness retainer bolt and remove the engine wiring harness.

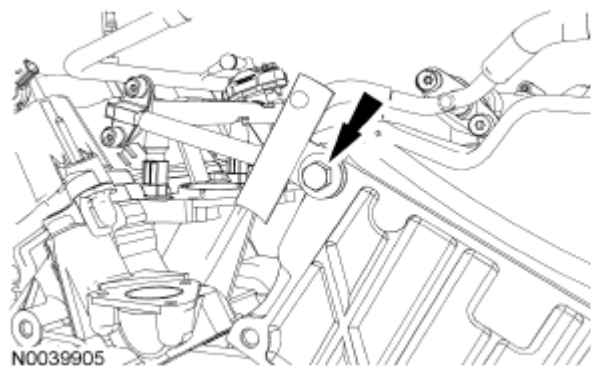


Fig. 265: Identifying Engine Wiring Harness Retainer Bolt
Courtesy of FORD MOTOR CO.

31. Disconnect the fuel pressure and temperature sensor vacuum hose fitting.
- Remove the vacuum harness.

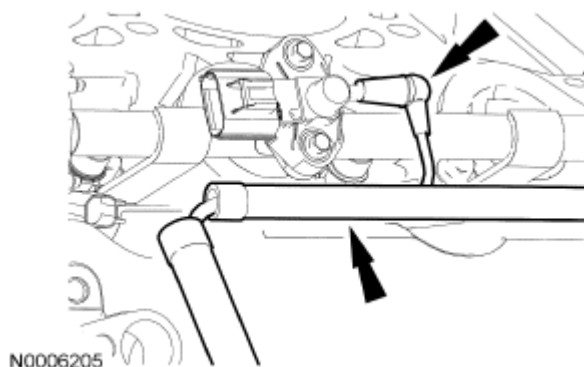


Fig. 266: Identifying Fuel Pressure And Temperature Sensor Vacuum Hose Fitting
Courtesy of FORD MOTOR CO.

32. Disconnect the oil pressure switch electrical connector, remove the nut and detach the battery cable and harness bracket.

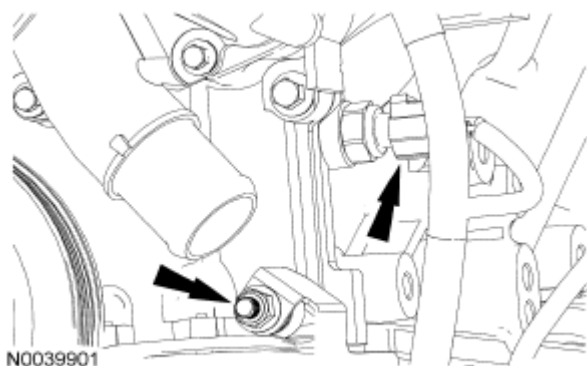


Fig. 267: Identifying Oil Pressure Switch Electrical Connector And Nut
Courtesy of FORD MOTOR CO.

33. Detach the retainers and remove the battery cable and harness.

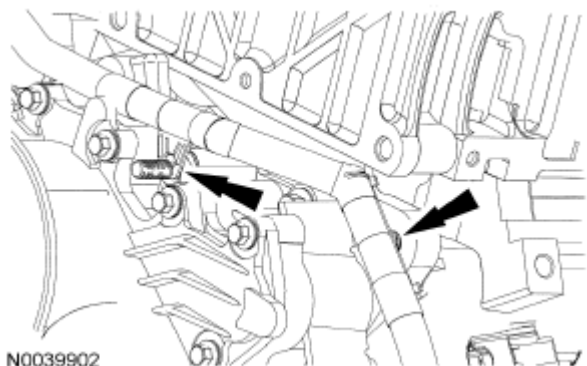


Fig. 268: Identifying Retainer And Battery Cable
Courtesy of FORD MOTOR CO.

34. Remove the oil pressure switch.

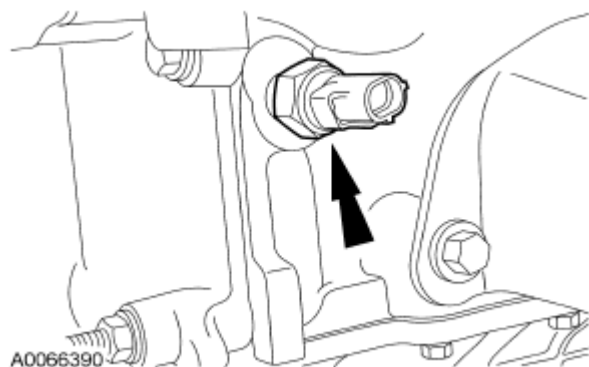


Fig. 269: Identifying Oil Pressure Switch
Courtesy of FORD MOTOR CO.

NOTE: LH shown, RH similar.

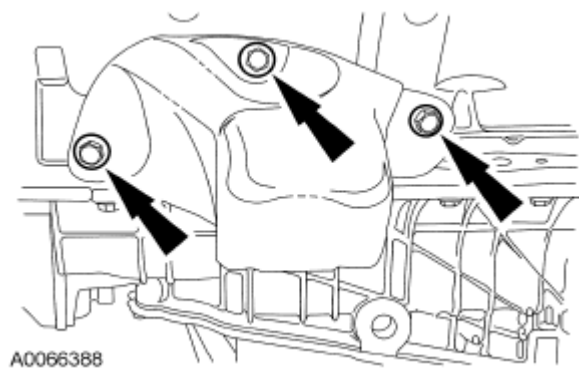


Fig. 270: Locating Insulator Bolts
Courtesy of FORD MOTOR CO.

35. Remove the RH and the LH insulator bolts and brackets.
36. Remove the fuel supply tube bolt.

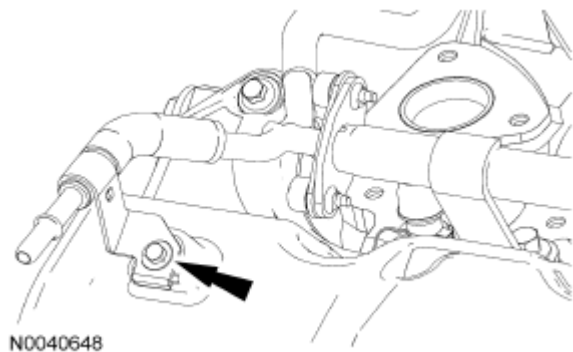


Fig. 271: Locating Fuel Supply Tube Bolt

Courtesy of FORD MOTOR CO.

37. Remove the bolts and the fuel rail.

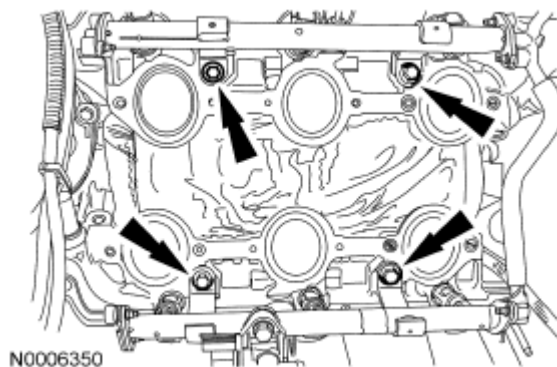


Fig. 272: Locating Fuel Rail Bolts
Courtesy of FORD MOTOR CO.

38. Remove the fuel injectors.
- Remove and discard the O-ring seals.

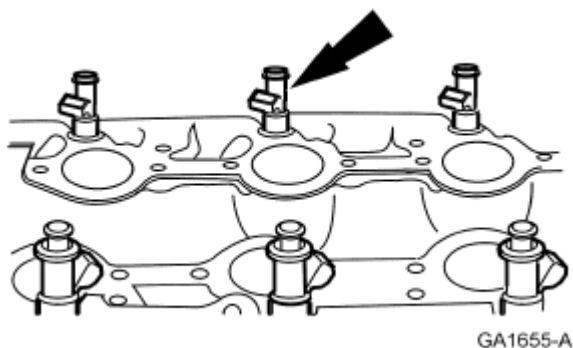


Fig. 273: Locating Fuel Injector
Courtesy of FORD MOTOR CO.

NOTE: RH shown, LH similar.

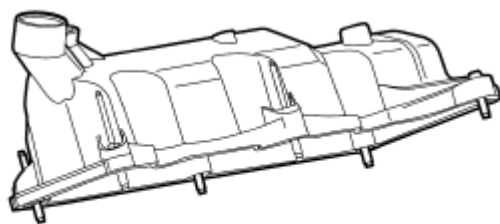


Fig. 274: Locating Valve Cover

Courtesy of FORD MOTOR CO.

39. Loosen the bolts and remove the valve covers.
40. Remove the thermostat housing.
 1. Remove the bolts.
 2. Release the bypass hose clamp and remove the thermostat housing.



Fig. 275: Identifying Bolts And Bypass Hose Clamp
Courtesy of FORD MOTOR CO.

41. Remove the bolt and the oil level indicator tube.

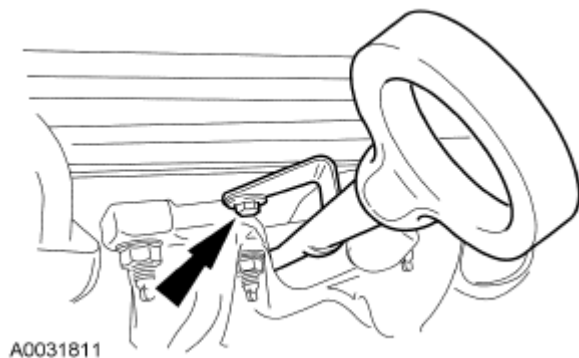
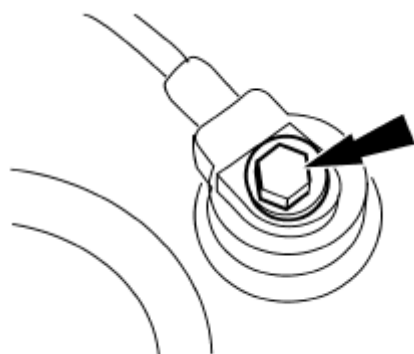


Fig. 276: Locating Oil Level Indicator Tube Bolt
Courtesy of FORD MOTOR CO.

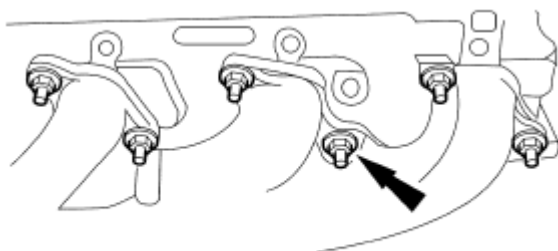
42. Remove the bolt and the knock sensor (KS).



GA1660-A

Fig. 277: Locating Knock Sensor Bolt
Courtesy of FORD MOTOR CO.

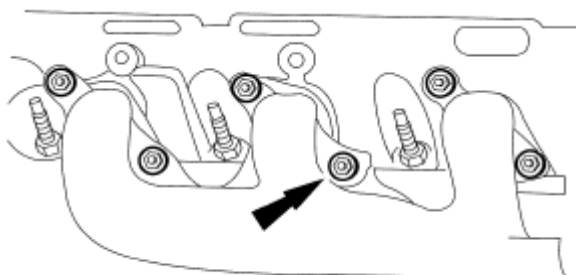
43. Remove the nuts and the RH exhaust manifold and gasket.
 - Discard the nuts and the gasket.



N0013712

Fig. 278: Locating RH Exhaust Manifold Nuts
Courtesy of FORD MOTOR CO.

44. Remove and discard the 6 RH exhaust manifold studs.
45. Remove the nuts and the LH exhaust manifold and gasket.
 - Discard the nuts and the gasket.



N0013711

Fig. 279: Locating LH Exhaust Manifold Nuts
Courtesy of FORD MOTOR CO.

46. Remove and discard the 6 LH exhaust manifold studs.

47. Using the special tool to hold the crankshaft pulley, remove the bolt.

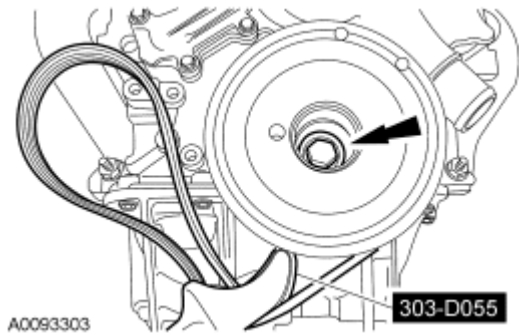


Fig. 280: Holding Crankshaft Pulley Using Special Tool
Courtesy of FORD MOTOR CO.

NOTE: If the pulley bolt is not installed, the tool will bottom out before the pulley is off.

48. Install the crankshaft pulley bolt 2 to 3 turns. Using the special tools and the two 8-mm bolts, remove the crankshaft pulley.
- Discard the crankshaft pulley bolt.

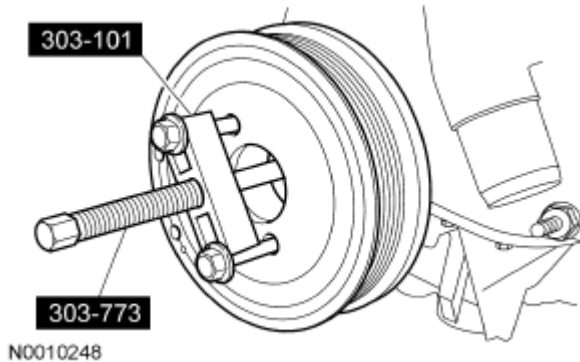


Fig. 281: Identifying Special Tools
Courtesy of FORD MOTOR CO.

49. Remove the bolts and the coolant pump pulley.

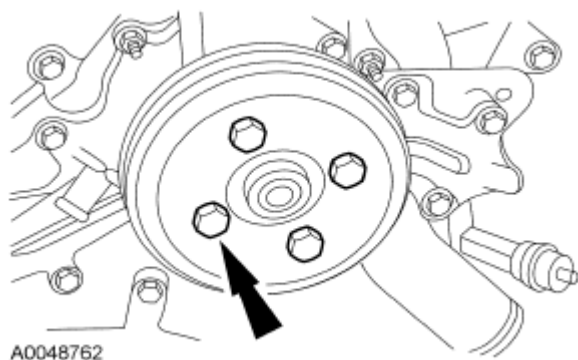


Fig. 282: Locating Coolant Pump Pulley Bolt
Courtesy of FORD MOTOR CO.

50. Remove the bolts and the coolant pump.

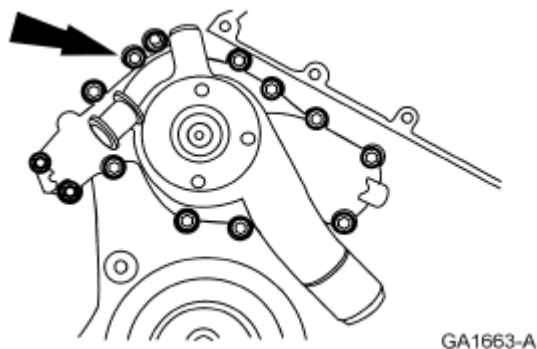


Fig. 283: Locating Coolant Pump Bolts
Courtesy of FORD MOTOR CO.

Early build vehicles

51. Rotate the crankshaft until the cam lobe of the cylinder being serviced is in the UP position.

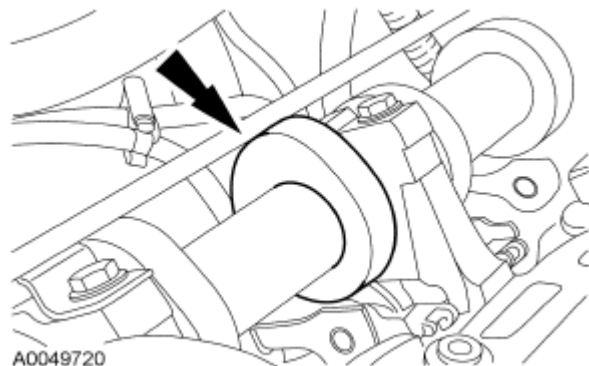


Fig. 284: Locating Cam Lobe
Courtesy of FORD MOTOR CO.

Late build vehicles

52. Rotate the crankshaft until the cam lobe of the cylinder being serviced is in the UP position.

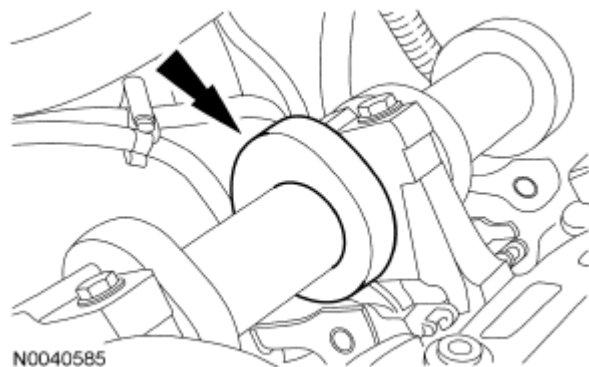


Fig. 285: Locating Crankshaft Cam Lobe
Courtesy of FORD MOTOR CO.

All vehicles

NOTE: Mark each camshaft roller follower to make sure it is installed in its original position during reassembly.

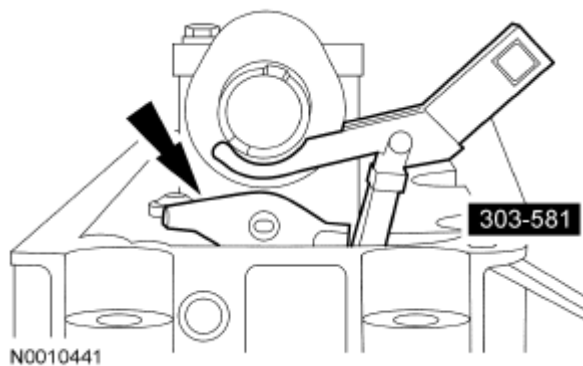


Fig. 286: Locating Camshaft Roller Follower And Special Tools
Courtesy of FORD MOTOR CO.

53. Using the special tool, remove the camshaft roller followers.
54. Remove the RH hydraulic chain tensioner.

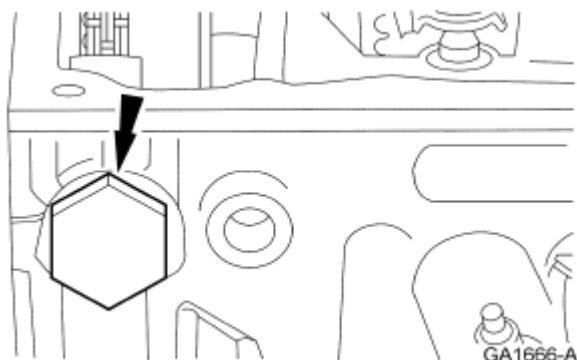


Fig. 287: Locating RH Hydraulic Chain Tensioner
Courtesy of FORD MOTOR CO.

55. Install the special tools on the RH cylinder head and tighten the top 2 clamp bolts.
- Tighten to 10 Nm (89 lb-in).

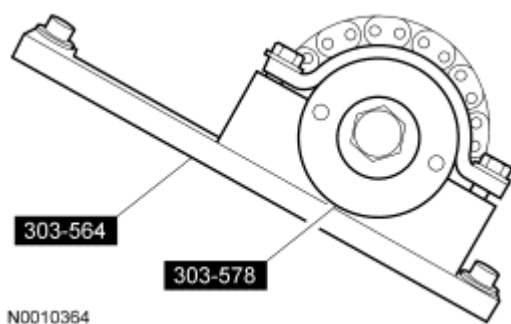


Fig. 288: Identifying Special Holding Tool
Courtesy of FORD MOTOR CO.

CAUTION: The RH camshaft sprocket bolt is a LH-threaded bolt.

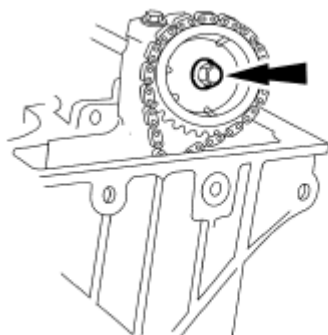


Fig. 289: Locating RH Camshaft Sprocket Bolt
Courtesy of FORD MOTOR CO.

56. Remove the RH camshaft sprocket bolt.
57. Remove the bolt.

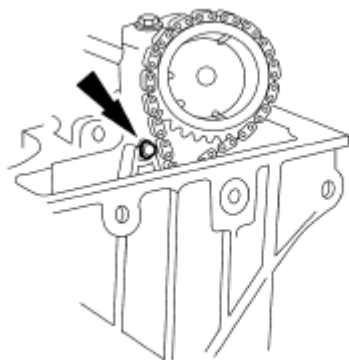


Fig. 290: Locating Bolt
Courtesy of FORD MOTOR CO.

58. Remove the camshaft sprocket from the camshaft and install a rubber band on the cassette to hold the chain and camshaft sprocket in place.

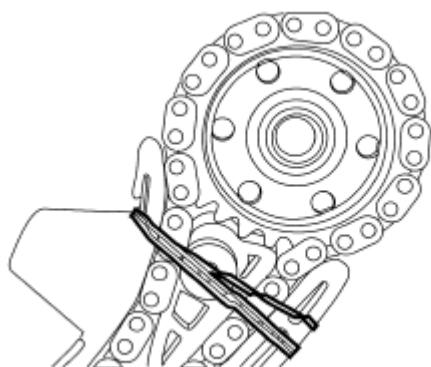


Fig. 291: Identifying Rubber Band On Cassette
Courtesy of FORD MOTOR CO.

59. Remove the LH hydraulic chain tensioner.

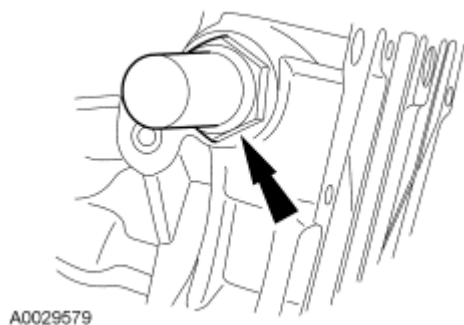


Fig. 292: Locating Camshaft Tensioner

Courtesy of FORD MOTOR CO.

60. Install the special tools on the LH cylinder head.

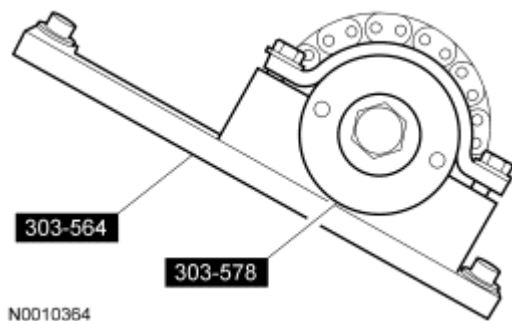


Fig. 293: Identifying Special Holding Tool
Courtesy of FORD MOTOR CO.

61. Remove the LH camshaft sprocket bolt.

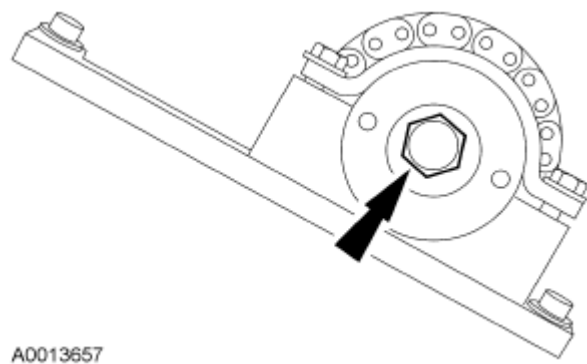
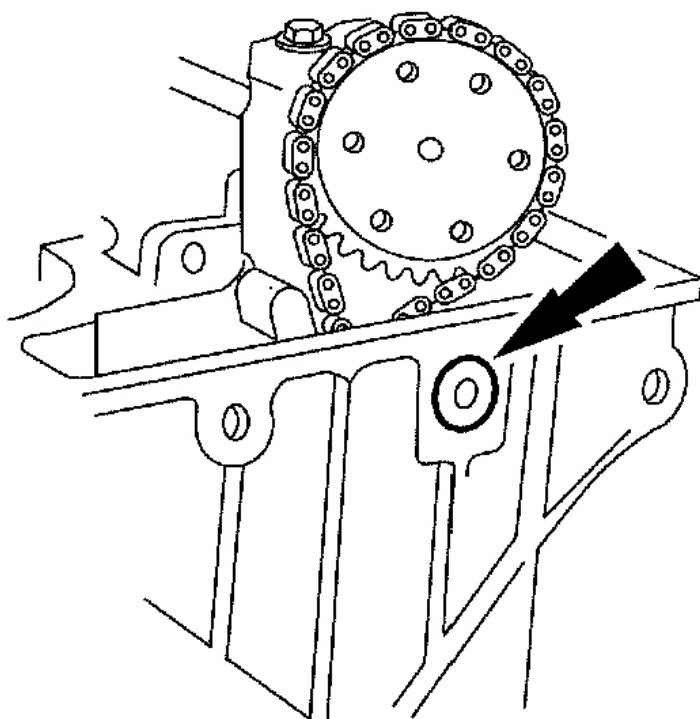


Fig. 294: Locating LH Camshaft Sprocket Bolt
Courtesy of FORD MOTOR CO.

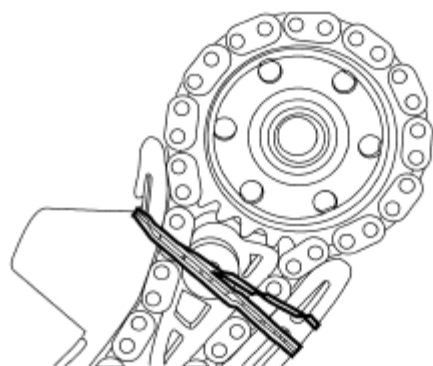
62. Remove the bolt.



GA1670-A

Fig. 295: Identifying LH Cassette Upper Bolt
Courtesy of FORD MOTOR CO.

63. Remove the camshaft sprocket from the camshaft and install a rubber band on the cassette to hold the chain and camshaft sprocket in place.



GA1724-A

Fig. 296: Identifying Rubber Band On Cassette
Courtesy of FORD MOTOR CO.

Early build vehicles

NOTE: New cylinder head bolts must be installed. They are a torque-to-yield design and cannot be reused.

64. Remove the bolts in the sequence shown and remove the cylinder heads.

- Discard the gaskets and the bolts.

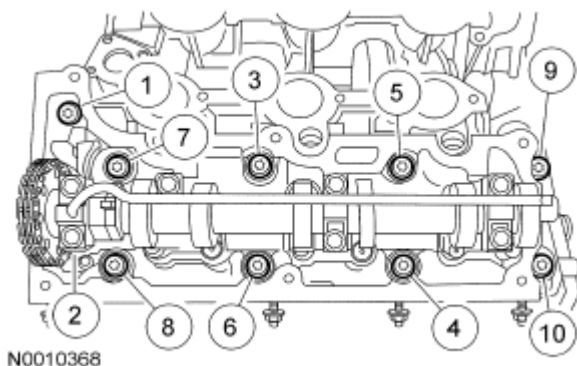


Fig. 297: Identifying Cylinder Head Bolts Removing Sequence
Courtesy of FORD MOTOR CO.

Late build vehicles

NOTE: New cylinder head bolts must be installed. They are a torque-to-yield design and cannot be reused.

65. Remove the bolts in the sequence shown and remove the cylinder heads.

- Discard the gaskets and the bolts.

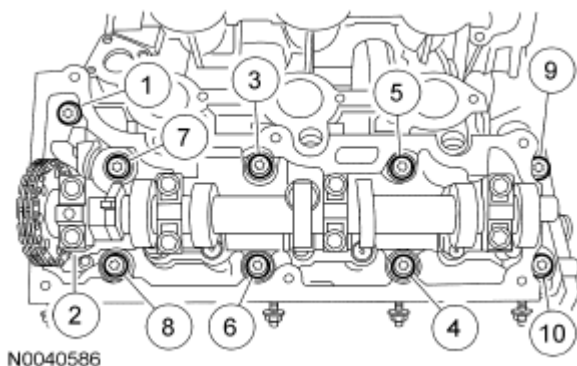


Fig. 298: Identifying Cylinder Head Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

All vehicles

CAUTION: Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools

cause scratches and gouges that make leak paths. Use a plastic scraping tool to remove all traces of the cylinder head gasket.

66. Clean and inspect the cylinder head sealing surfaces. For additional information, refer to **ENGINE SYSTEM-GENERAL INFORMATION**.
67. Using the special tool, remove the crankshaft front oil seal.

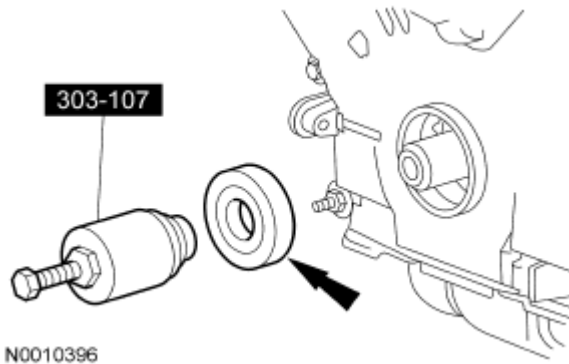


Fig. 299: Locating Special Tool And Crankshaft Front Oil Seal
Courtesy of FORD MOTOR CO.

68. Remove the 5 cylinder block cradle-to-engine front cover bolts.
69. Remove the bolts and the engine front cover.

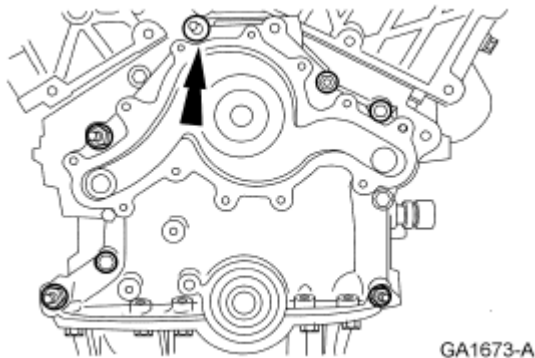


Fig. 300: Locating Engine Front Cover Bolts
Courtesy of FORD MOTOR CO.

70. Remove the bolts and the oil pan.

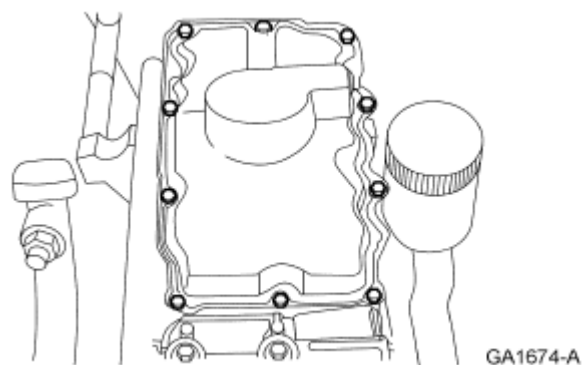


Fig. 301: Locating Oil Pan Bolts
Courtesy of FORD MOTOR CO.

71. Remove the bolt and the oil pump screen cover and tube.

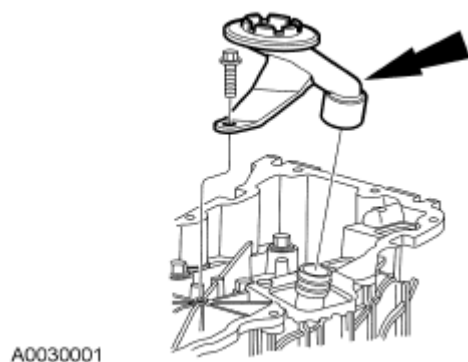


Fig. 302: Locating Oil Pump Screen Cover And Tube Bolt
Courtesy of FORD MOTOR CO.

NOTE: Note the location of the 2 silver-colored bolts with the washer seals. These bolts must be installed in the same position from which they were removed with new washer seals.

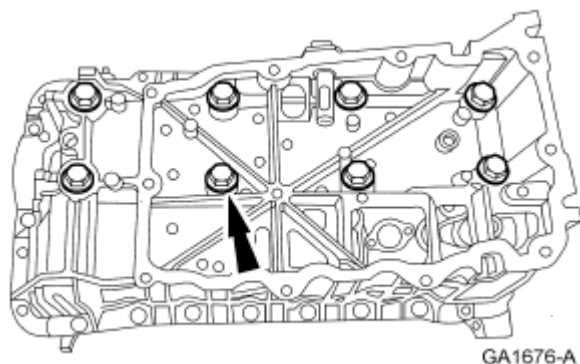


Fig. 303: Locating Cylinder Block Cradle Inner Bolts
Courtesy of FORD MOTOR CO.

72. Remove the cylinder block cradle inner bolts. Remove and discard the 2 washer seals.
73. Remove the cylinder block cradle Torx® bolts.

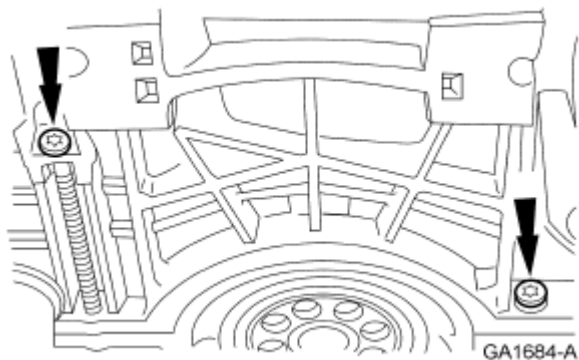


Fig. 304: Locating Cylinder Block Cradle Torx® Bolts
Courtesy of FORD MOTOR CO.

74. Remove the 15 bolts and the 2 nuts. Remove the cylinder block cradle.

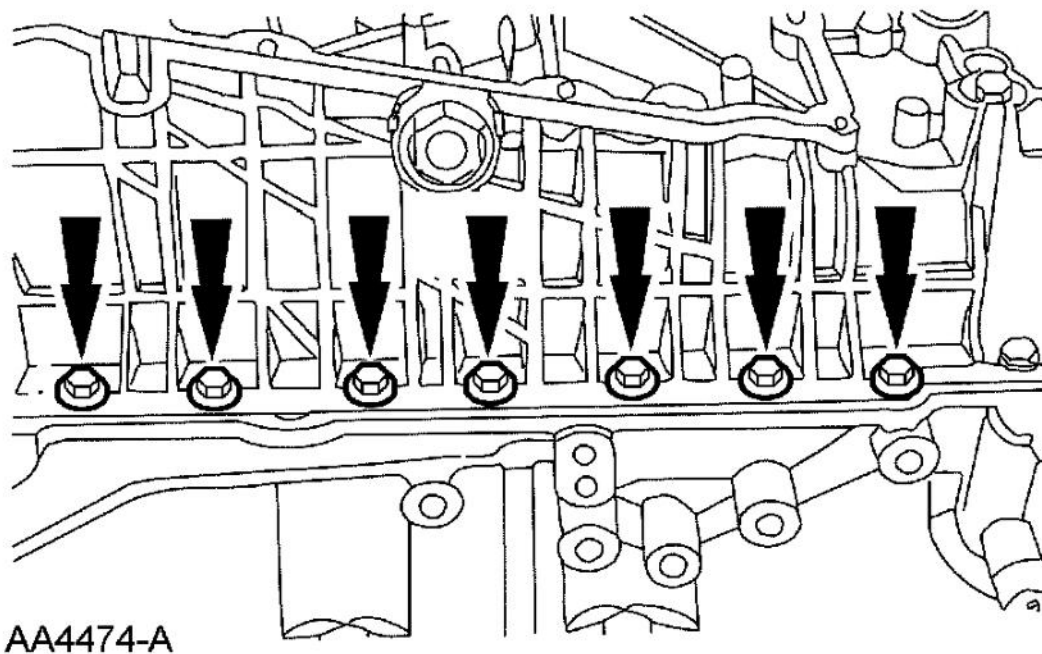
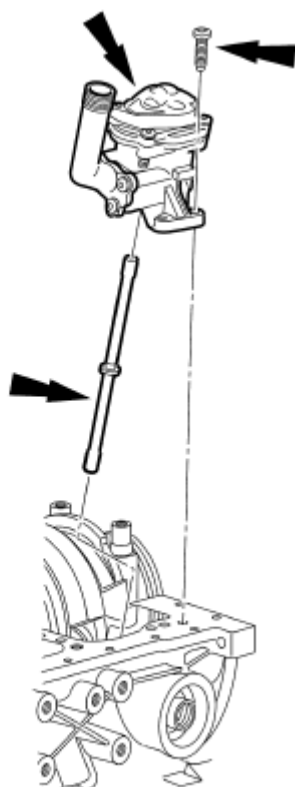


Fig. 305: Locating Outer Bolts
Courtesy of FORD MOTOR CO.

75. Remove the oil pump pickup tube, the oil pump and the oil pump intermediate shaft.



N0013589

Fig. 306: Locating Oil Pump Pickup Tube, Oil Pump And Oil Pump Intermediate Shaft
Courtesy of FORD MOTOR CO.

76. Remove the oil filter adapter.

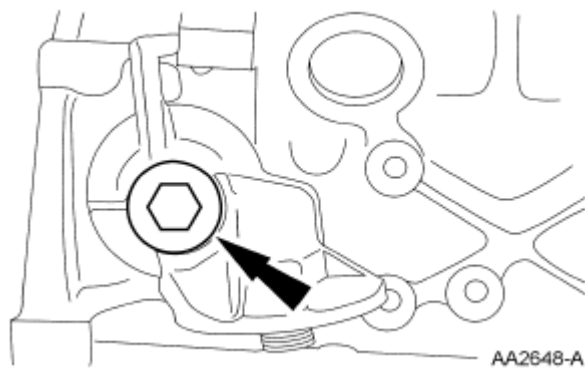


Fig. 307: Locating Oil Filter Adapter
Courtesy of FORD MOTOR CO.

77. Inspect and install new O-ring seals if necessary.

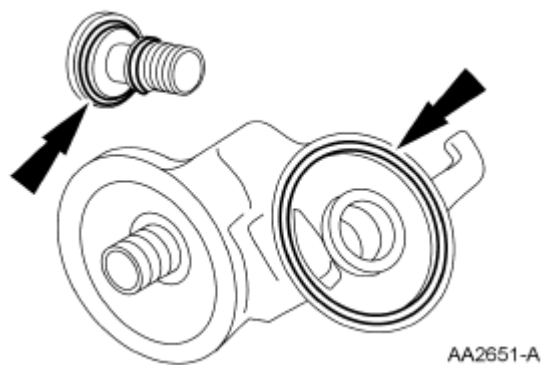


Fig. 308: Locating O-Ring Seals
Courtesy of FORD MOTOR CO.

78. Remove the jackshaft rear plug.

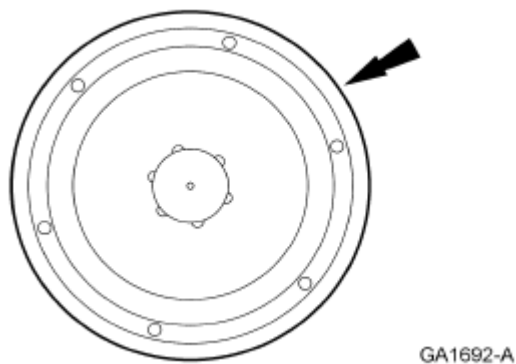


Fig. 309: Locating Jackshaft Rear Plug
Courtesy of FORD MOTOR CO.

79. Using the special tool, hold the crankshaft.

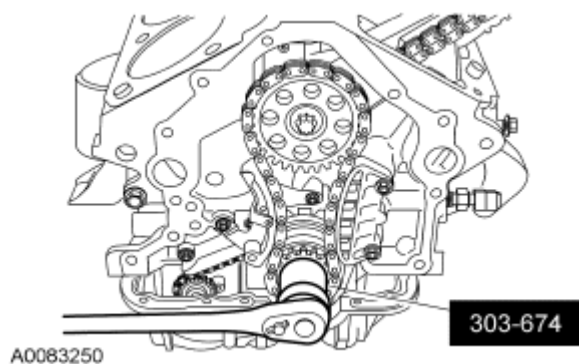


Fig. 310: Identifying Special Tool
Courtesy of FORD MOTOR CO.

80. Remove the jackshaft sprocket rear bolt.

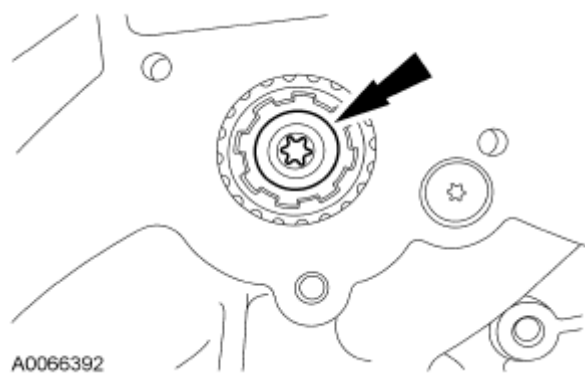


Fig. 311: Locating Jackshaft Sprocket Rear Bolt
Courtesy of FORD MOTOR CO.

81. Remove the RH cassette bolt.

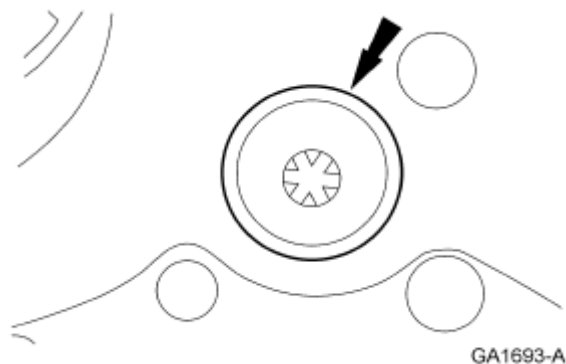


Fig. 312: Locating RH Cassette Bolt
Courtesy of FORD MOTOR CO.

82. Remove the RH cassette.

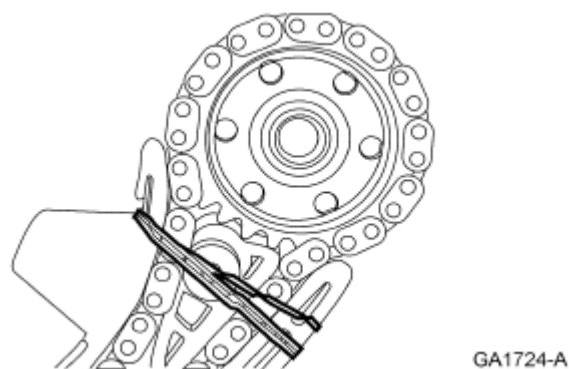


Fig. 313: Locating RH Cassette
Courtesy of FORD MOTOR CO.

83. Remove the oil pump bolt and retainer and then remove the oil pump drive.

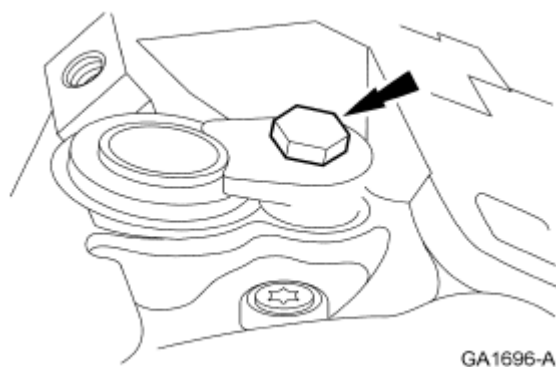


Fig. 314: Locating Oil Pump Bolt
Courtesy of FORD MOTOR CO.

84. Using the special tool to hold the crankshaft, loosen the front sprocket retaining bolt.

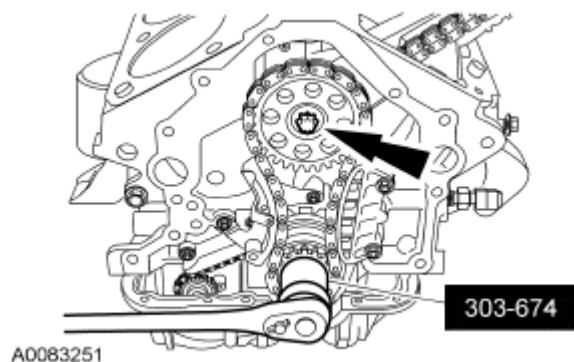


Fig. 315: Locating Front Sprocket Retaining Bolt And Special Tool
Courtesy of FORD MOTOR CO.

85. Remove the bolts and the chain tensioner.

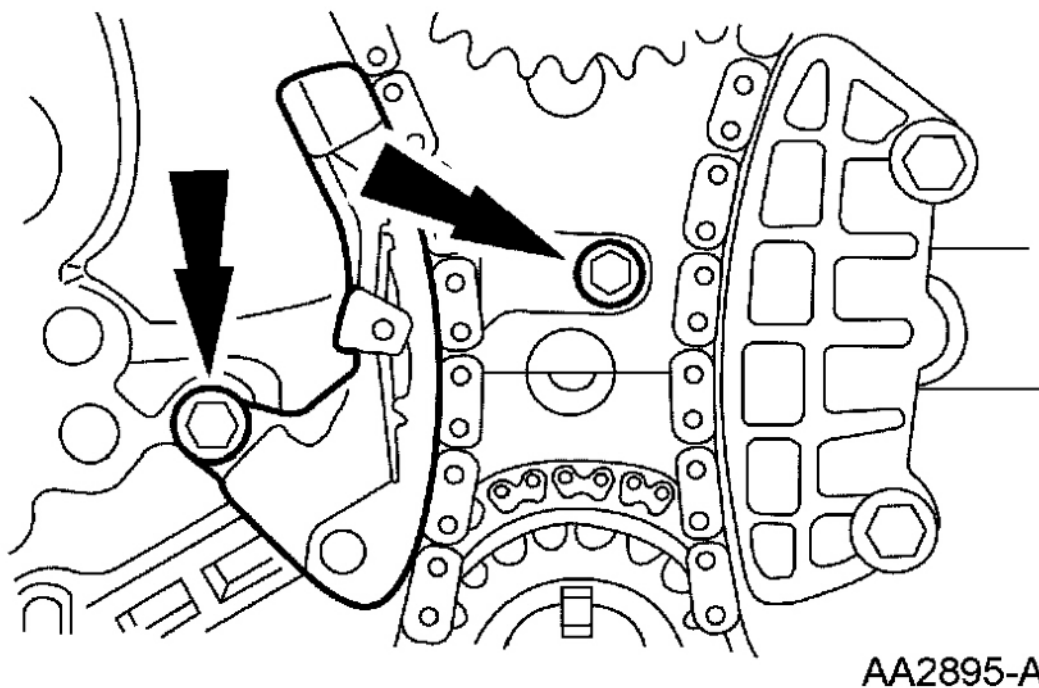


Fig. 316: Locating Jackshaft Chain Tensioner Bolts
Courtesy of FORD MOTOR CO.

86. Remove the chain guide.

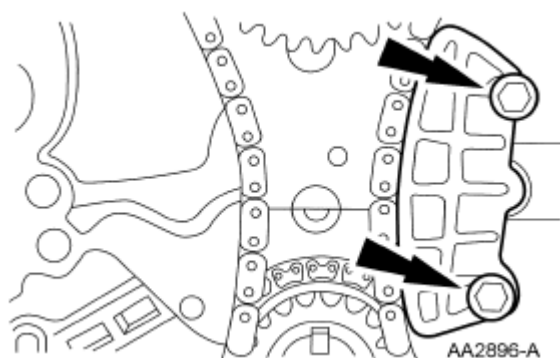
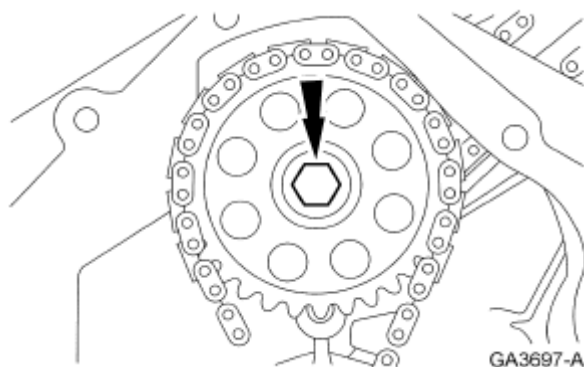


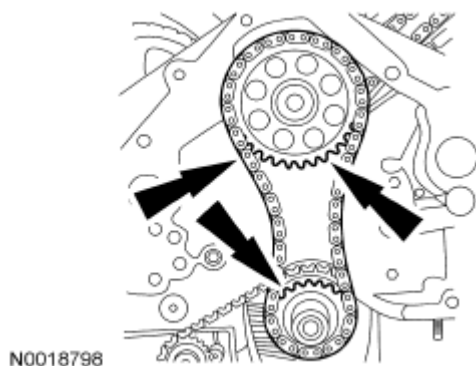
Fig. 317: Locating Chain Guide Bolt
Courtesy of FORD MOTOR CO.

87. Remove the bolt.

**Fig. 318: Locating Bolt**

Courtesy of FORD MOTOR CO.

88. Remove the jackshaft and crankshaft sprockets and the chain.
- Remove the crankshaft key.

**Fig. 319: Locating Jackshaft & Crankshaft Sprockets And Chain**

Courtesy of FORD MOTOR CO.

89. Remove the bolt and the front cassette.

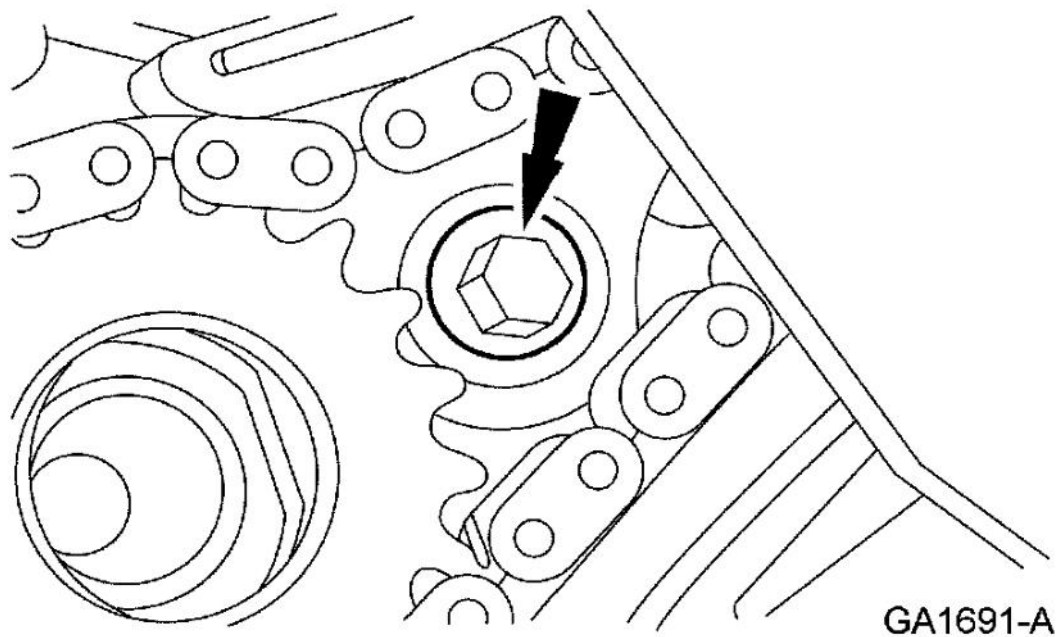


Fig. 320: Locating Cassette Bolt
Courtesy of FORD MOTOR CO.

90. Remove the jackshaft thrust plate.

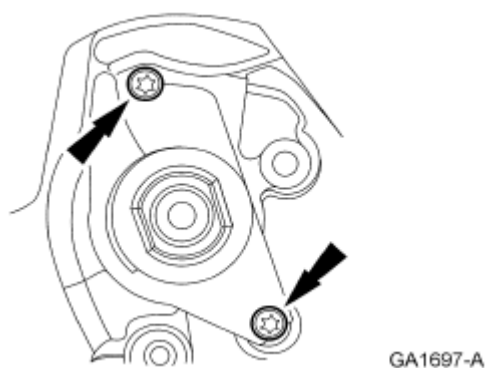
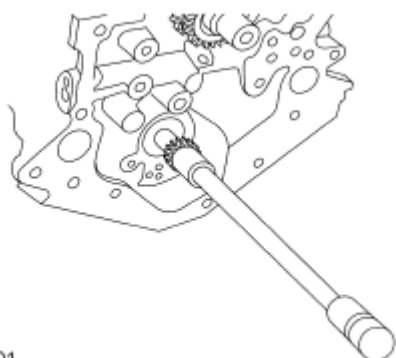


Fig. 321: Locating Jackshaft Thrust Plate Bolts
Courtesy of FORD MOTOR CO.

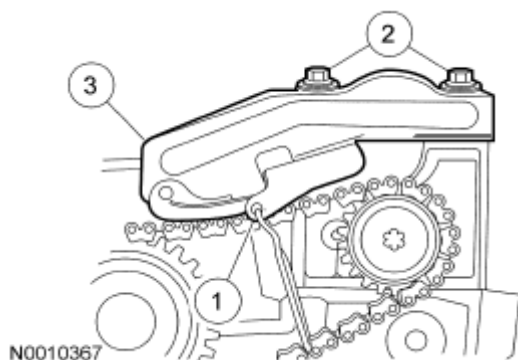
91. Remove the jackshaft.



A0011401

Fig. 322: Locating Jackshaft**Courtesy of FORD MOTOR CO.**

92. Remove the balance shaft tensioner.
1. Install a pin in the balance shaft tensioner.
 2. Remove the bolts.
 3. Remove the balance shaft tensioner.

**Fig. 323: Identifying Balance Shaft Tensioner, Bolts And Pin****Courtesy of FORD MOTOR CO.**

93. Remove the 2 bolts and the balance shaft chain guide.

NOTE: **DO NOT remove the balance shaft sprocket bolt.**

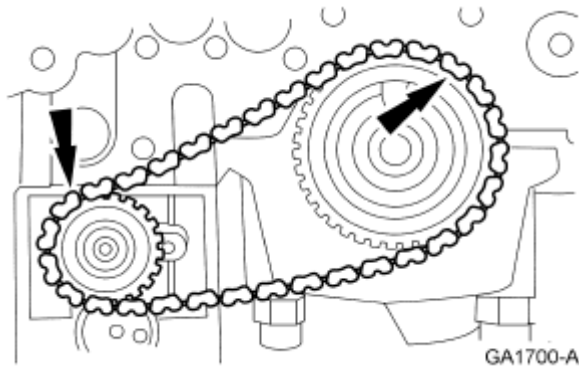


Fig. 324: Locating Balance Shaft Chain And Crankshaft Sprocket
Courtesy of FORD MOTOR CO.

94. Remove the balance shaft chain and crankshaft sprocket.
95. Remove the balance shaft.
 1. Remove the bolts.
 2. Remove the balance shaft.

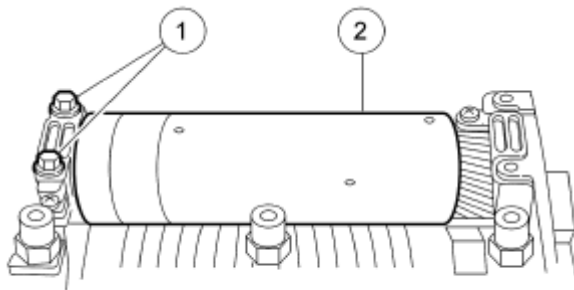


Fig. 325: Locating Balance Shaft And Bolts
Courtesy of FORD MOTOR CO.

96. Before removing the pistons, inspect the top of the cylinder bores. If necessary, remove the ridge or carbon deposits from each cylinder using an abrasive pad or equivalent, following the manufacturer's instructions.

NOTE: Clearly mark the connecting rods and rod caps in numerical order for correct reassembly.

97. Remove the connecting rod caps.
 1. Remove the connecting rod nuts.
 2. Remove the connecting rod cap.

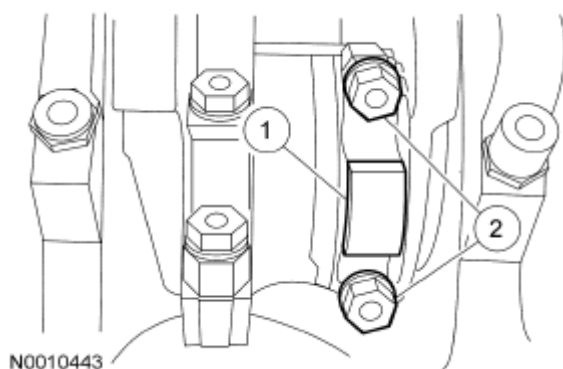


Fig. 326: Identifying Connecting Rod Nuts And Cap
Courtesy of FORD MOTOR CO.

98. Install rubber hose pieces on the bolts to protect the crankshaft and remove the pistons.

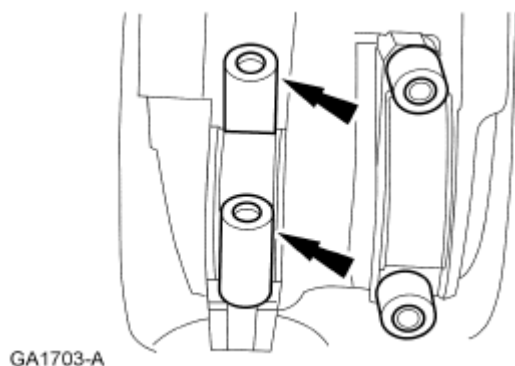


Fig. 327: Locating Rubber Hose Pieces
Courtesy of FORD MOTOR CO.

99. Remove the connecting rod bearings.

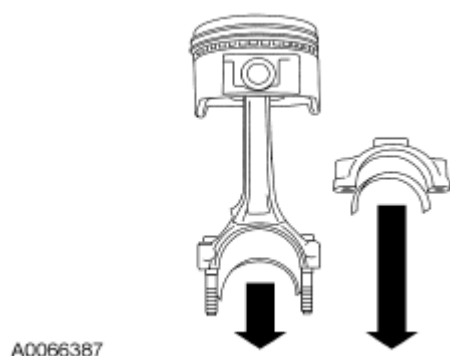


Fig. 328: Removing Connecting Rod Bearings
Courtesy of FORD MOTOR CO.

100. Remove the piston rings.

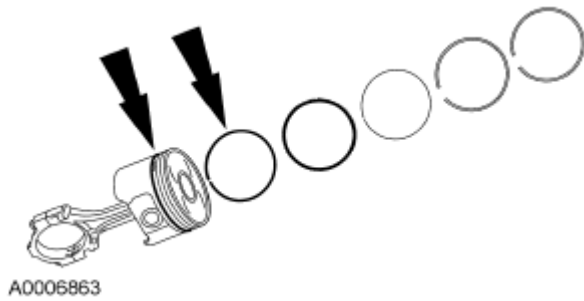


Fig. 329: Locating Piston Rings
Courtesy of FORD MOTOR CO.

101. Clean and inspect the pistons. For additional information, refer to **ENGINE SYSTEM-GENERAL INFORMATION**.

CAUTION: Remove the cylinder heads before removing the crankshaft. Failure to do so can result in engine damage.

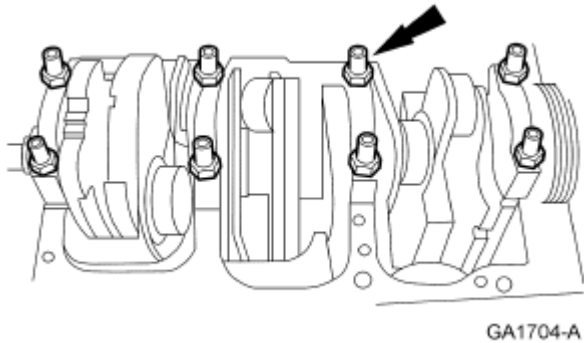


Fig. 330: Locating Bolts
Courtesy of FORD MOTOR CO.

102. Remove the bolts.

NOTE: Number (or mark) the crankshaft bearing caps before removing them.

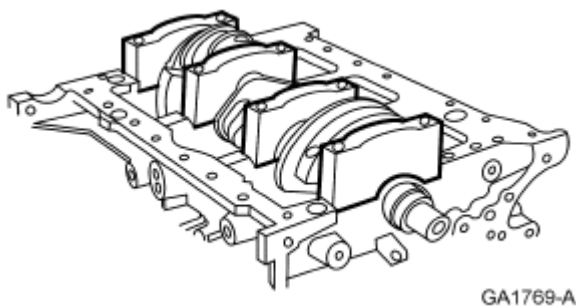


Fig. 331: Identifying Crankshaft Main Bearing Caps

Courtesy of FORD MOTOR CO.

103. Remove the crankshaft main bearing caps.
104. Remove the crankshaft rear oil seal from the crankshaft.

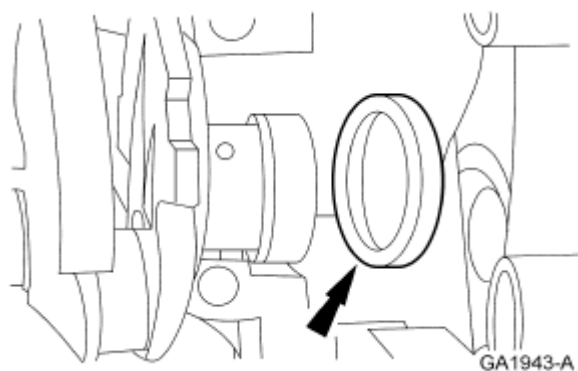


Fig. 332: Locating Crankshaft Rear Oil Seal
Courtesy of FORD MOTOR CO.

105. Remove the crankshaft.

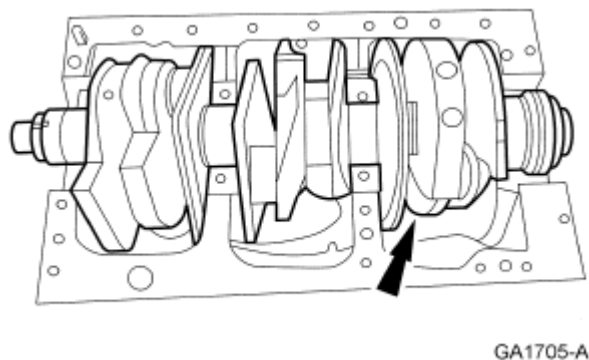


Fig. 333: Locating Crankshaft
Courtesy of FORD MOTOR CO.

106. Remove the crankshaft main bearings and the thrust bearing.

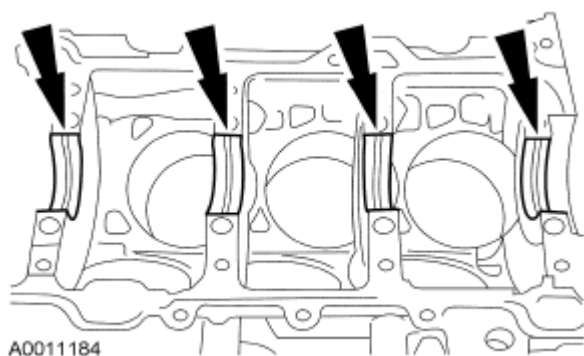
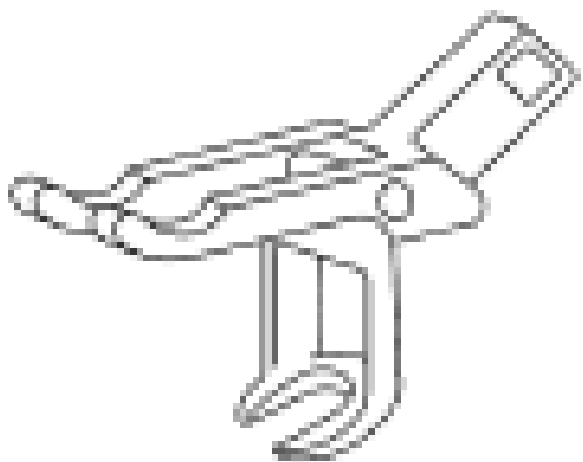


Fig. 334: Locating Crankshaft Main Bearings And Thrust Bearing
Courtesy of FORD MOTOR CO.

DISASSEMBLY AND ASSEMBLY OF SUBASSEMBLIES

CYLINDER HEAD

SPECIAL TOOLS

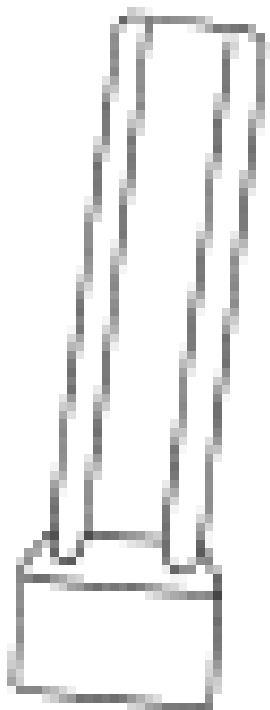


ST1330-A

Compressor, Valve Spring
303-581 (T97T-6565-A)

2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST1824-A

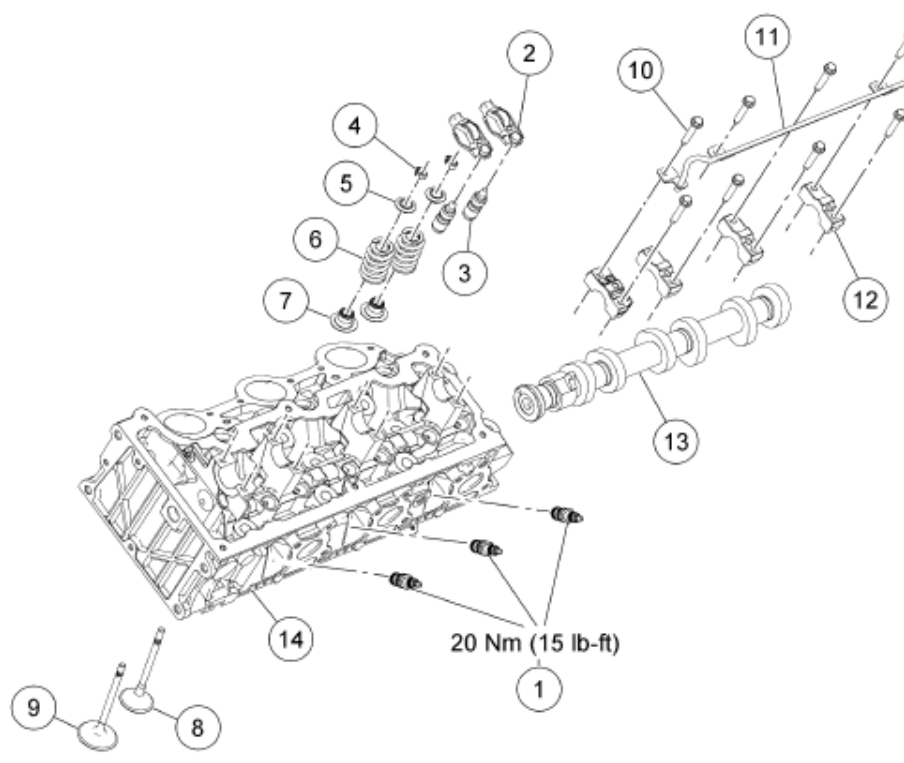
Installer, Valve Stem Oil Seal
303-370 (T90T-6571-A)

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada Motorcraft SAE 5W-30 Super Premium Motor Oil CXO-5W30-LSP12) or equivalent	WSS- M2C929-A

2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



Item	Part Number	Description
1	12405	Spark plugs
2	6529	Camshaft roller follower
3	6C501	Hydraulic lash adjuster
4	6518	Valve spring retainer key (12 required)
5	6A536	Valve spring retainer
6	6513	Valve spring (6 required)
7	6571	Valve seal (6 required)
8	6505	Exhaust valve
9	6507	Intake valve
10	W702341	Camshaft bearing cap mounting bolt (8 required)
11	6578	Oil supply tube (early build vehicles only)
12	6A258	Camshaft bearing cap (4 required)
13	6A274	LH camshaft
14	6050	Cylinder head

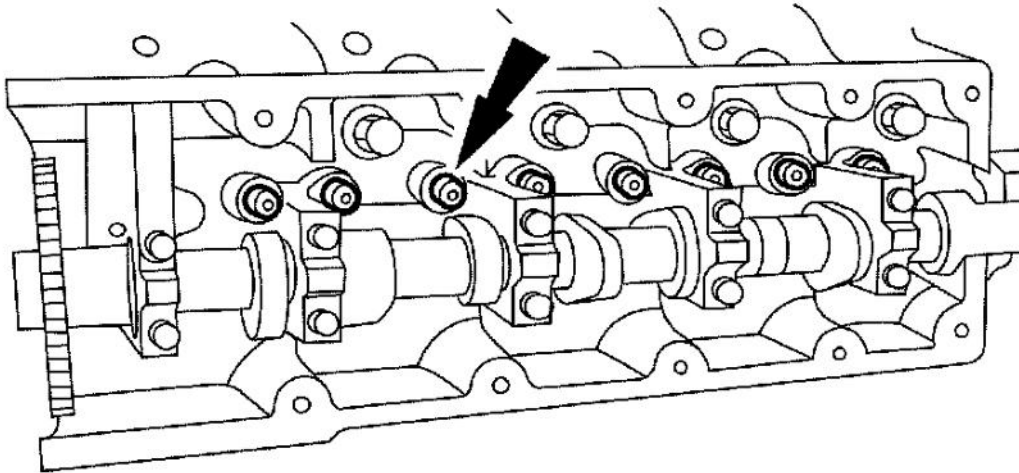
Fig. 335: Identifying Cylinder Head Components With Torque Specifications
Courtesy of FORD MOTOR CO.

Disassembly

All vehicles

1. Remove the spark plugs.

NOTE: Mark each hydraulic lash adjuster to make sure it is installed in its original position.



A26324-A

Fig. 336: Identifying Hydraulic Lash Adjusters
Courtesy of FORD MOTOR CO.

2. Remove the hydraulic lash adjusters.

NOTE: Keep the valves, valve springs, retainers and retainer keys in order so they can be installed in their original positions.

3. Using the special tool, remove the valve spring retainer keys, the valve spring and the retainer. Remove the valve.
 - Repeat the procedure until all of the valves are removed.



Fig. 337: Locating Special Tool, Valve Spring Retainer Keys, Valve Spring, Retainer And Valve
Courtesy of FORD MOTOR CO.

4. Remove and discard the valve seals.

Early build vehicles

NOTE: Mark the position of the camshaft bearing caps so they can be installed in their original positions.

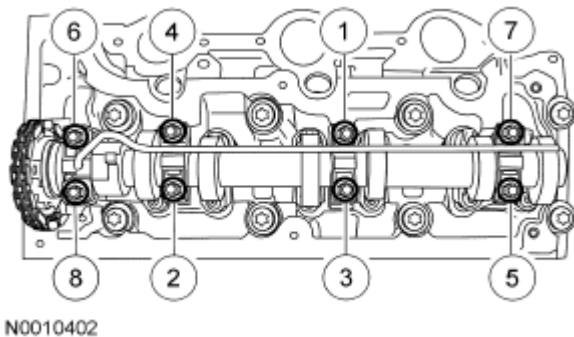


Fig. 338: Identifying Oil Supply Tube Bolts Removing Sequence
Courtesy of FORD MOTOR CO.

5. Remove the bolts in the sequence shown and remove the oil supply tube and the camshaft bearing caps.

Late build vehicles

NOTE: Mark the position of the camshaft bearing caps so they can be installed in their original positions.

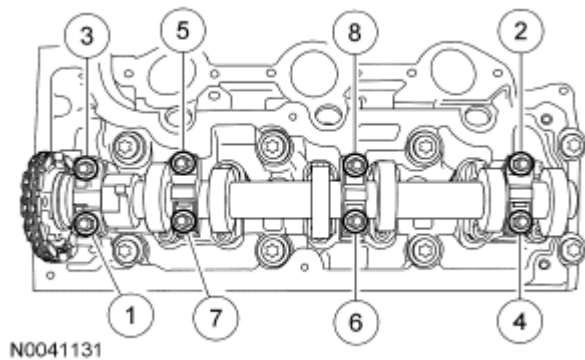


Fig. 339: Identifying Camshaft Bearing Cap Bolts Removing Sequence
Courtesy of FORD MOTOR CO.

6. Remove the bolts in the sequence shown and remove the camshaft bearing caps.

All vehicles

7. Remove the camshaft.

Assembly

NOTE: Lubricate all parts with clean engine oil prior to assembly.

NOTE: Install the camshaft roller followers only after the cylinder head is installed in the vehicle and the timing procedure has been carried out.

All vehicles

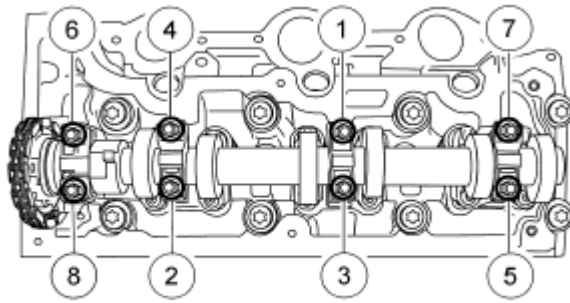
1. Inspect the cylinder head. For additional information, refer to **ENGINE SYSTEM-GENERAL INFORMATION**.
2. Position the camshaft.

Late build vehicles

NOTE: The camshaft bearing caps must be installed in their original positions.

NOTE: After installing the bolts, check the camshaft for free rotation.

3. Position the camshaft bearing caps and the bolts. Tighten the bolts in the sequence shown in 2 stages.
 - Stage 1: Tighten to 6 Nm (53 lb-in).
 - Stage 2: Tighten to 16 Nm (12 lb-ft).



N0041132

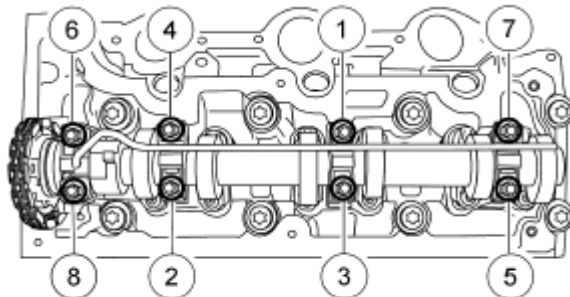
Fig. 340: Identifying Camshaft Bearing Cap Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

Early build vehicles

NOTE: The camshaft bearing caps must be installed in their original positions.

NOTE: After installing the bolts, check the camshaft for free rotation.

4. Position the camshaft bearing caps, the oil supply tube and the bolts. Tighten the bolts in the sequence shown in 2 stages.
 - Stage 1: Tighten to 6 Nm (53 lb-in).
 - Stage 2: Tighten to 16 Nm (12 lb-ft).



N0010402

Fig. 341: Identifying Oil Supply Tube Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

All vehicles

NOTE: Valves must be installed in the position from which they were removed.

5. Install the valve.
6. Using the special tool, install new valve stem seals.

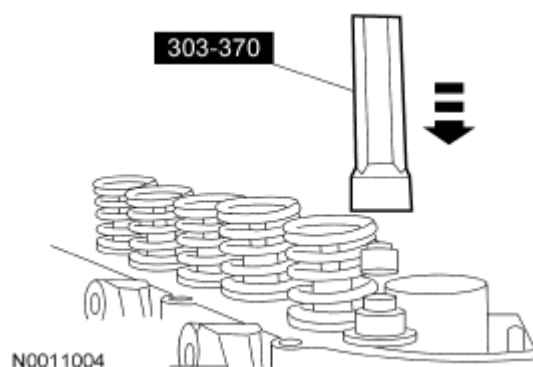


Fig. 342: Using Special Tool To Install New Valve Stem Seals
Courtesy of FORD MOTOR CO.

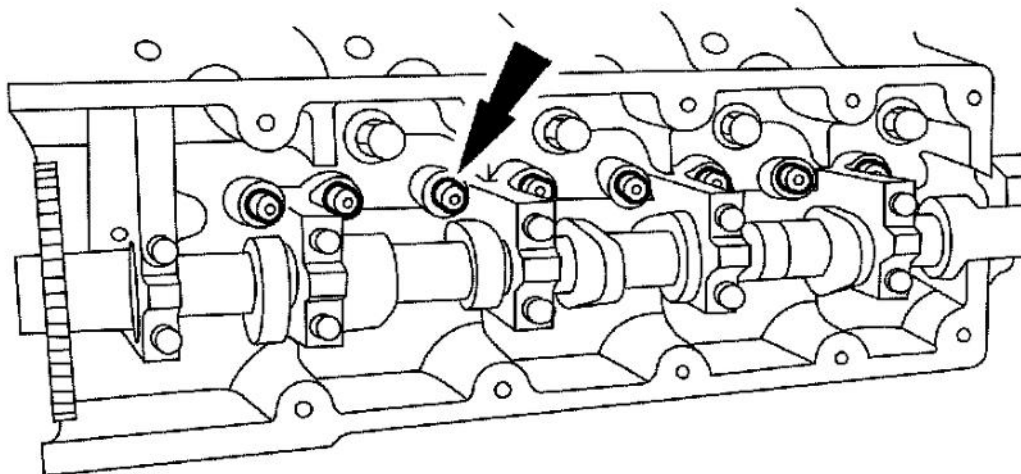
NOTE: The valve springs, retainers and retainer keys must be installed in the positions from which they were removed.



Fig. 343: Locating Special Tool, Valve Spring, Retainer And Retainer Keys
Courtesy of FORD MOTOR CO.

7. Using the special tool, install the valve spring, the retainer and the retainer keys.

NOTE: Install the hydraulic lash adjusters in the same positions from which they were removed.



A26324-A

Fig. 344: Identifying Hydraulic Lash Adjusters
Courtesy of FORD MOTOR CO.

8. Install the hydraulic lash adjusters.

PISTON

SPECIAL TOOLS

Service Set, Piston Pin
303-S024 (T68P-6135-A)

2006 Mercury Mountaineer

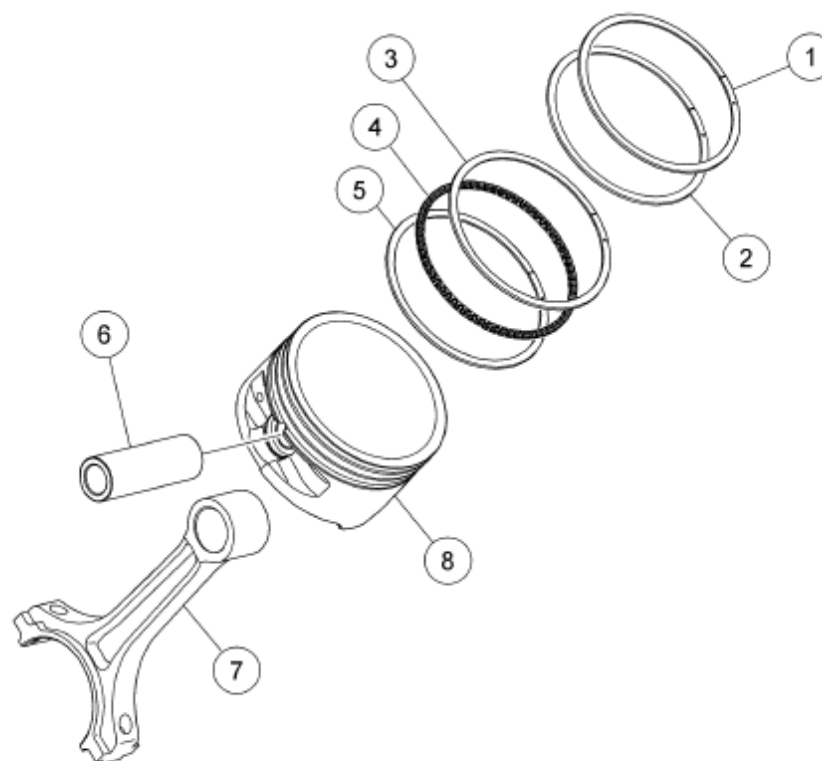
2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST1336-A

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada Motorcraft 5W-30 Super Premium Motor Oil CXO-5W30-LSP12) or equivalent	WSS- M2C929-A



N0006375

Item	Part Number	Description
1	6150	Piston compression upper ring
2	6152	Piston compression lower ring
3	6159	Piston oil control upper segment ring
4	6161	Piston oil control spacer
5	6159	Piston oil control lower segment ring
6	6135	Piston pin
7	6200	Connecting rod
8	6110	Piston

Fig. 345: Exploded View Of Piston Components
Courtesy of FORD MOTOR CO.

Disassembly

NOTE: The connecting rod bolts and nuts cannot be reused.

NOTE: Mark the position of the parts, so they can be installed in their original positions.

1. Remove the connecting rod bearings from the connecting rod and cap.

2. Remove the piston rings from the piston.
3. Using the special tool, press the piston pin out of the connecting rod and piston assembly.

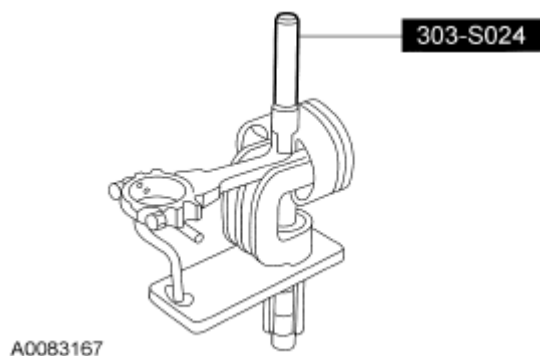


Fig. 346: Identifying Special Tool
Courtesy of FORD MOTOR CO.

Assembly

NOTE: Lubricate all parts with clean engine oil.

NOTE: Install the piston in the connecting rod with the cylinder number side of the rod and the indentation notch in the piston on the same side.

NOTE: The oil hole in the connecting rod must face the RH side of the cylinder block and the arrow on the piston must face the front of the engine block.

NOTE: If the piston pin is removed from the piston, a new piston and piston pin must be used. Do not reuse the piston or the piston pin.

1. Gradually heat the pin bore side of the connecting rod to approximately 232°C-316°C (467°F-626°F) and immediately install the piston pin.
2. Using the special tool, press the piston pin into the piston and connecting rod assembly.

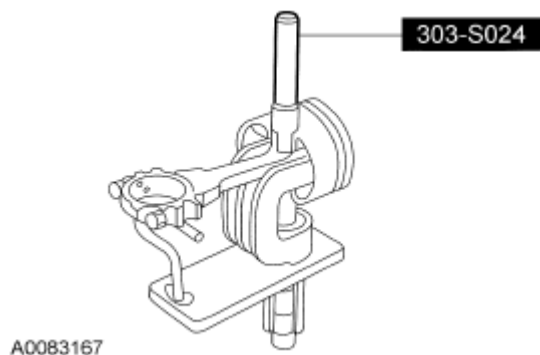


Fig. 347: Identifying Special Tool

Courtesy of FORD MOTOR CO.

3. Install the piston rings.
4. Make sure the ring gaps (oil spacer-A, oil ring-B, compression ring-C) are correctly spaced around the circumference of the piston.

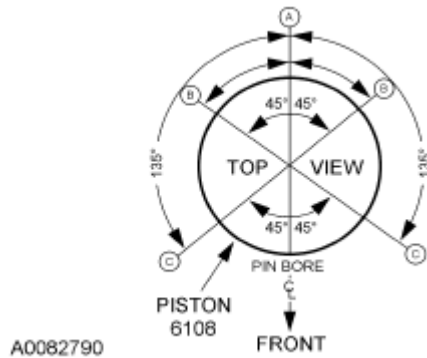


Fig. 348: Identifying Ring Gaps Positions
Courtesy of FORD MOTOR CO.

5. Install the connecting rod bearings in the connecting rod and cap.

ASSEMBLY

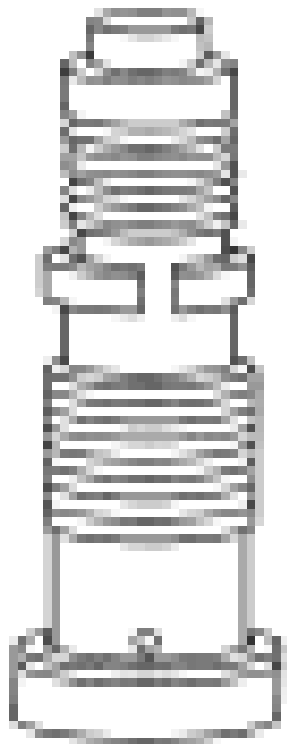
ENGINE

SPECIAL TOOLS

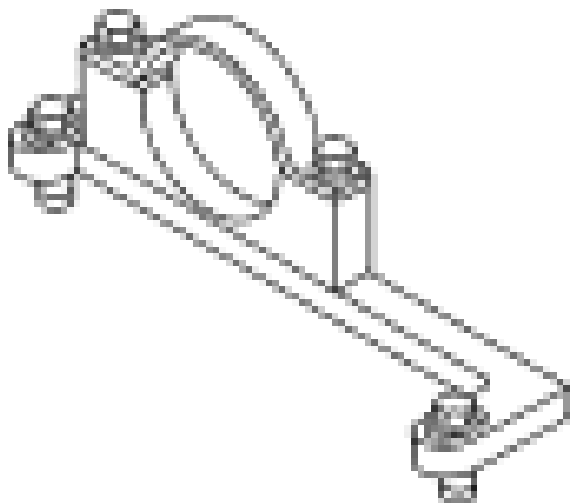
Tensioner, Timing Chain
303-571 (T97T-6K254-A)

2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST1774-A



ST1777-A

Holding Tool, Camshaft Sprocket
303-564 (T97T-6256-B)

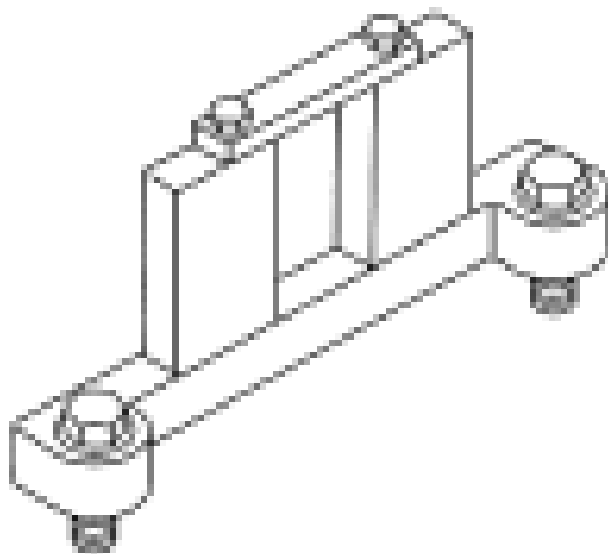
2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



Adapter for 303-564
303-578 (T97T-6256-A)

ST1776-A

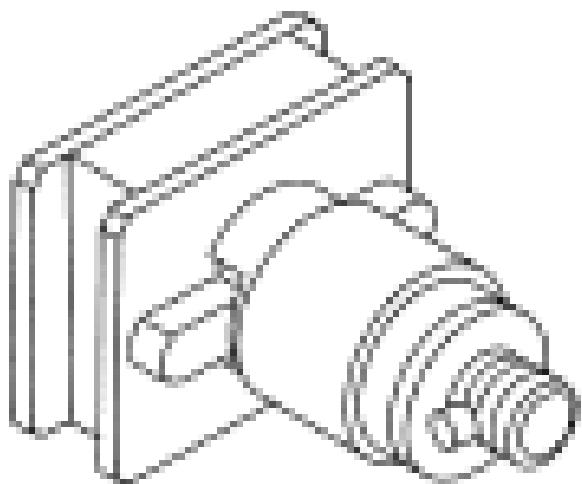


Holding Tool, Camshaft
303-577 (T97T-6256-C)

ST1778-A

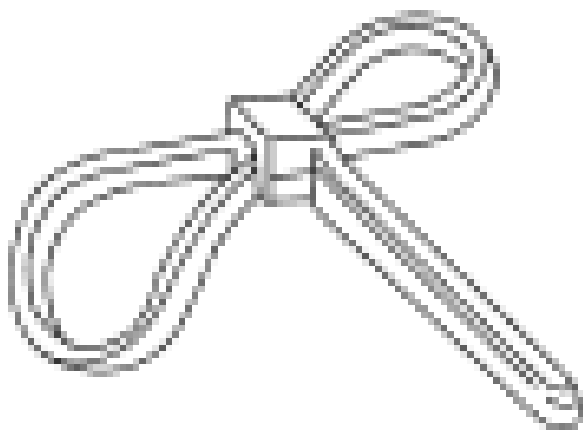
2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST1779-A

Adapter for 303-577
303-576 (T97T-6256-D)

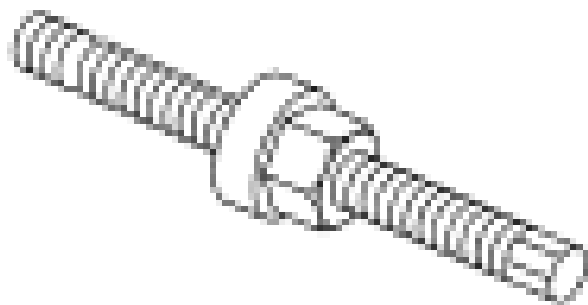


ST1438-A

Strap Wrench
303-D055 (85L-6000-A) or equivalent

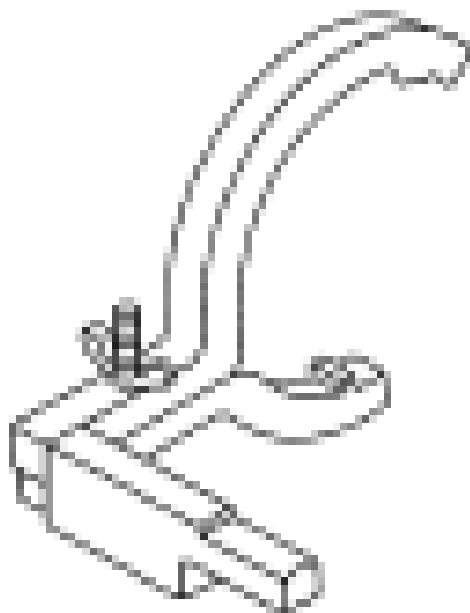
2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



Installer, Crankshaft Vibration Damper
303-102 (T74P-6316-B)

ST1287-A

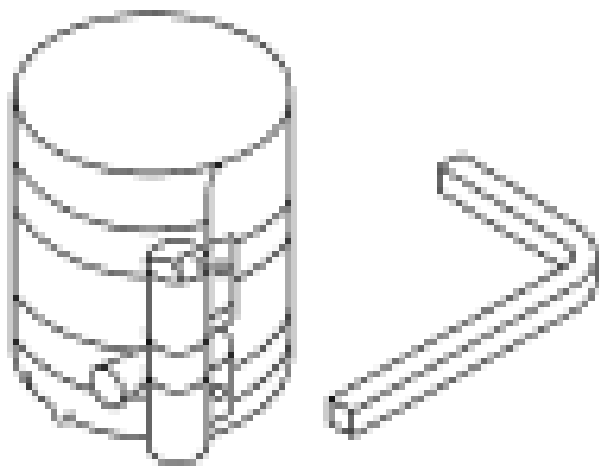


Timing Tool, Crankshaft TDC
303-573 (T97T-6303-A)

ST1775-A

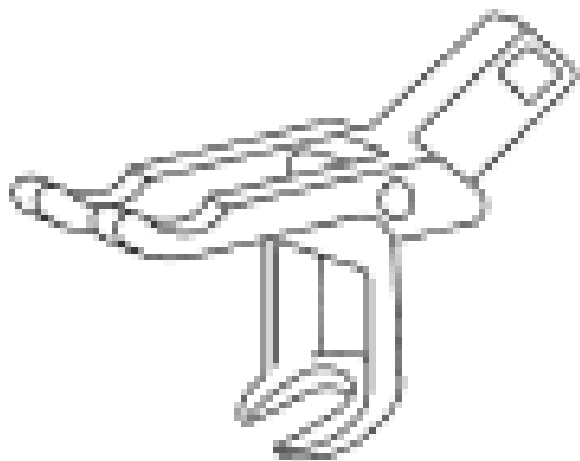
2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST1380-A

Compressor, Piston Ring
303-D032 (D81L-6002-C)



ST1330-A

Compressor, Valve Spring
303-581 (T97T-6565-A)

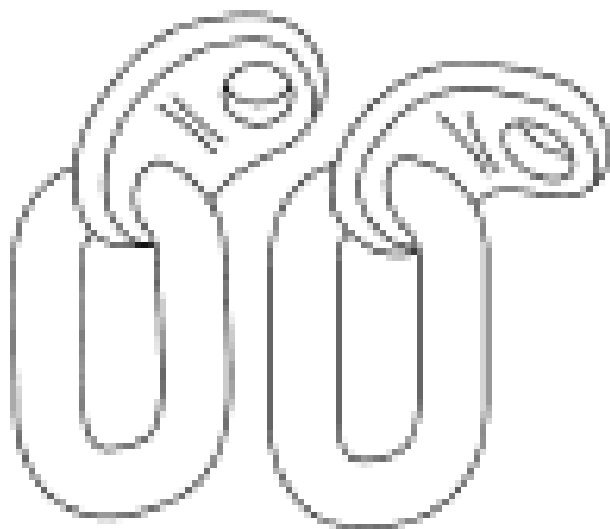
2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST2741A

Crankshaft Socket
303-674

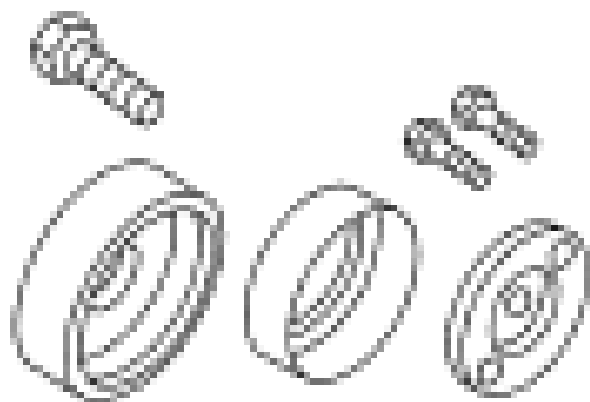


ST1831-A

Lifting Eyes
303-050

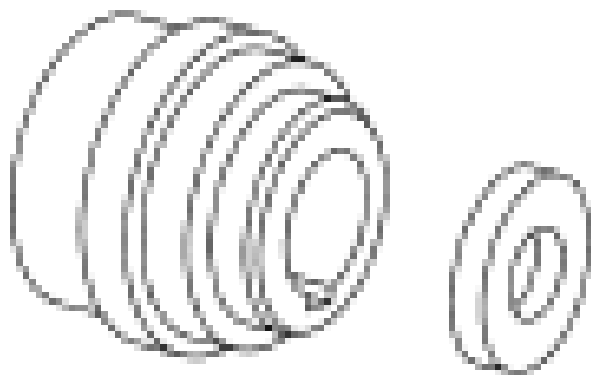
2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



Service Set, Crankshaft Rear Oil Seal
303-S524 (T95T-6701-AR)

ST1785-A



Aligner, Front Cover
303-093 (T74P-6019-A)

ST2439-A

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2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST2132-A

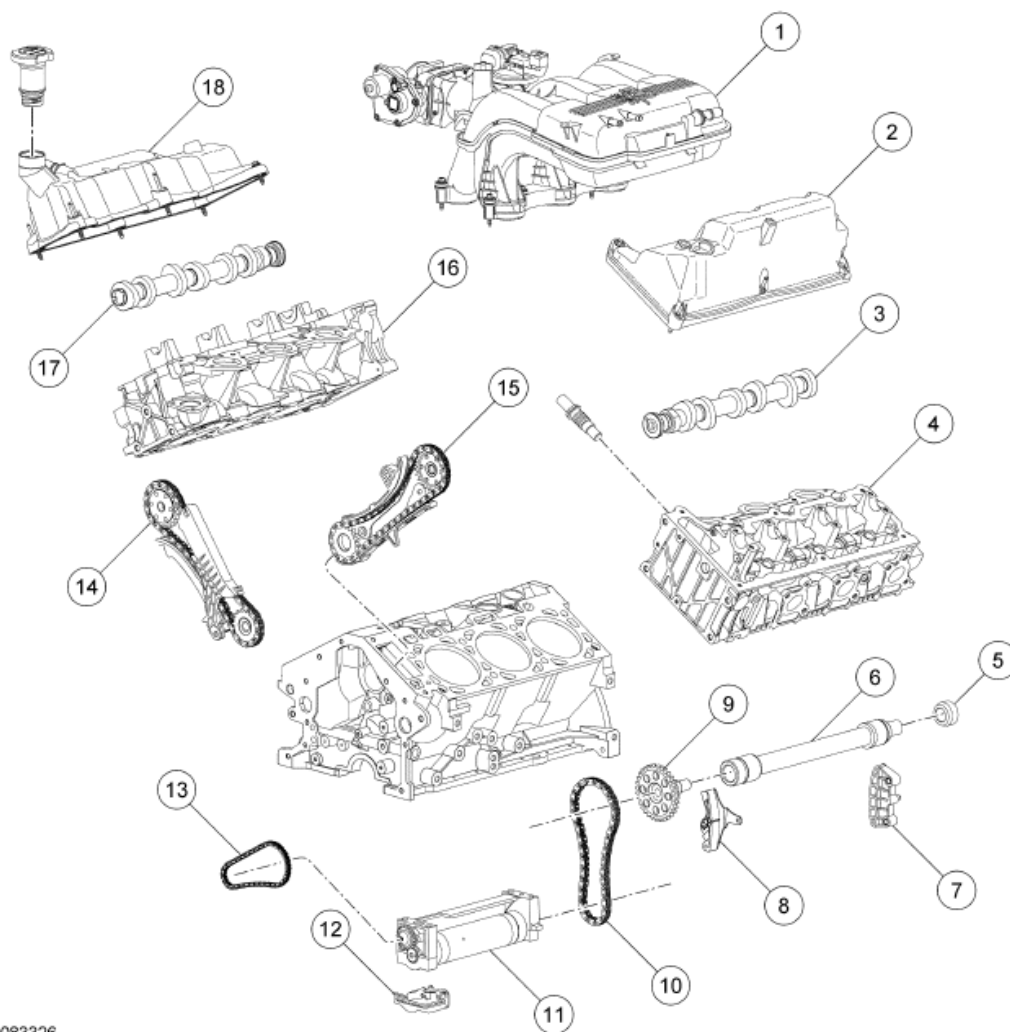
Installer, Crankshaft Rear Oil Seal
303-579 (T97T-6701-A)

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada Motorcraft SAE 5W-30 Super Premium Motor Oil CXO-5W30-LSP12) or equivalent	WSS-M2C929-A
Silicone Gasket Remover ZC-30	-
Motorcraft Metal Surface Prep ZC-31	-
Silicone Gasket and Sealant TA-30	WSE-M4G323-A4
Silicone Brake Caliper Grease and Dielectric Compound XG-3-A (Canada CXG-2-B)	ESE-M1C171-A

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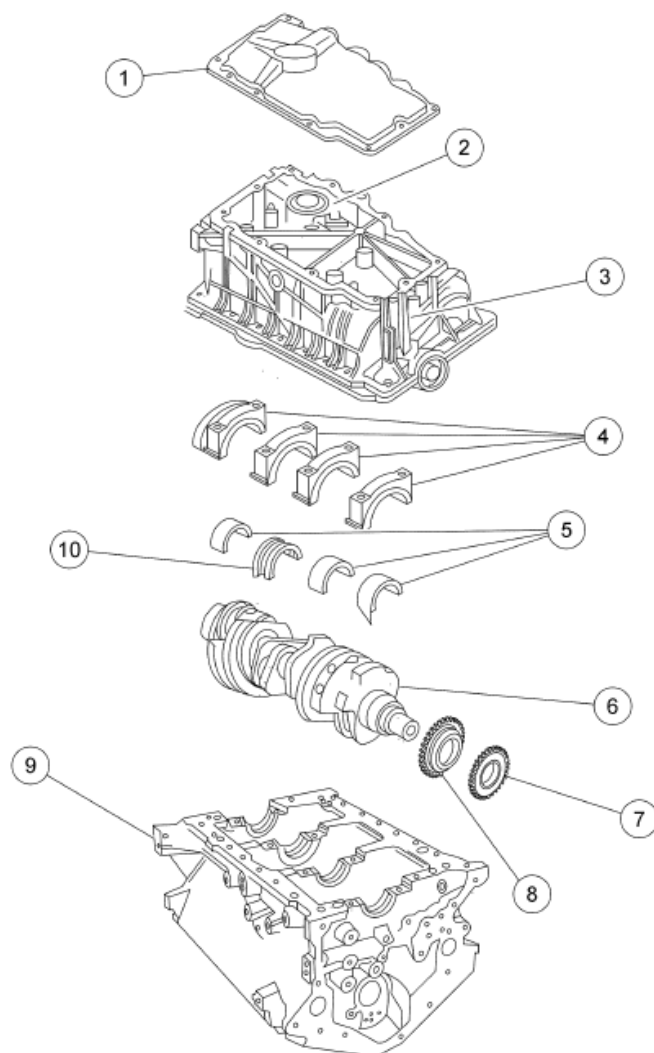
Item	Part Number	Description
1	9K479	Intake manifold
2	6A505	Valve cover, LH
3	6A274	Camshaft, LH
4	6050	Cylinder head, LH
5	6M296	Spacer
6	6M262	Jackshaft
7	6M272	Jackshaft chain guide
8	6M271	Jackshaft chain tensioner

Item	Part Number	Description
9	6M264	Jackshaft sprocket
10	6M270	Jackshaft chain assembly
11	6A311	Balance shaft
12	6K355	Balance shaft chain tensioner
13	6A364	Balance shaft chain
14	6M289	LH cassette
15	6M290	RH cassette
16	6049	Cylinder head, RH
17	6250	Camshaft, RH
18	6582	Valve cover, RH

Fig. 349: Exploded View Of Engine Components - Upper End - 4.0L SOHC Engine
 Courtesy of FORD MOTOR CO.

2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



N0041840

Item	Part Number	Description
1	6675	Oil pan
2	6617	Tube assembly oil pickup
3	6F092	Cylinder block cradle
4	—	Crankshaft main bearing caps
5	6A338	Crankshaft lower main bearings

Item	Part Number	Description
6	6303	Crankshaft
7	6306	Jackshaft sprocket
8	6K350	Balance shaft sprocket
9	6010	Cylinder block
10	6A339	Crankshaft lower thrust main bearing

Fig. 350: Exploded View Of Engine Components - Lower End - 4.0L SOHC Engine
Courtesy of FORD MOTOR CO.

CAUTION: If used as a leverage device, the fuel rail can be damaged. Care must be taken when working around the fuel rail.

NOTE: During engine assembly it may be necessary to check the bearing clearances and crankshaft end play. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION .

NOTE: Before engine assembly, use silicone gasket remover and metal surface prep and a suitable plastic or wooden scraper to clean the sealing surfaces. Follow the directions on the packaging. All sealing surfaces must be clean. Make sure coolant and oil passages are clear.

All engines

1. Install the crankshaft main bearings and the thrust bearing.
 - Lubricate the crankshaft main bearings with clean engine oil.

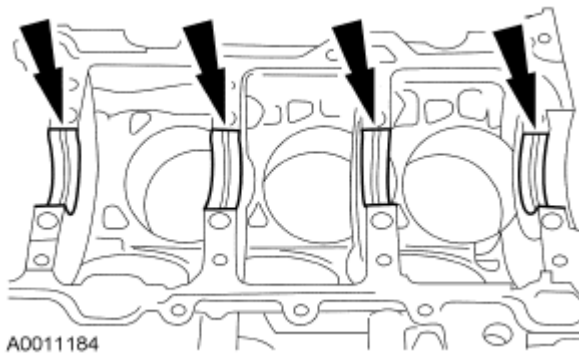


Fig. 351: Locating Crankshaft Main Bearings And Thrust Bearing
Courtesy of FORD MOTOR CO.

2. Install the lower main bearings in the bearing caps.

NOTE: The crankshaft main bearings are precision selective fit. Inspect the bearing clearance. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION .

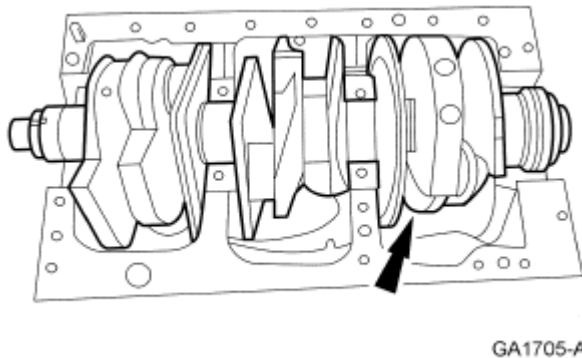


Fig. 352: Locating Lower Main Crankshaft Bearings
Courtesy of FORD MOTOR CO.

3. Install the crankshaft.

NOTE: If not secured within 4 minutes, the sealant must be removed and the sealing area cleaned. To clean the sealing area, use silicone gasket remover and metal surface prep. Follow the directions on the packaging. Failure to follow this procedure can cause future oil leakage.

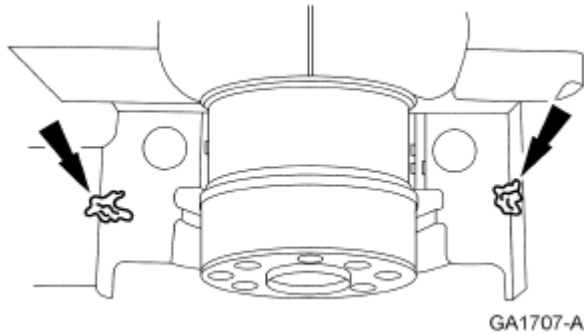


Fig. 353: Locating Sealant Applying Areas
Courtesy of FORD MOTOR CO.

4. Apply silicone gasket and sealant to the rear main bearing cap to cylinder block parting line.
5. Install the main bearing caps in the same position from which they were removed.

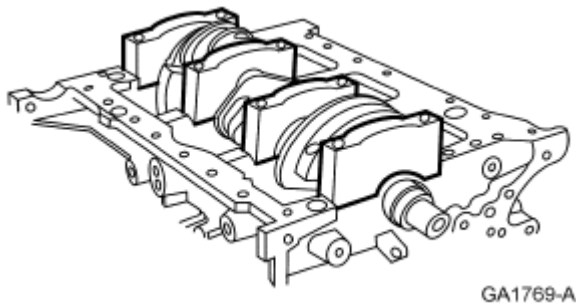


Fig. 354: Identifying Main Bearing Caps
Courtesy of FORD MOTOR CO.

6. Tighten the bolts.
 - Tighten to 97 Nm (72 lb-ft).

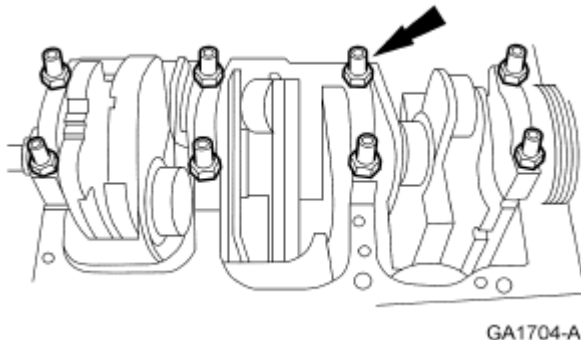


Fig. 355: Locating Bolts
Courtesy of FORD MOTOR CO.

7. Check the piston to cylinder bore and ring clearance. For additional information, refer to **ENGINE SYSTEM-GENERAL INFORMATION** .

NOTE: Lubricate the piston rings with clean engine oil.

8. Install the piston rings.
9. Make sure the ring gaps (oil spacer-A, oil ring-B, compression ring-C) are correctly spaced around the circumference of the piston.

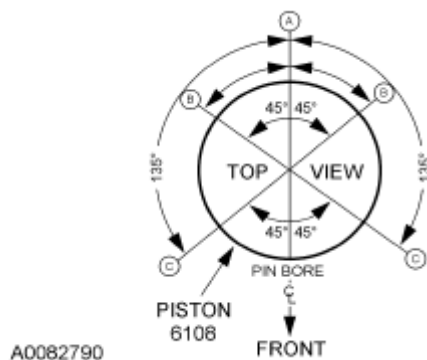


Fig. 356: Identifying Ring Gaps
Courtesy of FORD MOTOR CO.

10. Install the connecting rod bearings.

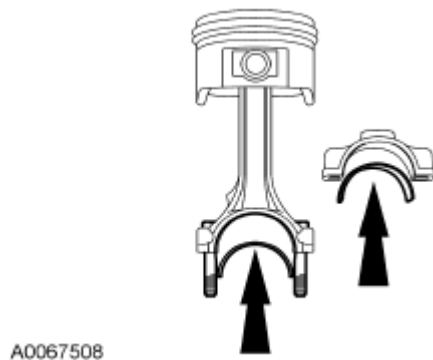


Fig. 357: Locating Connecting Rod Bearings
Courtesy of FORD MOTOR CO.

11. Install rubber hose pieces on the connecting rod bolts to protect the crankshaft.

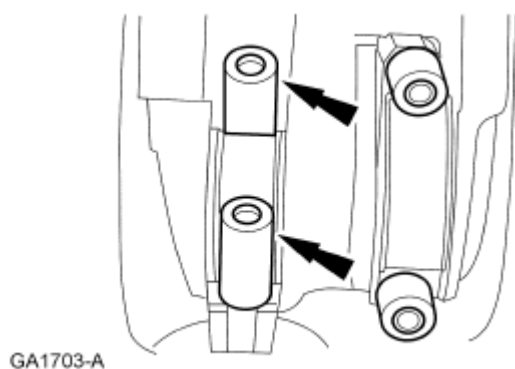


Fig. 358: Locating Rubber Hose Pieces
Courtesy of FORD MOTOR CO.

NOTE: Position the piston with the indentation arrow toward the front of the cylinder block.

12. Using the special tool, install the pistons.
 - Rotate the crankshaft as necessary.

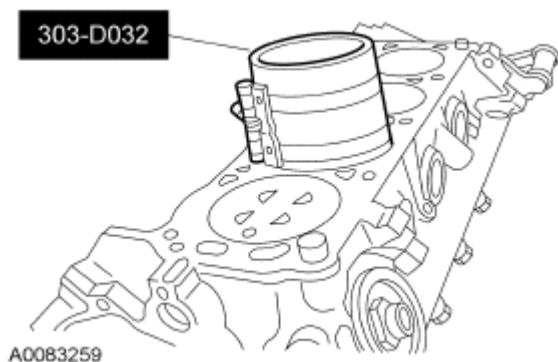


Fig. 359: Identifying Special Tool
Courtesy of FORD MOTOR CO.

NOTE: The old nuts and bolts are used for checking clearances. New nuts and bolts must be used for reassembly.

13. Check the clearance of each connecting rod bearing. For additional information, refer to **ENGINE SYSTEM-GENERAL INFORMATION**.
14. Rotate the crankshaft until the piston is at the bottom of its stroke.

NOTE: For cylinders 1, 2 and 3, remove the connecting rod nut at the oil split hole side first. For cylinders 4, 5 and 6, remove the opposite nut first.

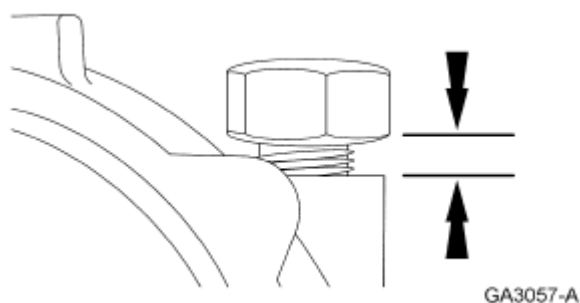


Fig. 360: Locating Nut Loosening Gap
Courtesy of FORD MOTOR CO.

15. Loosen the first nut until the face is approximately 2 mm (0.08 in) over the end of the bolt.
16. Tap on the nut until the bolt can be removed by hand.

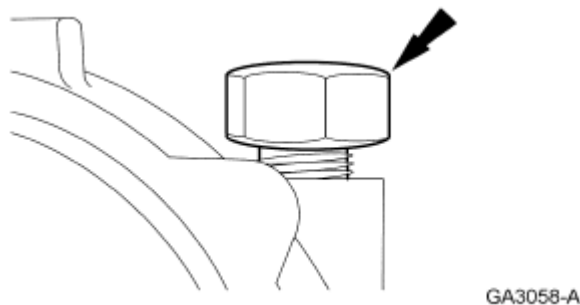


Fig. 361: Locating Nut
Courtesy of FORD MOTOR CO.

17. Repeat the previous 2 steps for the opposite bolt.
18. Install the new bolts making certain that the bolt head is parallel to the sideward face of the connecting rod.

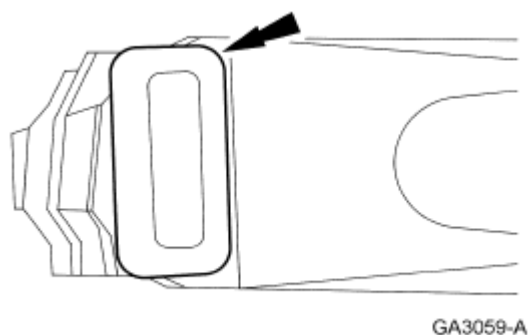


Fig. 362: Locating Sideward Face Of Connecting Rod
Courtesy of FORD MOTOR CO.

19. Install the connecting rod cap in the original position.
20. Install and tighten the connecting rod nuts finger-tight.

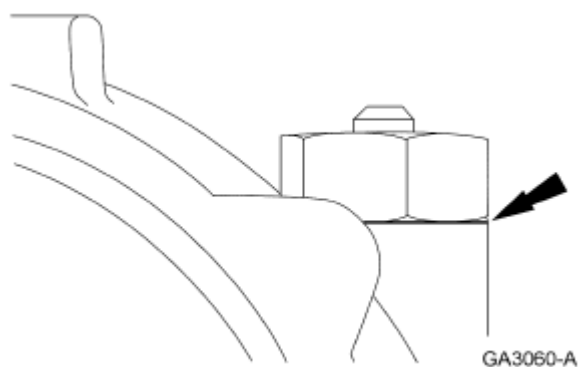


Fig. 363: Identifying Connecting Rod Nuts Finger-Tight
Courtesy of FORD MOTOR CO.

21. Tighten the connecting rod nuts in 2 stages:
 - Stage 1: Tighten to 20 Nm (15 lb-ft).
 - Stage 2: Tighten an additional 90 degrees.
22. Repeat the previous 4 steps for the remaining connecting rods.
23. Rotate crankshaft until the No. 1 piston is at top dead center (TDC).
24. Install the balance shaft.
 1. Install the balance shaft assembly.
 2. Install the bolts.
 - Tighten to 29 Nm (21 lb-ft).

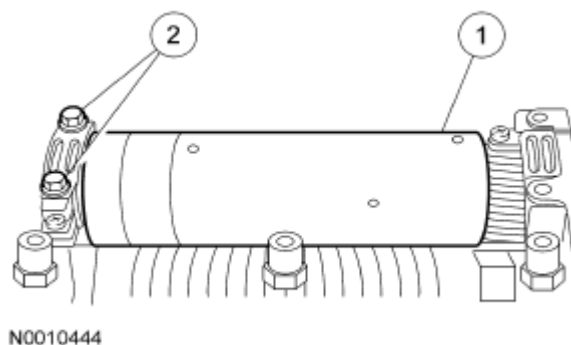


Fig. 364: Identifying Balance Shaft Assembly And Bolts
Courtesy of FORD MOTOR CO.

NOTE: Due to the gear ratio between the reversal shaft and the balance shaft, up to 7 complete turns of the balance shaft may be required to find the correct position.

25. Align the timing marks.
 - Install a 4 mm (0.16 in) pin to hold the shaft in place.

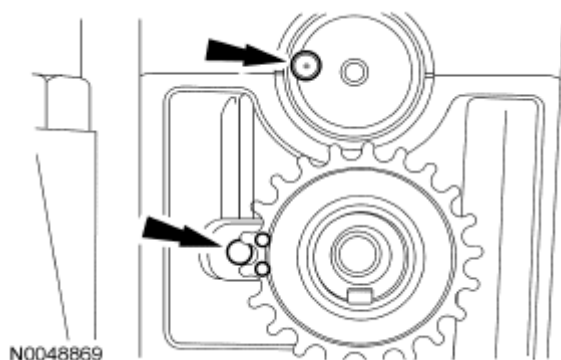


Fig. 365: Locating Timing Marks
Courtesy of FORD MOTOR CO.

26. Install the balance shaft chain and crankshaft sprocket.

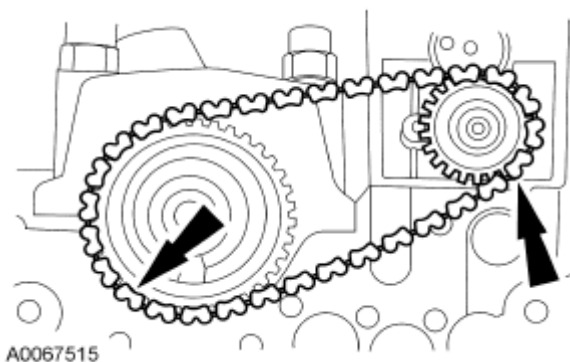


Fig. 366: Locating Balance Shaft Chain And Crankshaft Sprocket
Courtesy of FORD MOTOR CO.

27. Install the balance shaft tensioner and chain guide.
1. Install the balance shaft tensioner.
 2. Install the bolts and tighten to 29 Nm (21 lb-ft).
 3. Position the balance shaft chain guide, install the 2 bolts and tighten to 10 Nm (89 lb-in).
 - Remove the pins from the tensioner and the sprocket.
 - Install the crankshaft key.

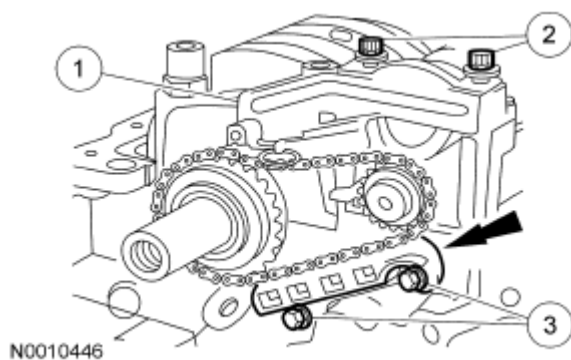


Fig. 367: Locating Balance Shaft Tensioner, Bolts And Balance Shaft Chain Guide
Courtesy of FORD MOTOR CO.

28. Install the oil pump intermediate shaft, the oil pump and the bolt.
- Tighten to 19 Nm (14 lb-ft).

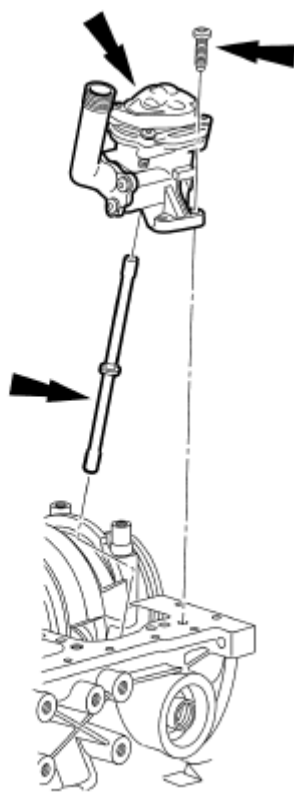
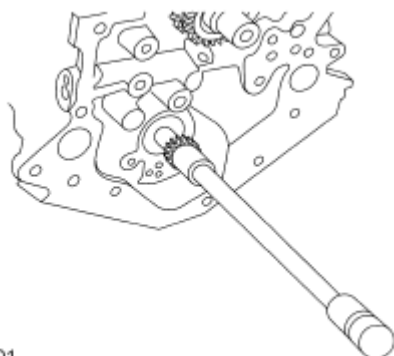


Fig. 368: Locating Oil Pump Intermediate Shaft And Oil Pump And Bolt
Courtesy of FORD MOTOR CO.

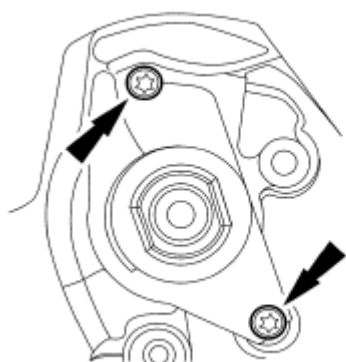
29. Install the jackshaft.



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Fig. 369: Locating Jackshaft
Courtesy of FORD MOTOR CO.

30. Install the jackshaft thrust plate and bolts.
- Tighten to 11 Nm (8 lb-ft).



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Fig. 370: Locating Jackshaft Thrust Plate And Bolts
Courtesy of FORD MOTOR CO.

31. Install the front cassette and bolt.
- Tighten to 19 Nm (14 lb-ft).

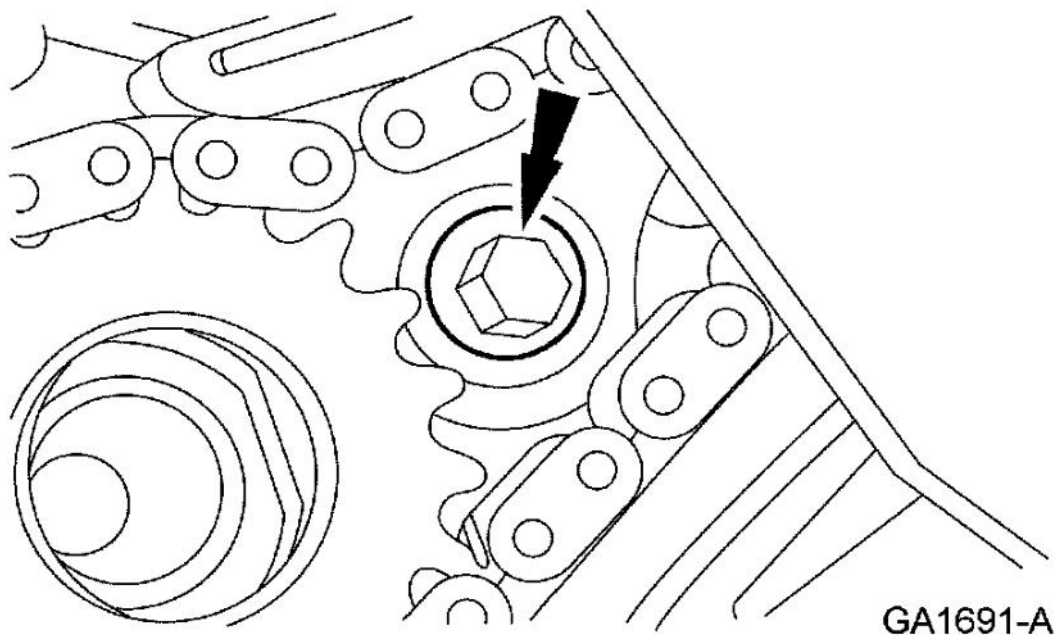


Fig. 371: Locating Cassette Bolt
Courtesy of FORD MOTOR CO.

32. Position the jackshaft, the crankshaft sprockets and the chain.

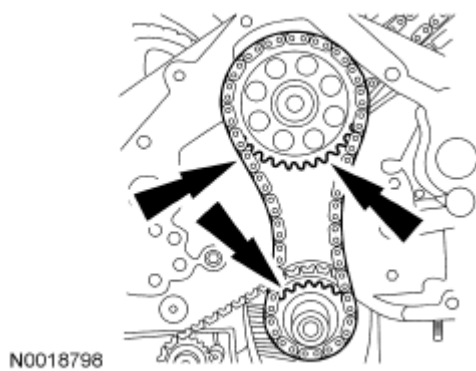


Fig. 372: Identifying Jackshaft, Crankshaft Sprockets And Chain
Courtesy of FORD MOTOR CO.

33. Install the chain guide and the bolts.
- Tighten to 19 Nm (14 lb-ft).

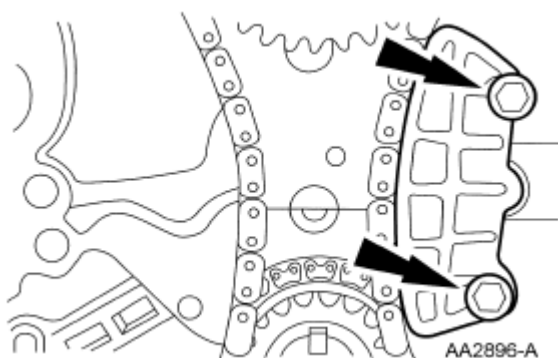


Fig. 373: Locating Chain Guide Bolts
Courtesy of FORD MOTOR CO.

34. Install the jackshaft chain tensioner and the bolts.
- Tighten to 10 Nm (89 lb-in).

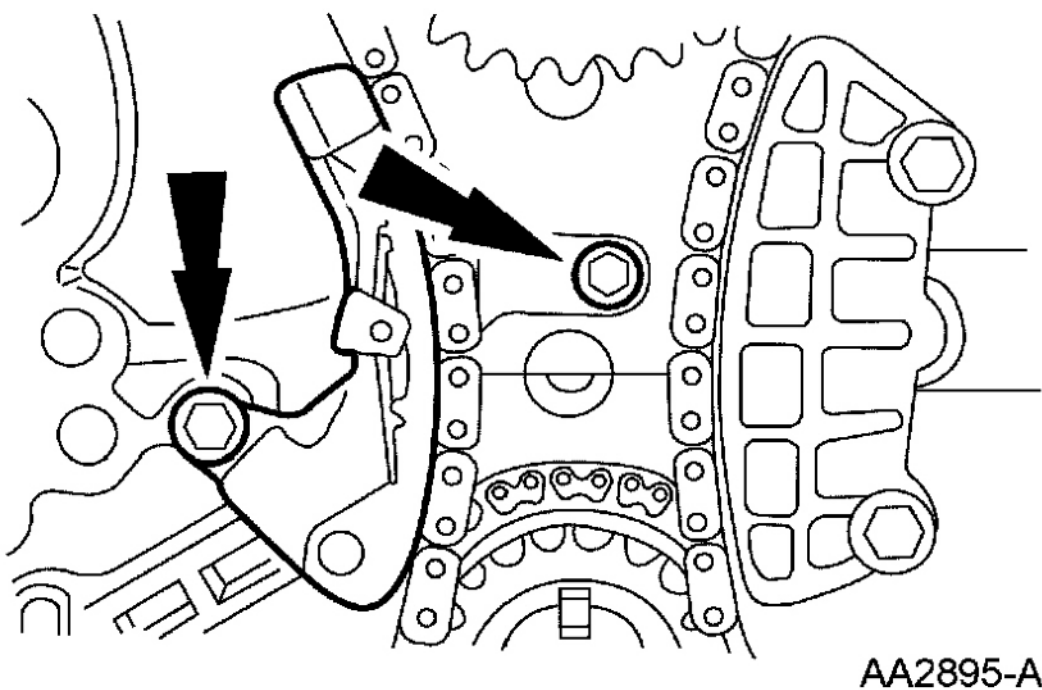


Fig. 374: Locating Jackshaft Chain Tensioner Bolts
Courtesy of FORD MOTOR CO.

35. Using the special tool, hold the crankshaft.

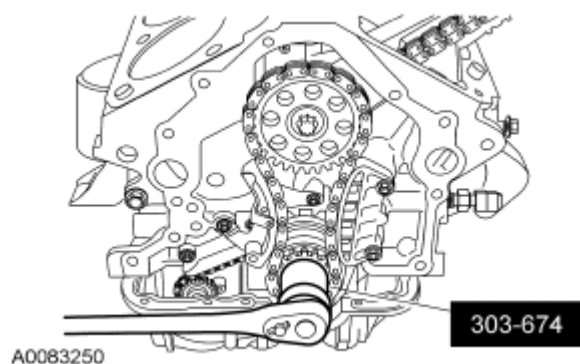


Fig. 375: Identifying Special Tool
Courtesy of FORD MOTOR CO.

36. Install the jackshaft front bolt and tighten in 2 stages.
- Stage 1: Tighten to 45 Nm (33 lb-ft).
 - Stage 2: Tighten an additional 90 degrees.

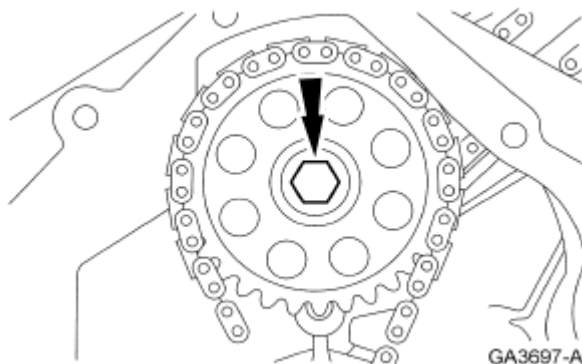


Fig. 376: Locating Jackshaft Front Bolt
Courtesy of FORD MOTOR CO.

37. Install the oil pump drive and the bolt.
- Tighten to 19 Nm (14 lb-in).

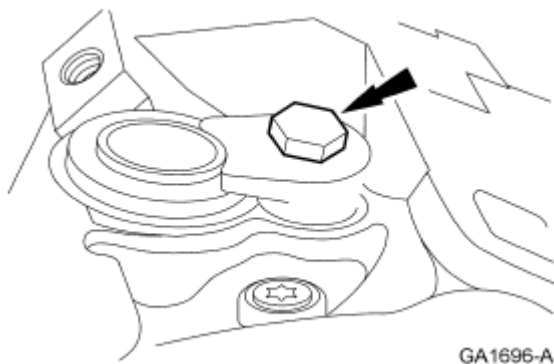


Fig. 377: Locating Oil Pump Drive Bolt

Courtesy of FORD MOTOR CO.

38. Install the RH cassette and sprocket to the jackshaft.
- Install, but do not tighten the bolt at this time.

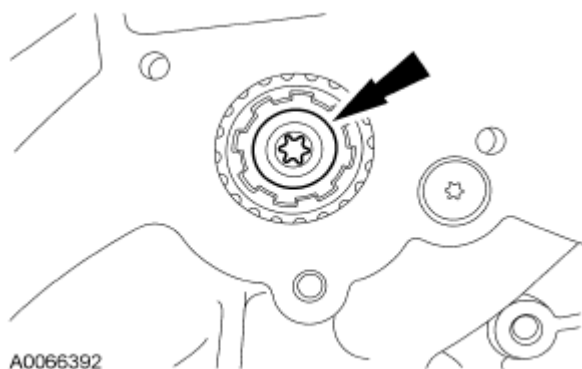


Fig. 378: Locating RH Cassette And Sprocket Bolt
Courtesy of FORD MOTOR CO.

39. Install the RH cassette bolt.
- Tighten to 19 Nm (14 lb-ft).

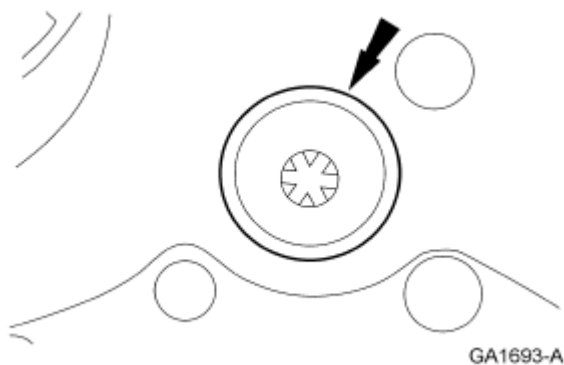


Fig. 379: Locating RH Cassette Bolt
Courtesy of FORD MOTOR CO.

40. Using the special tool, hold the crankshaft.

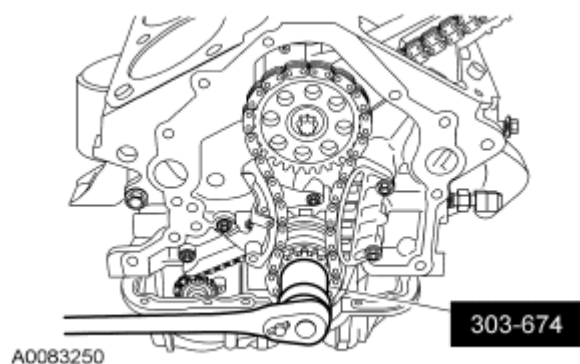


Fig. 380: Identifying Special Tool
Courtesy of FORD MOTOR CO.

41. Tighten the rear jackshaft bolt in 2 stages.
- Stage 1: Tighten to 20 Nm (15 lb-ft).
 - Stage 2: Tighten an additional 90 degrees.

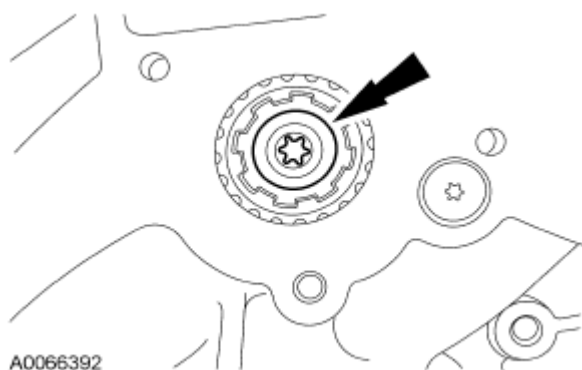


Fig. 381: Locating Rear Jackshaft Bolt
Courtesy of FORD MOTOR CO.

42. Install the rear jackshaft plug.

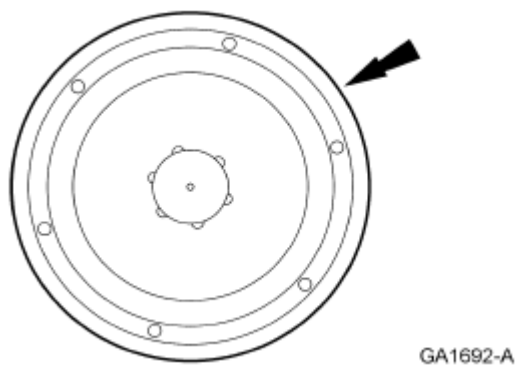


Fig. 382: Locating Rear Jackshaft Plug
Courtesy of FORD MOTOR CO.

43. Position the front cover gasket, the front cover and loosely install the bolts.

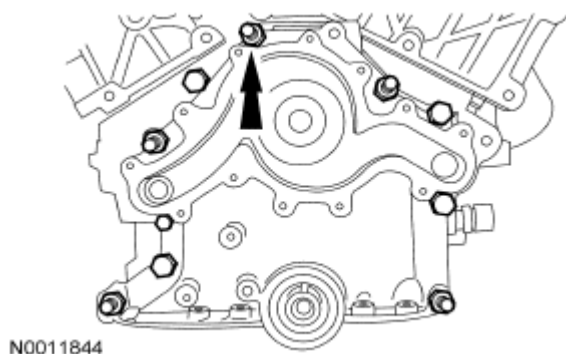


Fig. 383: Locating Front Cover Bolts
Courtesy of FORD MOTOR CO.

44. Install the special tool and tighten the front cover bolts.
- Tighten to 19 Nm (14 lb-ft).

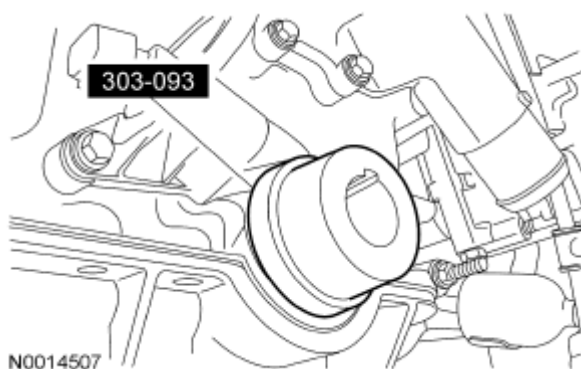


Fig. 384: Locating Special Tools
Courtesy of FORD MOTOR CO.

NOTE: Lubricate the seal lip with clean engine oil.

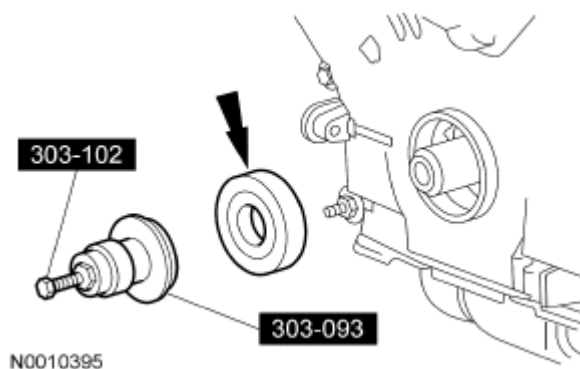
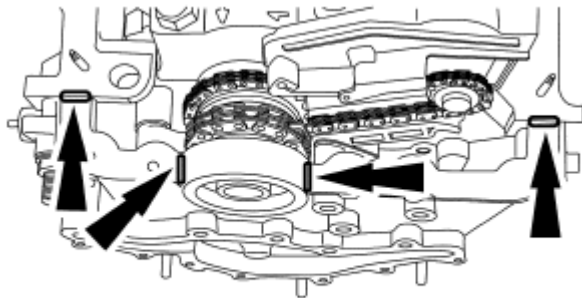


Fig. 385: Identifying Special Tools Crankshaft Front Oil Seal

Courtesy of FORD MOTOR CO.

45. Using the special tools, install the crankshaft front oil seal.

NOTE: If not secured within 4 minutes, the sealant must be removed and the sealing area cleaned. To clean the sealing area, use silicone gasket remover and metal surface prep. Follow the directions on the packaging. Failure to follow this procedure can cause future oil leakage.



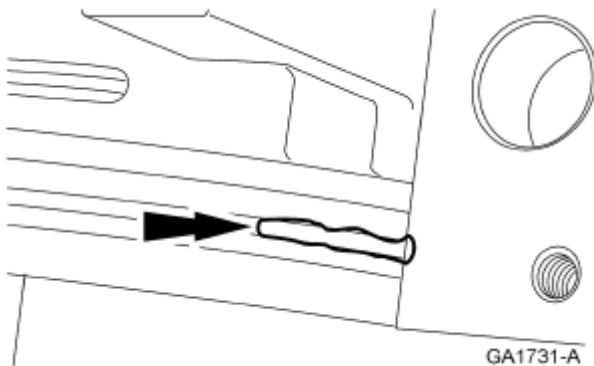
GA1730-A

Fig. 386: Identifying Sealant Applying Areas
Courtesy of FORD MOTOR CO.

46. Apply silicone gasket and sealant to the front cover in 4 places.

NOTE: If not secured within 4 minutes, the sealant must be removed and the sealing area cleaned. To clean the sealing area, use silicone gasket remover and metal surface prep. Follow the directions on the packaging. Failure to follow this procedure can cause future oil leakage.

47. Apply silicone gasket and sealant to the rear main bearing cap as shown.
- Position the cylinder block cradle gasket.



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Fig. 387: Identifying Cylinder Block Cradle Gasket
Courtesy of FORD MOTOR CO.

CAUTION: The cylinder block cradle inserts must be loosened completely or damage to the cylinder block cradle or oil leaks can result.

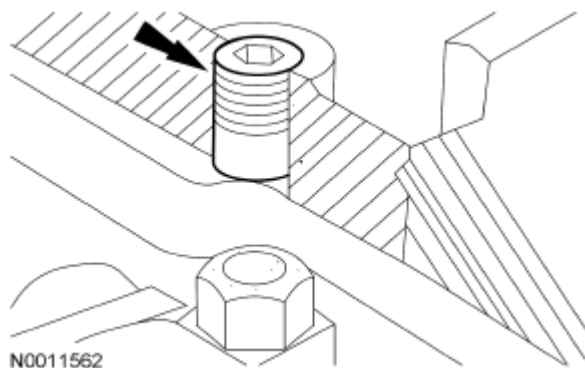


Fig. 388: Identifying Cylinder Block Cradle Insert
Courtesy of FORD MOTOR CO.

48. Loosen the cylinder block cradle inserts.
49. Position the cylinder block cradle and gasket assembly.

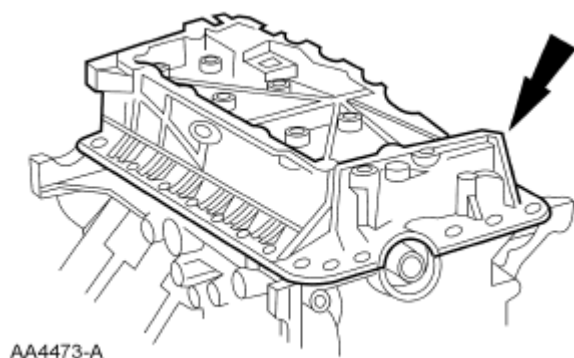


Fig. 389: Identifying Cylinder Block Cradle And Gasket Assembly
Courtesy of FORD MOTOR CO.

50. Install and finger-tighten the 20 bolts and 2 nuts.

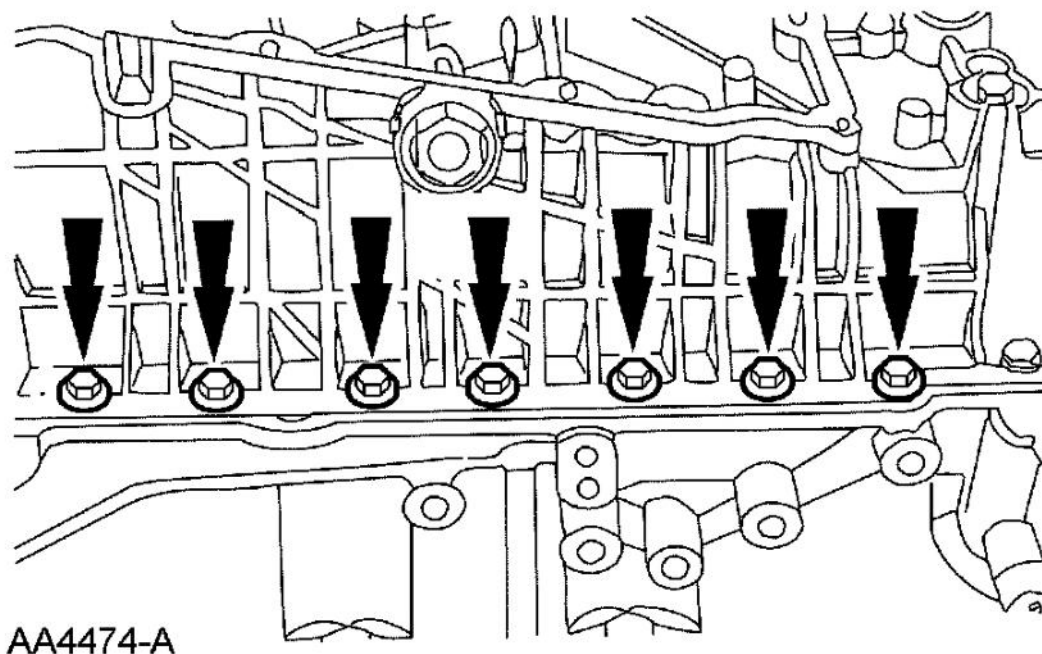


Fig. 390: Locating Outer Bolts
Courtesy of FORD MOTOR CO.

51. Install and finger-tighten the Torx® bolts.

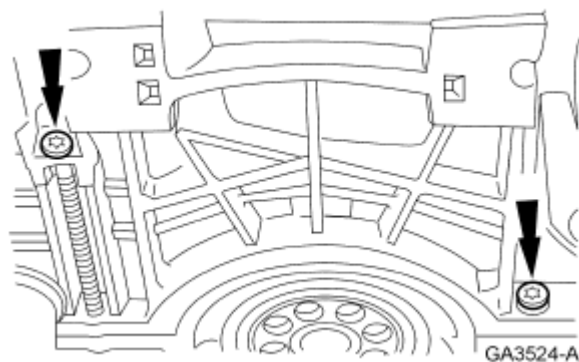


Fig. 391: Locating Torx® Bolts
Courtesy of FORD MOTOR CO.

NOTE: The cylinder block cradle to the cylinder block alignment must be within a maximum mismatch of 0.25 mm (0.01 in) cylinder block cradle underflush or 0.05 mm (0.00196 in) cylinder block cradle protrusion.

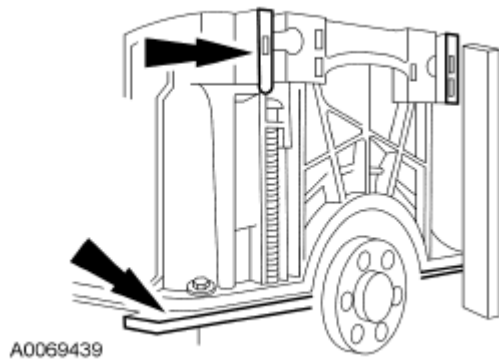


Fig. 392: Using Straightedge To Align Transmission Face Of Cylinder Block Cradle With Rear Face Of Cylinder Block
Courtesy of FORD MOTOR CO.

52. Using a straightedge, align the transmission face of the cylinder block cradle with the rear face of the cylinder block.

NOTE: **The 20 bolts may or may not have washers. All the bolts should be of the same type.**

53. Tighten the 20 bolts and the 2 nuts.
- Tighten bolts with washers and the nuts to 10 Nm (89 lb-in).
 - Tighten bolts without washers to 14 Nm (10 lb-ft).

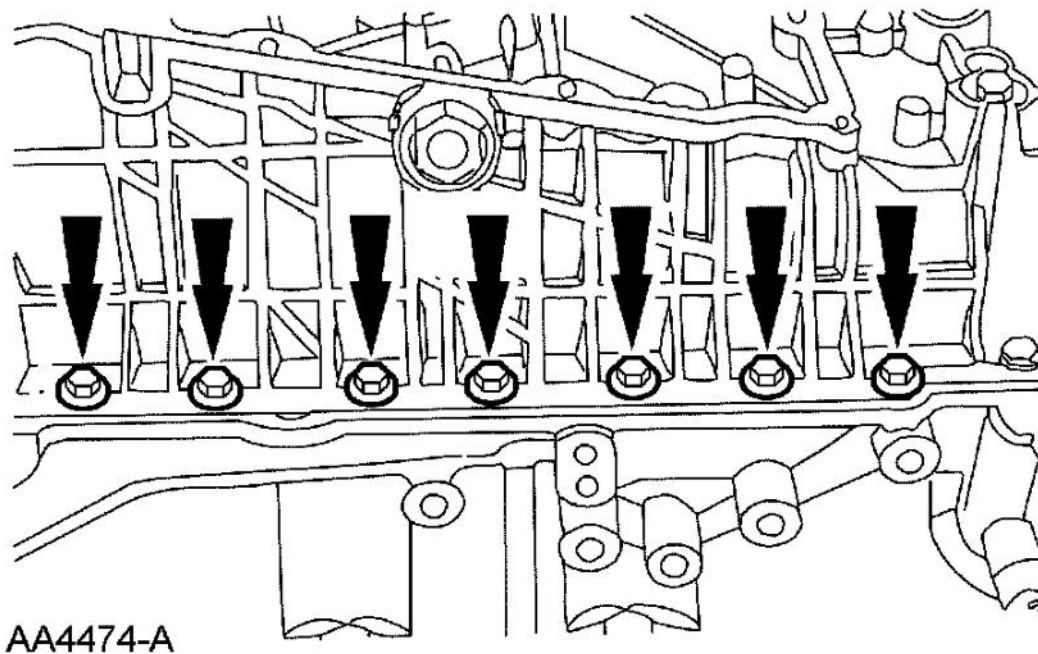


Fig. 393: Locating Outer Bolts
Courtesy of FORD MOTOR CO.

54. Tighten the Torx® bolts.
- Tighten to 8 Nm (81 lb-in).

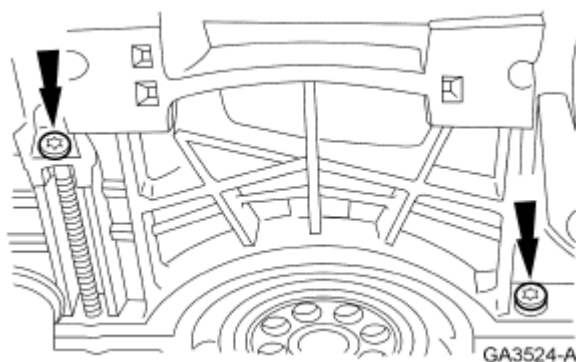


Fig. 394: Locating Torx® Bolts
Courtesy of FORD MOTOR CO.

55. Tighten the inserts.
- Tighten to 3 Nm (27 lb-in).

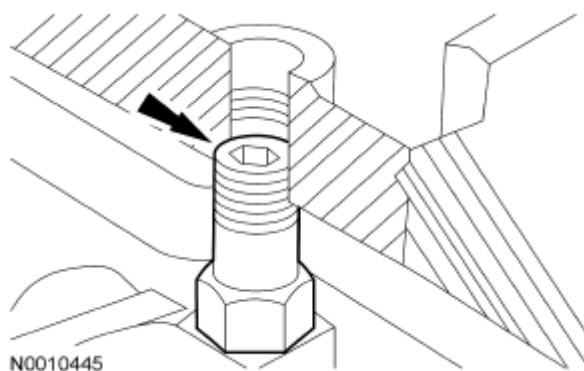


Fig. 395: Locating Insert
Courtesy of FORD MOTOR CO.

56. Install new seals on the 2 silver bolts and position them in the cylinder block cradle.

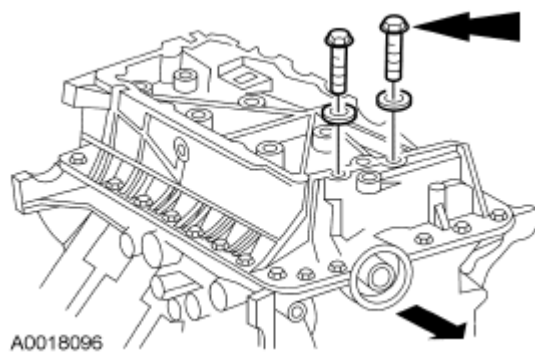


Fig. 396: Locating Silver Bolts
Courtesy of FORD MOTOR CO.

57. Position the 6 remaining bolts.

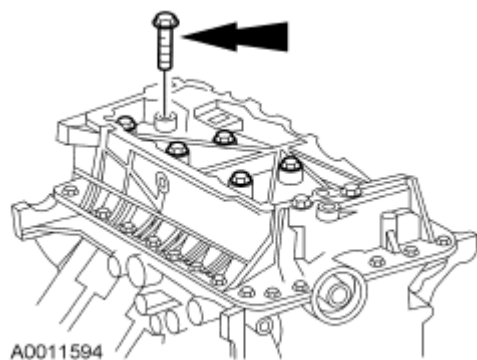


Fig. 397: Locating Bolt
Courtesy of FORD MOTOR CO.

58. Tighten the cylinder block cradle inner bolts in the sequence shown in 2 stages.
- Stage 1: Tighten to 15 Nm (11 lb-ft).

- Stage 2: Tighten to 34 Nm (25 lb-ft).

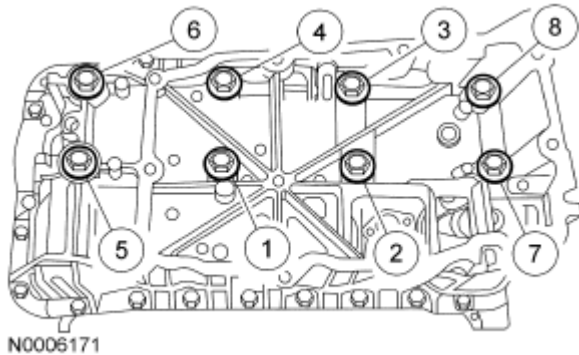


Fig. 398: Identifying Cylinder Block Cradle Inner Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

NOTE: Assemblies that measured out of specification must have the entire assembly procedure repeated.

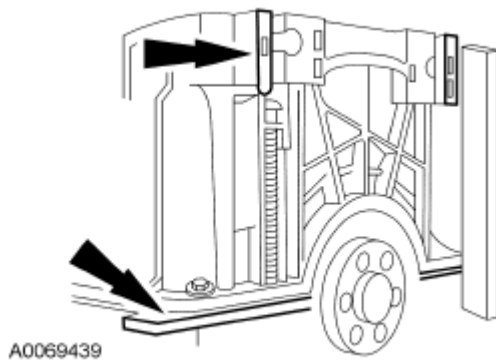


Fig. 399: Locating Rear Face Of Cylinder Block And Transmission Face Of Cylinder Block Cradle
Courtesy of FORD MOTOR CO.

59. Measure the step between the rear face of the cylinder block and the transmission face of the cylinder block cradle.
60. Repair all assemblies that exceed underflush specification by installing shims on one or both sides of the cylinder block cradle.

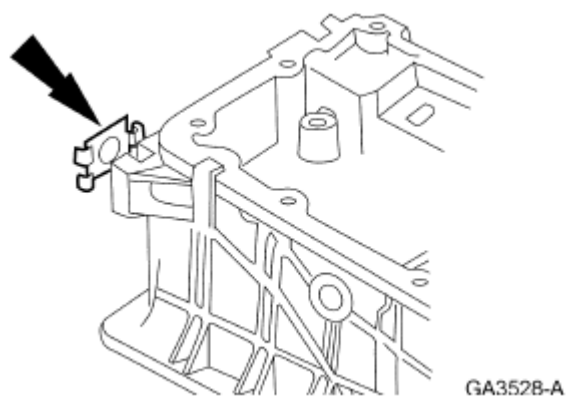


Fig. 400: Locating Cylinder Block Cradle Shims
Courtesy of FORD MOTOR CO.

61. Install the oil pump screen cover and tube and the bolt.
- Tighten to 10 Nm (89 lb-in).

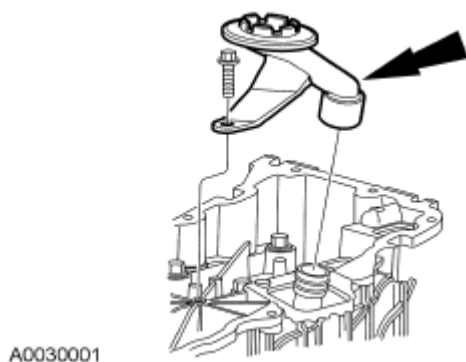


Fig. 401: Locating Oil Pump Screen Cover And Bolt
Courtesy of FORD MOTOR CO.

62. Install the gasket, the oil pan and the bolts.
- Tighten to 9 Nm (80 lb-in).

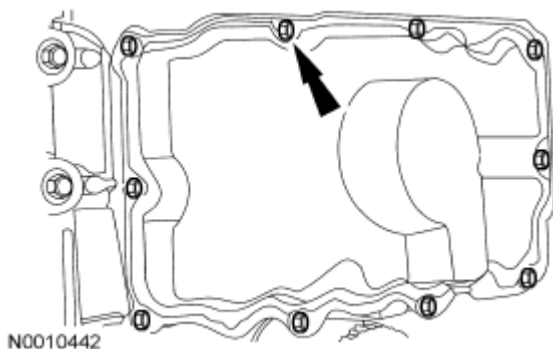


Fig. 402: Locating Oil Pan And Bolts
Courtesy of FORD MOTOR CO.

63. Install the oil filter adapter and the bolt.

- Tighten to 57 Nm (42 lb-in).

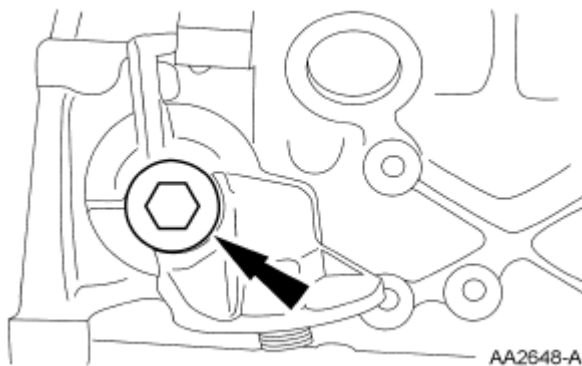


Fig. 403: Locating Filter Adapter And Bolt
Courtesy of FORD MOTOR CO.

64. Install the coolant pump and the bolts.

- Tighten to 10 Nm (89 lb-in).

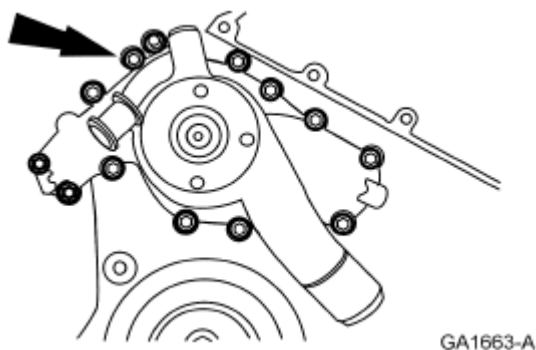


Fig. 404: Locating Coolant Pump Bolts
Courtesy of FORD MOTOR CO.

NOTE: LH shown, RH similar.

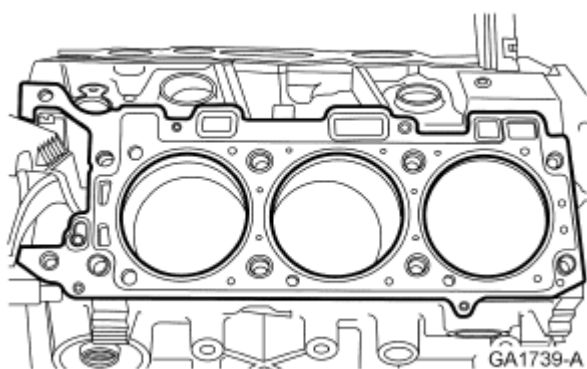


Fig. 405: Locating Cylinder Head Gasket
Courtesy of FORD MOTOR CO.

NOTE: If a new cylinder head must be installed on an early build engine, a kit that contains the cylinder head without an oil supply tube and with 6 new roller followers must be used.

65. Install the cylinder head gaskets.

Early build vehicles

NOTE: New cylinder head bolts must be installed. They are a torque-to-yield design and cannot be reused.

66. Install the LH cylinder head and tighten the new bolts in the sequence shown in 2 stages.
- Stage 1: Tighten to 12 Nm (9 lb-ft).
 - Stage 2: Tighten to 25 Nm (18 lb-ft).

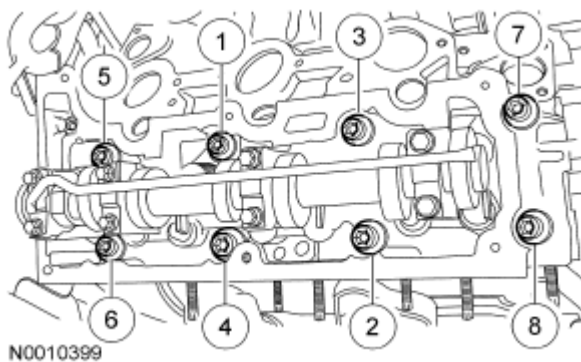


Fig. 406: Identifying Cylinder Head Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

67. Install the two 8-mm bolts.
- Tighten to 32 Nm (24 lb-ft).

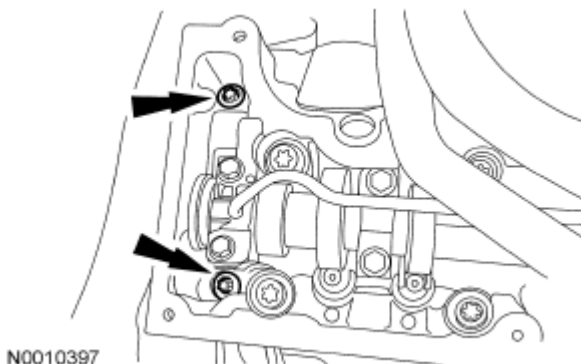


Fig. 407: Locating 8-MM Bolts
Courtesy of FORD MOTOR CO.

68. Tighten the bolts in the sequence shown in 2 stages.
- Stage 1: Rotate 90 degrees.
 - Stage 2: Rotate an additional 90 degrees.

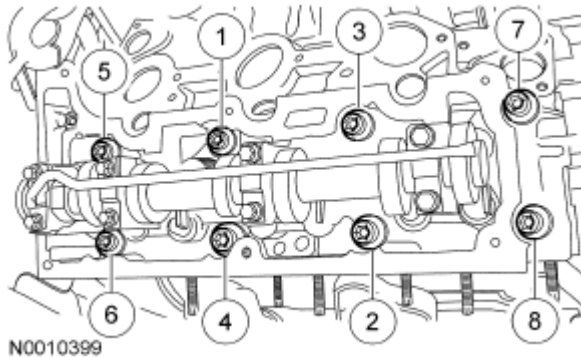


Fig. 408: Identifying Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

NOTE: New cylinder head bolts must be installed. They are a torque-to-yield design and cannot be reused.

69. Install the RH cylinder head. Install 8 new 12-mm bolts and tighten in the sequence shown in 2 stages.
- Stage 1: Tighten to 12 Nm (9 lb-ft).
 - Stage 2: Tighten to 25 Nm (18 lb-ft).

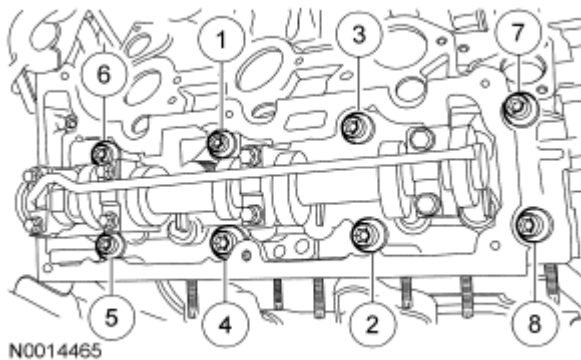


Fig. 409: Identifying RH Cylinder Head Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

70. Install 2 new 8-mm bolts.
- Tighten to 32 Nm (24 lb-ft).

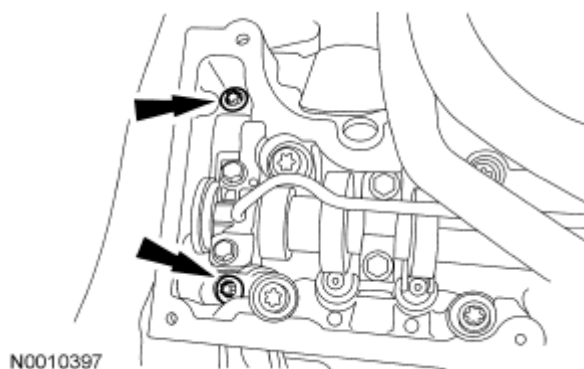


Fig. 410: Identifying 8-MM Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

71. Tighten the eight 12-mm bolts in the sequence shown in 2 stages.
- Stage 1: Rotate 90 degrees.
 - Stage 2: Rotate an additional 90 degrees.

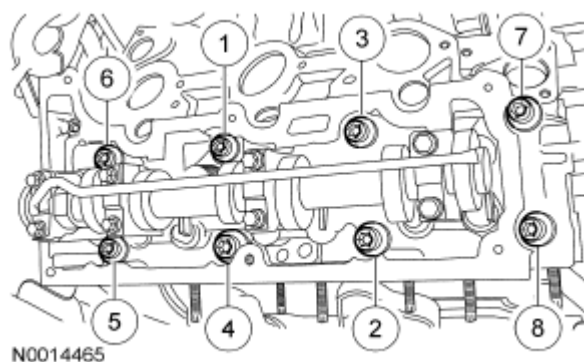


Fig. 411: Locating 12-MM Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

Late build vehicles

NOTE: New cylinder head bolts must be installed. They are a torque-to-yield design and cannot be reused.

72. Install the LH cylinder head and tighten the new bolts in the sequence shown in 2 stages.
- Stage 1: Tighten to 12 Nm (9 lb-ft).
 - Stage 2: Tighten to 25 Nm (18 lb-ft).

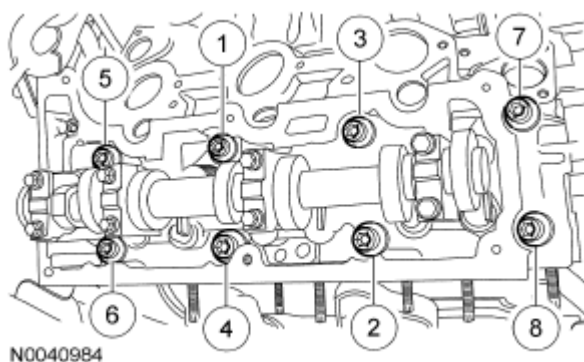


Fig. 412: Identifying LH Cylinder Head Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

73. Install the two 8-mm bolts.
- Tighten to 32 Nm (24 lb-ft).

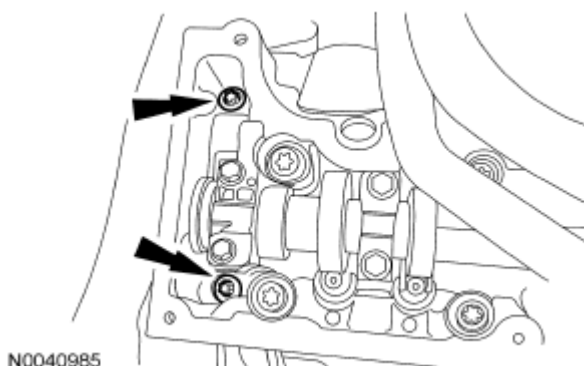


Fig. 413: Locating 8-MM Bolts
Courtesy of FORD MOTOR CO.

74. Tighten the bolts in the sequence shown in 2 stages.
- Stage 1: Rotate 90 degrees.
 - Stage 2: Rotate an additional 90 degrees.

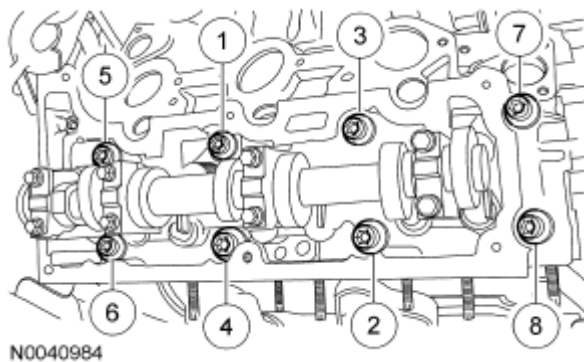


Fig. 414: Identifying Bolts Tightening Sequence

Courtesy of FORD MOTOR CO.

NOTE: New cylinder head bolts must be installed. They are a torque-to-yield design and cannot be reused.

75. Install the RH cylinder head. Install 8 new 12-mm bolts and tighten in the sequence shown in 2 stages.
- Stage 1: Tighten to 12 Nm (9 lb-ft).
 - Stage 2: Tighten to 25 Nm (18 lb-ft).

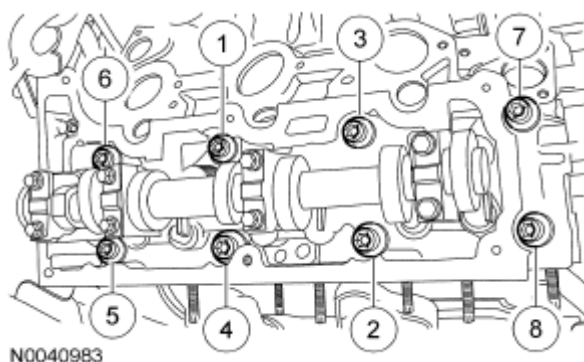


Fig. 415: Identifying RH Cylinder Head Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

76. Install 2 new 8-mm bolts.
- Tighten to 32 Nm (24 lb-ft).

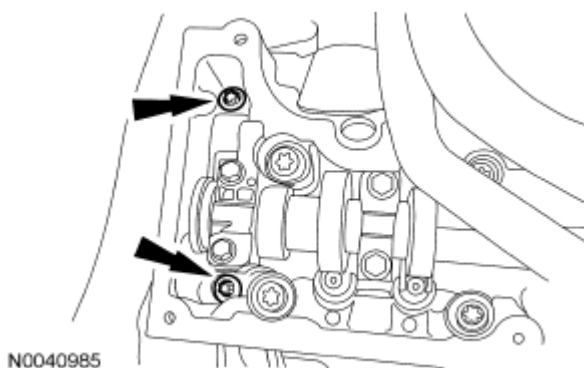


Fig. 416: Locating 8-MM Bolts
Courtesy of FORD MOTOR CO.

77. Tighten the eight 12-mm bolts in the sequence shown in 2 stages.
- Stage 1: Rotate 90 degrees.
 - Stage 2: Rotate an additional 90 degrees.

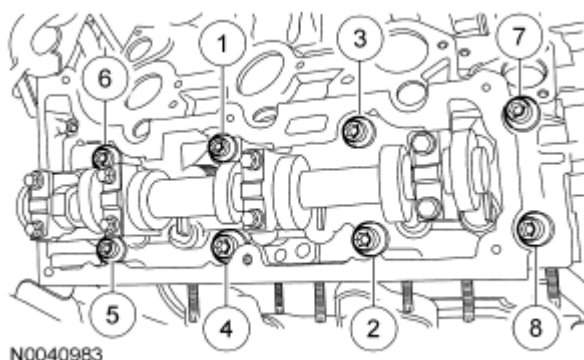


Fig. 417: Identifying 12-MM Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

All vehicles

78. Using the special tool, install the crankshaft pulley.



Fig. 418: Identifying Special Tool And Crankshaft Pulley
Courtesy of FORD MOTOR CO.

CAUTION: A new bolt must be used each time it is removed.

79. Using the special tool, tighten the bolt in 2 stages.
- Stage 1: Tighten to 50 Nm (37 lb-ft).
 - Stage 2: Rotate an additional 90 degrees.

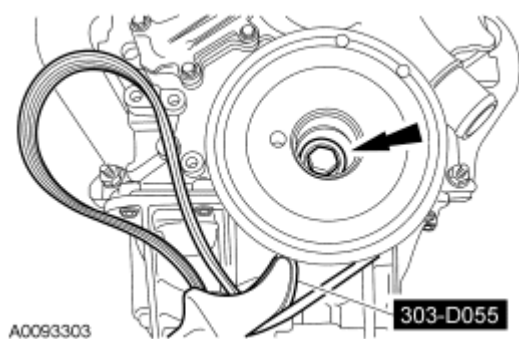


Fig. 419: Holding Crankshaft Pulley Using Special Tool
Courtesy of FORD MOTOR CO.

80. Install the coolant pump pulley and the bolts.
- Tighten to 25 Nm (18 lb-ft).

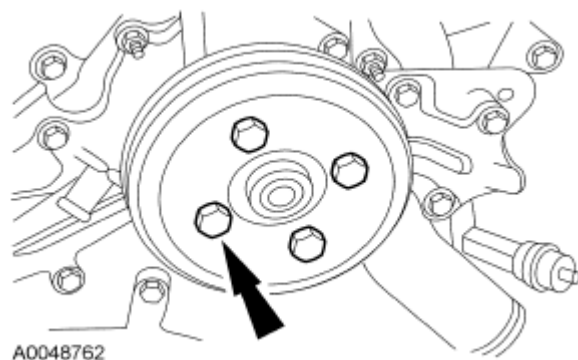


Fig. 420: Locating Coolant Pump Pulley Bolts
Courtesy of FORD MOTOR CO.

CAUTION: The camshaft sprocket must turn freely on the camshaft. DO NOT tighten the bolt.

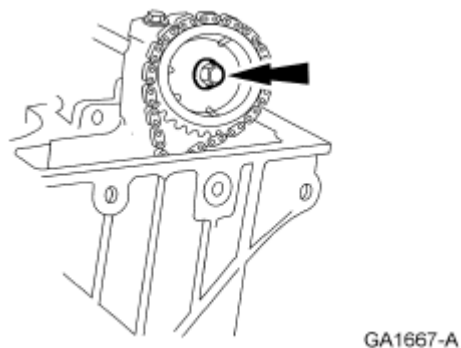
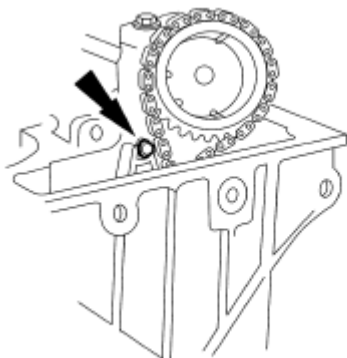


Fig. 421: Locating RH Camshaft Sprocket Bolt
Courtesy of FORD MOTOR CO.

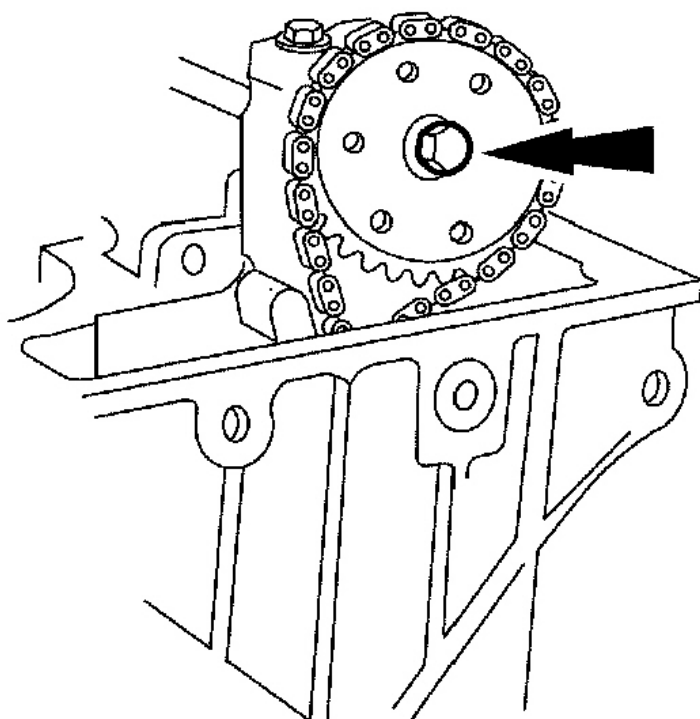
81. Loosely install the RH camshaft sprocket bolt.
82. Install the bolt.
 - Tighten to 10 Nm (89 lb-in).



GA3228-A

Fig. 422: Locating Bolt
Courtesy of FORD MOTOR CO.

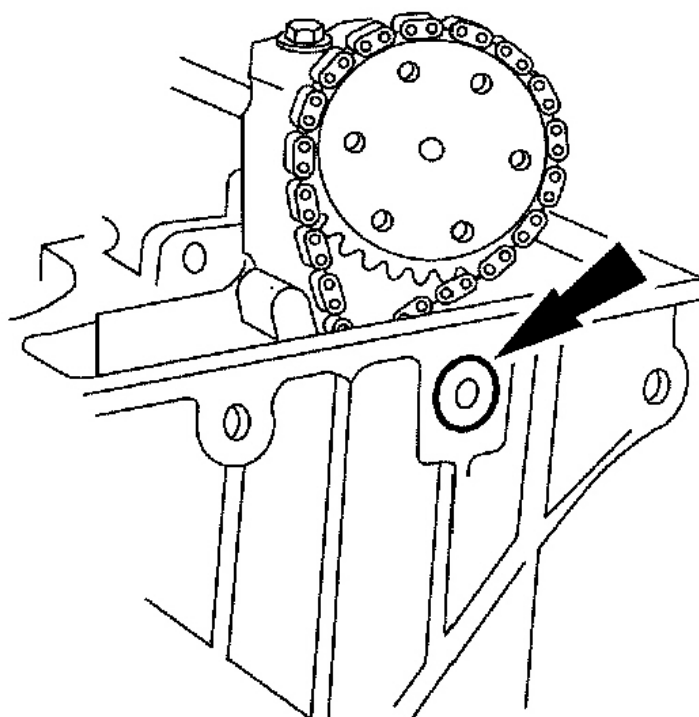
CAUTION: The camshaft sprocket must turn freely on the camshaft. **DO NOT** tighten the bolt.



GA1669-A

Fig. 423: Identifying LH Camshaft Sprocket Bolt
Courtesy of FORD MOTOR CO.

83. Loosely install the LH camshaft sprocket bolt.
84. Install the bolt.
 - Tighten to 12 Nm (9 lb-ft).



GA1670-A

Fig. 424: Identifying LH Cassette Upper Bolt
Courtesy of FORD MOTOR CO.

85. Turn the crankshaft one revolution clockwise.

CAUTION: Do not rotate the engine counterclockwise. Rotating the engine counterclockwise will result in incorrect timing of the engine.

NOTE: The special tool must be installed on the damper and should contact the engine block. This positions the engine at top dead center (TDC).

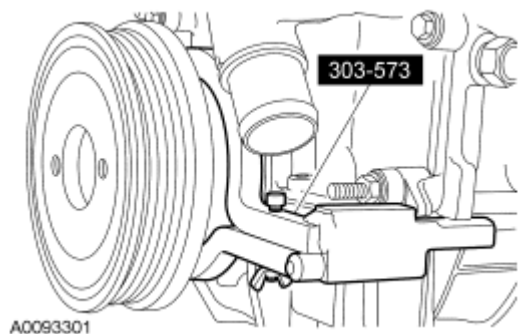


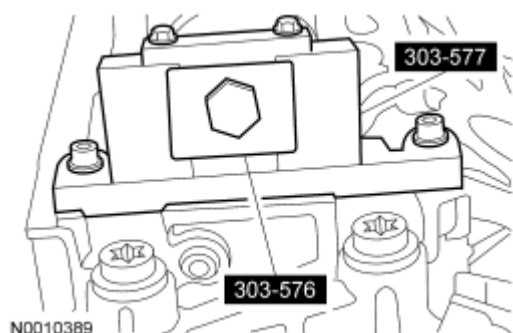
Fig. 425: Identifying Special Tool (303-573)

Courtesy of FORD MOTOR CO.

86. Install the special tool.

NOTE: Camshaft timing slots are off-center.

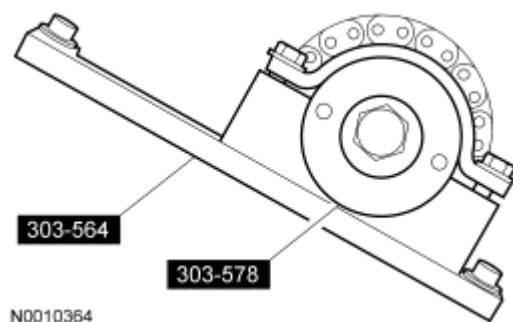
NOTE: Position the camshaft timing slots below centerline of camshaft to correctly fit the special tools.

**Fig. 426: Identifying Special Tools (303-576, 303-577)**

Courtesy of FORD MOTOR CO.

87. Install the special tools on the front of the RH cylinder head.

NOTE: Leave the top 2 special tool clamp bolts loose.

**Fig. 427: Identifying Special Holding Tool**

Courtesy of FORD MOTOR CO.

88. Install the special tools on the rear of the RH cylinder head.
89. Install the special tool.

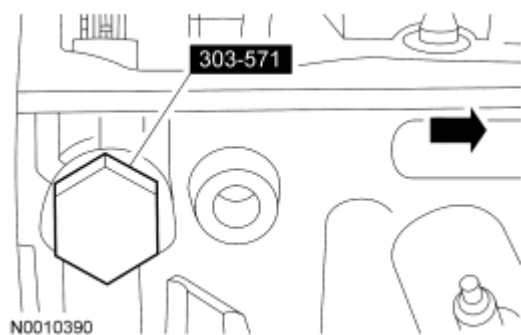


Fig. 428: Identifying Special Tool (303-571)
Courtesy of FORD MOTOR CO.

CAUTION: The RH camshaft sprocket bolt is a left-hand threaded bolt.

90. Tighten the bolts.

1. Tighten the special tool top 2 clamp bolts to 10 Nm (89 lb-in).
2. Tighten the camshaft bolt to 85 Nm (63 lb-ft).

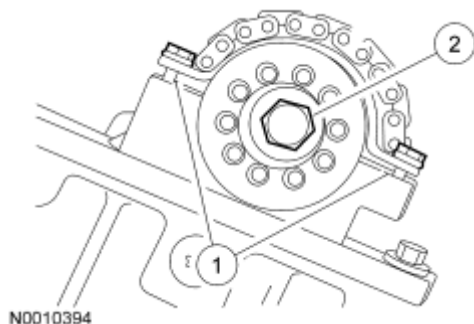


Fig. 429: Identifying Camshaft Bolt & Clamp Bolts
Courtesy of FORD MOTOR CO.

91. Remove the special tool and install the RH camshaft tensioner.

- Tighten to 44 Nm (32 lb-ft).

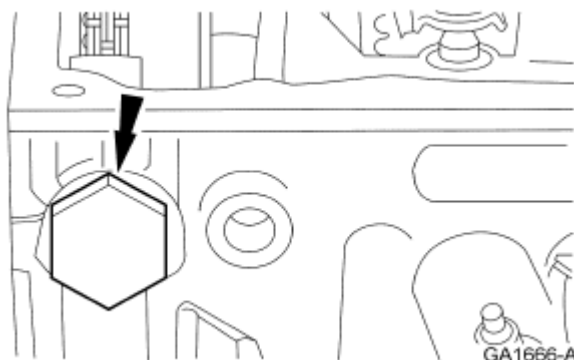


Fig. 430: Identifying RH Camshaft Tensioner Bolt
Courtesy of FORD MOTOR CO.

NOTE: Do not tighten the special tool top 2 clamp bolts. Camshaft sprocket must rotate freely.

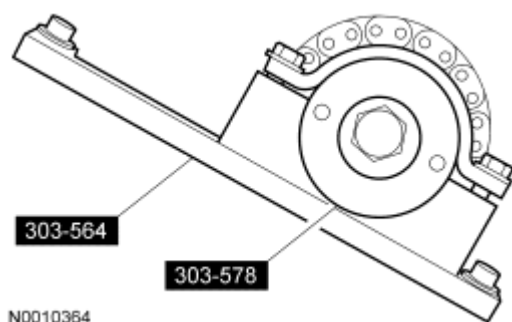


Fig. 431: Identifying Special Holding Tool
Courtesy of FORD MOTOR CO.

92. Install the special tools on the front of the LH cylinder head.

NOTE: Camshaft timing slots are off-center.

NOTE: Position the camshaft timing slots below centerline of camshaft to correctly fit the special tools.

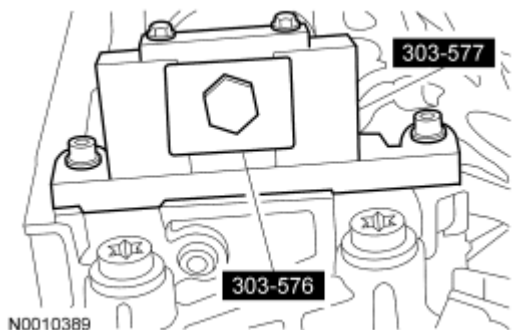


Fig. 432: Identifying Special Tools (303-576, 303-577)
Courtesy of FORD MOTOR CO.

93. Install the special tools on the front of the LH cylinder head.
94. Install the special tool.



Fig. 433: Identifying Special Tool
Courtesy of FORD MOTOR CO.

95. Tighten the bolts.
 1. Tighten the special tool top 2 clamp bolts to 10 Nm (89 lb-in).
 2. Tighten the camshaft bolt to 85 Nm (63 lb-ft).

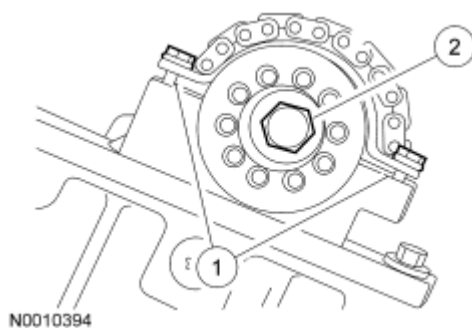


Fig. 434: Identifying Camshaft Bolt & Clamp Bolts
Courtesy of FORD MOTOR CO.

96. Install the LH camshaft tensioner.
 - Tighten to 44 Nm (32 lb-ft).

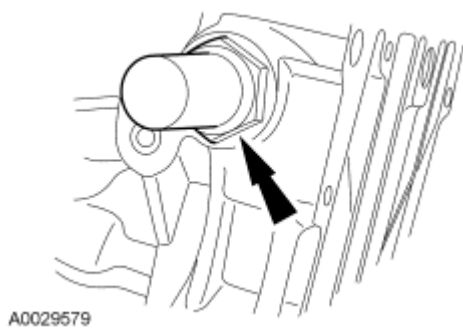


Fig. 435: Locating Camshaft Tensioner
Courtesy of FORD MOTOR CO.

Early build vehicles

97. Rotate the crankshaft until the cam lobe is in the UP position.

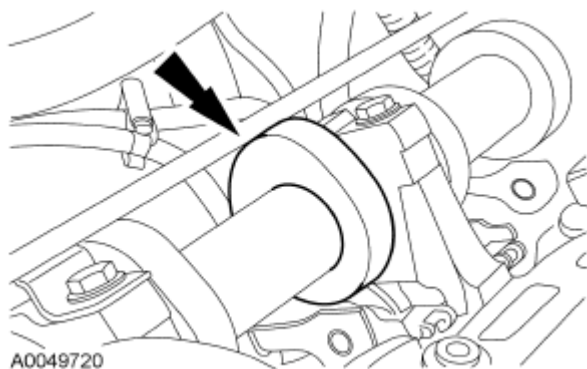


Fig. 436: Identifying Cam Lobe
Courtesy of FORD MOTOR CO.

Late build vehicles

98. Rotate the crankshaft until the cam lobe is in the UP position.

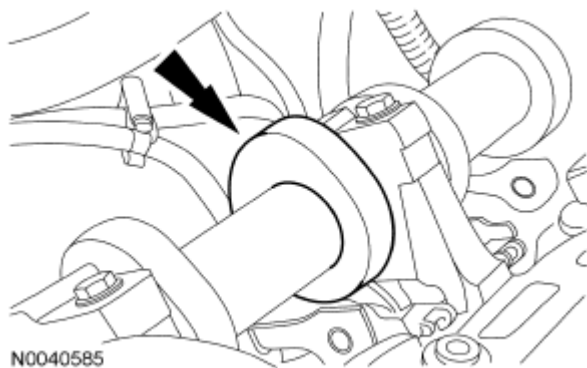


Fig. 437: Identifying Crankshaft Cam Lobe In UP Position

Courtesy of FORD MOTOR CO.

All vehicles

NOTE: Lubricate the parts with clean engine oil.

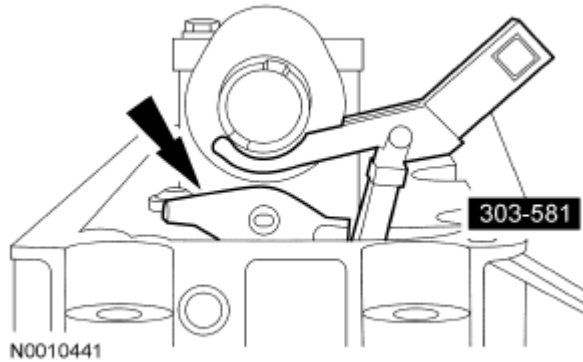


Fig. 438: Identifying Special Tool And Roller Follower
Courtesy of FORD MOTOR CO.

99. Using the special tool, install the roller followers in their original positions.
100. Inspect the RH and LH exhaust manifold gasket mating surfaces for flatness. For additional information, refer to **ENGINE SYSTEM-GENERAL INFORMATION**.
101. Install 6 new RH exhaust manifold studs.
 - Tighten to 12 Nm (9lb-ft).
102. Install a new gasket, the RH exhaust manifold and the new nuts.
 - Tighten to 22 Nm (16 lb-ft).

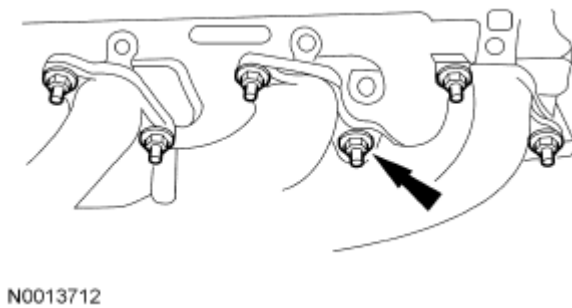
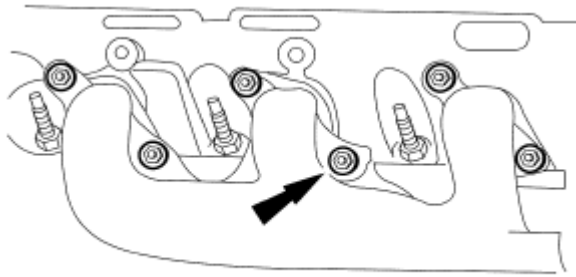


Fig. 439: Identifying RH Exhaust Manifold And Nuts
Courtesy of FORD MOTOR CO.

103. Install 6 new LH exhaust manifold studs.
 - Tighten to 12 Nm (9 lb-ft).
104. Install a new gasket, the LH exhaust manifold and the new nuts.
 - Tighten to 22 Nm (16 lb-ft).

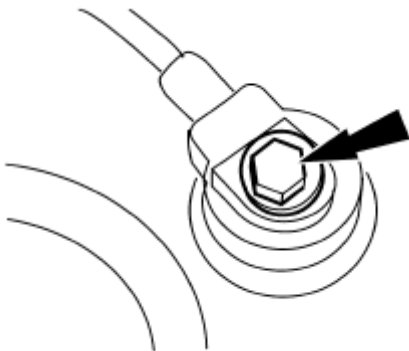


N0013711

Fig. 440: Locating LH Exhaust Manifold Nuts
Courtesy of FORD MOTOR CO.

NOTE: Prior to installation, use metal surface prep to clean mating surfaces.
Follow the directions on the packaging

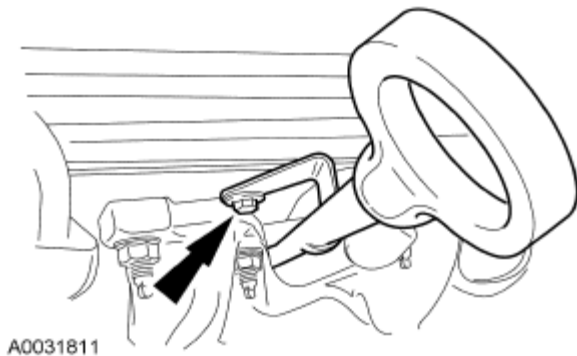
105. Install the knock sensor (KS) and the bolt.
- Tighten to 20 Nm (15 lb-ft).



GA1660-A

Fig. 441: Locating Knock Sensor Bolt
Courtesy of FORD MOTOR CO.

106. Install the oil level indicator tube and bolt.



A0031811

Fig. 442: Locating Oil Level Indicator Tube Bolt

Courtesy of FORD MOTOR CO.

107. Position the thermostat housing and bypass hose on the coolant pump.

1. Install the bolts.
 - Tighten to 11 Nm (8 lb-ft).
2. Position the bypass hose clamp.



Fig. 443: Locating Bypass Hose Clamp And Bolts
Courtesy of FORD MOTOR CO.

NOTE: RH valve cover shown, LH similar.

108. Install the valve covers and tighten the bolts.

- Tighten to 10 Nm (89 lb-in).

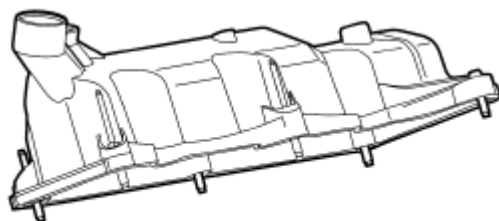
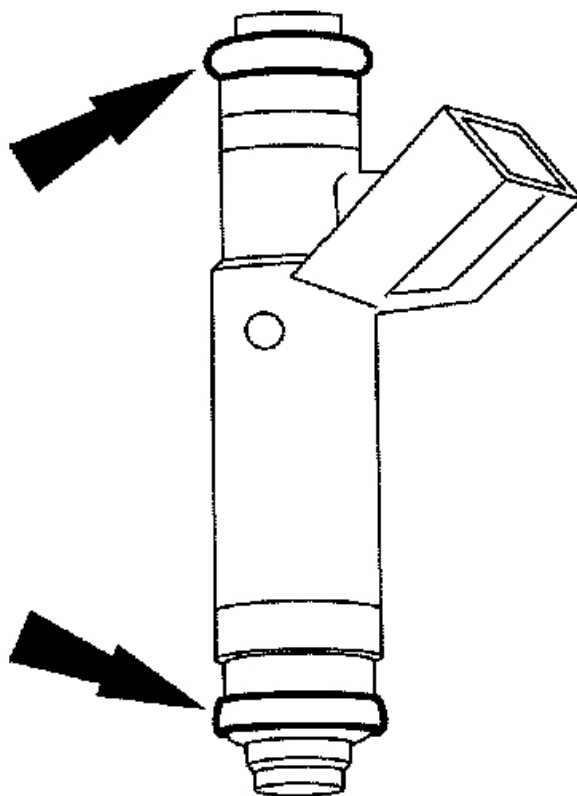


Fig. 444: Locating Valve Cover
Courtesy of FORD MOTOR CO.

CAUTION: Use O-ring seals that are made of special fuel-resistant material. Use of ordinary O-rings seals can cause the fuel system to leak. Do not reuse the O-ring seals.



AV1418-A

Fig. 445: Locating Fuel Injector O-Ring Seals
Courtesy of FORD MOTOR CO.

109. Install new O-ring seals on each of the fuel injectors.

NOTE: Lubricate the fuel injector O-ring seals with clean engine oil.

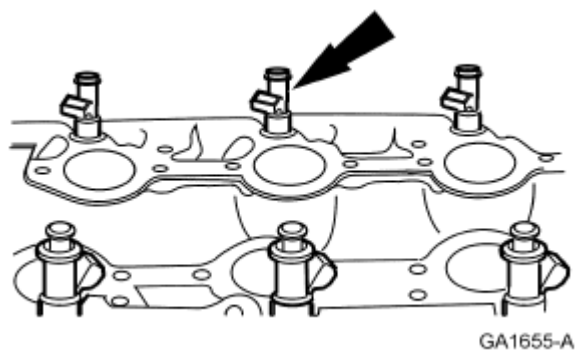


Fig. 446: Locating Fuel Injector
Courtesy of FORD MOTOR CO.

110. Install the fuel injectors.
111. Install the fuel rail and the bolts.
 - Tighten to 24 Nm (18 lb-ft).

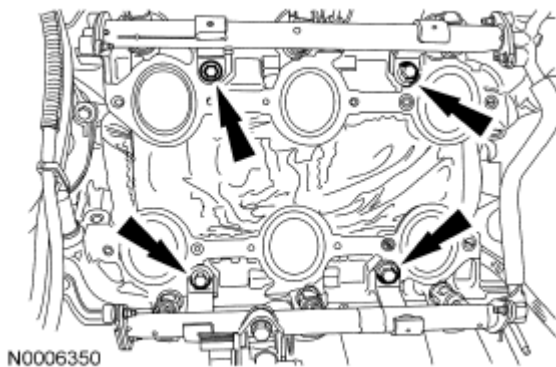


Fig. 447: Locating Fuel Rail And Bolts
Courtesy of FORD MOTOR CO.

112. Position the fuel supply tube and install the bolt.
 - Tighten to 6 Nm (53 lb-in).

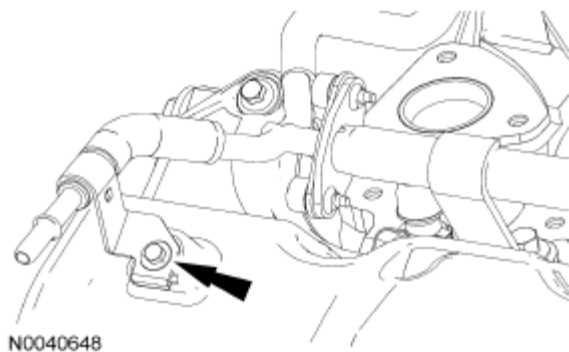


Fig. 448: Locating Fuel Supply Tube Bolt

Courtesy of FORD MOTOR CO.

NOTE: LH shown, RH similar.

113. Install the LH and RH insulator brackets and the bolts.
- Tighten to 80 Nm (59 lb-ft).

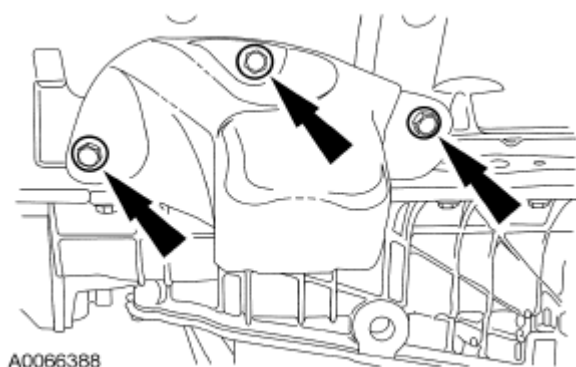


Fig. 449: Locating Insulator Bracket Bolts
Courtesy of FORD MOTOR CO.

114. Install the oil pressure switch.
- Tighten to 13 Nm (10 lb-ft).

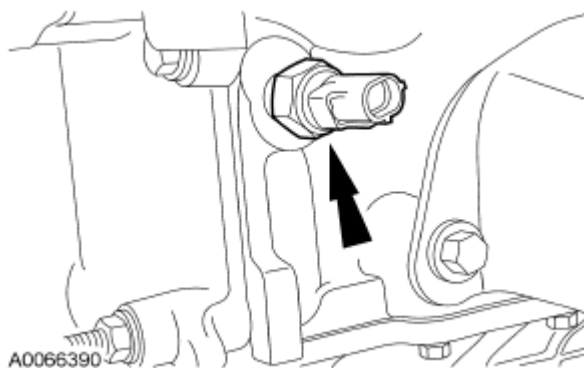


Fig. 450: Locating Oil Pressure Switch
Courtesy of FORD MOTOR CO.

115. Position the battery cable, harness and attach the retainers.

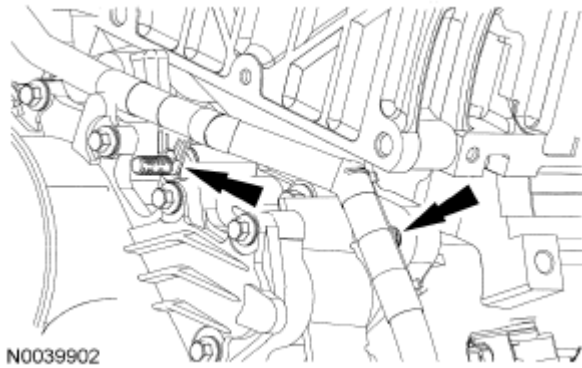


Fig. 451: Locating Battery Cable And Retainers
Courtesy of FORD MOTOR CO.

116. Connect the oil pressure switch electrical connector. Position the battery cable and harness bracket and install the nut.
- Tighten to 20 Nm (15 lb-ft).

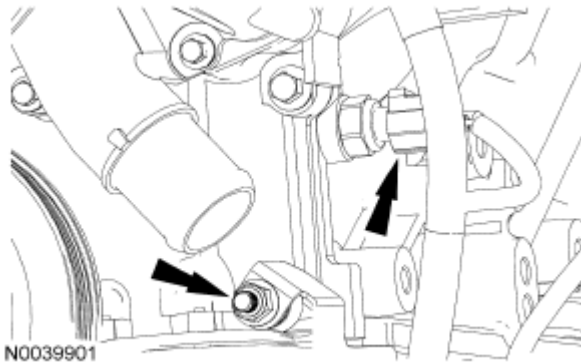


Fig. 452: Locating Oil Pressure Switch Electrical Connector And Nut
Courtesy of FORD MOTOR CO.

117. Position the vacuum harness on the engine and connect the fuel pressure and temperature sensor vacuum hose fittings.

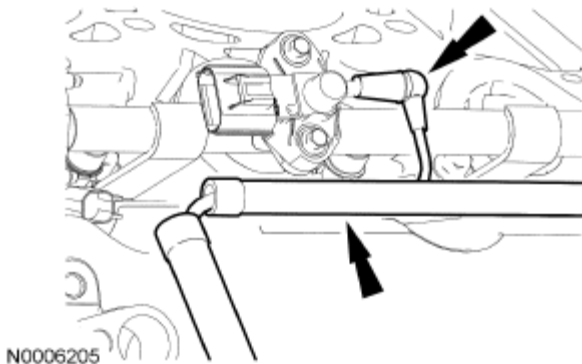


Fig. 453: Locating Fuel Pressure And Temperature Sensor Vacuum Hose Fittings

Courtesy of FORD MOTOR CO.

118. Position the engine wiring harness on the engine.
119. Position the engine wiring harness retainer and install the bolt.
 - Tighten to 47 Nm (35 lb-ft).

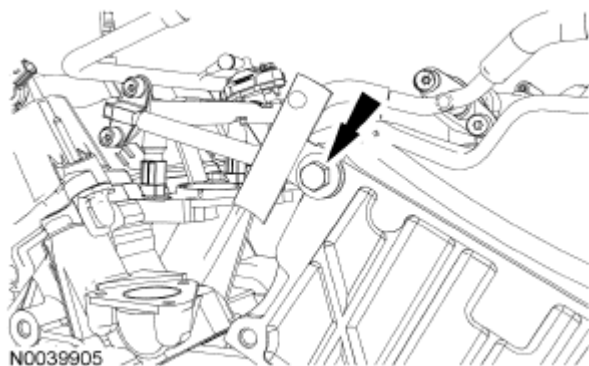


Fig. 454: Locating Engine Wiring Harness Retainer And Bolt
Courtesy of FORD MOTOR CO.

120. Connect the engine coolant temperature (ECT) sensor electrical connector.

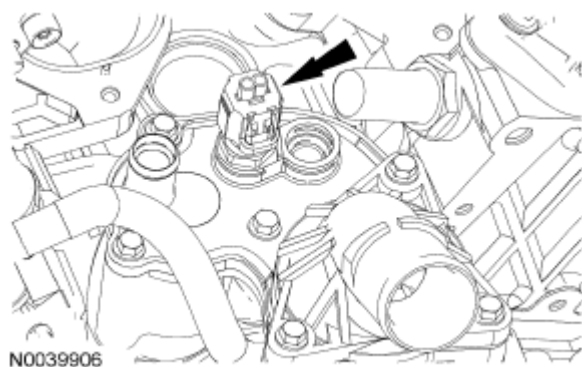


Fig. 455: Locating Engine Coolant Temperature Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

121. Connect the fuel rail pressure & temperature sensor and the camshaft position (CMP) sensor electrical connector.

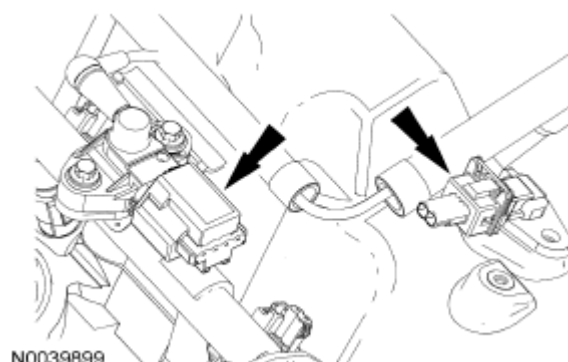


Fig. 456: Locating Fuel Rail Pressure & Temperature Sensor And Camshaft Position (CMP) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

122. Connect the crankshaft position (CKP) sensor electrical connectors and new wiring anchors.

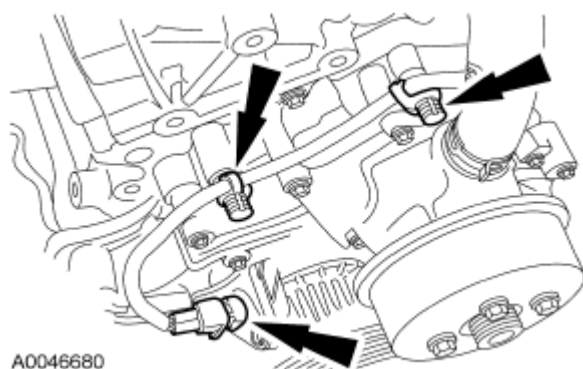


Fig. 457: Locating Crankshaft Position Sensor Electrical Connectors And Wiring Anchors
Courtesy of FORD MOTOR CO.

NOTE: RH shown, LH similar.

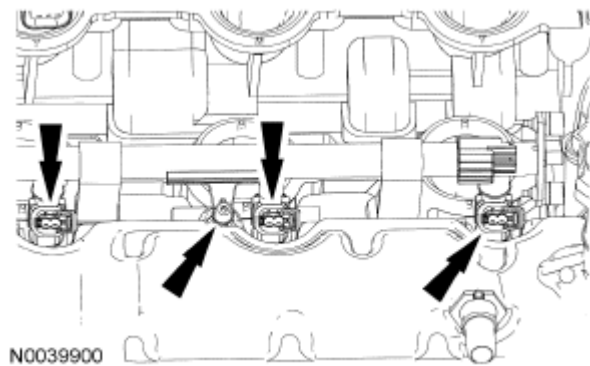


Fig. 458: Locating Fuel Injector Electrical Connectors And Wiring Harness Retainers
Courtesy of FORD MOTOR CO.

123. Connect the 6 fuel injector electrical connectors and attach the wiring harness retainers.
124. Install the gaskets, the intake manifold and the bolts.
 - Tighten to 11 Nm (8 lb-ft).

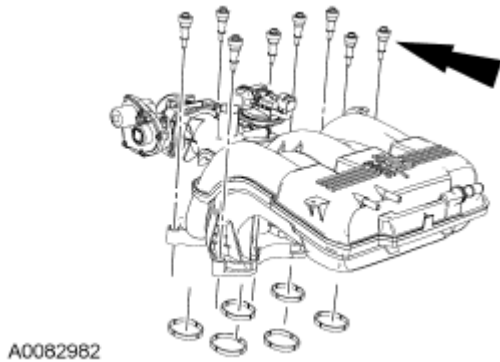


Fig. 459: Locating Gaskets, Intake Manifold And Bolts
Courtesy of FORD MOTOR CO.

125. Install the exhaust manifold-to-exhaust gas recirculation (EGR) system module tube.
 - Tighten to 34 Nm (25 lb-ft).

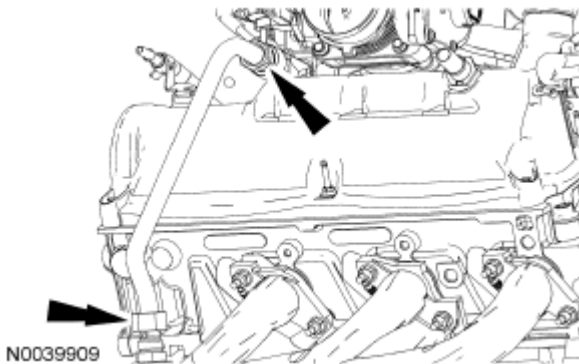


Fig. 460: Locating Exhaust Manifold-To-Exhaust Gas Recirculation System Module Tube
Courtesy of FORD MOTOR CO.

126. Connect the electronic throttle body (TB) and throttle position (TP) sensor electrical connectors. Attach the wiring harness bracket and install the nut.
 - Tighten to 9 Nm (80 lb-in).

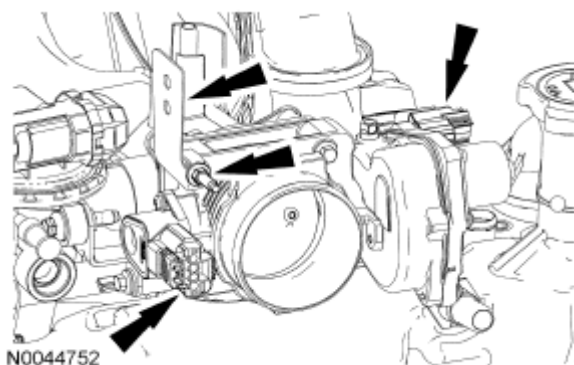


Fig. 461: Locating Electronic Throttle Body (TB), Throttle Position (TP) Sensor Electrical Connectors, Wiring Harness Bracket And Nut
Courtesy of FORD MOTOR CO.

127. Connect the exhaust gas recirculation (EGR) system module vacuum hose and electrical connector. Attach the wiring harness pin-type retainer.

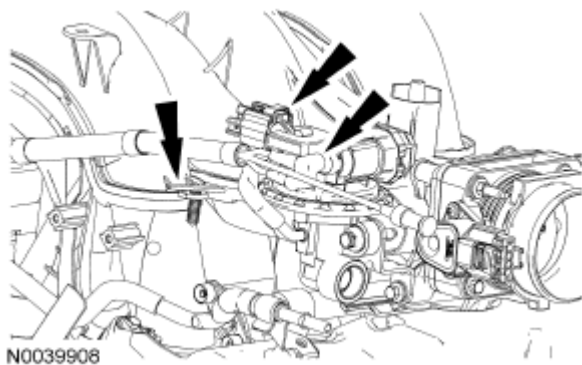


Fig. 462: Identifying Exhaust Gas Recirculation (EGR) System Module Vacuum Hose, Electrical Connector And Wiring Harness Pin-Type Retainer
Courtesy of FORD MOTOR CO.

128. Attach the wiring harness pin-type retainer and connect the KS electrical connector.



Fig. 463: Locating KS Electrical Connector

Courtesy of FORD MOTOR CO.

129. Connect the vacuum and positive crankcase ventilation (PCV) hoses to the intake manifold.

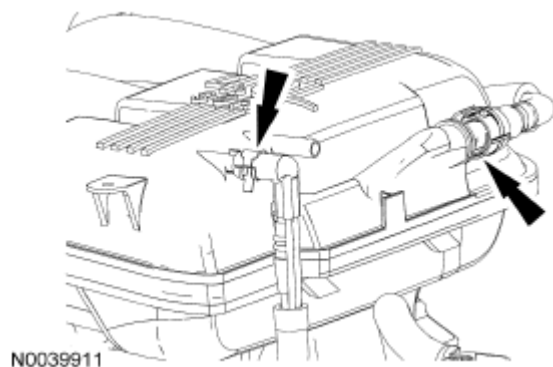


Fig. 464: Locating Vacuum And Positive Crankcase Ventilation Hoses
Courtesy of FORD MOTOR CO.

130. Install the oil cooler and hose.
- Tighten to 57 Nm (42 lb-ft).

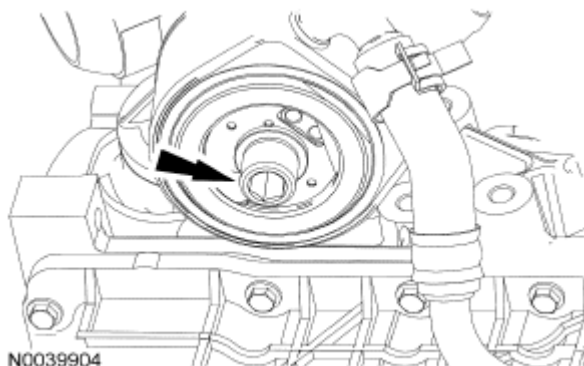


Fig. 465: Locating Oil Cooler And Hose
Courtesy of FORD MOTOR CO.

131. Connect the oil cooler hose. Position the oil cooler hose bracket and install the bolt.
- Tighten to 25 Nm (18 lb-ft).

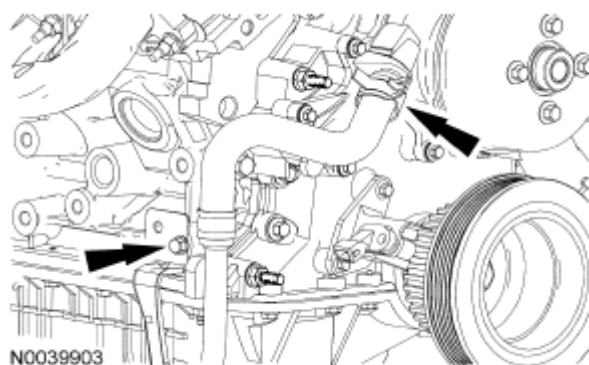


Fig. 466: Locating Oil Cooler Hose And Bolt
Courtesy of FORD MOTOR CO.

132. Position the ignition coil, bracket and spark plug wires as an assembly and install the bolts.
- Tighten to 10 Nm (89 lb-in).

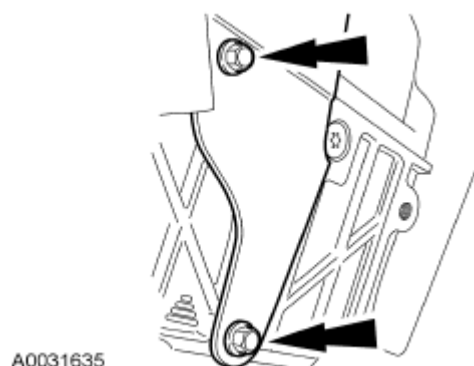


Fig. 467: Locating Bolts
Courtesy of FORD MOTOR CO.

NOTE: RH spark plug wires shown removed for clarity.

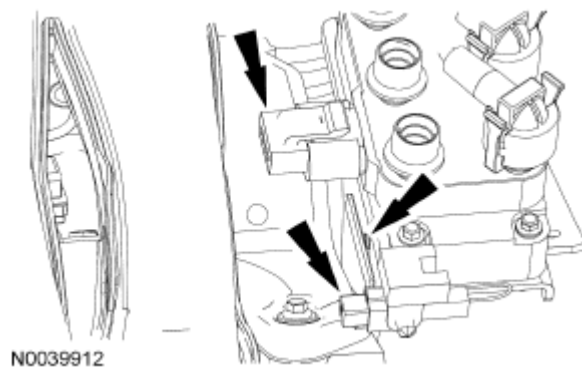


Fig. 468: Identifying Wiring Harness Retainer, Coil And Radio Interference Capacitor Electrical Connectors
Courtesy of FORD MOTOR CO.

133. Attach the wiring harness retainer and connect the coil and radio interference capacitor electrical connectors.

CAUTION: Make sure to orient the spark plug boots so the spark plug wires do not contact the exhaust manifolds. Wire contact can send voltage spikes to other electronic modules.

NOTE: Apply silicone dielectric compound to the inside of the spark plug boots.

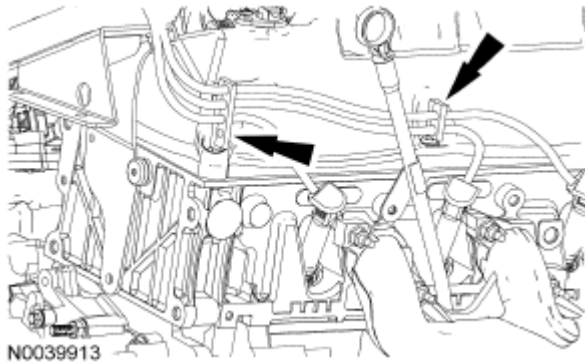


Fig. 469: Locating LH Spark Plug Wire Retainers
Courtesy of FORD MOTOR CO.

134. Attach the LH spark plug wire retainers and connect the LH spark plug wires to the spark plugs.

CAUTION: Make sure to orient the spark plug boots so the spark plug wires do not contact the exhaust manifolds. Wire contact can send voltage spikes to other electronic modules.

NOTE: Apply silicone dielectric compound to the inside of the spark plug boots.

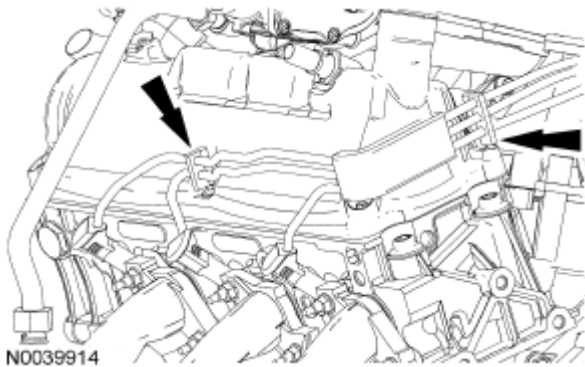


Fig. 470: Locating RH Spark Plug Wire Retainers
Courtesy of FORD MOTOR CO.

135. Attach the RH spark plug wire retainers and connect the RH spark plug wires to the spark plugs.

136. Position the heater hose tube bracket and the hoses as an assembly and install the bolt.
- Tighten to 23 Nm (17 lb-ft).

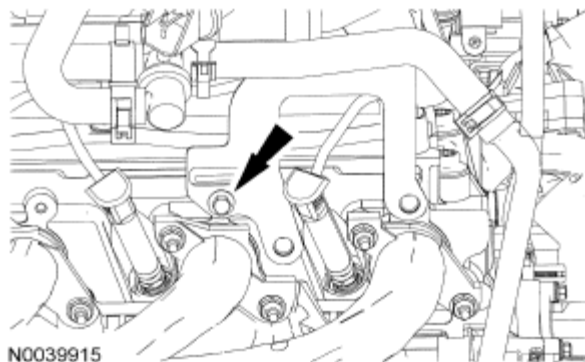


Fig. 471: Locating Heater Hose Tube Bracket Bolt
Courtesy of FORD MOTOR CO.

137. Connect the hose to the oil cooler.

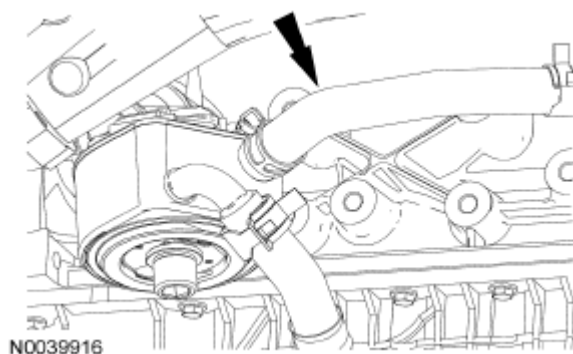


Fig. 472: Locating Oil Cooler Hose
Courtesy of FORD MOTOR CO.

138. Connect the heater hose to the thermostat housing.

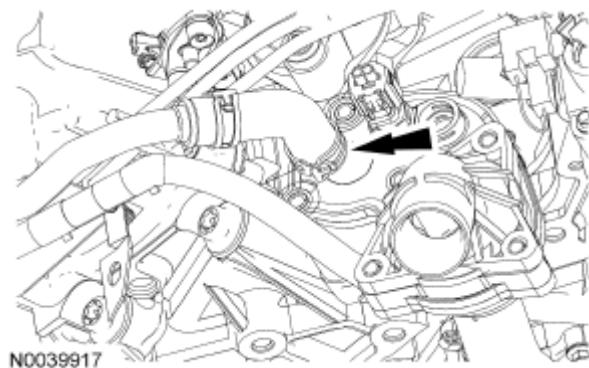


Fig. 473: Locating Heater Hose Clamp

Courtesy of FORD MOTOR CO.

139. Install the generator mounting bracket.
1. Install the generator mounting bracket bolts.
 - Tighten to 42 Nm (31 lb-ft).
 2. Install the drive belt tensioner and bolt.
 - Tighten to 47 Nm (35 lb-ft).

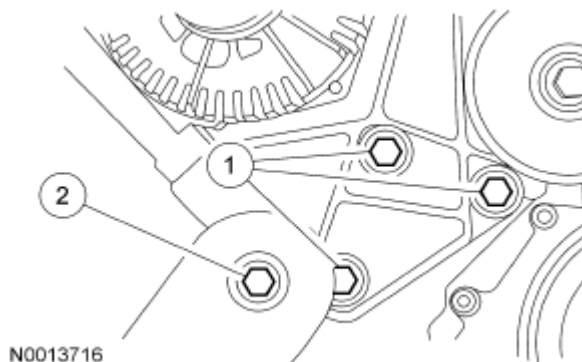


Fig. 474: Locating Generator Mounting Bracket Bolts And Drive Belt Tensioner Bolt
Courtesy of FORD MOTOR CO.

140. Connect the generator electrical connections and the wire harness retainer.
- Tighten to 9 Nm (80 lb-in).



Fig. 475: Locating Generator Electrical Connections And Wire Harness Retainer
Courtesy of FORD MOTOR CO.

141. Install the accessory bracket and the bolts.
- Tighten to 42 Nm (31 lb-ft).

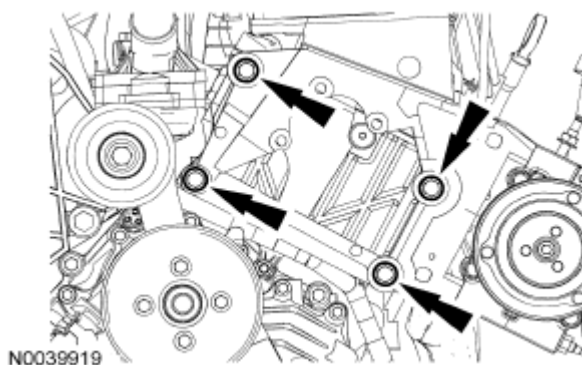


Fig. 476: Locating Accessory Bracket Bolts
Courtesy of FORD MOTOR CO.

142. Connect the A/C compressor electrical connector and wire harness retainer.

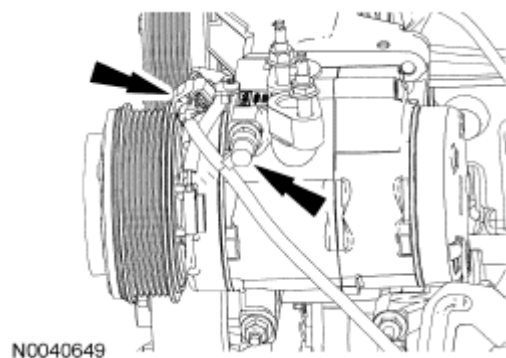


Fig. 477: Locating A/C Compressor Electrical Connector And Wire Harness Retainer
Courtesy of FORD MOTOR CO.

143. Install the bolt.
- Tighten to 10 Nm (89 lb-in).

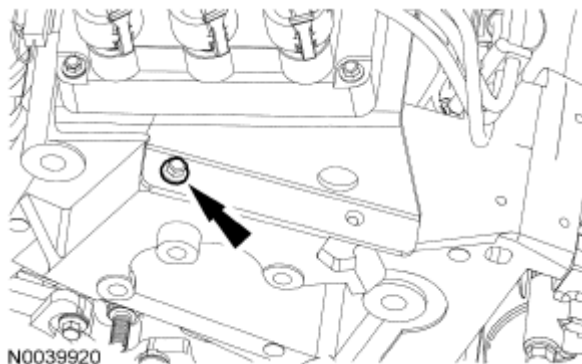


Fig. 478: Locating Bolt
Courtesy of FORD MOTOR CO.

144. Install the right side lifting bracket.

- Tighten to 37 Nm (27 lb-ft).

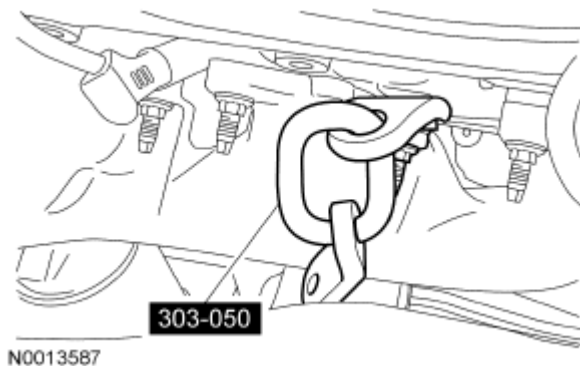


Fig. 479: Identifying Special Tool
Courtesy of FORD MOTOR CO.

145. Install the left side lifting bracket.

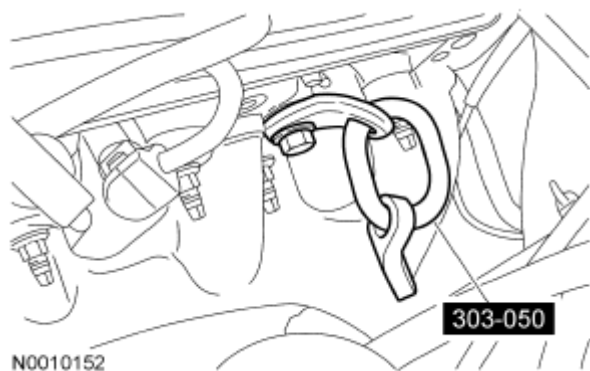


Fig. 480: Identifying Special Tool
Courtesy of FORD MOTOR CO.

146. Using the special tool and a floor crane, remove the engine from the engine stand.

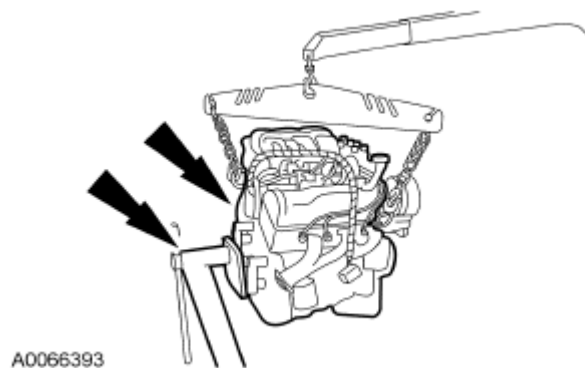


Fig. 481: Identifying Special Tool, Floor Crane And Engine
Courtesy of FORD MOTOR CO.

NOTE: Be sure that the crankshaft rear sealing surface is clean and free of any rust or corrosion. To clean the crankshaft rear sealing surface, use an extra-fine emery cloth or an extra-fine steel wool with metal surface cleaner.

- 147. Lubricate the crankshaft rear oil seal with engine oil.
- 148. Install the special tools.

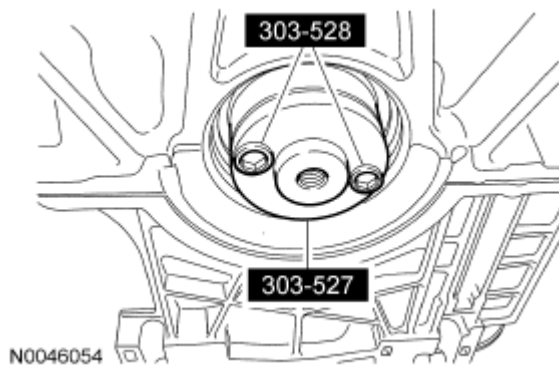


Fig. 482: Identifying Special Tools
Courtesy of FORD MOTOR CO.

- 149. Position the crankshaft rear seal.

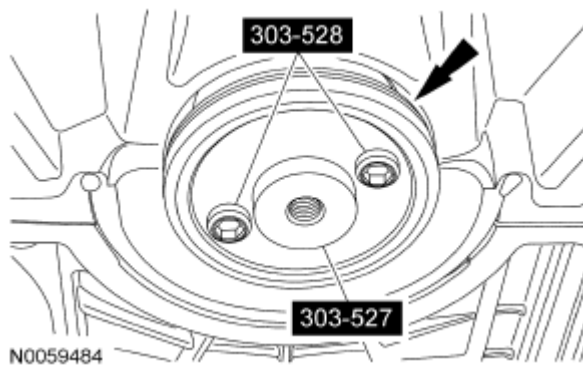


Fig. 483: Identifying Crankshaft Rear Seal And Special Tools
Courtesy of FORD MOTOR CO.

- 150. Using the special tool, install the crankshaft rear oil seal.

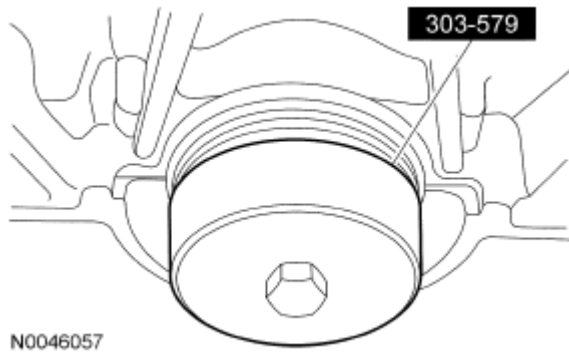


Fig. 484: Identifying Special Tool
Courtesy of FORD MOTOR CO.

151. Install the spacer plate.

NOTE: Special bolts are used for flexplate installation. Do not use standard bolts.

152. Install the flexplate.

- Tighten the bolts in the sequence shown in 2 stages.
- Stage 1: Tighten to 13 Nm (10 lb-ft).
- Stage 2: Tighten to 71 Nm (52 lb-ft).

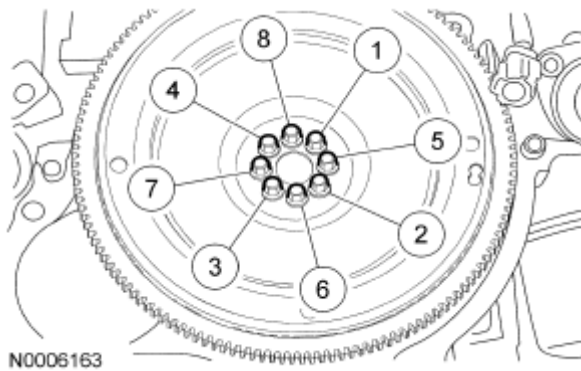


Fig. 485: Identifying Flexplate Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

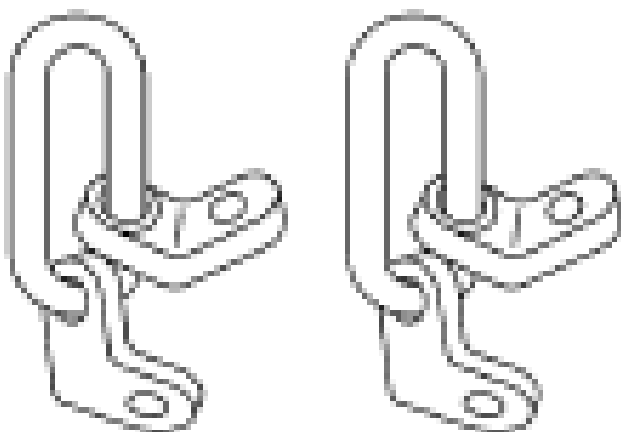
INSTALLATION

ENGINE

SPECIAL TOOLS

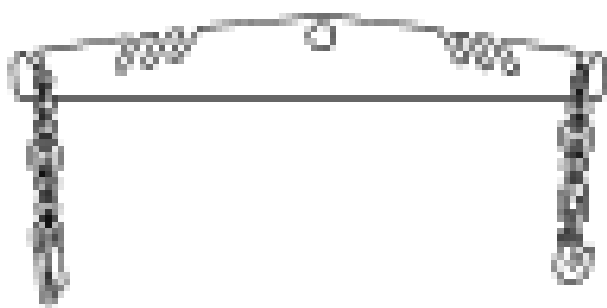
2006 Mercury Mountaineer

2006 ENGINE Engine - 4.0L SOHC - Explorer & Mountaineer



ST1595-A

Lifting Brackets
303-050 (T70P-6000) or equivalent



ST2673-A

Spreader Bar
303-D701 or equivalent

MATERIAL SPECIFICATIONS

Item	Specification
Motorcraft SAE 5W-30 Premium Synthetic Blend Motor Oil XO-5W30-QSP (in Canada Motorcraft SAE 5W-30 Super Premium Motor Oil XCO-5W30-LSP12) or equivalent	WSS-M2C929-A

Installation

CAUTION: If used as a leverage device, the fuel rail can be damaged. Care must be taken when working around the fuel rail.

1. Position the engine in the vehicle and remove the floor crane and special tool.

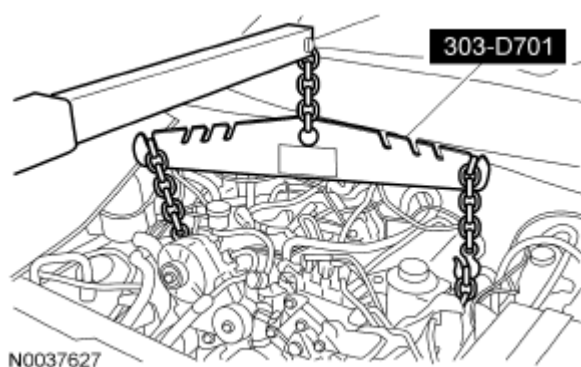


Fig. 486: Identifying Special Tool
Courtesy of FORD MOTOR CO.

2. Install the RH engine support insulator nuts.
 - Tighten to 90 Nm (66 lb-ft).



Fig. 487: Locating RH Engine Support Insulator Nuts
Courtesy of FORD MOTOR CO.

3. Remove the special tool from the RH side of the engine.

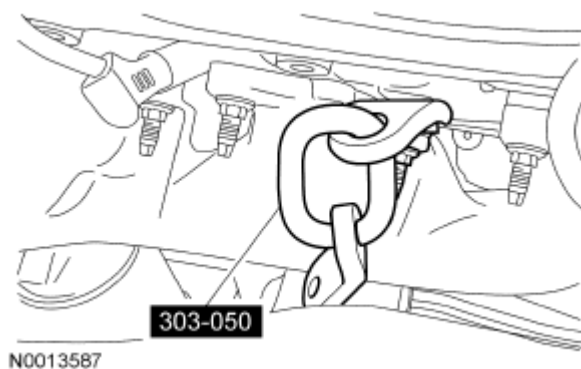


Fig. 488: Identifying Special Tool

Courtesy of FORD MOTOR CO.

4. Install the heater tube bracket bolt.
 - Tighten to 34 Nm (25 lb-ft).

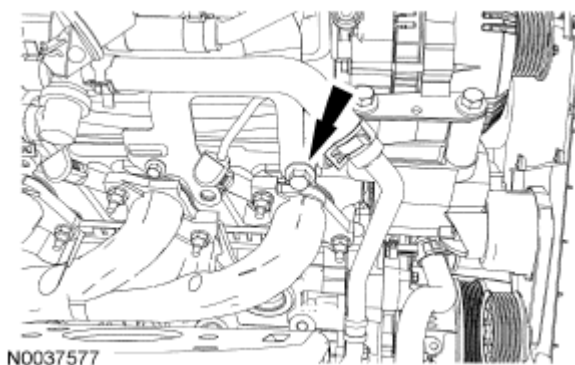


Fig. 489: Locating Heater Tube Bracket Bolt
Courtesy of FORD MOTOR CO.

5. If equipped, connect the block heater electrical connector and the wiring harness retainer.

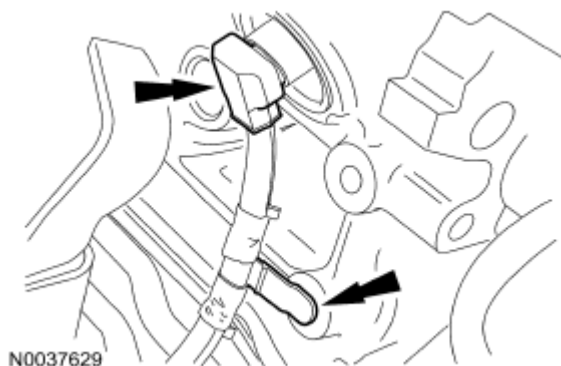


Fig. 490: Locating Block Heater Electrical Connector And Wiring Harness Retainer
Courtesy of FORD MOTOR CO.

6. Remove the special tool from the LH side of the engine.

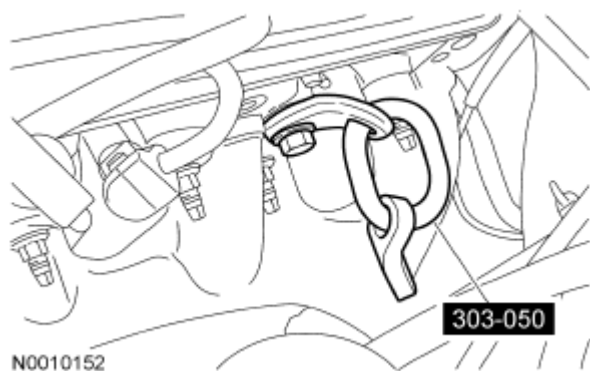


Fig. 491: Identifying Special Tool
Courtesy of FORD MOTOR CO.

7. Install the LH engine support insulator through bolt.
 - Tighten to 103 Nm (76 lb-ft).

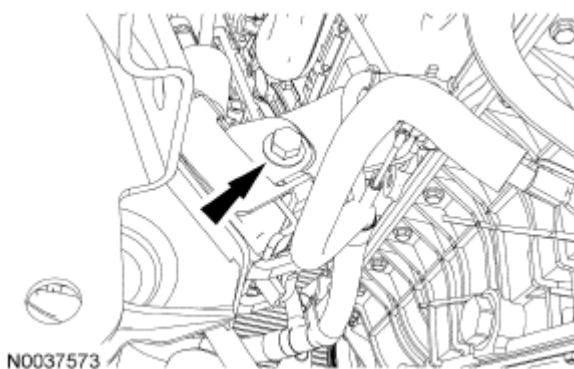


Fig. 492: Locating LH Engine Support Insulator Bolt
Courtesy of FORD MOTOR CO.

8. Position the battery cable harness bracket and install the nut.
 - Tighten to 15 Nm (11 lb-ft).

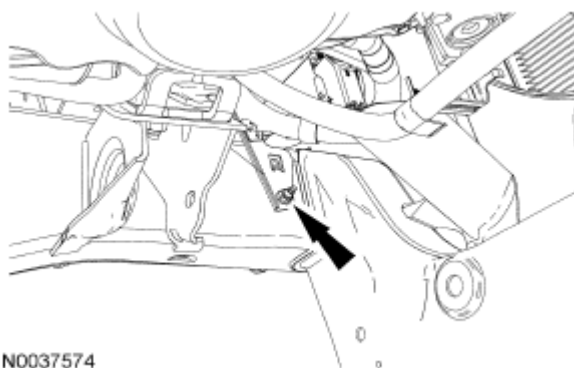


Fig. 493: Locating Battery Cable Harness Bracket Nut
Courtesy of FORD MOTOR CO.

9. Position the transmission cooler tubes and install the nut.
 - Tighten to 23 Nm (17 lb-ft).

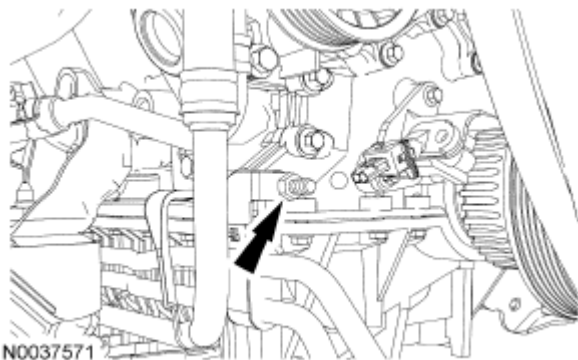


Fig. 494: Locating Transmission Cooler Tubes Nut
Courtesy of FORD MOTOR CO.

10. Install the oil filter.
 - Tighten to 13 Nm (10 lb-ft).

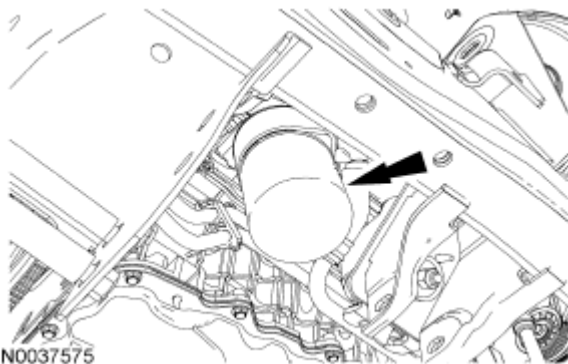


Fig. 495: Locating Oil Filter
Courtesy of FORD MOTOR CO.

11. Install the transmission. For additional information, refer to **AUTOMATIC TRANSAXLE/TRANSMISSION - 5R55S**.
12. Attach the starter wiring and install the nuts. Install the terminal cover.
 1. Tighten the S-terminal nut to 6 Nm (53 lb-in).
 2. Tighten the B-terminal nut to 12 Nm (9 lb-ft).

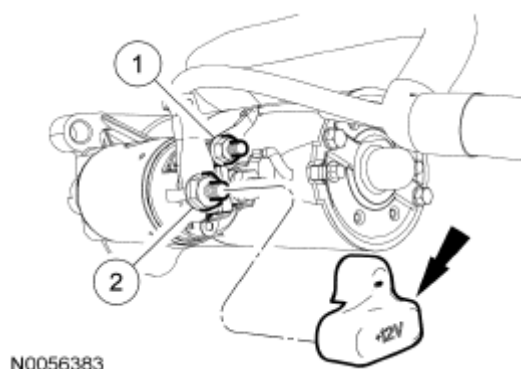


Fig. 496: Locating Starter Wiring Nuts And Terminal Cover
Courtesy of FORD MOTOR CO.

13. Install a new gasket and a new O-ring seal. Position the A/C tube, install the nut, close the latch and connect the A/C high pressure cutoff switch electrical connector.
 - Tighten to 15 Nm (11 lb-ft).

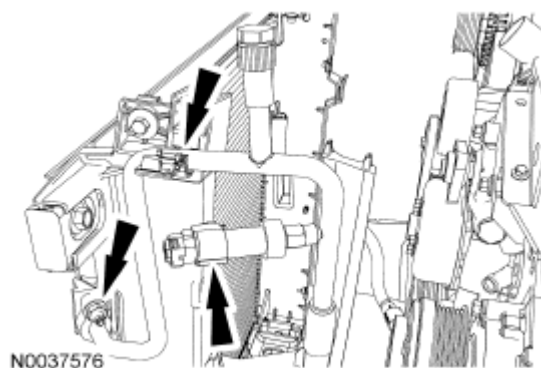


Fig. 497: Locating A/C Tube, Nut, Latch And A/C High Pressure Cutoff Switch Electrical Connector
Courtesy of FORD MOTOR CO.

14. Install new gaskets and new O-ring seal. Position the A/C tubes and install the nuts.
 - Tighten the A/C fitting nuts to 15 Nm (11 lb-ft).
 - Tighten the A/C tube bracket nut to 10 Nm (89 lb-in).

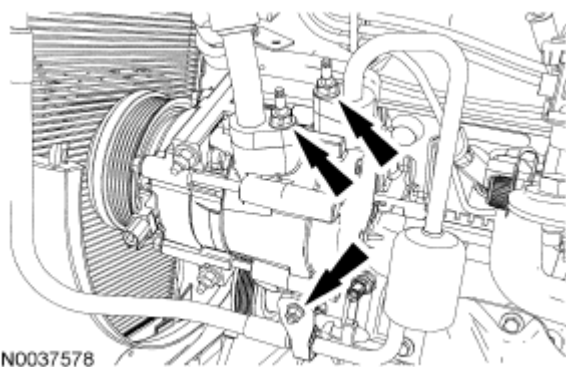


Fig. 498: Locating A/C Tube Bracket Nut And A/C Fitting Nuts
Courtesy of FORD MOTOR CO.

15. Position the evaporative emissions (EVAP) hose and connect it to the EVAP canister purge valve. Connect the EVAP canister purge valve electrical connector.

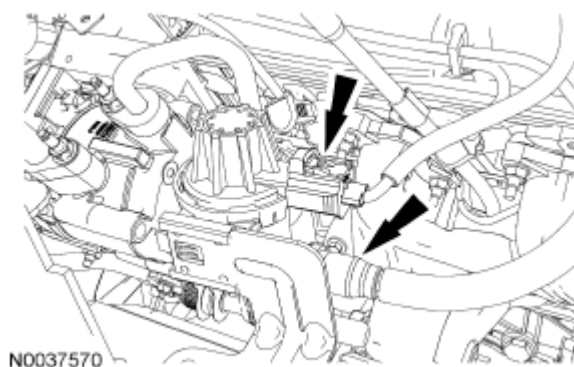


Fig. 499: Locating Evaporative Emissions (EVAP) Hose And EVAP Canister Purge Valve Electrical Connector
Courtesy of FORD MOTOR CO.

16. Connect the brake booster vacuum hose.

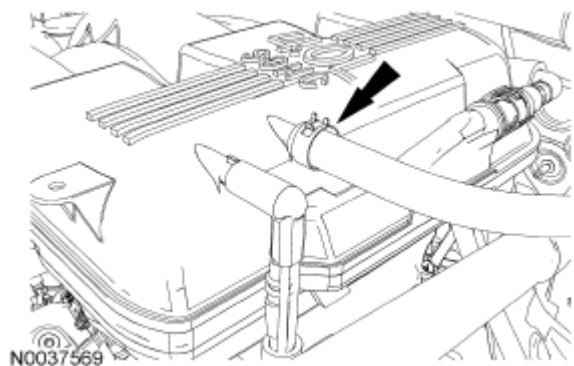


Fig. 500: Locating Brake Booster Vacuum Hose Clamp
Courtesy of FORD MOTOR CO.

17. Position the power steering pump and install the bolts.
 - Tighten to 25 Nm (18 lb-ft).

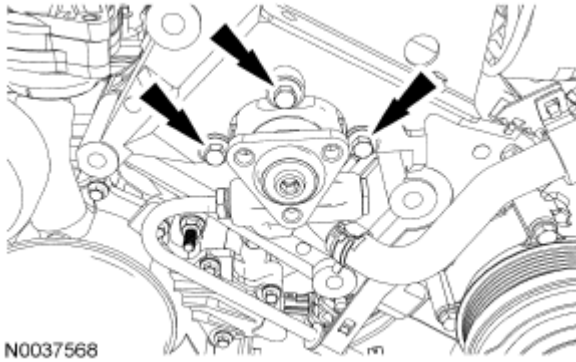


Fig. 501: Locating Power Steering Pump Bolts
Courtesy of FORD MOTOR CO.

NOTE: **A/C compressor shown removed for clarity.**

18. Position the power steering pressure (PSP) hose and the power steering reservoir-to-power steering pump hoses and install the bolts.
 - Tighten to 11 Nm (8 lb-ft).

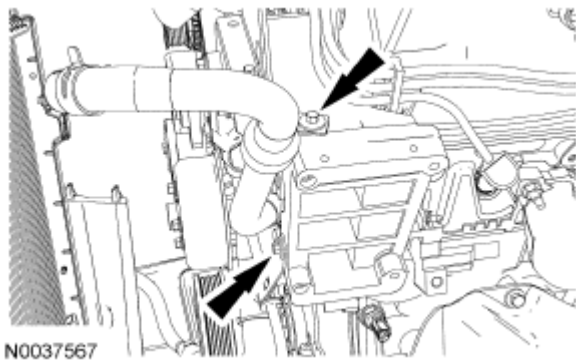


Fig. 502: Locating Power Steering Reservoir-To-Power Steering Pump Hoses Bolts
Courtesy of FORD MOTOR CO.

19. Connect the power steering pressure switch electrical connector.

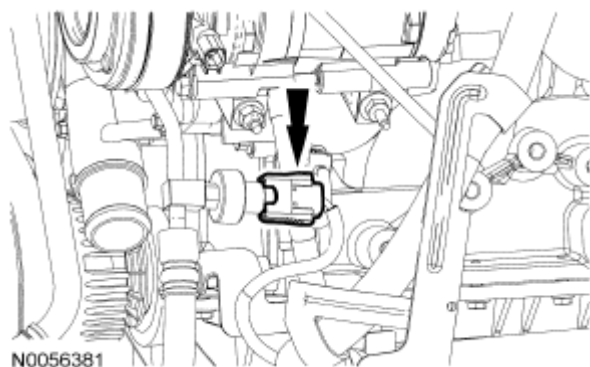


Fig. 503: Locating Power Steering Pressure Switch Electrical Connector
Courtesy of FORD MOTOR CO.

20. Connect the lower radiator hose to the coolant pump.

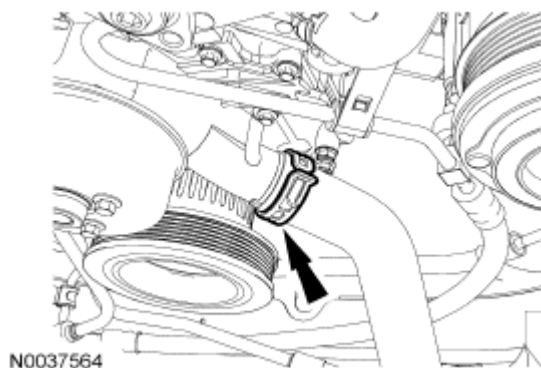


Fig. 504: Locating Lower Radiator Hose
Courtesy of FORD MOTOR CO.

21. Position the power steering pump pulley and install the bolts finger tight.



Fig. 505: Locating Power Steering Pump Pulley And Bolts
Courtesy of FORD MOTOR CO.

22. Rotate the accessory drive belt counterclockwise and install the accessory drive belt.

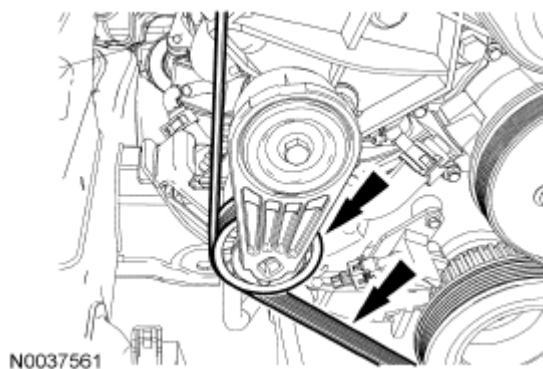


Fig. 506: Locating Accessory Drive Belt And Accessory Drive Belt
Courtesy of FORD MOTOR CO.

23. Tighten the power steering pump pulley bolts.
- Tighten to 25 Nm (18 lb-ft).

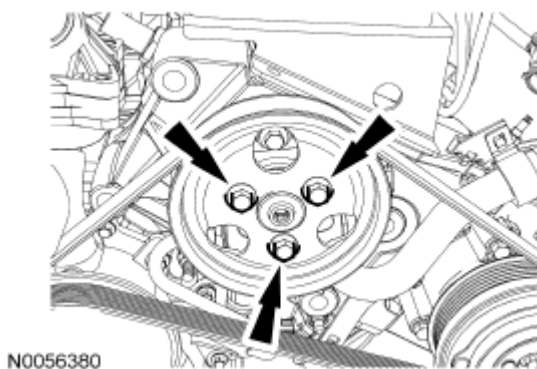


Fig. 507: Locating Power Steering Pump Pulley Bolts
Courtesy of FORD MOTOR CO.

24. Install the upper radiator hose.

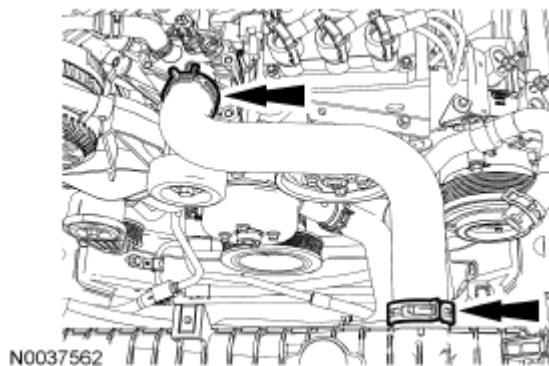


Fig. 508: Locating Upper Radiator Hose Clamps
Courtesy of FORD MOTOR CO.

25. Connect the EVAP hose.

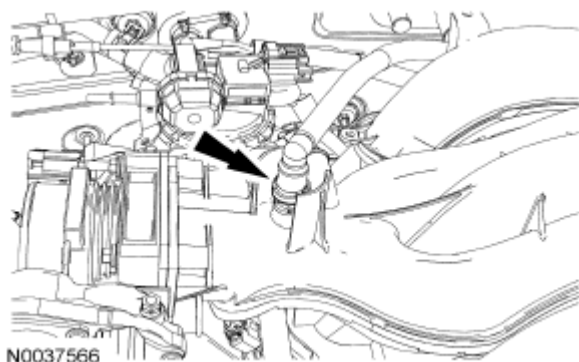


Fig. 509: Locating EVAP Hose
Courtesy of FORD MOTOR CO.

26. Position the ground wire and install the bolt.

- Tighten to 10 Nm (89 lb-in).

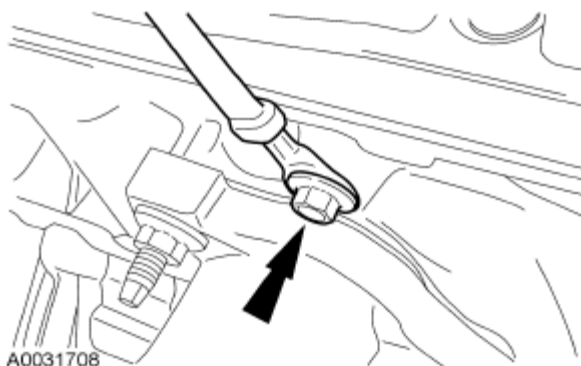


Fig. 510: Locating Ground Wire Bolt
Courtesy of FORD MOTOR CO.

27. Connect the heater hoses and the vacuum hose.

- Connect the heater control valve vacuum hose.

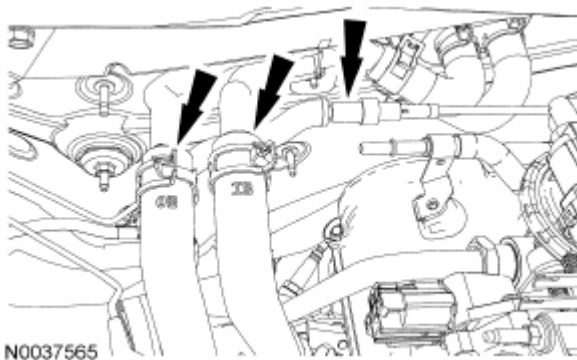
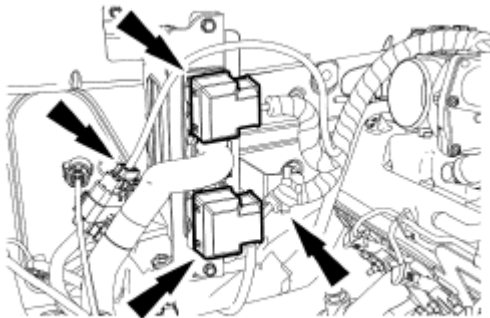


Fig. 511: Locating Heater Hoses And Vacuum Hose
Courtesy of FORD MOTOR CO.

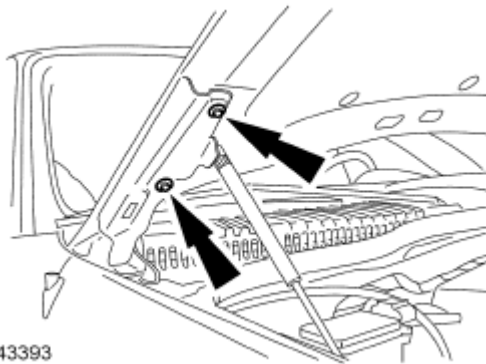
28. Connect the engine wiring harness-to-powertrain control module (PCM) electrical connectors and the wiring harness electrical connector. Attach the wiring harness retainer.



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Fig. 512: Locating Engine Wiring Harness-To-Powertrain Control Module (PCM) Electrical Connectors, Wiring Harness Electrical Connector And Retainer
Courtesy of FORD MOTOR CO.

29. Position the hood and install the 4 bolts.
- Tighten to 12 Nm (9 lb-ft).



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Fig. 513: Locating Hood Hinge Bolts
Courtesy of FORD MOTOR CO.

30. Connect the windshield washer hose.

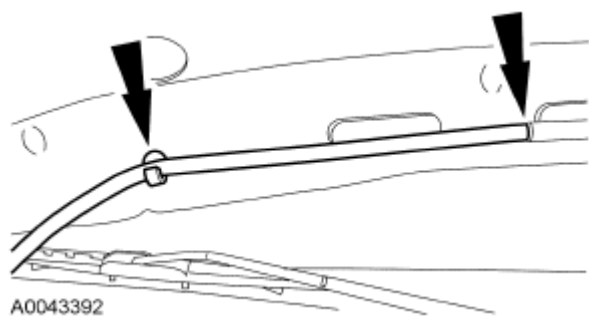


Fig. 514: Locating Windshield Washer Hose
Courtesy of FORD MOTOR CO.

31. Install the air cleaner and the air cleaner outlet pipe. For additional information, refer to **INTAKE AIR DISTRIBUTION & FILTERING** .
32. Install the cooling fan. For additional information, refer to **ENGINE COOLING** .
33. Connect the battery cable connectors and install the nuts. Close the cover.
 - Tighten to 12 Nm (9 lb-ft).

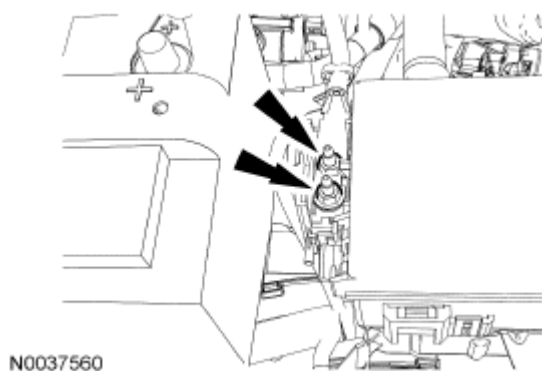


Fig. 515: Locating Battery Cable Connectors Nuts
Courtesy of FORD MOTOR CO.

34. Connect the electrical connector and attach the wiring harness retainers.

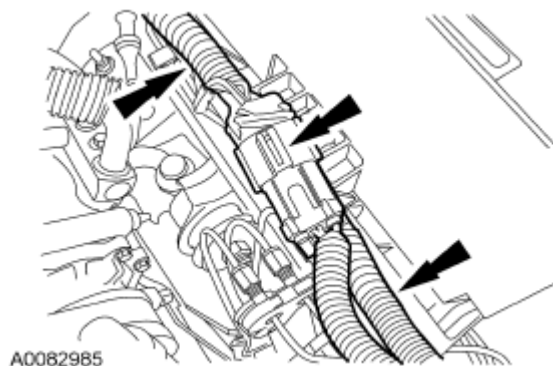


Fig. 516: Locating Electrical Connector And Wiring Harness Retainers

Courtesy of FORD MOTOR CO.

35. Position the ground wire and install the nut.
- Tighten to 9 Nm (80 lb-in).

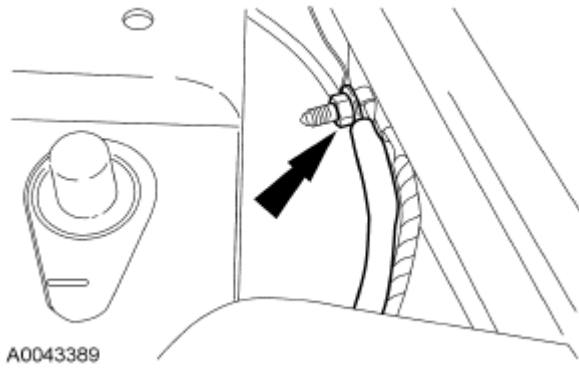


Fig. 517: Locating Ground Wire Nut
Courtesy of FORD MOTOR CO.

36. Connect the battery cables. For additional information, refer to **BATTERY, MOUNTING AND CABLES** .
37. Connect the fuel supply tube spring lock coupling. For additional information, refer to **FUEL SYSTEM-GENERAL INFORMATION** .
38. Fill the engine with clean engine oil.
39. Fill the cooling system for additional information, refer to **ENGINE COOLING** .
40. Recharge the A/C system. For additional information, refer to **CLIMATE CONTROL SYSTEM-GENERAL INFORMATION AND DIAGNOSTICS** .
41. Start the engine and check for leaks. Stop the engine and check all fluid levels.
42. Carry out the fluid level check for the transmission. For additional information, refer to **AUTOMATIC TRANSAXLE/TRANSMISSION - 5R55S** .