

2006 Mercury Montego

2006 ENGINE Engine - Five Hundred, Freestyle & Montego

2006 ENGINE

Engine - Five Hundred, Freestyle & Montego

SPECIFICATIONS

GENERAL SPECIFICATIONS

GENERAL SPECIFICATIONS

Item	Specification
Lubricants and Sealants	
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (in Canada Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12) or equivalent	WSS-M2C930-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	ESE-M1C171-A
Motorcraft Metal Surface Cleaner ZC-21	WSE-M5B392-A
Threadlock and Sealer TA-25	WSK-M2G351-A5
Engine	
Displacement	3.0L (4V) (182 CID)
Number of cylinders	6
Bore	89.0 mm (3.50 in)
Stroke	79.5 mm (3.13 in)
Firing order	1-4-2-5-3-6
Oil pressure (minimum at 1,500 RPM with engine warmed up after 10 minutes of idling.)	76 kPa (11 psi)
Oil capacity ⁽¹⁾	5.7 L (6.0 qts)
Compression ratio	10:1
Cylinder Head and Valve Train	
Cylinder head distortion ⁽²⁾	-
Combustion chamber volume	52 cc (3.17 CI)
Valve arrangement (front to rear)	LH intake I-I-I-I-I-I LH exhaust E-E-E-E-E-E RH intake I-I-I-I-I-I RH exhaust E-E-E-E-E-E
Valve guide bore diameter	6.015-6.044 mm (0.236-0.237 in)
Valve stem diameter - intake	5.975-5.995 mm (0.2350-0.2358 in)
Valve stem diameter - exhaust	5.950-5.970 mm (0.2343-0.2350 in)
Valve stem-to-guide clearance - intake	0.019-0.069 mm (0.0007-0.0027 in)
Valve stem-to-guide clearance - exhaust	0.046-0.095 mm (0.0018-0.0037 in)
Valve head diameter - intake	35 mm (1.38 in)

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Valve head diameter - exhaust	30 mm (1.18 in)
Valve head diameter (intake) - gauge diameter	33.5 mm (1.3189 in)
Valve head diameter (exhaust) - gauge diameter	28.0 mm (1.10236 in)
Valve face runout	0.04 mm (0.001 in)
Valve face angle	45.25-45.75 degrees
Valve seat width - intake	1.1-1.4 mm (0.043-0.055 in)
Valve seat width - exhaust	1.4-1.7 mm (0.055-0.066 in)
Valve seat runout	0.04 mm (0.001 in)
Valve seat angle	44.5-45.0 degrees
Valve spring free length (approx.)	46.6 mm (1.84 in)
Valve spring squareness	2.5%
Valve spring compression pressure (N @ spec, length)	693 N @ 30.09 mm (156 lbs @ 1.18 in)
Valve spring installed height (N @ spec, length)	39.89 mm ± 0.2 mm (1.57 in ± 0.0078 in)
Valve spring installed pressure	240 N ± 12 N @ 39.89 mm (53.95 lbs ± 2.69 lbs @ 1.57 in)
Valve spring installed pressure - service limit	10% force loss @ specified height
Roller follower ratio @ max. lift	2.0:1
Hydraulic Lash Adjuster	
Diameter (standard)	16-15.988 mm (0.6290-0.6294 in)
Clearance-to-bore	0.018-0.069 mm (0.0007-0.0027 in)
Hydraulic leakdown rate	5-25 seconds
Collapsed lash adjuster gap	0.50-1.11 mm (0.019-0.043 in)
Camshaft	
Theoretical valve lift @ 0 lash	9.80 mm (0.388 in)
Lobe lift-intake	4.29 mm (0.16 in)
Lobe lift-exhaust	4.68 mm (0.18 in)
Allowable lobe lift loss	0.76 mm (0.003 in)
Journal diameter (all)	26.962-26.936 mm (1.061-1.060 in)
Camshaft journal bore inside diameter	27.012-26.987 mm (1.063-1.062 in)
Camshaft journal-to-bearing clearance - standard	0.028-0.074 mm (0.001-0.0029 in)
Camshaft journal-to-bearing clearance - service limit	0.121 mm (0.0047 in)
Runout	-
End play - service limit	0.025-0.165 mm (0.0009-0.0064 in)
Cylinder Block	
Cylinder bore diameter - grade 1	89.000-89.010 mm (3.5039-3.5043 in)
Cylinder bore diameter - grade 2	89.011-89.020 mm (3.5043-3.5047 in)
Cylinder bore diameter - grade 3	89.021-89.030 mm (3.5047-3.5051 in)
Cylinder bore maximum taper	0.020 mm (0.008 in)
Cylinder bore maximum out-of-round	0.015 mm (0.0005 in)
Cylinder bore maximum out-of-round - service limit	0.020 mm (0.0007 in)

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Main bearing bore inside diameter	67.998-68.022 mm (2.677-2.678 in)
Head gasket surface flatness	-
Crankshaft	
Main bearing journal diameter	62.968-62.992 mm (2.479-2.480 in)
Main bearing journal maximum taper	0.008 mm (0.0003 in)
Main bearing journal maximum out-of-round	0.006 mm (0.0082 in)
Main bearing journal-to-cylinder block clearance	0.026-0.042 mm (0.0010-0.0016 in)
Connecting rod journal diameter	49.969-49.991 mm (1.967-1.968 in)
Connecting rod journal maximum taper	0.008 mm (0.0003 in)
Connecting rod journal maximum out-of-round	0.006 mm (0.0002 in)
Crankshaft maximum end play	0.135-0.255 mm (0.005-0.010 in)
Piston and Connecting Rod	
Piston diameter - coated, grade 1	88.990-89.010 mm (3.5035-3.5043 in)
Piston diameter - coated, grade 2	88.998-89.022 mm (3.5039-3.5048 in)
Piston diameter - coated, grade 3	89.010-89.030 mm (3.5043-3.5051 in)
Piston diameter - uncoated, grade 1	88.970-88.980 mm (3.5027-3.5031 in)
Piston diameter - uncoated, grade 2	88.978-88.992 mm (3.5030-3.5036 in)
Piston diameter - uncoated, grade 3	88.990-89.000 mm (3.5035-3.5039 in)
Piston-to-cylinder bore clearance - uncoated	0.018 to 0.042 mm (0.0007-0.0016 in)
Piston ring end gap - compression (top, gauge diameter) ⁽³⁾	0.100-0.250 mm (0.0039-0.0098 in)
Piston ring end gap - compression (bottom, gauge diameter)	0.27-0.42 mm (0.0106-0.0165 in)
Piston ring end gap - oil ring (steel rail, gauge diameter)	0.15-0.65 mm (0.0059-0.0255 in)
Piston ring end gap - compression (top, service limit)	0.50 mm max. (0.0196 in)
Piston ring end gap - compression (bottom, service limit)	0.65 mm max. (0.0255 in)
Piston ring end gap - oil ring (steel rail, service limit)	0.90 mm max. (0.0354 in)
Piston ring groove width - compression (top)	1.230-1.245 mm (0.0484-0.0490 in)
Piston ring groove width - compression (bottom)	1.530-1.545 mm (0.0602-0.0608 in)
Piston ring groove width - oil ring	2.530-2.555 mm (0.0996-0.1005 in)
Piston ring width	-
Piston ring-to-groove clearance	-
Piston pin bore diameter	21.015-21.020 mm (0.8273-0.8275 in)
Piston pin diameter	21.011-21.013 mm (0.8271-0.8273 in)
Piston pin length	60.51-60.08 mm (2.382-2.365 in)
Piston pin-to-piston fit	0.002 to 0.009 mm (0.00007-0.00003 in)
Piston-to-connecting rod clearance	-
Connecting rod-to-pin clearance - standard	0.004-0.0201 mm (0.0001-0.0008 in)
Connecting rod-to-pin clearance - service limit	0.035 mm (0.0013 in)
Connecting rod pin bore diameter	21.017-21.031 mm (0.827-0.828 in)
Connecting rod length (center-to-center)	138.06-138.14 mm (5.435-5.438 in)
Connecting rod maximum allowed bend	0.038 mm (0.0015 in) per 25 mm

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	(0.984 in)
Connecting rod maximum allowed twist	0.050 mm (0.0019 in) per 25 mm (0.984 in)
Connecting rod bearing bore diameter	53.015-53.035 mm (2.0872-2.0879 in)
Connecting rod bearing-to-crankshaft clearance	0.028-0.066 mm (0.001-0.0025 in)
Connecting rod side clearance	0.100-0.30 mm (0.0039-0.0118 in)
(1) With filter change.	
(2) Refer to the procedure for specifications.	
(3) Specification 82.4 mm (3.2441 in) diameter gauge.	

TORQUE SPECIFICATIONS**TORQUE SPECIFICATIONS**

Description	N.m	lb-ft	lb-in
Accessory drive belt tensioner bolt	45	33	-
Air conditioning compressor bolts and nuts	25	18	-
Air conditioning compressor bracket bolts	25	18	-
Battery B+ nut	5	-	44
Block heater	14	10	-
Camshaft journal cap bolts	10	-	89
Camshaft oil seal retainer bolts	10	-	89
Camshaft position (CMP) sensor bolt	10	-	89
Coolant bypass tube bolts	10	-	89
Coolant pump bolts ⁽¹⁾	-	-	-
Crankshaft position (CKP) sensor bolt	10	-	89
Crankshaft damper bolt ⁽¹⁾	-	-	-
Crankcase vent cover bolts	10	-	89
Cylinder head bolts ⁽¹⁾	-	-	-
Driveshaft bolts	25	18	-
Exhaust gas recirculation (EGR) system module bolts	25	18	-
EGR system module tube nuts	40	30	-
Engine front cover bolts and stud ⁽¹⁾	-	-	-
Engine support insulator nuts	70	52	-
Exhaust manifold heat shield bolts	11	8	-
Exhaust manifold nuts	20	15	-
Exhaust manifold stud	12	9	-
Exhaust manifold-to-catalytic converter bolts	40	30	-
Flexplate bolts	80	59	-

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Front transaxle stabilizer mount nut and bolt	40	30	-
Fuel rail bolts	10	-	89
Generator bolts and nuts	48	35	-
Generator-to-engine front cover studs	8	-	71
Generator B+ terminal nut (W705790-S901)	8	-	71
Ground strap bolts	10	-	89
Ground cable-to-transaxle housing bolt	12	9	-
Halfshaft support bracket bolts	48	35	-
Ignition coil-on-plug bolts	6	-	53
Intermediate shaft-to-steering gear bolt (N808349-S439)	23	17	-
Knock sensor (KS) bolt	20	15	-
Oil filter adapter bolts ⁽¹⁾	-	-	-
Oil filter	16	12	-
Oil level indicator and tube stud bolt	9	-	80
Oil pan baffle nuts ⁽¹⁾	-	-	-
Oil pan bolts	25	18	-
Oil pan drain plug	26	19	-
Oil pan-to-oil filter adapter bolt	25	18	-
Oil pan-to-transaxle bolts	40	30	-
Oil pressure sender	14	10	-
Oil pump bolts	10	-	89
Oil pump screen and pickup tube bolts	10	-	89
Outer tie-rod end nuts	90	66	-
Power steering fluid reservoir nuts	9	-	80
Power steering fluid reservoir bracket nut	9	-	80
Power steering pump nuts	25	18	-
Power steering pump bracket bolts	25	18	-
Power steering pressure (PSP) tube bracket-to-cylinder head bolts	7	-	62
PSP tube bracket-to-fluid reservoir bracket bolt	7	-	62
PSP tube bracket-to-crossmember bolt	25	18	-
Power steering tube-to-steering gear bolt	25	18	-
Radio ignition interference capacitor bolt	8	-	71
Rear transaxle mount bracket-to- transaxle bolts ⁽²⁾	55	41	-
RH engine support insulator bracket bolts ⁽²⁾	55	41	-
RH valve cover-to power steering fluid reservoir stud bolts	7	-	62
Shifter cable bracket bolts	25	18	-
Spark plugs	15	11	-
Stabilizer bar link nuts	55	41	-
Starter motor ground cable bolt	25	18	-
Starter cable positive nut	12	9	-

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Thermostat housing-to-coolant pump bolts	10	-	89
Timing chain guide bolts	25	18	-
Timing chain tensioner bolts	25	18	-
Torque converter-to-flexplate nuts	36	27	-
Transaxle-to-engine bolts	40	30	-
Transaxle roll restrictor cross brace-to-body bolts ⁽²⁾	55	41	-
Transaxle roll restrictor cross brace-to-roll restrictor bolt ⁽²⁾	48	35	-
Transaxle roll restrictor bracket-to-roll restrictor bolts ⁽²⁾	55	41	
Transaxle roll restrictor-to-transaxle bolts ⁽²⁾	55	41	-
Upper and lower intake manifold bolts	10	-	89
Valve cover bolts and stud bolts	10	-	89
Wiring harness shield-to-valve cover stud bolt nuts	6	-	53

(1) Refer to the appropriate procedure.

(2) When reinstalling fasteners originally coated with threadlock, clean with a wire brush prior to applying new threadlock. Apply threadlock to the threads of the bolt(s).

DESCRIPTION AND OPERATION

ENGINE

WARNING: The 3.0L Duratec engine is equipped with a composite intake manifold and fabricated exhaust manifolds. The engine should not be supported by these manifolds during repair procedures. Failure to follow these instructions can result in personal injury.

The 3.0L Duratec is a 4-valve-per-cylinder, dual overhead camshaft engine. The engine uses a distributorless ignition system. The cylinder block is a 2-piece design with the upper portion housing the cylinders, and a separate lower cylinder block containing the main bearing caps. Both sections are made of aluminum, with inserts for the bearing areas and caps. An aluminum oil pan bolts to the bottom of the lower cylinder block and to the transaxle to provide greater strength.

The camshafts are mounted in the cylinder heads and act against a roller follower to open and close the valves. A hydraulic lash adjuster is located on one side of the roller follower and the valve tip on the opposite end. The camshafts are driven off the front of each cylinder head by 2 chains (one each side). Both of the chains are driven by sprockets that are located on the crankshaft, just in front of the oil pump.

DIAGNOSIS AND TESTING

ENGINE

Refer to **ENGINE** for basic mechanical concerns.

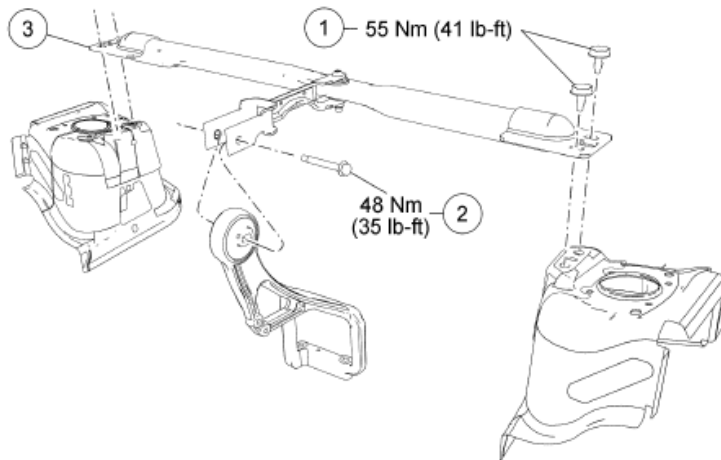
Refer to **INTRODUCTION - GASOLINE** article for driveability concerns.

IN-VEHICLE REPAIR

UPPER INTAKE MANIFOLD

MATERIAL

Item	Specification
Threadlock and Sealer TA-25	WSK-M2G351-A5



N0017262

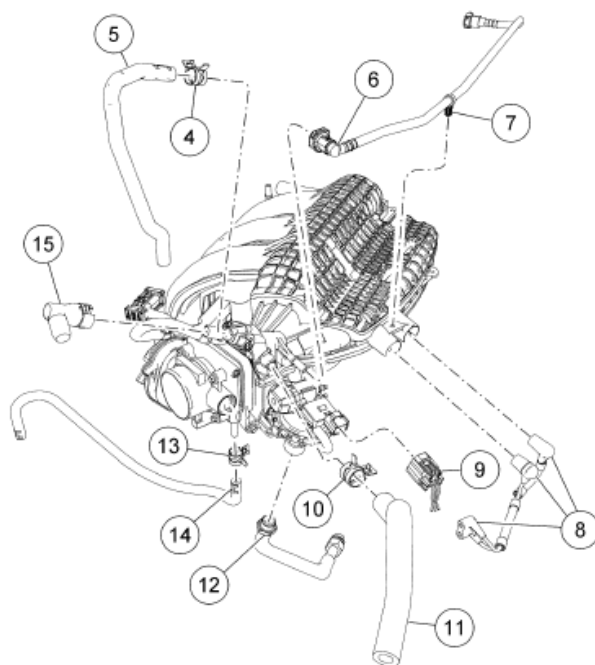
Item	Part Number	Description
1	W705985	Transaxle roll restrictor cross brace bolts (4 required)
2	W506525	Transaxle roll restrictor bolt

Item	Part Number	Description
3	6G053	Transaxle roll restrictor cross brace

Fig. 1: Identifying Upper Intake Manifold Components (1 Of 3) (With Torque Specifications)
 Courtesy of FORD MOTOR CO.

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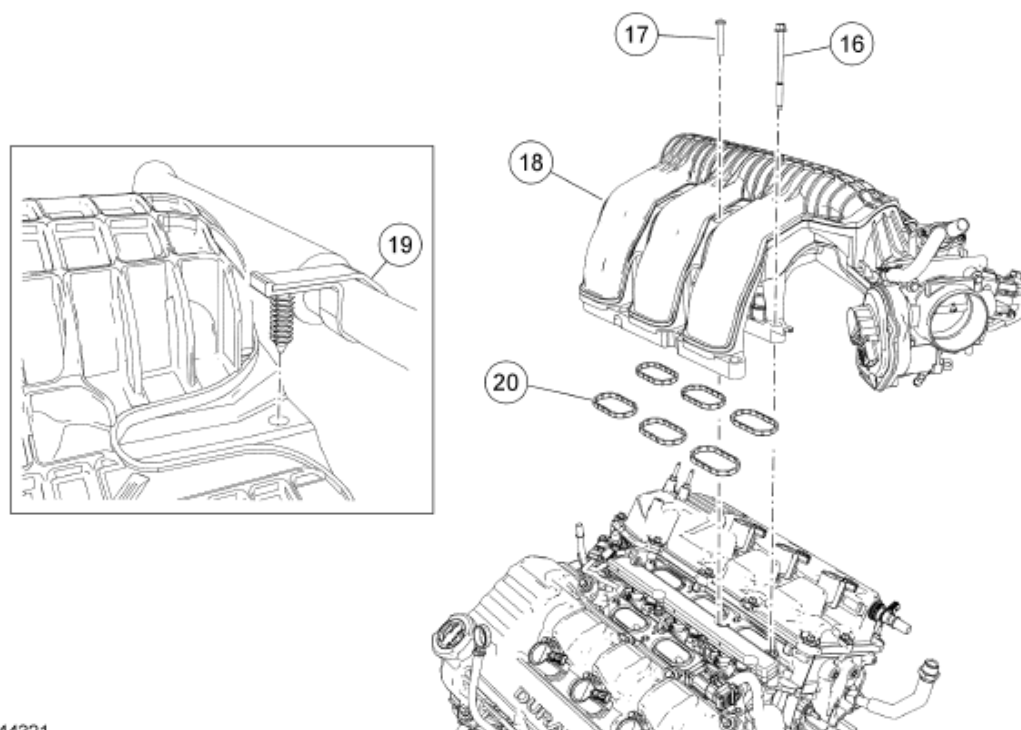


N0003263

Item	Part Number	Description
4	8287	Positive crankcase ventilation (PCV) coolant hose clamp
5	18663	PCV coolant hose (2 required for late build)
6	9G271	Evaporative emissions (EVAP) canister purge valve tube
7	—	EVAP canister purge valve tube retainer (part of 9G271)
8	9E498	Vacuum tube fittings (3 required)
9	14A464	Exhaust gas recirculation (EGR) system module electrical connector (part of 12B637)

Item	Part Number	Description
10	—	Brake booster vacuum hose clamp
11	9C482	Brake booster vacuum hose
12	—	EGR system module tube fitting (part of 9D477)
13	8287	Throttle body coolant hose clamp (early build)
14	9F814	Throttle body coolant hose (early build)
15	6K817	PCV tube

Fig. 2: Identifying Upper Intake Manifold Components (2 Of 3)
Courtesy of FORD MOTOR CO.



N0044321

Item	Part Number	Description
16	9Y450	Upper intake manifold bolt (8 required)
17	W505978	Upper intake manifold-to-lower intake manifold screw (4 required)
18	9424	Upper intake manifold
19	—	Fuel tube retainer (part of 9G700)
20	310300	Upper intake manifold gasket (6 required)

Fig. 3: Identifying Upper Intake Manifold Components (3 Of 3)
 Courtesy of FORD MOTOR CO.

Removal

All vehicles

1. Drain the cooling system. For additional information, refer to **DRAINING** .
2. Disconnect the battery ground cable. For additional information, refer to **REMOVAL AND INSTALLATION** .
3. Remove the air cleaner outlet pipe. For additional information, refer to **REMOVAL AND INSTALLATION** .
4. Remove the 4 transaxle roll restrictor cross brace bolts.
5. Remove the bolt and the transaxle roll restrictor cross brace.

6. Disconnect the evaporative emissions (EVAP) canister purge valve tube from the upper intake manifold and detach the retainer.
7. Disconnect the positive crankcase ventilation (PCV), brake booster and vacuum harness tubes from the upper intake manifold.
8. Detach the fuel tube retainer from the upper intake manifold.
9. Disconnect the exhaust gas recirculation (EGR) system module electrical connector and vacuum tube.
10. Detach the vacuum tube from the upper intake manifold vacuum tube retainer.
11. Disconnect the EGR system module tube from the EGR system module.

Early build

12. Disconnect and plug the throttle body and PCV coolant hoses.

Late build

13. Disconnect and plug the 2 PCV coolant hoses.

All vehicles

14. Disconnect the throttle body electrical connector.
15. If equipped, remove and discard the 4 upper-to-lower intake manifold screws.
16. Remove the 8 bolts and the upper intake manifold.
 - Remove and discard the gaskets.

Installation**All vehicles**

NOTE: Clean and inspect all sealing surfaces. Install new gaskets.

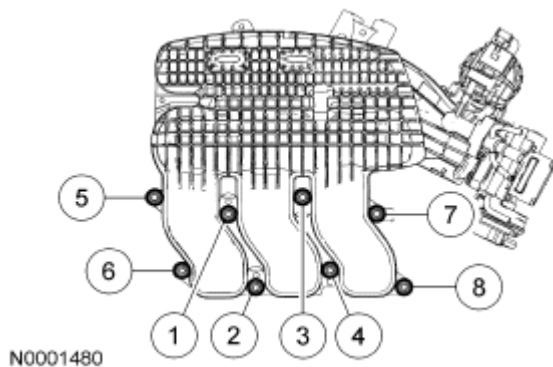


Fig. 4: Identifying Tightening Sequence Of Bolts
Courtesy of FORD MOTOR CO.

1. Position the upper intake manifold and install the 8 bolts.

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- Tighten in the sequence shown to 10 N.m (89 lb-in).
2. Connect the throttle body electrical connector.

Late build

3. Connect the 2 PCV coolant hoses.

Early build

4. Connect the throttle body and PCV coolant hoses.

All vehicle

5. Connect the EGR system module tube to the EGR system module.
 - Tighten to 40 N.m (30 lb-ft).
6. Attach the vacuum tube to the upper intake manifold vacuum tube retainer.
7. Connect the EGR system module electrical connector and vacuum tube.
8. Attach the fuel tube retainer to the upper intake manifold.
9. Connect the PCV, brake booster and vacuum harness tubes to the upper intake manifold.
10. Connect the EVAP canister purge valve tube to the upper intake manifold and attach the retainer.
11. Clean the 4 transaxle roll restrictor cross brace bolts using a wire brush and apply new threadlock to the threads.
12. Position the transaxle roll restrictor cross brace and install the 4 new bolts.
 - Tighten to 55 N.m (41 lb-ft).
13. Clean the transaxle roll restrictor cross brace-to-roll restrictor bolt using a wire brush and apply new threadlock to the threads.
14. Install a new transaxle roll restrictor cross brace-to-roll restrictor bolt.
 - Tighten to 48 N.m (35 lb-ft).
15. Install the air cleaner outlet pipe. For additional information, refer to **REMOVAL AND INSTALLATION**.
16. Connect the battery ground cable. For additional information, refer to **REMOVAL AND INSTALLATION**.
17. Fill and bleed the cooling system. For additional information, refer to **COOLING SYSTEM DRAINING, FILLING AND BLEEDING**.

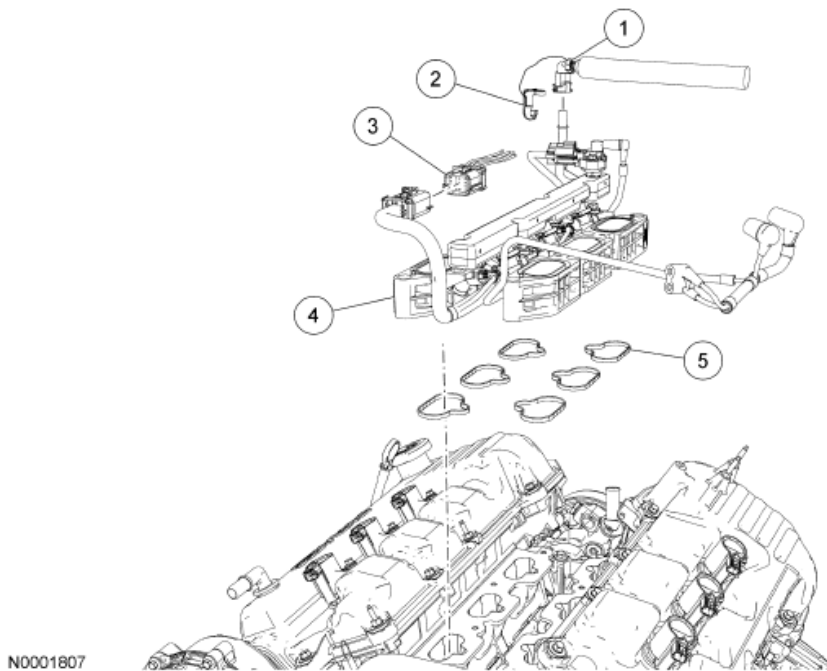
LOWER INTAKE MANIFOLD

MATERIAL

Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS- M2C930-A

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Item	Part Number	Description
1	9G700	Fuel tube
2	—	Fuel tube redundant clip (part of 9G700)
3	14A464	Fuel charging wiring harness electrical connector (part of 9H589)

Item	Part Number	Description
4	9K461	Lower intake manifold
5	9439	Lower intake manifold gasket (6 required)

Fig. 5: Identifying Lower Intake Manifold Components
Courtesy of FORD MOTOR CO.

Removal

WARNING:

Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited, resulting in possible personal injury.

Fuel in the fuel system remains under high pressure even when the engine is not running. Before repairing or disconnecting any of the fuel system components, the fuel system pressure must be relieved to prevent accidental spraying of fuel, causing personal injury or a fire hazard.

1. Release the fuel system pressure. For additional information, refer to **FUEL SYSTEM PRESSURE RELEASE**.
2. Disconnect the battery ground cable. For additional information, refer to **REMOVAL AND INSTALLATION**.
3. Remove the upper intake manifold. For additional information, refer to **UPPER INTAKE MANIFOLD**.

4. Disconnect the fuel tube redundant clip.

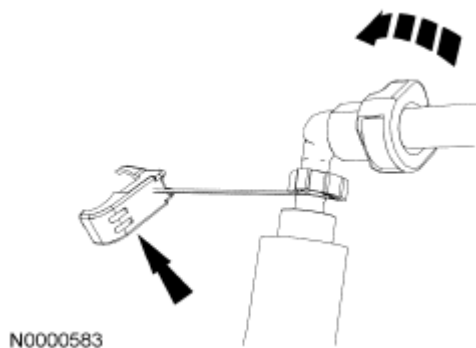


Fig. 6: Disconnecting Fuel Tube Redundant Clip
Courtesy of FORD MOTOR CO.

5. Press the fuel tube quick release coupling button and disconnect the fuel tube from the fuel rail.

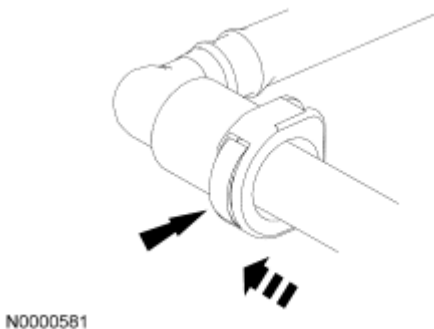


Fig. 7: Locating Fuel Tube Quick Connect Coupling Button
Courtesy of FORD MOTOR CO.

6. Disconnect the fuel rail pressure and temperature sensor electrical connector and vacuum tube.
7. Disconnect the fuel charging wiring harness electrical connector.
8. Remove the lower intake manifold.
 - Remove and discard the gaskets.

Installation

NOTE: Clean and inspect all sealing surfaces. Install new gaskets.

1. Position the lower intake manifold.
2. Connect the fuel charging wiring harness electrical connector.
3. Connect the fuel rail pressure and temperature sensor electrical connector and vacuum tube.

CAUTION: Make sure that the fuel tube coupling clicks into place when installing the tube. To make sure that the fuel tube is fully seated, pull

on the tube.

NOTE: Apply clean engine oil to the end of the tube before inserting a tube into the connector.

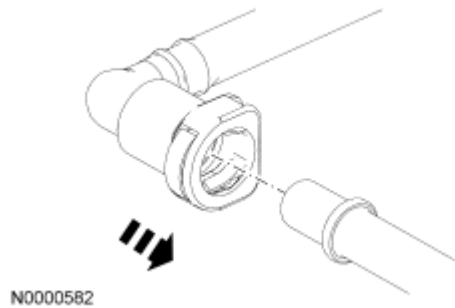


Fig. 8: Installing Quick Connect Coupling Onto Tube
Courtesy of FORD MOTOR CO.

4. Connect the fuel tube to the fuel rail.
5. Connect the fuel tube redundant clip.

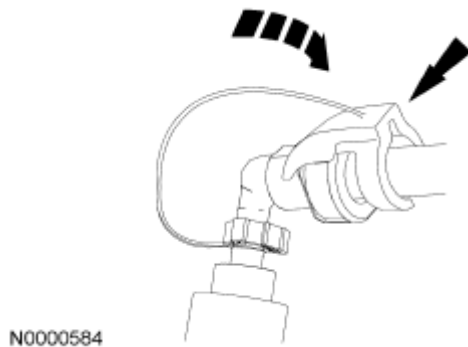


Fig. 9: Connecting Fuel Tube Redundant Clip
Courtesy of FORD MOTOR CO.

6. Install the upper intake manifold. For additional information, refer to UPPER INTAKE MANIFOLD.
7. Connect the battery ground cable. For additional information, refer to REMOVAL AND INSTALLATION.

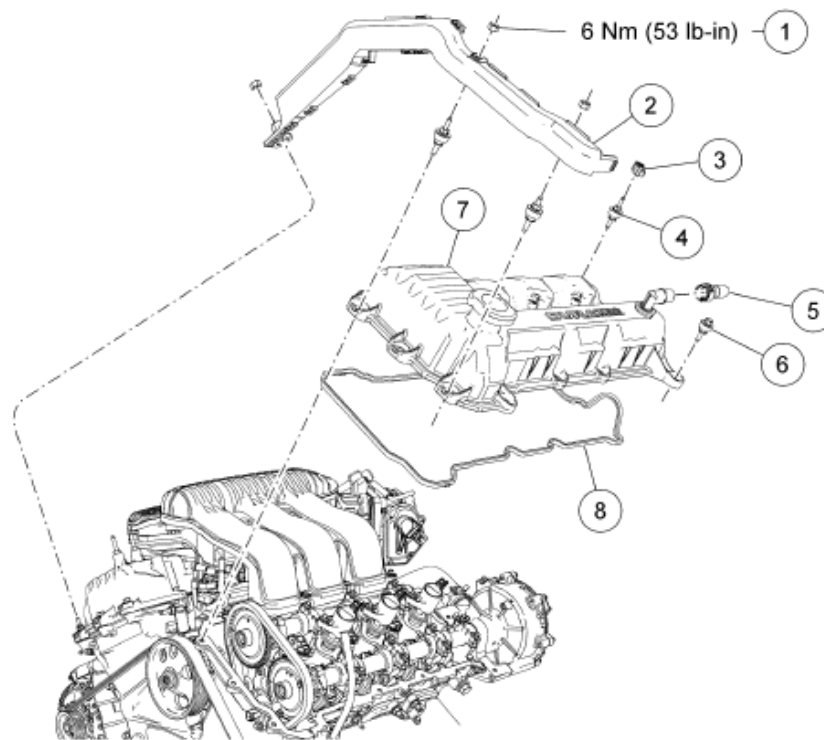
VALVE COVER - LH

MATERIAL

Item	Specification
Silicone Gasket and Sealant TA-30	WSE-M4G323-A4

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N0001808

Item	Part Number	Description
1	—	Wiring conduit-to-valve cover stud bolt nut (3 required)
2	14A099	Wiring conduit (part of 12B637)
3	—	Wiring retainer (3 required) (part of 9H589)
4	6C519	Valve cover stud bolt (8 required)
5	6578	Crankcase ventilation tube
6	6C519	Valve cover bolt (6 required)
7	6A505	Valve cover
8	6A559	Valve cover gasket

Fig. 10: Identifying Valve Cover Components - LH (With Torque Specifications)
Courtesy of FORD MOTOR CO.

Removal

CAUTION: During engine repair procedures, cleanliness is extremely important. Any foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan, can cause engine failure.

1. Remove the LH ignition coil-on-plugs. For additional information, refer to **REMOVAL AND INSTALLATION**.

2. Disconnect the crankcase ventilation tube from the valve cover.
3. Remove the 3 nuts and position the wiring conduit aside.
4. Detach the 3 wiring retainers from the valve cover stud bolts.
5. Remove the oil level indicator.
6. Remove the 6 bolts, 8 stud bolts and the valve cover.
 - Remove and discard the gasket.

Installation

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 old sealant.

1. Clean the valve cover, cylinder head and front cover sealing surfaces.

NOTE: The valve cover must be installed and the bolts and stud bolts tightened within 4 minutes of sealant application.

2. Apply a 5 mm (0.19 in) dot of silicone gasket sealant to the front cover-to-cylinder head joints.

NOTE: Install a new gasket in the valve cover.

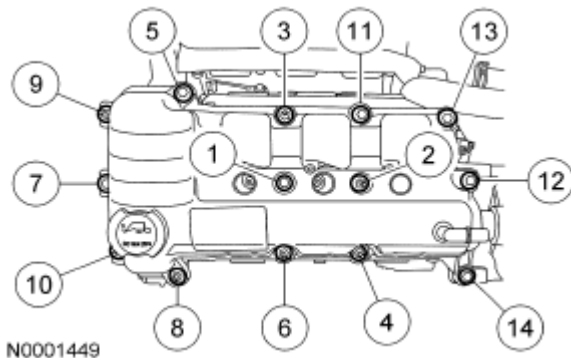


Fig. 11: Identifying Valve Cover Tightening Sequence Of Bolts
Courtesy of FORD MOTOR CO.

3. Position the valve cover and install the 6 bolts and 8 stud bolts.
 - Tighten in the sequence shown to 10 N.m (89 lb-in).
4. Install the oil level indicator.
5. Attach the wiring retainers to the valve cover stud bolts.
6. Position the wiring conduit and install the 3 nuts.
 - Tighten to 6 N.m (53 lb-in).

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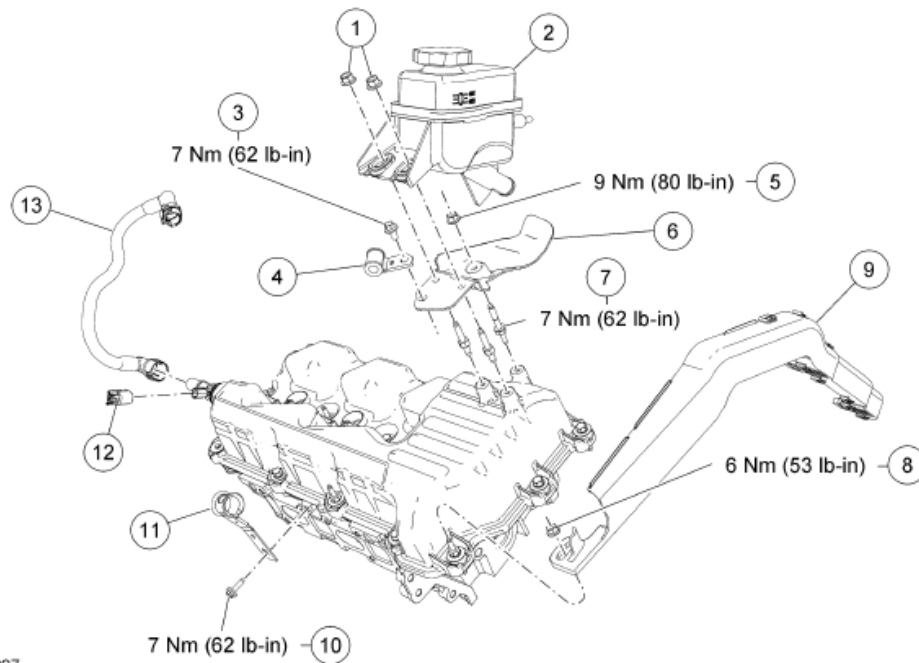
2006 ENGINE Engine - Five Hundred, Freestyle & Montego

7. Attach the crankcase ventilation tube to the valve cover.
8. Install the LH ignition coil-on-plugs. For additional information, refer to **REMOVAL AND INSTALLATION**.

VALVE COVER - RH

MATERIAL

Item	Specification
Silicone Gasket and Sealant TA-30	WSE-M4G323-A4

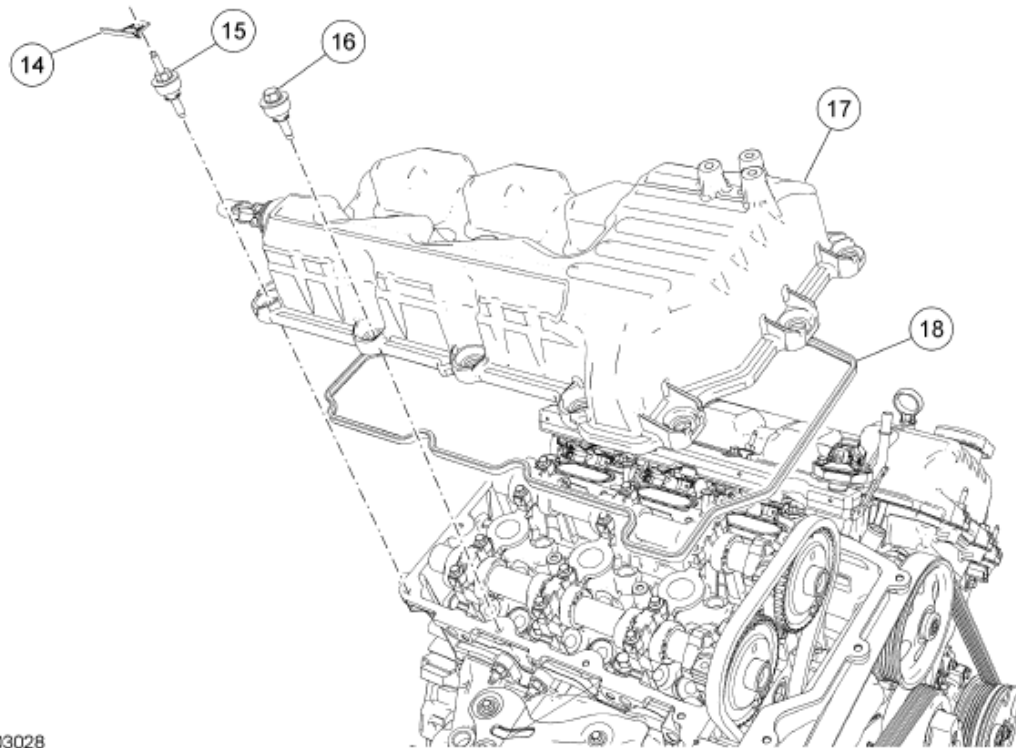


N0003027

Item	Part Number	Description
1	W520111	Power steering reservoir nuts (2 required)
2	3R700	Power steering fluid reservoir
3	W505251	Power steering pressure (PSP) tube retainer bracket bolt
4	—	PSP tube retainer bracket (part of 3F524)
5	W520111	Power steering fluid reservoir bracket nut
6	3490	Power steering fluid reservoir bracket
7	—	Power steering fluid reservoir bracket stud bolt (3 required) (part of 6582)

Item	Part Number	Description
8	—	Wiring conduit nut (3 required)
9	—	Wiring conduit (part of 12B637)
10	W655891	PSP tube retainer bracket bolt
11	—	PSP tube retainer bracket (part of 3F524)
12	14A464	Positive crankcase ventilation (PCV) valve electrical connector (part of 12B637)
13	6K817	PCV tube

Fig. 12: Identifying Valve Cover Components - RH (1 Of 2) (With Torque Specifications)
Courtesy of FORD MOTOR CO.



N0003028

Item	Part Number	Description
14	—	Wiring retainer (2 required) (part of 12B637)
15	6C519	Valve cover stud bolt (5 required)
16	6C519	Valve cover bolt (9 required)
17	6582	Valve cover
18	6584	Valve cover gasket

Fig. 13: Identifying Valve Cover Components - RH (2 Of 2)
Courtesy of FORD MOTOR CO.

Removal

CAUTION: During engine repair procedures, cleanliness is extremely important. Any foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan, can cause engine failure.

1. Remove the upper intake manifold. For additional information, refer to **UPPER INTAKE MANIFOLD**.
2. Remove the RH ignition coil-on-plugs. For additional information, refer to **REMOVAL AND INSTALLATION**.
3. If equipped, disconnect the positive crankcase ventilation (PCV) valve electrical connector.
4. Remove the PCV tube.

5. Remove the 2 nuts and position the power steering fluid reservoir aside.
6. Remove the bolt and detach the power steering pressure (PSP) tube bracket from the fluid reservoir bracket.
7. Remove the nut and the power steering fluid reservoir bracket.
8. Remove the 3 power steering fluid reservoir bracket stud bolts from the valve cover.
9. Remove the bolt and detach the PSP tube bracket from the backside of the RH cylinder head.
10. Remove the 3 nuts and detach the wiring conduit from the valve cover stud bolts.
11. Detach the 2 wiring retainers from the valve cover stud bolts.
12. Remove the 9 bolts, 5 stud bolts and the RH valve cover.
 - Remove and discard the gasket.

Installation

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 old sealant.

1. Clean the valve cover, cylinder head and front cover sealing surfaces.

NOTE: The valve cover must be installed and the bolts and stud bolts tightened within 4 minutes of sealant application.

2. Apply a 5 mm (0.19 in) dot of silicone gasket sealant to the front cover-to-cylinder head joints.

NOTE: Install a new gasket in the valve cover.

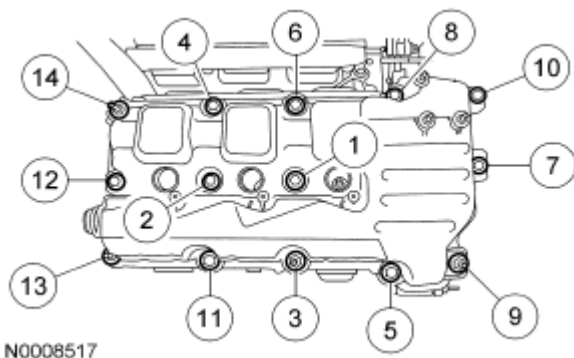


Fig. 14: Identifying Valve Cover Tightening Sequence Of Bolts
Courtesy of FORD MOTOR CO.

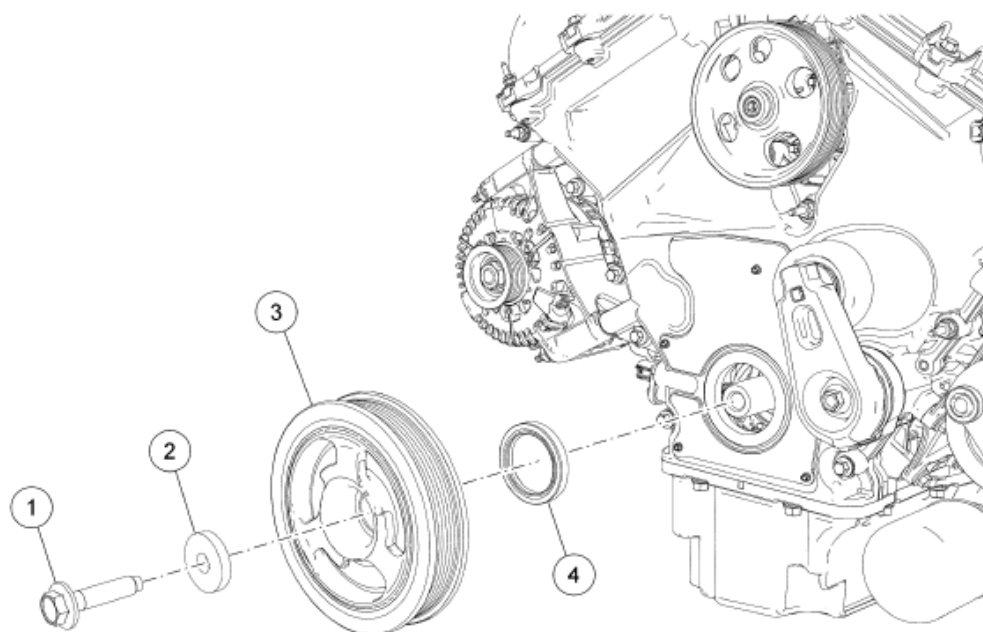
3. Position the valve cover and install the 9 bolts and 5 stud bolts.
 - Tighten in the sequence shown to 10 N.m (89 lb-in).
4. Attach the 2 wiring retainers to the valve cover stud bolts.

5. Attach the wiring conduit to the valve cover stud bolts and install the 3 nuts.
 - Tighten to 6 N.m (53 lb-in).
6. Position the PSP tube bracket to the backside of the RH cylinder head and install the bolt.
 - Tighten to 7 N.m (62 lb-in).
7. Install the 3 power steering fluid reservoir bracket stud bolts into the valve cover.
 - Tighten to 7 N.m (62 lb-in).
8. Position the power steering fluid reservoir bracket and install the nut.
 - Tighten to 9 N.m (80 lb-in).
9. Position the PSP tube bracket and install the bolt.
 - Tighten to 7 N.m (62 lb-in).
10. Position the power steering fluid reservoir and install the 2 nuts.
 - Tighten to 9 N.m (80 lb-in).
11. Install the PCV tube.
12. If equipped, connect the PCV valve electrical connector.
13. Install the RH ignition coil-on-plugs. For additional information, refer to **REMOVAL AND INSTALLATION** .
14. Install the upper intake manifold. For additional information, refer to **UPPER INTAKE MANIFOLD**.

LOWER END COMPONENTS - EXPLODED VIEW, CRANKSHAFT PULLEY AND CRANKSHAFT FRONT SEAL

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N0001812

Item	Part Number	Description
1	W701512-S	Crankshaft pulley bolt
2	W701511-S	Washer
3	6316	Crankshaft pulley
4	6700	Crankshaft front seal

Fig. 15: Exploded View Of Crankshaft Pulley & Crankshaft Front Seal Components
Courtesy of FORD MOTOR CO.

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

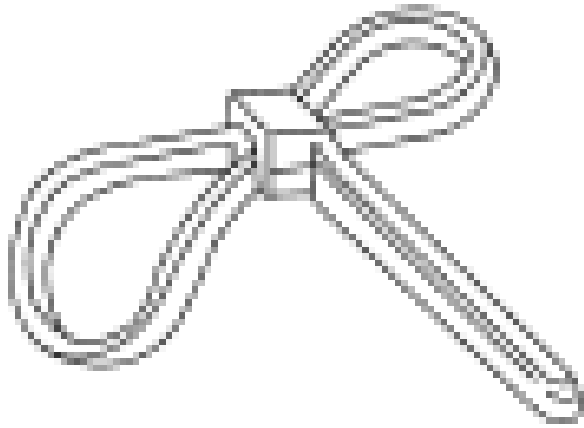
CRANKSHAFT PULLEY

SPECIAL TOOL(S)

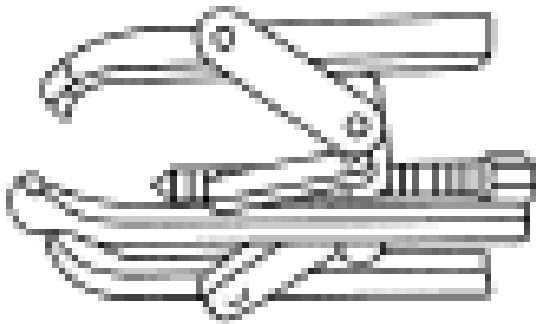
Strap Wrench 303-D055 (D85L-6000-A)

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ST1438-A



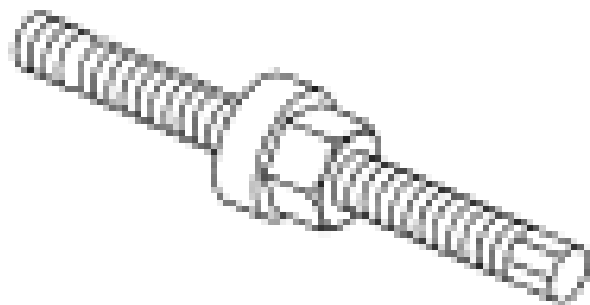
ST1184-A

3 Jaw Puller 303-D121

Replacer, Crankshaft Damper 303-102 (T74P-

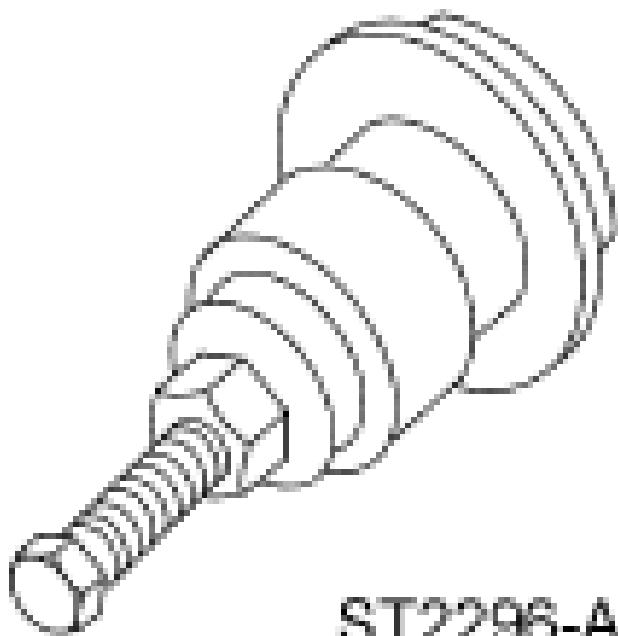
2006 Mercury Montego

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ST1287-A

6316-B)



ST2296-A

Installer, Front Cover Seal 303-335 (T88T-6701-A)

MATERIAL

Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS-M2C930-A
Silicone Gasket and Sealant TA-30	WSE-M4G323-A4

Motorcraft Metal Surface Cleaner ZC-21

WSE-M5B392-
A**Removal**

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.
2. Remove the accessory drive belt. For additional information, refer to **REMOVAL AND INSTALLATION**.
3. Remove the pin-type retainers and the RH fender splash shield.
4. Use the special tool to hold the crankshaft pulley and remove the crankshaft pulley bolt.

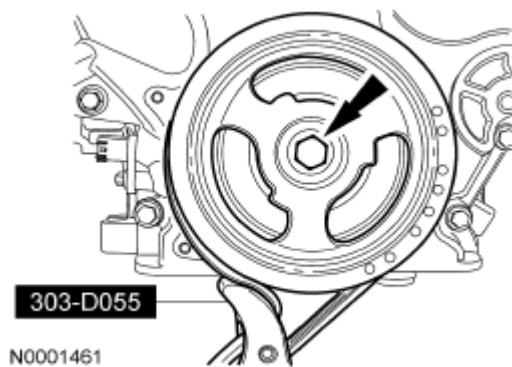


Fig. 16: Removing Crankshaft Pulley Bolt
Courtesy of FORD MOTOR CO.

5. Using the special tool, remove the crankshaft pulley.

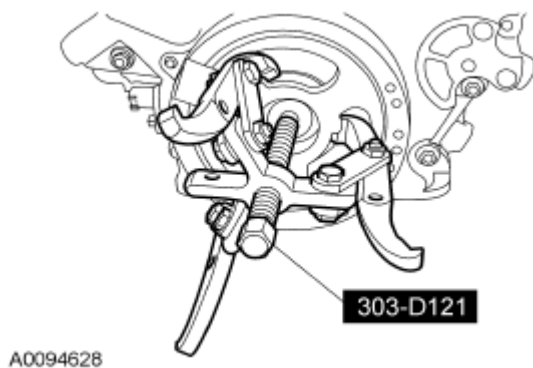


Fig. 17: Removing Crankshaft Pulley
Courtesy of FORD MOTOR CO.

Installation

1. Lubricate the front cover and the crankshaft front seal inner lip with clean engine oil.

NOTE:

Clean the keyway and slot using metal surface cleaner before applying silicone gasket and sealer.

The crankshaft pulley must be installed and bolt tightened within 4 minutes of applying the silicone gasket and sealer.

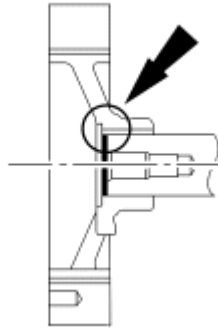


Fig. 18: Applying Silicone Gasket And Sealant
Courtesy of FORD MOTOR CO.

2. Apply silicone gasket and sealant to the end of the keyway slot.

NOTE:

Lubricate the outside diameter sealing surfaces with clean engine oil.

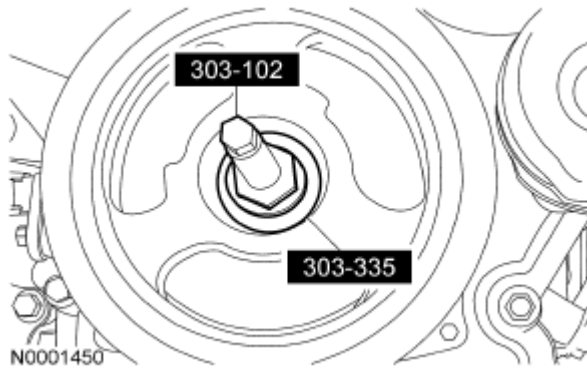


Fig. 19: Installing Crankshaft Pulley
Courtesy of FORD MOTOR CO.

3. Using the special tool, install the crankshaft pulley.
4. Install the bolt and washer. Using the special tool to hold the crankshaft pulley, tighten the bolt in 4 stages:
 - Stage 1: Tighten to 120 N.m (89 lb-ft).
 - Stage 2: Loosen one full turn.
 - Stage 3: Tighten to 50 N.m (37 lb-ft).
 - Stage 4: Tighten an additional 90 degrees.

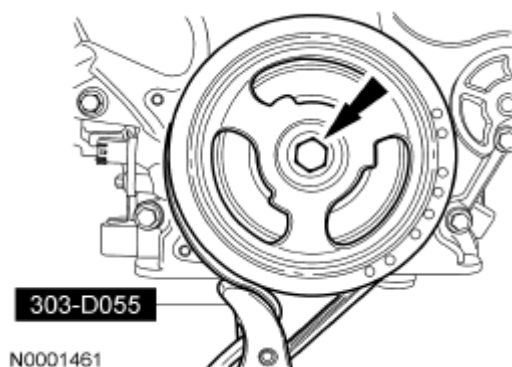
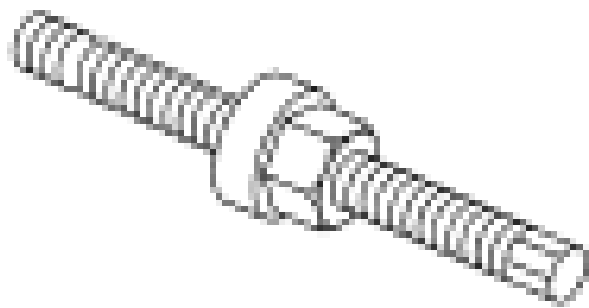


Fig. 20: Installing Bolt & Washer
Courtesy of FORD MOTOR CO.

5. Position the RH fender splash shield and install the pin-type retainers.
6. Install the accessory drive belt. For additional information, refer to **REMOVAL AND INSTALLATION**.

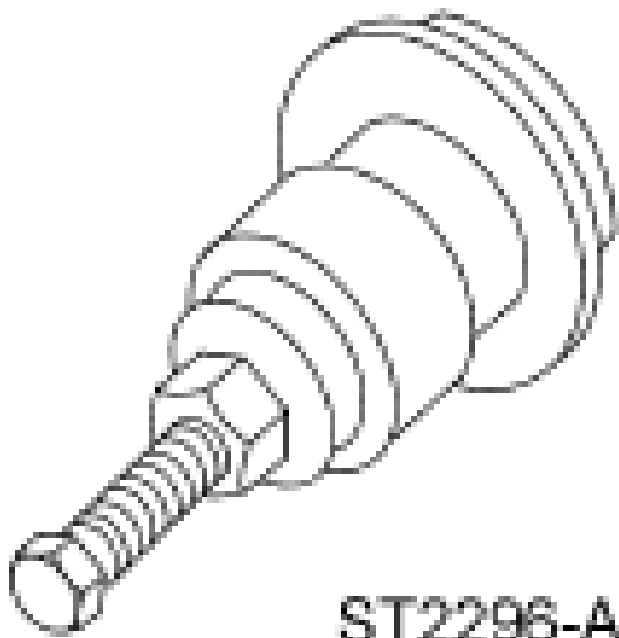
CRANKSHAFT FRONT SEAL

SPECIAL TOOL(S)

 ST1287-A	Replacer, Crankshaft Damper 303-102 (T74P-6316-B)

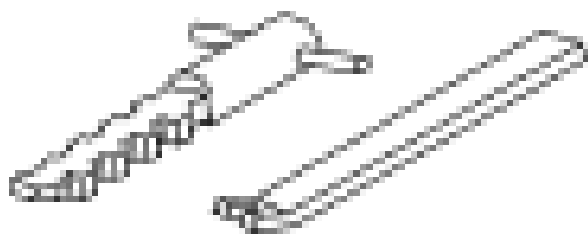
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ST2296-A

Installer, Front Cover Oil Seal 303-335 (T88T-6701-A)



ST1385-A

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

MATERIAL

Item	Specification
Motorcraft Metal Surface Cleaner ZC-21	WSE-M5B392-A
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS-M2C930-A

Removal

1. Remove the crankshaft pulley. For additional information, refer to **CRANKSHAFT PULLEY**.

CAUTION: Do not scratch or damage the sealing surfaces when using the special tool to remove the crankshaft front oil seal.

2. Using the special tool, remove the crankshaft front oil seal and discard. Installation

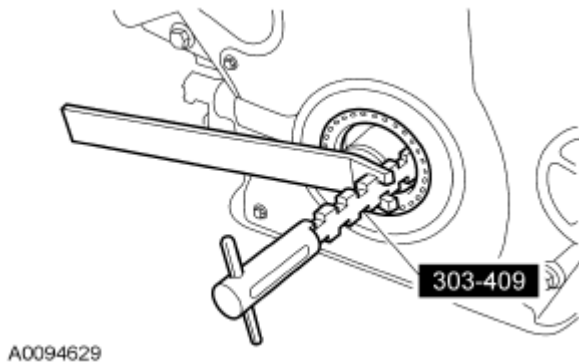


Fig. 21: Removing Crankshaft Front Oil Seal
Courtesy of FORD MOTOR CO.

NOTE: Clean all sealing surfaces with metal surface cleaner.

1. Apply clean engine oil to the seal lip and seal bore before installing the seal.
2. Using the special tools, install the crankshaft front oil seal.

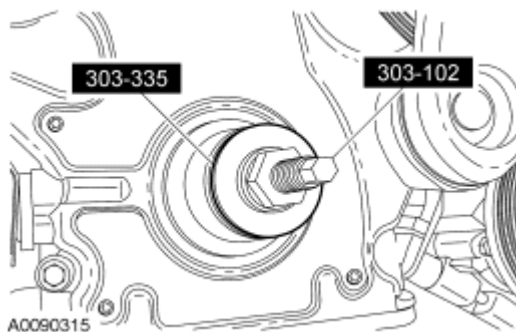
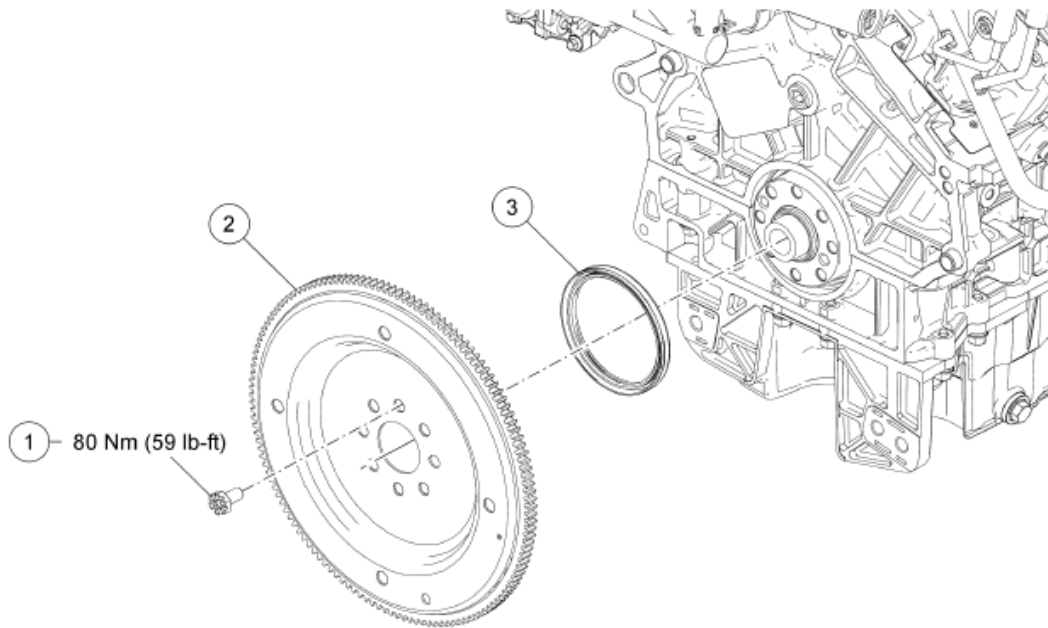


Fig. 22: Installing Crankshaft Seal Using Special Tools (303-335 And 303-102)
Courtesy of FORD MOTOR CO.

3. Install the crankshaft pulley. For additional information, refer to **CRANKSHAFT PULLEY**.

LOWER END COMPONENTS - EXPLODED VIEW, FLEXPLATE AND CRANKSHAFT REAR SEAL



N0000285

Item	Part Number	Description
1	W701559-S	Flexplate bolt (8 required)
2	6375	Flexplate
3	6701	Crankshaft rear oil seal

Fig. 23: Exploded View Of Flexplate & Crankshaft Rear Seal Components (With Torque Specifications)
Courtesy of FORD MOTOR CO.

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

FLEXPLATE

Removal and Installation

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.
2. Remove the transaxle. For additional information, refer to **TRANSAXLE** or **TRANSAXLE**.
3. Remove the bolts and the flexplate.
 - To install, tighten to 80 Nm (59 lb-ft).
4. To install, reverse the removal procedure.

CRANKSHAFT REAR SEAL

SPECIAL TOOL(S)

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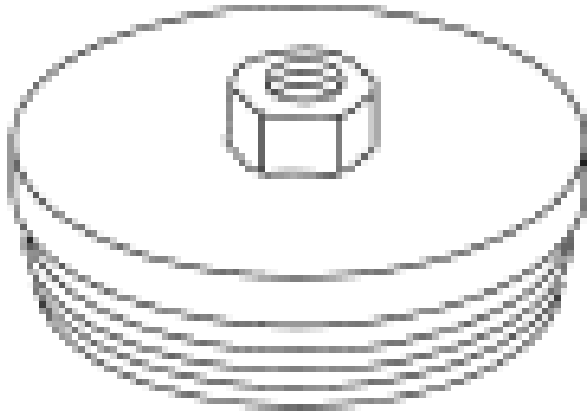
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Slide Hammer 307-005 (T59L-100-B)

ST1187-A



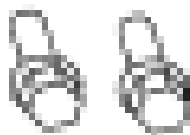
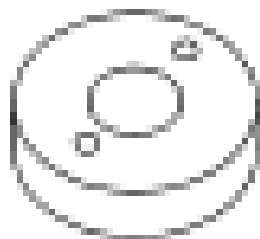
Remover, Crankshaft Rear Seal 303-519 (T95P-6701-EH)

ST1382-A

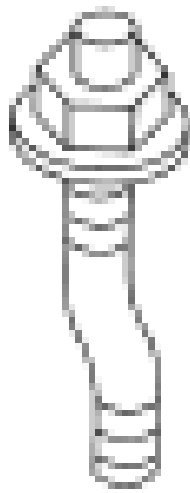
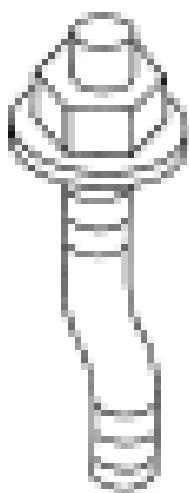
Installer, Crankshaft Rear Main Oil Seal 303-178 (T82L-6701-A)

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ST1327-A



ST1333-A

Installer Bolts, Crankshaft Rear Main Oil Seal
303-384 (T91P-6701-A)

MATERIAL

Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada): or equivalent	WSS- M2C930-A
Motorcraft Metal Surface Cleaner ZC-21	WSE- M5B392-A

Removal

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.
2. Remove the flexplate. For additional information, refer to **FLEXPLATE**.
3. Using the special tools, remove the crankshaft rear oil seal and discard.

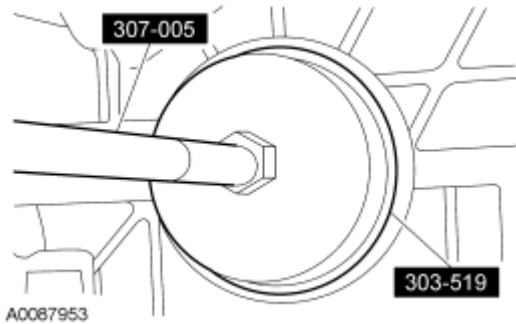


Fig. 24: Identifying Special Tools (307-005 And 303-519)
Courtesy of FORD MOTOR CO.

Installation

NOTE: Clean all sealing surfaces with metal surface cleaner.
Apply clean engine oil to the seal lip and seal bore before installing the seal.

1. Using the special tools, install the crankshaft rear oil seal.

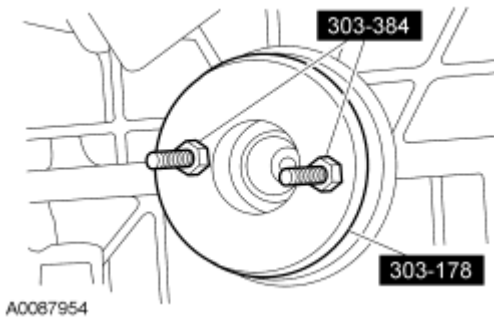


Fig. 25: Identifying Special Tools (303-384 And 303-178)
Courtesy of FORD MOTOR CO.

ENGINE FRONT COVER

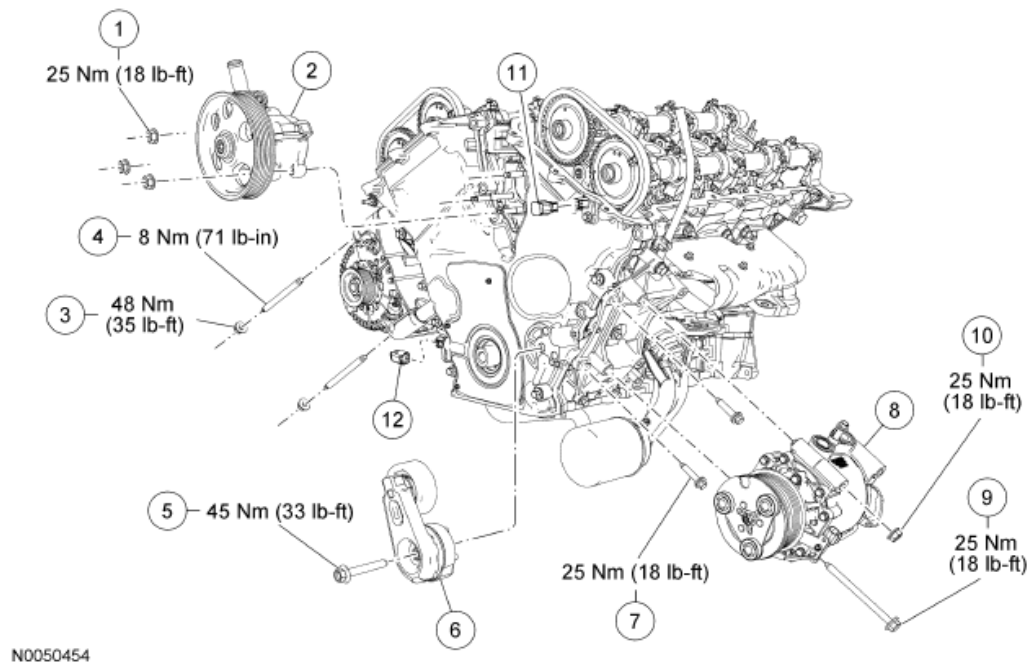
MATERIAL

Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS-M2C930-A

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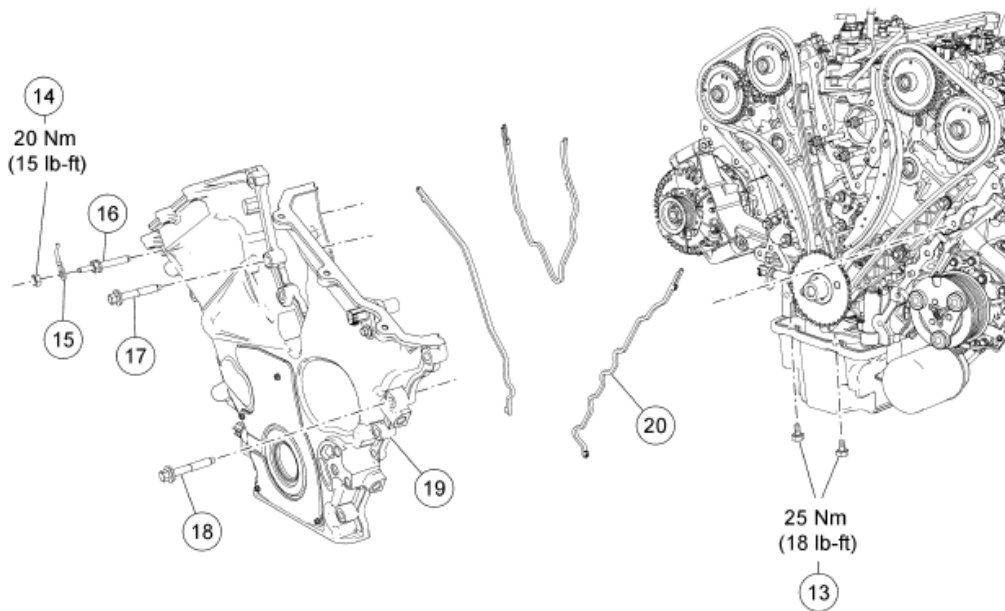
Silicone Gasket Remover ZC-30	-
Motorcraft Metal Surface Prep ZC-31	-
Silicone Gasket and Sealant TA-30	WSE-M4G323-A4



Item	Part Number	Description
1	W701582	Power steering pump nut (3 required)
2	3A696	Power steering pump
3	W520414	Generator stud nut (2 required)
4	W709985	Generator stud (2 required)
5	209901	Accessory drive belt tensioner bolt
6	6B209	Accessory drive belt tensioner
7	W701625	A/C compressor bracket bolt (2 required)

Item	Part Number	Description
8	19D629	A/C compressor
9	W705825	A/C compressor bolt (2 required)
10	W520413	A/C compressor stud nut (2 required)
11	14A464	Camshaft position (CMP) sensor electrical connector (part of 12B637)
12	14A464	Crankshaft position (CKP) sensor electrical connector (part of 12B637)

Fig. 26: Exploded View Of Engine Front Cover Components (1 Of 2) (With Torque Specifications)
Courtesy of FORD MOTOR CO.



N0034884

Item	Part Number	Description
13	W709678	Oil pan-to-front cover bolts (2 required)
14	W701525	Engine front cover stud bolt nut
15	—	Ground wire
16	W706213	Engine front cover stud bolt

Item	Part Number	Description
17	W704961	Engine front cover bolt (8 required)
18	W701525	Engine front cover bolt (7 required)
19	6019	Engine front cover
20	6D081	Engine front cover gasket (3 required)

Fig. 27: Exploded View Of Engine Front Cover Components (2 Of 2) (With Torque Specifications)
Courtesy of FORD MOTOR CO.

Removal

CAUTION: During engine repair procedures, cleanliness is extremely important. Any foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan, can cause engine failure.

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 **REMOVAL AND INSTALLATION**.
3. Remove the crankshaft front seal. For additional information, refer to **LOWER END COMPONENTS - EXPLODED VIEW, CRANKSHAFT PULLEY AND CRANKSHAFT FRONT SEAL** and **CRANKSHAFT FRONT SEAL**.
4. Remove the LH and RH valve covers. For additional information, refer to **VALVE COVER - LH** and **VALVE COVER - RH**.
5. Remove the bolt and the accessory drive belt tensioner.

6. Remove the 3 power steering pump nuts and position the power steering pump and fluid reservoir aside.
7. Disconnect the crankshaft position (CKP) sensor electrical connector.
8. Disconnect the camshaft position (CMP) sensor electrical connector.
9. Remove the 2 generator-to-engine front cover stud nuts.
10. Remove the 2 generator-to-engine front cover studs.
11. Remove the 3 pin-type retainers and the radiator splash shield.
12. Remove the 2 A/C compressor bolts and the 2 A/C compressor nuts.
 - Support the A/C compressor with mechanic's wire.
13. Remove the 2 A/C compressor bracket-to-engine front cover bolts.
14. Remove the nut and detach the ground wire from the engine front cover stud bolt.
15. Remove the 2 oil pan-to-front cover bolts.

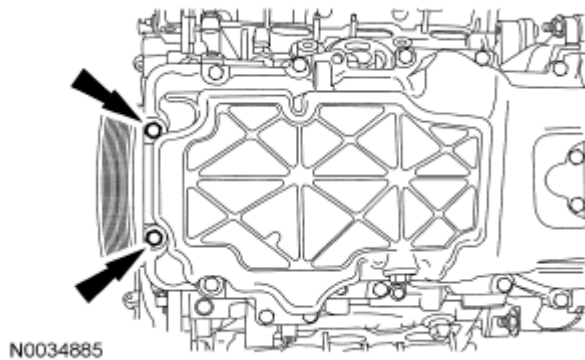


Fig. 28: Locating Oil Pan-To-Front Cover Bolts
Courtesy of FORD MOTOR CO.

16. Remove the 15 bolts, stud bolt and the engine front cover.
 - Remove and discard the gaskets.

Installation

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.

Do not damage the oil pan gasket while cleaning the sealant from the cylinder block-to-oil pan joint.

1. Use a plastic scraping tool to remove all traces of sealant.
 - Clean all sealing surfaces with silicone gasket remover and metal surface prep.

NOTE:

Install 3 new gaskets in the front cover.

The engine front cover must be installed and the bolts tightened

within 4 minutes of applying sealant.

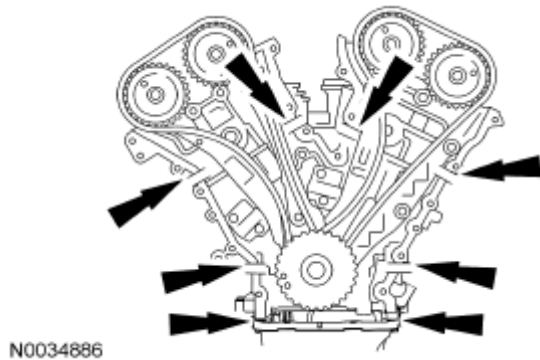


Fig. 29: Locating Diameter Dot Of Silicone Gasket
Courtesy of FORD MOTOR CO.

2. Apply a 6 mm (0.23 in) diameter dot of silicone gasket and sealer to the cylinder block, lower cylinder block, cylinder head and oil pan mating surfaces.
3. Position the engine front cover and install the 15 bolts and stud bolt.
 - Tighten in the sequence shown to 25 N.m (18 lb-ft).

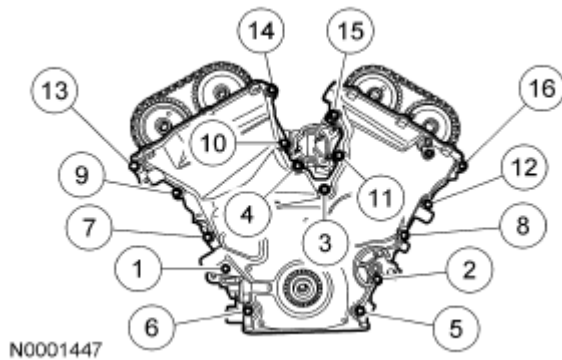


Fig. 30: Identifying Tightening Sequence Of Bolts & Stud Bolt
Courtesy of FORD MOTOR CO.

4. Install the 2 oil pan-to-front cover bolts.
 - Tighten to 25 N.m (18 lb-ft).

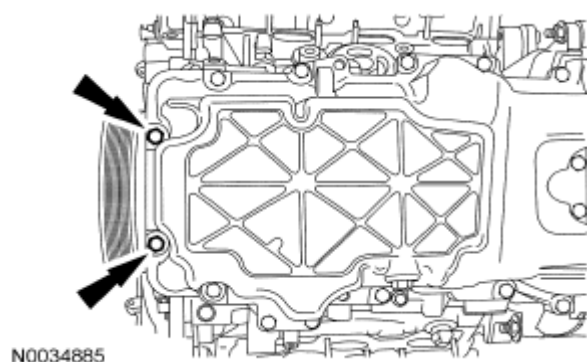


Fig. 31: Locating Oil Pan-To-Front Cover Bolts
 Courtesy of FORD MOTOR CO.

5. Remove the oil pan plug and drain the engine oil.
 - Install the plug and tighten to 26 N.m (19 lb-ft).
6. Attach the ground wire to the engine front cover stud bolt and install the nut.
 - Tighten to 20 N.m (15 lb-ft).
7. Install the 2 A/C compressor bracket-to-engine front cover bolts.
 - Tighten to 25 N.m (18 lb-ft).
8. Position the A/C compressor and install the 2 bolts and 2 nuts.
 - Tighten to 25 N.m (18 lb-ft).
9. Position the radiator splash shield and install the 3 pin-type retainers.
10. Install the 2 generator-to-engine front cover studs.
 - Tighten to 8 N.m (71 lb-in).
11. Install the 2 generator-to-engine front cover stud nuts.
 - Tighten to 48 N.m (35 lb-ft).
12. Connect the camshaft position (CMP) sensor electrical connector.
13. Connect the crankshaft position (CKP) sensor electrical connector.
14. Position the power steering pump and fluid reservoir. Install the 3 power steering pump nuts.
 - Tighten to 25 N.m (18 lb-ft).
15. Install the accessory drive belt tensioner and the bolt.
 - Tighten to 45 N.m (33 lb-ft).
16. Install the LH and RH valve covers. For additional information, refer to **VALVE COVER - LH** and **VALVE COVER - RH**.
17. Install the crankshaft front seal. For additional information, refer to **LOWER END COMPONENTS - EXPLODED VIEW, CRANKSHAFT PULLEY AND CRANKSHAFT FRONT SEAL** and **CRANKSHAFT FRONT SEAL**.
18. Fill the engine with clean engine oil.
19. Connect the battery ground cable. For additional information, refer to **REMOVAL AND INSTALLATION**.

TIMING DRIVE COMPONENTS**Removal**

CAUTION: During engine repair procedures, cleanliness is extremely important. Any foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan, can cause engine failure.

Failure to verify correct timing drive component alignment will result in severe engine damage.

1. Remove the engine front cover. For additional information, refer to **ENGINE FRONT COVER**.

CAUTION: This pulse wheel is used in several different engines. Install the pulse wheel with the keyway in the slot stamped "30" or "30RFF" (orange in color).

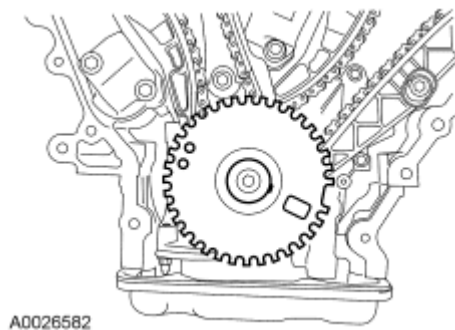


Fig. 32: Identifying Ignition Pulse Wheel
Courtesy of FORD MOTOR CO.

2. Remove the ignition pulse wheel.
3. Install the damper bolt.

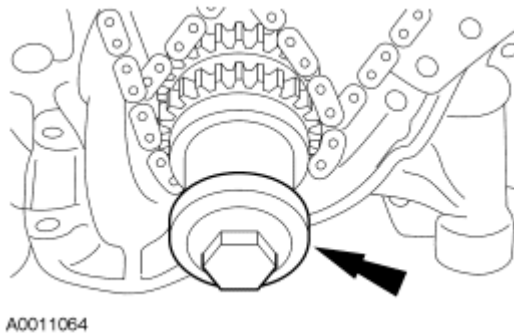


Fig. 33: Identifying Damper Bolt
Courtesy of FORD MOTOR CO.

4. Remove the LH and RH spark plugs.
5. Rotate the crankshaft clockwise to position the crankshaft keyway in the 11 o'clock position and position the camshafts in the correct position. This will position the No. 1 cylinder at top dead center (TDC).
 - Verify that the camshafts are correctly located. If not, rotate the crankshaft one additional turn and recheck.

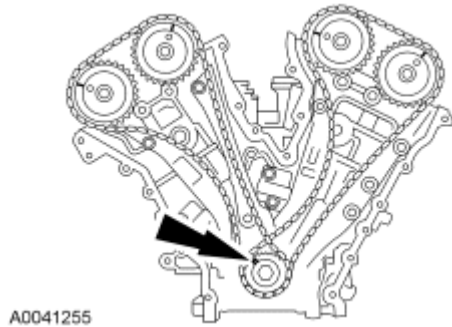


Fig. 34: Identifying Crankshaft Keyway In 11 O'Clock Position
Courtesy of FORD MOTOR CO.

6. Rotate the crankshaft clockwise 120 degrees to the 3 o'clock position to locate the RH camshafts in the neutral position.

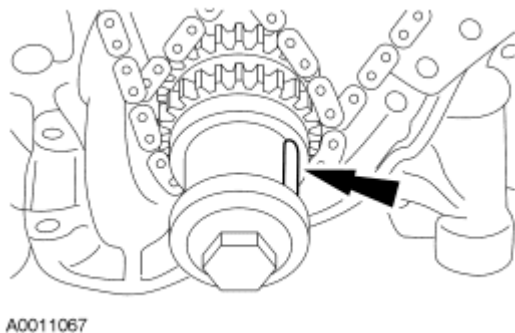


Fig. 35: Identifying Crankshaft Keyway
Courtesy of FORD MOTOR CO.

7. Verify that the RH camshafts are in the neutral position.

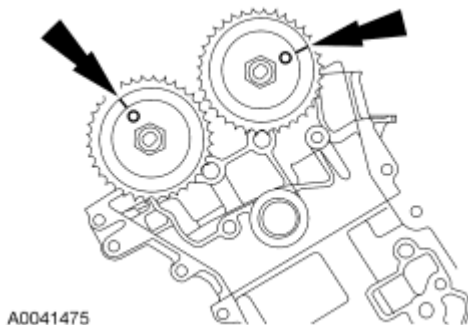


Fig. 36: Locating Camshafts Align Marks
Courtesy of FORD MOTOR CO.

8. Remove the RH timing chain tensioner arm.
 1. Remove the bolts.
 2. Remove the tensioner.
 3. Remove the tensioner arm.

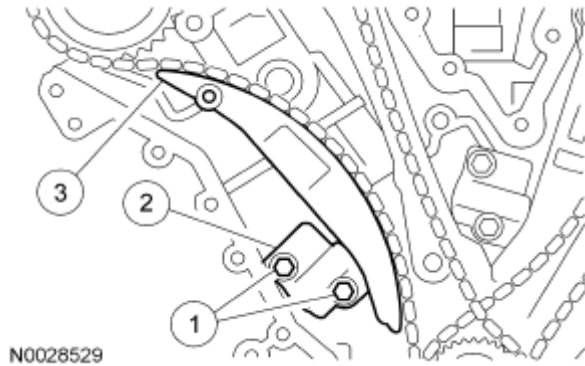


Fig. 37: Identifying Timing Chain Tensioner Arm & Bolts
Courtesy of FORD MOTOR CO.

9. Remove the bolts, RH timing chain guide and the timing chain.

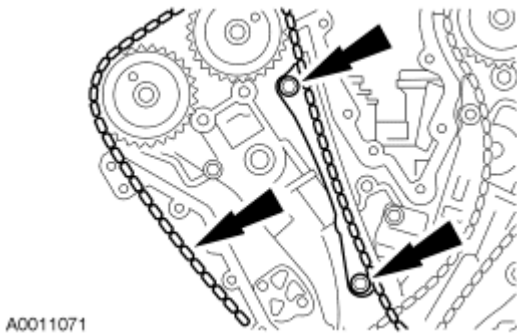
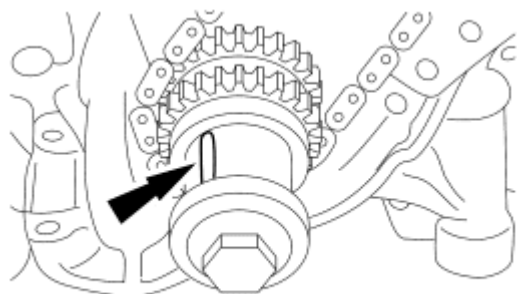


Fig. 38: Locating Timing Chain Guide & Bolts
Courtesy of FORD MOTOR CO.

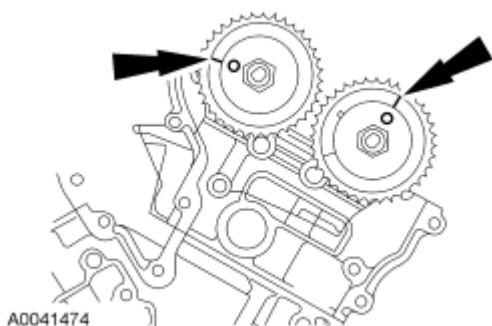
10. Rotate the clockwise 600 degrees (1-2/3 turns) to position the crankcase key way in the 11 o'clock position. This will position the LH camshafts in the neutral position.



A0011072

Fig. 39: Positioning Crankcase Key Way In 11 O'Clock Position
Courtesy of FORD MOTOR CO.

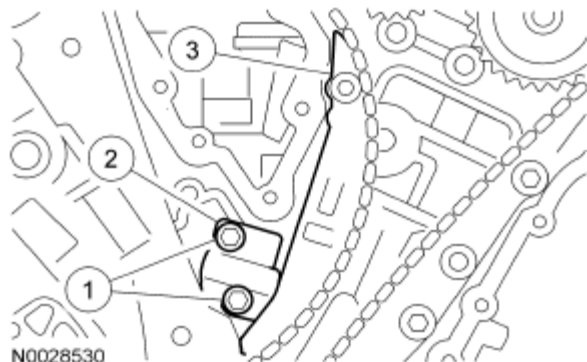
11. Verify the LH camshafts are in the neutral position.



A0041474

Fig. 40: Locating Camshafts Aligning Marks
Courtesy of FORD MOTOR CO.

12. Remove the LH timing chain and tensioner arm.
1. Remove the bolts.
 2. Remove the tensioner.
 3. Remove the tensioner arm.



N0028530

Fig. 41: Identifying Timing Chain & Tensioner Arm Bolts
Courtesy of FORD MOTOR CO.

13. Remove the LH timing chain and timing chain guide.

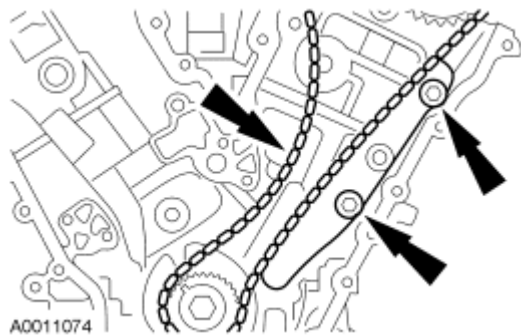


Fig. 42: Locating Timing Chain & Timing Chain Guide
Courtesy of FORD MOTOR CO.

14. Remove the damper bolt and the crankshaft sprocket.

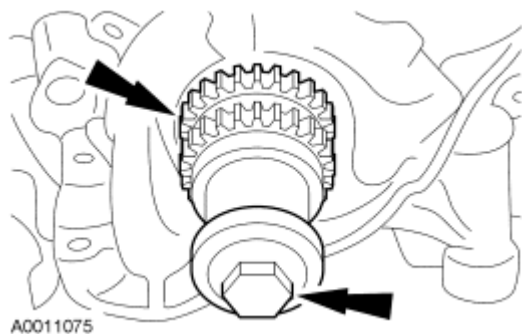


Fig. 43: Locating Damper Bolt & Crankshaft Sprockets
Courtesy of FORD MOTOR CO.

Installation

CAUTION: Failure to verify correct timing drive component alignment will result in severe engine damage.

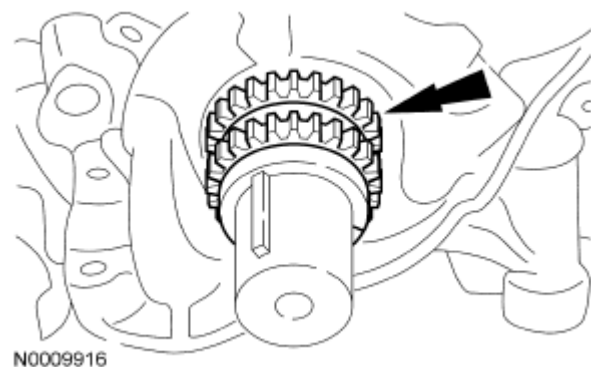


Fig. 44: Locating Crankshaft Sprocket With Timing Marks Out

Courtesy of FORD MOTOR CO.

1. Install the crankshaft sprocket with the timing marks out.

NOTE: LH shown, RH similar.

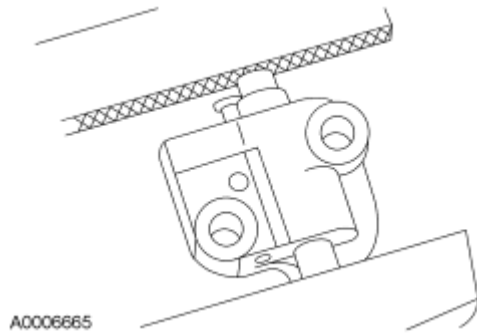


Fig. 45: Identifying Chain Tensioner In Soft-Jawed Vise
Courtesy of FORD MOTOR CO.

2. Position the chain tensioner in a soft-jawed vise.

NOTE: LH shown, RH similar.

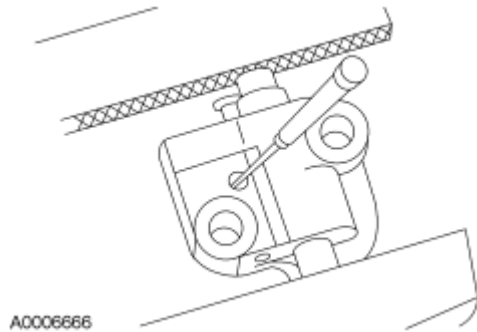


Fig. 46: Holding Chain Tensioner Ratchet Lock Mechanism Away From Ratchet Stem
Courtesy of FORD MOTOR CO.

3. Hold the chain tensioner ratchet lock mechanism away from the ratchet stem with a small pick.

CAUTION: During tensioner compression, do not release the ratchet stem until the tensioner piston is fully bottomed in its bore or damage to the ratchet stem will result.

4. Slowly compress the timing chain tensioner.
5. Retain the tensioner piston with a 1.5 mm (0.05 in) wire or paper clip.

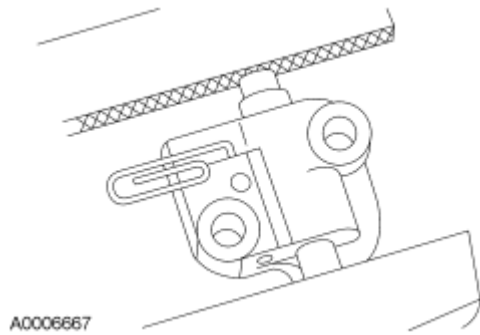


Fig. 47: Retaining Tensioner Piston With 1.5-mm (0.06-in) Wire Or Paper Clip
Courtesy of FORD MOTOR CO.

6. If timing marks in the timing chains are not evident, use a permanent-type marker to mark the crankshaft and camshaft timing marks on the LH and RH timing chains.
 1. Mark any link to use as the crankshaft timing mark.
 2. Starting with the crankshaft timing mark, count 29 links and mark the link.
 3. Continue counting to link 42 and mark the link.

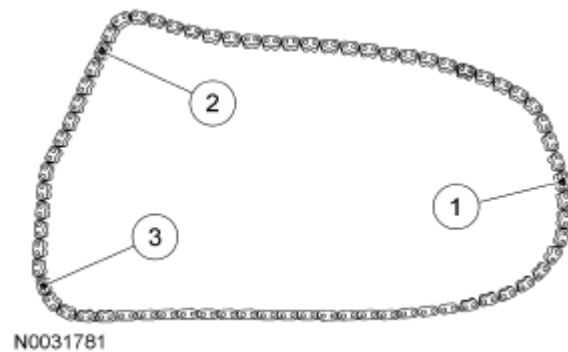


Fig. 48: Locating Crankshaft & Camshaft Timing Marks On Timing Chain
Courtesy of FORD MOTOR CO.

7. Verify that the LH camshafts are correctly positioned.

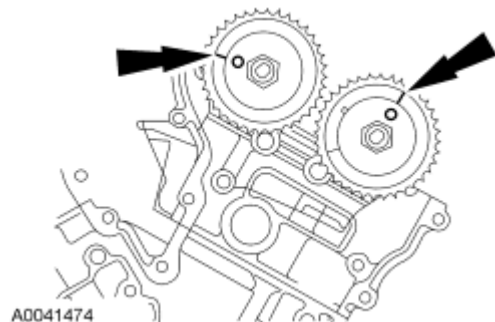


Fig. 49: Locating Camshafts Aligning Marks
Courtesy of FORD MOTOR CO.

8. Position the LH timing chain and guide and install the bolts.
 - Align the marks on the timing chain with the marks on the camshaft and crankshaft sprockets.
 - Tighten to 25 N.m (18 lb-ft).

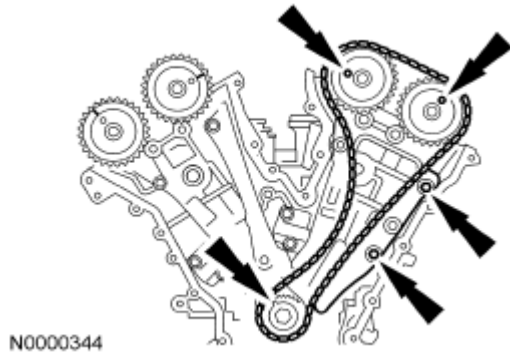


Fig. 50: Locating Aligning Marks On Timing Chain
Courtesy of FORD MOTOR CO.

9. Install the LH timing chain tensioner arm and the LH timing chain tensioner.
 1. Install the tensioner arm.
 2. Position the tensioner.
 3. Install the bolts.
 - Tighten to 25 N.m (18 lb-ft).

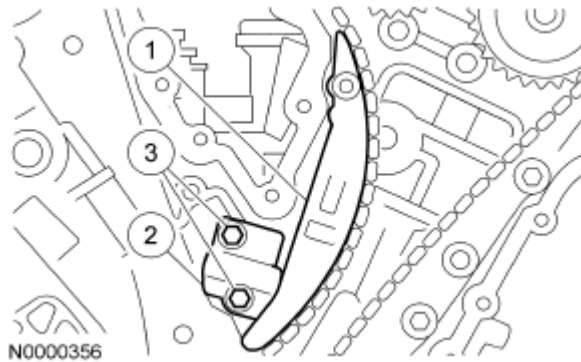


Fig. 51: Identifying Timing Chain Tensioner Arm & Bolts
Courtesy of FORD MOTOR CO.

10. Install the crankshaft damper bolt and rotate the crankshaft clockwise 120 degrees until the crankshaft keyway is in the 3 o'clock position.

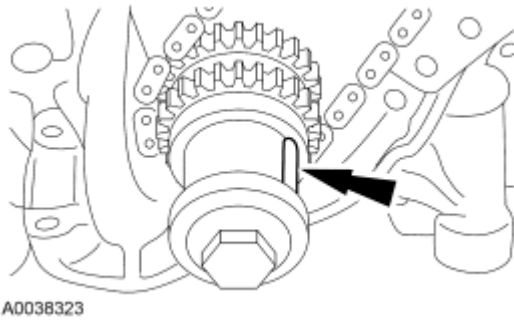


Fig. 52: Locating Crankshaft Keyway
Courtesy of FORD MOTOR CO.

11. Verify that the RH camshafts are correctly positioned.

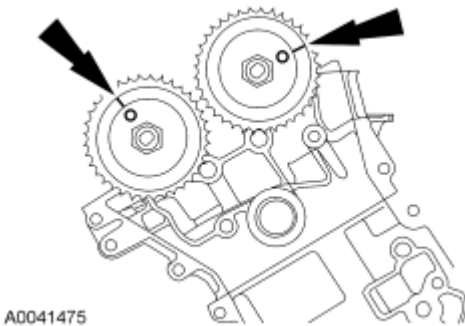


Fig. 53: Locating Camshafts Align Marks
Courtesy of FORD MOTOR CO.

12. Install the RH timing chain and chain guide and install the bolts.
- Align the marks on the timing chain with the marks on the camshaft and crankshaft sprockets.
 - Tighten to 25 N.m (18 lb-ft).

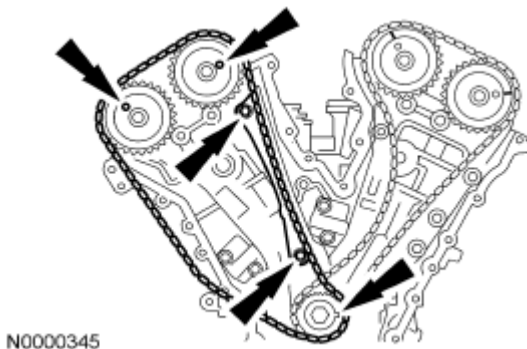


Fig. 54: Locating Aligning Marks On Timing Chain
Courtesy of FORD MOTOR CO.

13. Install the RH timing chain tensioner and tensioner arm.

1. Install the tensioner arm.
2. Position the tensioner.
3. Install the bolts.
 - Tighten to 25 N.m (18 lb-ft).

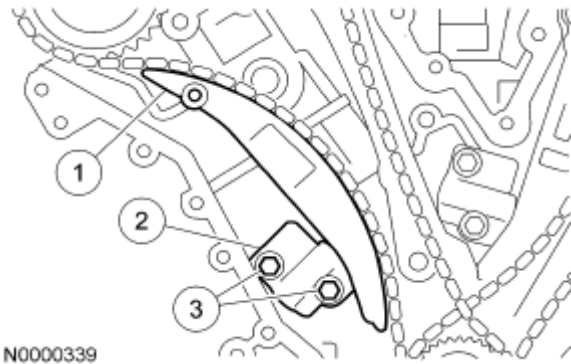
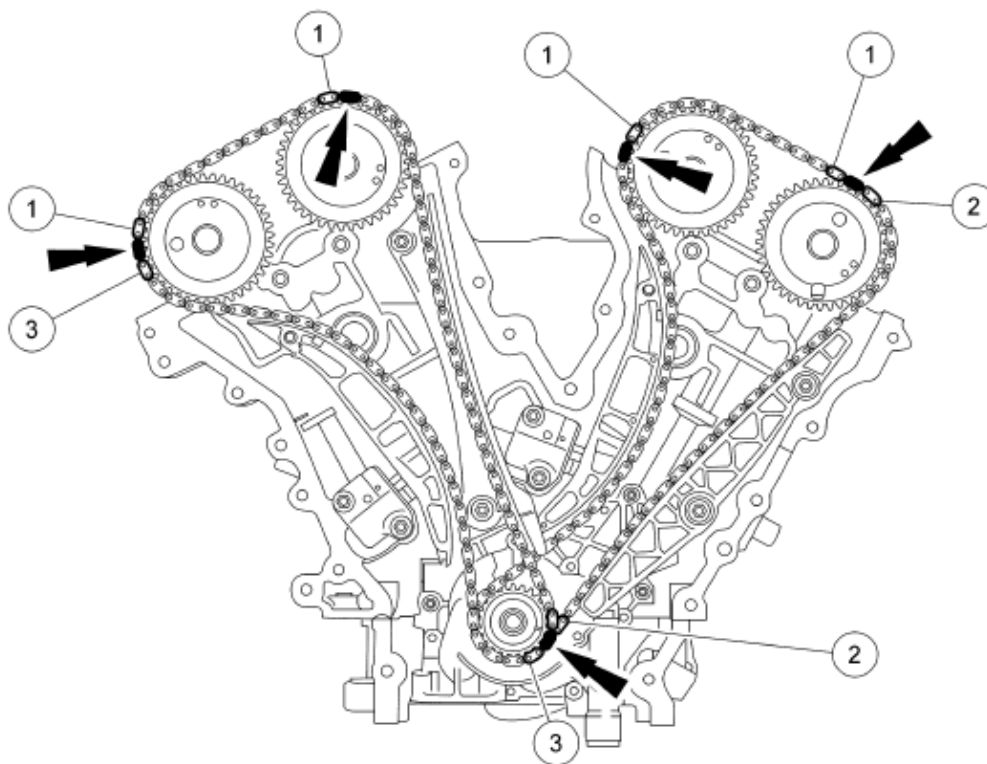


Fig. 55: Identifying Timing Chain Tensioner & Tensioner Arm Bolt
Courtesy of FORD MOTOR CO.

14. Remove the LH and RH timing chain tensioner piston retaining wires.
15. Rotate the crankshaft counterclockwise 120 degrees to top dead center (TDC).

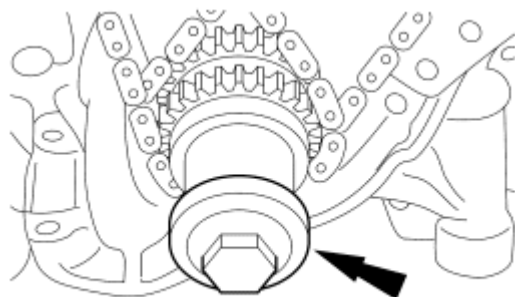
CAUTION: Failure to verify correct timing drive component alignment will result in severe engine damage.



N0031782

Fig. 56: Locating Timing Checking Mark
Courtesy of FORD MOTOR CO.

16. Verify the timing with the following steps.
 1. There should be 12 chain links between the camshaft timing marks.
 2. There should be 27 chain links between the camshaft and the crankshaft timing marks.
 3. There should be 30 chain links between the camshaft and the crankshaft timing marks.
17. Remove the crankshaft damper bolt.



A0011064

Fig. 57: Identifying Damper Bolt
Courtesy of FORD MOTOR CO.

CAUTION: This pulse wheel is used in several different engines. Install the pulse wheel with the keyway in the slot stamped "30" or "30RFF" (orange in

color).

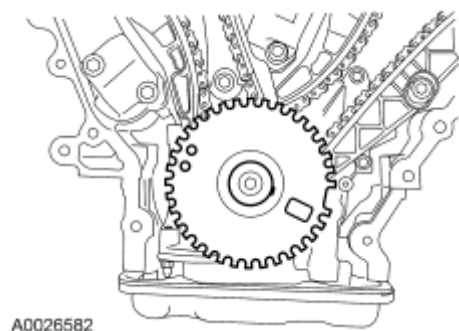


Fig. 58: Identifying Ignition Pulse Wheel
Courtesy of FORD MOTOR CO.

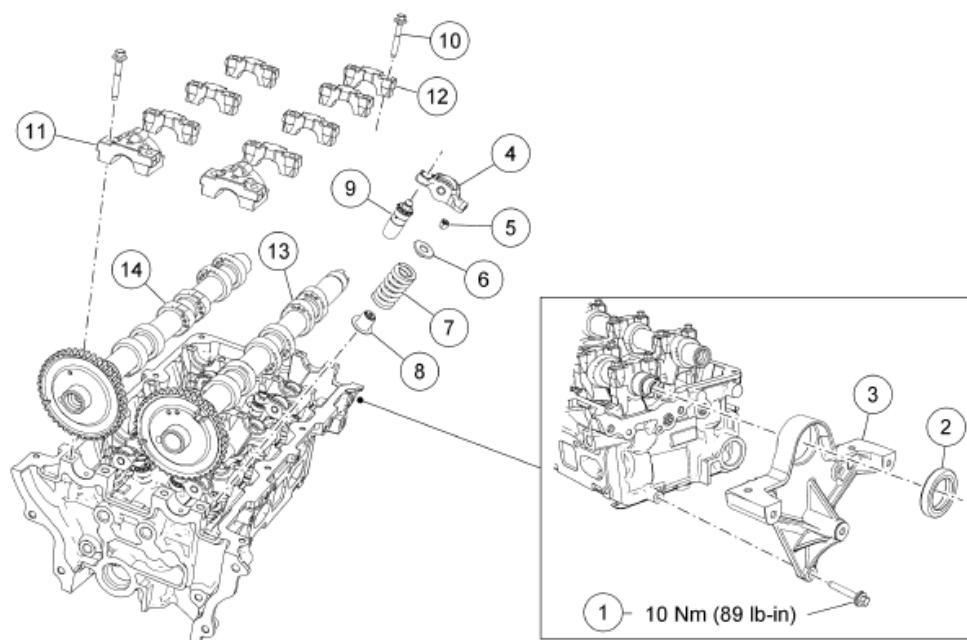
18. Install the ignition pulse wheel.
19. Install the LH and RH spark plugs.
 - Tighten to 15 N.m (11 lb-ft).
20. Install the engine front cover. For additional information, refer to **ENGINE FRONT COVER**.

VALVE TRAIN COMPONENTS - EXPLODED VIEW

Valve Train Components - LH

2006 Mercury Montego

2006 ENGINE Engine - Five Hundred, Freestyle & Montego



Item	Part Number	Description
1	W503280	Camshaft oil seal retainer bolt (3 required)
2	6K292	Camshaft oil seal
3	6B294	Camshaft oil seal retainer
4	6529	Roller follower
5	6518	Valve spring retainer key
6	6514	Valve spring retainer
7	6513	Valve spring
8	6A517	Valve stem seal

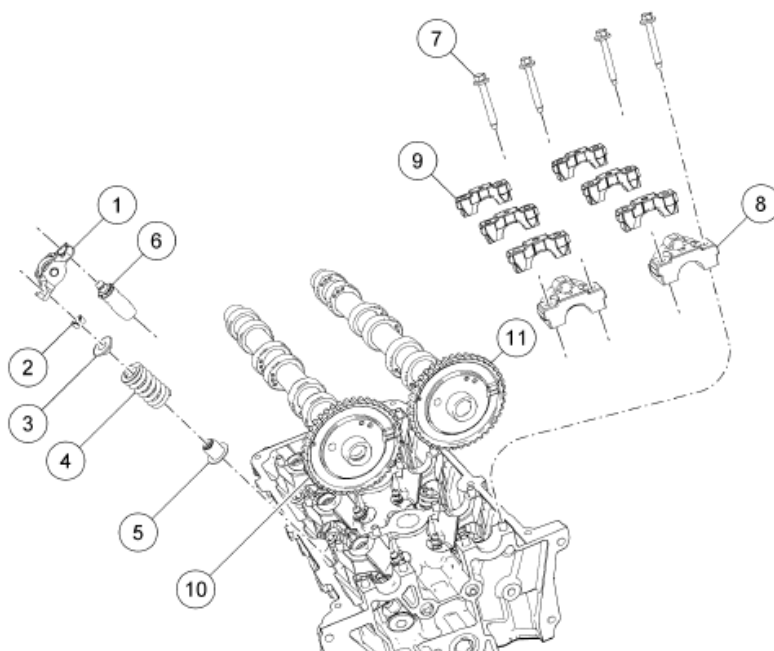
Item	Part Number	Description
9	6C501	Hydraulic lash adjuster
10	W705391-S	Camshaft bearing cap bolt (16 required)
11	6B280	Camshaft bearing thrust cap (2 required)
12	6A258	Camshaft bearing cap (7 required)
13	6A269	Exhaust camshaft
14	6A268	Intake camshaft

Fig. 59: Exploded View Of Valve Train Components - LH (With Torque Specifications)
Courtesy of FORD MOTOR CO.

Valve Train Components - RH

2006 Mercury Montego

2006 ENGINE Engine - Five Hundred, Freestyle & Montego



Item	Part Number	Description
1	6529	Roller follower
2	6518	Valve spring retainer key
3	6514	Valve spring retainer
4	6513	Valve spring
5	6A517	Valve stem seal
6	6C501	Hydraulic lash adjuster
7	W705391-S	Camshaft bearing cap bolt (16 required)

Item	Part Number	Description
8	6B280	Camshaft bearing thrust cap (2 required)
9	6A258	Camshaft bearing cap (6 required)
10	6A267	Exhaust camshaft
11	6A266	Intake camshaft

Fig. 60: Exploded View Of Valve Train Components - RH
Courtesy of FORD MOTOR CO.

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

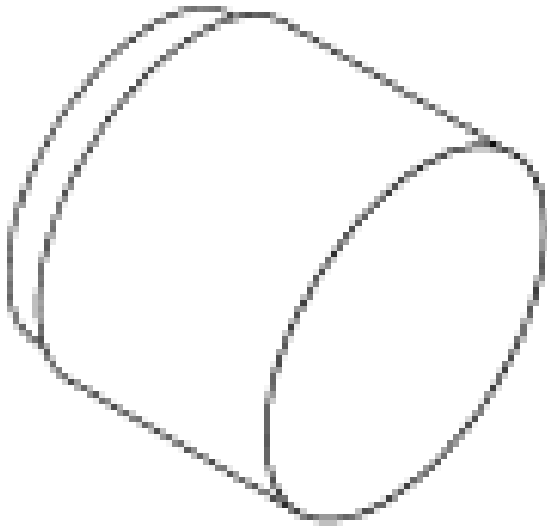
CAMSHAFT - LH

SPECIAL TOOL(S)

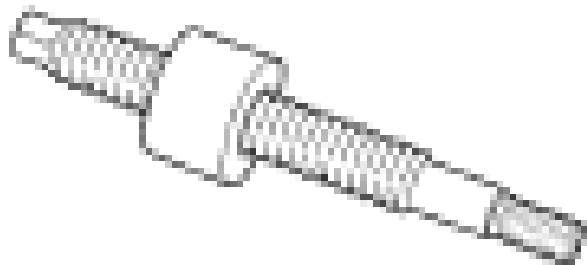
Protector, Camshaft Oil Seal 303-463 (T94P-6256-AH)

2006 Mercury Montego

2006 ENGINE Engine - Five Hundred, Freestyle & Montego



ST2060-A



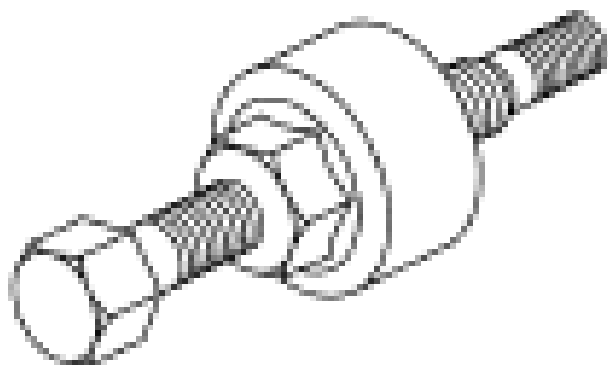
ST2867-A

Installer, Camshaft Pulley 303-458 (T94P-6312-AH3)

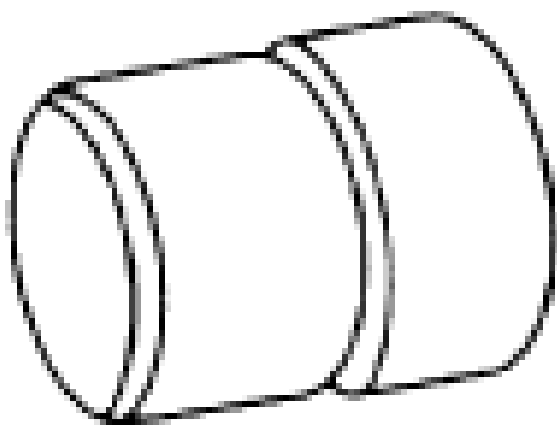
Installer, Power Steering Pump Pulley 211-185 (T91P-3A733-A)

2006 Mercury Montego

2006 ENGINE Engine - Five Hundred, Freestyle & Montego



ST1586-A



ST1404-A

Installer, Camshaft Oil Seal 303-1139

MATERIAL

Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS- M2C930-A

Removal

1. Remove the coolant pump. For additional information refer to **REMOVAL AND INSTALLATION** .

2. Remove the timing drive components. For additional information, refer to **TIMING DRIVE COMPONENTS**.

NOTE: To make sure of correct sealing, do not scratch the camshaft.

3. Remove the 3 bolts and the camshaft oil seal retainer.
4. Using a suitable press, remove the camshaft oil seal from the retainer.
 - Discard the camshaft oil seal.

CAUTION: Cylinder head camshaft bearing caps are numbered to verify that they are assembled in their original positions. If the numbers cannot be seen, mark the camshaft bearing caps prior to removing them.

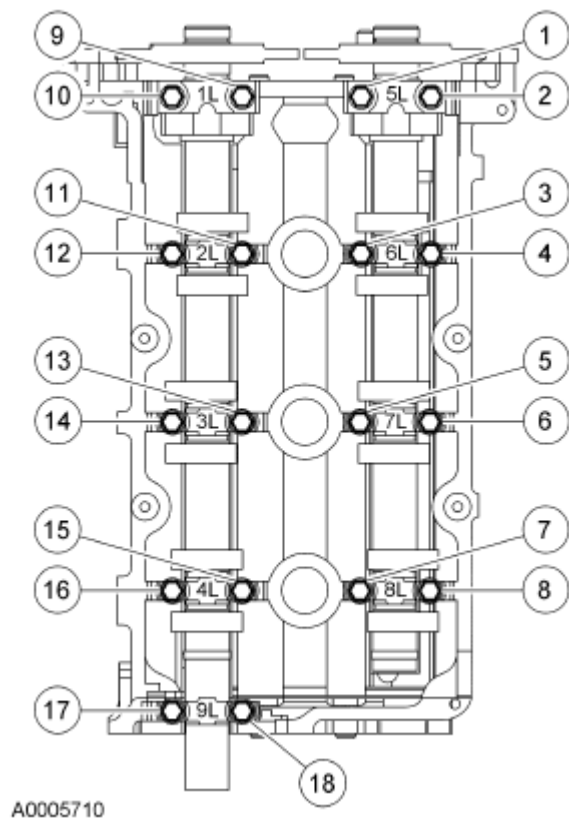


Fig. 61: Identifying Loosening Sequence Of Camshaft Bolts
Courtesy of FORD MOTOR CO.

5. Loosen the LH camshaft bolts evenly in the sequence shown to allow the camshafts to rise from the cylinder head and remove the camshaft bearing and thrust caps.
6. Remove the camshafts from the LH cylinder head.

INSTALLATION

1. Lubricate the camshafts with clean engine oil and carefully position the camshafts into the cylinder head.
 - Align the camshafts as shown.

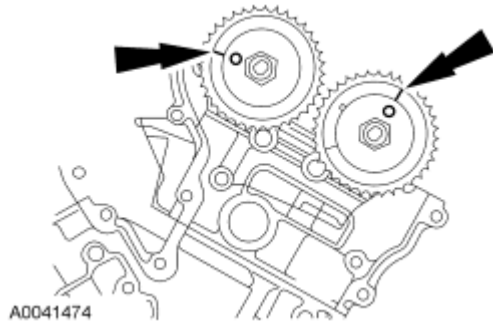


Fig. 62: Locating Camshafts Aligning Marks
Courtesy of FORD MOTOR CO.

CAUTION:

The camshaft caps must be installed in their original positions or damage to the engine may occur.

Do not install the camshaft journal thrust caps until all of the camshaft bearing caps have been installed, or damage to the thrust caps may occur.

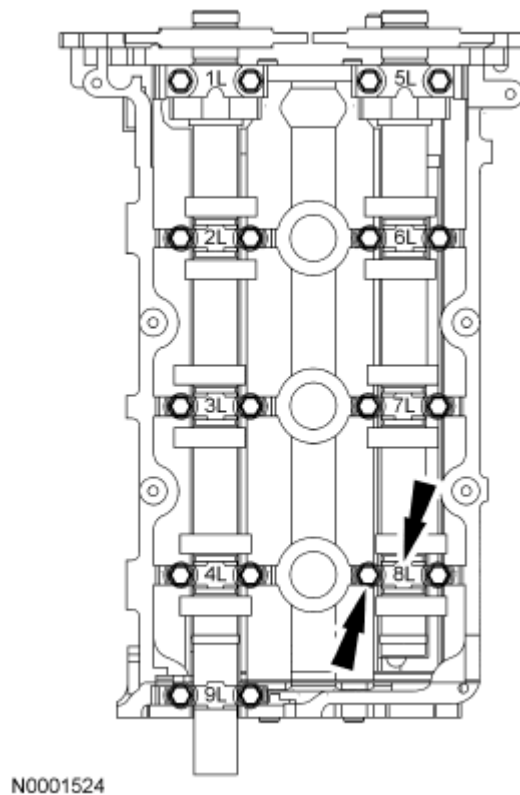


Fig. 63: Identifying Camshaft Bearing Caps Bolts Installing Sequence

Courtesy of FORD MOTOR CO.

2. Lubricate the bearing surfaces of the camshaft bearing caps with clean engine oil and install the bearing caps.
 - Loosely install the bolts.
3. Lubricate the bearing surfaces of the camshaft bearing thrust caps with clean engine oil and install the bearing thrust caps.
 - Loosely install the bolts.

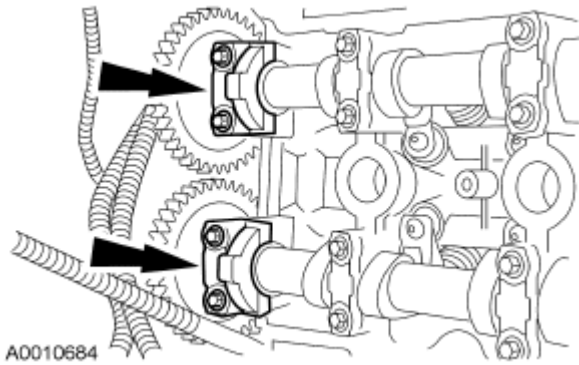


Fig. 64: Locating Camshaft Bearing Thrust Caps Bolt
Courtesy of FORD MOTOR CO.

4. Tighten the bolts in the sequence shown to 10 N.m (89 lb-in).

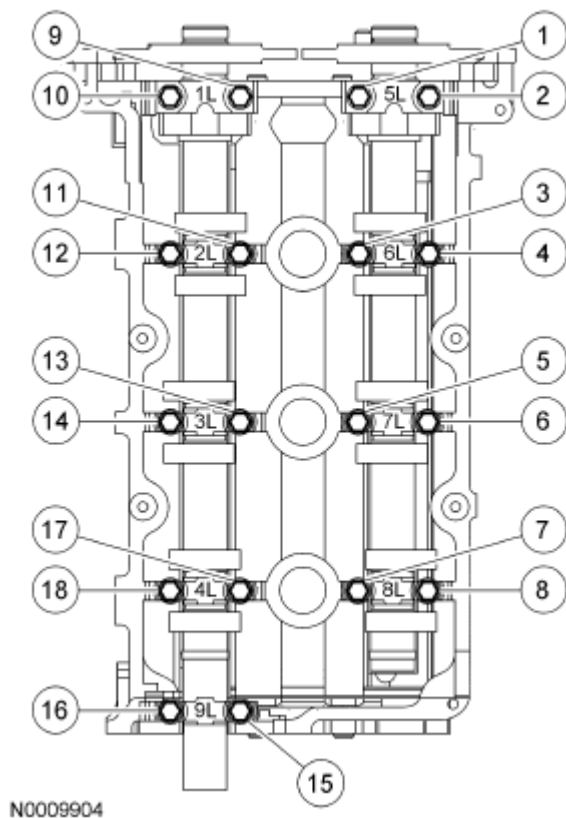


Fig. 65: Identifying Tightening Sequence Of Bolts
Courtesy of FORD MOTOR CO.

5. Install the camshaft oil seal retainer and the bolts.
 - Tighten to 10 N.m (89 lb-in).

NOTE: Lubricate the camshaft oil seal with clean engine oil.

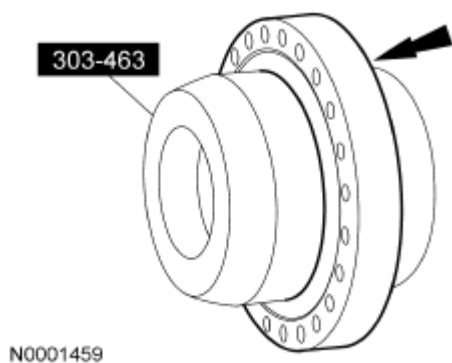


Fig. 66: Locating Camshaft Oil Seal Position On Special Tool
Courtesy of FORD MOTOR CO.

6. Position the new camshaft oil seal on the special tool.

7. Position the special tool and the camshaft oil seal on the camshaft.

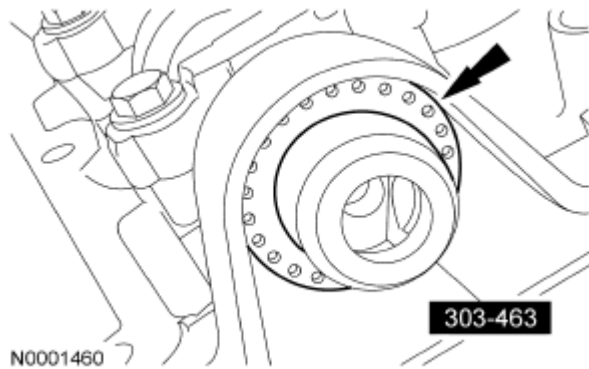


Fig. 67: Locating Position Of Camshaft Oil Seal On Camshaft
Courtesy of FORD MOTOR CO.

8. Using the special tools, install the camshaft oil seal.

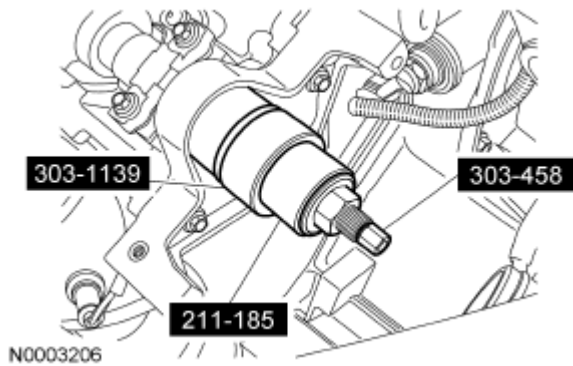


Fig. 68: Installing Camshaft Oil Seal
Courtesy of FORD MOTOR CO.

9. Install the timing drive components. For additional information, refer to **TIMING DRIVE COMPONENTS**.
10. Install the coolant pump. For additional information, refer to **REMOVAL AND INSTALLATION**.

CAMSHAFT - RH

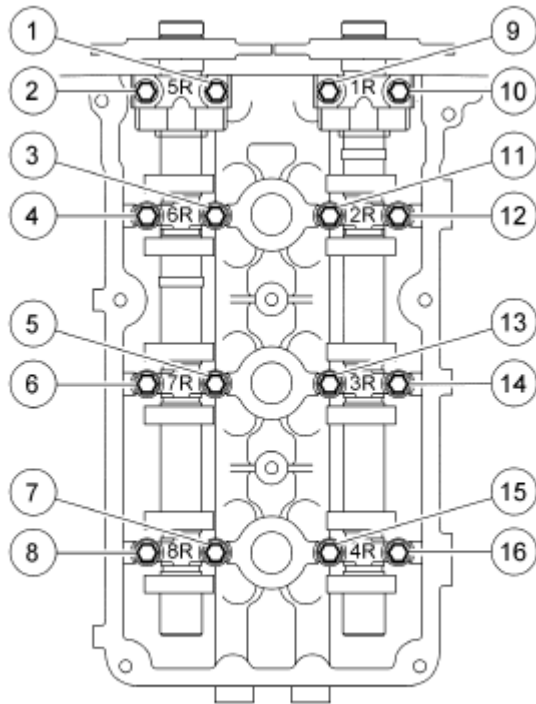
MATERIAL

Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS- M2C930-A

Removal

1. Remove the timing drive components. For additional information, refer to **TIMING DRIVE COMPONENTS**.

CAUTION: Cylinder head camshaft bearing caps are numbered to verify that they are assembled in their original positions. If the numbers cannot be seen, mark the camshaft bearing caps prior to removing them.



N0008513

Fig. 69: Identifying Loosening Sequence Of Cylinder Head Camshaft Bearing Caps Bolts
Courtesy of FORD MOTOR CO.

2. Loosen the RH camshaft bolts evenly in the sequence shown to allow the camshafts to rise from the cylinder head and remove the camshaft bearing and thrust caps.
3. Remove the camshafts from the RH cylinder heads.

Installation

1. Lubricate the camshafts with clean engine oil and carefully position the camshafts into the cylinder head.
 - Align the camshafts as shown.

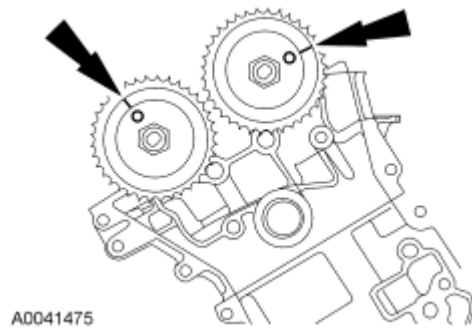


Fig. 70: Locating Camshafts Align Marks
Courtesy of FORD MOTOR CO.

CAUTION:

The camshaft caps must be installed in their original positions or damage to the engine may occur.

Do not install the camshaft journal thrust caps until all of the camshaft bearing caps have been installed, or damage to the thrust caps may occur.

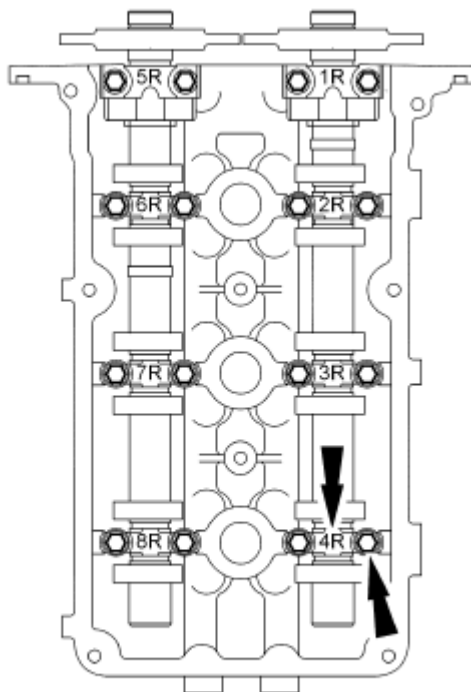
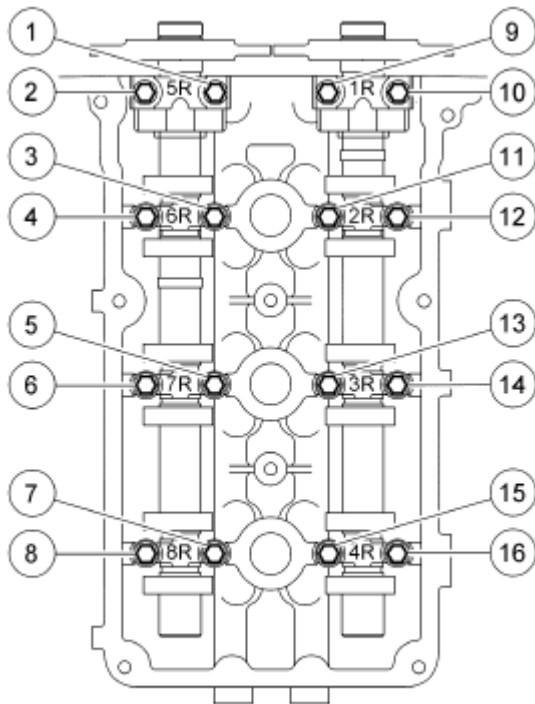


Fig. 71: Identifying Camshaft Bearing Caps Bolts Loosening Sequence
Courtesy of FORD MOTOR CO.

-
2. Lubricate the bearing surfaces of the camshaft bearing caps with clean engine oil and install the bearing caps.

- Loosely install the bolts.
- 3. Lubricate the bearing surfaces of the camshaft bearing thrust caps with clean engine oil and install the bearing thrust caps.
 - Loosely install the bolts.
- 4. Tighten the bolts in the sequence shown to 10 N.m (89 lb-in).



N0008513

Fig. 72: Identifying Tightening Sequence Of Bolts
Courtesy of FORD MOTOR CO.

- 5. Install the timing drive components. For additional information, refer to **TIMING DRIVE COMPONENTS**.

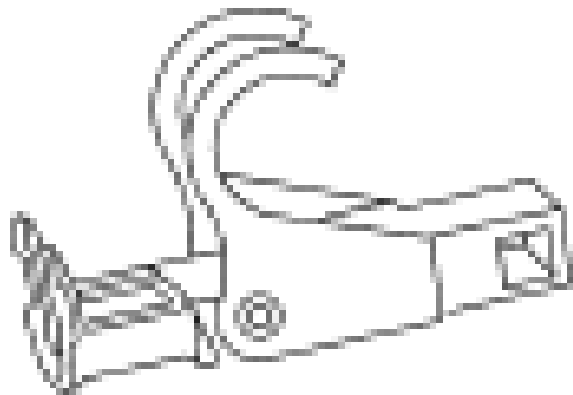
CAMSHAFT ROLLER FOLLOWER

SPECIAL TOOL(S)

Compressor, Valve Spring 303-473 (T94P-6565-

2006 Mercury Montego

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ST1975-A

BH)

MATERIAL

Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS- M2C930-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 LH and RH valve covers. For additional information, refer to **VALVE COVER - LH** and **VALVE COVER - RH**.
3. Remove the 6 spark plugs.
 - To install, tighten to 15 N.m (11 lb-ft).
4. Remove the RH splash shield.
 - To install, tighten to 9 N.m (80 lb-in).
5. Rotate the crankshaft until the camshaft lobe is pointing directly away from the roller follower.
6. Using the special tool, remove the roller followers.

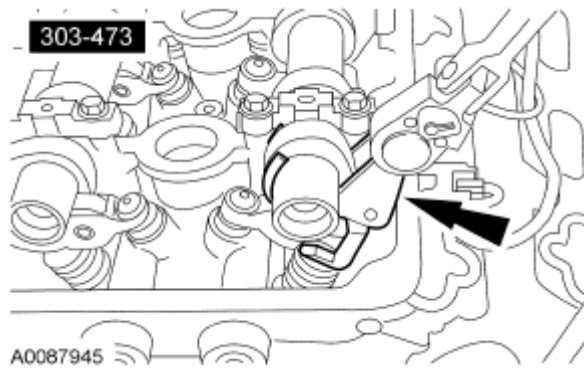


Fig. 73: Removing Roller Followers
Courtesy of FORD MOTOR CO.

NOTE: Lubricate the camshaft followers with clean engine oil.

7. To install, reverse the removal procedure.

HYDRAULIC LASH ADJUSTER

MATERIAL

Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS- M2C930-A

Removal and Installation

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

NOTE: Mark the positions of the hydraulic lash adjusters to make sure they are assembled in their original positions.

2. Remove the hydraulic lash adjusters.

NOTE: Inspect the hydraulic lash adjusters for scoring marks and uneven wear in the bore. Install new lash adjusters if necessary.

3. To install, reverse the removal procedure.

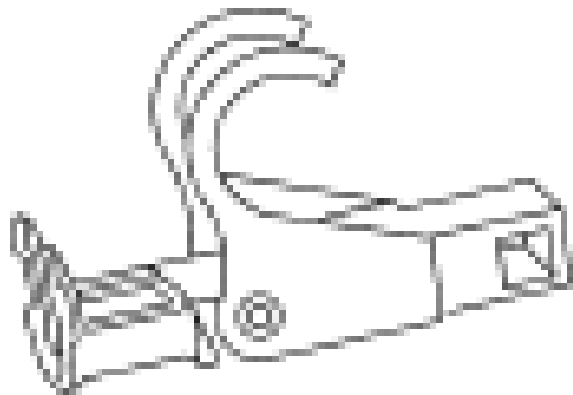
- Lubricate the hydraulic lash adjusters with clean engine oil.

VALVE SPRING, RETAINER AND SEAL

SPECIAL TOOL(S)

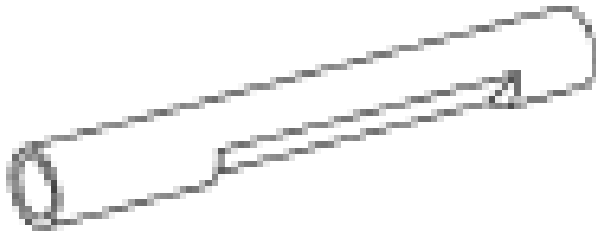
2006 Mercury Montego

2006 ENGINE Engine - Five Hundred, Freestyle & Montego



ST1975-A

Compressor, Valve Spring 303-473 (T94P-6565-BH)



ST1977-A

Installer, Valve Stem Oil Seal 303-470 (T94P-6510-CH)

MATERIAL

Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS- M2C930-A

Removal

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

NOTE: If air pressure has forced the piston to the bottom of the cylinder, any loss

of air pressure will allow the valve(s) to fall into the cylinder. A rubber band, tape or string wrapped around the end of the valve stem will prevent this from happening.

2. Pressurize the cylinder using compressed air.
3. Using the special tool, remove the key, retainer and the valve spring.



Fig. 74: Identifying Special Tool (303-473)
Courtesy of FORD MOTOR CO.

4. **NOTE:** Camshaft removed for clarity. Remove the valve seal.

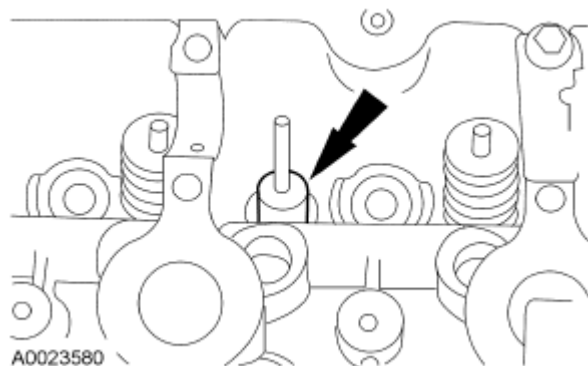


Fig. 75: Removing Valve Seal
Courtesy of FORD MOTOR CO.

Installation

NOTE: Lubricate the valve guide with clean engine oil.

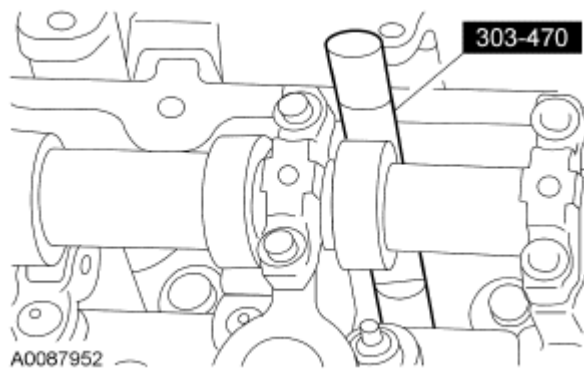


Fig. 76: Identifying Special Tool
Courtesy of FORD MOTOR CO.

1. Using the special tool, install the valve seal.
2. Using the special tool, install the valve spring, retainer and key.



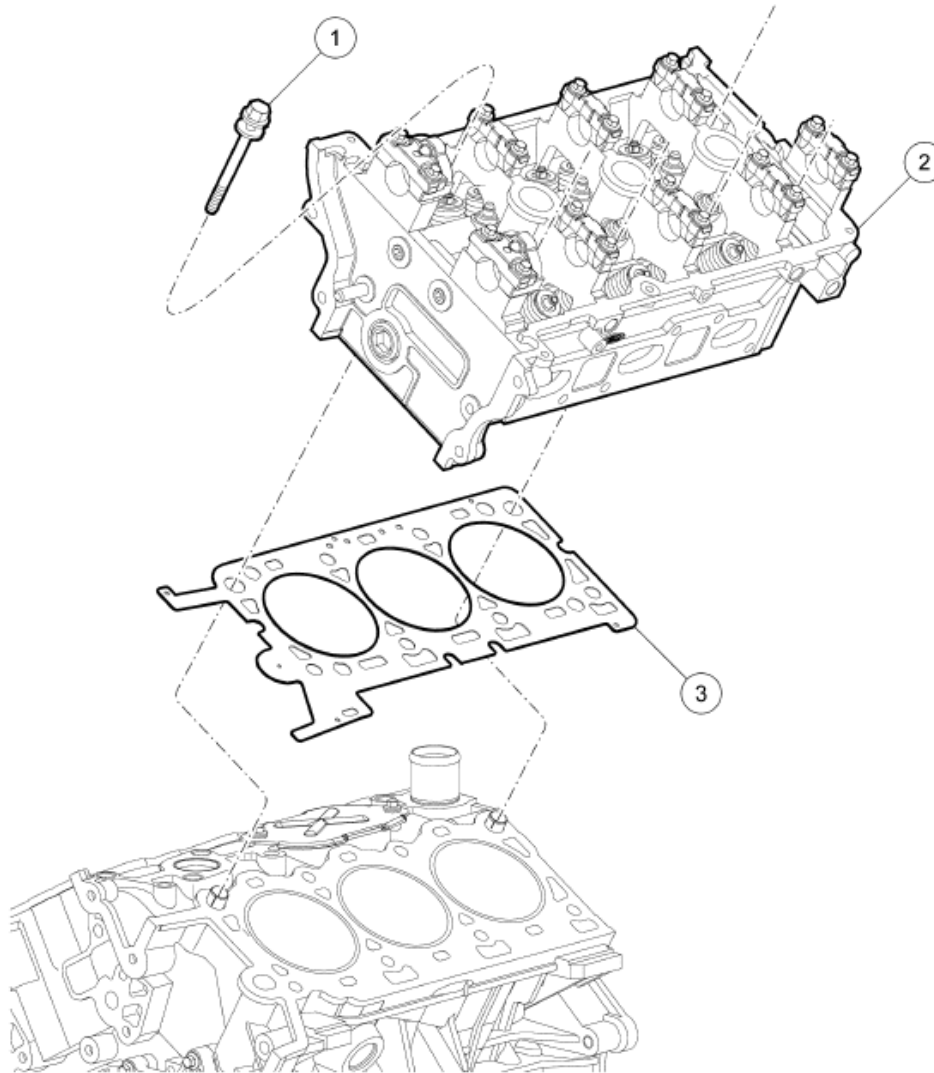
Fig. 77: Identifying Special Tool (303-473)
Courtesy of FORD MOTOR CO.

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

CYLINDER HEAD - LH

MATERIAL

Item	Specification
Silicone Gasket Remover ZC-30	-
Motorcraft Metal Surface Prep ZC-31	-
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS- M2C930-A



N0001533

Item	Part Number	Description
1	6065	Cylinder head bolt (8 required)
2	6050	Cylinder head assembly
3	6051	Cylinder head gasket

Fig. 78: Identifying Cylinder Head Components - LH
 Courtesy of FORD MOTOR CO.

Removal

CAUTION: During engine repair procedures, cleanliness is extremely important. Any foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan, can cause engine failure.

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING** .
2. Remove the lower intake manifold. For additional information, refer to **LOWER INTAKE MANIFOLD**.
3. Remove the coolant bypass tube. For additional information, refer to **REMOVAL AND INSTALLATION** .
4. Remove the LH camshafts. For additional information, refer to **CAMSHAFT - LH**.
5. Remove the LH exhaust manifold. For additional information, refer to **EXHAUST MANIFOLD - LH**.
6. Remove the oil level indicator and tube. For additional information, refer to **OIL LEVEL INDICATOR AND TUBE**.

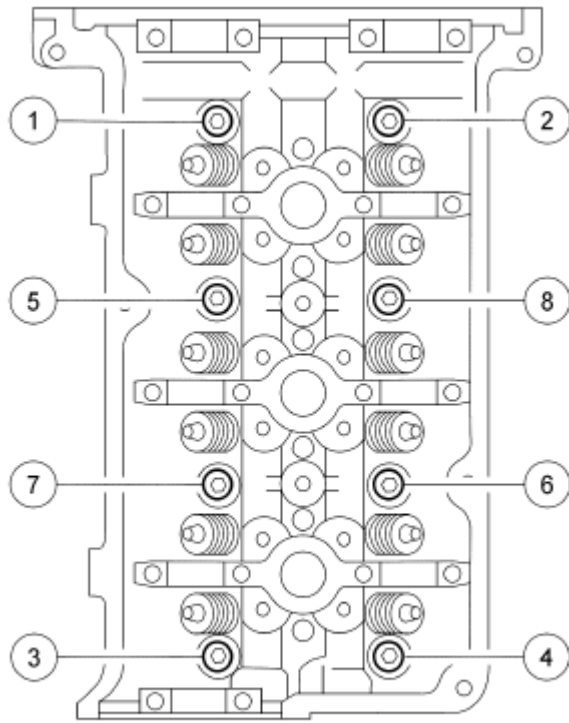
CAUTION: The camshaft roller followers must be installed in their original positions.

7. Remove the camshaft roller followers.

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

8. Remove the hydraulic lash adjusters.

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



N0001536

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

9. Remove the bolts in the sequence shown.
10. Remove the cylinder head and support the cylinder head on a bench with the head gasket side up.
 - Discard the gasket and the bolts.

NOTE: The straightedge used must be flat within 0.0051 mm (0.0002 in) per foot of tool length.

11. Inspect all areas of the deck face with a straightedge and feeler gauge. The cylinder head must not have depressions deeper than 0.0254 mm (0.0001 in) across a 38.1 mm (1.5 in) square area, or scratches more than 0.0254 mm (0.0001 in).

Installation

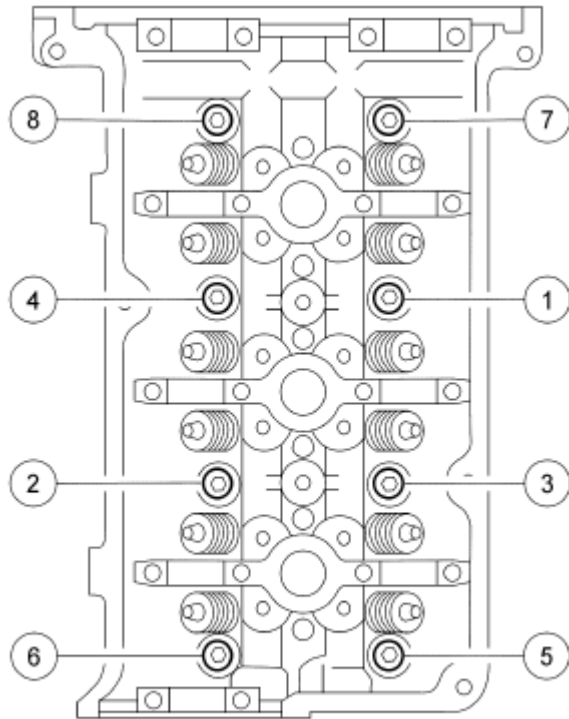
CAUTION: Do not use metal scrapers, wire brushes, power abrasive discs or other abrasive means to clean the sealing surfaces. These tools cause scratches and gouges which make leak paths.

1. Use a plastic scraping tool to remove all traces of the head gasket.
 - Clean all surfaces with silicone gasket remover and metal surface prep.
2. Clean the cylinder head bolt holes in the cylinder block. Make sure all coolant, oil or other foreign

material is removed.

3. Position the new gasket and the cylinder head.

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



N0001535

Fig. 80: Identifying Installing Sequence Of Cylinder Head Bolts
Courtesy of FORD MOTOR CO.

4. Install the 8 bolts and tighten in 6 stages in the sequence shown.
 - Stage 1: Tighten to 40 N.m (30 lb-ft).
 - Stage 2: Tighten 90 degrees.
 - Stage 3: Loosen one full turn.
 - Stage 4: Tighten to 40 N.m (30 lb-ft).
 - Stage 5: Tighten 90 degrees.
 - Stage 6: Tighten 90 degrees.

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

5. Install the hydraulic lash adjusters.
 - Lubricate the hydraulic lash adjusters with clean engine oil.

2006 Mercury Montego

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

6. Install the camshaft roller followers.
 - Lubricate the camshaft roller followers with clean engine oil.
7. Install the oil level indicator and tube. For additional information, refer to **OIL LEVEL INDICATOR AND TUBE**.
8. Install the LH exhaust manifold. For additional information, refer to **EXHAUST MANIFOLD - LH**.
9. Install the coolant bypass tube. For additional information, refer to **REMOVAL AND INSTALLATION**.
10. Install the lower intake manifold. For additional information, refer to **LOWER INTAKE MANIFOLD**.

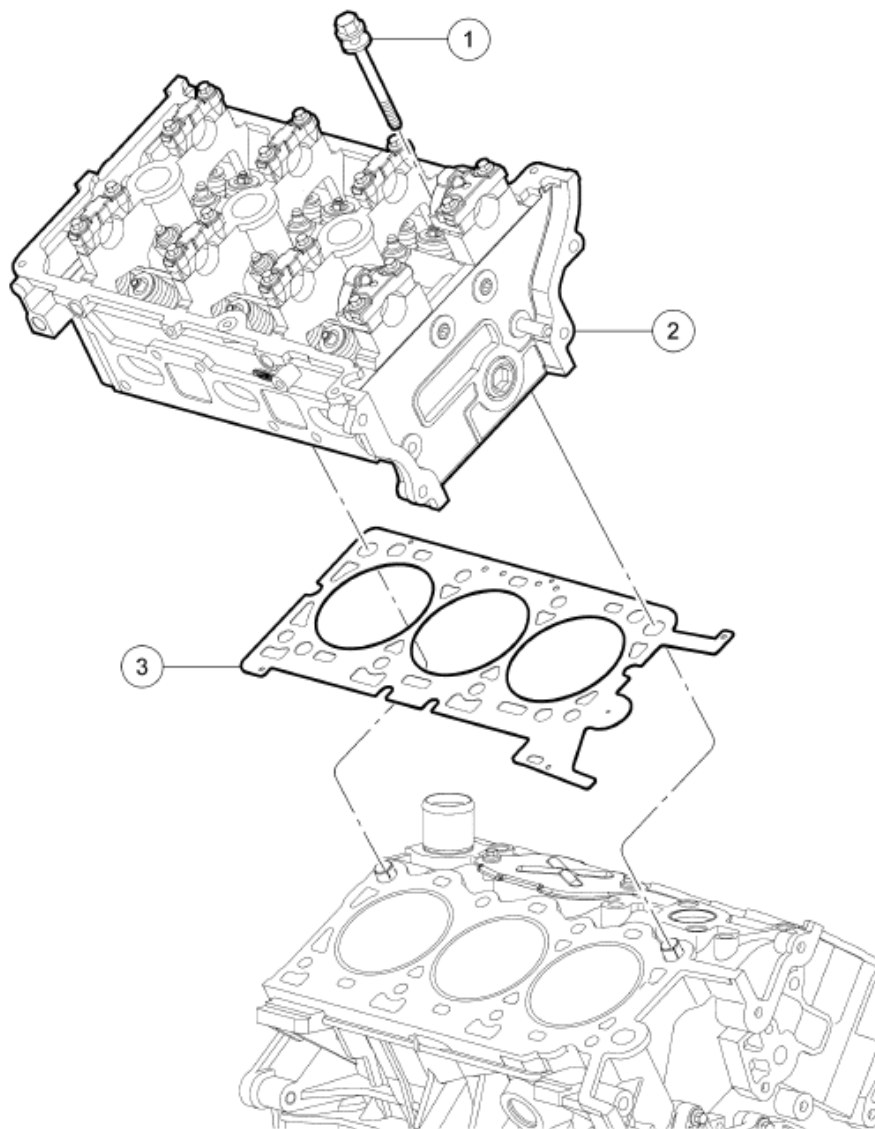
CYLINDER HEAD - RH

MATERIAL

Item	Specification
Silicone Gasket Remover ZC-30	-
Motorcraft Metal Surface Prep ZC-31	-
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS- M2C930-A

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N0001534

Item	Part Number	Description
1	6065	Cylinder head bolt (8 required)
2	6049	Cylinder head assembly
3	6051	Cylinder head gasket

Fig. 81: Identifying Cylinder Head Components - RH
Courtesy of FORD MOTOR CO.

Removal

CAUTION: During engine repair procedures, cleanliness is extremely important. Any foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan, can cause engine failure.

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.
2. Remove the lower intake manifold. For additional information, refer to **LOWER INTAKE MANIFOLD**.
3. Remove the coolant bypass tube. For additional information, refer to **REMOVAL AND INSTALLATION**.
4. Remove the RH camshafts. For additional information, refer to **CAMSHAFT - RH**.

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

5. Remove the camshaft roller followers.

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

6. Remove the hydraulic lash adjusters.
7. Remove the 6 RH exhaust manifold nuts and position the manifold aside.
 - Remove and discard the gasket.
8. Remove the bolt and detach the power steering pressure tube (PSP) bracket.

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

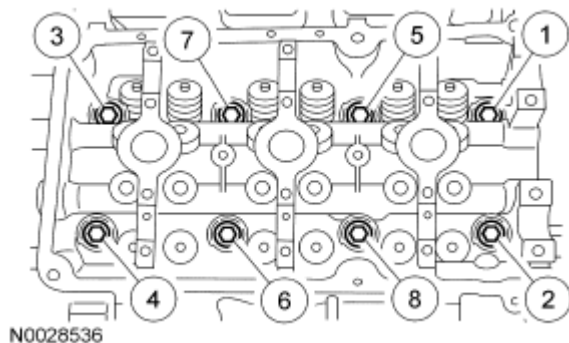


Fig. 82: Identifying Removing Sequence Of Cylinder Head Bolts
Courtesy of FORD MOTOR CO.

9. Remove the bolts in the sequence shown.
10. Remove the cylinder head and support the cylinder head on a bench with the head gasket side up.
 - Discard the gasket and the bolts.

NOTE: The straightedge used must be flat within 0.0051 mm (0.0002 in) per foot of

tool length.

11. Inspect all areas of the deck face with a straightedge and feeler gauge. The cylinder head must not have depressions deeper than 0.0254 mm (0.0001 in) across a 38.1 mm (1.5 in) square area, or scratches more than 0.0254 mm (0.0001 in).

Installation

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.

1. Use a plastic scraping tool to remove all traces of the head gasket.
 - Clean all surfaces with silicone gasket remover and metal surface prep.
2. Clean the cylinder head bolt holes in the cylinder block. Make sure all coolant, oil or other foreign material is removed.
3. Position the new gasket and the cylinder head.

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

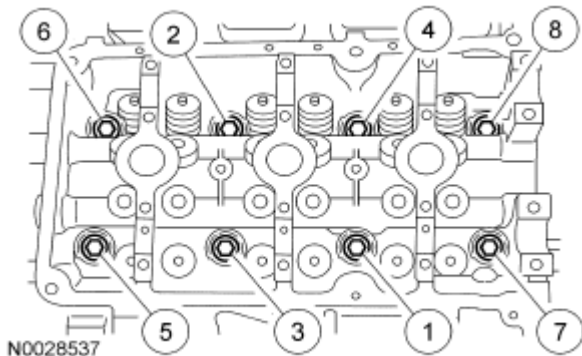


Fig. 83: Identifying Installing Sequence Of Cylinder Head Bolts
Courtesy of FORD MOTOR CO.

4. Install the 8 bolts and tighten in 6 stages in the sequence shown.
 - Stage 1: Tighten to 40 N.m (30 lb-ft).
 - Stage 2: Tighten 90 degrees.
 - Stage 3: Loosen 1 full turn.
 - Stage 4: Tighten to 40 N.m (30 lb-ft).
 - Stage 5: Tighten 90 degrees.
 - Stage 6: Tighten 90 degrees.

CAUTION: The hydraulic lash adjusters must be installed in their original

positions.

5. Install the hydraulic lash adjusters.
 - Lubricate the hydraulic lash adjusters with clean engine oil.

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

6. Install the camshaft roller followers.
 - Lubricate the camshaft roller followers with clean engine oil.
7. Position a new gasket, the RH exhaust manifold and install the 6 nuts.
 - Tighten to 20 N.m (15 lb-ft).

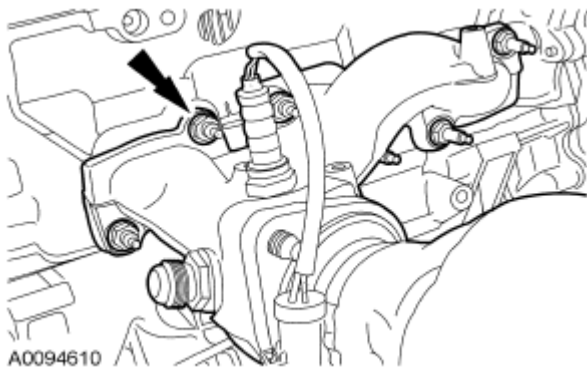


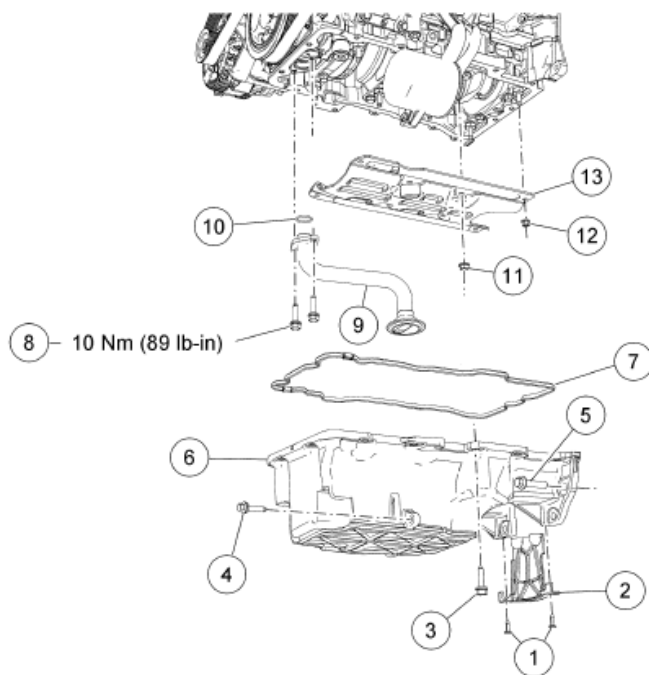
Fig. 84: Locating Exhaust Manifold Nut
Courtesy of FORD MOTOR CO.

8. Position the PSP tube bracket and install the bolt.
 - Tighten to 7 N.m (62 lb-in).
9. Install the RH camshafts. For additional information, refer to **VALVE COVER - RH**.
10. Install the coolant bypass tube. For additional information, refer to **REMOVAL AND INSTALLATION**.
11. Install the lower intake manifold. For additional information, refer to **LOWER INTAKE MANIFOLD**.

ENGINE LUBRICATION COMPONENTS - EXPLODED VIEW

2006 Mercury Montego

2006 ENGINE Engine - Five Hundred, Freestyle & Montego



N0001811

Item	Part Number	Description
1	N811125	Torque converter lower inspection cover pin-type retainers (2 required)
2	7A828	Torque converter lower inspection cover
3	W709678	Oil pan-to-engine bolt (15 required)
4	W701232	Oil pan-to-oil filter adapter bolt
5	W500121	Oil pan-to-transaxle bolt (2 required)
6	6676	Oil pan
7	6710	Oil pan gasket

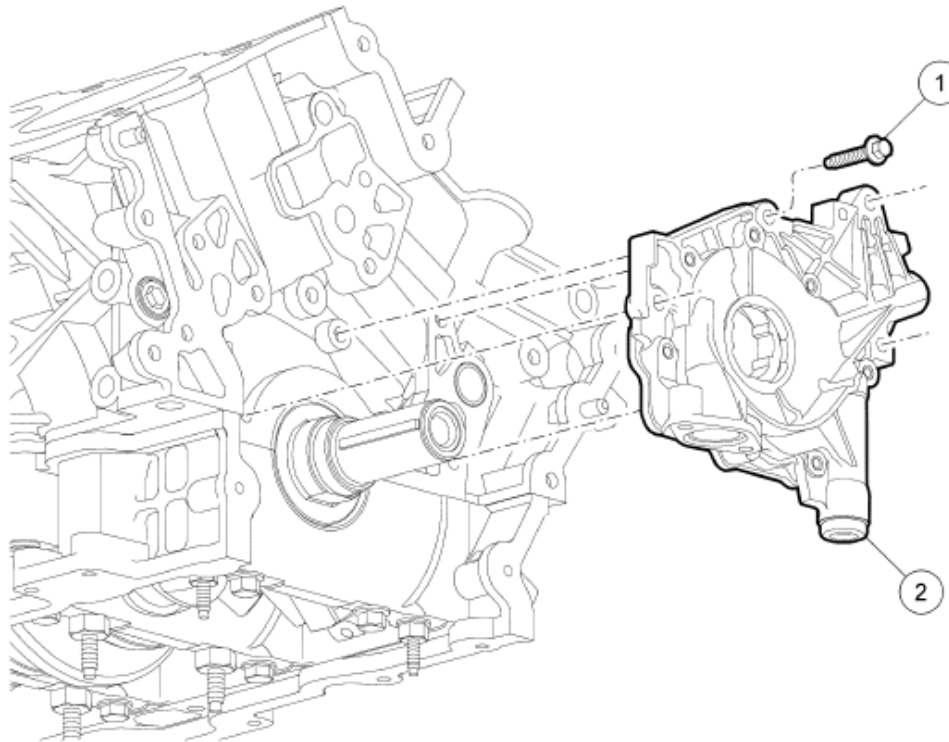
Item	Part Number	Description
8	W709678	Oil pump screen and pickup tube bolt (2 required)
9	6622	Oil pump screen and pickup tube
10	6625	Oil pump screen and pickup tube O-ring seal
11	W701582	Oil pan baffle (M8) nut (4 required)
12	W701542	Oil pan baffle (M6) nut (4 required)
13	6687	Oil pan baffle

Fig. 85: Identifying Oil Pan, Oil Pump Screen, Pickup Tube & Oil Pan Baffle Components (With Torque Specifications)

Courtesy of FORD MOTOR CO.

2006 Mercury Montego

2006 ENGINE Engine - Five Hundred, Freestyle & Montego



N0000295

Item	Part Number	Description
1	W500300-S	Oil pump bolt (4 required)
2	6621	Oil pump

Fig. 86: Identifying Oil Pump Components
Courtesy of FORD MOTOR CO.

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

OIL PAN

MATERIAL

Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS-M2C930-A
Silicone Gasket and Sealant TA-30	WSE-M4G323-A4
Motorcraft Metal Surface Cleaner ZC-21	WSE-M5B392-A

Removal

CAUTION: During engine repair procedures, cleanliness is extremely important. Any

foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan, can cause engine failure.

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.
2. Remove the front catalytic converter. For additional information, refer to **REMOVAL AND INSTALLATION**.
3. Remove the 2 bolts and the front catalytic converter bracket.

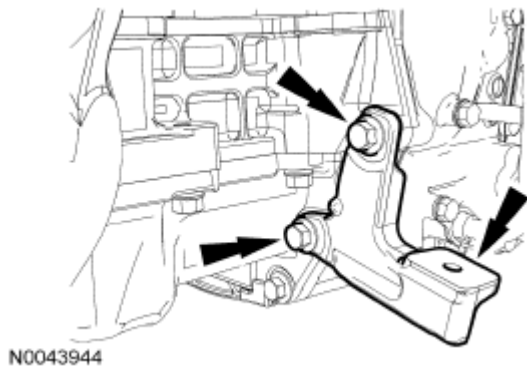


Fig. 87: Locating Front Catalytic Converter Bracket Bolts
Courtesy of FORD MOTOR CO.

4. Drain the engine oil and install the drain plug.
 - Tighten to 26 N.m (19 lb-ft).
5. Remove and discard the oil filter.
6. Remove the torque converter lower inspection cover.
7. Remove the 2 oil pan-to-transaxle bolts.
8. Remove the oil pan-to-oil filter adapter bolt.
9. Remove the 15 bolts and the oil pan.
 - Remove and discard the gasket.

Installation

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.

1. Use a plastic scraping tool to remove all traces of the oil pan gasket.
 - Clean all surfaces with metal surface cleaner.
2. **NOTE:** The oil pan must be installed and the bolts tightened within 4 minutes of sealant application. Apply a 10 mm (0.39 in) diameter dot of silicone sealant to the areas indicated.

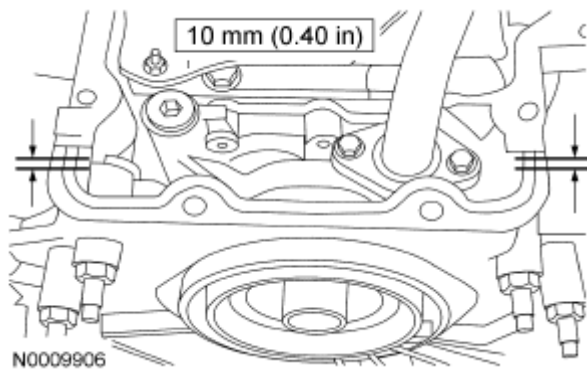


Fig. 88: Applying Diameter Dot Of Silicone Sealant To Areas
Courtesy of FORD MOTOR CO.

3. Position the oil pan and a new gasket, and loosely install the bolts and stud bolts.
4. Install the oil pan-to-transaxle bolts.
 - Tighten to 40 N.m (30 lb-ft).
5. Tighten the oil pan-to-engine bolts in the sequence shown to 25 N.m (18 lb-ft).

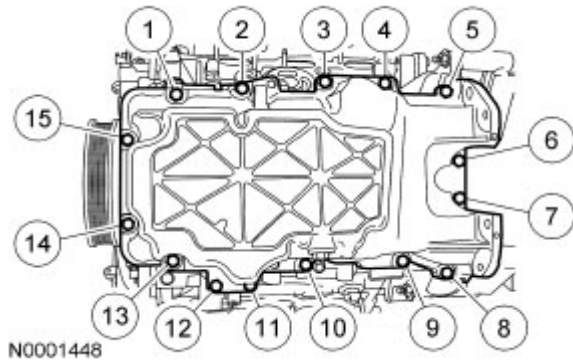


Fig. 89: Tightening Oil Pan-To-Engine Bolts
Courtesy of FORD MOTOR CO.

6. Install the oil pan-to-oil filter adapter bolt.
 - Tighten to 25 N.m (18 lb-ft).
7. Install a new oil filter.
 - Tighten to 16 N.m (12 lb-ft).
8. Install the front catalytic converter bracket and the 2 bolts.
 - Tighten to 40 N.m (30 lb-ft).

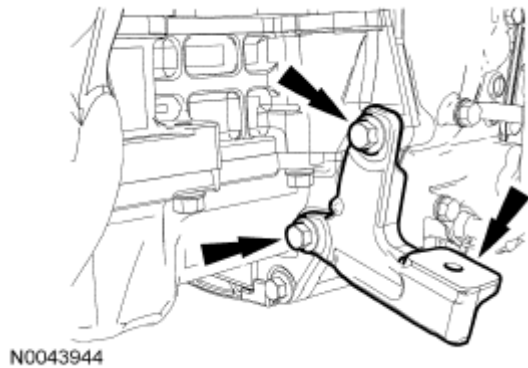


Fig. 90: Locating Front Catalytic Converter Bracket Bolts
Courtesy of FORD MOTOR CO.

9. Install the front catalytic converter. For additional information, refer to **REMOVAL AND INSTALLATION**.
10. Fill the engine with clean engine oil.

OIL PUMP SCREEN AND PICKUP TUBE

MATERIAL

Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS- M2C930-A

Removal and Installation

CAUTION: During engine repair procedures, cleanliness is extremely important. Any foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan, can cause engine failure.

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.
2. Remove the oil pan. For additional information, refer to **ENGINE LUBRICATION COMPONENTS - EXPLODED VIEW** and **OIL PAN**.
3. Remove the 2 bolts and the oil pump screen and pickup tube.
 - To install, tighten to 10 Nm (89 lb-in).
 - Remove and discard the O-ring seal.

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

4. To install, reverse the removal procedure.

OIL PAN BAFFLE**Removal and Installation**

CAUTION: During engine repair procedures, cleanliness is extremely important. Any foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan, can cause engine failure.

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.
2. Remove the oil pump screen and pickup tube. For additional information, refer to **ENGINE LUBRICATION COMPONENTS - EXPLODED VIEW** and **OIL PUMP SCREEN AND PICKUP TUBE**.
3. Remove the 8 nuts and the oil pan baffle.
 - To install, tighten the oil pan baffle nuts in 2 stages.
 - Stage 1: Tighten to 5 N.m (44 lb-in).
 - Stage 2: Tighten an additional 45 degrees.
4. To install, reverse the removal procedure.

OIL PUMP**Removal**

CAUTION: During engine repair procedures, cleanliness is extremely important. Any foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan, can cause engine failure.

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.
2. Remove the timing drive components. For additional information, refer to **TIMING DRIVE COMPONENTS**.
3. Remove the oil pump screen and pickup tube. For additional information, refer to **ENGINE LUBRICATION COMPONENTS - EXPLODED VIEW**, **OIL PUMP SCREEN** and **PICKUP TUBE**.
4. Remove the bolts in the sequence shown.

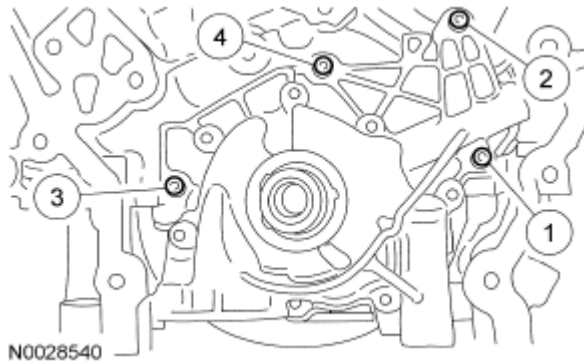


Fig. 91: Removal Sequence For Oil Pump Bolts
Courtesy of FORD MOTOR CO.

5. Remove the oil pump.

Installation

1. Position the oil pump and install the bolts.
 - Tighten in the sequence shown to 10 N.m (89 lb-in).

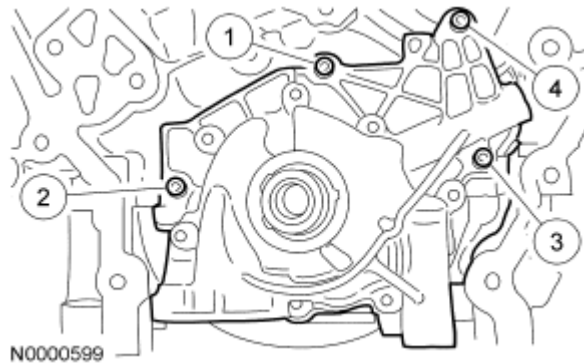


Fig. 92: Installation Sequence For Oil Pump Bolts
Courtesy of FORD MOTOR CO.

2. Install the oil pump screen and pickup tube. For additional information, refer to **ENGINE LUBRICATION COMPONENTS - EXPLODED VIEW**, **OIL PUMP SCREEN** and **PICKUP TUBE**.
3. Install the timing drive components. For additional information, refer to **TIMING DRIVE COMPONENTS**.

OIL LEVEL INDICATOR AND TUBE

MATERIAL

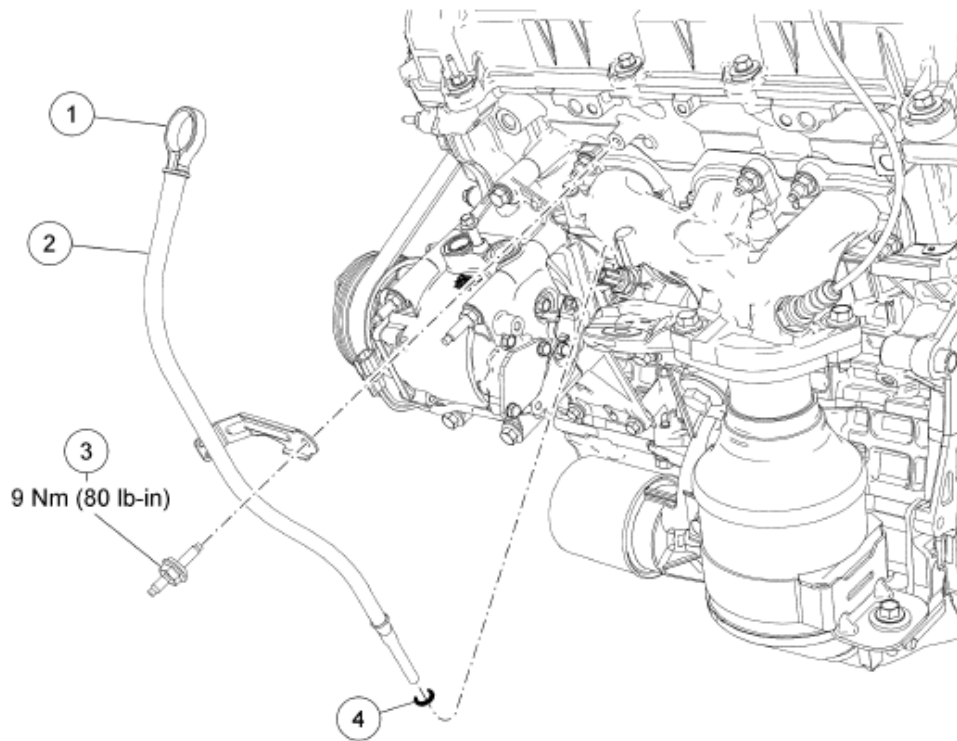
Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US);	WSS-

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Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent

M2C930-A



Item	Part Number	Description
1	6750	Oil level indicator
2	6754	Oil level indicator tube
3	W701822	Oil level indicator tube stud bolt
4	110282	Oil level indicator O-ring seal

Fig. 93: Identifying Oil Level Indicator & Tube Components (With Torque Specifications)
Courtesy of FORD MOTOR CO.

Removal and Installation

1. Remove the oil level indicator.
2. Remove the stud bolt and the oil level indicator tube.
 - Remove and discard the O-ring seal.
 - To install, tighten to 9 N.m (80 lb-in).

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

3. To install, reverse the removal procedure.

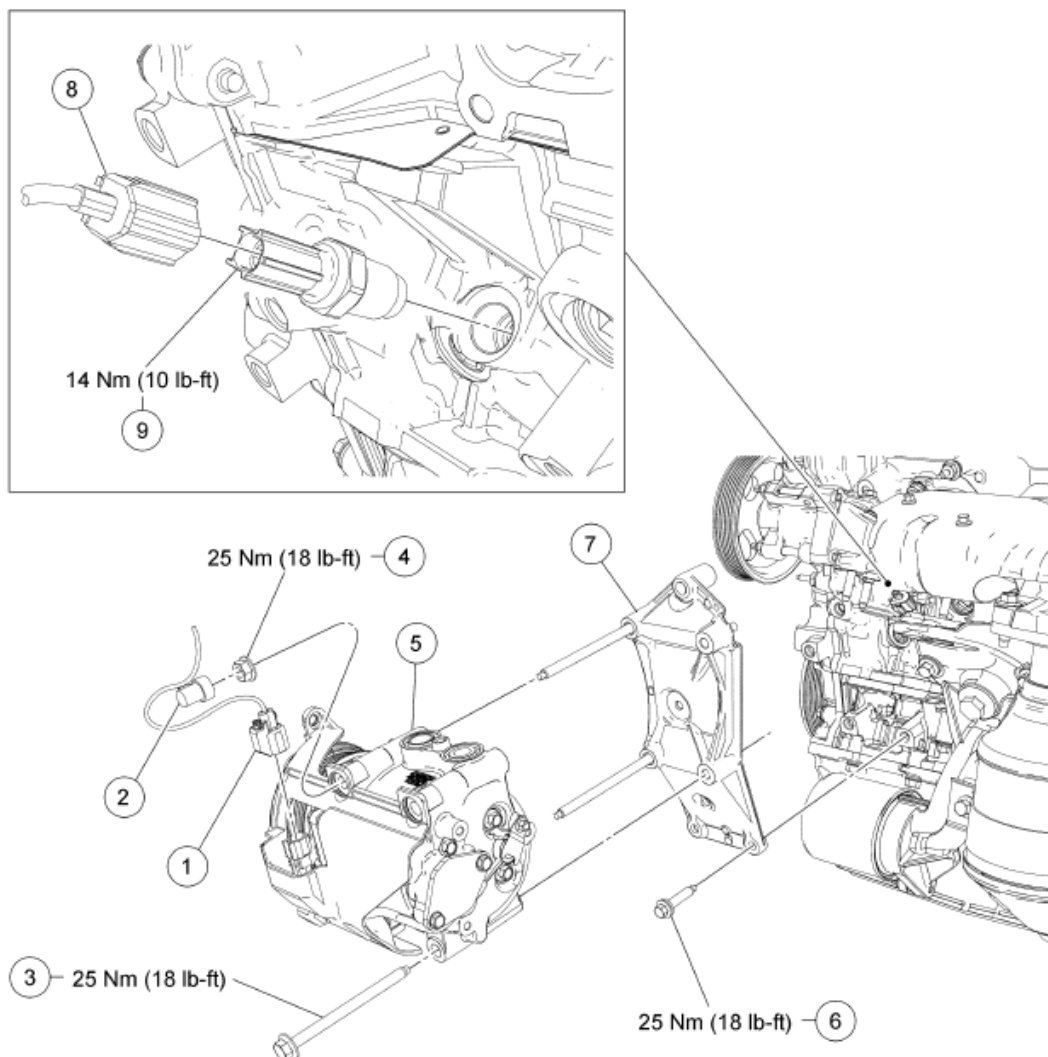
2006 Mercury Montego

2006 ENGINE Engine - Five Hundred, Freestyle & Montego

OIL PRESSURE SENDER

MATERIAL

Item	Specification
Thread Sealant with PTFE TA-24	WSK-M2G350-A2



N0044247

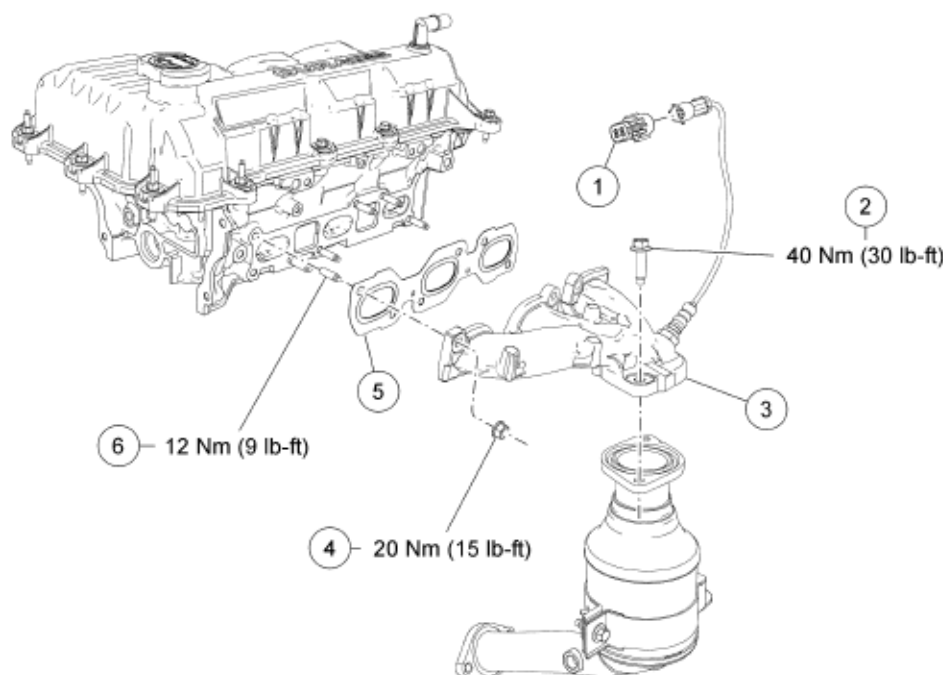
Item	Part Number	Description
1	14A464	A/C compressor electrical connector (part of 12B637)
2	14A163	Wiring harness retainer (part of 12B637)
3	W705825	A/C compressor bolt (2 required)
4	W520413	A/C compressor nut (2 required)
5	19703	A/C compressor
6	W701625	A/C compressor bracket bolt (6 required)
7	19N586	A/C compressor bracket
8	14A464	Oil pressure sender electrical connector (part of 12B637)
9	9278	Oil pressure sender

Fig. 94: Identifying Oil Pressure Sender Components (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. Remove cooling fan motor and shroud. For additional information, refer to **REMOVAL AND INSTALLATION** .
3. Remove the lower radiator splash shield.
4. Remove the accessory drive belt. For additional information, refer to **REMOVAL AND INSTALLATION** .
5. Disconnect the A/C compressor electrical connector and wiring harness retainer.
6. Remove the 2 bolts, 2 nuts and position the A/C compressor aside.
 - To install, tighten to 25 N.m (18 lb-ft).
7. Remove the 6 bolts and position the A/C compressor bracket aside.
 - To install, tighten to 25 N.m (18 lb-ft).
8. Disconnect the oil pressure sender electrical connector.
9. Remove the oil pressure sender.
 - To install, tighten to 14 N.m (10 lb-ft).
10. To install, reverse the removal procedure.
 - Apply pipe sealant with Teflon® to the oil pressure sender threads.

EXHAUST MANIFOLD - LH



N0045209

Item	Part Number	Description
1	14A464	Heated oxygen sensor (HO2S) electrical connector (part of 12B637)
2	W709982	LH exhaust manifold-to-catalytic converter bolt (2 required)
3	9431	LH exhaust manifold
4	W701706	LH exhaust manifold nut (6 required)
5	9448	LH exhaust manifold gasket
6	W701732	LH exhaust manifold stud (6 required)

Fig. 95: Identifying Exhaust Manifold Components - LH (With Torque Specifications)
 Courtesy of FORD MOTOR CO.

Removal and Installation

1. Remove the cooling fans. For additional information, refer to **REMOVAL AND INSTALLATION**.
2. Disconnect the heated oxygen sensor (HO2S) electrical connector.
3. Remove the 2 exhaust manifold-to-catalytic converter bolts.
 - To install, tighten to 40 N.m (30 lb-ft).
4. Remove and discard the 6 exhaust manifold nuts.
 - To install, tighten to 20 N.m (15 lb-ft).
5. Remove the exhaust manifold.
 - Remove and discard the gasket.

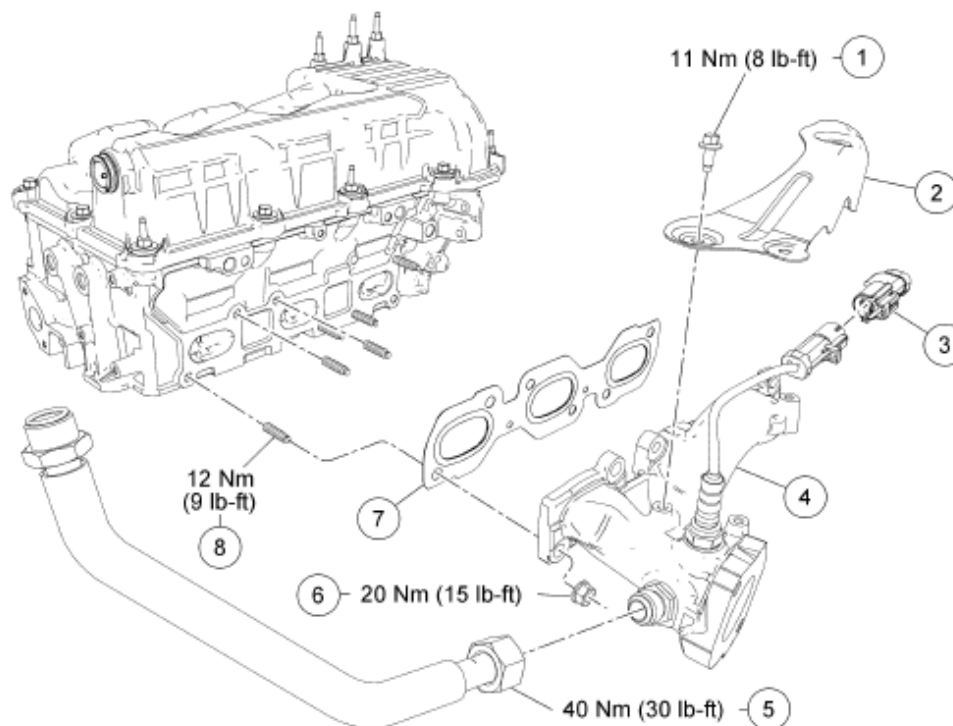
6. Remove and discard the 6 exhaust manifold studs.

- To install, tighten to 12 N.m (9 lb-ft).

NOTE: Make sure to install new studs, nuts and gasket.

7. To install, reverse the removal procedure.

EXHAUST MANIFOLD - RH



N0044912

Item	Part Number	Description
1	W701130	RH exhaust manifold heat shield bolts (2 required)
2	9A462	RH exhaust manifold heat shield
3	14A464	Heated oxygen sensor (HO2S) electrical connector (part of 12B637)
4	9430	RH exhaust manifold
5	—	Exhaust gas recirculation (EGR) system module tube fitting nut (part of 9D477)
6	W701706	RH exhaust manifold nut (6 required)
7	9448	RH exhaust manifold gasket
8	W701732	RH exhaust manifold stud (6 required)

Fig. 96: Identifying Exhaust Manifold Components - RH (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. Remove the RH catalytic converter. For additional information, refer to **REMOVAL AND INSTALLATION**.
3. Disconnect the heated oxygen sensor (HO2S) electrical connector.
4. Remove the 3 bolts and the RH exhaust manifold heat shield
 - To install, tighten to 11 N.m (8 lb-ft).
5. Disconnect the exhaust gas recirculation (EGR) system module tube from the exhaust manifold.
 - To install, tighten to 40 N.m (30 lb-ft).
6. Remove and discard the 6 RH exhaust manifold nuts.
 - To install, tighten to 20 N.m (15 lb-ft).
7. Remove and discard the 3 studs closest to the rear of the cylinder head.
 - To install, tighten to 12 N.m (9 lb-ft).
8. Remove the RH exhaust manifold and gasket.
 - Discard the exhaust manifold gasket.
9. Remove and discard the 3 remaining studs.
 - To install, tighten to 12 N.m (9 lb-ft).

NOTE: Make sure to install a new exhaust manifold gasket, studs and nuts.

10. To install, reverse the removal procedure.

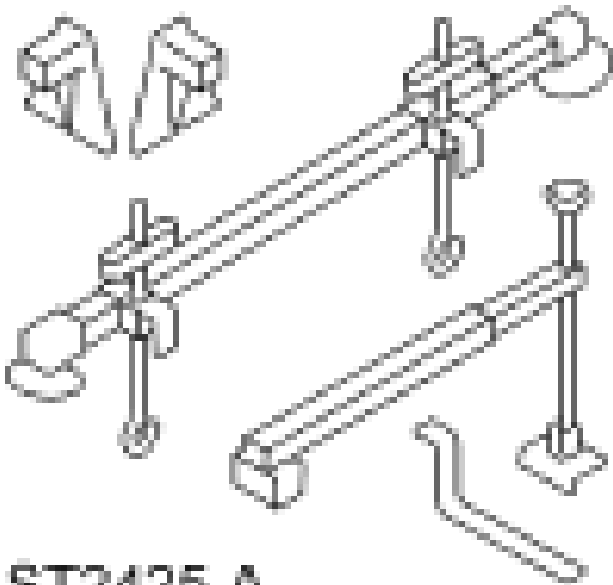
ENGINE SUPPORT INSULATORS - LH

SPECIAL TOOL(S)

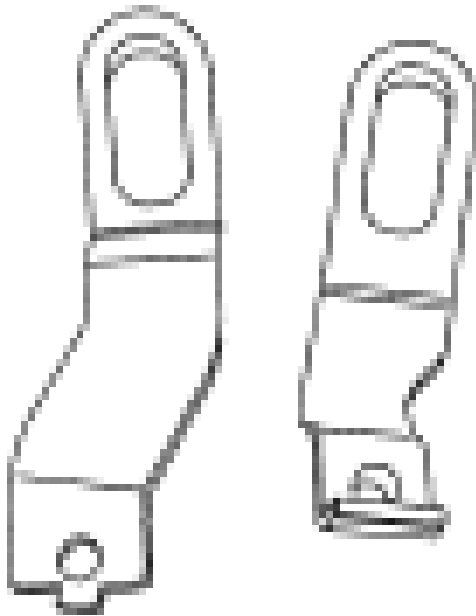
	3-Bar Engine Support Kit 303-F072
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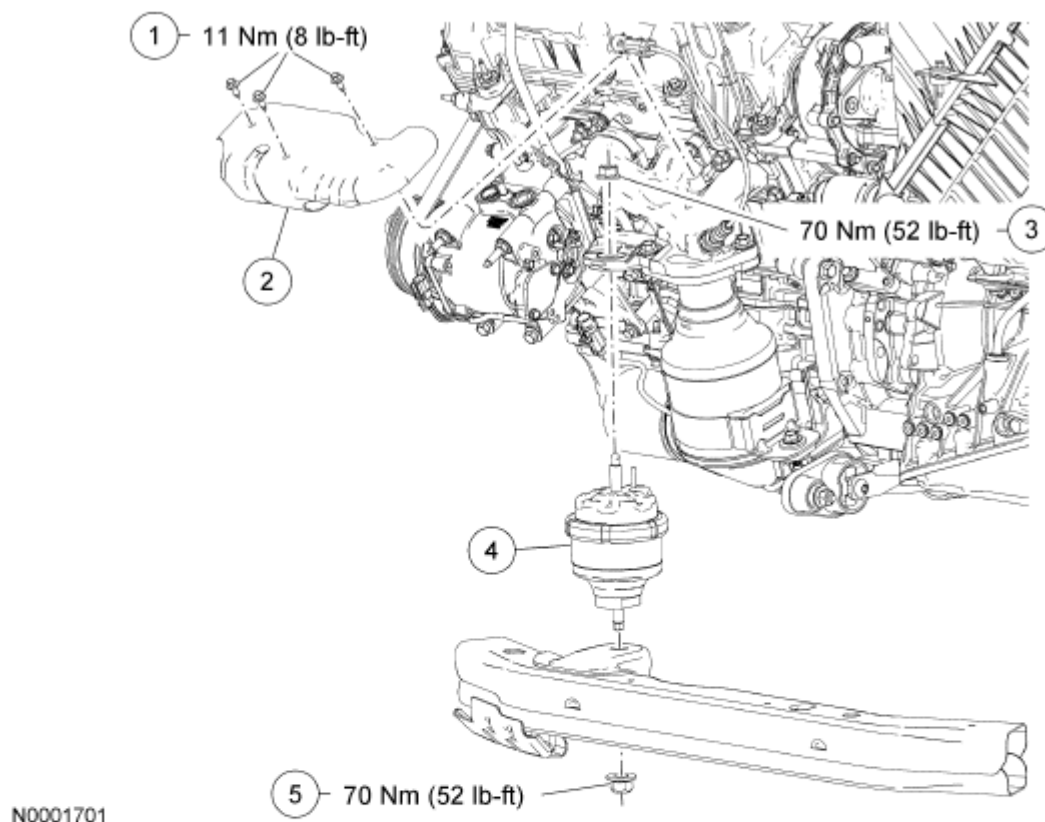


ST2425-A



ST2463-A

Lifting Brackets, Engine 134-00243 or equivalent



Item	Part Number	Description
1	W707130	LH exhaust manifold heat shield bolts (3 required)
2	9A462	LH exhaust manifold heat shield
3	W711311	LH engine support insulator upper nut
4	6038	LH engine support insulator
5	N802978	LH engine support insulator lower nut

Fig. 97: Identifying Engine Support Insulator Components - LH (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. Remove and discard the roll restrictor cross brace-to-roll restrictor bolt.
 - To install, tighten to 48 N.m (35 lb-ft).

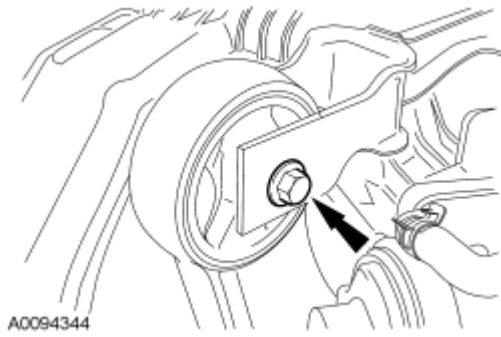


Fig. 98: Locating Upper Roll Restrictor Bolt
Courtesy of FORD MOTOR CO.

3. Remove the front transaxle stabilizer bolt and nut.
 - To install, tighten to 40 N.m (30 lb-ft).

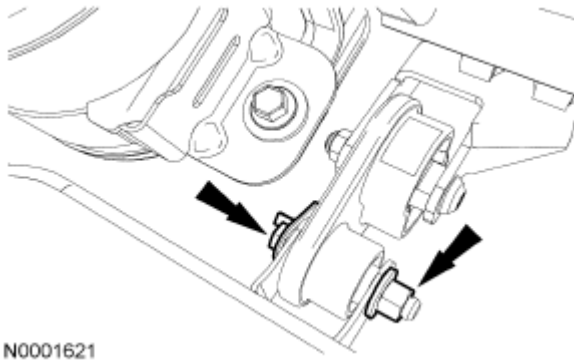


Fig. 99: Locating Front Transaxle Stabilizer Bolt And Nut
Courtesy of FORD MOTOR CO.

4. If equipped, remove the 3 bolts and the LH exhaust manifold heat shield.
 - To install, tighten to 11 N.m (8 lb-ft).
5. Remove the engine support insulator lower nut.
 - To install, tighten to 70 N.m (52 lb-ft).
6. Remove the engine support insulator upper nut.
 - To install, tighten to 70 N.m (52 lb-ft).
7. Mount the special tool to the LH cylinder head.

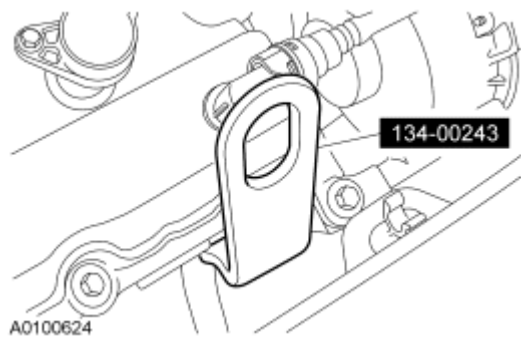


Fig. 100: Special Tool Installed Onto LH Cylinder Head
Courtesy of FORD MOTOR CO.

8. Using the special tools, raise the engine to gain the clearance necessary to remove the insulator.

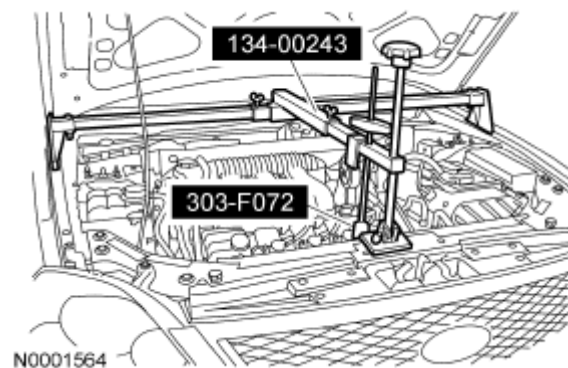


Fig. 101: Identifying Special Tool
Courtesy of FORD MOTOR CO.

CAUTION: Make sure that the engine support insulator locator pins are aligned correctly with the bracket.

9. To install, reverse the removal procedure.

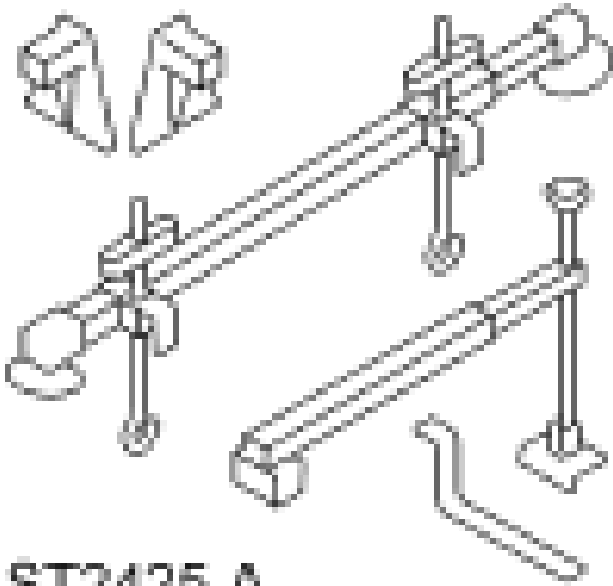
ENGINE SUPPORT INSULATORS - RH

SPECIAL TOOL(S)

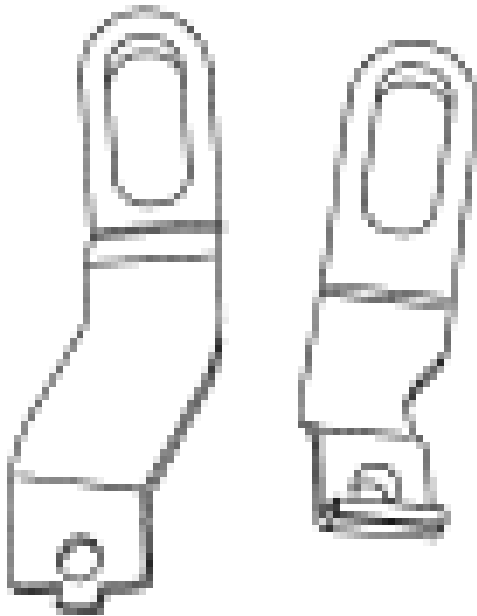
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2006 Mercury Montego

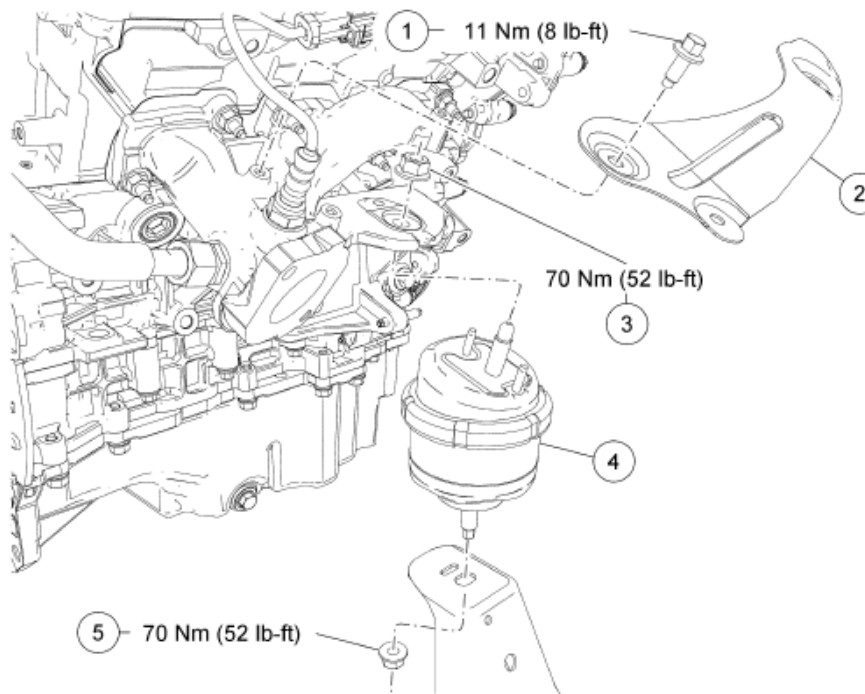
2006 ENGINE Engine - Five Hundred, Freestyle & Montego



3-Bar Engine Support Kit 303-F072



Lifting Brackets, Engine 134-00243 or equivalent



N0001702

Item	Part Number	Description
1	W707130	RH exhaust manifold heat shield bolt (3 required)
2	9A462	RH exhaust manifold heat shield
3	W711311	RH engine support insulator upper nut
4	6068	RH engine support insulator
5	W710922	RH engine support insulator lower nut

Fig. 102: Identifying Engine Support Insulator Components - RH (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. Remove the cowl vent screen. For additional information, refer to **REMOVAL AND INSTALLATION**.
3. Remove the RH catalytic converter. For additional information, refer to **REMOVAL AND INSTALLATION**.
4. Remove the RH halfshaft. For additional information, refer to **REMOVAL**.
5. Remove and discard the roll restrictor cross brace-to-roll restrictor bolt.
 - To install, tighten to 48 N.m (35 lb-ft).

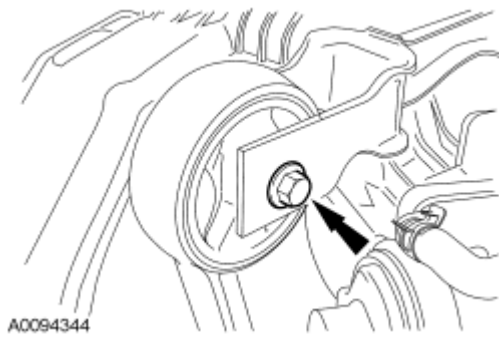


Fig. 103: Locating Upper Roll Restrictor Bolt
Courtesy of FORD MOTOR CO.

NOTE: LH shown, RH similar.

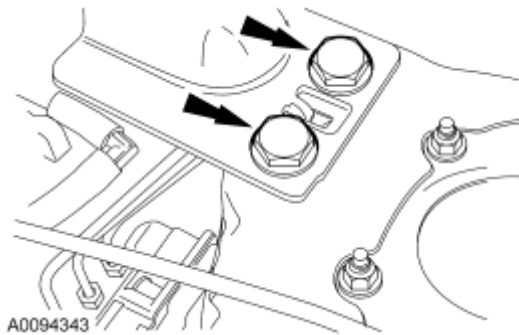


Fig. 104: Identifying Transaxle Roll Restrictor Bar Bolts
Courtesy of FORD MOTOR CO.

6. Remove the 4 roll restrictor cross brace bolts.
 - Remove the cross brace.
 - To install, tighten to 55 N.m (41 lb-ft).
7. Remove the 3 bolts and the RH exhaust manifold heat shield.
 - To install, tighten to 11 N.m (8 lb-ft).
8. Remove the engine support insulator lower nut.
 - To install, tighten to 70 N.m (52 lb-ft).
9. Remove the engine support insulator upper nut.
 - To install, tighten to 70 N.m (52 lb-ft).
10. Remove the bolt and detach the power steering pressure (PSP) tube from the RH cylinder head.
 - To install, tighten to 7 N.m (62 lb-in).
11. Mount the special tool to the RH cylinder head.

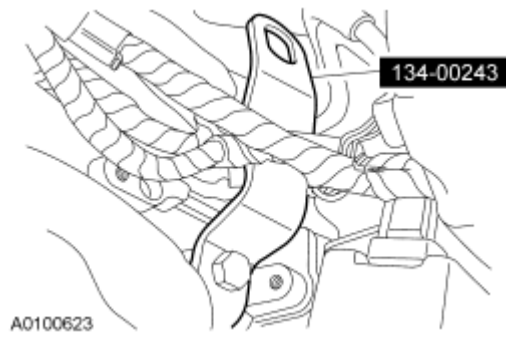


Fig. 105: View Of Special Tool On RH Cylinder Head
Courtesy of FORD MOTOR CO.

12. Using the special tools, raise the engine to gain the clearance necessary to remove the insulator.
 - Remove the engine support insulator.

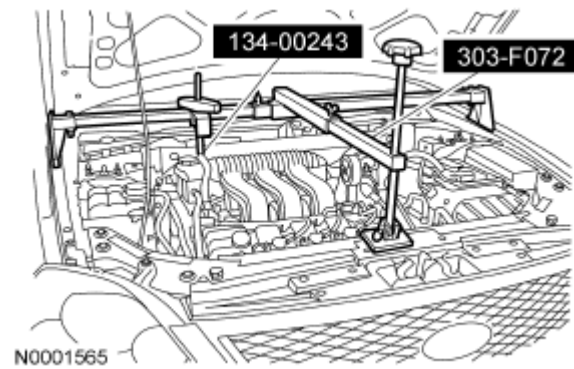


Fig. 106: Identifying Special Tool
Courtesy of FORD MOTOR CO.

CAUTION: Make sure that the engine support insulator locator pin is aligned correctly with the bracket.

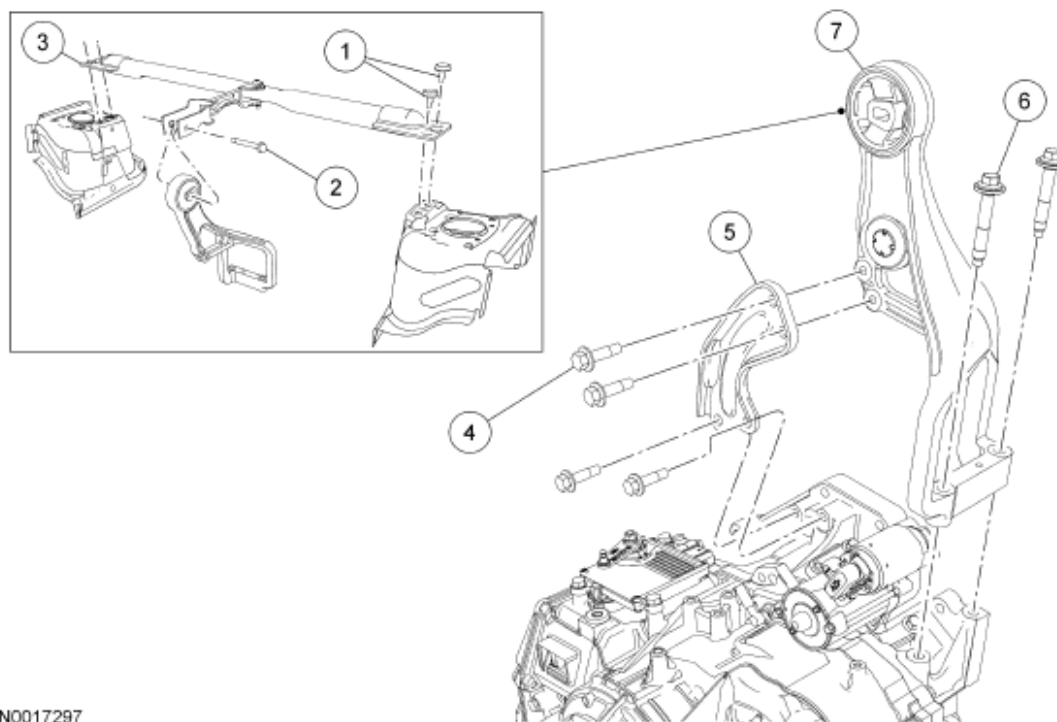
13. To install, reverse the removal procedure.

ENGINE MOUNT - ANTI-ROLL

MATERIAL

Item	Specification
Threadlock and Sealer TA-25	WSK-M2G351-A5

NOTE: 6 speed transaxle shown, CVT similar.



N0017297

Item	Part Number	Description
1	W705985	Roll restrictor cross brace-to-strut tower bolts (4 required)
2	W506525	Roll restrictor cross brace-to-roll restrictor bolt
3	6G053	Roll restrictor cross brace
4	W711311	Roll restrictor support bracket bolt (4 required)
5	6G087	Roll restrictor support bracket
6	W710524	Roll restrictor bolt (2 required)
7	6F055	Roll restrictor

Fig. 107: Identifying Engine Mount Components - Anti-Roll
Courtesy of FORD MOTOR CO.

Removal and Installation

1. Remove the air cleaner outlet pipe. For additional information, refer to **REMOVAL AND INSTALLATION**.
2. Remove the 4 throttle body bolts and position the throttle body aside.
 - To install, tighten to 10 N.m (89 lb-in).
3. Remove the roll restrictor cross brace-to-roll restrictor bolt.
 - To install, clean the bolt using a wire brush, apply new threadlock to the threads and tighten to 48 Nm (35 lb-ft).

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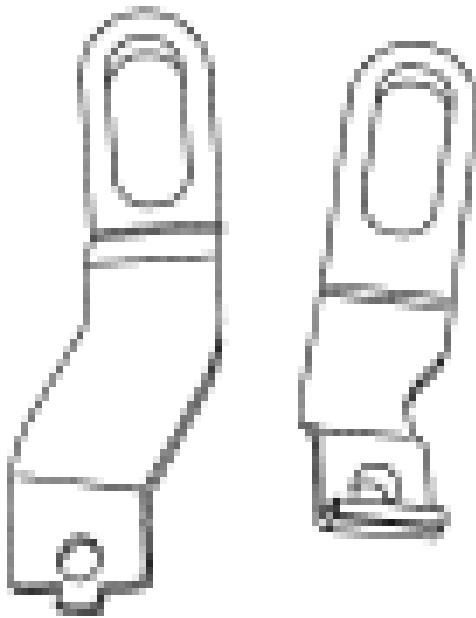
2006 ENGINE Engine - Five Hundred, Freestyle & Montego

4. Remove the 4 roll restrictor cross brace-to-strut tower bolts and the crossbar.
 - To install, clean the bolts using a wire brush, apply new threadlock to the threads and tighten to 55 Nm (41 lb-ft).
5. Remove the 4 roll restrictor support bracket bolts and the support bracket.
 - To install, clean the bolts using a wire brush, apply new threadlock to the threads and tighten to 55 Nm (41 lb-ft).
6. Detach the wiring retainer from the roll restrictor.
7. Remove the 2 bolts and the roll restrictor.
 - To install, clean the bolt using a wire brush, apply new threadlock to the threads and tighten to 55 Nm (41 lb-ft).
8. To install, reverse the removal procedure.

REMOVAL

ENGINE

SPECIAL TOOL(S)



ST2463-A

Lifting Brackets, Engine 134-00243 or equivalent

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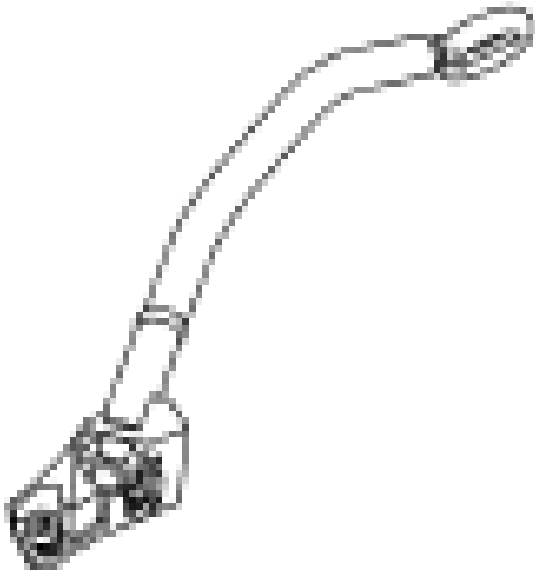
Powertrain Lift with Tilting Plate 014-00765



Spreader Bar 303-D089 (D93P-6001-A3) or equivalent

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ST2873-A

Engine Lifting Bracket Set 303-1140

Removal

WARNING:

Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited, resulting in possible personal injury.

Fuel in the fuel system remains under high pressure even when the engine is not running. Before repairing or disconnecting any of the fuel system components, the fuel system pressure must be relieved to prevent accidental spraying of fuel, causing personal injury or a fire hazard.

All vehicles

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING & LIFTING**.
2. Release the fuel system pressure. For additional information, refer to **FUEL SYSTEM PRESSURE RELEASE**.
3. Disconnect the negative and positive battery cables. For additional information, refer to **REMOVAL AND INSTALLATION**.
4. Recover the A/C system. For additional information, refer to **REFRIGERANT SYSTEM RECOVERY**.
5. Remove the air cleaner outlet pipe and air cleaner. For additional information, refer to **REMOVAL AND**

INSTALLATION .

6. Remove the cowl vent panel. For additional information, refer to **REMOVAL AND INSTALLATION** .
7. Drain the cooling system. For additional information, refer to **DRAINING** .
8. Remove the LH and RH halfshafts. For additional information, refer to **REMOVAL** and **REMOVAL** .
9. Remove the exhaust flex pipe and LH catalytic converter. For additional information, refer to **REMOVAL AND INSTALLATION** .
10. Remove and discard the roll restrictor cross brace-to-roll restrictor bolt.

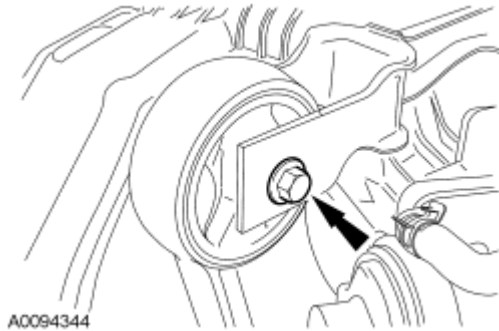


Fig. 108: Locating Upper Roll Restrictor Bolt
Courtesy of FORD MOTOR CO.

11. Remove and discard the 4 roll restrictor cross brace bolts and the cross brace.

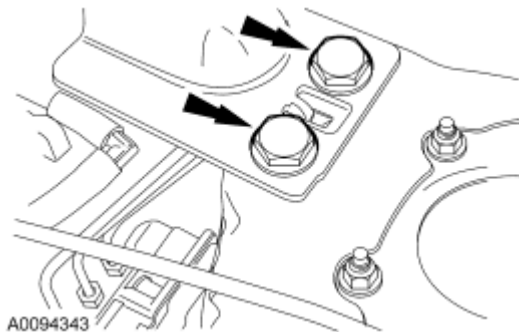


Fig. 109: Identifying Transaxle Roll Restrictor Bar Bolts
Courtesy of FORD MOTOR CO.

12. Remove the bolt and detach the ground strap from the RH fender.

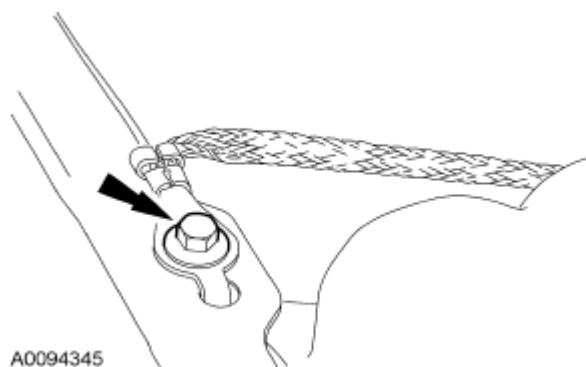


Fig. 110: Locating Fender Bolt
Courtesy of FORD MOTOR CO.

13. Disconnect the redundant clip, press the quick release coupling button and disconnect the fuel tube from the fuel rail.

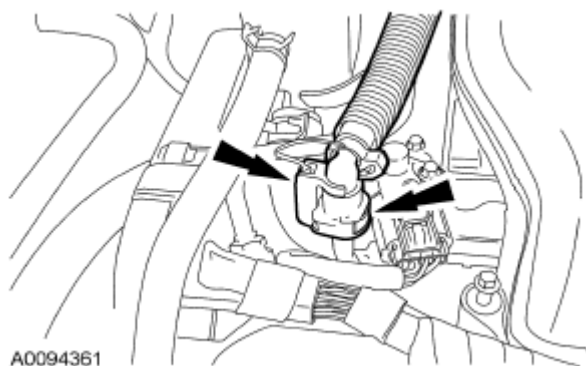


Fig. 111: Locating Quick Release Coupling Button
Courtesy of FORD MOTOR CO.

14. Detach the fuel tube clip from the upper intake manifold.

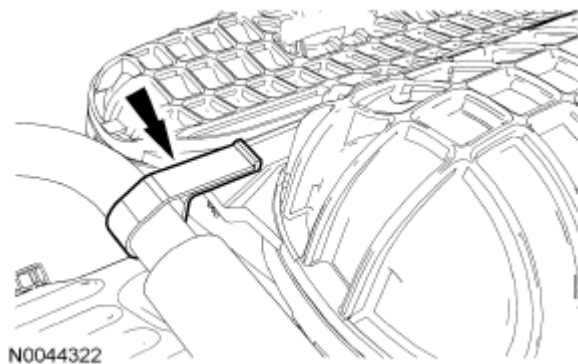


Fig. 112: Locating Fuel Tube Clip
Courtesy of FORD MOTOR CO.

15. Disconnect the vapor tube from the purge valve.

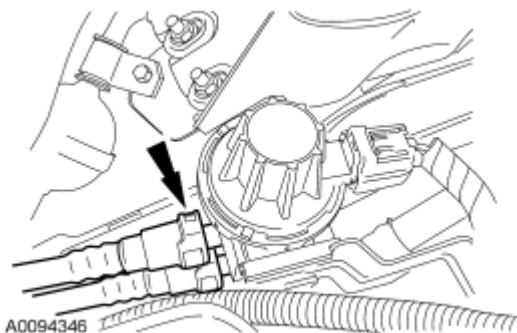


Fig. 113: Locating Vapor Tube
Courtesy of FORD MOTOR CO.

16. Disconnect the 2 powertrain control module (PCM) electrical connectors and detach the wiring conduit.

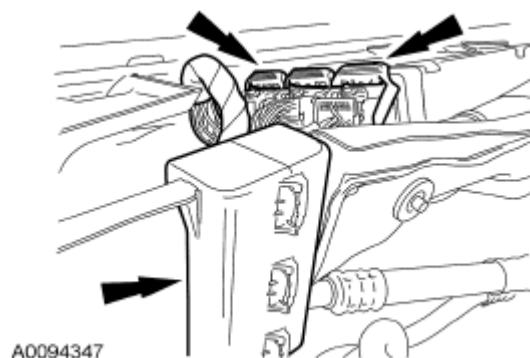


Fig. 114: Locating Powertrain Control Module (PCM) Electrical Connectors
Courtesy of FORD MOTOR CO.

17. Disconnect the power steering reservoir hose and detach the retainer.

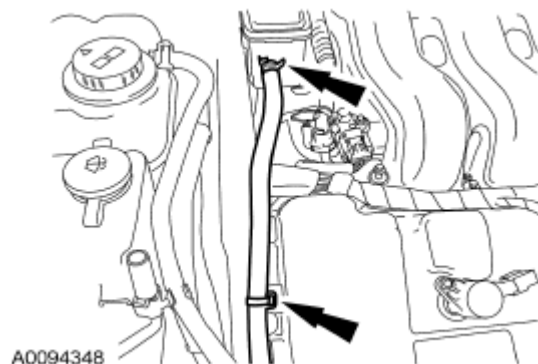


Fig. 115: Locating Power Steering Reservoir Hose Retainer
Courtesy of FORD MOTOR CO.

18. Remove the bolt and detach the ground wire from the LH fender.

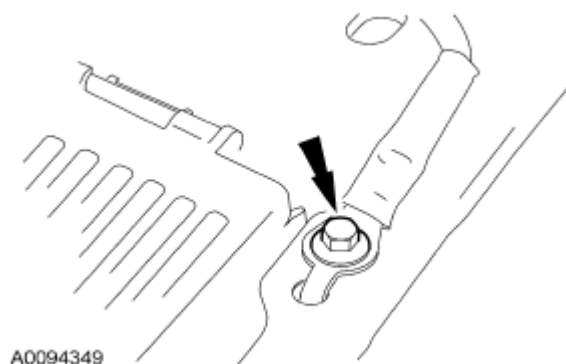


Fig. 116: Locating Fender Bolt
Courtesy of FORD MOTOR CO.

19. Remove the nut and detach the B+ terminal from the battery cable.

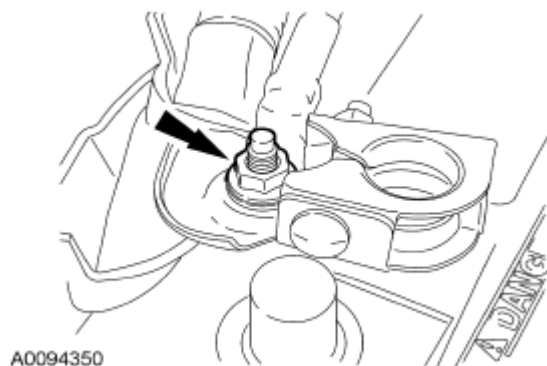


Fig. 117: Locating Battery Cable Nut
Courtesy of FORD MOTOR CO.

Vehicles with CVT transaxle

20. Disconnect the shift cable.

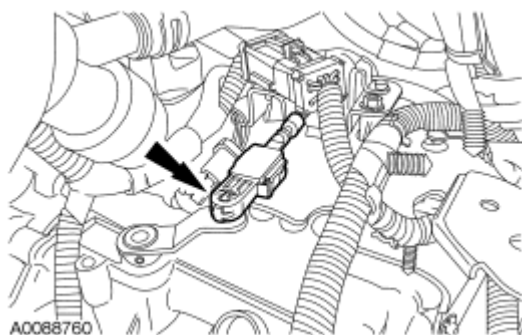


Fig. 118: Locating Shift Cable End

Courtesy of FORD MOTOR CO.

21. Disconnect the 16-pin electrical connector and detach the wiring retainers.
 - Detach the electrical connector from the shift cable bracket.

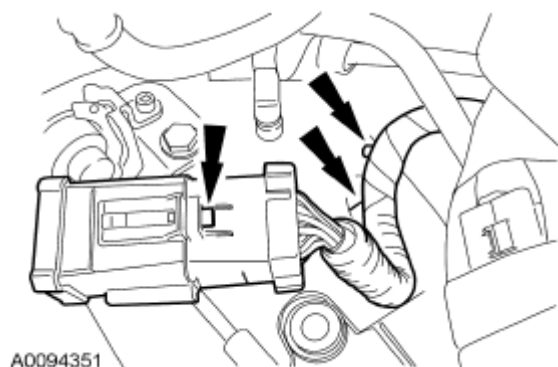


Fig. 119: Locating Electrical Connector From Shift Cable Bracket
Courtesy of FORD MOTOR CO.

22. Remove the 2 bolts and position the shift cable aside.

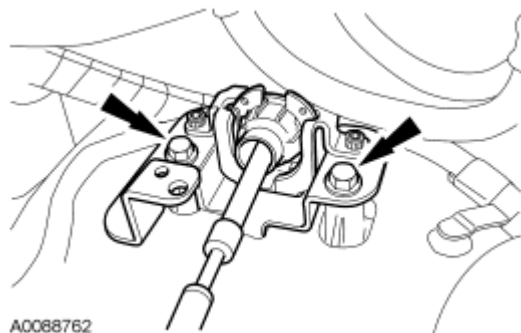


Fig. 120: Locating Shift Cable Bracket Bolts
Courtesy of FORD MOTOR CO.

Vehicles with 6-speed transaxle

23. Disconnect the shift cable.

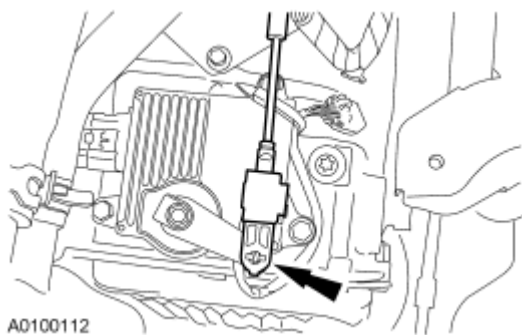


Fig. 121: Locating Shift Cable End
Courtesy of FORD MOTOR CO.

24. Disconnect the 16-pin electrical connector and detach the wiring retainer.
- Disconnect the electrical connector from the shift cable bracket.

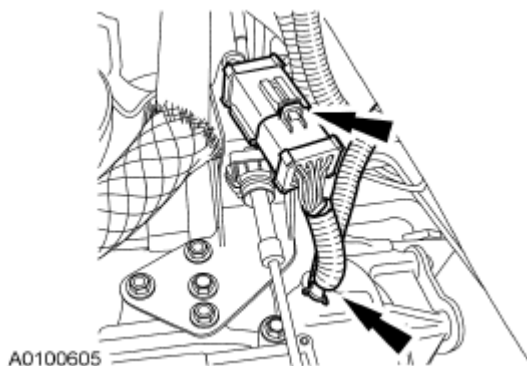


Fig. 122: Locating Electrical Connector From Shift Cable Bracket
Courtesy of FORD MOTOR CO.

25. Remove the 3 shift cable bracket bolts and position the cable and bracket aside.

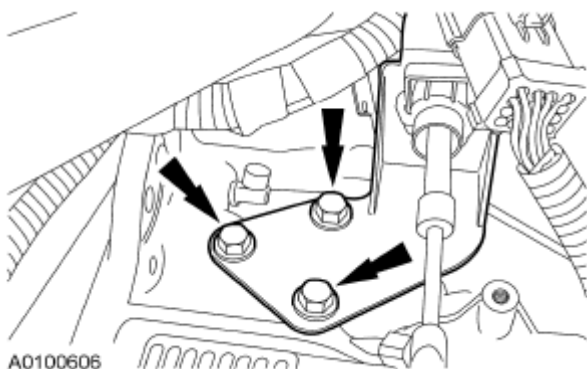


Fig. 123: Locating Shift Cable Bracket Bolts
Courtesy of FORD MOTOR CO.

All vehicles

26. Disconnect the heater hose and the positive crankcase ventilation (PCV) coolant hose.

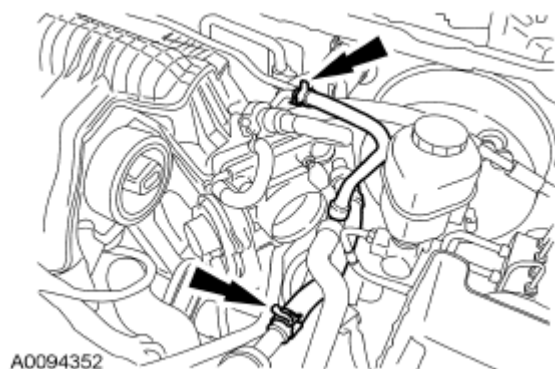


Fig. 124: Locating Positive Crankcase Ventilation (PCV) Coolant Hose
Courtesy of FORD MOTOR CO.

27. Disconnect the brake booster vacuum hose from the upper intake manifold.

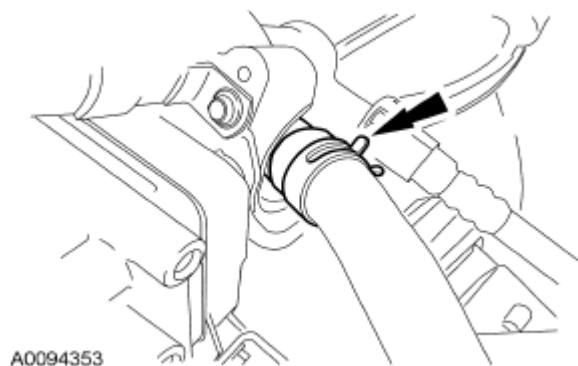


Fig. 125: Locating Brake Booster Vacuum Hose
Courtesy of FORD MOTOR CO.

28. Disconnect the coolant hoses from the thermostat housing.

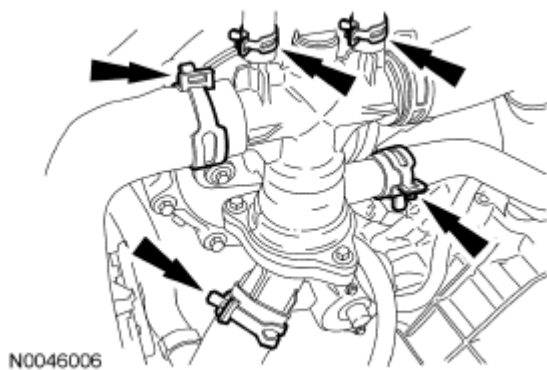


Fig. 126: Locating Coolant Hoses From Thermostat Housing
Courtesy of FORD MOTOR CO.

29. Detach the coolant tube retainers.

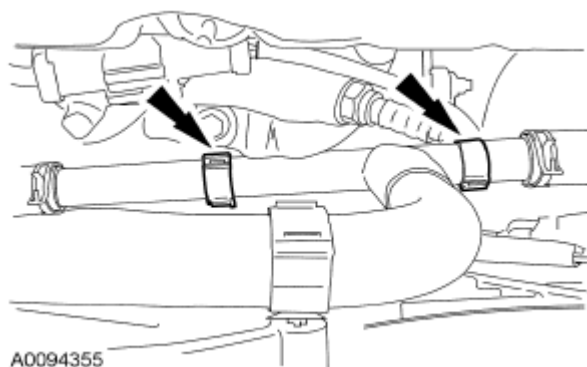


Fig. 127: Locating Coolant Tube Retainers
Courtesy of FORD MOTOR CO.

30. Disconnect the 10-pin electrical connector and detach the wiring retainers.

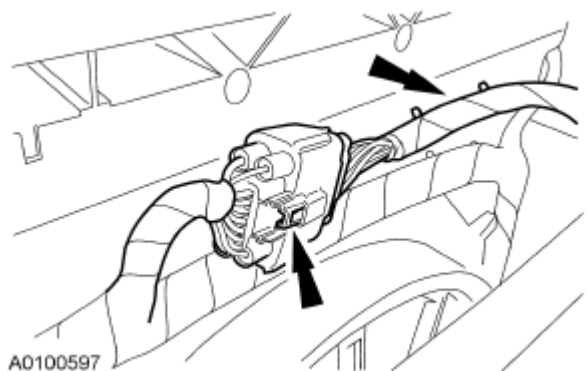


Fig. 128: Locating 10-Pin Electrical Connector
Courtesy of FORD MOTOR CO.

31. Disconnect the A/C high-pressure switch electrical connector.

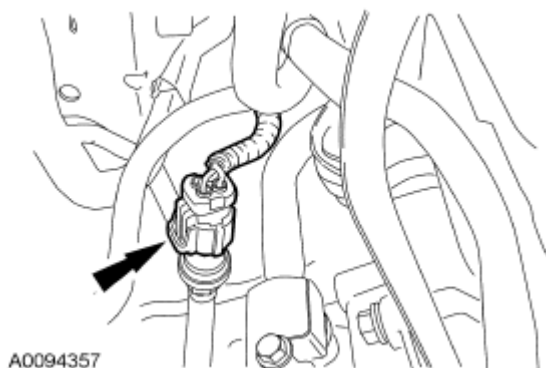


Fig. 129: Locating A/C High-Pressure Switch Electrical Connector

Courtesy of FORD MOTOR CO.

32. Remove the bolt and disconnect the A/C compressor manifold tube assembly.

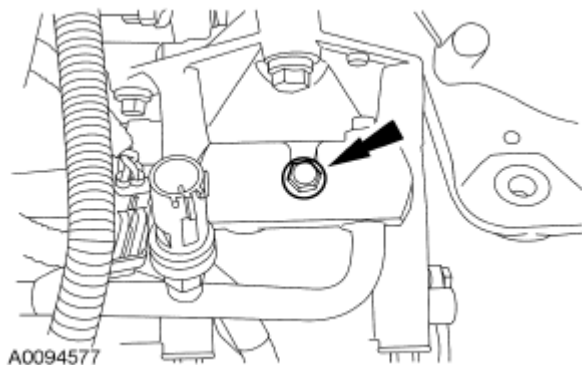


Fig. 130: Locating A/C Compressor Manifold Tube Assembly Bolt
Courtesy of FORD MOTOR CO.

33. Remove the nut and position the A/C tubes aside.

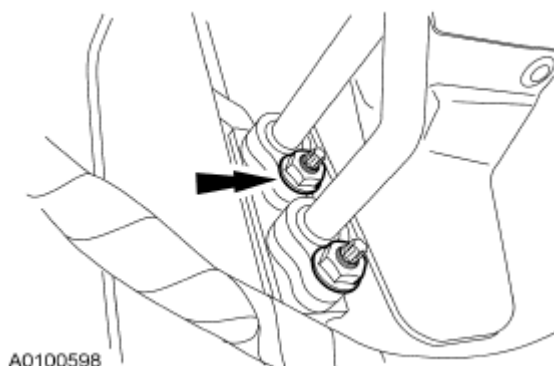


Fig. 131: Locating A/C Tubes Nut
Courtesy of FORD MOTOR CO.

34. Disconnect the transmission cooler hoses.

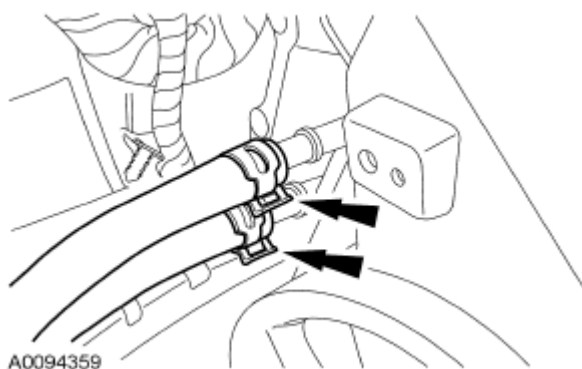


Fig. 132: Locating Transmission Cooler Hoses
Courtesy of FORD MOTOR CO.

35. Disconnect the power steering cooler hose.

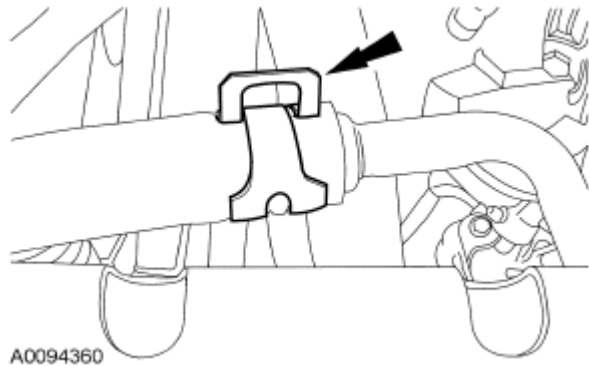


Fig. 133: Locating Power Steering Cooler Hose
Courtesy of FORD MOTOR CO.

36. Remove the engine oil pan drain plug and drain the engine oil.
- Install the plug and tighten to 26 N.m (19 lb-ft).

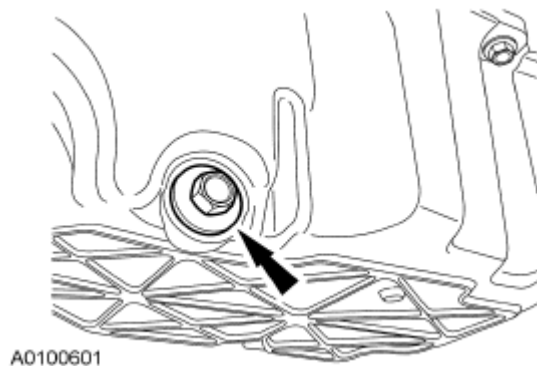


Fig. 134: Locating Engine Oil Pan Drain Plug
Courtesy of FORD MOTOR CO.

37. If equipped, disconnect the block heater electrical connector and detach the wiring harness.

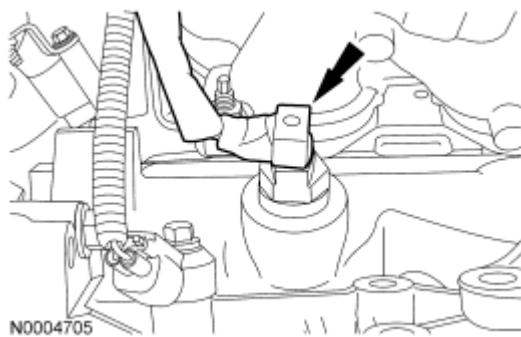


Fig. 135: Locating Block Heater Electrical Connector
Courtesy of FORD MOTOR CO.

38. Remove the 2 pin-type retainers and the torque converter lower access plug.

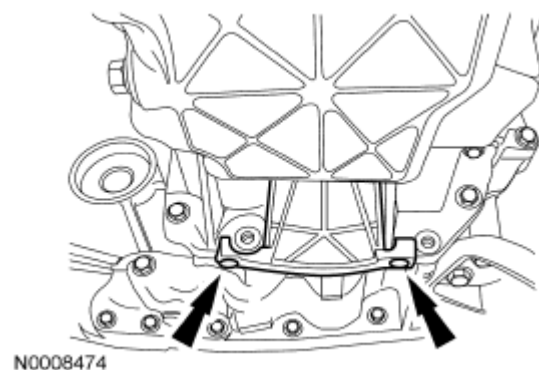


Fig. 136: Locating Torque Converter Lower Access Plug
Courtesy of FORD MOTOR CO.

39. Remove and discard the 4 torque converter nuts.



Fig. 137: Locating Torque Converter Nuts
Courtesy of FORD MOTOR CO.

40. Remove the 3 engine-to-transaxle bolts and the LH catalytic converter bracket.

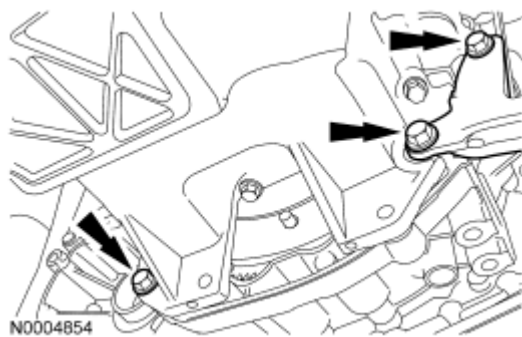


Fig. 138: Locating Transaxle-To-Engine Bolts
Courtesy of FORD MOTOR CO.

41. If equipped, remove the 2 driveshaft support bracket bolts.

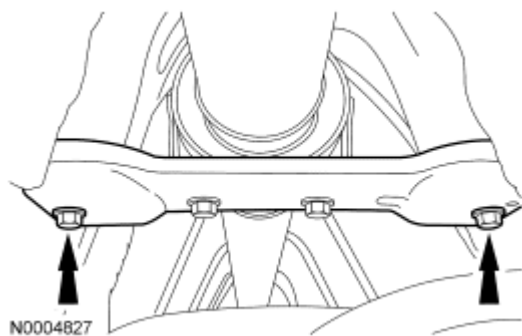


Fig. 139: Identifying Driveshaft Cross Brace Mounting Bolts
Courtesy of FORD MOTOR CO.

42. If equipped, remove the bolts and disconnect the driveshaft.
- Position the driveshaft aside.

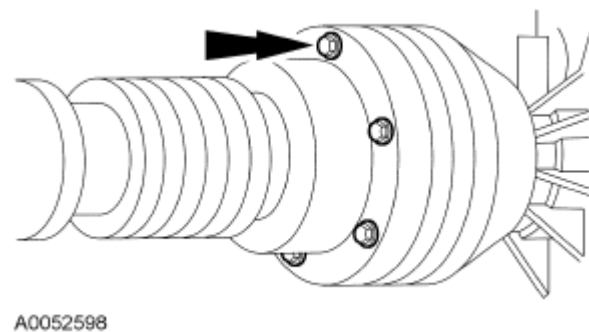


Fig. 140: Locating Driveshaft Bolts
Courtesy of FORD MOTOR CO.

43. Using the special tool, lower the powertrain and subframe from the vehicle.



Fig. 141: Lowering Powertrain & Subframe From Vehicle Using Special Tool
Courtesy of FORD MOTOR CO.

44. Remove the nuts and separate the stabilizer bar links from the struts.

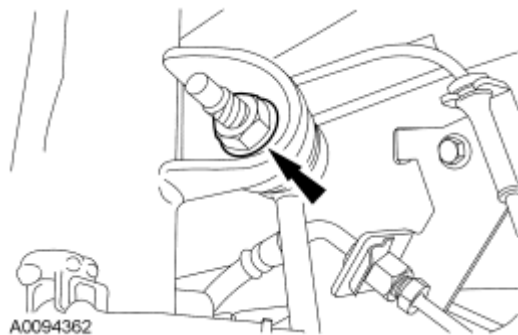


Fig. 142: Identifying Stabilizer Bar Link Nuts
Courtesy of FORD MOTOR CO.

45. Remove the nuts and separate the outer tie rods from the wheel knuckles.
- Discard the nuts.

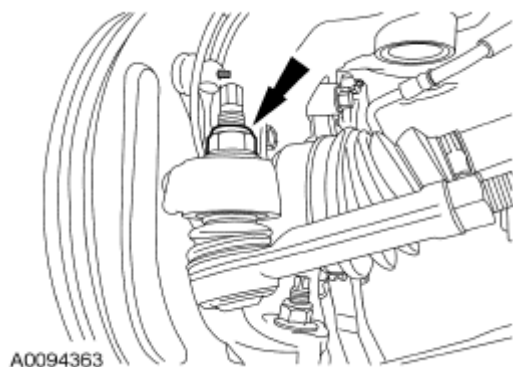


Fig. 143: Locating Outer Tie Rods From Wheel Knuckles Nuts
Courtesy of FORD MOTOR CO.

46. Remove and discard the steering column intermediate shaft bolt.

- Detach the intermediate shaft from the steering gear.

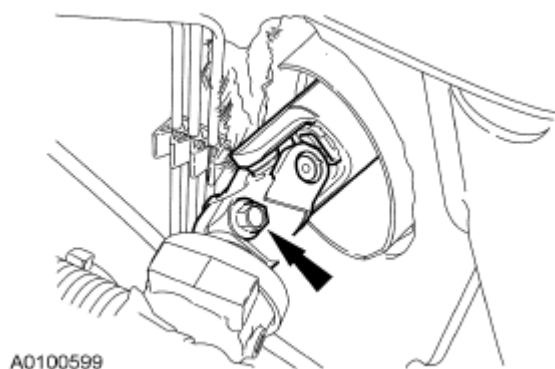


Fig. 144: Locating Intermediate Shaft Bolt
Courtesy of FORD MOTOR CO.

47. Using the special tool, support the powertrain and the subframe.



Fig. 145: Supporting Powertrain & Subframe Using Special Tool
Courtesy of FORD MOTOR CO.

48. Remove the 6 bolts and the 2 rear subframe brackets.

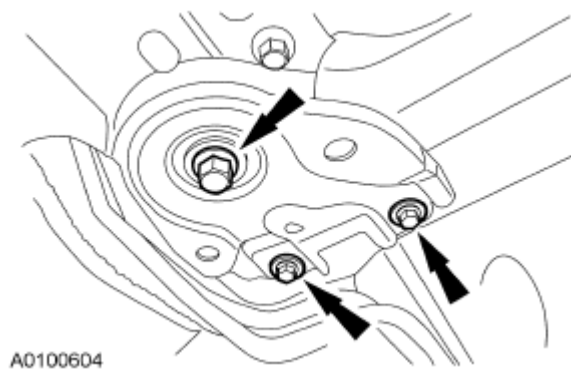


Fig. 146: Locating Rear Subframe Brackets Bolts
Courtesy of FORD MOTOR CO.

49. Remove the 2 forward subframe bolts and washers.

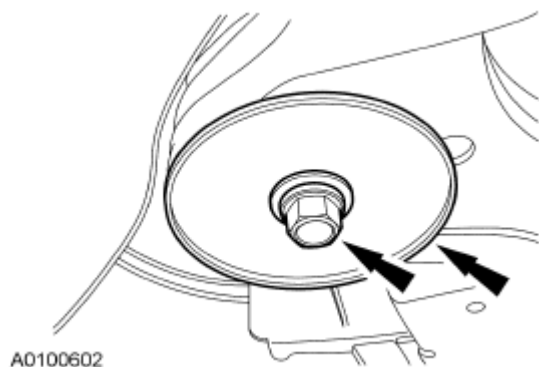


Fig. 147: Locating Subframe Bolts & Washers
Courtesy of FORD MOTOR CO.

50. Remove the power steering pressure (PSP) tube bracket bolt and disconnect the PSP switch electrical connector.

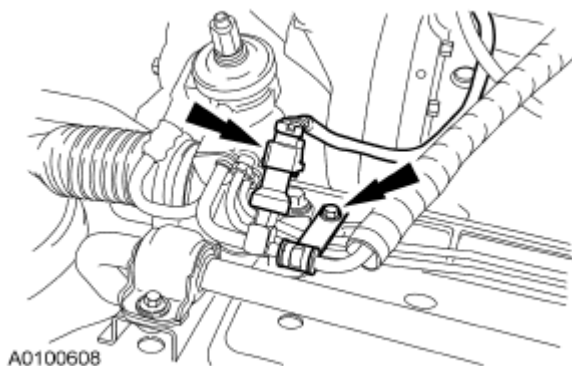


Fig. 148: Locating Power Steering Pressure (PSP) Tube Bracket Bolt
Courtesy of FORD MOTOR CO.

51. Remove the bolt and disconnect the power steering fluid tubes.

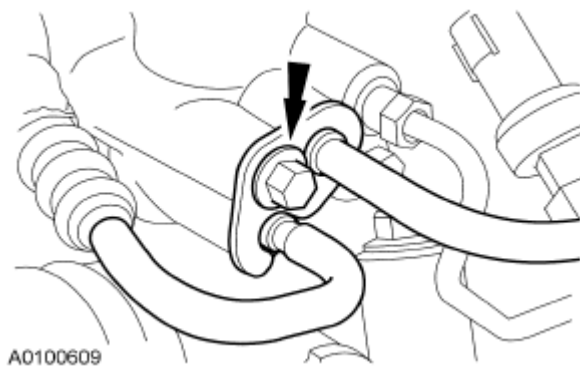


Fig. 149: Locating Power Steering Fluid Tubes Bolt

Courtesy of FORD MOTOR CO.

52. Disconnect the RH catalyst monitor sensor electrical connector and detach the pin-type retainers from the subframe.

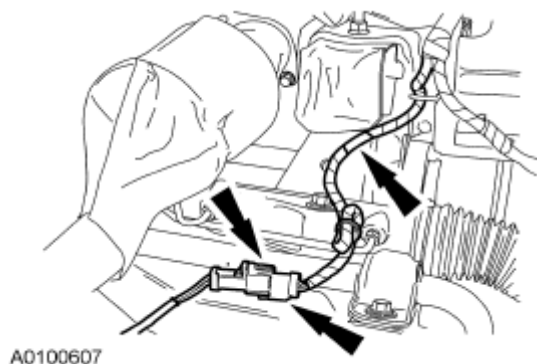


Fig. 150: Locating Catalyst Monitor Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

Vehicles with CVT transaxle

53. Disconnect the transaxle bulkhead electrical connector.

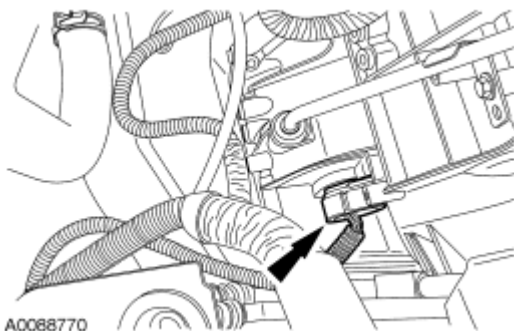


Fig. 151: Locating Transaxle Bulkhead Electrical Connector
Courtesy of FORD MOTOR CO.

54. Detach the wiring harness retainer from the transaxle.

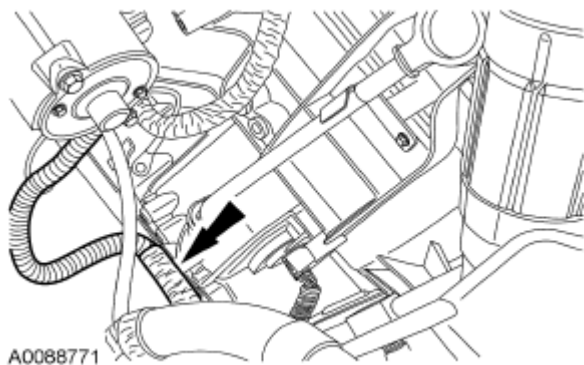


Fig. 152: Locating Wiring Harness Retainer From Transaxle
Courtesy of FORD MOTOR CO.

55. Detach the wiring harness retainers from the transaxle.



Fig. 153: Locating Wire Harness Retainers At Transaxle
Courtesy of FORD MOTOR CO.

56. Detach the lower wiring harness retainers from the transaxle.

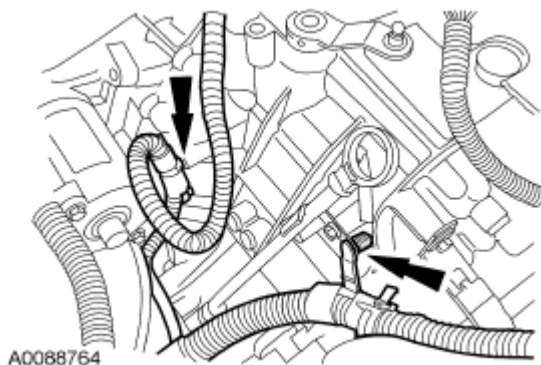


Fig. 154: Locating Lower Wiring Harness Retainers From Transaxle
Courtesy of FORD MOTOR CO.

57. Remove the 4 bolts and the roll restrictor bracket.

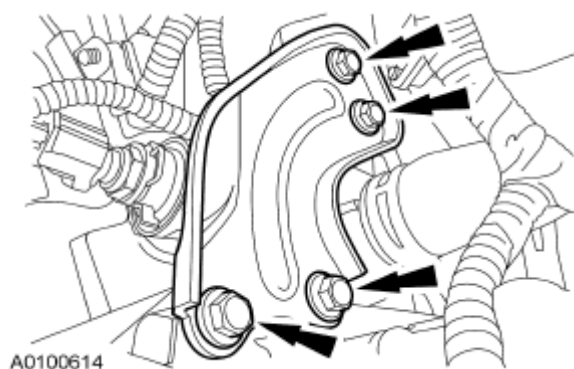


Fig. 155: Locating Roll Restrictor Bracket Bolts
Courtesy of FORD MOTOR CO.

58. Detach the wiring harness from the roll restrictor.



Fig. 156: Locating Wiring Harness At Roll Restrictor Bolts
Courtesy of FORD MOTOR CO.

59. Remove the 2 bolts and the roll restrictor.

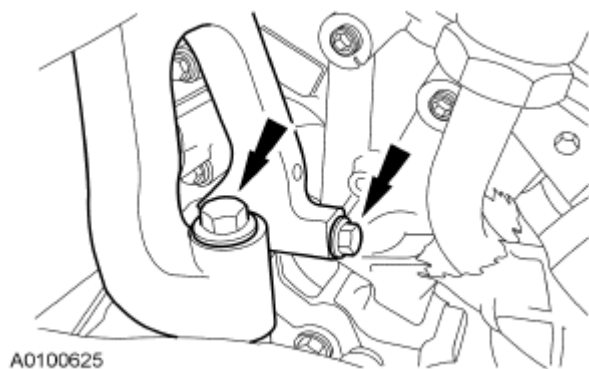


Fig. 157: Locating Roll Restrictor Bolts
Courtesy of FORD MOTOR CO.

60. Remove the starter motor electrical connector cover.

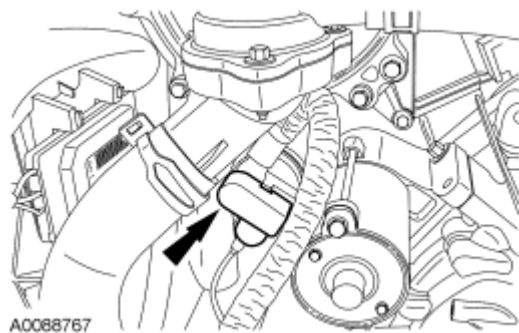


Fig. 158: Identifying Electrical Cover For Starter Motor Electrical Connectors
Courtesy of FORD MOTOR CO.

61. Remove the nuts and disconnect the starter motor wiring.

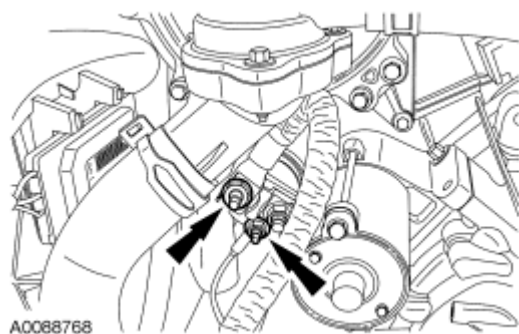


Fig. 159: Identifying Starter Motor Electrical Connectors
Courtesy of FORD MOTOR CO.

62. Remove the 2 bolts and the starter motor.

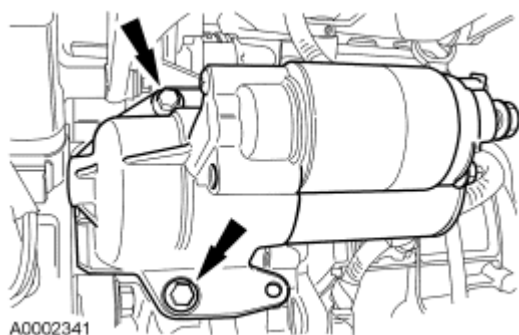


Fig. 160: Identifying Starter Motor Mounting Bolts
Courtesy of FORD MOTOR CO.

63. Remove the bolt and disconnect the ground cable.

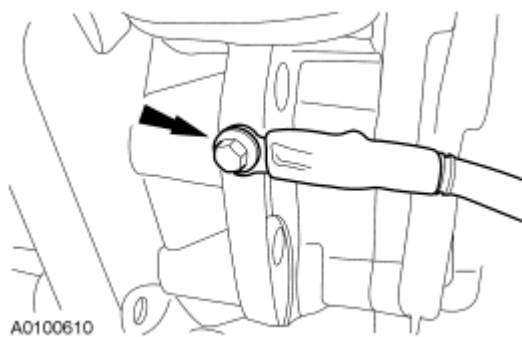


Fig. 161: Locating Ground Wire
Courtesy of FORD MOTOR CO.

Vehicles with 6-speed transaxle

64. Disconnect the wire harness from the transmission control unit (TCU).

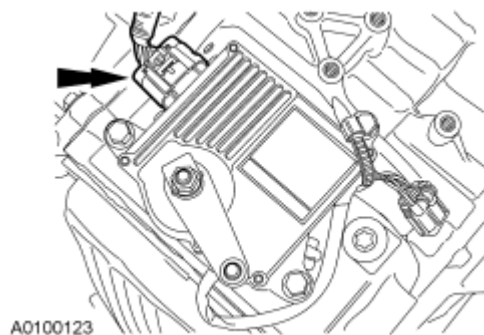


Fig. 162: Identifying Transmission Control Module Electrical Connector
Courtesy of FORD MOTOR CO.

65. Remove the 4 bolts and the roll restrictor bracket.

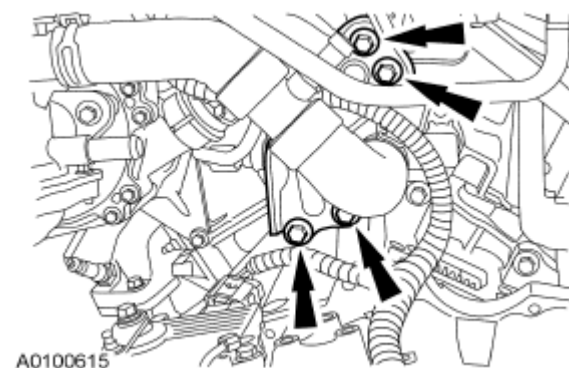


Fig. 163: Locating Roll Restrictor Bracket Bolts
Courtesy of FORD MOTOR CO.

66. Remove the 2 bolts and the roll restrictor.

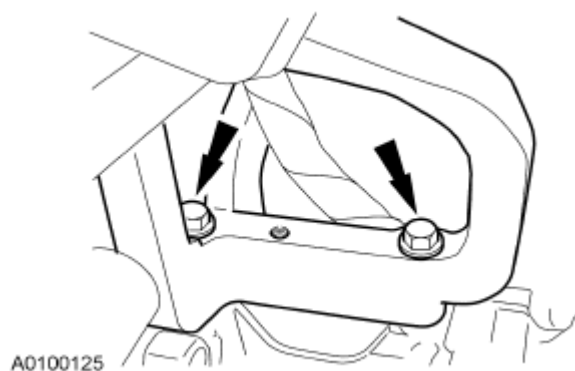


Fig. 164: Locating Roll Restrictor Bolts
Courtesy of FORD MOTOR CO.

67. Remove the starter motor electrical connector cover.

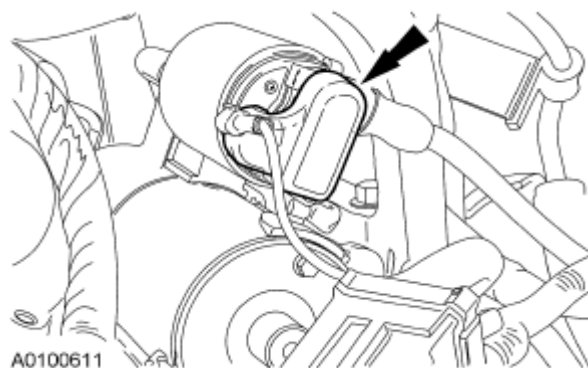


Fig. 165: Locating Starter Motor Electrical Connector Cover
Courtesy of FORD MOTOR CO.

68. Remove the nuts and disconnect the starter motor wiring.

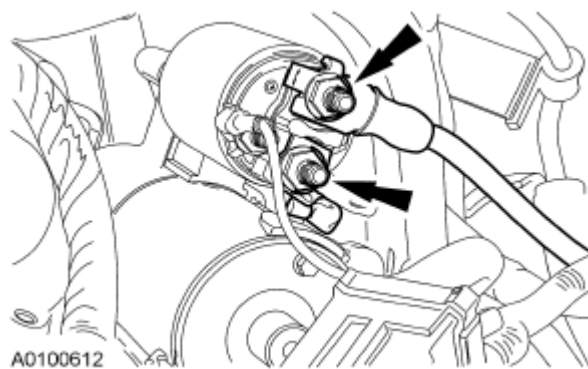


Fig. 166: Locating Starter Motor Wiring Nuts
Courtesy of FORD MOTOR CO.

69. Remove the 2 bolts and the starter motor.

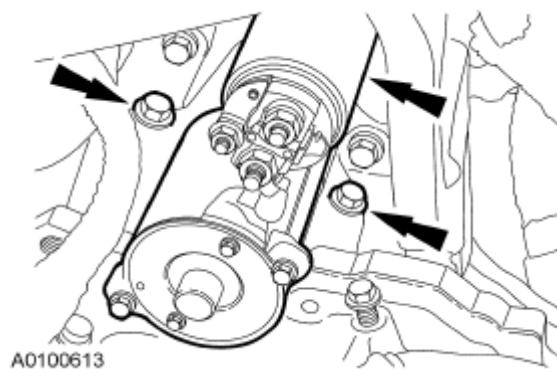


Fig. 167: Locating Starter Motor Bolts
Courtesy of FORD MOTOR CO.

70. Remove the bolt and disconnect the ground cable.

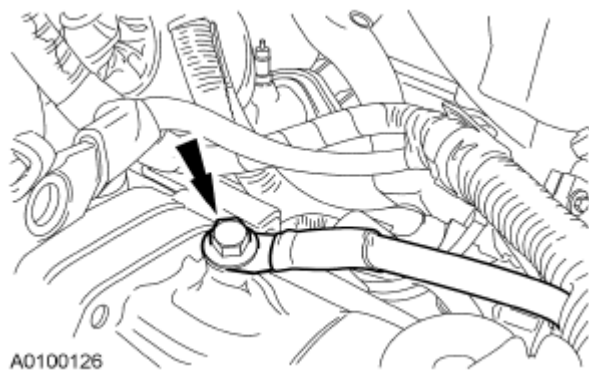


Fig. 168: Locating Ground Cable Bolt
Courtesy of FORD MOTOR CO.

All vehicles

71. Install the special tool to the RH cylinder head.

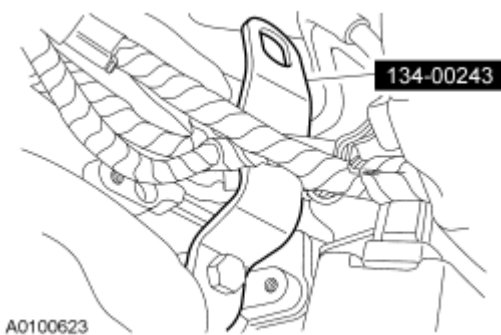


Fig. 169: View Of Special Tool On RH Cylinder Head
Courtesy of FORD MOTOR CO.

72. Install the special tool to the LH cylinder head.

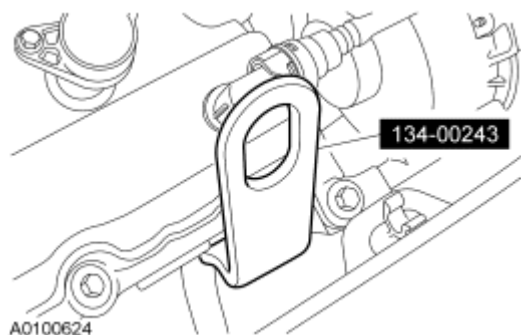


Fig. 170: Special Tool Installed Onto LH Cylinder Head
Courtesy of FORD MOTOR CO.

NOTE: When installing the lower half of the lifting bracket it will be easier to loosely install the upper bolt first then install the lower bolt.

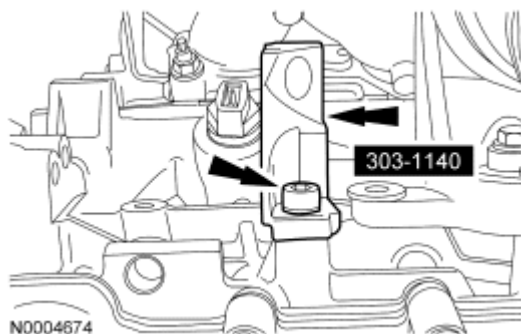


Fig. 171: Identifying Lower Half Of Lifting Hook
Courtesy of FORD MOTOR CO.

73. Install the lower half of the special tool.
74. Install the upper half of the special tool.



Fig. 172: Identifying Upper Half Of Lifting Hook
Courtesy of FORD MOTOR CO.

75. Using the special tools and a suitable engine crane, support the powertrain.

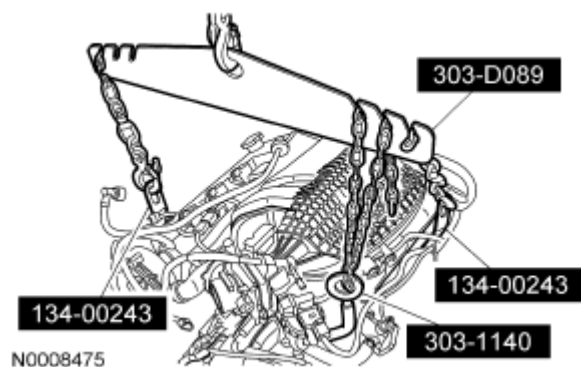


Fig. 173: Supporting Powertrain Using Special Tool
Courtesy of FORD MOTOR CO.

76. Remove the front transaxle stabilizer bolt.

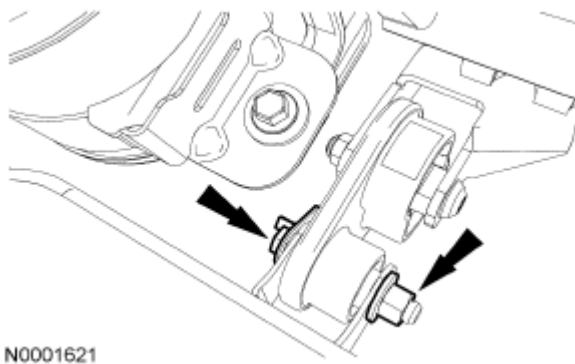


Fig. 174: Locating Front Transaxle Stabilizer Bolt
Courtesy of FORD MOTOR CO.

77. Remove the 3 bolts and the RH exhaust manifold heat shield.

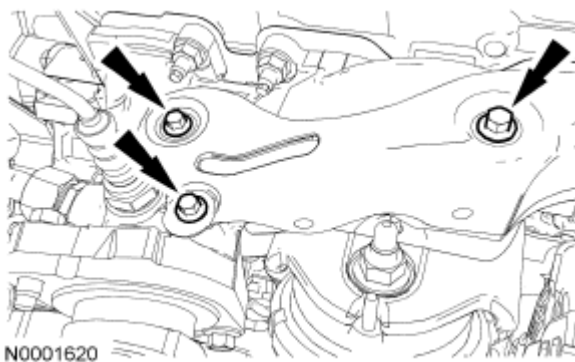


Fig. 175: Locating RH Exhaust Manifold Heat Shield Bolts
Courtesy of FORD MOTOR CO.

78. Remove the RH engine insulator upper nut.

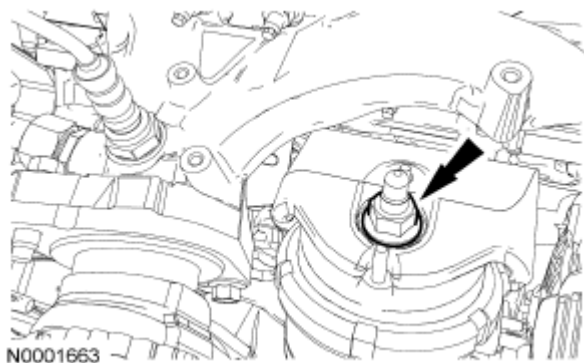


Fig. 176: Locating RH Engine Insulator Upper Nut
Courtesy of FORD MOTOR CO.

79. Remove the LH engine insulator upper nut.

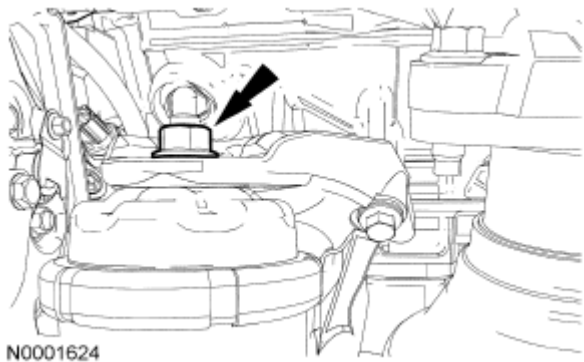


Fig. 177: Locating LH Engine Insulator Upper Nut
Courtesy of FORD MOTOR CO.

80. If equipped, remove the upper power transfer unit (PTU) bracket bolts and the bracket.

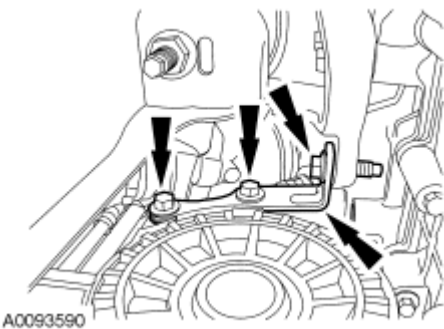


Fig. 178: Identifying Upper PTU Bracket Bolts And Bracket
Courtesy of FORD MOTOR CO.

Vehicles with CVT transaxle

81. Remove the 4 front transaxle insulator bracket bolts.

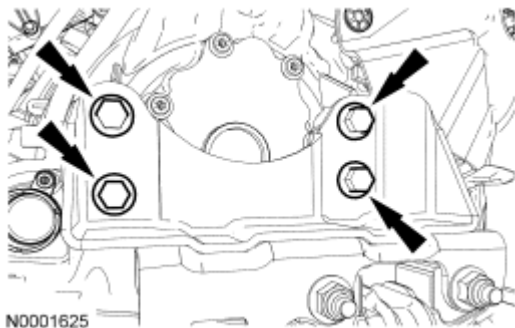


Fig. 179: Locating Transaxle Mount Bolts
Courtesy of FORD MOTOR CO.

Vehicles with 6-speed transaxle

82. Remove the 3 front transaxle insulator bracket bolts.

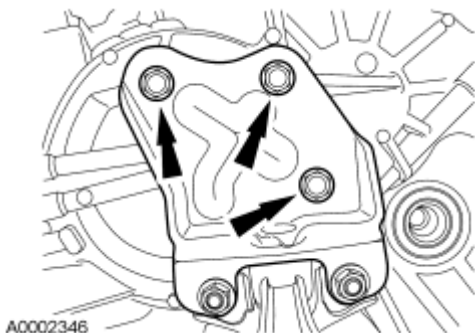


Fig. 180: Identifying Upper Transaxle Mount Retaining Bolts
Courtesy of FORD MOTOR CO.

All vehicles

83. Using the special tools and a suitable engine crane, lift the powertrain off of the subframe.

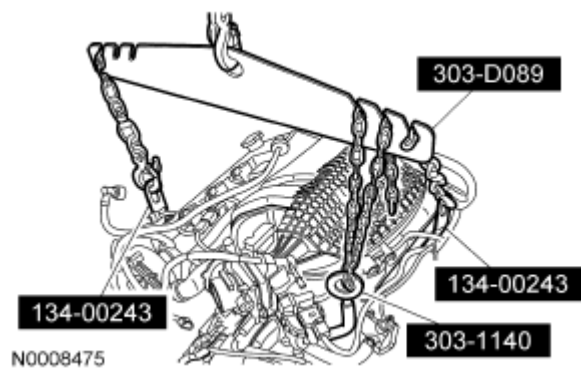


Fig. 181: Lifting Powertrain Off Of Subframe
Courtesy of FORD MOTOR CO.

84. Lower the powertrain and support the transaxle using blocks of wood.
85. Position the knock sensor (KS) heat shield aside.

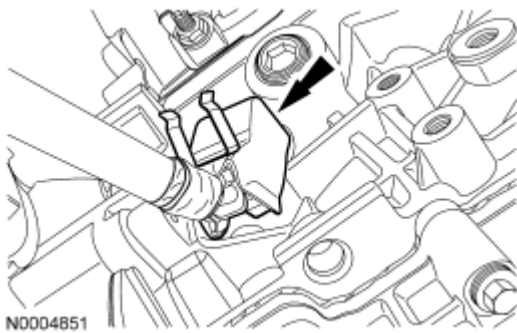


Fig. 182: Identifying Knock Sensor Heat Shield
Courtesy of FORD MOTOR CO.

86. Disconnect the electrical connector and then remove the bolt and the KS.

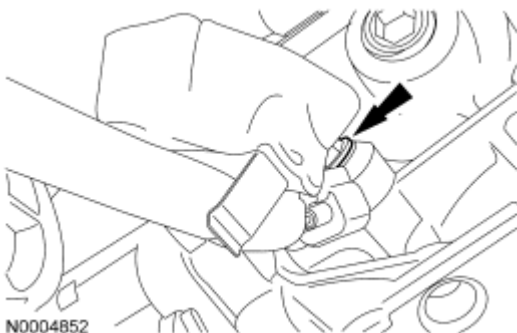


Fig. 183: Locating Knock Sensor
Courtesy of FORD MOTOR CO.

87. Remove the engine-to-transaxle bolt.

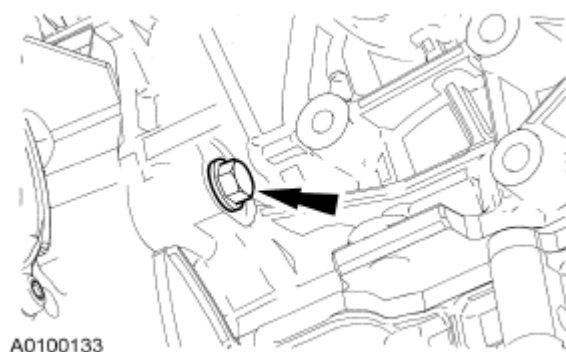


Fig. 184: Locating Engine-To-Transaxle Bolt
Courtesy of FORD MOTOR CO.

Vehicles with CVT transaxle

88. Remove the 4 remaining transaxle-to-engine bolts.
 - Separate the engine from the transaxle.

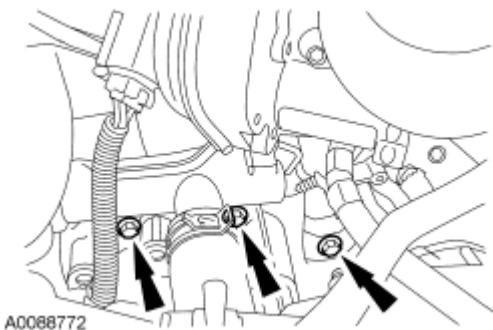


Fig. 185: Identifying Transaxle-To-Engine Bolts
Courtesy of FORD MOTOR CO.

Vehicles with 6-speed transaxle

89. Remove the 4 remaining transaxle-to-engine bolts.
 - Separate the engine from the transaxle.

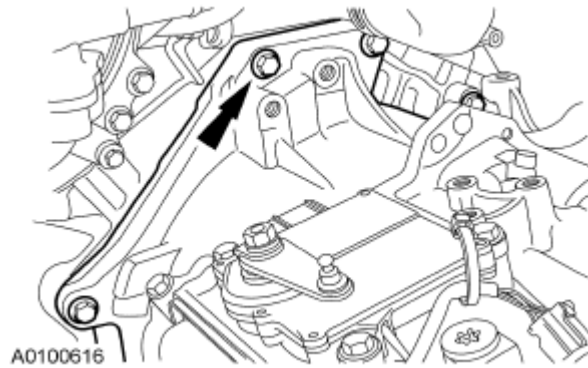
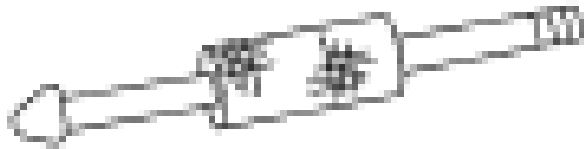


Fig. 186: Locating Transaxle-To-Engine Bolts (6-Speed)
Courtesy of FORD MOTOR CO.

DISASSEMBLY

ENGINE

SPECIAL TOOL(S)



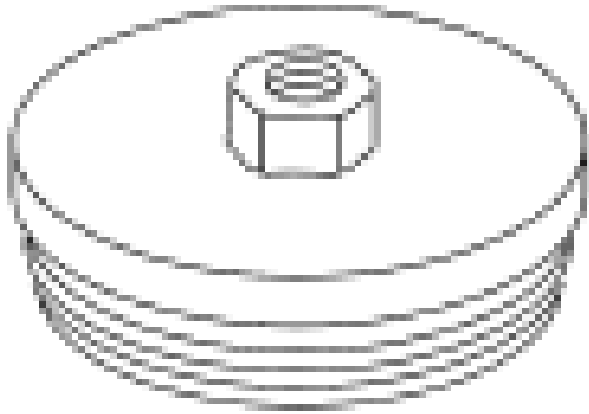
ST1187-A

Slide Hammer 307-005 (T59L-100-B)

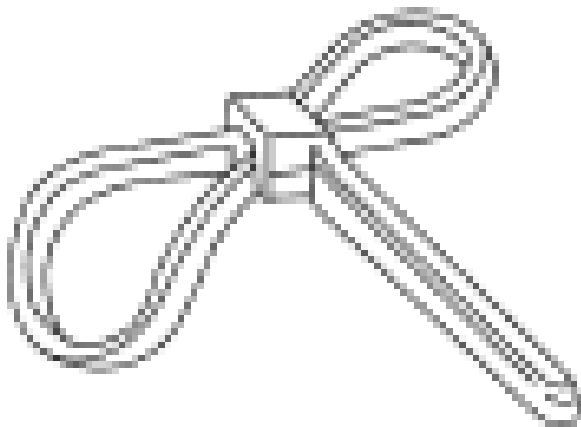
Remover, Crankshaft Rear Oil Seal 303-519
(T95P-6701-EH)

2006 Mercury Montego

2006 ENGINE Engine - Five Hundred, Freestyle & Montego



ST1382-A



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

ST1438-A

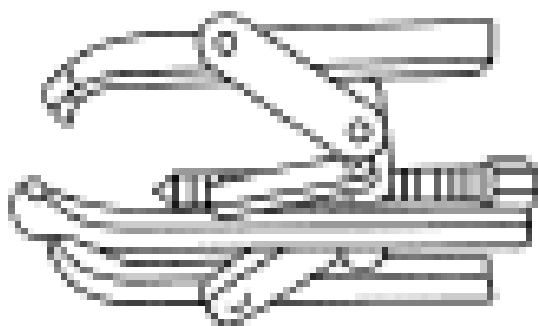
Remover, Oil Seal 303-409 (T92C-6700CH)

2006 Mercury Montego

2006 ENGINE Engine - Five Hundred, Freestyle & Montego



ST1385-A



ST1184-A

3-Jaw Puller 303-D121

MATERIAL

Item	Specification
Silicone Gasket Remover ZC-30	-
Motorcraft Metal Surface Prep ZC-31	-

CAUTION: During engine repair procedures, cleanliness is extremely important. Any foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan, can cause engine failure.

NOTE: For additional information, refer to the exploded view under Engine Assembly.

All vehicles

1. Remove the 8 bolts and the flexplate.

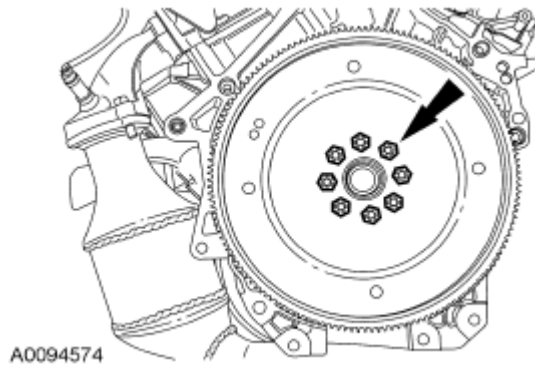


Fig. 187: Locating Flexplate Bolts
Courtesy of FORD MOTOR CO.

2. Using the special tools, remove and discard the crankshaft rear oil seal.

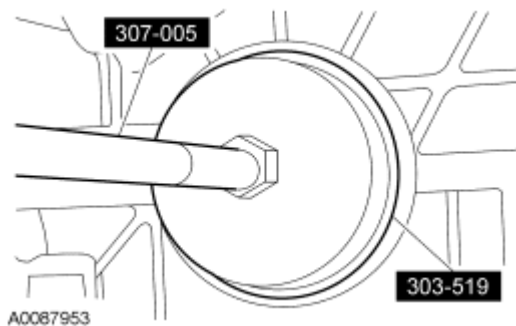


Fig. 188: Identifying Special Tools (307-005 And 303-519)
Courtesy of FORD MOTOR CO.

3. Mount the engine on a suitable stand.

Freestyle only

4. Remove the 3 retainers and the A/C compressor pulley shield.

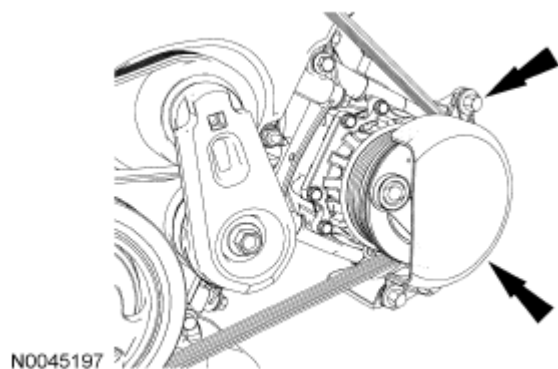


Fig. 189: Locating A/C Compressor Pulley Shield Retainers
Courtesy of FORD MOTOR CO.

All vehicles

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

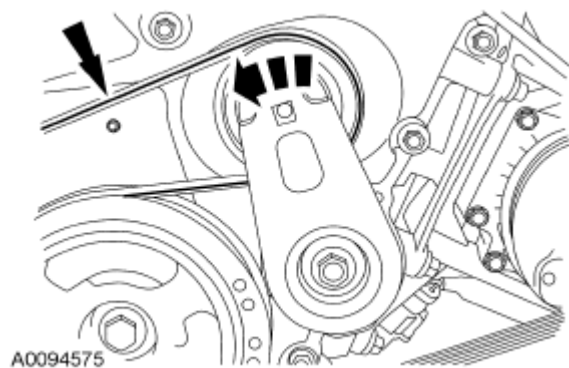


Fig. 190: Locating Accessory Drive Belt
Courtesy of FORD MOTOR CO.

6. Disconnect the A/C compressor electrical connector.

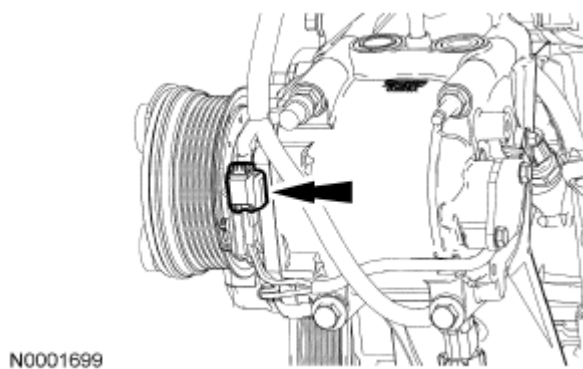


Fig. 191: Locating A/C Compressor Electrical Connector
Courtesy of FORD MOTOR CO.

7. Disconnect the LH catalyst monitor sensor electrical connector and detach the wiring retainer.

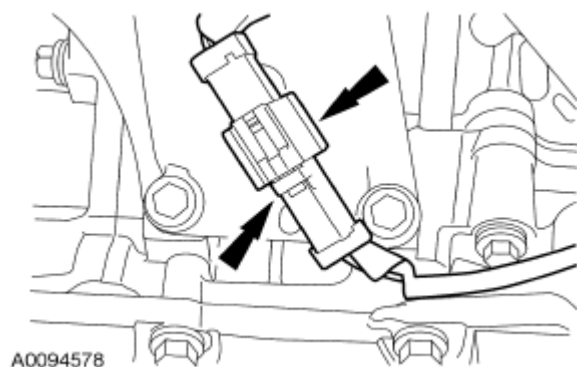


Fig. 192: Locating Catalyst Monitor Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

Freestyle only

8. Remove the 2 nuts, the bolt and the A/C compressor shield.

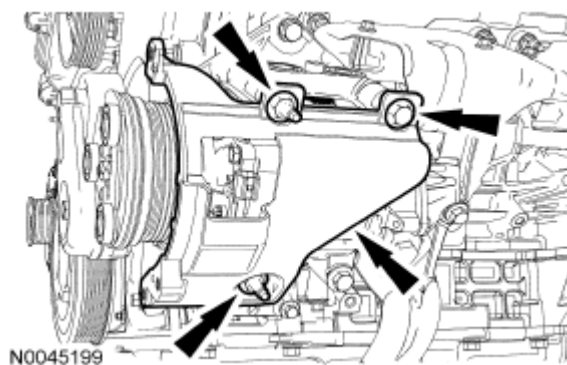


Fig. 193: Locating A/C Compressor Shield Nuts & Bolts
Courtesy of FORD MOTOR CO.

9. Remove the bolt and the A/C compressor.

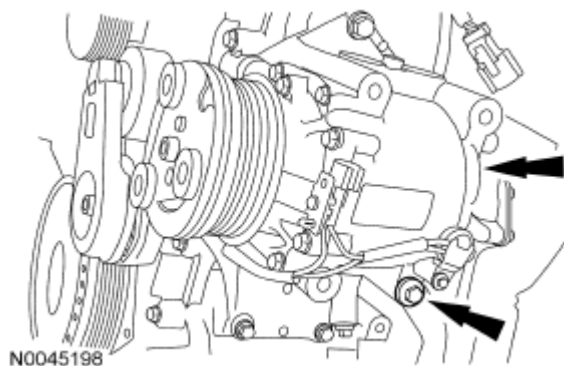


Fig. 194: Locating A/C Compressor Bolts
Courtesy of FORD MOTOR CO.

All vehicles

10. Remove the 2 bolts, 2 nuts and the A/C compressor.

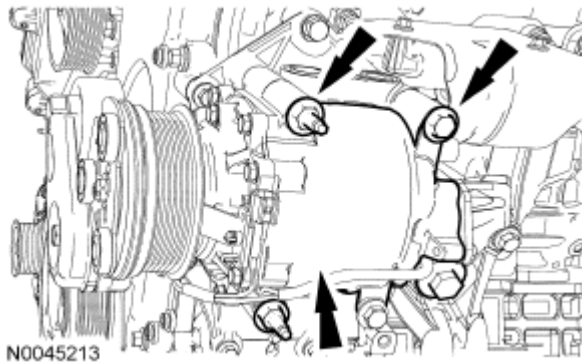


Fig. 195: Locating A/C Compressor Nuts & Bolts
Courtesy of FORD MOTOR CO.

11. Remove the 5 bolts and the A/C compressor bracket.

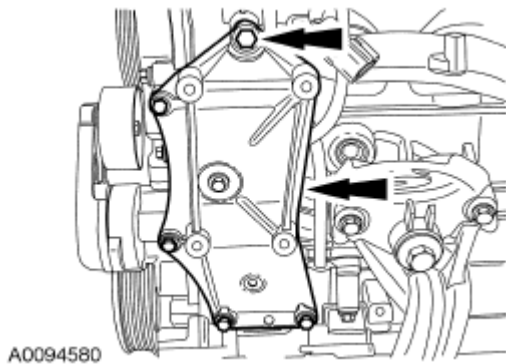


Fig. 196: Locating A/C Compressor Bracket Bolts
Courtesy of FORD MOTOR CO.

12. Disconnect the LH heated oxygen sensor (HO2S) electrical connector and detach the wiring retainer.

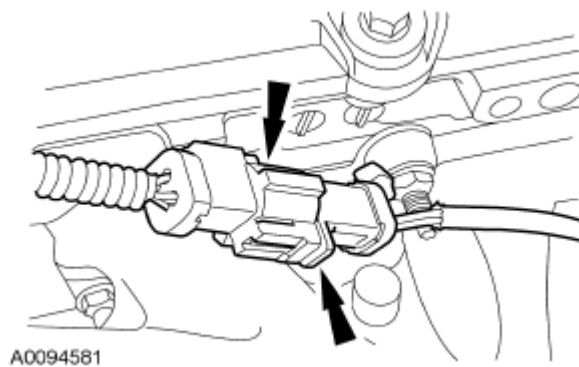


Fig. 197: Locating Heated Oxygen Sensor (HO2S) Electrical Connector
Courtesy of FORD MOTOR CO.

13. Disconnect the oil pressure sensor electrical connector.

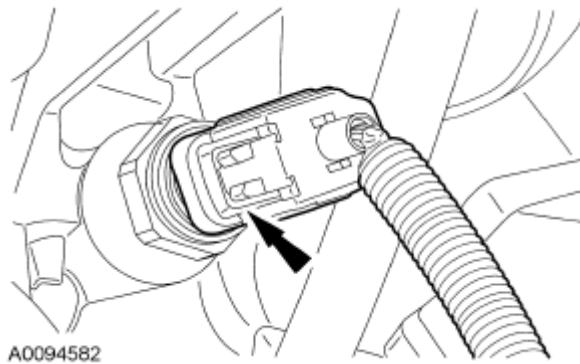


Fig. 198: Locating Oil Pressure Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

14. Remove the 2 nuts, disconnect the camshaft position sensor (CMP) and detach the retainers.

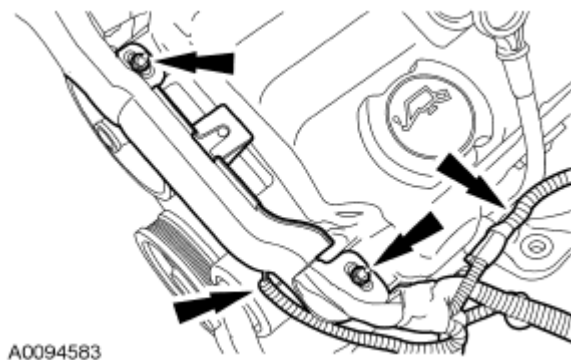


Fig. 199: Locating Retainers & Nuts
Courtesy of FORD MOTOR CO.

15. Loosen the fittings and remove the exhaust gas recirculation (EGR) system module tube.

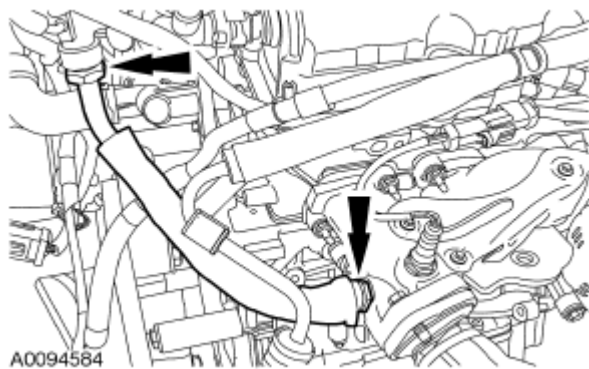


Fig. 200: Locating Exhaust Gas Recirculation (EGR) System Module Tube
Courtesy of FORD MOTOR CO.

16. Disconnect the EGR system module electrical connector.

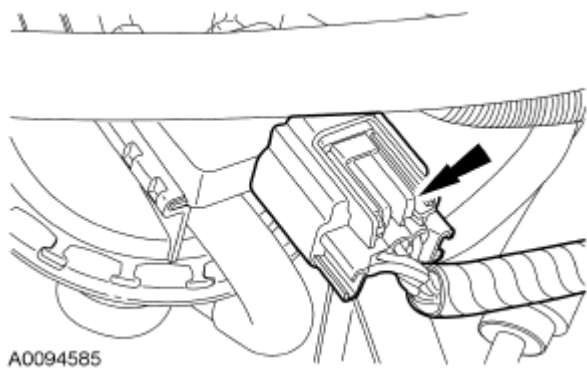


Fig. 201: Locating EGR System Module Electrical Connector
Courtesy of FORD MOTOR CO.

17. Disconnect the throttle body electrical connector.

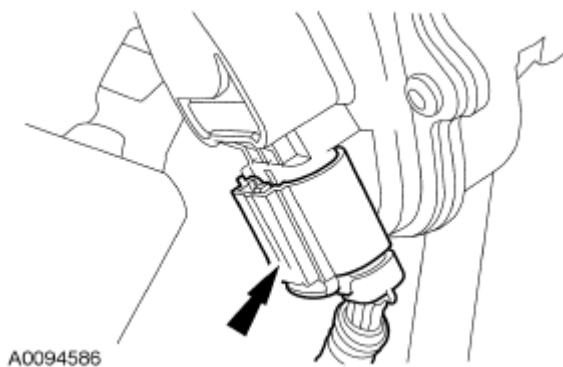


Fig. 202: Locating Throttle Body Electrical Connector
Courtesy of FORD MOTOR CO.

18. Disconnect and remove the positive crankcase ventilation (PCV) tube.

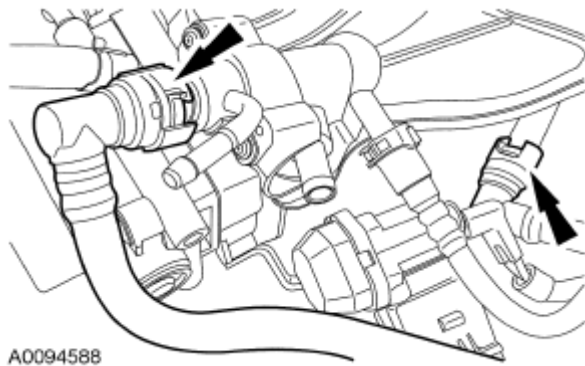


Fig. 203: Locating Positive Crankcase Ventilation (PCV) Tube
Courtesy of FORD MOTOR CO.

19. Disconnect the fuel rail pressure and temperature sensor vacuum tube and electrical connector.

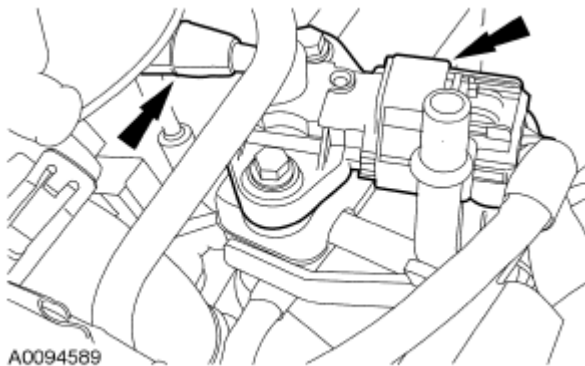


Fig. 204: Locating Temperature Sensor Vacuum Tube
Courtesy of FORD MOTOR CO.

20. Disconnect the fuel charging wiring harness electrical connector.

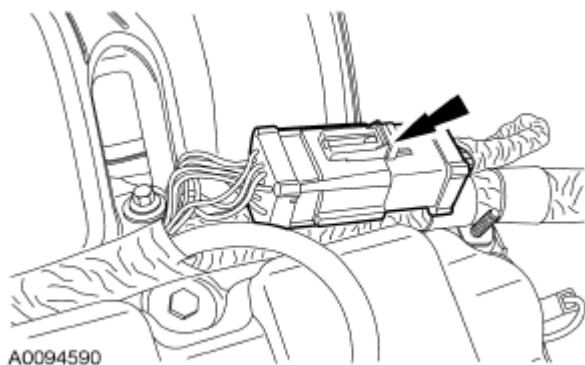


Fig. 205: Locating Fuel Charging Wiring Harness Electrical Connector
Courtesy of FORD MOTOR CO.

21. Disconnect the RH HO2S and detach the retainer.

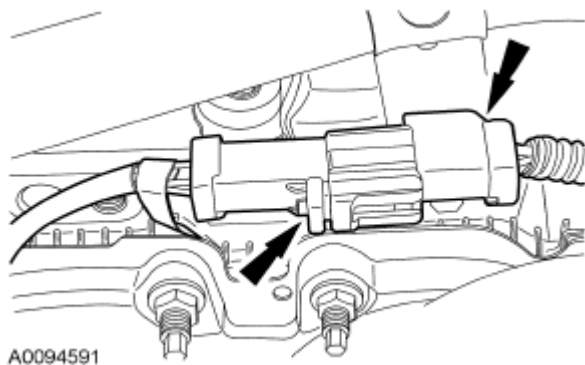


Fig. 206: Locating RH HO2S & Retainer
Courtesy of FORD MOTOR CO.

22. Remove the bolt and detach the power steering tube bracket.

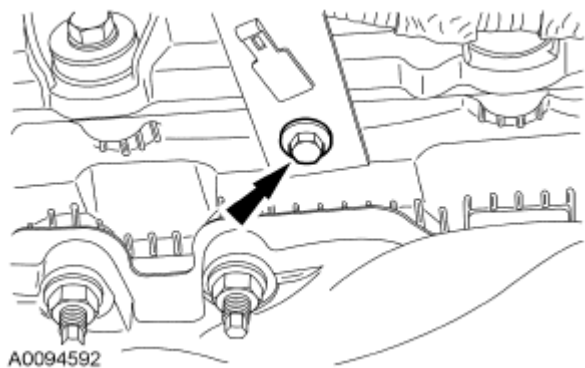


Fig. 207: Locating Power Steering Tube Bracket Bolt (1 Of 2)
Courtesy of FORD MOTOR CO.

23. Remove the bolt and detach the power steering tube bracket.

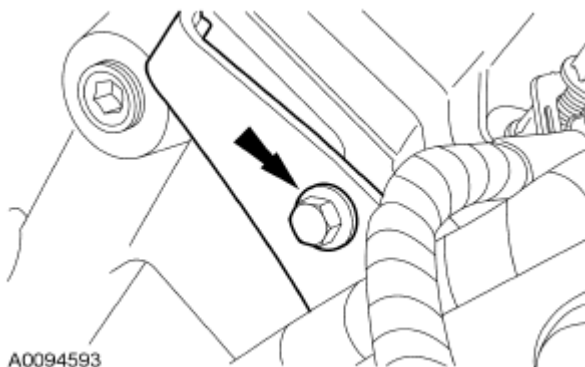


Fig. 208: Locating Power Steering Tube Bracket Bolt (2 Of 2)
Courtesy of FORD MOTOR CO.

24. Remove the 2 nuts and detach the power steering fluid reservoir.

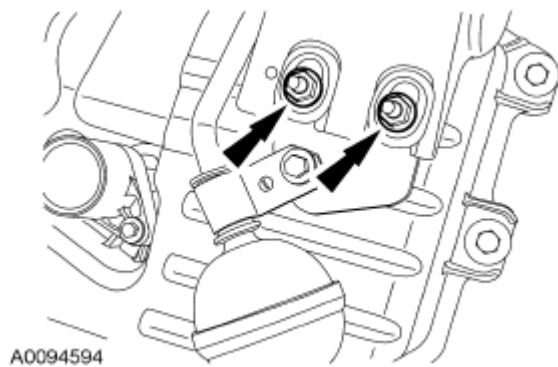


Fig. 209: Locating Power Steering Fluid Reservoir Nuts
Courtesy of FORD MOTOR CO.

25. Remove the power steering fluid reservoir bracket nut.

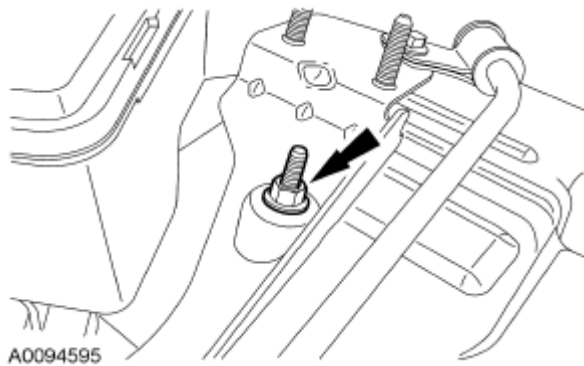


Fig. 210: Locating Power Steering Fluid Reservoir Bracket Nut
Courtesy of FORD MOTOR CO.

26. Remove the 3 nuts and the power steering pump, reservoir and tubes.

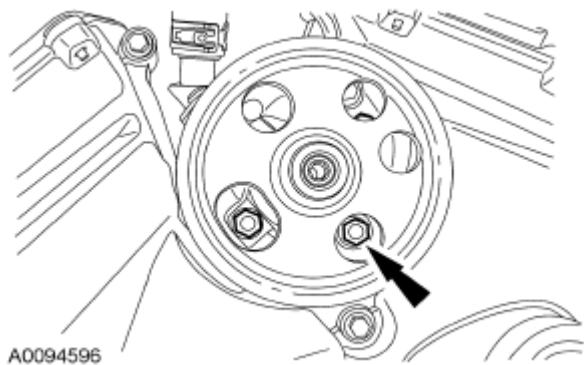


Fig. 211: Locating Power Steering Pump Nuts
Courtesy of FORD MOTOR CO.

27. Remove the 8 bolts and the upper and lower intake manifold.

- Remove and discard the gaskets.

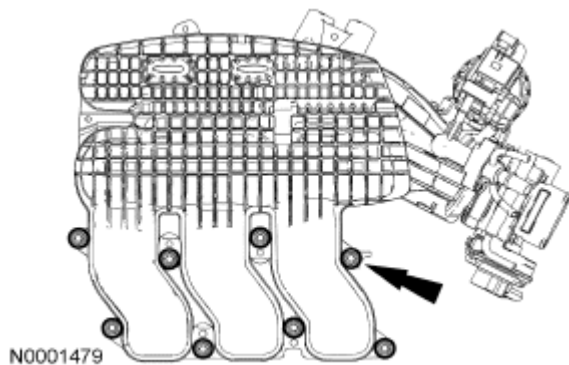


Fig. 212: Locating Upper & Lower Intake Manifold Bolts
Courtesy of FORD MOTOR CO.

28. Remove the nut and position the wiring conduit aside.

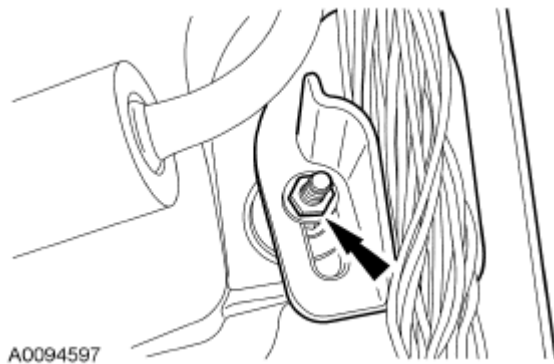


Fig. 213: Locating Wiring Conduit Nut
Courtesy of FORD MOTOR CO.

29. Disconnect the RH ignition coil electrical connectors and detach the wiring retainers.

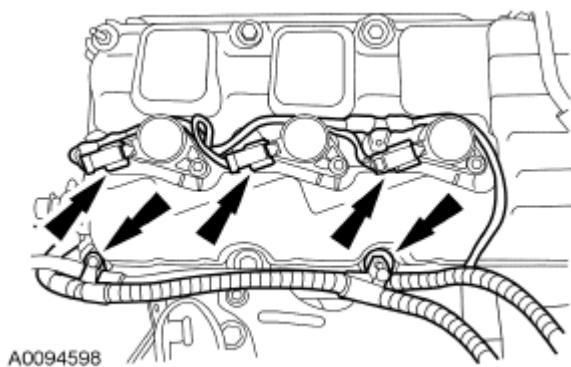


Fig. 214: Locating Ignition Coil Electrical Connectors & Wiring Retainers
Courtesy of FORD MOTOR CO.

30. Remove the nut and disconnect the generator wiring.
- Detach the wiring retainer.

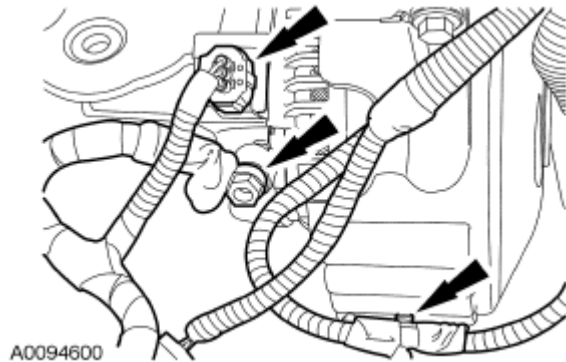


Fig. 215: Locating Generator Wiring Nut
Courtesy of FORD MOTOR CO.

31. Remove the nut and detach the ground wire.

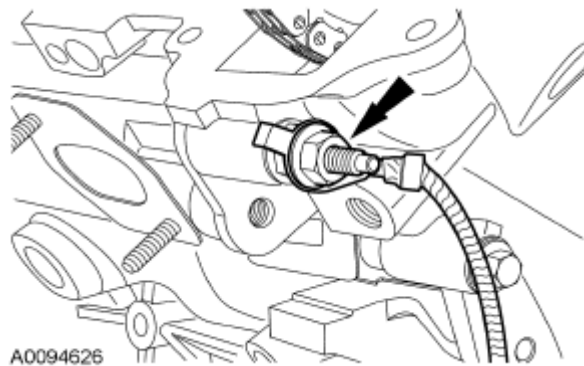


Fig. 216: Locating Ground Wire Nut
Courtesy of FORD MOTOR CO.

32. Disconnect the crankshaft position sensor (CKP) electrical connector and detach the wiring retainer.

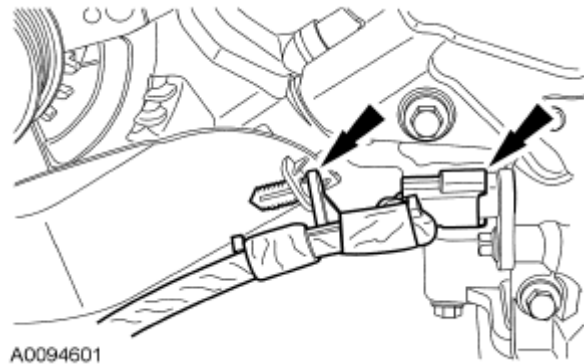


Fig. 217: Locating Crankshaft Position Sensor (CKP) Electrical Connector & Wiring Retainers

Courtesy of FORD MOTOR CO.

33. Disconnect the LH ignition coil electrical connectors and detach the wiring retainers.

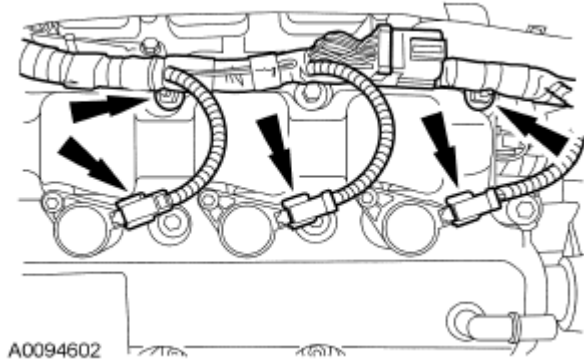


Fig. 218: Locating Ignition Coil Electrical Connectors & Wiring Retainers
Courtesy of FORD MOTOR CO.

34. Disconnect the engine coolant temperature (ECT) sensor and the radio interference capacitor electrical connectors.



Fig. 219: Locating Engine Coolant Temperature (ECT) Sensor
Courtesy of FORD MOTOR CO.

35. Disconnect the bypass and the coolant pump hoses.

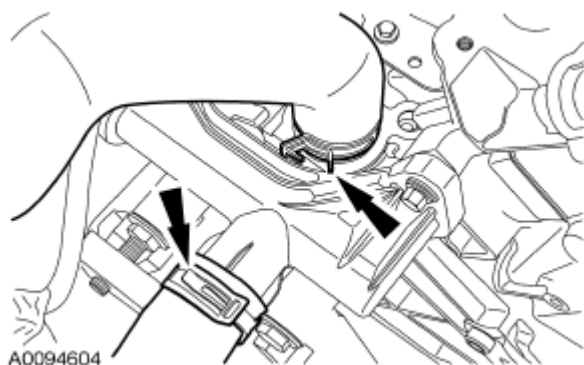


Fig. 220: Locating Coolant Pump Hoses Clamp
Courtesy of FORD MOTOR CO.

36. Remove the engine wiring harness.
37. Remove the stud bolt and the oil level indicator tube.
 - Remove and discard the O-ring seal.

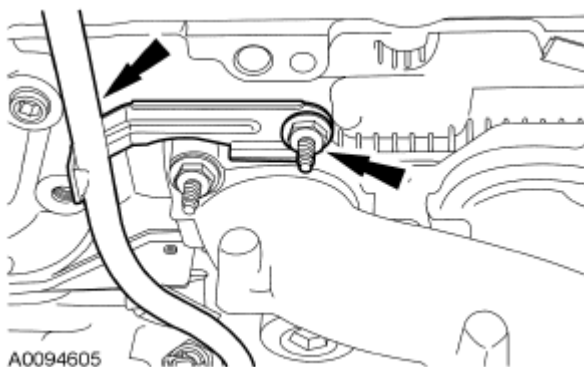


Fig. 221: Locating Stud Bolt & Oil Level Indicator Tube
Courtesy of FORD MOTOR CO.

38. Remove and discard the oil filter.

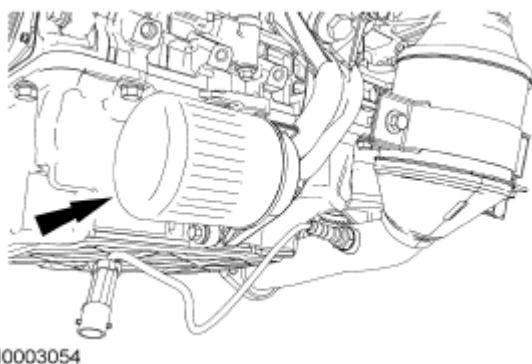


Fig. 222: Locating Oil Filter
Courtesy of FORD MOTOR CO.

39. Remove the 4 bolts and the oil filter adapter.
- Remove and discard the O-ring seal from the M22 bolt.

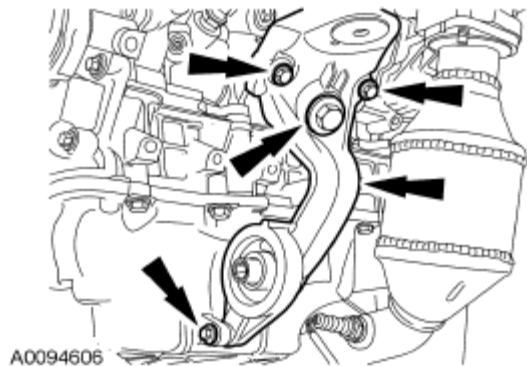


Fig. 223: Locating Oil Filter Adapter Bolts
Courtesy of FORD MOTOR CO.

40. Remove the 2 nuts, bolt and the generator.

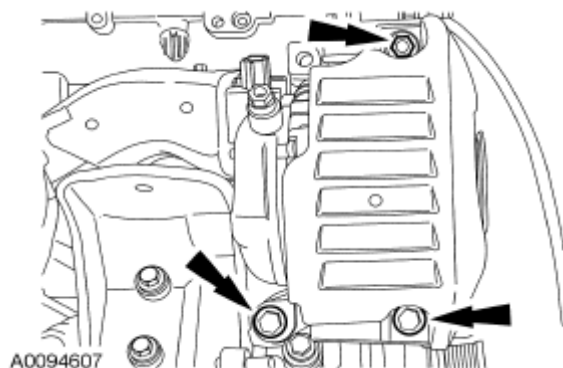


Fig. 224: Locating Generator, Nuts & Bolts
Courtesy of FORD MOTOR CO.

41. Remove the 4 bolts and the RH engine insulator bracket.

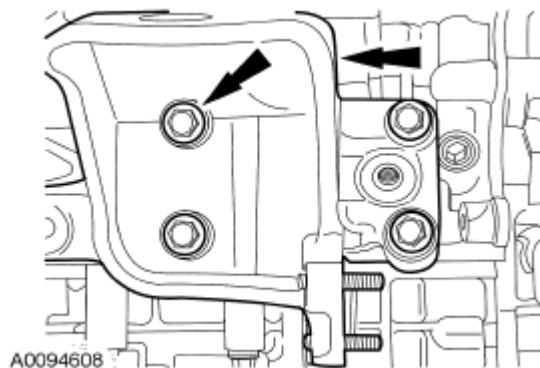


Fig. 225: Locating Engine Insulator Bracket Bolts
Courtesy of FORD MOTOR CO.

42. Remove and discard the 6 RH exhaust manifold nuts.

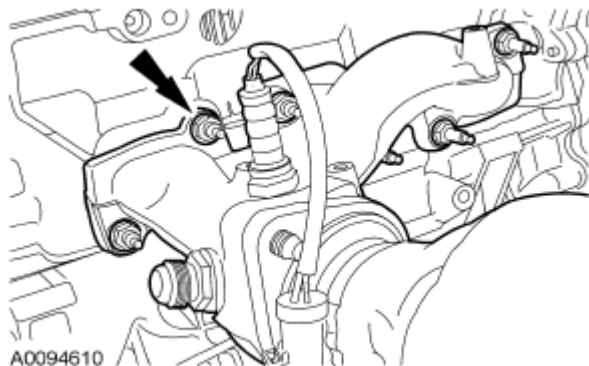


Fig. 226: Locating Exhaust Manifold Nuts
Courtesy of FORD MOTOR CO.

43. Remove the RH exhaust manifold.
- Remove and discard the gasket.
44. Remove and discard the 6 RH exhaust manifold studs.

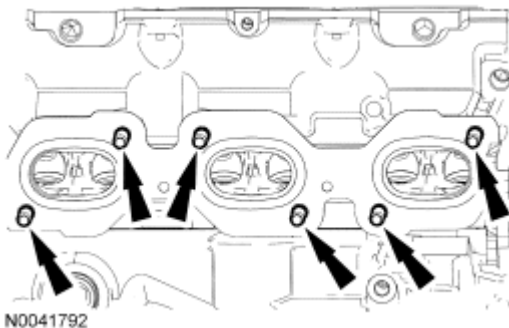


Fig. 227: Locating Exhaust Manifold Studs
Courtesy of FORD MOTOR CO.

45. Remove and discard the 6 LH exhaust manifold nuts.

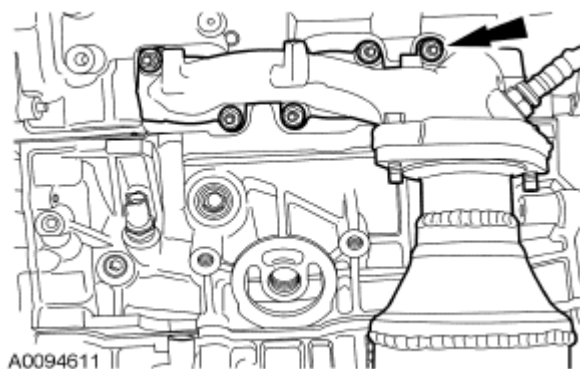


Fig. 228: Locating Exhaust Manifold Nuts
Courtesy of FORD MOTOR CO.

46. Remove the LH exhaust manifold.
 - Remove and discard the gasket.
47. Remove and discard the 6 LH exhaust manifold studs.

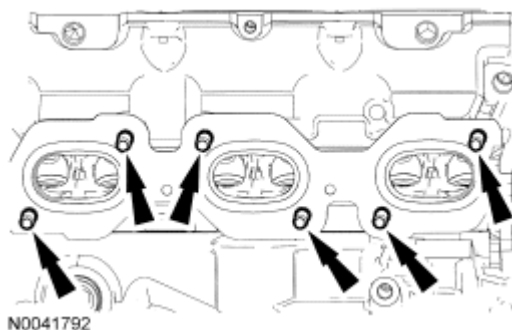


Fig. 229: Locating Exhaust Manifold Studs
Courtesy of FORD MOTOR CO.

48. Remove the 6 bolts and the RH and LH ignition coils.

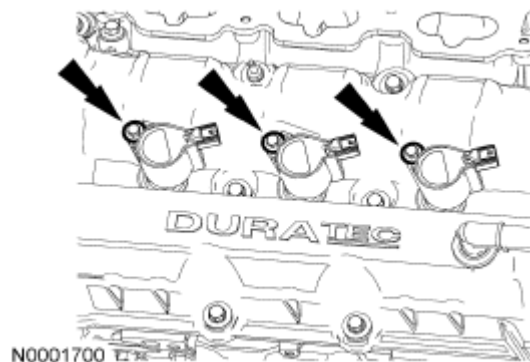


Fig. 230: Locating RH & LH Ignition Coils
Courtesy of FORD MOTOR CO.

49. Remove the 6 bolts, 8 stud bolts and the LH valve cover.
- Remove and discard the gasket.

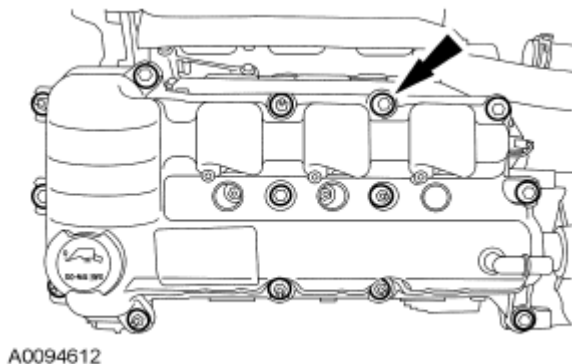


Fig. 231: Locating LH Valve Cover Bolt
Courtesy of FORD MOTOR CO.

50. Remove the 9 bolts, 5 stud bolts and the RH valve cover.
- Remove and discard the gasket.

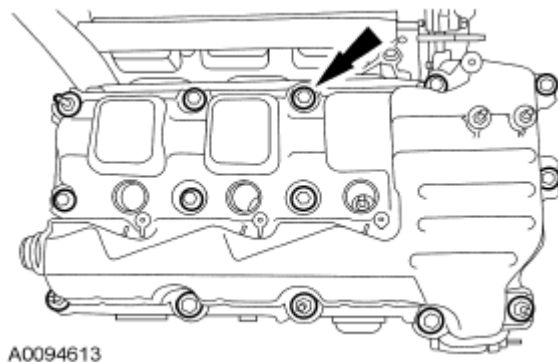


Fig. 232: Locating RH Valve Cover Bolt
Courtesy of FORD MOTOR CO.

51. Remove the 2 bolts and the thermostat housing.
- Remove and discard the O-ring seal.

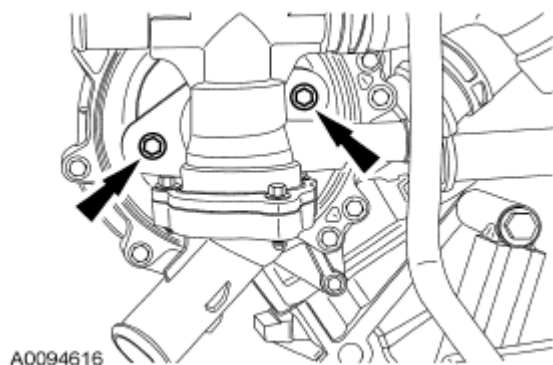


Fig. 233: Locating Thermostat Housing Bolts
Courtesy of FORD MOTOR CO.

52. Remove the 4 bolts and the coolant pump.

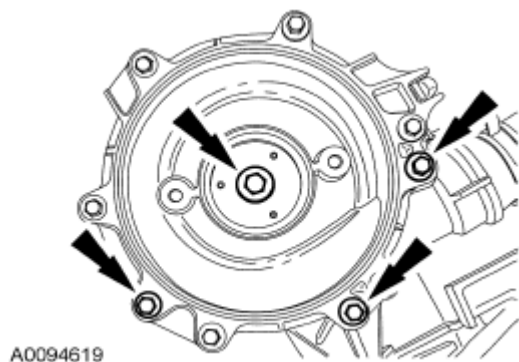


Fig. 234: Locating Coolant Pump Bolts
Courtesy of FORD MOTOR CO.

53. Remove the 2 bolts and the coolant bypass tube.

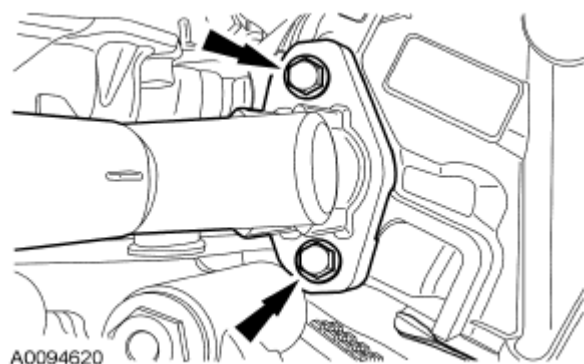


Fig. 235: Locating Coolant Bypass Tube Bolts
Courtesy of FORD MOTOR CO.

54. Remove the bolt and the radio interference capacitor.



Fig. 236: Locating Radio Interference Capacitor Bolt
Courtesy of FORD MOTOR CO.

55. Remove the 15 bolts and the oil pan.
- Remove and discard the gasket.

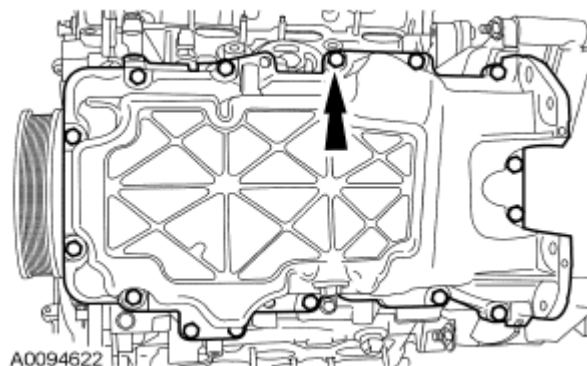


Fig. 237: Locating Oil Pan Bolts
Courtesy of FORD MOTOR CO.

56. Remove the 2 bolts and the oil pump screen and pickup tube.
- Remove and discard the O-ring seal.

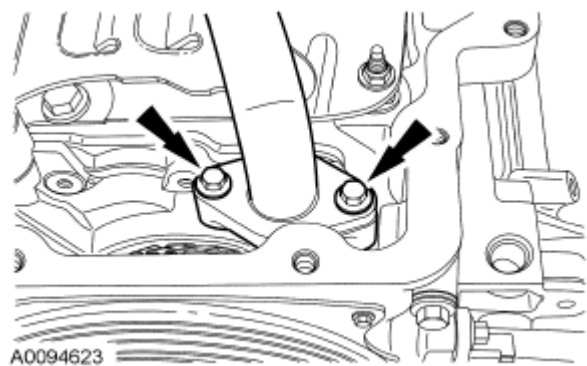


Fig. 238: Locating Engine Insulator Bracket Bolts
Courtesy of FORD MOTOR CO.

57. Remove the 8 nuts and the oil pan baffle.

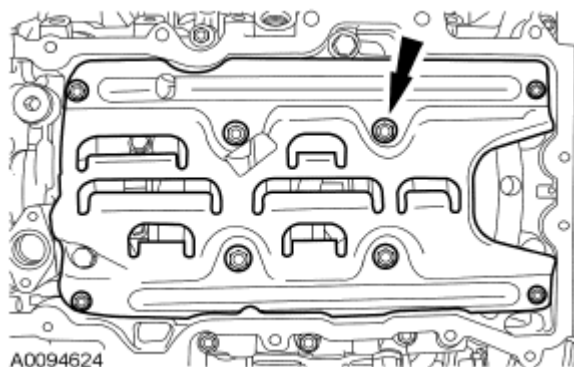


Fig. 239: Locating Oil Pan Baffle Nuts
Courtesy of FORD MOTOR CO.

58. Remove the oil pressure sender.

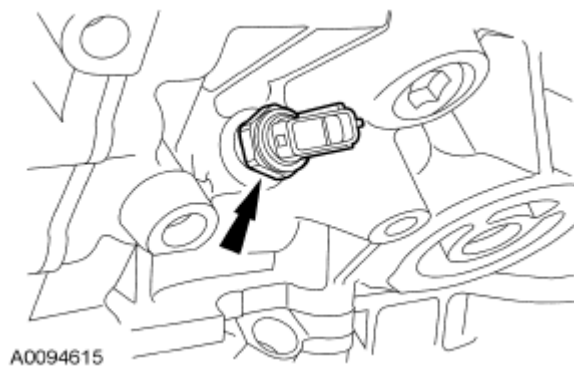


Fig. 240: Locating Oil Pressure Sender
Courtesy of FORD MOTOR CO.

59. If equipped, remove the block heater.

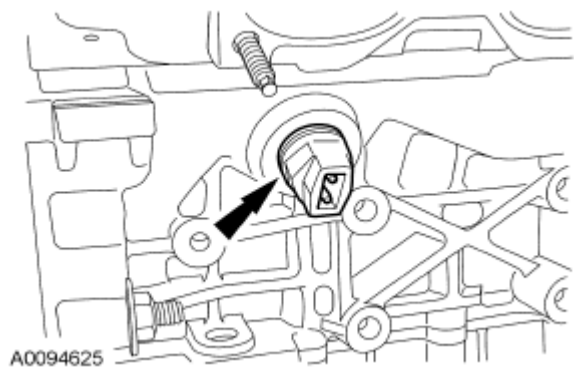


Fig. 241: Locating Block Heater
Courtesy of FORD MOTOR CO.

60. Use the special tool to hold the crankshaft damper and remove the bolt.

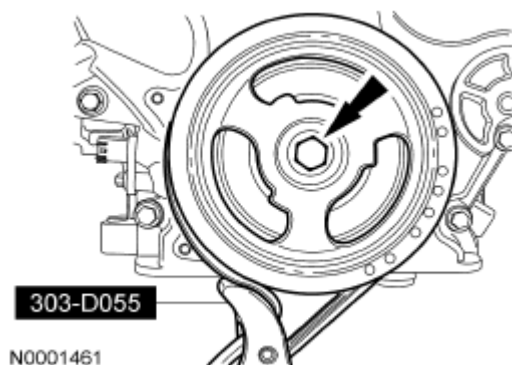


Fig. 242: Identifying Special Tool & Crankshaft Damper Bolt
Courtesy of FORD MOTOR CO.

61. Using the special tool, remove the crankshaft damper.

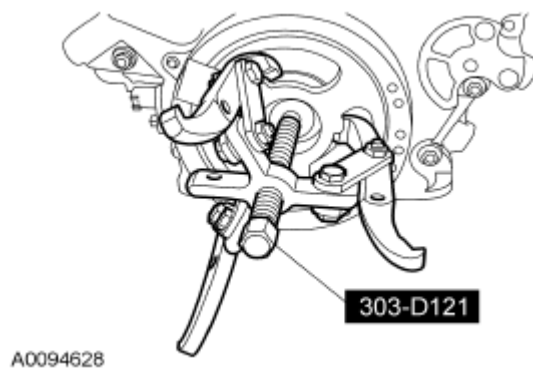


Fig. 243: Identifying Special Tool (1 Of 2)
Courtesy of FORD MOTOR CO.

62. Using the special tool, remove and discard the crankshaft front seal from the engine front cover.

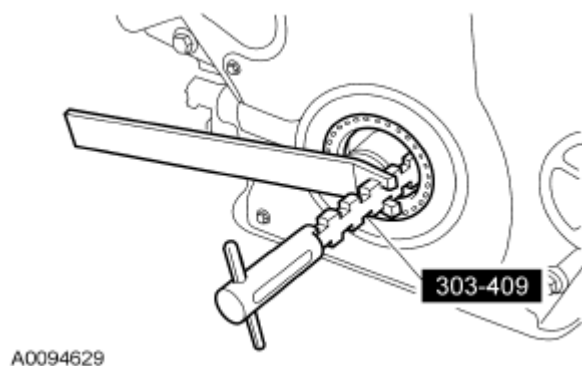


Fig. 244: Identifying Special Tool (2 Of 2)
Courtesy of FORD MOTOR CO.

63. Remove the bolt and the belt tensioner.

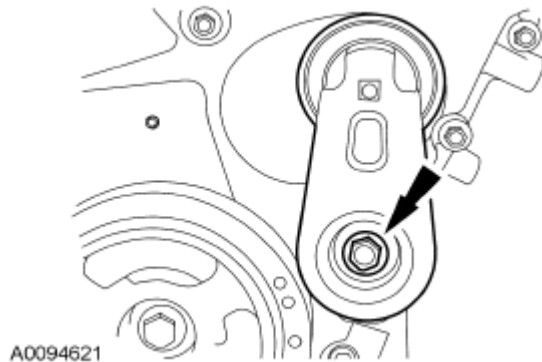


Fig. 245: Locating Belt Tensioner Bolt
Courtesy of FORD MOTOR CO.

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

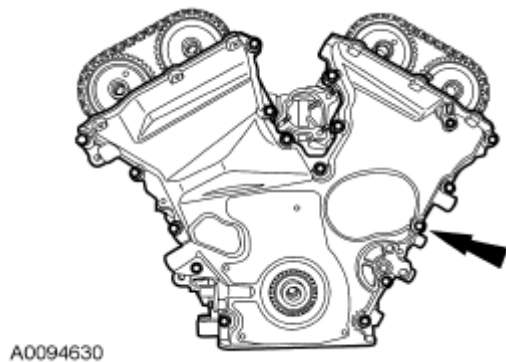


Fig. 246: Locating Front Cover Bolts & Stud Bolt
Courtesy of FORD MOTOR CO.

64. Remove the stud bolt, 14 bolts and the front cover.
- Remove and discard the gaskets.

CAUTION: This pulse wheel is used in several different engines. Install the pulse wheel with the keyway in the slot stamped "30" or "30 RFF" only (orange in color).

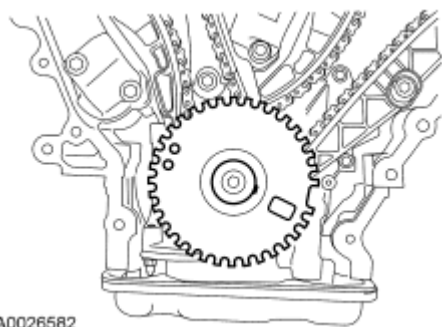


Fig. 247: Identifying Ignition Pulse Wheel
Courtesy of FORD MOTOR CO.

65. Remove the ignition pulse wheel.
66. Install the damper bolt.

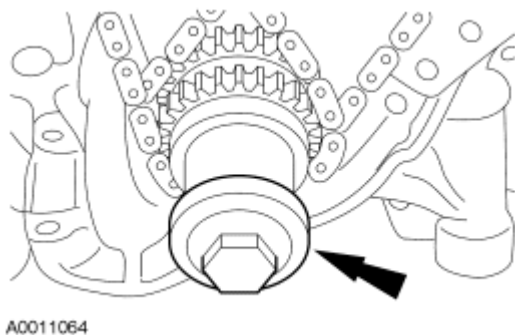


Fig. 248: Identifying Damper Bolt
Courtesy of FORD MOTOR CO.

CAUTION: Only use hand tools when removing or installing the spark plugs, damage can occur to the cylinder head or spark plug.

NOTE: LH shown, RH similar.

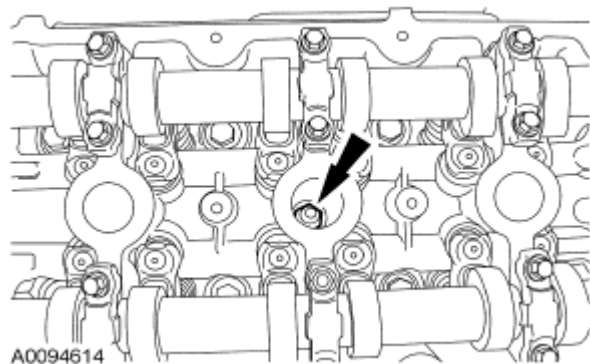


Fig. 249: Locating Spark Plug

Courtesy of FORD MOTOR CO.

67. Remove the LH and RH spark plugs.
68. Rotate the crankshaft clockwise to position the crankshaft key way in the 11 o'clock position and position the camshafts in the correct position. This will position the number 1 cylinder at top dead center (TDC).
 - Verify that the camshafts are correctly located. If not, rotate the crankshaft 1 additional turn and recheck.

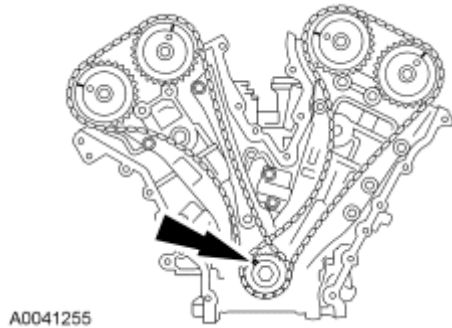


Fig. 250: Identifying Crankshaft Keyway In 11 O'Clock Position
Courtesy of FORD MOTOR CO.

69. Rotate the crankshaft clockwise 120 degrees to the 3 o'clock position to locate the RH camshafts in the neutral position.

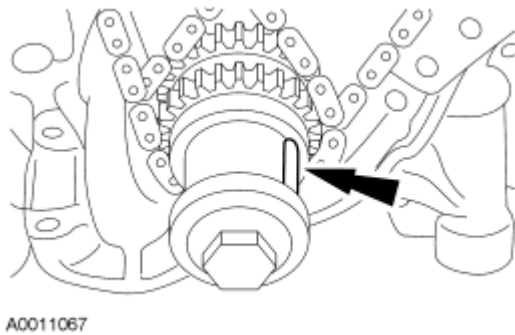


Fig. 251: Identifying Crankshaft Keyway
Courtesy of FORD MOTOR CO.

70. Verify that the RH camshafts are in the neutral position.

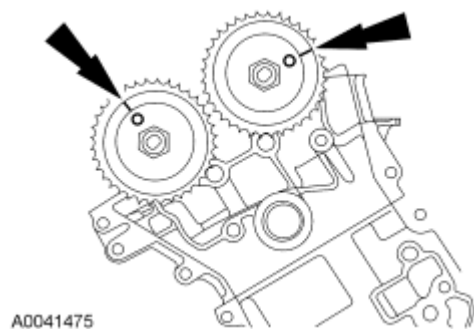


Fig. 252: Locating Camshafts Align Marks
Courtesy of FORD MOTOR CO.

71. Remove the RH timing chain tensioner arm.
1. Remove the 2 bolts.
 2. Remove the tensioner.
 3. Remove the tensioner arm.

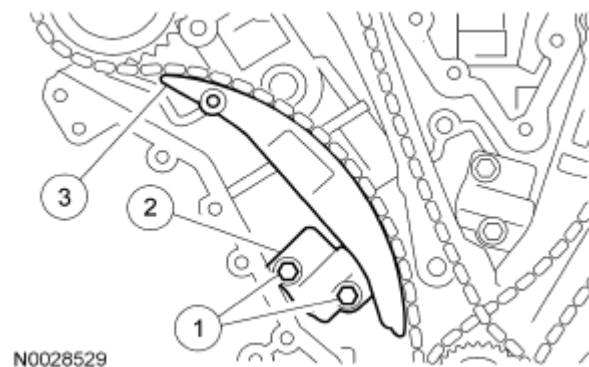


Fig. 253: Identifying Tensioner Arm & Tensioner
Courtesy of FORD MOTOR CO.

72. Remove the 2 bolts, RH timing chain guide and the timing chain.

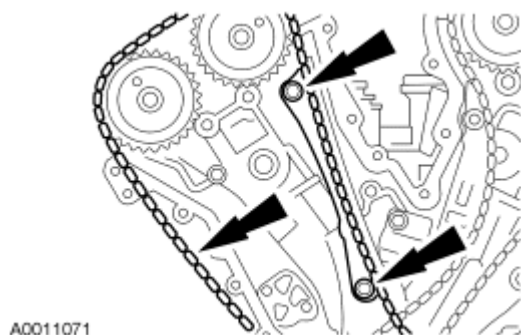
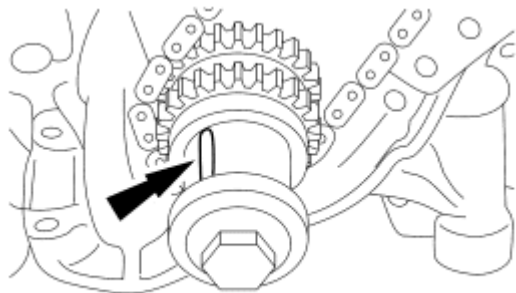


Fig. 254: Locating Timing Chain Guide & Bolts
Courtesy of FORD MOTOR CO.

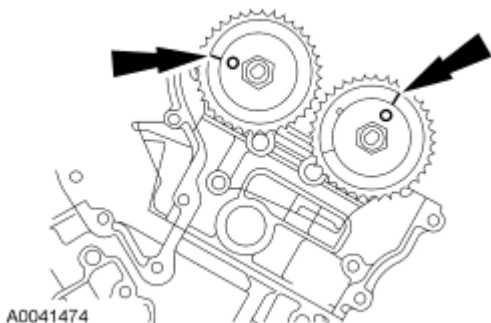
73. Rotate the crankcase clockwise 600 degrees (1-2/3 turns) to position the crankcase keyway in the 11 o'clock position. This will position the LH camshafts in the neutral position.



A0011072

Fig. 255: Positioning Crankcase Key Way In 11 O'Clock Position
Courtesy of FORD MOTOR CO.

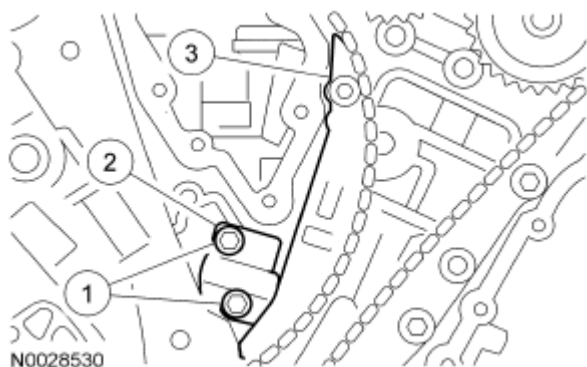
74. Verify the LH camshafts are in the neutral position.



A0041474

Fig. 256: Locating Camshafts Aligning Marks
Courtesy of FORD MOTOR CO.

75. Remove the LH timing chain and tensioner arm.
1. Remove the 2 bolts.
 2. Remove the tensioner.
 3. Remove the tensioner arm.



N0028530

Fig. 257: Identifying Tensioner Arm & Tensioner
Courtesy of FORD MOTOR CO.

76. Remove the LH timing chain and timing chain guide.

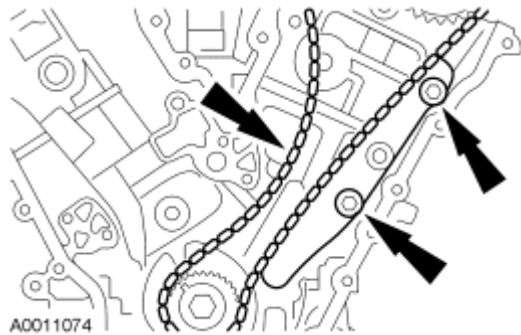


Fig. 258: Locating Timing Chain & Timing Chain Guide
Courtesy of FORD MOTOR CO.

77. Remove the damper bolt and the crankshaft sprockets.

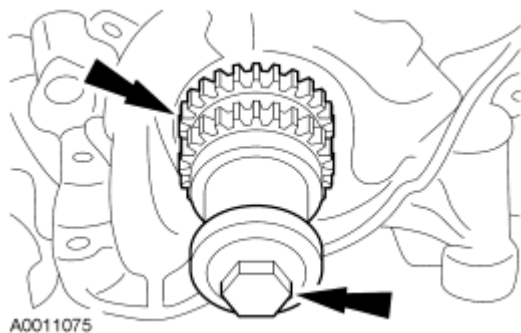


Fig. 259: Locating Damper Bolt & Crankshaft Sprockets
Courtesy of FORD MOTOR CO.

78. Remove the 3 bolts and camshaft oil seal retainer.
- Remove and discard the press-in-place gasket.

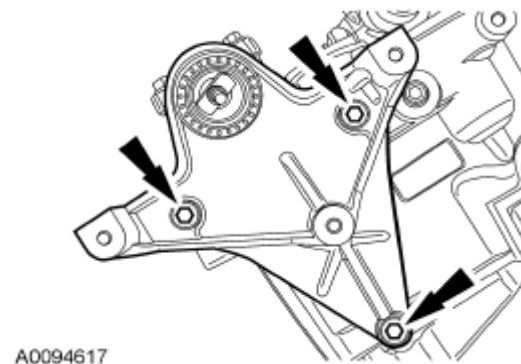


Fig. 260: Locating Camshaft Oil Seal Retainer Bolts
Courtesy of FORD MOTOR CO.

79. Using a suitable press, remove the camshaft oil seal.

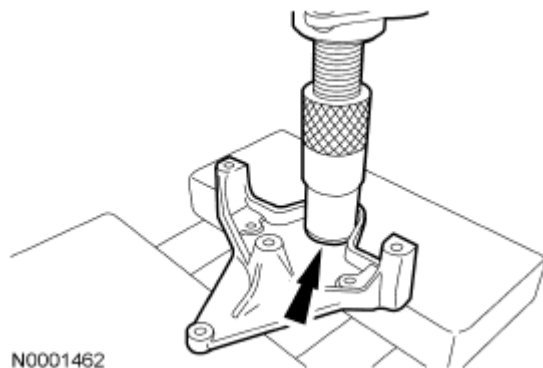
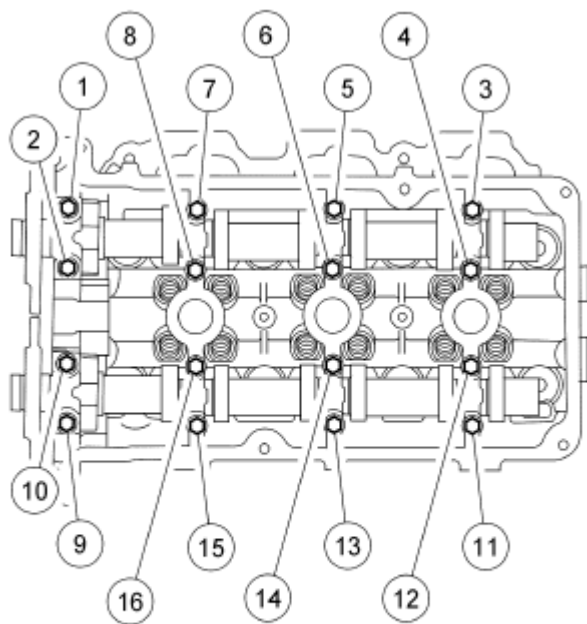


Fig. 261: Locating Special Tool
Courtesy of FORD MOTOR CO.

CAUTION: Cylinder head camshaft bearing caps are numbered to verify that they are assembled in their original positions. If the numbers cannot be seen, mark the camshaft bearing caps prior to removing them.

NOTE: RH shown, LH similar.
The camshaft caps have alignment dowels.



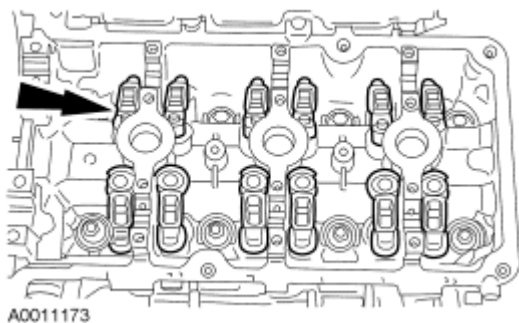
N0028541

Fig. 262: Identifying Camshaft Cap Bolts Loosening Sequence
Courtesy of FORD MOTOR CO.

80. Loosen the LH and RH camshaft cap bolts in the indicated sequence and remove the camshaft caps.
 - Tap the caps lightly with a soft-faced mallet to loosen the camshaft caps.
81. Remove the LH and RH camshafts.

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

NOTE: RH shown, LH similar.



A0011173

Fig. 263: Locating Camshaft Roller Followers
Courtesy of FORD MOTOR CO.

82. Remove the LH and RH camshaft roller followers.

- Mark the location of the roller followers using a permanent-type marker.

NOTE: RH shown, LH similar.

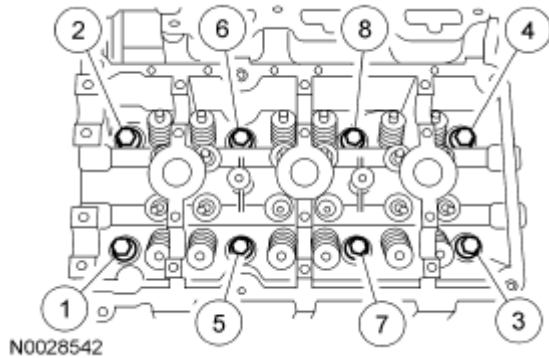


Fig. 264: Identifying Cylinder Heads Bolts Loosening Sequence
Courtesy of FORD MOTOR CO.

83. Loosen the bolts in the indicated sequence and remove the LH and RH cylinder heads.

- Remove and discard the gaskets and the bolts.

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.

CAUTION: Observe all warnings or cautions and follow all application directions contained on the packaging of the silicone gasket remover and the metal surface prep.

NOTE: If there is no residual gasket material present, metal surface prep can be used to clean and prepare the surfaces.

84. Clean the cylinder head-to-cylinder block mating surface of both the cylinder head and the cylinder block.

1. Remove any large deposits of silicone or gasket material with a plastic scraper.
2. Apply silicone gasket remover, following package directions, and allow to set for several minutes.
3. Remove the silicone gasket remover with a plastic scraper. A second application of silicone gasket remover may be required if residual traces of silicone or gasket material remain.
4. Apply metal surface prep, following package directions, to remove any traces of oil or coolant, and to prepare the surfaces to bond with the new gasket. Do not attempt to make the metal shiny. Some staining of the metal surfaces is normal.

85. Support the cylinder head on a bench with the head gasket side up.

NOTE: The straightedge used must be flat within 0.0051 mm (0.0002 in) per foot of tool length.

86. Inspect all areas of the deck face with a straightedge and feeler gauge. The cylinder head must not have depressions deeper than 0.0254 mm (0.001 in) across a 38.1 mm (1.5 in) square area, or scratches more than 0.0254 mm (0.001 in).
87. Remove the 3 bolts and the power steering pump bracket.

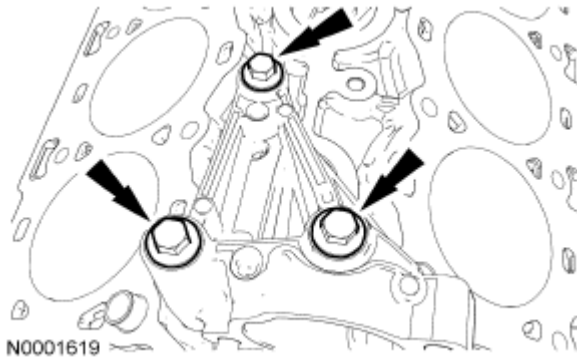


Fig. 265: Locating Power Steering Pump Bracket Bolts
Courtesy of FORD MOTOR CO.

88. Remove the 2 bolts and the oil separator cover.
 - Remove and discard the gasket.

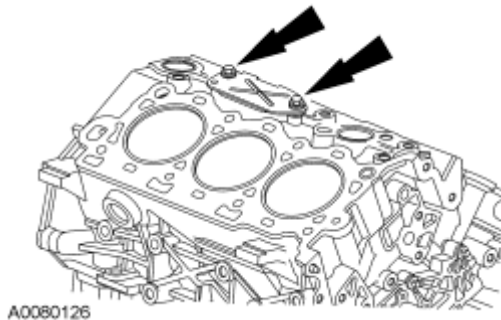


Fig. 266: Locating Oil Separator Cover Bolts
Courtesy of FORD MOTOR CO.

89. Remove the crankshaft key.

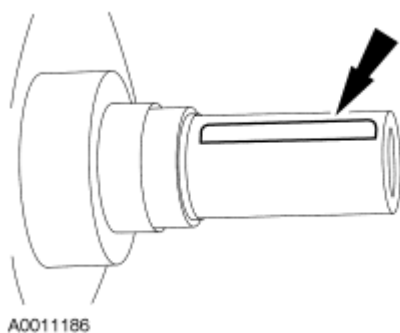


Fig. 267: Locating Crankshaft Key
Courtesy of FORD MOTOR CO.

DISASSEMBLY AND ASSEMBLY OF SUBASSEMBLIES

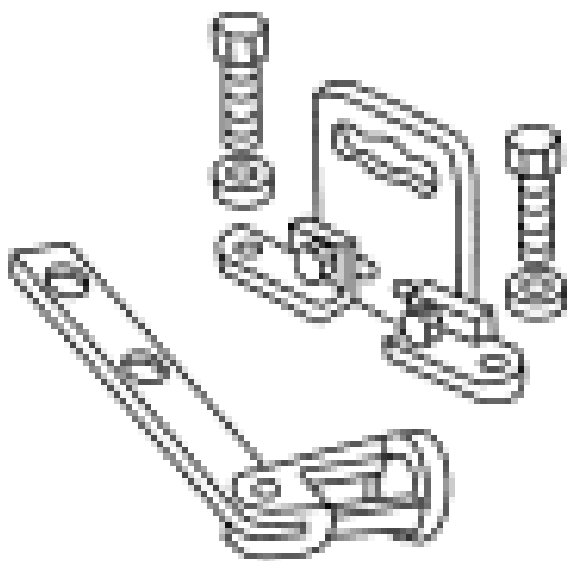
CYLINDER HEAD

SPECIAL TOOL TABLE

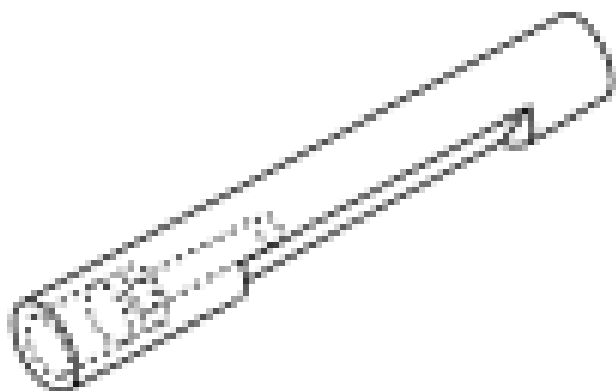
ST1981-A	Compressor, Valve Spring 303-300 (T87C-6565-A)
	Compressor, Valve Spring 303-350 (T89P-6565-A)

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ST1907-A



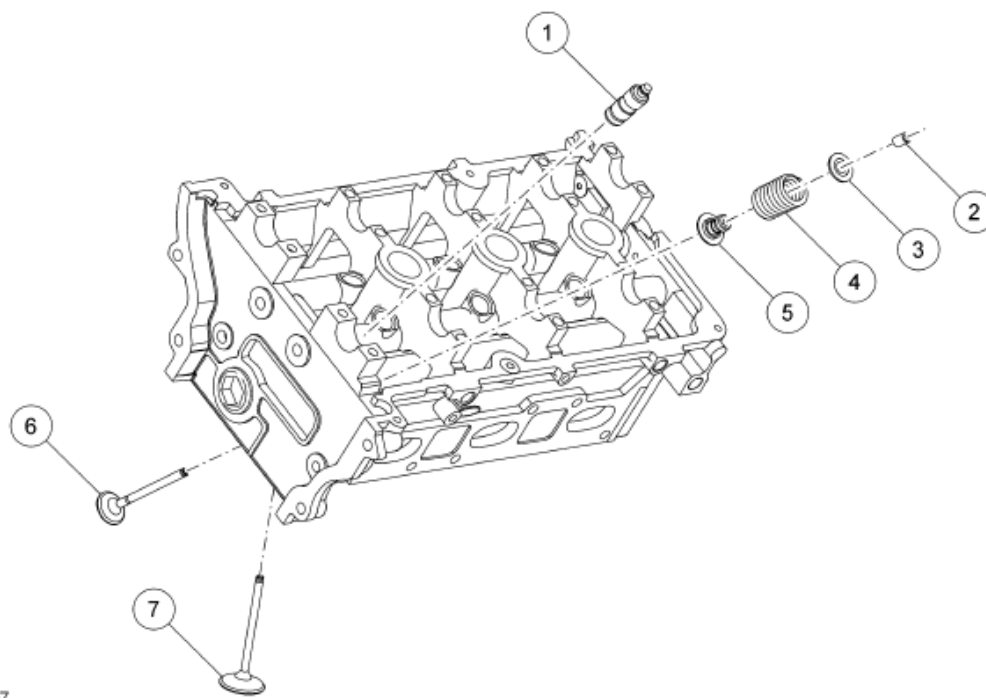
ST1906-A

Installer, Valve Stem Oil Seal 303-470 (T94P-6510-CH)

MATERIAL TABLE

Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS- M2C930-A

Cylinder Head



A0090907

Item	Part Number	Description
1	6C501	Hydraulic lash adjuster (12 required)
2	6518	Valve spring retainer key (12 required)
3	6514	Valve spring retainer (12 required)
4	6513	Valve spring (12 required)
5	6A517	Valve stem seal (12 required)
6	6505	Intake valve
7	6507	Exhaust valve

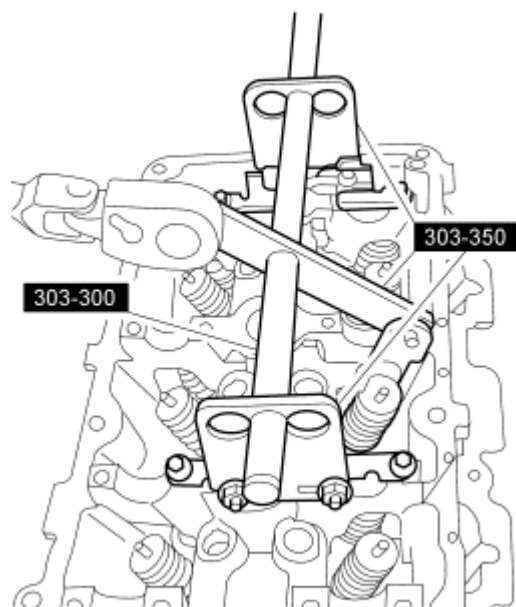
Fig. 268: Identifying Cylinder Head Components

Courtesy of FORD MOTOR CO.

Disassembly

CAUTION: If the components are to be reinstalled, they must be installed in the same positions. Mark the locations of the components removed.

1. Remove the hydraulic lash adjusters.
2. Using the special tools, remove the keys, retainer and spring.



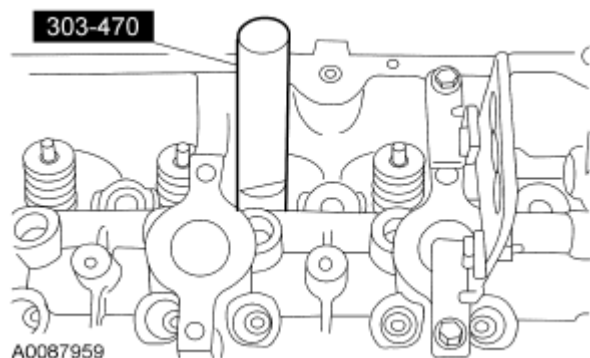
A0087958

Fig. 269: Identifying Special Tools (303-300 And 303-350)
Courtesy of FORD MOTOR CO.

3. Remove the valve from the cylinder head.
4. Remove the valve stem seal.

Assembly

1. Using the special tool, install the valve stem seal.



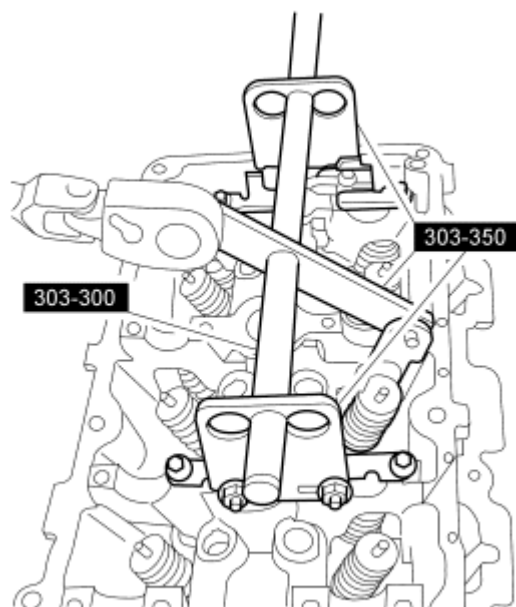
A0087959

Fig. 270: Identifying Special Tool
Courtesy of FORD MOTOR CO.

2. Install the valve.
3. Using the special tools, install the valve spring, retainer and key.

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A0087958

Fig. 271: Identifying Special Tools (303-300 And 303-350)
Courtesy of FORD MOTOR CO.

4. Install the hydraulic lash adjusters.

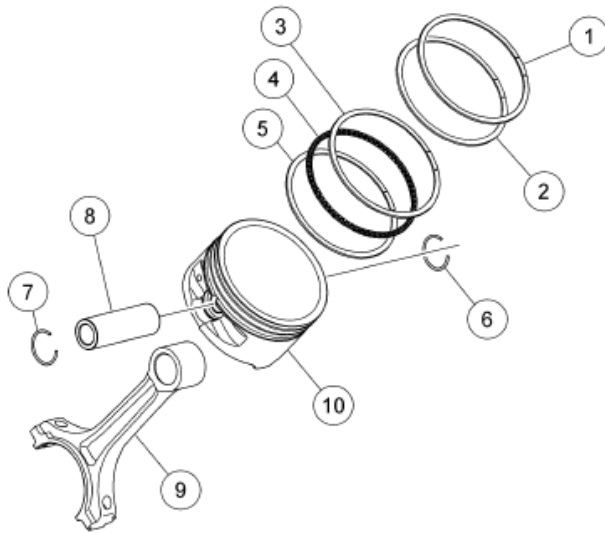
PISTON

Material

Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS-M2C930-A

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N0010114

Fig. 272: Exploded View Of Engine Piston Assembly
Courtesy of FORD MOTOR CO.

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	6140	Piston pin retainer
7	6140	Piston pin retainer
8	6135	Piston pin
9	6200	Connecting rod
10	6110	Piston

Disassembly

1. Remove the piston rings from the piston.
 - Discard the piston rings.
2. Remove the 2 piston pin retainers and the piston pin.

NOTE: If the piston and connecting rod are to be reinstalled, they must be assembled in the same orientation. Mark the piston orientation to the connecting rod for reassembly.

3. Separate the piston from the connecting rod.
4. Clean and inspect the piston and connecting rod. For additional information, refer to **SPECIFICATIONS**.

Assembly

1. Align the piston-to-connecting rod orientation marks and position the connecting rod in the piston.
2. Lubricate the piston pin and pin bore with clean engine oil.
3. Install the piston pin in the piston and connecting rod assembly.
4. Install the piston pin retaining clips in the piston.
5. Lubricate the piston and the new piston rings with clean engine oil.

NOTE: The piston compression lower ring should be installed with the "O" mark on the ring face pointing up toward the top of the piston.

NOTE: When installing the piston oil control spacer, orient the gap such that the cut ends are pointed toward the top of the piston.

6. Install the piston rings onto the piston as shown in the figure below.
 1. Center line of the piston parallel to the wrist pin bore
 2. Upper compression ring gap location
 3. Upper oil control segment ring gap location
 4. Lower oil control segment ring gap location
 5. Expander ring and lower compression ring gap location

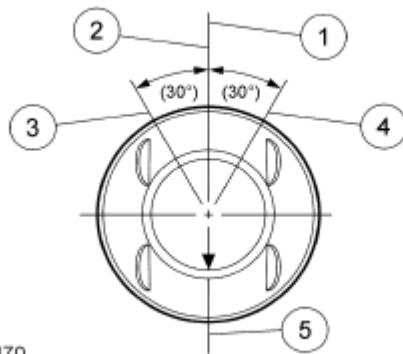


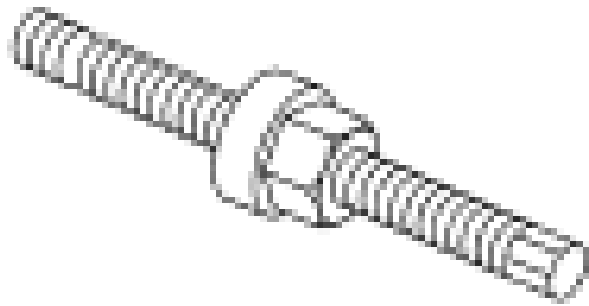
Fig. 273: Exploded View Of Piston Ring Position
Courtesy of FORD MOTOR CO.

ASSEMBLY**ENGINE**

2006 Mercury Montego

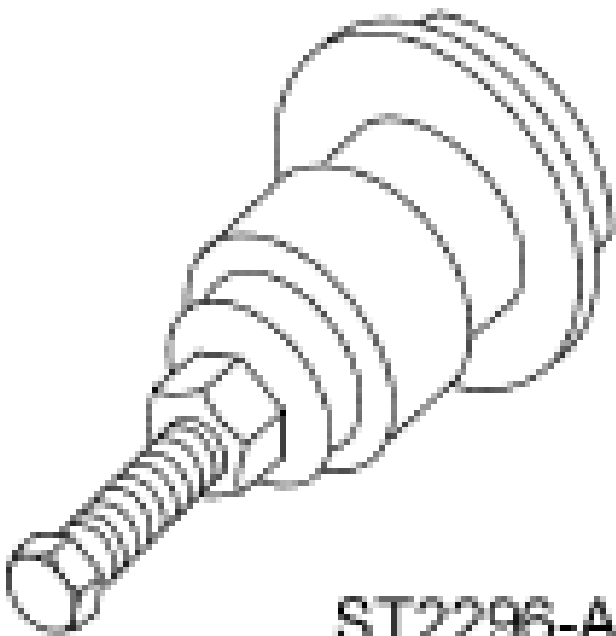
2006 ENGINE Engine - Five Hundred, Freestyle & Montego

SPECIAL TOOL TABLE



ST1287-A

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

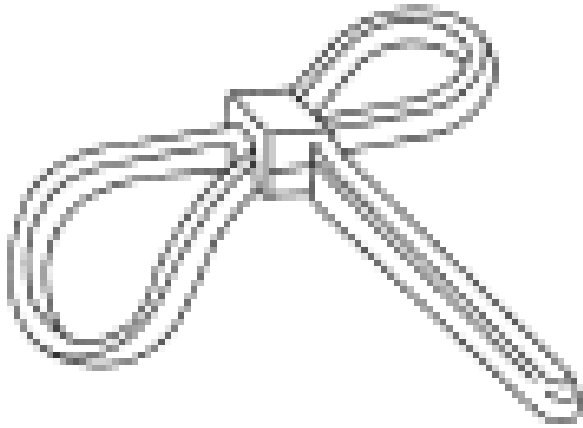


ST2296-A

Installer, Front Cover Oil Seal 303-335 (T88T-
6701-A)

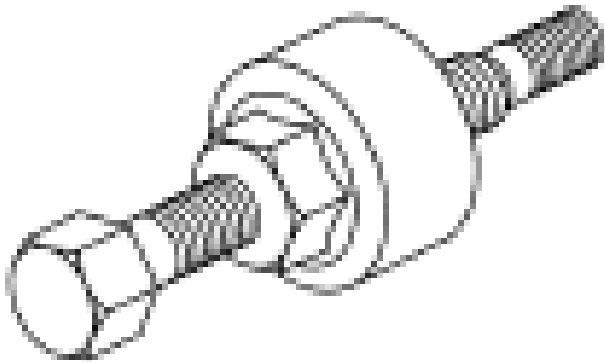
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Strap Wrench 303-D055 (D85L-6000-A)

ST1438-A

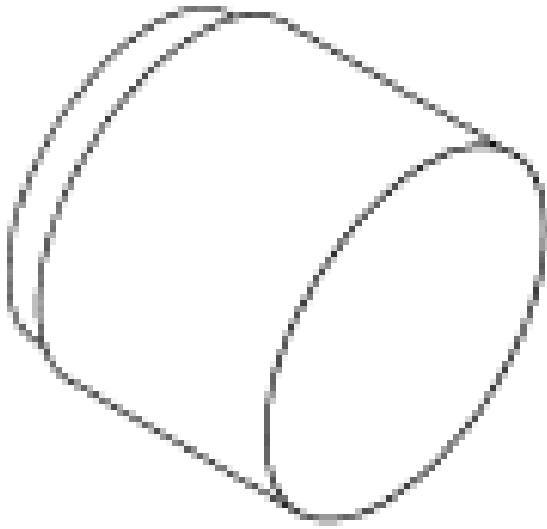


Installer, Power Steering Pump Pulley 211-185
(T91P-3A733-A)

ST1586-A

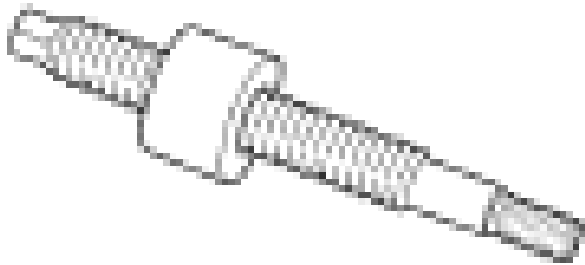
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ST2060-A

Protector, Camshaft Oil Seal 303-463 (T94P-6256-AH)



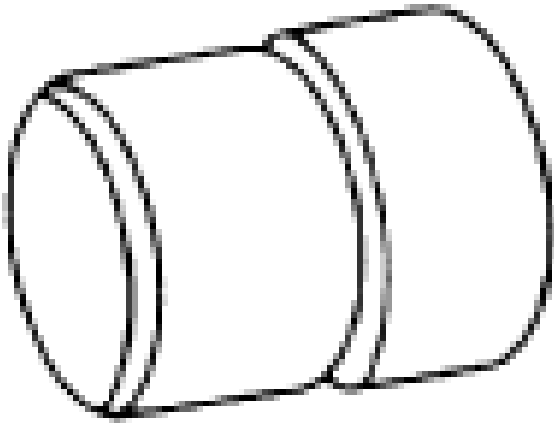
ST2867-A

Installer, Camshaft Pulley 303-458 (T94P-6312-AH3)

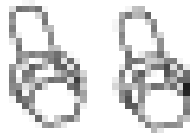
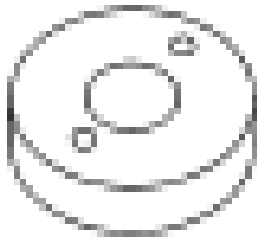
Installer, Camshaft Oil Seal 303-1139

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2006 ENGINE Engine - Five Hundred, Freestyle & Montego



ST1404-A



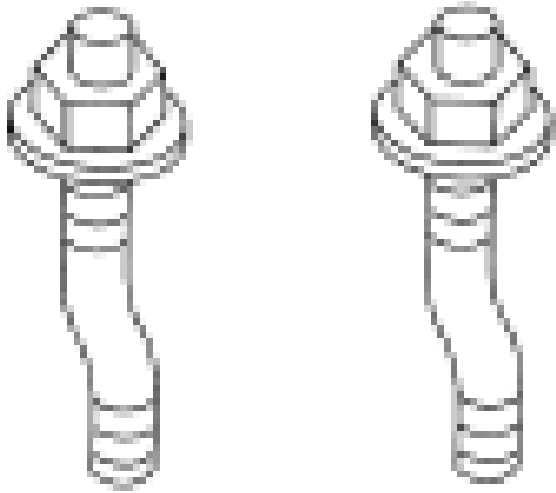
ST1327-A

Installer, Crankshaft Rear Main Oil Seal 303-178 (T82L-6701-A)

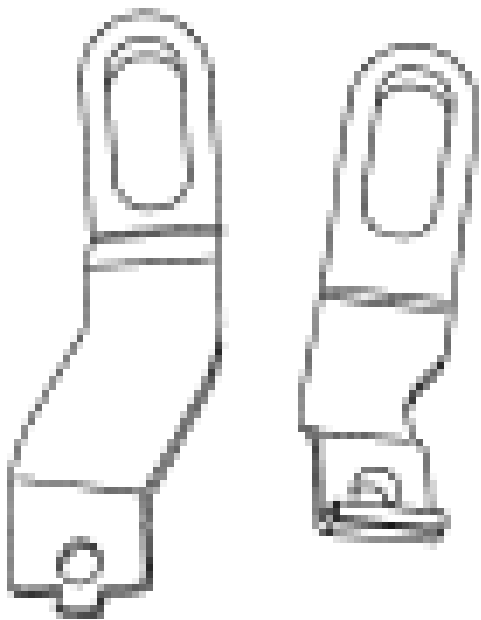
Installer Bolts, Crankshaft Rear Main Oil Seal 303-384 (T91P-6701-A)

2006 Mercury Montego

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ST1333-A

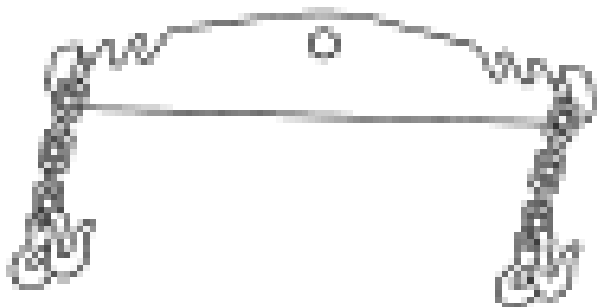


ST2463-A

Lifting Brackets, Engine 134-00243 or equivalent

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Spreader Bar 303-D089 (D93P-6001-A3) or equivalent

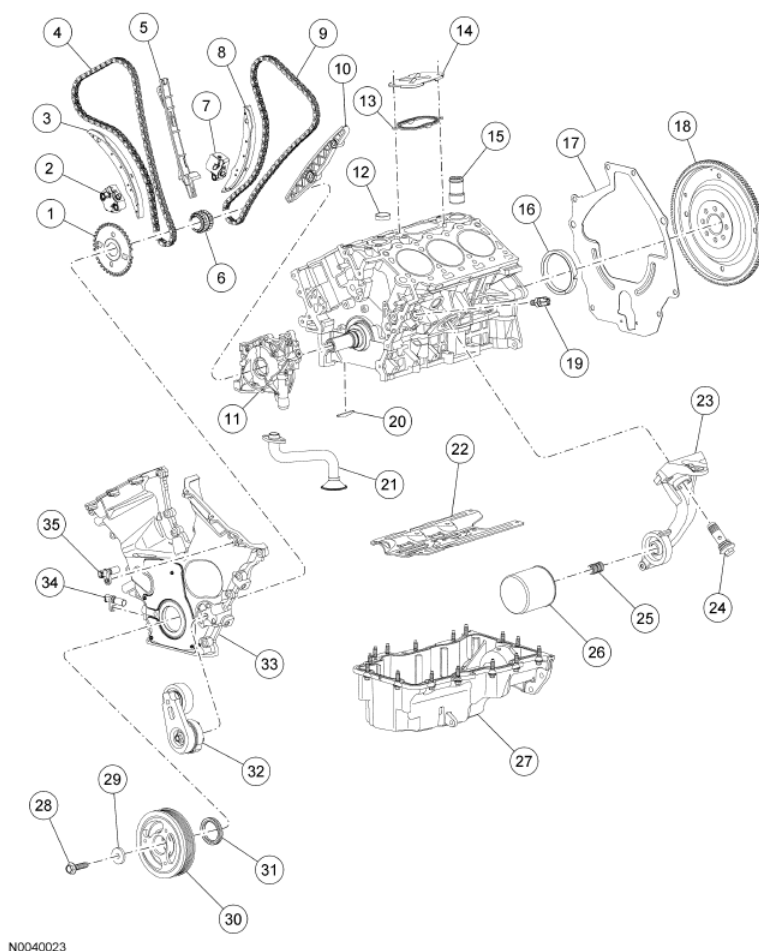
ST1602-A

MATERIAL TABLE

Item	Specification
Silicone Gasket and Sealant TA-30	WSE-M4G323-A4
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (in Canada Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12) or equivalent	WSS-M2C930-A
Silicone Brake Caliper Grease and Dielectric Compound XG-3-A	ESE-M1C171-A
Silicone Gasket Remover ZC-30	-
Motorcraft Metal Surface Prep ZC-31	-

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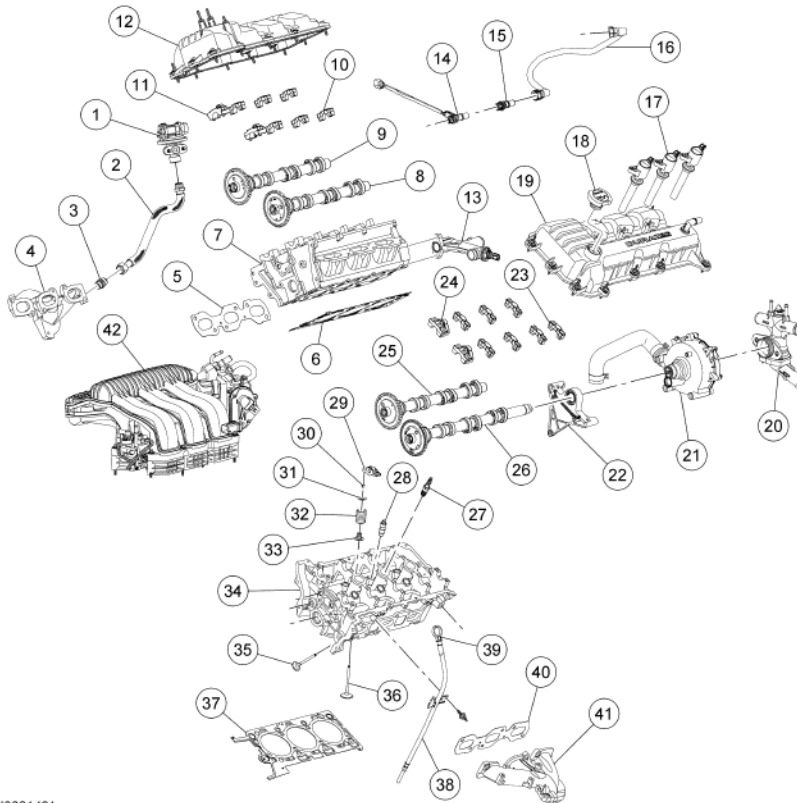
Item	Part Number	Description
1	12A227	Ignition pulse wheel
2	6L266	RH timing chain tensioner
3	6K255	RH timing chain tensioner arm
4	6268	RH timing chain
5	6M256	RH timing chain guide
6	6306	Crankshaft sprocket
7	6L266	LH timing chain tensioner
8	6K255	LH timing chain tensioner arm
9	6268	LH timing chain
10	6B297	LH timing chain guide
11	6621	Oil pump
12	W701923	Cup plug
13	6B752	Oil separator gasket
14	6889	Oil separator cover
15	8A505	Water inlet tube
16	6701	Crankshaft rear oil seal
17	—	Spacer plate
18	6375	Flexplate
19	9278	Oil pressure sender

Item	Part Number	Description
20	W705934	Woodruff key
21	6622	Oil pickup tube and screen
22	6687	Oil pan baffle
23	6881	Oil filter adapter
24	6894	Oil filter adapter bolt
25	6890	Oil filter adapter insert
26	6714	Oil filter
27	6675	Oil pan
28	W701512	Crankshaft vibration damper bolt
29	W701511	Crankshaft vibration damper washer
30	6316	Crankshaft vibration damper
31	6700	Crankshaft front seal
32	6B209	Accessory drive belt tensioner
33	6019	Front cover
34	6B288	Crankshaft position (CKP) sensor
35	6C315	Camshaft position (CMP) sensor

Fig. 274: Identifying Engine Components (1 Of 2)
Courtesy of FORD MOTOR CO.

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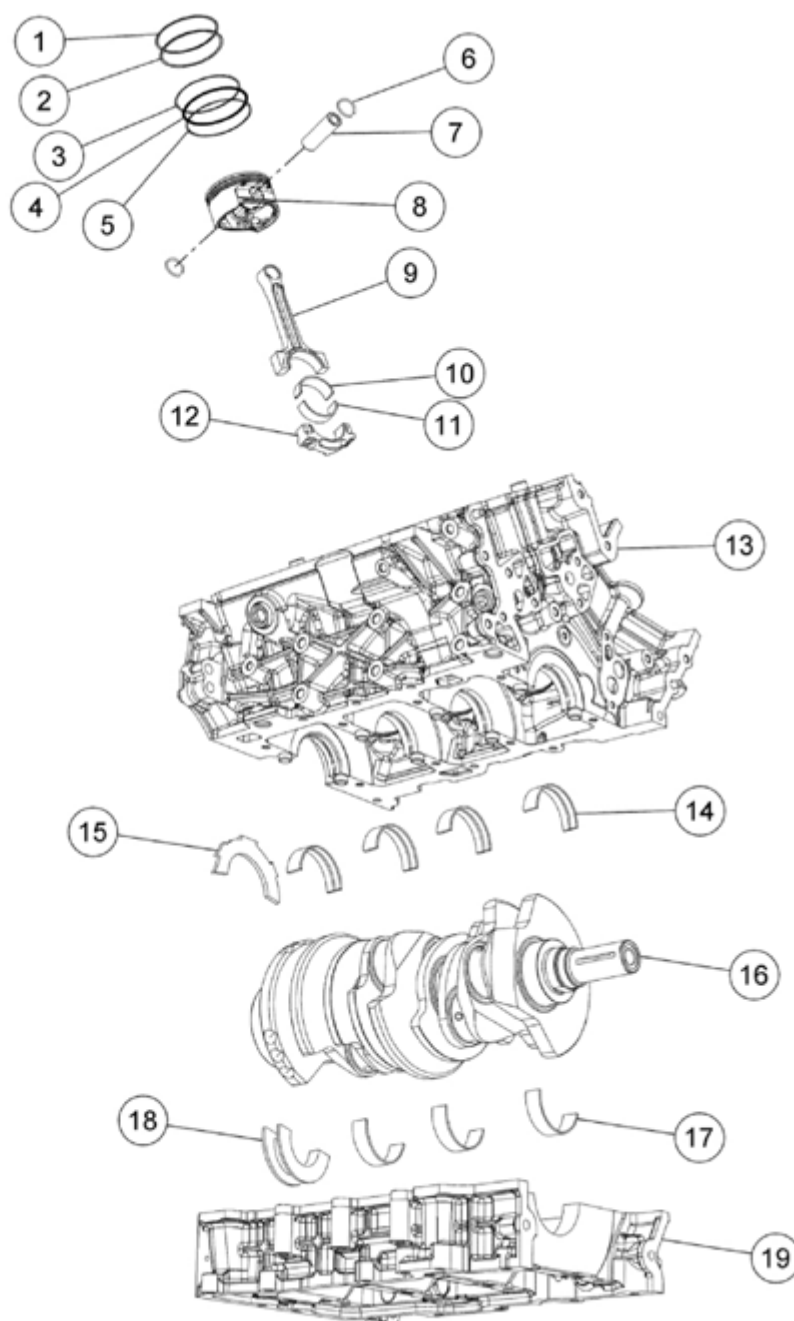
Item	Part Number	Description
1	9D475	Exhaust gas recirculation (EGR) system module
2	9D477	EGR module tube
3	9F485	RH exhaust manifold insert
4	9431	RH exhaust manifold
5	9448	RH exhaust manifold gasket
6	6051	RH cylinder head gasket
7	6050	RH cylinder head
8	6A266	RH exhaust camshaft
9	6A268	RH intake camshaft
10	6A258	Camshaft journal cap
11	6B280	Camshaft bearing cap
12	6582	RH valve cover
13	8548	Coolant bypass tube
14	9769	Positive crankcase ventilation (PCV) valve (heated)
15	6A666	PCV valve (non-heated)
16	6K817	PCV tube
17	12A366	Coil-on-plug (6 required)

Item	Part Number	Description
18	6766	Oil fill cap
19	6A405	LH valve cover
20	8A586	Thermostat housing
21	8501	Coolant pump
22	6B293	Camshaft oil seal retainer
23	6A258	Camshaft journal cap
24	6B280	Camshaft bearing cap
25	6A267	LH intake camshaft
26	6A269	LH exhaust camshaft
27	12405	Spark plug
28	6C501	Hydraulic lash adjuster
29	6529	Camshaft roller follower
30	6514	Valve spring retainer
31	6518	Valve spring retainer key
32	6513	Valve spring
33	6A517	Valve stem seal
34	6049	LH cylinder head
35	6507	Exhaust valve
36	6505	Intake valve
37	6083	LH cylinder head gasket
38	6754	Oil level indicator tube
39	6750	Oil level indicator
40	9448	LH exhaust manifold gasket
41	9431	LH exhaust manifold
42	9424/9J477	Upper/lower intake manifold

Fig. 275: Identifying Engine Components (2 Of 2)
Courtesy of FORD MOTOR CO.

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N0105670

Fig. 276: Exploded View Of Lower Engine Block
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	6150	Piston compression upper ring (6 required)
2	6152	Piston compression lower ring (6 required)
3	6159	Piston oil control upper segment

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		ring (6 required)
4	6161	Piston oil control spacer (6 required)
5	6159	Piston oil control lower segment ring (6 required)
6	6140	Piston pin retainer (12 required)
7	6135	Piston pin (6 required)
8	6110	Piston (6 required)
9	6200	Connecting rod (6 required)
10	6211	Connecting rod upper bearing (6 required)
11	6211	Connecting rod lower bearing (6 required)
12	6210	Connecting rod cap (6 required)
13	6010	Cylinder block
14	6333	Cylinder block crankshaft main bearing (4 required)
15	6A341	Crankshaft upper thrust bearing
16	6303	Crankshaft
17	6333	Lower cylinder block crankshaft main bearings (3 required)
18	6337	Lower cylinder block crankshaft main thrust bearing
19	6F095	Lower cylinder block

All vehicles

CAUTION: During engine repair procedures, cleanliness is extremely important. All parts must be thoroughly cleaned and any foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan, can cause engine failure.

NOTE: Assembly of the engine requires various inspections/measurements of the engine components (engine block, crankshaft, connecting rods, pistons and piston rings). These inspections/measurements will aid in determining if the engine components will require replacement. For additional information, refer to ENGINE SYSTEM - GENERAL INFORMATION .

NOTE: This procedure is for selecting bearings using a new crankshaft.

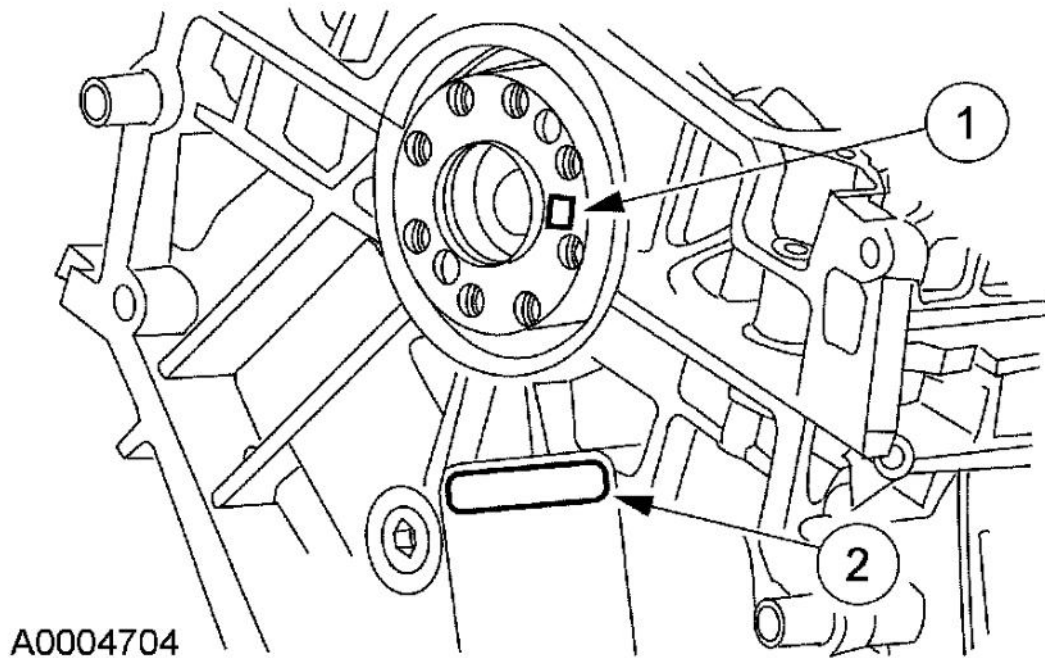


Fig. 277: Locating Codes
Courtesy of FORD MOTOR CO.

1. Select the crankshaft main bearings for each crankshaft journal.
 1. Read the code on the crankshaft flange.
 2. Read the code on the cylinder block rear face.
 - The first two numbers after the asterisk make up the code for main No. 1 and the next two numbers for main No. 2.
 - The first two numbers after the second asterisk make up the code for main No. 3 and the last two numbers for main No. 4.
2. Using the chart shown in **Fig. 278**, choose a bearing for each main. Match the block and crankshaft code with its corresponding column or row, by reading across the "crankshaft" row and down the "block" column.
 - For example: If the block code is * 0609* 0711* and the crankshaft code is * 8580* 8082* , main No. 1 should use grade 1 bearings, as determined by the intersection of the 06 block column and the 85 crankshaft row. Mains 2, 3 and 4 should all be grade 2.

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BLOCK CODE

(C1)

	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22
92	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2
91	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2
89	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2
88	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2
87	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2
86	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2
85	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2
84	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3
83	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3
82	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3
81	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3
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69	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3
68	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3

CRANKSHAFT CODE

A0053883

Fig. 278: Bearing Selection Chart
Courtesy of FORD MOTOR CO.

NOTE: Before assembling the cylinder block, all sealing surfaces must be free of chips, dirt, paint and foreign material. Also, make sure the coolant and oil passages are clear.

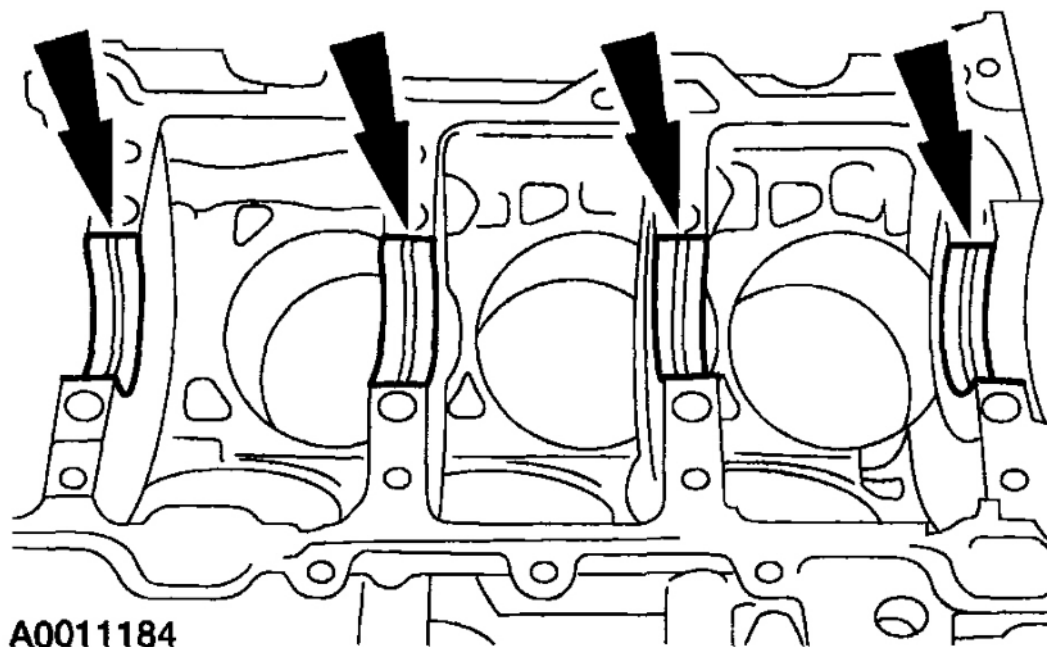


Fig. 279: Removing/Installing Upper Crankshaft Main Bearings At Cylinder Block
Courtesy of FORD MOTOR CO.

3. Lubricate the upper crankshaft main bearings with clean engine oil and install the 4 crankshaft main bearings in the cylinder block.
4. Lubricate the lower crankshaft main bearings with clean engine oil and install the 4 crankshaft main bearings in the lower cylinder block.

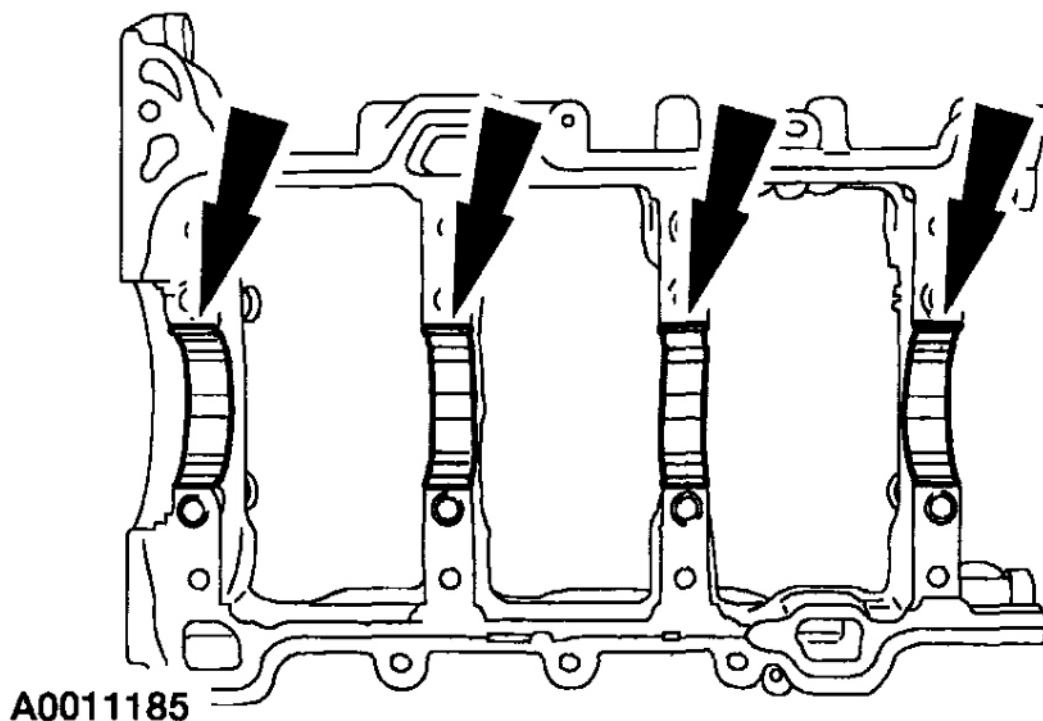


Fig. 280: Removing/Installing Lower Crankshaft Main Bearings At Lower Cylinder Block
Courtesy of FORD MOTOR CO.

5. Lubricate the crankshaft thrust bearing with clean engine oil and install in the cylinder block.

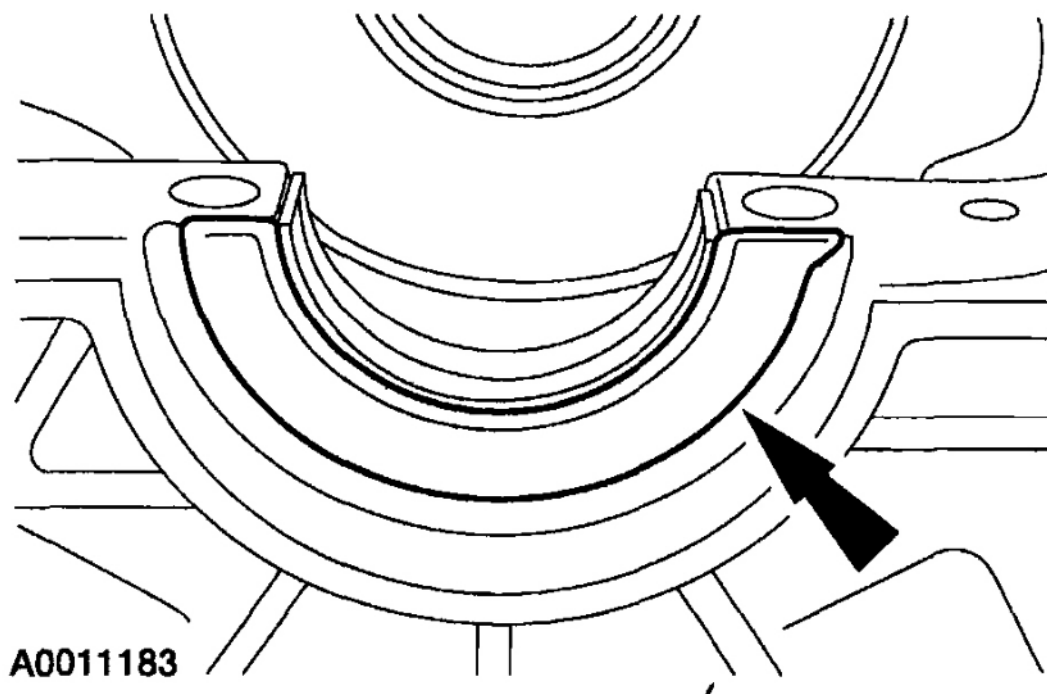


Fig. 281: Removing/Installing Crankshaft Thrust Bearing At Cylinder Block
Courtesy of FORD MOTOR CO.

6. If removed, install the crankshaft key into the keyway on the crankshaft.

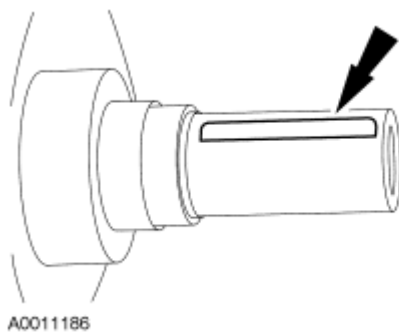


Fig. 282: Locating Crankshaft Key
Courtesy of FORD MOTOR CO.

7. Apply clean engine oil to the crankshaft main and rod bearing journals.
8. Position the crankshaft in the cylinder block.

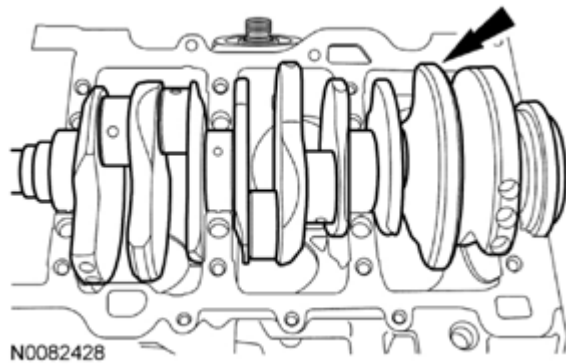


Fig. 283: Locating Crankshaft In Cylinder Block

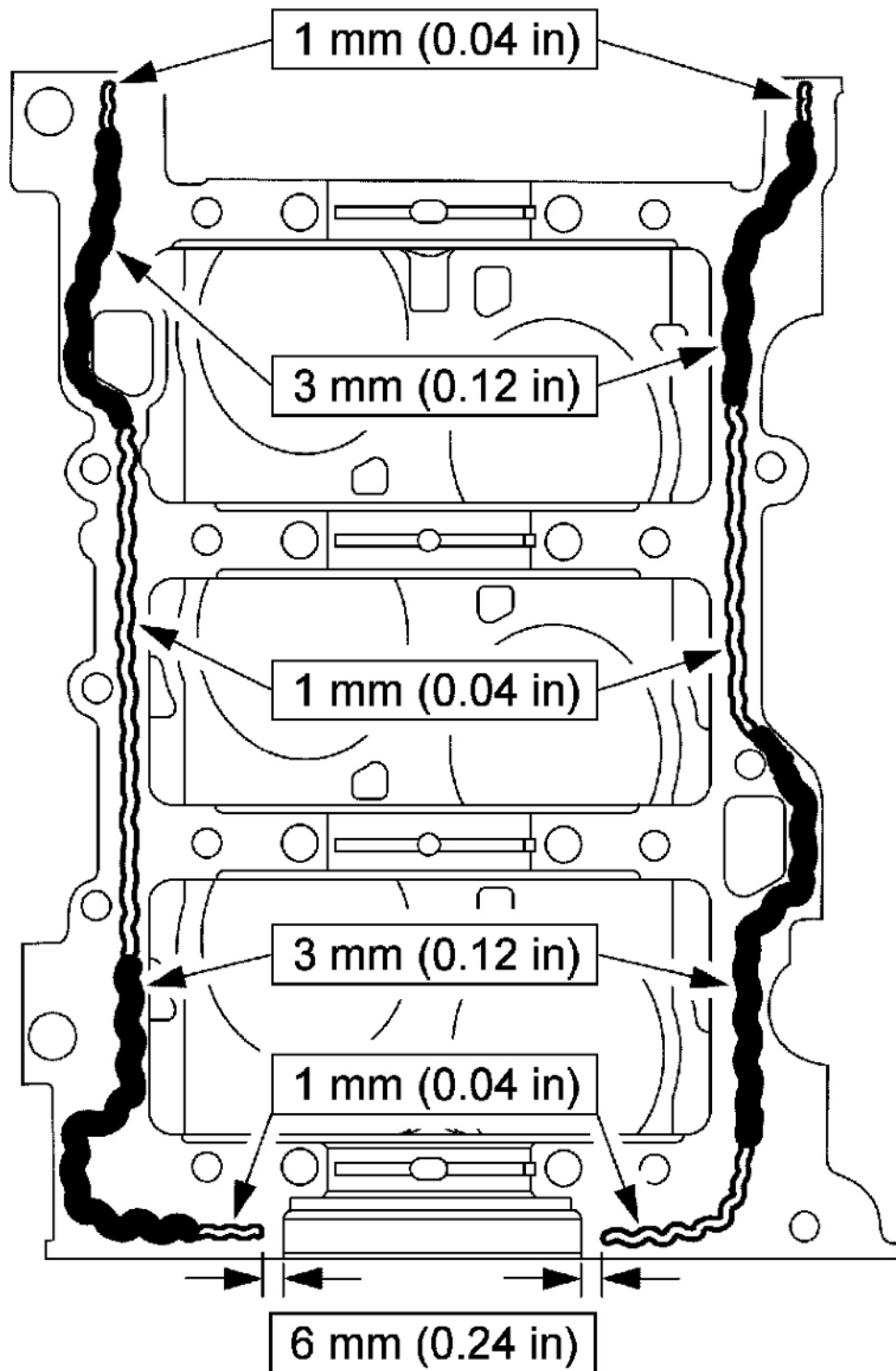
Courtesy of FORD MOTOR CO.

CAUTION: The lower cylinder block must be installed and the bolts tightened within four minutes of applying the sealant.

NOTE: Clean and degrease both surfaces using metal surface cleaner before applying sealant.

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Fig. 284: Applying Gasket And Sealant To Cylinder Block
Courtesy of FORD MOTOR CO.

9. Apply gasket and sealant to the cylinder block as shown.

CAUTION: Fasteners No. 5--8 are studs. Fasteners No. 18--22 are M8 x 1.25 mm x 79.3 mm (0.05 in x 3.12 in) bolts. Fasteners No. 1--4, 17 are M8 x 1.25 mm x 95.3 mm (0.05 in x 3.75 in) bolts. Fasteners 9--12 are M10 x 1.5 mm x 106.8 mm (0.06 in x 4.20 in)/M8 x 1.25 mm x 21.5 mm (0.05 in x 0.84 in) studs. Fasteners 13-16 are M10 x 1.5 mm x 106 mm (0.06 in x 4.17 in) bolts. The bolts and studs must be installed in the correct position or engine damage can result.

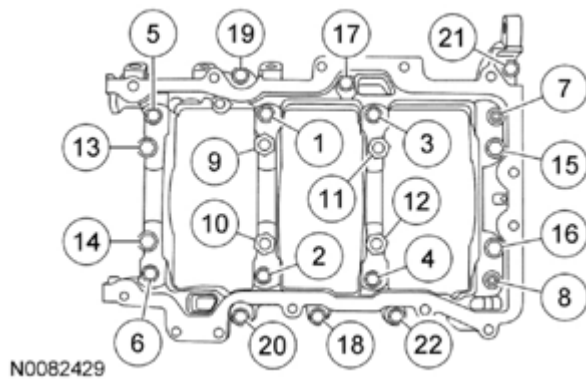


Fig. 285: Identifying Lower Cylinder Block Bolts And Studs Tightening Sequence
Courtesy of FORD MOTOR CO.

10. Position the lower cylinder block and install the bolts and studs.
 - Tighten the bolts and studs in the sequence shown in four stages.
 - Stage 1: Tighten fasteners 1--8 to 25 Nm (18 lb-ft).
 - Stage 2: Tighten fasteners 9--16 to 40 Nm (30 lb-ft).
 - Stage 3: Tighten fasteners 1--16 90 degrees.
 - Stage 4: Tighten fasteners 17-22 to 25 Nm (18 lb-ft).
11. Using the Dial Indicator Gauge with Holding Fixture, measure crankshaft end play.
 - Position the crankshaft to the rear of the cylinder block.
 - Zero the Dial Indicator Gauge with Holding Fixture.
 - Move the crankshaft to the front of the cylinder block. Note and record the crankshaft end play.
 - Acceptable crankshaft end play is 0.100-0.255 mm (0.003-0.010 in). If the crankshaft end play exceeds the specified range, install new parts as necessary.

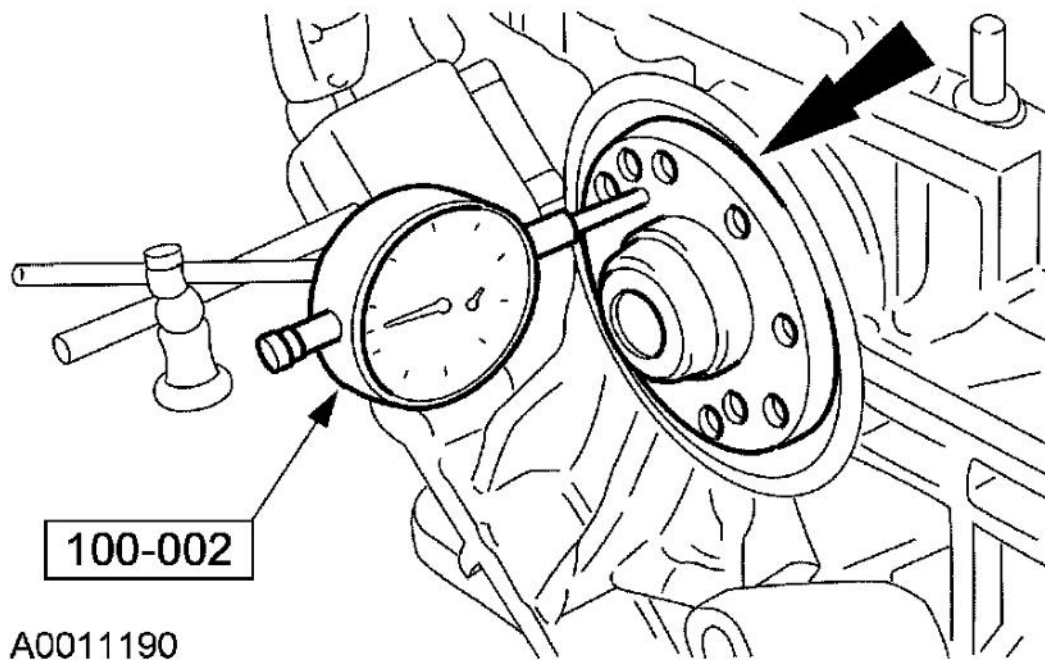


Fig. 286: Measuring Crankshaft End Play Using Special Tools
Courtesy of FORD MOTOR CO.

12. Using the Crankshaft Rear Main Oil Seal Installer and the Crankshaft Rear Main Oil Seal Installer Bolts, install the crankshaft rear oil seal.

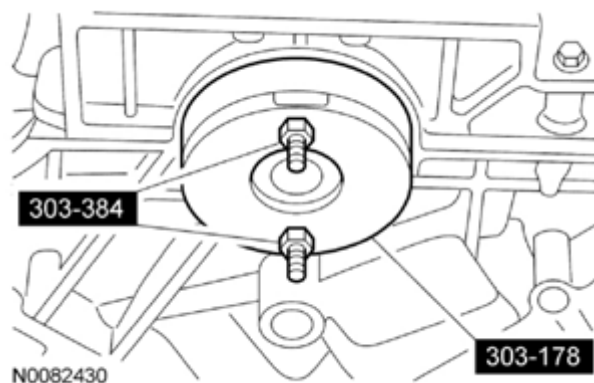


Fig. 287: Installing Rear Main Oil Seal Using Crankshaft Rear Main Oil Seal Installer
Courtesy of FORD MOTOR CO.

13. Install the engine-to-transaxle separator plate.

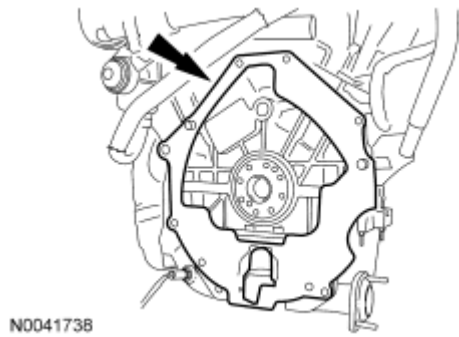


Fig. 288: Locating Engine-To-Transaxle Separator Plate
Courtesy of FORD MOTOR CO.

14. Position the flexplate and install the bolts. Tighten to 80 N.m (59 lb-ft).

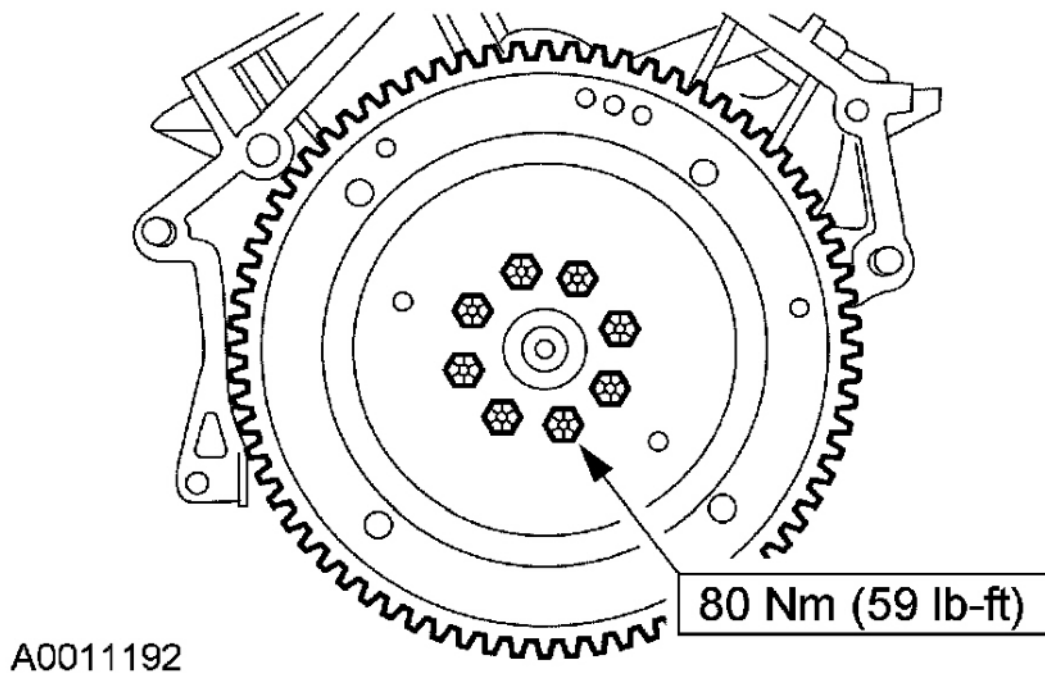


Fig. 289: Tightening Flexplate Bolts - With Torque Specification
Courtesy of FORD MOTOR CO.

15. Mount the engine on an engine stand.
16. Using the chart (**Fig. 290**), select the correct piston grade size for the cylinder bores.
 - Measure the cylinder block bore diameter.
 - Mark the outside of the block with the appropriate number(s) to identify bore grade size.
 - Choose the correct piston grade size for the cylinder bore.

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LITER	GRADE	CYLINDER BLOCK BORE DIAMETER	PISTON DIAMETER UNCOATED	PISTON DIAMETER COATED
3.0L	1	89.000-89.010	88.970-88.980	88.990-89.010
3.0L	2	89.010-89.020	88.978-88.992	88.998-89.022
3.0L	3	89.020-89.030	88.990-89.000	89.010-89.030
3.0L	1A	89.000-89.010	88.970-89.980	88.990-89.010
3.0L	2A	89.010-89.020	88.978-89.992	88.998-89.022
3.0L	3A	89.020-89.030	88.990-89.000	89.010-89.030

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Fig. 290: Cylinder Block Bore Diameter Chart
Courtesy of FORD MOTOR CO.

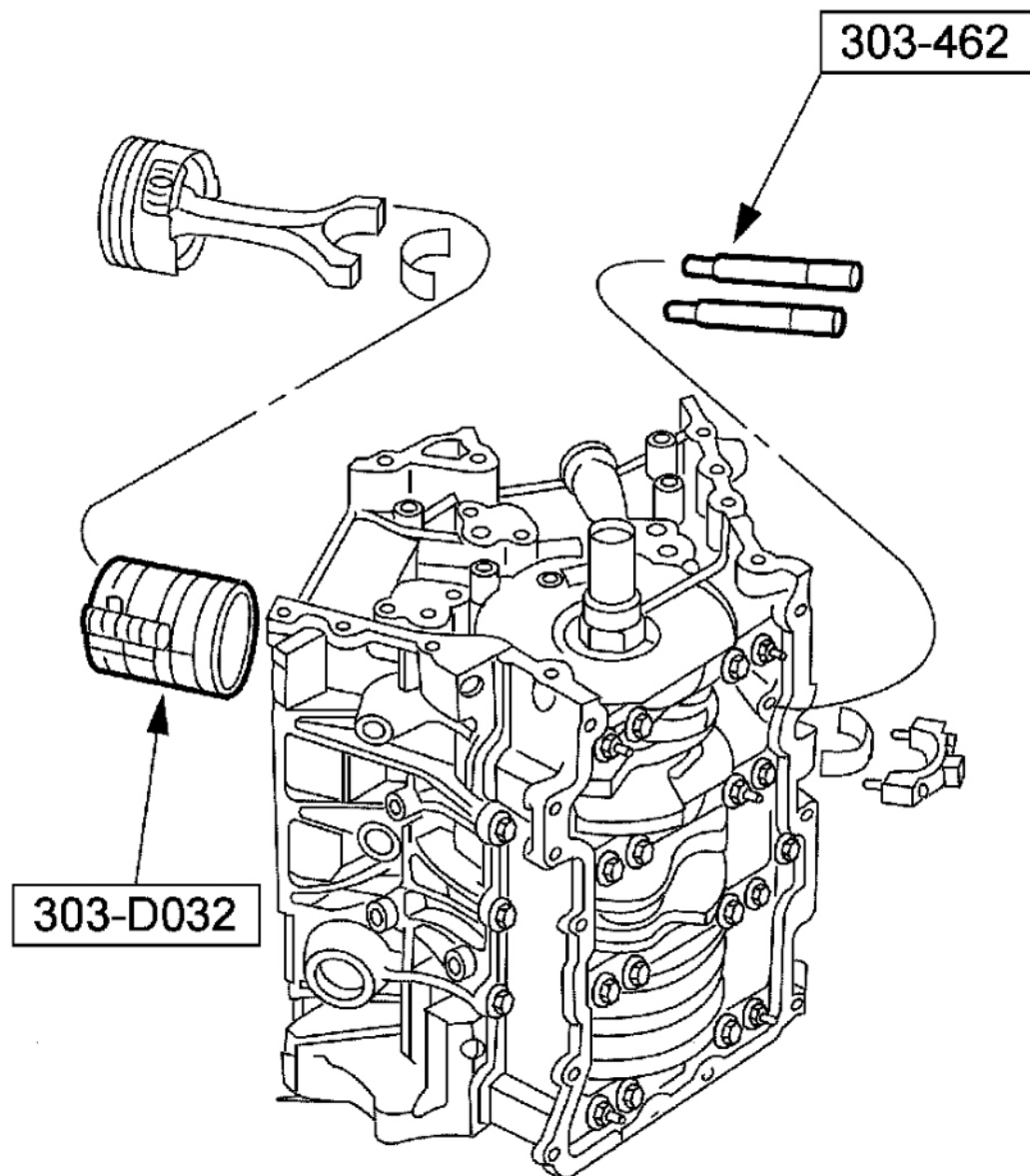
CAUTION: Be sure not to scratch the cylinder wall or crankshaft journal with the connecting rod. Push the piston down until the connecting rod bearing seats on the crankshaft journal.

NOTE: Lubricate the pistons, piston rings, connecting rod bearings and the entire cylinder bores with clean engine oil.

NOTE: Make sure the piston rings are positioned to specifications for installation. For additional information, refer to PISTON.

NOTE: Make sure the piston arrow on top is facing toward the front of the engine.

NOTE: After installation of each piston and connecting rod, rotate the crankshaft to verify smooth operation.



A0006848

Fig. 291: Installing Piston And Connecting Rod Assemblies Using Special Tools
Courtesy of FORD MOTOR CO.

17. Using the special tools, install the piston and connecting rod assemblies.

NOTE: The rod cap installation must keep the same orientation as marked during disassembly or engine damage may occur.

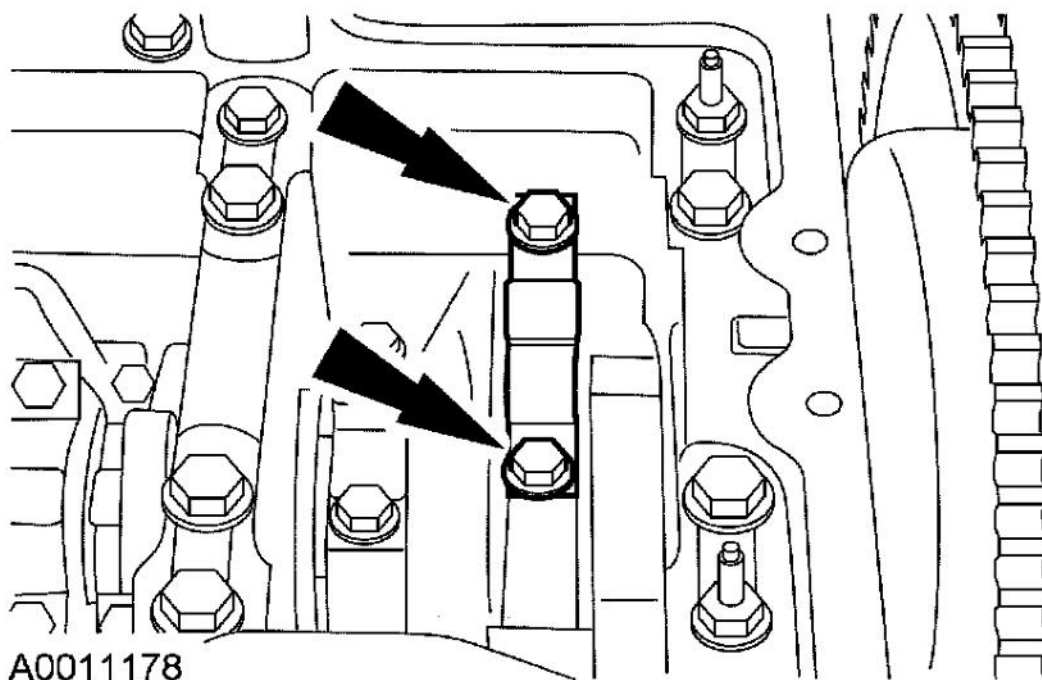


Fig. 292: Tightening Connecting Rod Caps And Bolts
Courtesy of FORD MOTOR CO.

18. Install the connecting rod caps and the new bolts.
 - Tighten the bolts in two stages.
 - Stage 1: Tighten to 23 Nm (17 lb-ft).
 - Stage 2: Tighten to 43 Nm (32 lb-ft).
19. Install the oil separator cover, a new gasket and the 2 bolts.
 - Tighten to 10 N.m (89 lb-in).

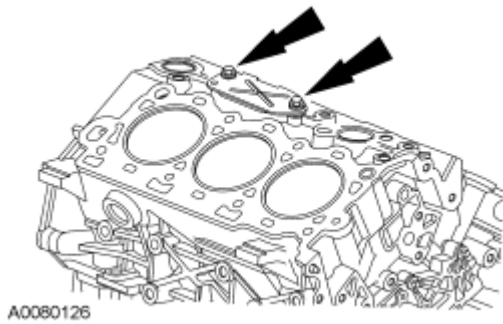


Fig. 293: Locating Oil Separator Cover Bolts
Courtesy of FORD MOTOR CO.

20. Install the power steering pump bracket and the 3 bolts.
- Tighten to 25 N.m (18 lb-ft).

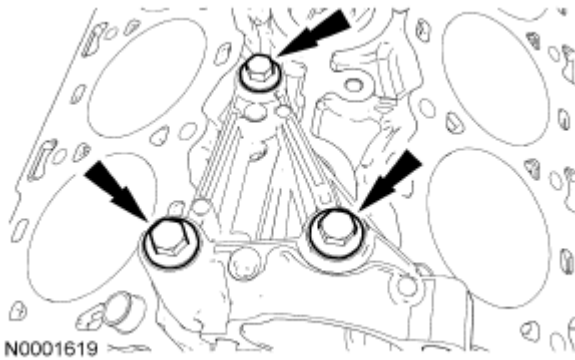


Fig. 294: Locating Power Steering Pump Bracket Bolts
Courtesy of FORD MOTOR CO.

21. **NOTE:** RH shown, LH similar.

NOTE: Position the new gaskets and the LH and RH cylinder heads. Install new bolts and tighten in the sequence shown in 6 stages:

- Stage 1: Tighten to 40 N.m (30 lb-ft).
- Stage 2: Tighten to 90 N.m (66 lb-ft).
- Stage 3: Loosen 1 full turn.
- Stage 4: Tighten to 40 N.m (30 lb-ft).
- Stage 5: Tighten 90 degrees.
- Stage 6: Tighten 90 degrees.

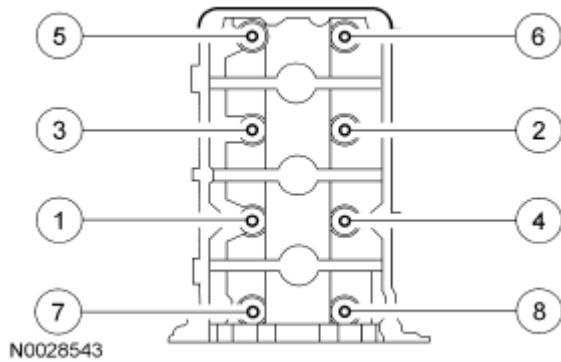


Fig. 295: Identifying Cylinder Heads Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

22. Install the crankshaft damper bolt and rotate the crankshaft key way to the 11 o'clock position to locate top dead center (TDC).

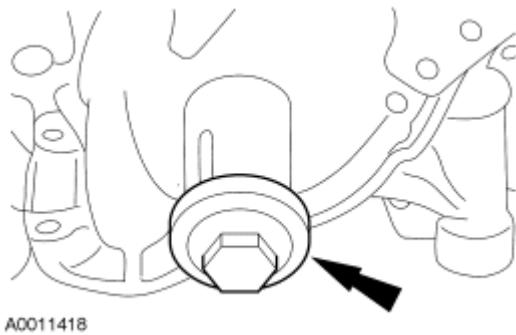


Fig. 296: Locating Crankshaft Damper Bolt
Courtesy of FORD MOTOR CO.

23. Apply clean engine oil to the LH and RH camshaft roller followers.

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

NOTE: RH shown, LH similar.

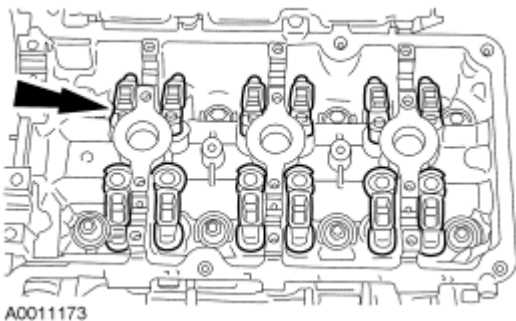


Fig. 297: Locating Camshaft Roller Followers
Courtesy of FORD MOTOR CO.

24. Install the LH and RH camshaft roller followers.
25. Apply clean engine oil to the LH and RH camshafts.
26. Install the LH and RH camshafts.
 - Locate the camshafts as shown in illustration.

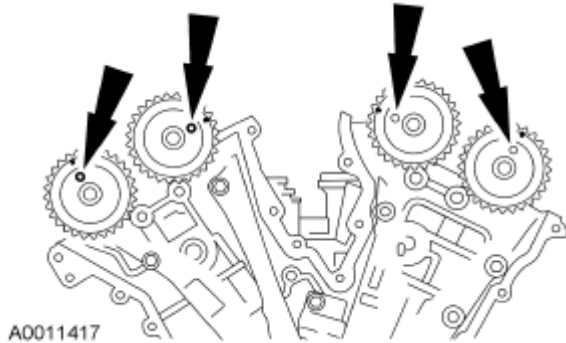


Fig. 298: Locating Camshafts
Courtesy of FORD MOTOR CO.

CAUTION:

The camshaft caps must be installed in their original positions or damage to the engine may occur.

Do not install the camshaft journal thrust caps until all of the camshaft bearing caps have been installed, or damage to the thrust caps can occur.

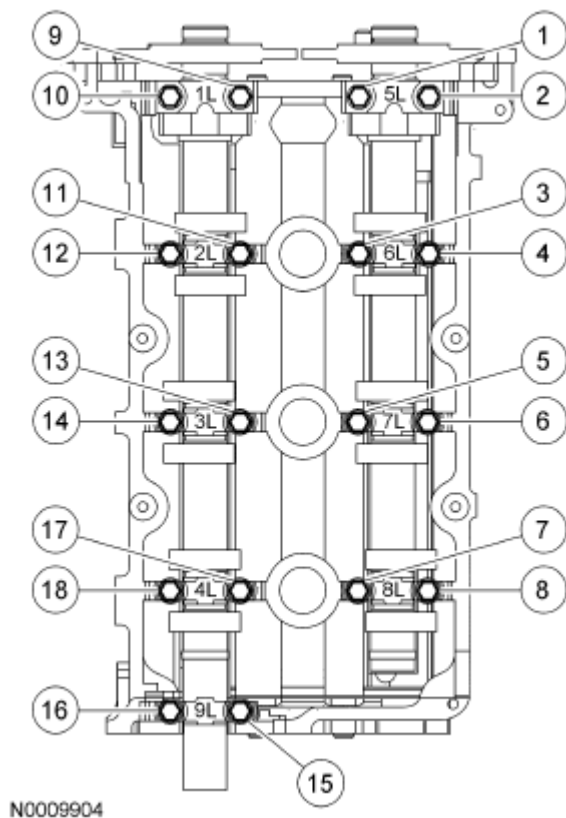


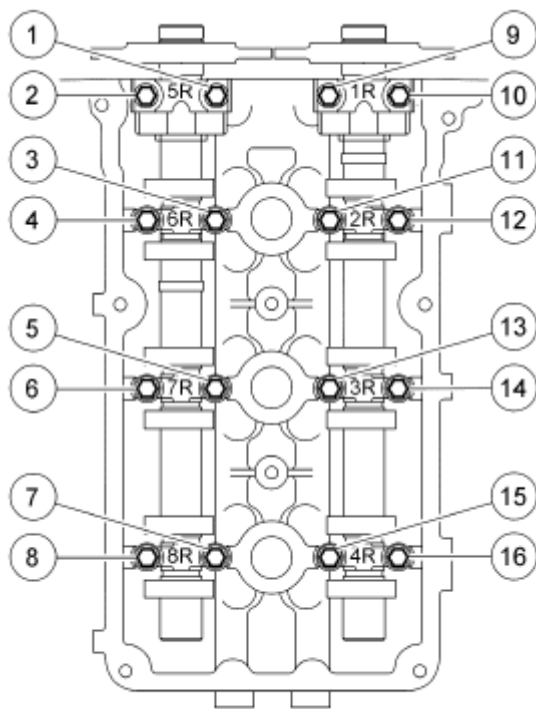
Fig. 299: Identifying LH Camshaft Caps Bolts Tightening Sequence
 Courtesy of FORD MOTOR CO.

27. Lubricate the camshaft journal caps with clean engine oil. Position the LH camshaft caps and install the bolts.
 - Tighten in the sequence shown to 10 N.m (89 lb-in).

CAUTION:

The camshaft caps must be installed in their original positions or damage to the engine may occur.

Do not install the camshaft journal thrust caps until all of the camshaft bearing caps have been installed, or damage to the thrust caps can occur.

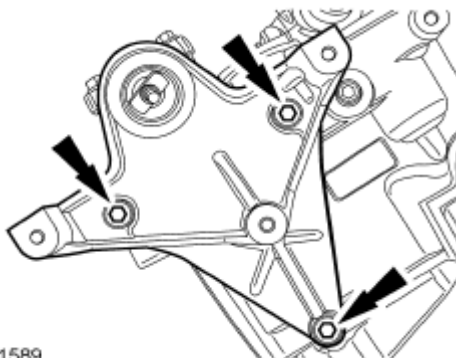


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Fig. 300: Identifying RH Camshaft Caps Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

28. Position the RH camshaft caps and install the bolts.
 - Tighten in the sequence shown to 10 N.m (89 lb-in).

NOTE: Clean the sealing surface with metal surface prep before installing a new press-in-place gasket.



N0001589

Fig. 301: Locating Camshaft Oil Seal Retainer Bolts
Courtesy of FORD MOTOR CO.

29. Install the camshaft oil seal retainer and the 3 bolts.

- Tighten to 10 N.m (89 lb-in).

NOTE: Lubricate the camshaft oil seal with clean engine oil.

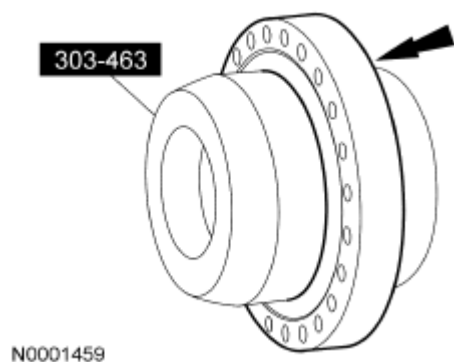


Fig. 302: Locating Camshaft Oil Seal On Special Tool
Courtesy of FORD MOTOR CO.

30. Position the new camshaft oil seal on the special tool.
31. Position the special tool and the camshaft oil seal on the camshaft.

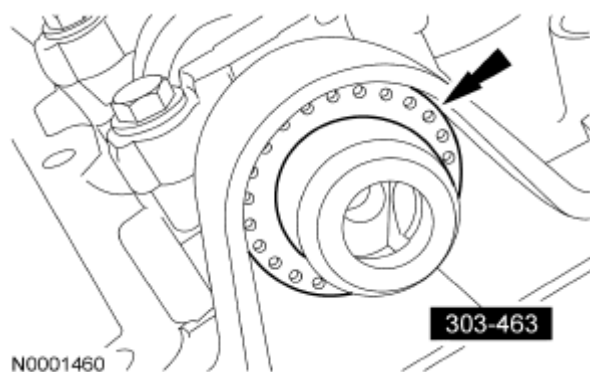


Fig. 303: Locating Camshaft Oil Seal Position
Courtesy of FORD MOTOR CO.

32. Using the special tools, install the camshaft oil seal.

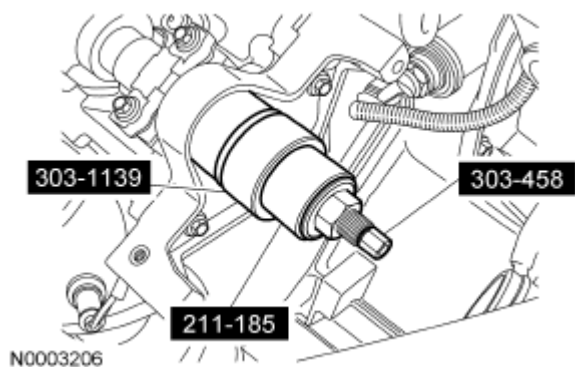


Fig. 304: Identifying Special Tools
Courtesy of FORD MOTOR CO.

33. Remove the crankshaft damper bolt.

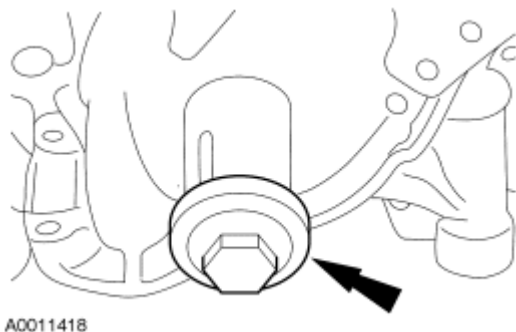


Fig. 305: Locating Crankshaft Damper Bolt
Courtesy of FORD MOTOR CO.

NOTE: Failure to verify correct timing drive component alignment will result in severe engine damage.

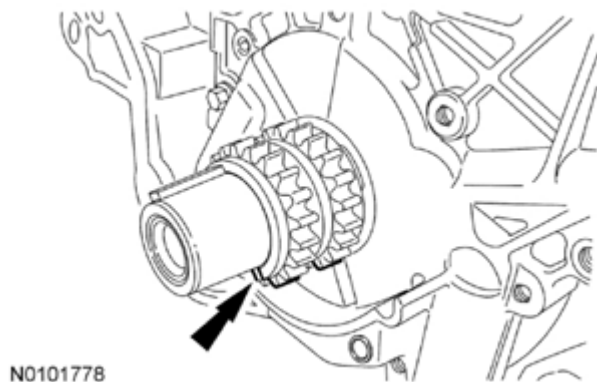


Fig. 306: Locating Crankshaft Sprocket With Timing Mark Facing Out
Courtesy of FORD MOTOR CO.

34. Install the crankshaft sprocket with the timing mark facing out. The timing mark on the LH and RH timing chains will be aligned to this mark during assembly.

NOTE: LH shown, RH similar.

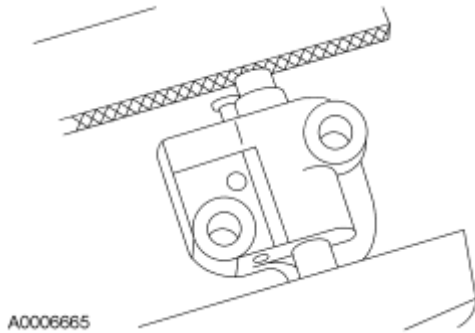


Fig. 307: Identifying Chain Tensioner In Soft-Jawed Vise
Courtesy of FORD MOTOR CO.

35. Position the chain tensioner in a soft-jawed vise.

NOTE: LH shown, RH similar.

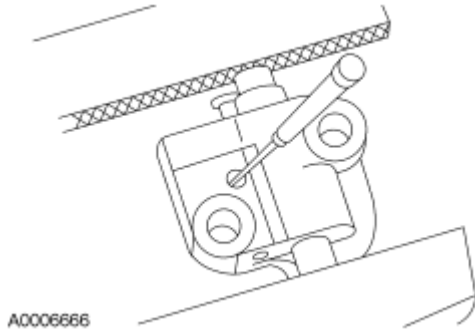


Fig. 308: Holding Chain Tensioner Ratchet Lock Mechanism Away From Ratchet Stem
Courtesy of FORD MOTOR CO.

36. Hold the chain tensioner ratchet lock mechanism away from the ratchet stem with a small pick.

CAUTION: During tensioner compression, do not release the ratchet stem until the tensioner piston is fully bottomed in its bore or damage to the ratchet stem will result.

37. Slowly compress the timing chain tensioner.
38. Retain the tensioner piston with a 1.5 mm (0.06 in) wire or paper clip.

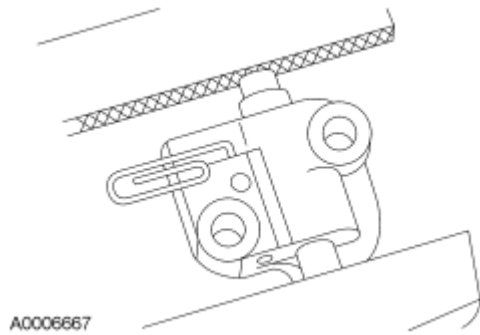


Fig. 309: Retaining Tensioner Piston With 1.5-mm (0.06-in) Wire Or Paper Clip
Courtesy of FORD MOTOR CO.

39. If timing marks in the timing chains are not evident, use a permanent-type marker to mark the crankshaft and camshaft timing marks on the LH and RH timing chains.
1. Mark any link to use as the crankshaft timing mark.
 2. Starting with the crankshaft timing mark, count 29 links and mark the link.
 3. Continue counting to link 42 and mark the link.

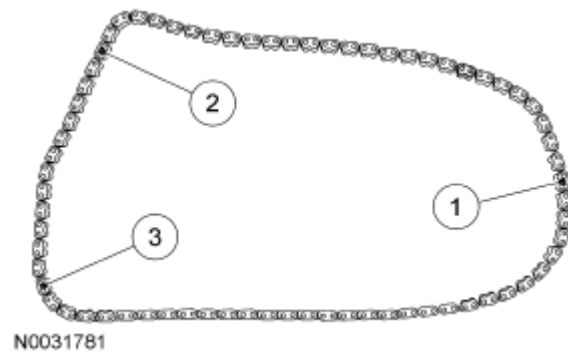


Fig. 310: Identifying Timing Chains Marks
Courtesy of FORD MOTOR CO.

40. Verify that the LH camshafts are correctly positioned.

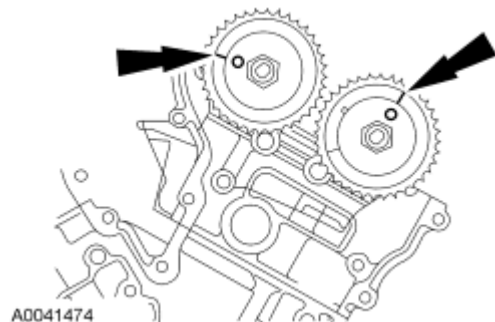


Fig. 311: Locating Camshafts Aligning Marks
Courtesy of FORD MOTOR CO.

41. Position the LH timing chain and guide and install the 2 bolts.
- Tighten to 25 N.m (18 lb-ft).
 - Align the marks on the timing chain with the marks on the camshaft and crankshaft sprockets.

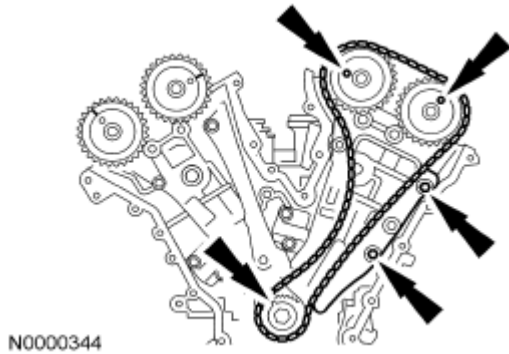


Fig. 312: Identifying Timing Chains Marks & Bolts
Courtesy of FORD MOTOR CO.

42. Install the LH timing chain tensioner arm and the LH timing chain tensioner.
1. Install the tensioner arm.
 2. Position the tensioner.
 3. Install the 2 bolts.
- Tighten to 25 N.m (18 lb-ft).

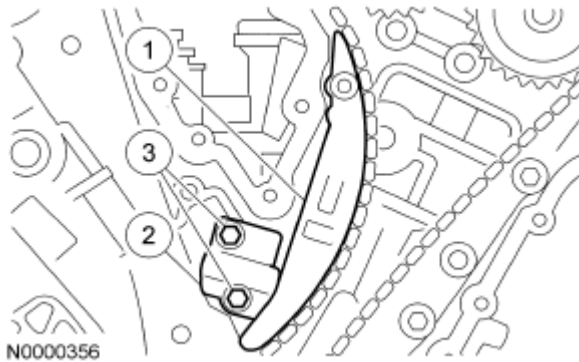
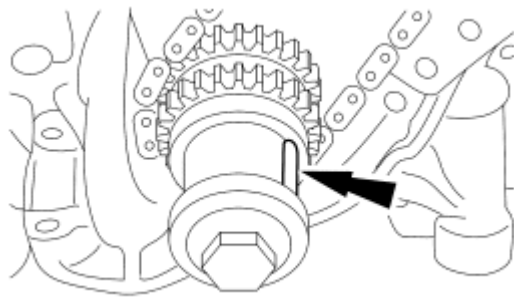


Fig. 313: Identifying Tensioner Arm & Tensioner
Courtesy of FORD MOTOR CO.

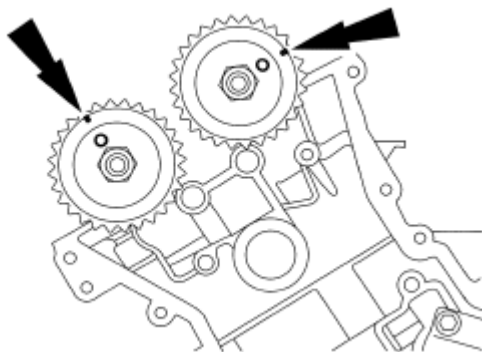
43. Install the crankshaft damper bolt and rotate the crankshaft clockwise 120 degrees until the crankshaft keyway is in the 3 o'clock position.



A0038323

Fig. 314: Locating Crankshaft Keyway
Courtesy of FORD MOTOR CO.

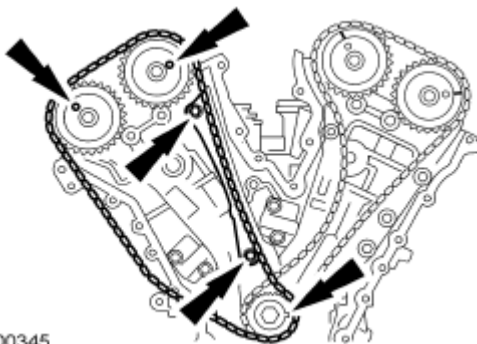
44. Verify that the RH camshafts are correctly positioned.



A0011422

Fig. 315: Locating Crankshaft Position
Courtesy of FORD MOTOR CO.

45. Install the RH timing chain and chain guide and install the 2 bolts.
- Tighten to 25 N.m (18 lb-ft).
 - Align the marks on the timing chain with the marks on the camshaft and crankshaft sprockets.



N0000345

Fig. 316: Locating Timing Chain Marks & Bolts
Courtesy of FORD MOTOR CO.

46. Install the RH timing chain tensioner and tensioner arm.

1. Install the tensioner arm.
2. Position the tensioner.
3. Install the 2 bolts.
 - Tighten to 25 N.m (18 lb-ft).

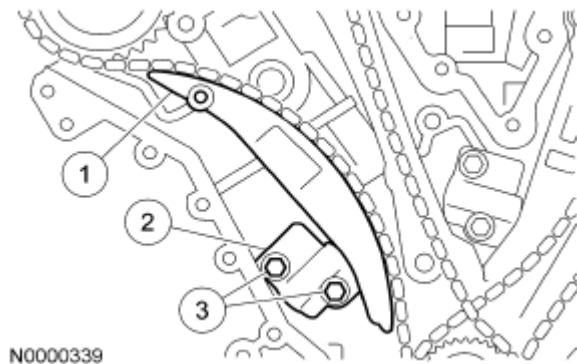
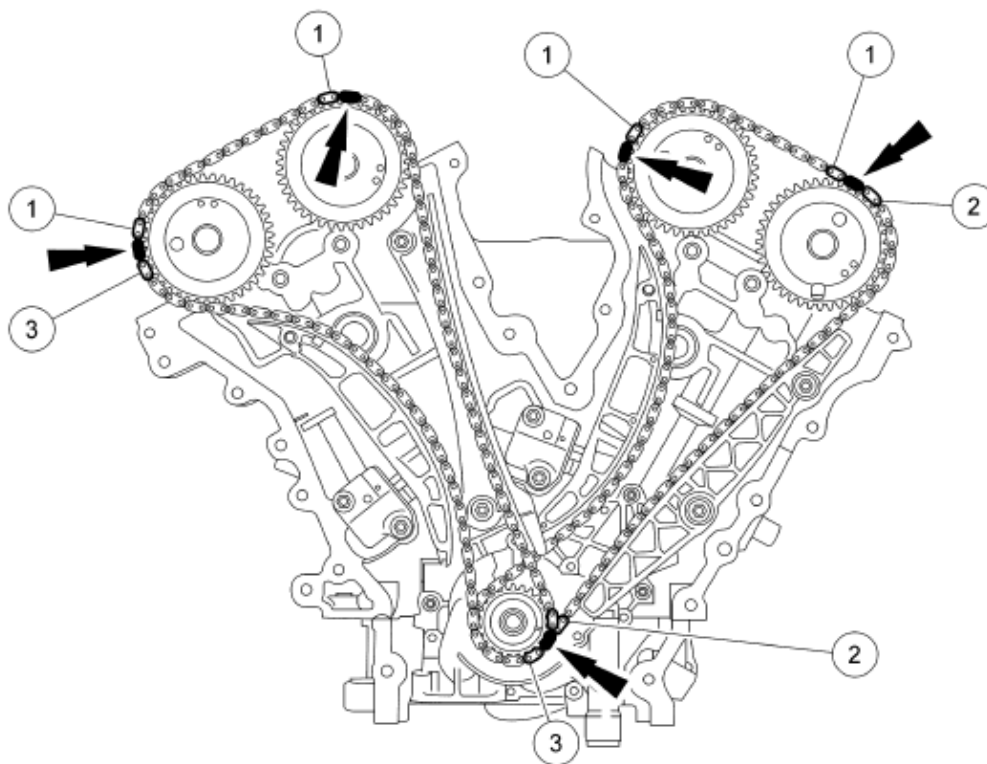


Fig. 317: Identifying Tensioner Arm And Tensioner
Courtesy of FORD MOTOR CO.

47. Remove the LH and RH timing chain tensioner piston retaining wires.
48. Rotate the crankshaft counterclockwise 120 degrees to top dead center (TDC).

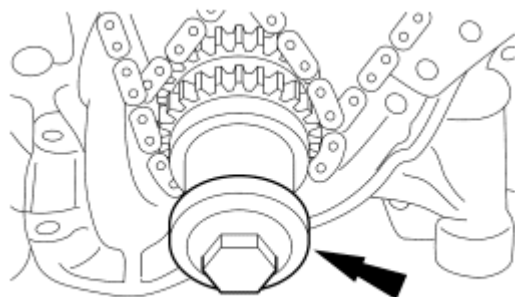
CAUTION: Failure to verify correct timing drive component alignment will result in severe engine damage.



N0031782

Fig. 318: Locating Crankshaft Timing Marks
Courtesy of FORD MOTOR CO.

49. Verify the timing with the following steps.
 1. There should be 12 chain links between the camshaft timing marks.
 2. There should be 27 chain links between the camshaft and the crankshaft timing marks.
 3. There should be 30 chain links between the camshaft and the crankshaft timing marks.
50. Remove the crankshaft damper bolt.



A0011064

Fig. 319: Identifying Damper Bolt
Courtesy of FORD MOTOR CO.

CAUTION: This pulse wheel is used in several different engines. Install the pulse wheel with the keyway in the slot stamped "30" or "30RFF" only

(orange in color).

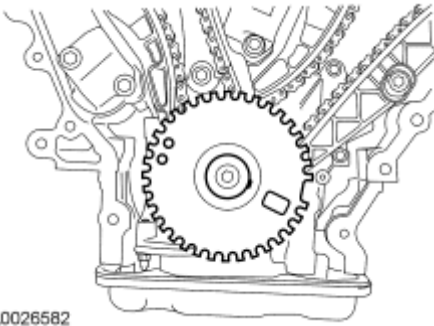


Fig. 320: Identifying Ignition Pulse Wheel
Courtesy of FORD MOTOR CO.

51. Install the ignition pulse wheel.

CAUTION: Only use hand tools when removing or installing the spark plugs, damage can occur to the cylinder head or spark plug.

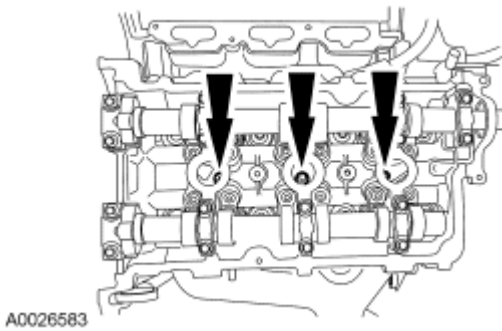


Fig. 321: Locating Spark Plugs
Courtesy of FORD MOTOR CO.

52. Install the LH and RH spark plugs.
- Tighten to 15 N.m (11 lb-ft).
53. Install 3 new gaskets in the engine front cover.

NOTE:

Clean the sealing surfaces with silicone gasket remover and metal surface prep before applying gasket and sealant.

The front cover must be installed and the bolts tightened within 4 minutes of sealant application.

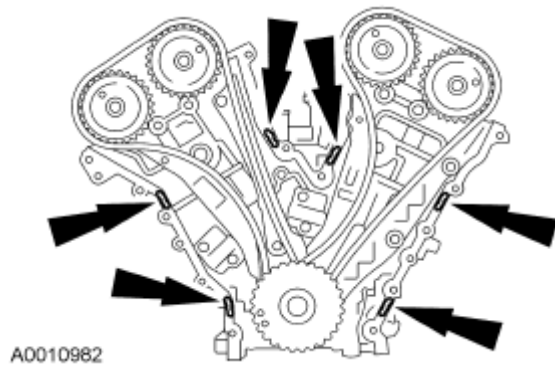


Fig. 322: Locating Gaskets In Engine Front Cover
Courtesy of FORD MOTOR CO.

54. Apply a 6 mm (0.24 in) dot of silicone gasket and sealant to the cylinder block-to-lower cylinder block and cylinder head mating surfaces.
55. Position the engine front cover. Install the 14 bolts and the stud bolt.
 - Tighten in the sequence shown to 25 N.m (18 lb-ft).

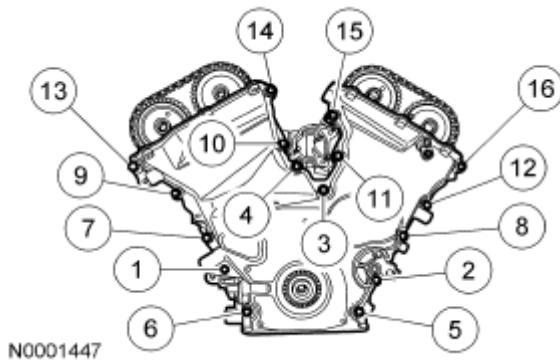


Fig. 323: Identifying Engine Front Cover Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

56. Install the belt tensioner and the bolt.
 - Tighten to 45 N.m (33 lb-ft).

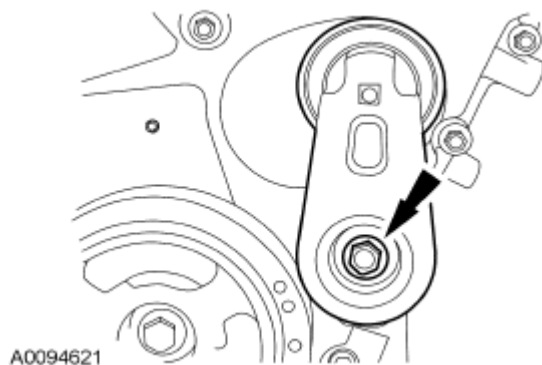


Fig. 324: Locating Belt Tensioner Bolt
Courtesy of FORD MOTOR CO.

NOTE: Apply clean engine oil to the seal lip and seal bore before installing the seal.

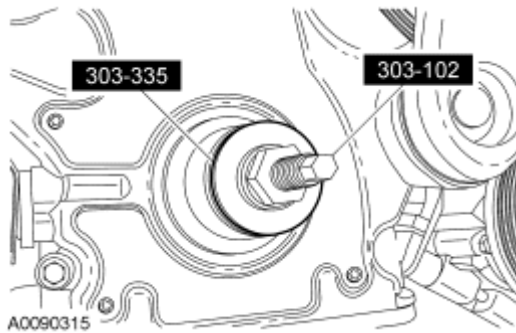


Fig. 325: Installing Crankshaft Seal Using Special Tools (303-335 And 303-102)
Courtesy of FORD MOTOR CO.

57. Using the special tool, install a new crankshaft front seal.

NOTE: Clean the keyway and slot using metal surface cleaner before applying silicone gasket and sealant.
The crankshaft damper must be installed and the bolt tightened within 4 minutes of sealant application.

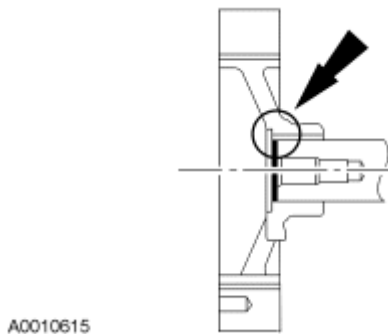


Fig. 326: Applying Silicone Gasket And Sealant
Courtesy of FORD MOTOR CO.

58. Apply silicone gasket and sealant to the end of the crankshaft damper keyway slot.

NOTE: Lubricate the outside diameter sealing surfaces with clean engine oil.

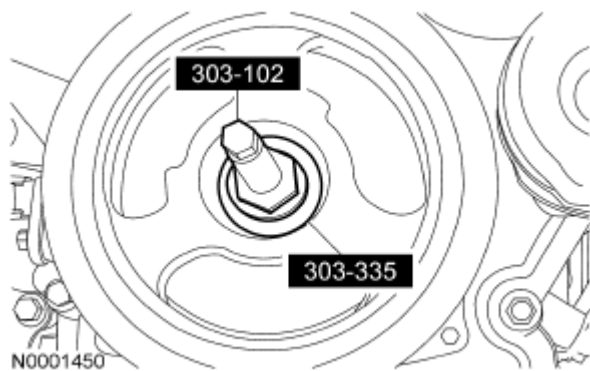


Fig. 327: Identifying Special Tools
Courtesy of FORD MOTOR CO.

59. Using the special tools, install the crankshaft pulley.
60. Using the special tool to hold the crankshaft pulley, install the bolt and washer and tighten in 4 stages.
 - Stage 1: Tighten to 120 N.m (89 lb-ft).
 - Stage 2: Loosen 1 full turn (360 degrees).
 - Stage 3: Tighten to 50 N.m (37 lb-ft).
 - Stage 4: Tighten to 90 N.m (66 lb-ft).

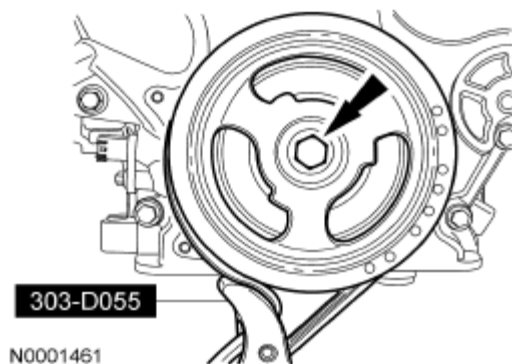


Fig. 328: Identifying Crankshaft Pulley Bolt & Special Tools
Courtesy of FORD MOTOR CO.

61. If equipped, install the block heater.
 - Tighten to 14 N.m (10 lb-ft).

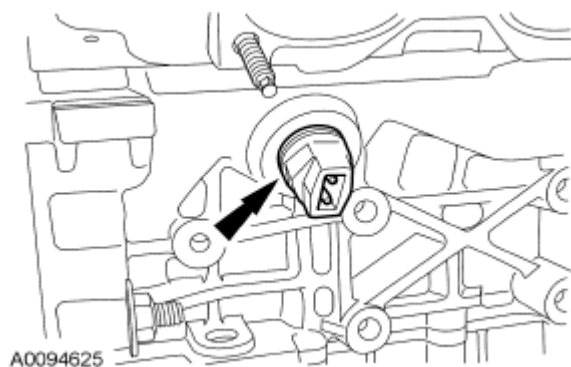


Fig. 329: Locating Block Heater
Courtesy of FORD MOTOR CO.

62. Install the oil pressure sender.
- Tighten to 14 N.m (10 lb-ft).

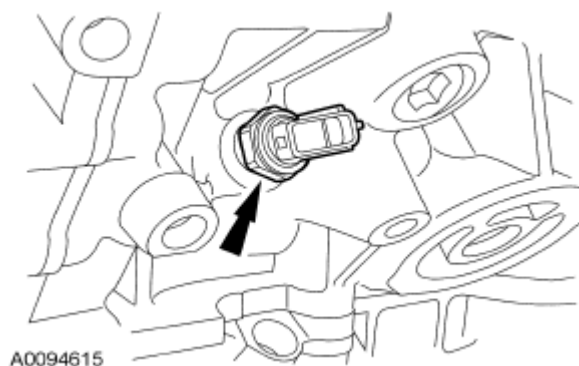


Fig. 330: Locating Oil Pressure Sender
Courtesy of FORD MOTOR CO.

63. Install the oil pan baffle and the 8 nuts.
- Tighten the M8 nuts to 15 N.m (11 lb-ft) and then rotate 45 degrees.
 - Tighten the M6 nuts to 5 N.m (44 lb-in) and then rotate 45 degrees.

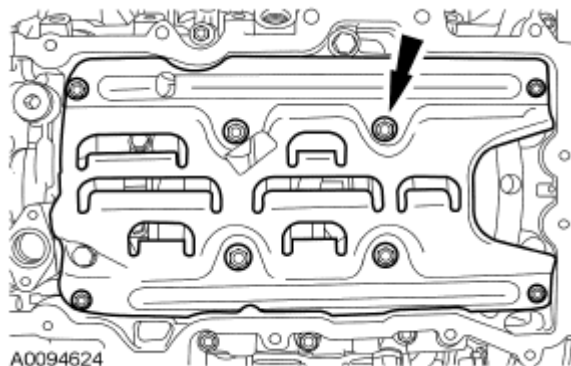


Fig. 331: Locating Oil Pan Baffle Nut
Courtesy of FORD MOTOR CO.

NOTE: Lubricate the new oil pump screen and pickup tube O-ring seal with clean engine oil.

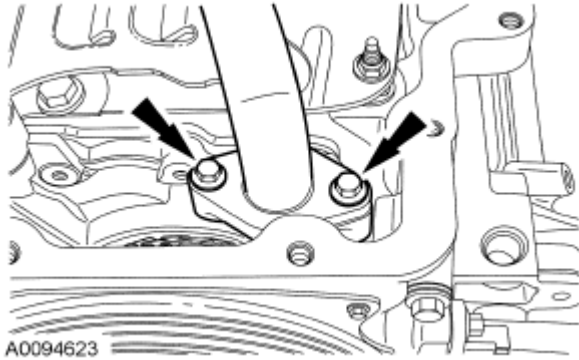


Fig. 332: Locating Pickup Tube Bolts
Courtesy of FORD MOTOR CO.

64. Position the oil pump screen and pickup tube and install the 2 bolts.
 - Tighten to 10 N.m (89 lb-in).
65. Install the radio interference capacitor and the bolt.
 - Tighten to 8 N.m (71 lb-in).



Fig. 333: Locating Radio Interference Capacitor Bolts
Courtesy of FORD MOTOR CO.

66. Install the coolant bypass tube and the 2 bolts.
 - Tighten to 10 N.m (89 lb-in).

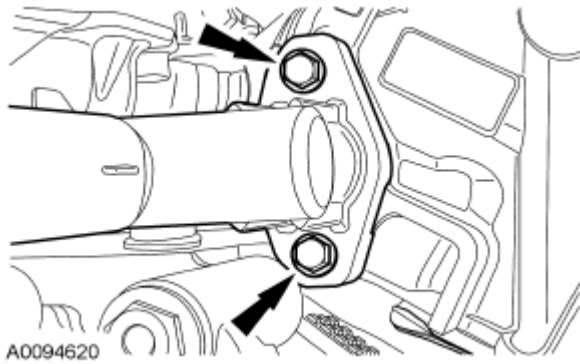


Fig. 334: Locating Coolant Bypass Tube Bolts
Courtesy of FORD MOTOR CO.

- NOTE:** The center coolant pump uses a sealing washer and must be replaced whenever the bolt is removed.
- NOTE:** The hole in the coolant pump for the center coolant pump bolt is threaded. Once the center coolant pump is unscrewed from the camshaft, it must also be unscrewed from the coolant pump.

67. Remove the center coolant pump bolt from the coolant pump and discard the sealing washer.
 - Install a new sealing washer on the center coolant pump bolt, then install the center coolant pump bolt in the coolant pump.
68. Install the coolant pump and the 4 bolts. Tighten in 4 stages:
 - Stage 1: Tighten the coolant pump center bolt to 4 N.m (35 lb-in).
 - Stage 2: Loosely install the 3 coolant pump outer bolts.
 - Stage 3: Tighten the coolant pump center bolt to 25 N.m (18 lb-ft).
 - Stage 4: Tighten the 3 coolant pump outer bolts to 10 N.m (89 lb-in).

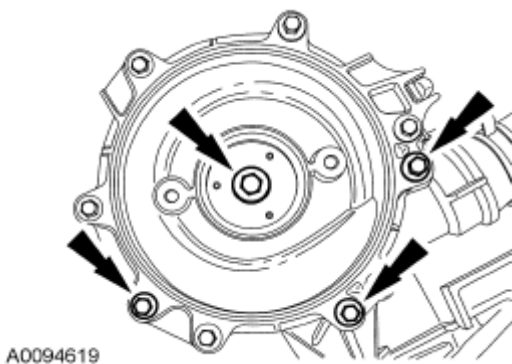


Fig. 335: Locating Coolant Pump Bolts
Courtesy of FORD MOTOR CO.

- NOTE:** Install a new O-ring seal on the thermostat housing and lubricate with

clean engine oil

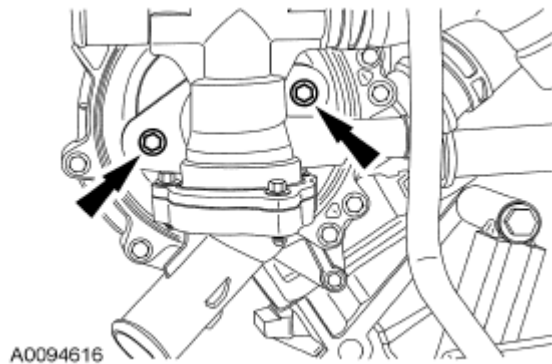


Fig. 336: Locating Thermostat Housing Bolts
Courtesy of FORD MOTOR CO.

69. Install the thermostat housing and the 2 bolts.
 - Tighten to 10 N.m (89 lb-in).

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 old sealant.

70. Clean the LH and RH valve cover sealing surfaces.

NOTE: The valve cover must be installed and the bolts and stud bolts tightened within 4 minutes of sealant application.

71. Apply a 5 mm (0.19 in) dot of silicone gasket sealant to the front cover-to-RH cylinder head joints.

NOTE: Install a new gasket in the valve cover.

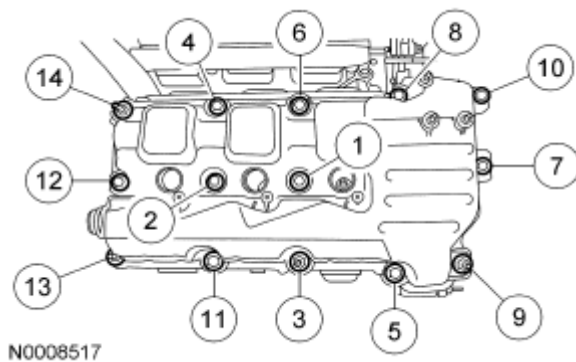


Fig. 337: Identifying RH Valve Cover Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

72. Position the RH valve cover. Install the 9 bolts and 5 stud bolts.

- Tighten in the sequence shown to 10 N.m (89 lb-in).

NOTE: The valve cover must be installed and the bolts and stud bolts tightened within 4 minutes of sealant application.

73. Apply a 5 mm (0.19 in) dot of silicone gasket sealant to the front cover-to-LH cylinder head joints.

NOTE: Install a new gasket in the valve cover.

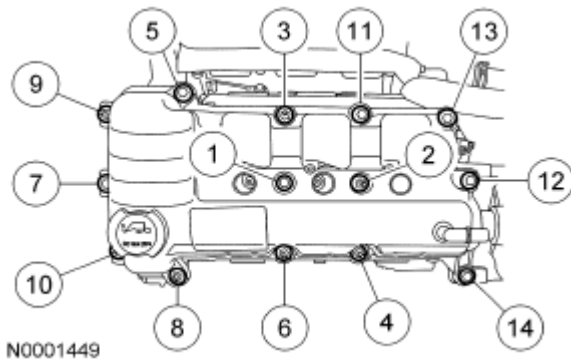


Fig. 338: Identifying LH Valve Cover Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

74. Position the LH valve cover. Install the 6 bolts and 8 stud bolts.

- Tighten in the sequence shown to 10 N.m (89 lb-in).

75. Install the RH and LH ignition coils and the 6 bolts.

- Tighten to 6 N.m (53 lb-in).

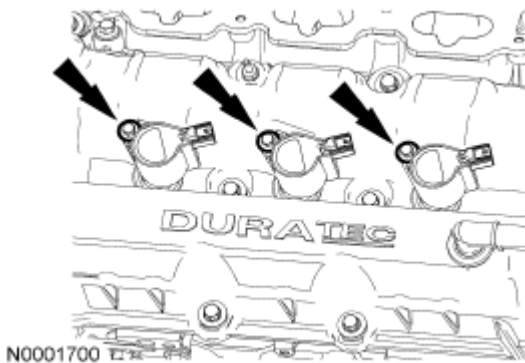


Fig. 339: Locating Ignition Coils
Courtesy of FORD MOTOR CO.

76. Install 6 new LH exhaust manifold studs.

- Tighten to 12 N.m (9 lb-ft).

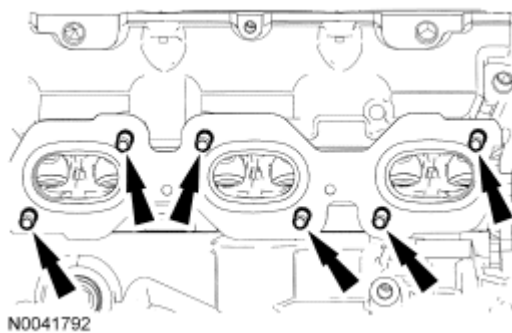


Fig. 340: Locating Exhaust Manifold Studs
Courtesy of FORD MOTOR CO.

77. Position a new gasket and the LH exhaust manifold and converter. Install the 6 new nuts.
 - Tighten to 20 N.m (15 lb-ft).

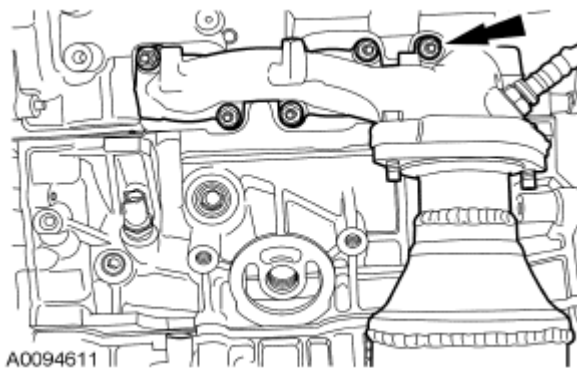


Fig. 341: Locating Exhaust Manifold Nuts
Courtesy of FORD MOTOR CO.

78. Install 6 new RH exhaust manifold studs.
 - Tighten to 12 N.m (9 lb-ft).

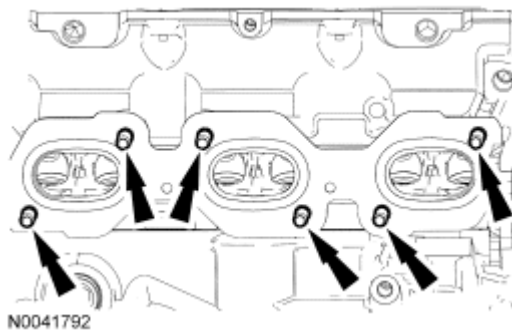


Fig. 342: Locating Exhaust Manifold Studs
Courtesy of FORD MOTOR CO.

79. Position a new gasket and the RH exhaust manifold and converter. Install the 6 new nuts.

- Tighten to 20 N.m (15 lb-ft).

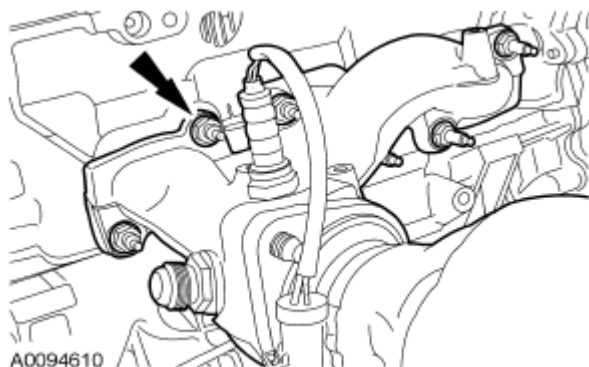


Fig. 343: Locating Exhaust Manifold Nut
Courtesy of FORD MOTOR CO.

80. Install the RH engine insulator bracket and the 4 bolts.
- Tighten to 55 N.m (41 lb-ft).

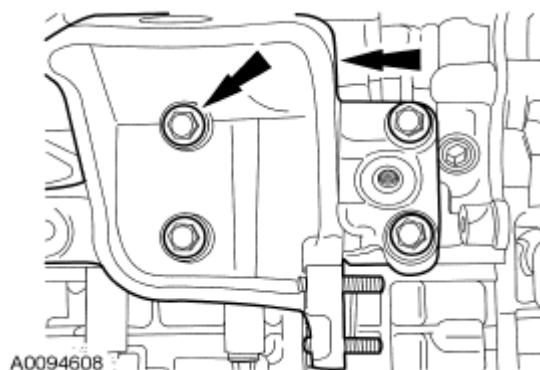


Fig. 344: Locating Engine Insulator Bracket Bolts
Courtesy of FORD MOTOR CO.

81. Install the generator, nuts and the bolt.
- Tighten to 48 N.m (35 lb-ft).

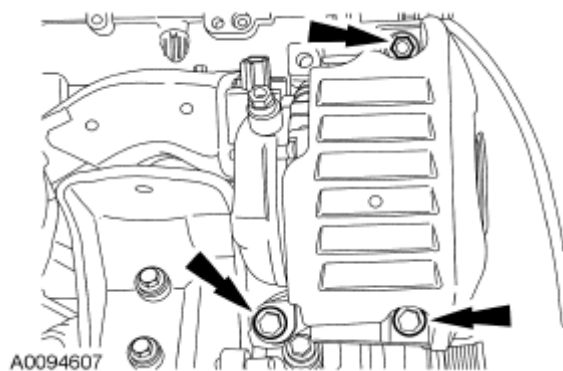


Fig. 345: Locating Generator Nuts & Bolt
Courtesy of FORD MOTOR CO.

NOTE: Install a new O-ring seal on the M22 bolt and lubricate with clean engine oil.

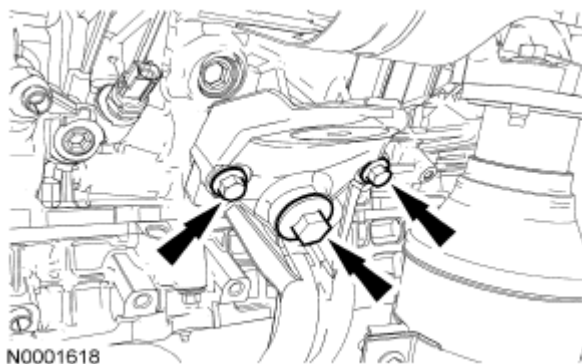
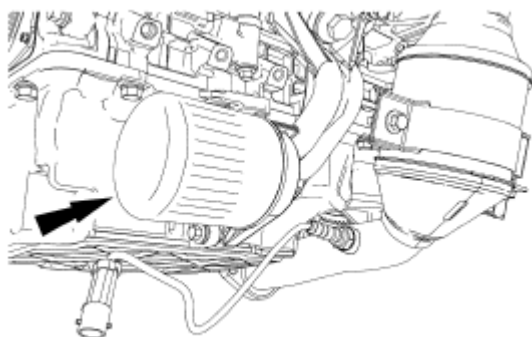


Fig. 346: Locating Oil Filter Adapter Bolts
Courtesy of FORD MOTOR CO.

82. Position the oil filter adapter and loosely install the bolts. Tighten in 3 stages:
 - Stage 1: Tighten the M22 bolt to 25 N.m (18 lb-ft).
 - Stage 2: Tighten the M8 bolt to 25 N.m (18 lb-ft).
 - Stage 3: Tighten the M22 bolt to 155 N.m (114 lb-ft).
83. Install a new oil filter.
 - Tighten to 16 N.m (12 lb-ft).

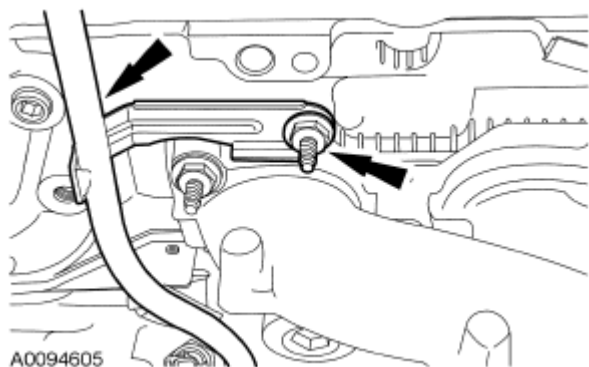


N0003054

Fig. 347: Locating Oil Filter

Courtesy of FORD MOTOR CO.

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



A0094605

Fig. 348: Locating Oil Level Indicator Tube & Stud Bolt

Courtesy of FORD MOTOR CO.

84. Install the oil level indicator tube and the stud bolt.
 - Tighten to 9 N.m (80 lb-in).
85. Position the engine wiring harness.
86. Connect the bypass and the coolant pump hoses.

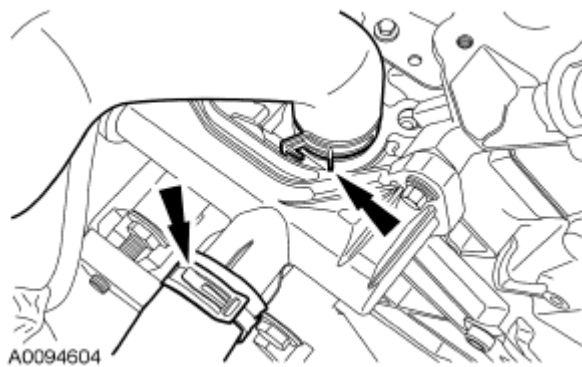


Fig. 349: Locating Bypass & Coolant Pump Hoses
Courtesy of FORD MOTOR CO.

87. Connect the engine coolant temperature (ECT) sensor and the radio interference capacitor electrical connectors.

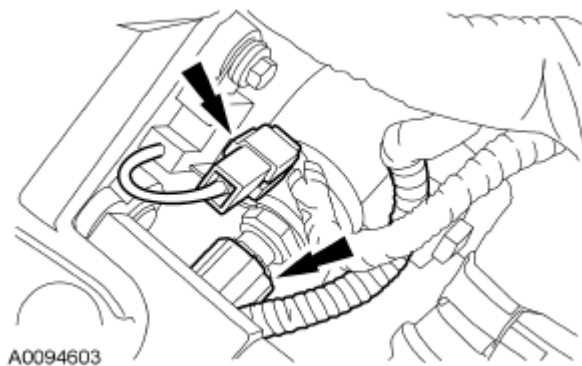


Fig. 350: Locating Engine Coolant Temperature Sensor & Radio Interference Capacitor Connectors
Courtesy of FORD MOTOR CO.

88. Connect the LH ignition coil electrical connectors and attach the wiring retainers.

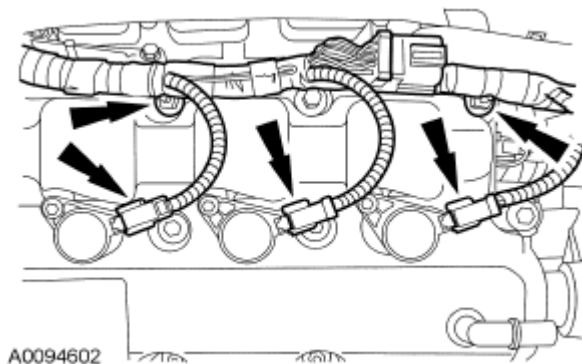


Fig. 351: Locating Ignition Coil Electrical Connectors & Wiring Retainers
Courtesy of FORD MOTOR CO.

89. Connect the crankshaft position sensor (CKP) electrical connector and attach the wiring retainer.

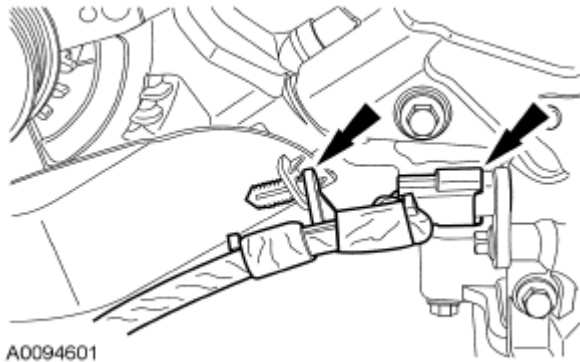


Fig. 352: Locating Crankshaft Position Sensor Electrical Connectors & Wiring Retainers
Courtesy of FORD MOTOR CO.

90. Attach the ground wire and install the nut.
- Tighten to 20 N.m (15 lb-ft).

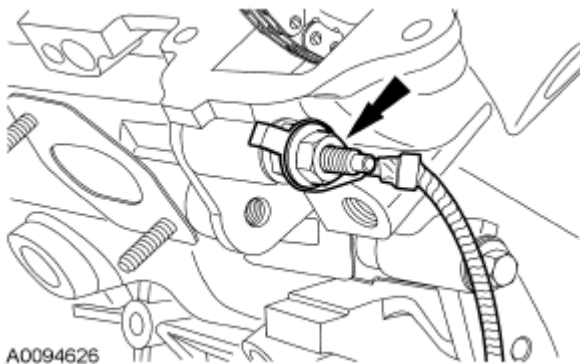


Fig. 353: Locating Ground Wire Installation Nut
Courtesy of FORD MOTOR CO.

91. Connect the generator wiring and install the nut.
- Attach the wiring retainer.
 - Tighten to 8 N.m (71 lb-in).

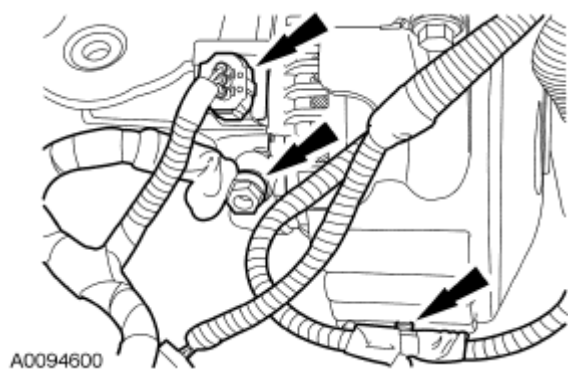


Fig. 354: Locating Wiring Retainer
Courtesy of FORD MOTOR CO.

92. Connect the RH ignition coil electrical connectors and attach the wiring retainers.

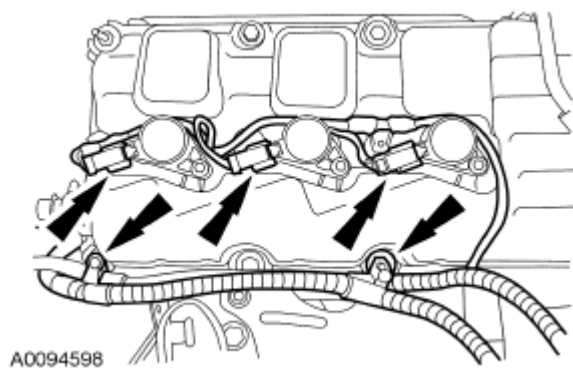


Fig. 355: Locating Ignition Coil Electrical Connectors And Wiring Retainers
Courtesy of FORD MOTOR CO.

93. Position the wiring conduit on the valve cover studs and install the nut.
- Tighten to 6 N.m (53 lb-in).

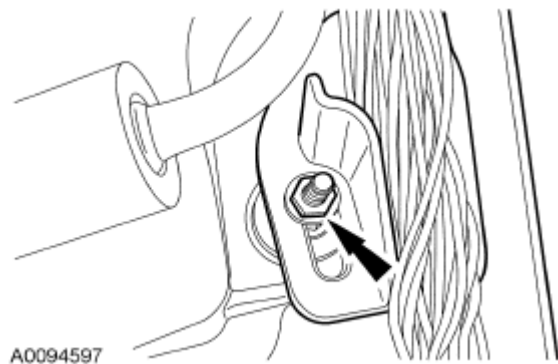


Fig. 356: Locating Nut
Courtesy of FORD MOTOR CO.

NOTE: If the engine is repaired or replaced because of upper engine failure, typically including valve or piston damage, check the intake manifold for metal debris. If metal debris is found, install a new intake manifold. Failure to follow these instructions can result in engine damage.

NOTE: Clean the sealing surfaces with metal surface prep before installing the upper and lower intake manifold.

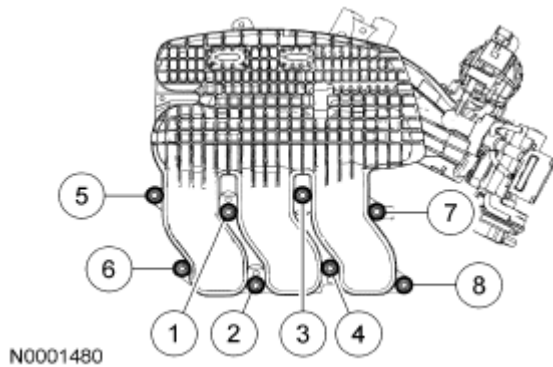


Fig. 357: Locating Intake Manifold Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

94. Position the new gaskets and the upper and lower intake manifold. Install the bolts.
 - Tighten in the sequence shown to 10 N.m (89 lb-in).
95. Position the power steering pump, reservoir bracket and tubes. Install the 3 nuts.
 - Tighten to 25 N.m (18 lb-ft).

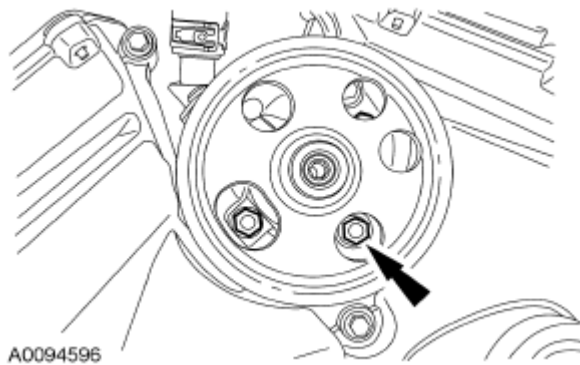


Fig. 358: Locating Nut
Courtesy of FORD MOTOR CO.

96. Install the power steering fluid reservoir bracket nut.
 - Tighten to 9 N.m (80 lb-in).

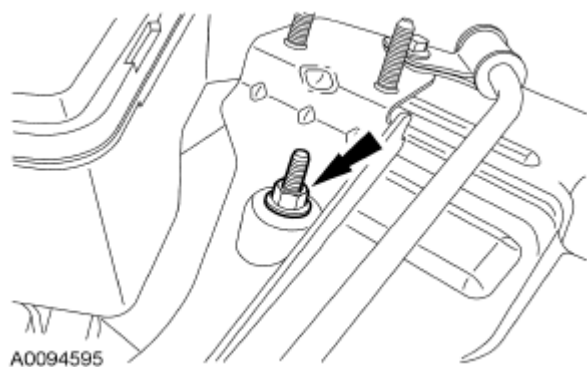


Fig. 359: Locating Power Steering Fluid Reservoir Bracket Nut
Courtesy of FORD MOTOR CO.

97. Position the power steering fluid reservoir and install the 2 nuts.
- Tighten to 9 N.m (80 lb-in).

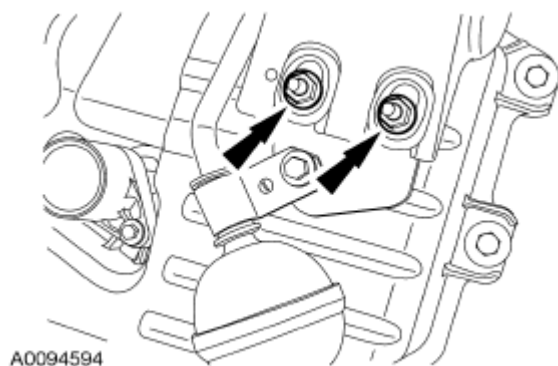


Fig. 360: Locating Power Steering Fluid Reservoir Nuts
Courtesy of FORD MOTOR CO.

98. Position the power steering tube bracket and install the bolt.
- Tighten to 7 N.m (62 lb-in).

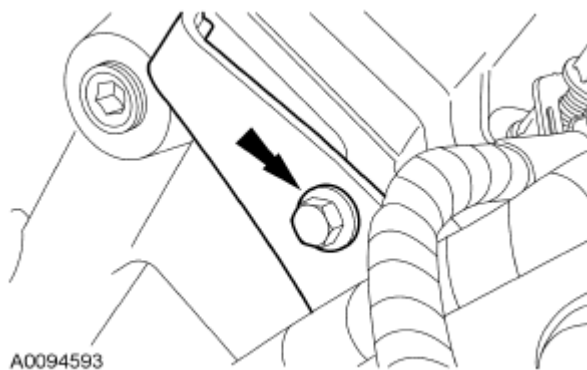


Fig. 361: Locating Power Steering Tube Bracket Bolt
Courtesy of FORD MOTOR CO.

99. Position the power steering tube bracket and install the bolt.
- Tighten to 7 N.m (62 lb-in).

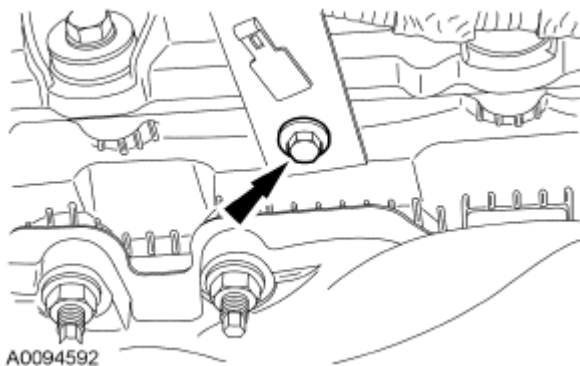


Fig. 362: Locating Power Steering Tube Bracket Bolt
Courtesy of FORD MOTOR CO.

100. Connect the RH HO2S and attach the retainer.

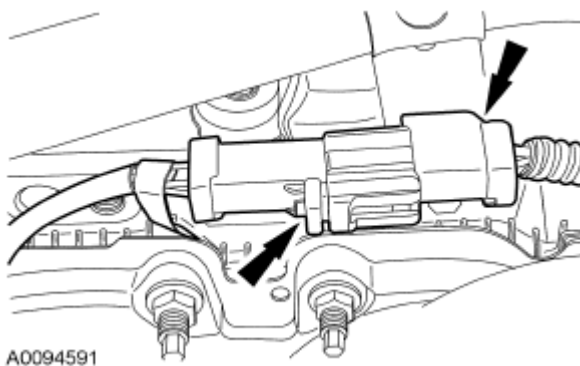


Fig. 363: Locating HO2S Connector & Retainer
Courtesy of FORD MOTOR CO.

101. Connect the fuel charging wiring harness electrical connector.

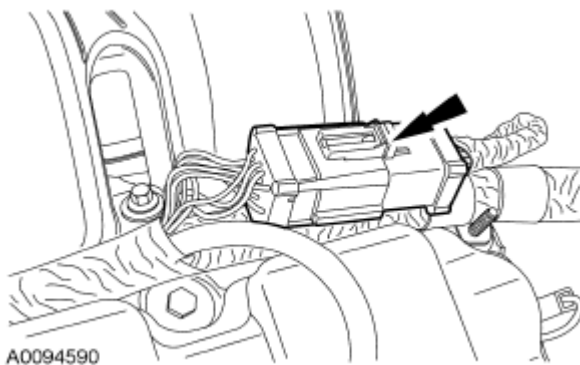


Fig. 364: Locating Fuel Charging Wiring Harness Electrical Connector

Courtesy of FORD MOTOR CO.

102. Connect the fuel rail pressure and temperature sensor vacuum tube and electrical connector.

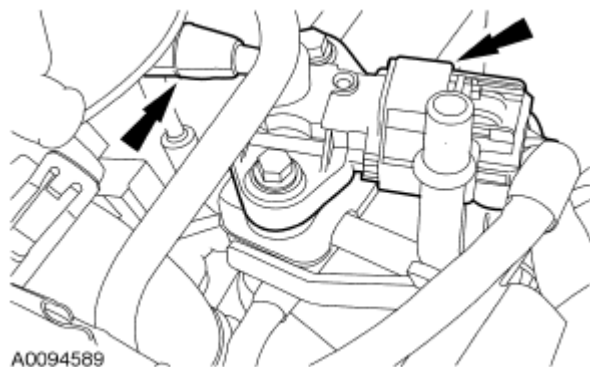


Fig. 365: Locating Fuel Rail Pressure, Temperature Sensor Vacuum Tube & Electrical Connector
Courtesy of FORD MOTOR CO.

103. Install and connect the positive crankcase ventilation (PCV) tube.

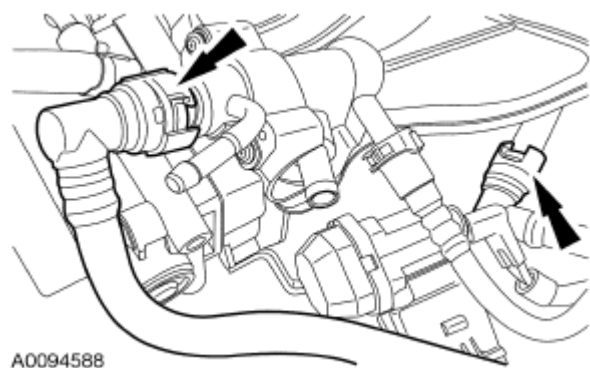


Fig. 366: Locating Positive Crankcase Ventilation (PCV) Tube
Courtesy of FORD MOTOR CO.

104. Connect the throttle body electrical connector.

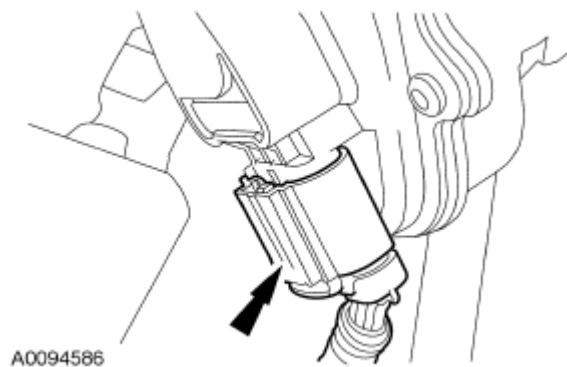


Fig. 367: Locating Throttle Body Electrical Connector
Courtesy of FORD MOTOR CO.

105. Connect the exhaust gas recirculation (EGR) system module electrical connector.

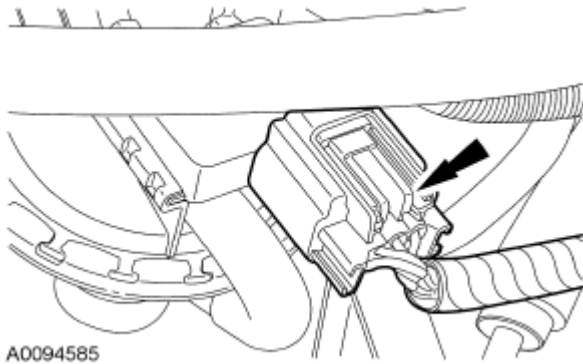


Fig. 368: Locating Exhaust Gas Recirculation (EGR) System Module Electrical Connector
Courtesy of FORD MOTOR CO.

106. Position the EGR system module tube.
- Tighten to 40 N.m (30 lb-ft).

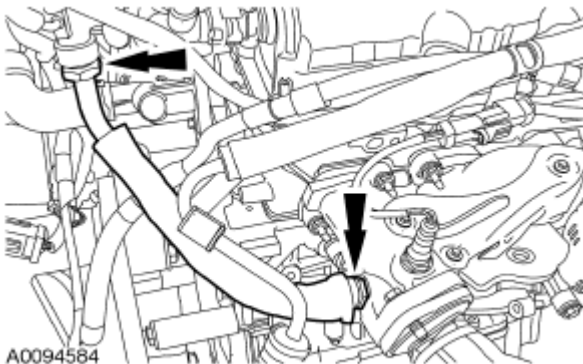


Fig. 369: Locating EGR System Module Tube
Courtesy of FORD MOTOR CO.

107. Connect the camshaft position sensor (CMP) electrical connector, attach the wiring retainers and install the 2 wiring conduit nuts.
- Tighten to 6 N.m (53 lb-in).

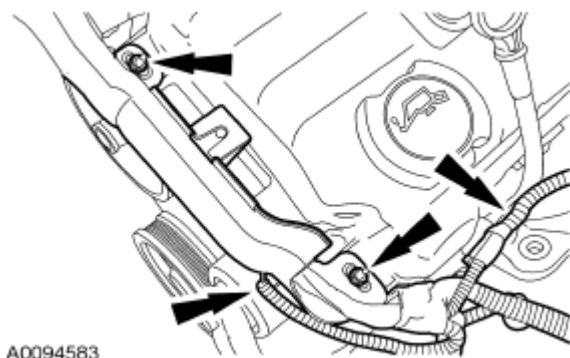


Fig. 370: Locating Camshaft Position Sensor (CMP) Electrical Connector
Courtesy of FORD MOTOR CO.

108. Connect the oil pressure sensor electrical connector.

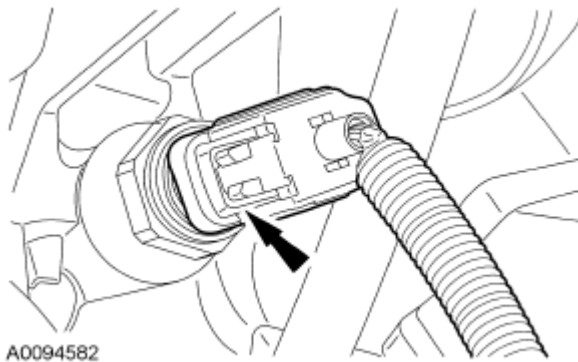


Fig. 371: Locating Oil Pressure Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

109. Connect the LH heated oxygen sensor (HO2S) electrical connector and attach the wiring retainer.

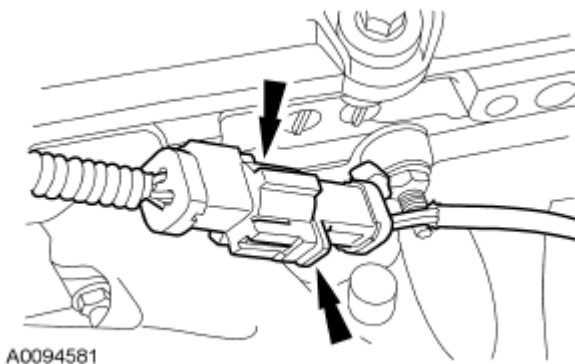


Fig. 372: Locating Heated Oxygen Sensor (HO2S) Electrical Connector & Wiring Retainer
Courtesy of FORD MOTOR CO.

110. Install the A/C compressor bracket and the 5 bolts.

- Tighten to 25 N.m (18 lb-ft).

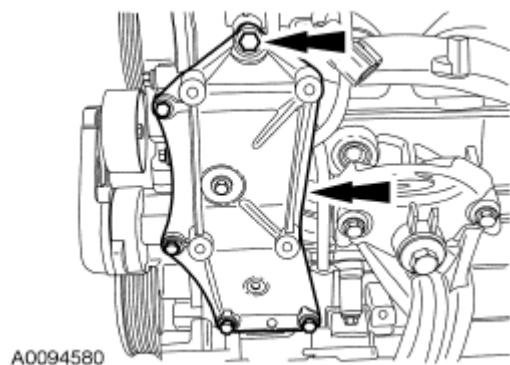


Fig. 373: Locating A/C Compressor Bracket Bolts
Courtesy of FORD MOTOR CO.

111. Install the A/C compressor, 2 nuts and 2 bolts.
- Tighten to 25 N.m (18 lb-ft).

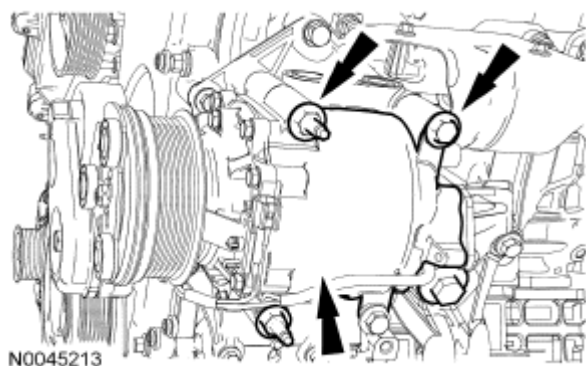


Fig. 374: Locating A/C Compressor Nuts And Bolts
Courtesy of FORD MOTOR CO.

Freestyle only

112. Install the A/C compressor and the bolt.
- Tighten to 25 N.m (18 lb-ft).

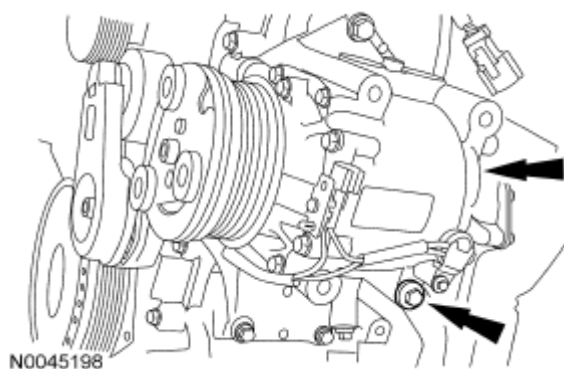


Fig. 375: Locating A/C Compressor Bolt
Courtesy of FORD MOTOR CO.

113. Install the A/C compressor shield, 2 nuts and the bolt.
- Tighten to 25 N.m (18 lb-ft).

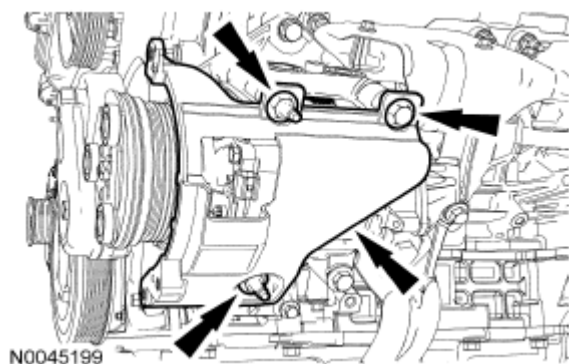


Fig. 376: Locating A/C Compressor Shield Nuts & Bolt
Courtesy of FORD MOTOR CO.

All vehicles

114. Connect the LH catalyst monitor sensor electrical connector and attach the wiring retainer.

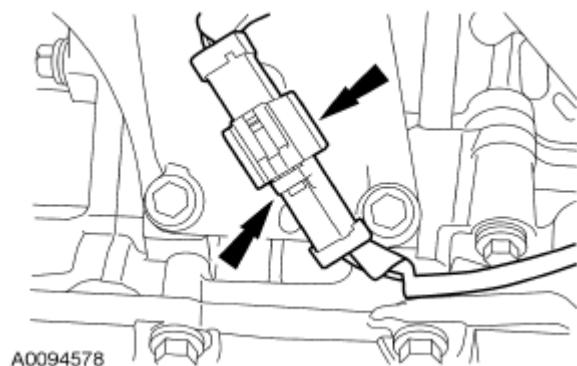


Fig. 377: Locating Catalyst Monitor Sensor Electrical Connector

Courtesy of FORD MOTOR CO.

115. Connect the A/C compressor electrical connector.

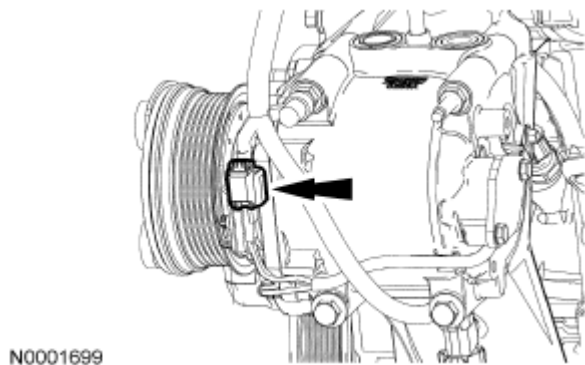


Fig. 378: Locating A/C Compressor Electrical Connector
Courtesy of FORD MOTOR CO.

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

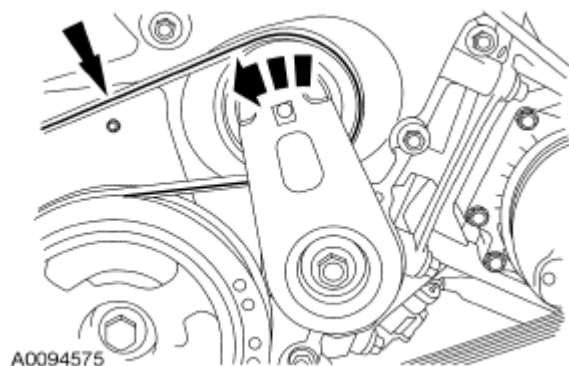


Fig. 379: Installing Accessory Drive Belt
Courtesy of FORD MOTOR CO.

Freestyle only

117. Install the A/C compressor pulley shield and the 3 retainers.

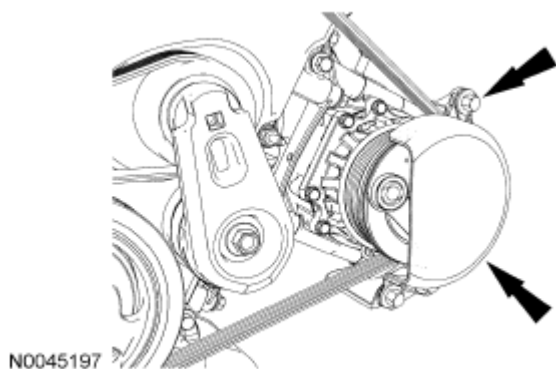


Fig. 380: Locating A/C Compressor Pulley Shield
Courtesy of FORD MOTOR CO.

All vehicles

118. Install the special tool to the RH cylinder head.



Fig. 381: View Of Special Tool On RH Cylinder Head
Courtesy of FORD MOTOR CO.

119. Install the special tool to the LH cylinder head.

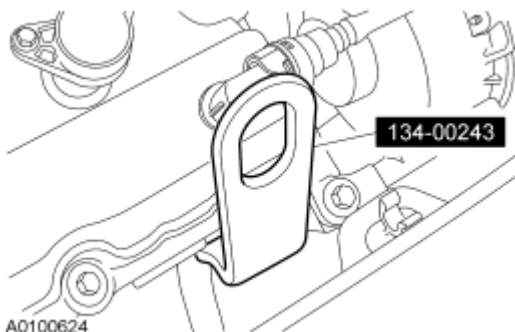


Fig. 382: Special Tool Installed Onto LH Cylinder Head
Courtesy of FORD MOTOR CO.

NOTE: When installing the lower half of the lifting bracket it will be easier to

loosely install the upper bolt first then install the lower bolt.

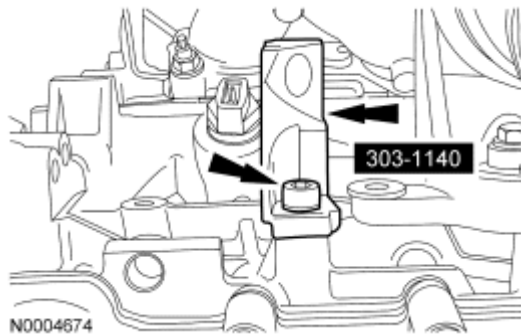


Fig. 383: Identifying Lower Half Of Lifting Hook
Courtesy of FORD MOTOR CO.

120. Install the lower half of the special tool.
121. Install the upper half of the special tool.



Fig. 384: Identifying Upper Half Of Lifting Hook
Courtesy of FORD MOTOR CO.

122. Using the special tools and a suitable engine crane, remove the engine from the engine stand.

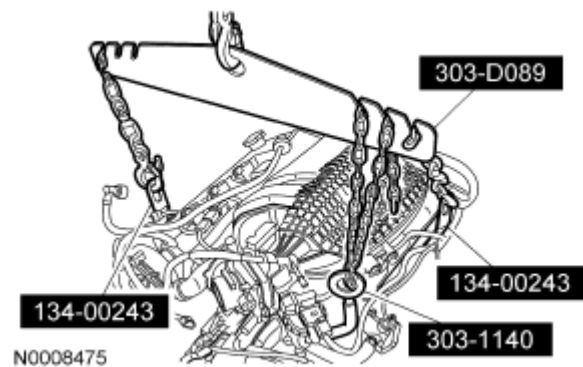
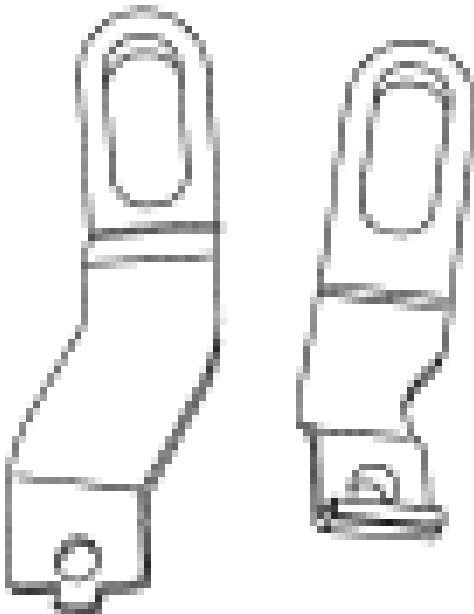


Fig. 385: Identifying Special Tools
Courtesy of FORD MOTOR CO.

INSTALLATION

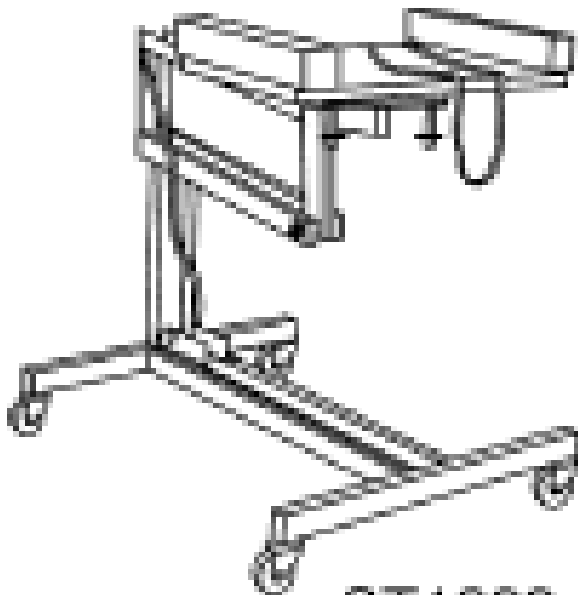
ENGINE

SPECIAL TOOL TABLE

 ST2463-A	Lifting Brackets, Engine 134-00243 or equivalent
	Powertrain Lift with Tilting Plate 014-00765

2006 Mercury Montego

2006 ENGINE Engine - Five Hundred, Freestyle & Montego



ST1293-A



ST1602-A

Spreader Bar 303-D089 (D93P-6001-A3) or
equivalent

2006 Mercury Montego

2006 ENGINE Engine - Five Hundred, Freestyle & Montego



ST2873-A

Engine Lifting Bracket Set 303-1140

MATERIAL TABLE

Item	Specification
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (in Canada Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12) or equivalent	WSS-M2C930-A
Threadlock and Sealer TA-25	WSK-M2G351-A5

WARNING: Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited, resulting in possible personal injury.

All vehicles

1. Using the special tools and a suitable engine crane, align the engine with the transaxle.

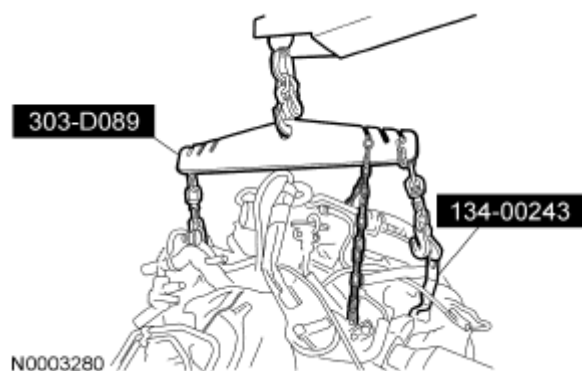


Fig. 386: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Vehicles with 6-speed transaxle

2. Install the 4 transaxle-to-engine bolts.
 - Tighten to 40 N.m (30 lb-ft).

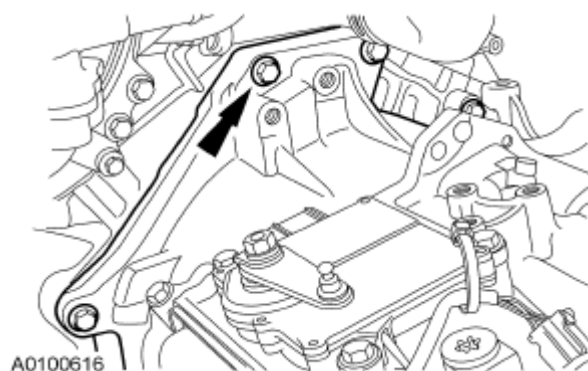


Fig. 387: Locating Transaxle-To-Engine Bolts
Courtesy of FORD MOTOR CO.

Vehicles with CVT transaxle

3. Install the 3 transaxle-to-engine bolts.
 - Tighten to 40 N.m (30 lb-ft).

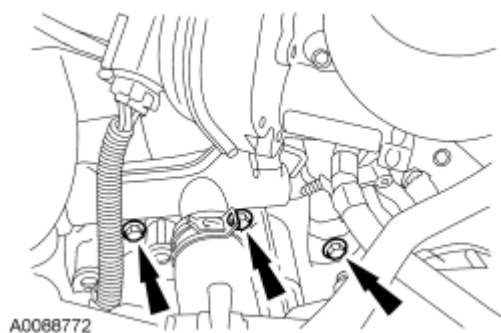


Fig. 388: Identifying Transaxle-To-Engine Bolts
Courtesy of FORD MOTOR CO.

All vehicles

4. Install the engine-to-transaxle bolt.
 - Tighten to 40 N.m (30 lb-ft).

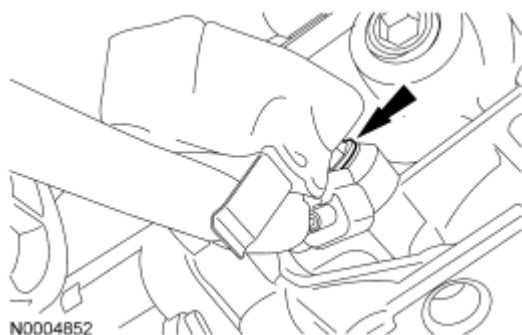


Fig. 389: Locating Knock Sensor
Courtesy of FORD MOTOR CO.

5. Position the knock sensor (KS), install the bolt and connect the electrical connector.
 - Tighten to 20 N.m (15 lb-ft).

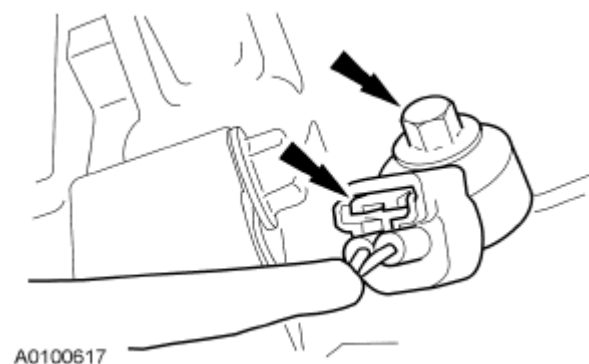


Fig. 390: Locating Electrical Connector & Bolt
Courtesy of FORD MOTOR CO.

6. Attach the heat shield to the KS.

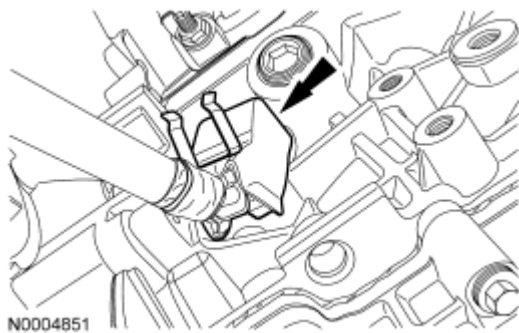


Fig. 391: Identifying Knock Sensor Heat Shield
Courtesy of FORD MOTOR CO.

NOTE: A third lift chain should be used to allow for level lifting of the engine.

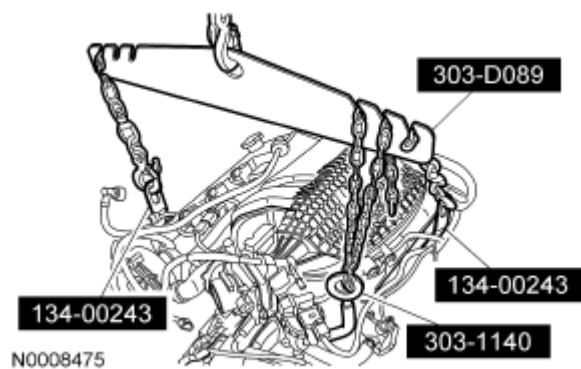


Fig. 392: Identifying Special Tools
Courtesy of FORD MOTOR CO.

7. Using the special tools and a suitable engine crane, position the powertrain on the subframe.
8. Install the LH engine insulator upper nut.
 - Tighten to 70 N.m (52 lb-ft).

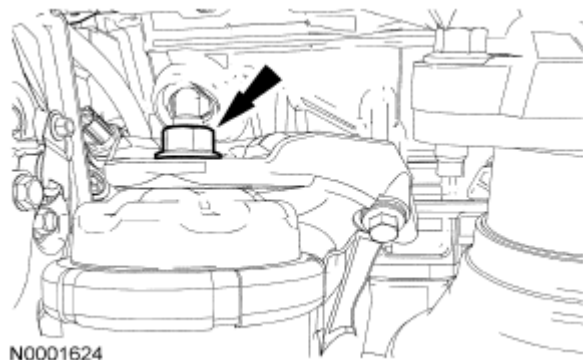


Fig. 393: Locating LH Engine Insulator Upper Nut
Courtesy of FORD MOTOR CO.

9. Install the RH engine insulator upper nut.
 - Tighten to 70 N.m (52 lb-ft).

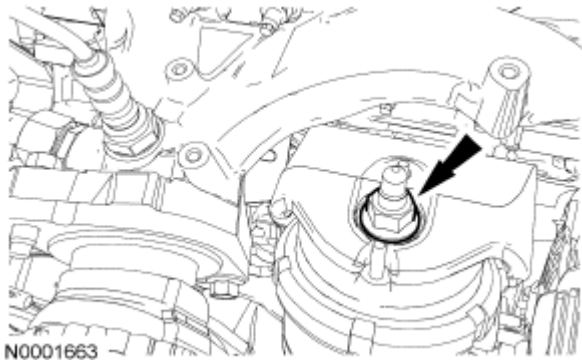


Fig. 394: Locating RH Engine Insulator Upper Nut
Courtesy of FORD MOTOR CO.

10. Position the RH exhaust manifold heat shield and install the 3 bolts.
 - Tighten to 11 N.m (8 lb-ft).

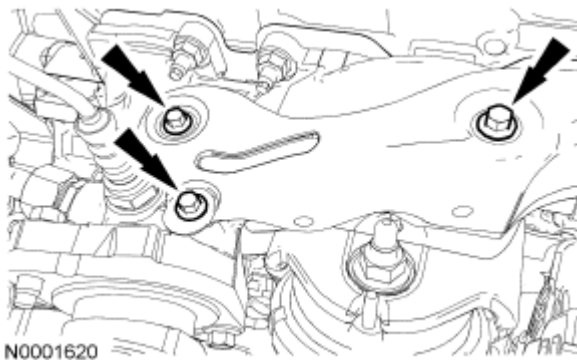


Fig. 395: Locating Exhaust Manifold Heat Shield Bolts
Courtesy of FORD MOTOR CO.

11. Install the front transaxle stabilizer bolt.
 - Tighten to 40 N.m (30 lb-ft).

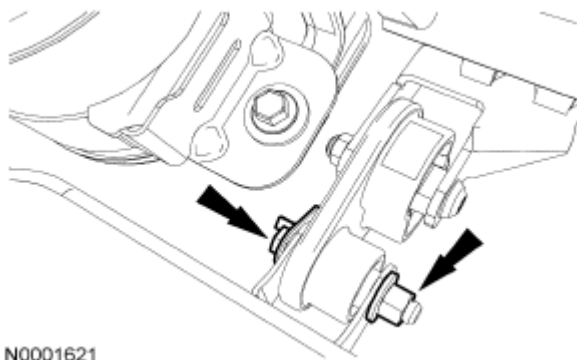


Fig. 396: Locating Front Transaxle Stabilizer Bolt & Nut
Courtesy of FORD MOTOR CO.

12. If equipped, install the upper power transfer unit (PTU) bracket and the bolts.
 - Tighten to 55 N.m (41 lb-ft).

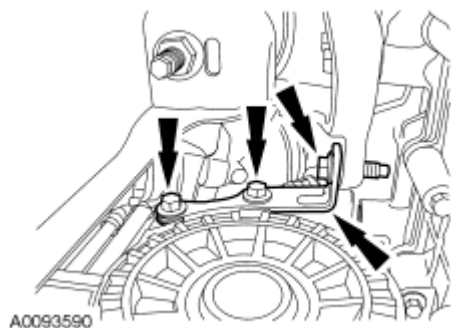


Fig. 397: Identifying Upper PTU Bracket Bolts And Bracket
Courtesy of FORD MOTOR CO.

Vehicles with 6-speed transaxle

13. Clean the 3 rear transaxle insulator bracket bolts using a wire brush and apply new threadlock to the threads.
14. Install the 3 rear transaxle insulator bracket bolts.
 - Tighten to 55 N.m (41 lb-ft).

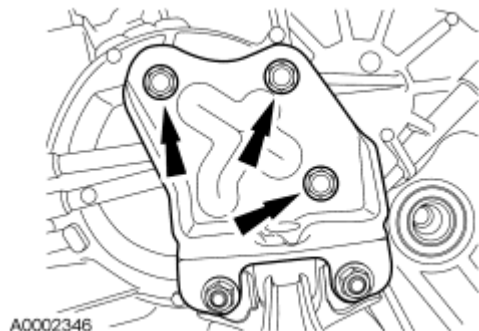


Fig. 398: Identifying Upper Transaxle Mount Retaining Bolts
Courtesy of FORD MOTOR CO.

15. Position the ground cable and install the bolt.
 - Tighten to 12 N.m (9 lb-ft).

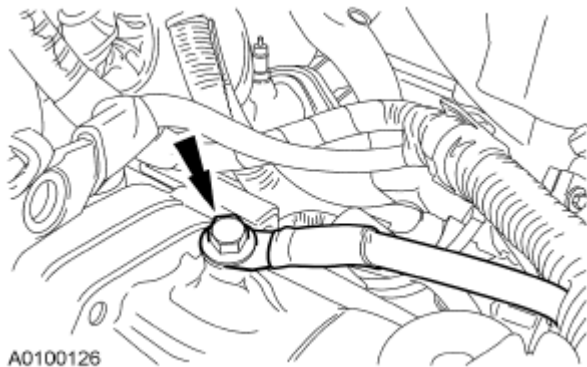


Fig. 399: Locating Ground Cable Bolt
Courtesy of FORD MOTOR CO.

16. Position the starter motor and install the 2 bolts.
 - Tighten to 25 N.m (18 lb-ft).

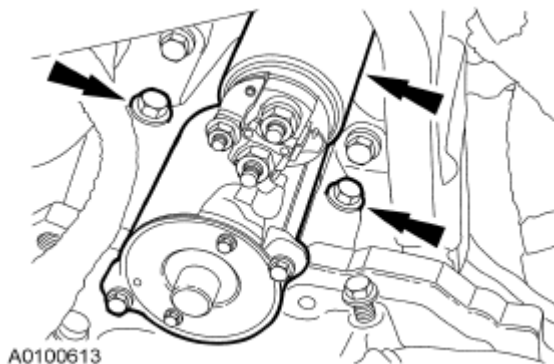


Fig. 400: Locating Starter Motor Bolts
Courtesy of FORD MOTOR CO.

17. Position the starter motor wiring and install the nuts.
 - Tighten the larger nut to 12 N.m (9 lb-ft).
 - Tighten the smaller nut to 9 N.m (80 lb-in).

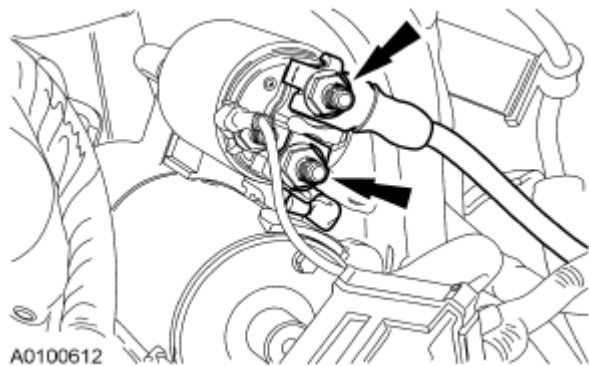


Fig. 401: Locating Starter Motor Wiring Nuts
Courtesy of FORD MOTOR CO.

18. Install the starter motor terminal cover.

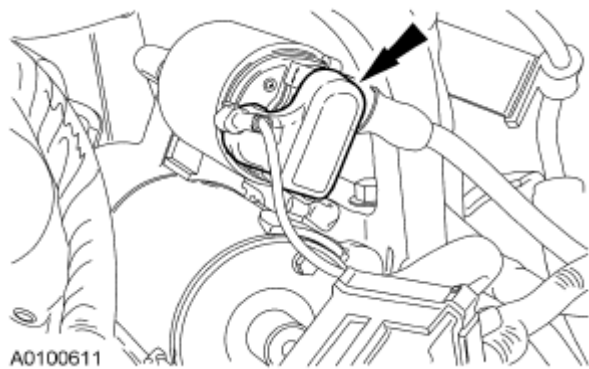


Fig. 402: Locating Starter Motor Terminal Cover
Courtesy of FORD MOTOR CO.

19. Clean the 2 roll restrictor bolts using a wire brush and apply new threadlock to the threads.
20. Position the roll restrictor and install the 2 bolts.
- Tighten to 55 N.m (41 lb-ft).

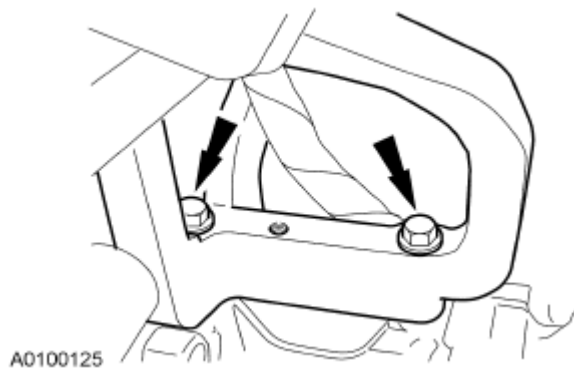


Fig. 403: Locating Roll Restrictor Bolts

Courtesy of FORD MOTOR CO.

21. Clean the 4 roll restrictor bracket bolts using a wire brush and apply new threadlock to the threads.
22. Position the roll restrictor bracket and install the 4 bolts.
 - Tighten to 55 N.m (41 lb-ft).

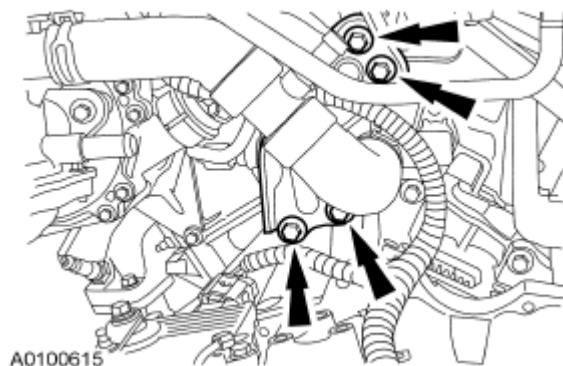


Fig. 404: Locating Roll Restrictor Bracket Bolts
Courtesy of FORD MOTOR CO.

23. Connect the transmission control unit (TCU) wire harness.

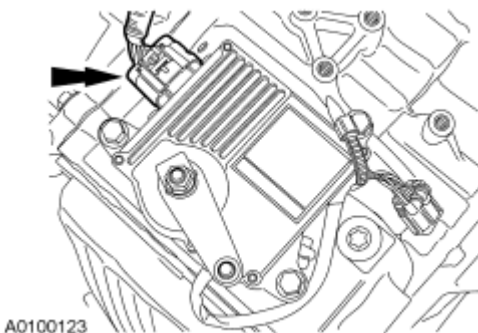


Fig. 405: Identifying Transmission Control Module Electrical Connector
Courtesy of FORD MOTOR CO.

Vehicles with CVT transaxle

24. Clean the 4 rear transaxle insulator bolts using a wire brush and apply new threadlock to the threads.
25. Install the 4 rear transaxle insulator bracket bolts.
 - Tighten to 55 N.m (41 lb-ft).

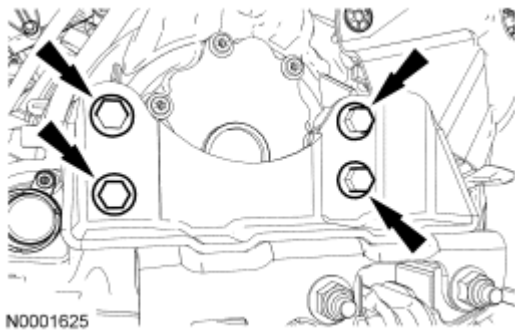


Fig. 406: Locating Transaxle Mount Bolts
Courtesy of FORD MOTOR CO.

26. Position the ground cable and install the bolt.
- Tighten to 12 Nm (9 lb-ft).

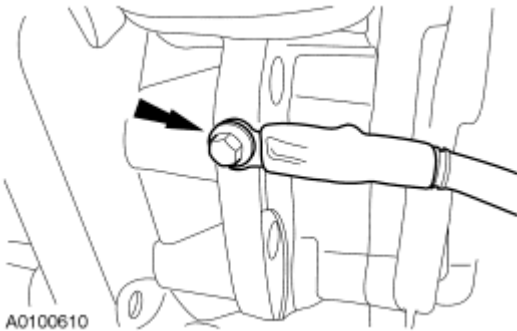


Fig. 407: Locating Ground Wire
Courtesy of FORD MOTOR CO.

27. Position the starter motor and install the 2 bolts.
- Tighten to 25 N.m (18 lb-ft).

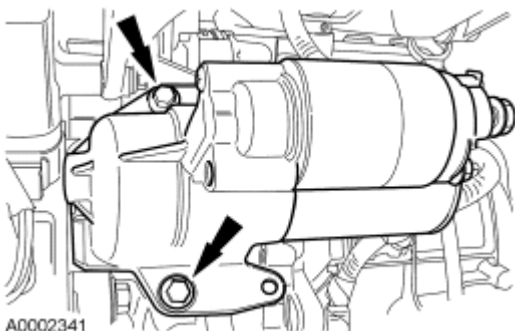


Fig. 408: Identifying Starter Motor Mounting Bolts
Courtesy of FORD MOTOR CO.

28. Position the starter motor wiring and install the nuts.
- Tighten the larger nut to 12 N.m (9 lb-ft).

- Tighten the smaller nut to 9 N.m (80 lb-in).

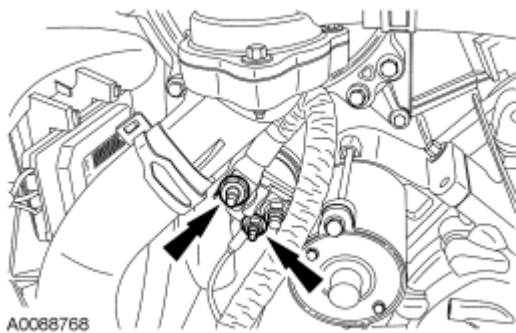


Fig. 409: Identifying Starter Motor Electrical Connectors
Courtesy of FORD MOTOR CO.

29. Install the starter motor terminal cover.

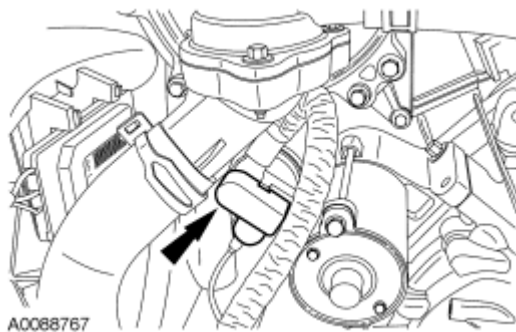


Fig. 410: Identifying Electrical Cover For Starter Motor Electrical Connectors
Courtesy of FORD MOTOR CO.

30. Clean the 2 roll restrictor bolts using a wire brush and apply new threadlock to the threads.
31. Position the roll restrictor and install the 2 bolts.
- Tighten to 55 N.m (41 lb-ft).

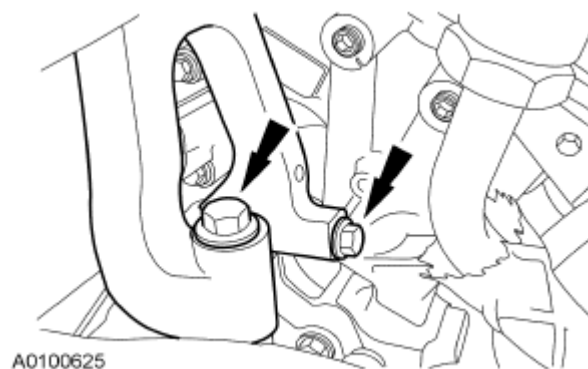


Fig. 411: Locating Roll Restrictor Bolts
Courtesy of FORD MOTOR CO.

32. Attach the wiring harness to the roll restrictor.



Fig. 412: Locating Wiring Harness At Roll Restrictor Bolts
Courtesy of FORD MOTOR CO.

33. Clean the 4 roll restrictor bracket bolts using a wire brush and apply new threadlock to the threads.
34. Position the roll restrictor bracket and install the 4 bolts.
- Tighten to 55 N.m (41 lb-ft).

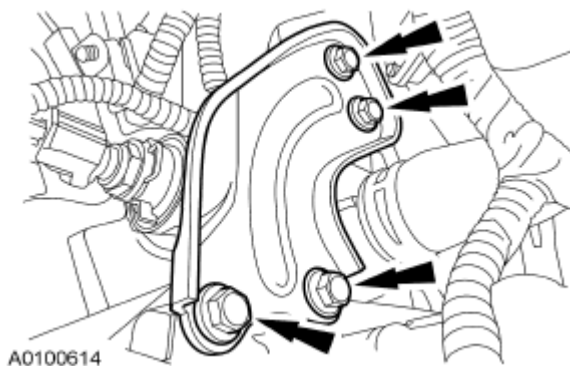


Fig. 413: Locating Roll Restrictor Bracket Bolts
Courtesy of FORD MOTOR CO.

35. Attach the lower wiring harness retainers to the transaxle.

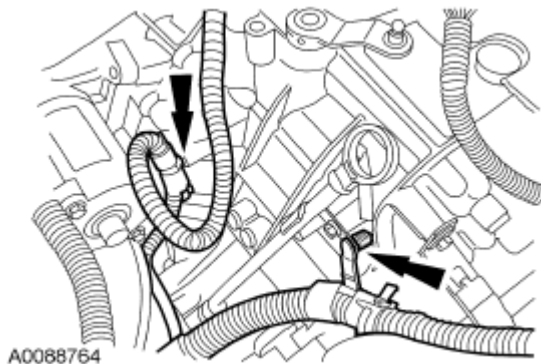


Fig. 414: Locating Lower Wiring Harness Retainers

Courtesy of FORD MOTOR CO.

36. Attach the wiring harness retainers to the transaxle.



Fig. 415: Locating Wire Harness Retainers At Transaxle
Courtesy of FORD MOTOR CO.

37. Attach the wiring harness retainer to the transaxle.

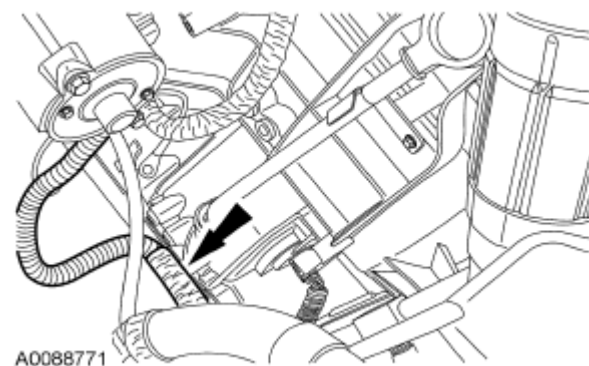


Fig. 416: Locating Wiring Harness Retainer
Courtesy of FORD MOTOR CO.

38. Connect the transaxle bulkhead electrical connector.

All vehicles

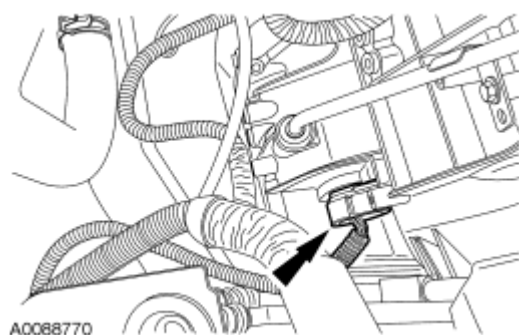


Fig. 417: Locating Transaxle Bulkhead Electrical Connector

Courtesy of FORD MOTOR CO.

39. Attach the pin-type retainers to the subframe and connect the RH catalyst monitor sensor electrical connector.

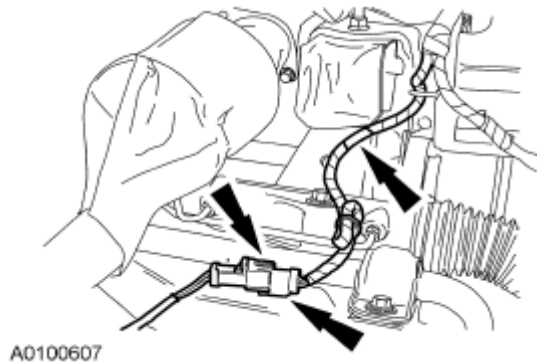


Fig. 418: Locating Pin-Type Retainers & Catalyst Monitor Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

40. Connect the power steering fluid tubes and install the bolt.
- Tighten to 25 Nm (18 lb-ft).

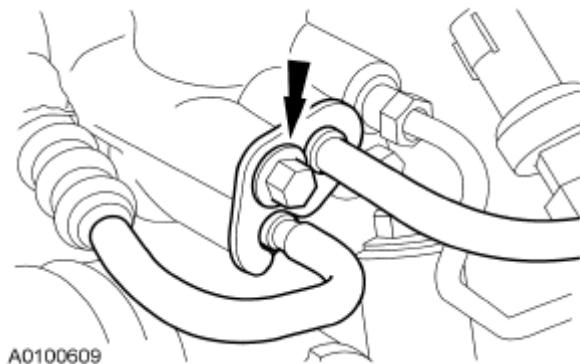


Fig. 419: Locating Power Steering Fluid Tubes & Bolt
Courtesy of FORD MOTOR CO.

41. Install the power steering pressure (PSP) tube bracket bolt and connect the PSP switch electrical connector.
- Tighten to 25 N.m (18 lb-ft).

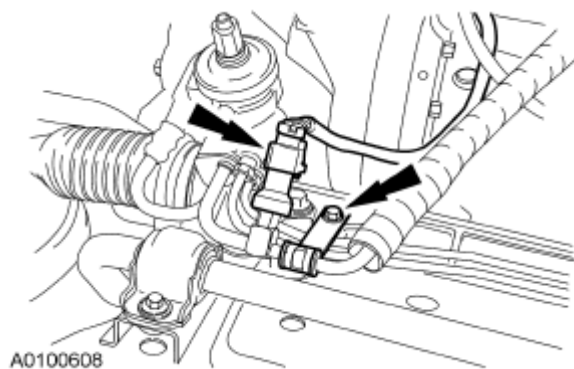


Fig. 420: Locating Power Steering Pressure Tube Bracket Bolt & PSP Switch Electrical Connector
Courtesy of FORD MOTOR CO.

42. Using the special tool, position the powertrain and subframe in the vehicle.

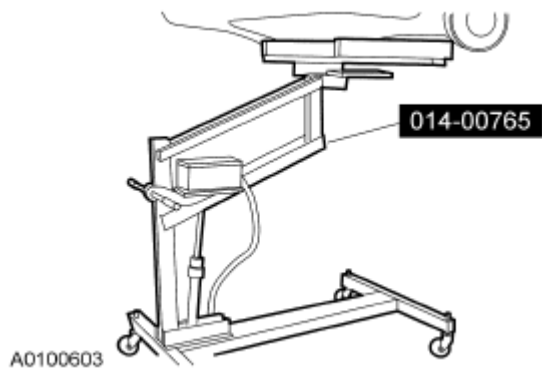


Fig. 421: Identifying Special Tool
Courtesy of FORD MOTOR CO.

43. Install the 2 forward subframe bolts and washers.
- Tighten to 200 Nm (148 lb-ft).

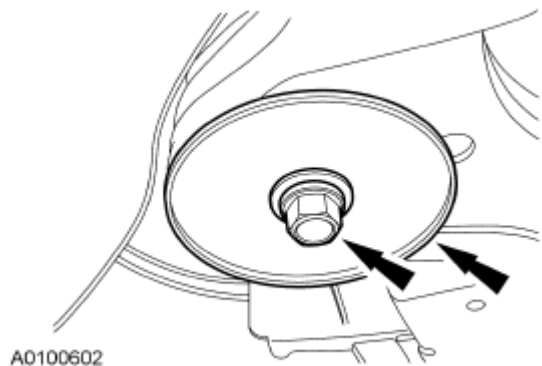


Fig. 422: Locating Forward Subframe Bolt & Washer
Courtesy of FORD MOTOR CO.

44. Position the rear subframe brackets and install the 6 bolts.

- Tighten the 2 larger bolts to 150 N.m (111 lb-ft).
- Tighten the 4 smaller bolts to 55 N.m (41 lb-ft).

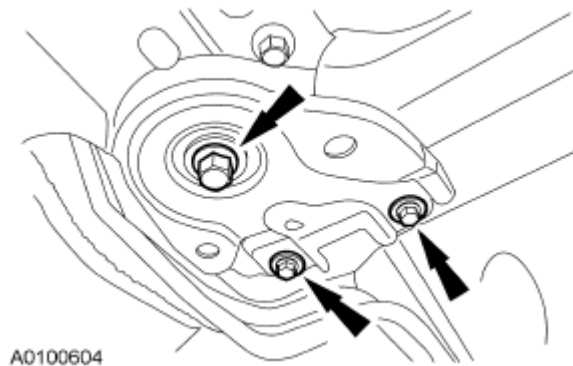


Fig. 423: Locating Rear Subframe Bracket Bolts
Courtesy of FORD MOTOR CO.

45. Attach the steering column intermediate shaft and install a new bolt.

- Tighten to 23 N.m (17 lb-ft).

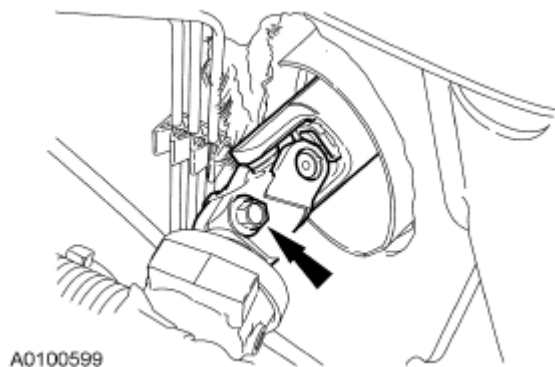


Fig. 424: Locating Steering Column Intermediate Shaft Bolt
Courtesy of FORD MOTOR CO.

46. Attach the outer tie rods to the wheel knuckles and install new nuts.

- Tighten to 115 N.m (85 lb-ft).

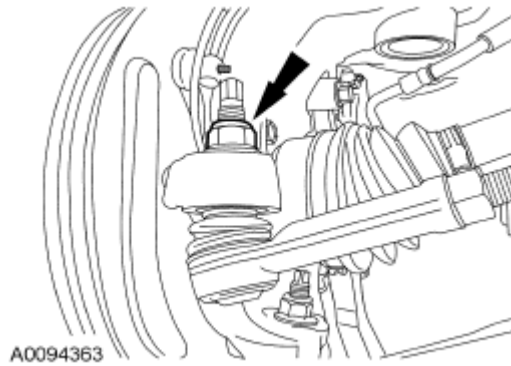


Fig. 425: Locating Outer Tie Rod Nut
Courtesy of FORD MOTOR CO.

47. Attach the stabilizer bar links to the struts and install new nuts.
- Tighten to 55 N.m (41 lb-ft).

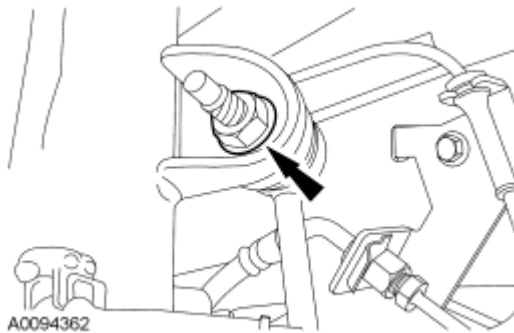


Fig. 426: Identifying Stabilizer Bar Link Nuts
Courtesy of FORD MOTOR CO.

48. If equipped, connect the driveshaft and install the bolts.
- Tighten to 25 N.m (18 lb-ft).

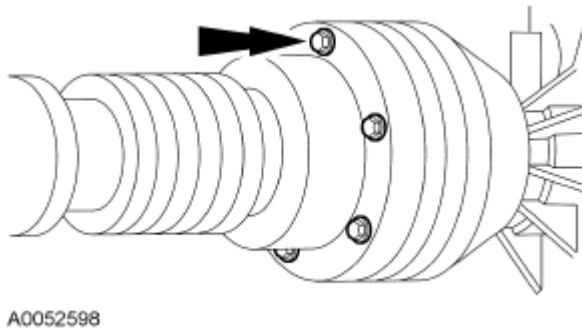


Fig. 427: Locating Driveshaft Bolt
Courtesy of FORD MOTOR CO.

49. If equipped, position the driveshaft support bracket and install the 2 bolts.

- Tighten to 25 N.m (18 lb-ft).

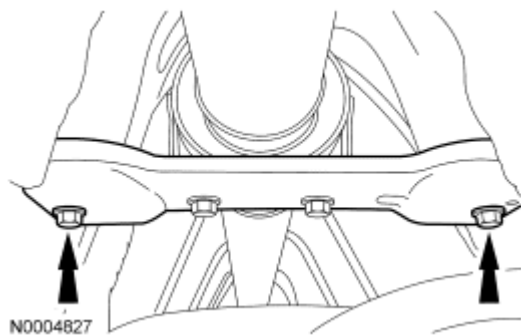


Fig. 428: Identifying Driveshaft Cross Brace Mounting Bolts
Courtesy of FORD MOTOR CO.

NOTE: The oil pan must be installed and the bolts tightened within 4 minutes of sealant application.

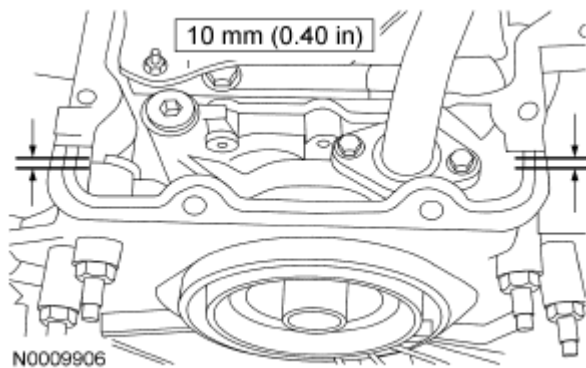


Fig. 429: Identifying Silicone Sealant Areas
Courtesy of FORD MOTOR CO.

50. Apply a 10 mm (0.39 in) diameter dot of silicone sealant to the areas indicated.
51. Position the oil pan and a new gasket. Loosely install the 15 bolts.

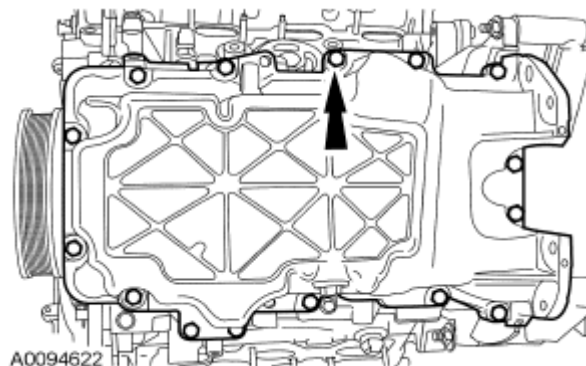


Fig. 430: Locating Oil Pan Bolt
Courtesy of FORD MOTOR CO.

52. Position the LH catalytic converter bracket and install the 3 engine-to-transaxle bolts.
- Tighten to 40 N.m (30 lb-ft).

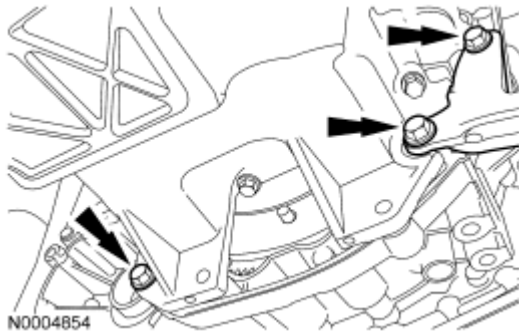


Fig. 431: Locating Transaxle-To-Engine Bolts
Courtesy of FORD MOTOR CO.

53. Tighten the 15 oil pan bolts in the sequence shown to 25 N.m (18 lb-ft).

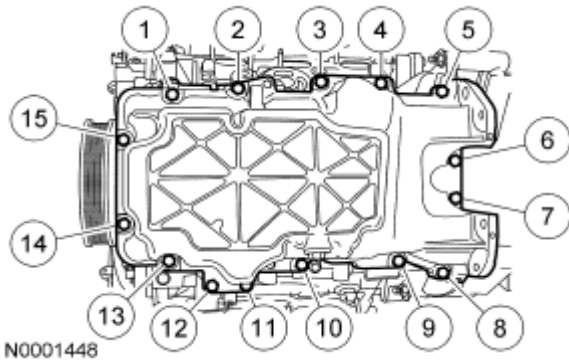


Fig. 432: Identifying Oil Pan Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

54. Install the oil pan-to-oil filter adapter bolt.
- Tighten to 25 N.m (18 lb-ft).

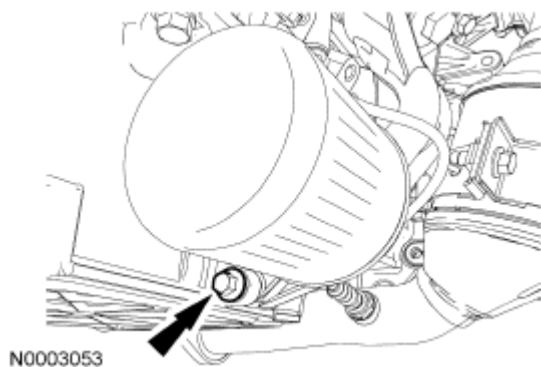


Fig. 433: Locating Oil Pan-To-Oil Filter Adapter Bolt
Courtesy of FORD MOTOR CO.

55. Install the 4 new torque converter nuts.
- Tighten to 36 N.m (27 lb-ft).

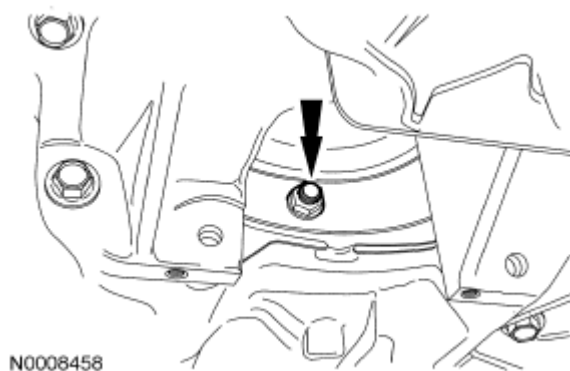


Fig. 434: Locating Torque Converter Nut
Courtesy of FORD MOTOR CO.

56. Position the lower torque converter access plug and install the pin-type retainers.

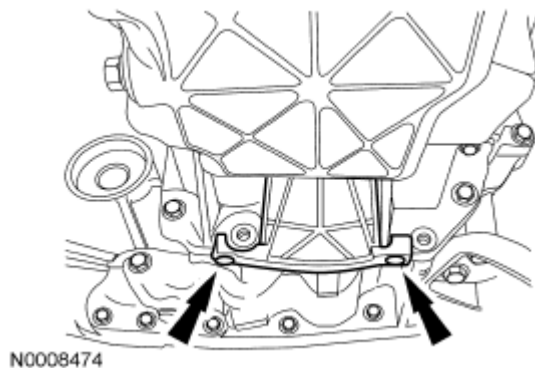


Fig. 435: Locating Pin-Type Retainers
Courtesy of FORD MOTOR CO.

57. If equipped, connect the block heater electrical connector and attach the wiring retainers.

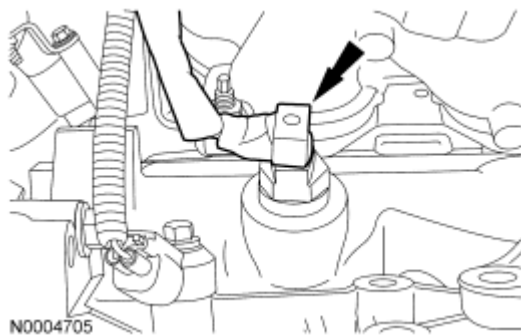


Fig. 436: Locating Block Heater Electrical Connector
Courtesy of FORD MOTOR CO.

58. Connect the power steering cooler hose.

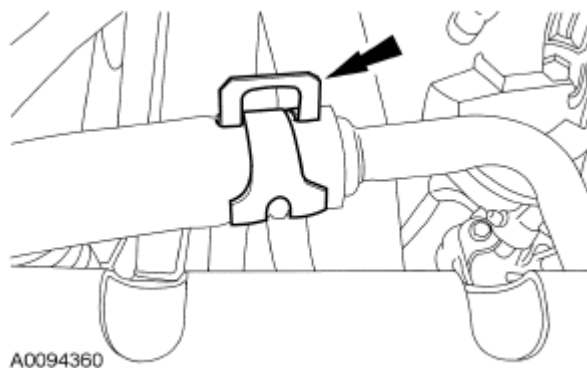


Fig. 437: Locating Power Steering Cooler Hose
Courtesy of FORD MOTOR CO.

59. Connect the transmission cooler hoses.

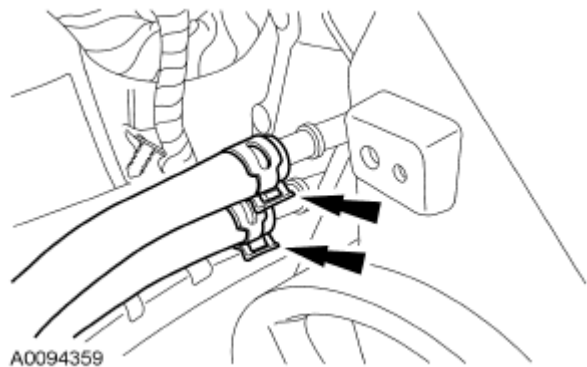


Fig. 438: Locating Transmission Cooler Hoses
Courtesy of FORD MOTOR CO.

60. Position the A/C tube and install the nut.

- Tighten to 8 N.m (71 lb-in).

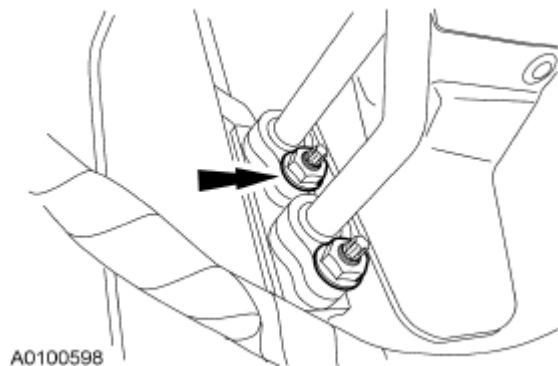


Fig. 439: Locating A/C Tube Nut
Courtesy of FORD MOTOR CO.

61. Position the A/C manifold assembly tubes and install the bolt.

- Tighten to 20 N.m (15 lb-ft).

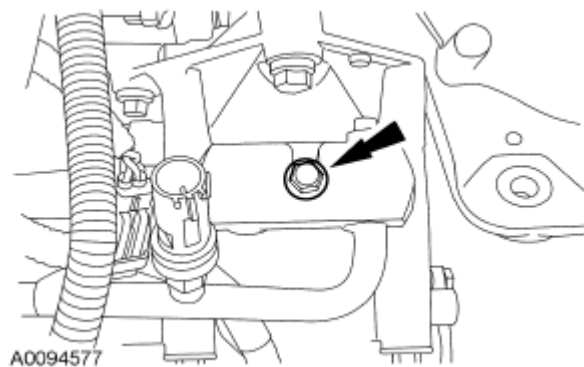


Fig. 440: Locating A/C Manifold Assembly Tubes Bolt
Courtesy of FORD MOTOR CO.

62. Connect the A/C high-pressure switch electrical connector.

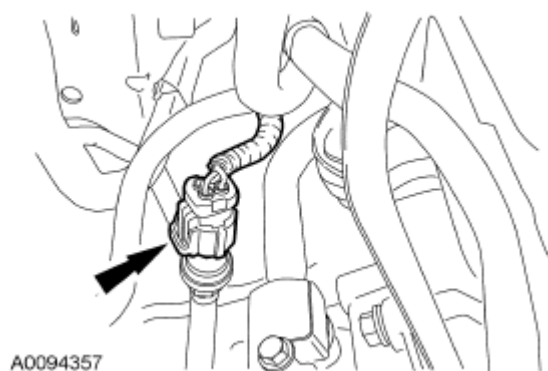


Fig. 441: Locating A/C High-Pressure Switch Electrical Connector
Courtesy of FORD MOTOR CO.

63. Connect the 10-pin electrical connector and attach the wiring retainers.

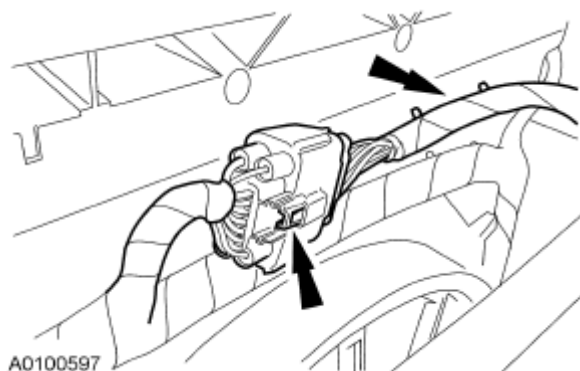


Fig. 442: Locating 10-Pin Electrical Connector & Wiring Retainer
Courtesy of FORD MOTOR CO.

64. Position the coolant tube and secure the tube in the clips.

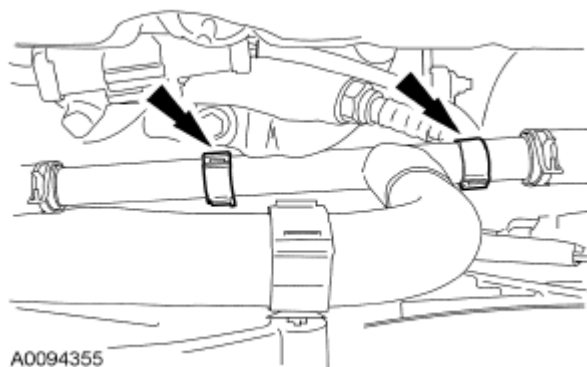


Fig. 443: Locating Coolant Tube Position
Courtesy of FORD MOTOR CO.

65. Connect the coolant hoses to the thermostat housing.

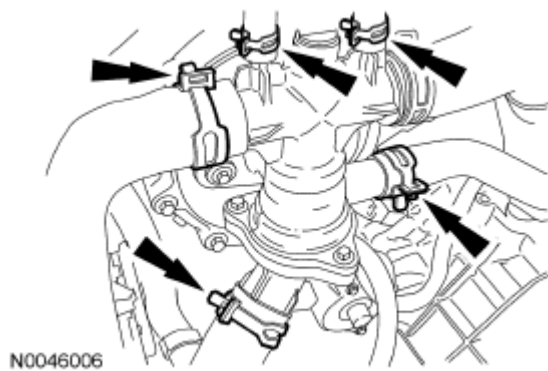


Fig. 444: Locating Coolant Hoses To Thermostat Housing
Courtesy of FORD MOTOR CO.

66. Connect the brake booster vacuum hose to the upper intake manifold.

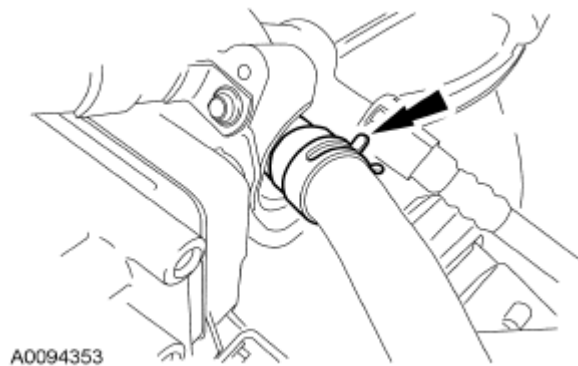


Fig. 445: Locating Brake Booster Vacuum Hose To Upper Intake Manifold
Courtesy of FORD MOTOR CO.

67. Connect the heater hose and the positive crankcase ventilation (PCV) coolant hose.

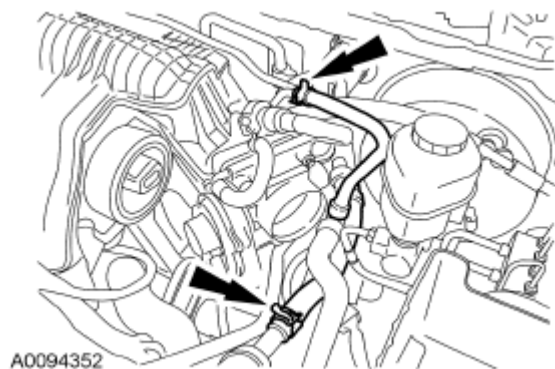


Fig. 446: Locating Heater Hose And Positive Crankcase Ventilation (PCV) Coolant Hose
Courtesy of FORD MOTOR CO.

Vehicles with 6-speed transaxle

68. Position the shift cable bracket and install the 3 bolts.

- Tighten to 25 N.m (18 lb-ft).

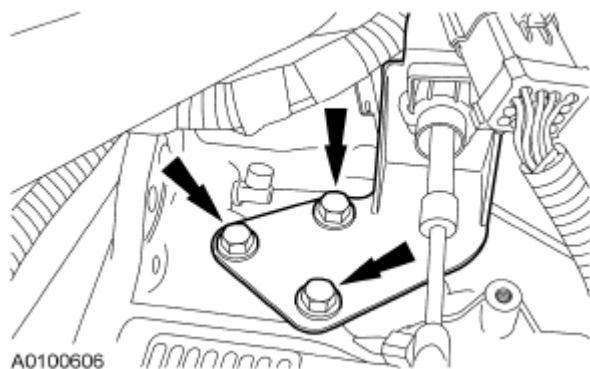


Fig. 447: Locating Shift Cable Bracket Bolts
Courtesy of FORD MOTOR CO.

69. Connect the 16-pin electrical connector and attach the wiring retainer.

- Connect the electrical connector to the shift cable bracket.

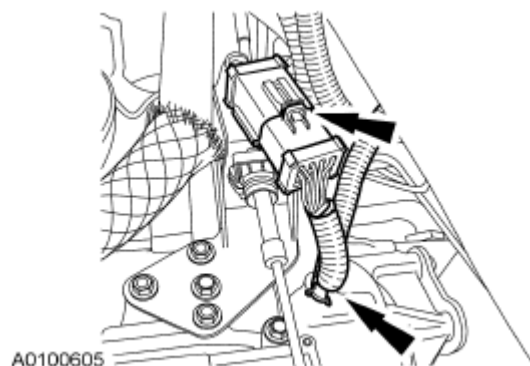


Fig. 448: Locating 16-Pin Electrical Connector & Wiring Retainer
Courtesy of FORD MOTOR CO.

70. Connect the shift cable.

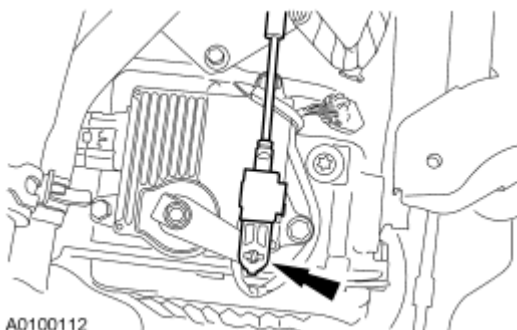


Fig. 449: Locating Shift Cable End

Courtesy of FORD MOTOR CO.

Vehicles with CVT transaxle

71. Position the shift cable bracket and install the 2 bolts.
- Tighten to 25 N.m (18 lb-ft).

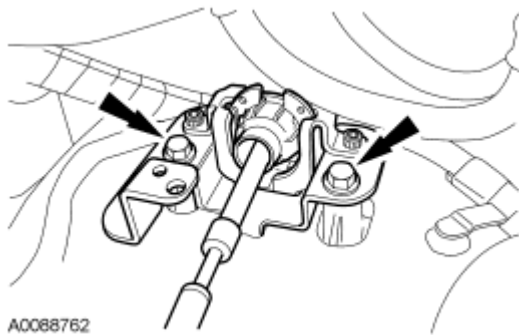


Fig. 450: Locating Shift Cable Bracket Bolts
Courtesy of FORD MOTOR CO.

72. Connect the 16-pin electrical connector and attach the wiring retainers.
- Attach the electrical connector to the shift cable bracket.

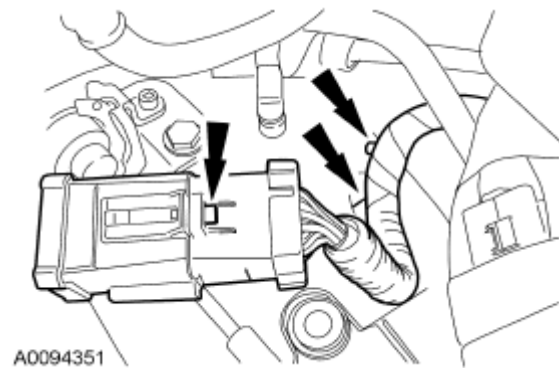


Fig. 451: Locating 16-Pin Electrical Connector & Wiring Retainers
Courtesy of FORD MOTOR CO.

73. Connect the shift cable.

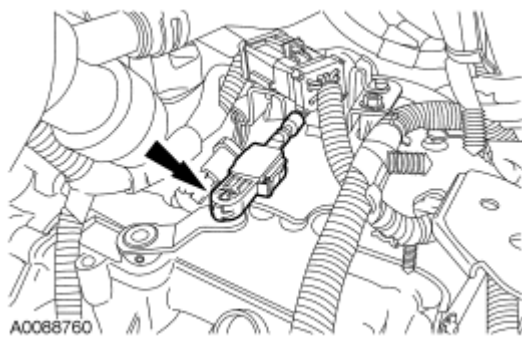


Fig. 452: Locating Shift Cable End
Courtesy of FORD MOTOR CO.

All vehicles

74. Attach the B+ terminal to the battery cable and install the nut.
- Tighten to 5 N.m (44 lb-in).

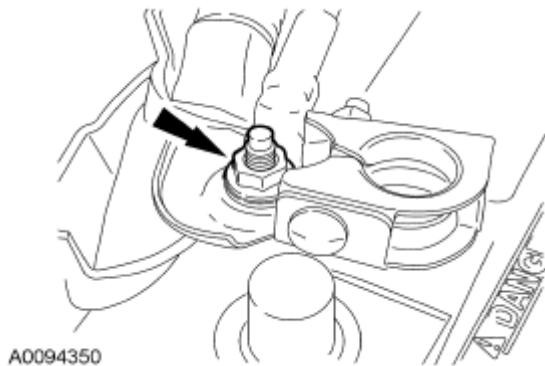


Fig. 453: Locating Battery Cable Nut
Courtesy of FORD MOTOR CO.

75. Position the ground wire on the LH fender and install the bolt.
- Tighten to 10 N.m (89 lb-in).

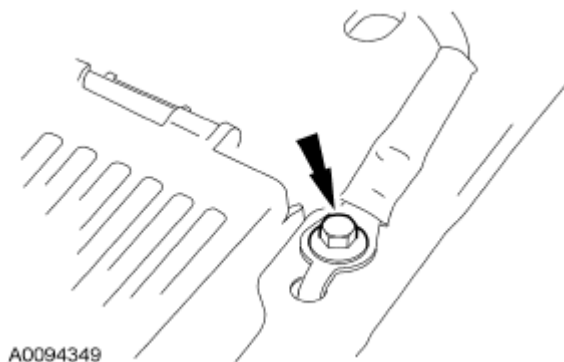


Fig. 454: Locating Ground Wire Bolt

Courtesy of FORD MOTOR CO.

76. Connect the power steering reservoir hose and attach the retainer.

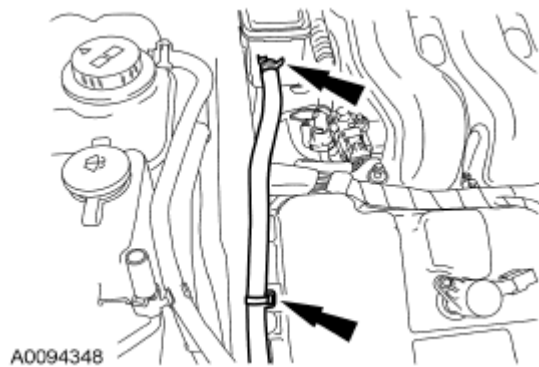


Fig. 455: Locating Power Steering Reservoir Hose & Retainer
Courtesy of FORD MOTOR CO.

77. Connect the 2 powertrain control module (PCM) electrical connectors and attach the wiring conduit.

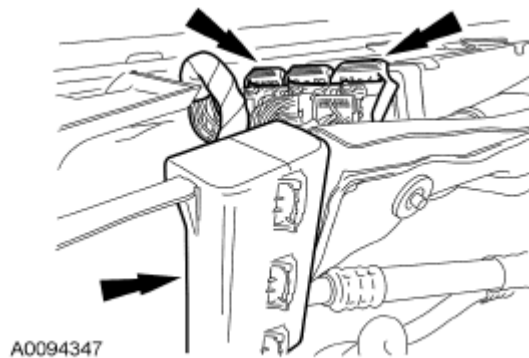


Fig. 456: Locating Powertrain Control Module Electrical Connectors & Wiring Conduit
Courtesy of FORD MOTOR CO.

78. Connect the vapor tube to the purge valve.

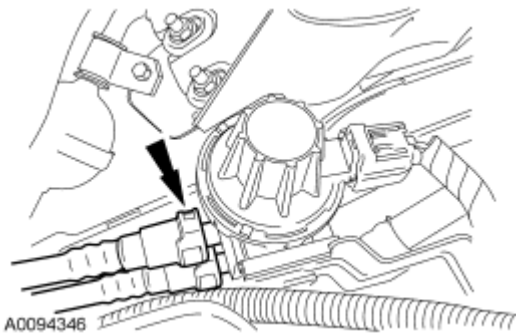


Fig. 457: Locating Vapor Tube
Courtesy of FORD MOTOR CO.

CAUTION: Make sure that the fuel tube coupling clicks into place when installing the tube. To make sure that the fuel tube is fully seated, pull on the tube.

NOTE: Apply clean engine oil to the end of the tube before inserting a tube into the connector.

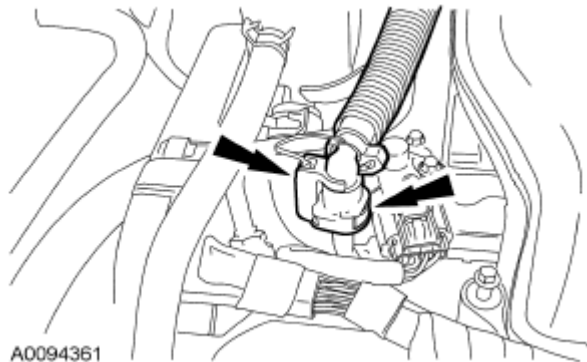


Fig. 458: Locating Fuel Tube
Courtesy of FORD MOTOR CO.

79. Connect the fuel tube to the fuel rail.
 - Connect the fuel tube redundant clip.
80. Attach the fuel tube retainer to the upper intake manifold.

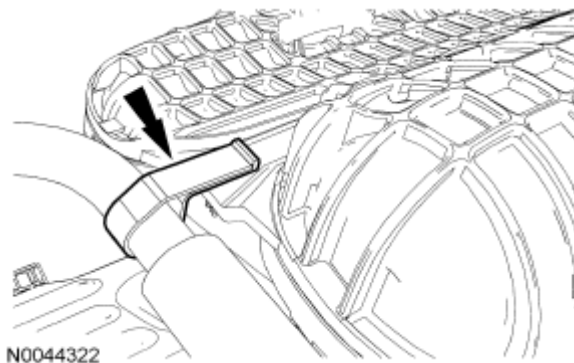


Fig. 459: Locating Fuel Tube Retainer
Courtesy of FORD MOTOR CO.

81. Position the ground strap on the RH fender and install the bolt.
 - Tighten to 10 N.m (89 lb-in).

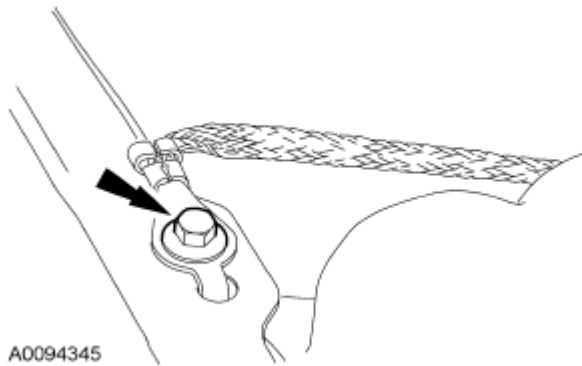


Fig. 460: Locating Ground Strap Bolt
Courtesy of FORD MOTOR CO.

82. Clean the 4 roll restrictor cross brace bolts using a wire brush and apply new threadlock to the threads.
83. Position the roll restrictor cross brace and install the 4 new bolts.
 - Tighten to 55 N.m (41 lb-ft).

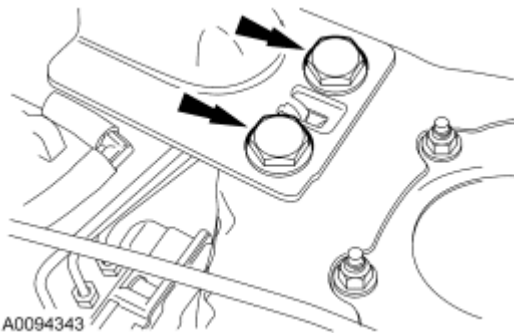


Fig. 461: Identifying Transaxle Roll Restrictor Bar Bolts
Courtesy of FORD MOTOR CO.

84. Clean the roll restrictor cross brace-to-roll restrictor bolt using a wire brush and apply new threadlock to the threads.
85. Install a new roll restrictor cross brace-to-roll restrictor bolt.
 - Tighten to 48 N.m (35 lb-ft).

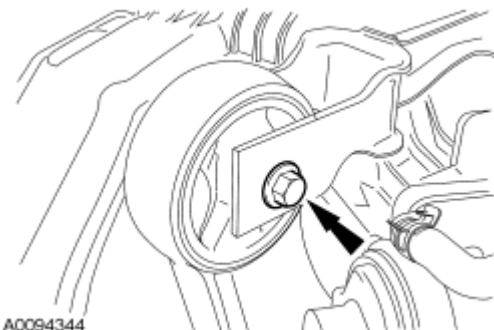


Fig. 462: Locating Upper Roll Restrictor Bolt
Courtesy of FORD MOTOR CO.

86. Install the LH and RH half shafts. For additional information, refer to **INSTALLATION** and **INSTALLATION** .
87. Install the exhaust flex pipe and the LH catalytic converter. For additional information, refer to **REMOVAL AND INSTALLATION** .
88. Install the cowl vent panel. For additional information, refer to **REMOVAL AND INSTALLATION** .
89. Install the air cleaner outlet pipe and air cleaner. For additional information, refer to **REMOVAL AND INSTALLATION** .
90. Fill the engine with clean engine oil.
91. Connect the negative and positive battery cables. For additional information, refer to **REMOVAL AND INSTALLATION** .
92. Evacuate and recharge the A/C system. For additional information, refer to **AIR CONDITIONING (A/C) SYSTEM RECOVERY, EVACUATION AND CHARGING** .
93. Fill the power steering system. For additional information, refer to **POWER STEERING SYSTEM FILLING** .
94. Fill and bleed the cooling system. For additional information, refer to **COOLING SYSTEM DRAINING, FILLING AND BLEEDING** .