

2002 Ford Focus LX

2002 ENGINE Engine, 2.0L SPI - Focus

2002 ENGINE

Engine, 2.0L SPI - Focus

SPECIFICATIONS

GENERAL SPECIFICATIONS

ENGINE - 2.0L SPI GENERAL SPECIFICATIONS

Item	Specification
Displacement	2.0 Liters (121 CD)
Number of cylinders	4
Bore and stroke	84.8 mm x 88 mm
Firing order	1-3-4-2
Oil pressure (hot 2000 RPM) - kPa	240 kPa -450 kPa
Drive belt tension	178 N - 311 N
Compression ratio	9.35:±0.25
Coolant capacity	5.0 - 5.8 Liters

CYLINDER HEAD AND VALVE TRAIN

ENGINE - 2.0L SPI CYLINDER HEAD AND VALVE TRAIN SPECIFICATION

Item	Specification (mm)
Valve guide inner diameter (I.D)	8.063-8.094
Intake and exhaust	8.063-8.094
Valve seats width - intake and exhaust	1.75-2.32
Angle	45 degrees
Runout (total indicated runout [T.I.R.])	0.064 MAX
Bore diameter (insert counterbore diameter) intake	39.940 MIN.
	39.965 MAX.
Bore diameter (insert counterbore diameter) exhaust	34.940 MIN.
	39.965 MAX.
Gaskets surface flatness	0.04/26 0.08/156
	0.15 Total
Head face surface finish	0.2/2.5 0.8
Valve stem to guide clearance intake	0.020-0.069
Valve stem to guide clearance exhaust	0.049-0.095

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Valve head diameter intake	41.9 -42.1
Valve head diameter exhaust	34.9 -35.1
Valve face runout limit intake and exhaust	0.005
Valve face angle	45.5 degrees
Valve stem diameter standard (std.) intake	8.025-8.043
Valve stem diameter standard (std.) exhaust	8.006-8.017
Valve springs	4.3 turns
Compression pressure - loaded	83.0 N @ 29.27
Compression pressure - unloaded	350 N @ 39.53
Free length (approximate)	52.4
Installed spring height	39.53
Valve springs assembled height	39.53
Service limit, pressure lost @ specified height %	5

ROCKER ARM**ENGINE - 2.0L SPI ROCKER ARM SPECIFICATION**

Item	Specification (mm)
Ratio	1.65
Valve tappet, hydraulic diameter (std.)	22.200 -22.212
Clearance to bore	0.023-0.065
Roundness	0.013
Finish micro	0.2
Service limit	0.127
Collapsed tappet gap	0-4.5
Tappet bore diameter	22.25 +/- 0.15
Camshaft bore inside diameter no. 1, 2, 3, 4, 5	45.796 -45.821

CAMSHAFT**ENGINE - 2.0L SPI CAMSHAFT SPECIFICATION**

Item	Specification (mm)
Lobe lift intake	6.23
Lobe lift exhaust	6.23
Allowable lobe lift loss	0.127
Theoretical valve maximum lift intake	10.28

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Theoretical valve maximum lift exhaust	10.28
End play	0.02-0.20
Service limit	0.20
Journal to cylinder head bearing surface clearance	0.03335-0.0835
Journal diameter standard	45.7375-45.7625
Runout limit	0.127 (runout of center bearing relative to bearing nos. 1 and 5)
Out-of-round limit	0.08
Camshaft drive assembled gear face runout crankshaft	0.65
Camshaft drive assembled gear face runout camshaft	0.275

CYLINDER BLOCK**ENGINE - 2.0L SPI CYLINDER BLOCK SPECIFICATION**

Item	Specification (mm)
Head gasket surface finish roughness height (CLA)	3.8-2.0
Head gasket surface finish roughness height cut-off	0.8
Dowel height chamfer	0.8x30°
Dowel height chamfer total	12.5
Cylinder bore diameter	84.8
Piston to cylinder bore clearance	0.020-0.040
Surface finish (RA) each bore min.	15-38
Average of all bores of a cylinder block (Ra) min.	20-30
Out-of-round limit	0.025
Tappet limit	0.013
Main bearing bore diameter @ +/- 30° PF Bearing Cap P/L	62.2835-62.3145
Main bearing bore diameter other than above	62.2935 +/- .0100

CRANKSHAFT**ENGINE - 2.0L SPI CRANKSHAFT SPECIFICATION**

Item	Specification (mm)
Main bearing journal diameter	57.98-58.0
Out-of-round limit	0.008

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Taper limit	0.008 per 25.4 (1)
Journal runout limit (runout of bearing 2, 3, and 4)	0.05
Crankshaft end play	0.100-0.300
Surface finish (RMS) micro	0.3
Clearance to crankshaft	0.020-0.065
Thrust bearing journal length	28.825 -28.854
Connecting rod journal length	28.825 -28.854
Out-of-round limit	0.008
Taper limit	0.008 per 25.4 (1)
Surface limit (RMS) micro	0.6 rear
Surface limit (RMS) micro	0.9 front
Main bearing thrust face surface finish (RMS) micro	0.6
Main bearing thrust face surface finish (RMS) rear micro	0.9
Main bearing thrust face surface finish (RMS) front runout limit	0.025
Runout limit (T.I.R.)	0.180
Flywheel ring (gear lateral runout (T.I.R.) manual transmission	1.5
Crankshaft end play	0.100-0.300

CONNECTING ROD**ENGINE - 2.0L SPI CONNECTING ROD SPECIFICATION**

Item	Specification (mm)
Connecting rod bearings clearance to crankshaft	0.020-0.065
Bearing wall thickness (std.)	1.476-1.488
Clearance of crankshaft without cylinder head	desired - 0.0457-0.0660
Clearance of crankshaft without cylinder head	allowable - 0.0461-0.0859
Clearance of crankshaft with cylinder head	desired - 0.0279-0.0483
Clearance of crankshaft with cylinder head	allowable - 0.0276-0.0674
Bearing wall thickness	2.117-2.129
Connecting rod piston pin bore diameter	20.570 -20.610
Crankshaft bearing bore diameter	46.89-46.91
Out-of-round limit - piston pin bore	.008
Taper limit piston pin bore	0.0038/25.4
Length (center to center)	131.905-131.975
Out-of-round-limit - bearing bore	0.010
Taper limit - bearing bore	0.010

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Alignment bore-to-bore (max. differential) twist	0.05
Alignment bore-to-bore (max. differential) bend	0.038
Side clearance (assembled to crank) standard	0.092-0.268
Side clearance (assembled to crank) service limit	0.356

PISTONS**ENGINE - 2.0L SPI PISTONS SPECIFICATION**

Item	Specification (mm)
Piston-to-bore clearance rebuild	0.020-0.040
Piston-to-bore clearance service	0.020-0.070
Piston diameter	84.77-84.80
Pin bore diameter	20.632-20.641
Ring groove width compression (top)	1.53-1.55
Ring groove width compression (bottom)	1.53-1.55
Ring groove width oil	4.008-4.032
Ring groove width compression ring (top) to ring groove clearance	0.04-0.08
Ring groove width compression ring (bottom) to ring groove clearance	0.06-0.09
Squish height	0.908-1.858
Piston pin length	66.2-67.0
Diameter standard	20.622-20.631
Pin to piston clearance	0.007-0.013
Pin to rod clearance	press fit - 8 KN

PISTONS RINGS**ENGINE - 2.0L SPI PISTONS RINGS SPECIFICATION**

Item	Specification (mm)
Piston ring width compression (top)	1.47-1.49
Ring width compression (bottom)	1.46-1.49
Ring width oil ring service limit	(Side clearance) 0.15 MAX.
Ring gap compression (top)	0.25-0.28
Ring gap compression (bottom)	0.25-0.28
Ring gap oil ring (steel rail)	0.04-1.68
Side clearance 1st ring	0.04-0.08

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Side clearance 2nd ring

0.04-0.09

LUBRICATION SYSTEM**ENGINE - 2.0L SPI LUBRICATION SYSTEM SPECIFICATION**

Item	Specification (mm)
Oil pump relief valve spring tension	41.4 -45.8 N @ 28.1
Relief valve-to-bore clearance	0.02-0.08
Oil pump type	Gerotor
Rotor clearance outer gear to housing clearance	0.074-0.161
Rotor clearance inner and outer gear to cover clearance (end play)	0.013-0.089
Rotor clearance inner to outer gear tip clearance	0.05-0.18
Oil capacity with filter	3.76 Liters

LUBRICANTS**ENGINE - 2.0L SPI LUBRICANTS SPECIFICATION**

	Specification
Super premium 5W20 SAE engine oil XO-5W20-QSP	WSS-M2C153-H
Silicone gasket and sealant F7AZ-19554-EA	WSK-M2G343-A4
Crankcase conditioner B7A -19579-C	ESR-M99C80-A

TORQUE SPECIFICATIONS**ENGINE - 2.0L SPI TORQUE SPECIFICATIONS**

Description	N.m	lb-ft	lb-in
Intake manifold nuts	10+90 degrees	10+90 degrees	89+90 degrees
Intake manifold bracket nuts and bolts	10	-	89
Front engine accessory drive bracket bolts	47	35	-
Front engine accessory drive bracket nuts	47	35	-
A/C compressor bolts	25	18	-
Upper generator bolts	48	35	-
Lower generator bolt	48	35	-
EGR valve to intake manifold	25	18	-
EGR valve to EGR manifold tube	24	18	-

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EGR manifold tube to exhaust manifold	6	-	53
Flexible exhaust pipe	47	35	-
Exhaust manifold nuts	27	20	-
Catalytic converter to exhaust manifold bolts	40	30	-
Oil control plug, iB5 transmission	35	26	-
Thermostat housing	13	10	-
Starter motor to transaxle	35	26	-
Lower transaxle flange bolts	47	35	-
Upper transaxle flange bolts	47	35	-
Left-hand transaxle flange bolts	47	35	-
Engine roll restrictor to transaxle	48	35	-
Engine roll restrictor to subframe	48	35	-
Rear engine mounting to body	48	35	-
Rear engine mounting (nut on transmission mounting bracket)	133	98	-
Front engine mounting to engine	80	59	-
Front engine mounting to body	48	35	
Wheel nuts	128	94	-
Suspension strut to body	48	35	-
Lower suspension arm ball joint to spindle carrier	47	35	-
Power steering pump	23	17	
Power steering pump pulley	47	35	-
Cylinder head bolts (refer to the PROCEDURE in this section)	-		-
Timing belt tensioner	25	18	-
Spark plugs	15	11	-
Oil level indicator tube	10	-	89
Valve cover bolts	9	-	80
Ignition coil (EI) bracket to cylinder head	10	-	89
Rocker arms	25	18	-
Camshaft thrust plate bolts	10	89	
Camshaft pulley bolt	105	77	-
Camshaft position sensor (CMP)	25	18	-
Oil pressure switch	13	10	-
Oil pump	13	10	-

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Oil pump tube	10	-	89
Coolant pump	25	18	-
Oil intake pipe to oil pump	10	-	89
Main bearing bolts	99	73	-
Rear crankshaft oil seal retainer	25	18	-
Big end bearing cap nuts (stage 1)	38	28	-
Intermediate shaft bracket	48	35	-
Oil pan to crankcase	25	18	-
Oil pan baffle	25	18	-
Upper timing belt cover	48	35	-
Lower timing belt cover	10	-	89
Engine oil drain plug	25	18	-
Knock sensor	20	15	
Flywheel	82	60	-
Crankshaft position sensor	6	-	53
Crankshaft pulley	120	89	-
Battery tray	25	18	-

DESCRIPTION AND OPERATION

ENGINE

General

The 2.0L SPI (Split Port Induction) engines significant features are:

- Idle Stability
- Engine Performance
- Fuel Economy

The 2.0L SPI Engines new features are:

- Multi-layer steel cylinder head gasket
- Single-layer steel IMRC gasket to cylinder head
- New aluminum intake manifold with water heated PCV fitting
- New aluminum engine mount
- New aluminum valve cover with integrated PCV

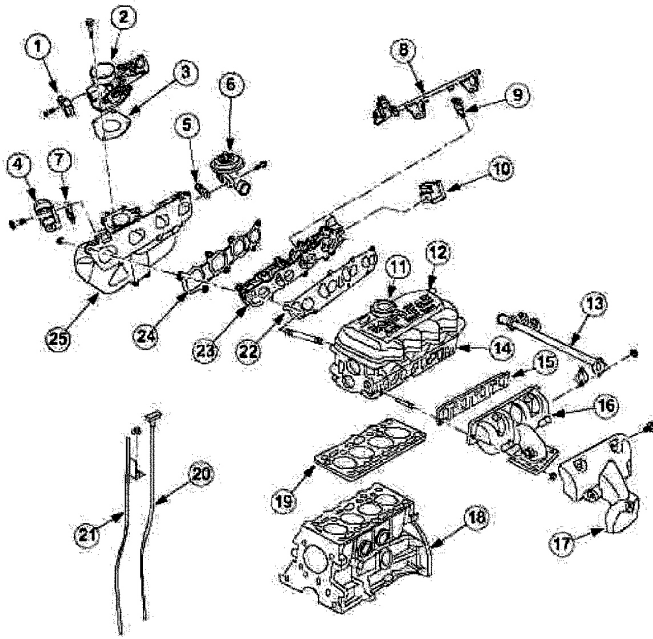
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- New aluminum FEAD bracket
- New electric IMRC actuator
- New 50 mm throttle body
- 60 mm mass air flow sensor
- Reduced load valve springs
- Reduced weight valve spring retainer

Upper Engine Components

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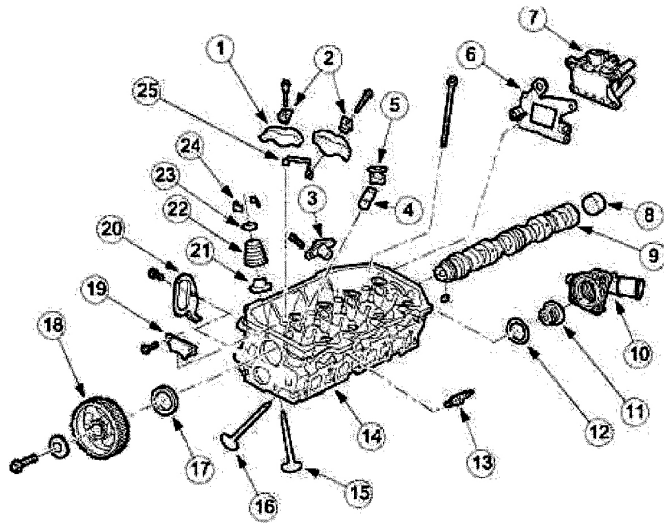
Item	Part Number	Description
1	-	Throttle position sensor
2	-	Throttle body
3	-	Throttle body gasket
4	-	Idle air control valve
5	-	EGR valve gasket
6	-	EGR valve
7	-	Idle air control gasket
8	-	Fuel injection supply manifold
9	-	Fuel injector
10	-	IMRC actuator
11	-	Oil filter cap
12	-	Valve cover
13	-	EGR valve to exhaust manifold tube
14	-	Cylinder head
15	-	Exhaust manifold gasket
16	-	Exhaust manifold
17	-	Exhaust manifold shield
18	-	Cylinder block
19	-	Head gasket
20	-	Oil level indicator
21	-	Oil level indicator tube
22	-	Intake manifold gasket
23	-	Intake manifold runner control (IMRC)
24	-	Intake manifold upper gasket
25	-	Intake manifold

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Fig. 1: Identifying Engine - 2.0L SPI Upper Components
Courtesy of FORD MOTOR CO.

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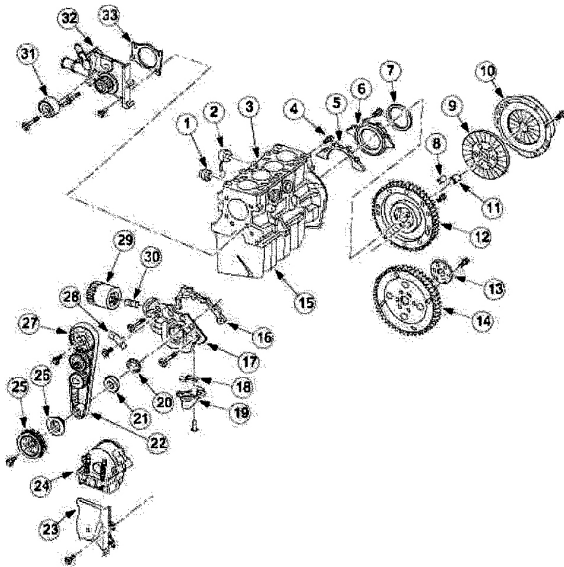
Item	Part Number	Description
1	-	Rocker arm
2	-	Rocker arm seats
3	-	Camshaft position sensor
4	-	Valve tappet
5	-	Valve tappet guide plate
6	-	Ignition coil bracket
7	-	Ignition coil
8	-	Cup plug
9	-	Camshaft
10	-	Water hose connection
11	-	Water thermostat
12	-	Water hose connection O-ring seal
13	-	Spark plug
14	-	Cylinder head
15	-	Intake valve
16	-	Exhaust valve
17	-	Camshaft front seal
18	-	Camshaft sprocket
19	-	Camshaft thrust plate
20	-	Engine lifting eye
21	-	Valve stem seal
22	-	Valve spring
23	-	Valve spring retainer
24	-	Valve spring retainer key
25	-	Valve tappet guide plate retainer

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Fig. 2: Identifying Engine - 2.0L SPI Cylinder Head Components
Courtesy of FORD MOTOR CO.

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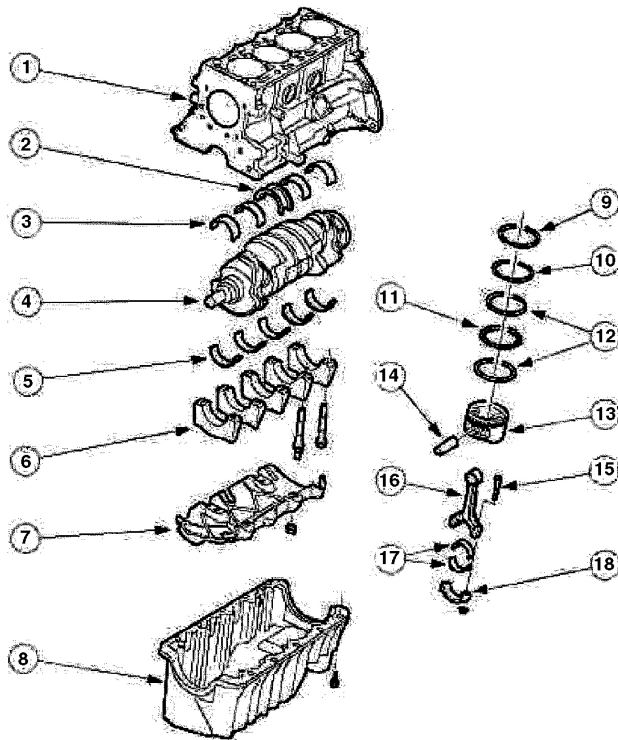
Item	Part Number	Description
1	-	Oil pressure sensor
2	-	Knock sensor
3	-	Cylinder block
4	-	Engine block plug
5	-	Crankshaft rear oil seal retainer gasket
6	-	Crankshaft rear oil seal retainer
7	-	Crankshaft rear oil seal
8	-	Flywheel dowel
9	-	Clutch disc
10	-	Clutch pressure plate
11	-	Input shaft pilot bearing
12	-	Flywheel (M/T)
13	-	Flexplate
14	-	Flywheel (A/T)
15	-	Oil pan
16	-	Oil pump gasket
17	-	Oil pump
18	-	Oil pump inlet tube gasket
19	-	Oil pump screen cover and tube
20	-	Crankshaft front seal
21	-	Timing belt guide
22	-	Timing belt
23	-	Engine front cover, lower
24	-	Front engine support mounting bracket
25	-	Crankshaft pulley
26	-	Crankshaft sprocket
27	-	Camshaft sprocket
28	-	Crankshaft position sensor
29	-	Oil filter
30	-	Oil filter mounting insert
31	-	Timing belt tensioner
32	-	Water pump
33	-	Water pump housing gasket

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Fig. 3: Identifying Engine - 2.0L SPI Lower Components (1 Of 2)
Courtesy of FORD MOTOR CO.

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Item	Part Number	Description
1	-	Cylinder block
2	-	Crankshaft thrust main bearing
3	-	Crankshaft main bearing (Upper)
4	-	Crankshaft
5	-	Crankshaft main bearing (Lower)
6	-	Main bearing caps
7	-	Oil pan baffle
8	-	Oil pan
9	-	Upper compression ring
10	-	Lower compression ring
11	-	Oil control ring spacer
12	-	Oil control ring
13	-	Piston
14	-	Piston pin
15	-	Connecting rod bolt
16	-	Connecting rod
17	-	Connecting rod bearing
18	-	Connecting rod cap

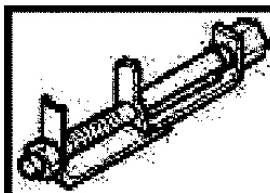
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Fig. 4: Identifying Engine - 2.0L SPI Lower Components (2 Of 2)
Courtesy of FORD MOTOR CO.

DIAGNOSIS AND TESTING

ENGINE

REFER to ENGINE SYSTEM-GENERAL INFORMATION article .

IN-VEHICLE REPAIR**INTAKE MANIFOLD****Special Tool(s)**

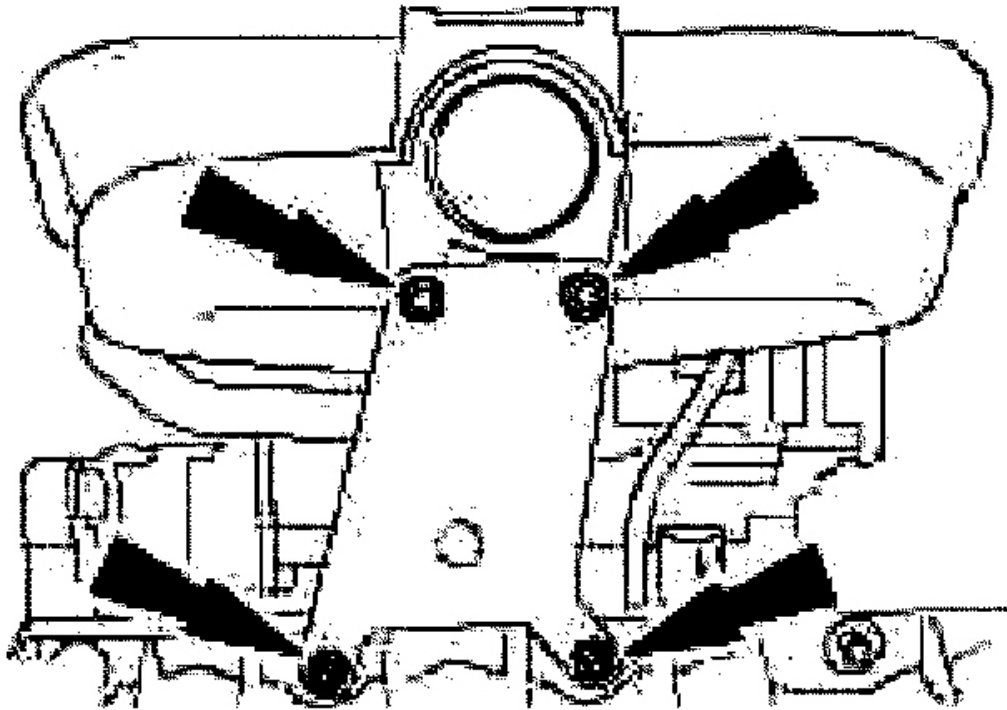
Remover/Installer, hose clamp
412-108 (T96P-18539-A)

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Fig. 5: Identifying Special Tool
Courtesy of FORD MOTOR CO.

Removal

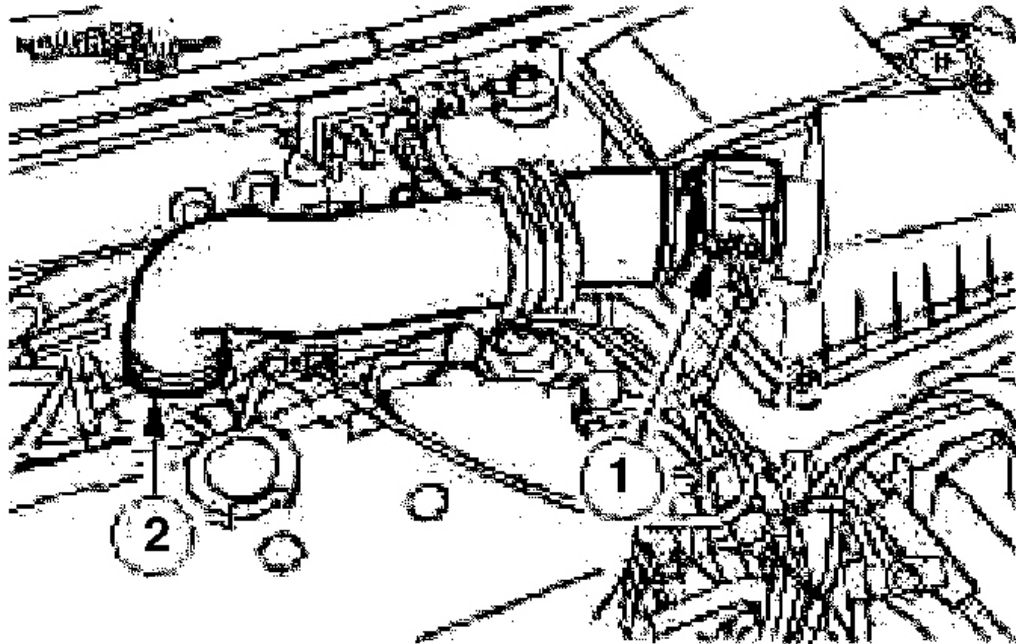
1. Release the fuel pressure. For additional information, refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Disconnect the battery ground cable.
3. Raise and support the vehicle.
4. Detach the intake manifold bracket.
 - Loosen the nuts and remove the bolts.



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Fig. 6: Removing Intake Manifold Bracket
Courtesy of FORD MOTOR CO.

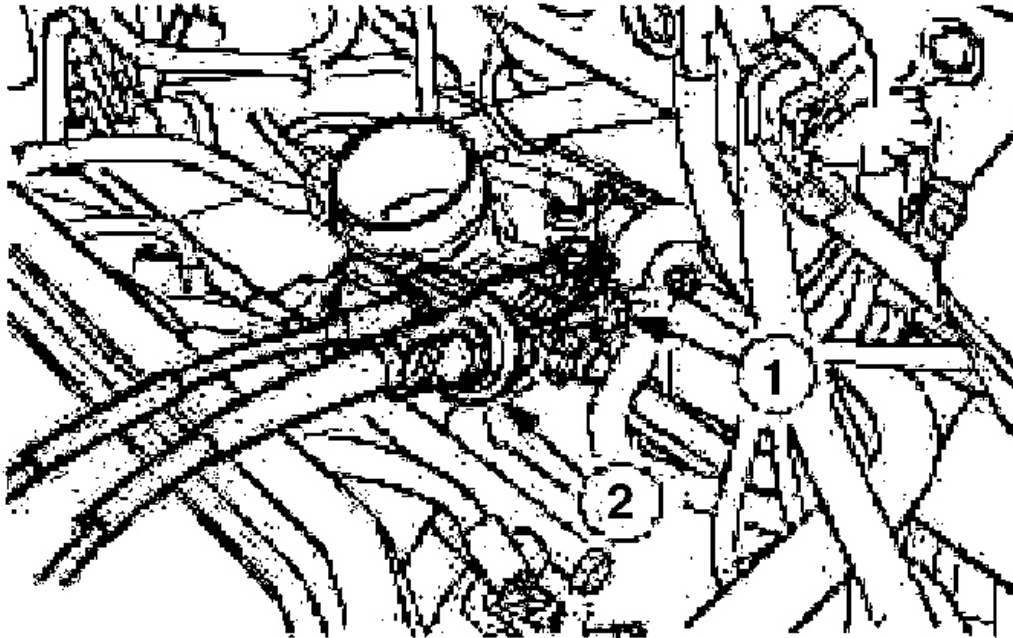
5. Lower the vehicle.
6. Remove the air cleaner housing.
 1. Disconnect the mass air flow (MAF) sensor electrical connector.
 2. Disconnect the air cleaner outlet hose.
 - Remove the air cleaner housing from the rubber bushing.



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Fig. 7: Disconnecting Mass Air Flow (MAF) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

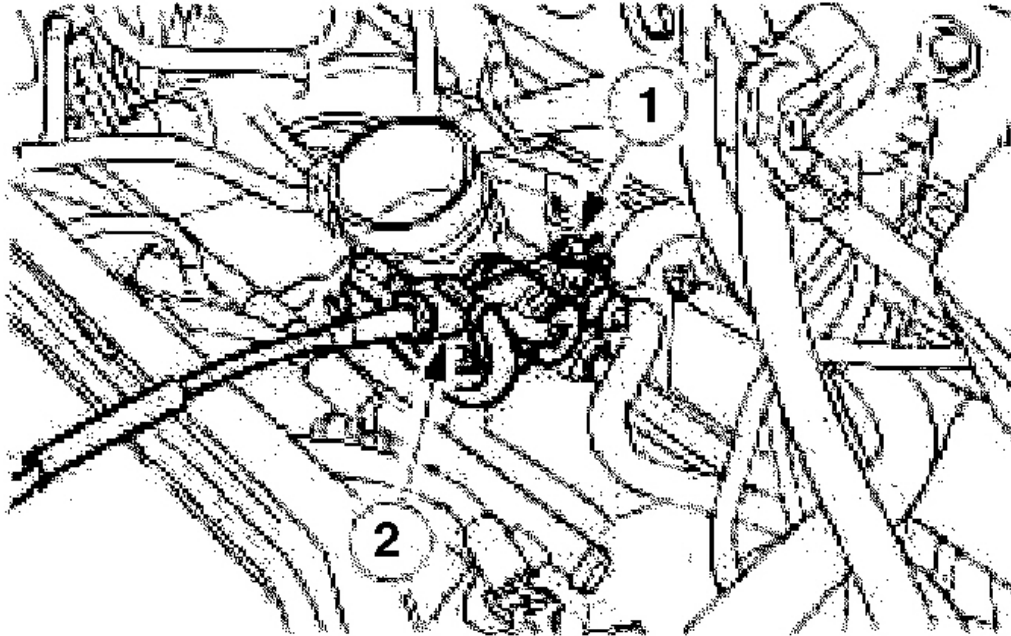
7. Disconnect the accelerator cable.
 1. Unhook the cable.
 2. Remove the plastic clip and position the accelerator cable to one side.



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Fig. 8: Disconnecting Accelerator Cable
Courtesy of FORD MOTOR CO.

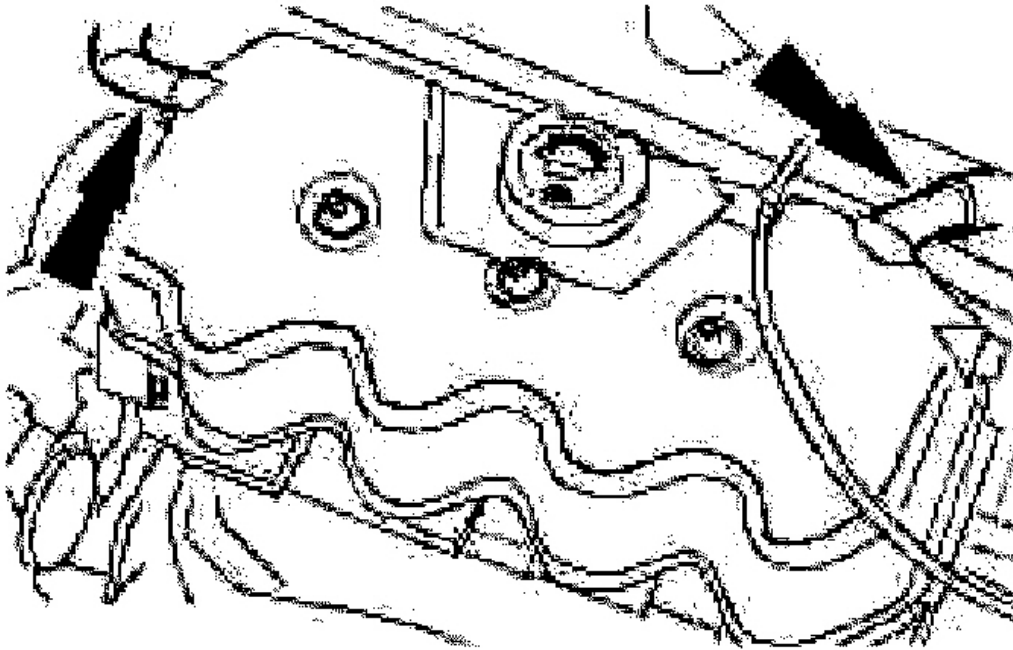
8. Disconnect the speed control cable.
 1. Unhook the cable.
 2. Remove the plastic clip and position the speed control cable to one side.



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Fig. 9: Disconnecting Speed Control Cable
Courtesy of FORD MOTOR CO.

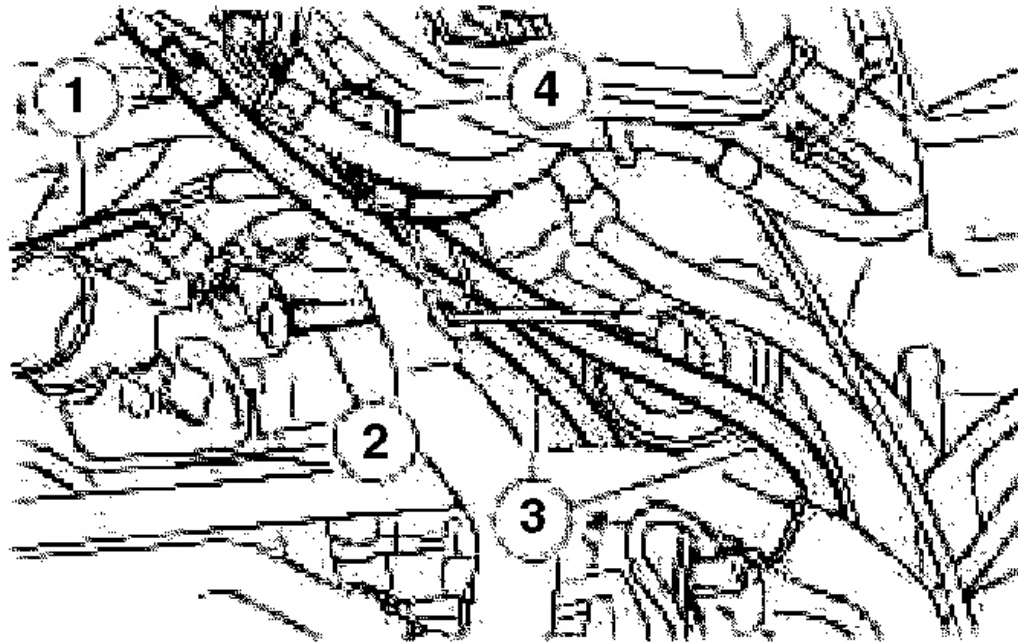
9. Disconnect the positive crankcase ventilation hoses.



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Fig. 10: Disconnecting Positive Crankcase Ventilation Hoses
Courtesy of FORD MOTOR CO.

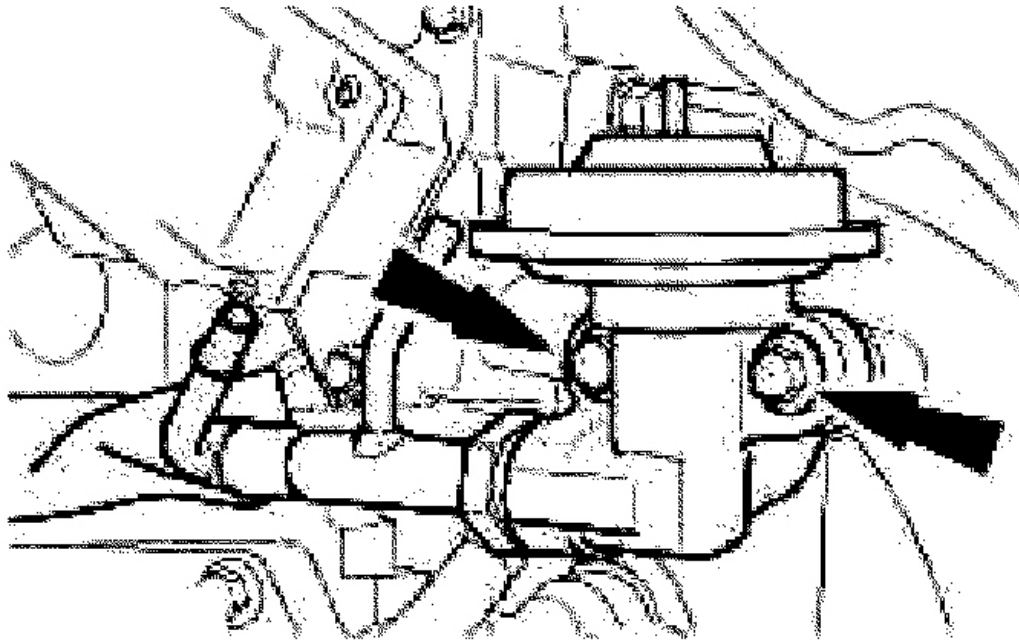
10. Disconnect the vacuum hoses.
 1. EVAP solenoid valve.
 2. Brake booster.
 3. Delta pressure feedback electronic (DPFE) system sensor.
 4. Exhaust gas recirculation (EGR) valve.



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Fig. 11: Disconnecting Vacuum Hoses
Courtesy of FORD MOTOR CO.

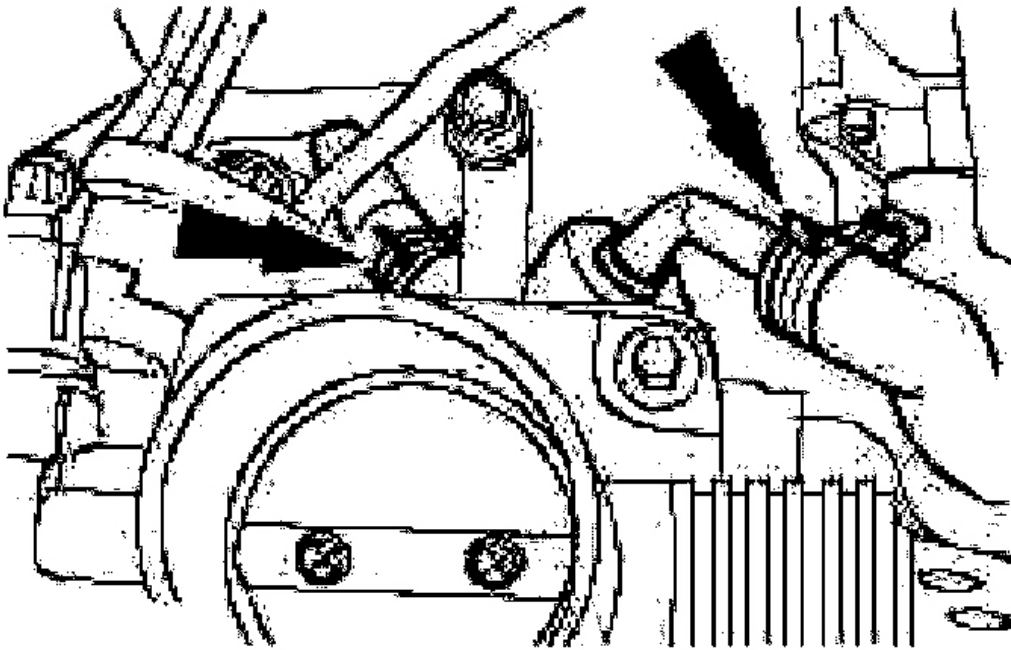
11. Disconnect the EGR valve.
 - Discard the gasket.



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Fig. 12: Disconnecting EGR Valve
Courtesy of FORD MOTOR CO.

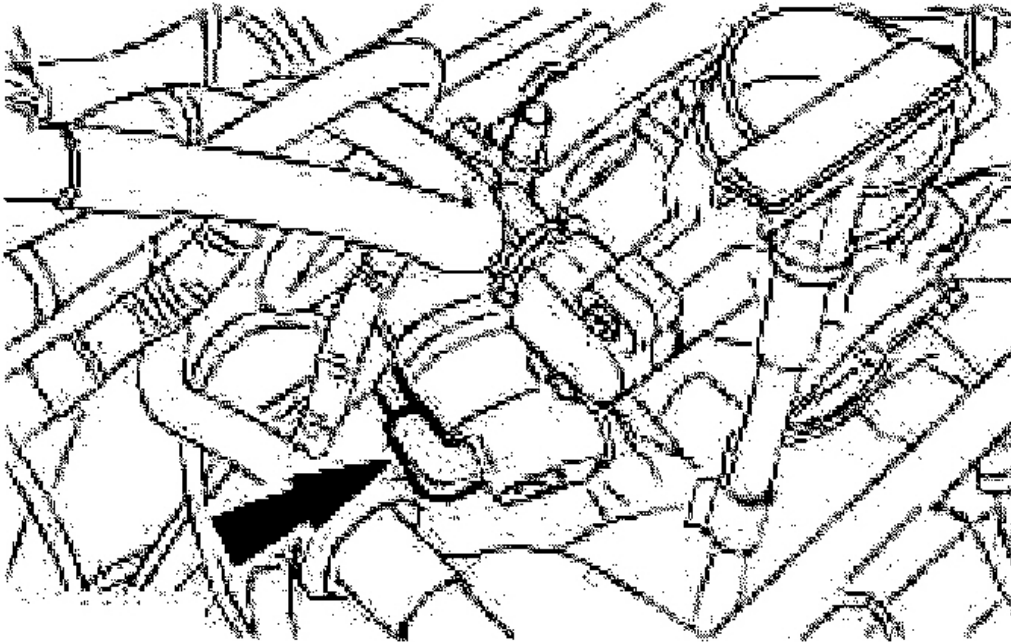
NOTE: Clamp the hoses to prevent coolant loss.



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Fig. 13: Disconnecting Coolant Hoses From Intake Manifold
Courtesy of FORD MOTOR CO.

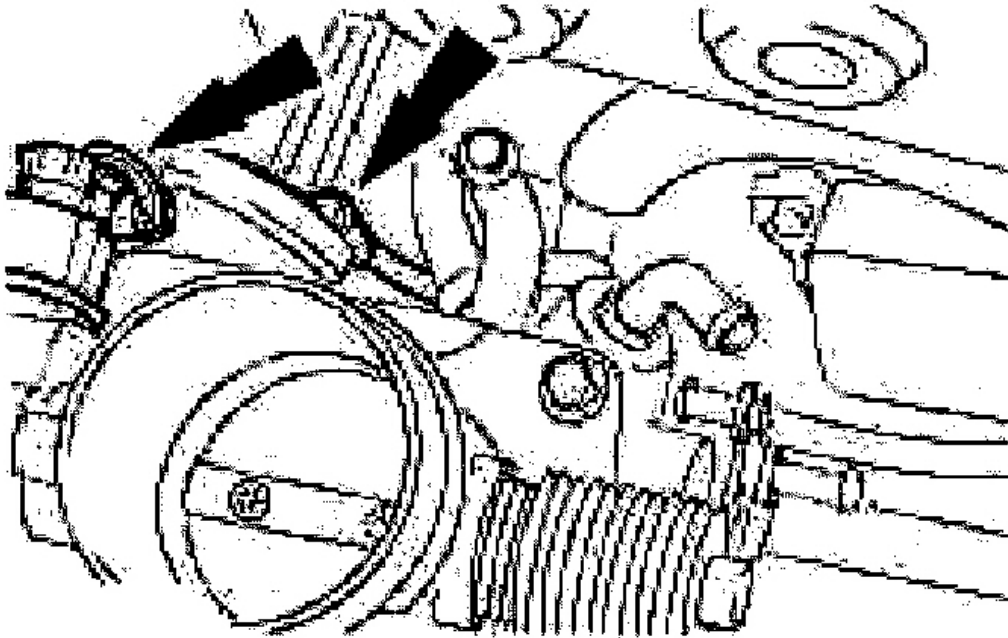
12. Disconnect the coolant hoses from the intake manifold.
13. Remove the vacuum hose assembly.



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Fig. 14: Removing Vacuum Hose Assembly
Courtesy of FORD MOTOR CO.

14. Disconnect the throttle position (TP) sensor and the idle air control (IAC) valve.

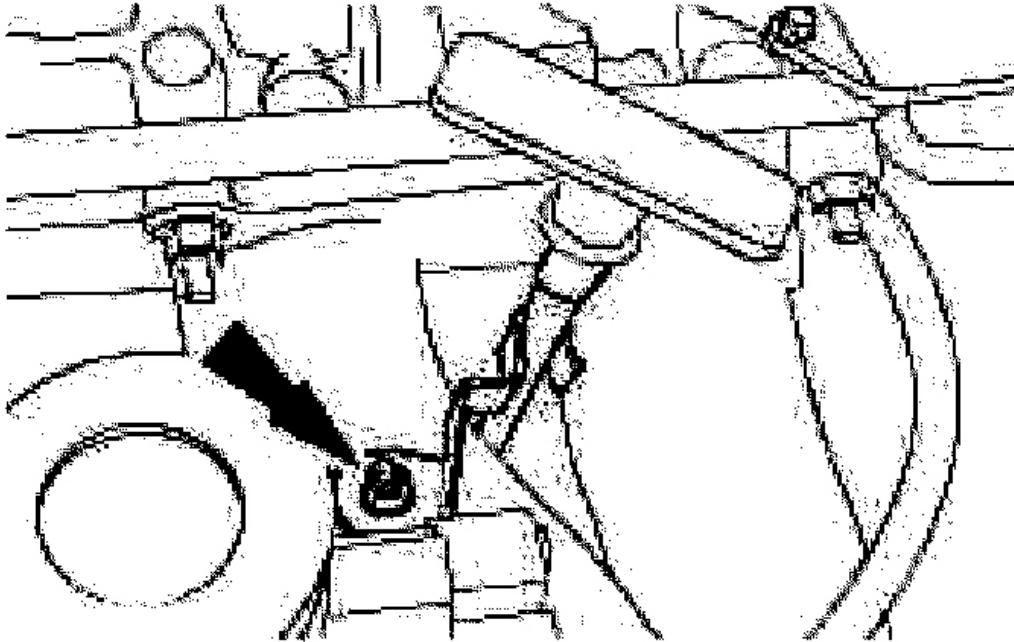


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Fig. 15: Disconnecting Throttle Position (TP) Sensor And Idle Air Control (IAC) Valve

Courtesy of FORD MOTOR CO.

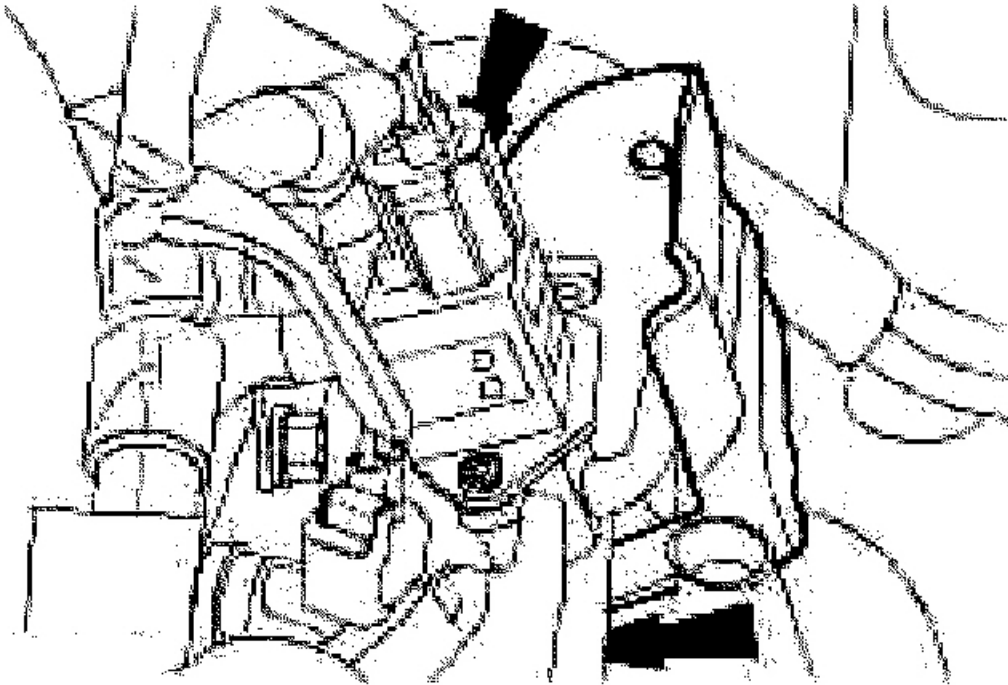
NOTE: Do not remove the oil level indicator tube.



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Fig. 16: Removing Bracket From Oil Level Indicator Tube
Courtesy of FORD MOTOR CO.

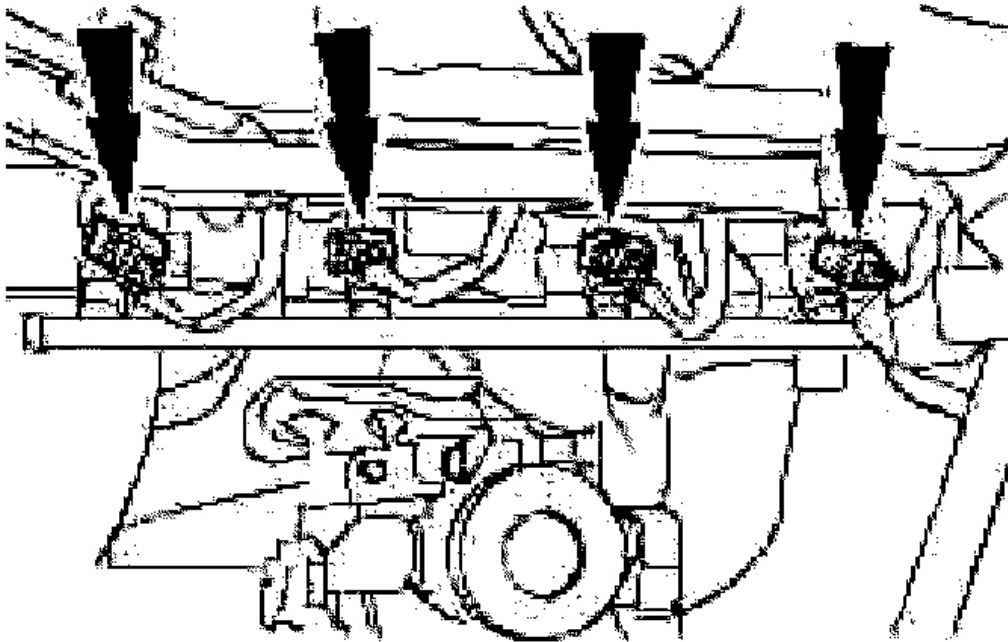
15. Remove the bolt and bracket from the oil level indicator tube.
16. Remove the intake manifold upper support bracket.



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Fig. 17: Removing Intake Manifold Upper Support Bracket
Courtesy of FORD MOTOR CO.

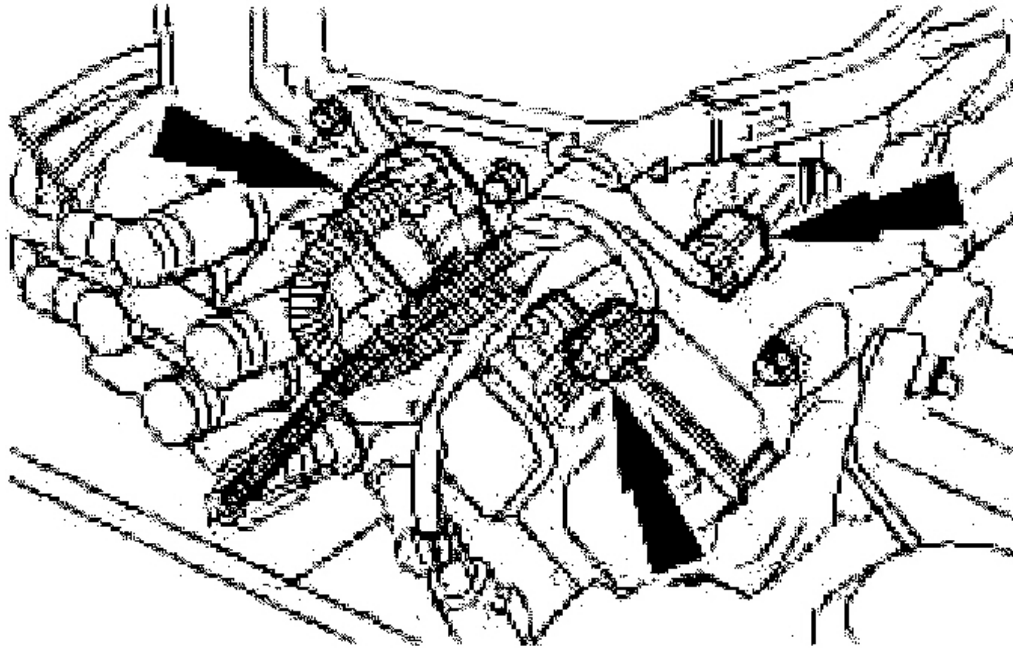
17. Disconnect the fuel injector electrical connectors.



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Fig. 18: Disconnecting Fuel Injector Electrical Connectors
Courtesy of FORD MOTOR CO.

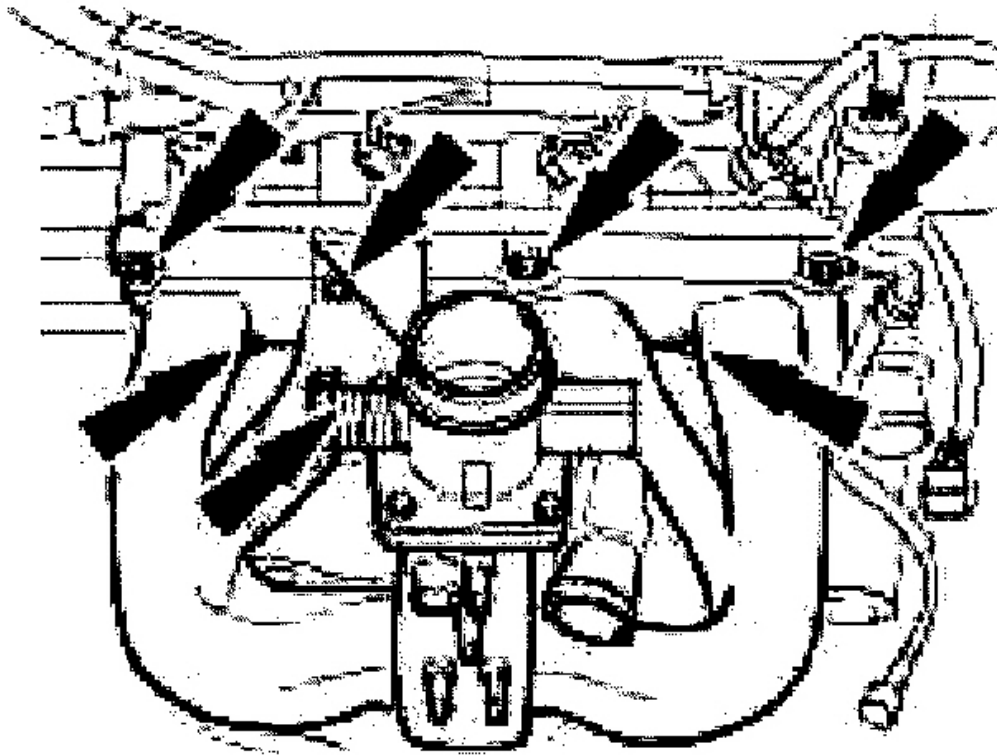
18. Disconnect the electrical connectors.
 1. Intake manifold runner control (IMRC).
 2. Camshaft position (CMP) sensor.
 3. Ignition Coil.



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Fig. 19: Disconnecting Electrical Connectors
Courtesy of FORD MOTOR CO.

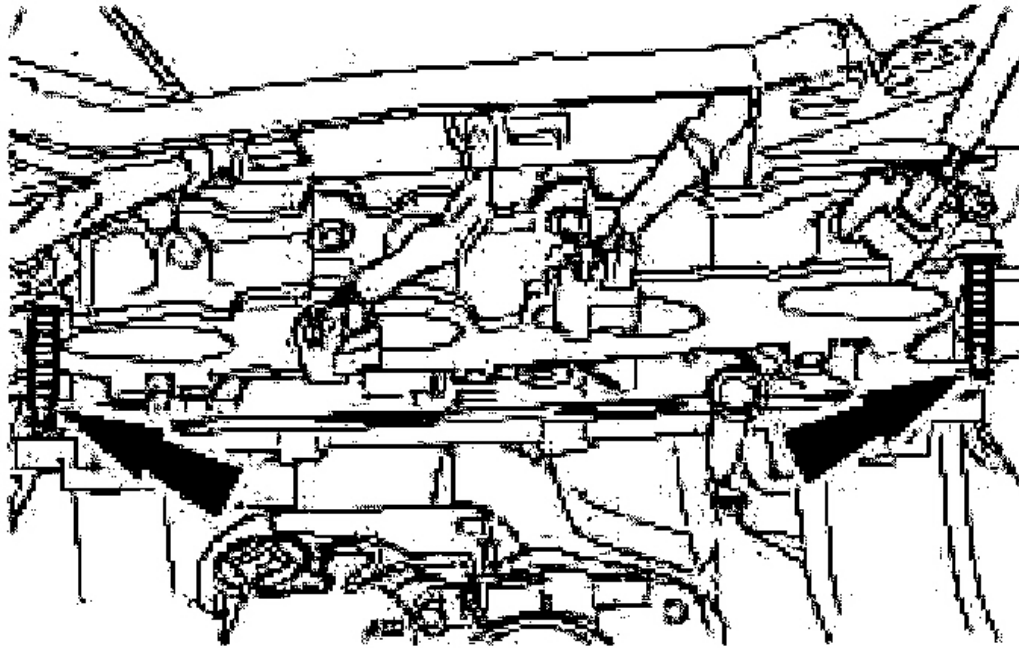
19. Disconnect the fuel lines from the fuel rail. For additional information, refer to **FUEL SYSTEMS** .
20. Remove the intake manifold retainers and position the manifold to the rear of the engine compartment (shown with engine removed).



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Fig. 20: Removing Intake Manifold Retainers
Courtesy of FORD MOTOR CO.

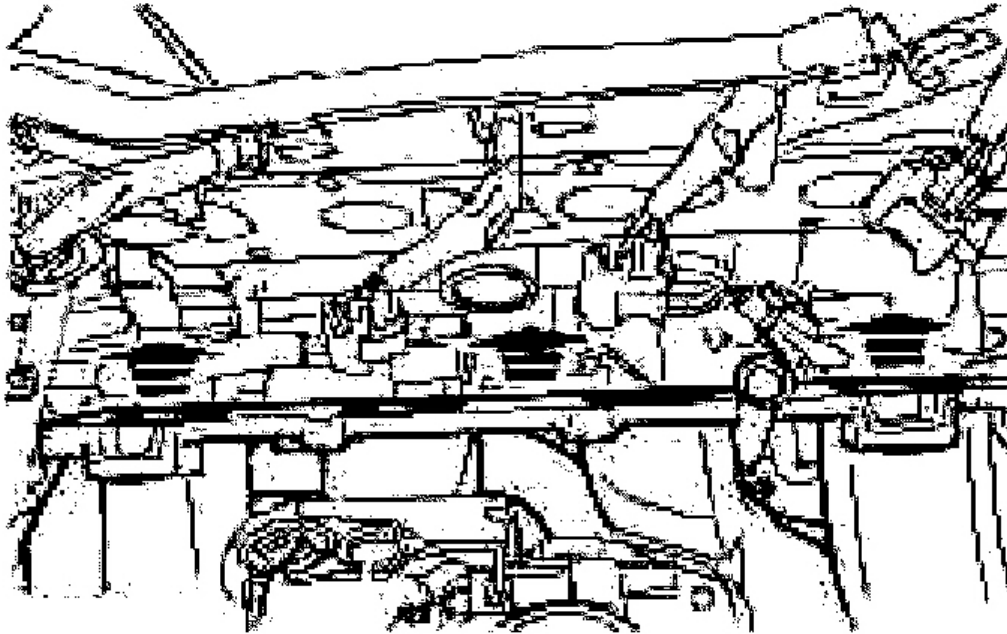
21. Remove the IMRC manifolds (shown with engine removed).
 - Remove the two studs first.
 - Discard the gaskets.



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Fig. 21: Removing IMRC Manifolds
Courtesy of FORD MOTOR CO.

22. Remove the intake manifold from the engine compartment.

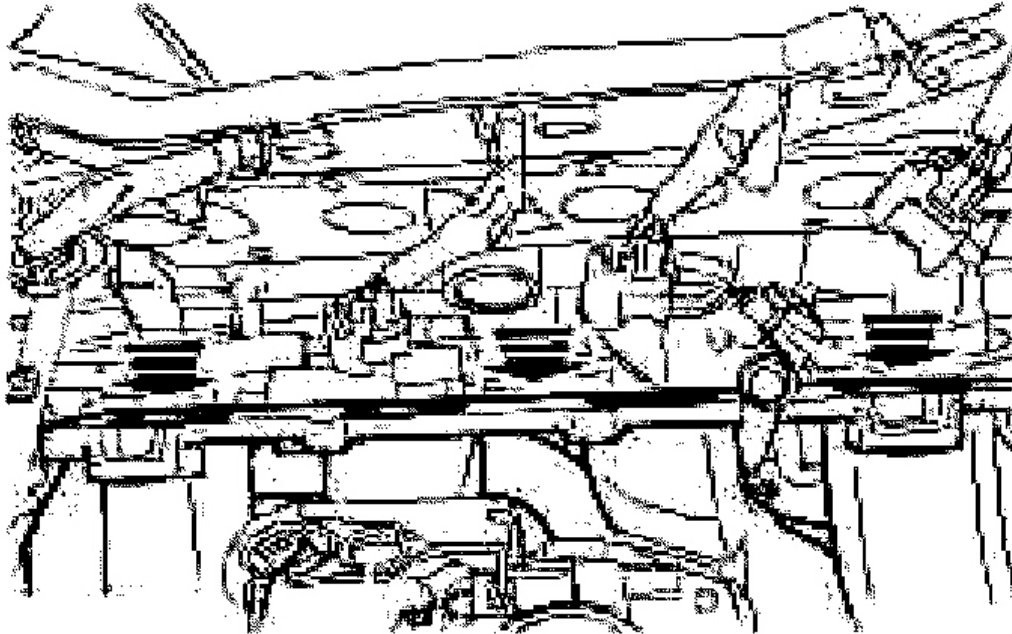


G03432070

Fig. 22: Removing Intake Manifold From Engine Compartment
Courtesy of FORD MOTOR CO.

Installation

1. Position the intake manifold to the rear of the engine compartment (shown with engine removed).

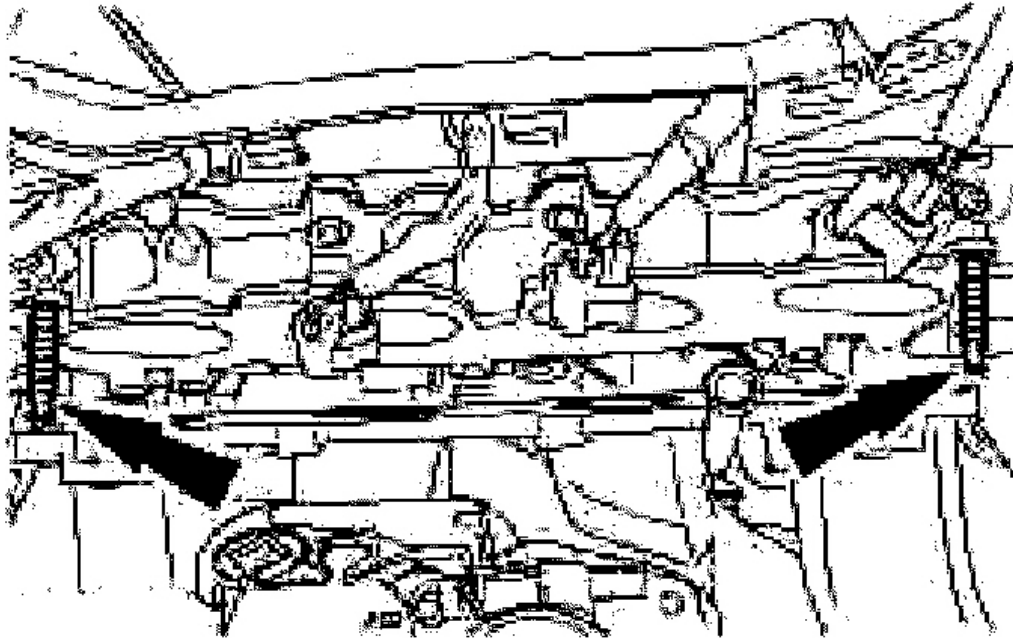


G03432071

Fig. 23: Installing Intake Manifold To Rear Of Engine Compartment
Courtesy of FORD MOTOR CO.

NOTE: Use new gaskets.

2. Install the IMRC manifolds and the two studs (shown with engine removed).
 - Tighten the studs in two stages.
 - Stage 1: 10 N.m.
 - Stage 2: 90 degrees.

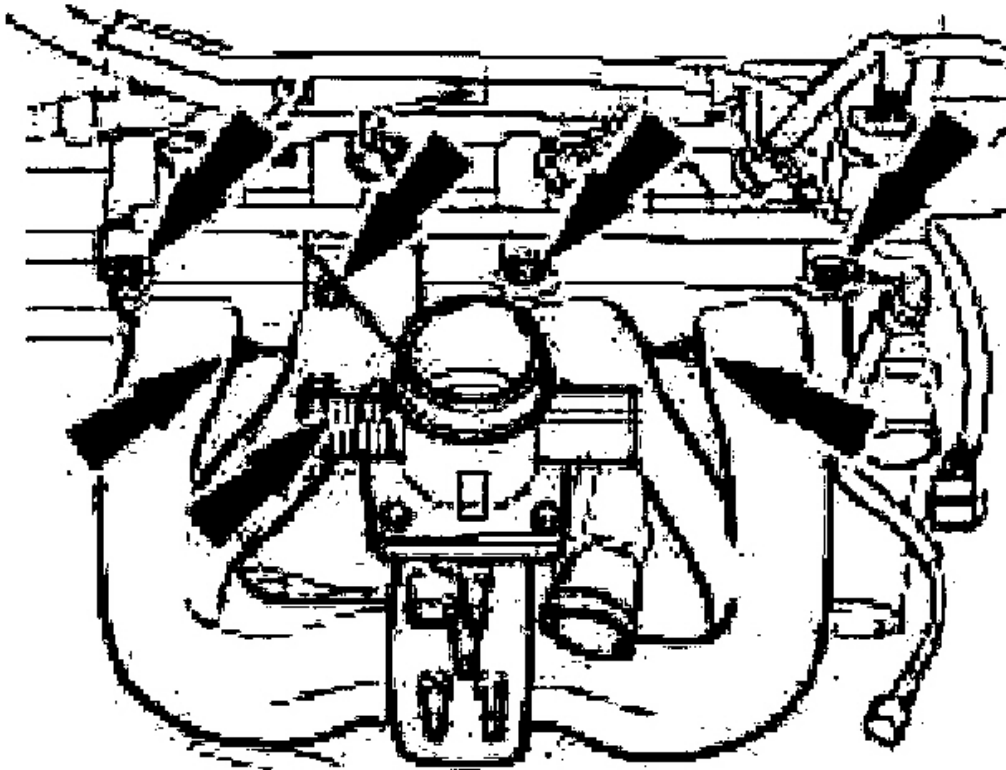


G03432072

Fig. 24: Installing IMRC Manifolds
Courtesy of FORD MOTOR CO.

NOTE: Use new gaskets.

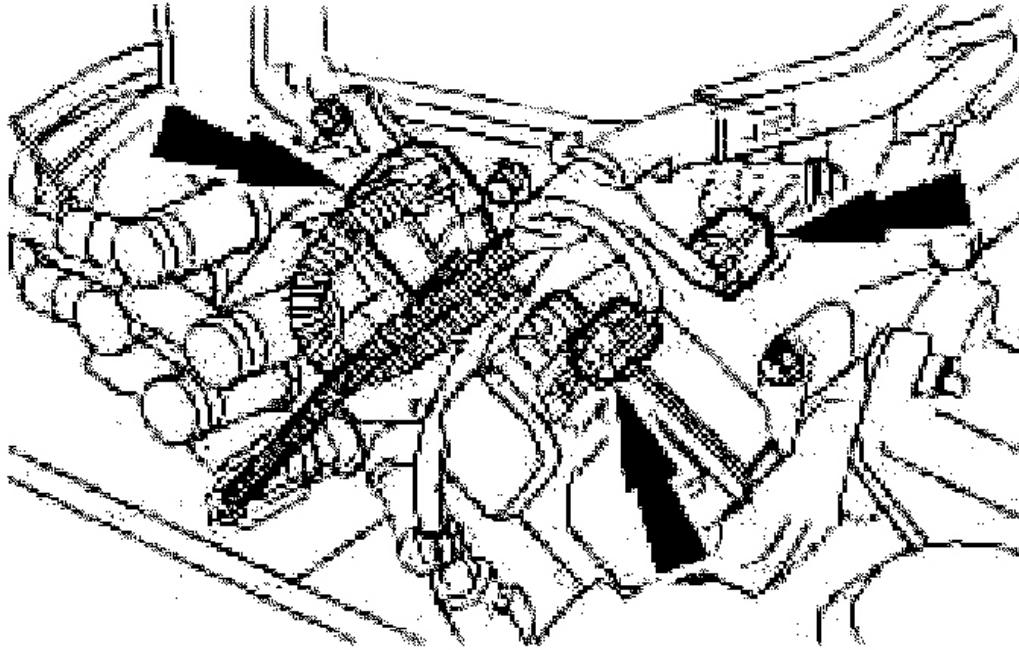
3. Install the intake manifold and retainers (shown with engine removed).
 - Tighten the nuts and bolts in two stages
 - Stage 1: 10 N.m.
 - Stage 2: 90 degrees.



G03432073

Fig. 25: Installing Intake Manifold And Retainers
Courtesy of FORD MOTOR CO.

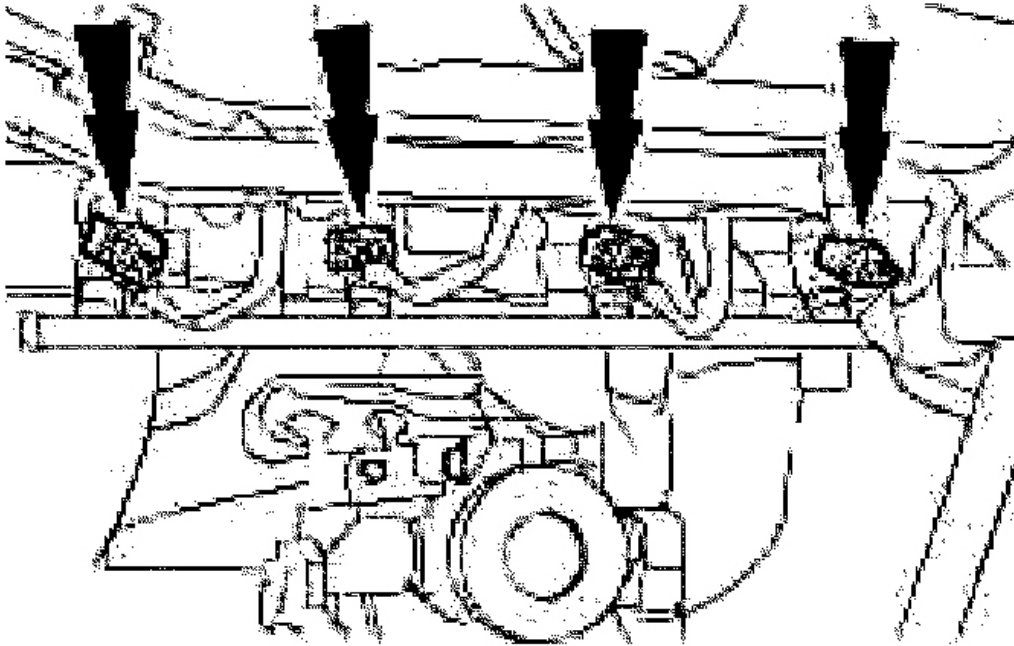
4. Connect the fuel lines to the fuel rail. For additional information, refer to **FUEL SYSTEMS** .
5. Connect the electrical connectors.
 1. Ignition coil.
 2. CMP sensor.
 3. IMRC.



G03432074

Fig. 26: Connecting Electrical Connectors
Courtesy of FORD MOTOR CO.

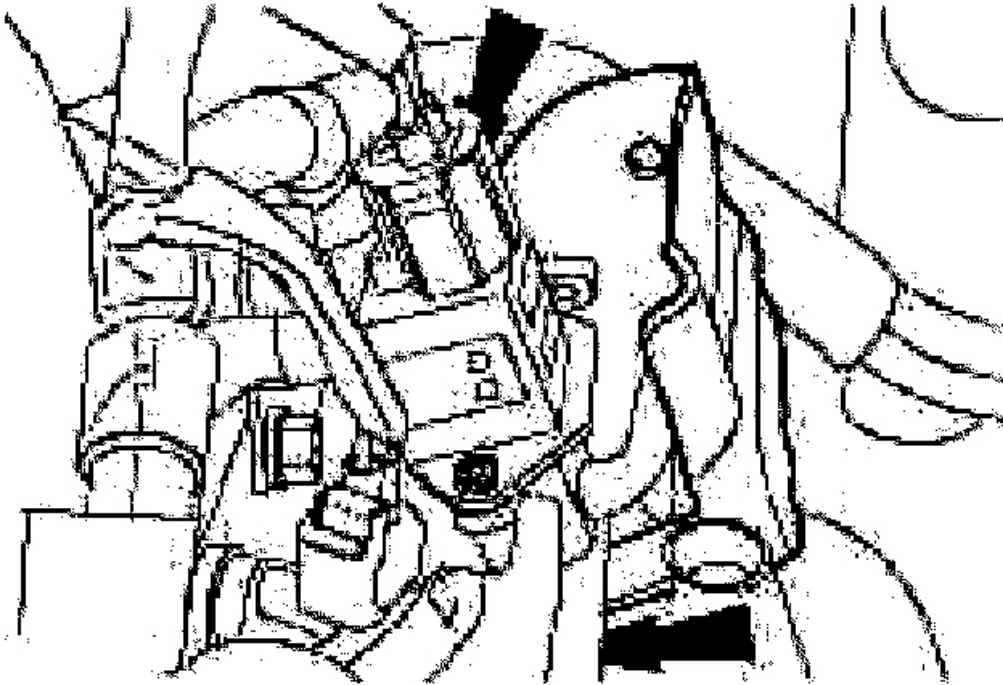
6. Connect the fuel injector electrical connectors.



G03432075

Fig. 27: Connecting Fuel Injector Electrical Connectors
Courtesy of FORD MOTOR CO.

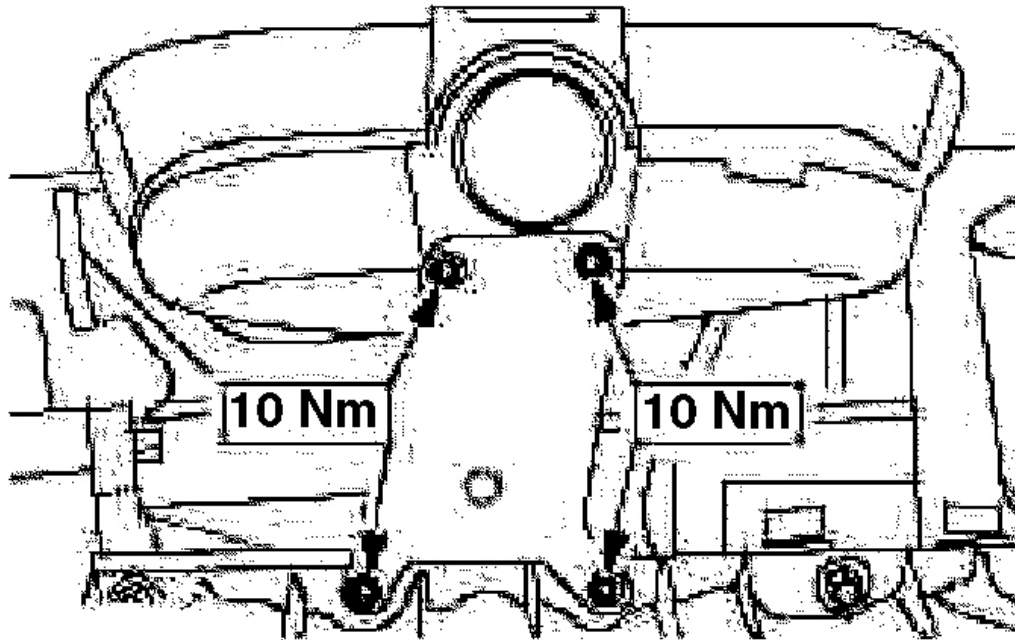
7. Install the intake manifold upper support bracket.



G03432076

Fig. 28: Installing Intake Manifold Upper Support Bracket
Courtesy of FORD MOTOR CO.

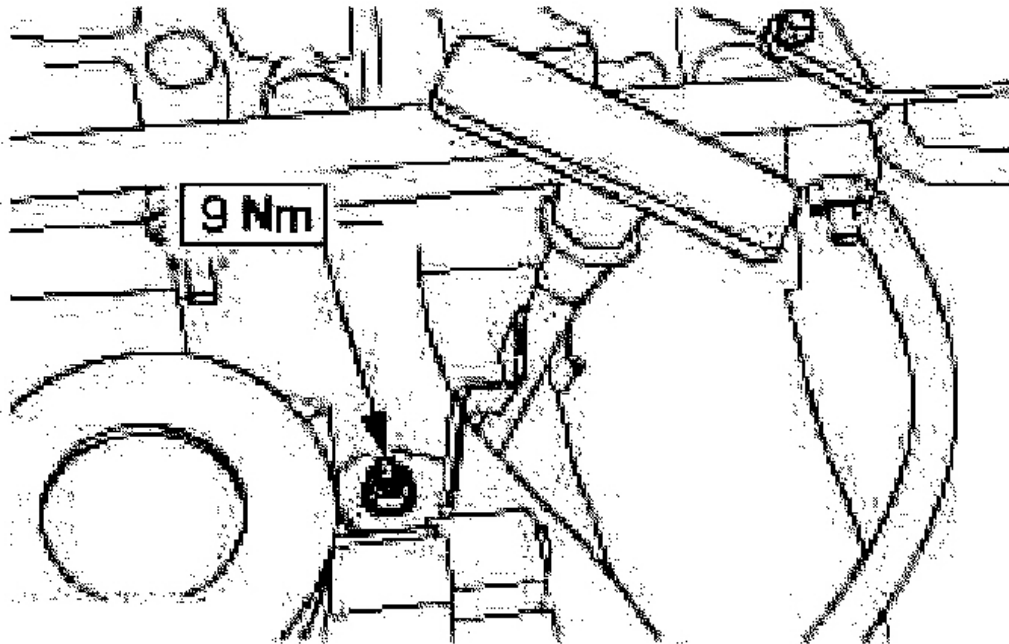
8. Raise and support the vehicle.
9. Attach the intake manifold bracket.
 - Install the bolts and tighten the nuts.



G03432077

Fig. 29: Installing Intake Manifold Bracket
Courtesy of FORD MOTOR CO.

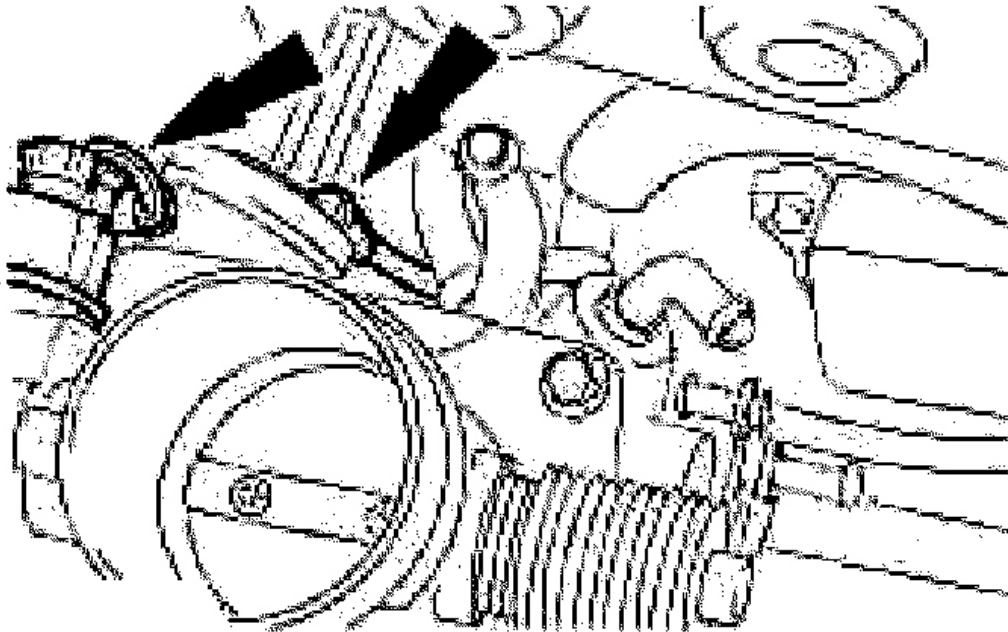
10. Lower the vehicle.
11. Install the bracket and bolt to the oil level indicator tube.



G03432078

Fig. 30: Installing Bracket And Bolt To Oil Level Indicator Tube
Courtesy of FORD MOTOR CO.

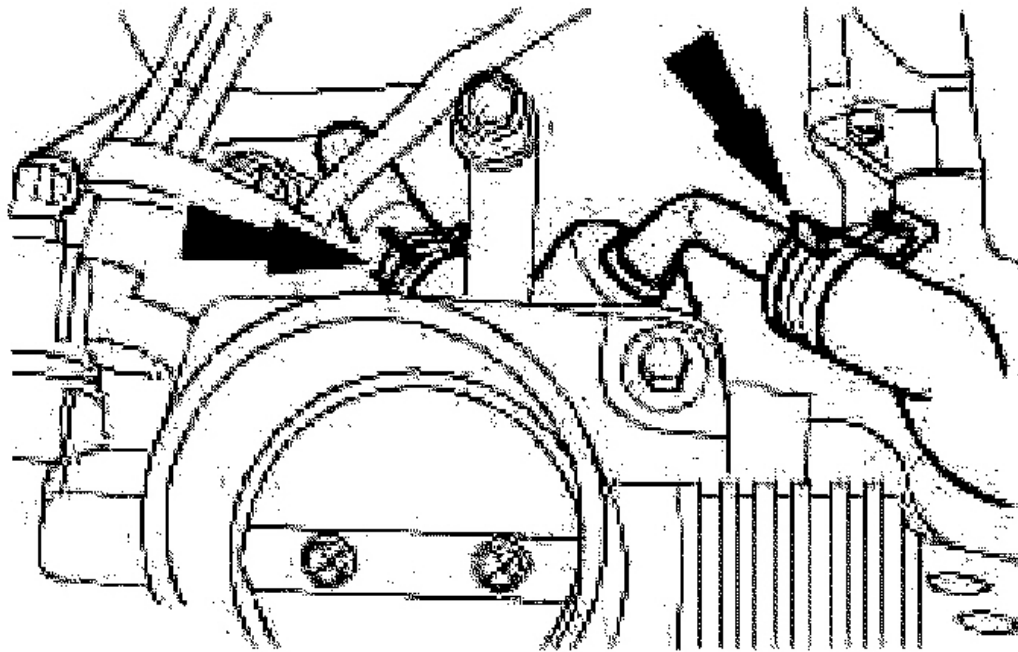
12. Connect the TP sensor and the IAC valve.



G03432079

Fig. 31: Connecting TP Sensor And IAC Valve
Courtesy of FORD MOTOR CO.

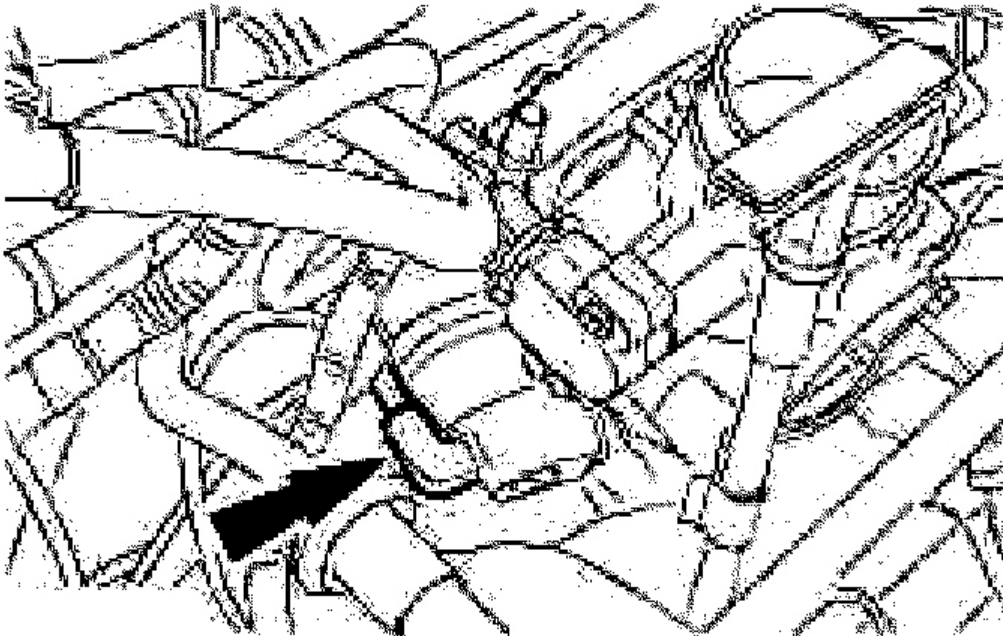
13. Connect the coolant hoses to the intake manifold.
 - Remove the clamps.



G03432080

Fig. 32: Connecting Coolant Hoses To Intake Manifold
Courtesy of FORD MOTOR CO.

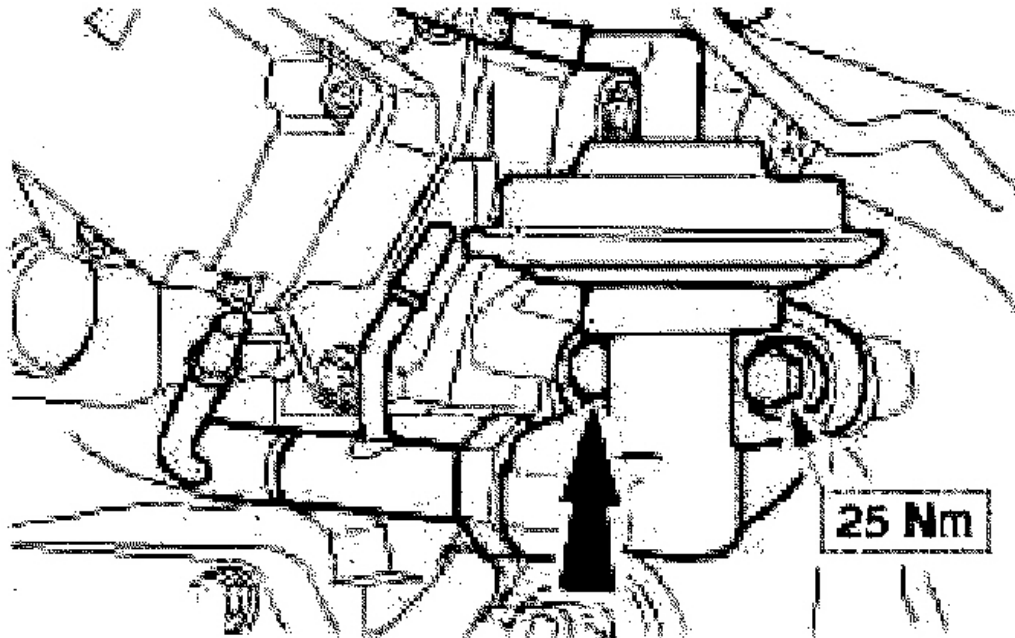
14. Install the vacuum hose assembly.



G03432081

Fig. 33: Installing Vacuum Hose Assembly
Courtesy of FORD MOTOR CO.

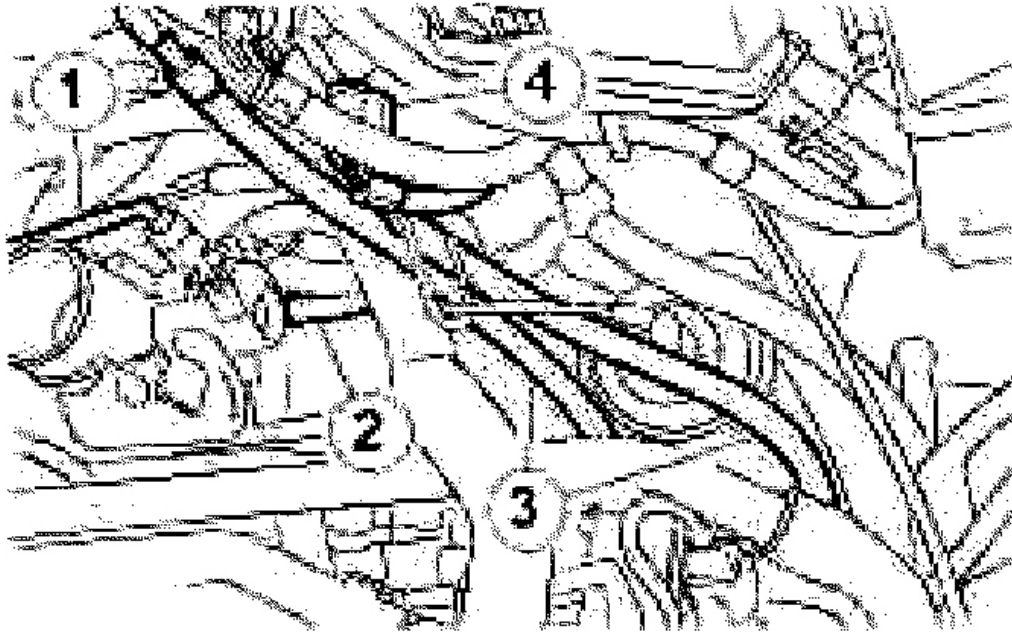
15. Connect the EGR valve.
 - Install a new gasket.



G03432082

Fig. 34: Connecting EGR Valve
Courtesy of FORD MOTOR CO.

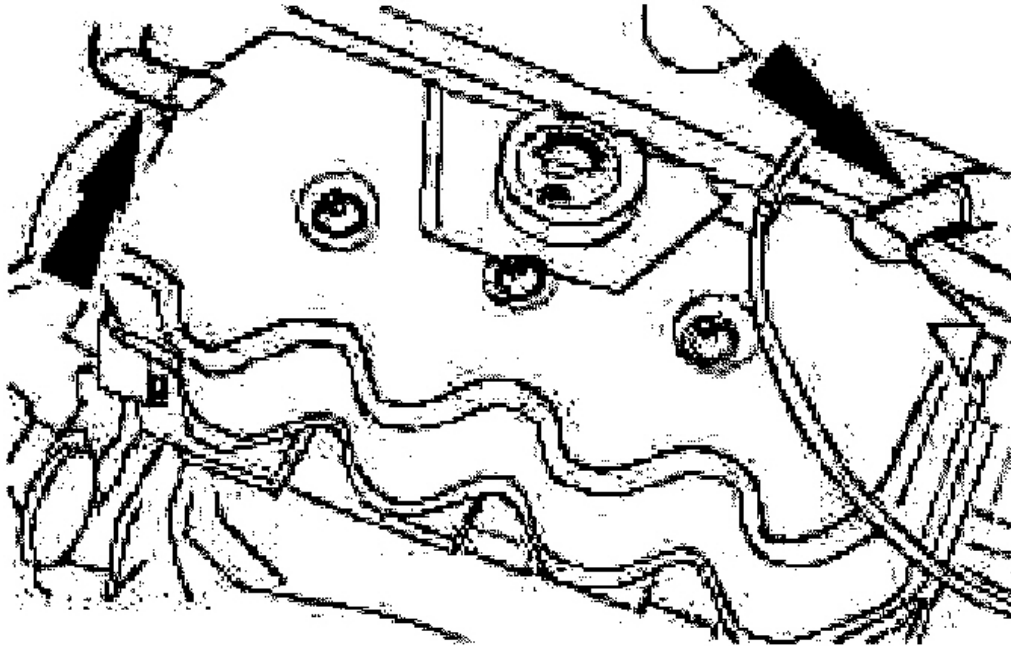
16. Connect the vacuum hoses.
 1. EVAP solenoid valve.
 2. Brake booster.
 3. DPFE system sensor.
 4. EGR valve.



G03432083

Fig. 35: Connecting Vacuum Hoses
Courtesy of FORD MOTOR CO.

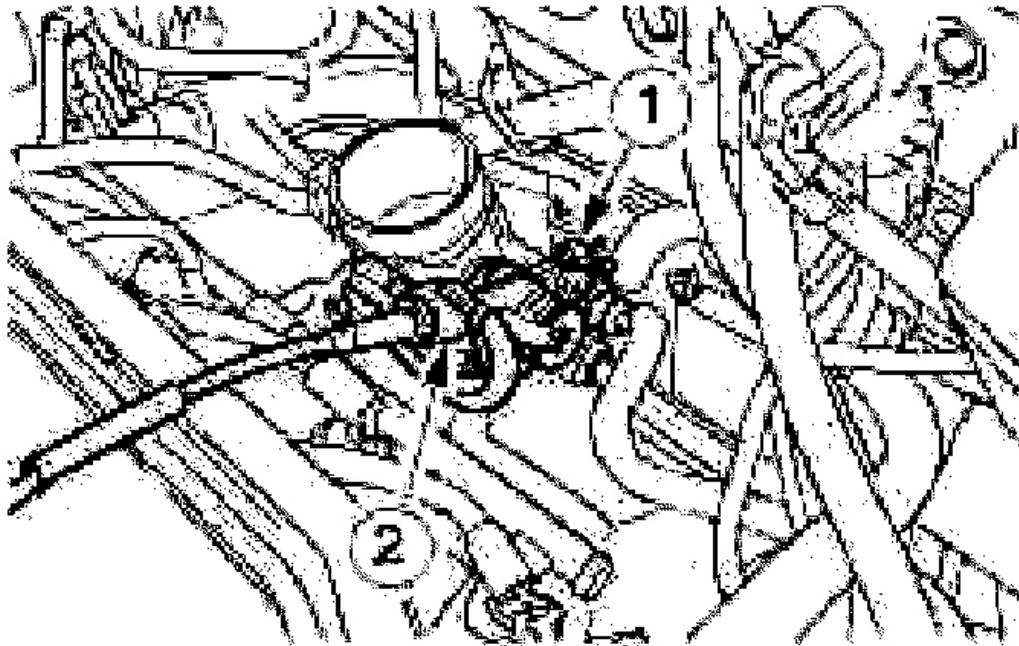
17. Connect the positive crankcase ventilation hoses.
 - Make sure the twist-lock positive crankcase ventilation valve is secure.



G03432084

Fig. 36: Connecting Positive Crankcase Ventilation Hoses
Courtesy of FORD MOTOR CO.

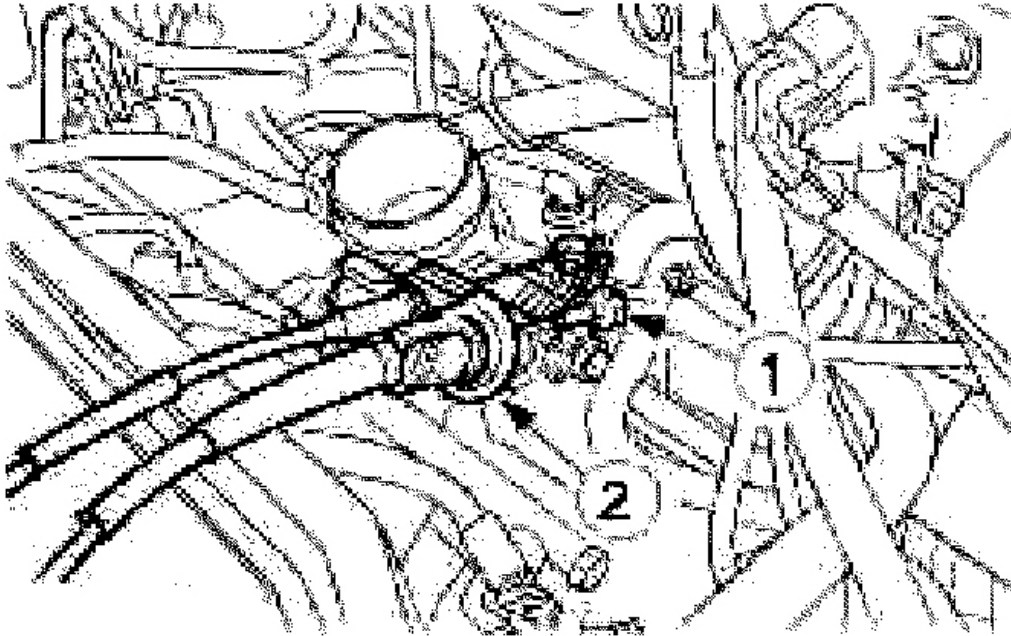
18. Connect the speed control cable.
 1. Connect the cable.
 2. Position the speed control cable and install the plastic clip.



G03432085

Fig. 37: Connecting Speed Control Cable
Courtesy of FORD MOTOR CO.

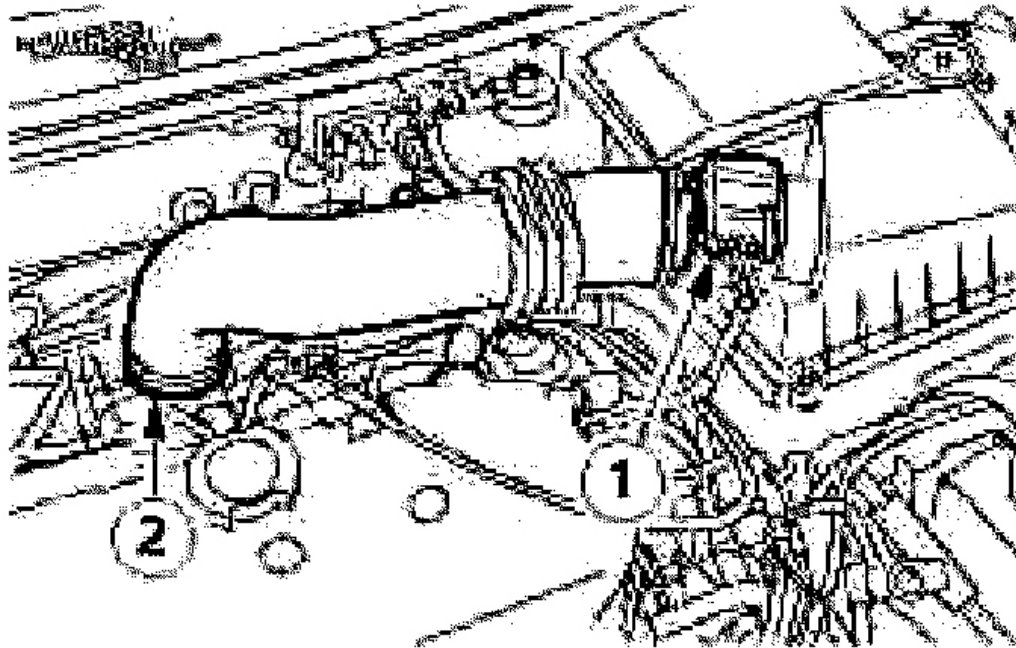
19. Connect the accelerator cable.
 1. Connect the cable.
 2. Position the accelerator cable and install the plastic clip.



G03432086

Fig. 38: Connecting Accelerator Cable
Courtesy of FORD MOTOR CO.

20. Install the air cleaner housing.
 1. Connect the MAF sensor electrical connector.
 2. Connect the air cleaner outlet hose.
 - Install the air cleaner housing into the rubber bushing.



G03432087

Fig. 39: Connecting MAF Sensor Electrical Connector
Courtesy of FORD MOTOR CO.



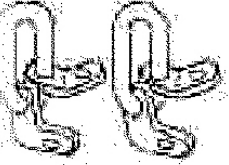
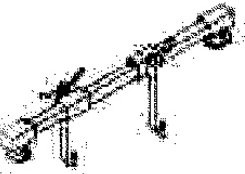

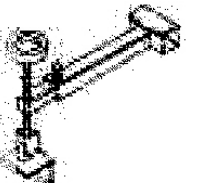
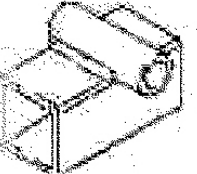
21. Connect the battery ground cable .

CRANKSHAFT FRONT SEAL

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine, 2.0L SPI - Focus

	Oil Pump Seal Replacer 303-164 (T81P-6700 -A)
	Seal Remover 303-409 (T92C-6700 -CH)
	Lifting Bracket, Engine 303-050 (T70P-6000)
	Support Bar, Engine 303-290A
	Adaptor for 303-290A 303-290-01
	Adaptor for 303-290A 303-290-03A
	Adaptor for 303-290A 303-290-02

2002 Ford Focus LX

2002 ENGINE Engine, 2.0L SPI - Focus

Fig. 40: Identifying Special Tools
Courtesy of FORD MOTOR CO.

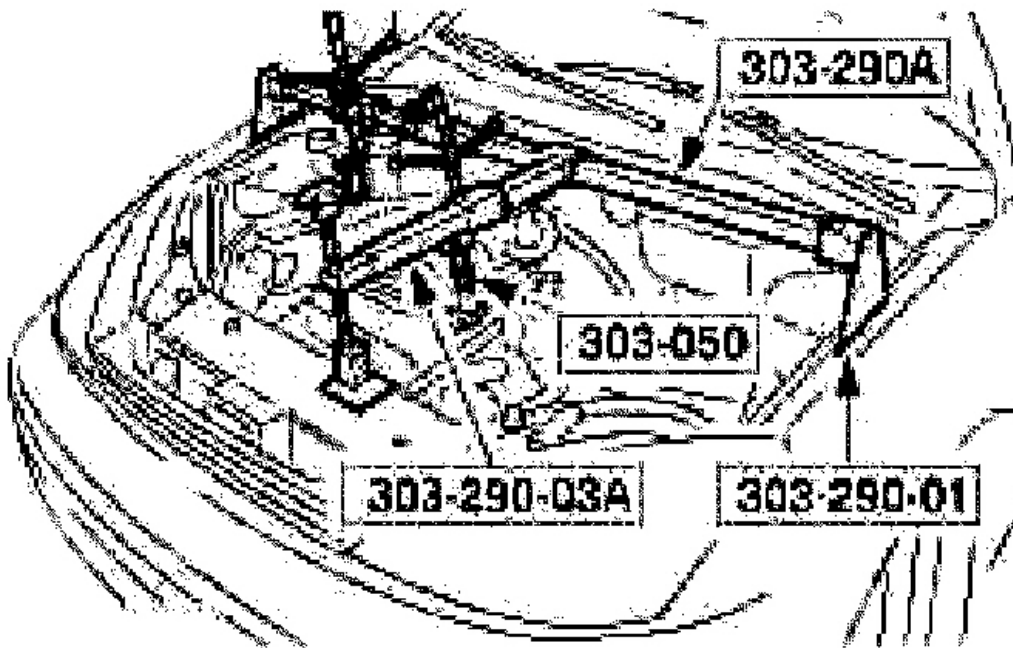
Material

MATERIAL SPECIFICATION

Engine oil	WSS-M2C153-H
------------	--------------

Removal

1. Remove the timing belt. For additional information, refer to **TIMING BELT**.
2. Using the special tools, support the engine.

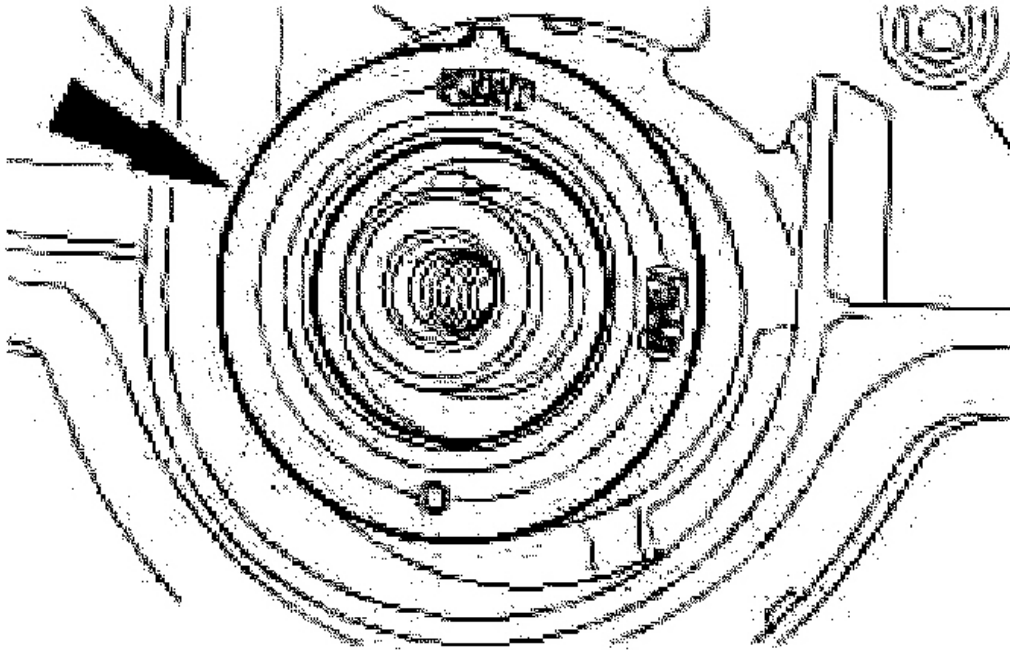


G03432089

Fig. 41: Supporting Engine Using Special Tool
Courtesy of FORD MOTOR CO.

3. Remove the jack.
4. Raise and support the vehicle.

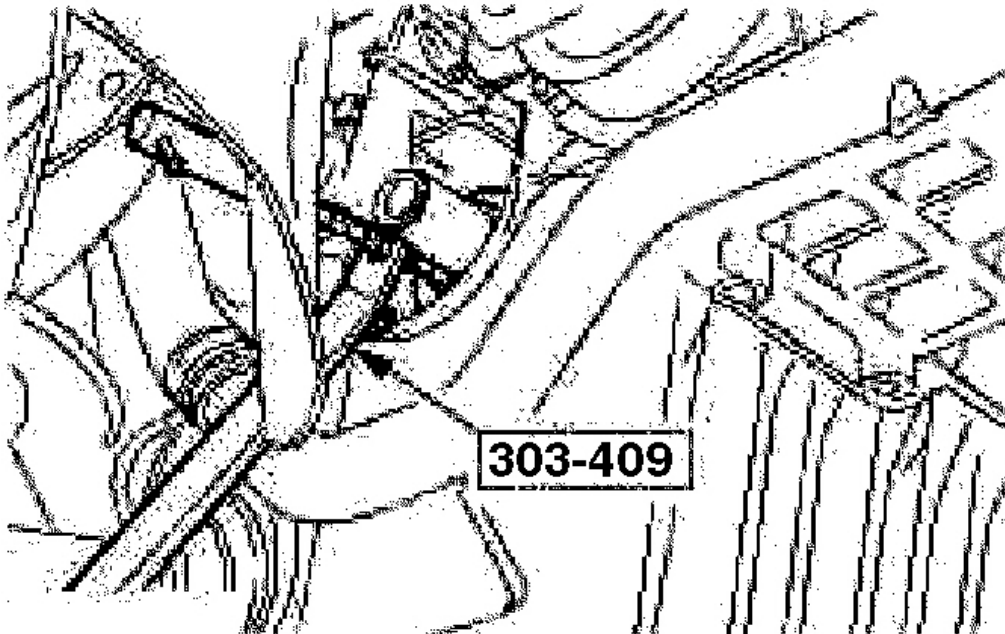
5. Remove the crankshaft timing belt pulley.



G03432090

Fig. 42: Removing Crankshaft Timing Belt Pulley
Courtesy of FORD MOTOR CO.

NOTE: Do not damage the crankshaft surface.



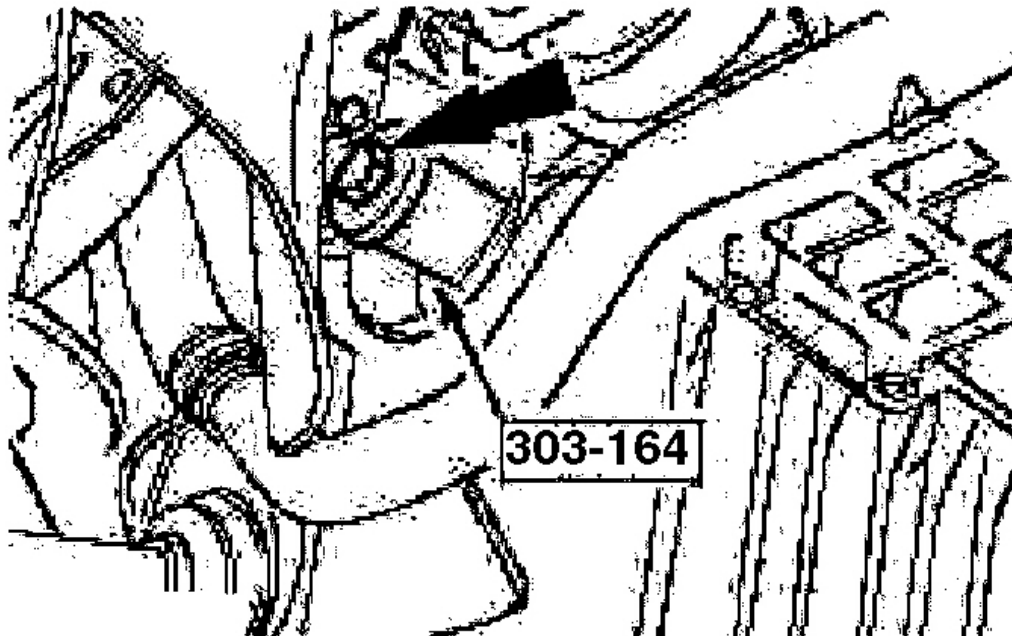
G03432091

Fig. 43: Removing Crankshaft Front Oil Seal
Courtesy of FORD MOTOR CO.

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

Installation

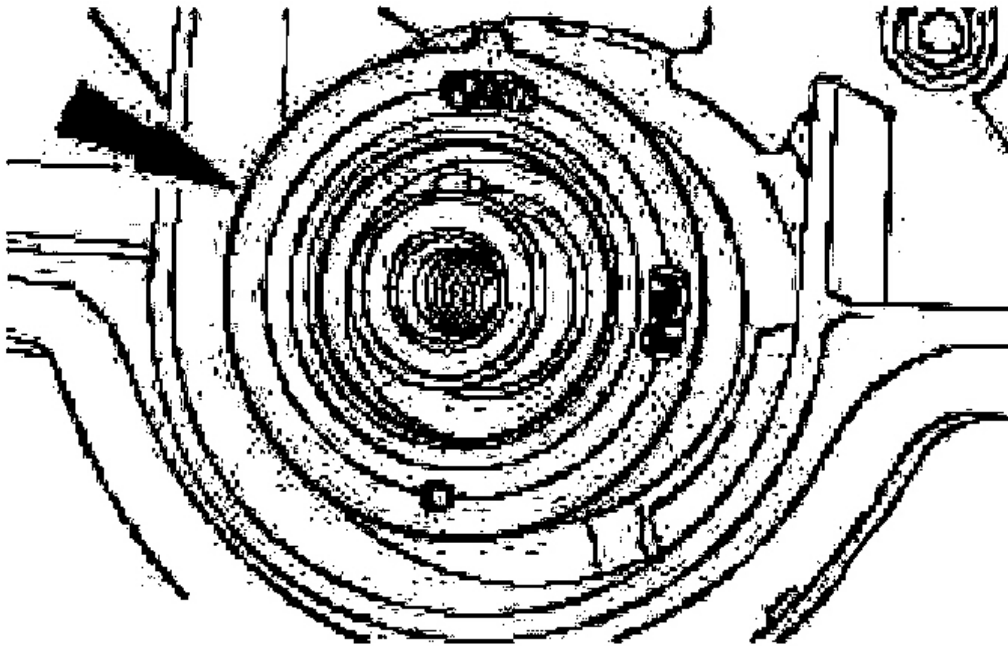
1. Using the special tool, install a new crankshaft oil seal.
 - Lubricate the crankshaft and crankshaft oil seal lip with engine oil.



G03432092

Fig. 44: Installing New Crankshaft Front Oil Seal
Courtesy of FORD MOTOR CO.

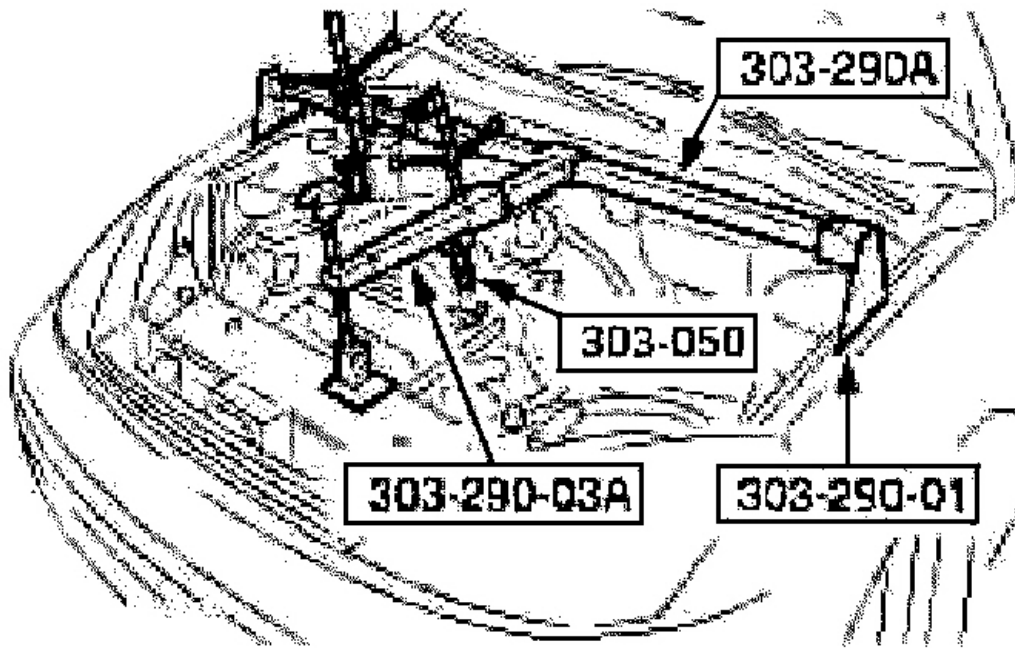
2. Install the crankshaft timing belt pulley.



G03432093

Fig. 45: Installing Crankshaft Timing Belt Pulley
Courtesy of FORD MOTOR CO.

3. Lower the vehicle.
4. Place the jack under the oil pan and raise slowly until the special tool 303-290 is free from strain.
5. Remove the special tools.



G03432094

Fig. 46: Removing Special Tools
Courtesy of FORD MOTOR CO.

6. Install the timing belt. For additional information, refer to **TIMING BELT** .

VALVE SPRINGS

Special Tool(s)



G03432095

Fig. 47: Identifying Special Tool
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

Cable ties	A969-M1C17-AA
Silicone grease	

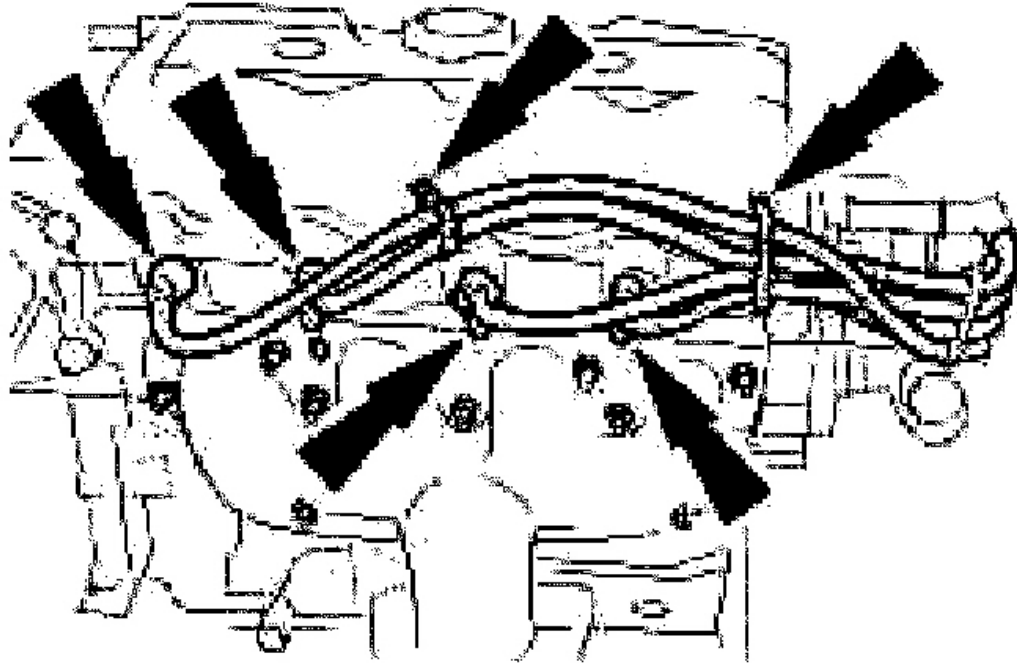
Removal

1. Disconnect the battery ground cable

CAUTION: Do not pull on the cable when removing the spark plug connector. If necessary remove the ignition coil plug to avoid bending the cable. Turn the spark plug connector slightly before removing to loosen the gasket.

CAUTION: Pull off the spark plug connector in a straight movement.

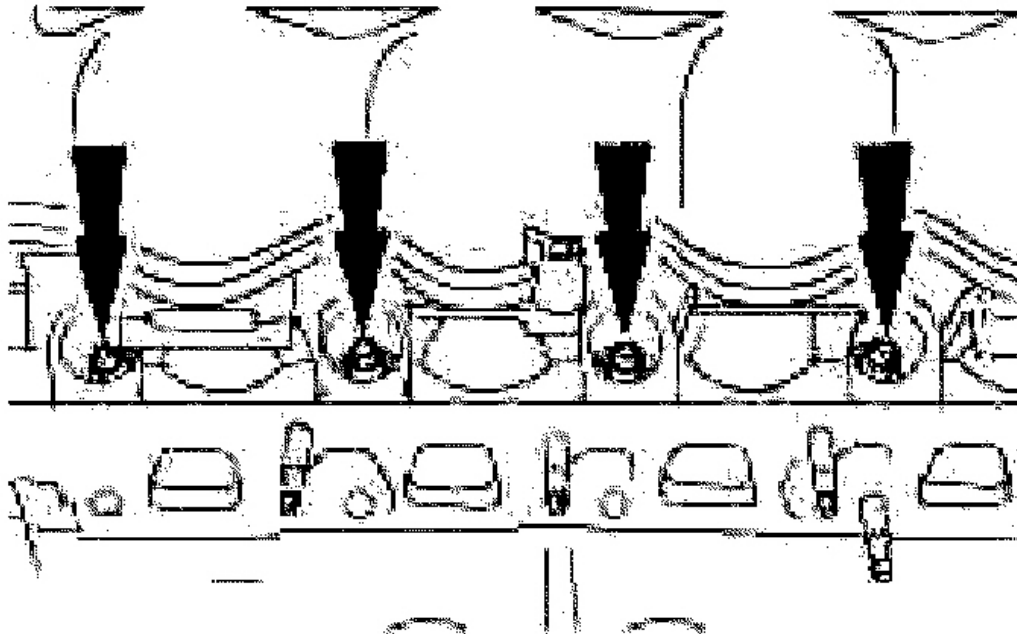
2. Disconnect the ignition wires from the spark plugs.
 - Remove the two ignition wire separators from the valve cover.



G03432096

Fig. 48: Disconnecting Ignition Wires From Spark Plugs
Courtesy of FORD MOTOR CO.

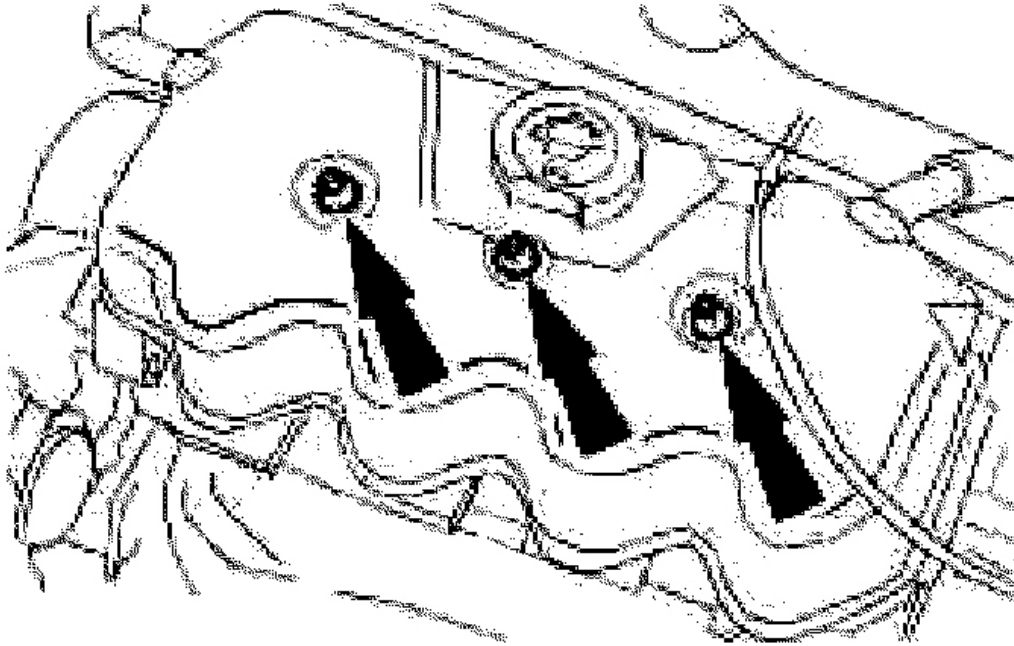
NOTE: If an original spark plug is reused, install it in the same cylinder from which it was removed. New spark plugs may be installed in any cylinder.



G03432097

Fig. 49: Removing Spark Plugs
Courtesy of FORD MOTOR CO.

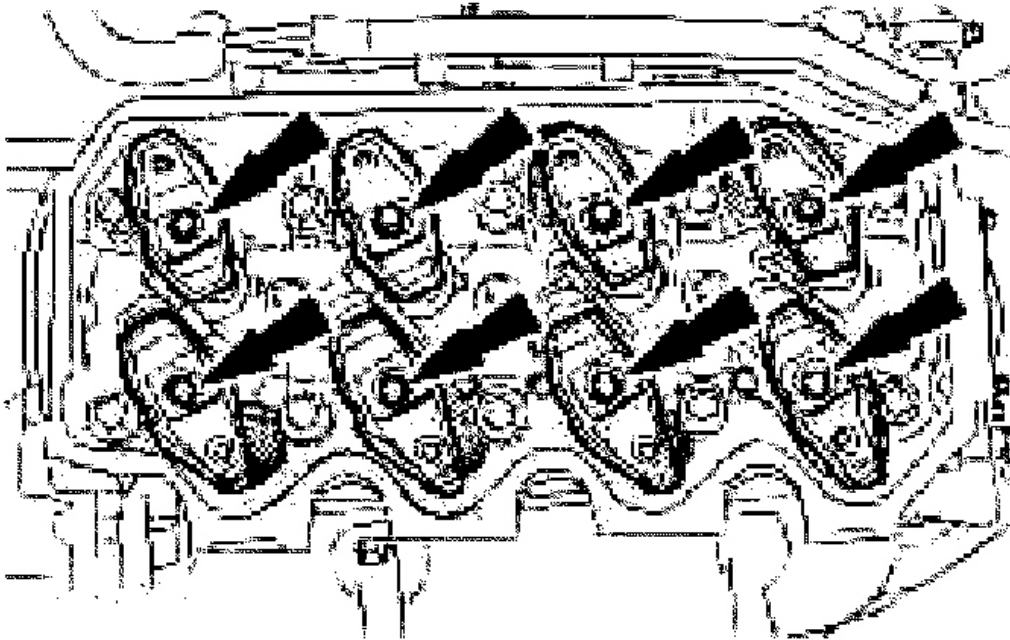
3. Remove the spark plugs.
4. Remove the valve cover.



G03432098

Fig. 50: Removing Valve Cover
Courtesy of FORD MOTOR CO.

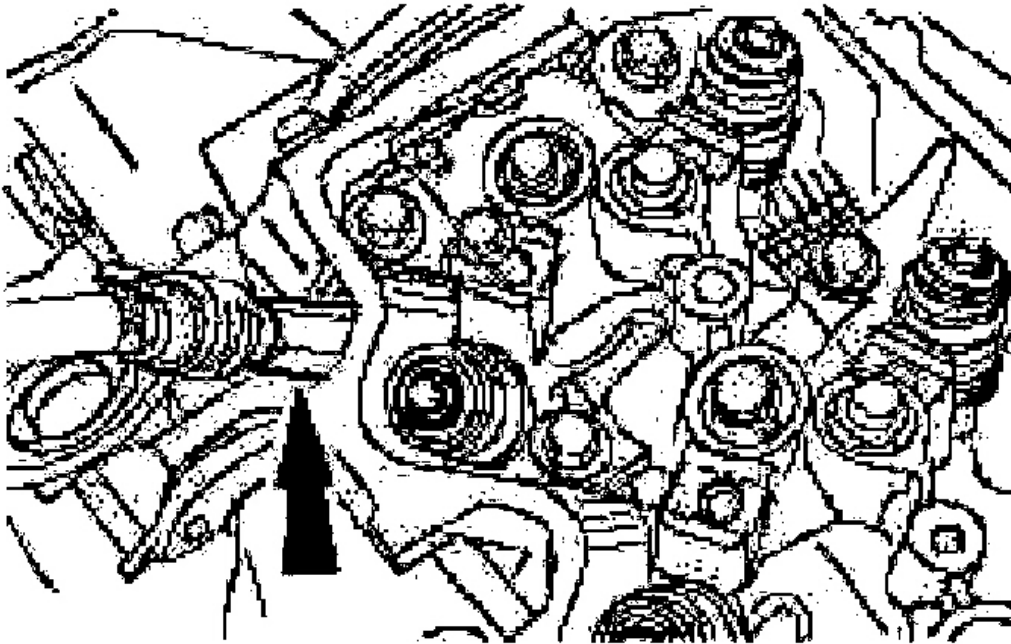
5. Remove the rocker arms.



G03432099

Fig. 51: Removing Rocker Arms
Courtesy of FORD MOTOR CO.

NOTE: Bring the affected piston to top dead center (TDC) to prevent the valves from falling into the cylinder if air pressure is interrupted.

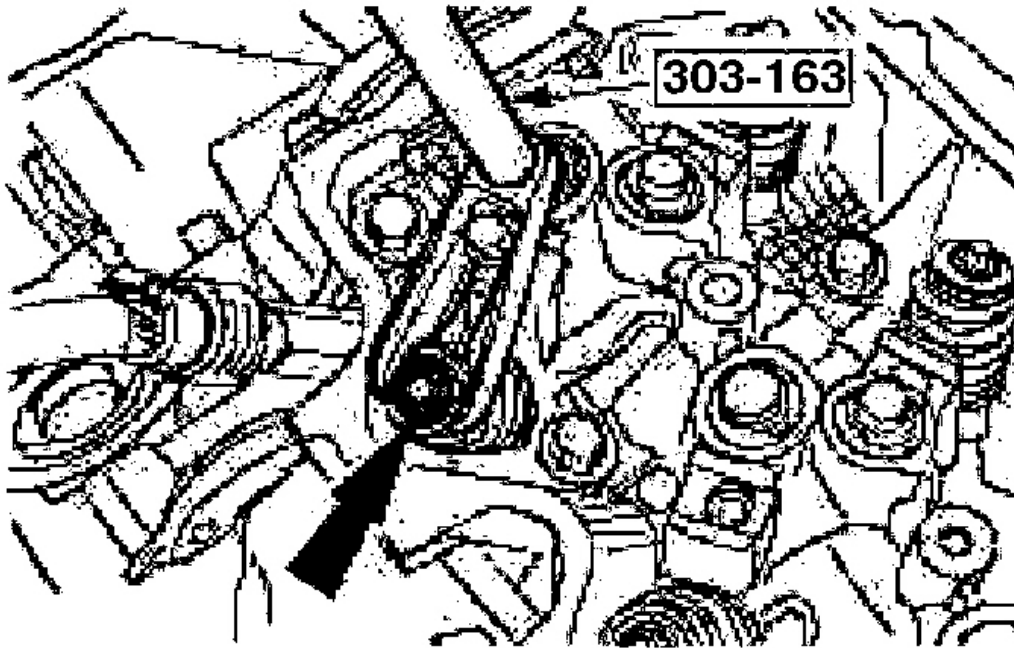


G03432100

Fig. 52: Installing Adaptor
Courtesy of FORD MOTOR CO.

6. Install an adaptor and apply 965 kPa of air pressure to hold the valve shut.

NOTE: **Keep the components in order for reassembly.**



G03432101

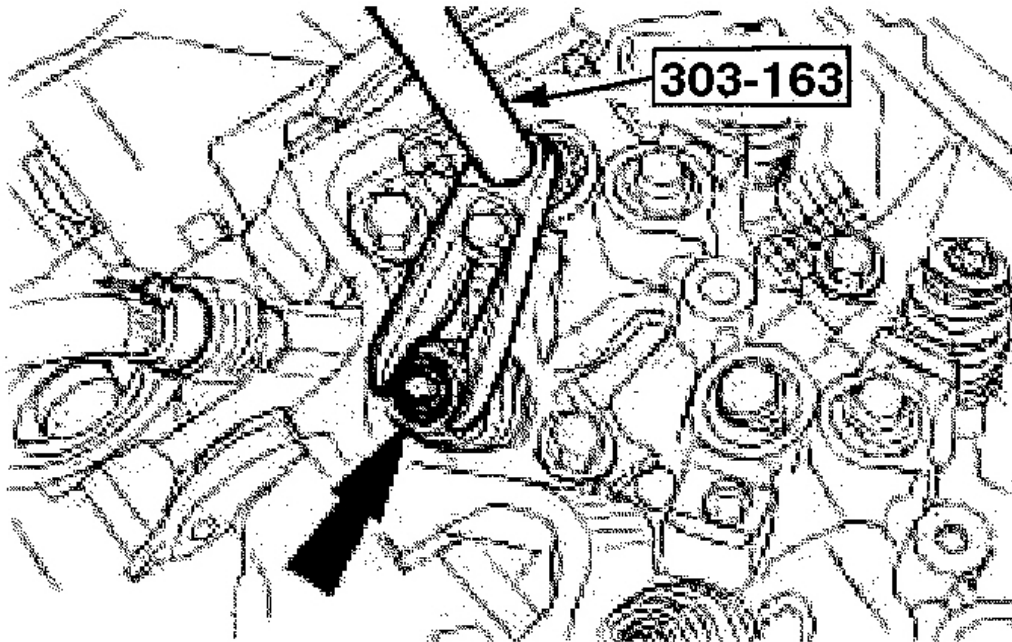
Fig. 53: Compressing Valve Spring And Removing Valve Spring Retainer Key And Valve Spring

Courtesy of FORD MOTOR CO.

7. Using the special tool to compress the valve spring and remove the valve spring retainer key and the valve spring.

Installation

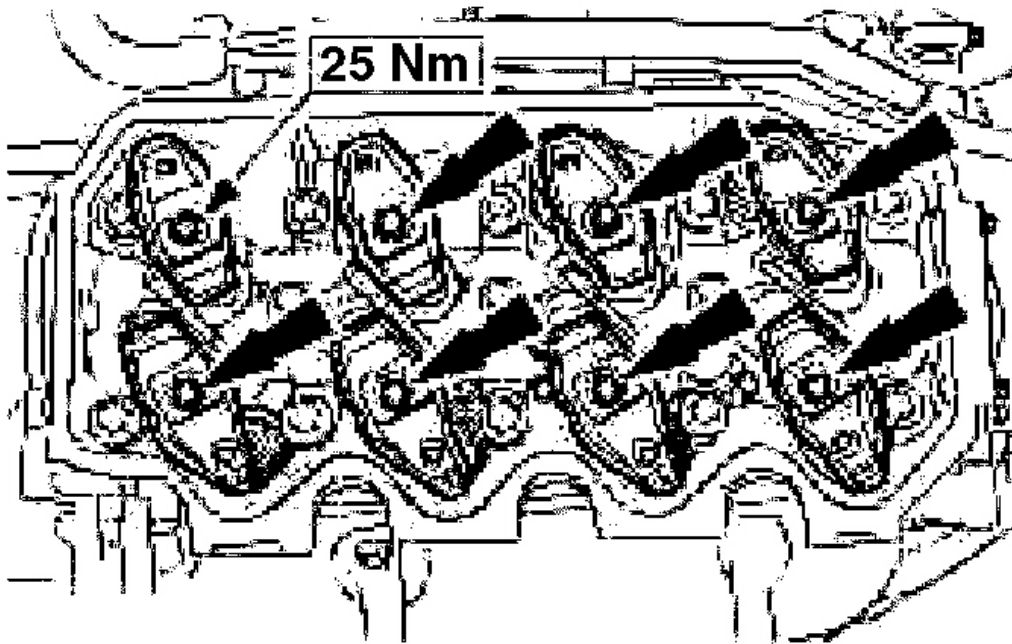
1. Use the special tool to compress the valve spring and install the valve spring retainer.



G03432102

Fig. 54: Compressing Valve Spring And Installing Valve Spring Retainer
Courtesy of FORD MOTOR CO.

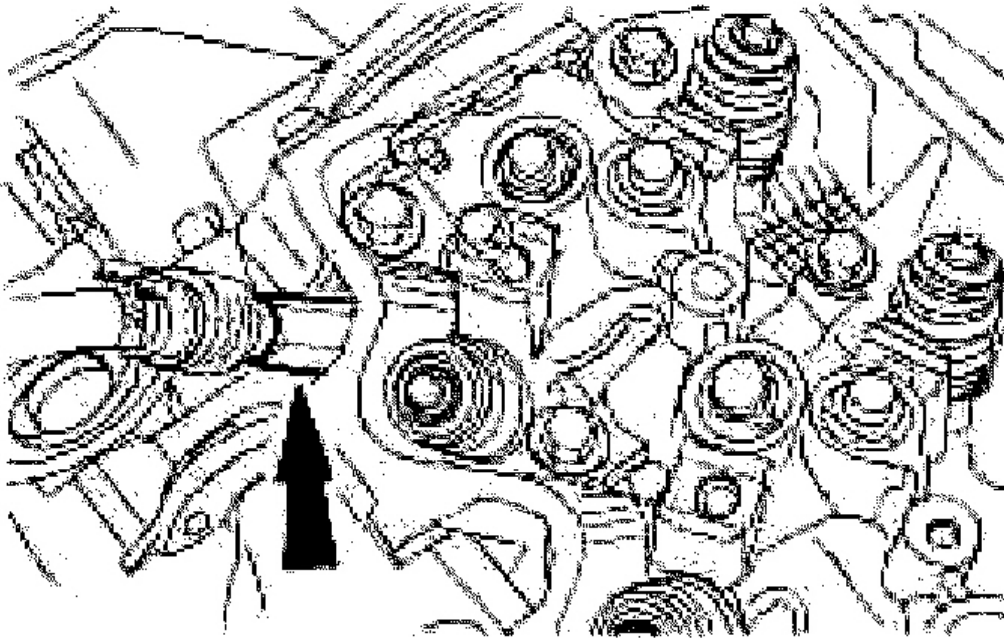
NOTE: Check that the rocker guides are sitting correctly.



G03432103

Fig. 55: Installing Rocker Arms
Courtesy of FORD MOTOR CO.

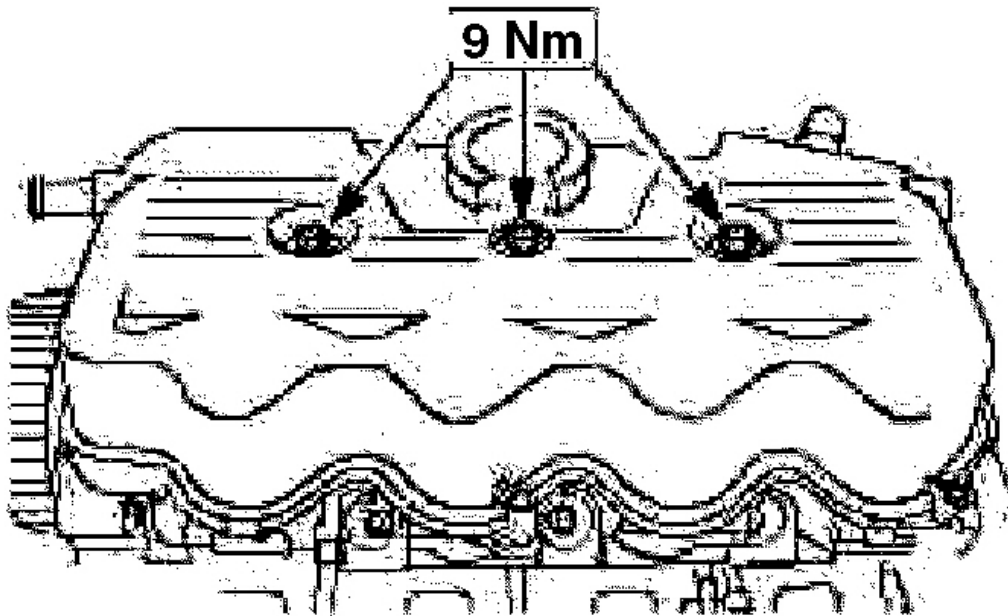
2. Install the rocker arms.
3. Remove the adaptor.



G03432104

Fig. 56: Removing Adaptor
Courtesy of FORD MOTOR CO.

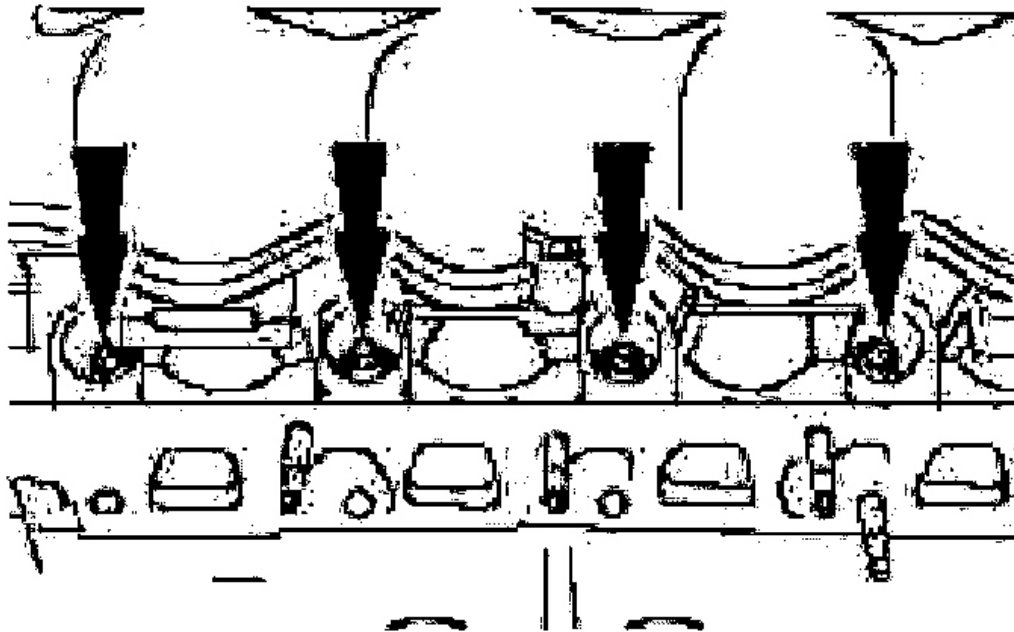
4. Install the valve cover.



G03432105

Fig. 57: Installing Valve Cover
Courtesy of FORD MOTOR CO.

5. Install the spark plugs (shown with engine removed).
 - Apply lubricant to the spark plug thread.



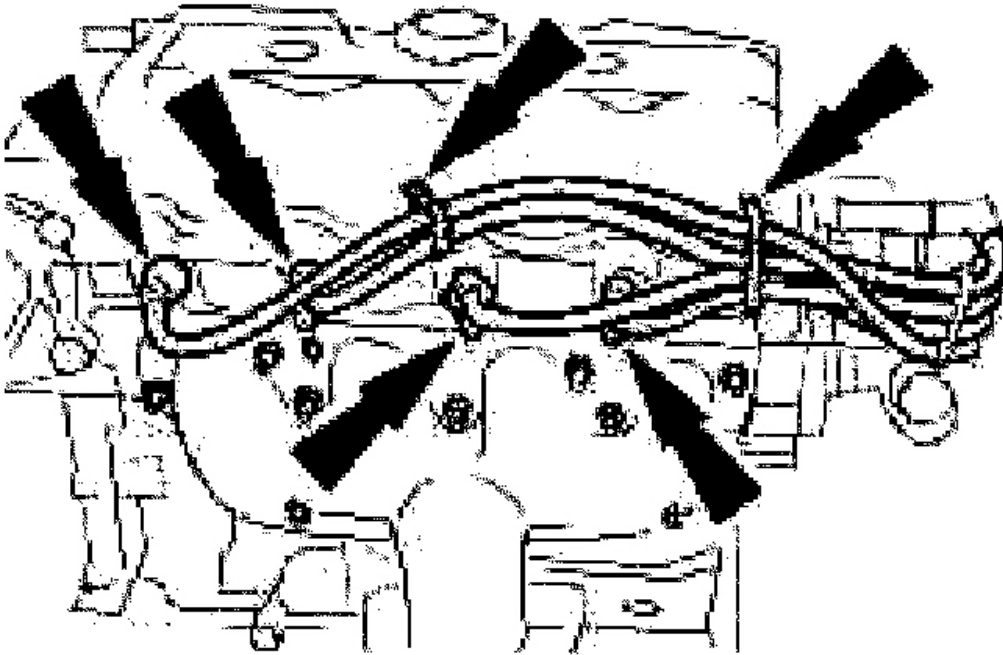
G03432106

Fig. 58: Installing Spark Plugs
Courtesy of FORD MOTOR CO.

CAUTION: Use a blunt object (plastic cable tie) to apply the silicone grease, to avoid damaging the spark plug connector seal.

CAUTION: Push on the spark plug connector in a straight movement.

NOTE: Coat the inside of the spark plug connector with silicone grease to a depth of 5-10 mm.



G03432107

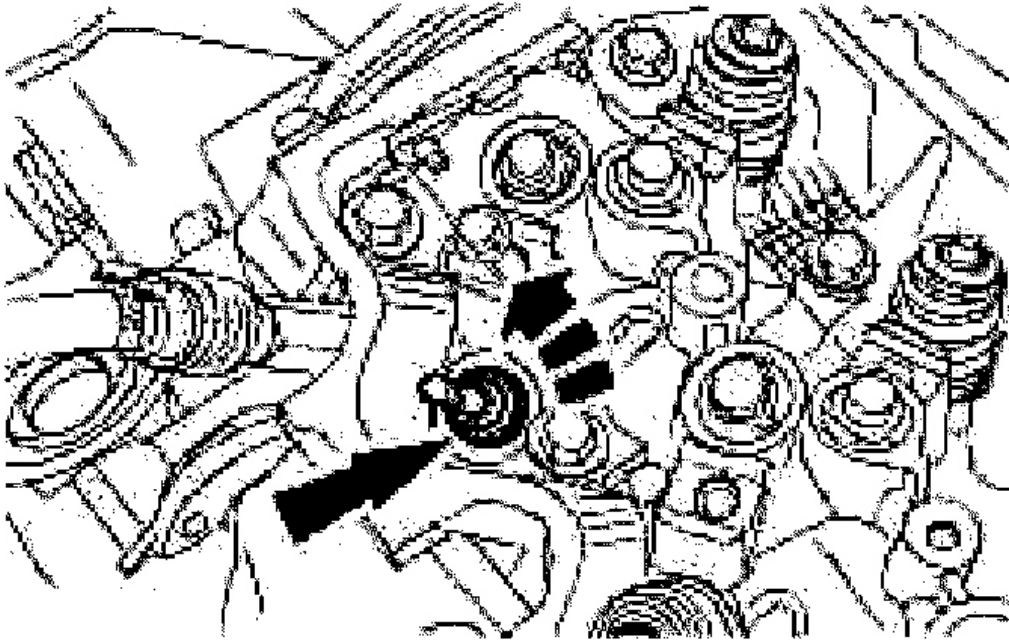
Fig. 59: Connecting Spark Plug Connector
Courtesy of FORD MOTOR CO.

6. Push on the spark plug connector until it engages.
7. Connect the battery ground cable .

VALVE SEALS

Removal

1. Remove the valve springs. For additional information, refer to **VALVE SPRINGS** .
2. Remove and discard the valve stem seal.

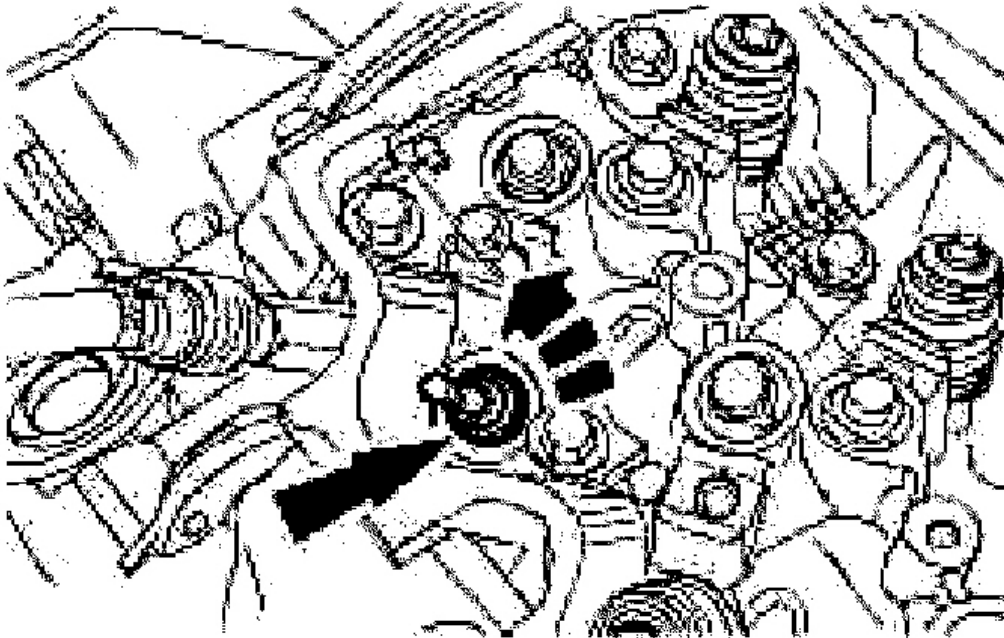


G03432108

Fig. 60: Removing Valve Stem Seal
Courtesy of FORD MOTOR CO.

Installation

1. Install the valve stem seal.



G03432109

Fig. 61: Installing Valve Stem Seal
Courtesy of FORD MOTOR CO.

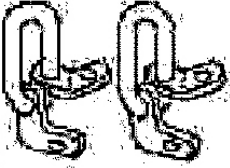


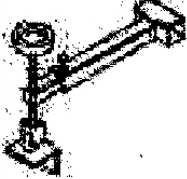
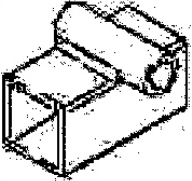
2. Install the valve springs. For additional information, refer to **VALVE SPRINGS** .

CAMSHAFT

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine, 2.0L SPI - Focus

	Lifting Bracket, Engine 303-050 (T70P-6000)
	Support Bar, Engine 303-290A
	Adapter for 303-290A 303-290-01
	Adapter for 303-290A 303-290-03A
	Adapter for 303-290A 303-290-02

G03432110

Fig. 62: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

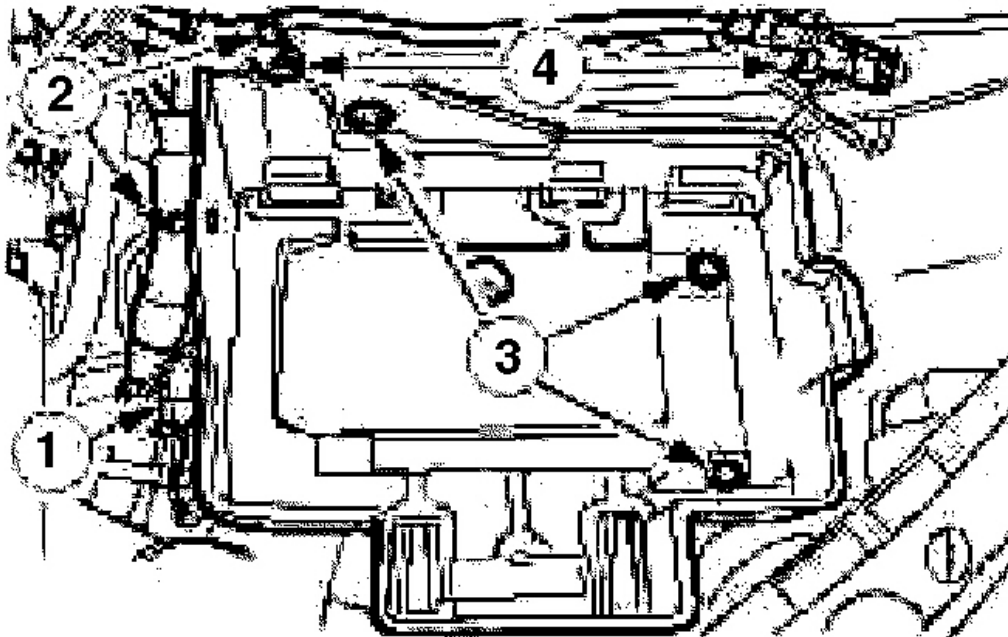
SAE 5W -20 Premium Synthetic Blend Motor Oil XO -5W20-QSP (in

Canada Motorcraft SAE 5W-20 Super Premium Motor Oil CX0-5W20-LSP12) or equivalent

WSSM2C930-A

Removal

1. Remove the battery.).
2. Remove the battery tray and detach the ground cable.
 1. Unclip and disconnect the electrical connector.
 2. Unclip the wiring harness.
 3. Remove the bolts.
 4. Detach the positive and negative cables.

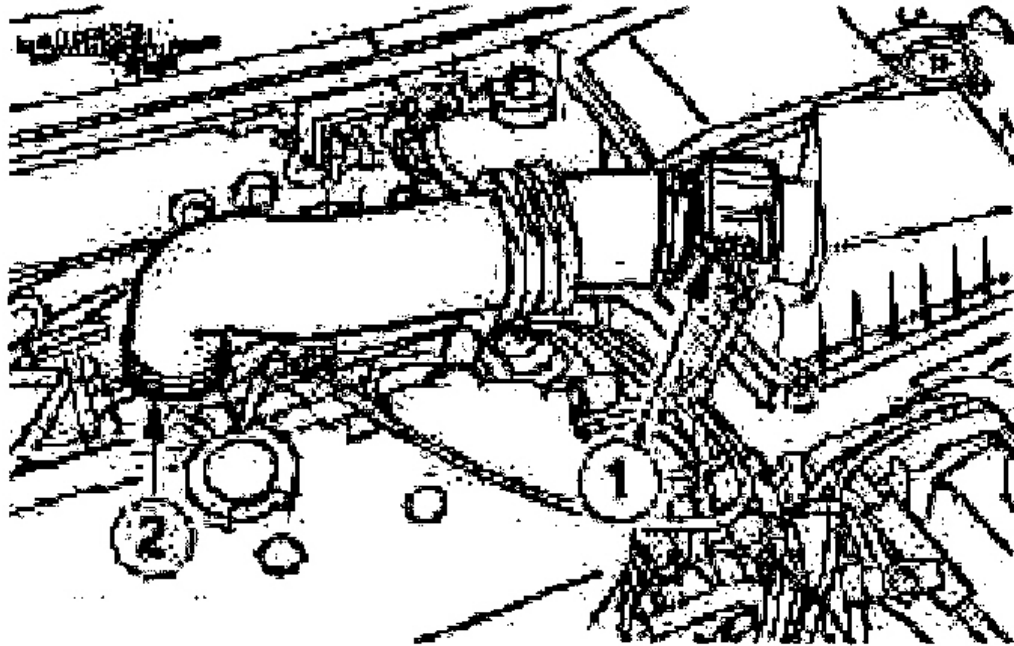


G03432111

Fig. 63: Removing Battery Tray And Detaching Ground Cable
Courtesy of FORD MOTOR CO.

3. Remove the air cleaner housing.
 1. Disconnect the mass air flow (MAF) sensor electrical connector.

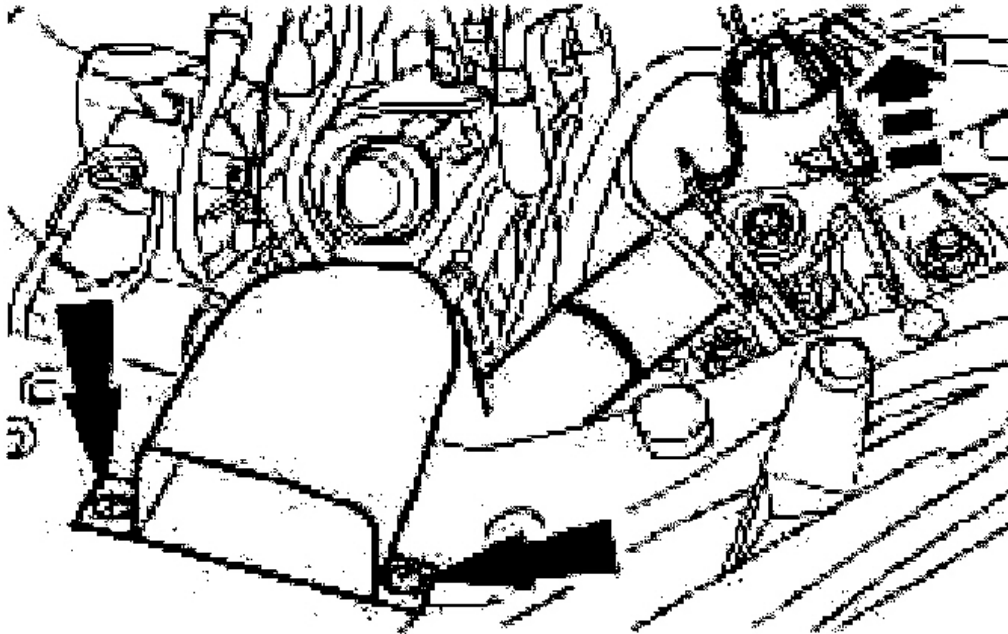
2. Detach the air cleaner outlet pipe.
 - Remove the air cleaner housing from the rubber bushing.



G03432112

Fig. 64: Disconnecting Mass Air Flow (MAF) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

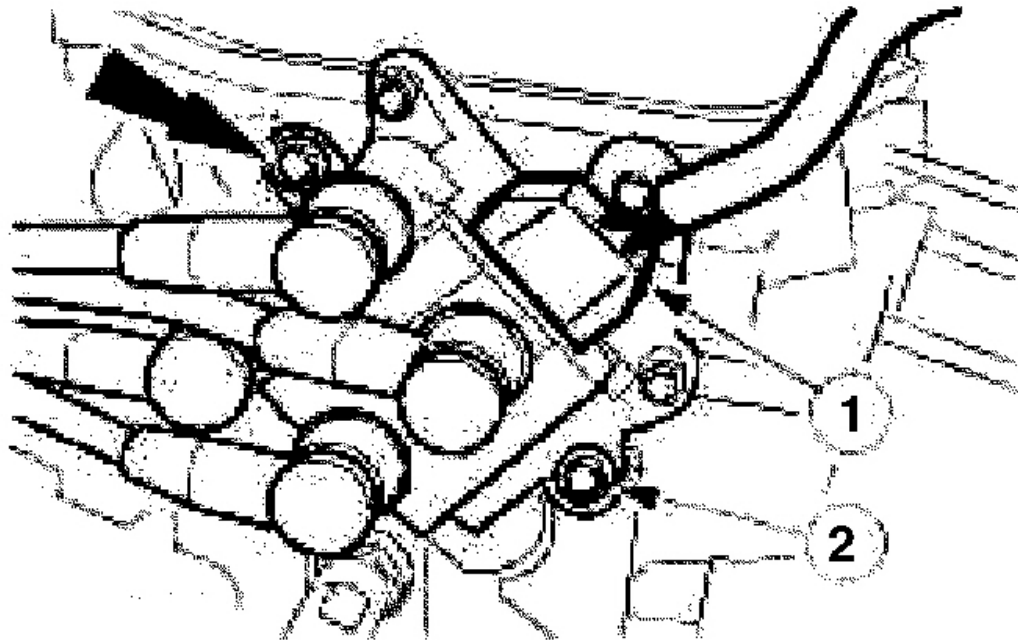
4. Remove the air cleaner intake pipe.



G03432113

Fig. 65: Removing Air Cleaner Intake Pipe
Courtesy of FORD MOTOR CO.

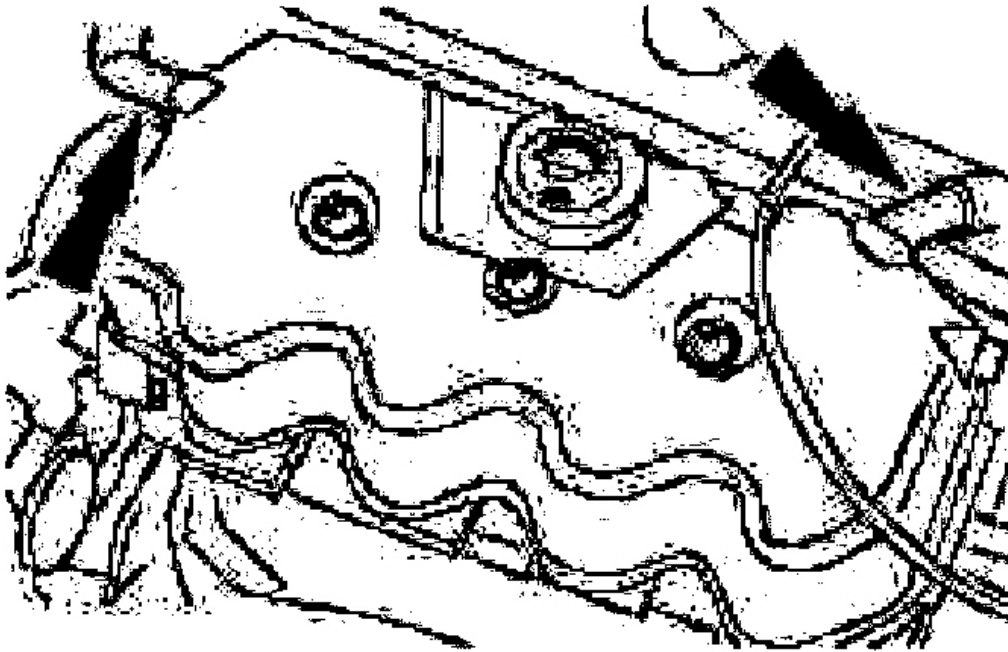
5. Remove the electrical ignition (EI) coil.
 1. Disconnect the electrical connector.
 2. Remove the bolts and position the EI coil.



G03432114

Fig. 66: Removing Electrical Ignition (EI) Coil
Courtesy of FORD MOTOR CO.

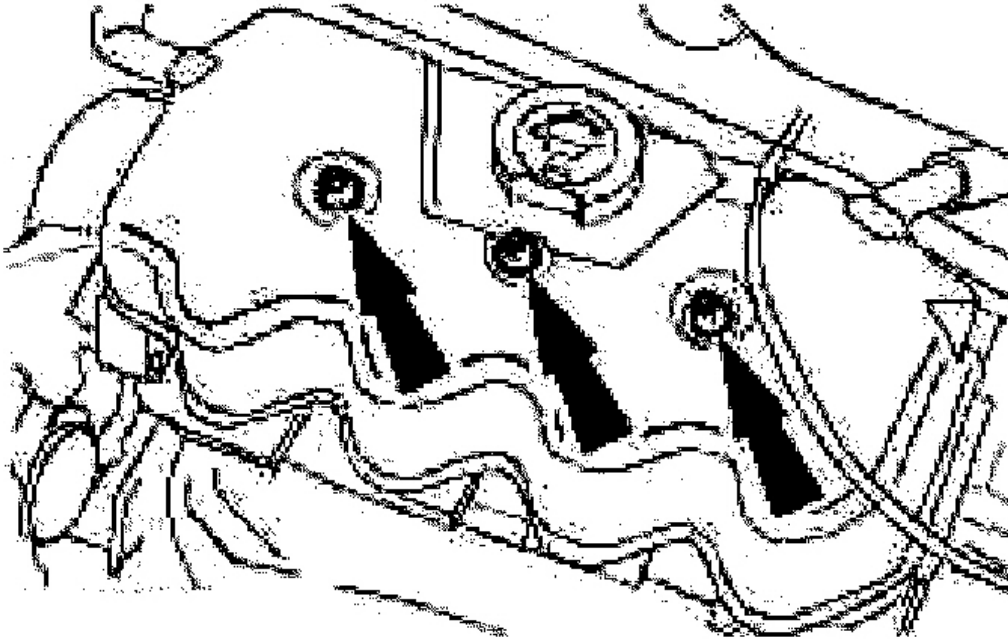
6. Disconnect the fresh air and positive crankcase ventilation hoses.



G03432115

Fig. 67: Removing Fresh Air And Positive Crankcase Ventilation Hoses
Courtesy of FORD MOTOR CO.

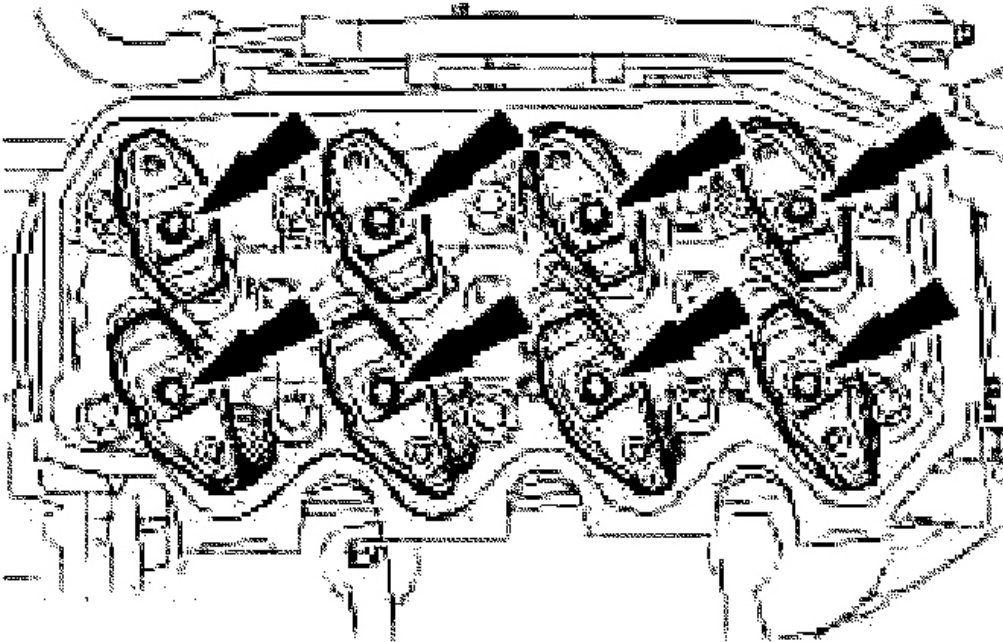
7. Remove the valve cover.



G03432116

Fig. 68: Removing Valve Cover
Courtesy of FORD MOTOR CO.

8. Remove the rocker arms.

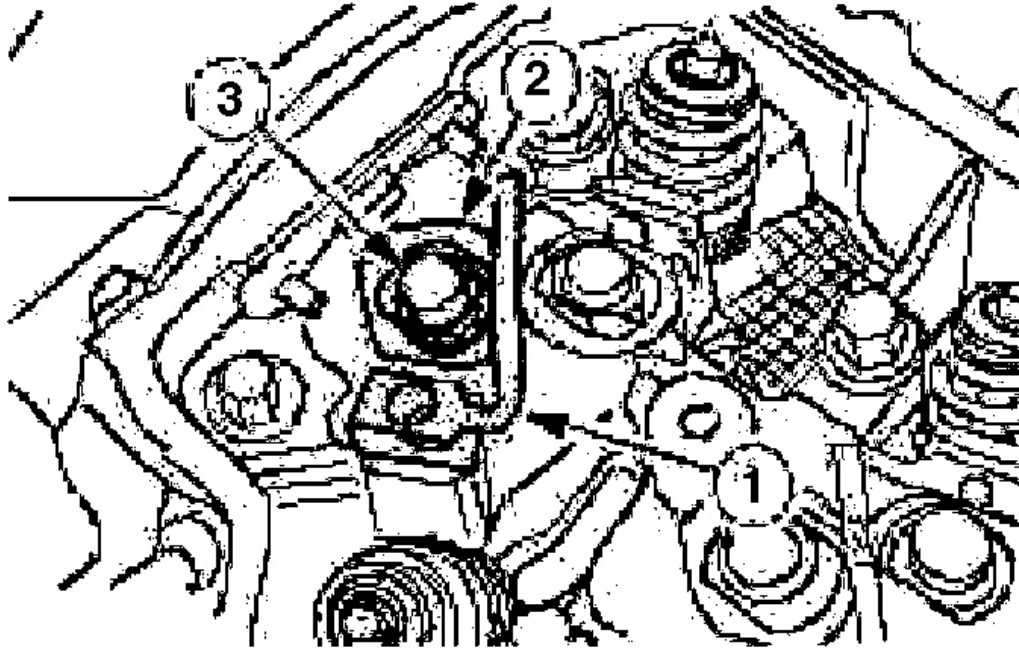


G03432117

Fig. 69: Removing Rocker Arms
Courtesy of FORD MOTOR CO.

NOTE: **Keep the valve tappets in order for reassembly.**

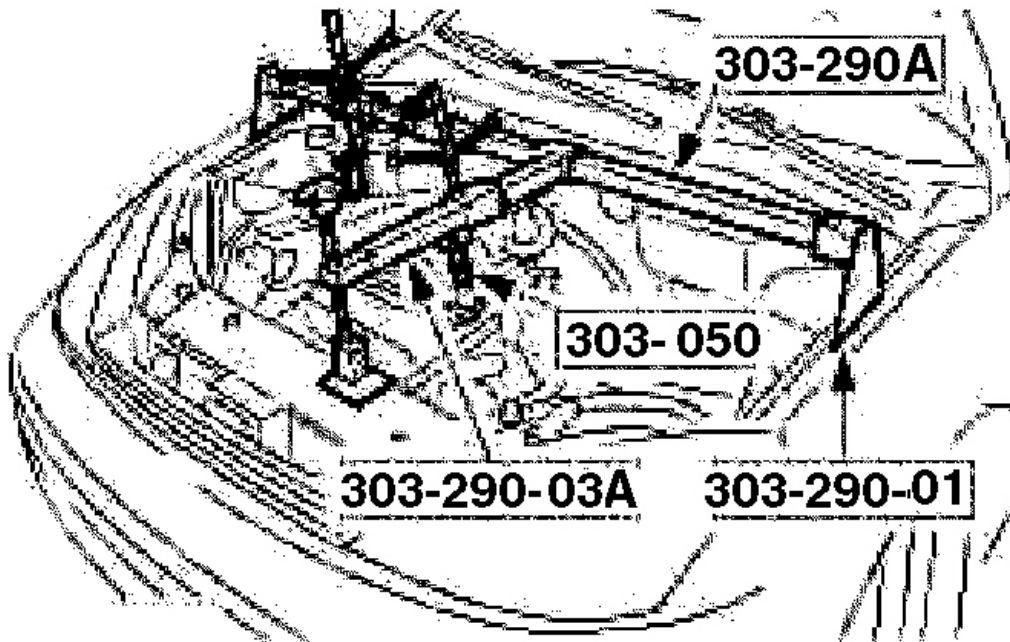
9. Remove the valve tappets.
 1. Remove the valve tappet guide plate retainers.
 2. Remove the valve tappet guide plates.
 3. Remove the valve tappets.



G03432118

Fig. 70: Removing Valve Tappets
Courtesy of FORD MOTOR CO.

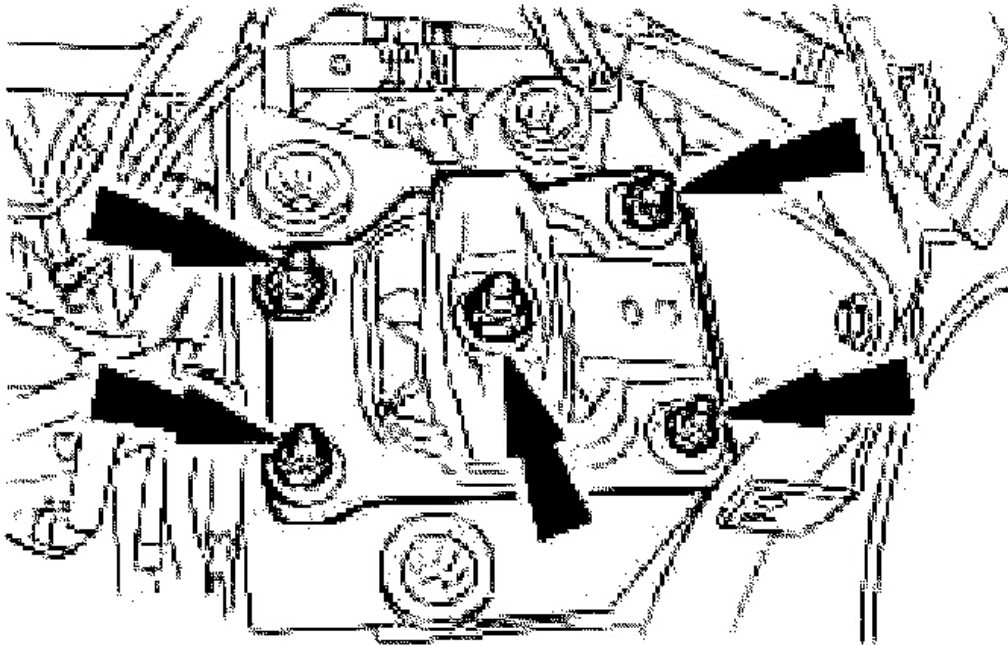
10. Remove the timing belt. For additional information, refer to **TIMING BELT** .
11. Remove the camshaft oil seal. For additional information, refer to **CAMSHAFT SEAL** .
12. Using the special tools, support the engine.



G03432119

Fig. 71: Supporting Engine Using Special Tools
Courtesy of FORD MOTOR CO.

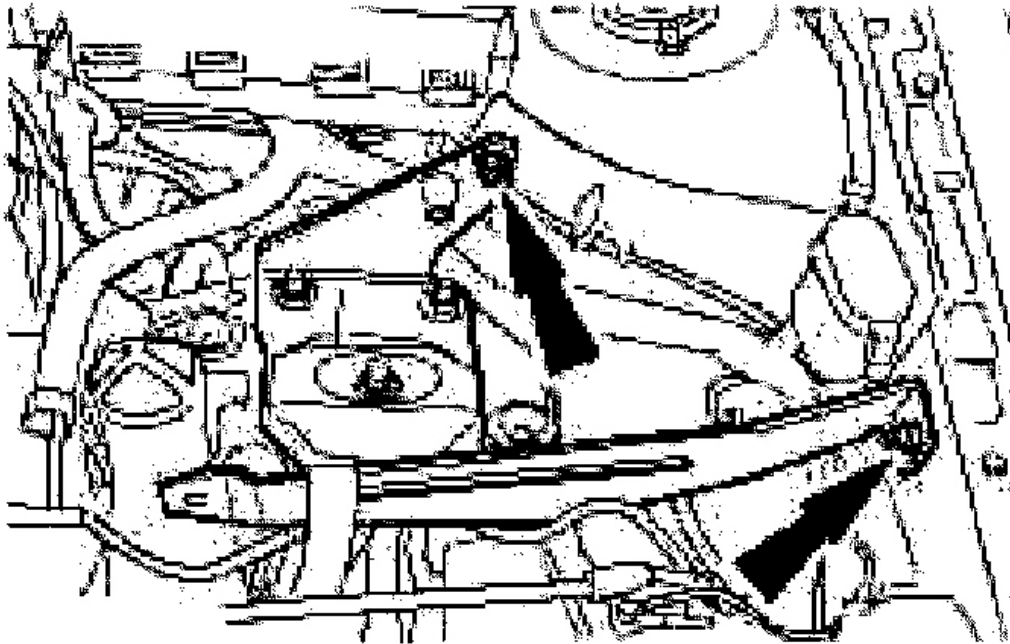
13. Remove the engine rear mounting.



G03432120

Fig. 72: Removing Engine Rear Mounting
Courtesy of FORD MOTOR CO.

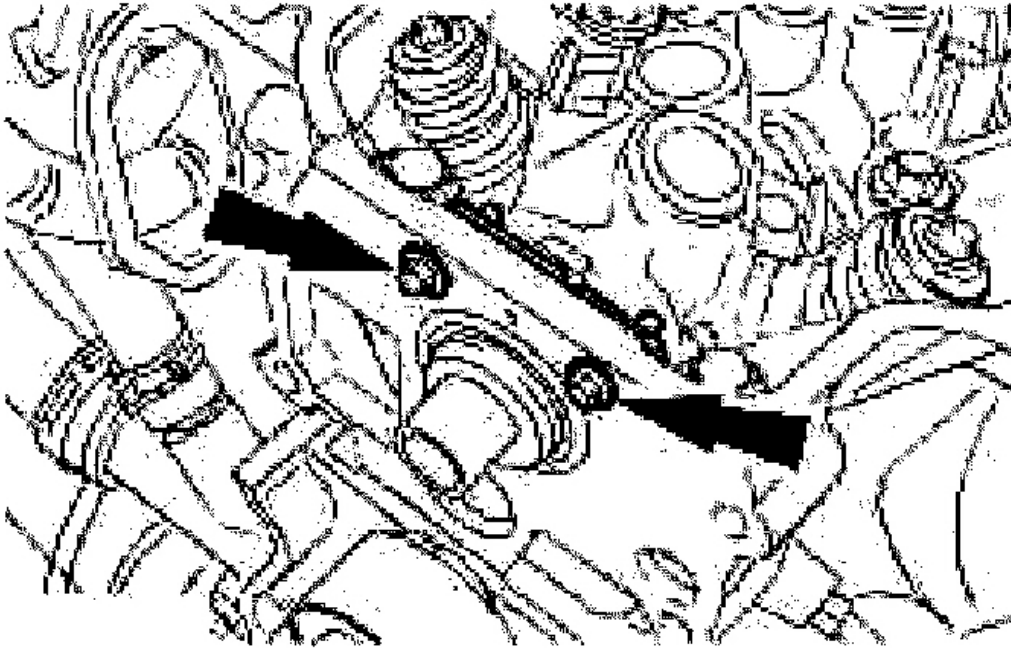
14. Detach the air cleaner housing bracket and position it to one side.



G03432121

Fig. 73: Detaching Air Cleaner Housing Bracket
Courtesy of FORD MOTOR CO.

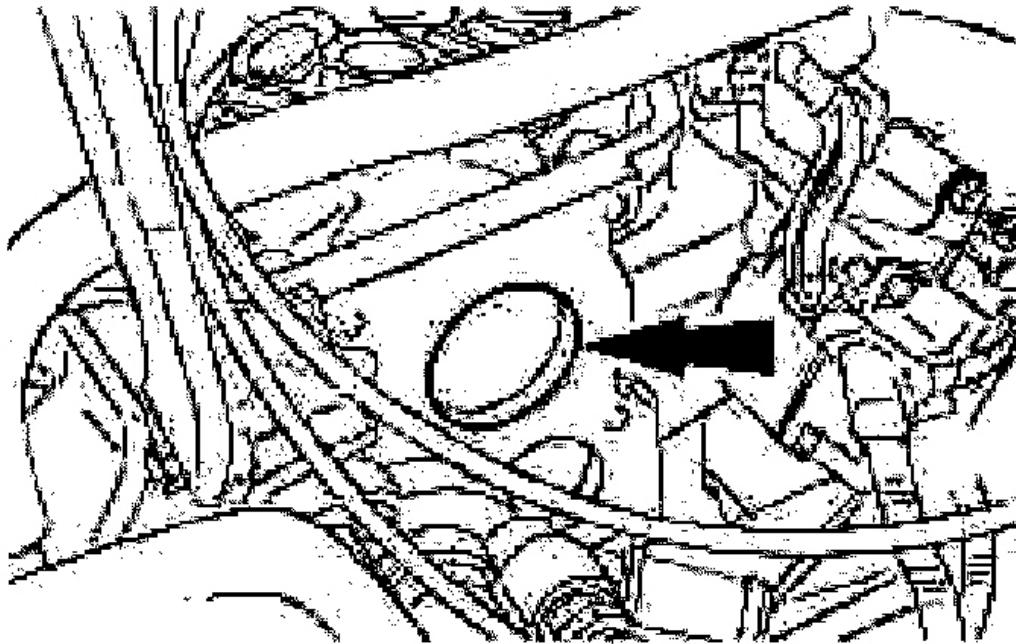
15. Remove the camshaft thrust plate.



G03432122

Fig. 74: Removing Camshaft Thrust Plate
Courtesy of FORD MOTOR CO.

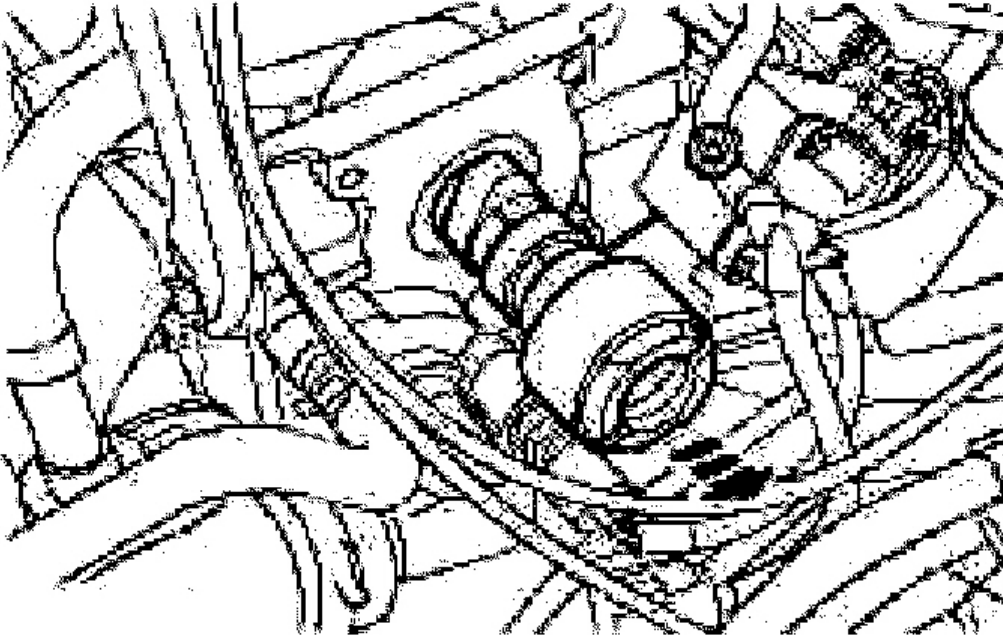
16. Remove and discard the blanking plug from the rear of the cylinder head.



G03432123

Fig. 75: Removing Blanking Plug From Rear Of Cylinder Head
Courtesy of FORD MOTOR CO.

17. Remove the camshaft from the rear of the cylinder head.

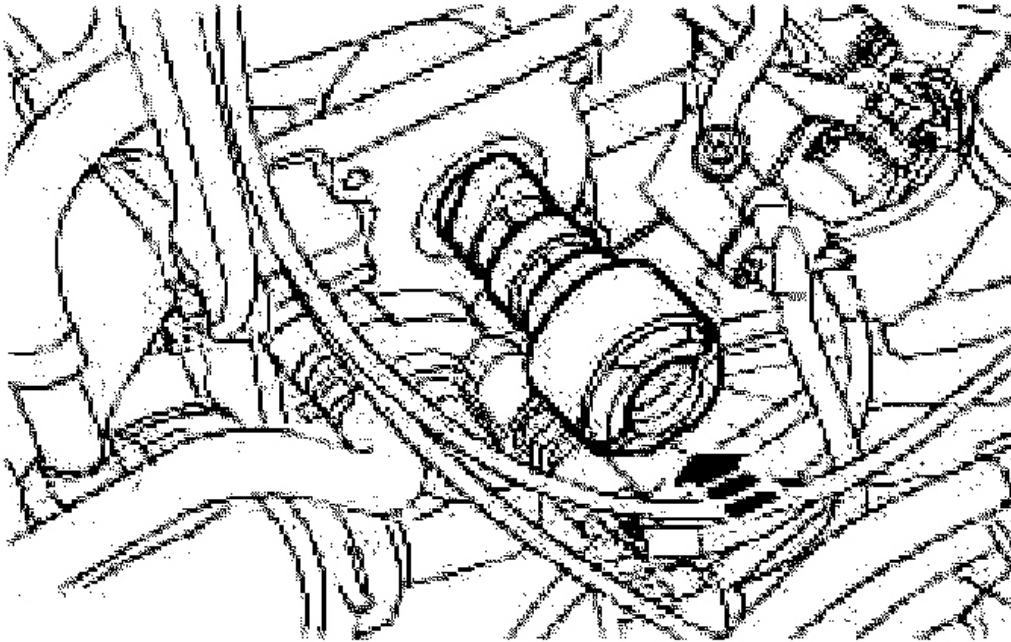


G03432124

Fig. 76: Removing Camshaft From Rear Of Cylinder Head
Courtesy of FORD MOTOR CO.

Installation

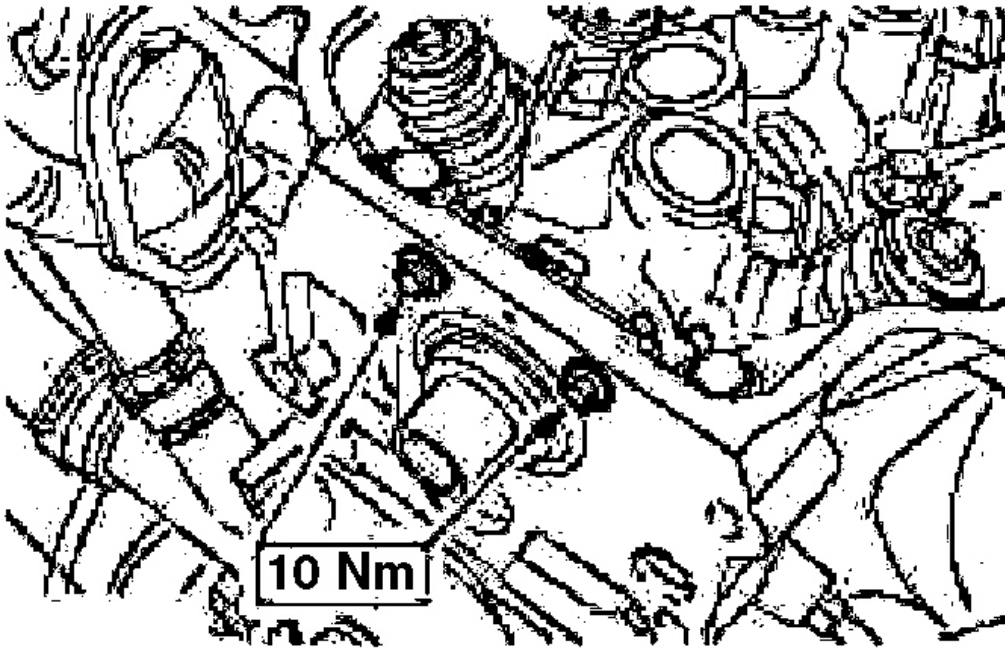
NOTE: Coat the cylinder head cam bore with clean engine oil prior to camshaft installation.



G03432125

Fig. 77: Installing Camshaft Through Rear Of Cylinder Head
Courtesy of FORD MOTOR CO.

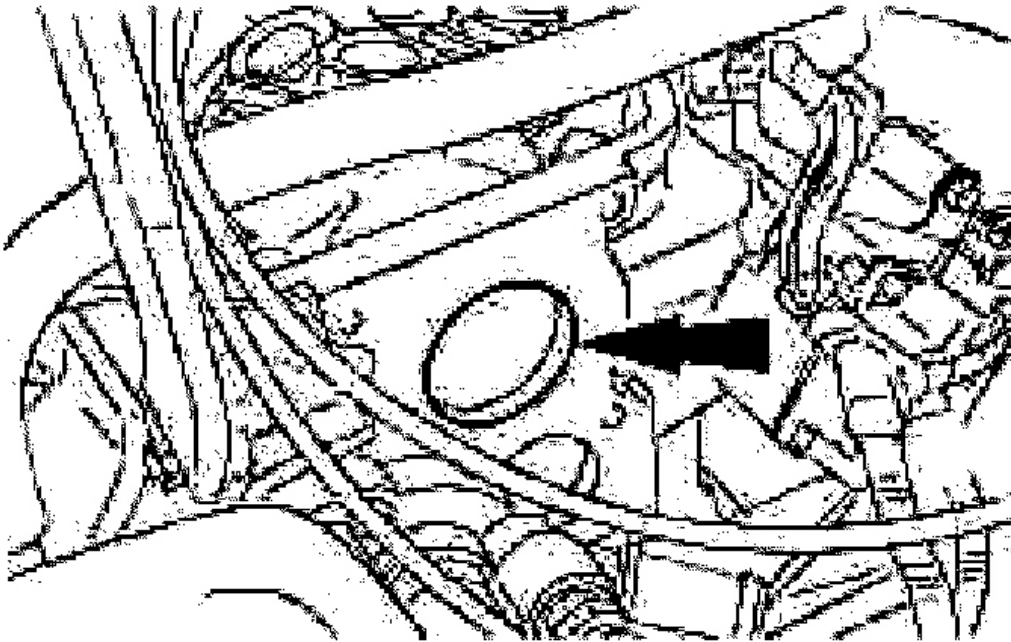
1. Install the camshaft through the rear of the cylinder head.
2. Install the camshaft thrust plate.



G03432126

Fig. 78: Installing Camshaft Thrust Plate
Courtesy of FORD MOTOR CO.

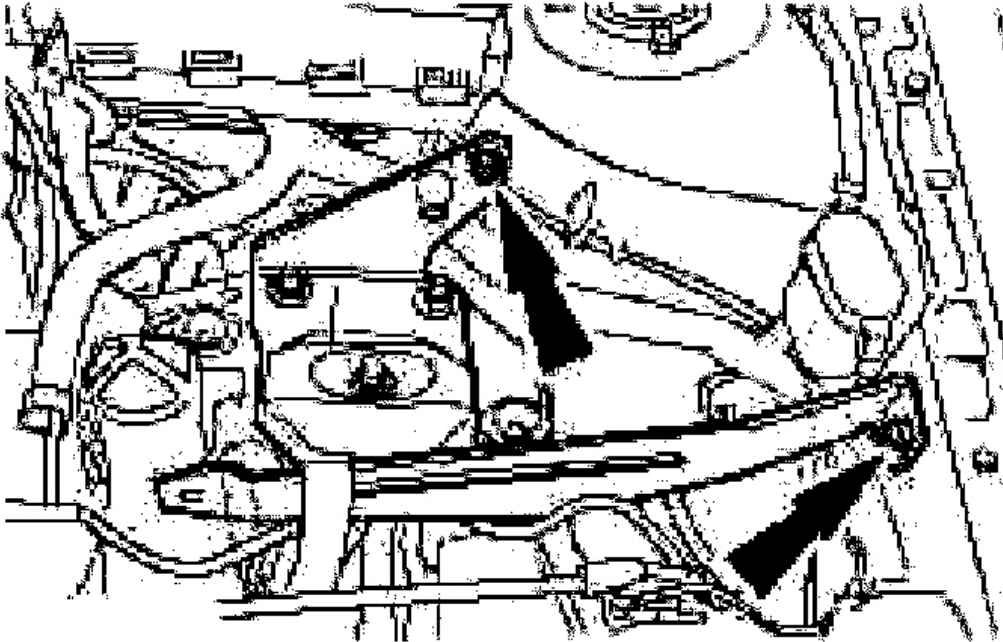
3. Install a new camshaft oil seal. For additional information, refer to **CAMSHAFT SEAL** .
4. Install a new blanking plug with sealer.



G03432127

Fig. 79: Installing New Blanking Plug With Sealer
Courtesy of FORD MOTOR CO.

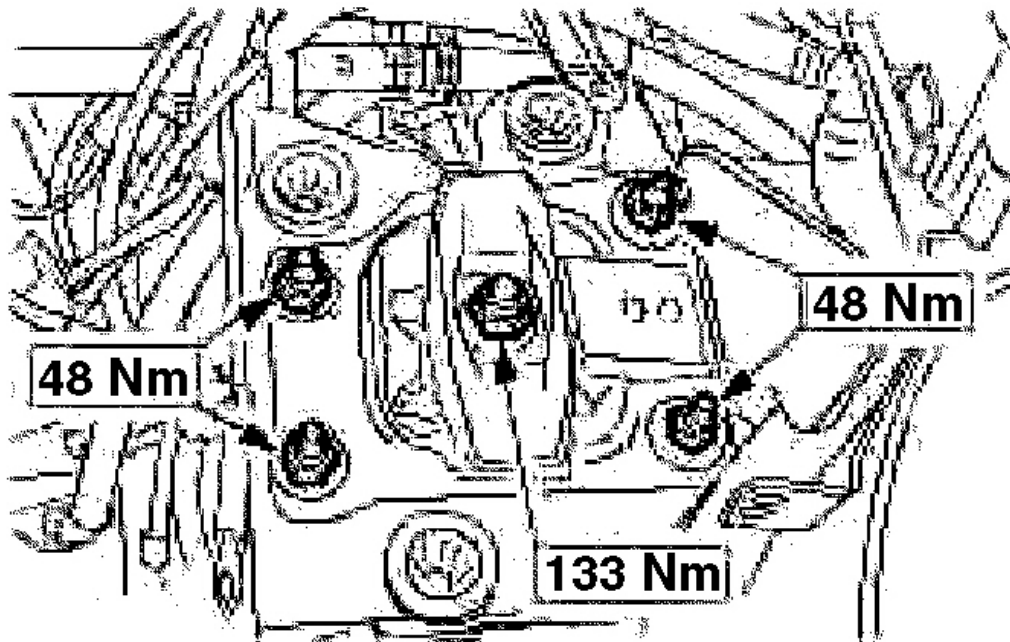
5. Attach the air cleaner housing bracket.



G03432128

Fig. 80: Attaching Air Cleaner Housing Bracket
Courtesy of FORD MOTOR CO.

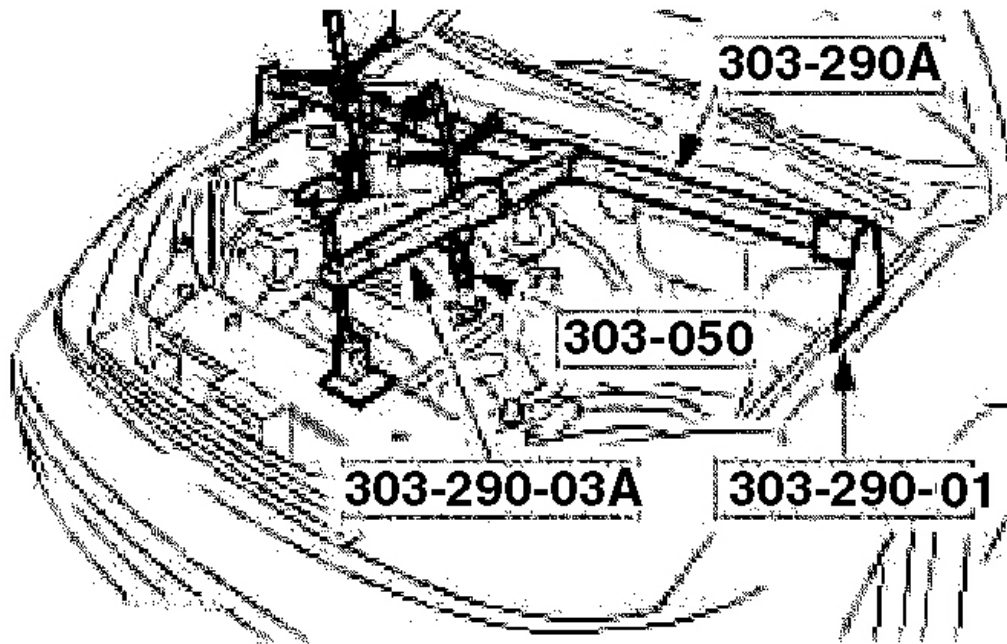
6. Install the engine rear mounting.



G03432129

Fig. 81: Installing Engine Rear Mounting
Courtesy of FORD MOTOR CO.

7. Lower the engine.
8. Remove the special tools.



G03432130

Fig. 82: Removing Special Tools
Courtesy of FORD MOTOR CO.

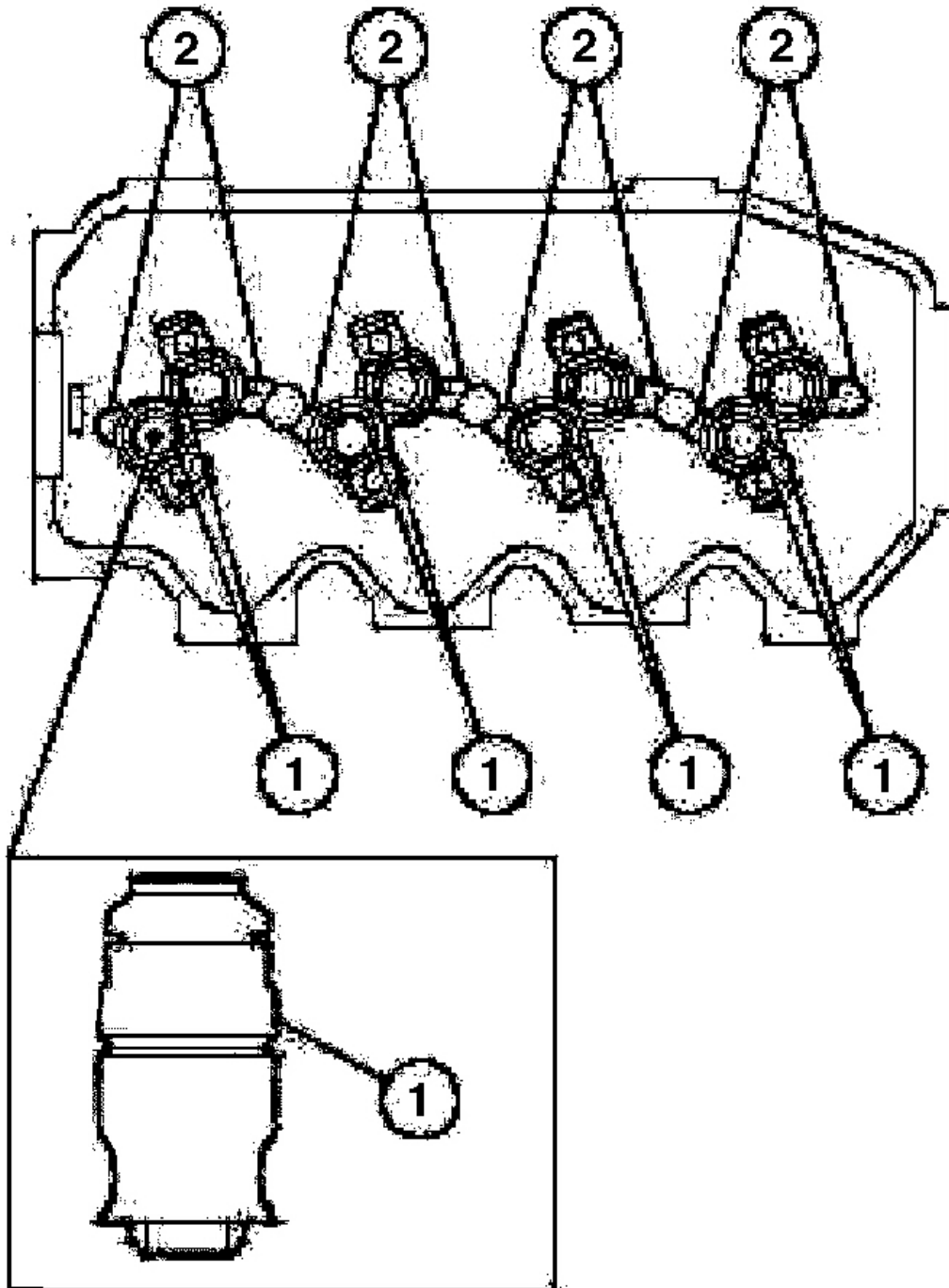
9. Install the timing belt. For additional information, refer to **TIMING BELT** .

CAUTION: The oil feed hole in the valve tappet must face away from the oil feed hole in the cylinder head bore.

NOTE: Coat the valve tappets and cylinder head bores with a suitable engine assembly lubricant.

2002 Ford Focus LX

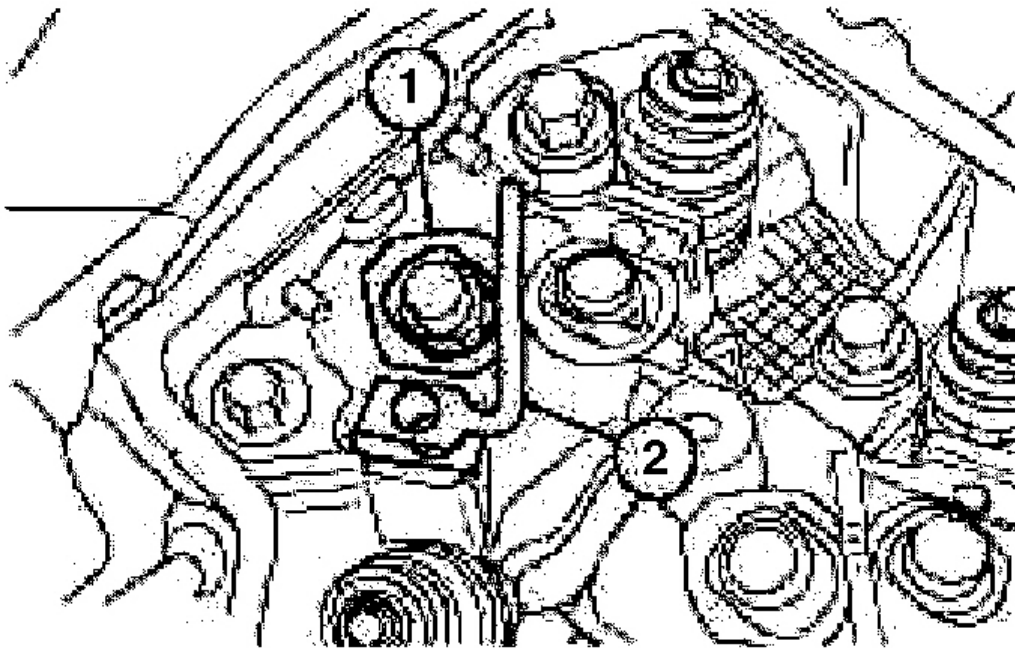
2002 ENGINE Engine, 2.0L SPI - Focus



G03432131

Fig. 83: Installing Valve Tappets Into Cylinder Head Bores
Courtesy of FORD MOTOR CO.

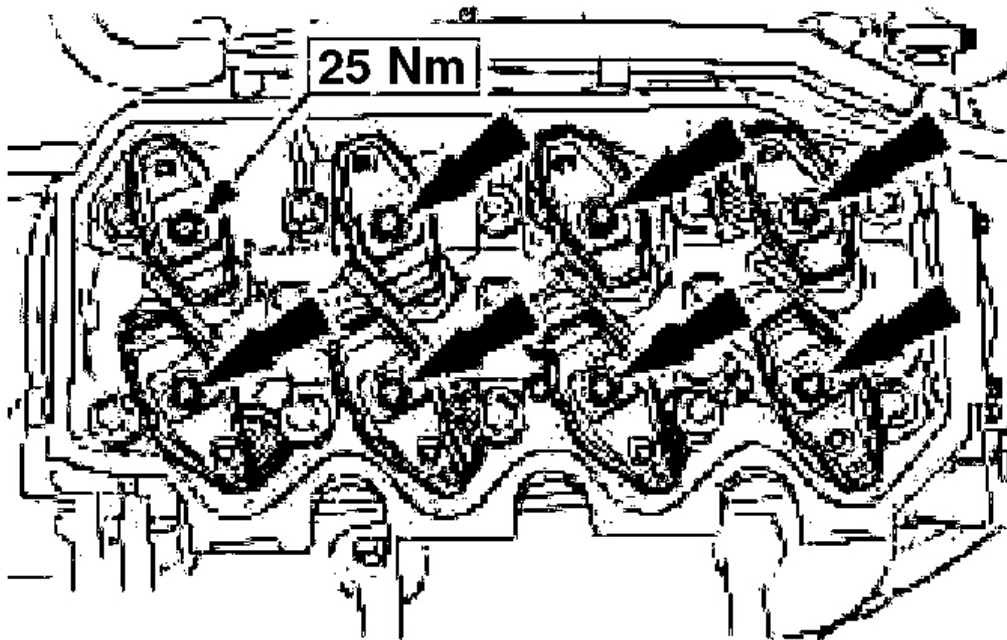
10. Install the valve tappets into the cylinder head bores with the oil feed holes (1) in the valve tappets facing away from the oil feed holes (2) in the cylinder head bores.
11. Install the valve tappet guide plates (1) and the valve tappet guide retainers (2).



G03432132

Fig. 84: Installing Valve Tappet Guide Plates And Valve Tappet Guide Retainers
Courtesy of FORD MOTOR CO.

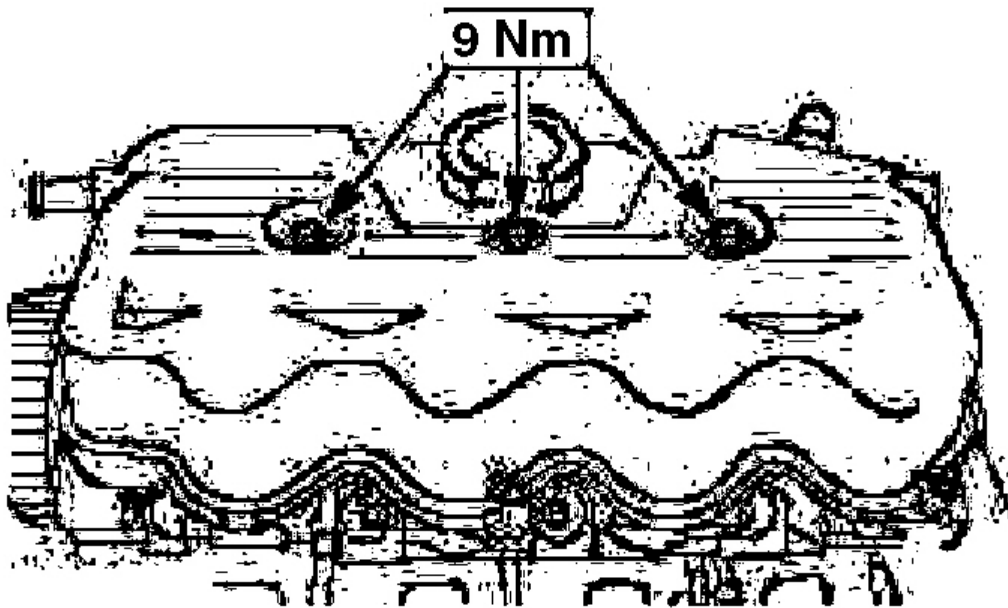
NOTE: Check that the rocker guides are sitting correctly.



G03432133

Fig. 85: Installing Rocker Arms
Courtesy of FORD MOTOR CO.

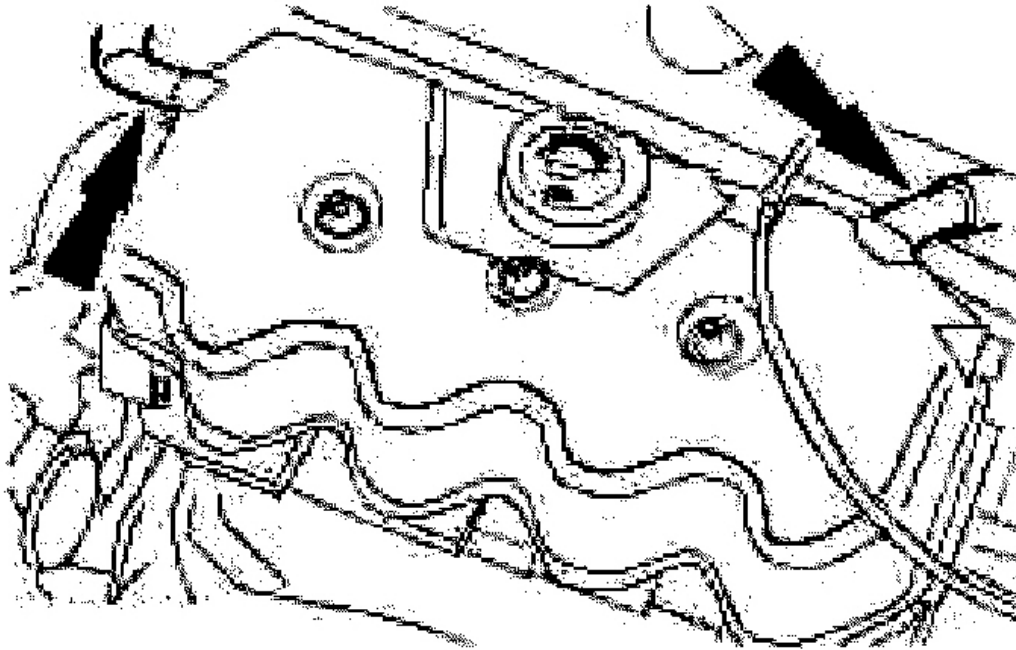
12. Install the rocker arms.
13. Install the valve cover.



G03432134

Fig. 86: Installing Valve Cover
Courtesy of FORD MOTOR CO.

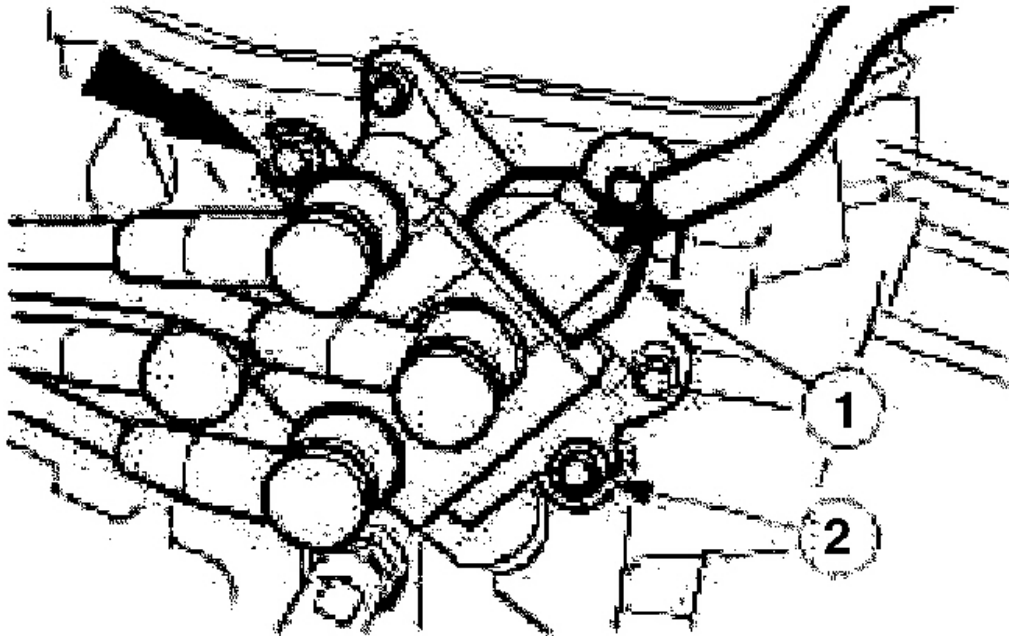
14. Connect the fresh air and positive crankcase ventilation hoses.
 - Make sure that the positive crankcase ventilation hose is secured.



G03432135

Fig. 87: Connecting Fresh Air And Positive Crankcase Ventilation Hoses
Courtesy of FORD MOTOR CO.

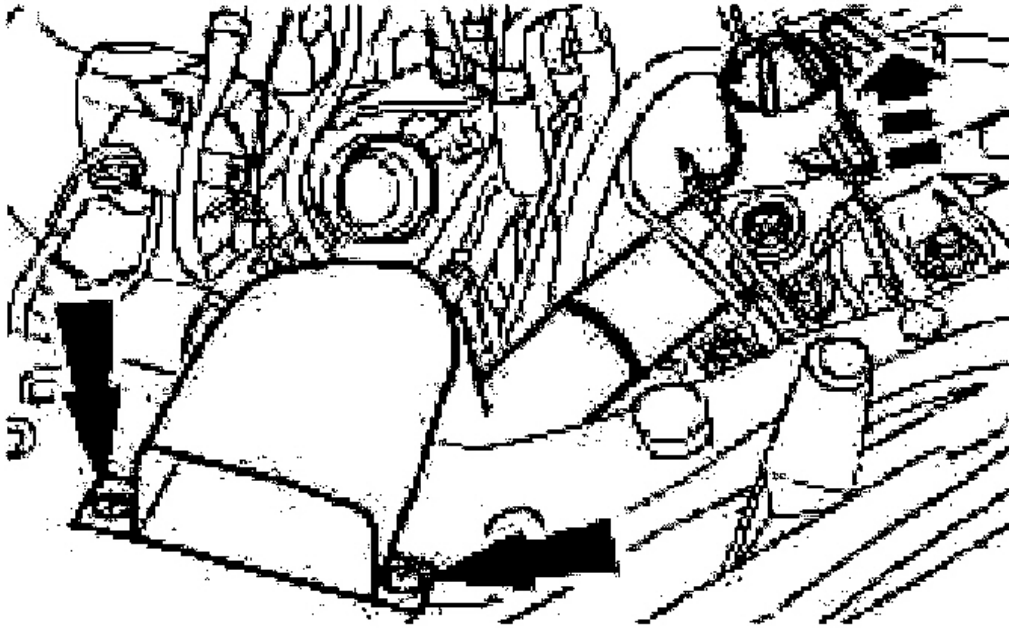
15. Install the EI coil.
 1. Connect the electrical connector.
 2. Install the bolts.



G03432136

Fig. 88: Installing EI Coil
Courtesy of FORD MOTOR CO.

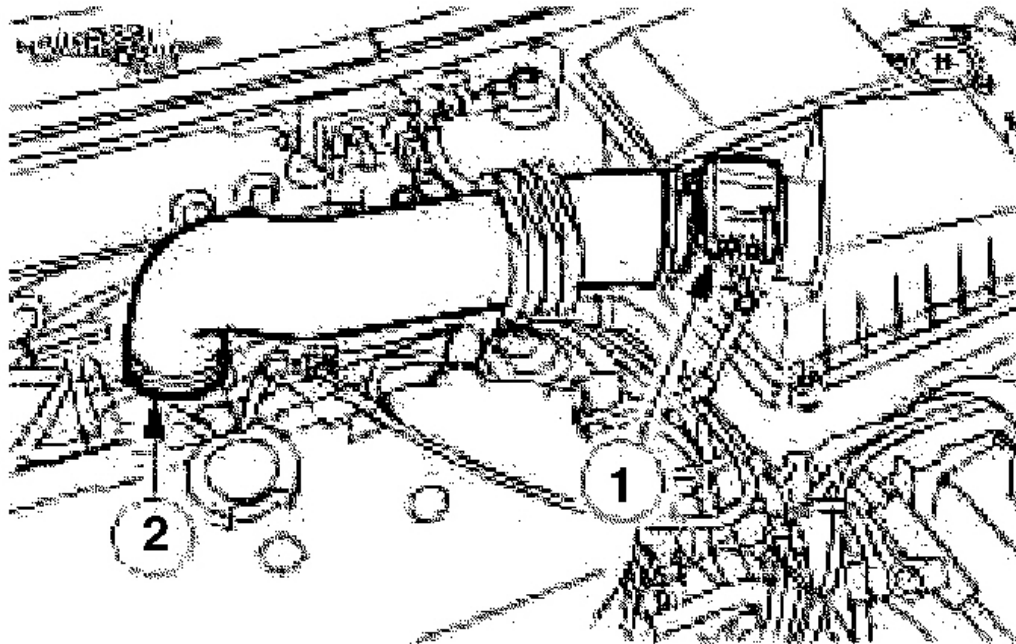
16. Install the air cleaner intake pipe.



G03432137

Fig. 89: Installing Air Cleaner Intake Pipe
Courtesy of FORD MOTOR CO.

17. Install the air cleaner housing.
 1. Connect the MAF electrical connector.
 2. Attach the air cleaner intake pipe.
 - Push the air cleaner housing into the rubber bushing.



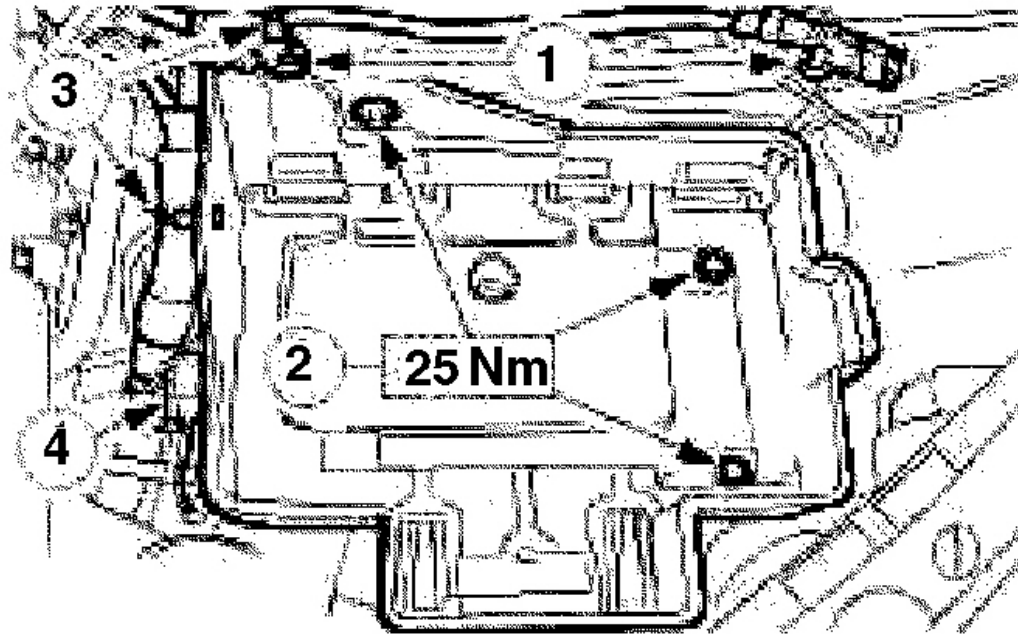
G03432138

Fig. 90: Connecting MAF Electrical Connector
Courtesy of FORD MOTOR CO.

18. Install the battery tray.
 1. Install the positive and negative cables.
 2. Tighten the bolts.
 3. Clip on the wiring harness.
 4. Connect and attach the electrical connector.

2002 Ford Focus LX

2002 ENGINE Engine, 2.0L SPI - Focus



G03432139

Fig. 91: Installing Battery Tray
Courtesy of FORD MOTOR CO.

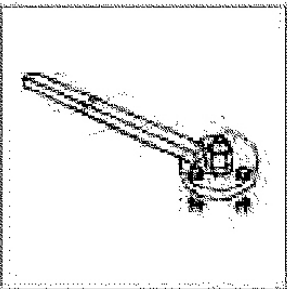
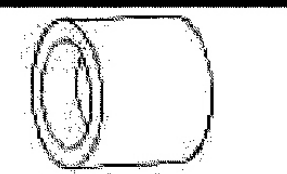
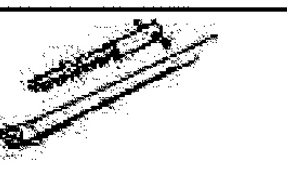
19. Install the battery.).

CAMSHAFT SEAL

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine, 2.0L SPI - Focus

	Wrench, Pulley, Camshaft 303-098 (T74P-6256-B)
	Installer, Oil Seal, Timing Cover 303-160 (T81P-6292-A)
	Remover, Oil Seal 303-409 (T92C-6700-CH)

G03432140

Fig. 92: Identifying Special Tools
Courtesy of FORD MOTOR CO.

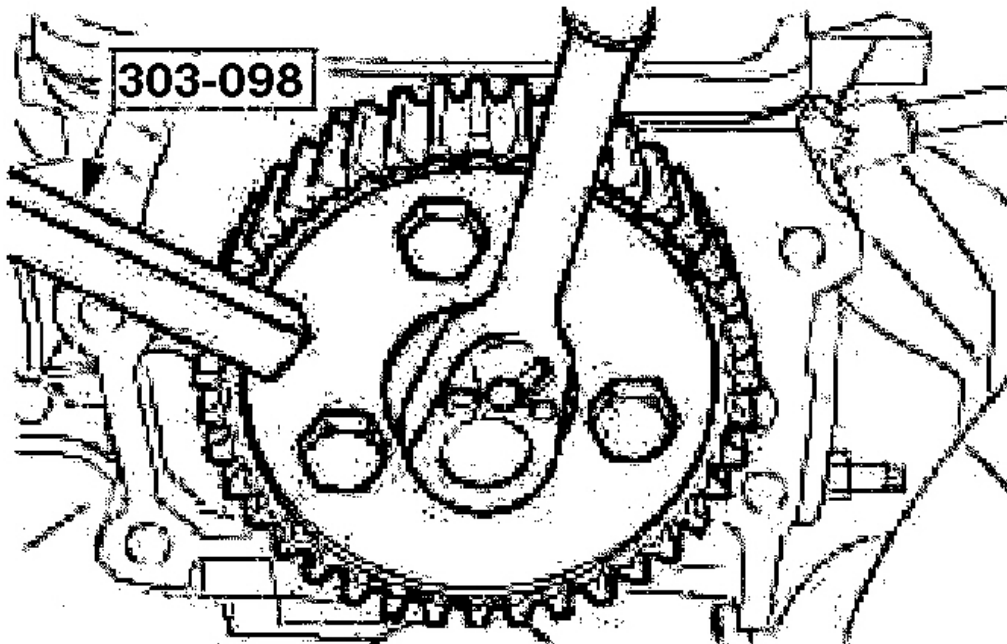
Material

MATERIAL SPECIFICATION

Engine oil	WSS-M2C153-H
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Removal

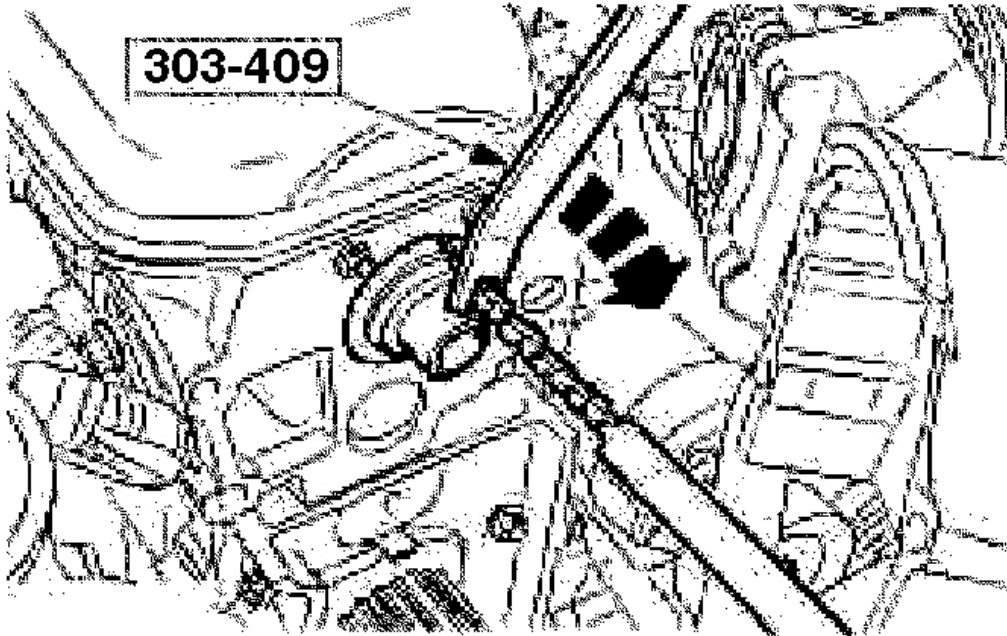
1. Remove the timing belt. For additional information, refer to **TIMING BELT** .
2. Using the special tool, remove the camshaft timing belt pulley.



G03432141

Fig. 93: Removing Camshaft Timing Belt Pulley
Courtesy of FORD MOTOR CO.

3. Using the special tool, remove the camshaft oil seal.



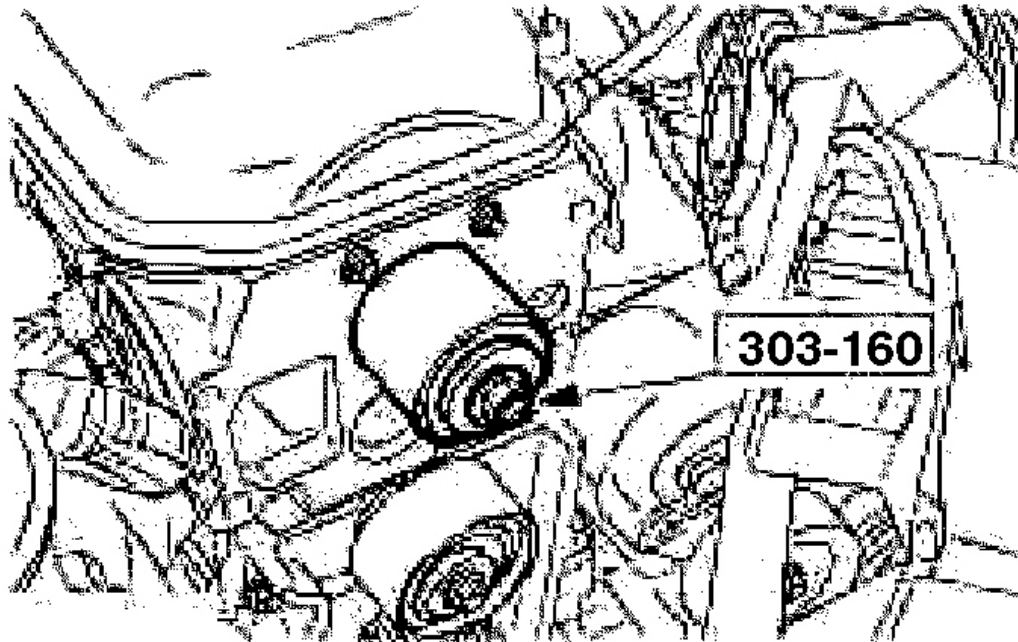
G03432142

Fig. 94: Removing Camshaft Oil Seal
Courtesy of FORD MOTOR CO.

Installation

1. Using the special tool, install a new oil seal.
 - Lubricate the oil seal lip and the camshaft running face with engine oil.

Insert the oil seal in the special tool and draw it in with the timing belt pulley bolt.



G03432143

Fig. 95: Installing New Camshaft Oil Seal
Courtesy of FORD MOTOR CO.

2. Using the special tool, install the camshaft timing belt pulley.

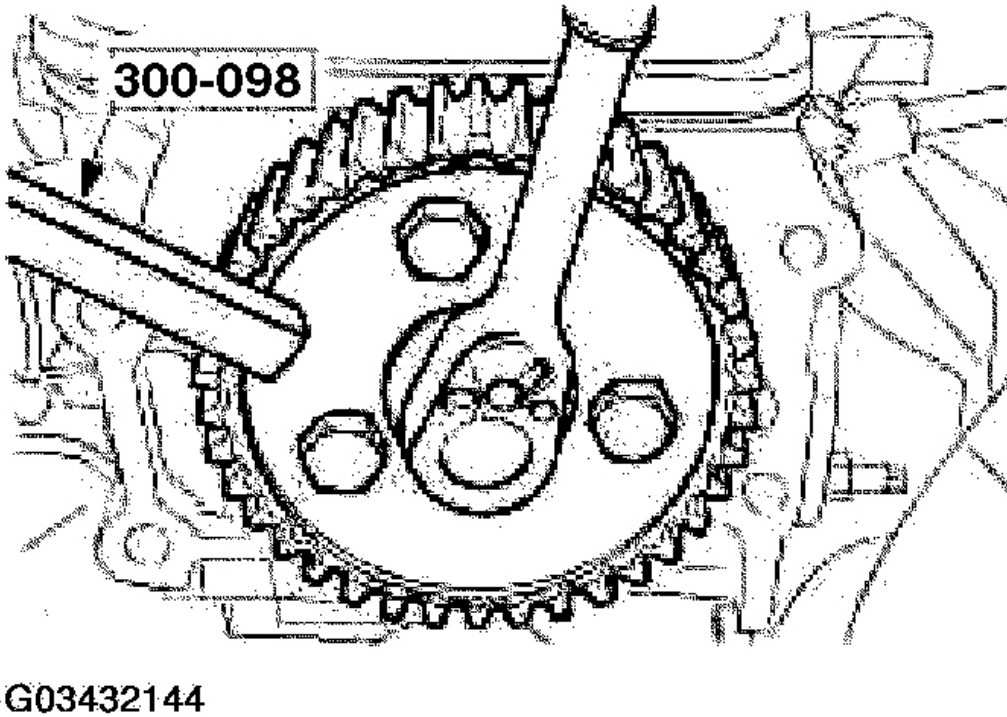


Fig. 96: Installing Camshaft Timing Belt Pulley
Courtesy of FORD MOTOR CO.

3. Install the timing belt. For additional information, refer to **TIMING BELT** .

TIMING BELT

Material

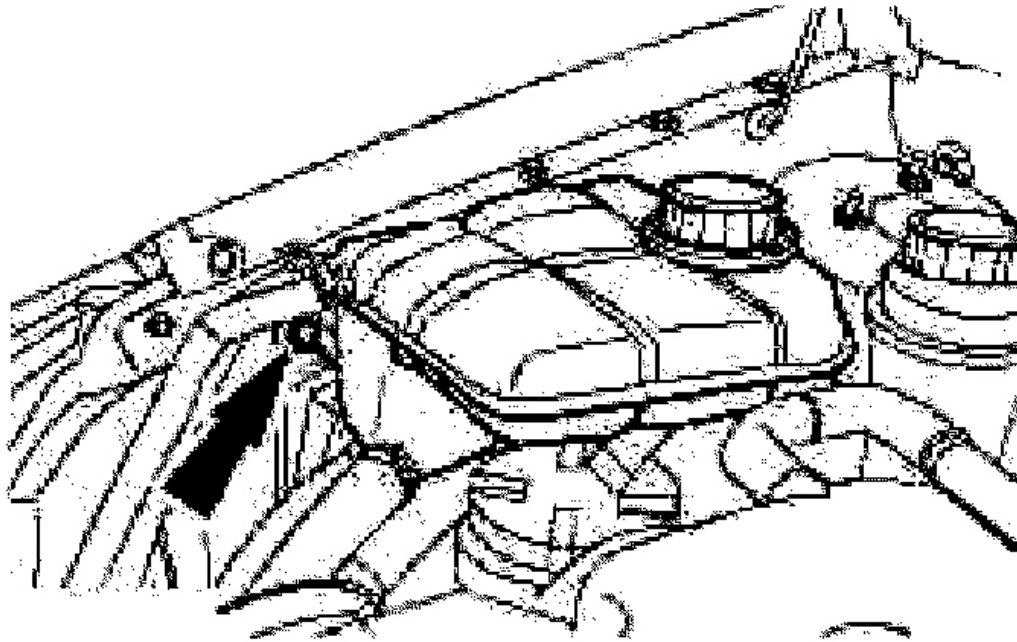
MATERIAL SPECIFICATION

Cable ties	A969-M1C171-AA
Silicon grease	

Removal

1. Remove the accessory drive belt. For additional information, refer to **SPECIFICATIONS & DRIVE BELT ROUTING** .
2. Detach the coolant expansion tank.

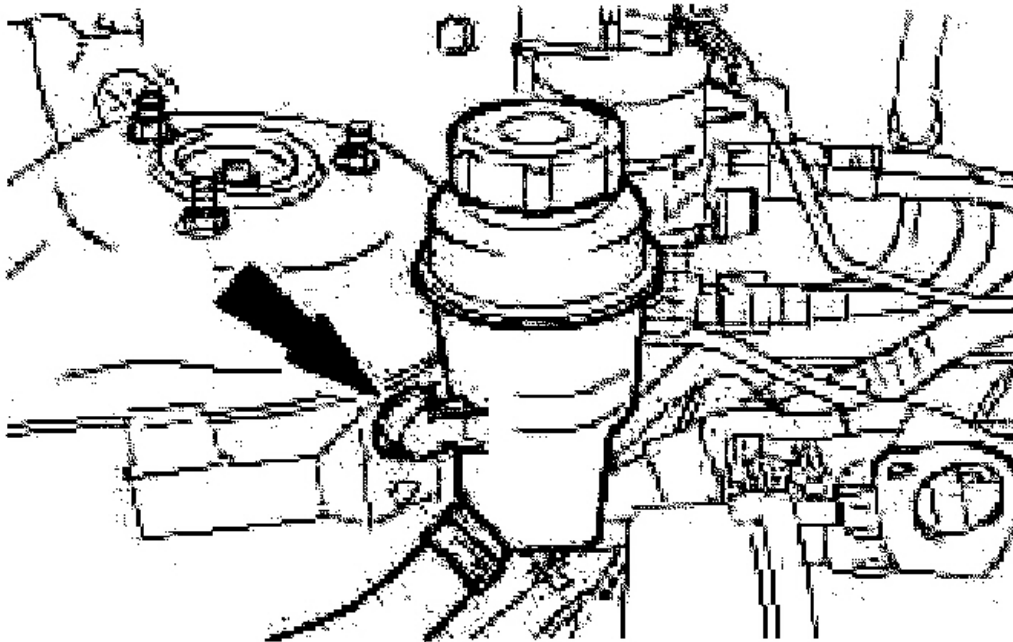
- Remove the bolt and position the expansion tank to one side.



G03432145

Fig. 97: Detaching Coolant Expansion Tank
Courtesy of FORD MOTOR CO.

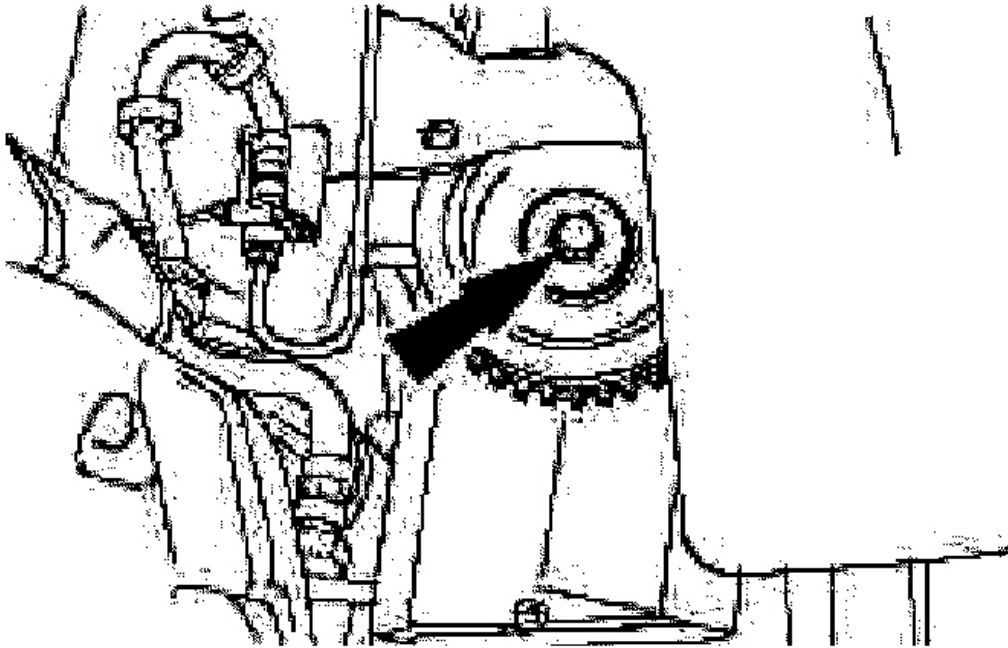
3. Detach the power steering reservoir and position to one side.



G03432146

Fig. 98: Detaching Power Steering Reservoir
Courtesy of FORD MOTOR CO.

4. Remove the right-hand front wheel and tire.
5. Remove the crankshaft pulley/vibration damper.



G03432147

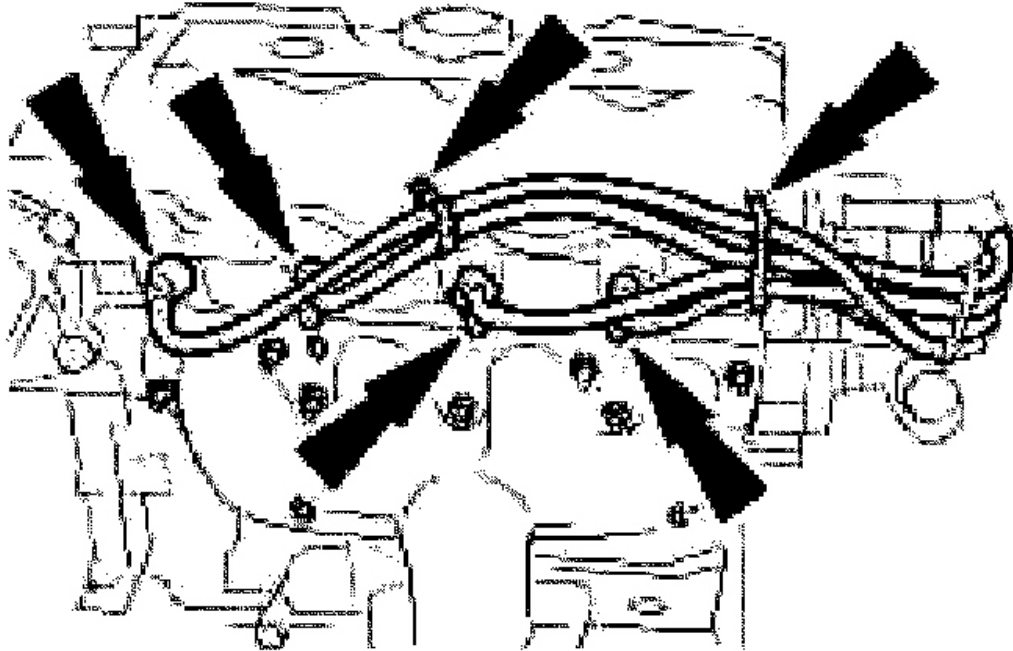
Fig. 99: Removing Crankshaft Pulley/Vibration Damper
Courtesy of FORD MOTOR CO.

6. Lower the vehicle.

CAUTION: Do not pull on the ignition wire when removing the spark plug connector. If necessary remove the ignition coil plug to avoid bending the ignition wire. Turn the spark plug connector slightly before removing to loosen the gasket.

CAUTION: Pull off the spark plug connector in a straight movement.

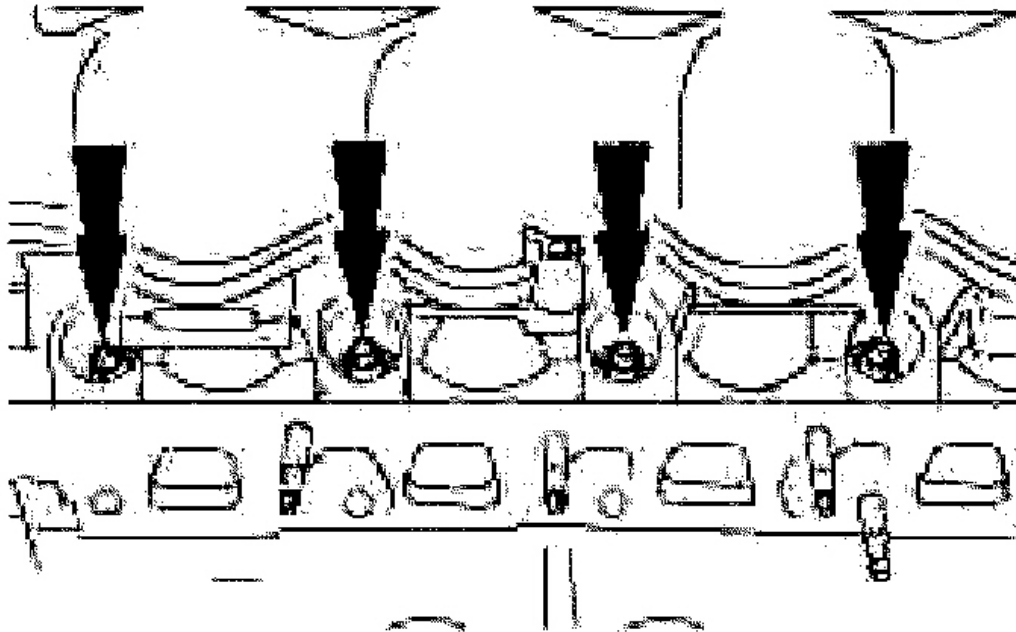
7. Disconnect the ignition wires from the spark plugs.
 - Remove the two ignition wire separators from the valve cover.



G03432148

Fig. 100: Disconnecting Ignition Wires From Spark Plugs
Courtesy of FORD MOTOR CO.

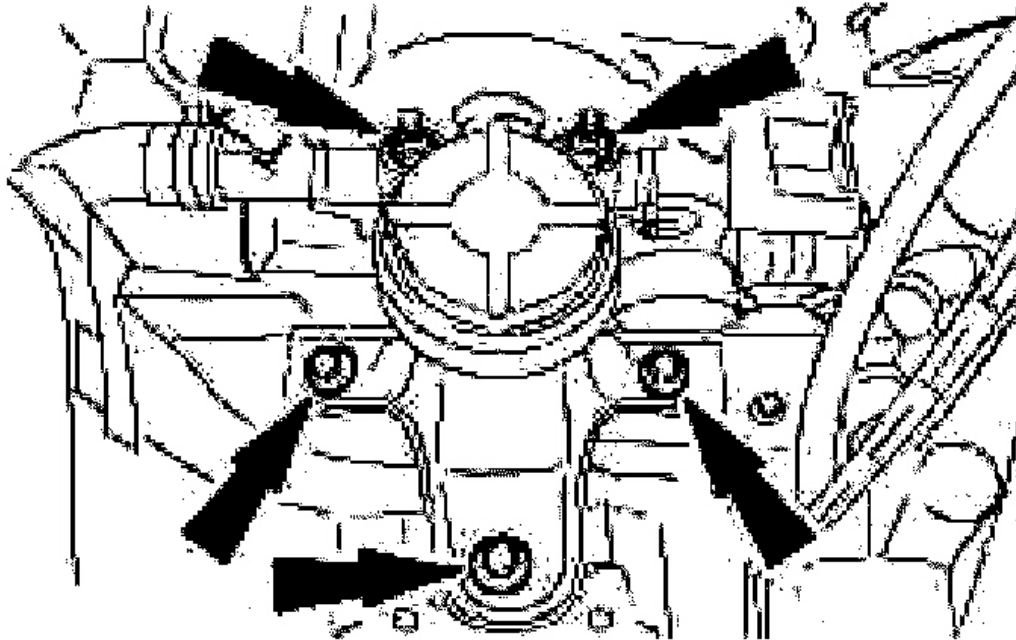
NOTE: If an original spark plug is reused, install it in the same cylinder from which it was removed. New spark plugs may be installed in any cylinder.



G03432149

Fig. 101: Removing Spark Plugs
Courtesy of FORD MOTOR CO.

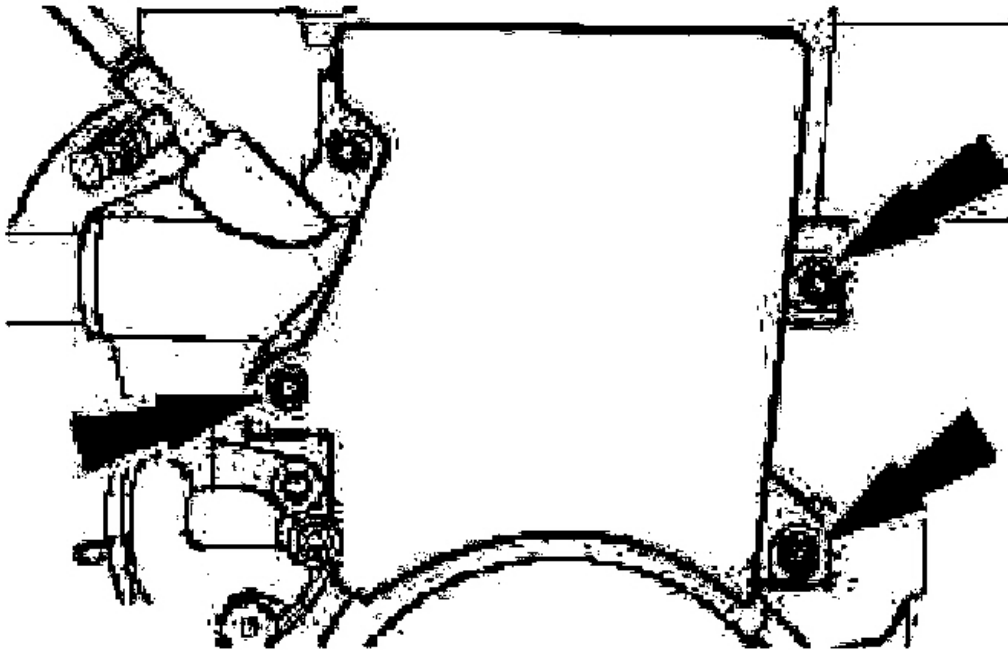
8. Remove the spark plugs (shown with engine removed).
9. Place a jack with a wooden block under the oil pan and raise slowly until the front engine mounting is free from strain.
10. Remove the engine front mounting.



G03432150

Fig. 102: Removing Engine Front Mounting
Courtesy of FORD MOTOR CO.

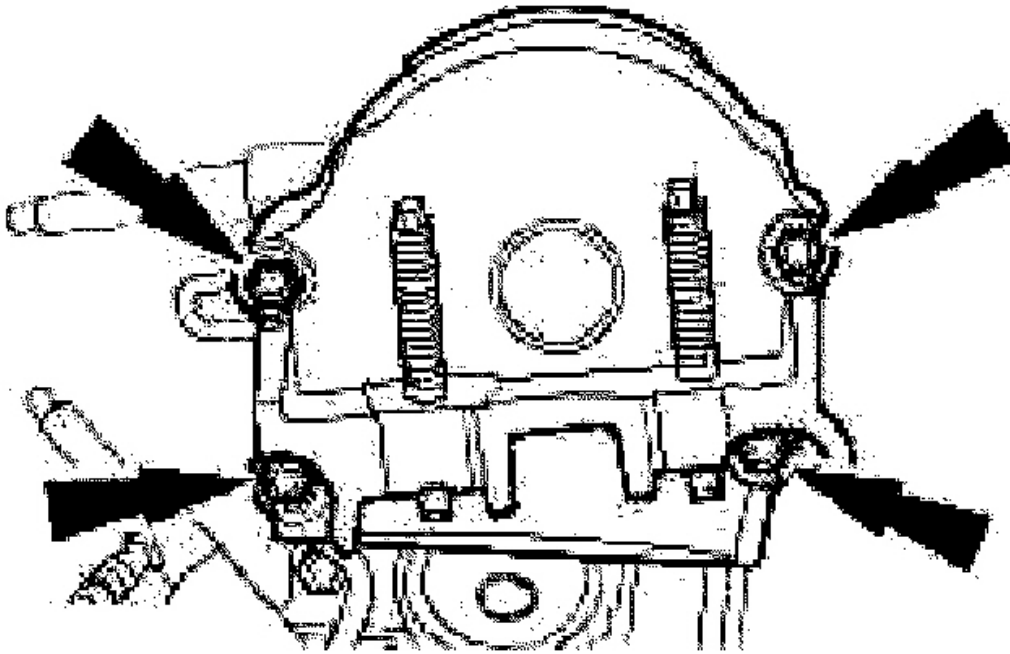
11. Remove the timing belt cover.



G03432151

Fig. 103: Removing Timing Belt Cover
Courtesy of FORD MOTOR CO.

12. Remove the engine front mounting bracket (shown with engine removed).



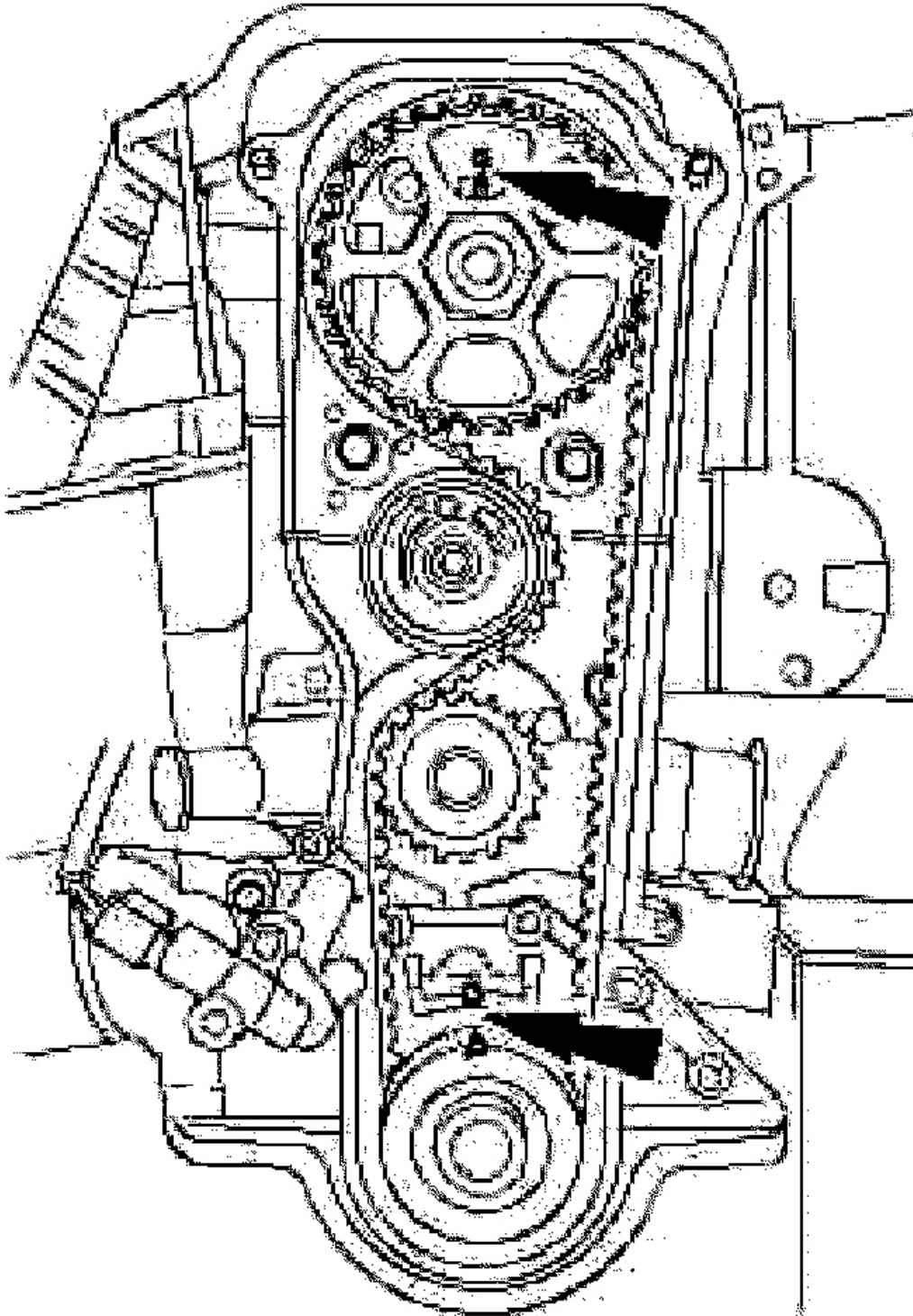
G03432152

Fig. 104: Removing Engine Front Mounting Bracket
Courtesy of FORD MOTOR CO.

13. Align the timing marks.

2002 Ford Focus LX

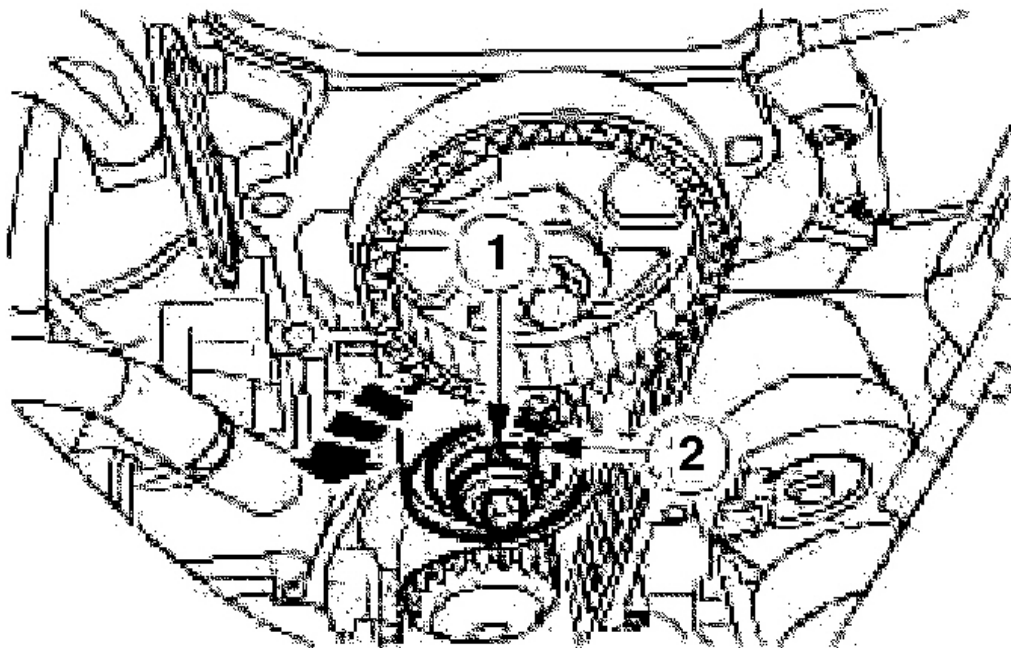
2002 ENGINE Engine, 2.0L SPI - Focus



G03432153

Fig. 105: Aligning Timing Marks
Courtesy of FORD MOTOR CO.

14. Remove the timing belt.
 1. Use an 8 mm Allen wrench and turn counter clockwise 1/4 turn.
 2. Insert a 3 mm (1/8 inch) drill bit to lock the timing belt tensioner in place.
 - Remove the timing belt.

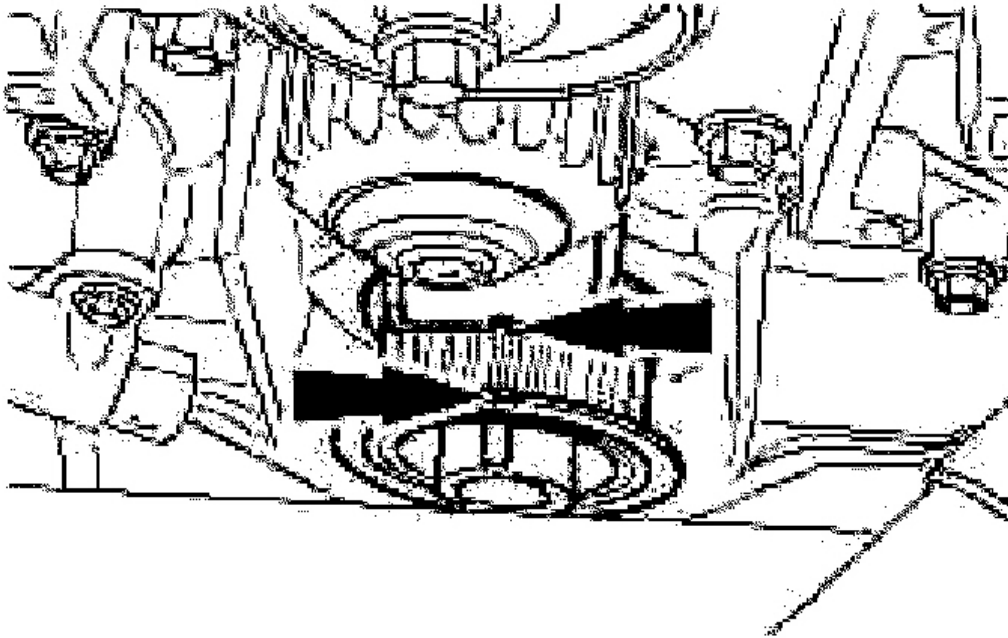


G03432154

Fig. 106: Removing Timing Belt
Courtesy of FORD MOTOR CO.

Installation

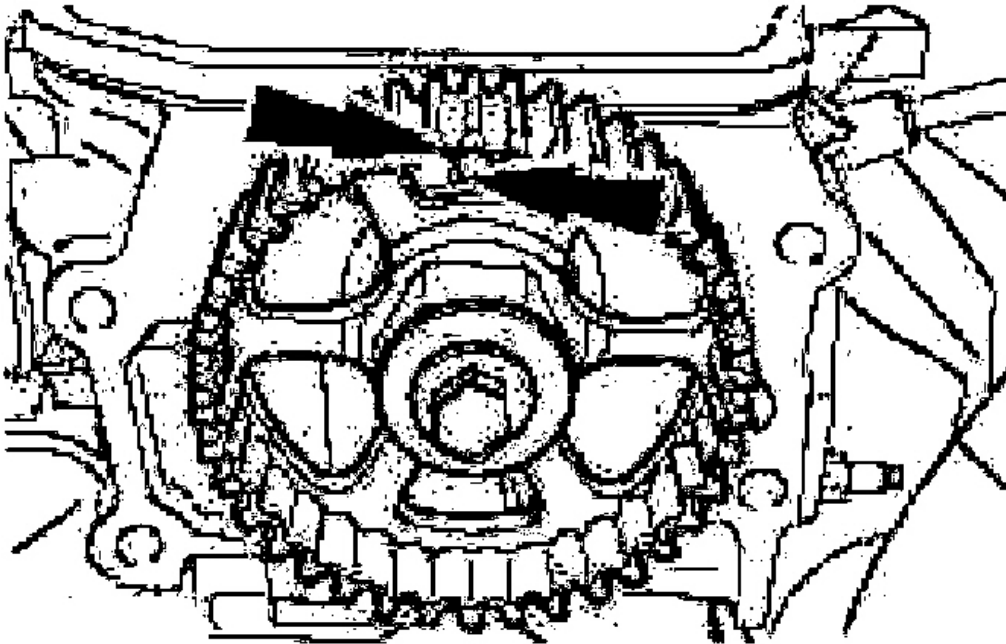
1. Check the alignment of the timing mark on the crankshaft timing belt pulley.



G03432155

Fig. 107: Checking Alignment Of Timing Mark On Crankshaft Timing Belt Pulley
Courtesy of FORD MOTOR CO.

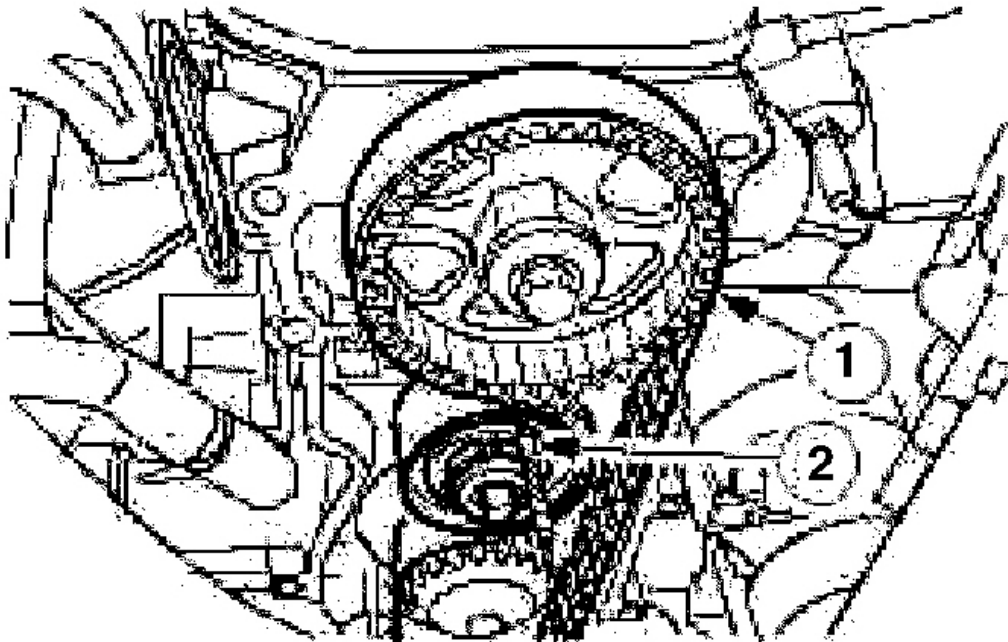
2. Check the alignment of the timing mark on the camshaft timing belt pulley.



G03432156

Fig. 108: Checking Alignment Of Timing Mark On Camshaft Timing Belt Pulley
Courtesy of FORD MOTOR CO.

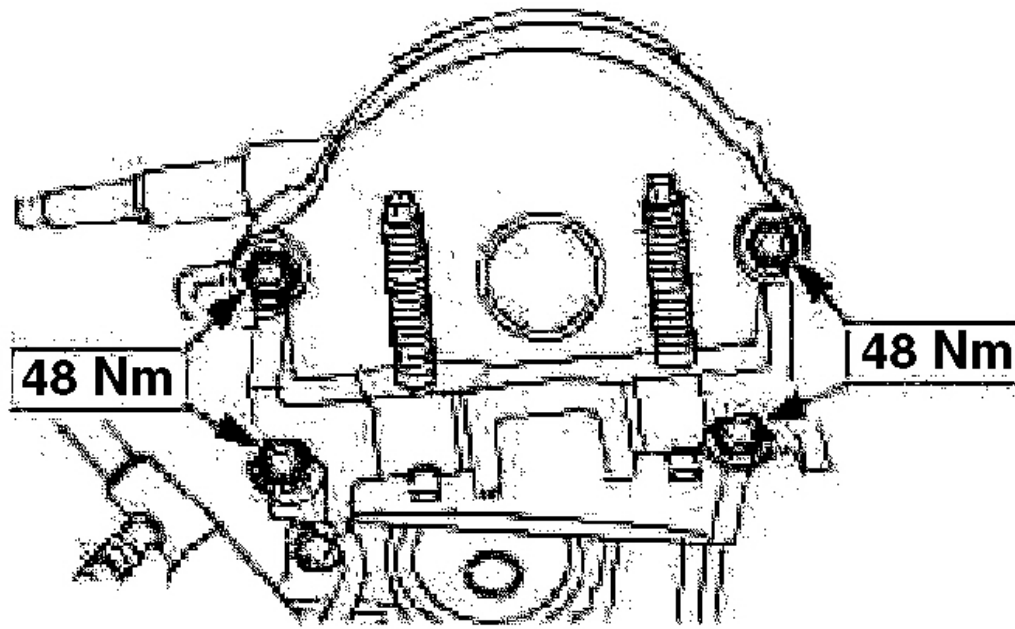
3. Install the timing belt.
 1. Install the timing belt over the pulleys in a counter clockwise direction starting at the crankshaft.
 - Keep the belt span from the crankshaft to the camshaft tight while installing the timing belt over the camshaft.
 3. Remove the 3 mm (1/8 inch) drill bit to release the timing belt tensioner.



G03432157

Fig. 109: Installing Timing Belt
Courtesy of FORD MOTOR CO.

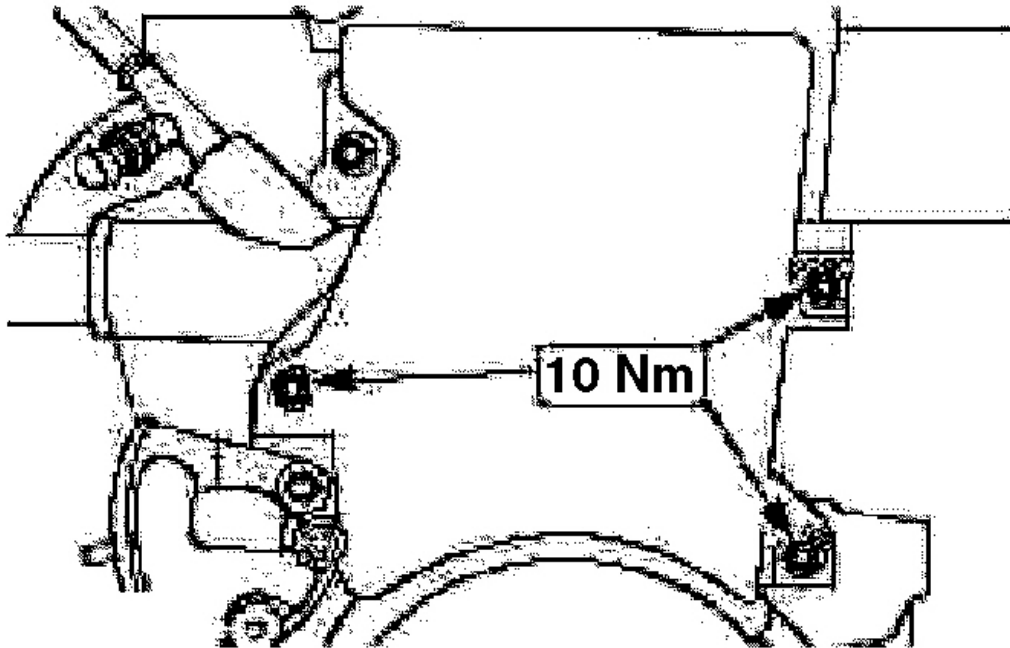
4. Turn the crankshaft at least two turns in clockwise direction to TDC position for cylinder one.
5. Check the alignment of the timing marks. If the alignment is not correct repeat the previous steps.
6. Install the engine front mounting bracket (shown with engine removed).



G03432158

Fig. 110: Installing Engine Front Mounting Bracket
Courtesy of FORD MOTOR CO.

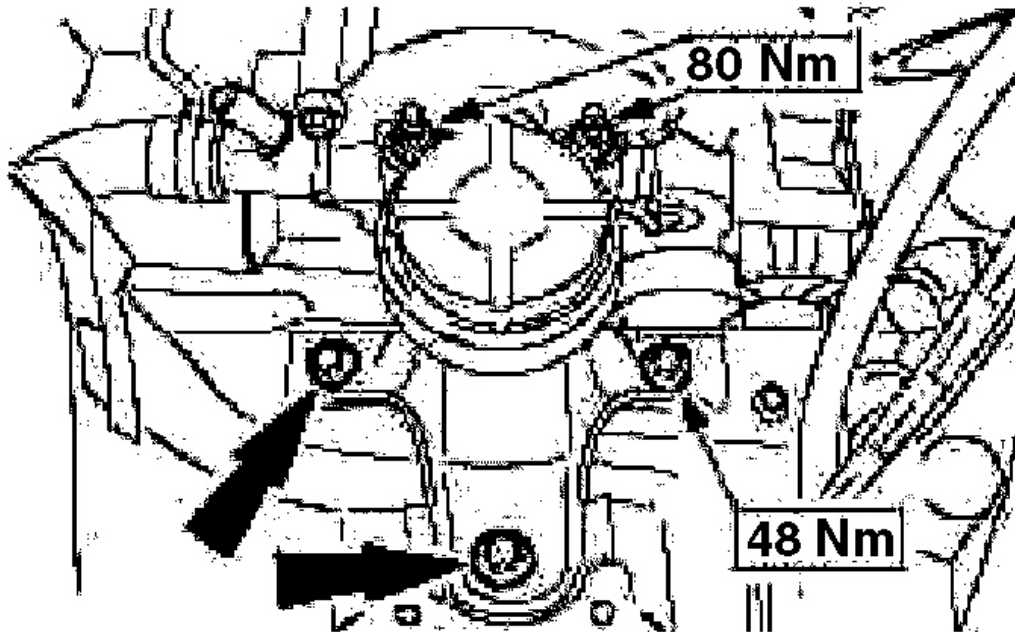
7. Install the timing belt cover (shown with engine removed).



G03432159

Fig. 111: Installing Timing Belt Cover
Courtesy of FORD MOTOR CO.

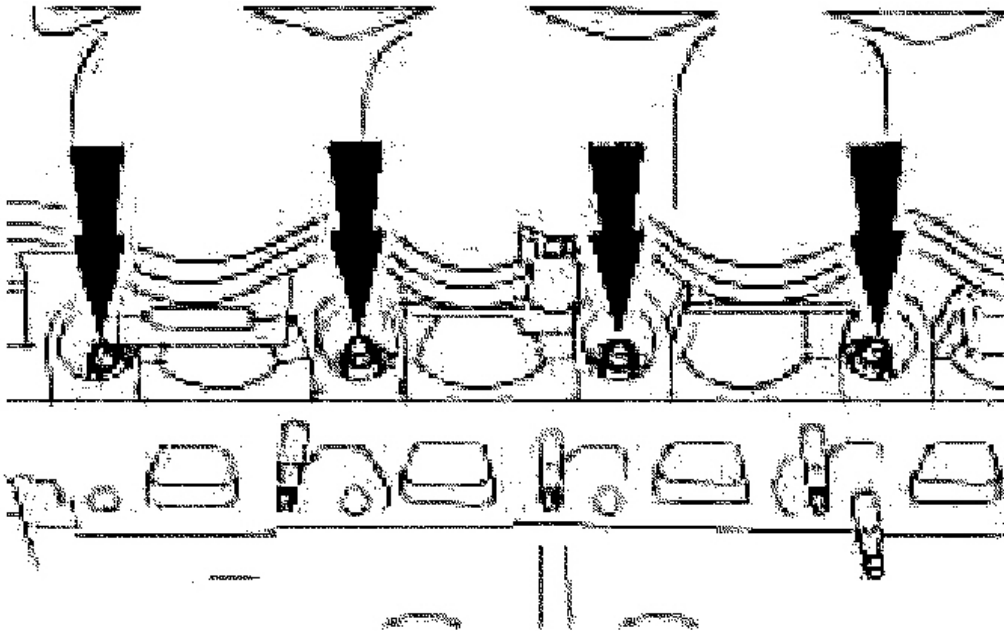
8. Install the engine front mounting.



G03432160

Fig. 112: Installing Engine Front Mounting
Courtesy of FORD MOTOR CO.

9. Remove the jack.
10. Install the spark plugs (shown with engine removed).



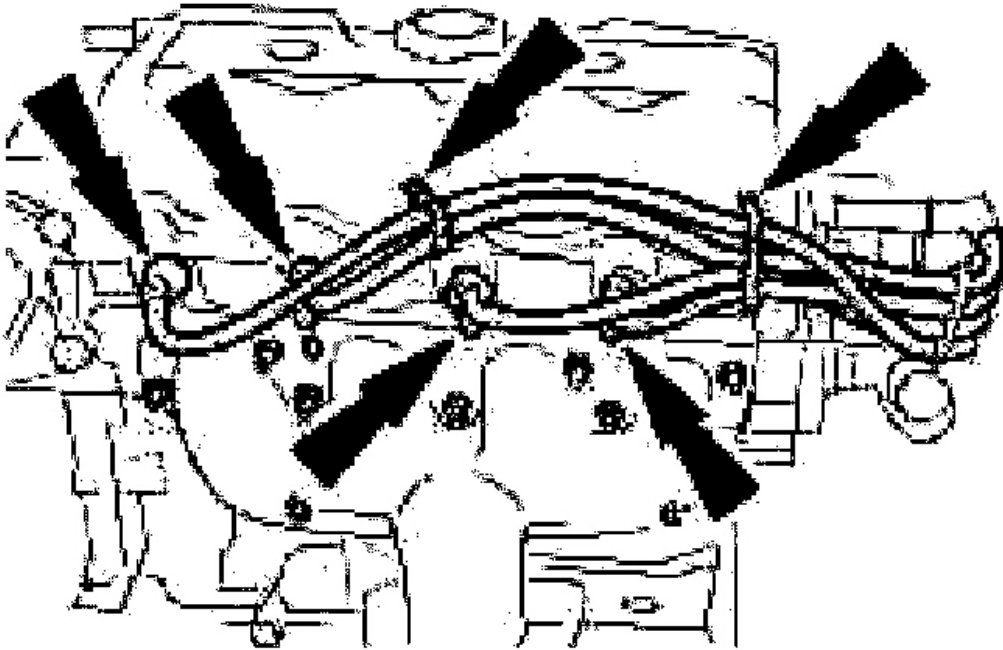
G03432161

Fig. 113: Installing Spark Plugs
Courtesy of FORD MOTOR CO.

CAUTION: Use a blunt object (for example plastic cable tie) to apply the silicone grease, to avoid damaging the spark plug connector seal.

CAUTION: Push on the spark plug connector in a straight movement.

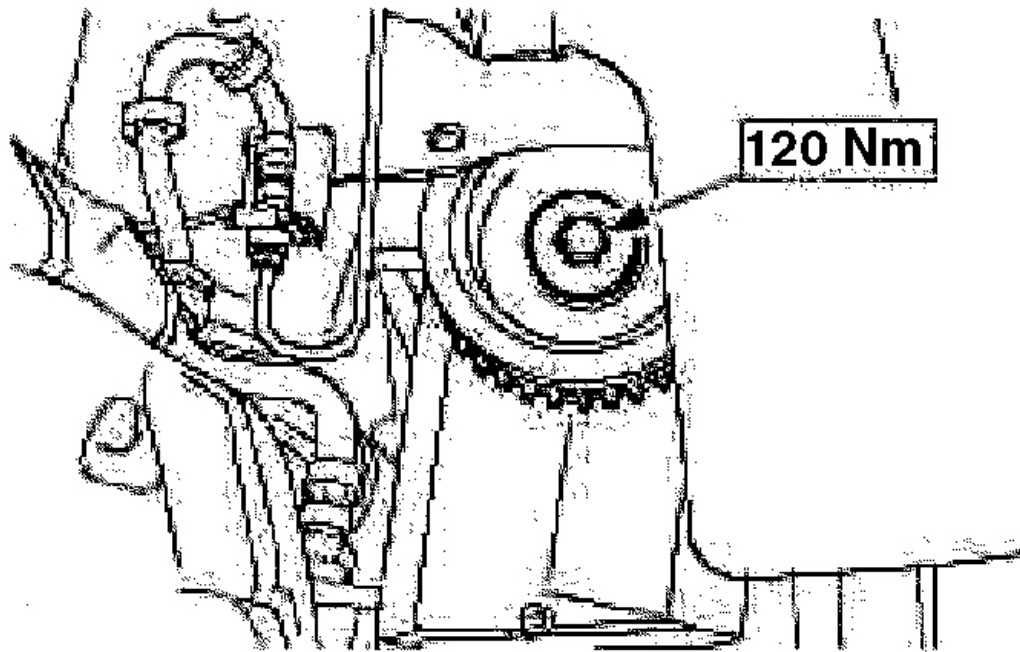
NOTE: Coat the inside of the spark plug connector with silicone grease to a depth of 5-10 mm.



G03432162

Fig. 114: Engaging Spark Plug Connector
Courtesy of FORD MOTOR CO.

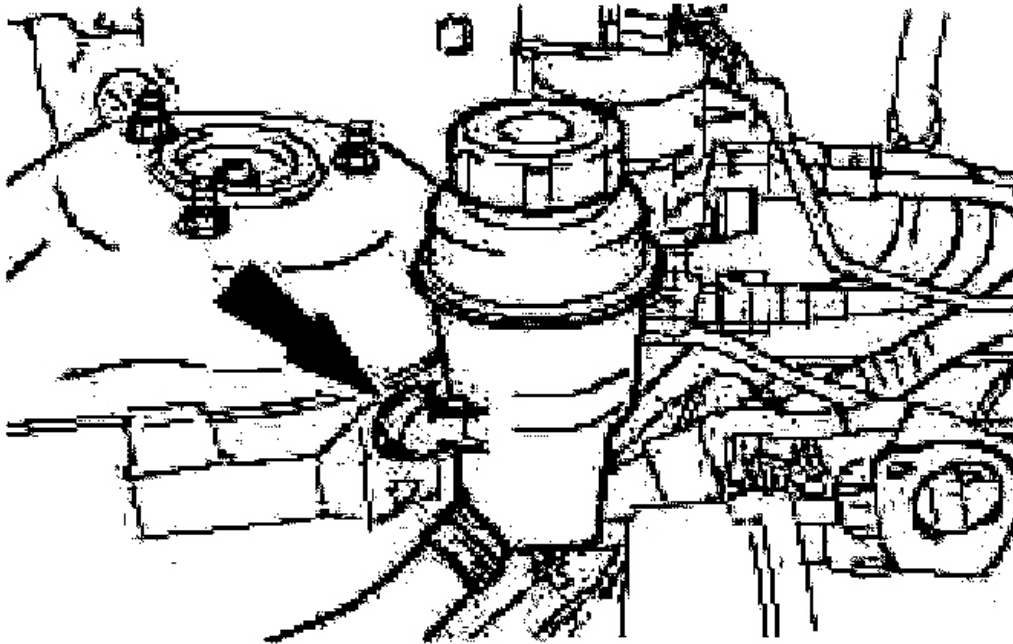
11. Push on the spark plug connector until it engages.
12. Raise and support the vehicle.
13. Install the crankshaft pulley/vibration damper.
 - Position the drive belt on the crankshaft pulley.



G03432163

Fig. 115: Installing Crankshaft Pulley/Vibration Damper
Courtesy of FORD MOTOR CO.

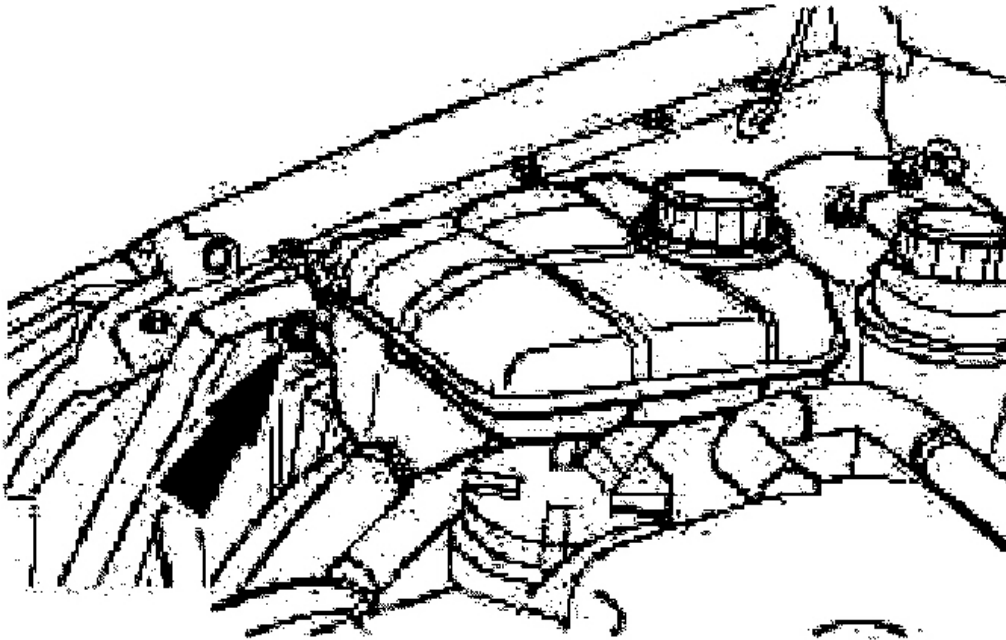
14. Install the right-hand front wheel and tire.
15. Install the power steering reservoir.



G03432164

Fig. 116: Installing Power Steering Reservoir
Courtesy of FORD MOTOR CO.

16. Install the coolant expansion tank.



G03432165

Fig. 117: Installing Coolant Expansion Tank
Courtesy of FORD MOTOR CO.

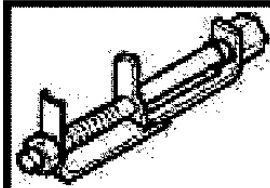
17. Install the accessory drive belt. For additional information, refer to **SPECIFICATIONS & DRIVE BELT ROUTING** article .

EXHAUST MANIFOLD

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine, 2.0L SPI - Focus



Remover/Installer, hose clamp
412 - 108 (T96P - 18539 - A)

G03432166

Fig. 118: Identifying Special Tools
Courtesy of FORD MOTOR CO.

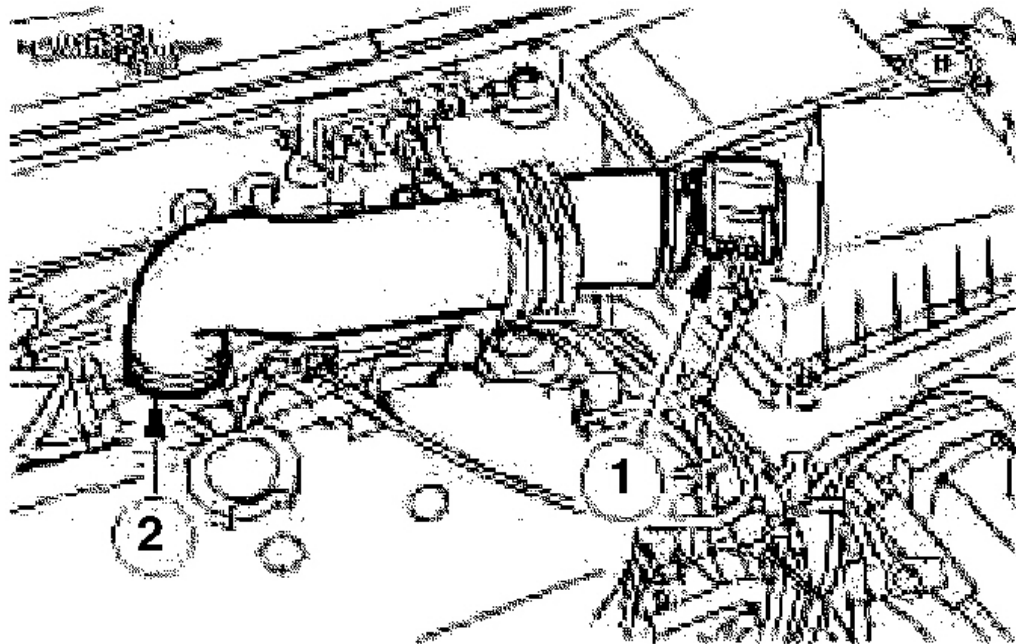
Material

MATERIAL SPECIFICATION

Cable ties

Removal

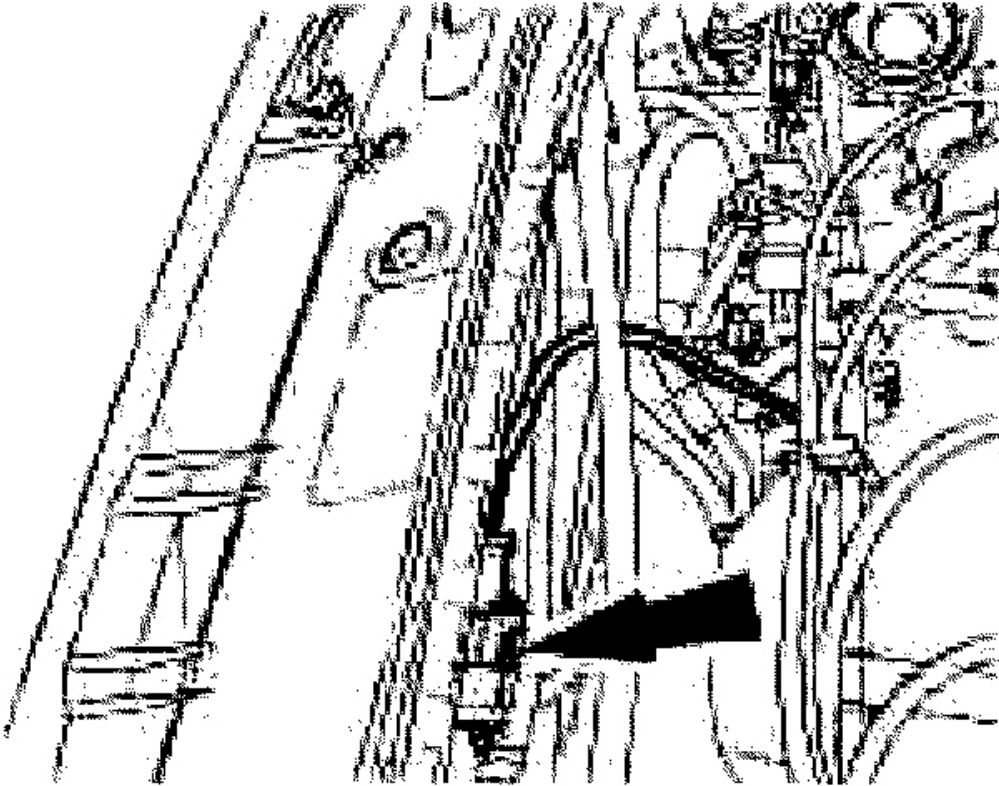
1. Remove the air cleaner housing.
 1. Disconnect electrical connector of the mass air flow (MAF) sensor.
 2. Detach the intake hose.
 - Remove the air cleaner housing from the rubber bushing.



G03432167

Fig. 119: Removing Air Cleaner Housing
Courtesy of FORD MOTOR CO.

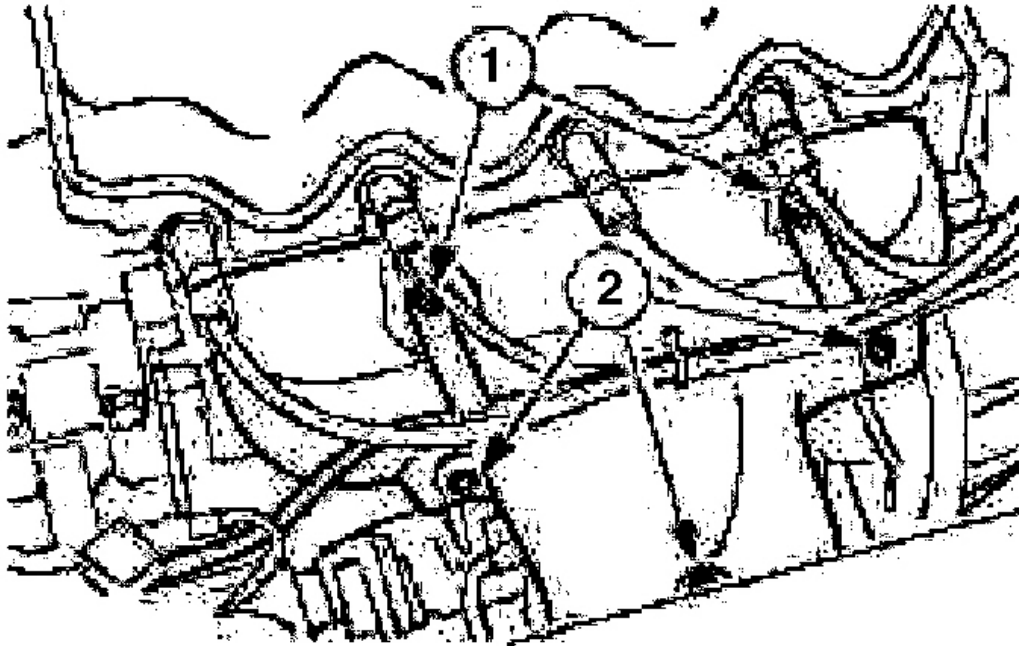
2. Disconnect the heated oxygen sensor (HO2S) electrical connector.



G03432168

Fig. 120: Disconnecting Heated Oxygen Sensor (Ho2S) Electrical Connector
Courtesy of FORD MOTOR CO.

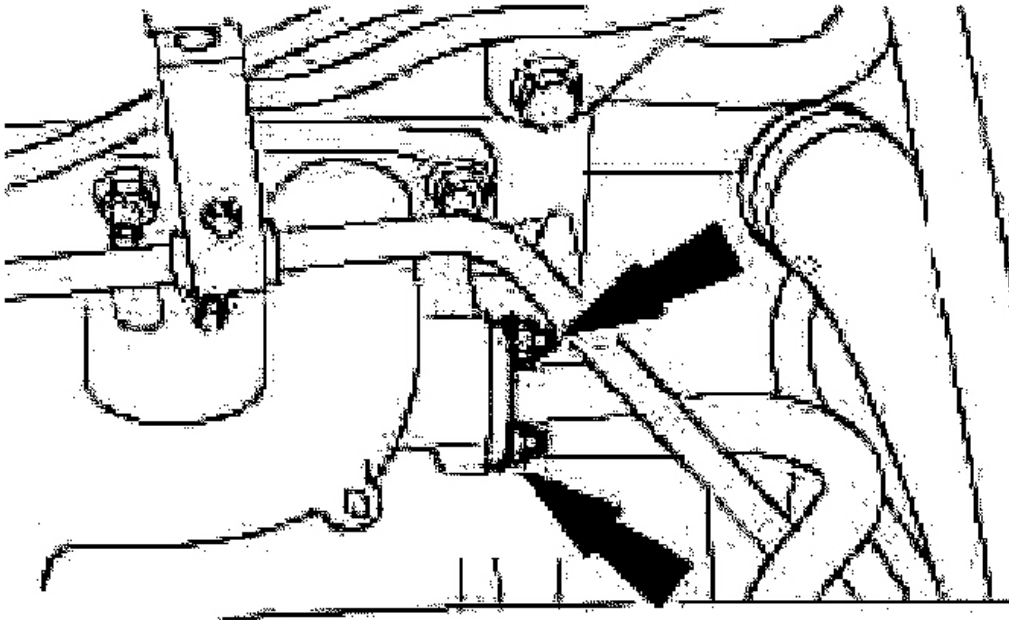
3. Remove the heat shield.
 1. Remove the nuts and the power steering high pressure tube.
 2. Remove the nuts and the heat shield.



G03432169

Fig. 121: Removing Heat Shield
Courtesy of FORD MOTOR CO.

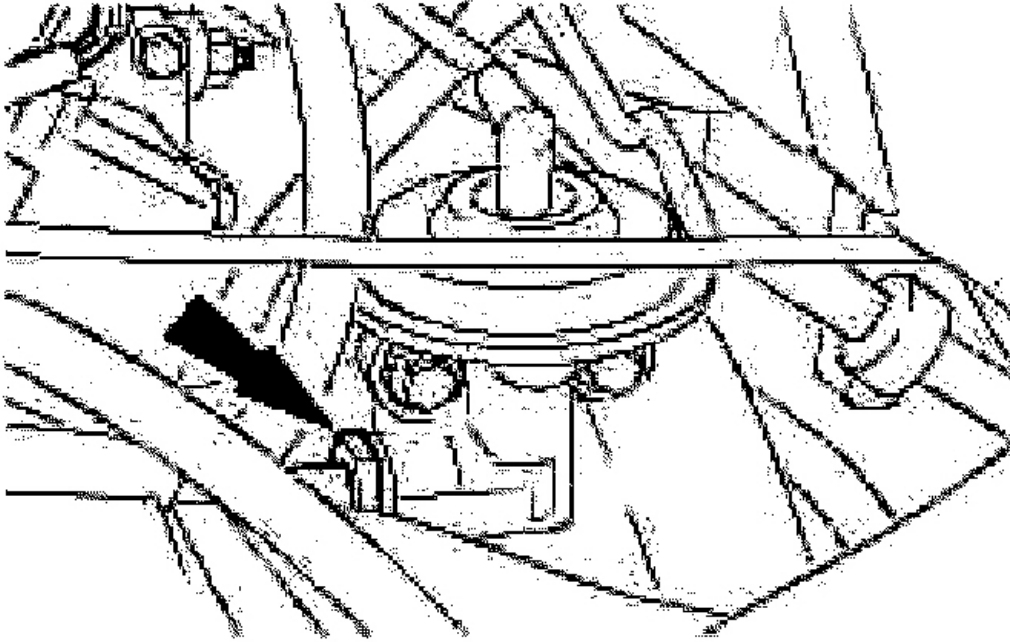
4. Remove the exhaust gas recirculation (EGR) tube.



G03432170

Fig. 122: Removing Exhaust Gas Recirculation (EGR) Tube
Courtesy of FORD MOTOR CO.

5. Loosen the EGR tube fitting approximately three turns.



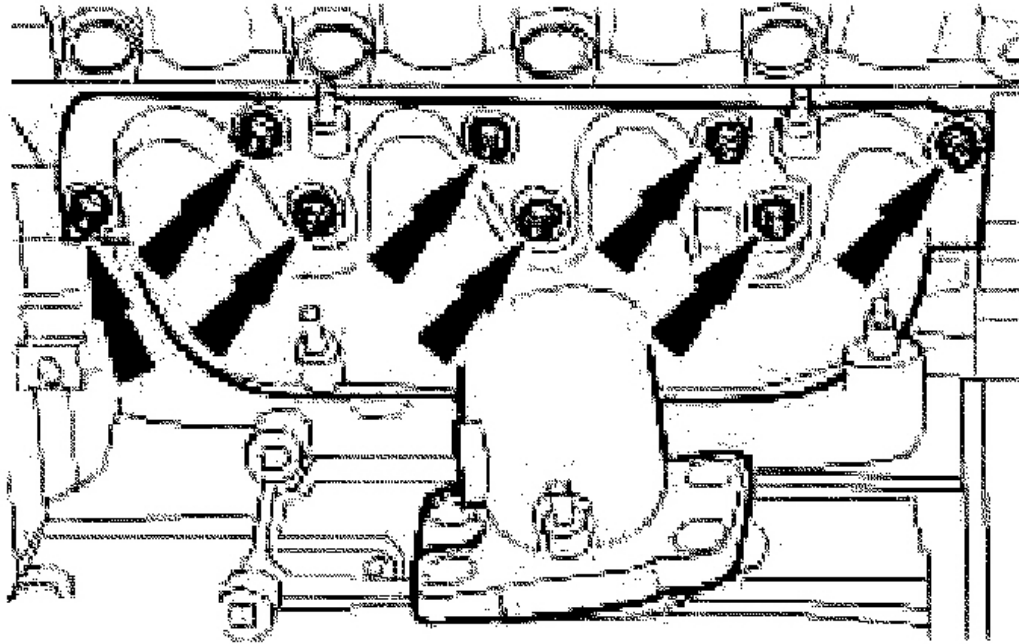
G03432171

Fig. 123: Loosening EGR Tube Fitting
Courtesy of FORD MOTOR CO.

6. Remove the catalytic converter (TWC).
7. Lower the vehicle.

CAUTION: Do not work on aluminum engine components until the engine is cold.

8. Remove the nuts, the exhaust manifold and the gasket.
 - Discard the gasket.

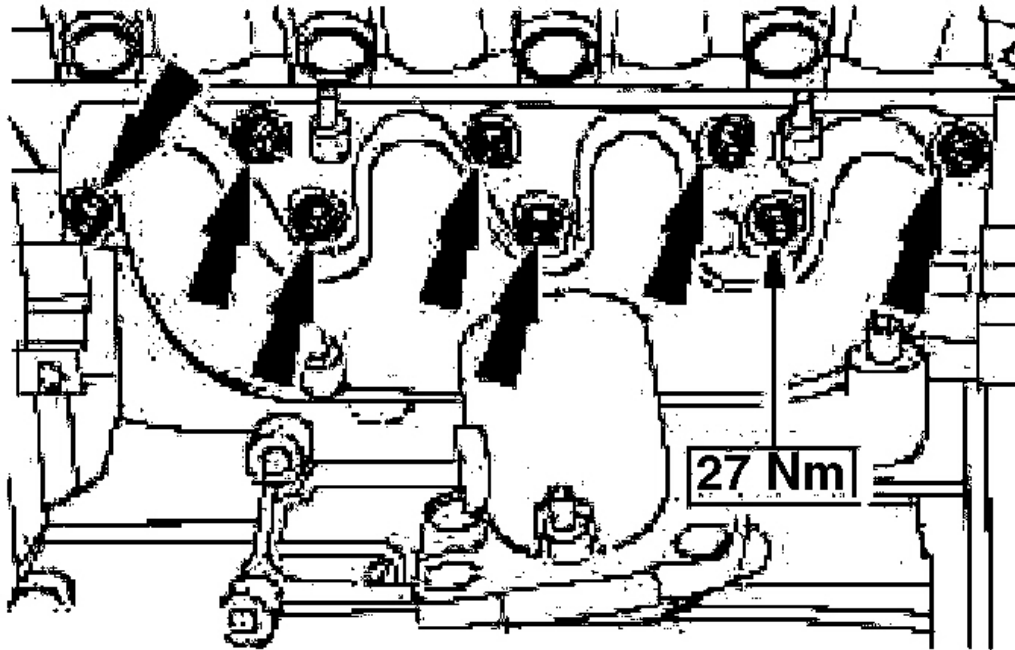


G03432172

Fig. 124: Removing Exhaust Manifold And Gasket
Courtesy of FORD MOTOR CO.

Installation

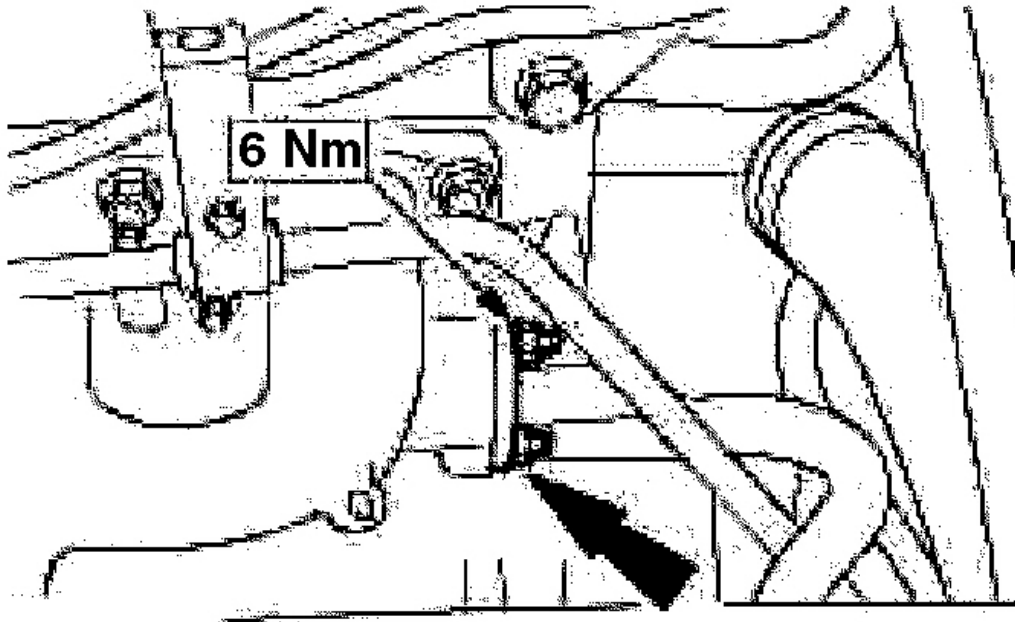
CAUTION: Do not use abrasive grinding discs to remove manual scrapers. Do not scratch or gouge aluminum sealing surface.



G03432173

Fig. 125: Installing Exhaust Manifold And New Gasket
Courtesy of FORD MOTOR CO.

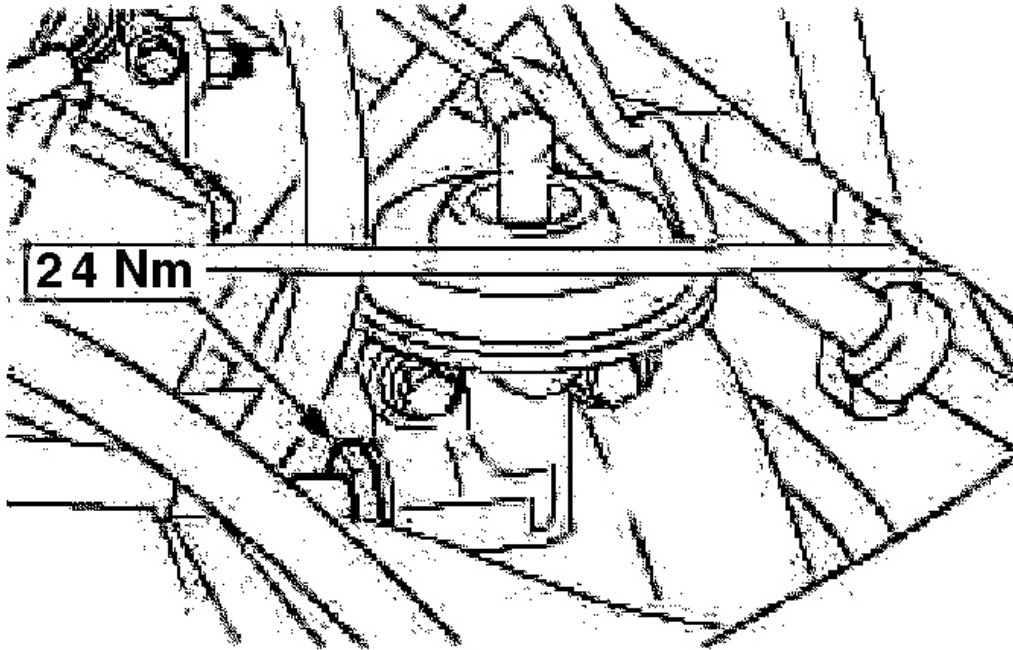
1. Install the exhaust manifold and a new gasket.
2. Raise and support the vehicle.
3. Install the TWC.
4. Install the EGR - tube and install the nuts.



G03432174

Fig. 126: Installing EGR Tube
Courtesy of FORD MOTOR CO.

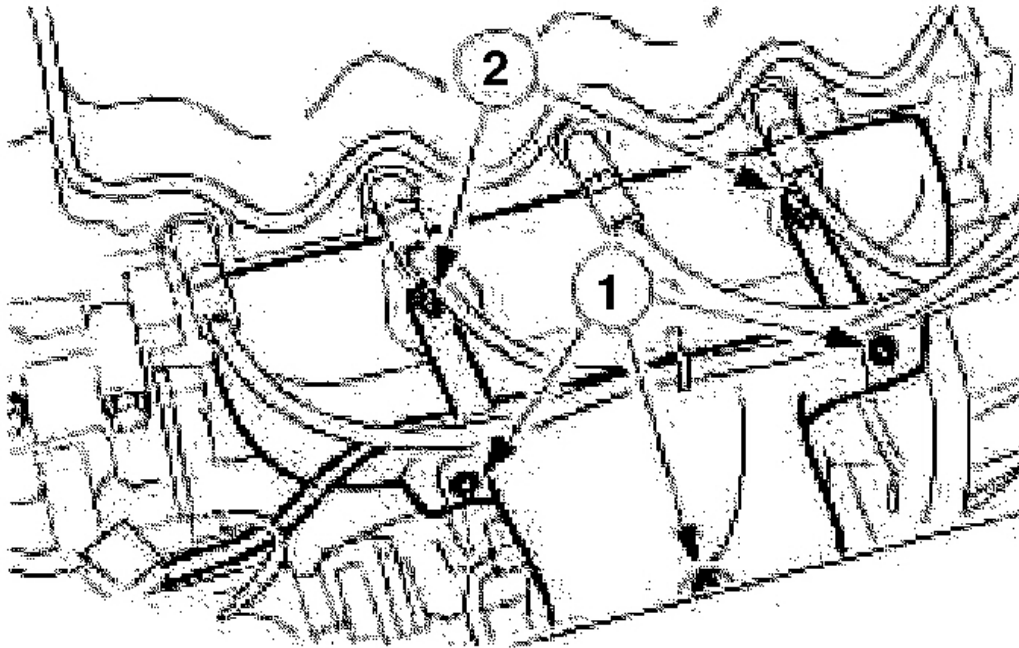
5. Tighten the EGR - Tube nut.



G03432175

Fig. 127: Tightening EGR Tube Nut
Courtesy of FORD MOTOR CO.

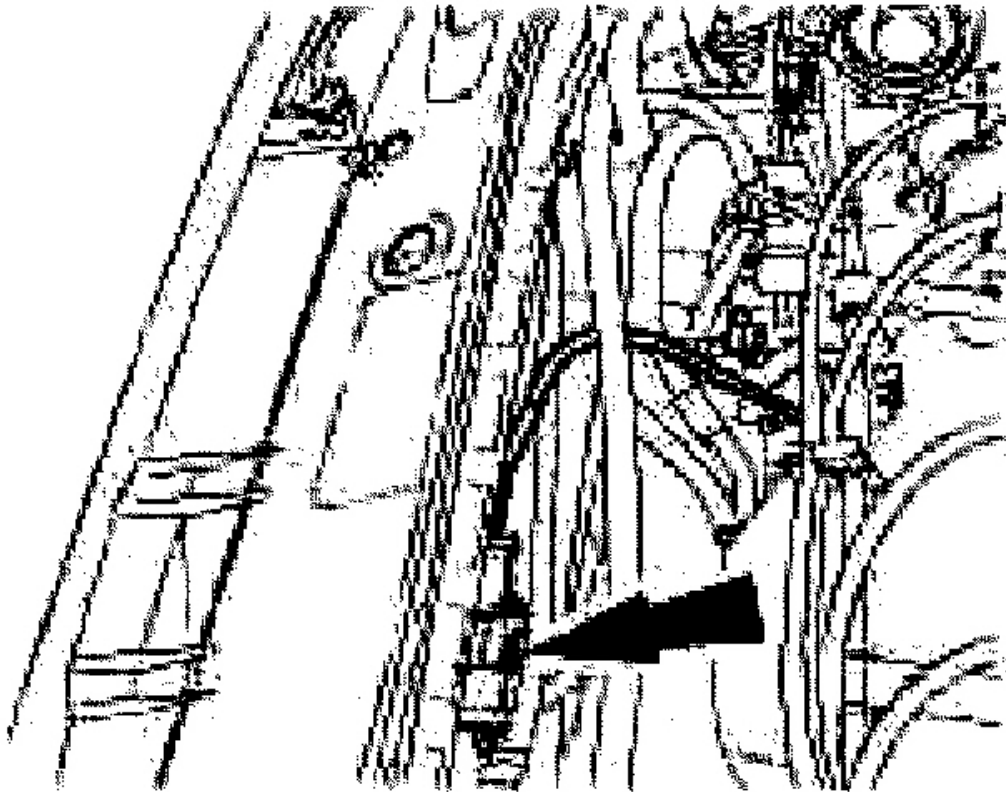
6. Install the heat shield.
 1. Position the heat shield and install the nuts.
 2. Install the power steering pressure tube and install the nuts.



G03432176

Fig. 128: Installing Heat Shield
Courtesy of FORD MOTOR CO.

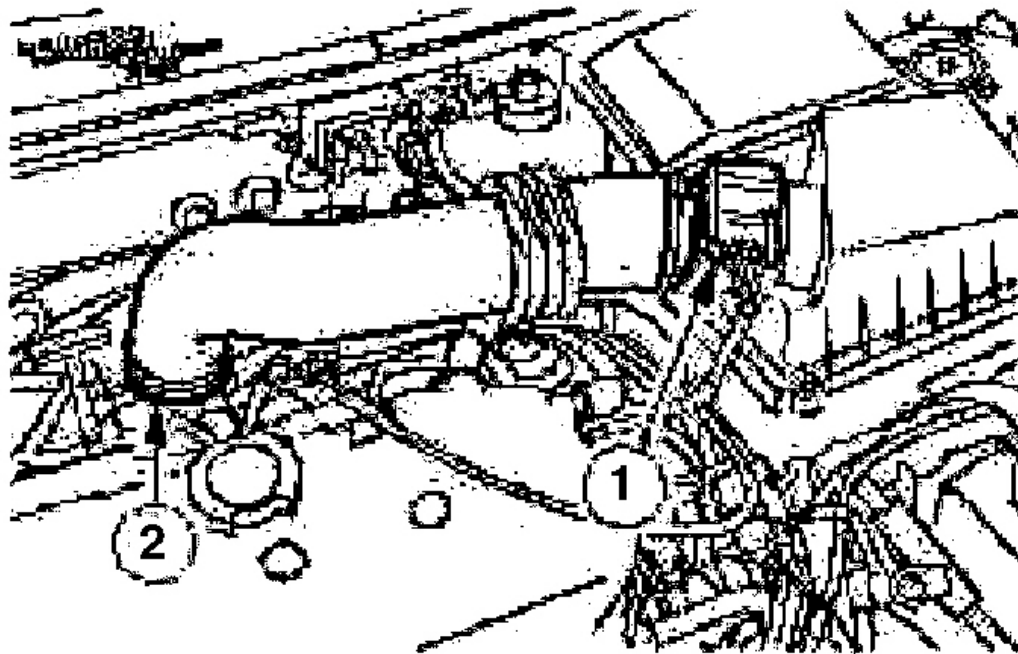
7. Connect the heated oxygen sensor (HO2S) electrical connector.



G03432177

Fig. 129: Connecting Heated Oxygen Sensor (Ho2S) Electrical Connector
Courtesy of FORD MOTOR CO.

8. Install the air cleaner housing (ACL)
 1. Connect the MAF electrical connector.
 2. Attach the intake hose.



G03432178

Fig. 130: Installing Air Cleaner Housing (ACL)
Courtesy of FORD MOTOR CO.

9. Connect the battery ground lead.

CYLINDER HEAD

Special Tool(s)



G03432179

Fig. 131: Identifying Special Tools
Courtesy of FORD MOTOR CO.

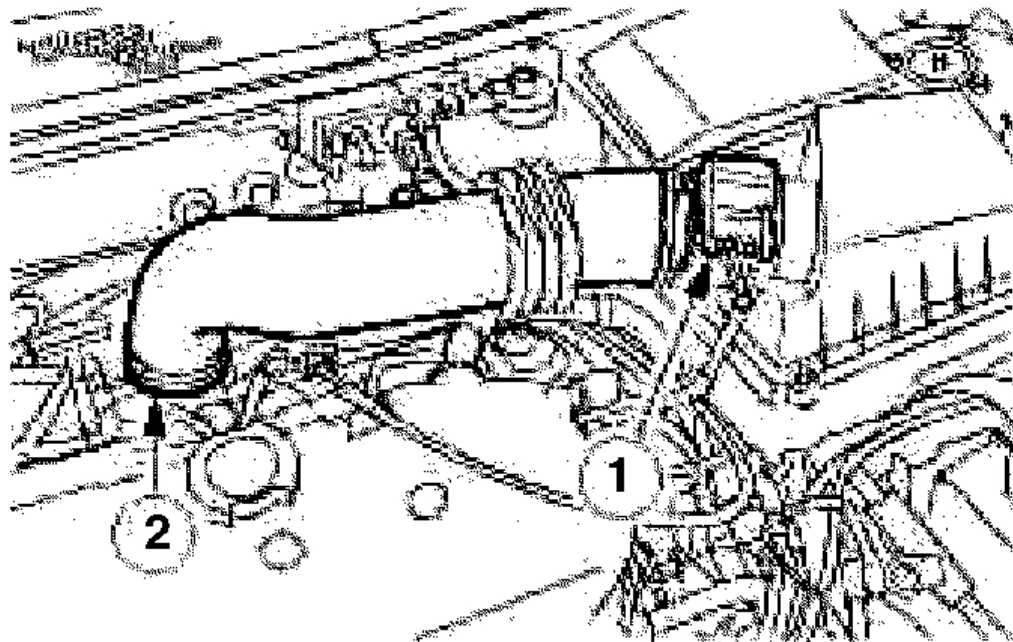
Material

MATERIAL SPECIFICATION

Cable ties	WSS-M2C153-H
Engine oil	

Removal

1. Remove the air cleaner housing.
 1. Disconnect the mass air flow MAF electrical connector.
 2. Detach the intake hose.
 - Remove the air cleaner housing from the rubber bushing.

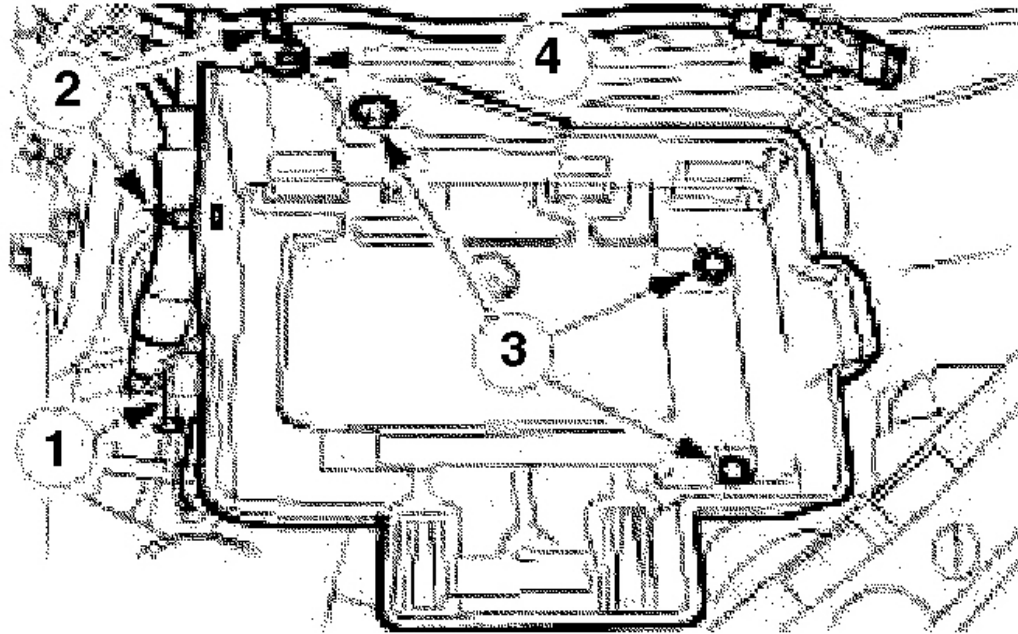


G03432180

Fig. 132: Disconnecting Mass Air Flow (MAF) Electrical Connector
Courtesy of FORD MOTOR CO.

**CAUTION: Disconnect the battery positive and the ground cable.
Remove the battery.**

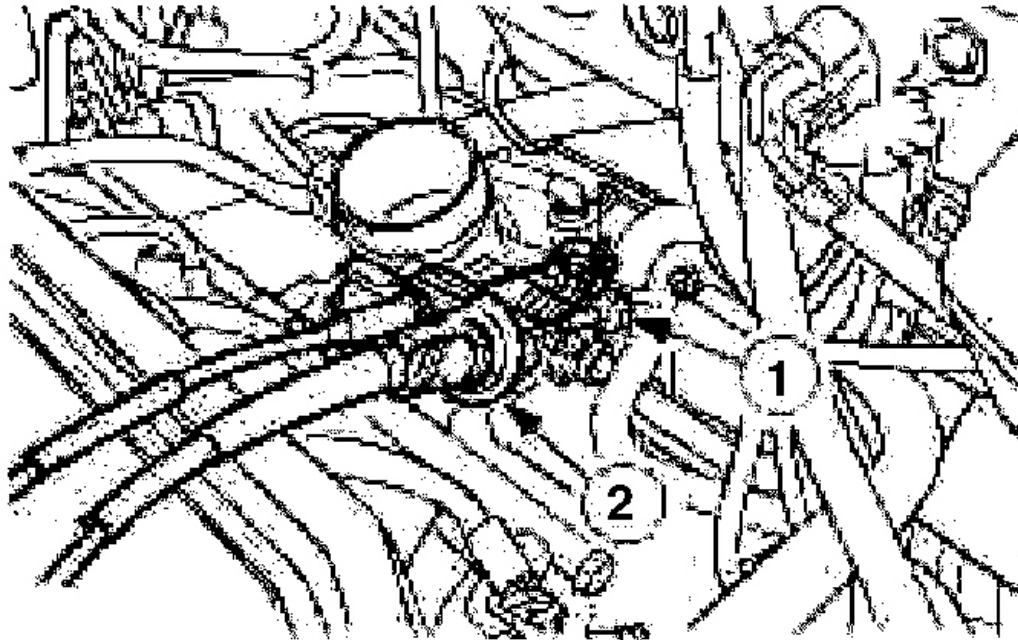
2. Remove the battery tray and detach the ground cable.
 1. Detach and separate the connector.
 2. Detach the wiring harness.
 3. Unscrew the bolts.
 4. Detach the positive and negative cables.



G03432181

Fig. 133: Removing Battery Tray And Detaching Ground Cable
Courtesy of FORD MOTOR CO.

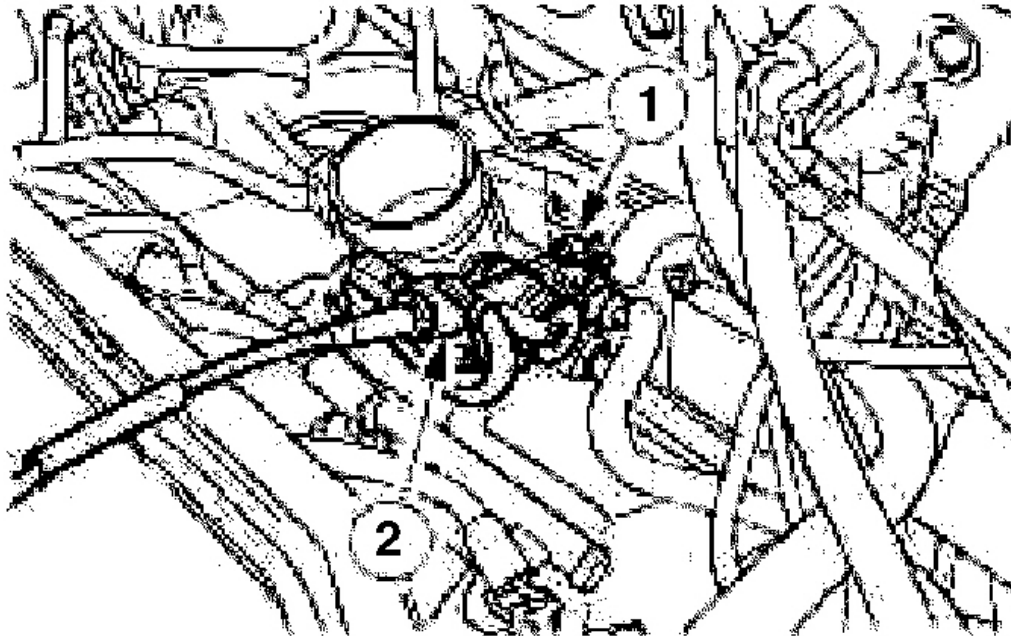
3. Detach the accelerator cable.
 1. Unhook the cable.
 2. Pull off the plastic clip and lay the accelerator cable to one side.



G03432182

Fig. 134: Detaching Accelerator Cable
Courtesy of FORD MOTOR CO.

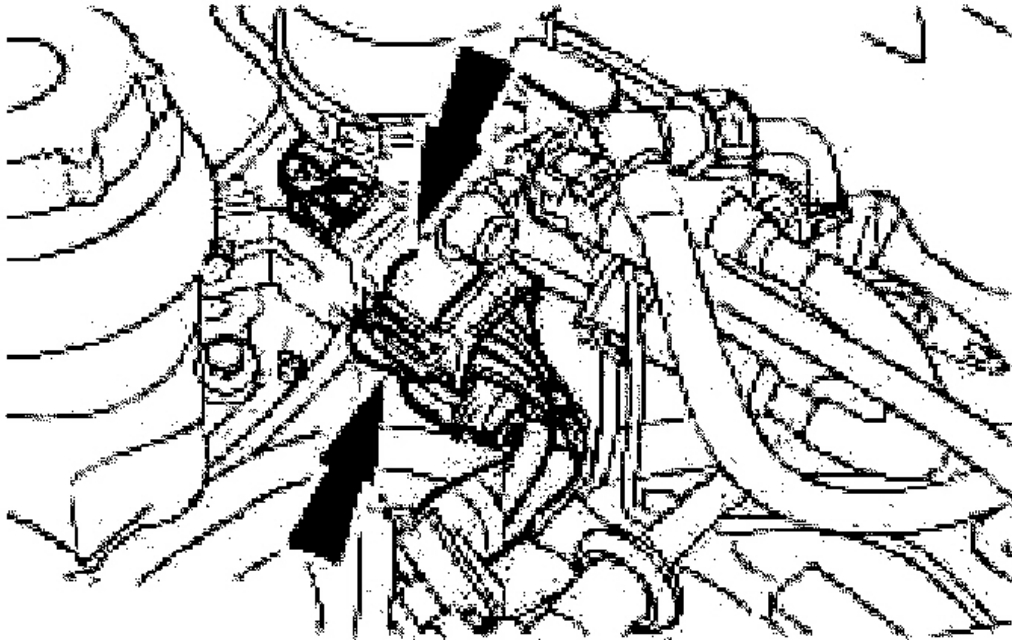
4. Remove the speed control cable.
 1. Unhook the cable.
 2. Pull off the plastic clip and lay the speed control cable to one side.



G03432183

Fig. 135: Removing Speed Control Cable
Courtesy of FORD MOTOR CO.

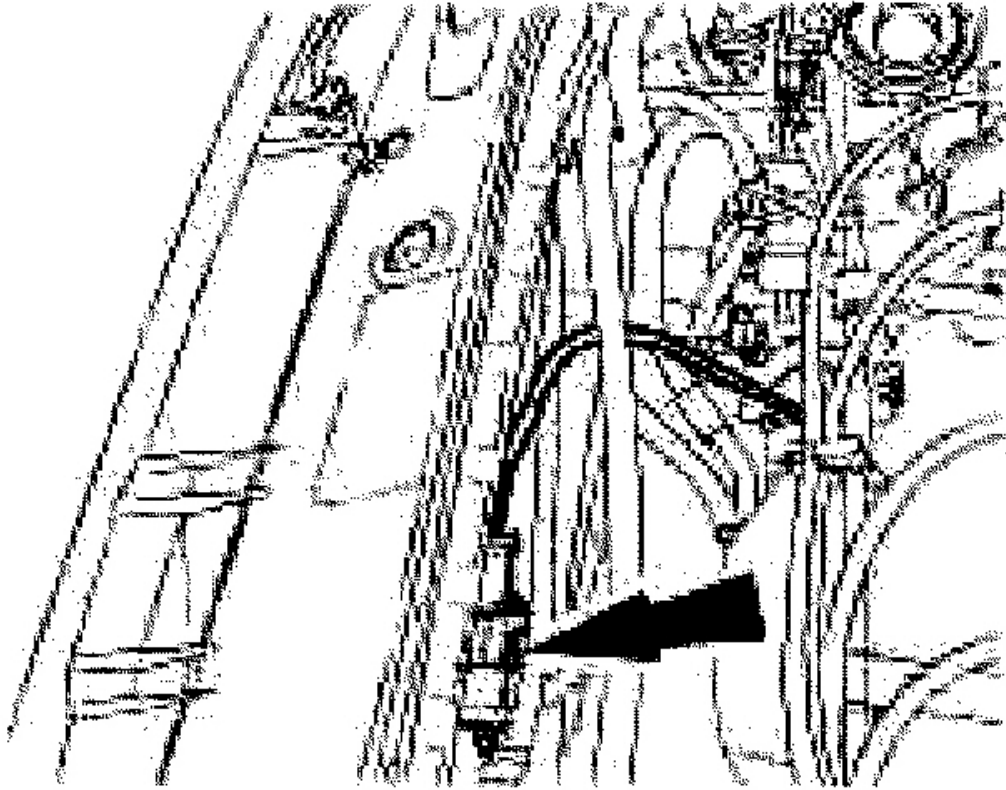
5. Disconnect the both powertrain control module (PCM) connectors.



G03432184

Fig. 136: Disconnecting Powertrain Control Module (PCM) Connectors
Courtesy of FORD MOTOR CO.

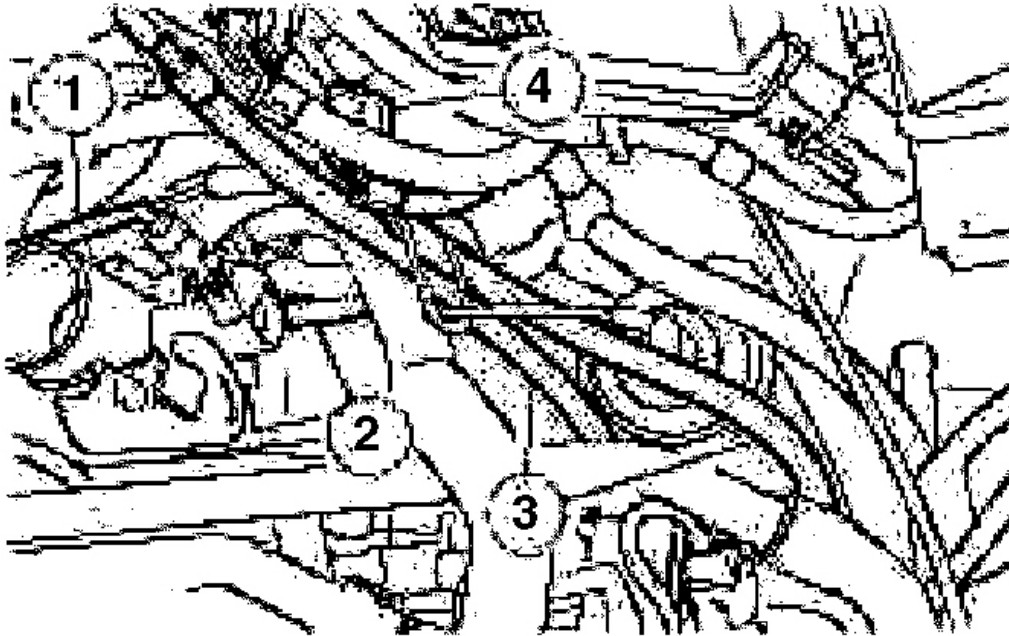
6. Disconnect the heated oxygen sensor (HO2S) electrical connector.



G03432185

Fig. 137: Disconnecting Heated Oxygen Sensor (HO2S) Electrical Connector
Courtesy of FORD MOTOR CO.

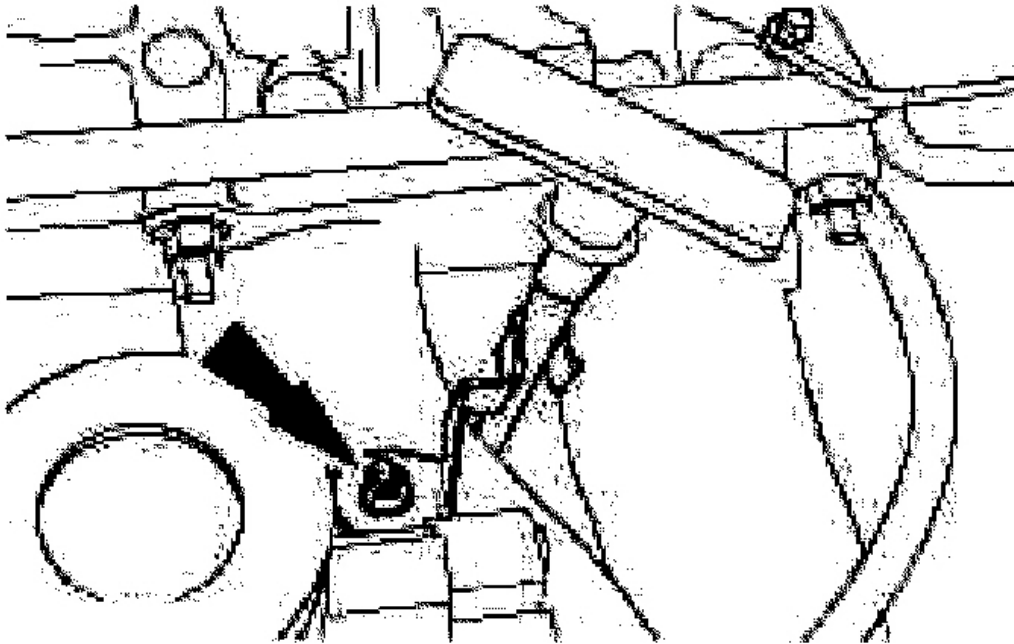
7. Detach the vacuum hoses.
 1. EVAP
 2. Brake servo
 3. Delta Pressure Feedback Electronic System Sensor (DPFE)
 4. Exhaust gas recirculation (EGR) valve



G03432186

Fig. 138: Detaching Vacuum Hoses
Courtesy of FORD MOTOR CO.

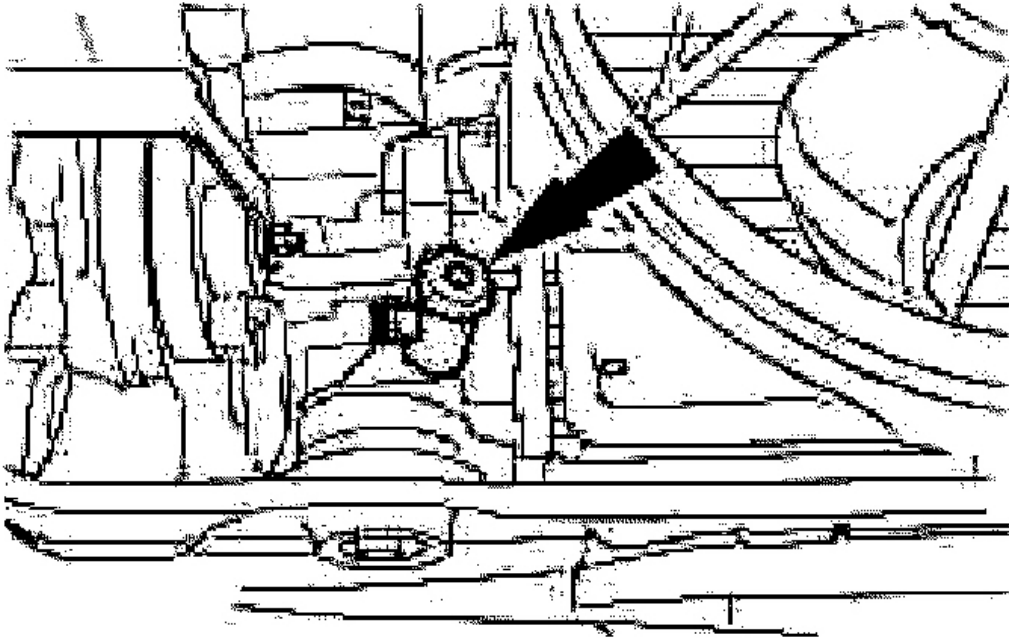
8. Remove the nut and the oil level indicator tube.



G03432187

Fig. 139: Removing Oil Level Indicator Tube
Courtesy of FORD MOTOR CO.

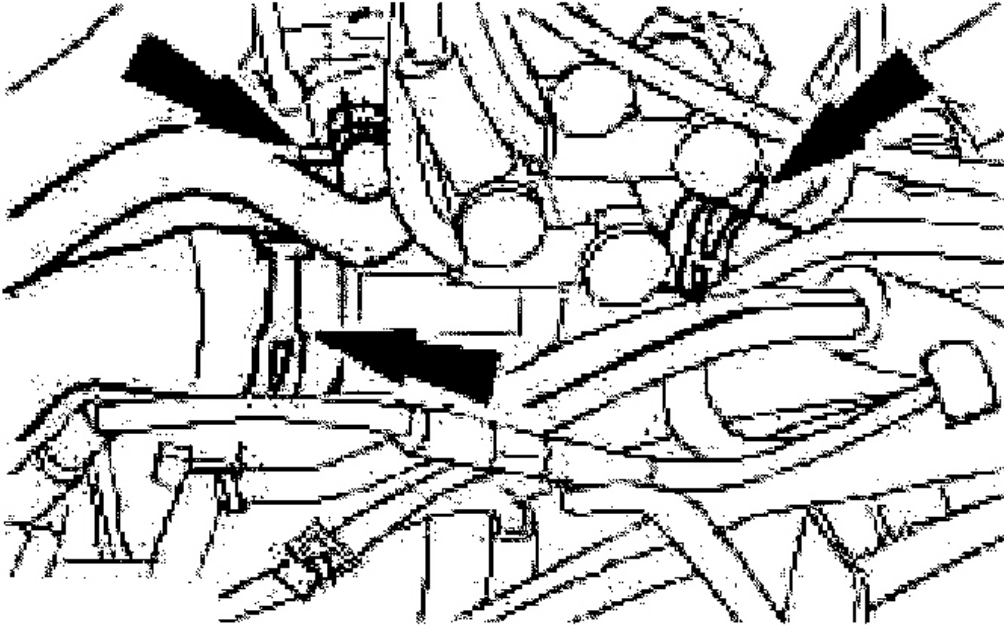
WARNING: Danger of scalding if the engine is hot.



G03432188

Fig. 140: Removing Drain Plug
Courtesy of FORD MOTOR CO.

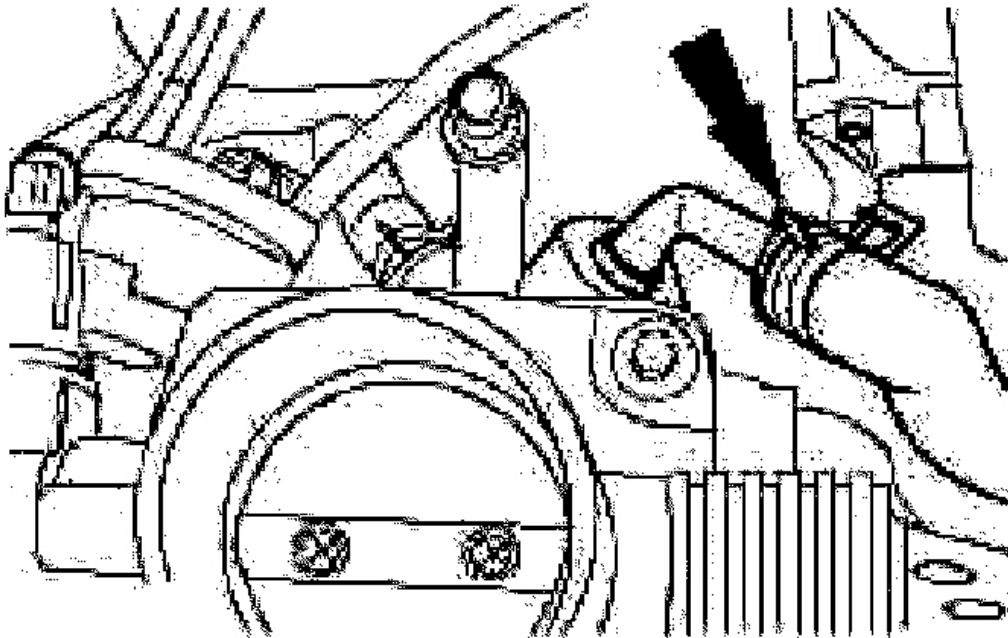
9. Drain the coolant (shown from below).
10. Remove the coolant hoses from the thermostat housing.



G03432189

Fig. 141: Removing Coolant Hoses From Thermostat Housing
Courtesy of FORD MOTOR CO.

11. Remove the coolant hose.

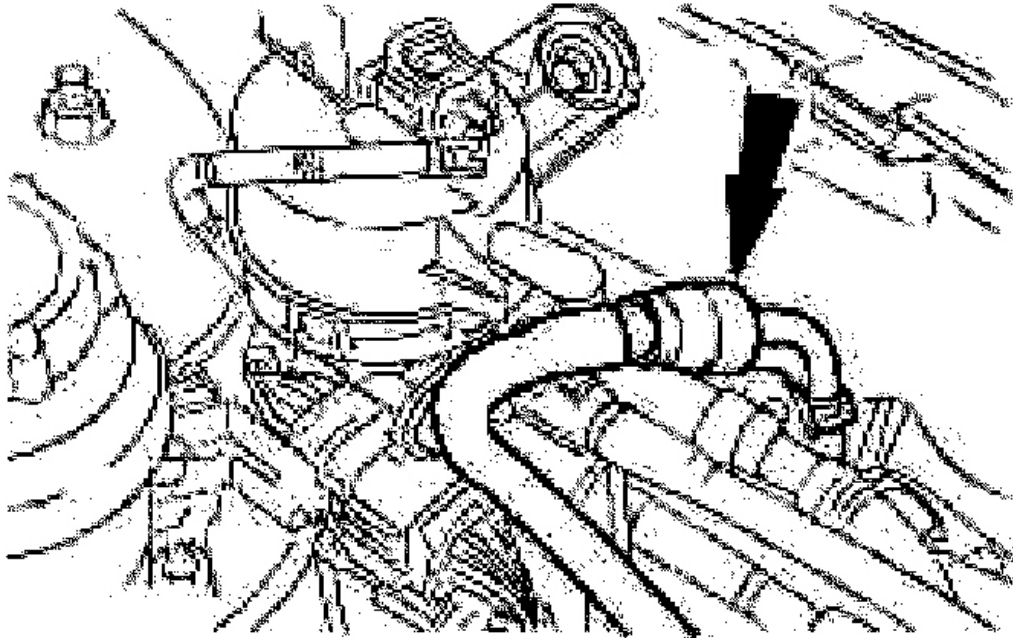


G03432190

Fig. 142: Removing Coolant Hose
Courtesy of FORD MOTOR CO.

WARNING: Escaping fuel. Observe the safety regulations for working with fuel. Failure to follow these instruction may result in personal injury.

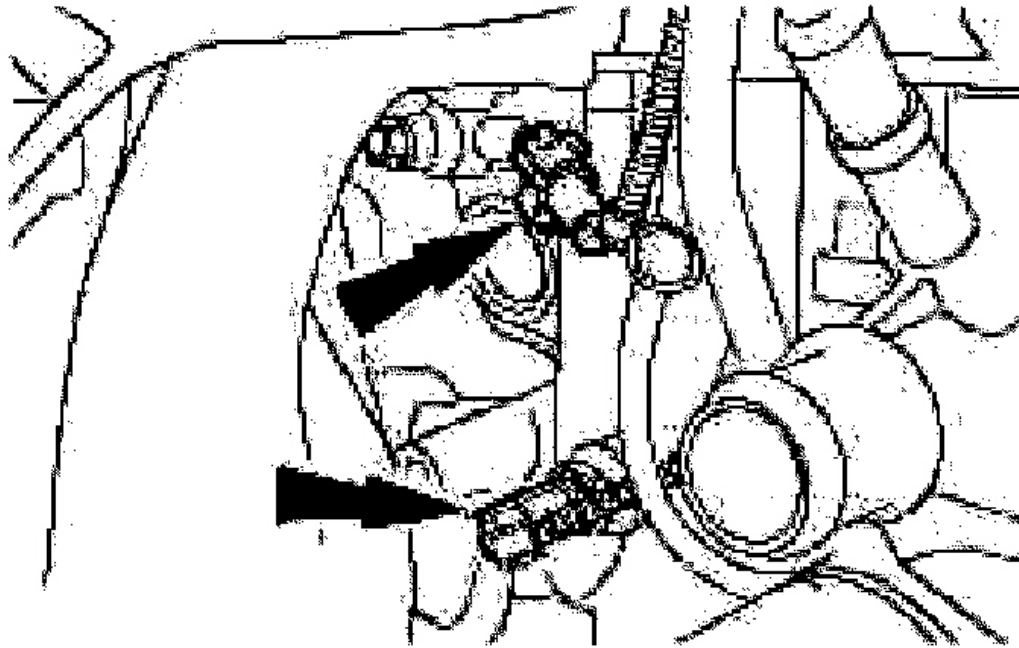
12. Drain off the fuel. For additional information, refer to **FUEL SYSTEMS** article .
 - Detach the fuel hose.



G03432191

Fig. 143: Detaching Fuel Hose
Courtesy of FORD MOTOR CO.

13. Raise and support the vehicle.
14. Disconnect the knock sensor (KS) and the oil pressure switch electrical connectors (shown from below).
 1. Oil pressure switch
 2. Knock sensor

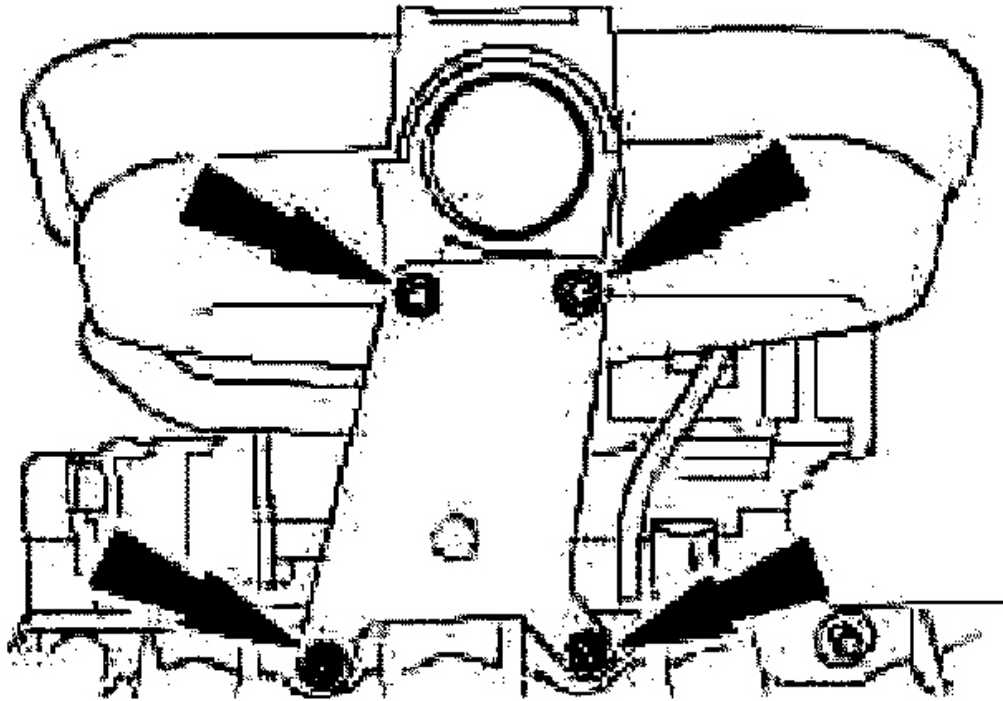


G03432192

Fig. 144: Disconnecting Knock Sensor (KS) And Oil Pressure Switch Electrical Connectors

Courtesy of FORD MOTOR CO.

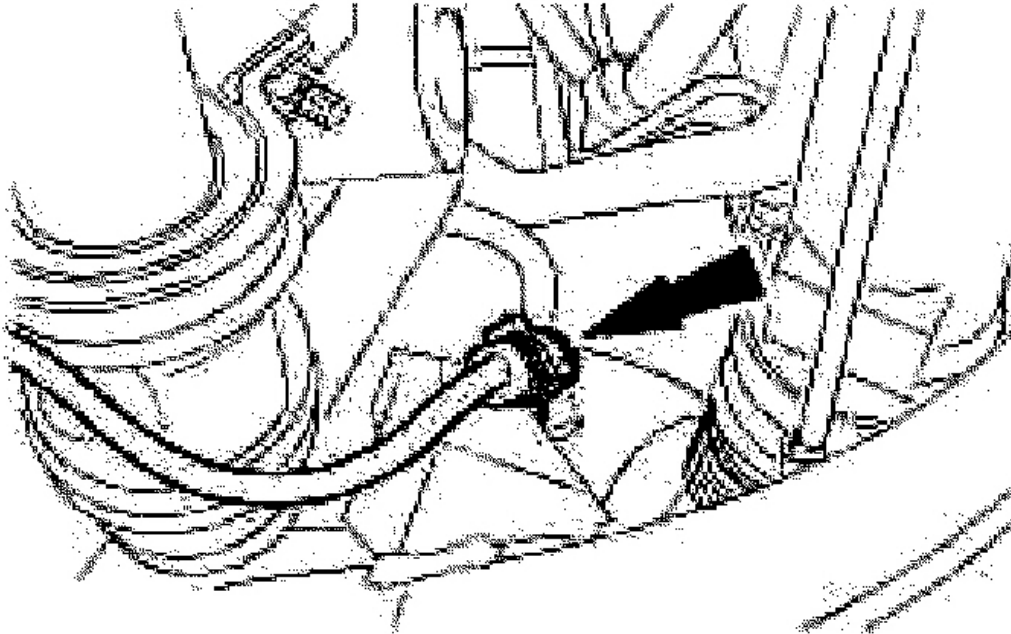
15. Detach the intake manifold bracket.
 - Loosen the nuts and remove the bolts.



G03432193

Fig. 145: Detaching Intake Manifold Bracket
Courtesy of FORD MOTOR CO.

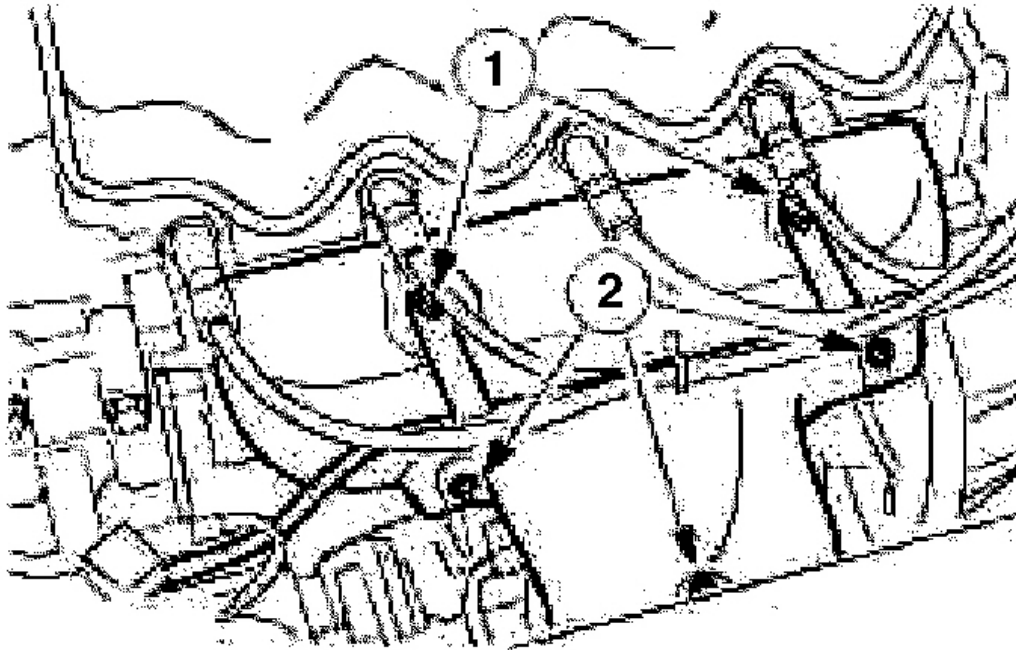
16. Disconnect and remove the catalyst monitor sensor electrical connector.



G03432194

Fig. 146: Removing Catalyst Monitor Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

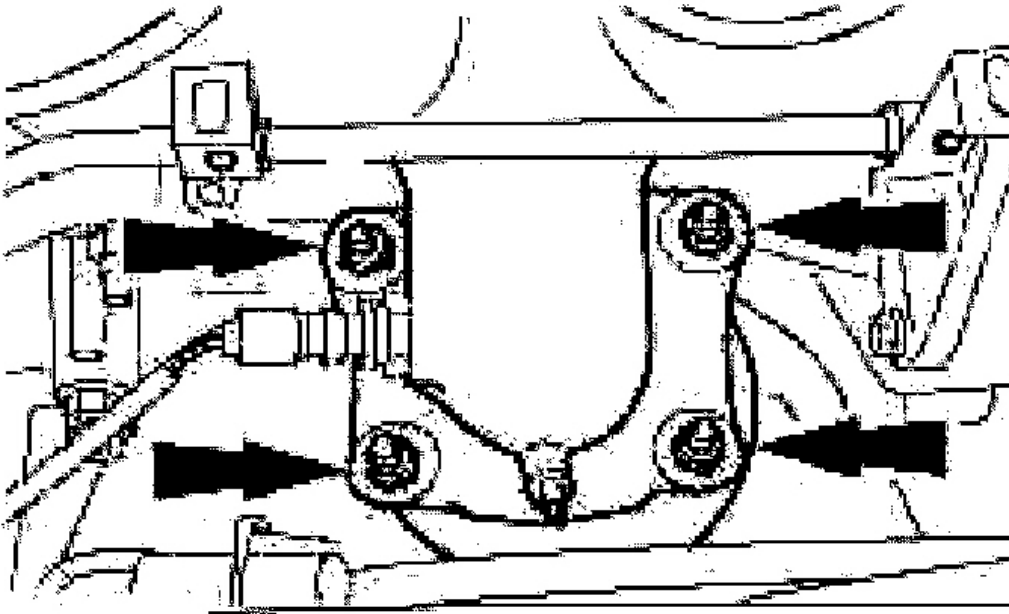
17. Lower the vehicle.
18. Remove the heat shield.
 1. Power steering pipe
 2. Heat shield



G03432195

Fig. 147: Removing Heat Shield
Courtesy of FORD MOTOR CO.

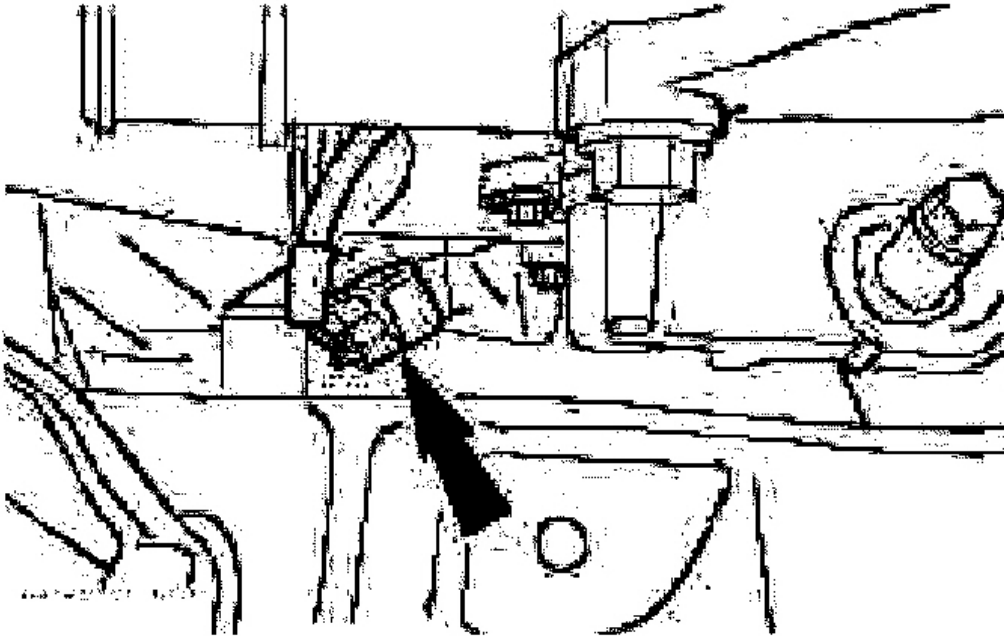
19. Remove the catalytic converter from the exhaust manifold.



G03432196

Fig. 148: Removing Catalytic Converter From Exhaust Manifold
Courtesy of FORD MOTOR CO.

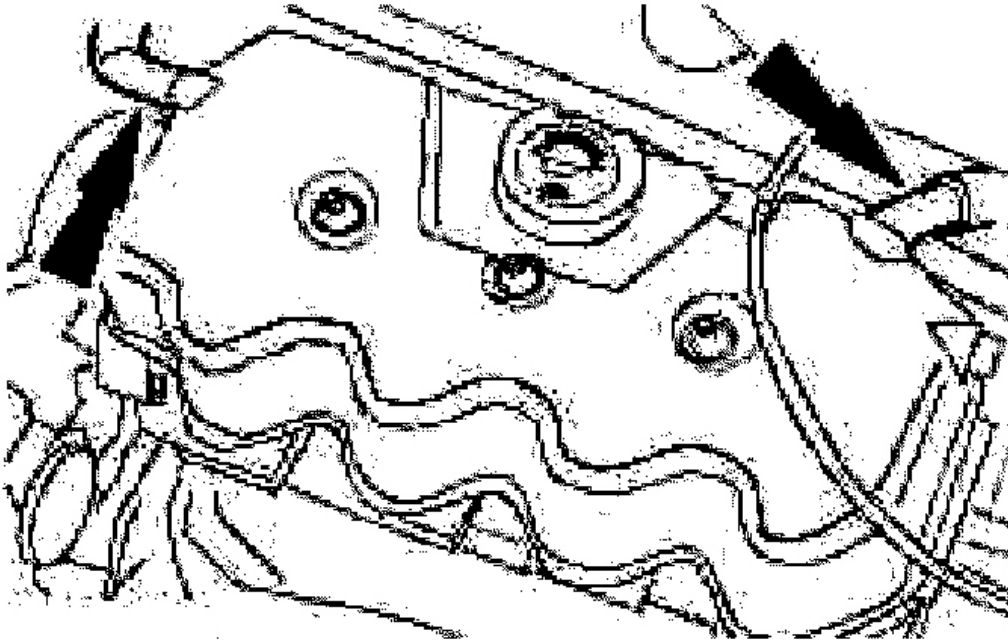
20. Remove the timing belt. For additional information, refer to **TIMING BELT** ..
21. Disconnect the crankshaft position sensor (CKP) electrical connector.



G03432197

Fig. 149: Disconnecting Crankshaft Position Sensor (CKP) Electrical Connector
Courtesy of FORD MOTOR CO.

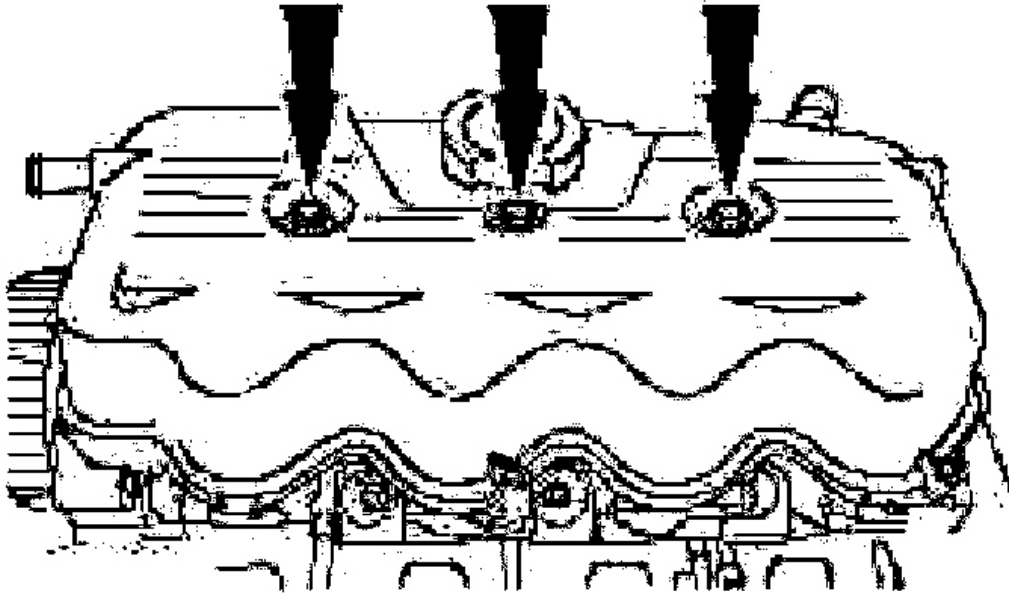
22. Disconnect the PCV and the fresh air hoses.



G03432198

Fig. 150: Disconnecting PCV And Fresh Air Hoses
Courtesy of FORD MOTOR CO.

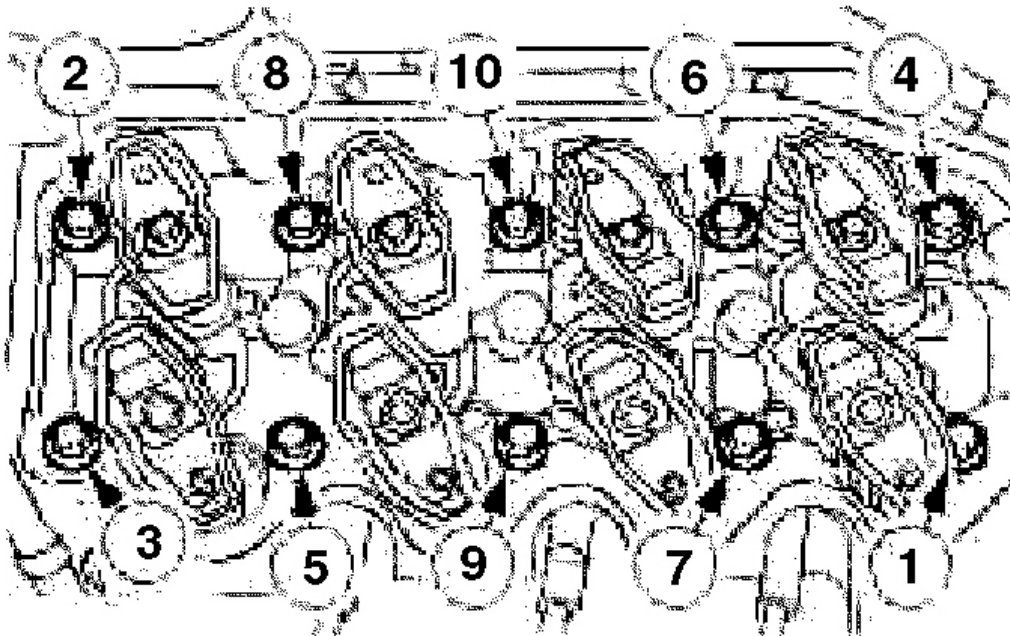
23. Remove the valve cover.



G03432199

Fig. 151: Removing Valve Cover
Courtesy of FORD MOTOR CO.

CAUTION: Do not work on aluminum engine components until the engine is cold.



G03432200

Fig. 152: Identifying Loosening Sequence Of Cylinder Bolts
Courtesy of FORD MOTOR CO.

24. Loosen the cylinder head bolts in the indicated sequence.
25. Remove the cylinder head.
 - Discard the gasket.

Installation

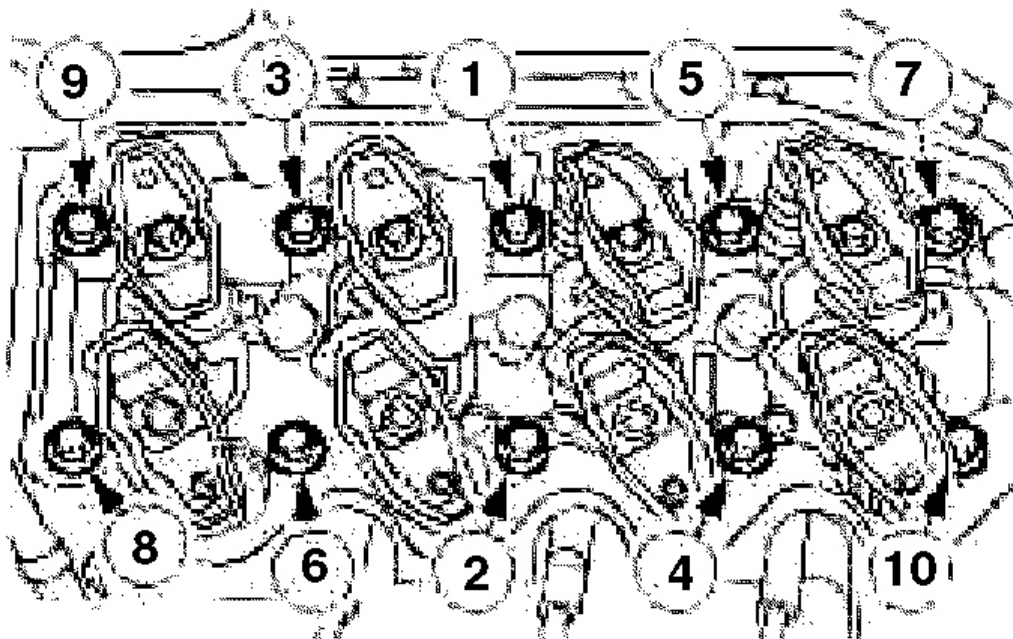
CAUTION: Do not use abrasive grinding disk to remove gasket material; use only plastic scrapers. Do not scratch or gouge aluminum sealing surfaces.

1. Clean all gasket material from the mating surfaces on the cylinder head and cylinder block. Clean out the bolt holes in the cylinder block. Inspect the cylinder head for distortion. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION article .
2. Install a new head gasket on the cylinder block.

CAUTION: Always install new cylinder head bolts.

NOTE: Lubricate the cylinder head bolts with engine oil prior to installation.

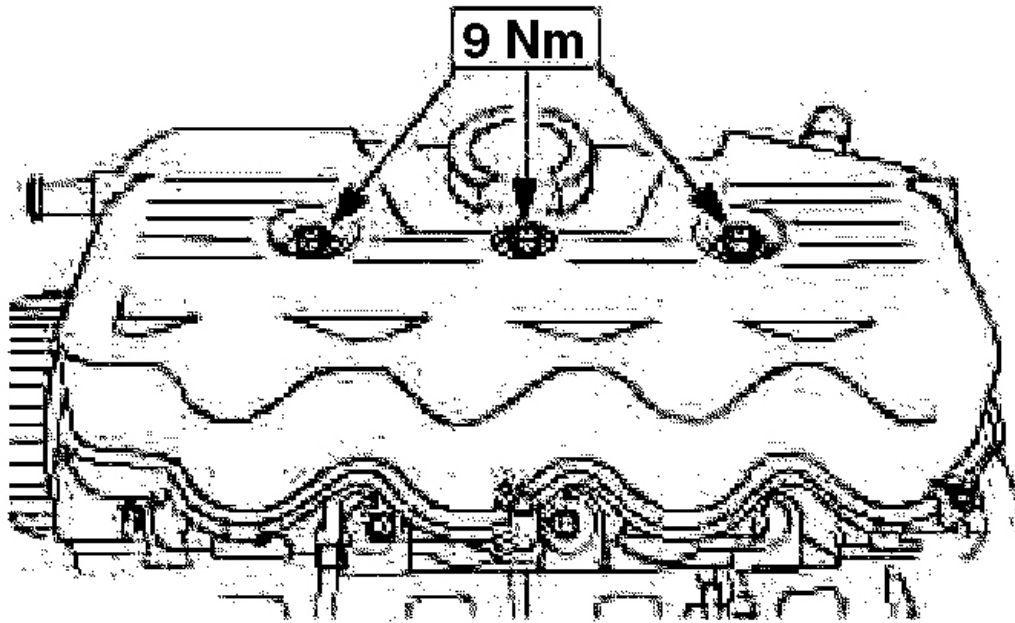
3. Install the cylinder head assembly and tighten the cylinder head bolts in the following sequence.
 1. Tighten all bolts in a single sequence to 50 N.m.
 2. Back the bolts off 1/2 turn.
 3. Tighten the bolts in sequence shown to 50 N.m.
 4. Rotate all the bolts in a single sequence an additional 180 degrees in two steps of 90 degrees each.



G03432201

Fig. 153: Identifying Tightening Sequence Of Cylinder Bolts
Courtesy of FORD MOTOR CO.

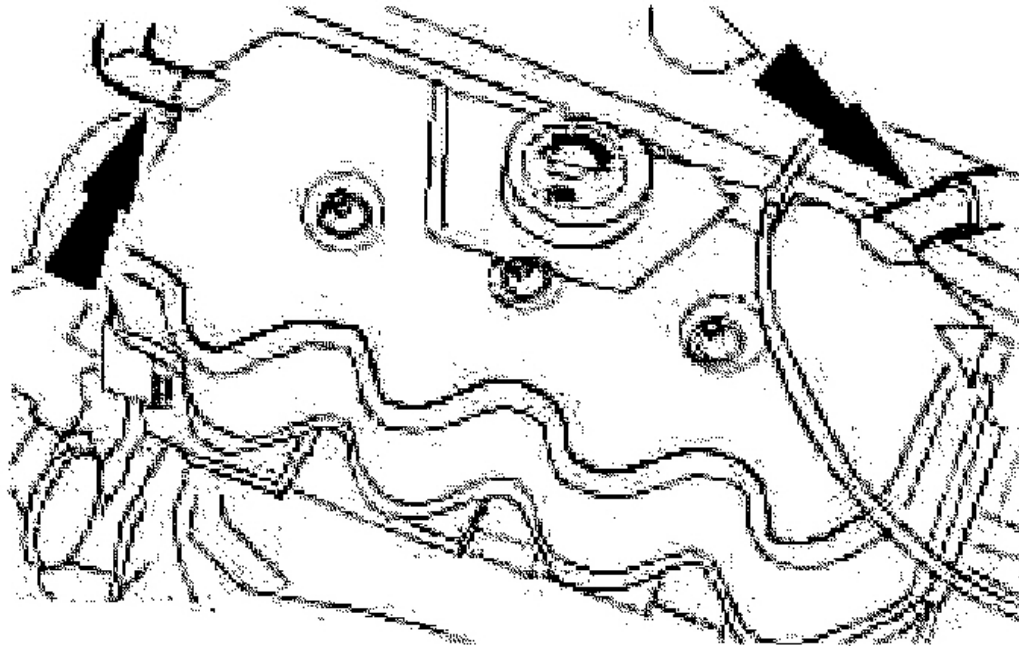
4. Install the valve cover.



G03432202

Fig. 154: Installing Valve Cover
Courtesy of FORD MOTOR CO.

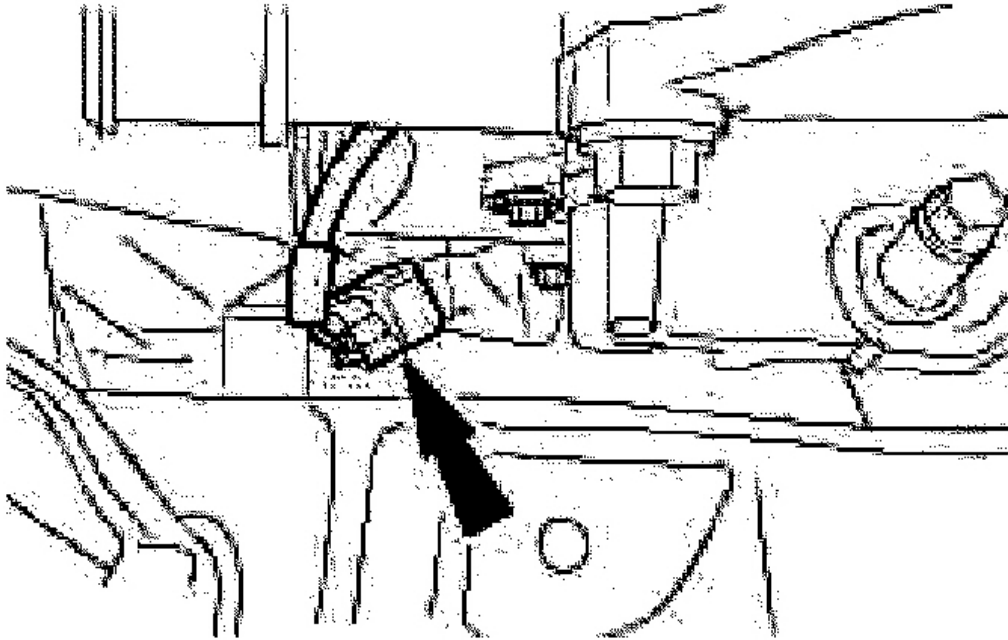
5. Connect the fresh air and PCV hoses.
 - Make sure that the twist-on PCV is secure.



G03432203

Fig. 155: Connecting Fresh Air And PCV Hoses
Courtesy of FORD MOTOR CO.

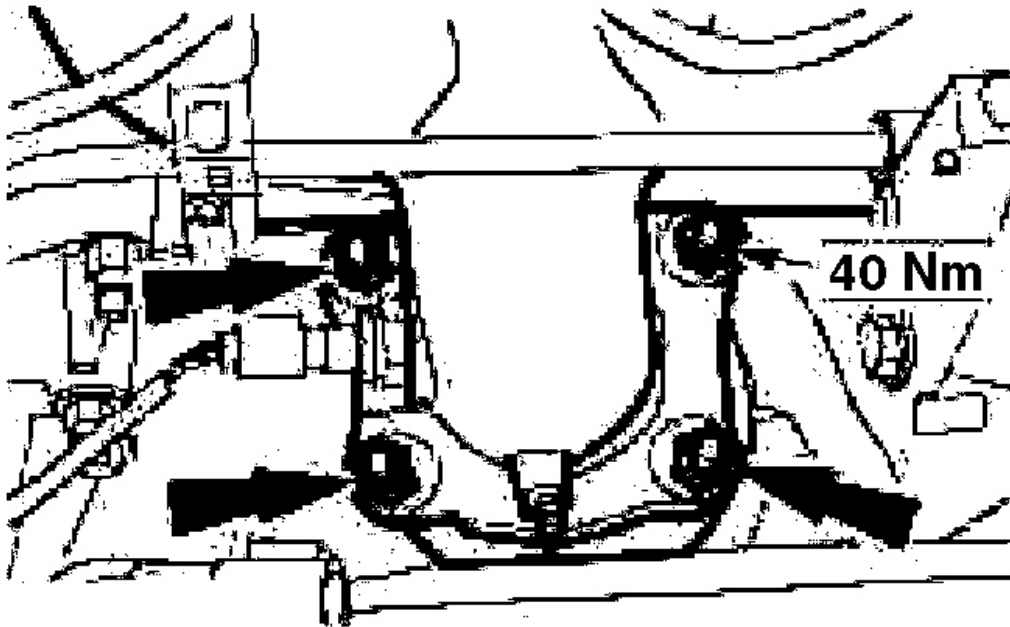
6. Connect the crankshaft position sensor (CKP) electrical connector.



G03432204

Fig. 156: Connecting Crankshaft Position Sensor (CKP) Electrical Connector
Courtesy of FORD MOTOR CO.

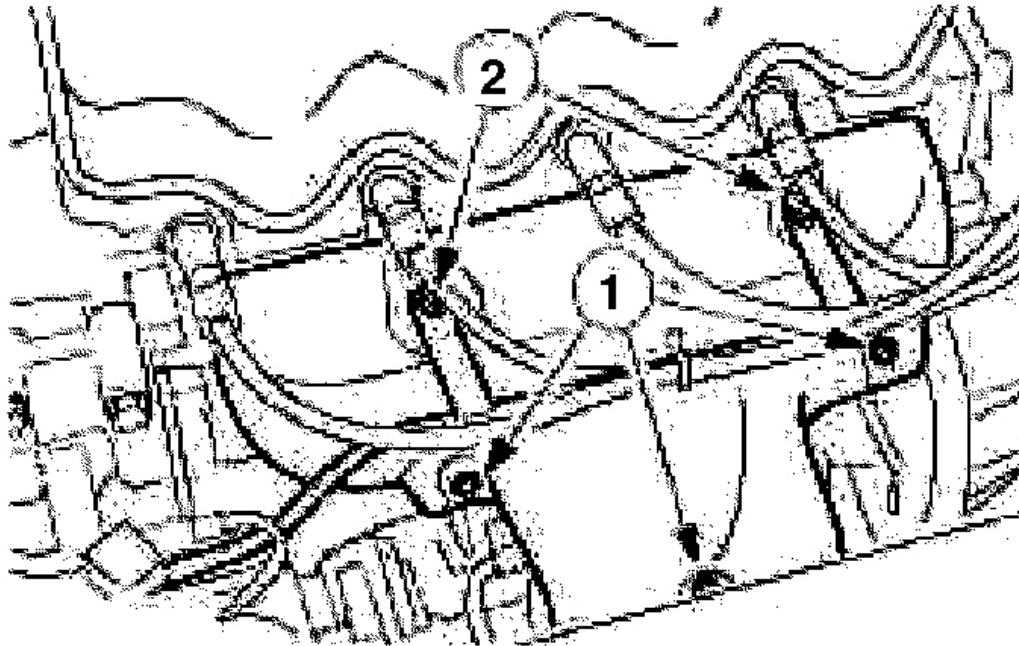
7. Install and tension the timing belt. For additional information, refer to **TIMING BELT**.
8. Install the catalytic converter to the exhaust manifold.



G03432205

Fig. 157: Installing Catalytic Converter To Exhaust Manifold
Courtesy of FORD MOTOR CO.

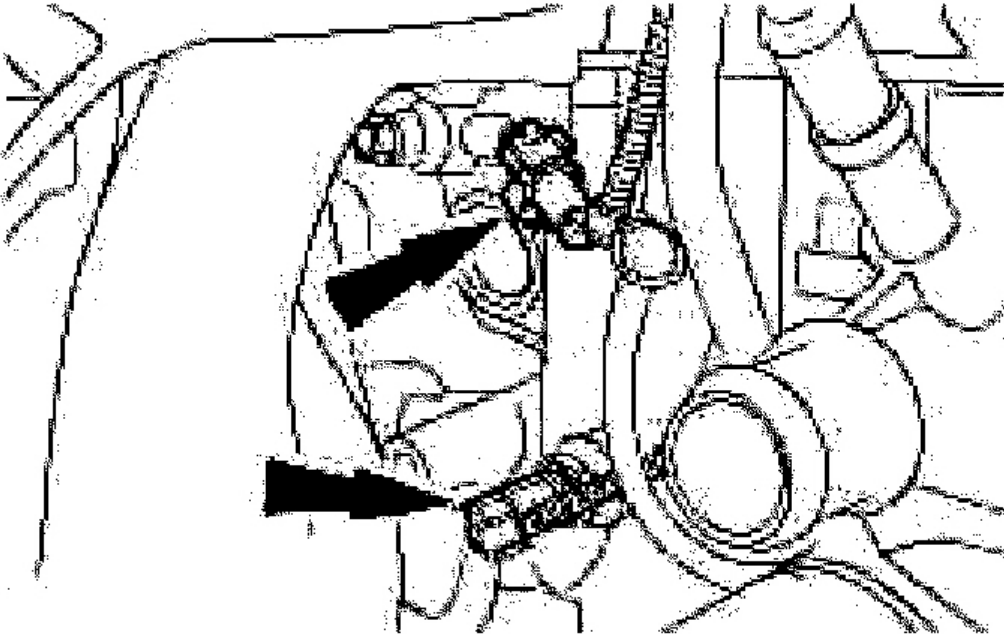
9. Install the heat shield.
 1. Heat shield
 2. Power steering tube



G03432206

Fig. 158: Installing Heat Shield
Courtesy of FORD MOTOR CO.

10. Raise and support the vehicle.
11. Connect the knock sensor (KS) and the oil pressure switch electrical connector.

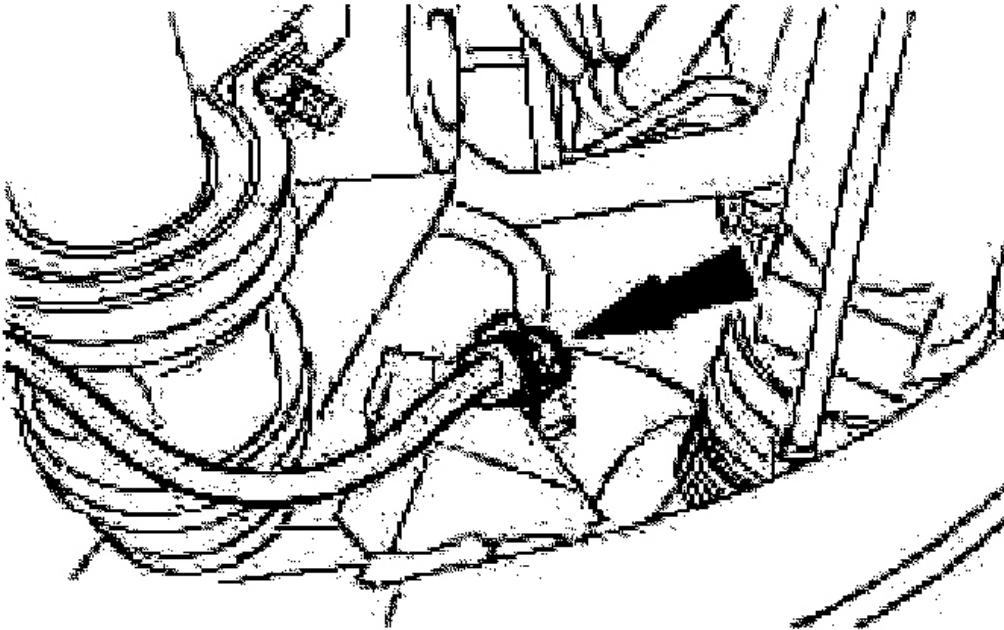


G03432207

Fig. 159: Connecting Knock Sensor (KS) And Oil Pressure Switch Electrical Connector

Courtesy of FORD MOTOR CO.

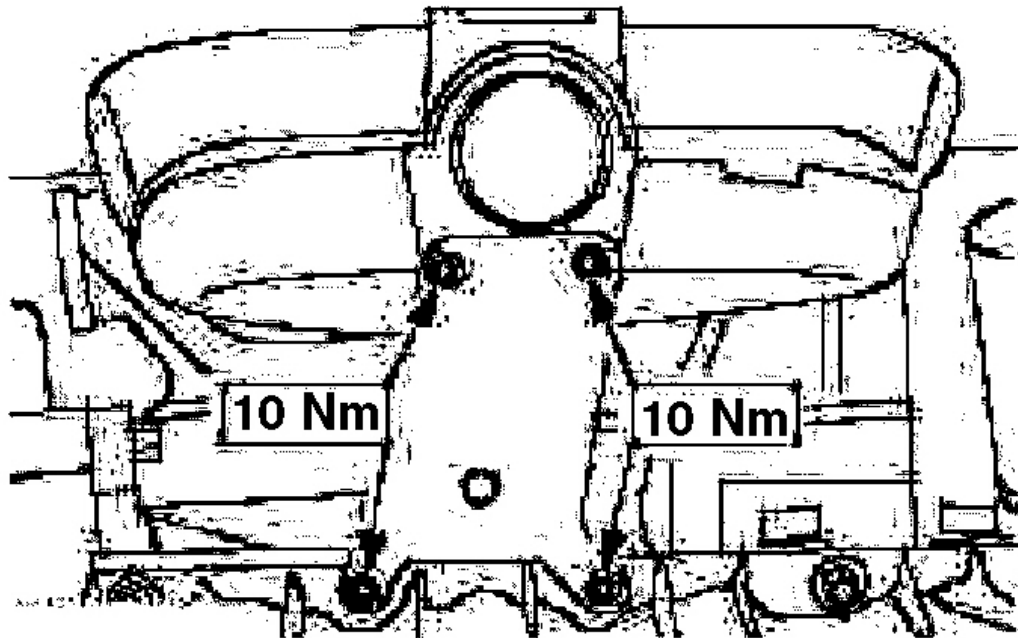
12. Connect the CMS sensor electrical connector.



G03432208

Fig. 160: Connecting CMS Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

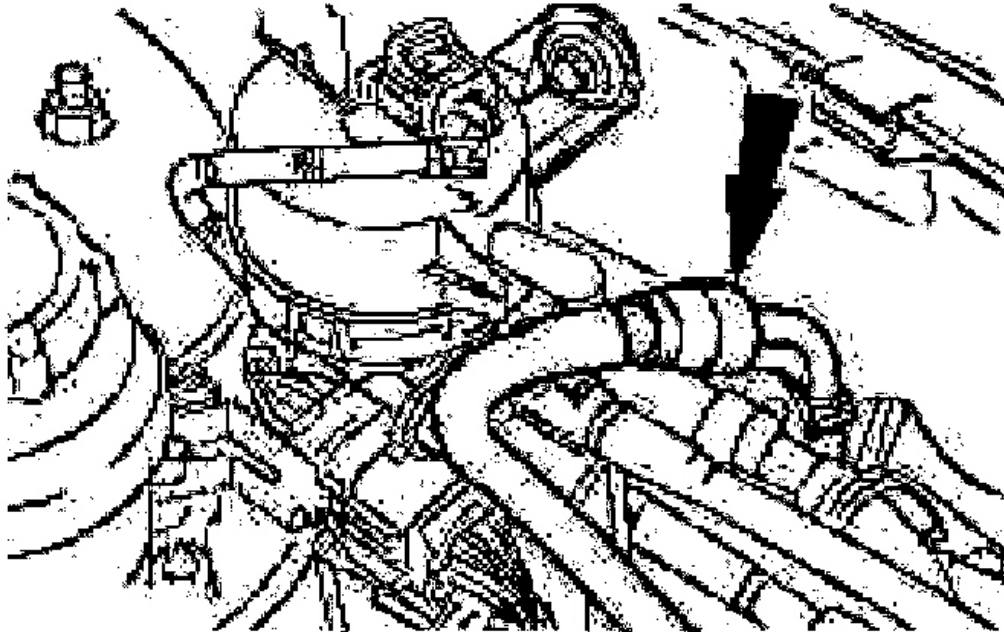
13. Install the intake manifold bracket (shown with engine removed).
 1. Install the bolts and tighten the nuts.



G03432209

Fig. 161: Installing Intake Manifold Bracket
Courtesy of FORD MOTOR CO.

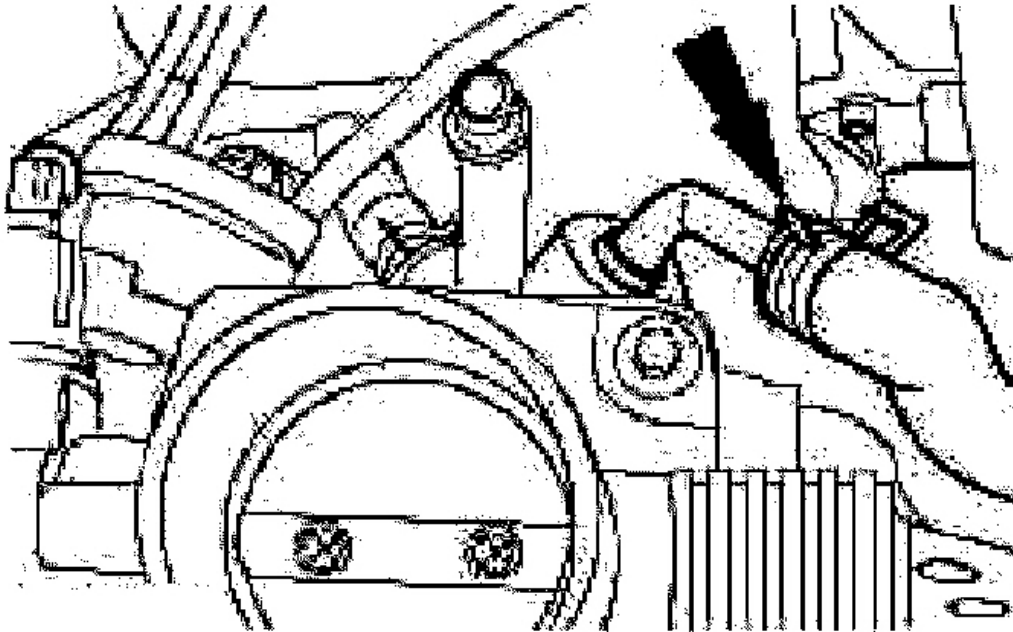
14. Lower the vehicle.
15. Install the fuel hose.



G03432210

Fig. 162: Installing Fuel Hose
Courtesy of FORD MOTOR CO.

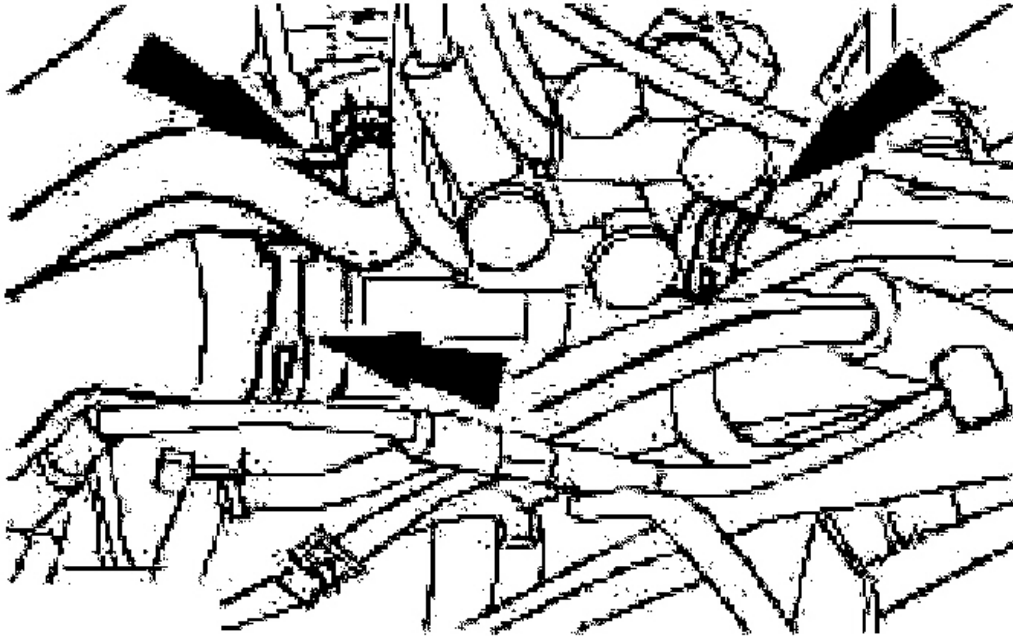
16. Install the coolant hose.



G03432211

Fig. 163: Installing Coolant Hose
Courtesy of FORD MOTOR CO.

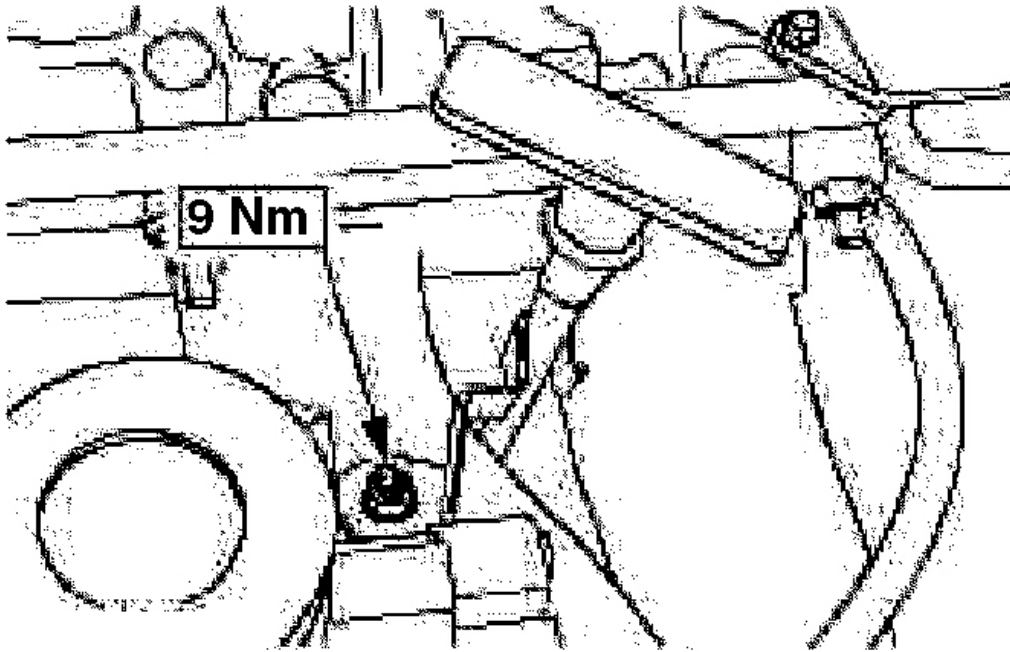
17. Install the coolant hoses to the thermostat housing.



G03432212

Fig. 164: Installing Coolant Hoses To Thermostat Housing
Courtesy of FORD MOTOR CO.

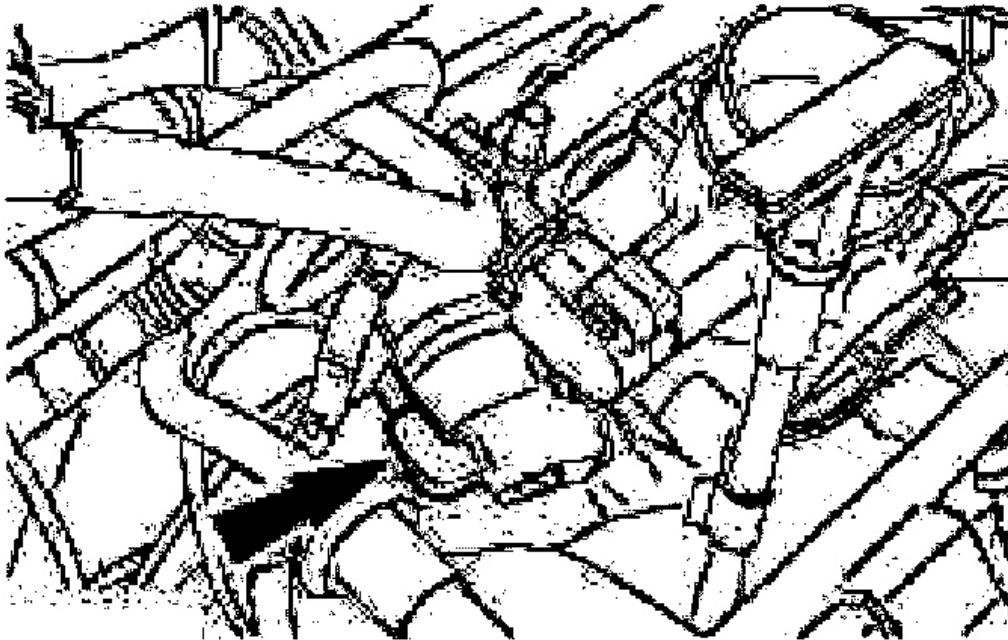
18. Install the oil level indicator tube.



G03432213

Fig. 165: Installing Oil Level Indicator Tube
Courtesy of FORD MOTOR CO.

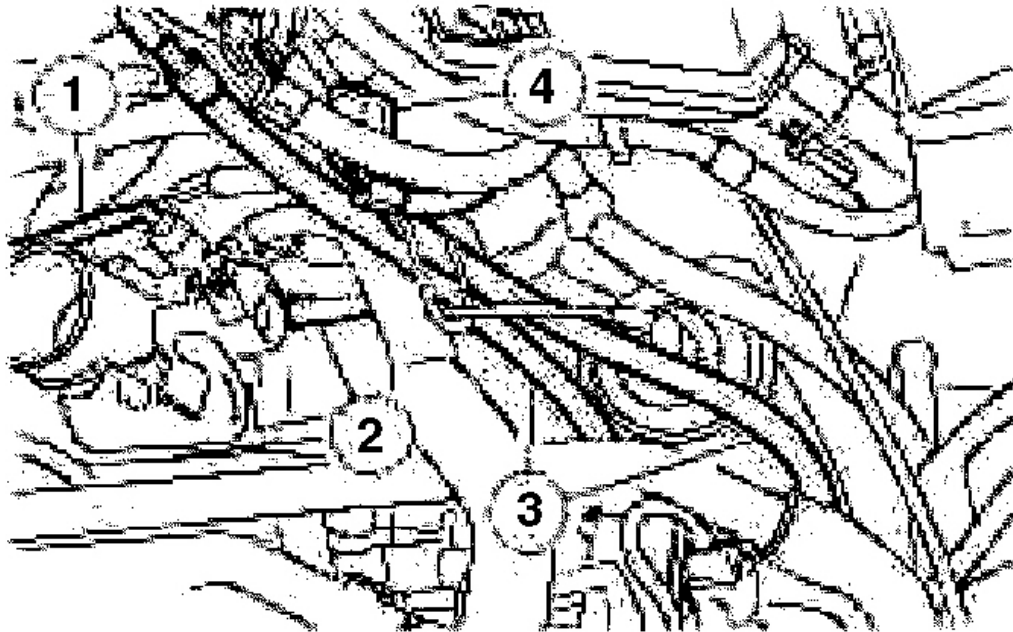
19. Install the vacuum hose.



G03432214

Fig. 166: Installing Vacuum Hoses (1 Of 2)
Courtesy of FORD MOTOR CO.

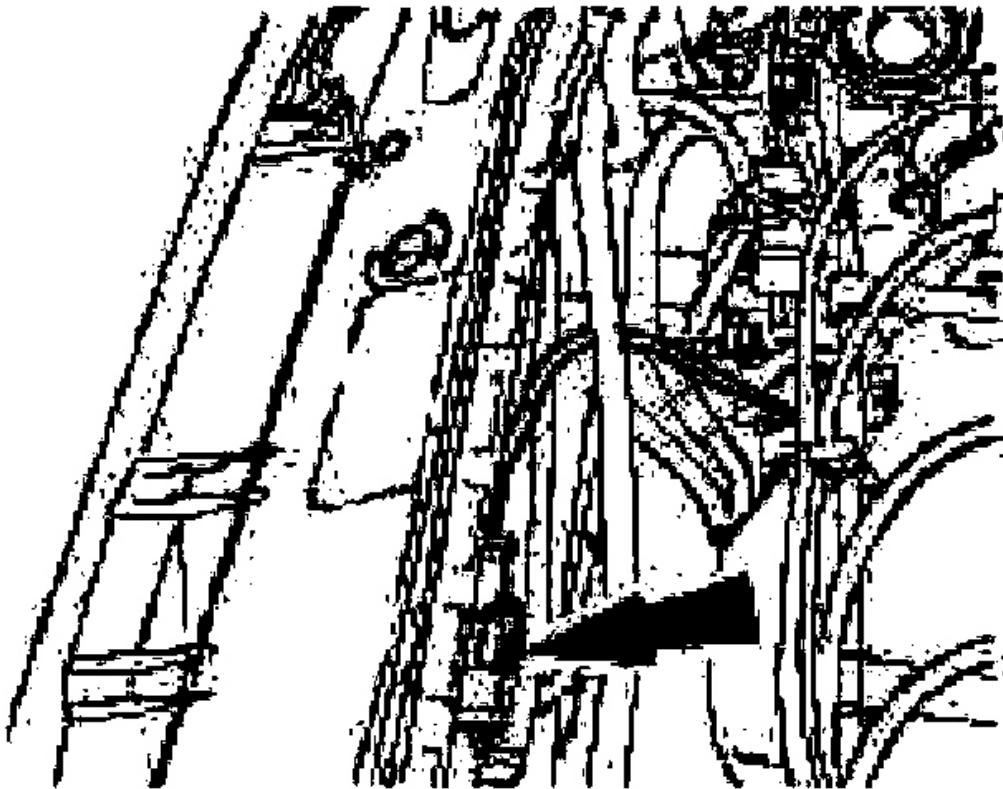
20. Install the vacuum hoses.
 1. EVAP
 2. Brake servo
 3. Delta Pressure Feedback Electronic System Sensor (DPFE)
 4. EGR-valve



G03432215

Fig. 167: Installing Vacuum Hoses (2 Of 2)
Courtesy of FORD MOTOR CO.

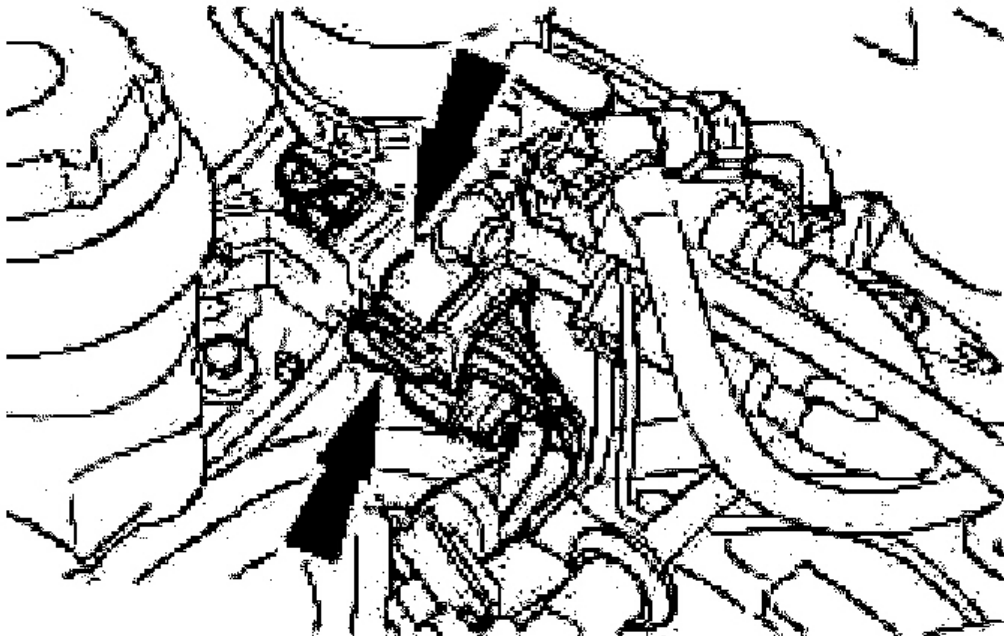
21. Connect the HO2S electrical connector.



G03432216

Fig. 168: Connecting HO2S Electrical Connector
Courtesy of FORD MOTOR CO.

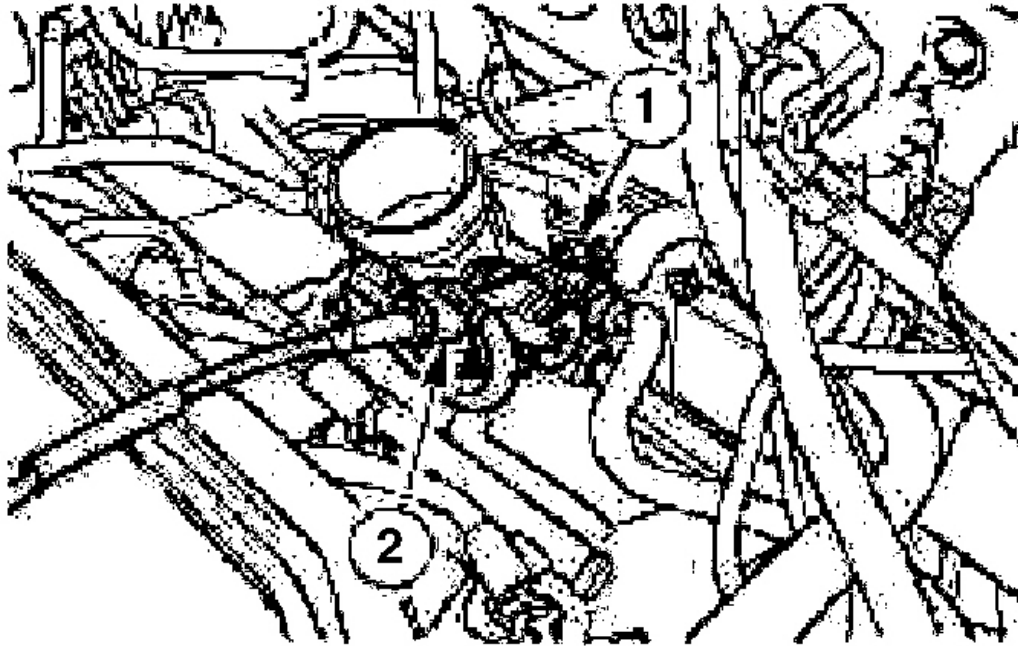
22. Connect both PCM connectors.



G03432217

Fig. 169: Connecting PCM Connectors
Courtesy of FORD MOTOR CO.

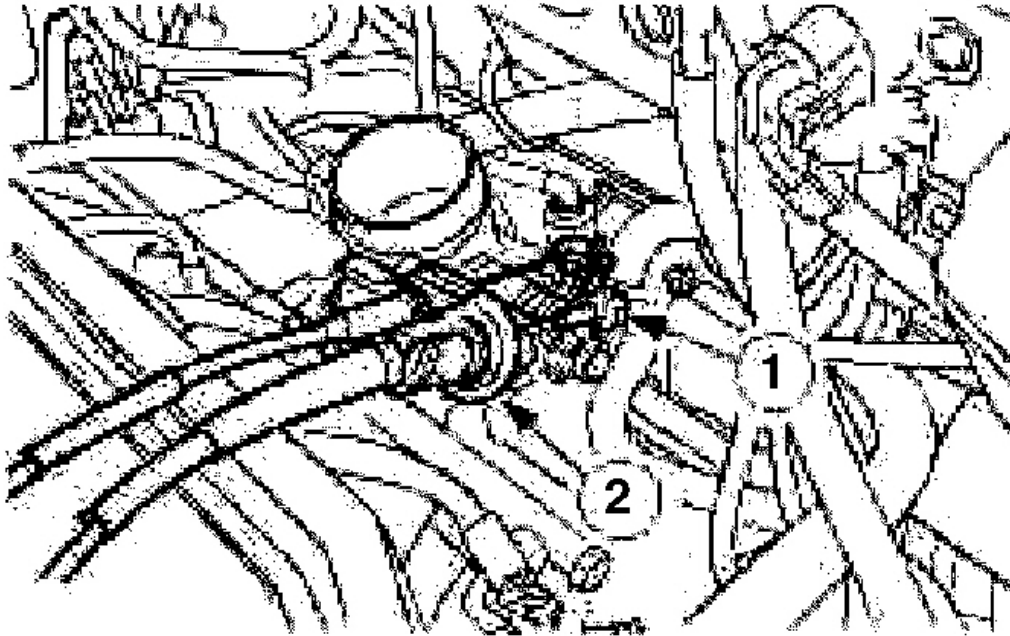
23. Install the speed control cable.
 1. Install the cable.
 2. Install the plastic clip.



G03432218

Fig. 170: Installing Speed Control Cable
Courtesy of FORD MOTOR CO.

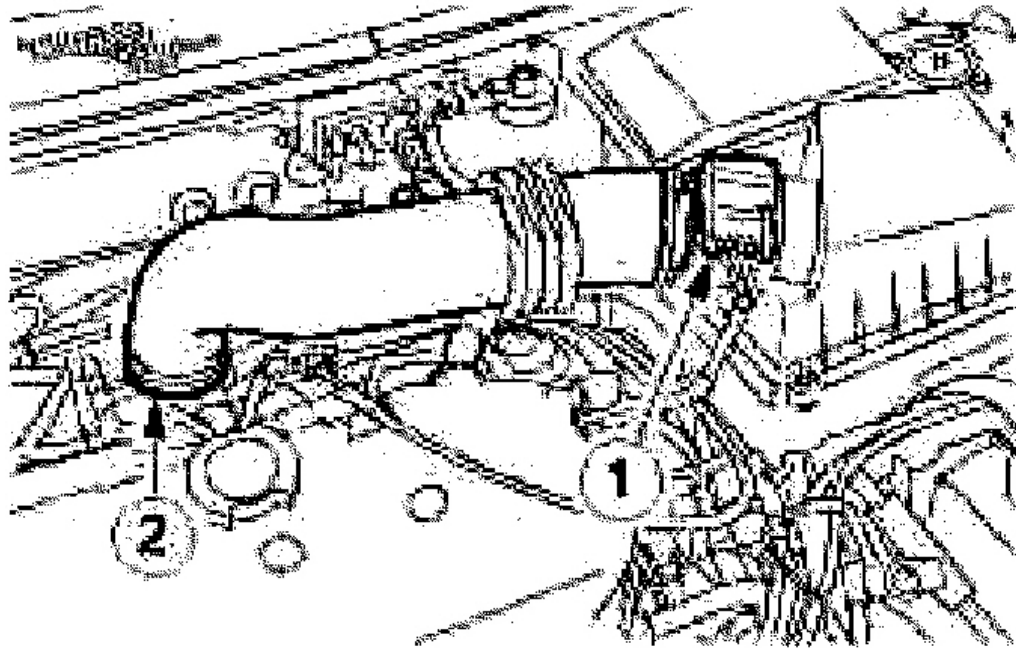
24. Install the accelerator cable.
 1. Install the cable.
 2. Install the plastic clip.



G03432219

Fig. 171: Installing Accelerator Cable
Courtesy of FORD MOTOR CO.

25. Install the air cleaner housing.
 1. Connect the MAF electrical connector.
 2. Attach the intake hose.
 - Install the air cleaner housing to the rubber bushing.



G03432220

Fig. 172: Connecting MAF Electrical Connector
Courtesy of FORD MOTOR CO.

26. Change the engine oil (and the oil filter).
27. Fill the cooling system. For additional information, refer to **COOLING SYSTEM DRAINING, FILLING AND BLEEDING** article .
28. Connect the battery ground cable.

NOTE: When the battery has been disconnected and reconnected, some abnormal drive symptoms may occur while the vehicle relearns its adaptive strategy. The vehicle may need to be driven 16 km (10 miles) or more to relearn the strategy.

29. Install the battery .
30. Start the engine and check for leaks.

2002 Ford Focus LX

2002 ENGINE Engine, 2.0L SPI - Focus

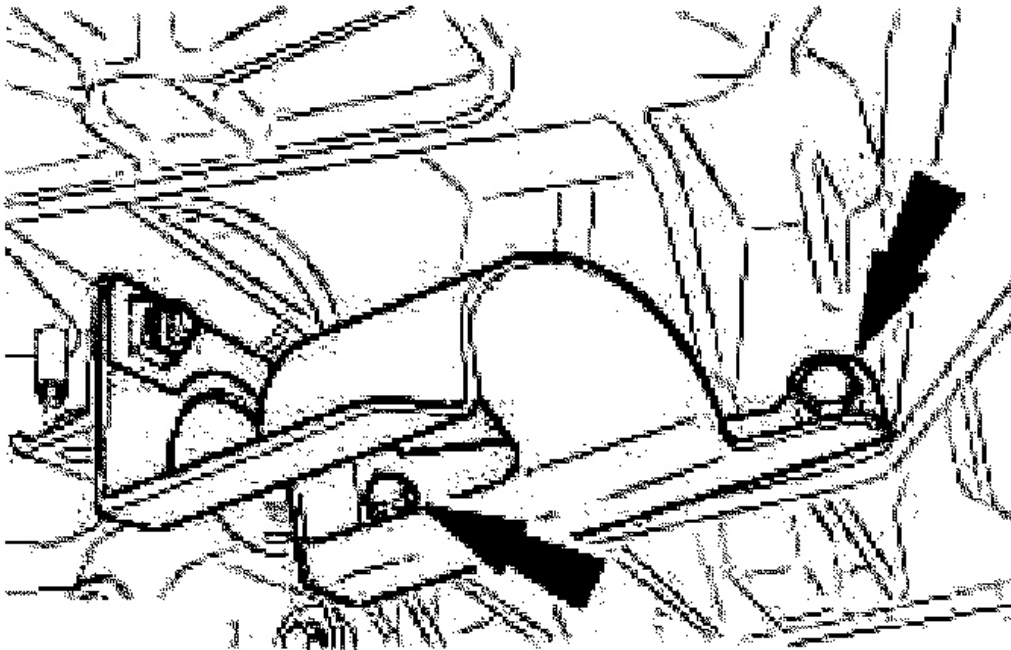
Material

MATERIAL SPECIFICATION

Engine oil	WSS-M2C153-H
Silicone gasket and sealant	WSE-M4G323-A6

Removal

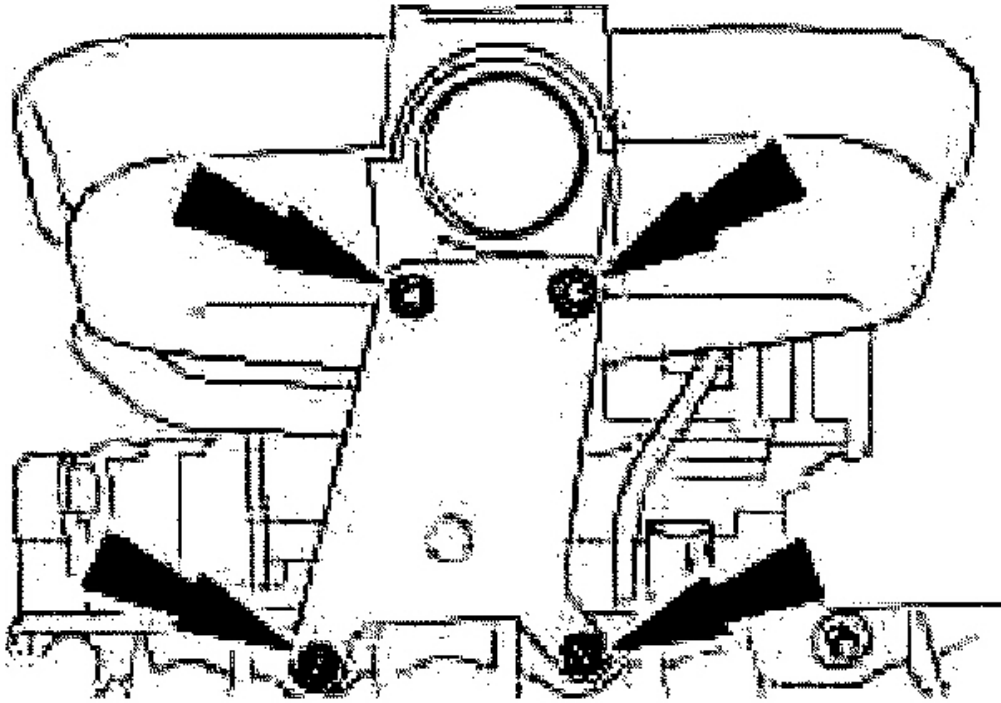
1. Remove the three-way catalytic converter (TWC).
2. Remove the bolts and the two brackets.



G03432221

Fig. 173: Removing Brackets
Courtesy of FORD MOTOR CO.

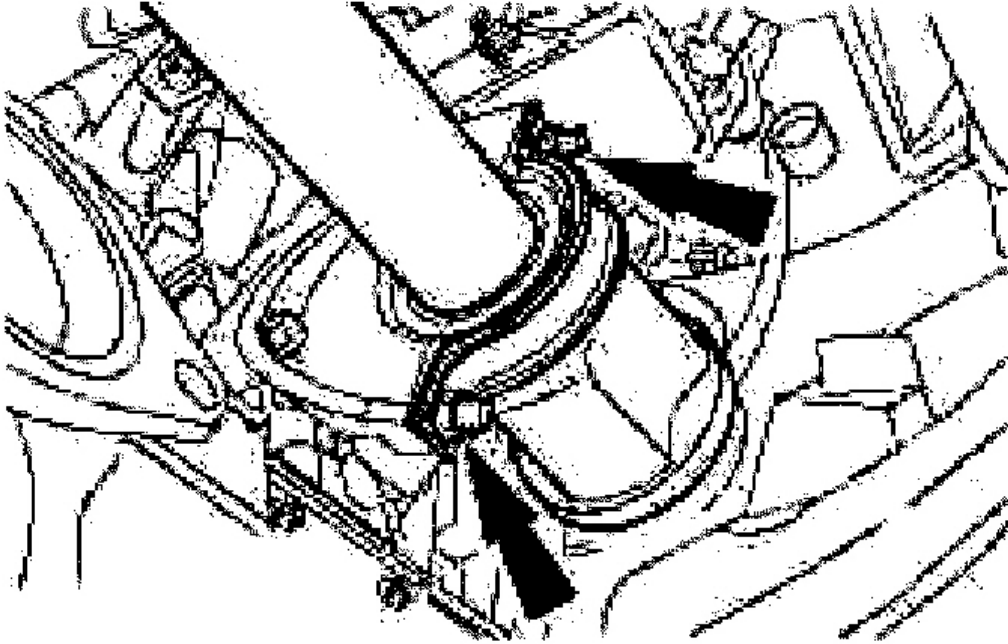
3. Remove the intake manifold bracket.



G03432222

Fig. 174: Removing Intake Manifold Bracket
Courtesy of FORD MOTOR CO.

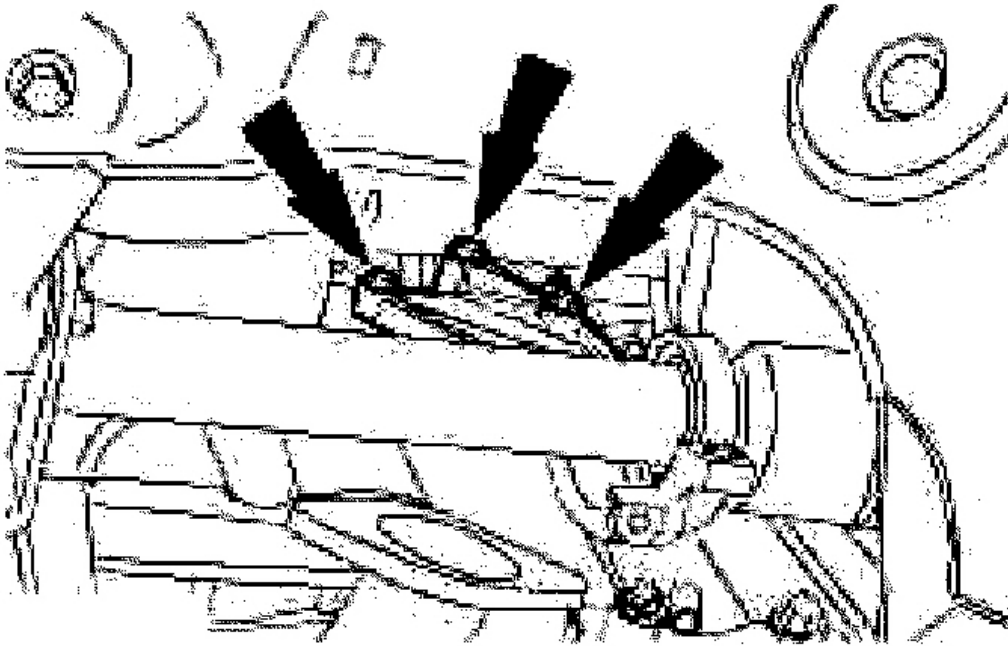
4. Remove the axleshaft bracket clamp.



G03432223

Fig. 175: Removing Axleshaft Bracket Clamp
Courtesy of FORD MOTOR CO.

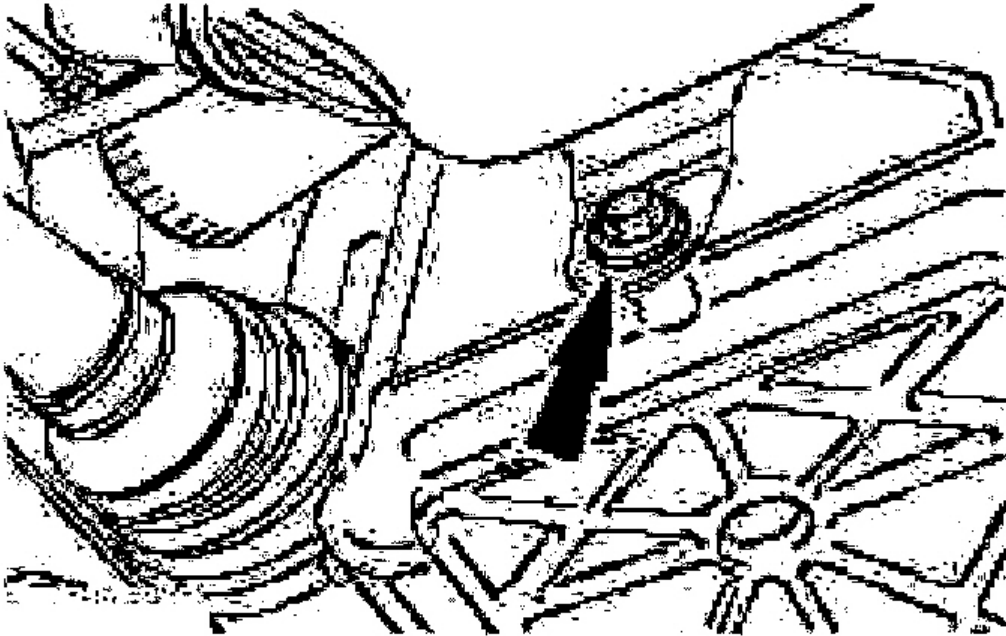
5. Remove the axleshaft bracket.



G03432224

Fig. 176: Removing Axleshaft Bracket
Courtesy of FORD MOTOR CO.

6. Remove the coolant tube bolt.



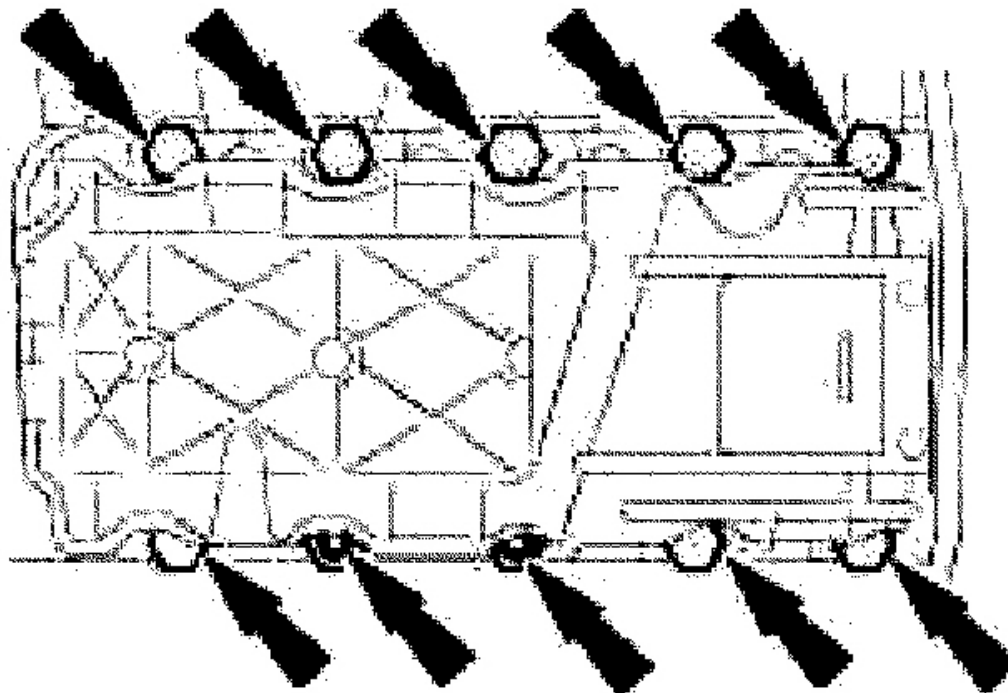
G03432225

Fig. 177: Removing Coolant Tube Bolt
Courtesy of FORD MOTOR CO.

7. Remove the oil pan drain plug and drain the engine oil. Install the drain plug.

NOTE: **Note position of stud bolts for assembly reference.**

8. Remove the oil pan.
 - Discard the gasket.



G03432226

Fig. 178: Removing Oil Pan
Courtesy of FORD MOTOR CO.

Installation

CAUTION: Do not use abrasive grinding discs to remove gasket material; use only plastic scrapers. Do not scratch or gouge aluminum sealing surfaces.

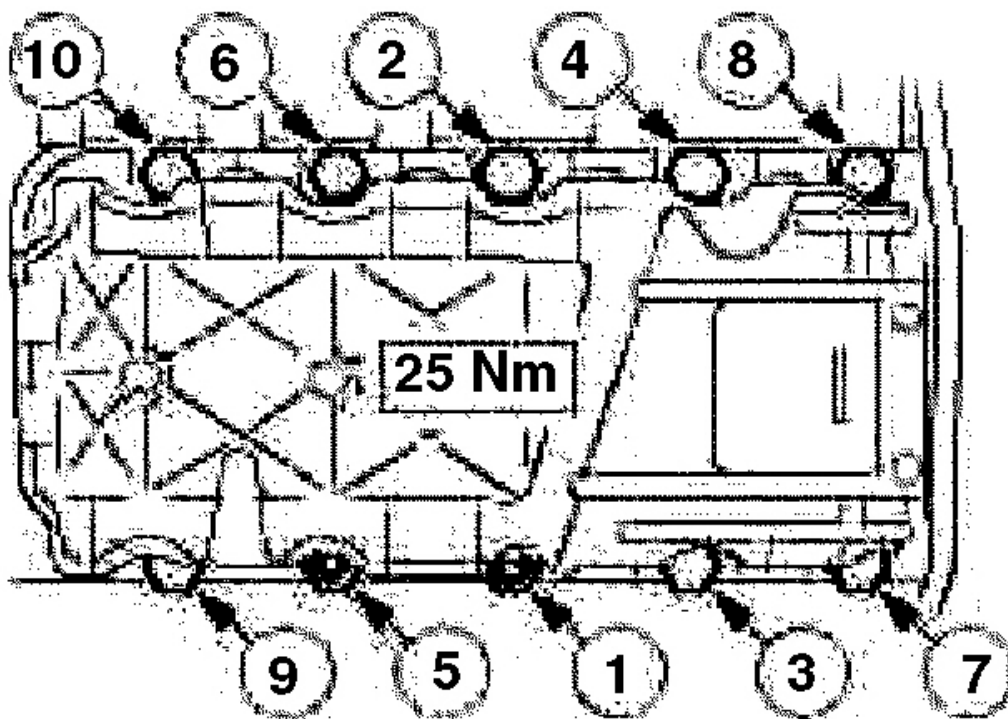
1. Clean and inspect the mounting faces of both the oil pan and the cylinder block. To remove all traces of previous sealer, use solvent to clean the cylinder block and oil pan. Both surfaces must be flat, clean and dry.

NOTE: Install the oil pan within ten minutes of the sealant being applied.

2. Apply silicone gasket and sealant approximately 3.0 mm wide at the oil pump to cylinder block joints and the crankshaft rear oil seal retainer to cylinder block joints.

CAUTION: Make sure the press fit tabs are fully engaged in the oil pan gasket channel when installing the oil pan gasket and oil pan.

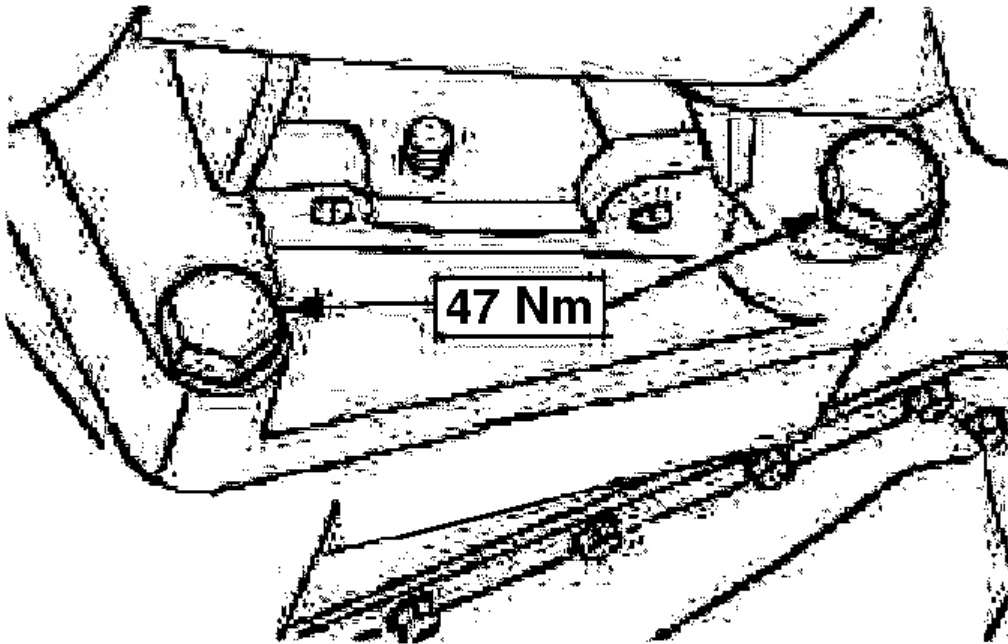
3. Install the oil pan gasket in the oil pan.
4. Install the oil pan. Tighten the bolts in the indicated sequence.



G03432227

Fig. 179: Identifying Tightening Sequence Of Oil Pan Bolts
Courtesy of FORD MOTOR CO.

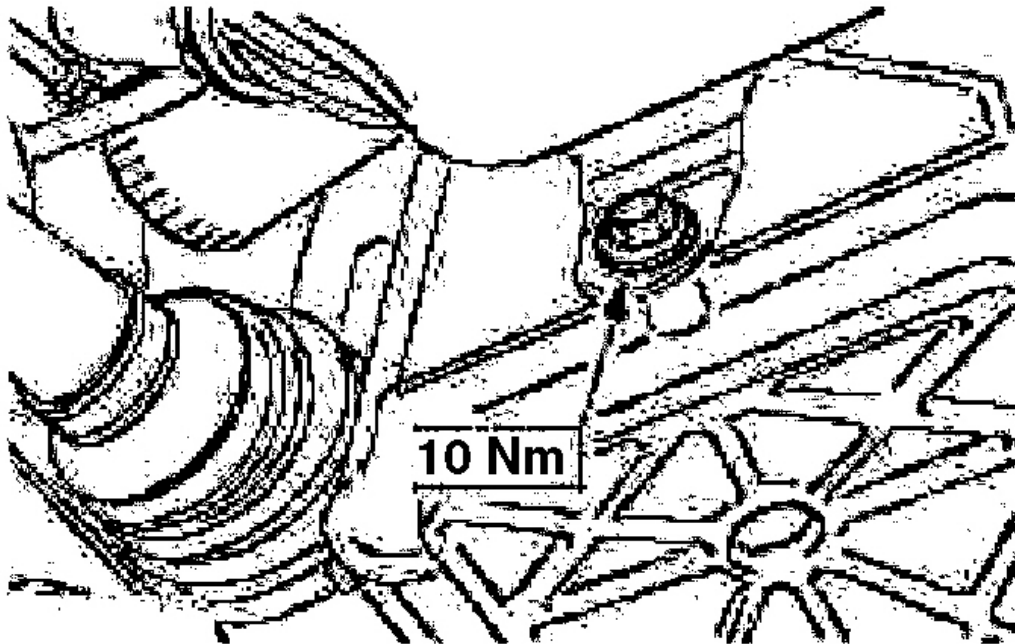
5. Install the two brackets and the bolts.



G03432228

Fig. 180: Installing Brackets Bolts
Courtesy of FORD MOTOR CO.

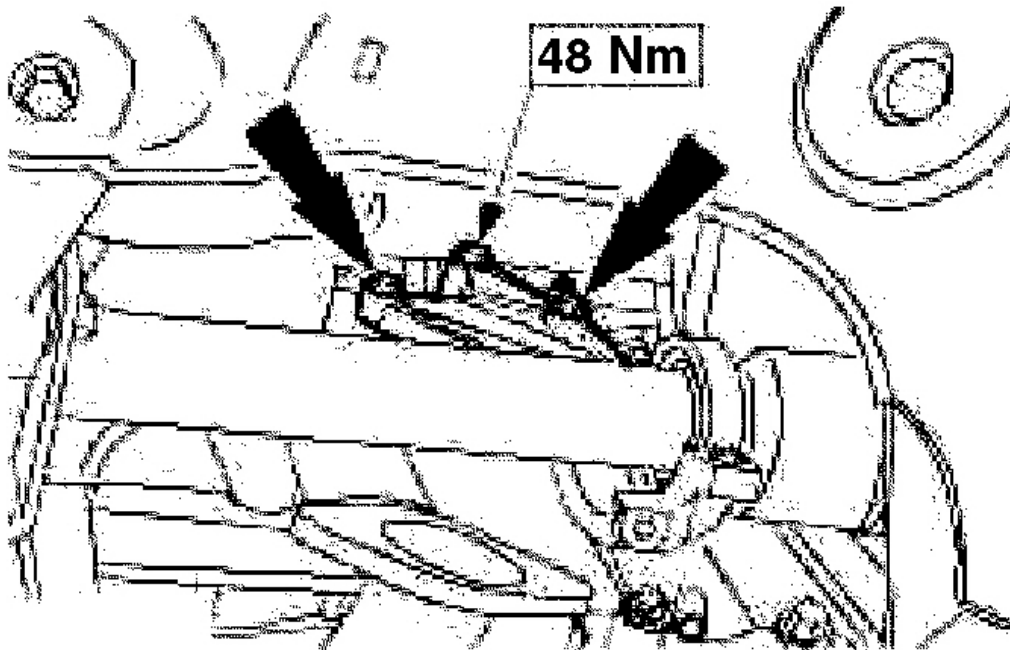
6. Install the coolant tube bolt.



G03432229

Fig. 181: Installing Coolant Tube Bolt
Courtesy of FORD MOTOR CO.

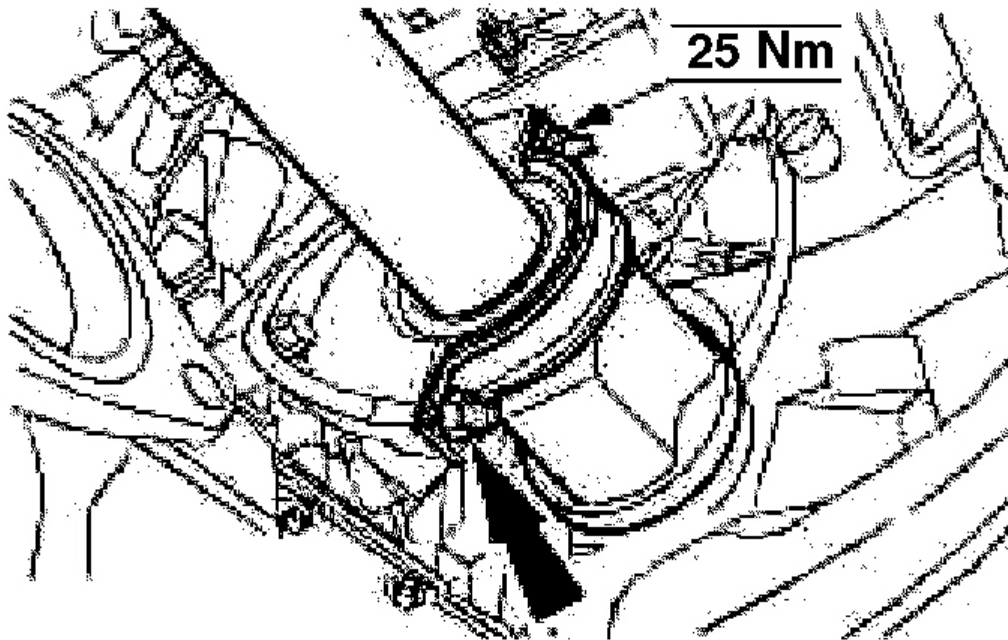
7. Install the axleshaft bracket.



G03432230

Fig. 182: Installing Axleshaft Bracket
Courtesy of FORD MOTOR CO.

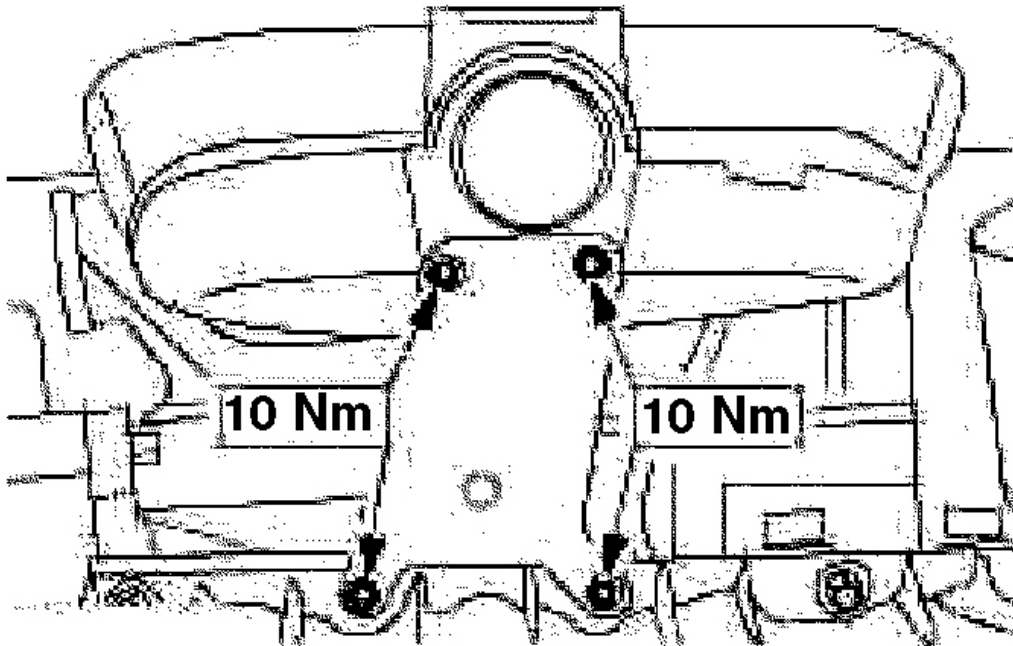
8. Install the axlehaft bracket clamp.



G03432231

Fig. 183: Installing Axleshaft Bracket Clamp
Courtesy of FORD MOTOR CO.

9. Install the intake manifold bracket.



G03432232

Fig. 184: Installing Intake Manifold Bracket
Courtesy of FORD MOTOR CO.





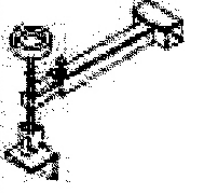
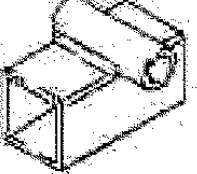
10. Install the catalytic converter.
11. Fill the engine with engine oil
12. Start the engine and check for leaks.

OIL PUMP

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine, 2.0L SPI - Focus

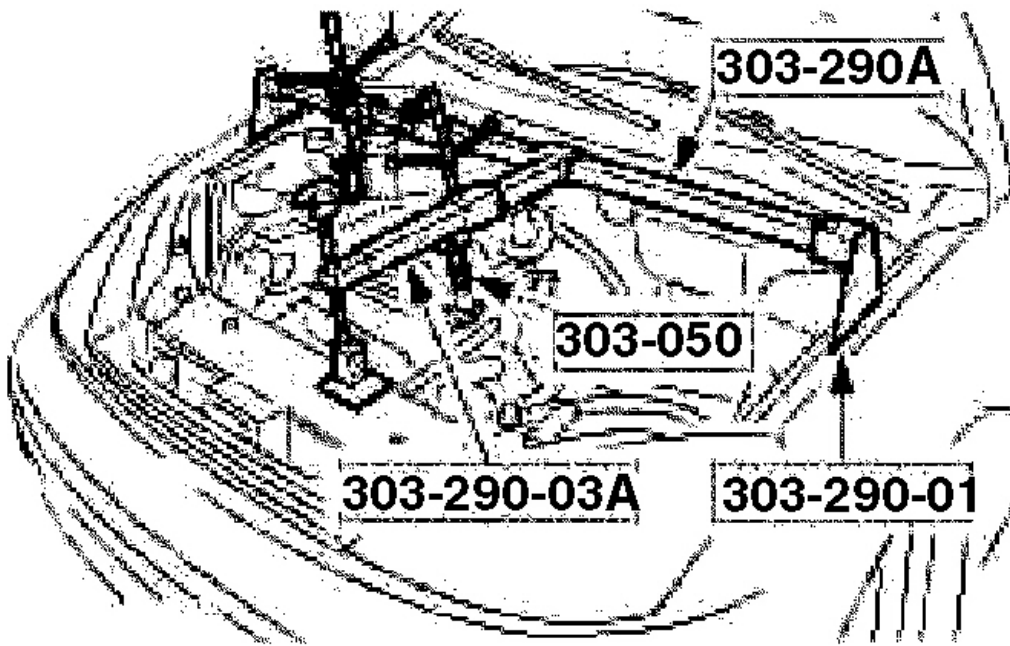
 5T1504A	Installer, Crankshaft front, oil seal 303-164 (T81P -6700-A)
	Bracket, Engine lifting 303-050 (T70P -6000)
	Support Bar, Engine 303-290A
	Adaptor for 303-290A 303-290-01
	Adaptor for 303-290A 303-290-03A
	Adaptor for 303-290A 303-290-02

G03432233

Fig. 185: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Removal

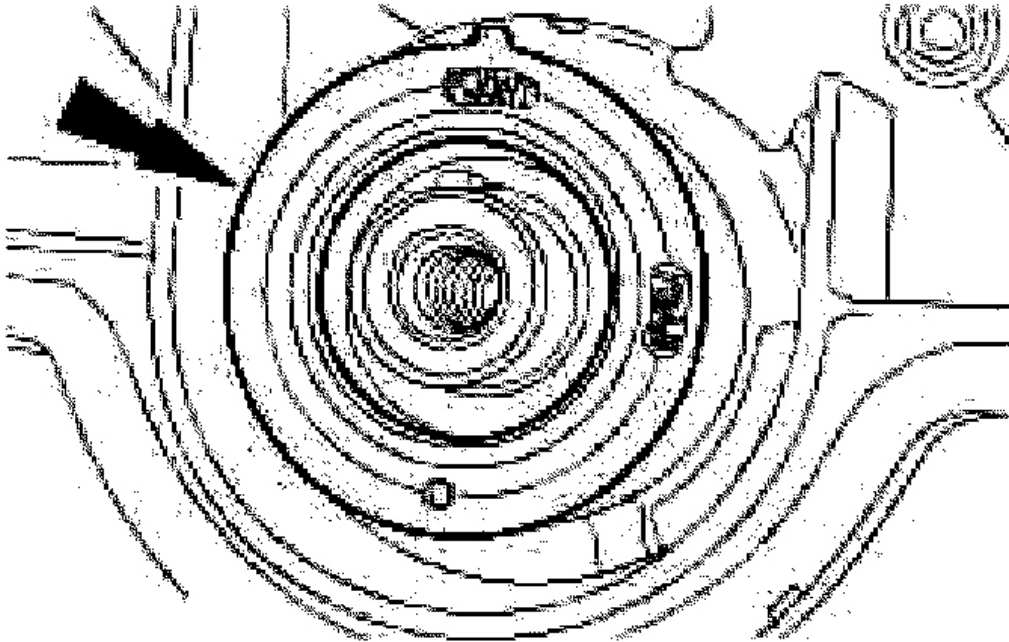
1. Remove the timing belt. For additional information, refer to **TIMING BELT**.
2. Using the special tools, support the engine.



G03432234

Fig. 186: Supporting Engine Using Special Tools
Courtesy of FORD MOTOR CO.

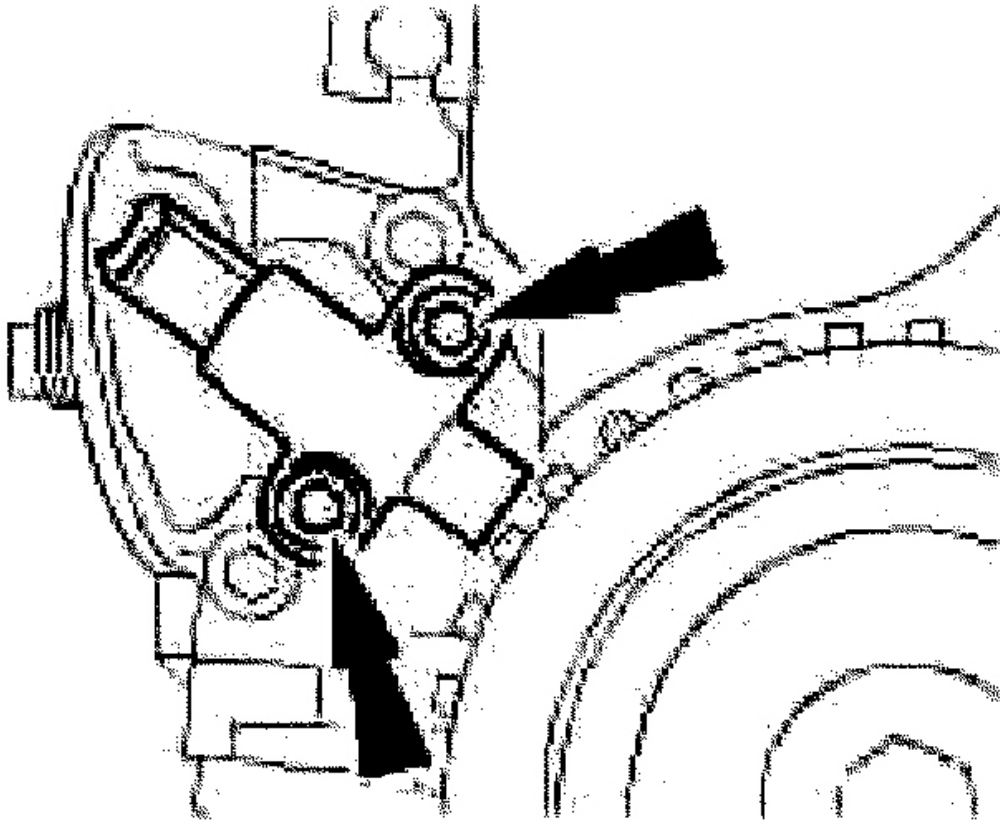
3. Remove the jack.
4. Remove the crankshaft timing belt pulley.



G03432235

Fig. 187: Removing Crankshaft Timing Belt Pulley
Courtesy of FORD MOTOR CO.

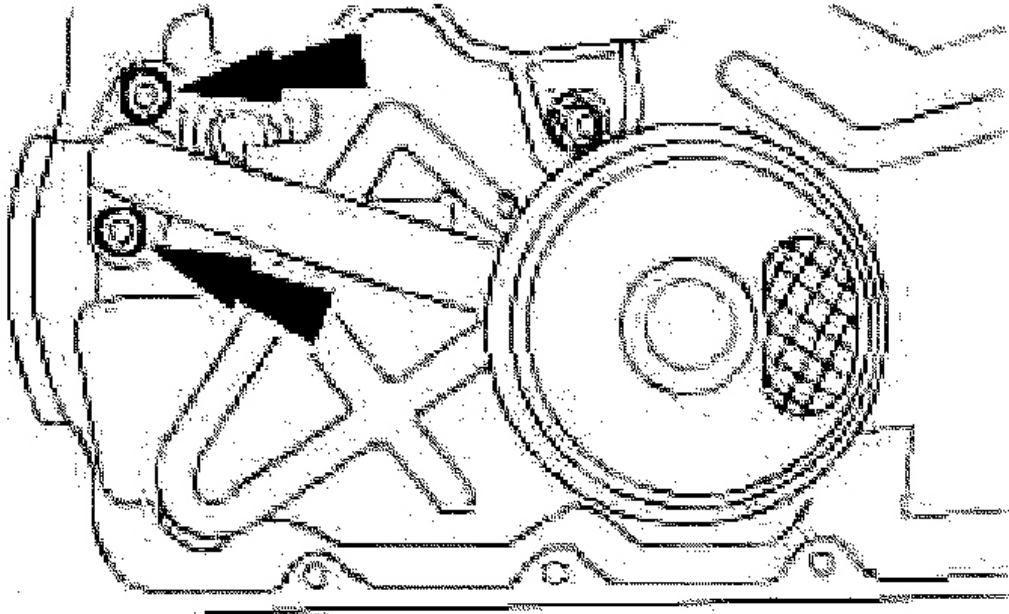
5. Remove the oil pan. For additional information, refer to **OIL PAN**.
6. Remove the crankshaft position (CKP) sensor.



G03432236

Fig. 188: Removing Crankshaft Position (CKP) Sensor
Courtesy of FORD MOTOR CO.

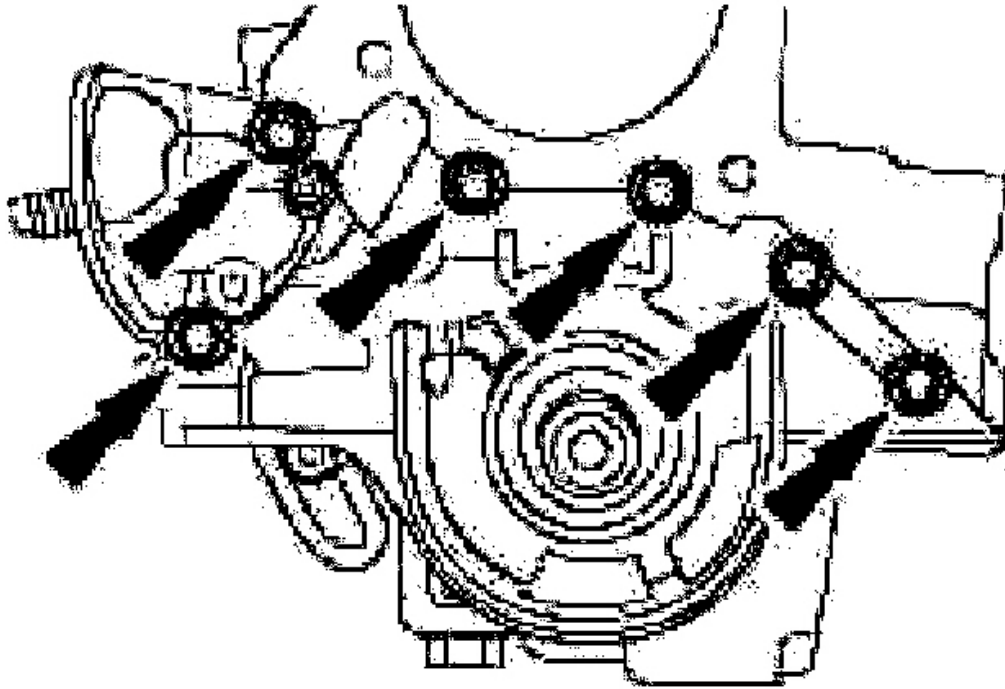
7. Remove the two bolts and the oil pump screen cover and tube.
 - Discard the gasket.



G03432237

Fig. 189: Removing Oil Pump Screen Cover And Tube
Courtesy of FORD MOTOR CO.

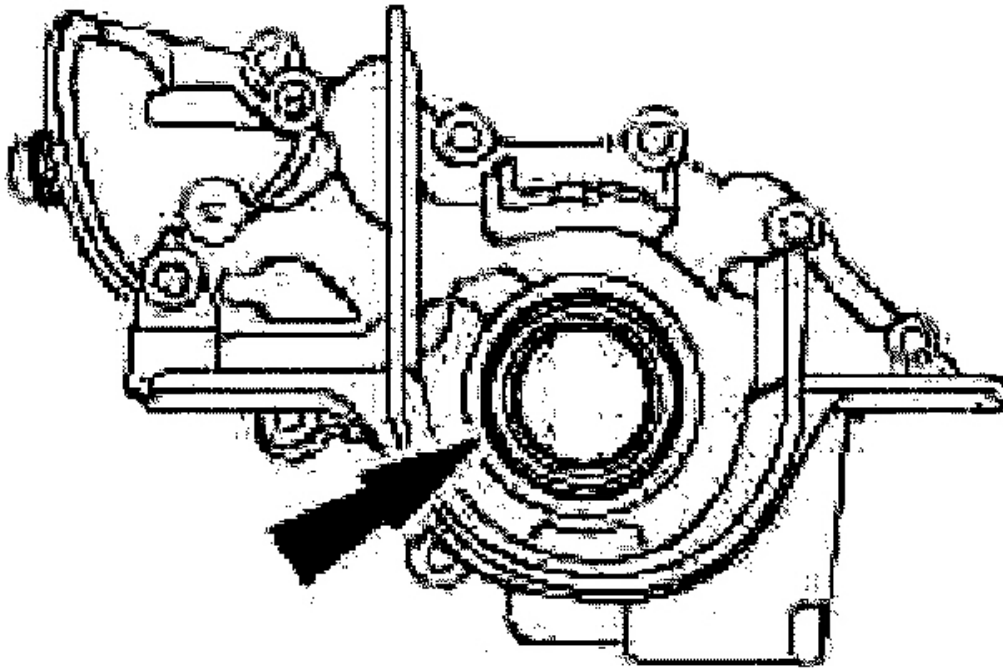
8. Remove the oil pump.
 - Discard the gasket.



G03432238

Fig. 190: Removing Oil Pump
Courtesy of FORD MOTOR CO.

9. Remove the oil pump seal.

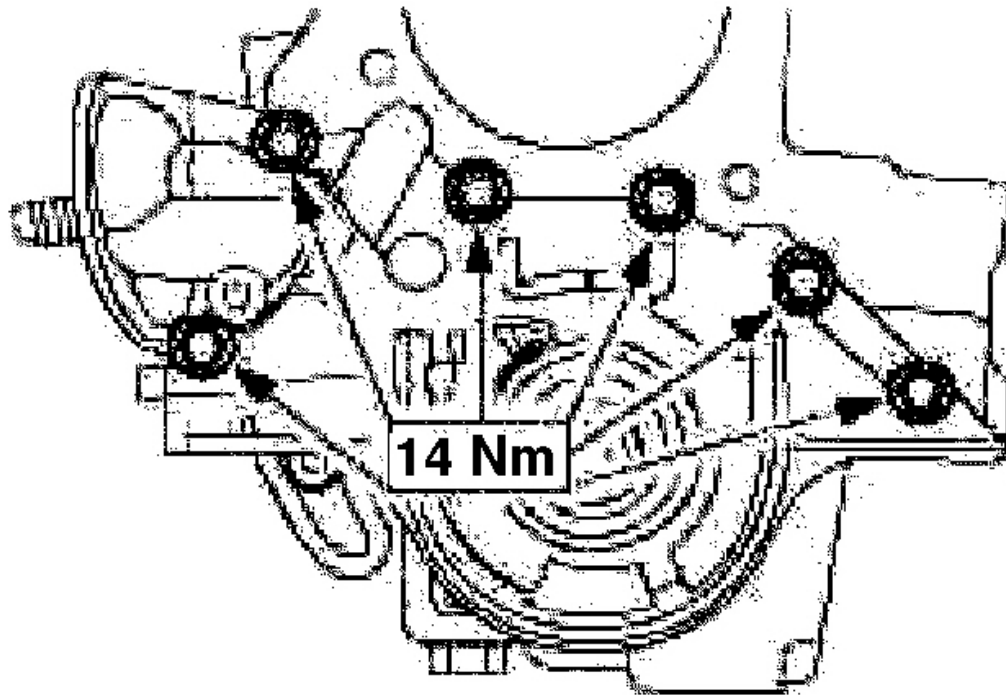


G03432239

Fig. 191: Removing Oil Pump Seal
Courtesy of FORD MOTOR CO.

Installation

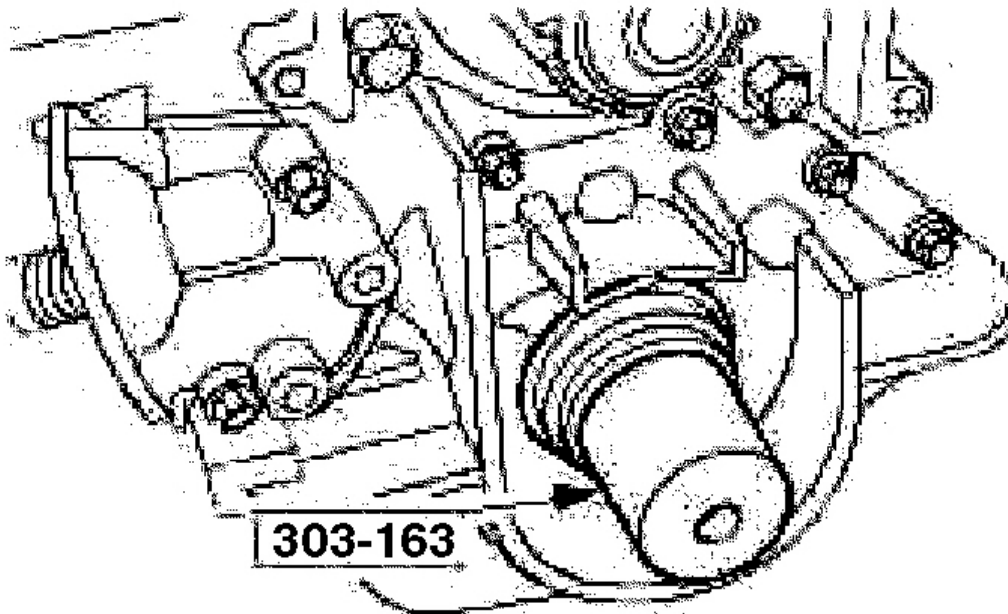
1. Install the oil pump.
 - Position the oil pump.



G03432240

Fig. 192: Installing Oil Pump
Courtesy of FORD MOTOR CO.

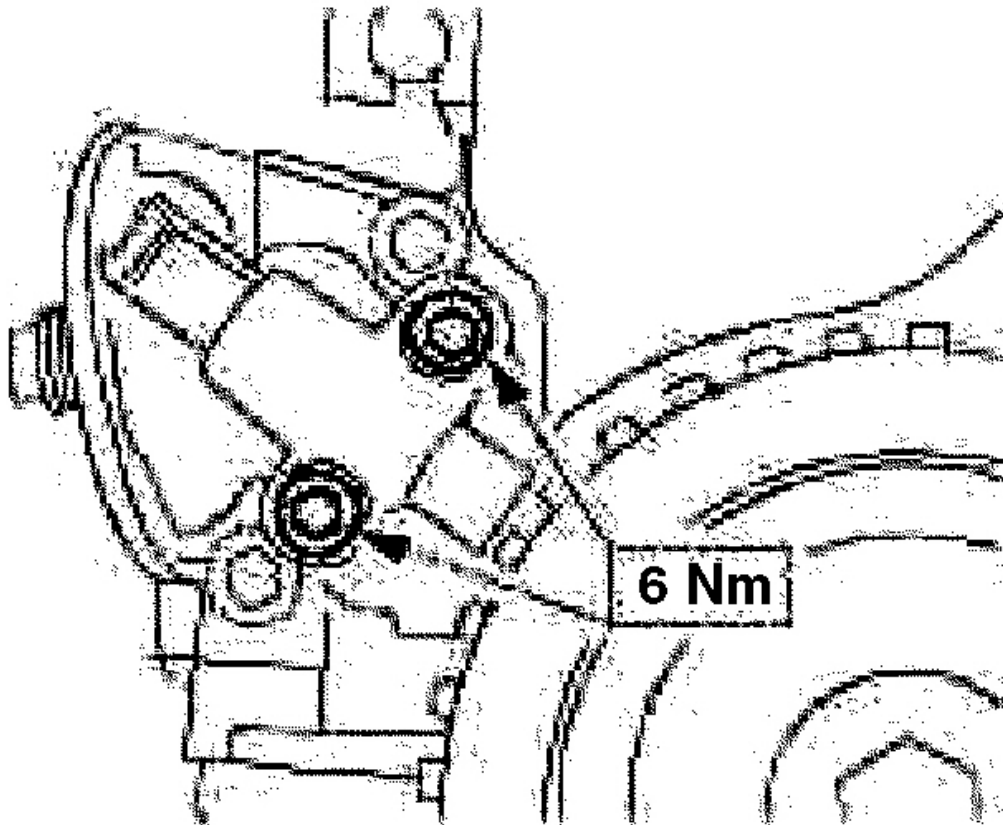
2. Using the special tool, install the oil pump seal.



G03432241

Fig. 193: Installing Oil Pump Seal
Courtesy of FORD MOTOR CO.

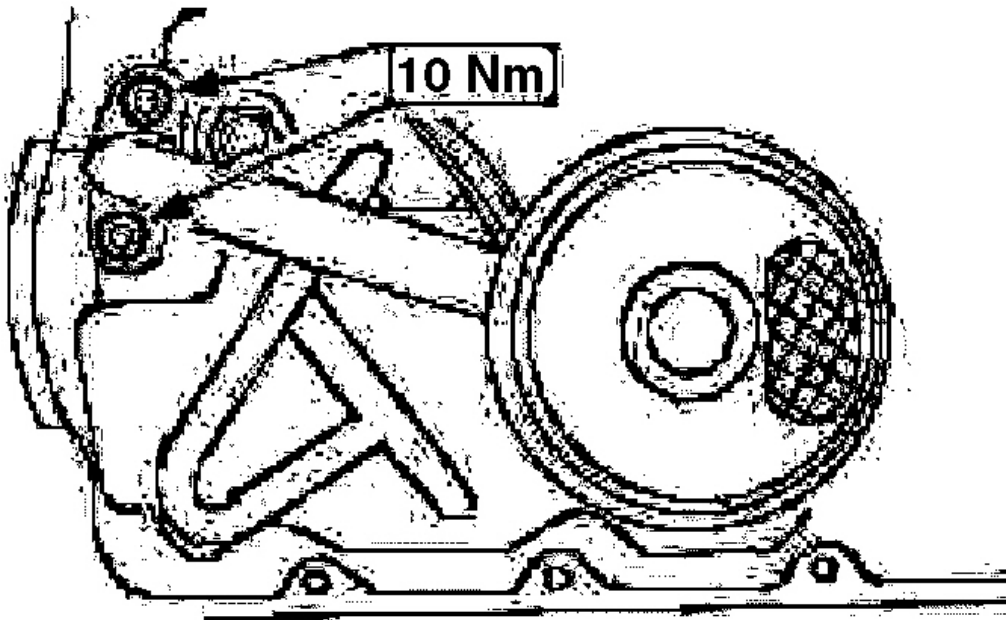
3. Install the crankshaft position (CKP) sensor.



G03432242

Fig. 194: Installing Crankshaft Position (CKP) Sensor
Courtesy of FORD MOTOR CO.

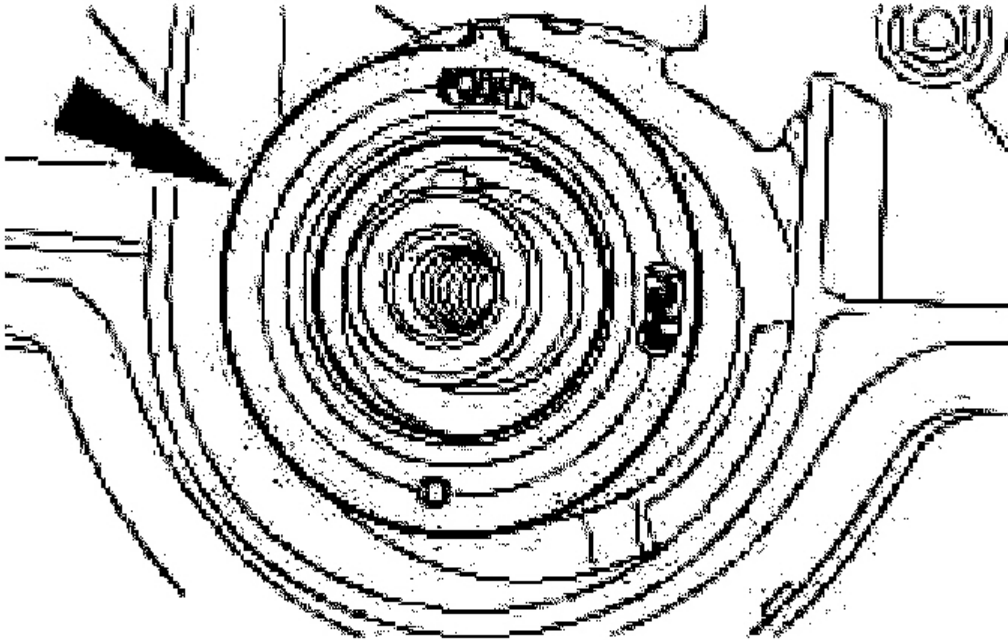
NOTE: Install a new gasket.



G03432243

Fig. 195: Installing Oil Pump Screen Cover And Tube
Courtesy of FORD MOTOR CO.

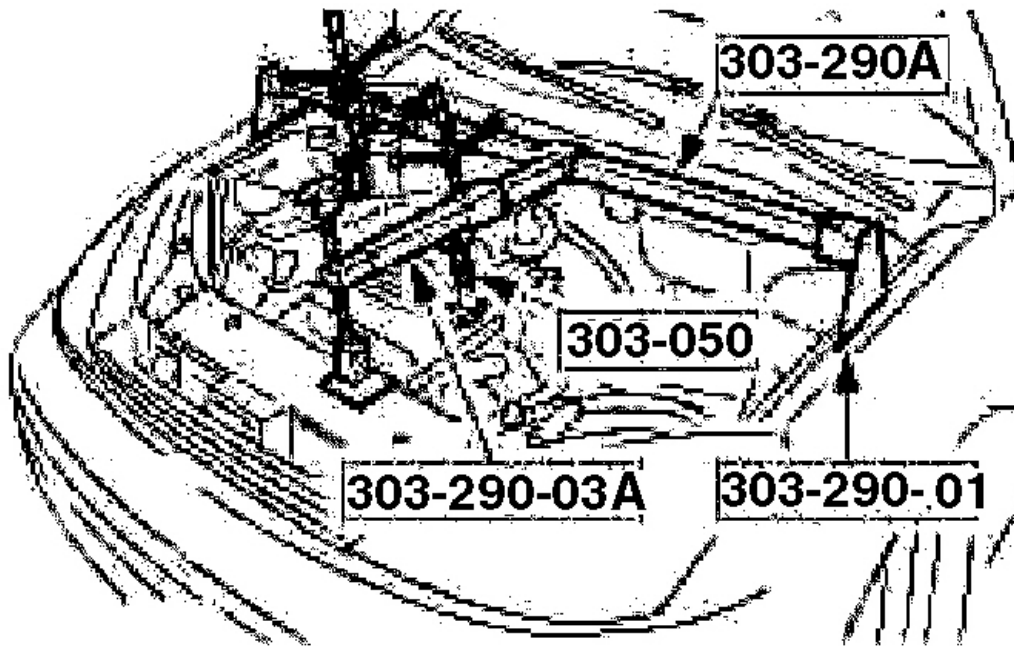
4. Install the two bolts and the oil pump screen cover and tube.
5. Install the oil pan. For additional information, refer to **OIL PAN**.
6. Install the crankshaft timing belt pulley.



G03432244

Fig. 196: Installing Crankshaft Timing Belt Pulley
Courtesy of FORD MOTOR CO.

7. Position the jack.
8. Remove the special tools.



G03432245

Fig. 197: Removing Special Tools
Courtesy of FORD MOTOR CO.


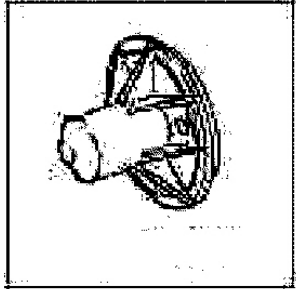
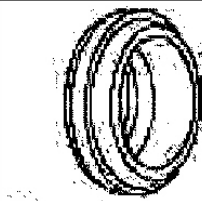

9. Install the timing belt. For additional information, refer to **TIMING BELT** .

CRANKSHAFT REAR SEAL

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine, 2.0L SPI - Focus

	Seal Remover 303-409 (T92C-6700-CH)
	Crankshaft Rear Seal Replacer 303-328 (T88P-6701-B1)
	Crankshaft Rear Seal Replacer 303-329 (T88P-6701-B2)
	Locking Tool, Flywheel 303-103 (T74P-6375-A)

G03432246

Fig. 198: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

Engine oil	WSS-M2C153-H
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Removal

Vehicles with automatic transaxle

1. Remove the transaxle. For additional information, refer to AUTOMATIC

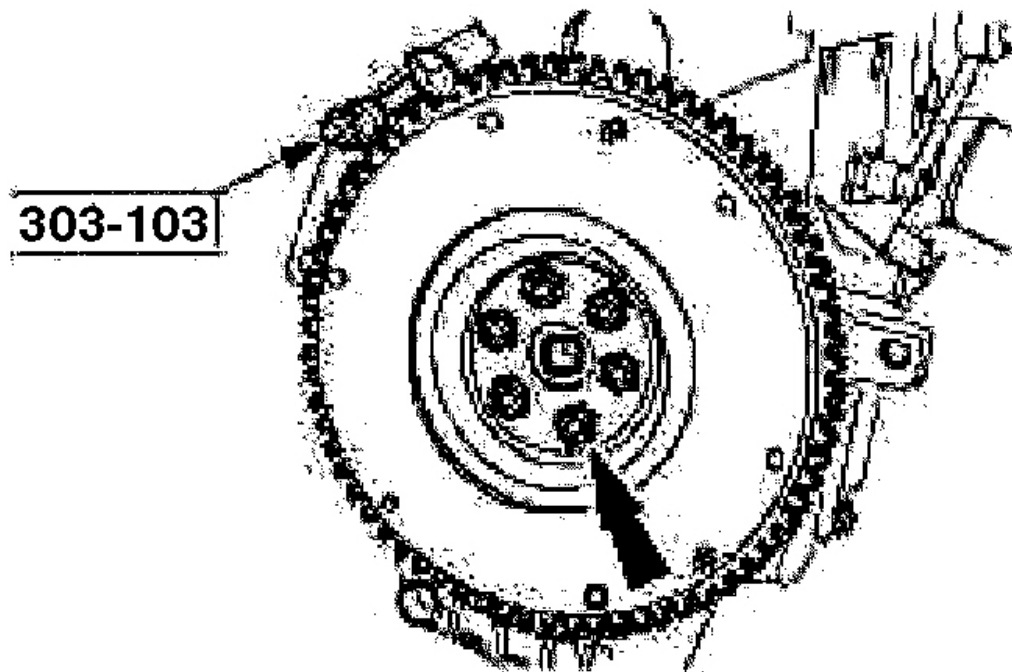
TRANSAXLE/TRANSMISSION article .

Vehicles with manual transaxle

2. Remove the transaxle. For additional information, refer to MANUAL TRANSAXLE/TRANSMISSION .
3. Remove the clutch. For additional information, refer to **CLUTCHES** article .

All Vehicles

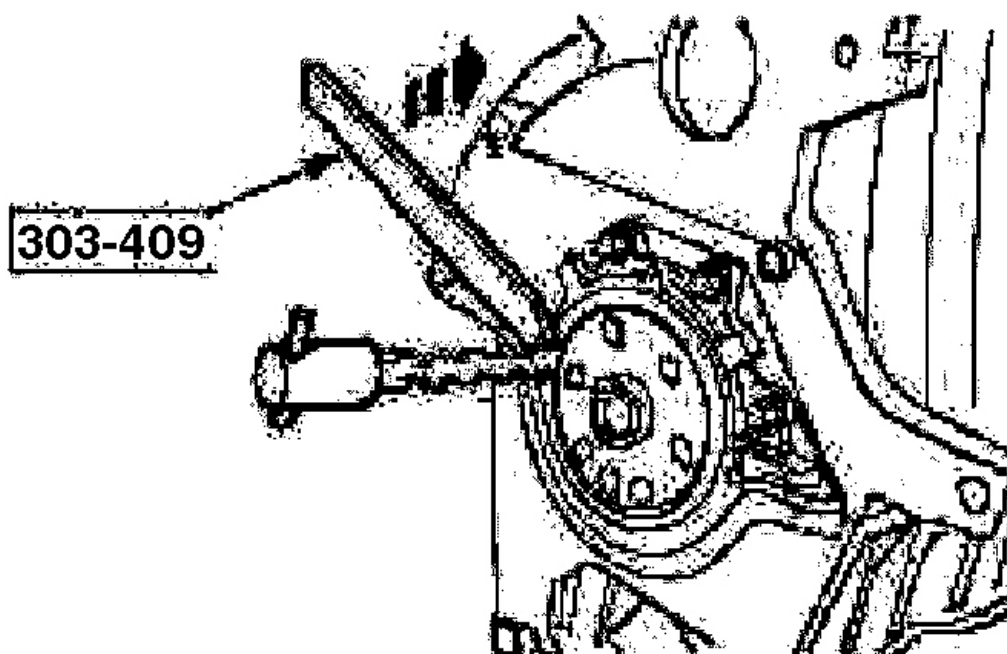
4. Remove the flywheel.
 - Install the special tool.
 - Remove the bolts.



G03432247

Fig. 199: Removing Flywheel
Courtesy of FORD MOTOR CO.

CAUTION: Do not damage the crankshaft surface.



G03432248

Fig. 200: Removing Crankshaft Rear Oil Seal
Courtesy of FORD MOTOR CO.

5. Using the special tool, remove the crankshaft rear oil seal.
6. Inspect the crankshaft rear oil seal area for any damage which may cause the rear oil seal to leak. If necessary, repair or replace the crankshaft. For additional information, refer to **DISASSEMBLY**.

Installation

All Vehicles

1. Using the special tool, install the crankshaft rear oil seal.
 - Lubricate the crankshaft surface and the sealing lip of the rear crankshaft oil seal with engine oil.

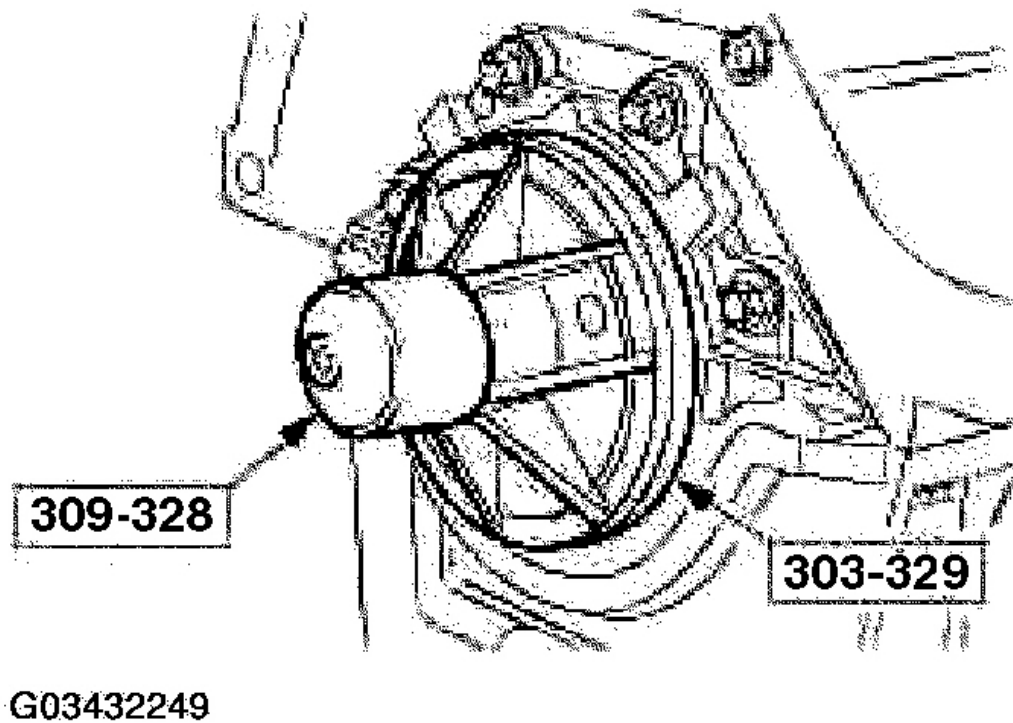


Fig. 201: Installing Crankshaft Rear Oil Seal
Courtesy of FORD MOTOR CO.

2. Install the flywheel.
 - Tighten the bolts fingertight.
 - Install the special tool.
 - Tighten the bolts.

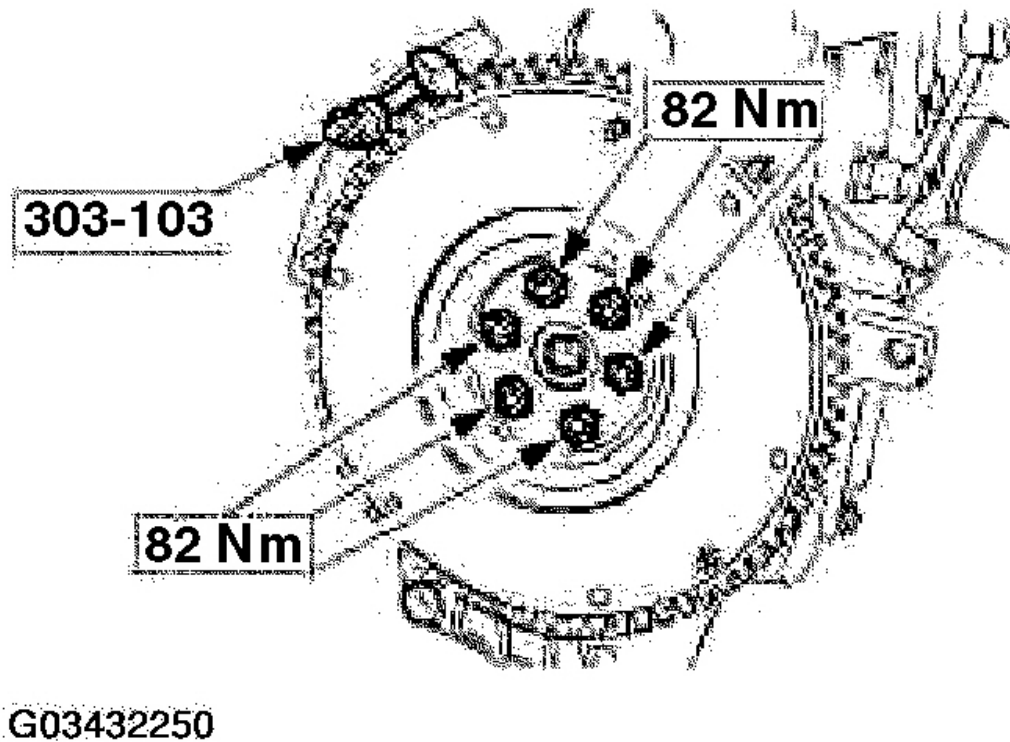


Fig. 202: Installing Flywheel
Courtesy of FORD MOTOR CO.

Vehicles with manual transaxle

3. Install the clutch. For additional information, refer to **CLUTCHES** article .

Vehicles with automatic transaxle

4. Install the transaxle. For additional information, refer to Section AUTOMATIC TRANSAXLE/TRANSMISSION article .

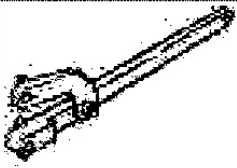
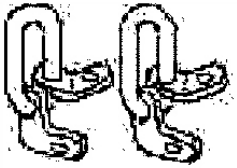
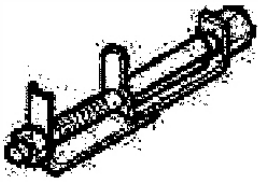
Vehicles with manual transaxle

5. Install the transaxle. For additional information, refer to MANUAL TRANSAXLE/TRANSMISSION .

REMOVAL

ENGINE - VEHICLES WITH: IB5/MANUAL TRANSAXLE

Special Tool(s)

	Flange Holding Wrench, Universal 205-072 (15-030A)
	Lifting Bracket, Engine 303-050 (T70P-6000)
	Remover/Installer, Hose Clamp 412-108 (T96P-18539-A)

G03432251

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

Material

MATERIAL SPECIFICATION

Cable ties

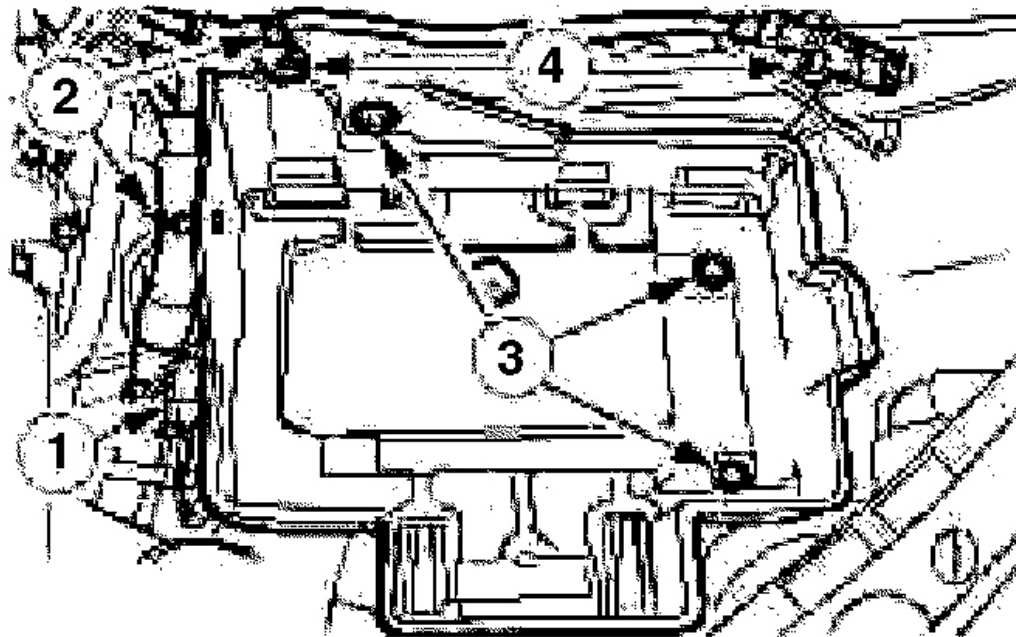
Removal

All Vehicles

CAUTION: To prevent the risk of scalding, place a thick cloth over the filler cap before opening the cooling circuit. Failure to

do so may result in personal injury.

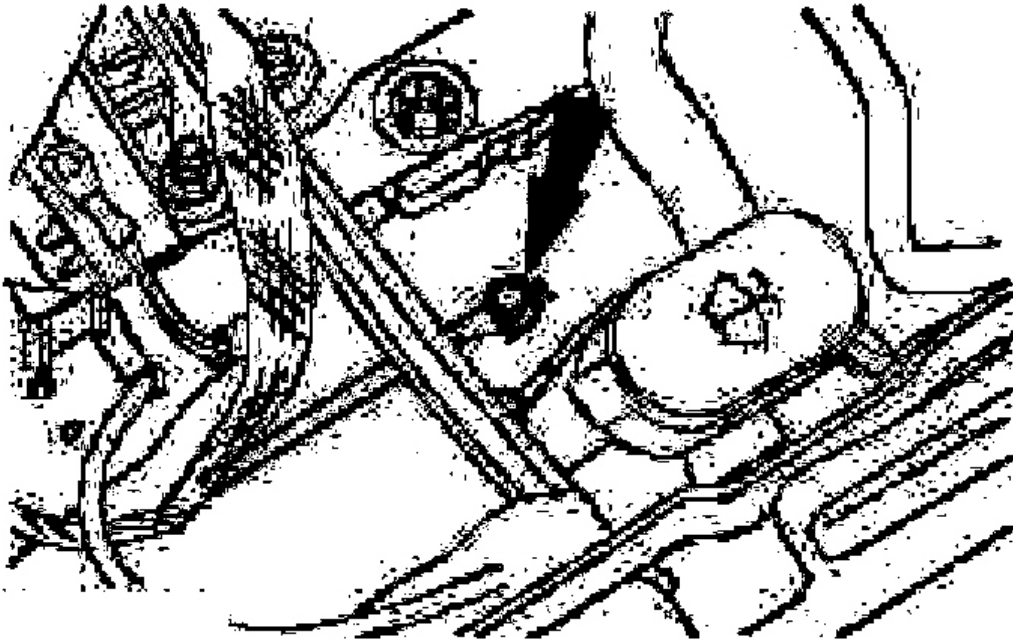
1. Open the coolant expansion tank.
2. Remove the battery .
3. Remove the battery tray and the ground cable.
 1. Unclip and separate the connector.
 2. Unclip the wiring harness.
 3. Unscrew the bolts.
 4. Remove the positive and negative cables.



G03432252

Fig. 204: Removing Battery Tray And Ground Cable
Courtesy of FORD MOTOR CO.

4. Disconnect the ground cable.

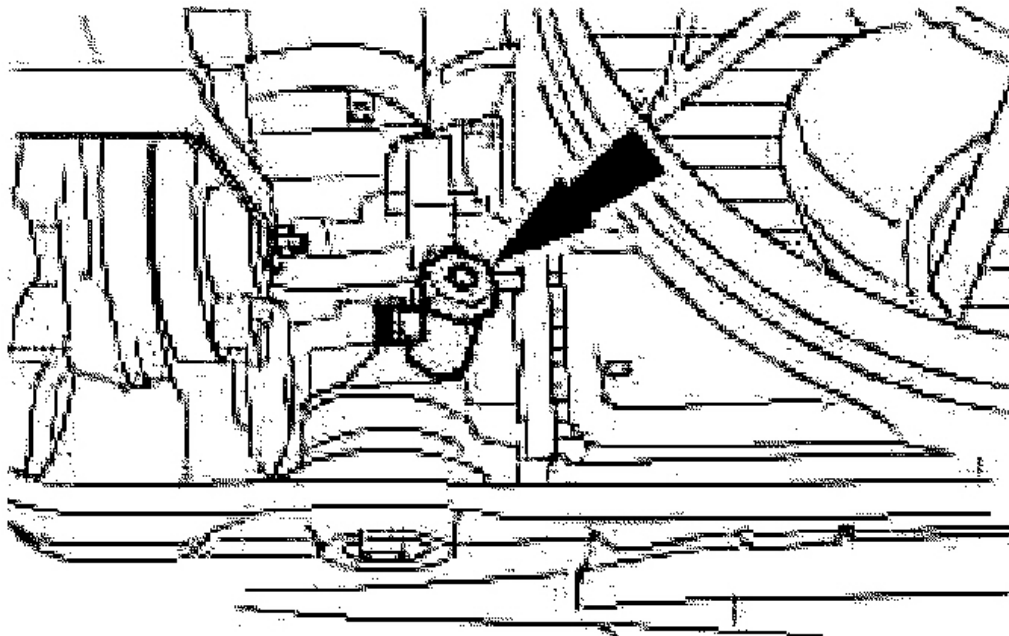


G03432253

Fig. 205: Disconnecting Ground Cable
Courtesy of FORD MOTOR CO.

WARNING: Danger of scalding if the engine is warm. Failure to do so may result in personal injury.

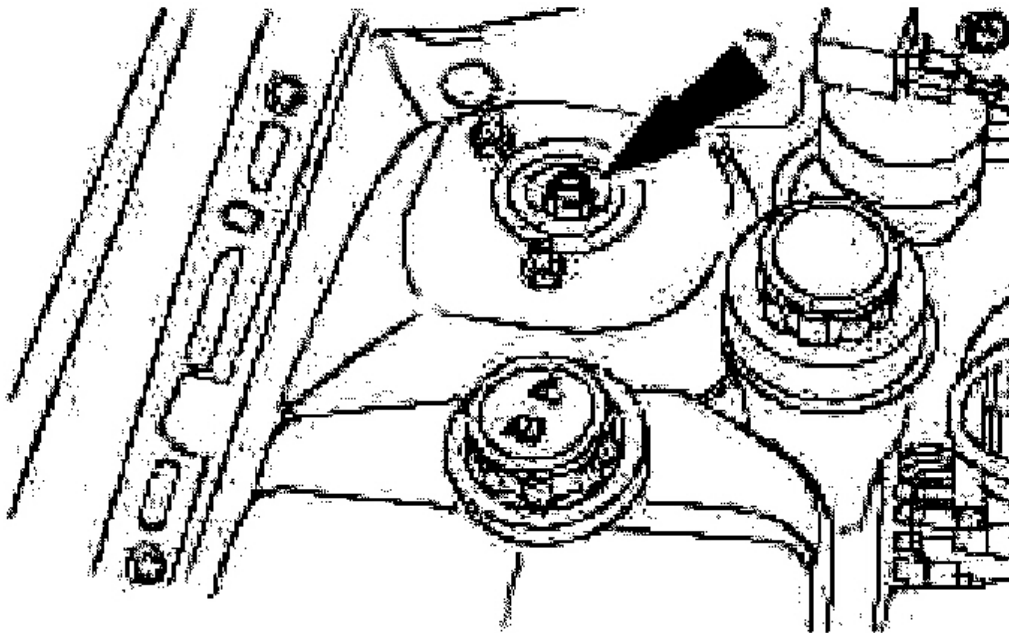
5. Drain the coolant (shown from below).
 - Screw the drain plug back in after draining.



G03432254

Fig. 206: Removing Drain Plug
Courtesy of FORD MOTOR CO.

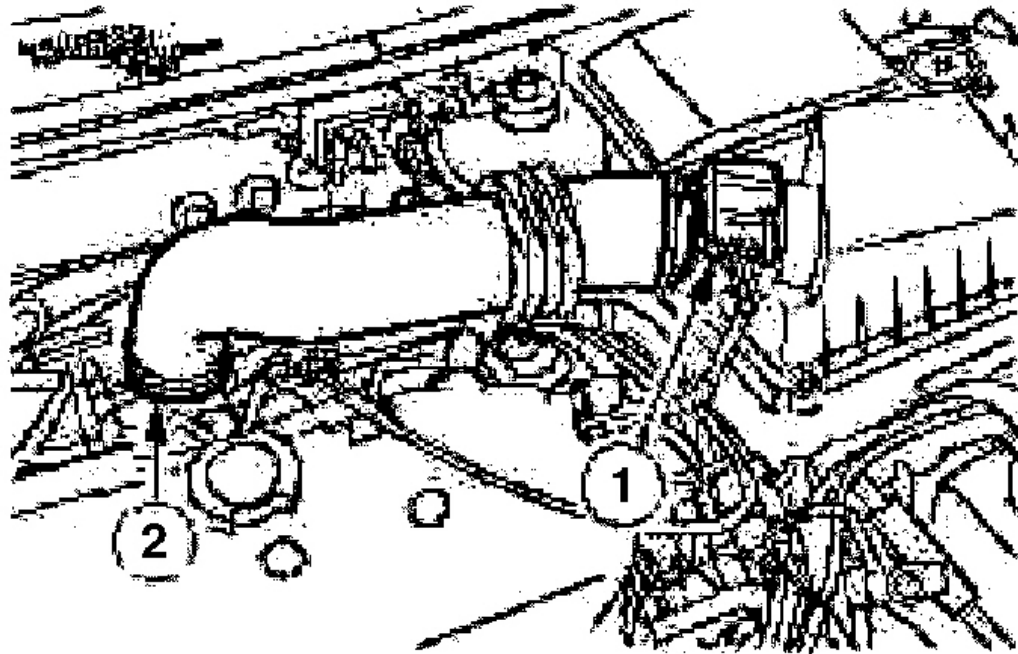
NOTE: Use an Allen key to prevent the piston rod from turning.



G03432255

Fig. 207: Removing Suspension Strut Nuts
Courtesy of FORD MOTOR CO.

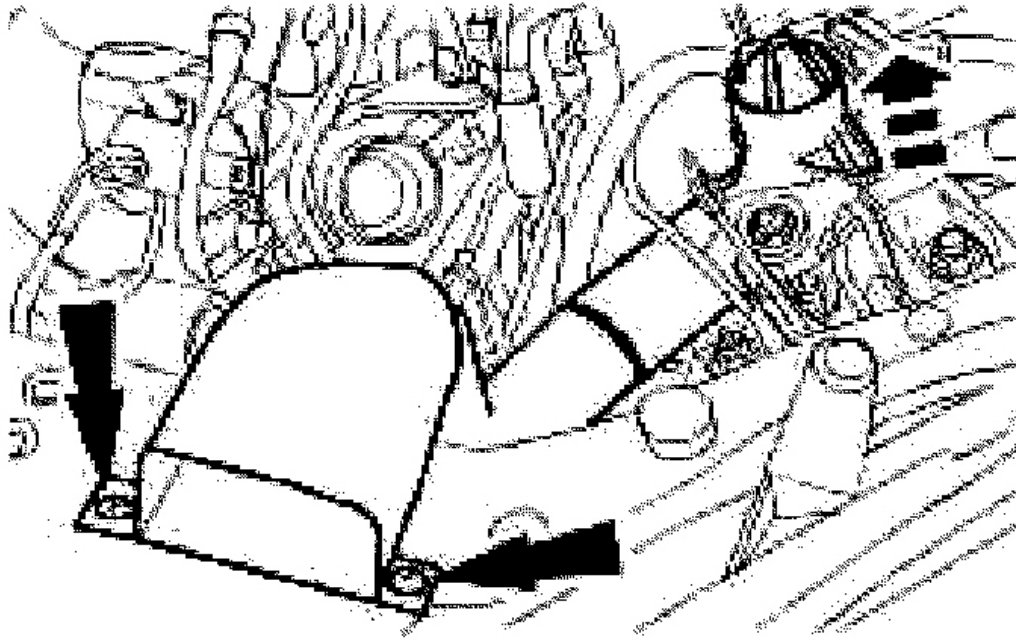
6. Slacken the suspension strut nuts by five turns on both sides (right-hand side shown).
7. Remove the air cleaner (ACL) housing.
 1. Pull off the plug of the mass air flow (MAF) sensor.
 2. Remove the intake hose.
 - Remove the air cleaner housing from the rubber bushing.



G03432256

Fig. 208: Removing Air Cleaner (ACL) Housing
Courtesy of FORD MOTOR CO.

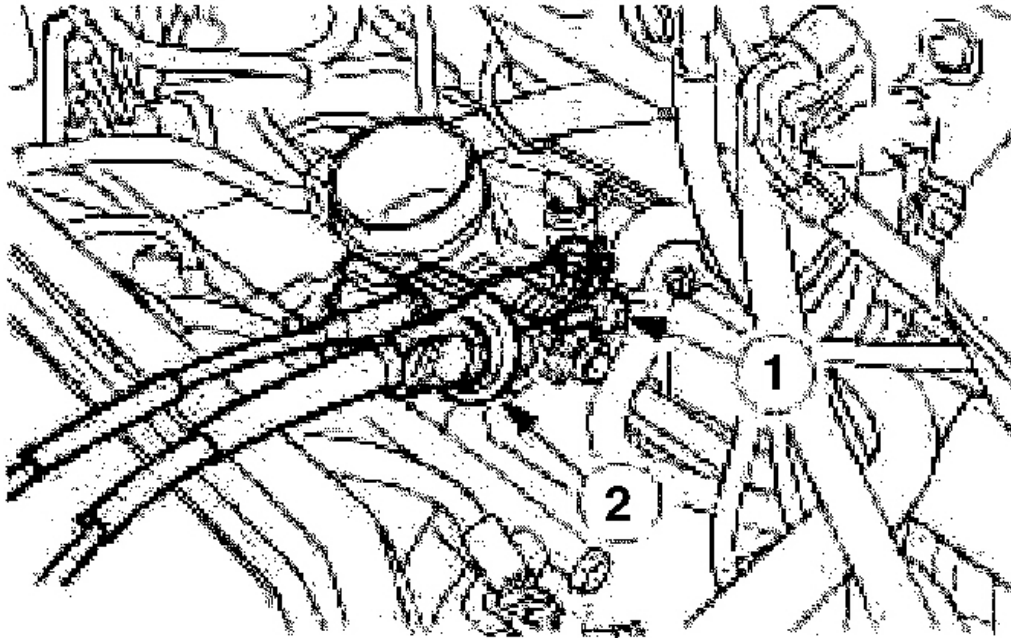
8. Remove the air cleaner intake pipe.



G03432257

Fig. 209: Removing Air Cleaner Intake Pipe
Courtesy of FORD MOTOR CO.

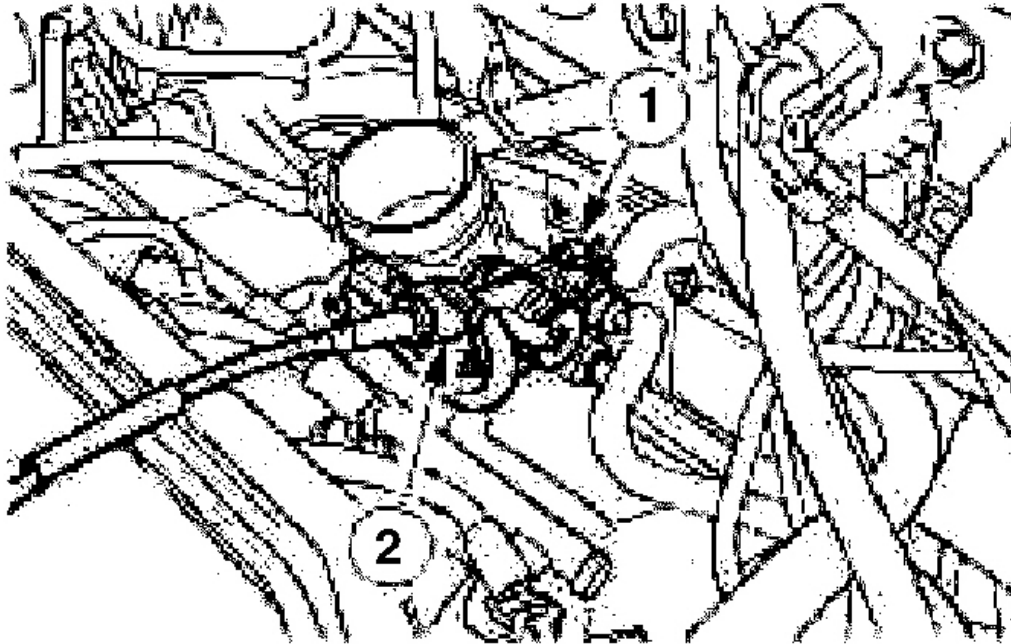
9. Remove the accelerator cable.
 1. Unhook the cable.
 2. Pull off the plastic clip and lay the accelerator cable to one side.



G03432258

Fig. 210: Removing Accelerator Cable
Courtesy of FORD MOTOR CO.

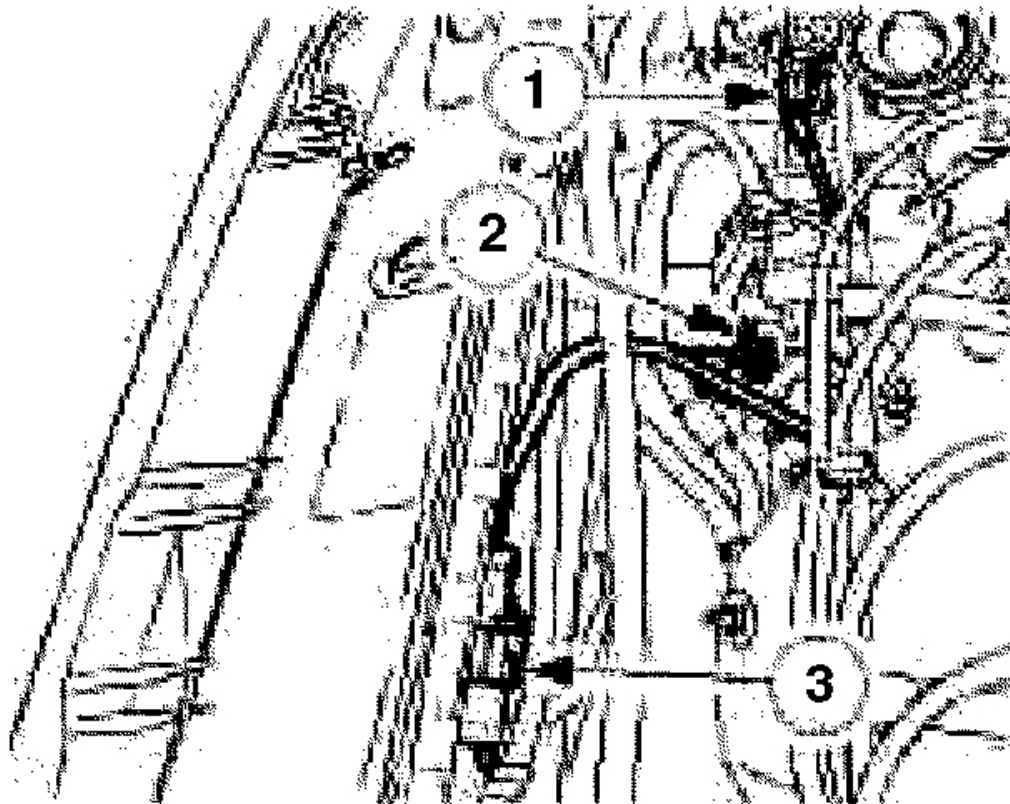
10. Remove the speed control cable.
 1. Unhook the cable.
 2. Pull off the plastic clip and lay the speed control cable to one side.



G03432259

Fig. 211: Removing Speed Control Cable
Courtesy of FORD MOTOR CO.

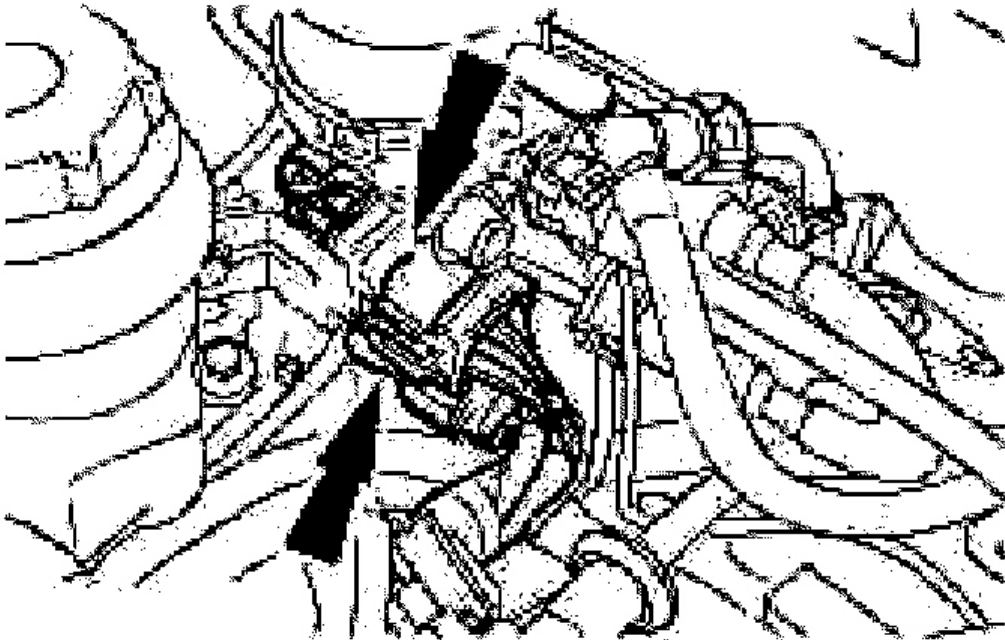
11. Disconnect the electrical connectors
 1. Power steering pump pressure switch
 2. Generator
 3. Heated oxygen sensor (HO2S)



G03432260

Fig. 212: Disconnecting Electrical Connectors
Courtesy of FORD MOTOR CO.

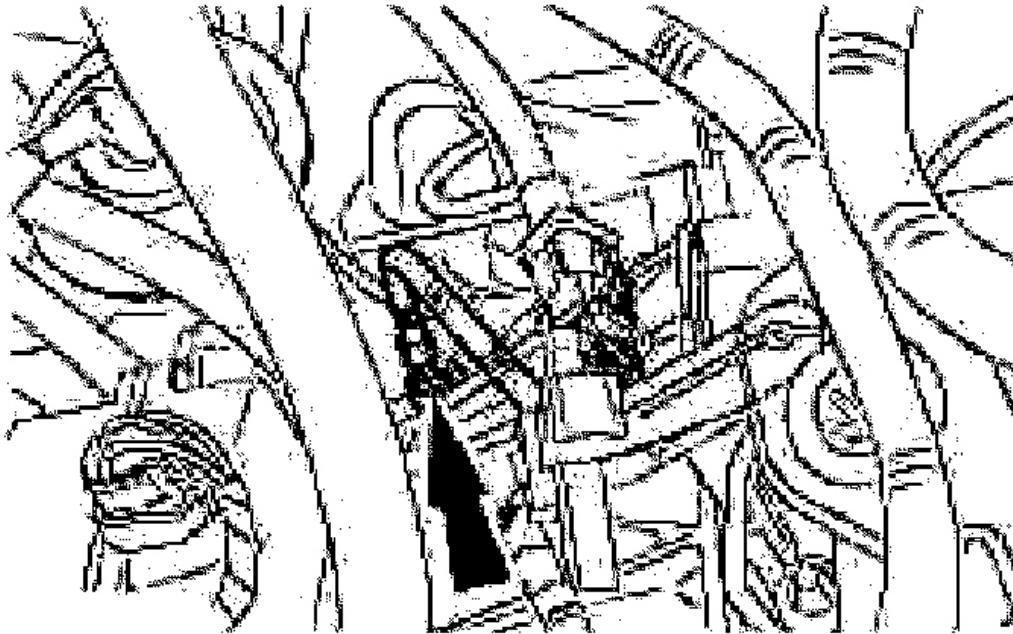
12. Disconnect both powertrain control module (PCM) connectors.



G03432261

Fig. 213: Disconnecting Powertrain Control Module (PCM) Connectors
Courtesy of FORD MOTOR CO.

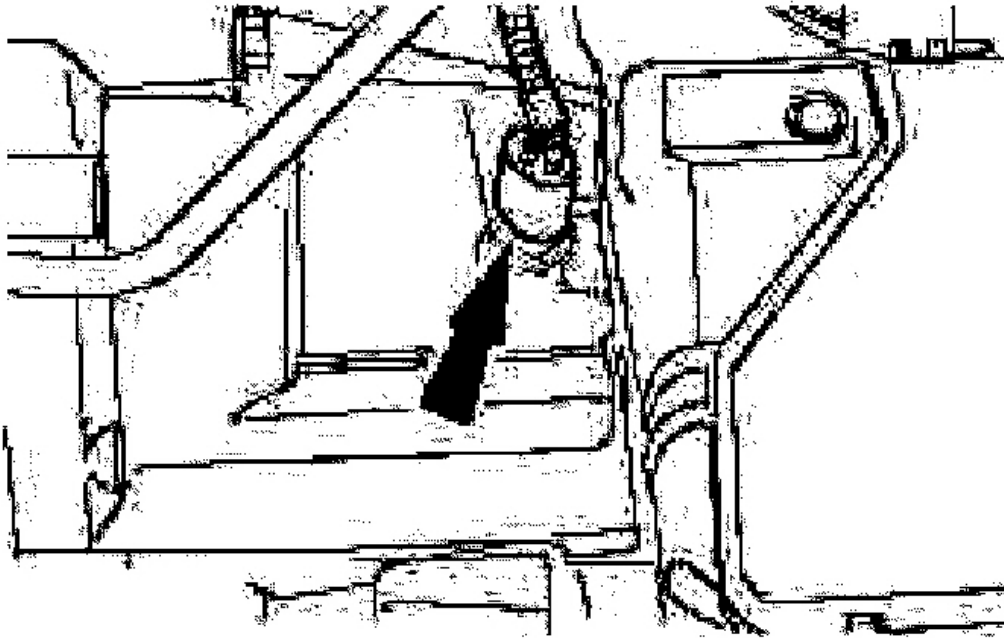
13. Disconnect the vehicle speed sensor (VSS) electrical connector.



G03432262

Fig. 214: Disconnecting Vehicle Speed Sensor (VSS) Electrical Connector
Courtesy of FORD MOTOR CO.

14. Disconnect the reversing lamp switch electrical connector.

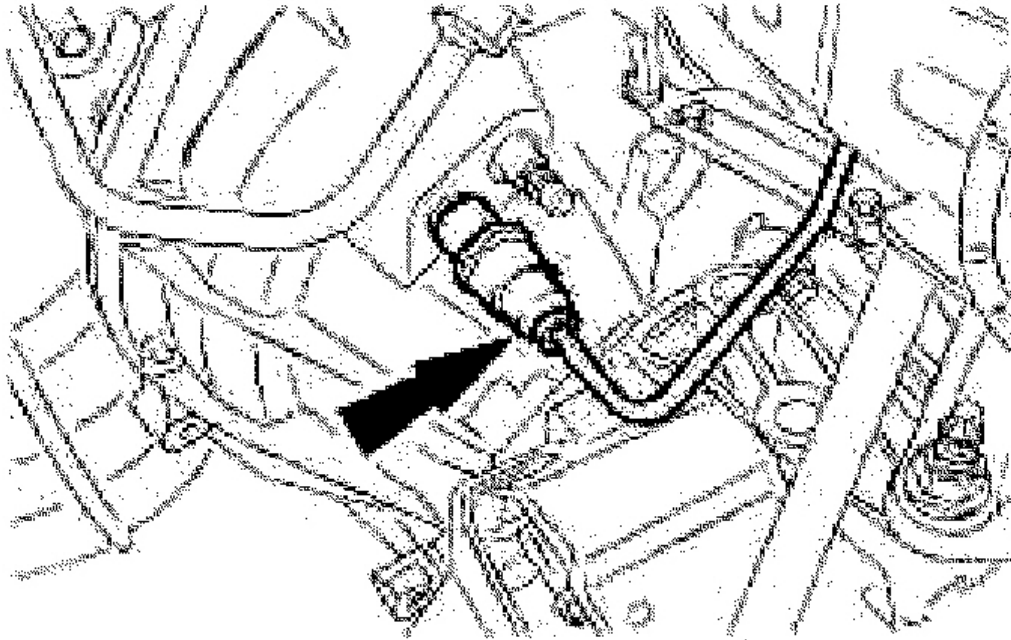


G03432263

Fig. 215: Disconnecting Reversing Lamp Switch Electrical Connector
Courtesy of FORD MOTOR CO.

CAUTION: Escaping brake fluid. Observe the safety regulations for working with brake fluid. For additional information, refer to DISC & DRUM article .

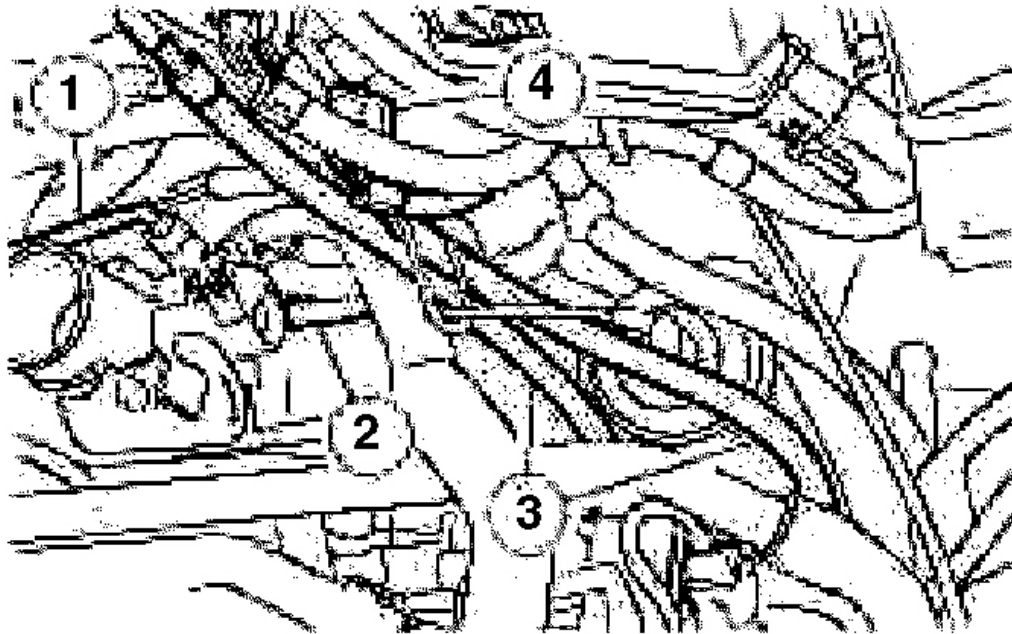
15. Remove the high-pressure pipe from the clutch slave cylinder.
 - Pull out the clip.
 - Pull out the high-pressure tube and tie it up with cable ties.



G03432264

Fig. 216: Removing High-Pressure Pipe From Clutch Slave Cylinder
Courtesy of FORD MOTOR CO.

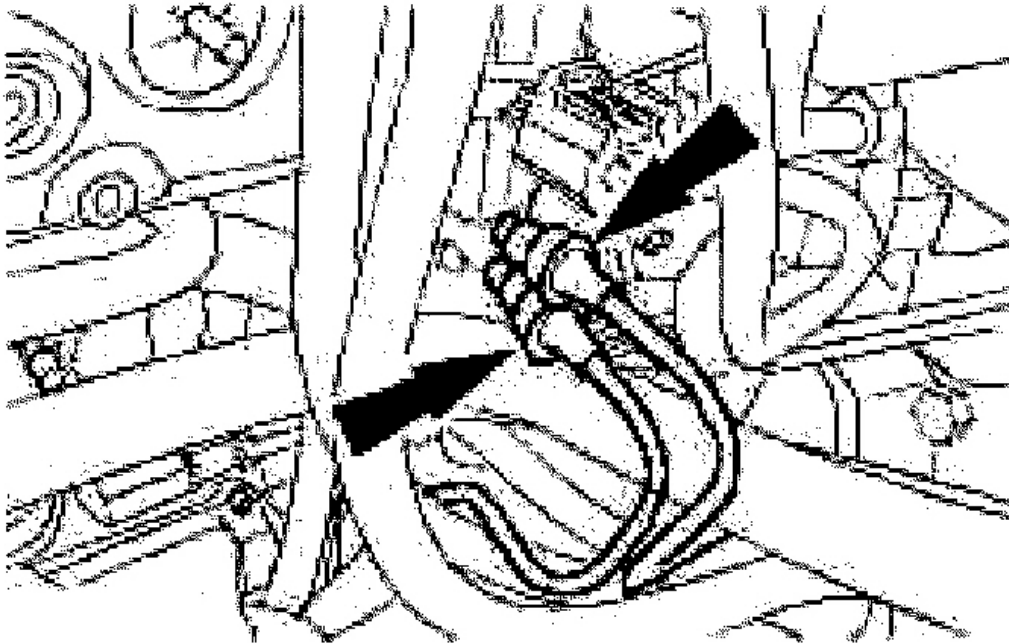
16. Remove the vacuum hoses.
 1. EVAP
 2. Brake servo
 3. Delta Pressure Feedback Electronic (DPFE) system sensor
 4. EGR-valve



G03432265

Fig. 217: Removing Vacuum Hoses (1 Of 2)
Courtesy of FORD MOTOR CO.

17. Remove the vacuum hose.

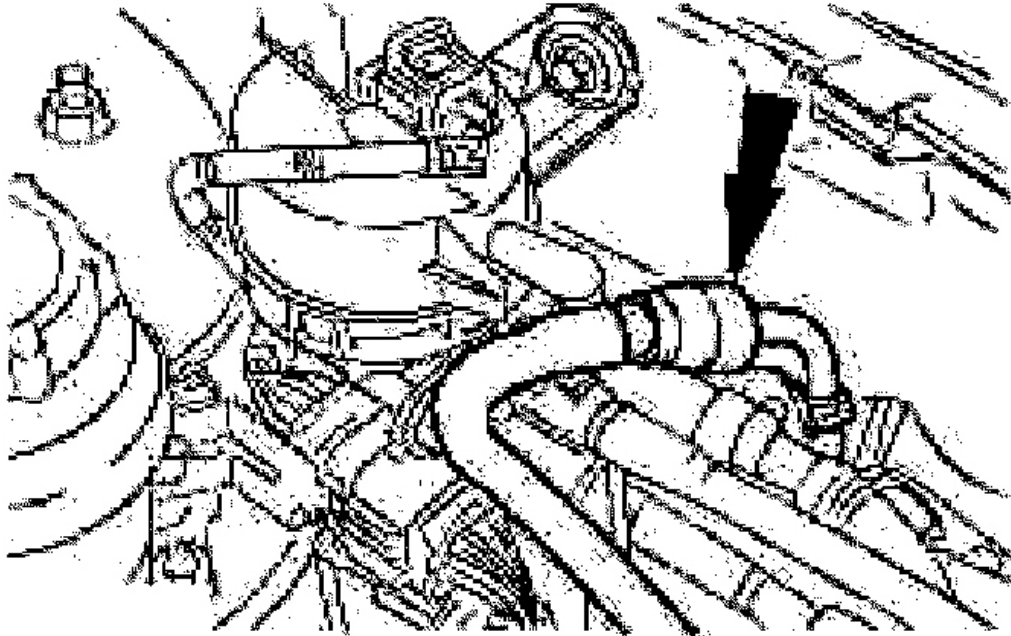


G03432266

Fig. 218: Removing Vacuum Hoses (2 Of 2)
Courtesy of FORD MOTOR CO.

WARNING: Escaping fuel. Observe the safety regulations for working with fuel. Failure to do so may result in personal injury.

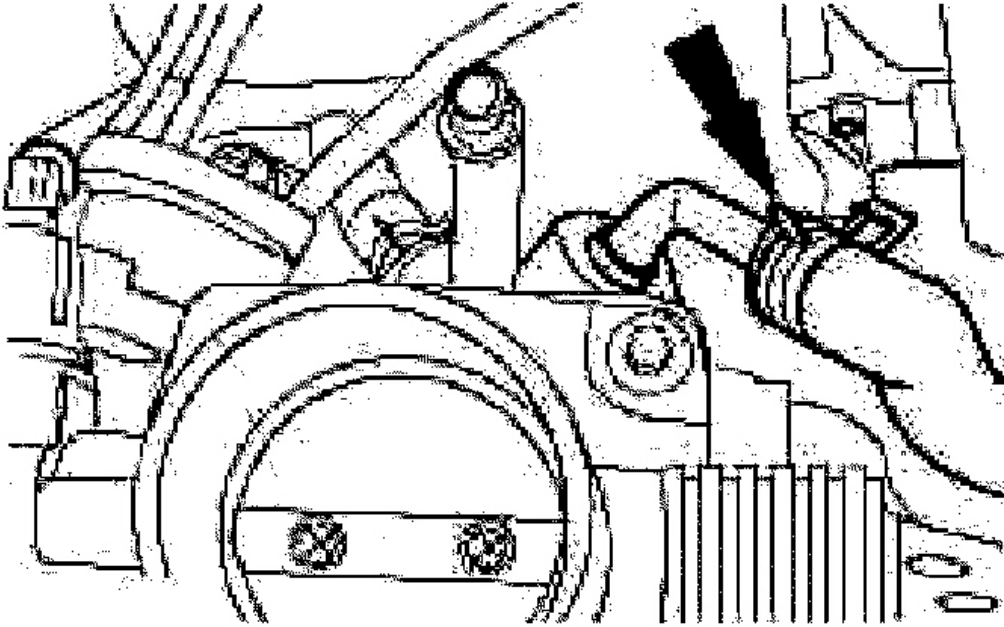
18. Drain off the fuel. For additional information, refer to **ENGINE SYSTEM-GENERAL INFORMATION** article .
 - Remove the fuel hose.



G03432267

Fig. 219: Removing Fuel Hose
Courtesy of FORD MOTOR CO.

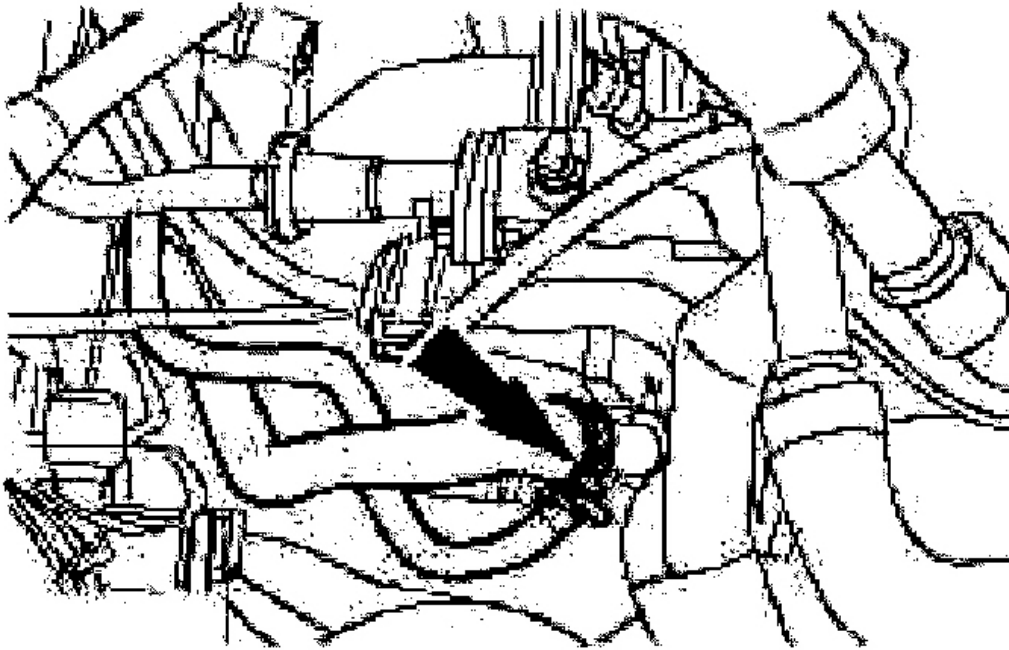
19. Remove the coolant hose from the intake manifold.



G03432268

Fig. 220: Removing Coolant Hose From Intake Manifold
Courtesy of FORD MOTOR CO.

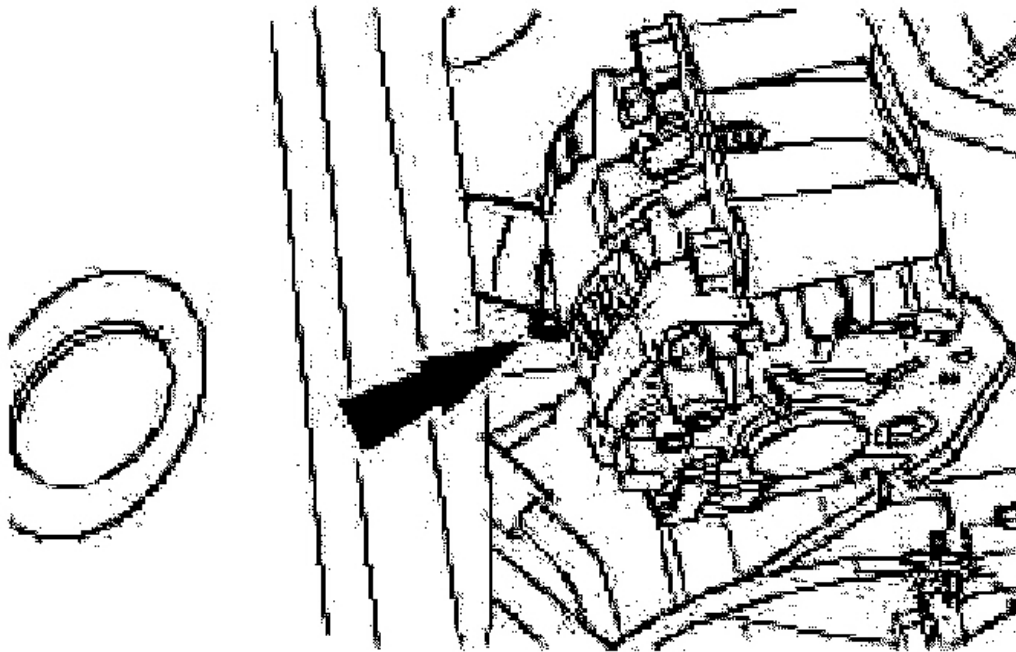
20. Remove the coolant hose from the water pump.



G03432269

Fig. 221: Removing Coolant Hose From Water Pump
Courtesy of FORD MOTOR CO.

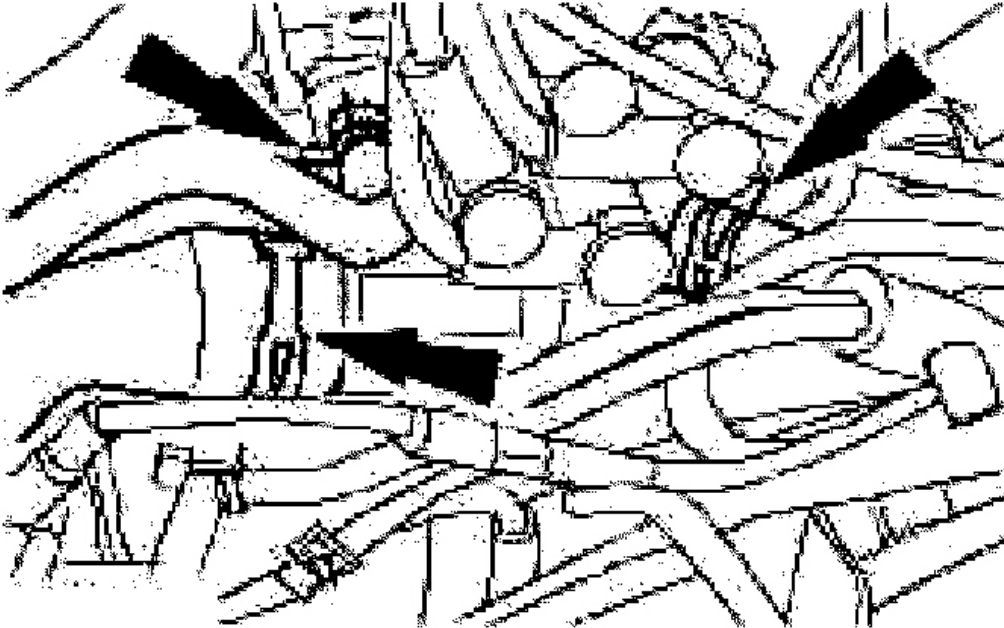
21. Remove the coolant hose from the coolant pipe.



G03432270

Fig. 222: Removing Coolant Hose From Coolant Pipe
Courtesy of FORD MOTOR CO.

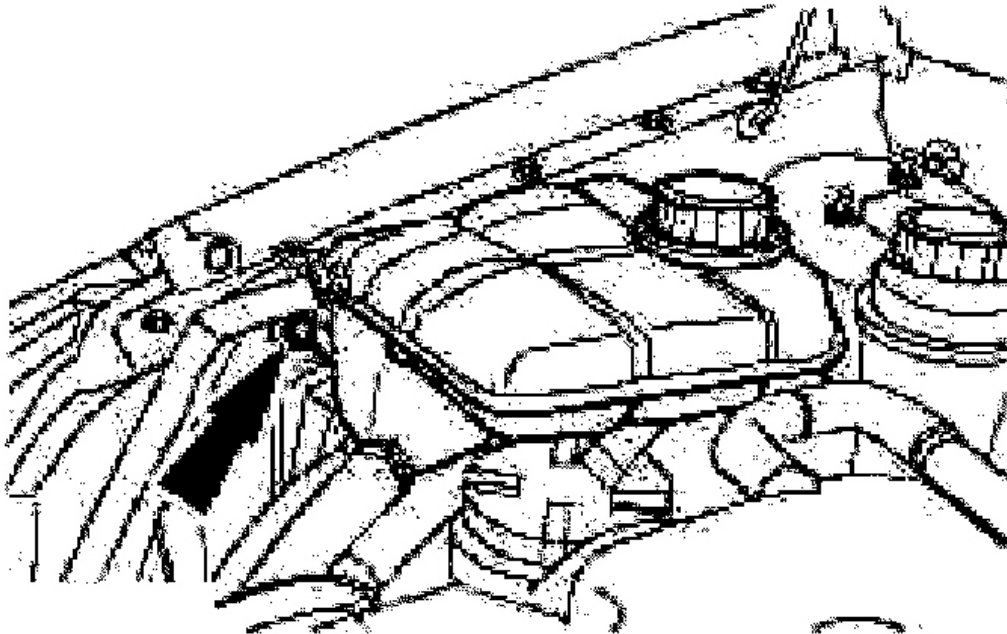
22. Remove the coolant hoses from the coolant hose connectors.



G03432271

Fig. 223: Removing Coolant Hoses From Coolant Hose Connectors
Courtesy of FORD MOTOR CO.

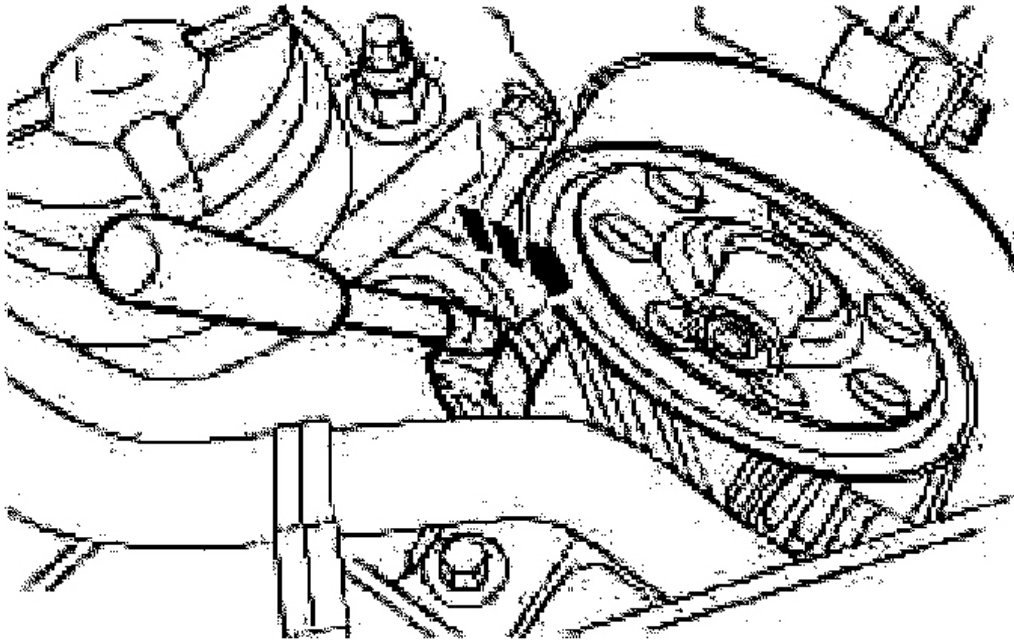
23. Remove the coolant expansion tank and lay it to one side.



G03432272

Fig. 224: Removing Coolant Expansion Tank And Lay
Courtesy of FORD MOTOR CO.

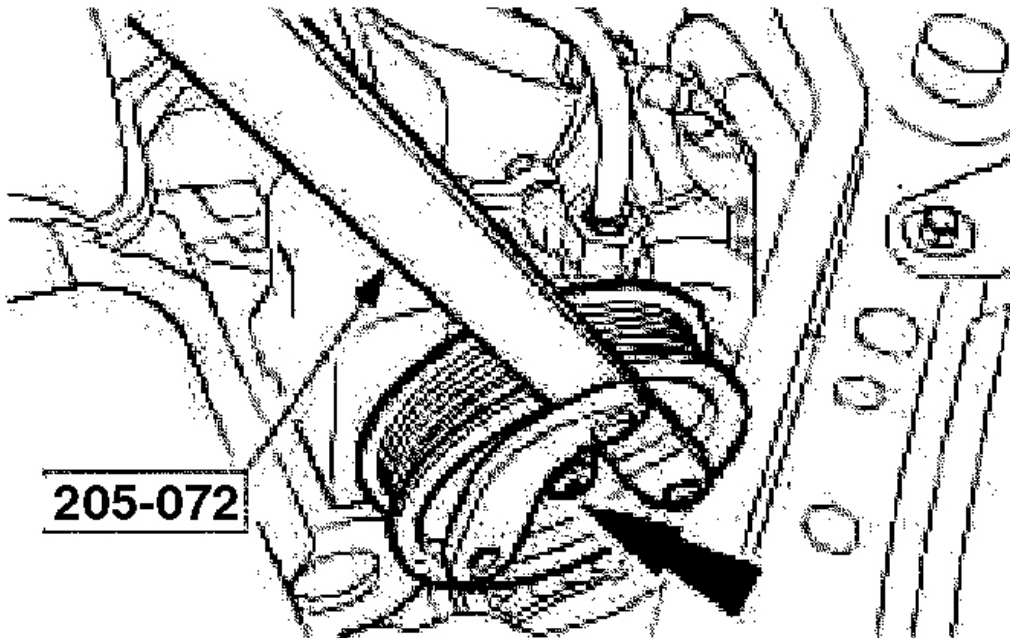
24. Slacken the accessory drive belt and remove it.
 - Turn the belt tensioner clockwise.



G03432273

Fig. 225: Removing Accessory Drive Belt
Courtesy of FORD MOTOR CO.

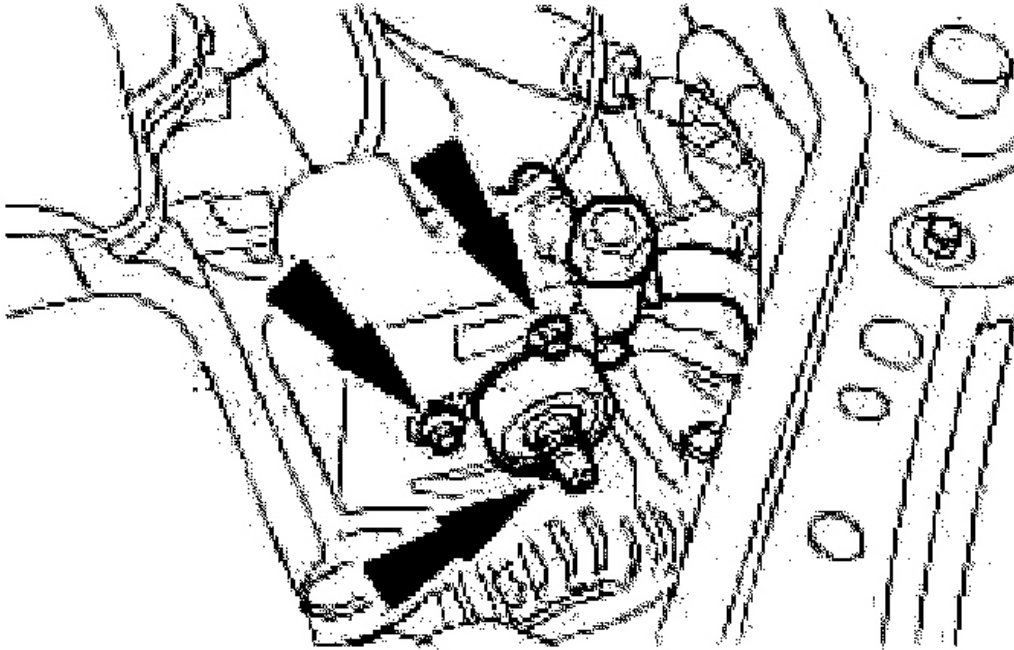
NOTE: Using the special tool to prevent the power steering pump pulley from rotating remove the power steering pump pulley retaining nut.



G03432274

Fig. 226: Removing Power Steering Pump Pulley
Courtesy of FORD MOTOR CO.

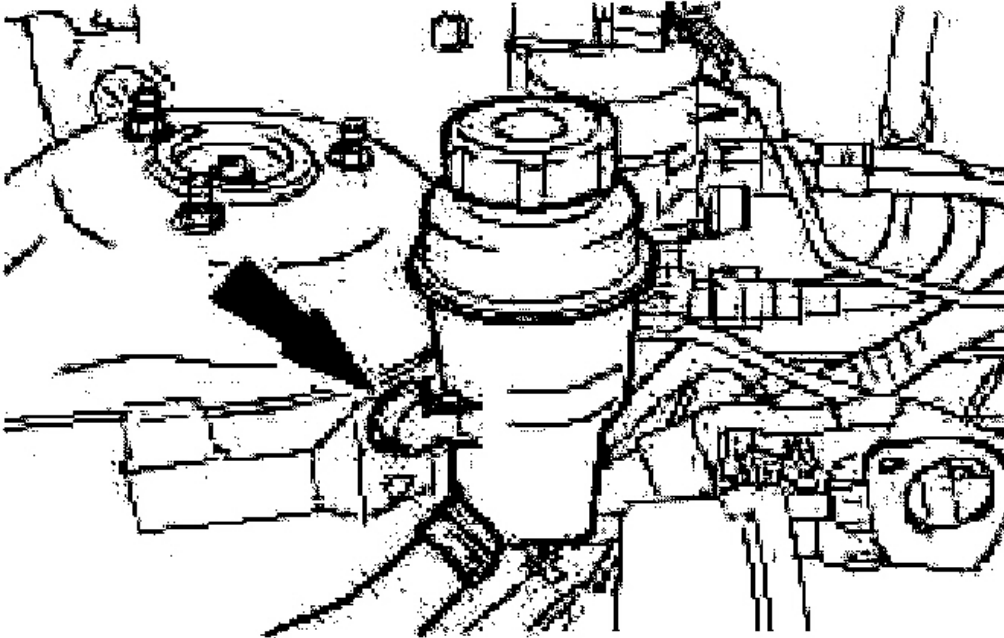
25. Remove the power steering pump pulley.
26. Remove the power steering pump and position it to one side.



G03432275

Fig. 227: Removing Power Steering Pump
Courtesy of FORD MOTOR CO.

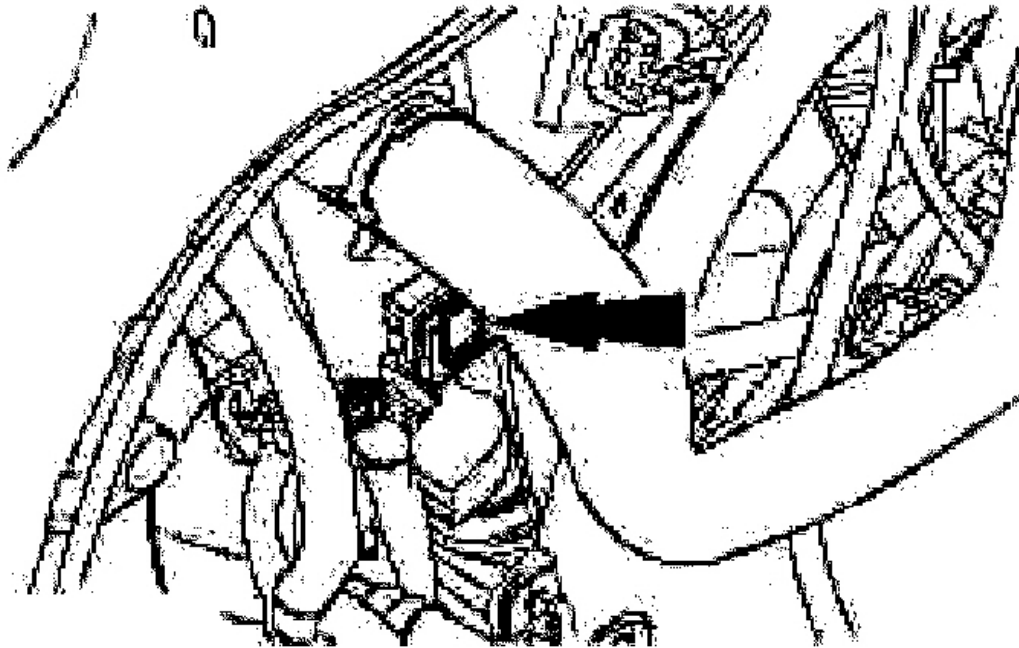
27. Remove the PAS reservoir and position it to one side.



G03432276

Fig. 228: Removing PAS Reservoir
Courtesy of FORD MOTOR CO.

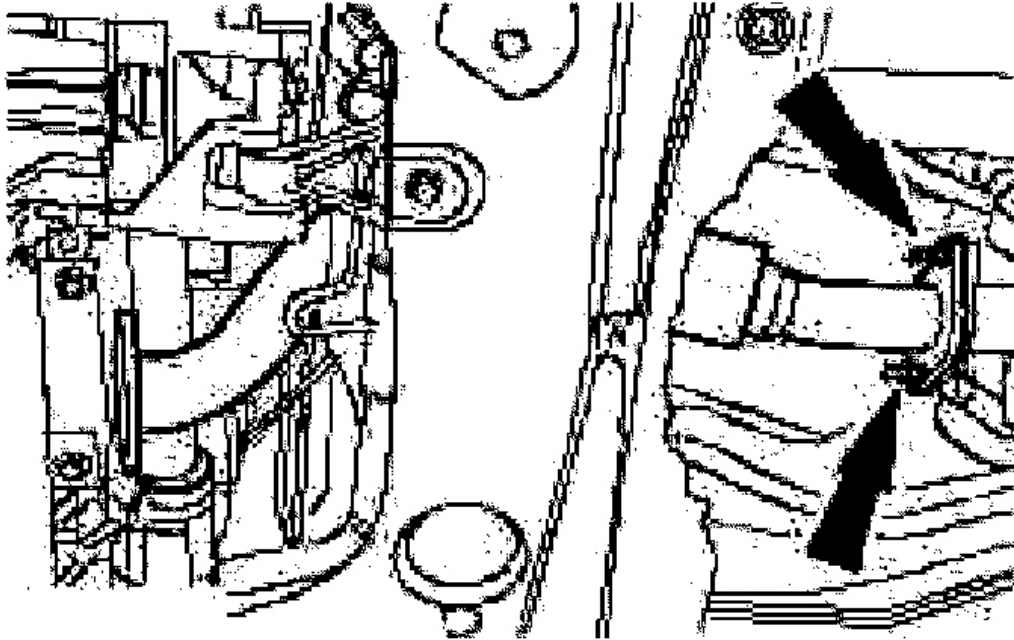
28. Remove the radiator fan.
 - Unclip the clips on both sides (left-hand side shown).
 - Remove the air deflector upwards.



G03432277

Fig. 229: [Removing Air Deflector]
Courtesy of FORD MOTOR CO.

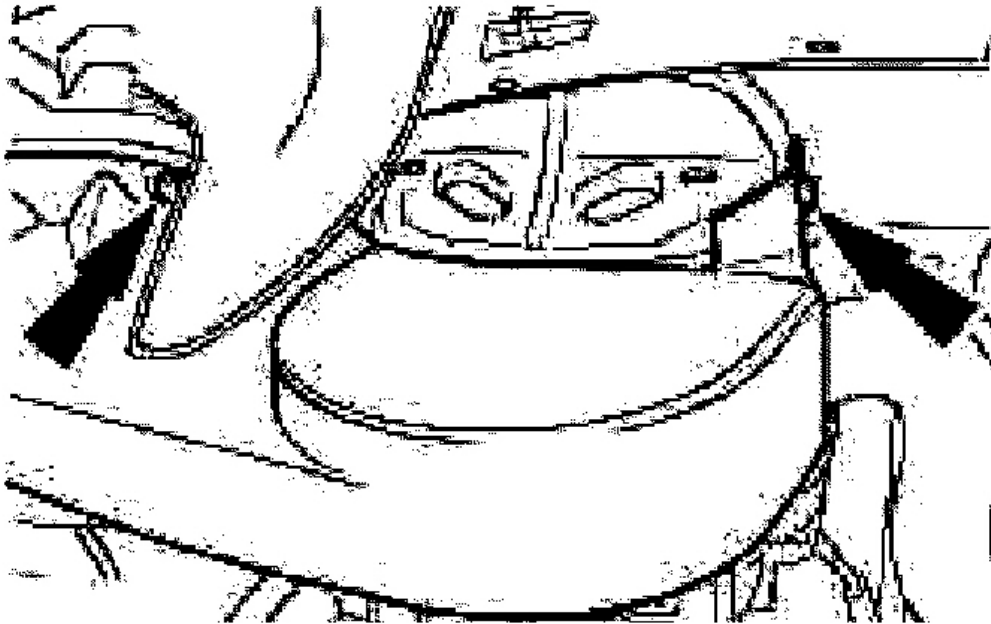
29. Remove the catalytic converter.
30. Remove the flexible exhaust pipe.



G03432278

Fig. 230: Removing Flexible Exhaust Pipe
Courtesy of FORD MOTOR CO.

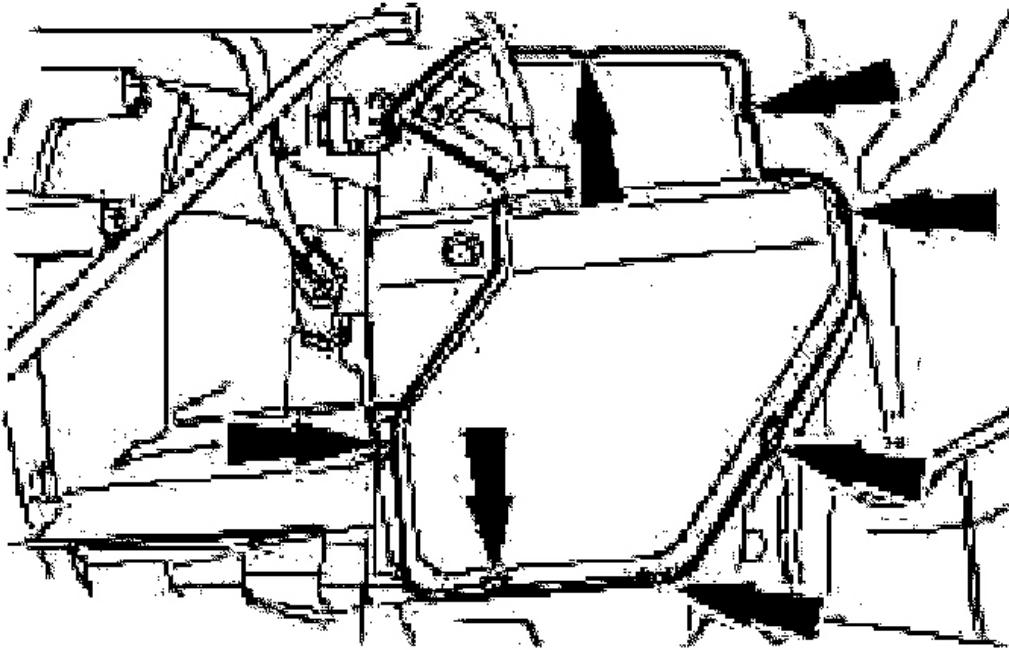
31. Remove the drive belt cover.



G03432279

Fig. 231: Removing Drive Belt Cover
Courtesy of FORD MOTOR CO.

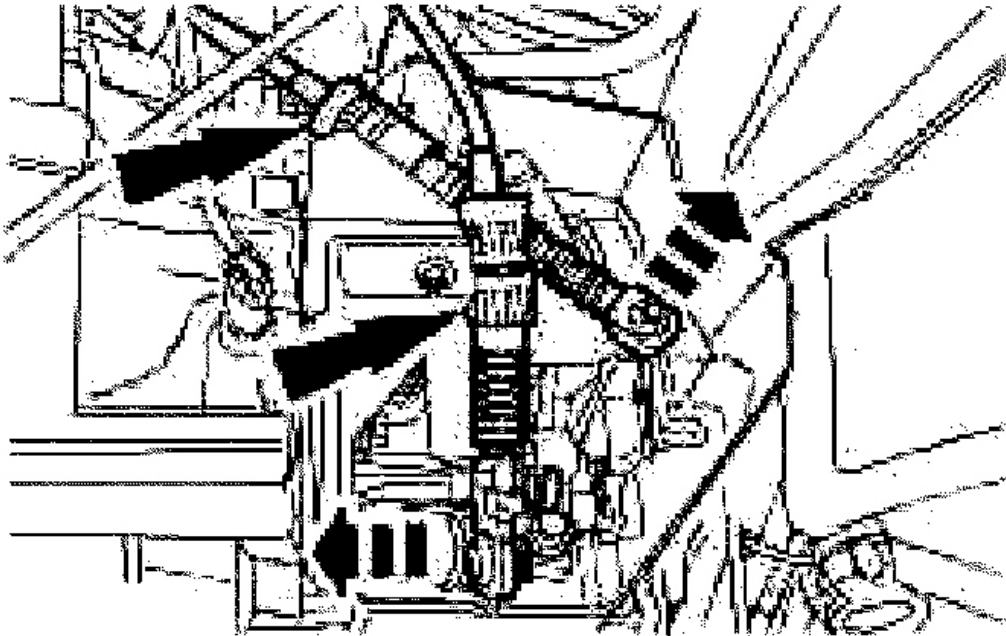
32. Remove the cover of the shift cable and selector cable.



G03432280

Fig. 232: Removing Cover Of Shift Cable And Selector Cable
Courtesy of FORD MOTOR CO.

33. Remove the shift cable and selector cable.
 - Remove the shift cable and selector cable by turning the abutment collar clockwise out of the bracket.

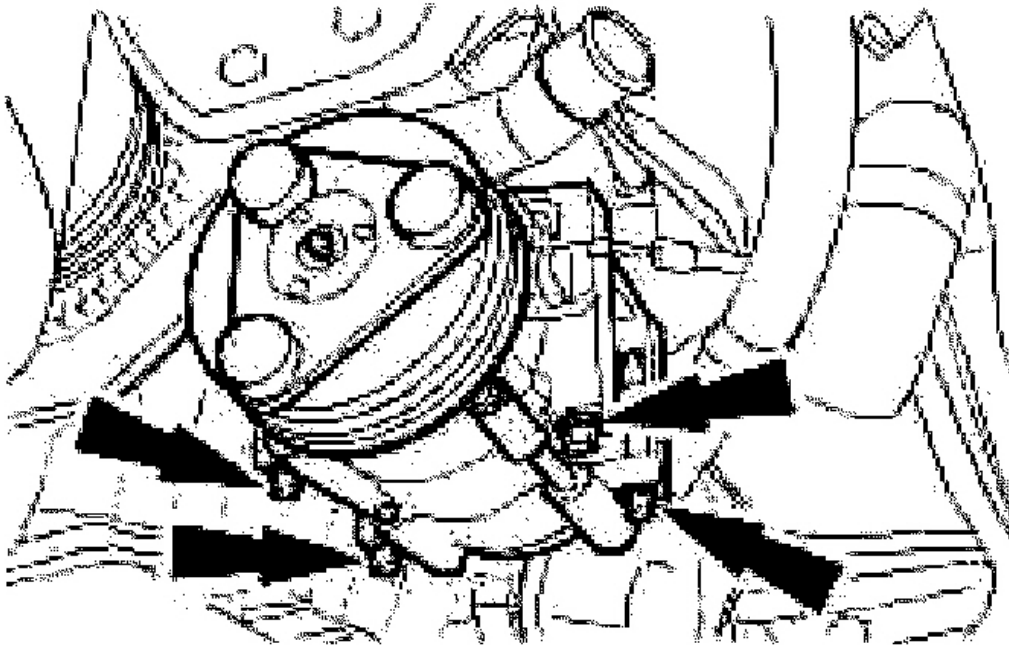


G03432281

Fig. 233: Removing Shift Cable And Selector Cable
Courtesy of FORD MOTOR CO.

Vehicles with air conditioning

34. Remove the air conditioning compressor and secure it to the radiator crossmember.

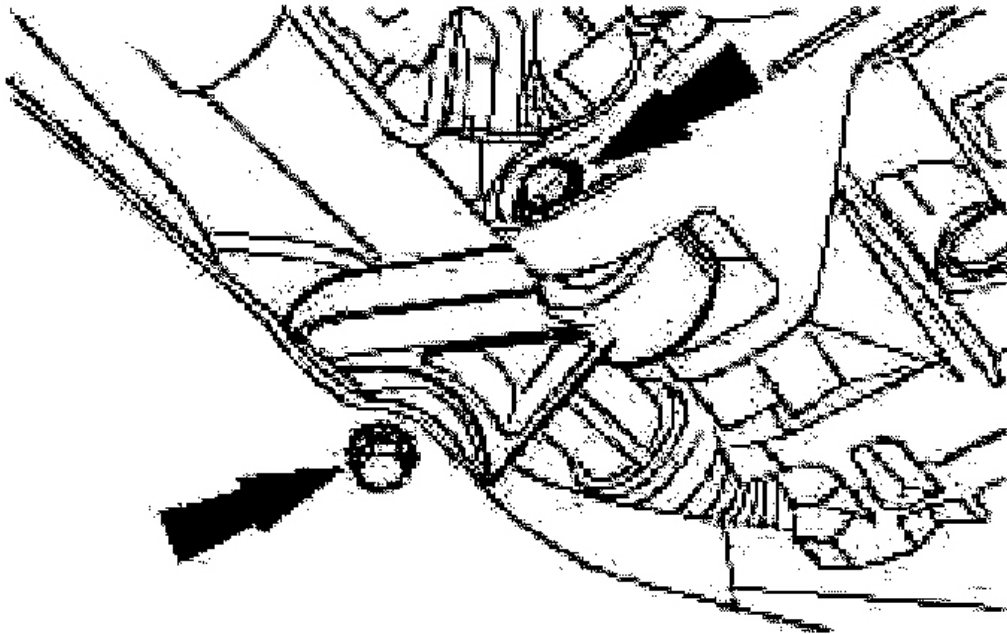


G03432282

Fig. 234: Removing Air Conditioning Compressor
Courtesy of FORD MOTOR CO.

All vehicles

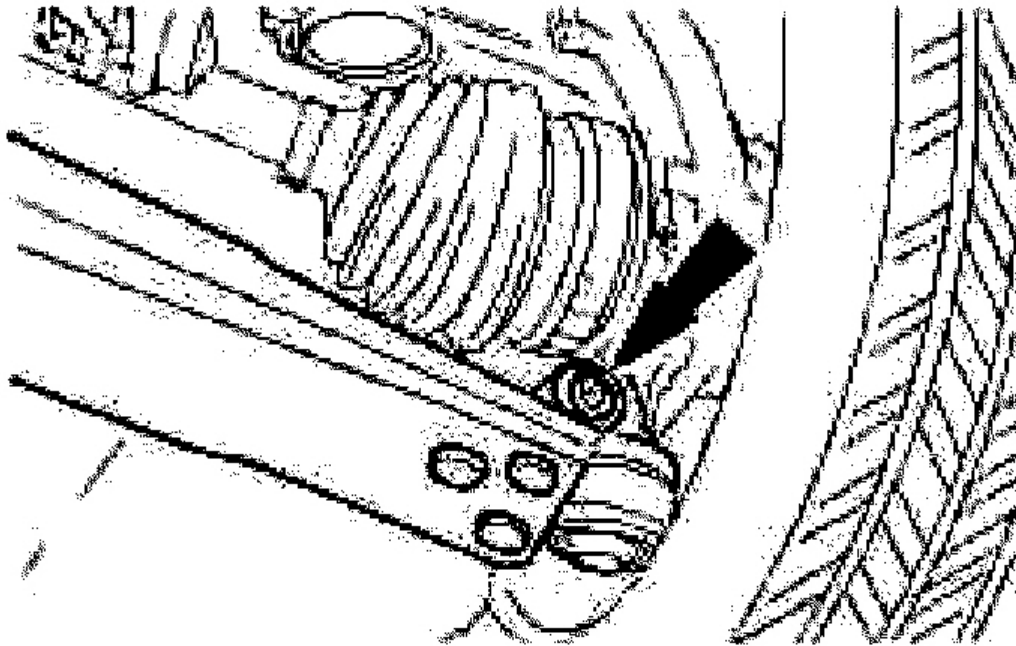
35. Remove the right-hand engine support insulator.



G03432283

Fig. 235: Removing Right-Hand Engine Support Insulator
Courtesy of FORD MOTOR CO.

36. Remove both suspension arms (right-hand side shown).

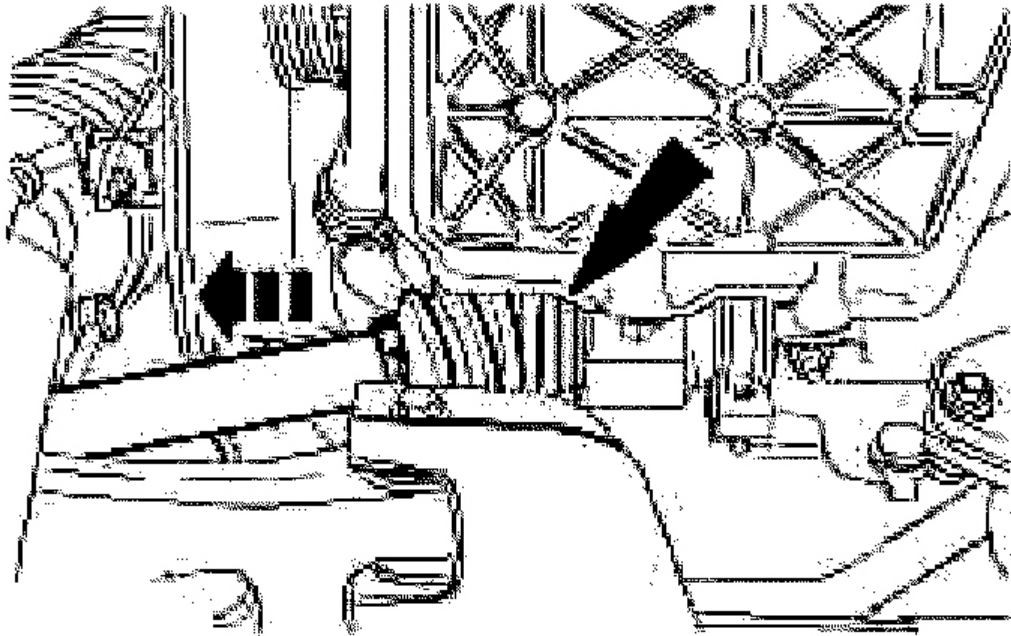


G03432284

Fig. 236: Removing Suspension Arms
Courtesy of FORD MOTOR CO.

CAUTION: The inner joint must not be bent at more than 18 degrees;
the outer joint must not be bent at more than 45 degrees.

37. Remove the right-hand front drive halfshaft from the intermediate shaft.
 - Remove the clamping strap.
 - Pull the front drive halfshaft from the intermediate shaft and tie it up with cable ties.



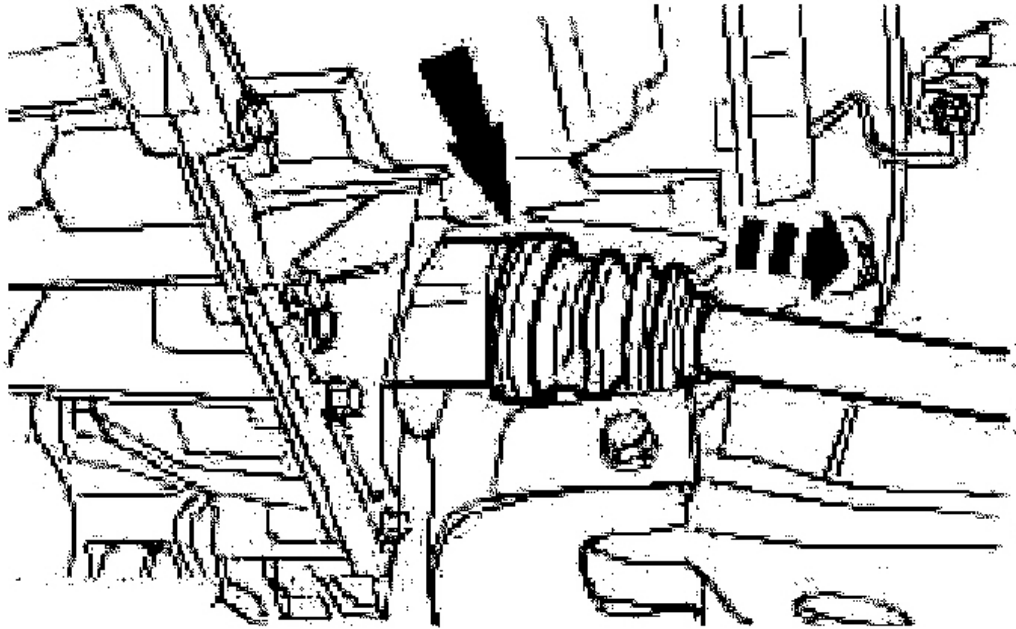
G03432285

Fig. 237: Removing Right-Hand Front Drive Halfshaft From Intermediate Shaft

Courtesy of FORD MOTOR CO.

CAUTION: The inner joint must not be bent at more than 18 degrees;
the outer joint must not be bent at more than 45 degrees.

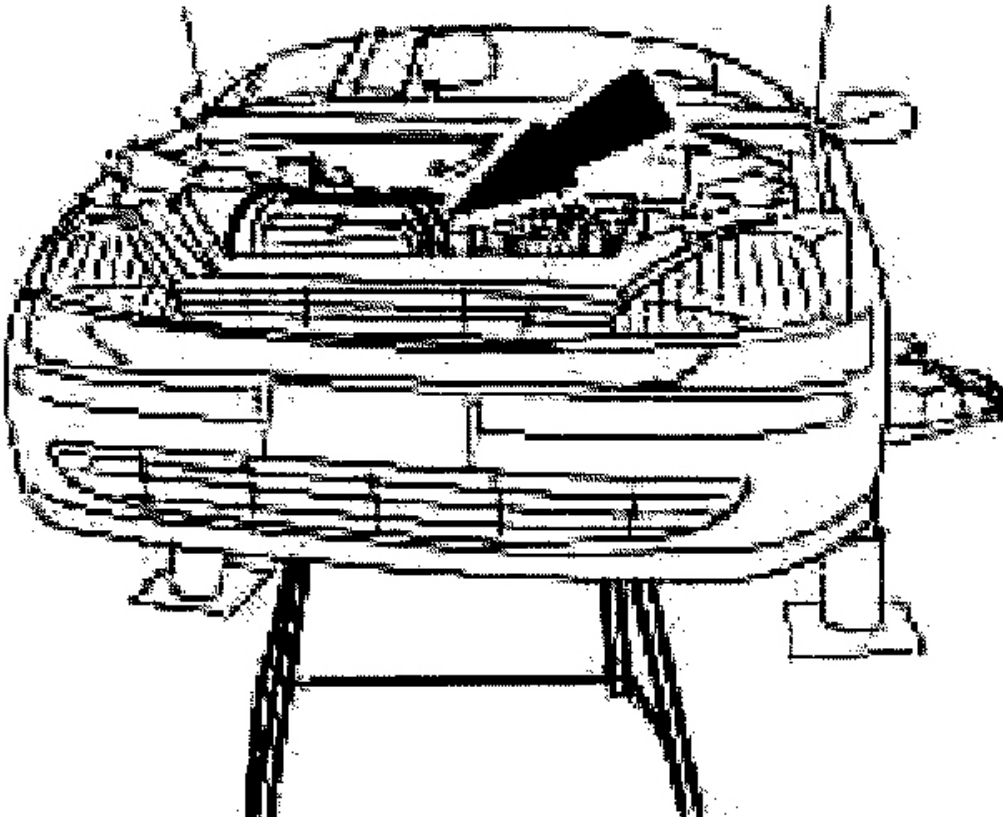
38. Remove the left-hand front drive halfshaft from the tripod housing.
 - Remove the clamping strap.
 - Pull the front drive halfshaft from the tripod housing and tie it up with cable ties.



G03432286

Fig. 238: Removing Left-Hand Front Drive Halfshaft From Tripod Housing
Courtesy of FORD MOTOR CO.

39. Position the assembly stand with wooden blocks on it under the vehicle.
40. Carefully lower the vehicle until the engine and transaxle assembly is on the assembly stand.
41. Secure the engine and transaxle assembly on the assembly stand with a retaining strap.

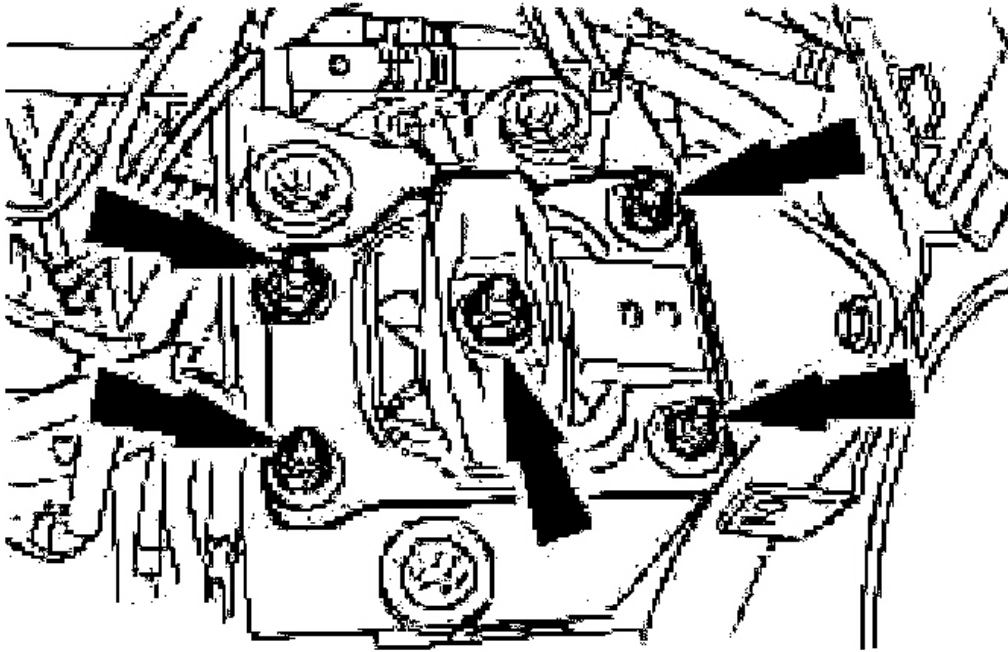


G03432287

Fig. 239: Securing Engine And Transaxle Assembly On Assembly Stand With Retaining Strap

Courtesy of FORD MOTOR CO.

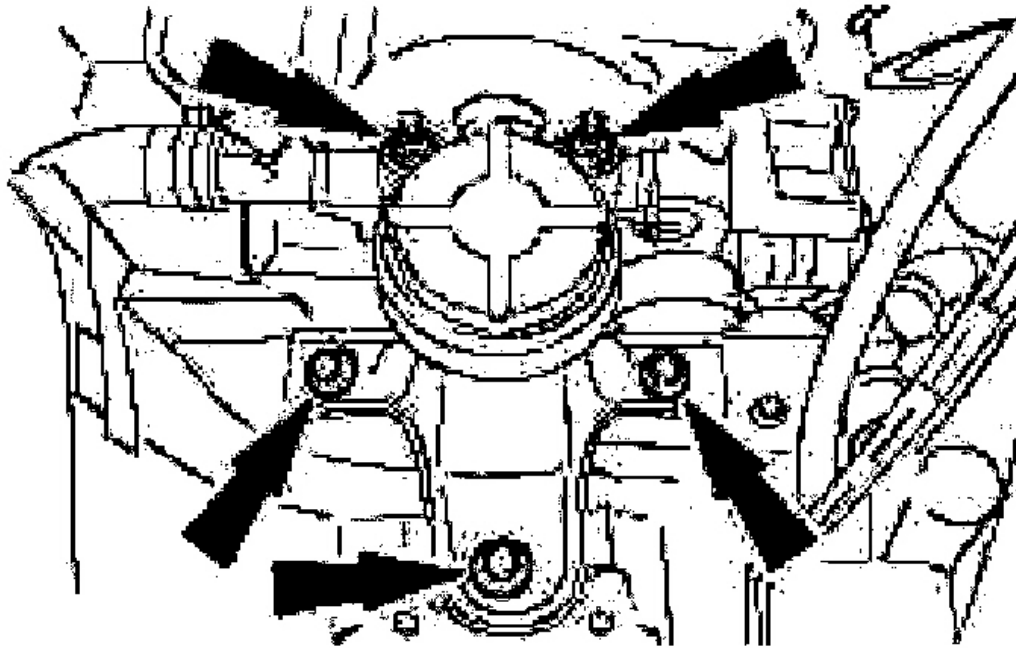
42. Remove the engine rear mount.



G03432288

Fig. 240: Removing Engine Rear Mount
Courtesy of FORD MOTOR CO.

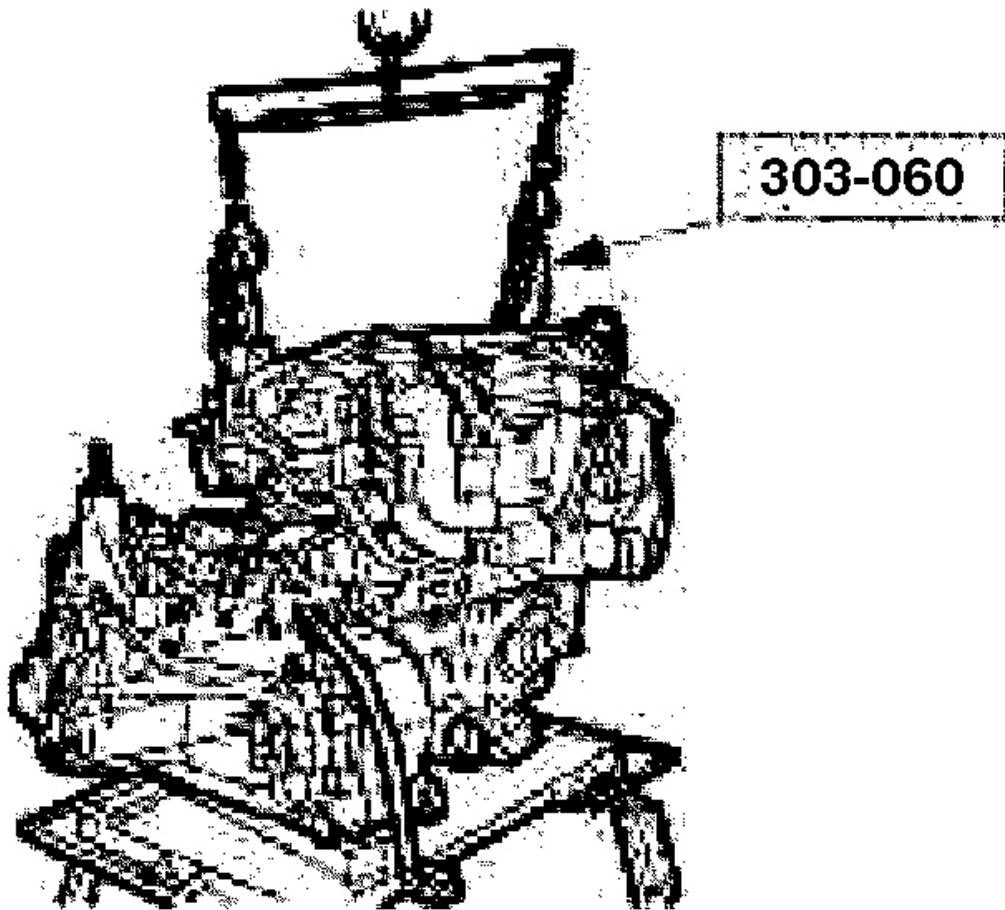
43. Remove the engine front mount.



G03432289

Fig. 241: Removing Engine Front Mount
Courtesy of FORD MOTOR CO.

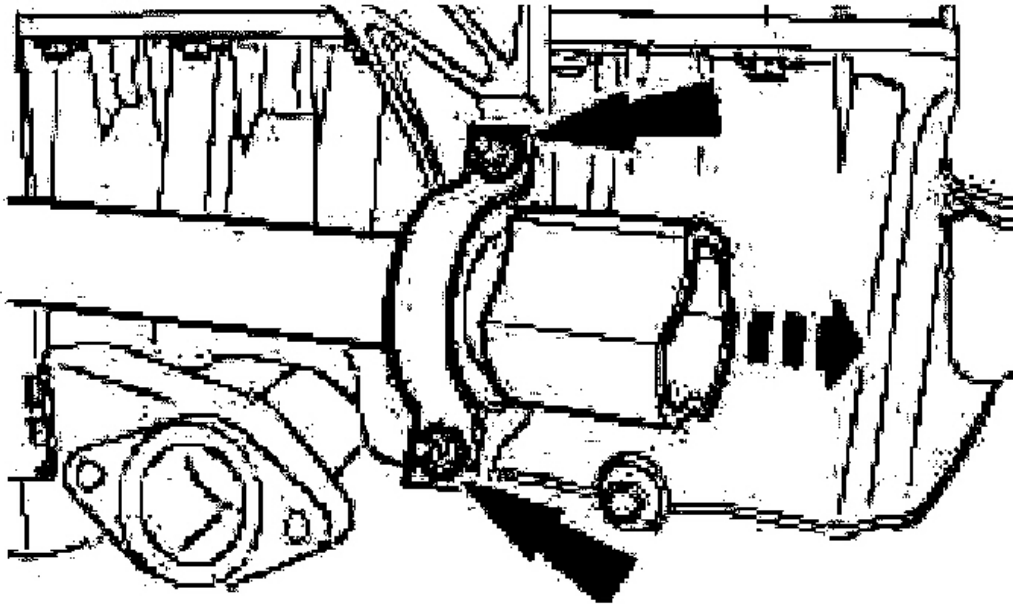
44. Carefully raise the vehicle.
 - Secure the engine and transaxle assembly with a retaining strap on the assembly table.
 - Pull the assembly stand forward with the engine and transaxle assembly.
45. Use a floor crane and the special tool to separate the engine from the transaxle.



G03432290

Fig. 242: Separating Engine From Transaxle
Courtesy of FORD MOTOR CO.

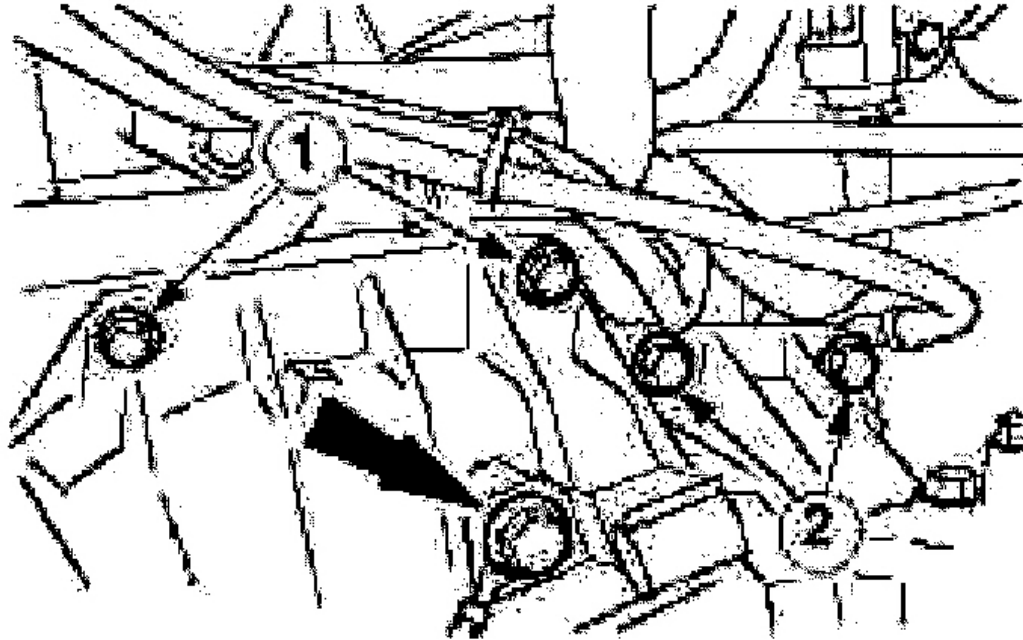
46. Remove the retaining clip.



G03432291

Fig. 243: Removing Retaining Clip
Courtesy of FORD MOTOR CO.

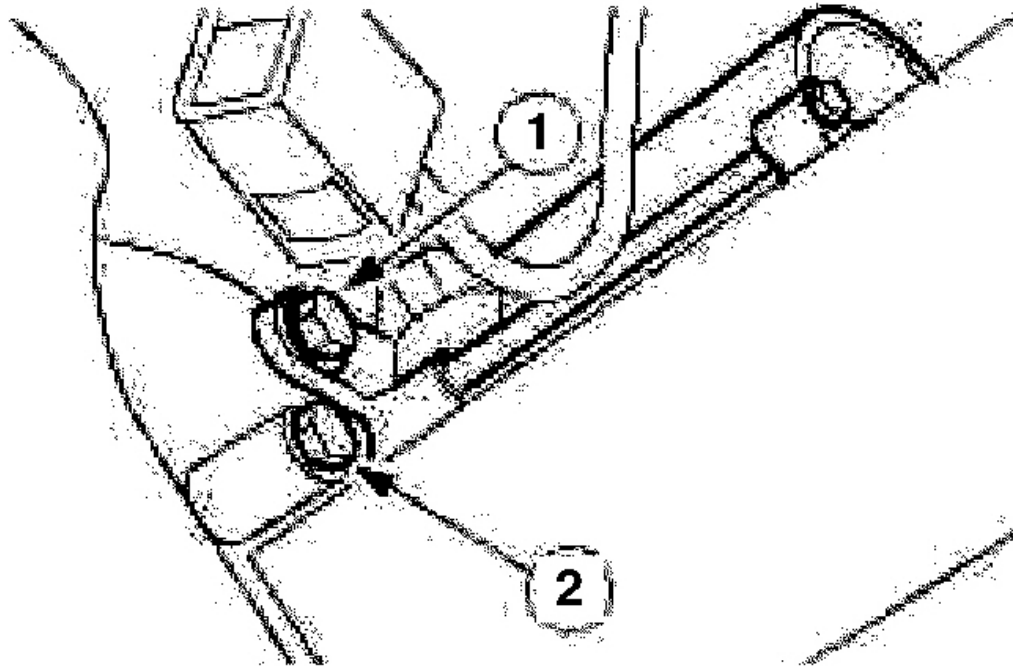
47. Remove the transaxle upper bolts.
 1. Flange bolts
 2. Starter motor bolts
 - Disconnect the ground cable.



G03432292

Fig. 244: Removing Transaxle Upper Bolts
Courtesy of FORD MOTOR CO.

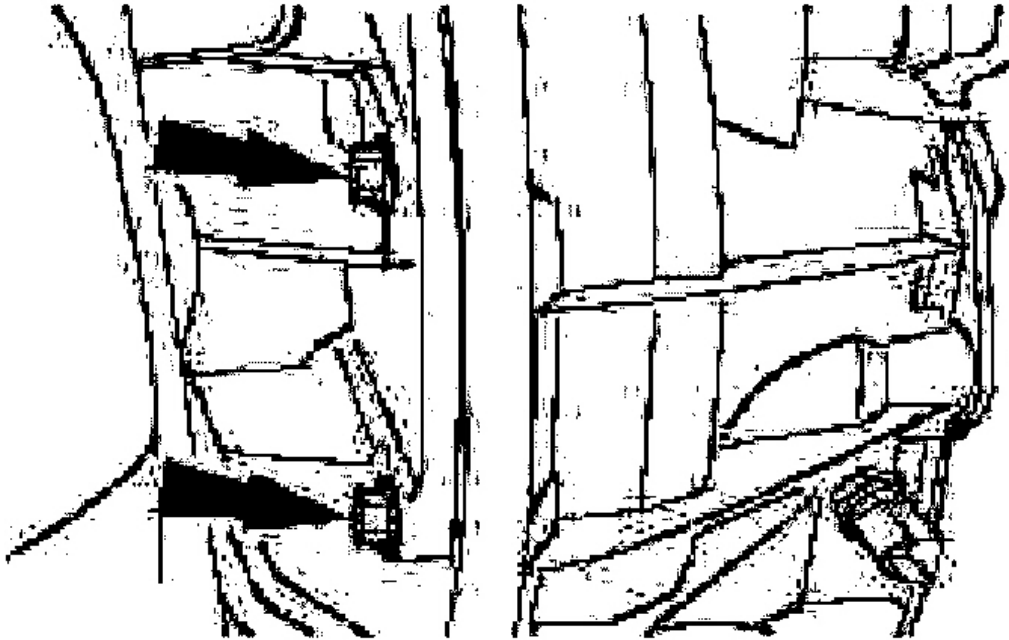
48. Remove the right-hand transaxle flange bolt and remove the starter motor.
 1. Starter motor bolt
 2. Flange bolt



G03432293

Fig. 245: Removing Right-Hand Transaxle Flange Bolt And Starter Motor
Courtesy of FORD MOTOR CO.

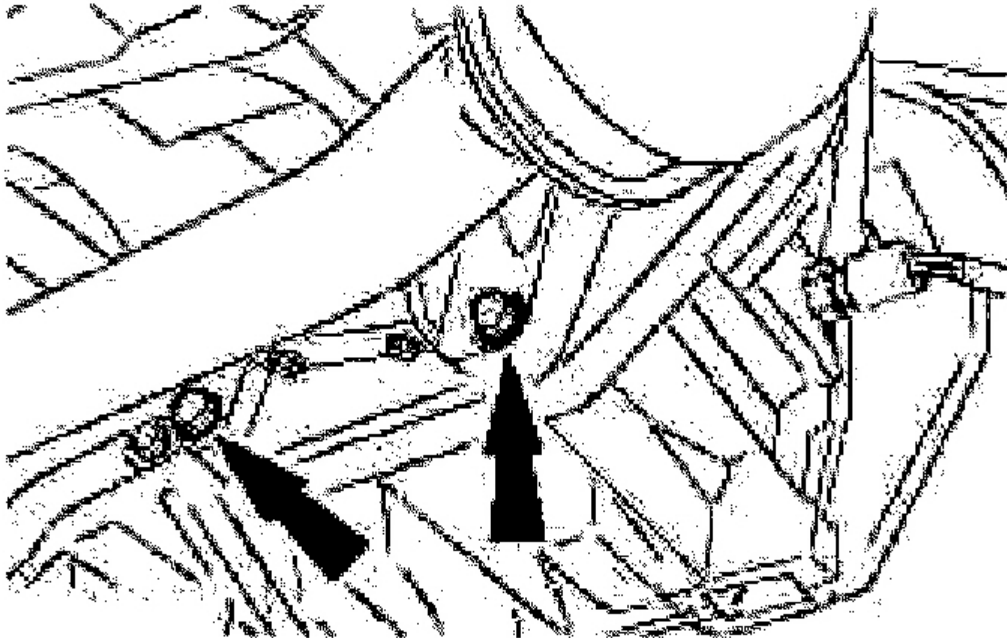
49. Remove the transaxle left-hand flange bolts.



G03432294

Fig. 246: Removing Transaxle Left-Hand Flange Bolts
Courtesy of FORD MOTOR CO.

50. Remove the transaxle lower flange bolts.



G03432295

Fig. 247: Removing Transaxle Lower Flange Bolts
Courtesy of FORD MOTOR CO.

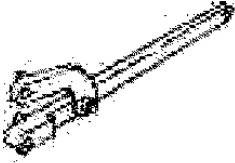
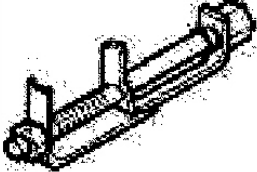
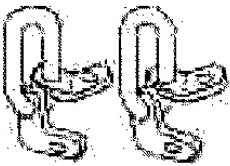
51. Separate the engine from the transaxle.

ENGINE - VEHICLES WITH: AUTOMATIC TRANSAXLE

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine, 2.0L SPI - Focus

	Flange Holding Wrench, Universal 205-072 (15-03A)
	Remover/Installer, hose clamp 412-108 (T96P-18539-A)
	Lifting Bracket, Engine 303-050 (T70P-6000)

G03432296

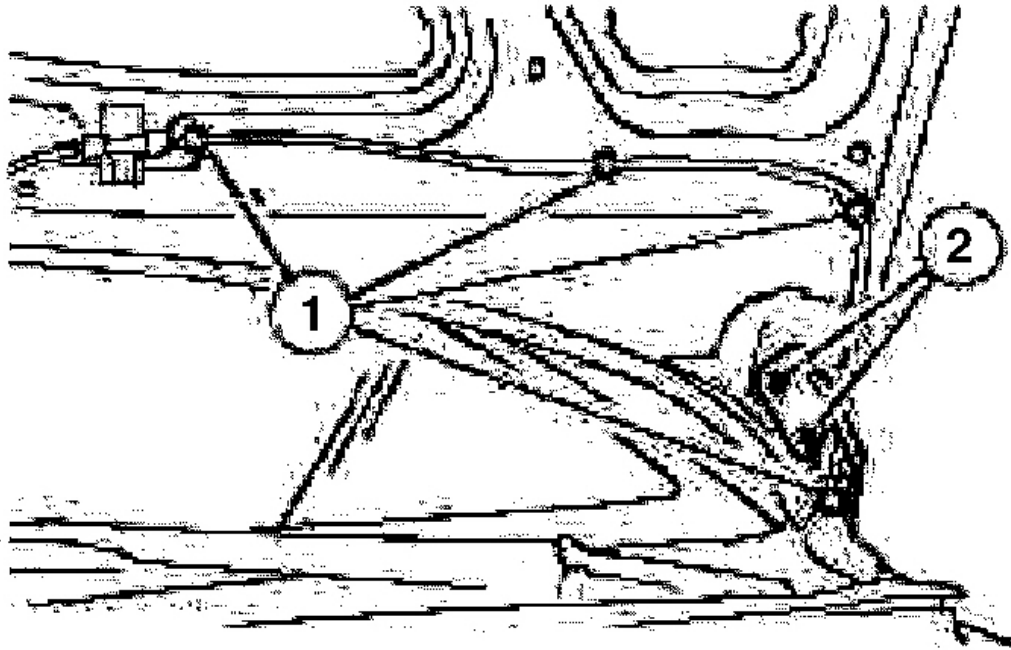
Fig. 248: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Removal

All Vehicles

NOTE: Mark the hinge-to hood placement to ease alignment when installing the hood.

1. Remove the hood.
 1. Disconnect the windshield washer hose and clips.
 2. Remove the four retainers(two each side) and remove the hood.

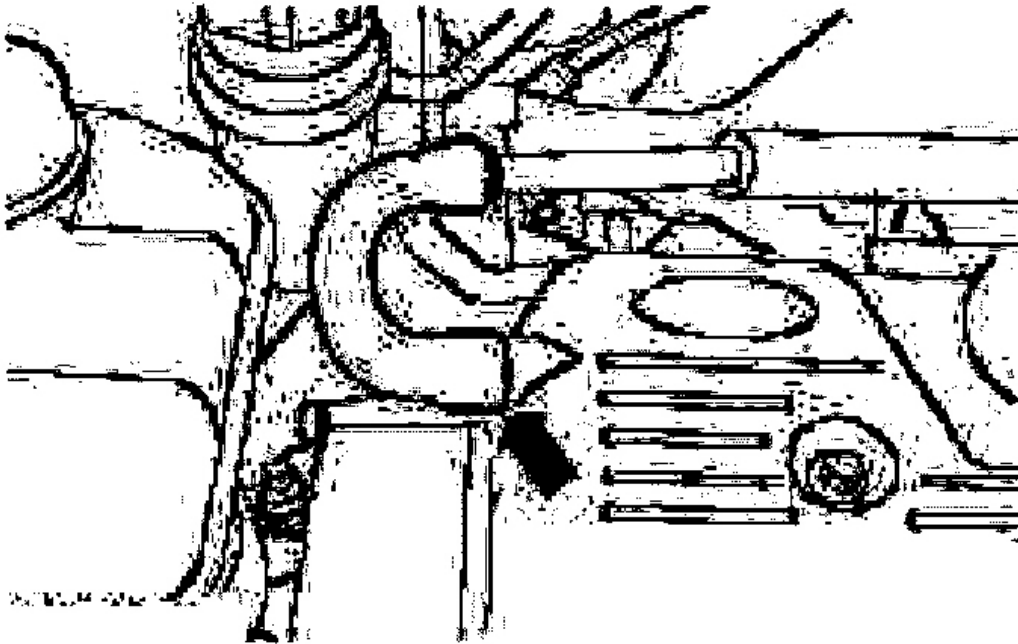


G03432297

Fig. 249: Removing Hood
Courtesy of FORD MOTOR CO.

WARNING: Escaping fuel. Observe the safety regulations for working with fuel. Failure to do so may result in personal injury.

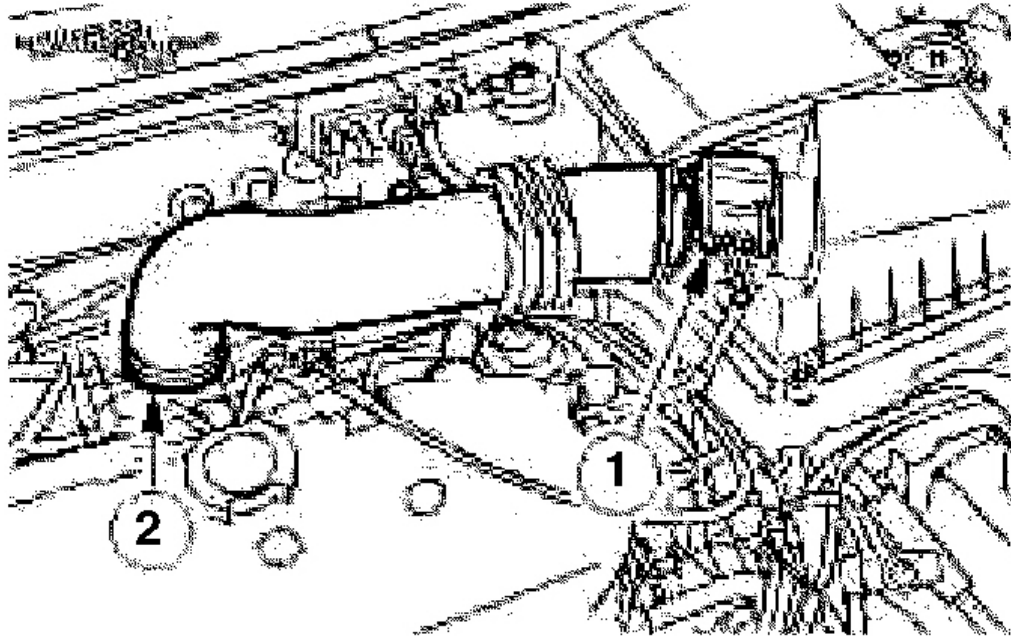
2. Disconnect the fuel line spring lock couplings. For additional information, refer to **FUEL SYSTEMS** article .
3. Remove the battery tray .
4. Disconnect the crankcase breather hose.



G03432298

Fig. 250: Disconnecting Crankcase Breather Hose
Courtesy of FORD MOTOR CO.

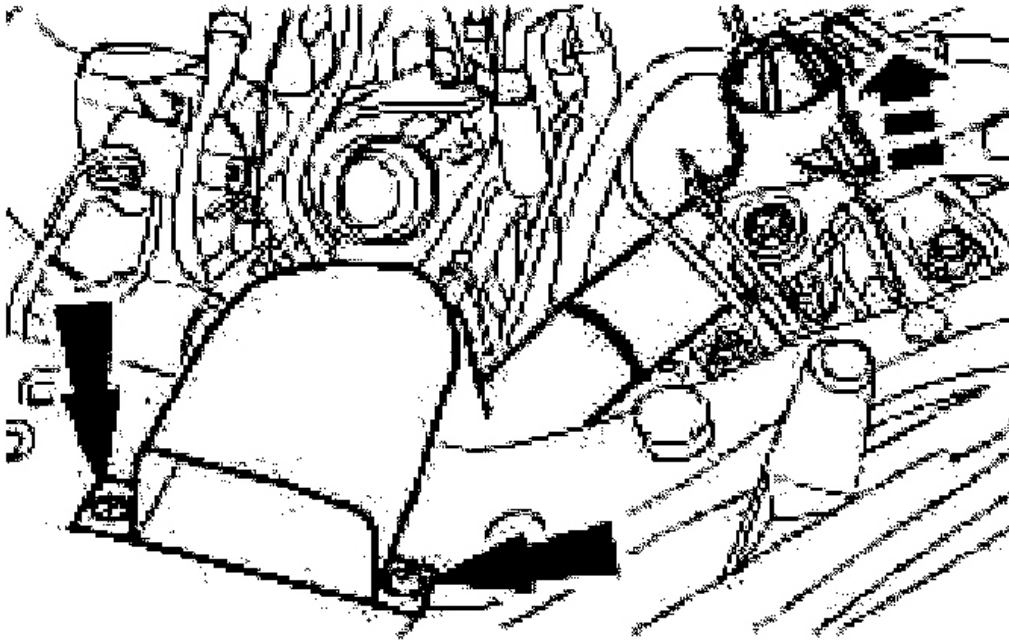
5. Remove the air cleaner (ACL) housing.
 1. Disconnect the mass air flow (MAF) sensor electrical connector.
 2. Remove the intake hose.
 - Remove the air cleaner housing from the rubber bushing.



G03432299

Fig. 251: Removing Air Cleaner (ACL) Housing
Courtesy of FORD MOTOR CO.

6. Remove the air cleaner intake pipe.



G03432300

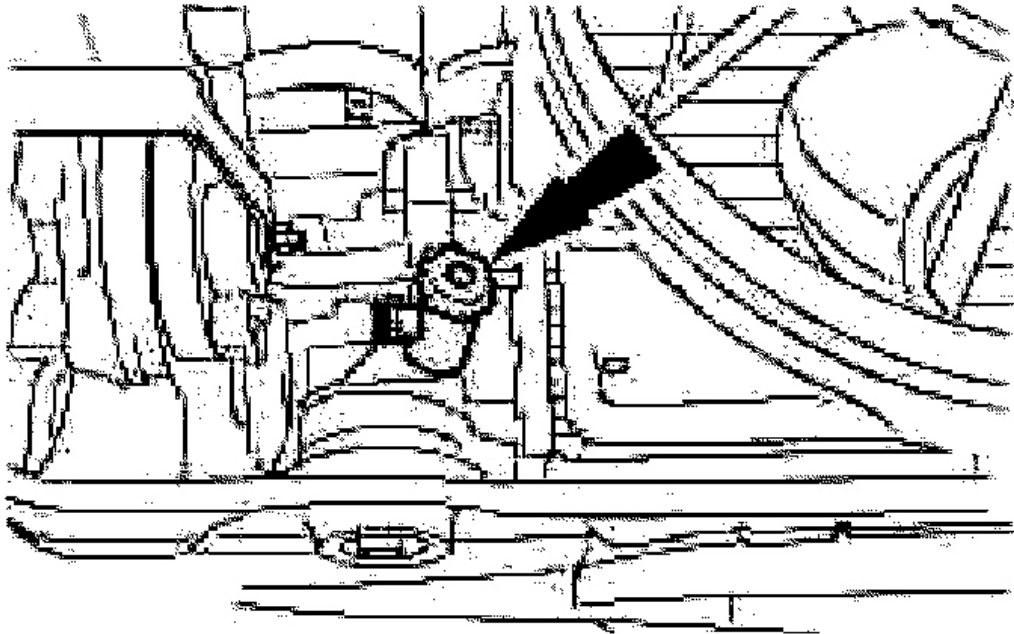
Fig. 252: Removing Air Cleaner Intake Pipe
Courtesy of FORD MOTOR CO.

CAUTION: To prevent the risk of scalding, place a thick cloth over the filler cap before opening the cooling circuit. Failure to do so may result in personal injury.

7. Open the coolant expansion tank.

WARNING: Danger of scalding if the engine is warm. Failure to do so may result in personal injury.

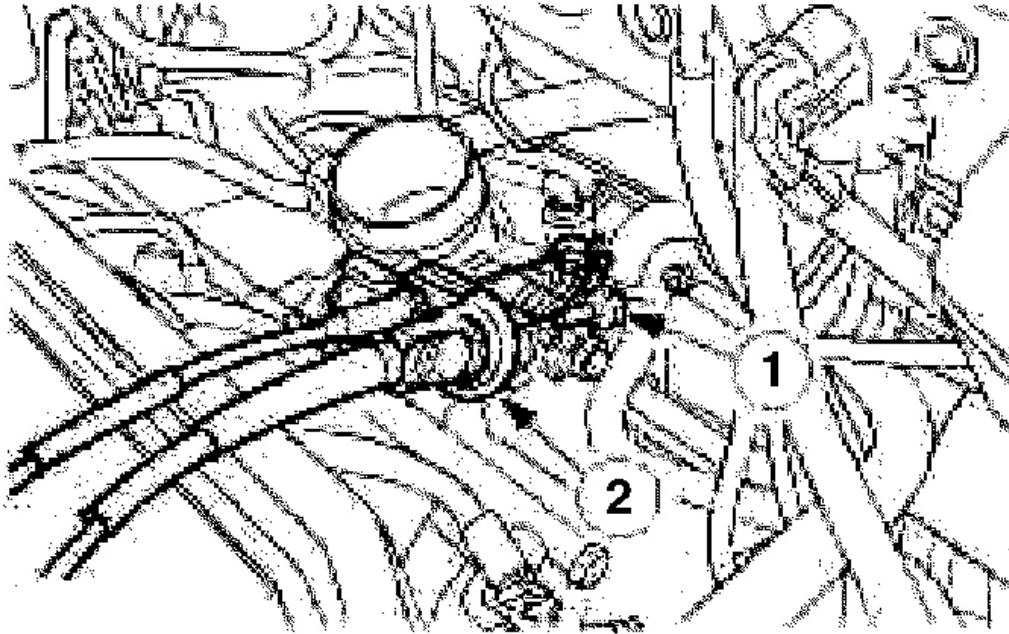
8. Drain the coolant (shown from below).
 - Screw the drain plug back in after draining.



G03432301

Fig. 253: Removing Drain Plug
Courtesy of FORD MOTOR CO.

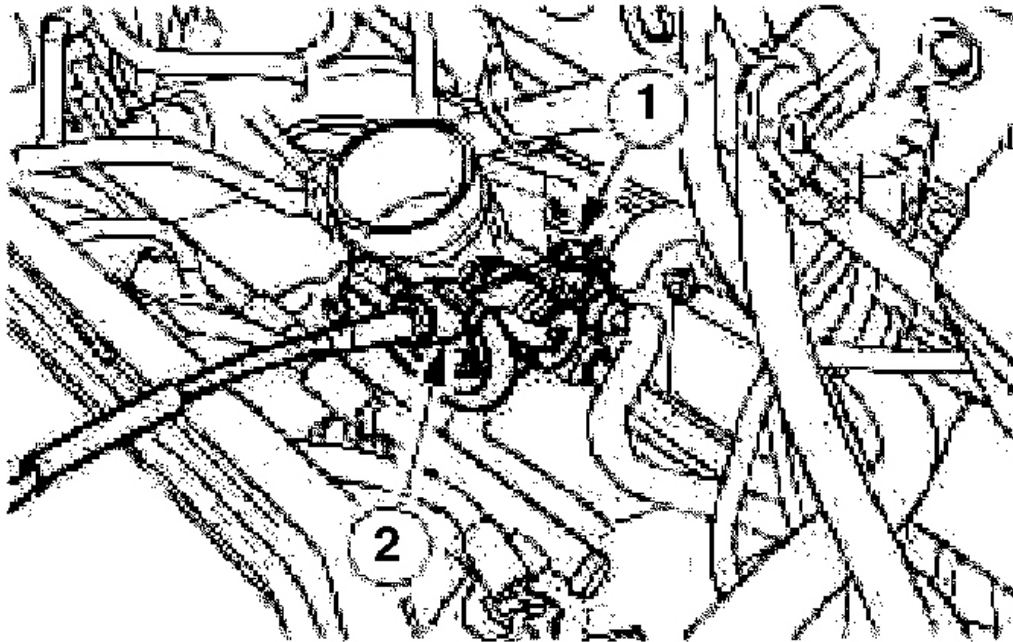
9. Remove the accelerator cable.
 1. Unhook the cable.
 2. Pull off the plastic clip and lay the accelerator cable to one side.



G03432302

Fig. 254: Removing Accelerator Cable
Courtesy of FORD MOTOR CO.

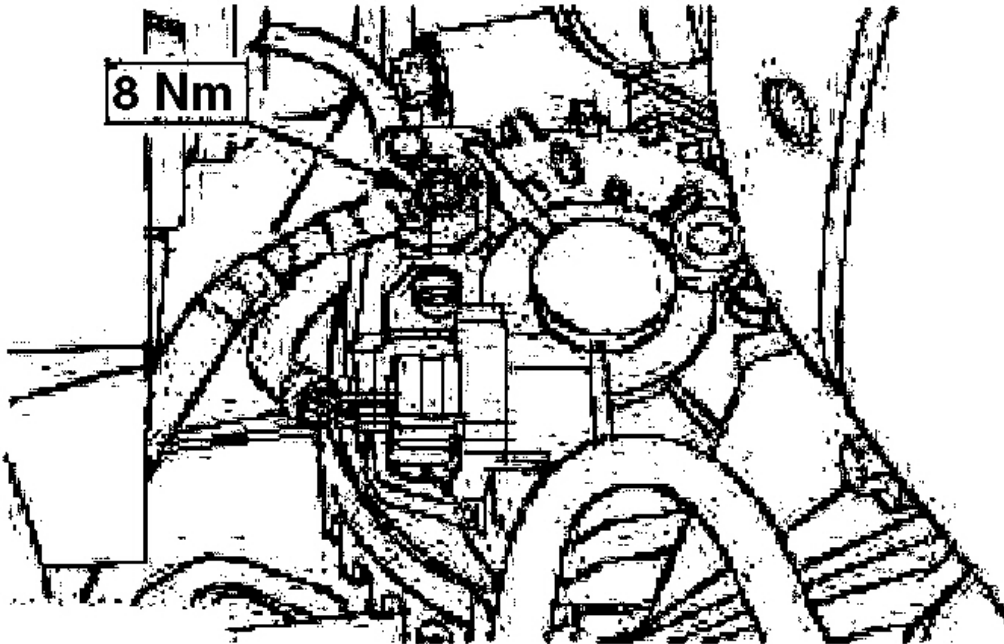
10. Remove the speed control cable (if equipped).
 1. Unhook the cable.
 2. Pull off the plastic clip and lay the accelerator cable to one side.



G03432303

Fig. 255: Removing Speed Control Cable
Courtesy of FORD MOTOR CO.

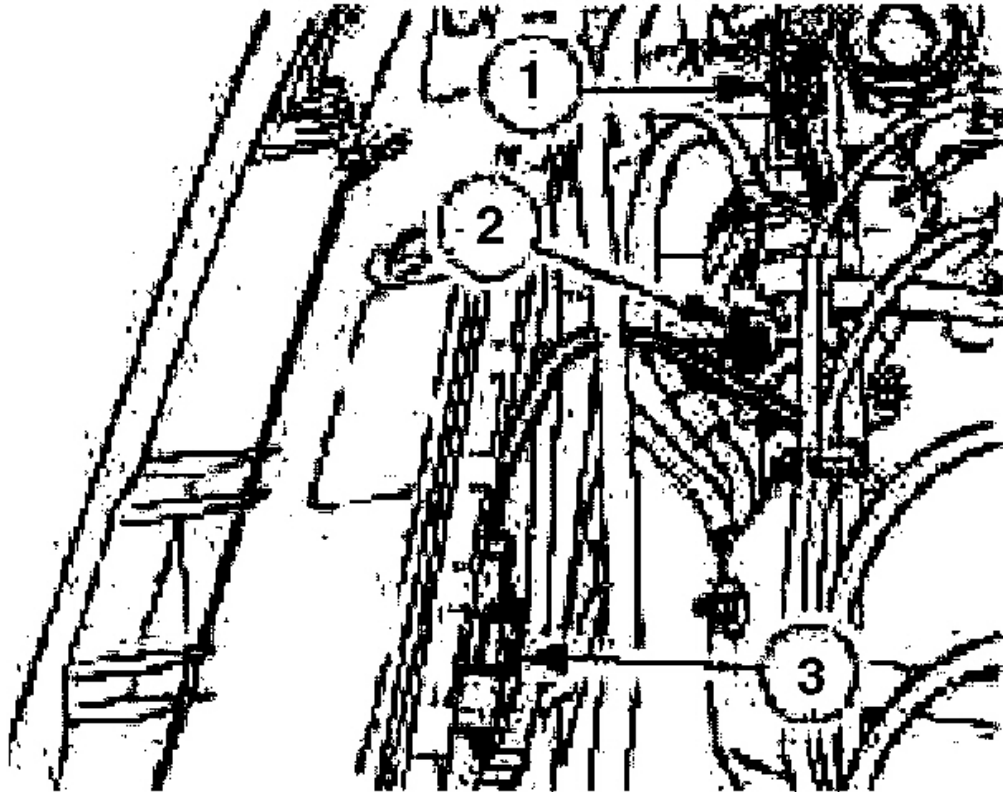
11. Disconnect the cable from the generator.



G03432304

Fig. 256: Disconnecting Cable From Generator
Courtesy of FORD MOTOR CO.

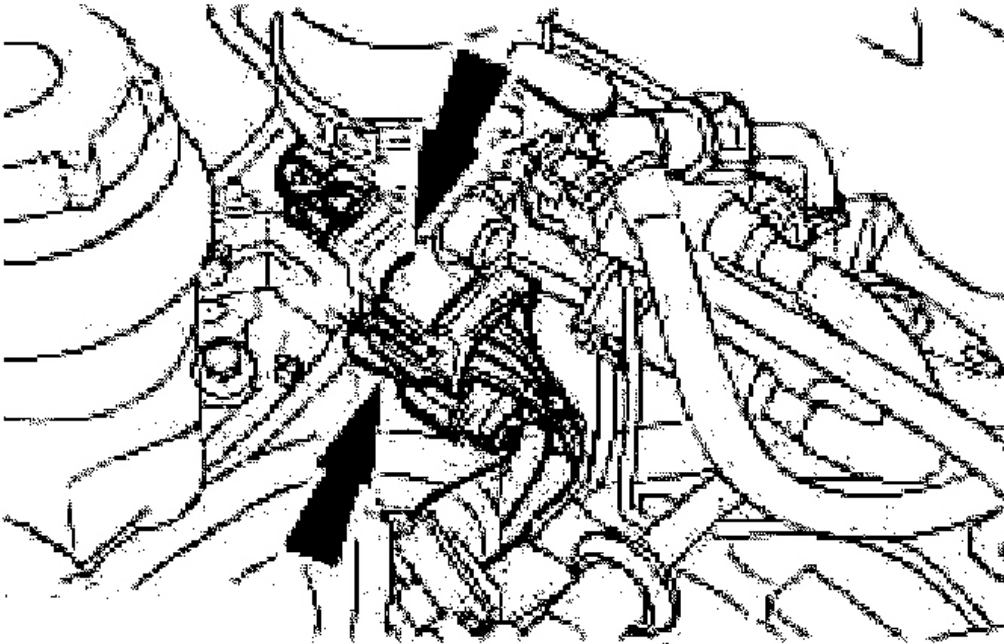
12. Disconnect the electrical connectors.
 1. Power steering pump pressure switch.
 2. Generator.
 3. Heated oxygen sensor (HO2S).



G03432305

Fig. 257: Disconnecting Electrical Connectors
Courtesy of FORD MOTOR CO.

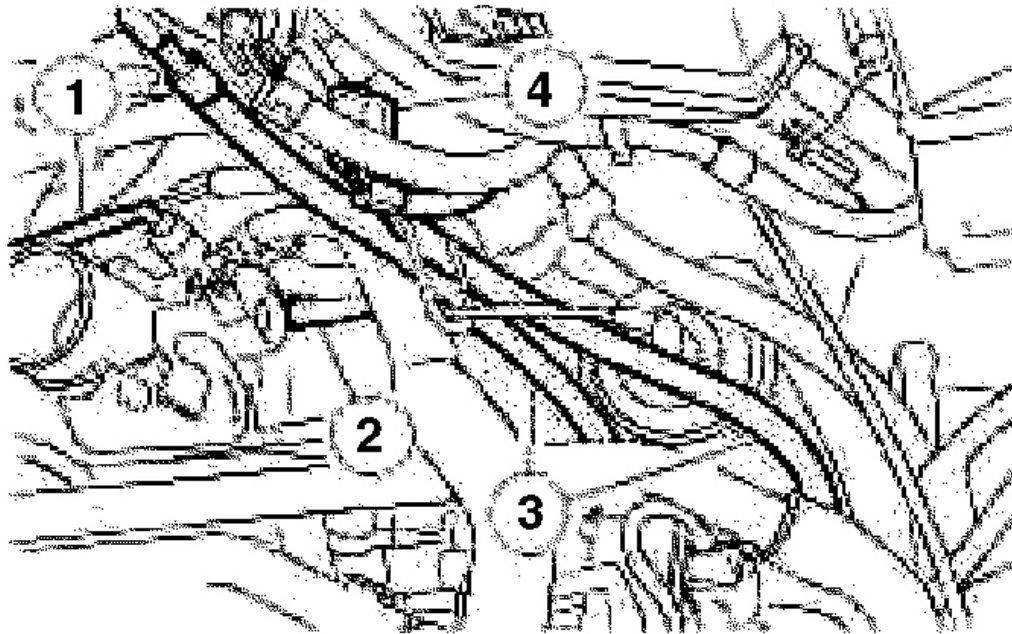
13. Disconnect both powertrain control module (PCM) connectors.



G03432306

Fig. 258: Disconnecting Powertrain Control Module (PCM) Connectors
Courtesy of FORD MOTOR CO.

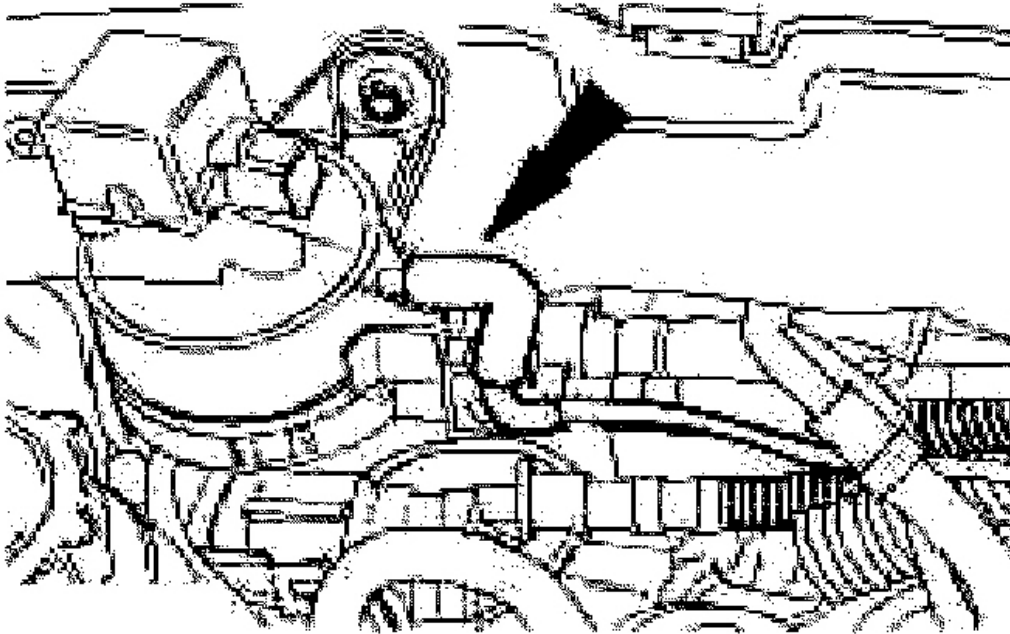
14. Detach the vacuum hoses.
 1. Evaporative emission (EVAP).
 2. Brake servo.
 3. Delta Pressure Feedback Electronic (DPFE) system sensor.
 4. EGR-valve and EGR vacuum regulator solenoid.



G03432307

Fig. 259: Detaching Vacuum Hoses
Courtesy of FORD MOTOR CO.

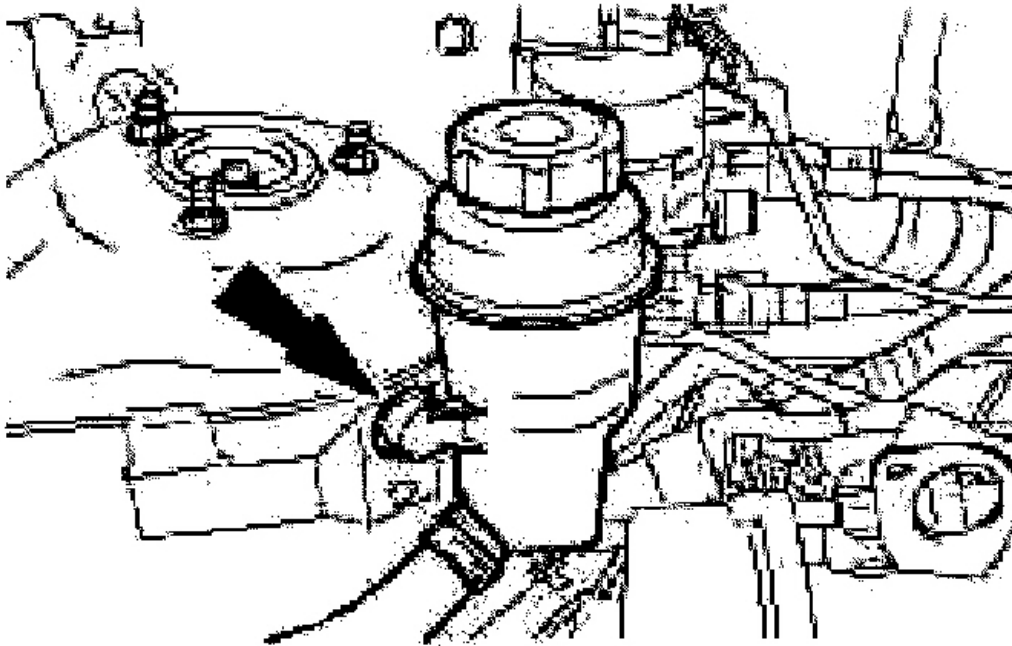
15. Detach the vacuum hose from the evaporative canister purge valve.



G03432308

Fig. 260: Detaching Vacuum Hose From Evaporative Canister Purge Valve
Courtesy of FORD MOTOR CO.

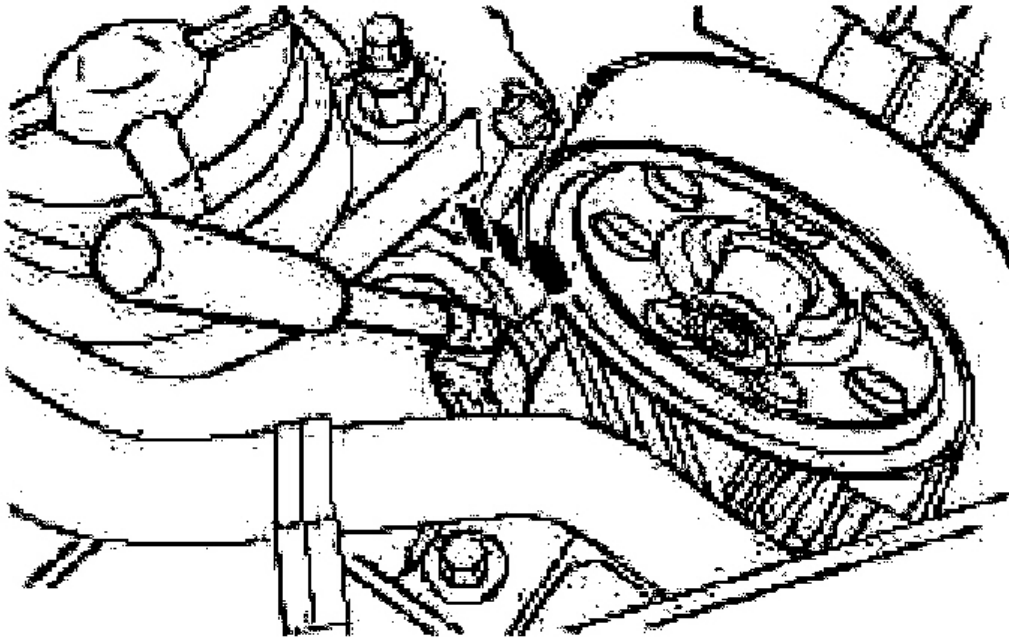
16. Remove the coolant expansion tank. For additional information, refer to ENGINE COOLING article .
17. Remove the PAS reservoir and lay it to one side.



G03432309

Fig. 261: Removing PAS Reservoir
Courtesy of FORD MOTOR CO.

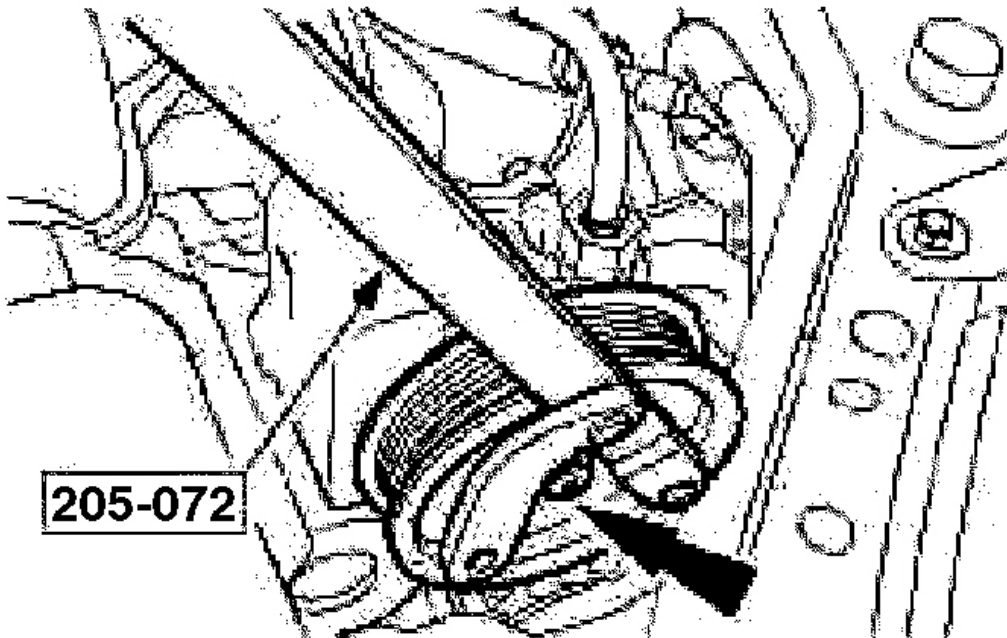
18. Position aside the accessory drive belt.
 - Rotate the tensioner clockwise and remove the belt from the power steering pulley.



G03432310

Fig. 262: Removing Accessory Drive Belt
Courtesy of FORD MOTOR CO.

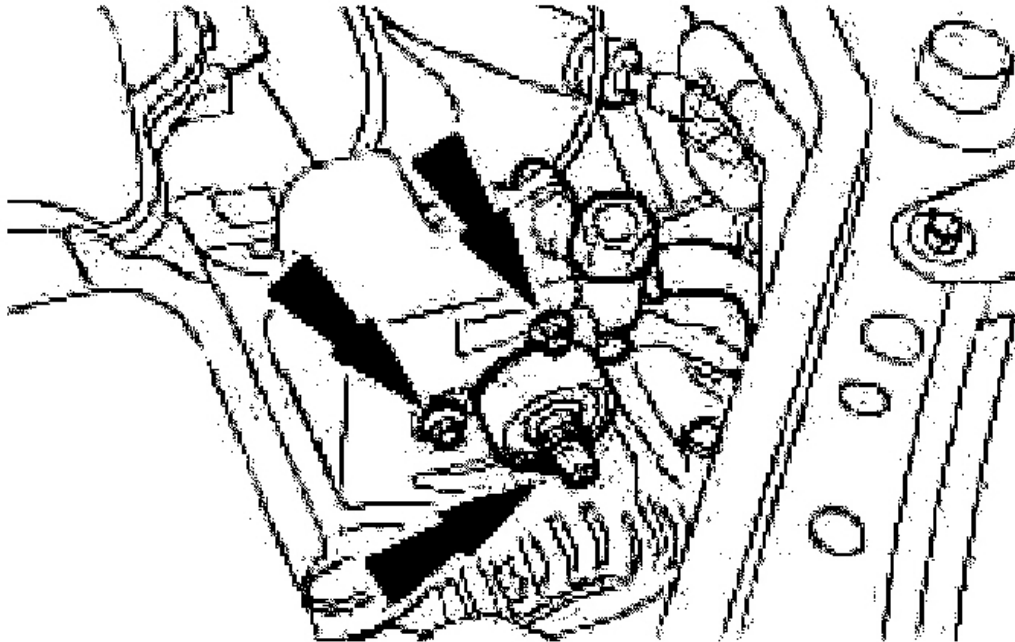
NOTE: Using the special tool to prevent the power steering pump pulley from rotating remove the power steering pump pulley nut.



G03432311

Fig. 263: Removing Power Steering Pump Pulley
Courtesy of FORD MOTOR CO.

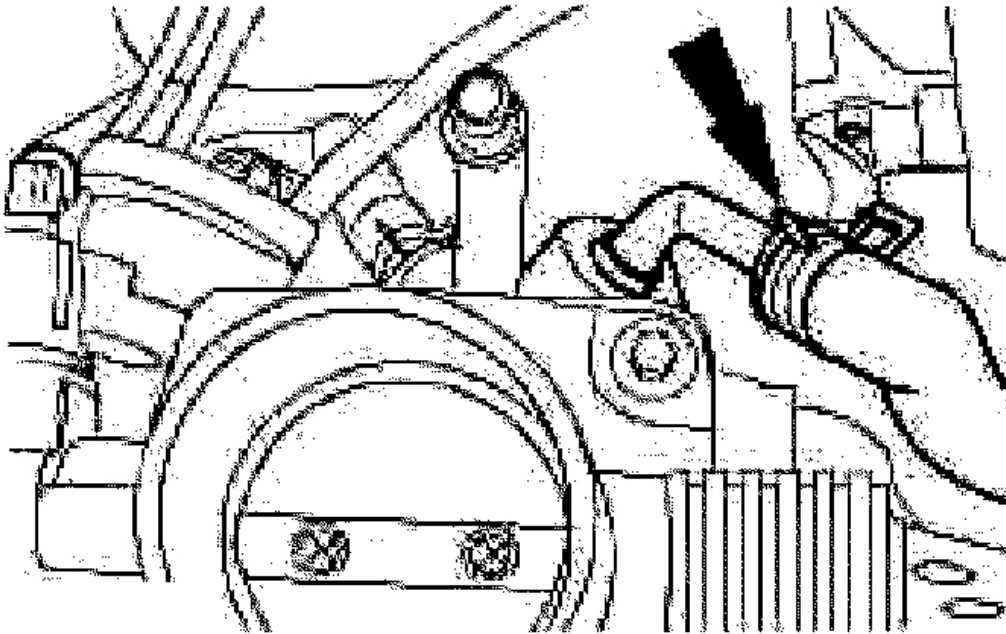
19. Remove the power steering pump pulley.
20. Remove the power steering pump and position it to one side.



G03432312

Fig. 264: Removing Power Steering Pump
Courtesy of FORD MOTOR CO.

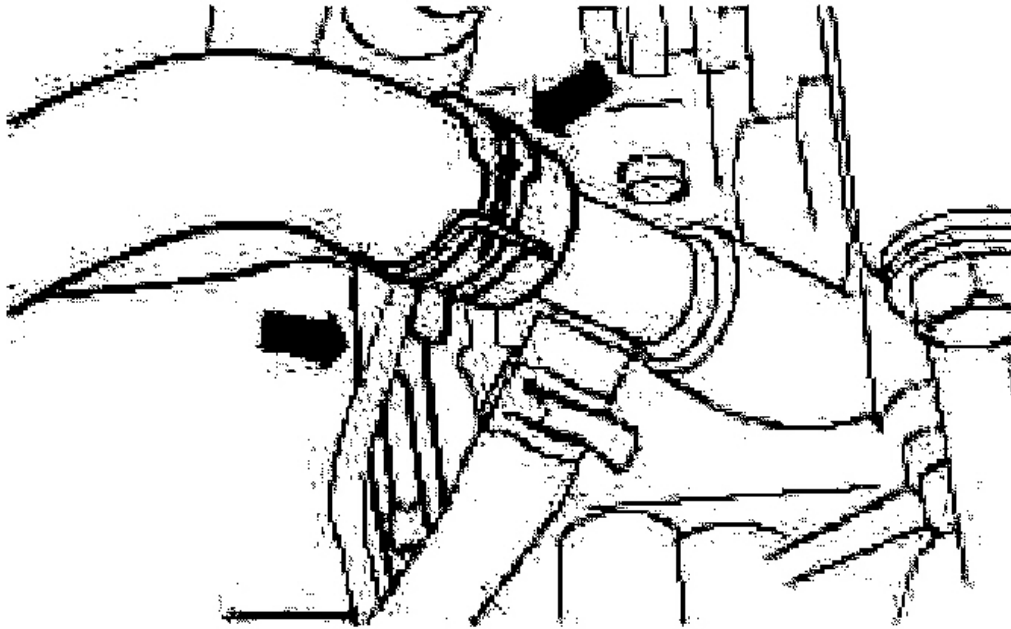
21. Detach the coolant hose from the intake manifold.



G03432313

Fig. 265: Detaching Coolant Hose From Intake Manifold
Courtesy of FORD MOTOR CO.

22. Detach the coolant hose from the water pump.



G03432314

Fig. 266: Detaching Coolant Hose From Water Pump
Courtesy of FORD MOTOR CO.

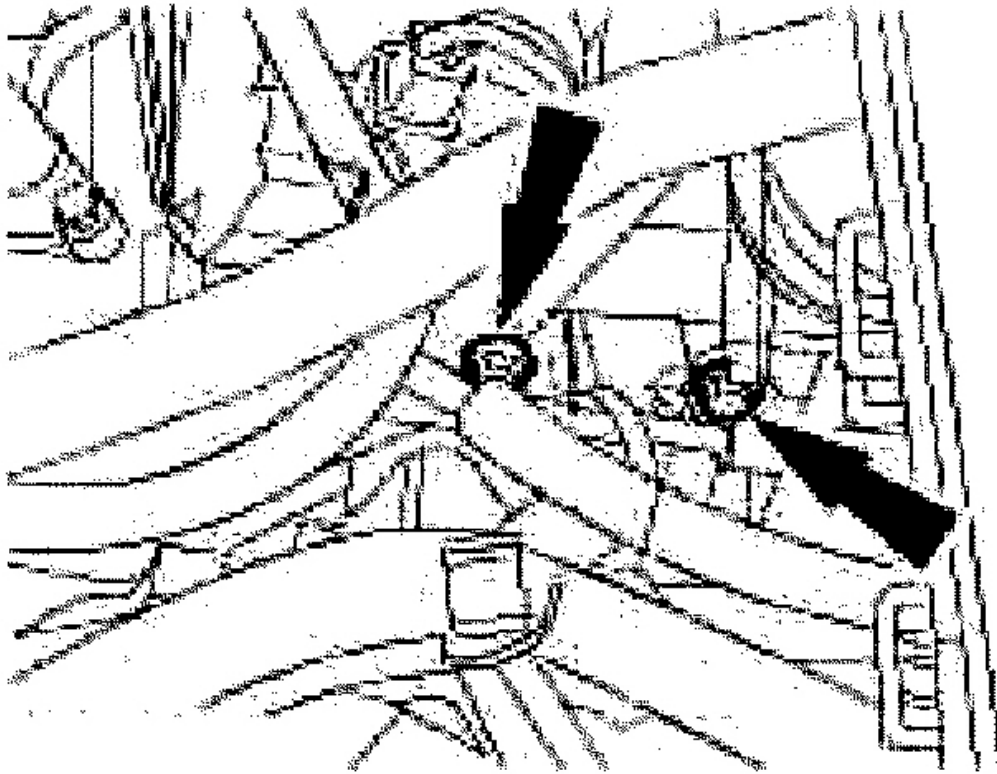
23. Detach the coolant hose from the thermostat housing.



G03432315

Fig. 267: Detaching Coolant Hose From Thermostat Housing
Courtesy of FORD MOTOR CO.

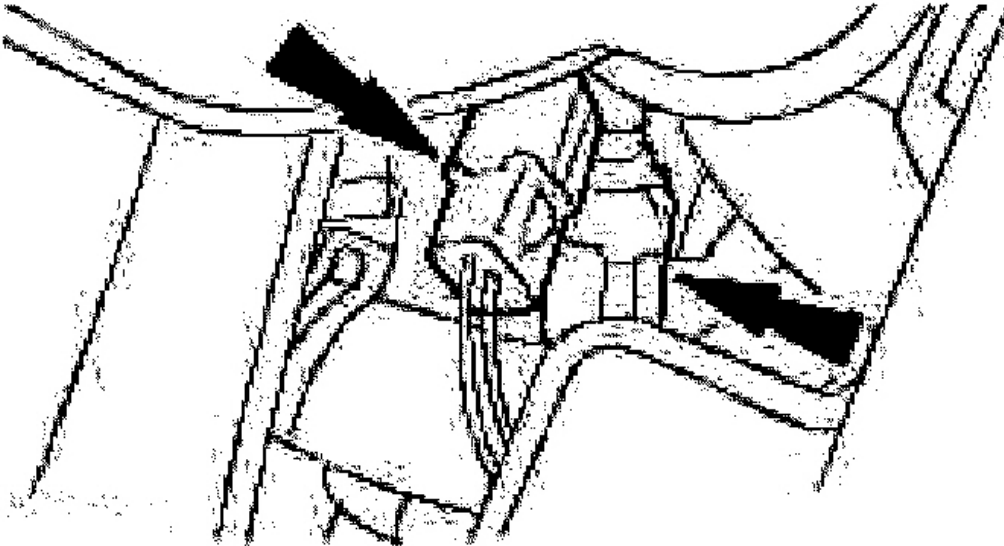
24. Remove the upper starter motor bolts.



G03432316

Fig. 268: Removing Upper Starter Motor Bolts
Courtesy of FORD MOTOR CO.

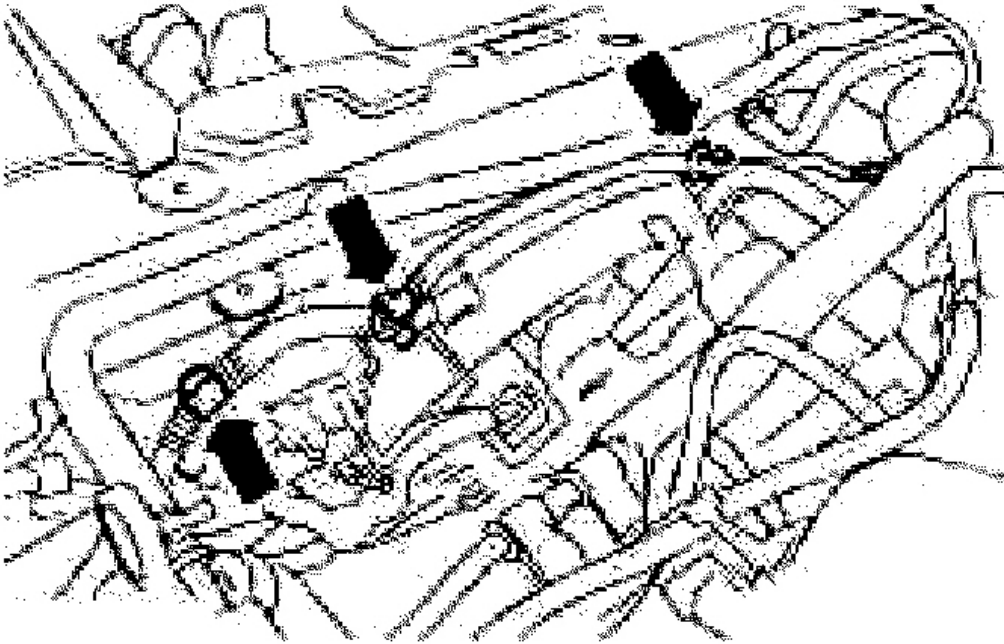
25. Disconnect the cooling fan motor electrical connectors.



G03432317

Fig. 269: Disconnecting Cooling Fan Motor Electrical Connectors
Courtesy of FORD MOTOR CO.

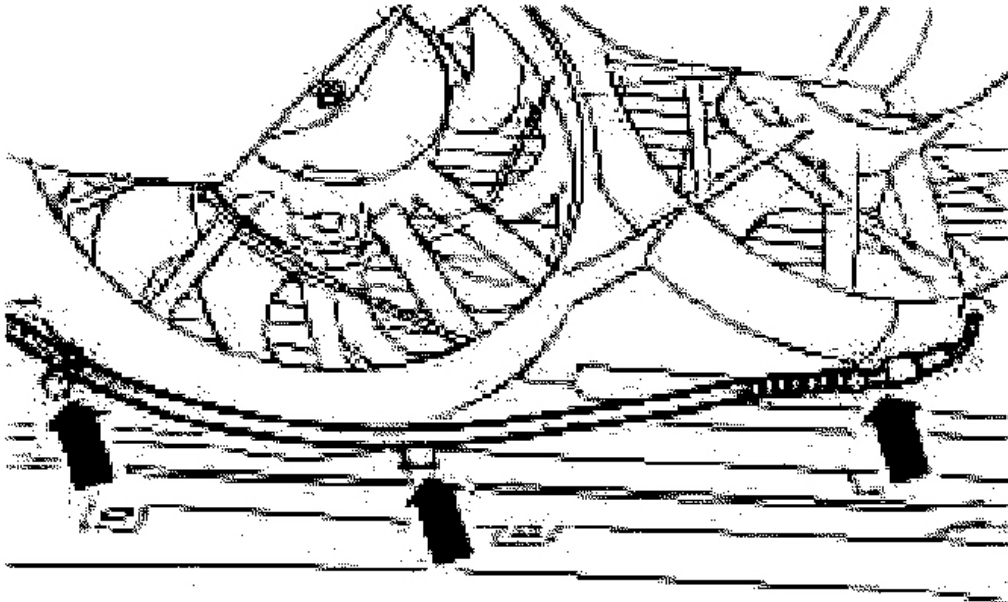
26. Remove the pin-type retainers.



G03432318

Fig. 270: Removing Pin-Type Retainers
Courtesy of FORD MOTOR CO.

27. Remove the catalytic converter.
28. Disconnect the lower harness retainers.



G03432319

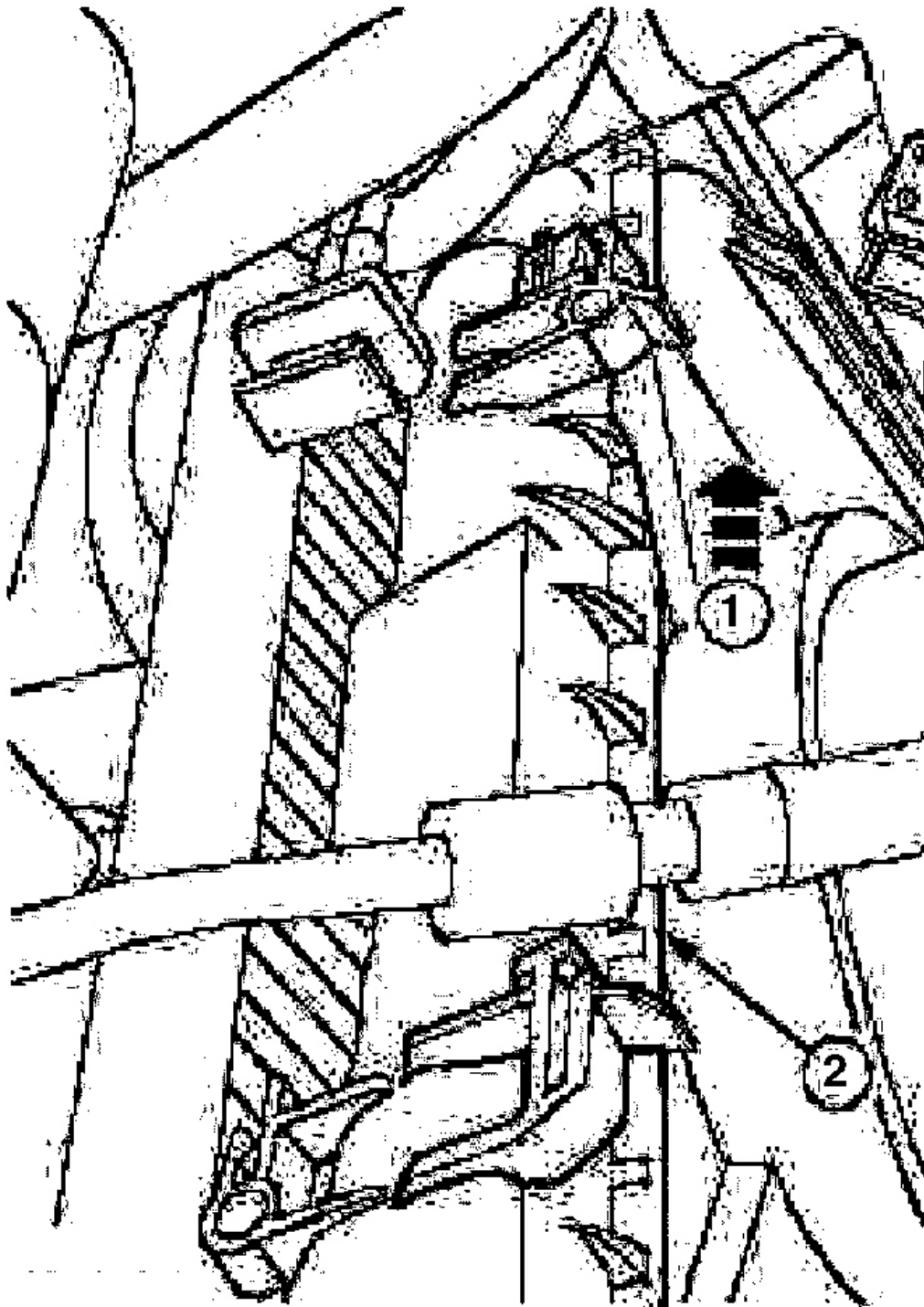
Fig. 271: Disconnecting Lower Harness Retainers
Courtesy of FORD MOTOR CO.

CAUTION: Do not use excessive force to release the cooling fan shroud.

29. Remove the cooling fan shroud.
 1. Release the top clips of the radiator to allow the cooling fan motor and shroud to be raised.
 2. Remove the fan and shroud.

2002 Ford Focus LX

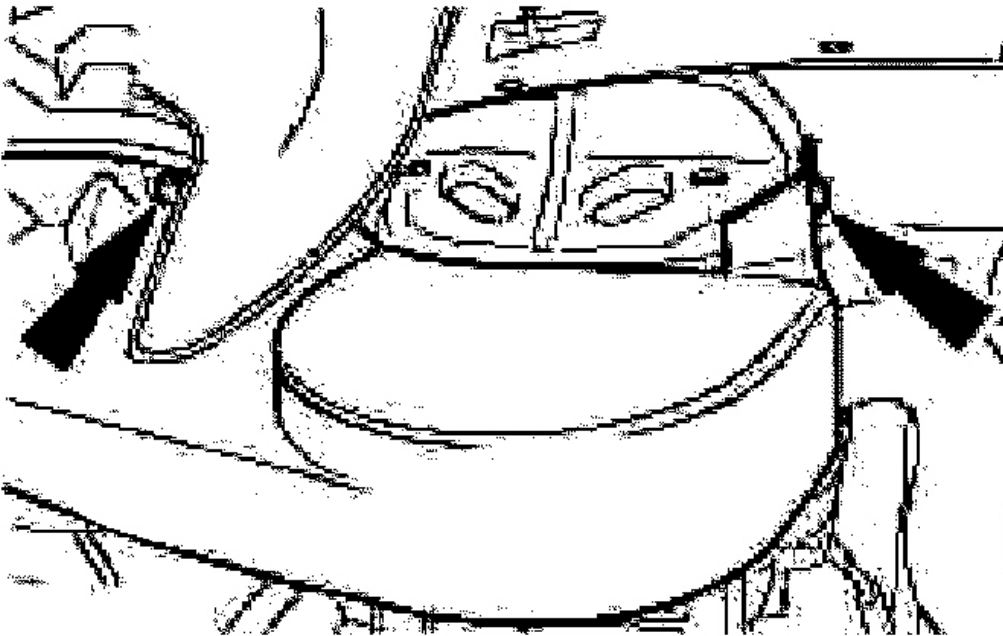
2002 ENGINE Engine, 2.0L SPI - Focus



G03432320

Fig. 272: Removing Cooling Fan Shroud
Courtesy of FORD MOTOR CO.

30. Remove the drive belt cover.



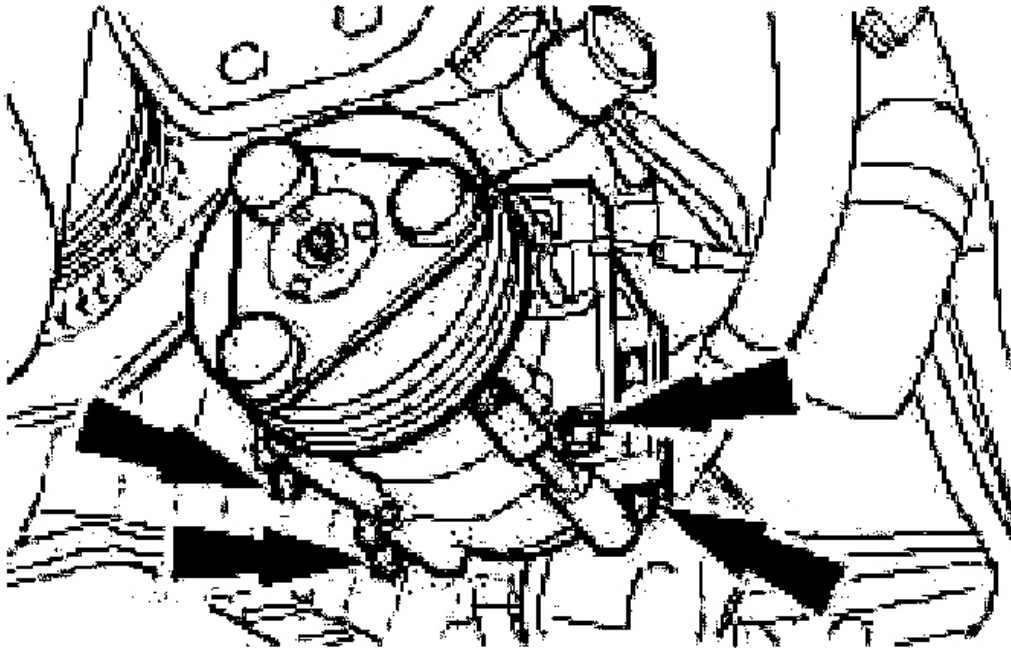
G03432321

Fig. 273: Removing Drive Belt Cover
Courtesy of FORD MOTOR CO.

31. Remove the drive belt.

Vehicles with air conditioning

32. Detach the air conditioning compressor and tie it up on the radiator crossmember.

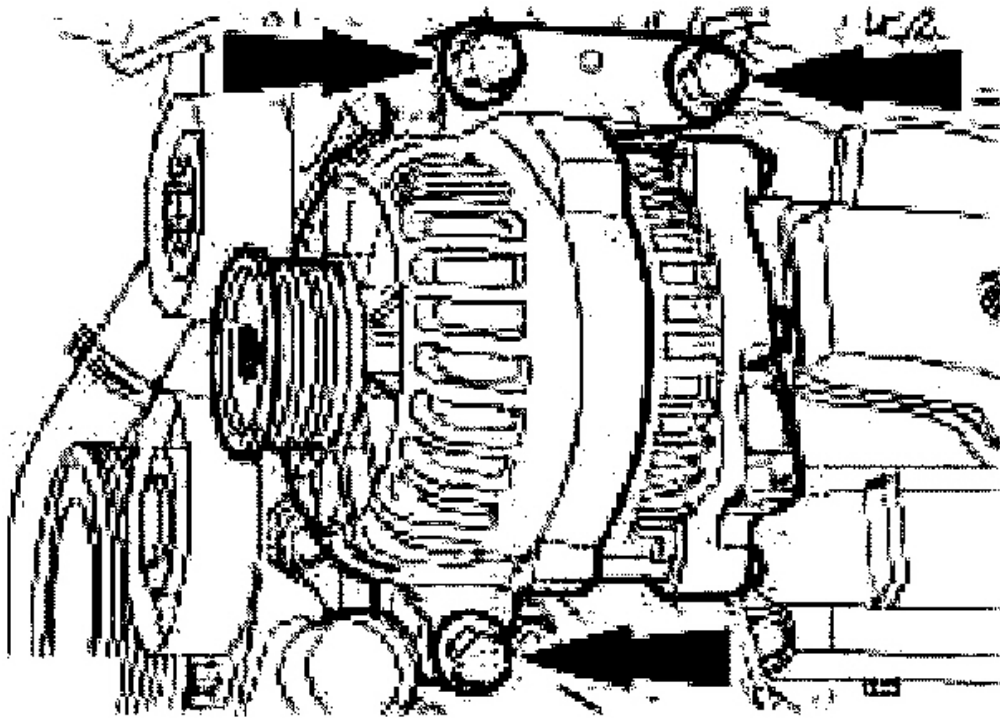


G03432322

Fig. 274: Detaching Air Conditioning Compressor
Courtesy of FORD MOTOR CO.

All vehicles

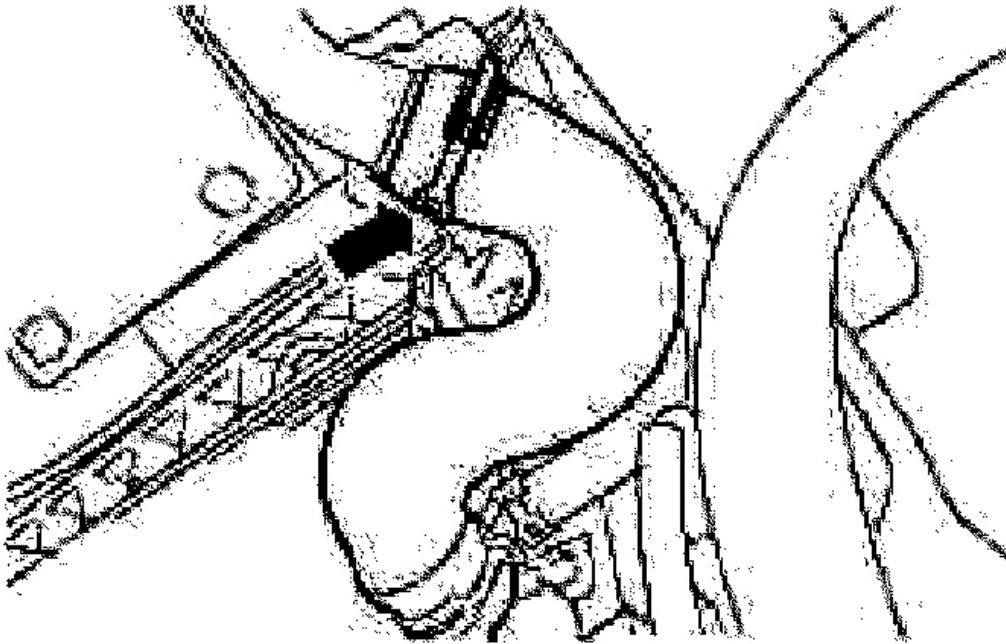
33. Remove the generator (engine removed shown).



G03432323

Fig. 275: Removing Generator
Courtesy of FORD MOTOR CO.

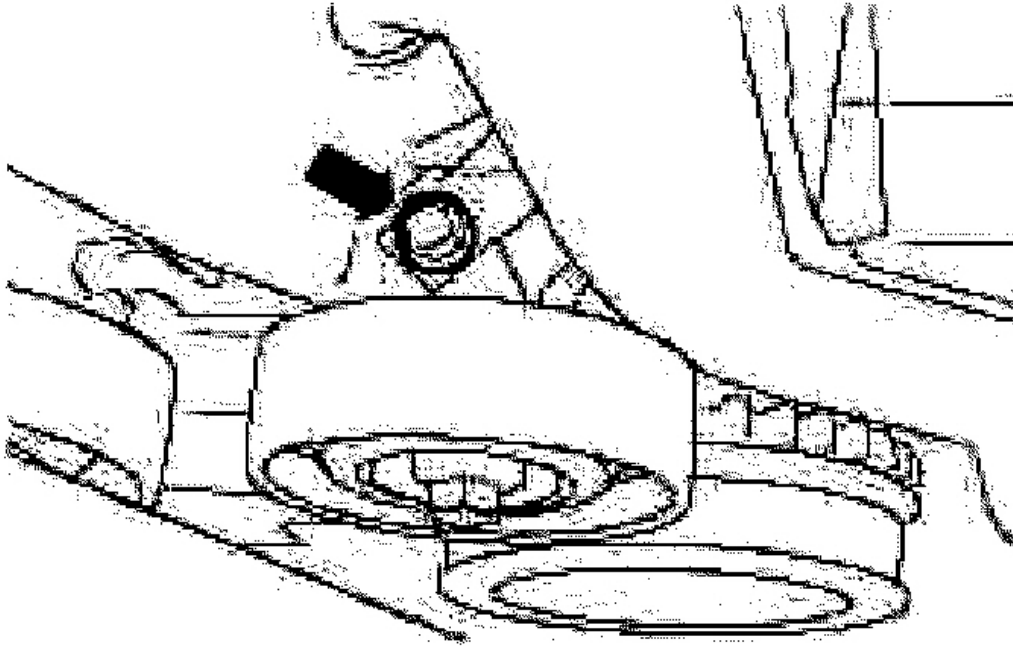
34. Detach the coolant hose from the coolant pipe.



G03432324

Fig. 276: Detaching Coolant Hose From Coolant Pipe
Courtesy of FORD MOTOR CO.

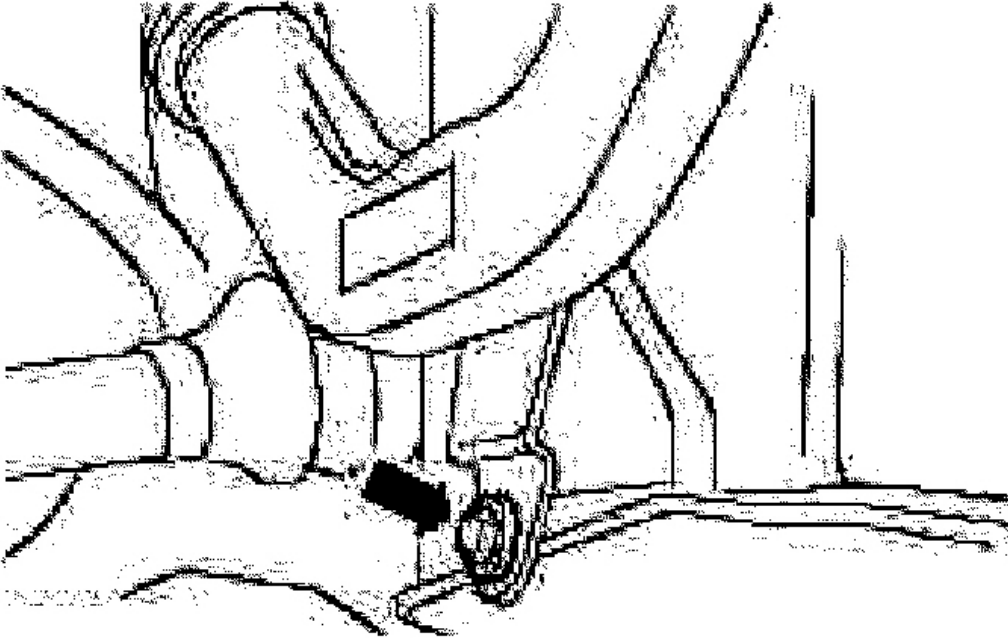
35. Remove the coolant pipe bolt.



G03432325

Fig. 277: Removing Coolant Pipe Bolt
Courtesy of FORD MOTOR CO.

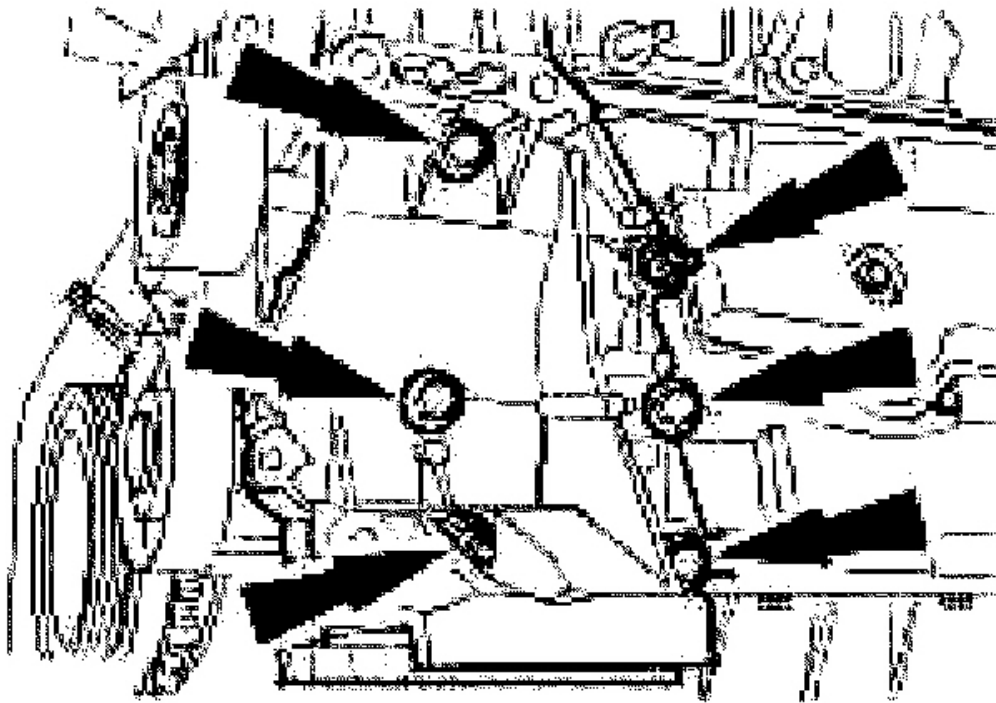
36. Remove the bolt and tube.



G03432326

Fig. 278: Removing Bolt And Tube
Courtesy of FORD MOTOR CO.

37. Remove the accessory drive bracket (engine removed shown).



G03432327

Fig. 279: Removing Accessory Drive Bracket
Courtesy of FORD MOTOR CO.

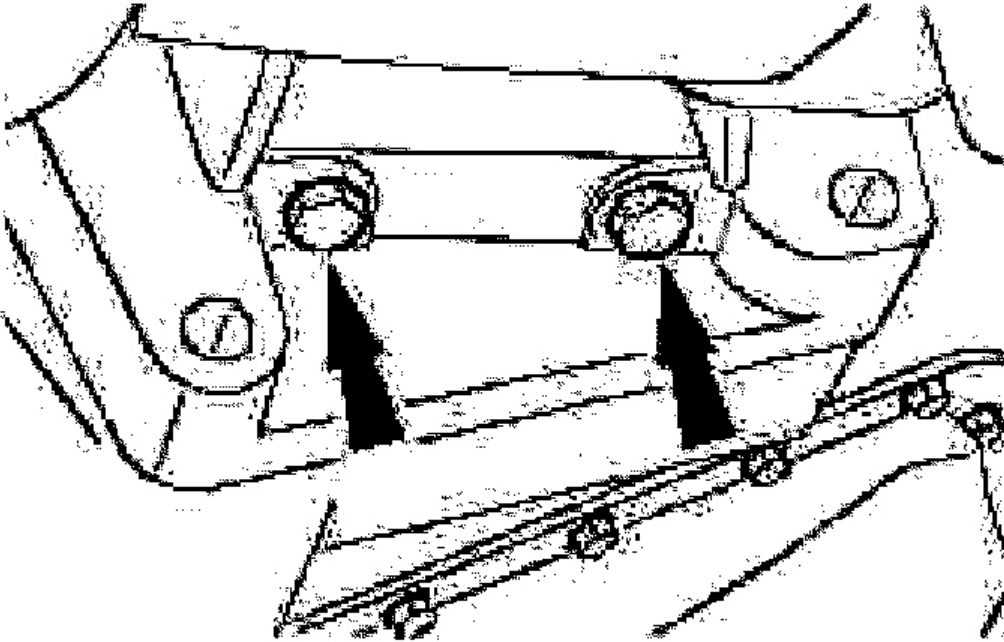
38. Remove the transaxle lower flange bolts and catalytic converter bracket.



G03432328

Fig. 280: Removing Transaxle Lower Flange Bolts And Catalytic Converter Bracket
Courtesy of FORD MOTOR CO.

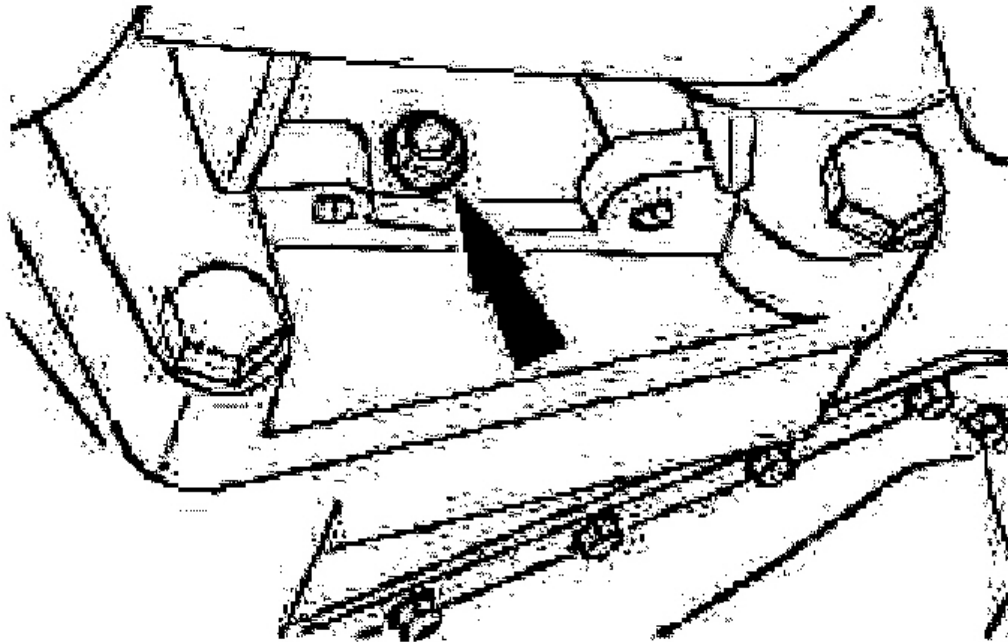
39. Remove the torque converter cover bolts.



G03432329

Fig. 281: Removing Torque Converter Cover Bolts
Courtesy of FORD MOTOR CO.

40. Disconnect the torque converter from the engine drive plate (four nuts).
 - Rotate the flywheel to access all bolts.

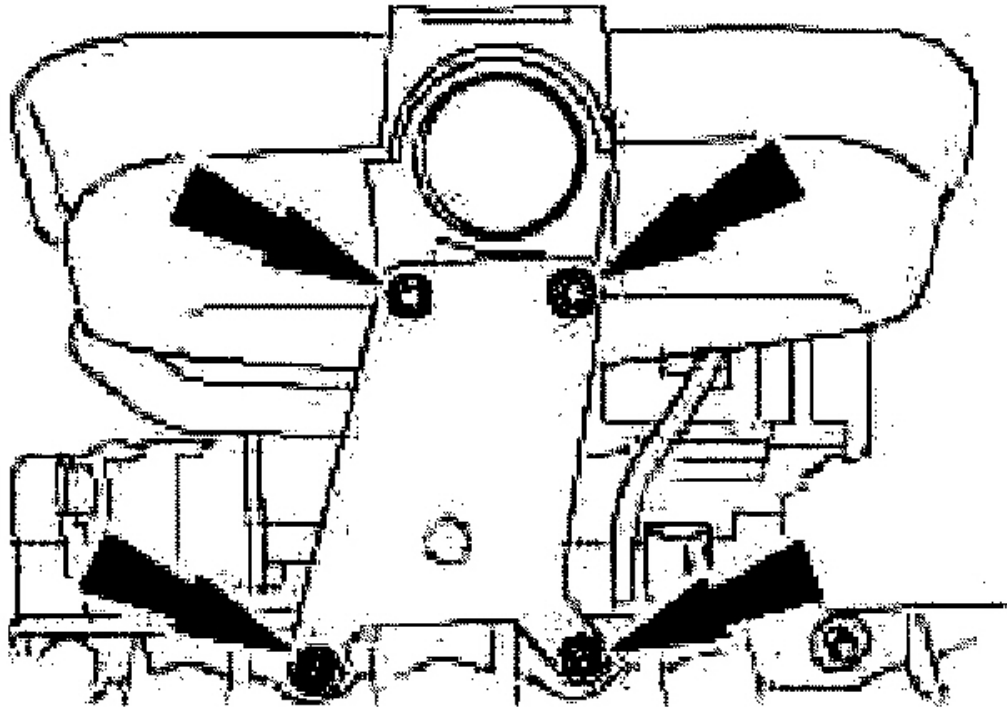


G03432330

Fig. 282: Disconnecting Torque Converter From Engine Drive Plate (Four Nuts)

Courtesy of FORD MOTOR CO.

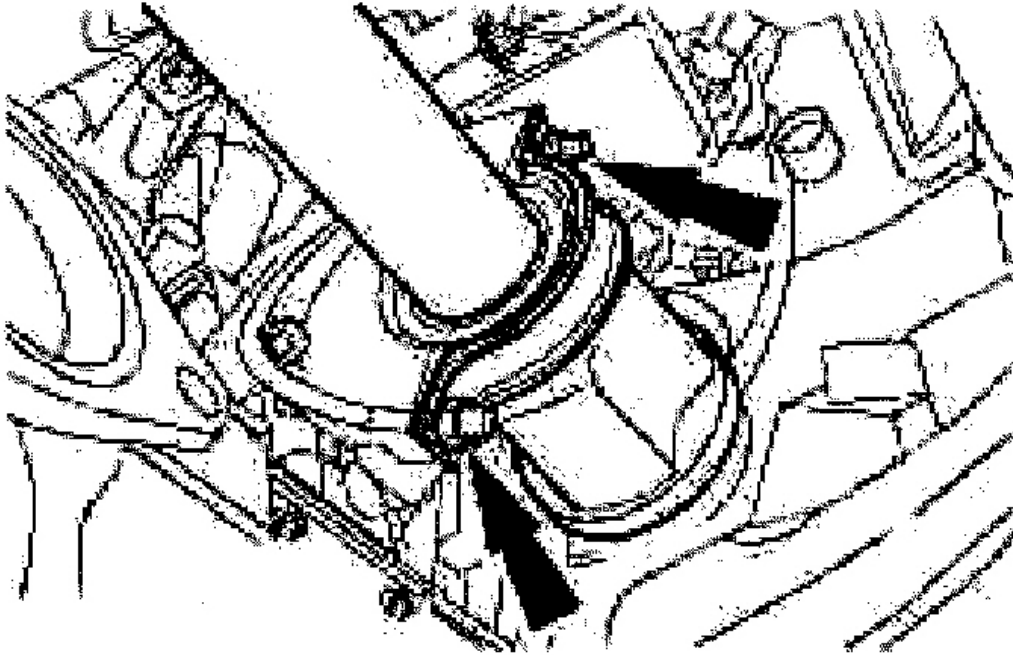
41. Remove nuts, bolts and bracket.
 - Detach connector pin-type retainer.



G03432331

Fig. 283: Removing Bracket
Courtesy of FORD MOTOR CO.

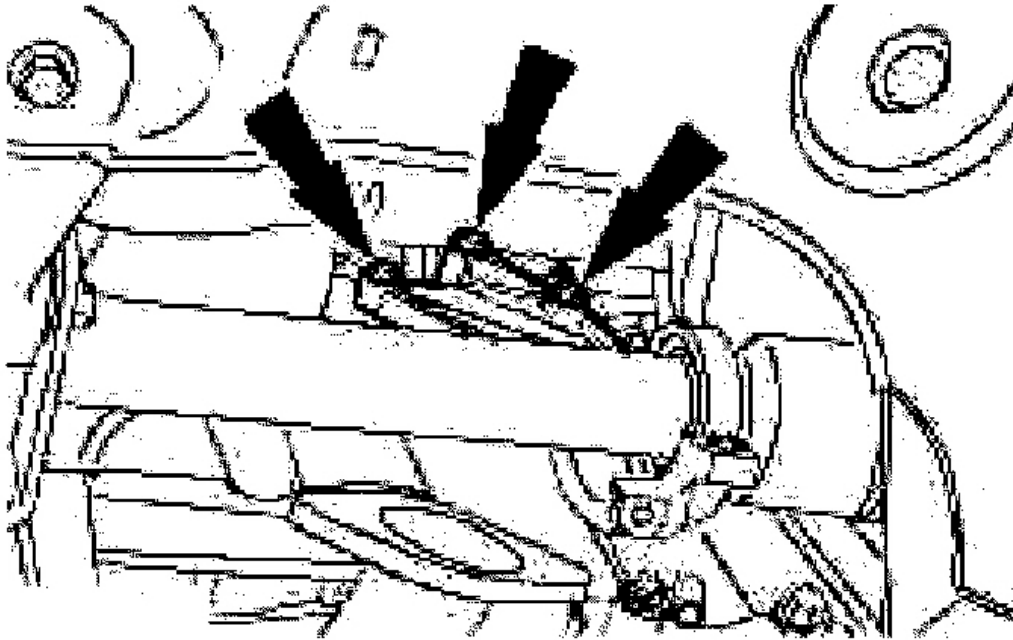
42. Remove the retaining clip.



G03432332

Fig. 284: Removing Retaining Clip
Courtesy of FORD MOTOR CO.

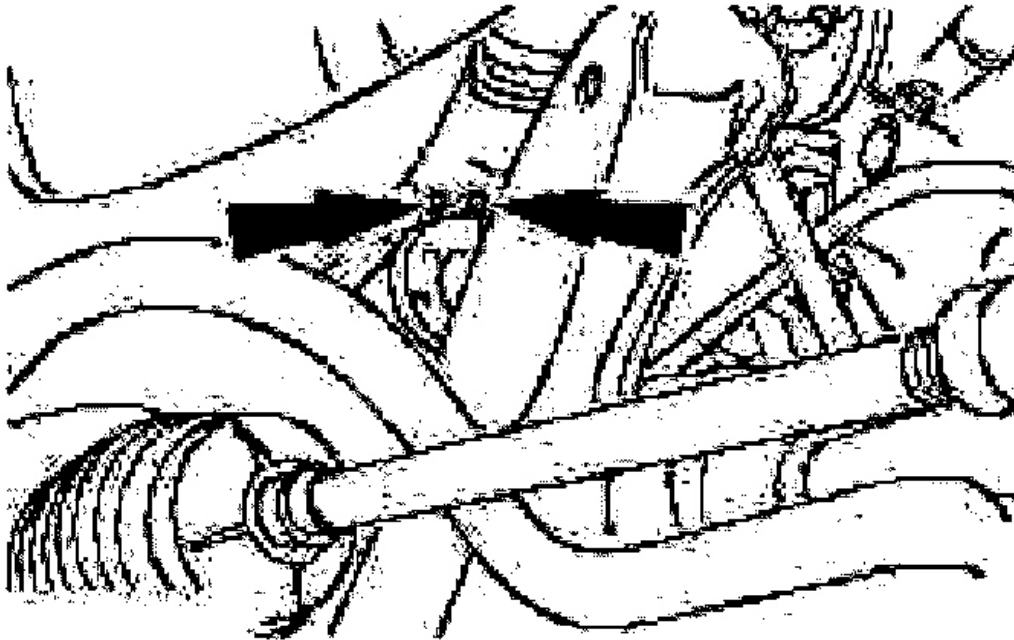
43. Remove the intermediate shaft bracket.



G03432333

Fig. 285: Removing Intermediate Shaft Bracket
Courtesy of FORD MOTOR CO.

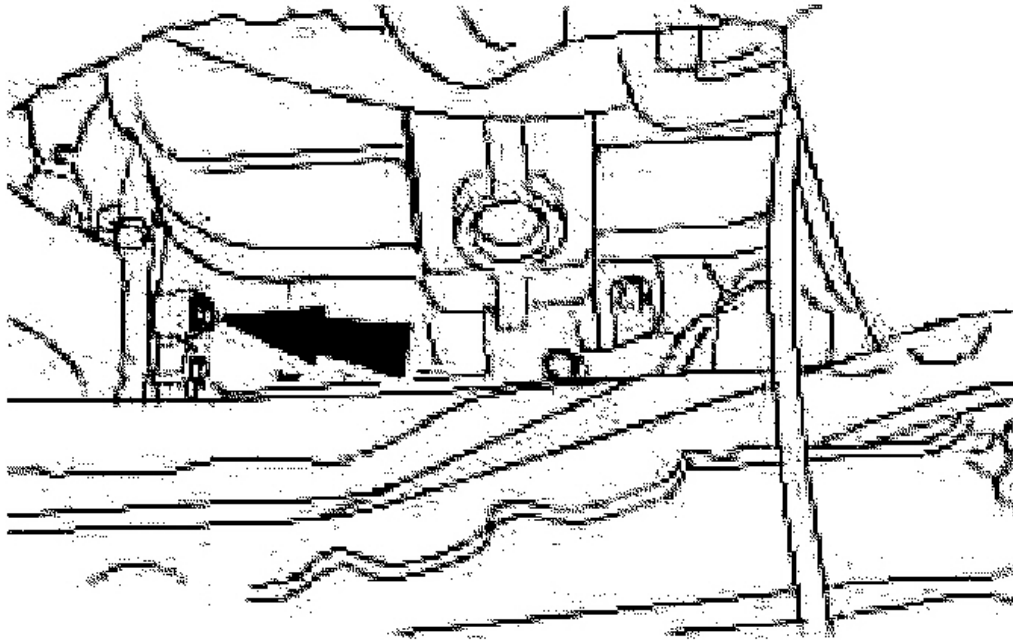
44. Disconnect the starter motor electrical connectors (two nuts).



G03432334

Fig. 286: Disconnecting Starter Motor Electrical Connectors
Courtesy of FORD MOTOR CO.

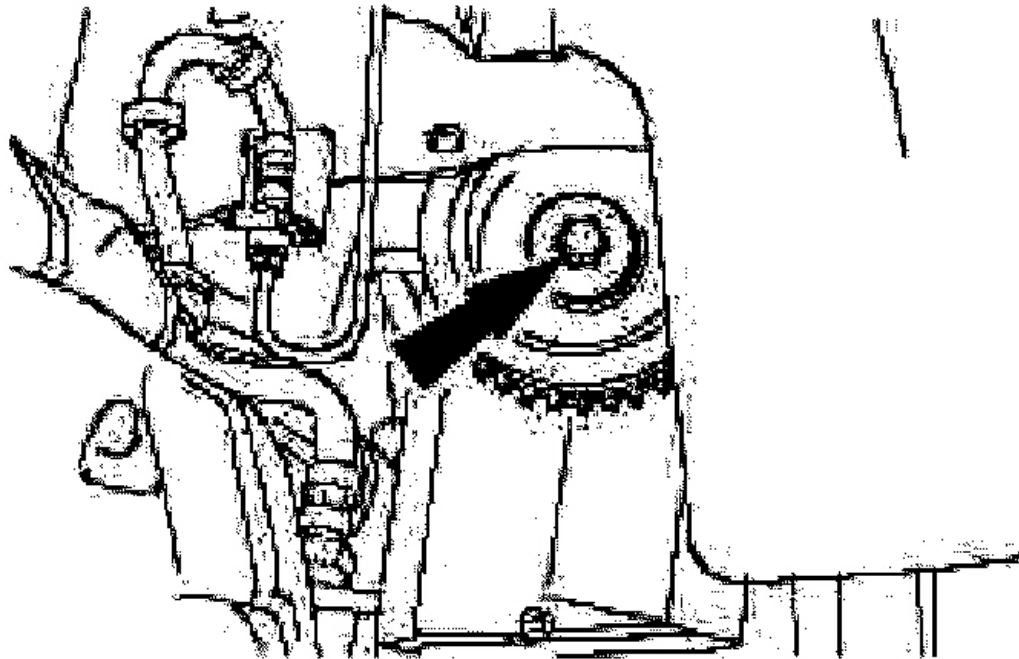
45. Remove the starter motor.
 - Remove the starter motor bolt.



G03432335

Fig. 287: Removing Starter Motor
Courtesy of FORD MOTOR CO.

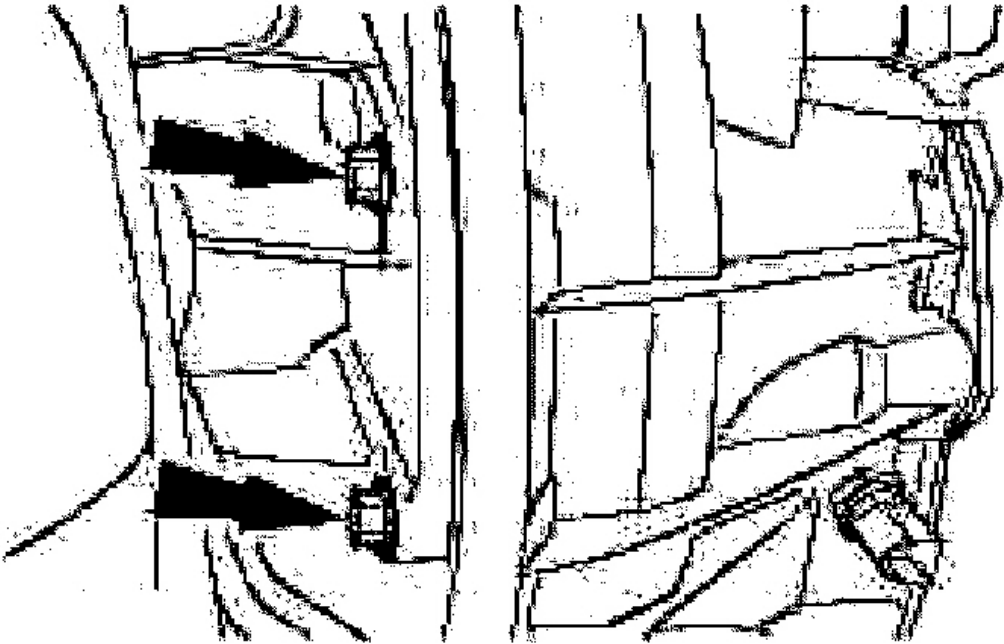
46. Remove the crankshaft pulley.
 - Remove the crankshaft pulley bolt.



G03432336

Fig. 288: Removing Crankshaft Pulley
Courtesy of FORD MOTOR CO.

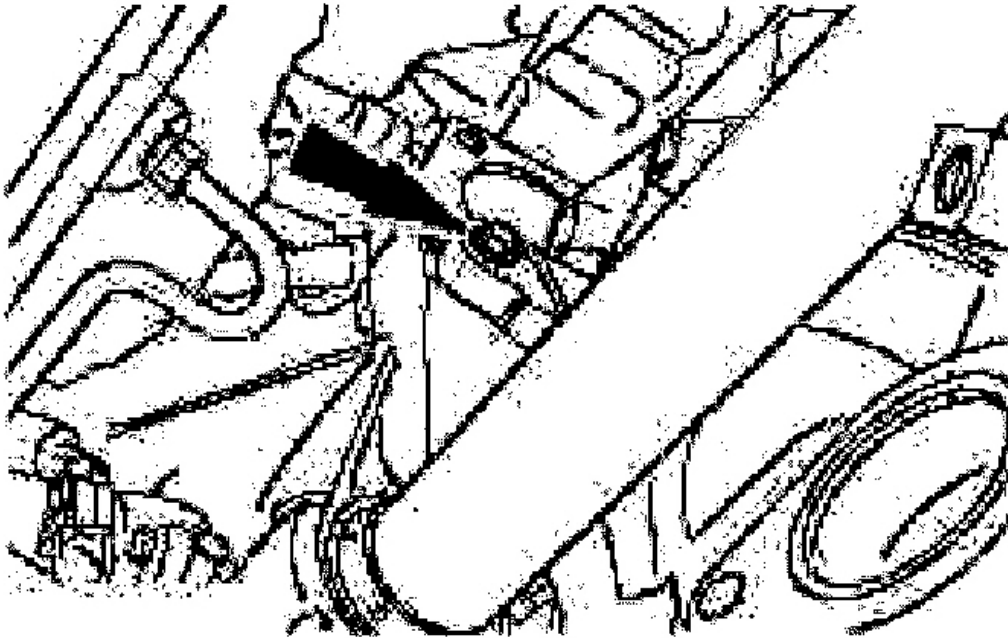
47. Remove the left-hand transaxle flange bolts.



G03432337

Fig. 289: Removing Left-Hand Transaxle Flange Bolts
Courtesy of FORD MOTOR CO.

48. Remove the right-hand transaxle flange bolt.



G03432338

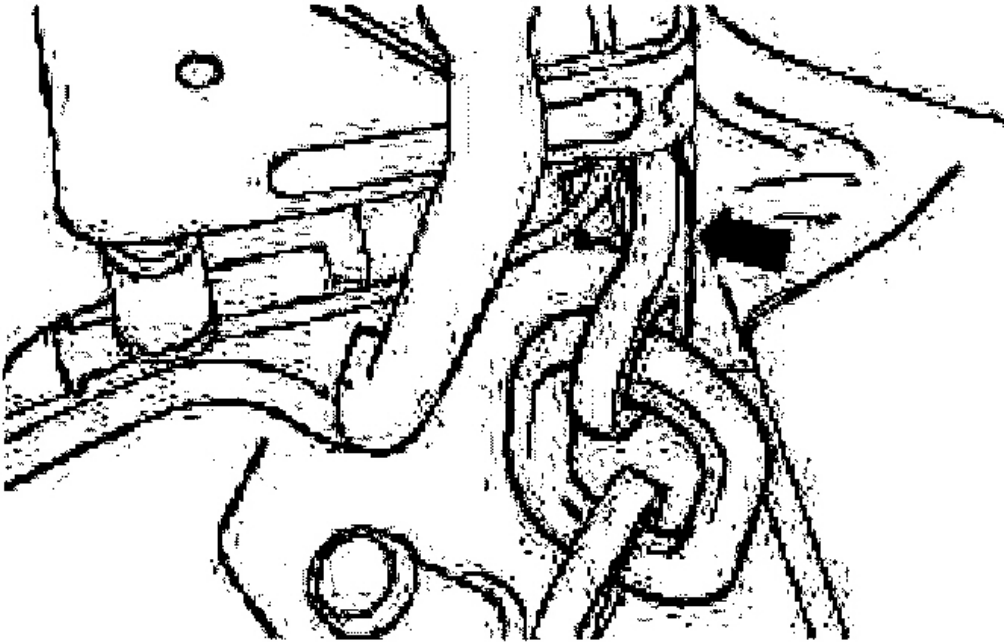
Fig. 290: Removing Right-Hand Transaxle Flange Bolt
Courtesy of FORD MOTOR CO.

49. Lower the vehicle.

CAUTION: Insert a wooden block between jack and transaxle.

50. Support the transaxle with a jack.

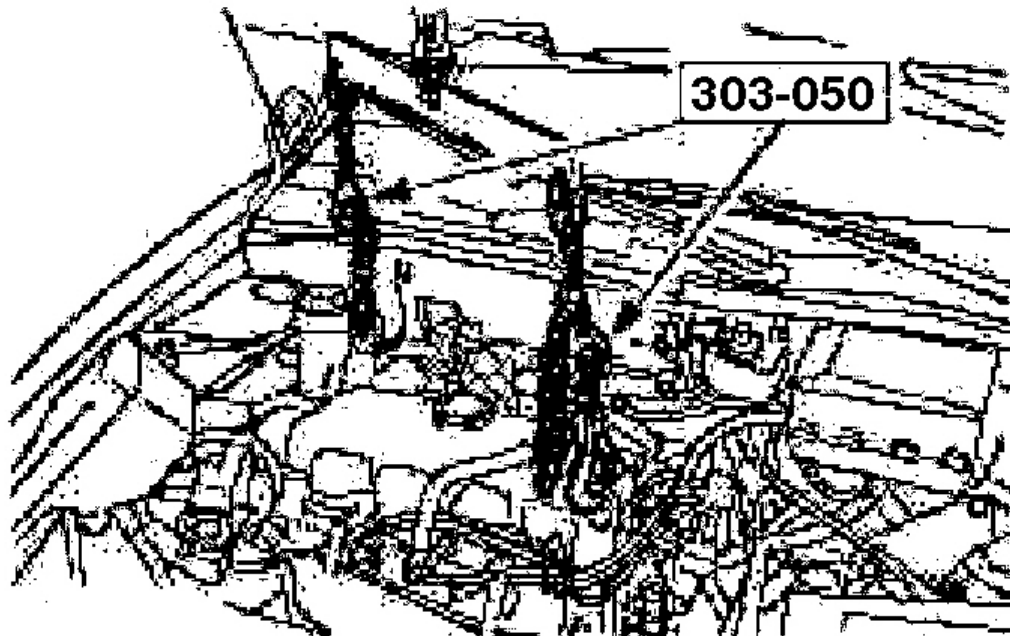
51. Install left and right side lifting brackets.



G03432339

Fig. 291: Installing Left And Right Side Lifting Brackets
Courtesy of FORD MOTOR CO.

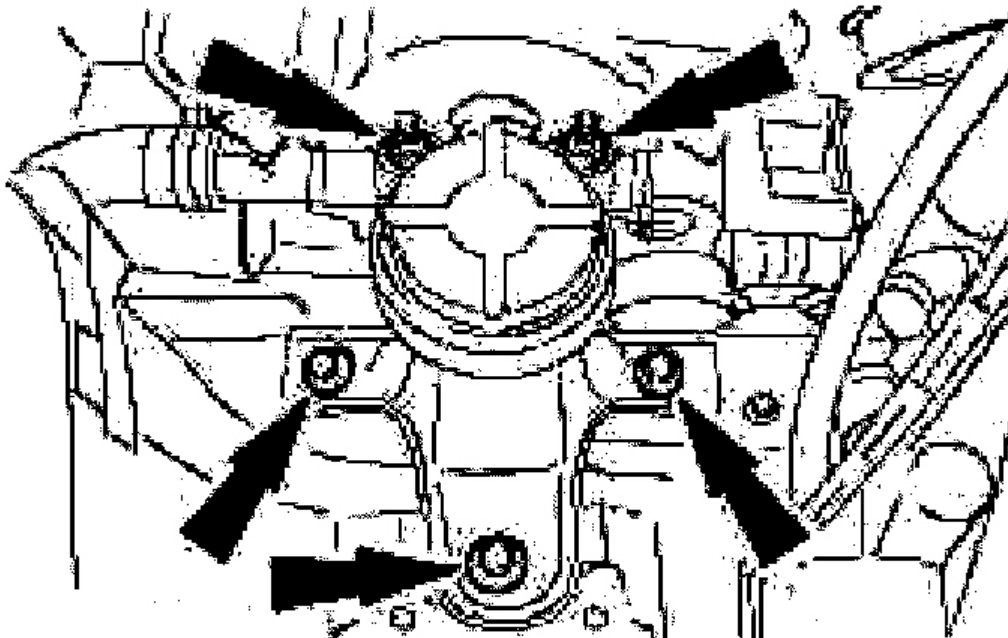
52. Using the special tool, install suitable floor crane.
 - Raise the engine slightly to prevent pressure on the support insulators.



G03432340

Fig. 292: Installing Suitable Floor Crane Using Special Tool
Courtesy of FORD MOTOR CO.

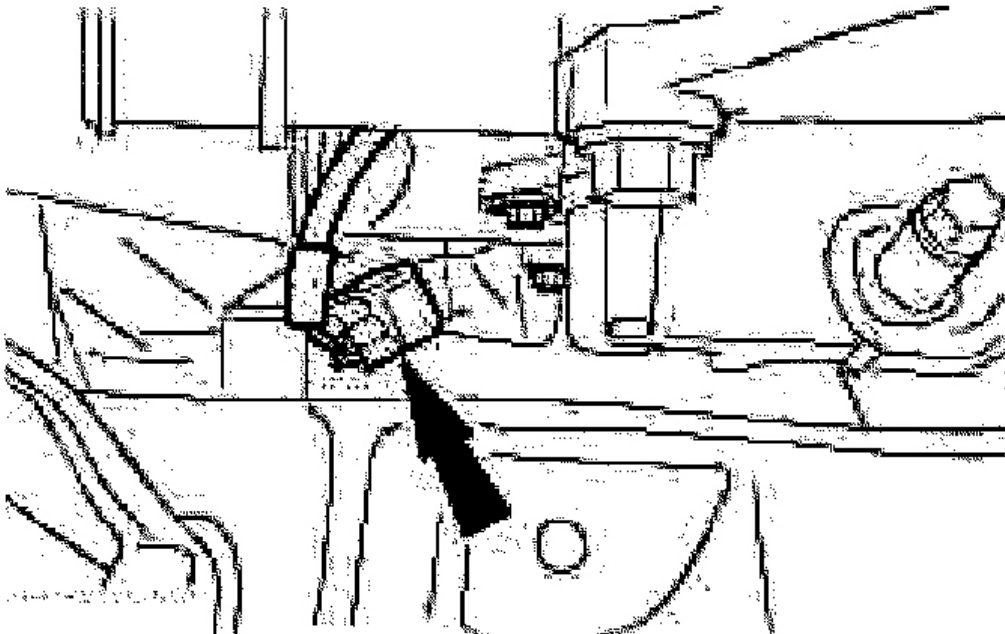
53. Remove the engine front mounting.



G03432341

Fig. 293: Removing Engine Front Mounting
Courtesy of FORD MOTOR CO.

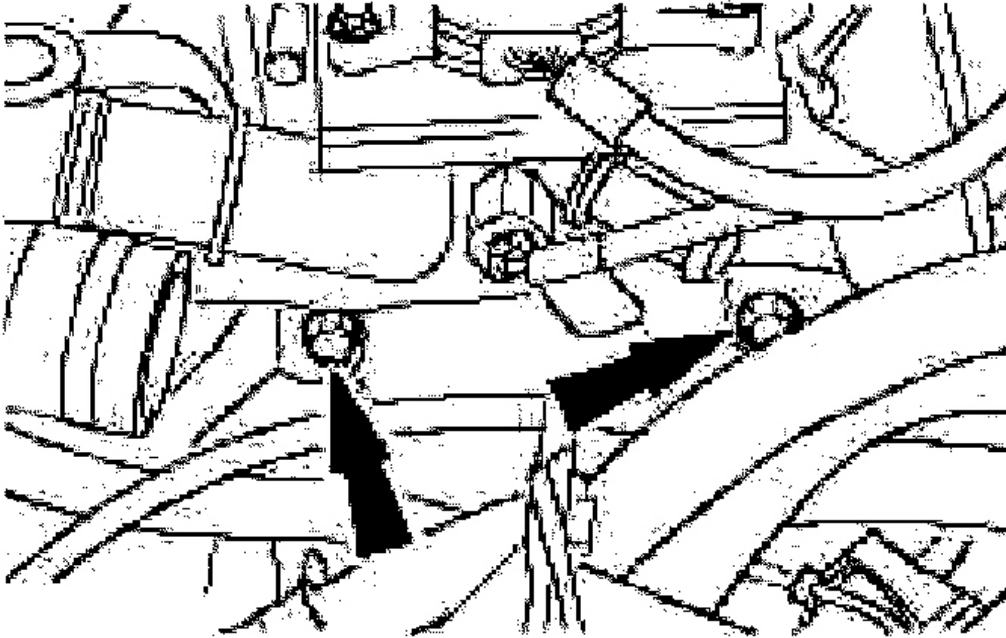
54. Disconnect the crankshaft position (CKP) sensor electrical connector.



G03432342

Fig. 294: Disconnecting Crankshaft Position (CKP) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

55. Remove the upper transaxle flange bolts.



G03432343

Fig. 295: Removing Upper Transaxle Flange Bolts
Courtesy of FORD MOTOR CO.

56. Separate the engine from the transaxle and remove it out the top.



DISASSEMBLY

ENGINE

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine, 2.0L SPI - Focus

	Cylinder Ridge Reamer 303-016 (T64L-6011-EA)
	Strap Wrench 303-D055 (D85L-6000-A)

G03432344

Fig. 296: Removing Special Tools
Courtesy of FORD MOTOR CO.

1. Disconnect and remove the following.
 - Vacuum hoses
 - Coolant hoses and tubes
 - Positive crankcase ventilation and fresh air hoses
2. Remove the clutch (if equipped). For additional information, refer to **CLUTCHES** article .
3. Remove the flywheel.
 - Install the special tool.
 - Remove the bolts.

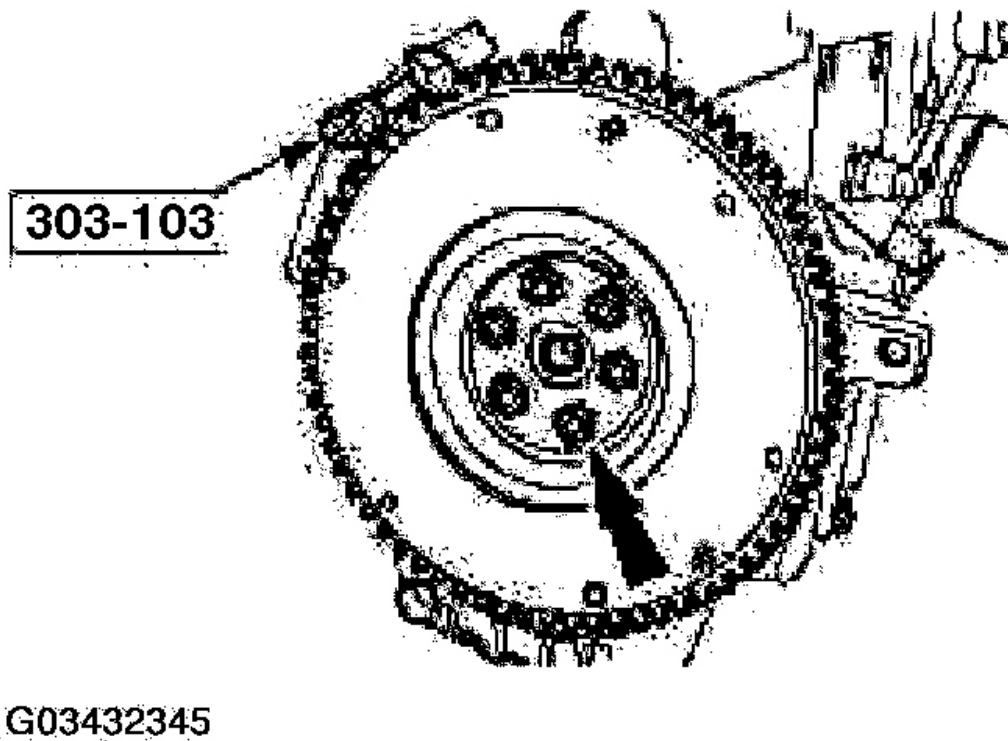
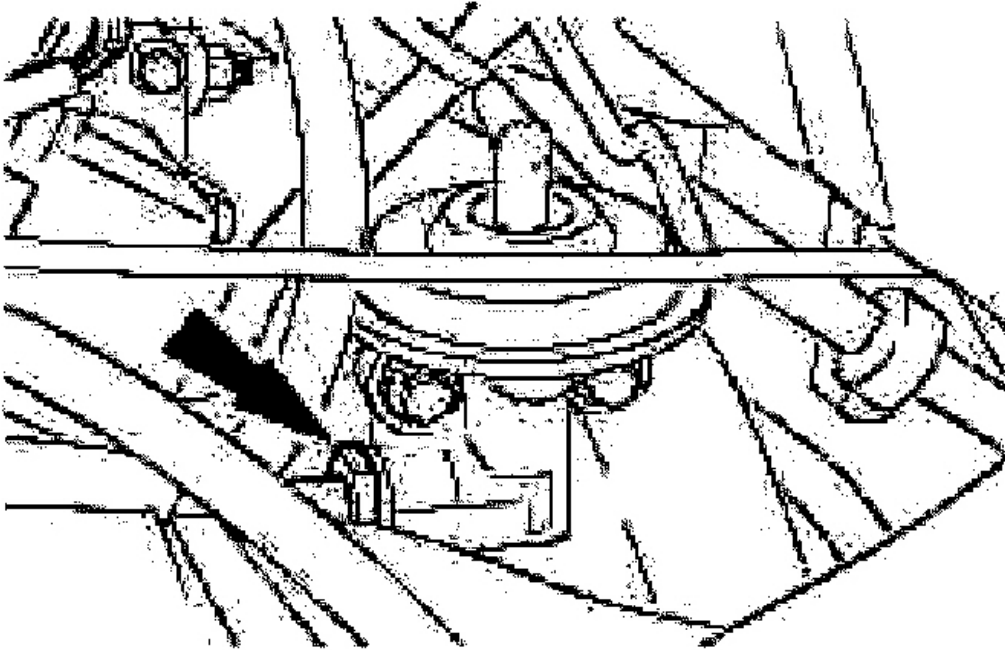


Fig. 297: Removing Flywheel
Courtesy of FORD MOTOR CO.

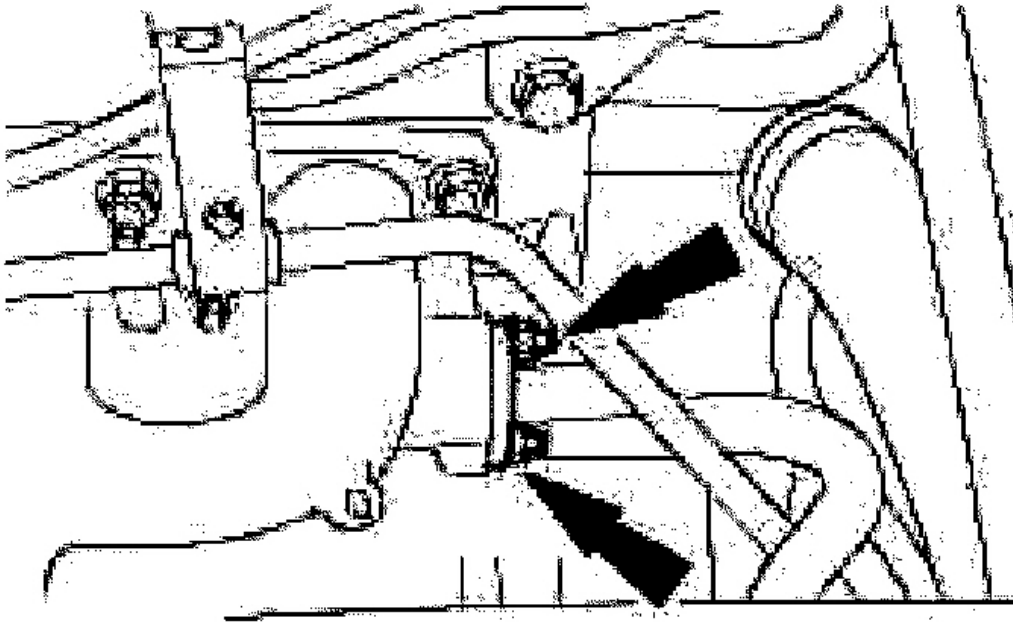
4. Attach the engine to stand.
5. Disconnect the exhaust gas recirculation tube from the EGR valve.



G03432346

Fig. 298: Disconnecting Exhaust Gas Recirculation Tube From EGR Valve
Courtesy of FORD MOTOR CO.

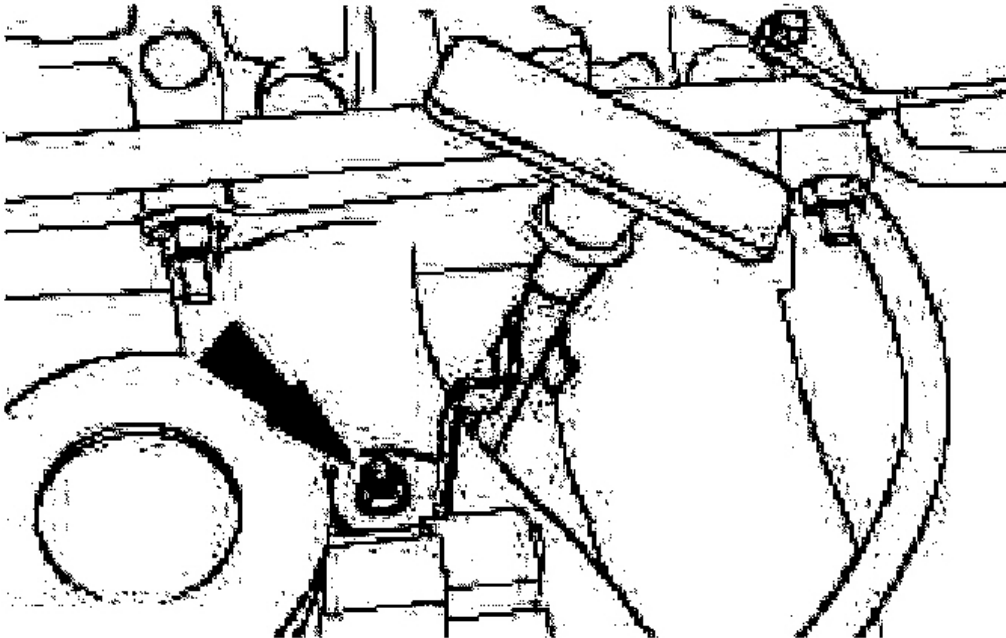
6. Disconnect the EGR tube from the exhaust manifold.



G03432347

Fig. 299: Disconnecting EGR Tube From Exhaust Manifold
Courtesy of FORD MOTOR CO.

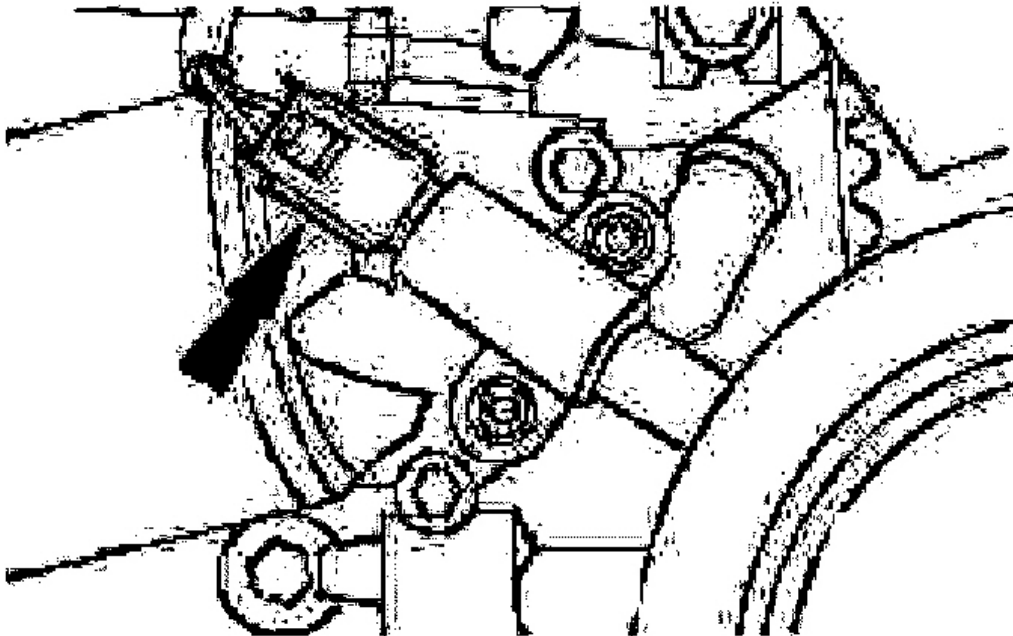
7. Remove the oil lever indicator tube.



G03432348

Fig. 300: Removing Oil Lever Indicator Tube
Courtesy of FORD MOTOR CO.

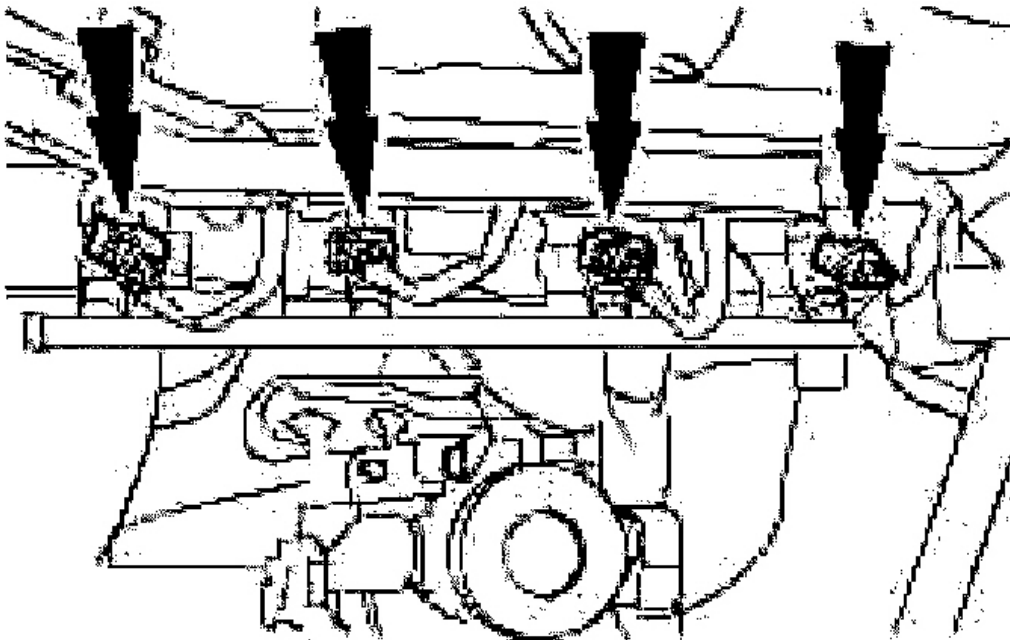
8. Disconnect the crankshaft position (CKP) sensor electrical connector.



G03432349

Fig. 301: Disconnecting Crankshaft Position (CKP) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

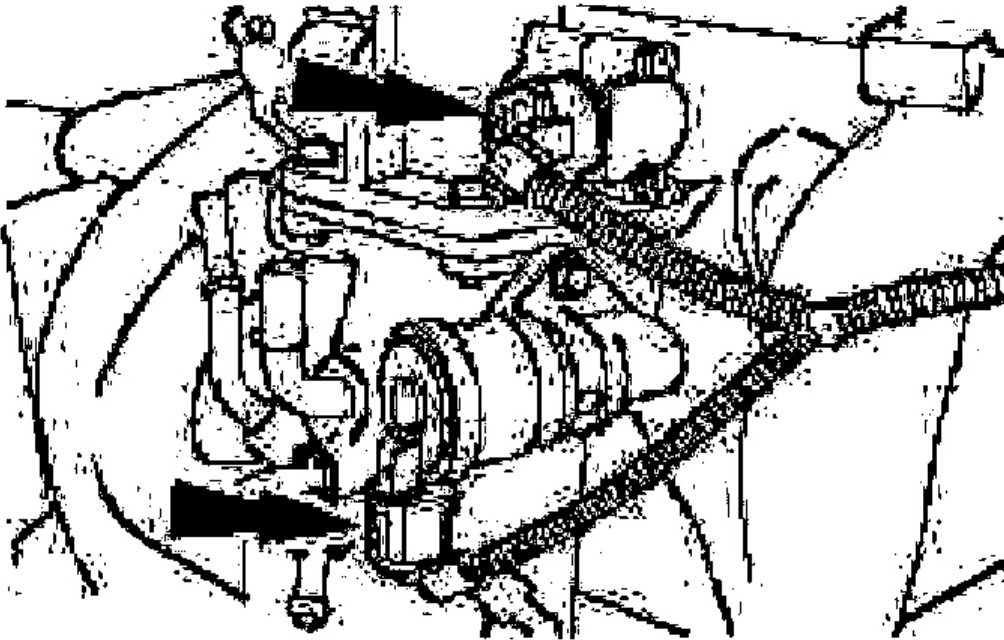
9. Disconnect the fuel injectors electrical connectors.



G03432350

Fig. 302: Disconnecting Fuel Injectors Electrical Connectors
Courtesy of FORD MOTOR CO.

10. Disconnect the idle air control (IAC) valve and the throttle position (TP) sensor electrical connectors.

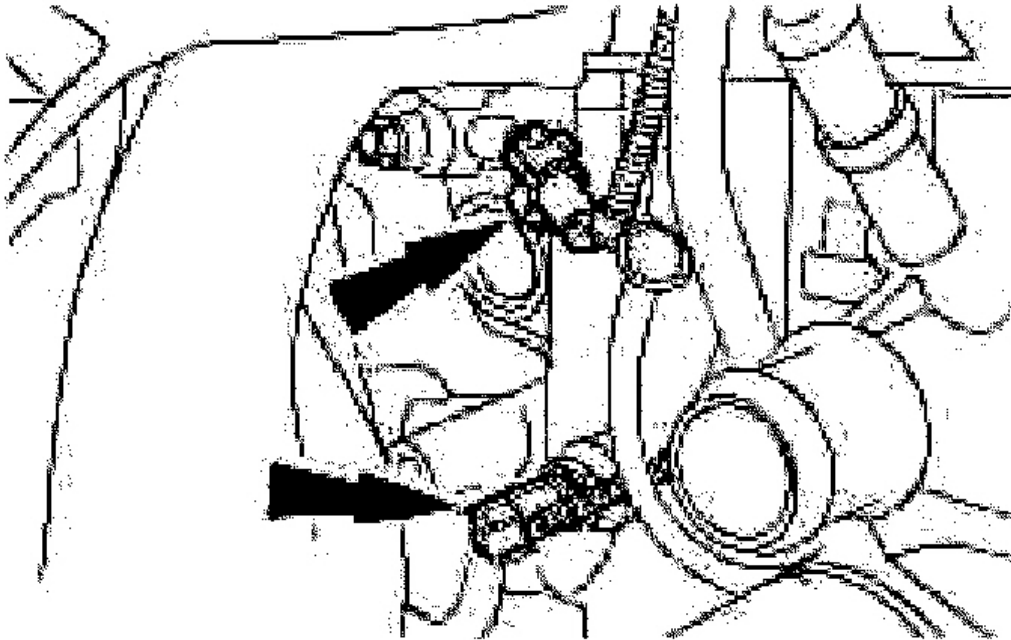


G03432351

Fig. 303: Disconnecting Idle Air Control (IAC) Valve And Throttle Position (TP) Sensor Electrical Connectors

Courtesy of FORD MOTOR CO.

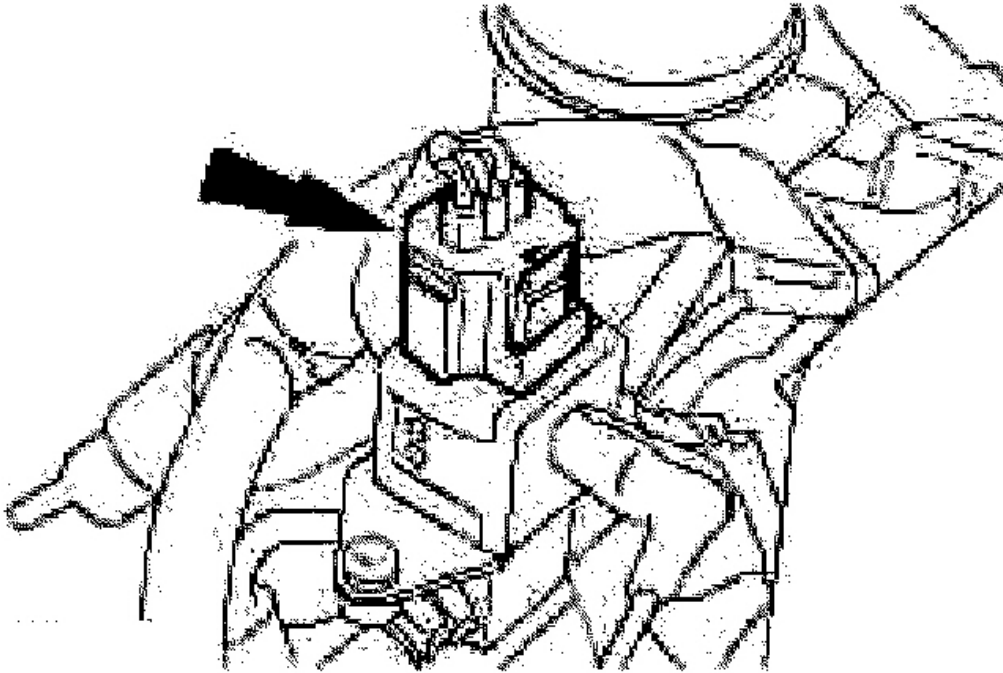
11. Disconnect the oil pressure sender unit and the knock sensor.



G03432352

Fig. 304: Disconnecting Oil Pressure Sender Unit And Knock Sensor
Courtesy of FORD MOTOR CO.

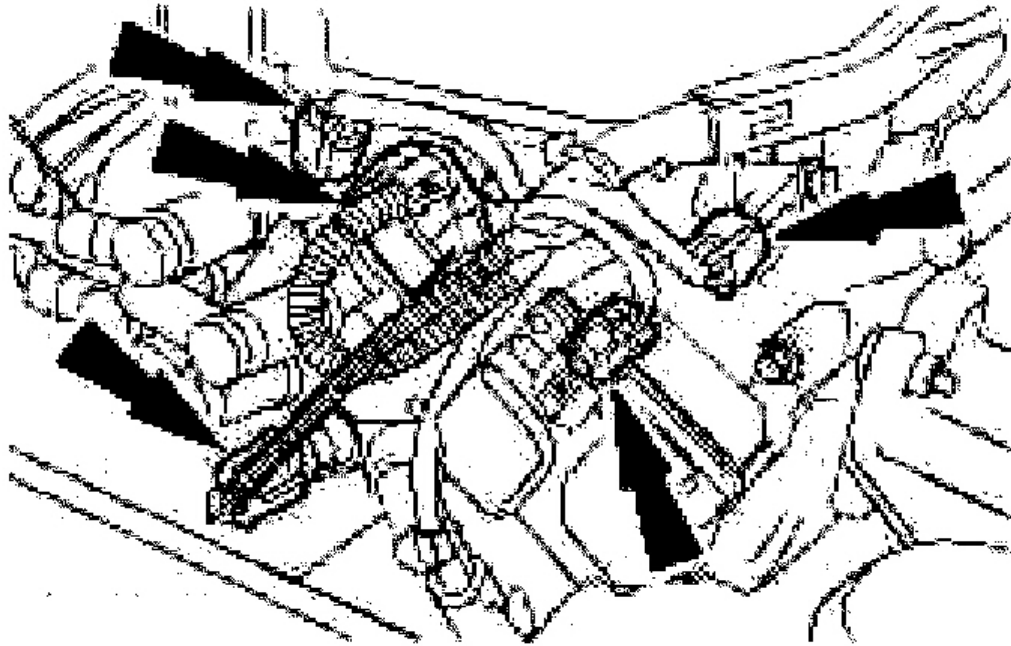
12. Disconnect the fuel pressure sensor electrical connector.



G03432353

Fig. 305: Disconnecting Fuel Pressure Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

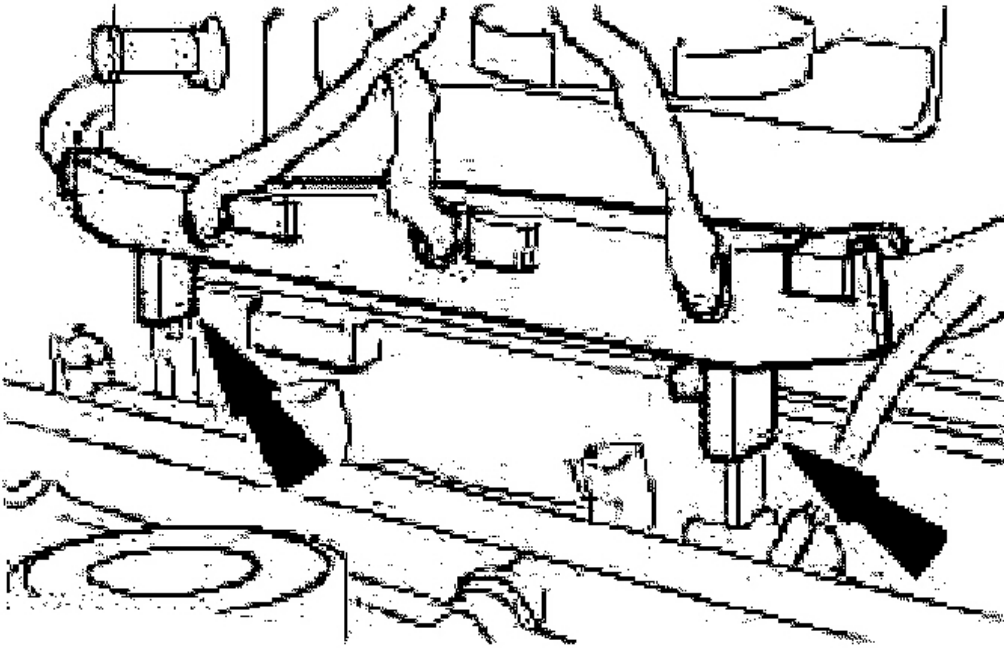
13. Disconnect the electrical connectors.
 - Camshaft position (CMP) sensor
 - Intake manifold runner control (IMRC)
 - Radio interference capacitor
 - Ignition coil
 - Water temperature indicator sender unit



G03432354

Fig. 306: Disconnecting Electrical Connectors
Courtesy of FORD MOTOR CO.

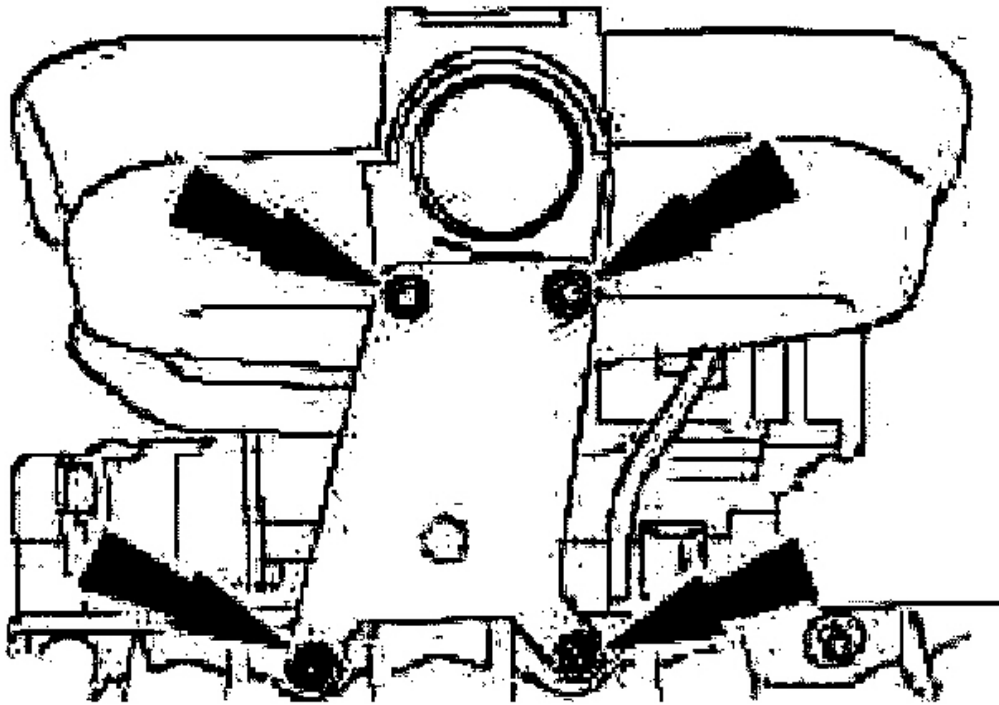
14. Detach the retainers and remove the fuel charge wiring harness.



G03432355

Fig. 307: Removing Fuel Charge Wiring Harness
Courtesy of FORD MOTOR CO.

15. Remove the intake manifold bracket.

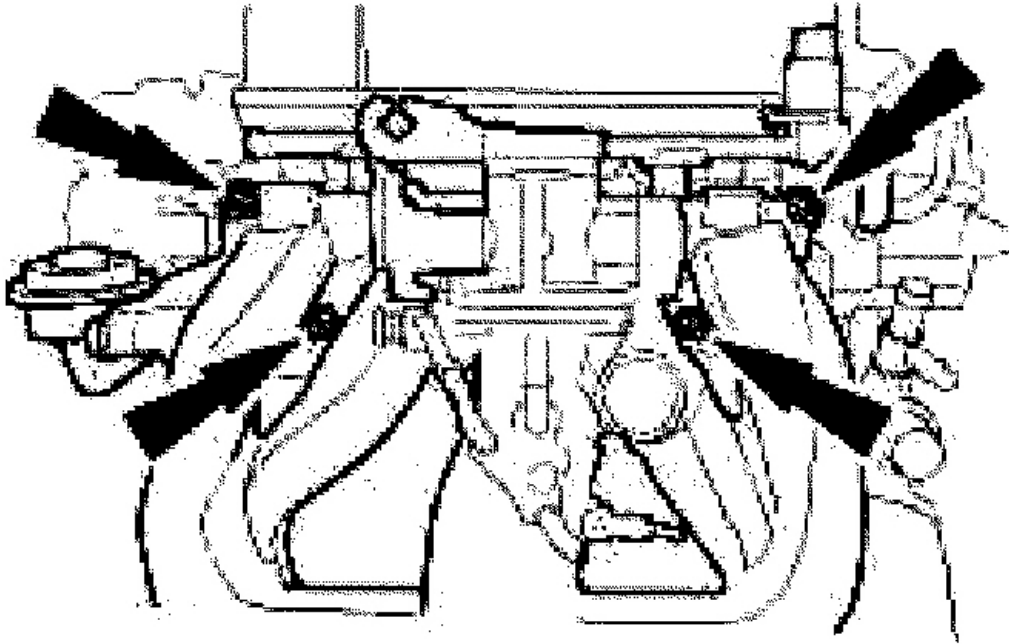


G03432356

Fig. 308: Removing Intake Manifold Bracket
Courtesy of FORD MOTOR CO.

CAUTION: Use care not to drop any components.

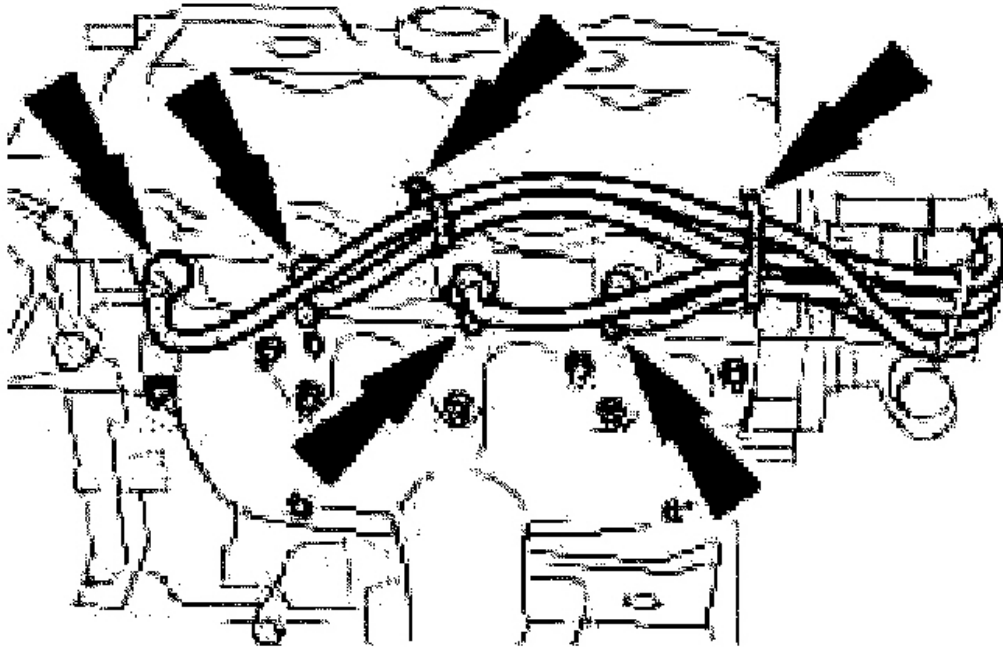
16. Remove the intake manifold and IMRC.
 - Discard the gaskets.



G03432357

Fig. 309: Removing Intake Manifold And IMRC
Courtesy of FORD MOTOR CO.

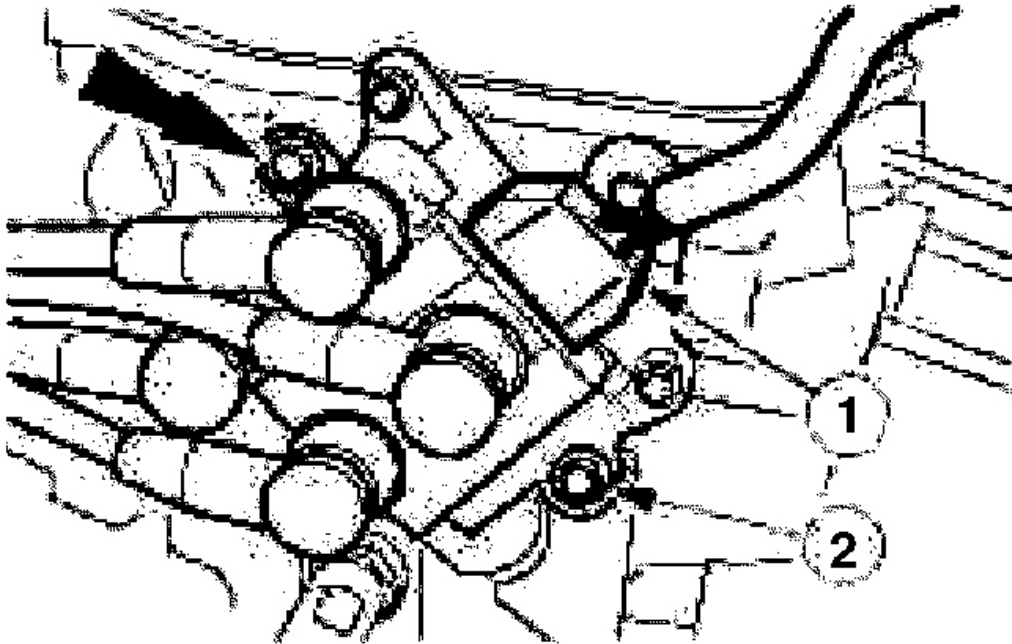
CAUTION: Do not pull on the ignition wires directly, as wires may separate from the connector inside the boot.



G03432358

Fig. 310: Disconnecting Spark Plug Wires
Courtesy of FORD MOTOR CO.

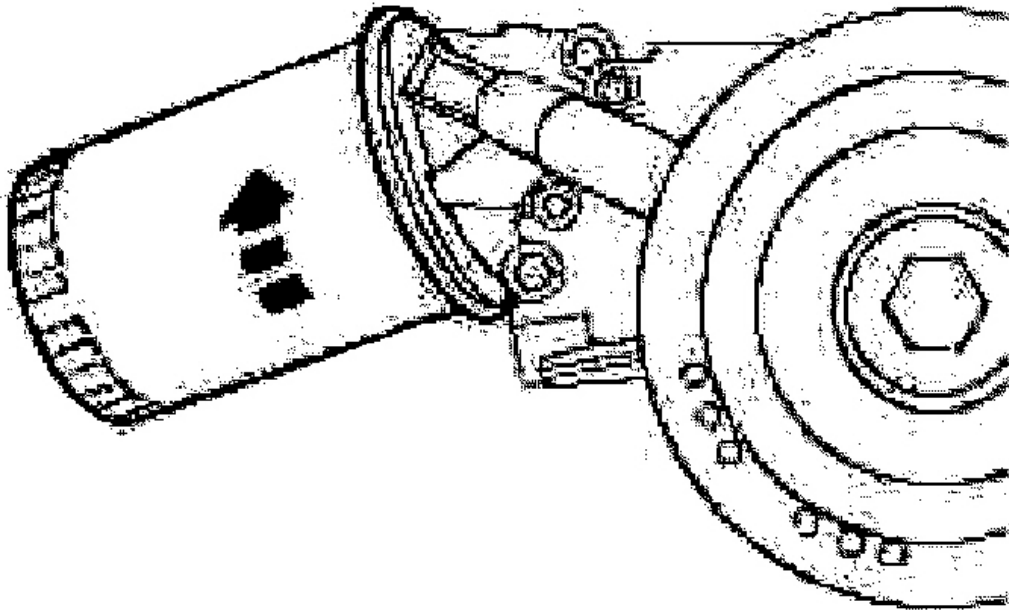
17. Disconnect the spark plug wires.
18. Remove the ignition coil, ignition coil bracket and wires as one assembly.



G03432359

Fig. 311: Removing Ignition Coil, Ignition Coil Bracket And Wires
Courtesy of FORD MOTOR CO.

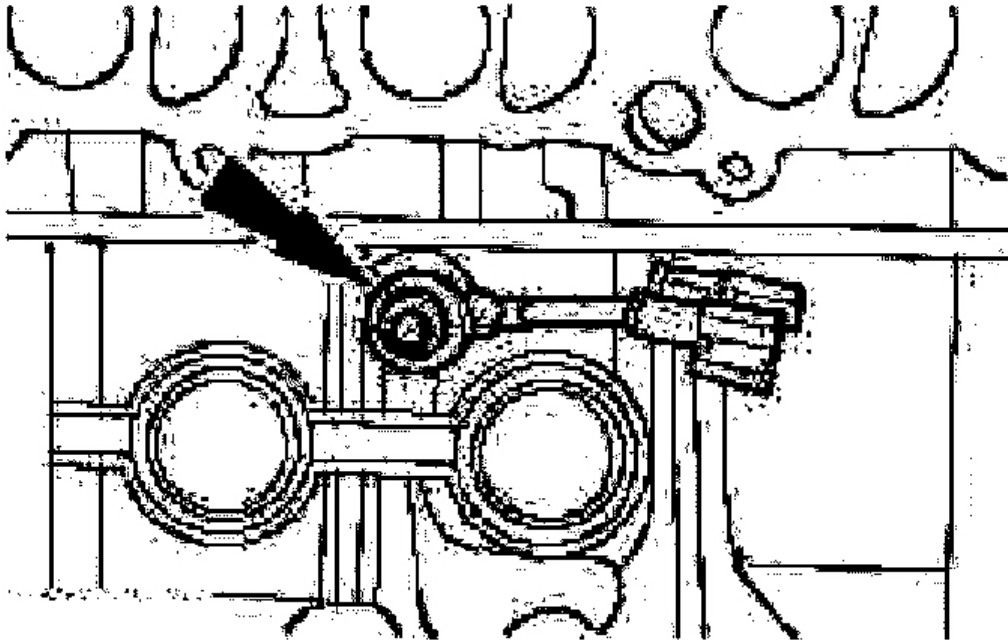
19. Remove the oil filter.



G03432360

Fig. 312: Removing Oil Filter
Courtesy of FORD MOTOR CO.

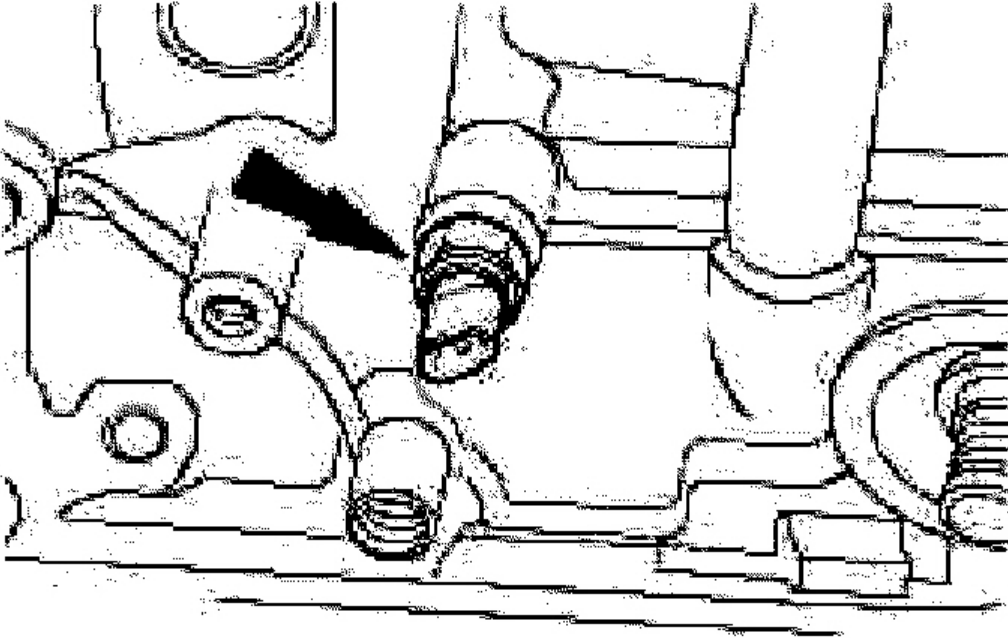
20. Remove the knock sensor.



G03432361

Fig. 313: Removing Knock Sensor
Courtesy of FORD MOTOR CO.

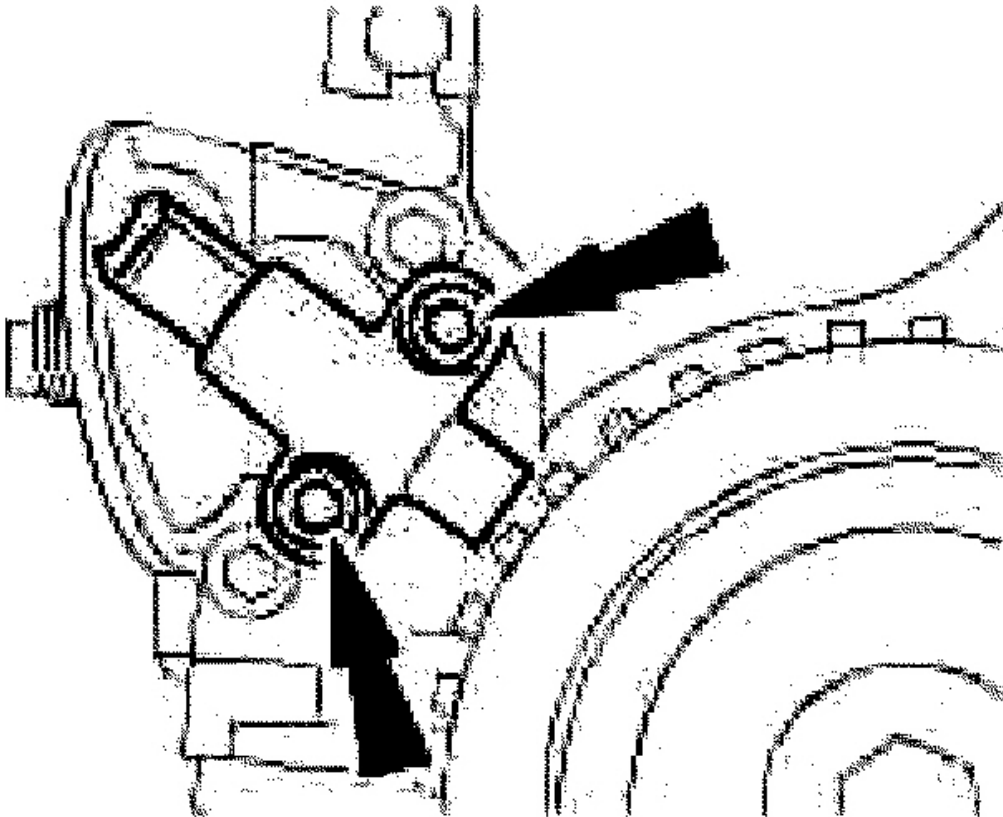
21. Remove the oil pressure sender unit.



G03432362

Fig. 314: Removing Oil Pressure Sender Unit
Courtesy of FORD MOTOR CO.

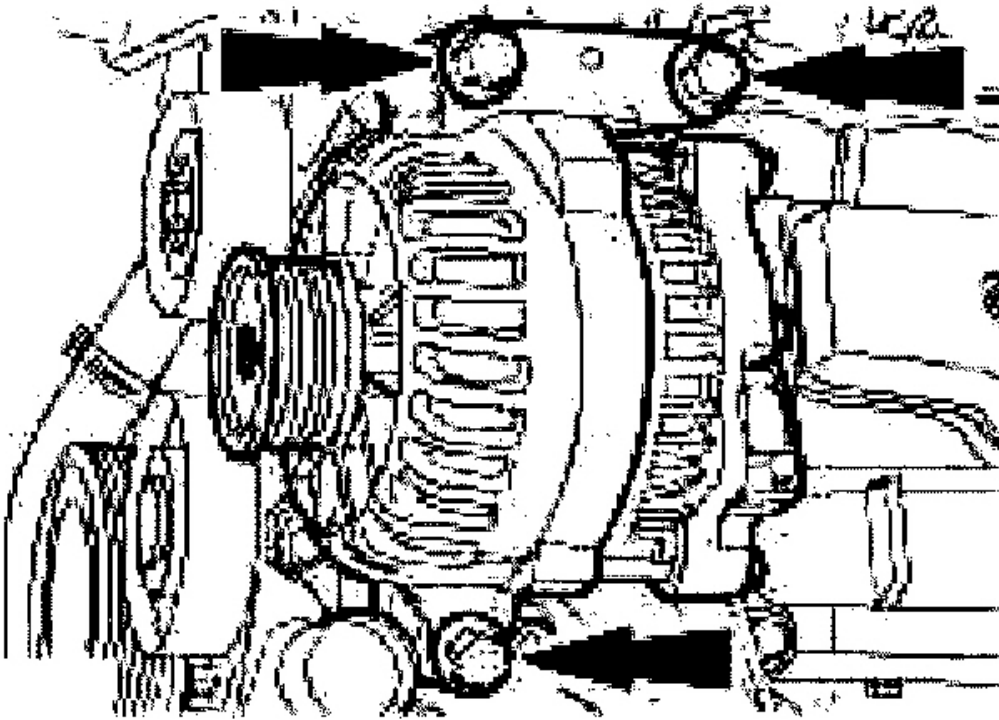
22. Remove the CKP sensor.



G03432363

Fig. 315: Removing CKP Sensor
Courtesy of FORD MOTOR CO.

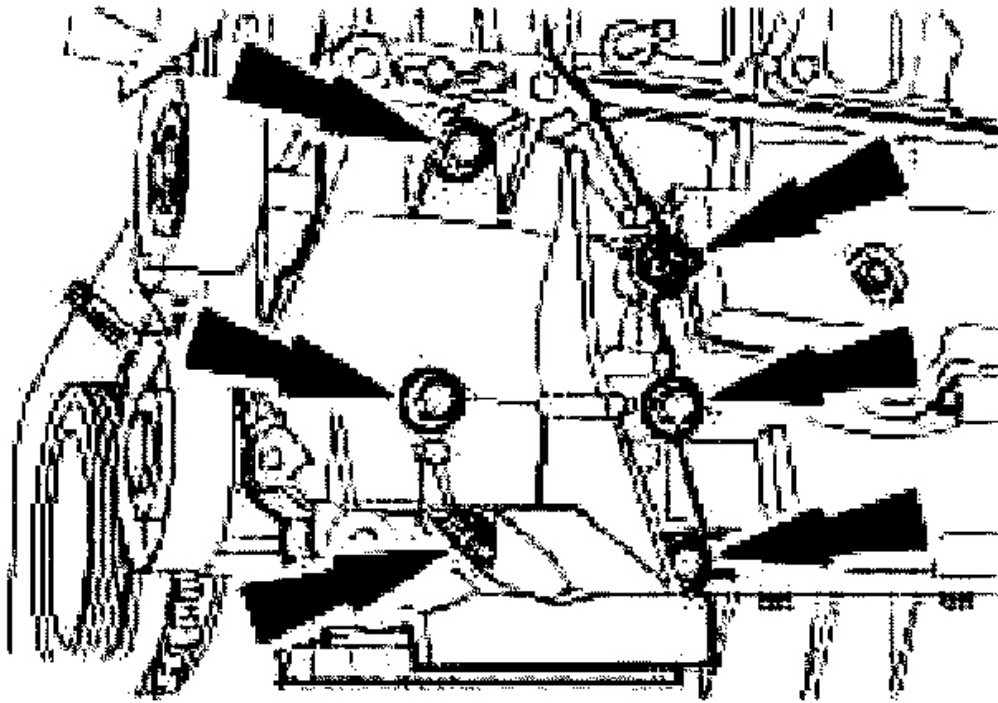
23. Remove the generator.



G03432364

Fig. 316: Removing Generator
Courtesy of FORD MOTOR CO.

24. Remove the accessory drive belt bracket.

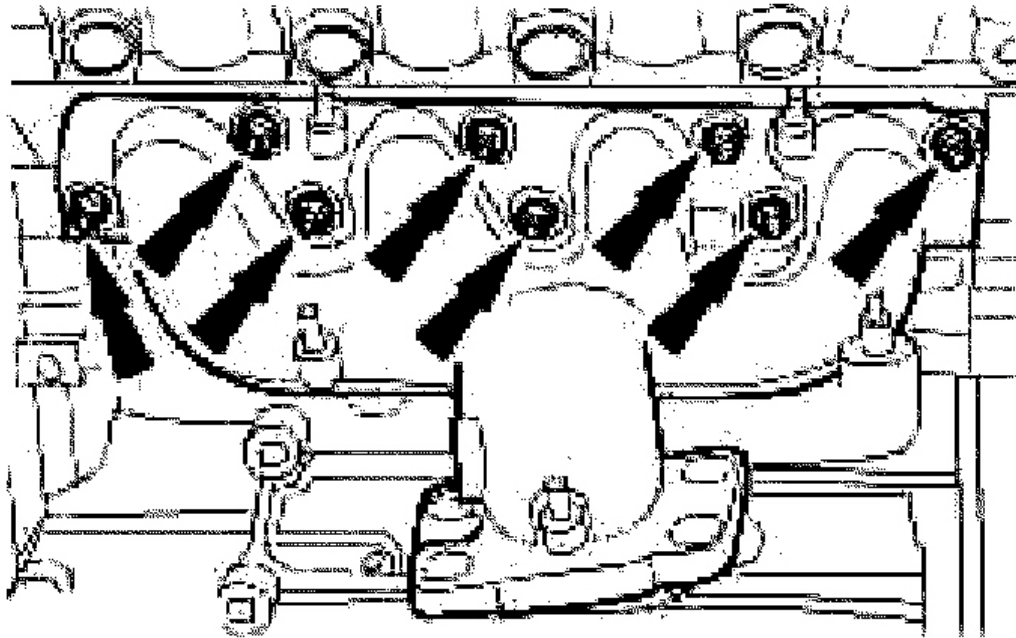


G03432365

Fig. 317: Removing Accessory Drive Belt Bracket
Courtesy of FORD MOTOR CO.

NOTE: Remove the nuts evenly.

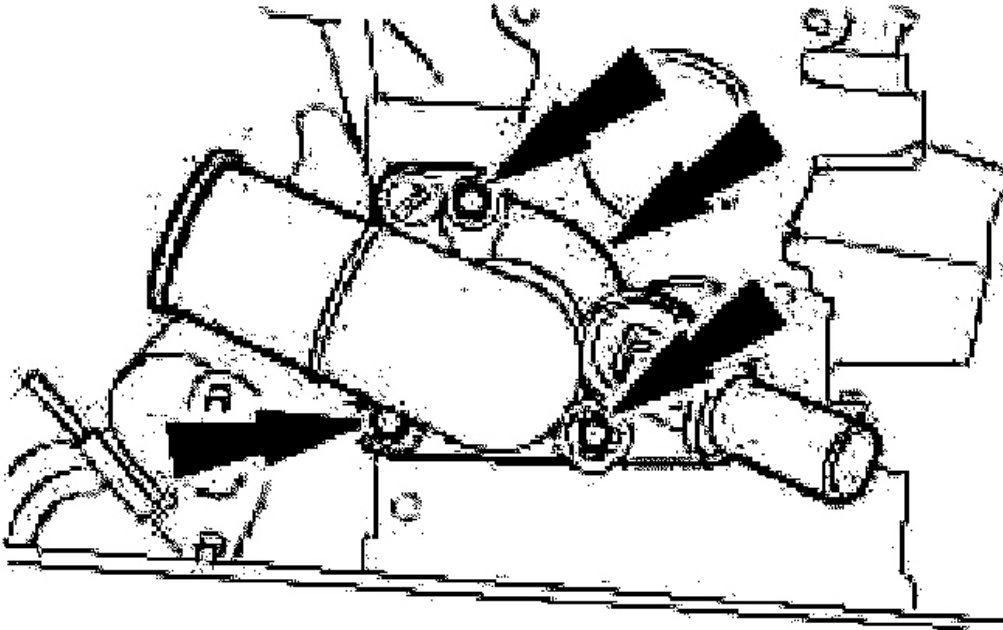
25. Remove the exhaust manifold.
 - Discard the gasket.



G03432366

Fig. 318: Removing Exhaust Manifold
Courtesy of FORD MOTOR CO.

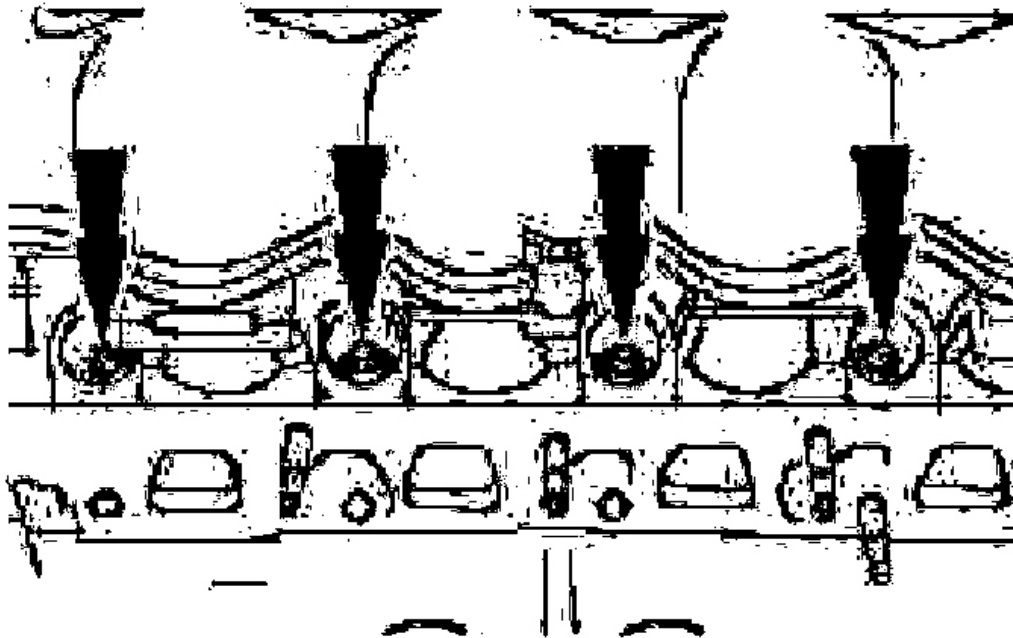
26. Remove the water outlet connection, thermostat and gasket.



G03432367

Fig. 319: Removing Water Outlet Connection, Thermostat And Gasket
Courtesy of FORD MOTOR CO.

NOTE: If an original spark plug is reused, install it in the same cylinder from which it was removed. New spark plugs may be installed in any cylinder.

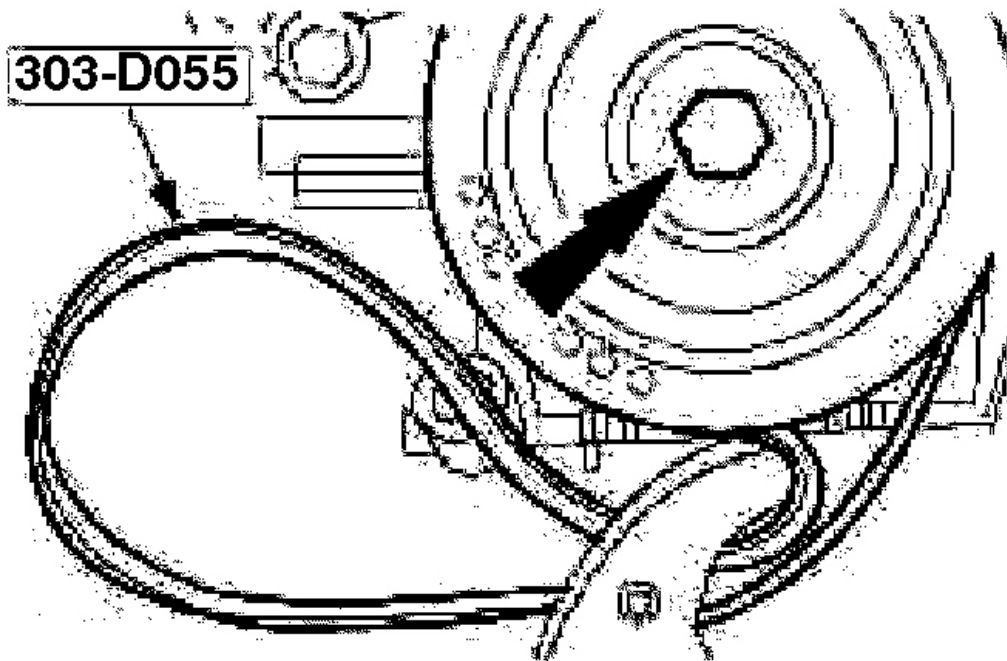


G03432368

Fig. 320: Removing Spark Plugs
Courtesy of FORD MOTOR CO.

27. Remove the spark plugs.

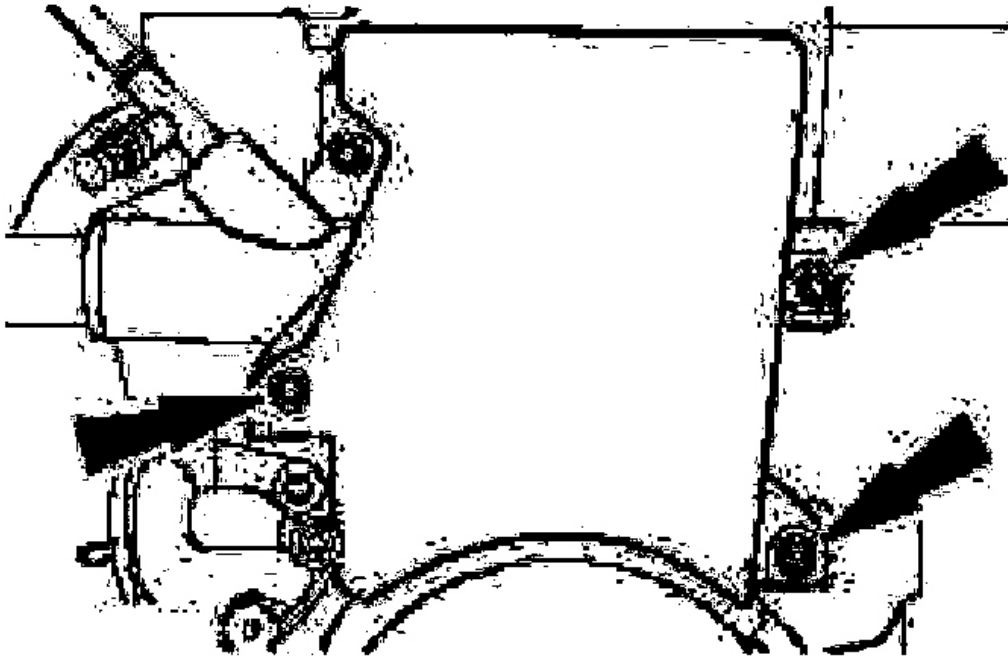
NOTE: Using the special tool, hold the crankshaft pulley.



G03432369

Fig. 321: Removing Crankshaft Pulley
Courtesy of FORD MOTOR CO.

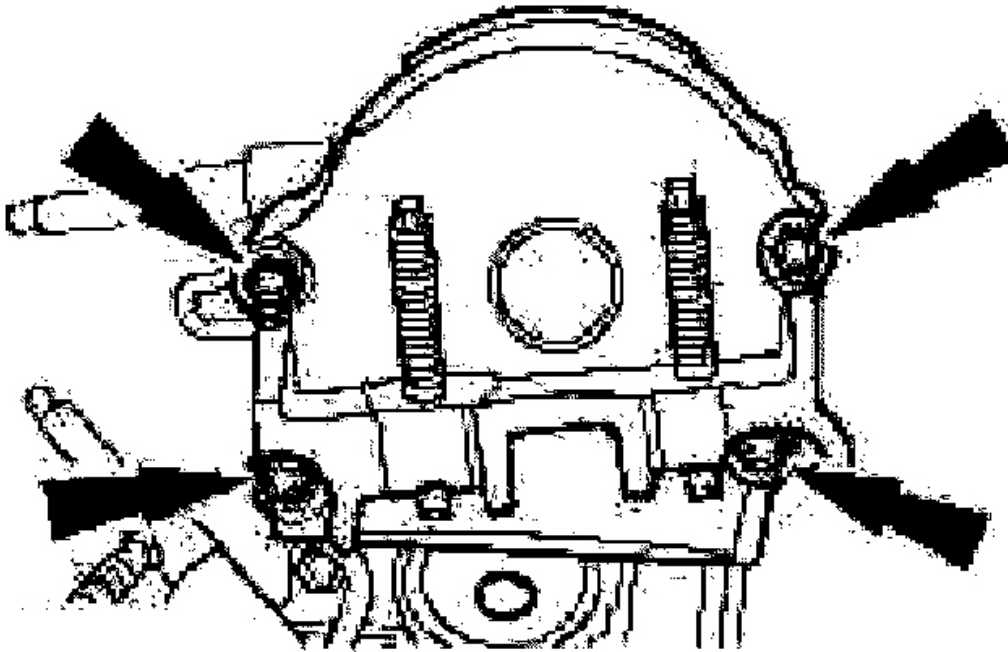
28. Remove the crankshaft pulley.
29. Remove the timing belt cover.



G03432370

Fig. 322: Removing Timing Belt Cover
Courtesy of FORD MOTOR CO.

30. Remove the upper timing belt cover.



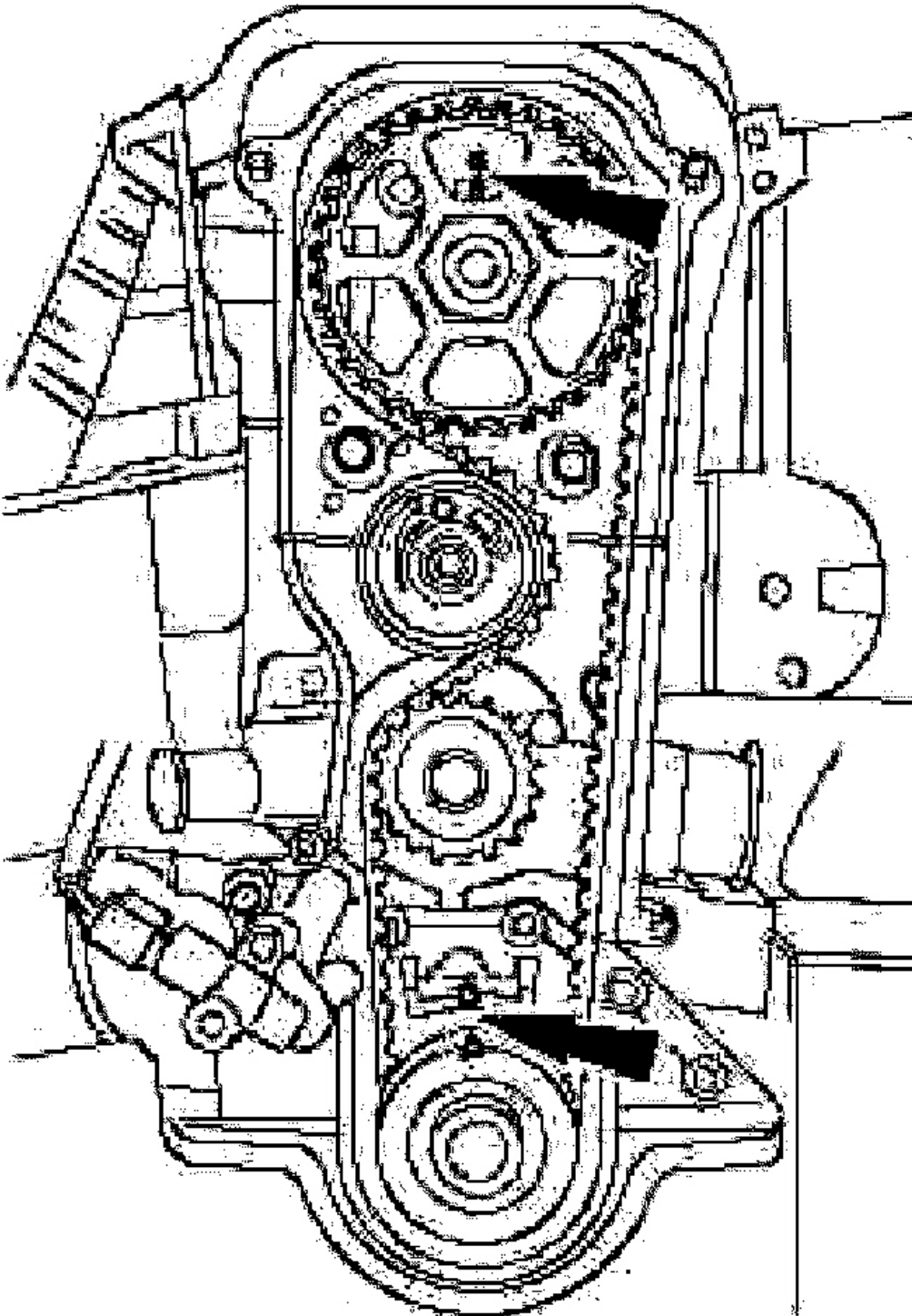
G03432371

Fig. 323: Removing Upper Timing Belt Cover
Courtesy of FORD MOTOR CO.

31. Align the timing marks.

2002 Ford Focus LX

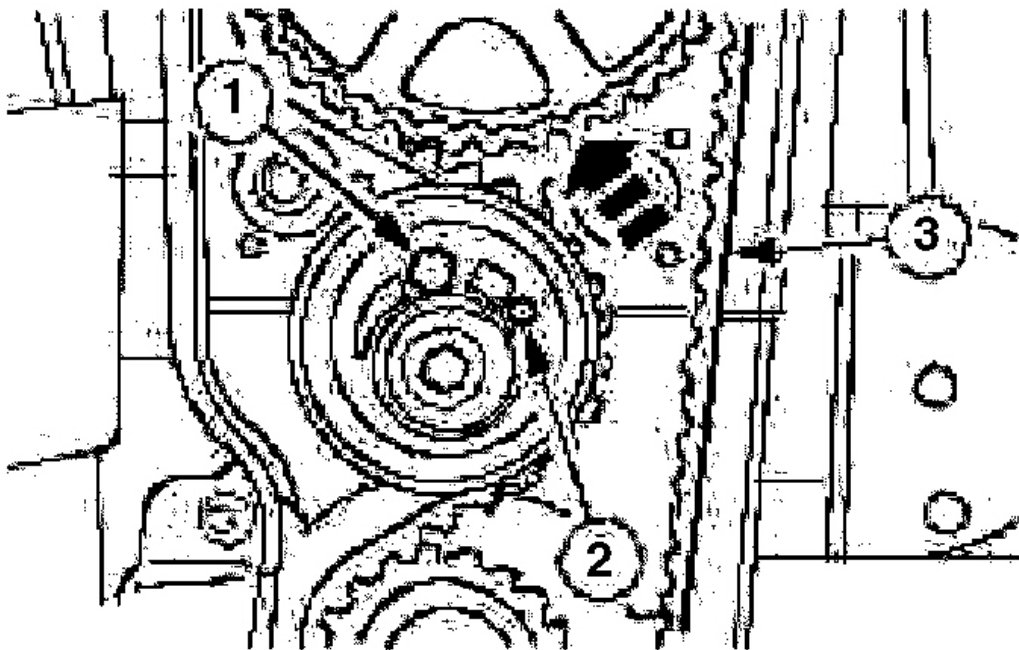
2002 ENGINE Engine, 2.0L SPI - Focus



G03432372

Fig. 324: Aligning Timing Marks
Courtesy of FORD MOTOR CO.

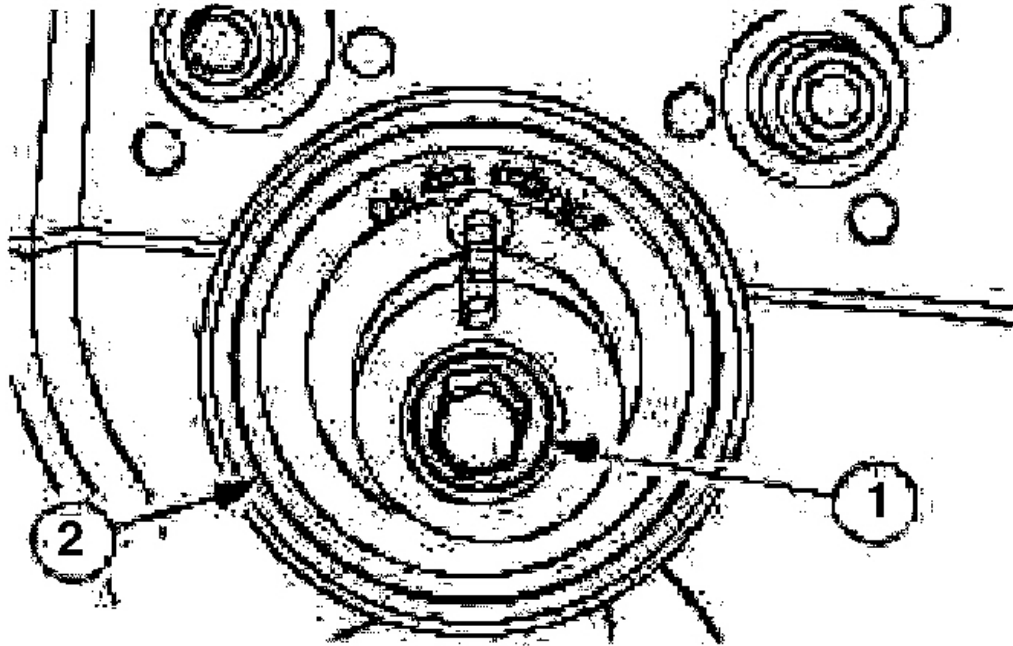
32. Remove the timing belt.
 1. Use an 8 mm Allen key and turn counterclockwise one-fourth turn.
 2. Insert a 3 mm (1/8 inch) drill bit to lock the timing belt tensioner in place.
 3. Remove the timing belt.



G03432373

Fig. 325: Removing Timing Belt
Courtesy of FORD MOTOR CO.

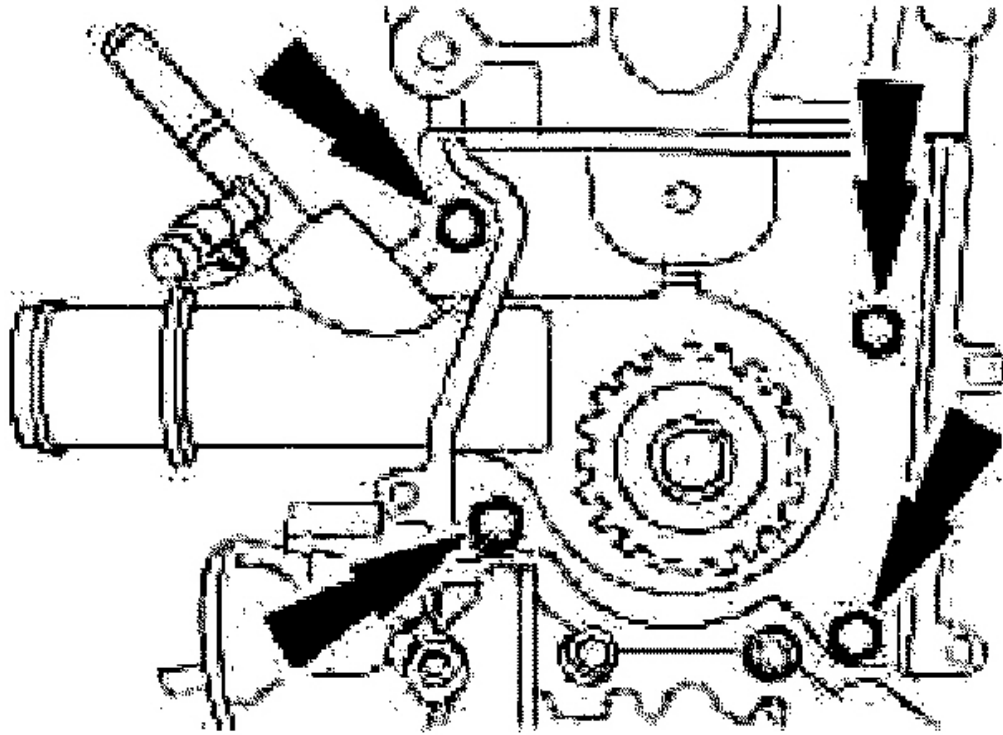
33. Remove the timing belt tensioner.
 1. Remove the bolt.
 2. Remove the tensioner.



G03432374

Fig. 326: Removing Timing Belt Tensioner
Courtesy of FORD MOTOR CO.

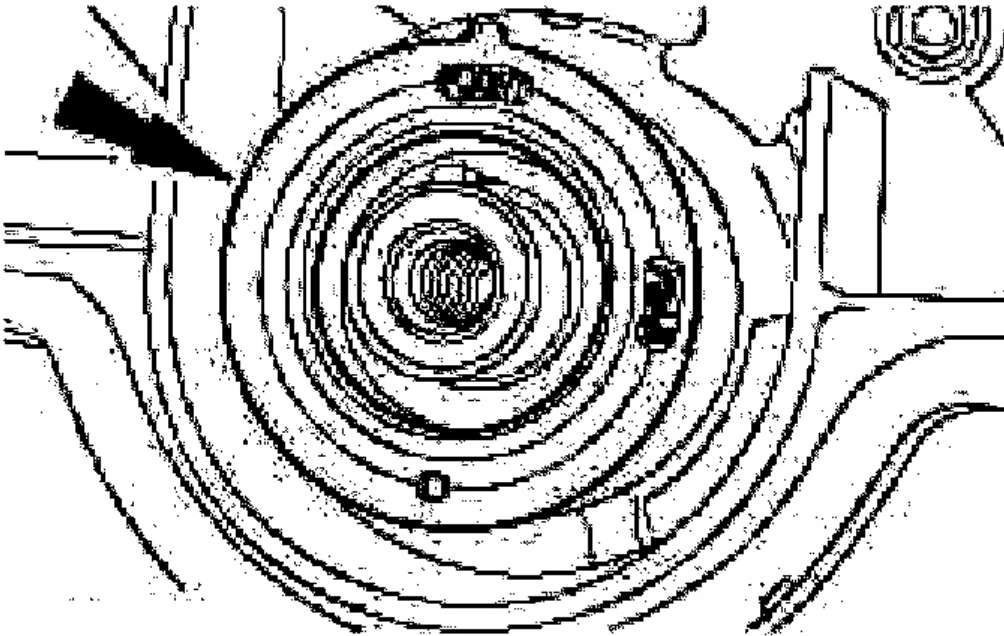
34. Remove the water pump.
 - Discard the gasket.



G03432375

Fig. 327: Removing Water Pump
Courtesy of FORD MOTOR CO.

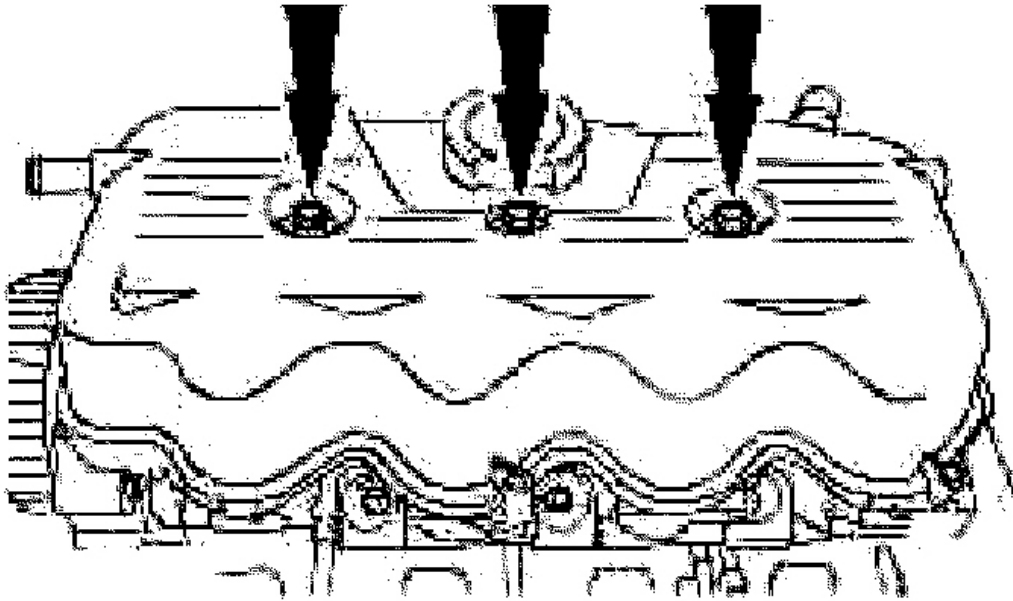
35. Remove the crankshaft sprocket and the timing belt guide.



G03432376

Fig. 328: Removing Crankshaft Sprocket And Timing Belt Guide
Courtesy of FORD MOTOR CO.

36. Remove the valve cover.

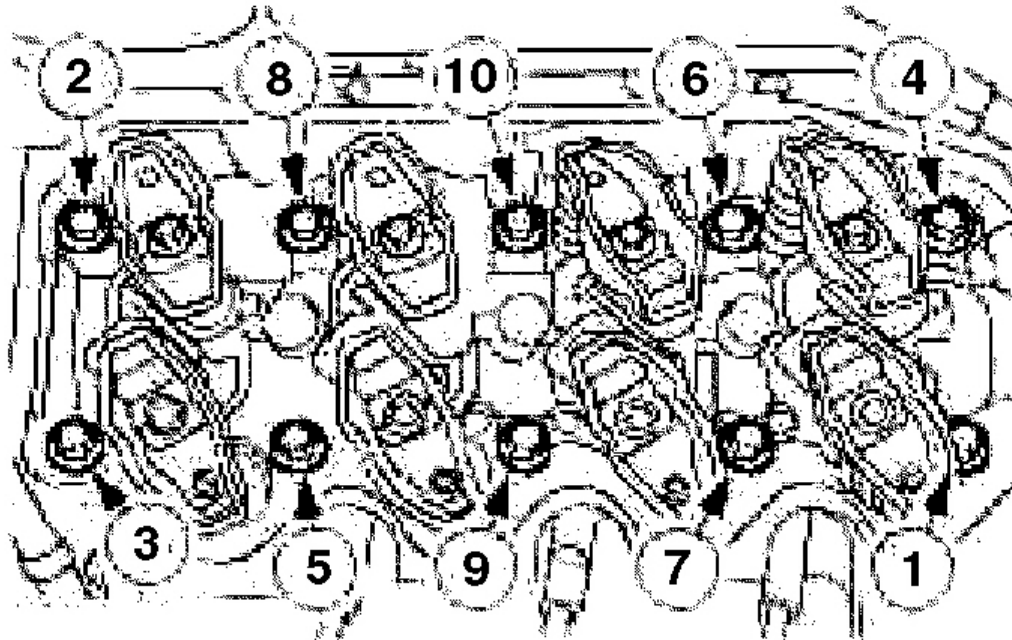


G03432377

Fig. 329: Removing Valve Cover
Courtesy of FORD MOTOR CO.

NOTE: Remove the bolts evenly and sequentially.

37. Remove the cylinder head.
 - Discard the gasket.

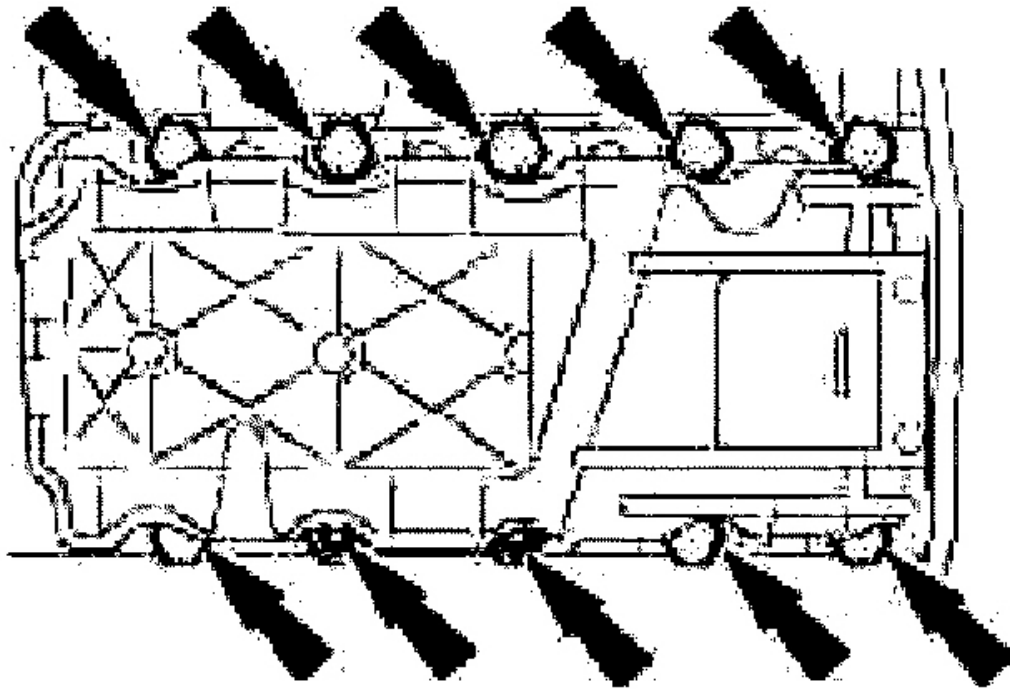


G03432378

Fig. 330: Identifying Removal Sequence Of Cylinder Head Bolts
Courtesy of FORD MOTOR CO.

NOTE: Mark location of the two stud bolts.

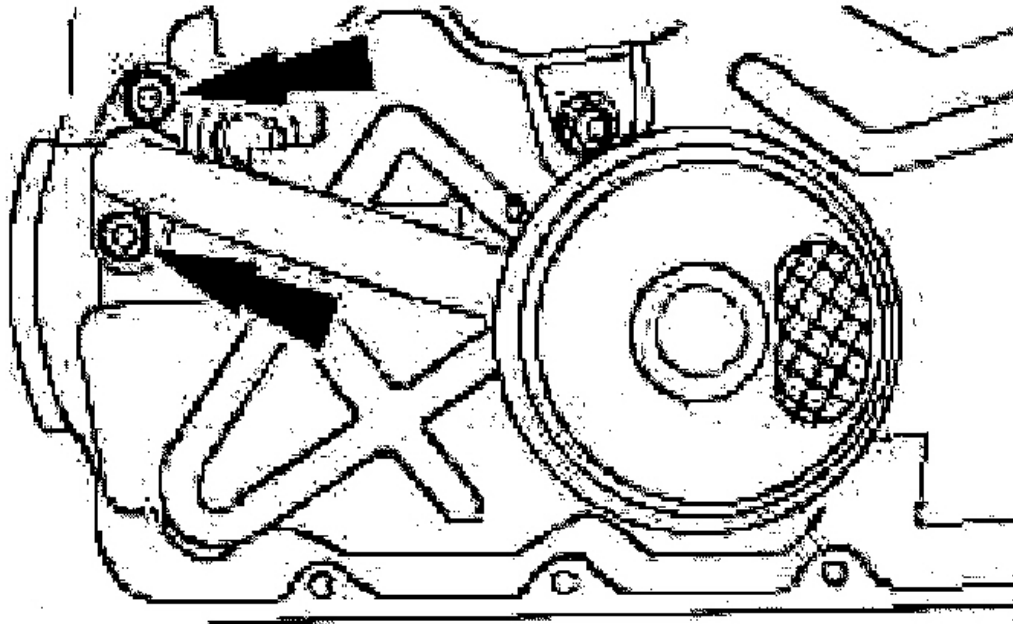
38. Remove the oil pan.
 - Discard the gasket.



G03432379

Fig. 331: Removing Oil Pan
Courtesy of FORD MOTOR CO.

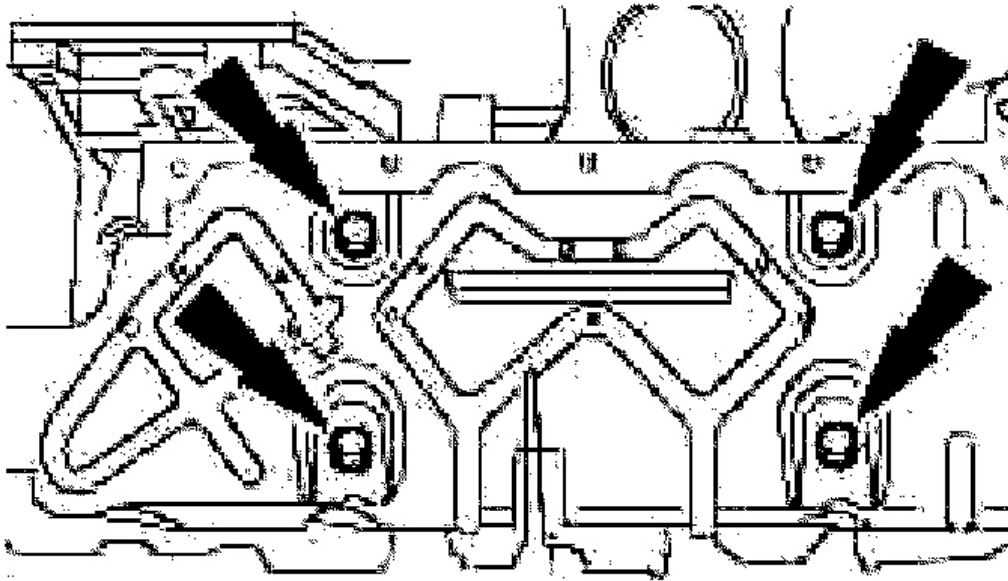
39. Remove the oil pump screen cover and tube.
 - Discard the gasket.



G03432380

Fig. 332: Removing Oil Pump Screen Cover And Tube
Courtesy of FORD MOTOR CO.

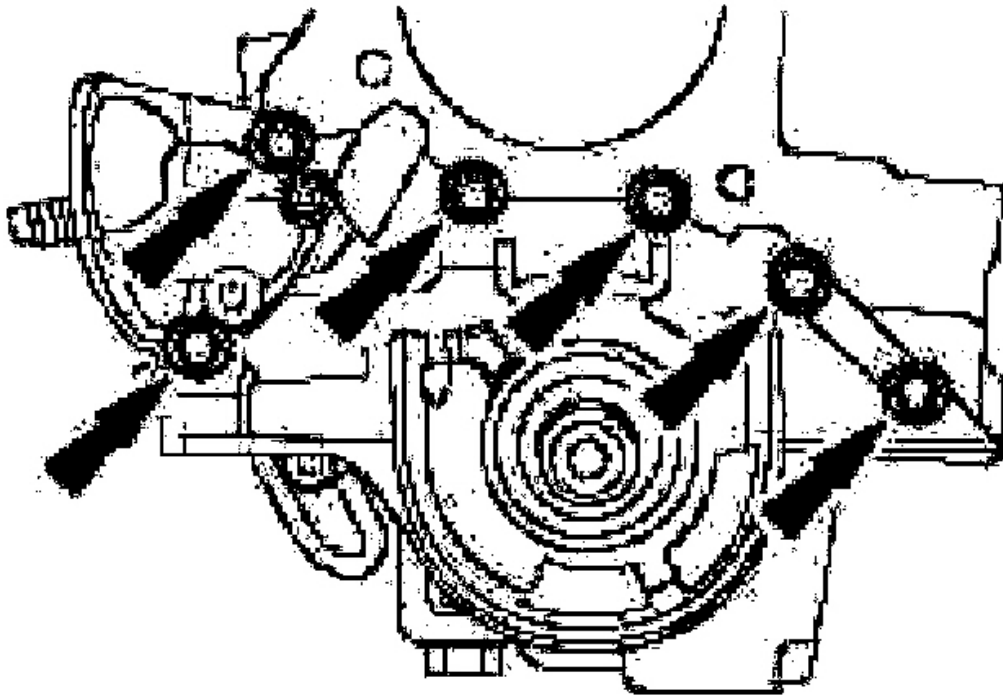
40. Remove the oil baffle.



G03432381

Fig. 333: Removing Oil Baffle
Courtesy of FORD MOTOR CO.

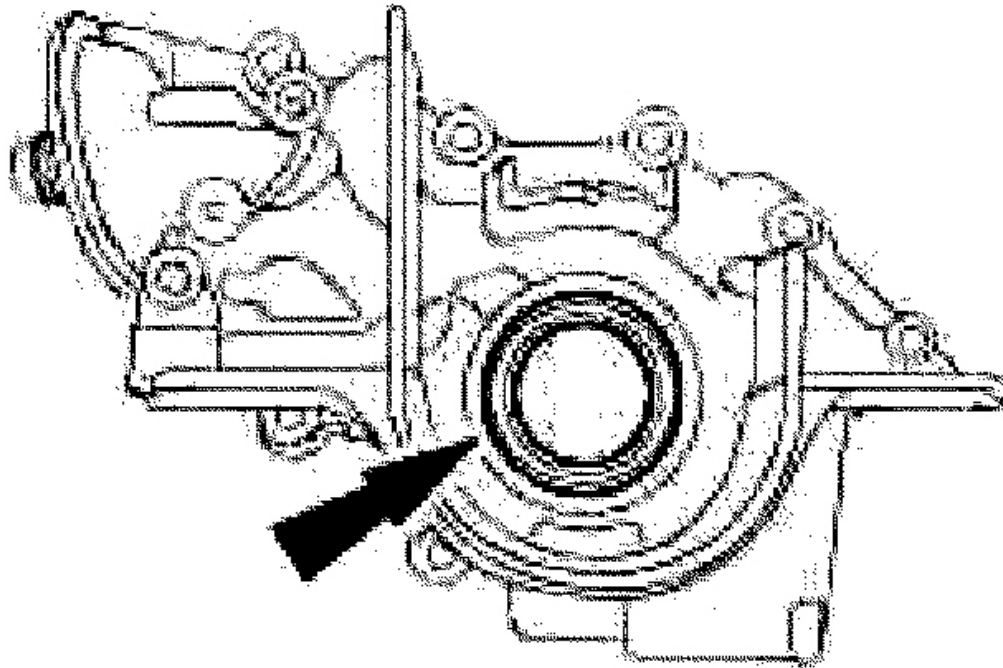
41. Remove the oil pump.
 - Discard the gasket.



G03432382

Fig. 334: Removing Oil Pump
Courtesy of FORD MOTOR CO.

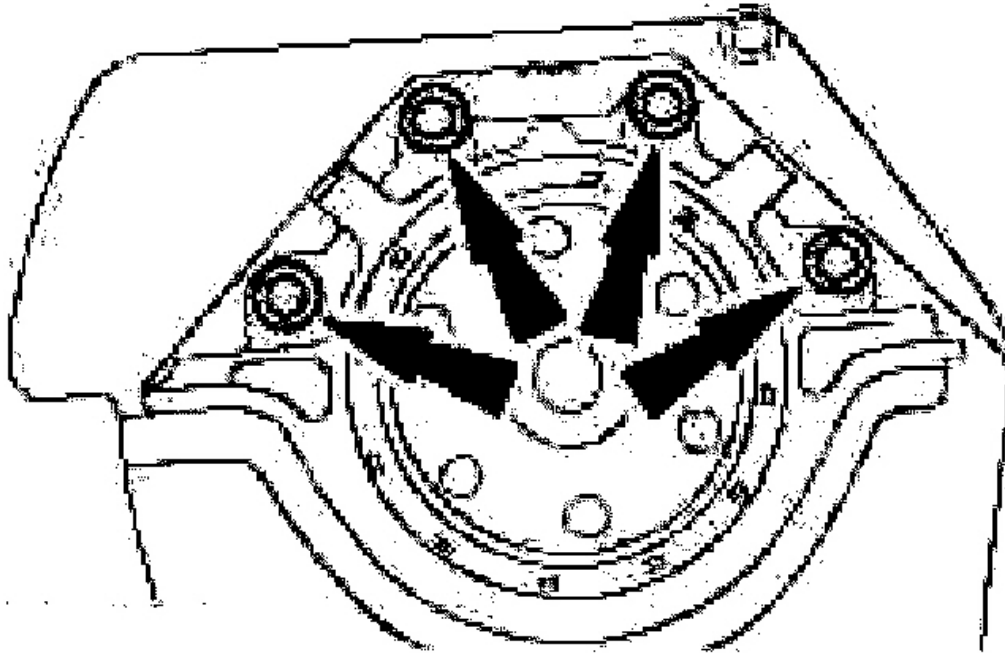
42. Remove and discard the oil pump seal.



G03432383

Fig. 335: Removing Oil Pump Seal
Courtesy of FORD MOTOR CO.

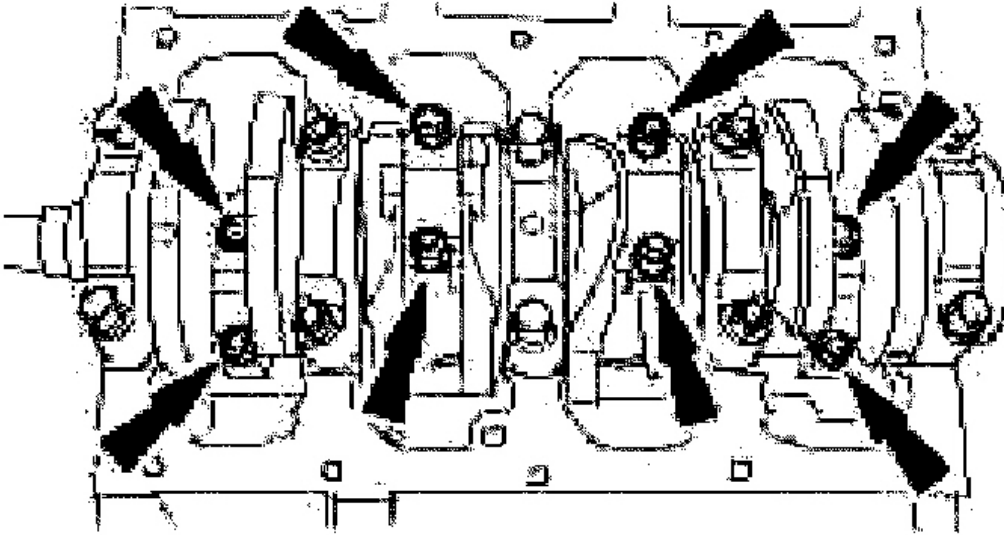
43. Remove the crankshaft rear seal retainer.
 - Discard the gasket.



G03432384

Fig. 336: Removing Crankshaft Rear Seal Retainer
Courtesy of FORD MOTOR CO.

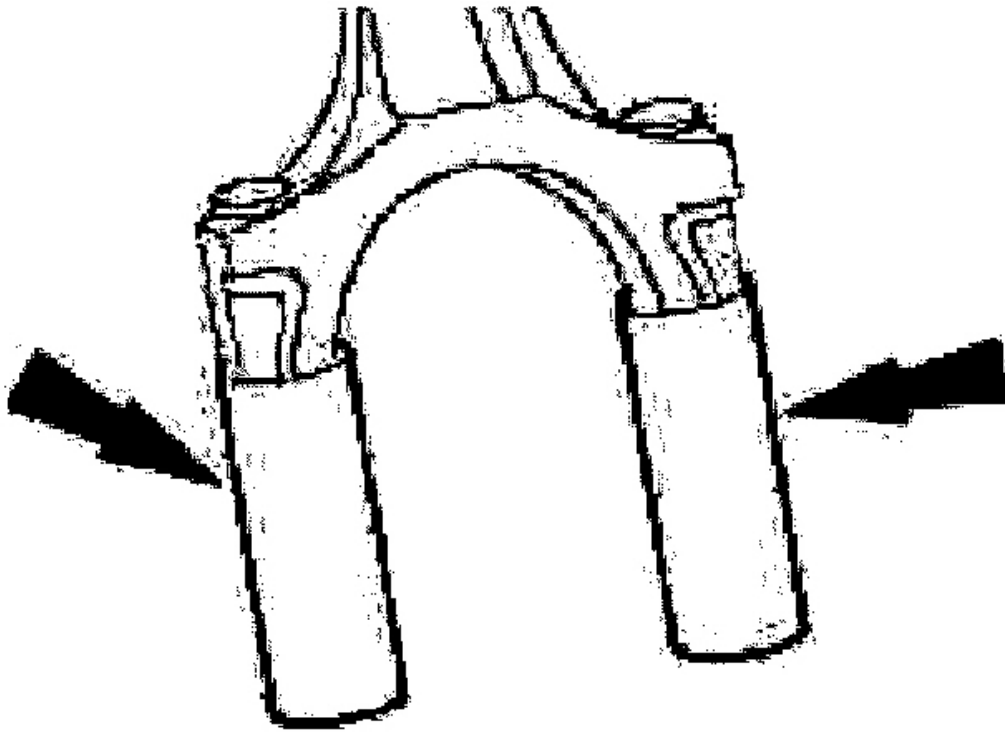
44. Remove the four connection rod caps.



G03432385

Fig. 337: Removing Connecting Rod Caps
Courtesy of FORD MOTOR CO.

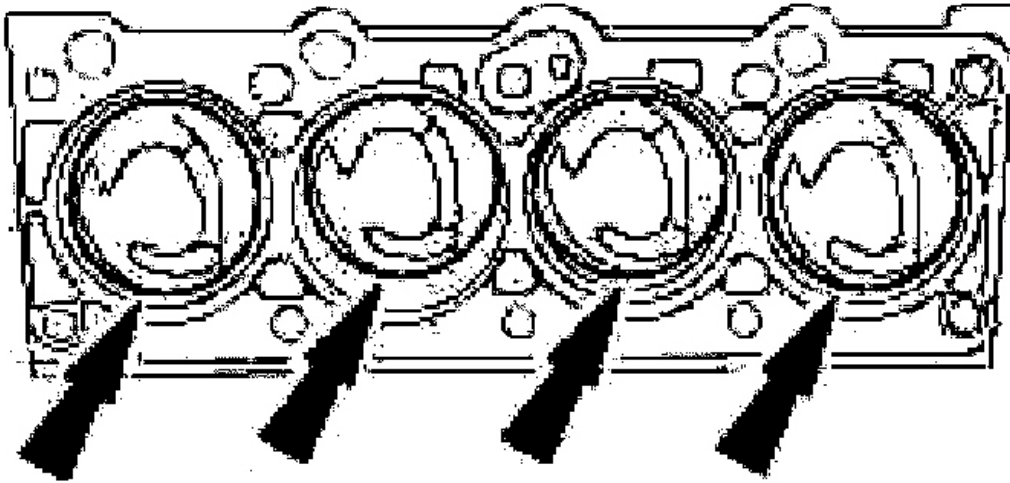
45. Install a short length of rubber tubing over the connection rod bolts to avoid damage to the crankcase journals.



G03432386

Fig. 338: Installing Short Length Of Rubber Tubing Over Connecting Rod Bolts
Courtesy of FORD MOTOR CO.

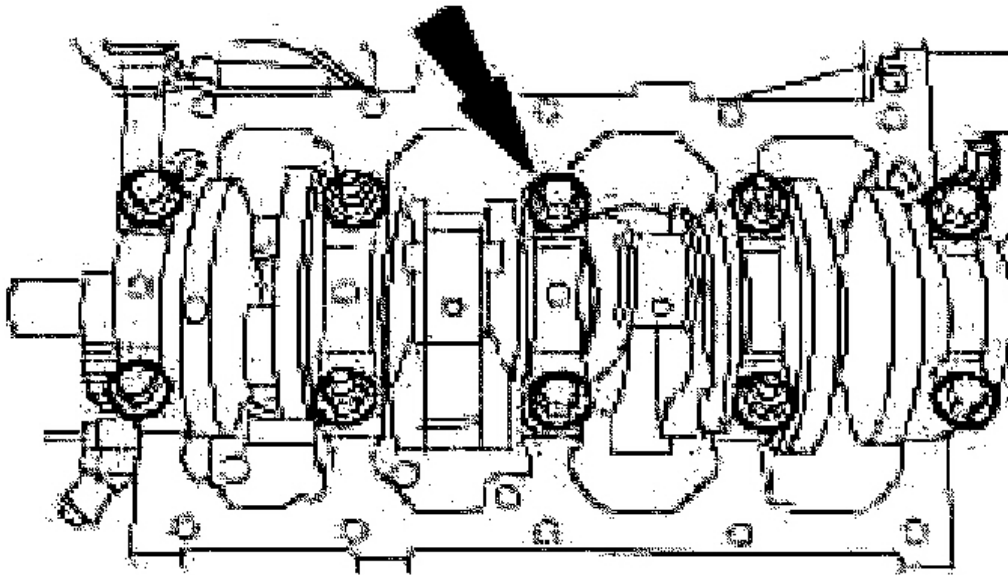
46. Inspect the top of each cylinder bore before removing the piston. If a ridge has formed at the top of the cylinder, the ridge must be removed before the pistons can be removed. Remove the ridge as follows:
 - Turn the crankshaft clockwise until the piston is at the bottom of its cylinder bore.
 - Place a clean shop cloth over the piston head to collect cuttings.
 - Using the special tool 303-016 (T64L-6011-EA), remove the ridge. Never cut into the ring travel area more than 0.8 mm (1/32 in) when removing the ridge.
47. Remove the pistons and the connection rod assemblies.



G03432387

Fig. 339: Removing Pistons And Connecting Rod Assemblies
Courtesy of FORD MOTOR CO.

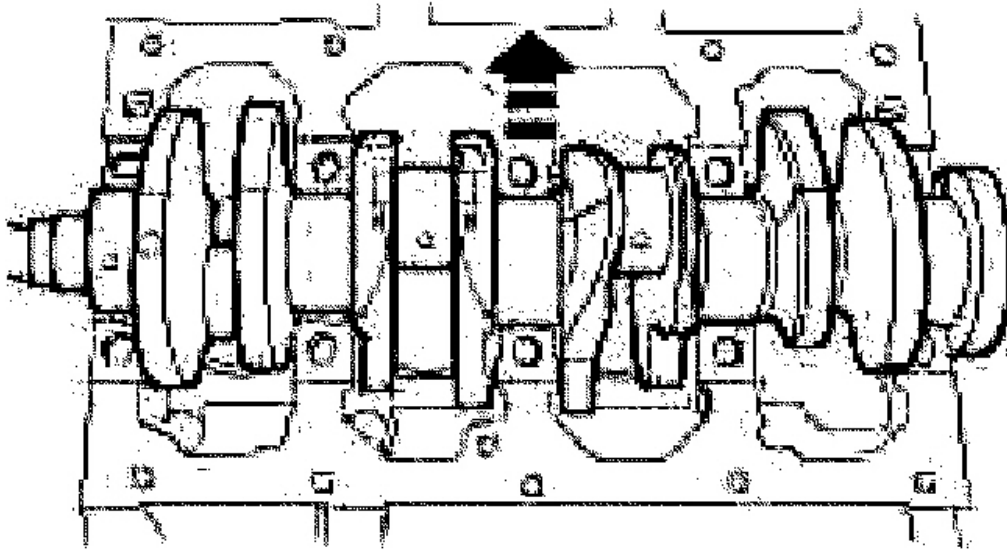
NOTE: The crankshaft main bearings are precision selective fit. Check bearing clearances or select fit a new crankshaft main bearing. For additional information, refer to **ENGINE SYSTEM-GENERAL INFORMATION** article .



G03432388

Fig. 340: Removing Main Bearing Caps And Lower Crankshaft Main Bearings
Courtesy of FORD MOTOR CO.

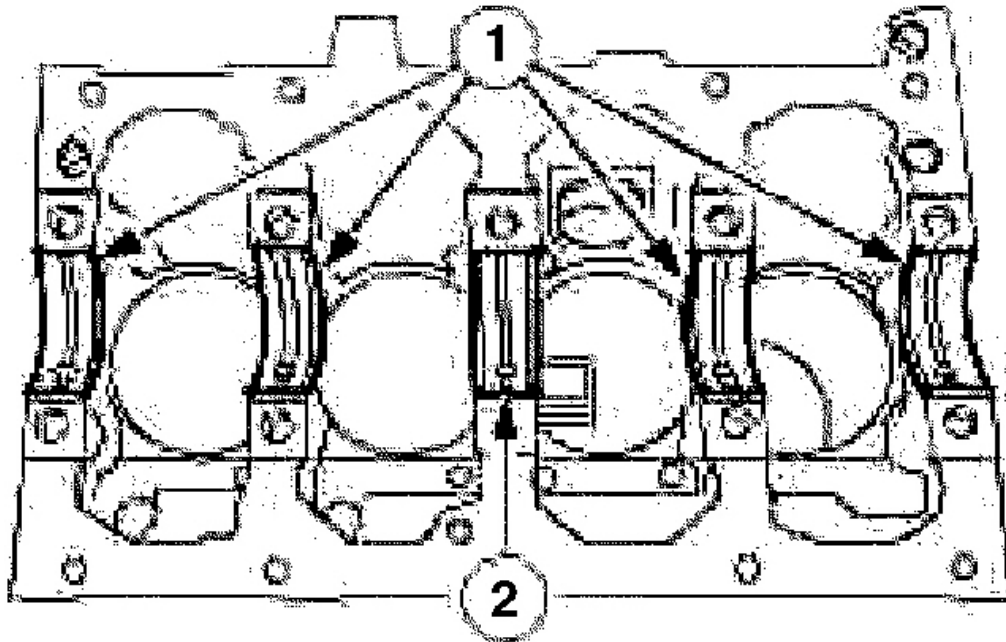
48. Remove the five main bearing caps and the lower crankshaft main bearings.
49. Remove the crankshaft.



G03432389

Fig. 341: Removing Crankshaft
Courtesy of FORD MOTOR CO.

50. Remove the bearings.
 1. Upper crankshaft main bearings.
 2. Crankshaft thrust main bearing.



G03432390

Fig. 342: Removing Upper Crankshaft Main Bearings And Crankshaft Thrust Main Bearing

Courtesy of FORD MOTOR CO.

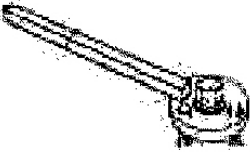

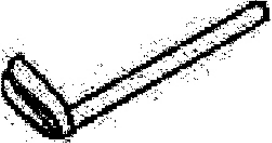

DISASSEMBLY AND ASSEMBLY OF SUBASSEMBLIES

CYLINDER HEAD

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine, 2.0L SPI - Focus

	Remover Camshaft Pulley 303-098 (T74P-6256-B)
	Camshaft Seal Replacer 303-160 (T81P-6292-A)
	Valve Spring Compressor 303-163 (T81P-6513-A)
	Seal Remover 303-409 (T92C-6700-CH)

G03432391

Fig. 343: Identifying Special Tools
Courtesy of FORD MOTOR CO.

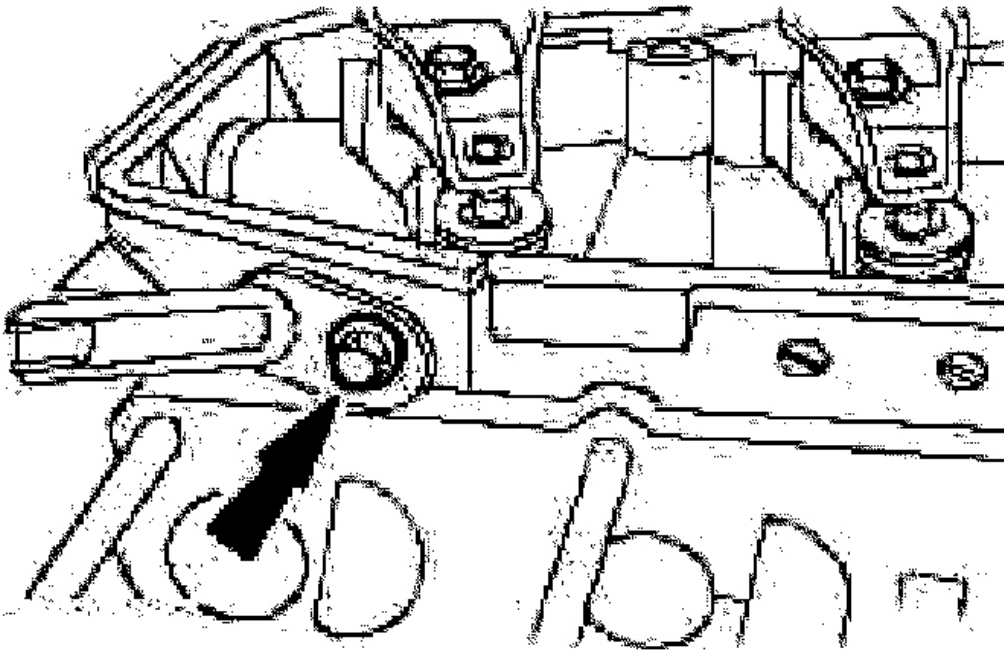
Material

MATERIAL SPECIFICATION

Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (in Canada Motorcraft SAE 5W-20 Super Premium Motor Oil CX0-5W20-LSP12) or equivalent	WSSM2C930-A
Silicone Brake Caliper Grease and Dielectric Compound XG-3-A	ESEM1C171-A

Disassembly

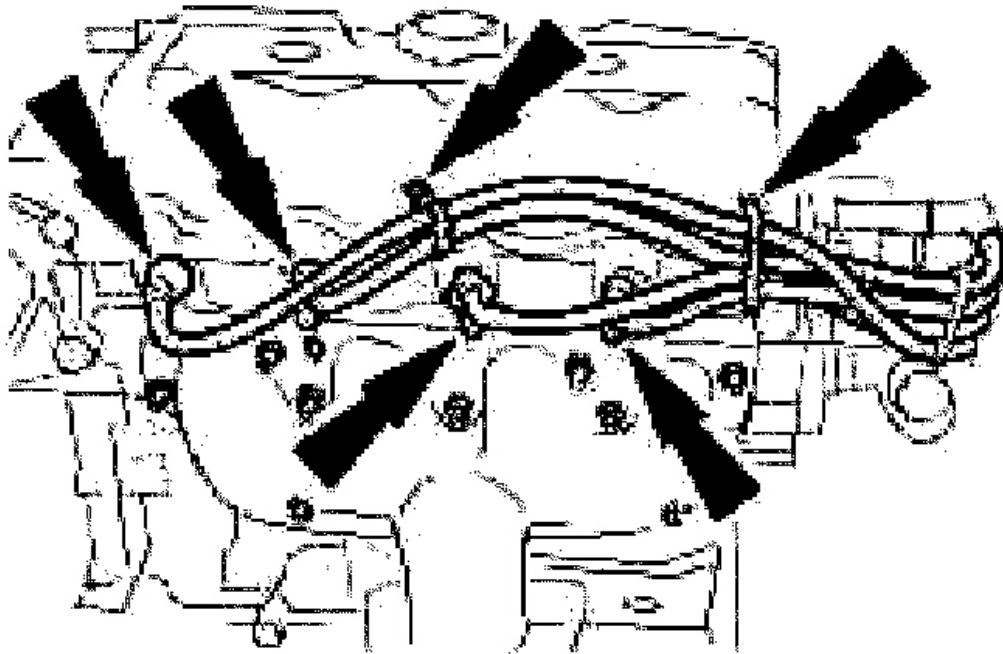
1. Remove the bolt and the camshaft position (CMP) sensor.



G03432392

Fig. 344: Removing Camshaft Position (CMP) Sensor
Courtesy of FORD MOTOR CO.

CAUTION: Do not pull on the ignition wires directly, as wires may separate from the connector inside the boot.

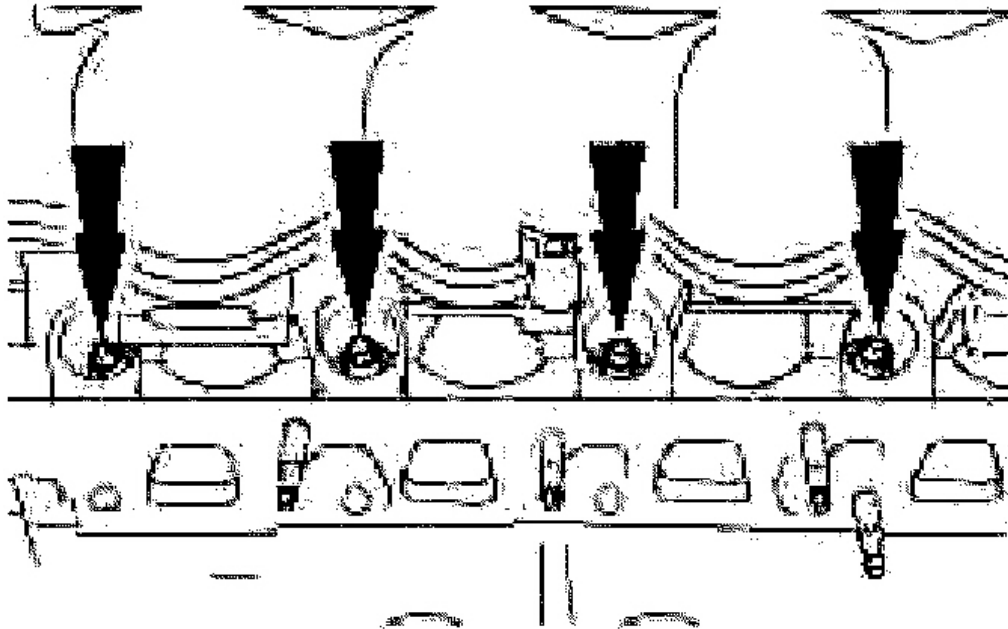


G03432393

Fig. 345: Disconnecting Spark Plug Wires
Courtesy of FORD MOTOR CO.

2. Disconnect the spark plug wires.

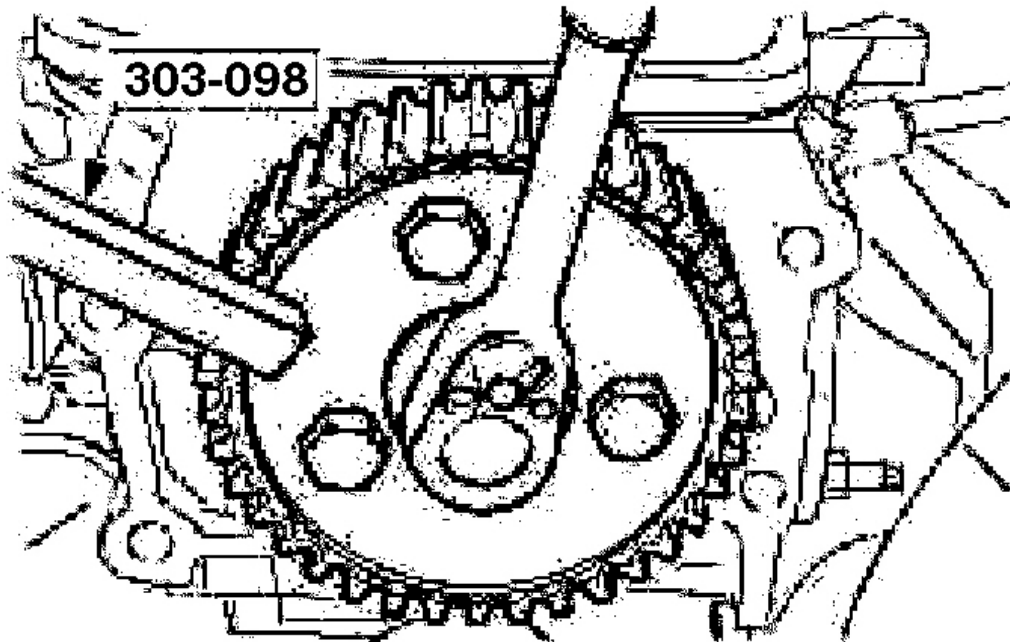
NOTE: If an original spark plug is reused, install it in the same cylinder from which it was removed. New spark plugs may be installed in any cylinder.



G03432394

Fig. 346: Removing Spark Plugs
Courtesy of FORD MOTOR CO.

3. Remove the spark plugs.
4. Using the special tool, remove the camshaft timing belt pulley.

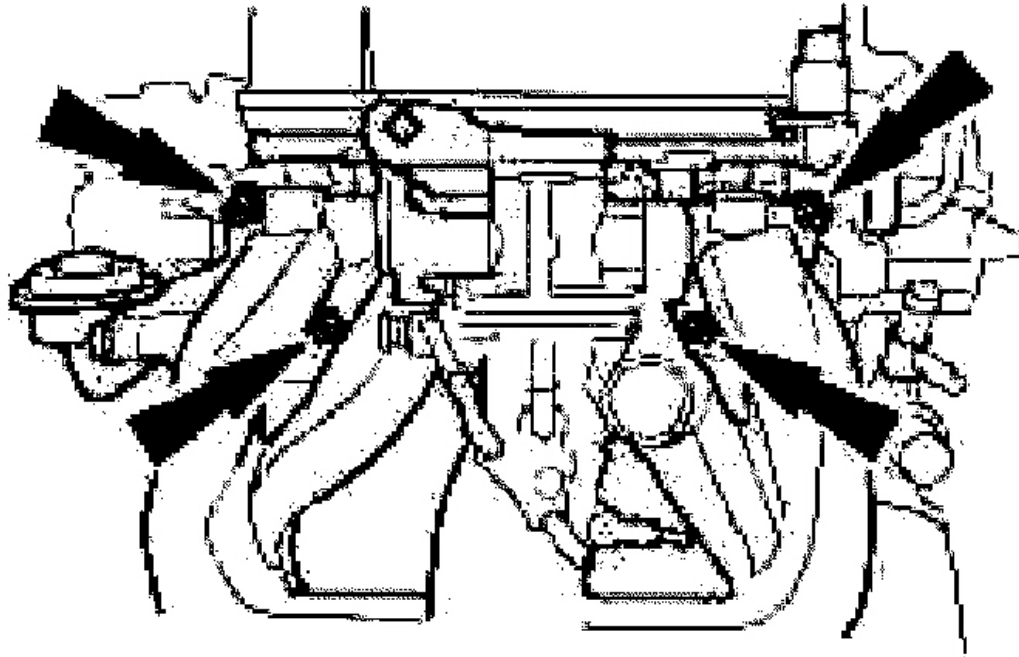


G03432395

Fig. 347: Removing Camshaft Timing Belt Pulley
Courtesy of FORD MOTOR CO.

CAUTION: Use care not to drop any components.

5. Remove the intake manifold.
 - Discard the gaskets.

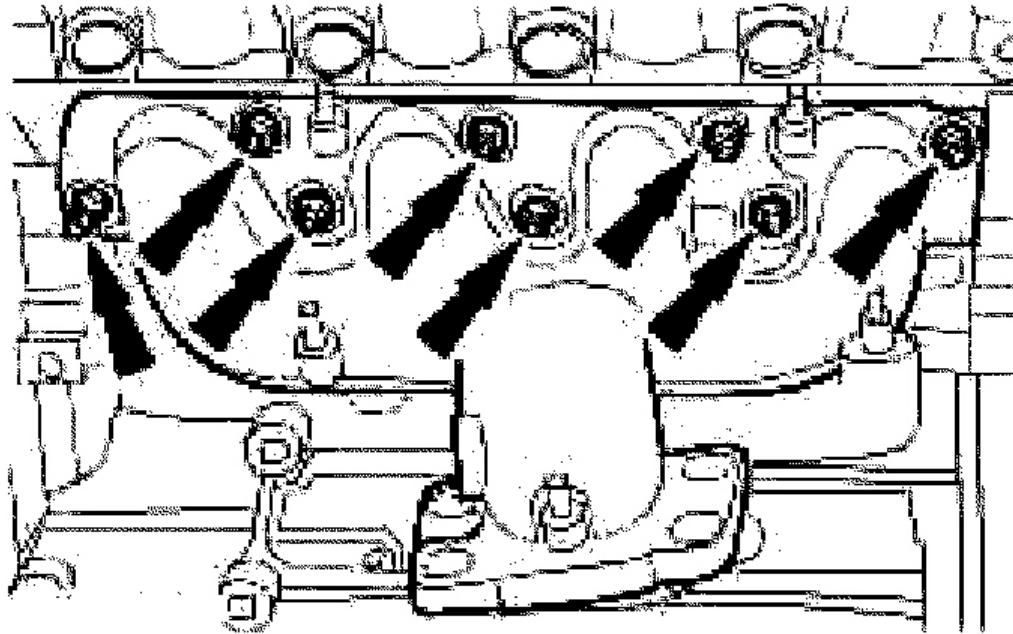


G03432396

Fig. 348: Removing Intake Manifold
Courtesy of FORD MOTOR CO.

NOTE: Remove the nuts evenly.

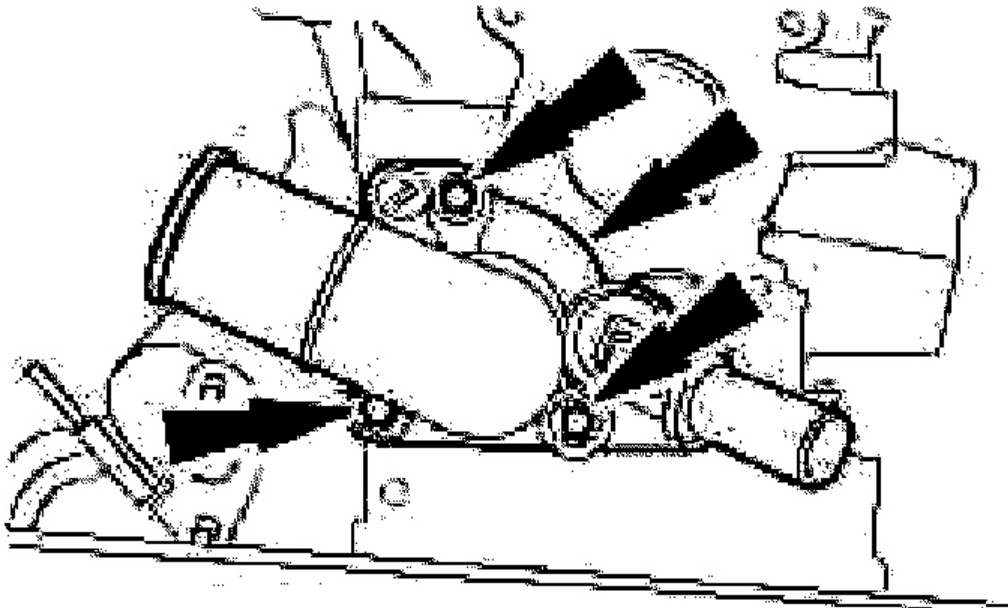
6. Remove the exhaust manifold.
 - Discard the gasket.



G03432397

Fig. 349: Removing Exhaust Manifold
Courtesy of FORD MOTOR CO.

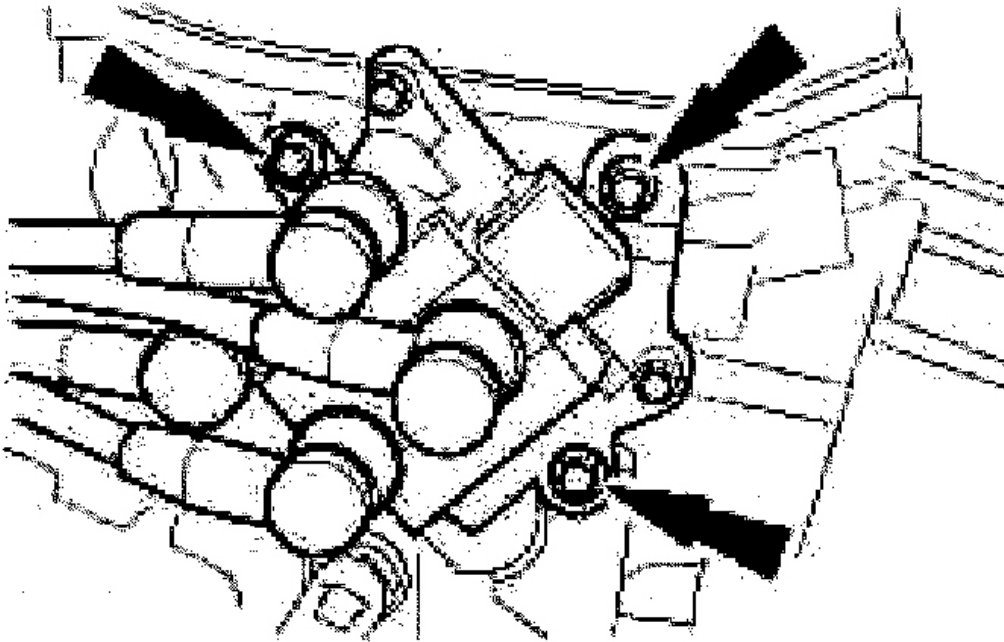
7. Remove the coolant outlet connection, thermostat and gasket.



G03432398

Fig. 350: Removing Thermostat And Gasket
Courtesy of FORD MOTOR CO.

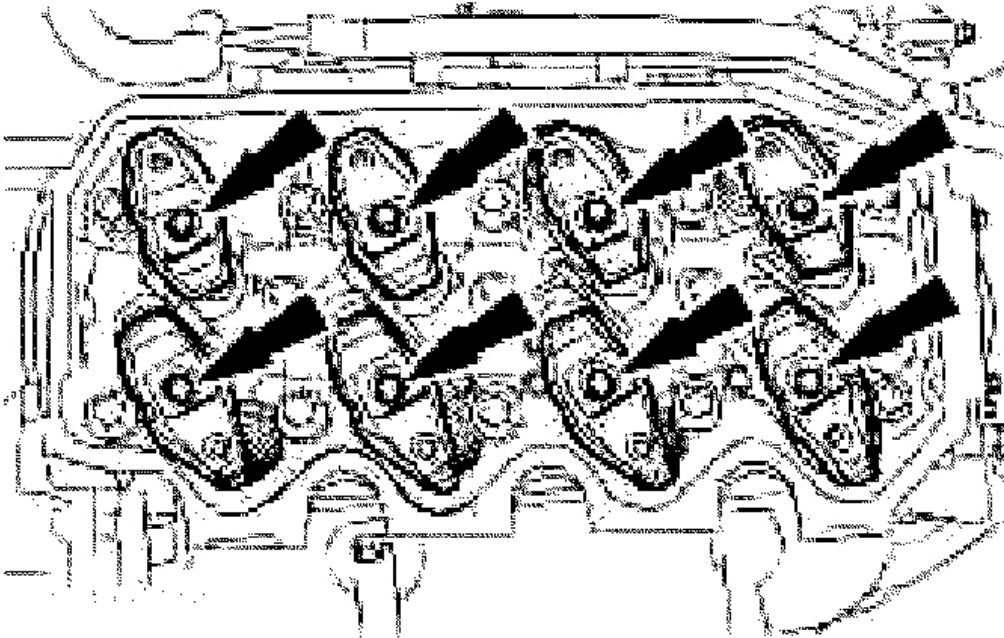
8. Remove the ignition coil, ignition coil bracket and wires as one assembly.



G03432399

Fig. 351: Removing Ignition Coil, Ignition Coil Bracket And Wires
Courtesy of FORD MOTOR CO.

9. Remove the rocker arms.

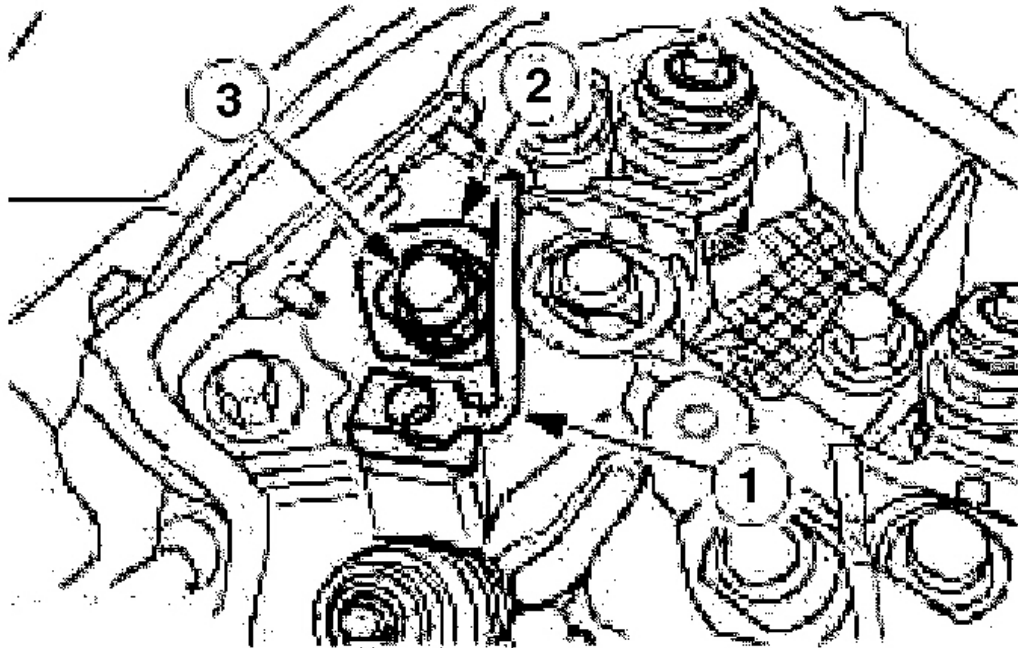


G03432400

Fig. 352: Removing Rocker Arms
Courtesy of FORD MOTOR CO.

NOTE: Always return the valve tappets to their original tappet bores unless new tappets are being installed.

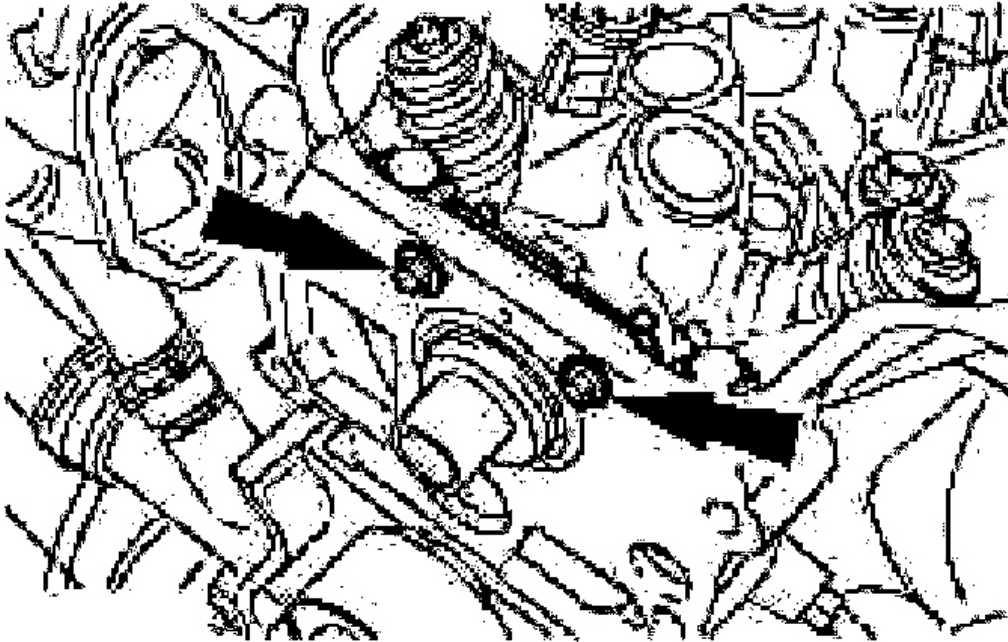
10. Remove the valve tappet(s).
 1. Remove the valve tappet guide plate retainers.
 2. Remove the valve tappet guide plates.
 3. Remove the valve tappets.



G03432401

Fig. 353: Removing Valve Tappet
Courtesy of FORD MOTOR CO.

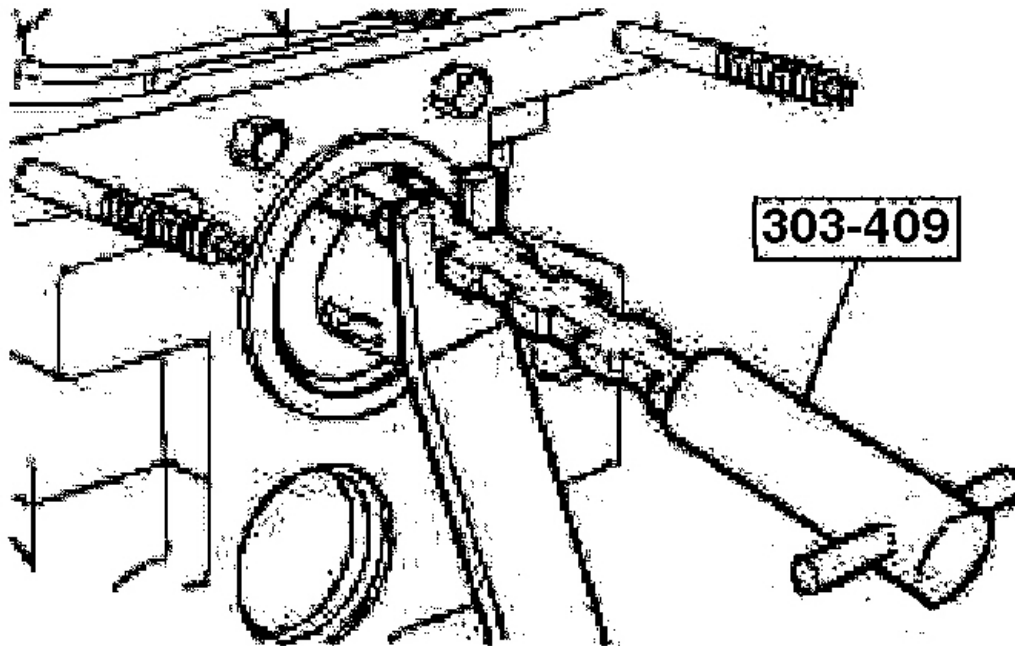
11. Remove the camshaft thrust plate.



G03432402

Fig. 354: Removing Camshaft Thrust Plate
Courtesy of FORD MOTOR CO.

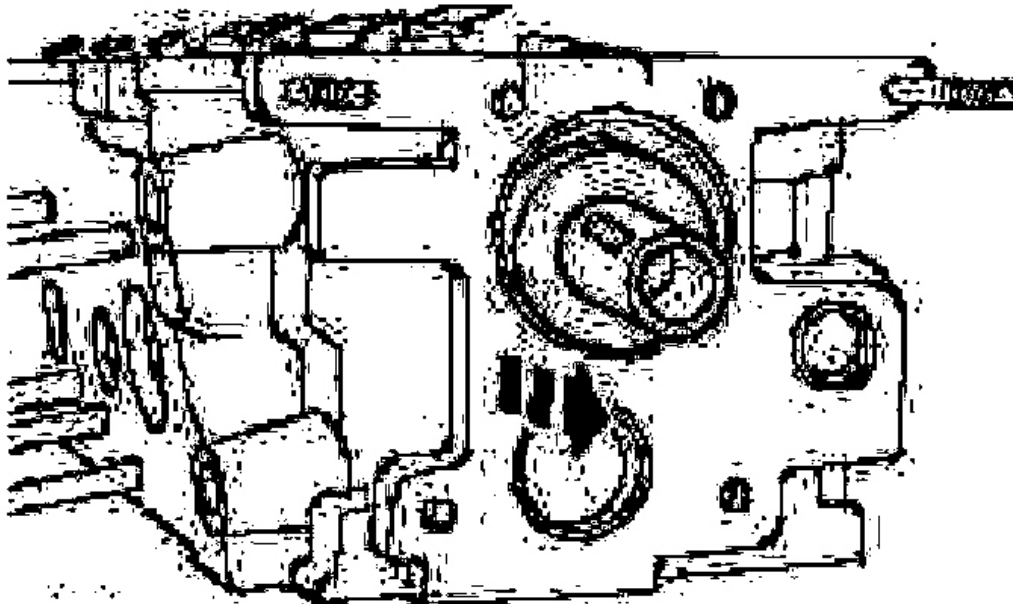
12. Using the special tool, remove the camshaft front oil seal.



G03432403

Fig. 355: Removing Camshaft Front Oil Seal
Courtesy of FORD MOTOR CO.

NOTE: The camshaft can be removed in either direction.

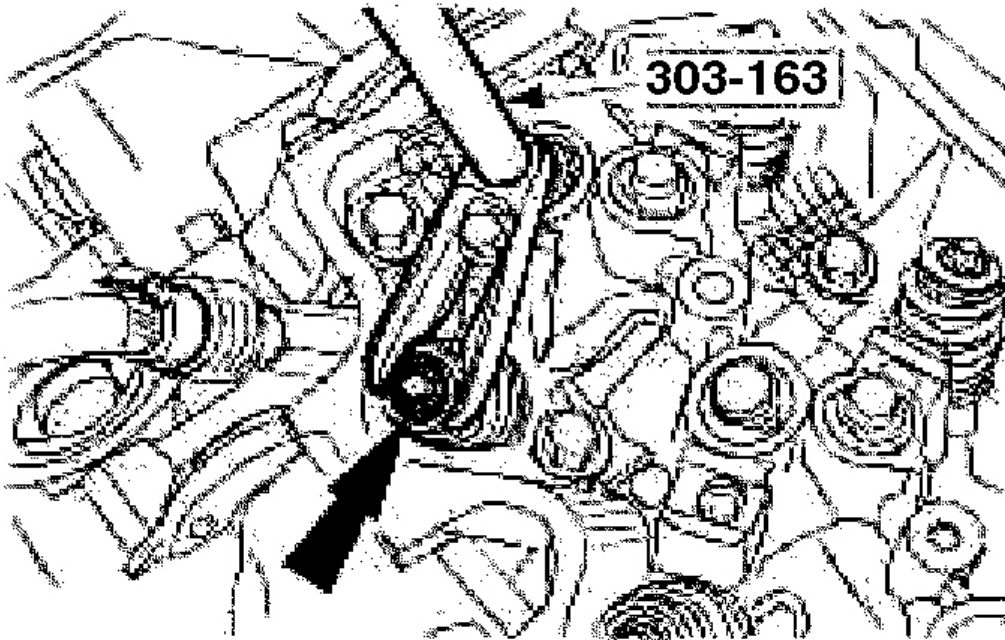


G03432404

Fig. 356: Removing Camshaft
Courtesy of FORD MOTOR CO.

13. Remove the camshaft.

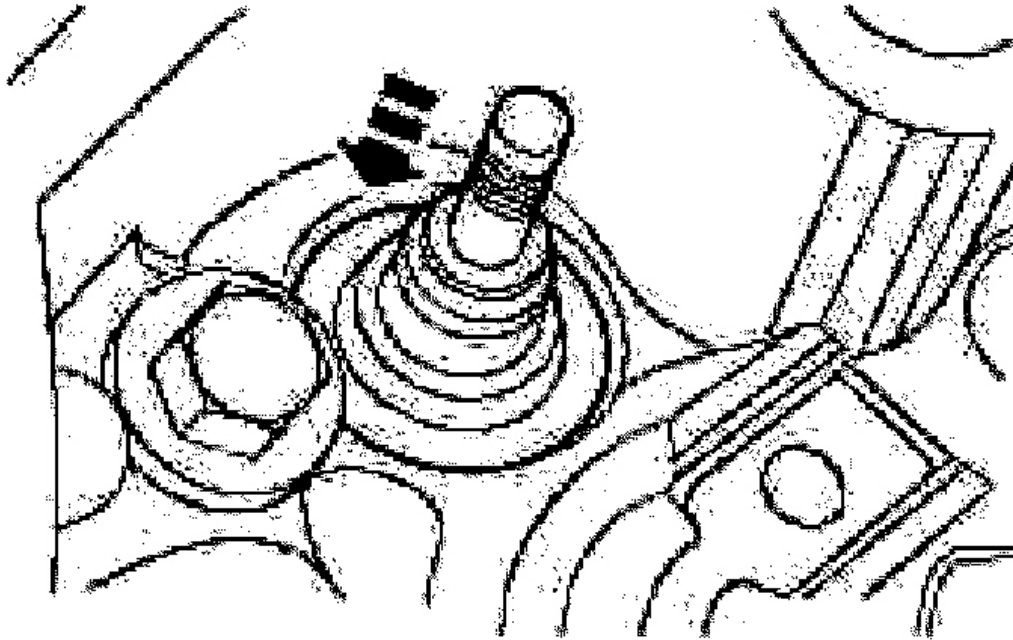
NOTE: **Keep the components in order for reassembly.**



G03432405

Fig. 357: Removing Valve Spring Retainer Key And Valve Spring
Courtesy of FORD MOTOR CO.

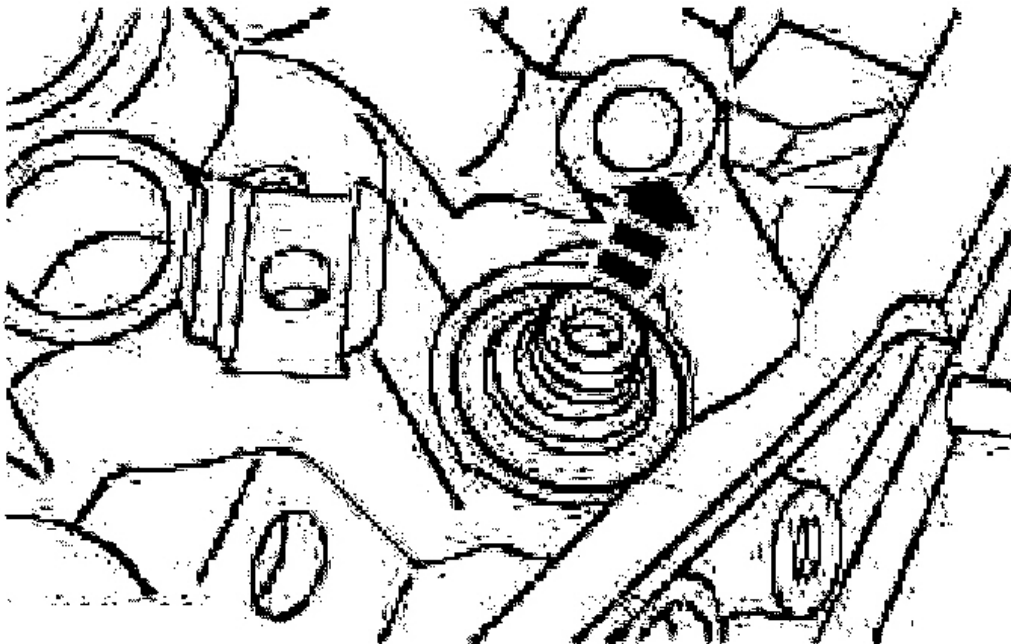
14. Using the special tool, compress the valve spring and remove the valve spring retainer key and the valve spring.
15. Slowly remove the special tool.
16. Remove the valves.



G03432406

Fig. 358: Removing Valves
Courtesy of FORD MOTOR CO.

17. Remove and discard the valve stem seals.

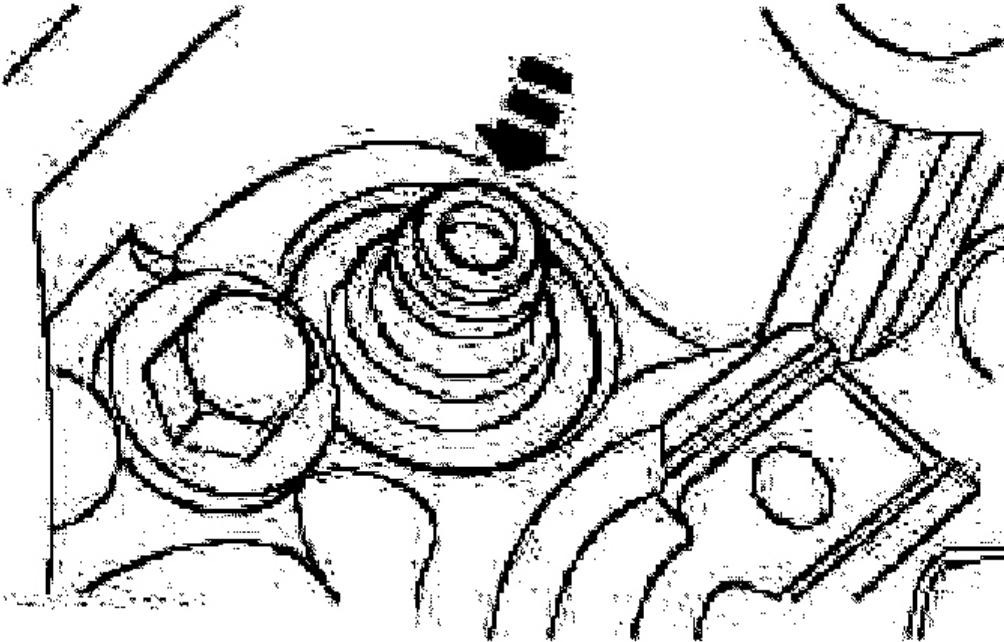


G03432407

Fig. 359: Removing Valve Stem Seals
Courtesy of FORD MOTOR CO.

Assembly

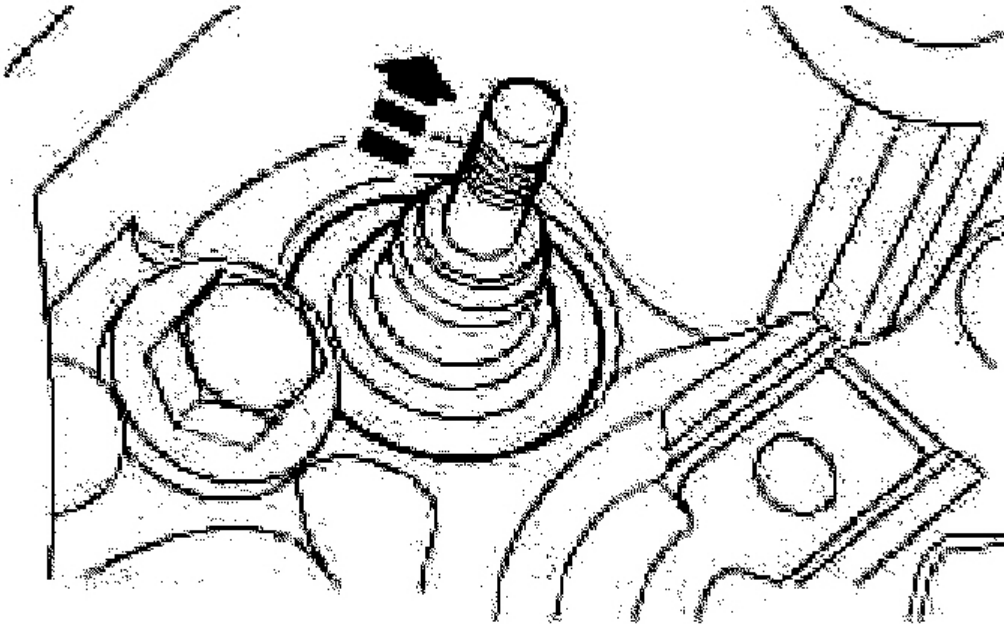
1. Install the valve seals.



G03432408

Fig. 360: Installing Valve Stem Seals
Courtesy of FORD MOTOR CO.

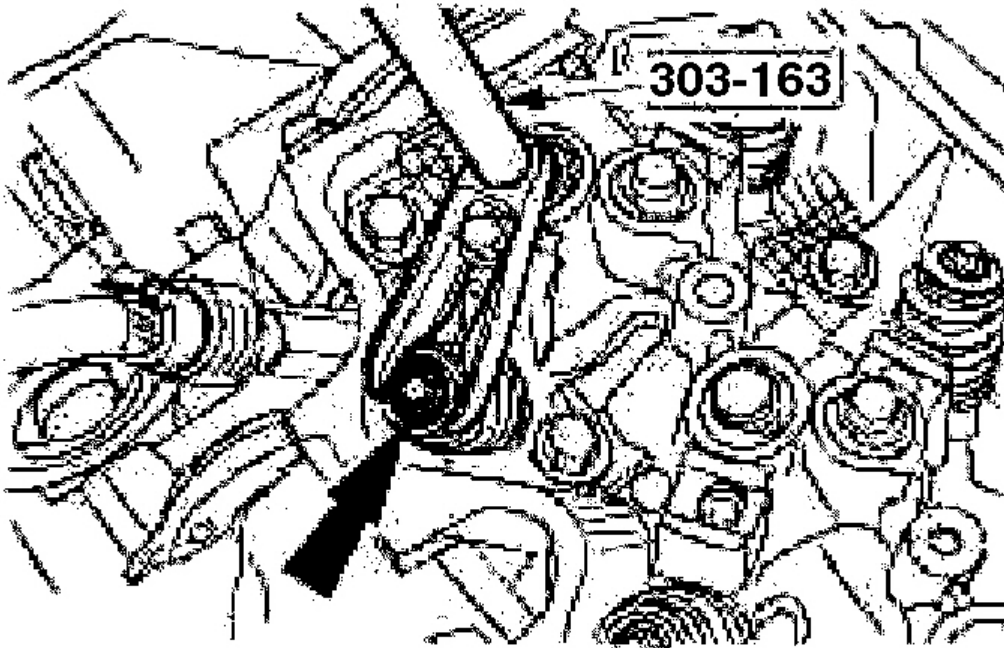
NOTE: If installing the original valves, make sure that the valves are installed in the position from which they were removed. Coat the valve stems with clean engine oil before installation.



G03432409

Fig. 361: Installing Exhaust And Intake Valves
Courtesy of FORD MOTOR CO.

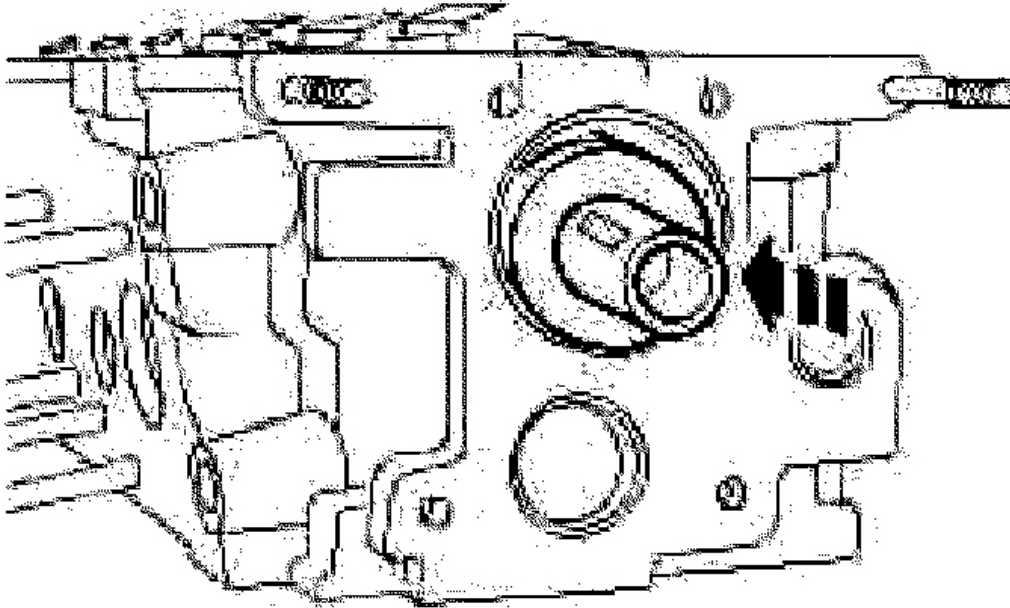
2. Install the exhaust and intake valves.
3. Using special tool, compress the valve spring and install the valve spring retainer.



G03432410

Fig. 362: Installing Valve Spring Retainer
Courtesy of FORD MOTOR CO.

- NOTE:** Lubricate the camshaft lobes and bearing surfaces with a suitable engine assembly lubricant.
- NOTE:** Inspect for the presence of a clogged oil gallery. Verify that the camshaft contains the camshaft oil flow control rod and the rear end has a cup plug installed prior to the installation of the camshaft.

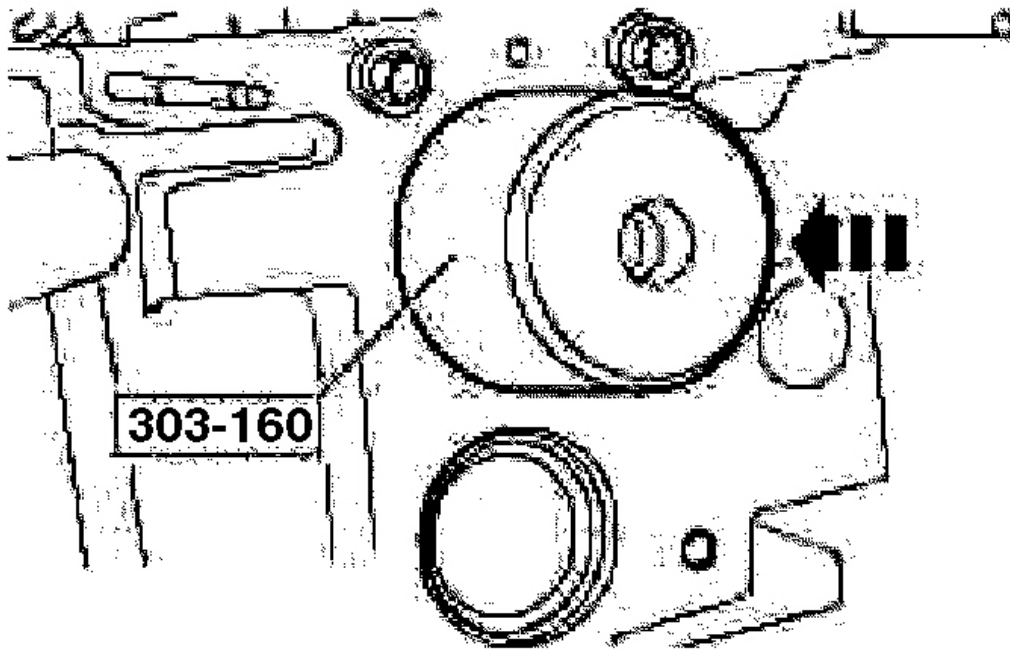


G03432411

Fig. 363: Installing Camshaft
Courtesy of FORD MOTOR CO.

4. Install the camshaft.
5. Apply a thin film of clean engine oil to the lip of the camshaft front seal.

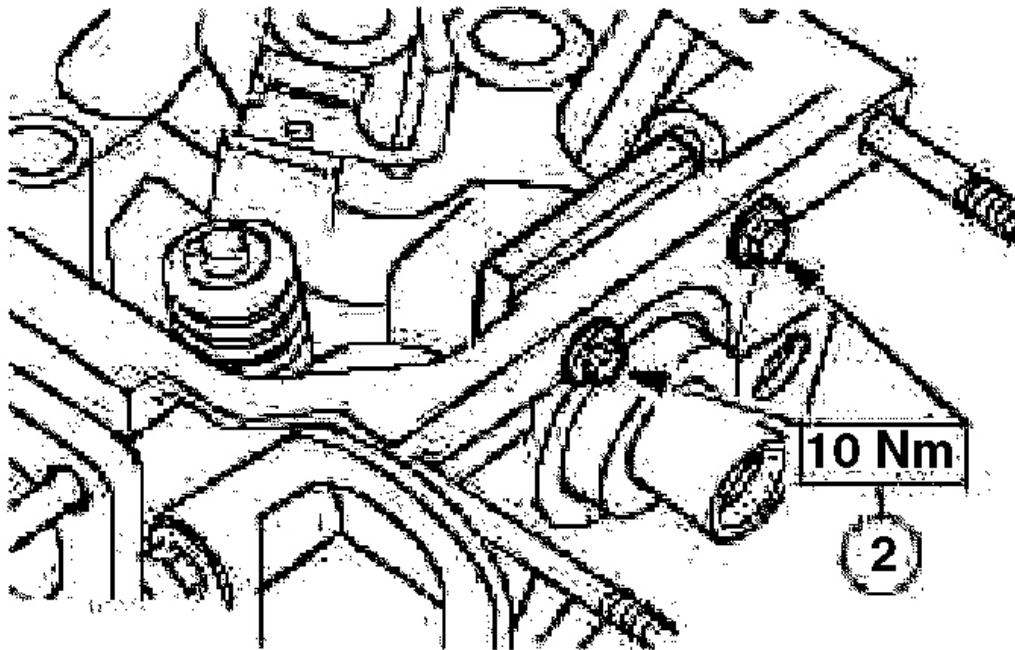
NOTE: The seal depth should be 0.05-0.0 mm below flush with the cylinder head front face.



G03432412

Fig. 364: Installing Camshaft Front Seal
Courtesy of FORD MOTOR CO.

6. Using the special tool, install the camshaft front seal.
7. Install the camshaft thrust plate.



G03432413

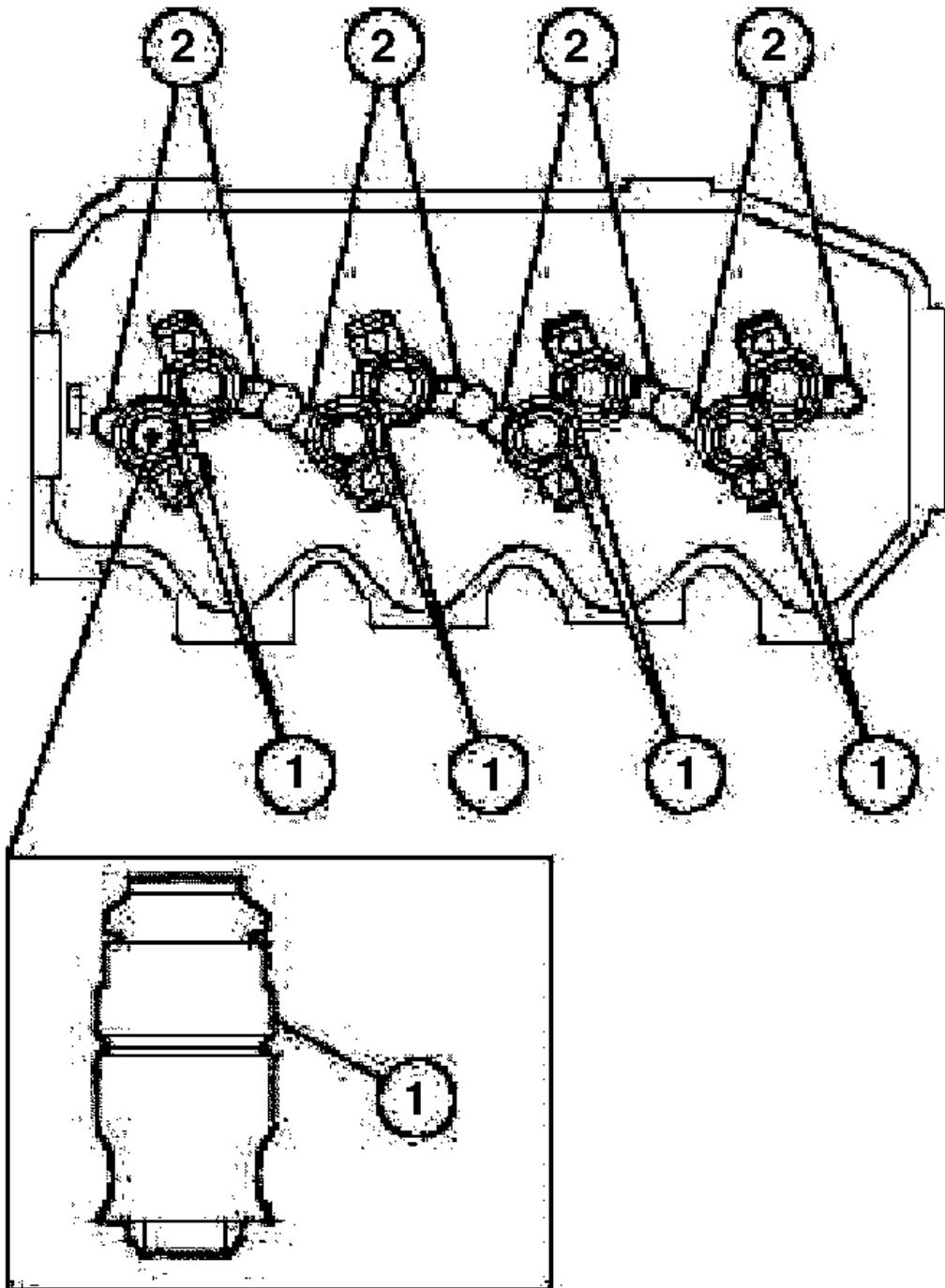
Fig. 365: Installing Camshaft Thrust Plate
Courtesy of FORD MOTOR CO.

CAUTION: The oil feed hole in the valve tappet must face away from the oil feed hole in the cylinder head bore.

NOTE: Coat the valve tappets and cylinder head bores with a suitable engine assembly lubricant.

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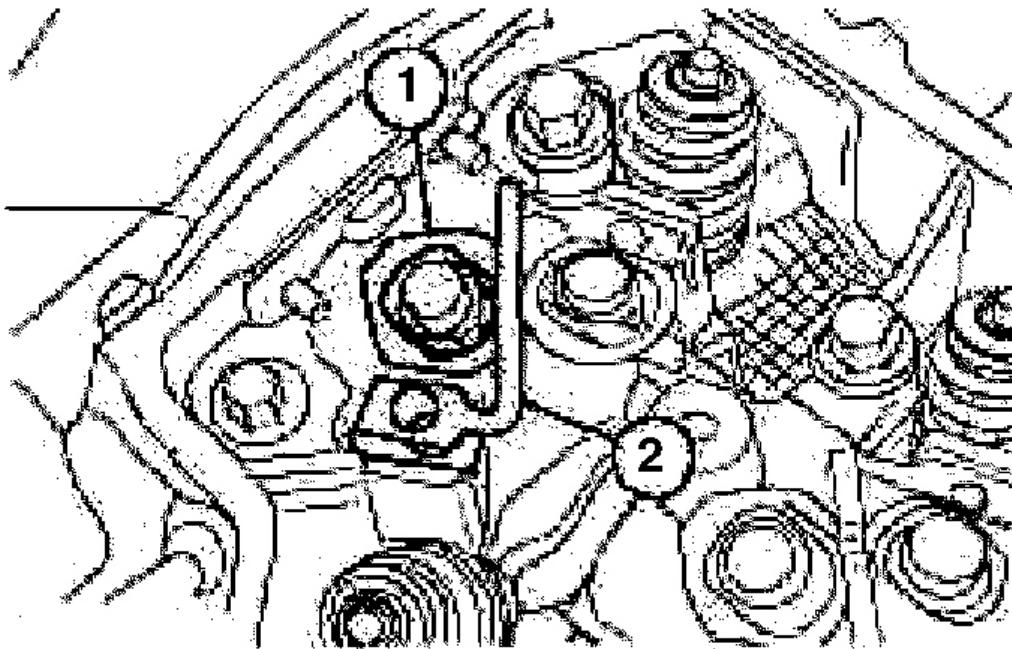
2002 ENGINE Engine, 2.0L SPI - Focus



G03432414

Fig. 366: Installing Valve Tappets Into Cylinder Head Bores
Courtesy of FORD MOTOR CO.

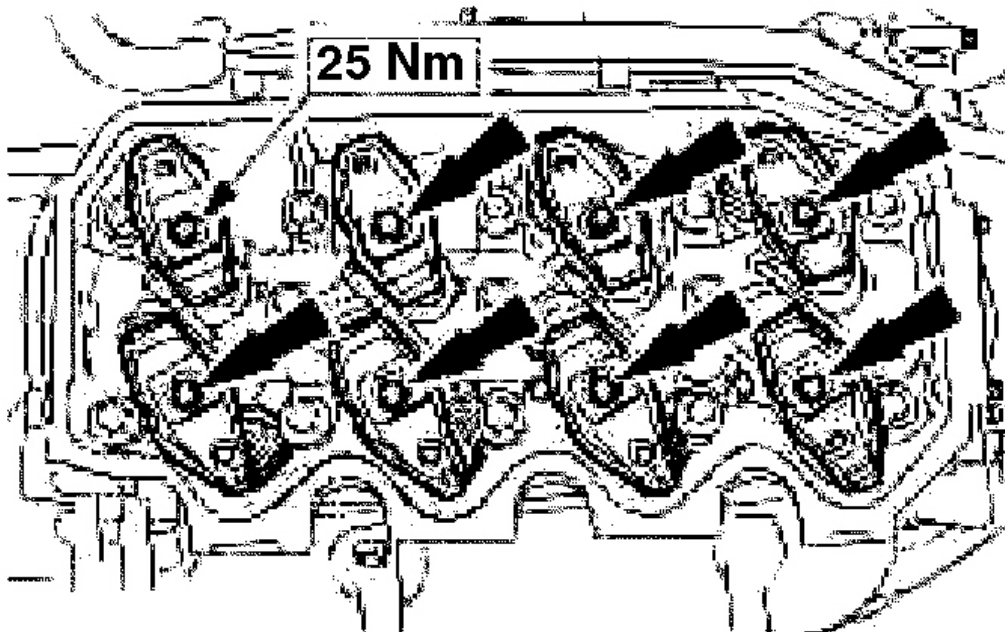
8. Install the valve tappets into the cylinder head bores with the feed holes (1) in the valve tappets facing away from the oil feed holes (2) in the cylinder head bores.
9. Install the valve tappet guide plates (1) and valve tappet guide retainers (2).



G03432415

Fig. 367: Installing Valve Tappet Guide Plates And Valve Tappet Guide Retainers
Courtesy of FORD MOTOR CO.

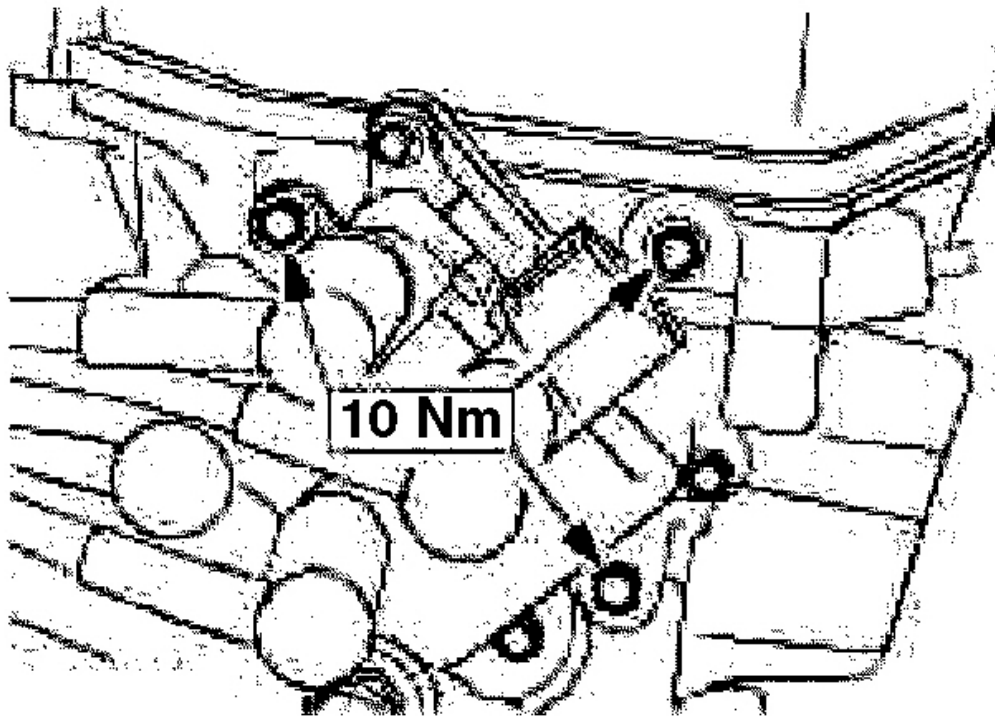
10. Install the rocker arms.



G03432416

Fig. 368: Installing Rocker Arms
Courtesy of FORD MOTOR CO.

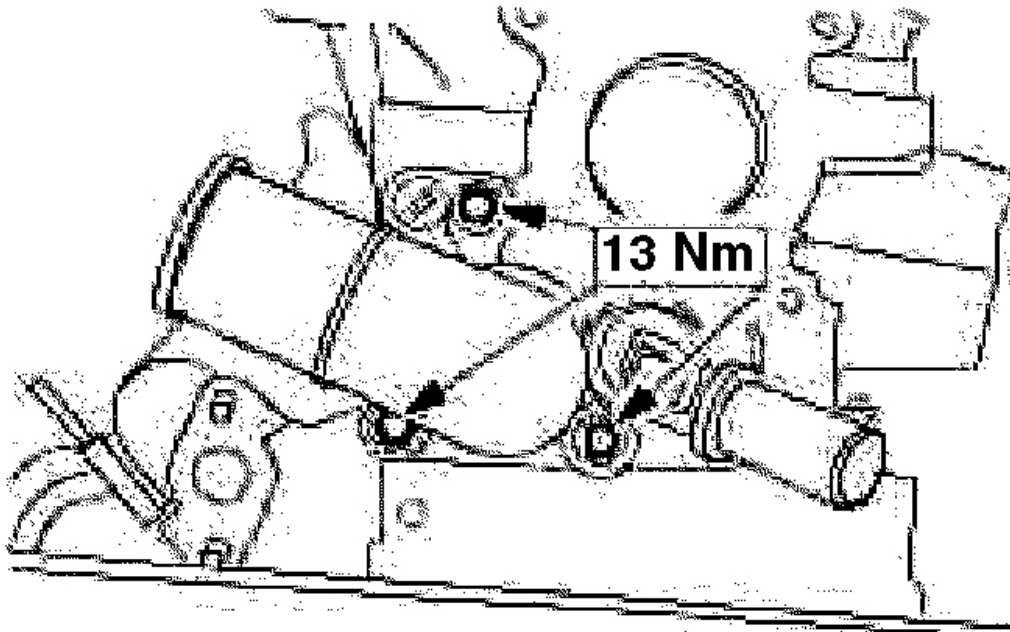
11. Install the coil bracket, coil and spark plug wires.



G03432417

Fig. 369: Installing Coil Bracket, Coil And Spark Plug Wires
Courtesy of FORD MOTOR CO.

NOTE: Inspect the coolant outlet connection gasket. Install a new gasket if it is cracked, torn or damaged.



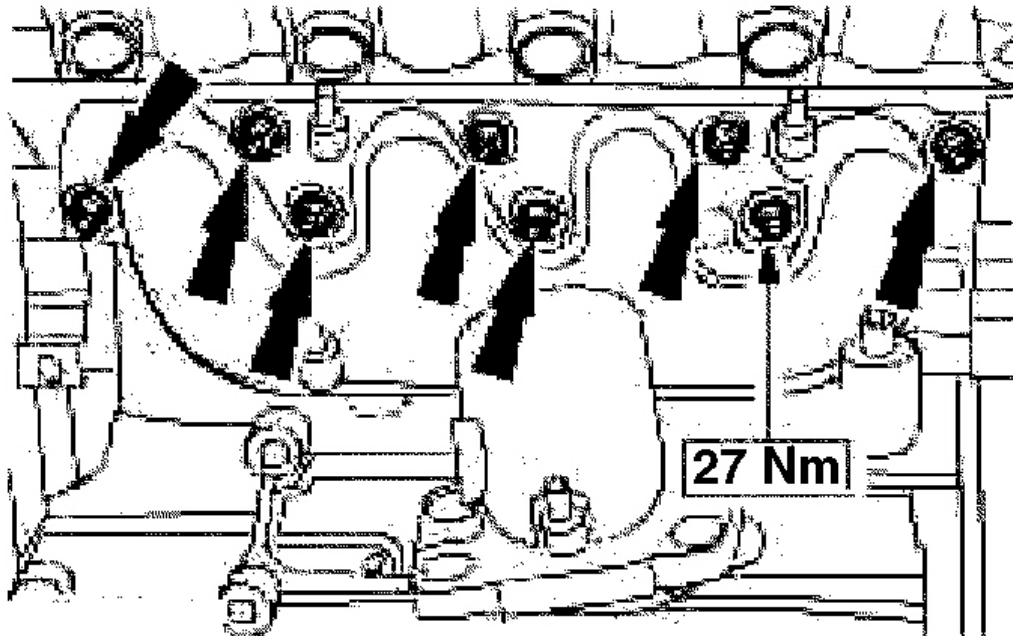
G03432418

Fig. 370: Installing Coolant Outlet Connection
Courtesy of FORD MOTOR CO.

12. Install the coolant outlet connection.

NOTE: **Tighten the bolts evenly.**

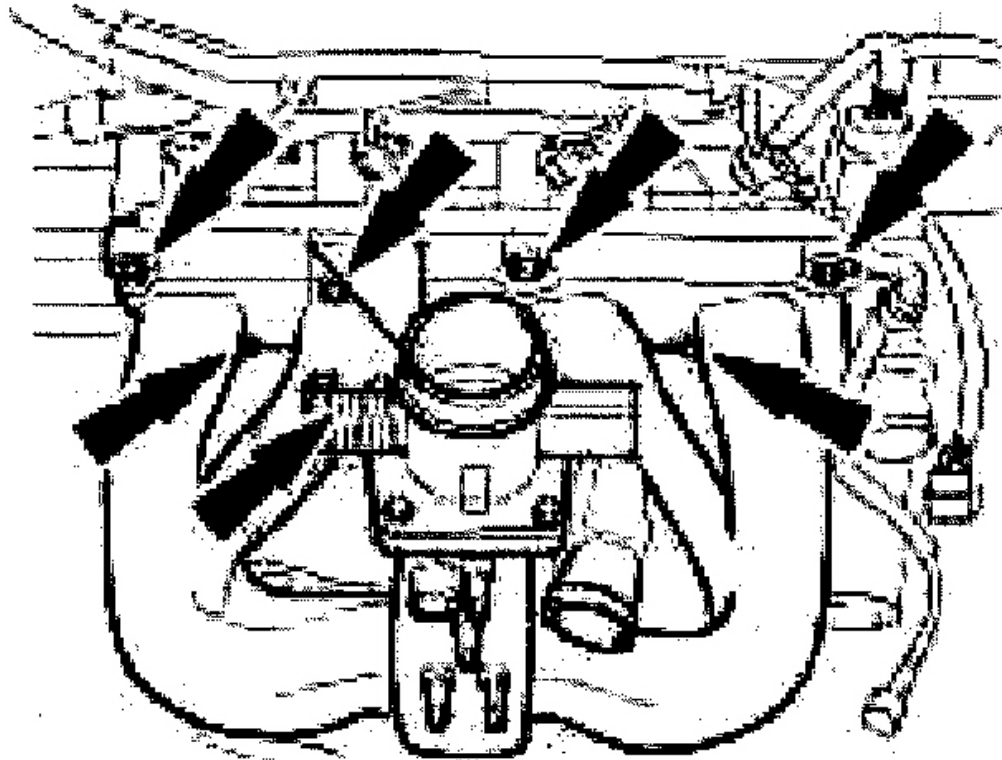
13. Install the exhaust manifold.
 - Use a new gasket.



G03432419

Fig. 371: Installing Exhaust Manifold
Courtesy of FORD MOTOR CO.

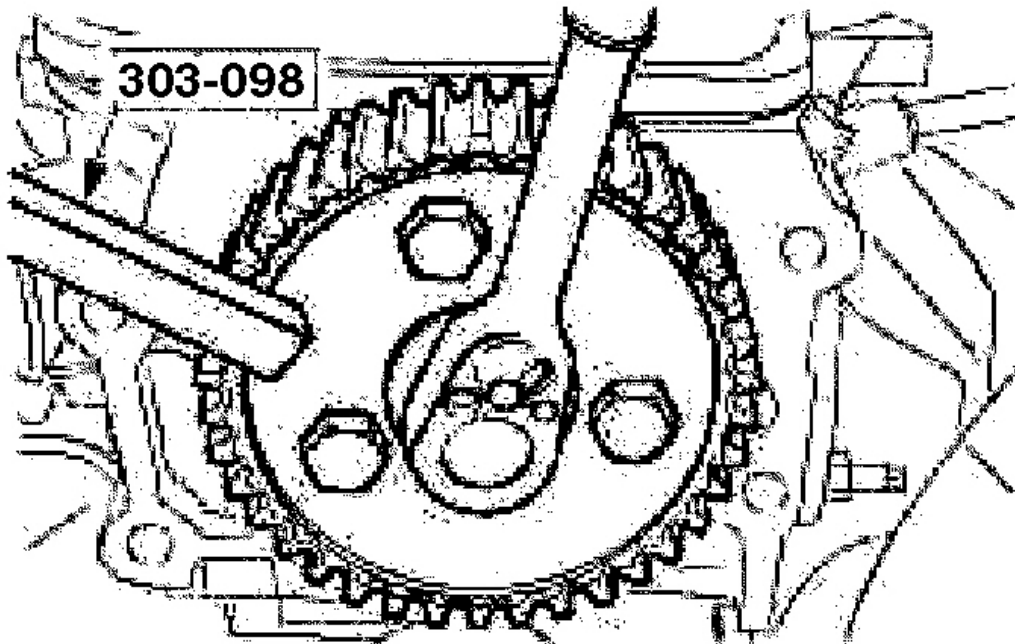
14. Install a new gasket and the intake manifold.
 - Tighten the nuts and bolts to 10 N.m and 90 degrees.



G03432420

Fig. 372: Installing New Gasket And Intake Manifold
Courtesy of FORD MOTOR CO.

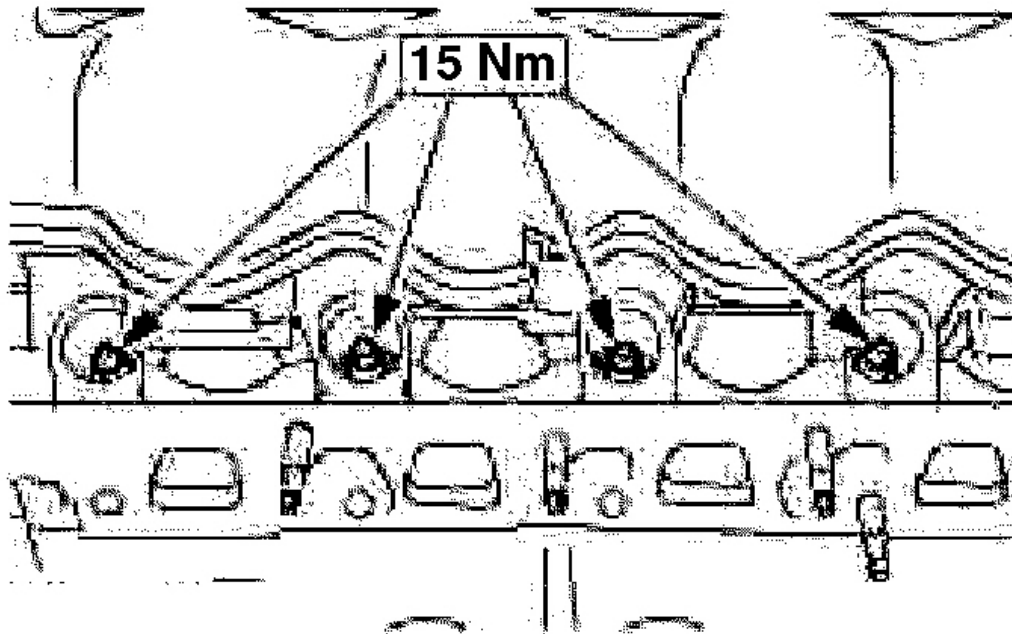
15. Using the special tool, install the camshaft timing belt pulley.



G03432421

Fig. 373: Installing Camshaft Timing Belt Pulley
Courtesy of FORD MOTOR CO.

16. Install the spark plugs (shown with engine removed).



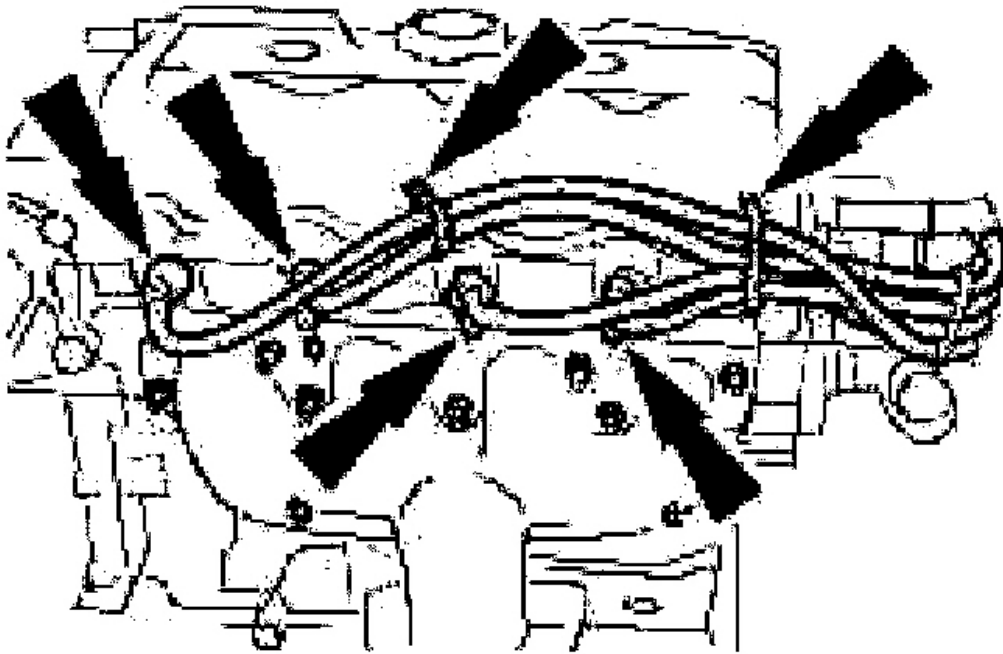
G03432422

Fig. 374: Installing Spark Plugs
Courtesy of FORD MOTOR CO.

CAUTION: Use a blunt object (for example plastic cable tie) to apply the silicone grease, to avoid damaging the spark plug connector seal.

CAUTION: Push on the spark plug connector in a straight movement.

NOTE: Coat the inside of the spark plug connector with silicone grease to a depth of 5-10 mm.



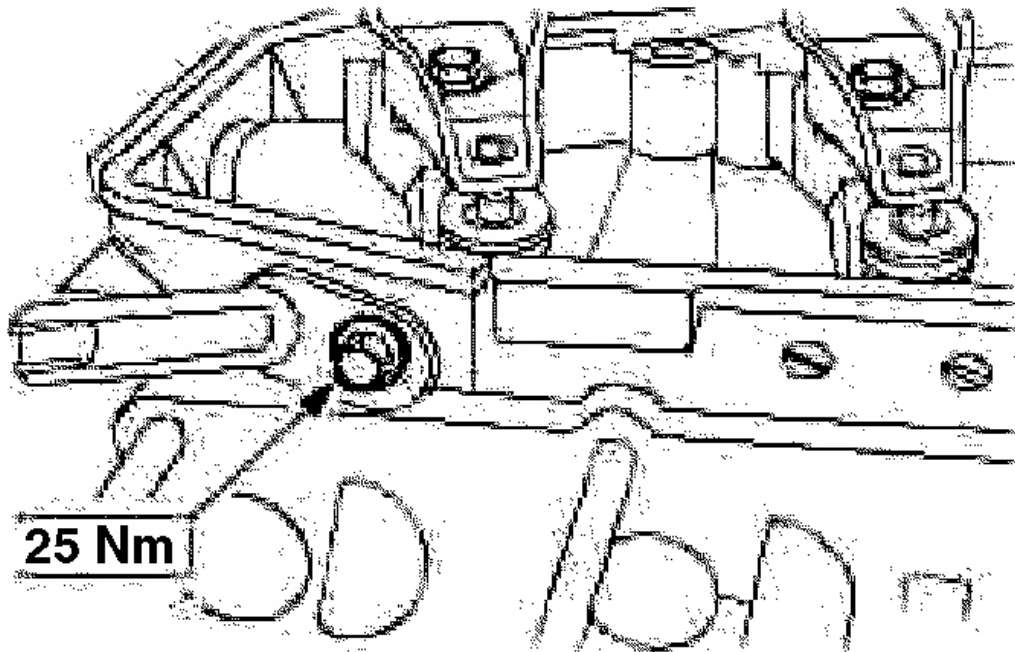
G03432423

Fig. 375: Engaging Spark Plug Connectors
Courtesy of FORD MOTOR CO.

17. Push on the spark plug connector until it engages.
18. Install the CMP sensor.

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G03432424



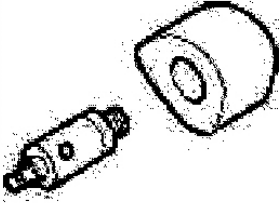
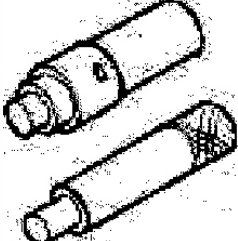
Fig. 376: Installing CMP Sensor
Courtesy of FORD MOTOR CO.

PISTON

Special Tool(s)

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	Pin Locator 303-D058 (D86P -6135-A) or equivalent
	Piston Pin Remover/Replacer 303-025 (T68P -6135-A1)
	Piston Pin Remover/Replacer 303-062 (T71P -6135-P1)
	Piston Pin Remover/Replacer 303-158 (T81P -6135-A2)

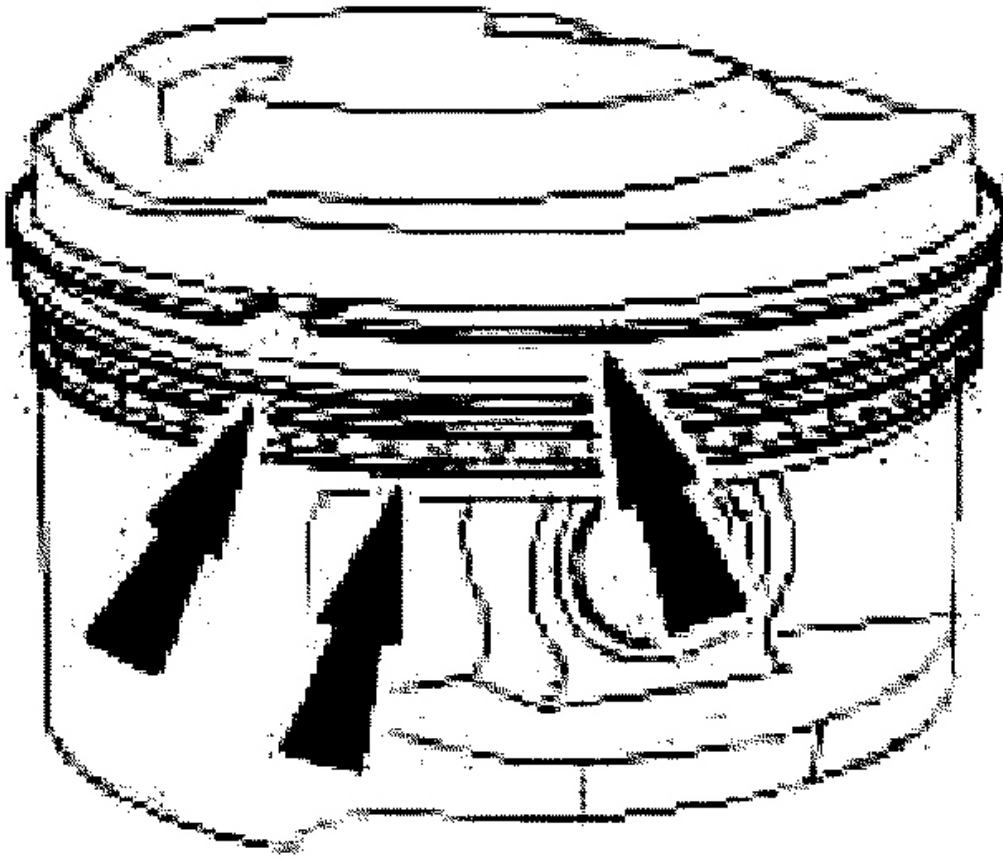
G03432425

Fig. 377: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Disassembly

NOTE: If the connecting rod bearings are to be reused, each one must be identified so that it can be installed in its original position location.

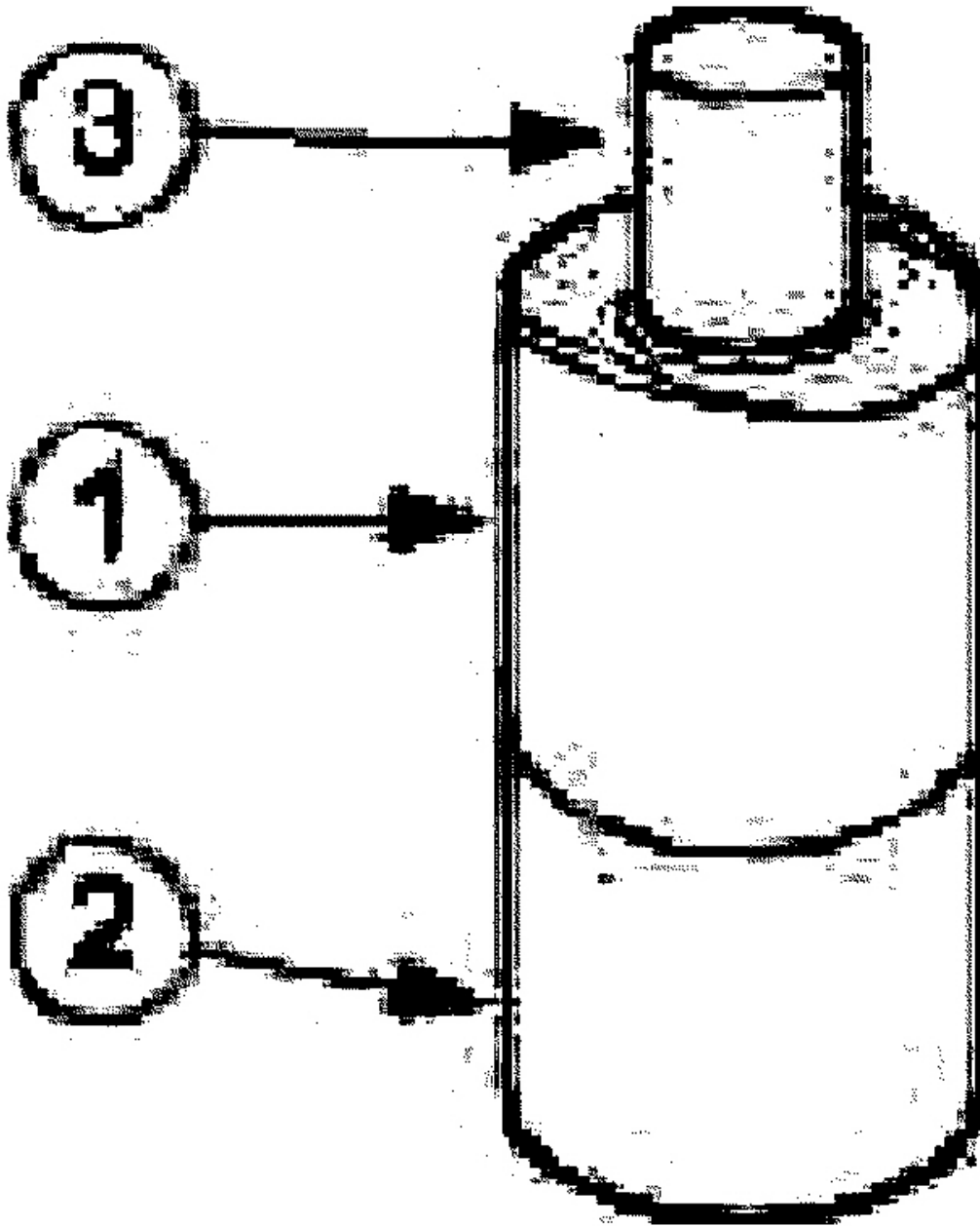
1. Remove the connecting rod bearings from the connecting rod and the rod cap.
2. Remove the piston rings using a suitable piston ring expander.



G03432426

Fig. 378: Removing Piston Rings
Courtesy of FORD MOTOR CO.

3. Mark the pistons to ensure assembly with the same connecting rod and installation in the same cylinder from which they were removed.
4. Place (1) sleeve in (2) base and position (3) pin locator into the center hole of sleeve.

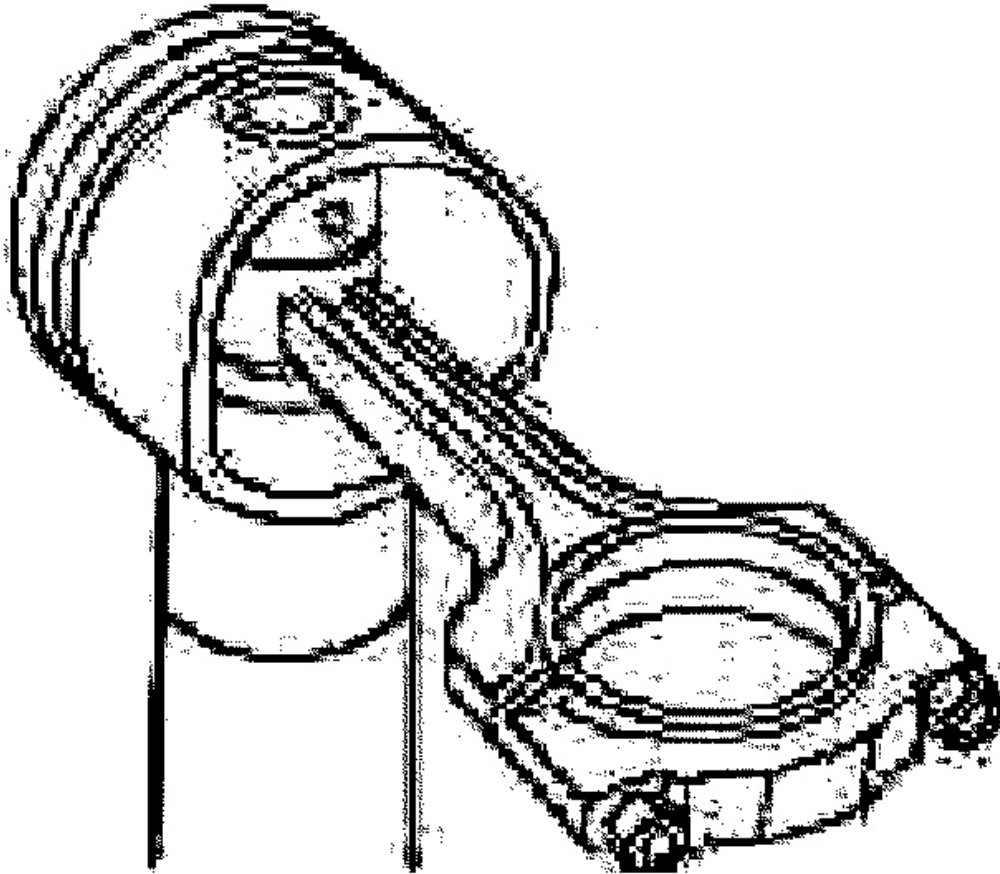


G03432427

Fig. 379: Placing Sleeve In Base And Positioning Pin Locator Into Center Hole Of Sleeve

Courtesy of FORD MOTOR CO.

5. Position the piston pin over the pin locator.



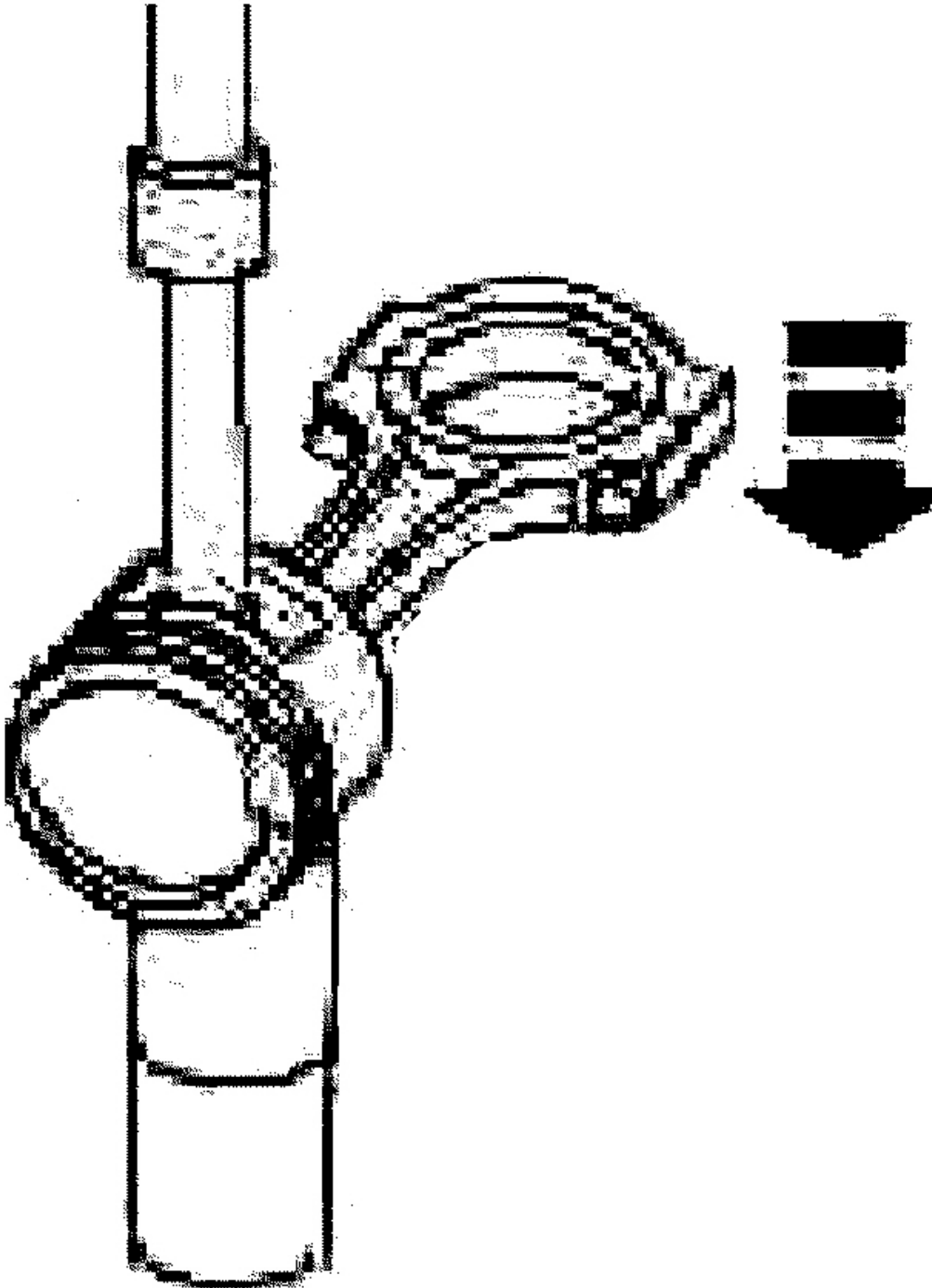
G03432428

Fig. 380: Positioning Piston Pin Over Pin Locator
Courtesy of FORD MOTOR CO.

6. Place driver into the bore of the piston pin and press the pin out of the connecting rod.

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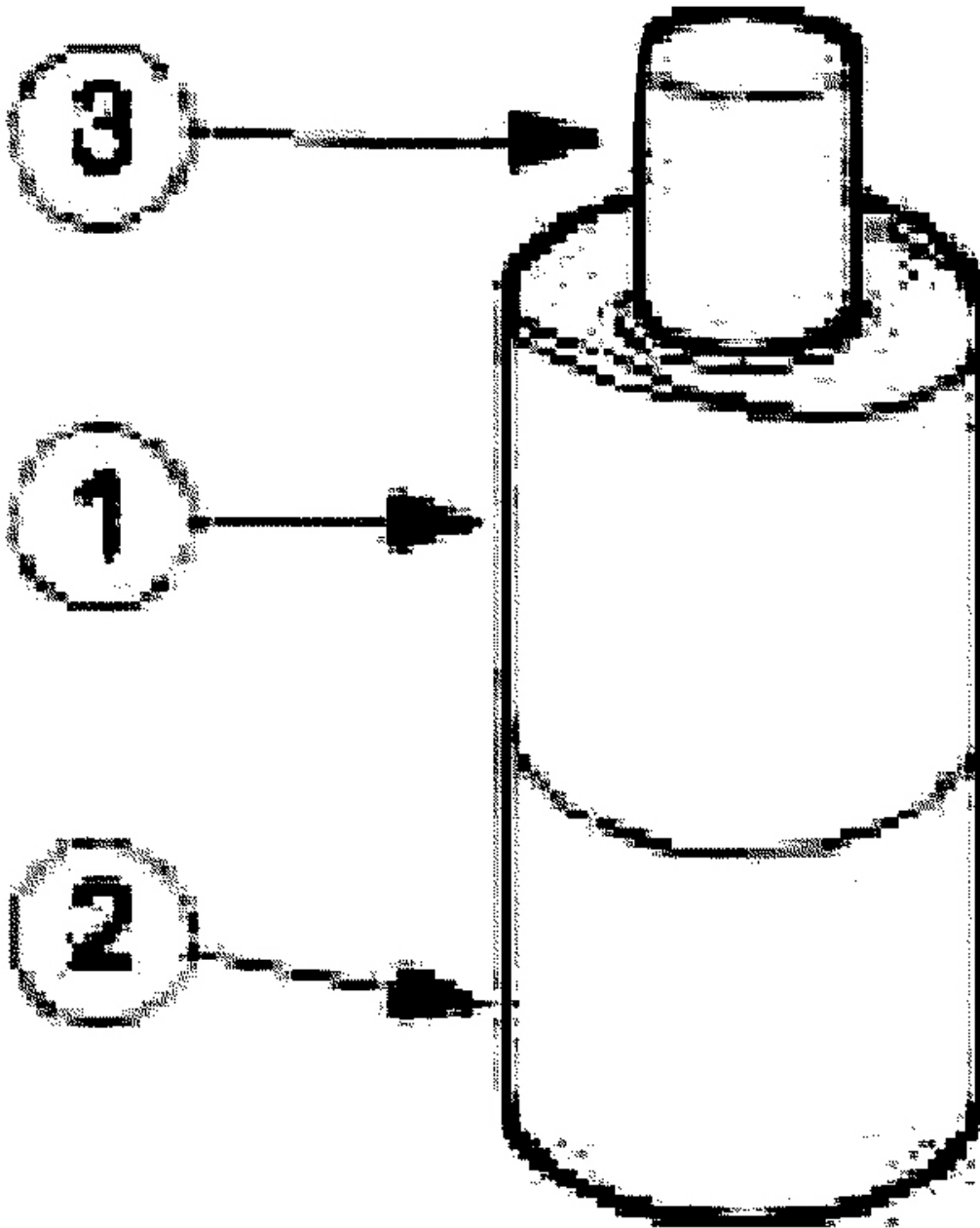


G03432429

Fig. 381: Placing Driver Into Bore Of Piston Pin And Pressing Pin Out Of Connecting Rod
Courtesy of FORD MOTOR CO.

Assembly

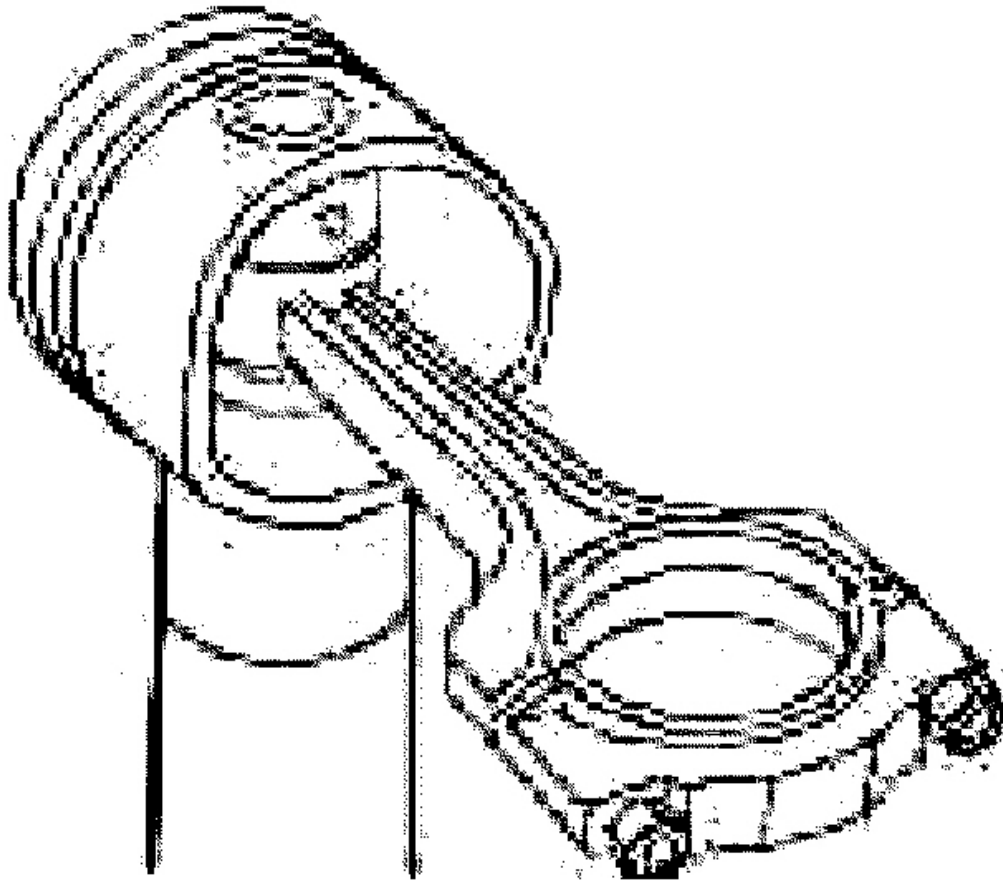
1. Place (1) sleeve in (2) and position (3) pin locator into the center hole of sleeve.



G03432430

Fig. 382: Placing Sleeve In And Positioning Pin Locator Into Center Hole Of Sleeve
Courtesy of FORD MOTOR CO.

2. Position the piston to be assembled onto the locator.



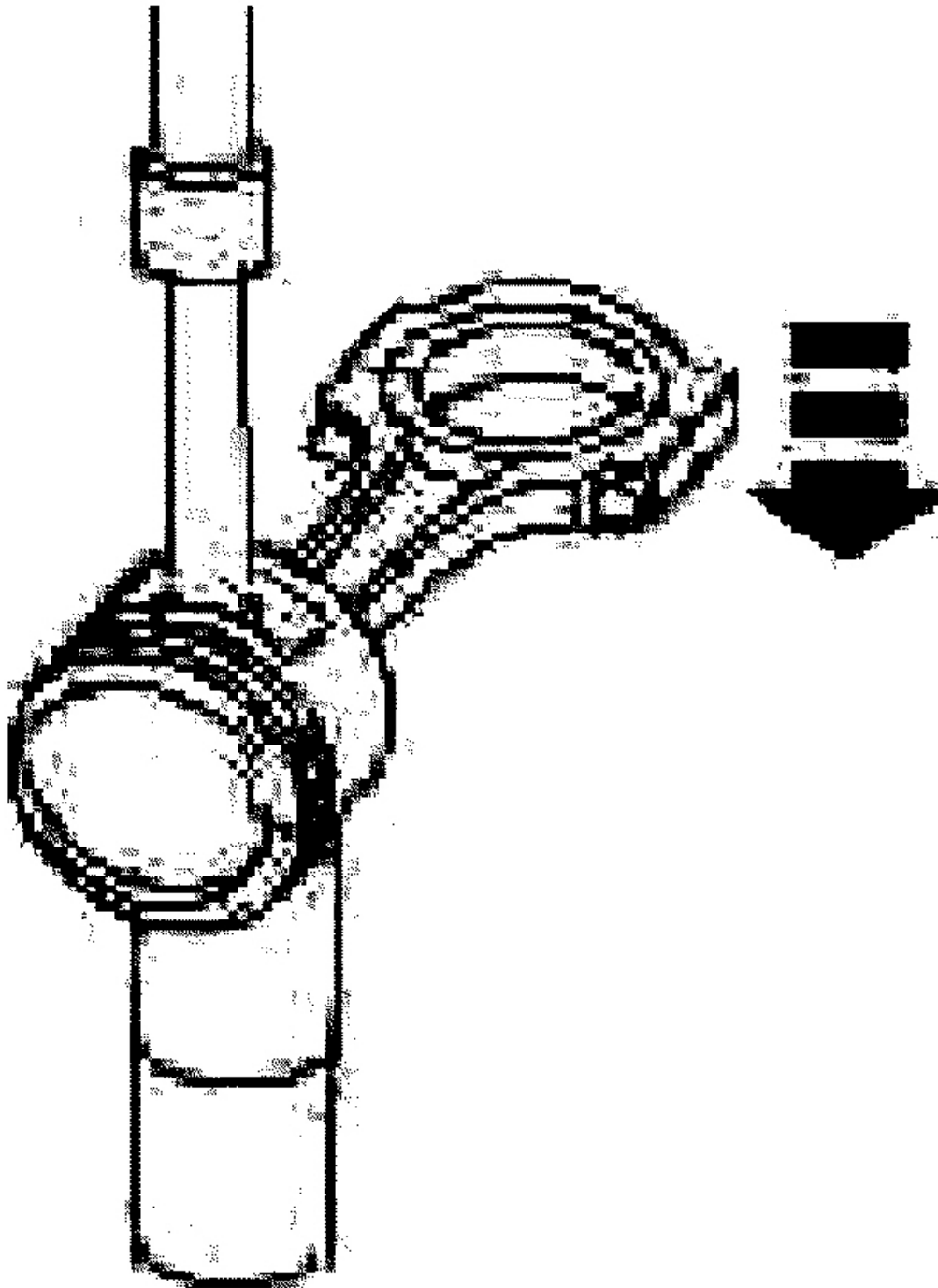
G03432431

Fig. 383: Assembling Piston Onto Locator
Courtesy of FORD MOTOR CO.

3. Press the pin into the piston and the connecting rod with driver.

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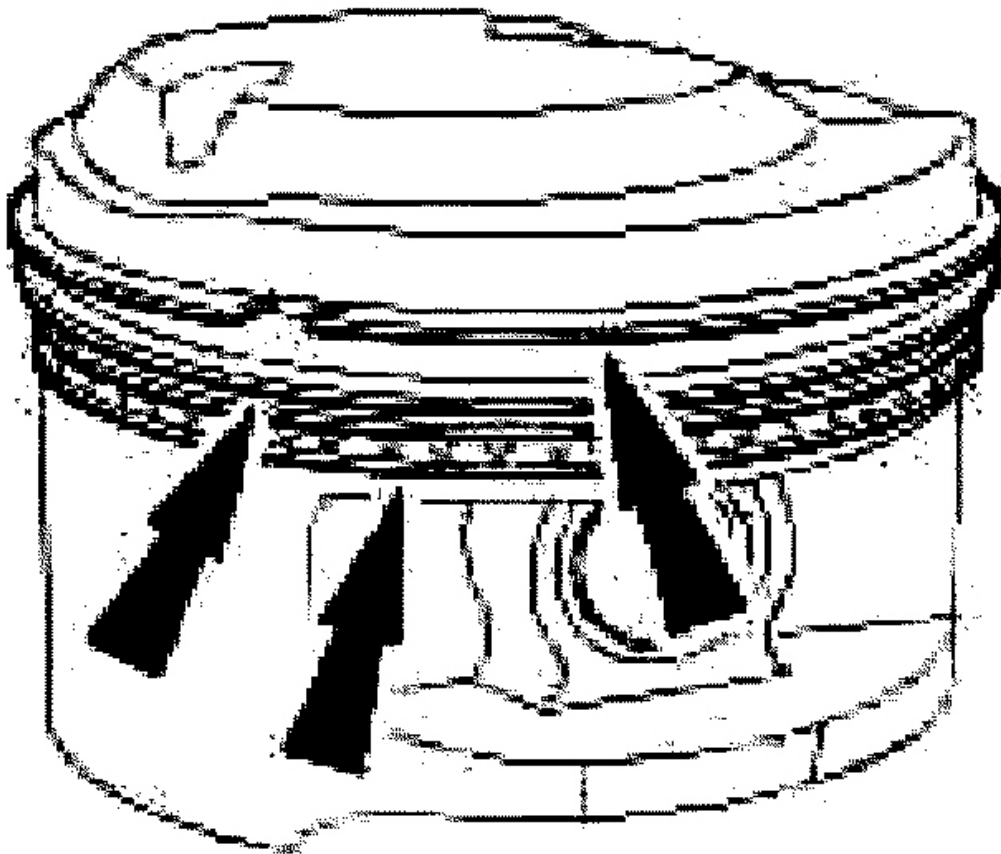
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G03432432

Fig. 384: Pressing Pin Into Piston And Connecting Rod With Driver
Courtesy of FORD MOTOR CO.

4. Install the piston rings using a suitable expander. The compression ring is to be installed with the grooved side facing down.



G03432433

Fig. 385: Installing Piston Rings
Courtesy of FORD MOTOR CO.

NOTE: The connecting rod bearings are selective fit to provide the necessary clearance. Refer to ENGINE SYSTEM-GENERAL INFORMATION article to measure the clearance and select the

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proper connecting rod bearing.


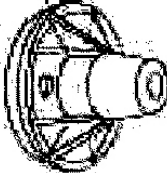
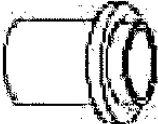

NOTE: When installing the connecting rod bearings, ensure that the tab on the bearing engages the slot in the connecting rod and the rod cap and that the bearings are fully seated.

5. Install a connecting rod bearing in the connecting rod and the rod cap.
6. Check the connecting rod to crankshaft clearance. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION article .

ASSEMBLY

ENGINE

Special Tool(s)

	Crankshaft Rear Seal Pilot 303-329 (T88P -6701 -B2)
	Crankshaft Rear Seal Replacer 303-328 (T88P -6701 -B1)
	Oil Pump Seal Replacer 303-164 (T81P -6700 -A)
	Strap Wrench 303-D055 (D85L -6000 -A) or equivalent

G03432434

Fig. 386: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

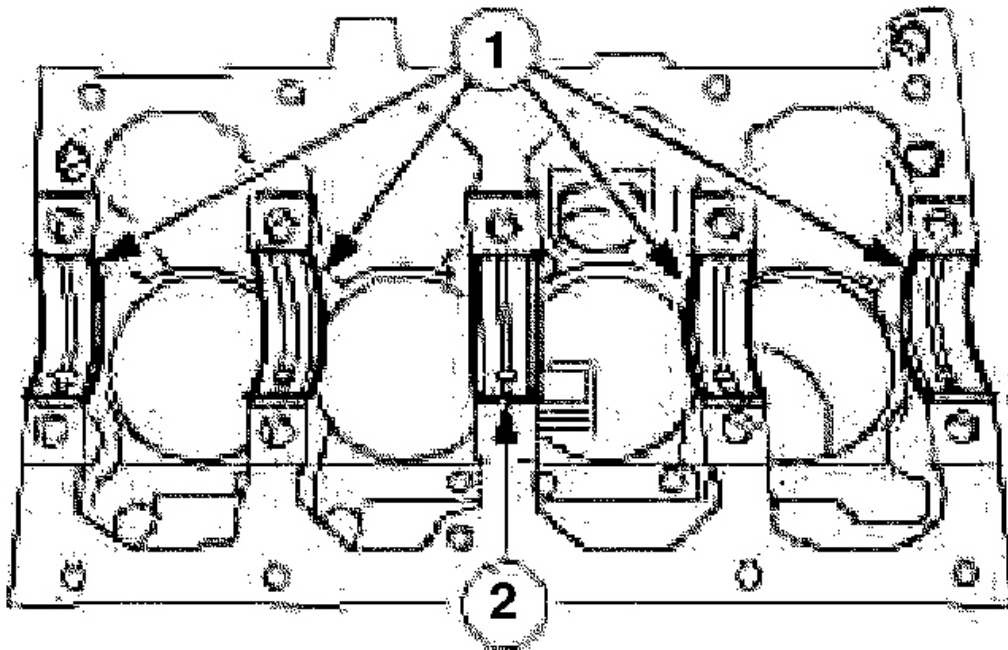
Engine oil	WSS-M2C153-H
Silicone gasket and sealant	F6AZ-19562-AA or equivalent Ford specification WSE-M4G323-A6

CAUTION: Do not use abrasive grinding discs to remove the gasket material; use only plastic manual scrapers. Do not scratch or gouge aluminum sealing surfaces.

NOTE: All bearing surfaces must be lubricated before assembly or installation.

NOTE: The crankshaft main bearings are precision selective fit. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION article .

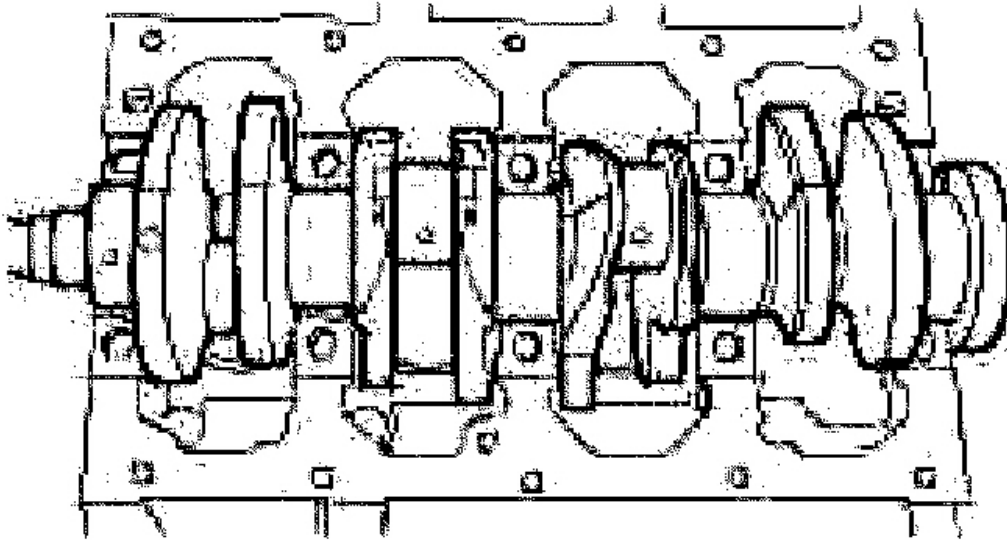
1. Install the main bearings.
 1. Upper crankshaft main bearing.
 2. Crankshaft thrust main bearing.



G03432435

Fig. 387: Installing Upper Crankshaft Main Bearing And Crankshaft Thrust Main Bearing
Courtesy of FORD MOTOR CO.

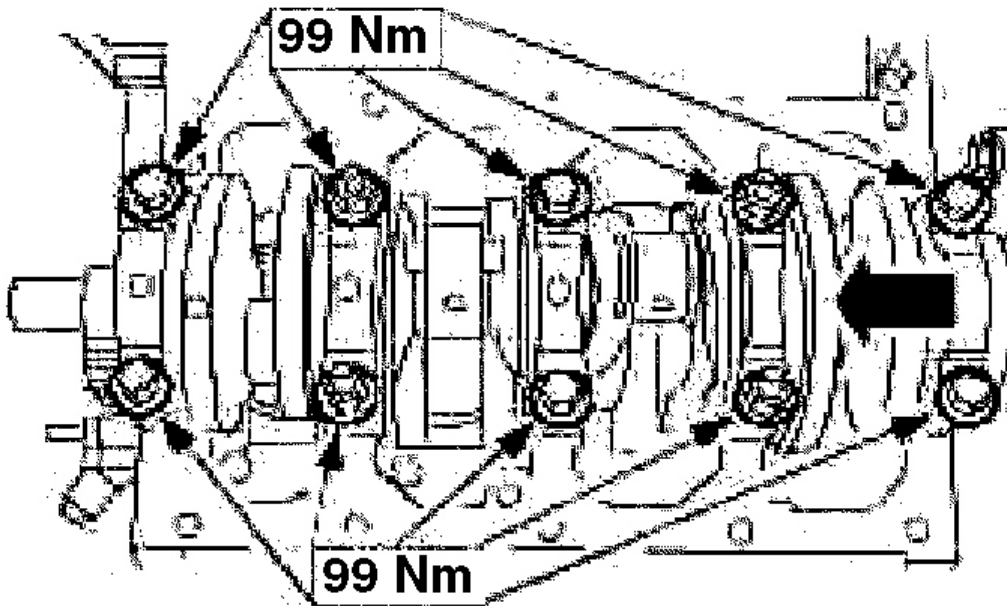
2. Install the crankshaft.



G03432436

Fig. 388: Installing Crankshaft
Courtesy of FORD MOTOR CO.

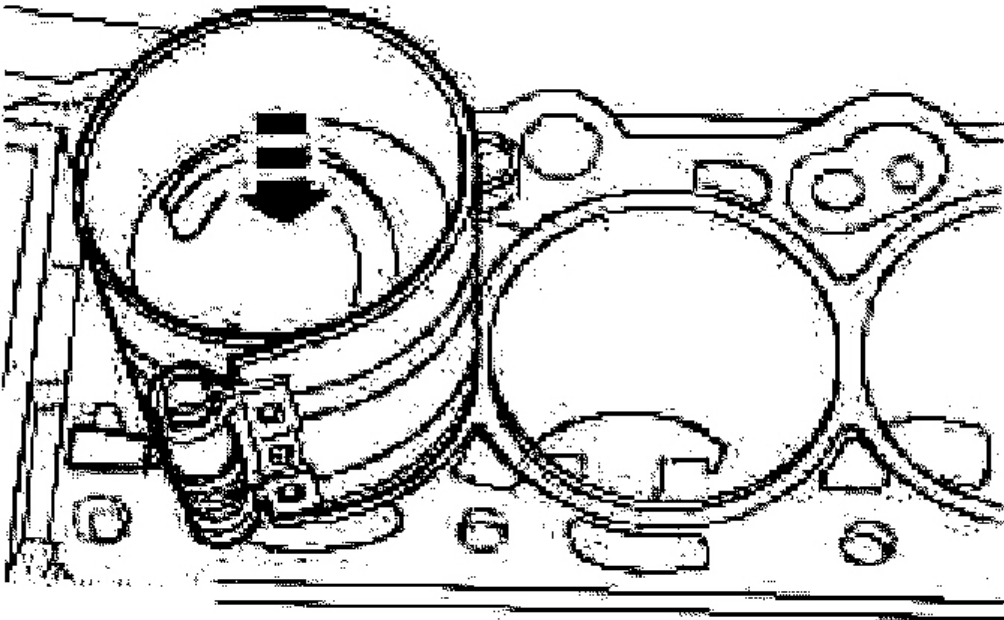
- NOTE:** The crankshaft main bearings are numbered 1 to 5 with No. 1 at the front of the engine. Make sure the arrow faces the front of the engine.
- NOTE:** Apply axial load to the rear of the crankshaft simultaneously to tightening of the bolts. For additional information, refer to **ENGINE SYSTEM-GENERAL INFORMATION** article .



G03432437

Fig. 389: Installing Lower Crankshaft Main Bearings And Main Bearing Caps
Courtesy of FORD MOTOR CO.

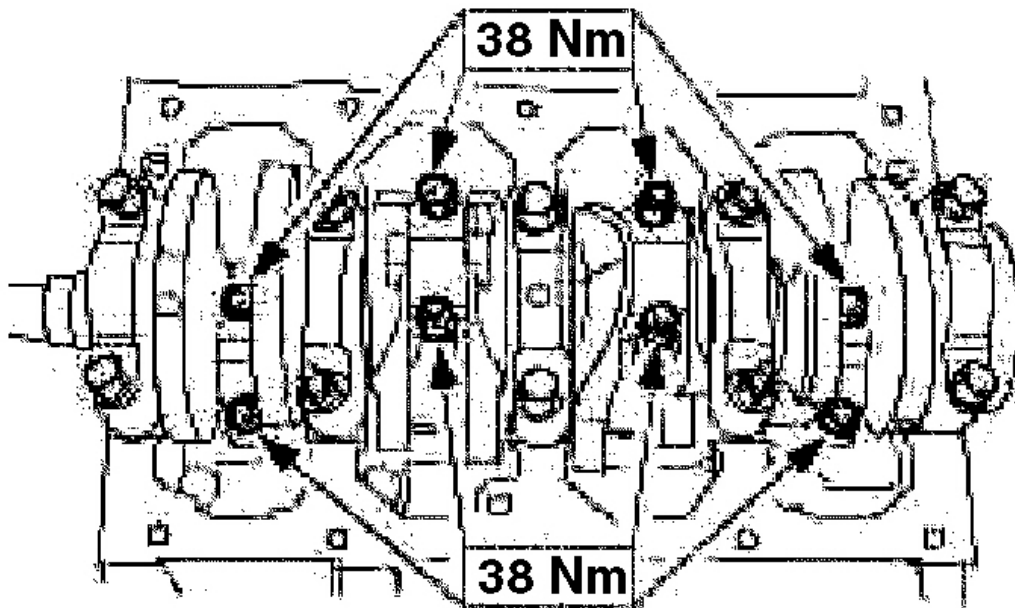
3. Install the five lower crankshaft main bearings and the five main bearing caps.
4. Install the piston and connection rod assemblies.



G03432438

Fig. 390: Installing Piston And Connecting Rod Assemblies
Courtesy of FORD MOTOR CO.

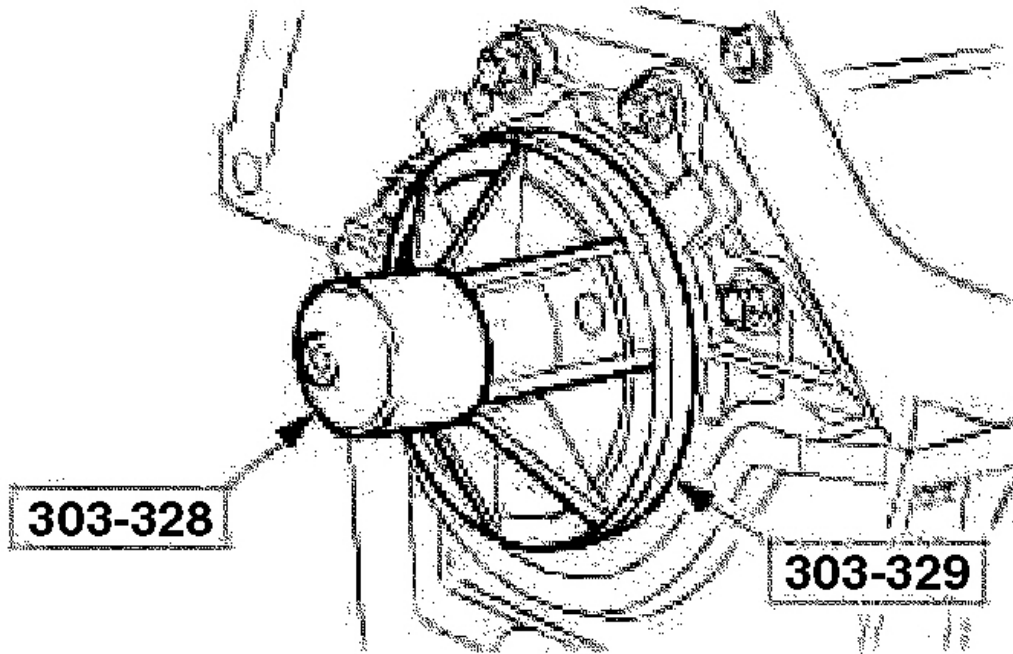
5. Install the four crankshaft rod caps.



G03432439

Fig. 391: Installing Crankshaft Rod Caps
Courtesy of FORD MOTOR CO.

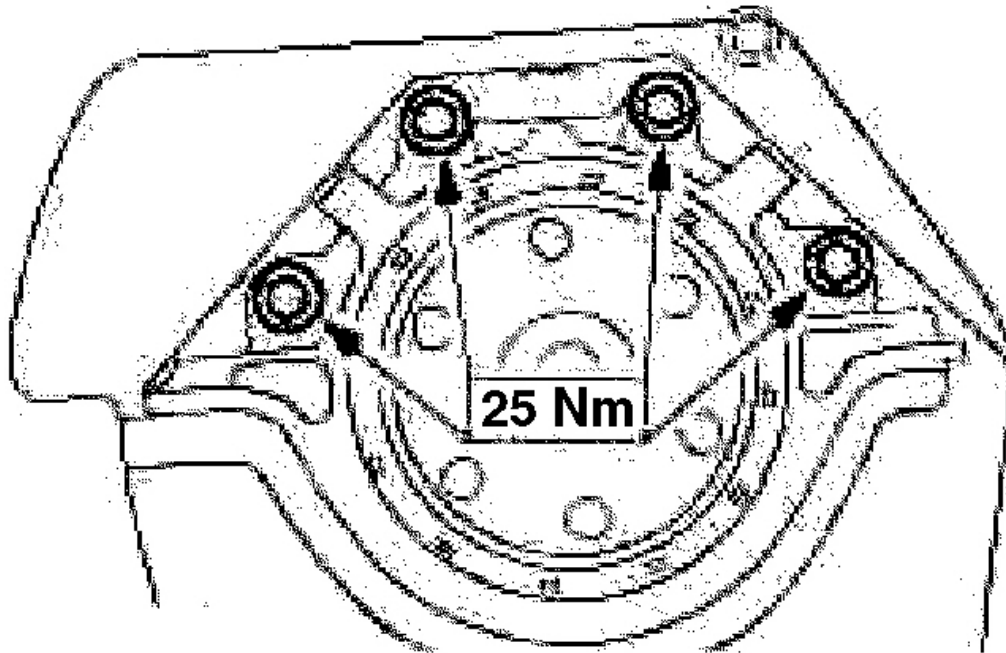
- NOTE:** Coat the rear oil seal area and the crankshaft rear oil seal lip with engine oil.
- NOTE:** Make sure the crankshaft rear oil seal is on correctly and that the edges are not rolled over.



G03432440

Fig. 392: Installing New Crankshaft Rear Oil Seal
Courtesy of FORD MOTOR CO.

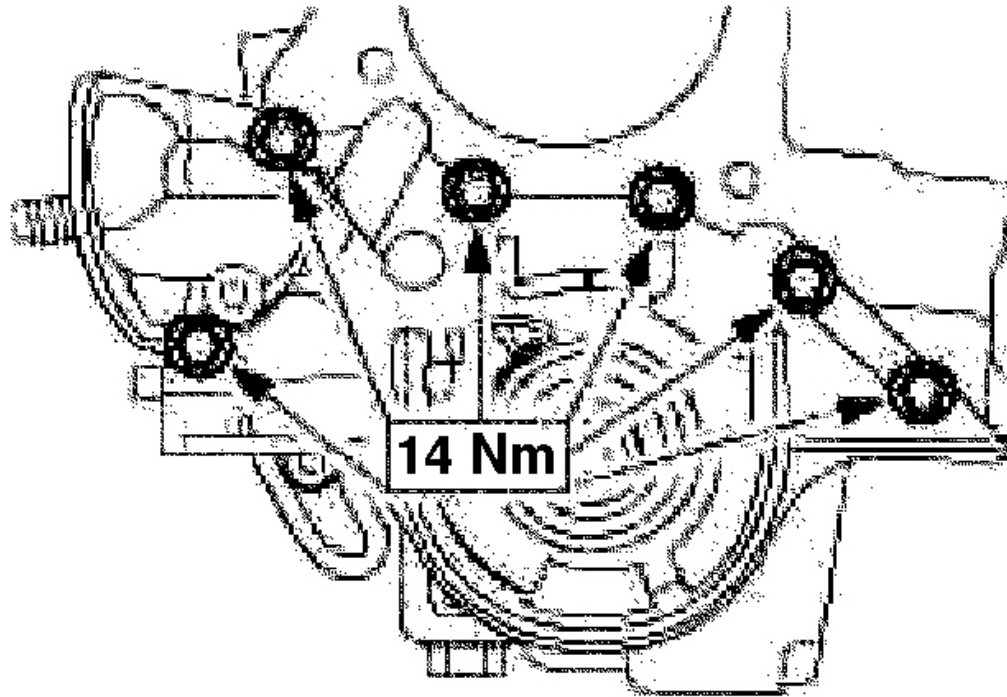
6. Using the special tools, install a new crankshaft rear oil seal.
7. Install the crankshaft rear seal retainer.
 - Use a new gasket.



G03432441

Fig. 393: Installing Crankshaft Rear Seal Retainer
Courtesy of FORD MOTOR CO.

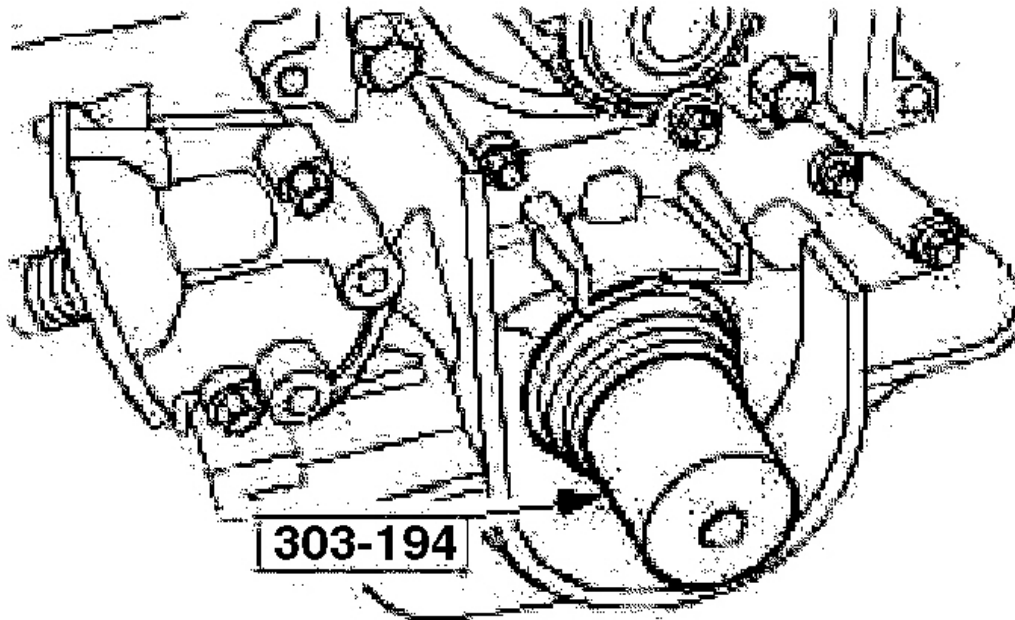
8. Install the oil pump.
 - Use a new gasket.



G03432442

Fig. 394: Installing Oil Pump
Courtesy of FORD MOTOR CO.

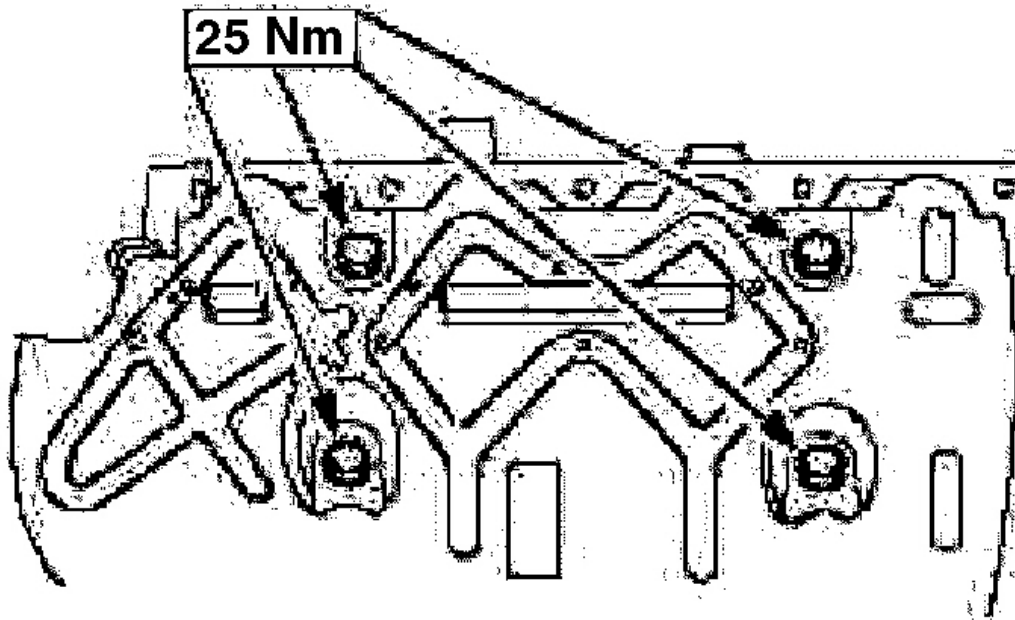
9. Using the special tool, install a new oil pump seal.



G03432443

Fig. 395: Installing New Oil Pump Seal
Courtesy of FORD MOTOR CO.

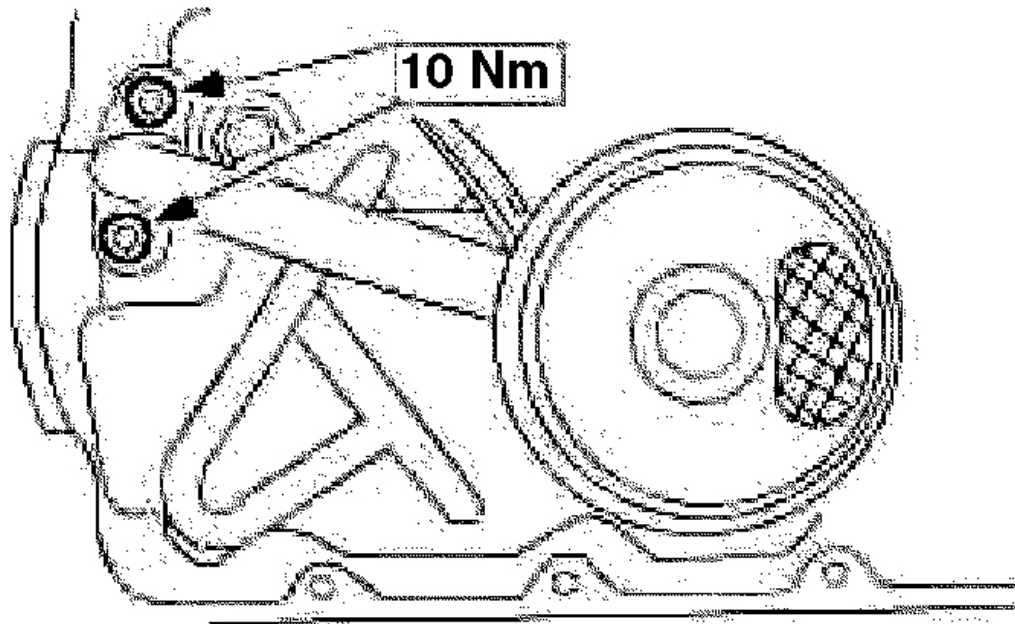
10. Install the oil baffle.



G03432444

Fig. 396: Installing Oil Baffle
Courtesy of FORD MOTOR CO.

11. Install the oil pump screen cover and tube.
 - Use a new gasket.

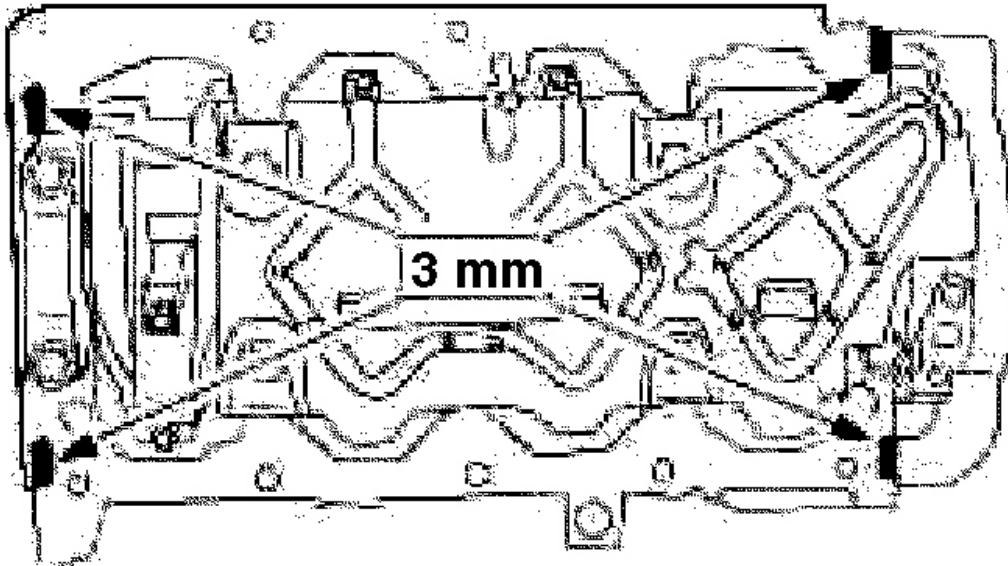


G03432445

Fig. 397: Installing Oil Pump Screen Cover And Tube
Courtesy of FORD MOTOR CO.

12. Clean and inspect the mounting faces of both the oil pan and the cylinder block. To remove all traces of previous sealant, use solvent to clean the cylinder block and oil pan. Both surfaces must be flat, clean and dry.

NOTE: **Install the oil pan within ten minutes after the sealant is applied.**



G03432446

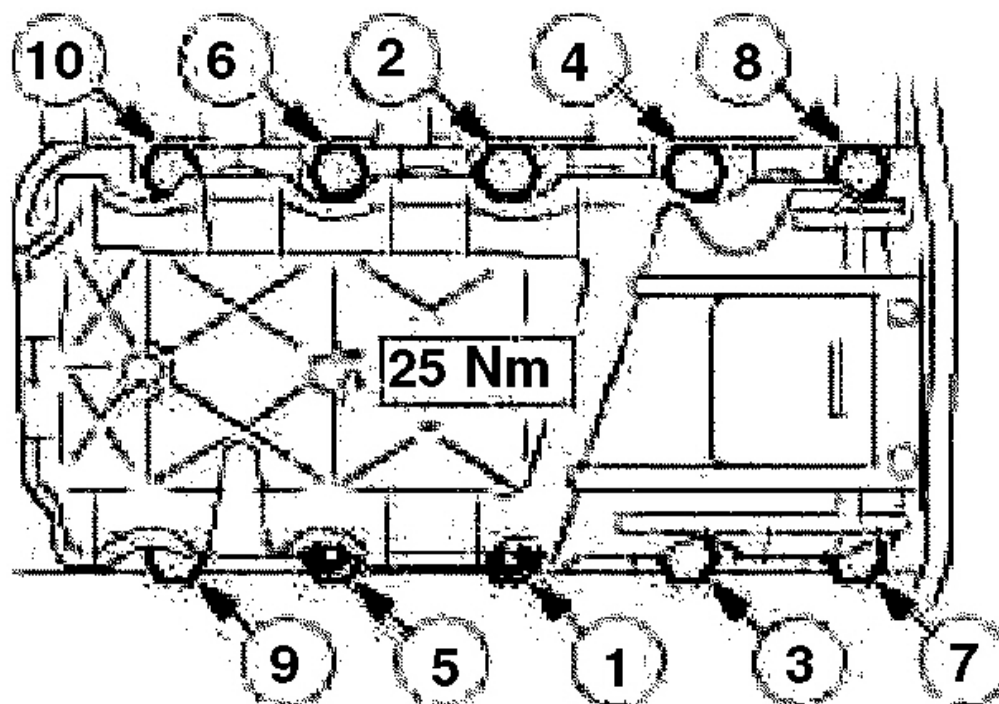
Fig. 398: Applying Silicone Gasket And Sealant F6AZ-19562-AA At Oil Pan To Cylinder Block Joints
Courtesy of FORD MOTOR CO.

13. Apply silicone gasket and sealant F6AZ-19562-AA or equivalent Ford specification WSE-M4G323-A6 approximately 3 mm (0.125 In) wide at the oil pan to cylinder block joints and the crankshaft rear oil seal retainer to cylinder block joints.

NOTE: Make sure the press fit tabs are fully engaged in the oil pan gasket channel when installing the oil pan gasket and oil pan.

NOTE: The rear edge of the oil pan must be aligned with the rear face of the cylinder block using a straight edge.

14. Install the oil pan. Tighten the bolts in the sequence shown.
 - The stud bolt locations are one and five.



G03432447

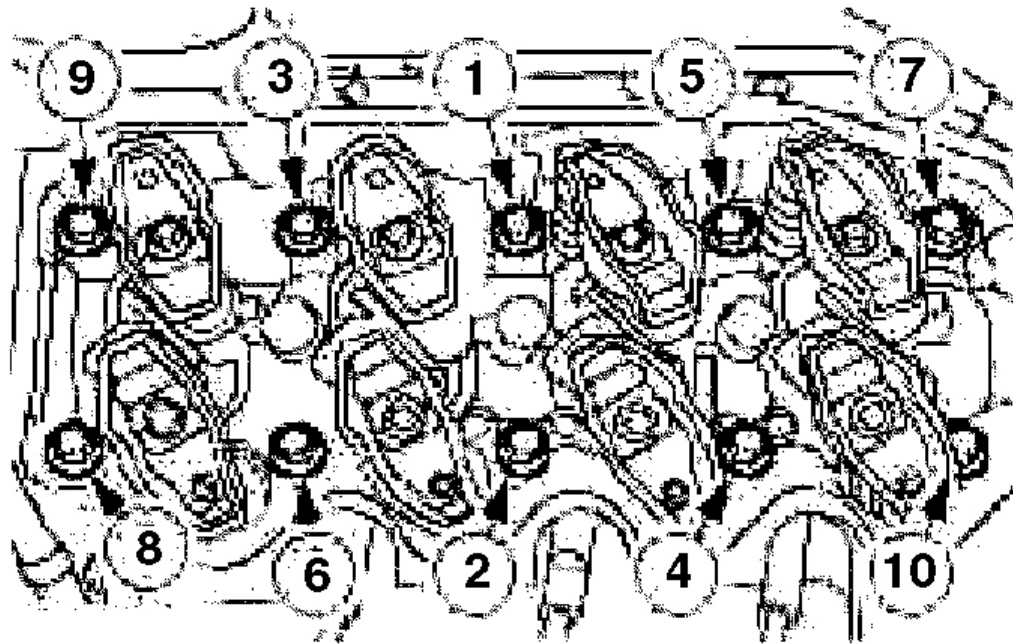
Fig. 399: Identifying Tightening Sequence Of Oil Pan Bolts
Courtesy of FORD MOTOR CO.

CAUTION: Always use new cylinder head bolts.

NOTE: Lubricate the cylinder head bolts with engine oil prior to installation.

- Install a new gasket and tighten the cylinder head bolts in the following sequence.
 1. Tighten all the bolts in a single sequence to 50 N.m.
 2. Back the bolts off one-half turn.
 3. Tighten all the bolts in the sequence shown to 50 N.m.
 4. Rotate all the bolts in a single sequence an additional 180 degrees, in two steps of

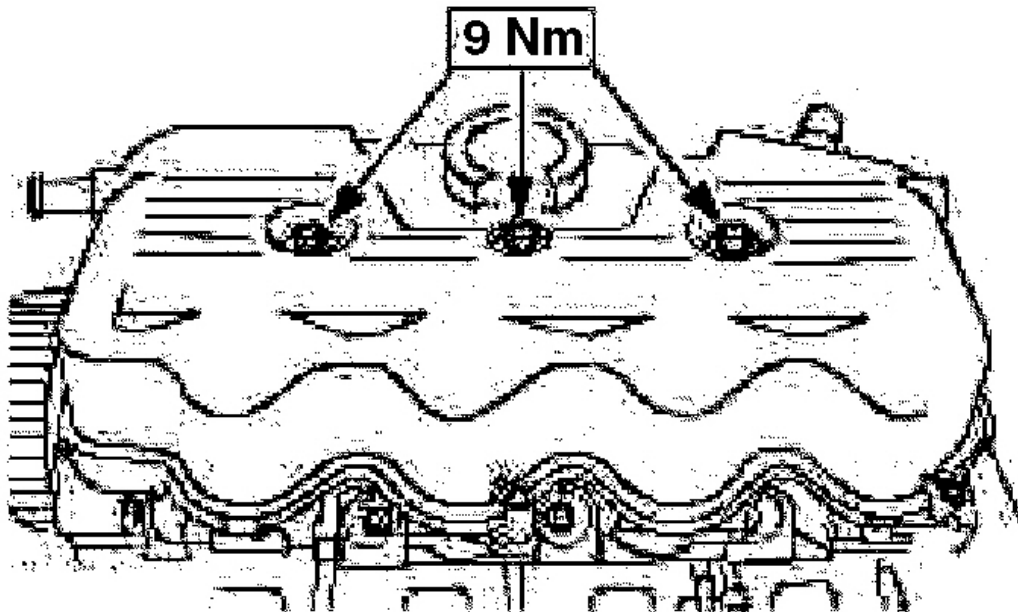
90 degrees each.



G03432448

Fig. 400: Identifying Tightening Sequence Of Cylinder Head Bolts
Courtesy of FORD MOTOR CO.

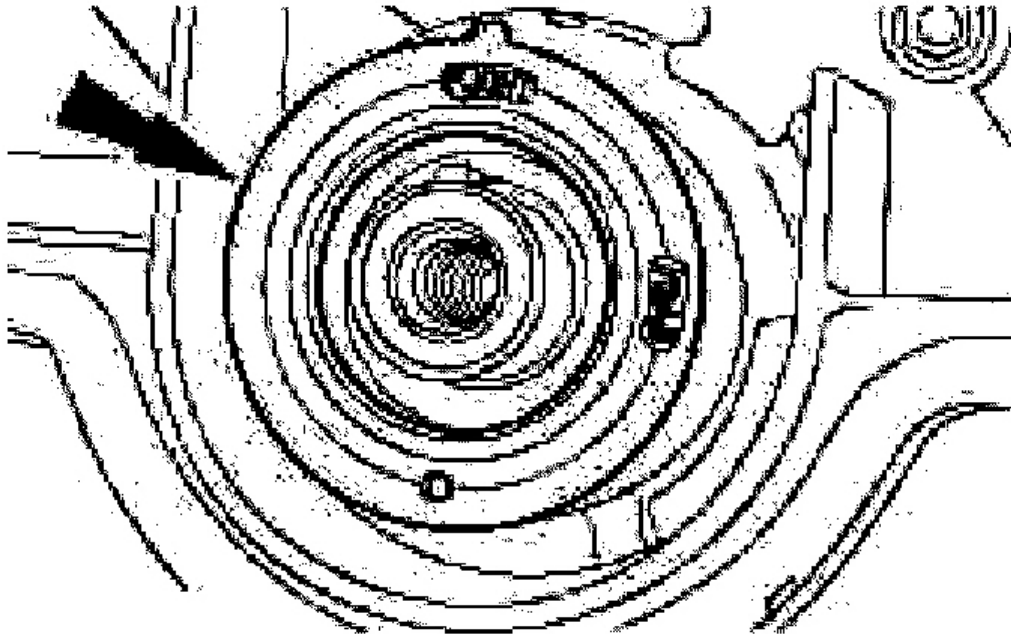
NOTE: Inspect the valve cover gasket. Install a new gasket if it is cracked, torn, distorted or damaged.



G03432449

Fig. 401: Installing Valve Cover
Courtesy of FORD MOTOR CO.

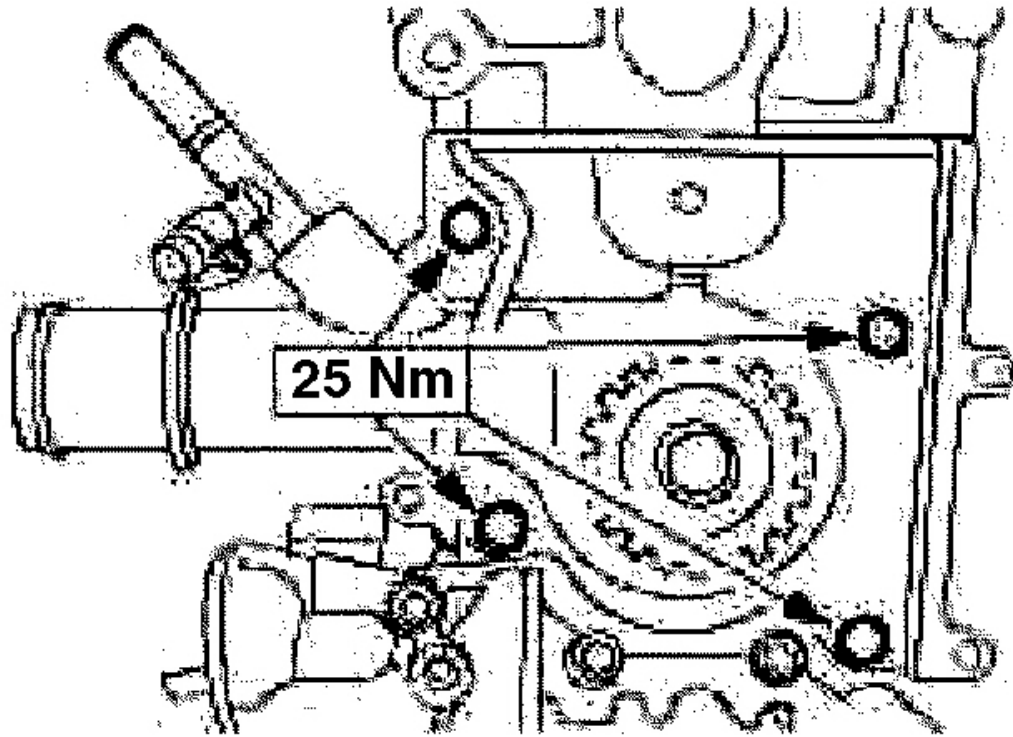
- Install the valve cover.
- Install the timing belt guide and the crankshaft sprocket.



G03432450

Fig. 402: Installing Timing Belt Guide And Crankshaft Sprocket
Courtesy of FORD MOTOR CO.

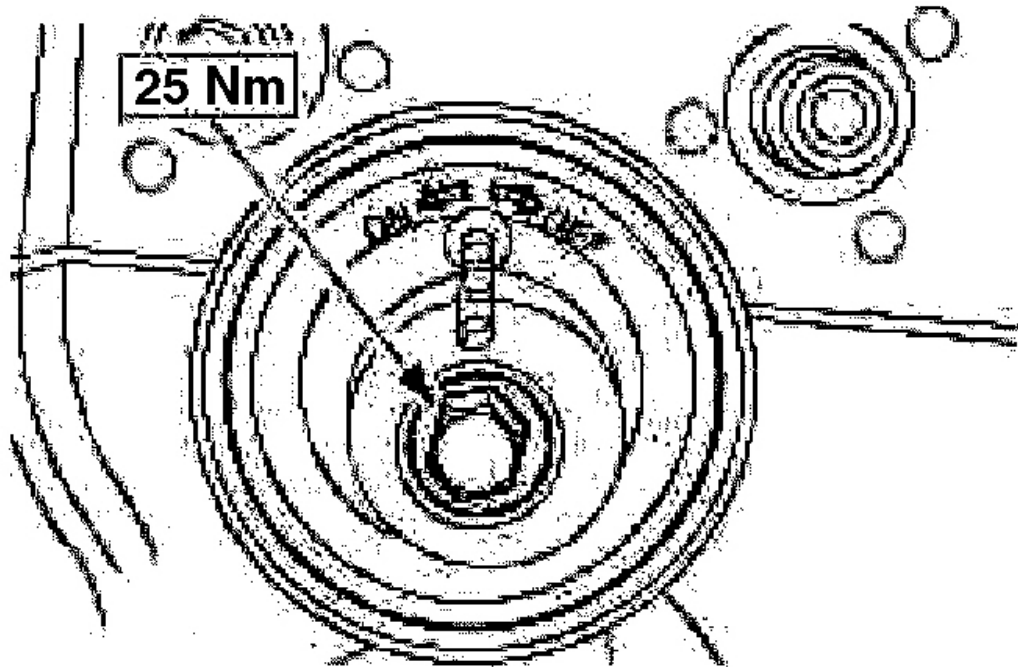
- Install the water pump.
 - Use a new gasket.



G03432451

Fig. 403: Installing Water Pump
Courtesy of FORD MOTOR CO.

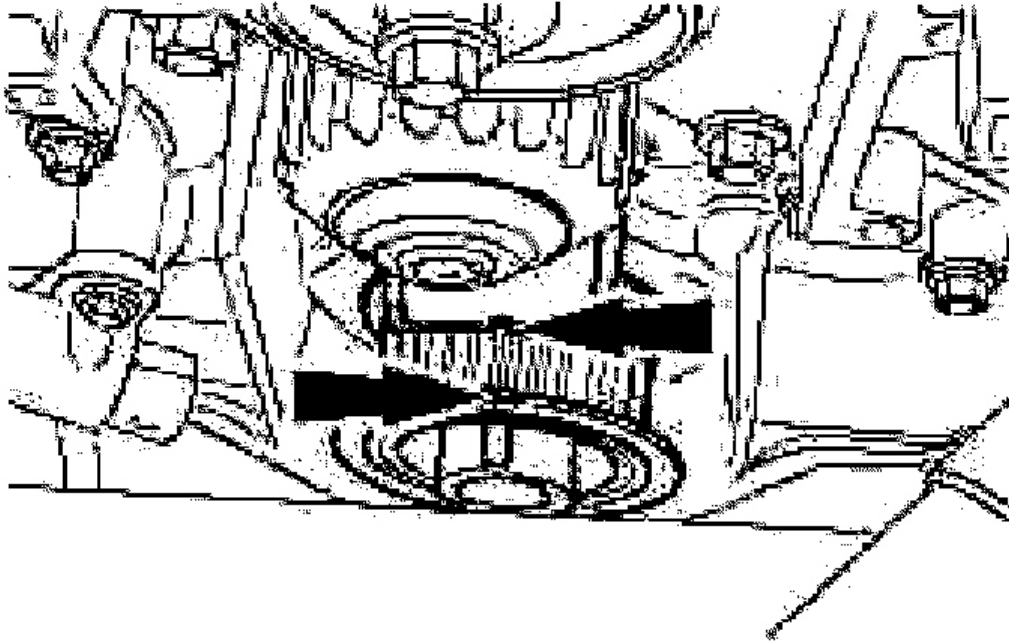
- Install the timing belt tensioner.



G03432452

Fig. 404: Installing Timing Belt Tensioner
Courtesy of FORD MOTOR CO.

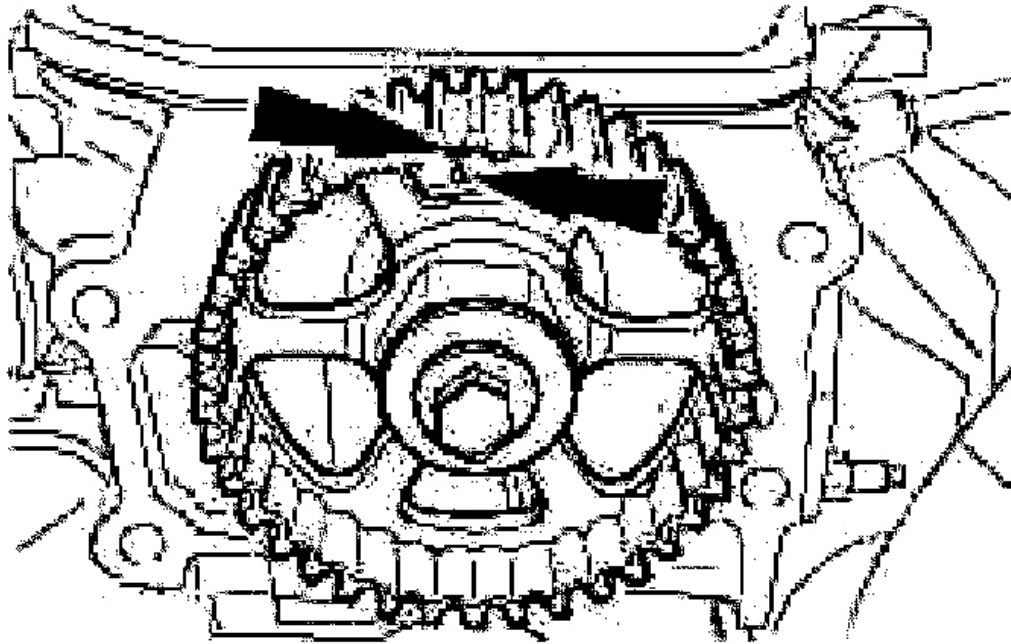
- Line up the timing marks of the crankshaft.



G03432453

Fig. 405: Aligning Timing Marks Of Crankshaft
Courtesy of FORD MOTOR CO.

- Line up the timing marks of the camshaft.



G03432454

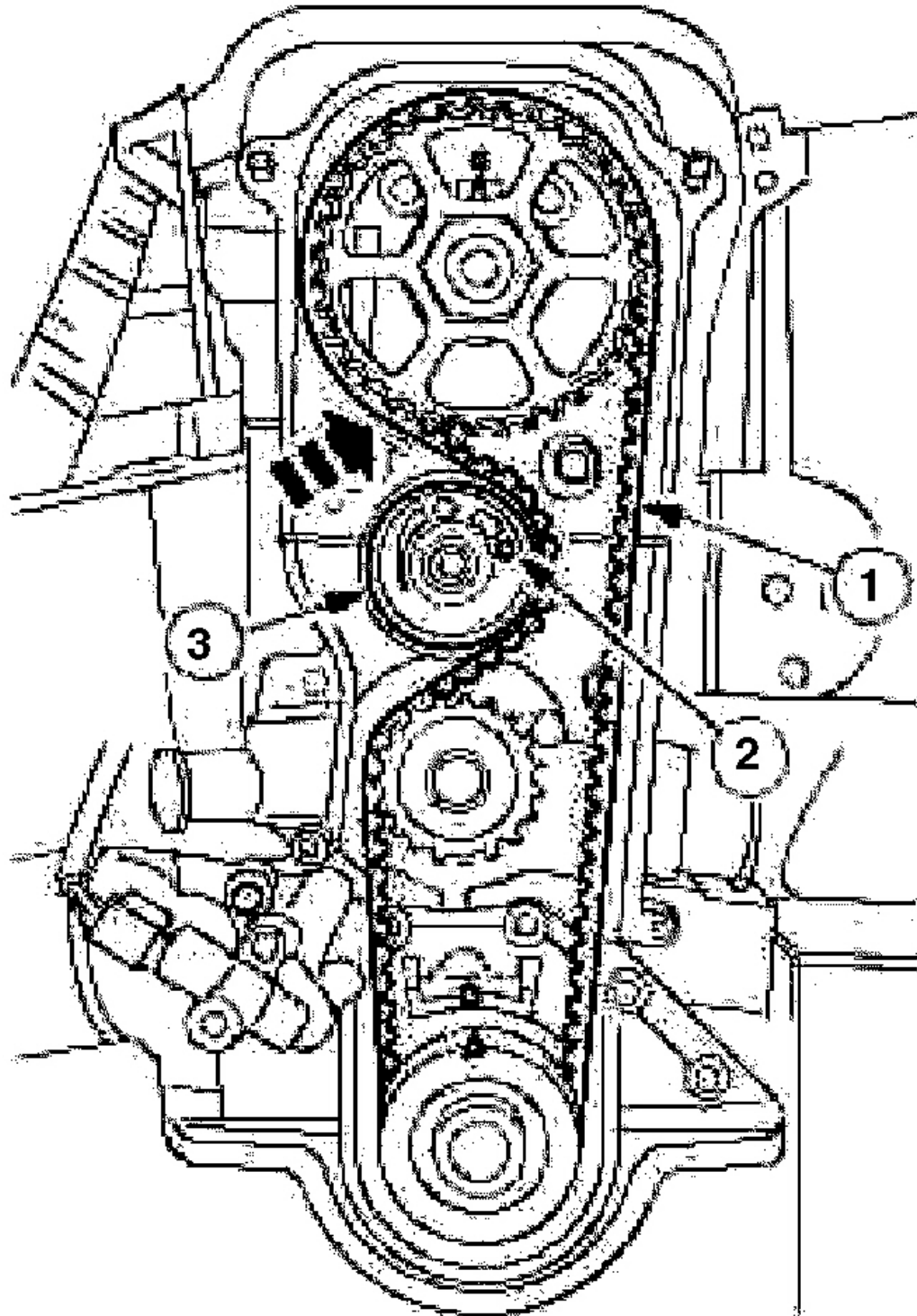
Fig. 406: Aligning Timing Marks Of Camshaft
Courtesy of FORD MOTOR CO.

NOTE: Install the timing belt over the sprockets in a counterclockwise direction starting at the crankshaft. Keep the belt span from the crankshaft to the camshaft tight while installing the timing belt over the camshaft.

- Install the timing belt.
 1. Position the timing belt.
 2. Remove the holding tool.
 3. Release the tensioner.

2002 Ford Focus LX

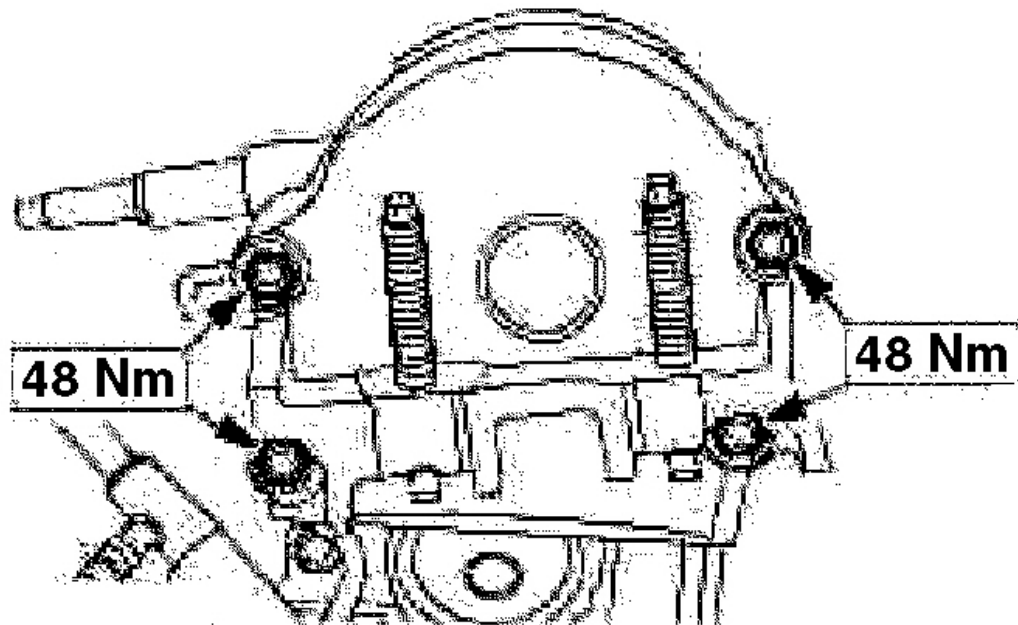
2002 ENGINE Engine, 2.0L SPI - Focus



G03432455

Fig. 407: Installing Timing Belt
Courtesy of FORD MOTOR CO.

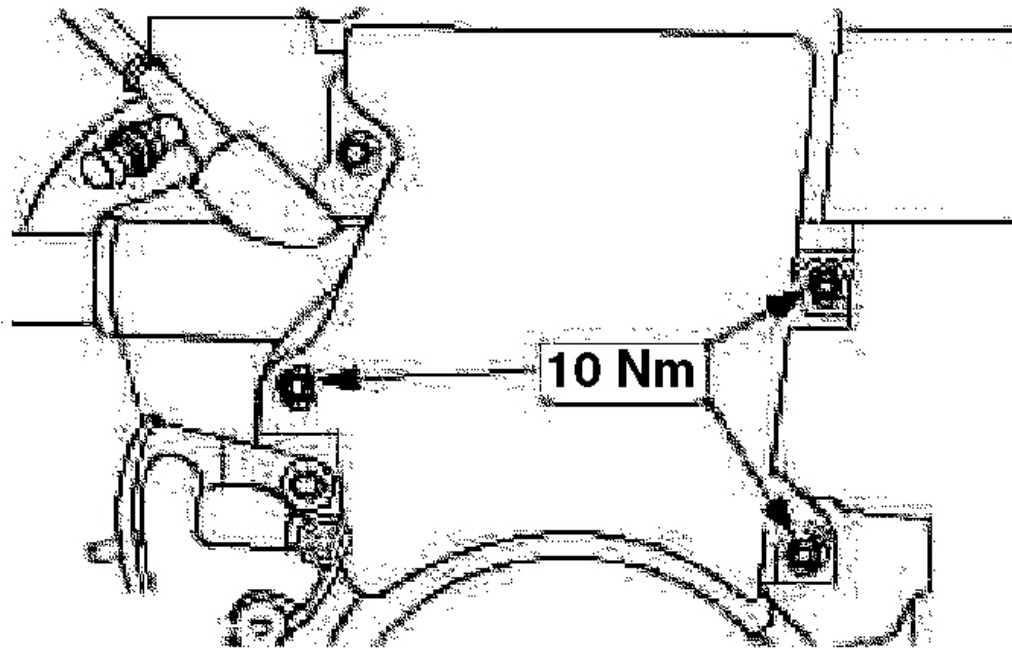
- Rotate the crankshaft two turns and recheck the timing marks.
- Install the upper timing belt cover.



G03432456

Fig. 408: Installing Upper Timing Belt Cover
Courtesy of FORD MOTOR CO.

- Install the timing belt cover.

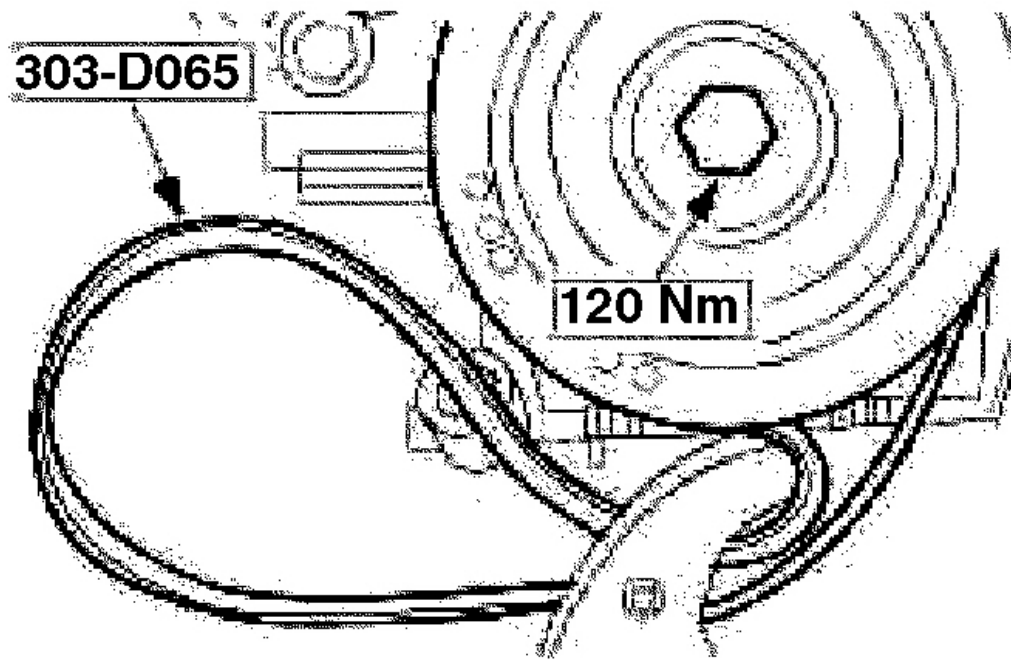


G03432457

Fig. 409: Installing Timing Belt Cover
Courtesy of FORD MOTOR CO.

NOTE: Using the special tool, hold the crankshaft pulley.

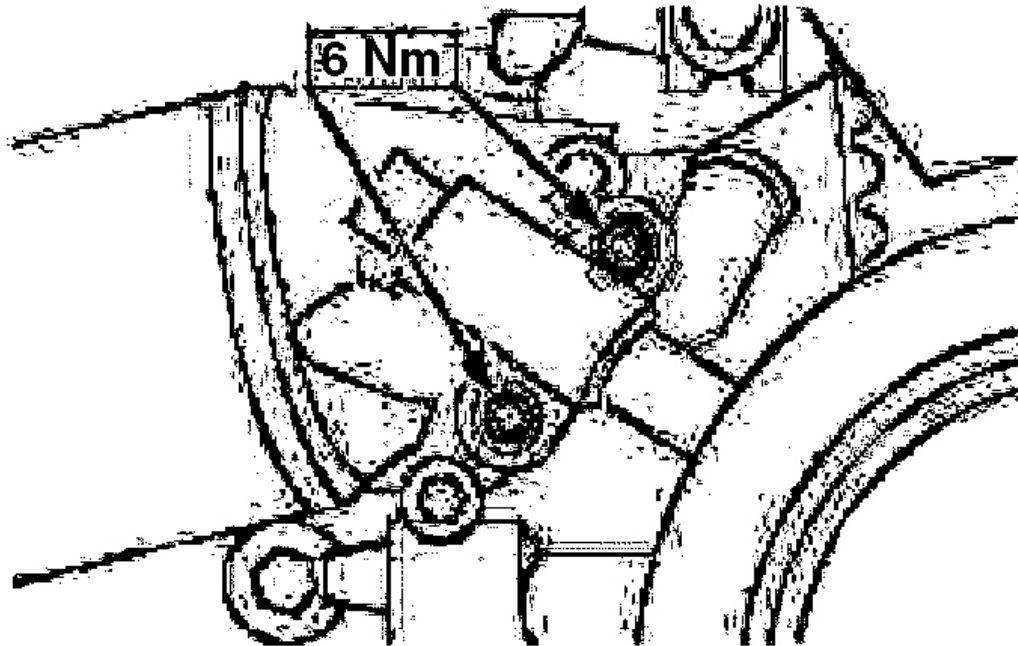
- Install the crankshaft pulley.
 - Install the bolt.



G03432458

Fig. 410: Installing Crankshaft Pulley
Courtesy of FORD MOTOR CO.

- Install the crankshaft position (CKP) sensor.

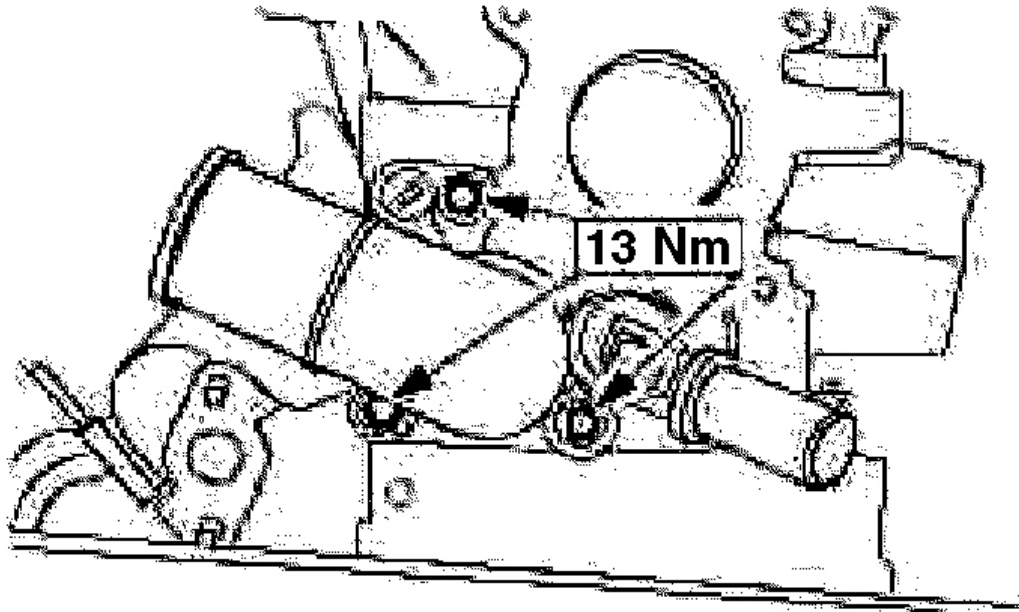


G03432459

Fig. 411: Installing Crankshaft Position (CKP) Sensor
Courtesy of FORD MOTOR CO.

- Install the spark plugs.

NOTE: Inspect the water outlet connection gasket. Install a new gasket if it is cracked, torn, or damaged.



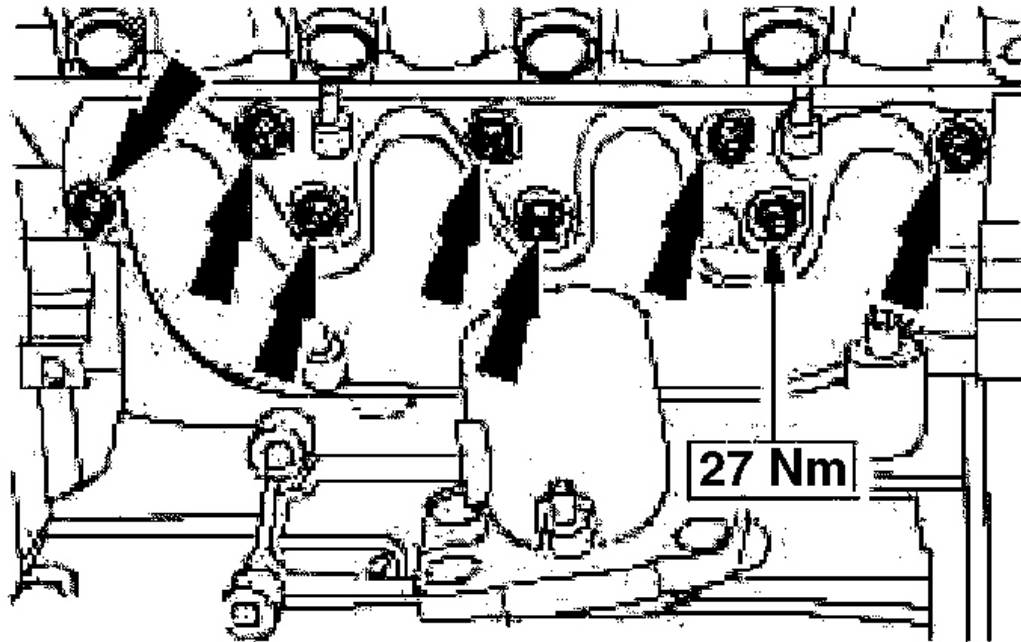
G03432460

Fig. 412: Installing Water Outlet Connection
Courtesy of FORD MOTOR CO.

- Install the water outlet connection.

NOTE: **Tighten the bolts evenly.**

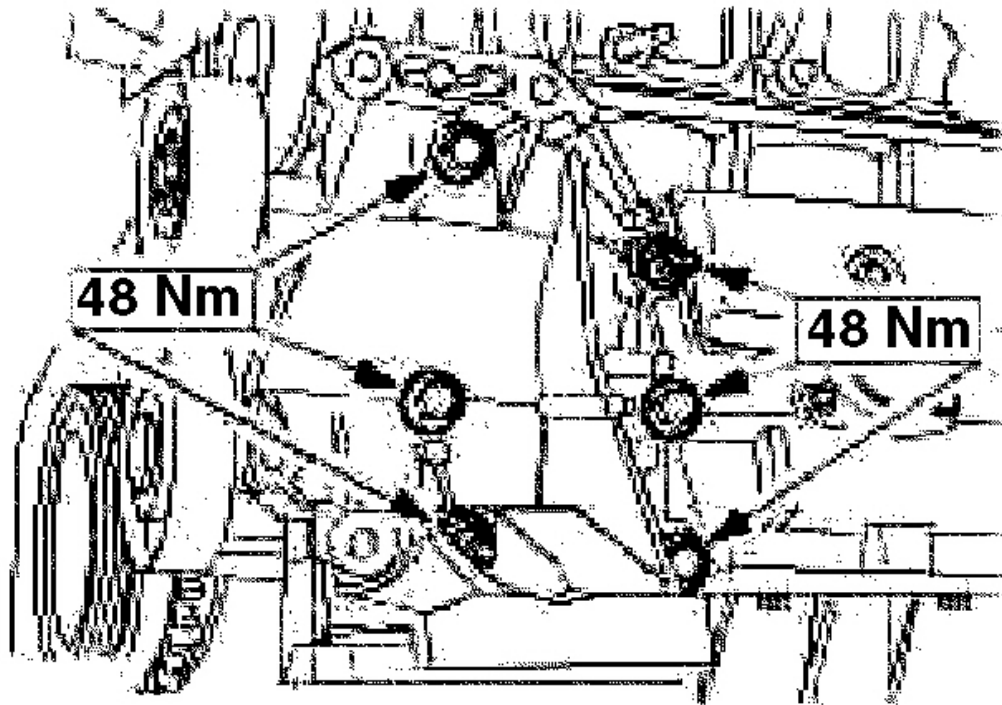
- Install the exhaust manifold.
 - Use a new gasket.



G03432461

Fig. 413: Installing Exhaust Manifold
Courtesy of FORD MOTOR CO.

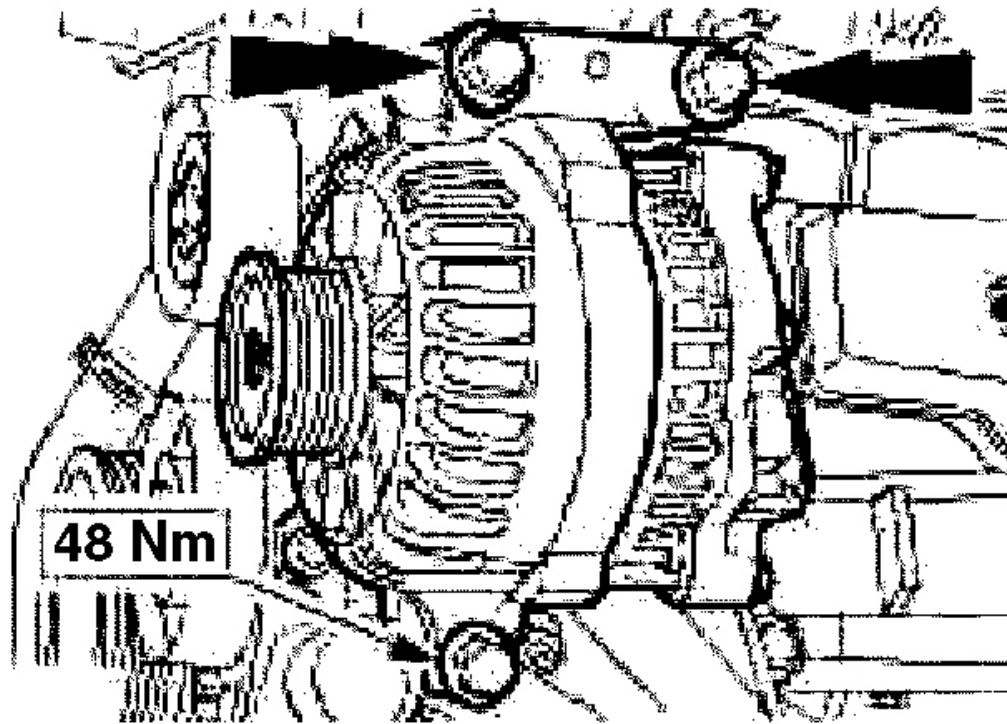
- Install the accessory drive bracket.



G03432462

Fig. 414: Installing Accessory Drive Bracket
Courtesy of FORD MOTOR CO.

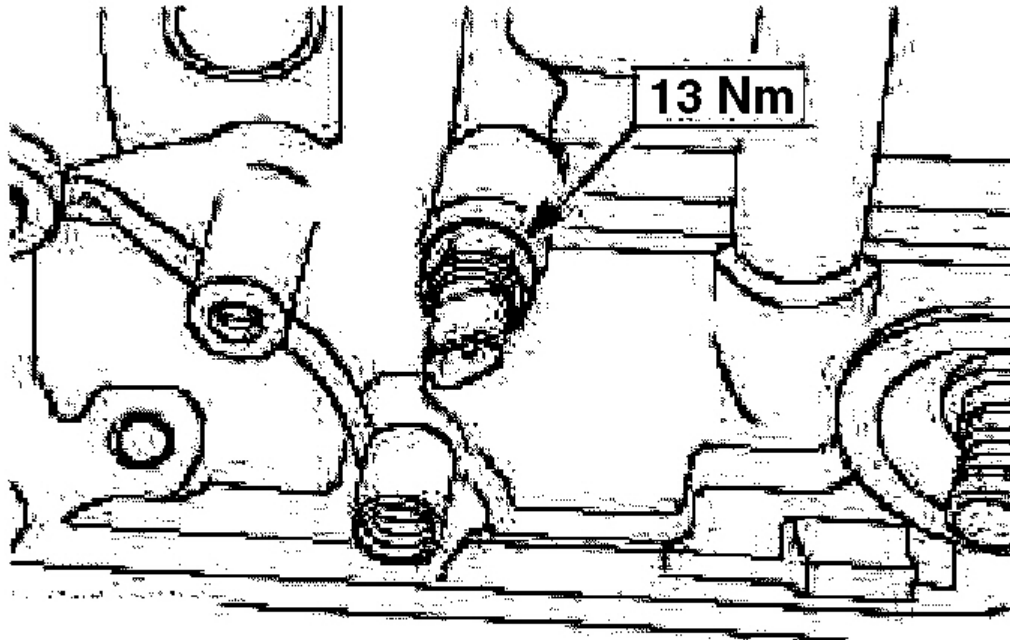
- Install the generator (if necessary).



G03432463

Fig. 415: Installing Generator
Courtesy of FORD MOTOR CO.

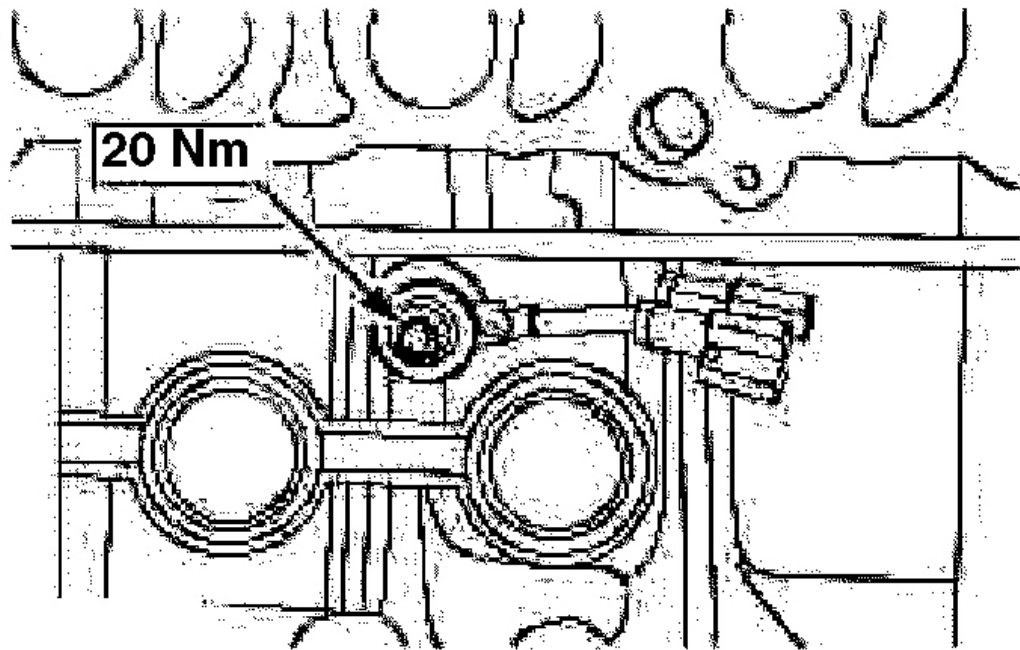
NOTE: Wrap the threads with Teflon tape.



G03432464

Fig. 416: Installing Oil Pressure Sender Unit
Courtesy of FORD MOTOR CO.

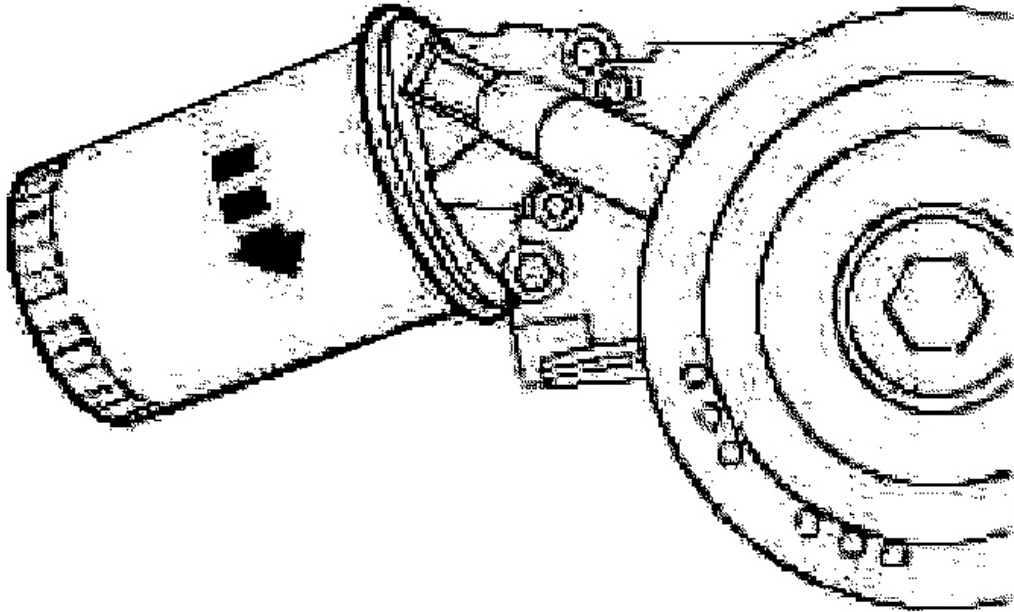
- Install the oil pressure sender unit.
- Install the knock sensor.



G03432465

Fig. 417: Installing Knock Sensor
Courtesy of FORD MOTOR CO.

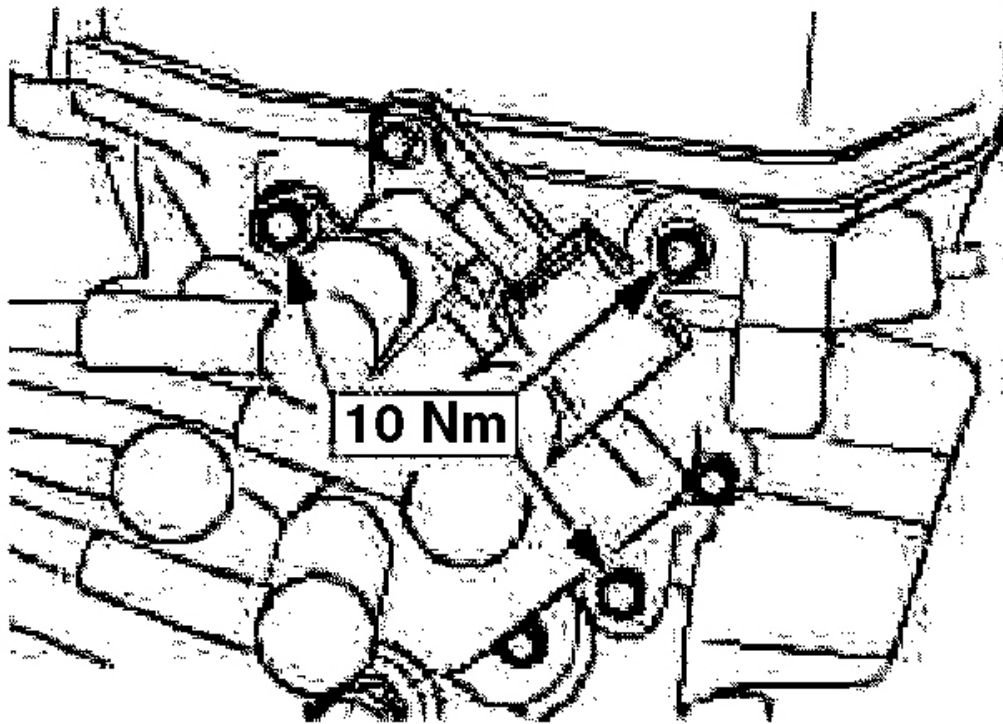
- Install the oil filter.



G03432466

Fig. 418: Installing Oil Filter
Courtesy of FORD MOTOR CO.

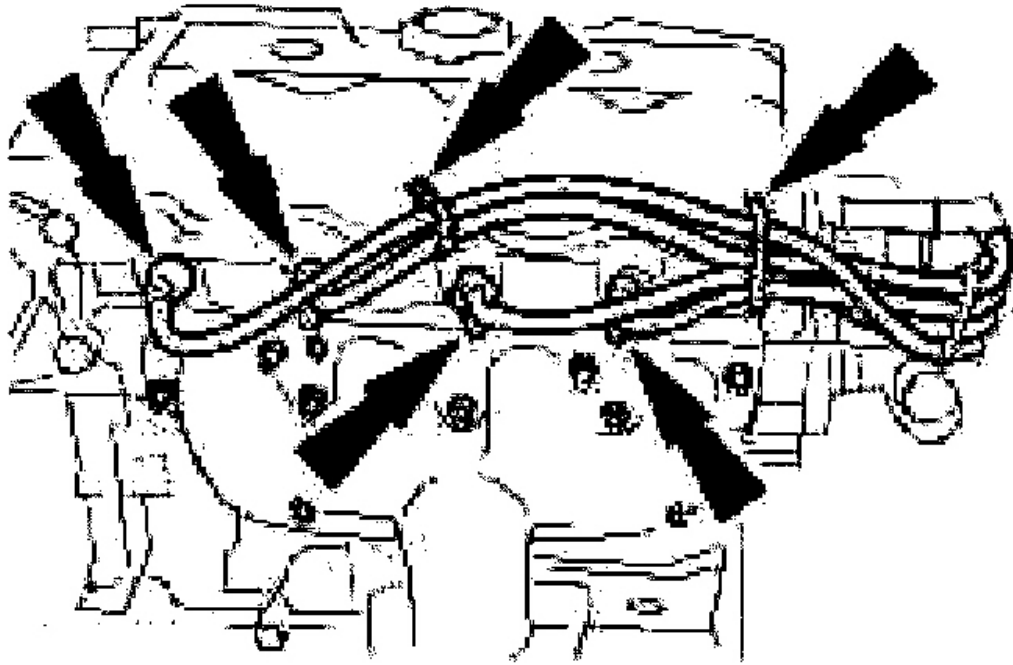
- Install the coil bracket, coil and spark plug wires.



G03432467

Fig. 419: Installing Coil Bracket, Coil And Spark Plug Wires
Courtesy of FORD MOTOR CO.

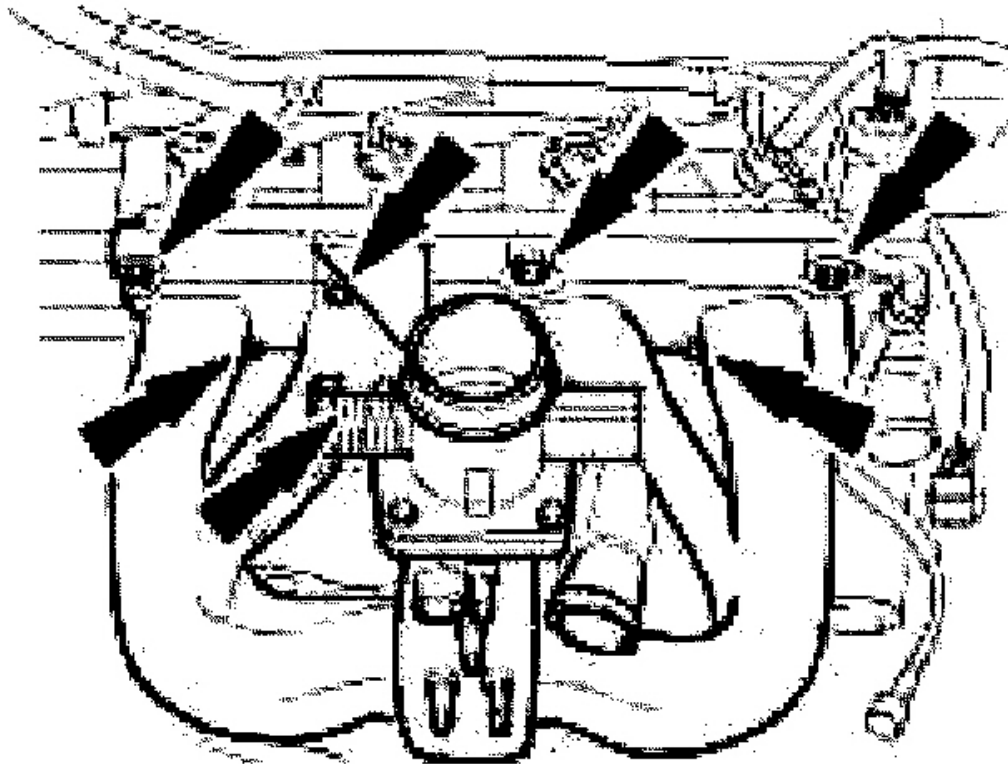
- Connect the spark plug wires.



G03432468

Fig. 420: Connecting Spark Plug Wires
Courtesy of FORD MOTOR CO.

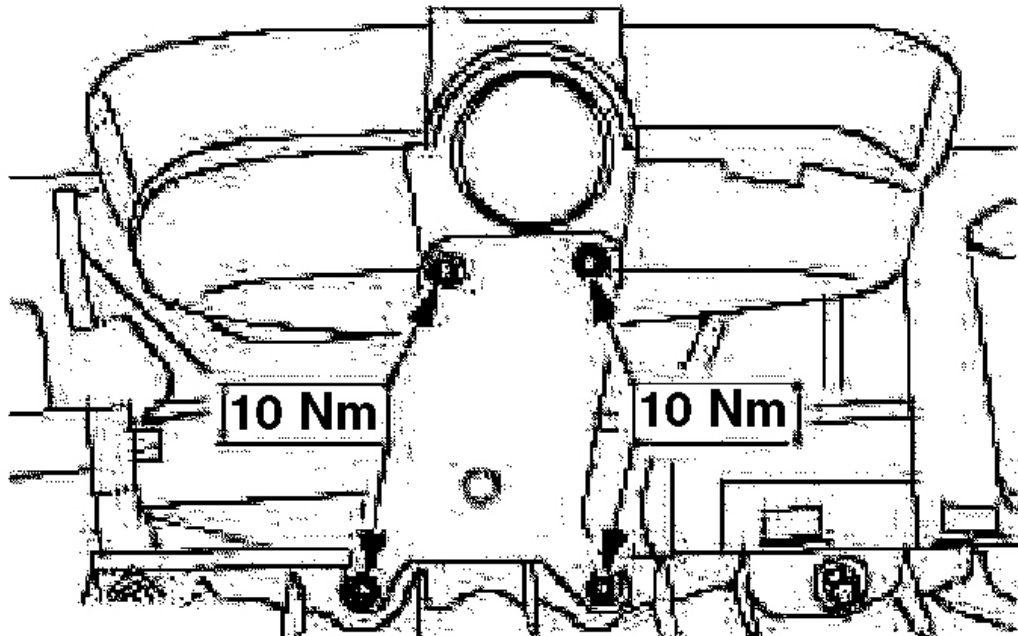
- Install a new gasket and the intake manifold.
 - Tighten the nuts and bolts to 10 N.m and 90 degrees.



G03432469

Fig. 421: Installing New Gasket And Intake Manifold
Courtesy of FORD MOTOR CO.

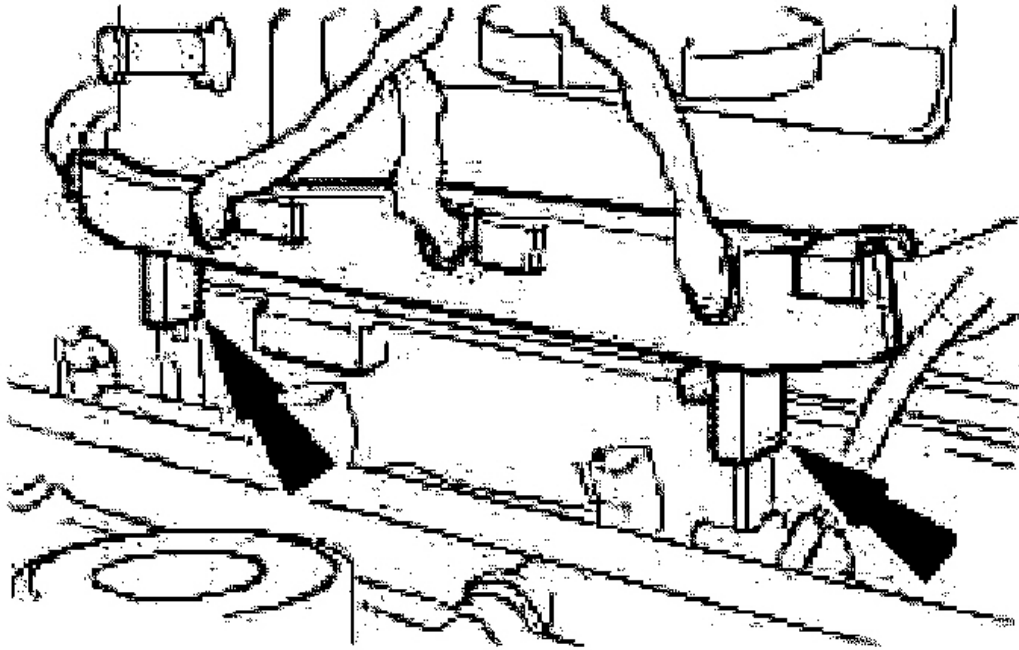
- Install the intake manifold bracket.



G03432470

Fig. 422: Installing Intake Manifold Bracket
Courtesy of FORD MOTOR CO.

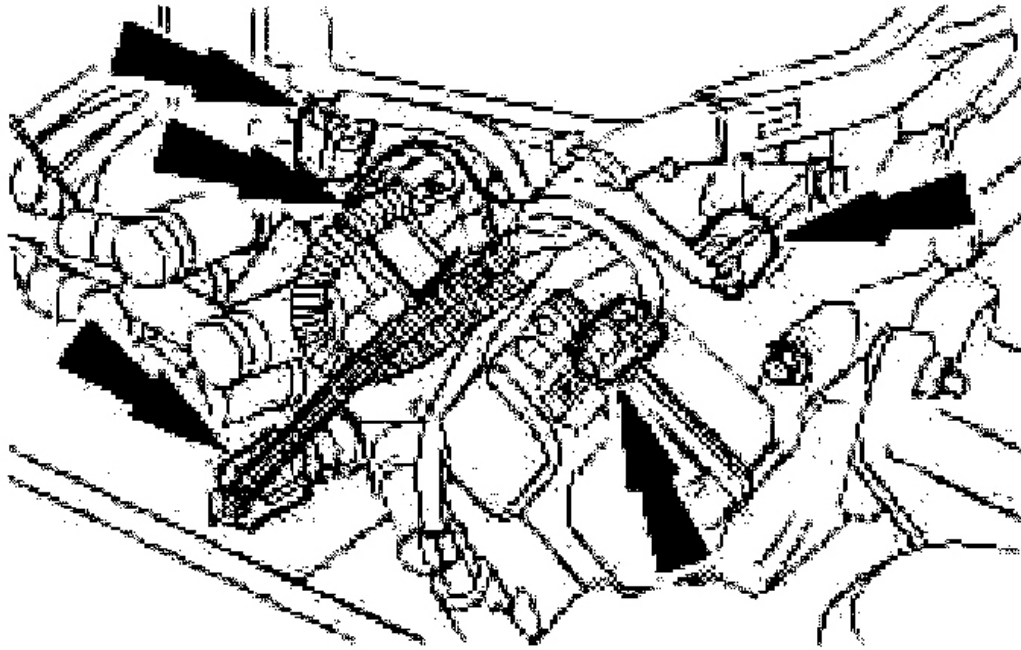
- Position the fuel charging wire harness.



G03432471

Fig. 423: Installing Fuel Charging Wire Harness
Courtesy of FORD MOTOR CO.

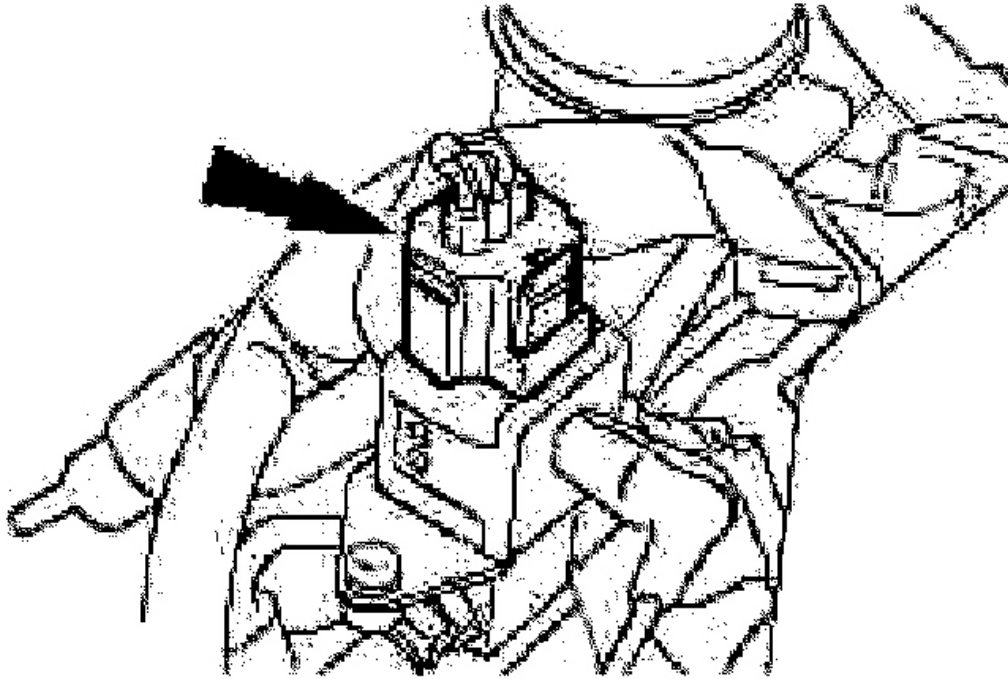
- Connect the electrical connectors.
 - Camshaft position (CMP) sensor
 - IMRC
 - Ignition coil
 - Capacitor
 - Water temperature sender unit



G03432472

Fig. 424: Connecting Electrical Connectors
Courtesy of FORD MOTOR CO.

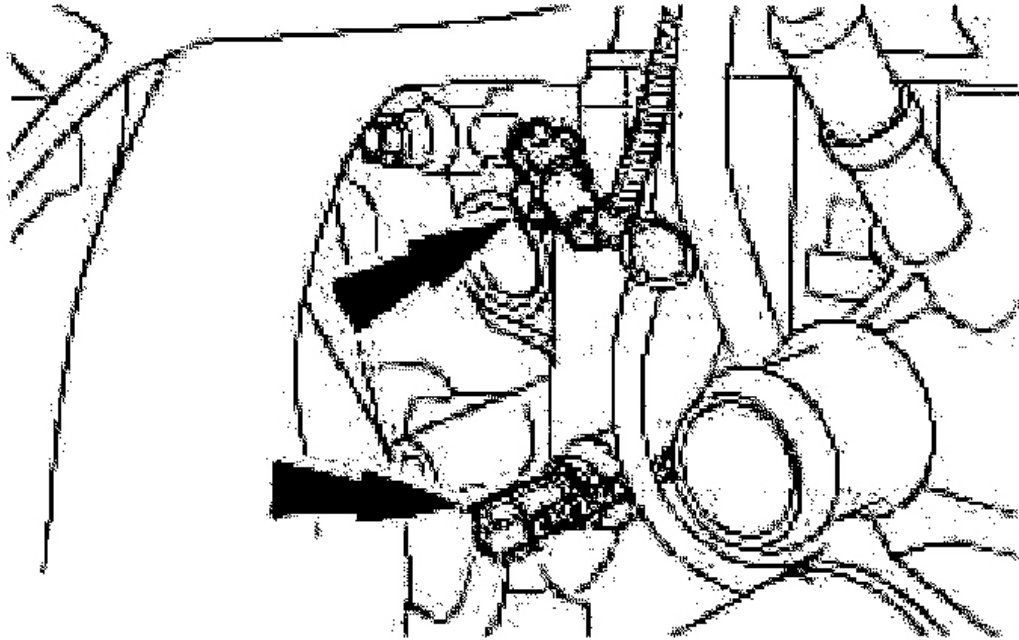
- Connect the fuel pressure sensor electrical connectors.



G03432473

Fig. 425: Connecting Fuel Pressure Sensor Electrical Connectors
Courtesy of FORD MOTOR CO.

- Connect the oil pressure sender unit and the knock sensor electrical connectors.

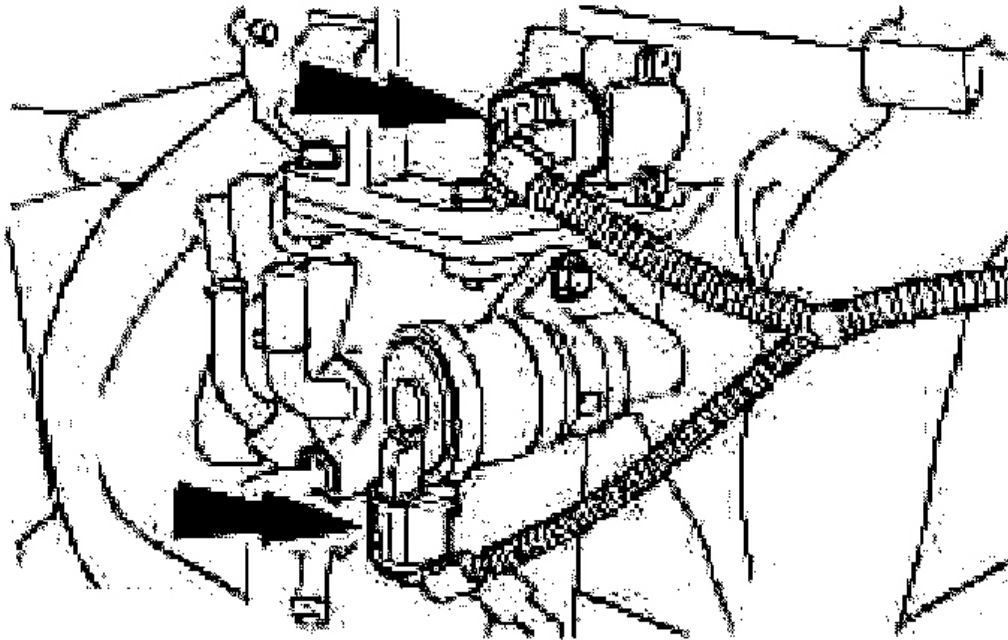


G03432474

Fig. 426: Connecting Oil Pressure Sender Unit And Knock Sensor Electrical Connectors

Courtesy of FORD MOTOR CO.

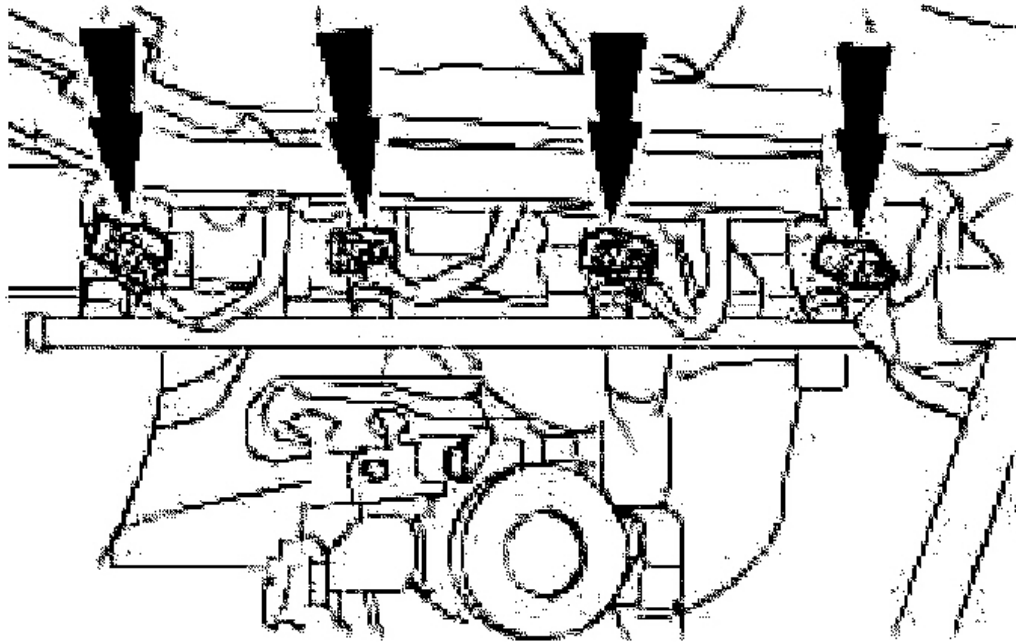
- Connect the idle air control valve and the throttle position sensor.



G03432475

Fig. 427: Connecting Idle Air Control Valve And Throttle Position Sensor
Courtesy of FORD MOTOR CO.

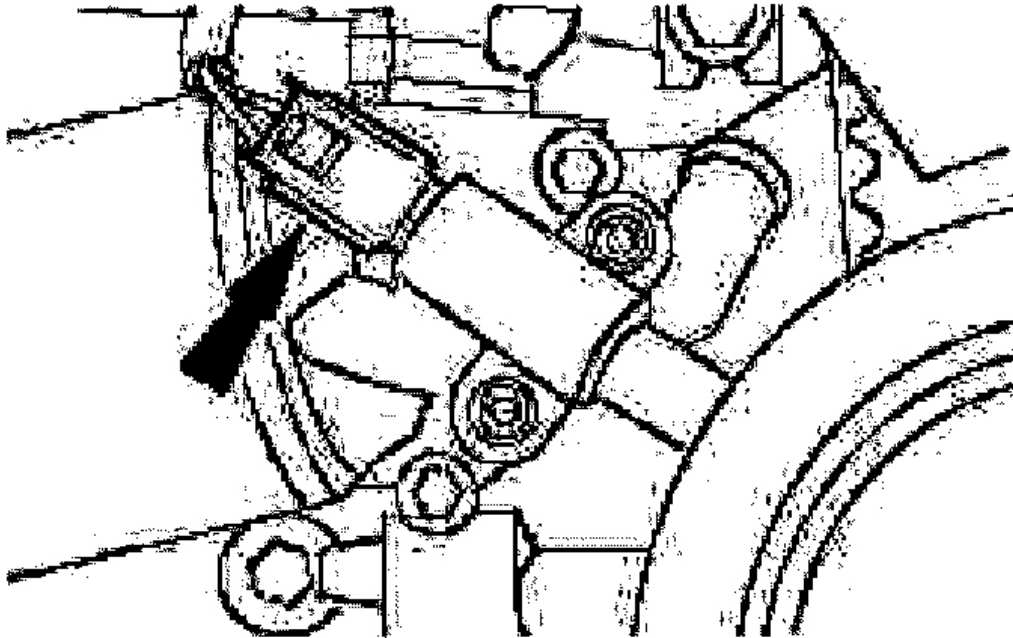
- Connect the fuel injectors electrical connectors.



G03432476

Fig. 428: Connecting Fuel Injectors Electrical Connectors
Courtesy of FORD MOTOR CO.

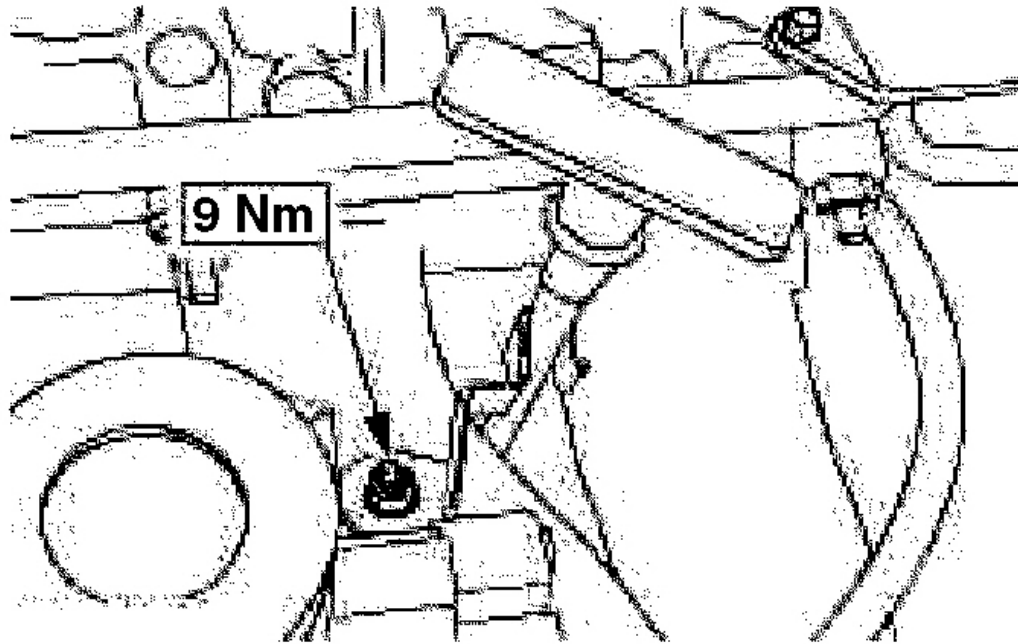
- Connect the crankshaft position sensor electrical connector.



G03432477

Fig. 429: Connecting Crankshaft Position Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

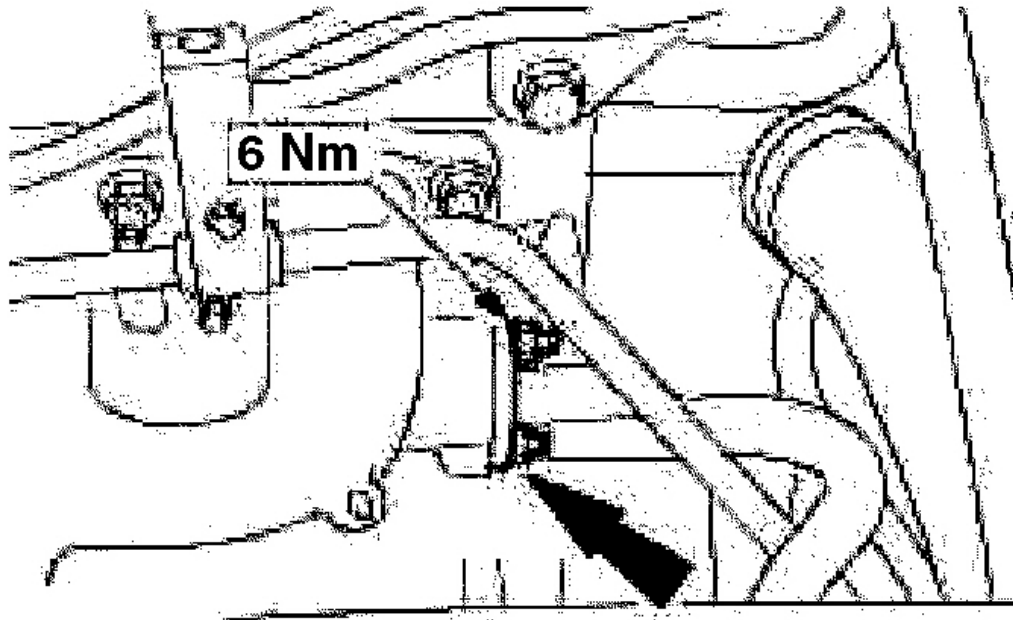
- Install the oil indicator tube.



G03432478

Fig. 430: Installing Oil Indicator Tube
Courtesy of FORD MOTOR CO.

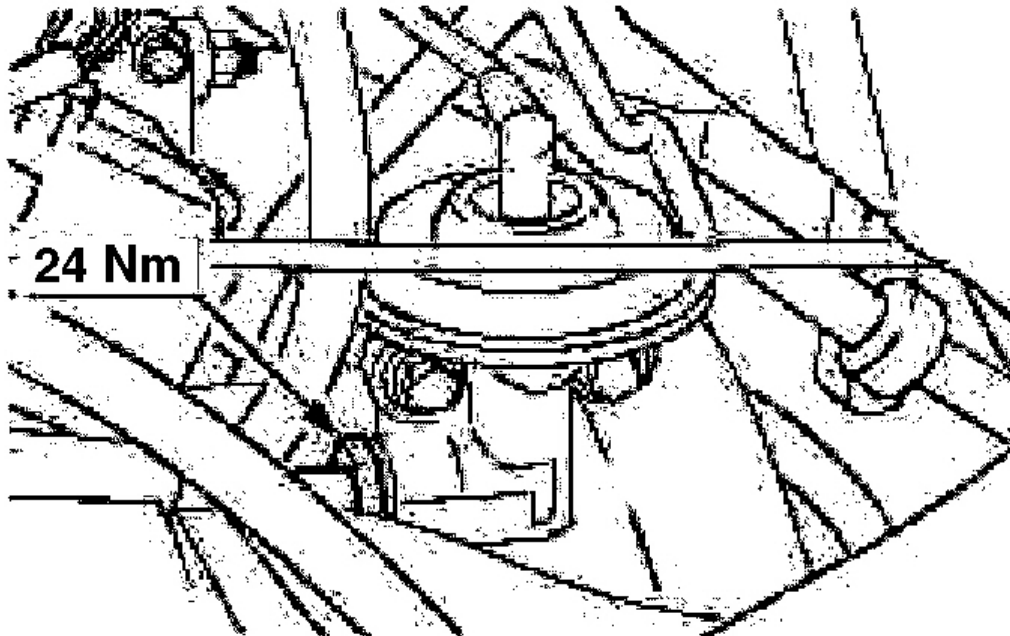
- Connect the EGR tube to the exhaust manifold.
 - Use a new gasket.



G03432479

Fig. 431: Connecting EGR Tube To Exhaust Manifold
Courtesy of FORD MOTOR CO.

- Install the EGR tube to the EGR valve.



G03432480

Fig. 432: Installing EGR Tube To EGR Valve
Courtesy of FORD MOTOR CO.

- Remove the engine from the stand.
- Install the flywheel.
 - Tighten the bolts fingertight.
 - Install the special tool.
 - Tighten the bolts.

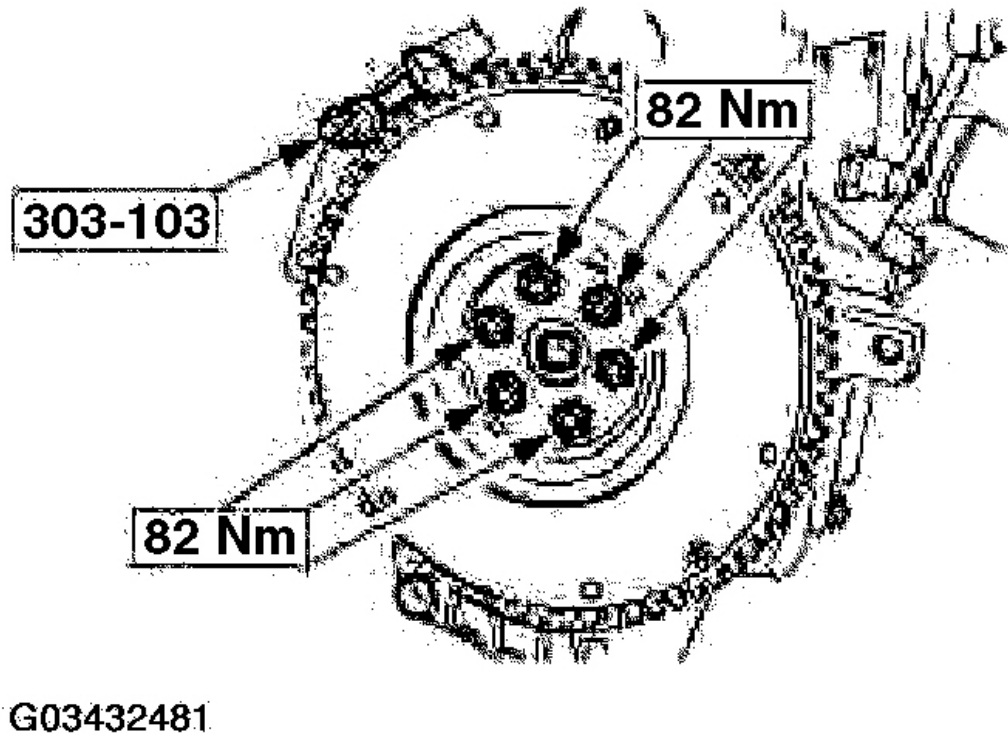


Fig. 433: Installing Flywheel
Courtesy of FORD MOTOR CO.

15. Install the clutch (if equipped). For additional information, refer to **CLUTCHES** article .
16. Install and connect:
 - Fresh air and positive crankcase ventilation hoses
 - Coolant hoses and tubes
 - Vacuum hoses

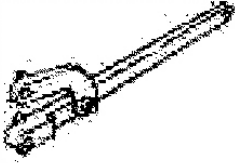

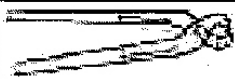
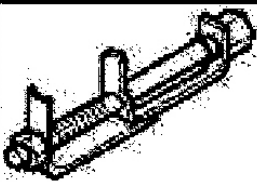
INSTALLATION

ENGINE - VEHICLES WITH: IB5/MANUAL TRANSAXLE

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine, 2.0L SPI - Focus

	Flange holding Wrench, Universal 205-(15-030A)
	Lifting Bracket, Engine 303-050 (T70P-6000)
	Boot Clamp Pliers or equivalent 205-D066 (D87P-1090 -A)
	Remover/Installer Radiator Hose Clamp 412-108 (T96P-18539-A)

G03432482

Fig. 434: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

Cable ties	ESD-M1C220-A
High-temperature grease	
Engine oil	WSS-M2C153-H
Transmission fluid	WSD-M2C200-B

Installation

All Vehicles

1. Using the special tool and a floor crane to position the engine to the transaxle.

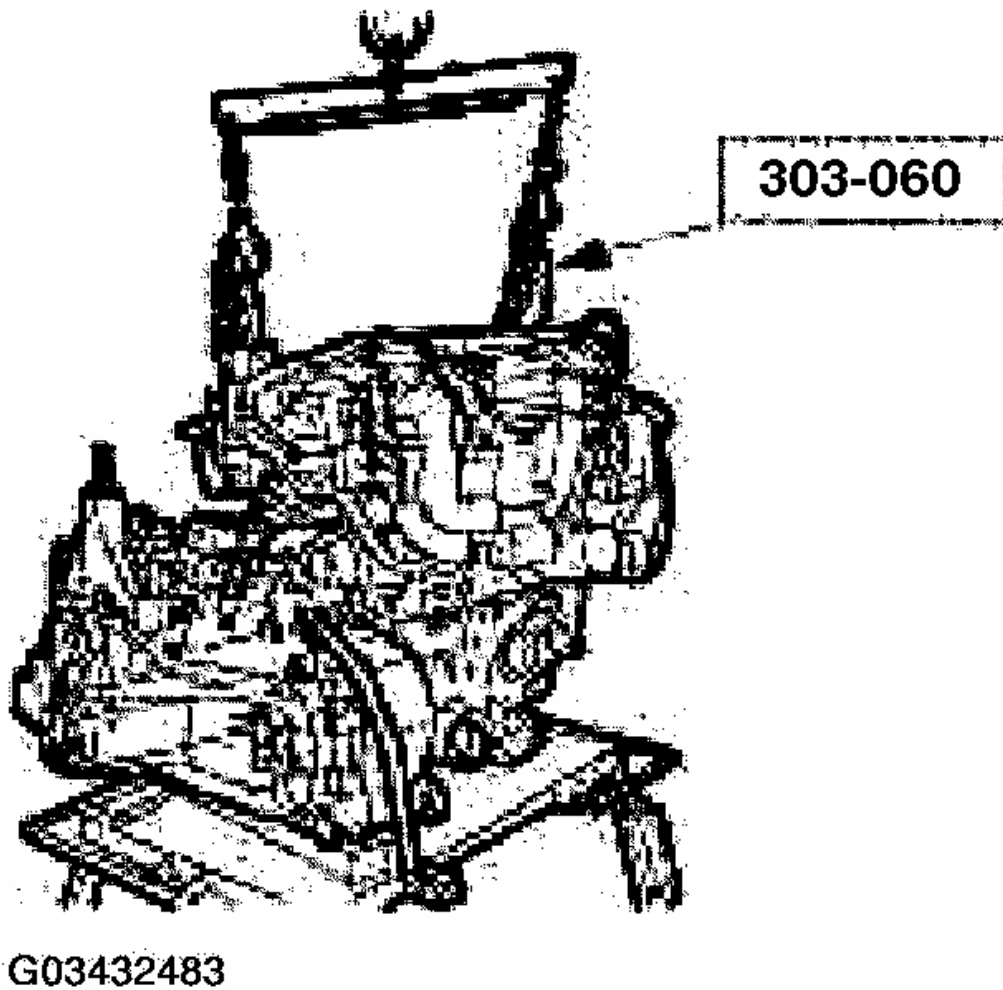
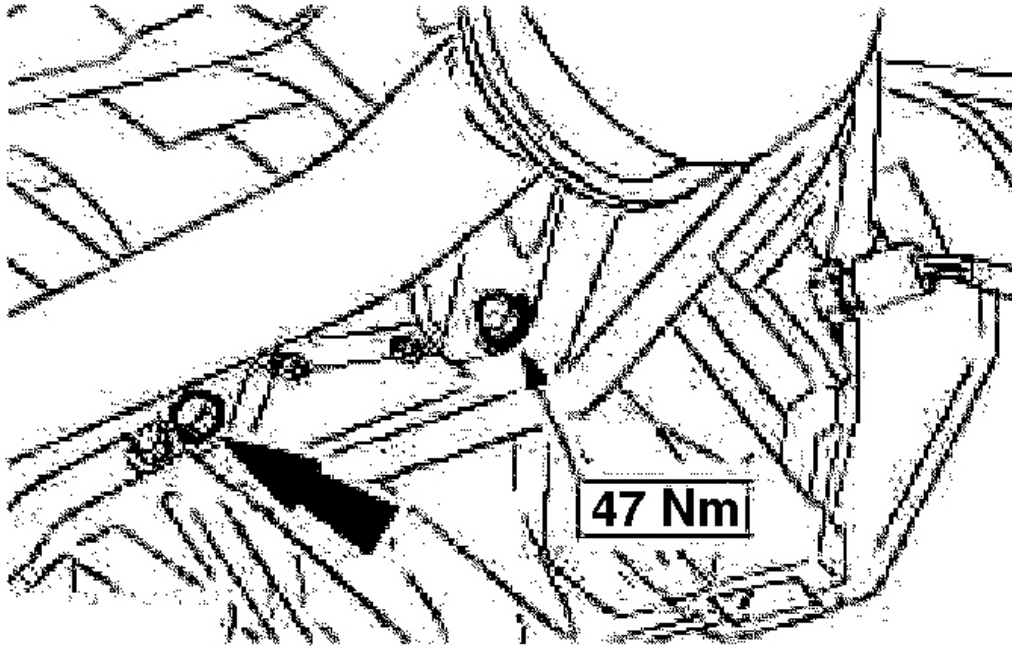


Fig. 435: Positioning Engine To Transaxle Using Special Tool And Floor Crane
Courtesy of FORD MOTOR CO.

2. Tighten the transaxle flange lower bolts.



G03432484

Fig. 436: Tightening Transaxle Flange Lower Bolts
Courtesy of FORD MOTOR CO.

3. Tighten the transaxle flange left-hand bolts.

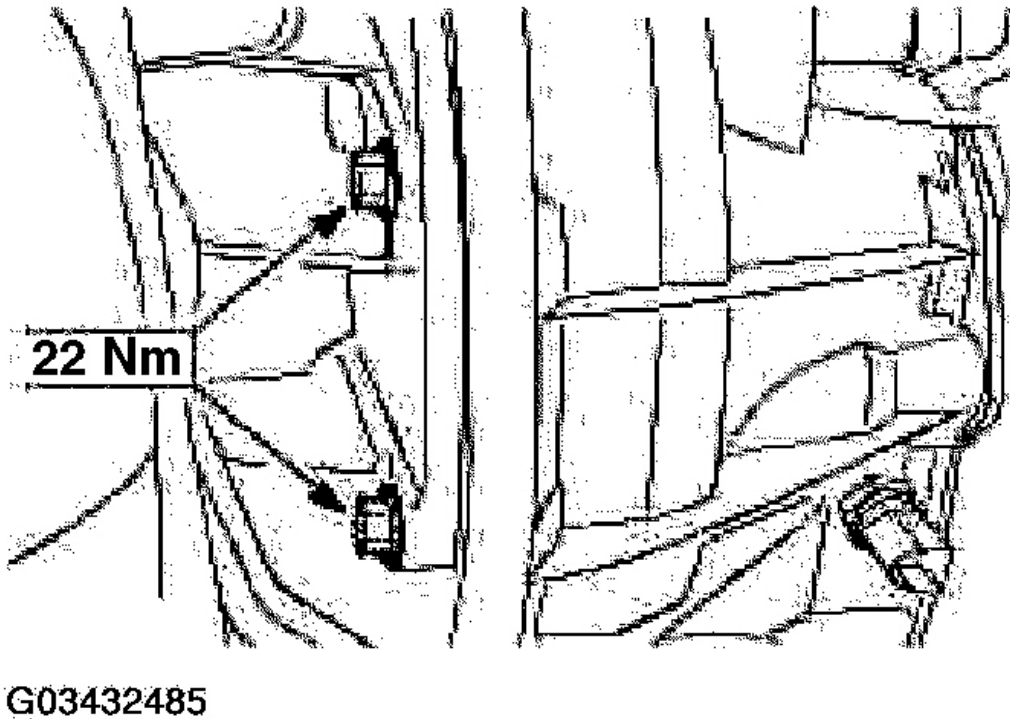
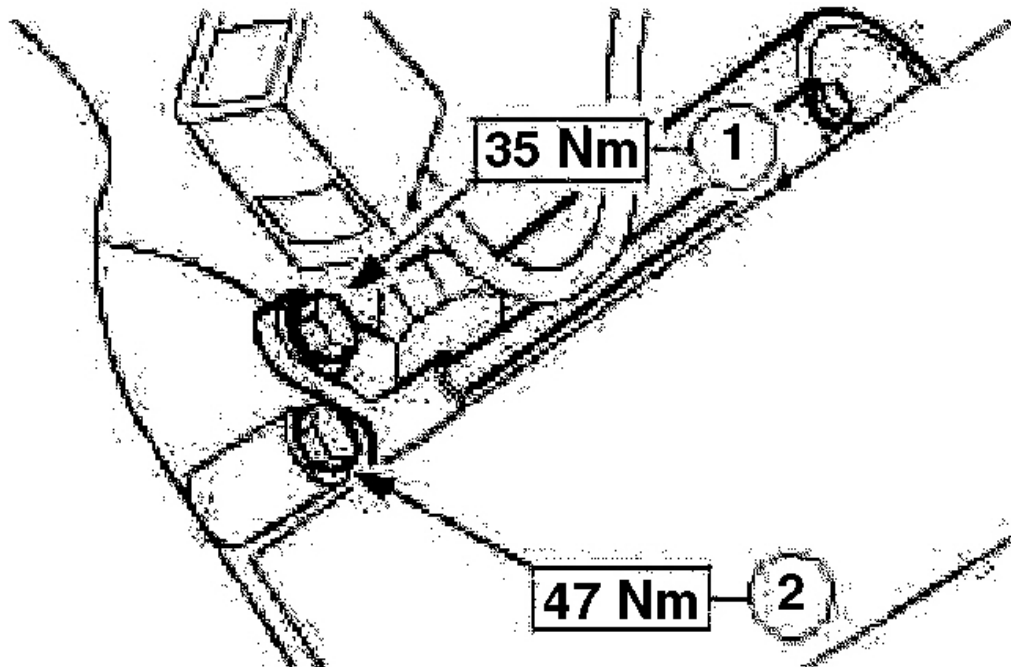


Fig. 437: Tightening Transaxle Flange Left-Hand Bolts
Courtesy of FORD MOTOR CO.

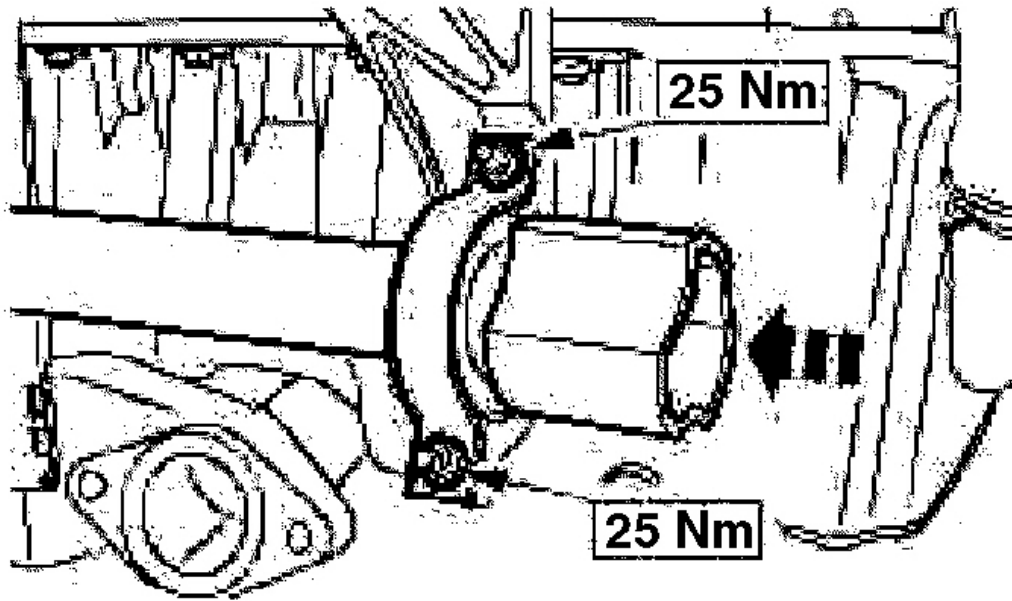
4. Install the starter motor and tighten the flange bolt.
 1. Starter motor bolt
 2. Flange bolt



G03432486

Fig. 438: Installing Starter Motor And Tightening Flange Bolt
Courtesy of FORD MOTOR CO.

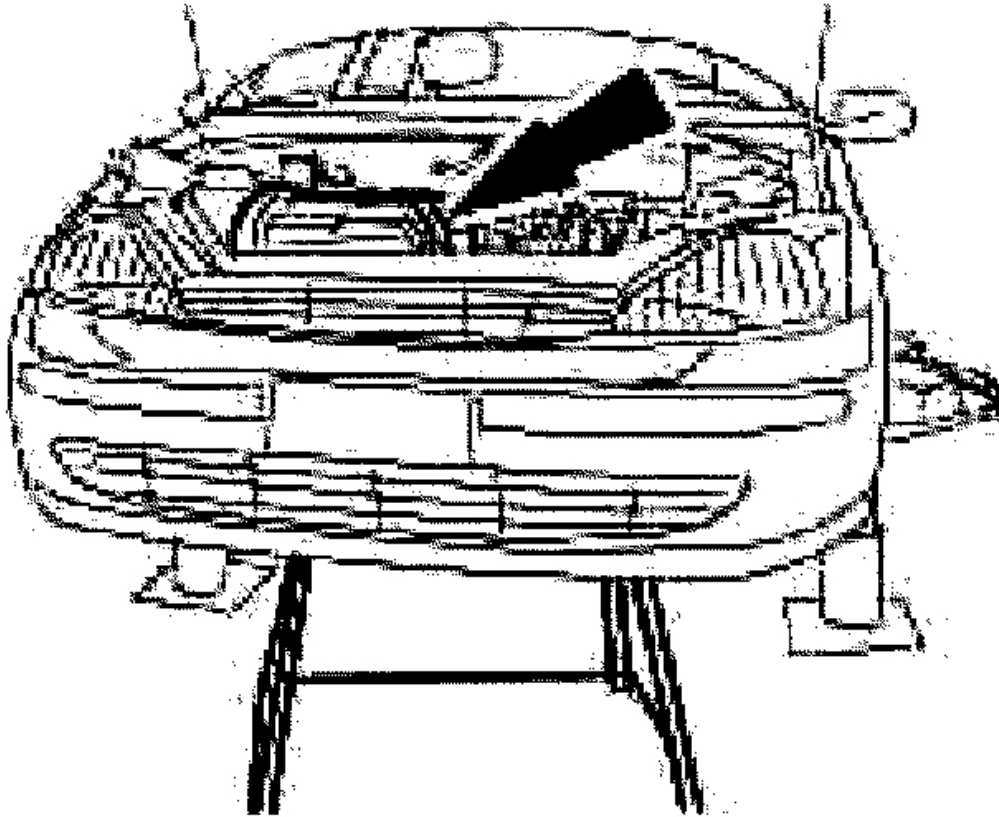
NOTE: Use new retaining clamp.



G03432487

Fig. 439: Installing Retaining Clamp
Courtesy of FORD MOTOR CO.

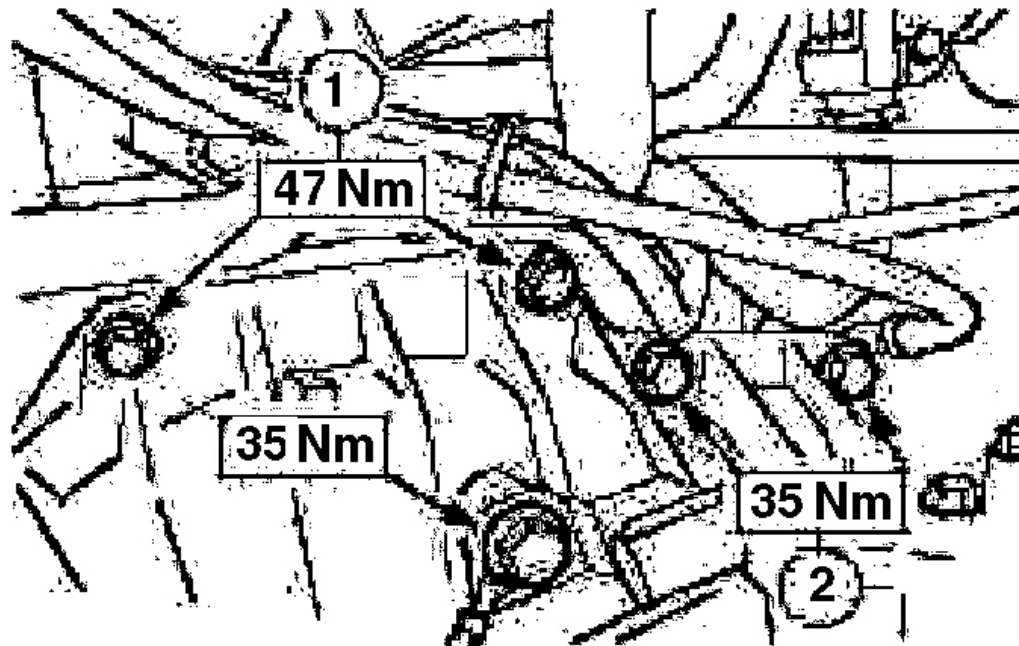
5. Install the retaining clamp.
6. Raise and support the vehicle.
7. Locate the engine and transmission assembly on the assembly stand in installation position underneath the vehicle.



G03432488

Fig. 440: Locating Engine And Transmission Assembly On Assembly Stand
Courtesy of FORD MOTOR CO.

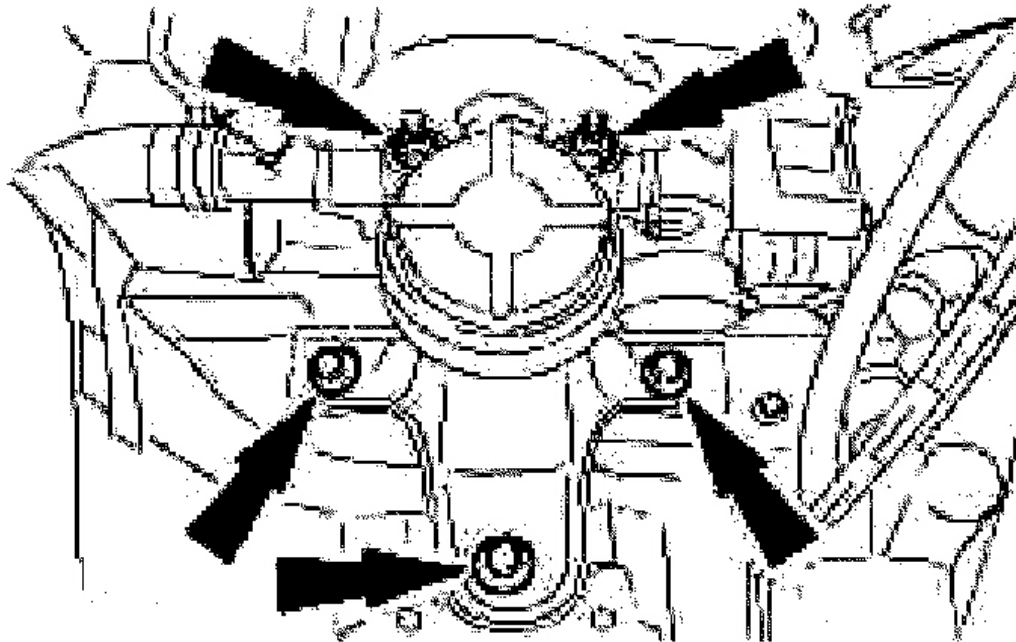
8. Carefully lower the vehicle.
9. Install the bolts.
 1. Transaxle upper flange bolts.
 2. Starter motor bolts.
 - Install the ground strap.



G03432489

Fig. 441: Installing Transaxle Upper Flange Bolts And Starter Motor Bolts
Courtesy of FORD MOTOR CO.

NOTE: Install the bolts and nuts finger tight.

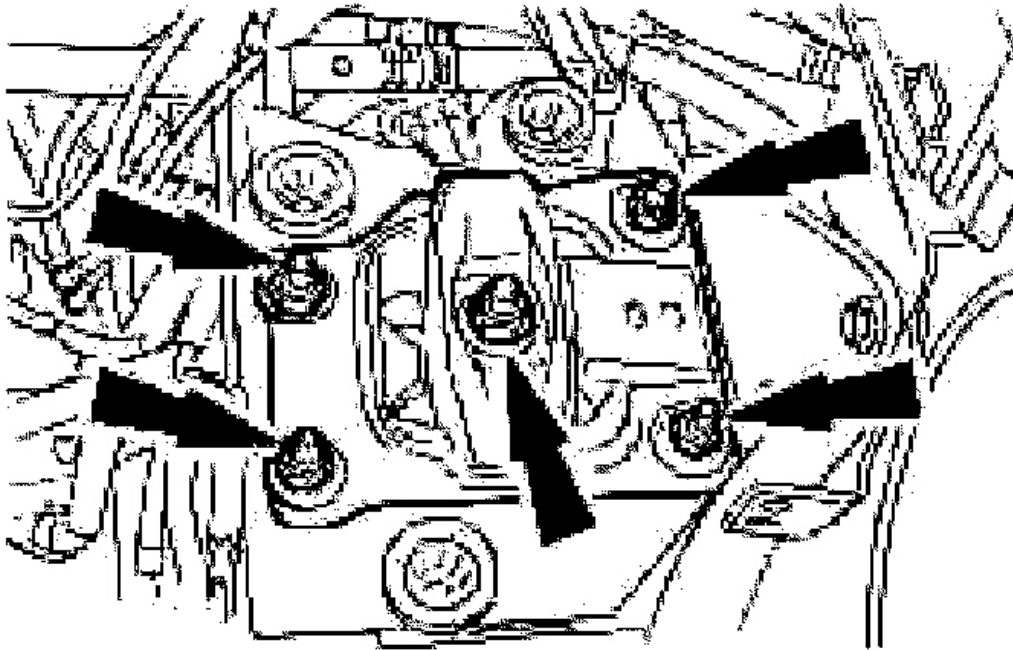


G03432490

Fig. 442: Installing Engine Front Mount
Courtesy of FORD MOTOR CO.

10. Install the engine front mount.

NOTE: Install the nuts finger tight.

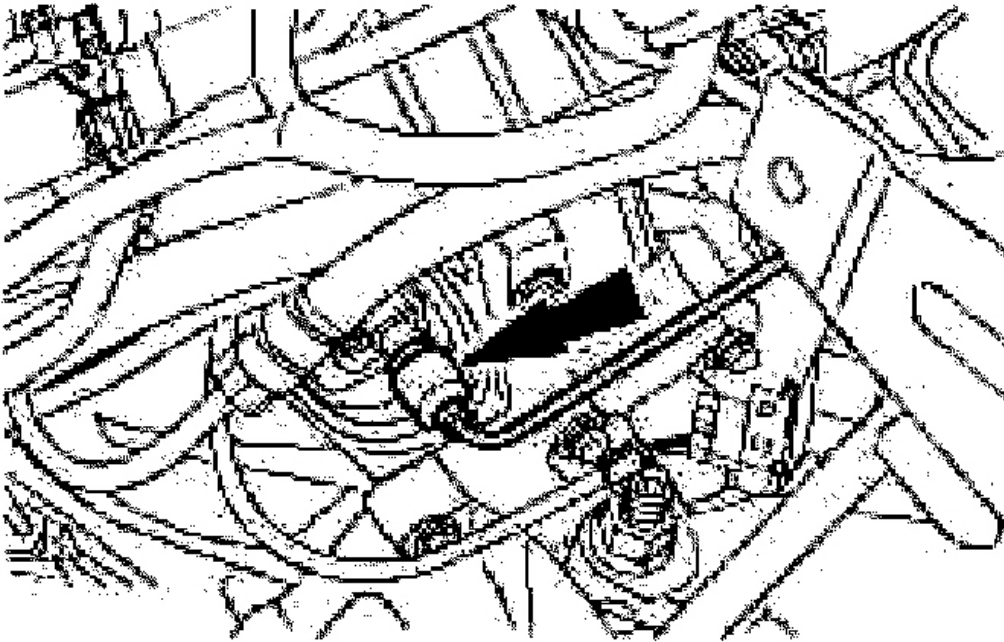


G03432491

Fig. 443: Installing Engine Rear Mount
Courtesy of FORD MOTOR CO.

11. Install the engine rear mount.

CAUTION: Brake fluid will escape. Observe the safety regulations for the use of brake fluid. .



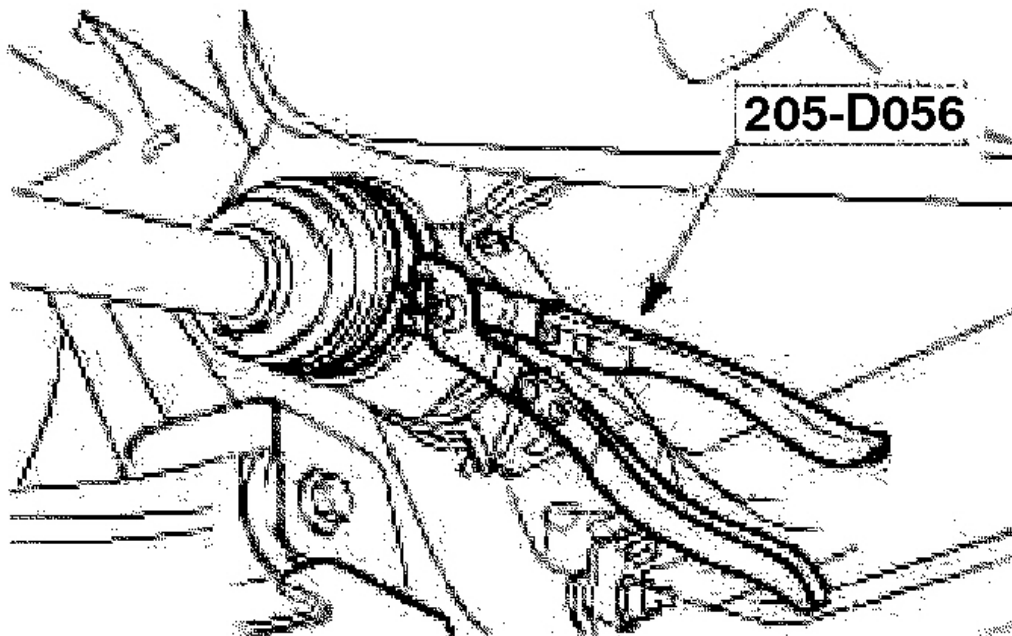
G03432492

Fig. 444: Connecting High-Pressure Tube To Clutch Slave Cylinder
Courtesy of FORD MOTOR CO.

12. Connect the high-pressure tube to the clutch slave cylinder.
13. Remove the retaining strap from the transaxle.
14. Raise and support the vehicle.
 - Remove the assembly stand.

CAUTION: The inner part of the constant velocity joint must not be bent at more than 18 degrees, the outer part no more than 45 degrees.

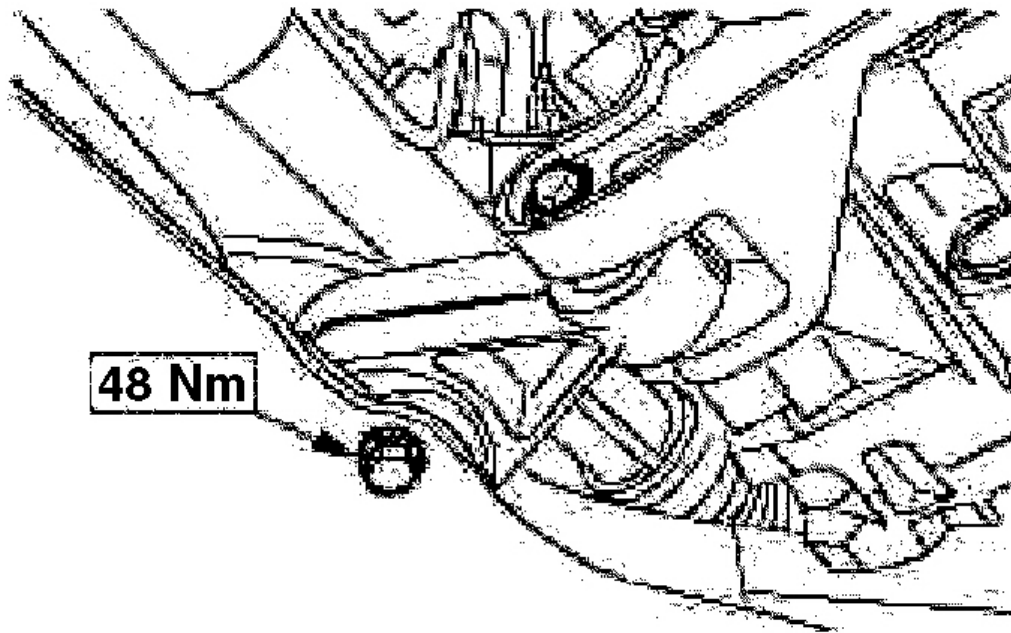
NOTE: Use a new boot clamp.



G03432493

Fig. 445: Installing Front Drive Halfshafts
Courtesy of FORD MOTOR CO.

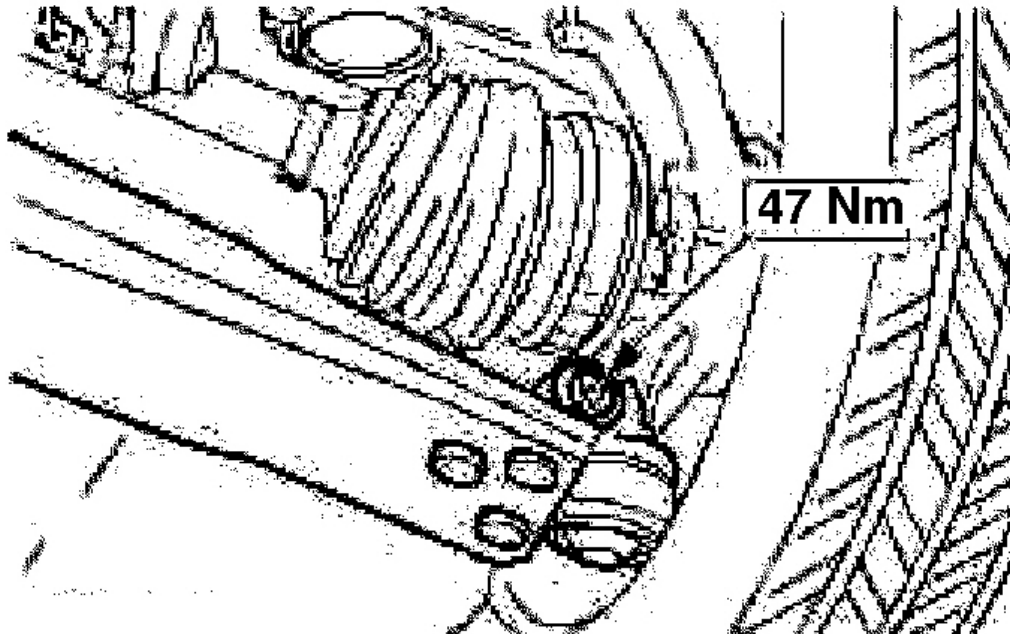
15. Using the special tool, install both front drive halfshafts (right-hand side shown).
16. Install the right-hand engine support insulator.



G03432494

Fig. 446: Installing Right-Hand Engine Support Insulator
Courtesy of FORD MOTOR CO.

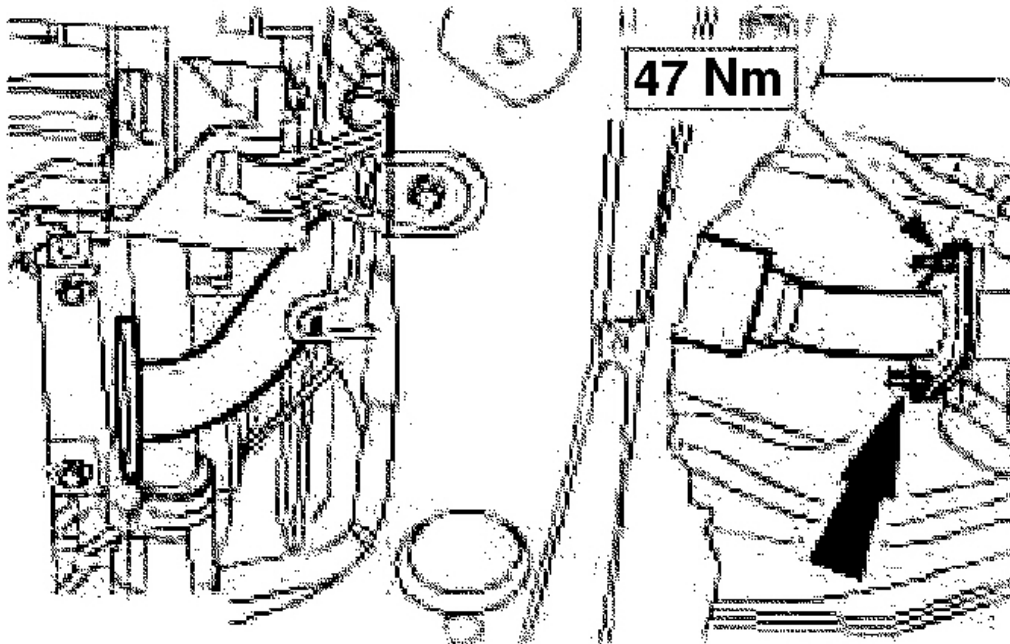
17. Attach both lower arms (right-hand side shown).



G03432495

Fig. 447: Installing Lower Arms
Courtesy of FORD MOTOR CO.

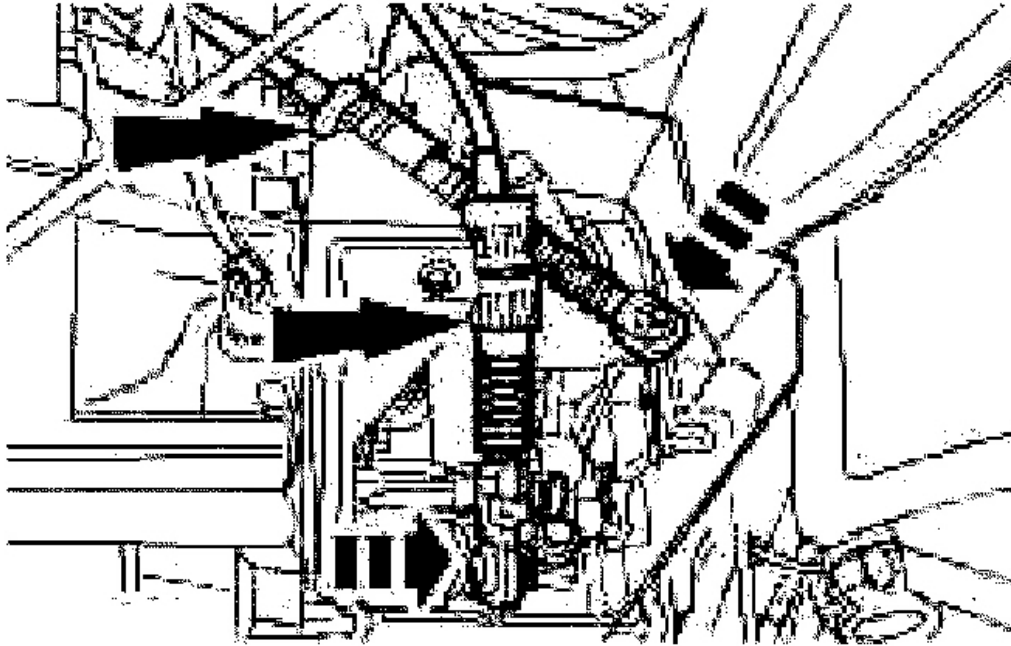
18. Install the flexible exhaust pipe.



G03432496

Fig. 448: Installing Flexible Exhaust Pipe
Courtesy of FORD MOTOR CO.

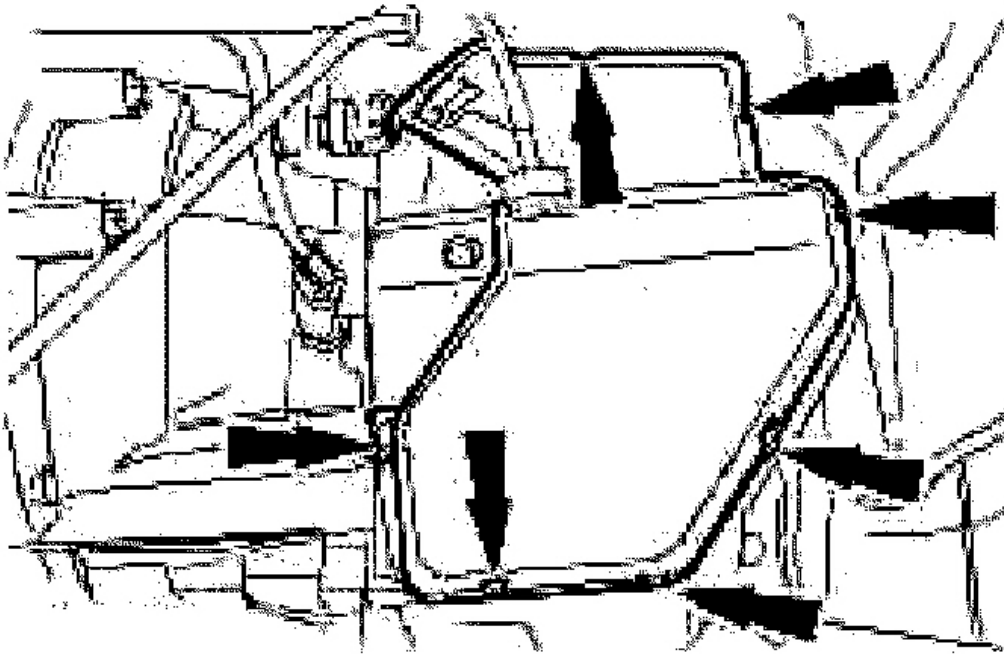
19. Install the gearshift cables.
 - Attach the gearshift cables to the brackets by twisting the abutment brackets counterclockwise.



G03432497

Fig. 449: Installing Gearshift Cables
Courtesy of FORD MOTOR CO.

20. Install the cover for the gearshift cables.

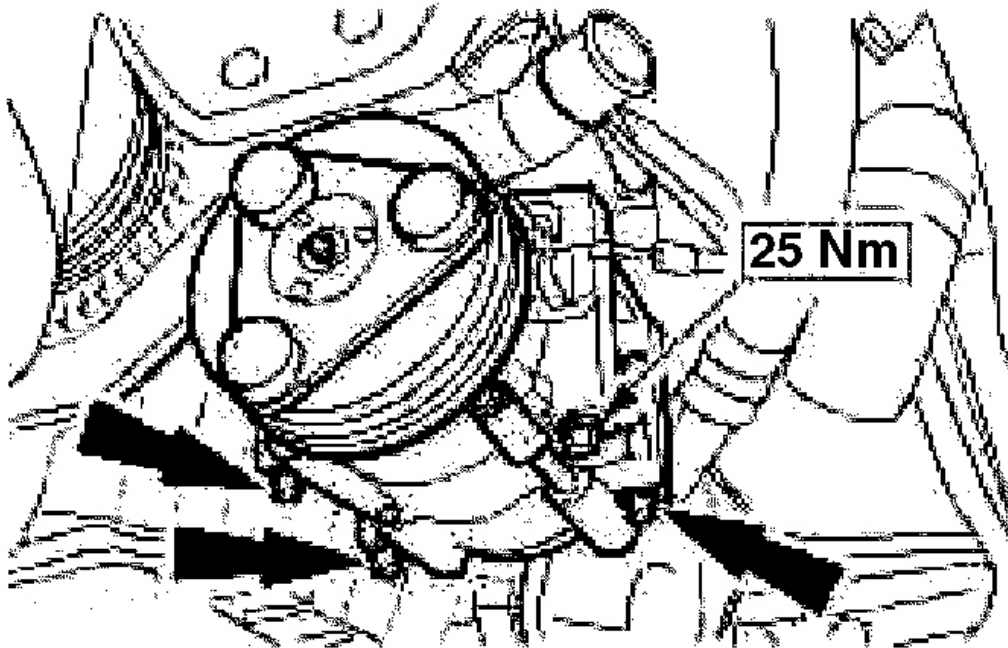


G03432498

Fig. 450: Installing Gearshift Cables Cover
Courtesy of FORD MOTOR CO.

Vehicles with air conditioning

21. Install the air conditioning compressor.

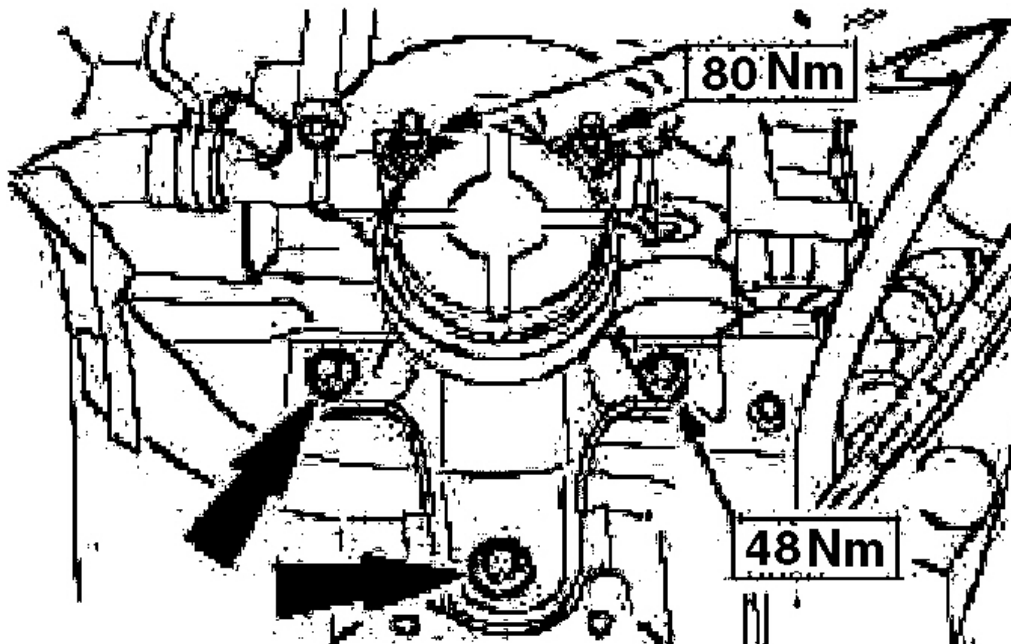


G03432499

Fig. 451: Installing Air Conditioning Compressor
Courtesy of FORD MOTOR CO.

All Vehicles

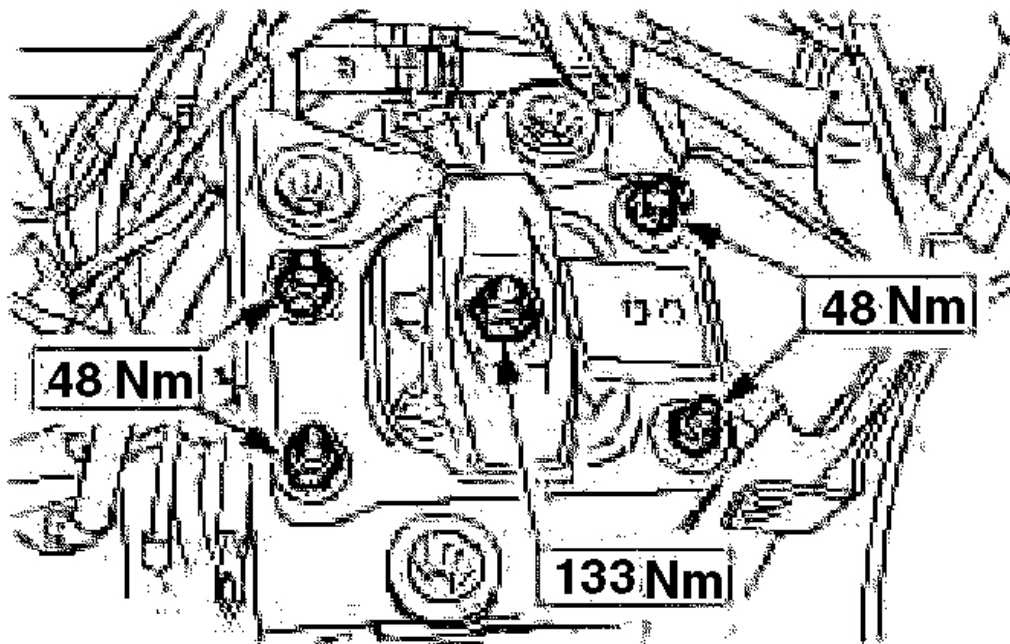
22. Install the catalytic converter.
23. Tighten the engine front mount nuts and bolts.



G03432500

Fig. 452: Tightening Engine Front Mount Nuts And Bolts
Courtesy of FORD MOTOR CO.

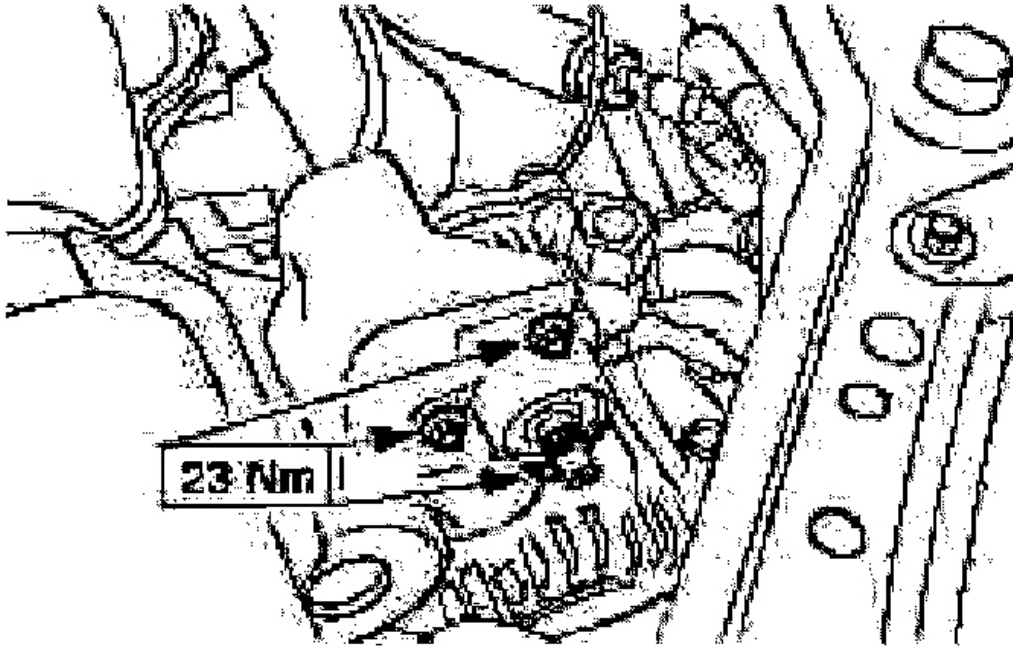
24. Tighten the engine rear mount nuts.



G03432501

Fig. 453: Tightening Engine Rear Mount Nuts
Courtesy of FORD MOTOR CO.

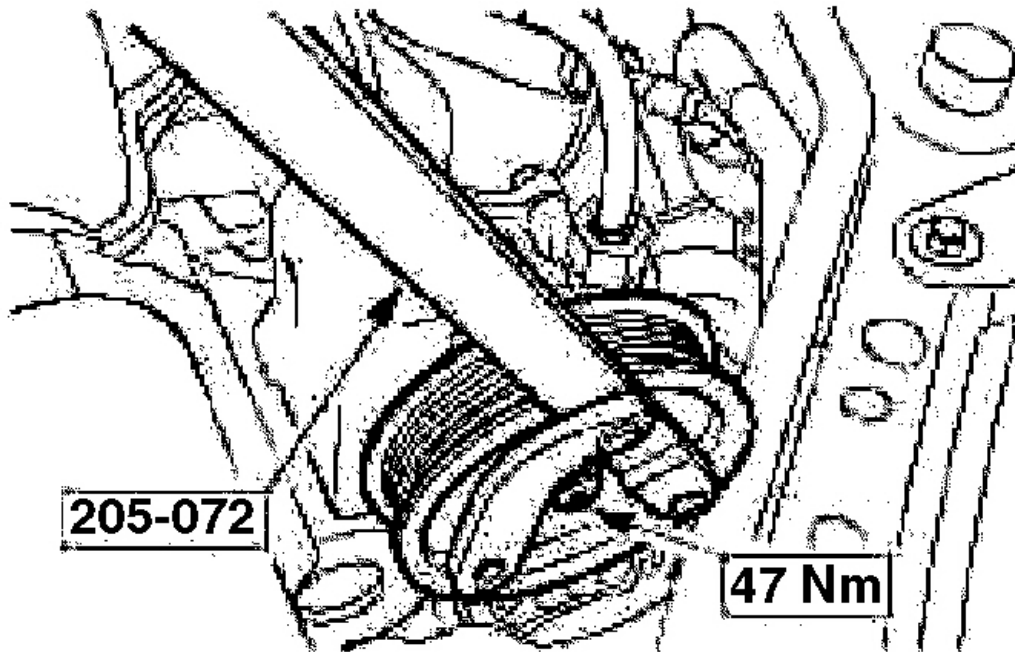
25. Install the power steering pump.



G03432502

Fig. 454: Installing Power Steering Pump
Courtesy of FORD MOTOR CO.

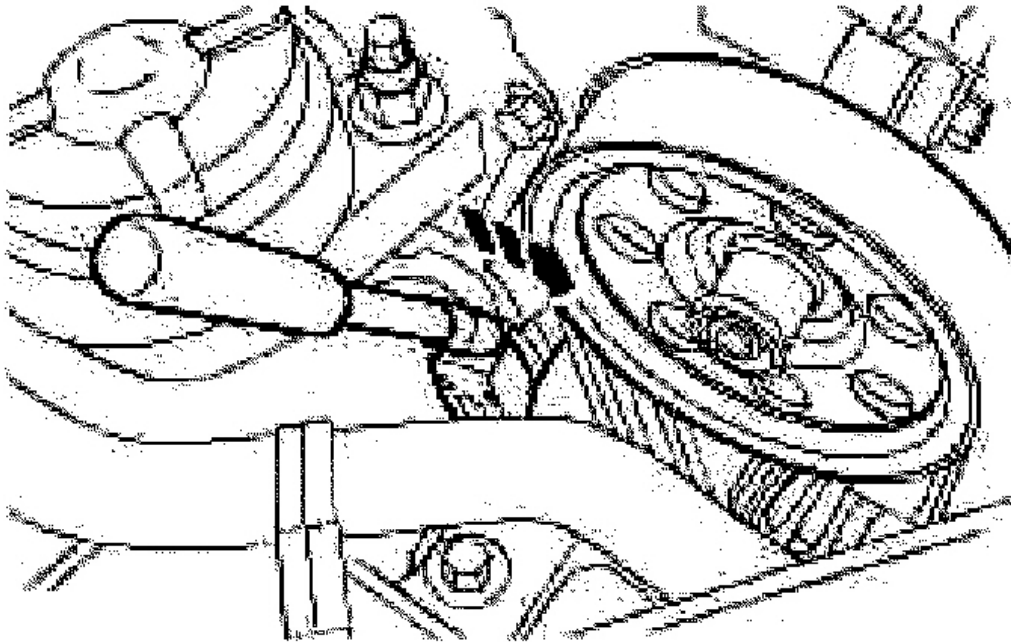
26. Using the special tool to prevent the power steering pump from rotating install the power steering pump pulley nut. Install the power steering pump pulley.



G03432503

Fig. 455: Preventing Power Steering Pump From Rotating Using Special Tool
Courtesy of FORD MOTOR CO.

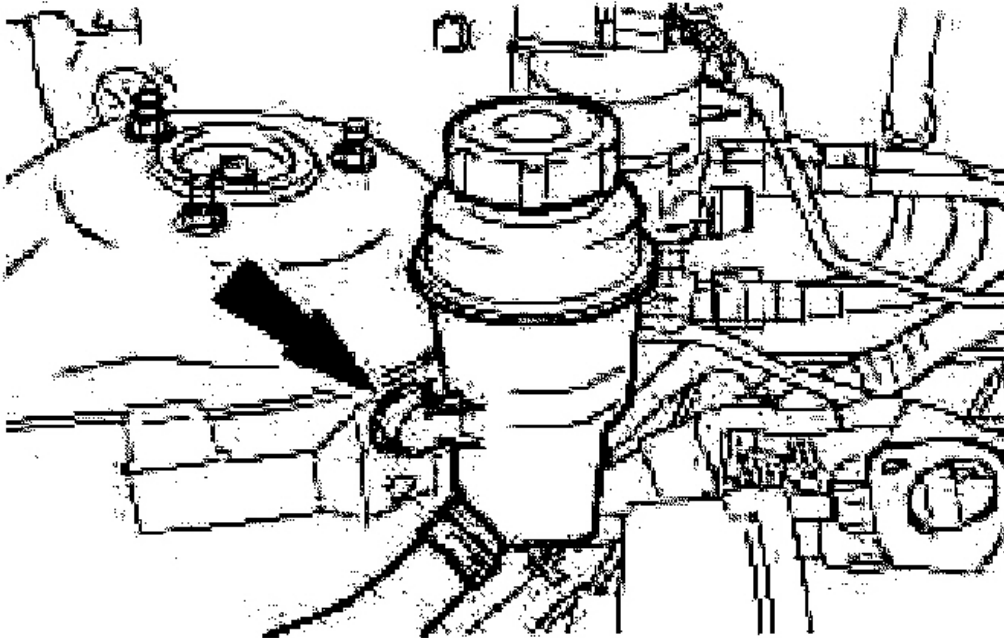
27. Install the accessory drive belt.
 - Turn the belt tensioner clockwise.



G03432504

Fig. 456: Installing Accessory Drive Belt
Courtesy of FORD MOTOR CO.

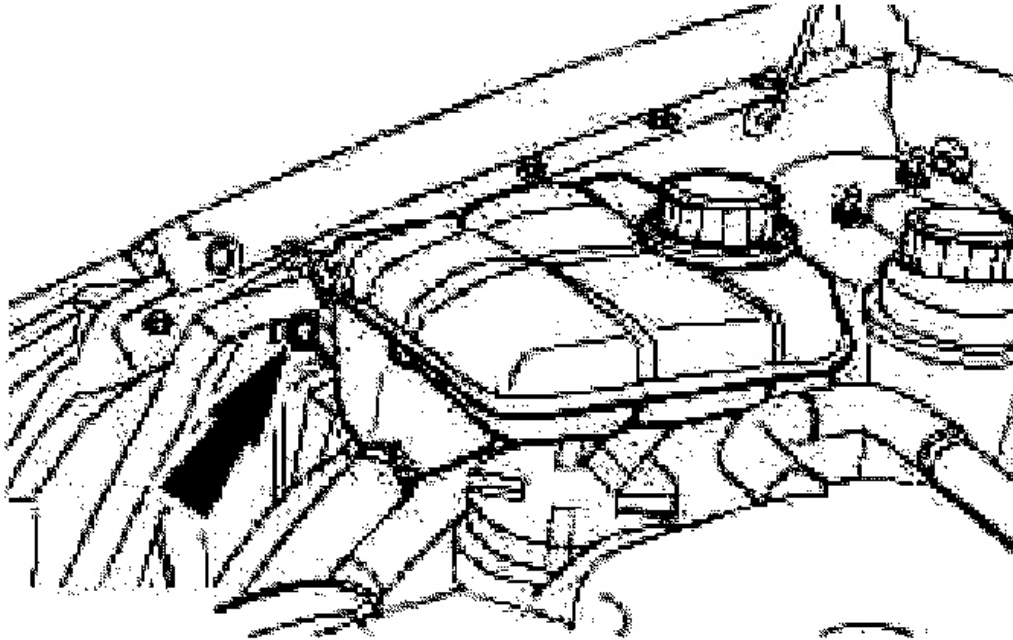
28. Push the power steering fluid reservoir into place.



G03432505

Fig. 457: Installing Power Steering Fluid Reservoir
Courtesy of FORD MOTOR CO.

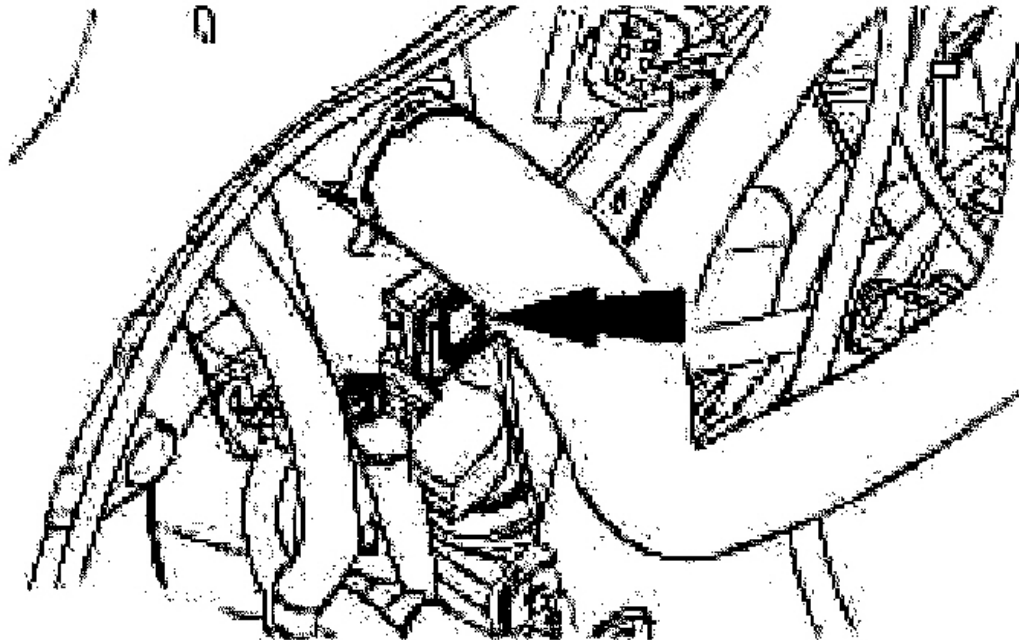
29. Install the coolant expansion tank.



G03432506

Fig. 458: Installing Coolant Expansion Tank
Courtesy of FORD MOTOR CO.

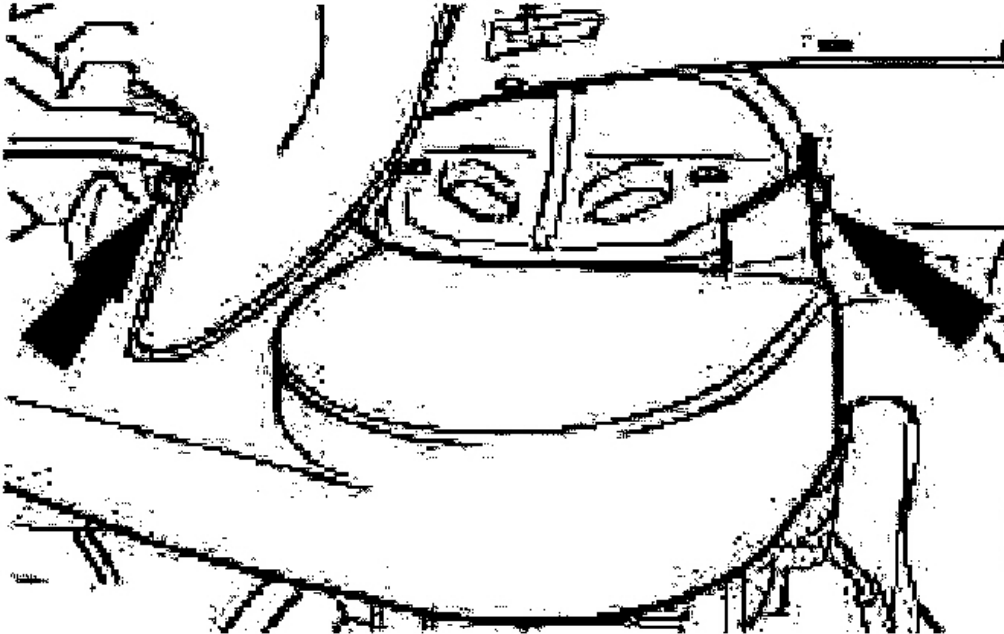
30. Install the cooling fan to the radiator.
 - Position the air deflector and clip on at the top on both sides (left-hand side shown).
 - Install the cooling fan wiring harness.



G03432507

Fig. 459: Installing Cooling Fan To Radiator
Courtesy of FORD MOTOR CO.

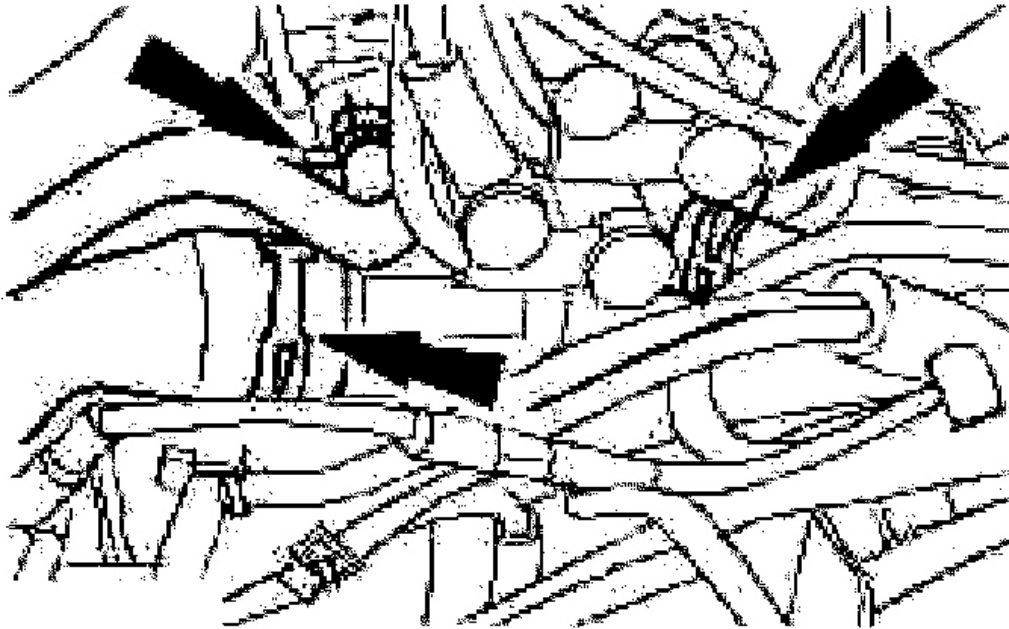
31. Raise and support the vehicle.
32. Install the accessory drive belt cover.



G03432508

Fig. 460: Installing Accessory Drive Belt Cover
Courtesy of FORD MOTOR CO.

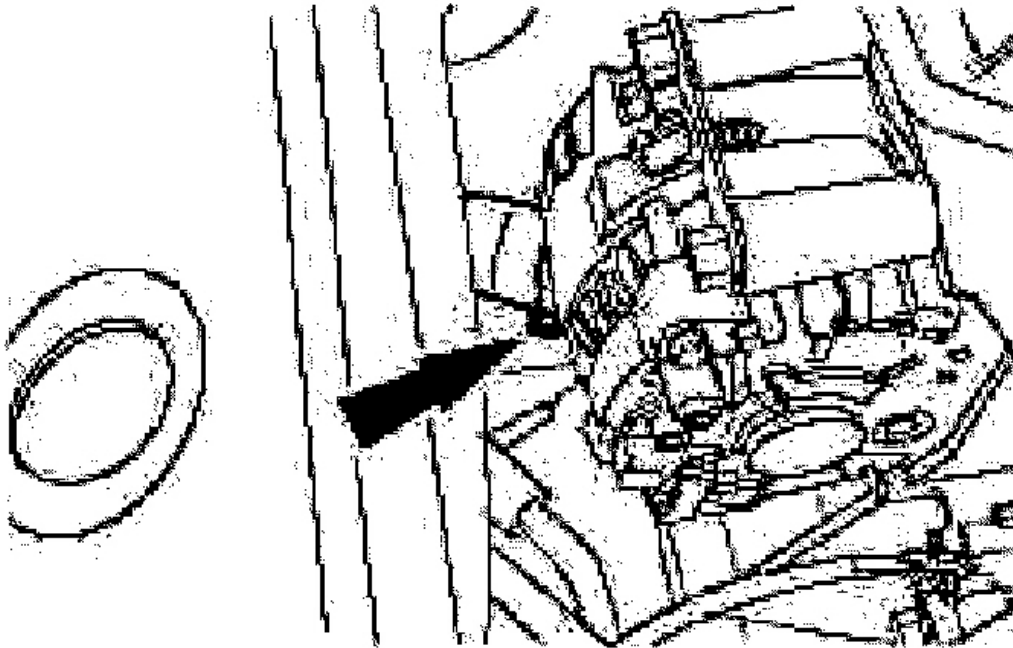
33. Lower the vehicle.
34. Install the coolant hoses to the coolant hose connector.



G03432509

Fig. 461: Installing Coolant Hoses To Coolant Hose Connector
Courtesy of FORD MOTOR CO.

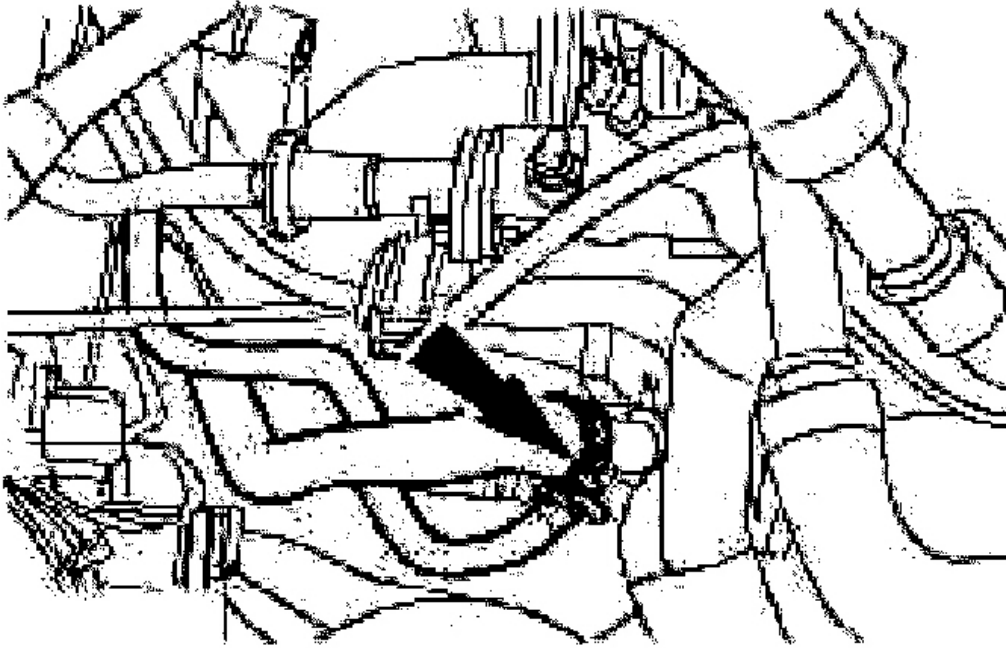
35. Install the coolant hose to the coolant tube.



G03432510

Fig. 462: Installing Coolant Hose To Coolant Tube
Courtesy of FORD MOTOR CO.

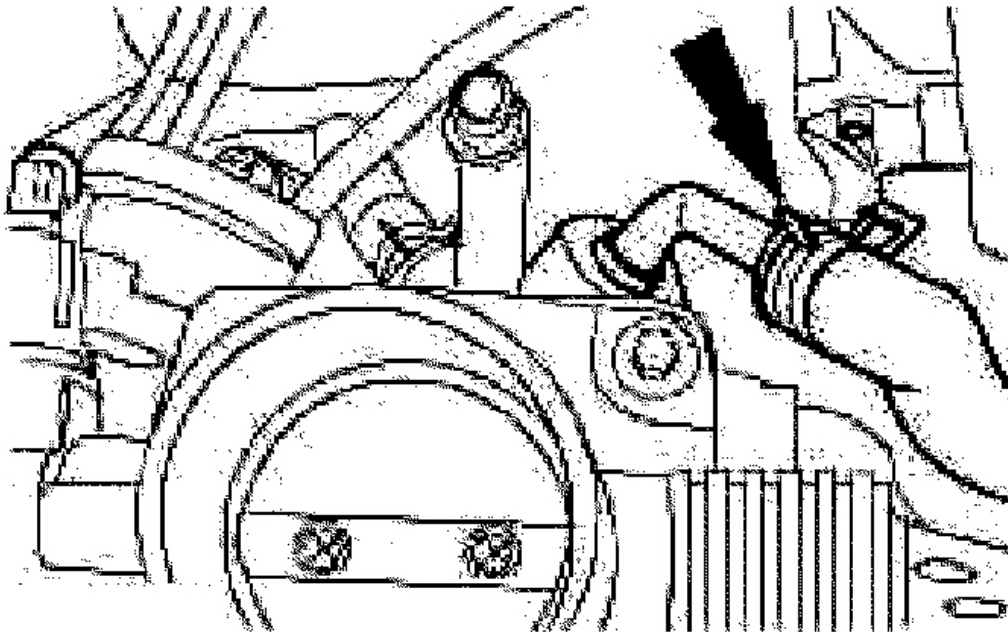
36. Install the coolant hose to the water pump.



G03432511

Fig. 463: Installing Coolant Hose To Water Pump
Courtesy of FORD MOTOR CO.

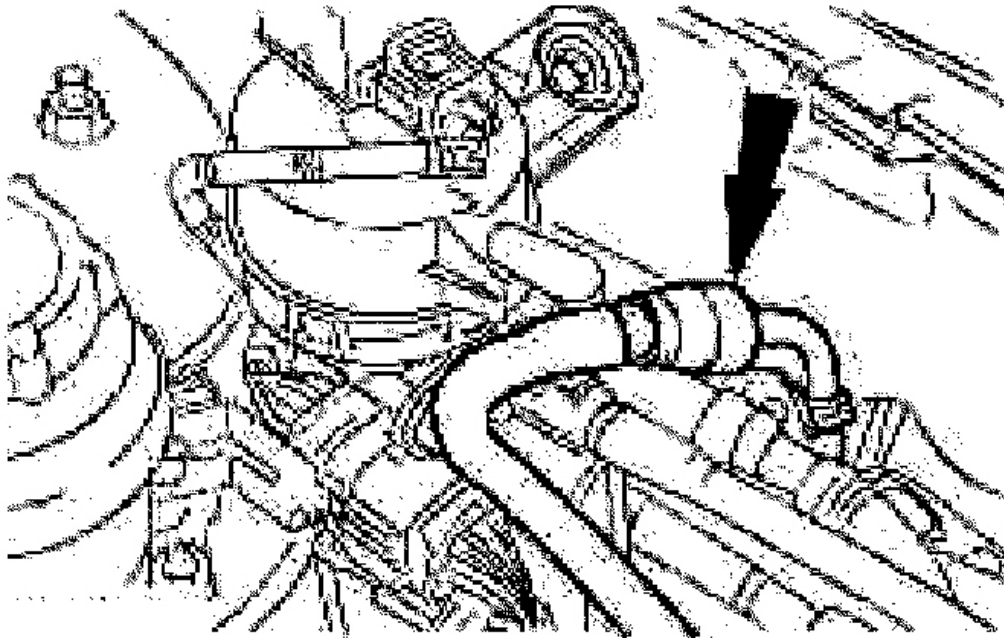
37. Install the coolant hose to the intake manifold.



G03432512

Fig. 464: Installing Coolant Hose To Intake Manifold
Courtesy of FORD MOTOR CO.

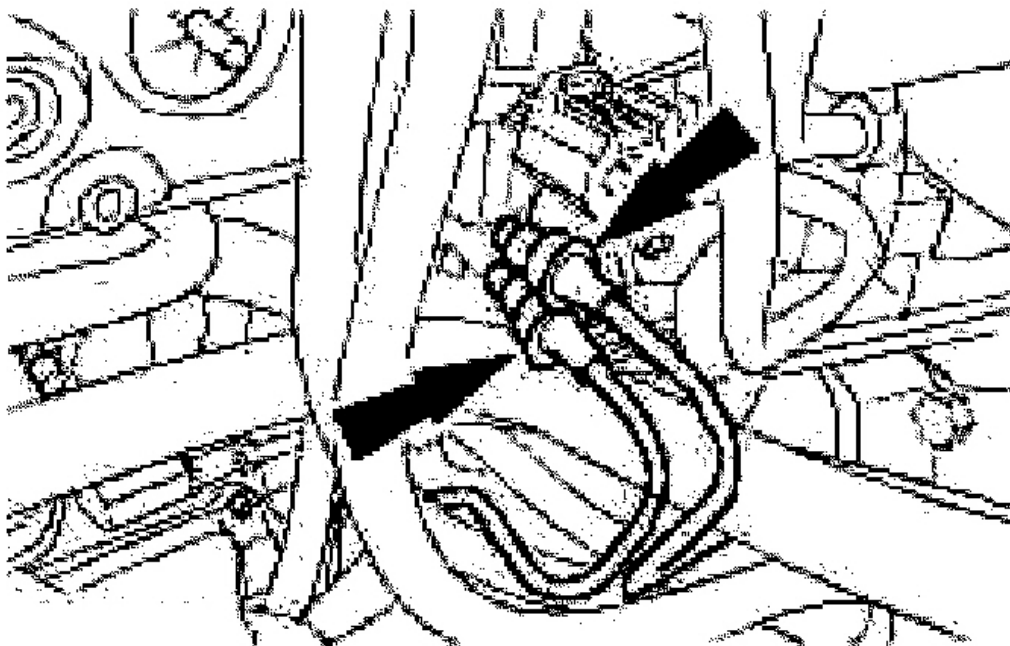
38. Connect the fuel pipe.



G03432513

Fig. 465: Connecting Fuel Pipe
Courtesy of FORD MOTOR CO.

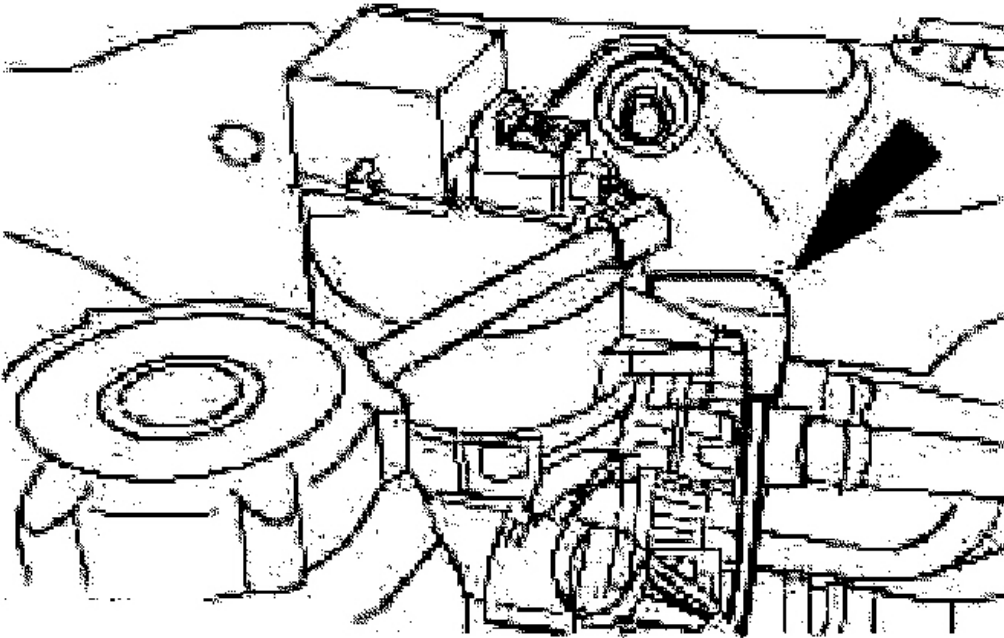
39. Connect the vacuum hoses.



G03432514

Fig. 466: Connecting Vacuum Hoses (1 Of 2)
Courtesy of FORD MOTOR CO.

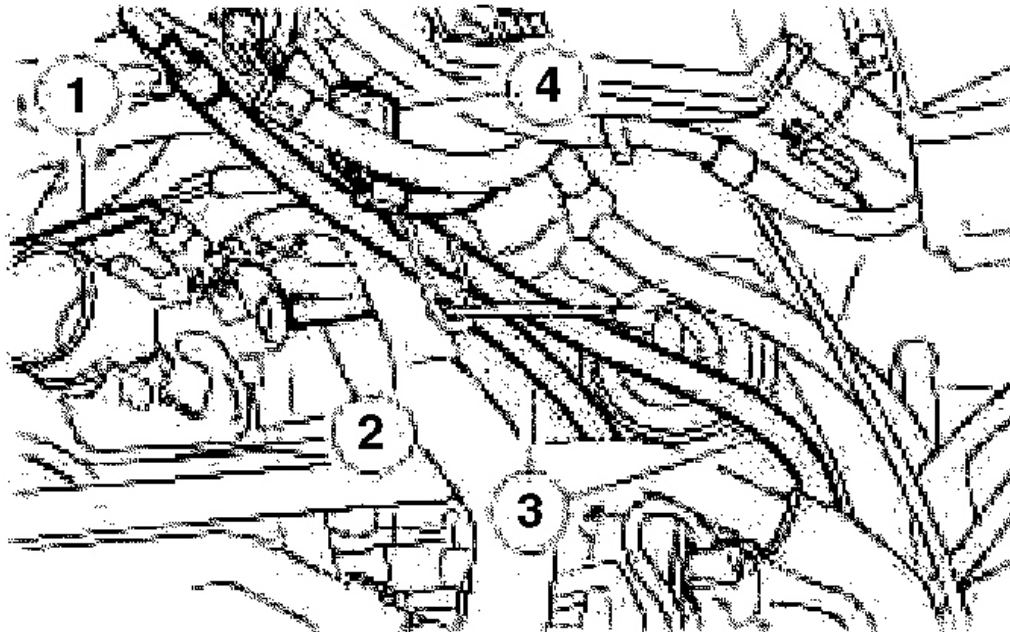
40. Connect the vacuum hose.



G03432515

Fig. 467: Connecting Vacuum Hoses (2 Of 2)
Courtesy of FORD MOTOR CO.

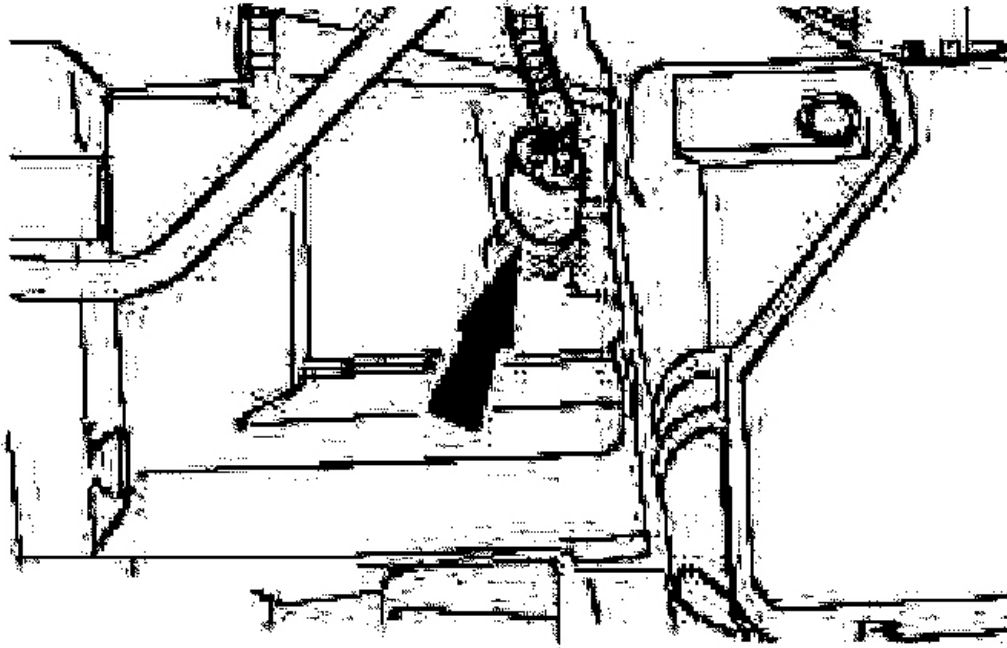
41. Connect the vacuum hoses.
 1. EVAP hose
 2. Brake servo hose
 3. Delta pressure feedback vacuum hoses
 4. EGR hose



G03432516

Fig. 468: Connecting Delta Pressure Feedback Vacuum Hoses
Courtesy of FORD MOTOR CO.

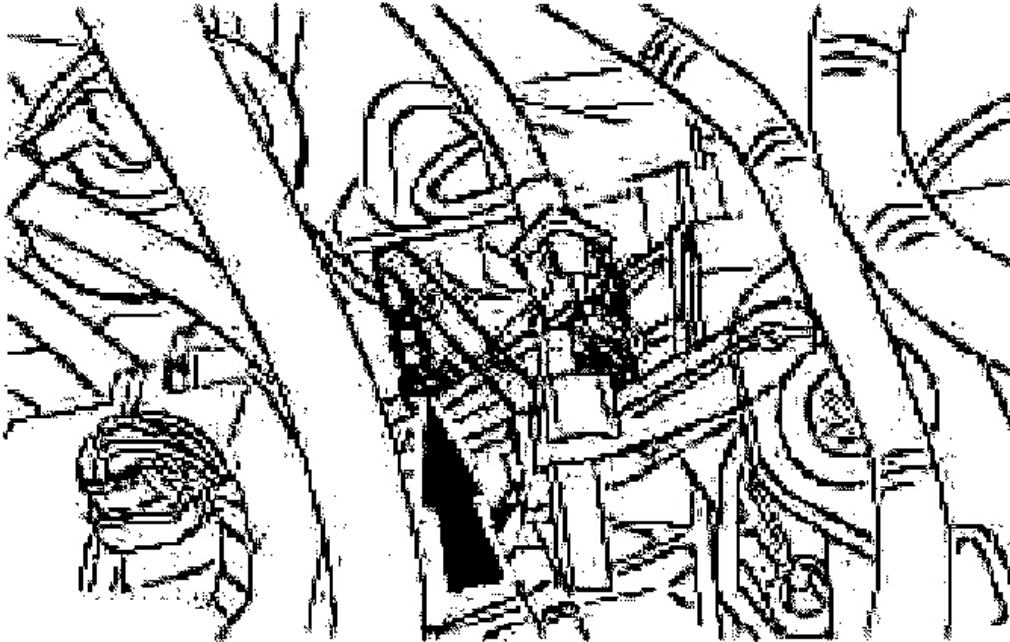
42. Connect the reversing lamp electrical connector.



G03432517

Fig. 469: Connecting Reversing Lamp Electrical Connector
Courtesy of FORD MOTOR CO.

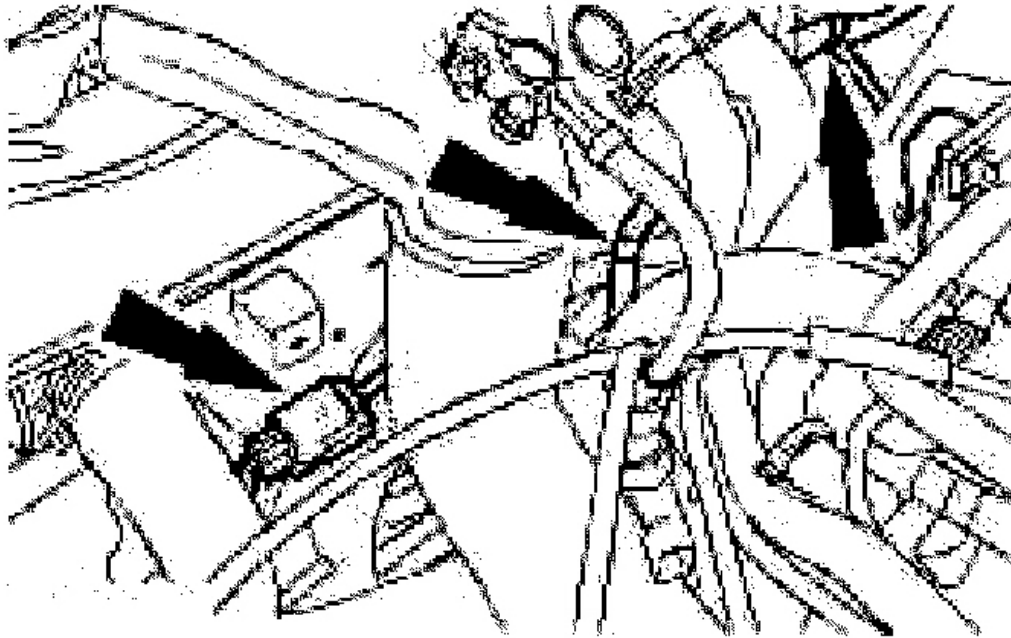
43. Connect the vehicle speed sensor (VSS) electrical connector.



G03432518

Fig. 470: Connecting Vehicle Speed Sensor (VSS) Electrical Connector
Courtesy of FORD MOTOR CO.

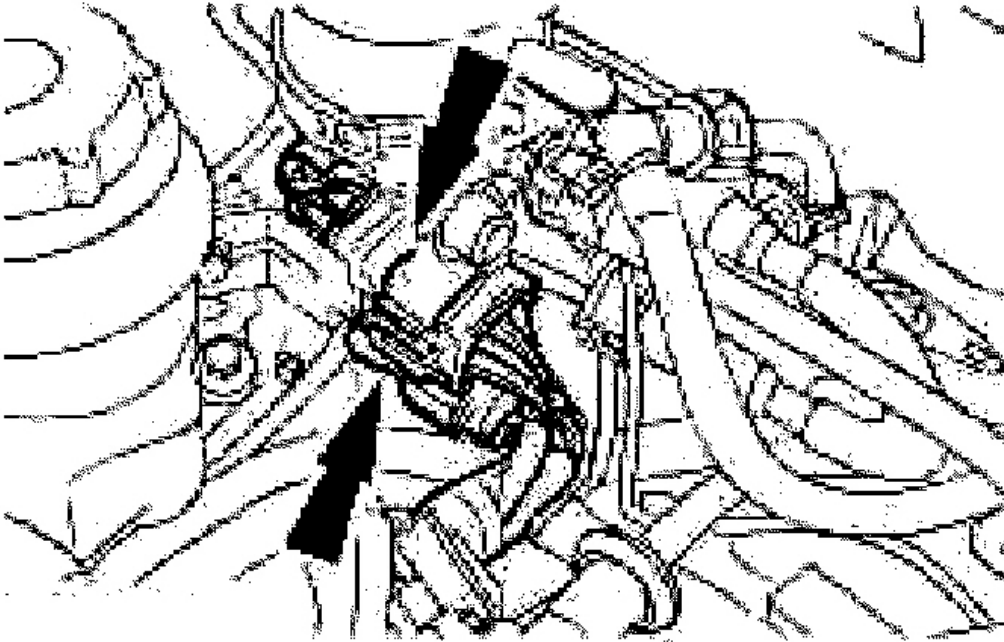
44. Connect the cooling fan electrical connector.
 - Secure the cable with cable ties.



G03432519

Fig. 471: Connecting Cooling Fan Electrical Connector
Courtesy of FORD MOTOR CO.

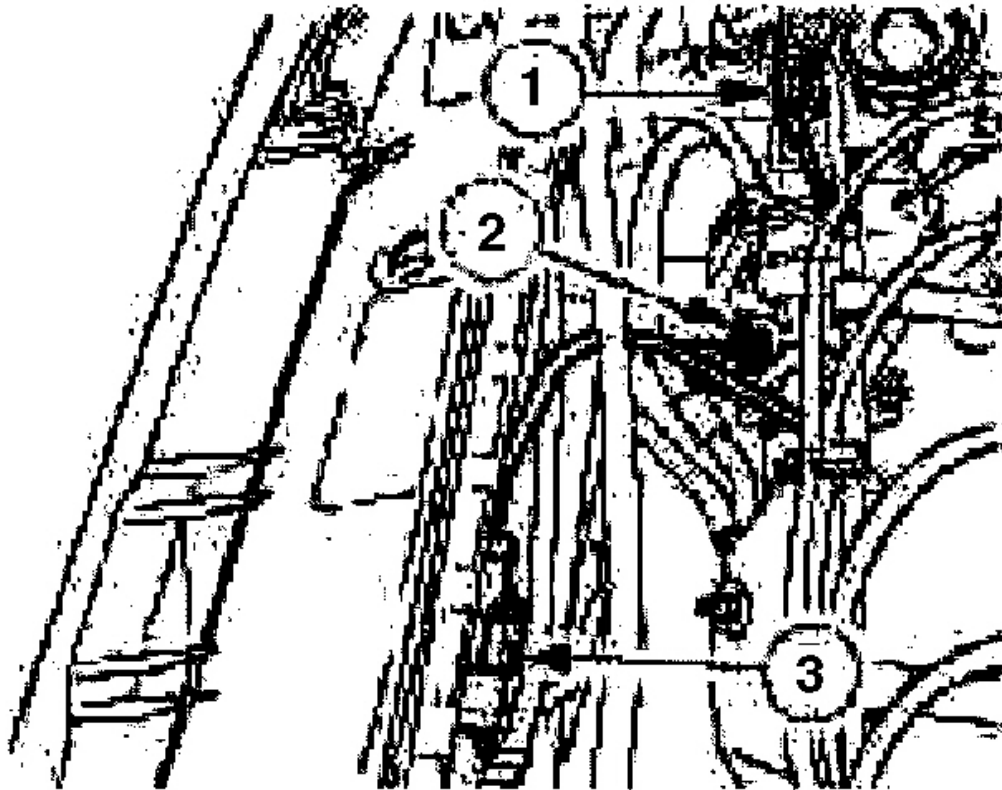
45. Connect both PCM electrical connectors.



G03432520

Fig. 472: Connecting PCM Electrical Connectors
Courtesy of FORD MOTOR CO.

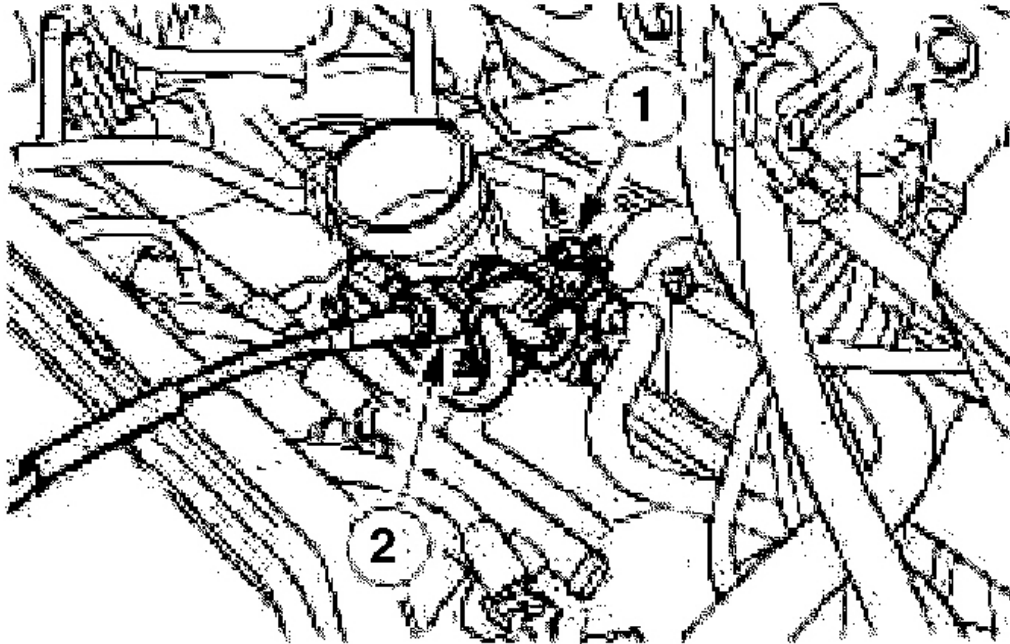
46. Connect the electrical connectors.
 1. Power steering pump pressure switch electrical connector
 2. Generator electrical connector
 3. Heated oxygen sensor electrical connector



G03432521

Fig. 473: Connecting Electrical Connectors
Courtesy of FORD MOTOR CO.

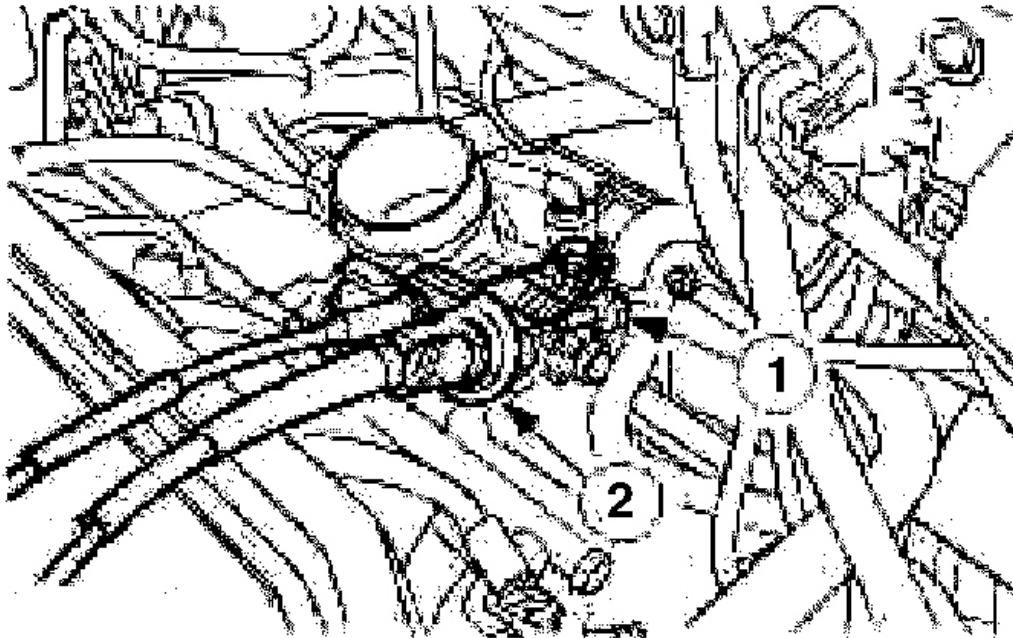
47. Install the speed control cable.
 1. Hook the cable in place.
 2. Clip on the plastic clip.



G03432522

Fig. 474: Installing Speed Control Cable
Courtesy of FORD MOTOR CO.

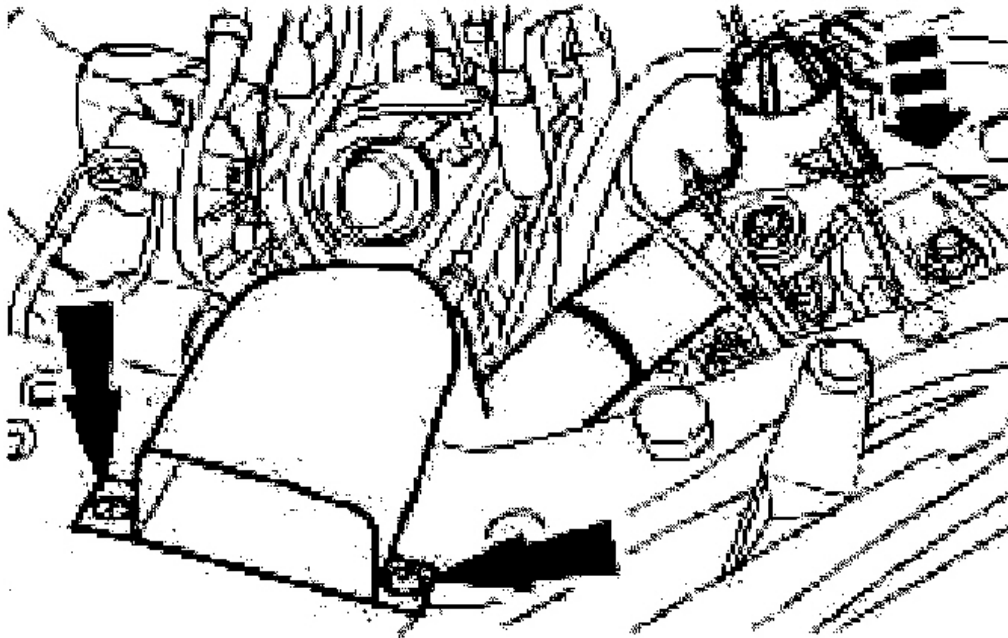
48. Install the accelerator cable.
 1. Hook the cable in place.
 2. Clip on the plastic clip.



G03432523

Fig. 475: Installing Accelerator Cable
Courtesy of FORD MOTOR CO.

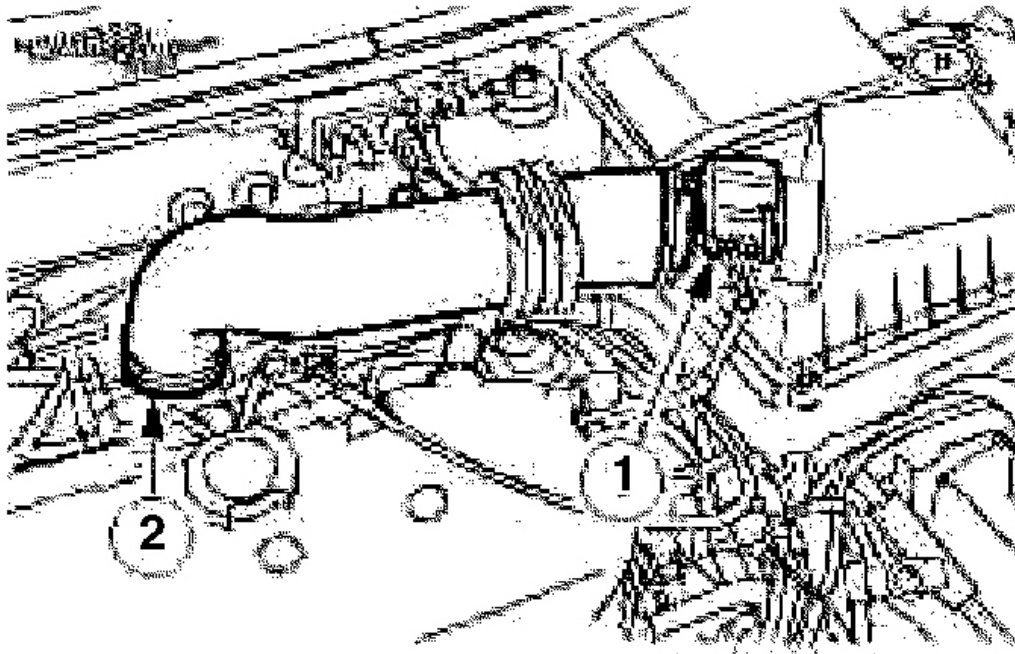
49. Install the air cleaner intake pipe.



G03432524

Fig. 476: Installing Air Cleaner Intake Pipe
Courtesy of FORD MOTOR CO.

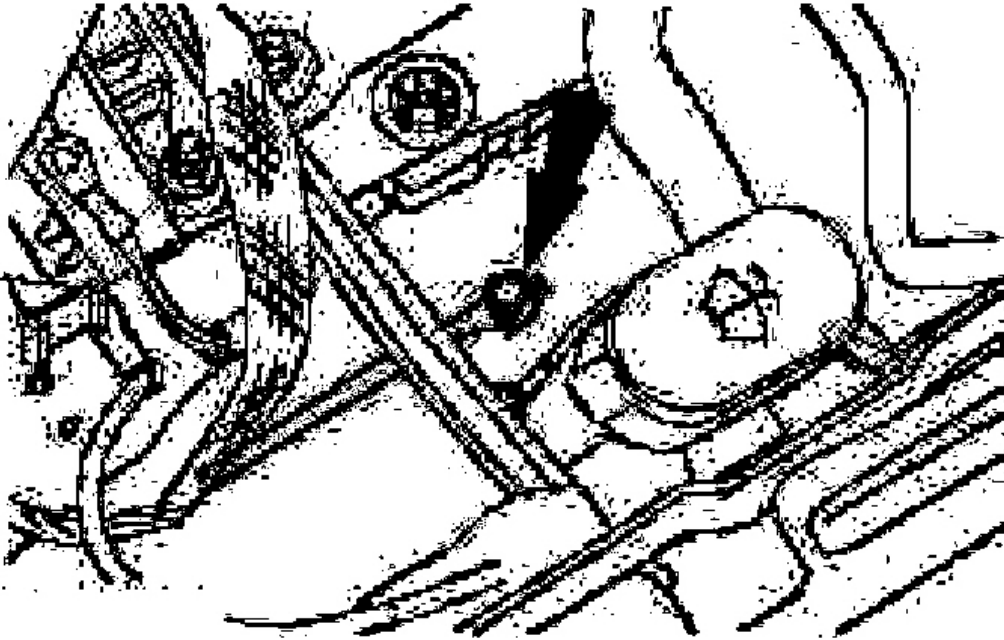
50. Install the air cleaner (ACL).
 - Insert the air cleaner housing into the rubber bushing.
 - 2. Connect the MAF sensor electrical connector.
 - 3. Install the outlet pipe.



G03432525

Fig. 477: Installing Air Cleaner (ACL)
Courtesy of FORD MOTOR CO.

51. Attach the ground cable.

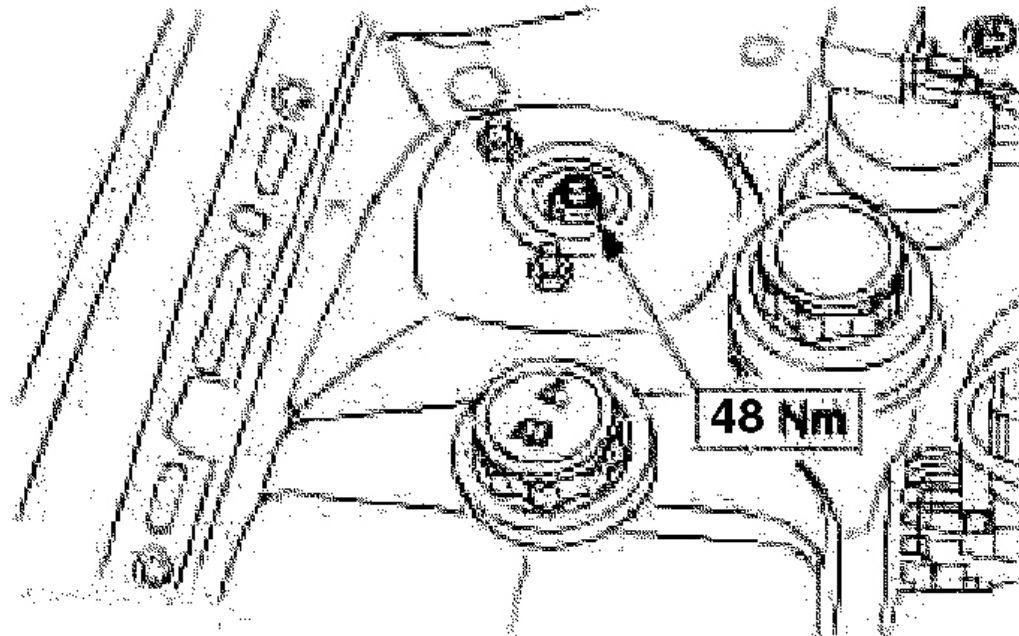


G03432526

Fig. 478: Attaching Ground Cable
Courtesy of FORD MOTOR CO.

NOTE: Use an Allen key to stop the piston rod from turning.

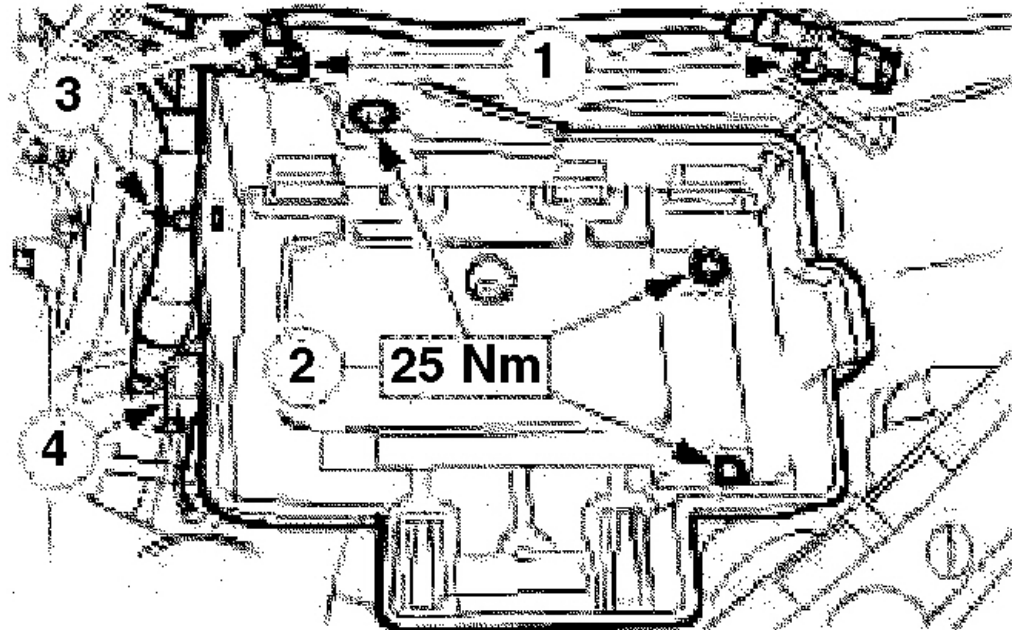
52. Tighten the suspension strut nut on both sides (right-hand side shown).
 - Use a box end wrench and tighten finger tight.
 - Use a torque wrench and tighten to the specified torque.



G03432527

Fig. 479: Tightening Suspension Strut Nut
Courtesy of FORD MOTOR CO.

53. Install the battery tray.
 1. Install the positive and negative cables.
 2. Tighten the bolts.
 3. Clip on the wiring harness.
 4. Connect the electrical connector.



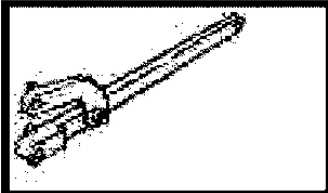
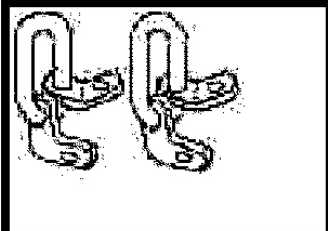
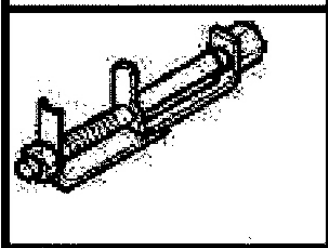
G03432528

Fig. 480: Installing Battery Tray
Courtesy of FORD MOTOR CO.

54. Install the battery.
55. Fill the cooling system. For additional information, refer to **COOLING SYSTEM DRAINING, FILLING AND BLEEDING** .
56. Fill the engine with engine oil.

ENGINE - VEHICLES WITH: AUTOMATIC TRANSAXLE

Special Tool(s)

	Flange Holding Wrench, Universal 205-072 (15-03A)
	Lifting Bracket, Engine 303-050 (T70P-6000)
	Remover/Installer, Hose Clamp 412-108 (T96P-18539-A)

G03432529

Fig. 481: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

Cable ties	ESD-M1C220-A
High-temperature grease	
Engine oil	WSS-M2C153-H
Coolant	ESD-M97B49 -A

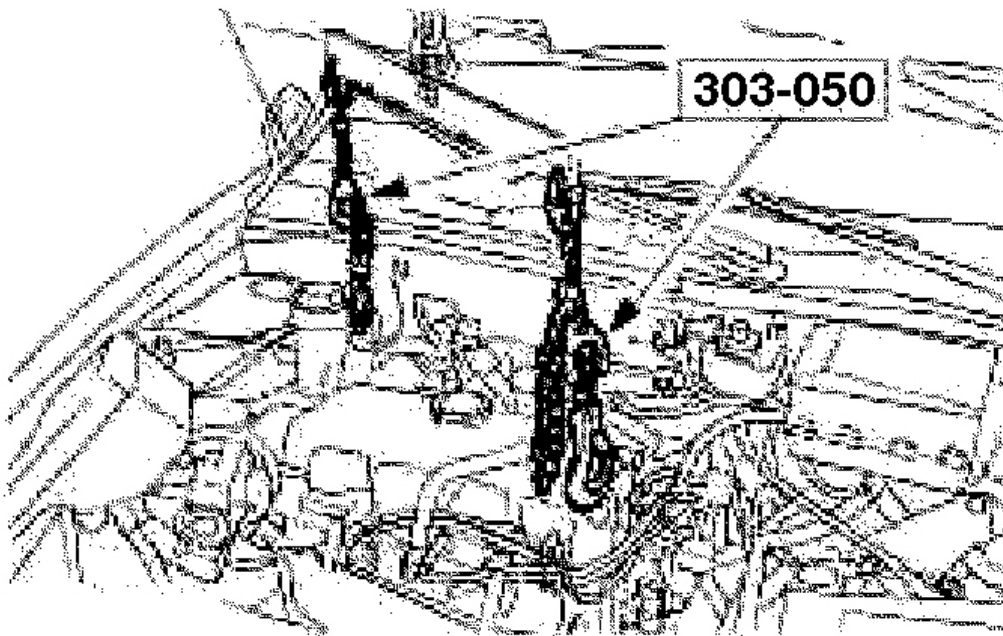
Installation

All Vehicles

NOTE: The location of the engine mountings and the engine support insulators are given looking from the automatic transaxle to the engine.

CAUTION: Insert a wooden block between jack and transaxle.

1. Support the transaxle with a jack.
2. Using the special tool and a suitable floor crane to bring the engine into installation position and lower it.

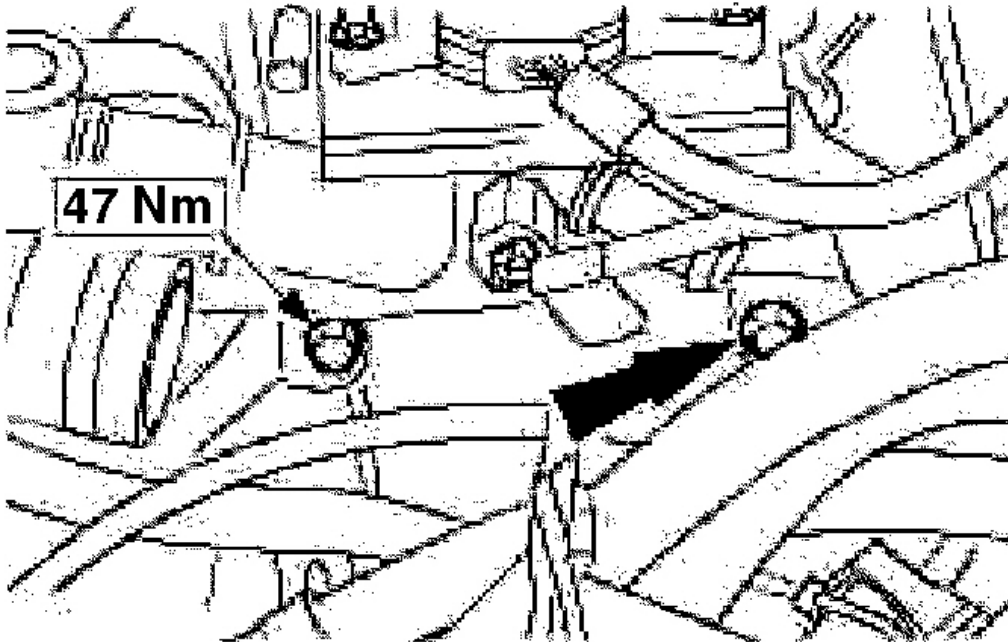


G03432530

Fig. 482: Bringing Engine Into Installation Position Using Special Tool And Suitable Floor Crane

Courtesy of FORD MOTOR CO.

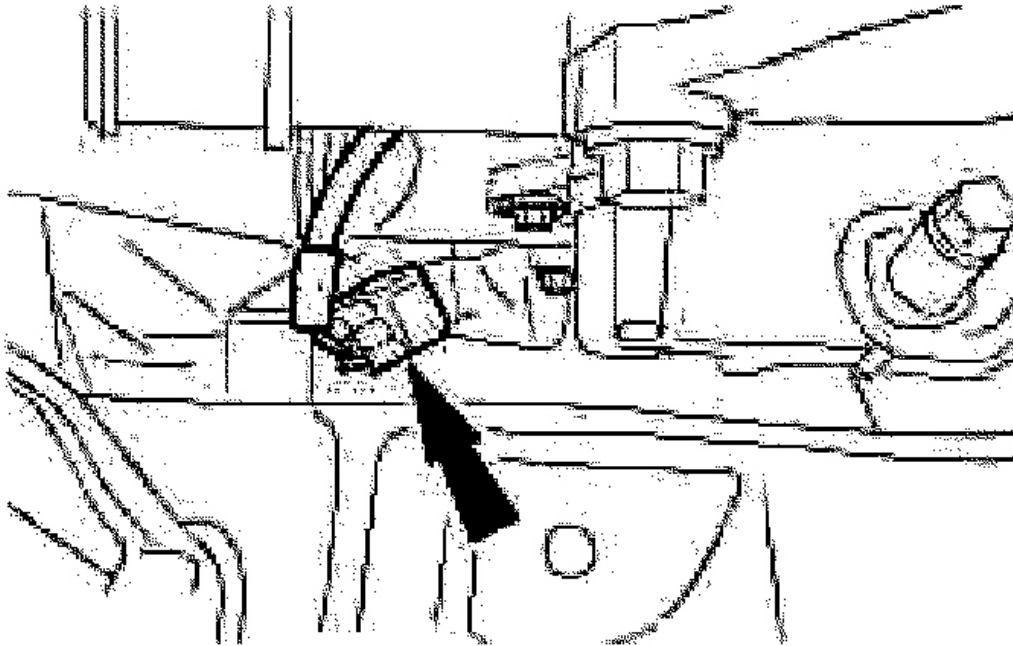
3. Install the transaxle upper flange bolts.



G03432531

Fig. 483: Installing Transaxle Upper Flange Bolts
Courtesy of FORD MOTOR CO.

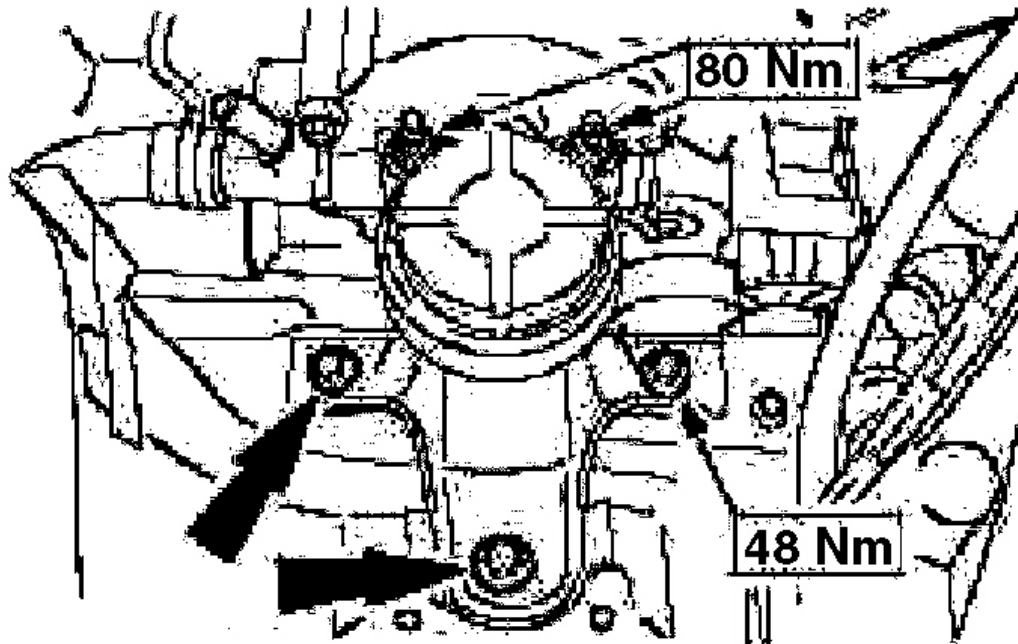
4. Connect the crankshaft position (CKP) sensor electrical connector.



G03432532

Fig. 484: Connecting Crankshaft Position (CKP) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

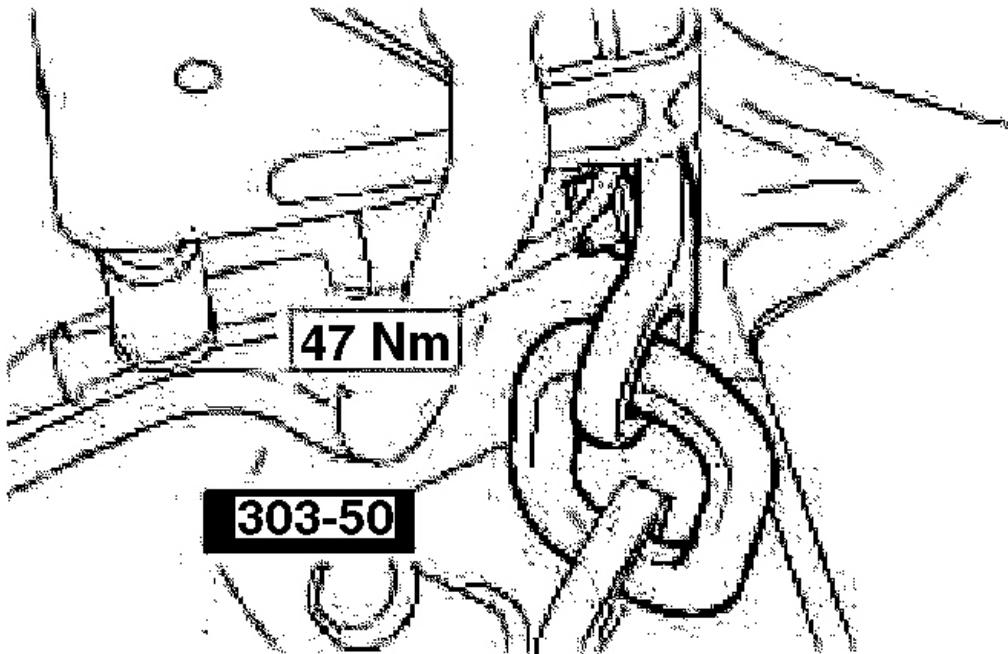
5. Install the engine front mount.
 - Remove the engine crane and floor jack.



G03432533

Fig. 485: Installing Engine Front Mount
Courtesy of FORD MOTOR CO.

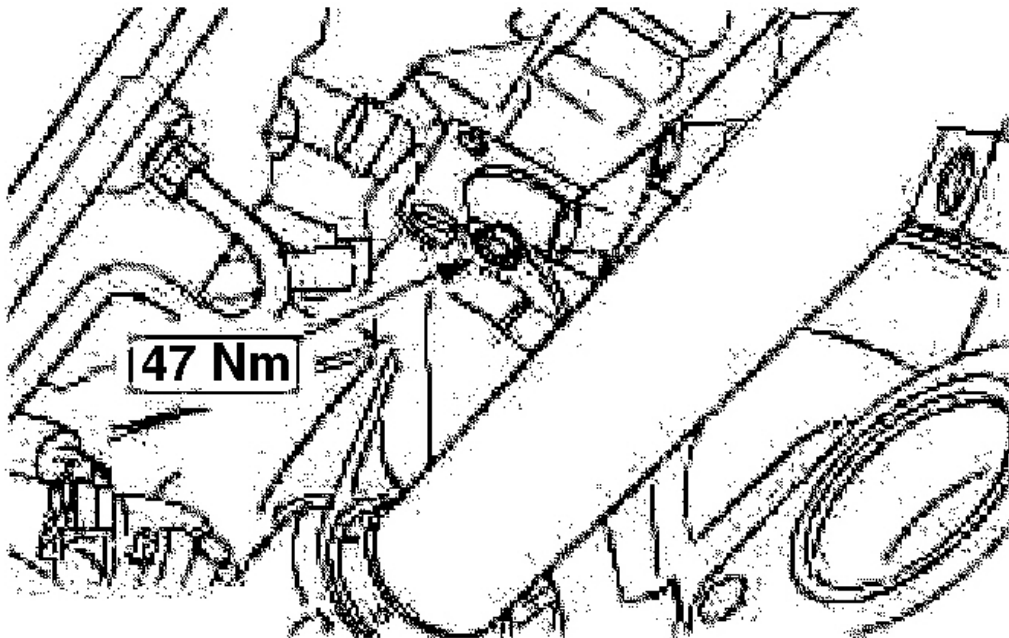
6. Remove left and right side lifting brackets.



G03432534

Fig. 486: Removing Left And Right Side Lifting Brackets
Courtesy of FORD MOTOR CO.

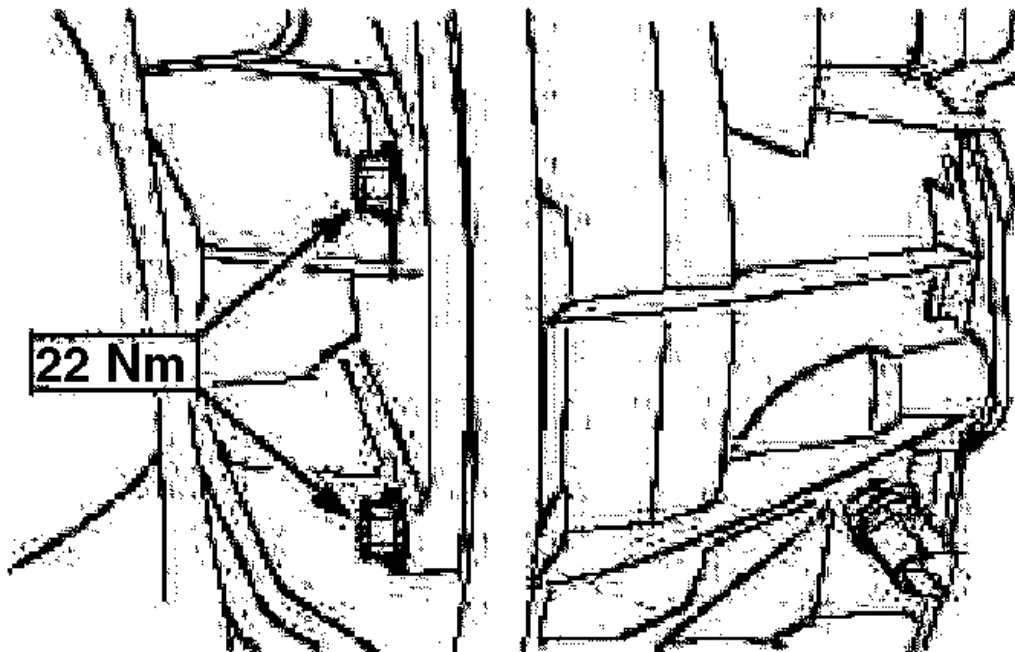
7. Raise and support the vehicle.
8. Install the transaxle right-hand flange bolt.



G03432535

Fig. 487: Installing Transaxle Right-Hand Flange Bolt
Courtesy of FORD MOTOR CO.

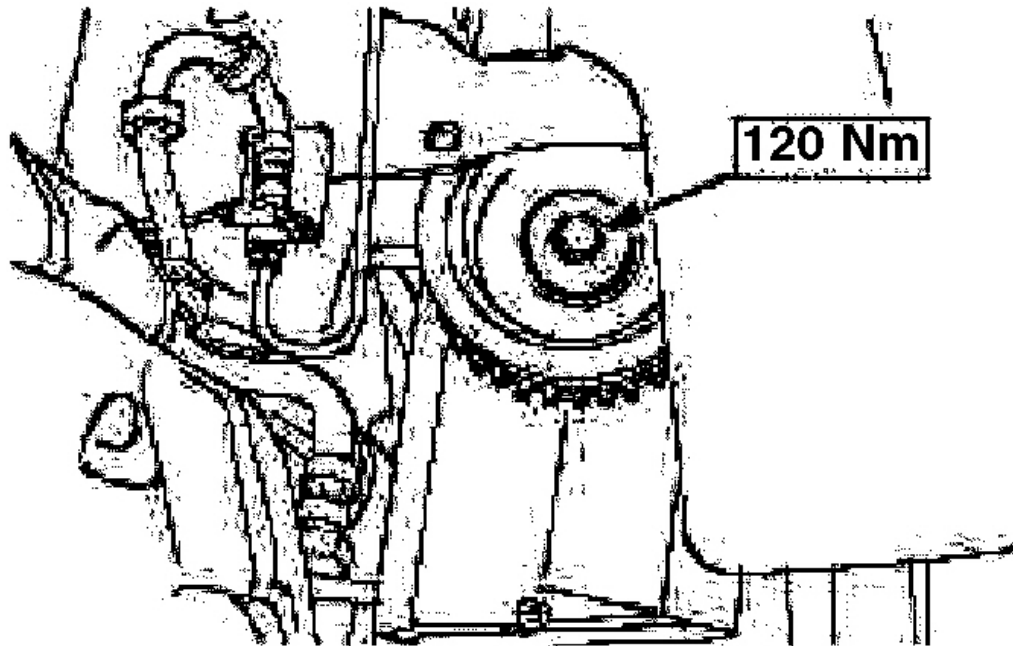
9. Install the transaxle left-hand flange bolts.



G03432536

Fig. 488: Installing Transaxle Left-Hand Flange Bolts
Courtesy of FORD MOTOR CO.

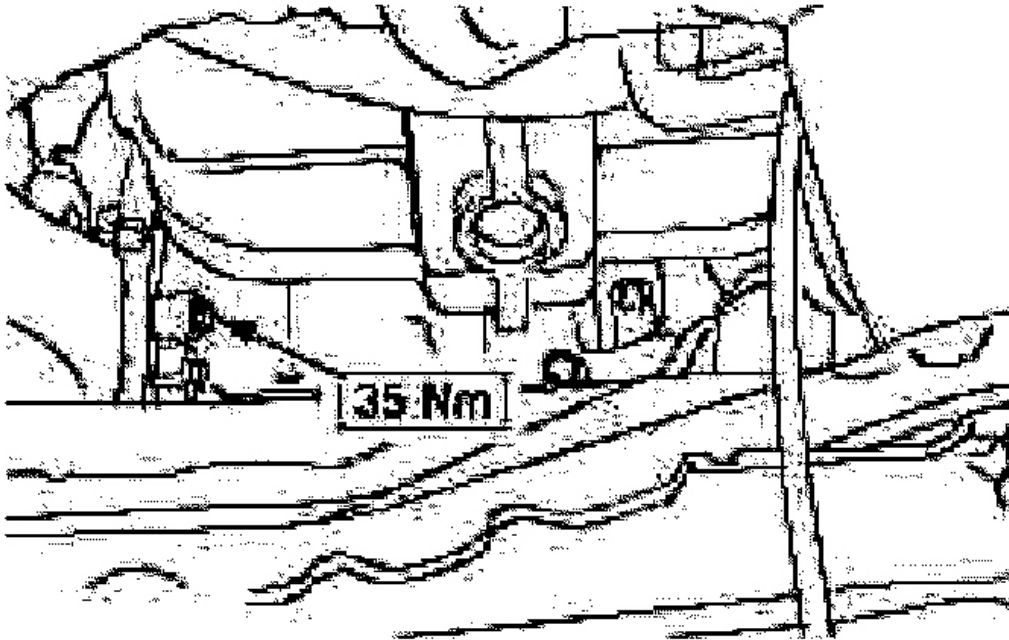
10. Install the crankshaft pulley.
 - Tighten the crankshaft pulley bolt.



G03432537

Fig. 489: Installing Crankshaft Pulley
Courtesy of FORD MOTOR CO.

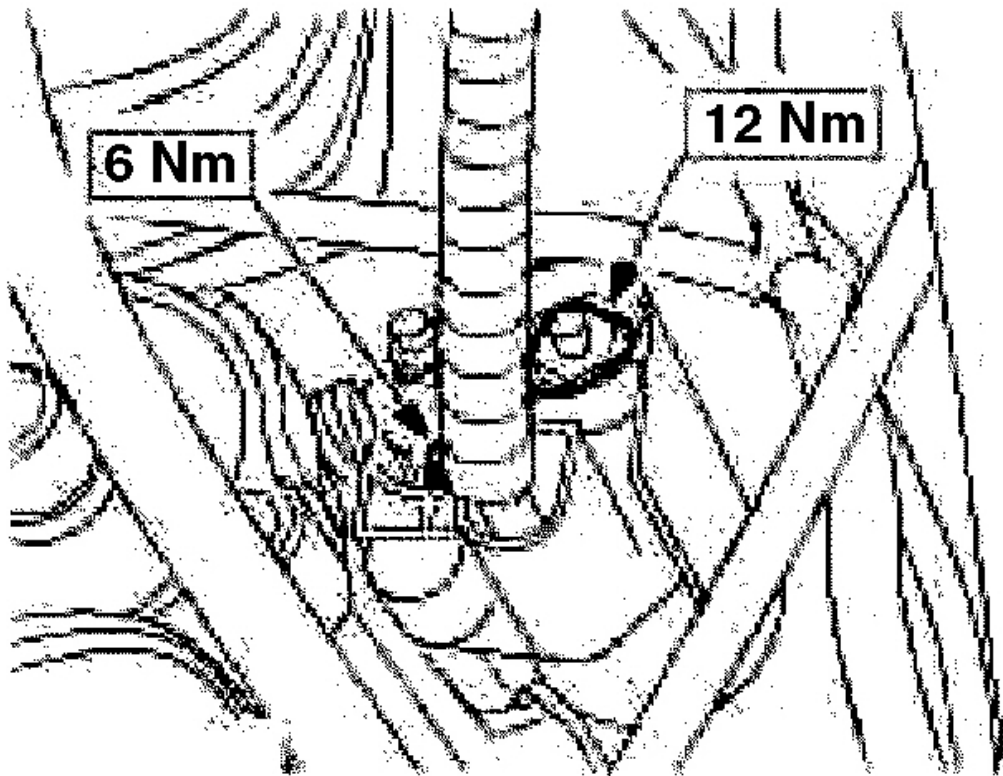
11. Install the starter motor.



G03432538

Fig. 490: Installing Starter Motor
Courtesy of FORD MOTOR CO.

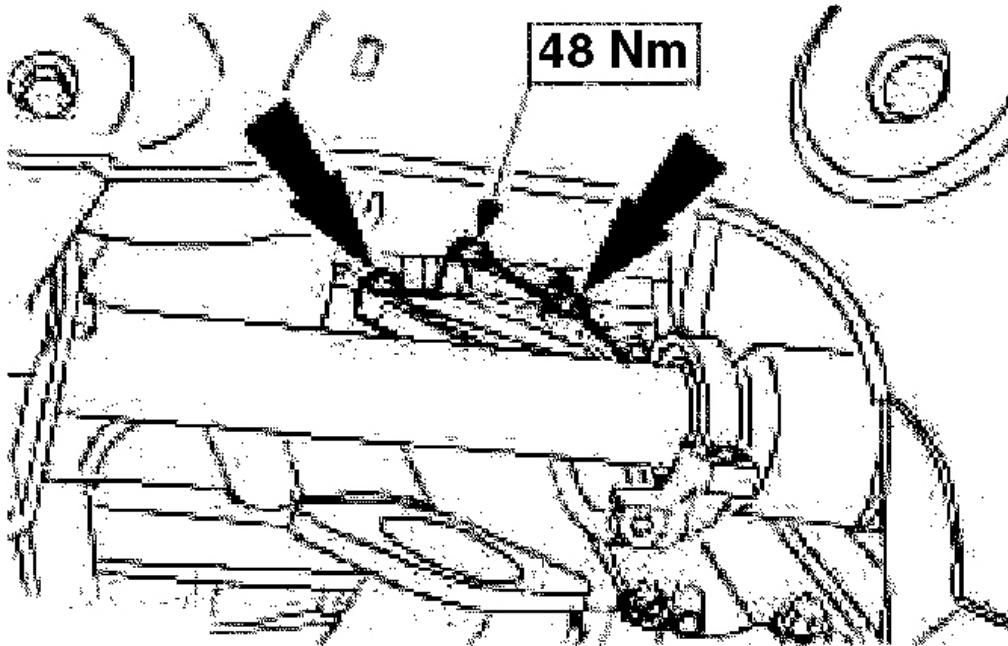
12. Install the starter motor electrical connectors.



G03432539

Fig. 491: Installing Starter Motor Electrical Connectors
Courtesy of FORD MOTOR CO.

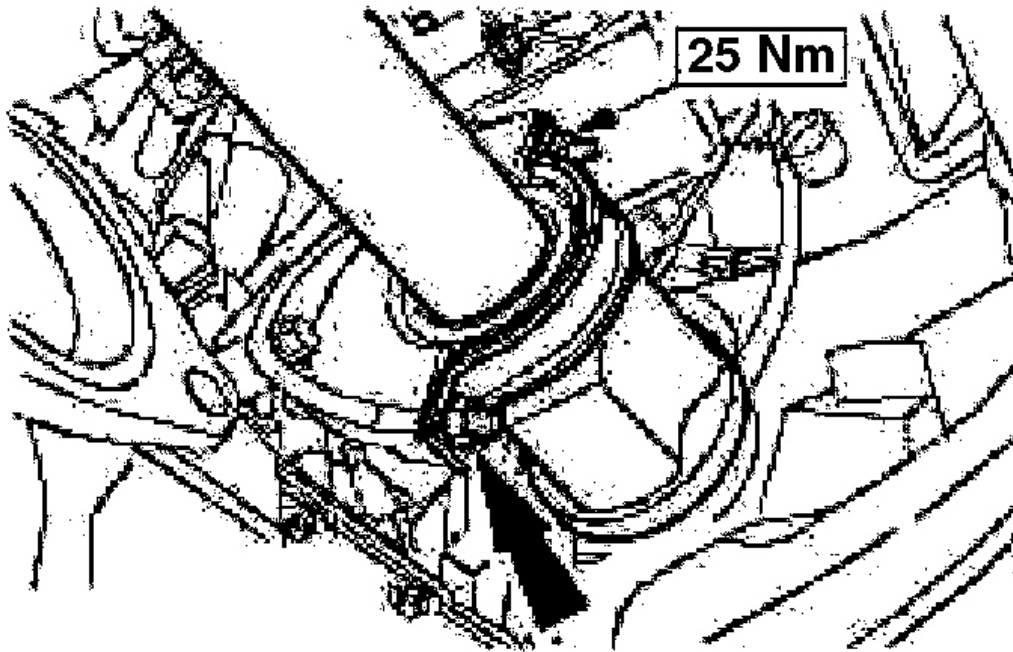
13. Install the intermediate shaft bracket.



G03432540

Fig. 492: Installing Intermediate Shaft Bracket
Courtesy of FORD MOTOR CO.

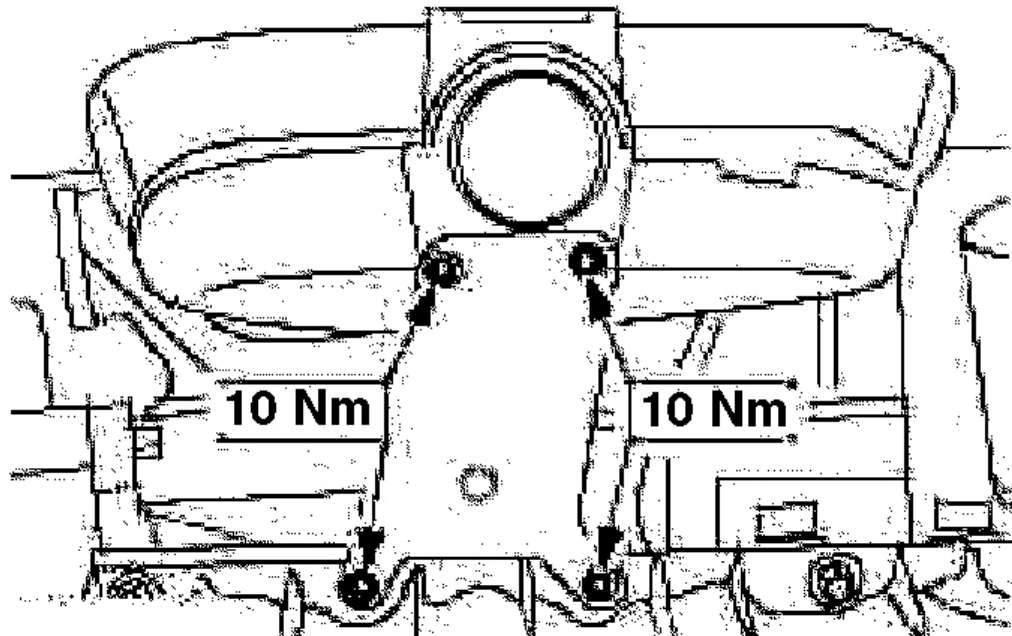
NOTE: Use a new retaining clamp.



G03432541

Fig. 493: Installing Retaining Clamp
Courtesy of FORD MOTOR CO.

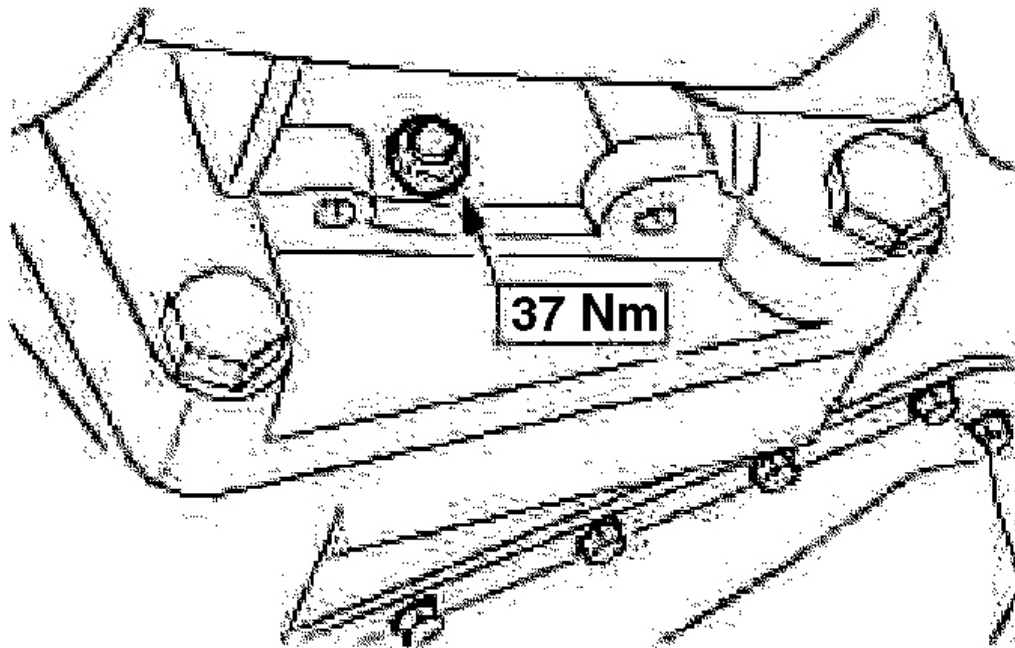
14. Install the retaining clamp.
15. Attach the intake manifold bracket.
 - Install the bolts and tighten the nuts.



G03432542

Fig. 494: Installing Intake Manifold Bracket
Courtesy of FORD MOTOR CO.

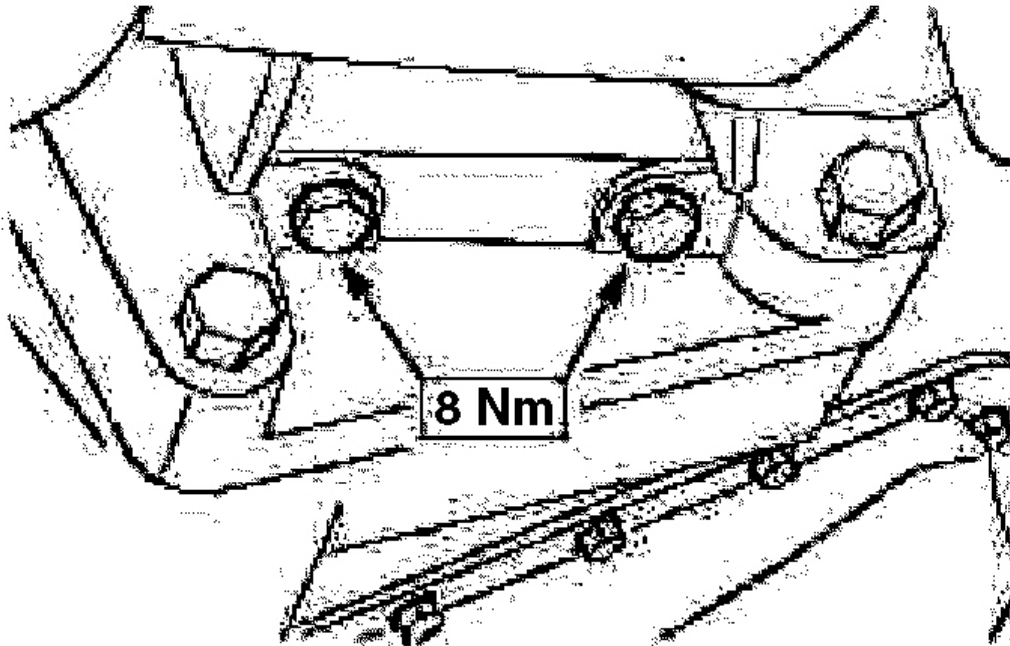
16. Install the torque converter to the engine drive plate (four nuts).
 - Rotate flywheel to install nuts.



G03432543

Fig. 495: Installing Torque Converter To Engine Drive Plate
Courtesy of FORD MOTOR CO.

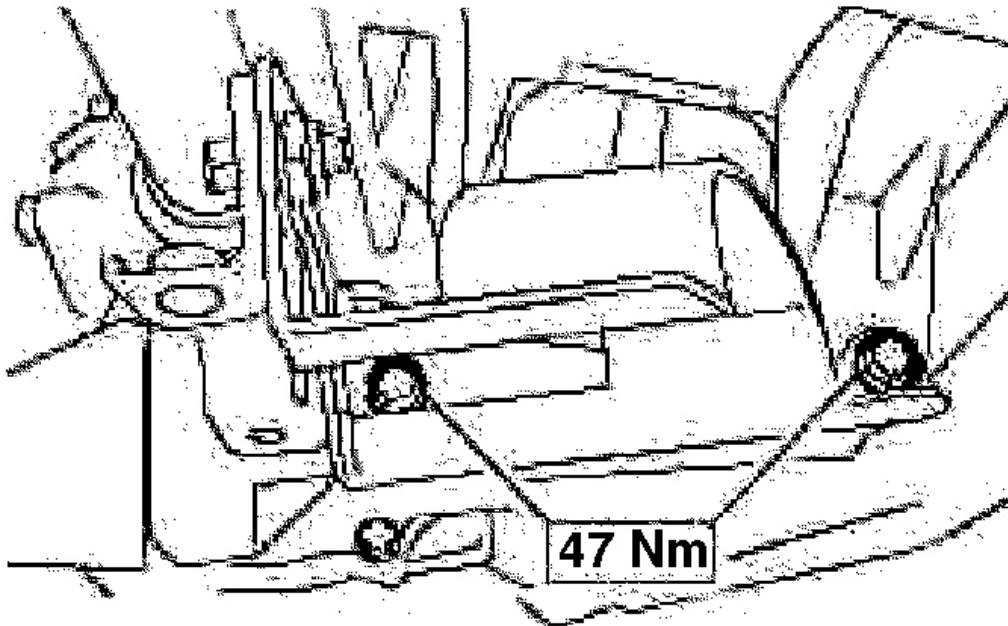
17. Install the torque converter cover.



G03432544

Fig. 496: Installing Torque Converter Cover
Courtesy of FORD MOTOR CO.

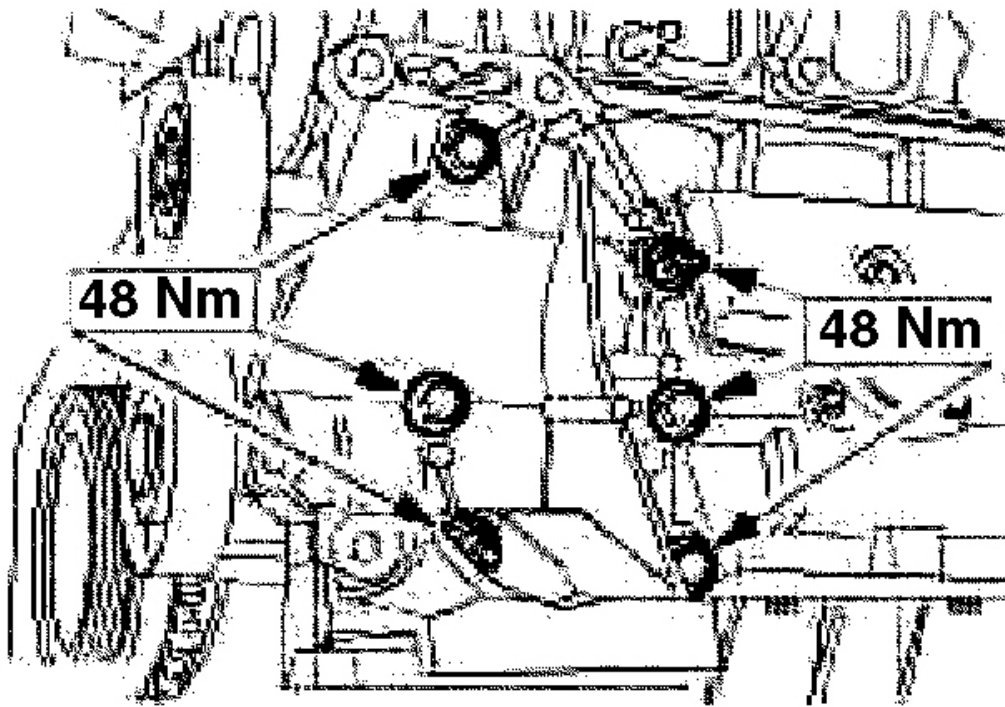
18. Install the transaxle lower flange bolts.



G03432545

Fig. 497: Installing Transaxle Lower Flange Bolts
Courtesy of FORD MOTOR CO.

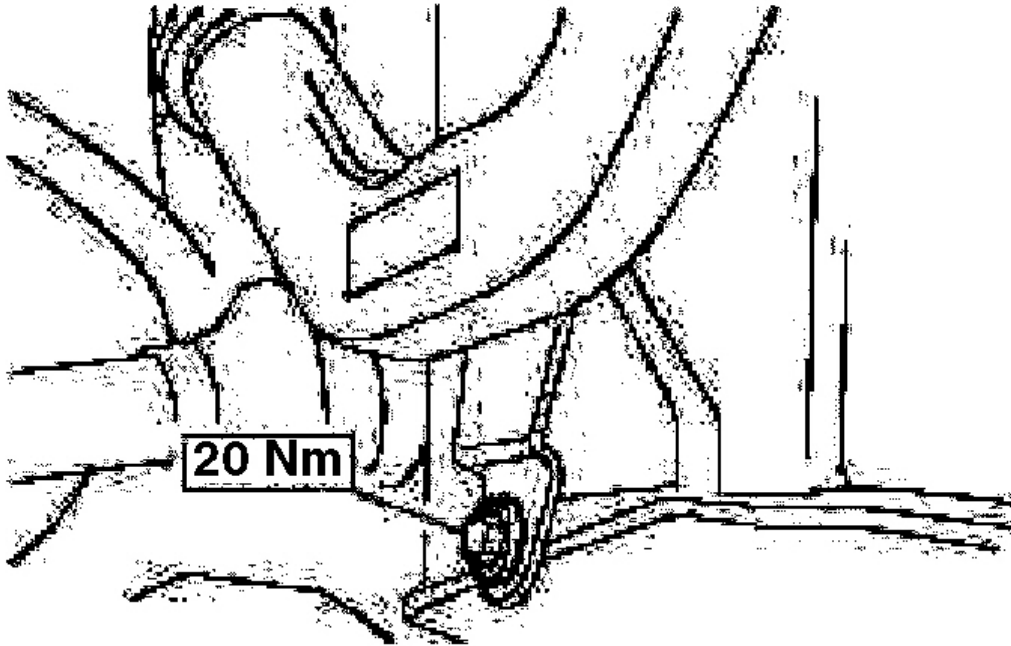
19. Install the accessory drive bracket.



G03432546

Fig. 498: Installing Accessory Drive Bracket
Courtesy of FORD MOTOR CO.

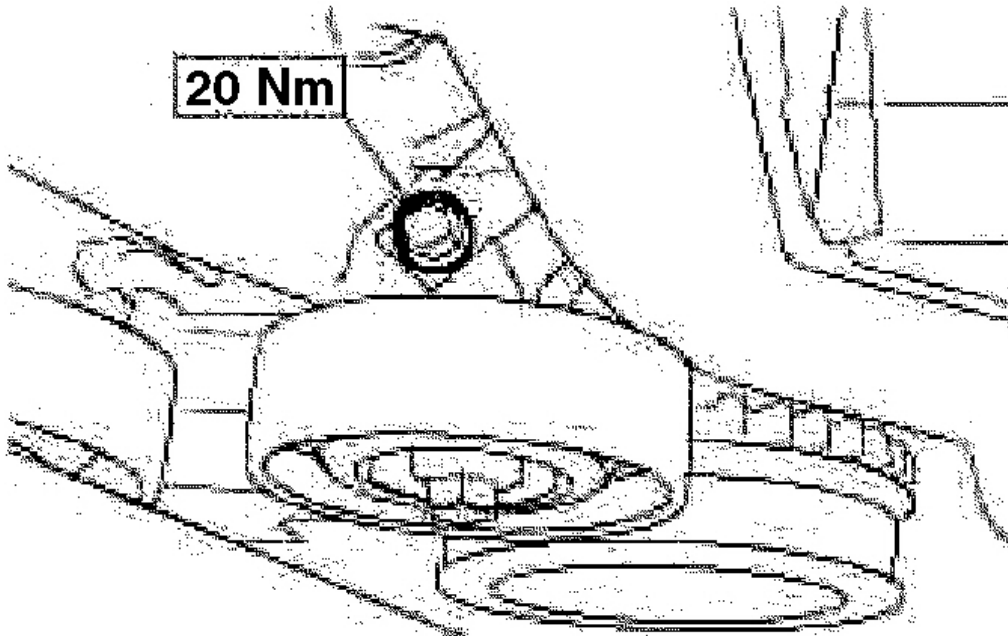
20. Position back tube and install bolt.



G03432547

Fig. 499: Positioning Back Tube And Installing Bolt
Courtesy of FORD MOTOR CO.

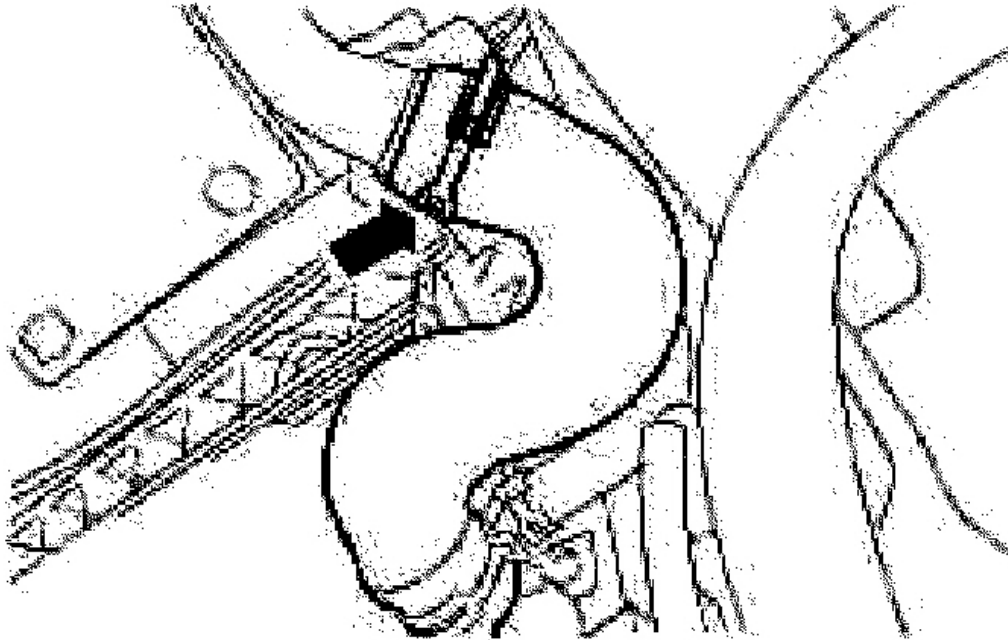
21. Install the coolant pipe bolt.



G03432548

Fig. 500: Installing Coolant Pipe Bolt
Courtesy of FORD MOTOR CO.

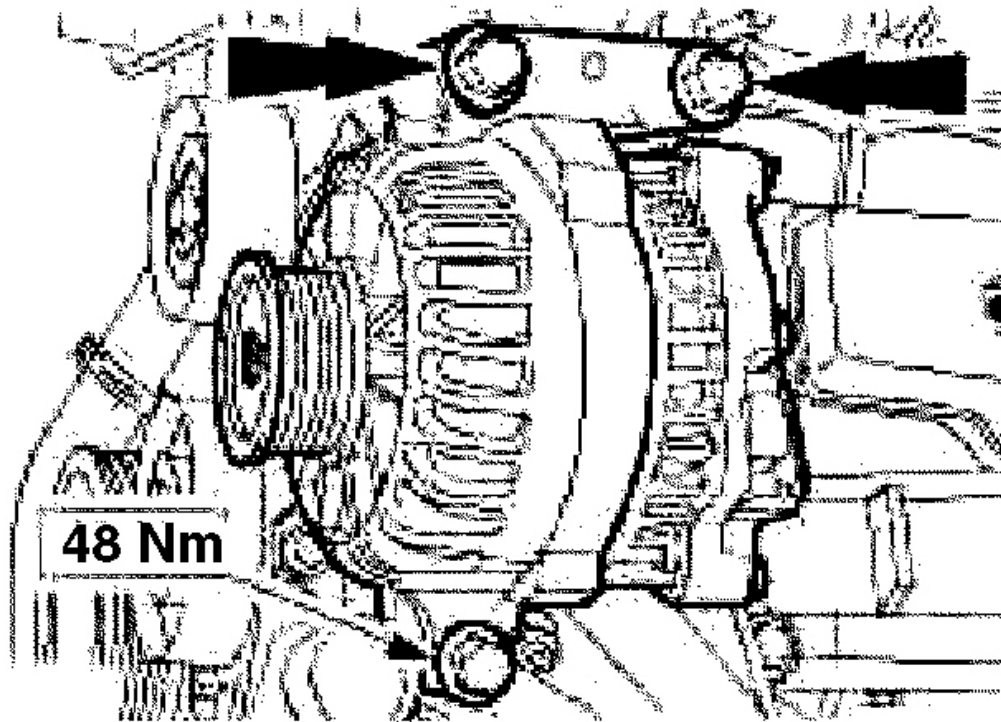
22. Connect the coolant hose to the coolant tube.



G03432549

Fig. 501: Connecting Coolant Hose To Coolant Tube
Courtesy of FORD MOTOR CO.

23. Install the generator (engine removed shown).

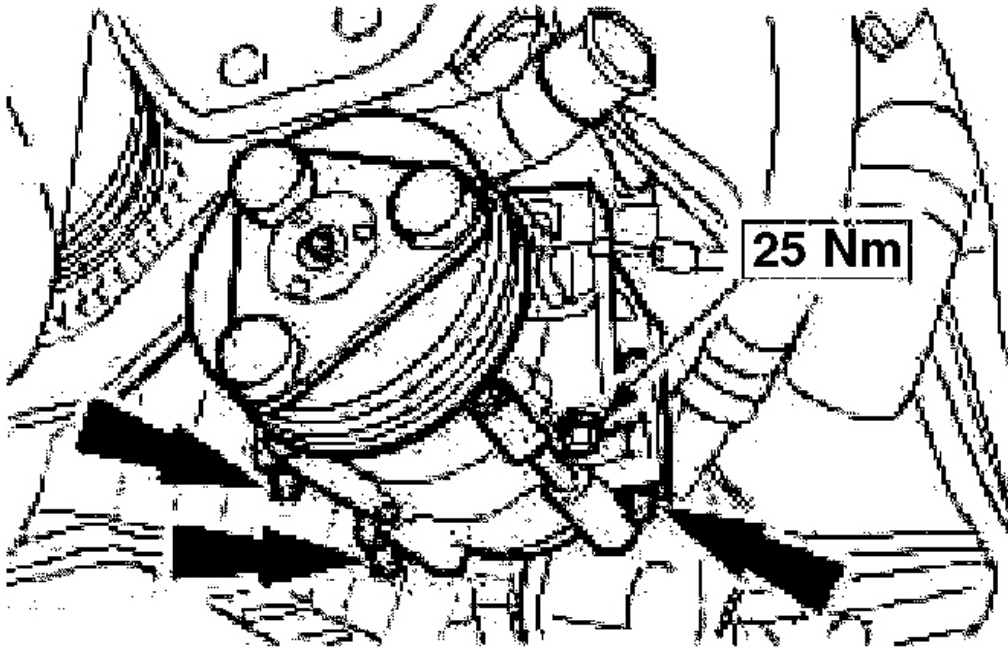


G03432550

Fig. 502: Installing Generator
Courtesy of FORD MOTOR CO.

Vehicles with air conditioning

24. Install the compressor.



G03432551

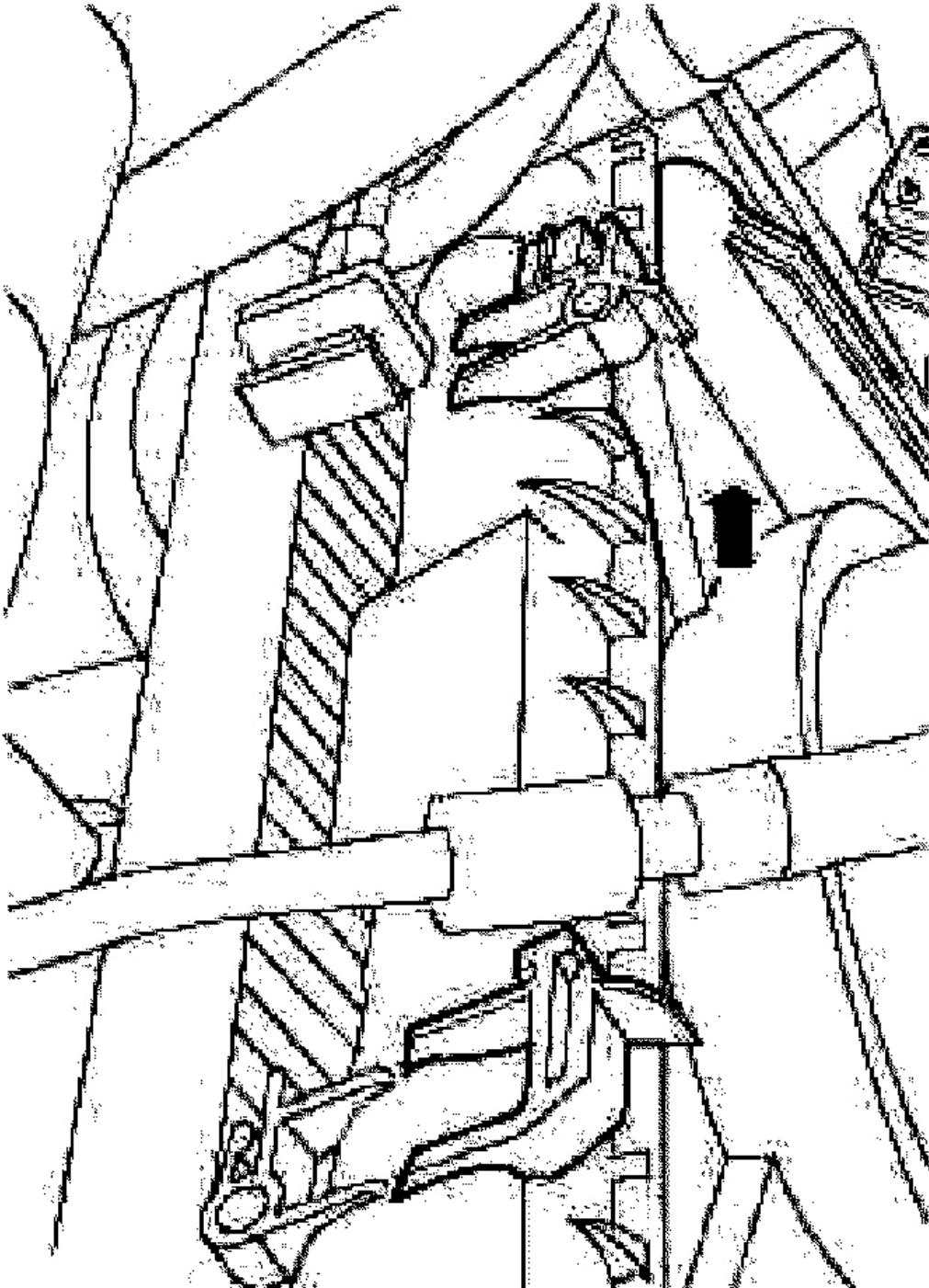
Fig. 503: Installing Compressor
Courtesy of FORD MOTOR CO.

All Vehicles

25. Position back drive belt.
26. Install fan shroud.

2002 Ford Focus LX

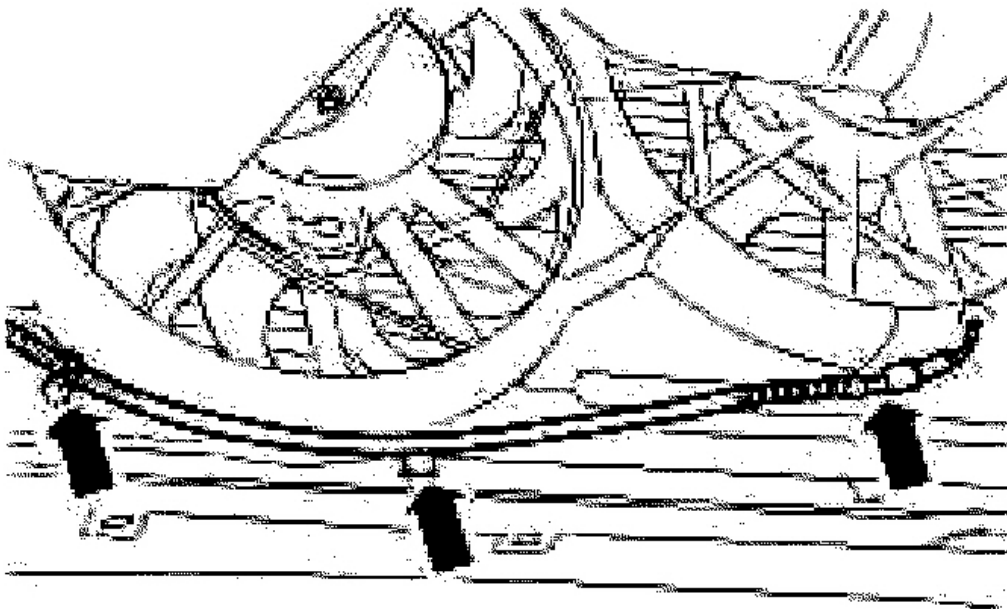
2002 ENGINE Engine, 2.0L SPI - Focus



G03432552

Fig. 504: Installing Fan Shroud
Courtesy of FORD MOTOR CO.

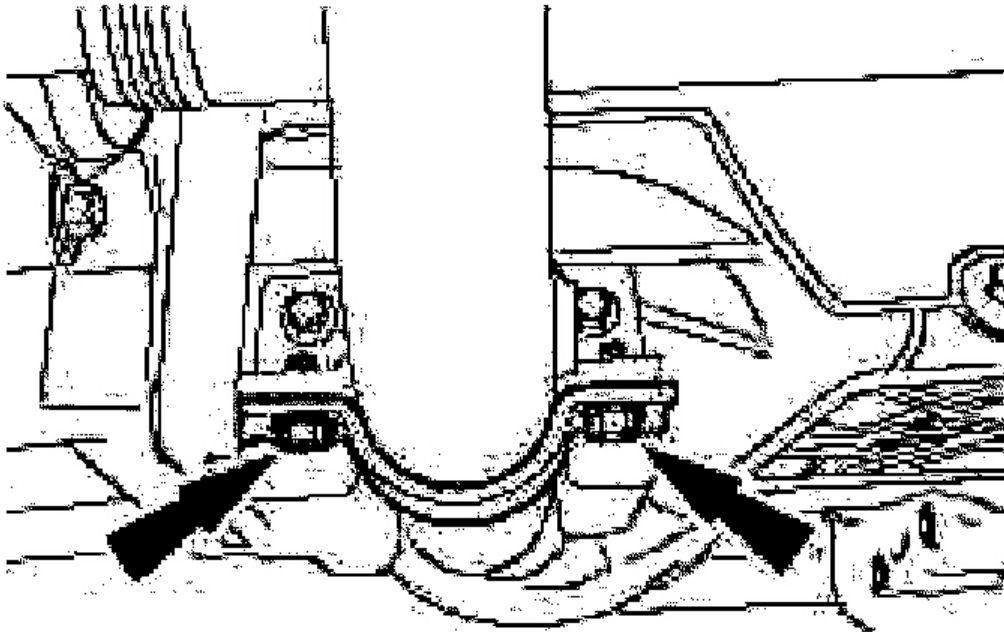
27. Attach the harness retainers.



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Fig. 505: Installing Harness Retainers
Courtesy of FORD MOTOR CO.

28. Position and support the catalytic converter.
29. Loosely install the lower clamp.



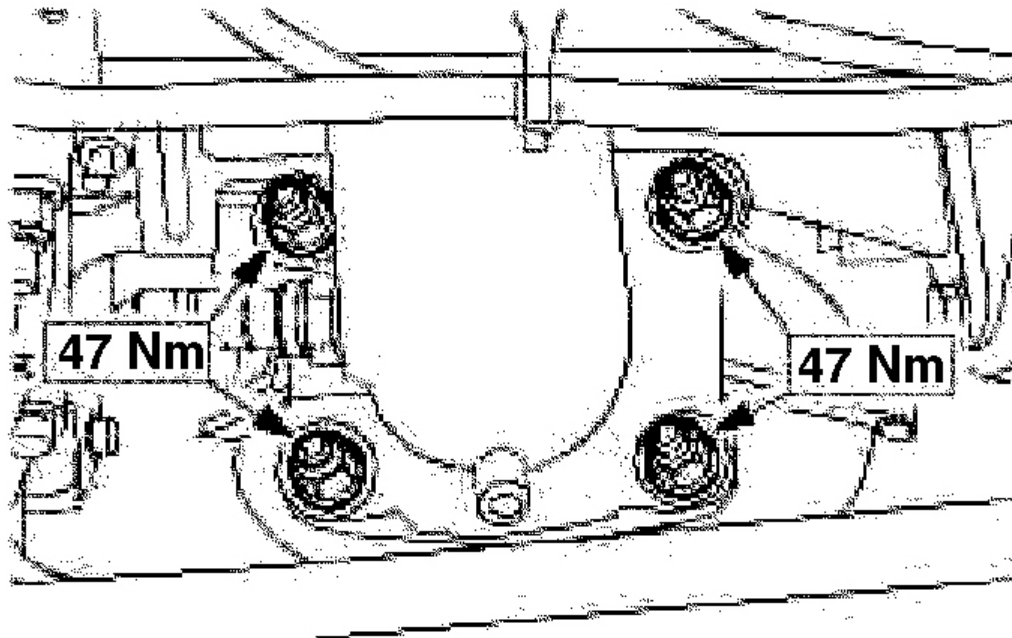
G03432554

Fig. 506: Installing Lower Clamp
Courtesy of FORD MOTOR CO.

30. Remove the support from the catalytic converter.
31. Lower the vehicle.

CAUTION: Never use jointing compound forward of the catalytic converter.

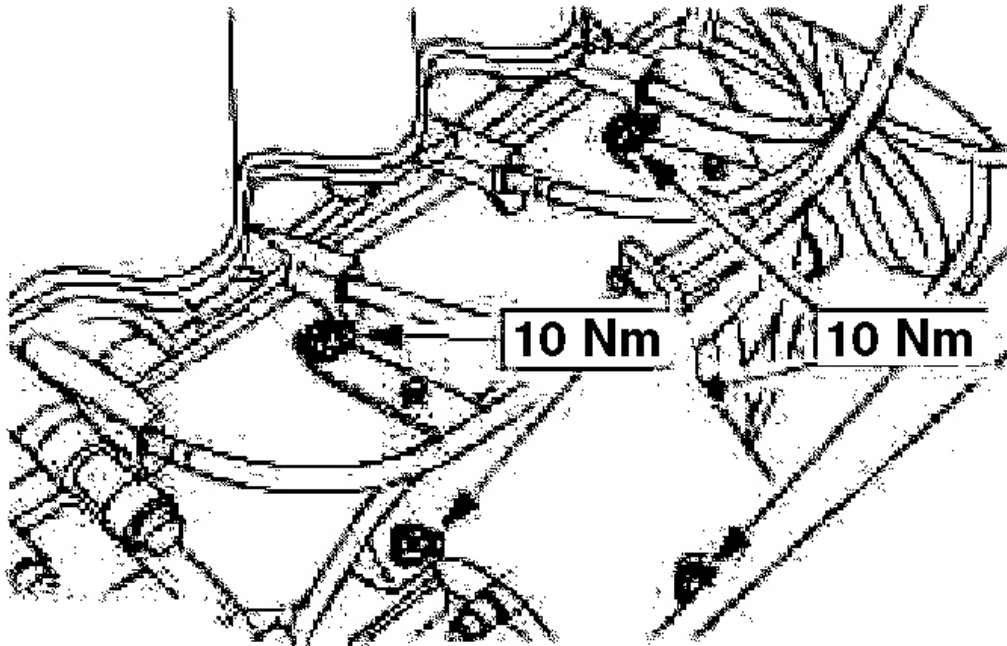
32. Install the catalytic converter to the manifold.
 - Use a new gasket and nuts.



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Fig. 507: Installing Catalytic Converter To Manifold
Courtesy of FORD MOTOR CO.

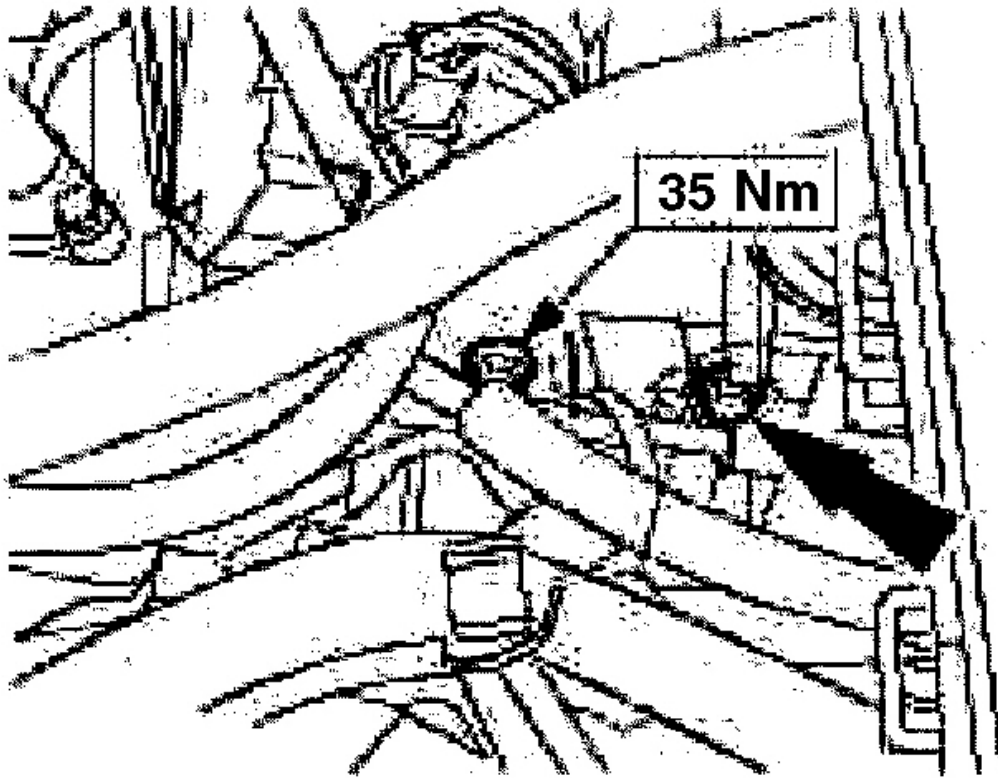
33. Install the heat shield.



G03432556

Fig. 508: Installing Heat Shield
Courtesy of FORD MOTOR CO.

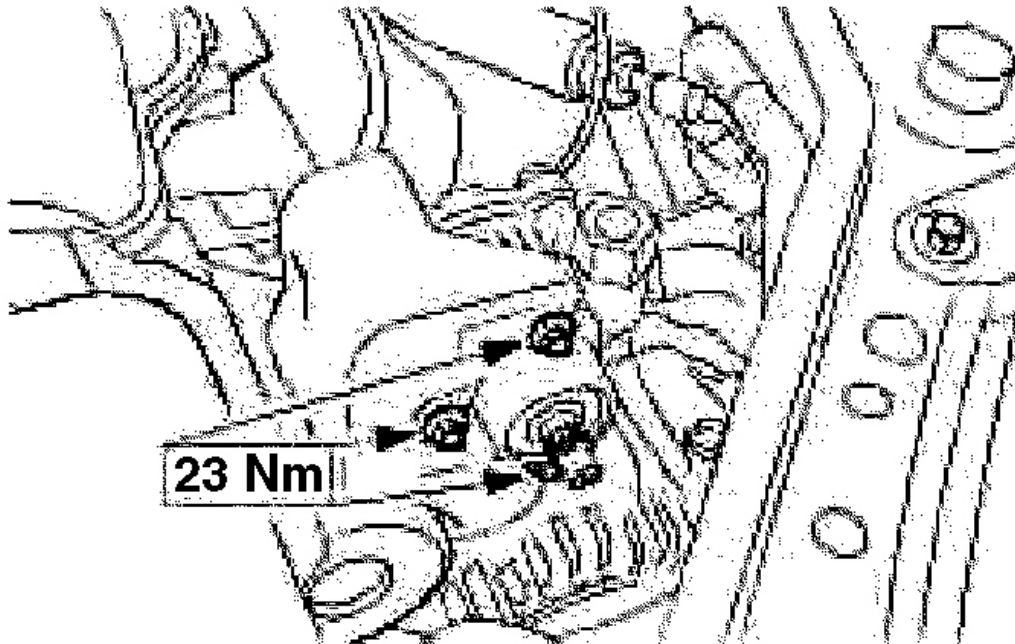
34. Install the upper starter bolts.



G03432557

Fig. 509: Installing Upper Starter Bolts
Courtesy of FORD MOTOR CO.

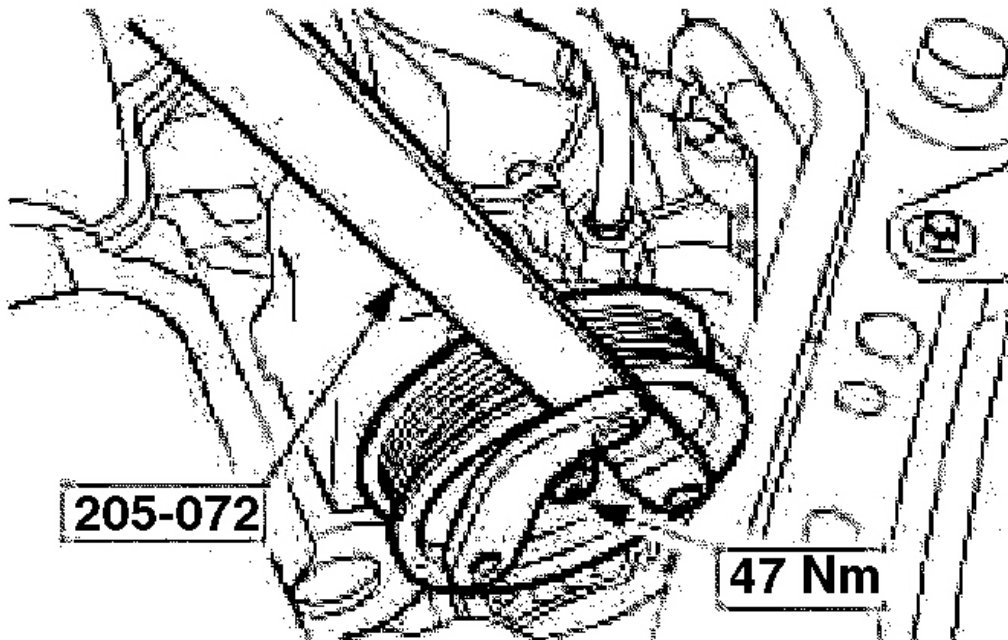
35. Install the power steering pump.



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Fig. 510: Installing Power Steering Pump
Courtesy of FORD MOTOR CO.

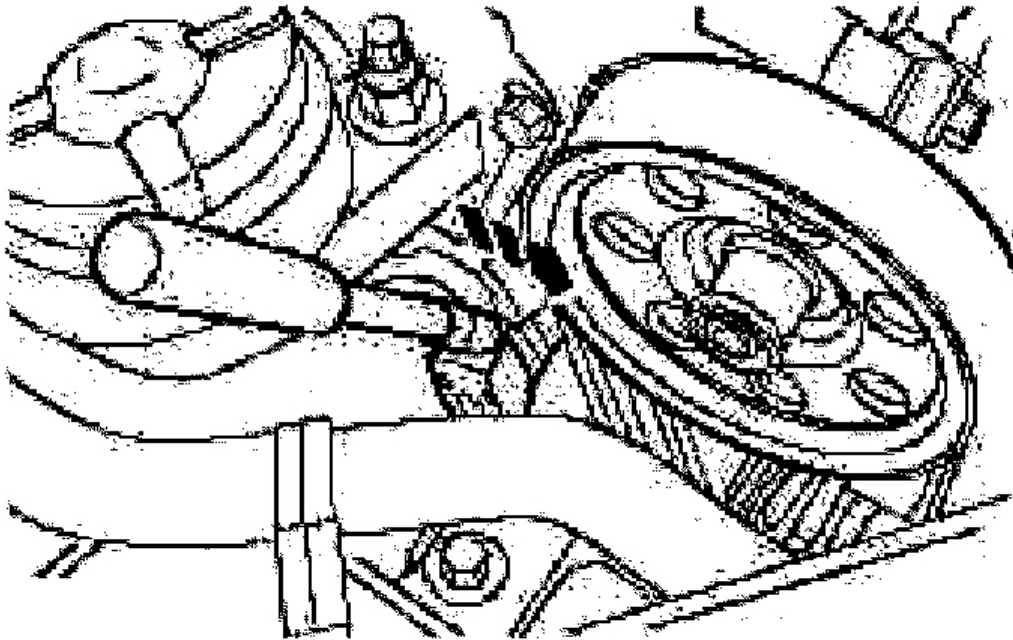
36. Using the special tool to prevent the power steering pump pulley from rotating install the power steering pump nut. Install the power steering pump pulley.



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Fig. 511: Installing Power Steering Pump Pulley
Courtesy of FORD MOTOR CO.

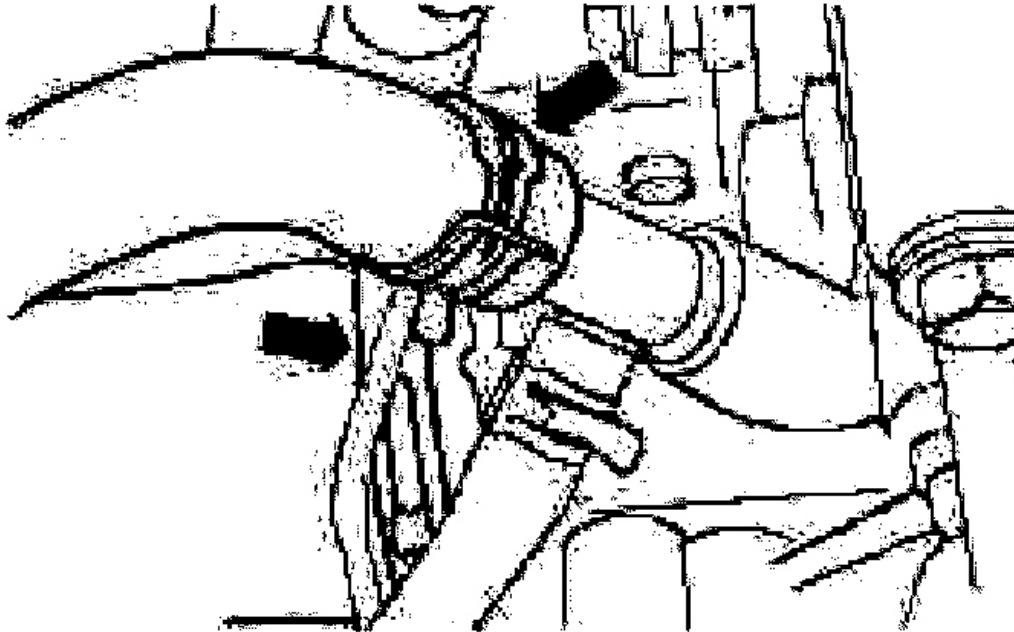
37. Install the accessory drive belt.
 - Turn the belt tensioner clockwise.



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Fig. 512: Installing Accessory Drive Belt
Courtesy of FORD MOTOR CO.

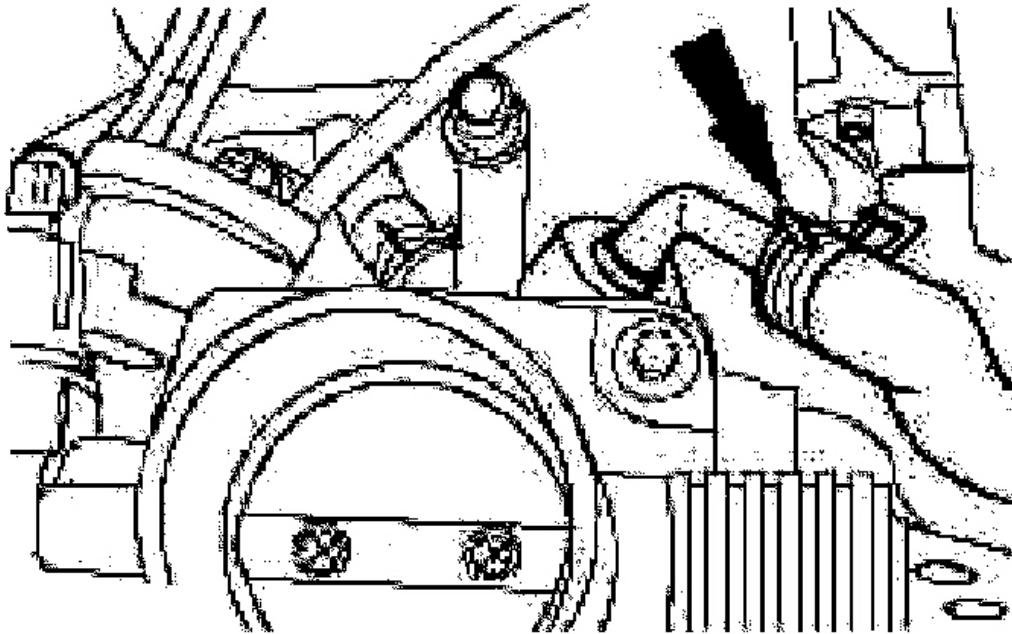
38. Install the coolant hoses to the water pump.



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Fig. 513: Installing Coolant Hoses To Water Pump
Courtesy of FORD MOTOR CO.

39. Install the coolant hose to the intake manifold.



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Fig. 514: Installing Coolant Hose To Intake Manifold
Courtesy of FORD MOTOR CO.

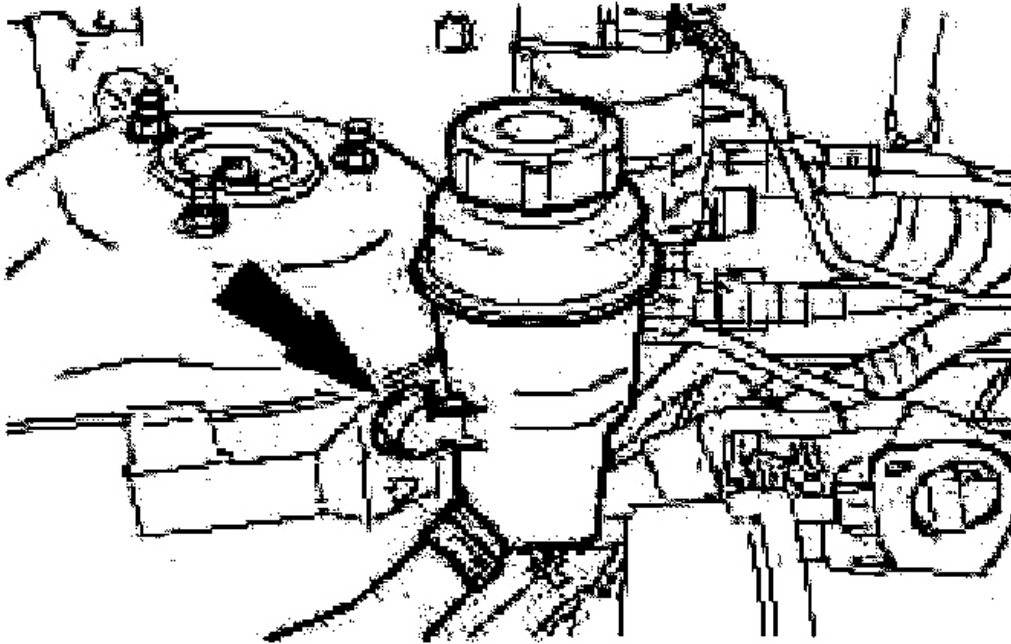
40. Connect the coolant hoses to the coolant hose connector.



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Fig. 515: Connecting Coolant Hoses To Coolant Hose Connector
Courtesy of FORD MOTOR CO.

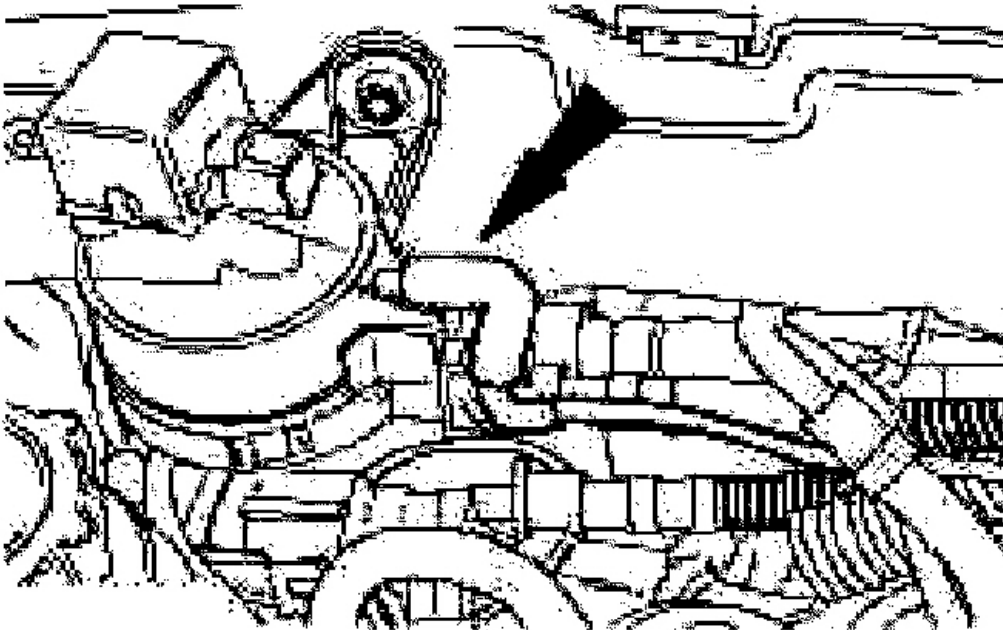
41. Push the power steering fluid reservoir into place.



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Fig. 516: Installing Power Steering Fluid Reservoir
Courtesy of FORD MOTOR CO.

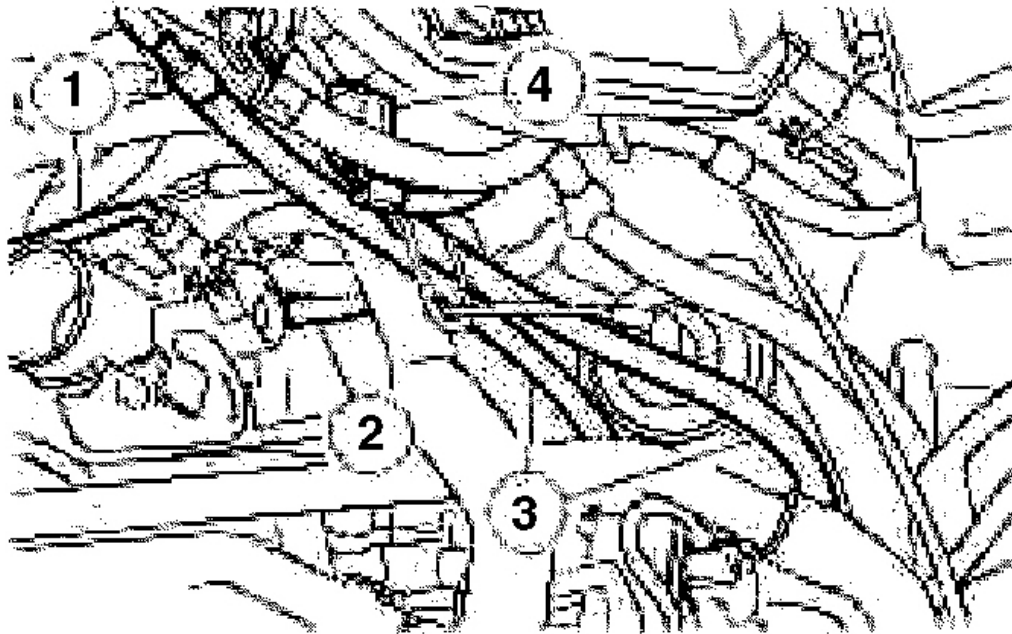
42. Connect the vacuum hose to the evaporative canister purge valve.



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Fig. 517: Connecting Vacuum Hose To Evaporative Canister Purge Valve
Courtesy of FORD MOTOR CO.

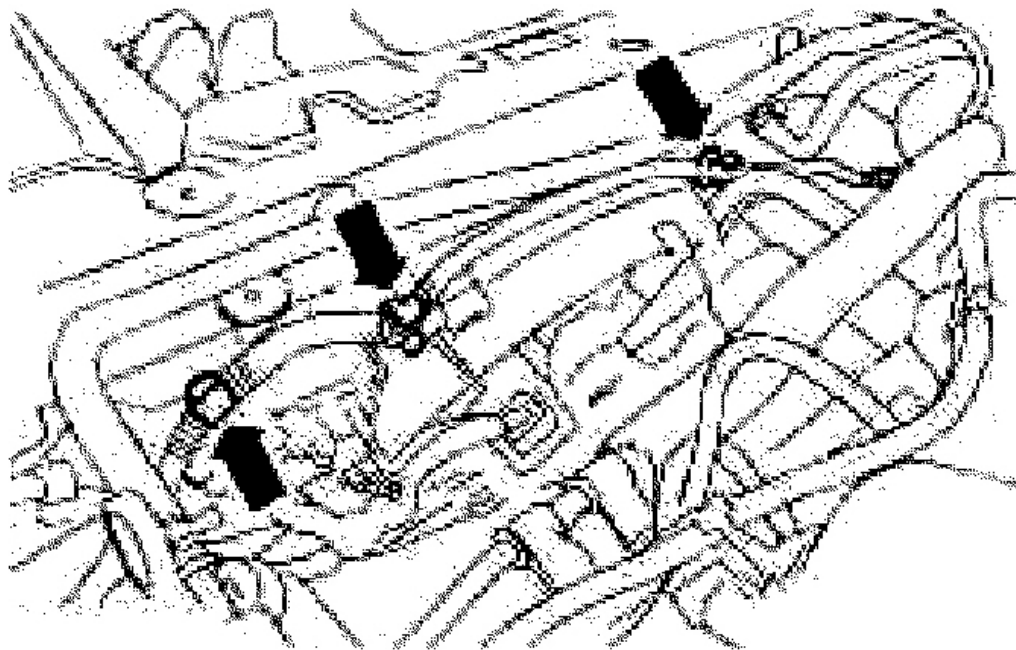
43. Connect the vacuum hoses.
 1. Evaporative emission (EVAP).
 2. Brake servo.
 3. Delta pressure feedback electronic (DPFE).
 4. Exhaust gas recirculation (EGR) valve and EGR vacuum regulator solenoid.



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Fig. 518: Connecting Vacuum Hoses
Courtesy of FORD MOTOR CO.

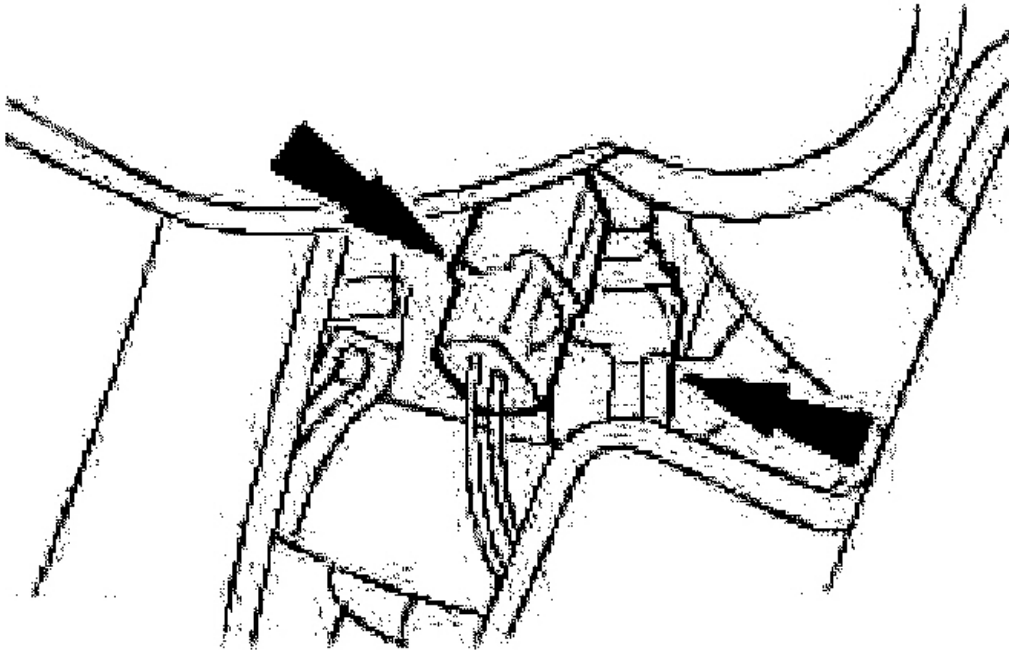
44. Install the fan to the radiator.
- Install the fan wiring harness.



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Fig. 519: Installing Fan To Radiator
Courtesy of FORD MOTOR CO.

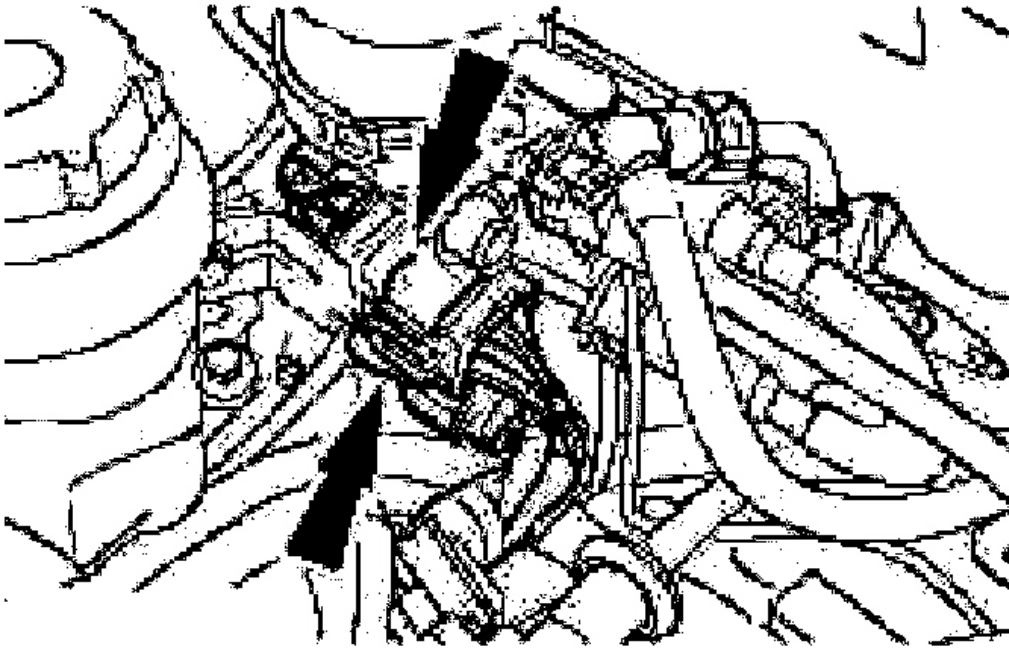
45. Connect the radiator fan electrical connector.



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Fig. 520: Connecting Radiator Fan Electrical Connector
Courtesy of FORD MOTOR CO.

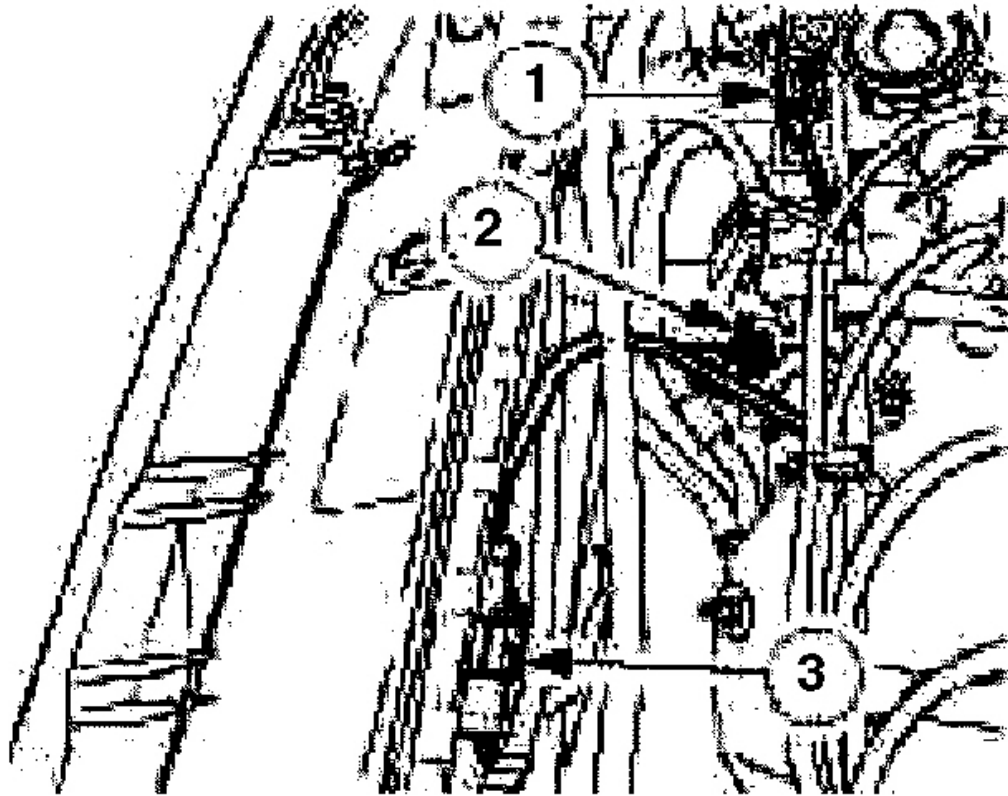
46. Connect both powertrain control module (PCM) connectors.



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Fig. 521: Connecting Powertrain Control Module (PCM) Connectors
Courtesy of FORD MOTOR CO.

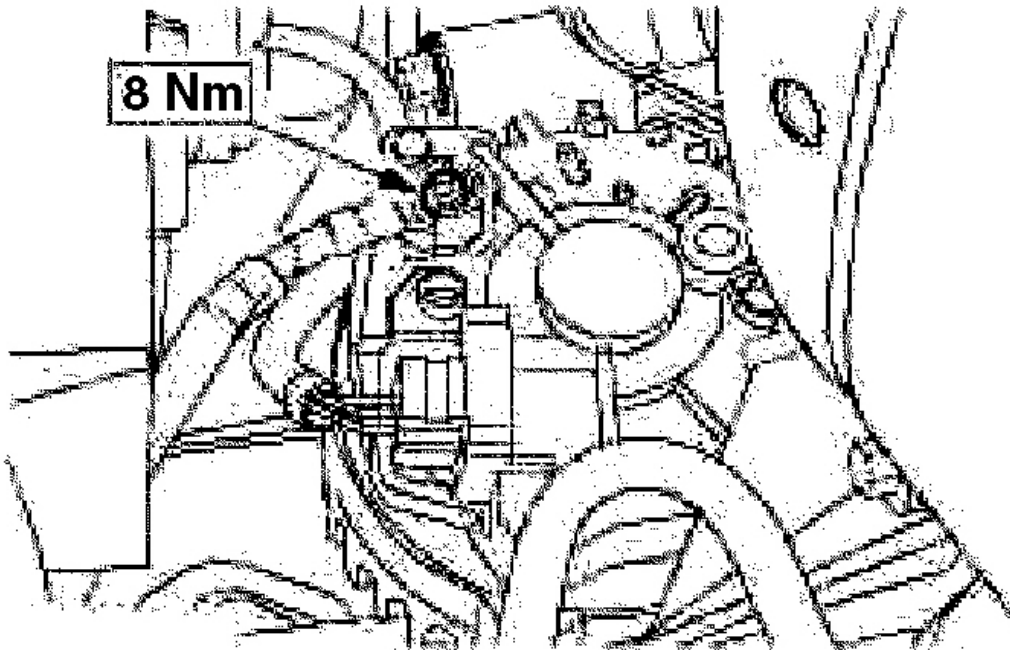
47. Connect the electrical connectors.
 1. Power steering pump pressure switch.
 2. Generator.
 3. Heated oxygen sensor (HO2S).



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Fig. 522: Connecting Electrical Connectors
Courtesy of FORD MOTOR CO.

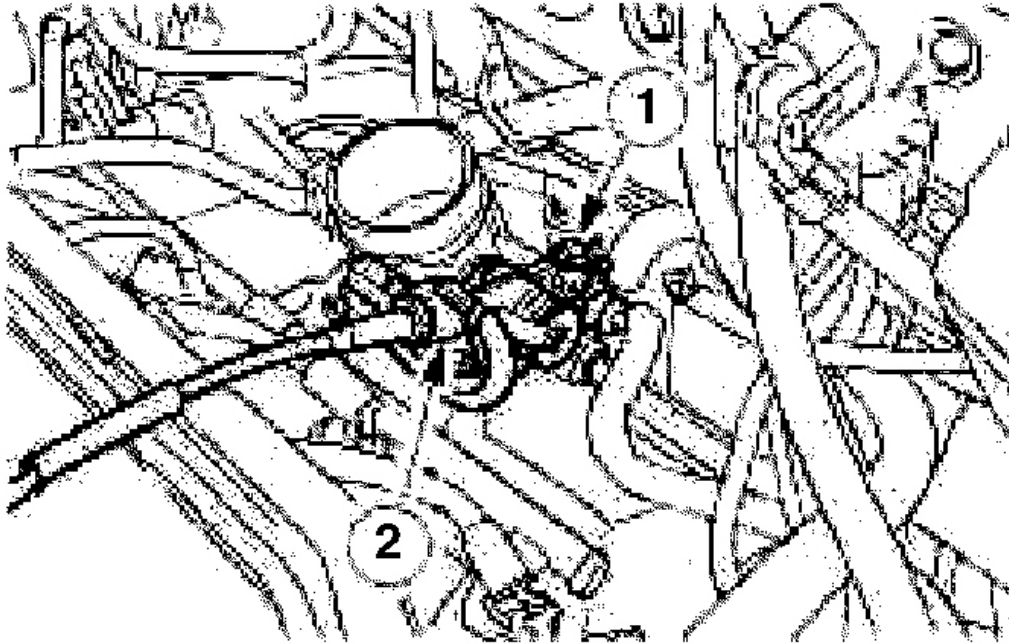
48. Connect the cable to the generator.



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Fig. 523: Connecting Cable To Generator
Courtesy of FORD MOTOR CO.

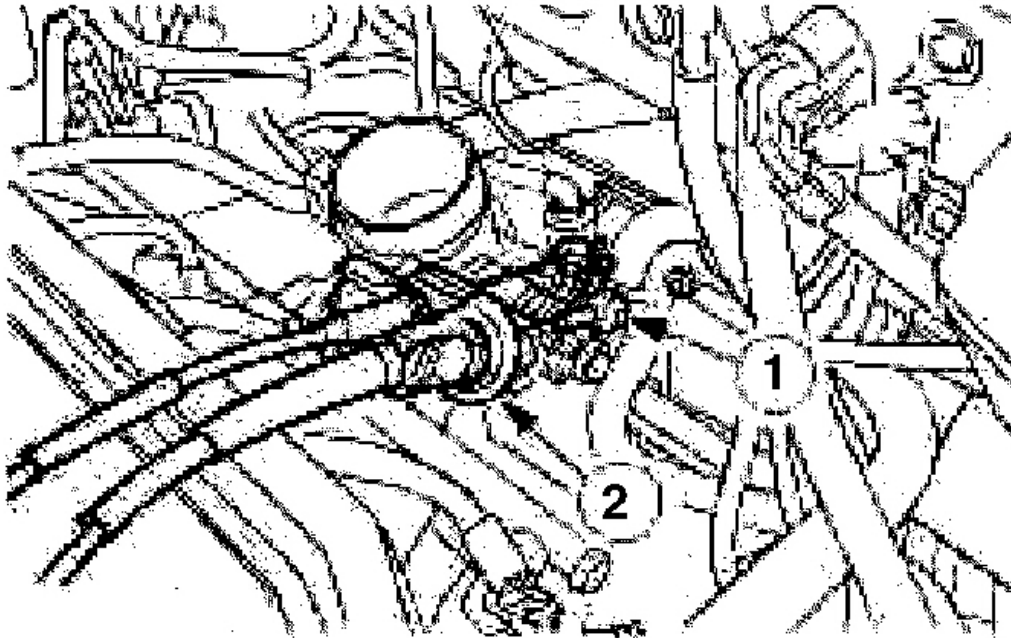
49. Install the speed control cable (if equipped).
 1. Hook the cable in place.
 2. Clip on the plastic clip.



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Fig. 524: Installing Speed Control Cable
Courtesy of FORD MOTOR CO.

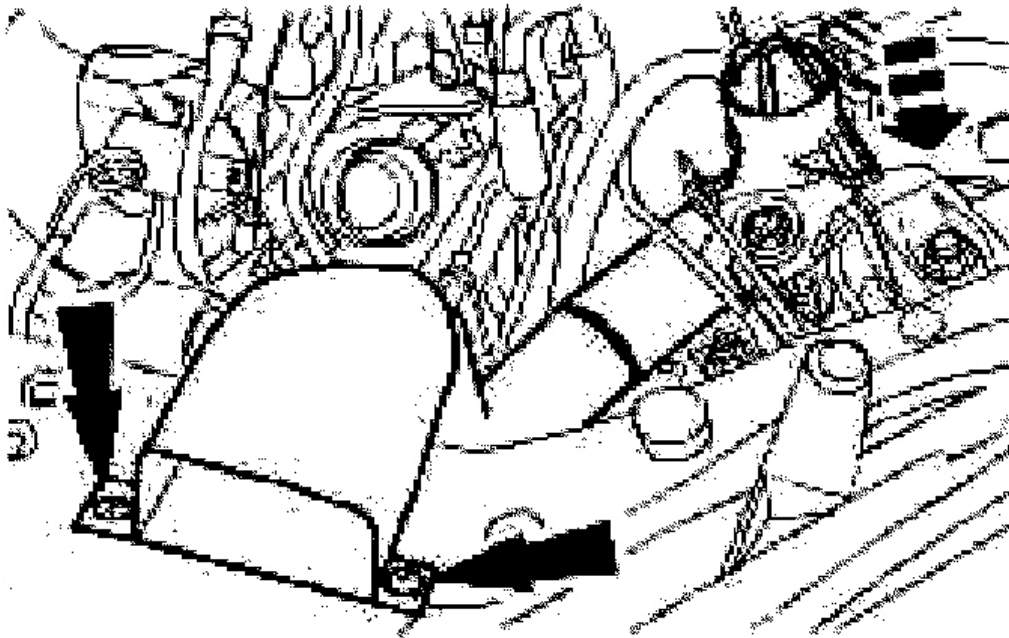
50. Install the accelerator cable.
 1. Hook the cable in place.
 2. Clip on the plastic clip.



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Fig. 525: Installing Accelerator Cable
Courtesy of FORD MOTOR CO.

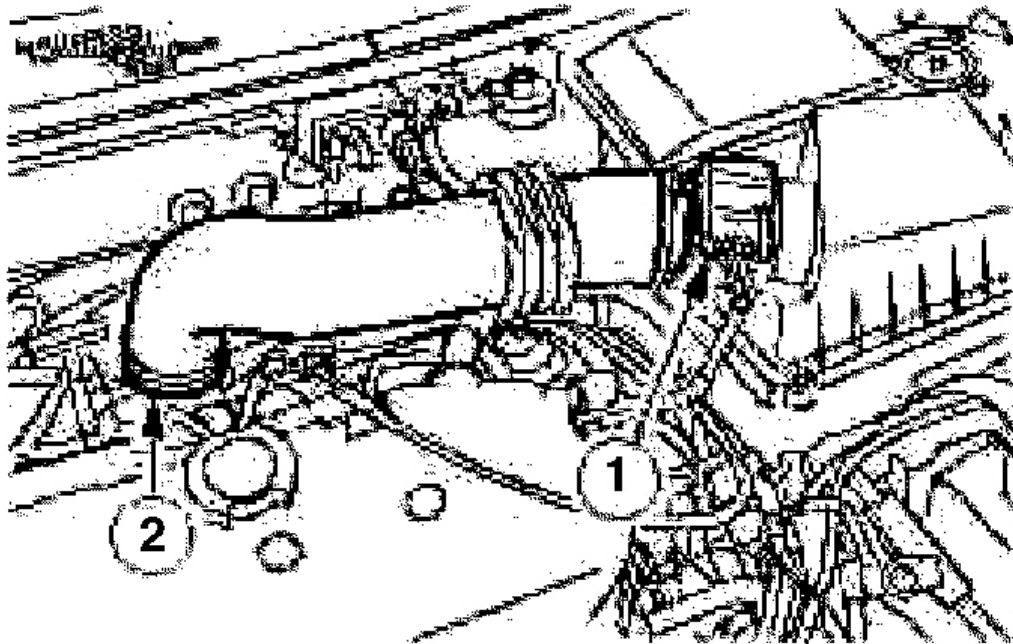
51. Connect the fuel line spring lock coupling. For additional information, refer to **FUEL SYSTEMS** article .
52. Install the intake pipe.



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Fig. 526: Installing Intake Pipe
Courtesy of FORD MOTOR CO.

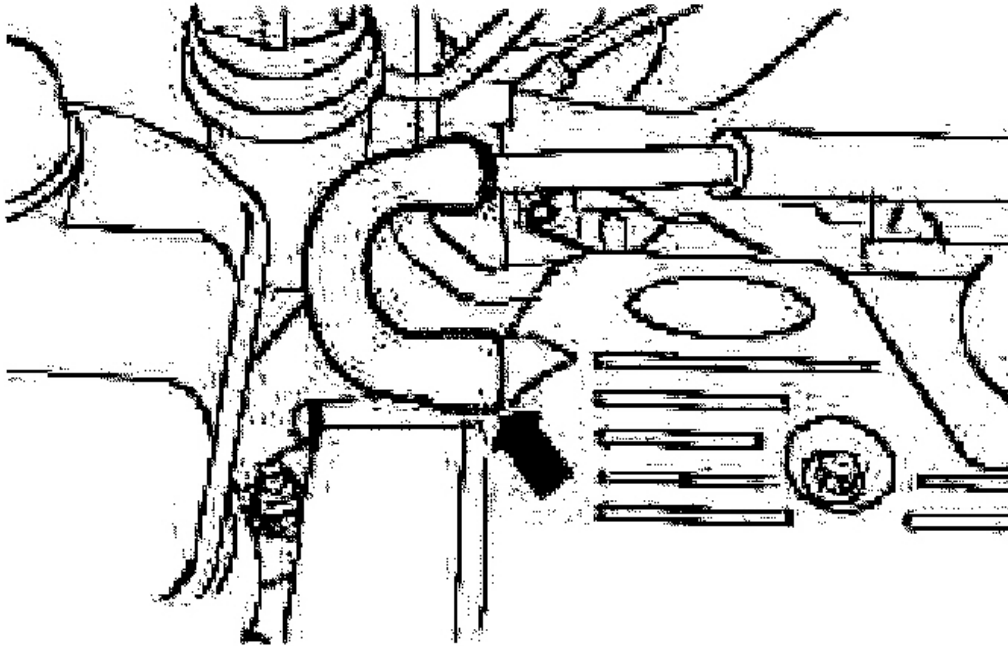
53. Install the air cleaner (ACL) housing.
 1. Connect the MAF sensor electrical connector.
 2. Install the outlet pipe.



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Fig. 527: Connecting MAF Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

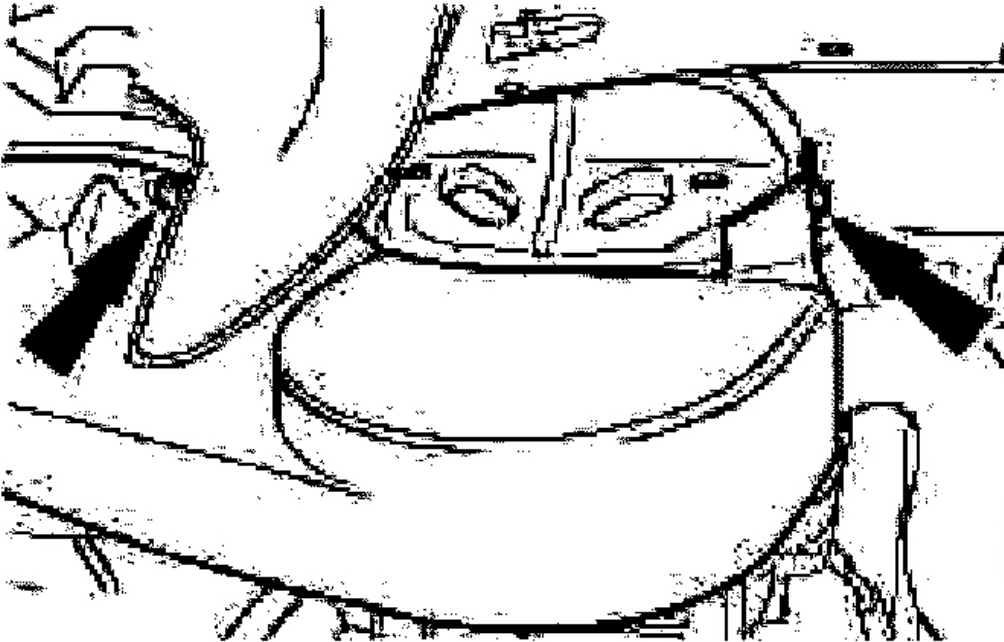
54. Attach the crankcase breather hose.



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Fig. 528: Connecting Crankcase Breather Hose
Courtesy of FORD MOTOR CO.

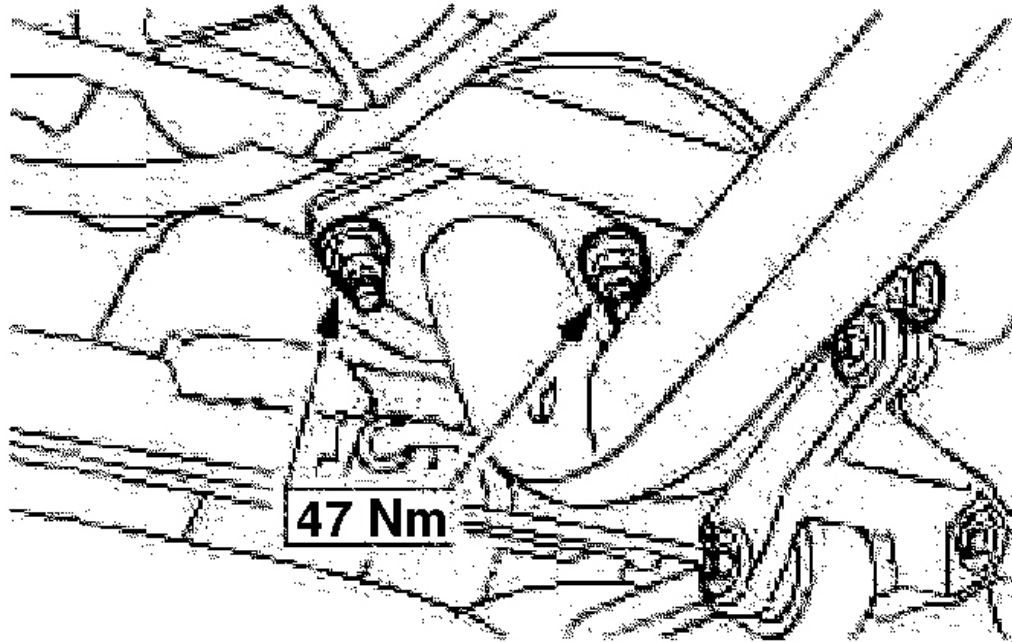
55. Raise and support the vehicle.
56. Install the accessory drive belt cover.



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Fig. 529: Installing Accessory Drive Belt Cover
Courtesy of FORD MOTOR CO.

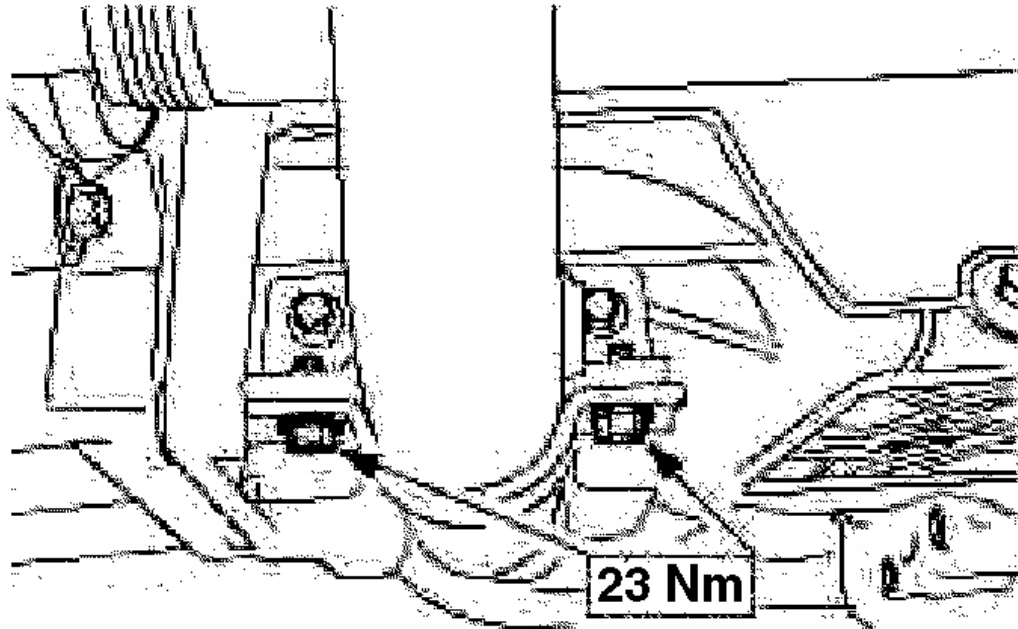
57. Connect the catalytic converter to the flexible pipe.
 - Use a new gasket and nuts.



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Fig. 530: Connecting Catalytic Converter To Flexible Pipe
Courtesy of FORD MOTOR CO.

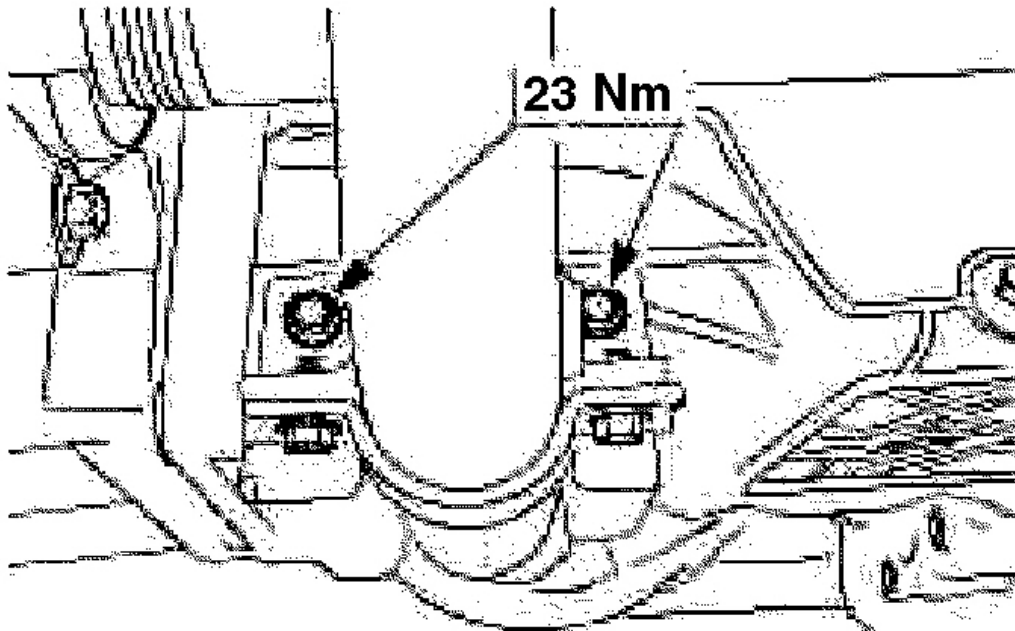
58. Install the bracket.
 - Tighten the bolts.



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Fig. 531: Installing Bracket
Courtesy of FORD MOTOR CO.

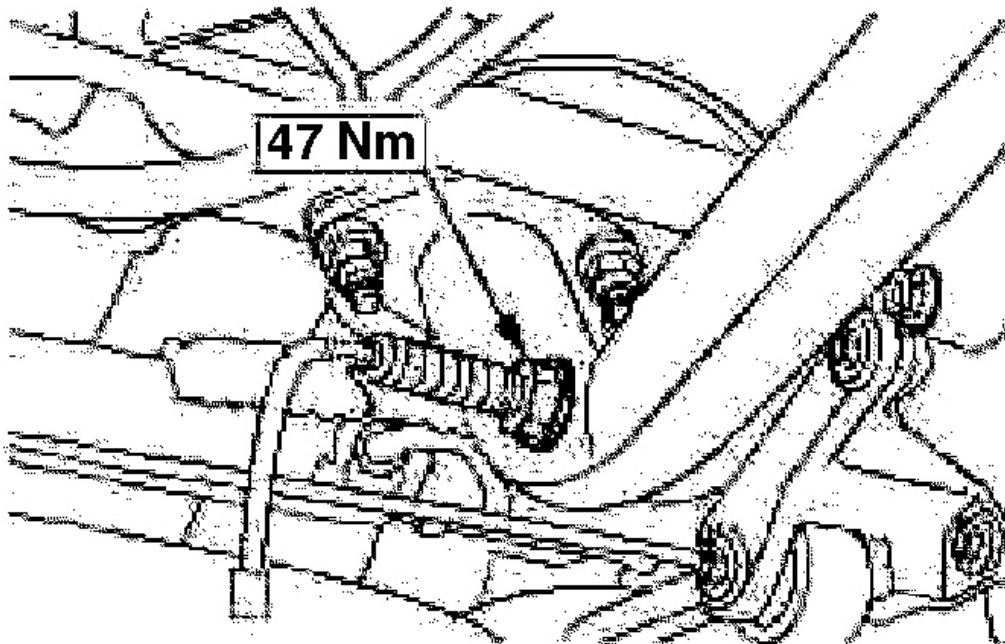
59. Tighten the bracket adjusting bolts.



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Fig. 532: Tightening Bracket Adjusting Bolts
Courtesy of FORD MOTOR CO.

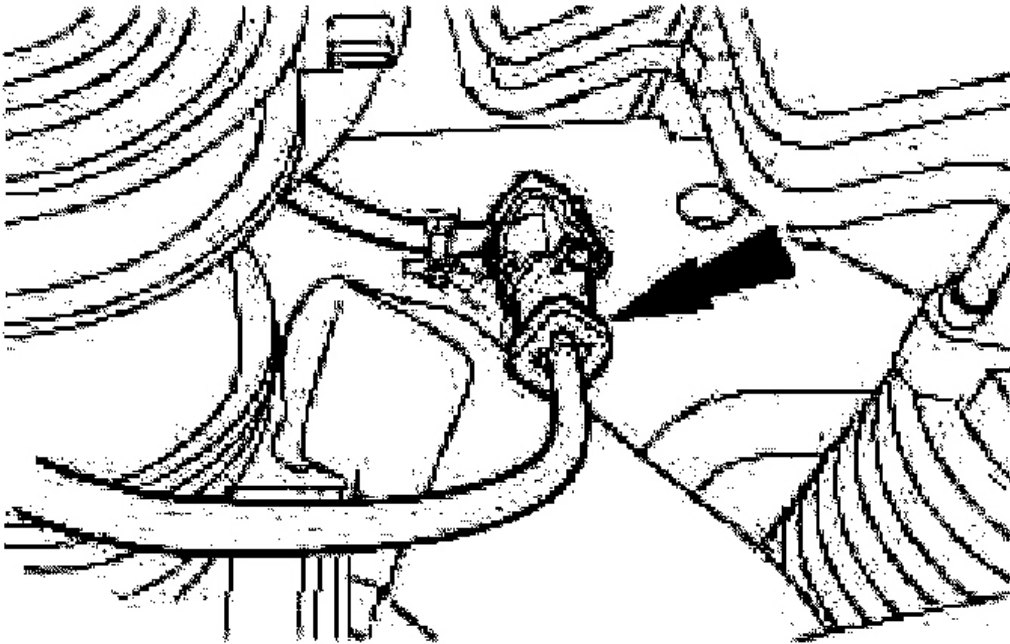
60. Install the catalyst monitor sensor.



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Fig. 533: Installing Catalyst Monitor Sensor
Courtesy of FORD MOTOR CO.

61. Install the catalyst monitor sensor electrical connector.



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Fig. 534: Installing Catalyst Monitor Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

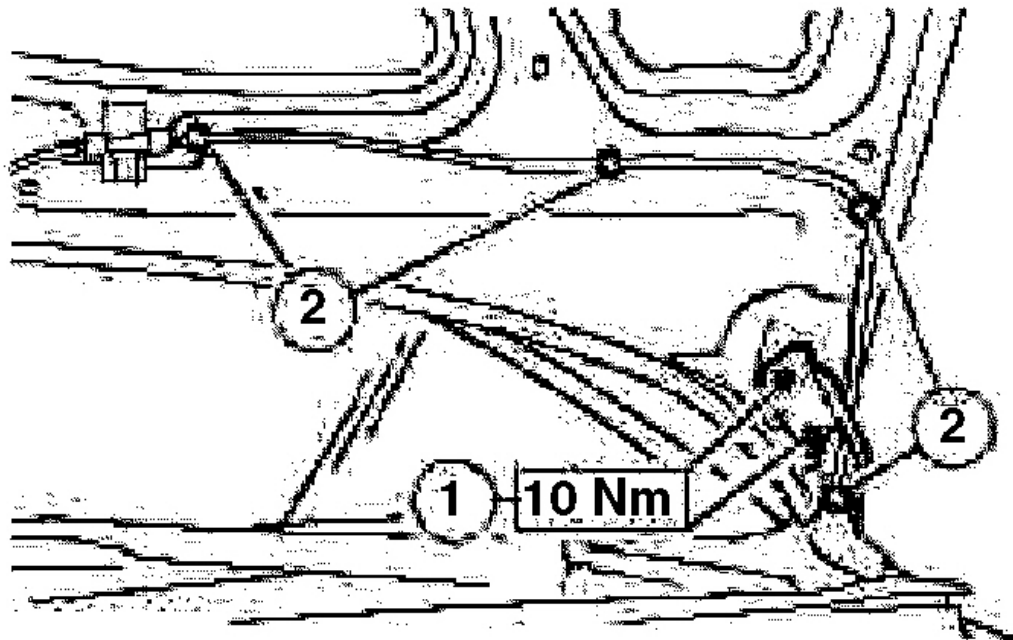
62. Lower the vehicle.
63. Install the battery tray .
64. Fill the engine with engine oil.
65. Install the coolant expansion tank. For additional information, refer to ENGINE COOLING article .

NOTE: **Line up the hinge-to hood reference mark when installing hood.**

66. Install the hood.
 1. Position the hood and install the four bolts (two each side).
 2. Install the windshield washer hose and clips.

2002 Ford Focus LX

2002 ENGINE Engine, 2.0L SPI - Focus



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Fig. 535: Installing Hood
Courtesy of FORD MOTOR CO.