

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

2002 ENGINE**Engine - 2.0L Zetec-E (Zetec) - Focus****SPECIFICATIONS****ENGINE DATA****ENGINE 2.0L ZETEC-E (ZETEC) GENERAL DATA SPECIFICATION**

Engine management	EEC V/SEFI
Emission standard	96 EEC
Fuel	91 RON unleaded
Identification code	CAA
Firing order	1-3-4-2
Bore	84.8 mm
Stroke	88.0 mm
Cubic capacity	1,988 cm ³
Compression ratio	9.6:1
Maximum engine performance at 5,300 RPM	130 hp
Maximum engine torque at 4,000 RPM	130 lb ft
Idle speed RPM	800 RPM
Speed limitation (rev/min)	7,100 RPM

ENGINE OIL**ENGINE 2.0L ZETEC-E (ZETEC) ENGINE OIL SPECIFICATIONS**

Viscosity/ambient temperature	Description	Specification
Recommended engine oils	-	-
SAE 5W -20 / below -30°C to over +40°C	SAE 5W -20 Engine Oil certified for gasoline engines by the American Petroleum Institute	ILSAC GF-3 and WSS-M2C153-H
SAE 5W -20 / below -30°C to over +40°C	Ford Formula E Economy Engine Oil	ACEA A1/B1 and WSS-M2C914-A

If engine oils of this specification are not available, engine oils of specification API SH/EC, ACEA A2/B2 or ACEA A3/B3 may also be used.

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CAPACITIES**ENGINE 2.0L ZETEC-E (ZETEC) ENGINE OIL CAPACITIES SPECIFICATIONS**

Litres	
Engine oil, initial fill including filter	4.35
Engine oil, oil change including filter	4.25
Engine oil, oil change excluding filter	3.75

LUBRICANTS, FLUIDS, SEALERS AND ADHESIVES**ENGINE 2.0L ZETEC-E (ZETEC) LUBRICANTS, FLUID, SEALERS AND ADHESIVES SPECIFICATIONS**

Item	Specification
Sealant, camshaft bearing caps	WSK-M2G348-A5
Sealant, cylinder block mating faces (Hylosil 502)	WSK-M4G320-A
Sealant, cylinder block mating faces (Loctite Ultrablack) (alternative)	WSE-M4G320-A2
Sealant, crankshaft position sensor	ESW-1C155-A
Sealant, crankshaft position sensor (alternative)	WSD-M1C-226-A
Sealant, oil pan	WSE-M4G323-A6
Thread locking compound	SDM-M4G9107-A
Spark plug thread lubricant (Never Seeze)	WSD-M13P8-A1
Lubricant, injection nozzle O-rings	WSEM-2C903-A1
Silicone grease for spark plug connector seal	A696-M1C171-AA
High-temperature grease for clutch disc engagement splines	ESD-M1C220-A

CYLINDER BLOCK**ENGINE 2.0L ZETEC-E (ZETEC) CYLINDER BLOCK SPECIFICATIONS**

Description	mm
Cylinder bore diameter, class 1.	84.800 - 84.810
Cylinder bore diameter, class 2.	84.810 - 84.820
Cylinder bore diameter, class 3.	84.820 - 84.830
Inner diameter, main bearing shells installed	58.011 - 58.038
Inner diameter, main bearing shells installed (main bearing shells with stepped sizes)	58.008 - 58.031
Main bearing radial clearance	0.011 - 0.058

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Main bearing radial clearance (main bearing shells with stepped sizes)	0.020 - 0.042
Main bearing parent bore	62.287 - 62.300

PISTONS

ENGINE 2.0L ZETEC-E (ZETEC) PISTONS SPECIFICATIONS

Description	mm
Piston diameter, class 1.	84.770 - 84.780
Piston diameter, class 2.	84.780 - 84.790
Piston diameter, class 3.	84.790 - 84.800
Piston clearance in cylinder	0.010 - 0.030
Piston ring gaps (installed)	0.30 - 0.50
- upper compression ring	
- lower compression ring	0.30 - 0.50
- oil scraper ring	0.40 - 1.40

Ring gap position: The piston ring gaps must be distributed evenly around the circumference of the piston. This also applies to the oil scraper ring elements. Align the ring gaps at 120 degrees to each other.

CRANKSHAFT

ENGINE 2.0L ZETEC-E (ZETEC) CRANKSHAFT SPECIFICATIONS

Description	mm
Main bearing journal diameter	57.980-58.000
Main bearing journal end float	0.09-0.26
Connecting rod bearing journal diameter	46.89-46.91

LOWER CRANKSHAFT SPACER

ENGINE 2.0L ZETEC-E (ZETEC) LOWER CRANKSHAFT SPACER SPECIFICATIONS

Description	mm
Required spacer washer thickness if there is a gap between the cylinder block and the lower crankcase of:	-
0.26 mm - 0.50 mm	0.25
0.51 mm - 0.75 mm	0.50

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CONNECTING ROD**ENGINE 2.0L ZETEC-E (ZETEC) CONNECTING ROD SPECIFICATIONS**

Description	mm
Big end bore diameter	49.89 - 49.91
Small end bore diameter	19.951 - 19.981
Inner diameter, connecting rod bearing shells installed	46.926 - 46.960
Radial connecting rod bearing clearance	0.016 - 0.070
Axial connecting rod bearing clearance	0.090 - 0.320

PISTON PIN**ENGINE 2.0L ZETEC-E (ZETEC) PISTON PIN SPECIFICATIONS**

Description	mm
Piston pin length	55.800 - 56.200
Piston pin diameter, white	19.997 - 20.000
Piston pin diameter, red	20.625 - 20.628
Piston pin clearance in piston	0.016 - 0.049

CAMSHAFT**ENGINE 2.0L ZETEC-E (ZETEC) CAMSHAFT SPECIFICATIONS**

Description	mm
Bearing journal diameter	25.960 - 25.980
Camshaft bearing radial clearance	0.020 - 0.070
Camshaft end float	0.080 - 0.220
Lobe lift intake	8.90
Lobe lift exhaust	8.70
Theoretical valve maximum lift intake	8.90
Theoretical valve maximum lift exhaust	8.70

VALVES**ENGINE 2.0L ZETEC-E (ZETEC) VALVES SPECIFICATIONS**

Description	mm
Valve clearance in the valve guide	
Intake valve	0.017-0.064

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Exhaust valve	0.017-0.064
Intake valve clearance (at 20°C ° 5°C)	0.11-0.18
Exhaust valve clearance (at 20 °C ° 5°C)	0.27-0.34

CYLINDER HEAD**ENGINE 2.0L ZETEC-E (ZETEC) CYLINDER HEAD SPECIFICATIONS**

Description	Specification
Maximum distortion (mating surface)	0.1 mm
Height of mating surface	1.76 mm - 2.12 mm
Peak-to-valley height of mating surface (reference length 2.5 mm vertical to groove direction)	$R^{3z} = 6.0$ "MU"m
Oil pressure at 800 - 850 RPM	1.3 bar - 2.5 bar
Oil pressure at 4000 RPM	3.7 bar - 5.5 bar

TORQUE SPECIFICATIONS**ENGINE 2.0L ZETEC-E (ZETEC) TORQUE SPECIFICATIONS**

Description	N.m	lb-ft	lb-in
Hose clamps	4	-	35
Intake manifold studs	5	-	44
Intake manifold bolts and nuts	18	13	-
EGR tube assembly to EGR valve	40	30	-
EGR pipe to ignition coil bracket	6	-	53
EGR tube assembly to catalyst	40	30	-
Heat shield to exhaust manifold	10	-	89
Exhaust manifold studs	5	-	44
Exhaust manifold nuts	16	12	-
Catalytic converter to exhaust manifold	48	35	-
Catalytic converter to exhaust	47	35	-
Right-hand driveshaft center bearing	25	18	-
Generator to bracket	25	18	-
Generator bracket to upper cylinder block bolts	25	18	-
Generator bracket to lower cylinder block bolts	65	48	-
Transmission flange bolts	47	35	-
Starter motor to transmission	35	26	-

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Oil drain plug, MTX transmission	45	33	-
Oil control plug, MTX transmission	45	33	-
Flywheel bolts	112	83	-
Clutch pressure plate	29	21	-
Engine roll restrictor to transmission	48	35	-
Engine roll restrictor to subframe	48	35	-
Engine rear mount to body	48	35	-
Engine rear mount (nut on transmission mounting bracket)	133	98	-
Engine front mount to engine	80	59	-
Engine front mount to body	48	35	-
Power steering pump to bracket	24	18	-
Power steering pump bracket	48	35	-
Cylinder head bolts	(1)	-	-
Camshaft bearing cap bolts	(1)	-	-
Cylinder head cover	(1)	-	-
Spark plugs	15	11	-
Timing belt tensioner	25	18	-
Camshaft timing belt pulleys	68	50	-
Upper timing belt cover	10	-	89
Ignition coil (EI) bracket to cylinder head	21	15	-
Thermostat housing	20	15	-
Fuel rail	10	-	89
Engine rear lifting eye	16	12	-
Engine rear lifting eye studs	6	-	53
Engine front lifting eye	47	35	-
Cylinder block	-	-	-
Engine oil drain plug	25	18	-
Oil pressure switch	27	20	-
Cylinder block oil gallery blanking plugs	23	17	-
Heater pipe bracket to oil pan	10	-	89
Oil pan to lower crankcase	(1)	-	-
Lower crankcase to cylinder block	22	16	-
Oil pump	11	8	-
Oil intake pipe to oil pump	10	-	89

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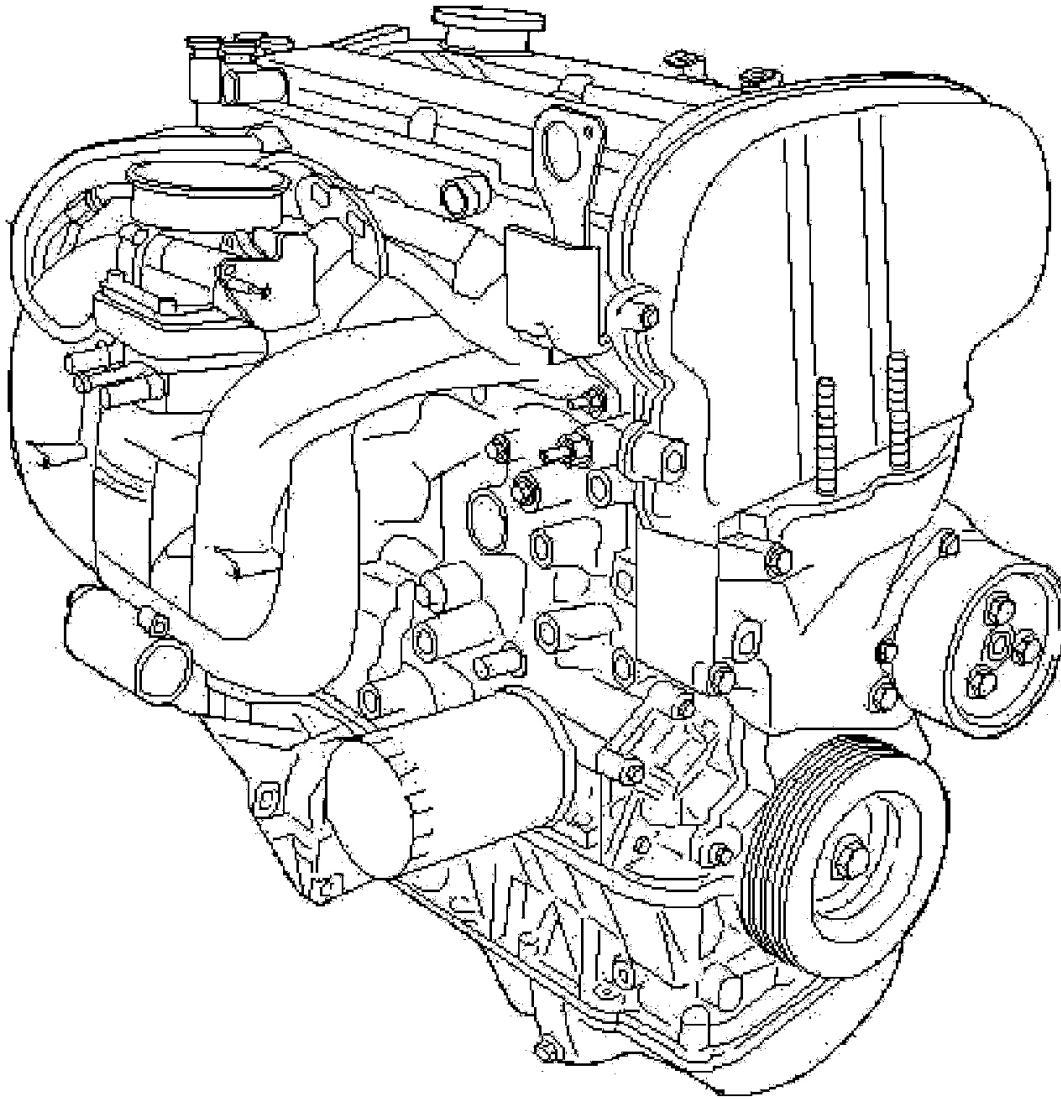
Main bearing bolts	(1)	-	-
Connecting rod bearing cap bolts	(1)	-	-
Coolant pump	18	13	-
Crankshaft rear oil seal carrier	20	15	-
Drive belt idler pulley	40	30	-
Crankcase ventilation pipe bracket	23	17	-
Crankcase ventilation	10	-	89
Coolant pump pulley	24	18	-
Crankshaft belt pulley	115	85	-
Crankshaft position sensor bracket	21	15	-
Crankshaft position sensor to bracket	8	-	71
Idler pulley	23	17	-
Knock sensor	20	15	-
(1) Refer to the procedure in this article.			

DESCRIPTION AND OPERATION

ENGINE

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Fig. 1: Identifying 2.0L Zetec-E Engine
Courtesy of FORD MOTOR CO.

The vehicle range is fitted with the "New Generation 2.0L Zetec-E engine". The most significant features are:

- Hydraulic engine mountings
- 16 valve DOHC
- Full flow oil filter
- Aluminum alloy cylinder head

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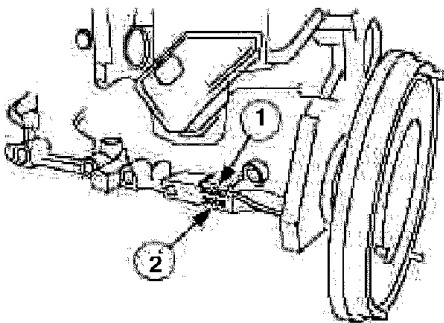
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- Cast iron block
- High temperature resistant coating on exhaust valves
- Valve train with mechanical tappets
- Modified timing belt guide
- Aluminum timing belt cover with integral engine mounting function to reduce noise, vibration and harshness (NVH)
- Aluminum crankcase reinforcement and flat oil pan to reduce NVH
- Generator with check-back function for generator load

The changes made are:

- close coupled tri-metal catalytic converter
- EGR system
- Adjustable valve tappets
- use of a cylinder head temperature (CHT) sensor in place of an engine coolant temperature (ECT) sensor.

VIN Derivative location on the cylinder block

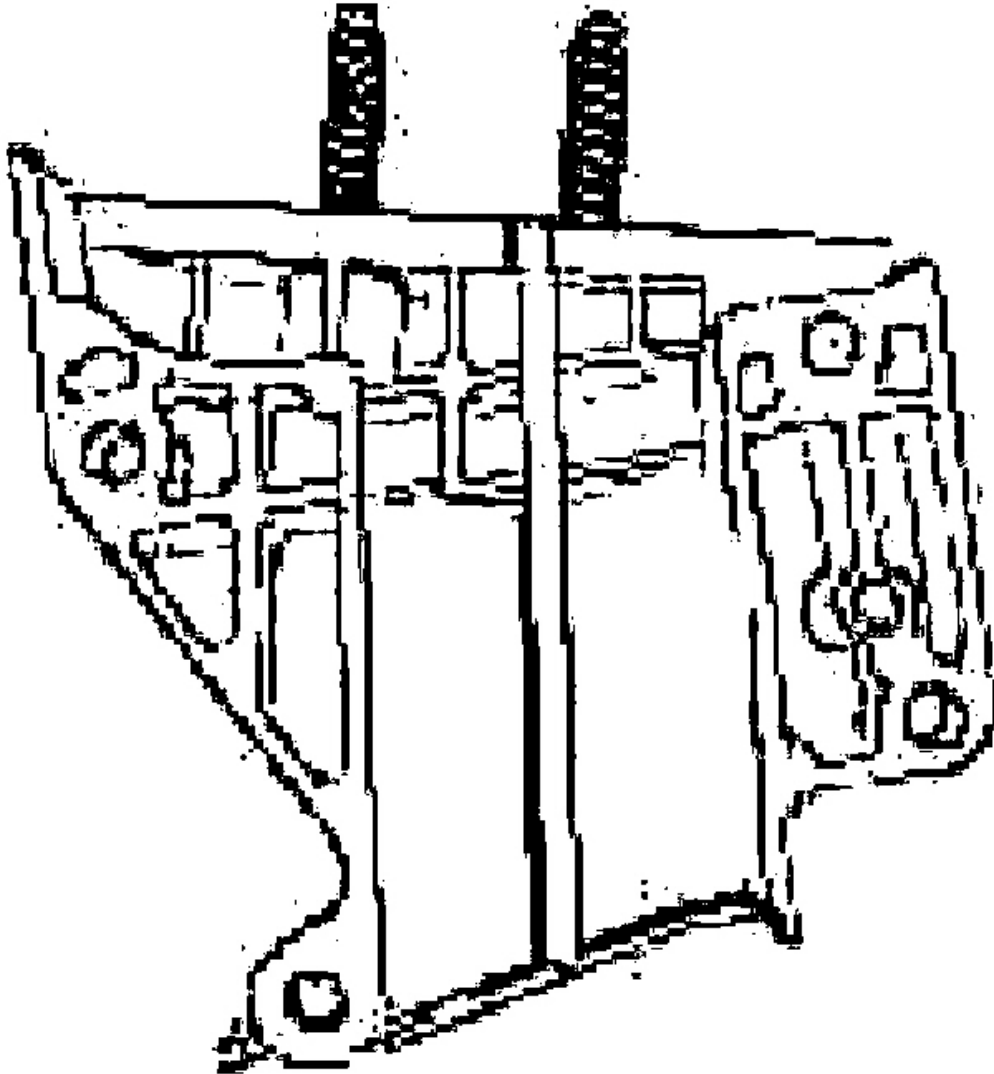


Item	Part Number	Description
1	-	Engine serial number
2	CAA	VIN derivative

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Fig. 2: Identifying VIN Derivative Location On Cylinder Block
Courtesy of FORD MOTOR CO.

Central timing belt cover/front engine mounting bracket



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Fig. 3: Identifying Central Timing Belt Cover/Front Engine Mounting Bracket
Courtesy of FORD MOTOR CO.

The new timing belt cover is further reinforced by a vertical support. The central timing belt cover and the front engine mounting have to be removed to fit a new timing belt.

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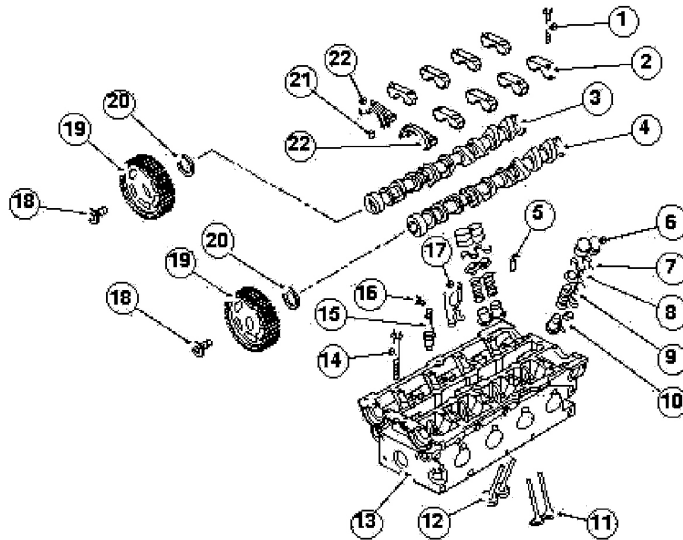
Cylinder Head

Valve Train

The exhaust valve springs are marked blue whilst the inlet valve springs are marked red. The valve clearance can be adjusted by exchanging the valve tappets. Precision is required when adjusting the valve clearance in order to avoid repeated removal and reinstallation of the camshafts.

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Item	Part Number	Description
1	-	Camshaft bearing cap bolt
2	-	Camshaft bearing cap
3	-	Inlet camshaft
4	-	Exhaust camshaft
5	-	Oil gallery plug
6	-	Valve tappet
7	-	Valve collet
8	-	Valve spring retainer
9	-	Valve spring
10	-	Valve stem oil seal
11	-	Exhaust valves
12	-	Inlet valves
13	-	Cylinder head
14	-	Cylinder head bolt
15	-	Spark plug
16	-	Engine lifting eye bolt
17	-	Engine lifting eye
18	-	Camshaft pulley bolt
19	-	Camshaft belt pulleys
20	-	Camshaft oil seals
21	-	Guide sleeve for front camshaft bearing cap
22	-	Front camshaft bearing cap

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Fig. 4: Identifying Engine Valve Train Components
Courtesy of FORD MOTOR CO.

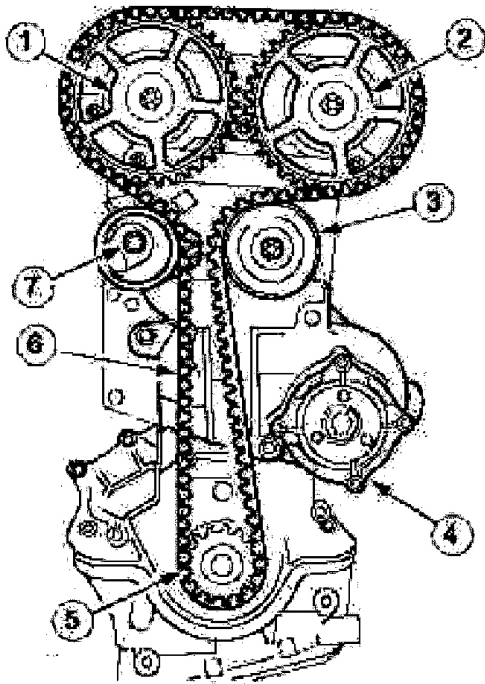
Mechanical bucket tappet

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The level of wear is so minimal that initial checking and adjustment of the valve clearance is not necessary until 150,000 km (90,000 miles).

Drive belt



Item	Part Number	Description
1	-	Intake camshaft with timing pulley
2	-	Exhaust camshaft with timing pulley
3	-	Idler pulley
4	-	Outer coolant pump housing on engine block
5	-	Crankshaft timing pulley
6	-	Timing belt guide
7	-	Spring-loaded timing belt tensioner with eccentric adjustment for removing and installing the timing belt

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Fig. 5: Identifying Engine Drive Belt Components
Courtesy of FORD MOTOR CO.

- A new timing belt must be installed after 150,000 km (90,000 miles) or after 10 years.
- A new timing belt must always be installed after repair work in which it was removed.

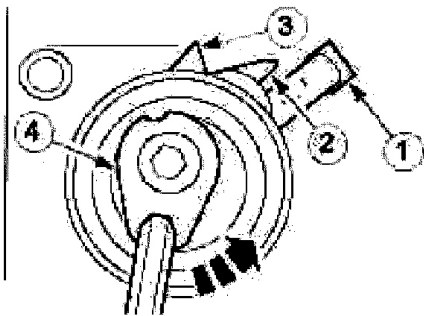
Timing Belt Tensioner

CAUTION: Only tension the timing belt by turning in a counterclockwise direction.

An automatic timing belt tensioner ensures that the belt has the correct tension. When a new belt is fitted, the tensioner is moved into the base setting (arrowhead (3) and marker (2) are in line). This base setting is taken up by one of the cams (4). Another (spring-loaded) cam ensures that the belt is kept at the correct tension when the engine is running. The belt tensioner moves up to 30 degrees from its center position in each direction.

NOTE: Do not re-tighten the belt since there is a risk of exceeding the permitted working range in one of the directions. The belt tensioner base setting only applies in the case of new timing belts. Re-tightening of the belt can cause it to rip or flutter.

It is no longer possible to check the base setting once the adjustment tools and pin have been removed (the spring forces of the valve train are exerted on the belt and change the position of the belt tensioner).

Automatic Timing Belt Tensioner

Item	Part Number	Description
1	-	Bracket secured in sheet metal cover
2	-	Marker
3	-	Arrowhead
4	-	Cam for base setting

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Fig. 6: Identifying Automatic Timing Belt Tensioner

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Courtesy of FORD MOTOR CO.

Cylinder Head Attachments

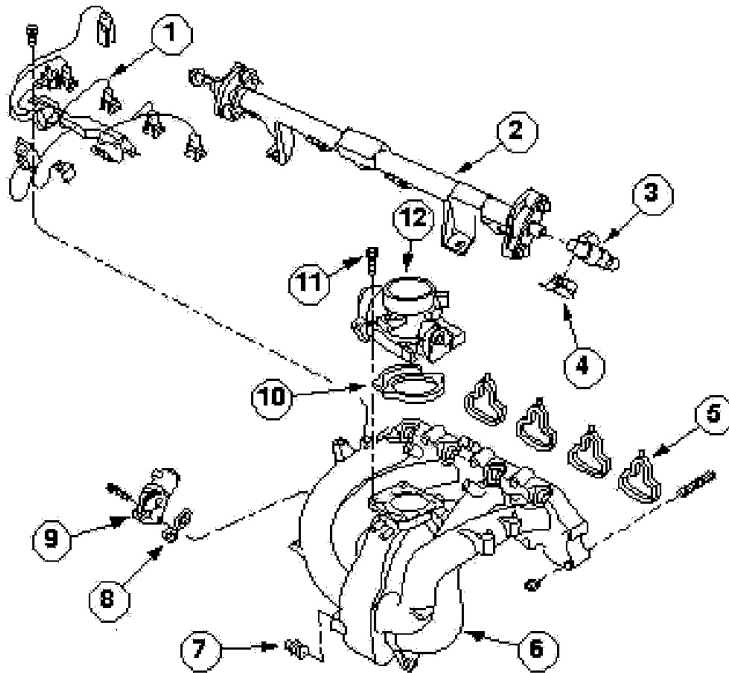
Intake Manifold

The new Zetec-E engines are fitted with an intake manifold made of glass fibre reinforced plastic. The ducts in the intake manifold are arranged to ensure that the intake distance is the same for each cylinder.

Intake Manifold Attachments

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Item	Part Number	Description
1	-	Injector plug
2	-	Fuel rail
3	-	Injector
4	-	Injector retainer
5	-	Intake manifold gasket
6	-	Intake manifold
7	-	Quick release coupling for the brake booster vacuum hose
8	-	Idle speed control (ISC) valve gasket
9	-	ISC valve
10	-	Throttle body gasket
11	-	Throttle body bolt
12	-	Throttle body

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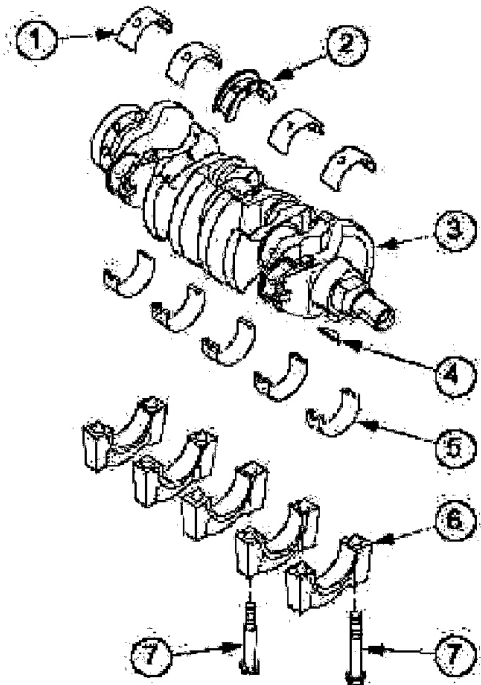
Fig. 7: Identifying Intake Manifold Attachments
Courtesy of FORD MOTOR CO.

Cylinder Block

Crankshaft

The crankshaft is housed in five bearings and has a counterweight for each cylinder. The central main bearing has two thrust half shells which axially guide the crankshaft and set the end float.

Crankshaft Bearings



Item	Part Number	Description
1	-	Cylinder block main bearing shell
2	-	Main bearing shell with thrust half shells
3	-	Crankshaft
4	-	Woodruff key for crankshaft pulley hub
5	-	Bearing shell, main bearing cap
6	-	Main bearing cap
7	-	Main bearing cap bolt

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Fig. 8: Identifying Crankshaft Bearings
Courtesy of FORD MOTOR CO.

Connecting (ISC) rod bearings

The connecting rods are numbered one to four starting at the timing belt end. It is practically

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impossible to mix up the connecting rod bearing caps and connecting rods since the connecting rod bearing caps are broken away from the connecting rod during production. The fracture profile of a connecting rod bearing cap therefore only fits one of the connecting rods.

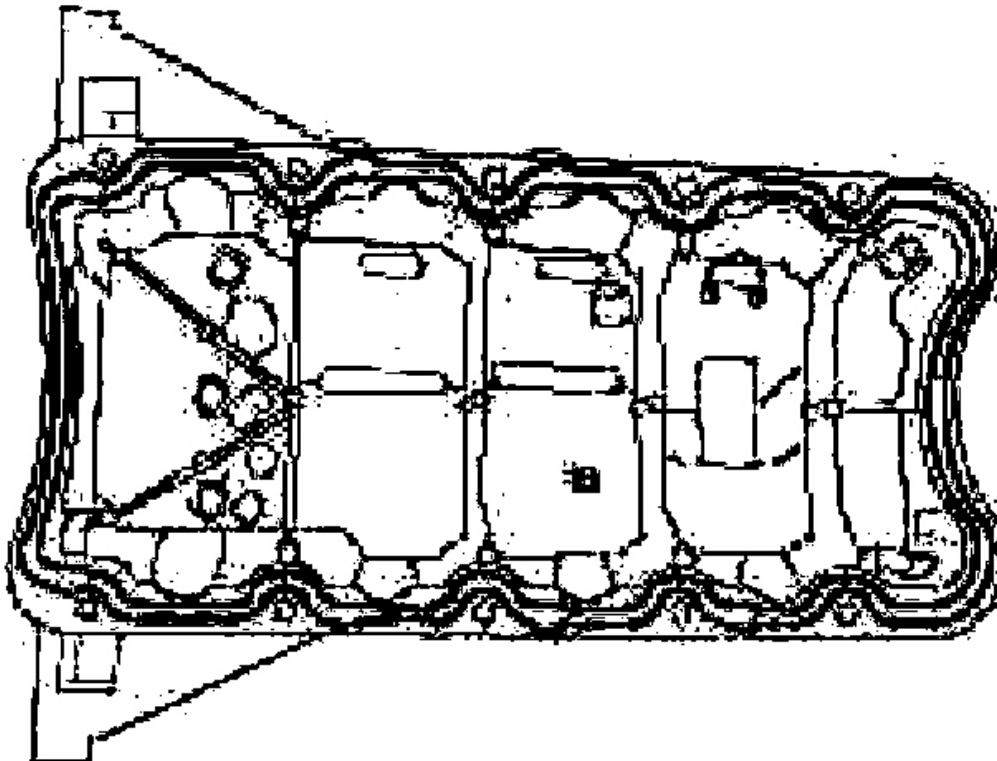
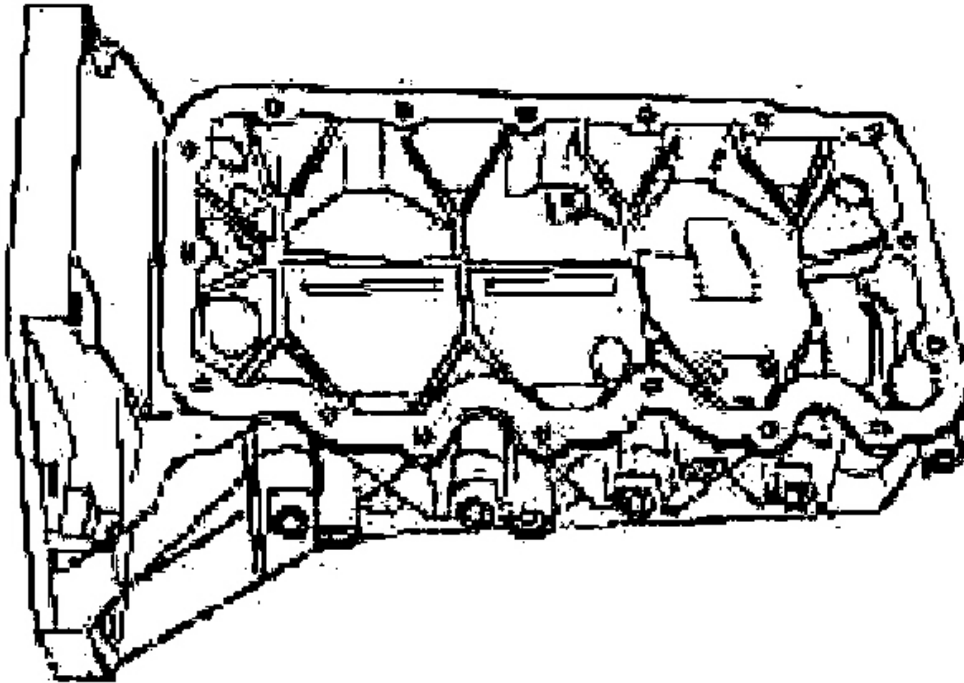
Crankcase Reinforcement

Lower crankcase

View of Crankcase Reinforcements

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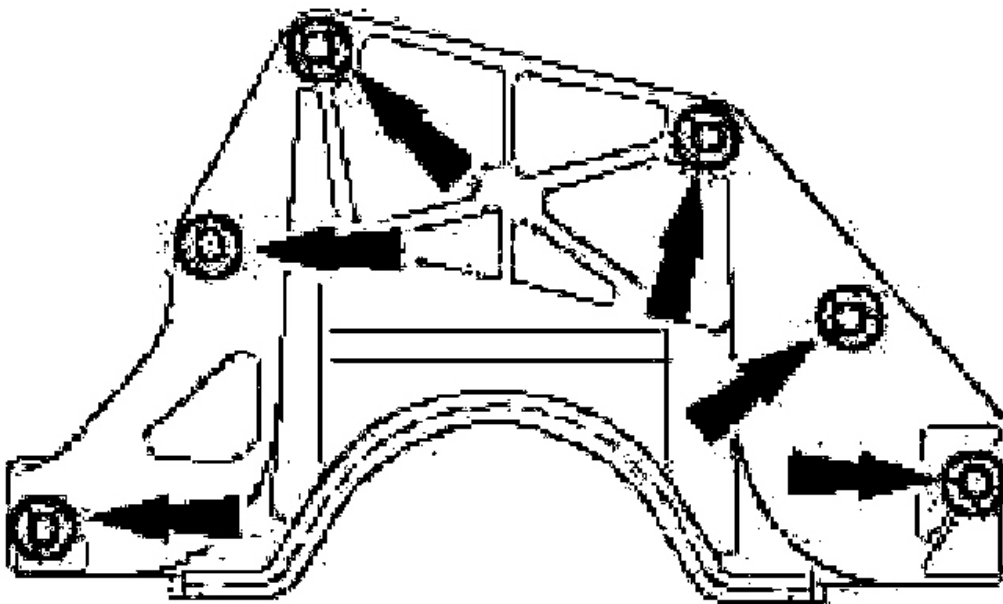


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Fig. 9: Identifying Crankcase Reinforcements
Courtesy of FORD MOTOR CO.

The crankcase reinforcements are designed to damp engine vibrations. This leads to a further reduction in interior noise levels. The crankcase reinforcements are sealed against the cylinder block by means of a flat carrier gasket.

Crankcase Reinforcement Spacers

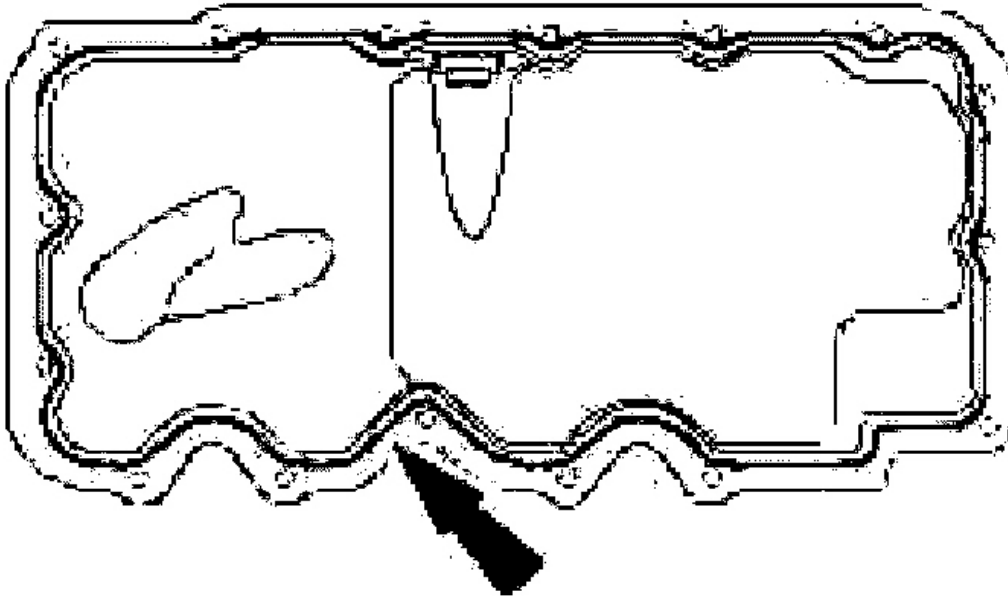


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Fig. 10: Identifying Crankcase Reinforcement Spacers
Courtesy of FORD MOTOR CO.

The crankcase reinforcement spacers are needed to even out any excessive gap between the transmission and the crankcase reinforcements.

Oil Pan



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Fig. 11: Identifying Oil Pan
Courtesy of FORD MOTOR CO.

The unit is closed off at the bottom by a drawn sheet metal oil pan which is directly fixed to the crankcase reinforcements. A 3 mm wide bead of sealer ensures that the unit is leakproof.

Engine Control

Powertrain Control Module (PCM)

The PCM controls the Zetec-E engine. To enable it to do this, the PCM requires comprehensive information regarding the current operating state of the engine. The PCM obtains this information by means of numerous sensors.

- The PCM controls:
- the fully electronic (EI) ignition system
- the sequential electronic fuel injection (SEFI)
- the air-conditioning system in conjunction with the cooling system.

DIAGNOSIS AND TESTING

ENGINE

REFER to ENGINE SYSTEM-GENERAL INFORMATION article .

GENERAL PROCEDURES

VALVE CLEARANCE

Material

MATERIAL SPECIFICATION

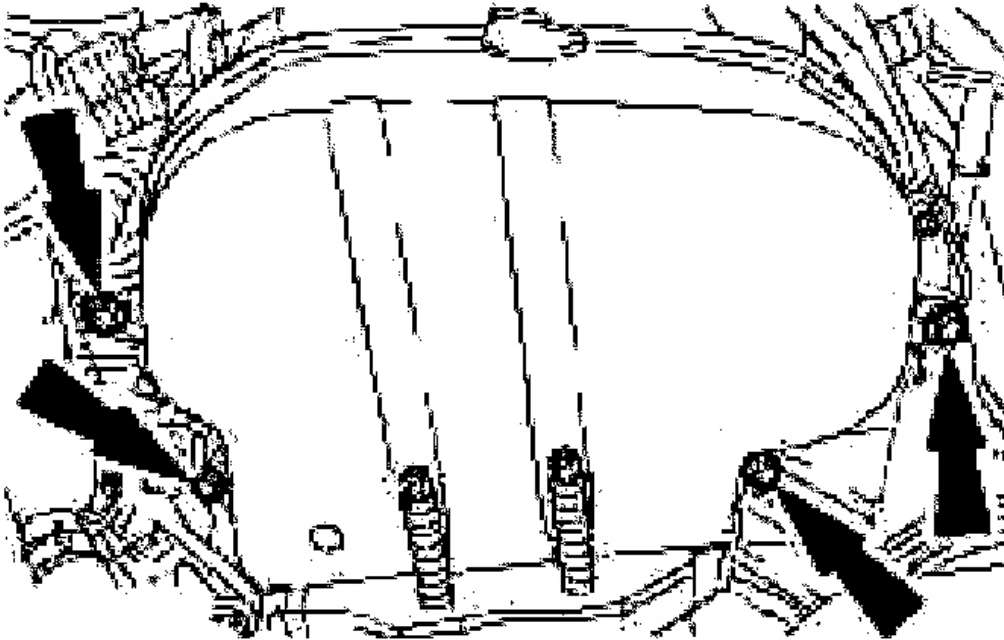
Cable ties	A960-M1C171-AA
Silicone grease for spark plug connector seal	

Adjust

CAUTION: Exchange the tappets to correct the valve clearance.

CAUTION: Disconnect the battery ground cable.

NOTE: Do not remove the upper timing belt cover.



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Fig. 12: Removing Upper Timing Belt Cover
Courtesy of FORD MOTOR CO.

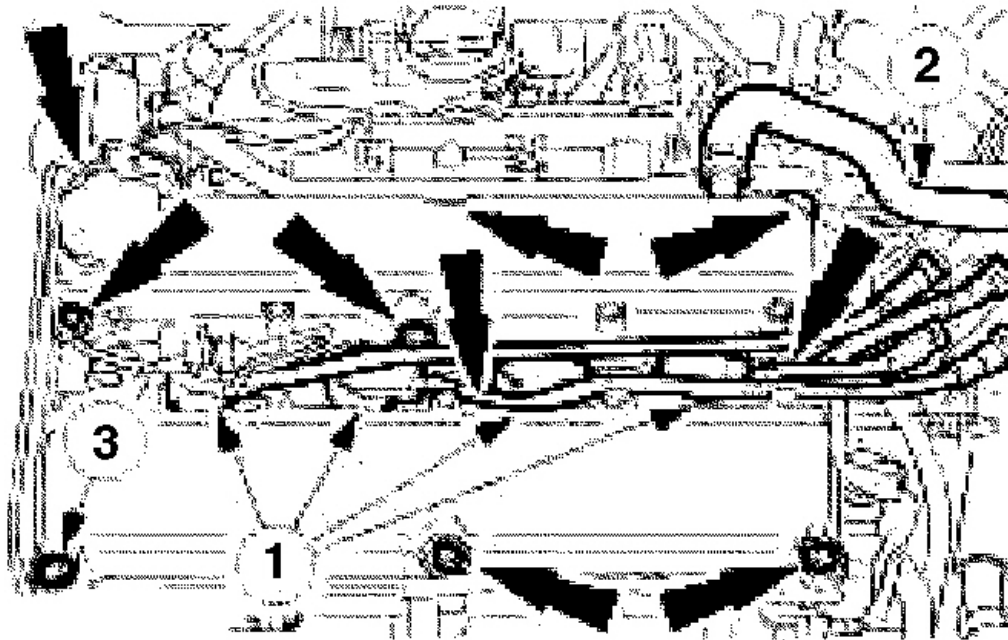
1. Undo the bolts in the upper timing belt cover.

CAUTION: Do not pull the spark plug connectors by the ignition wires when removing them. If necessary pull off the ignition wires from the ignition coils to prevent kinking the ignition wires. Slightly twist the spark plug connectors before removing them in order to loosen the seals.

CAUTION: Pull off the spark plug connectors in line with the spark plugs.

NOTE: Loosening sequence: from the outside to the inside, working diagonally.

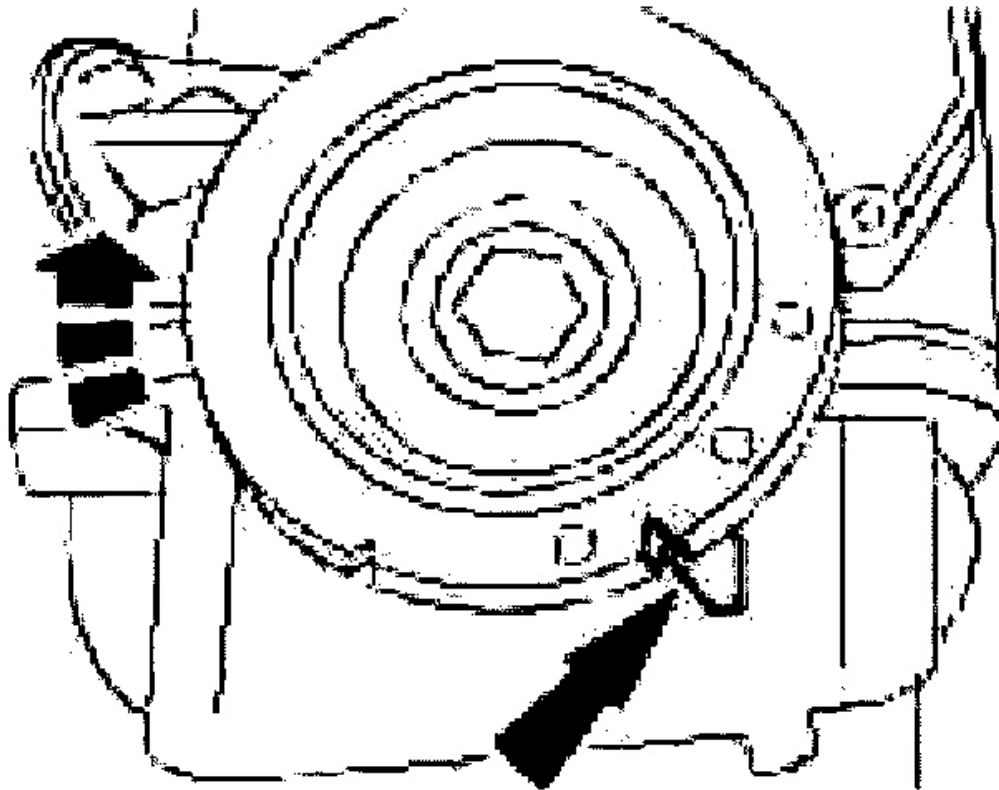
2. Remove the cylinder head cover.
 1. Pull off the spark plug connectors.
 2. Detach the crankcase ventilation hose.
 3. Unscrew the 10 bolts.



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Fig. 13: Pulling Off Spark Plug Connectors
Courtesy of FORD MOTOR CO.

CAUTION: Only rotate the engine on the crankshaft and in its rotation direction.



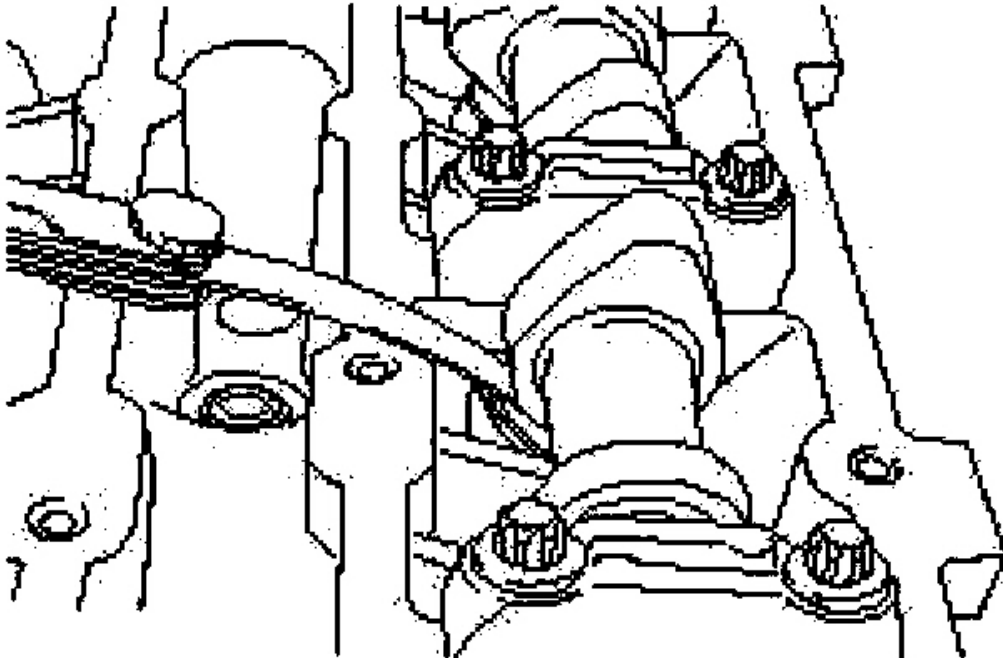
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Fig. 14: Setting Engine To TDC On Cylinder Number 1
Courtesy of FORD MOTOR CO.

3. Set the engine to TDC on cylinder number 1.

NOTE: **Note down each cylinder number and the valve clearances measured.**

4. Measure the valve clearance using feeler gauges.
 - Permitted valve clearance: inlet (0.11 - 0.18 mm)
 - Permitted valve clearance: exhaust (0.27 - 0.34 mm)



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Fig. 15: Measuring Valve Clearance Using Feeler Gauges
Courtesy of FORD MOTOR CO.

CAUTION: Only rotate the engine on the crankshaft.

5. Measure the valve clearance (continued).

- Rotate the engine a further 180 degrees on the crankshaft in its rotation direction. In this instance, the measuring sequence follows the firing order 1-3-4-2.
- Repeat the previous steps for the other cylinders.

NOTE: Only carry out the following steps when the valve clearance must be adjusted.

NOTE: Aim to set the valve clearances to the middle of the range (inlet

0.15 mm; exhaust 0.30 mm)

6. Remove the camshafts. For additional information, refer to **CAMSHAFT** .

NOTE: **The number on the tappet indicates the tappet thickness.**

7. Determine the tappet thickness required.

- Remove the adjusting tappet and read the thickness from the back side.
- Determine the tappet thickness required and insert the correct tappet.
- Inlet valves: tappet thickness required = thickness of currently installed tappet + measured valve clearance - 0.15 mm.
- Exhaust valves: tappet thickness required = thickness of currently installed tappet + measured valve clearance - 0.30 mm.

CAUTION: Set the piston on cylinder number 1 to approximately 25 mm before TDC.

8. Install the camshafts and camshaft timing belts. For additional information, refer to **CAMSHAFT** .

NOTE: **Turn the camshaft to measure the valve clearance.**

NOTE: **Do not attach the timing belt until the setting is in order.**

9. Recheck the valve clearance after adjustment is complete.
10. Install the timing belt. For additional information, refer to **TIMING BELT** .

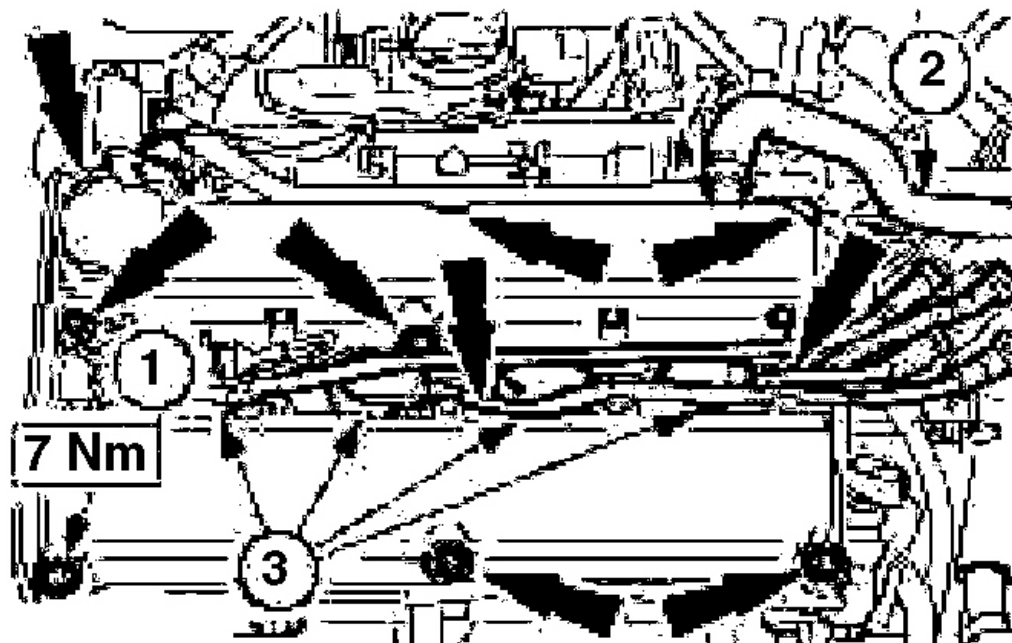
CAUTION: Use a blunt object (a plastic cable tie) to apply the silicone grease, to avoid damaging the spark plug connectors.

CAUTION: Push on the spark plug connectors, keeping them in line with the spark plugs.

NOTE: **Apply silicone grease to the inside of the spark plug connectors to a depth of 5-10 mm.**

11. Install the cylinder head cover.

1. Insert the 10 bolts and tighten them in two stages.
 - Stage 1: 2 N.m.
 - Stage 2: 7 N.m.
4. Attach the crankcase ventilation hose.
5. Fit the spark plug connectors and make sure that they engage correctly.

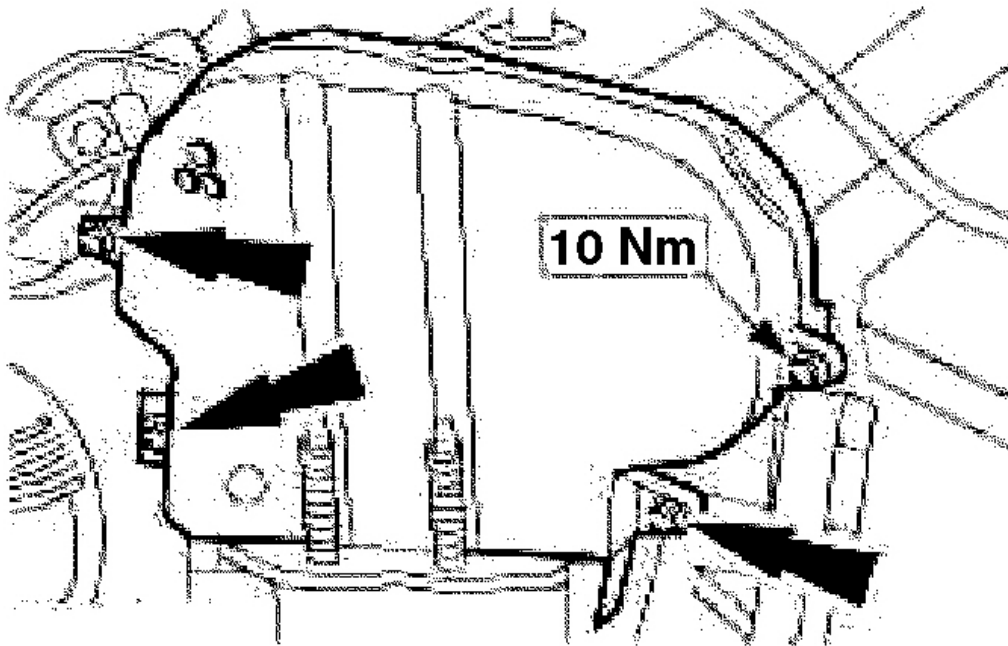


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Fig. 16: Installing Spark Plug Connectors

Courtesy of FORD MOTOR CO.

NOTE: Check that the gasket on the upper timing belt cover is seated correctly and adjust if necessary.



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Fig. 17: Installing Upper Timing Belt Cover
Courtesy of FORD MOTOR CO.

12. Install the upper timing belt cover.

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.

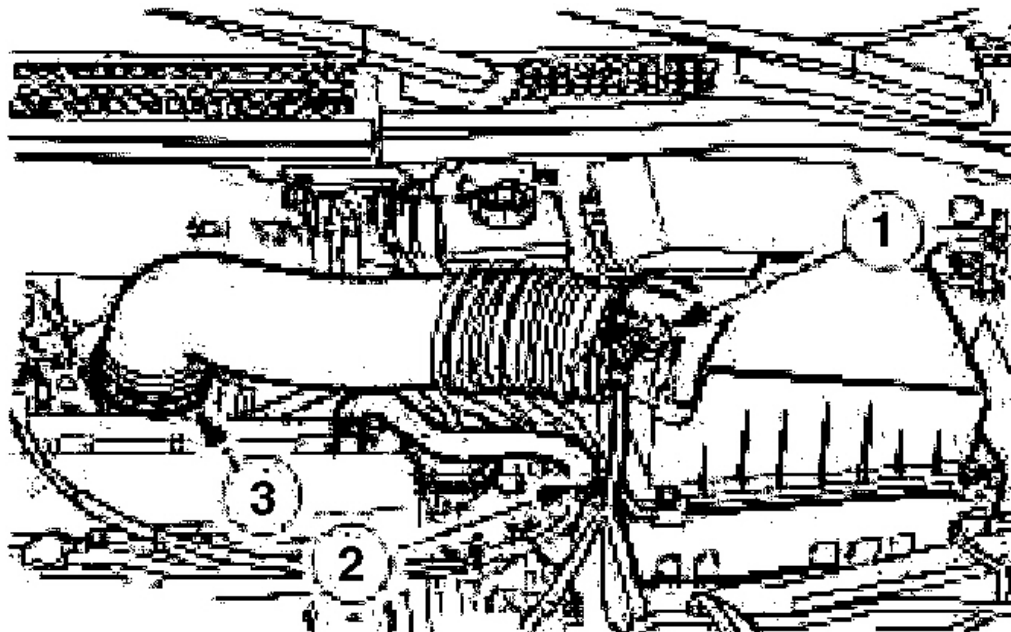
13. Connect the battery ground cable.
14. Check the fluid levels and adjust if necessary.
15. Check that the vacuum hoses and cables are routed correctly and fix in place using cable ties.

IN-VEHICLE REPAIR

INTAKE MANIFOLD

Removal

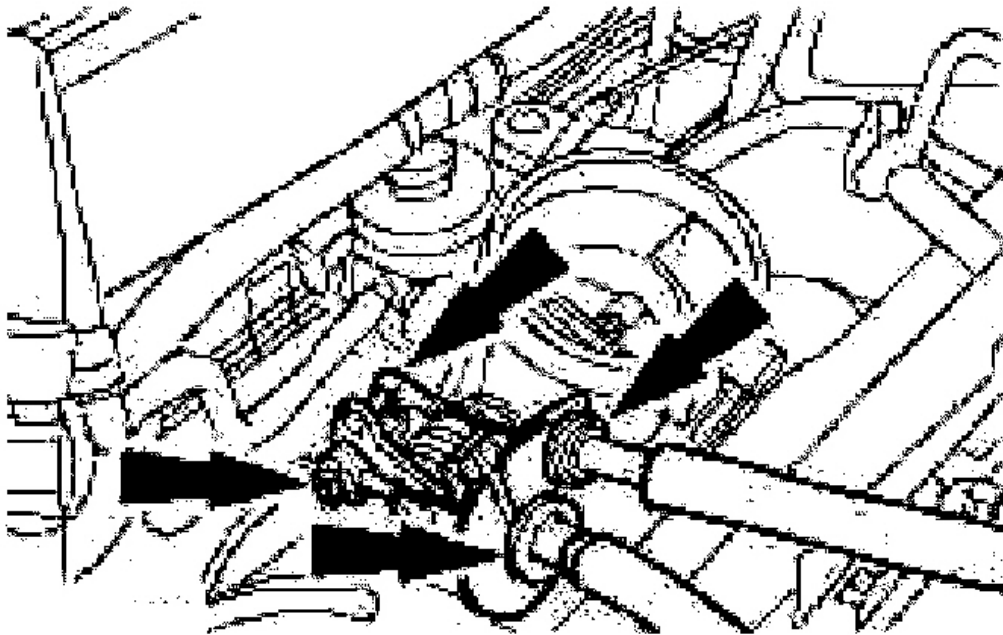
1. Release the fuel pressure. For additional information, refer to **FUEL SYSTEM PRESSURE RELEASE** .
2. Unfasten the cable ties if necessary and install new ones when reinstalling.
3. Remove the generator. For additional information, refer to **GENERATORS & REGULATORS** article .
4. Remove the air cleaner housing.
 1. Pull off the mass air flow (MAF) sensor connector.
 2. Detach the crankcase ventilation hose.
 3. Detach the intake hose.
 - Pull out the air cleaner housing from the rubber bushings.



G03431623

Fig. 18: Pulling Off Mass Air Flow (MAF) Sensor Connector
Courtesy of FORD MOTOR CO.

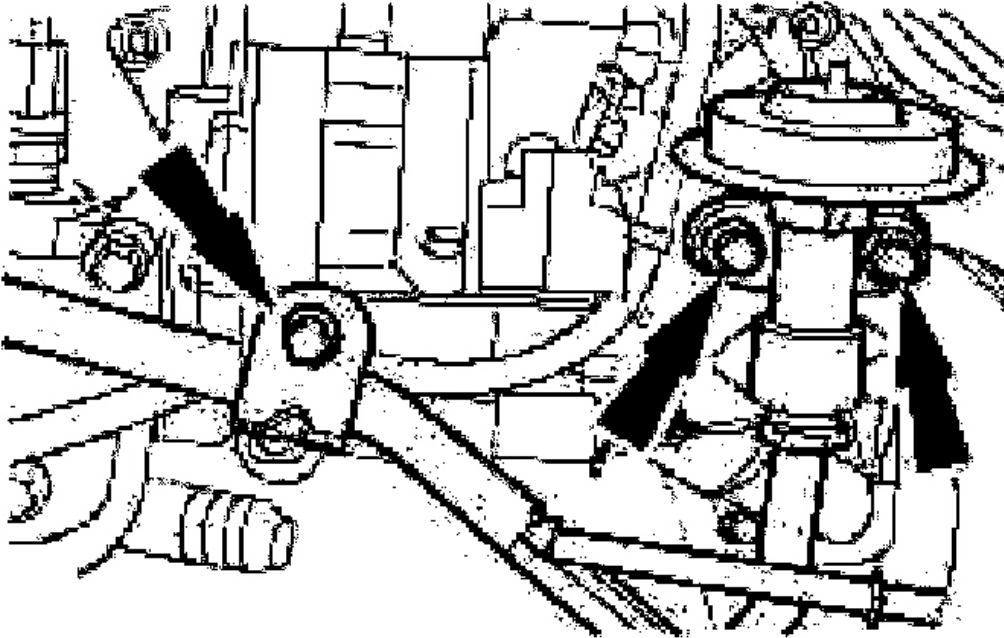
5. Detach the accelerator cable and the speed control cable (if equipped) from the throttle body.



G03431624

Fig. 19: Detaching Accelerator Cable And Speed Control Cable
Courtesy of FORD MOTOR CO.

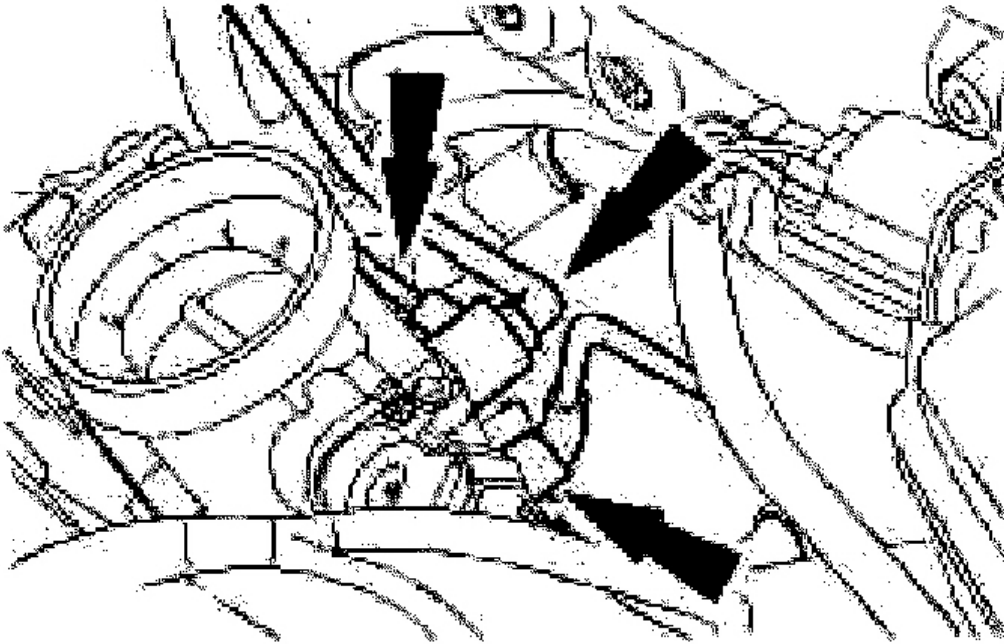
6. Remove the fuel pressure sensor. For additional information, refer to **FUEL PRESSURE SENSOR**.
7. Detach the EGR valve and EGR pipe bracket.



G03431625

Fig. 20: Detaching EGR Valve And EGR Pipe Bracket
Courtesy of FORD MOTOR CO.

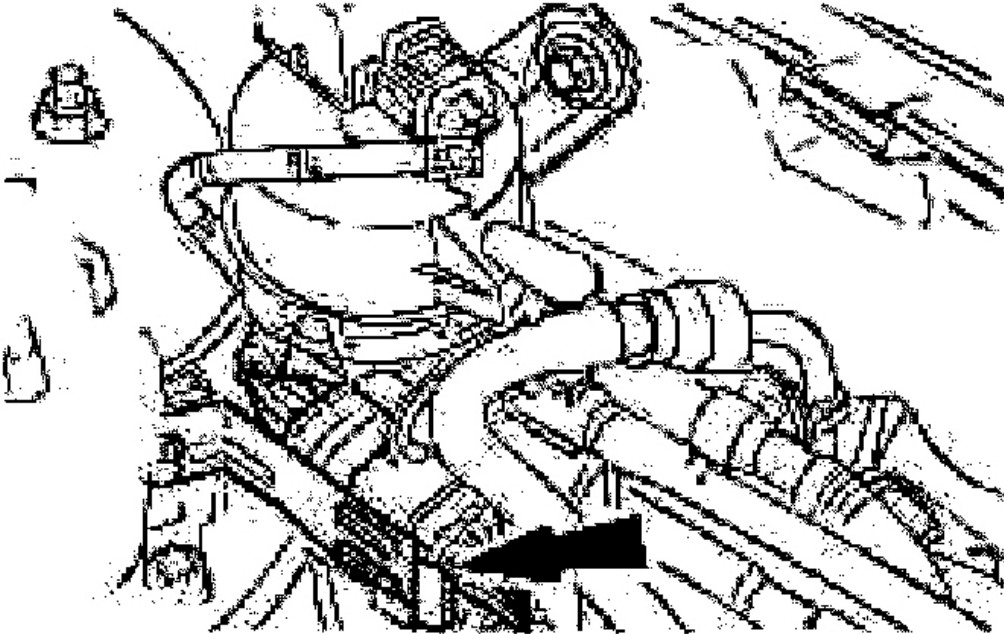
8. Pull off the vacuum hoses.



G03431626

Fig. 21: Removing Vacuum Hoses
Courtesy of FORD MOTOR CO.

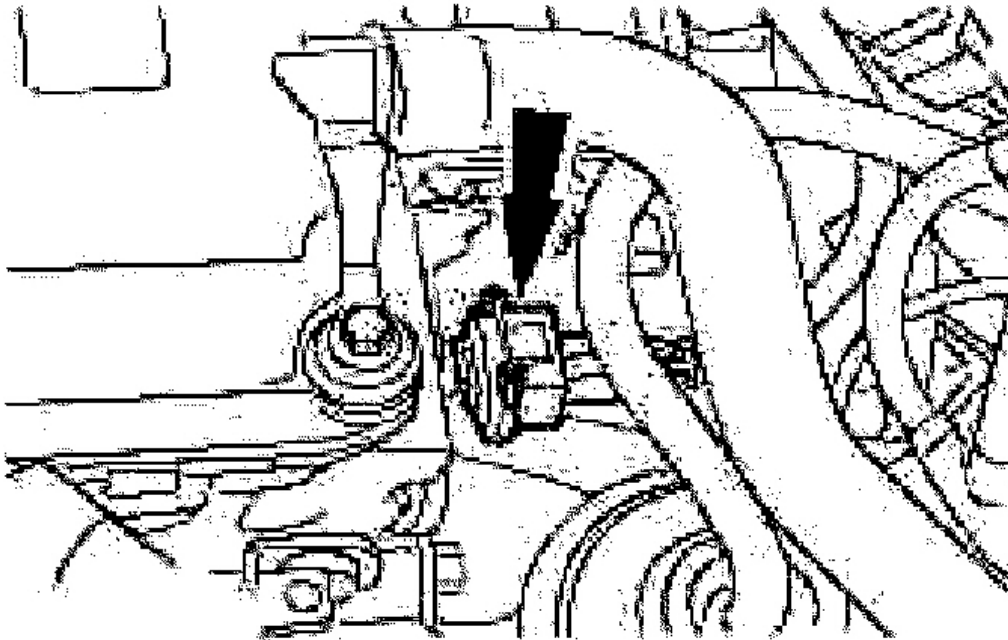
9. Disconnect the fuel injector wiring.



G03431627

Fig. 22: Disconnecting Fuel Injector Wiring
Courtesy of FORD MOTOR CO.

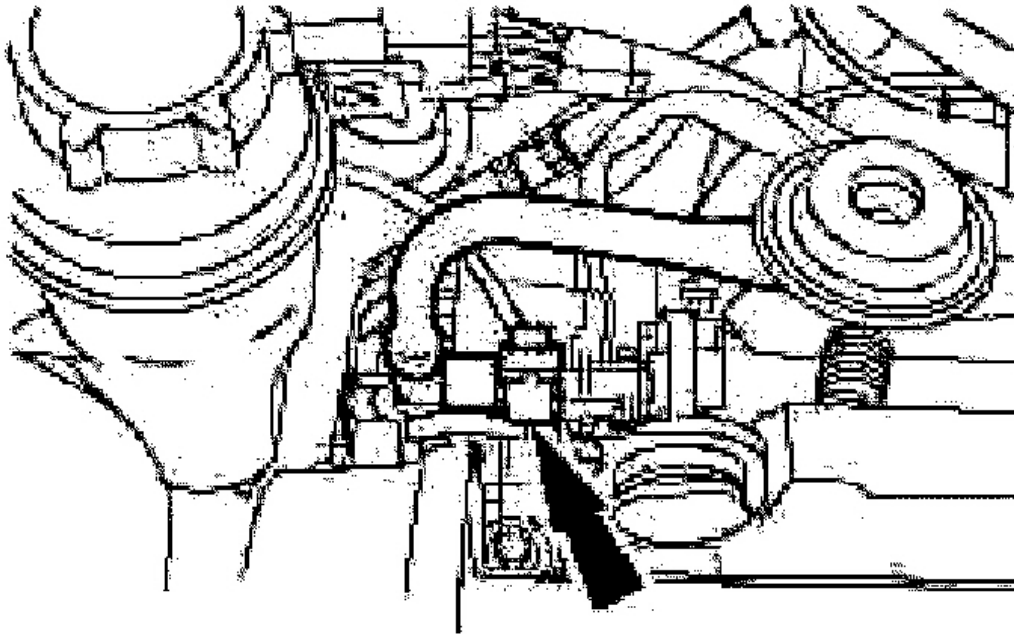
10. Disconnect the camshaft position (CMP) sensor.



G03431628

Fig. 23: Disconnecting Camshaft Position (CMP) Sensor
Courtesy of FORD MOTOR CO.

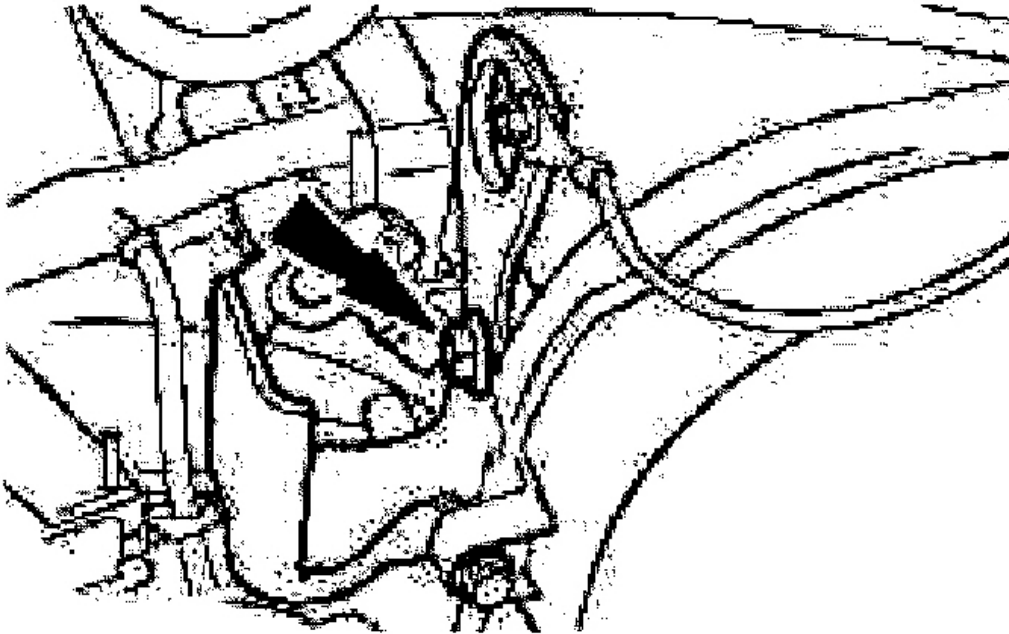
11. Detach the fuel line.



G03431629

Fig. 24: Detaching Fuel Line
Courtesy of FORD MOTOR CO.

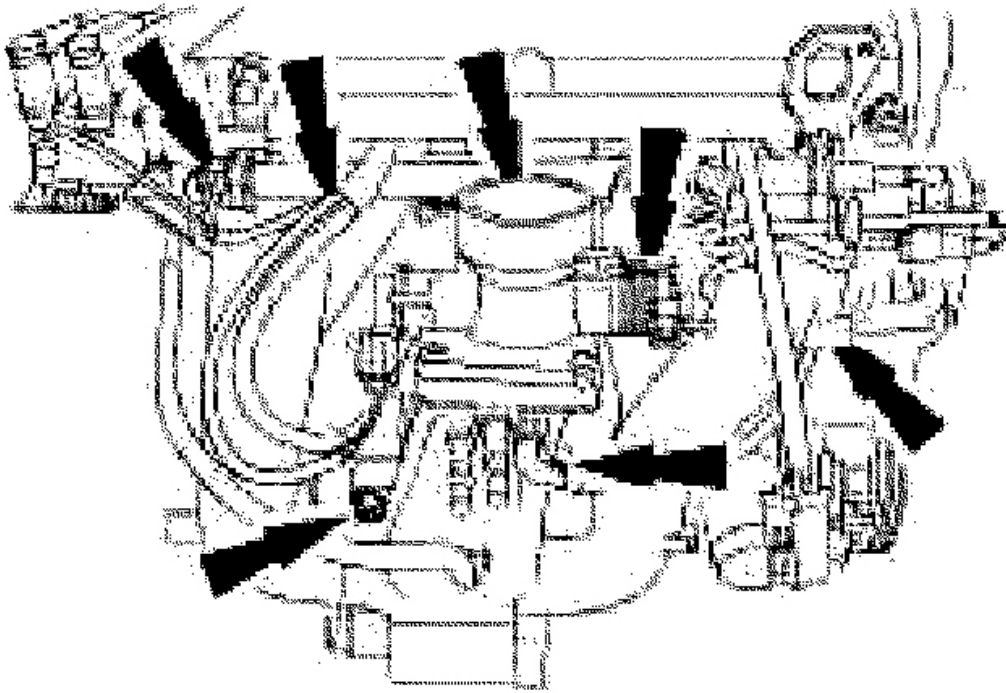
12. Remove the engine lifting eye.



G03431630

Fig. 25: Removing Engine Lifting Eye
Courtesy of FORD MOTOR CO.

13. Detach the intake manifold (graphic shows engine removed).
 1. Remove the intake manifold studs on the front end of the engine.
 2. Remove the five bolts and two nuts.



G03431631

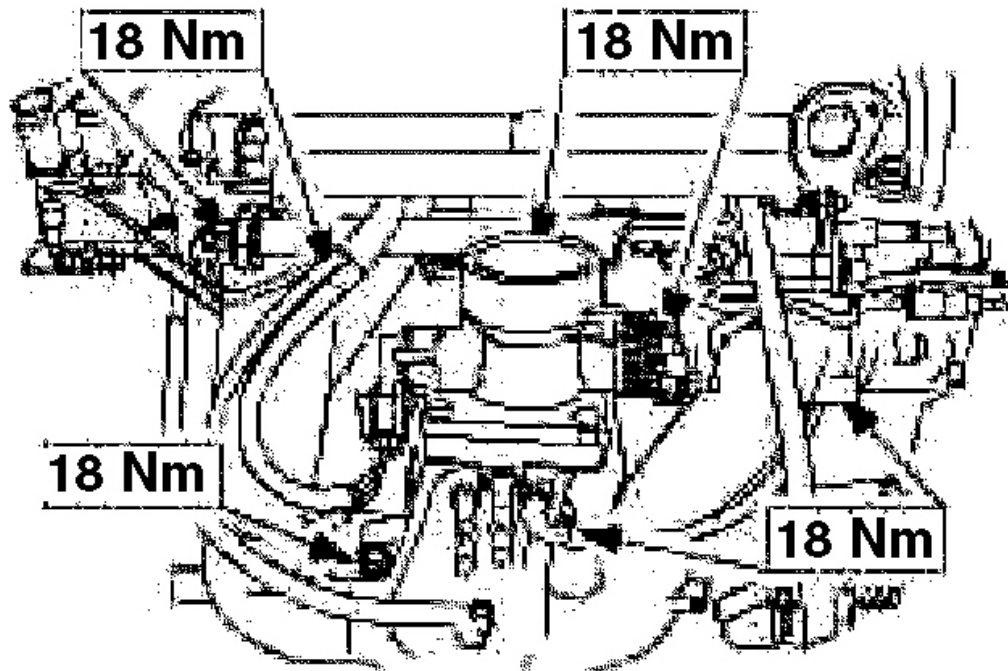
Fig. 26: Removing Intake Manifold
Courtesy of FORD MOTOR CO.

Installation

1. Install the intake manifold (graphic shows engine removed).

NOTE: Stud tightening torque = 10 N.m.

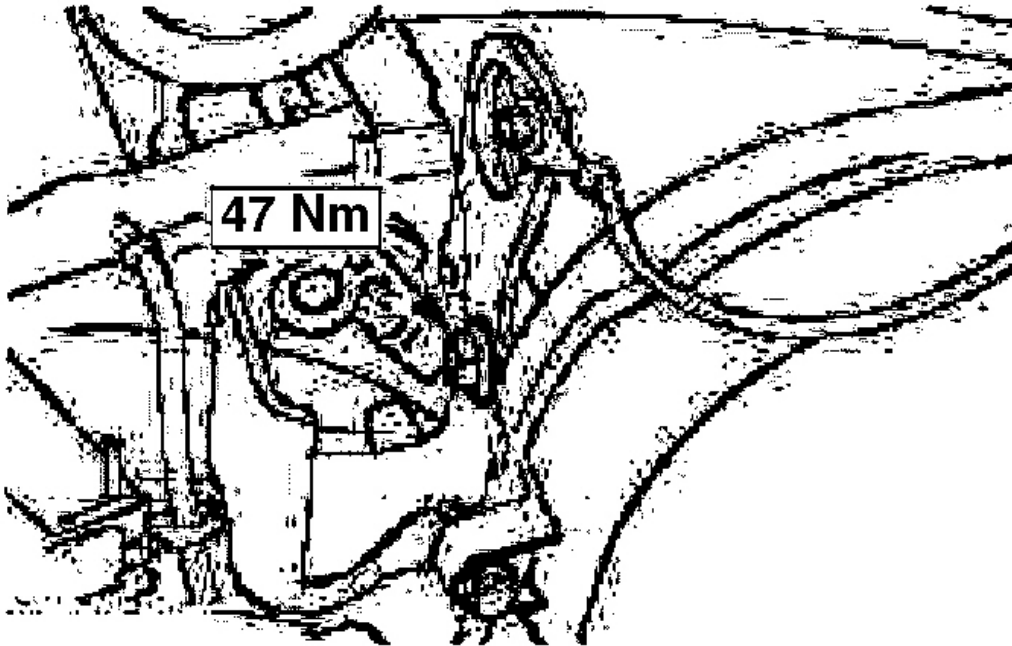
1. Screw in the intake manifold studs.
2. Tighten the five bolts and two nuts.



G03431632

Fig. 27: Installing Intake Manifold
Courtesy of FORD MOTOR CO.

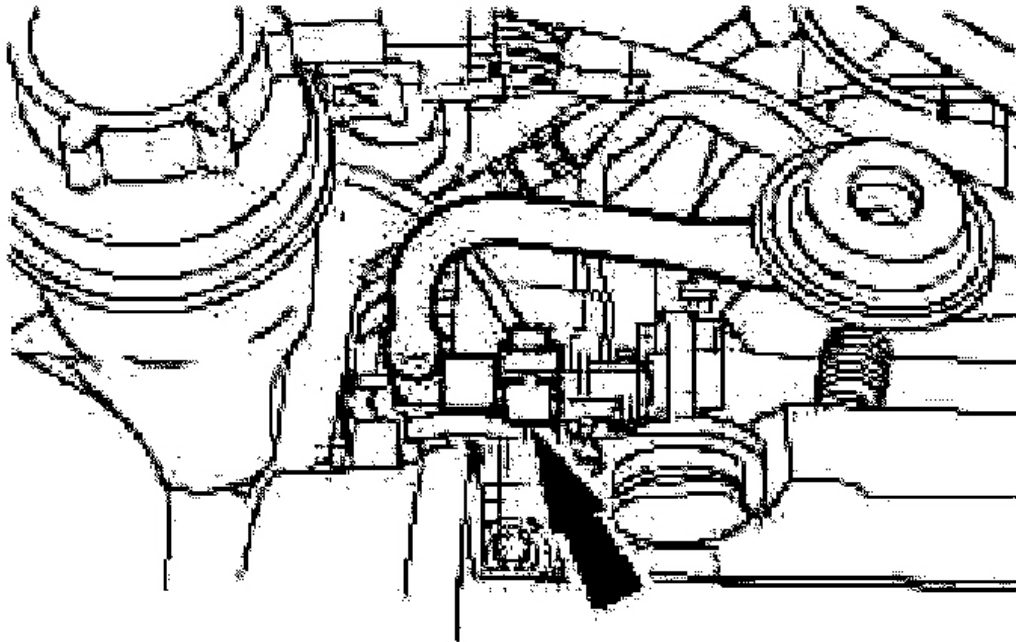
2. Install the engine lifting eye.



G03431633

Fig. 28: Installing Engine Lifting Eye
Courtesy of FORD MOTOR CO.

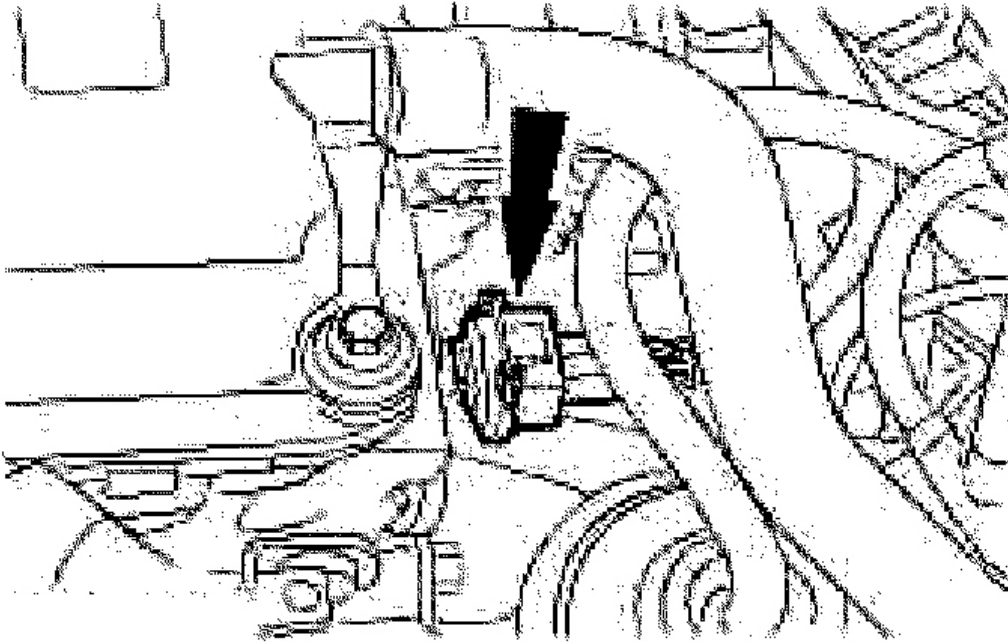
3. Install the generator. For additional information, refer to **GENERATORS & REGULATORS** article .
4. Install the fuel pressure sensor. For additional information, refer to **FUEL PRESSURE SENSOR** .
5. Install the fuel line.



G03431634

Fig. 29: Installing Fuel Line
Courtesy of FORD MOTOR CO.

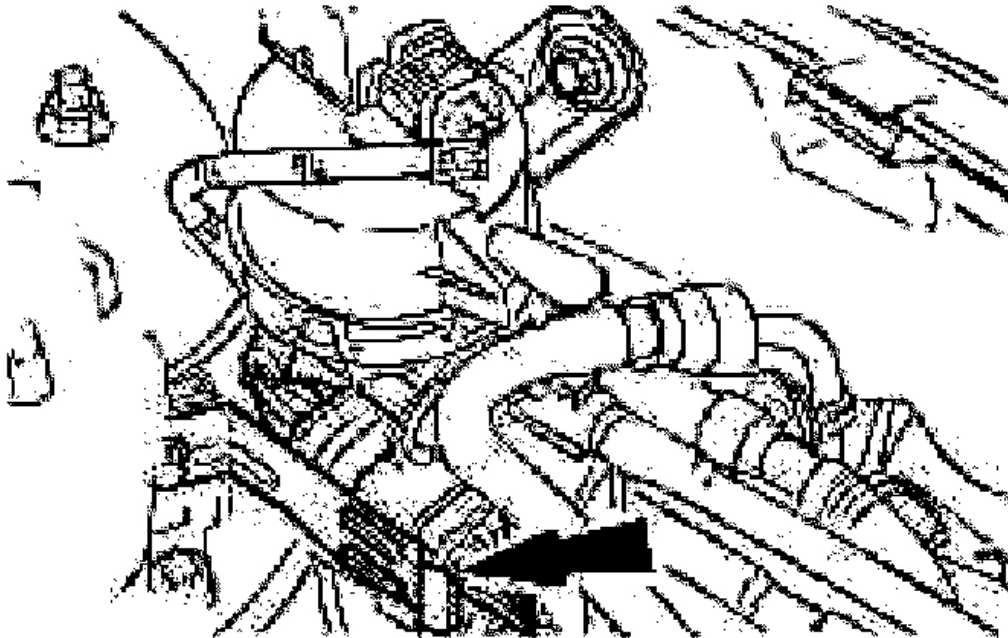
6. Connect the camshaft position (CMP) sensor.



G03431635

Fig. 30: Connecting Camshaft Position (CMP) Sensor
Courtesy of FORD MOTOR CO.

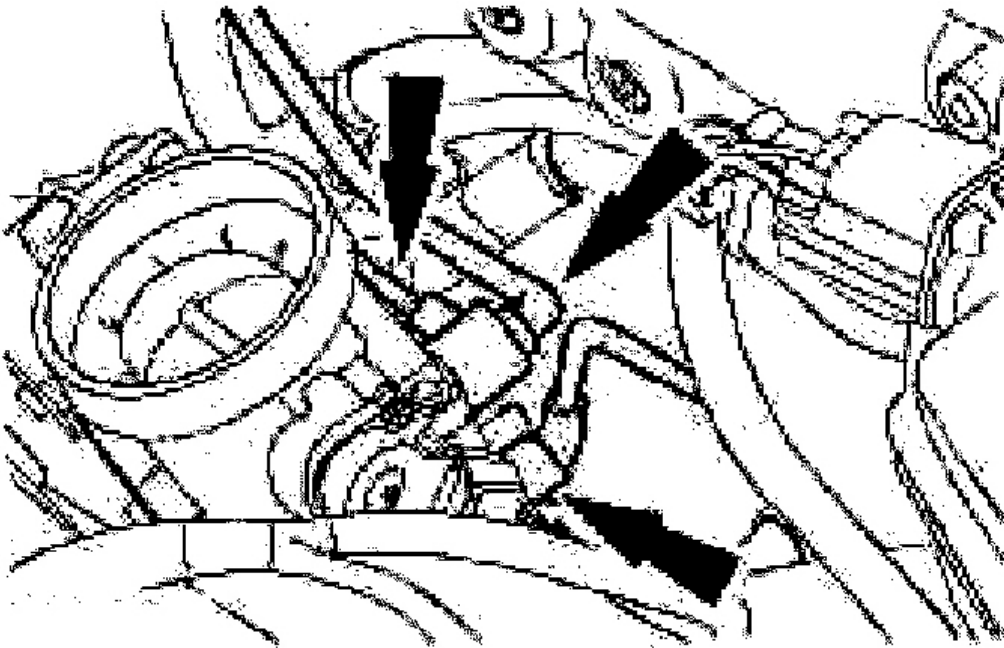
7. Connect the fuel injector wiring.



G03431636

Fig. 31: Connecting Fuel Injector Wiring
Courtesy of FORD MOTOR CO.

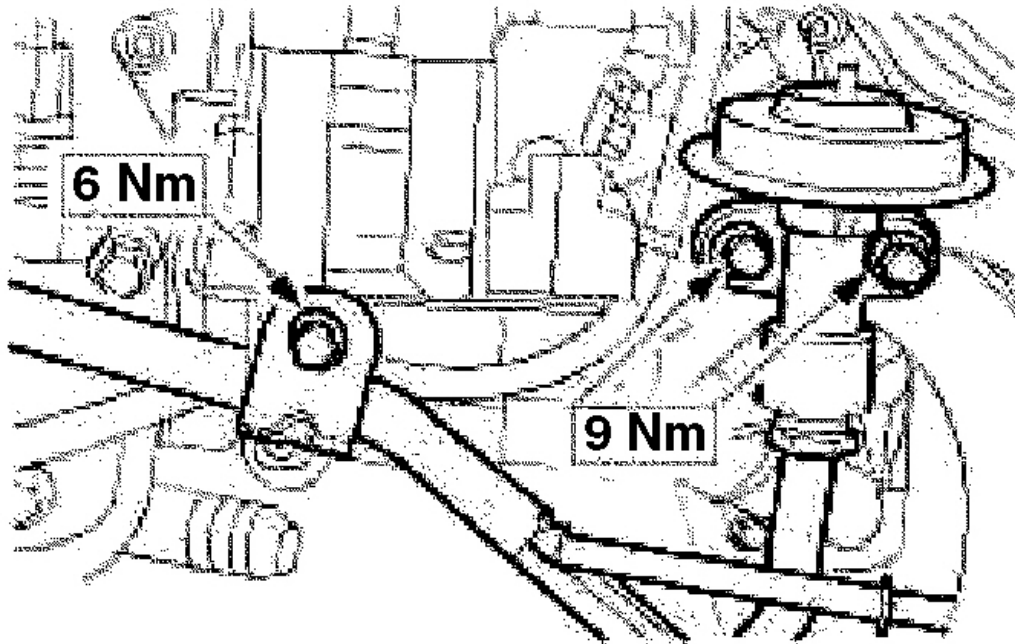
8. Install the vacuum hoses.



G03431637

Fig. 32: Installing Vacuum Hoses
Courtesy of FORD MOTOR CO.

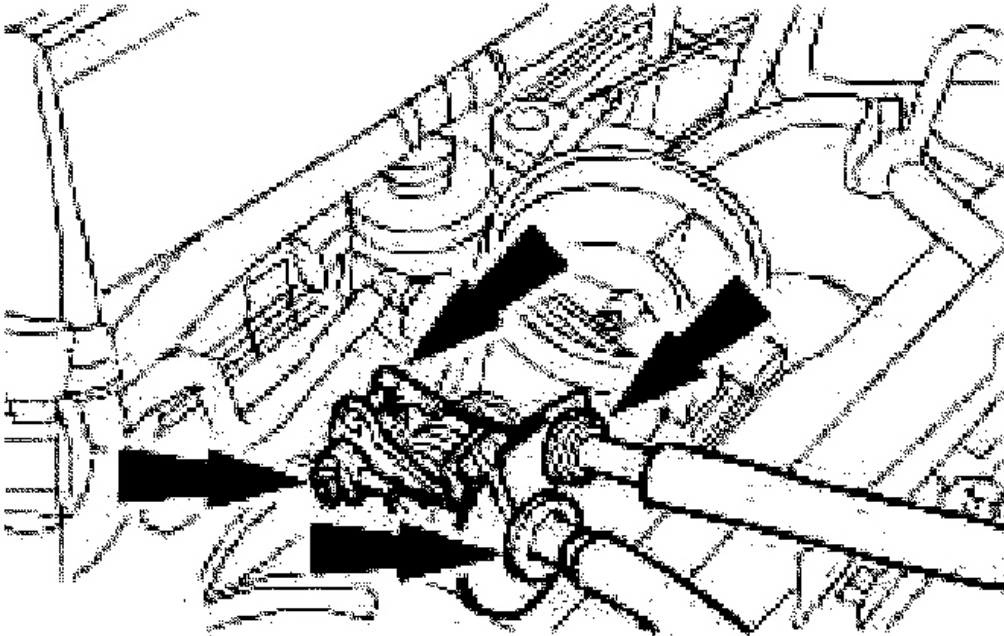
9. Install the EGR valve with a new gasket and EGR pipe bracket.



G03431638

Fig. 33: Installing EGR Valve With New Gasket And EGR Pipe Bracket
Courtesy of FORD MOTOR CO.

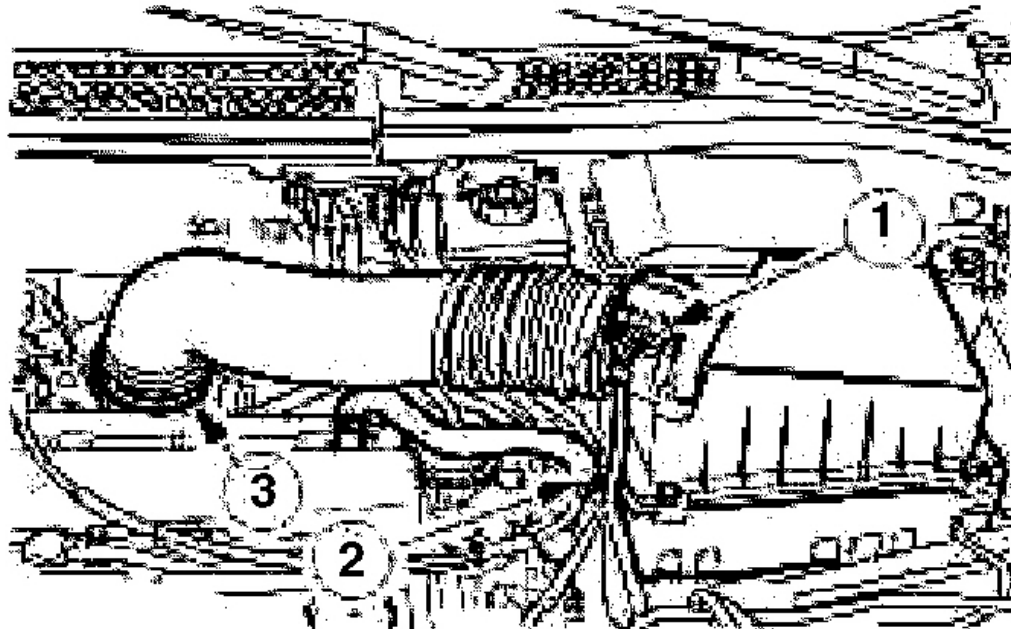
10. Install the accelerator cable and the speed control cable (if equipped) to the throttle body.



G03431639

Fig. 34: Installing Accelerator Cable And Speed Control Cable
Courtesy of FORD MOTOR CO.

11. Install the air cleaner housing.
 - Insert the air filter housing into the rubber bushings.
 - 2. Attach the mass air flow (MAF) sensor connector.
 - 3. Attach the crankcase ventilation hose.
 - 4. Attach the intake hose.



G03431640

Fig. 35: Installing Mass Air Flow (MAF) Sensor Connector
Courtesy of FORD MOTOR CO.

12. If necessary, install new cable ties when reinstalling.

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.

13. Connect the battery ground cable.

CRANKSHAFT FRONT SEAL

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

	Installer, Crankshaft Front Oil Seal 303-164 (T81P -6700-A)
	Remover, Oil Seal 303-409 (T92C-6700-CH)

G03431641

Fig. 36: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

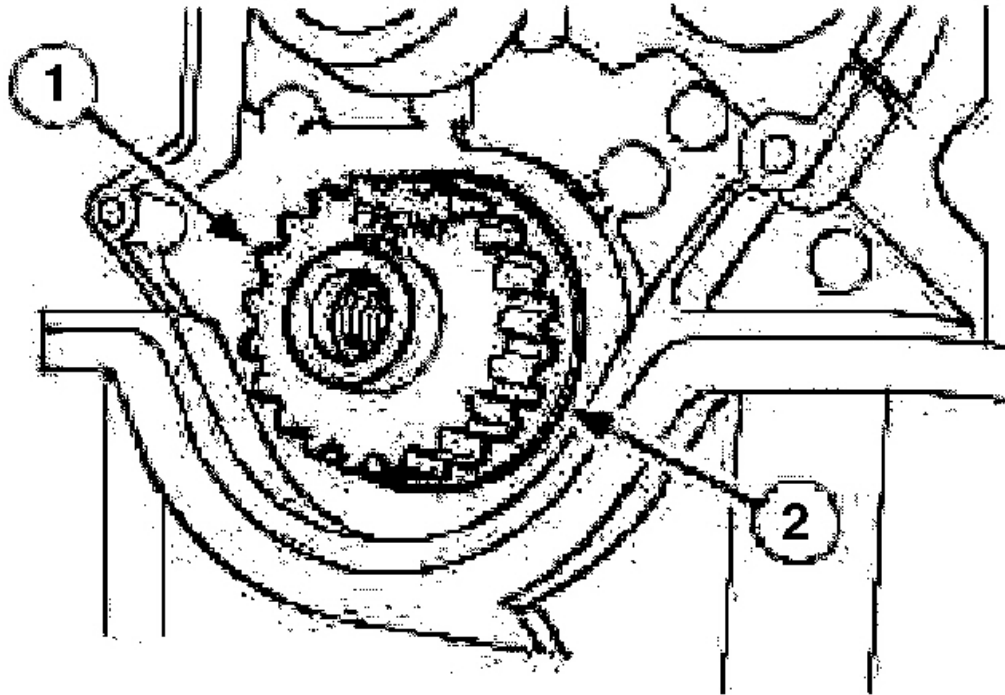
Engine oil	WSS-M2C153-H
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Removal

1. Remove the timing belt. For additional information, refer to **TIMING BELT** .

NOTE: **FRONT marking and thrust washer installation position.**

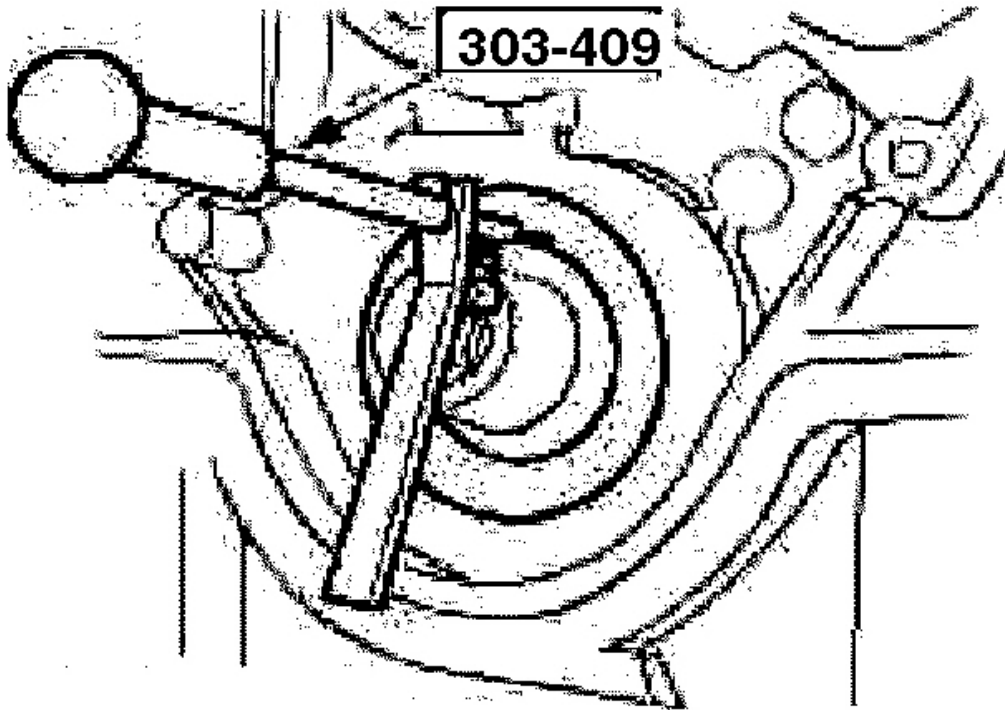
2. Detach the crankshaft timing belt.
 1. Remove the crankshaft pulley hub.
 2. Remove the timing belt thrust washer.



G03431642

Fig. 37: Removing Crankshaft Pulley Hub
Courtesy of FORD MOTOR CO.

3. Using the special tool remove the crankshaft front oil seal.



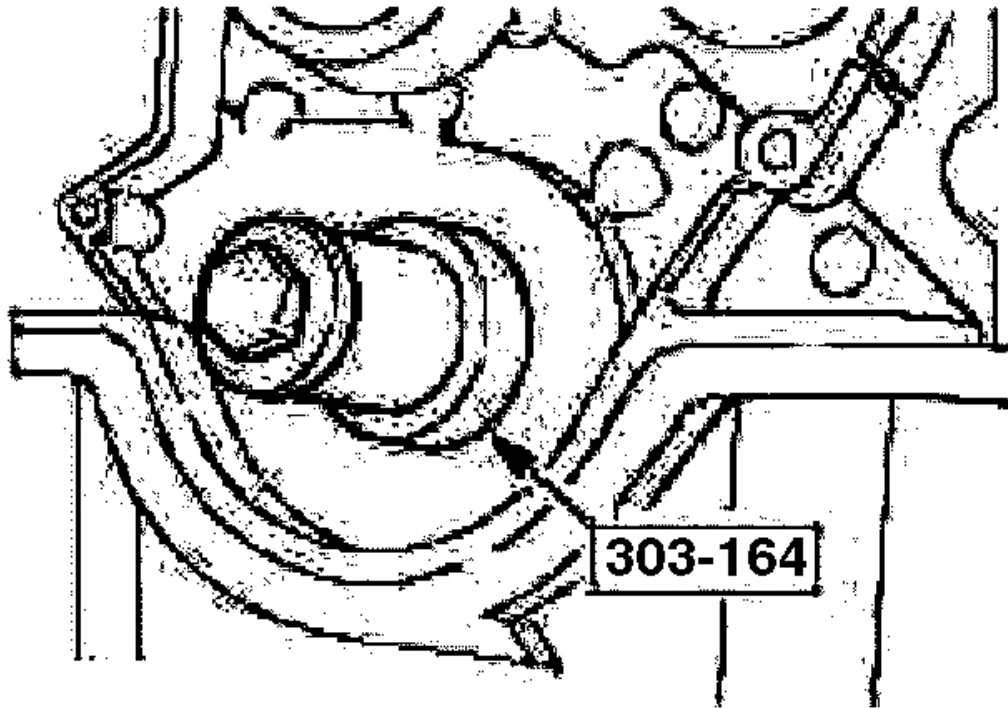
G03431643

Fig. 38: Removing Crankshaft Front Oil Seal
Courtesy of FORD MOTOR CO.

Installation

NOTE: Use the crankshaft pulley hub bolt and washer.

1. Using the special tool install the crankshaft front oil seal.
 - Coat the oil seal lip and crankshaft running surface with engine oil.

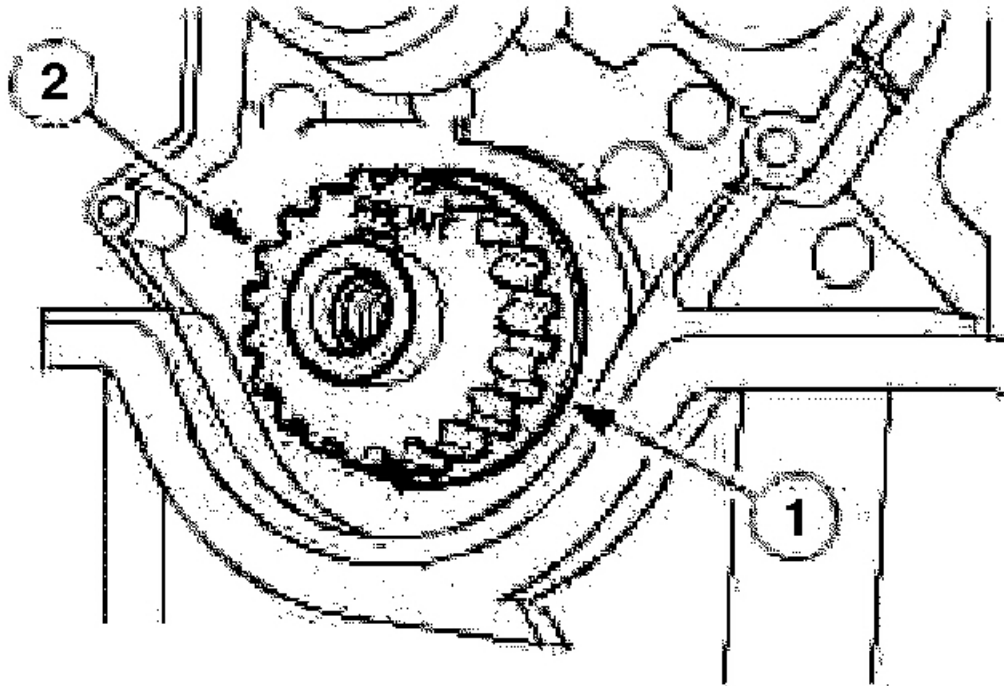


G03431644

Fig. 39: Installing Crankshaft Front Oil Seal
Courtesy of FORD MOTOR CO.

NOTE: FRONT marking and thrust washer installation position.

2. Install the crankshaft pulley hub.
 1. Install the timing belt thrust washer.
 2. Install the crankshaft pulley hub.



G03431645

Fig. 40: Installing Crankshaft Pulley Hub
Courtesy of FORD MOTOR CO.

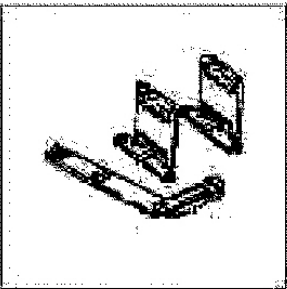
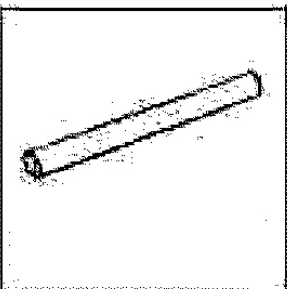
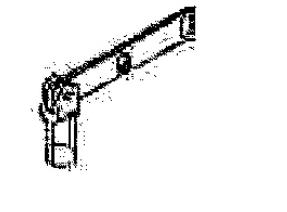
3. Install the timing belt. For additional information, refer to **TIMING BELT** .

VALVE SPRINGS

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

	Compressor, Valve Spring 303-350 (T89P-6565-A)
	Compressor, Valve Spring 303-300 (T87C-6565-A)
	Compressor, Valve Spring 303-472 (T94P-6565-AH)

G03431646

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

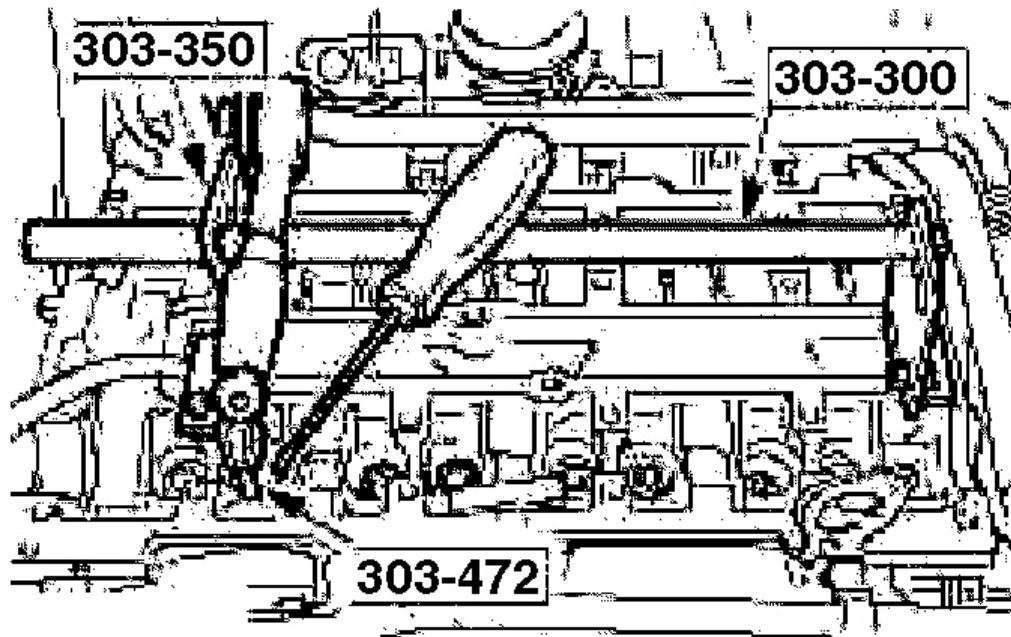
Removal

1. Remove the valve tappets.

WARNING: Always wear protective goggles when working with compressed air. This can prevent injury. Failure to follow these instructions may result in personal injury.

2. Using special tools, remove the valve springs.
 - Apply compressed air to the cylinders.
 - Compress the valve springs and remove the valve collets.

- Remove the valve spring retainers and the valve springs and place them in order to one side. To remove the collets use some grease and a small screw driver.



G03431647

Fig. 42: Removing Valve Springs
Courtesy of FORD MOTOR CO.

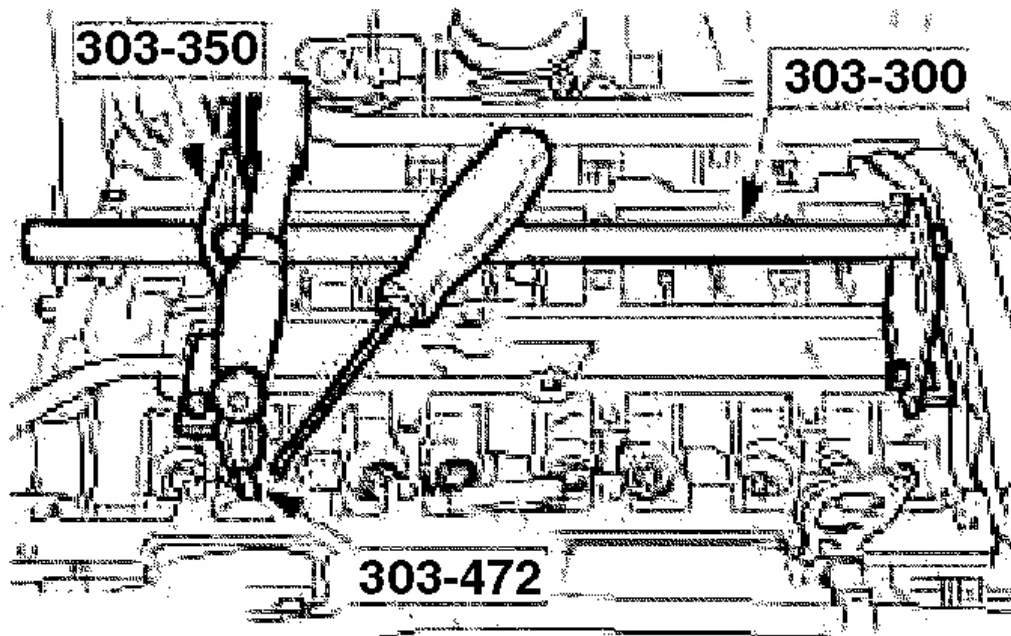
Installation

NOTE: Check that there is no dirt or particles within the valve stem grooves. Check the seating of the valve collets.

1. Using special tools install the valve springs.
 - Insert the valve springs and the valve spring retainers.
 - Compress the valve springs and install the valve collets.
 - Disconnect and remove the air supply.

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus



G03431648

Fig. 43: Installing Valve Springs
Courtesy of FORD MOTOR CO.

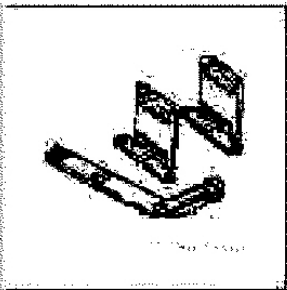
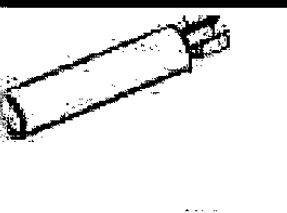
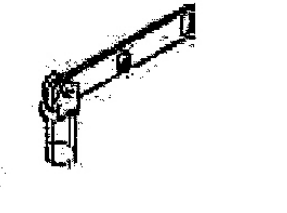
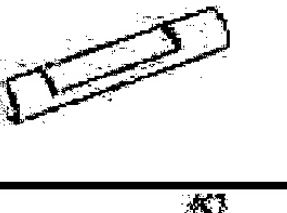
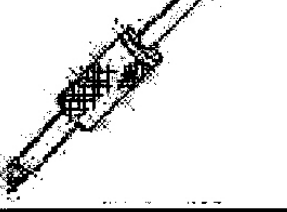
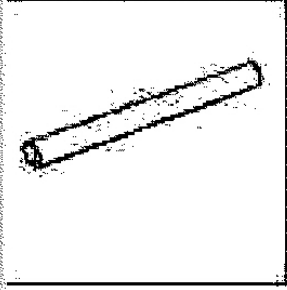
2. Install the valve tappets.

VALVE SEALS

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

	Compressor, Valve Spring 303-350 (T89P-6565-A)
	Remover, Oil Seal, Valve Stem 303-468 (T94P-6510-AH)
	Compressor, Valve Spring 303-472 (T94P-6565-AH)
	Installer, Oil Seal, Valve Stem 303-470 (T94P-6510-CH)
	Impact Slide Hammer 307-005 (T59L-100-B)
	Compressor, Valve Spring 303-300 (T87C-6565-A)

2002 Ford Focus LX
2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

Fig. 44: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

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

Removal

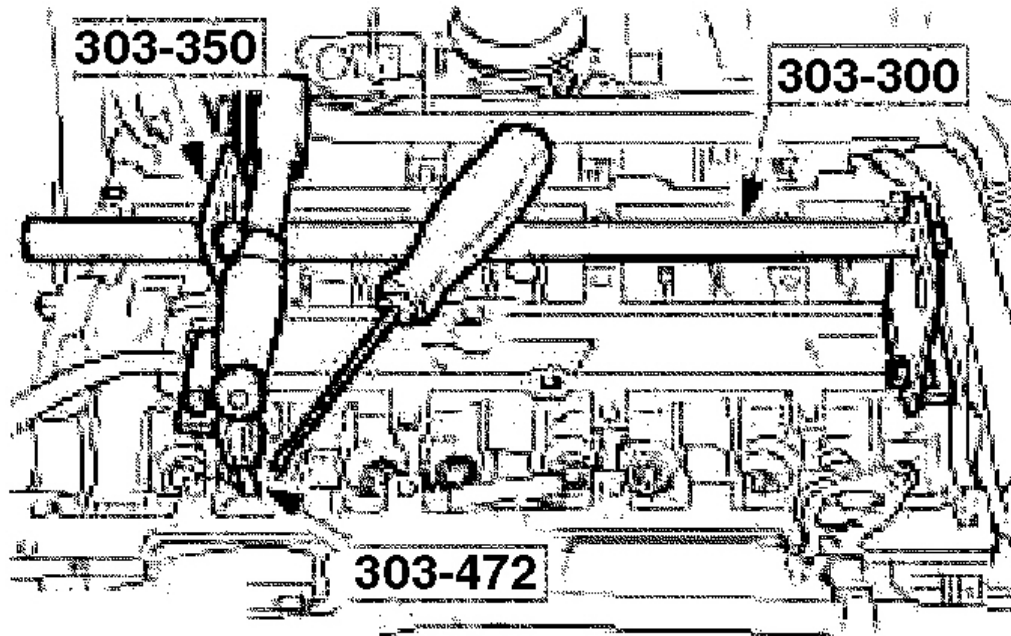
1. Remove the camshafts. For additional information, refer to **CAMSHAFTS** .
 - Remove the valve tappets and place them in order to one side.

WARNING: Always wear protective goggles when working with compressed air. This can prevent injury. Failure to follow these instructions may result in personal injury.

2. Unscrew the spark plug on cylinder No. 1 and connect the compressed air supply.

CAUTION: Use compressed air at 7 to 10 bars.

3. Using the special tools and apply compressed air to the cylinder.
 - Using the special tools, compress the valve springs and remove the valve collets using some grease and a small screwdriver.
 - Remove the valve spring retainers and the valve springs.

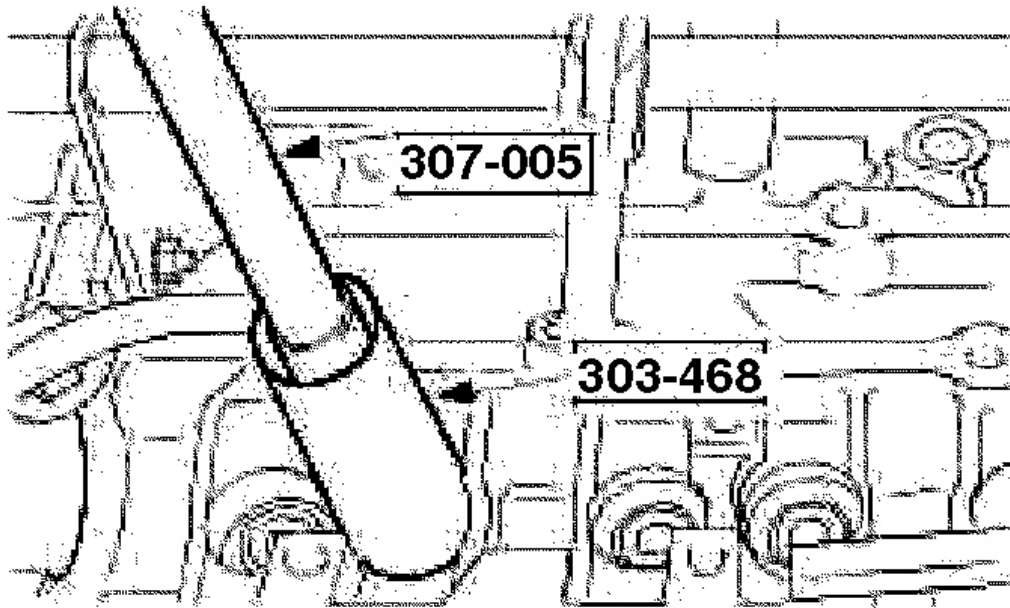


G03431650

Fig. 45: Removing Valve Spring Retainers And Valve Springs
Courtesy of FORD MOTOR CO.

NOTE: Place all parts in order to one side.

4. Remove the valve springs.
5. Using special tools, remove the valve stem seals.



G03431651

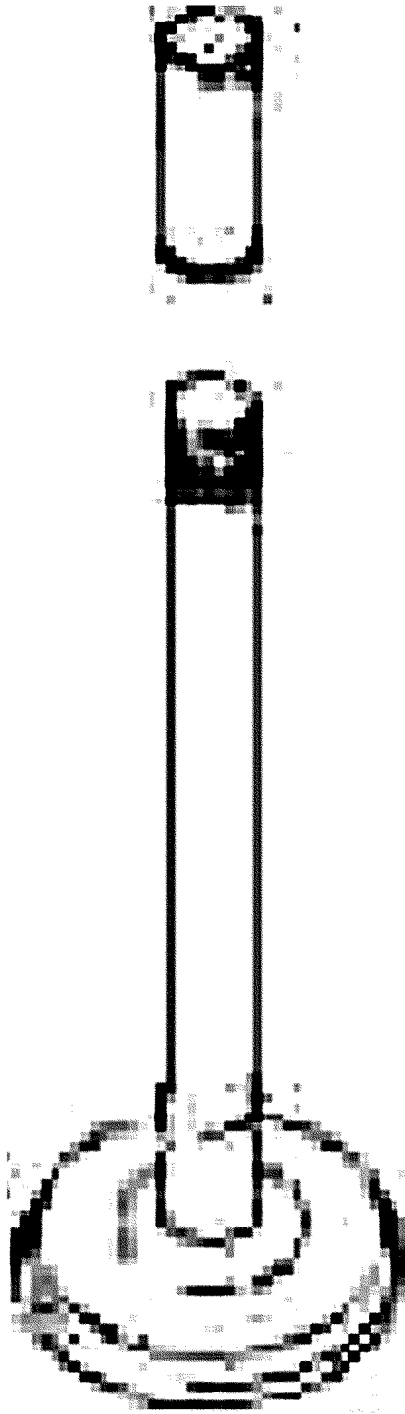
Fig. 46: Removing Valve Stem Seals
Courtesy of FORD MOTOR CO.

Installation

1. Valve stem seal installation sleeve.

2002 Ford Focus LX

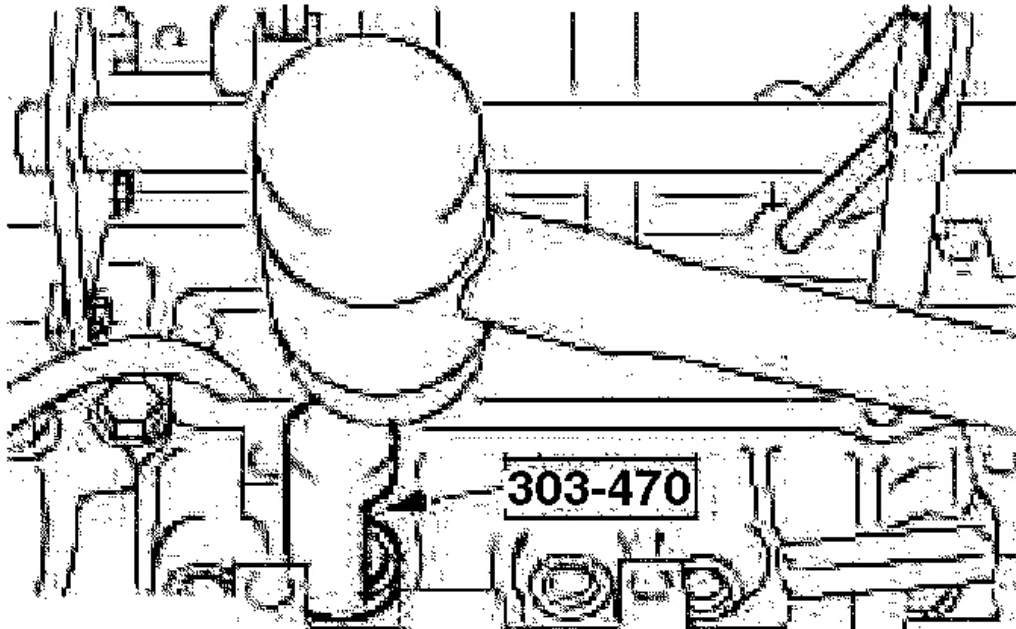
2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus



G03431652

Fig. 47: Identifying Valve Stem Seal Installation Sleeve
Courtesy of FORD MOTOR CO.

2. Using the special tool, install the valve stem oil seals.

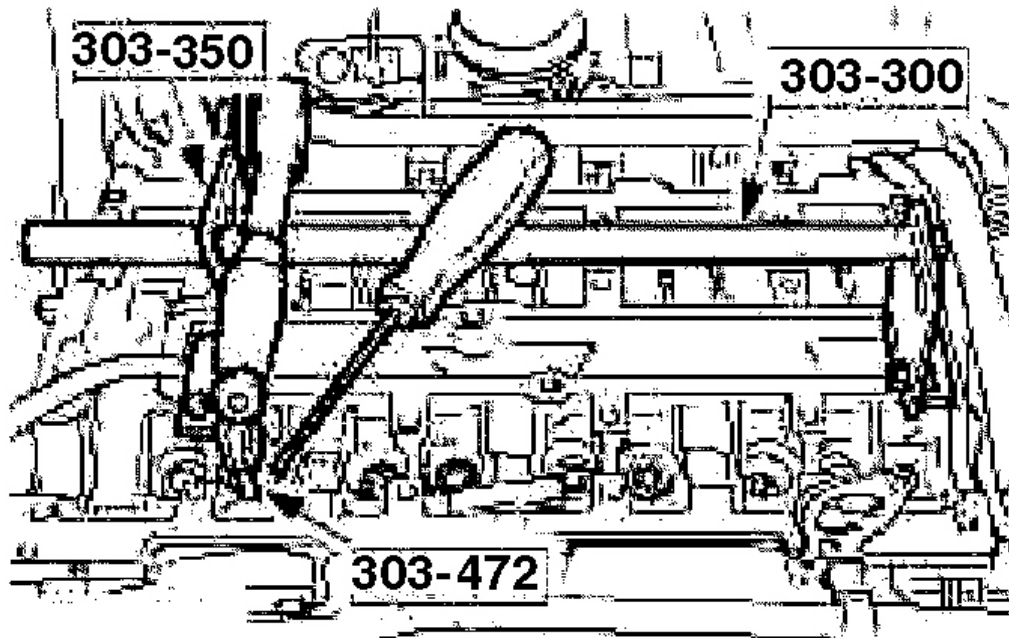


G03431653

Fig. 48: Installing Valve Stem Oil Seals
Courtesy of FORD MOTOR CO.

NOTE: Check the seating of the valve collets.

3. Using the special tools, install the valve springs.
 - Insert the valve springs and the valve spring retainers.
 - Compress the valve springs and install the valve collets using some grease and a small screwdriver.



G03431654

Fig. 49: Installing Valve Springs
Courtesy of FORD MOTOR CO.

NOTE: Do not tighten the spark plug at this stage.

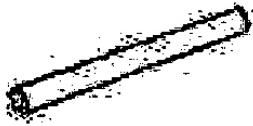

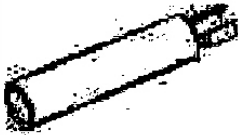
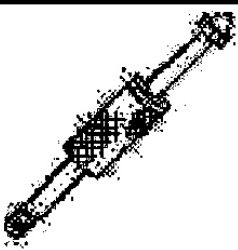
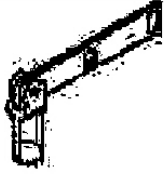

4. Disconnect the compressed air supply and screw in the spark plug.
5. Repeat appropriate steps for all the other cylinders.
6. Coat the valve tappets with engine oil and insert them.
7. Install the camshafts. For additional information, refer to **CAMSHAFT** .

VALVES

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

	Compressor, Valve Spring (303-300) T87C-6565-A)
	Compressor, Valve Spring 303-350 (T89P-6565-A)
	Remover, Oil Seal, Valve Stem 303-468 (T94P-6510-AH)
	Impact Slide Hammer 307-005 (T59L-100-B)
	Compressor, Valve Spring 303-472 (T94P-6565-AH)
	Installer, Oil Seal, Valve Stem 303-470 (T94P-6510-CH)

2002 Ford Focus LX
2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

Fig. 50: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

Engine oil	WSS-M2C153-H
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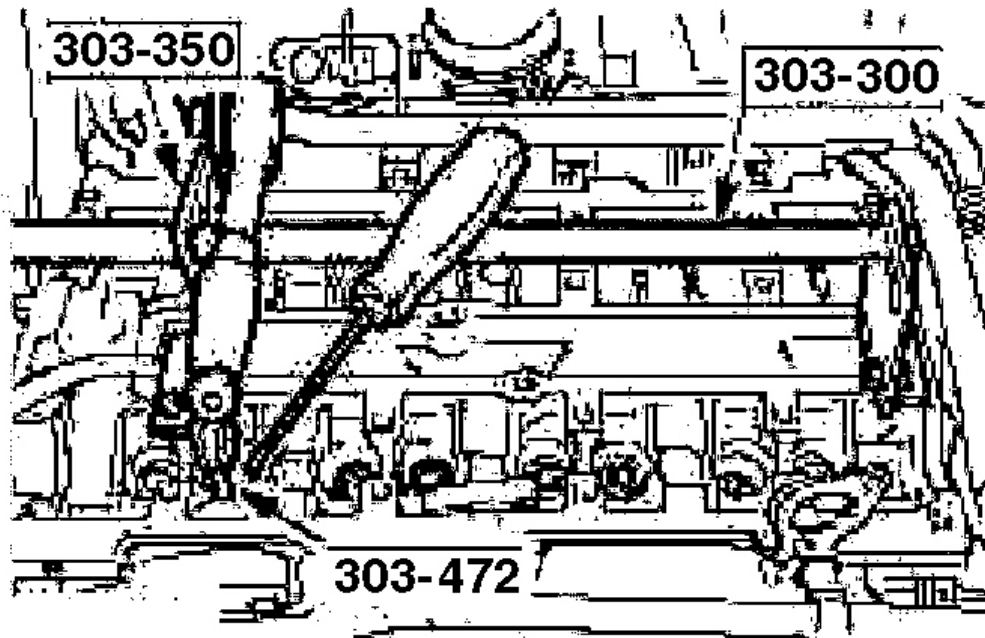
Removal

- NOTE:** Place the cylinder head onto a clean support on the workbench.
- NOTE:** Place wooden wedges in the combustion chamber recesses in the cylinder head to stop the valves from opening during removal.

1. Using the special tools, compress the valve springs.
 - Compress the valve springs and remove the valve collets using some grease and a small screwdriver.
 - Remove the valve spring retainers and the valve springs.

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

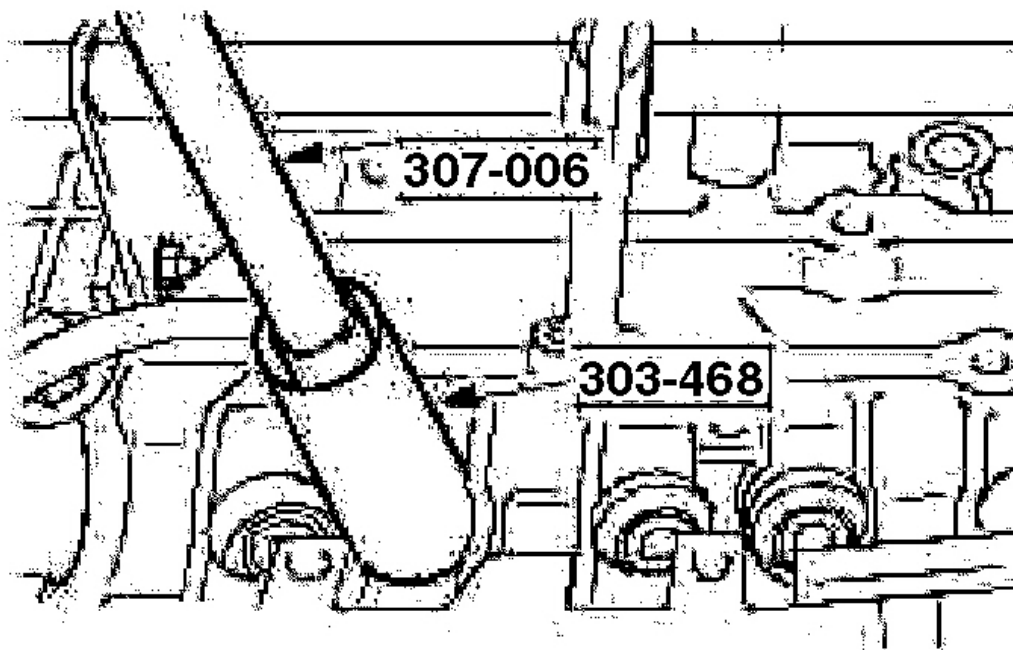


G03431656

Fig. 51: Removing Valve Spring Retainers And Valve Springs
Courtesy of FORD MOTOR CO.

NOTE: Place all parts in order to one side.

2. Remove the valve springs.
3. Using the special tools, remove the valve stem seals.



G03431657

Fig. 52: Removing Valve Stem Seals
Courtesy of FORD MOTOR CO.

4. Remove the valves and place them in order to one side.

Installation

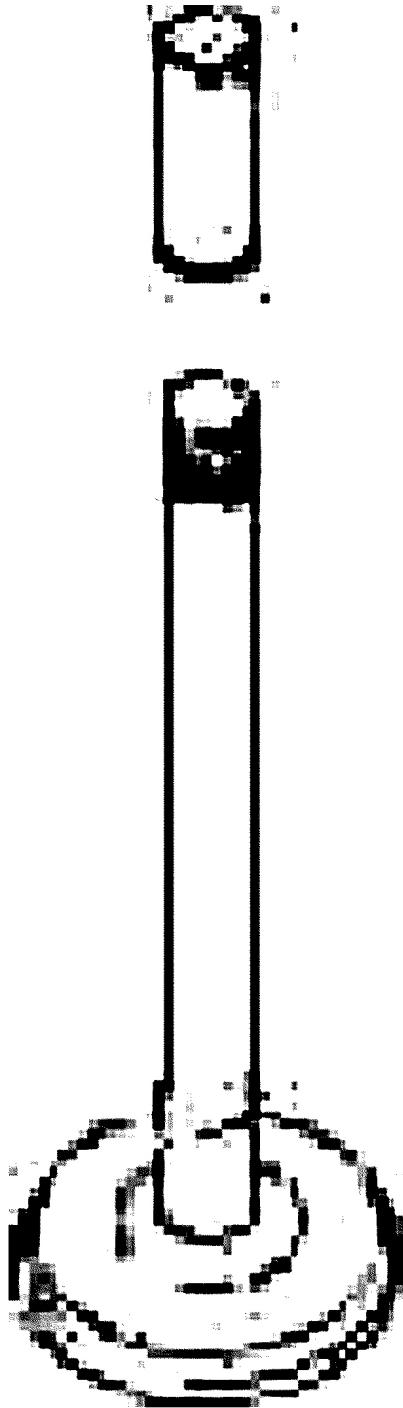
NOTE: Follow the procedure recommended by the grinding paste manufacturer.

NOTE: Install each valve in the same position from which it was removed.

1. Regrind the valves.
2. Thoroughly clean off any traces of sealer and grinding paste from all components.
3. Coat the valve stems with engine oil and insert them in the valve guides.
4. Valve stem seal installation sleeve.

2002 Ford Focus LX

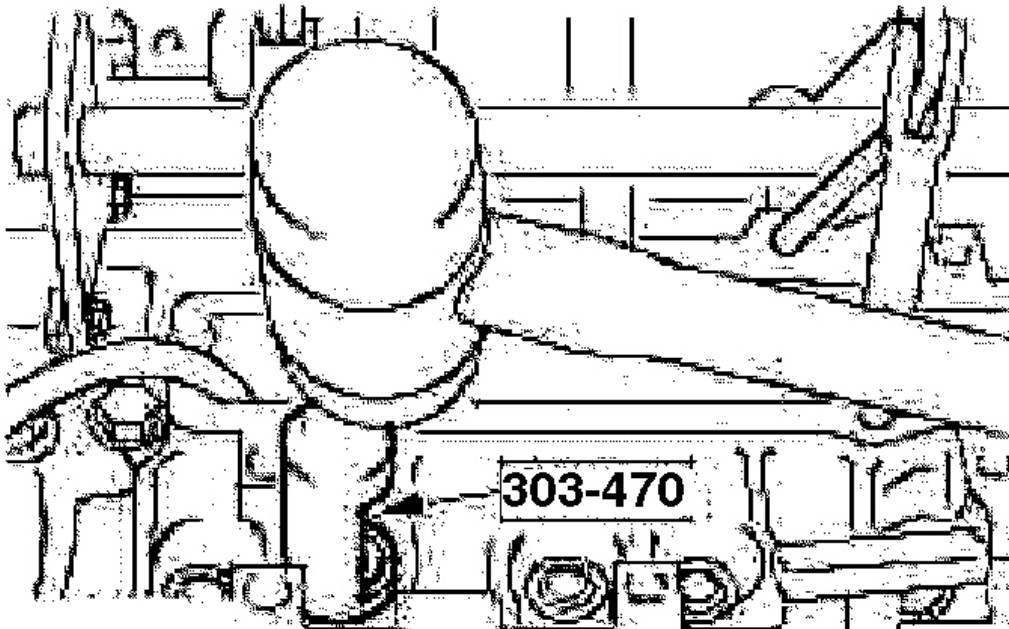
2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus



G03431658

Fig. 53: Identifying Valve Stem Seal Installation Sleeve
Courtesy of FORD MOTOR CO.

5. Using the special tool, install new valve stem oil seals.



G03431659

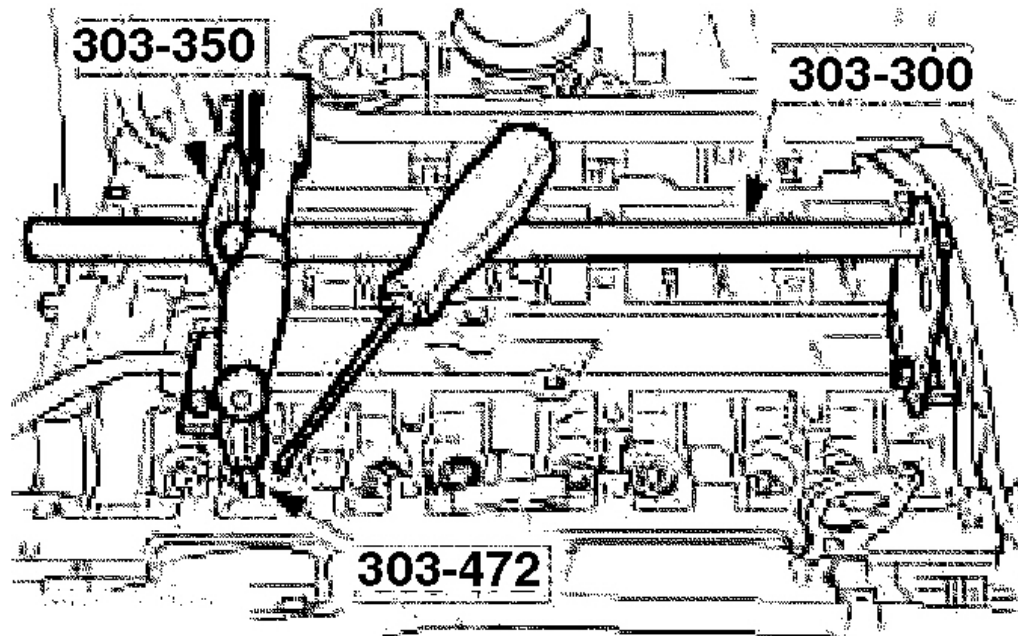
Fig. 54: Installing New Valve Stem Oil Seals
Courtesy of FORD MOTOR CO.

NOTE: Check the seating of the valve collets.

6. Using the special tools, install the valve springs.
 - Insert the valve springs and the valve spring retainers.
 - Compress the valve springs and install the valve collets using some grease and a small screwdriver.

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

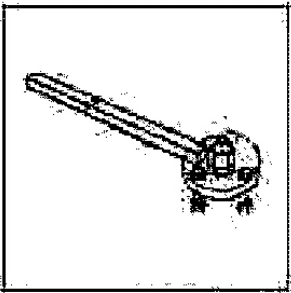



G03431660

Fig. 55: Installing Valve Springs
Courtesy of FORD MOTOR CO.

CAMSHAFTS

Special Tool(s)

	Remover, Camshaft Pulley 303-098 (T74P -6256 -B)
	Installer Camshaft, Oil Seal 303-160 (T81P -6292 -A)

G03431661

Fig. 56: Identifying Special Tools
Courtesy of FORD MOTOR CO.

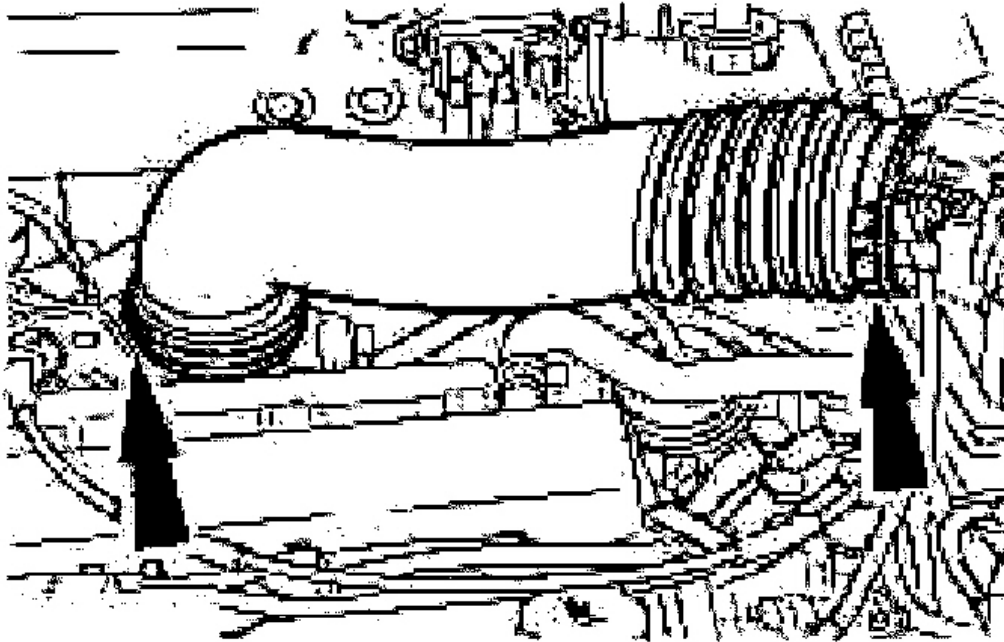
Material

MATERIAL SPECIFICATION

Cable ties	WSK-M2G348-A5
Sealant, camshaft bearing caps	
Engine oil	WSS-M2C153-H

Removal

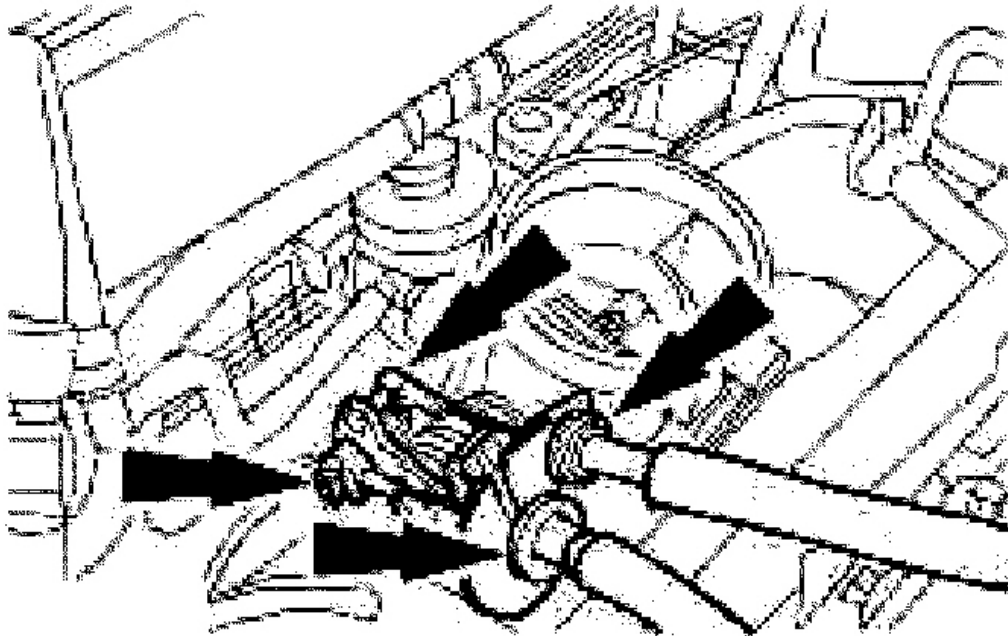
1. Remove the intake pipe.



G03431662

Fig. 57: Removing Intake Pipe
Courtesy of FORD MOTOR CO.

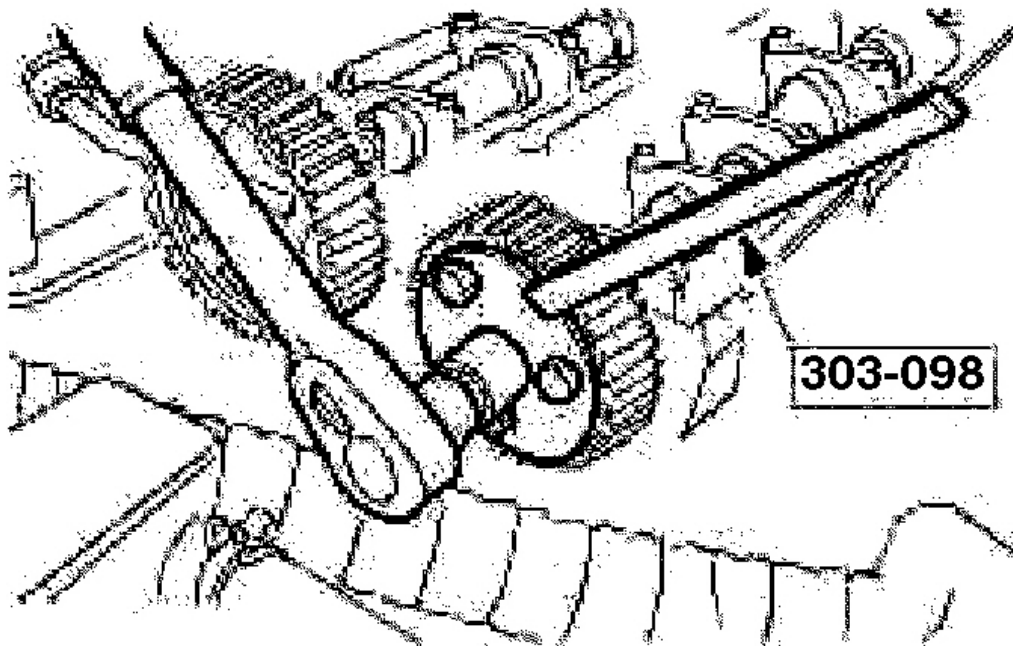
2. Detach the accelerator cable and the speed control cable (if equipped).



G03431663

Fig. 58: Removing Accelerator Cable And Speed Control Cable
Courtesy of FORD MOTOR CO.

3. Remove the timing belt. For additional information, refer to **TIMING BELT**.
4. Remove the camshaft timing pulleys.
 - Prevent turning using the special tool.

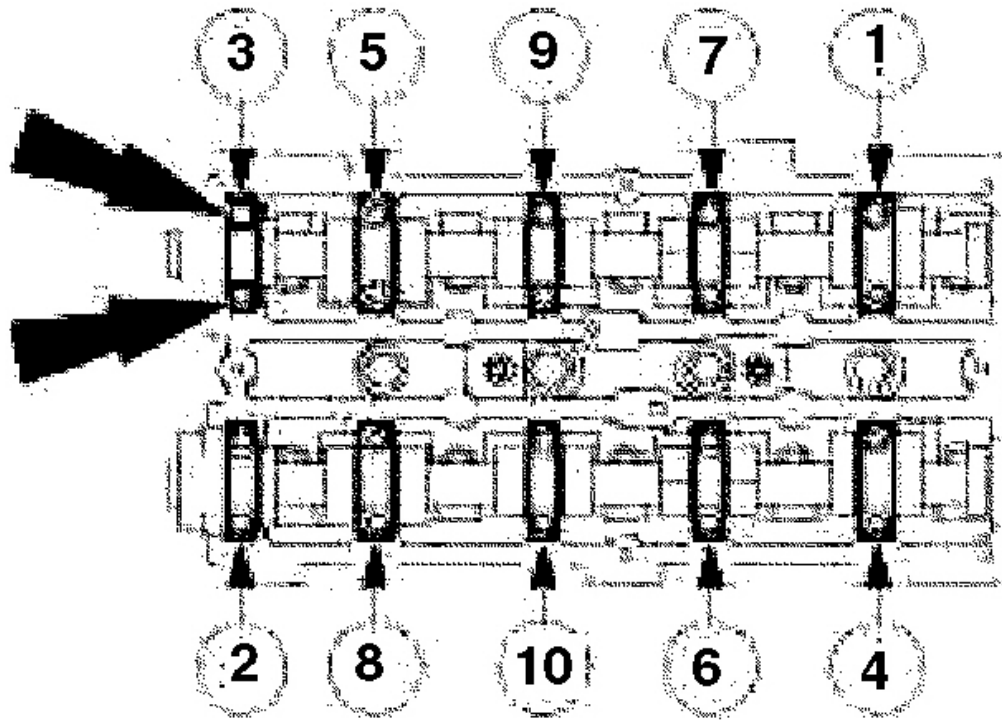


G03431664

Fig. 59: Removing Camshaft Timing Pulleys
Courtesy of FORD MOTOR CO.

NOTE: Loosening sequence.

5. Unscrew the bolts of the camshaft bearing caps evenly in several stages two turns at a time.
 - Remove the oil seals.
 - Remove the camshafts.

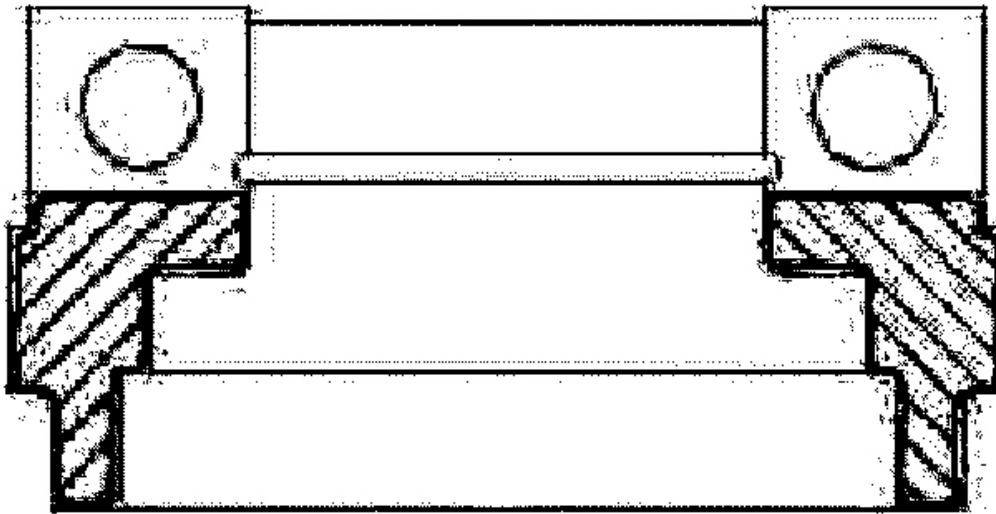


G03431665

Fig. 60: Identifying Loosening Sequence Of Camshaft Bearing Caps Bolts
Courtesy of FORD MOTOR CO.

Installation

NOTE: Identification numbers are provided on the outer face of the camshaft bearing caps.

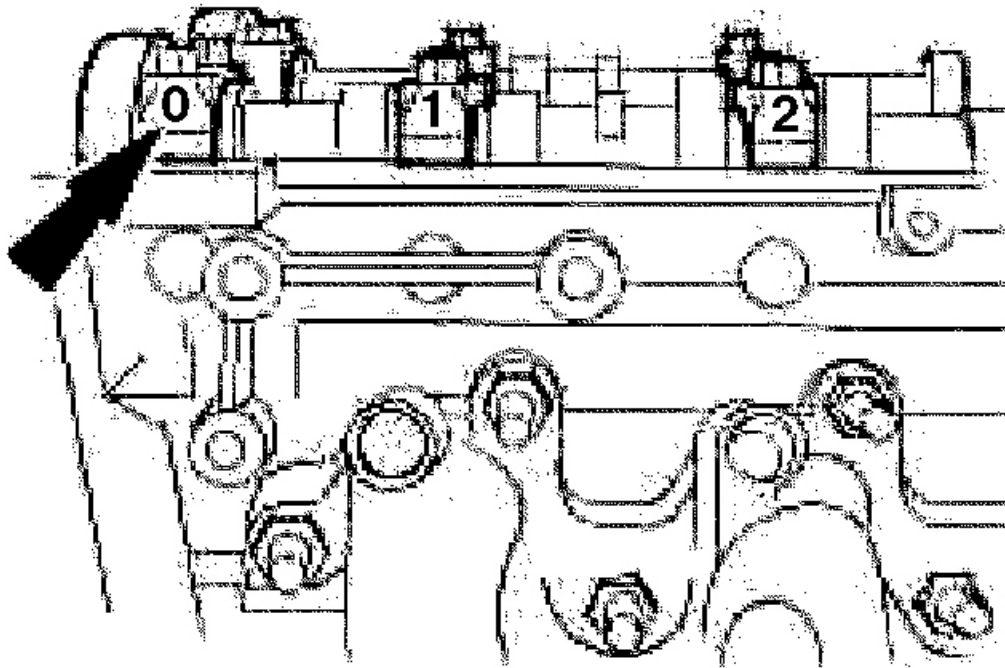


G03431666

Fig. 61: Applying Sealant To Camshaft Bearing Cap
Courtesy of FORD MOTOR CO.

1. Apply sealant to camshaft bearing cap numbers 0 and 5 in the areas shown.
2. Turn the crankshaft to approximately 60 degrees before TDC on cylinder number 1.

NOTE: Lay the camshaft in place so that none of the cams is at full lift.



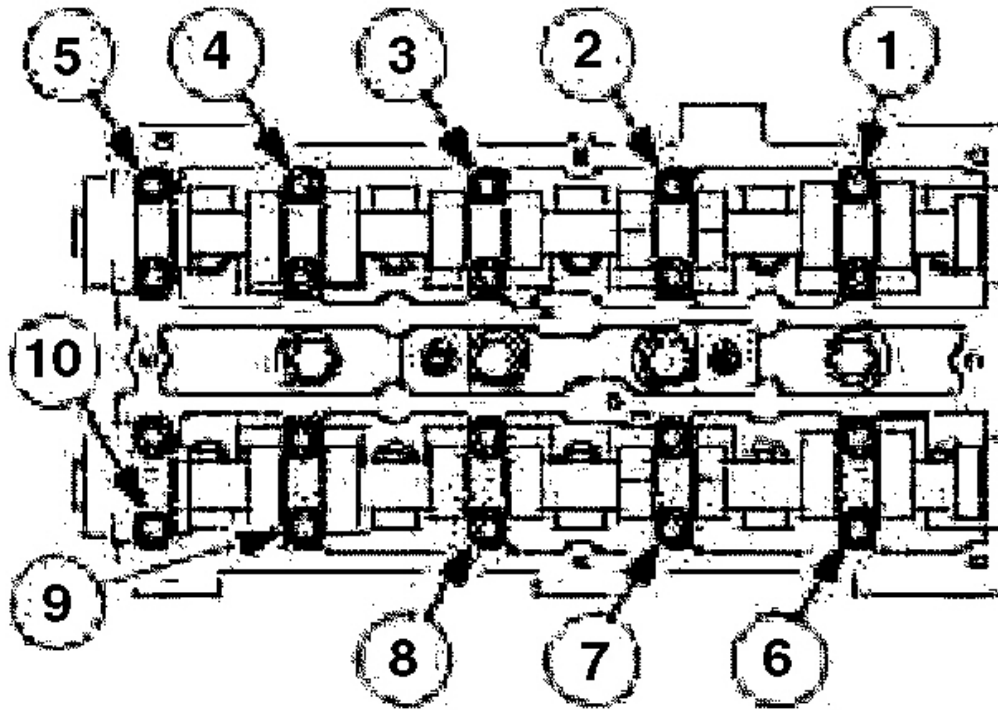
G03431667

Fig. 62: Lubricating Camshaft And Camshaft Bearing Caps With Engine Oil
Courtesy of FORD MOTOR CO.

3. Lubricate the camshaft and camshaft bearing caps with engine oil.

NOTE: **Screw in the camshaft bearing cap bolts evenly, in the sequence shown, a half turn at a time and tighten them in two stages.**

4. Tighten the bolts of the camshaft bearing caps.
 - Stage 1: 10 N.m.
 - Stage 2: 19 N.m.



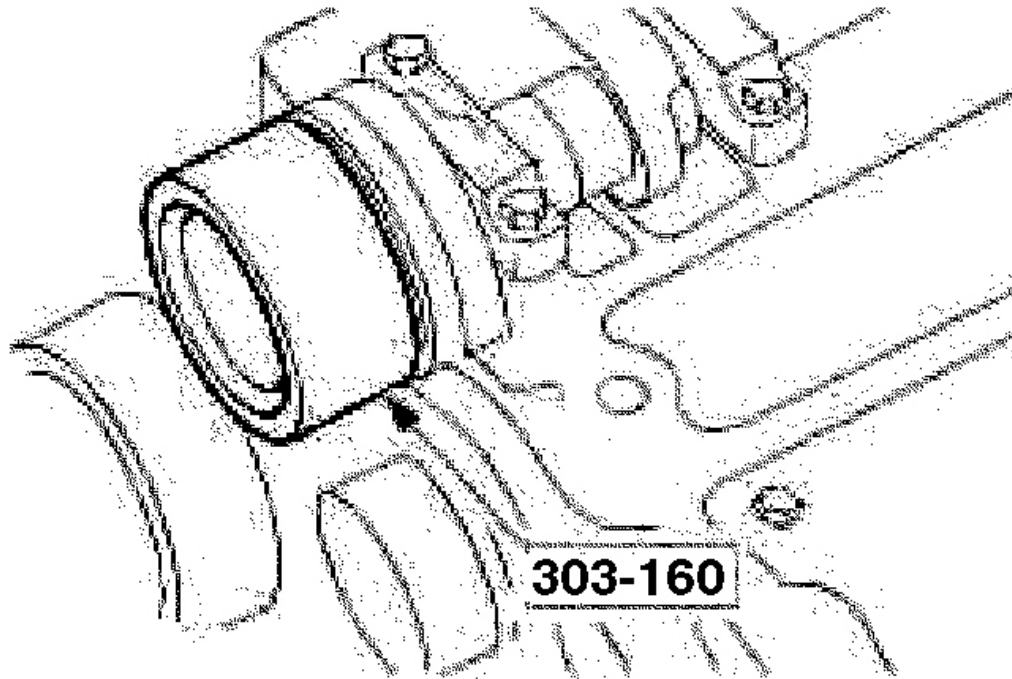
G03431668

Fig. 63: Identifying Tightening Sequence Of Camshaft Bearing Caps Bolts
Courtesy of FORD MOTOR CO.

5. Check the valve clearance and if necessary adjust. For additional information, refer to **Valve Clearance**.
6. Install the camshaft oil seals.
 - Lubricate the camshaft and oil seal lip with engine oil.
 - Using the special tool install a new oil seal.

NOTE: Do not tighten the bolts. The camshaft timing pulleys must be able to turn freely on the camshafts.

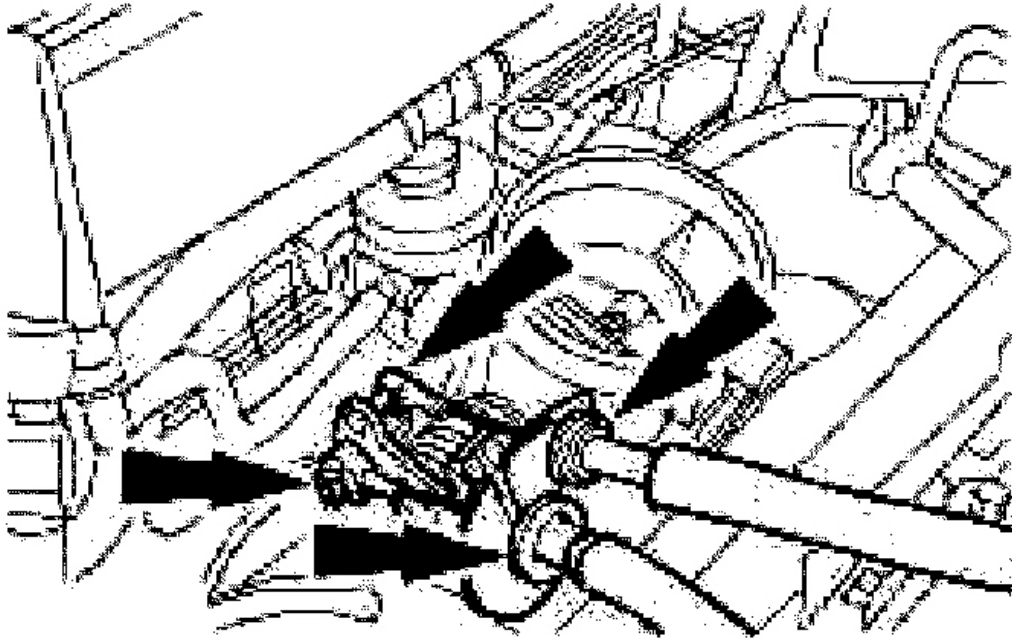
Install the camshaft timing pulleys.



G03431669

Fig. 64: Installing Camshaft Oil Seals
Courtesy of FORD MOTOR CO.

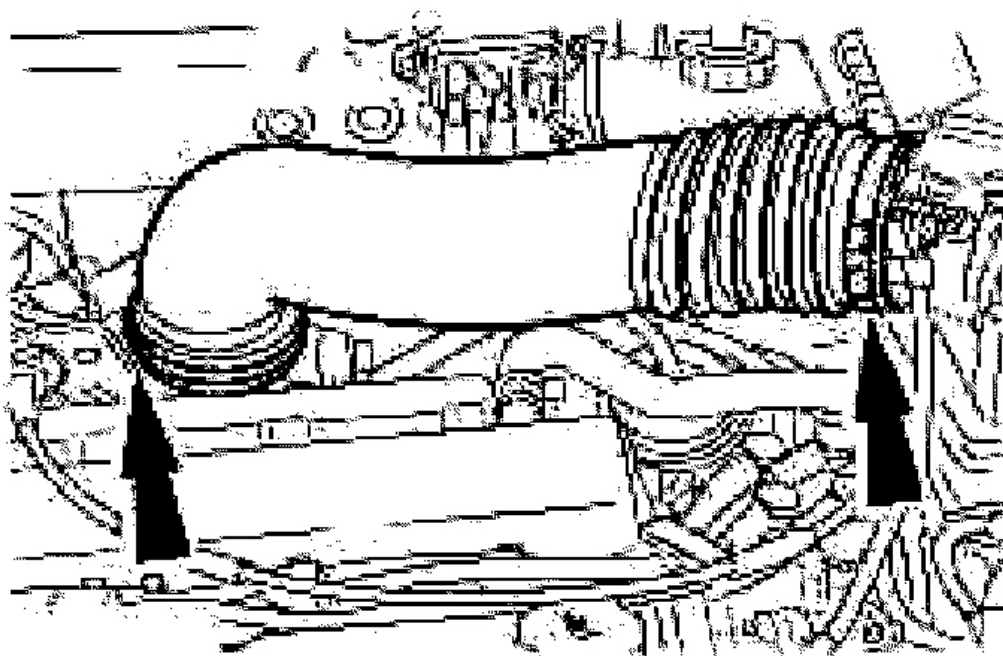
7. Install the timing belt. For additional information, refer to **TIMING BELT** .
8. Lower the vehicle.
9. Attach the accelerator cable and the speed control cable (if equipped).



G03431670

Fig. 65: Installing Accelerator Cable And Speed Control Cable
Courtesy of FORD MOTOR CO.

10. Install the intake pipe.



G03431671

Fig. 66: Installing Intake Pipe
Courtesy of FORD MOTOR CO.

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.

11. Standard finishing operations

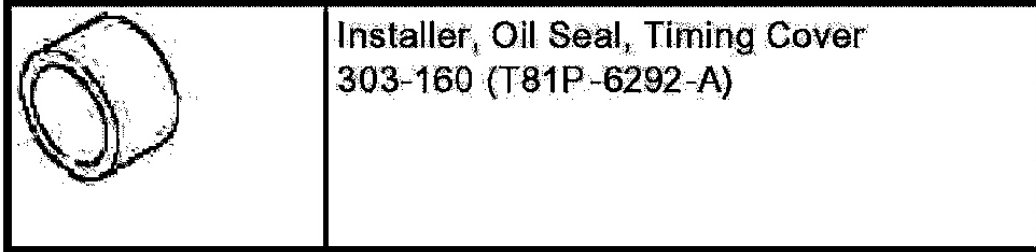
- Connect the battery ground cable.
- Check fluid levels and correct if necessary.
- Check the routing of vacuum hoses and cables and secure them with cable ties.
- Check fluid levels again and correct if necessary.

CAMSHAFT SEAL

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus



G03431672

Fig. 67: Identifying Special Tools
Courtesy of FORD MOTOR CO.

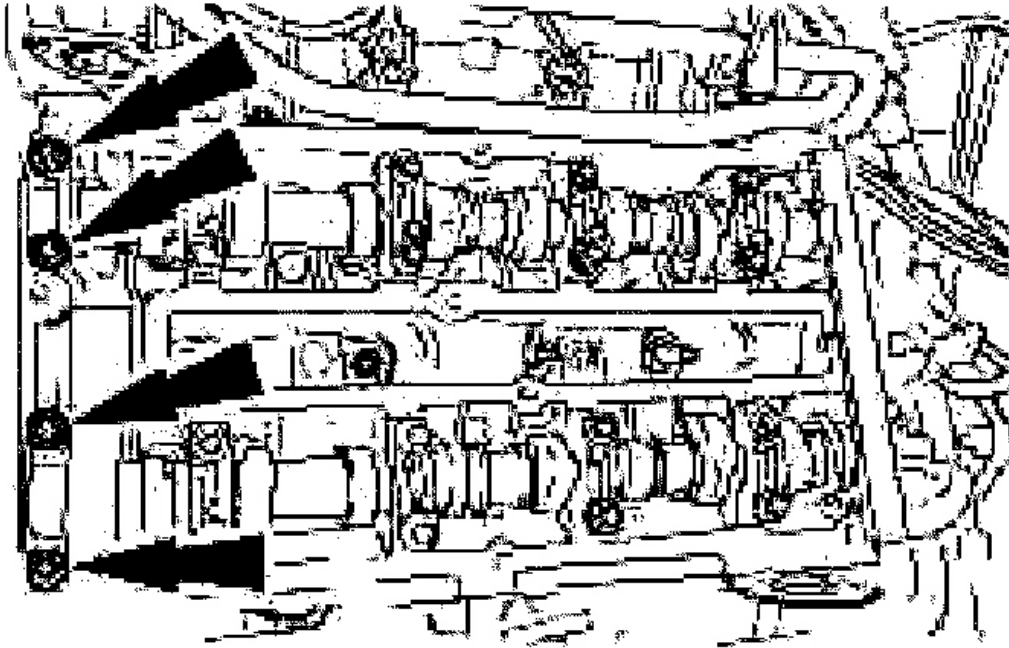
Material

MATERIAL SPECIFICATION

Gasket maker	WSK-M2G348-A5
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Removal

1. Remove the timing belt. For additional information, refer to **TIMING BELT** .
2. Remove the camshaft pulleys.
 - Remove the bolts.
3. Remove camshaft bearing caps numbers 0 and 5.
 - Remove the camshaft oil seals.

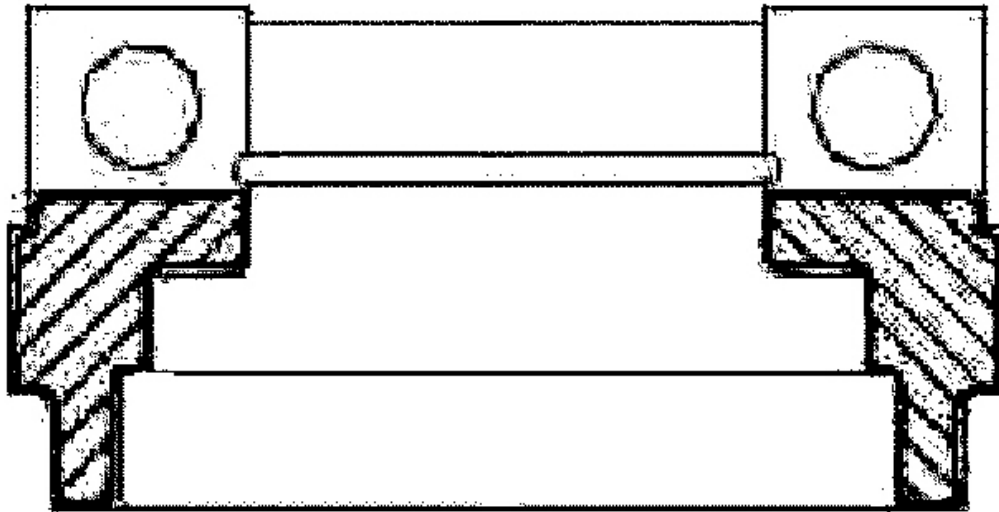


G03431673

Fig. 68: Removing Camshaft Bearing Caps
Courtesy of FORD MOTOR CO.

Installation

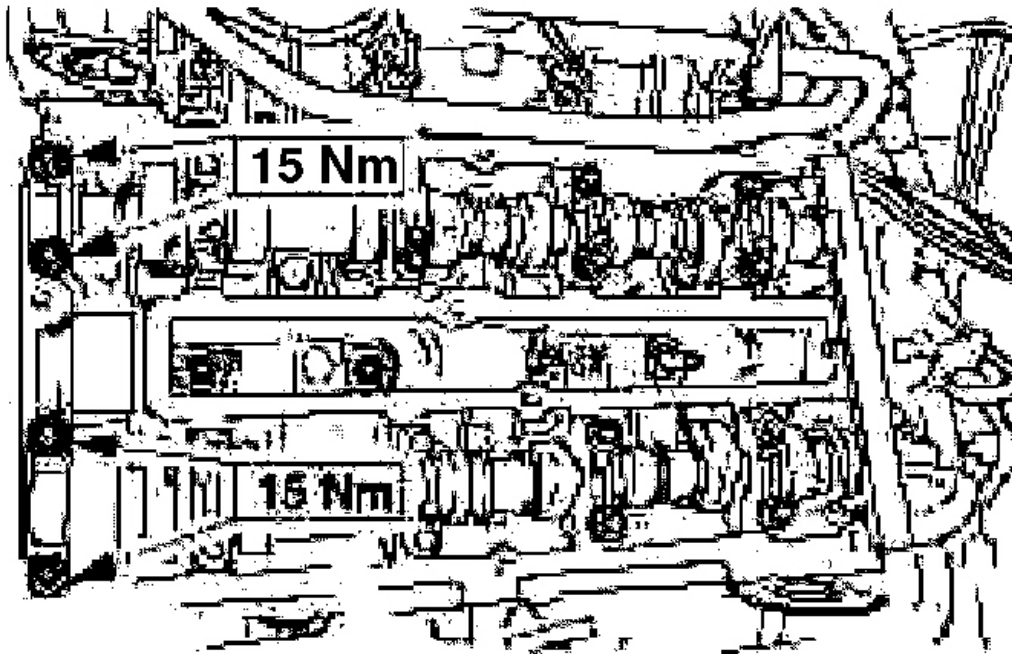
1. Thinly coat camshaft bearing caps numbers 0 and 5 with gasket maker.



G03431674

Fig. 69: Applying Sealant To Camshaft Bearing Caps
Courtesy of FORD MOTOR CO.

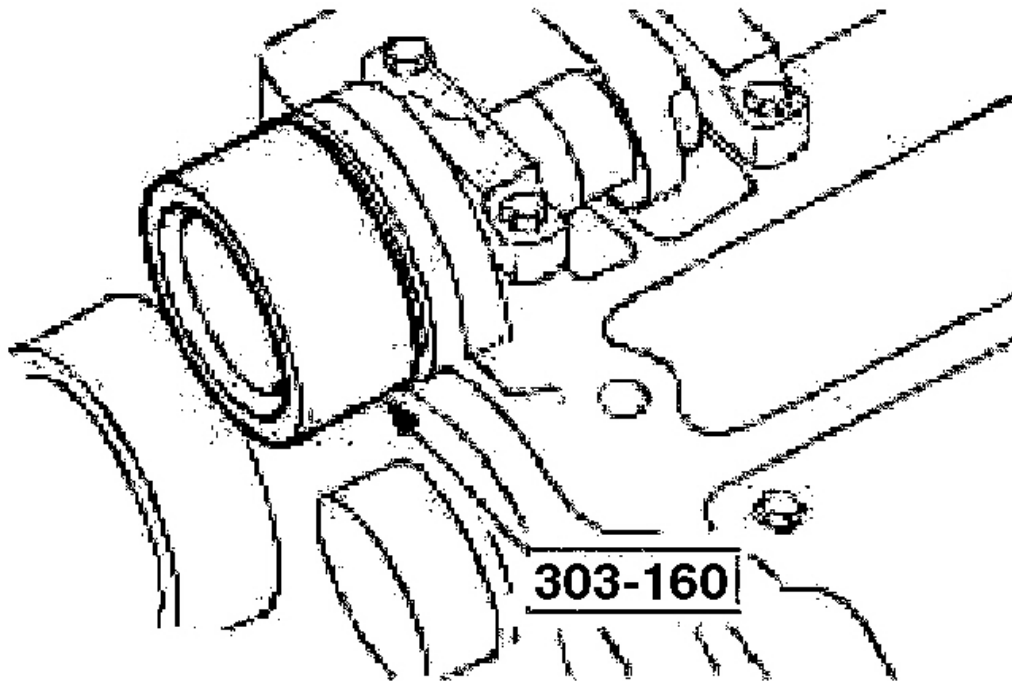
2. Install a new exhaust camshaft oil seal.
3. Install camshaft bearing caps numbers 0 and 5.



G03431675

Fig. 70: Installing Camshaft Bearing Caps
Courtesy of FORD MOTOR CO.

4. Using the special tool, press in the intake and exhaust camshaft oil seals.



G03431676

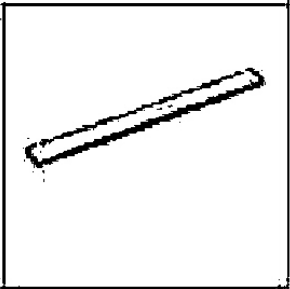

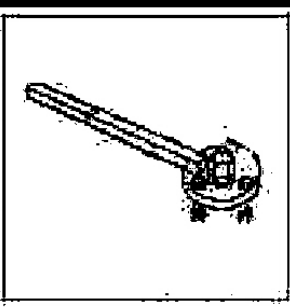
Fig. 71: Installing Intake And Exhaust Camshaft Oil Seals
Courtesy of FORD MOTOR CO.

NOTE: Do not tighten the bolts yet.

5. Slide the timing belt pulleys onto the camshafts and screw in the timing belt pulley bolts.
6. Install a new timing belt. For additional information, refer to **TIMING BELT** .

TIMING BELT

Special Tool(s)

	Plate, Camshaft Alignment 303-465 (T94P -6256 -CH)
	Timing Peg, Crankshaft TDC 303-574 (T97-P6000 -A)
	Remover, Camshaft Pulley 303-098 (T74P -6256 -B)

G03431677

Fig. 72: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

Never Seeze	WSD-M13P8-A1
Cable ties	A960-M1C171-AA
Silicone grease for spark plug connector seal	

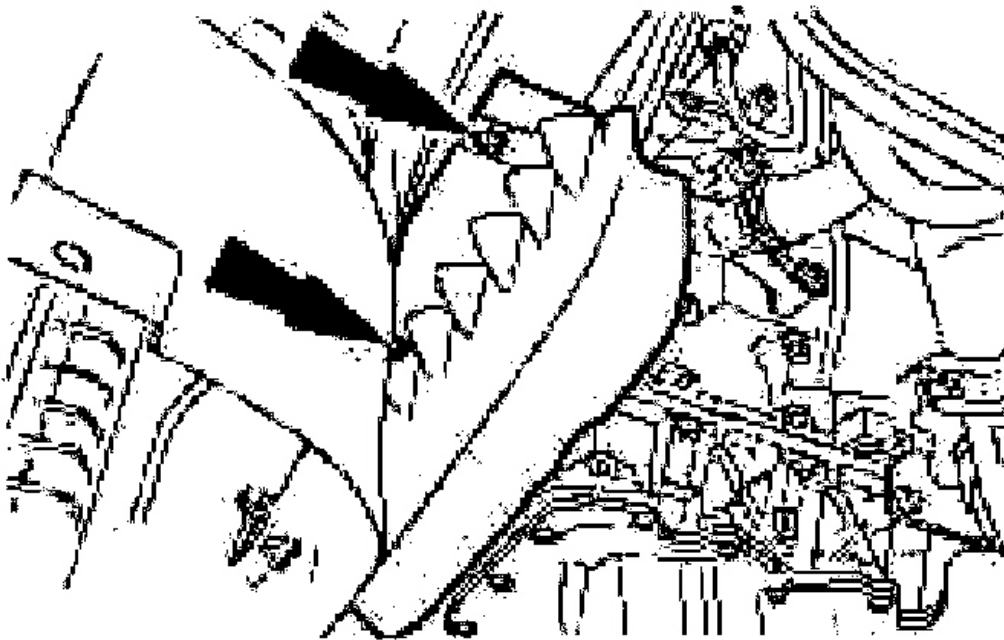
Removal

1. General Instructions.
 - The positions of the engine mounting and the engine roll restrictor are described looking from the transmission towards the engine.

- If necessary, use Special Tool 412-108 to remove coolant and ventilation hoses.
- Owing to special model variants, some steps do not apply to all vehicles. These are clearly marked in the text.
- If necessary, cut the cable tie and install new on installation.

CAUTION: Disconnect the battery negative cable.

2. Raise and support the vehicle.
3. Detach the drive belt cover.



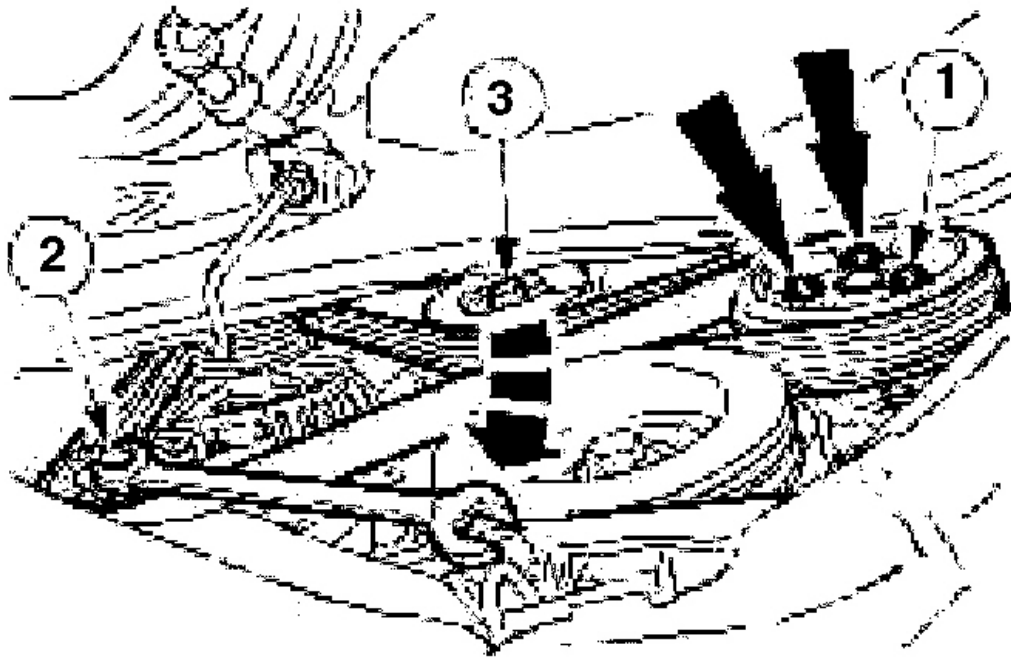
G03431678

Fig. 73: Detaching Drive Belt Cover
Courtesy of FORD MOTOR CO.

NOTE: Mark the drive belt running direction.

4. Remove the drive belt.

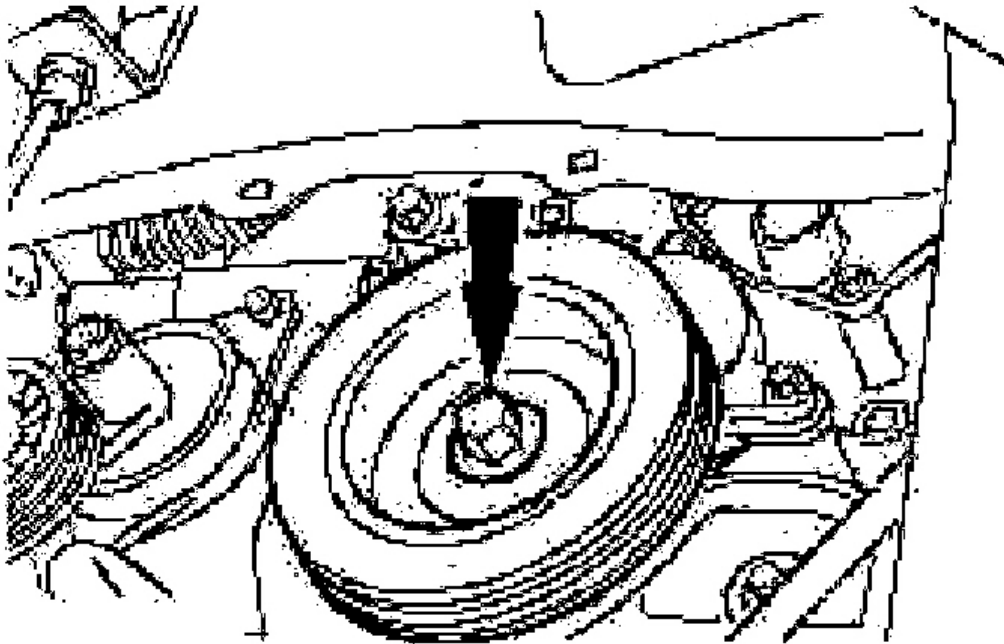
1. Loosen the bolts on the coolant pump pulley.
2. Slacken the drive belt by turning clockwise and remove it.
 - Detach the coolant pump belt pulley.
4. Detach the multi-groove belt idler pulley.



G03431679

Fig. 74: Removing Drive Belt
Courtesy of FORD MOTOR CO.

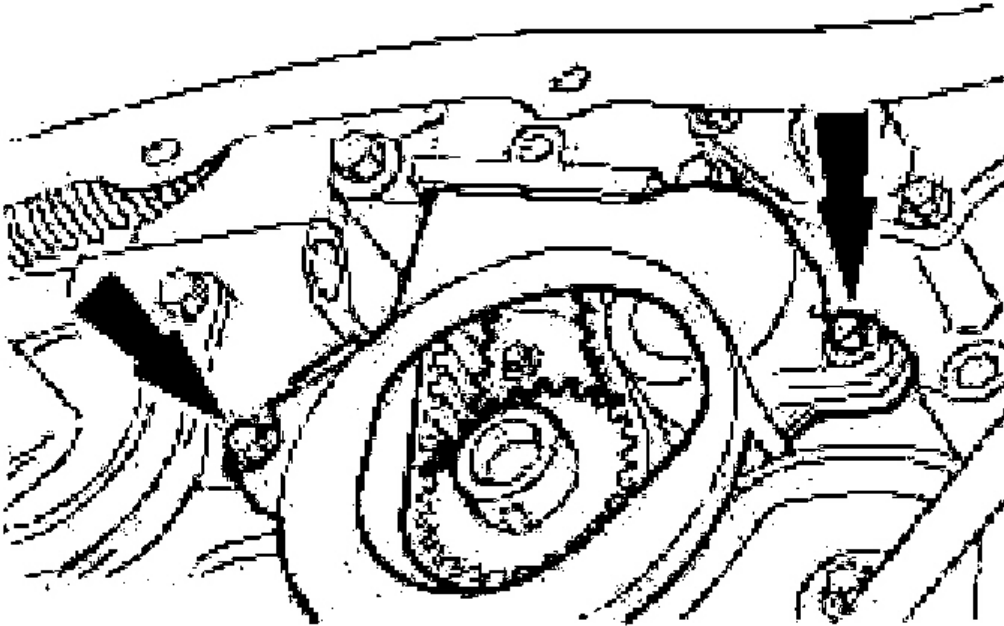
5. Detach the crankshaft pulley/vibration damper.



G03431680

Fig. 75: Detaching Crankshaft Pulley/Vibration Damper
Courtesy of FORD MOTOR CO.

CAUTION: The removal of the lower part of the engine front cover is necessary to avoid damage to the timing belt.



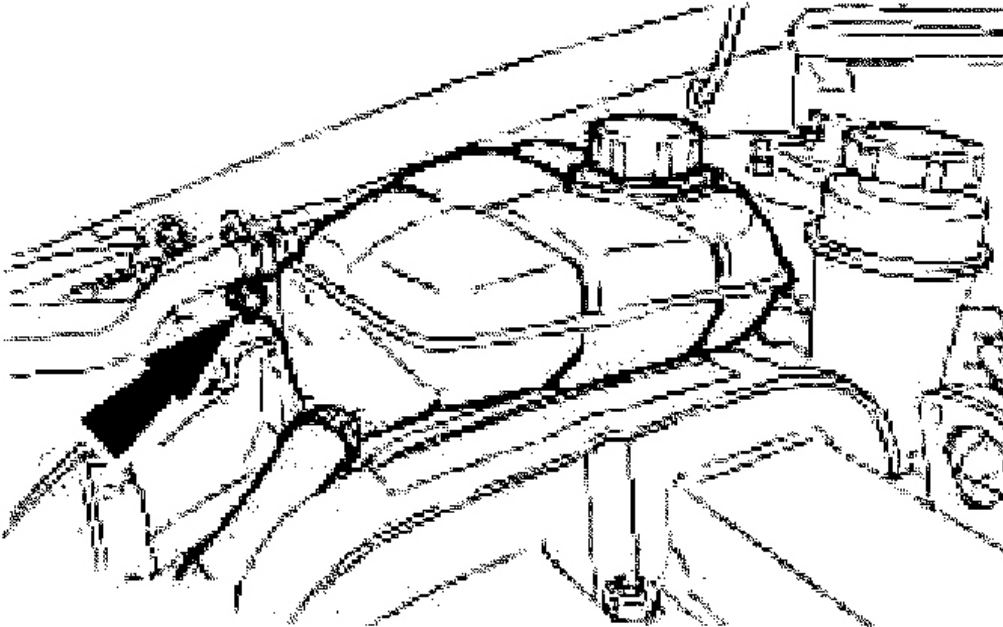
G03431681

Fig. 76: Detaching Lower Timing Belt Cover
Courtesy of FORD MOTOR CO.

6. Detach the lower timing belt cover.
7. Lower the vehicle.
8. Detach the coolant expansion tank and lay it to one side.

2002 Ford Focus LX

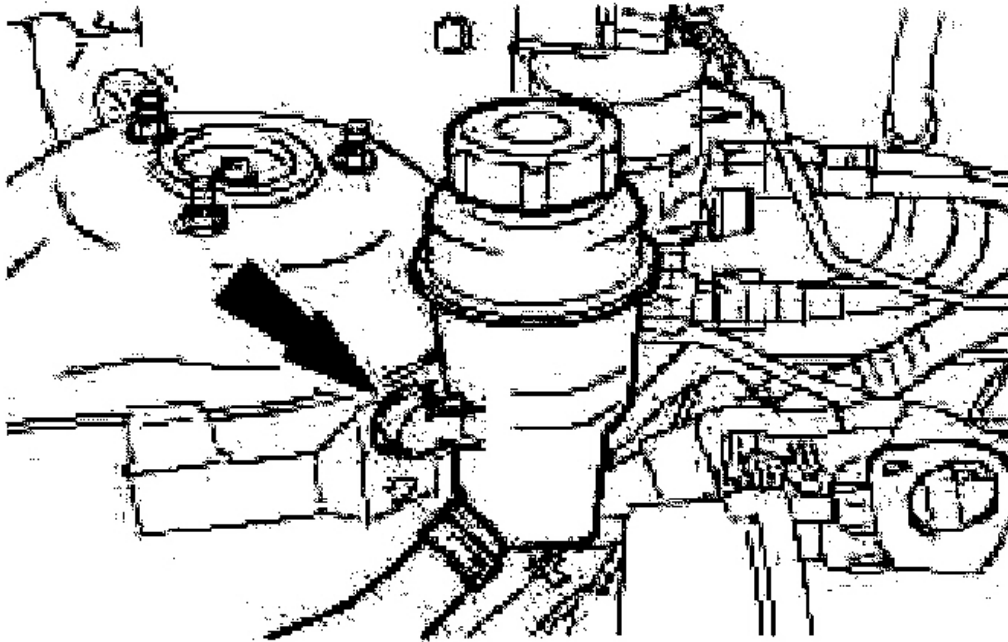
2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus



G03431682

Fig. 77: Removing Coolant Expansion Tank
Courtesy of FORD MOTOR CO.

9. Remove the PAS reservoir and lay it to one side.



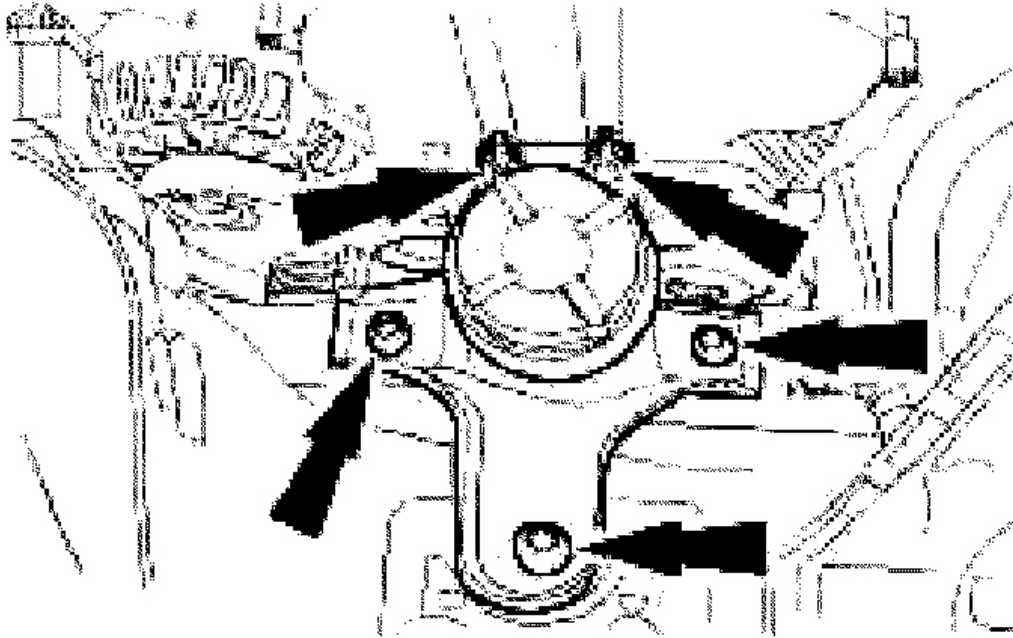
G03431683

Fig. 78: Removing PAS Reservoir
Courtesy of FORD MOTOR CO.

CAUTION: Insert the wooden block between the oil pan and the jack.

10. Position the jack with the wooden block under the oil pan and raise so that the front engine mounting is free from load.

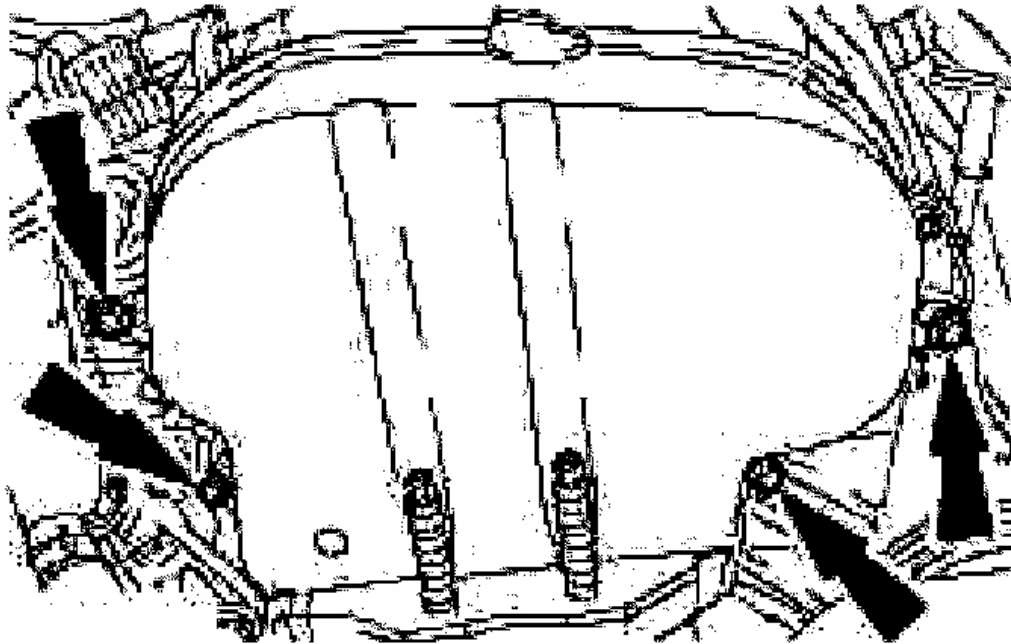
NOTE: Mark the position of the engine mounting.



G03431684

Fig. 79: Removing Front Engine Mounting
Courtesy of FORD MOTOR CO.

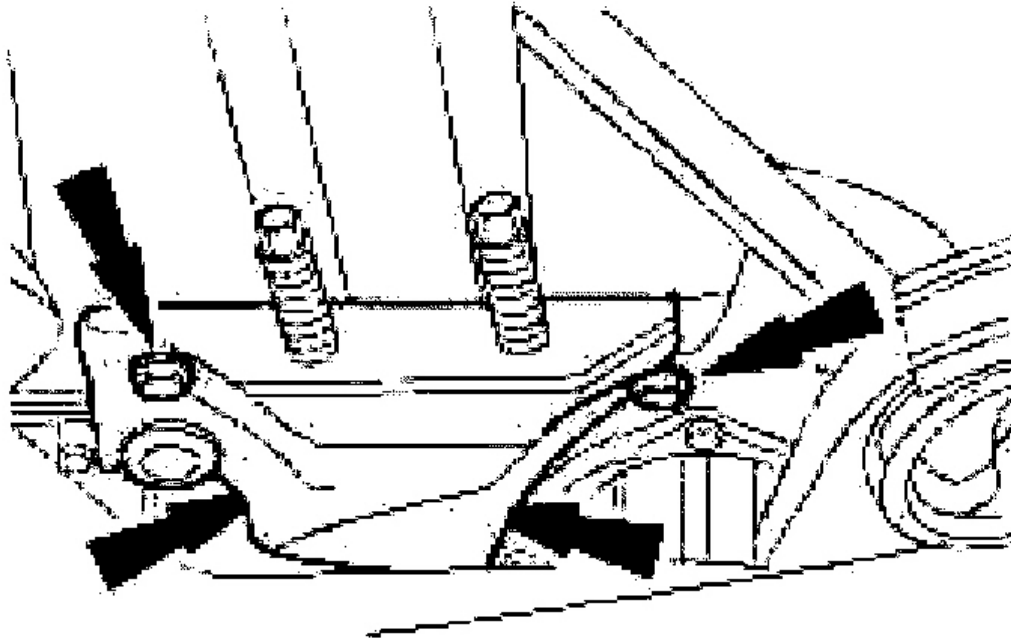
11. Remove the front engine mounting.
12. Detach the timing belt upper cover.
 - Leave the timing belt cover in its installed position.



G03431685

Fig. 80: Removing Timing Belt Upper Cover
Courtesy of FORD MOTOR CO.

13. Detach the timing belt center cover/front engine mounting bracket.
 - Remove the timing belt upper cover.



G03431686

Fig. 81: Removing Timing Belt Center Cover/Front Engine Mounting Bracket
Courtesy of FORD MOTOR CO.

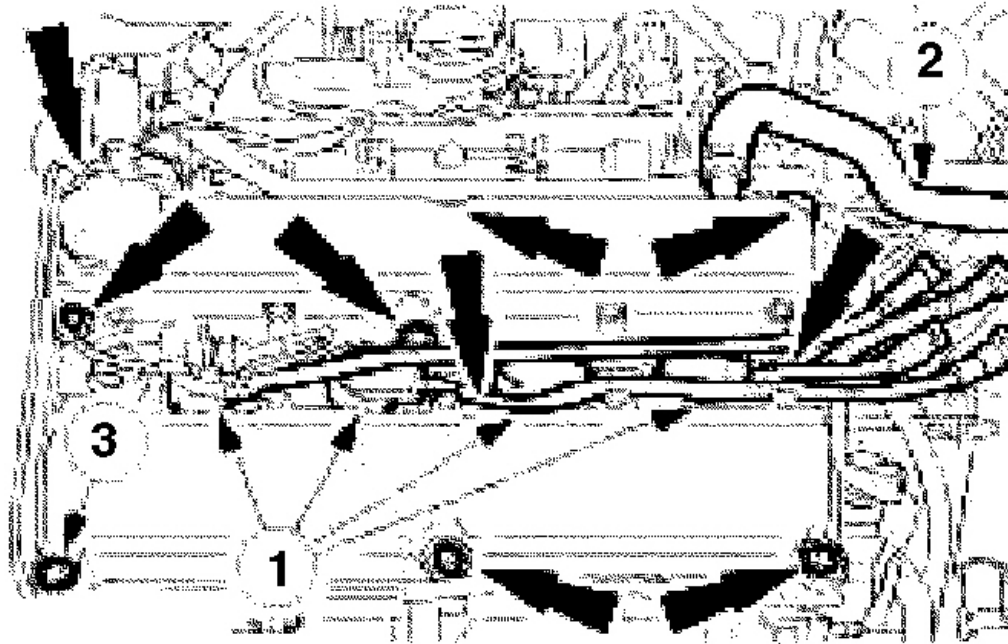
CAUTION: Do not pull the cable when removing the spark plug connectors. If necessary, remove the ignition cables from the ignition coil to avoid kinking the cables. Turn the spark plug connectors slightly before removing to loosen the seal.

CAUTION: Pull off the spark plug connectors in line with the spark plugs.

NOTE: Loosening sequence: from the outside to the inside, working diagonally.

14. Remove the cylinder head cover.
 1. Pull off the spark plug connectors.

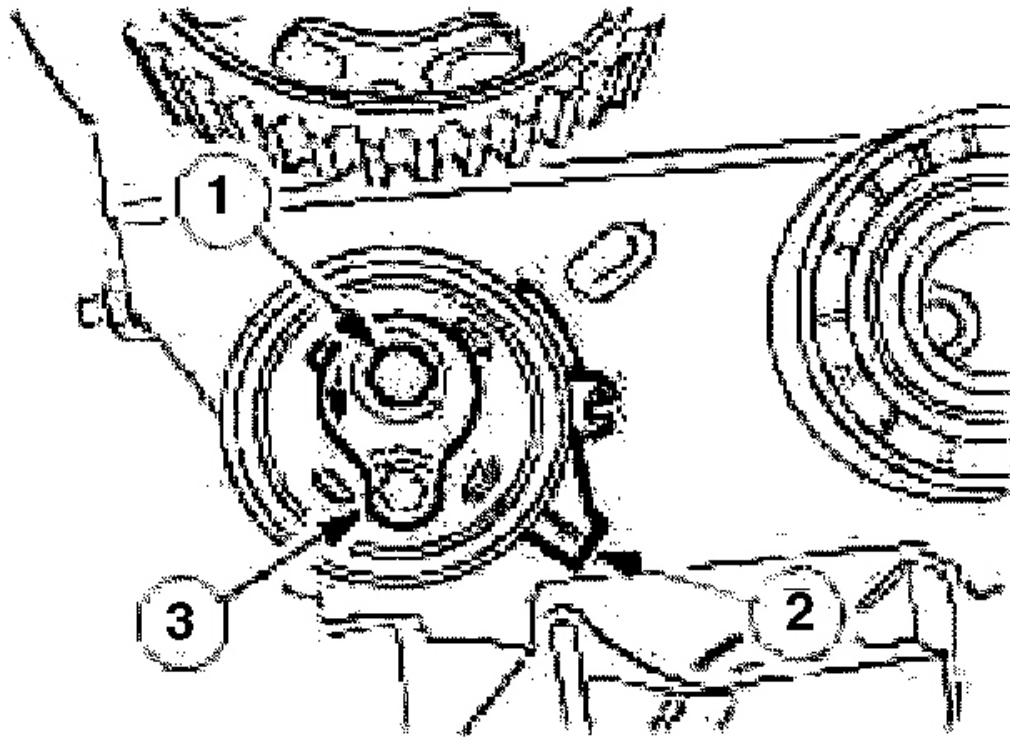
2. Detach the PCV hose.
3. Remove ten bolts.



G03431687

Fig. 82: Pulling Off Spark Plug Connectors
Courtesy of FORD MOTOR CO.

15. Remove the spark plugs.
16. Turn the engine to TDC on cylinder number 1.
17. Detension the timing belt.
 1. Unscrew the bolt four turns.
 2. Position the tensioner so the locating tab is at approximately the 4 o'clock position.
 3. Line up the hex key slot in the tensioner adjusting washer with the pointer that is located behind the pulley.



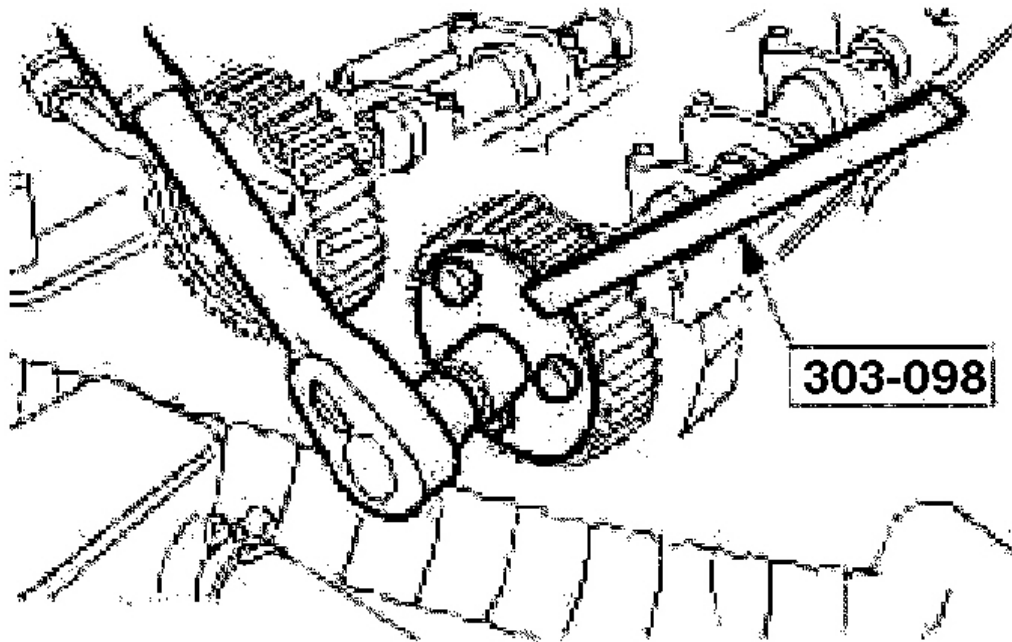
G03431688

Fig. 83: Detensioning Timing Belt
Courtesy of FORD MOTOR CO.

18. Remove the timing belt.
19. Slacken the camshaft timing pulleys.
 - Prevent from turning using the special tool.

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

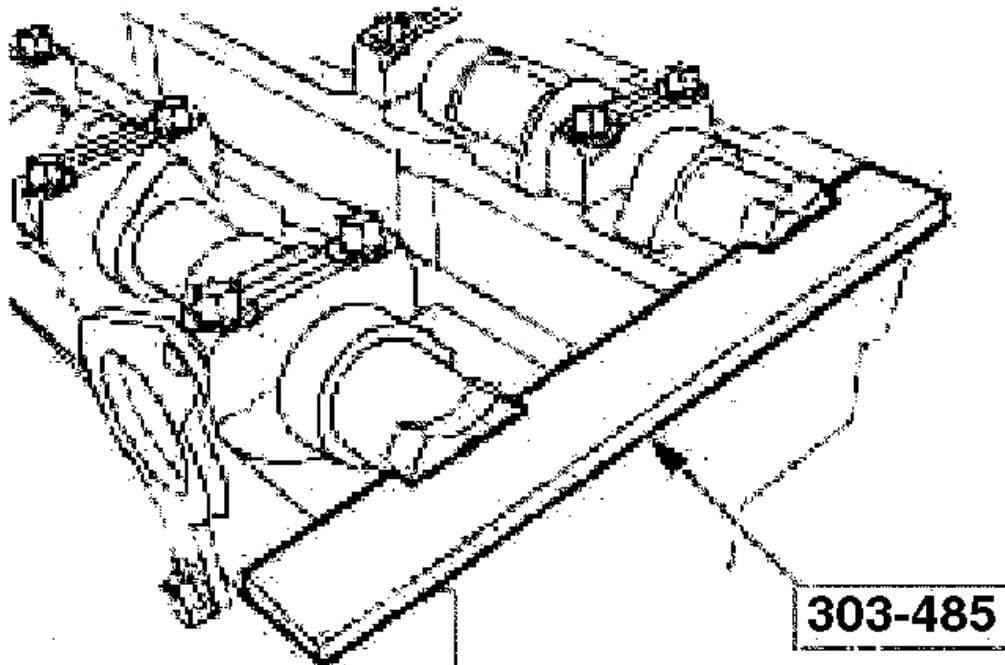


G03431689

Fig. 84: Slackening Camshaft Timing Pulleys
Courtesy of FORD MOTOR CO.

Installation

NOTE: Do not tighten the bolts. The camshaft timing pulleys must be able to turn freely on the camshafts.

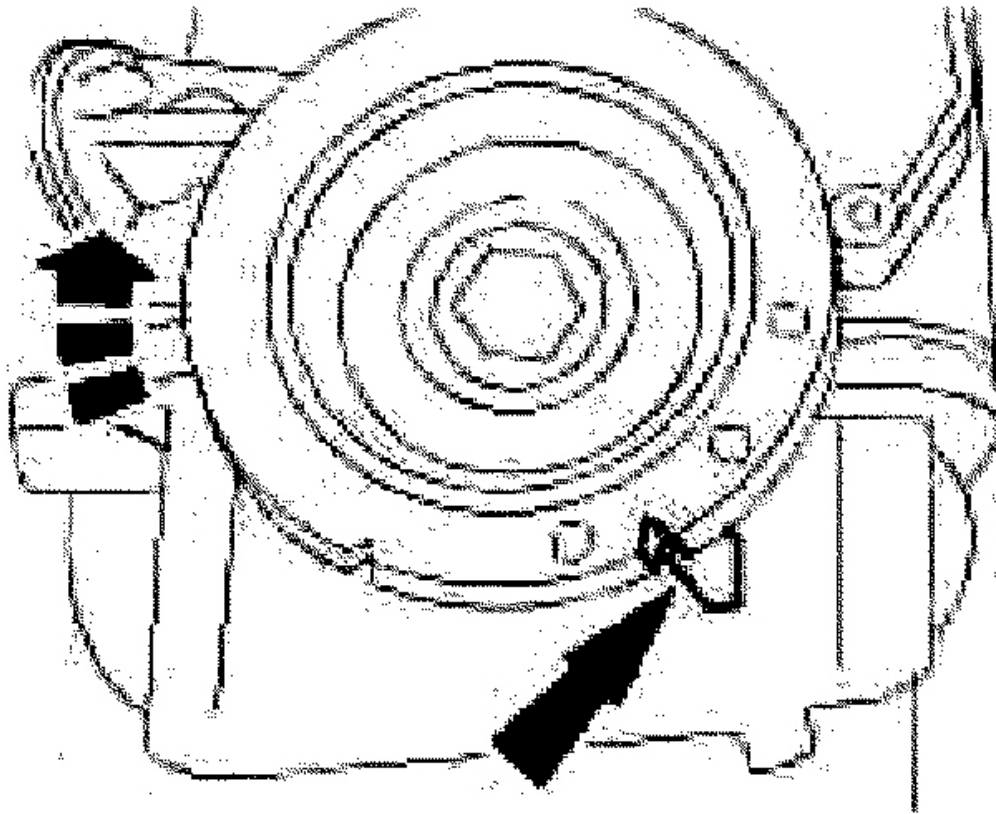


G03431690

Fig. 85: Inserting Special Tool Into Camshafts
Courtesy of FORD MOTOR CO.

1. Turn the camshafts to ignition position on cylinder number 1 and insert the special tool into the camshafts.

NOTE: **Rotate the crankshaft clockwise.**



G03431691

Fig. 86: Rotating Crankshaft For Positioning Cylinder Number 1 To TDC Position
Courtesy of FORD MOTOR CO.

2. Rotate the crankshaft to TDC on cylinder number 1.

NOTE: Cylinders No. 1 and No. 4 are at TDC when the Woodruff key points straight up.

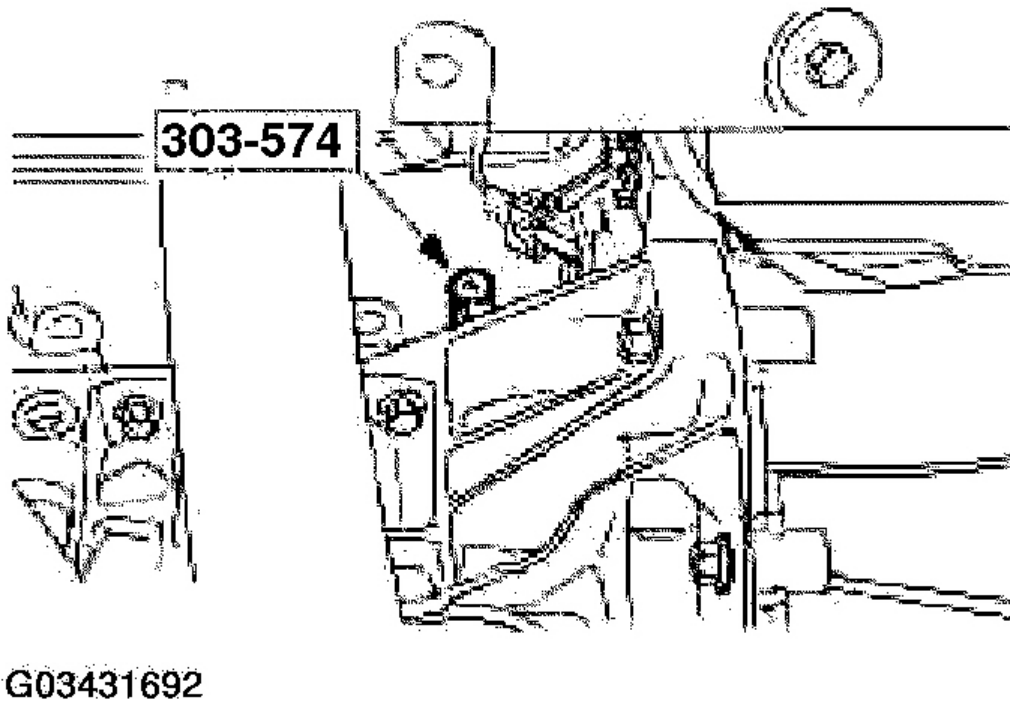


Fig. 87: Removing Blanking Plug
Courtesy of FORD MOTOR CO.

3. Remove the blanking plug, completely screw in the special tool and auto-align the crankshaft to TDC.

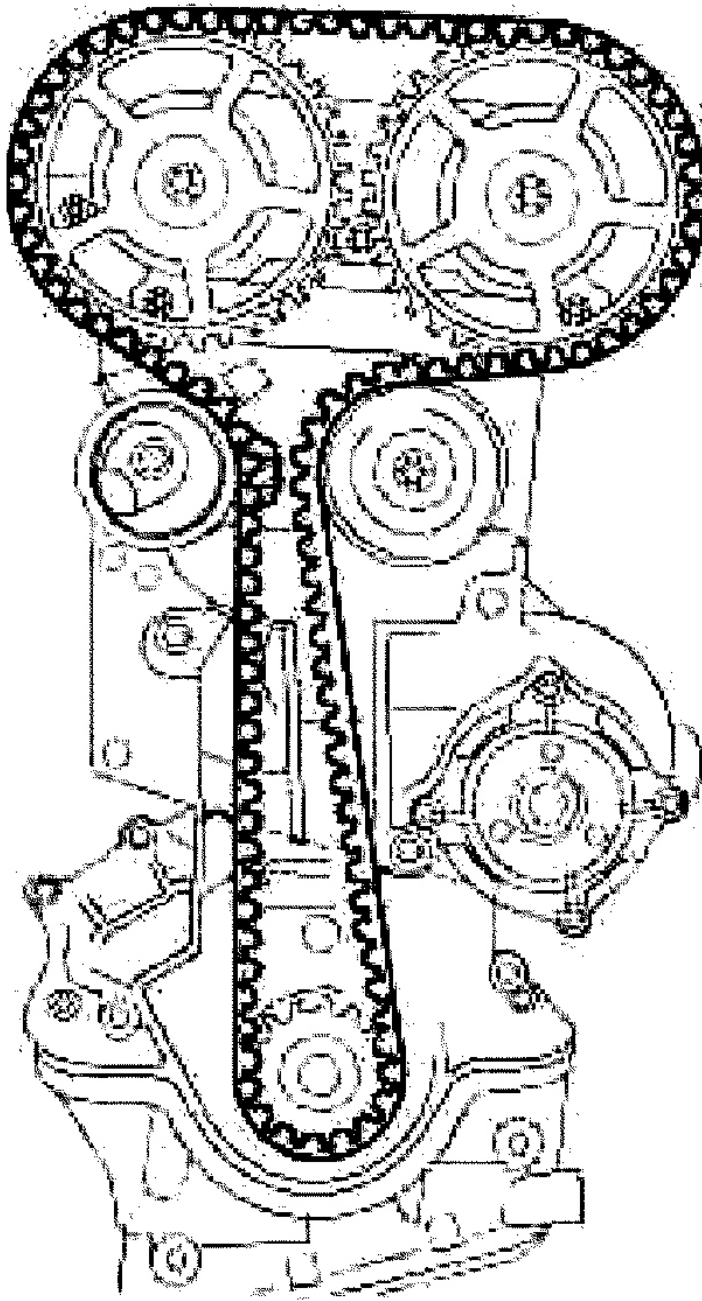
CAUTION: Do not kink the timing belt (do not bend the timing belt less than a diameter of 35 mm).

CAUTION: Do not rotate the crankshaft, check that it is still resting against the timing pin.

NOTE: The lug of the belt tensioner must not be hooked into the sheet metal cover during timing belt installation.

4. Position a new timing belt in place.
 - Starting from the crankshaft timing belt pulley and working counterclockwise, position

the timing belt in place while keeping it under tension.



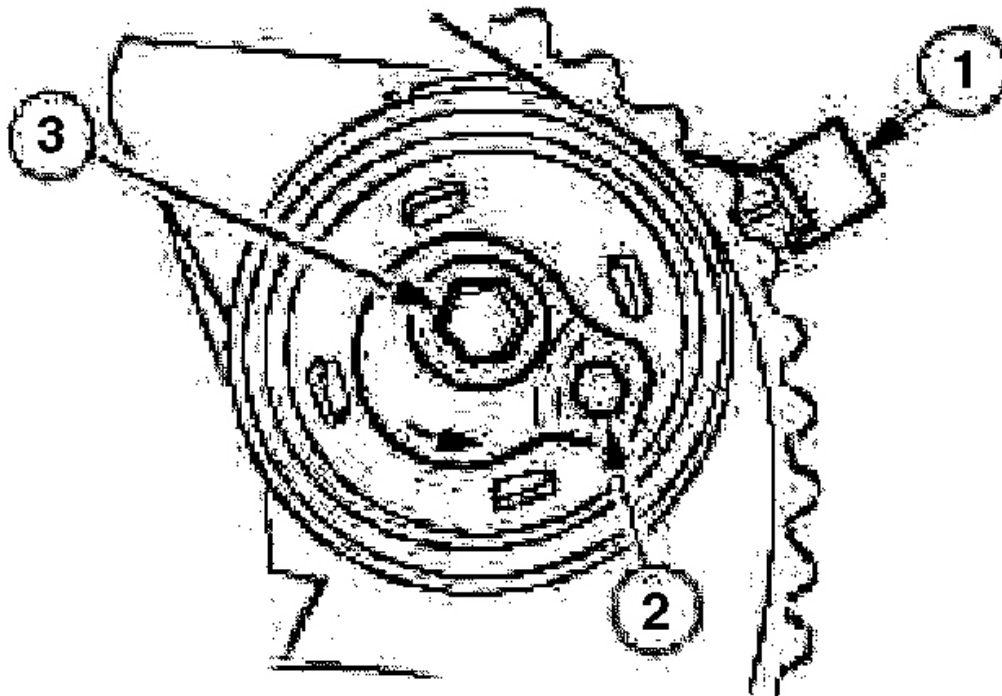
G03431693

Fig. 88: Installing Timing Belt
Courtesy of FORD MOTOR CO.

CAUTION: Incorrect timing belt tension will cause incorrect valve timing.

5. Pre tension the timing belt.

1. Rotate the tensioner locating tab counterclockwise and insert the locating tab into the slot in the rear timing cover.
2. Position the hex key slot in the tensioner adjusting washer to the 4 o'clock position.
3. Tighten the attaching bolt enough to seat the tensioner firmly against the rear timing cover, but still allow the tensioner adjusting washer to be rotated using a 6mm hex key.

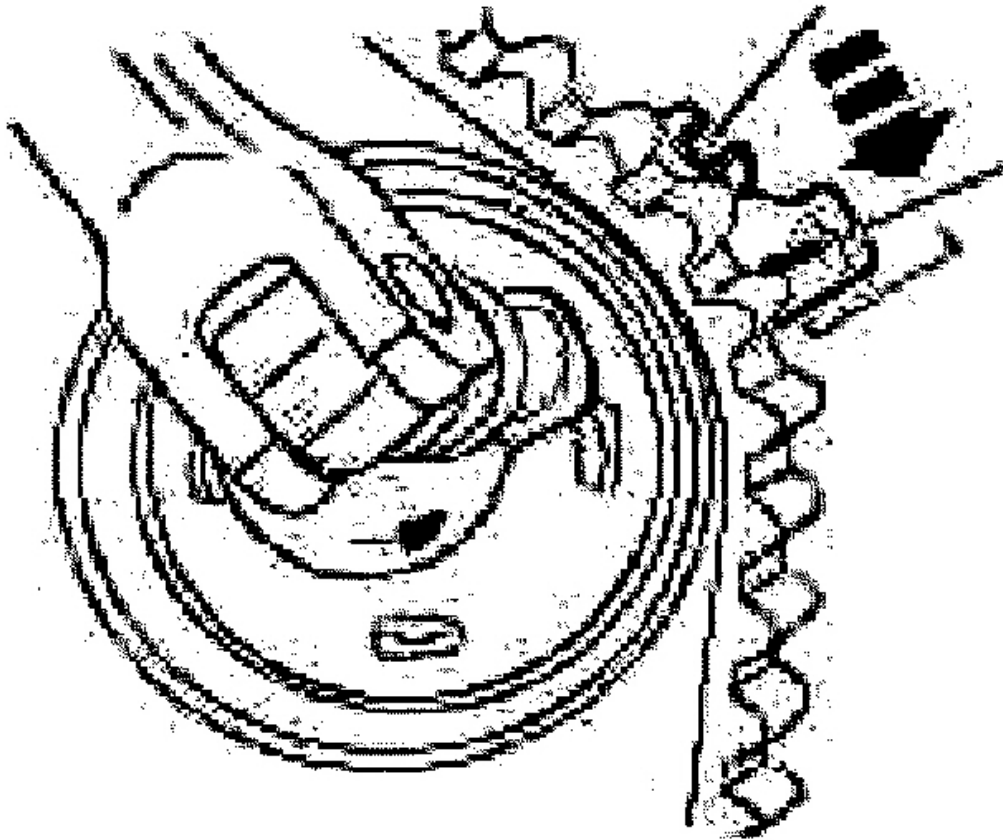


G03431694

Fig. 89: Tightening Attaching Bolt For Seating Tensioner Against Rear Timing Cover

Courtesy of FORD MOTOR CO.

CAUTION: Tension the timing belt, working counterclockwise.



G03431695

Fig. 90: Rotating Adjusting Washer Counterclockwise Until Notch In Pointer Centered Over Index Line On Locating Tab
Courtesy of FORD MOTOR CO.

6. Using the hex key, rotate the adjusting washer counterclockwise until the notch in the pointer is centered over the index line on the locating tab (the pointer will move clockwise during adjustment).
7. While holding the adjusting washer in position, tighten the bolt.

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

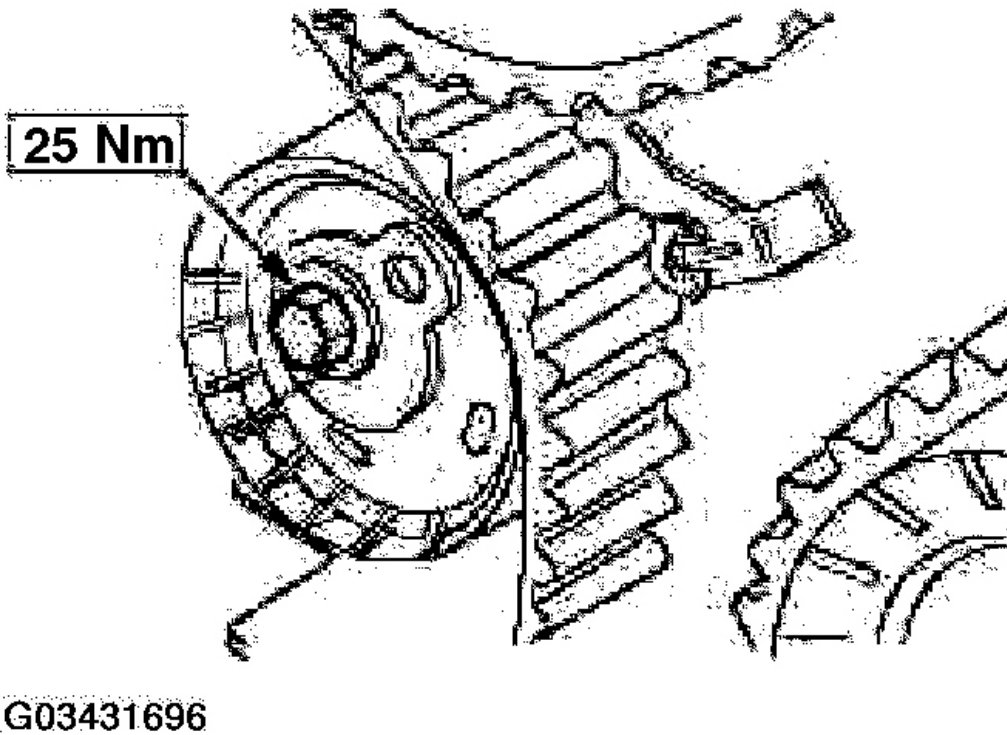
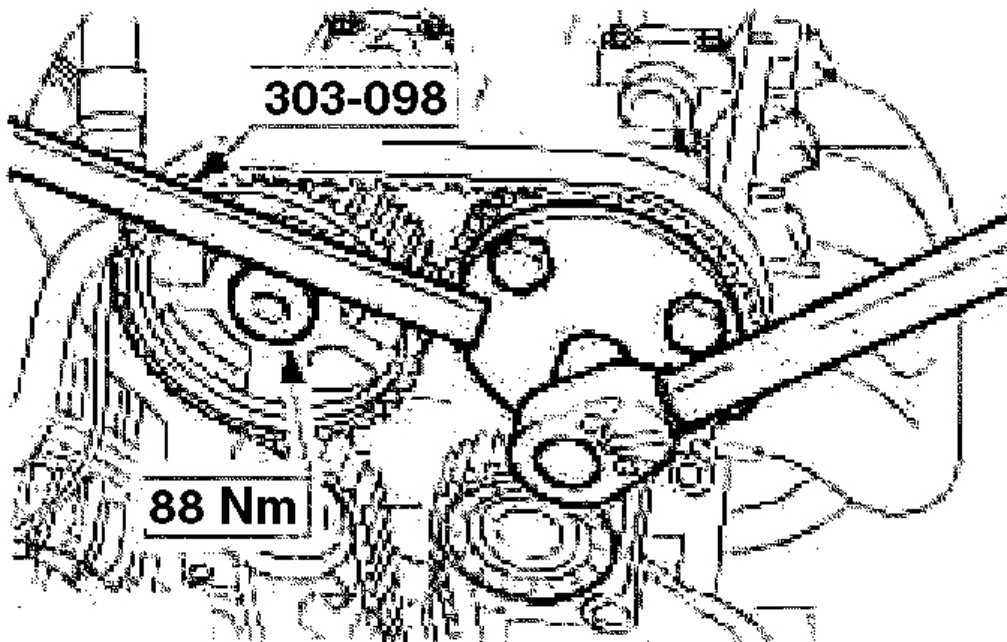


Fig. 91: Tightening Bolt

Courtesy of FORD MOTOR CO.

CAUTION: Do not tighten the camshaft timing pulley bolts against Special Tool 303-465; use Special Tool 303-098 to prevent movement.

NOTE: The crankshaft must remain at TDC on cylinder number 1.



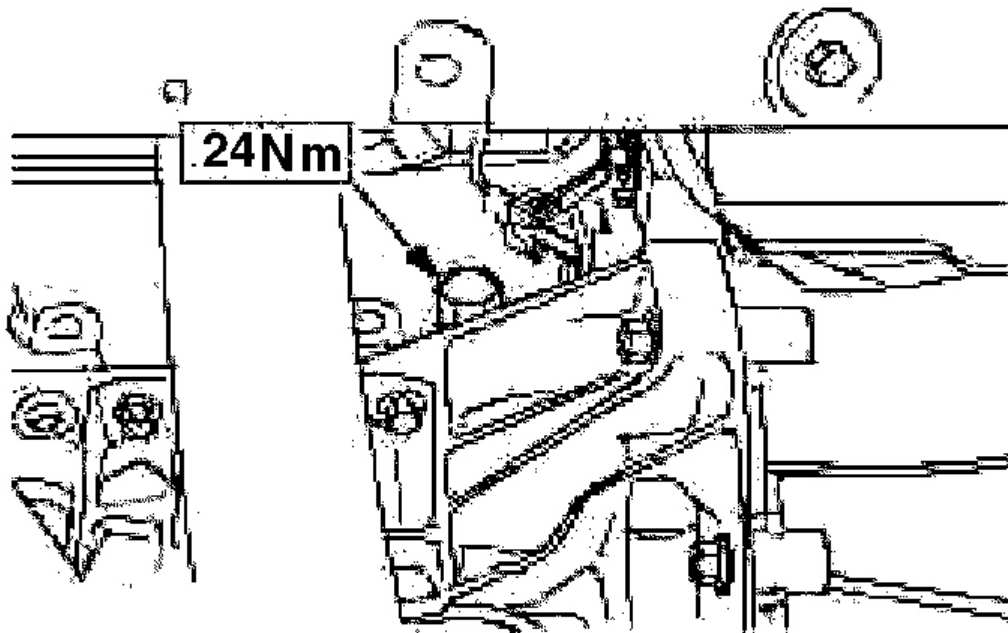
G03431697

Fig. 92: Tightening Camshaft Timing Pulleys Bolts
Courtesy of FORD MOTOR CO.

8. Tighten the bolts of the camshaft timing pulleys.
9. Unscrew and remove Special Tool 303-574.
10. Remove Special Tool 303-465 from the camshafts.

NOTE: Turn the crankshaft two revolutions in the normal direction of rotation.

11. Check the valve timing by inserting the special tool. Correct it if necessary.
 - Screw in Special Tool 303-574 and make sure that the crankshaft is touching it.
 - Insert Special Tool 303-465 into the camshafts; if necessary loosen the timing pulleys and correct the camshaft alignment.
 - Detach the special tools.
12. Screw in and tighten the blanking plug.



G03431698

Fig. 93: Tightening Blanking Plug
Courtesy of FORD MOTOR CO.

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

CAUTION: Push on the spark plug connectors, keeping them in line with the spark plugs.

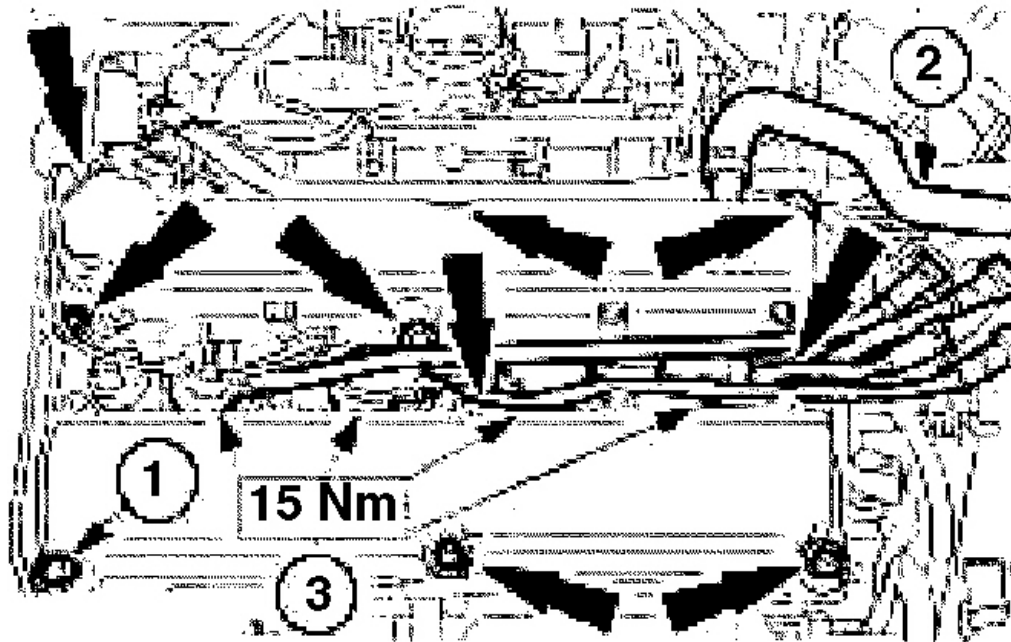
NOTE: Coat the inside of the spark plug connectors with silicone grease to a depth of 5-10 mm.

13. Install the cylinder head cover and spark plugs.

1. Tighten the bolts in two stages.

- Stage 1: 2 N.m
- Stage 2: 7 N.m

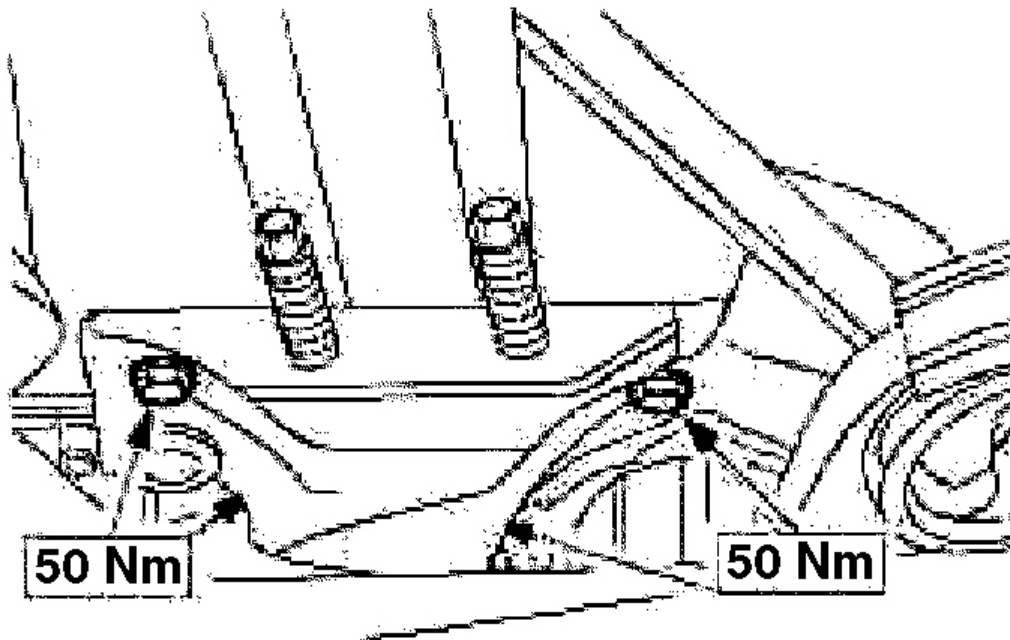
4. Attach the PCV hose.
5. Coat the spark plug thread with Never Seeze, screw in the spark plugs and push in the spark plug connector until it engages.



G03431699

Fig. 94: Installing Spark Plug And Spark Plug Connector
Courtesy of FORD MOTOR CO.

NOTE: Put the upper timing belt cover together with the center timing belt cover in place.

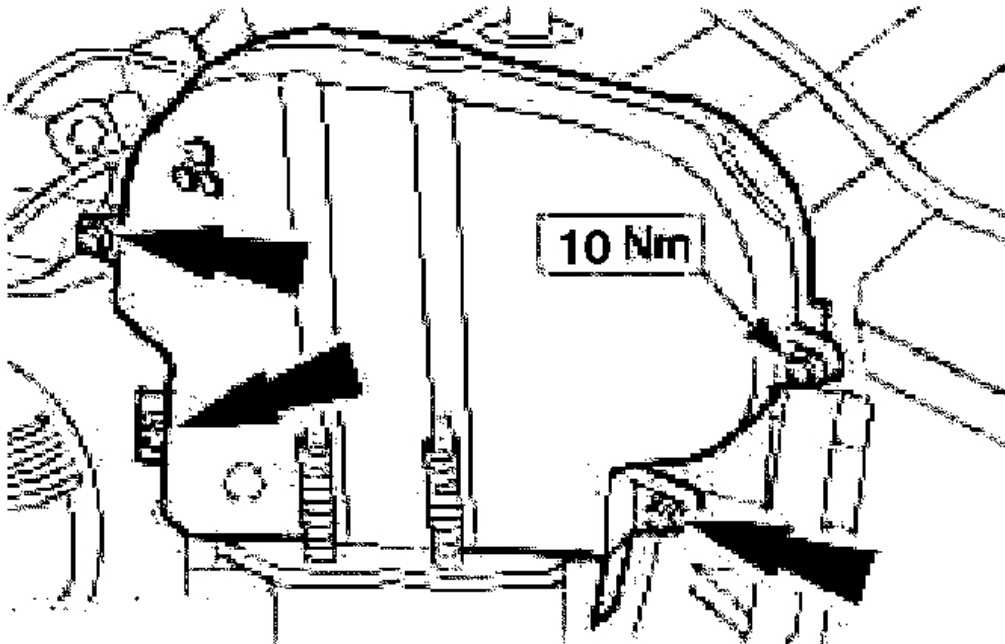


G03431700

Fig. 95: Installing Timing Belt Center Cover/Front Engine Mounting Bracket
Courtesy of FORD MOTOR CO.

14. Attach the timing belt center cover/front engine mounting bracket.

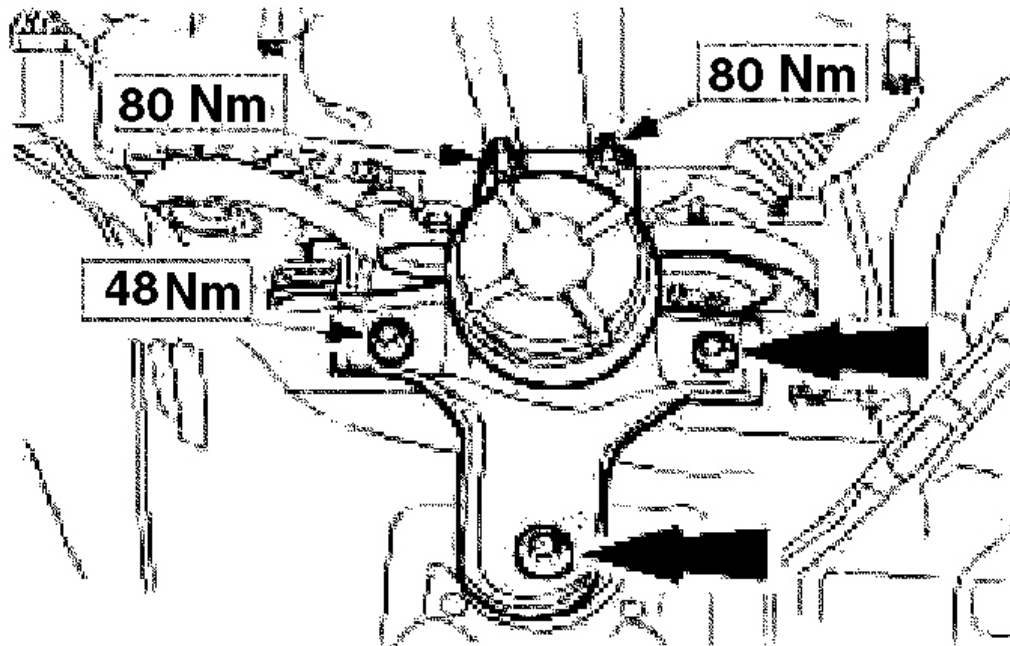
NOTE: Check the seating of the timing belt upper cover gasket and correct it if necessary.



G03431701

Fig. 96: Installing Timing Belt Upper Cover
Courtesy of FORD MOTOR CO.

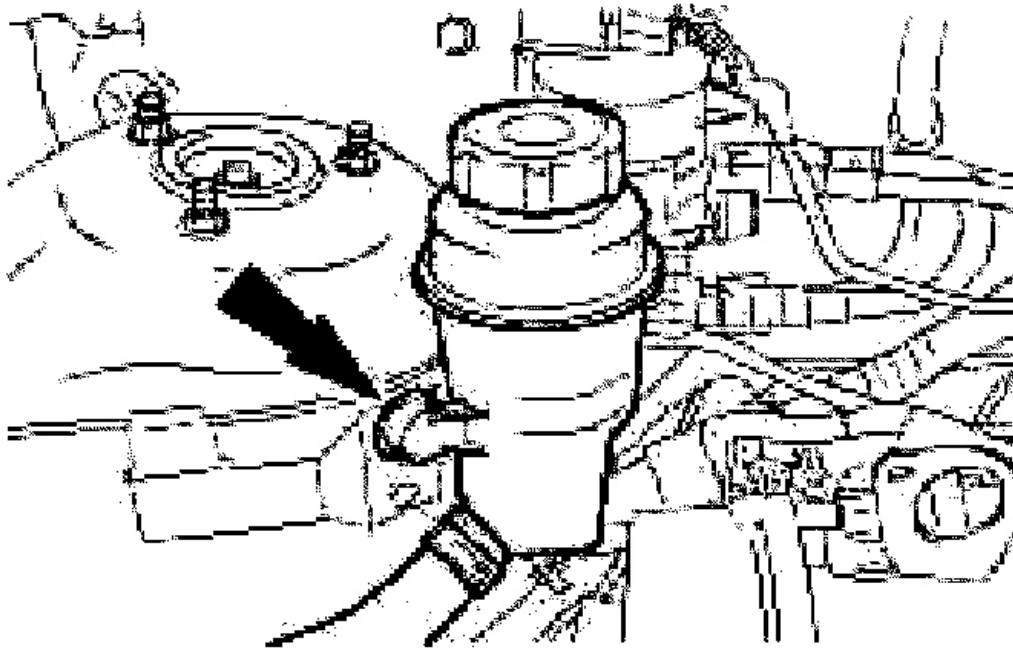
15. Attach the timing belt upper cover.
16. Install the front engine mounting.



G03431702

Fig. 97: Installing Front Engine Mounting
Courtesy of FORD MOTOR CO.

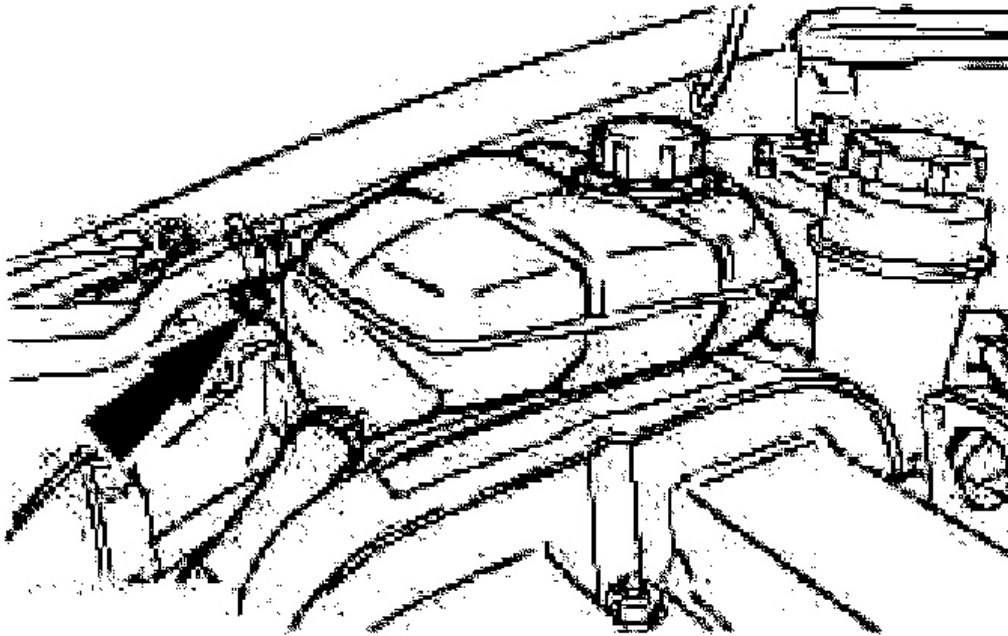
17. Connect the PAS reservoir.



G03431703

Fig. 98: Connecting PAS Reservoir
Courtesy of FORD MOTOR CO.

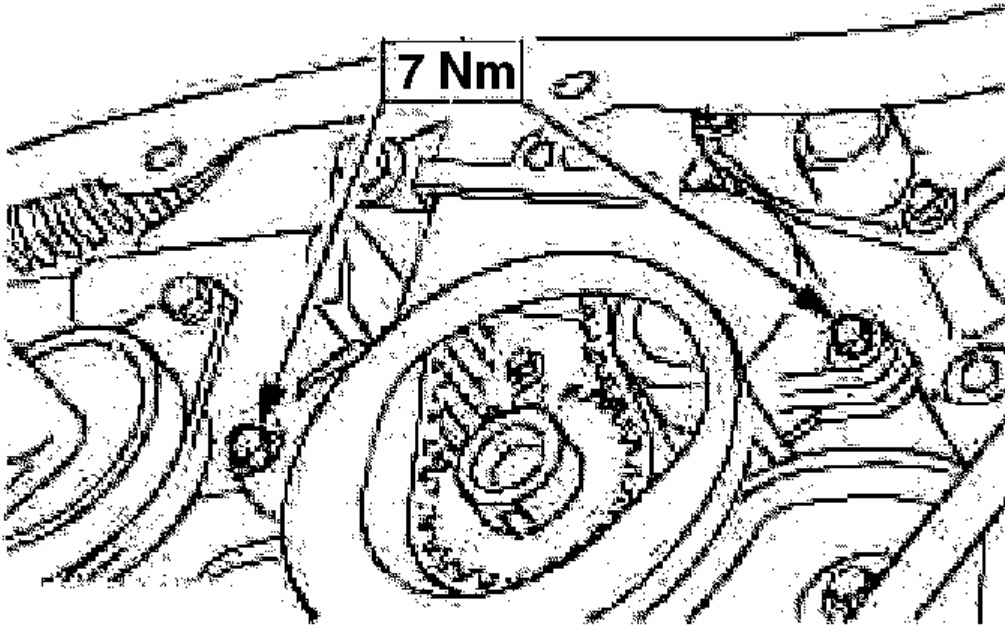
18. Install the coolant expansion tank.



G03431704

Fig. 99: Installing Coolant Expansion Tank
Courtesy of FORD MOTOR CO.

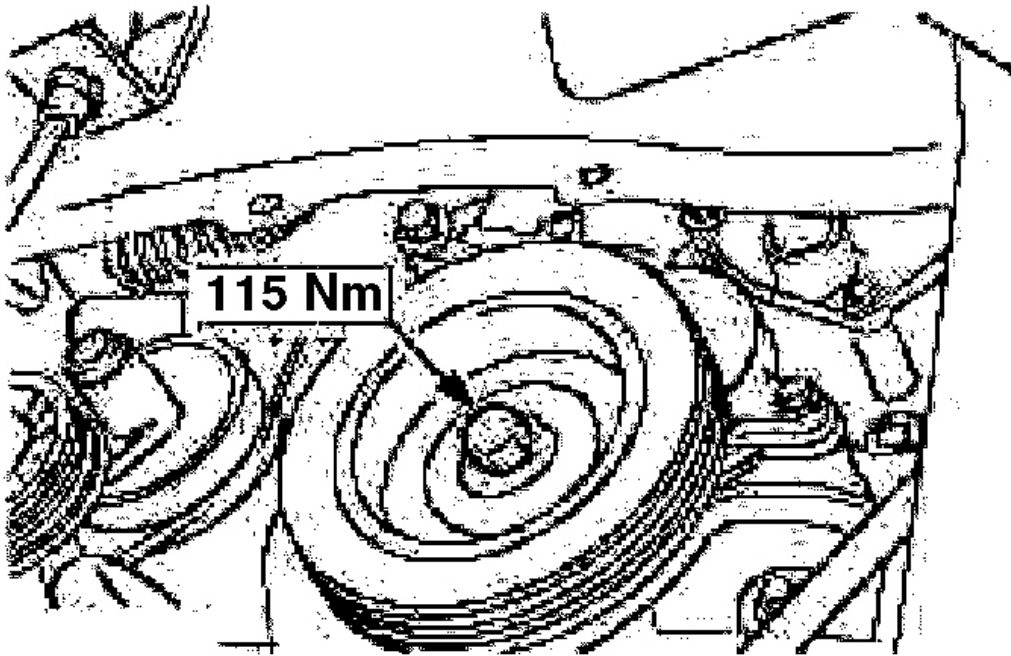
19. Pull the jack out towards the front of the vehicle.
20. Raise and support the vehicle.
21. Attach the lower timing belt cover.



G03431705

Fig. 100: Installing Lower Timing Belt Cover
Courtesy of FORD MOTOR CO.

22. Attach the crankshaft pulley/vibration damper.



G03431706

Fig. 101: Installing Crankshaft Pulley/Vibration Damper
Courtesy of FORD MOTOR CO.

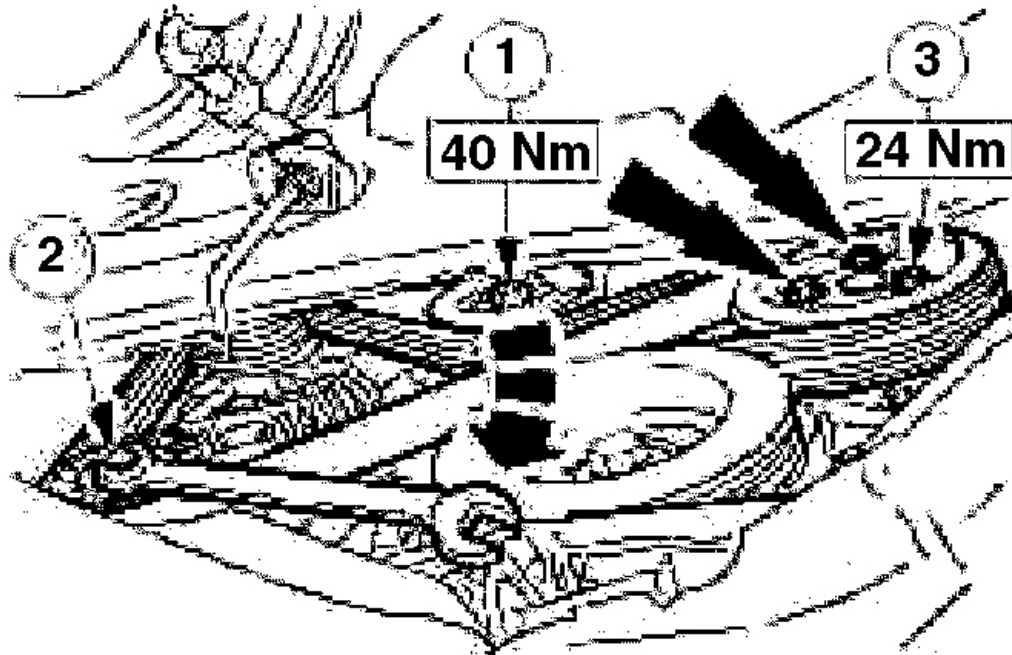
NOTE: Direction of travel on a used drive belt.

23. Install the drive belt.

1. Attach the multi-groove belt idler pulley.

NOTE: Screw in the bolts only until it starts to take up, do not tighten them.

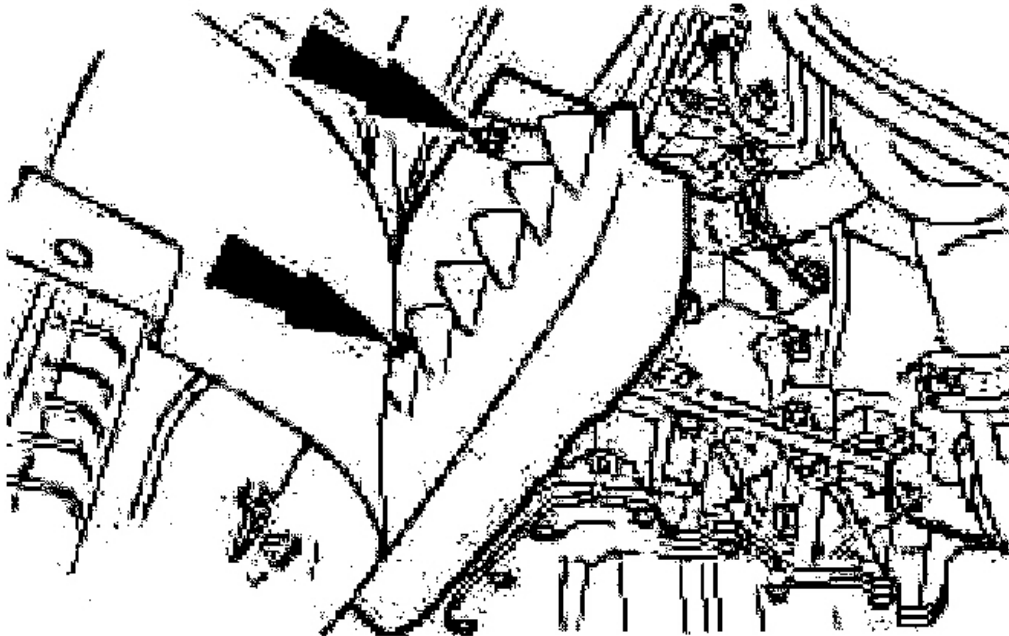
- Attach the coolant pump pulley.
3. Install the drive belt by turning clockwise and tension it.
 4. Tighten the bolts on the coolant pump pulley.



G03431707

Fig. 102: Installing Drive Belt
Courtesy of FORD MOTOR CO.

24. Attach the drive belt cover.



G03431708

Fig. 103: Installing Drive Belt Cover
Courtesy of FORD MOTOR CO.

25. Lower the vehicle.

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.

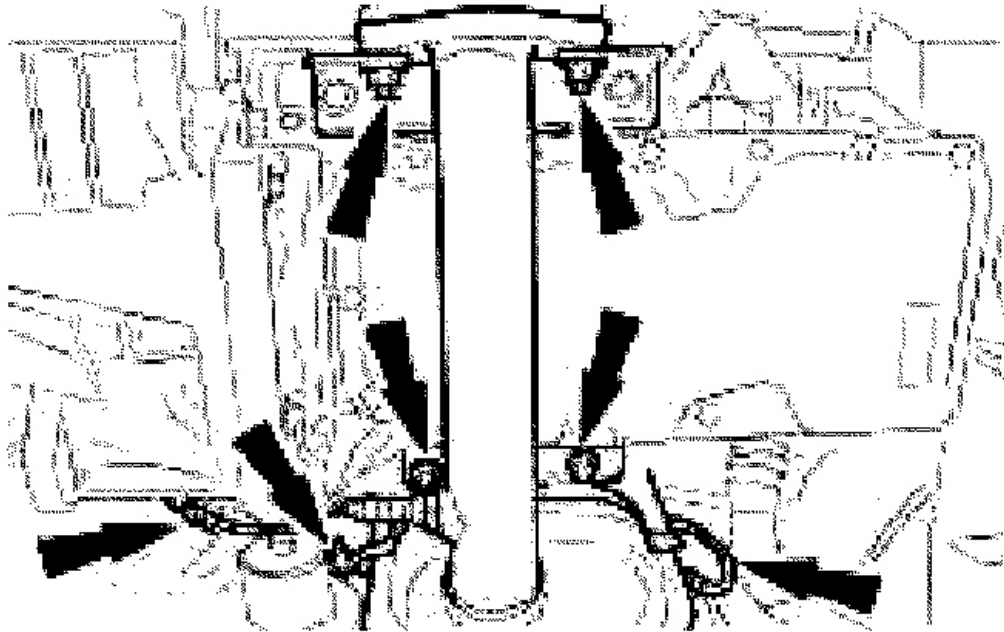
26. Standard finishing operations:

- Connect the battery negative cable.
- Check fluid levels and correct if necessary.
- Check the routing of vacuum hoses and cables and secure them with cable ties.

EXHAUST MANIFOLD

Removal

1. Raise and support the vehicle.
2. Detach the catalyst bracket and disconnect the plugs for the heated oxygen sensor (HO2S).

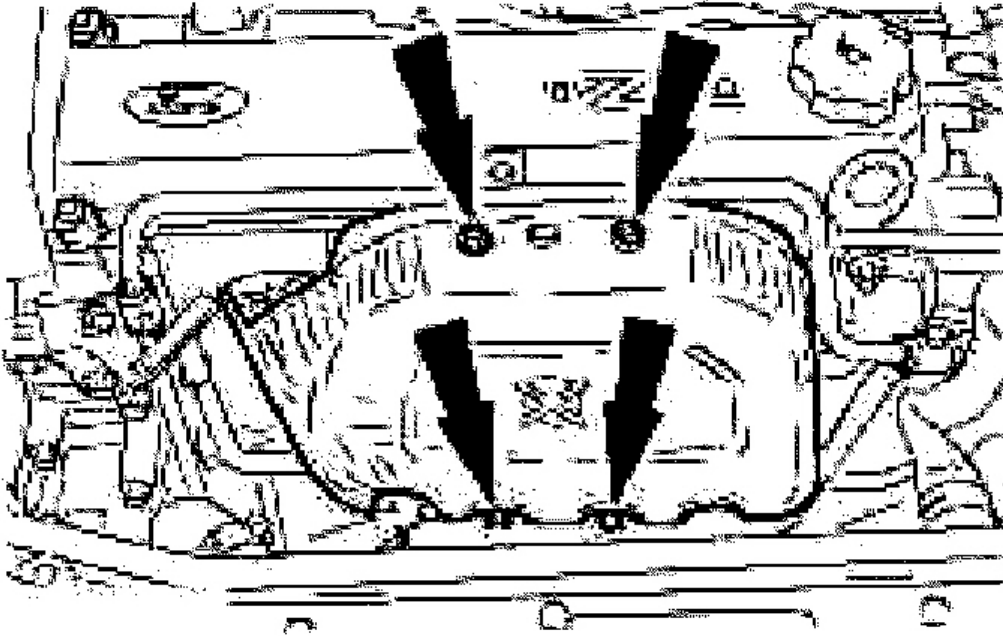


G03431709

Fig. 104: Removing Catalyst Bracket And Disconnecting Plugs For Heated Oxygen Sensor (HO2S)

Courtesy of FORD MOTOR CO.

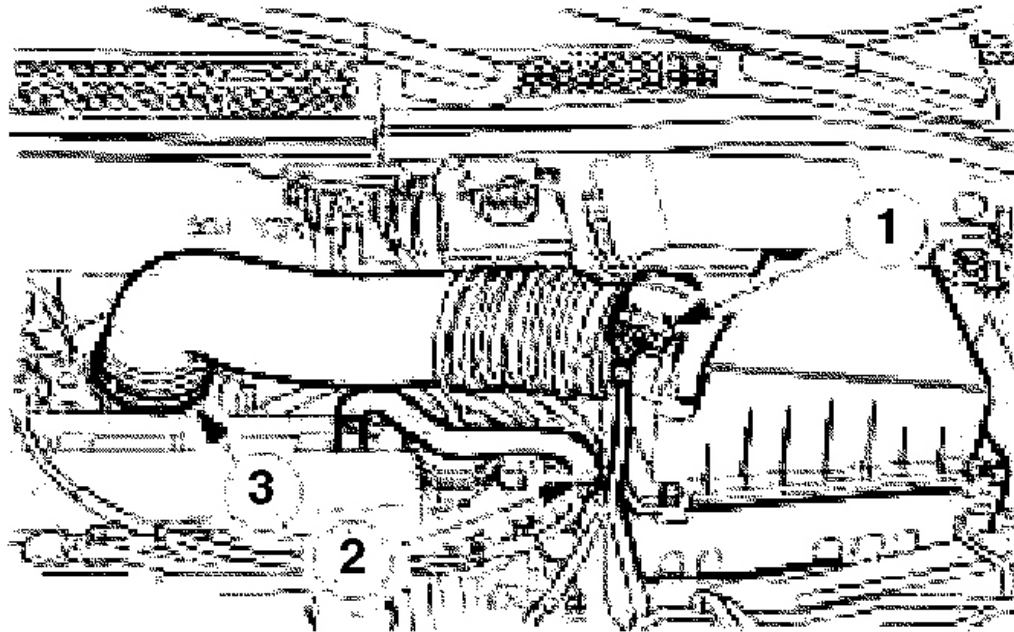
3. Lower the vehicle.
4. Detach the heat shield.



G03431710

Fig. 105: Removing Heat Shield
Courtesy of FORD MOTOR CO.

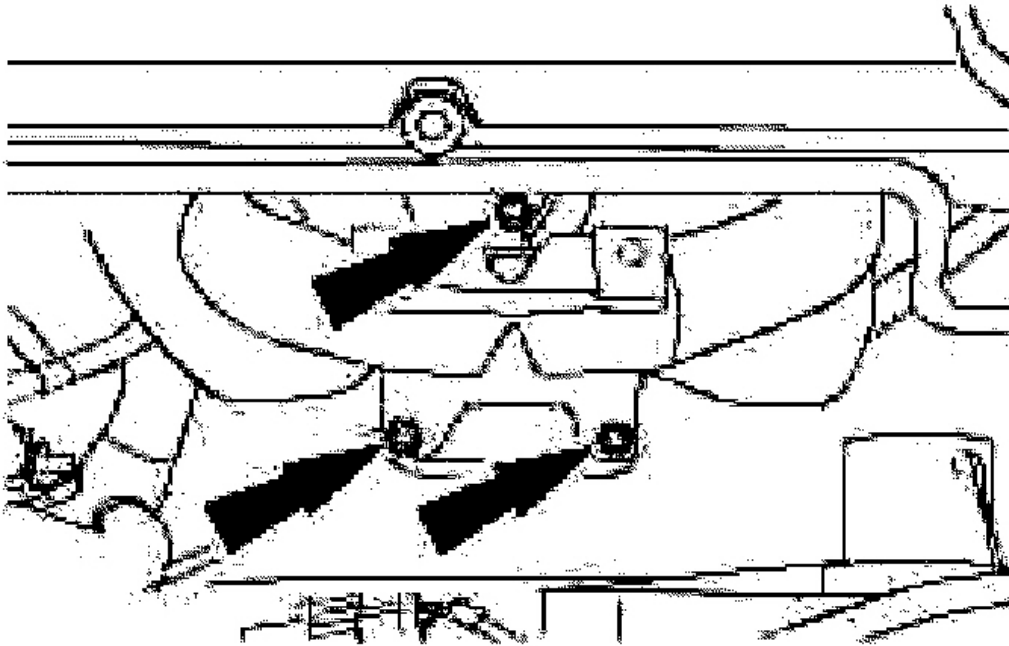
5. Remove the air cleaner housing.
 1. Pull out the plug of the mass air flow (MAF) sensor.
 2. Detach the positive crankcase ventilation (PCV) hose.
 3. Detach the intake hose.
 - Remove the air cleaner housing from the rubber bushings.



G03431711

Fig. 106: Pulling Out Plug Of Mass Air Flow (MAF) Sensor
Courtesy of FORD MOTOR CO.

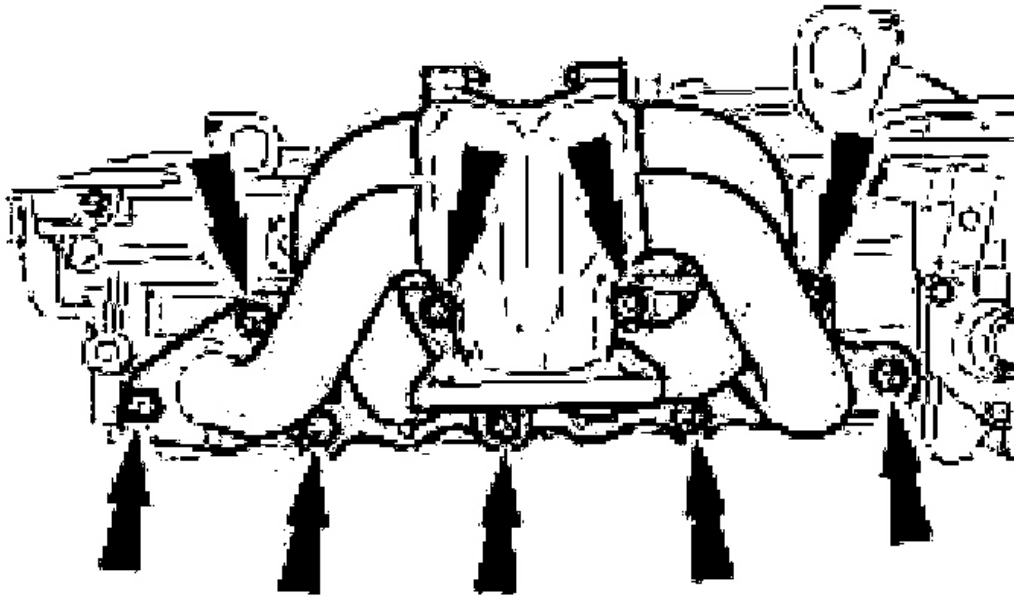
6. Remove and discard the exhaust gas recirculation (EGR) tube.
7. Detach the exhaust manifold from the catalyst.



G03431712

Fig. 107: Removing Exhaust Manifold From Catalyst
Courtesy of FORD MOTOR CO.

8. Detach the exhaust manifold from the cylinder head.

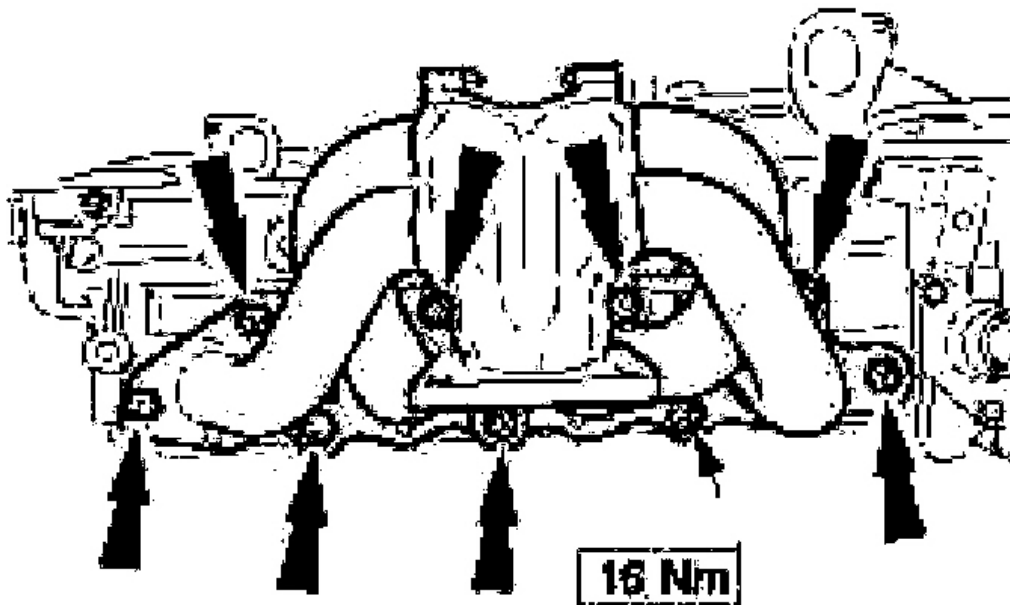


G03431713

Fig. 108: Removing Exhaust Manifold From Cylinder Head
Courtesy of FORD MOTOR CO.

Installation

1. Attach the exhaust manifold to the cylinder head using the alignment spacers with the two outside bolts and a new manifold gasket.



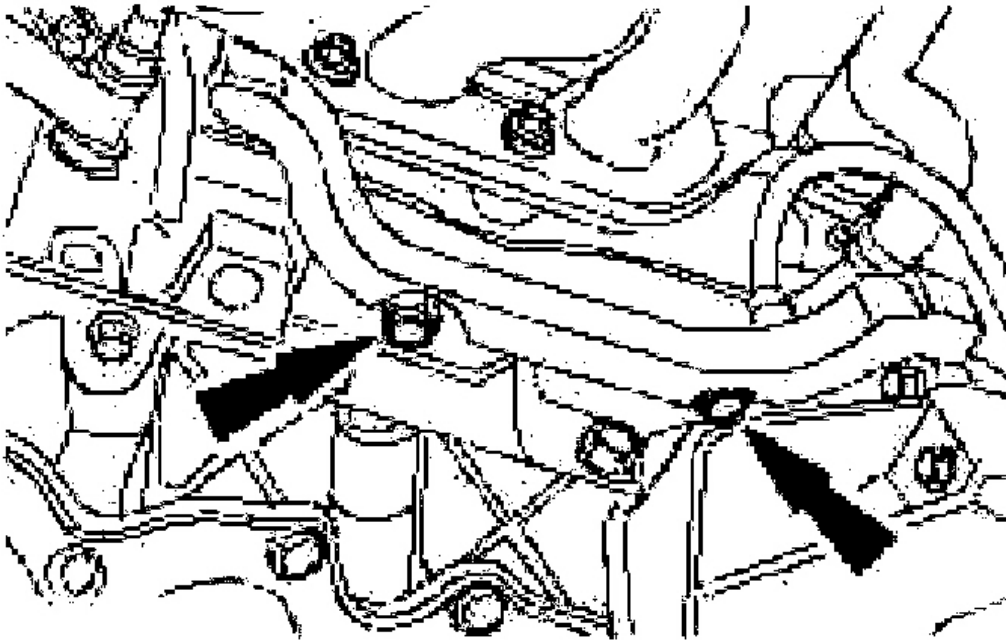
G03431714

Fig. 109: Installing Exhaust Manifold To Cylinder Head
Courtesy of FORD MOTOR CO.

CAUTION: Always follow the correct installation sequence for the catalytic converter in order to prevent damage.

CAUTION: Do not allow debris to fall into the exhaust manifold.

NOTE: Examine the threads in the exhaust catalyst cone and EGR.
Clean as required.



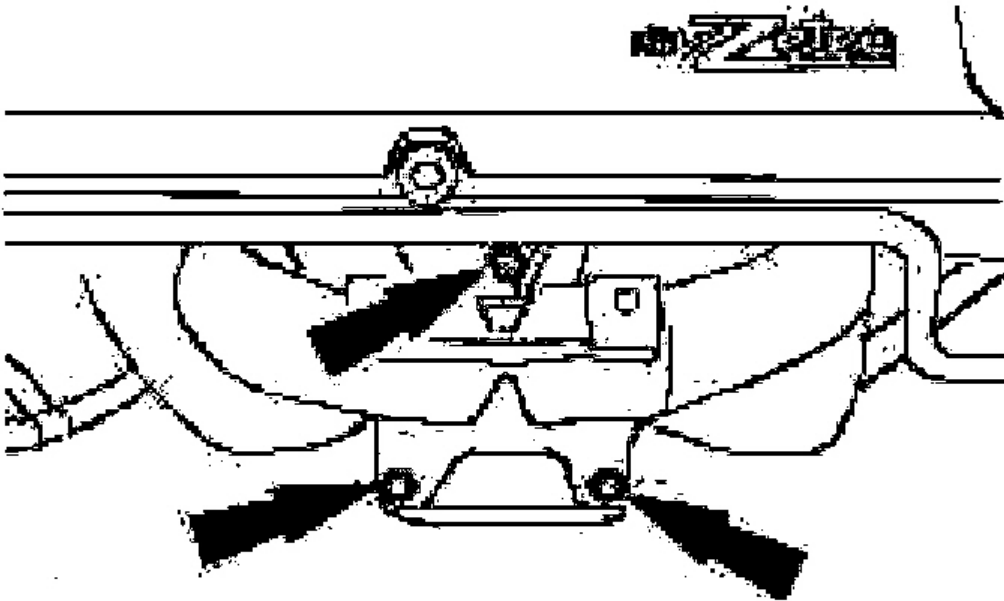
G03431715

Fig. 110: Loosening Bracket Of Catalytic Converter
Courtesy of FORD MOTOR CO.

2. Loosen the bracket for the catalytic converter so that it can move freely.

NOTE: Use a new gasket.

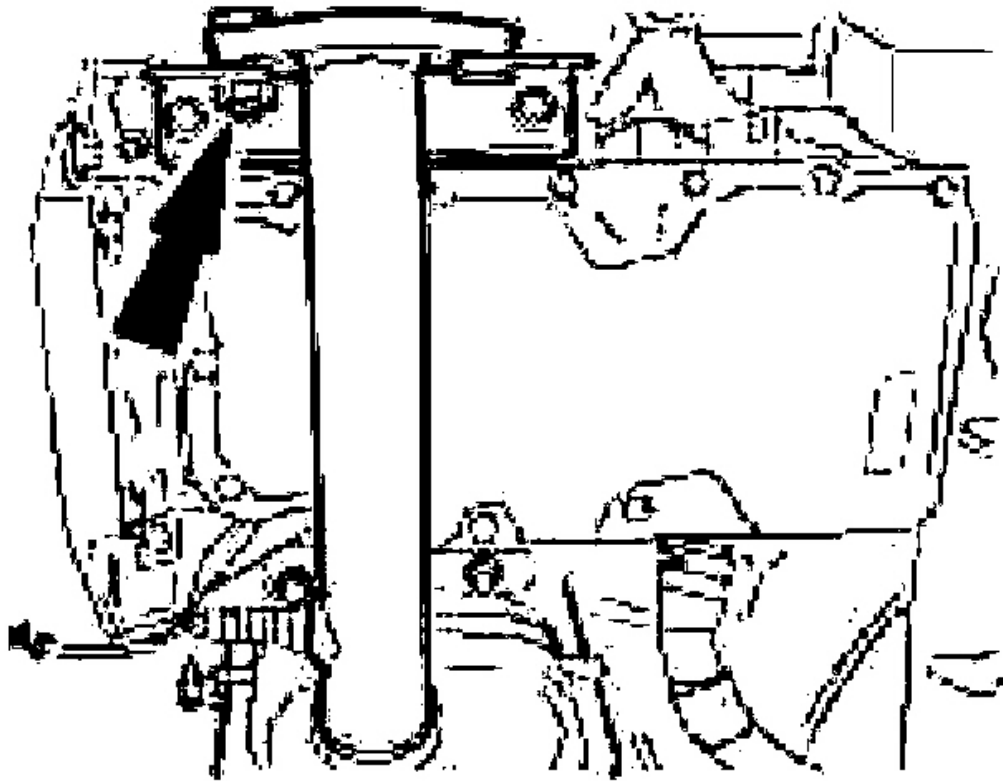
NOTE: Do not fully tighten the nuts/bolts at this stage.



G03431716

Fig. 111: Installing Catalytic Converter On The Exhaust Manifold
Courtesy of FORD MOTOR CO.

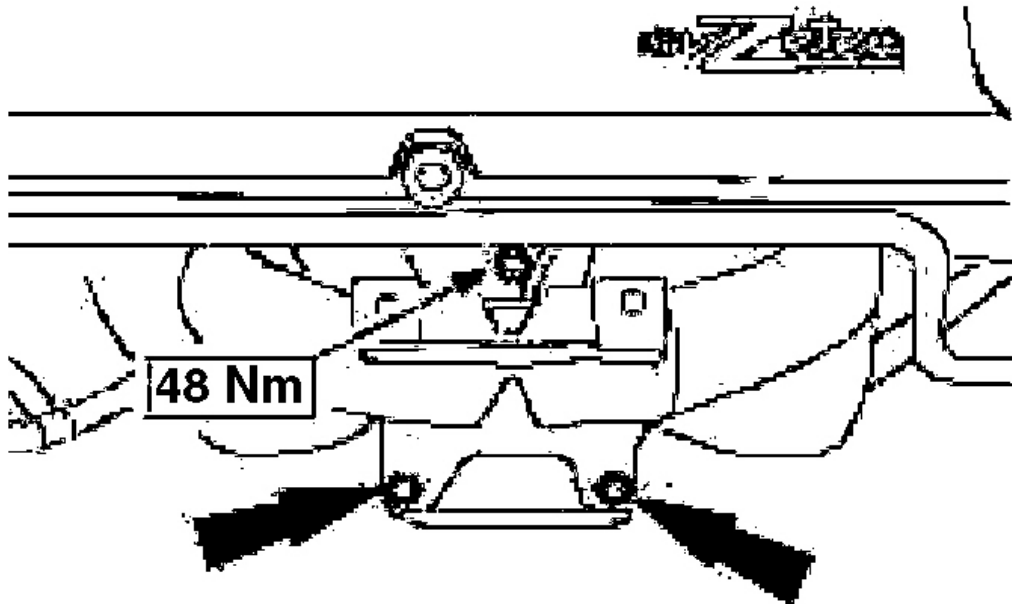
3. Position the catalytic converter on the exhaust manifold using new hardware.
4. Raise and support the vehicle.
5. Using a nut and bolt, temporarily secure the catalytic converter to the bracket at the rear.



G03431717

Fig. 112: Securing Catalytic Converter To Bracket At Rear
Courtesy of FORD MOTOR CO.

6. Tighten the catalytic converter to the exhaust manifold.



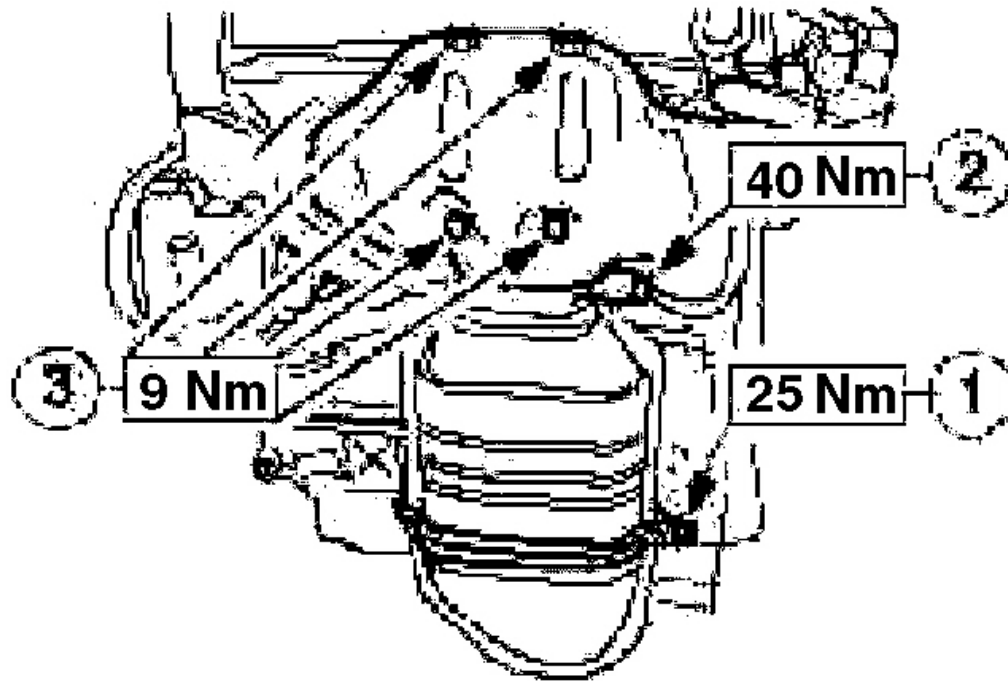
G03431718

Fig. 113: Tightening Catalytic Converter To Exhaust Manifold
Courtesy of FORD MOTOR CO.

NOTE: Always use a new catalyst to EGR valve pipe assembly.

NOTE: Loosely assemble the pipe to both the EGR valve and the exhaust catalyst before tightening the unions.

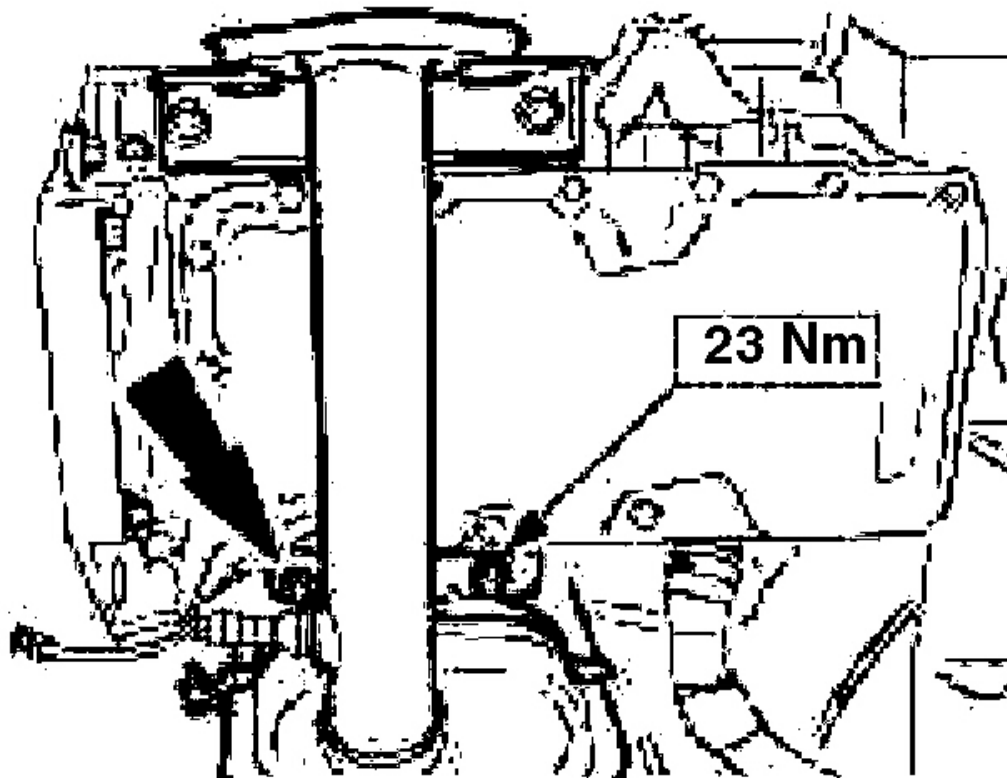
7. Attach the catalytic converter.
 1. Tighten the bolts on the catalytic converter bracket.
 2. Install a new EGR-pipe.
 3. Attach the heat shield.



G03431719

Fig. 114: Installing Heat Shield
Courtesy of FORD MOTOR CO.

8. Attach the bracket for the catalytic converter.
 - Tighten the bolts.
 - Remove the temporary bolt from the rear catalytic converter bracket.



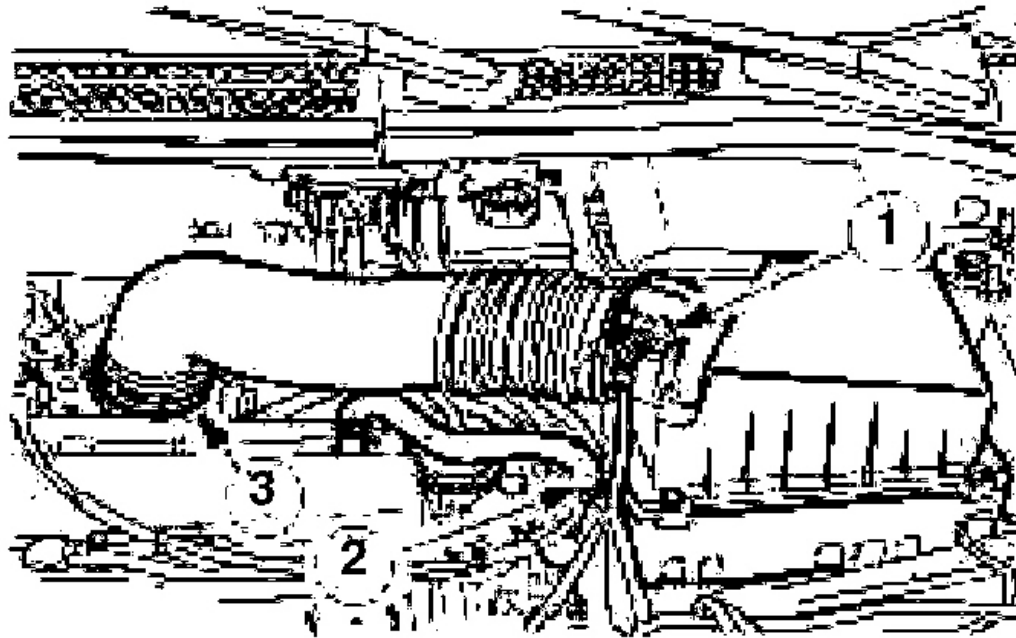
G03431720

Fig. 115: Installing Bracket Of Catalytic Converter
Courtesy of FORD MOTOR CO.

9. Lower the vehicle.
10. Attach the air filter housing.
 - Press the air filter housing into the rubber bushings.
 - 2. Push on the mass air flow (MAF) sensor multiplug.
 - 3. Attach the PCV hose.
 - 4. Attach the intake hose.

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus



G03431721


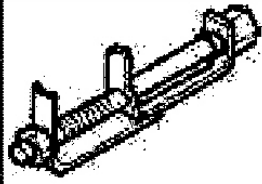
Fig. 116: Connecting Mass Air Flow (MAF) Sensor
Courtesy of FORD MOTOR CO.

CYLINDER HEAD

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

	Installer Camshaft, Oil Seal 303-160 (T81P-6292-A)
	Remover/Installer, Hose Clamp 412-108 (T96P-18539-A)

G03431722

Fig. 117: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

Sealant, camshaft bearing caps	WSK-M2G348-A5
Cable ties	ESD-M97B49-A
Coolant	
Sealant	WS-M4G348-A5
Sealant remover	WSK-M2G348-A4
Engine oil	WSS-M2C153-H
Silicone grease for spark plug connector seal	A960-M1C171-AA

Removal

1. General remarks.

- The positions of the engine mounting and the engine roll restrictor are described looking from the transmission towards the engine.
- If necessary, use Special Tool 412-108 to remove coolant and ventilation hoses.
- Owing to special model variants, some steps do not apply to all vehicles. These are clearly marked in the text.

2. Release the fuel pressure. For additional information, refer to **FUEL SYSTEM**

PRESSURE RELEASE .

CAUTION: Disconnect the battery negative cable.

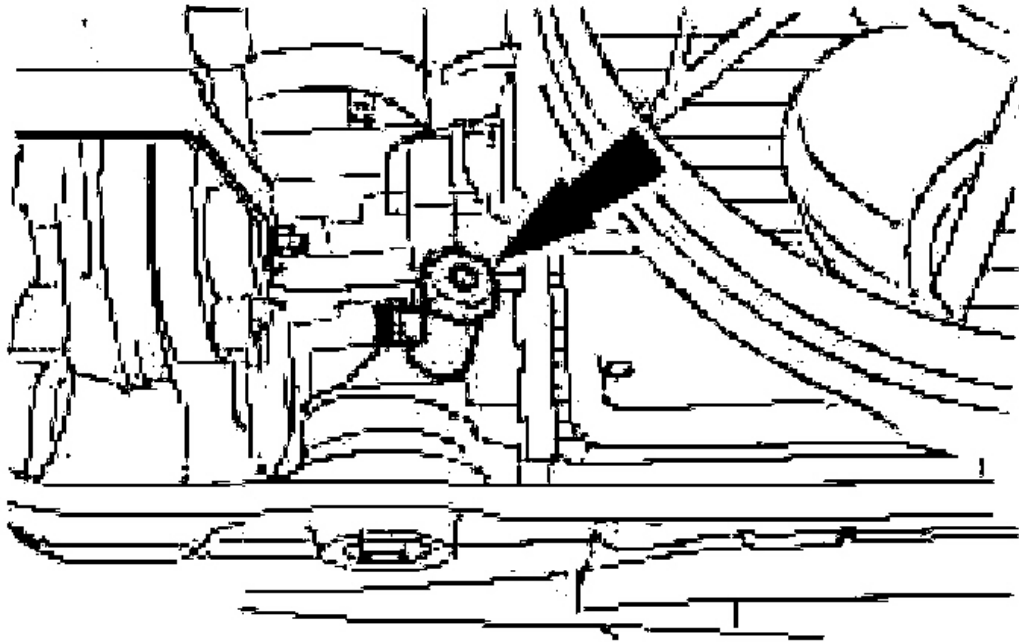
3. If necessary, separate cable ties and install on installation.

WARNING: 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.

4. Open the coolant reservoir.
5. Raise and support the vehicle.

WARNING: Danger of scalding if the engine is warm.

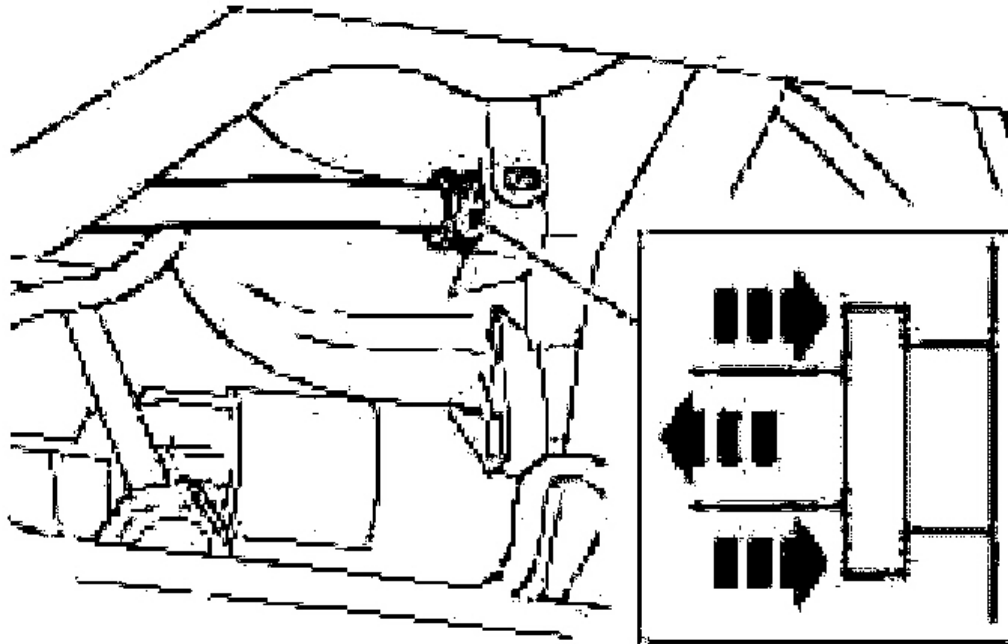
6. Drain the coolant from the radiator.
 - Install the radiator drain plug after draining the coolant.



G03431723

Fig. 118: Installing Radiator Drain Plug
Courtesy of FORD MOTOR CO.

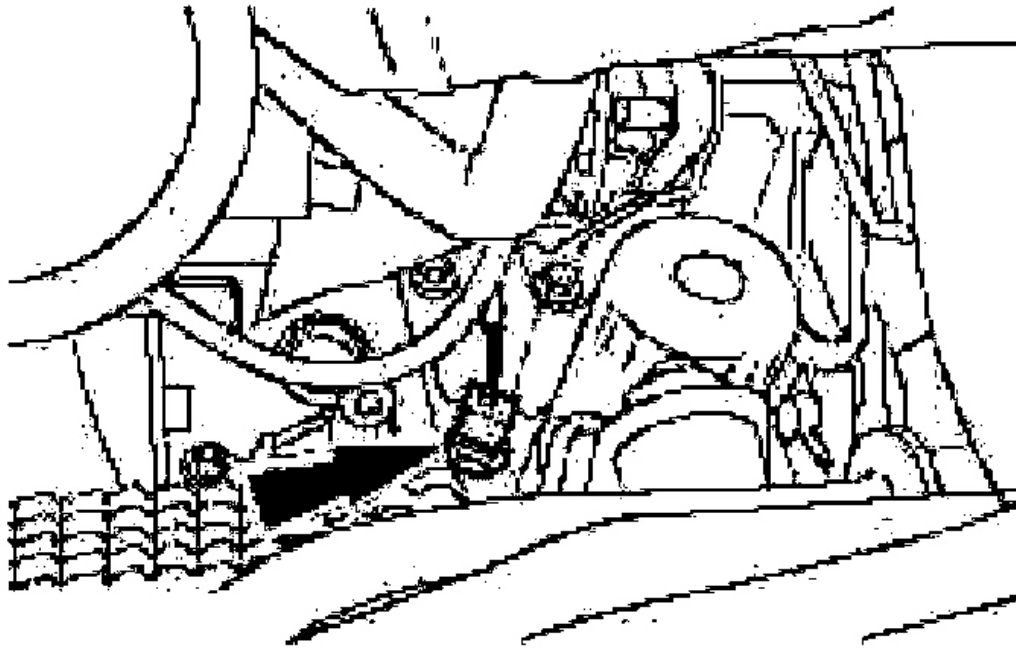
7. Detach the brake booster pipe from the intake manifold.
 - Release the quick release coupling and pull out the brake booster pipe.



G03431724

Fig. 119: Removing Brake Booster Pipe From Intake Manifold
Courtesy of FORD MOTOR CO.

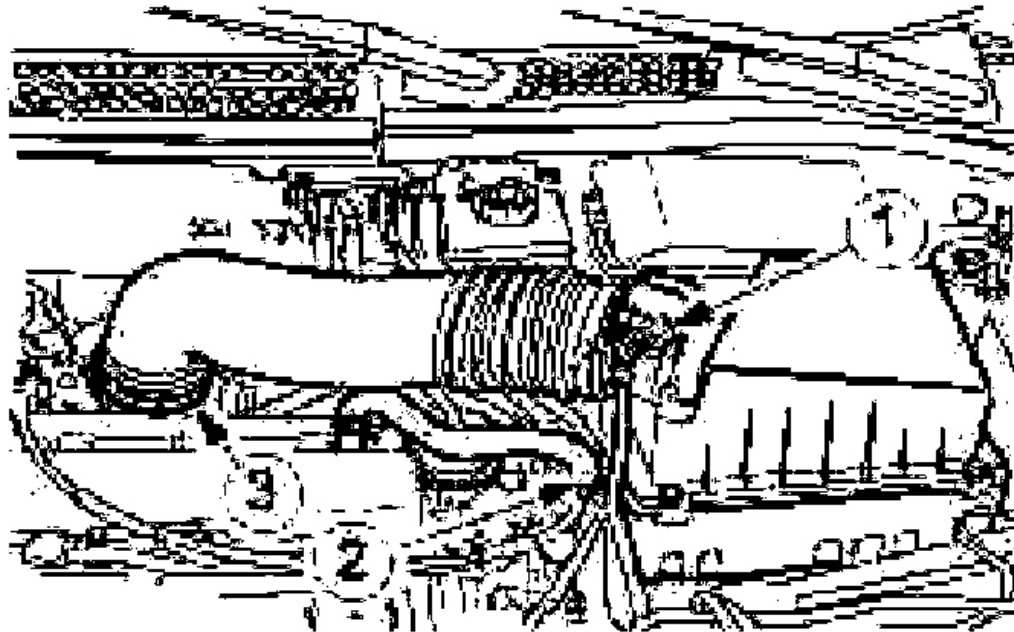
8. Disconnect the oil pressure switch connector.



G03431725

Fig. 120: Disconnecting Oil Pressure Switch Connector
Courtesy of FORD MOTOR CO.

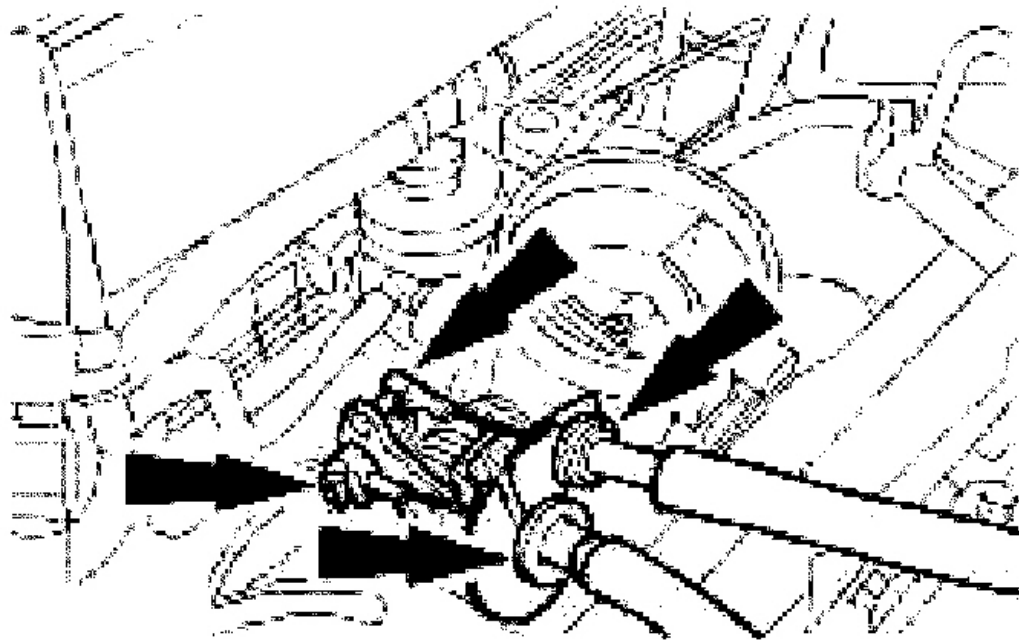
9. Lower the vehicle.
10. Remove the air cleaner housing.
 1. Pull out the plug of the mass air flow (MAF) sensor.
 2. Detach the PCV hose.
 3. Detach the intake hose.
 - Remove the air cleaner housing from the rubber bushings.



G03431726

Fig. 121: Pulling Out Plug Of Mass Air Flow (MAF) Sensor
Courtesy of FORD MOTOR CO.

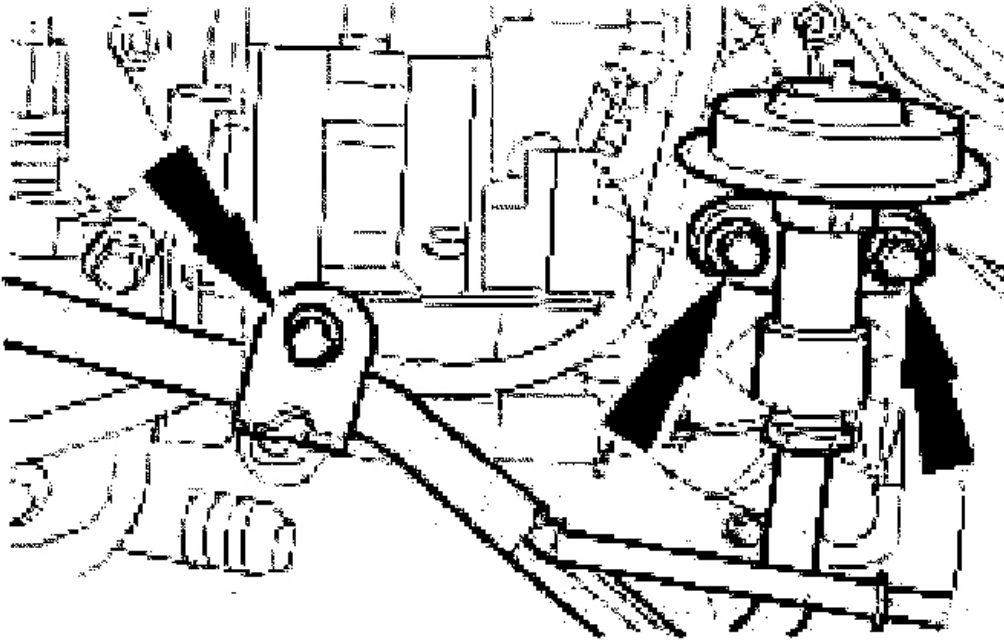
11. Detach the accelerator cable and the speed control cable (if equipped).
 1. Unhook the cable.
 2. Pull off the plastic clip and lay the accelerator cable to one side.



G03431727

Fig. 122: Removing Accelerator Cable And Speed Control Cable
Courtesy of FORD MOTOR CO.

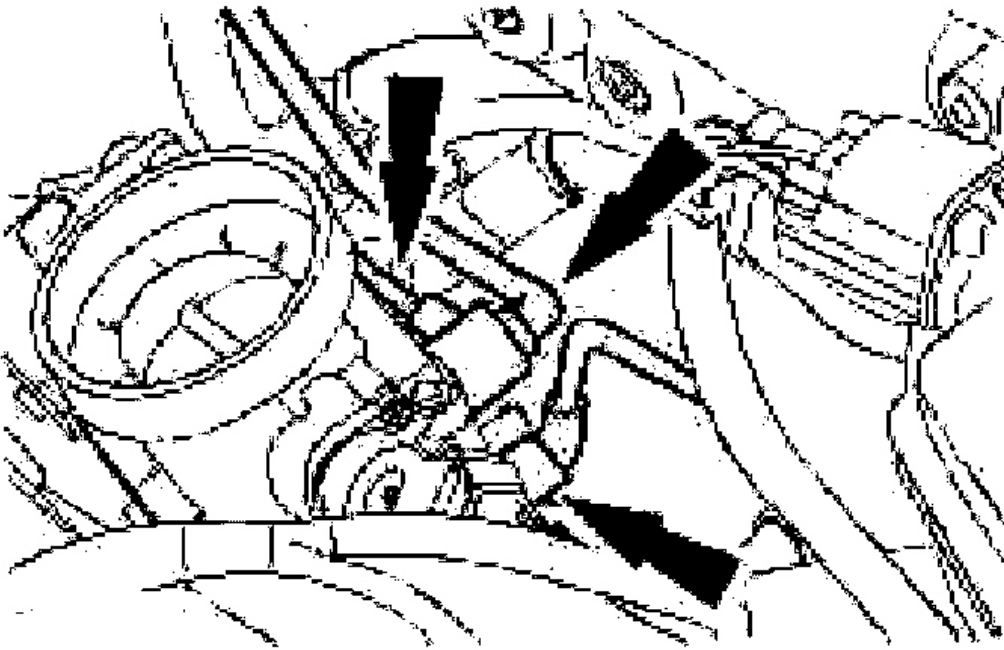
12. Detach the EGR valve and EGR pipe bracket.



G03431728

Fig. 123: Removing EGR Valve And EGR Pipe Bracket
Courtesy of FORD MOTOR CO.

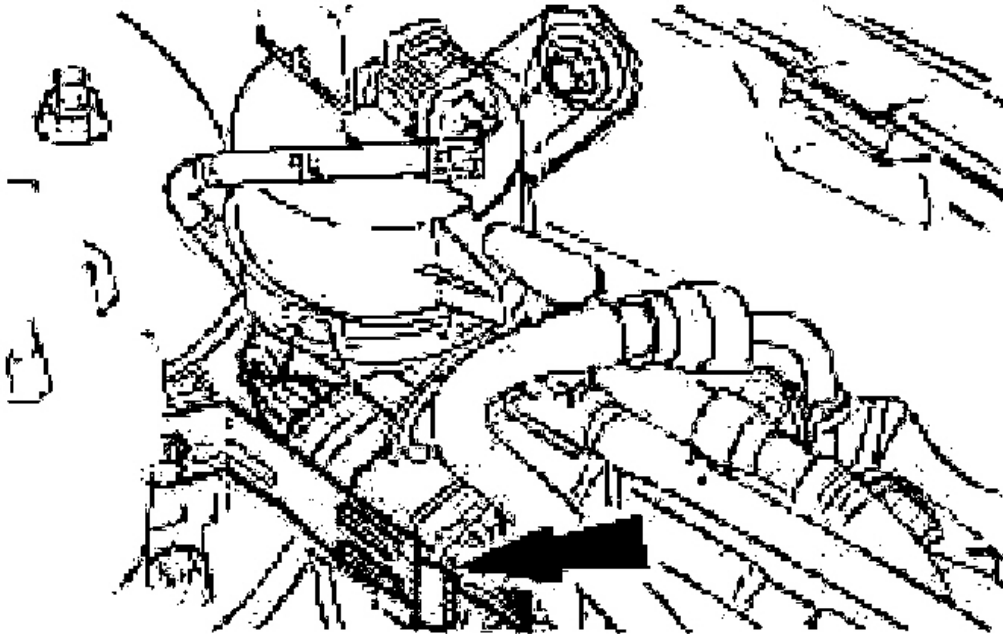
13. Pull off the vacuum hoses.



G03431729

Fig. 124: Pulling Off Vacuum Hoses
Courtesy of FORD MOTOR CO.

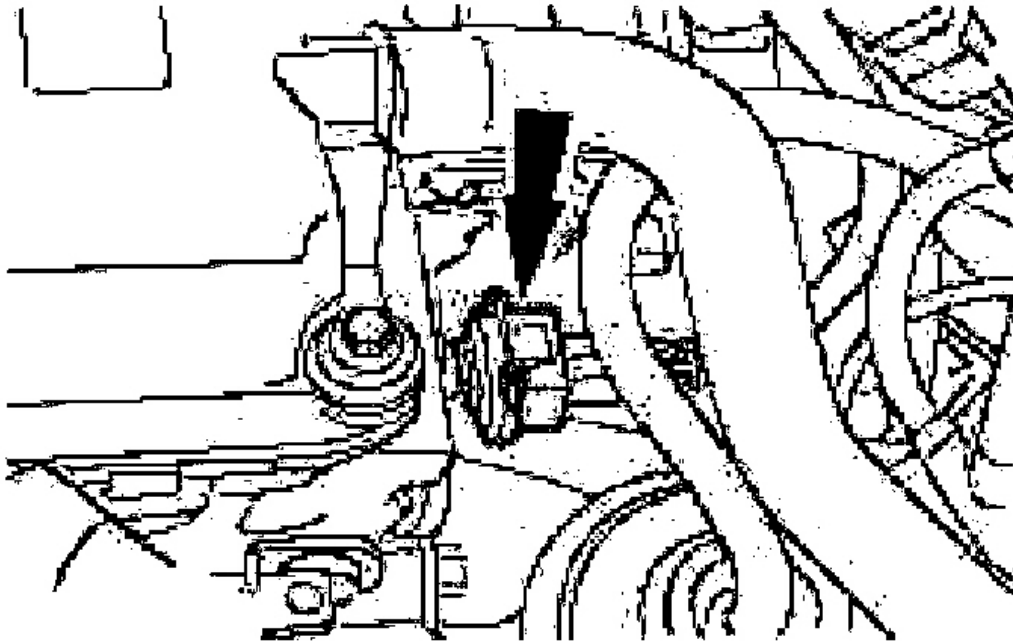
14. Disconnect the fuel injector wiring.



G03431730

Fig. 125: Disconnecting Fuel Injector Wiring
Courtesy of FORD MOTOR CO.

15. Disconnect the camshaft position (CMP) sensor.

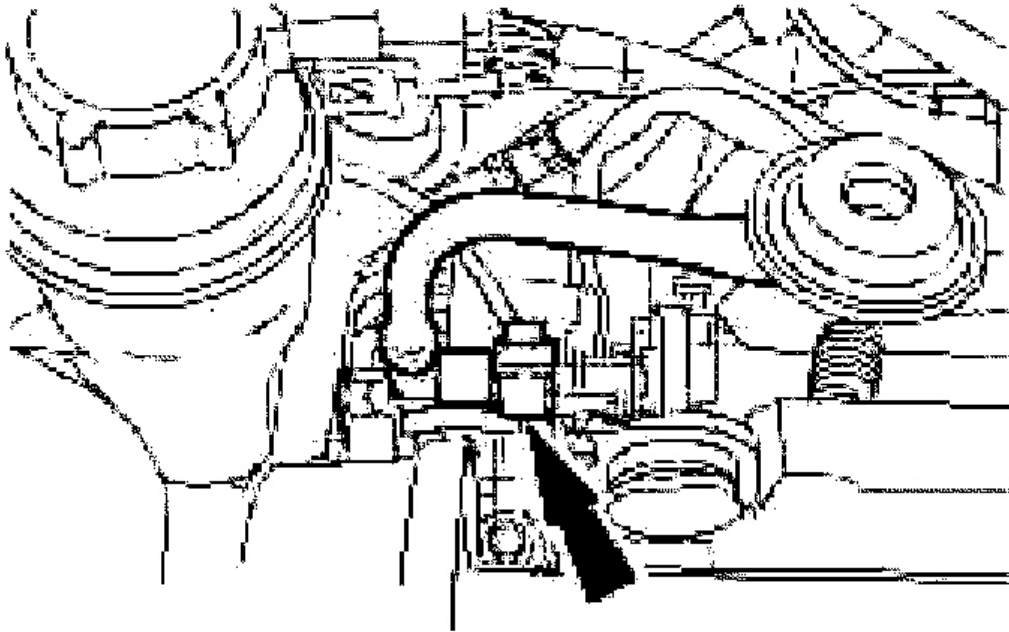


G03431731

Fig. 126: Disconnecting Camshaft Position (CMP) Sensor
Courtesy of FORD MOTOR CO.

WARNING: Escaping fuel. Observe the safety regulations for working with fuel.

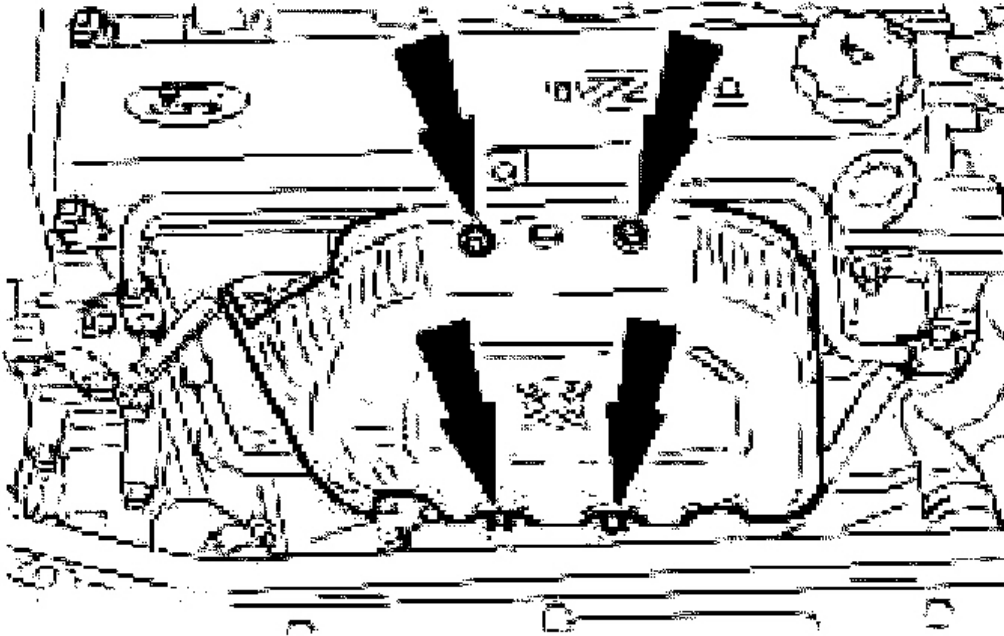
16. Detach the fuel lines.
 - Detach the ground cable.



G03431732

Fig. 127: Detaching Ground Cable
Courtesy of FORD MOTOR CO.

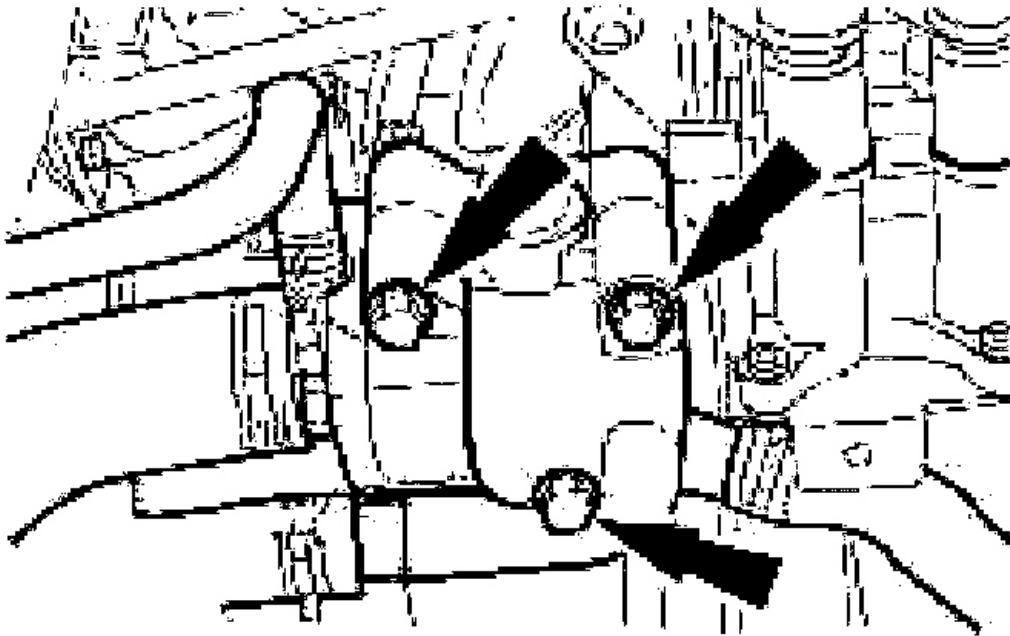
17. Detach the heat shield.



G03431733

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

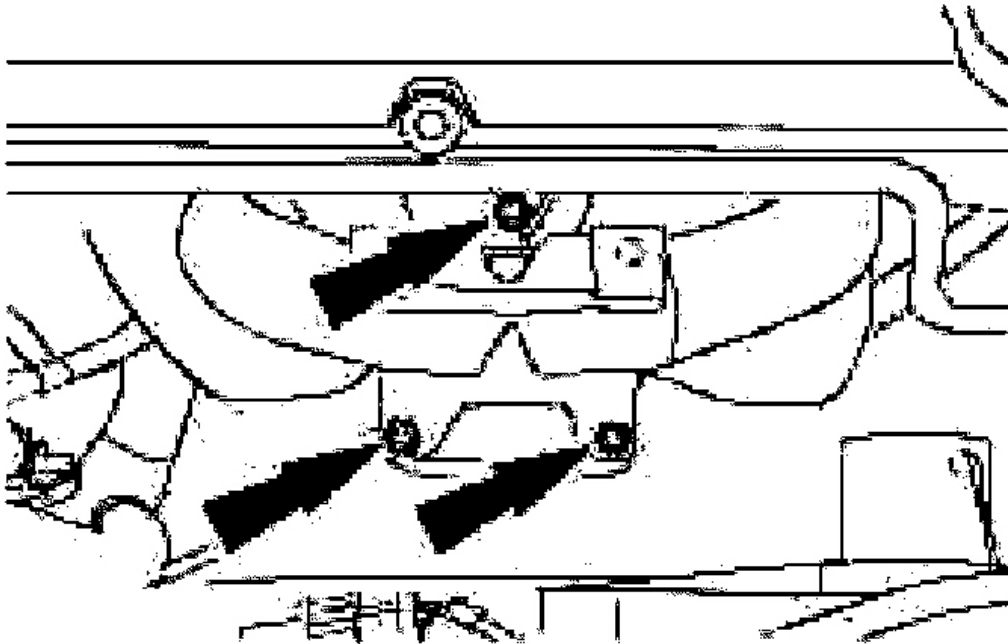
18. Detach the thermostat housing.



G03431734

Fig. 129: Removing Thermostat Housing
Courtesy of FORD MOTOR CO.

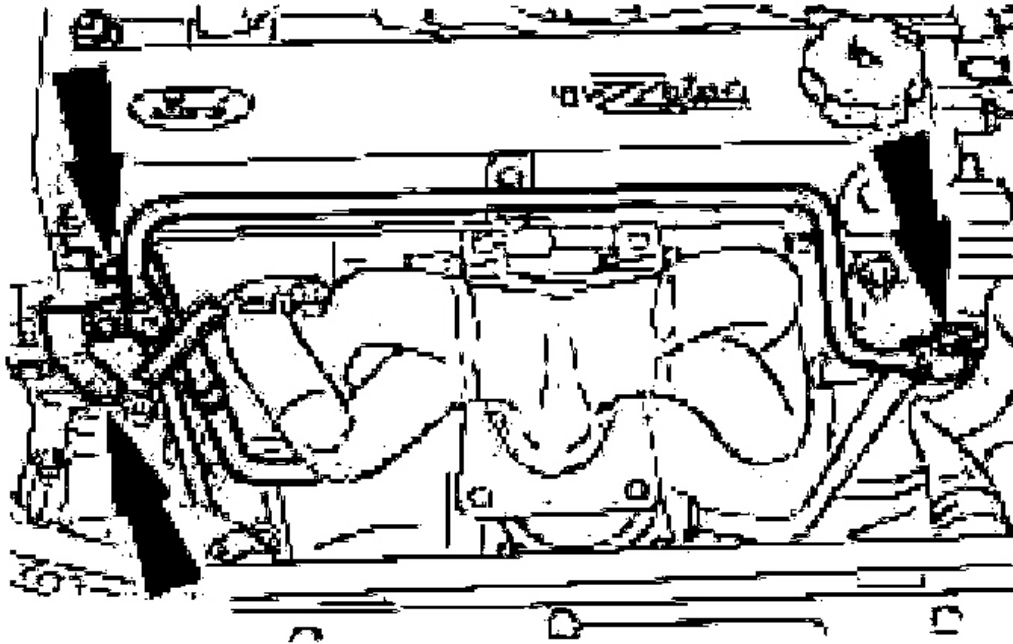
19. Detach the catalytic converter from the exhaust manifold.



G03431735

Fig. 130: Removing Catalytic Converter From Exhaust Manifold
Courtesy of FORD MOTOR CO.

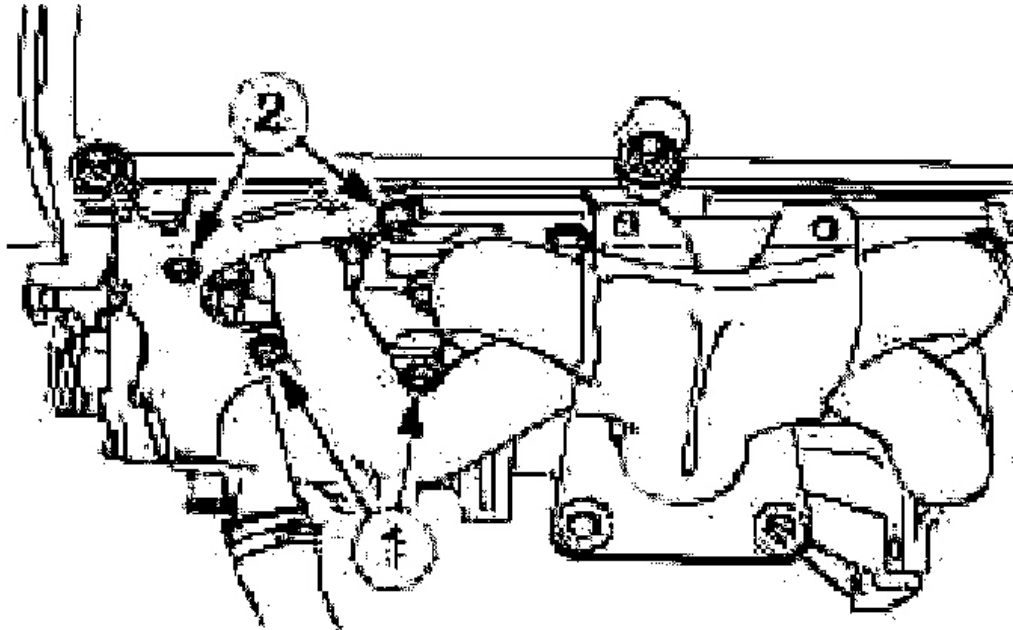
20. Detach the power steering pipe bracket and the oil level indicator tube.



G03431736

Fig. 131: Removing Power Steering Pipe Bracket And Oil Level Indicator Tube
Courtesy of FORD MOTOR CO.

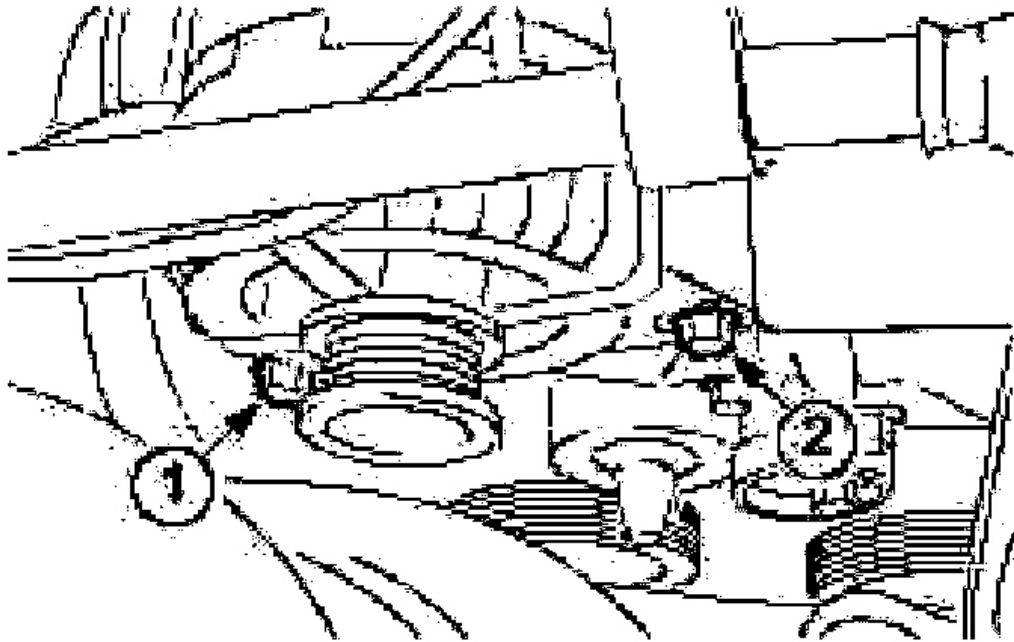
21. Detach the bracket from the power steering pump.
 1. Remove the lower studs.
 2. Remove the upper bolts.



G03431737

Fig. 132: Detaching Bracket From Power Steering Pump
Courtesy of FORD MOTOR CO.

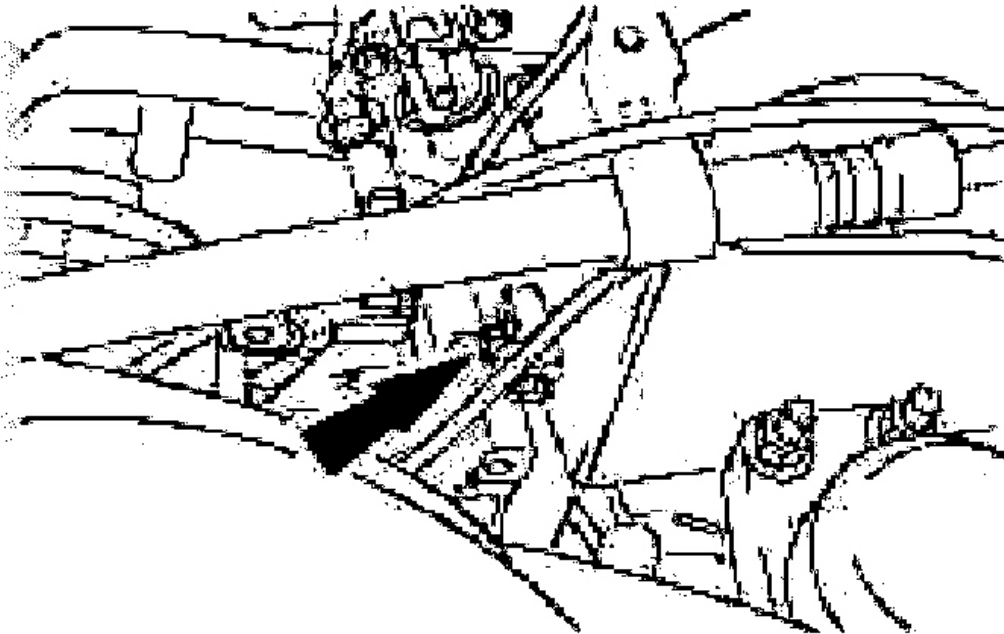
22. Detach the generator.
 1. Loosen the bolt.
 2. Remove the bolt.



G03431738

Fig. 133: Removing Generator
Courtesy of FORD MOTOR CO.

23. Unscrew the upper bolt from the generator bracket.



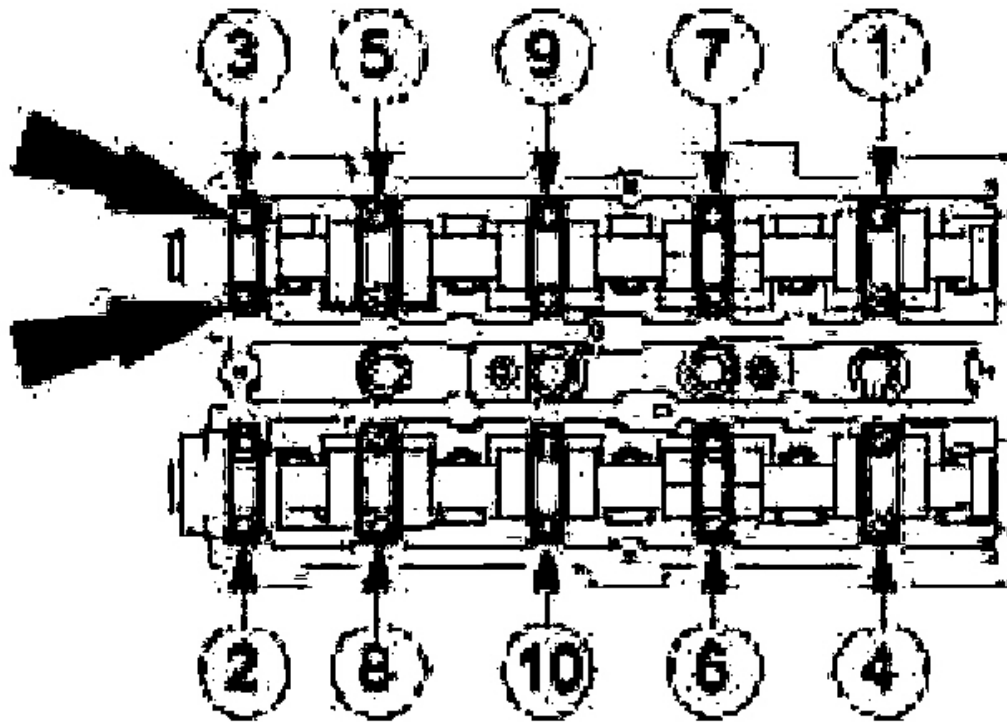
G03431739

Fig. 134: Removing Upper Bolt From Generator Bracket
Courtesy of FORD MOTOR CO.

24. Remove the timing belt. For additional information, refer to **TIMING BELT** .

NOTE: **Loosening sequence.**

25. Unscrew the bolts of the camshaft bearing caps evenly in several stages two turns at a time.
- Remove the oil seals.
 - Remove the camshafts.
 - Remove the tappets and keep them in order.



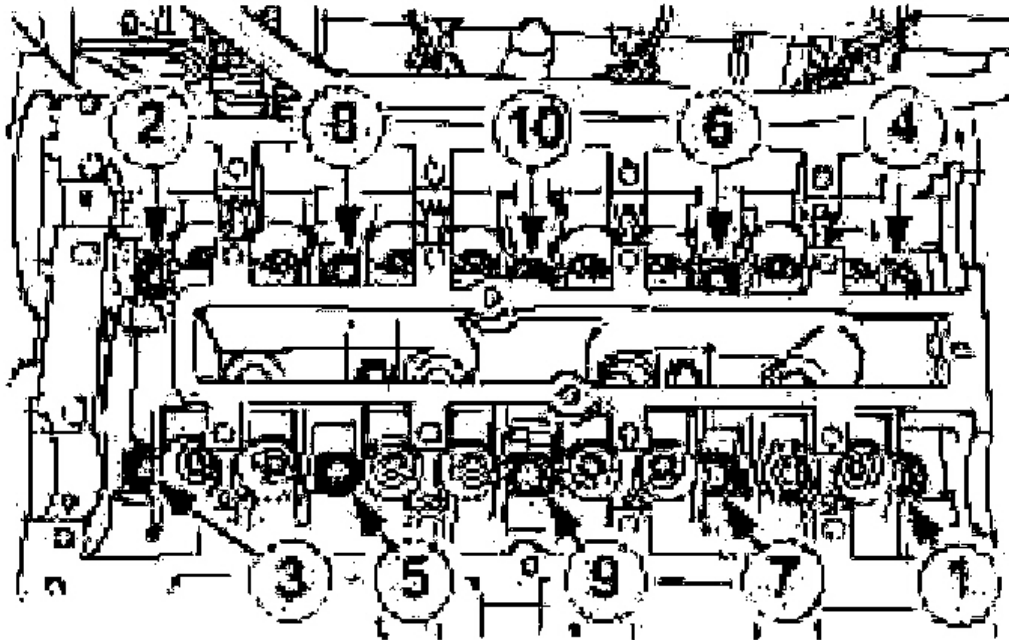
G03431740

Fig. 135: Identifying Loosening Sequence Of Camshaft Bearing Caps Bolts
Courtesy of FORD MOTOR CO.

CAUTION: Mark the bolts to be reused with one or two punch marks.
Bolts can be reused twice. Discard bolts as necessary.

CAUTION: The cylinder head must be cooled to ambient
temperature.

NOTE: Loosening sequence.



G03431741

Fig. 136: Identifying Loosening Sequence Of Cylinder Head Bolts
Courtesy of FORD MOTOR CO.

26. Remove the cylinder head bolts.
27. Remove the cylinder head.

Installation

1. General remarks.
 - If necessary, use Special Tool 412-108 to install coolant and ventilation hoses.
2. Preparatory operations

CAUTION: Do not damage the cylinder liner surfaces. Remove carbon deposits from the top edge of the cylinder.

- Remove gasket residue with seal remover and a spatula.
- Thoroughly clean the threaded holes of the cylinder head bolts.

3. Check the cylinder head deformation. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION .
4. Make up two locating studs as shown.

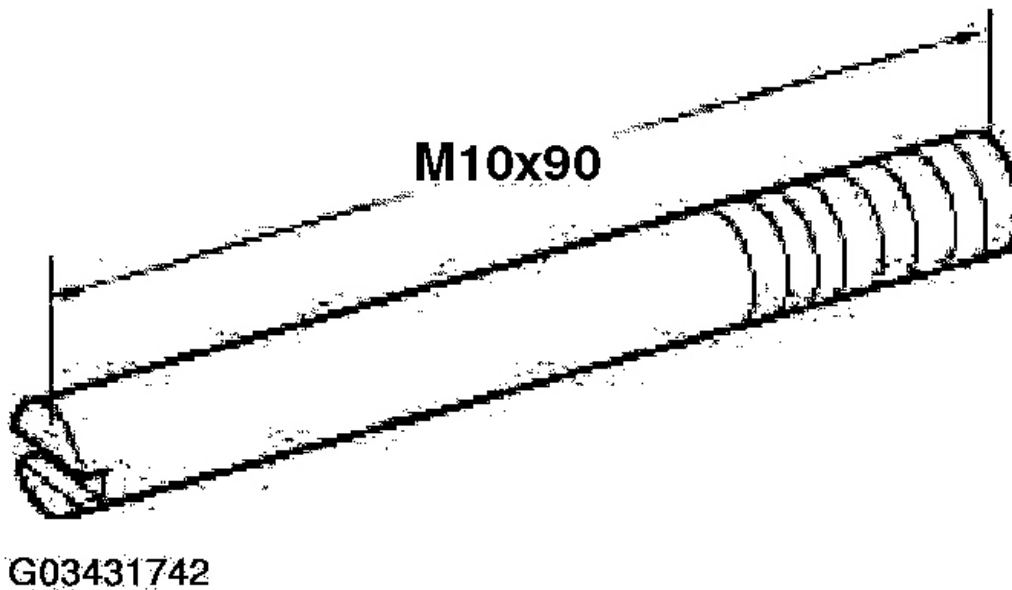
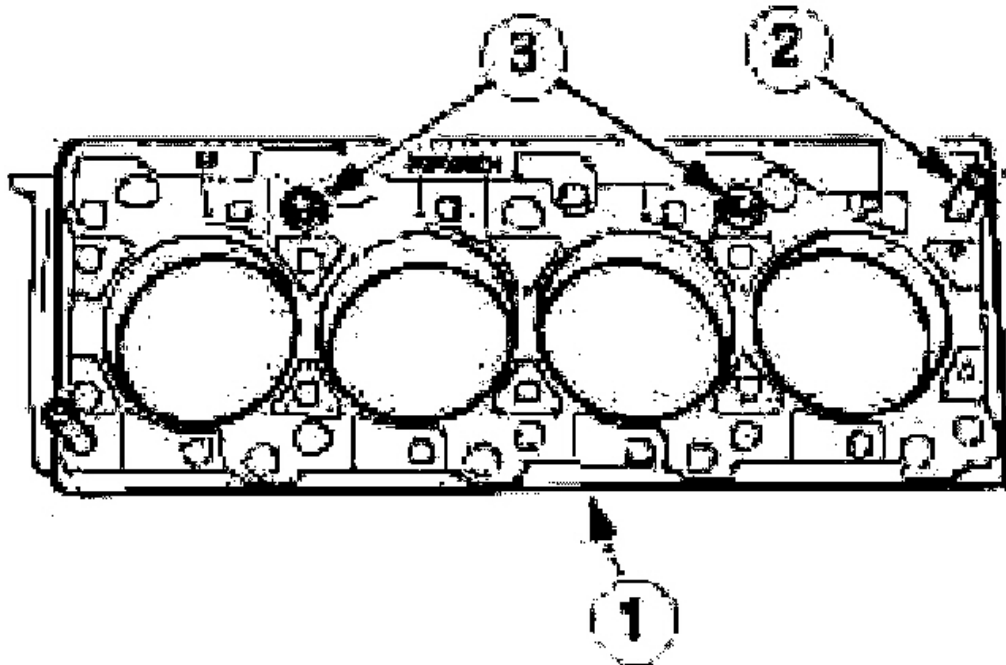


Fig. 137: Identifying Stud
Courtesy of FORD MOTOR CO.

5. Install a new cylinder head cover gasket on the cylinder block.
 1. Position a new cylinder head gasket.
 2. Insert the fabricated locating studs.
 3. Check that the locating studs are seated correctly.



G03431743

Fig. 138: Installing New Cylinder Head Cover Gasket On Cylinder Block
Courtesy of FORD MOTOR CO.

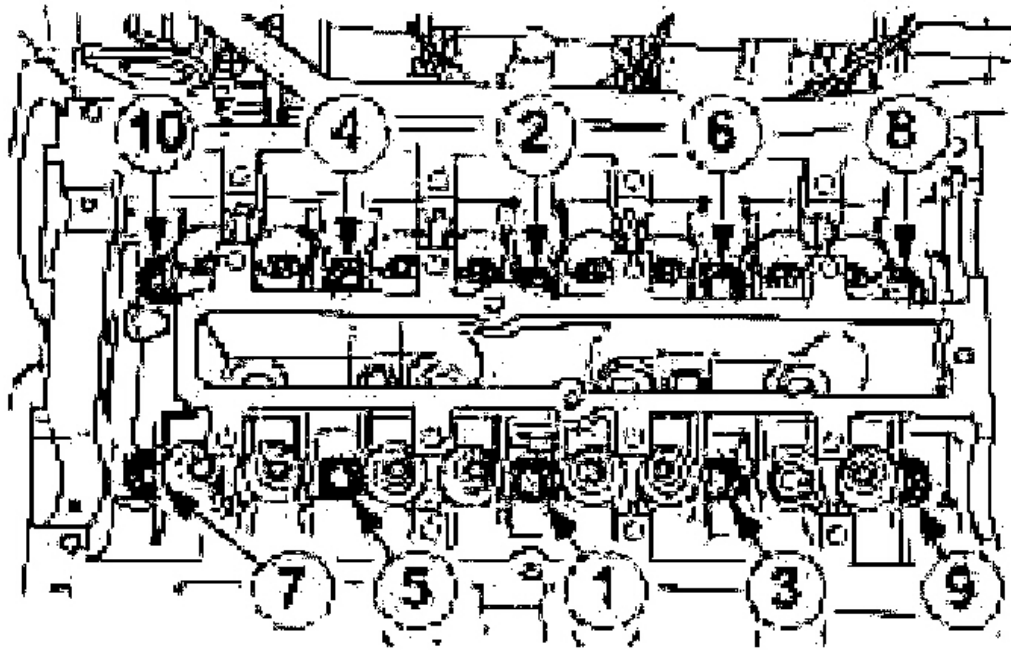
6. Install the cylinder head.
 - Position the cylinder head on the cylinder block.

CAUTION: Do not retighten the cylinder head bolts.

7. Tighten the cylinder head bolts in three stages in the sequence indicated.
 - Stage 1: 20 N.m
 - Stage 2: 40 N.m
 - Stage 3: 90 degrees.
 - Apply engine oil to the tappets and insert them.

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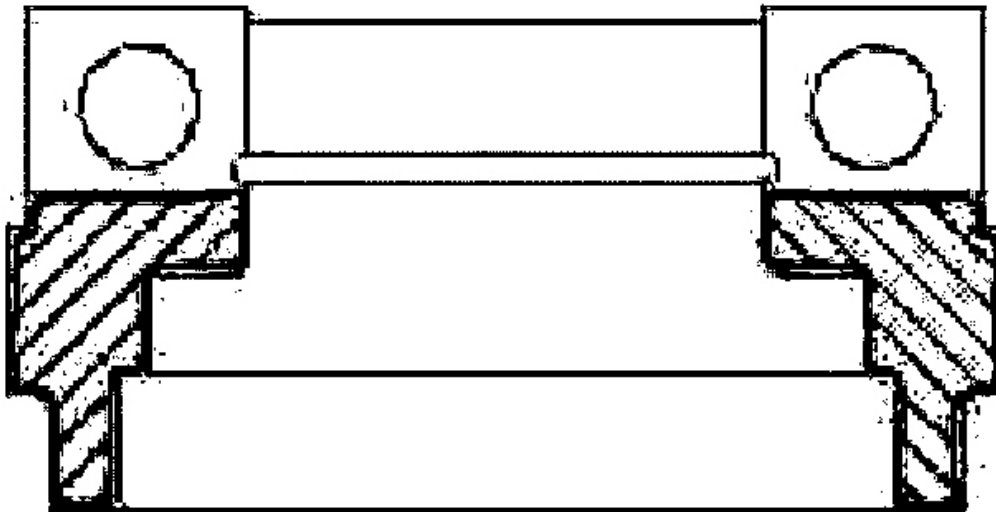
2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus



G03431744

Fig. 139: Identifying Tightening Sequence Of Cylinder Head Bolts
Courtesy of FORD MOTOR CO.

8. Apply sealant to camshaft bearing cap numbers 0 and 5 in the areas shown.



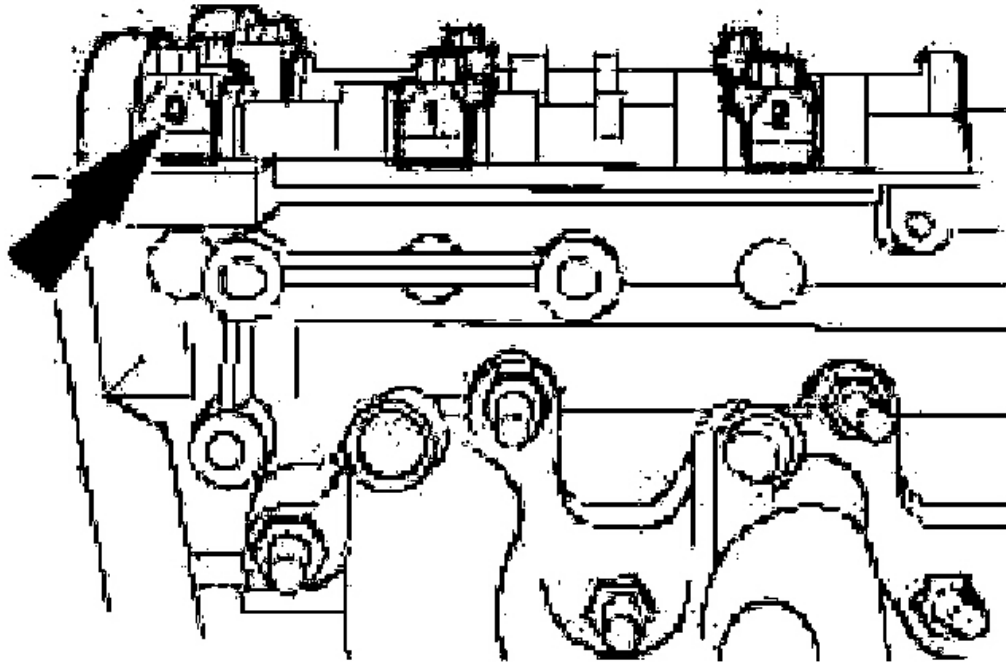
G03431745

Fig. 140: Applying Sealant To Camshaft Bearing Cap
Courtesy of FORD MOTOR CO.

9. Turn the crankshaft to approximately 60 degrees before TDC on cylinder number 1.

NOTE: Identification numbers are provided on the outer face of the camshaft bearing caps.

10. Lay the camshaft in place so that none of the cams is at full lift.
 - Lubricate the camshaft and camshaft bearing caps with engine oil.



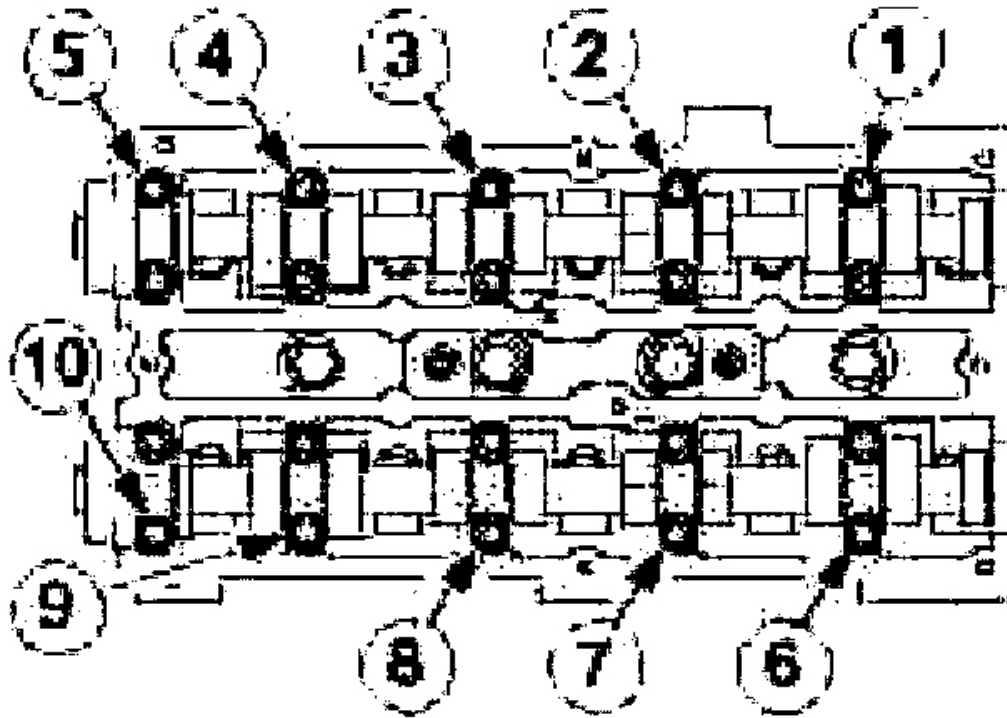
G03431746

Fig. 141: Identifying Marking On Outer Face Of Camshaft Bearing Caps
Courtesy of FORD MOTOR CO.

NOTE: **Screw in the camshaft bearing cap bolts evenly in several stages, in the sequence shown, a half turn at a time and tighten them in two stages.**

11. Tighten the bolts of the camshaft bearing caps.

- Stage 1: 10 N.m
- Stage 2: 19 N.m



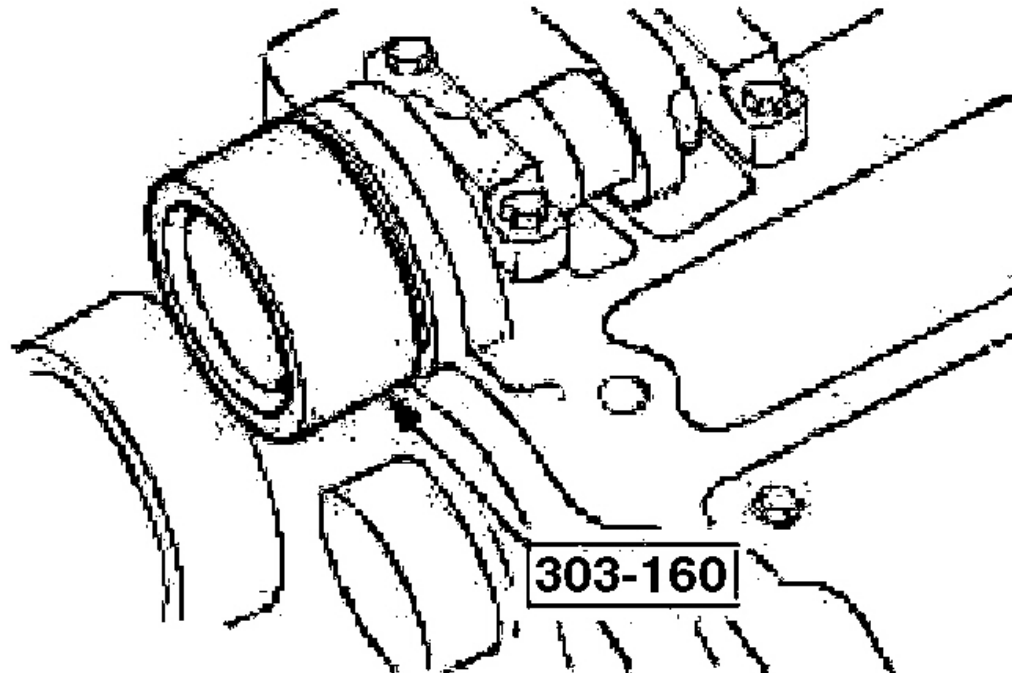
G03431747

Fig. 142: Identifying Tightening Sequence Of Camshaft Bearing Cap Bolts
Courtesy of FORD MOTOR CO.

12. Check the valve clearance and if necessary adjust. For additional information, refer to **Valve Clearance**.
13. Install the camshaft oil seals.
 - Lubricate the camshaft and oil seal lip with engine oil.
 - Using the special tool install a new oil seal.

NOTE: Do not tighten the bolts. The camshaft timing pulleys must be able to turn freely on the camshafts.

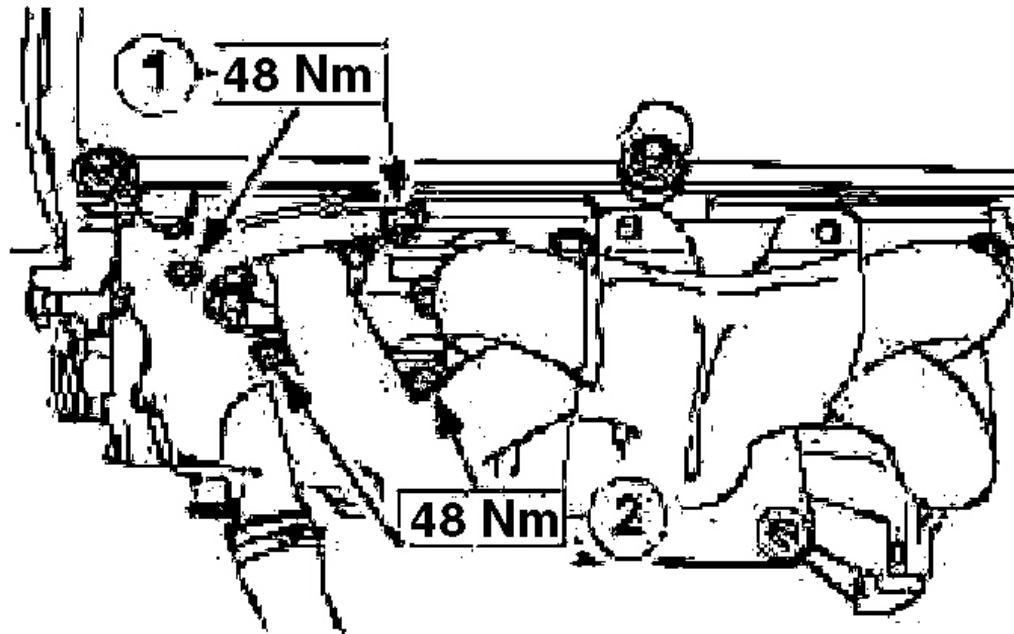
Attach the timing belt pulleys.



G03431748

Fig. 143: Installing Camshaft Oil Seals
Courtesy of FORD MOTOR CO.

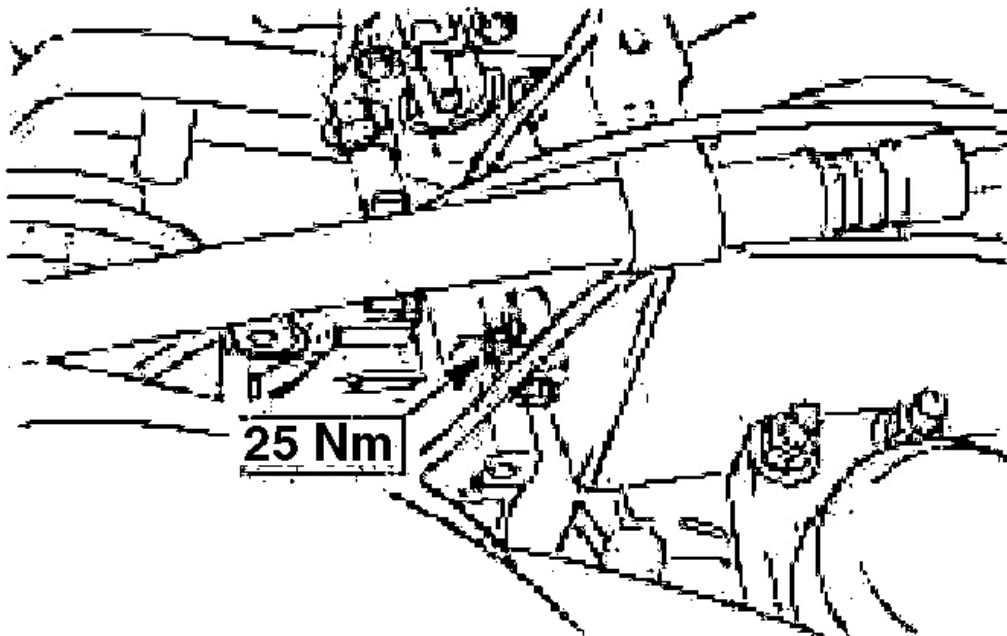
14. Install the timing belt. For additional information, refer to **TIMING BELT** .
15. Lower the vehicle.
16. Attach the power steering pump bracket.
 1. Screw in the upper bolts.
 2. Insert the lower studs.
 - Tighten the bolts and nuts.



G03431749

Fig. 144: Installing Power Steering Pump Bracket
Courtesy of FORD MOTOR CO.

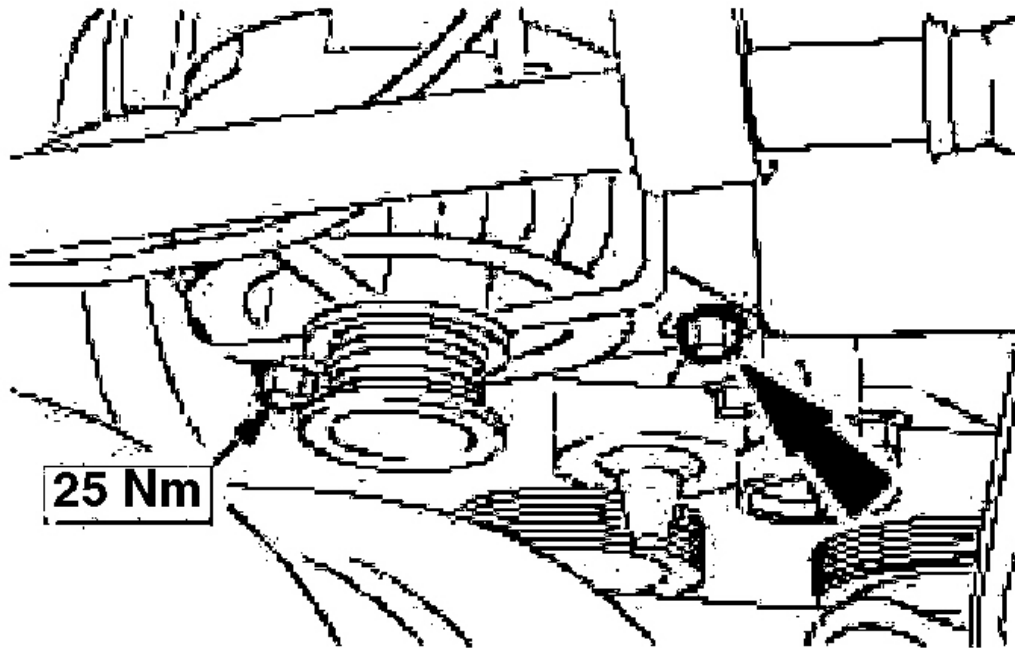
17. Install the upper bolt to the generator bracket.



G03431750

Fig. 145: Installing Upper Bolt Of Generator Bracket
Courtesy of FORD MOTOR CO.

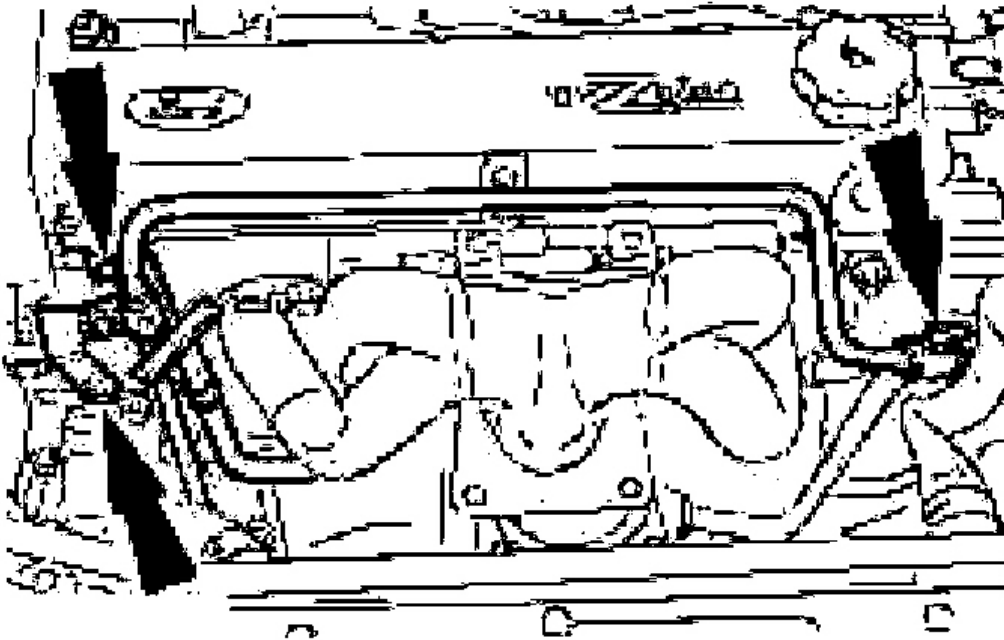
18. Attach the generator.



G03431751

Fig. 146: Installing Generator
Courtesy of FORD MOTOR CO.

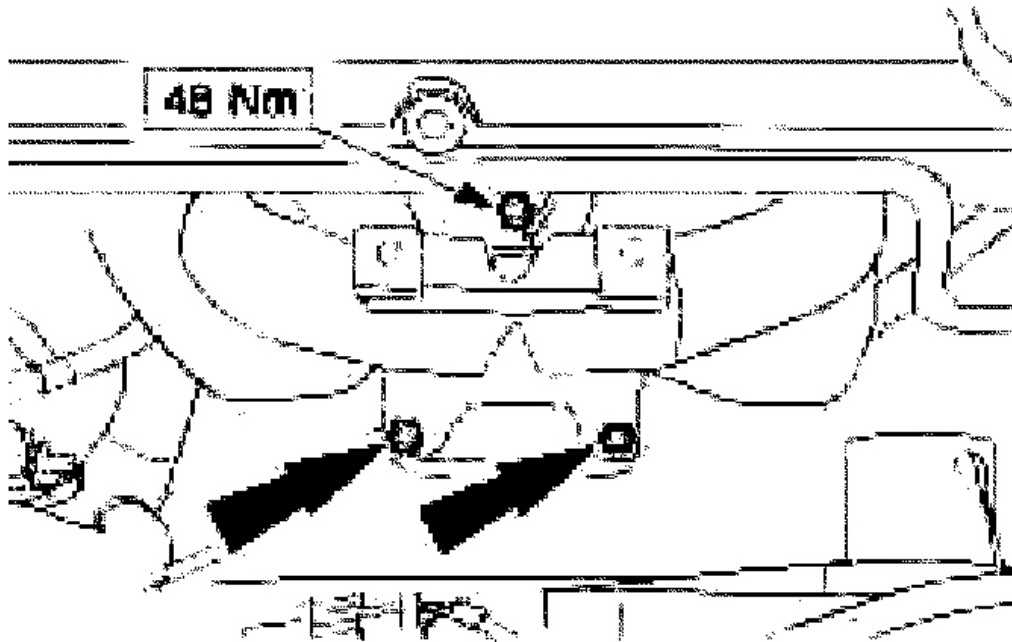
19. Attach the oil level indicator tube and the power steering pipe bracket.



G03431752

Fig. 147: Installing Oil Level Indicator Tube And Power Steering Pipe Bracket
Courtesy of FORD MOTOR CO.

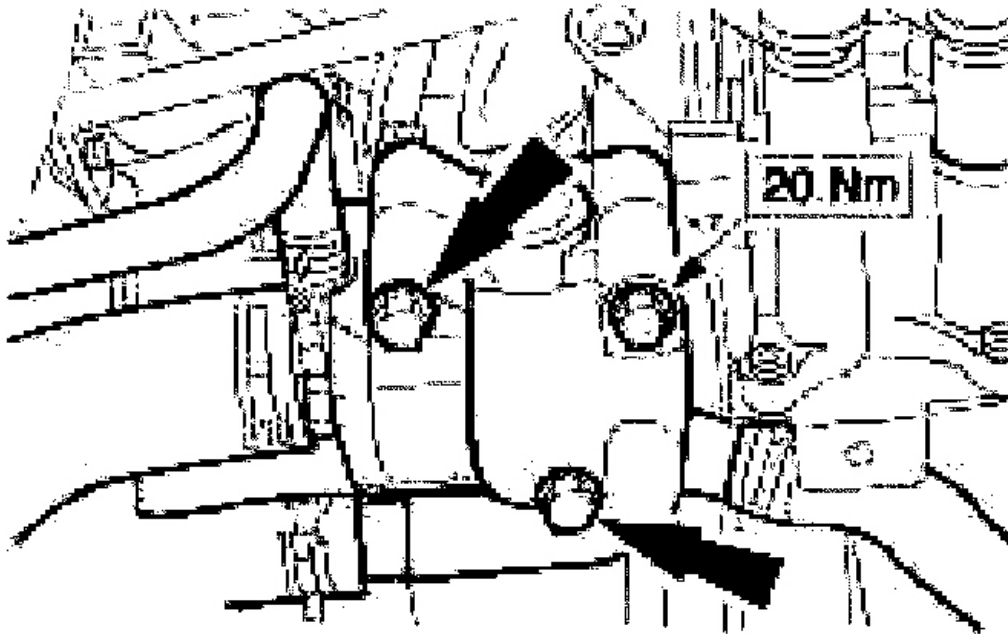
20. Attach the catalytic converter to the exhaust manifold.



G03431753

Fig. 148: Installing Catalytic Converter To Exhaust Manifold
Courtesy of FORD MOTOR CO.

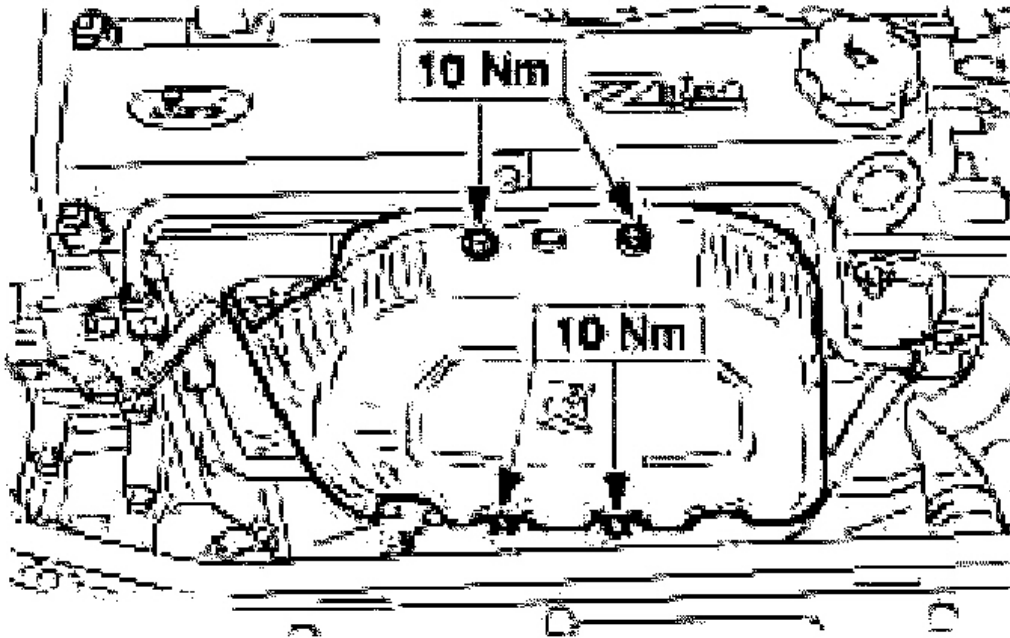
21. Attach the thermostat housing with new gasket.



G03431754

Fig. 149: Installing Thermostat Housing With New Gasket
Courtesy of FORD MOTOR CO.

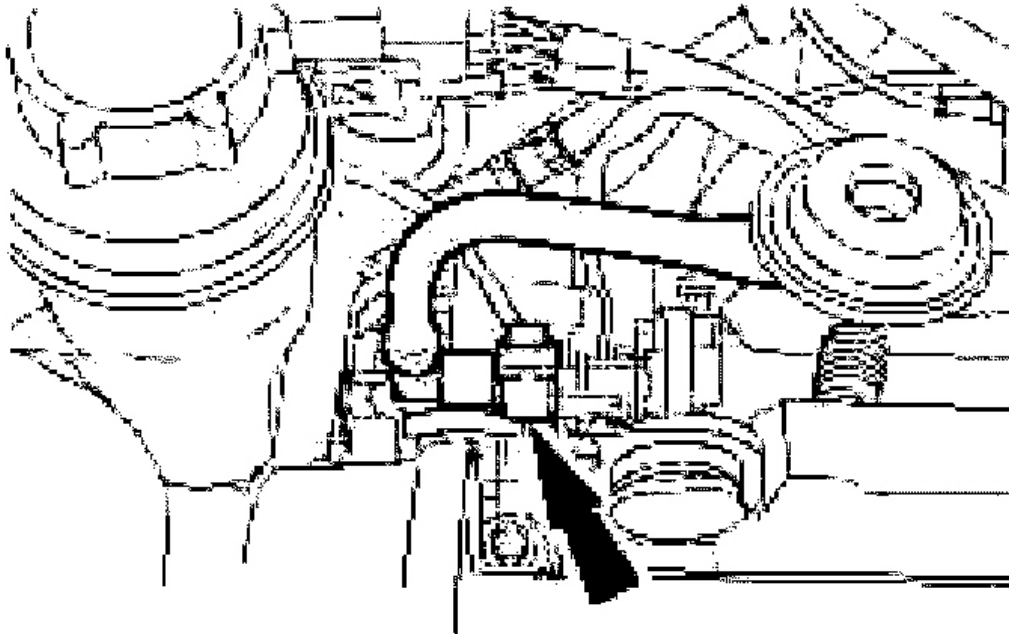
22. Attach the heat shield.



G03431755

Fig. 150: Installing Heat Shield
Courtesy of FORD MOTOR CO.

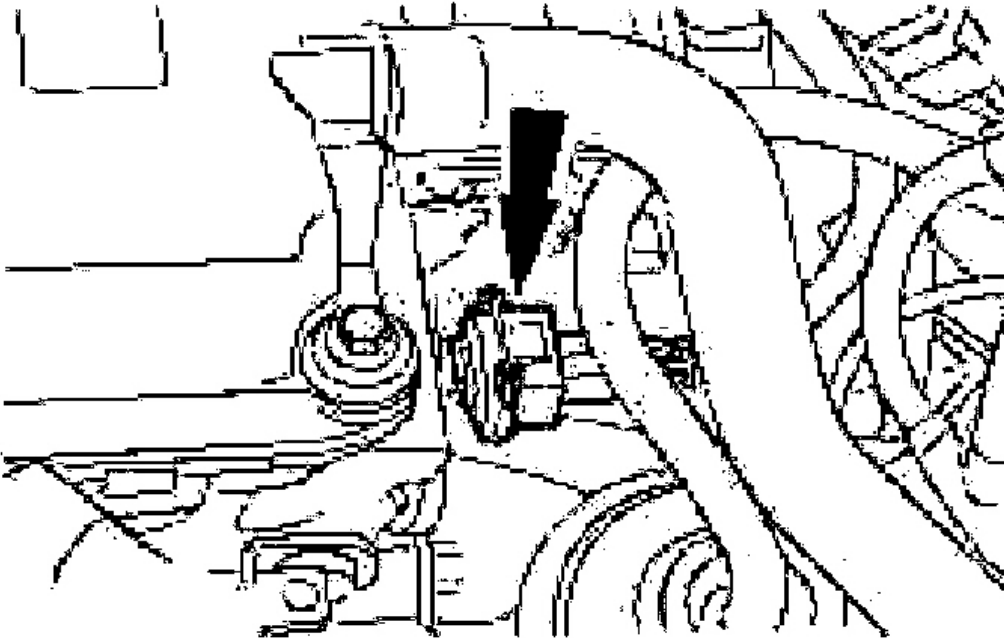
23. Attach the fuel lines.



G03431756

Fig. 151: Installing Fuel Lines
Courtesy of FORD MOTOR CO.

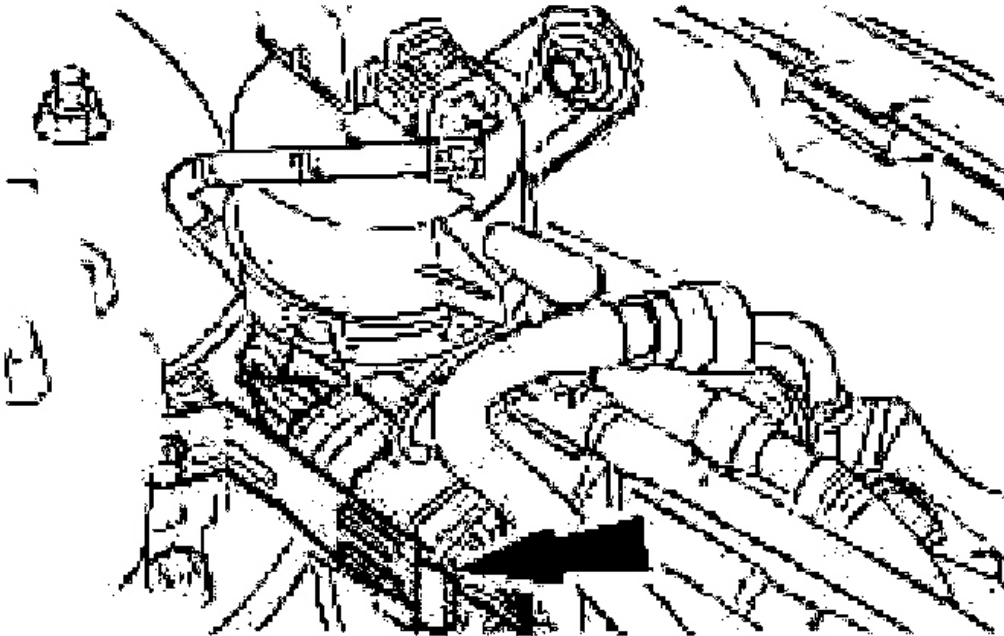
24. Connect the camshaft position (CMP) sensor.



G03431757

Fig. 152: Connecting Camshaft Position (CMP) Sensor
Courtesy of FORD MOTOR CO.

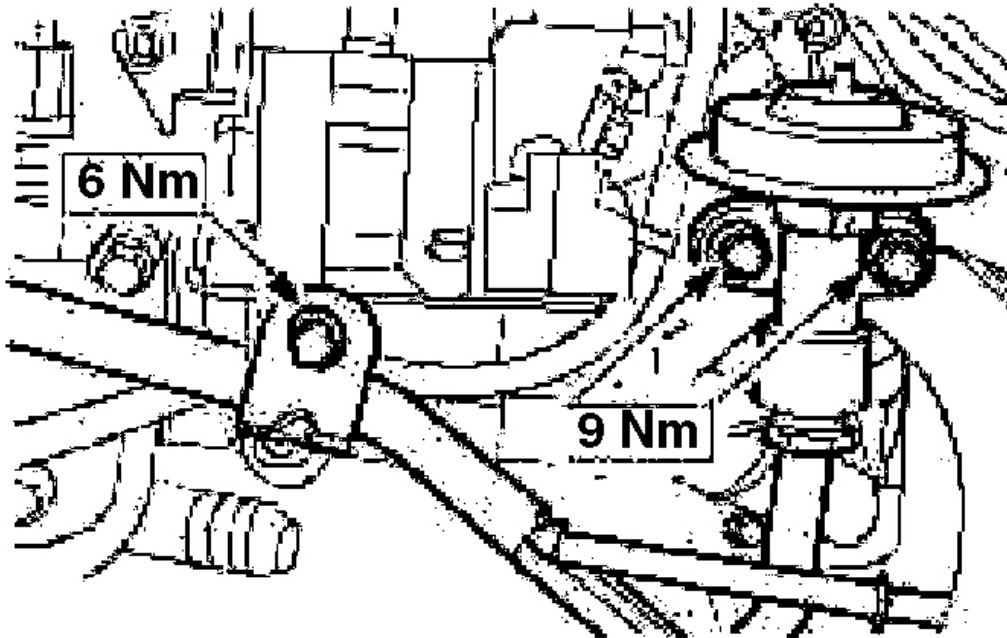
25. Connect the fuel injector wiring.



G03431758

Fig. 153: Connecting Fuel Injector Wiring
Courtesy of FORD MOTOR CO.

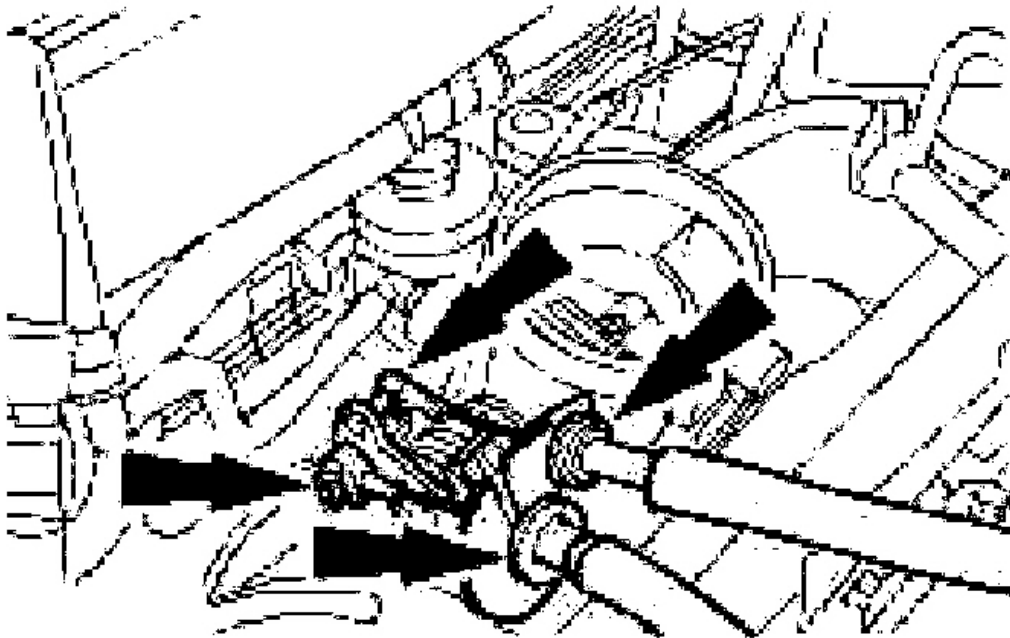
26. Attach the EGR valve with a new gasket and EGR pipe bracket.



G03431759

Fig. 154: Installing EGR Valve With New Gasket And EGR Pipe Bracket
Courtesy of FORD MOTOR CO.

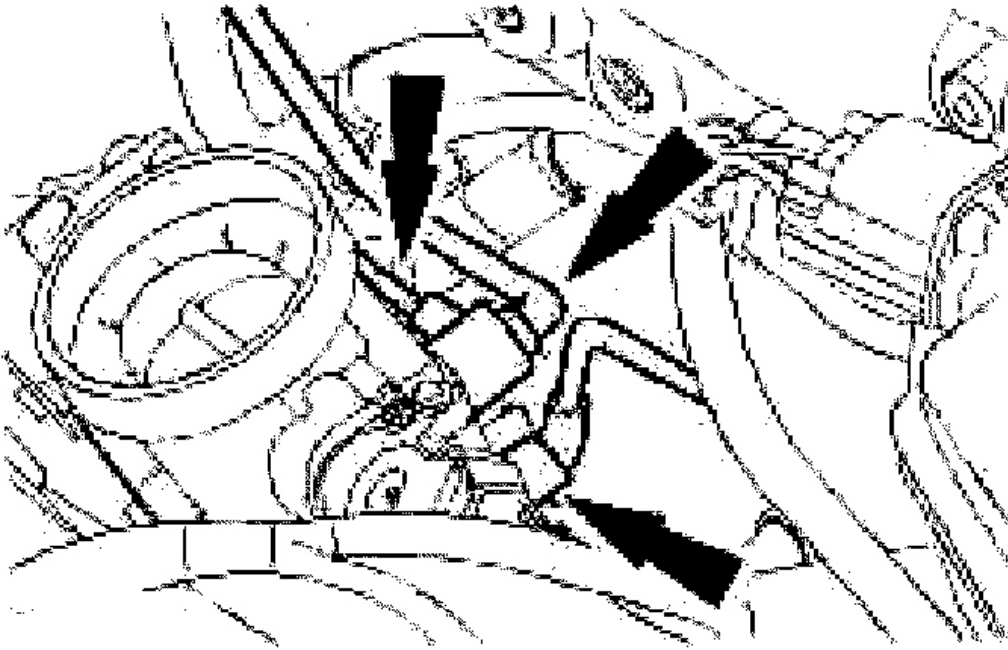
27. Attach the accelerator cable and the speed control cable (if equipped).



G03431760

Fig. 155: Installing Accelerator Cable And Speed Control Cable
Courtesy of FORD MOTOR CO.

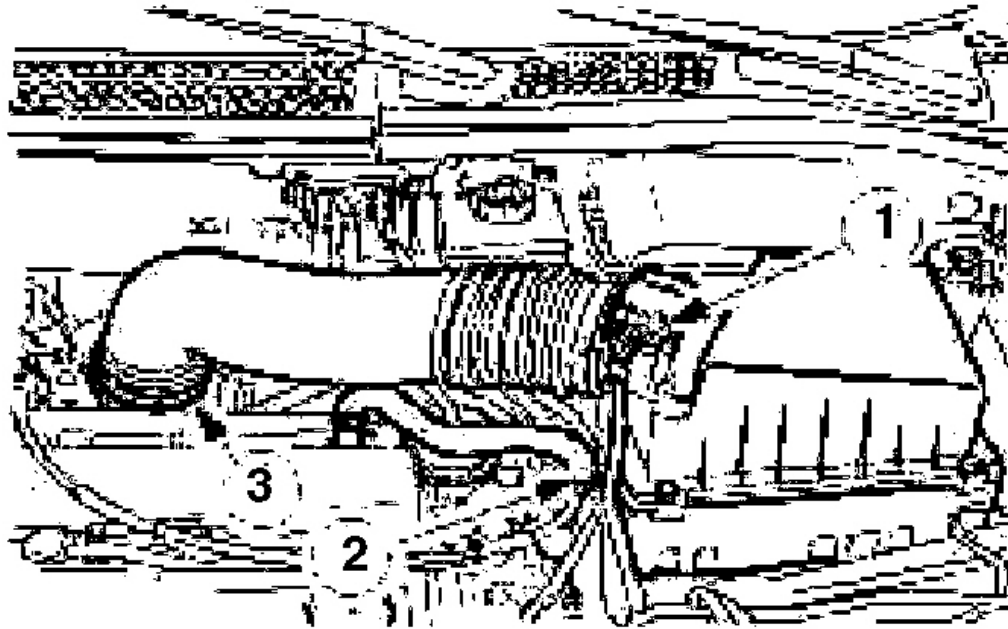
28. Push on the vacuum hoses.



G03431761

Fig. 156: Connecting Vacuum Hoses
Courtesy of FORD MOTOR CO.

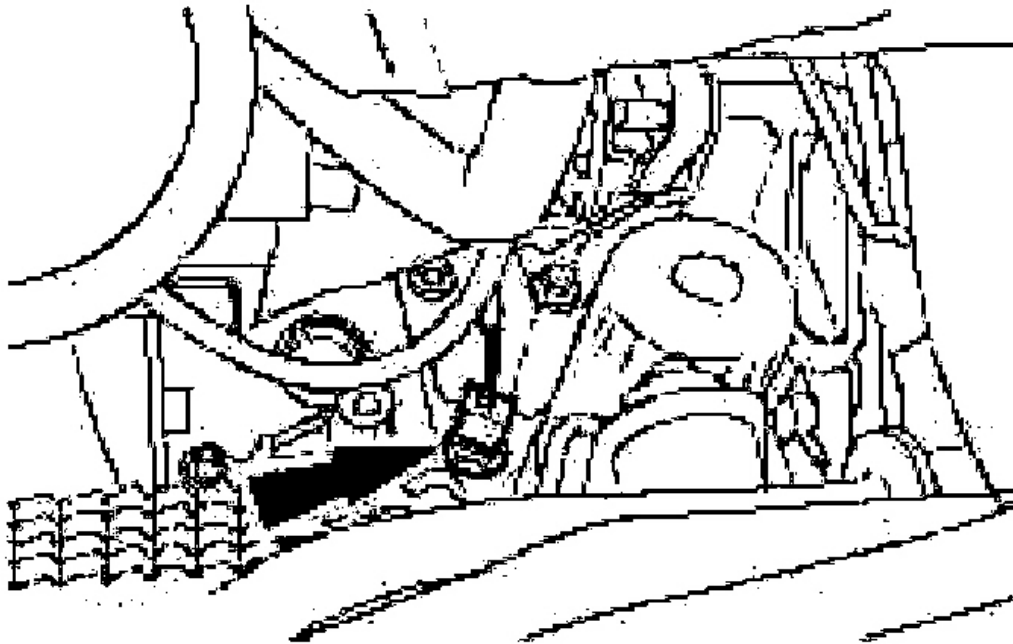
29. Attach the air filter housing.
 - Press the air filter housing into the rubber bushings.
2. Push on the mass air flow (MAF) sensor multiplug.
3. Attach the PCV hose.
4. Attach the intake hose.



G03431762

Fig. 157: Connecting Mass Air Flow (MAF) Sensor Multiplug
Courtesy of FORD MOTOR CO.

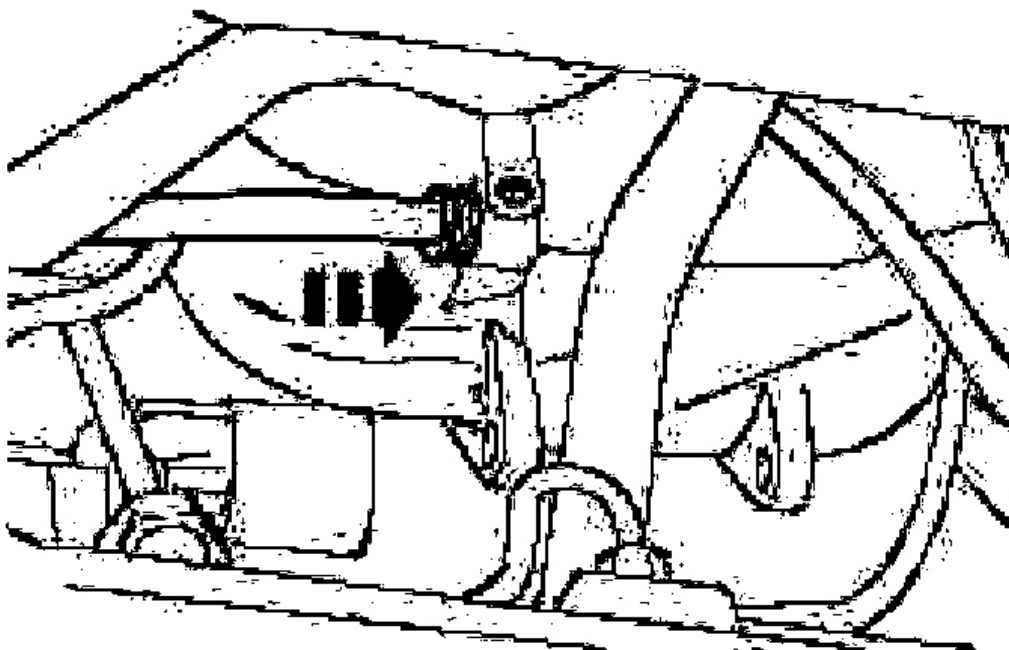
30. Raise and support the vehicle.
31. Push on the oil pressure switch electrical connector.



G03431763

Fig. 158: Connecting Oil Pressure Switch Electrical Connector
Courtesy of FORD MOTOR CO.

32. Attach the brake booster pipe and the PCV hose to the intake manifold.



G03431764

Fig. 159: Installing Brake Booster Pipe And PCV Hose To Intake Manifold
Courtesy of FORD MOTOR CO.

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.

33. Standard finishing operations

- Connect the battery negative cable.
- Top up the coolant. For additional information, refer to ENGINE COOLING .
- Close the coolant expansion tank.
- Check fluid levels and correct if necessary.
- Check the routing of vacuum hoses and cables and secure them with cable ties.
- Check fluid levels again and correct if necessary.

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

NOTE: The engine oil temperature must be at least 80°C.

Change the engine oil and the oil filter. For additional information, refer to **GENERAL SPECIFICATIONS** .

OIL PAN

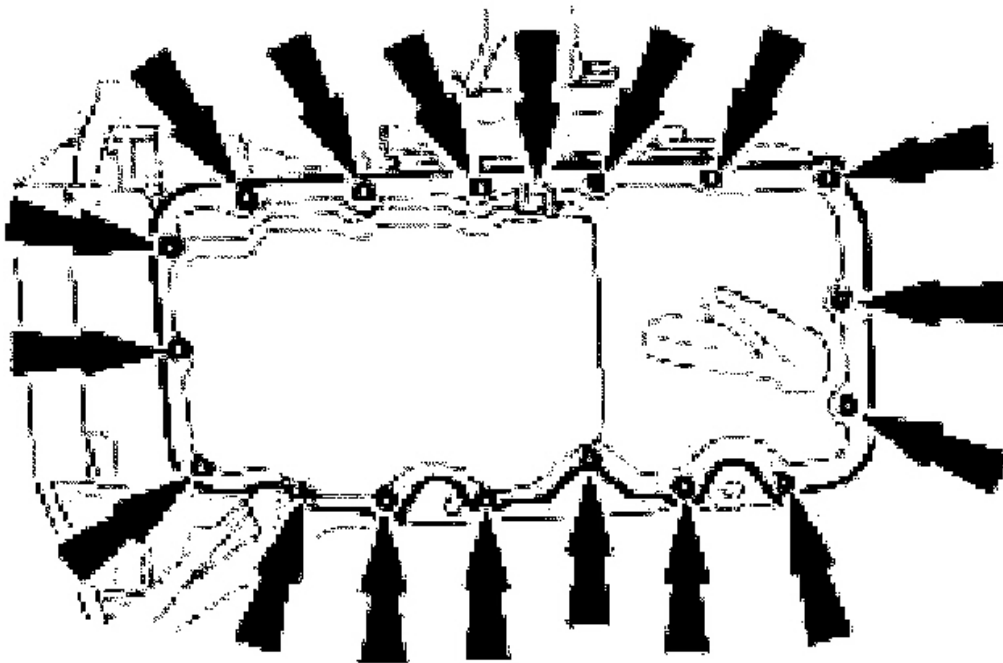
Material

MATERIAL SPECIFICATION

Sealant, oil sump	WSE-M4G323-A6
Engine oil	WSS-M2C153-H
Studs M6 x 20	

Removal

1. Remove the catalytic converter.
2. Drain the engine oil at the drain plug and remove the oil pan bolts (shown with engine removed).

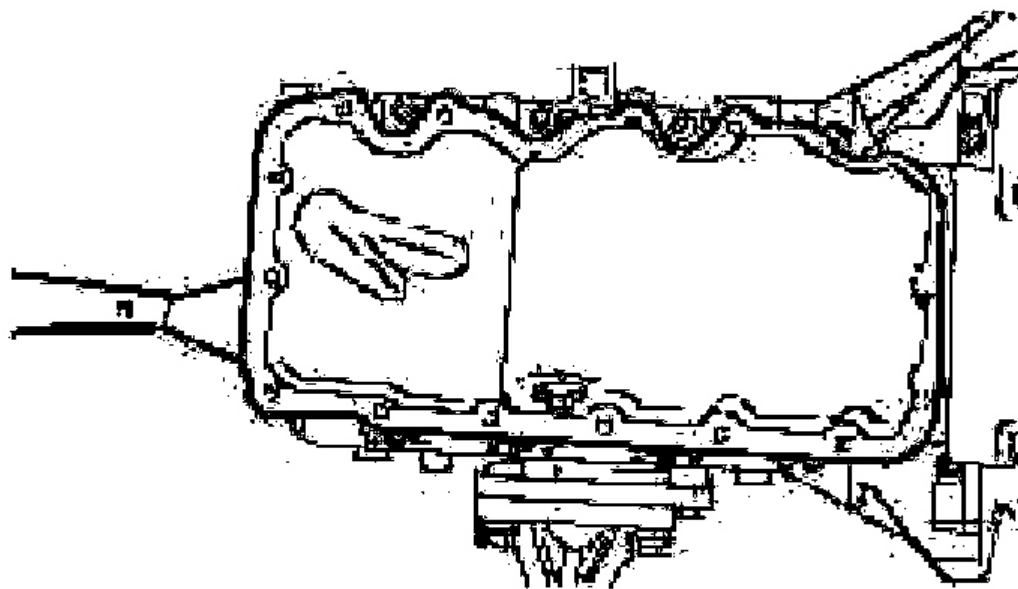


G03431765

Fig. 160: Removing Oil Pan Bolts
Courtesy of FORD MOTOR CO.

CAUTION: Do not damage the mating faces.

3. Remove the oil pan (shown with engine removed).
 - Separate the oil pan from the lower crankcase using a sharp spatula. Release the oil pan from the lower crankcase by tapping slightly against the tightened drain plug with a rubber hammer.



G03431766

Fig. 161: Separating Oil Pan From Lower Crankcase
Courtesy of FORD MOTOR CO.

Installation

1. Preparatory operations

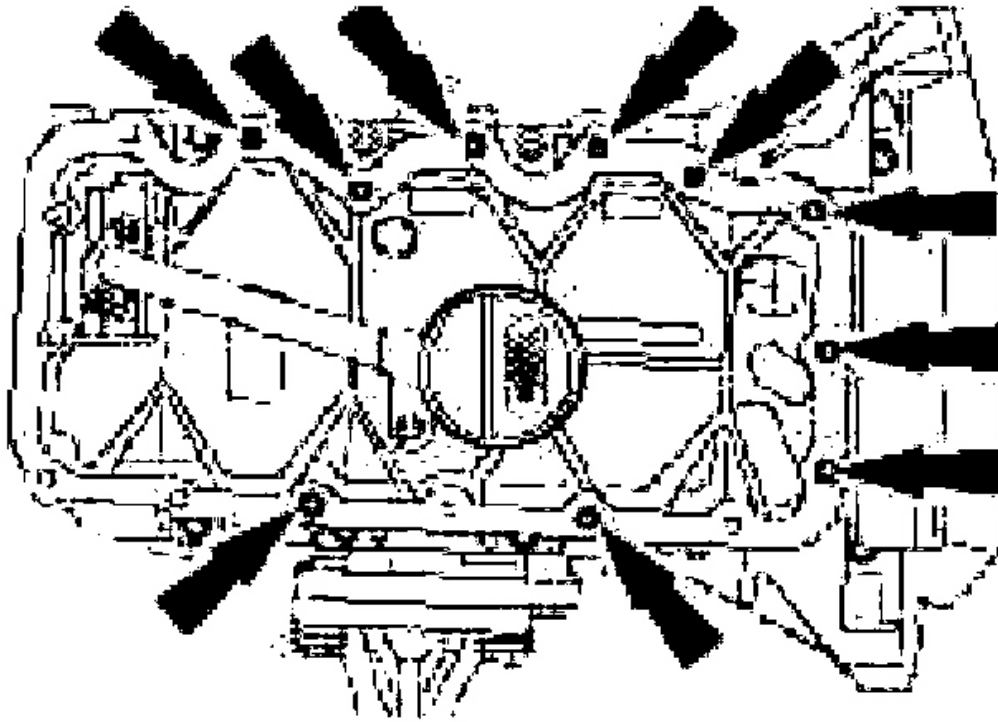
NOTE: Do not damage the mating faces.

- Clean the mating faces.

NOTE: Mating faces must be free from oil and sealant residue.

- Clean all traces of oil residue and oil sludge from the oil pan.

CAUTION: Use studs. Sealer in the dead end bores can cause damage to the ladder frame.

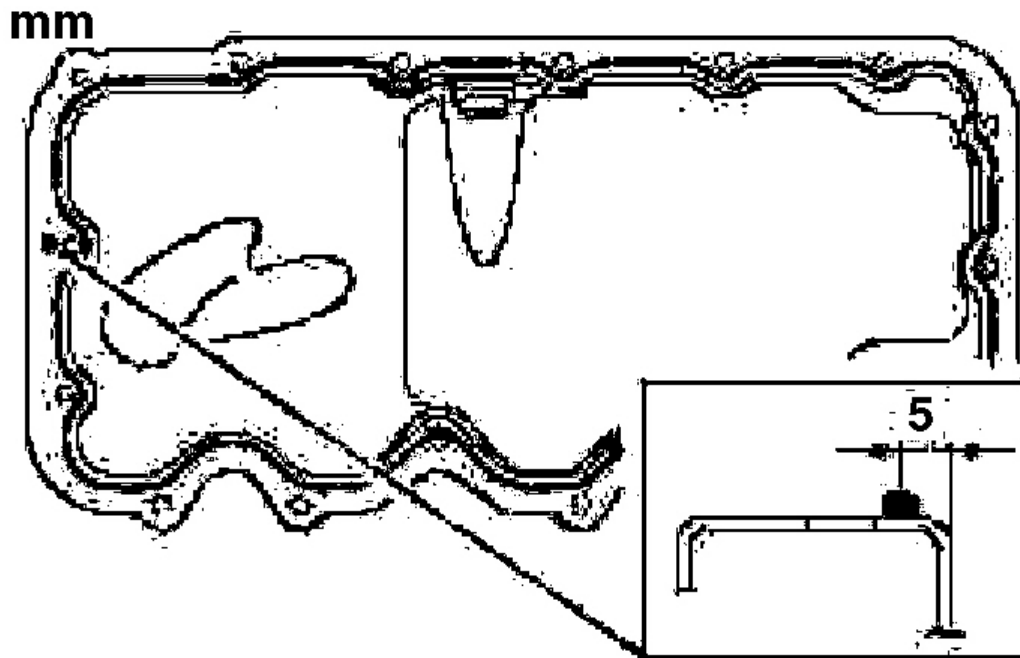


G03431767

Fig. 162: Installing Studs On Dead End Bores
Courtesy of FORD MOTOR CO.

2. Install 10 studs, M6 x 20, in the shown dead end bores.

NOTE: **Attach the oil pan within 10 minutes of applying sealant.**



G03431768

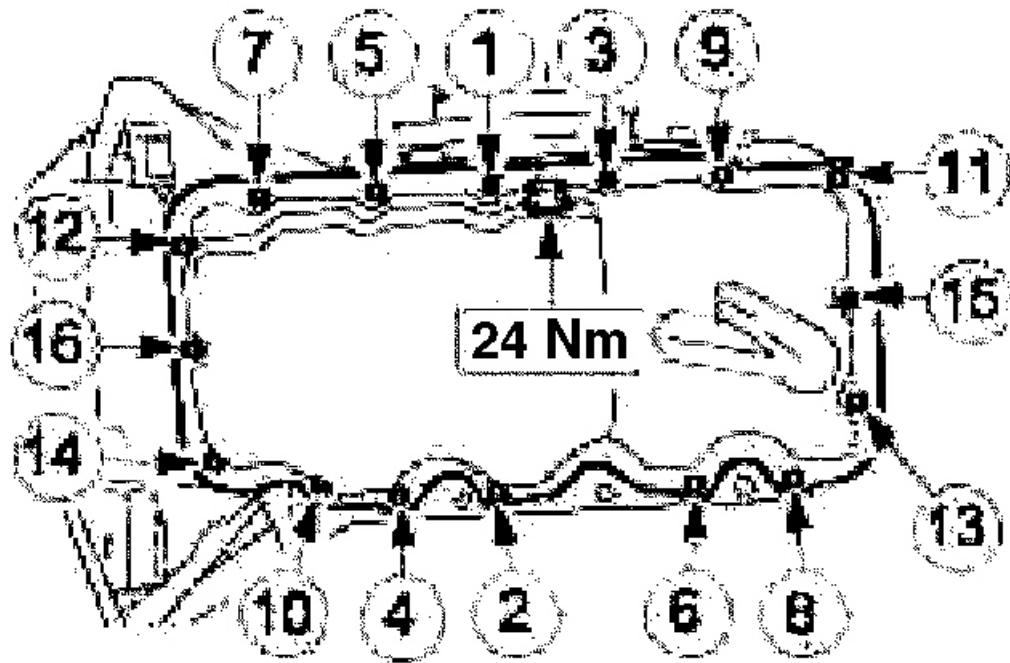
Fig. 163: Applying Bead Of Sealant To Oil Pan Mating Face
Courtesy of FORD MOTOR CO.

3. Apply a 3 mm bead of sealant to the oil pan mating face.

NOTE: Do not remove the oil pan, after the first contact with the ladder frame.

NOTE: Tightening sequence.

4. Attach the oil pan and tighten the bolts in two stages. Fit the drain plug (shown with engine removed).
 - Stage 1: 6 N.m
 - Stage 2: 10 N.m



G03431769

Fig. 164: Identifying Tightening Sequence Of Oil Pan Bolts
Courtesy of FORD MOTOR CO.

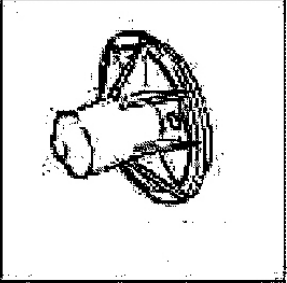


5. Install the catalytic converter.
6. Fill with engine oil.
 - Fill capacity and engine oil according to specifications.

CRANKSHAFT REAR SEAL

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

	Installer, Oil Seal (Rear), Crankshaft 303-328 (T88P -6701B-1)
	Locking Tool, Flywheel 303-103 (T74P -6375-A)
	Remover, Oil Seal, Crankshaft 303-409 (T92C -6700 -CH)

G03431770

Fig. 165: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

High temperature grease	ESD-M1C220-A
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Removal

Vehicles with manual transaxle

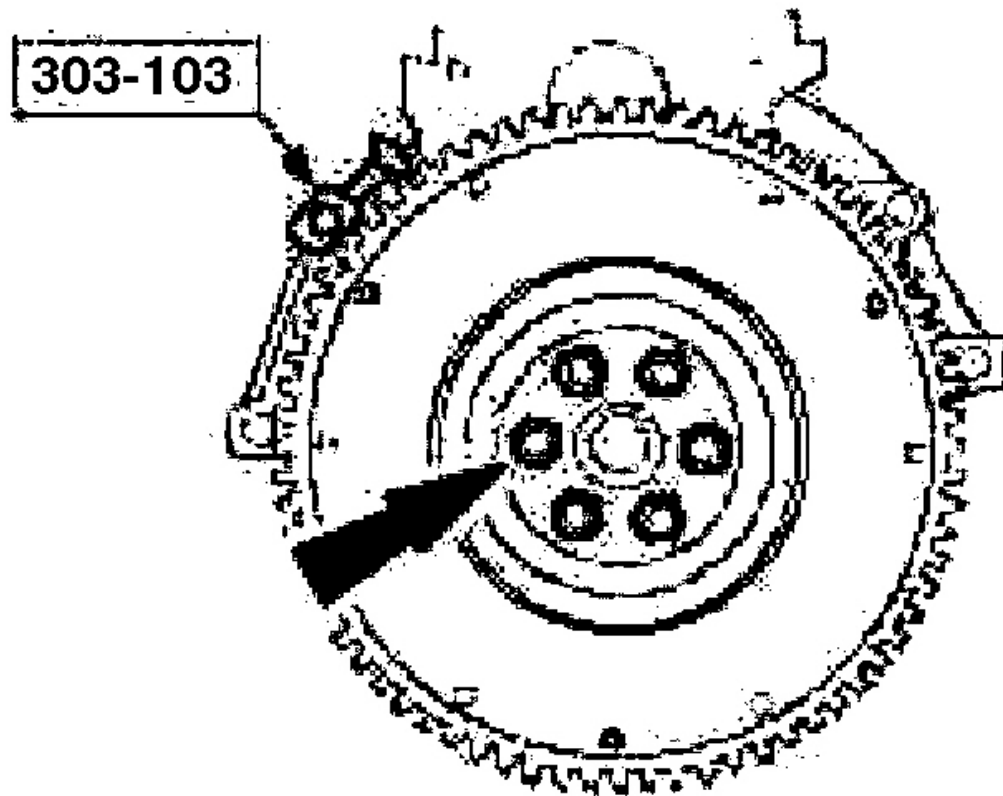
1. Remove the clutch. For additional information, refer to **CLUTCHES** article .

Vehicles with automatic transaxle

2. Remove the automatic transaxle. For additional information, refer to AUTOMATIC TRANSAXLE/TRANSMISSION .

All vehicles

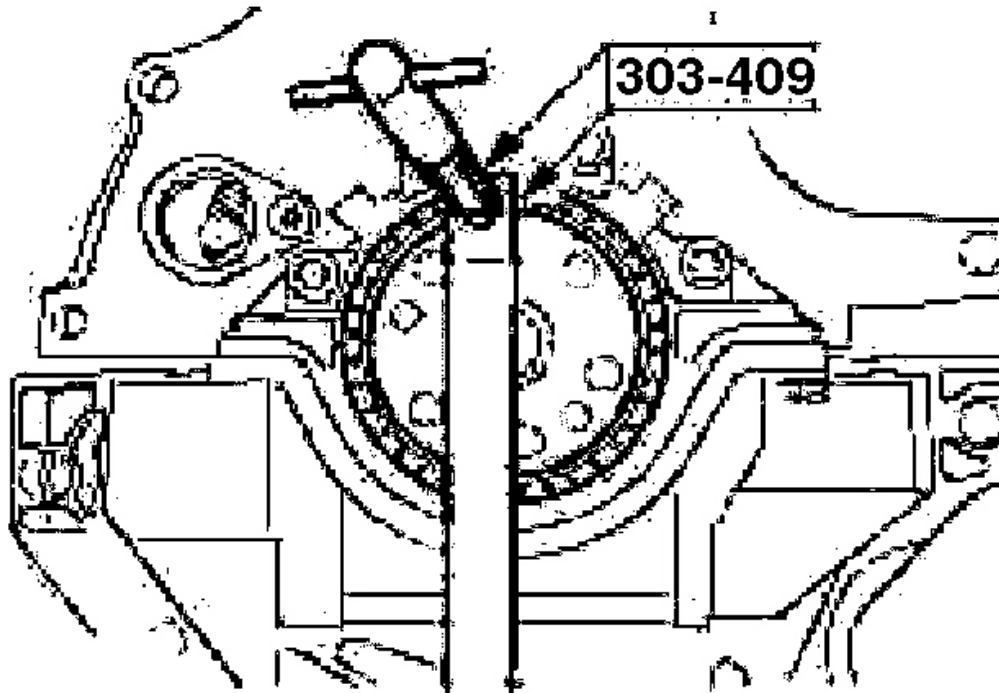
3. Using the special tool, remove the flywheel/drive plate.



G03431771

Fig. 166: Removing Flywheel/Drive Plate
Courtesy of FORD MOTOR CO.

4. Using the special tool, remove the oil seal.



G03431772

Fig. 167: Removing Oil Seal
Courtesy of FORD MOTOR CO.

Installation

All vehicles

1. Using the special tool, install the oil seal.
 - Install three flywheel bolts.

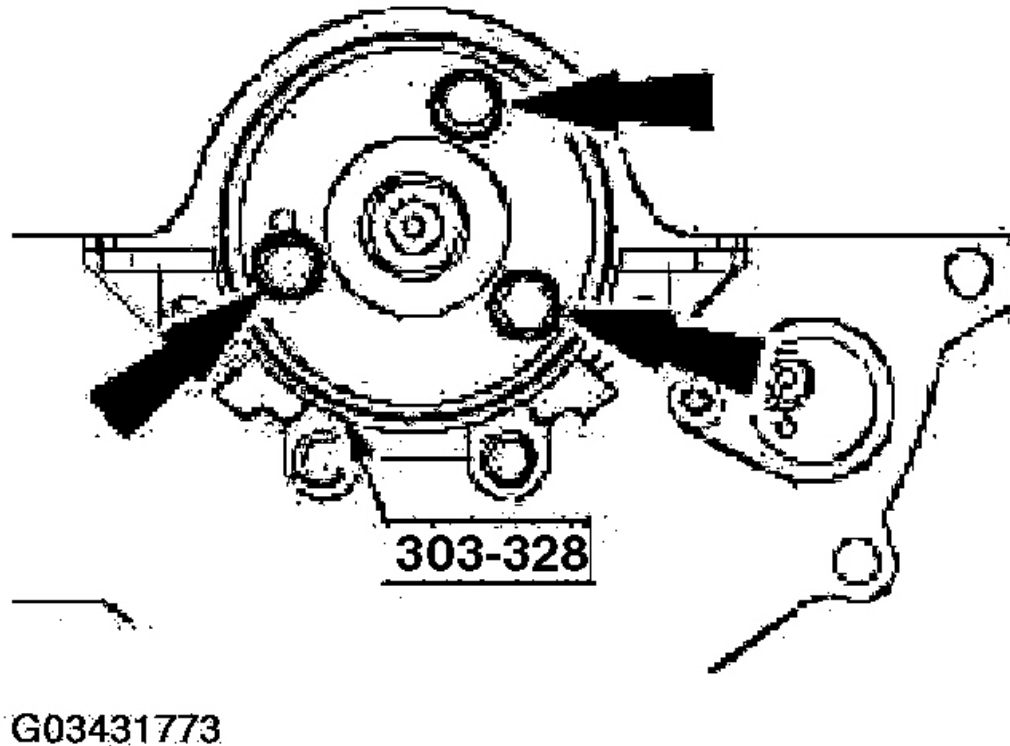
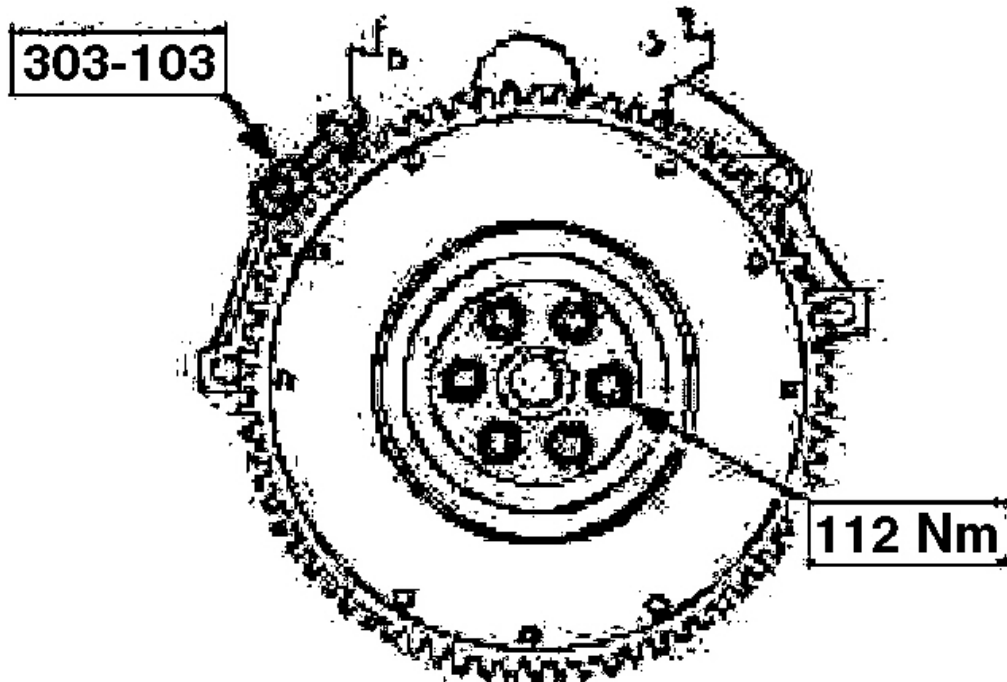


Fig. 168: Installing Oil Seal
Courtesy of FORD MOTOR CO.

NOTE: Remove any traces of thread-locking compound from the threaded bores on the crankshaft.



G03431774

Fig. 169: Installing Flywheel/Drive Plate
Courtesy of FORD MOTOR CO.

2. Using the special tool, install the flywheel/drive plate.

Vehicles with manual transaxle

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

Vehicles with automatic transaxle

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

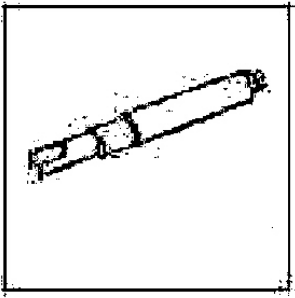

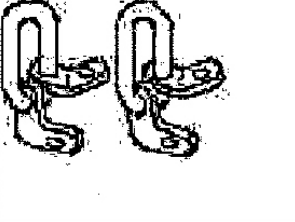
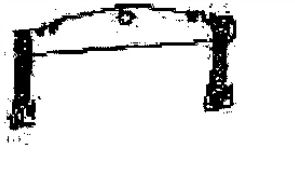
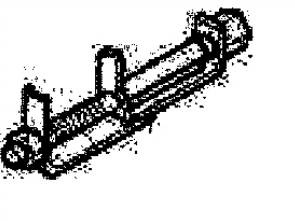
REMOVAL

ENGINE - VEHICLES WITH: MTX-75/MANUAL TRANSAXLE

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

Special Tool(s)

	Remover, Halfshaft 205-164 (T81P-4026-A)
	Aligner, Gearshift Lever Neutral Position 308-437
	Lifting Bracket, Engine 303-050 (T70P-6000)
	Spreader Bar 303-D089 (D93P-6001-A3)
	Remover/Installer, Cooling Hose Clamp 412-108 (T96P-18539-A)

G03431775

Fig. 170: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

Cable ties

Removal

All Vehicles

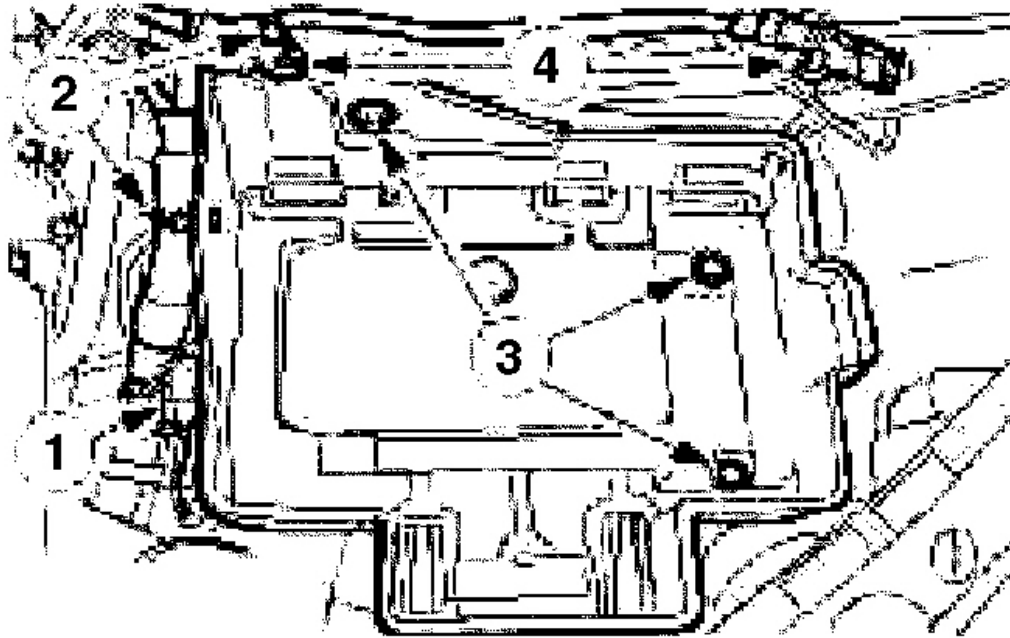
1. General remarks.
 - The positions of the engine mounting and the engine roll restrictor are described looking from the transmission towards the engine.
 - If necessary, use Special Tool 412-108 to remove coolant and ventilation hoses.
 - Owing to special model variants, some job steps do not apply to all vehicles. These are clearly marked in the text.
 - If necessary, separate the cable ties and renew on installation.
2. Release the fuel pressure. For additional information, refer to **FUEL SYSTEM PRESSURE RELEASE** .

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

3. Open the coolant expansion tank.

CAUTION: Disconnect the battery positive and negative cables.
Remove the battery.

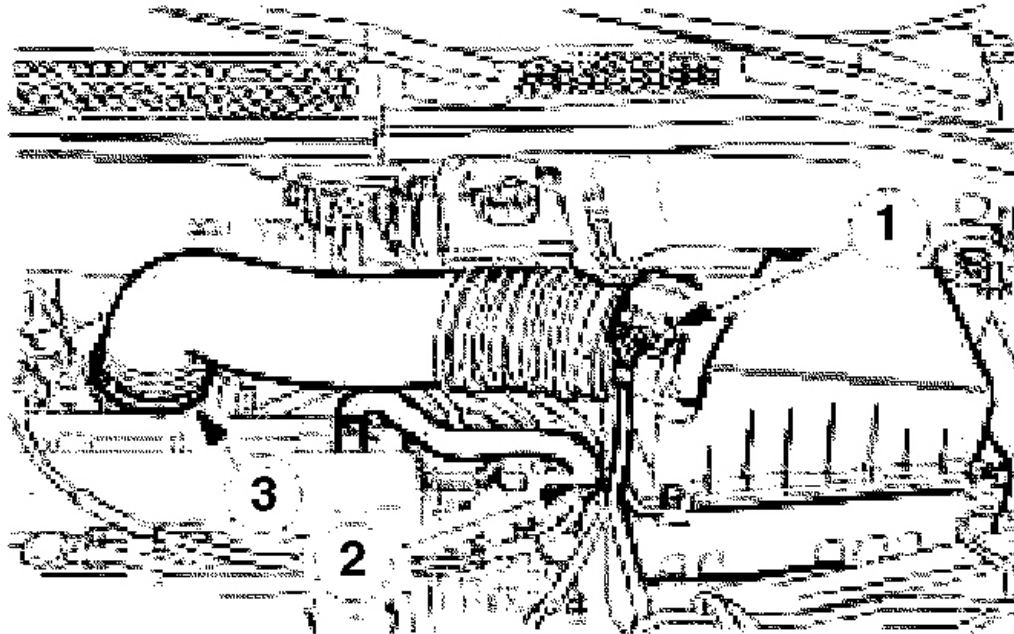
4. Remove the battery tray and detach the ground cable.
 1. Unclip and separate the connector.
 2. Unclip the wiring harness.
 3. Unscrew the bolts.
 4. Detach the positive and negative cables.



G03431776

Fig. 171: Removing Battery Tray And Ground Cable
Courtesy of FORD MOTOR CO.

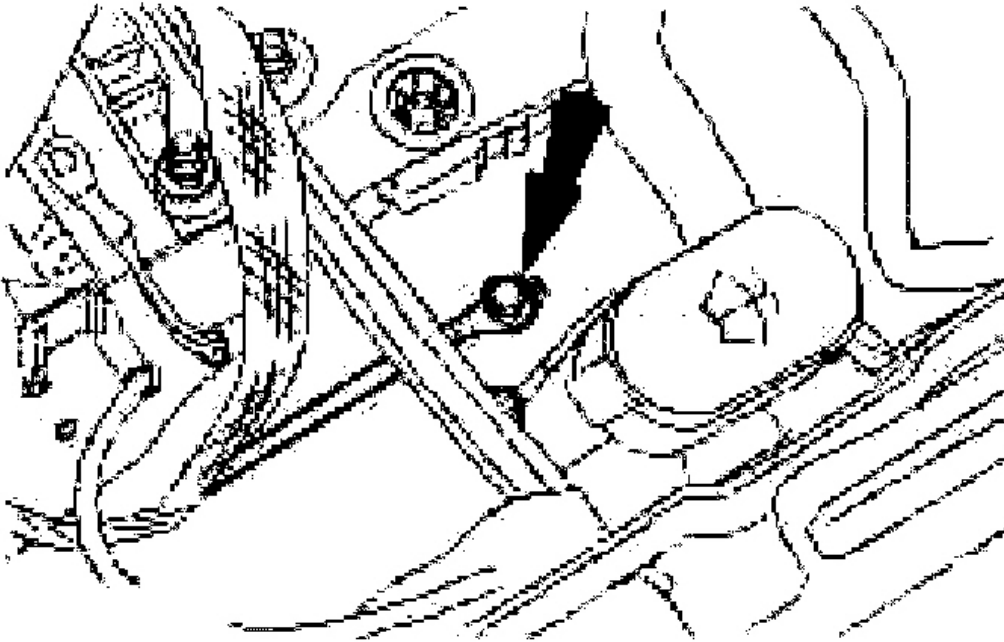
5. Remove the air cleaner housing.
 1. Pull off the plug of the mass air flow (MAF) sensor.
 2. Detach the PCV hose.
 3. Detach the intake hose.
 - Remove the air cleaner housing from the rubber bushing.



G03431777

Fig. 172: Pulling Off Plug Of Mass Air Flow (MAF) Sensor
Courtesy of FORD MOTOR CO.

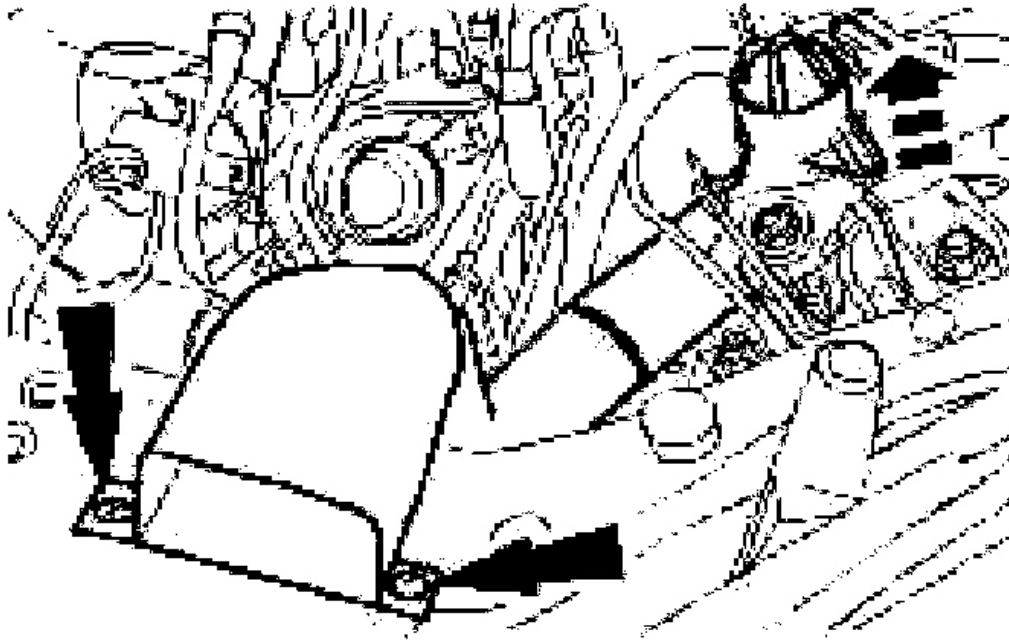
6. Detach the ground cable.



G03431778

Fig. 173: Removing Ground Cable
Courtesy of FORD MOTOR CO.

NOTE: The resonator is a push fit in the bracket.



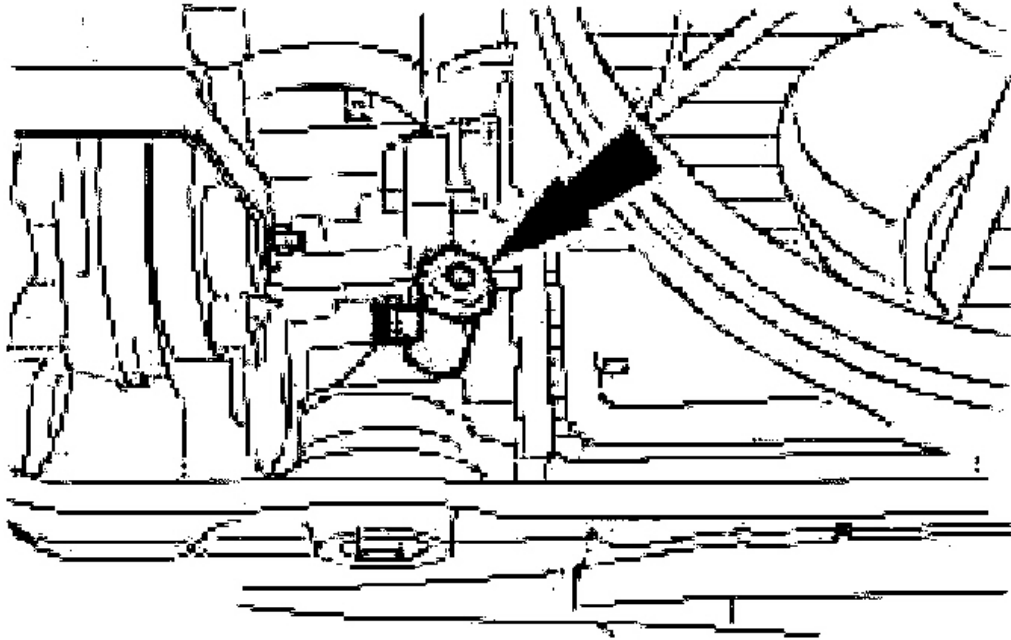
G03431779

Fig. 174: Removing Air Cleaner Intake With Resonator
Courtesy of FORD MOTOR CO.

7. Remove the air cleaner intake with resonator.
8. Raise and support the vehicle.

WARNING: Danger of scalding if the engine is warm.

9. Drain the coolant (shown from below).
 - Install the drain plug after draining.

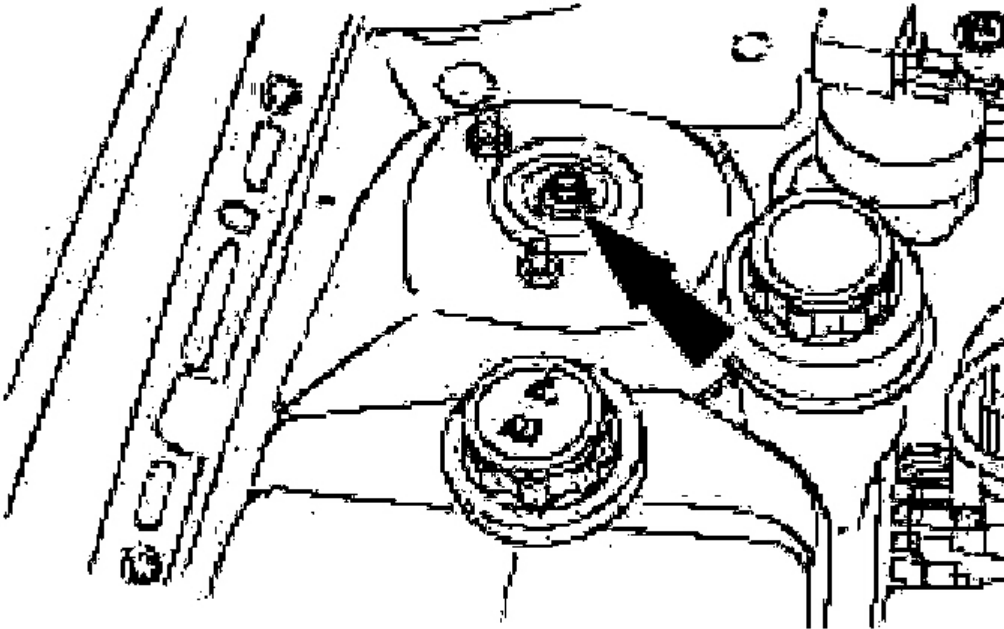


G03431780

Fig. 175: Installing Drain Plug
Courtesy of FORD MOTOR CO.

10. Drain the engine oil.
 - Install the drain plug after draining.
11. Partially lower the vehicle.

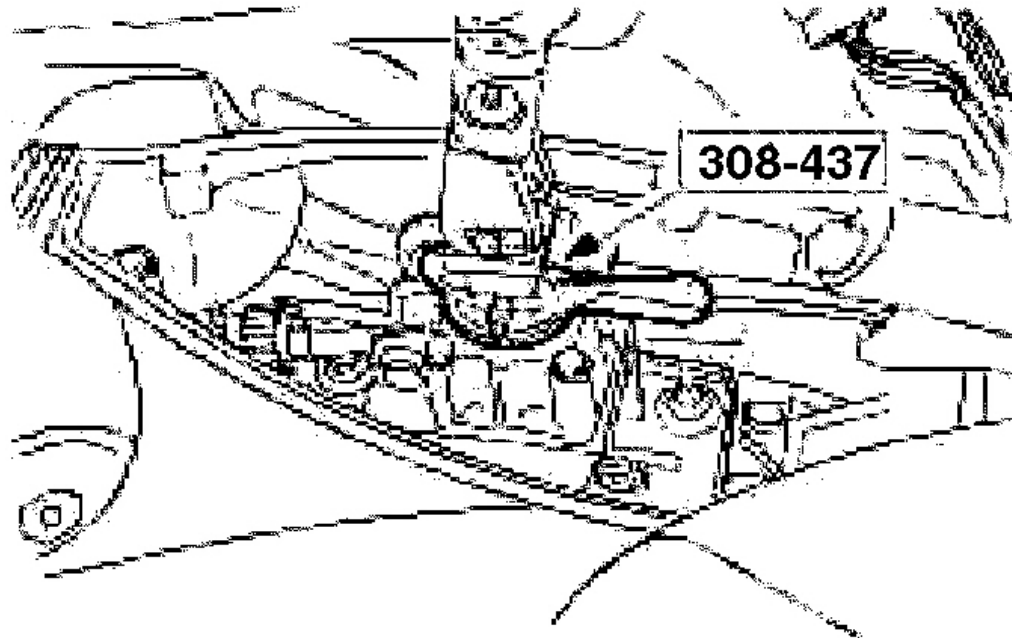
NOTE: Stop from turning using an Allen key.



G03431781

Fig. 176: Slackening Suspension Strut Nuts
Courtesy of FORD MOTOR CO.

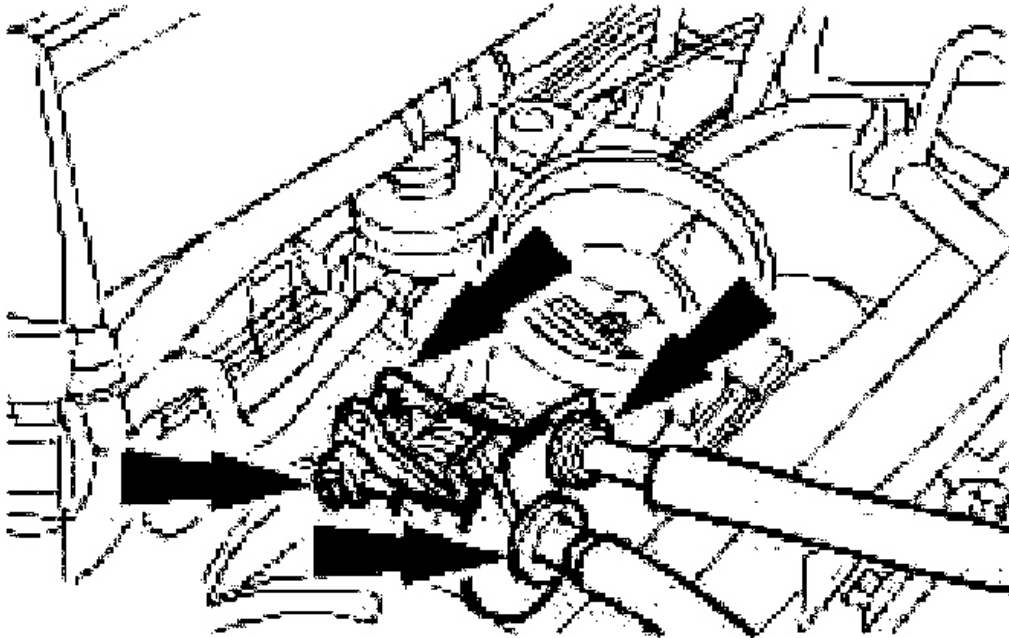
12. Slacken the suspension strut nuts by five turns on both sides.
13. Remove both front wheels and tires. .
14. Lock the driver's gear shift lever using the special tool.
 - Move the shift lever to neutral.
 - Detach the shift lever cover and insert the special tool.



G03431782

Fig. 177: Detaching Shift Lever Cover And Inserting Special Tool
Courtesy of FORD MOTOR CO.

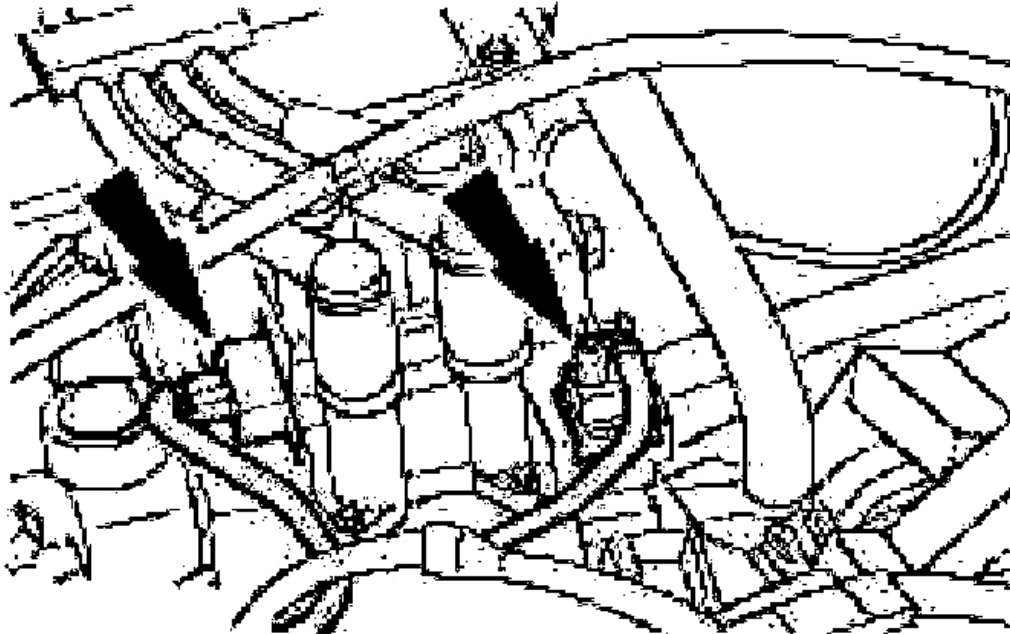
15. Detach the accelerator cable and the speed control cable (if equipped).



G03431783

Fig. 178: Removing Accelerator Cable And Speed Control Cable
Courtesy of FORD MOTOR CO.

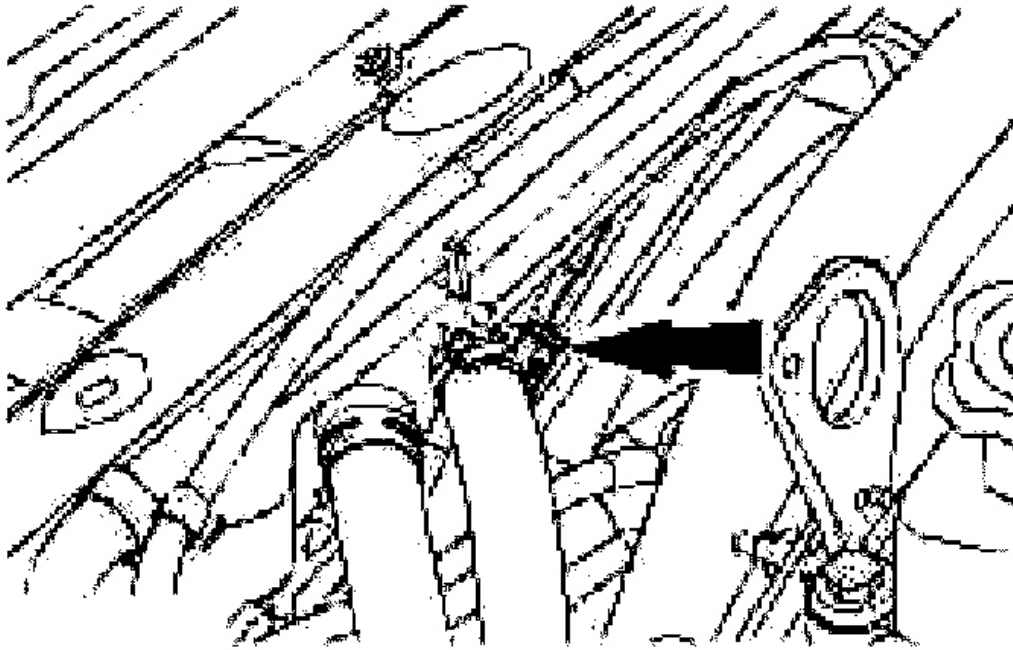
16. Pull off the connectors of the EI coil and the radio interference filter.



G03431784

Fig. 179: Removing Connectors Of EI Coil And Radio Interference Filter
Courtesy of FORD MOTOR CO.

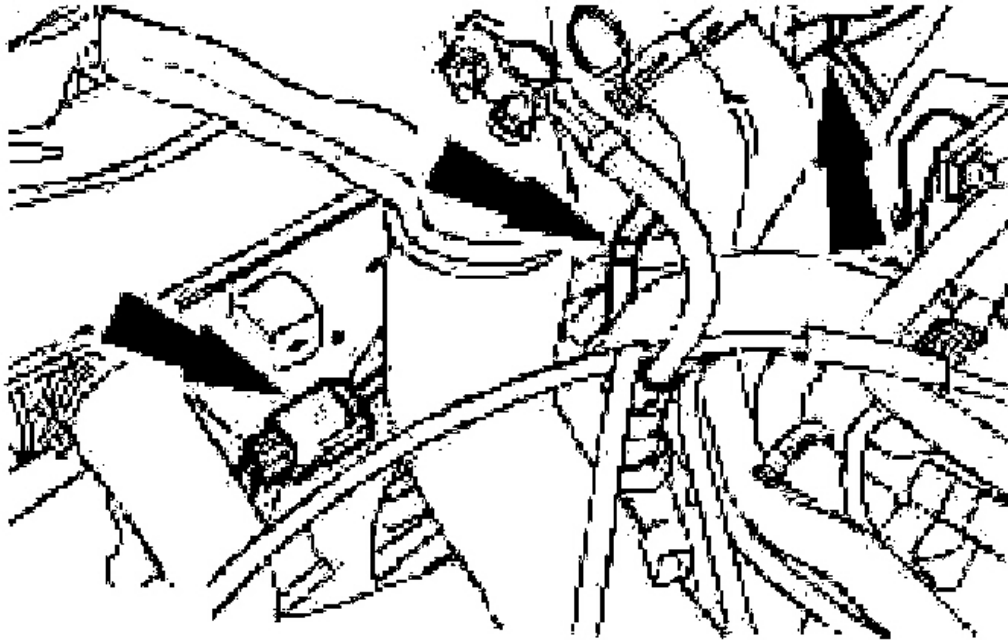
17. Separate the heated oxygen sensor (HO2S) connector.



G03431785

Fig. 180: Separating Heated Oxygen Sensor (HO2S) Connector
Courtesy of FORD MOTOR CO.

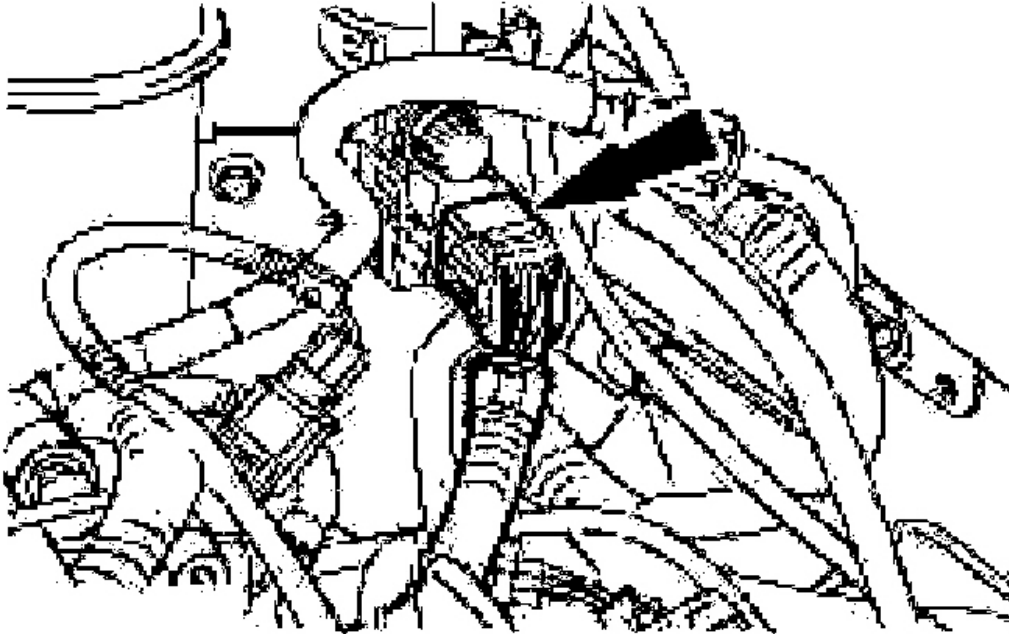
18. Disconnect the radiator fan plug.
 - Separate the cable ties.



G03431786

Fig. 181: Disconnecting Radiator Fan Plug
Courtesy of FORD MOTOR CO.

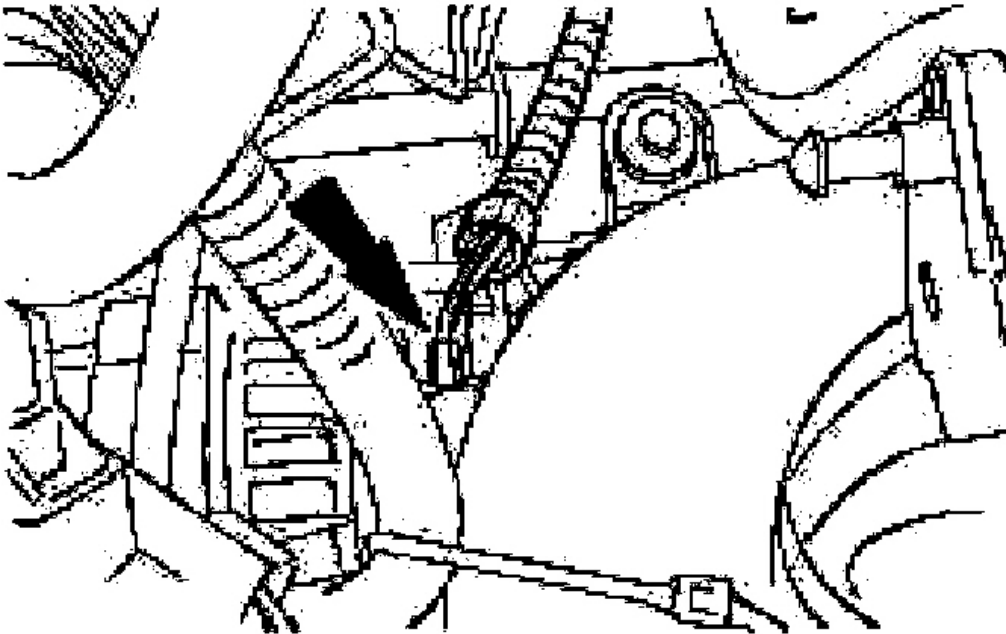
19. Disconnect the fuel injector wiring.



G03431787

Fig. 182: Disconnecting Fuel Injector Wiring
Courtesy of FORD MOTOR CO.

20. Disconnect the ground strap from the engine lifting eye.
21. Pull off the generator connector.



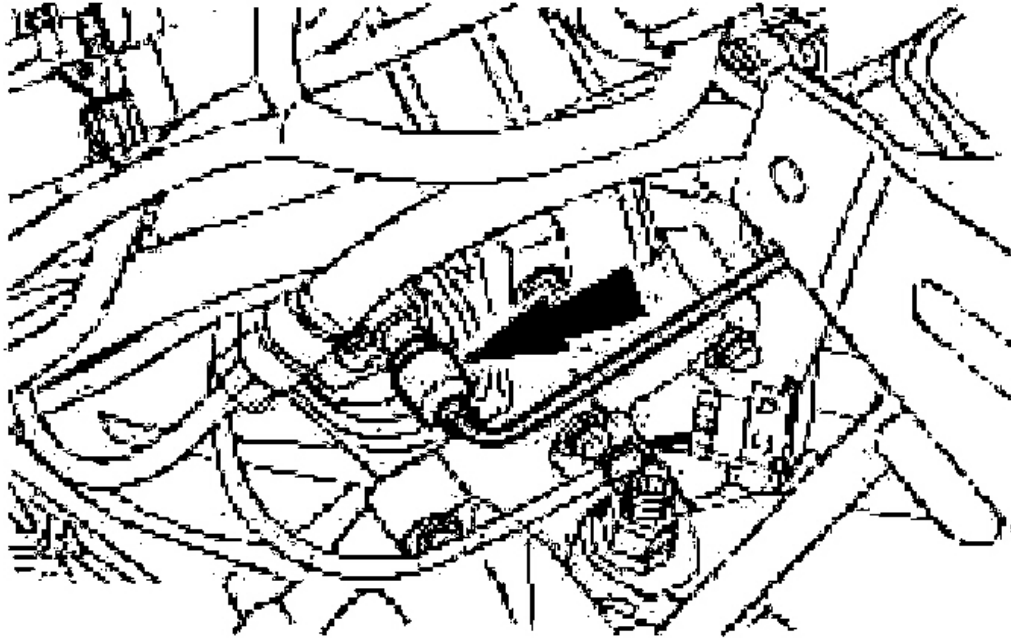
G03431788

Fig. 183: Disconnecting Generator Connector
Courtesy of FORD MOTOR CO.

WARNING: Escaping brake fluid. Do not allow brake fluid to come into contact with the skin or eyes. If brake fluid should come into contact with your skin or eyes, rinse the affected area immediately with water.

CAUTION: If any brake fluid gets on the paintwork wash it off immediately with water.

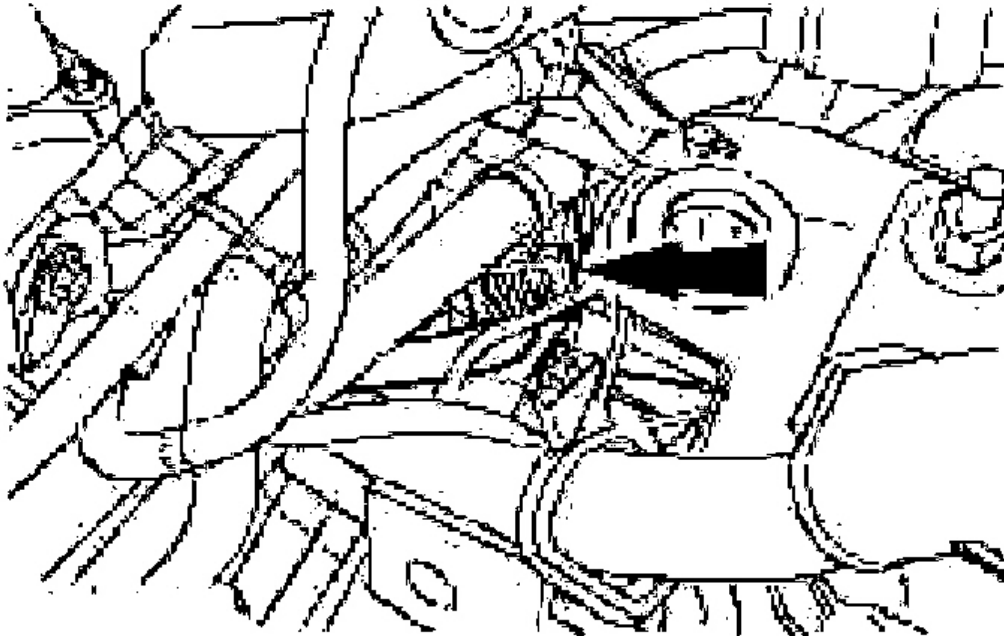
22. Detach the high-pressure pipe from the clutch slave cylinder.
 - Pull out the clip.
 - Pull out the high-pressure pipe and tie it up with cable ties.



G03431789

Fig. 184: Removing High-Pressure Pipe From Clutch Slave Cylinder
Courtesy of FORD MOTOR CO.

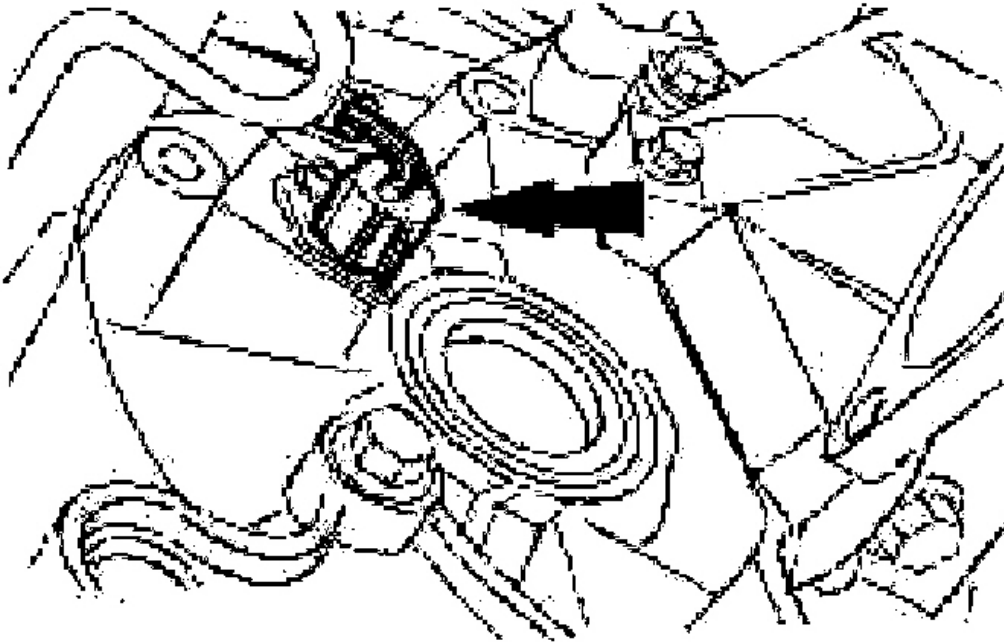
23. Separate the harness connector.



G03431790

Fig. 185: Separating Harness Connector
Courtesy of FORD MOTOR CO.

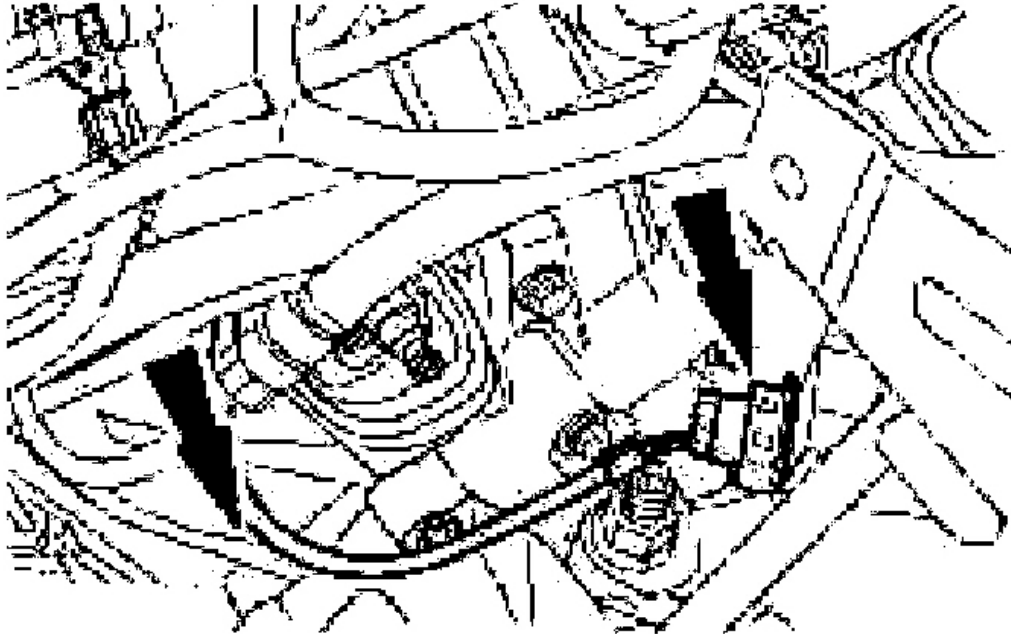
24. Raise and support the vehicle.
25. Disconnect the plug of the vehicle speed sensor (VSS)



G03431791

Fig. 186: Disconnecting Plug Of Vehicle Speed Sensor (VSS)
Courtesy of FORD MOTOR CO.

26. Disconnect the plug for the reversing lamp switch and the crankshaft position sensor (CKP sensor).
 - Unclip the wiring loom from the engine.

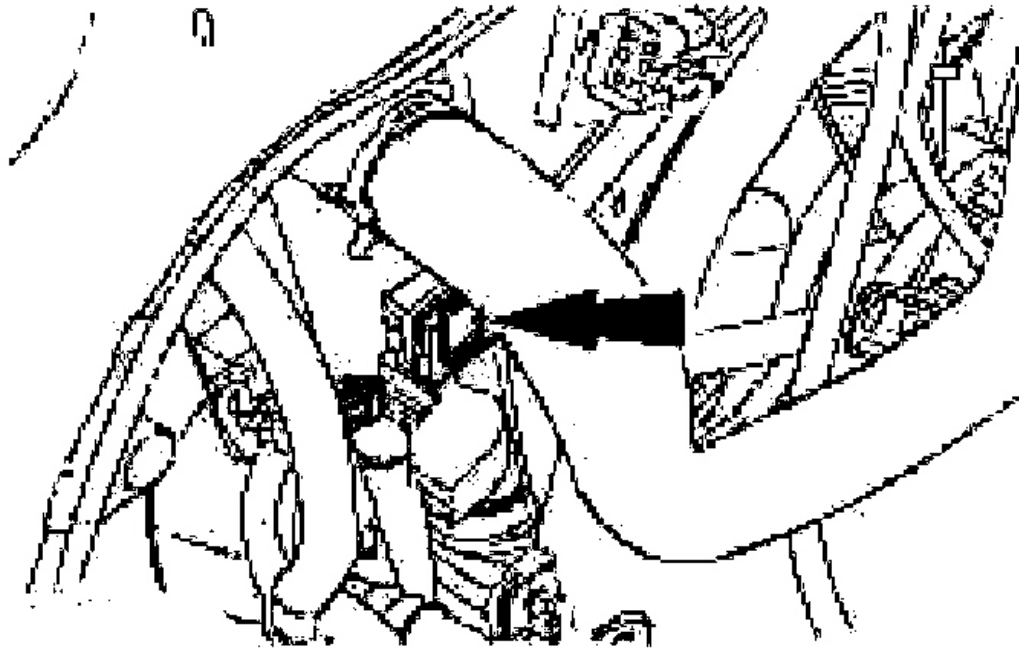


G03431792

Fig. 187: Disconnecting Plug For Reversing Lamp Switch And Crankshaft Position Sensor (CKP Sensor)

Courtesy of FORD MOTOR CO.

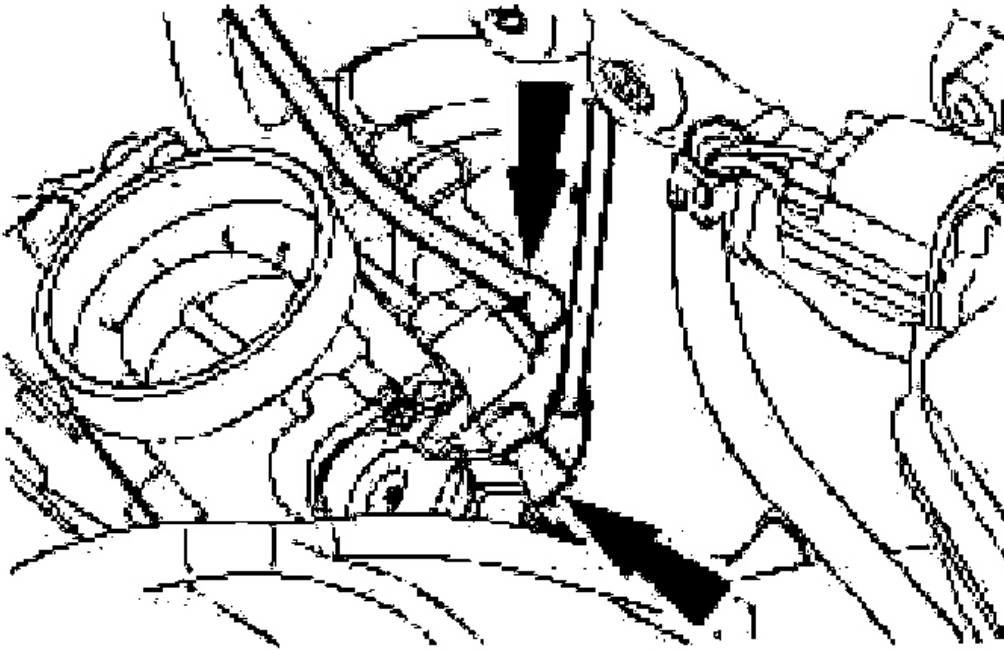
27. Remove the air deflector and the radiator fan.
 - Undo the clips on both sides (left side shown).
 - Unhook the air deflector upwards and remove it downwards.



G03431793

Fig. 188: Removing Air Deflector And Radiator Fan
Courtesy of FORD MOTOR CO.

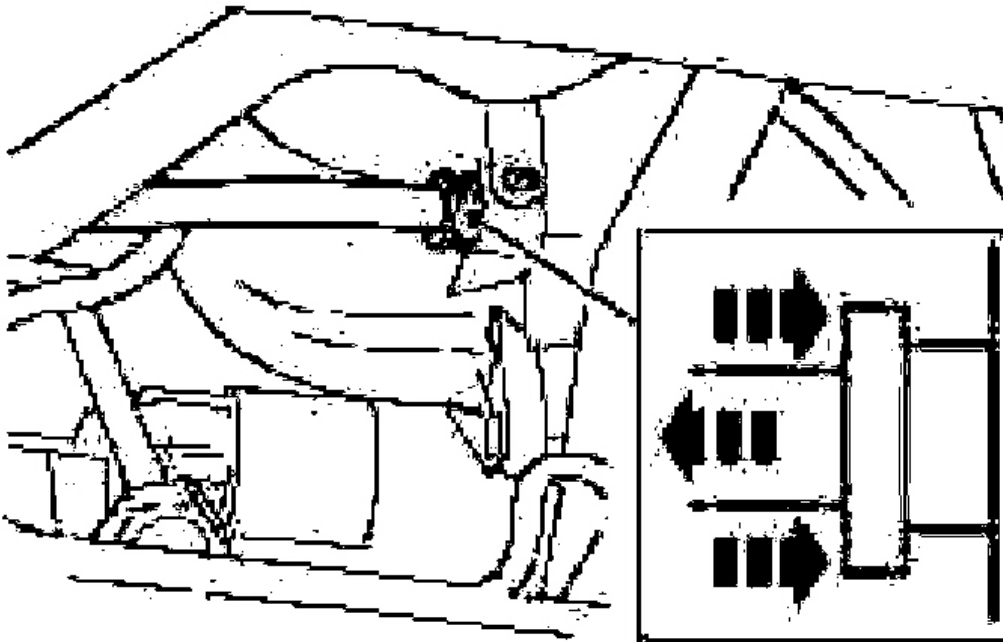
28. Partially lower the vehicle.
29. Pull off the low pressure hoses.



G03431794

Fig. 189: Removing Low Pressure Hoses
Courtesy of FORD MOTOR CO.

30. Detach the brake servo vacuum hose.

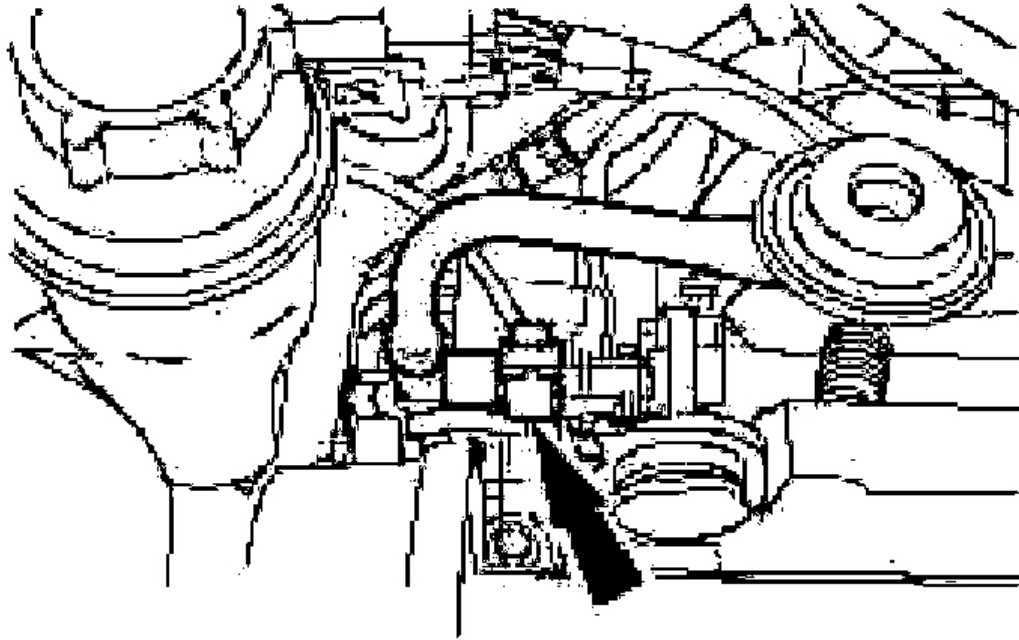


G03431795

Fig. 190: Removing Brake Servo Vacuum Hose
Courtesy of FORD MOTOR CO.

WARNING: Escaping fuel. Observe the safety regulations for working with fuel.

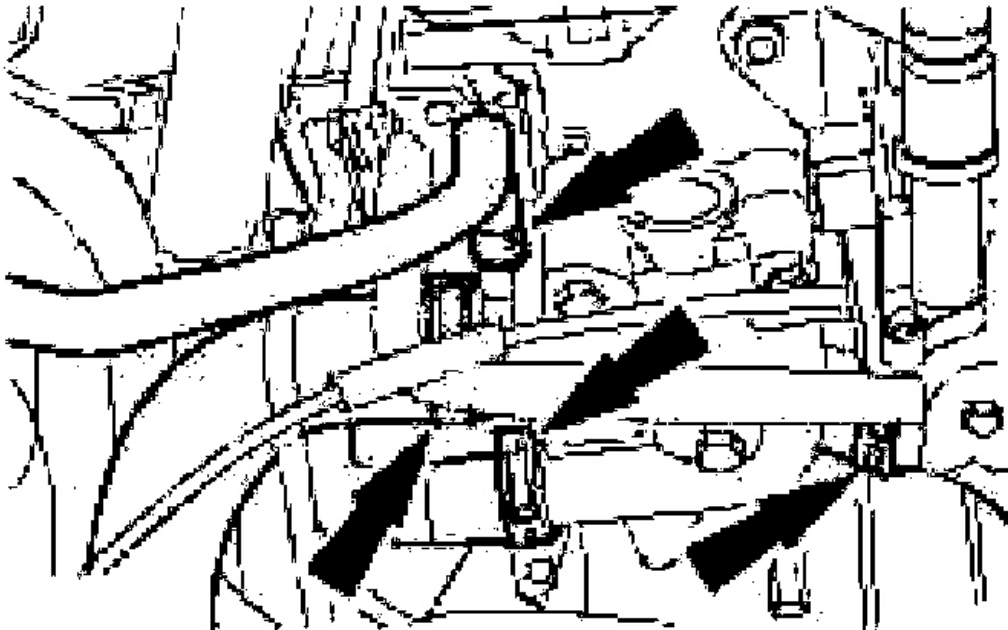
31. Detach the fuel pipes.
 - Detach the ground cable.



G03431796

Fig. 191: Removing Fuel Pipes
Courtesy of FORD MOTOR CO.

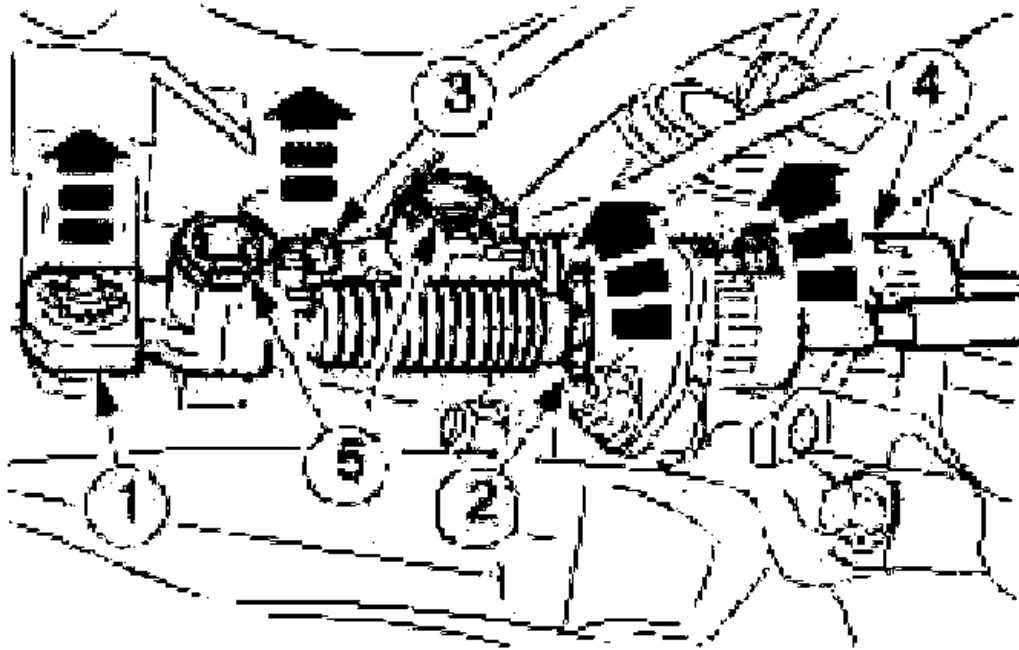
32. Detach the coolant hoses.



G03431797

Fig. 192: Removing Coolant Hoses
Courtesy of FORD MOTOR CO.

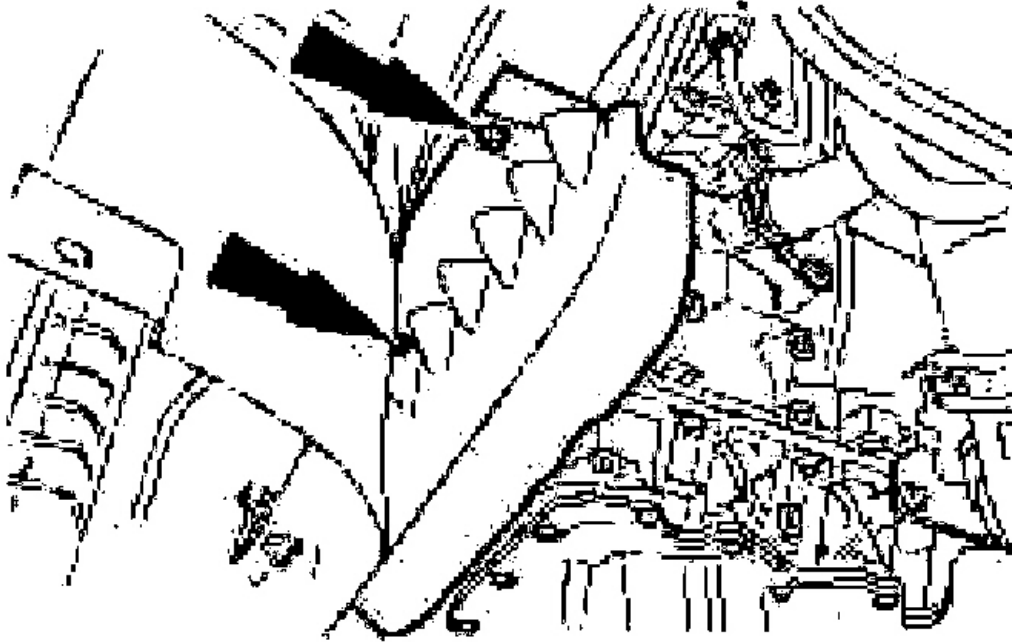
33. Detach the shift cable and selector cable from the transmission.
 1. Detach the shift cable from the gear lever.
 2. Pretension the abutment collars by turning them in an anti-clockwise direction and remove the cable assembly from the bracket.
 3. Detach the selector cable from the selector lever.
 4. Pretension the abutment collars by turning them in an anti-clockwise direction and remove the cable assembly from the bracket.
 5. Undo the adjustment mechanism by pressing it in.



G03431798

Fig. 193: Removing Shift Cable And Selector Cable From Transmission
Courtesy of FORD MOTOR CO.

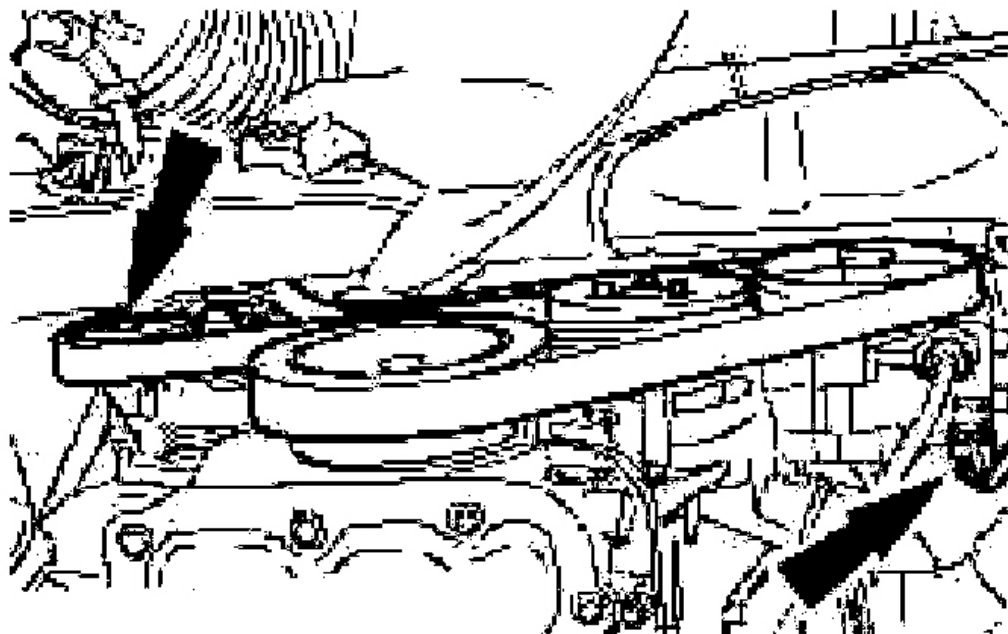
34. Raise and support the vehicle.
35. Remove the drive belt cover.



G03431799

Fig. 194: Removing Drive Belt Cover
Courtesy of FORD MOTOR CO.

36. Disconnect the power steering pressure switch (PSPS), slacken the drive belt and remove it (vehicle without air conditioning shown).
 - Turn the belt tensioner clockwise.



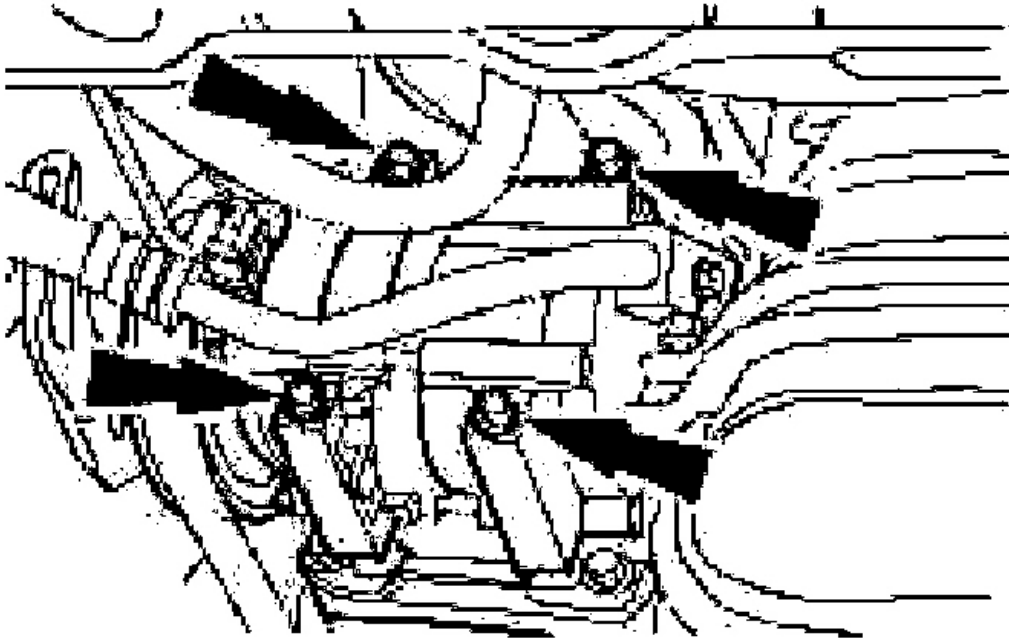
G03431800

Fig. 195: Disconnecting Power Steering Pressure Switch (PSPS) And Removing Drive Belt

Courtesy of FORD MOTOR CO.

Vehicles with air conditioning

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

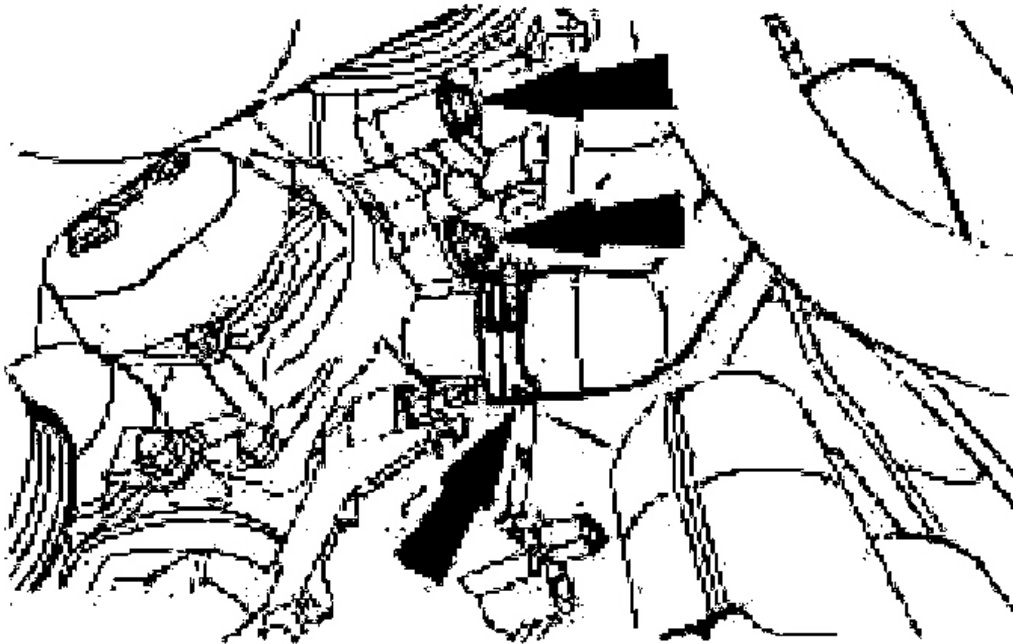


G03431801

Fig. 196: Removing Air Conditioning Compressor
Courtesy of FORD MOTOR CO.

All vehicles

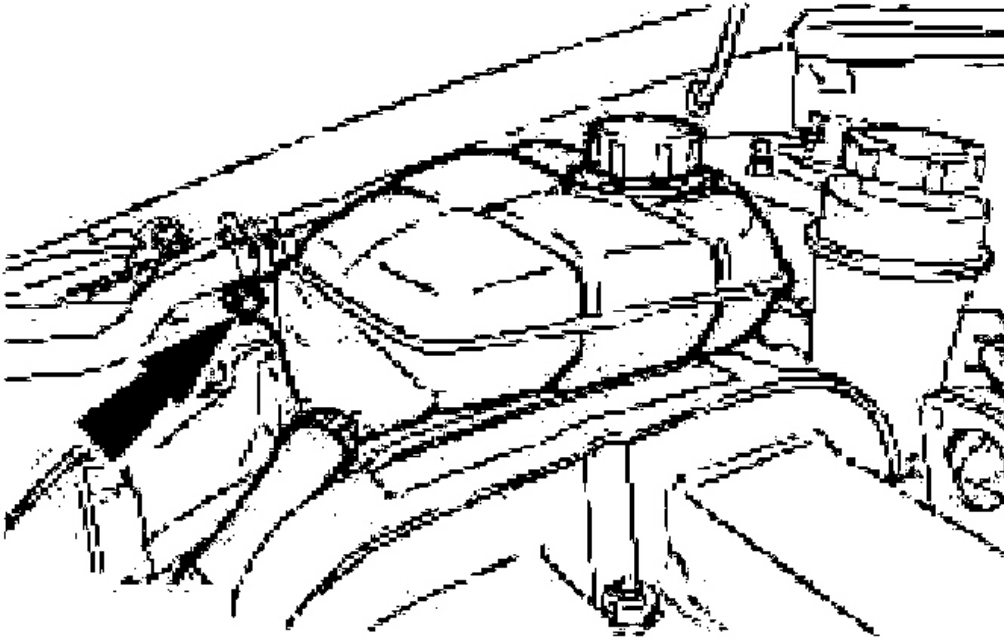
38. Detach the coolant hose and remove the power steering pump bolts.



G03431802

Fig. 197: Removing Coolant Hose And Power Steering Pump Bolts
Courtesy of FORD MOTOR CO.

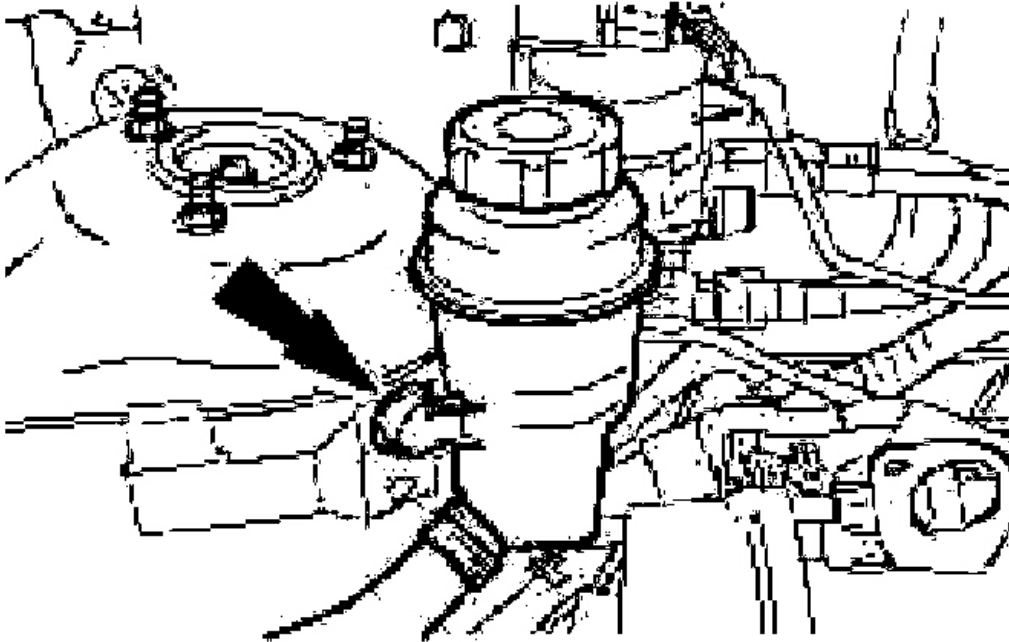
39. Lower the vehicle.
40. Detach the coolant expansion tank and position it to one side.



G03431803

Fig. 198: Removing Coolant Expansion Tank
Courtesy of FORD MOTOR CO.

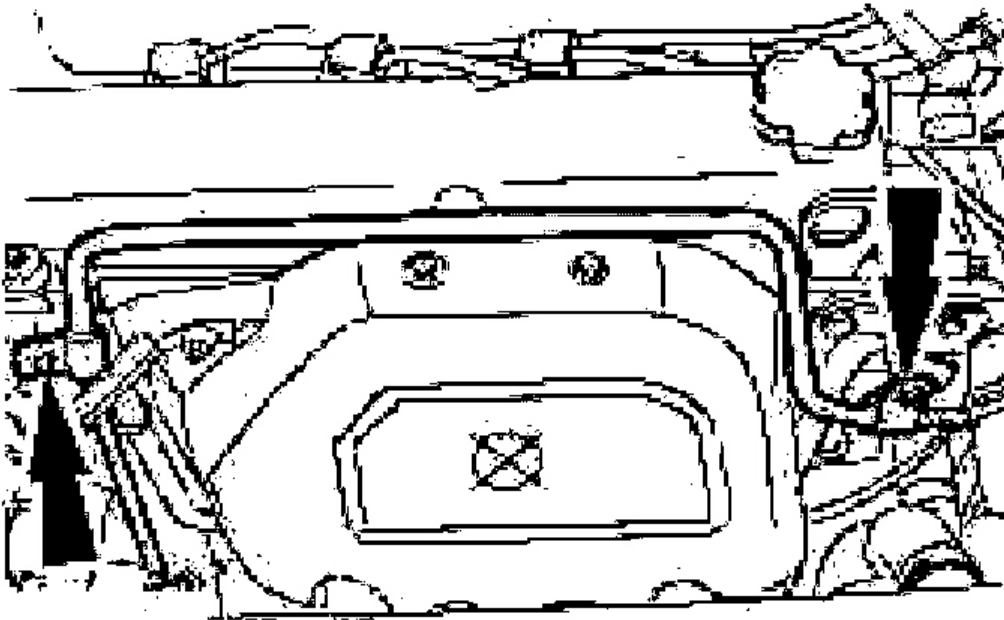
41. Remove the PAS reservoir and position it to one side.



G03431804

Fig. 199: Removing PAS Reservoir
Courtesy of FORD MOTOR CO.

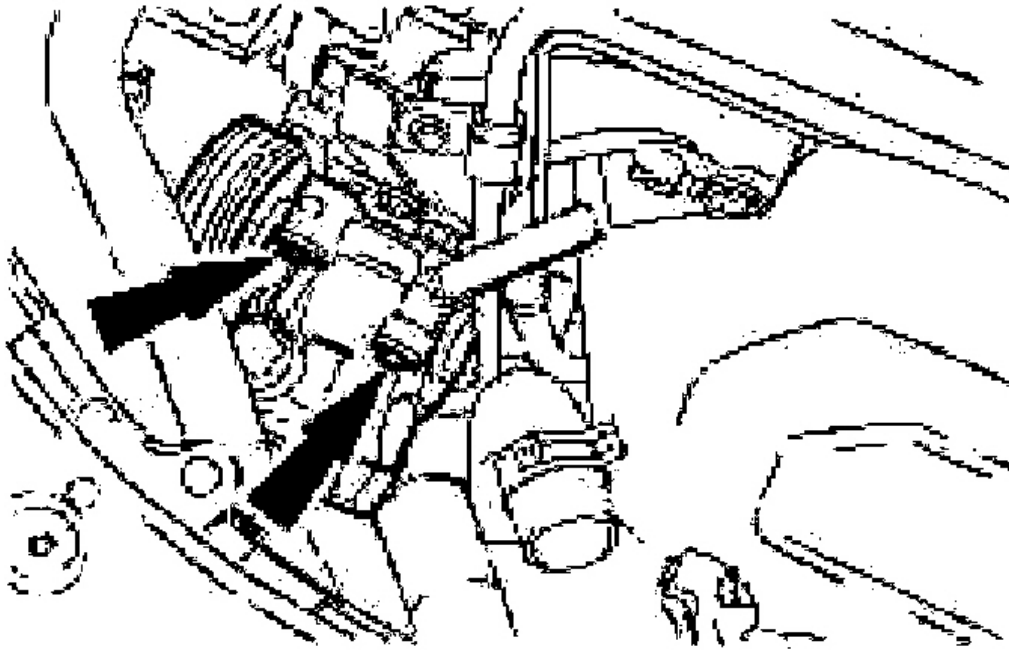
42. Detach the bracket of the power steering high-pressure pipe.



G03431805

Fig. 200: Removing Bracket Of Power Steering High-Pressure Pipe
Courtesy of FORD MOTOR CO.

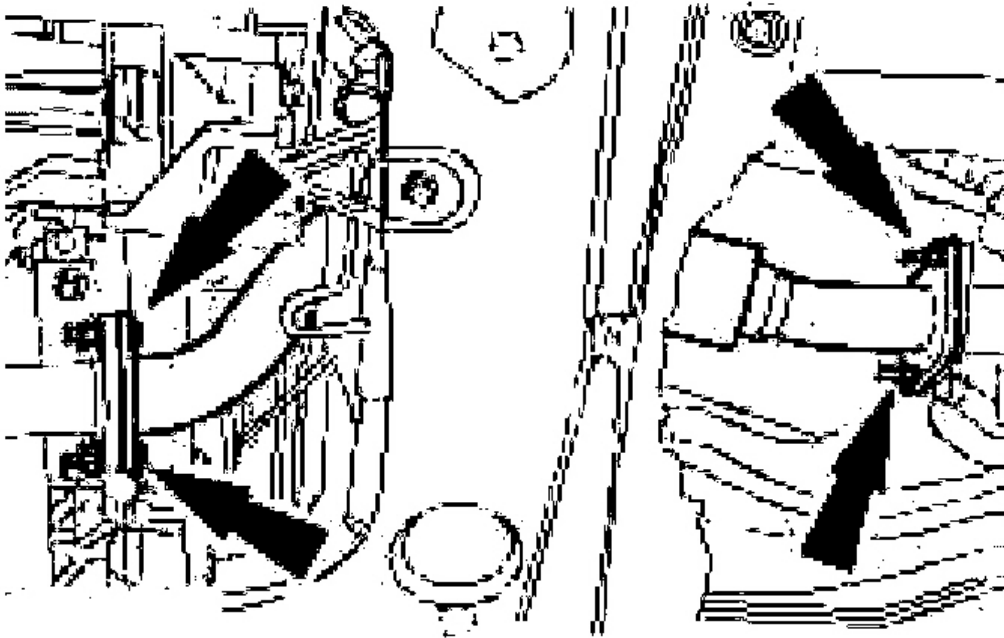
43. Detach the power steering pump and tie it up with cable ties.



G03431806

Fig. 201: Removing Power Steering Pump
Courtesy of FORD MOTOR CO.

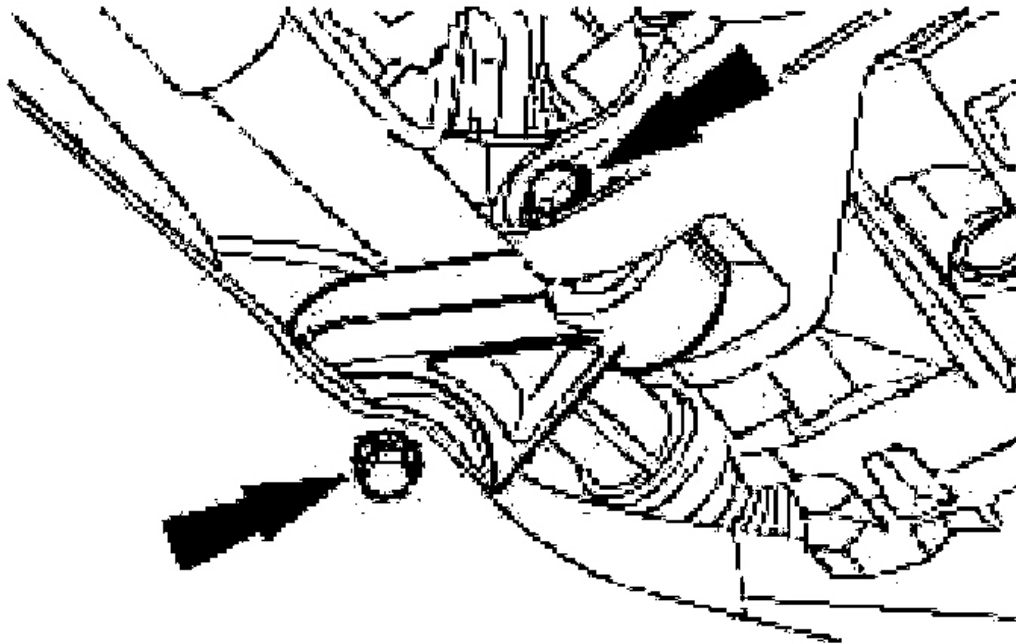
44. Raise and support the vehicle.
45. Remove the flexible exhaust pipe.



G03431807

Fig. 202: Removing Flexible Exhaust Pipe
Courtesy of FORD MOTOR CO.

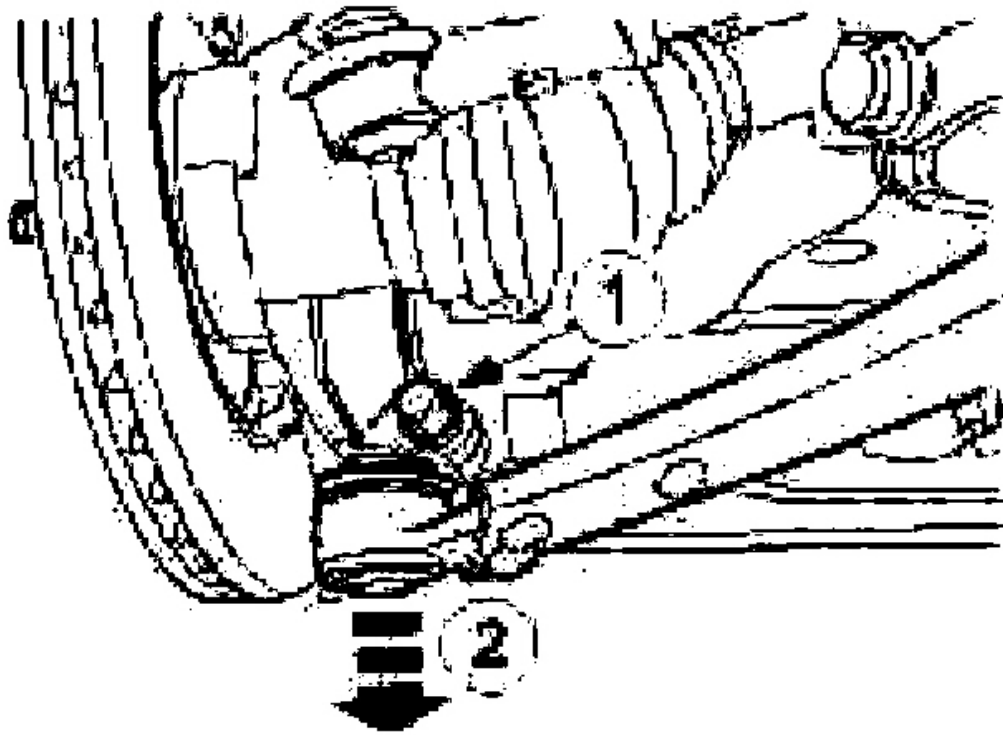
46. Remove the engine roll restrictor.



G03431808

Fig. 203: Removing Engine Roll Restrictor
Courtesy of FORD MOTOR CO.

47. Detach both suspension arms (left-hand side shown).
 1. Remove the bolt.
 2. Detach the lower arm ball joint.

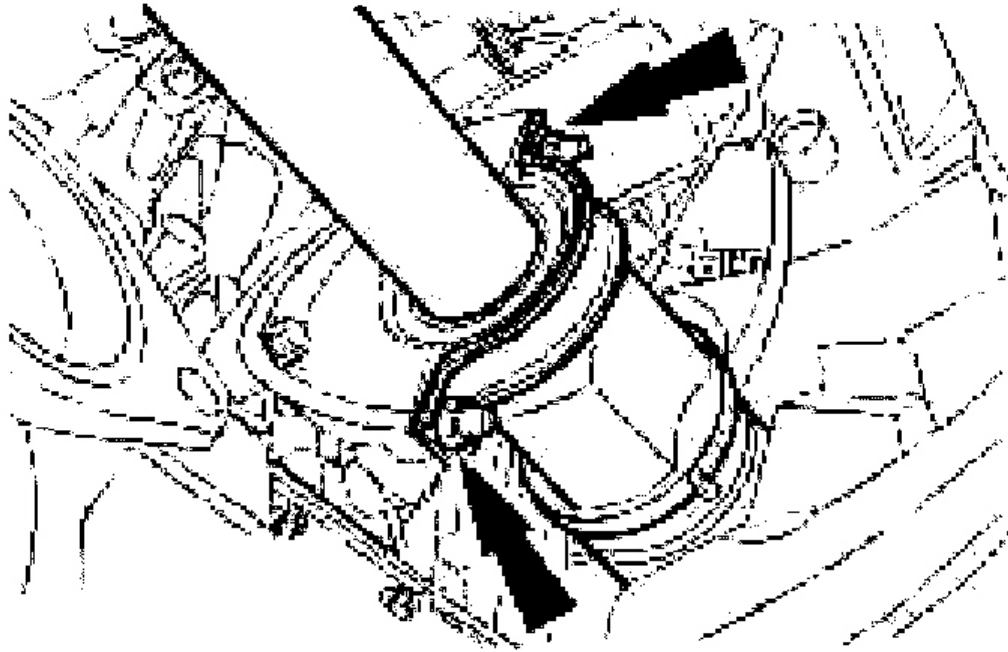


G03431809

Fig. 204: Removing Lower Arm Ball Joint And 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.

48. Detach the right-hand front drive halfshaft with intermediate shaft.
- Detach the intermediate shaft bearing cap.
 - Discard the nuts and bearing cap.
 - Pull the intermediate shaft with front drive halfshaft from the transmission and tie up with cable ties.
 - Close off the transmission with auxiliary plugs.



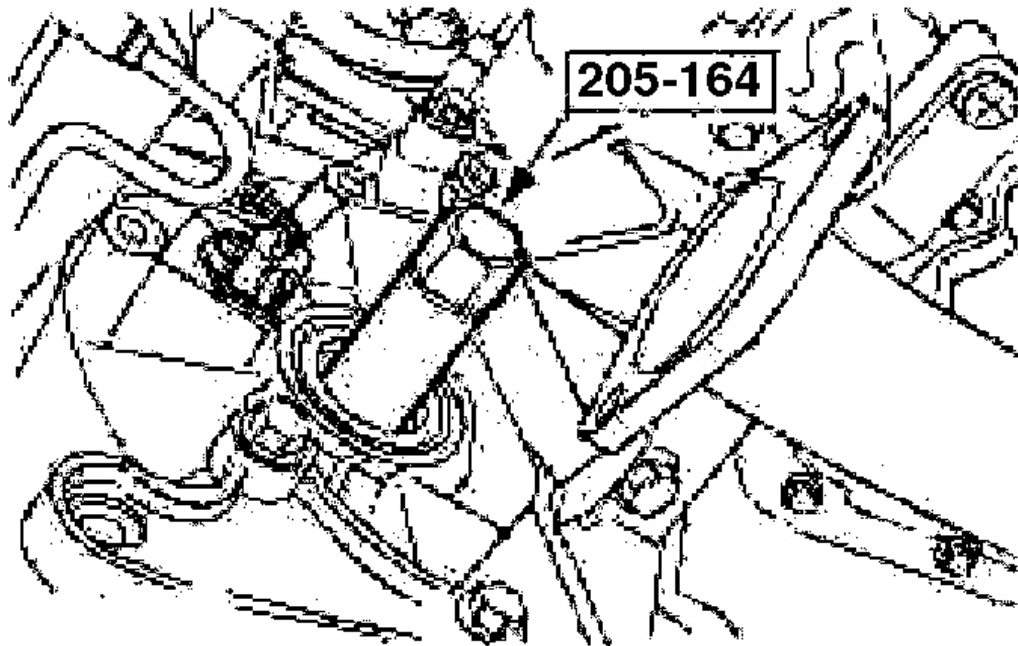
G03431810

Fig. 205: Removing Right-Hand Front Drive Halfshaft With 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.

49. Detach the left-hand front drive halfshaft from the transmission using the special tool.
 - Pull out the front drive halfshaft and tie up with cable ties.
 - Close off the transmission with auxiliary plugs.



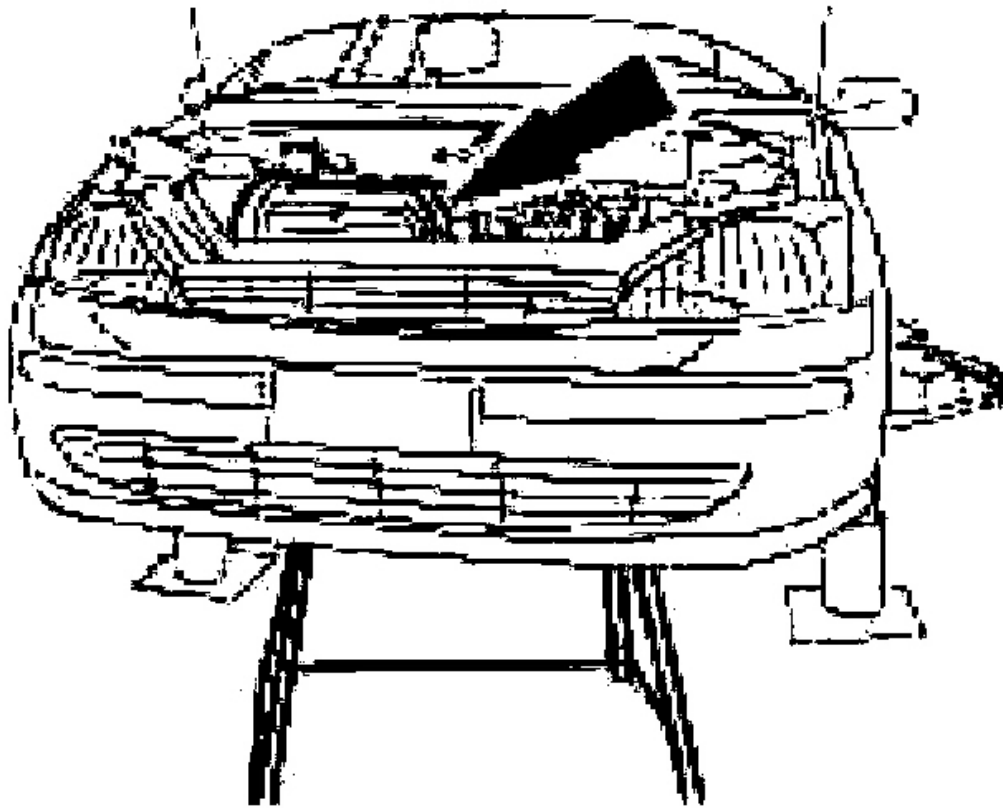
G03431811

Fig. 206: Removing Left-Hand Front Drive Halfshaft From Transmission
Using Special Tool
Courtesy of FORD MOTOR CO.

50. Put the assembly table with wooden blocks on it under the vehicle.
51. Carefully lower the vehicle until the engine and transmission assembly is positioned on the assembly stand.
52. Secure the engine and transmission assembly to the assembly stand with a retaining strap.

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

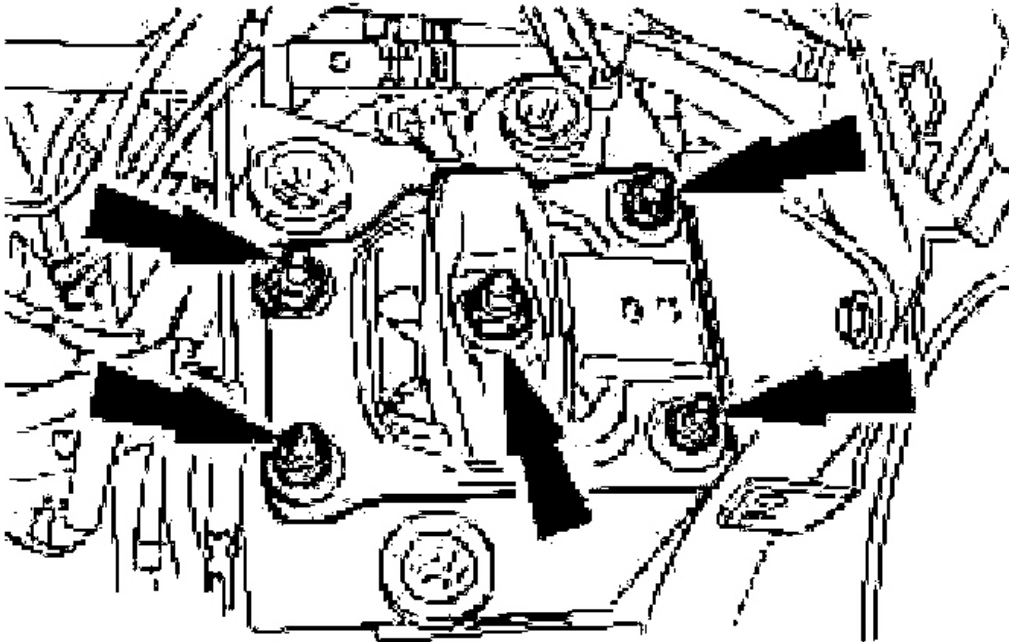


G03431812

Fig. 207: Securing Engine And Transmission Assembly To Assembly Stand With Retaining Strap

Courtesy of FORD MOTOR CO.

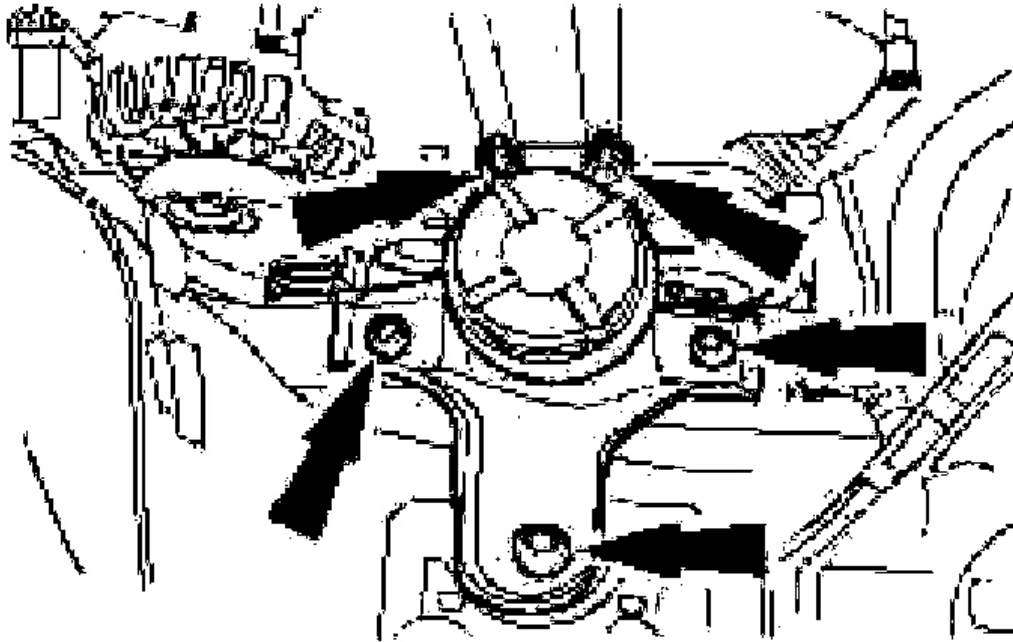
53. Remove the engine rear mounting.



G03431813

Fig. 208: Removing Engine Rear Mounting
Courtesy of FORD MOTOR CO.

54. Remove the engine front mounting.



G03431814

Fig. 209: Removing Engine Front Mounting
Courtesy of FORD MOTOR CO.

55. Carefully raise the vehicle.
 - Pull forwards the assembly stand with the engine and transmission assembly.
56. Hook the engine and transmission assembly into the crane.

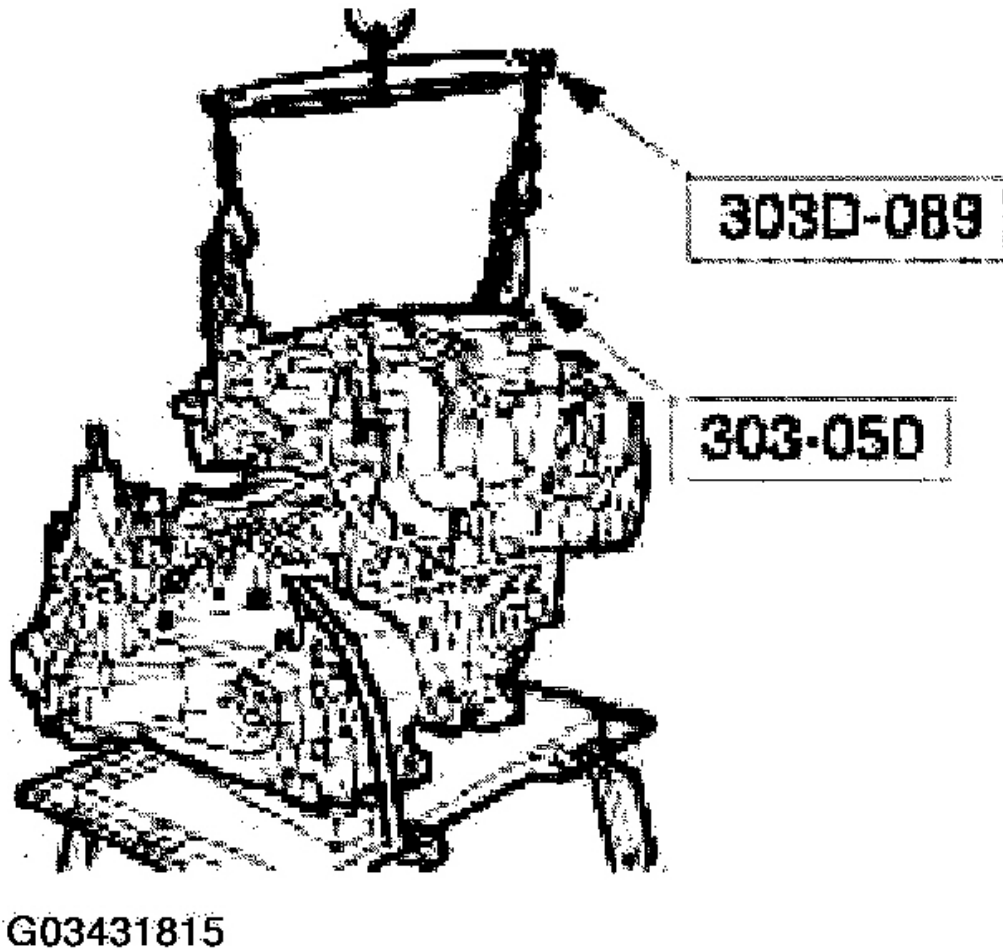
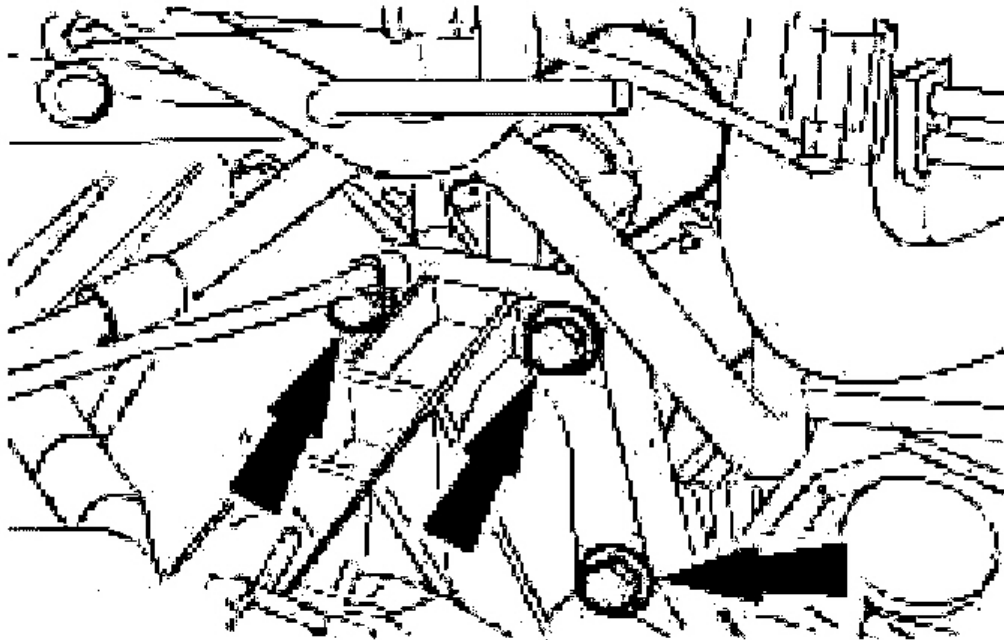


Fig. 210: Hooking Engine And Transmission Assembly Into Crane
Courtesy of FORD MOTOR CO.

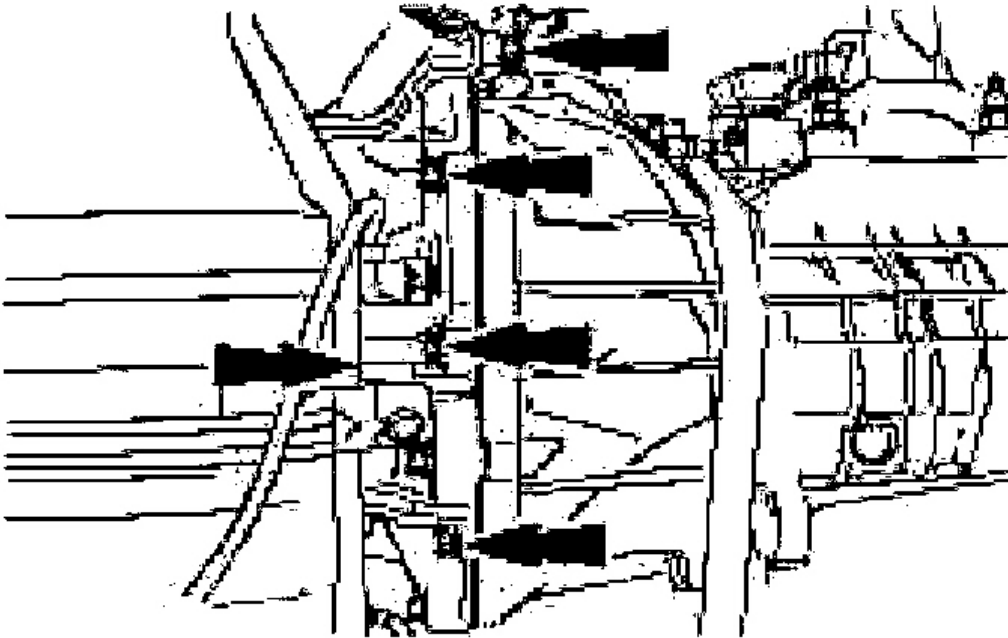
57. Remove the starter motor and ground cable.



G03431816

Fig. 211: Removing Starter Motor And Ground Cable
Courtesy of FORD MOTOR CO.

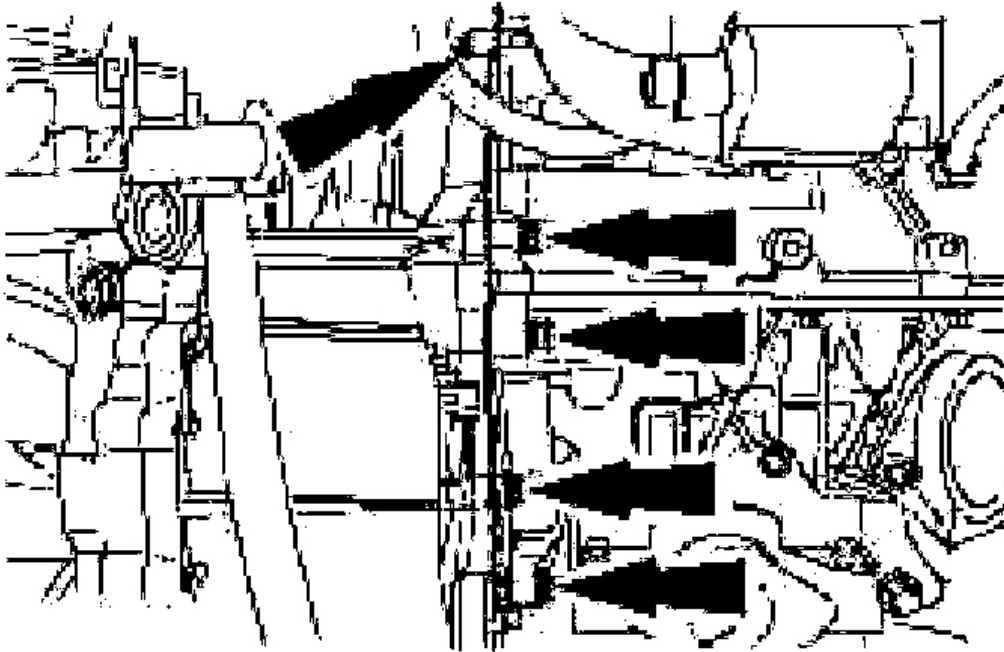
58. Remove the flange bolts.



G03431817

Fig. 212: Removing Flange Bolts (1 Of 2)
Courtesy of FORD MOTOR CO.

59. Remove the flange bolts (continued).



G03431818

Fig. 213: Removing Flange Bolts (2 Of 2)
Courtesy of FORD MOTOR CO.

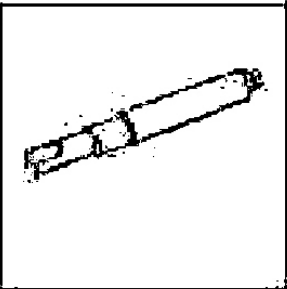

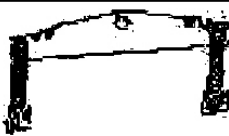
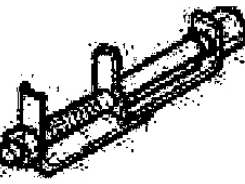
60. Separate the engine from the transaxle.

ENGINE - VEHICLES WITH: AUTOMATIC TRANSAXLE

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

	Rotator, Differential 205-164 (T81P-4026-A)
	Bracket, Engine Lifting 303-050 (T70P-6000)
	Spreader Bar 303-D089 (D93P-6001-A3)
	Remover/Installer, Cooling Hose Clamp 412-108 (T96P-18539-A)

G03431819

Fig. 214: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

Cable ties

Removal

All Vehicles

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

1. General remarks.

- The positions of the engine mounting and the engine roll restrictor are described looking from the transmission towards the engine.
- If necessary, use Special Tool 412-108 to remove coolant and ventilation hoses.
- Owing to special model variants, some steps do not apply to all vehicles. These are clearly marked in the text.
- If necessary, separate the cable ties and install new on installation.

2. Release the fuel pressure. For additional information, refer to **FUEL SYSTEM PRESSURE RELEASE** .

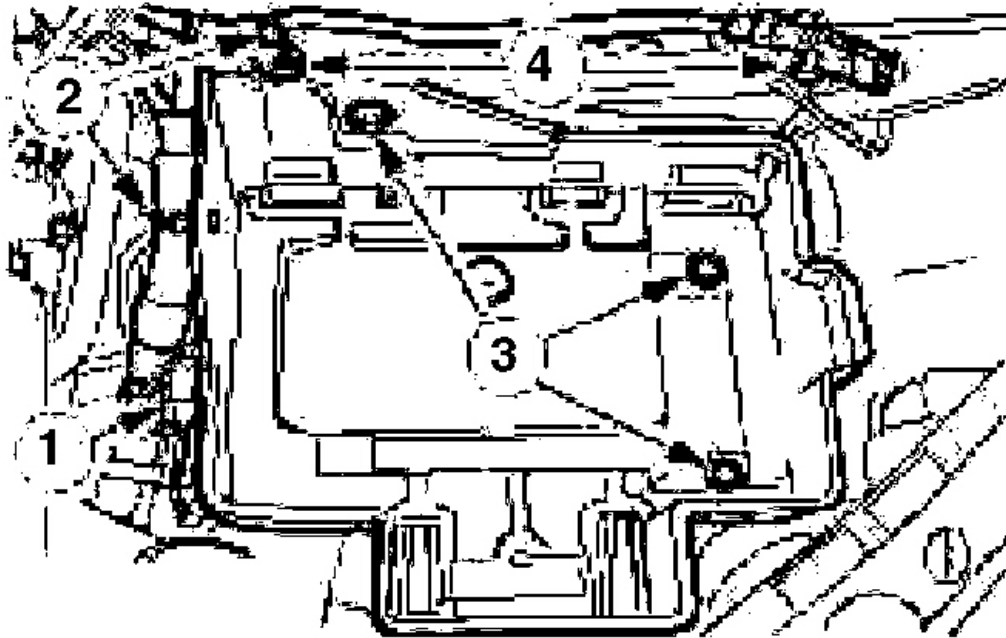
WARNING: To prevent the risk of scalding, place a thick cloth over the filler cap before opening the cooling circuit. Failure to do so can result in injury.

3. Open the coolant expansion tank.

CAUTION: Disconnect the battery positive and negative cables. Remove the battery.

4. Remove the battery tray and detach the ground cable.

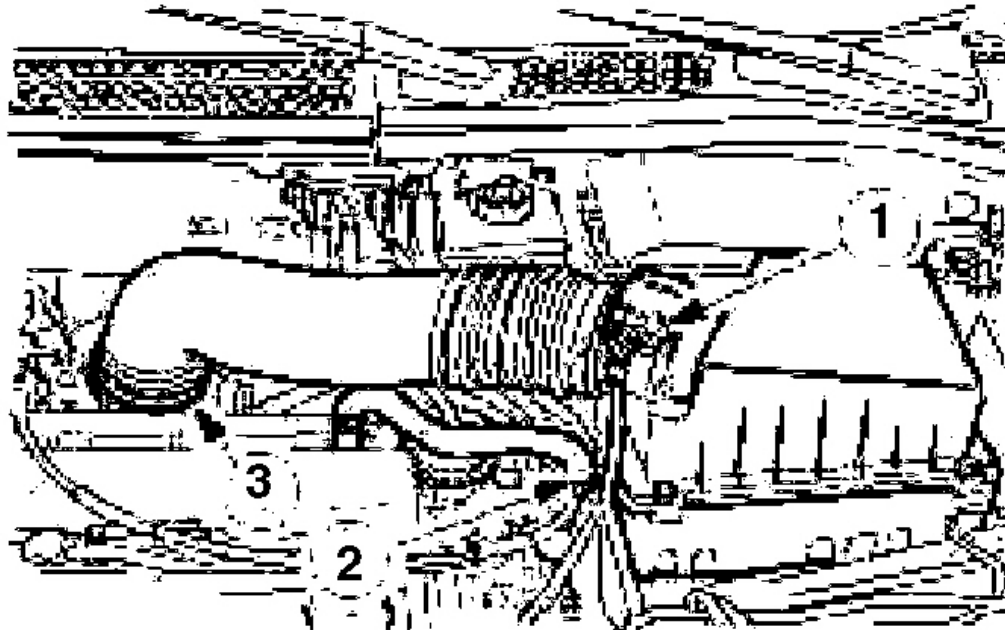
1. Unclip and separate the connector.
2. Unclip the wiring harness.
3. Unscrew the bolts.
4. Detach the positive and negative cables.



G03431820

Fig. 215: Removing Battery Tray And Ground Cable
Courtesy of FORD MOTOR CO.

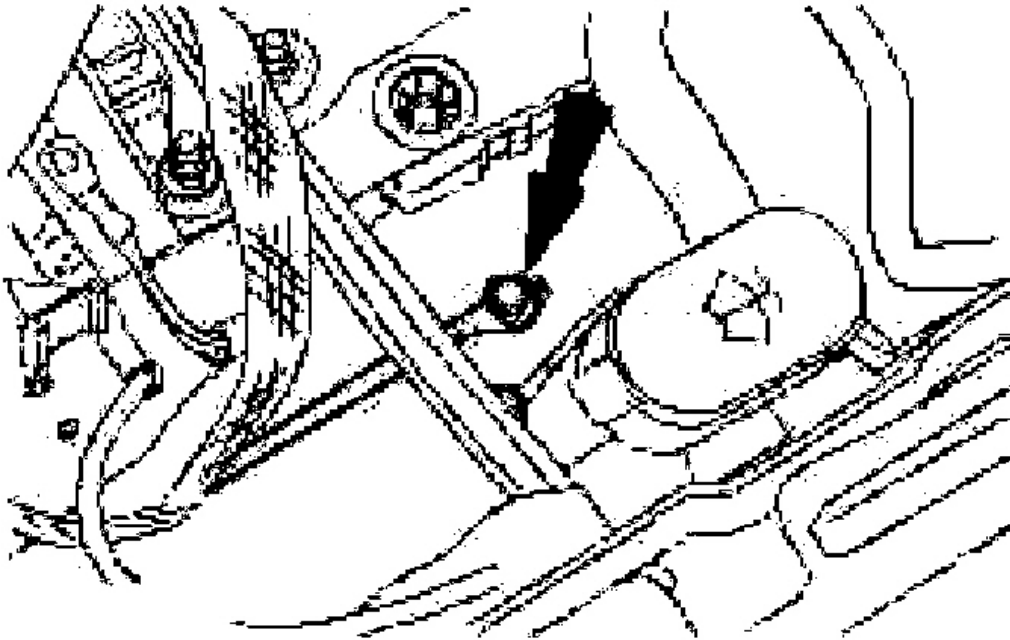
5. Remove the air cleaner housing.
 1. Detach the plug of the mass air flow (MAF) sensor.
 2. Detach the positive crankshaft ventilation (PCV) hose.
 3. Detach the intake hose.
 - Remove the air cleaner housing from the rubber bushing.



G03431821

Fig. 216: Removing Plug Of Mass Air Flow (MAF) Sensor
Courtesy of FORD MOTOR CO.

6. Detach the ground cable.

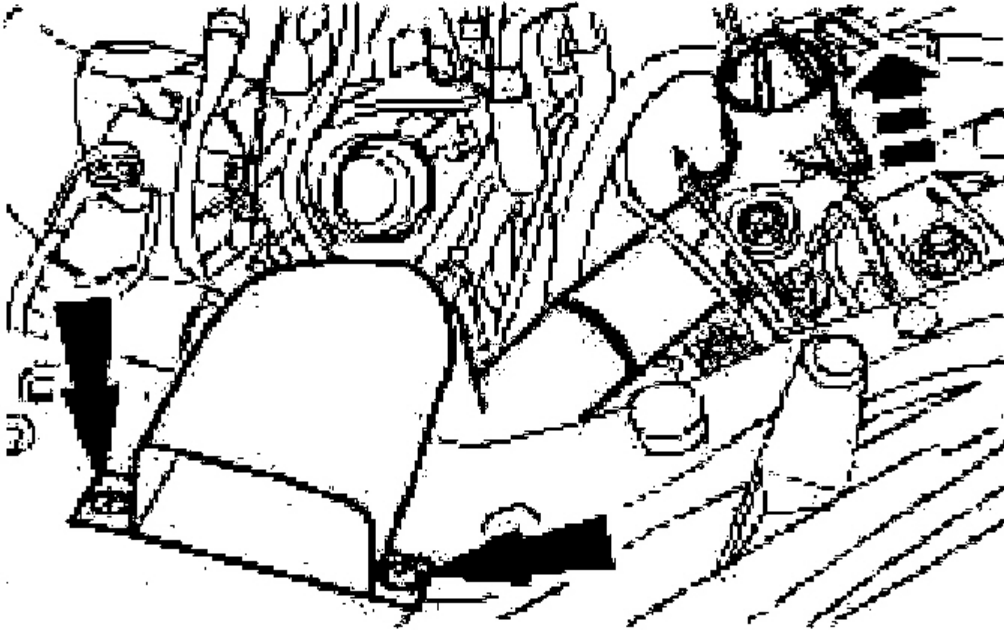


G03431822

Fig. 217: Removing Ground Cable
Courtesy of FORD MOTOR CO.

7. Detach the ground cable from the battery terminal.

NOTE: The resonator is a push fit in the bracket.



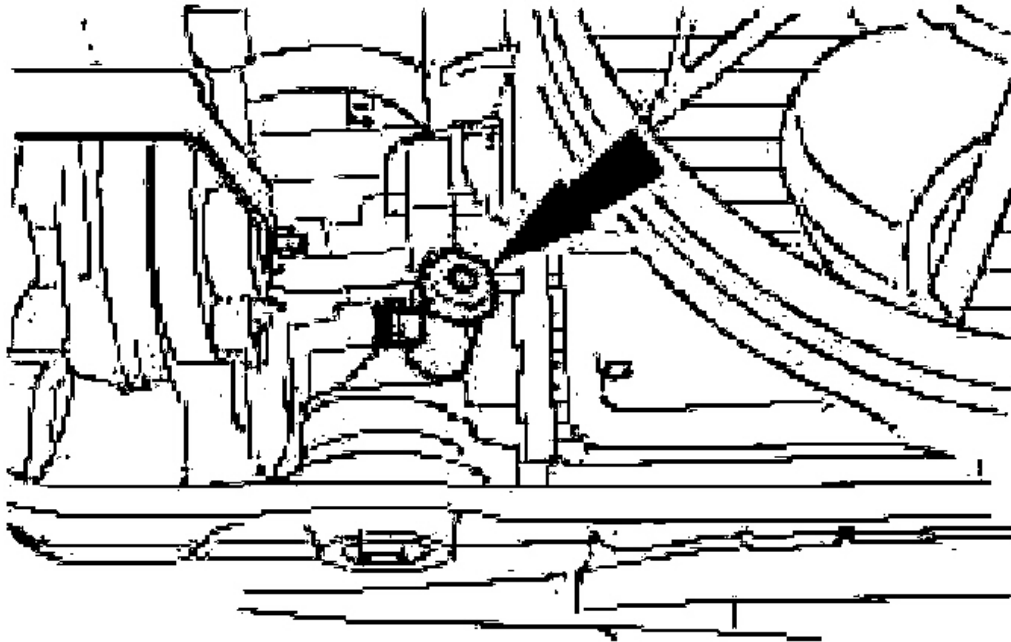
G03431823

Fig. 218: Removing Air Cleaner Intake With Resonator
Courtesy of FORD MOTOR CO.

8. Remove the air cleaner intake with resonator.

WARNING: Danger of scalding if the engine is warm.

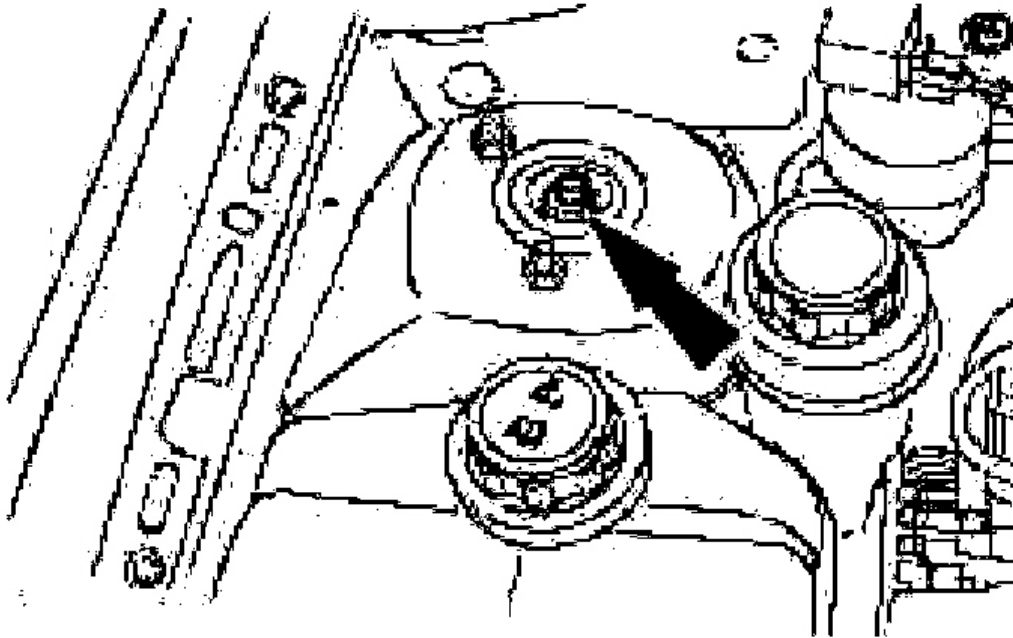
9. Drain the coolant.
 - Screw the drain plug back in after draining.



G03431824

Fig. 219: Installing Drain Plug After Draining
Courtesy of FORD MOTOR CO.

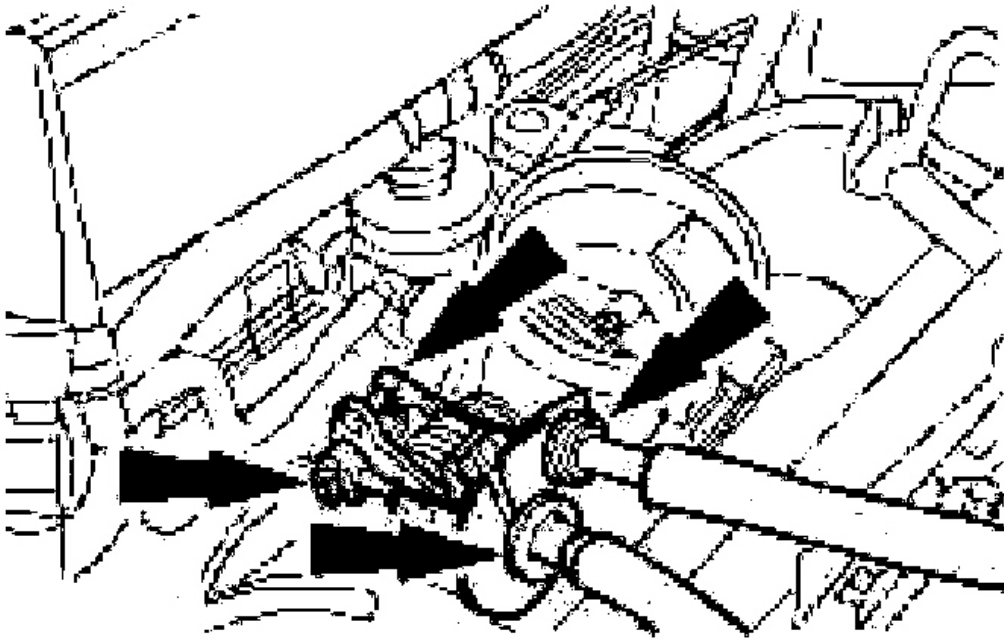
NOTE: Prevent the piston rod from turning, using an Allen key.



G03431825

Fig. 220: Slackening Suspension Strut Nuts
Courtesy of FORD MOTOR CO.

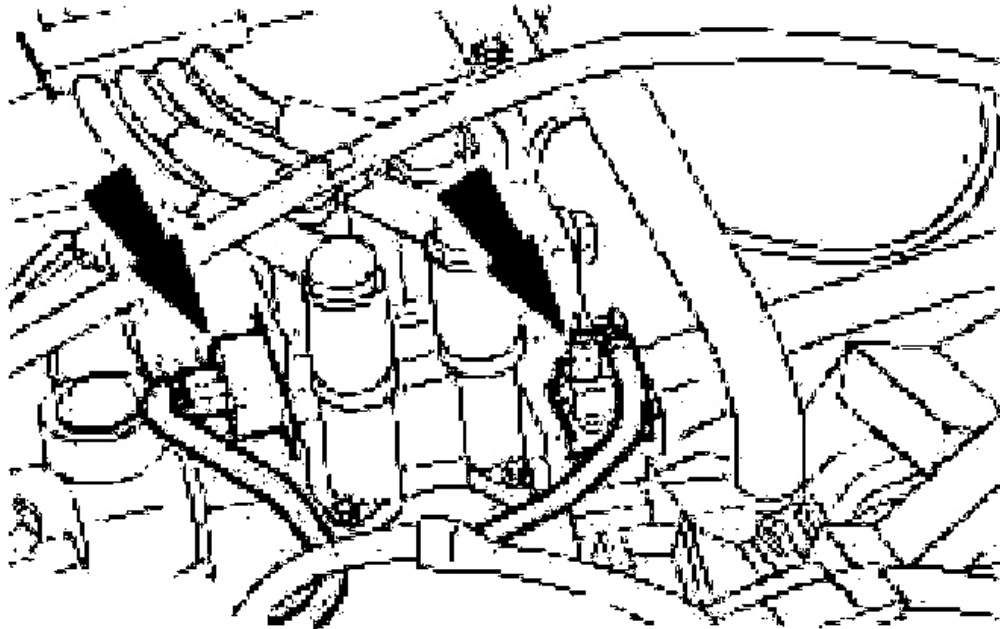
10. Slacken the suspension strut nuts by five turns on both sides.
11. Detach the accelerator cable and the speed control cable (if equipped).



G03431826

Fig. 221: Removing Accelerator Cable And Speed Control Cable
Courtesy of FORD MOTOR CO.

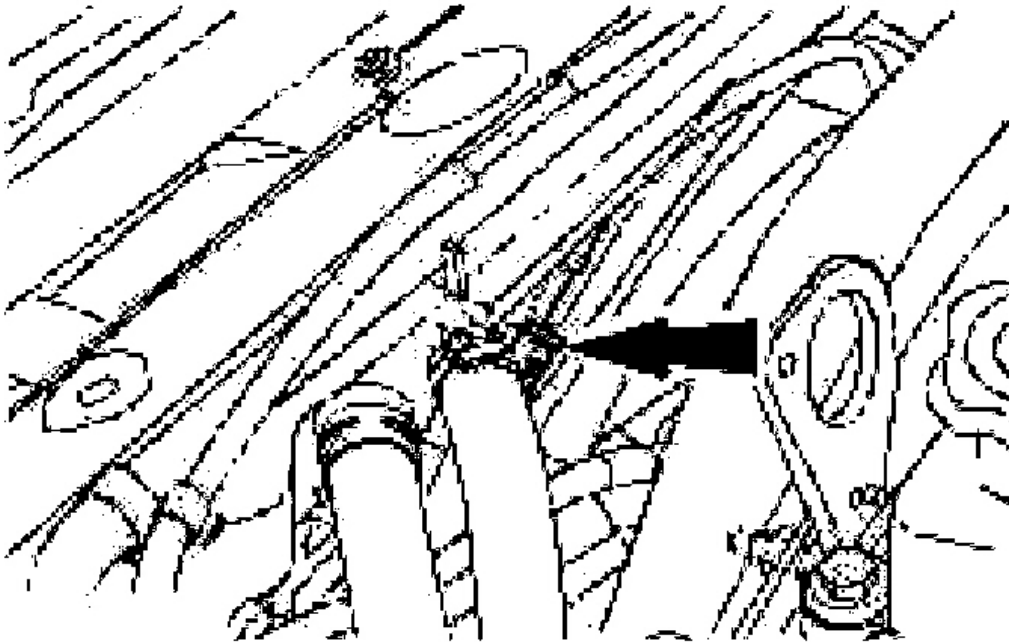
12. Detach the connectors of the EI coil and the radio interference filter.



G03431827

Fig. 222: Removing Connectors Of EI Coil And Radio Interference Filter
Courtesy of FORD MOTOR CO.

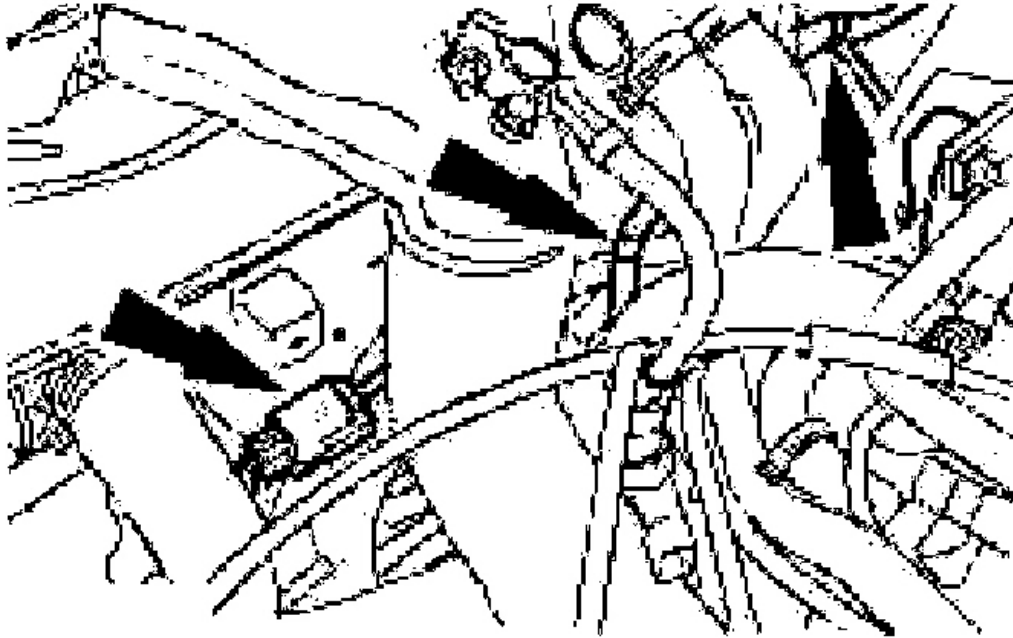
13. Detach the heated oxygen sensor (HO2S) connector.



G03431828

Fig. 223: Detaching Heated Oxygen Sensor (HO2S) Connector
Courtesy of FORD MOTOR CO.

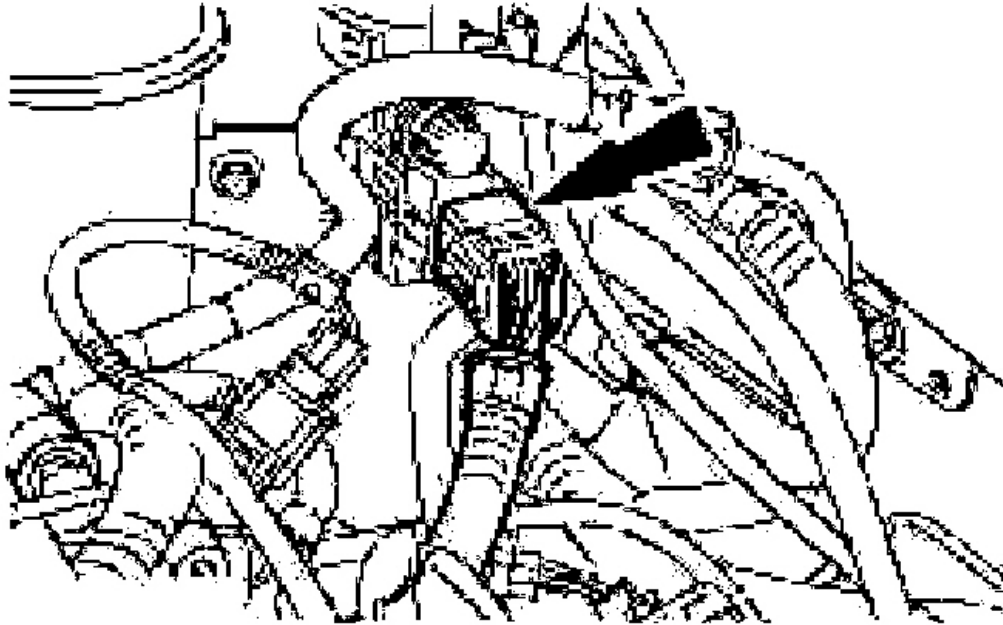
14. Disconnect the radiator fan connector.
 - Separate the cable ties (if necessary).



G03431829

Fig. 224: Disconnecting Radiator Fan Connector
Courtesy of FORD MOTOR CO.

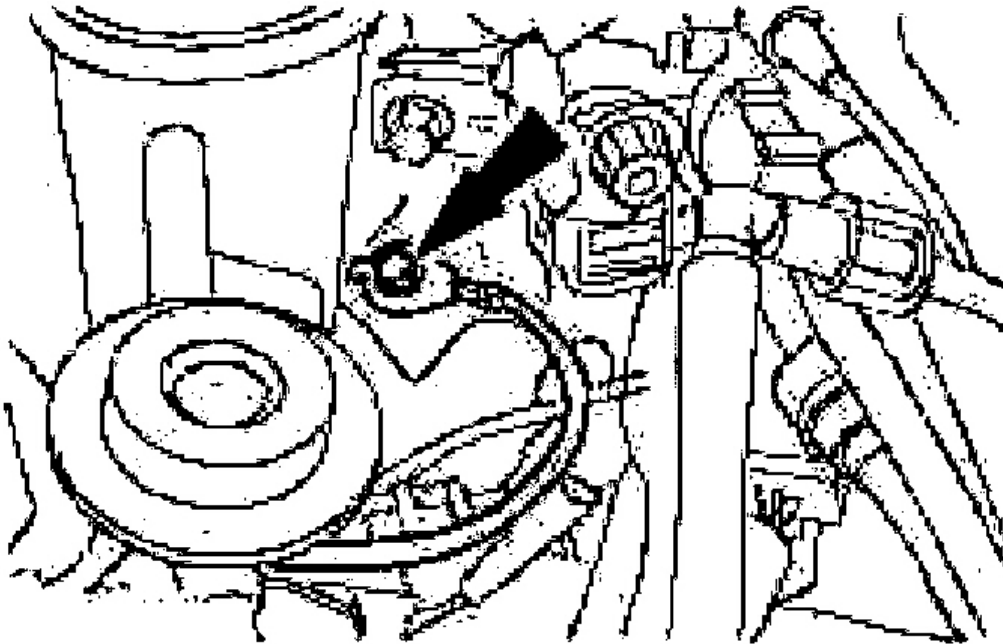
15. Disconnect the fuel injector wiring.



G03431830

Fig. 225: Disconnecting Fuel Injector Wiring
Courtesy of FORD MOTOR CO.

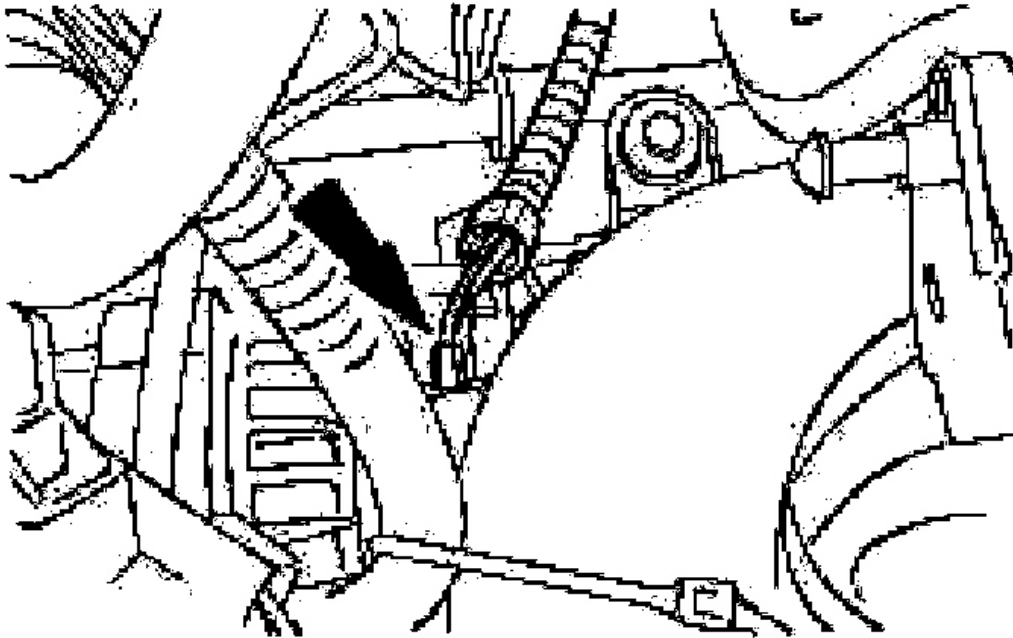
16. Remove the ground cable.



G03431831

Fig. 226: Removing Ground Cable
Courtesy of FORD MOTOR CO.

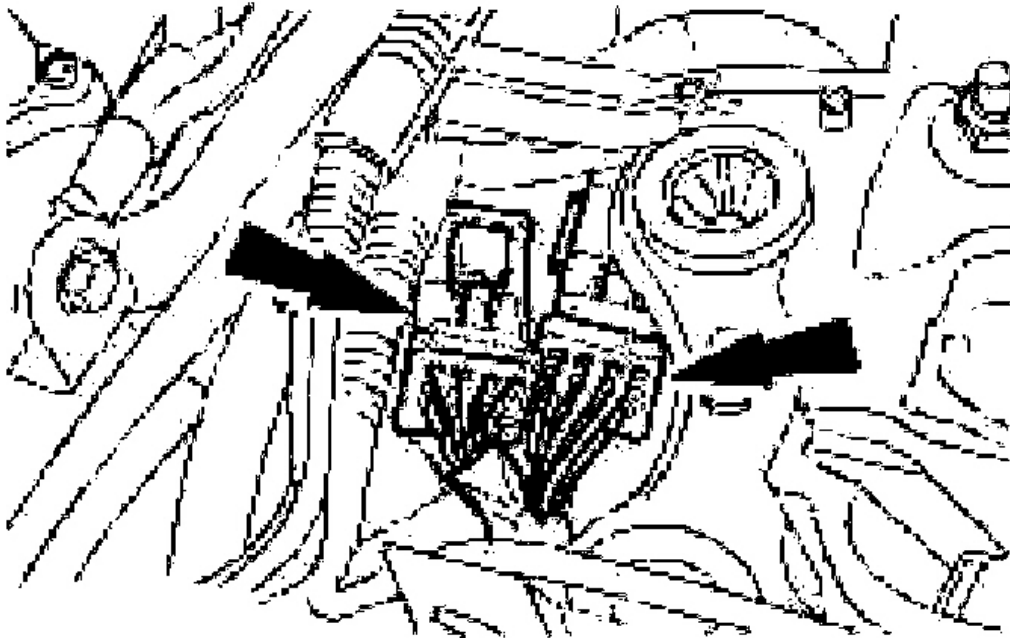
17. Detach the generator connector.



G03431832

Fig. 227: Removing Generator Connector
Courtesy of FORD MOTOR CO.

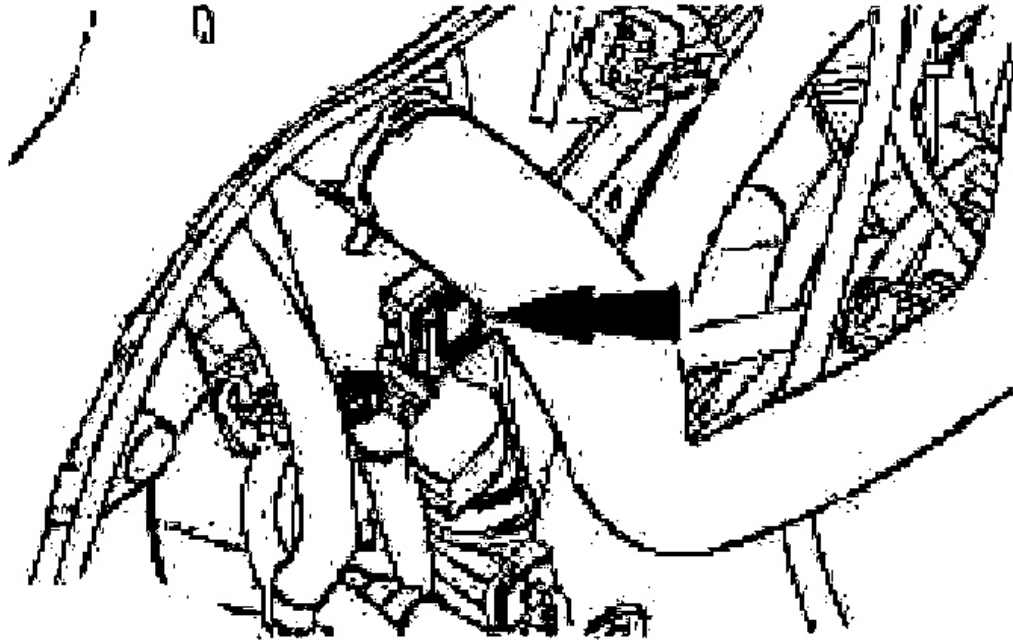
18. Disconnect the harness connector.



G03431833

Fig. 228: Disconnecting Harness Connector
Courtesy of FORD MOTOR CO.

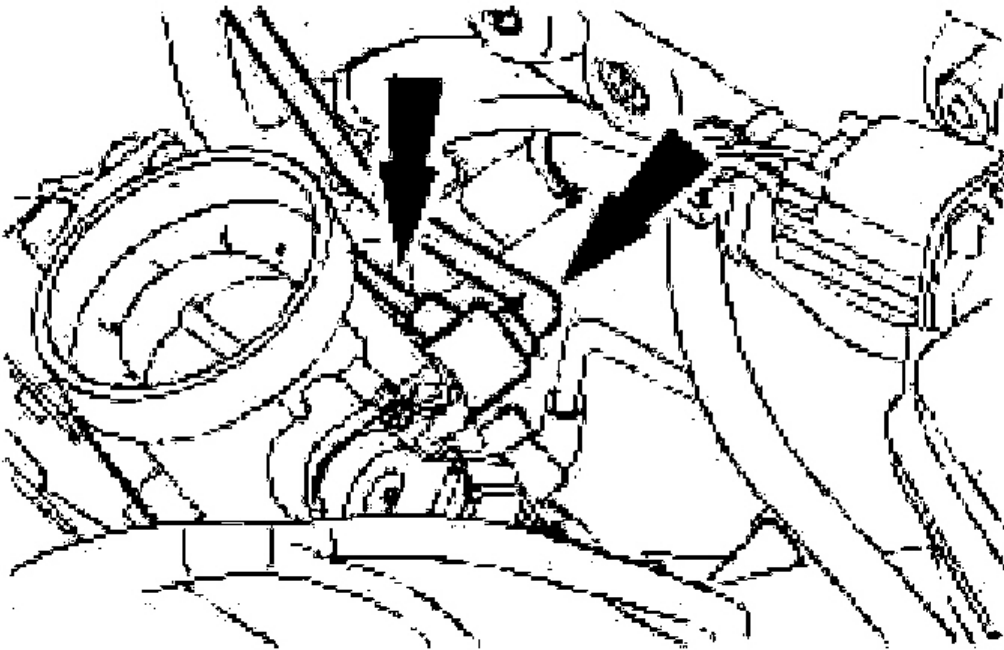
19. Remove the air deflector and the radiator fan.
 - Undo the clips on both sides (left side shown).
 - Unhook the air deflector upwards and remove it downwards.



G03431834

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

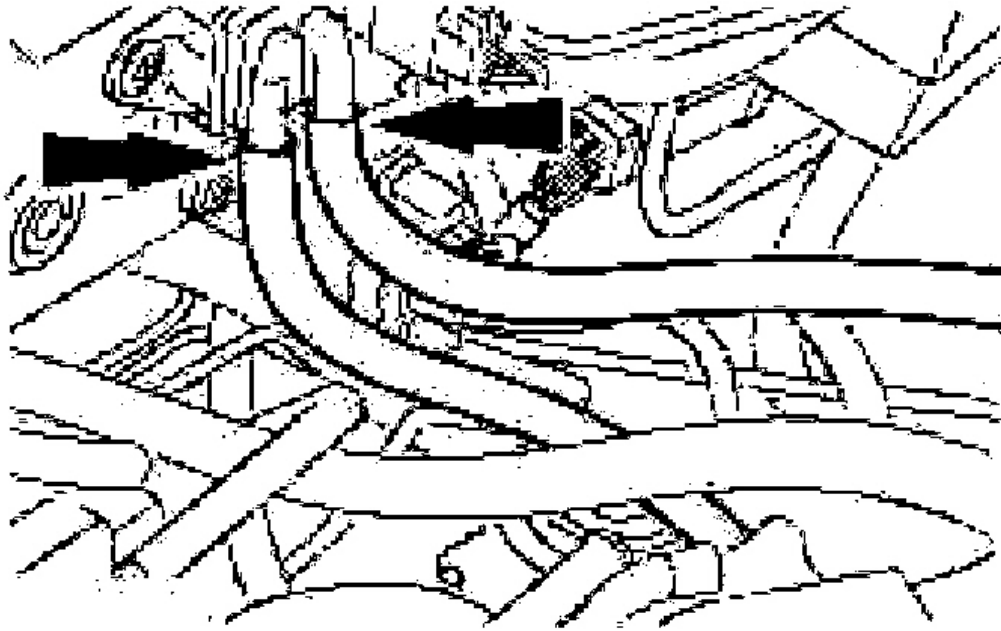
20. Detach the vacuum hoses.



G03431835

Fig. 230: Removing Vacuum Hoses (1 Of 2)
Courtesy of FORD MOTOR CO.

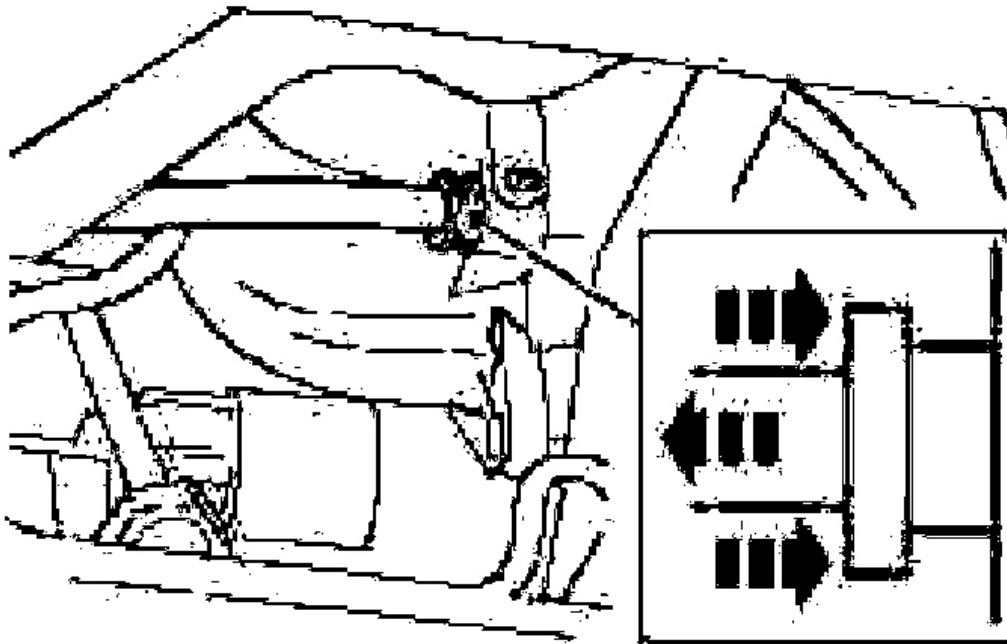
21. Detach the vacuum hoses.



G03431836

Fig. 231: Removing Vacuum Hoses (2 Of 2)
Courtesy of FORD MOTOR CO.

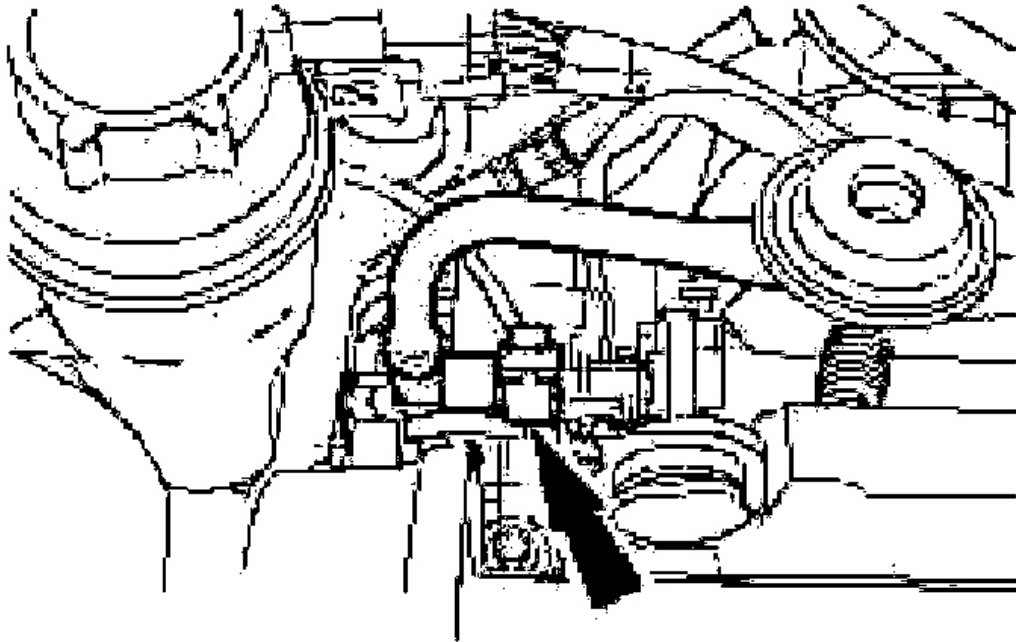
22. Detach the brake servo vacuum hose.



G03431837

Fig. 232: Removing Brake Servo Vacuum Hose
Courtesy of FORD MOTOR CO.

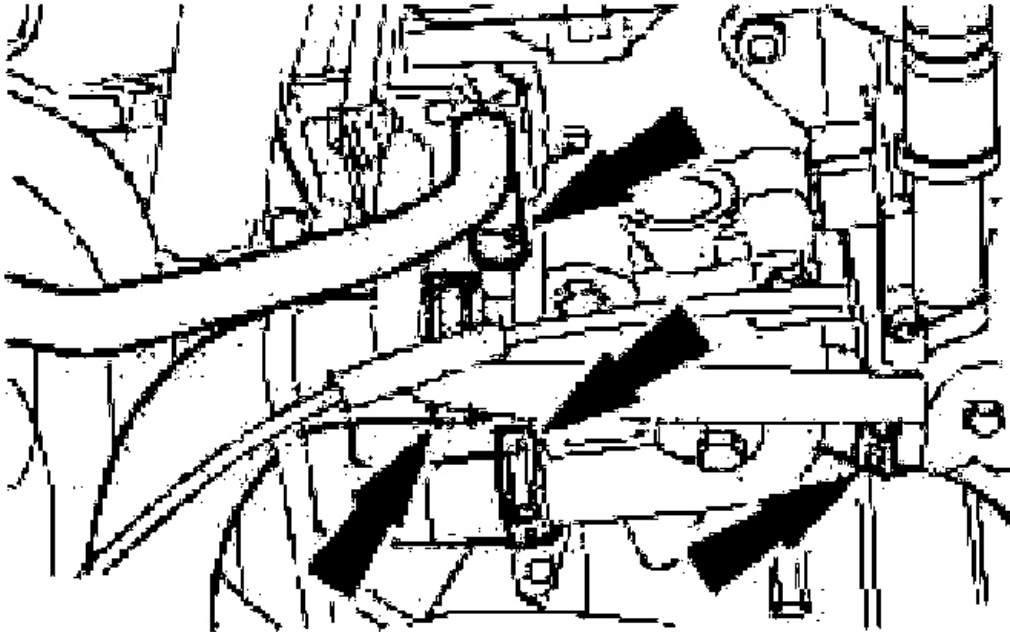
WARNING: Escaping fuel. Observe the safety regulations for working with fuel.



G03431838

Fig. 233: Removing Fuel Pipes
Courtesy of FORD MOTOR CO.

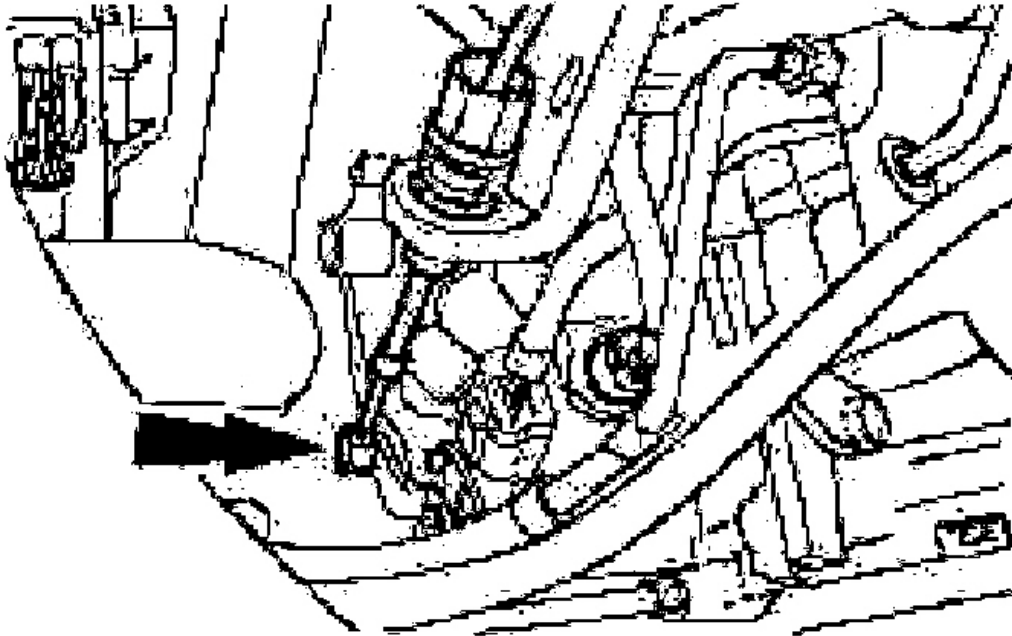
23. Detach the fuel pipes.
24. Detach the coolant hoses.



G03431839

Fig. 234: Removing Coolant Hoses
Courtesy of FORD MOTOR CO.

25. Disconnect the selector lever cable from the automatic transaxle selector lever assembly.

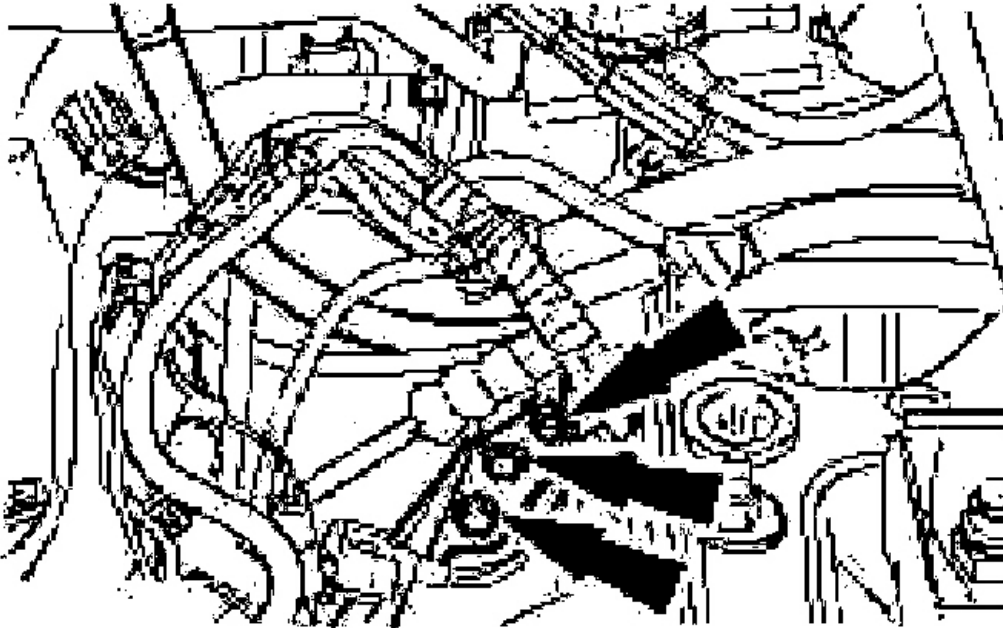


G03431840

Fig. 235: Disconnecting Selector Lever Cable From Automatic Transaxle Selector Lever Assembly

Courtesy of FORD MOTOR CO.

26. Remove the oil filler pipe/selector cable bracket.

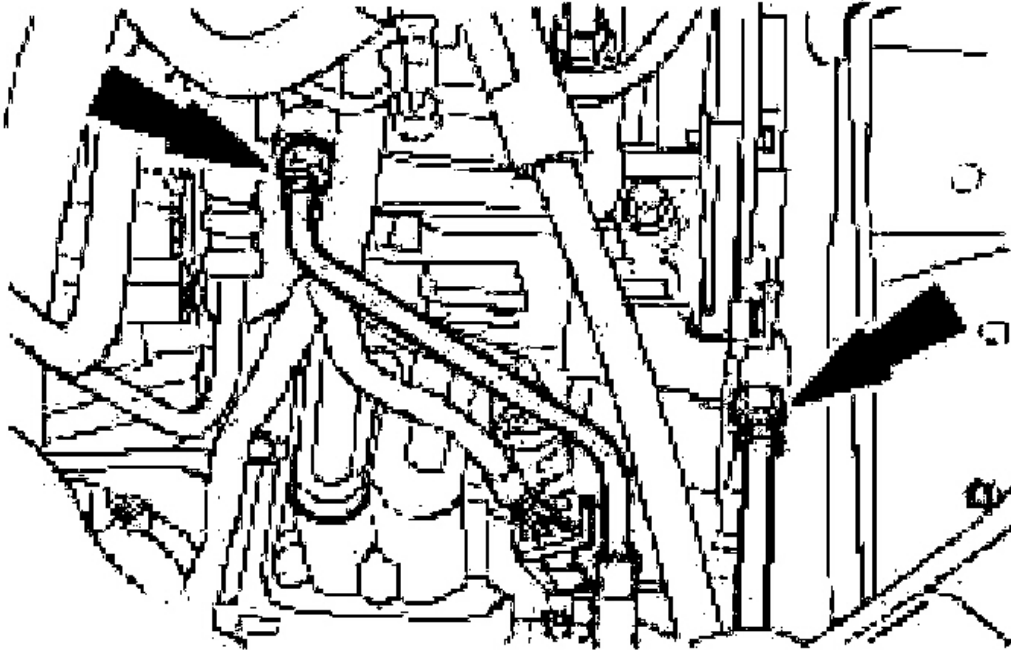


G03431841

Fig. 236: Removing Oil Filler Pipe/Selector Cable Bracket
Courtesy of FORD MOTOR CO.

CAUTION: Do not loosen the connecting fitting from the transaxle housing.

NOTE: Mark the location.



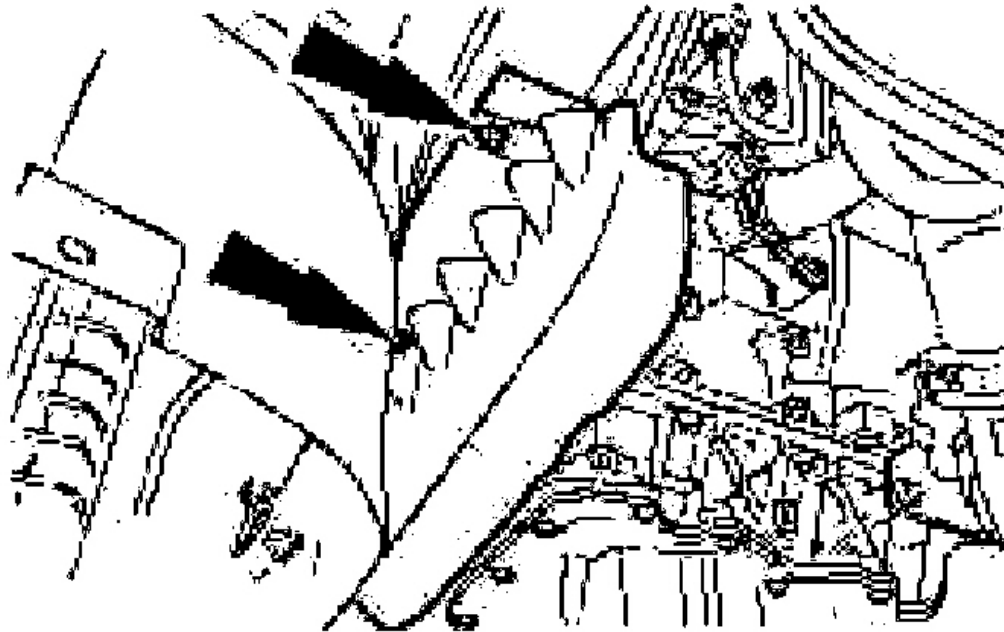
G03431842

Fig. 237: Detaching Oil Cooler Pipes From Transaxle
Courtesy of FORD MOTOR CO.

27. Detach the oil cooler pipes from the transaxle.
28. Raise and support the vehicle.

NOTE: Install the engine drain plug after draining.

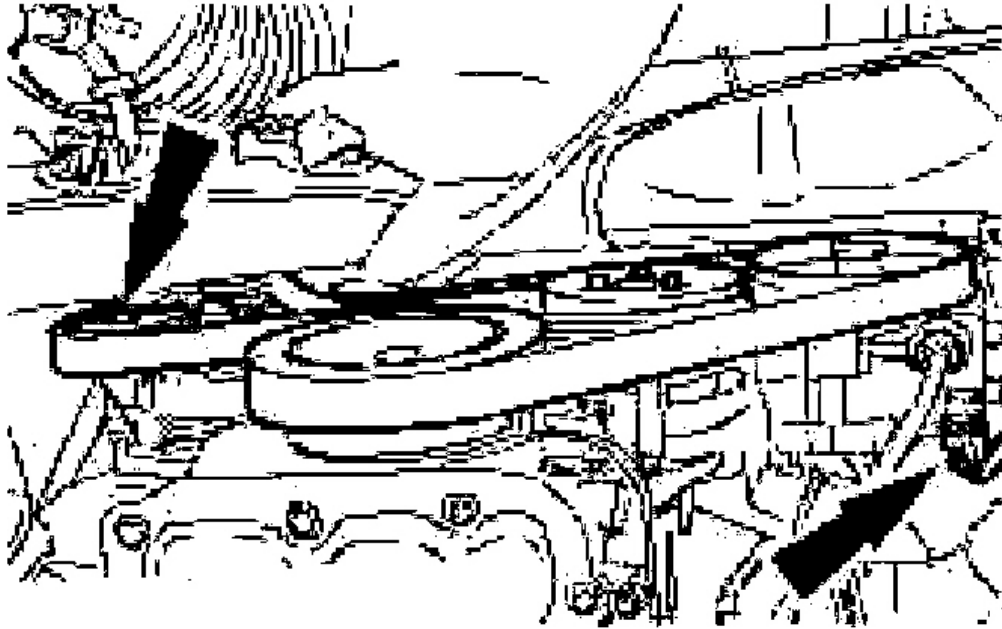
29. Drain the engine oil.
30. Remove the drive belt cover.



G03431843

Fig. 238: Removing Drive Belt Cover
Courtesy of FORD MOTOR CO.

31. Disconnect the power steering pressure switch (PSPS), slacken the drive belt and remove it (vehicle without air conditioning shown).
 - Turn the belt tensioner clockwise.



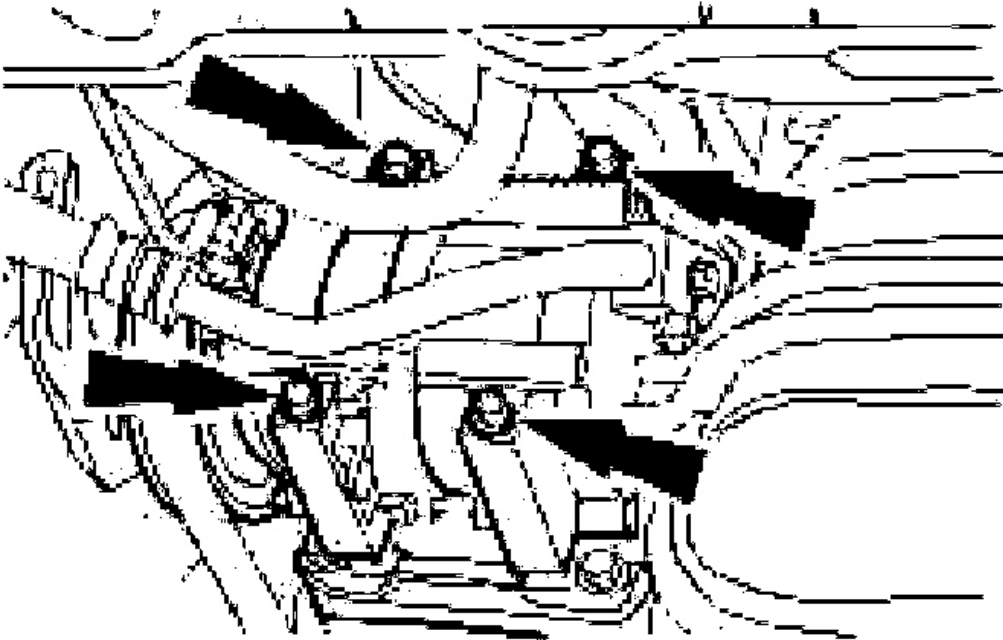
G03431844

Fig. 239: Disconnecting Power Steering Pressure Switch (PSPS) And Removing Drive Belt

Courtesy of FORD MOTOR CO.

Vehicles with air conditioning

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

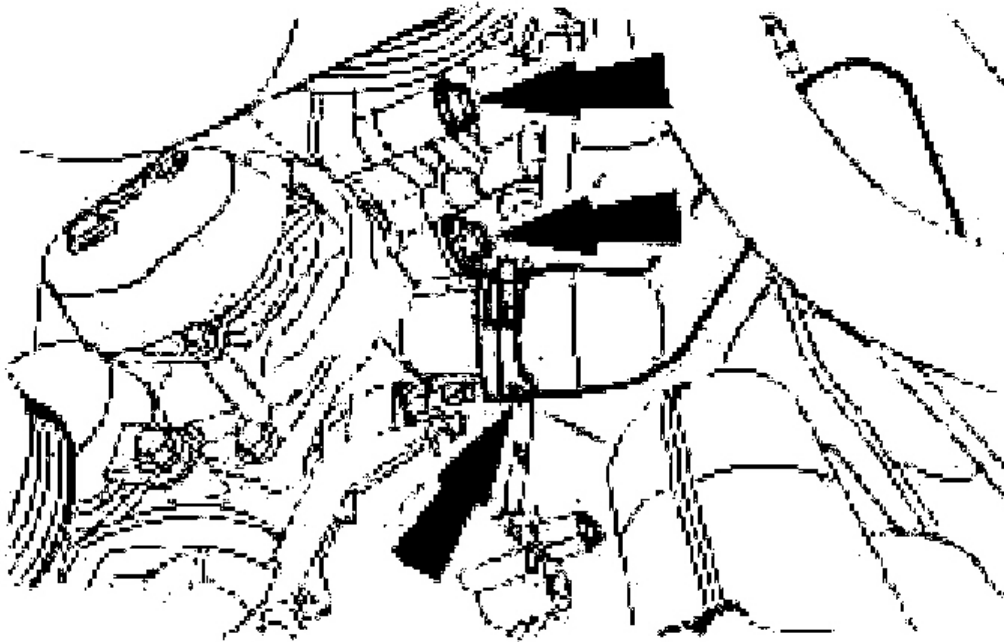


G03431845

Fig. 240: Detaching Air Conditioning Compressor
Courtesy of FORD MOTOR CO.

All vehicles

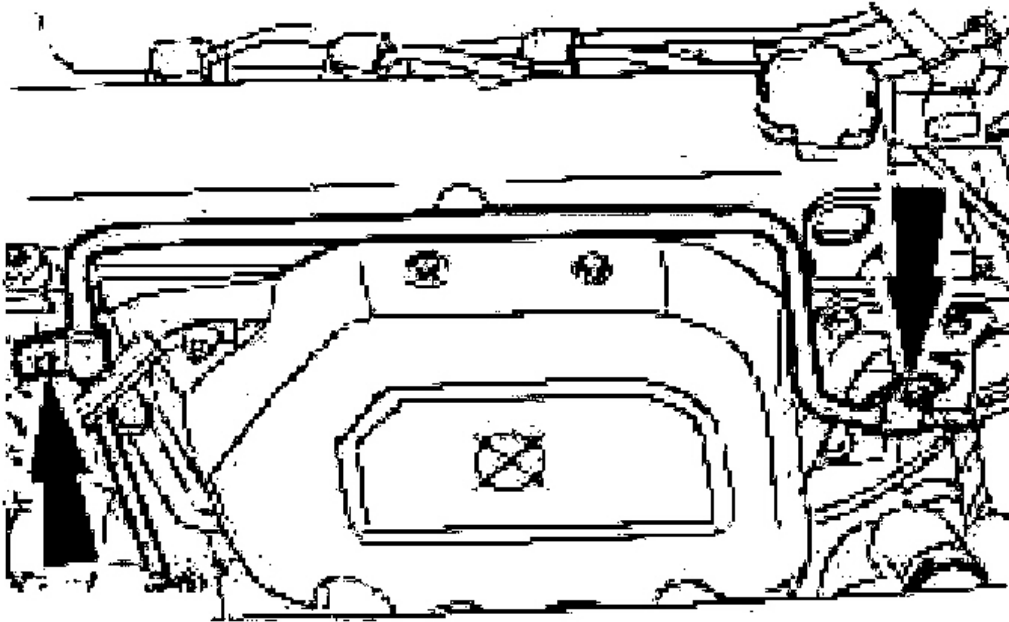
33. Detach the coolant hose and remove the bolts of the power steering pump.



G03431846

Fig. 241: Detaching Coolant Hose And Removing Bolts Of Power Steering Pump
Courtesy of FORD MOTOR CO.

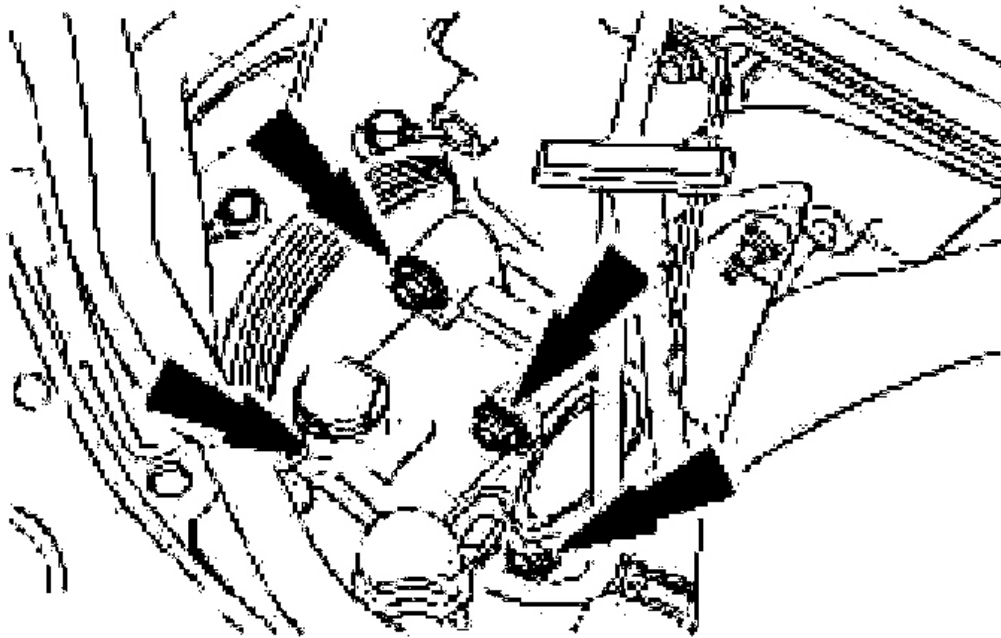
34. Lower the vehicle.
35. Detach the bracket of the power steering high-pressure pipe.



G03431847

Fig. 242: Detaching Bracket Of Power Steering High-Pressure Pipe
Courtesy of FORD MOTOR CO.

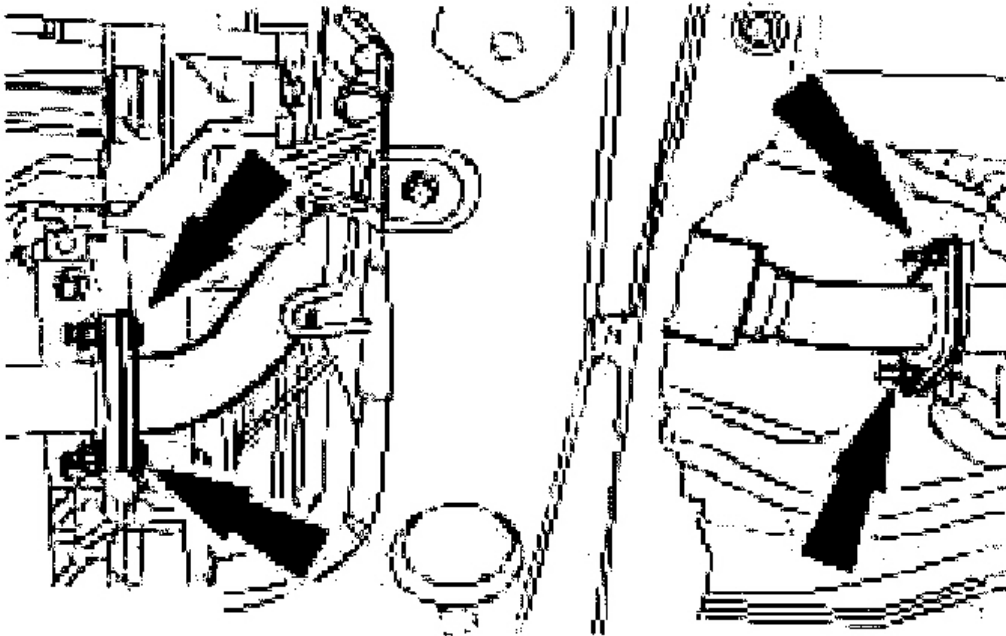
36. Detach the power steering pump and position it to one side and secure with cable ties.



G03431848

Fig. 243: Detaching Power Steering Pump
Courtesy of FORD MOTOR CO.

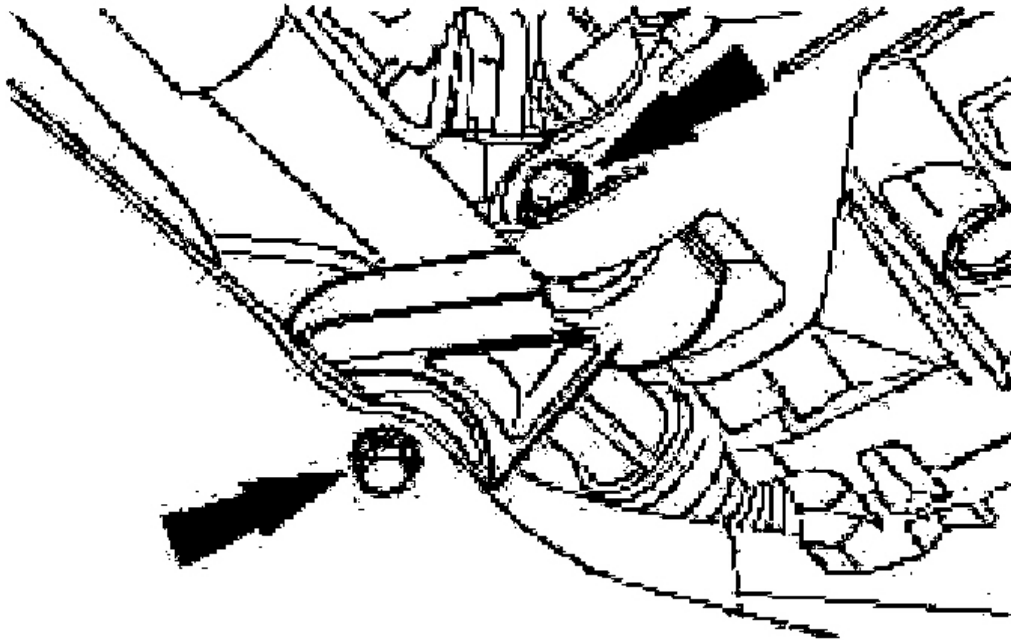
37. Remove both front wheels and tires.
38. Remove the flexible exhaust pipe.



G03431849

Fig. 244: Removing Flexible Exhaust Pipe
Courtesy of FORD MOTOR CO.

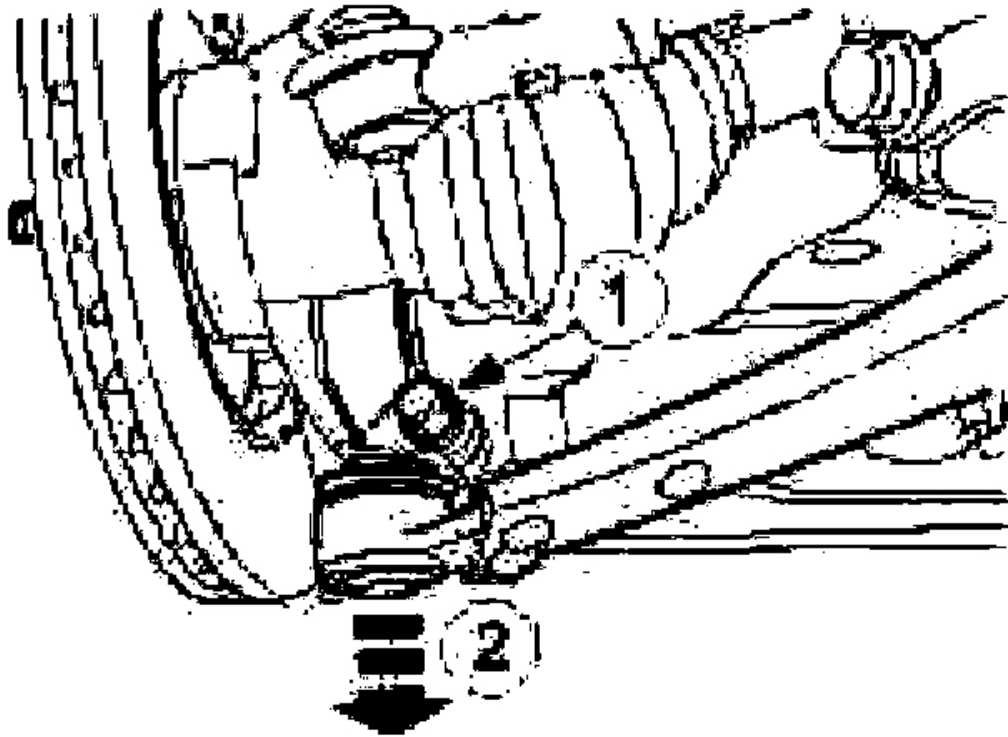
39. Remove the engine roll restrictor.



G03431850

Fig. 245: Removing Engine Roll Restrictor
Courtesy of FORD MOTOR CO.

40. Detach both suspension arms (left-hand side shown).
 1. Remove the bolt.
 2. Detach the lower arm ball joint.

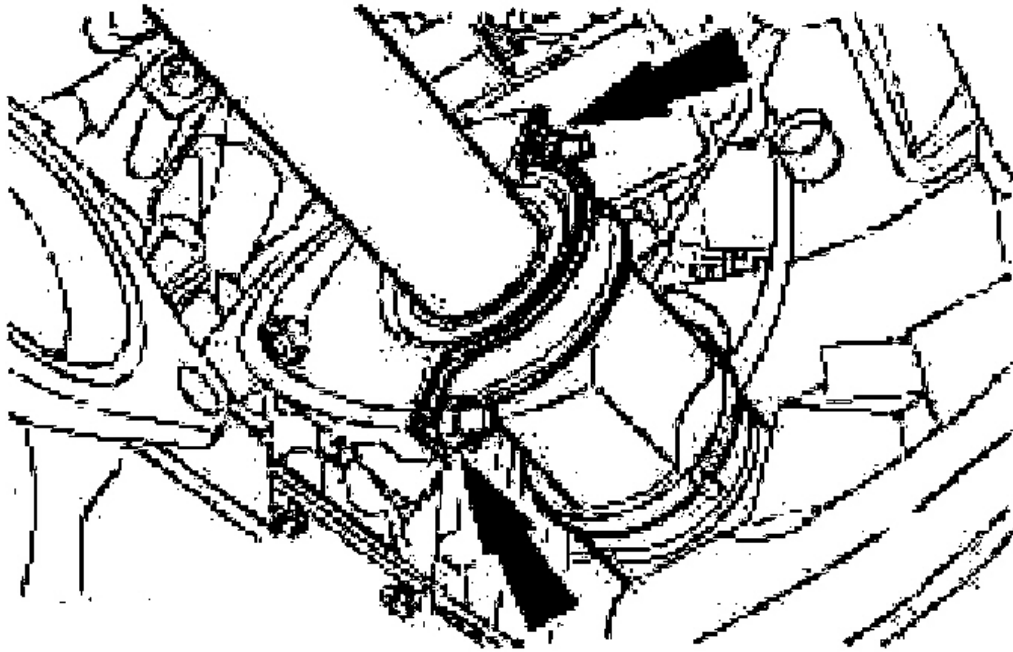


G03431851

Fig. 246: Removing Lower Arm Ball Joint And 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.

41. Detach the right-hand front drive halfshaft with intermediate shaft.
 - Detach the intermediate shaft bearing cap.
 - Discard the nuts and bearing cap.
 - Pull the intermediate shaft with front drive halfshaft from the transmission and tie up with cable ties.
 - Close off the transmission with auxiliary plugs.



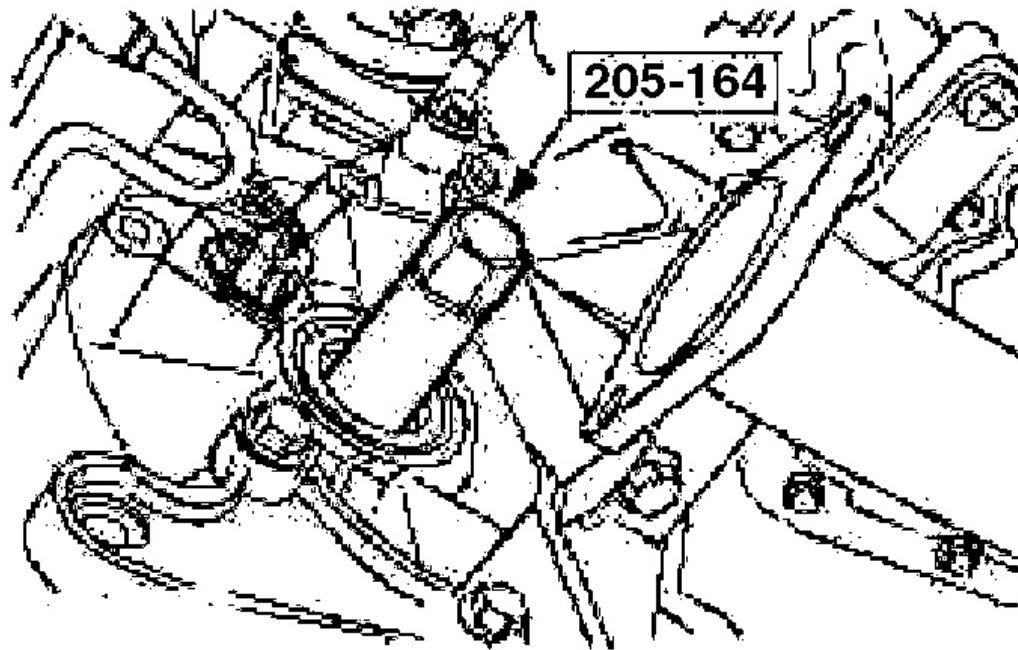
G03431852

Fig. 247: Detaching Right-Hand Front Drive Halfshaft With 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.

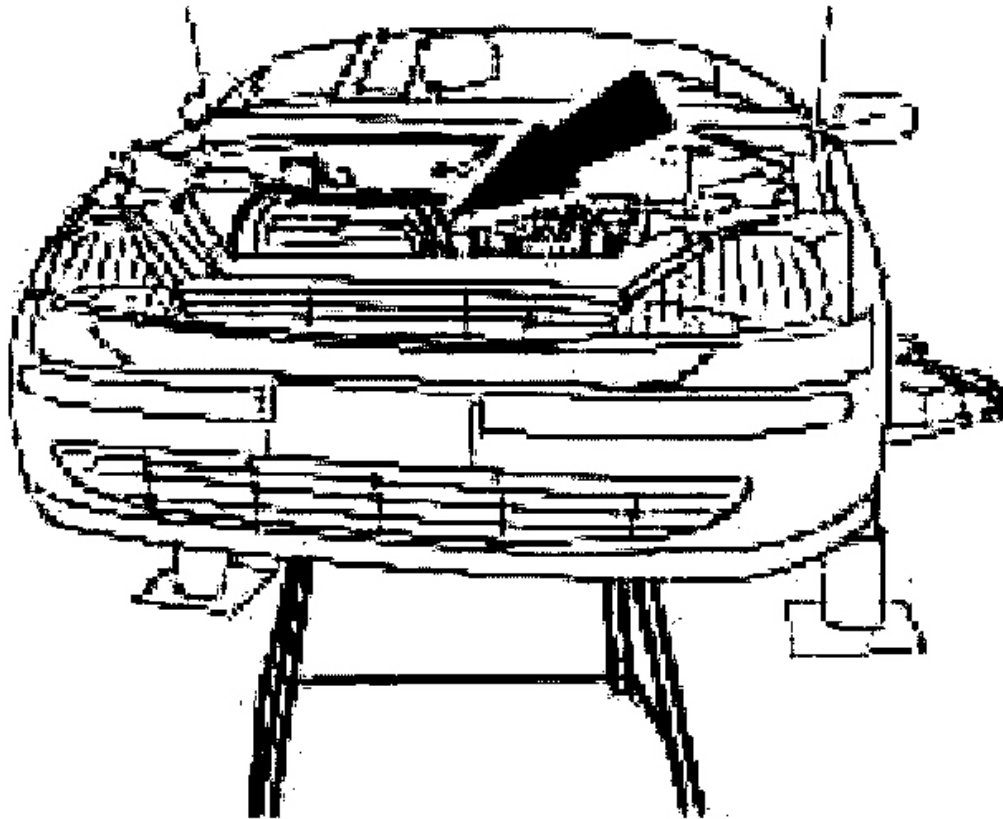
42. Detach the left-hand front drive halfshaft from the transmission using the special tool.
 - Pull out the front drive halfshaft and tie up with cable ties.
 - Close off the transmission with auxiliary plugs.



G03431853

Fig. 248: Detaching Left-Hand Front Drive Halfshaft From Transmission
Using Special Tool
Courtesy of FORD MOTOR CO.

43. Put the assembly table with wooden blocks on it under the vehicle.
44. Carefully lower the vehicle until the engine and transmission assembly is positioned on the assembly stand.
45. Secure the engine and transmission assembly to the assembly stand with a retaining strap.

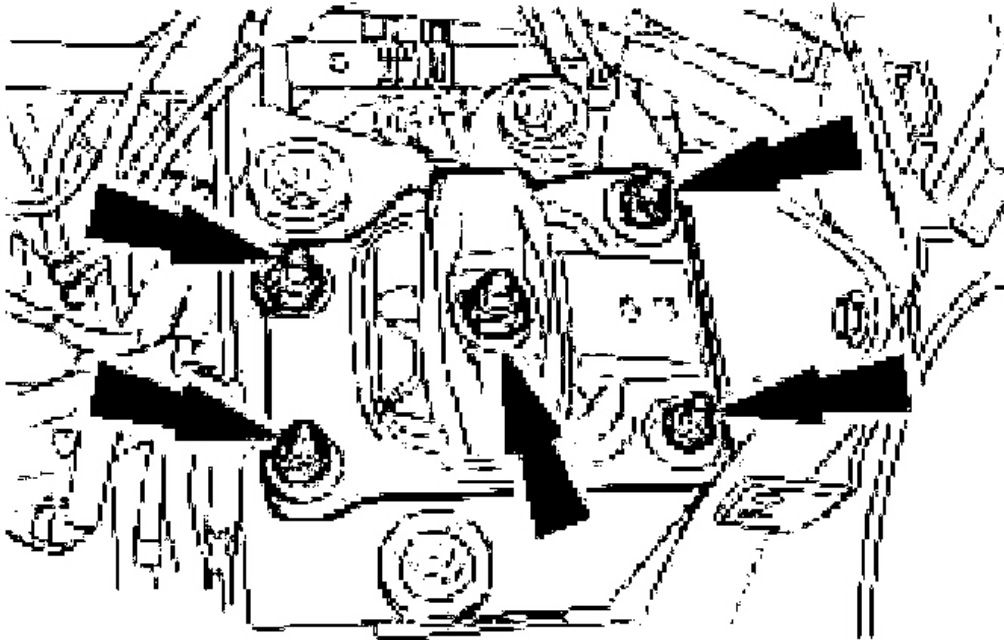


G03431854

Fig. 249: Securing Engine And Transmission Assembly To Assembly Stand With Retaining Strap

Courtesy of FORD MOTOR CO.

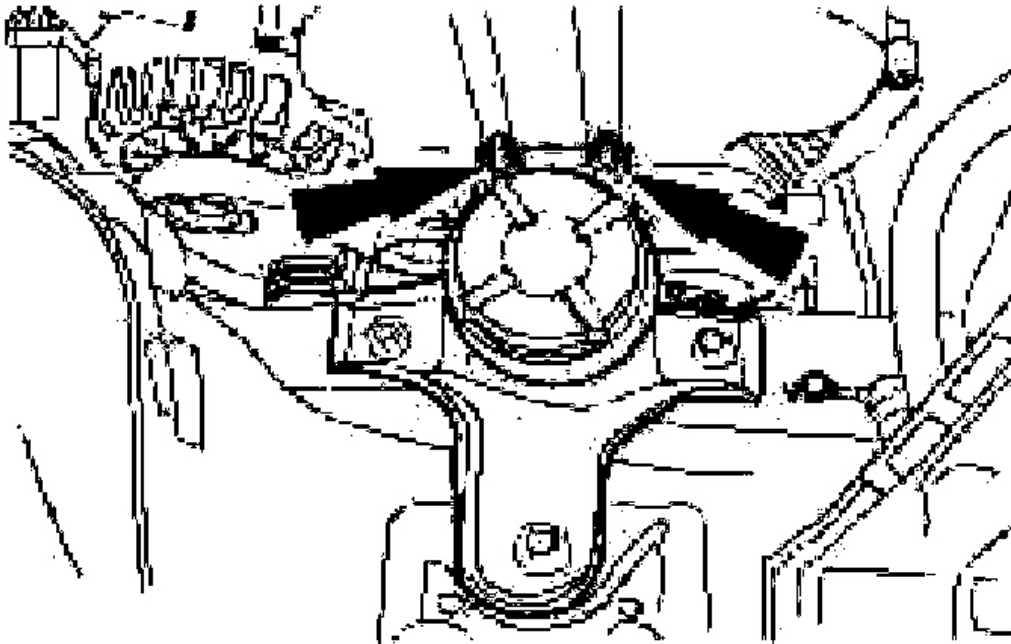
46. Remove the engine rear mounting.



G03431855

Fig. 250: Removing Engine Rear Mounting
Courtesy of FORD MOTOR CO.

47. Remove the engine front mounting nuts (without coolant expansion tank shown).



G03431856

Fig. 251: Removing Engine Front Mounting Nuts
Courtesy of FORD MOTOR CO.

48. Carefully raise the vehicle.
 - Pull the assembly stand forwards with the engine and transmission assembly.
49. Hook the engine and transmission assembly into the crane.

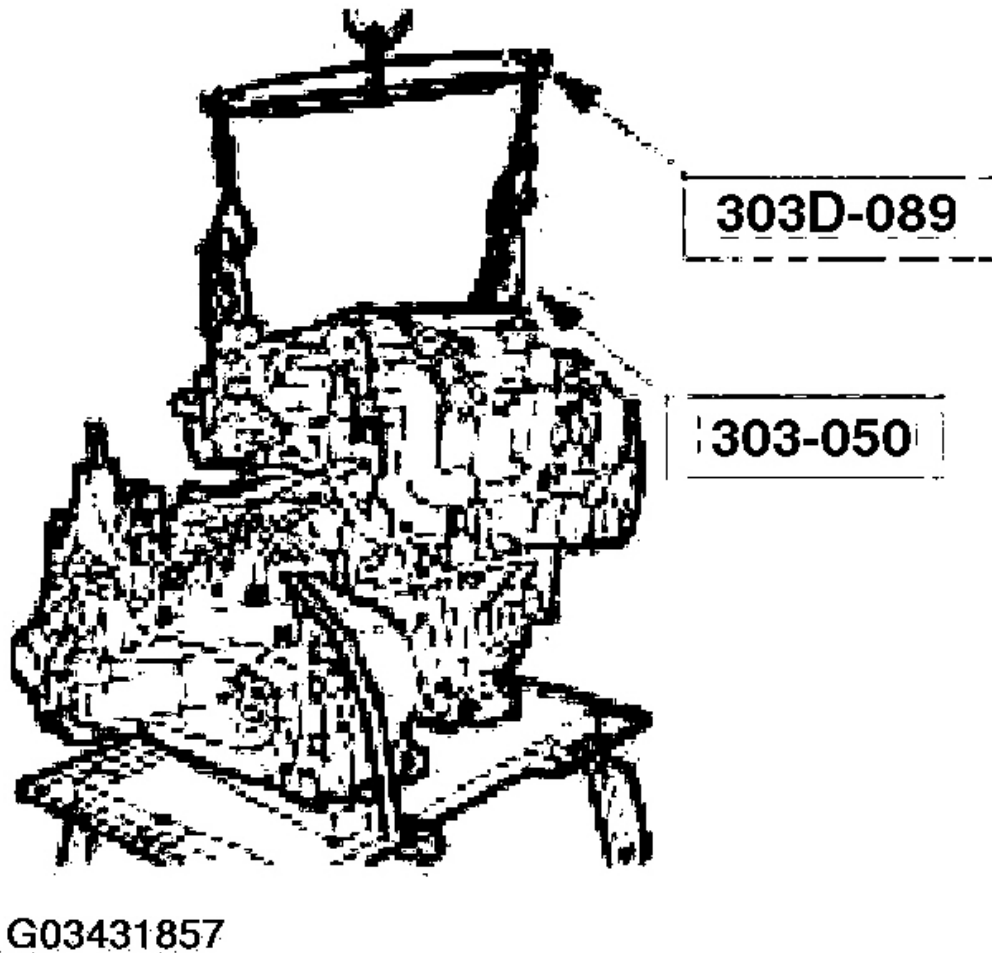
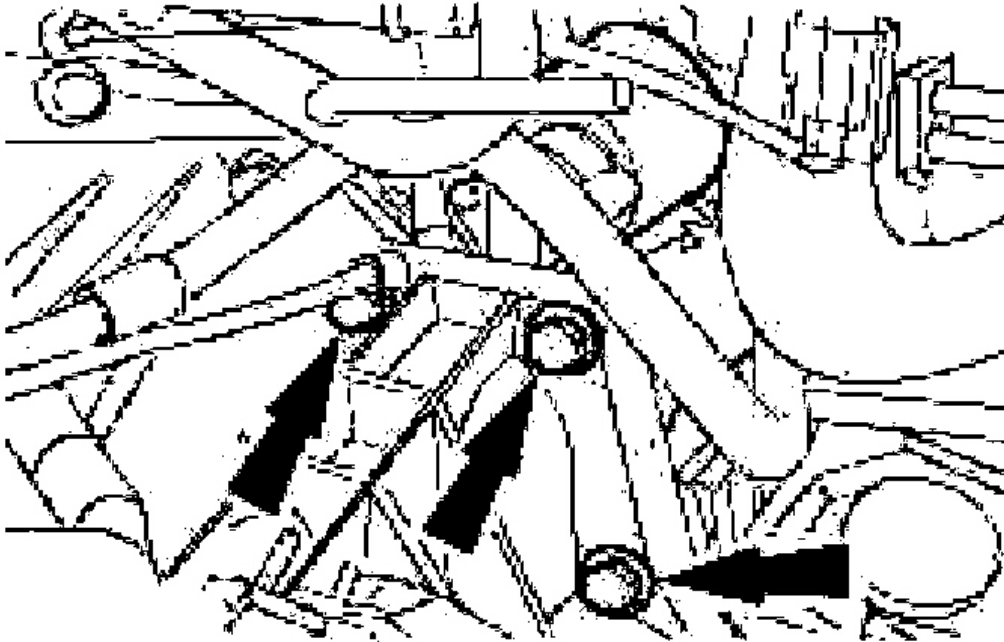


Fig. 252: Hooking Engine And Transmission Assembly Into Crane
Courtesy of FORD MOTOR CO.

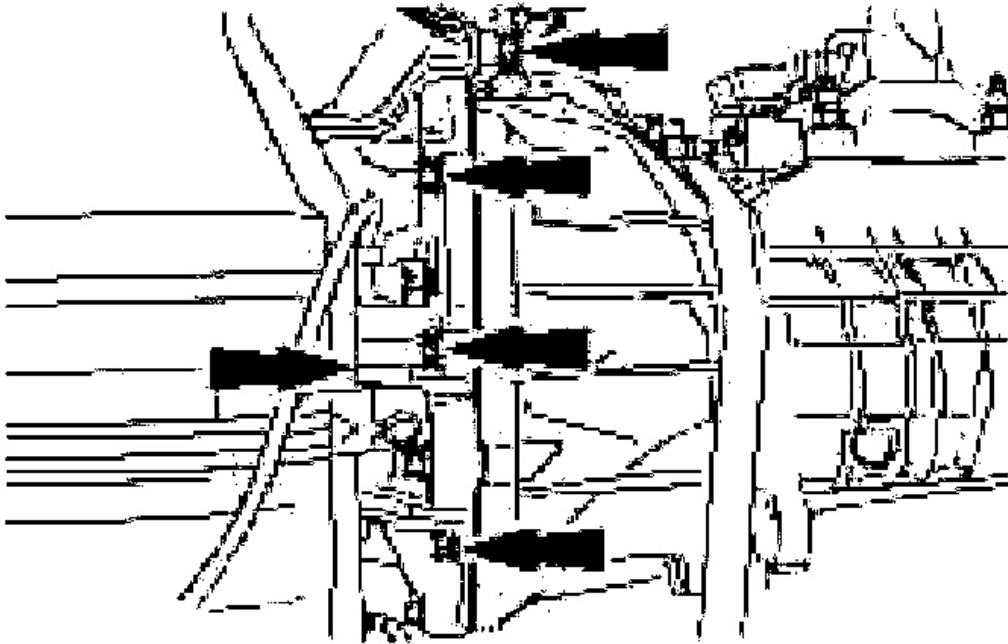
50. Remove the starter motor and ground cable.



G03431858

Fig. 253: Removing Starter Motor And Ground Cable
Courtesy of FORD MOTOR CO.

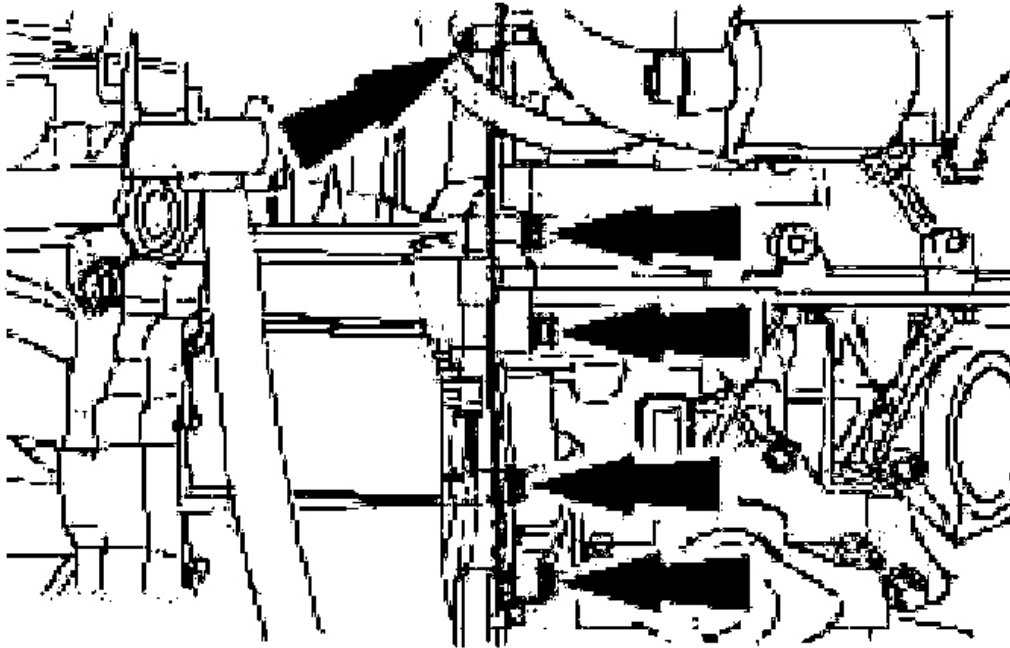
51. Remove the flange bolts.



G03431859

Fig. 254: Removing Flange Bolts (1 Of 2)
Courtesy of FORD MOTOR CO.

52. Remove the flange bolts (continued).



G03431860

Fig. 255: Removing Flange Bolts (2 Of 2)
Courtesy of FORD MOTOR CO.

53. Separate the engine from the transaxle.

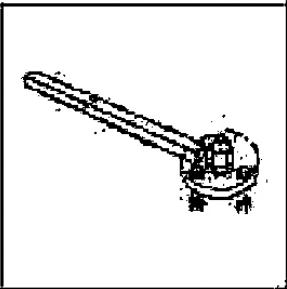

DISASSEMBLY

ENGINE

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

	Remover, Camshaft Pulley 303-098 (T74P-6256-B)
	Holding Tool, Flywheel 303-103 (T74P-6375-A)

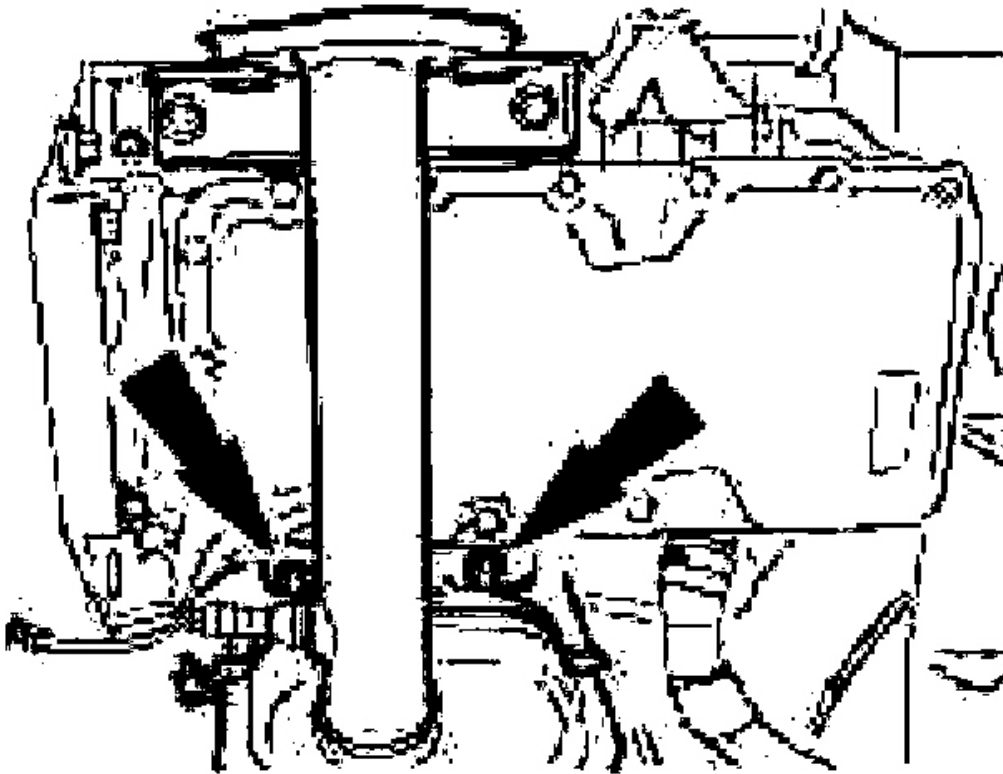
G03431861

Fig. 256: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Disassembly

All vehicles

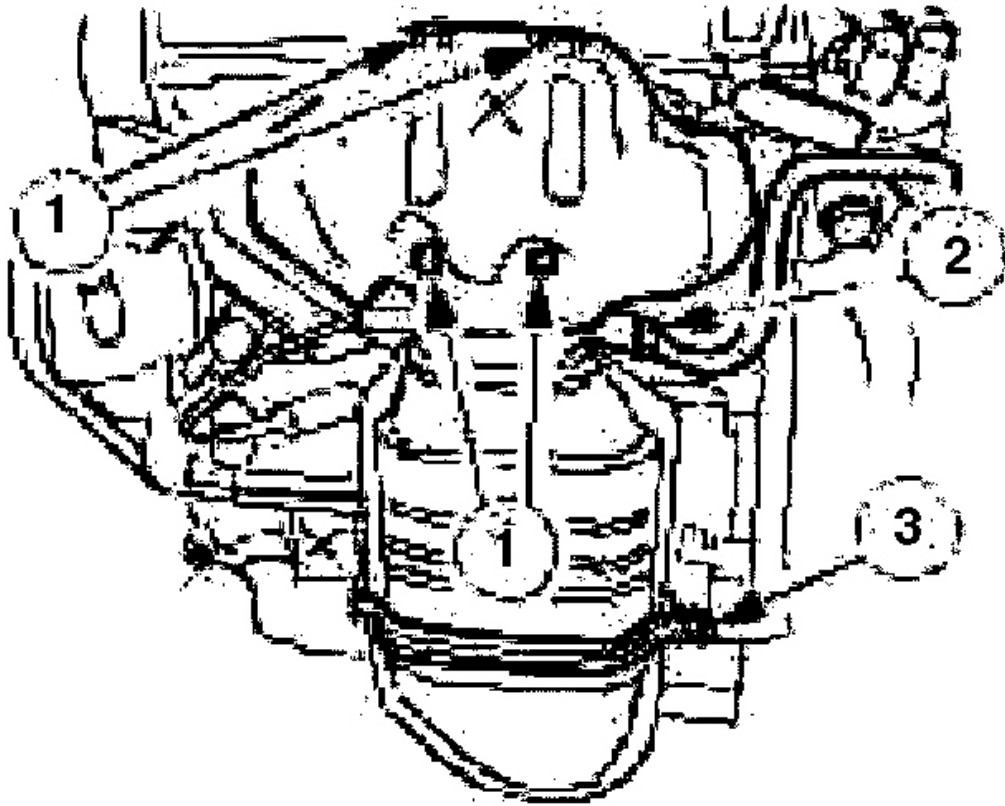
1. General remarks.
 - The engine remains hooked onto the workshop hoist until the assembly stand can be attached.
 - If the engine is positioned on the assembly stand and needs to be temporarily unhooked from the workshop hoist, then it must be secured with retaining straps.
 - Cut cable ties as necessary and install new during installation.
2. Detach the catalytic converter bracket.



G03431862

Fig. 257: Detaching Catalytic Converter Bracket
Courtesy of FORD MOTOR CO.

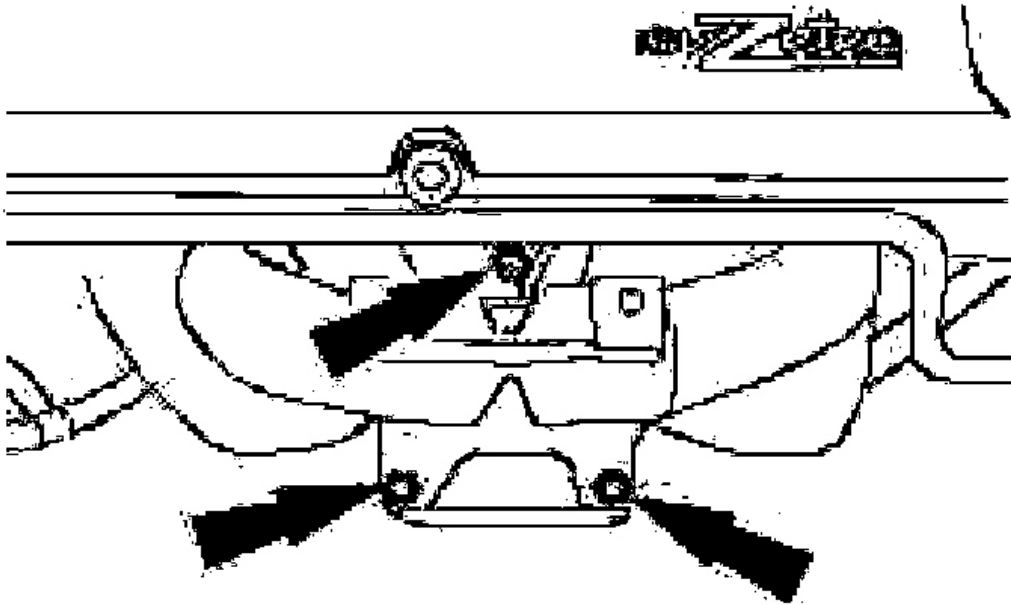
3. Detach the catalytic converter.
 1. Detach the heat shield.
 2. Remove the EGR pipe.
 3. Unscrew the bolt from the catalytic converter bracket.



G03431863

Fig. 258: Detaching Catalytic Converter (1 Of 2)
Courtesy of FORD MOTOR CO.

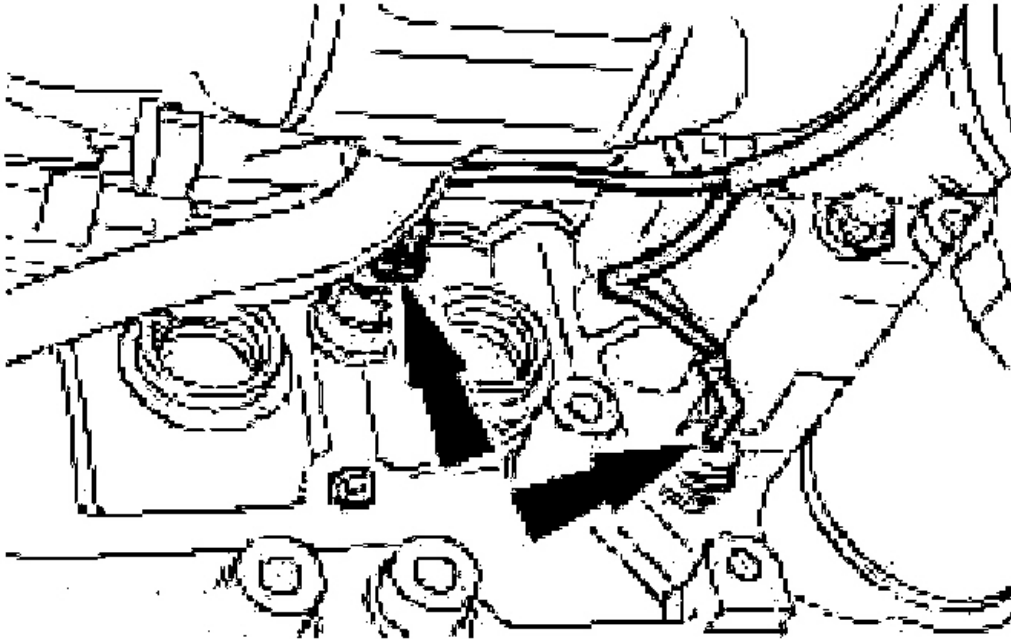
4. Detach the catalytic converter (cont.).



G03431864

Fig. 259: Detaching Catalytic Converter (2 Of 2)
Courtesy of FORD MOTOR CO.

5. Disconnect the multiplug from the oil pressure switch and the knock sensor (KS).

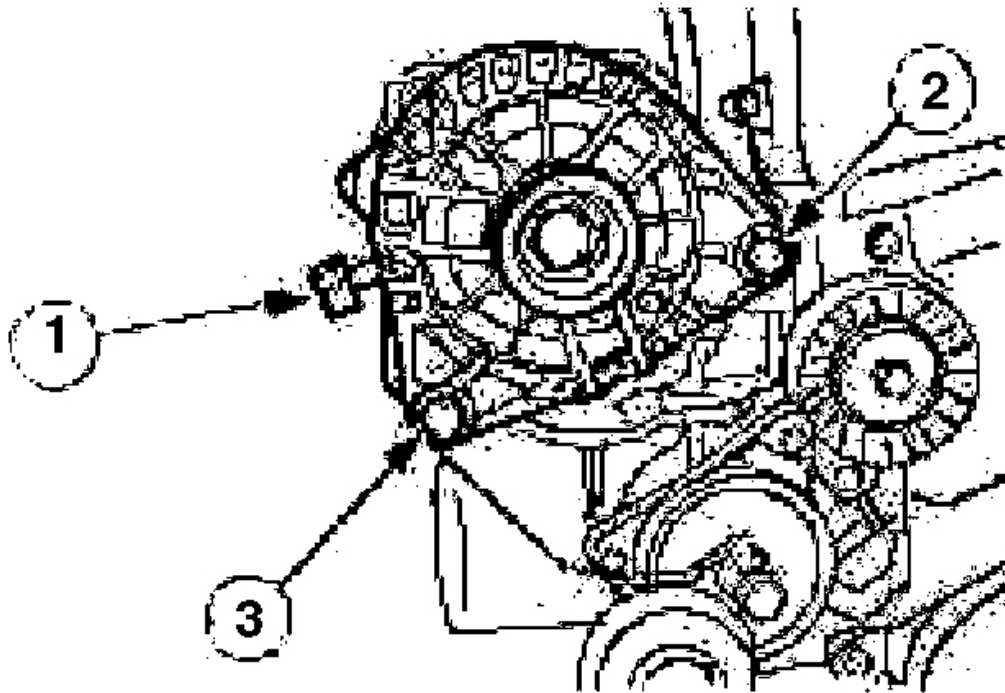


G03431865

Fig. 260: Disconnecting Multiplug From Oil Pressure Switch And Knock Sensor (KS)

Courtesy of FORD MOTOR CO.

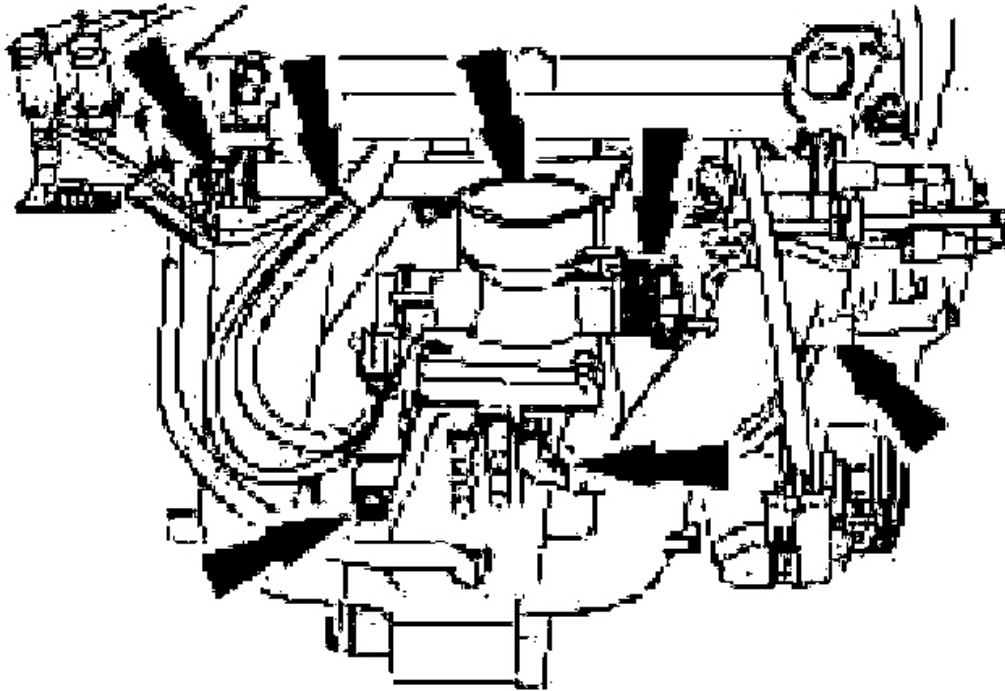
6. Detach the generator.
 1. Disconnect the positive cable.
 2. Unscrew the bolt.
 3. Loosen the bolt.



G03431866

Fig. 261: Disconnecting Positive Cable And Detaching Generator
Courtesy of FORD MOTOR CO.

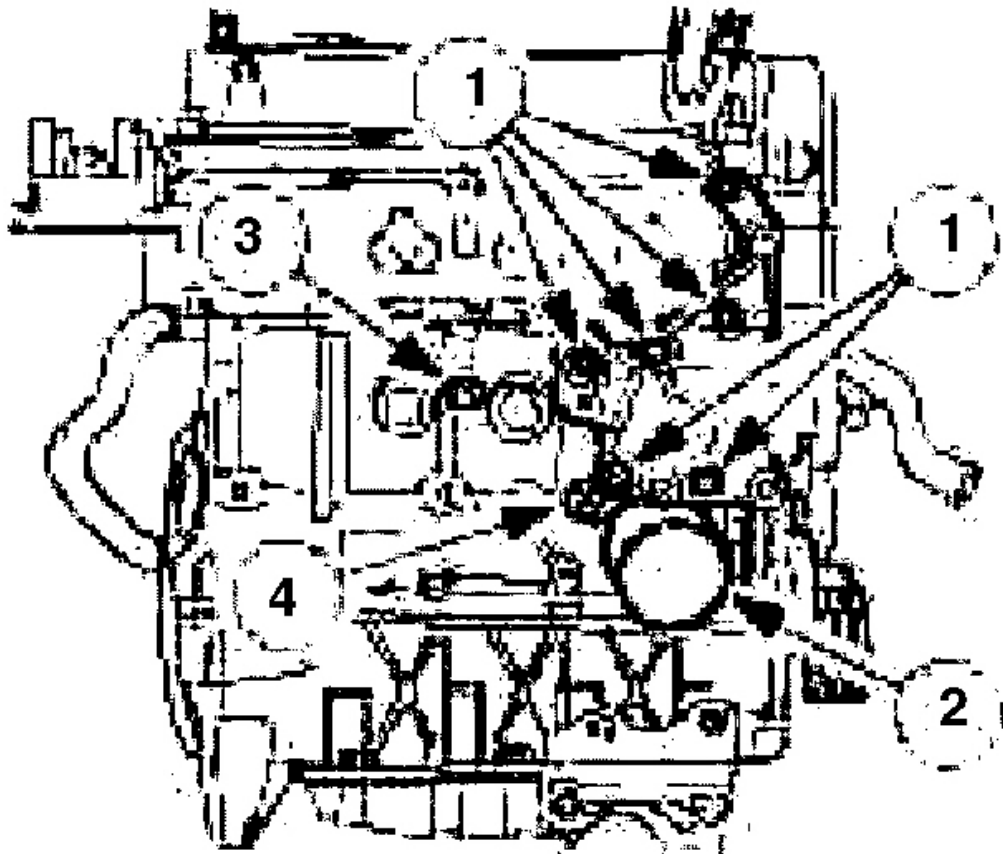
7. Detach the intake manifold.
 - Remove the five bolts and unscrew two nuts.



G03431867

Fig. 262: Removing Intake Manifold
Courtesy of FORD MOTOR CO.

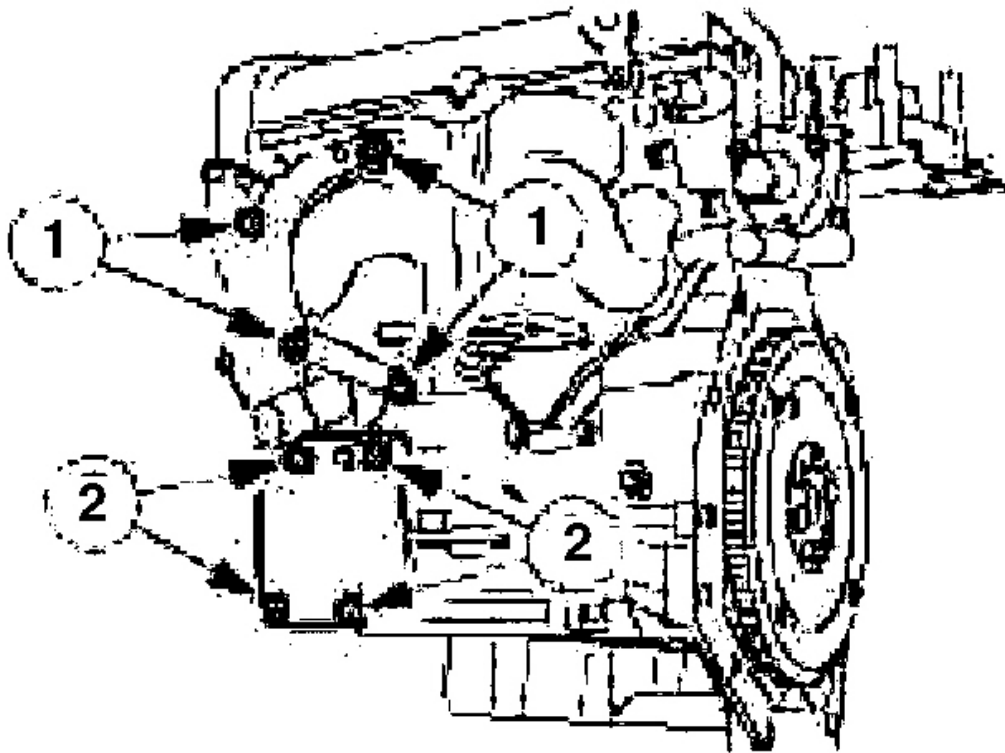
8. Detach the ancillary components on the intake side.
 1. Generator mounting bracket
 2. Oil filter
 3. Knock sensor (KS)
 4. Oil pressure switch



G03431868

Fig. 263: Removing Ancillary Components (Intake Side)
Courtesy of FORD MOTOR CO.

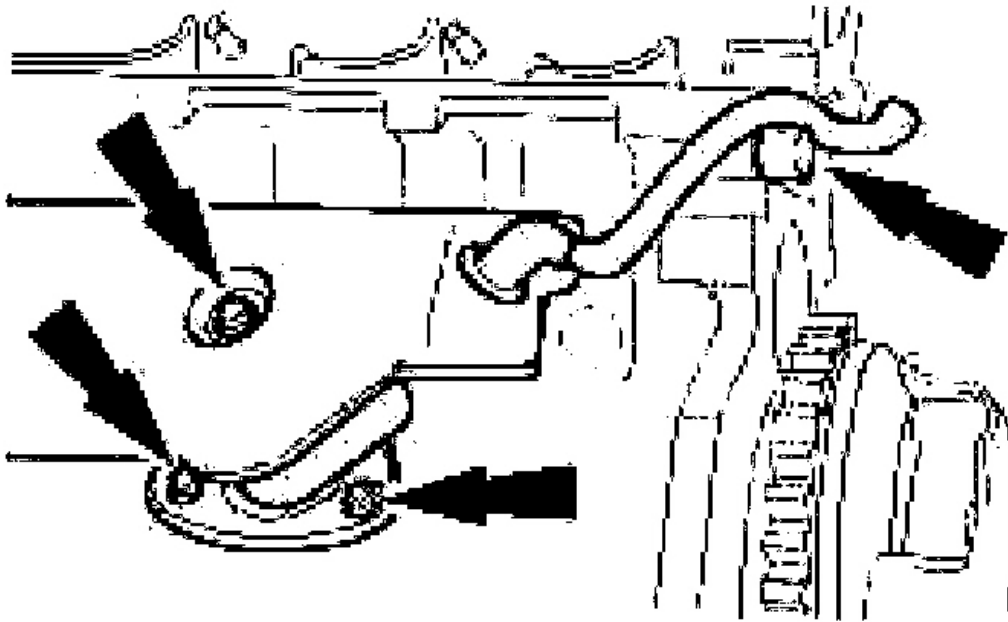
9. Attach the engine to the assembly stand.
10. Detach the ancillary components on the exhaust side.
 1. Bracket for power steering pump
 2. Bracket for air conditioning compressor



G03431869

Fig. 264: Removing Ancillary Components (Exhaust Side)
Courtesy of FORD MOTOR CO.

11. Disconnect the positive crankcase ventilation.



G03431870

Fig. 265: Disconnecting Positive Crankcase Ventilation
Courtesy of FORD MOTOR CO.

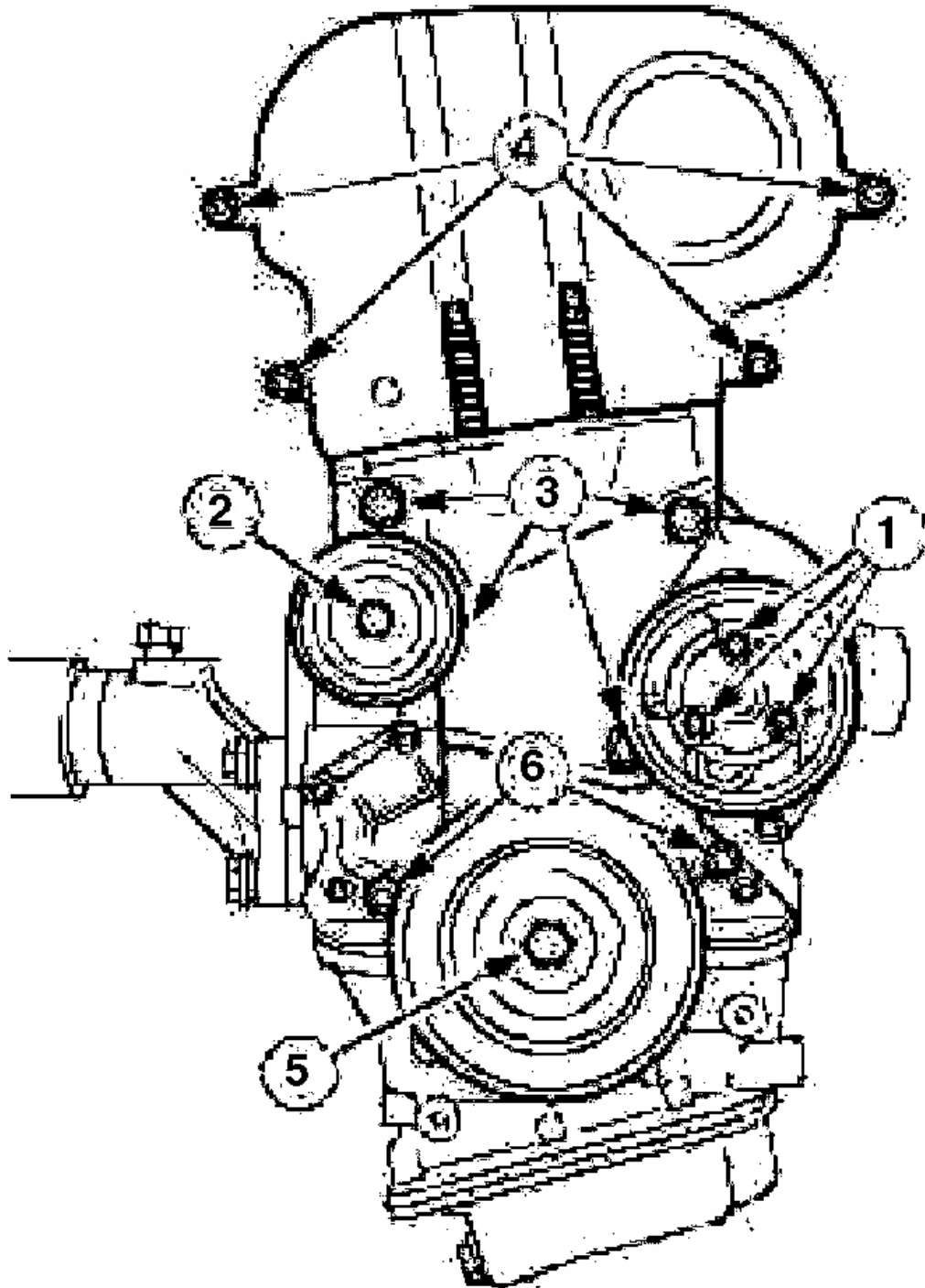
12. Detach the timing belt cover.
 1. Water pump belt pulley
 2. Drive belt idler pulley
 3. Center timing belt cover/front engine mounting bracket
 4. Upper timing belt cover

NOTE: Immobilize the flywheel using Special Tool 303-103.

5. Detach the pulley/vibration damper from the crankshaft.
6. Lower timing belt cover

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus



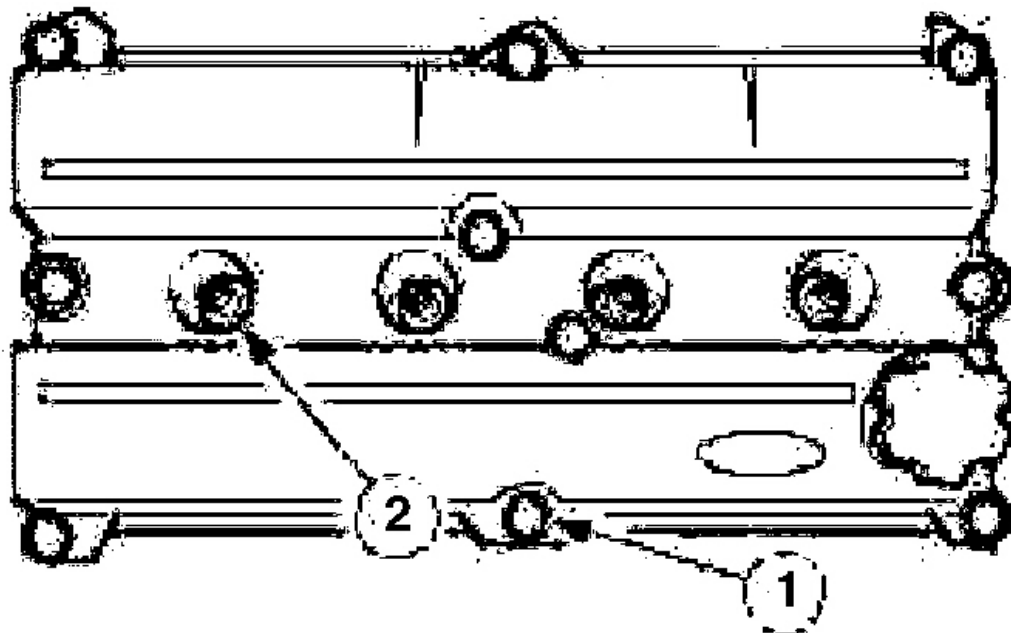
G03431871

Fig. 266: Removing Timing Belt Cover
Courtesy of FORD MOTOR CO.

CAUTION: Do not pull the spark plug connectors by the wire when removing them. If necessary pull off the ignition cables from the ignition coils to prevent kinking the cables. Slightly twist the spark plug connectors before removing them in order to loosen the seals.

CAUTION: Pull off the spark plug connectors in line with the spark plugs.

13. Detach the cylinder head cover.
 - Pull off the spark plug connectors.
 - 2. Remove the bolts.
 - 3. Remove the spark plugs.



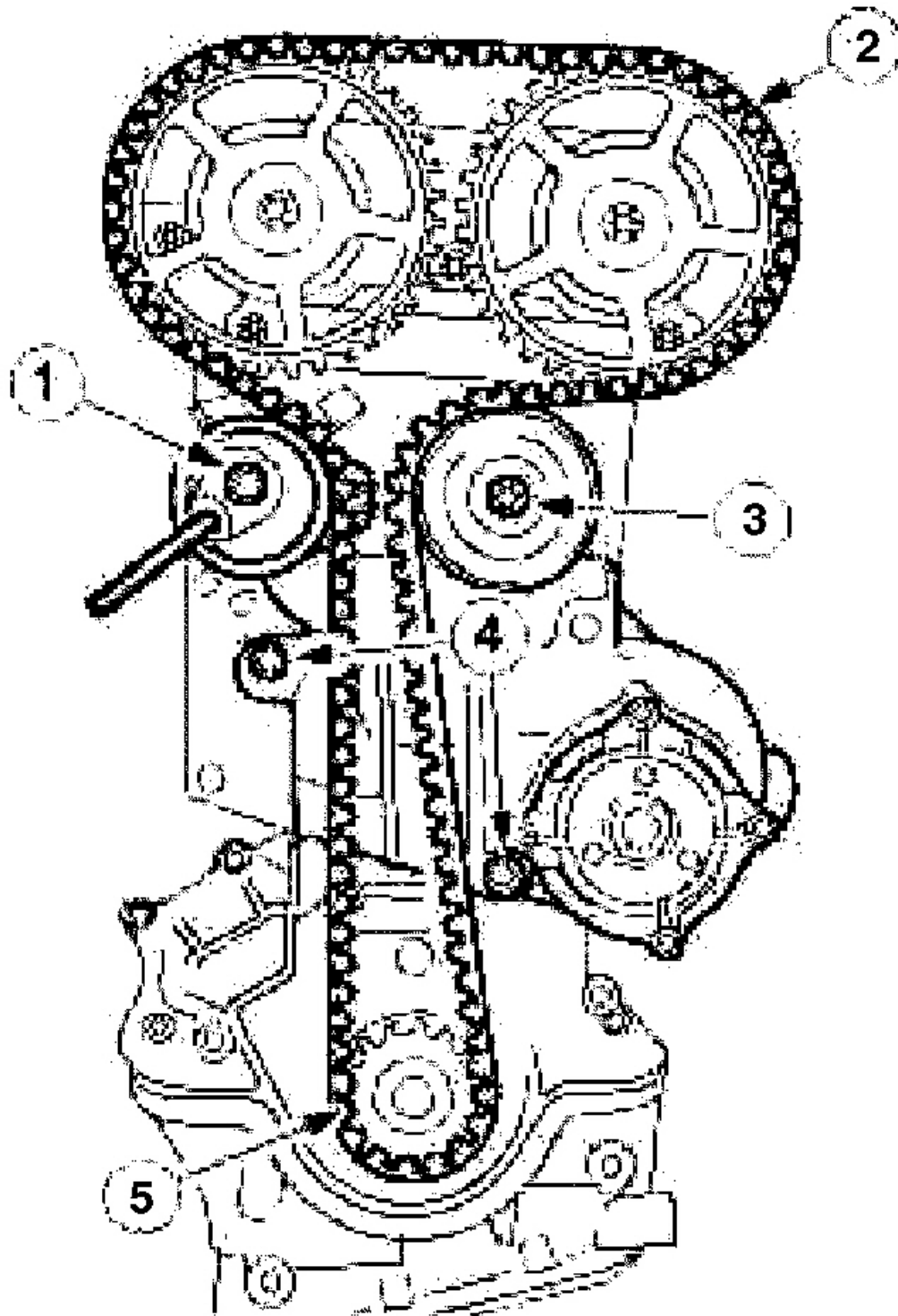
G03431872

Fig. 267: Detaching Cylinder Head Cover
Courtesy of FORD MOTOR CO.

14. Detach the timing belt drive and the water pump.
 1. Slacken the timing belt tensioner by twisting it counterclockwise and detach it.
 2. Remove the timing belt.
 3. Detach the upper idler pulley.
 4. Detach the water pump.
 5. Detach the crankshaft timing pulley and the thrust washer.

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus



G03431873

Fig. 268: Detaching Timing Belt Drive And Water Pump
Courtesy of FORD MOTOR CO.

15. Detach the camshaft timing pulleys.
- Use the special tool to stop them turning.

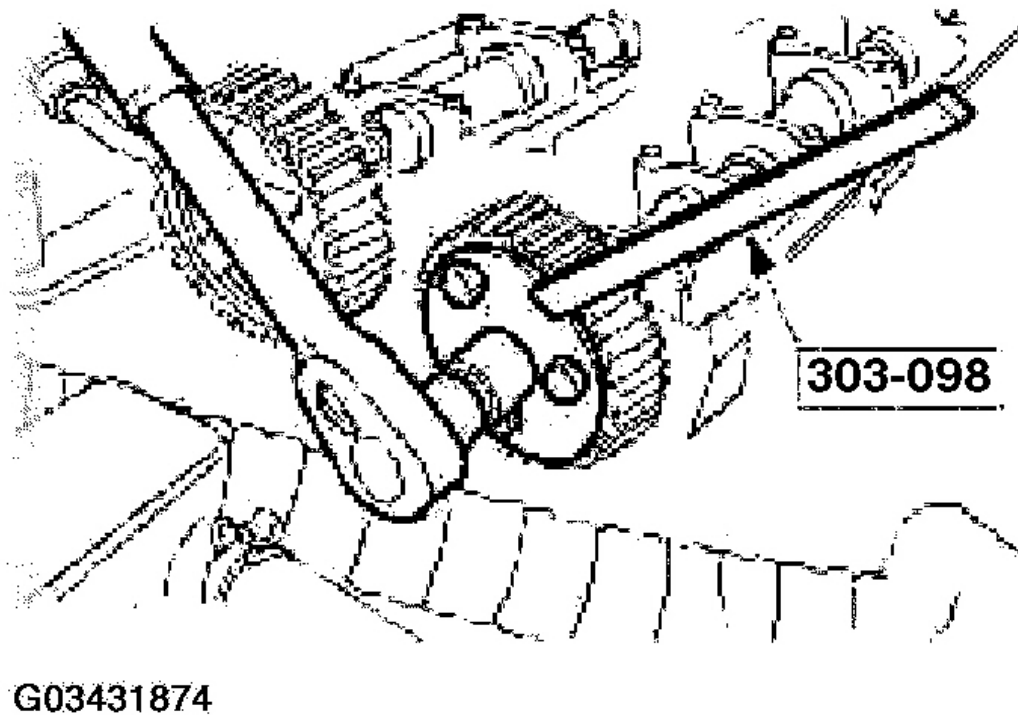
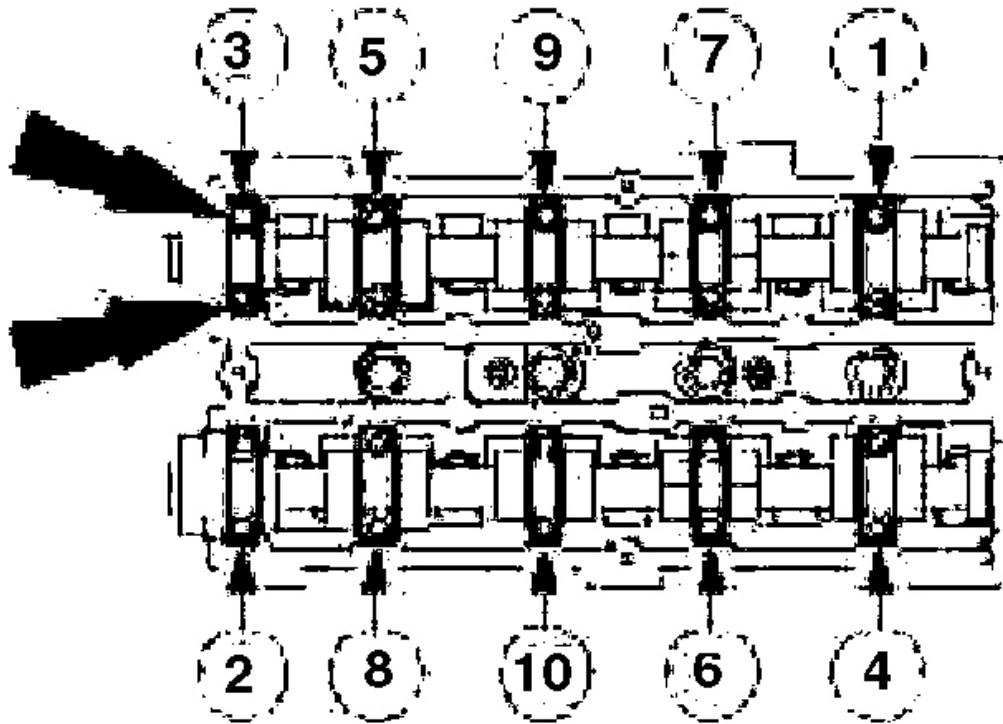


Fig. 269: Removing Camshaft Timing Pulleys
Courtesy of FORD MOTOR CO.

NOTE: Working in several stages, evenly loosen each bolt two turns at a time in the indicated sequence and remove the bolts.

16. Detach the camshaft bearing caps.
- Remove the oil seals.
 - Take out the camshafts.
 - Remove the valve tappets and lay them in order to one side.



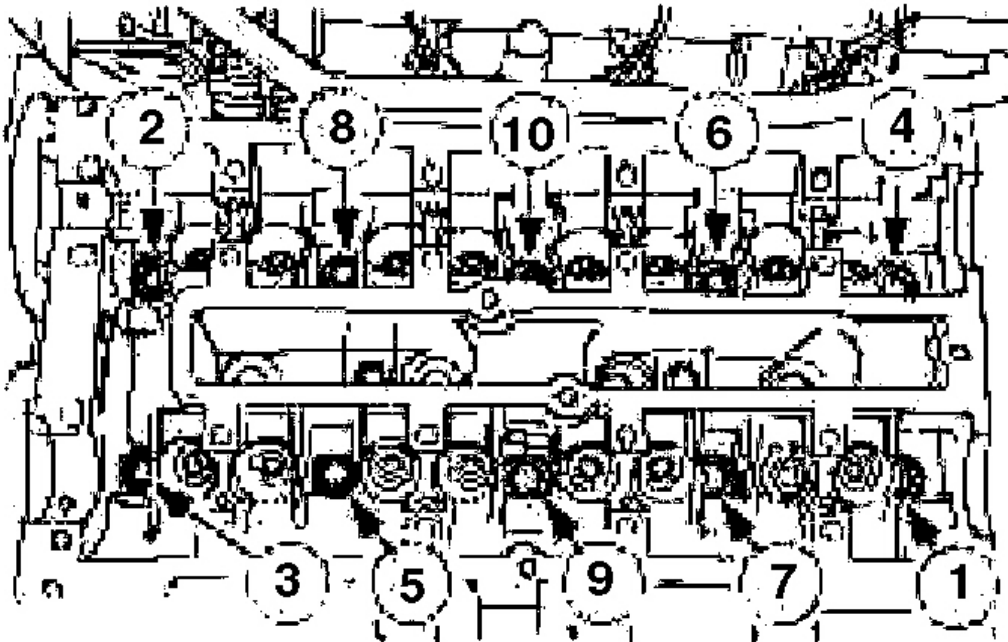
G03431875

Fig. 270: Identifying Loosening Sequence Of Camshaft Bearing Caps Bolts
Courtesy of FORD MOTOR CO.

CAUTION: Center-punch the bolts once or twice to mark them for re-use. The bolts can be re-used twice. Discard the bolts as necessary.

CAUTION: The cylinder head must cool down to room temperature before proceeding.

NOTE: Loosening sequence.



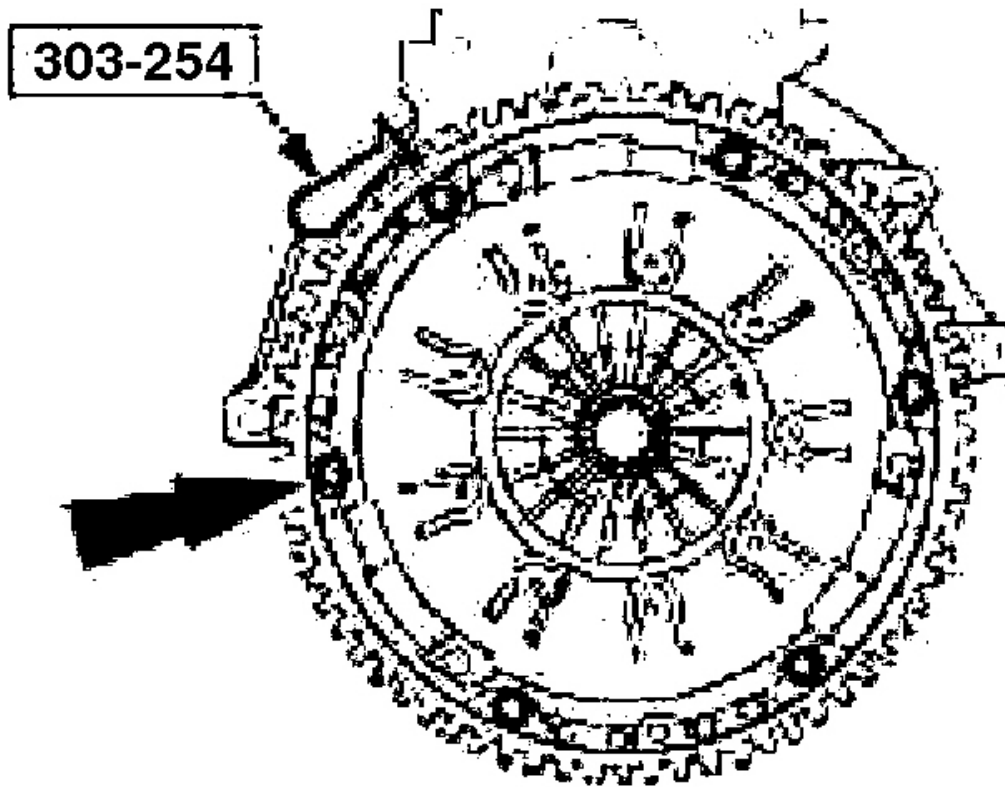
G03431876

Fig. 271: Identifying Loosening Sequence Of Cylinder Head Bolts
Courtesy of FORD MOTOR CO.

17. Remove the cylinder head bolts.
18. Lift off the cylinder head.
 - Hook the workshop hoist onto the engine lifting eyes, lift off the cylinder head and place it down onto clean blocks of wood.

Vehicles with manual transmission

19. Detach the clutch pressure plate and the clutch disc.

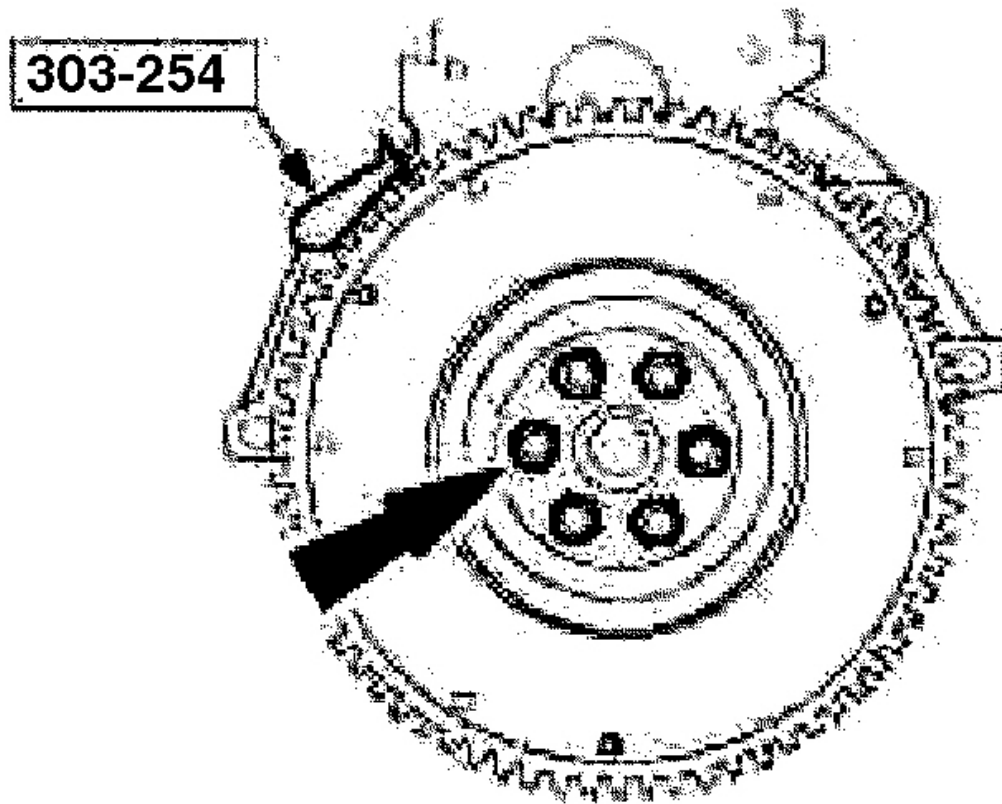


G03431877

Fig. 272: Detaching Clutch Pressure Plate And Clutch Disc
Courtesy of FORD MOTOR CO.

All vehicles

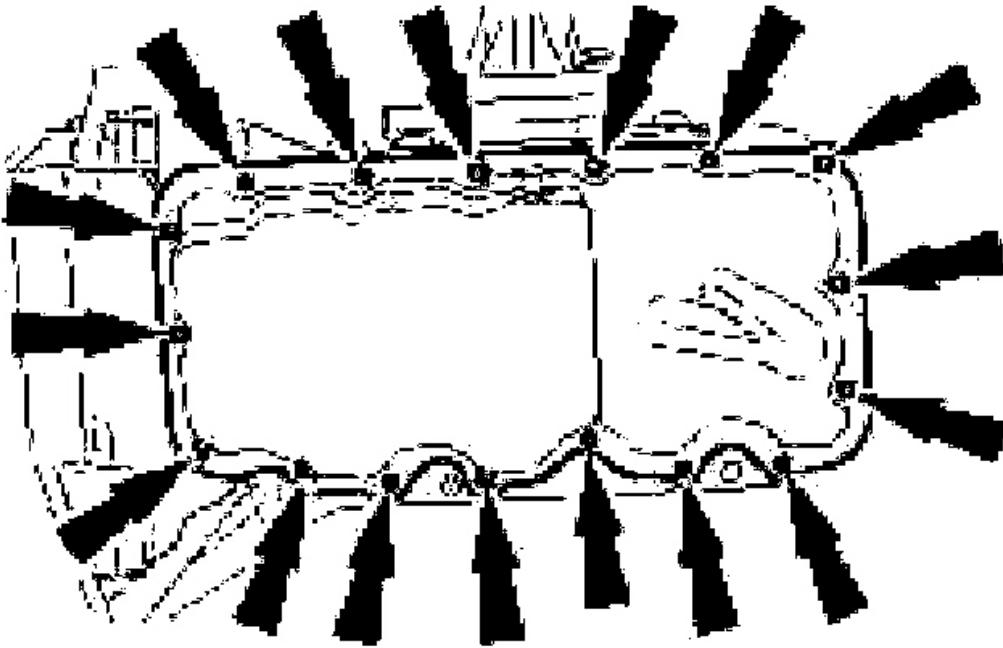
20. Detach the flywheel.
 - Detach the special tool.



G03431878

Fig. 273: Removing Flywheel
Courtesy of FORD MOTOR CO.

21. Remove the oil pan bolts.

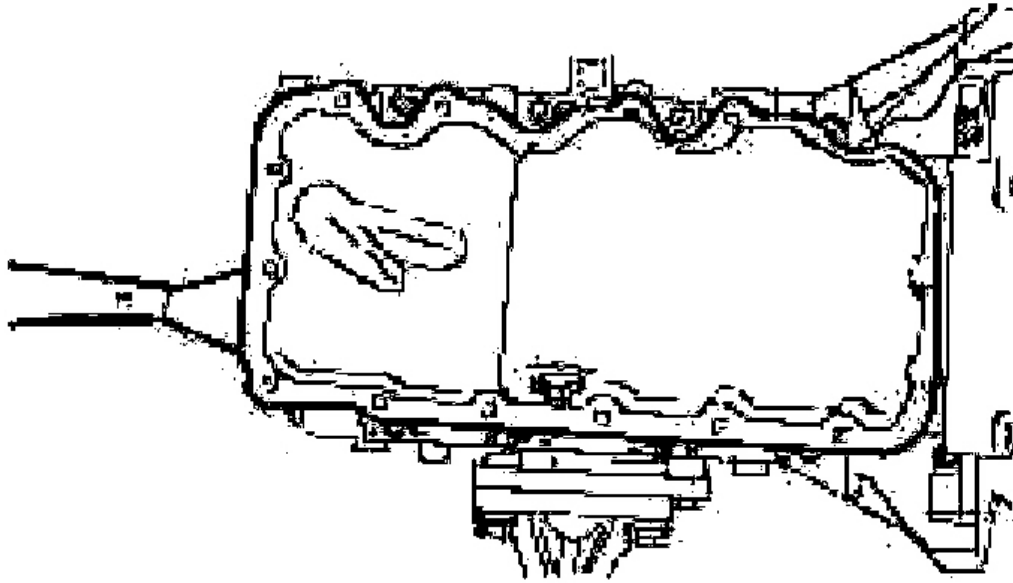


G03431879

Fig. 274: Removing Oil Pan Bolts
Courtesy of FORD MOTOR CO.

CAUTION: Do not damage the mating faces.

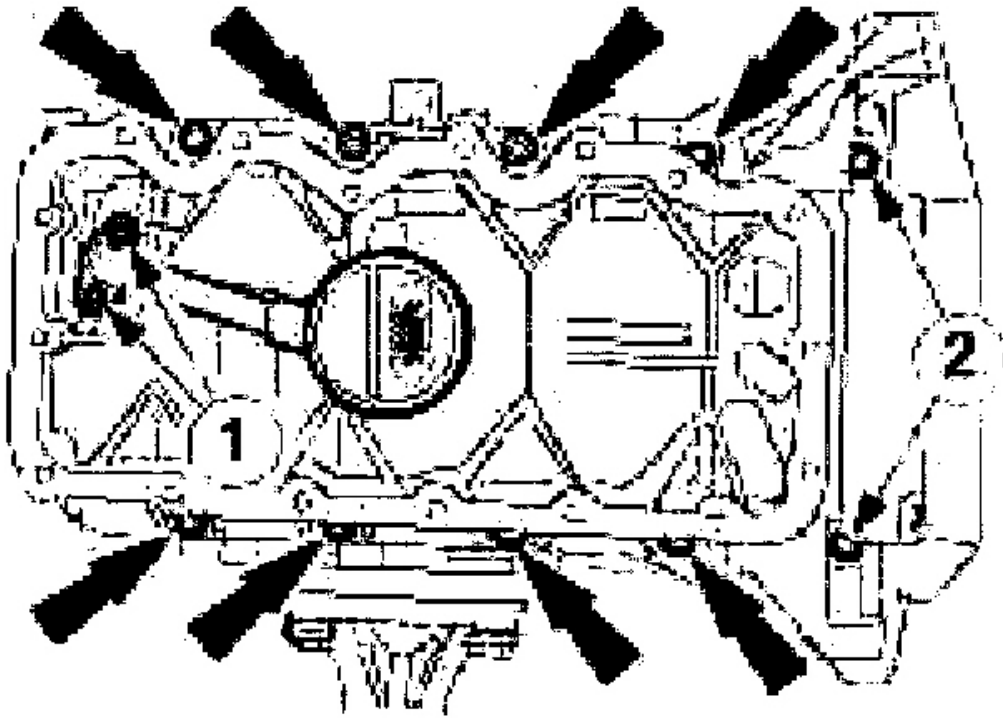
22. Remove the oil pan (shown with engine removed).
 - Separate the oil pan from the lower crankcase using a sharp spatula. Release the oil pan from the lower crankcase by tapping slightly against the tightened drain plug with a rubber hammer.



G03431880

Fig. 275: Separating Oil Pan From Lower Crankcase
Courtesy of FORD MOTOR CO.

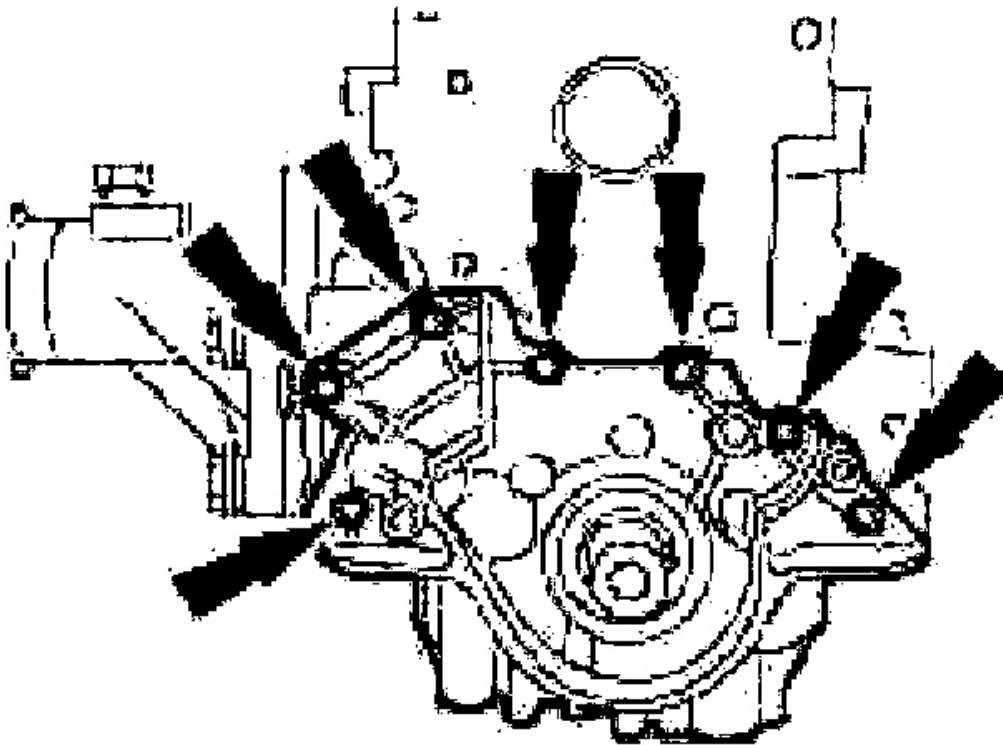
23. Detach the oil intake pipe and the lower crankcase.
 1. Oil intake pipe bolts
 2. Lower crankcase bolts



G03431881

Fig. 276: Removing Oil Intake Pipe And Lower Crankcase
Courtesy of FORD MOTOR CO.

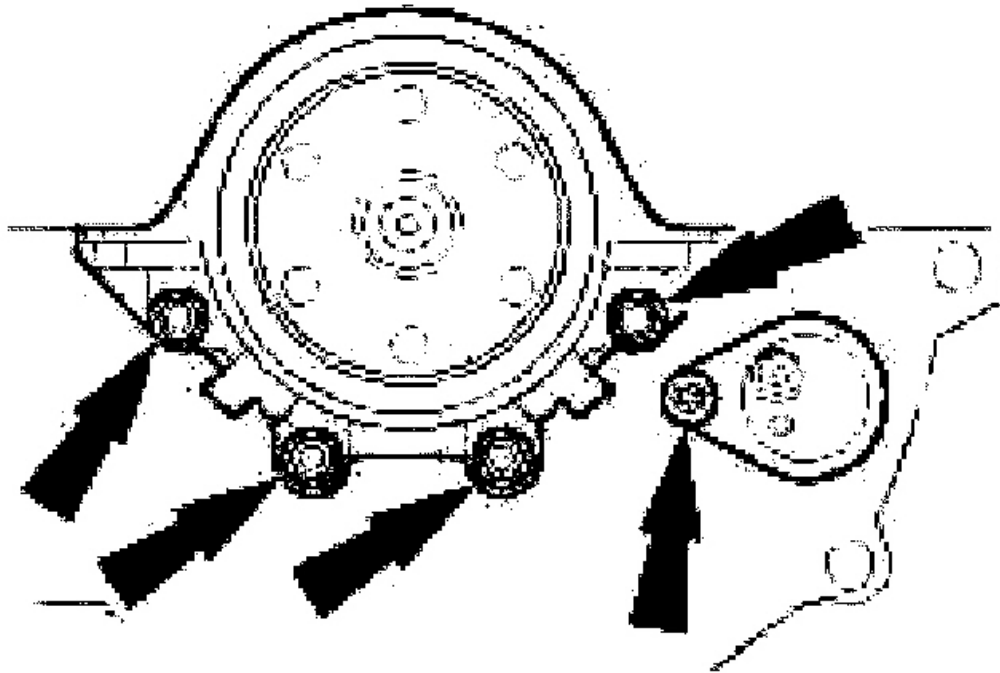
24. Detach the oil pump.



G03431882

Fig. 277: Removing Oil Pump
Courtesy of FORD MOTOR CO.

25. Detach the crankshaft rear oil seal carrier and the crankshaft position (CKP) sensor together with its bracket.



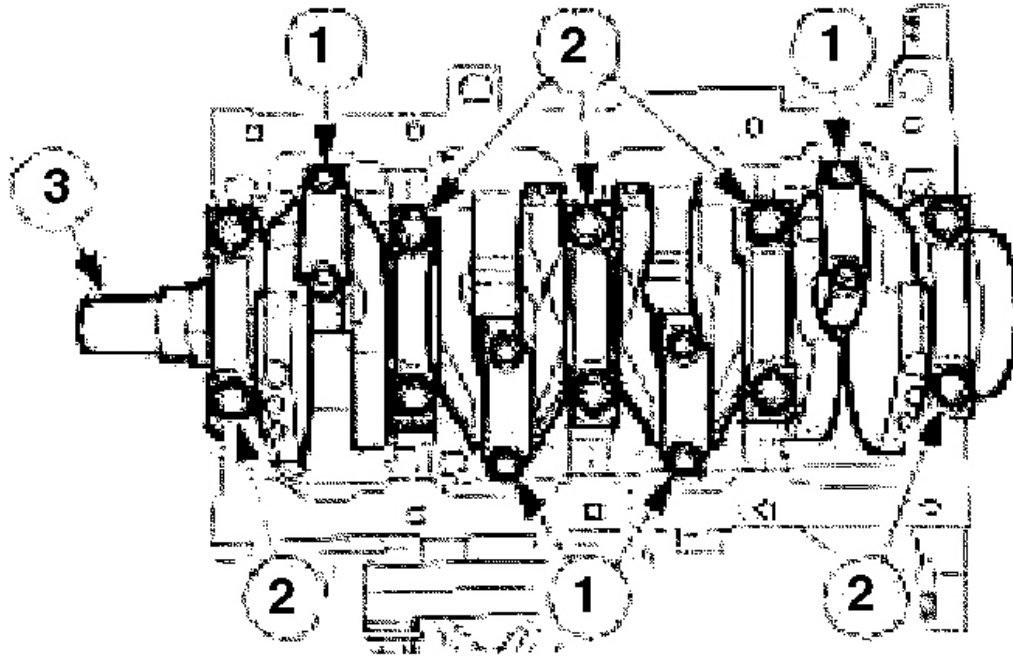
G03431883

Fig. 278: Removing Crankshaft Rear Oil Seal Carrier And Crankshaft Position (CKP) Sensor

Courtesy of FORD MOTOR CO.

NOTE: Lay all parts in order to one side.

26. Remove the crankshaft and pistons.
 1. Detach the connecting rod bearing caps.
 2. Detach the main bearing caps.
 3. Take out the crankshaft and press out the pistons with the connecting rods.



G03431884

Fig. 279: Removing Connecting Rod Bearing Caps Bolts
Courtesy of FORD MOTOR CO.

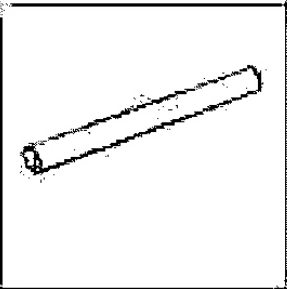
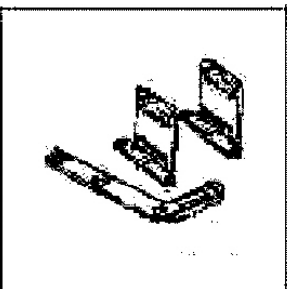
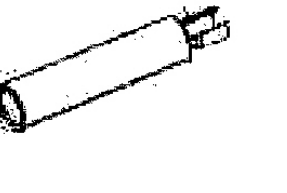
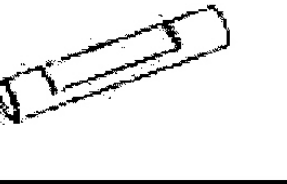
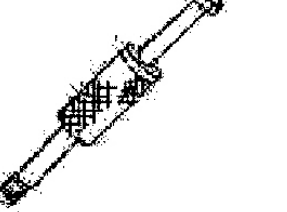
DISASSEMBLY AND ASSEMBLY OF SUBASSEMBLIES

CYLINDER HEAD

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

	Compressor, Valve Spring 303-300 (T87C-6565-A)
	Compressor, Valve Spring 303-350 (T89P-6565-A)
	Remover, Valve Stem Oil Seal 303-468 (T94P-6510-AH)
	Installer, Valve Stem Oil Seal 303-470 (T94P-6510-CH)
	Slide Hammer 307-005 (T59L-100-B)

G03431885

Fig. 280: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

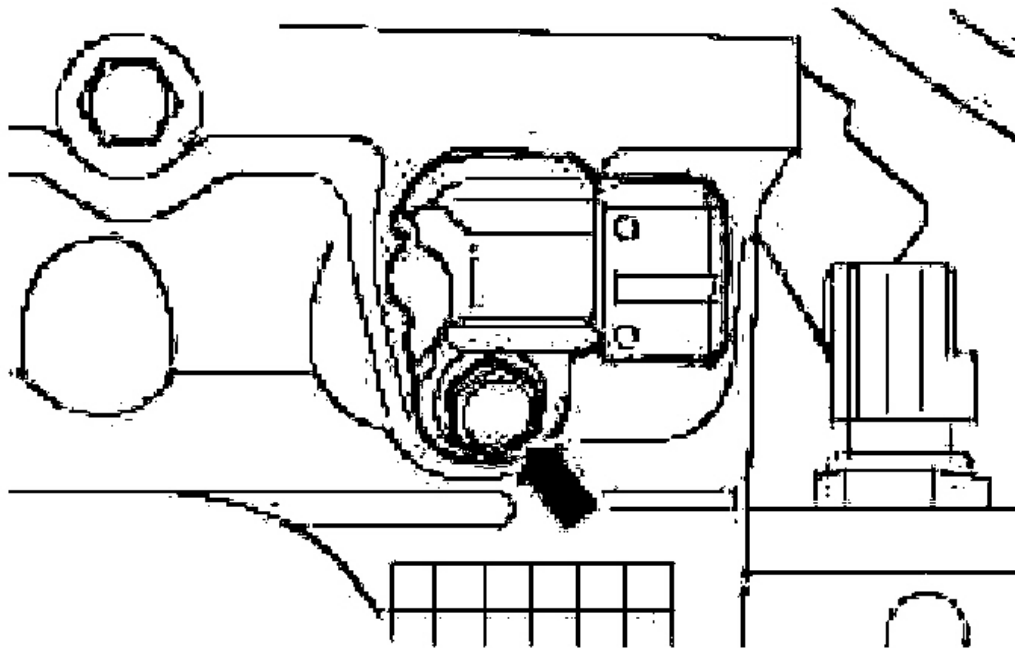
MATERIAL SPECIFICATION

Engine oil

WSS-M2C153-H

Disassembly

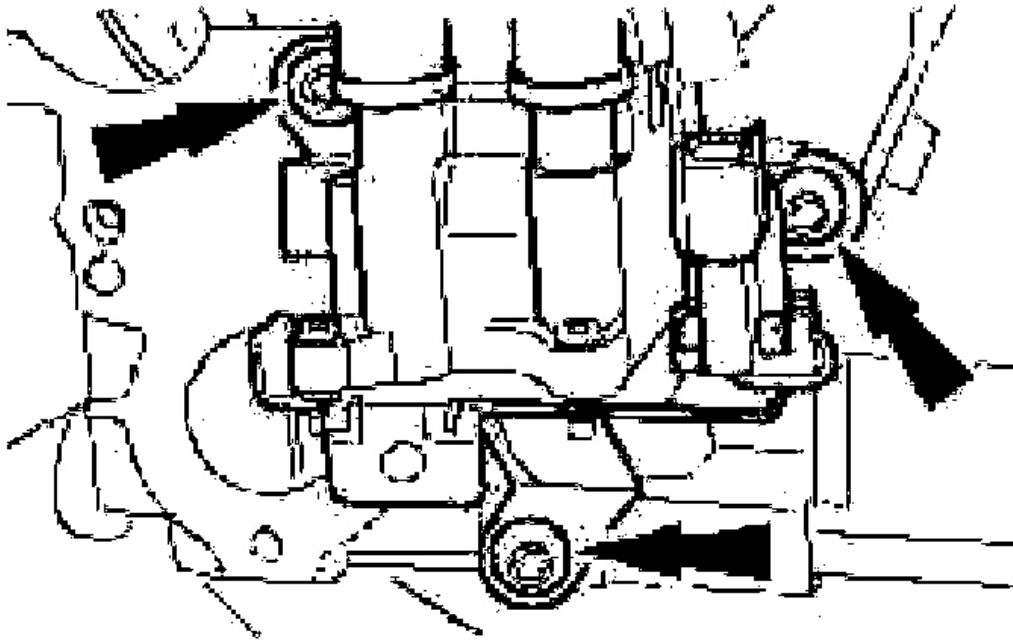
1. Remove the camshaft position sensor.



G03431886

Fig. 281: Removing Camshaft Position Sensor
Courtesy of FORD MOTOR CO.

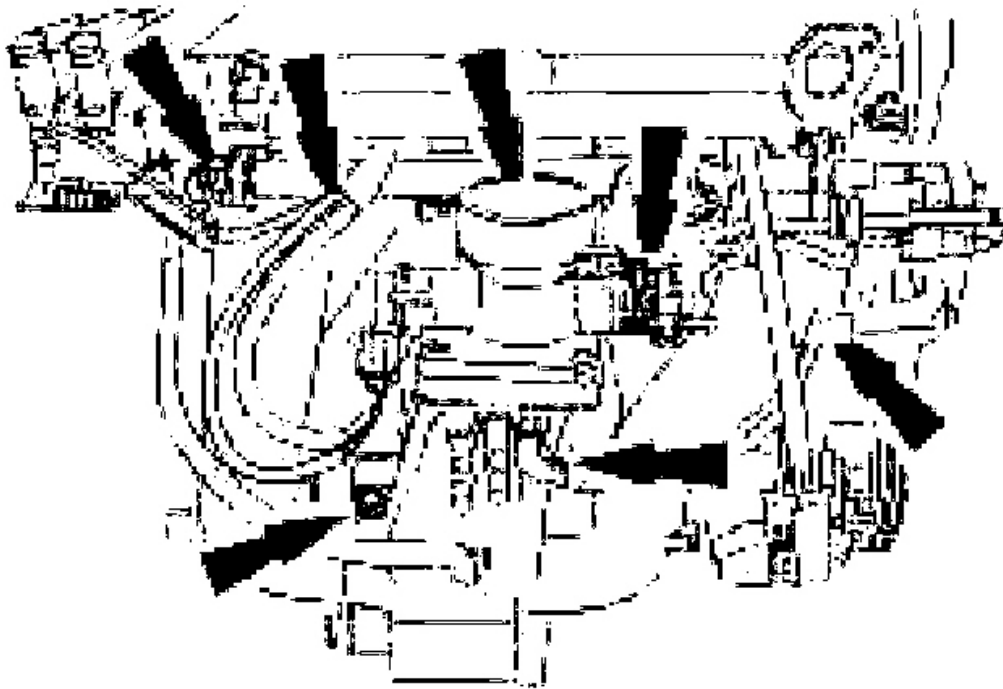
2. Remove the electronic ignition (EI) coil pack.



G03431887

Fig. 282: Removing Electronic Ignition (EI) Coil Pack
Courtesy of FORD MOTOR CO.

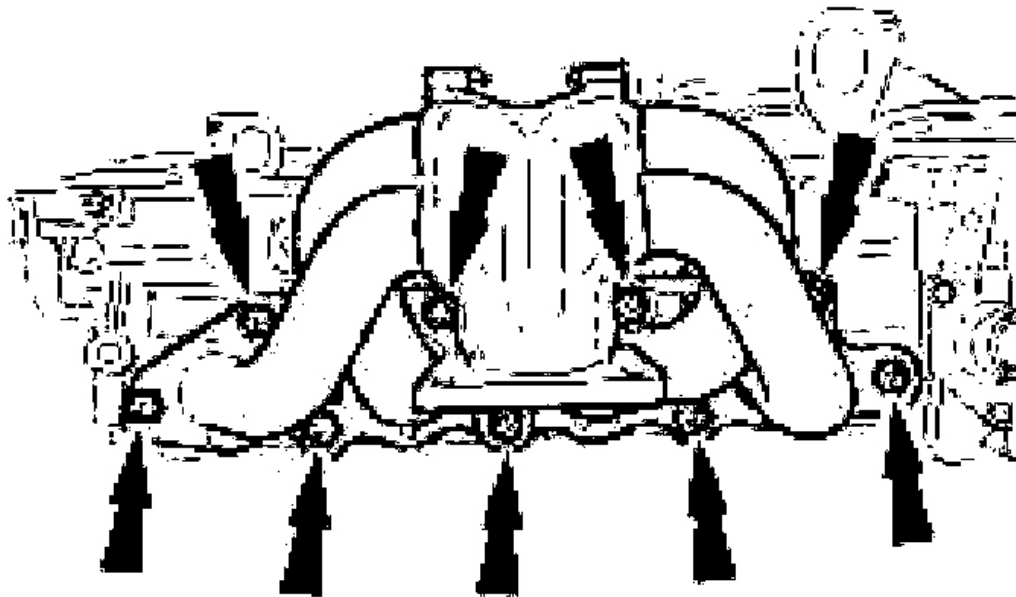
3. Remove the intake manifold.



G03431888

Fig. 283: Removing Intake Manifold
Courtesy of FORD MOTOR CO.

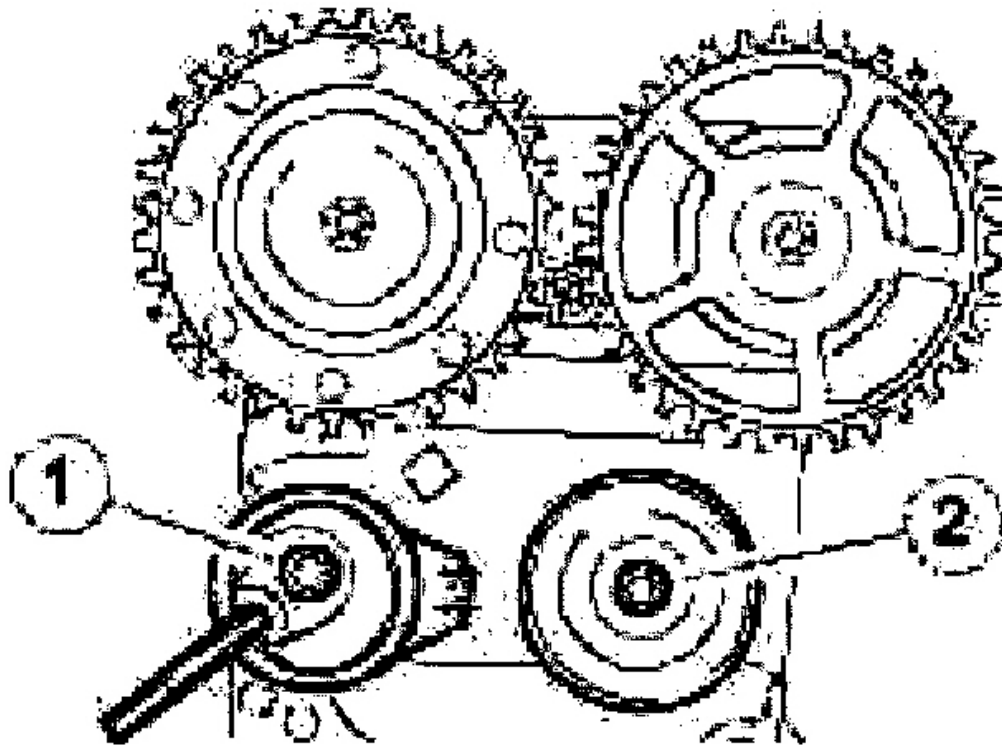
4. Remove the exhaust manifold.



G03431889

Fig. 284: Removing Exhaust Manifold
Courtesy of FORD MOTOR CO.

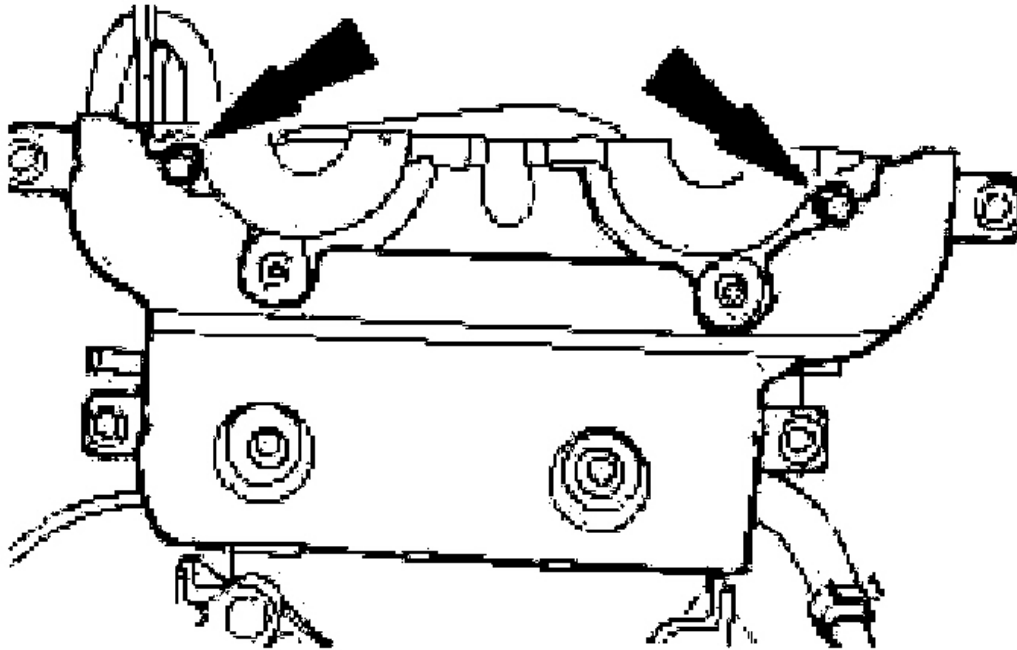
5. Remove the timing belt tensioner and idler pulley.
 1. Timing belt tensioner
 2. Idler pulley



G03431890

Fig. 285: Removing Timing Belt Tensioner And Idler Pulley
Courtesy of FORD MOTOR CO.

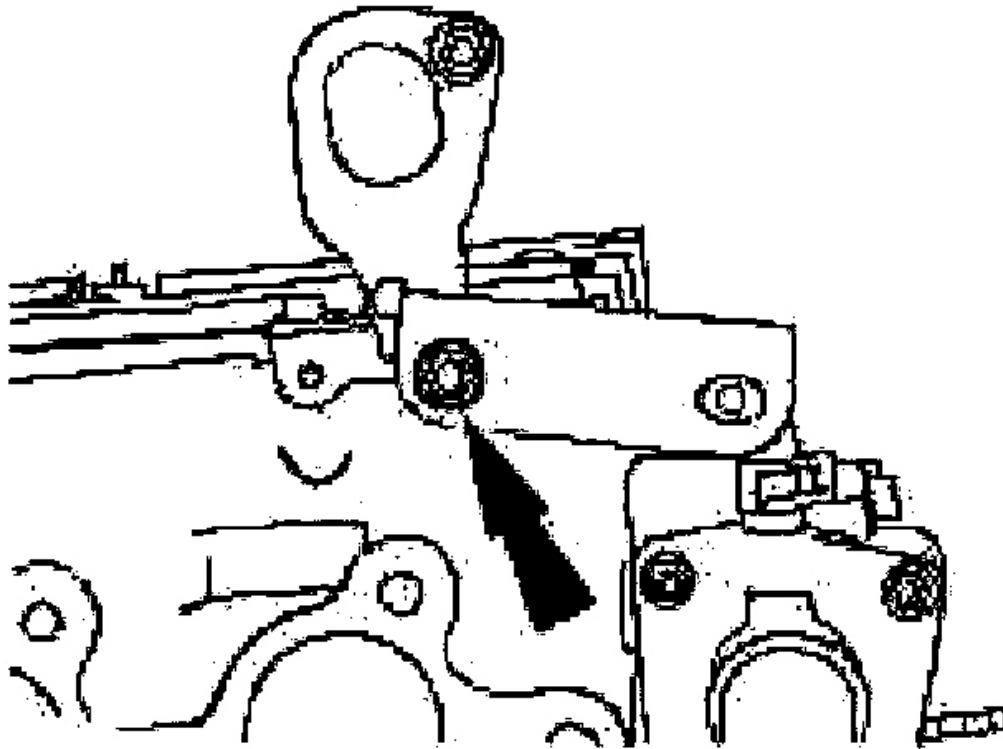
6. Remove the timing belt inner cover.



G03431891

Fig. 286: Removing Timing Belt Inner Cover
Courtesy of FORD MOTOR CO.

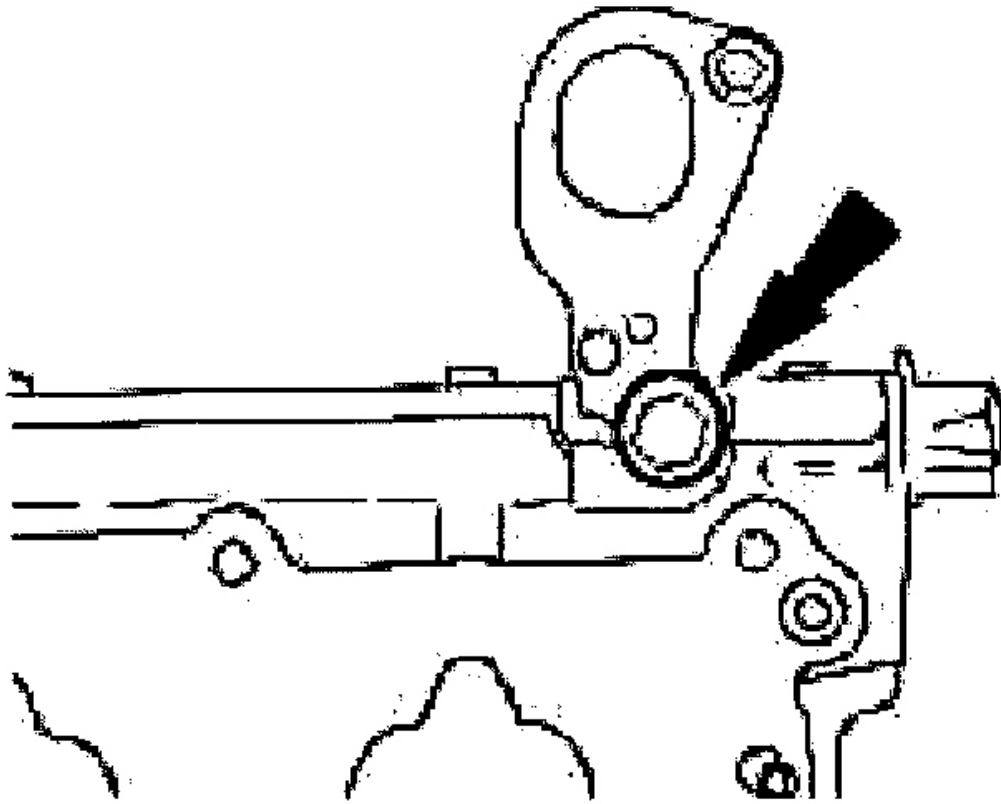
7. Remove the bracket.



G03431892

Fig. 287: Removing Bracket
Courtesy of FORD MOTOR CO.

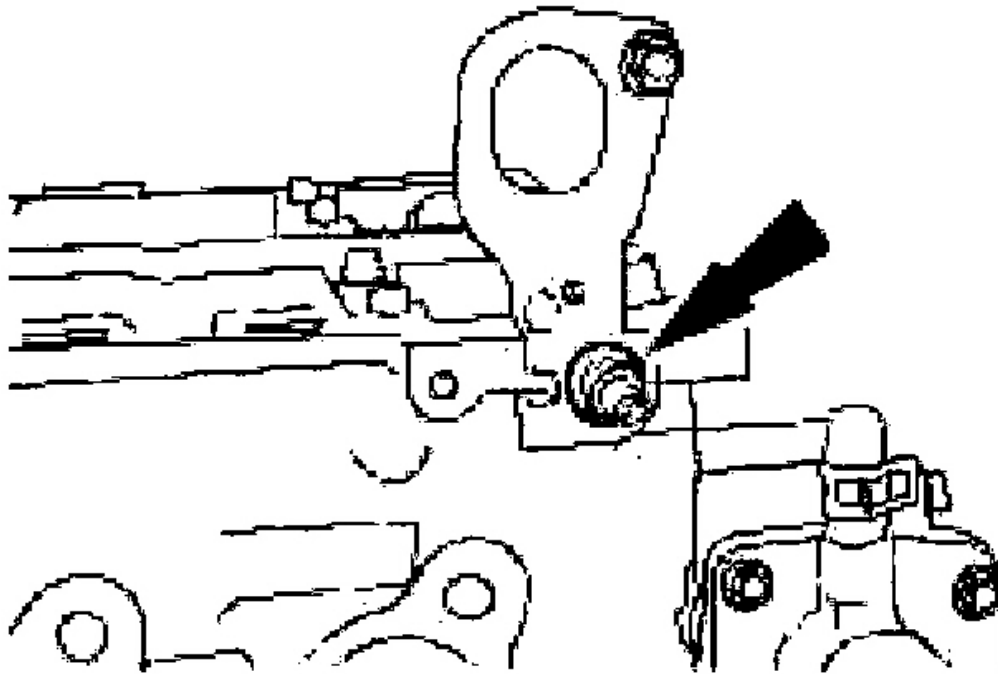
8. Remove the rear lifting eye.



G03431893

Fig. 288: Removing Rear Lifting Eye
Courtesy of FORD MOTOR CO.

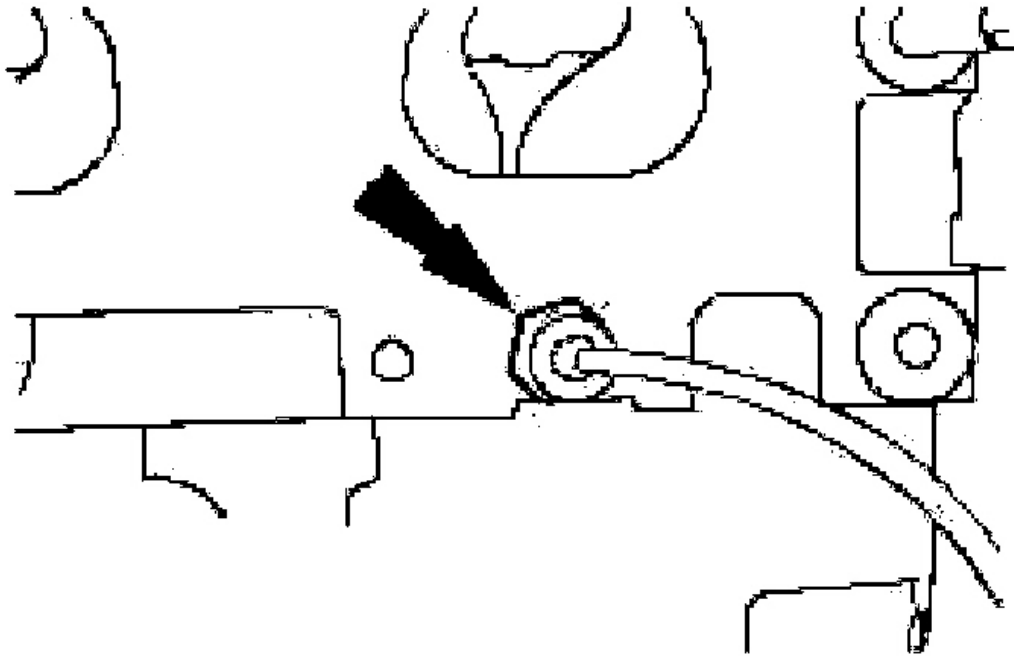
9. Remove the front lifting eye.



G03431894

Fig. 289: Removing Front Lifting Eye
Courtesy of FORD MOTOR CO.

10. Remove the cylinder head temperature (CHT) sensor.



G03431895

Fig. 290: Removing Cylinder Head Temperature (CHT) Sensor
Courtesy of FORD MOTOR CO.

11. Using the special tools, compress the valve spring and remove the valve spring retainer keys, the valve spring retainers, and the valve springs.
 - Remove the special tools.

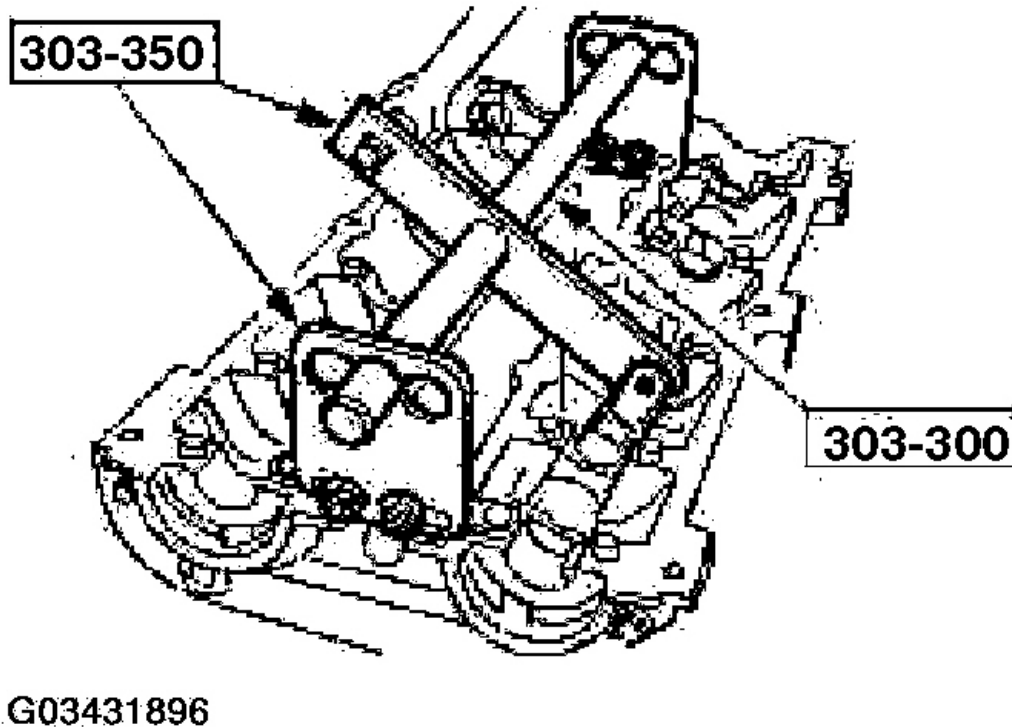
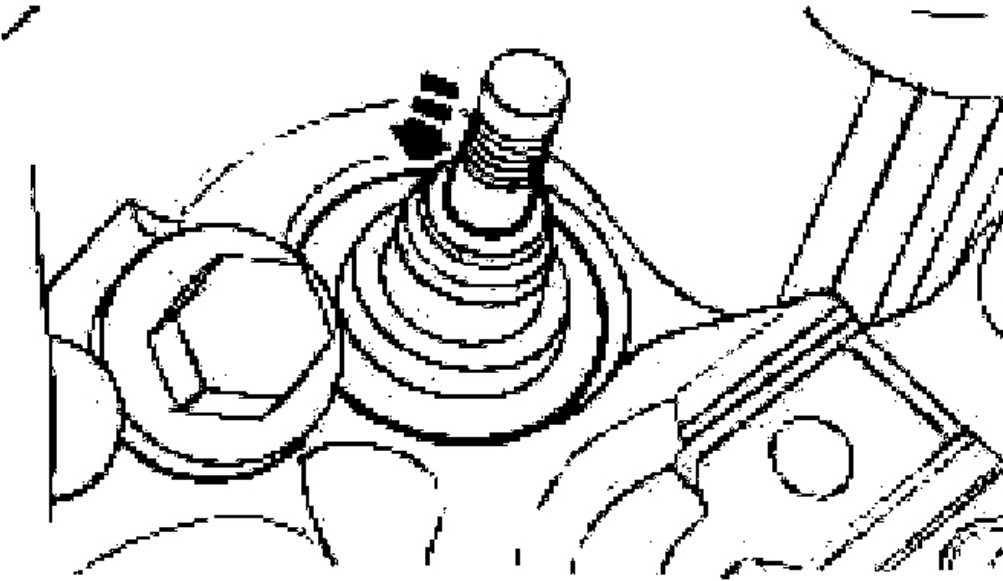


Fig. 291: Removing Valve Spring Retainer Keys, Valve Spring Retainers And Valve Springs

Courtesy of FORD MOTOR CO.

12. Inspect the valve spring, valve spring retainer and valve spring retainer key. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION . Install new parts as necessary.

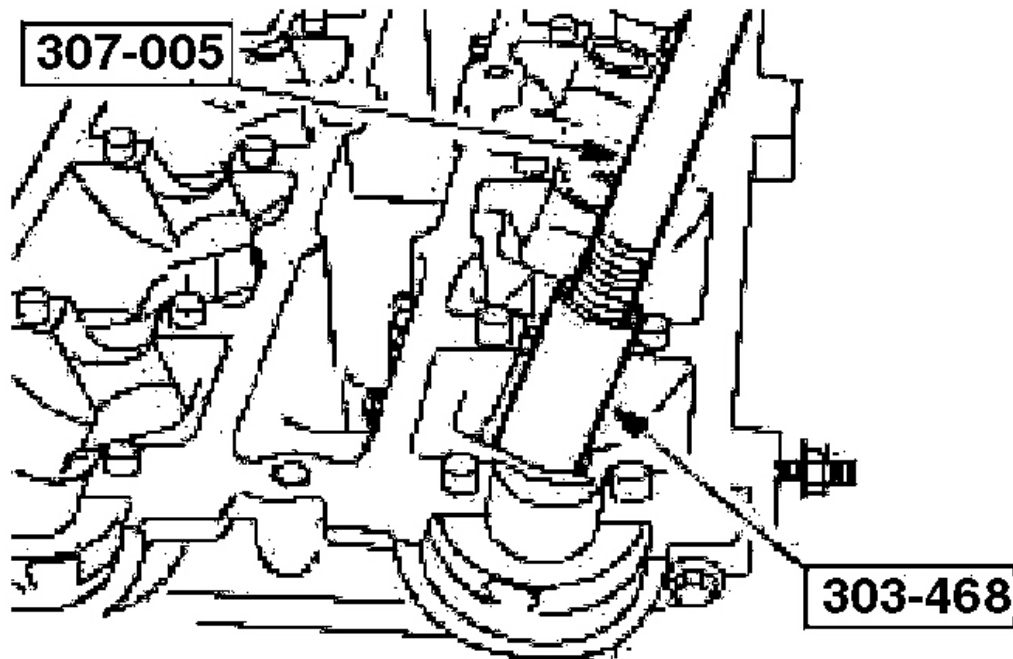
NOTE: Mark each valve if the original valves are to be used.



G03431897

Fig. 292: Removing Valves
Courtesy of FORD MOTOR CO.

13. Remove the valves.
14. Using the special tools, remove and discard the valve stem seals.



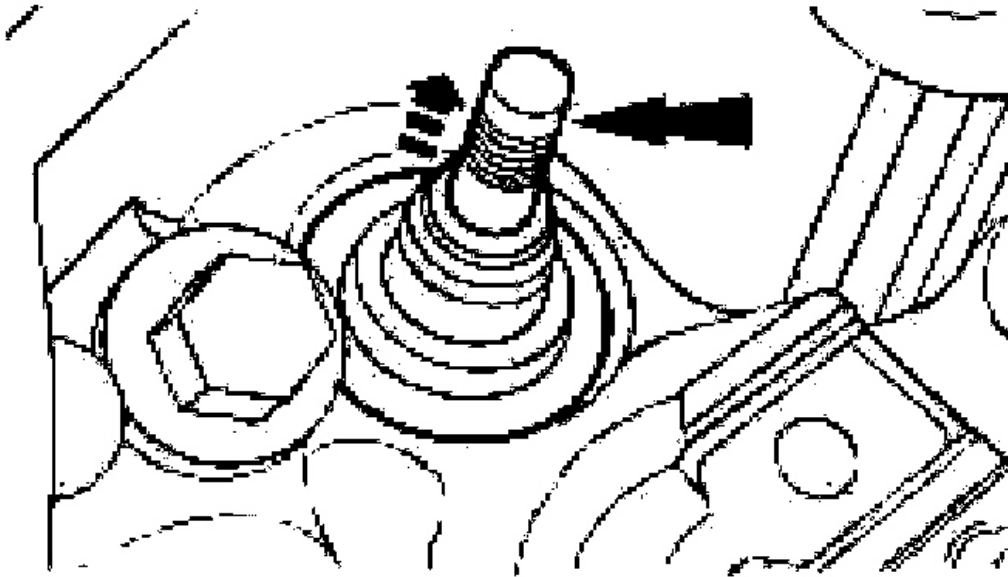
G03431898

Fig. 293: Removing Valve Stem Seals
Courtesy of FORD MOTOR CO.

15. Inspect the valves. For additional information refer to ENGINE SYSTEM-GENERAL INFORMATION . Install new parts as necessary.

Assembly

NOTE: If installing the original valves, make sure the valves are installed in the position from which they were removed. Coat the valve stems with Super Premium SAE 5W-20 Motor Oil or equivalent meeting Ford specification WSS-M2C153-H.

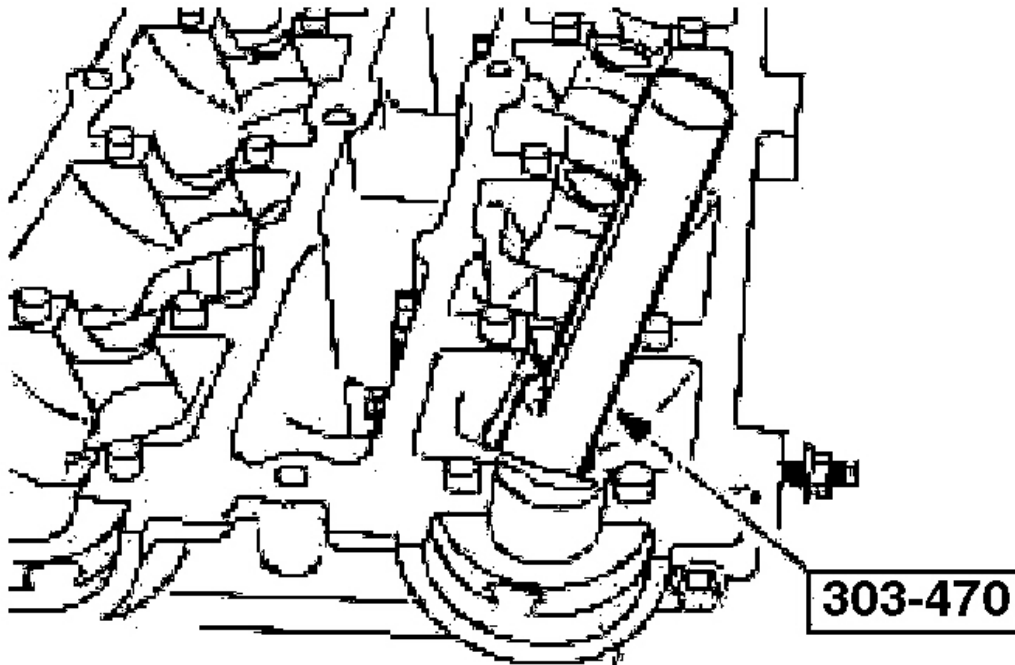


G03431899

Fig. 294: Installing Valves
Courtesy of FORD MOTOR CO.

1. Install the valves.

NOTE: Use the seal protector provided with the replacement kit to prevent damage to the valve stem seals.



G03431900

Fig. 295: Installing Valve Stem Seals Onto Cylinder Head Valve Guides
Courtesy of FORD MOTOR CO.

2. Lubricate valve and guides with Super Premium SAE 5W-20 Motor Oil or equivalent meeting Ford specification WSS-M2C153-H and using the special tool install the valve stem seals onto the cylinder head valve guides.
3. Place the valve spring in position over the valve and install the valve spring retainer.
4. Using the special tools, compress the valve spring and install the valve spring retainer keys.
 - Remove the special tools.

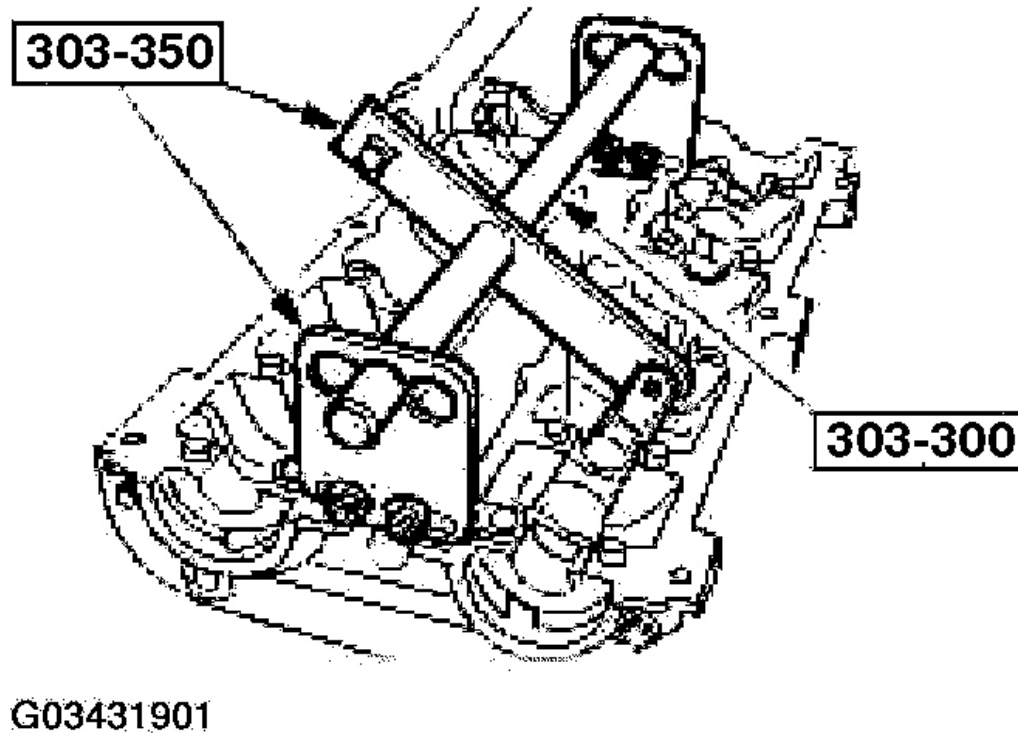
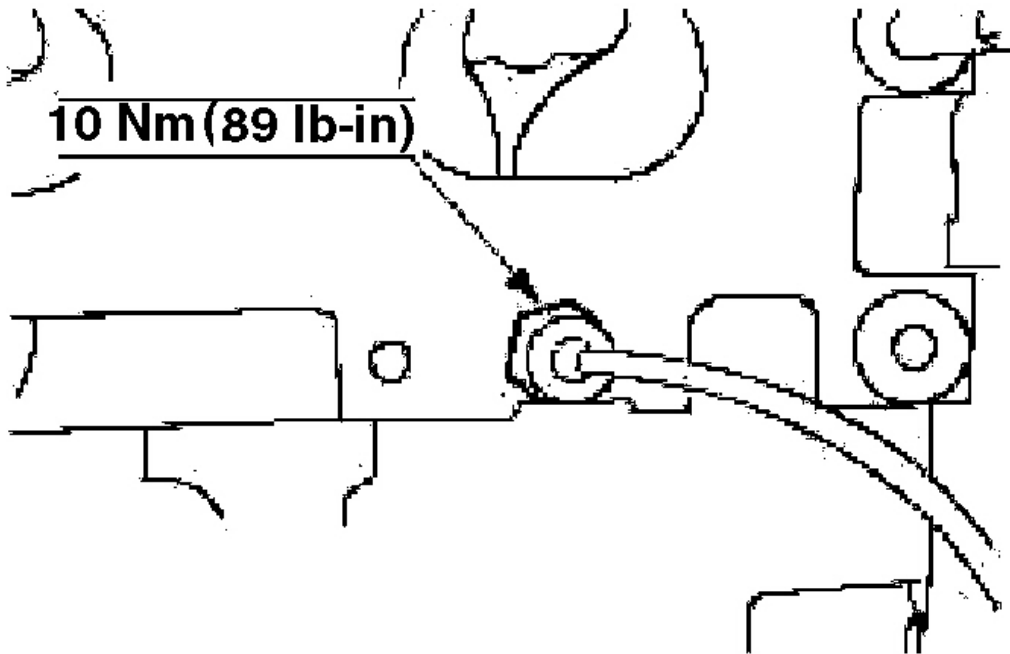


Fig. 296: Installing Valve Spring Retainer Keys And Valve Springs
Courtesy of FORD MOTOR CO.

5. Install the CHT sensor.



G03431902

Fig. 297: Installing CHT Sensor
Courtesy of FORD MOTOR CO.

6. Install the front lifting eye.

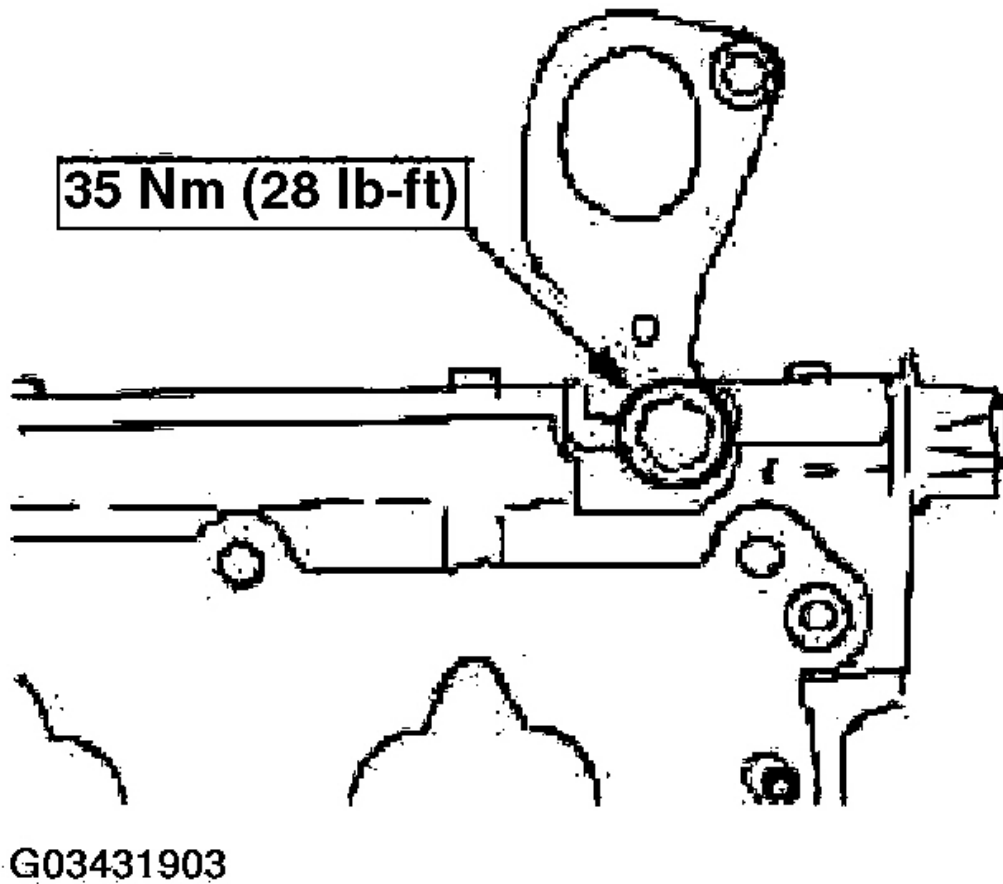


Fig. 298: Installing Front Lifting Eye
Courtesy of FORD MOTOR CO.

7. Install the rear lifting eye.

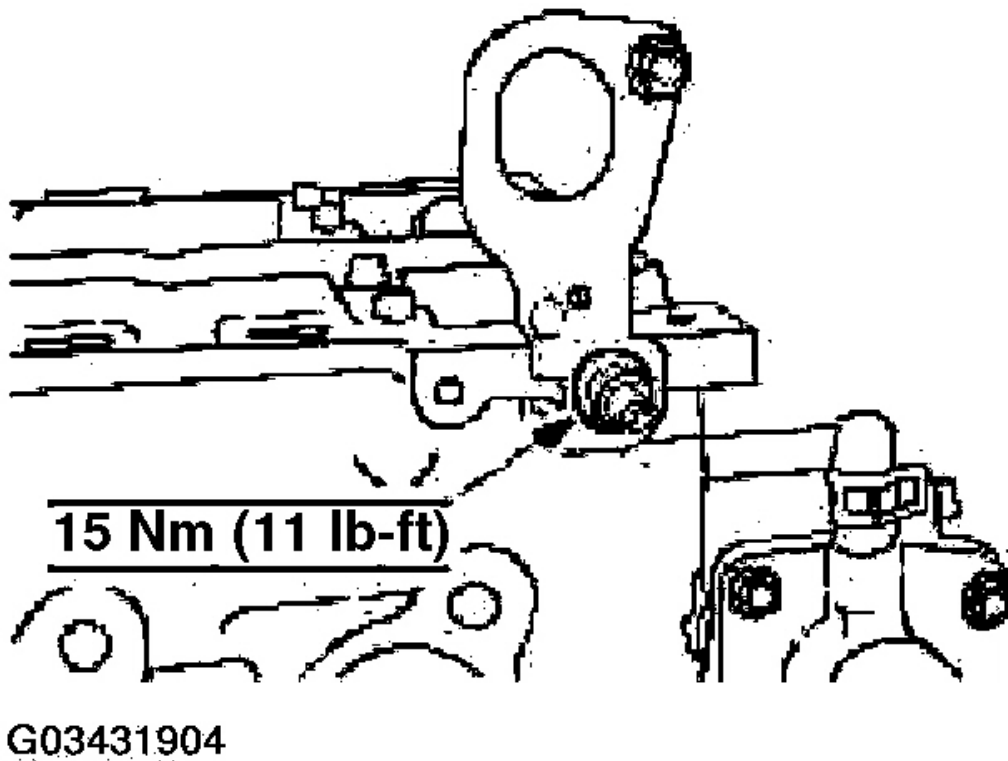
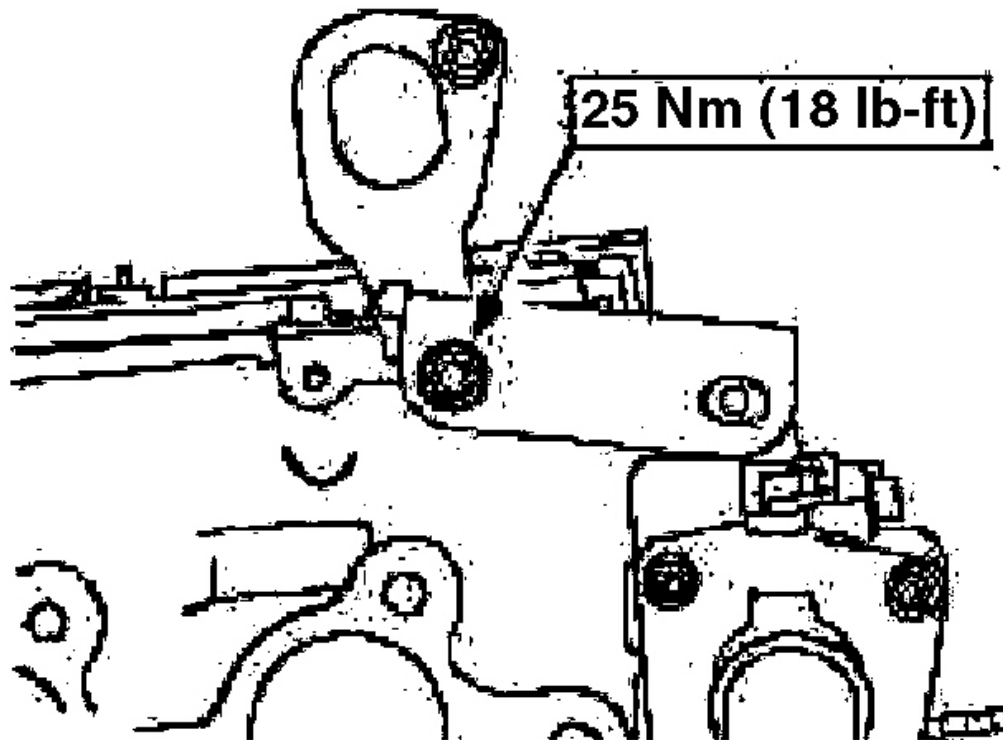


Fig. 299: Installing Rear Lifting Eye
Courtesy of FORD MOTOR CO.

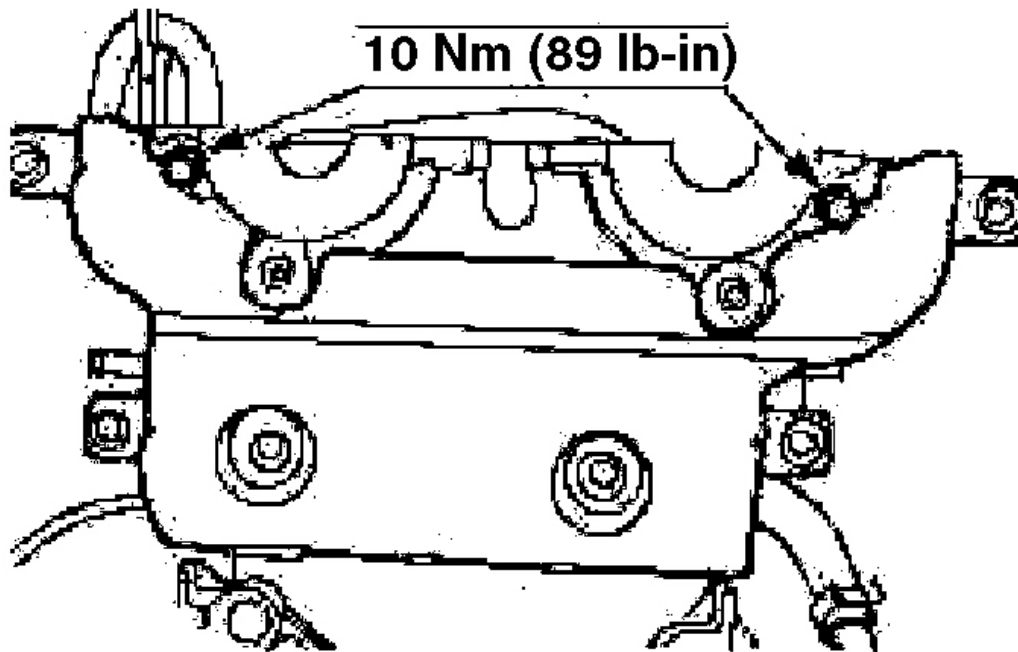
8. Install the bracket.



G03431905

Fig. 300: Installing Bracket
Courtesy of FORD MOTOR CO.

9. Install the timing belt inner cover.

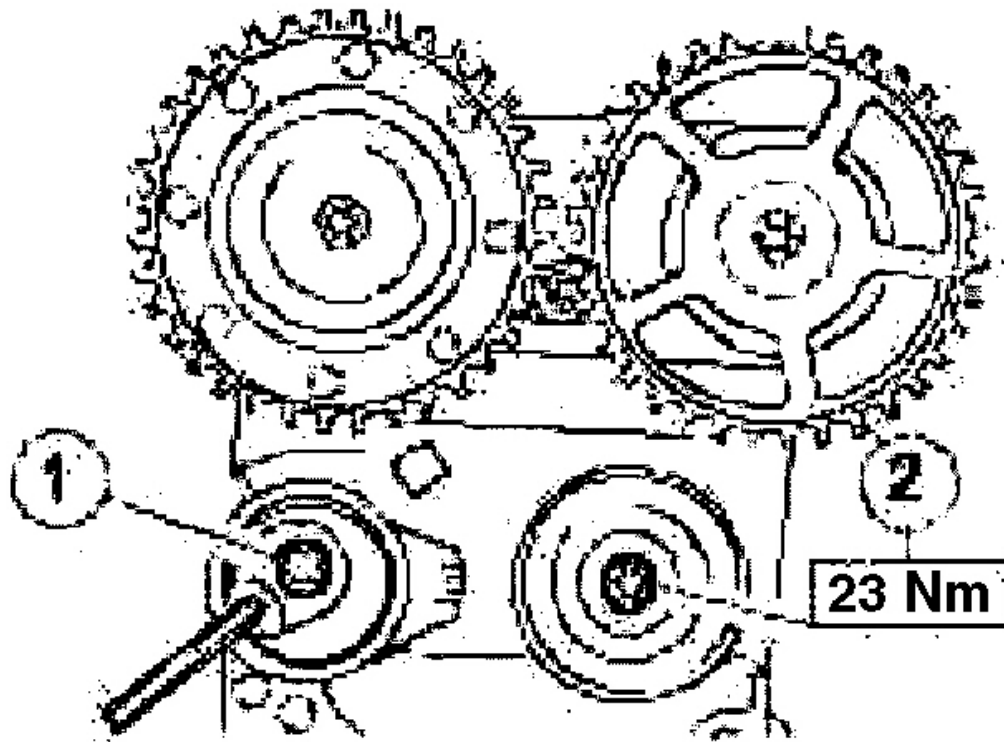


G03431906

Fig. 301: Installing Timing Belt Inner Cover
Courtesy of FORD MOTOR CO.

NOTE: Do not tighten the timing belt tensioner retaining bolt at this stage.

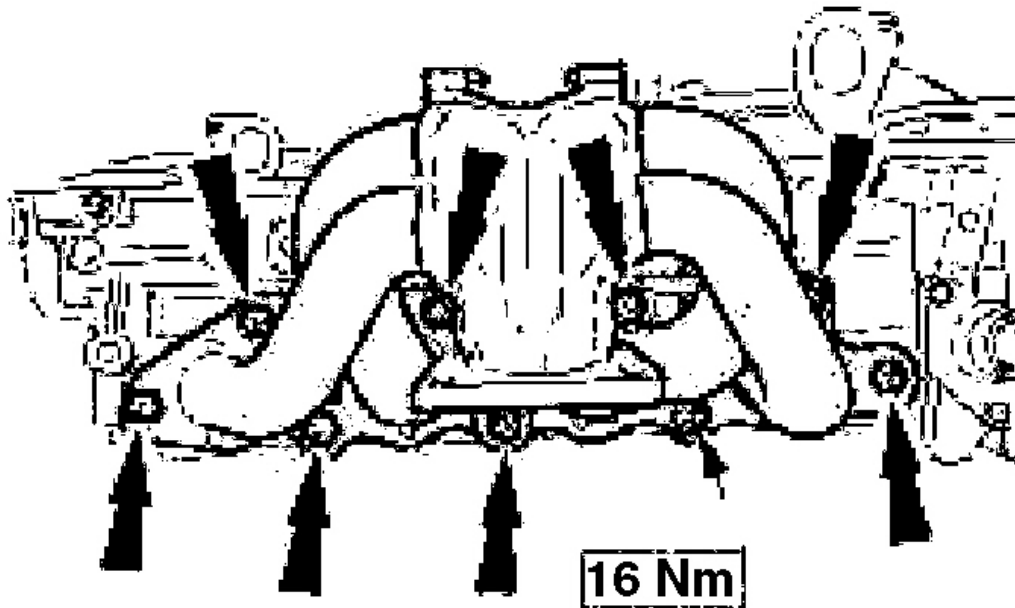
10. Install the timing belt tensioner and the idler pulley.
 1. Timing belt tensioner.
 2. Idler pulley



G03431907

Fig. 302: Installing Timing Belt Tensioner And Idler Pulley
Courtesy of FORD MOTOR CO.

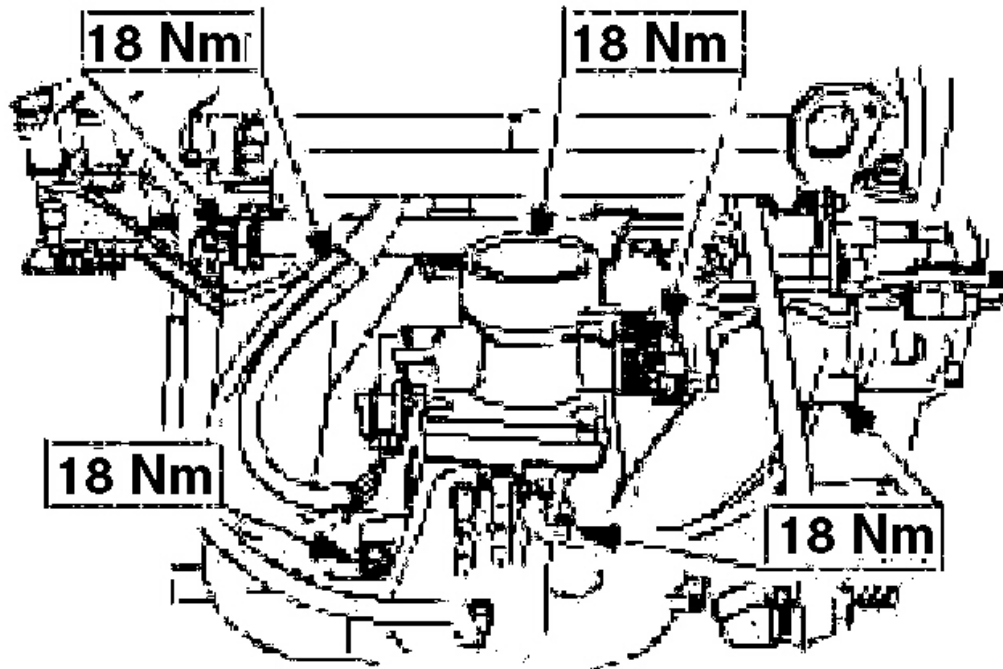
11. Install the exhaust manifold.



G03431908

Fig. 303: Installing Exhaust Manifold
Courtesy of FORD MOTOR CO.

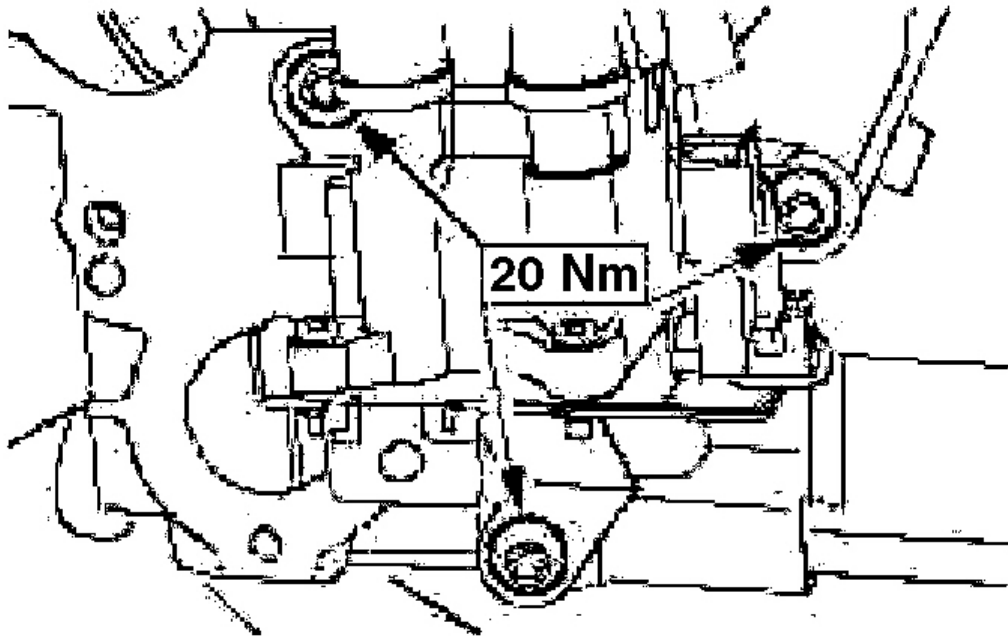
12. Install the intake manifold.



G03431909

Fig. 304: Installing Intake Manifold
Courtesy of FORD MOTOR CO.

13. Install the electronic ignition (EI) coil pack.



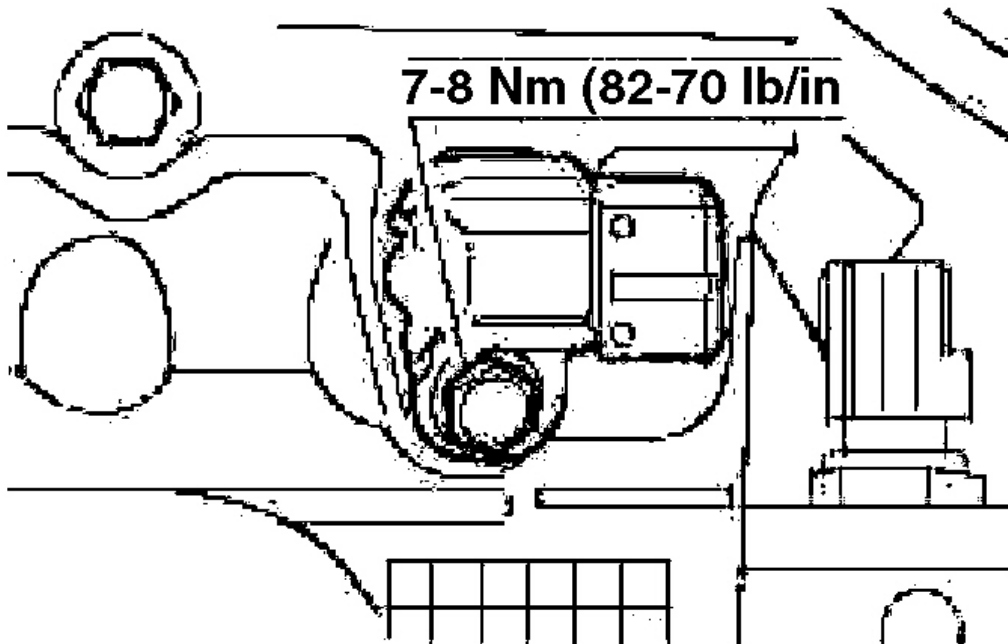
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Fig. 305: Installing Electronic Ignition (EI) Coil Pack
Courtesy of FORD MOTOR CO.

14. Install the camshaft position sensor.

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G03431911

Fig. 306: Installing Camshaft Position Sensor
Courtesy of FORD MOTOR CO.

ASSEMBLY

ENGINE

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

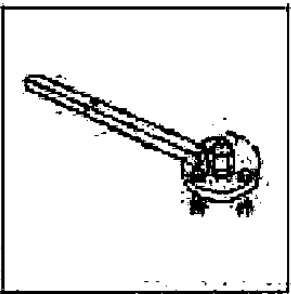
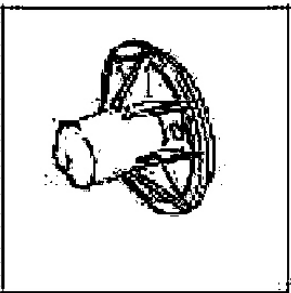
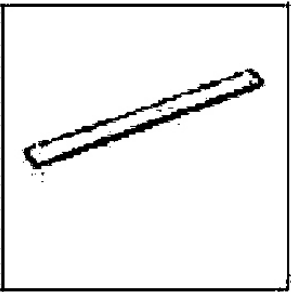



	Remover, Camshaft Pulley 303-098 (T74P-6256-B)
	Installer, Crankshaft Rear Main Oil Seal 303-328 (T88P-6701-B1)
	Alignment Plate, Camshaft 303-465 (T94P-6256-CH)
	Timing Pin, Cylinder No. 1 TDC 303-574 (T97P-6000-A)
	Installer, Camshaft Oil Seal 303-160 (T81P-6292-A)
	Holding Tool, Flywheel 303-103 (T74P-6375-A)

Fig. 307: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

High-temperature grease	ESD-M1C220-A
Sealant remover	WSKM2G348-A4
Sealant, joins between cylinder block and oil pump/oil seal carrier	WSKM4G320-A
Gasket maker	WSKM2G348-A5
Sealant, oil pan	WSSM4G323-A7
Engine oil	WSSM2C153-H
Silicone grease, spark plug connector seals	A696-M1C171-AA

Assembly

CAUTION: Do not damage the cylinder liner.

1. Preparatory operations.
2. Remove the carbon deposits at the upper edge of the cylinder.
3. Using a scraper and sealant remover, clean all re-usable parts and check them for damage.
4. Thoroughly clean all threaded bores.
5. Available sizes of main bearing shell.

NOTE: The main bearing shells are color coded.

- Size A: 2.145 - 2.152 mm (green)
- Size B: 2.142 - 2.147 mm (brown)
- Size C: 2.135 - 2.142 mm (brown)
- Size D: 2.130 - 2.137 mm (brown)

NOTE: Use main bearing shells of size "B" or "C" (refer to the previous step).

6. Measure the radial clearance of the crankshaft. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION .
 - Select a bearing shell in accordance with the previous step to determine bearing

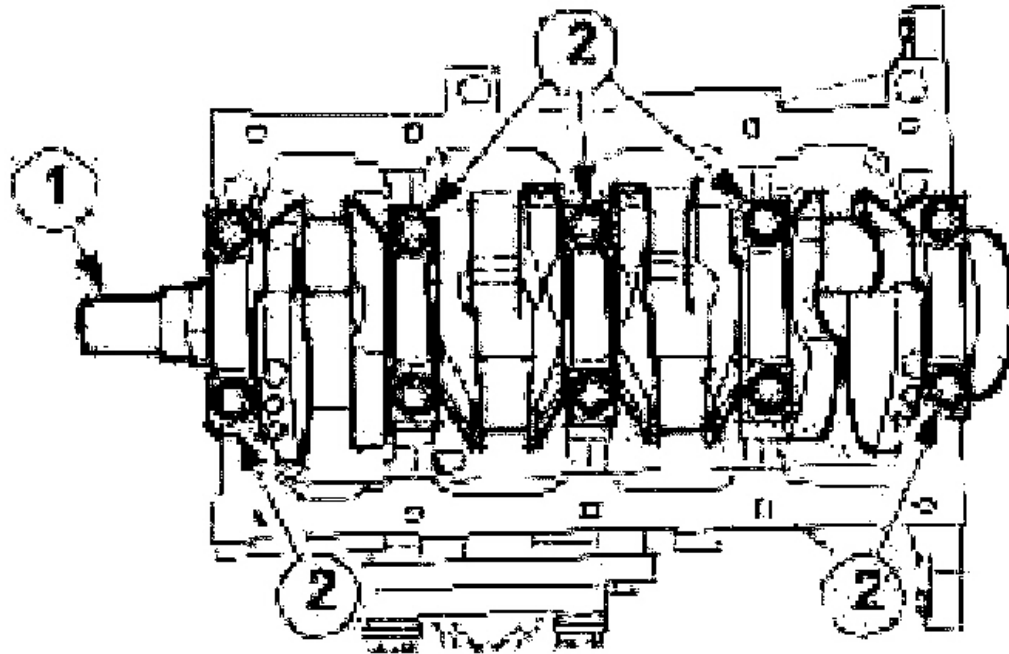
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clearance of 0.020 - 0.040 mm

7. Measure the axial clearance of the crankshaft. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION .
8. Measure the radial clearance of the camshaft. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION .
9. Measure the axial clearance of the camshaft. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION .
10. Measure the crankshaft. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION .
11. Measure the camshaft. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION .
12. Measure the cylinder bore. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION .
13. Measure the pistons. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION .
14. Measure the piston ring gaps. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION .
15. Measure the axial play of the piston rings. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION .
16. Check the cylinder head distortion. For additional information, refer to ENGINE SYSTEM-GENERAL INFORMATION .
17. Install the crankshaft.
 - Lay the main bearing shells clean and free of oil into the cylinder block and into the bearing caps.
 - Coat the inner side of the bearing shells with engine oil.
 3. Lay the crankshaft in place.
 4. Do not tighten the main bearing cap bolts yet.

Attach the main bearing caps.



G03431913

Fig. 308: Installing Main Bearing Caps
Courtesy of FORD MOTOR CO.

NOTE: The connecting rods are numbered starting at the timing belt end. The joined valve recesses on the piston crown face the intake side.

18. Install the pistons.

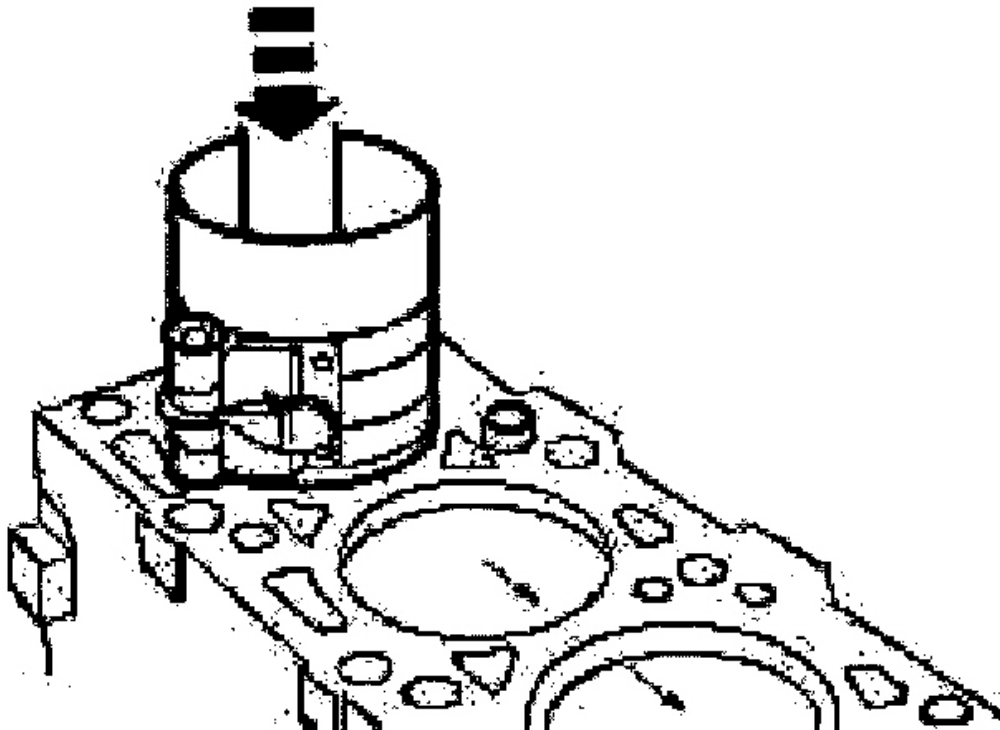
- Coat the pistons and cylinder liners with engine oil.
- Distribute the piston ring gaps and the elements of the oil scraper ring evenly around the circumference (120 degrees).
- Compress the piston rings using a piston ring compressor.
- Press pistons 1 and 4 with the handle of a hammer into the cylinders. The connecting rod bearing journals for cylinders 1 and 4 must be at BDC.
- Lay the corresponding bearing shells clean and free of oil into the connecting rod and the connecting rod bearing cap.

- Coat the inner side of the bearing shells with engine oil.

NOTE: Use new connecting rod bearing cap bolts.

NOTE: Do not tighten the connecting rod bearing cap bolts yet.

- Attach the bearing caps.
- Rotate the crankshaft through 180 degrees and insert pistons 2 and 3.
- Lay the corresponding bearing shells clean and free of oil into the connecting rod and the connecting rod bearing cap.
- Coat the inner side of the bearing shells with engine oil.

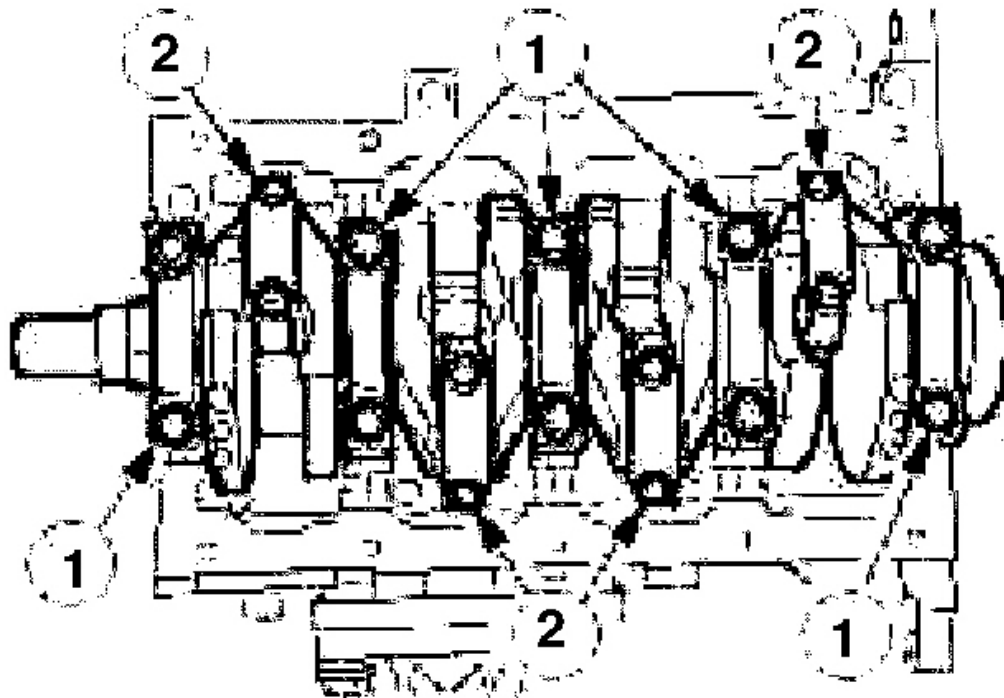


G03431914

Fig. 309: Installing Pistons
Courtesy of FORD MOTOR CO.

NOTE: The crankshaft must turn freely, if necessary check and adjust the bearing clearances.

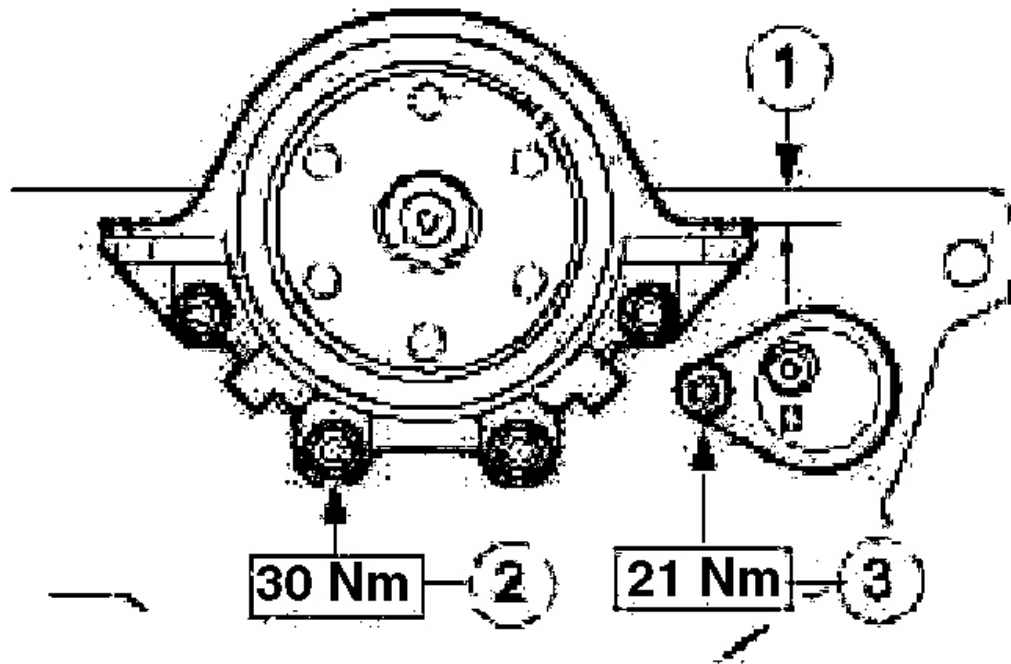
19. Tighten down the main bearings and connecting rod bearings.
 1. Tighten the main bearing bolts in two stages.
 - Stage 1: 25 N.m
 - Stage 2: 60 degrees
 4. Tighten the connecting rod bearing bolts in two stages.
 - Stage 1: 35 N.m
 - Stage 2: 90 degrees



G03431915

Fig. 310: Identifying Tightening Sequence Of Main Bearings And Connecting Rod Bearings Caps Bolts
Courtesy of FORD MOTOR CO.

20. Install the rear oil seal carrier and the crankshaft position (CKP) sensor with its bracket.
- Position a new oil seal carrier with a new seal in installation position and tighten the bolts finger tight.
 2. Align the oil seal carrier so that the mating face of the oil seal carrier is between 0.3 and 0.8 mm below the cylinder block.
 3. Tighten the bolts.
 4. Install the CKP sensor bracket.



G03431916

Fig. 311: Installing Rear Oil Seal Carrier And Crankshaft Position (CKP) Sensor

Courtesy of FORD MOTOR CO.

NOTE: Use three flywheel bolts.

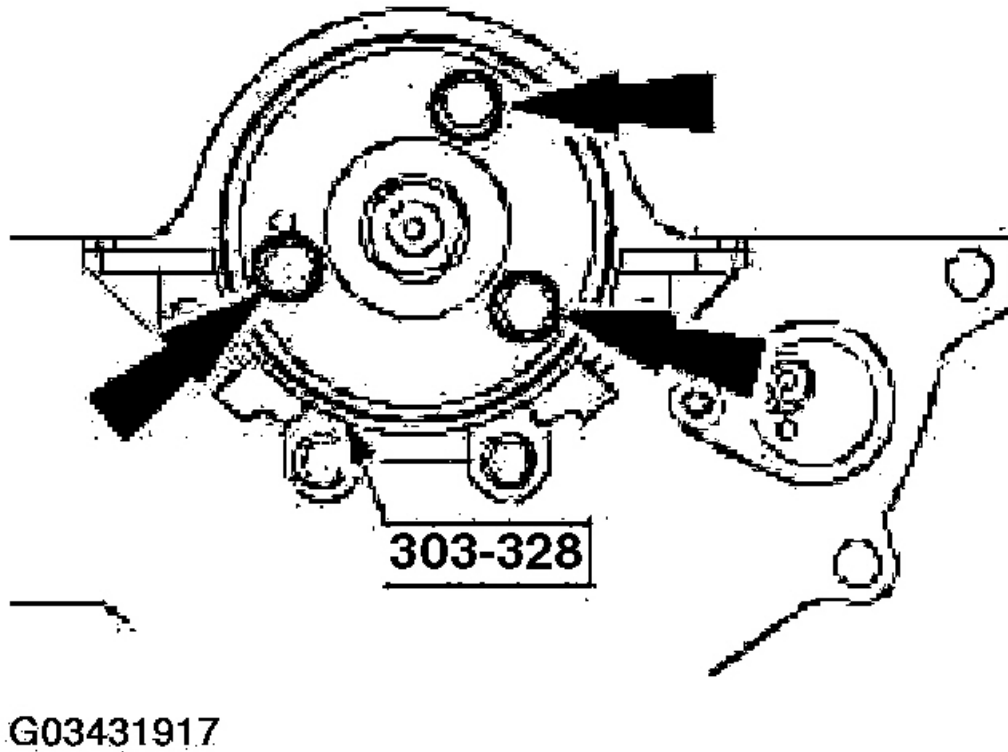
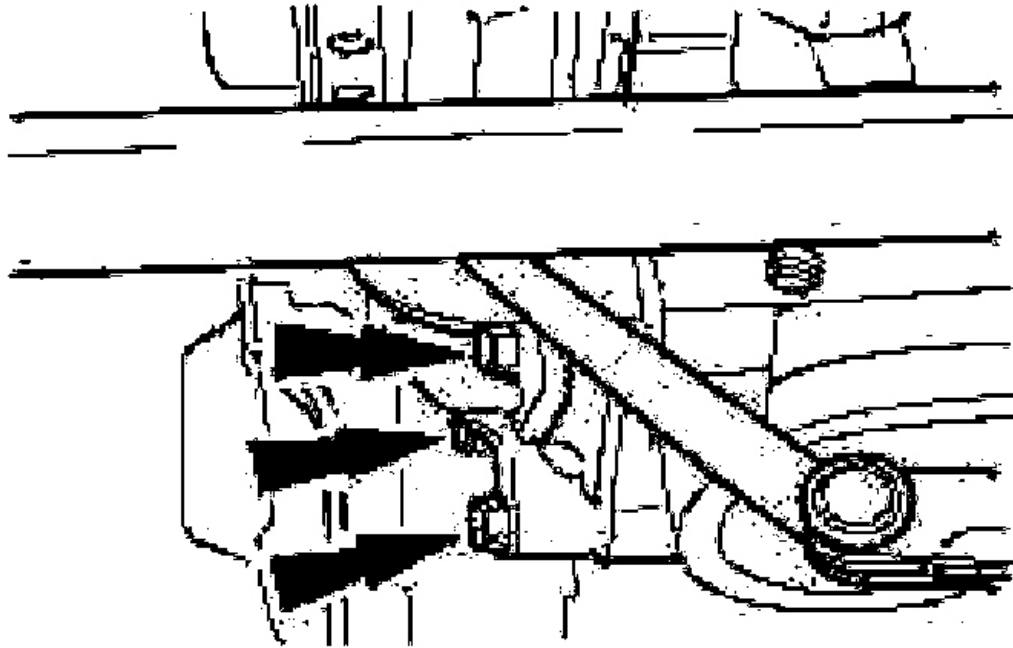


Fig. 312: Installing Oil Seal
Courtesy of FORD MOTOR CO.

21. Using special tool, draw in the oil seal.
22. Align the oil pump.
 - Position the oil pump with a new gasket and tighten the bolts finger tight.
 - Align the oil pump on both sides so that the sealing surfaces are 0.3 - 0.8 mm below the cylinder block.



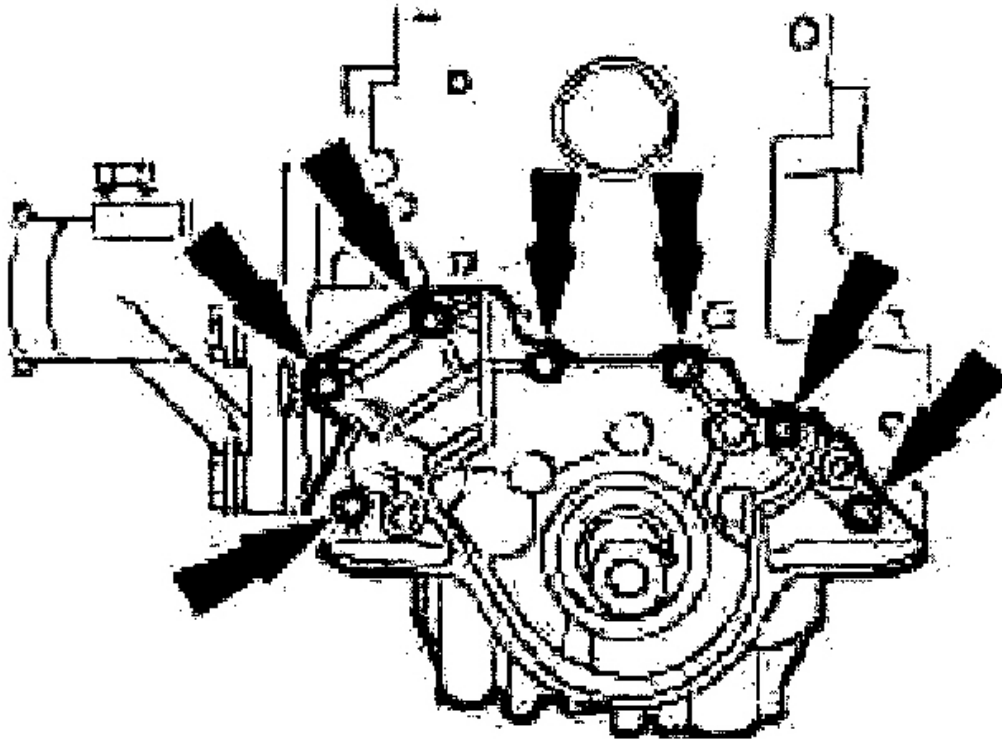
G03431918

Fig. 313: Aligning Oil Pump On Both Sides
Courtesy of FORD MOTOR CO.

23. Install the oil pump with a new crankshaft front oil seal.
- Check the alignment as described in the previous step, and correct if necessary.
 - Tighten the bolts in two stages:
 - Stage 1: 6 N.m.
 - Stage 2: 45 degrees.

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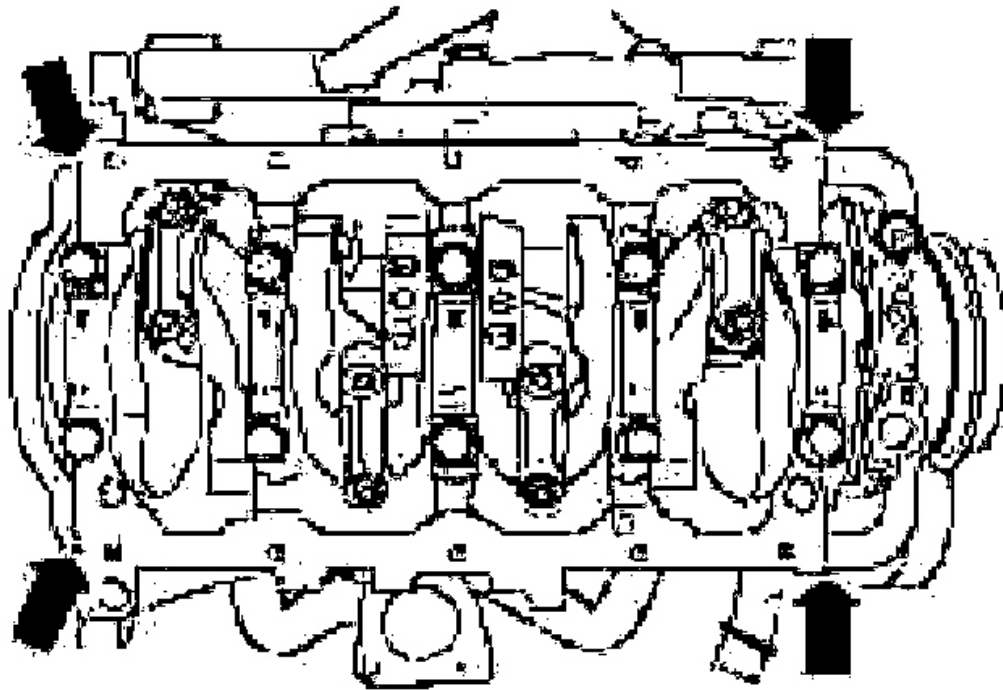
2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus



G03431919

Fig. 314: Installing Oil Pump With New Crankshaft Front Oil Seal
Courtesy of FORD MOTOR CO.

NOTE: Install the lower crankcase within 10 minutes of applying the sealer.



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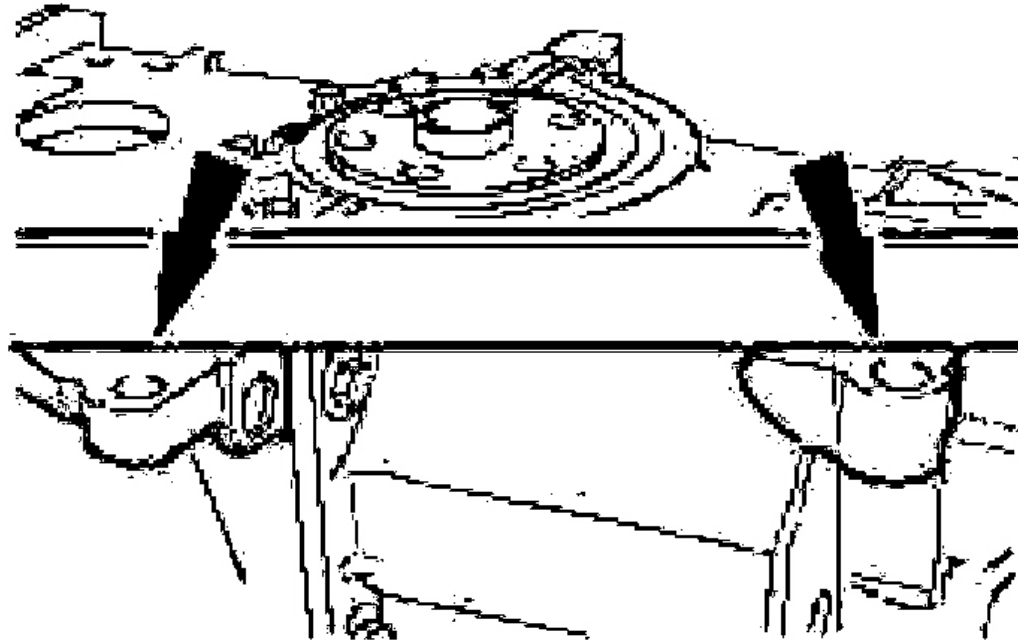
Fig. 315: Applying Bead Of Sealer To Cylinder Block
Courtesy of FORD MOTOR CO.

24. Apply a 4 mm bead of sealer to the areas as shown.

NOTE: If the permissible amounts for protrusion or gap are exceeded, install shims as described in the following steps.

25. Align the lower crankcase.

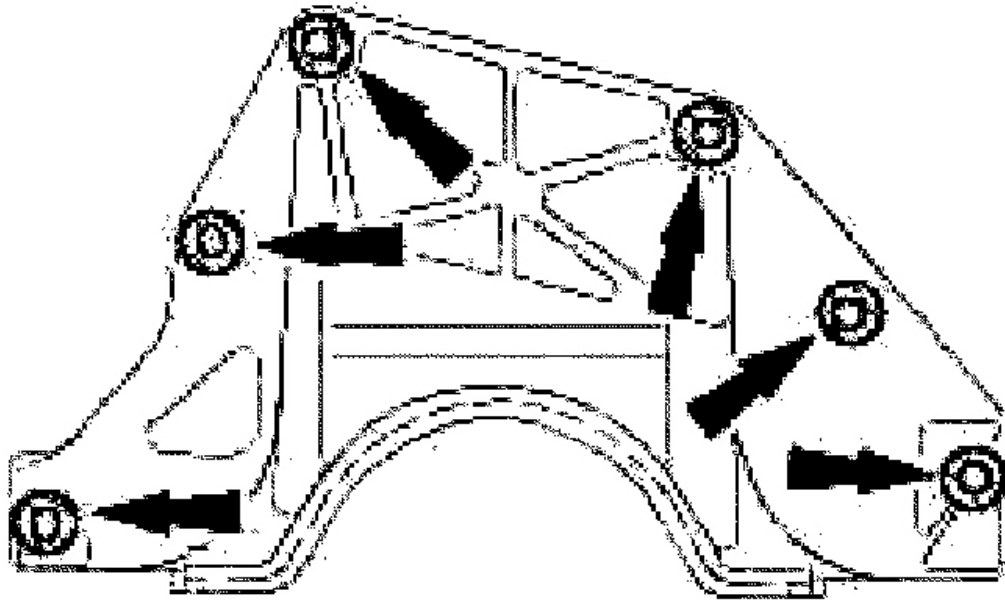
- Position the lower crankcase with a new gasket and tighten the bolts finger tight.
- Align the lower crankcase using a steel straight edge so that the cylinder block and the lower crankcase are level, or at least do not exceed the following tolerances:
 - MTX 75 manual transaxle: 0.10 mm protrusion to 0.25 mm gap.
 - FN automatic transaxle: 0.00 mm to 0.25 mm gap.



G03431921

Fig. 316: Aligning Lower Crankcase Using Steel Straight Edge
Courtesy of FORD MOTOR CO.

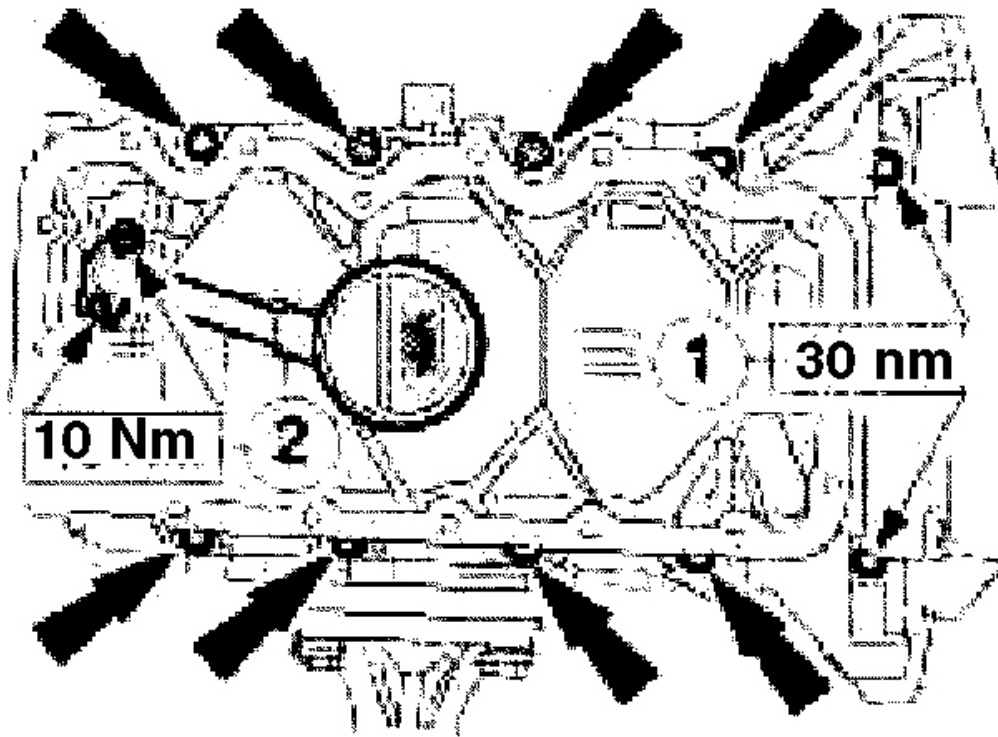
26. Install lower crankcase spacer washers as necessary.
- With a gap of 0.26 - 0.50 mm, fit 0.25 mm spacer washers.
 - With a gap of 0.51 - 0.75 mm, fit 0.50 mm spacer washers.



G03431922

Fig. 317: Installing Lower Crankcase Spacer Washers
Courtesy of FORD MOTOR CO.

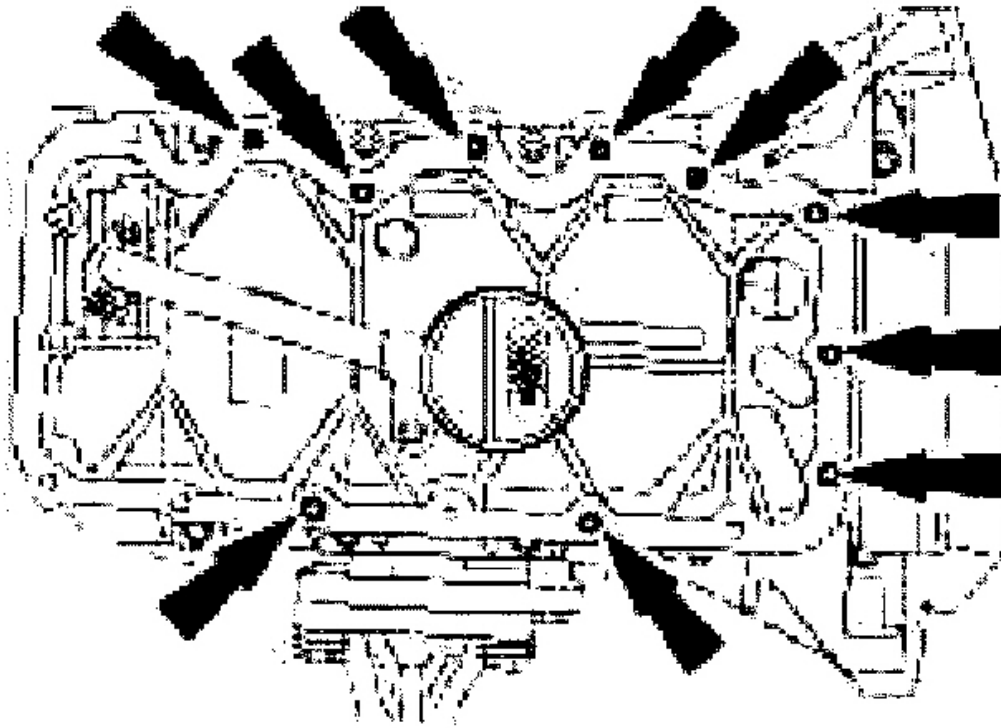
27. Attach the lower crankcase and the oil intake pipe using a new gasket.
 1. Tighten the bolts and check the alignment as described in the previous step, correct as necessary.
 2. Oil intake pipe bolts



G03431923

Fig. 318: Installing Lower Crankcase And Oil Intake Pipe Using New Gasket
Courtesy of FORD MOTOR CO.

CAUTION: Use studs. Sealant in the dead end bores can cause damage to the ladder frame.



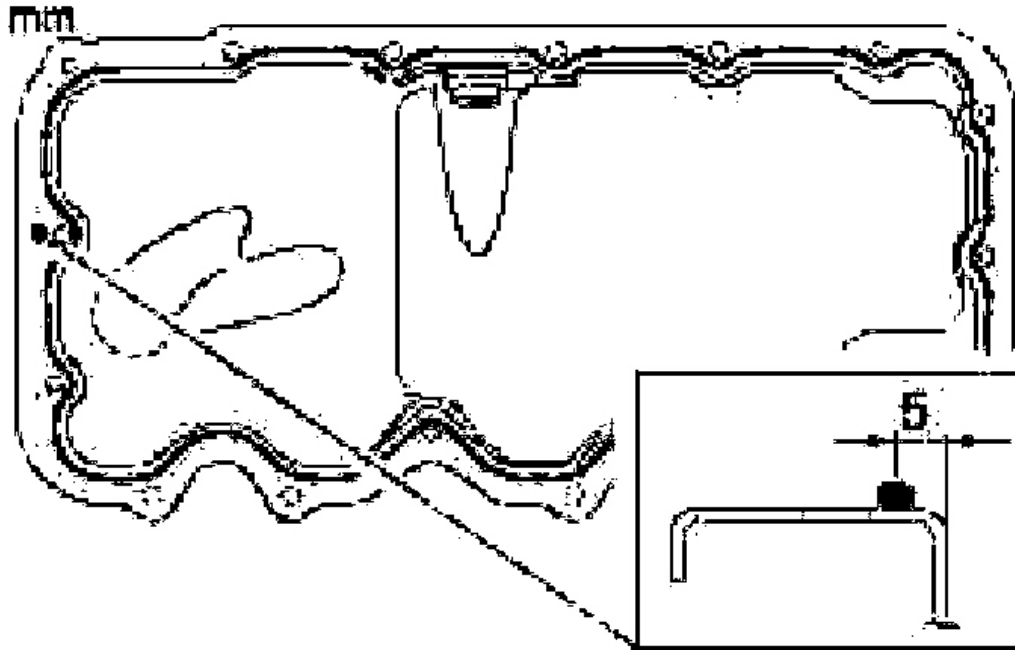
G03431924

Fig. 319: Installing Studs
Courtesy of FORD MOTOR CO.

28. Install 10 studs, M6 x 20, in the shown dead end bores.
29. Clean off any residues of oil or oil sludge from the oil pan.

NOTE: The sealing surfaces must be free of oil and sealant residue.

NOTE: Attach the oil pan within 10 minutes of applying the sealant.



G03431925

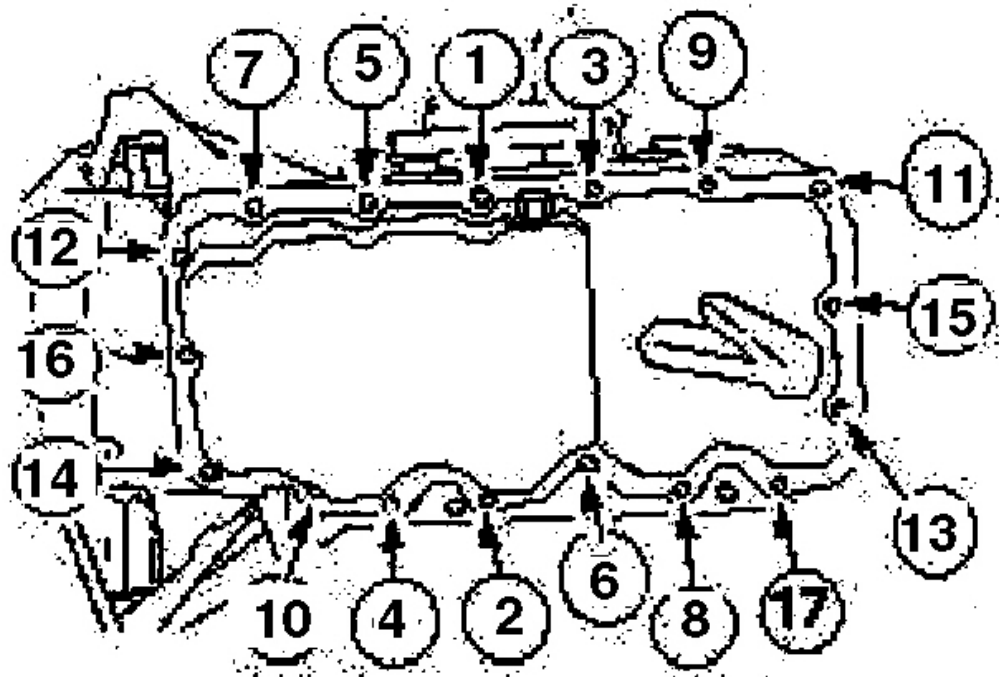
Fig. 320: Applying 3 mm Bead Of Sealant To Oil Pan Flange
Courtesy of FORD MOTOR CO.

30. Apply a 3 mm bead of sealant to the oil pan flange.

NOTE: Do not remove the oil pan, after the first contact with the ladder frame.

NOTE: Tightening sequence.

31. Attach the oil pan and tighten the bolts in two stages.
- Stage 1: 6 N.m
 - Stage 2: 10 N.m



G03431926

Fig. 321: Identifying Tightening Sequence Of Oil Pan Bolts
Courtesy of FORD MOTOR CO.

NOTE: Use new bolts.

NOTE: Remove any residual thread-locking compound from the threaded bores.

32. Install the flywheel.

- Attach the special tool and tighten the bolts.

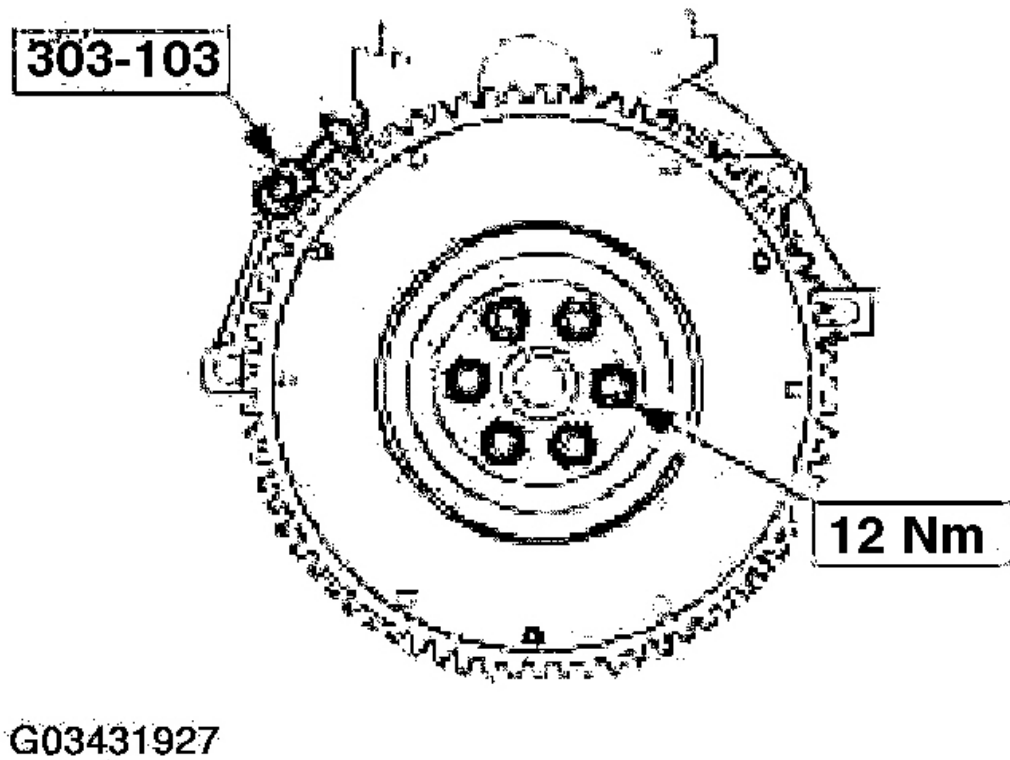


Fig. 322: Installing Flywheel
Courtesy of FORD MOTOR CO.

NOTE: Apply high-temperature grease thinly enough to make sure that no grease emerges from the splines when the clutch disc is slid onto the transmission input shaft.

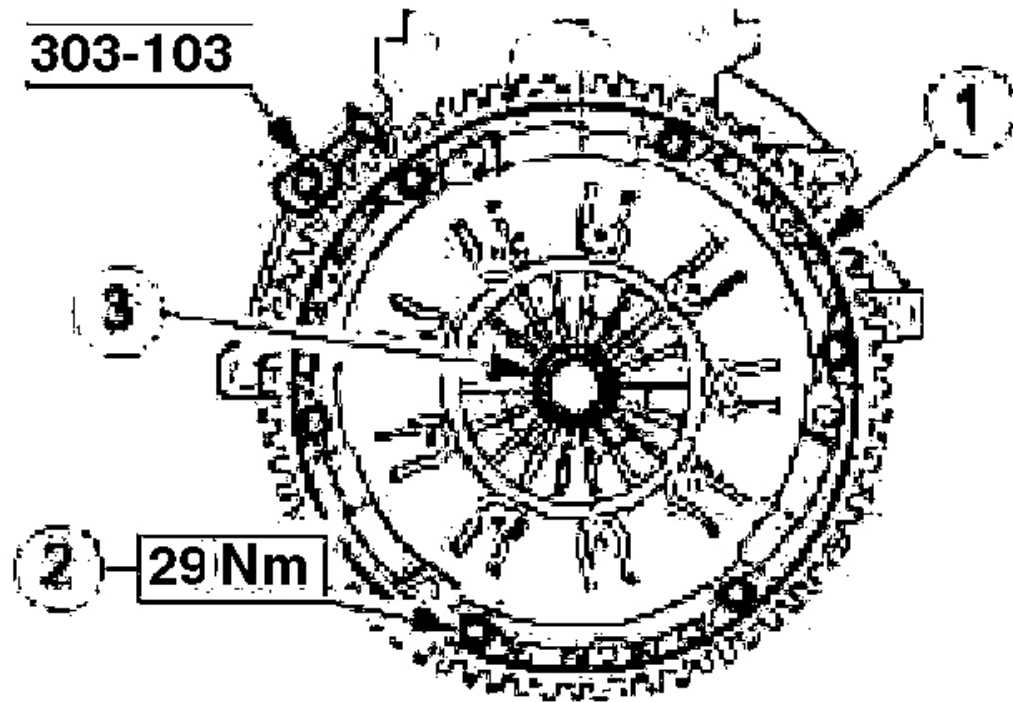
33. Evenly coat the splines of the clutch disc with high-temperature grease.

NOTE: Center the clutch disk on the pressure plate.

34. Install the clutch.

1. Position the clutch pressure plate with the centered clutch disc.
2. Working diagonally in several stages, tighten the bolts one turn at a time.
3. Check the centering and correct as necessary.

- Detach the special tool.



G03431928

Fig. 323: Installing Clutch
Courtesy of FORD MOTOR CO.

35. Make two guide studs as shown.

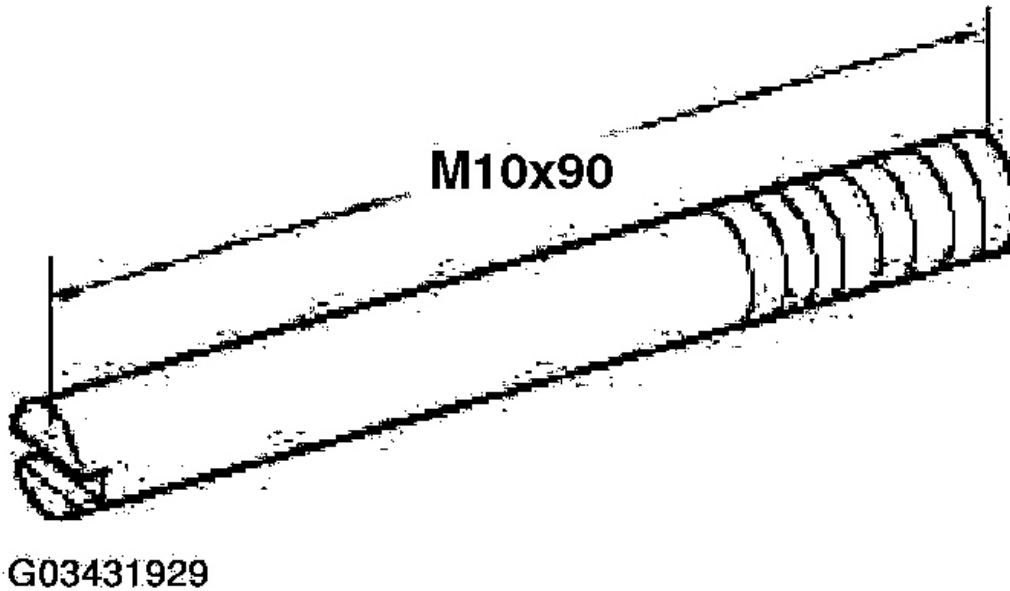
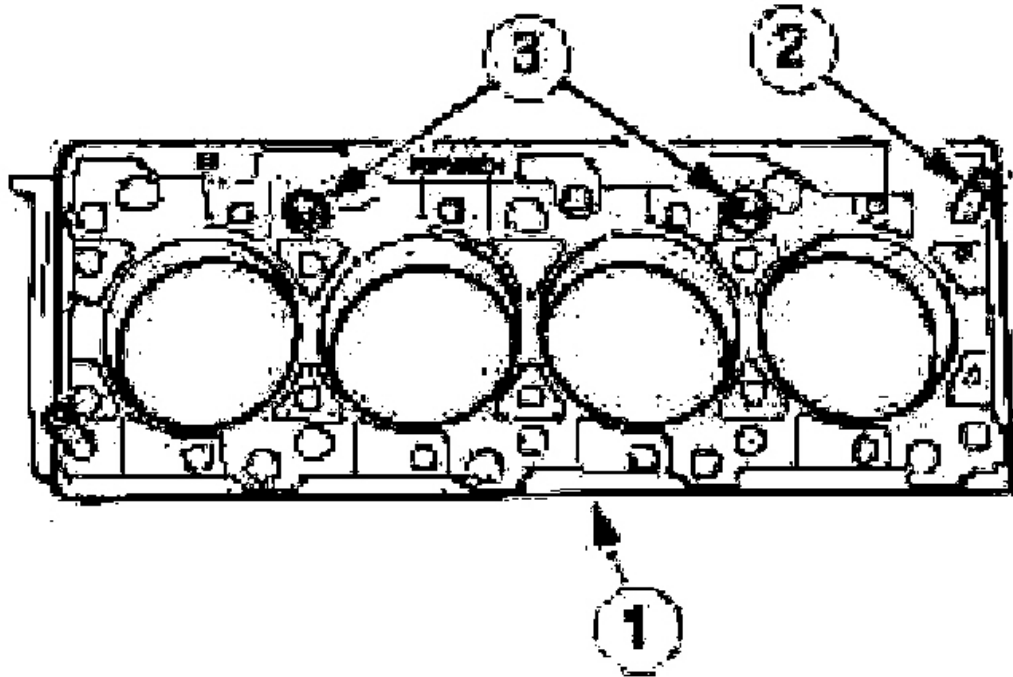


Fig. 324: Identifying Stud
Courtesy of FORD MOTOR CO.

36. Lay a new cylinder head gasket on the cylinder block.
 1. Lay a new cylinder head gasket in place.
 2. Screw in the guide studs made in the previous step.
 3. Check that the alignment dowels are correctly seated.



G03431930

Fig. 325: Installing New Cylinder Head Gasket On Cylinder Block
Courtesy of FORD MOTOR CO.

37. Put the cylinder head in place.

- Hook the cylinder head into the workshop hoist by the engine lifting eyes and move it into position.

CAUTION: Do not re-tighten the cylinder head bolts.

NOTE: Screw in the cylinder head bolts free of oil.

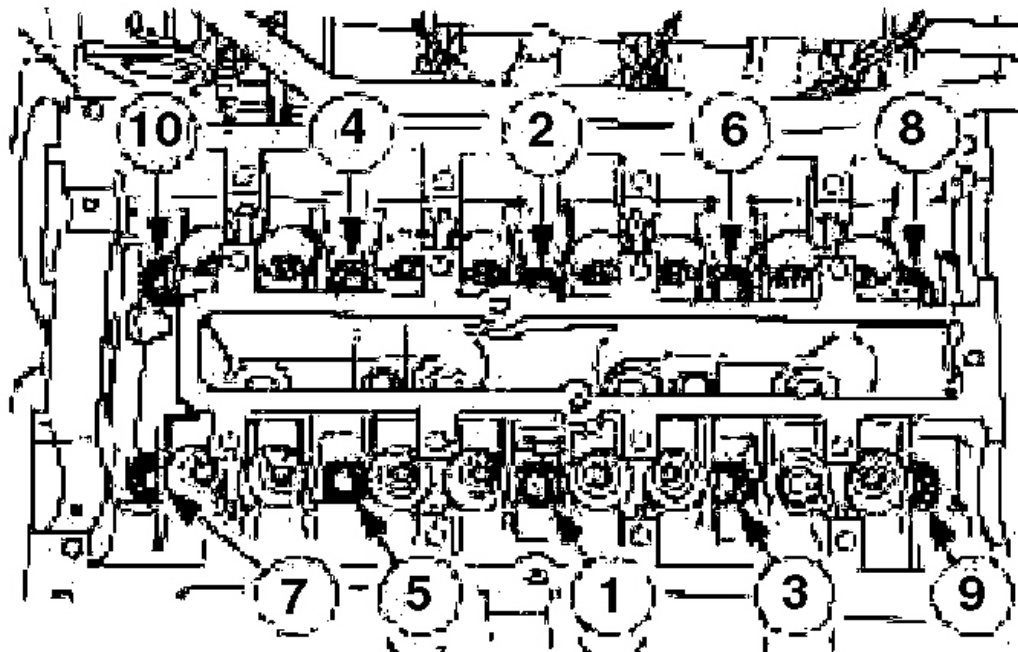
NOTE: Tighten the cylinder head bolts in three stages in the indicated sequence.

38. Attach the cylinder head.

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- Stage 1: 20 N.m
- Stage 2: 40 N.m
- Stage 3: 90 degrees

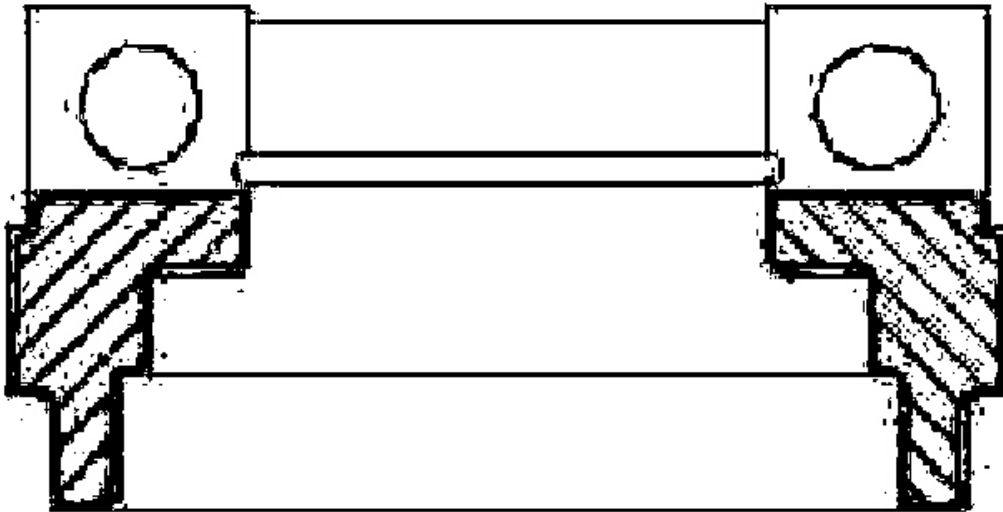


G03431931

Fig. 326: Identifying Tightening Sequence Of Cylinder Head Bolts
Courtesy of FORD MOTOR CO.

39. Lubricate the valve tappets with engine oil and fit them in the correct order.

NOTE: The identification numbers are located on the outside of the camshaft bearing caps.



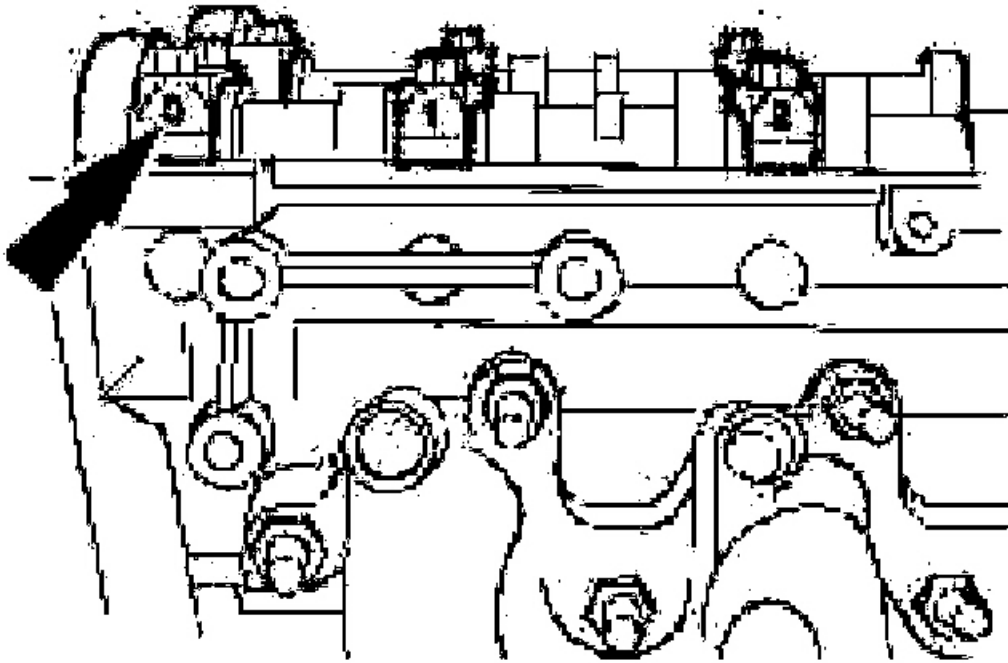
G03431932

Fig. 327: Applying Thin Coat Of Gasket Maker To Marked Areas On Camshaft Bearing Caps

Courtesy of FORD MOTOR CO.

40. Apply a thin coat of gasket maker to the marked areas on camshaft bearing caps 0 and 5.
41. Turn the crankshaft to approximately 60 degrees BTDC.

NOTE: Lay the camshafts in place with none of the cams at full lift.



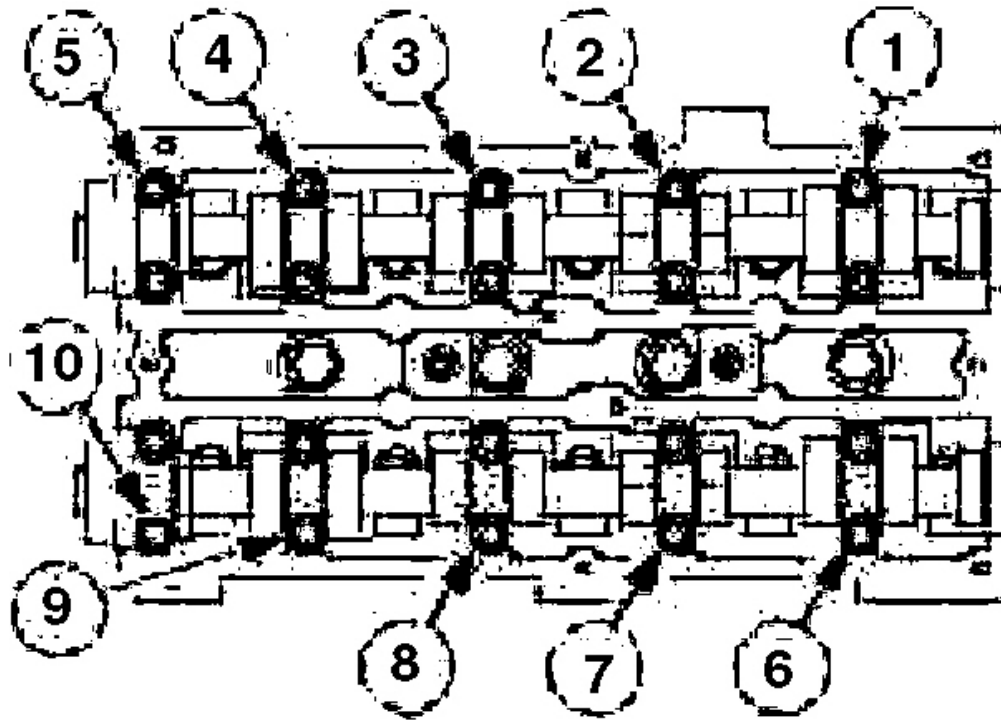
G03431933

Fig. 328: Coating Camshafts And Camshaft Bearing Caps With Engine Oil
Courtesy of FORD MOTOR CO.

42. Coat the camshafts and camshaft bearing caps with engine oil and insert them.

NOTE: Working in several stages, evenly screw in the camshaft bearing cap bolts in the indicated sequence, half a turn at a time, and then tighten them down in two stages.

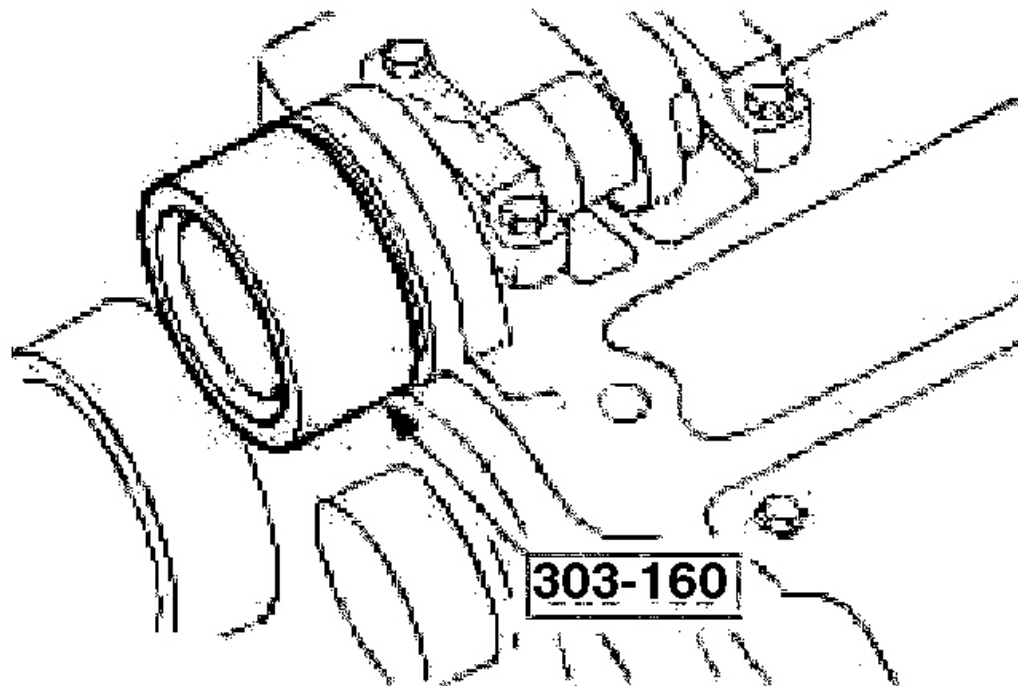
43. Tighten the camshaft bearing caps.
- Stage 1: 10 N.m
 - Stage 2: 19 N.m



G03431934

Fig. 329: Identifying Tightening Sequence Of Camshaft Bearing Caps Bolts
Courtesy of FORD MOTOR CO.

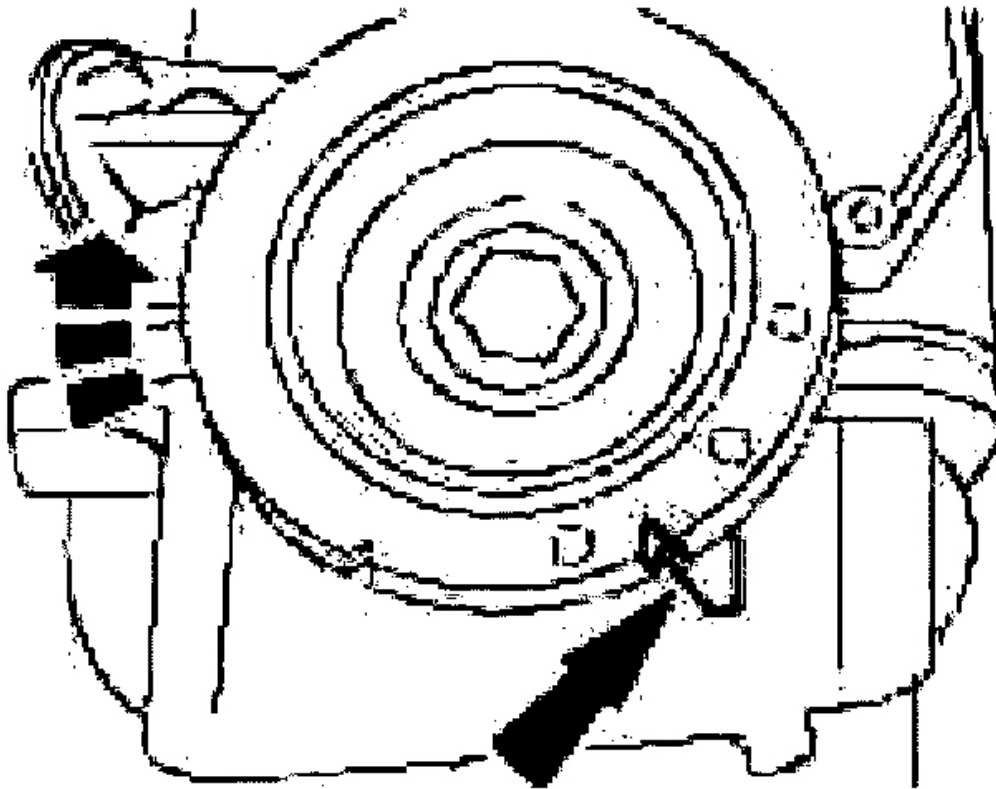
44. Check the valve clearance and if necessary adjust. For additional information, refer to **Valve Clearance**.
45. Install the camshaft oil seals.
 - Lubricate the camshaft and the seal lip of the oil seal with engine oil.
 - Draw in the new oil seals using the special tool, a washer and an M10 x 70 bolt.



G03431935

Fig. 330: Installing Camshaft Oil Seals
Courtesy of FORD MOTOR CO.

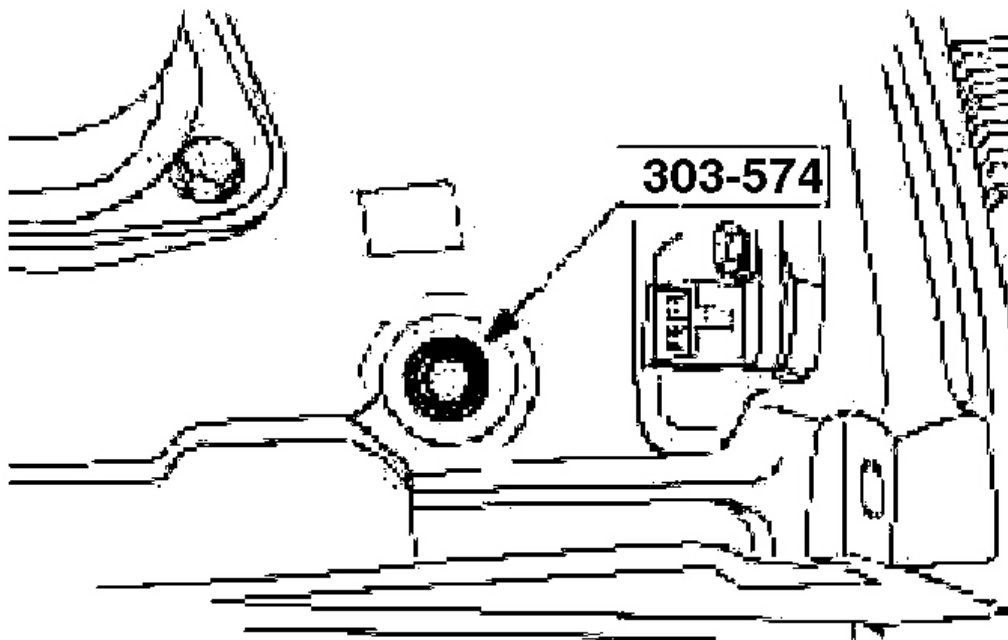
46. Turn the crankshaft to TDC on cylinder number 1.



G03431936

Fig. 331: Turning Crankshaft For Positioning Cylinder Number 1 To TDC Position
Courtesy of FORD MOTOR CO.

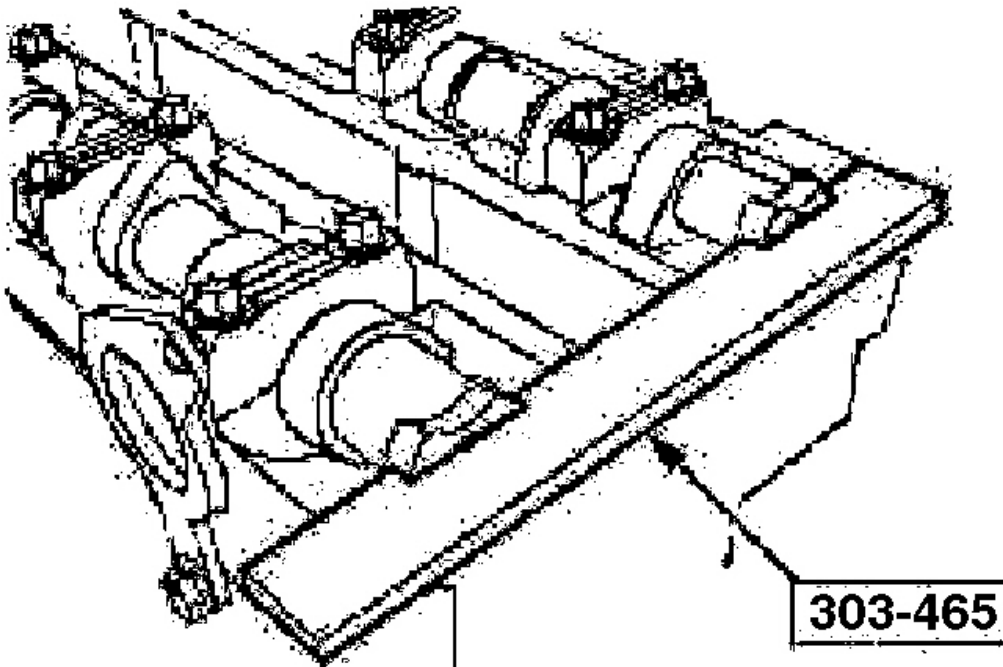
NOTE: Cylinders 1 and 4 are at TDC when the Woodruff key points towards the piston.



G03431937

Fig. 332: Removing Blanking Plug
Courtesy of FORD MOTOR CO.

47. Remove the blanking plug and align the crankshaft at TDC using the special tool.
48. Turn the camshafts to ignition point on cylinder number 1 and insert the special tool into the camshafts.

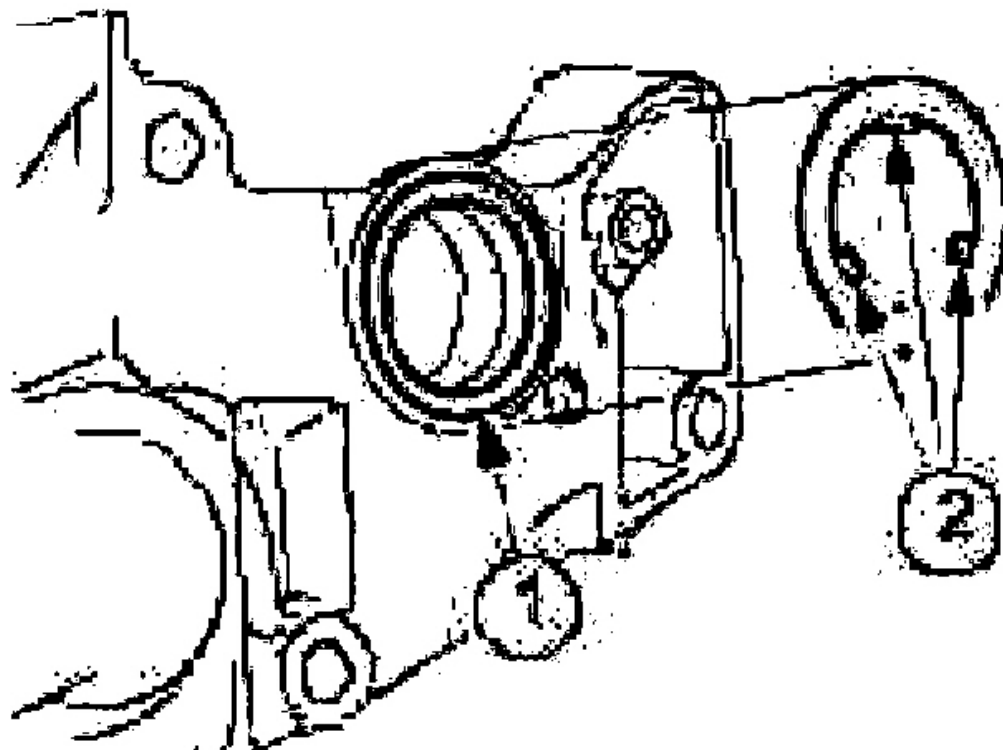


G03431938

Fig. 333: Inserting Special Tool Into Camshafts
Courtesy of FORD MOTOR CO.

NOTE: Do not tighten the bolts. It must be possible to turn the timing pulleys on the camshafts.

49. Slide the timing pulleys onto the camshafts and screw in the bolts.
50. Install a new gasket into the water pump.
 1. Lay the gasket in place.
 2. Secure the gasket by bending over the tabs.



G03431939

Fig. 334: Installing New Gasket Into Water Pump
Courtesy of FORD MOTOR CO.

CAUTION: Do not kink the timing belt (do not bend the timing belt less than a diameter of 35mm).

CAUTION: Do not rotate the crankshaft; as necessary check that it is still resting against the timing pin.

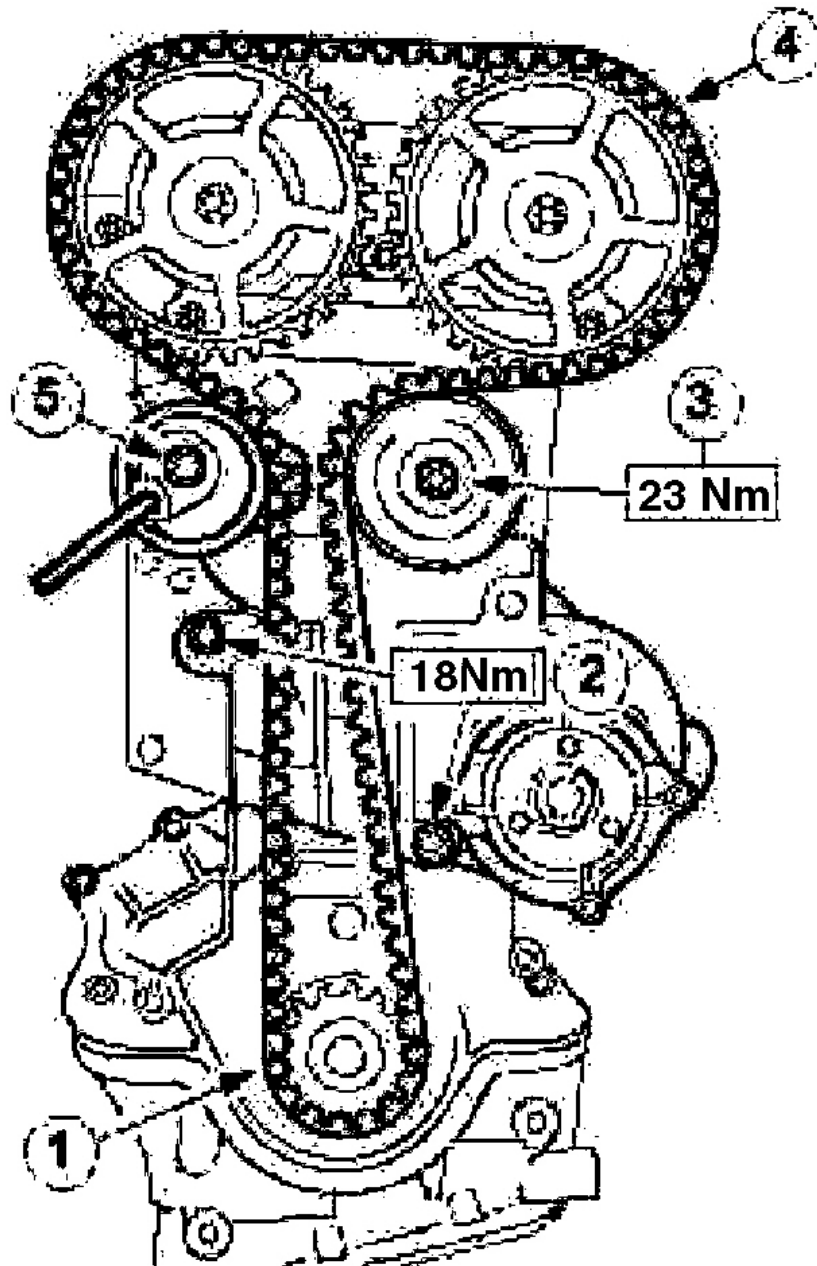
NOTE: The lug of the timing belt tensioner must not be hooked into the sheet metal cover during timing belt installation.

51. Position a new timing belt in place.

1. Slide the crankshaft timing pulley with a thrust washer onto the crankshaft.

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2. Attach the water pump.
3. Attach the upper idler pulley.
4. Starting from the crankshaft timing belt pulley and working counterclockwise, position the timing belt in place while keeping it under tension.
5. Attach the timing belt tensioner and screw in the bolt five turns.



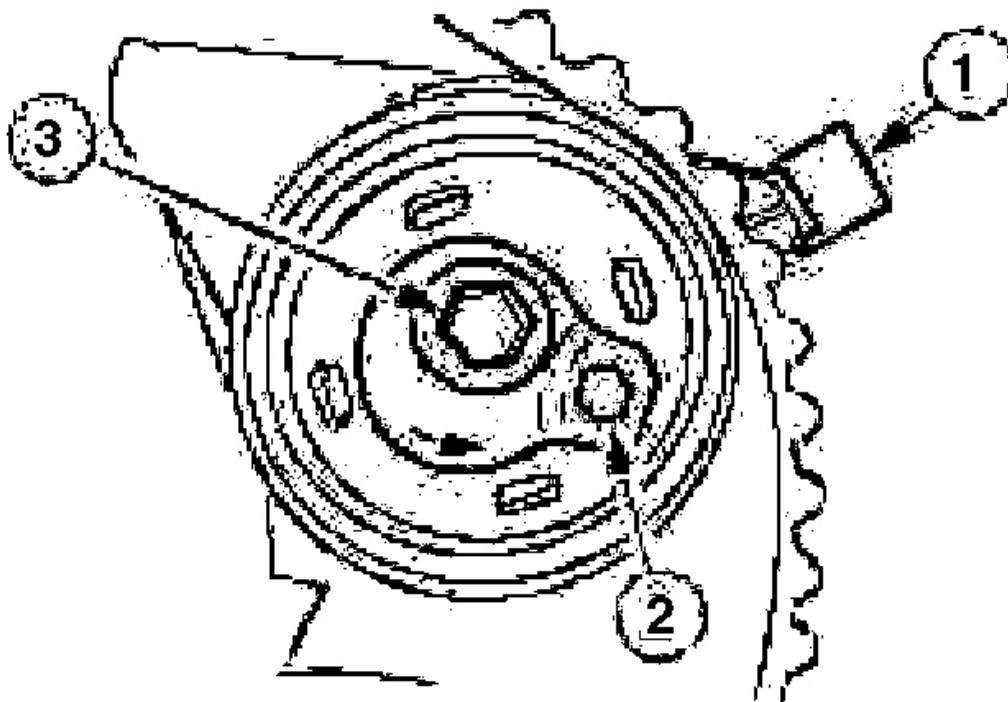
G03431940

Fig. 335: Installing New Timing Belt
Courtesy of FORD MOTOR CO.

CAUTION: Incorrect timing belt tension will cause incorrect valve timing.

52. Pre tension the timing belt.

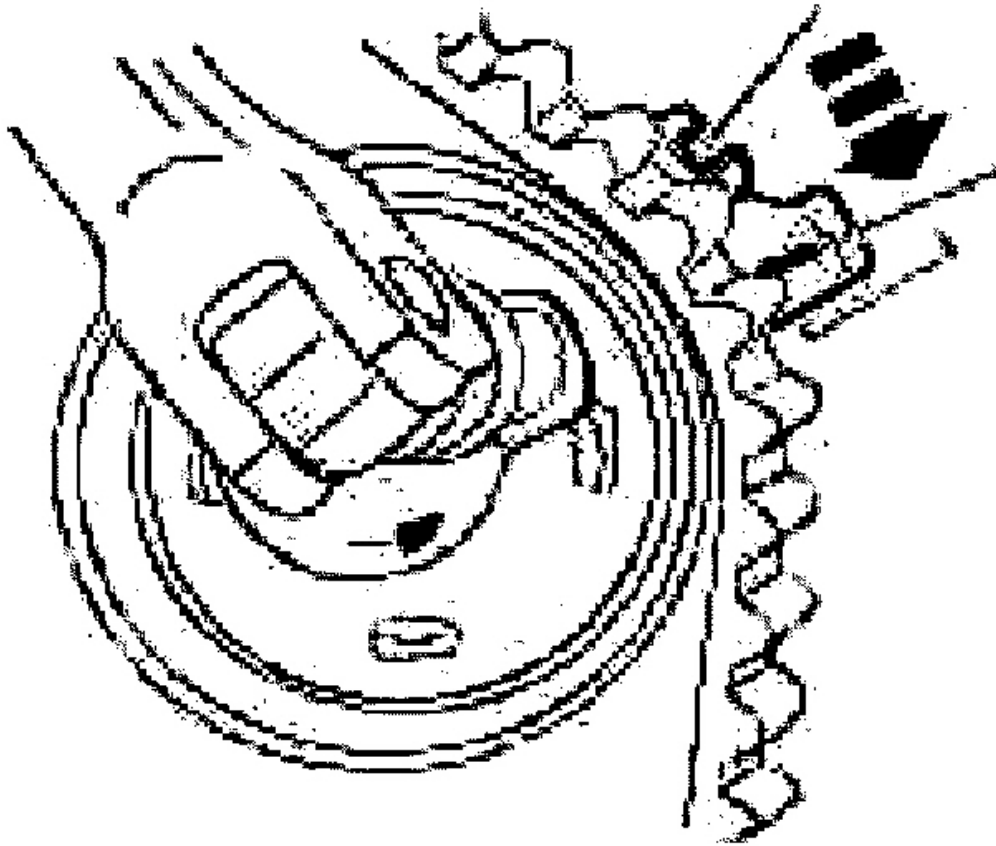
1. Rotate the tensioner locating tab counterclockwise and insert the locating tab into the slot in the rear timing cover.
2. Position the hex key slot in the tensioner adjusting washer to the 4 o'clock position.
3. Tighten the attaching bold enough to seat the tensioner firmly against the rear timing cover, but still allow the tensioner adjusting washer to be rotated using a 6mm hex key.



G03431941

Fig. 336: Tightening Attaching Bolt For Seating Tensioner Firmly Against Rear Timing Cover
Courtesy of FORD MOTOR CO.

CAUTION: Tension the timing belt, working counterclockwise.



G03431942

Fig. 337: Rotating Adjusting Washer Counterclockwise Until Notch In Pointer Centered Over Index Line On Locating Tab
Courtesy of FORD MOTOR CO.

53. Using the hex key, rotate the adjusting washer counterclockwise until the notch in the pointer is centered over the index line on the locating tab (the pointer will move clockwise during adjustment).
54. While holding the adjusting washer in position, tighten the bolt.

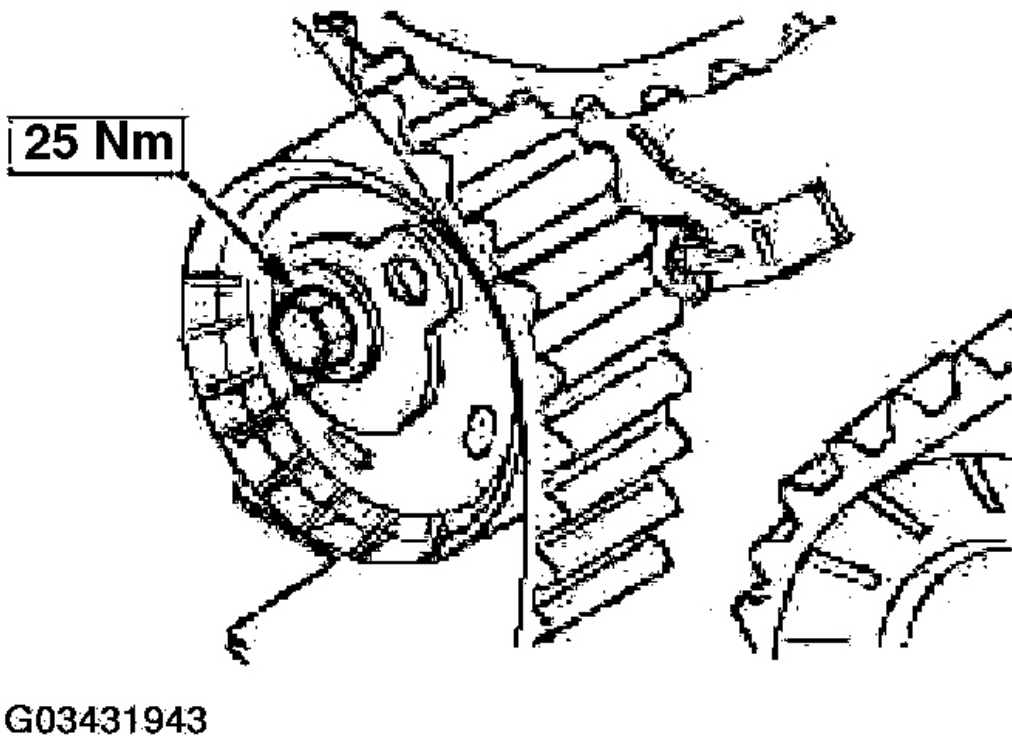
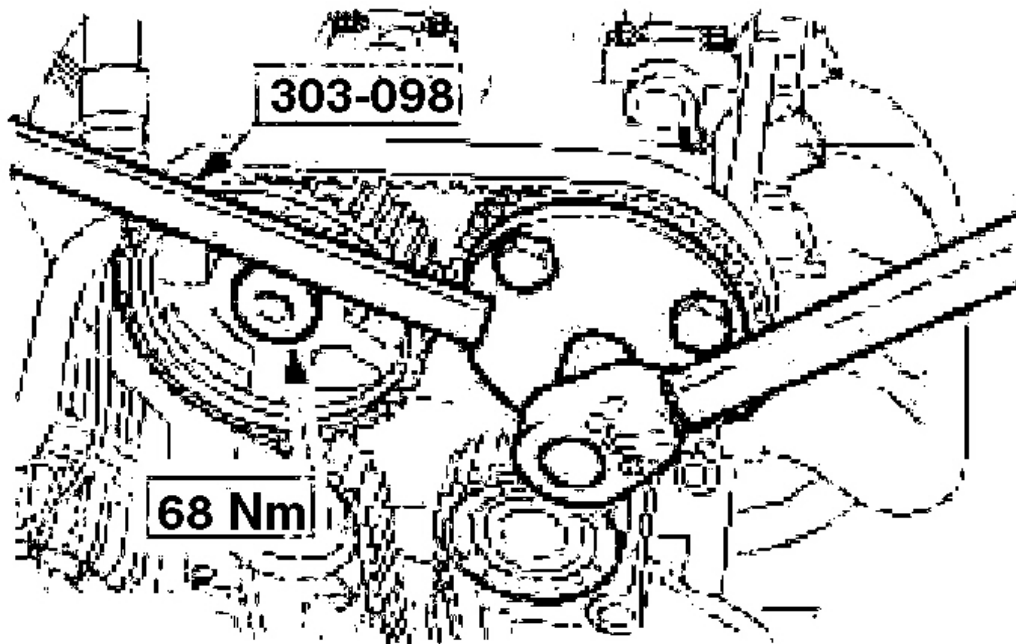


Fig. 338: Tightening Bolt
Courtesy of FORD MOTOR CO.

CAUTION: Do not tighten against Special Tool 303-465.

NOTE: Use the special tool to hold the timing pulleys.



G03431944

Fig. 339: Tightening Timing Pulleys Bolts
Courtesy of FORD MOTOR CO.

55. Tighten the bolts on the timing pulleys.
56. Unscrew and remove Special Tool 303-574.
57. Take Special Tool 303-465 off the camshafts.

NOTE: **Turn the engine two turns in the normal direction of rotation by the crankshaft.**

58. Check the valve timing by inserting the special tools and correct the alignment as necessary.
 - Screw in Special Tool 303-574 and make sure that the crankshaft is resting against the special tool.
 - Insert Special Tool 303-465 into the camshafts. If necessary loosen the timing pulleys and correct the camshaft alignment.
 - Detach the special tools.

59. Install the blanking plug.

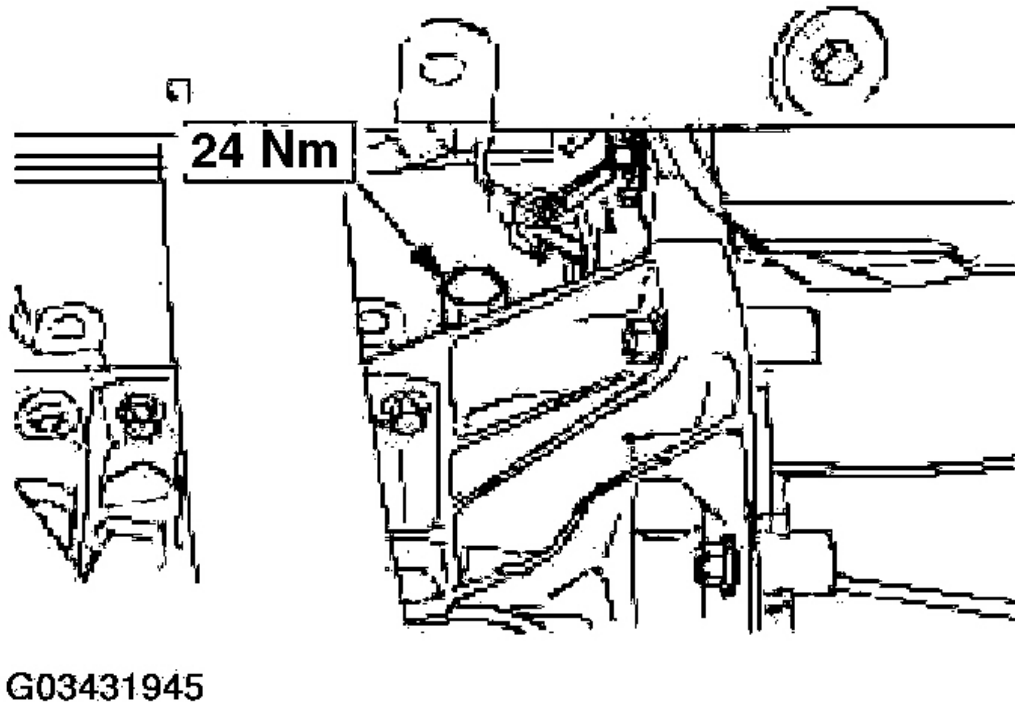


Fig. 340: Installing Blanking Plug
Courtesy of FORD MOTOR CO.

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

CAUTION: Push on the spark plug connectors, keeping them in line with the spark plugs.

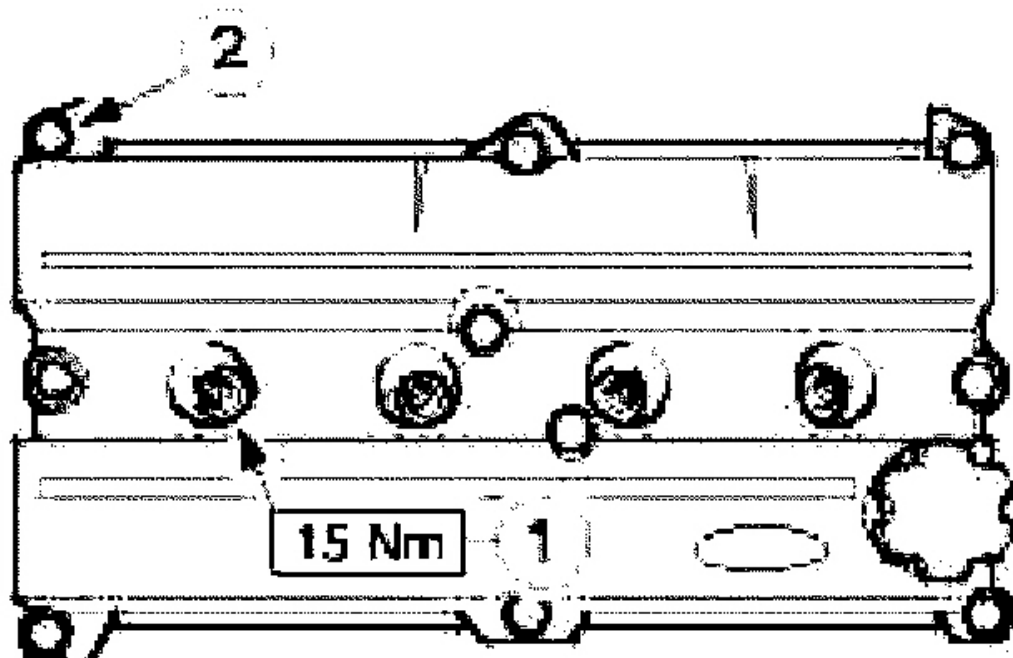
NOTE: Coat the inside of the spark plug connector to a depth of 5 - 10 mm with silicone grease.

60. Install the cylinder head cover and the spark plugs.

1. Screw in the spark plugs.

2. Tighten the cylinder head cover bolts in two stages.

- Stage 1: 2 N.m
- Stage 2: 7 N.m
- Push on the spark plug connectors until they click in place.



G03431946

Fig. 341: Installing Cylinder Head Cover
Courtesy of FORD MOTOR CO.

NOTE: Check the seating of the gasket on the upper timing belt cover and correct as necessary.

61. Attach the timing belt covers and the belt pulleys.

1. Lower timing belt cover
2. Crankshaft pulley/vibration damper
3. Upper timing belt cover

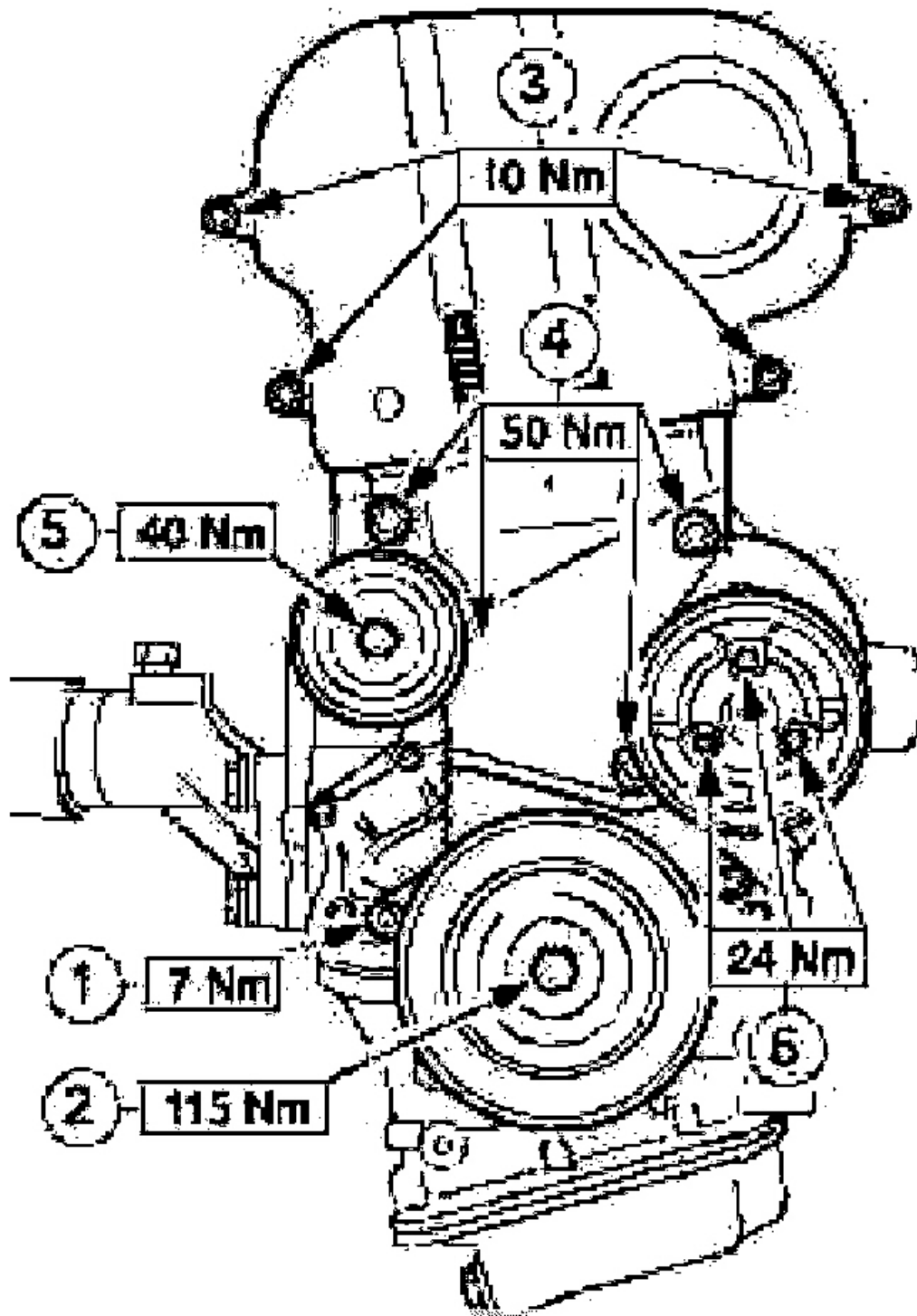
2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

4. Center timing belt cover/front engine mounting bracket
5. Drive belt idler pulley
6. Water pump belt pulley

2002 Ford Focus LX

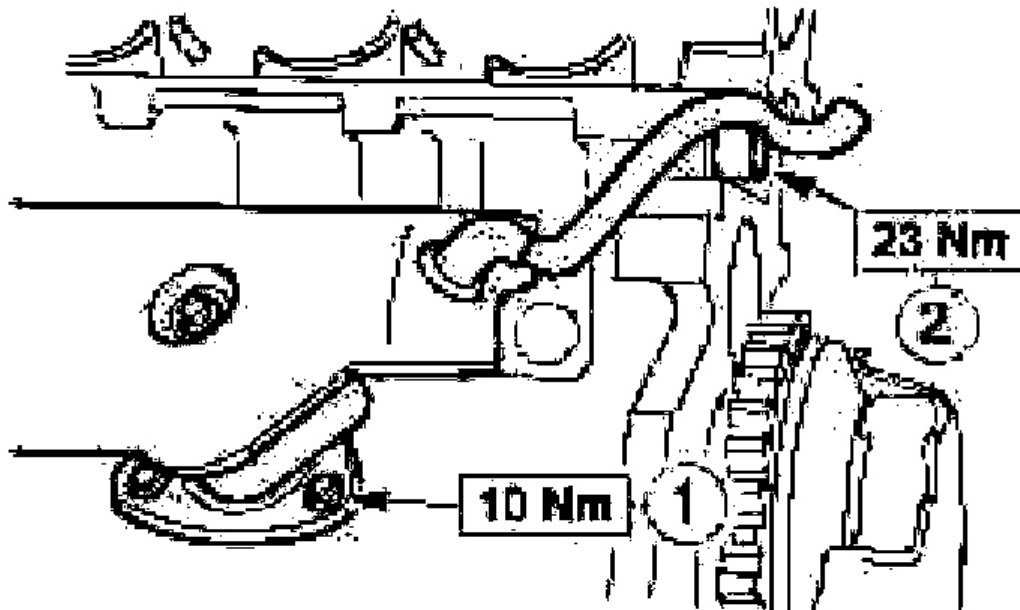
2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus



G03431947

Fig. 342: Installing Timing Belt Covers And Belt Pulleys
Courtesy of FORD MOTOR CO.

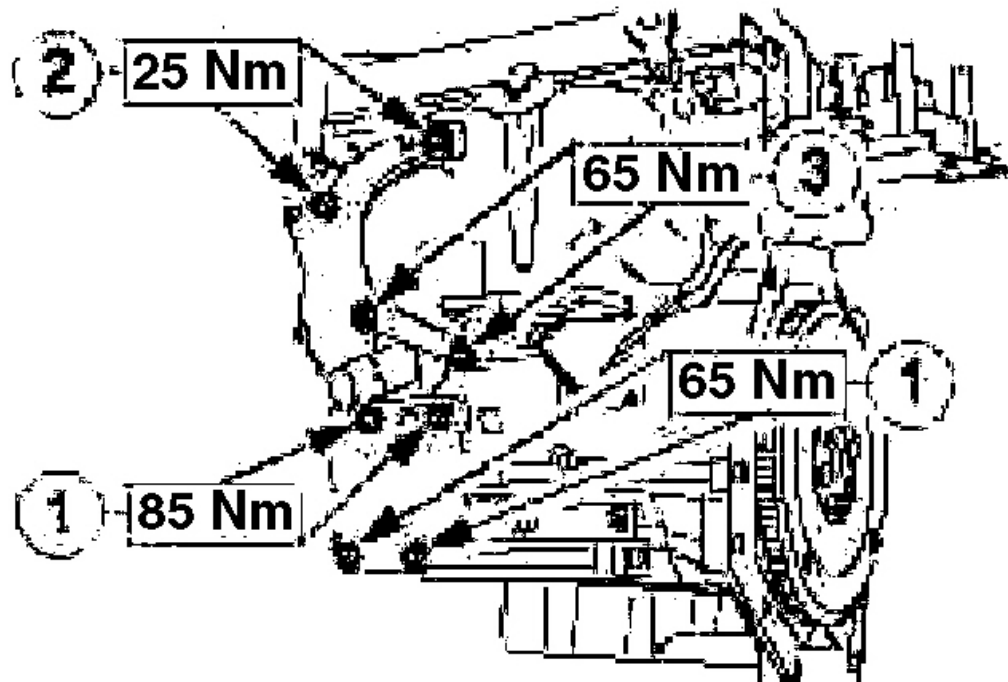
62. Connect the positive crankcase ventilation using a new seal.
1. Three bolts
 2. One bolt



G03431948

Fig. 343: Connecting Positive Crankcase Ventilation Using New Seal
Courtesy of FORD MOTOR CO.

63. Attach the ancillary components on the exhaust side.
1. Bracket for air conditioning compressor.
 2. Bracket for power steering pump to cylinder head.



G03431949

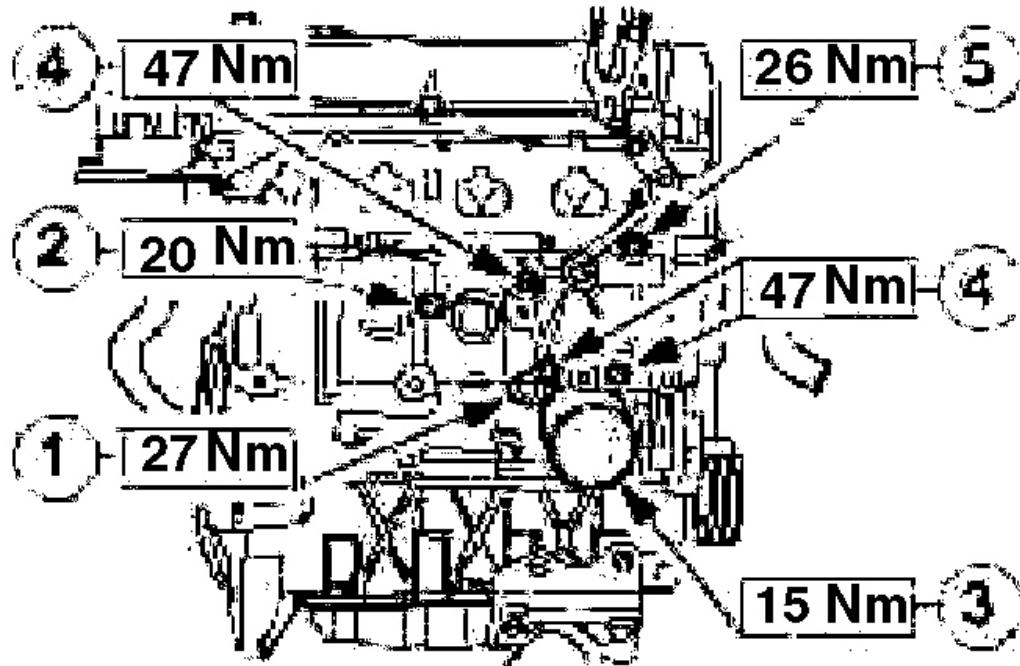
Fig. 344: Installing Ancillary Components Of Exhaust Side
Courtesy of FORD MOTOR CO.

3. Bracket for power steering pump to cylinder block.
64. Hook the engine by the engine lifting eyes onto the workshop hoist and detach it from the assembly stand.
 - Put the engine down onto the assembly stand and leave it hooked onto the workshop hoist.

NOTE: Coat the oil filter seal with engine oil.

65. Attach the ancillary components on the intake side.
 1. Oil pressure switch
 2. KS
 3. Attach a new oil filter.

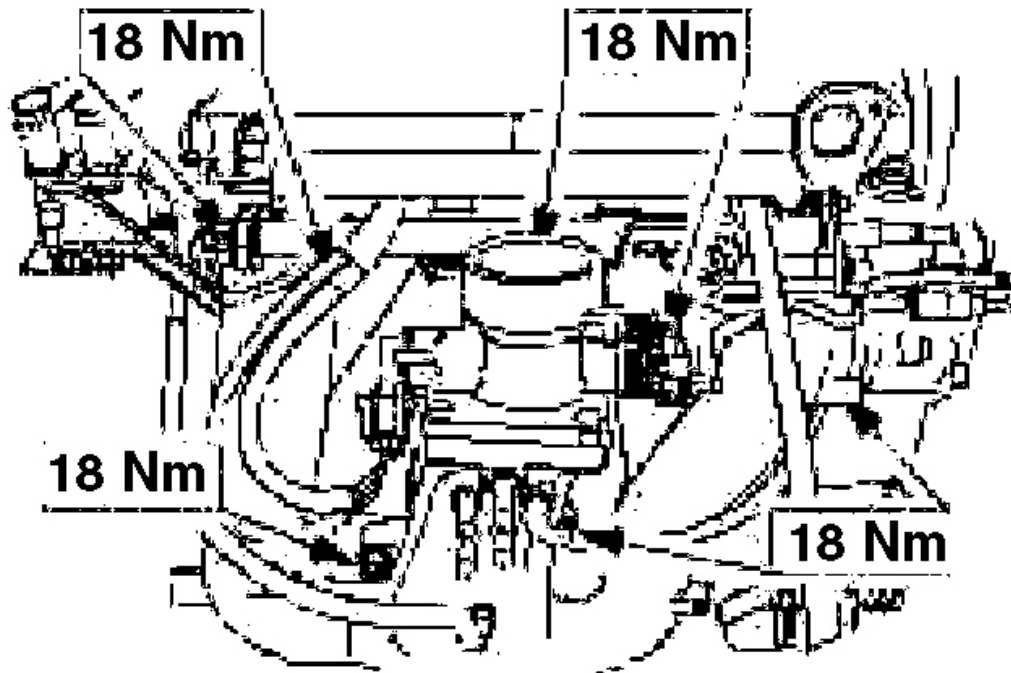
4. Generator bracket to cylinder block
5. Generator bracket to cylinder head



G03431950

Fig. 345: Installing Ancillary Components Of Intake Side
Courtesy of FORD MOTOR CO.

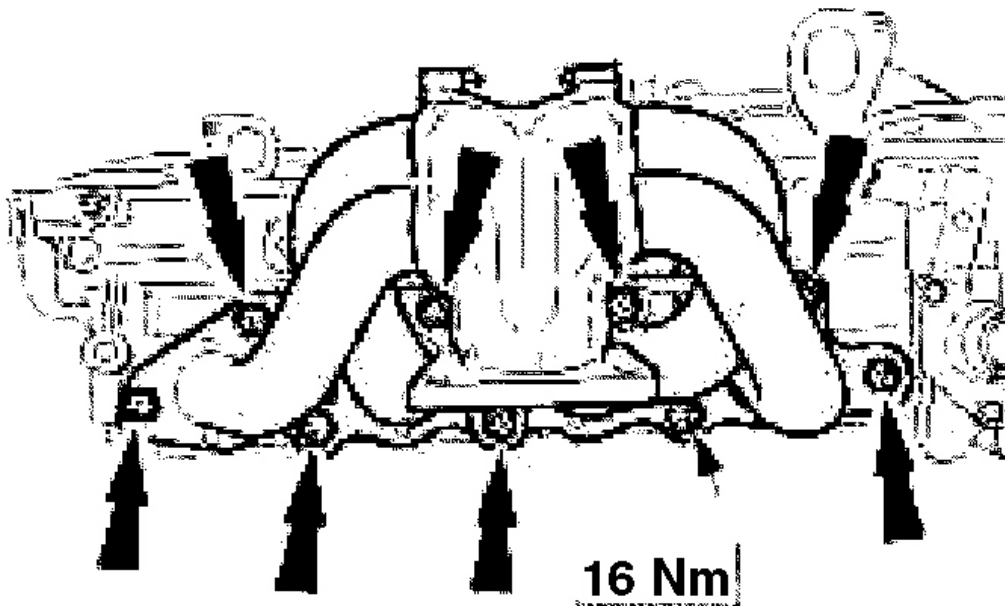
66. Attach the intake manifold.
 - Screw in five bolts and fit two nuts.



G03431951

Fig. 346: Installing Intake Manifold
Courtesy of FORD MOTOR CO.

67. Attach the exhaust manifold to the cylinder head using the alignment spacers with the two outside bolts and a new manifold gasket.



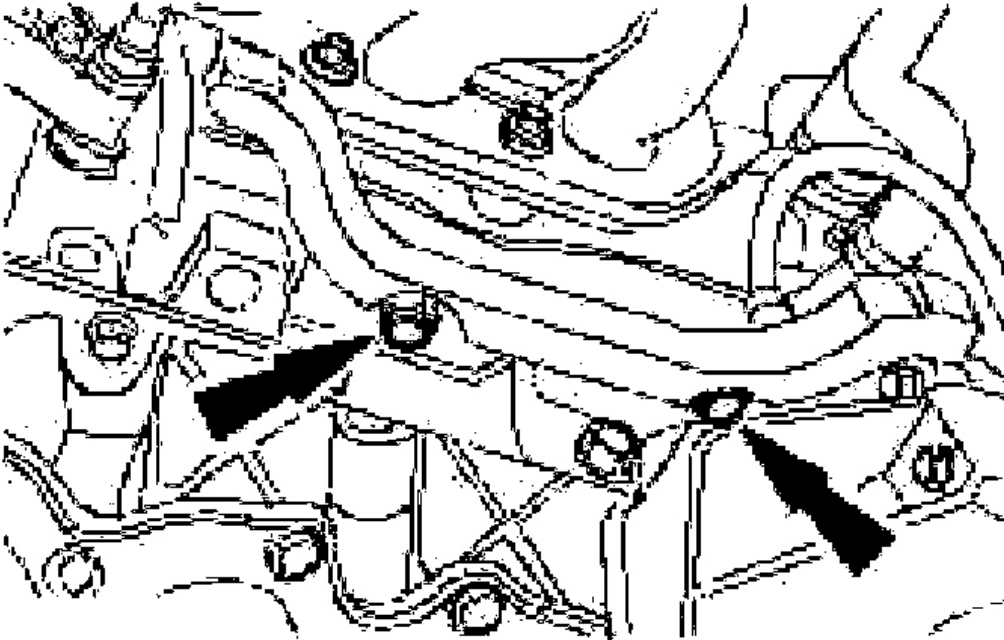
G03431952

Fig. 347: Installing Exhaust Manifold To Cylinder Head
Courtesy of FORD MOTOR CO.

CAUTION: Do not allow debris to fall into the exhaust manifold.

CAUTION: Always follow the correct installation sequence for the catalytic converter in order to prevent damage.

CAUTION: Examine the seats and threads in the exhaust catalyst cone and EGR valve. Clean as required.



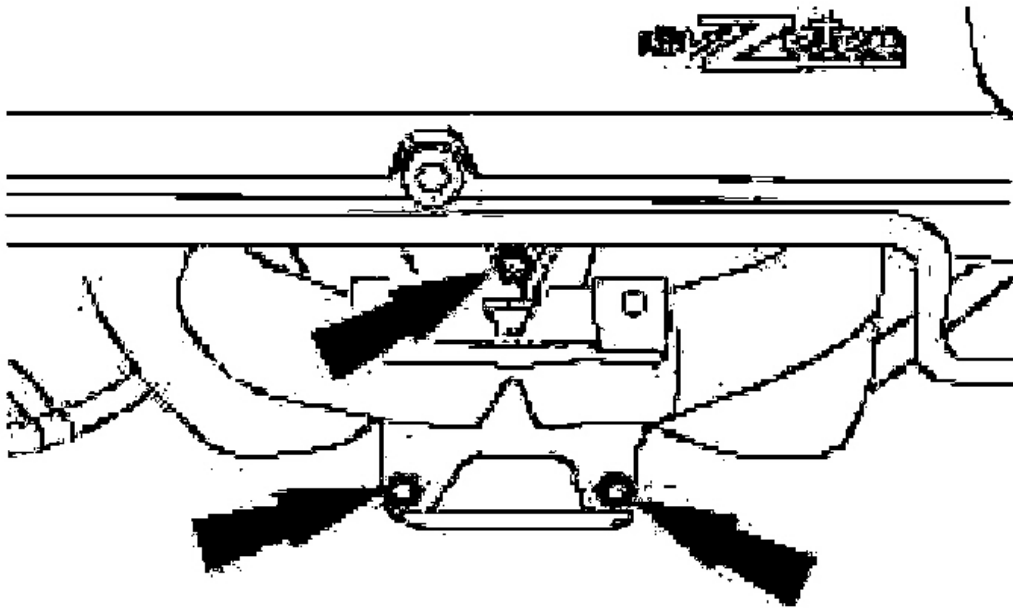
G03431953

Fig. 348: Loosening Bracket Of Catalytic Converter
Courtesy of FORD MOTOR CO.

68. Loosen the bracket for the catalytic converter so that it can move freely.

NOTE: Use a new gasket.

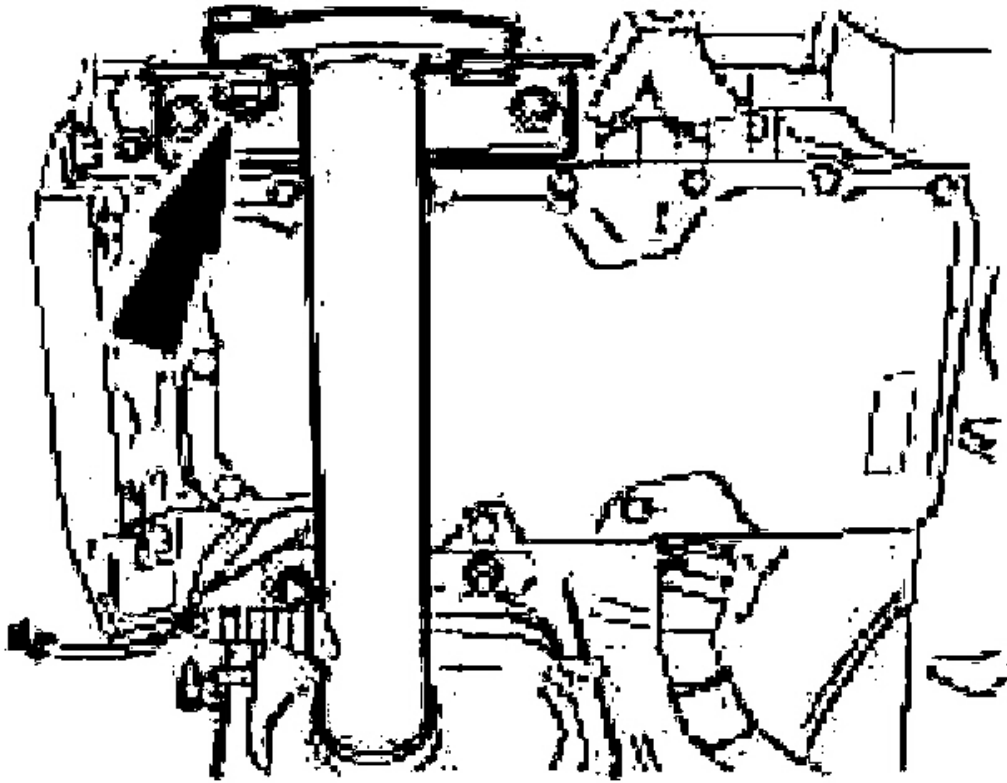
NOTE: Do not fully tighten the nuts/bolts at this stage.



G03431954

Fig. 349: Installing Catalytic Converter On Exhaust Manifold
Courtesy of FORD MOTOR CO.

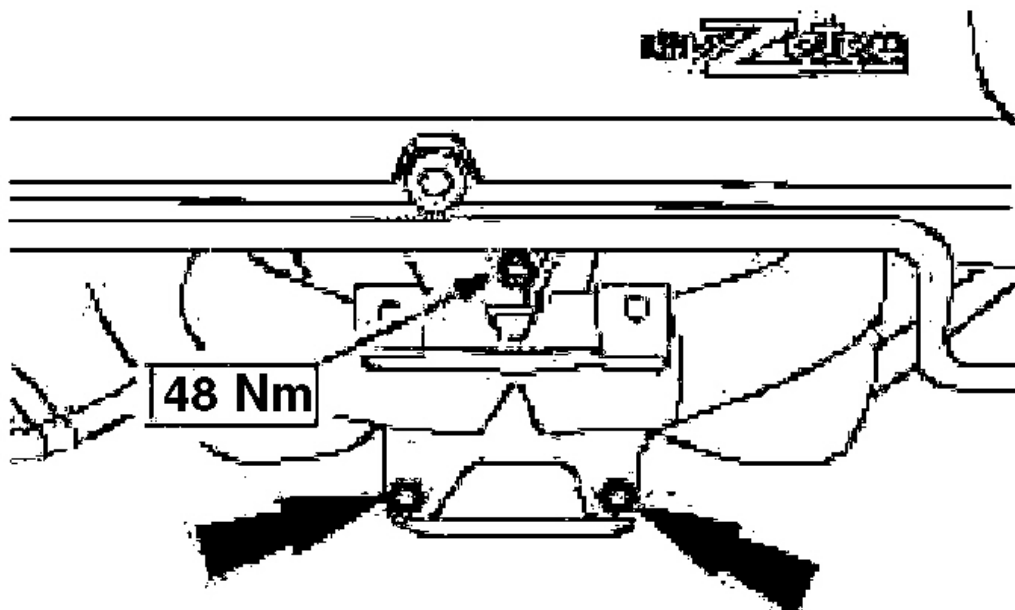
69. Position the catalytic converter on the exhaust manifold using new hardware.
70. Raise and support the vehicle.
71. Using a nut and bolt, temporarily secure the catalytic converter to the bracket at the rear.



G03431955

Fig. 350: Securing Catalytic Converter To Bracket At Rear
Courtesy of FORD MOTOR CO.

72. Tighten the catalytic converter to the exhaust manifold.



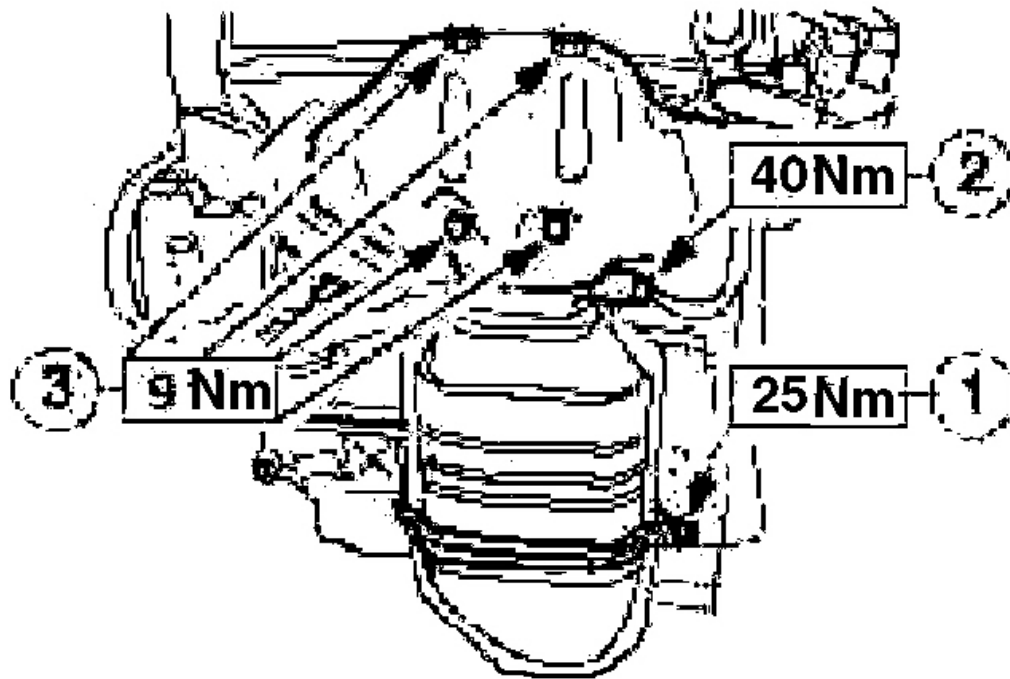
G03431956

Fig. 351: Tightening Catalytic Converter To Exhaust Manifold
Courtesy of FORD MOTOR CO.

NOTE: Always use a new catalyst to EGR valve pipe assembly.

NOTE: Loosely assemble the pipe to both the EGR valve and the exhaust catalyst before tightening the unions.

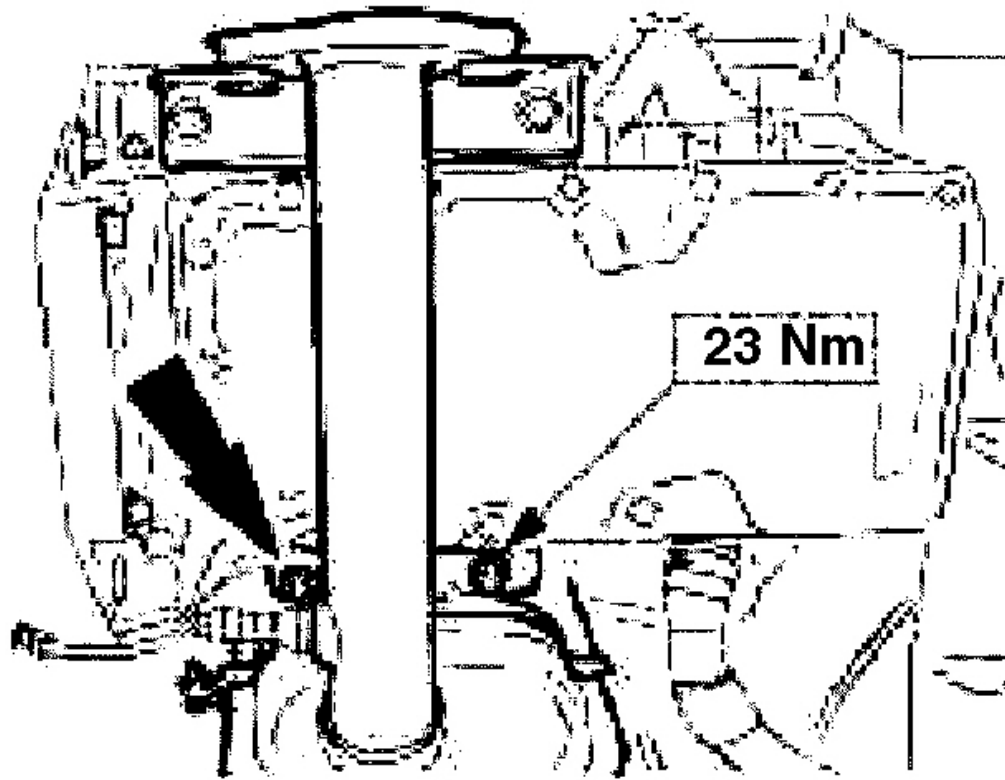
73. Attach the catalytic converter.
 1. Tighten the bolts on the catalytic converter bracket.
 2. Install a new EGR-pipe.
 3. Attach the heat shield.



G03431957

Fig. 352: Installing Catalytic Converter
Courtesy of FORD MOTOR CO.

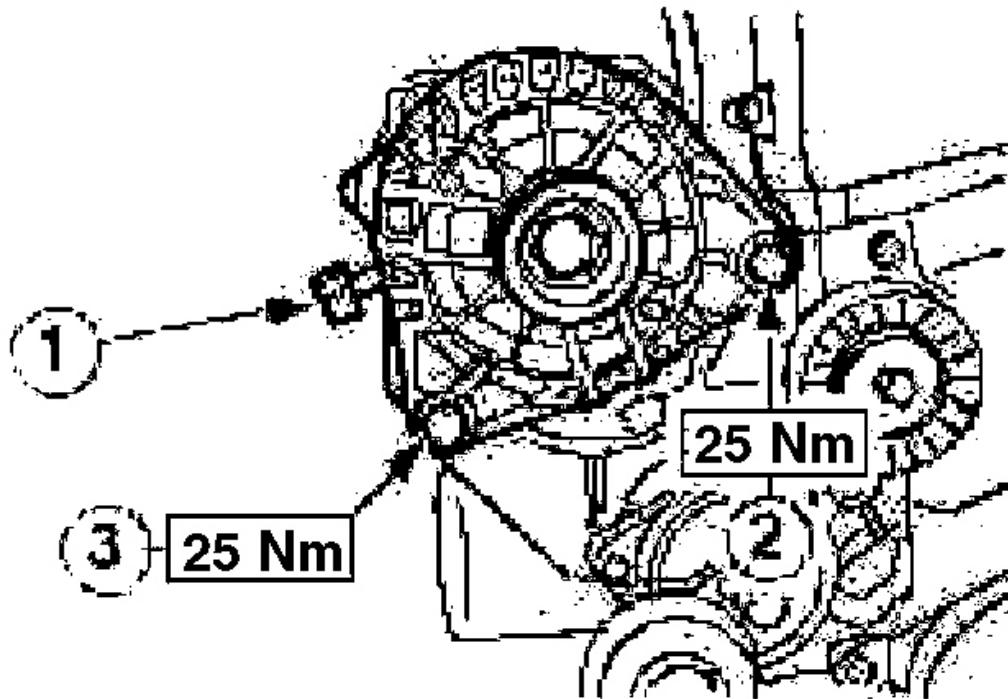
74. Attach the bracket for the catalytic converter.
- Tighten the bolts.
 - Remove the temporary bolt from the rear catalytic converter bracket.



G03431958

Fig. 353: Installing Bracket Of Catalytic Converter
Courtesy of FORD MOTOR CO.

75. Attach the generator.
 1. Screw in and tighten the bolt.
 2. Tighten the bolt.
 3. Connect the positive cable.



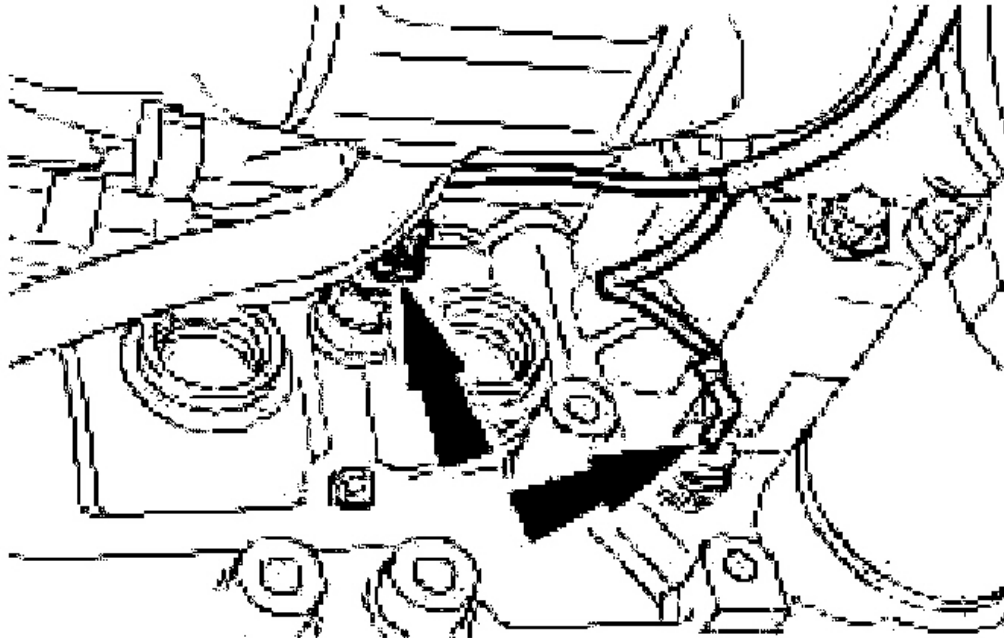
G03431959

Fig. 354: Installing Generator And Positive Cable
Courtesy of FORD MOTOR CO.

76. Connect the multiplug to the oil pressure switch and the KS.

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus



G03431960

Fig. 355: Connecting Multiplug To Oil Pressure Switch And KS
Courtesy of FORD MOTOR CO.

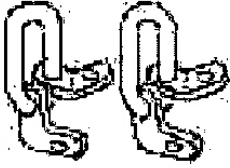
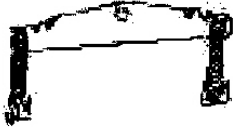

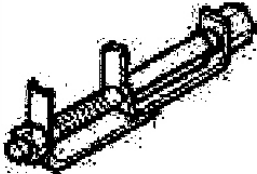
INSTALLATION

ENGINE - VEHICLES WITH: MTX-75/MANUAL TRANSAXLE

Special Tool(s)

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

	Lifting Bracket, Engine 303-050 (T70P -6000)
	Spreader Bar 303-D089 (D93P -6001-A3)
	Aligner, Gearshift Lever Neutral Position 308-437
	Remover/Installer, Cooling Hose Clamp 412-108 (T96P -18539-A)

G03431961

Fig. 356: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

Cable ties	ESD-M1C220-A
High-temperature grease	
Transmission fluid	ESDM-2C186-A
Engine oil	WSS-M2C153-H
Coolant	ESD-M97B49 -A

Installation

All vehicles

1. General note.

- If necessary, use Special Tool 412-108 to install coolant and ventilation hoses.

2. Preparatory operations

- Using a retaining strap, secure the transmission on the assembly stand.
- Hook the engine into the crane, bring into position at the transmission and support using wooden blocks.

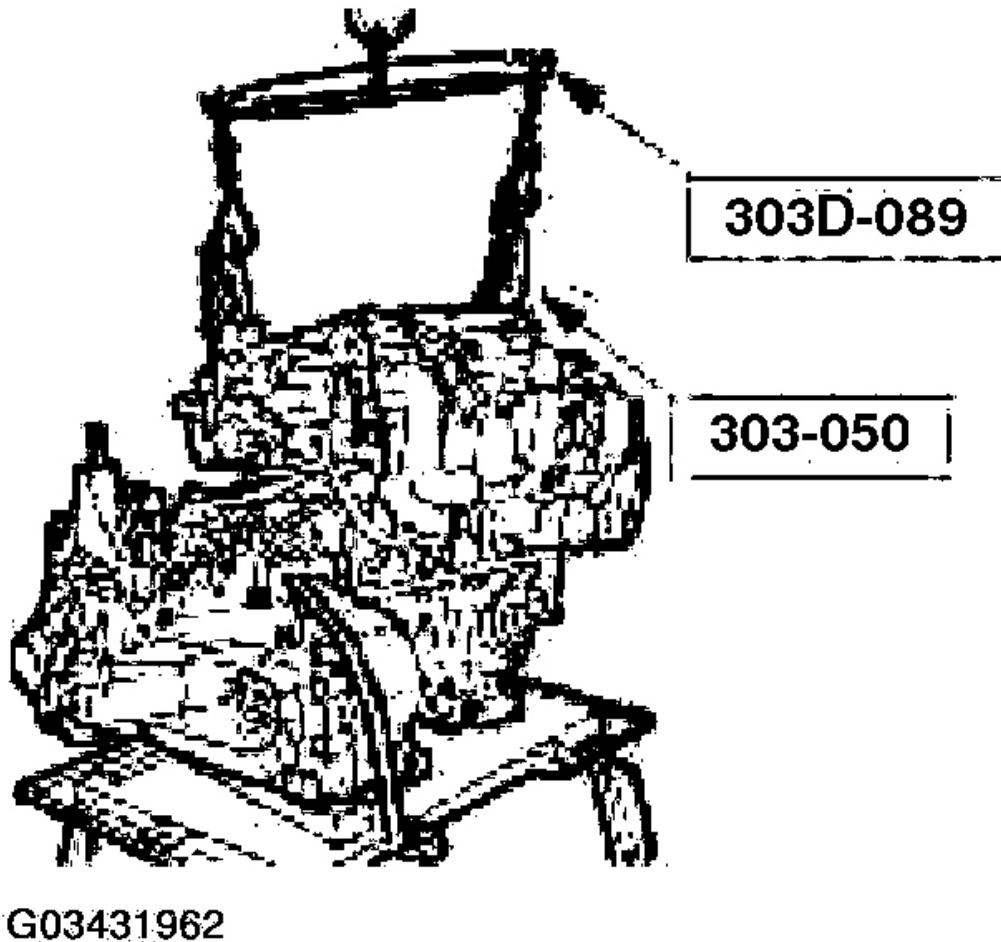
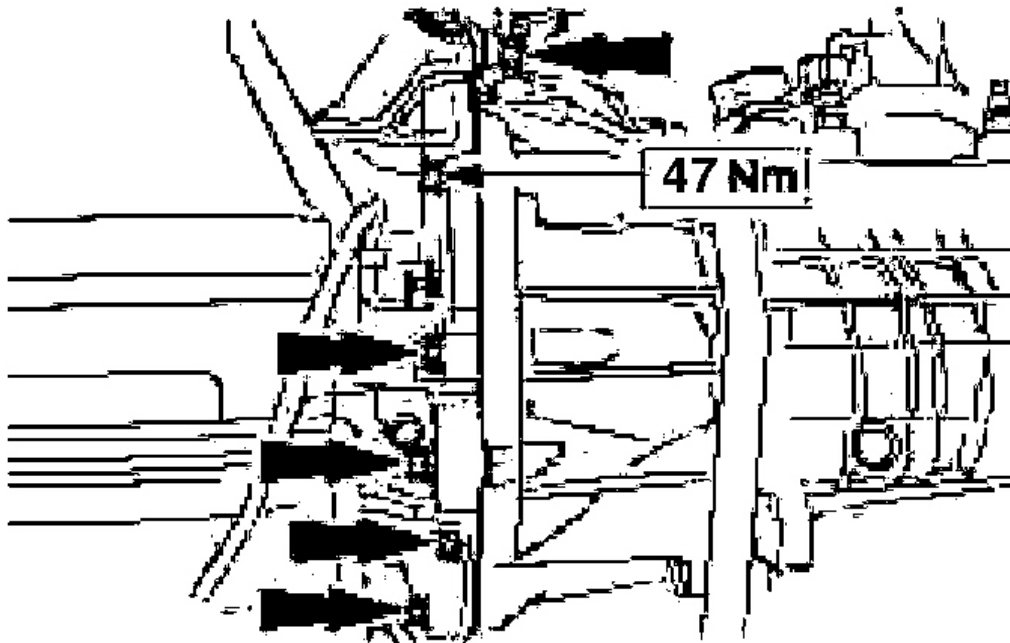


Fig. 357: Hooking Engine Into Crane, Bring Into Position At Transmission And Support Using Wooden Blocks

Courtesy of FORD MOTOR CO.

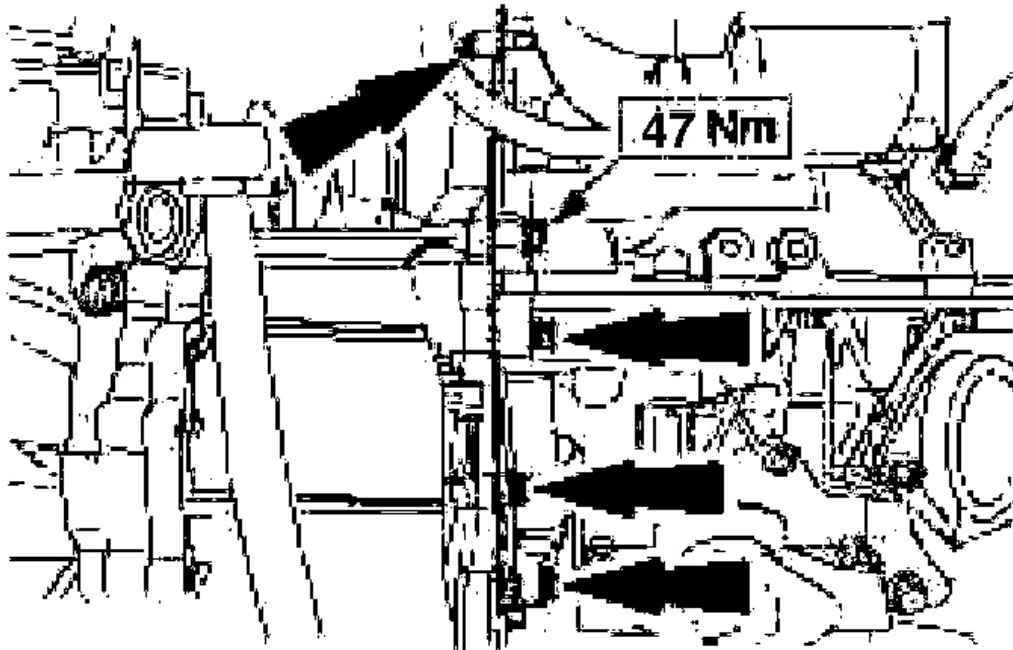
3. Install the flange bolts.



G03431963

Fig. 358: Installing Flange Bolts (1 Of 2)
Courtesy of FORD MOTOR CO.

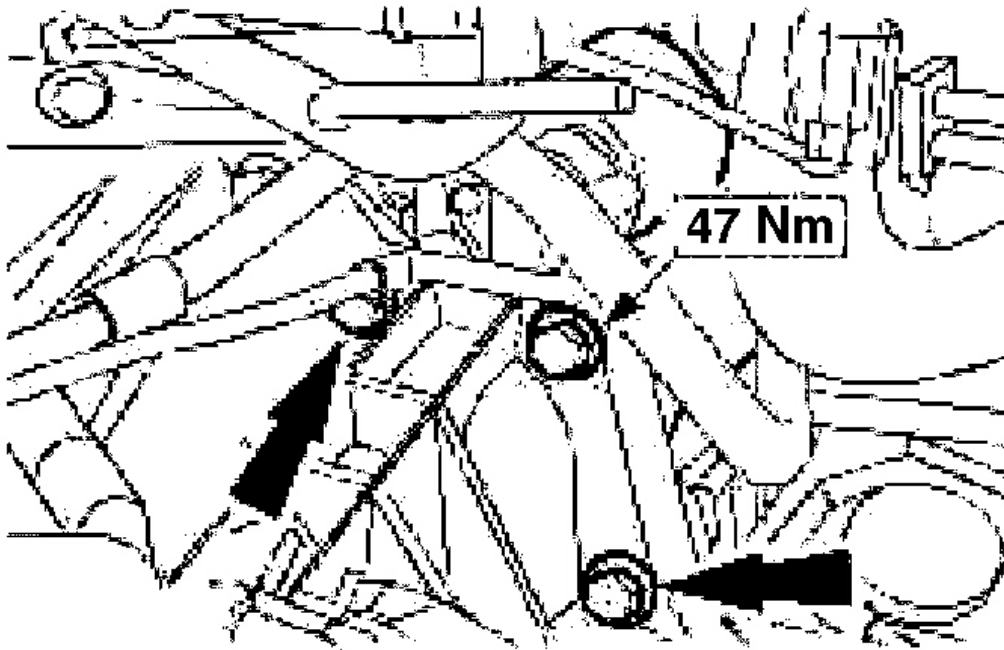
4. Install the flange bolts.
 - Detach the crane from the engine.



G03431964

Fig. 359: Installing Flange Bolts (2 Of 2)
Courtesy of FORD MOTOR CO.

5. Install the starter motor and ground cable.



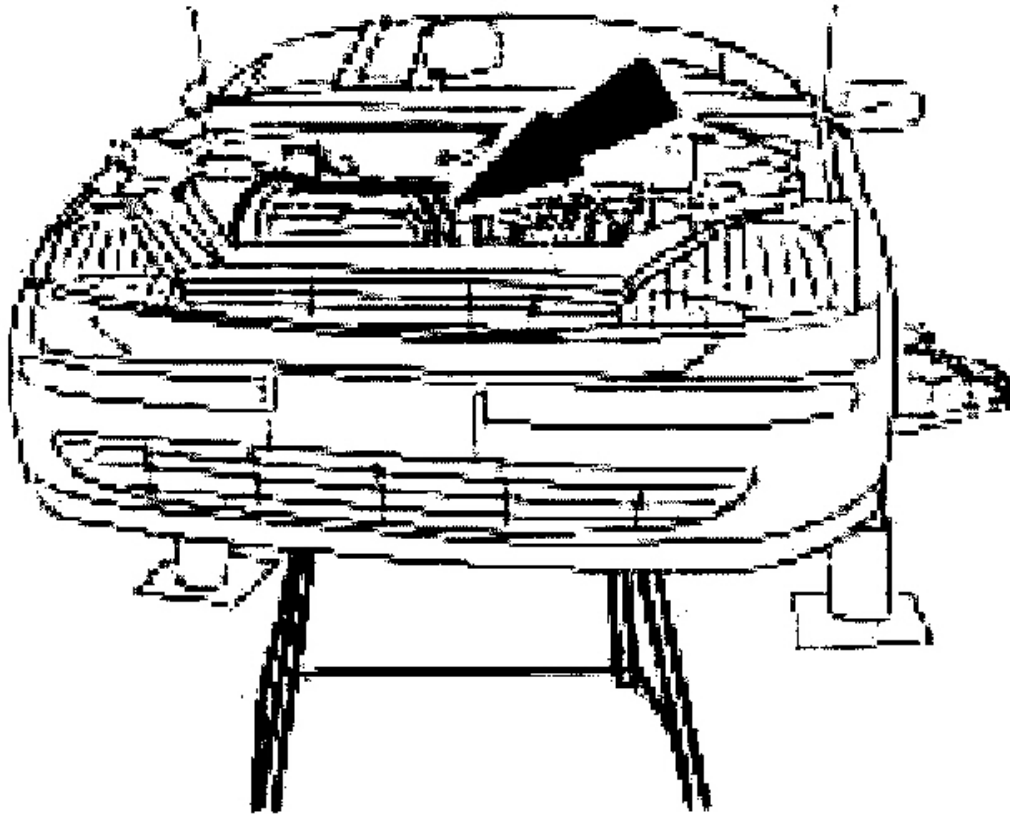
G03431965

Fig. 360: Installing Starter Motor And Ground Cable
Courtesy of FORD MOTOR CO.

6. Raise and support the vehicle.
7. Position the engine and transmission assembly on the assembly stand below the vehicle.
 - Carefully lower the vehicle.

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

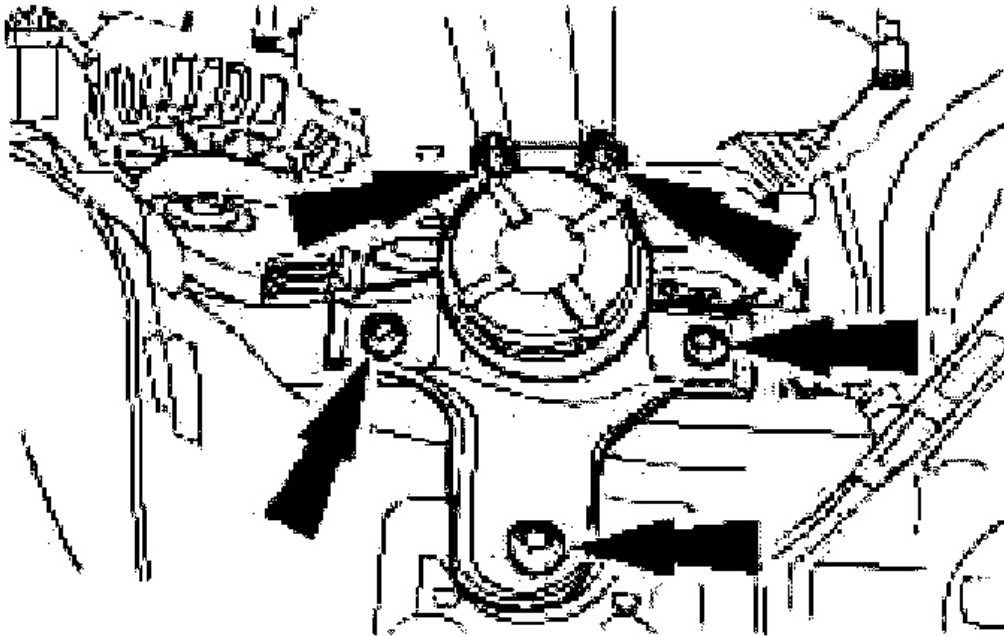


G03431966

**Fig. 361: Positioning Engine And Transmission Assembly On Assembly Stand
Below Vehicle**

Courtesy of FORD MOTOR CO.

NOTE: Insert/screw on the bolts and nuts fingertight.

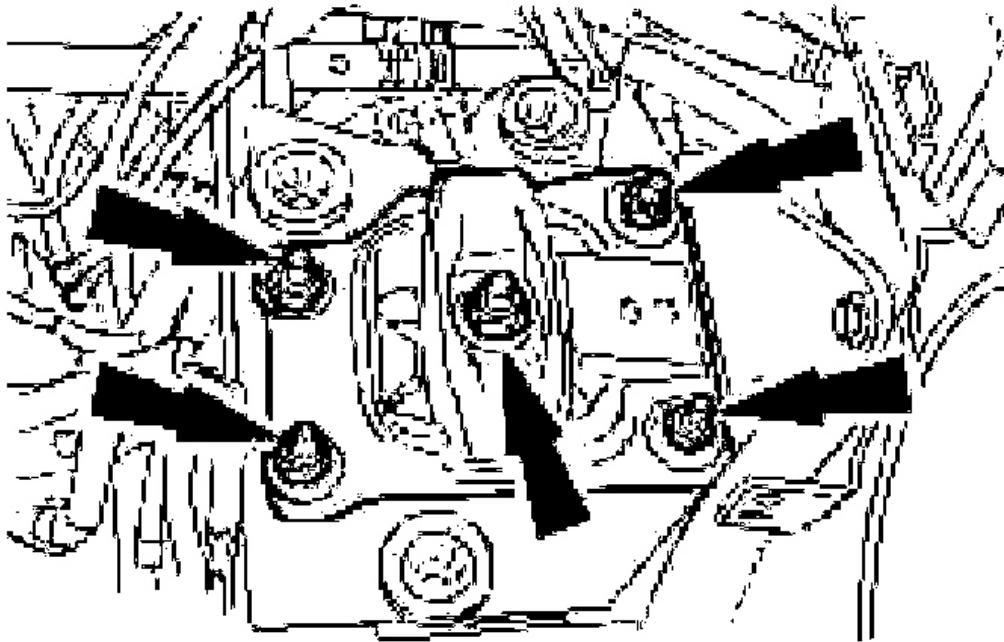


G03431967

Fig. 362: Installing Front Engine Mounting
Courtesy of FORD MOTOR CO.

8. Install the front engine mounting.

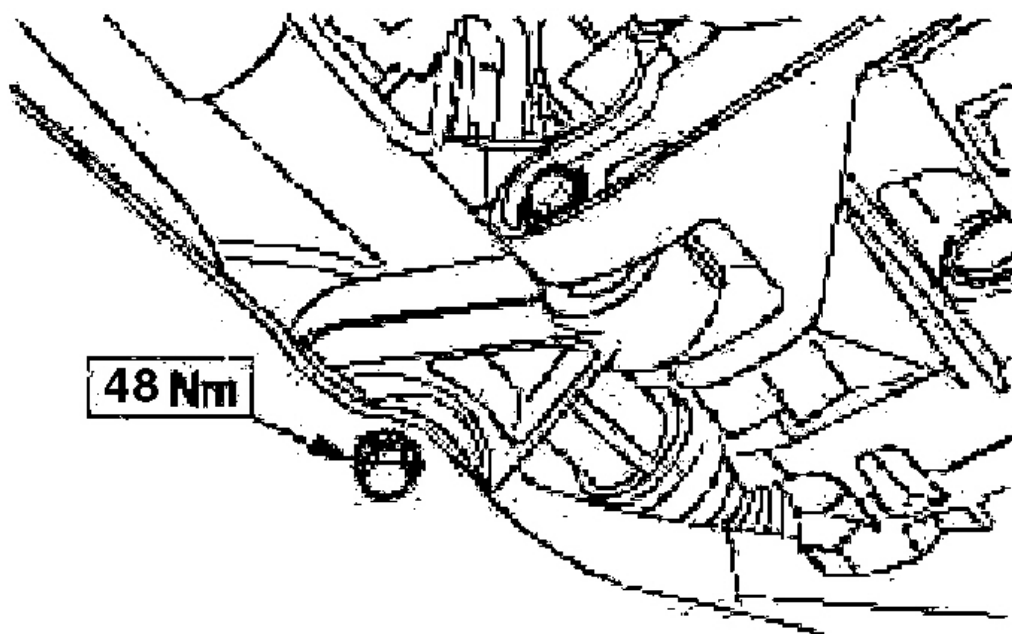
NOTE: **Screw on nuts fingertight.**



G03431968

Fig. 363: Installing Rear Engine Mounting
Courtesy of FORD MOTOR CO.

9. Install the rear engine mounting.
10. Remove the retaining strap from the transmission.
11. Raise and support the vehicle.
 - Remove the assembly stand.
12. Install the engine roll restrictor.

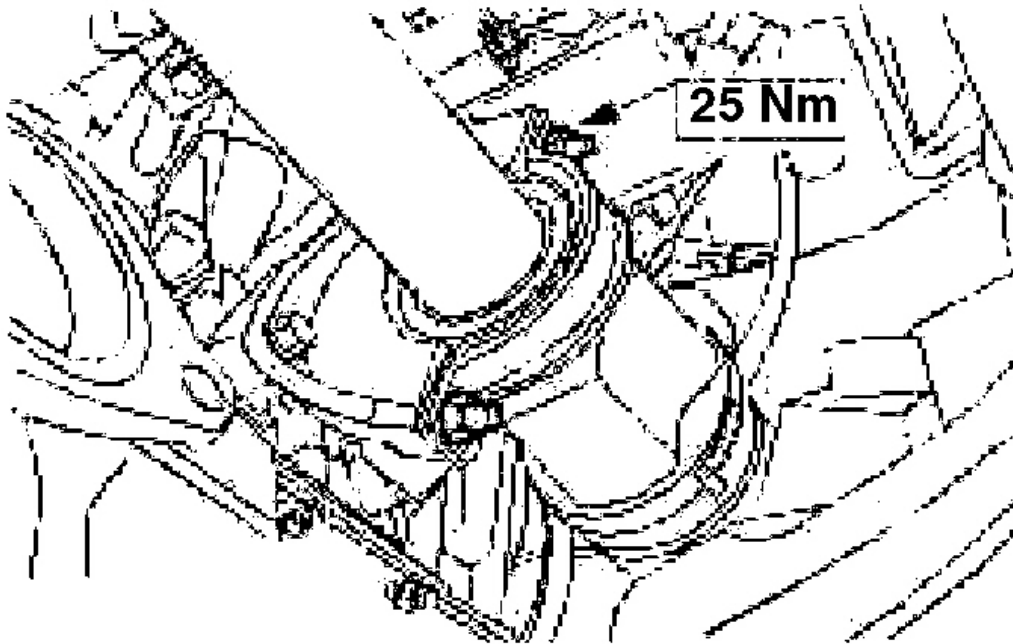


G03431969

Fig. 364: Installing Engine Roll Restrictor
Courtesy of FORD MOTOR CO.

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

NOTE: Use new bolts and new center bearing caps.



G03431970

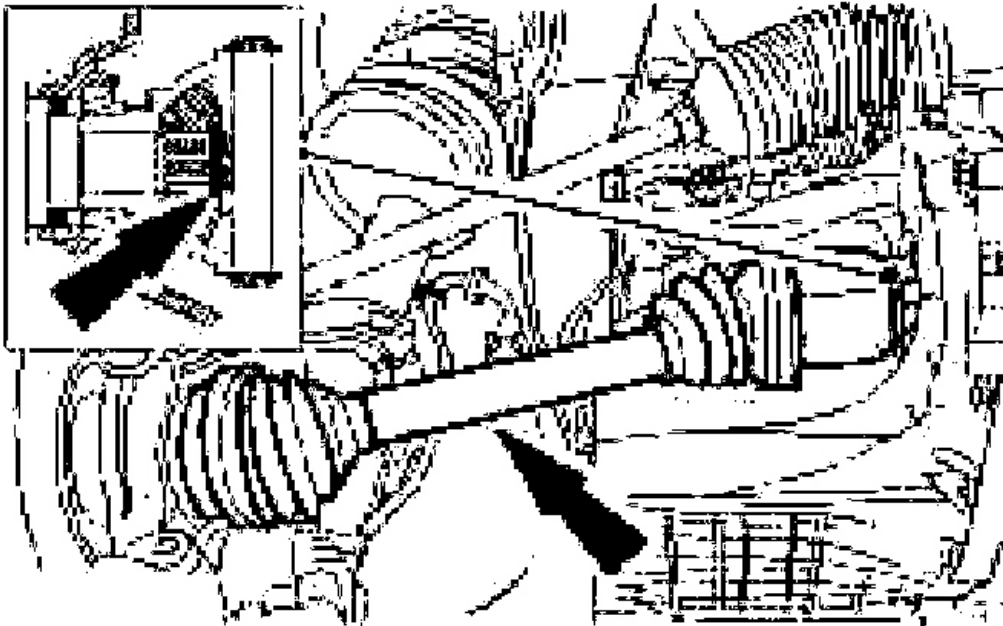
Fig. 365: Installing Right-Hand Input Shaft With Intermediate Shaft
Courtesy of FORD MOTOR CO.

13. Attach the right-hand input shaft with intermediate shaft.

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

NOTE: Use a new snap ring.

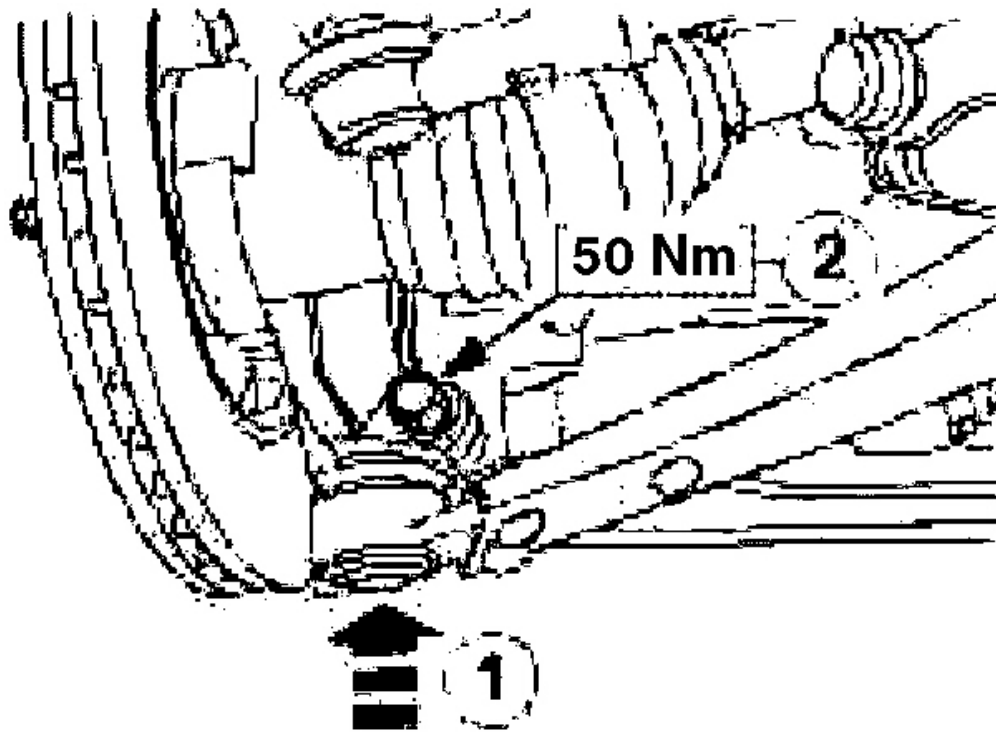
NOTE: Click the snap ring into place.



G03431971

Fig. 366: Installing Left-Hand Drive Shaft
Courtesy of FORD MOTOR CO.

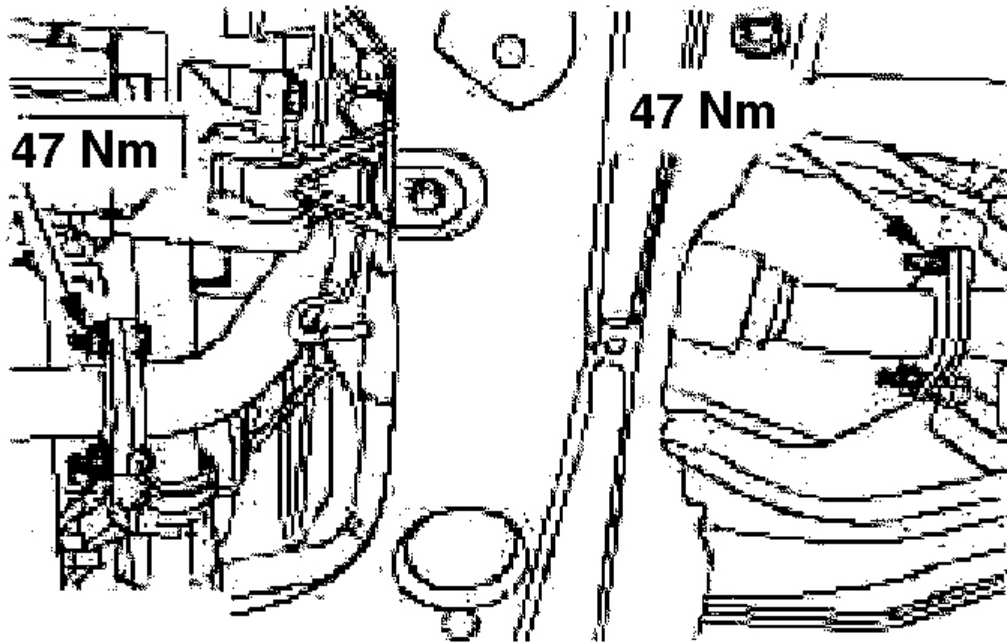
14. Attach the left-hand drive shaft.
15. Attach both suspension lower arms (left-hand side shown).
 1. Attach the lower arm ball joint.
 2. Install the bolt.



G03431972

Fig. 367: Installing Suspension Lower Arms And Lower Arm Ball Joint
Courtesy of FORD MOTOR CO.

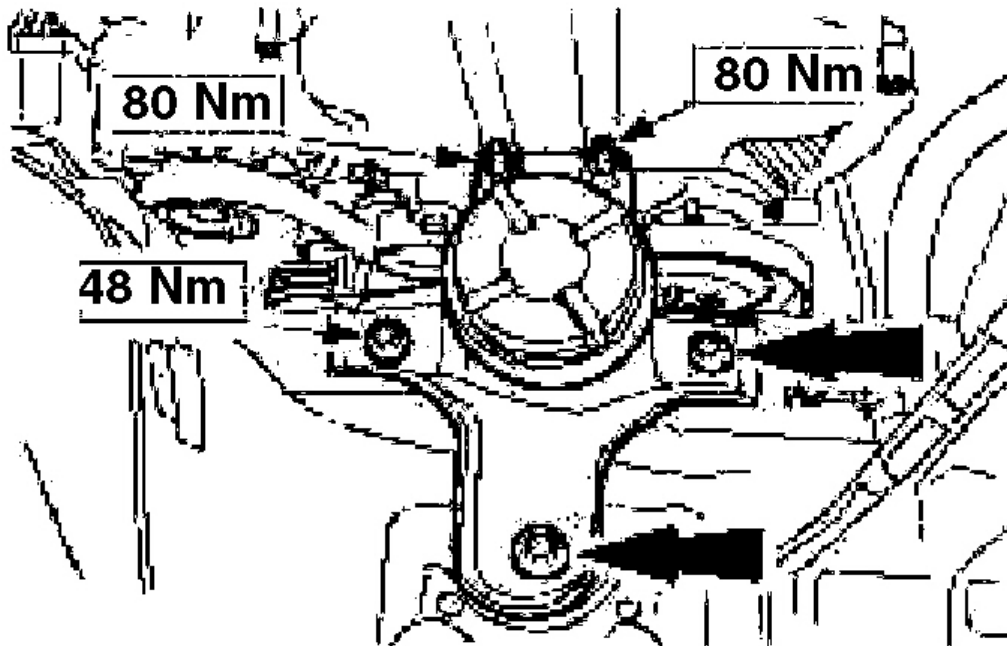
16. Install the flexible exhaust pipe.



G03431973

Fig. 368: Installing Flexible Exhaust Pipe
Courtesy of FORD MOTOR CO.

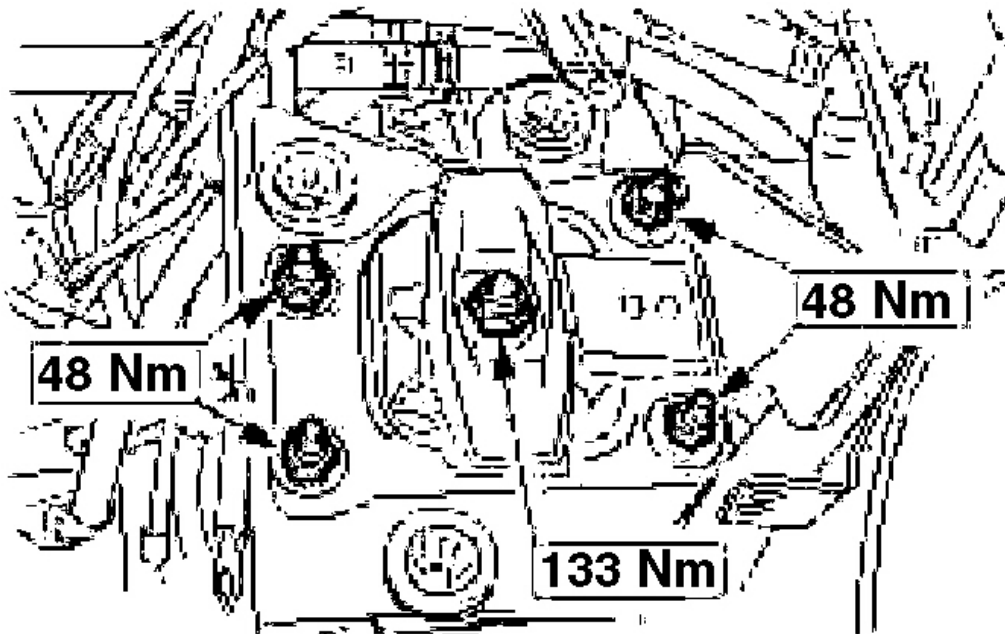
17. Lower the vehicle.
18. Tighten the rear engine mounting nuts/bolts.



G03431974

Fig. 369: Tightening Rear Engine Mounting Nuts/Bolts
Courtesy of FORD MOTOR CO.

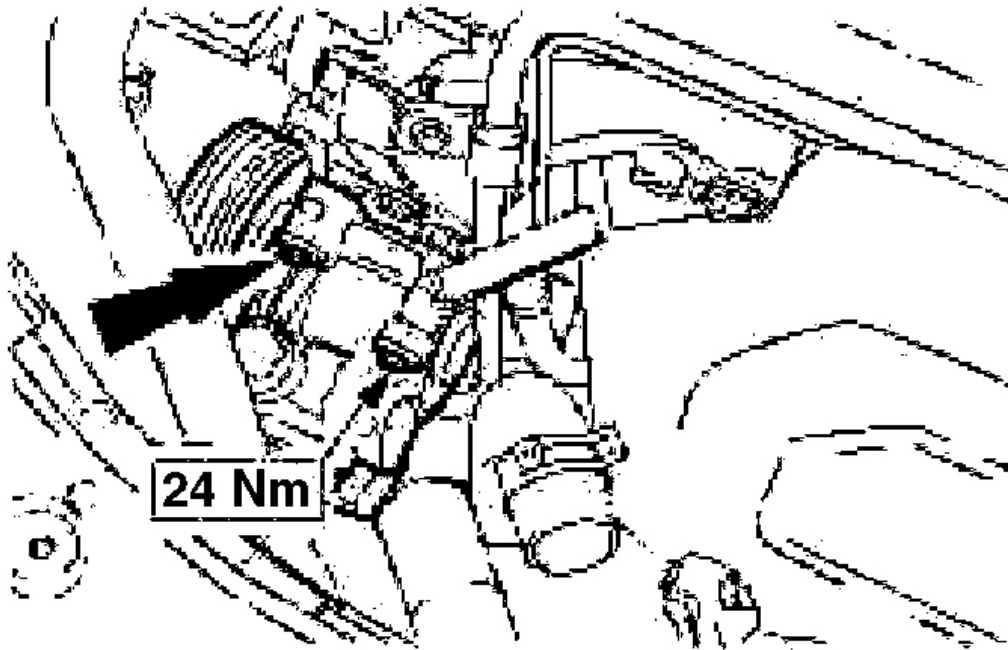
19. Tighten the front engine mounting nuts.



G03431975

Fig. 370: Tightening Front Engine Mounting Nuts
Courtesy of FORD MOTOR CO.

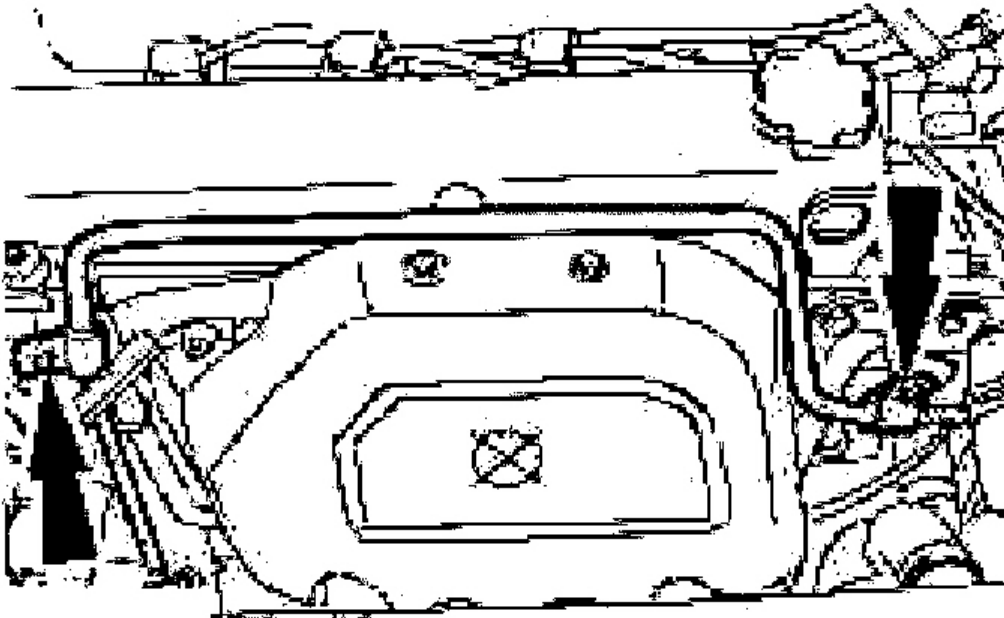
20. Install the power steering pump and fit the upper bolts.



G03431976

Fig. 371: Installing Power Steering Pump
Courtesy of FORD MOTOR CO.

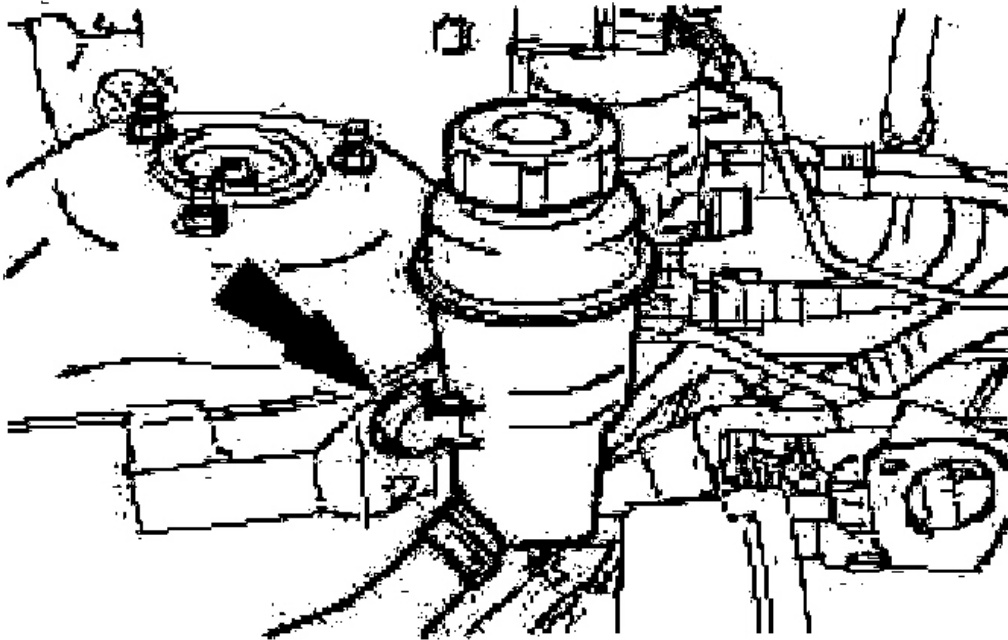
21. Attach the bracket to power steering high-pressure pipe.



G03431977

Fig. 372: Installing Bracket To Power Steering High-Pressure Pipe
Courtesy of FORD MOTOR CO.

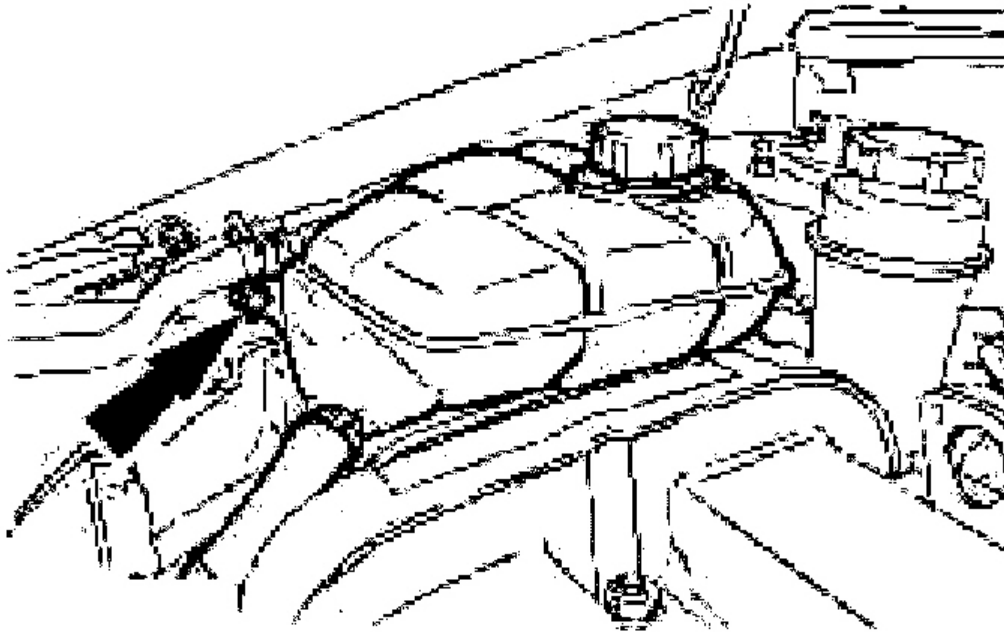
22. Install the PAS reservoir.



G03431978

Fig. 373: Installing PAS Reservoir
Courtesy of FORD MOTOR CO.

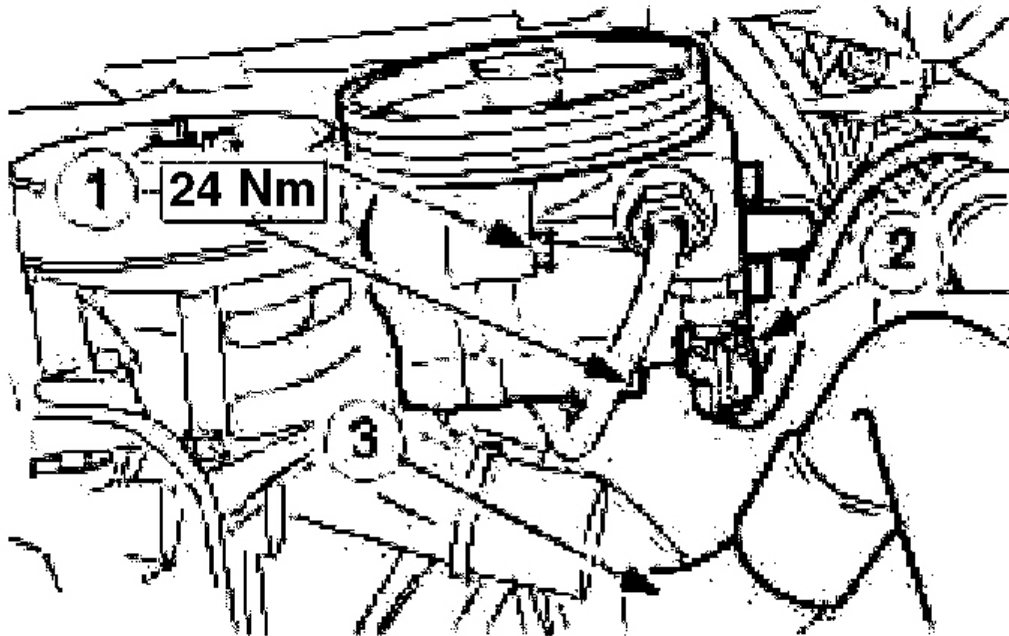
23. Install the coolant expansion tank.



G03431979

Fig. 374: Installing Coolant Expansion Tank
Courtesy of FORD MOTOR CO.

24. Raise and support the vehicle.
25. Attach the power steering pump lower bolts, power steering pump pressure switch electrical connector and the radiator lower coolant hose.
 1. Power steering pump lower bolts.
 2. Power steering pump pressure switch electrical connector.
 3. Radiator lower coolant hose.

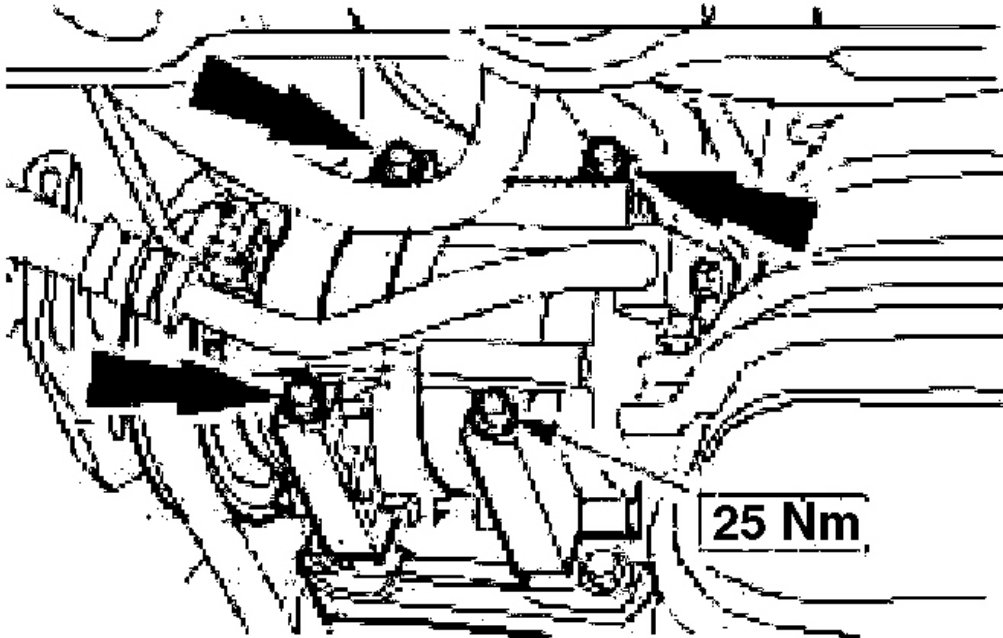


G03431980

Fig. 375: Installing Power Steering Pump Lower Bolts, Power Steering Pump Pressure Switch Electrical Connector And Radiator Lower Coolant Hose
Courtesy of FORD MOTOR CO.

Vehicles with air conditioning

26. Attach the air conditioning compressor.

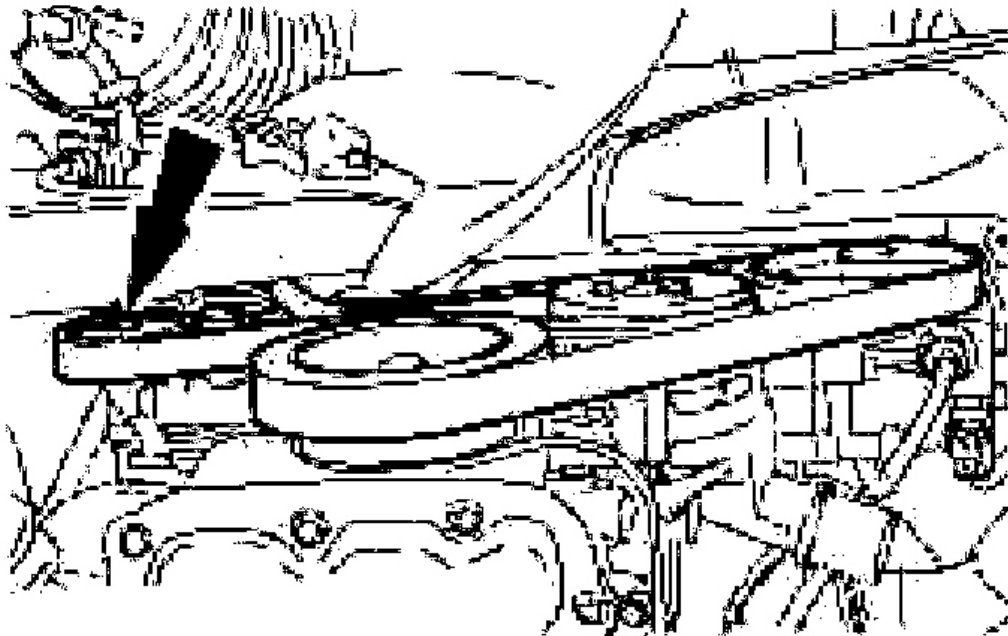


G03431981

Fig. 376: Installing Air Conditioning Compressor
Courtesy of FORD MOTOR CO.

All Vehicles

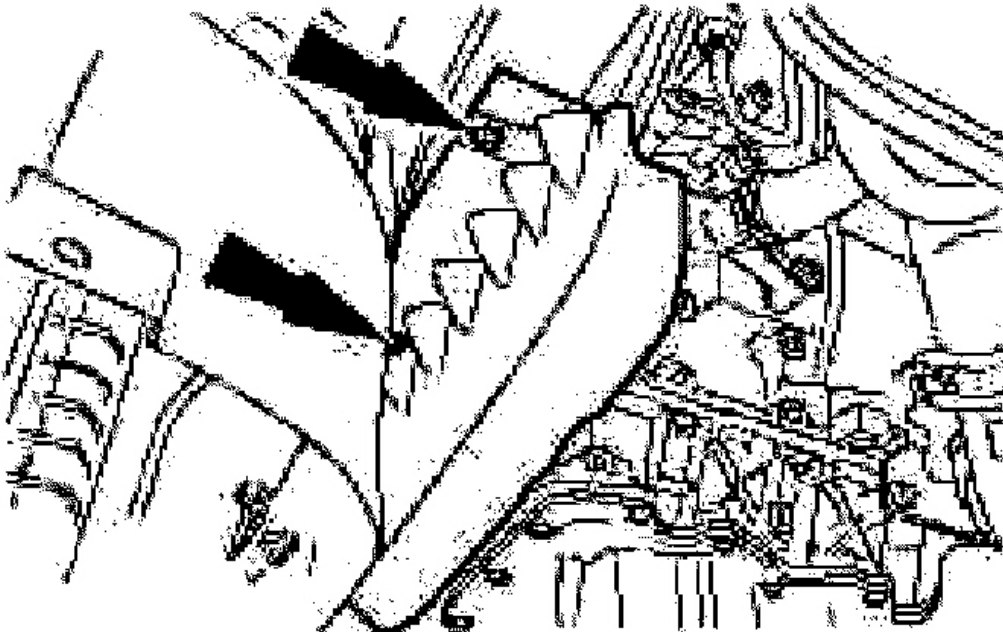
27. Install and tension the drive belt and connect the power steering pressure switch (PSPS).
 - Turn the belt tensioner clockwise.



G03431982

Fig. 377: Installing Drive Belt And Power Steering Pressure Switch (PSPS)
Courtesy of FORD MOTOR CO.

28. Install the drive belt cover.



G03431983

Fig. 378: Installing Drive Belt Cover
Courtesy of FORD MOTOR CO.

NOTE: Screw on wheel nuts fingertight.

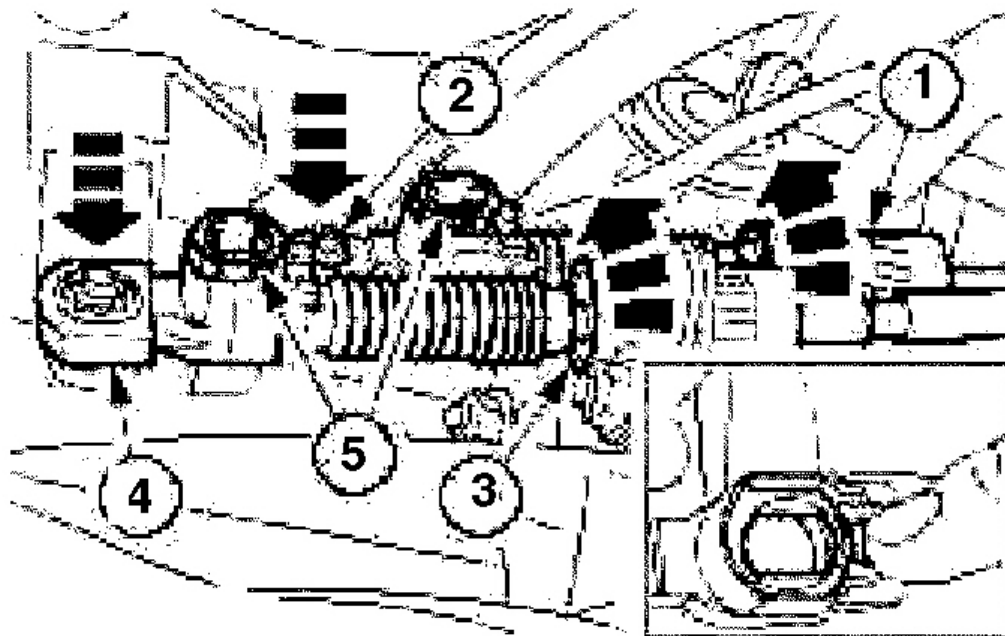
29. Install the front wheel.
30. Lower the vehicle.

NOTE: The adjusting mechanisms must be released by pressing them in.

NOTE: The abutment brackets are tensioned automatically once they have been released.

31. Connect the cables to the transaxle and adjust them.
 1. Release the abutment bracket by turning it counterclockwise and install the cable in the bracket.

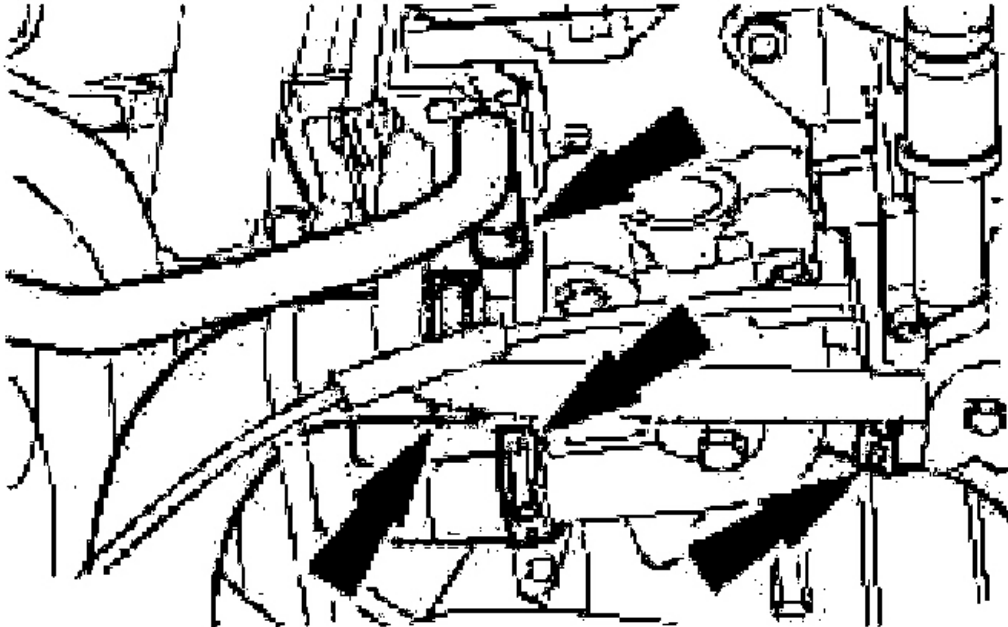
2. Connect the shift cable from the gear selector lever.
3. Release the abutment bracket by turning it counterclockwise and install the cable in the bracket.
4. Connect the shift cable to the gearshift lever.
5. Lock the adjusting mechanism by pressing down the clips.



G03431984

Fig. 379: Connecting And Adjusting Shift Cable To Transaxle
Courtesy of FORD MOTOR CO.

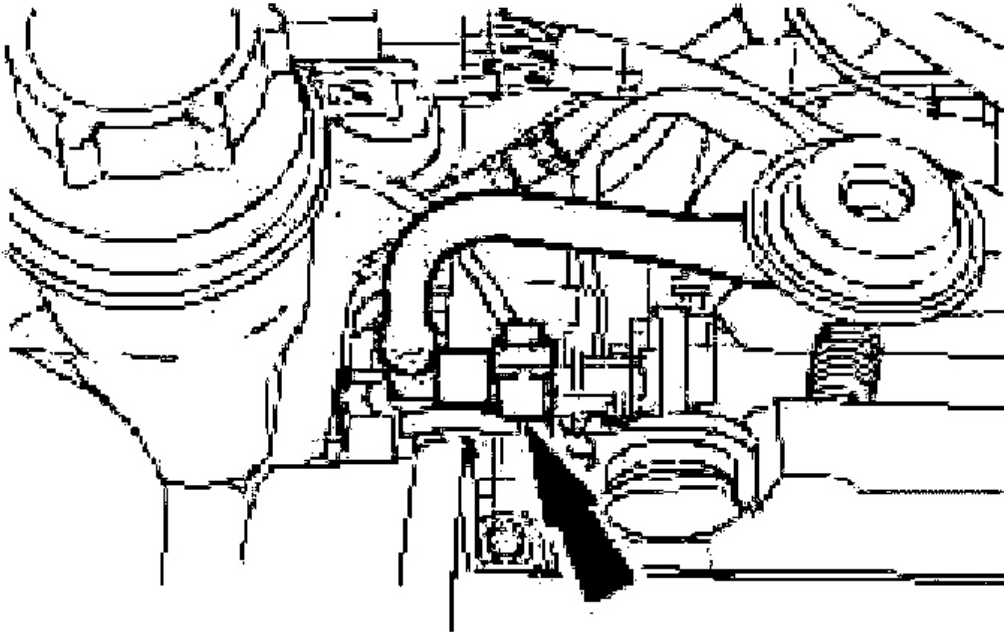
32. Attach the coolant hoses (continued).



G03431985

Fig. 380: Installing Coolant Hoses
Courtesy of FORD MOTOR CO.

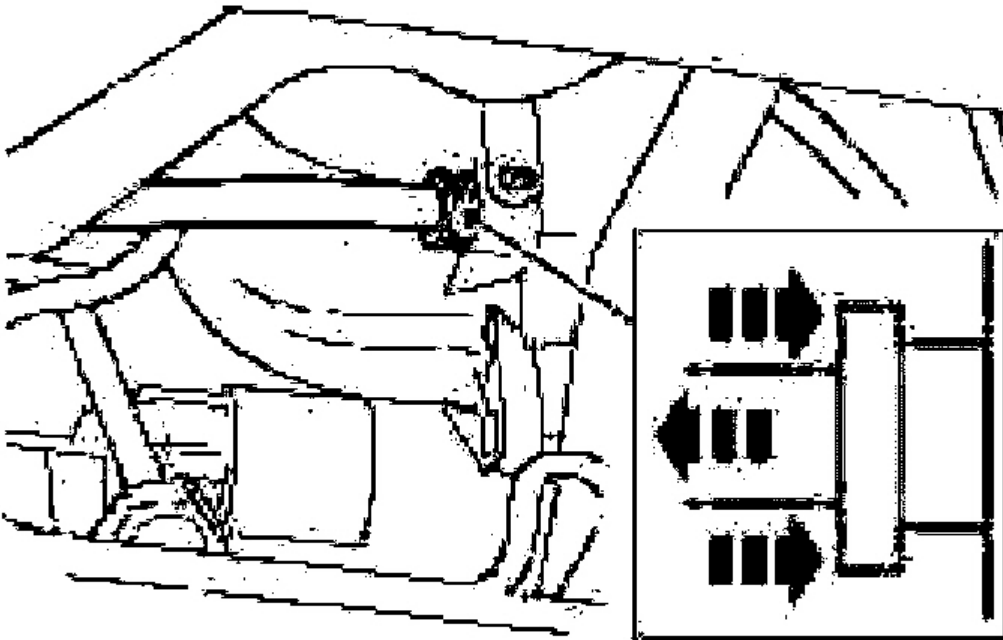
33. Attach the fuel pipes.



G03431986

Fig. 381: Installing Fuel Pipes
Courtesy of FORD MOTOR CO.

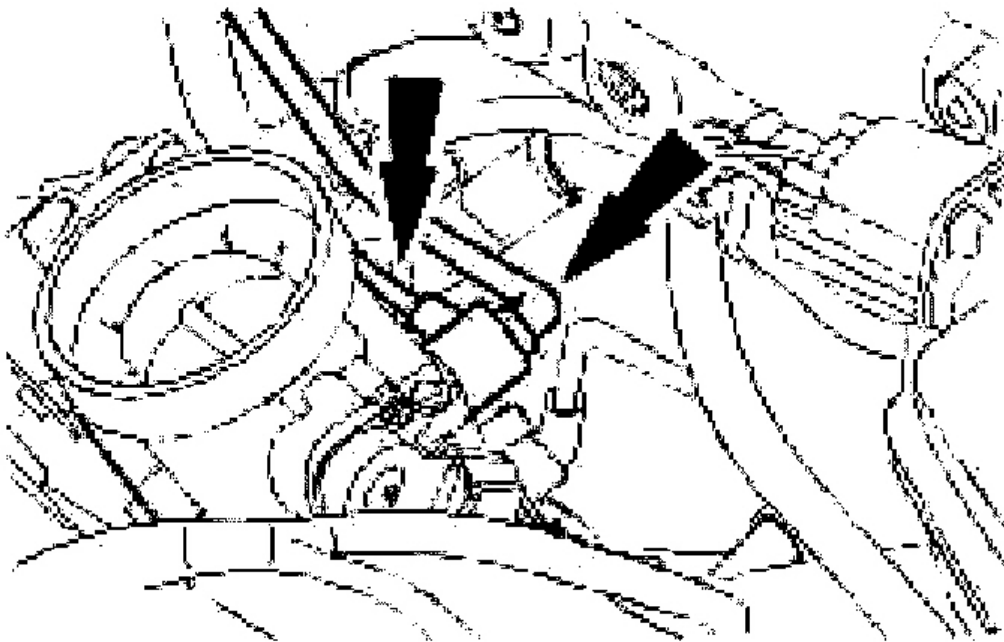
34. Attach the brake servo vacuum hose.



G03431987

Fig. 382: Installing Brake Servo Vacuum Hose
Courtesy of FORD MOTOR CO.

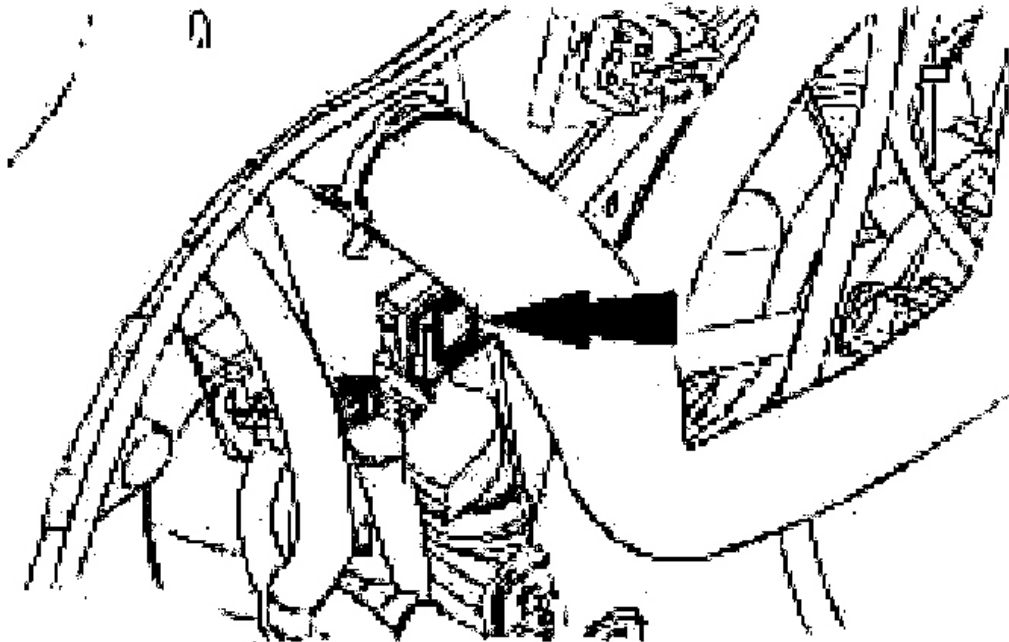
35. Attach the vacuum hoses.



G03431988

Fig. 383: Installing Vacuum Hoses
Courtesy of FORD MOTOR CO.

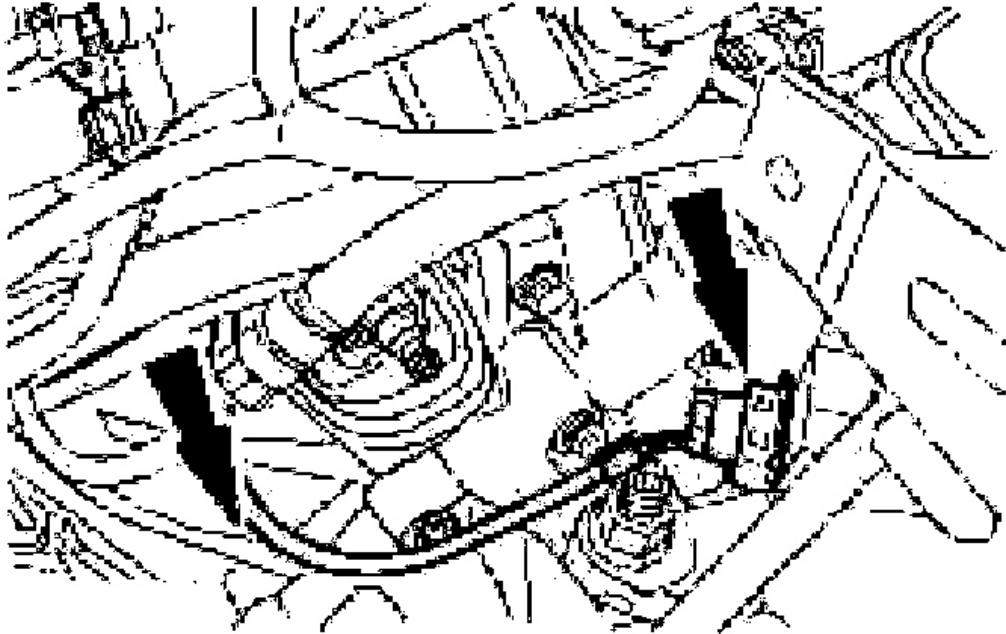
36. Install the air deflector and the radiator fan.
- Hook the air deflector in place.
 - Install the clips on both sides (left side shown).



G03431989

Fig. 384: Installing Air Deflector
Courtesy of FORD MOTOR CO.

37. Connect the plug for the reversing lamp switch and the crankshaft position sensor (CKP sensor).
 - Clip on the wiring loom.

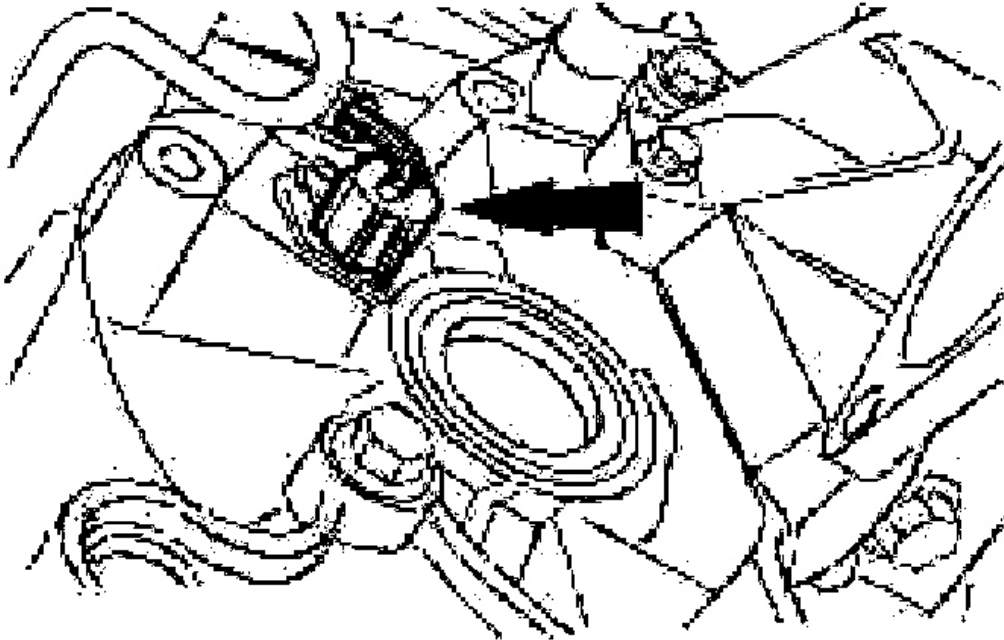


G03431990

Fig. 385: Connecting Plug Of Reversing Lamp Switch And Crankshaft Position Sensor (CKP Sensor)

Courtesy of FORD MOTOR CO.

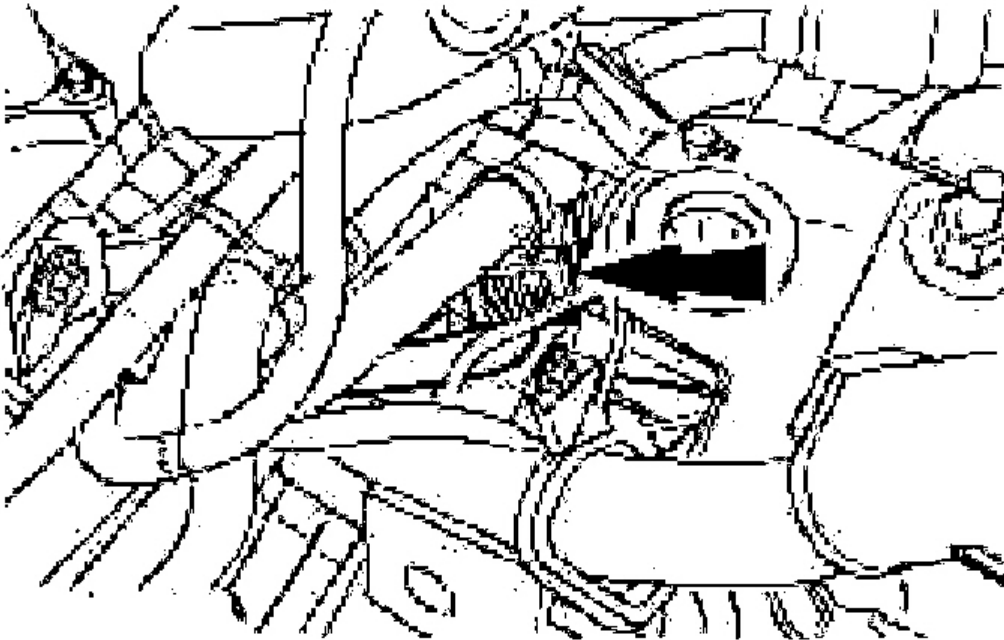
38. Connect the plug to the vehicle speed sensor (VSS)



G03431991

Fig. 386: Connecting Plug To Vehicle Speed Sensor (VSS)
Courtesy of FORD MOTOR CO.

39. Connect the harness connectors.



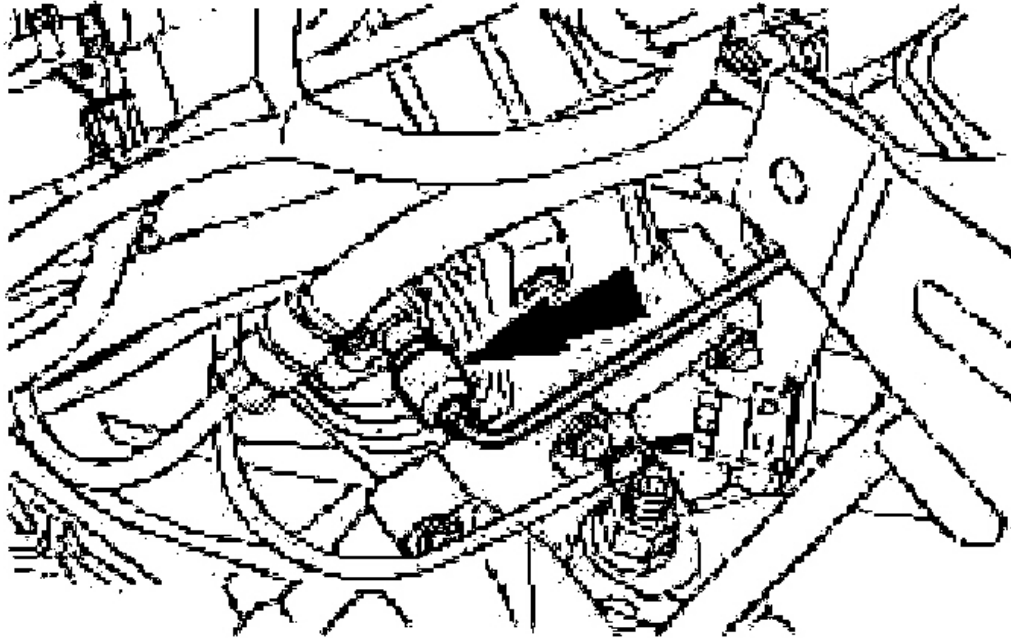
G03431992

Fig. 387: Connecting Harness Connectors
Courtesy of FORD MOTOR CO.

WARNING: Escaping brake fluid. Do not allow brake fluid to come into contact with the skin or eyes. If brake fluid should come into contact with your skin or eyes, rinse the affected area immediately with water.

CAUTION: If any brake fluid gets on the paintwork wash it off immediately with water.

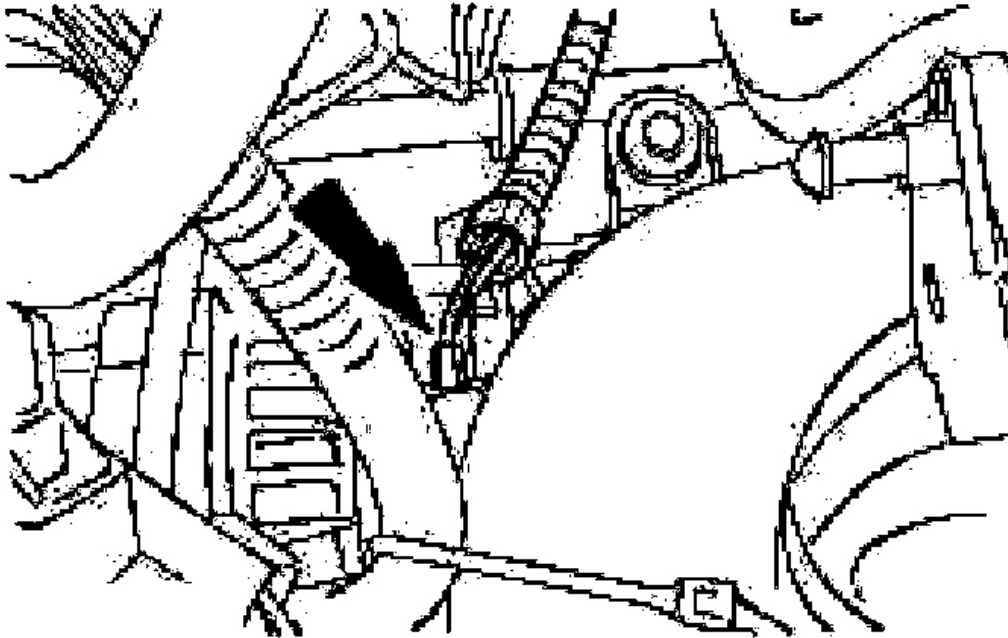
40. Attach the high-pressure pipe to the clutch slave cylinder.
 - Slide on the clip.



G03431993

Fig. 388: Installing High-Pressure Pipe To Clutch Slave Cylinder
Courtesy of FORD MOTOR CO.

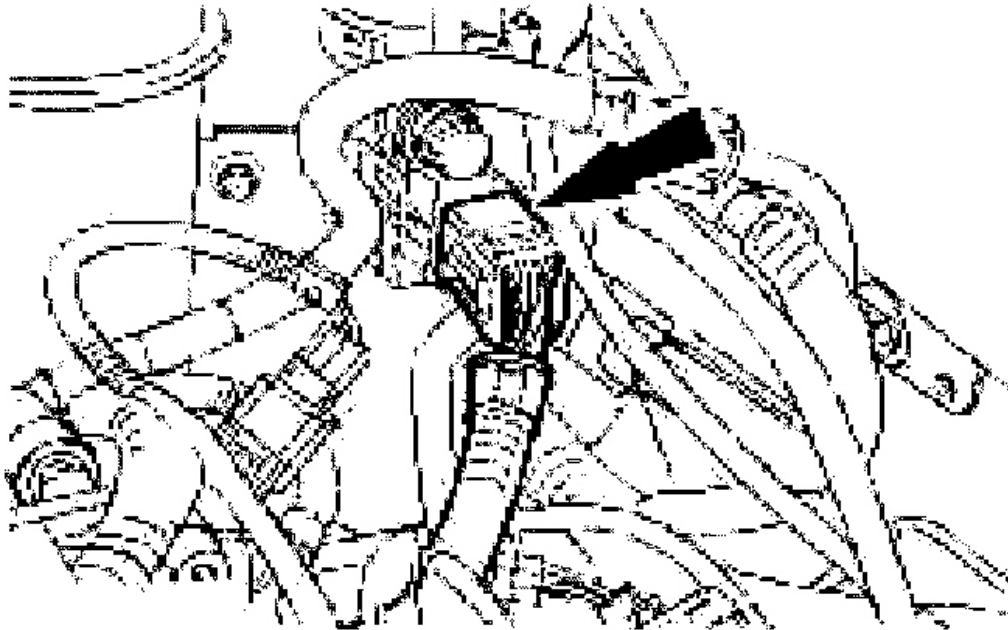
41. Attach the generator connector.



G03431994

Fig. 389: Installing Generator Connector
Courtesy of FORD MOTOR CO.

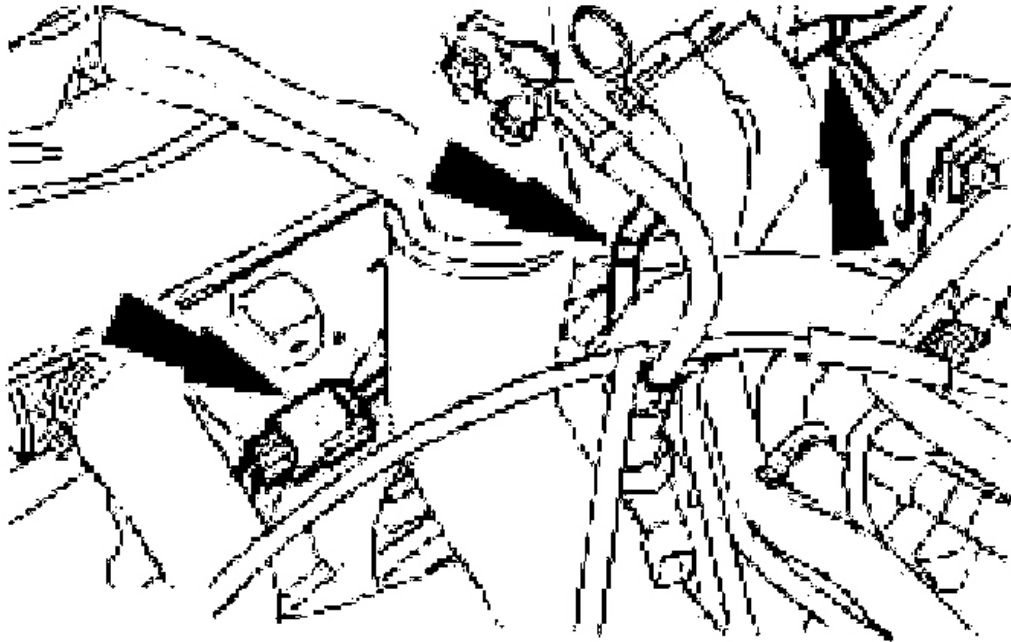
42. Connect the fuel injector wiring.



G03431995

Fig. 390: Connecting Fuel Injector Wiring
Courtesy of FORD MOTOR CO.

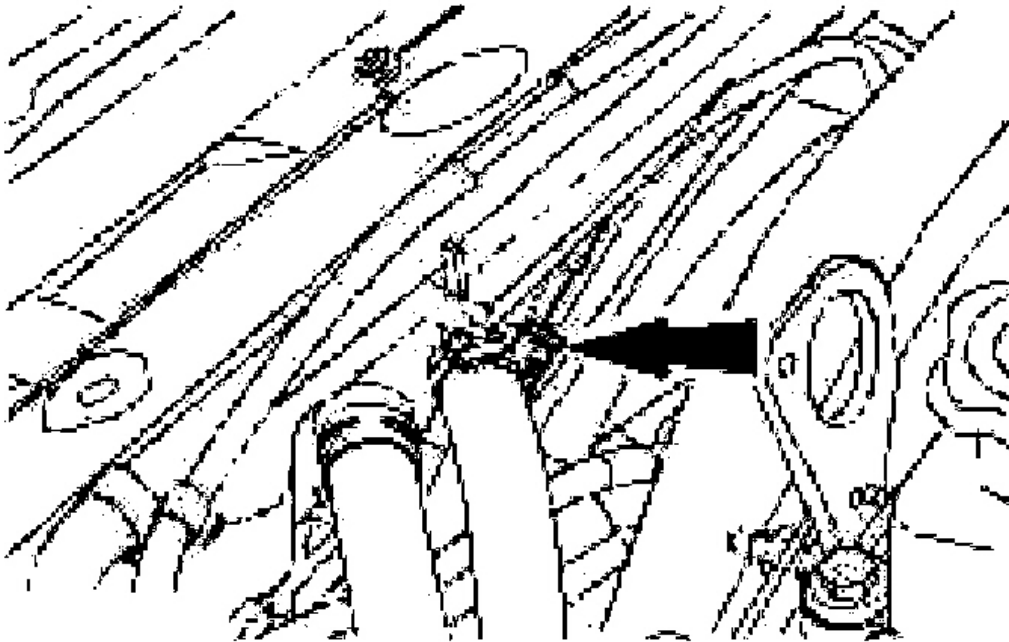
43. Connect the radiator fan connector.
 - Install the cable ties.



G03431996

Fig. 391: Connecting Radiator Fan Connector
Courtesy of FORD MOTOR CO.

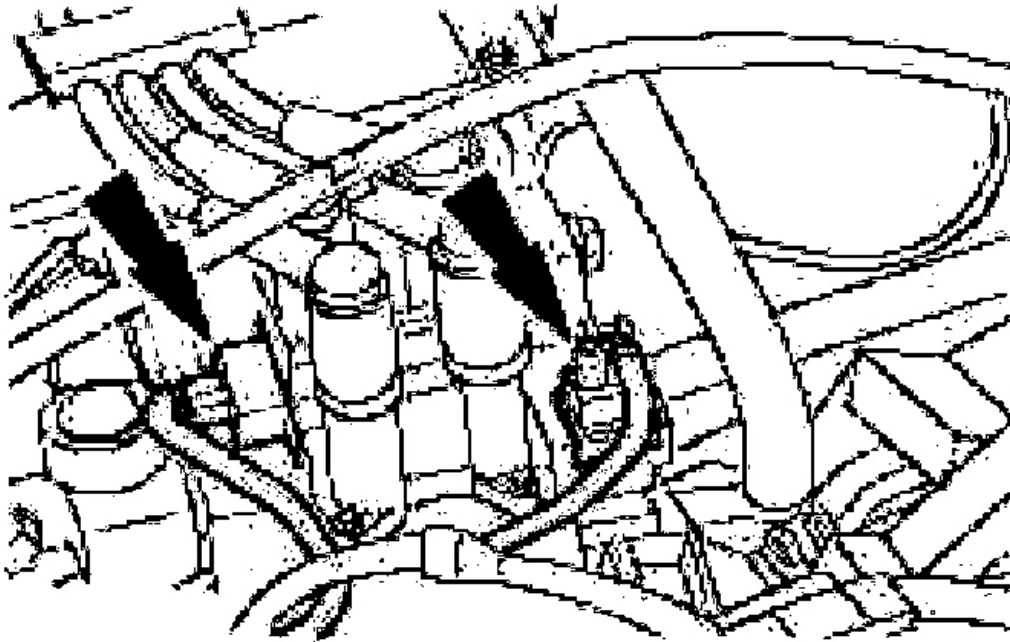
44. Attach the heated oxygen sensor (HO2S) connector.



G03431997

Fig. 392: Connecting Heated Oxygen Sensor (HO2S) Connector
Courtesy of FORD MOTOR CO.

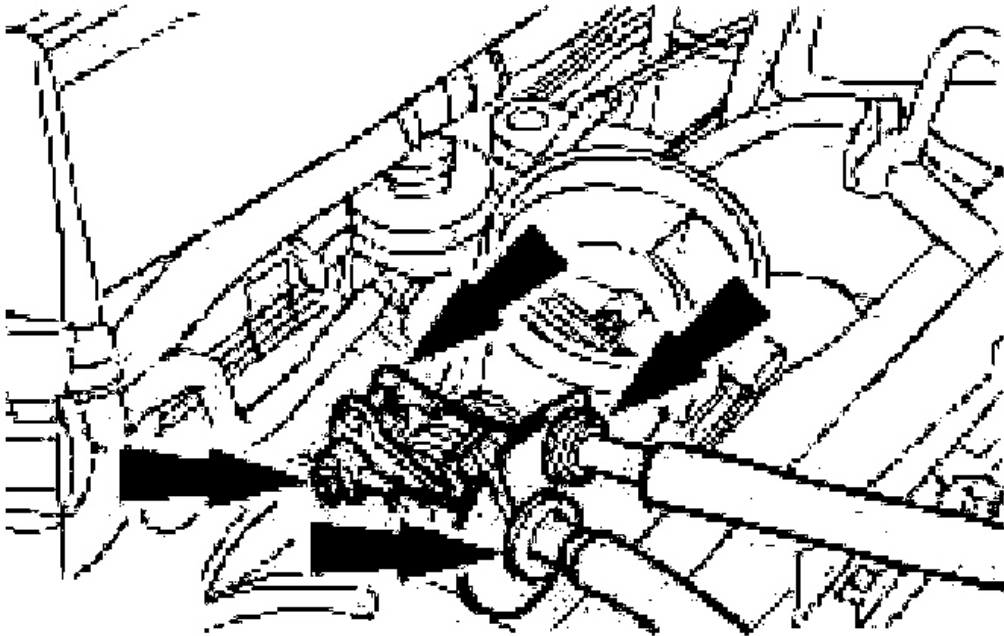
45. Attach the connectors of the EI coil and the radio interference filter.



G03431998

Fig. 393: Connecting Connectors Of EI Coil And Radio Interference Filter
Courtesy of FORD MOTOR CO.

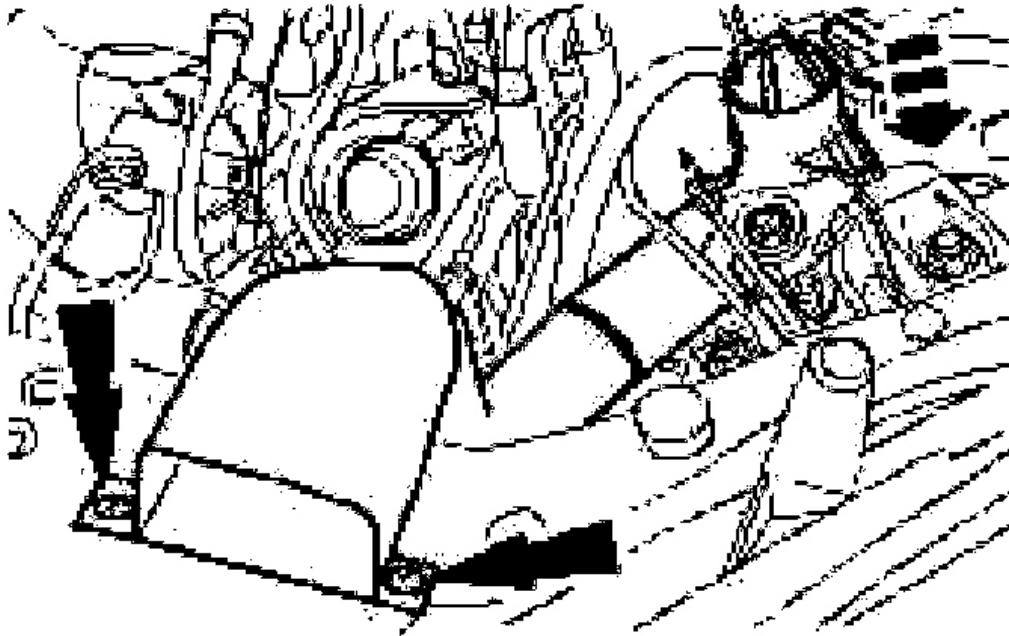
46. Attach the accelerator cable and the speed control cable (if equipped).



G03431999

Fig. 394: Installing Accelerator Cable And Speed Control Cable
Courtesy of FORD MOTOR CO.

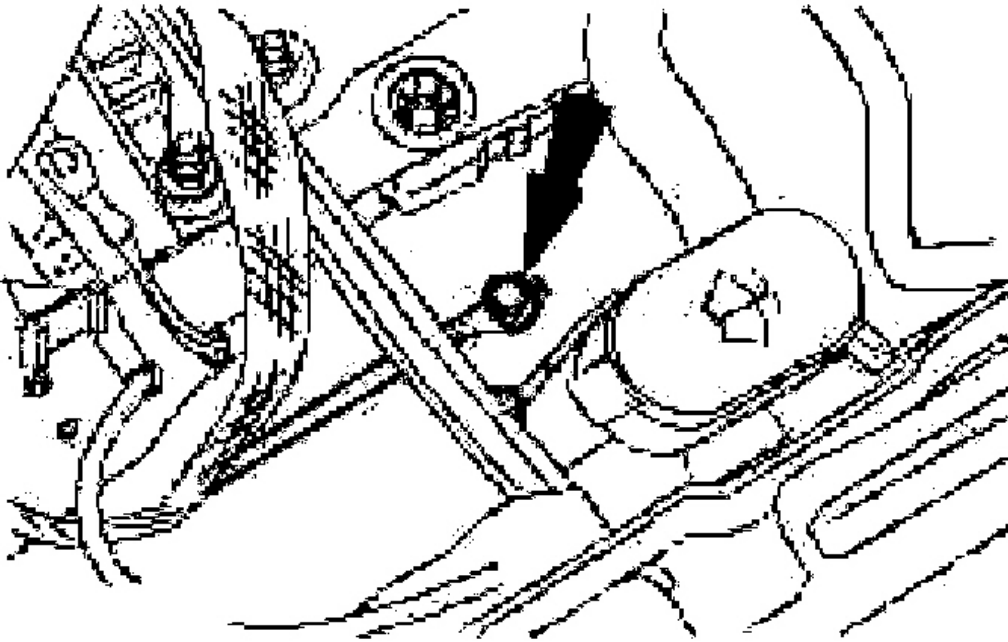
47. Install the air cleaner intake with resonator.



G03432000

Fig. 395: Installing Air Cleaner Intake With Resonator
Courtesy of FORD MOTOR CO.

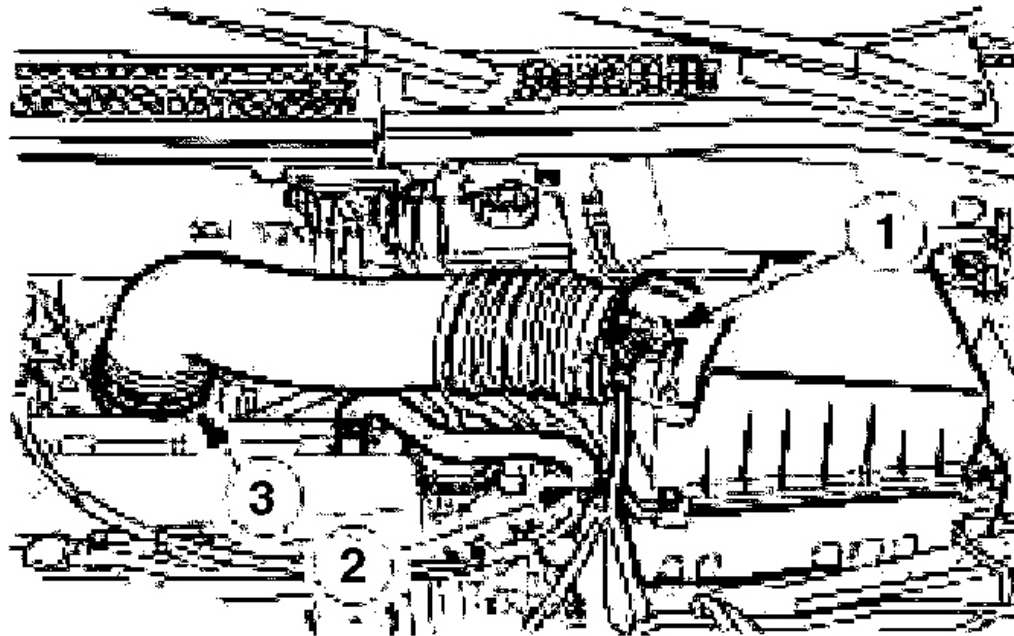
48. Attach the ground cable.



G03432001

Fig. 396: Installing Ground Cable
Courtesy of FORD MOTOR CO.

49. Install the air cleaner housing.
 - Press the air filter housing into the rubber bushings.
 - 2. Push on the mass air flow (MAF) sensor multiplug.
 - 3. Attach the PCV hose.
 - 4. Attach the intake hose.

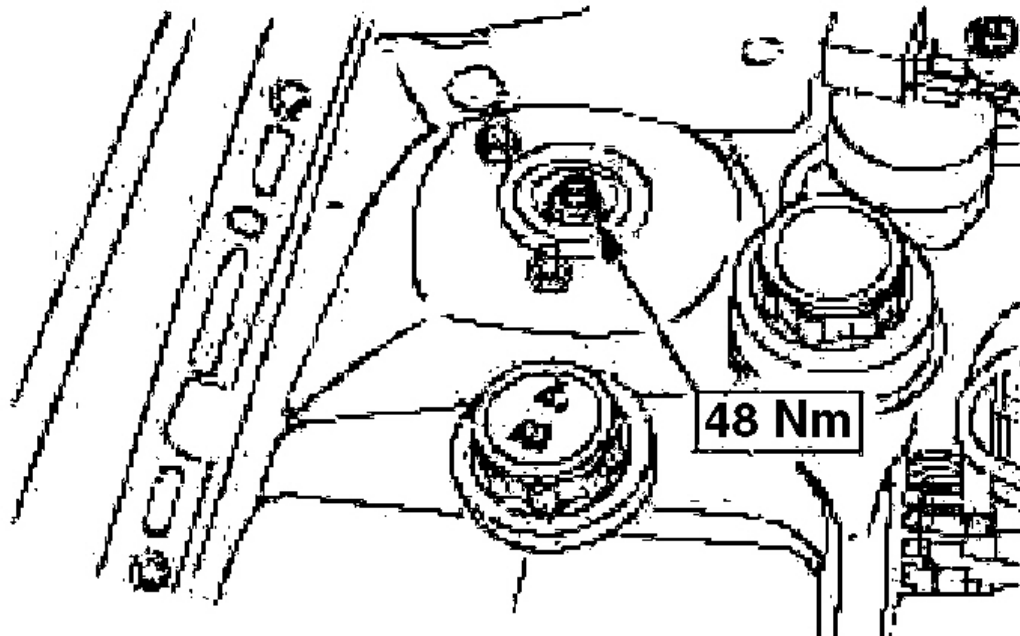


G03432002

Fig. 397: Installing Mass Air Flow (MAF) Sensor Multiplug
Courtesy of FORD MOTOR CO.

NOTE: Stop it from turning using an Allen key.

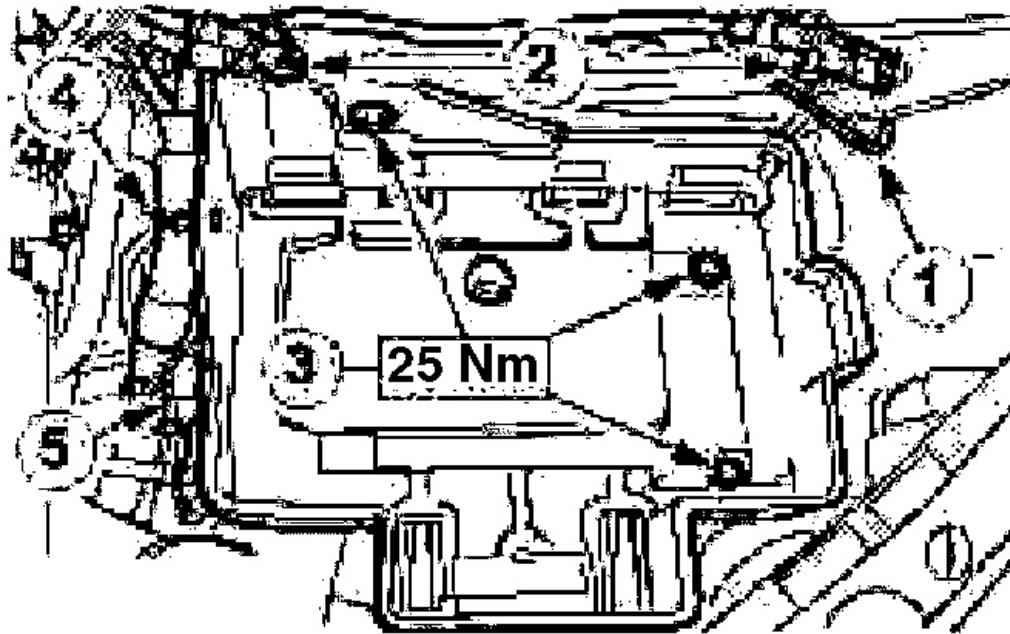
50. Tighten the suspension strut nuts on the right and left.
- Tighten by hand with a ring spanner.
 - Use a torque wrench to tighten to specification.



G03432003

Fig. 398: Tightening Suspension Strut Nuts
Courtesy of FORD MOTOR CO.

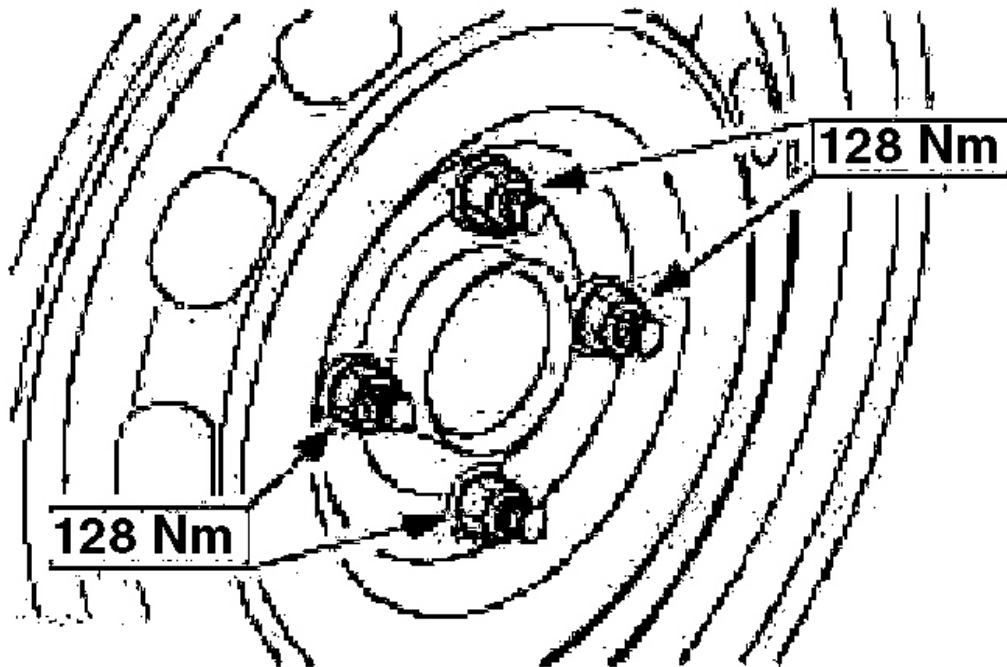
51. Install the battery tray.
 1. Attach the ground cable to the body.
 2. Attach the battery positive and negative cables.
 3. Install the bolts.
 4. Clip the wiring harness in place.
 5. Connect and clip in the plug.



G03432004

Fig. 399: Installing Battery Tray
Courtesy of FORD MOTOR CO.

52. Tighten the wheel nuts.



G03432005

Fig. 400: Tightening Wheel Nuts
Courtesy of FORD MOTOR CO.

53. Remove the special tool 308-437.

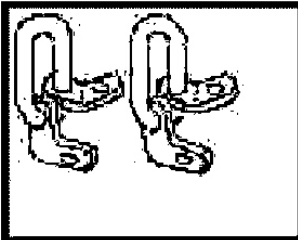
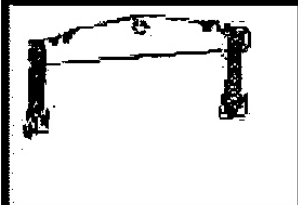
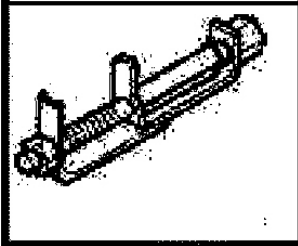
CAUTION: When the battery has been disconnected and reconnected, some abnormal drive symptoms may occur while the vehicle relearns its adaptive strategy. The vehicle may need to be driven 16 km (10 miles) or more to relearn the strategy.

54. Install and connect the battery.
55. Fill the cooling system. For additional information, refer to ENGINE COOLING .
56. Fill manual transmission fluid. For additional information, refer to **DRAINING & REFILLING** article .
57. Fill the engine with engine oil.

- 58. Check the routing of the vacuum hoses and wiring and secure them with cable ties.
- 59. Bleed the hydraulic clutch operating system. For additional information, refer to **BLEEDING HYDRAULIC SYSTEM** article .
- 60. Check the fluid levels after the road test and correct as necessary.
- 61. Check the engine and cooling system for leaks (visual inspection).

ENGINE - VEHICLES WITH: AUTOMATIC TRANSAXLE

Special Tool(s)

	Lifting Bracket, Engine 303-050 (T70P -6000)
	Spreader Bar 303-D089 (D93P -6001-A3)
	Remover/Installer, Cooling Hose Clamp 412-108 (T96P -18539-A)

G03432006

Fig. 401: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL SPECIFICATION

Cable ties	ESD-M1C220-A
High-temperature grease	

2002 Ford Focus LX	
2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus	

Automatic transmission fluid	XT-5-QM (MERCON(R) V)
Engine oil	WSS-M2C153-H
Coolant	ESD-M97B49 -A

Installation

All vehicles

- 1. General note.
 - If necessary, use Special Tool 412 - 108 to install coolant and ventilation hoses.
- 2. Preparatory operations
 - Using a retaining strap, secure the transmission on the assembly stand.
 - Hook the engine into the crane, bring into position at the transmission and support using wooden blocks.

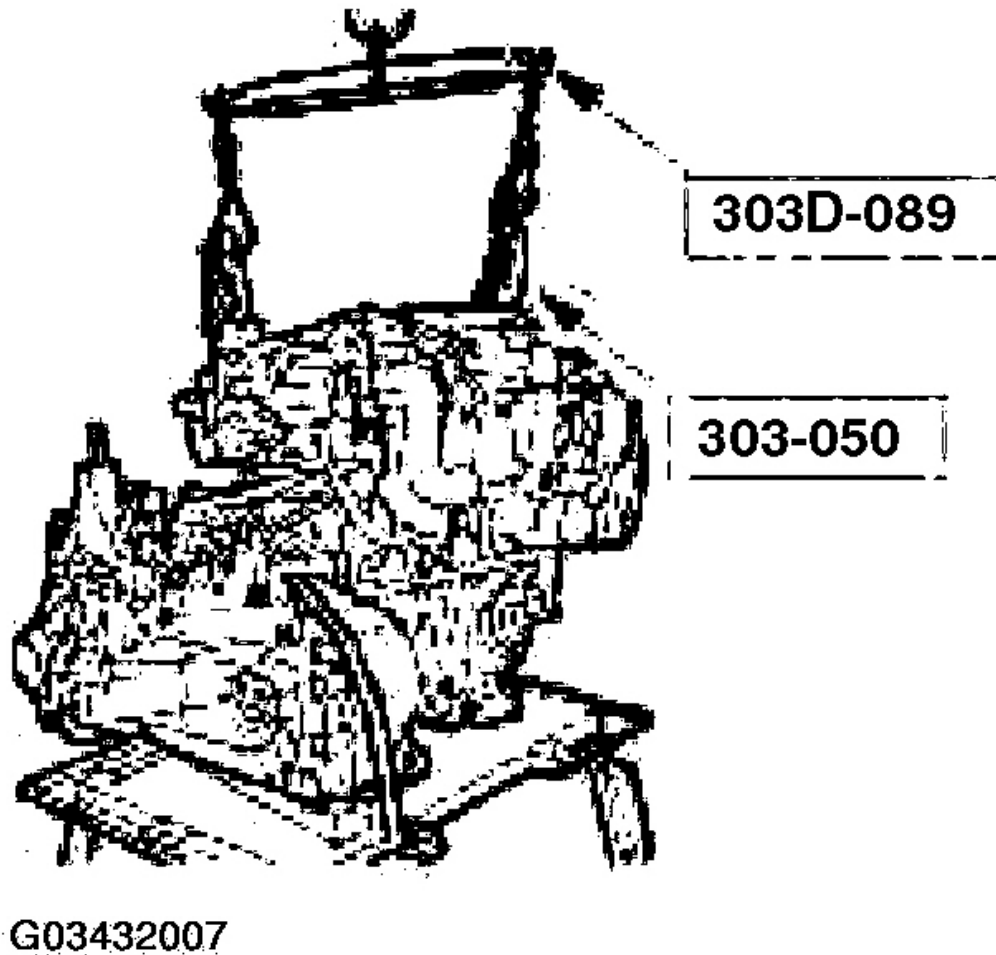
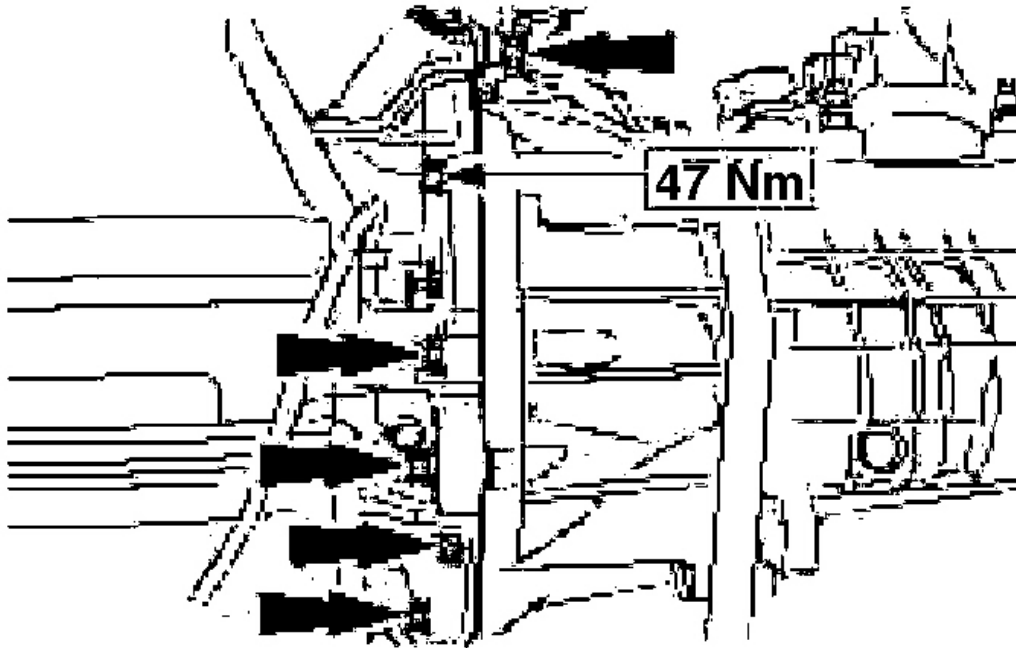


Fig. 402: Hooking Engine Into Crane, Bring Into Position At Transmission And Support Using Wooden Blocks
Courtesy of FORD MOTOR CO.

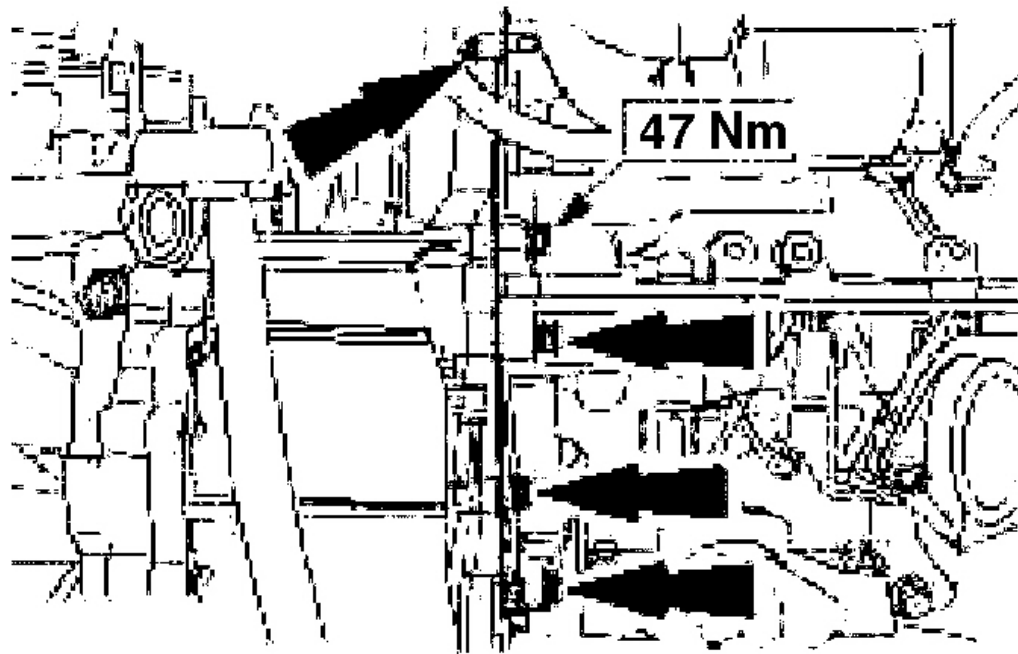
3. Install the flange bolts.



G03432008

Fig. 403: Installing Flange Bolts (1 Of 2)
Courtesy of FORD MOTOR CO.

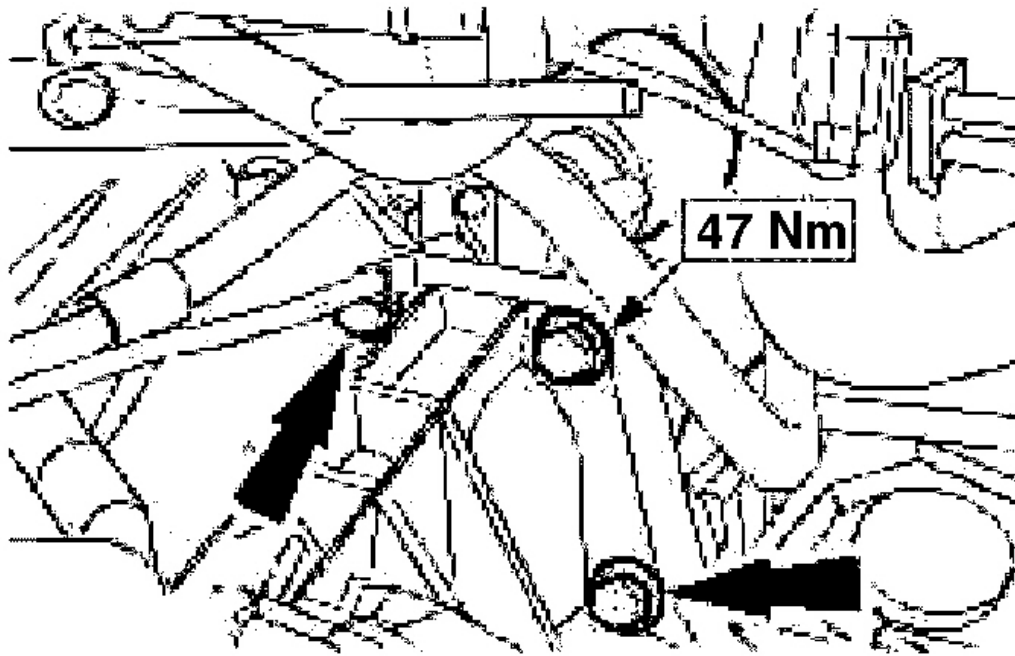
4. Install the flange bolts.
 - Detach the crane from the engine.



G03432009

Fig. 404: Installing Flange Bolts (2 Of 2)
Courtesy of FORD MOTOR CO.

5. Install the starter motor and ground cable.



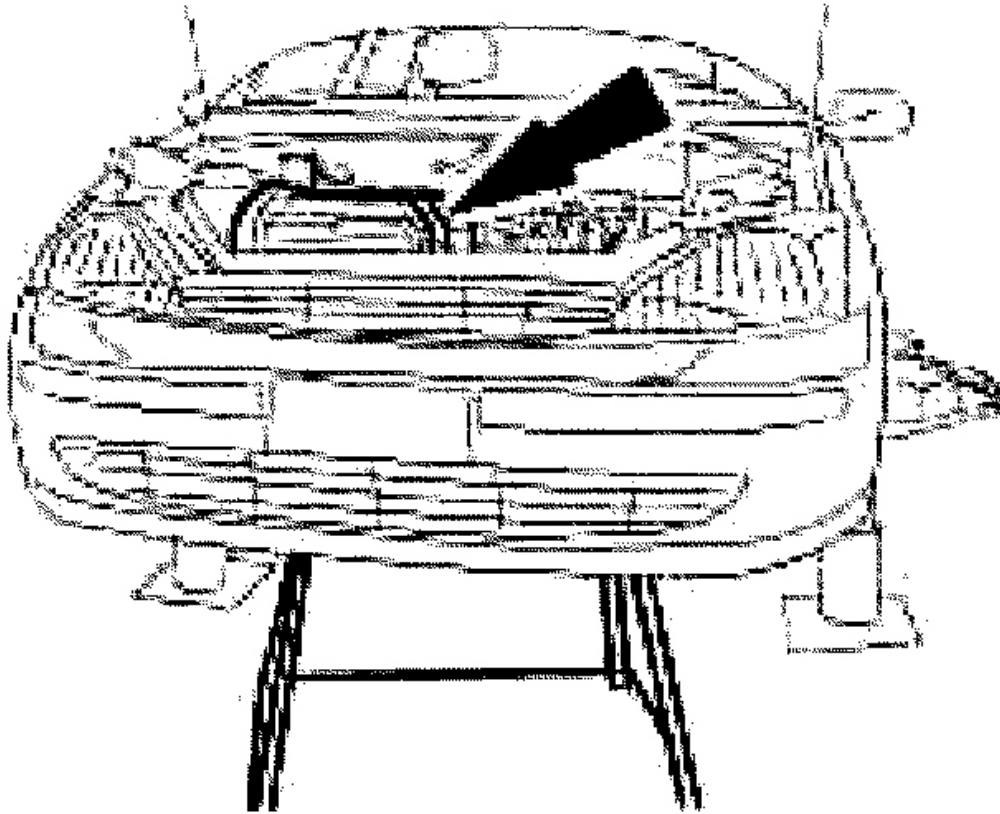
G03432010

Fig. 405: Installing Starter Motor And Ground Cable
Courtesy of FORD MOTOR CO.

6. Raise and support the vehicle.
7. Position the engine and transmission assembly on the assembly stand below the vehicle.
 - Carefully lower the vehicle.

2002 Ford Focus LX

2002 ENGINE Engine - 2.0L Zetec-E (Zetec) - Focus

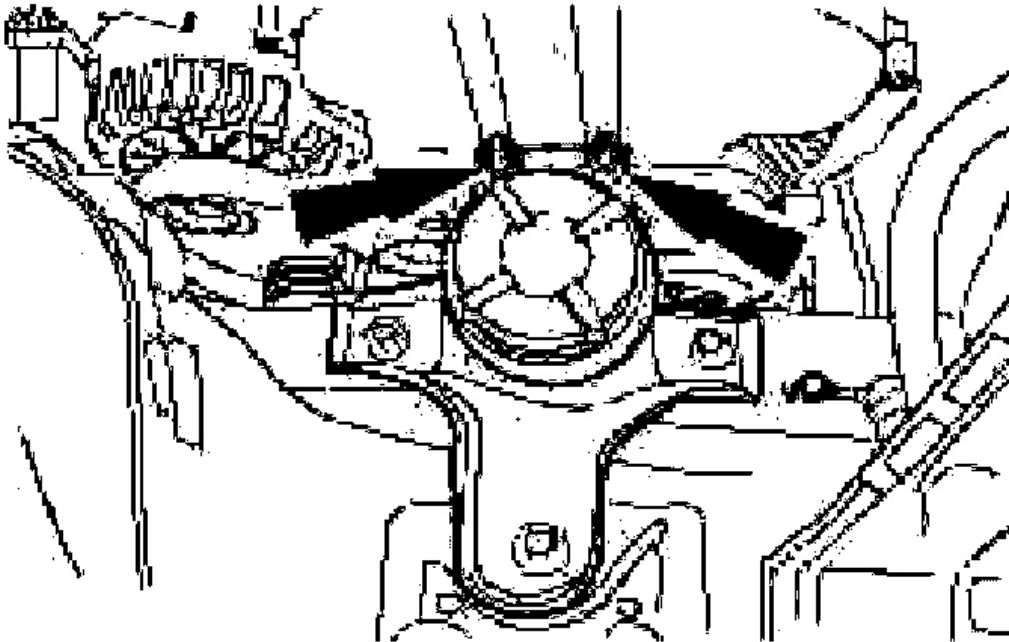


G03432011

Fig. 406: Positioning Engine And Transmission Assembly On Assembly Stand Below Vehicle

Courtesy of FORD MOTOR CO.

NOTE: Do not fully tighten the bolts and nuts at this stage.

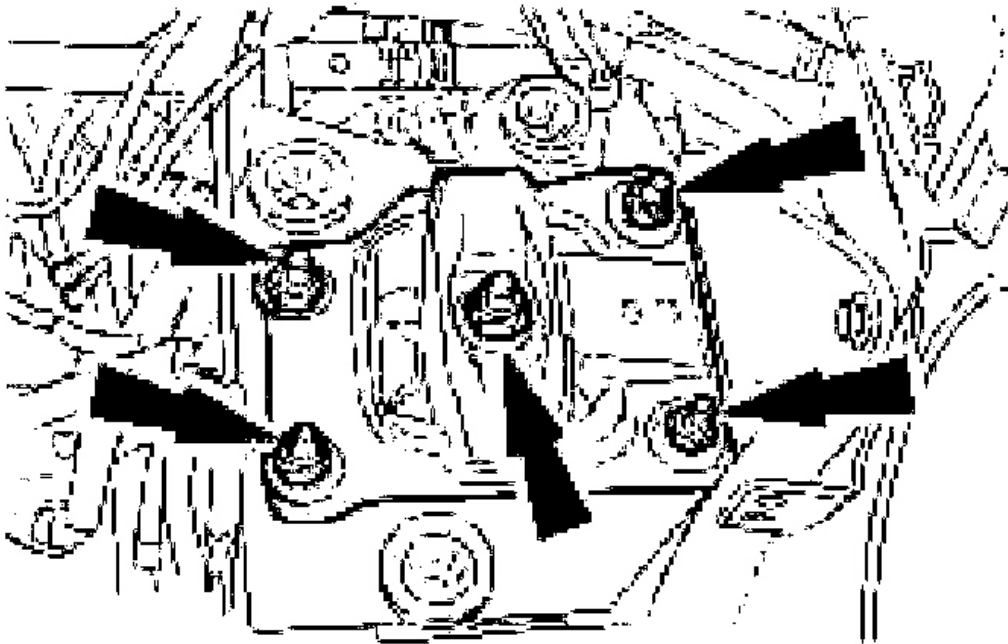


G03432012

Fig. 407: Installing Engine Front Mounting
Courtesy of FORD MOTOR CO.

8. Install the engine front mounting.

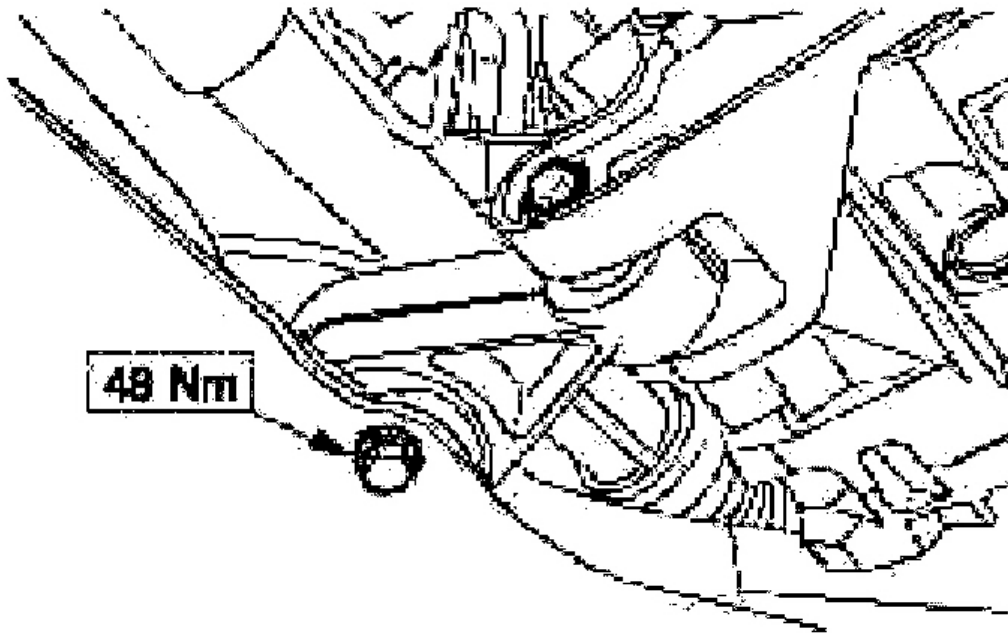
NOTE: Do not fully tighten the nuts at this stage.



G03432013

Fig. 408: Installing Engine Rear Mounting
Courtesy of FORD MOTOR CO.

9. Install the engine rear mounting.
10. Remove the retaining strap from the transmission.
11. Raise and support the vehicle.
 - Remove the assembly stand.
12. Install the engine roll restrictor.

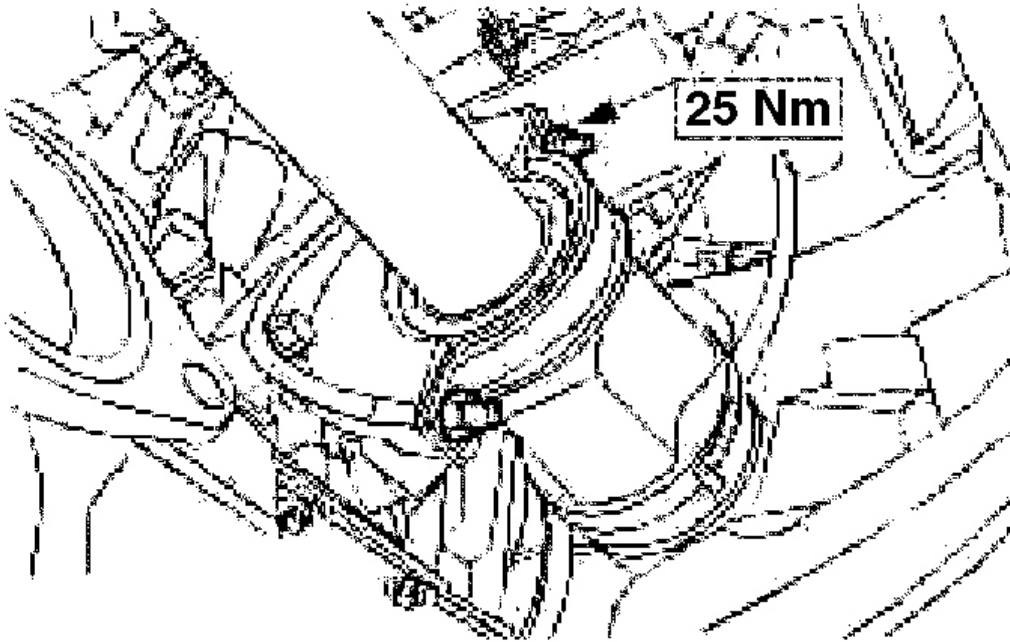


G03432014

Fig. 409: Installing Engine Roll Restrictor
Courtesy of FORD MOTOR CO.

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

NOTE: Use new bolts and new center bearing caps.



G03432015

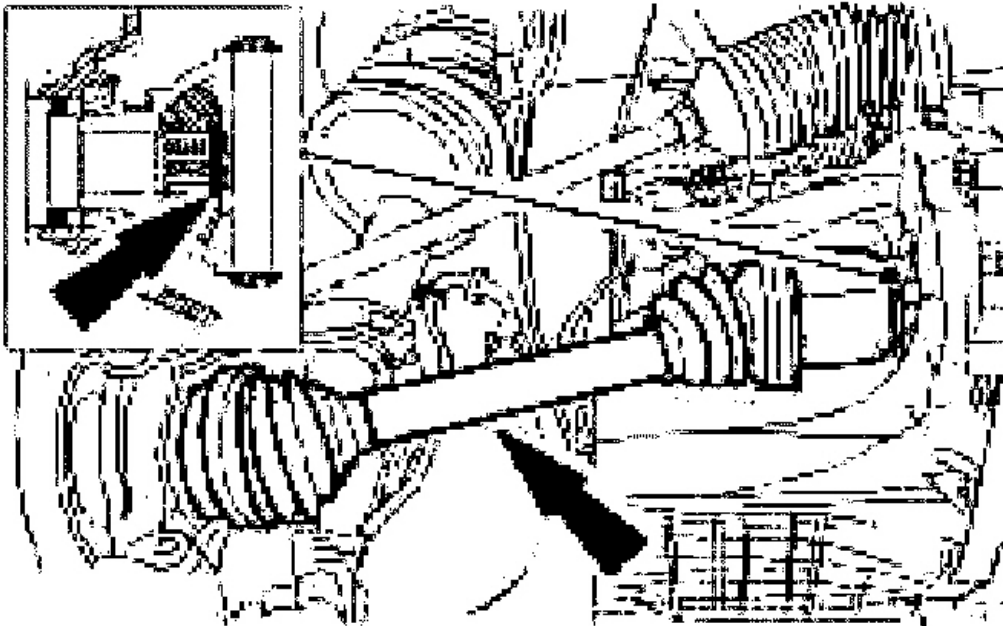
Fig. 410: Installing Right-Hand Input Shaft With Intermediate Shaft
Courtesy of FORD MOTOR CO.

13. Attach the right-hand input shaft with intermediate shaft.

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

NOTE: Use a new snap ring.

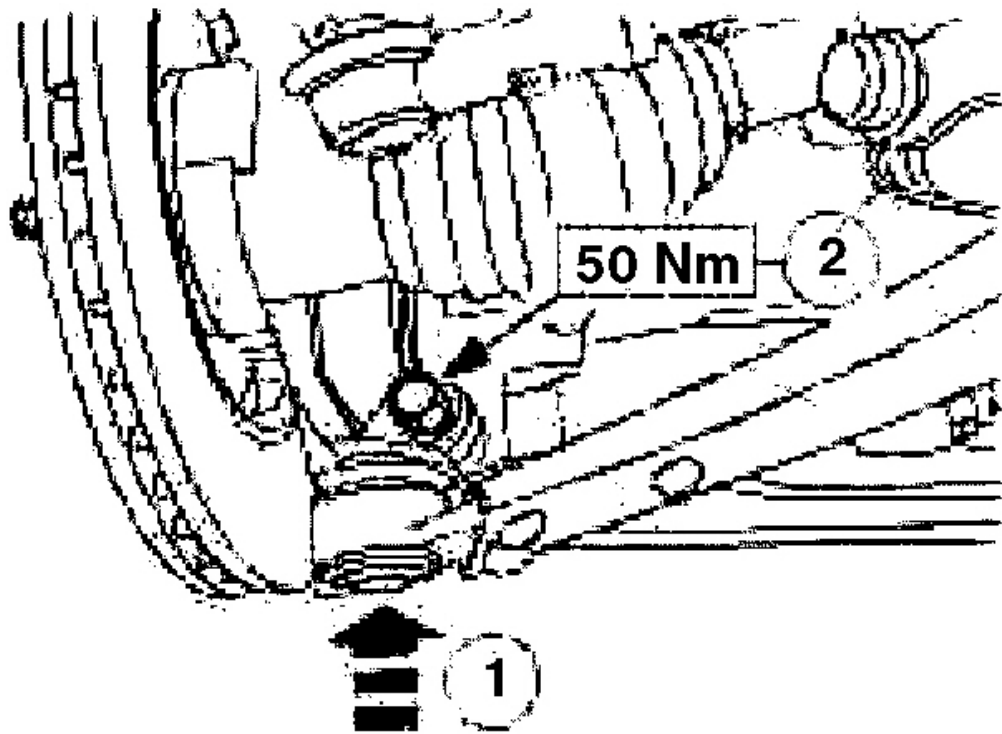
NOTE: Click the snap ring into place.



G03432016

Fig. 411: Installing Left-Hand Drive Shaft
Courtesy of FORD MOTOR CO.

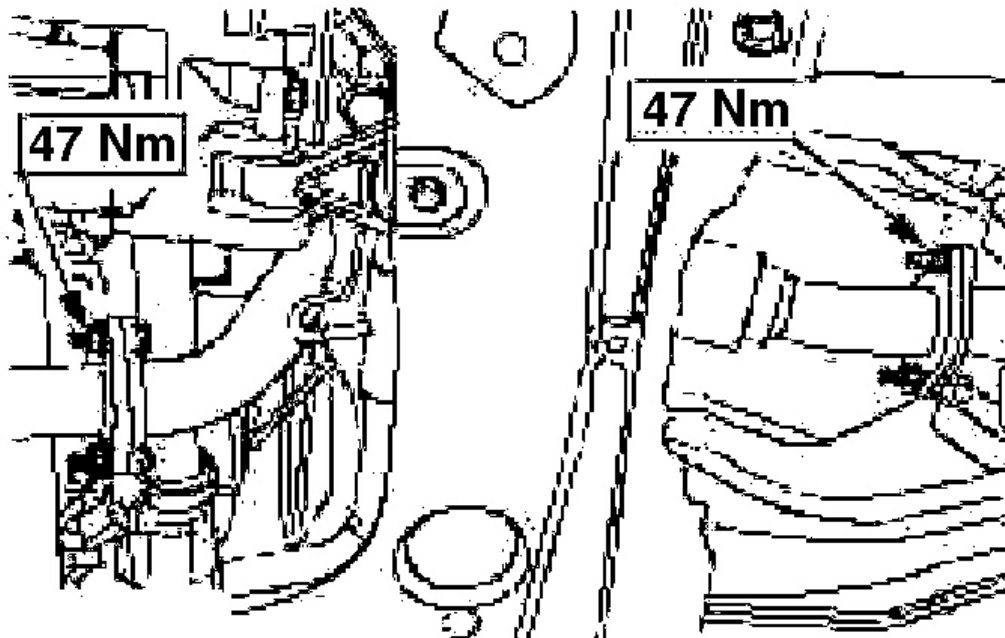
14. Attach the left-hand drive shaft.
15. Attach the both suspension lower arms (left-hand side shown).
 1. Attach the lower arm ball joint.
 2. Install the bolt.



G03432017

Fig. 412: Installing Suspension Lower Arms
Courtesy of FORD MOTOR CO.

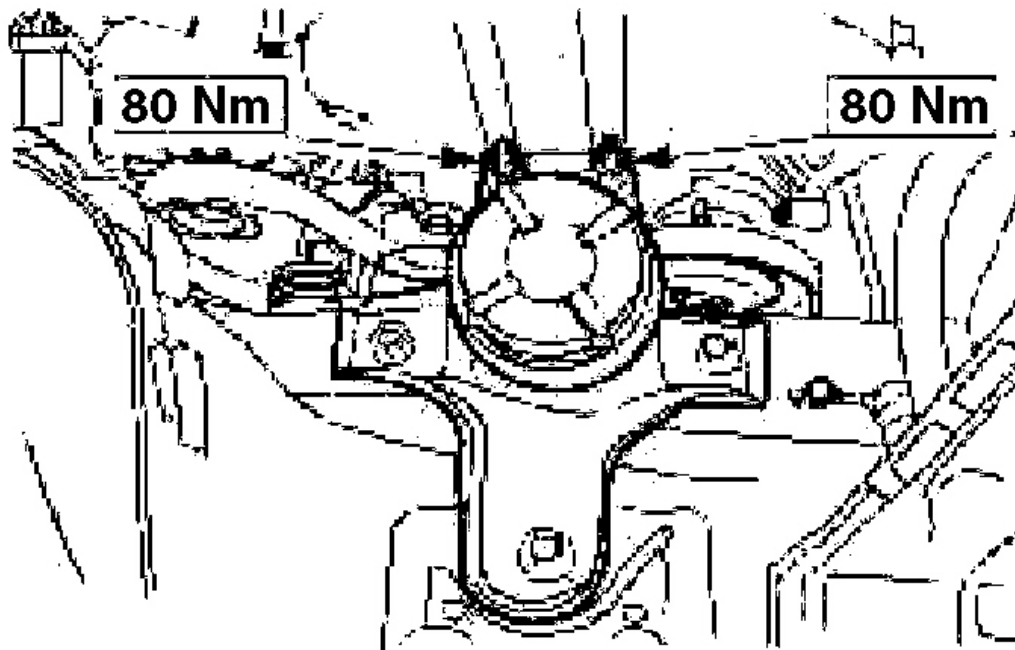
16. Install the flexible exhaust pipe.



G03432018

Fig. 413: Installing Flexible Exhaust Pipe
Courtesy of FORD MOTOR CO.

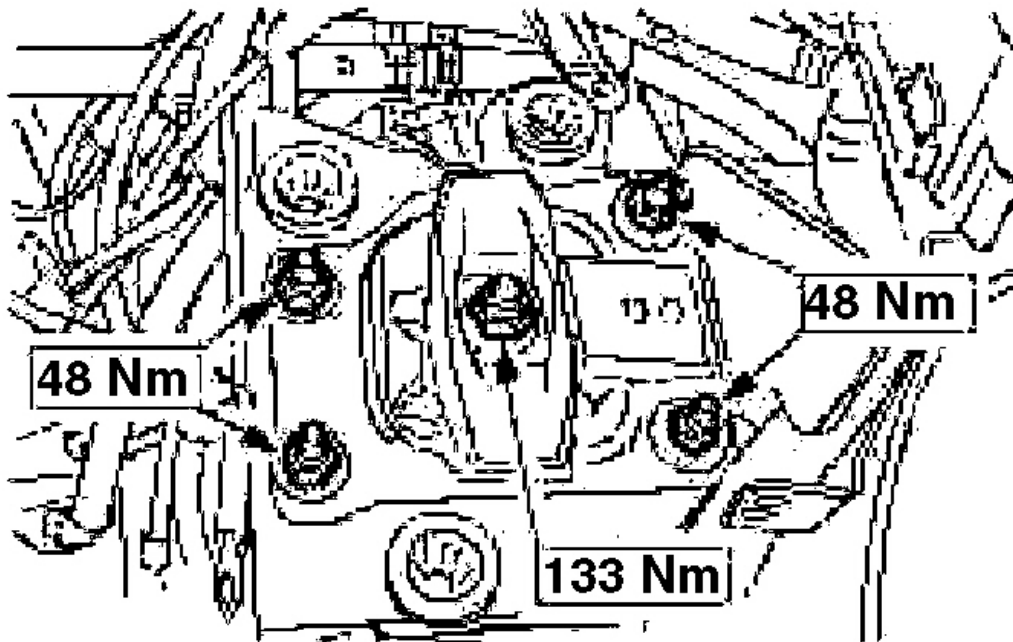
17. Lower the vehicle.
18. Tighten the engine rear mounting nuts/bolts.



G03432019

Fig. 414: Tightening Engine Rear Mounting Nuts
Courtesy of FORD MOTOR CO.

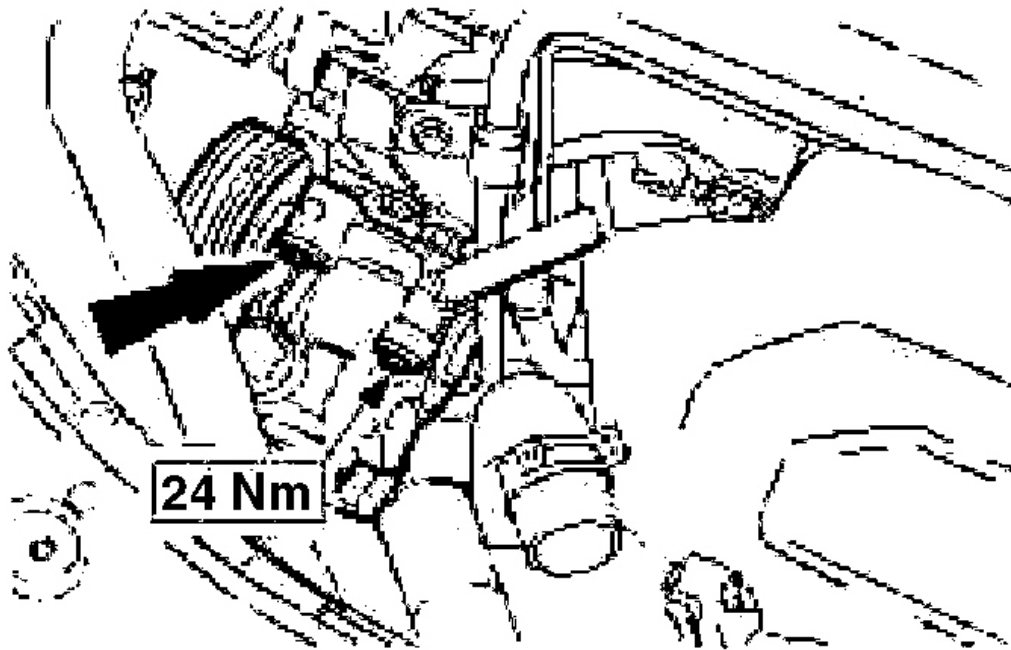
19. Tighten the engine front mounting nuts.



G03432020

Fig. 415: Tightening Engine Front Mounting Nuts
Courtesy of FORD MOTOR CO.

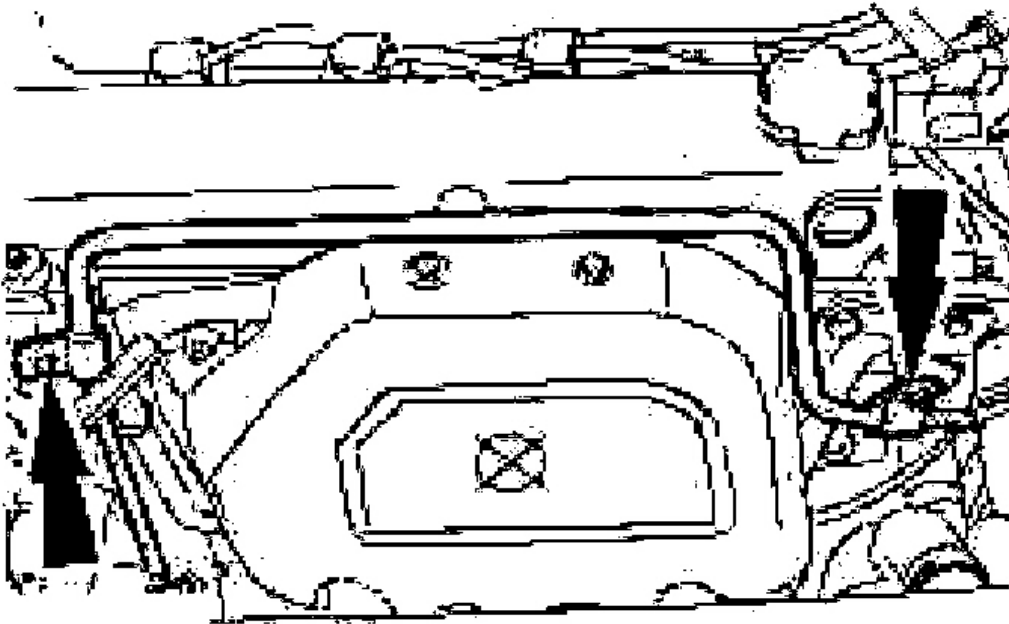
20. Attach the power steering pump and install the upper bolts.



G03432021

Fig. 416: Installing Power Steering Pump
Courtesy of FORD MOTOR CO.

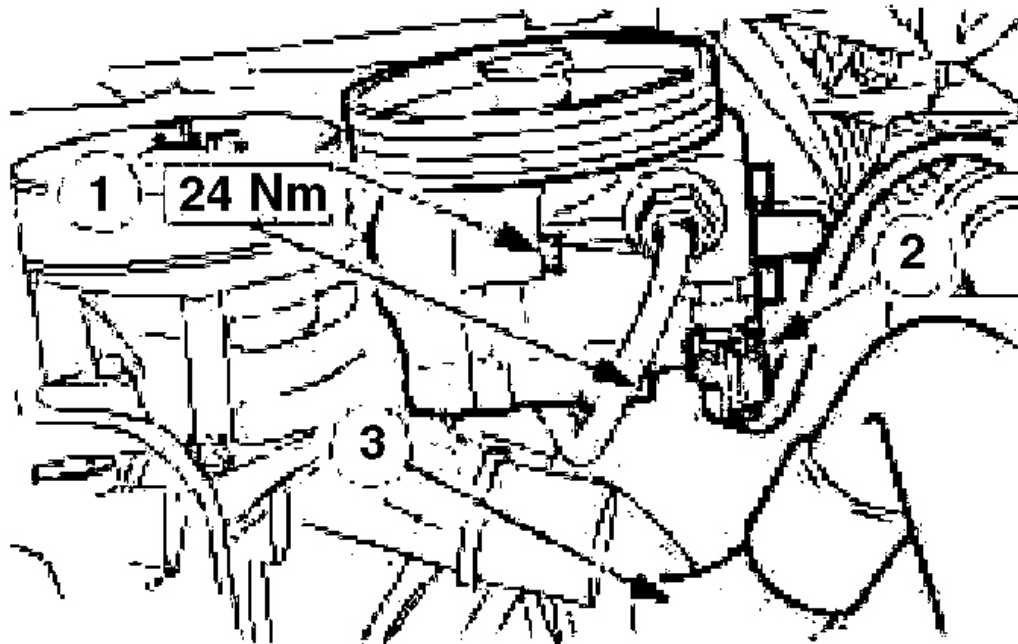
21. Attach the bracket to power steering high-pressure pipe.



G03432022

Fig. 417: Installing Bracket To Power Steering High-Pressure Pipe
Courtesy of FORD MOTOR CO.

22. Raise and support the vehicle.
23. Attach the power steering pump lower bolts, power steering pressure switch electrical connector and the radiator lower coolant hose.
 1. Power steering pump lower bolts.
 2. Power steering pump pressure switch electrical connector.
 3. Radiator lower coolant hose.

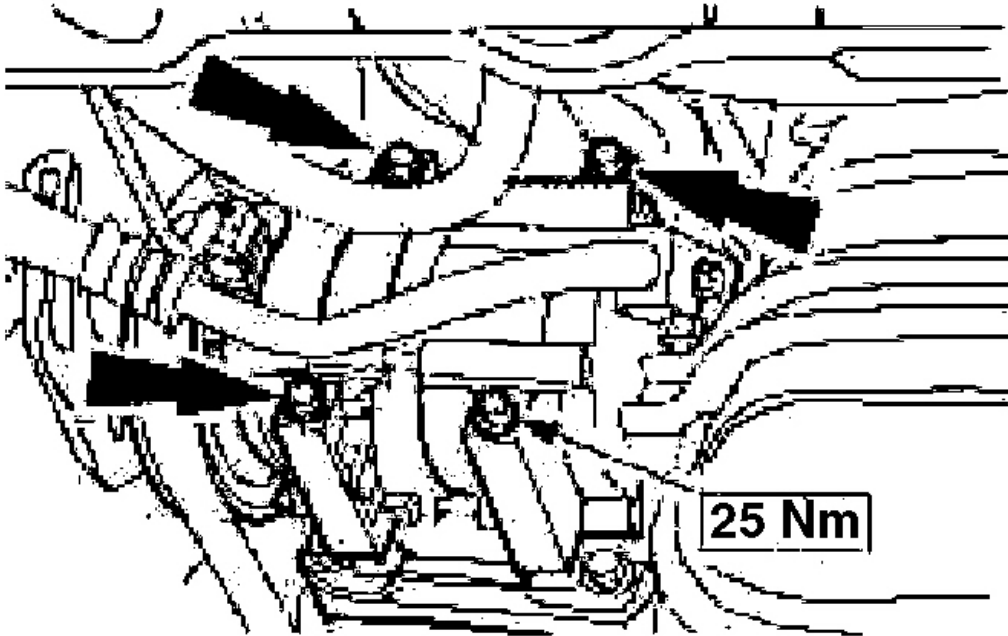


G03432023

Fig. 418: Installing Power Steering Pump Lower Bolts, Power Steering Pressure Switch Electrical Connector And Radiator Lower Coolant Hose
Courtesy of FORD MOTOR CO.

Vehicles with air conditioning

24. Attach the air conditioning compressor.

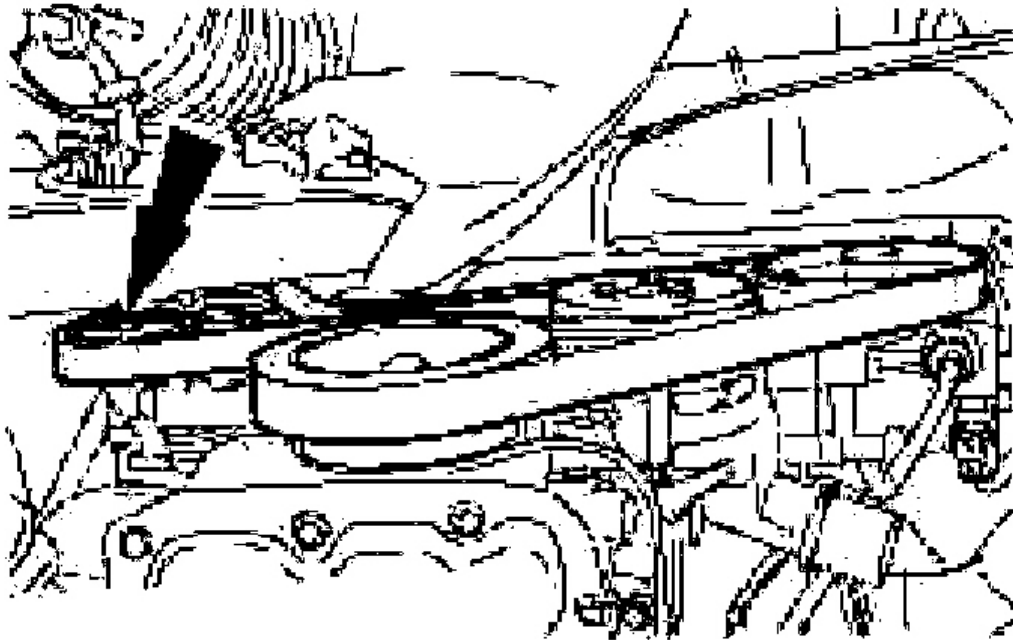


G03432024

Fig. 419: Installing Air Conditioning Compressor
Courtesy of FORD MOTOR CO.

All Vehicles

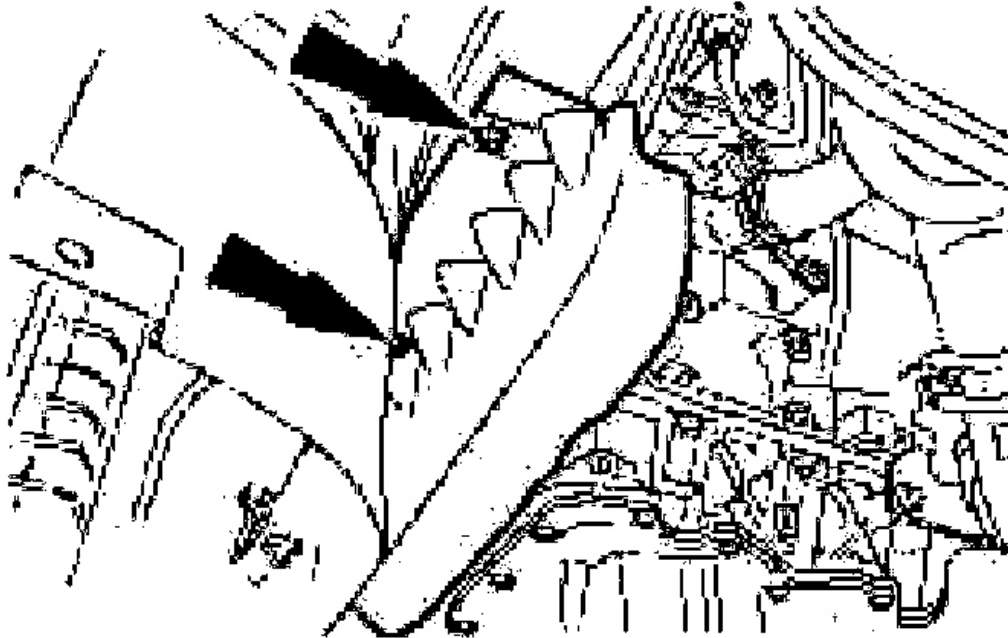
25. Install and tension the drive belt and connect the power steering pressure switch (PSPS).
 - Turn the belt tensioner clockwise.



G03432025

Fig. 420: Installing Drive Belt And Power Steering Pressure Switch (PSPS)
Courtesy of FORD MOTOR CO.

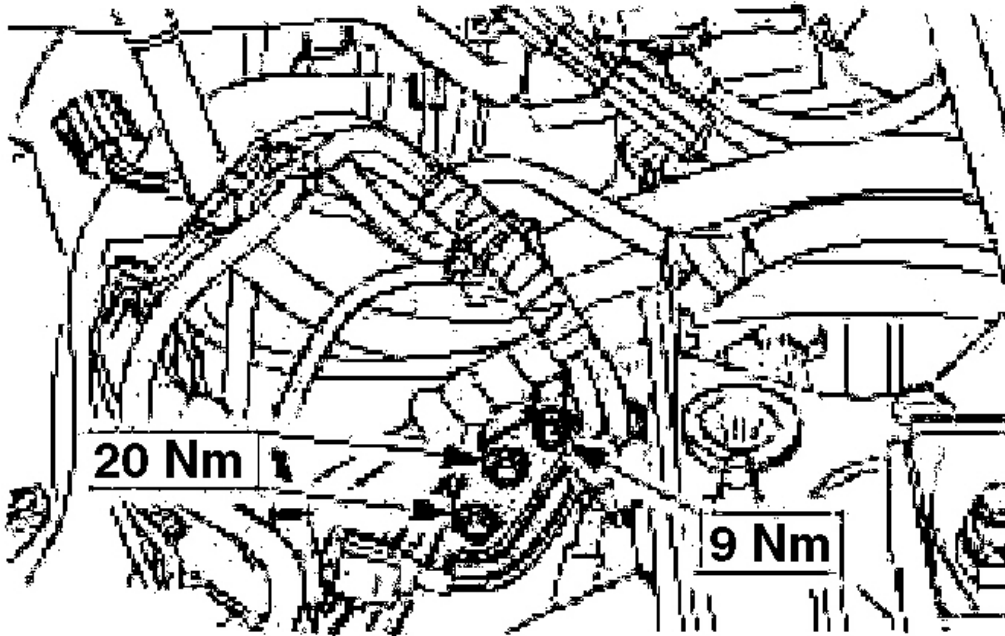
26. Install the drive belt cover.



G03432026

Fig. 421: Installing Drive Belt Cover
Courtesy of FORD MOTOR CO.

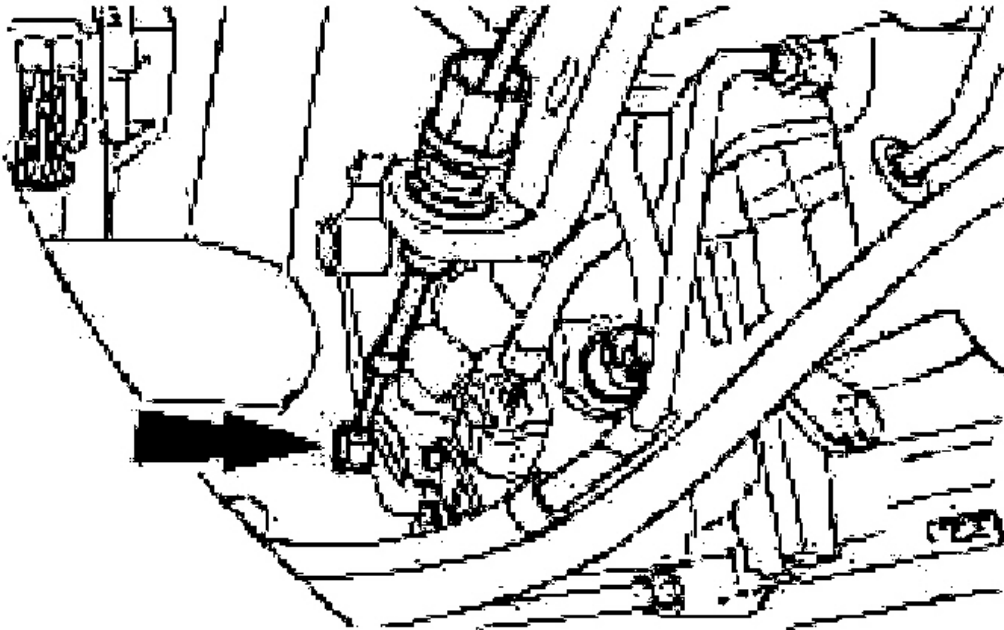
27. Install both front wheels and tires.
28. Install the oil filler pipe/selector cable bracket.



G03432027

Fig. 422: Installing Oil Filler Pipe/Selector Cable Bracket
Courtesy of FORD MOTOR CO.

29. Connect the selector lever cable to the automatic transaxle selector lever assembly.

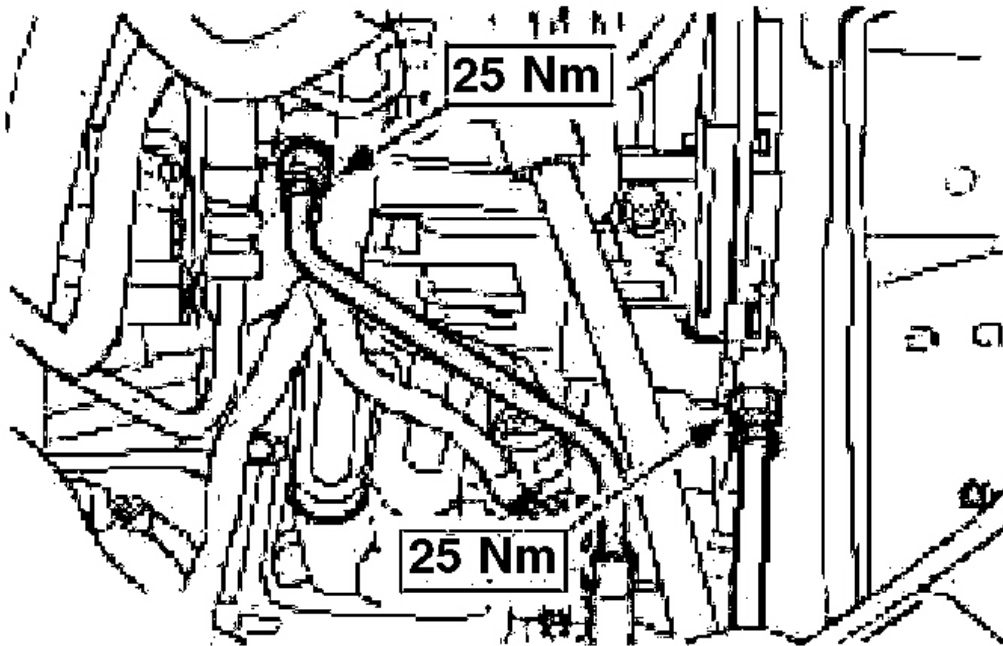


G03432028

Fig. 423: Connecting Selector Lever Cable To Automatic Transaxle Selector Lever Assembly

Courtesy of FORD MOTOR CO.

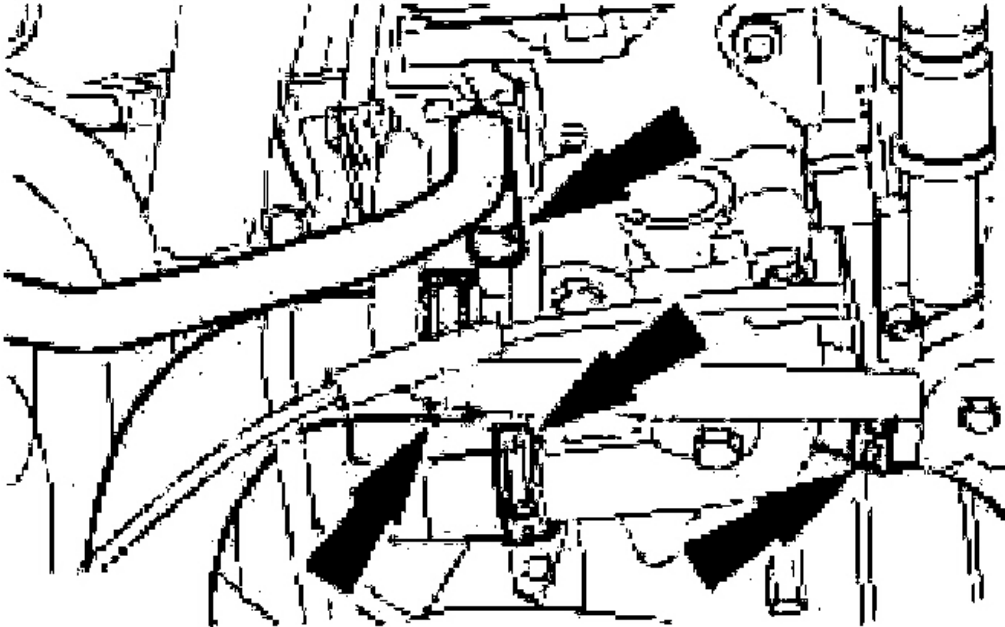
30. Attach the oil cooler pipes to the transaxle.



G03432029

Fig. 424: Installing Oil Cooler Pipes To Transaxle
Courtesy of FORD MOTOR CO.

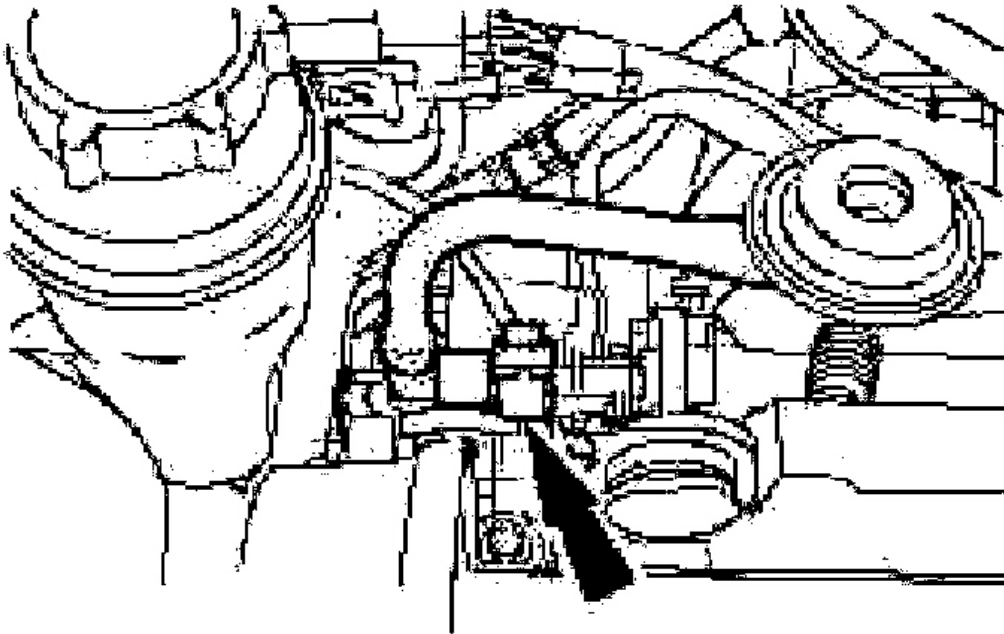
31. Attach the coolant hoses (continued).



G03432030

Fig. 425: Installing Coolant Hoses
Courtesy of FORD MOTOR CO.

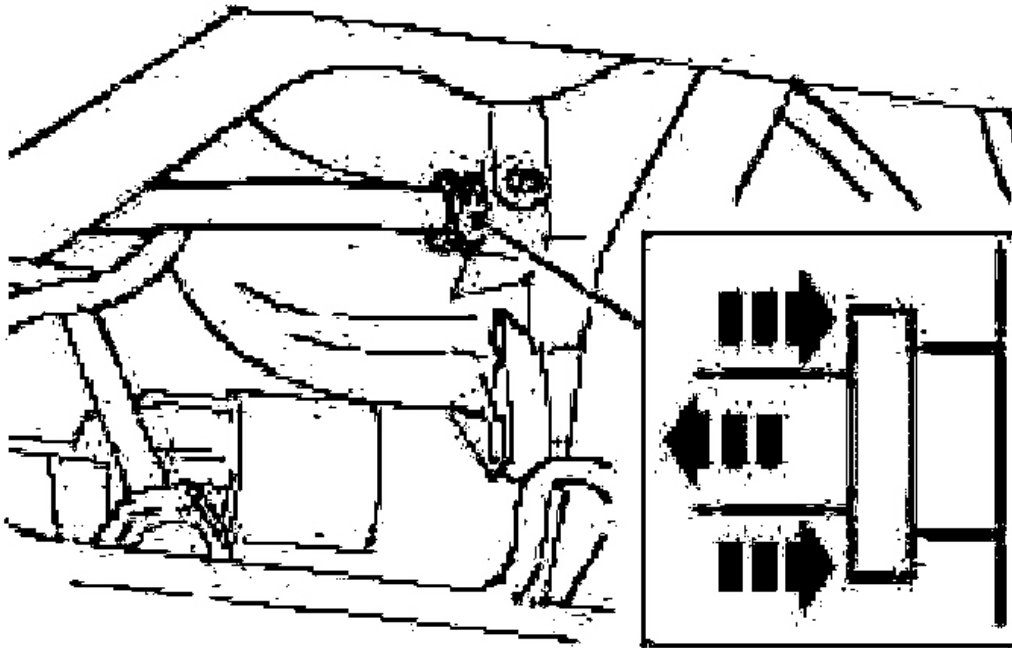
32. Attach the fuel pipes.



G03432031

Fig. 426: Installing Fuel Pipes
Courtesy of FORD MOTOR CO.

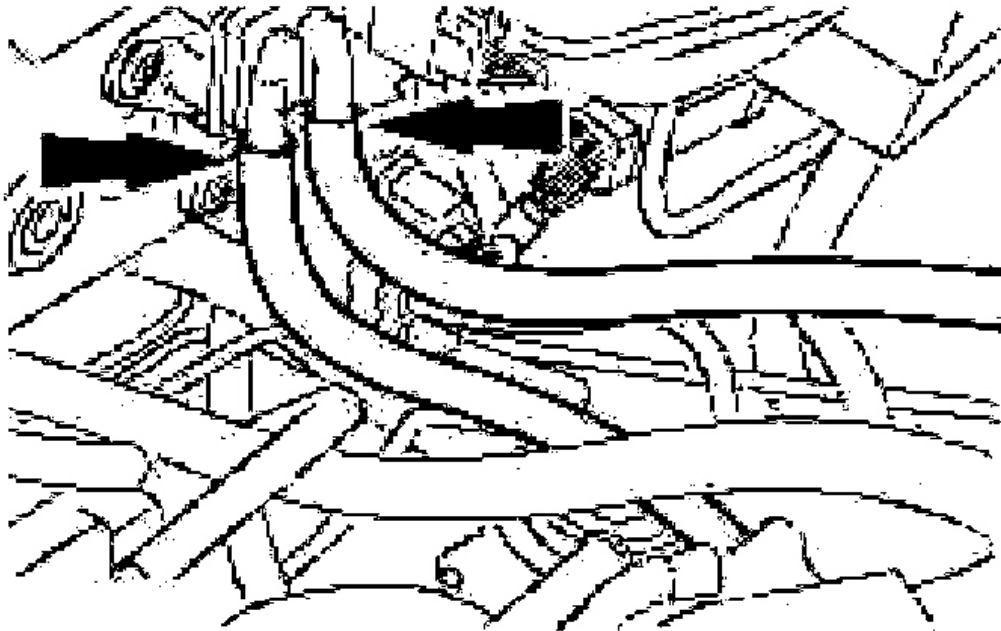
33. Attach the brake servo vacuum hose.



G03432032

Fig. 427: Installing Brake Servo Vacuum Hose
Courtesy of FORD MOTOR CO.

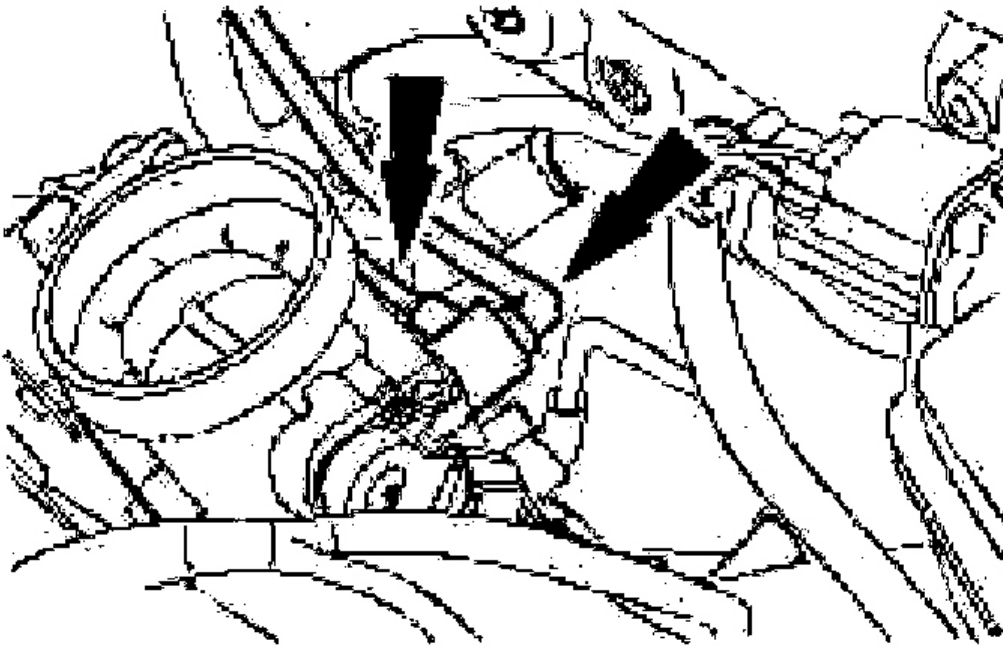
34. Attach the vacuum hoses.



G03432033

Fig. 428: Installing Vacuum Hoses (1 Of 2)
Courtesy of FORD MOTOR CO.

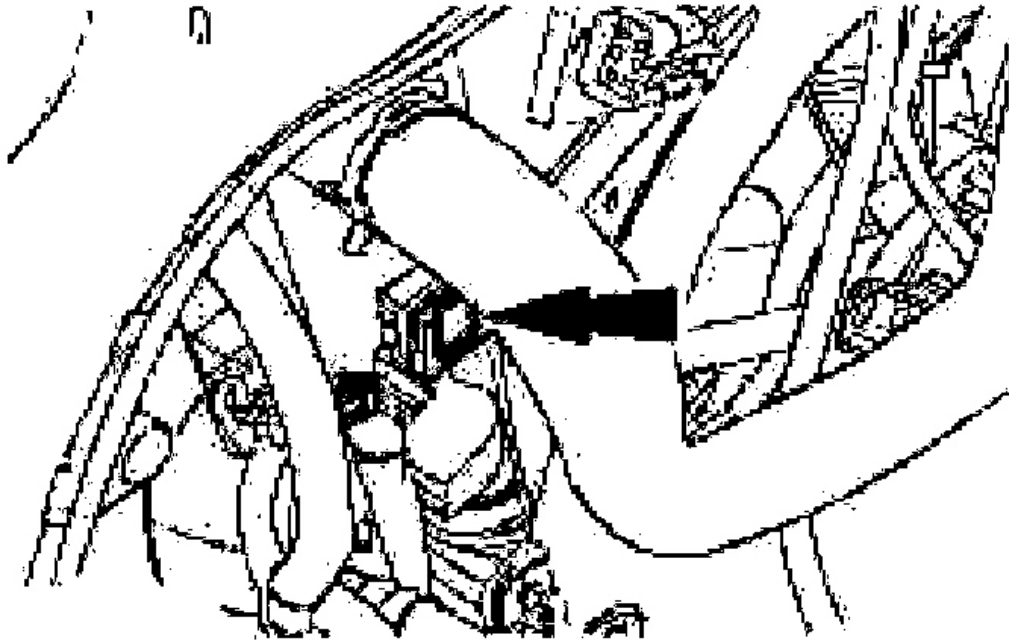
35. Attach the vacuum hoses.



G03432034

Fig. 429: Installing Vacuum Hoses (2 Of 2)
Courtesy of FORD MOTOR CO.

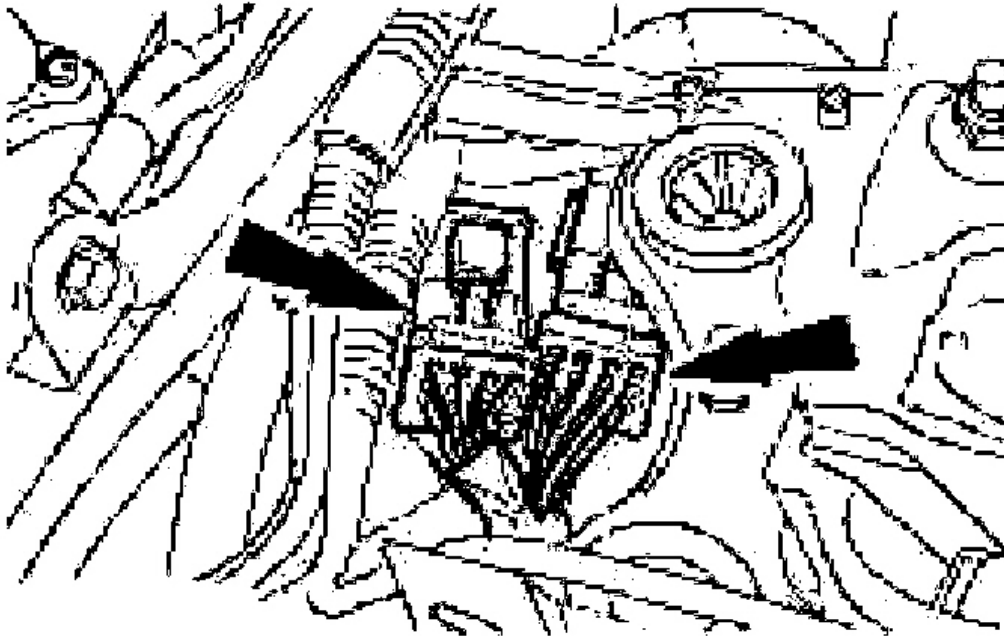
36. Install the air deflector and the radiator fan.
 - Hook the air deflector in place.
 - Install the clips on both sides (left side shown).



G03432035

Fig. 430: Installing Air Deflector
Courtesy of FORD MOTOR CO.

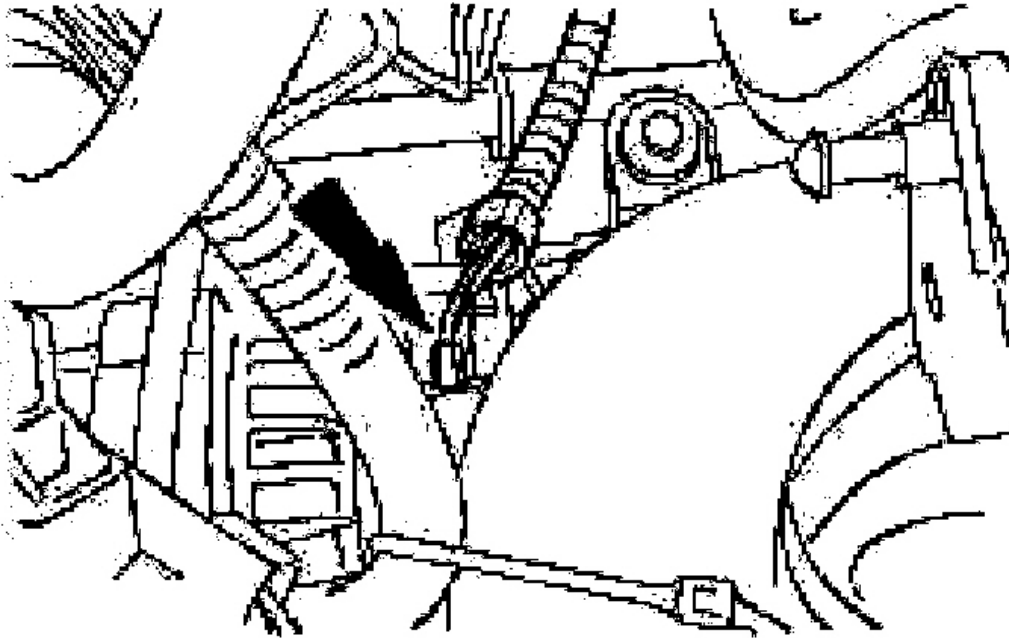
37. Connect the harness connectors.



G03432036

Fig. 431: Connecting Harness Connectors
Courtesy of FORD MOTOR CO.

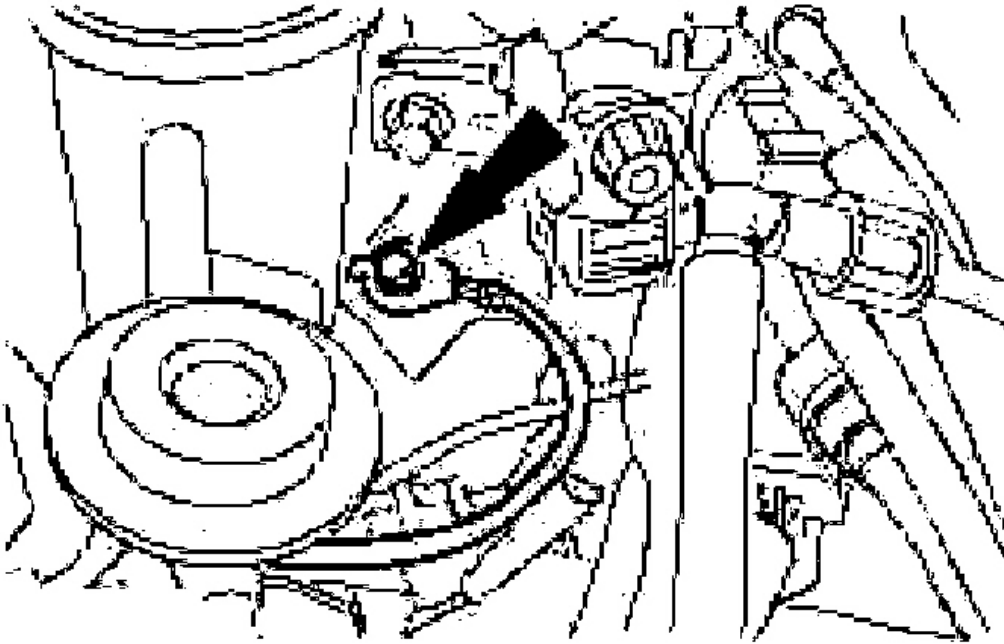
38. Attach the generator connector.



G03432037

Fig. 432: Installing Generator Connector
Courtesy of FORD MOTOR CO.

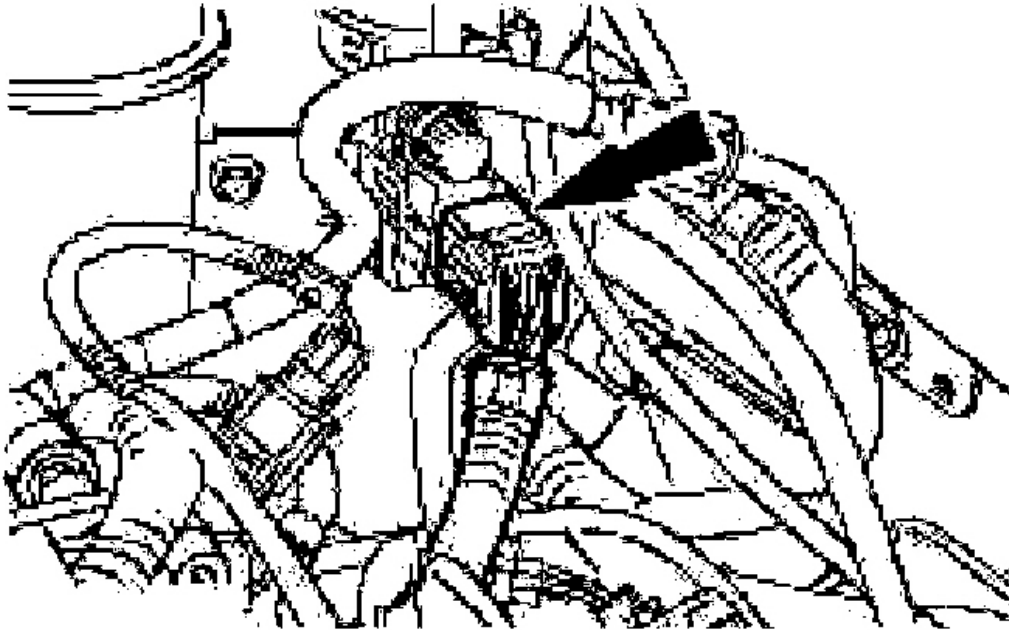
39. Install the ground cable.



G03432038

Fig. 433: Installing Ground Cable
Courtesy of FORD MOTOR CO.

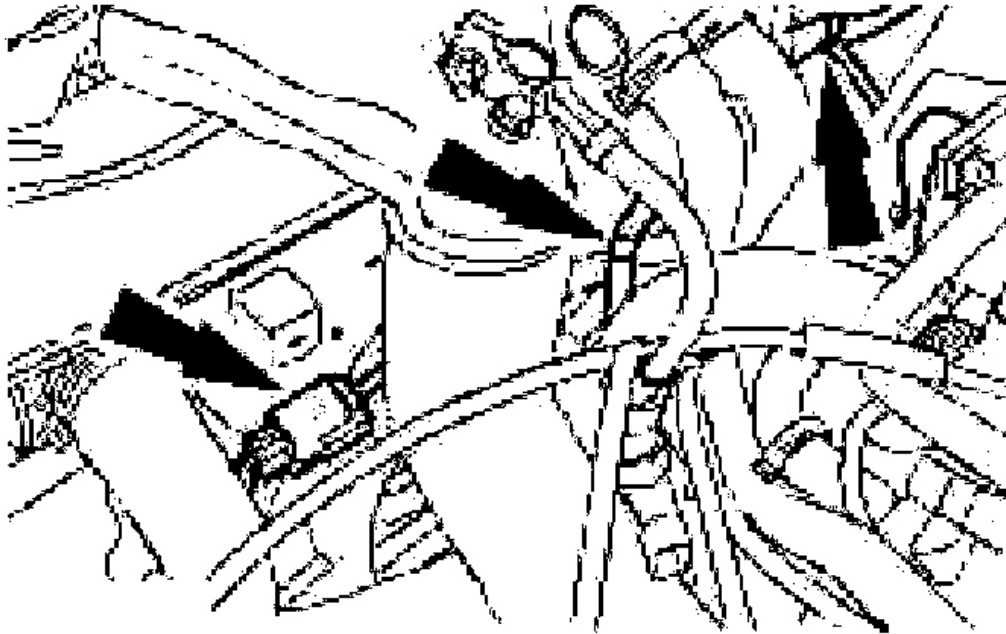
40. Connect the fuel injector cable ties.



G03432039

Fig. 434: Connecting Fuel Injector Cable Ties
Courtesy of FORD MOTOR CO.

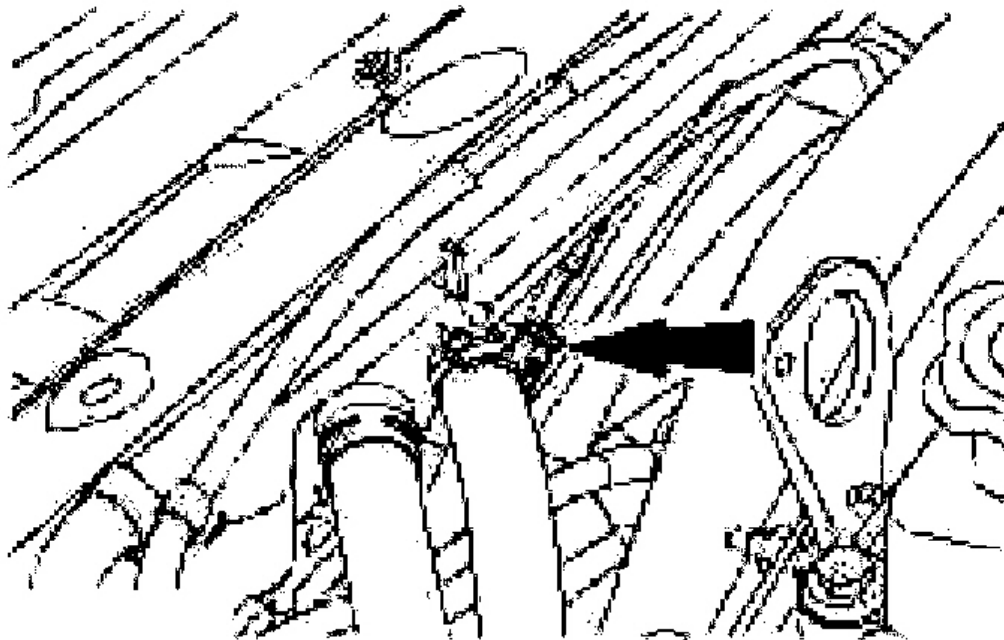
41. Connect the radiator fan connector.
 - Install the cable ties.



G03432040

Fig. 435: Connecting Radiator Fan Connector
Courtesy of FORD MOTOR CO.

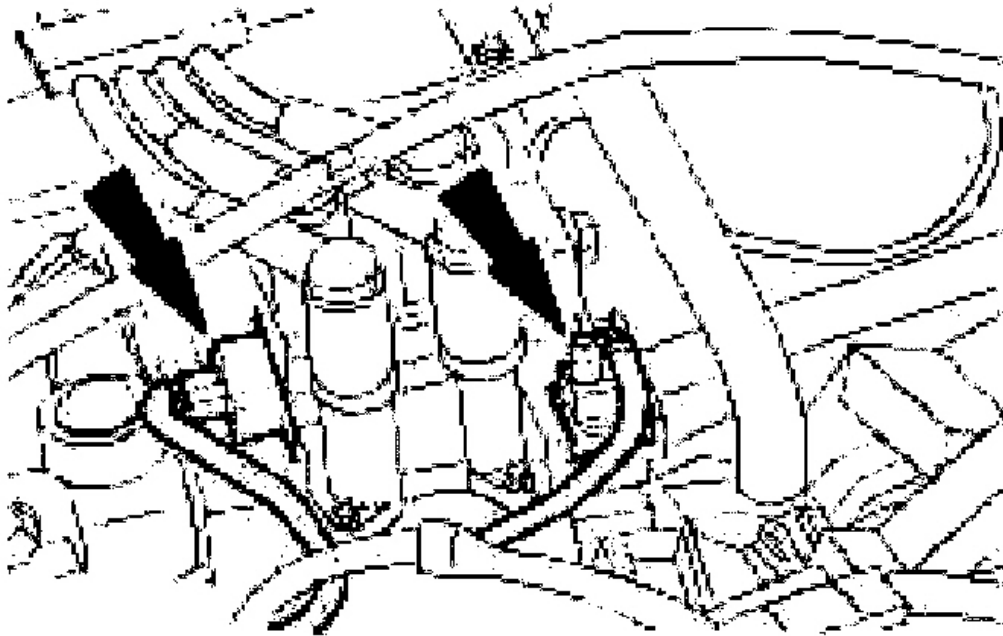
42. Attach the heated oxygen sensor (HO2S) connector.



G03432041

Fig. 436: Installing Heated Oxygen Sensor (HO2S) Connector
Courtesy of FORD MOTOR CO.

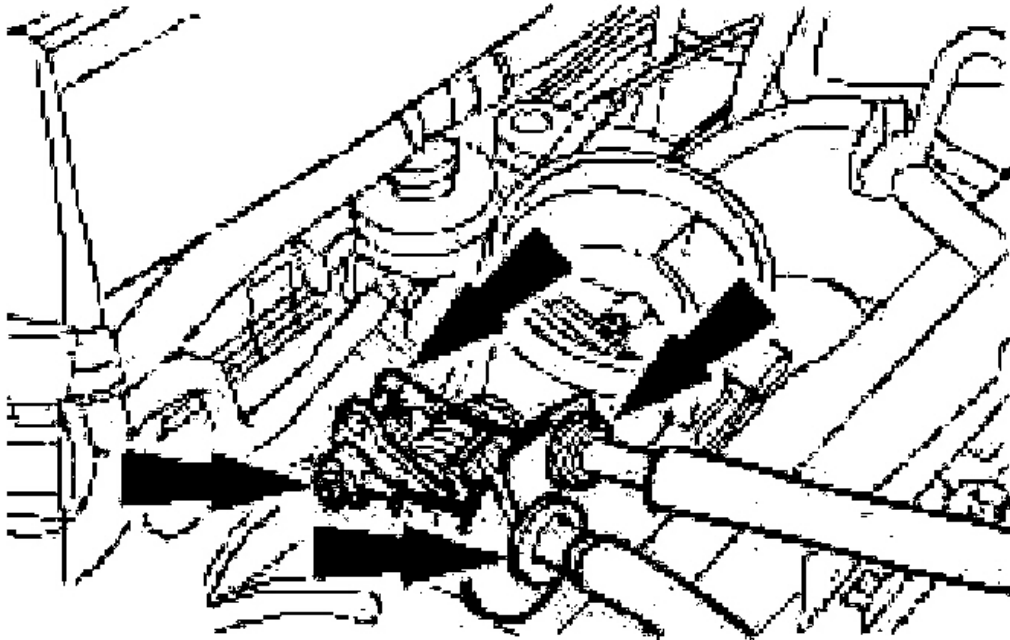
43. Attach the connectors of the EI coil and the radio interference filter.



G03432042

Fig. 437: Installing Connectors Of EI Coil And Radio Interference Filter
Courtesy of FORD MOTOR CO.

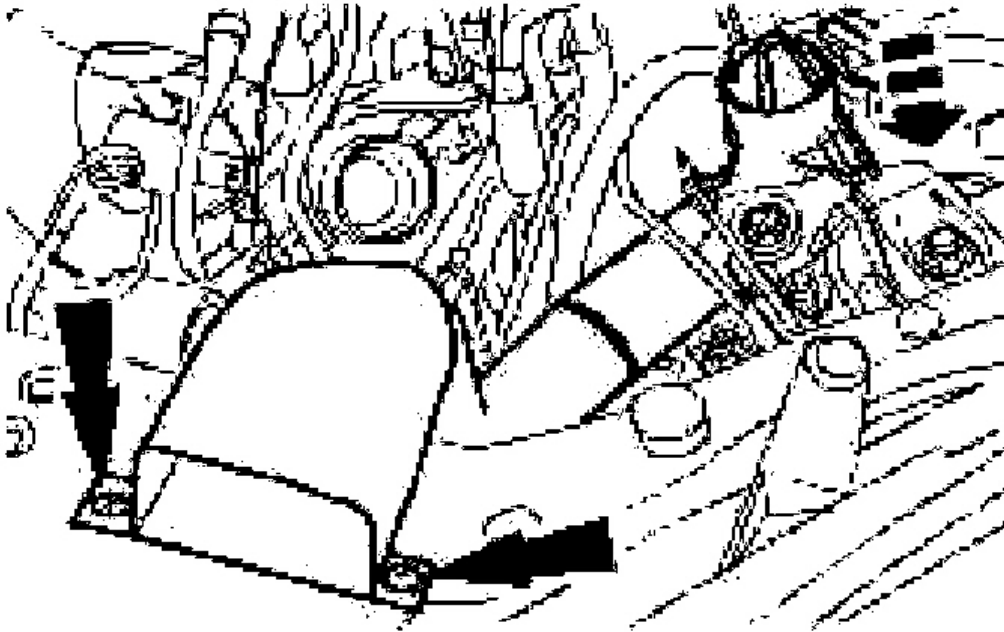
44. Attach the accelerator cable and the speed control cable (if equipped).



G03432043

Fig. 438: Installing Accelerator Cable And Speed Control Cable
Courtesy of FORD MOTOR CO.

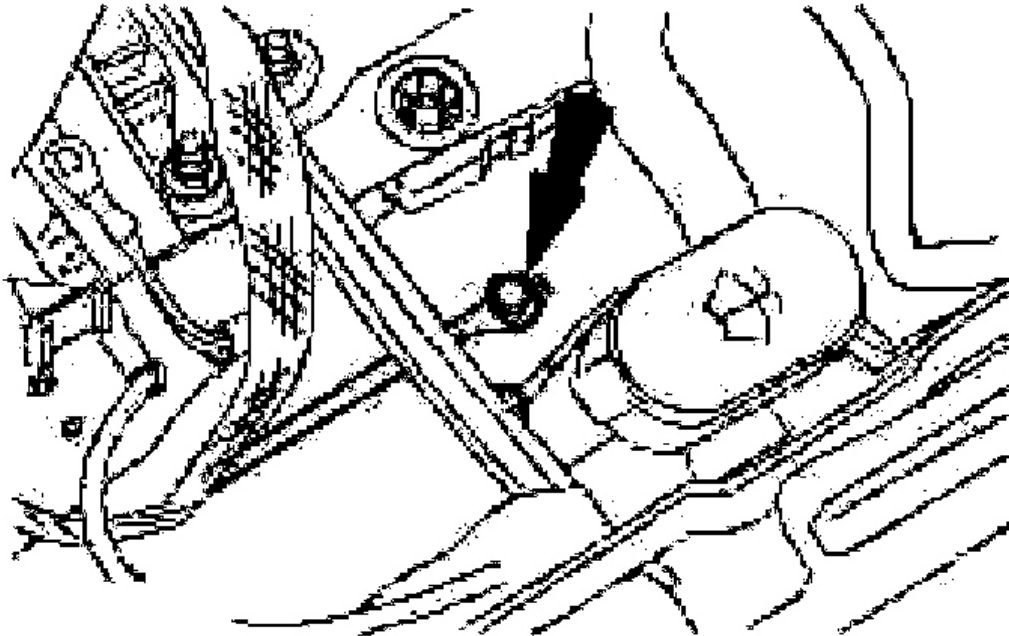
45. Install the air cleaner intake with resonator.



G03432044

Fig. 439: Installing Air Cleaner Intake With Resonator
Courtesy of FORD MOTOR CO.

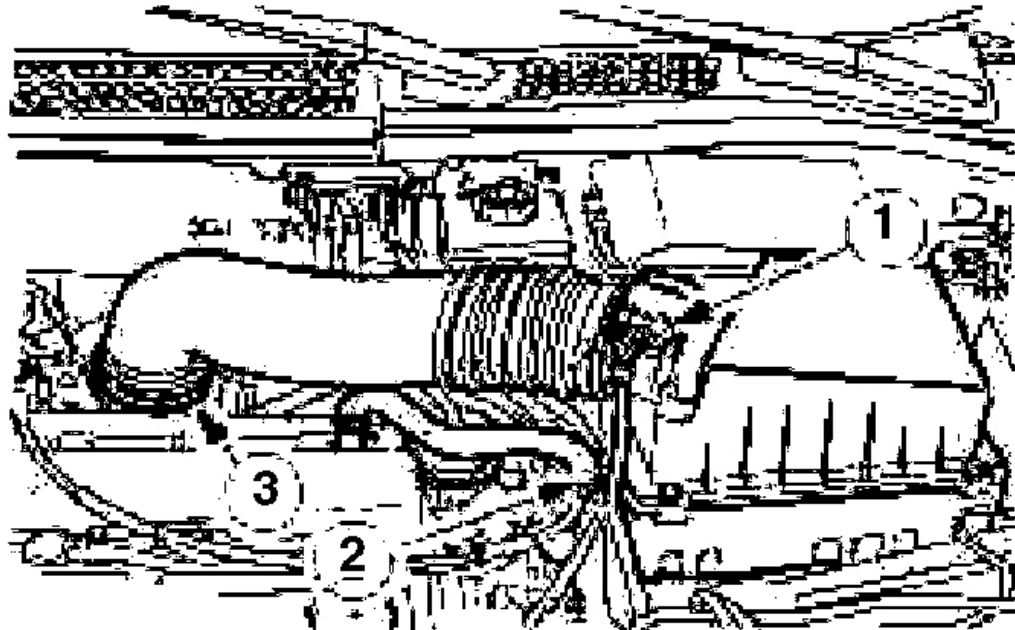
46. Attach the ground cable.



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Fig. 440: Installing Ground Cable
Courtesy of FORD MOTOR CO.

47. Attach the ground cable to the battery terminal.
48. Install the air cleaner housing.
 - Press the air filter housing into the rubber bushings.
 - 2. Push on the mass air flow (MAF) sensor multiplug.
 - 3. Attach the PCV hose.
 - 4. Attach the intake hose.

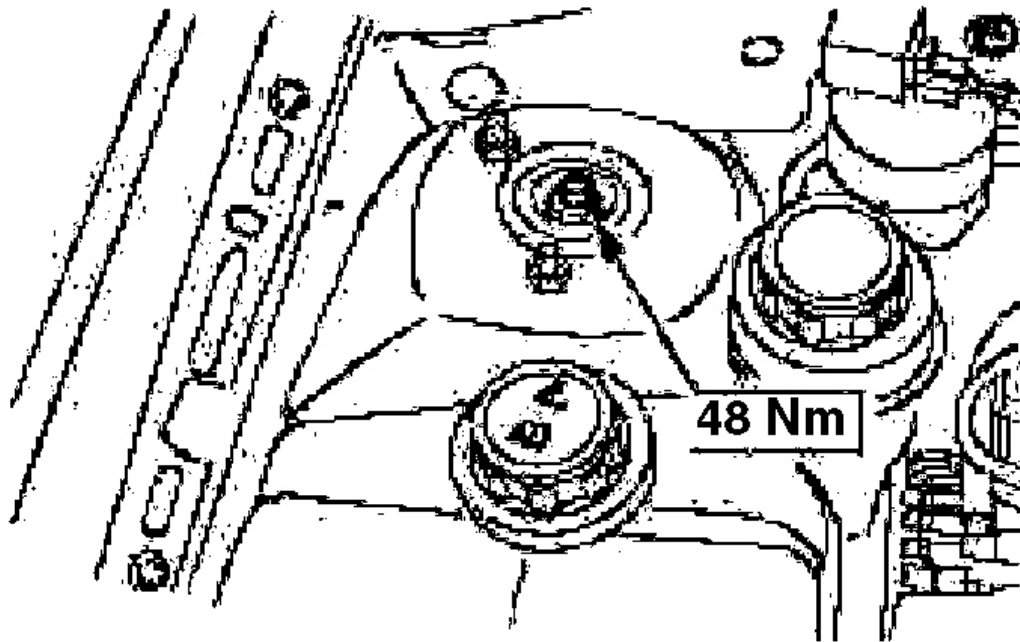


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Fig. 441: Installing Mass Air Flow (MAF) Sensor Multiplug
Courtesy of FORD MOTOR CO.

NOTE: Stop it from turning using an Allen key.

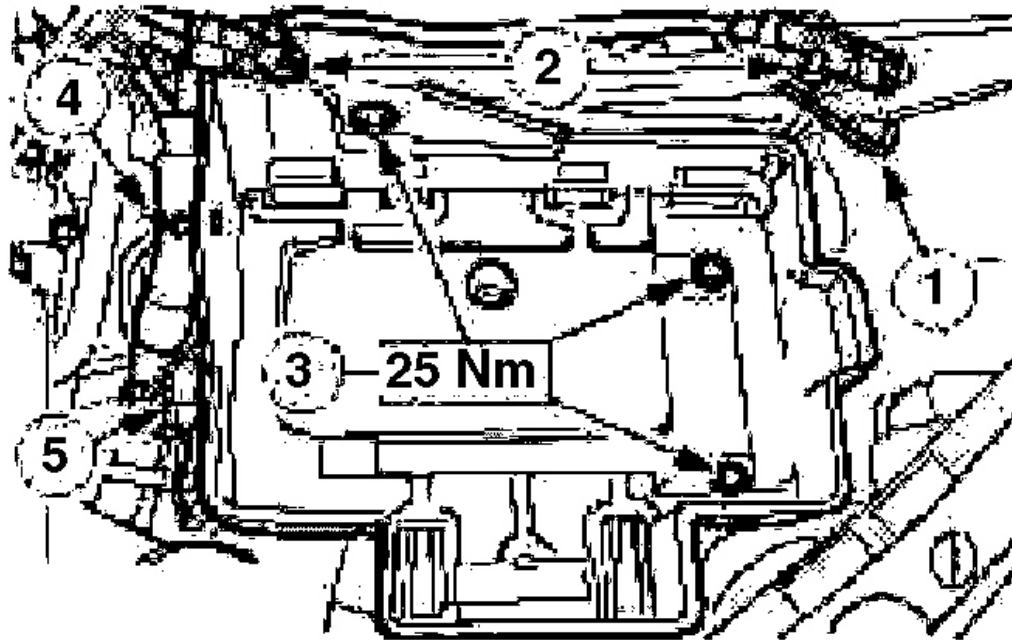
49. Tighten the suspension strut nuts on the right and left.
- Tighten by hand with a ring spanner.
 - Use a torque wrench to tighten to specification.



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Fig. 442: Tightening Suspension Strut Nuts
Courtesy of FORD MOTOR CO.

50. Install the battery tray.
 1. Attach the ground cable to the body.
 2. Attach the battery positive and negative cables.
 3. Install the bolts.
 4. Clip the wiring harness in place.
 5. Connect and clip in the plug.



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Fig. 443: Installing Battery Positive And Negative Cables And Tray
Courtesy of FORD MOTOR CO.

51. Install the battery.

CAUTION: 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.

52. Install and connect the battery.

53. Fill the cooling system. For additional information, refer to ENGINE COOLING .

54. Fill automatic transmission fluid. For additional information, refer to AUTOMATIC TRANSAXLE/TRANSMISSION .

55. Fill the engine with engine oil.

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56. Check the routing of the vacuum hoses and wiring and secure them with cable ties.
57. Check the fluid levels after the road test and correct as necessary.
58. Check the engine and cooling system for leaks (visual inspection).