

2002 Ford Focus LX

2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus

2002 TRANSMISSION

Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus

SPECIFICATIONS

LUBRICANTS, FLUIDS, SEALERS AND ADHESIVES

Item	Specification
High-temperature grease	ESDM-1C220-A
Manual transmission fluid	WSD-M2C200-C
DOT 3 Brake fluid	ESA-M6C25-A
Universal sealer (Hylomar)	ESEE-M4G1008-A
End cap sealer	WSE-M4G323-A4
Sealant, transaxle housing	WSK-M2G348-A5

CAPACITIES REFERENCE

	Litres
Manual transmission fluid (5 - 10 mm below the level of the filler hole)	2.3

TRANSAXLE RATIOS

Description	2.0L SPI
1st gear	3.154
2nd gear	1.926
3rd gear	1.281
4th gear	0.951
5th gear	0.756
Reverse gear	3.615
Final drive	3.610

MEASURING AND ADJUSTMENT SHIMS

Description	mm
Measuring shim	3.8
Shim availability (in increments of 0.1 mm)	0.1 - 0.7

TORQUE SPECIFICATIONS

Description	Nm	lb-ft	lb-in
Spur gear to differential	90	66	-

2002 Ford Focus LX

2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus

Clutch slave cylinder	10	-	89
Selector gate	22	16	-
Transaxle housing	23	17	-
Fifth gear housing to transaxle housing	17	13	-
Selector interlock mechanism	25	18	-
Reversing lamp switch	18	13	-
Transaxle housing end cover	12	9	-
Transaxle flange bolts	47	35	-
Engine roll restrictor to engine	48	35	-
Engine roll restrictor to subframe	48	35	-
Engine rear mount retaining bracket	80	59	-
Engine rear mount	48	35	-
Exhaust front pipe	47	35	-
Lower suspension arm to spindle carrier	47	35	-
Intermediate shaft center bearing retaining nuts	25	18	-
Selector lever to selector shaft	25	18	-
Gearshift cables cover	5	-	44
Gearshift cables retaining bracket	20	15	-
Clutch slave cylinder high-pressure line retaining bracket	28	21	-
Suspension top mounting retaining nuts	25	18	-
Battery tray	25	18	-
Selector finger	17	13	-
Transmission fluid filler plug	35	26	-

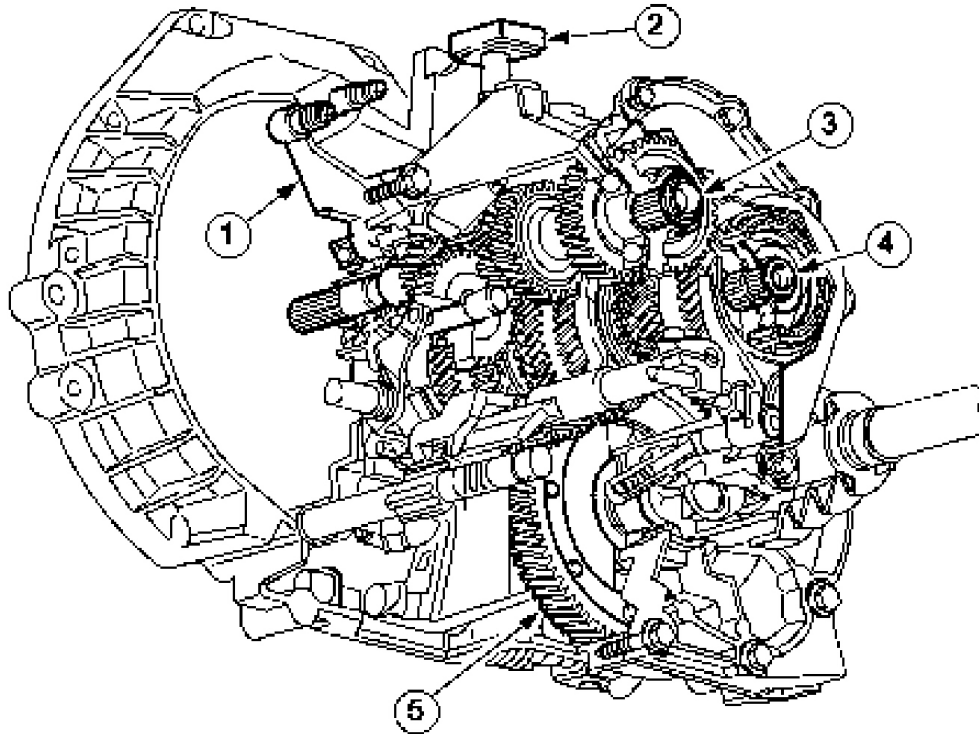
DESCRIPTION AND OPERATION

MANUAL TRANSAXLE

General view

2002 Ford Focus LX

2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus



Item	Part Number	Description
1	-	Clutch slave cylinder
2	-	Transaxle vent
3	-	Input shaft
4	-	Output shaft
5	-	Differential

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Fig. 1: Manual Transaxle General View
Courtesy of FORD MOTOR CO.

The iB5 manual transaxle in the vehicle is a "2-shaft transaxle" which has been revised to include a cable operating mechanism for the first time.

The aluminum transaxle housing comprises two sections. Its rigidity has been improved with the inclusion of reinforcement ribbing in the design. The transaxle housing sections come in pairs and cannot be obtained separately. The clutch is hydraulically actuated.

2002 Ford Focus LX

2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus

All the gears in the "2-shaft transaxle" are constant mesh gears (except reverse gear). In each gear, the required transaxle ratio is achieved by means of a pair of gear wheels.

When reverse gear is selected, the direction of rotation of the output shaft is changed by an idler gear.

The gears are all helical gears (except reverse gear). They all have synchronizers (except reverse gear) and run on plain bearings.

First and second gears have dual synchronizers.

The iB5 manual transaxle is filled with 2.3 liters of synthetic fluid, specification WSD-M2C200-C. The fill height is 5 to 10 mm below the lower edge of the check hole. Fluid changes are not necessary.

iB5 Manual Transaxle Components

General view

2002 Ford Focus LX
2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus

Fig. 2: Manual Transaxle Components General View
Courtesy of FORD MOTOR CO.

In neutral, no gear is connected to the output shaft via the gear synchronizers. No input torque is

2002 Ford Focus LX

2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus

transmitted to the differential.

Internal shift mechanism

Fig. 3: Identifying Components Internal Shift Mechanism
Courtesy of FORD MOTOR CO.

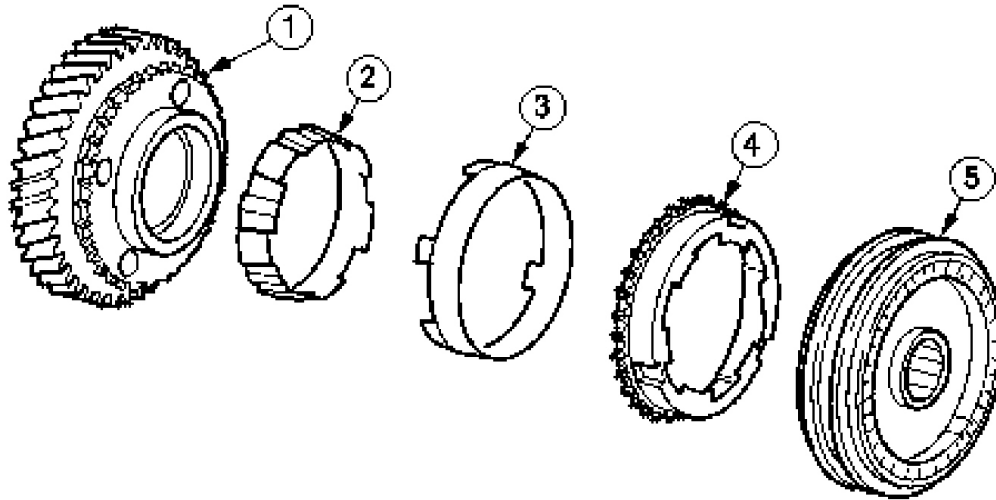
Input shaft

Fig. 4: Identifying Components Input Shaft
Courtesy of FORD MOTOR CO.

Output shaft

Fig. 5: Identifying Components Output Shaft
Courtesy of FORD MOTOR CO.

Dual synchronizer



Item	Part Number	Description
1	-	Gear wheel
2	-	Inner synchronizer ring
3	-	Cone ring
4	-	Outer synchronizer ring
5	-	Synchronizer assembly

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Fig. 6: Identifying Components Dual Synchronizer
Courtesy of FORD MOTOR CO.

Dual synchronizer

First and second gear have dual synchronizers. The use of a second synchronizer ring means that the effective synchronization area is increased approx. 100 % in relation to single synchronizers. Dual synchronization gives considerable improvement in gearshift quality.

The dual synchronizers consist of inner synchronizer ring, cone ring, outer synchronizer ring and synchronizer assembly.

The conical surface on the gear wheel is discontinued. Synchronization occurs through both synchronizer rings and the cone ring which is positively fitted to the gear wheel.

Differential

Major components of the differential include:

- Spur gear
- Differential housing with two taper roller bearings
- Differential pinions
- Input shaft pinions

The transaxle and differential are housed in a two-section aluminum housing and flange-mounted to the engine.

The input shafts have splines.

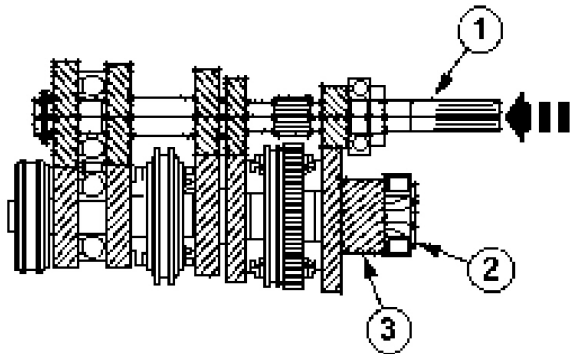
The input torque is transmitted to the differential via a spur gear which is bolted to the differential cage.

The differential cage contains the differential pinions mounted on one pin as well as the front halfshaft pinions connected to the front drive shafts through the splines.

If the front wheels are travelling at different speeds (when cornering), the front halfshaft pinions can move on the differential pinions.

Power flow

Neutral



Item	Part Number	Description
1	-	Input shaft
2	-	Output shaft
3	-	Output pinion

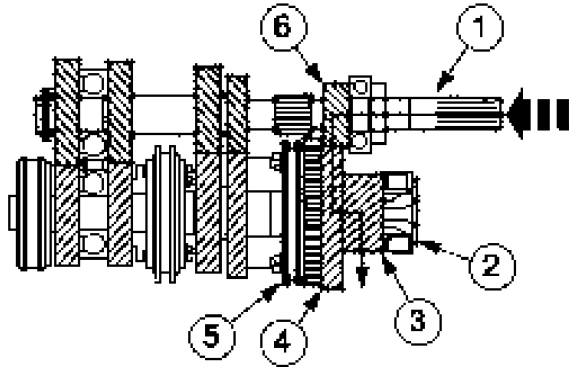
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Fig. 7: Identifying Power Flow Neutral
Courtesy of FORD MOTOR CO.

First gear

2002 Ford Focus LX

2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus

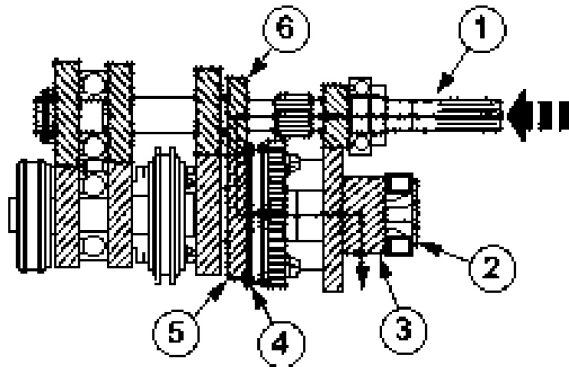


Item	Part Number	Description
1	-	Input shaft
2	-	Output shaft
3	-	Output pinion
4	-	1st gear wheel
5	-	Gear synchronizer, 1st/2nd gear
6	-	Gearing, 1st gear

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Fig. 8: Identifying Power Flow First Gear
Courtesy of FORD MOTOR CO.

Second gear



Item	Part Number	Description
1	-	Input shaft
2	-	Output shaft
3	-	Output pinion
4	-	Gear synchronizer, 1st/2nd gear
5	-	2nd gear wheel
6	-	Gearing, 2nd gear

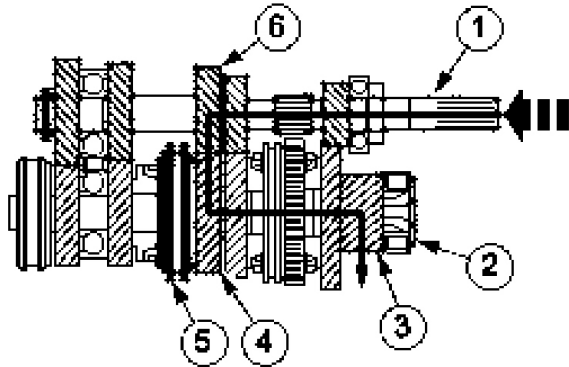
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Fig. 9: Identifying Power Flow Second Gear
Courtesy of FORD MOTOR CO.

Third gear

2002 Ford Focus LX

2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus

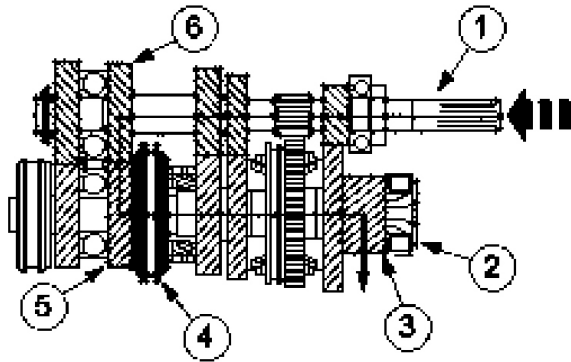


Item	Part Number	Description
1	-	Input shaft
2	-	Output shaft
3	-	Output pinion
4	-	Gearing, 3rd gear
5	-	Gear synchronizer, 3rd/4th gear
6	-	3rd gear wheel

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Fig. 10: Identifying Power Flow Third Gear
Courtesy of FORD MOTOR CO.

Fourth gear

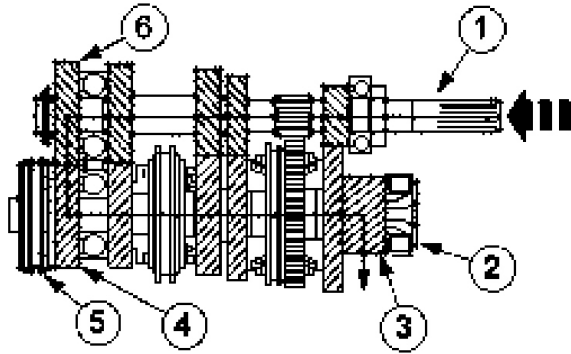


Item	Part Number	Description
1	-	Input shaft
2	-	Output shaft
3	-	Output pinion
4	-	Gear synchronizer, 3rd/4th gear
5	-	Gearing, 4th gear
6	-	4th gear wheel

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Fig. 11: Identifying Power Flow Fourth Gear
Courtesy of FORD MOTOR CO.

Fifth gear

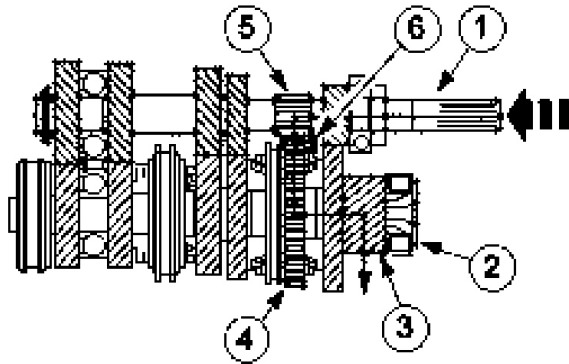


Item	Part Number	Description
1	-	Input shaft
2	-	Output shaft
3	-	Output pinion
4	-	Gearing, 5th gear
5	-	Gear synchronizer, 5th gear
6	-	5th gear wheel

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Fig. 12: Identifying Power Flow Fifth Gear
Courtesy of FORD MOTOR CO.

Reverse gear



Item	Part Number	Description
1	-	Input shaft
2	-	Output shaft
3	-	Output pinion
4	-	Reverse gear wheel
5	-	Gearing, reverse gear
6	-	Reverse idler gear

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Fig. 13: Identifying Power Flow Reverse Gear
Courtesy of FORD MOTOR CO.

The reverse idler gear is driven off the input shaft. Its purpose is to change the direction of rotation of the output shaft when reverse gear is selected.

The reverse idler gear runs in a plain bearing on the idler gear shaft and a bearing block.

The selector interlock mechanism and the selector finger are mounted on a sleeve in the selector mechanism housing. They hold the selected gear by means of a spring-loaded ball until a different gear is selected.

The selector interlock mechanism has three different positions.

DIAGNOSIS AND TESTING

MANUAL TRANSAXLE

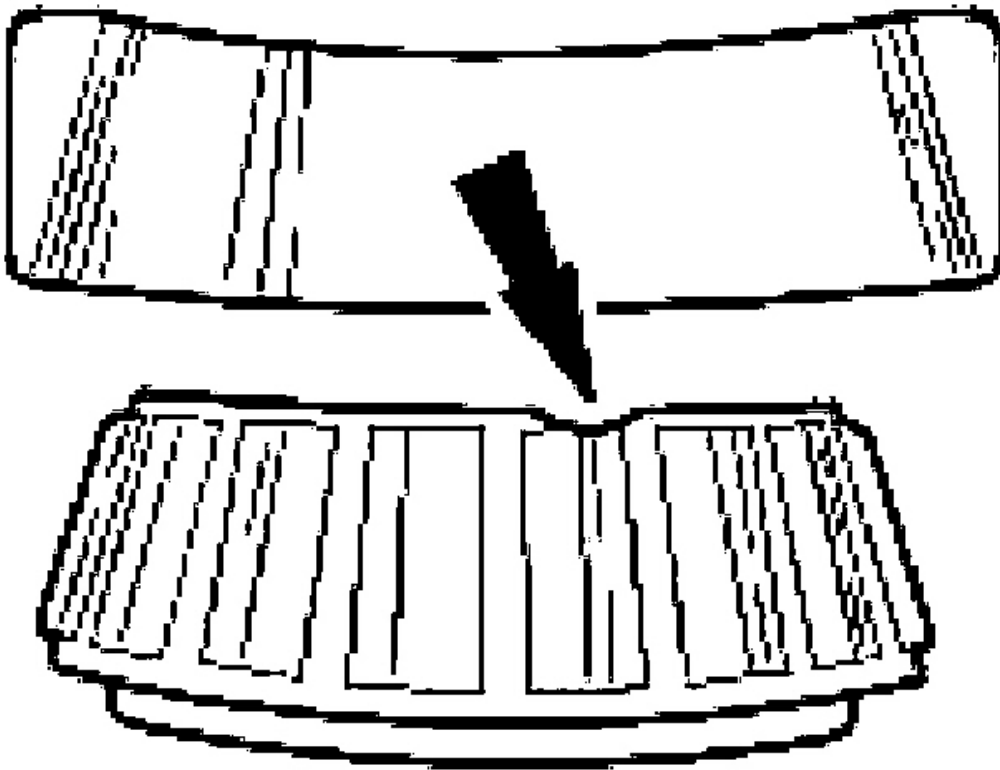
REFER to **MANUAL TRANSMISSION/TRANSAXLE AND CLUTCH - GENERAL**

INFORMATION .

GENERAL PROCEDURES

BEARING CHECK

NOTE: Establish the cause of the damage and resolve it.



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Fig. 14: Checking Bearing Cage
Courtesy of FORD MOTOR CO.

1. Check whether the bearing cage is damaged at the top, side or at the openings is damaged because of the unprofessional use of a special tool or of the wrong tool.
 - Install a new bearing if necessary.

2. Check whether the ends of the taper rollers are discoloured as a result of inadequate lubrication or overheating, possibly through excessive pre-load.
 - Install a new bearing and new seals if necessary.
 - Check the bearing is correctly lubricated.

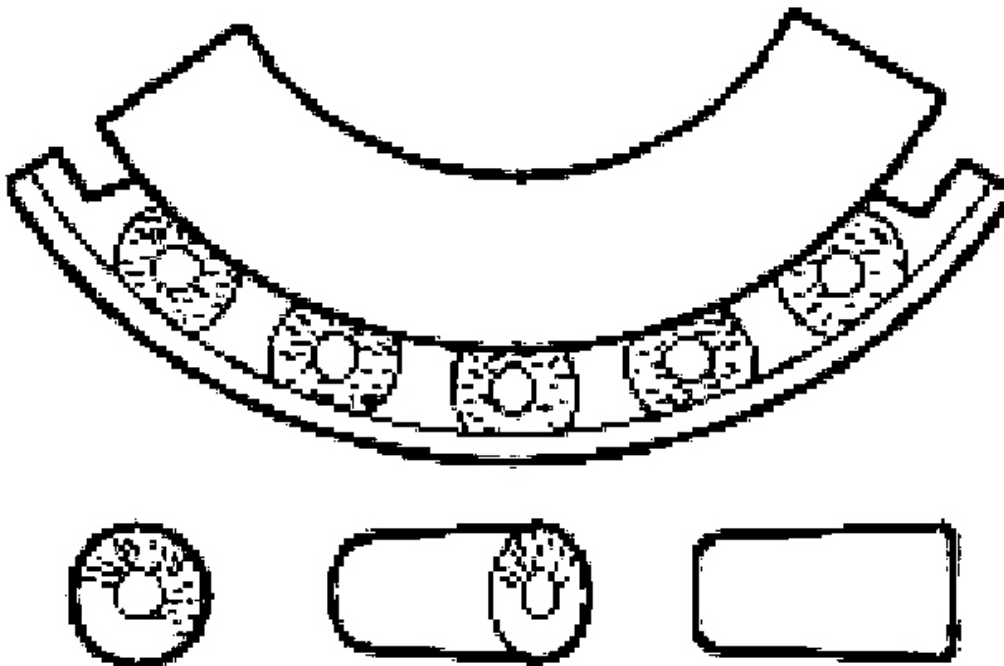
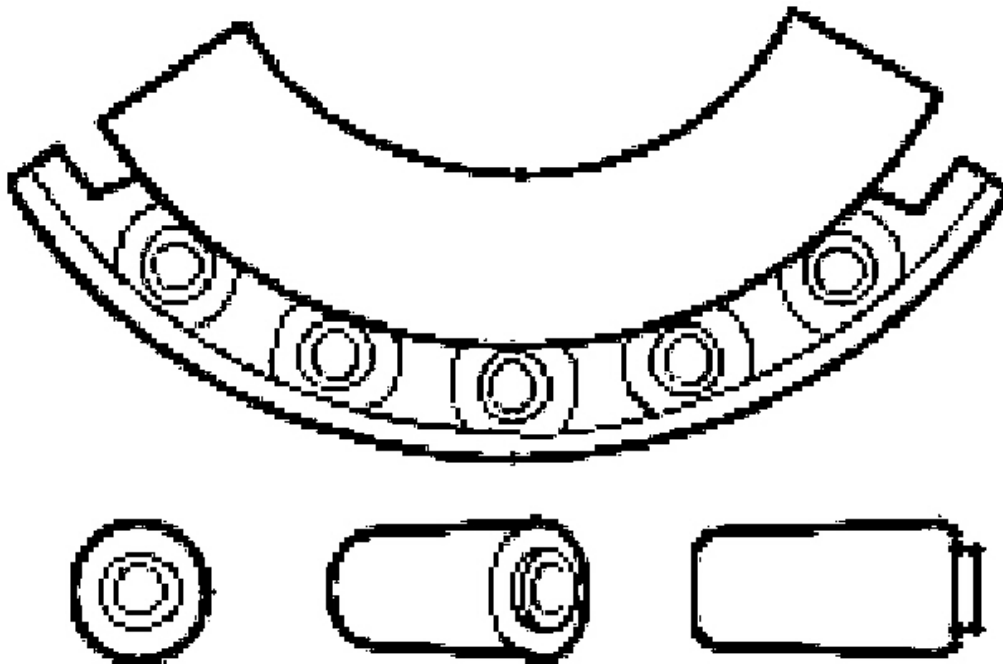
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Fig. 15: Checking Ends Of Taper Rollers
Courtesy of FORD MOTOR CO.

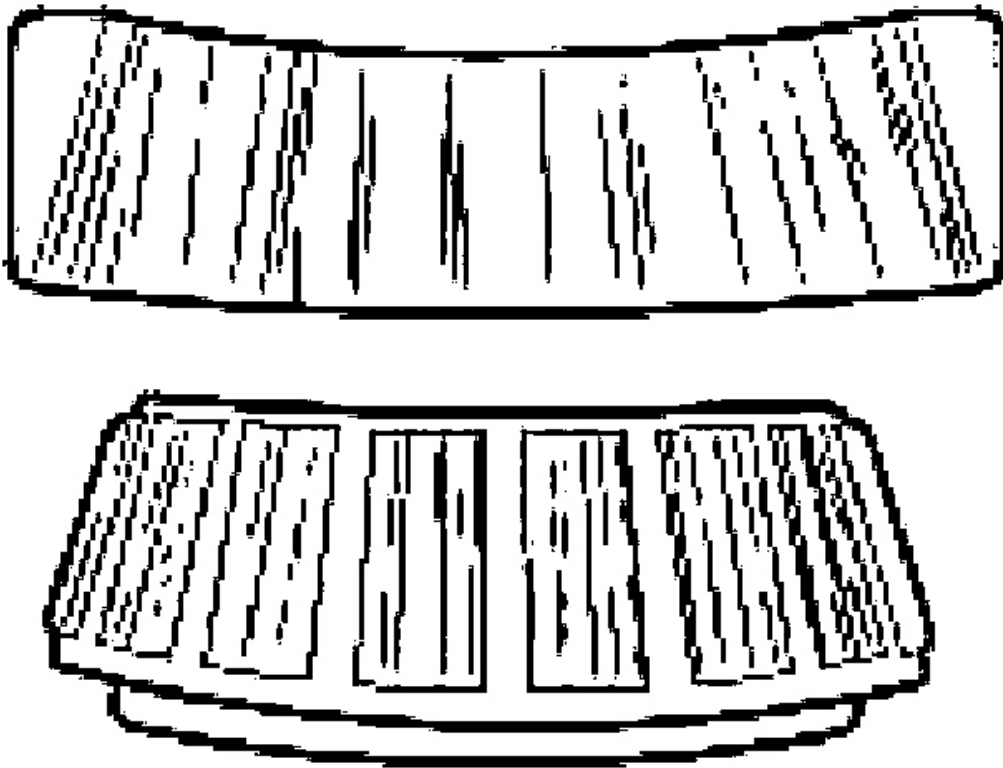
3. Check whether the ends of the taper rollers are worn away due to incorrect installation, excessive pre-load or faulty bearing seating.
 - Install a new bearing and new seals if necessary.
 - Check the bearing is correctly lubricated.



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Fig. 16: Checking Ends Of Taper Rollers Are Worn
Courtesy of FORD MOTOR CO.

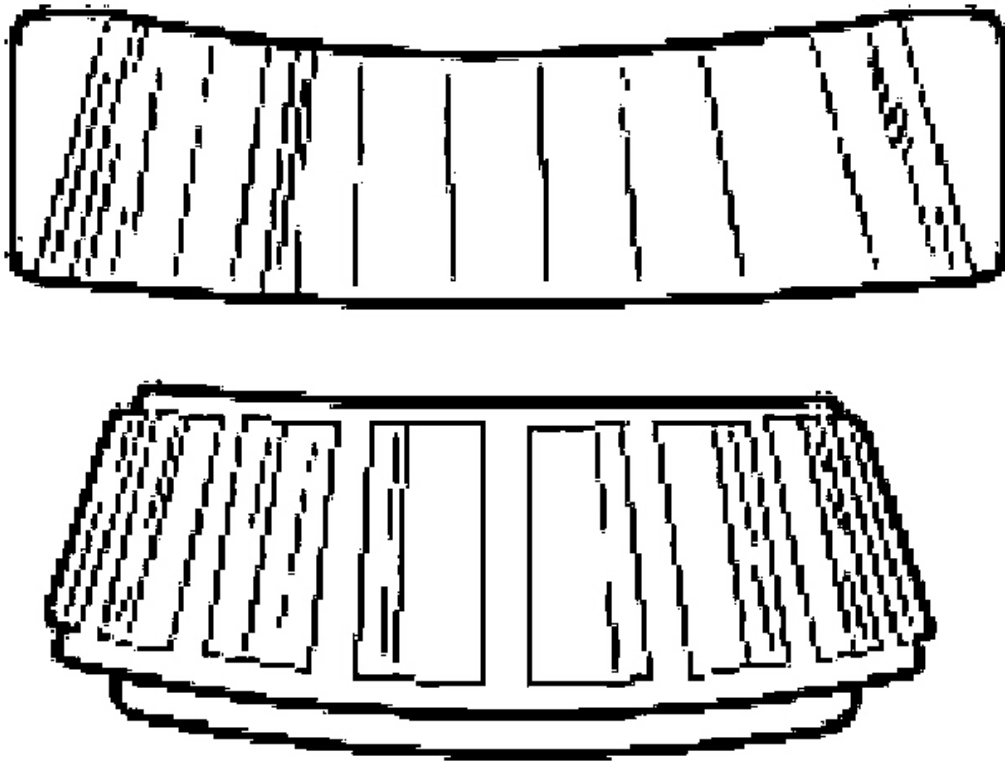
4. Check whether the bearing surfaces are grey or grey/black with deposits between the rollers.
 - Install a new bearing and new seals if necessary.
 - Check the bearing is correctly lubricated.



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Fig. 17: Checking Bearing Surfaces Are Grey Or Grey/Black
Courtesy of FORD MOTOR CO.

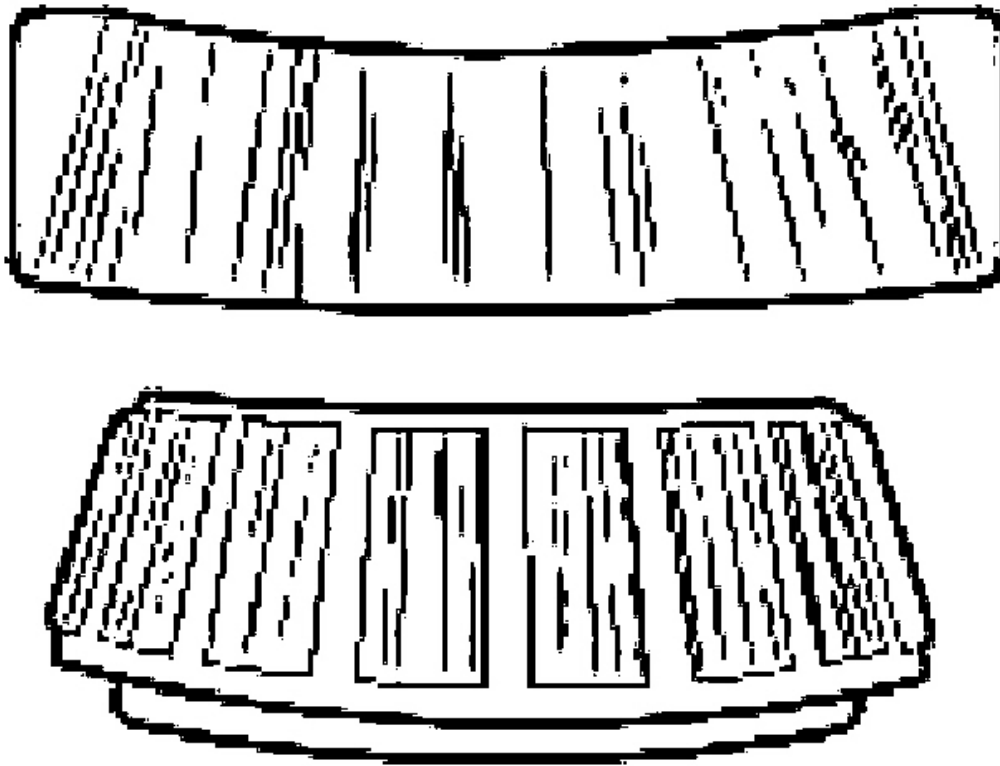
5. Check whether the bearing ring surfaces are grooved caused by static impact.
 - Install a new bearing if its surface is rough, or if it is noisy.



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Fig. 18: Checking Bearing Ring Surfaces Are Grooved
Courtesy of FORD MOTOR CO.

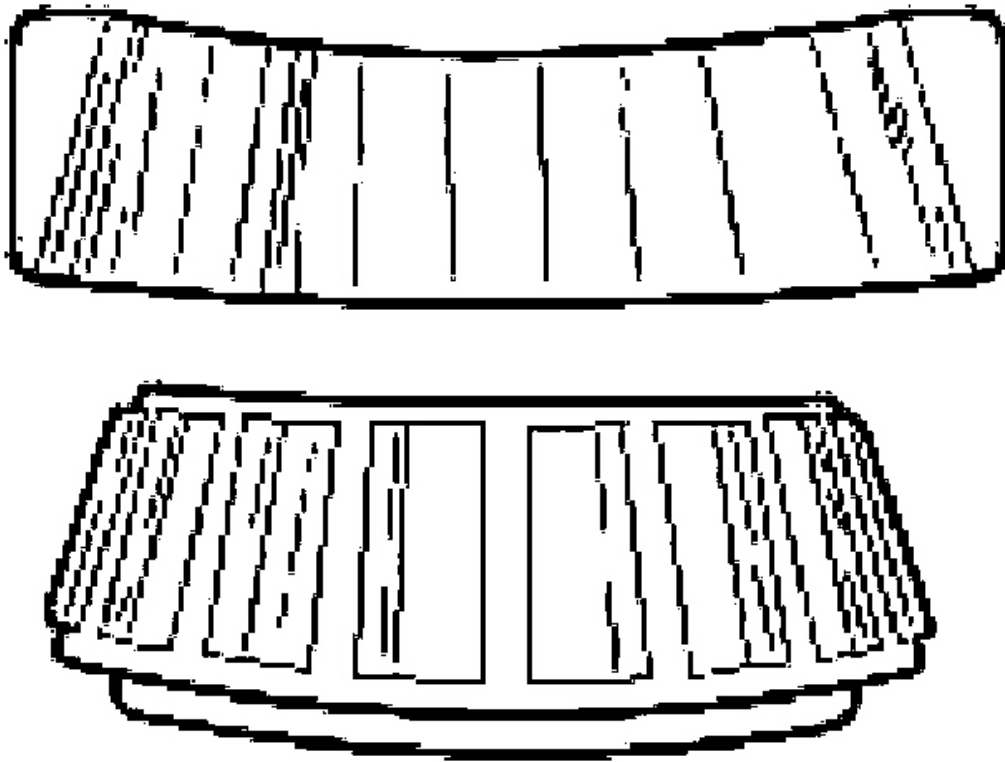
NOTE: Overheating can cause loss of surface hardness.



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Fig. 19: Checking For Dark Blue Color
Courtesy of FORD MOTOR CO.

6. Check for a dark blue color caused by overheating (yellow or brown is normal) due to excessive preload or inadequate lubrication.
 - Install a new bearing, new seals and check other components as necessary.
7. Check the surfaces for abrasion due to metal fatigue.
 - Install a new bearing and clean all other affected components as necessary.



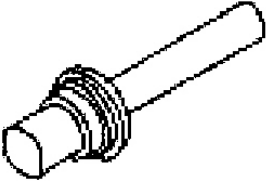
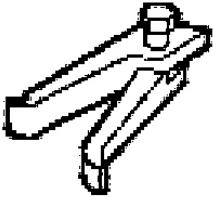
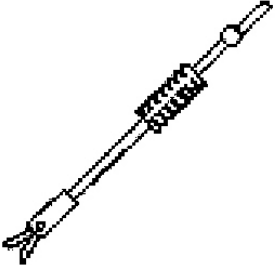
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Fig. 20: Checking Surfaces For Abrasion Due To Metal Fatigue
Courtesy of FORD MOTOR CO.

IN-VEHICLE REPAIR

HALFSHAFT SEAL LH

Special Tool(s)

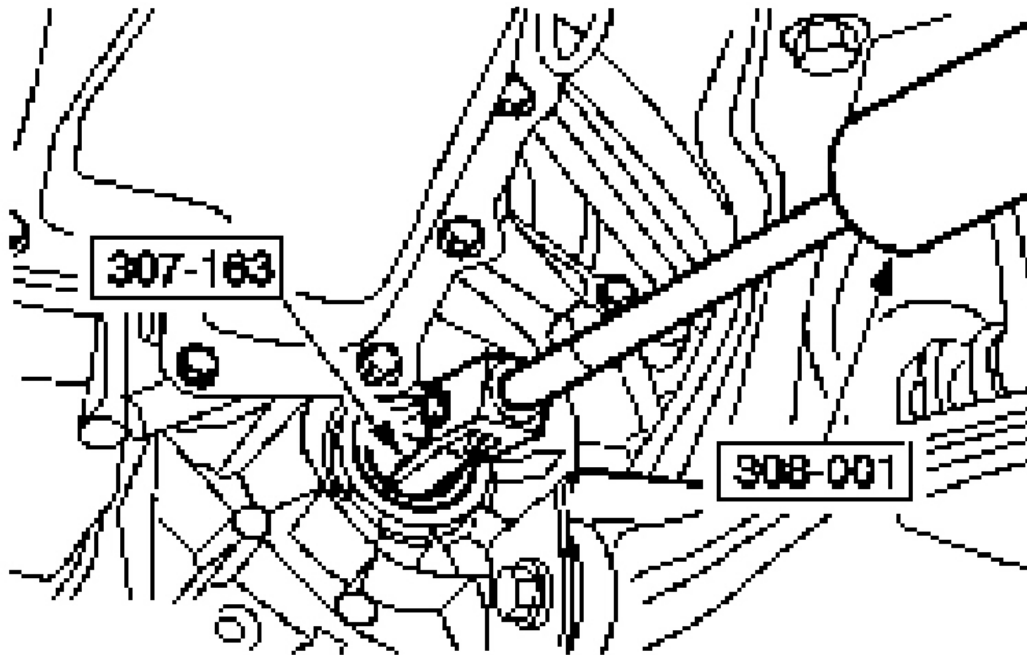
	Installer, Halfshaft Oil Seal 308-039
	Remover, Halfshaft Oil Seal 307-163 (T86P-70043-A)
	Remover, Pilot Bearing 308-001 (T58L-101-B)

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Fig. 21: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Removal

1. Remove the halfshaft. Refer to **AXLE SHAFTS** .
2. Using the special tools, remove the halfshaft oil seal.

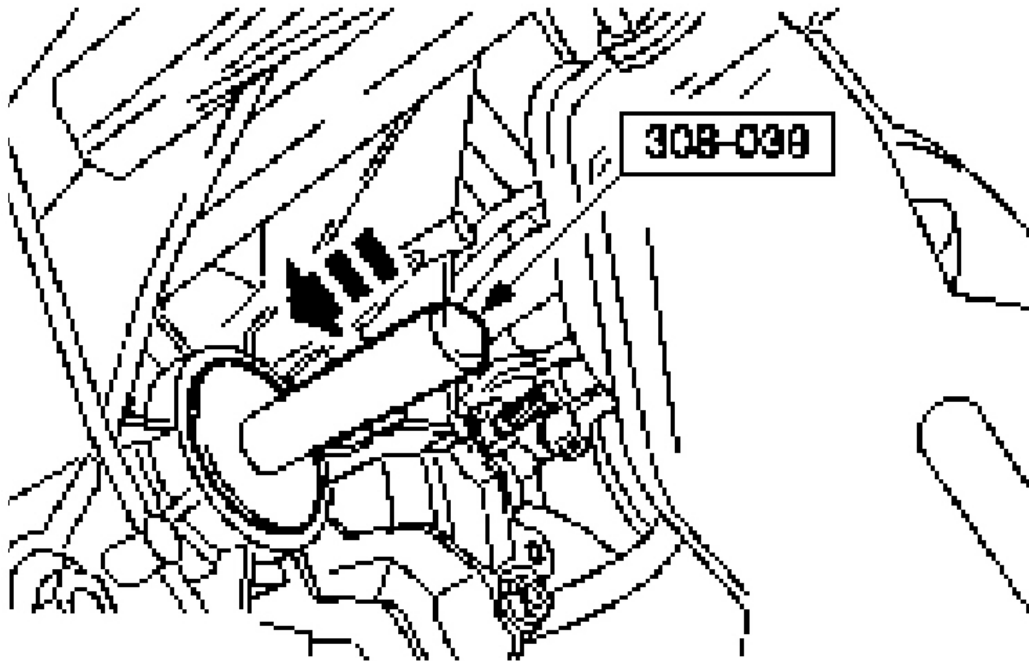


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Fig. 22: Removing Halfshaft Oil Seal
Courtesy of FORD MOTOR CO.

Installation

1. Using the special tool, install the halfshaft oil seal.



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Fig. 23: Installing Halfshaft Oil Seal
Courtesy of FORD MOTOR CO.

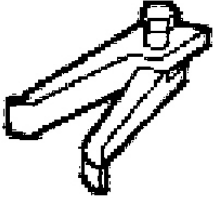
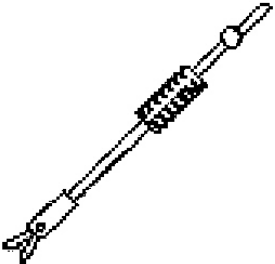
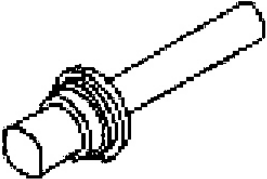
2. Install the halfshaft. Refer to **AXLE SHAFTS** .

HALFSHAFT SEAL RH

Special Tool(s)

2002 Ford Focus LX

2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus

	Remover, Halfshaft Oil Seal 308-208 (T86P-70043-A)
	Remover, Pilot Bearing 308-001 (T58L-101-B)
	Installer, Halfshaft Oil Seal 308-039

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Fig. 24: Identifying Special Tools
Courtesy of FORD MOTOR CO.

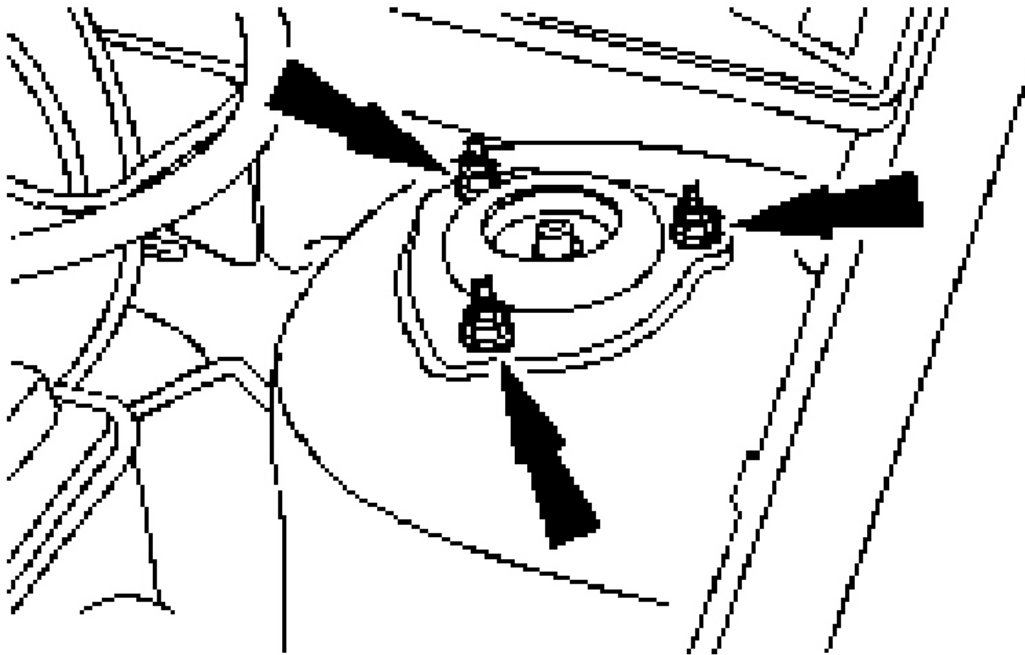
Material

MATERIAL REFERENCE

Manual transmission fluid	WSD-M2C200-C
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Removal

1. Loosen the strut and spring assembly top mount nuts by five turns (left-hand side shown).

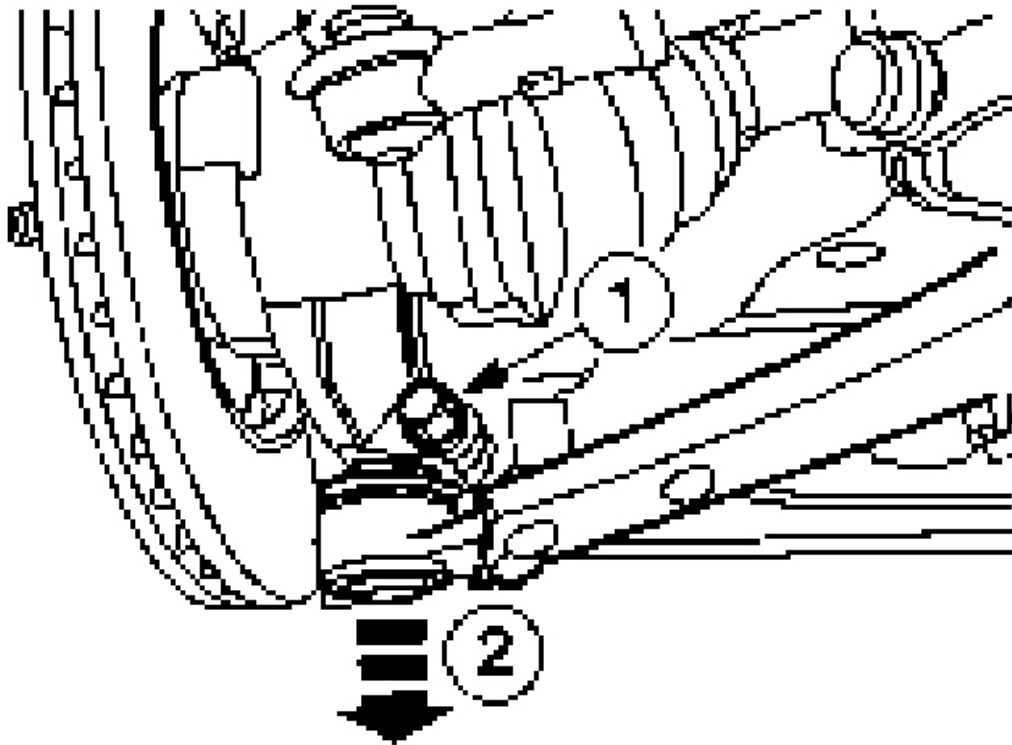


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Fig. 25: Loosening Strut And Spring Assembly Top Mount Nuts
Courtesy of FORD MOTOR CO.

2. Raise and support the vehicle.

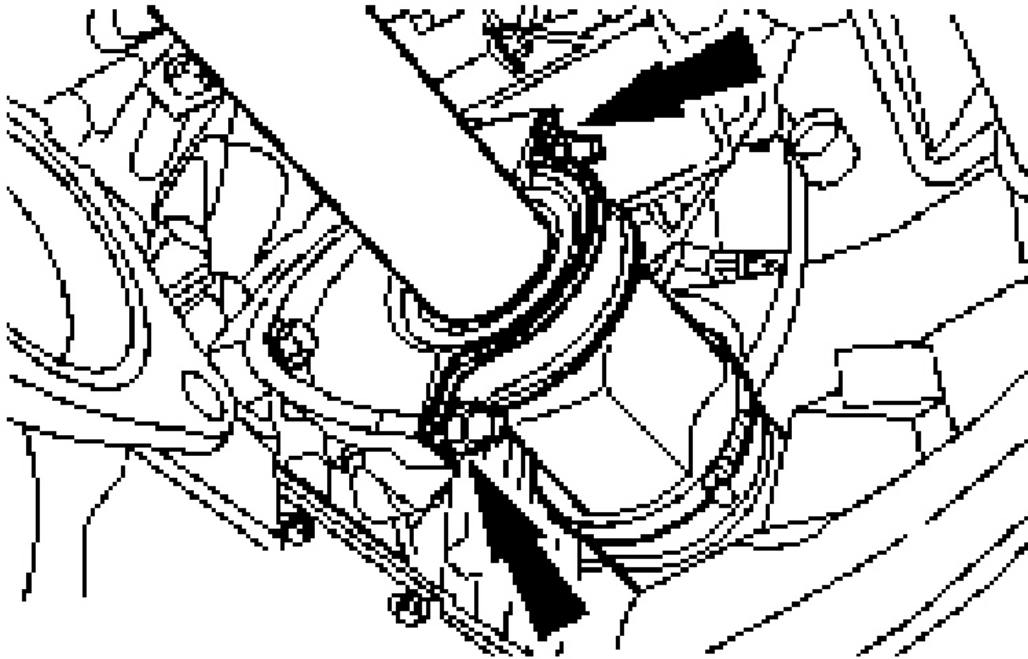
CAUTION: Protect the ball joint seal using a soft cloth to prevent damage.



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Fig. 26: Detaching Lower Arm Ball Joint
Courtesy of FORD MOTOR CO.

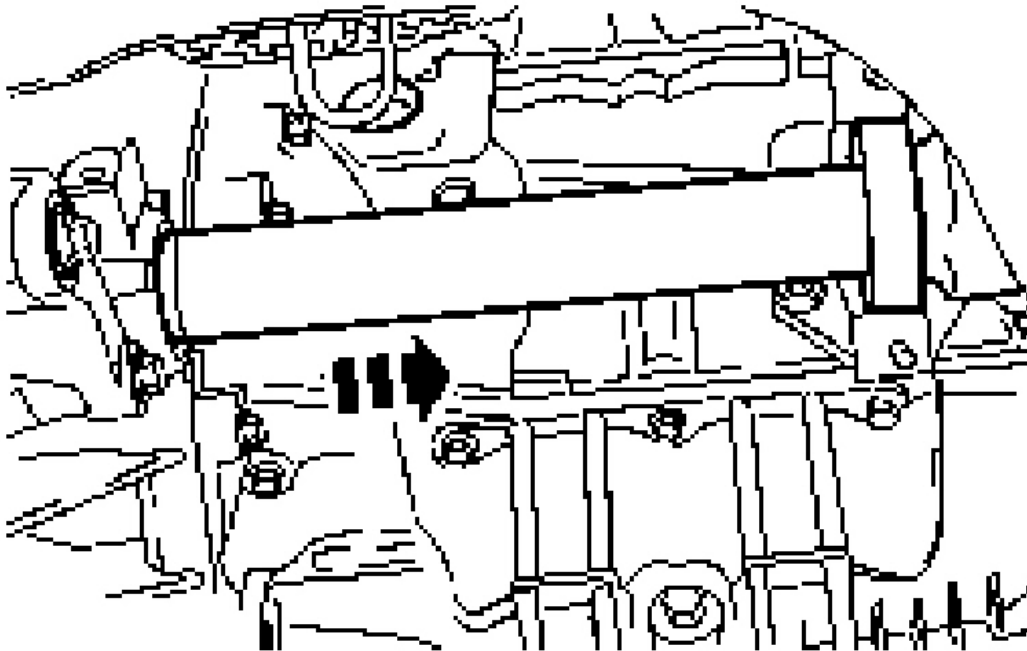
3. Detach the lower arm ball joint from the wheel knuckle.
 1. Remove the bolt
 2. Detach the lower arm ball joint
4. Remove the intermediate shaft center bearing retaining nuts and cap.
 - Discard the cap and nuts



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Fig. 27: Removing Intermediate Shaft Center Bearing Retaining Nuts
Courtesy of FORD MOTOR CO.

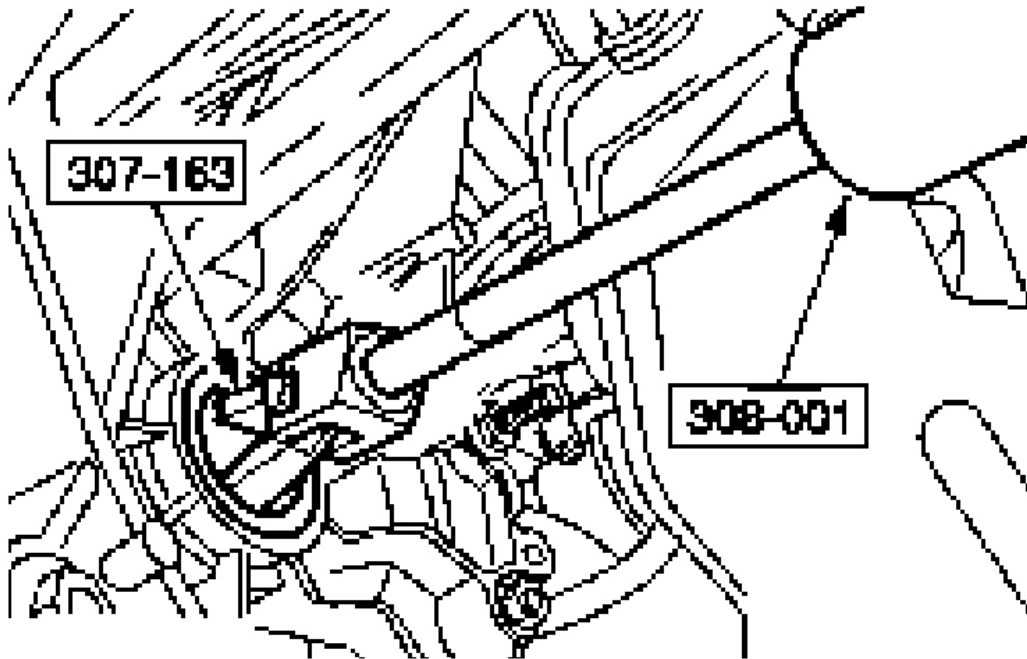
CAUTION: Support the halfshaft. The inner joint must not bent more than 18 degrees. The outer joint must be bent more than 45 degrees.



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Fig. 28: Detaching Intermediate Shaft And Halfshaft
Courtesy of FORD MOTOR CO.

5. Detach the intermediate shaft and halfshaft from the transaxle and secure it to one side.
 - Allow the oil to drain into a suitable container.
6. Using the special tools, remove the halfshaft oil seal (left-hand side shown right-hand side similar).

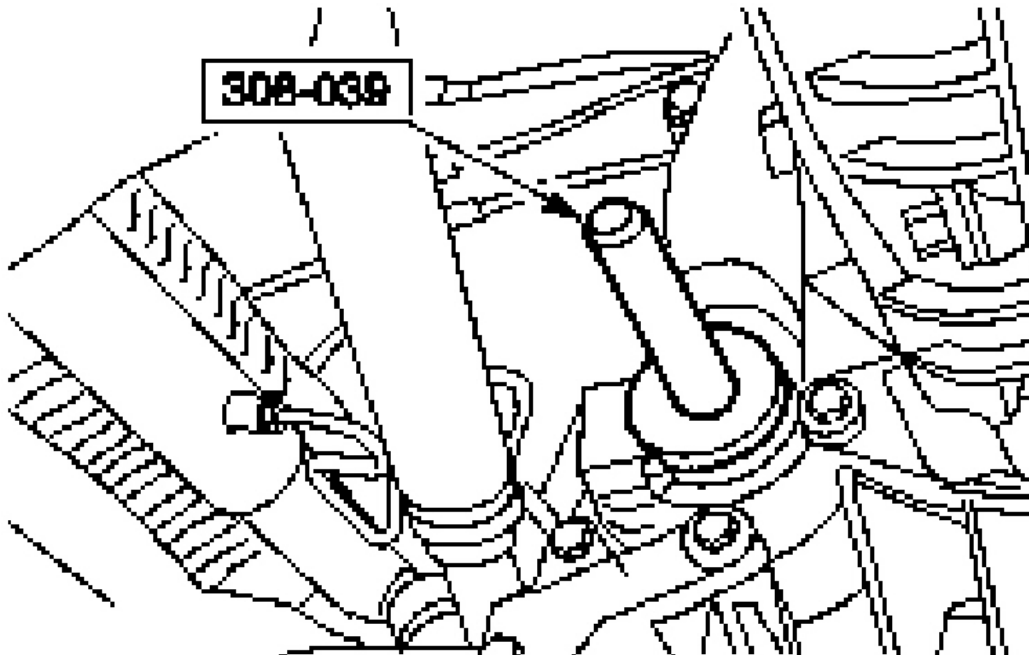


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Fig. 29: Removing Halfshaft Oil Seal
Courtesy of FORD MOTOR CO.

Installation

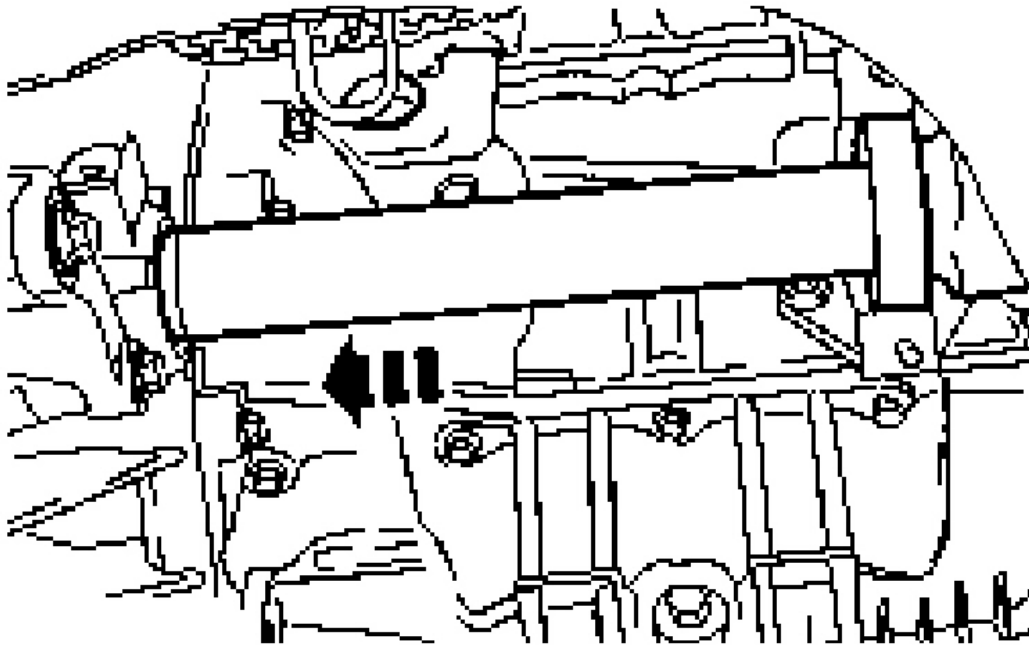
1. Using the special tool, install the halfshaft oil seal.



G03854511

Fig. 30: Installing Halfshaft Oil Seal
Courtesy of FORD MOTOR CO.

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

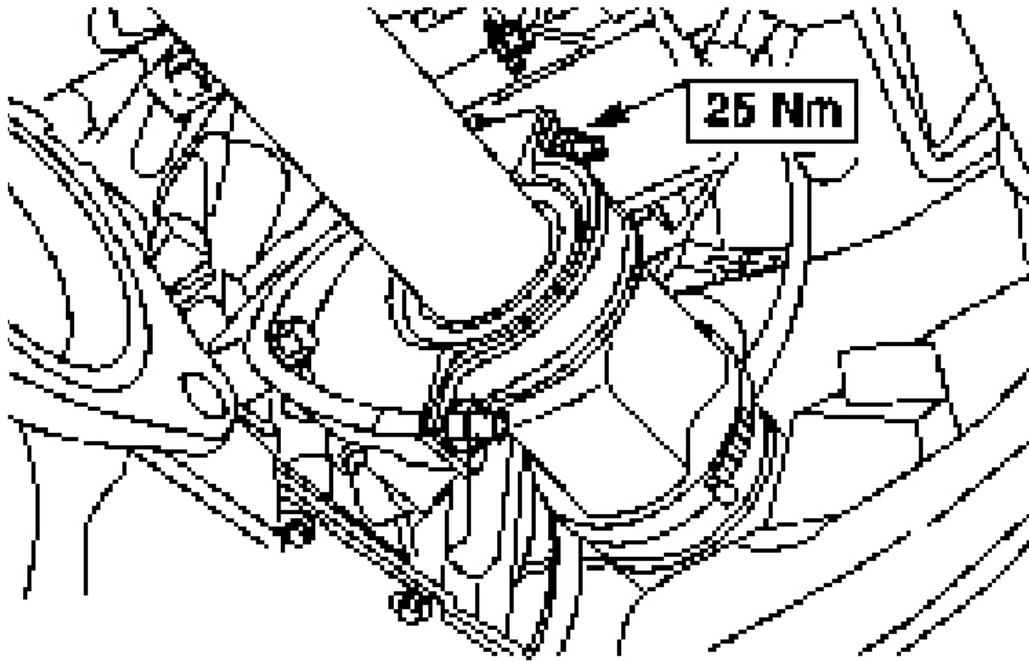


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Fig. 31: Attaching Intermediate Shaft And Halfshaft
Courtesy of FORD MOTOR CO.

2. Attach the intermediate shaft and halfshaft to the transaxle.

NOTE: **Install a new intermediate shaft center bearing cap and nuts.**

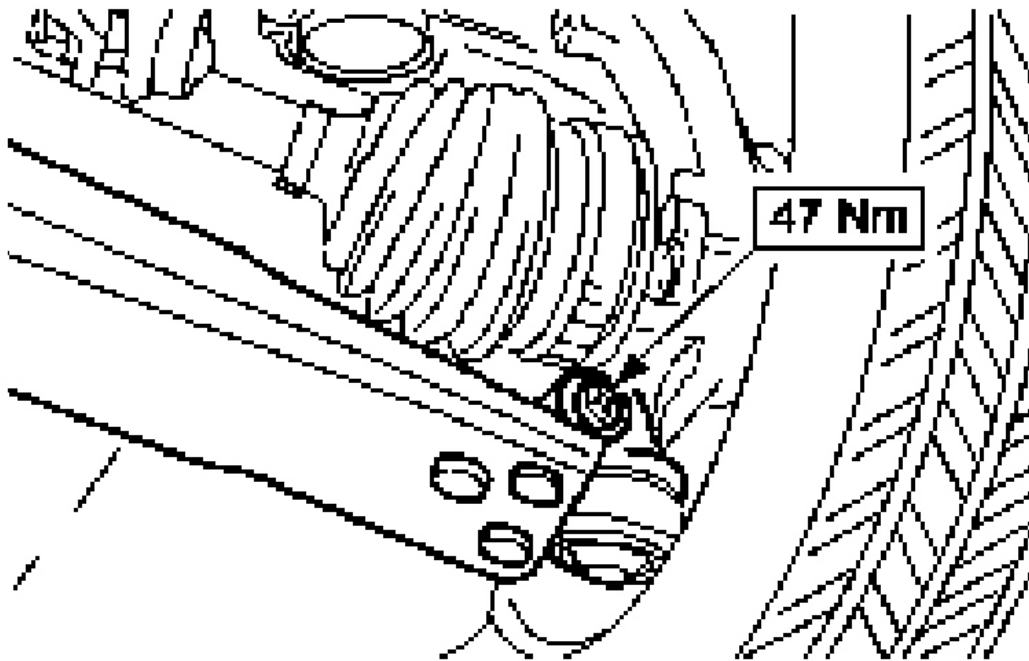


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Fig. 32: Installing Intermediate Shaft Center Bearing Cap
Courtesy of FORD MOTOR CO.

3. Install the intermediate shaft center bearing cap.

CAUTION: Protect the ball joint seal using a soft cloth to prevent damage.

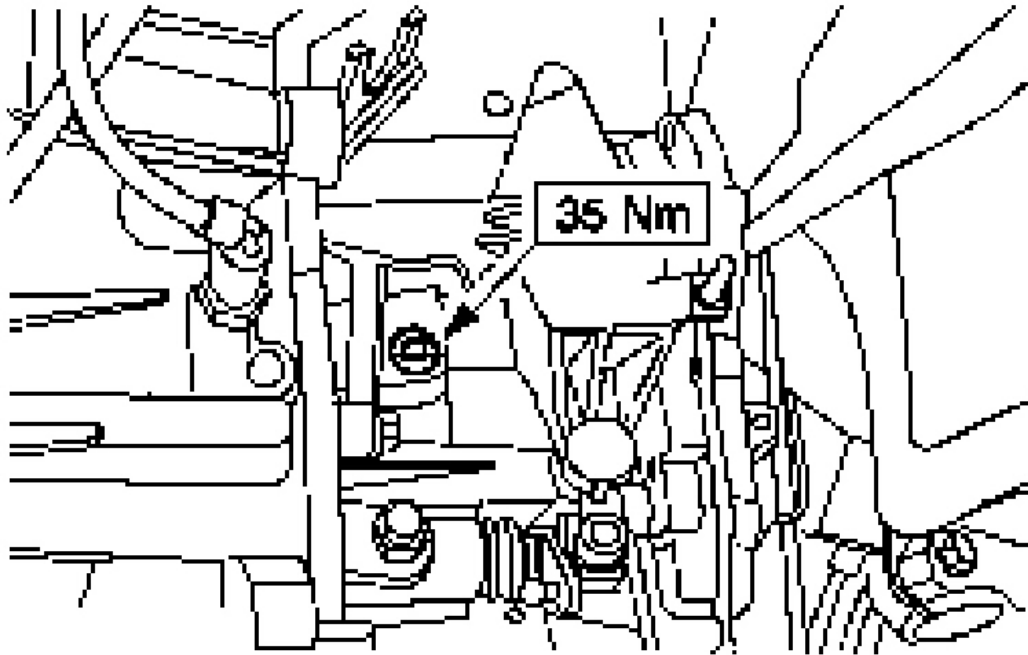


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Fig. 33: Attaching Lower Arm Ball Joint
Courtesy of FORD MOTOR CO.

4. Attach the lower arm ball joint to the wheel knuckle.

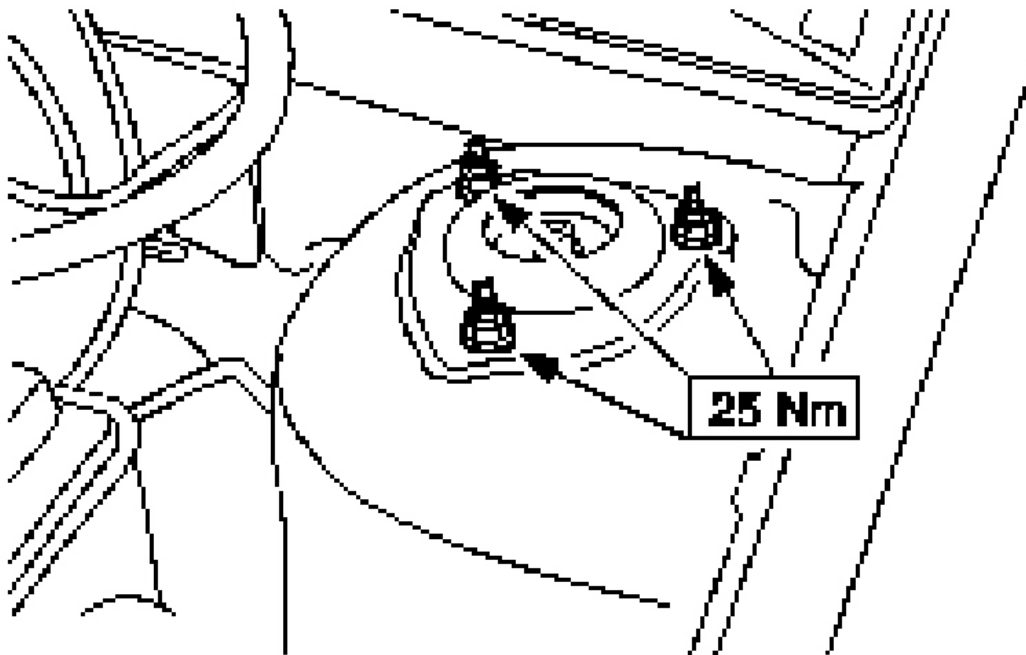
NOTE: The fill height is 5 - 10 mm below the lower edge of the filler hole.



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Fig. 34: Tightening Nut
Courtesy of FORD MOTOR CO.

5. Check the transaxle fluid level and top up with Manual transmission fluid if necessary.
6. Lower the vehicle.
7. Tighten the strut and spring assembly top mount nuts.



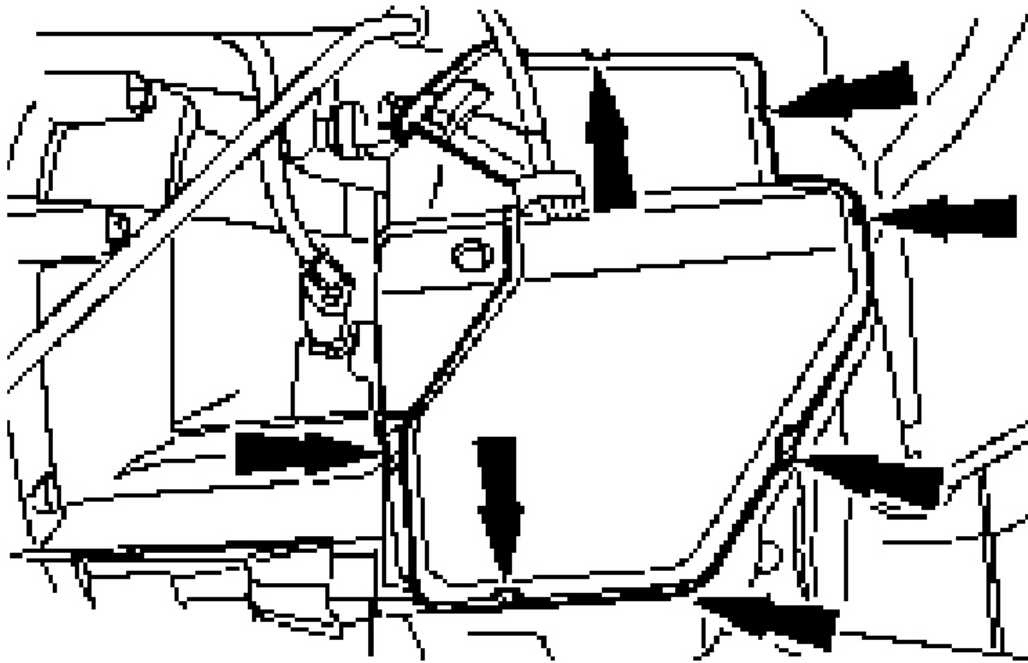
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Fig. 35: Tightening Strut And Spring Assembly Top Mount Nuts
Courtesy of FORD MOTOR CO.

GEARSHIFT CONTROL SHAFT SEAL

Removal

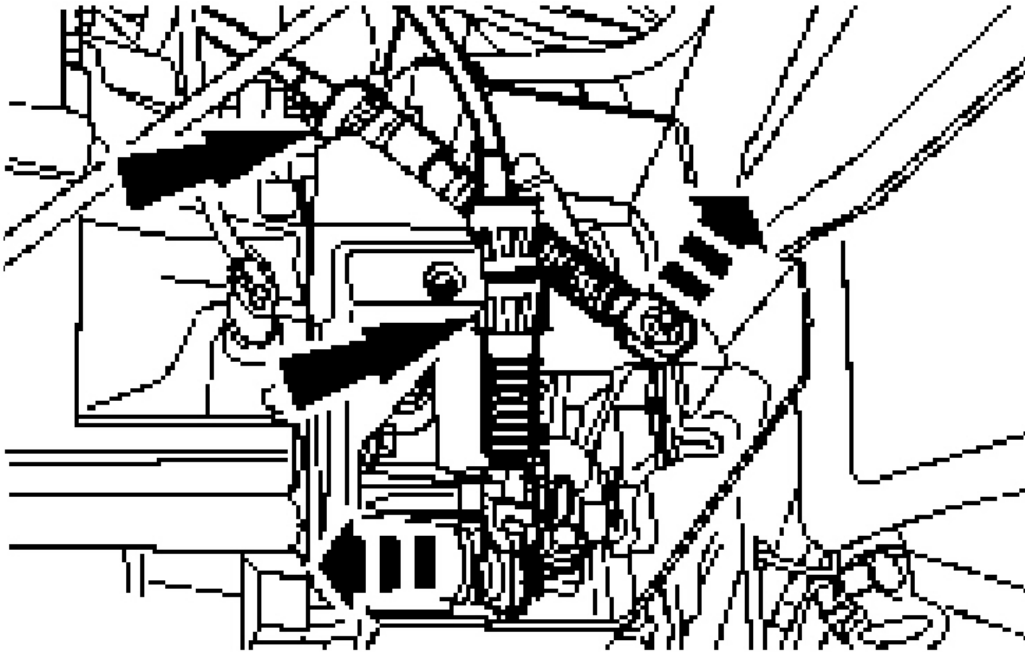
1. Engage the third gear.
2. Raise the vehicle.
3. Open the cover on the shift and selector cable.



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Fig. 36: Opening Cover On Shift And Selector Cable
Courtesy of FORD MOTOR CO.

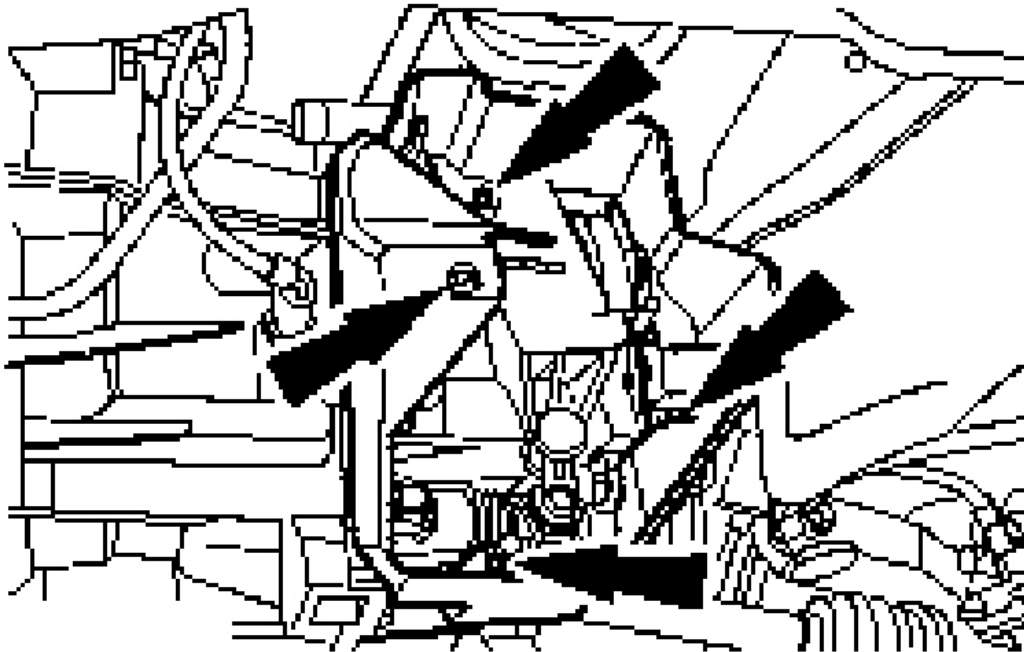
4. Remove the shift and selector cable.
 - Remove the shift and selector cable end fittings from the shift and selector lever.
 - Remove the shift and selector cable from the bracket by turning the lower part of abutment clockwise and the upper part counter clockwise.



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Fig. 37: Removing Shift And Selector Cable
Courtesy of FORD MOTOR CO.

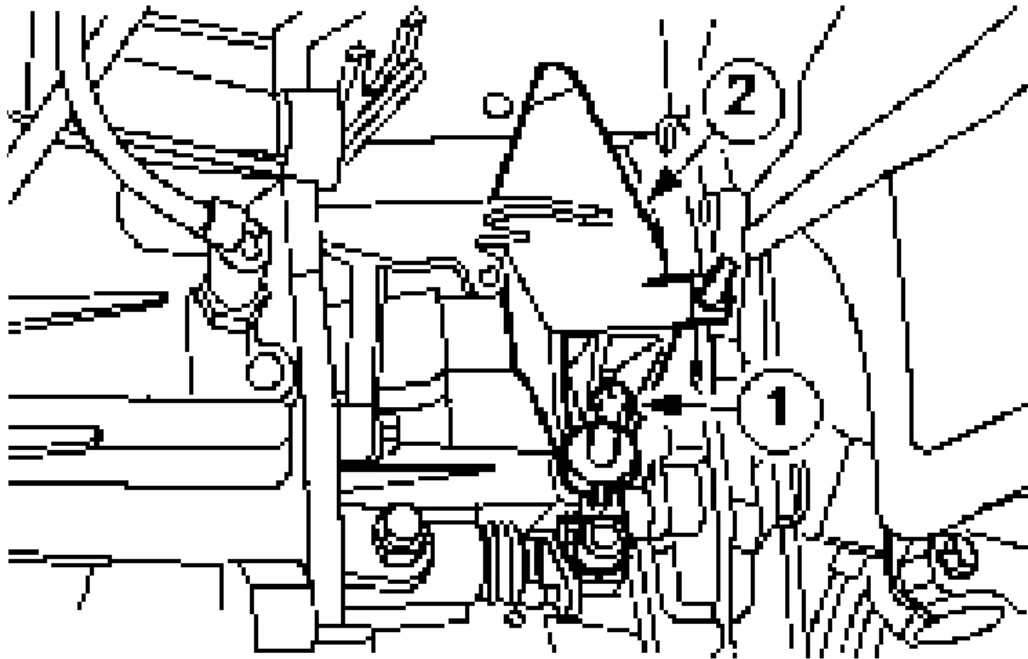
5. Remove the shift and selector cable cover.



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Fig. 38: Removing Shift And Selector Cable Cover
Courtesy of FORD MOTOR CO.

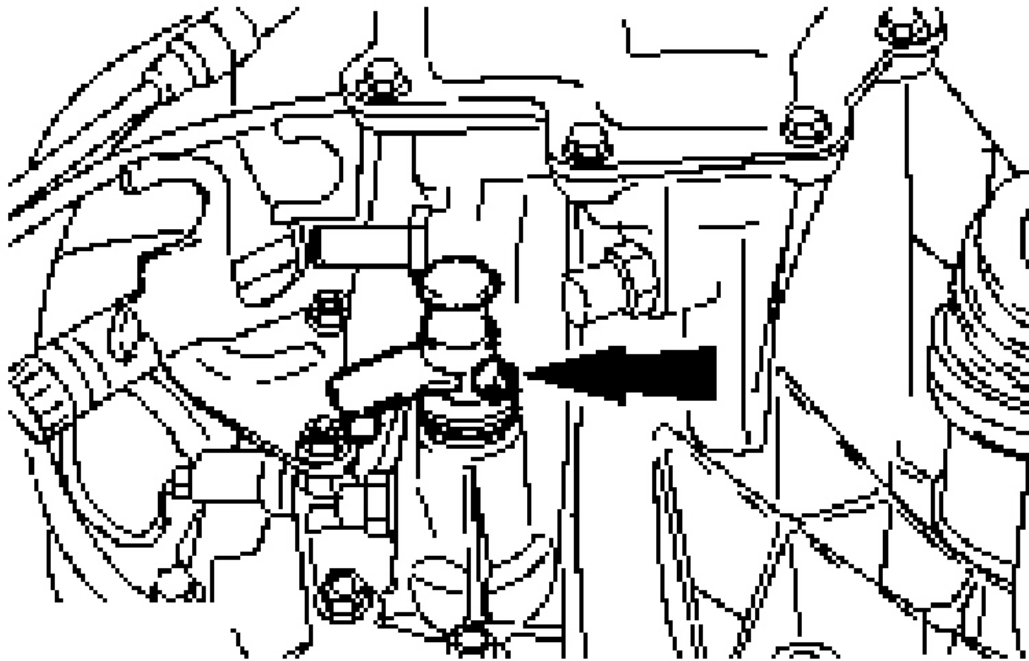
6. Remove the shift lever.
 1. Remove the rubber cap and the securing clip.
 2. Remove the shift lever.
 - Remove the boot from the selector lever.



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Fig. 39: Removing Shift Lever
Courtesy of FORD MOTOR CO.

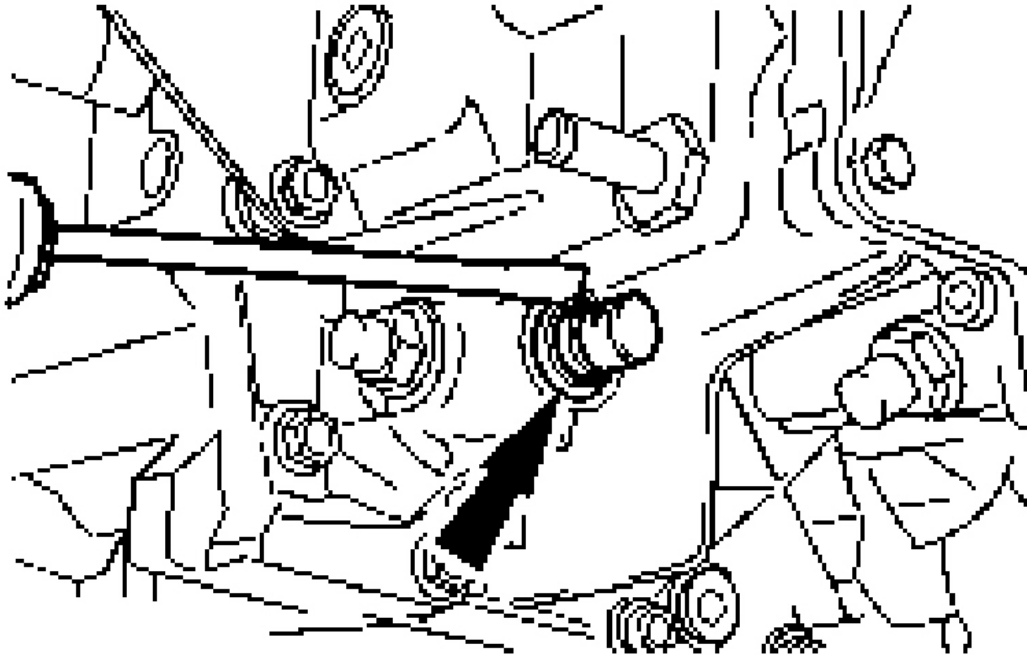
7. Remove the selector lever.



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Fig. 40: Removing Selector Lever
Courtesy of FORD MOTOR CO.

8. Remove the gearshift control shaft oil seal.
 - Clean up the shaft.



G03854522

Fig. 41: Removing Gearshift Control Shaft Oil Seal
Courtesy of FORD MOTOR CO.

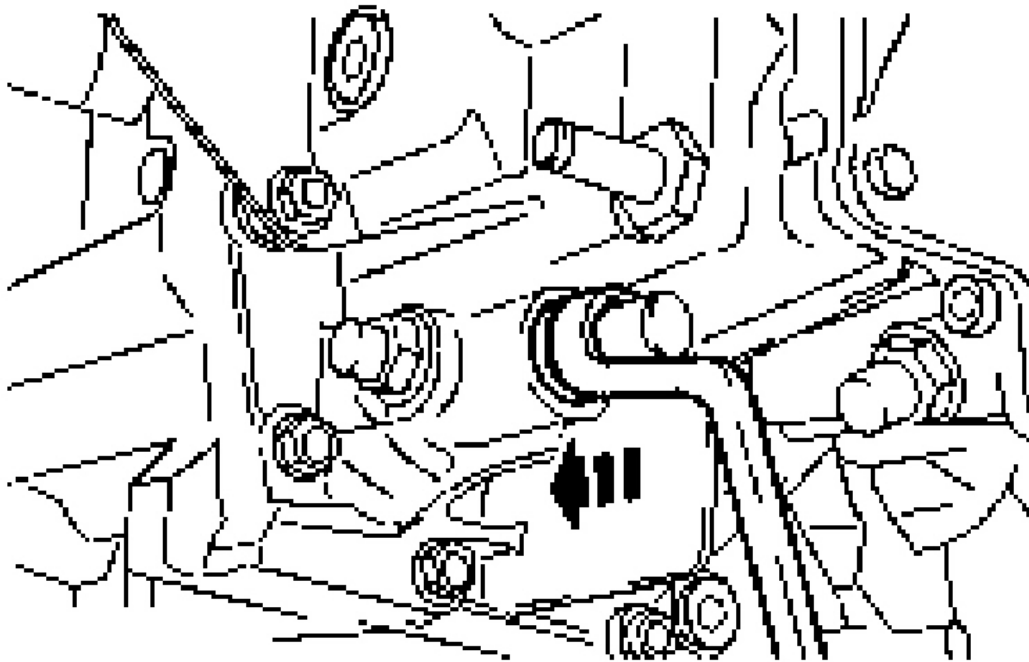
Installation

NOTE: The third gear must be engaged.

1. Remove the boot from the new oil seal.

CAUTION: Make sure that there is no adhesive tape lost under the sealing lip of the gearshift control shaft oil seal.

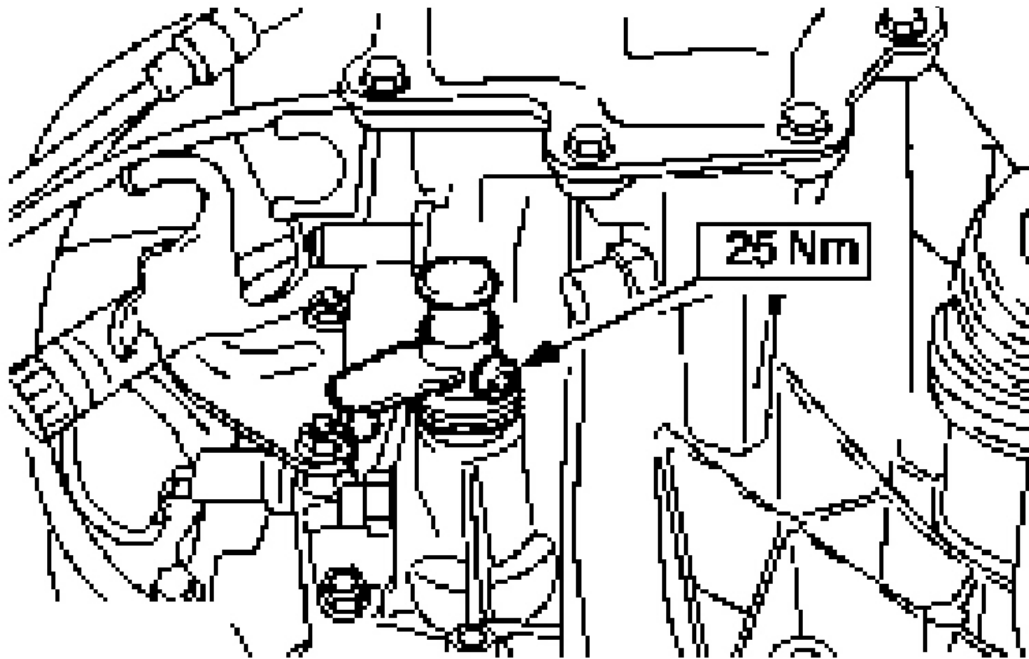
NOTE: Install a thin adhesive tape to the gear shaft to avoid damages of the oil seal from the bore or from the ring groove.



G03854523

Fig. 42: Installing Boot
Courtesy of FORD MOTOR CO.

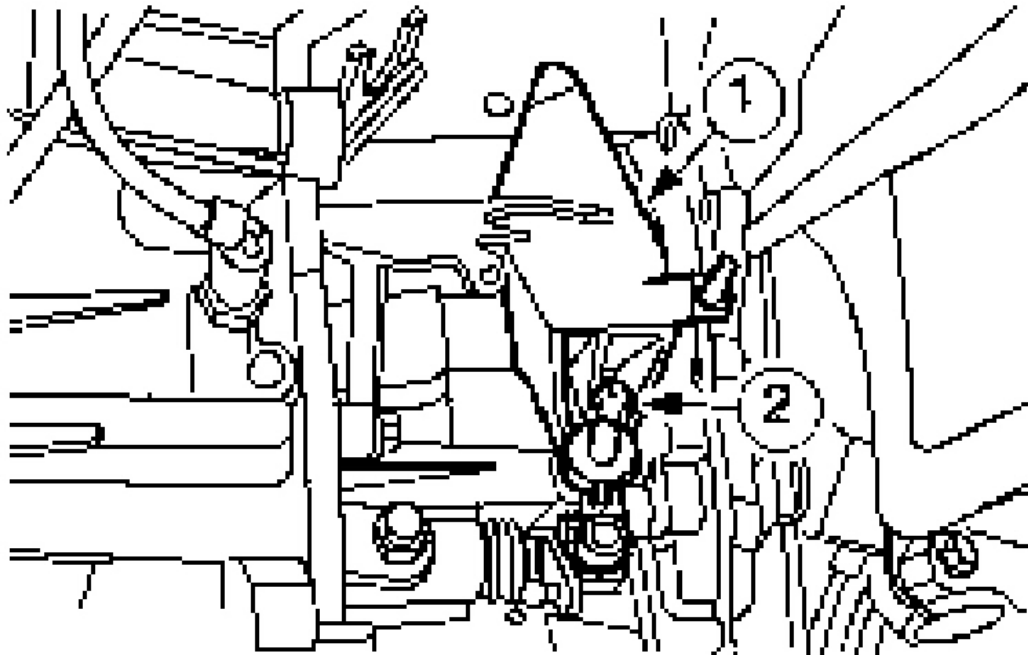
2. Using a wrench, install the gearshift control shaft oil seal.
 - Install the boot.
3. Install the selector lever.



G03854524

Fig. 43: Installing Selector Lever
Courtesy of FORD MOTOR CO.

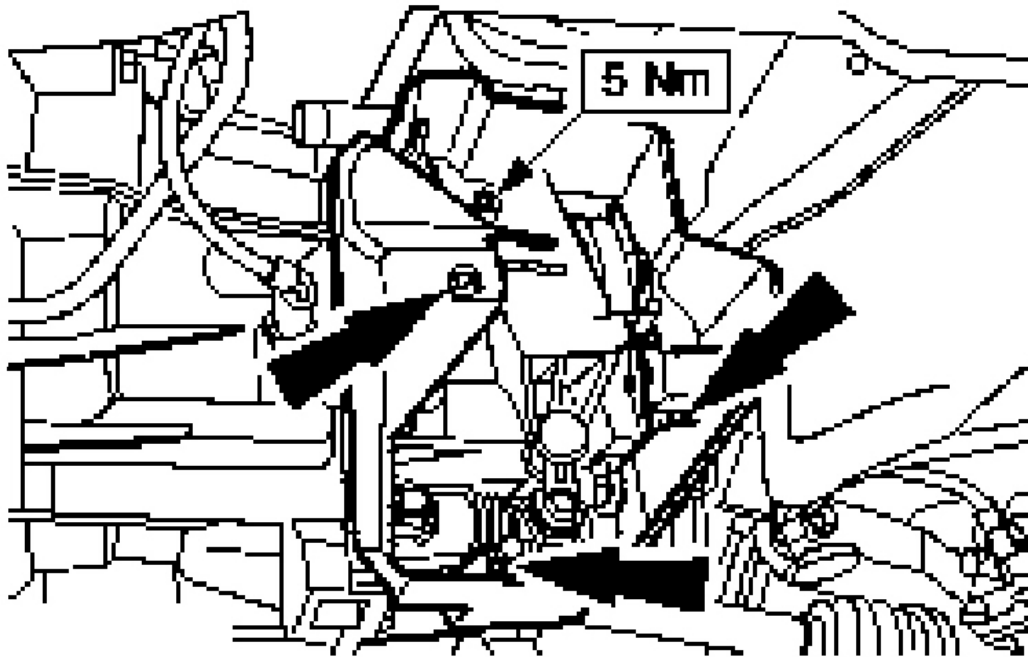
4. Install the shift lever.
 1. Insert the shift lever.
 2. Install the securing clip and the rubber cap.
 - Install the boot to the selector lever.



G03854525

Fig. 44: Installing Boot To Selector Lever
Courtesy of FORD MOTOR CO.

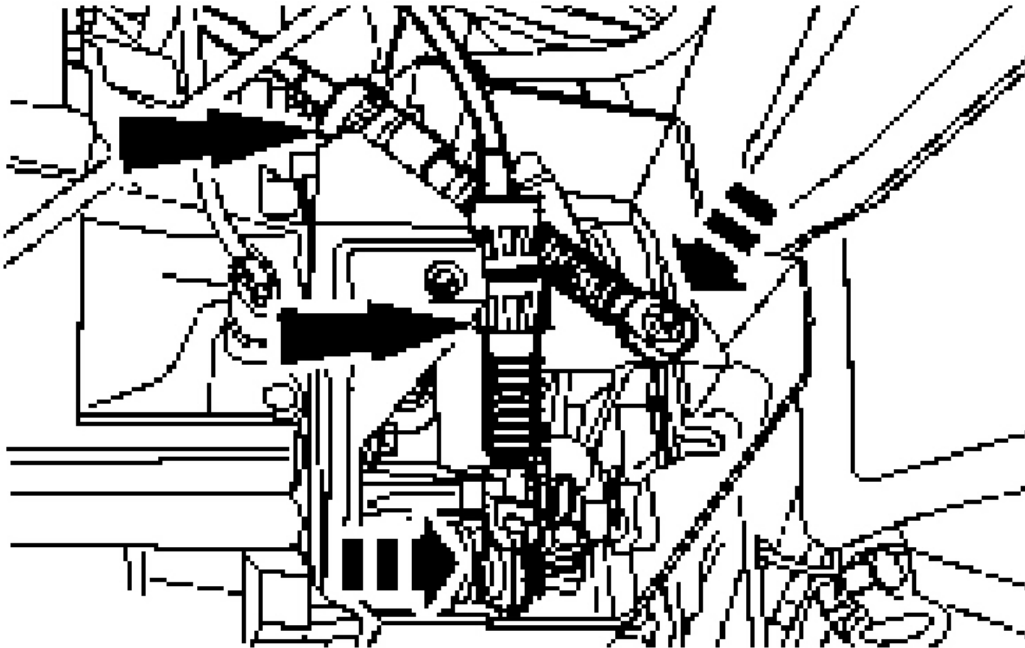
5. Install the shift and selector cable cover.



G03854526

Fig. 45: Installing Shift And Selector Cable Cover
Courtesy of FORD MOTOR CO.

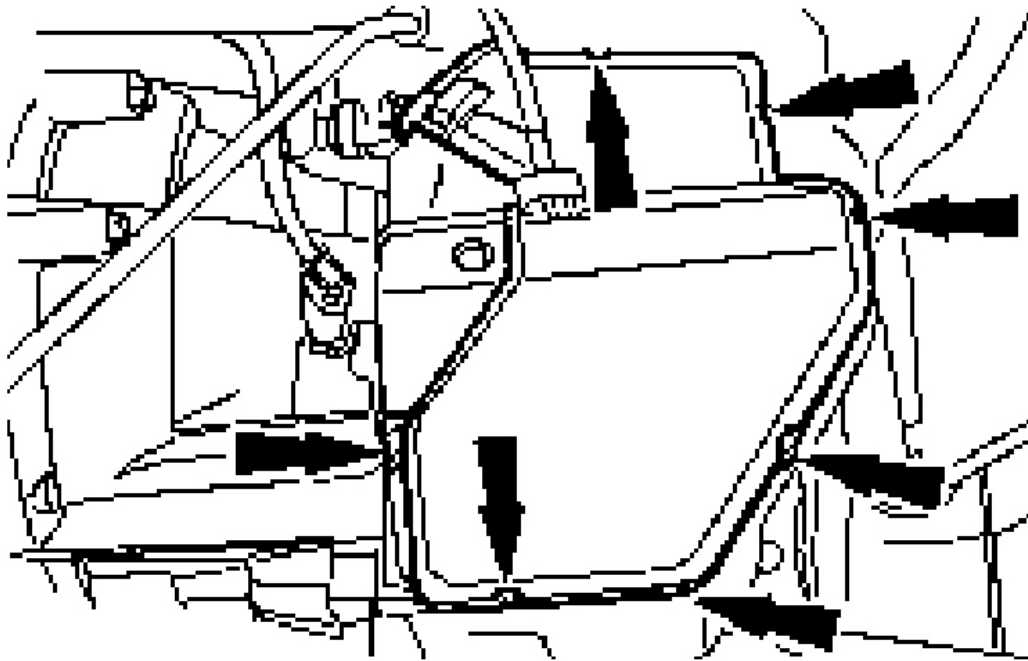
6. Install the shift and selector cable.
 - Install the shift and selector cable end fittings to the shift and selector lever.
 - Install the shift and selector cable to the bracket by turning the lower part of abutment clockwise and the upper part counter clockwise.



G03854527

Fig. 46: Installing Shift And Selector Cable
Courtesy of FORD MOTOR CO.

7. Close the cover on the shift and selector cable.



G03854528

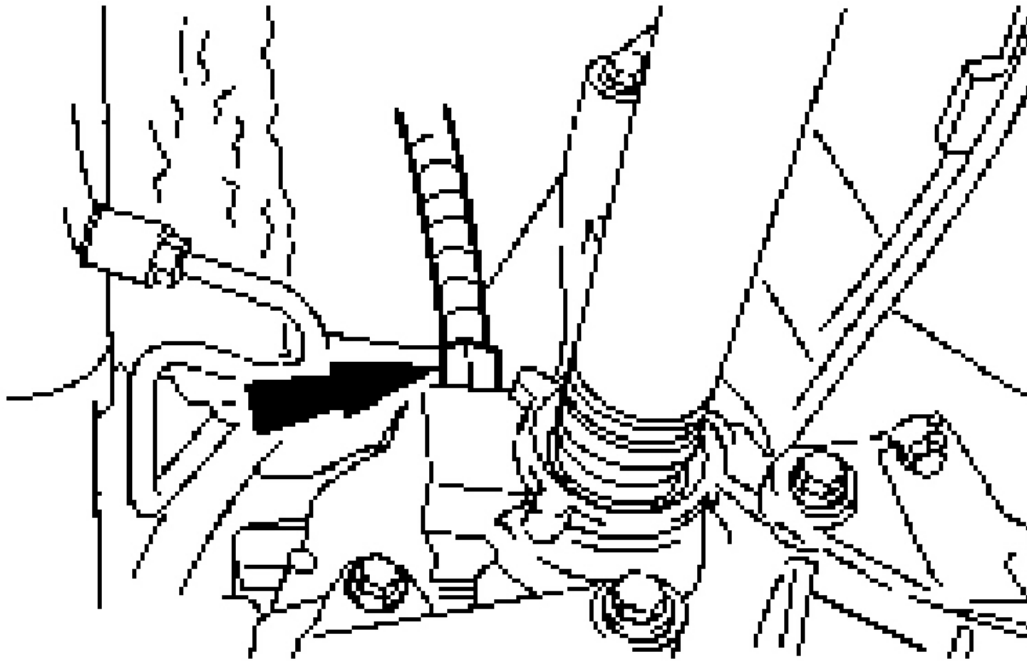
Fig. 47: Closing Cover On Shift And Selector Cable
Courtesy of FORD MOTOR CO.

8. Lower the vehicle.

VEHICLE SPEED SENSOR (VSS)

Removal

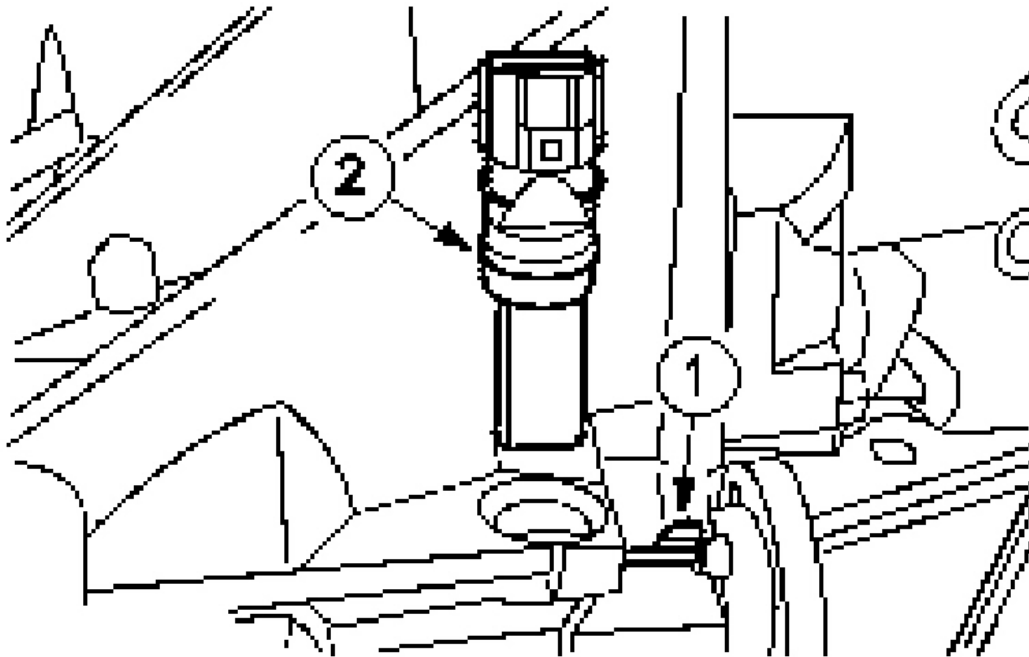
1. Raise and support the vehicle.
2. Disconnect the vehicle speed sensor (VSS) electrical connector.



G03854529

Fig. 48: Disconnecting Vehicle Speed Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

3. Remove the VSS.
 1. Remove the retaining pin.
 2. Remove the VSS.

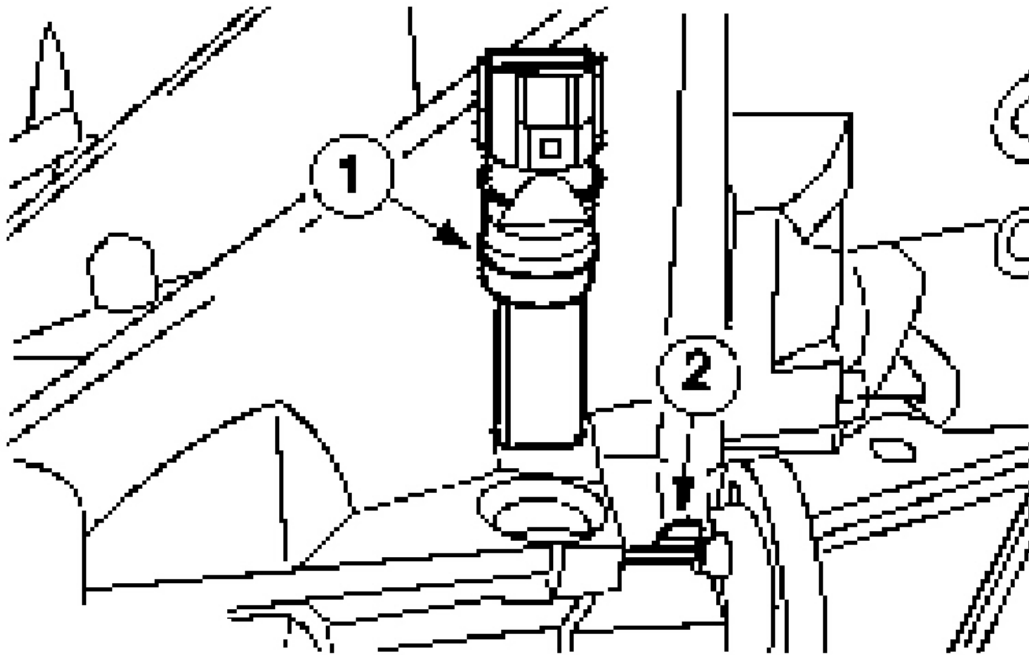


G03854530

Fig. 49: Removing VSS
Courtesy of FORD MOTOR CO.

Installation

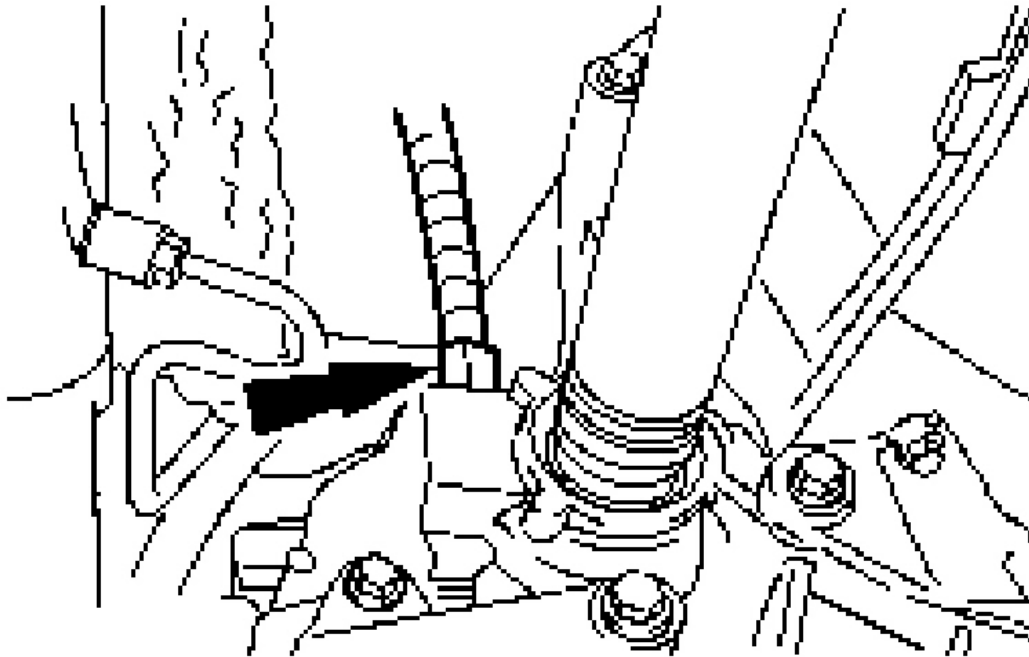
1. Install VSS.
 1. Insert the VSS.
 2. Insert the retaining pin.



G03854531

Fig. 50: Installing VSS
Courtesy of FORD MOTOR CO.

2. Install VSS connector.



G03854532

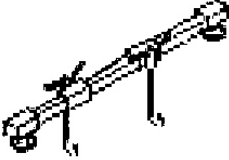
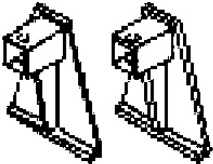
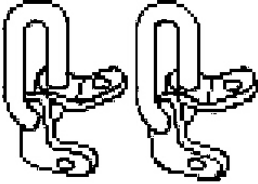
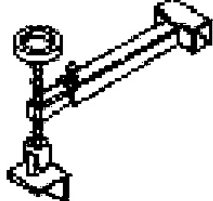

Fig. 51: Installing VSS Connector
Courtesy of FORD MOTOR CO.

3. Lower the vehicle.

REMOVAL

TRANSAXLE

Special Tool(s)

	Support Bar Engine 303-290A
	Adapter for 303-290 303-290-01
	Lifting Bracket, Engine 303-050 (T70P-6000)
	Adapter for 303-290A 303-290-03A
	Remover, Halfshaft 308-256

G03854533

Fig. 52: Identifying Special Tools
Courtesy of FORD MOTOR CO.

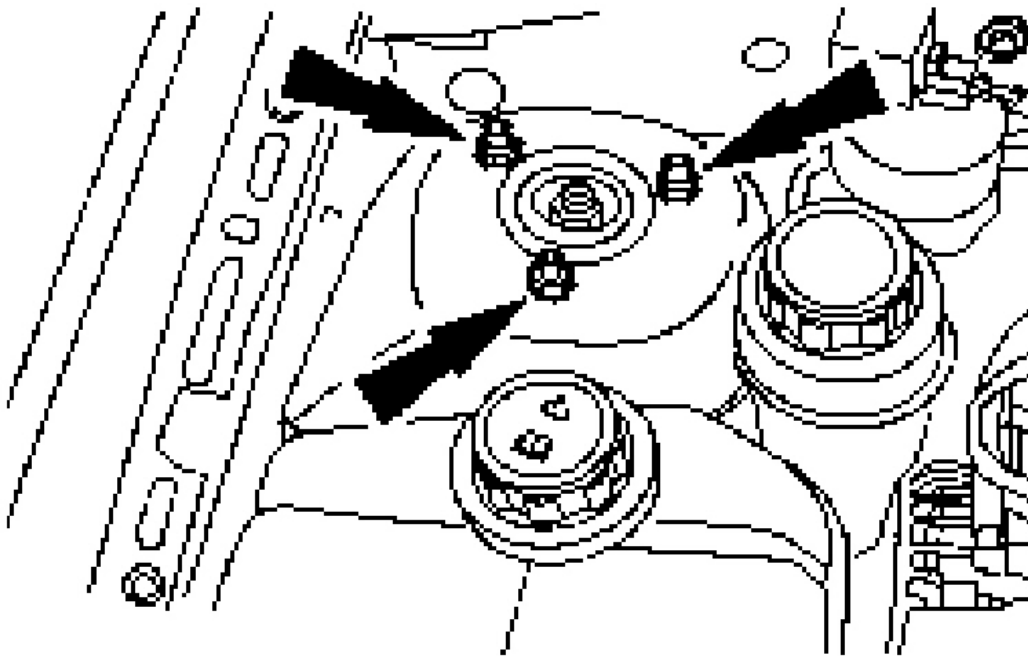
Material

MATERIAL REFERENCE

Cable ties	
------------	--

Removal

1. General notes.
 - The position markings for the engine mountings and engine roll restrictors are described looking from the transaxle towards the engine.
 - If necessary, cut cable ties and install new when installing the assembly.
2. Remove the battery tray.
3. Loosen the strut and spring assembly top mount nuts by five turns on both sides.

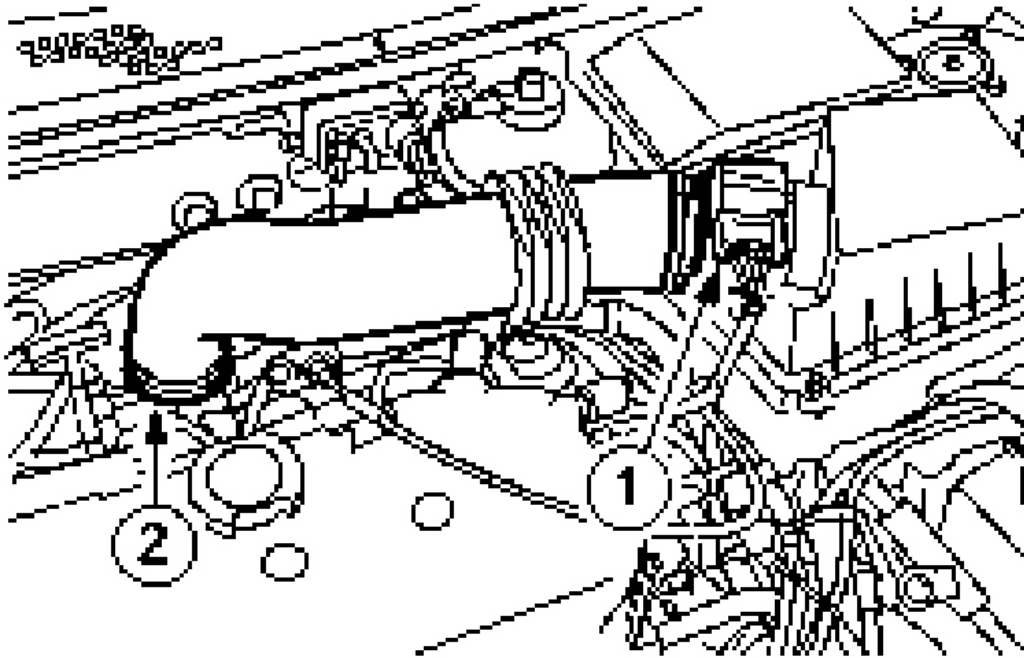


G03854534

Fig. 53: Loosening Strut And Spring Assembly Top Mount Nuts
Courtesy of FORD MOTOR CO.

4. Remove the air cleaner.
 1. Disconnect the plug of the MAF sensor.

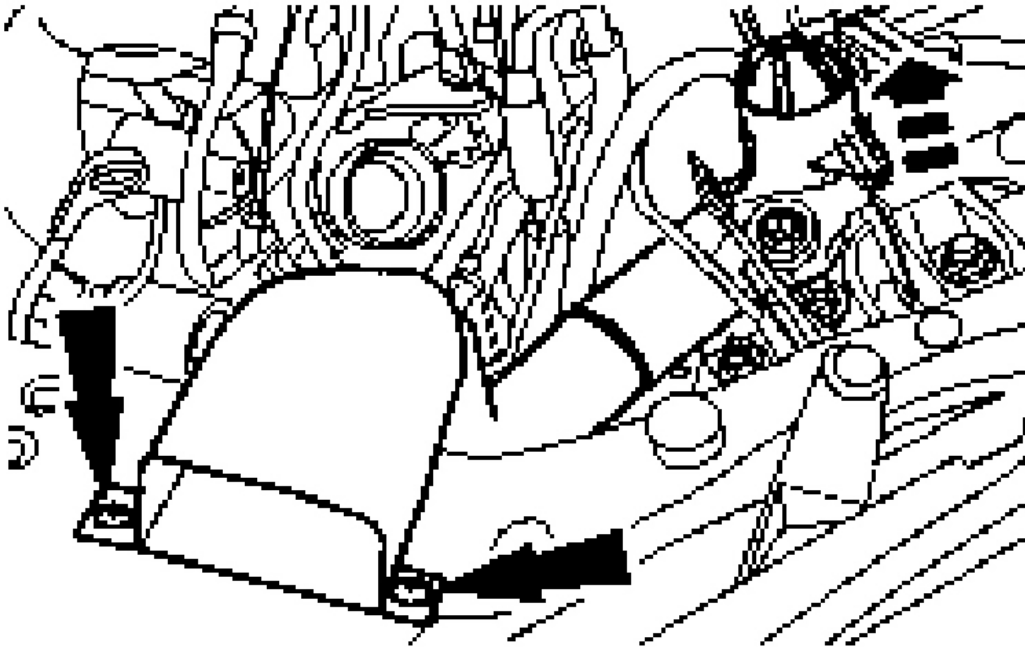
2. Detach the intake pipe.



G03854535

Fig. 54: Removing Air Cleaner
Courtesy of FORD MOTOR CO.

5. Remove the intake pipe.

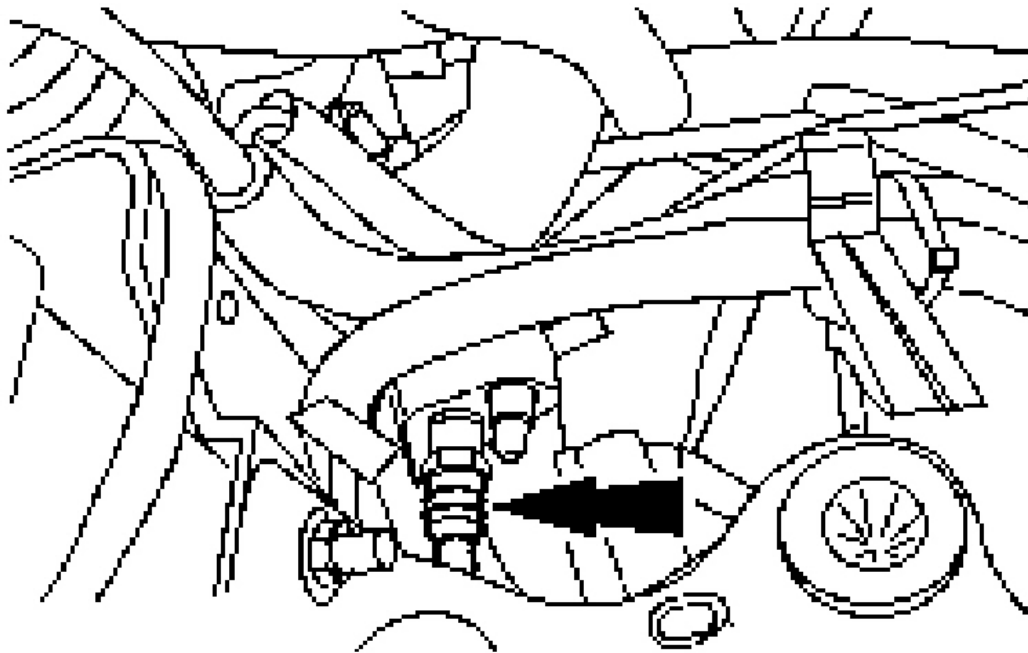


G03854536

Fig. 55: Removing Intake Pipe
Courtesy of FORD MOTOR CO.

WARNING: Escaping brake fluid. Do not allow brake fluid to come into contact with the skin or the eyes. If brake fluid does come into contact with the skin or the eyes, rinse the affected areas with water immediately. Failure to follow these instructions may result in personal injury.

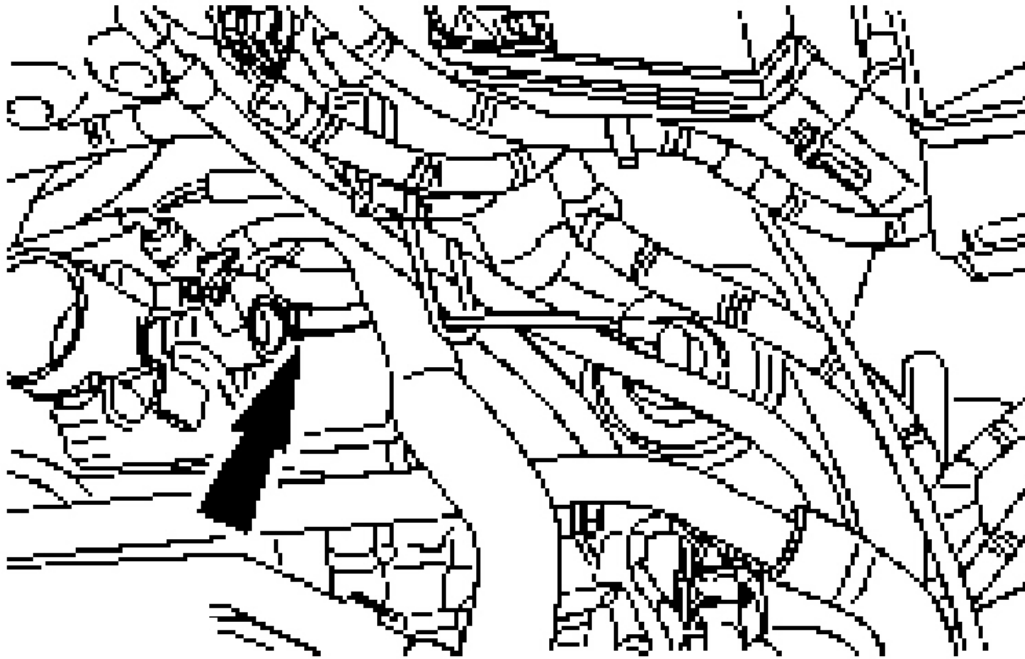
CAUTION: If brake fluid is spilt on the paintwork, the affected area must be immediately washed down with cold water.



G03854537

Fig. 56: Pulling Clutch Slave Cylinder High-Pressure Line Bracket
Courtesy of FORD MOTOR CO.

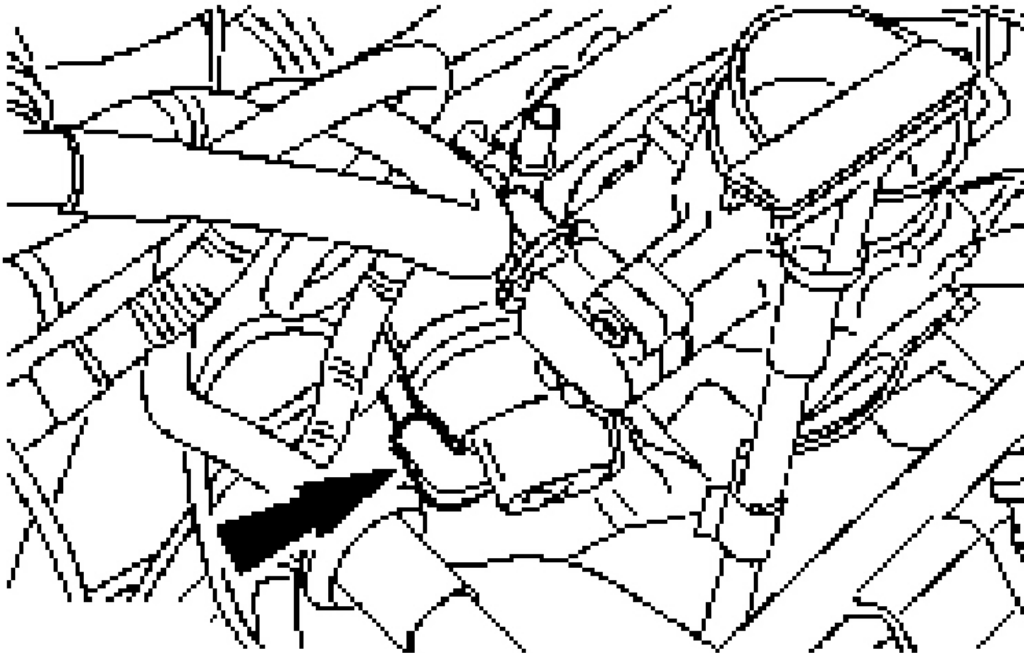
6. Remove the high-pressure line from the clutch slave cylinder.
 - Pull the clutch slave cylinder high-pressure line out of the bracket.
7. Disconnect the brake servo vacuum hose.



G03854538

Fig. 57: Disconnecting Brake Servo Vacuum Hose
Courtesy of FORD MOTOR CO.

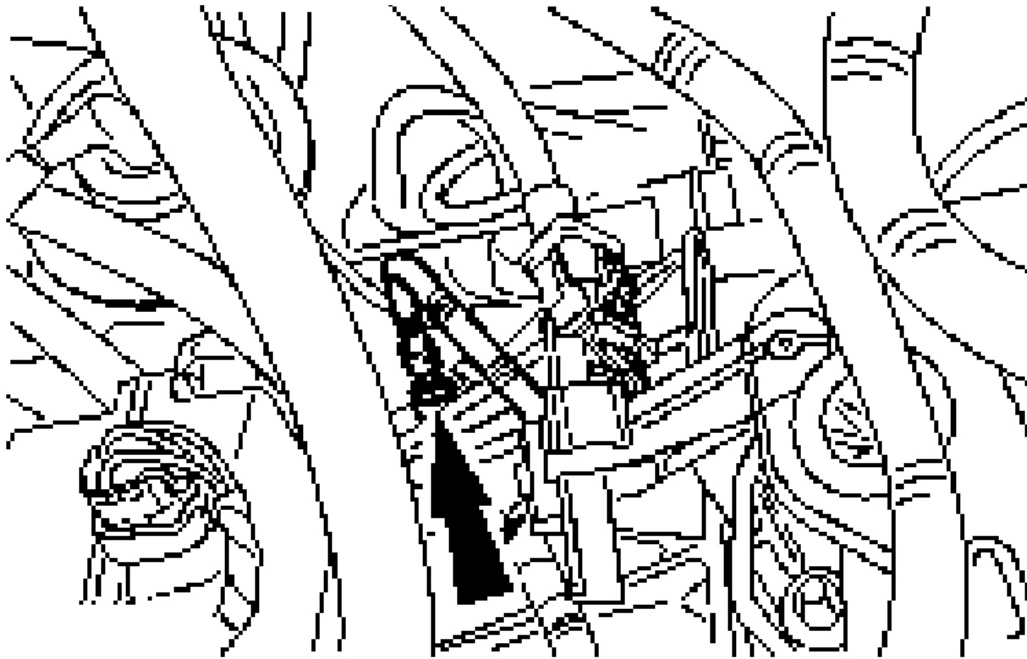
8. Disconnect the vacuum hoses.



G03854539

Fig. 58: Disconnecting Vacuum Hoses
Courtesy of FORD MOTOR CO.

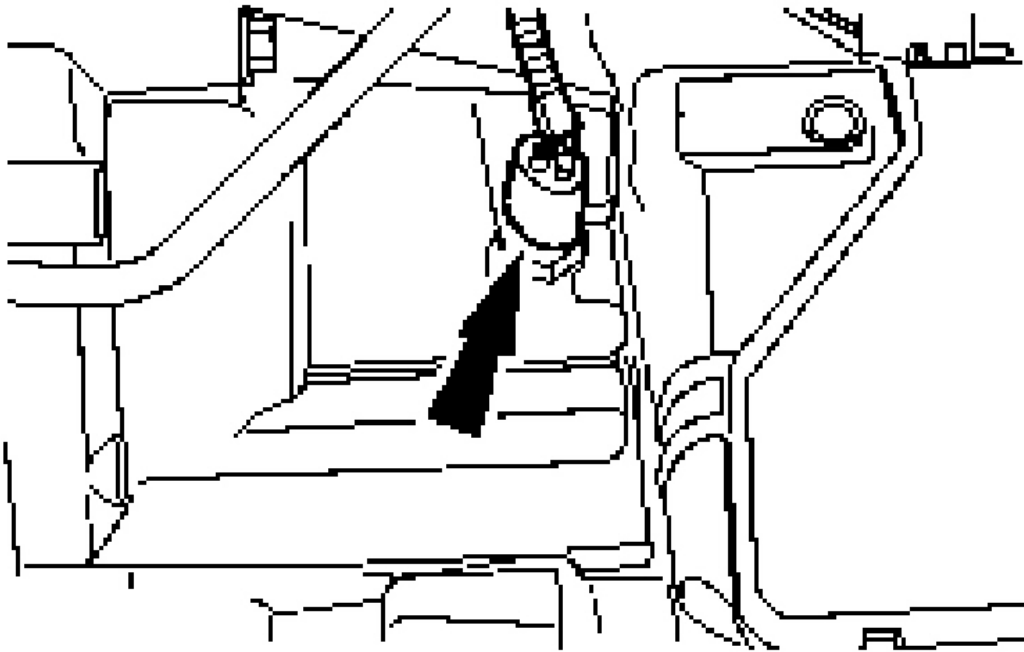
9. Disconnect the vehicle speed sensor (VSS) connector.



G03854540

Fig. 59: Disconnecting Vehicle Speed Sensor Connector
Courtesy of FORD MOTOR CO.

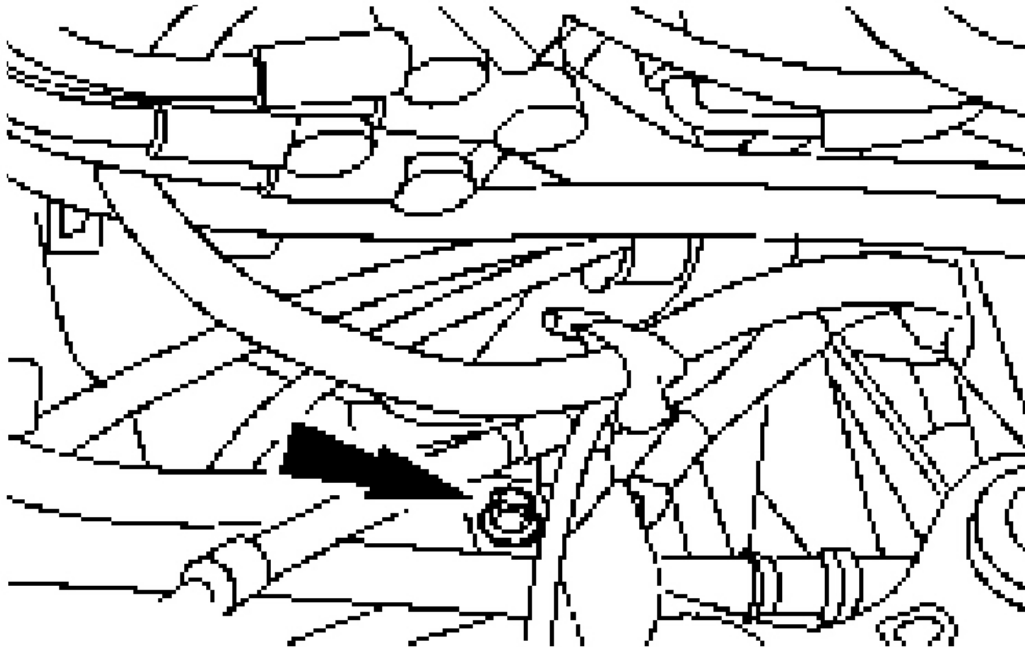
10. Disconnect the reversing light switch connector.



G03854541

Fig. 60: Disconnecting Reversing Light Switch Connector
Courtesy of FORD MOTOR CO.

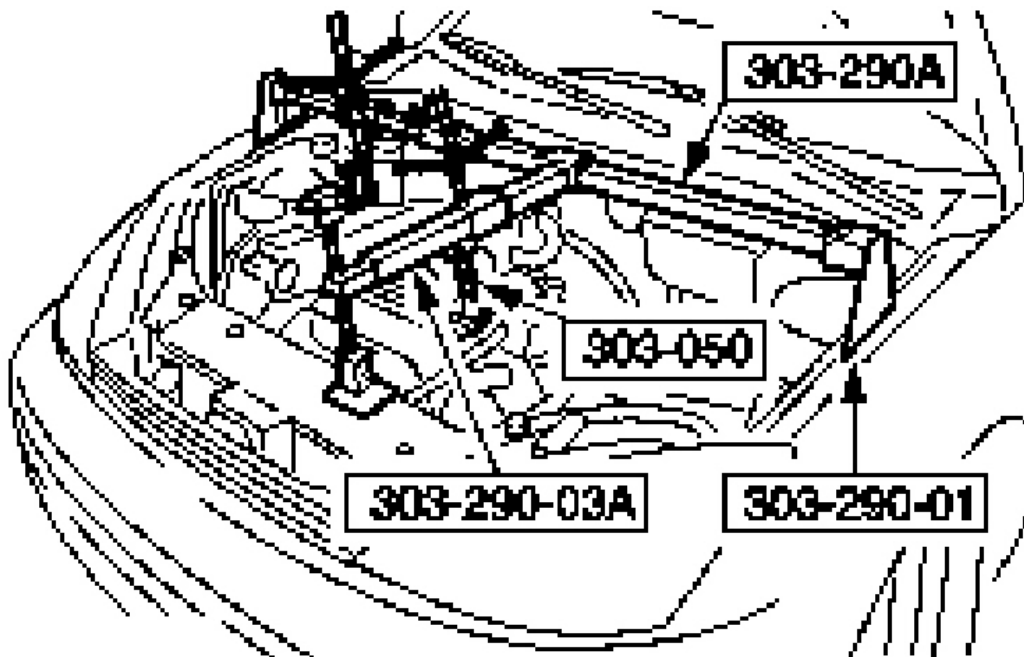
11. Remove the shift cable bracket mounting retainer.



G03854542

Fig. 61: Removing Shift Cable Bracket Mounting Retainer
Courtesy of FORD MOTOR CO.

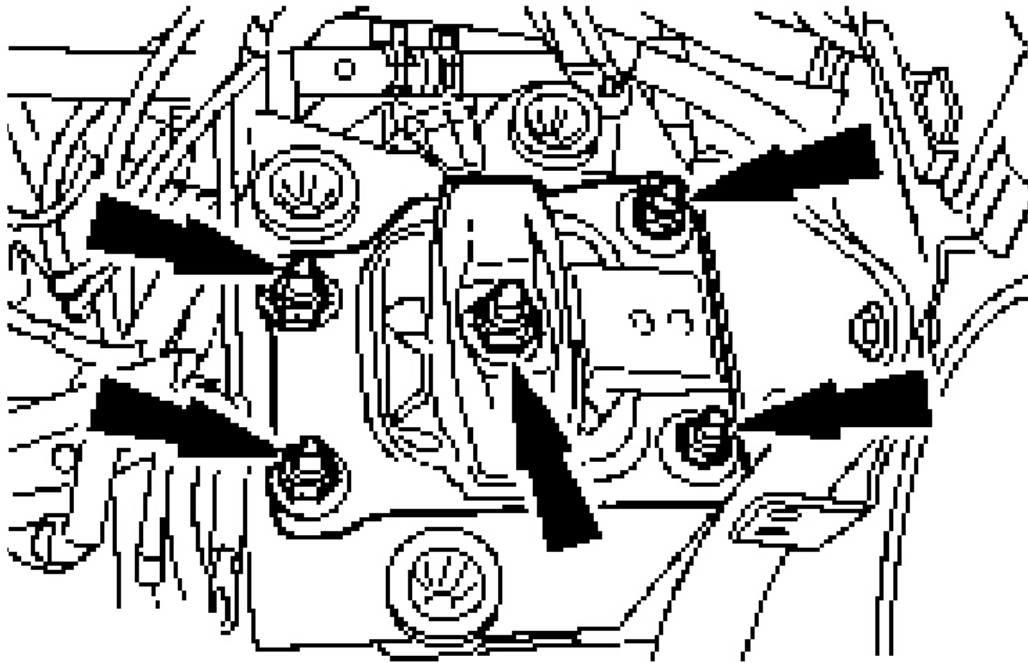
12. Install the special tools.



G03854543

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

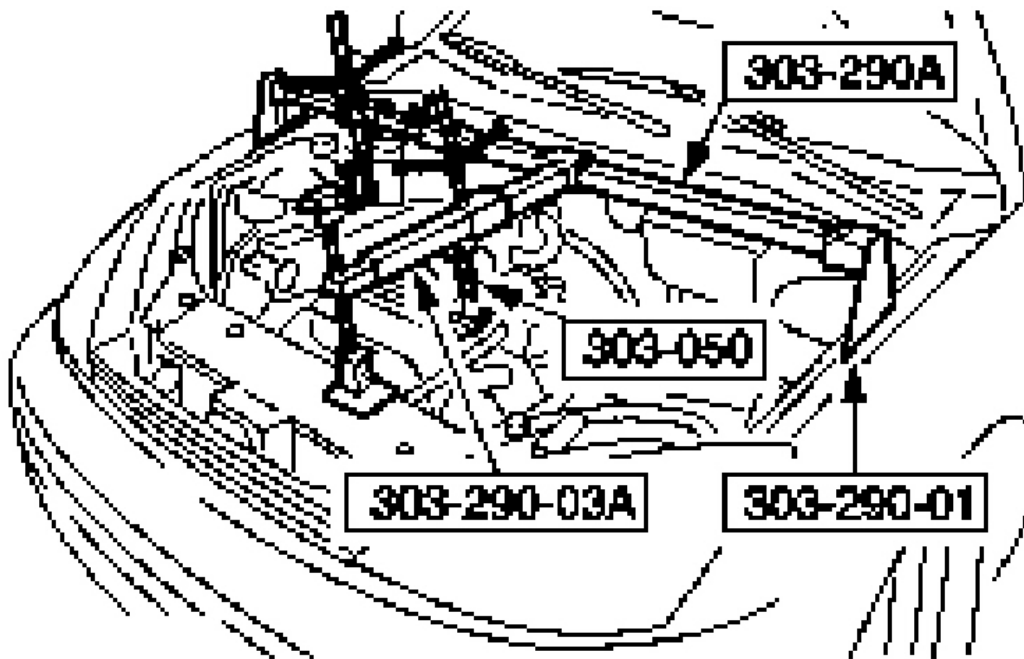
13. Remove the rear engine mounting.



G03854544

Fig. 63: Removing Rear Engine Mounting
Courtesy of FORD MOTOR CO.

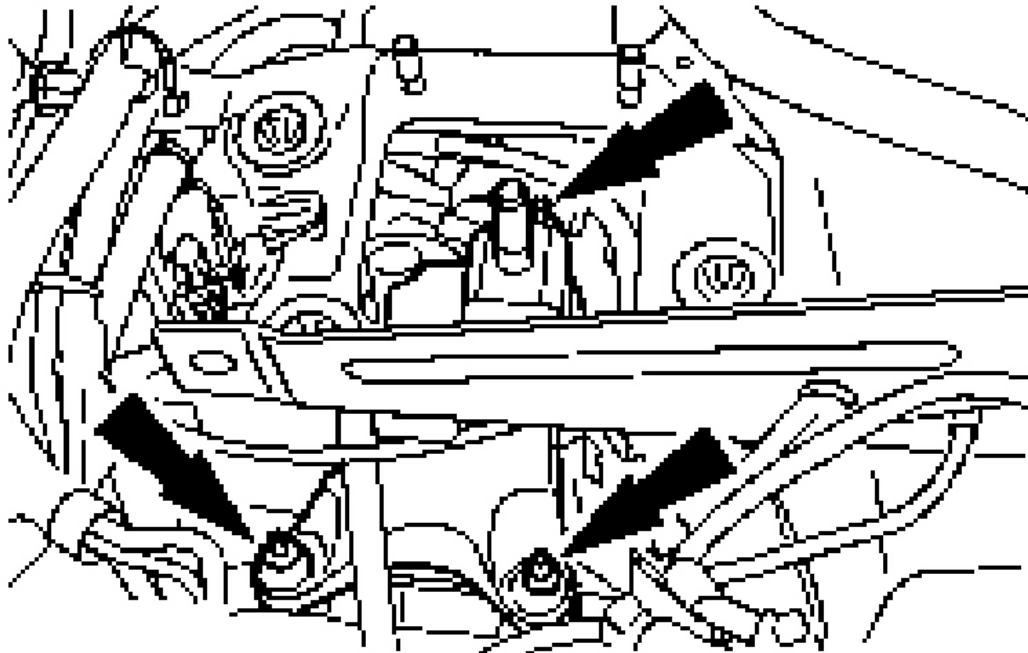
14. Using the special tools, lower the engine and transaxle assembly.



G03854545

Fig. 64: Lowering Engine And Transaxle Assembly
Courtesy of FORD MOTOR CO.

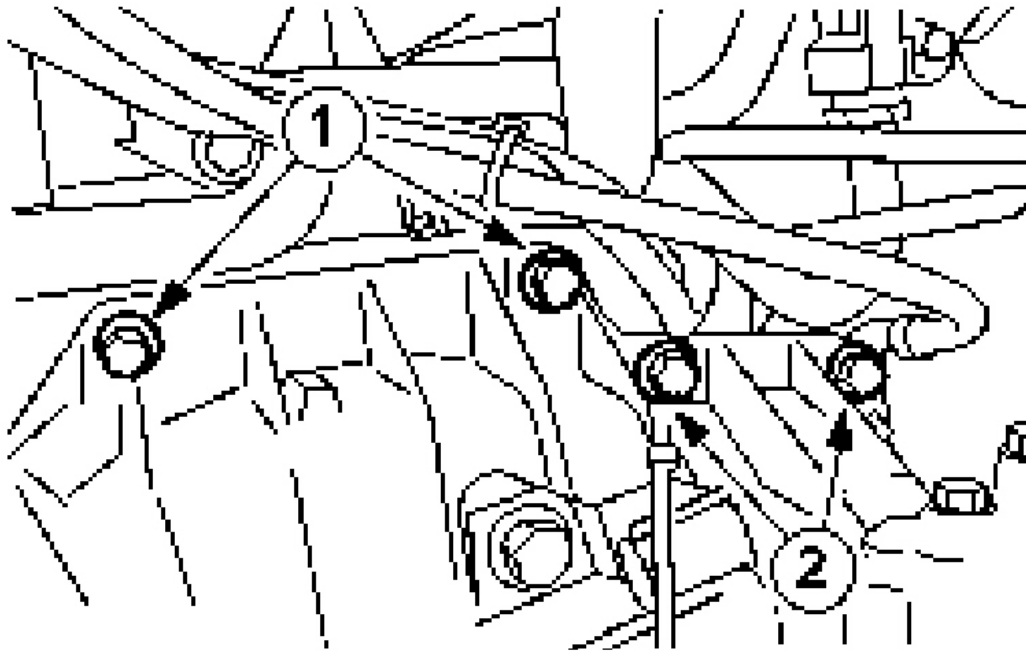
15. Remove the rear engine mounting bracket.



G03854546

Fig. 65: Removing Rear Engine Mounting Bracket
Courtesy of FORD MOTOR CO.

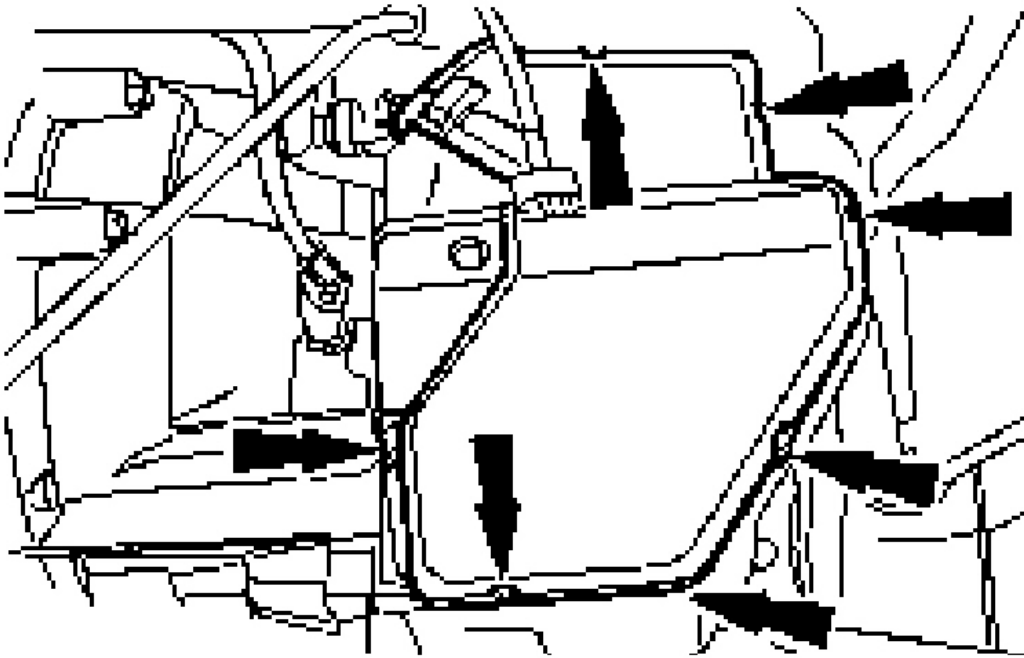
16. Remove the flange bolts and the starter motor retaining bolts.
 1. Remove the flange bolts.
 2. Remove the starter motor retaining bolts.



G03854547

Fig. 66: Removing Flange Bolts And Starter Motor Retaining Bolts
Courtesy of FORD MOTOR CO.

17. Remove the catalytic converter assembly.
18. Raise and support the vehicle.
19. Open the cover on the shift and selector cable.

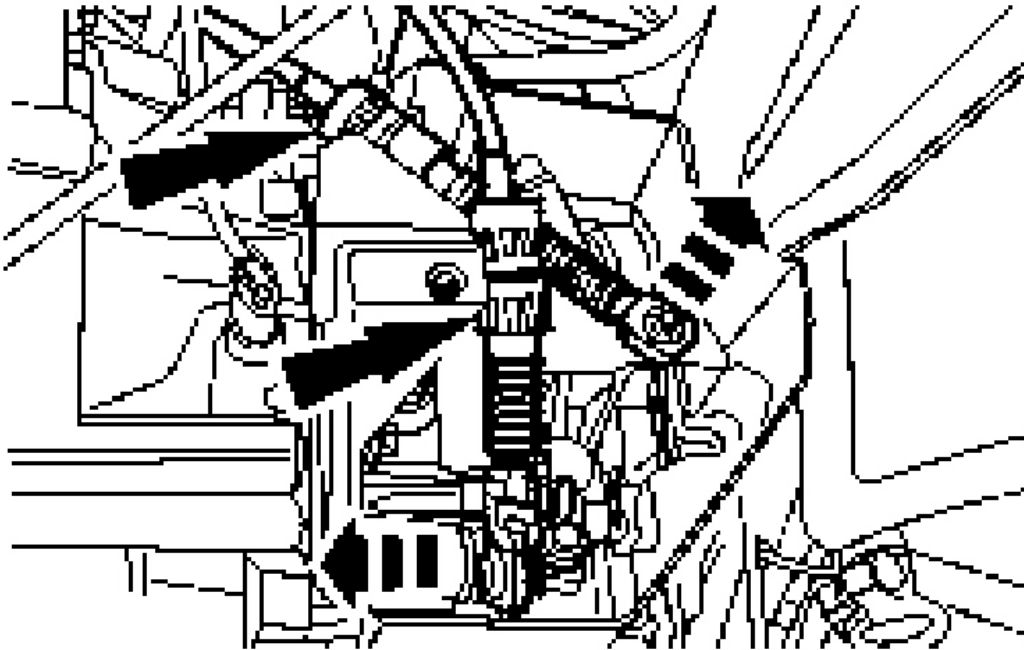


G03854548

Fig. 67: Opening Cover Shift And Selector Cable
Courtesy of FORD MOTOR CO.

20. Remove the shift and selector cable.

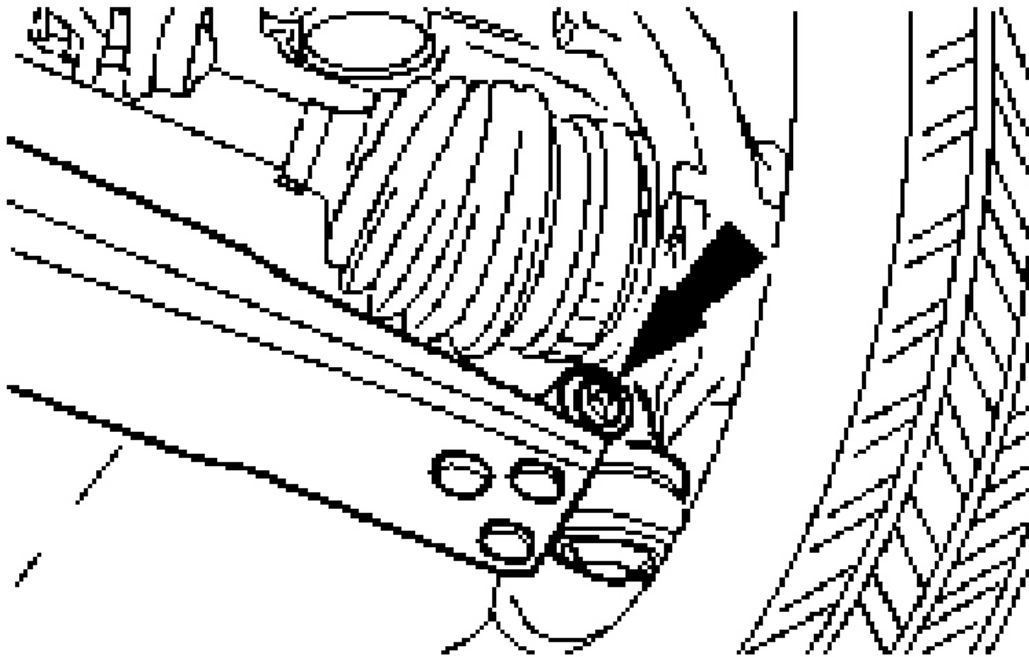
- Remove the shift and selector cable end fittings from the shift and selector lever.
- Remove the shift and selector cable from the bracket by turning the lower part of abutment clockwise and the upper part counterclockwise.



G03854549

Fig. 68: Removing Shift And Selector Cable
Courtesy of FORD MOTOR CO.

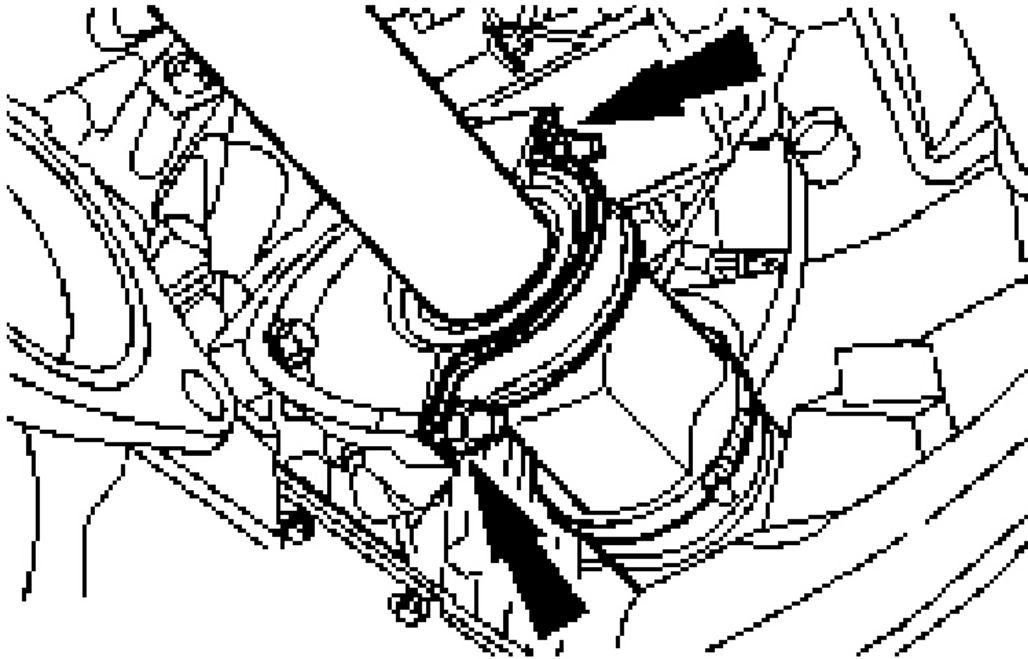
21. Remove the lower suspension arm ball joints on both sides (right-hand side shown left-hand side similar).



G03854550

Fig. 69: Removing Lower Suspension Arm Ball Joints
Courtesy of FORD MOTOR CO.

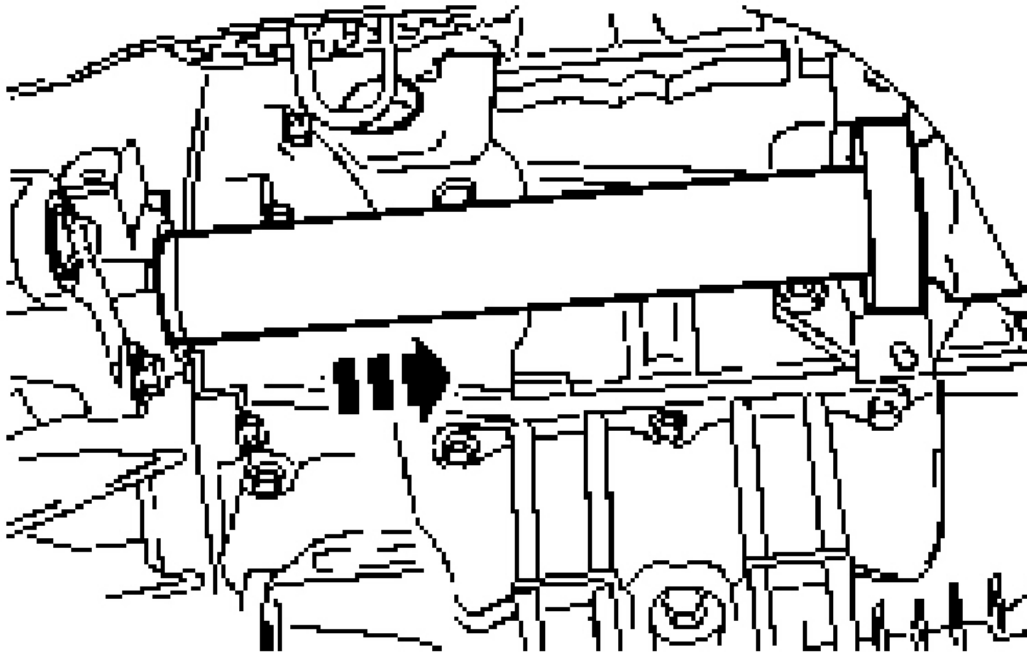
22. Remove the mounting bracket from the right-hand front halfshaft intermediate bearing.



G03854551

Fig. 70: Removing Mounting Bracket
Courtesy of FORD MOTOR CO.

CAUTION: The inner joint must not bend more than 18 degrees, the outer joint more than 45 degrees.

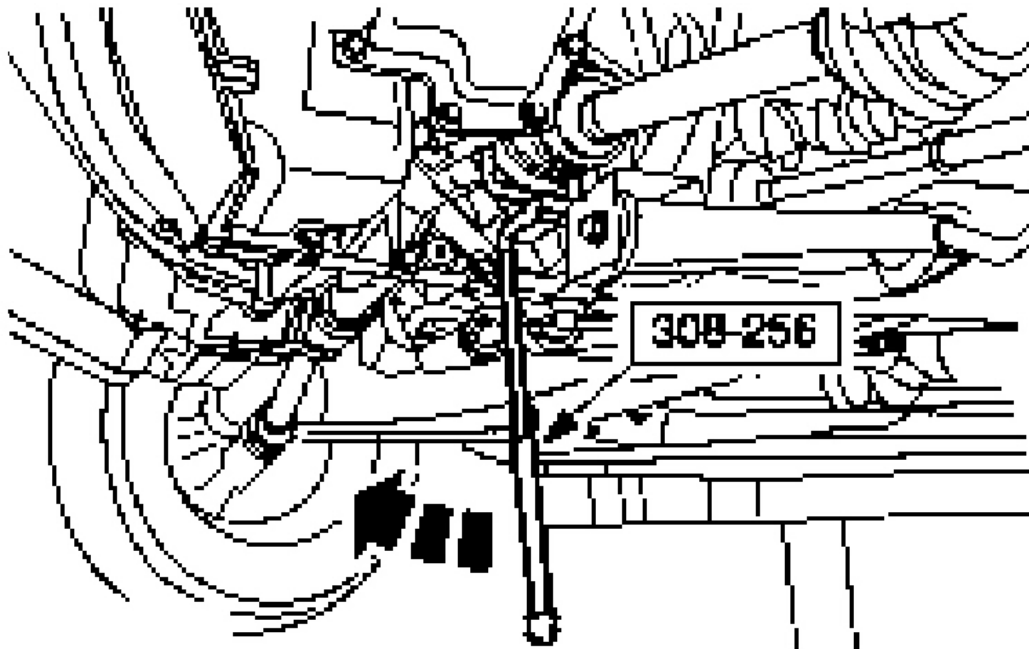


G03854552

Fig. 71: Removing Right-Hand Front Halfshaft
Courtesy of FORD MOTOR CO.

23. Remove the right-hand front halfshaft from the transaxle and secure it.

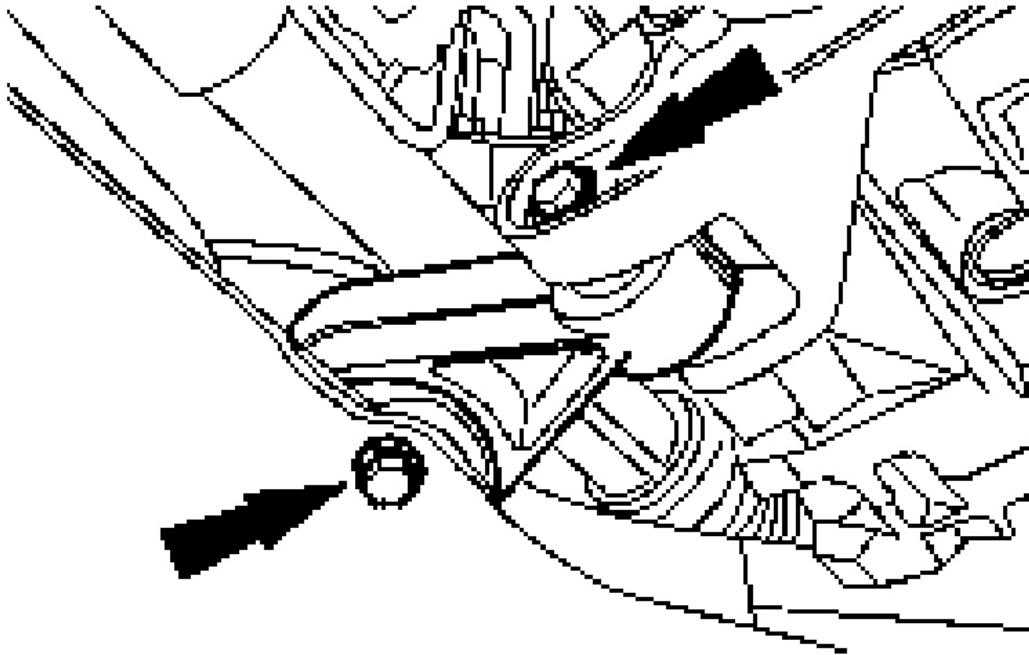
CAUTION: The inner joint must not bend more than 18 degrees, the outer joint more than 45 degrees.



G03854553

Fig. 72: Removing Left-Hand Front Halfshaft
Courtesy of FORD MOTOR CO.

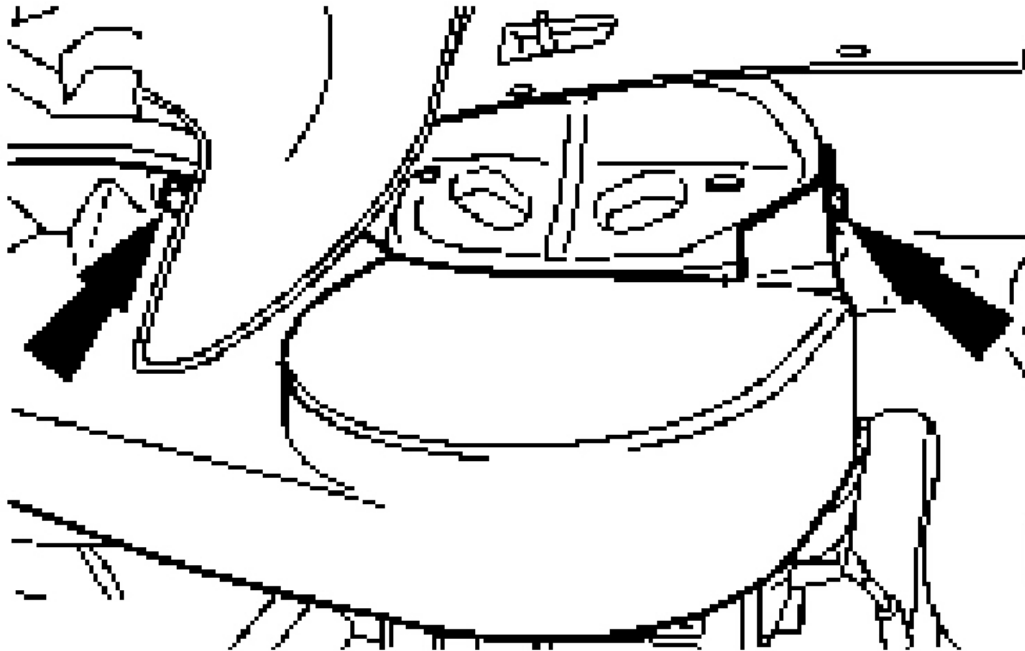
24. Remove the left-hand front halfshaft from the transaxle and secure it.
25. Remove the roll restrictor.



G03854554

Fig. 73: Removing Roll Restrictor
Courtesy of FORD MOTOR CO.

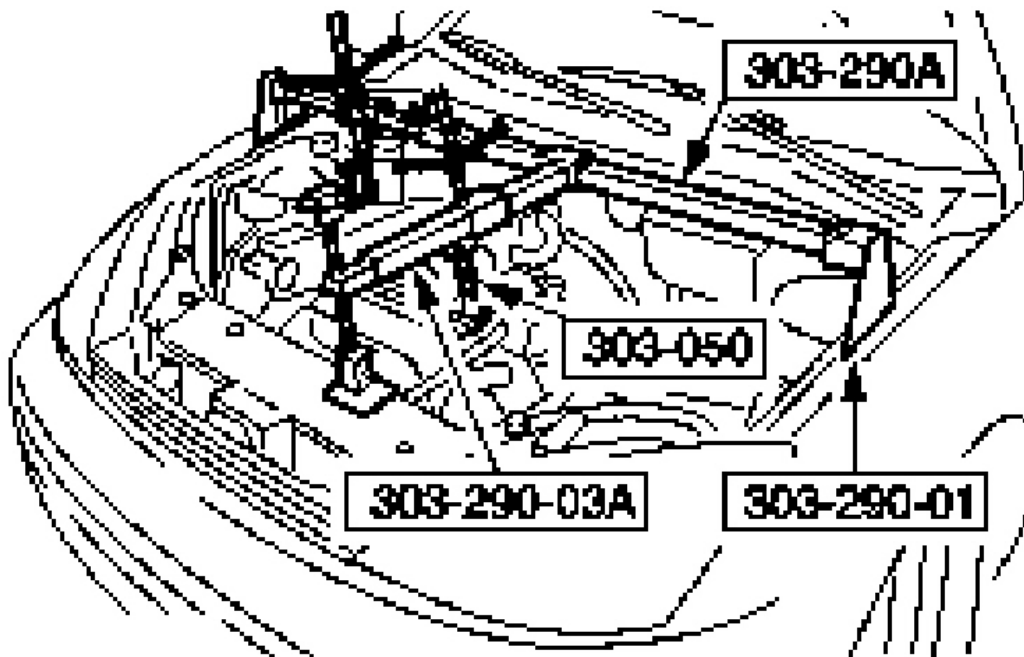
26. Remove the drive belt cover.



G03854555

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

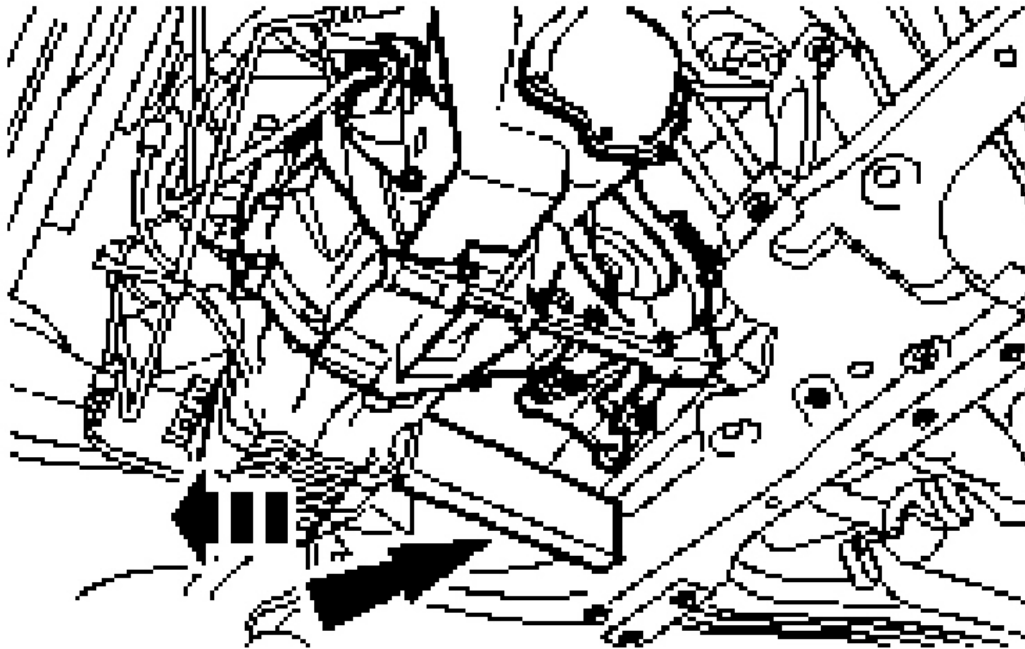
27. Lower the vehicle.
28. Using the special tools, lower the engine and transaxle assembly as far as possible.



G03854556

Fig. 75: Lowering Engine And Transaxle Assembly
Courtesy of FORD MOTOR CO.

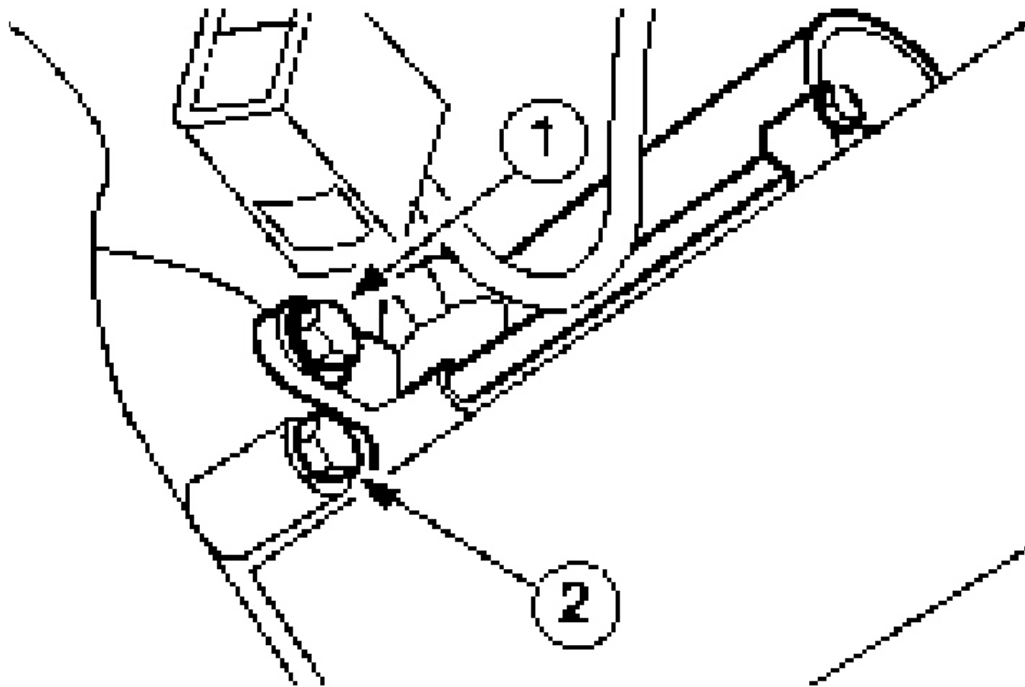
29. Raise and support the vehicle.
30. Tilt the engine and transaxle forwards and support using a wooden block (approximately 300 mm long).



G03854557

Fig. 76: Supporting Engine And Transaxle Using Wooden Block
Courtesy of FORD MOTOR CO.

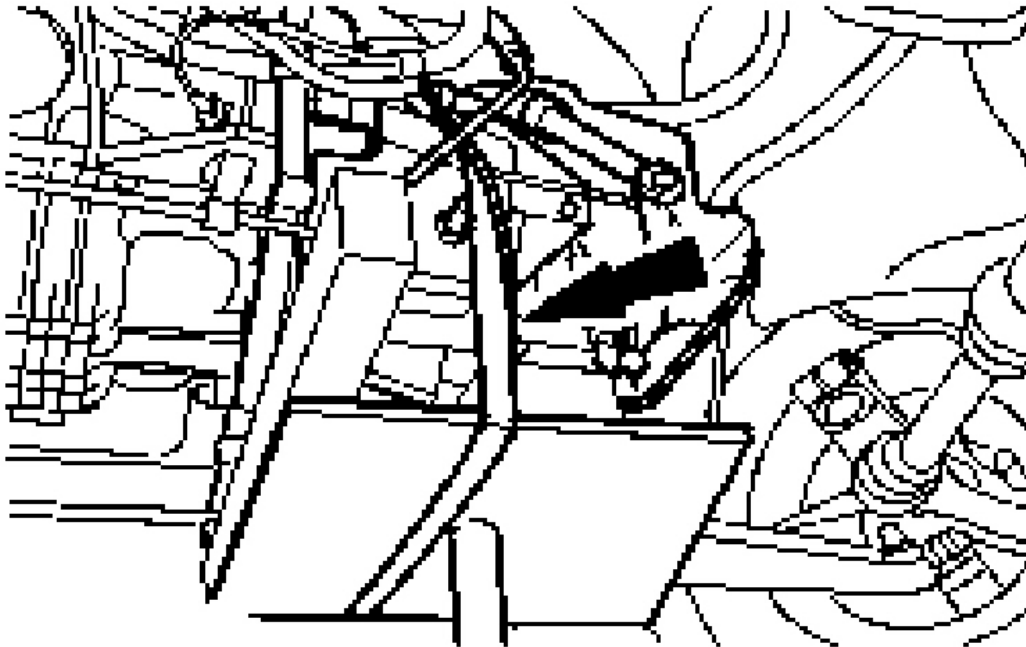
31. Undo the flange bolt and push the starter motor to one side.
 1. Starter motor bolt.
 2. Flange bolt.



G03854558

Fig. 77: Removing Flange Bolt
Courtesy of FORD MOTOR CO.

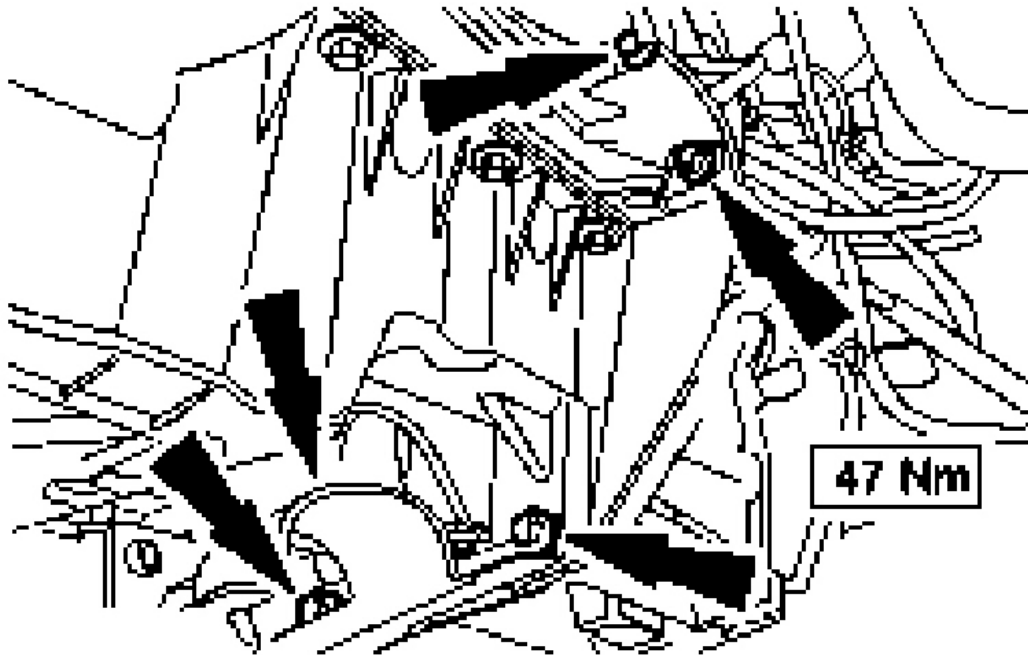
32. Secure the transaxle with a retaining strap and support using a transmission jack.



G03854559

Fig. 78: Securing Transaxle With Retaining Strap
Courtesy of FORD MOTOR CO.

NOTE: Support the transaxle using a transmission jack.



G03854560

Fig. 79: Removing Flange Bolts
Courtesy of FORD MOTOR CO.

33. Remove four flange bolts and the catalytic converter retaining bracket.
34. Lower the transaxle using the transmission jack.

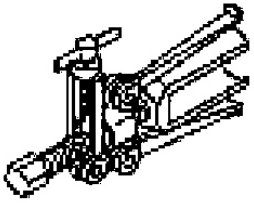

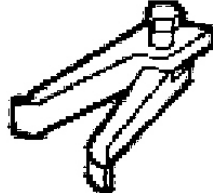


DISASSEMBLY

TRANSAXLE

Special Tool(s)

2002 Ford Focus LX

2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus

	Remover, Drive Pinion Oil Seal 205-078
	Remover, Bearing Cup, Differential 205-176 (15-074)
	Remover, Stator Case Bearing 307-163 (T86P-70043-A)
	Holding Fixture, Transmission 307-003 (T57L-500-B)
	Remover Input Shaft Fifth Gear 308-082

G03854561

Fig. 80: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL REFERENCE

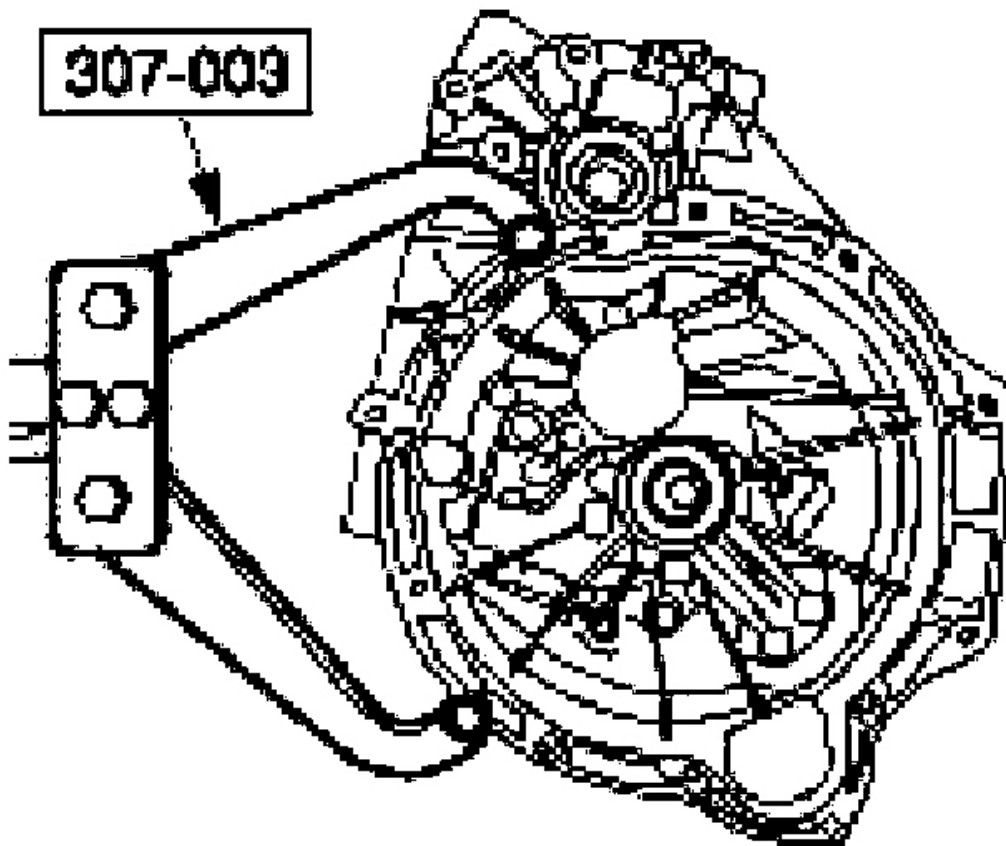
Metal Surface Cleaner

F4AZ-19A536-RA
WSE-M5B392-A**Disassembly**

1. General note

- Use vice jaw protectors when performing all the operations.
- Use a copper or plastic hammer.

2. Using the special tool, install the transaxle.

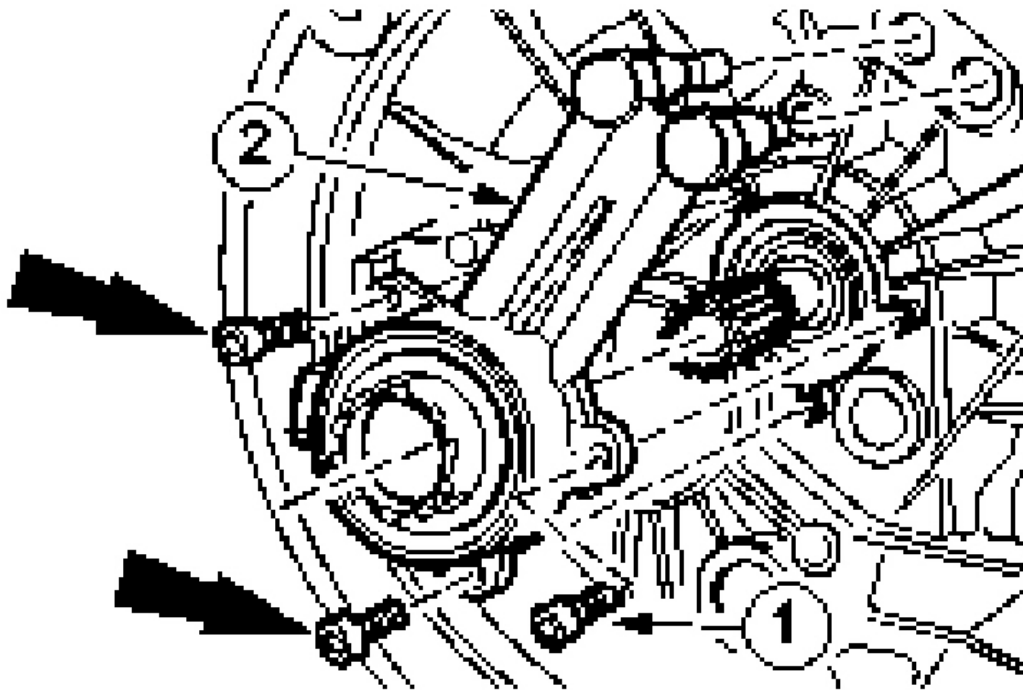


G03854562

Fig. 81: Installing Transaxle

Courtesy of FORD MOTOR CO.

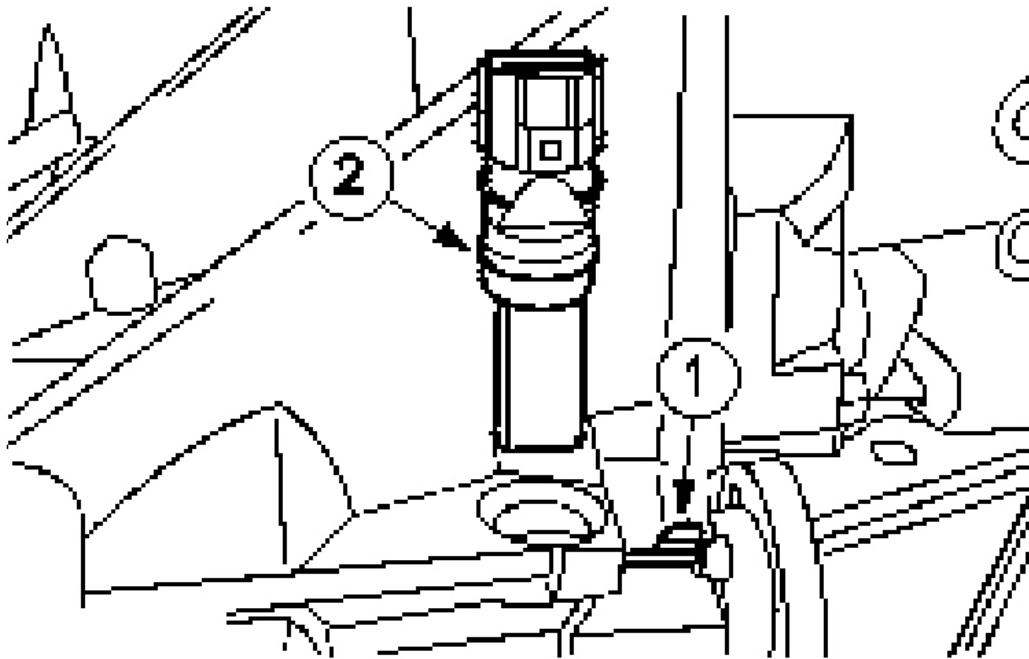
3. Remove the clutch slave cylinder.
 1. Remove the bolts.
 2. Remove the clutch slave cylinder.



G03854563

Fig. 82: Removing Clutch Slave Cylinder
Courtesy of FORD MOTOR CO.

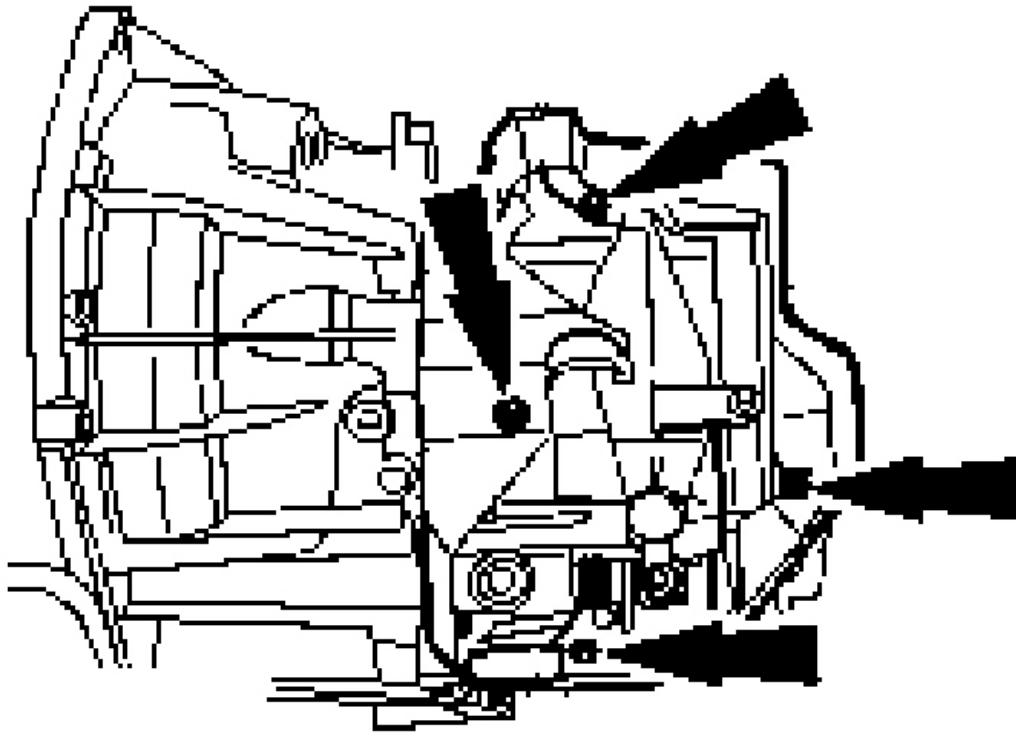
4. Remove the vehicle speed sensor (VSS).
 1. Remove the retaining pin.
 2. Remove the VSS.



G03854564

Fig. 83: Removing Vehicle Speed Sensor
Courtesy of FORD MOTOR CO.

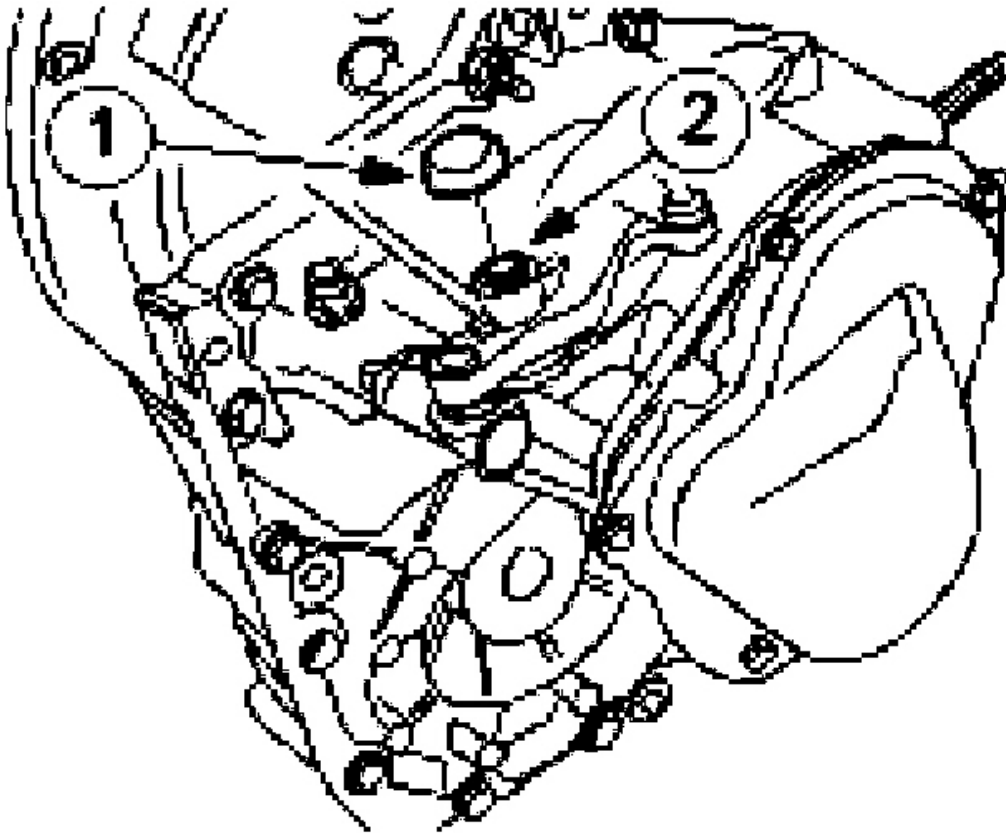
5. Remove the gearshift cable cover.



G03854565

Fig. 84: Removing Gearshift Cable Cover
Courtesy of FORD MOTOR CO.

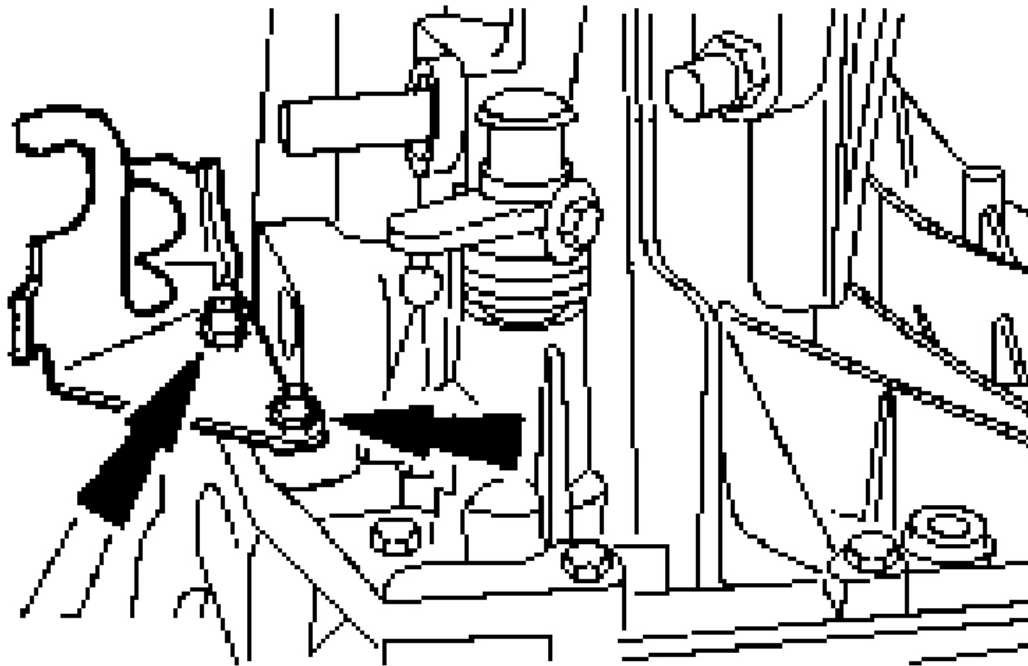
6. Remove the selector lever.
 1. Remove the protective cap.
 2. Remove the snap-ring.
 - Discard the snap ring.



G03854566

Fig. 85: Removing Selector Lever
Courtesy of FORD MOTOR CO.

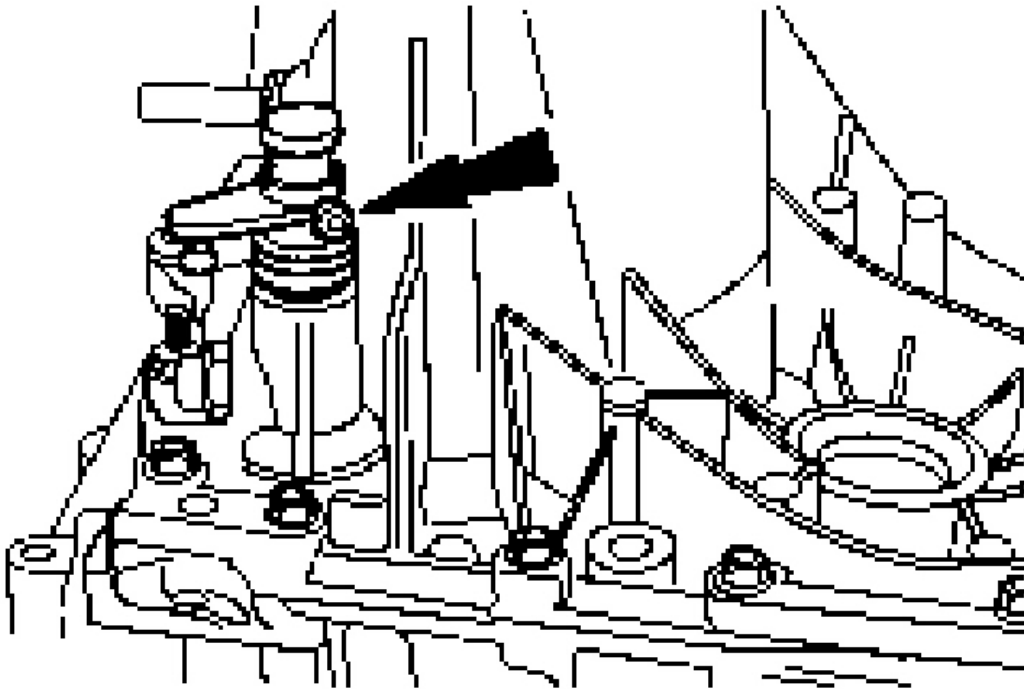
7. Remove selector the cable bracket.



G03854567

Fig. 86: Removing Selector Cable Bracket
Courtesy of FORD MOTOR CO.

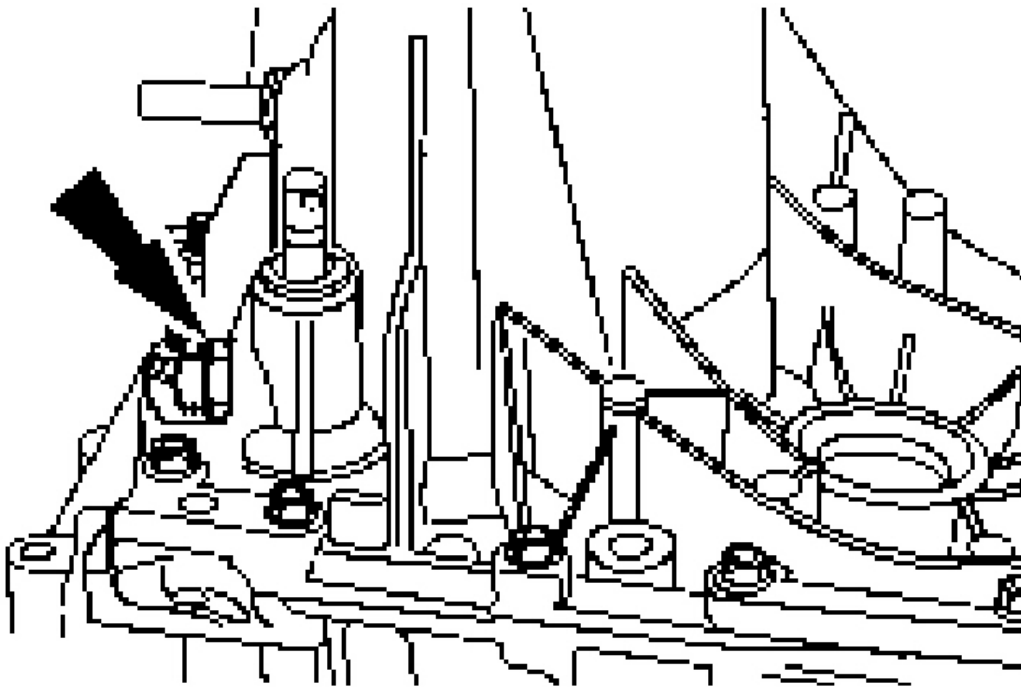
8. Remove the lever.
 - Remove the gaiter.



G03854568

Fig. 87: Removing Lever
Courtesy of FORD MOTOR CO.

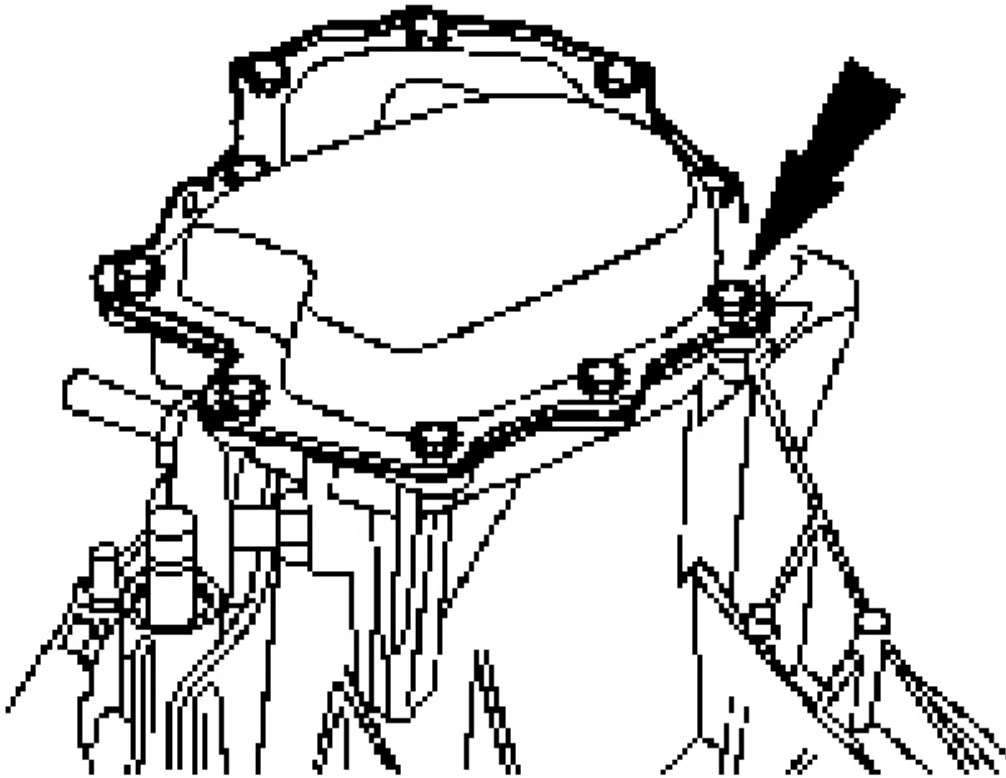
9. Remove the selector interlock mechanisms.



G03854569

Fig. 88: Removing Selector Interlock Mechanisms
Courtesy of FORD MOTOR CO.

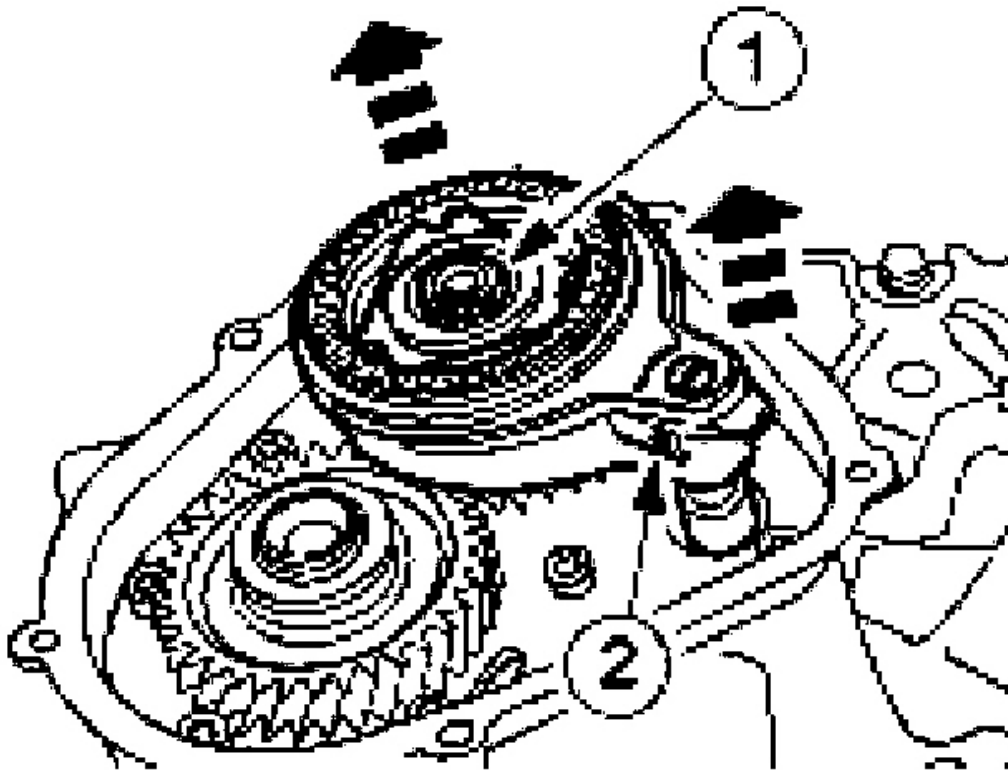
10. Remove the fifth gear cover.
 - Loosen the bolts and carefully separate the fifth gear cover by tapping lightly.



G03854570

Fig. 89: Removing Fifth Gear Cover
Courtesy of FORD MOTOR CO.

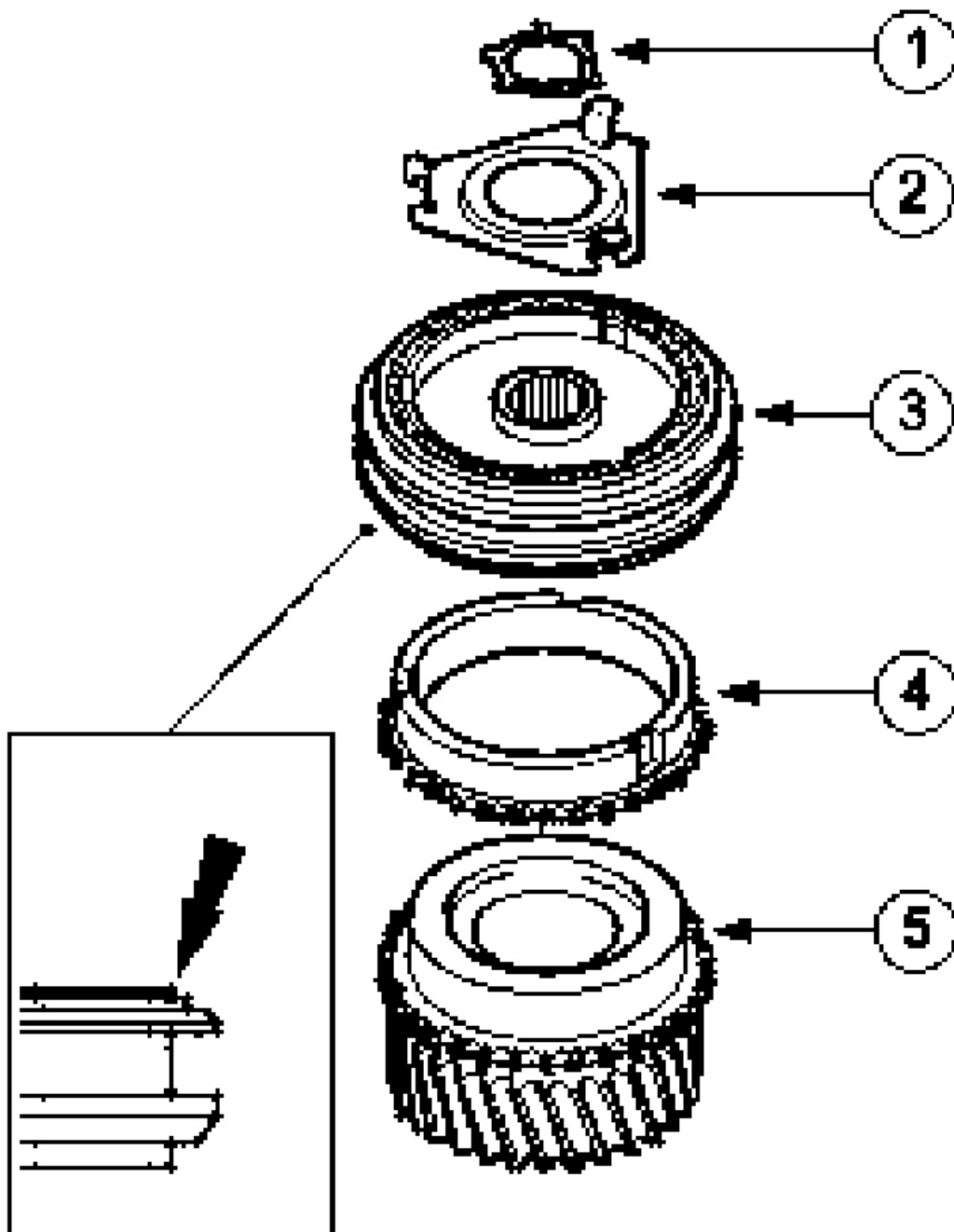
11. Remove the fifth gear synchronizer unit and the selector fork.
 1. Remove the fifth gear synchronizer unit retaining ring.
 2. Remove the selector fork retaining bolt.
 - Discard the retaining ring.
 - Discard the retaining bolt.



G03854571

Fig. 90: Removing Fifth Gear Synchronizer Unit And Selector Fork
Courtesy of FORD MOTOR CO.

NOTE: Mark the installation position of the gear synchronizer before disassembling.



G03854572

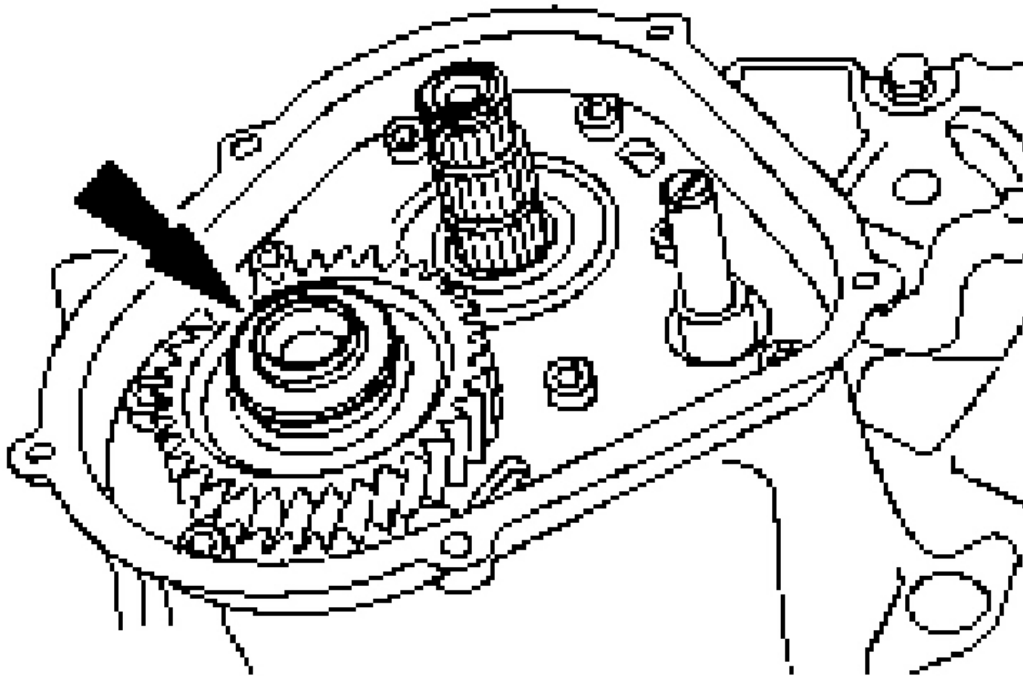
Fig. 91: Disassembling Fifth Gear Synchronizer Unit
Courtesy of FORD MOTOR CO.

12. Disassemble the fifth gear synchronizer unit.

1. Remove the snap-ring
2. Remove the retaining plate
3. Remove the gear synchronizer
4. Remove the synchronizer ring
5. Remove the gear wheel (fifth gear)

13. Remove the fifth gear wheel retaining ring.

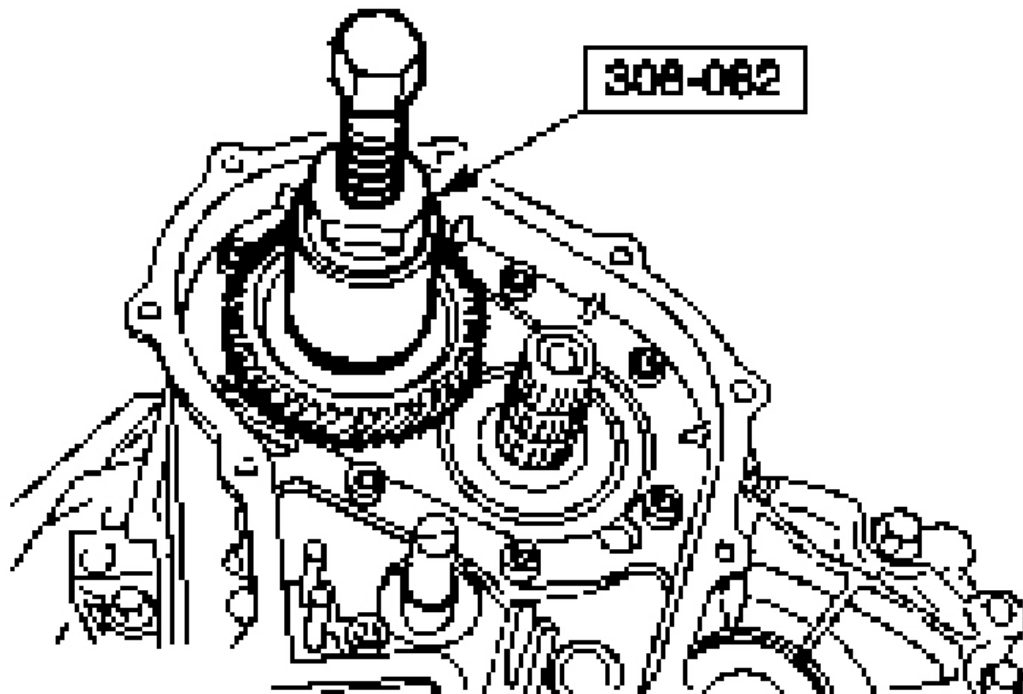
- Discard the retaining ring



G03854573

Fig. 92: Removing Fifth Gear Wheel Retaining Ring
Courtesy of FORD MOTOR CO.

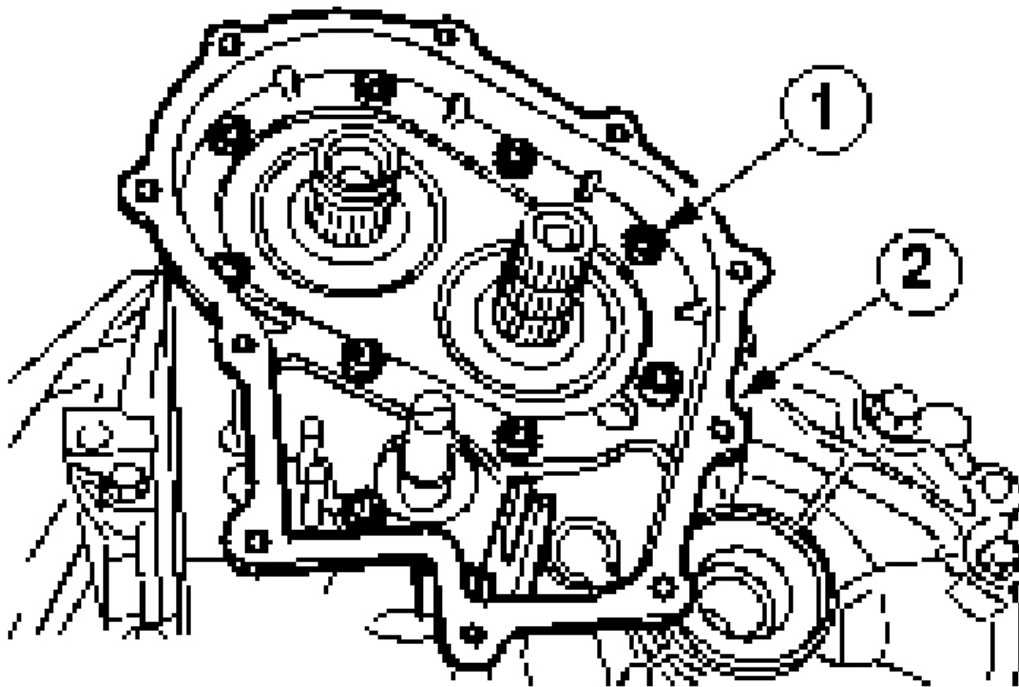
14. Using the special tool, remove the fifth gear wheel.



G03854574

Fig. 93: Removing Fifth Gear Wheel
Courtesy of FORD MOTOR CO.

CAUTION: Do not strike directly on the mating face.

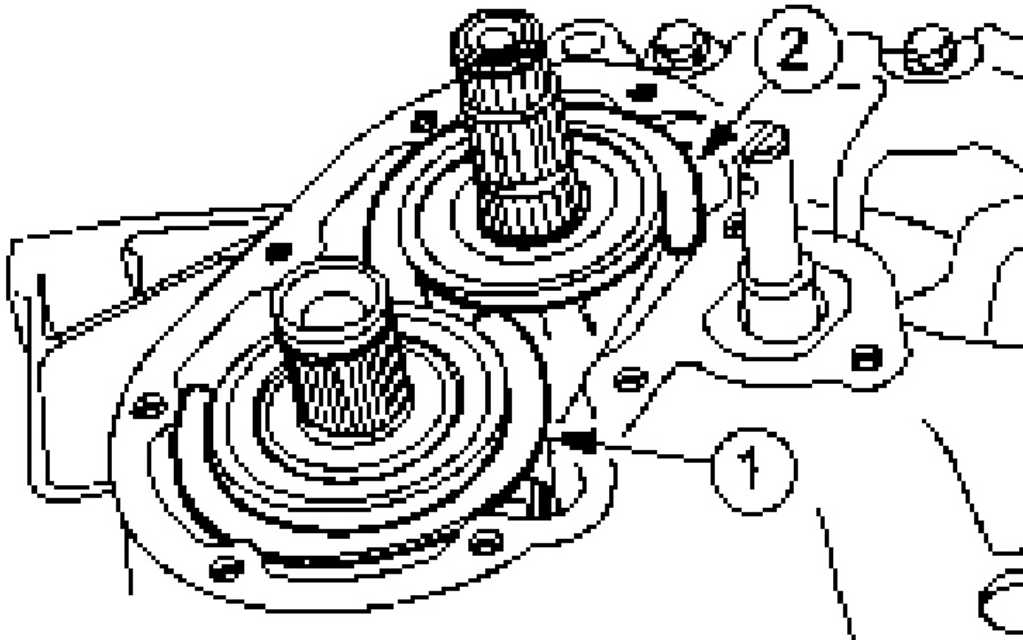


G03854575

Fig. 94: Loosening Bolts
Courtesy of FORD MOTOR CO.

15. Remove the fifth gear housing.
 1. Loosen the bolts and carefully separate the fifth gear housing sections by tapping lightly.
 2. Use metal surface cleaner, clean the mating face.
 - Discard the bolts.

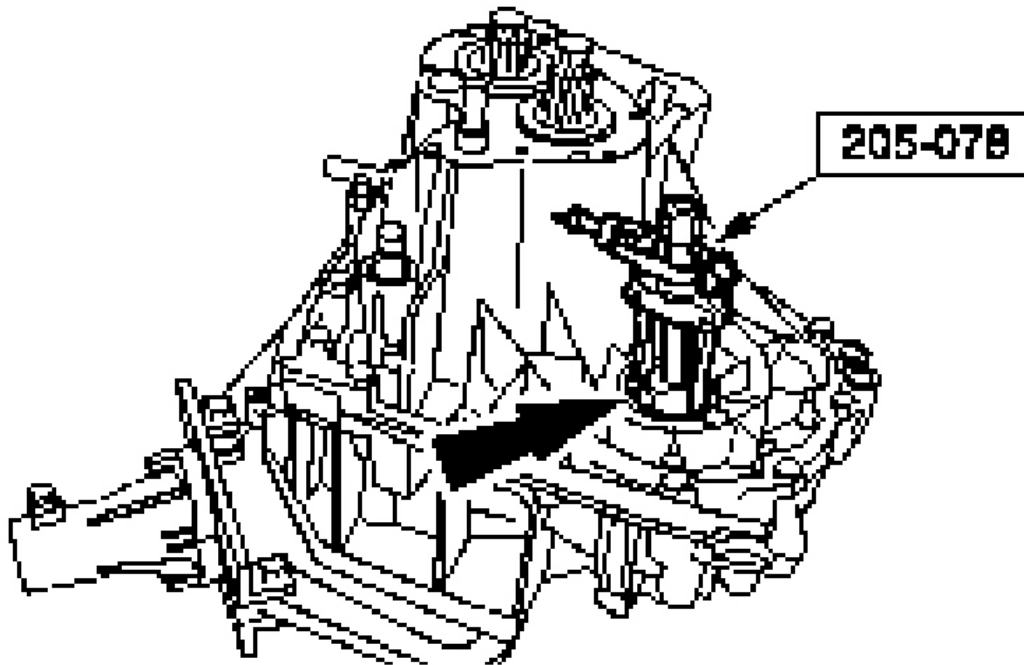
CAUTION: Do not strike directly on the mating face.



G03854576

Fig. 95: Removing Gasket
Courtesy of FORD MOTOR CO.

16. Remove the gasket.
 1. Detach the input shaft retaining ring.
 2. Detach the output shaft retaining ring.
 - Discard the retaining rings.
17. Using the special tool, remove both halfshaft oil seals (left-hand side shown, right-hand side similar).
 - The reversing lamp switch only needs to be removed for sealing purposes.

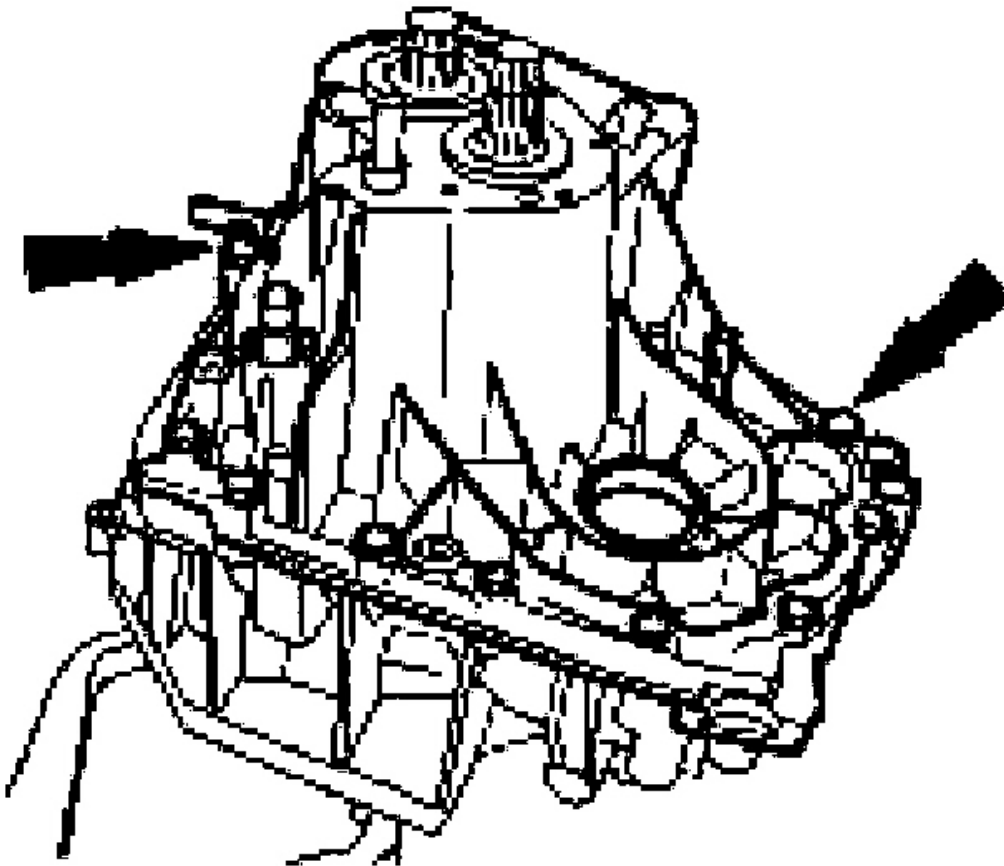


G03854577

Fig. 96: Removing Both Halfshaft Oil Seals
Courtesy of FORD MOTOR CO.

CAUTION: Do not use metal scrapers to clean the transaxle mating faces.

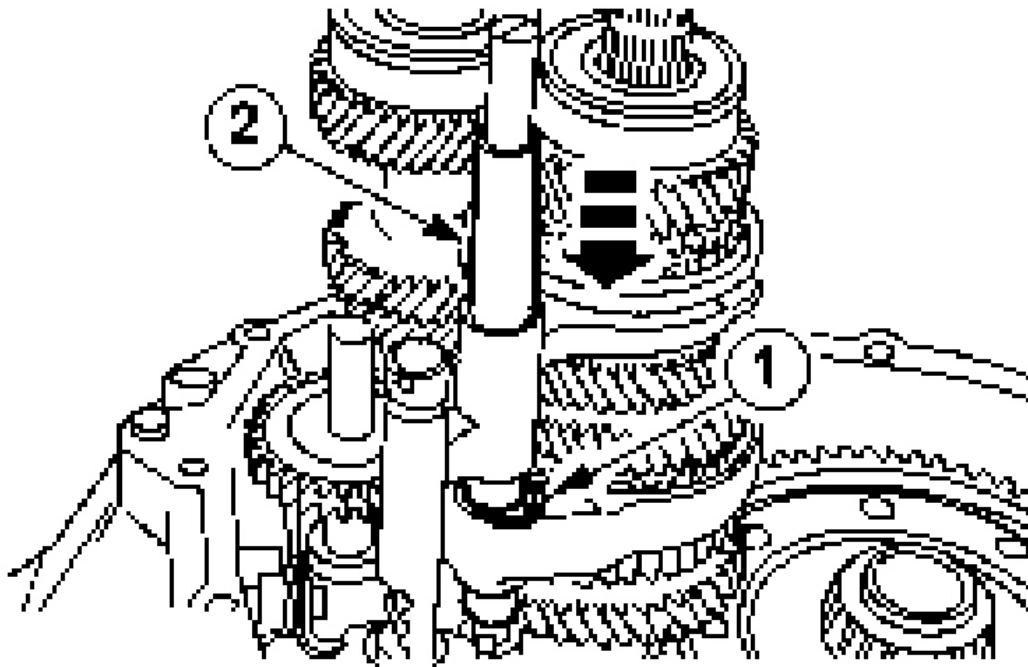
NOTE: Slightly turn the transmission housing to raise it.



G03854578

Fig. 97: Separating Transmission Housing From Clutch Housing
Courtesy of FORD MOTOR CO.

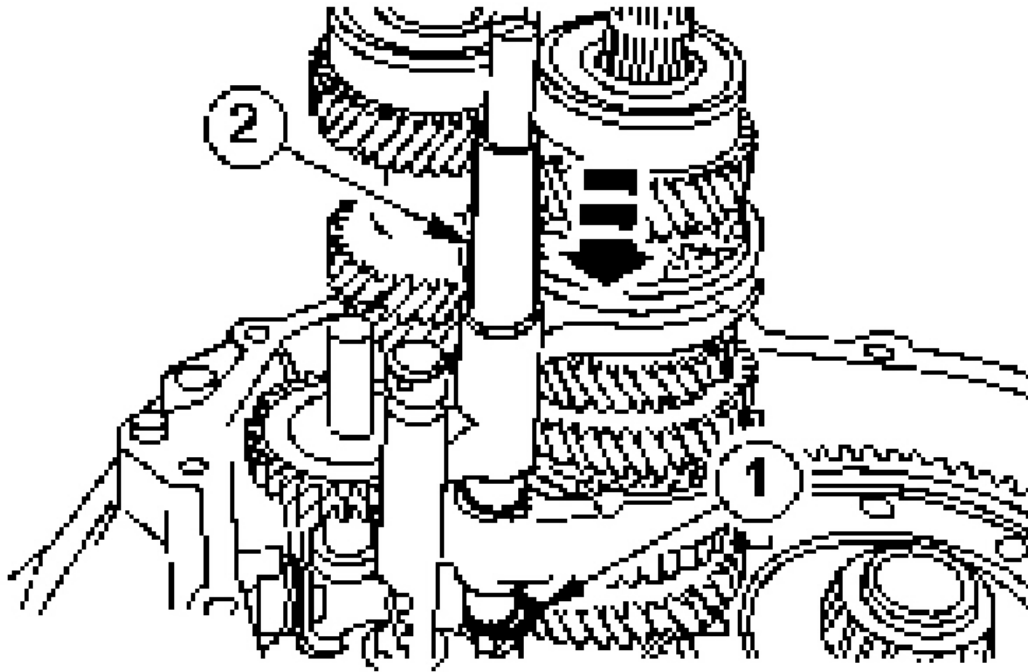
18. Separate the transmission housing from the clutch housing.
 - Use metal surface cleaner, clean the mating face.
19. Remove the upper snap-ring from the selector rod guide sleeve.
 1. Remove the upper snap-ring
 2. Push the selector rod guide sleeve downwards.
 - Discard the upper snap-ring.



G03854579

Fig. 98: Removing Upper Snap-Ring
Courtesy of FORD MOTOR CO.

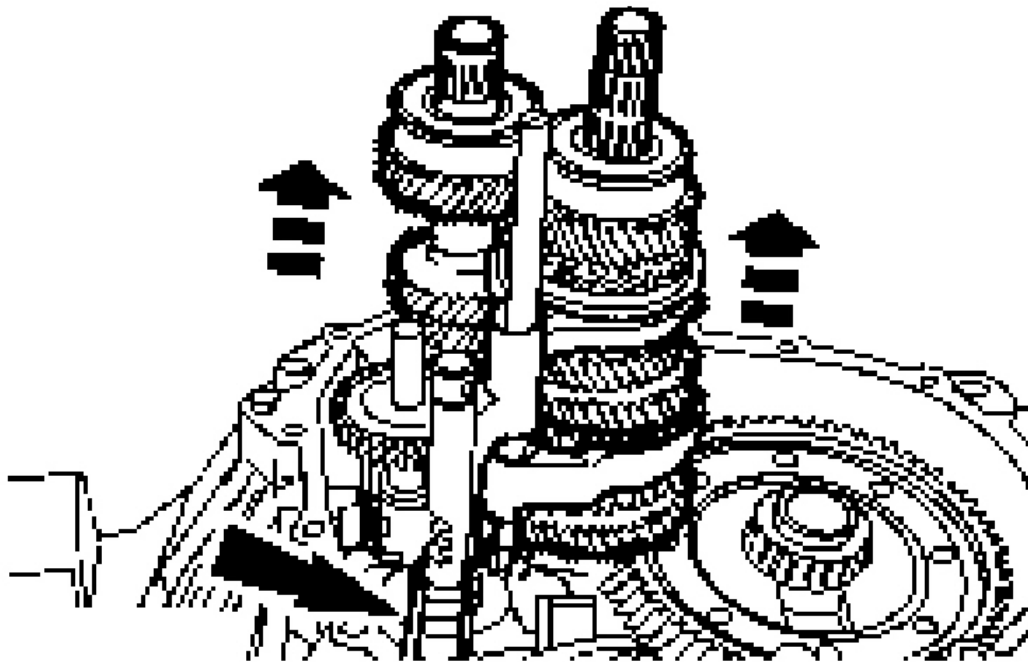
20. Remove the selector rod guide sleeve.
 1. Remove the lower snap-ring from the guide sleeve.
 2. Pull off the selector rod guide sleeve.
 - Discard the lower snap-ring.



G03854580

Fig. 99: Removing Selector Rod Guide Sleeve
Courtesy of FORD MOTOR CO.

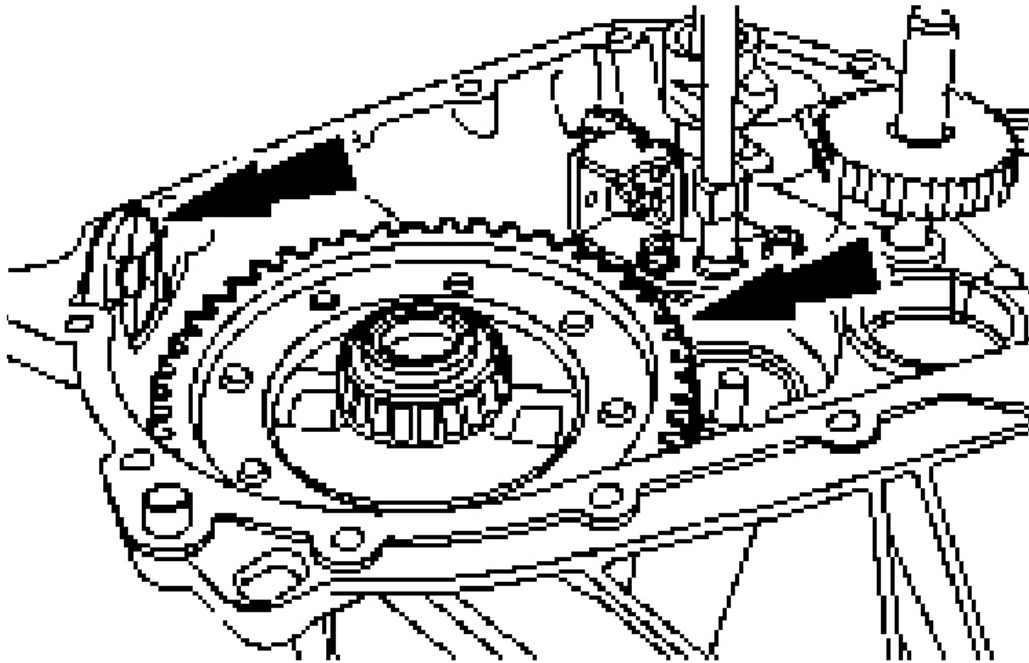
NOTE: Install a rubber belt to the auxiliary selector shaft to aid disassembly.



G03854581

Fig. 100: Removing Input And Output Shaft With Selector Forks
Courtesy of FORD MOTOR CO.

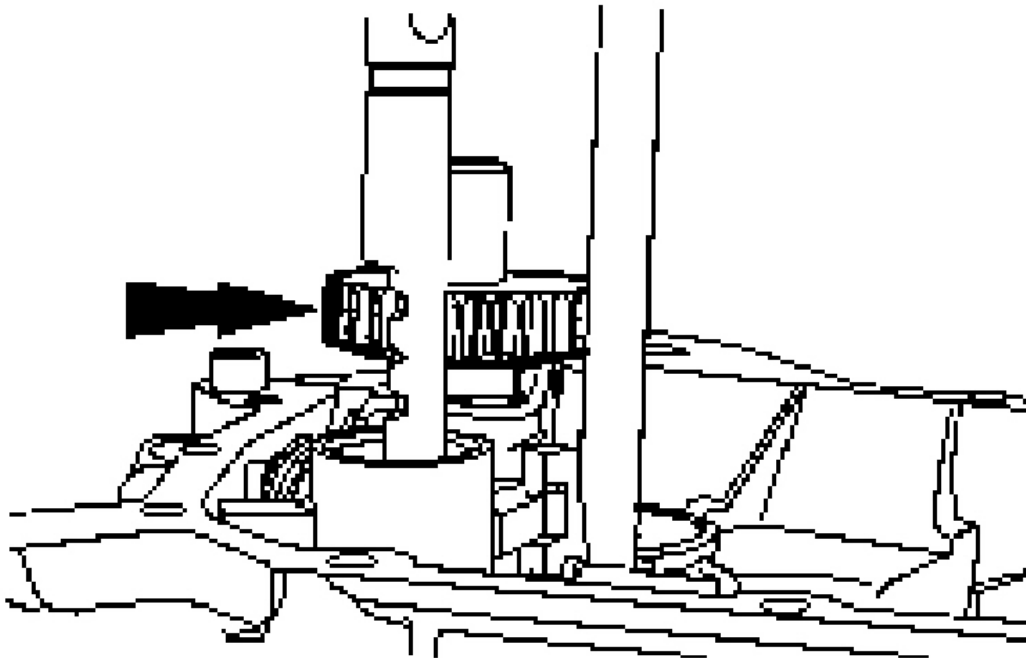
21. Remove the input and output shaft with the selector forks.
22. Remove the differential and the permanent magnet.



G03854582

Fig. 101: Removing Differential And Permanent Magnet
Courtesy of FORD MOTOR CO.

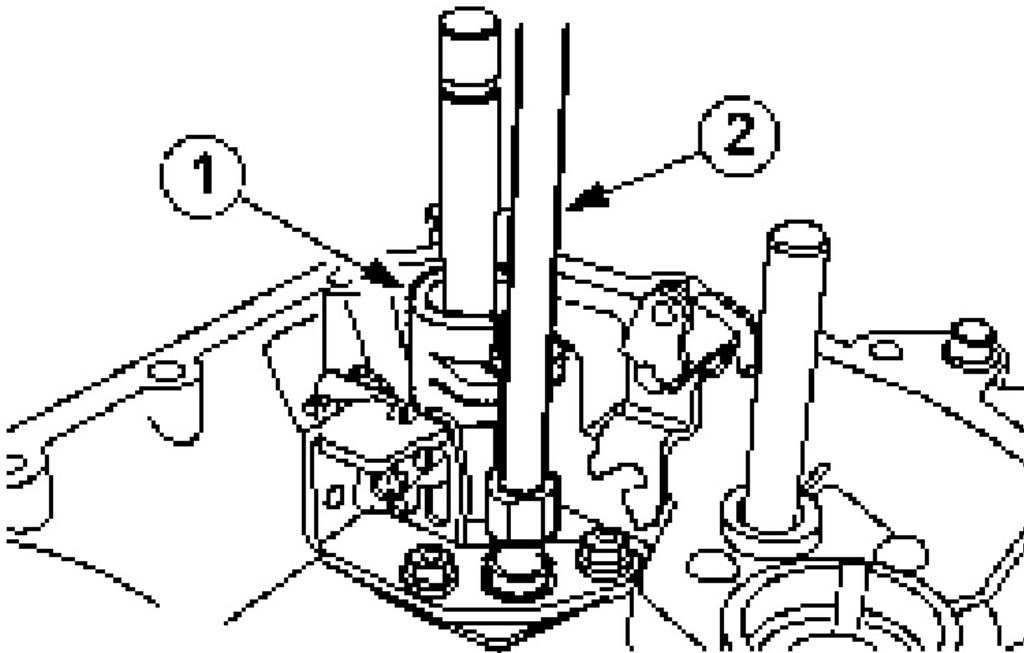
23. Remove the reverse idle gear.



G03854583

Fig. 102: Removing Reverse Idle Gear
Courtesy of FORD MOTOR CO.

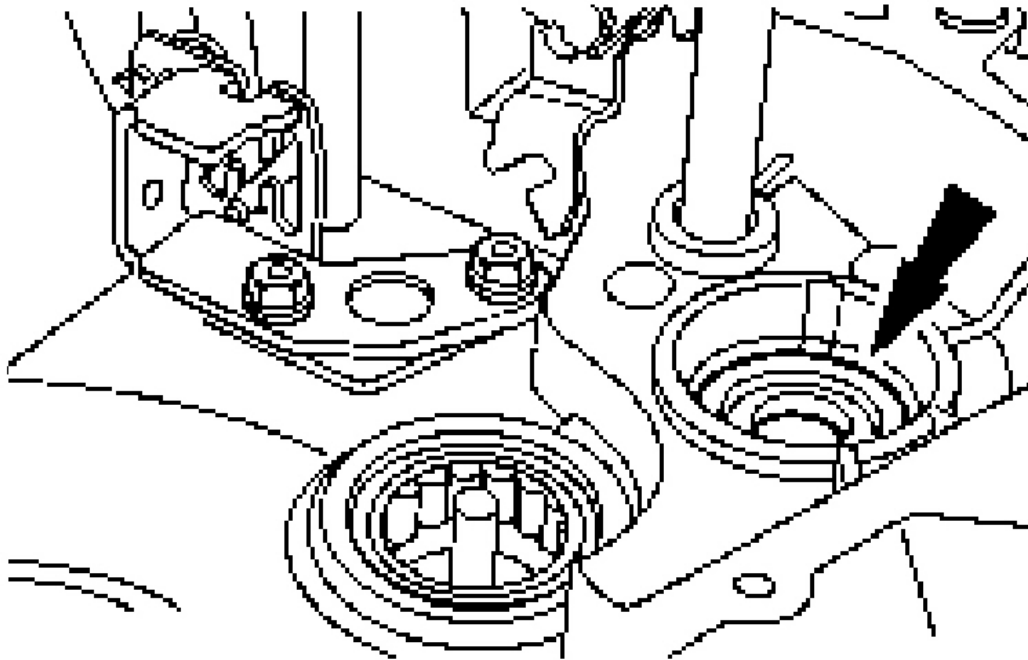
24. Remove the selector rod and locking plate.
 1. Shift selector interlock plate.
 2. Fifth and reverse gear selector rod.



G03854584

Fig. 103: Removing Selector Rod And Locking Plate
Courtesy of FORD MOTOR CO.

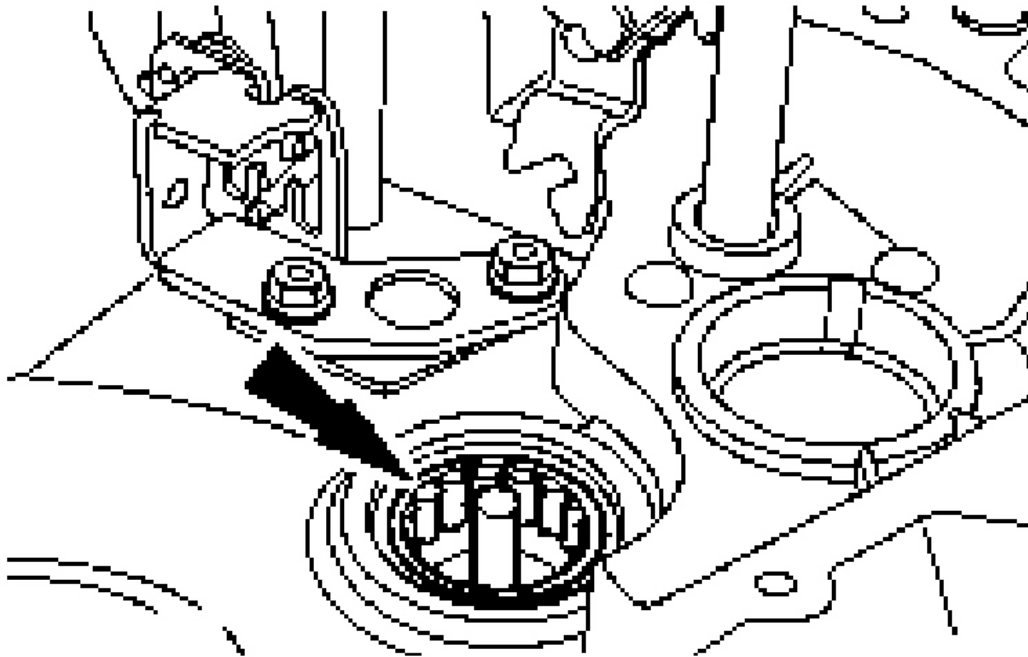
25. Remove the input shaft oil seal.
 - Discard the input shaft oil seal.



G03854585

Fig. 104: Removing Input Shaft Oil Seal
Courtesy of FORD MOTOR CO.

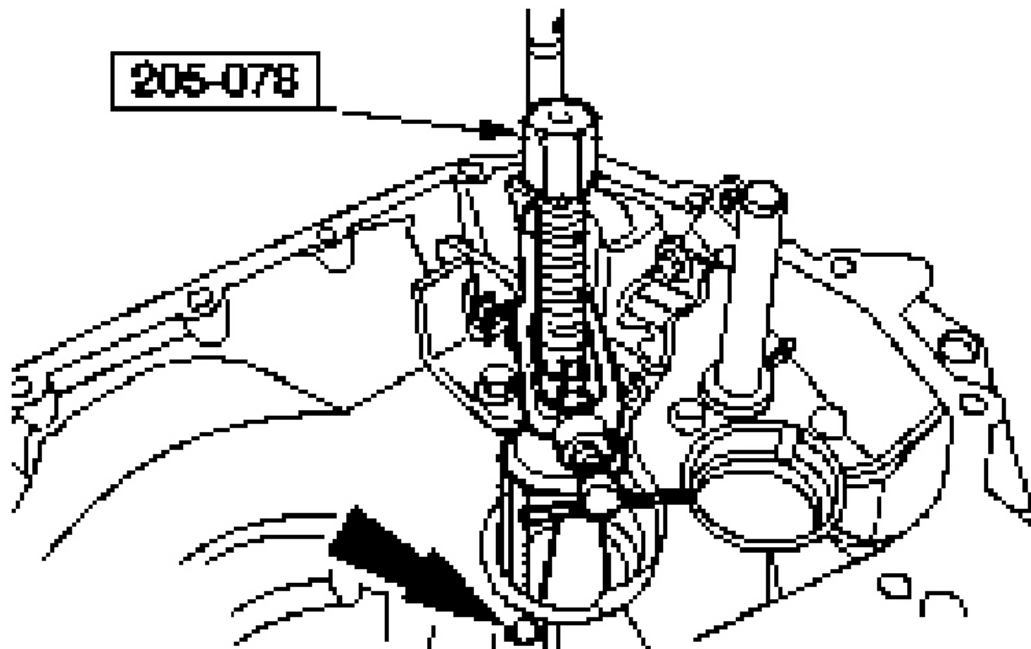
26. Remove output shaft roller bearing.
 - Press out the track rollers from the bearing cage.
 - Remove the bearing cage.



G03854586

Fig. 105: Removing Output Shaft Roller Bearing
Courtesy of FORD MOTOR CO.

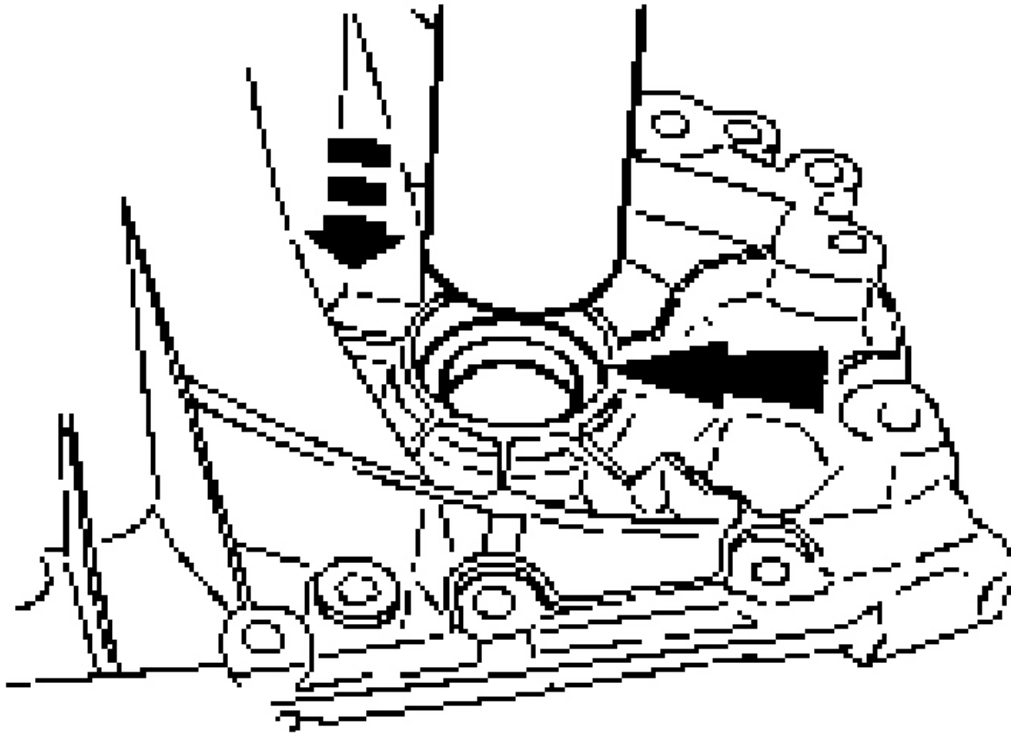
CAUTION: Only use the special tool in the position indicated, otherwise the blanking plug will be forced out of the housing.



G03854587

Fig. 106: Removing Oil Thrower
Courtesy of FORD MOTOR CO.

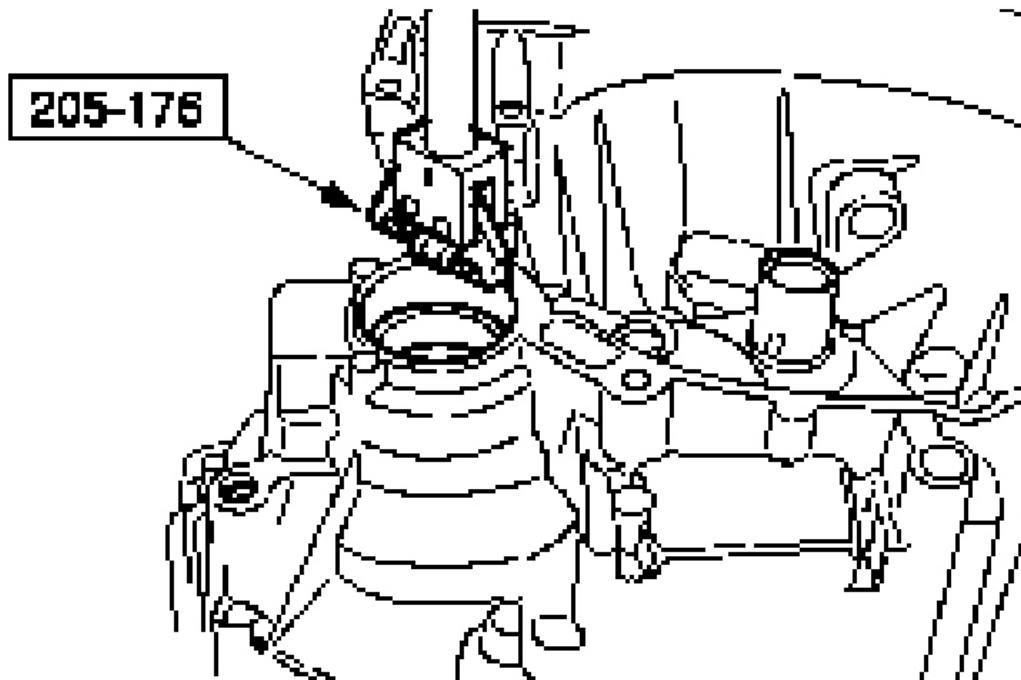
27. Using the special tool, remove the output shaft bearing cone.
 - Remove the oil thrower.
28. Remove the bearing cone.



G03854588

Fig. 107: Removing Bearing Cone
Courtesy of FORD MOTOR CO.

29. Using the special tool, remove the differential bearing cone.



G03854589

Fig. 108: Removing Differential Bearing Cone
Courtesy of FORD MOTOR CO.

DISASSEMBLY AND ASSEMBLY OF SUBASSEMBLIES

SELECTOR PLATE

Overview, selector mechanism

2002 Ford Focus LX

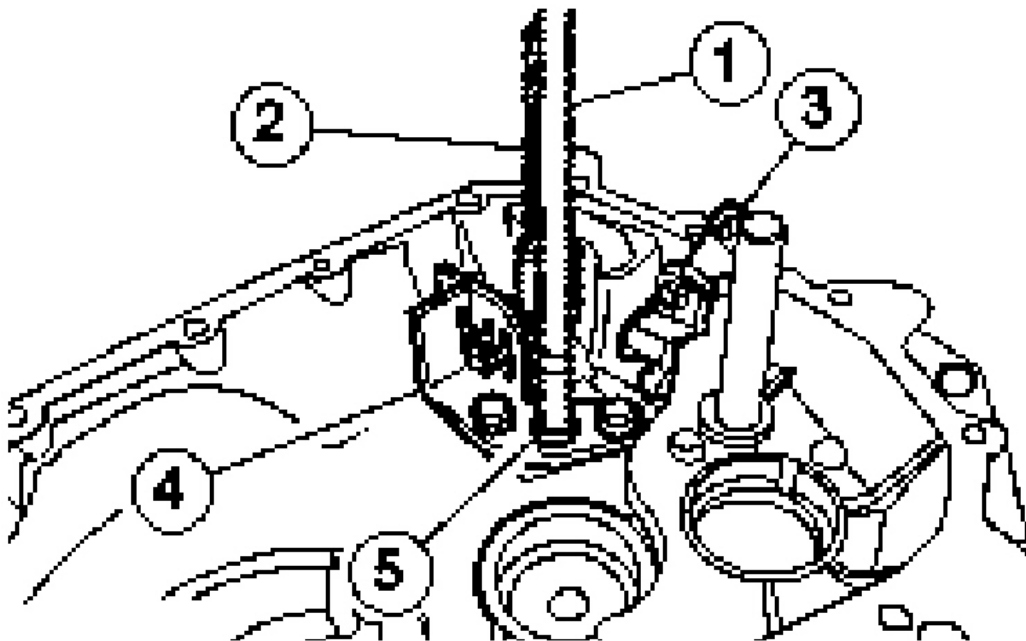
2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus

Fig. 109: Identifying Components Selector Mechanism **Courtesy of FORD MOTOR CO.**

Disassembly

1. Remove the selector mechanism.
 1. Fifth and reverse gear selector shaft.
 2. Selector shaft.
 3. Reverse gear selector lever.

4. Selector plate.
5. Fifth and reverse gear selector shaft guide sleeve.

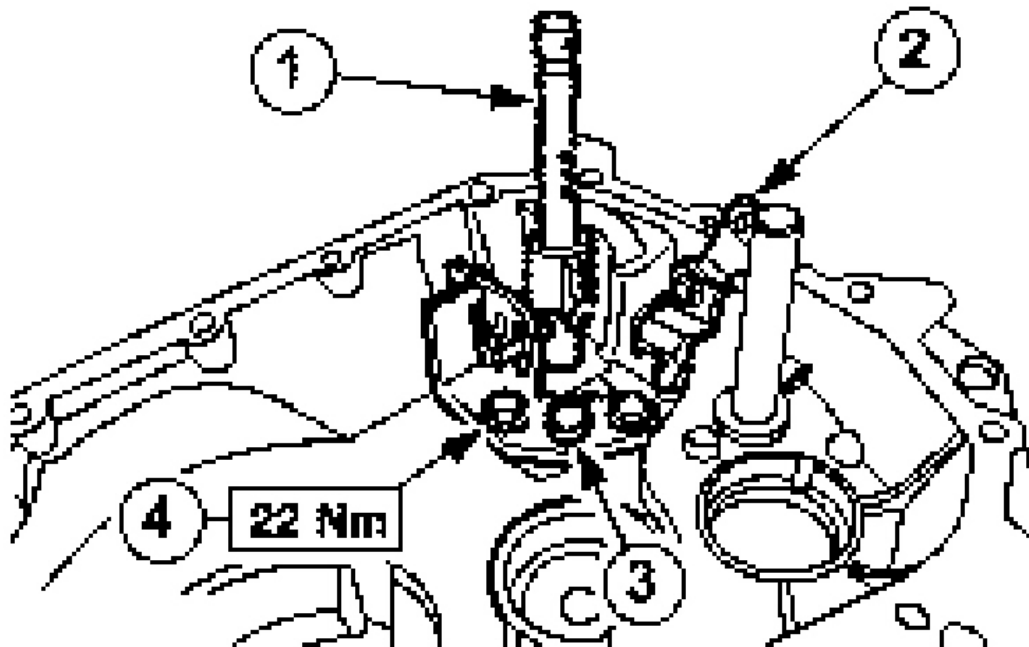


G03854591

Fig. 110: Removing Selector Mechanism
Courtesy of FORD MOTOR CO.

Assembly

1. Install the selector mechanism.
 1. Selector shaft.
 2. Reverse gear selector lever.
 3. Fifth and reverse gear selector shaft guide sleeve.
 4. Selector plate.



G03854592

Fig. 111: Installing Selector Mechanism
Courtesy of FORD MOTOR CO.

INPUT SHAFT

Material

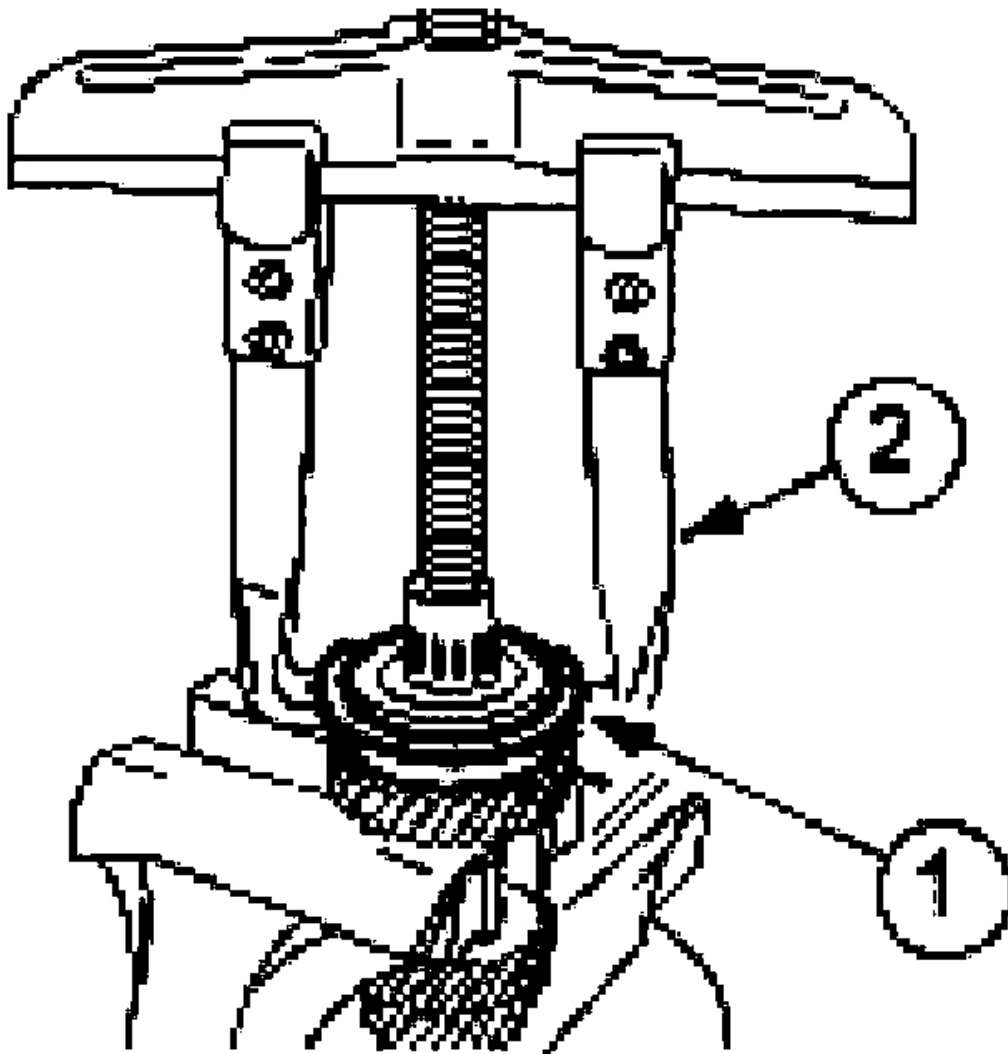
MATERIAL REFERENCE

Manual transmission fluid	WSD-M2C200-C
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Disassembly

CAUTION: Handle the synchronizer ring and synchronizer cone with care.

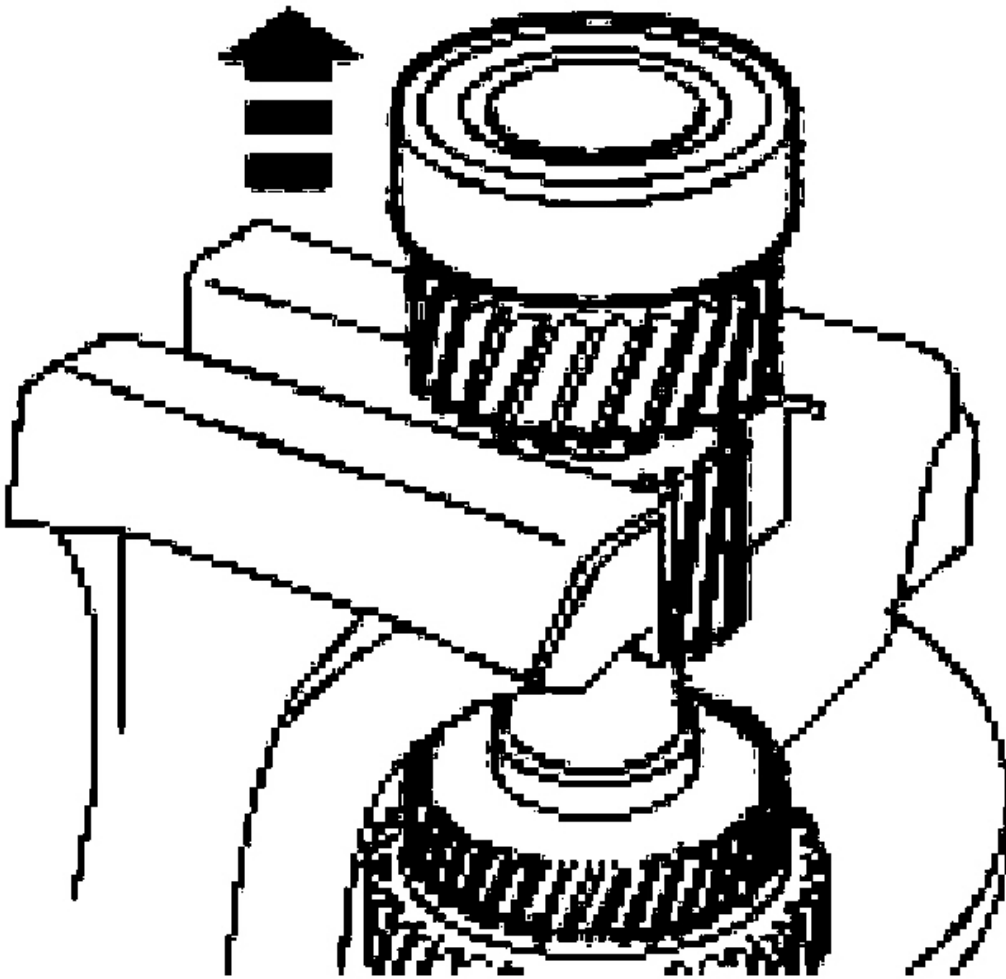
1. Using a puller, remove the bearing (transaxle end).
 1. Install the snap-ring.
 2. Install a standard puller underneath the snap-ring and pull off the bearing.



G03854593

Fig. 112: Removing Bearing
Courtesy of FORD MOTOR CO.

2. Remove the bearing (clutch end).

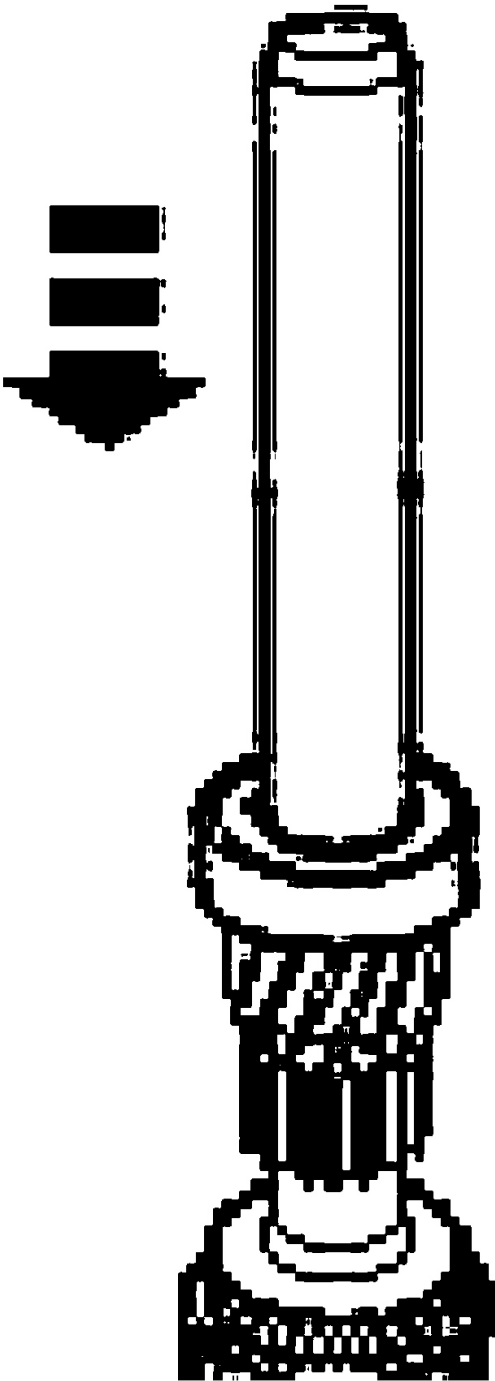


G03854594

Fig. 113: Removing Bearing (Clutch End)
Courtesy of FORD MOTOR CO.

Assembly

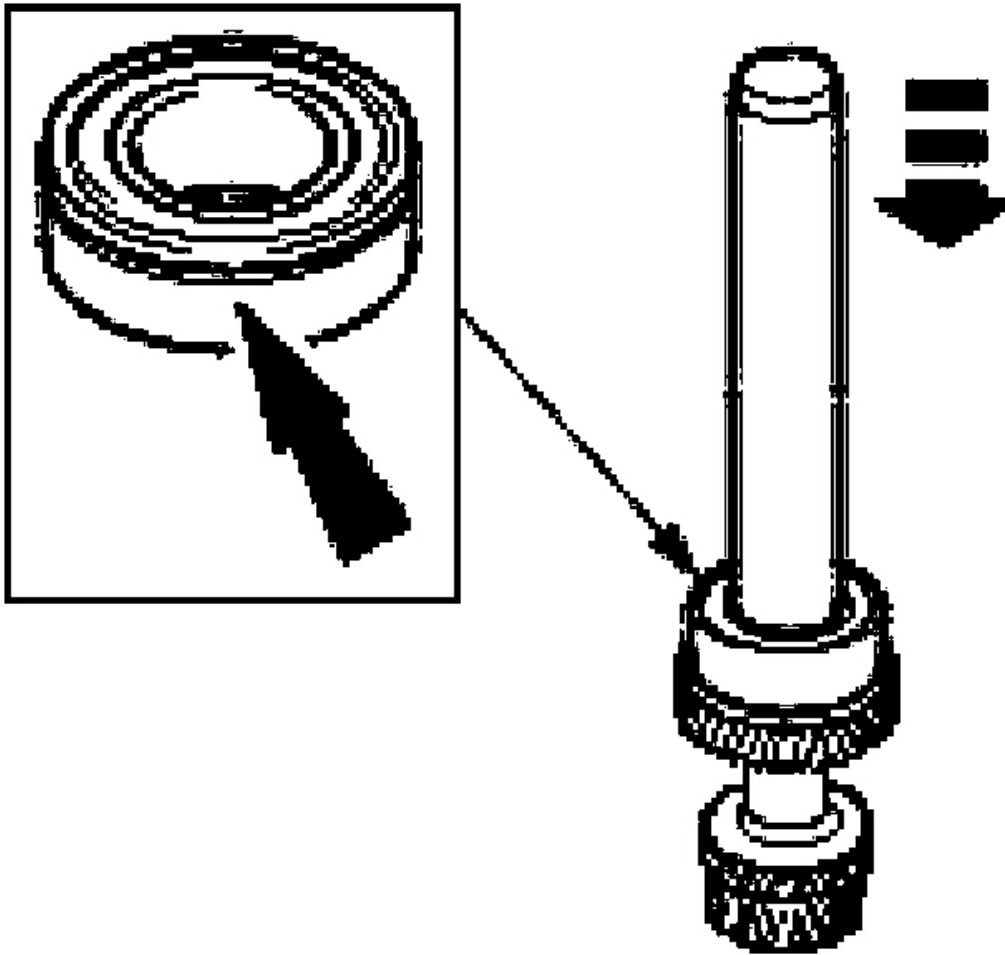
1. Carefully clean and check all parts and coat with Manual transmission fluid before reassembly.
2. Using a press and a suitable tube, install the bearing (clutch end).



G03854595

Fig. 114: Installing Bearing (Clutch End)
Courtesy of FORD MOTOR CO.

NOTE: The annular groove in the bearing must face outwards.



G03854596

Fig. 115: Installing Bearing (Transaxle End)
Courtesy of FORD MOTOR CO.

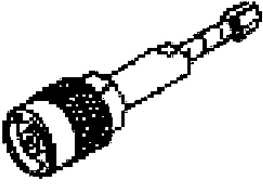
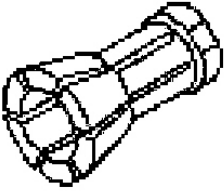
3. Using a press and a suitable tube, install the bearing (transaxle end).

OUTPUT SHAFT

Special Tool(s)

2002 Ford Focus LX

2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus

	Remover Bearing, (Main Tool) 205-295
	Collet for 205-295 307-217

G03854597

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

Material

MATERIAL REFERENCE

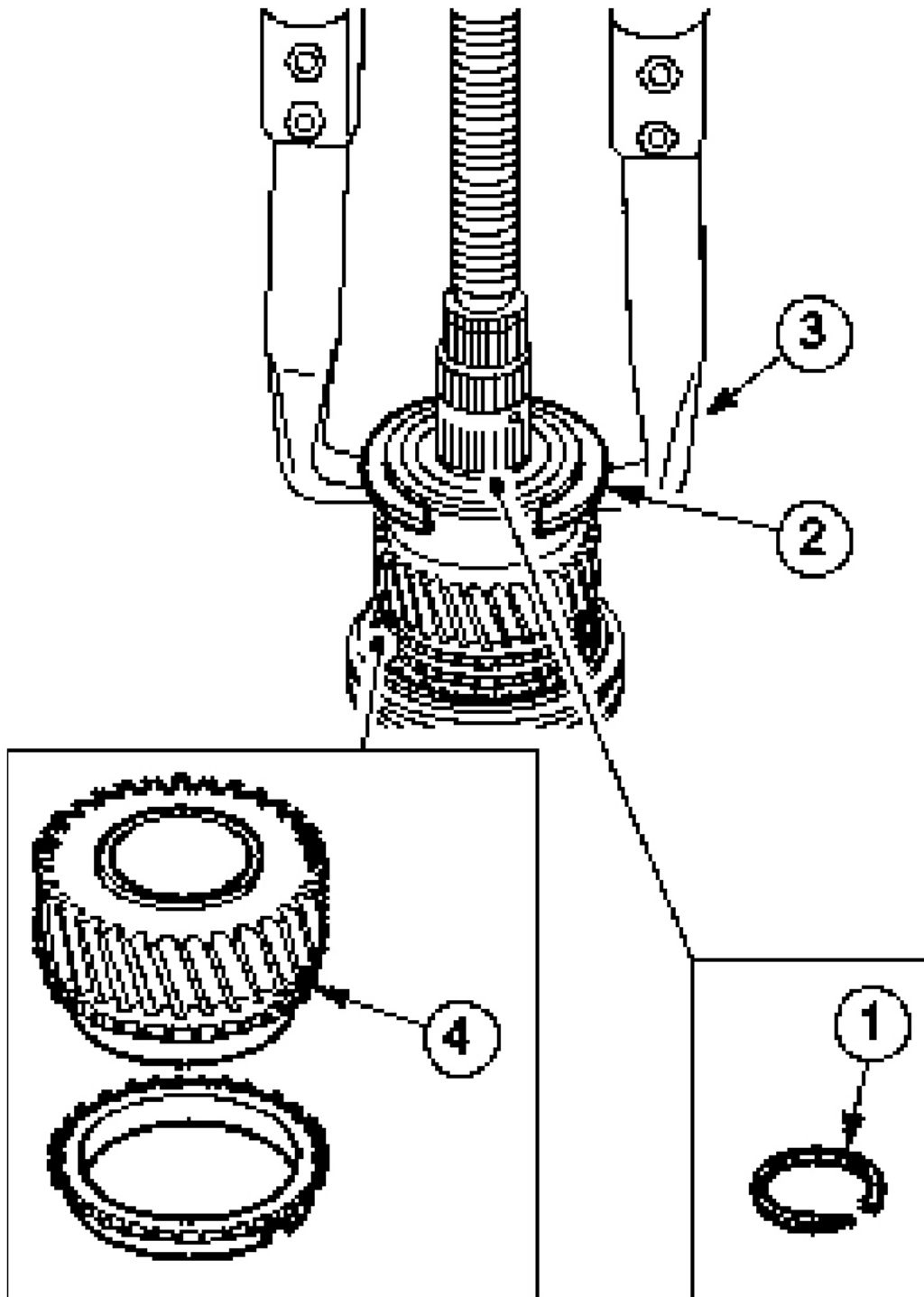
Manual transmission fluid	WSD-M2C200-C
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Disassembly

CAUTION: Handle the dual synchronizer parts with care.

2002 Ford Focus LX

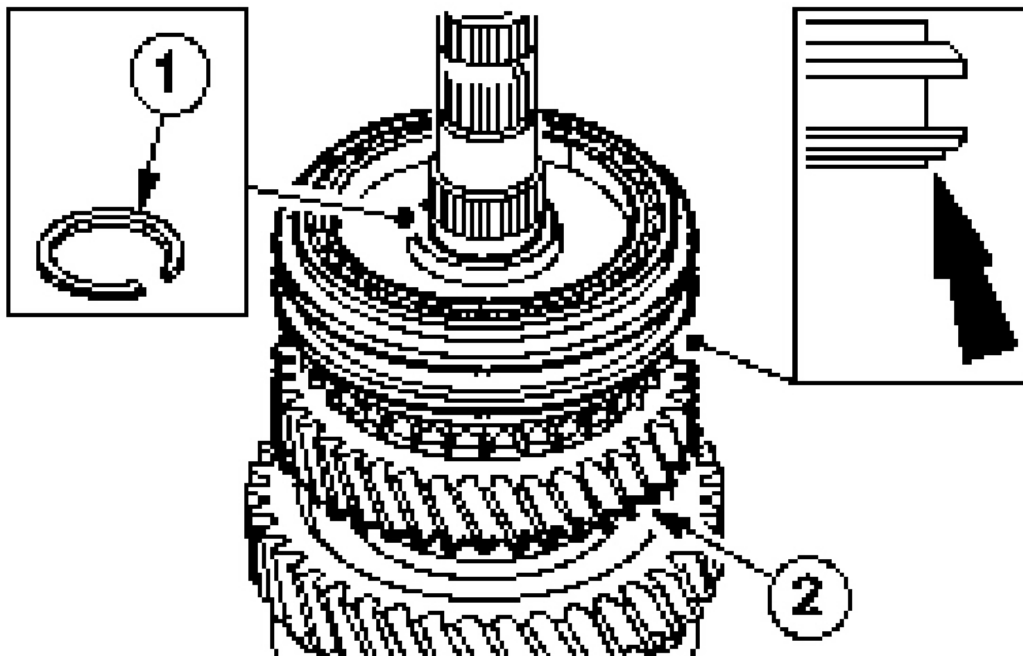
2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus



G03854598

Fig. 117: Removing Ball Bearing
Courtesy of FORD MOTOR CO.

1. Remove the ball bearing and the fourth gear wheel.
 1. Remove the small snap-ring.
 2. Install the snap-ring.
 3. Using a standard puller, remove the ball bearing.
 4. Remove the fourth gear wheel together with the synchronizer ring.
2. Remove third and fourth gear synchronizer unit.
 1. Remove the snap-ring.
 2. Remove the gear synchronizer, the third and fourth gear synchronizer unit and the third gear wheel.

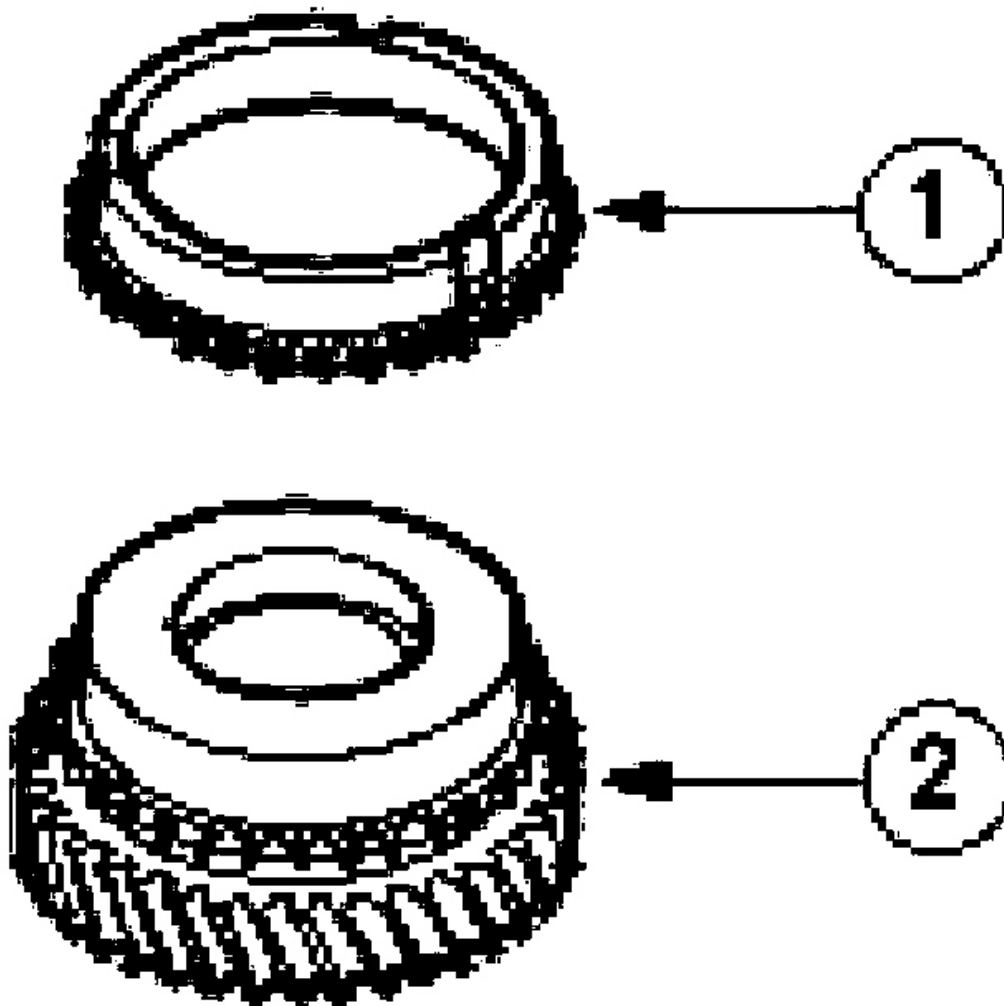


G03854599

Fig. 118: Removing Third And Fourth Gear Synchronizer Unit
Courtesy of FORD MOTOR CO.

3. Remove the third gear synchronizer ring.

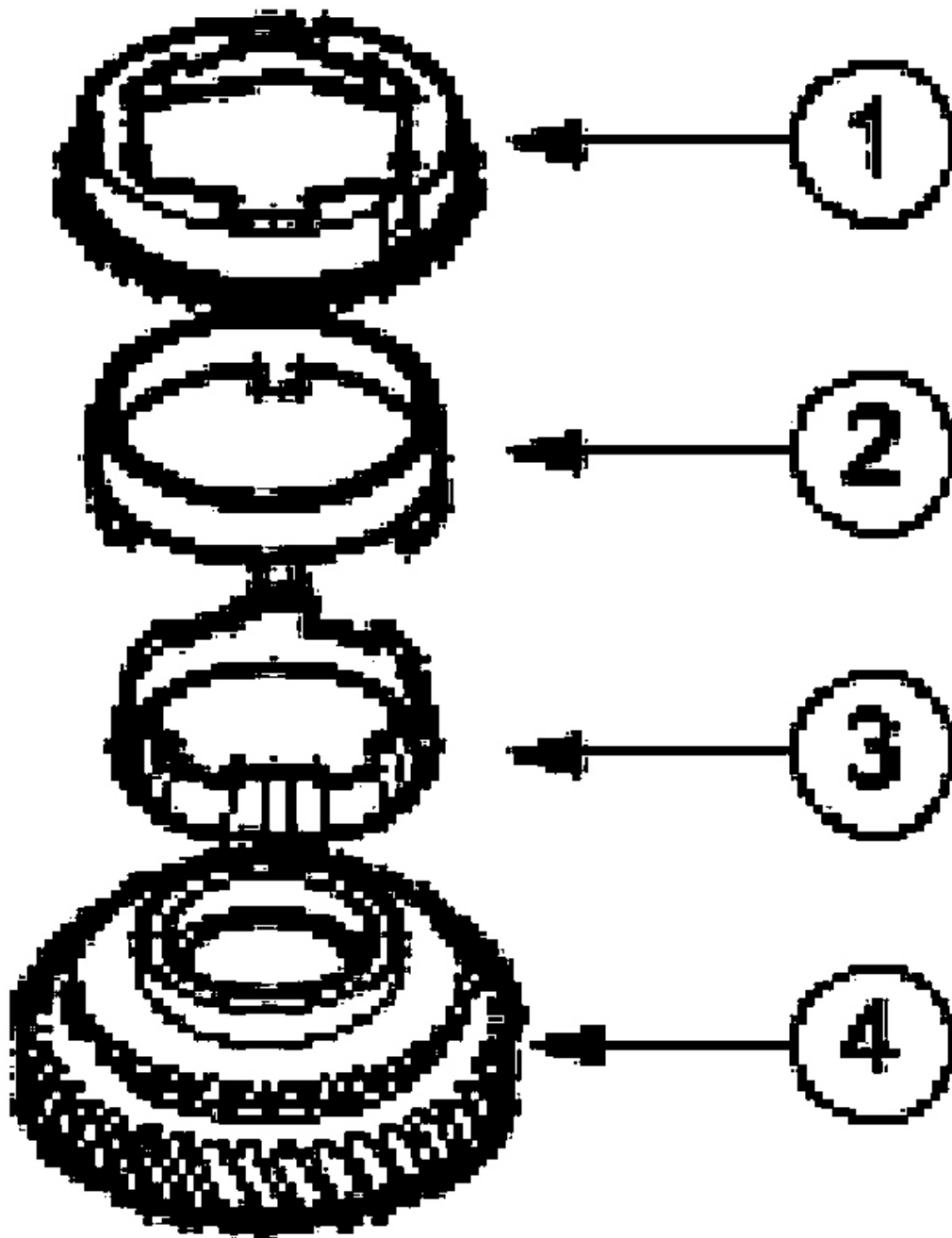
1. Synchronizer ring.
2. Gear wheel (third gear)



G03854600

Fig. 119: Removing Third Gear Synchronizer Ring
Courtesy of FORD MOTOR CO.

NOTE: The dual synchronizer as shown is used in case off servicing.

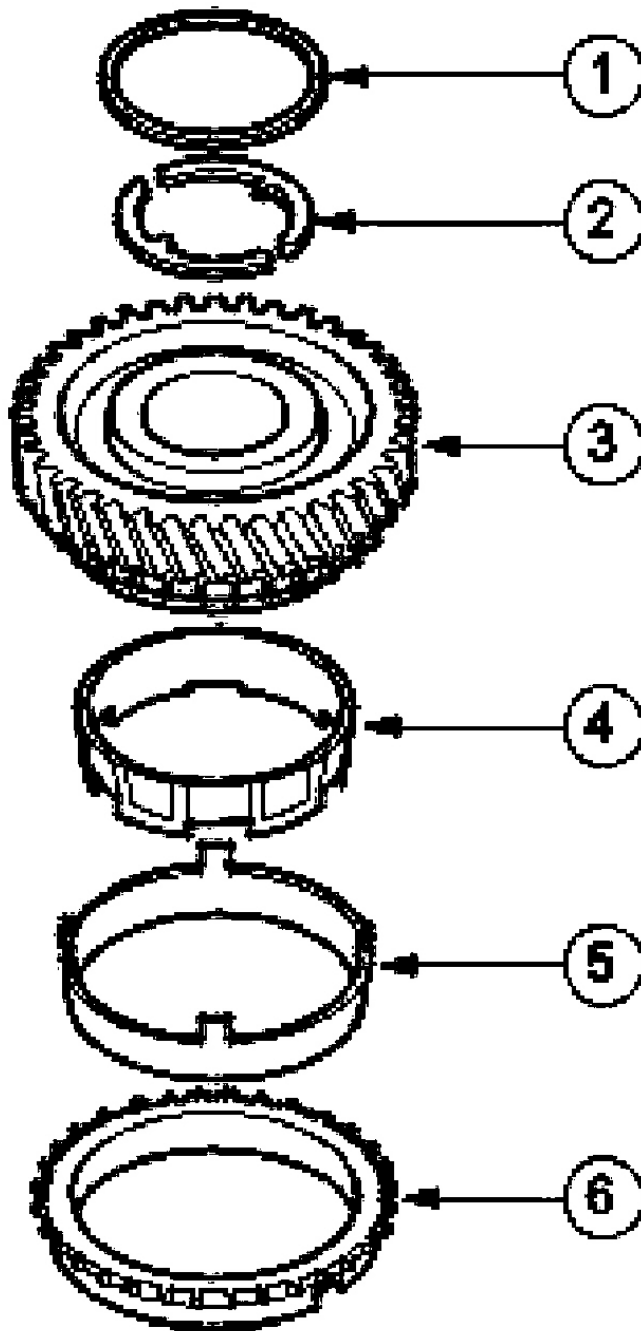


G03854601

Fig. 120: Disassembling Third Gear Synchronizer Unit

Courtesy of FORD MOTOR CO.

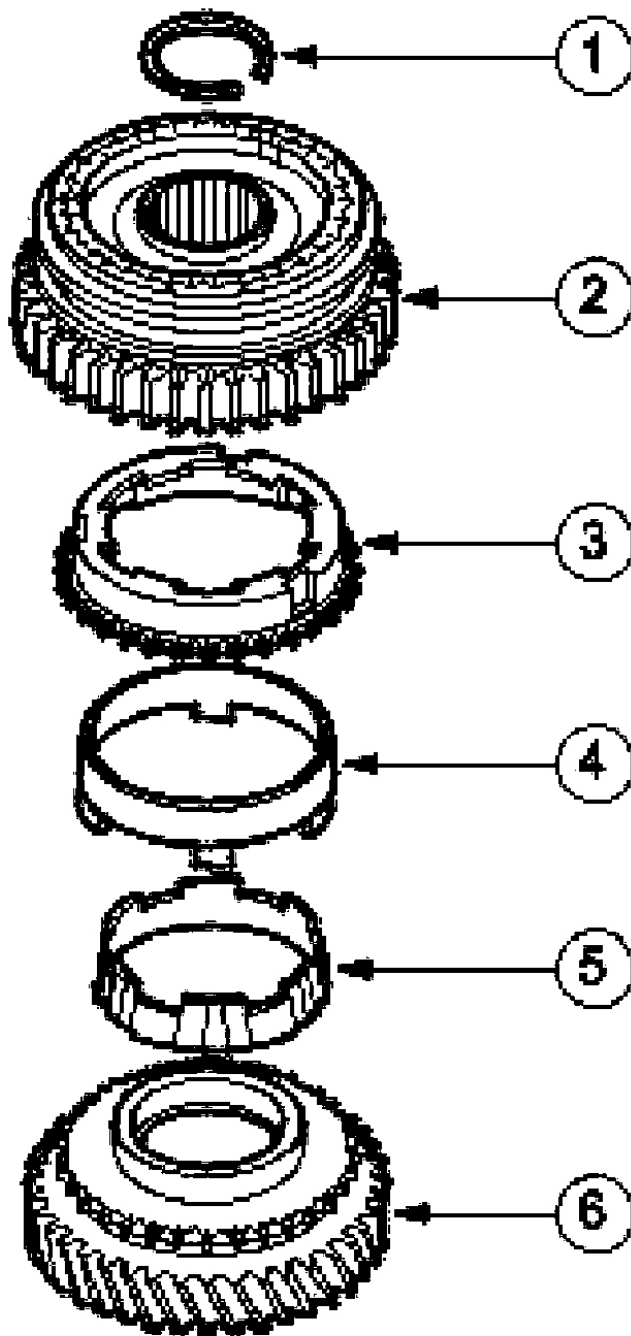
4. Disassemble the third gear synchronizer unit.
 1. Outer synchronizer ring
 2. Synchronizer cone
 3. Inner synchronizer ring
 4. Gear wheel (third gear)
5. Remove the second gear wheel together with the synchronizer unit.
 1. Closed retaining ring
 2. Half-round snap rings
 3. Gear wheel (second gear)
 4. Inner synchronizer ring
 5. Synchronizer cone
 6. Outer synchronizer ring



G03854602

Fig. 121: Removing Second Gear Wheel Together With Synchronizer Unit
Courtesy of FORD MOTOR CO.

NOTE: Remove the synchronizer unit and the first gear wheel together.



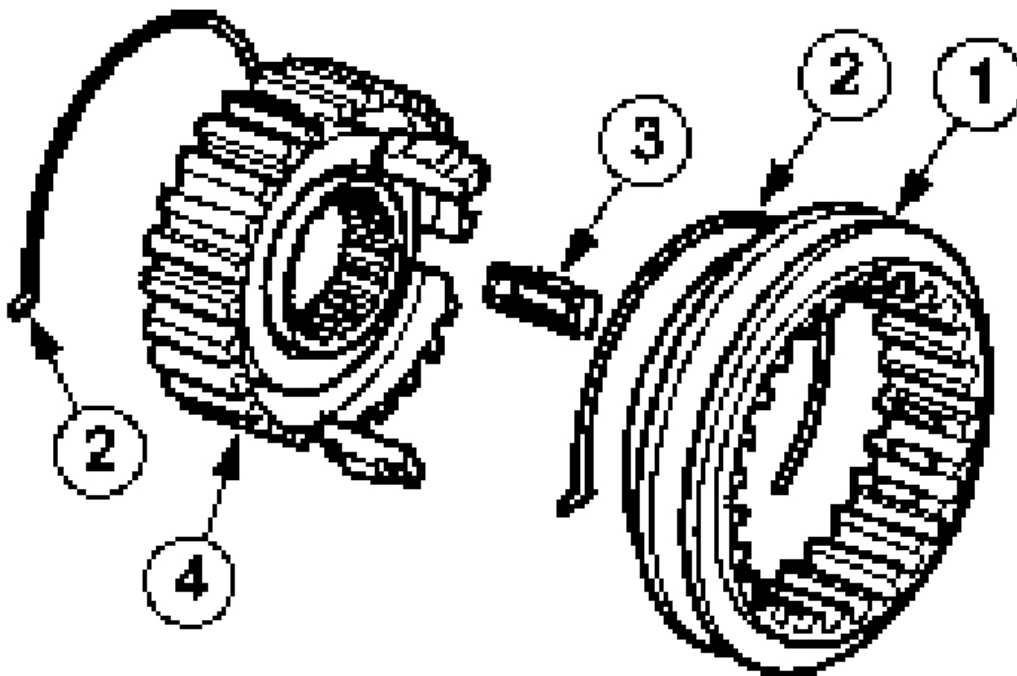
G03854603

Fig. 122: Removing First/Second Gear Synchronizer Together With Reverse Gear

Wheel**Courtesy of FORD MOTOR CO.**

6. Remove the first gear wheel and the reverse gear wheel together with the gear synchronizer and the synchronizer unit.
 1. Remove the snap-ring.
 2. Remove the first/second gear synchronizer together with the reverse gear wheel.
 3. Outer synchronizer ring
 4. Synchronizer cone
 5. Inner synchronizer ring
 6. Gear wheel (first gear)

CAUTION: Mark the installation position of the selector ring in relation to the gear synchronizer hub.



G03854604

Fig. 123: Disassembling Synchronizer Hub

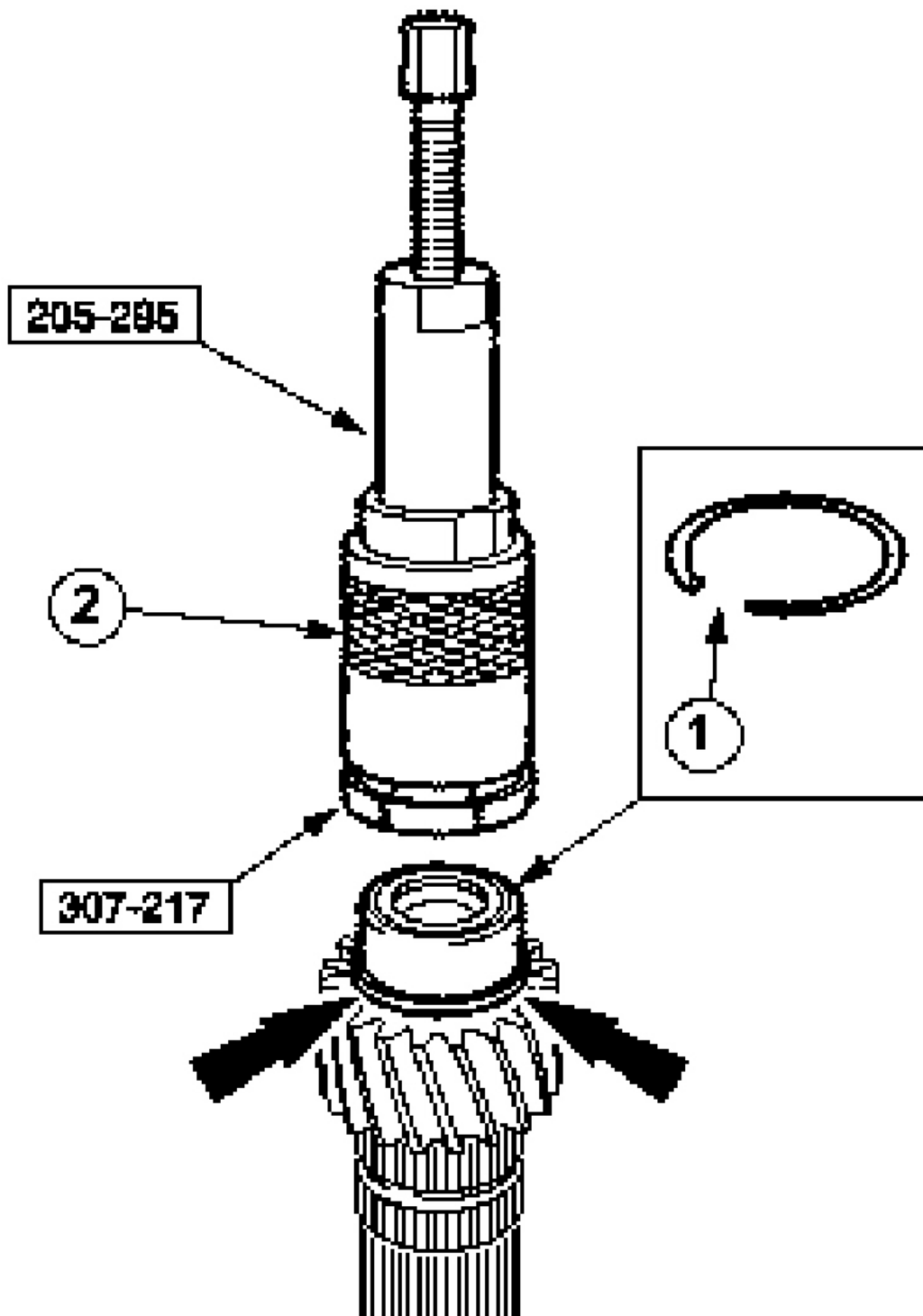
Courtesy of FORD MOTOR CO.

7. Disassemble the synchronizer hub.
 1. Selector ring
 2. Synchronizer spring
 3. Synchronizer lock
 4. Gear synchronizer hub

NOTE: **Insert a pressure piece into oil the thrower bore.**

2002 Ford Focus LX

2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus



G03854605

Fig. 124: Removing Bearing Cone
Courtesy of FORD MOTOR CO.

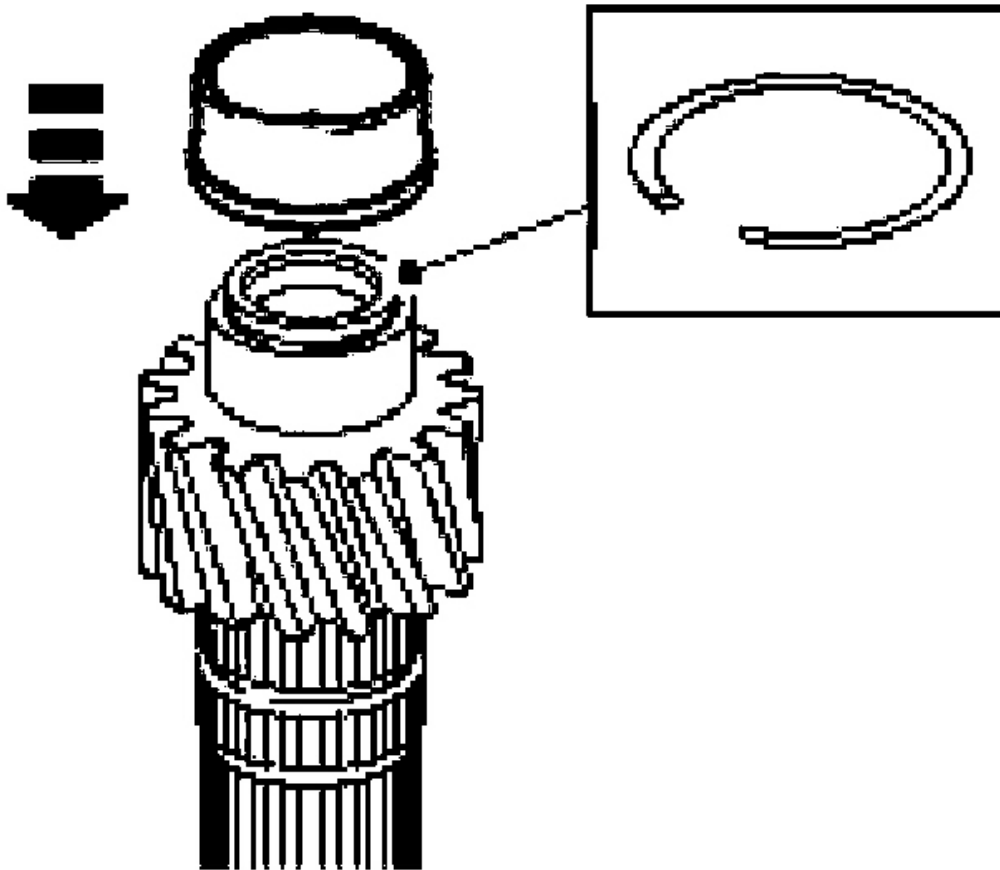
8. Using the special tools, remove the output shaft bearing cone.
 1. Remove the snap-ring.
 - Position the special tool 307-217 below of the bearing cone.
 3. Remove the bearing cone.

Assembly

CAUTION: Immerse the dual synchronizer units in a bath of transmission fluid prior to installation.

1. Carefully clean and check all running surfaces and coat them with Manual transmission fluid before reassembly.

NOTE: Install a new snap ring.

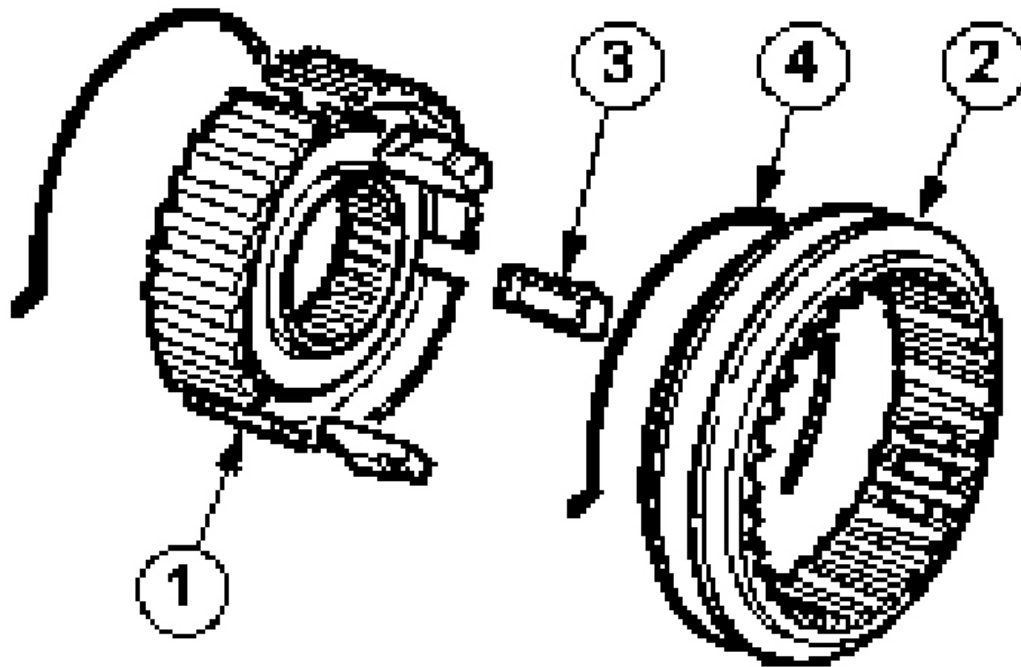


G03854606

Fig. 125: Installing Output Shaft Bearing Cone
Courtesy of FORD MOTOR CO.

2. Install the output shaft bearing cone.
 - Evenly heat the bearing cone to approximately 80 °C and slide it onto the output shaft.
 - Install the snap-ring.

NOTE: **Marking of selector ring installation position in relation to gear synchronizer hub.**

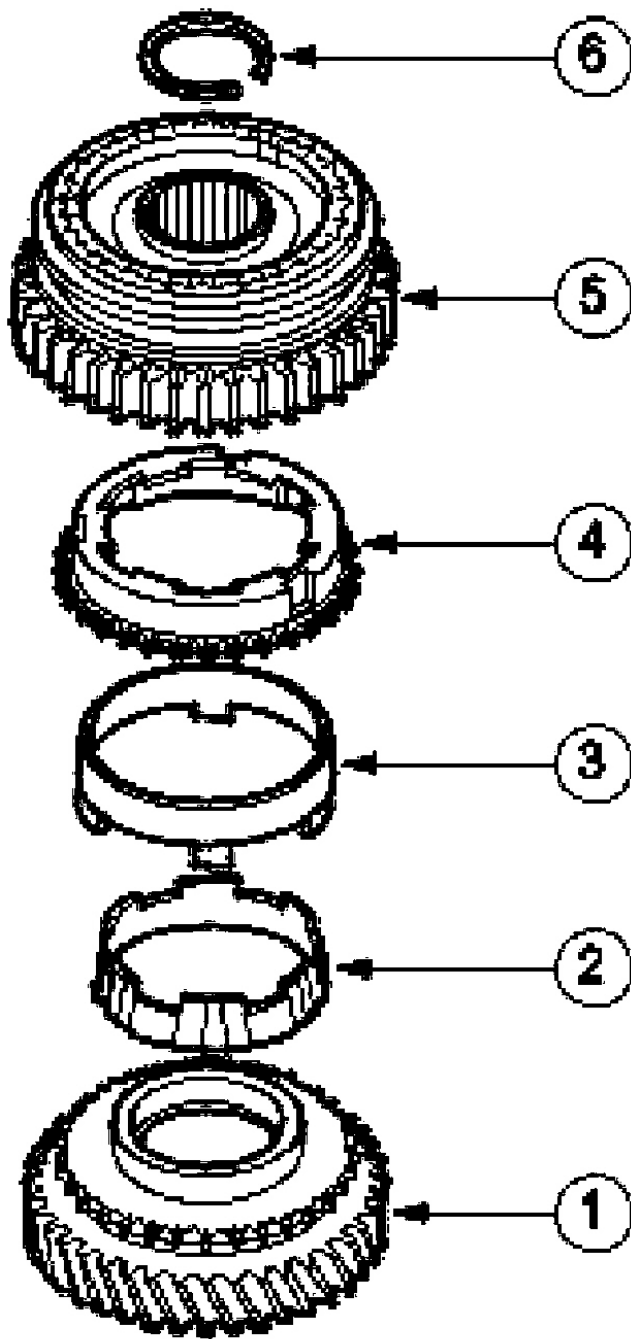


G03854607

Fig. 126: Assembling Gear Synchronizer
Courtesy of FORD MOTOR CO.

3. Assemble the gear synchronizer.
 1. Gear synchronizer hub
 2. Install the selector ring onto gear synchronizer hub.
 3. Insert the synchronizer lock.
 4. Insert the synchronizer spring.

NOTE: **Install a new snap ring.**



G03854608

Fig. 127: Installing First Gear And Reverse Gear Wheel
Courtesy of FORD MOTOR CO.

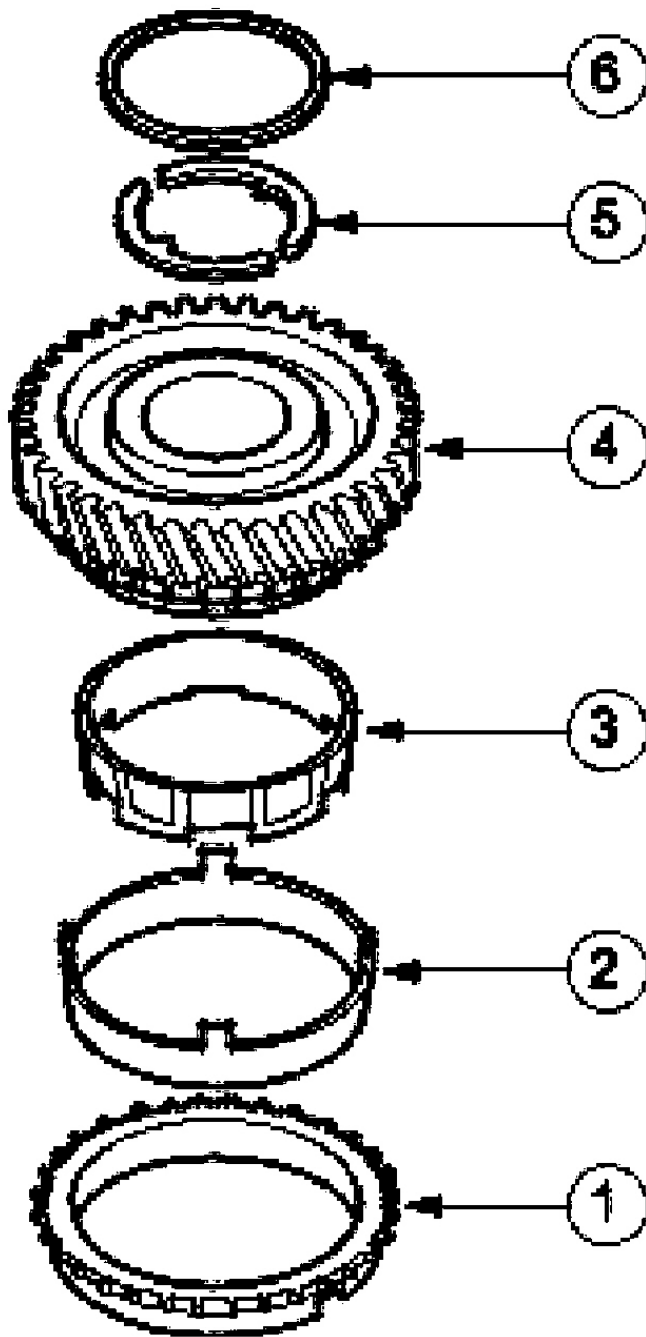
4. Install the first gear and reverse gear wheel onto the output shaft together with the gear

synchronizer and the synchronizer unit.

1. Gear wheel (first gear)
2. Inner synchronizer ring
3. Synchronizer cone
4. Outer synchronizer ring
5. First/second gear synchronizer with reverse gear wheel
6. Snap-ring

NOTE: Re-assemble synchronizer unit prior to installation.

NOTE: Install new halfround snap rings.



G03854609

Fig. 128: Installing Second Gear Wheel
Courtesy of FORD MOTOR CO.

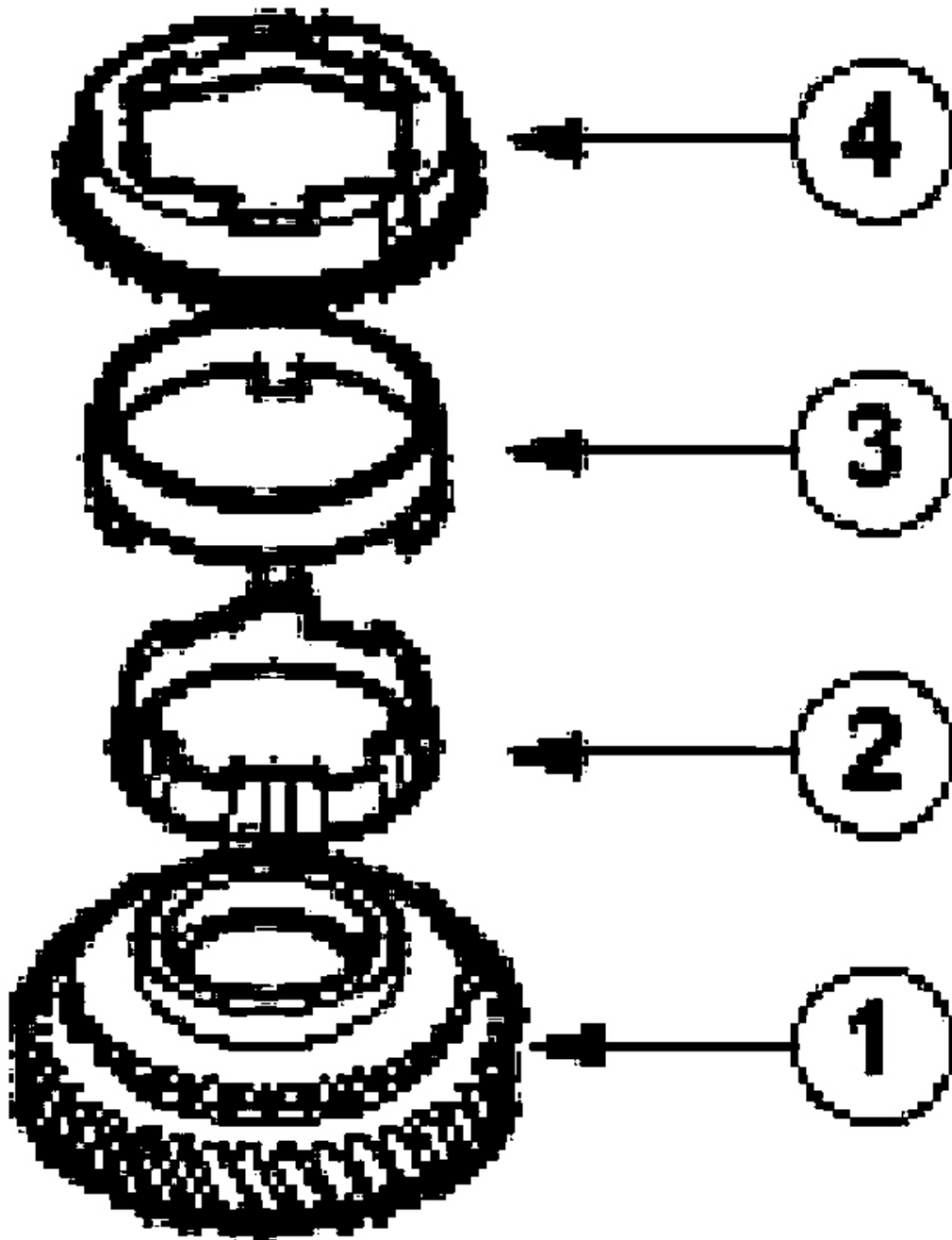
5. Install the second gear wheel onto the output shaft together with the synchronizer unit.

2002 Ford Focus LX

2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus

1. Outer synchronizer ring
2. Synchronizer cone
3. Inner synchronizer ring
4. Gearwheel (second gear)
5. Half-round snap-rings
6. Closed retaining ring

NOTE: The dual synchronizer as shown is used in case of servicing.

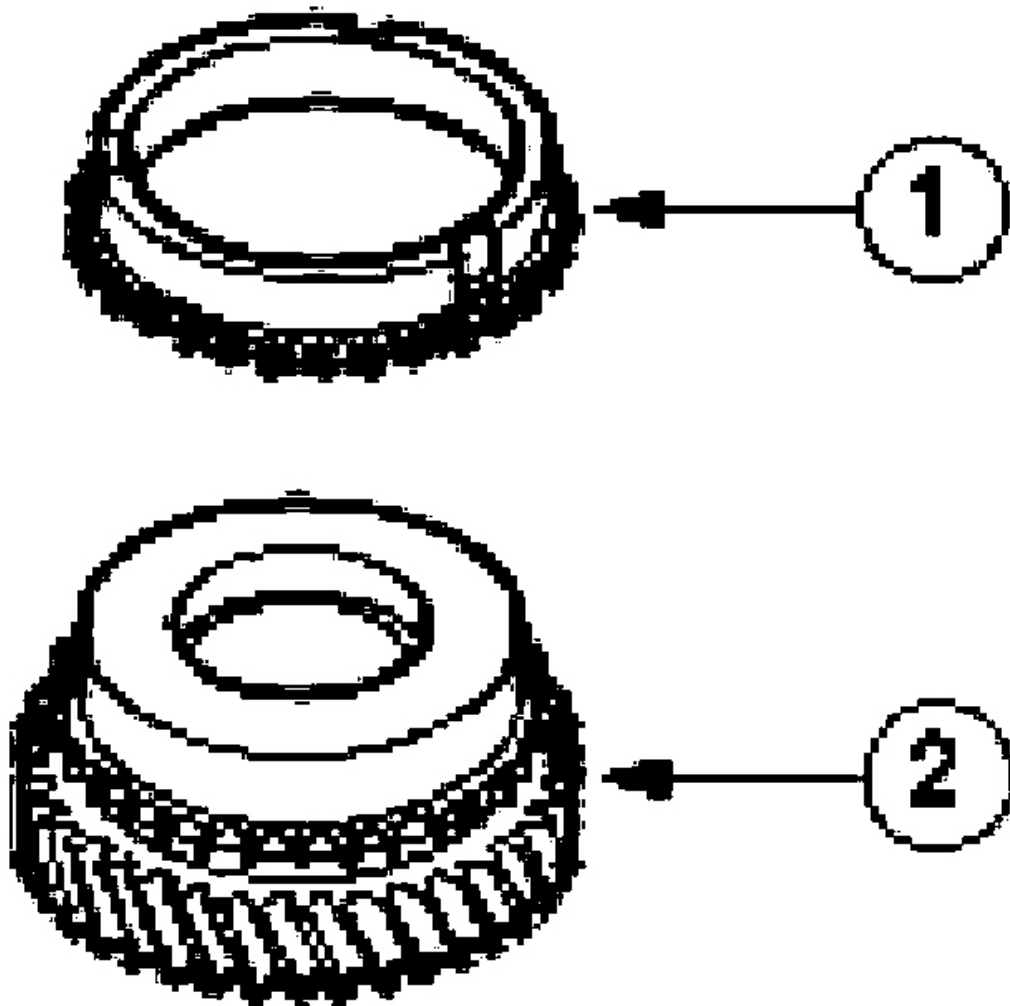


G03854610

Fig. 129: Assembling Third Gear Synchronizer Unit

Courtesy of FORD MOTOR CO.

6. Assemble the third gear synchronizer unit.
 1. Gear wheel (third gear)
 2. Inner synchronizer ring
 3. Synchronizer cone
 4. Outer synchronizer ring
7. Install the third gear synchronizer ring.
 1. Synchronizer ring.
 2. Gear wheel (third gear)

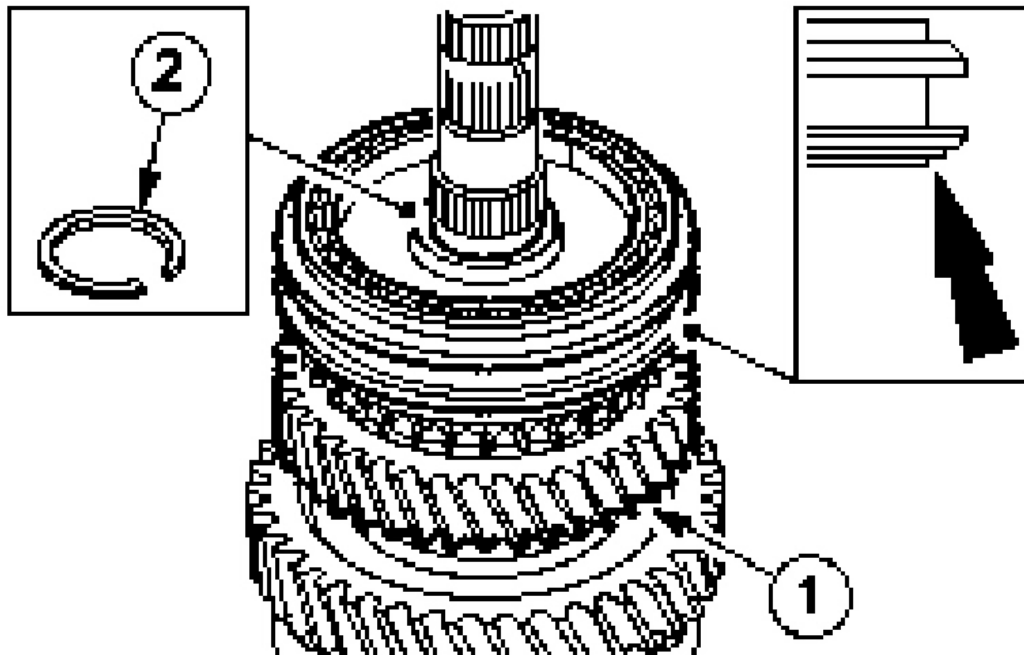


G03854611

Fig. 130: Installing Third Gear Synchronizer Ring
Courtesy of FORD MOTOR CO.

NOTE: Install the selector ring with annular groove facing downwards and small hub collar facing upwards.

NOTE: Install a new snap ring.



G03854612

Fig. 131: Installing Gear Synchronizer, Third/Fourth Gear Synchronizer Unit And Third Gear Wheel

Courtesy of FORD MOTOR CO.

8. Install the third/fourth gear synchronizer unit
 1. Install the gear synchronizer, the third/fourth gear synchronizer unit and the third gear wheel.
 2. Install the snap-ring.

NOTE: Install the ball bearing with annular groove facing outwards.

NOTE: Install a new snap ring.

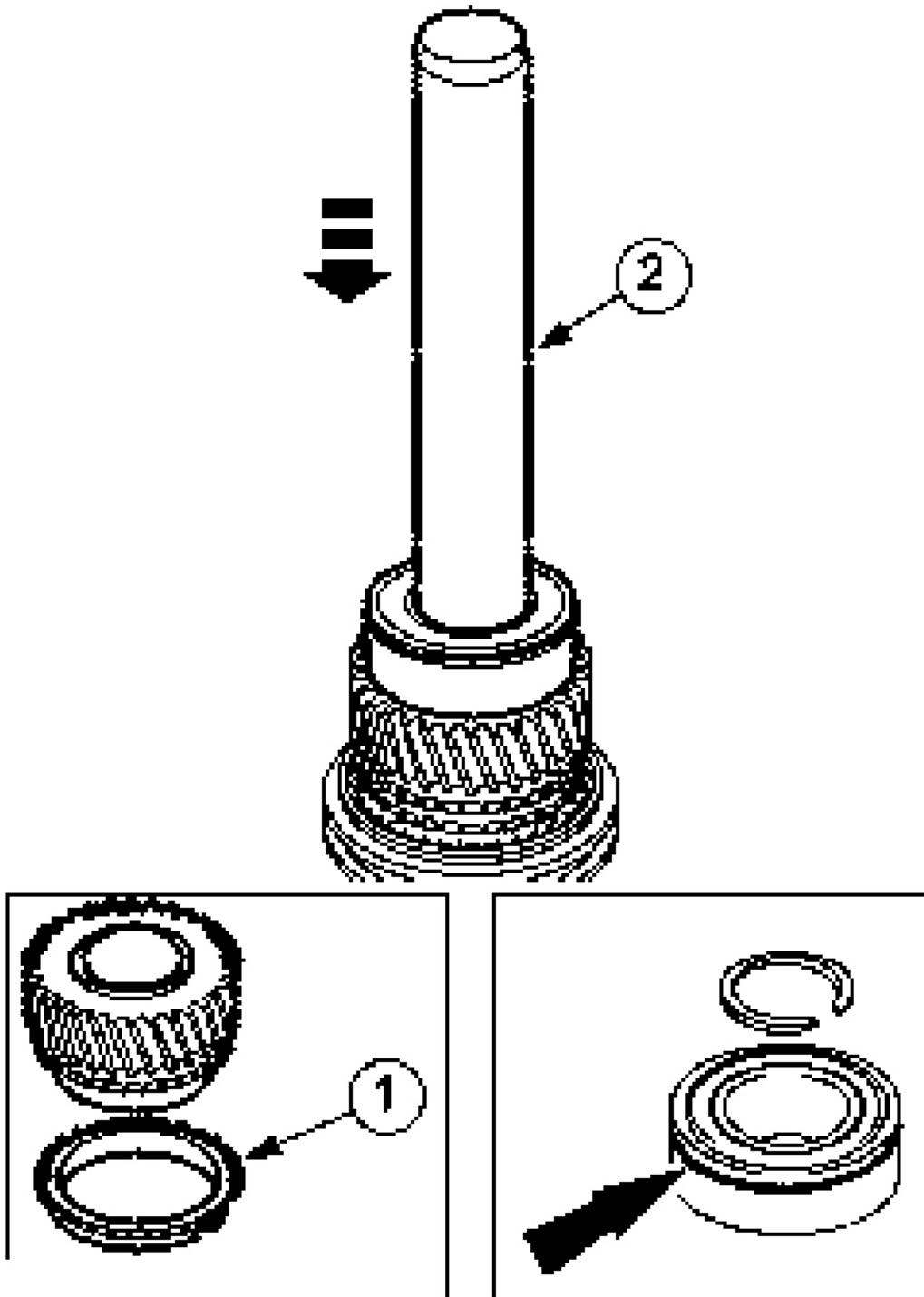
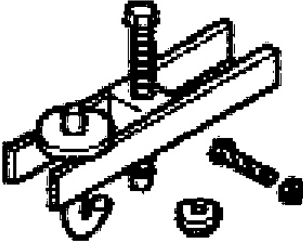
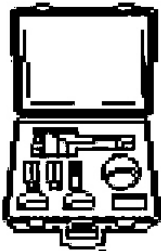



Fig. 132: Installing Fourth Gear Wheel And Ball Bearing
Courtesy of FORD MOTOR CO.

9. Install the fourth gear wheel and the ball bearing.
 1. Install the synchronizer ring together with the fourth gear wheel.
 2. Using a press and a suitable tube, press on the ball bearing.
 - Install the snap-ring.

DIFFERENTIAL

Special Tool(s)

	Remover, Wheel Knuckle 205-253 (T87C-1104-A) (8059)
	Puller, Drive Pinion/Differential Carrier 205-D036 (D81L-4220-A)
	Adaptor for 303-224 (Handle) 205-153 (T80T-4000-W)

G03854614

Fig. 133: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

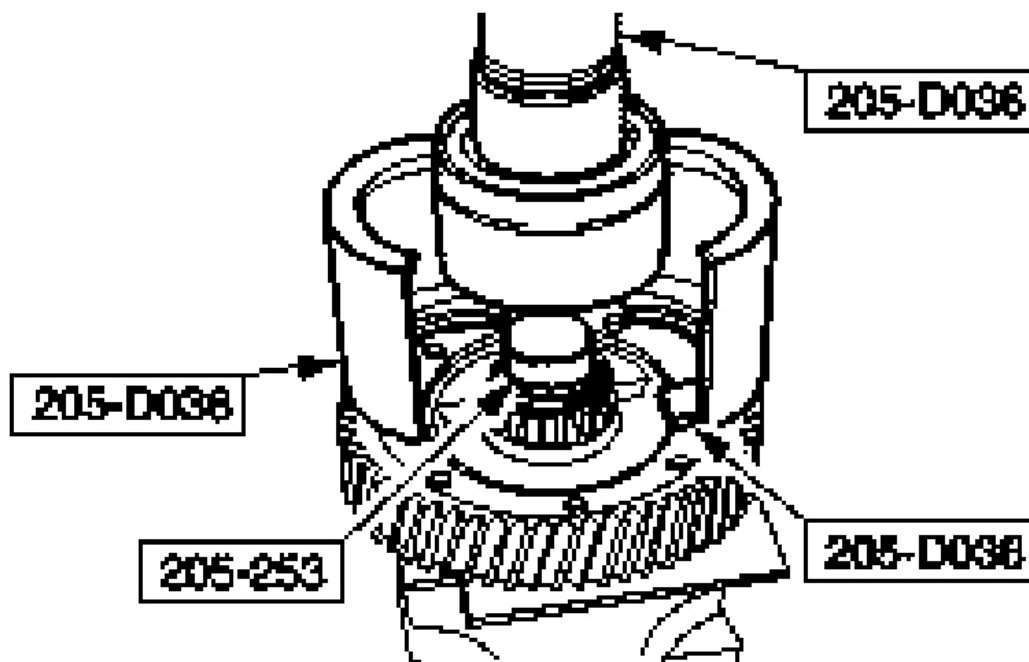
MATERIAL REFERENCE

Transmission fluid

WSD-M2C200-C

Disassembly

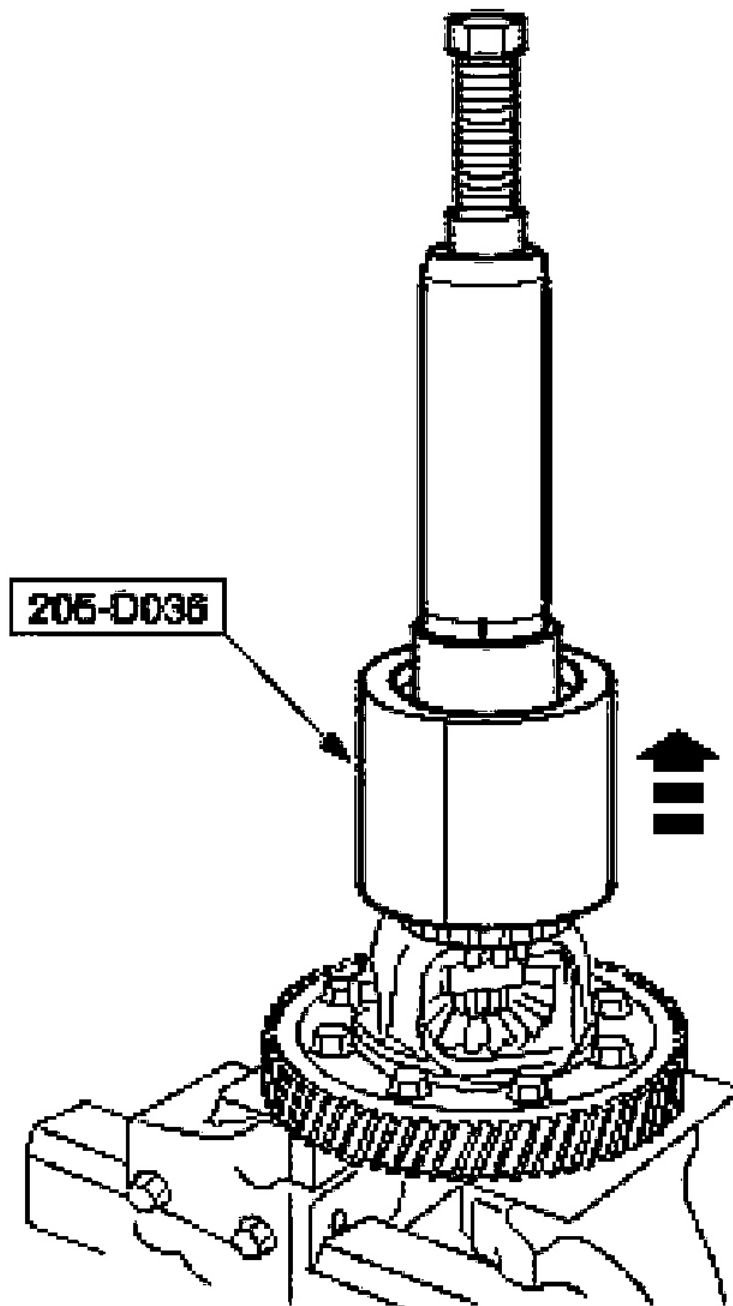
1. Install the special tools (clutch side shown).



G03854615

Fig. 134: Installing Special
Courtesy of FORD MOTOR CO.

2. Remove the taper roller bearings off the differential (transaxle side shown).
 - Remove the sensor ring off vehicle speed sensor (VSS).

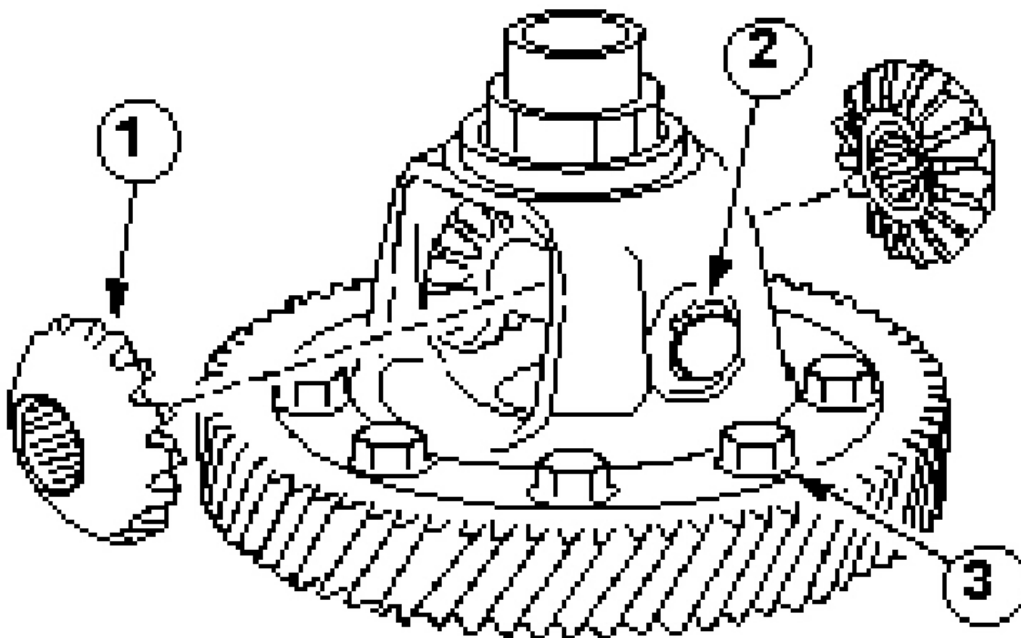


G03854616

Fig. 135: Removing Taper Roller Bearings
Courtesy of FORD MOTOR CO.

3. Remove differential pinions and the ring gear.

1. Rotate the front driveshaft differential pinions through 90 degrees while they are still inside the differential housing and remove them.
2. Remove the snap-ring and the shaft.
 - Remove the two differential pinions and plastic thrust elements.
4. Remove the eight bolts and the ring gear.



G03854617

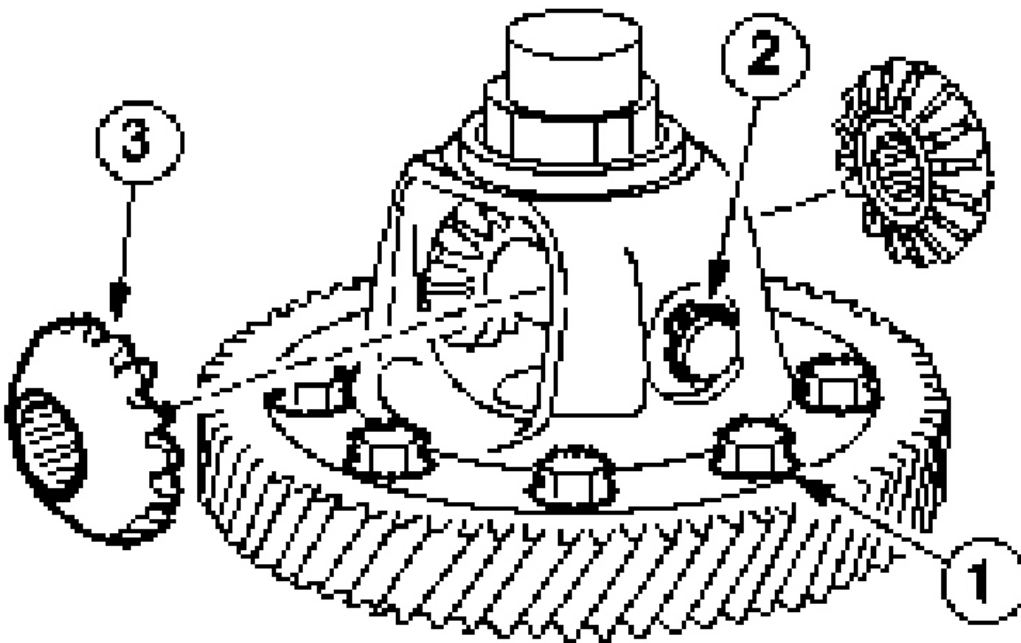
Fig. 136: Removing Bolts
Courtesy of FORD MOTOR CO.

Assembly

NOTE: Do not oil taper roller bearings which are to be used again. There is no need to treat new taper roller bearings before installing them.

1. Carefully clean and check all parts and coat with transmission fluid before reassembly.
2. Install the ring gear and the differential pinions.

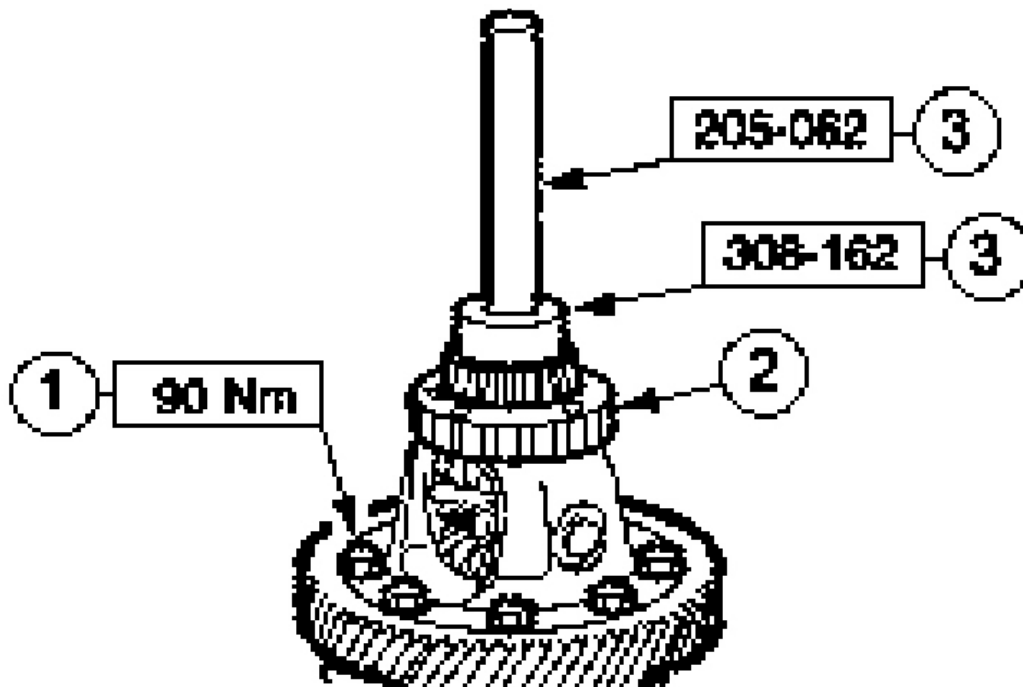
1. Install the ring gear by evenly tightening the previously used bolts.
 - Move the plastic thrust elements and differential pinions into the installation position.
3. Install the pin and the snap-ring
4. Insert the front driveshaft differential pinions and rotate them through 90 degrees once they are inside the differential housing.



G03854618

Fig. 137: Installing Ring Gear And Differential Pinions
Courtesy of FORD MOTOR CO.

NOTE: Use new ring gear bolts.



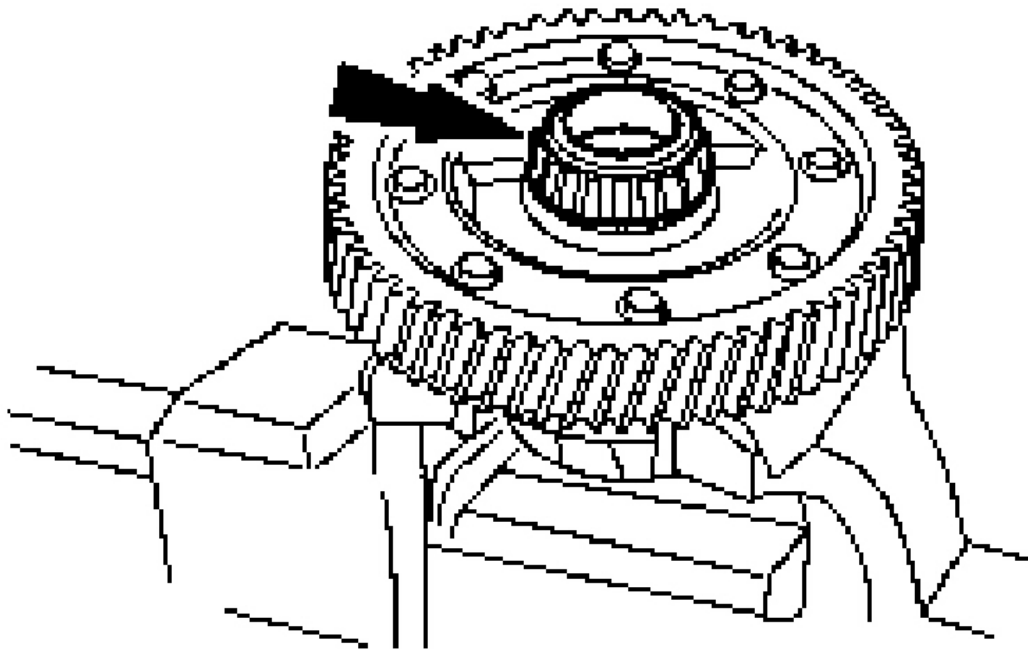
G03854619

Fig. 138: Installing Transaxle Side Taper Roller Bearing
Courtesy of FORD MOTOR CO.

3. Install the transaxle side taper roller bearing and the eight spur gear bolts.
 1. Evenly tighten the ring gear bolts by working diagonally.
 2. Install the VSS sensor ring.

NOTE: Do not rest on the lower taper roller bearing.

3. Using the special tools, install the taper roller bearing.
4. Install the clutch side taper roller bearing.
 - Evenly heat the bearing to approx. 80 °C and slide it onto the differential.



G03854620

Fig. 139: Installing Clutch Side Taper Roller Bearing
Courtesy of FORD MOTOR CO.

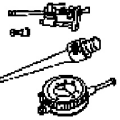


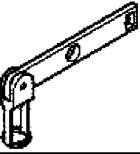


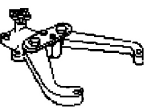
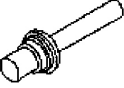
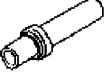

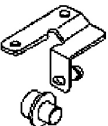
ASSEMBLY

TRANSAXLE

Special Tool(s)

2002 Ford Focus LX

2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus

	Dial Indicator Gauge with Holding Fixture 100-002 (TOOL-4201-C)
	Installer, Rear Hub Bearing/Oil Seal 205-296 (15-085)
	Compressor, Valve Spring 303-350 (T89P-6565-A)
	Compressor, Valve Spring 303-472 (T94P-6565-AH)
	Installer, Input Shaft Snap Ring 308-076
	Installer, Bearing Cones 308-041
	Mounting Fixture, Transmission 307-003 (T57L-500-B)
	Installer, Halfshaft Oil Seal 308-039 (16-018)
	Installer, Extension Housing Bushing/Oil Seal 308-045 (16-0159)
	Blanking Plugs, Transaxle Housing 308-152 (T88C-7025-AH)
	Set, Shim Selection 308-S217 (T94P-4451-BH)

G03854621

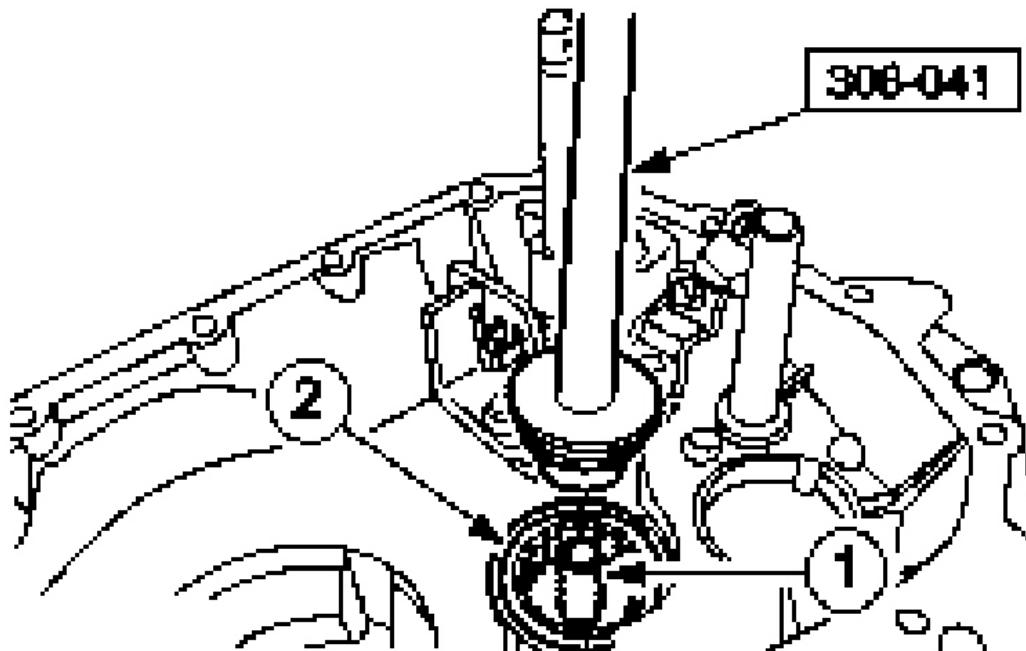
Fig. 140: Identifying Special Tools
Courtesy of FORD MOTOR CO.

MATERIAL REFERENCE

Universal sealant (Hylomar)	ESEE-M4G1008-A
End cap sealer	WSE-M4G323-A4
Sealant, transaxle housing	WSK-M2G348-A5
Manual transmission fluid	WSD-M2C200-C

Assembly

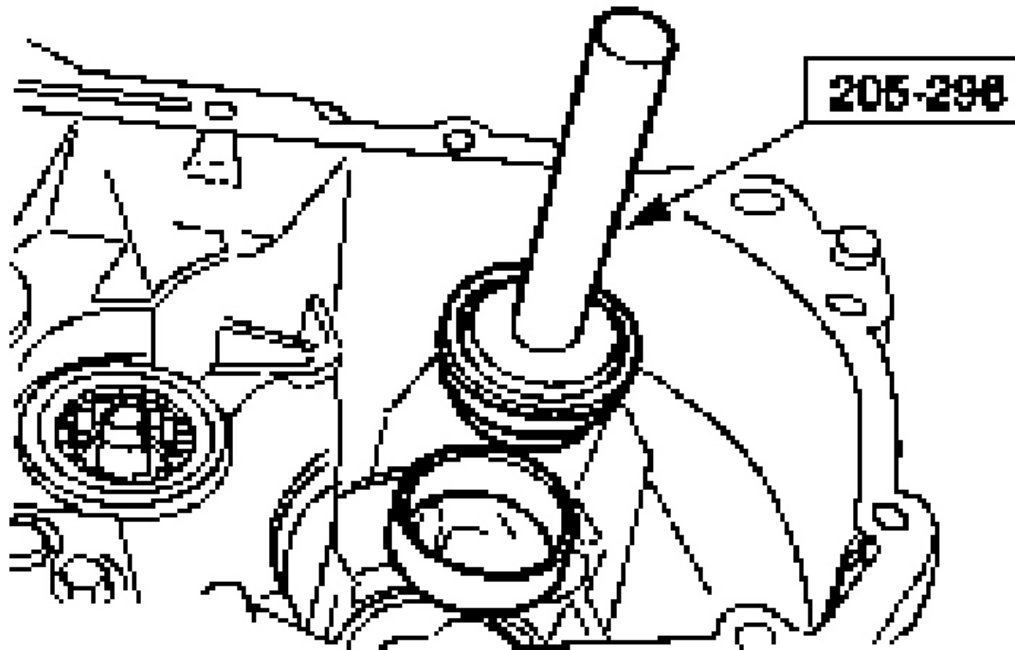
1. Clean and check all parts carefully before reassembly.
 - Apply Manual transmission fluid to all running surfaces.
2. Using the special tool, install the output shaft roller bearing and bearing cone.
 1. Install the oil thrower.
 2. Drive in the roller bearing as far as stop.



G03854622

Fig. 141: Installing Output Shaft Roller Bearing And Bearing Cone
Courtesy of FORD MOTOR CO.

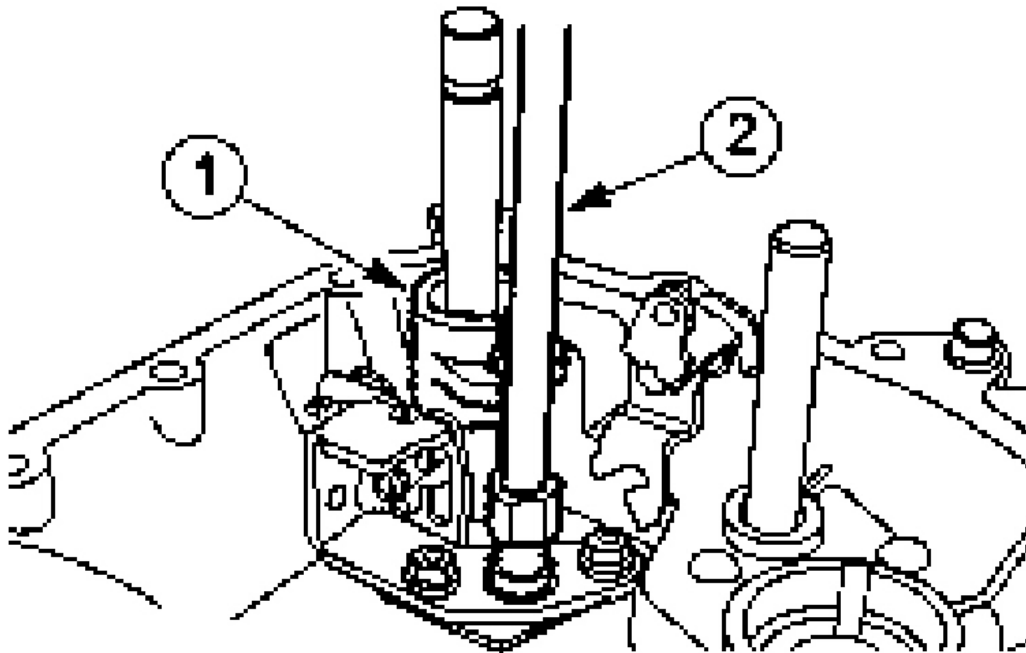
3. Using the special tool, install the differential bearing cone.



G03854623

Fig. 142: Installing Differential Bearing Cone
Courtesy of FORD MOTOR CO.

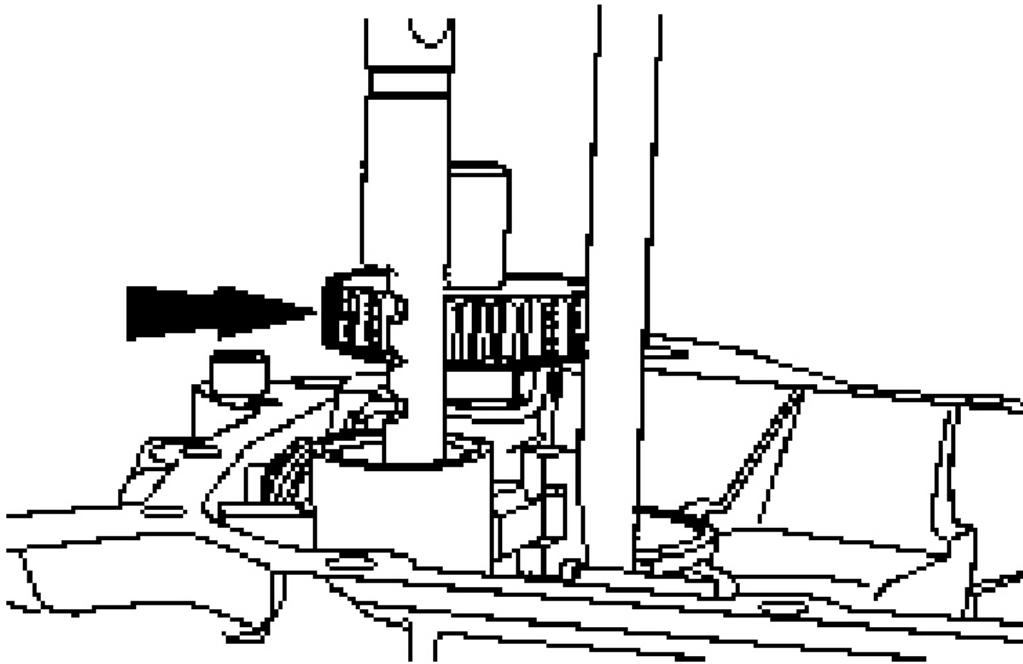
4. Install the selector rod with the locking plate.
 1. Install the shift selector interlock plate.
 2. Install the fifth and reverse gear selector rod.



G03854624

Fig. 143: Installing Selector Rod With Locking Plate
Courtesy of FORD MOTOR CO.

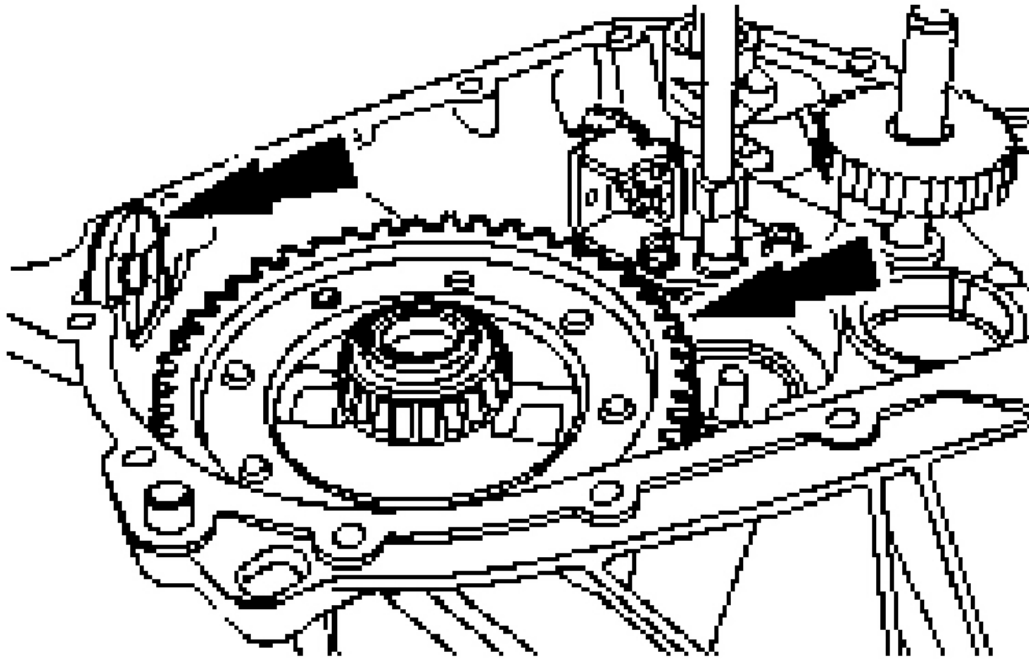
5. Install the reverse idle gear.



G03854625

Fig. 144: Installing Reverse Idle Gear
Courtesy of FORD MOTOR CO.

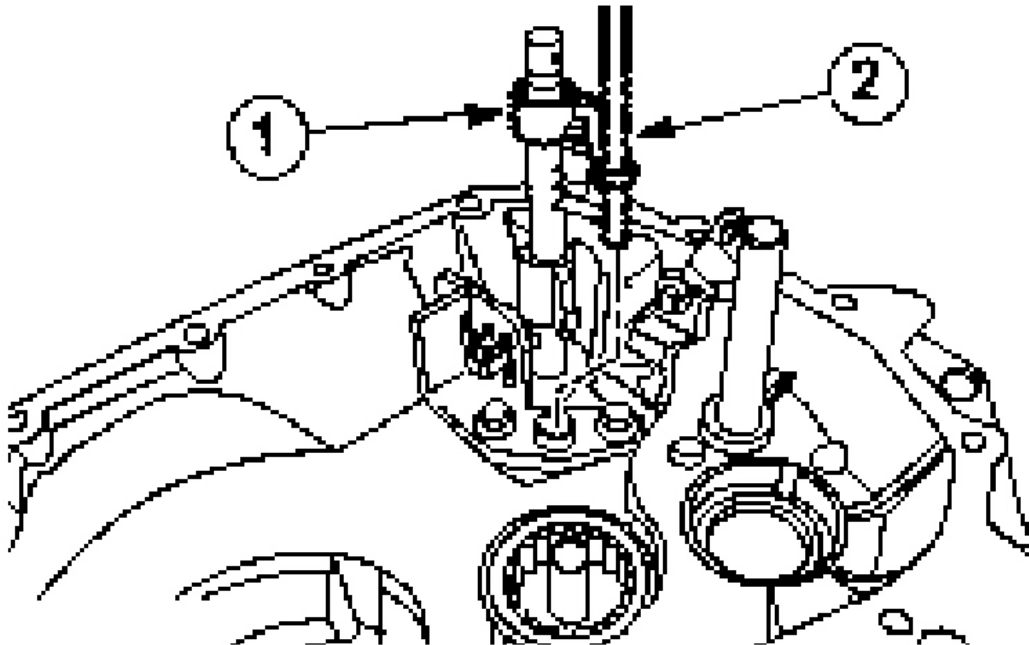
6. Install the differential and the permanent magnet.



G03854626

Fig. 145: Installing Differential And Permanent Magnet
Courtesy of FORD MOTOR CO.

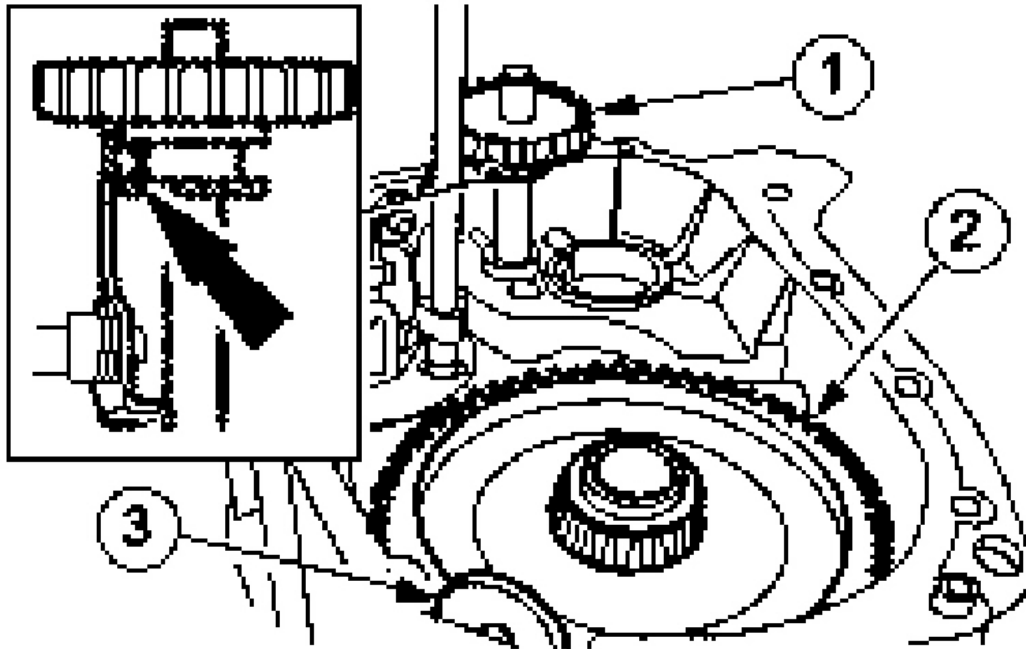
7. Install the fifth and reverse gear selector shaft and shift locking bush.
 1. Shift selector interlock plate
 2. Fifth and reverse gear selector shaft



G03854627

Fig. 146: Installing Fifth And Reverse Gear Selector Shaft And Shift Locking Bush
Courtesy of FORD MOTOR CO.

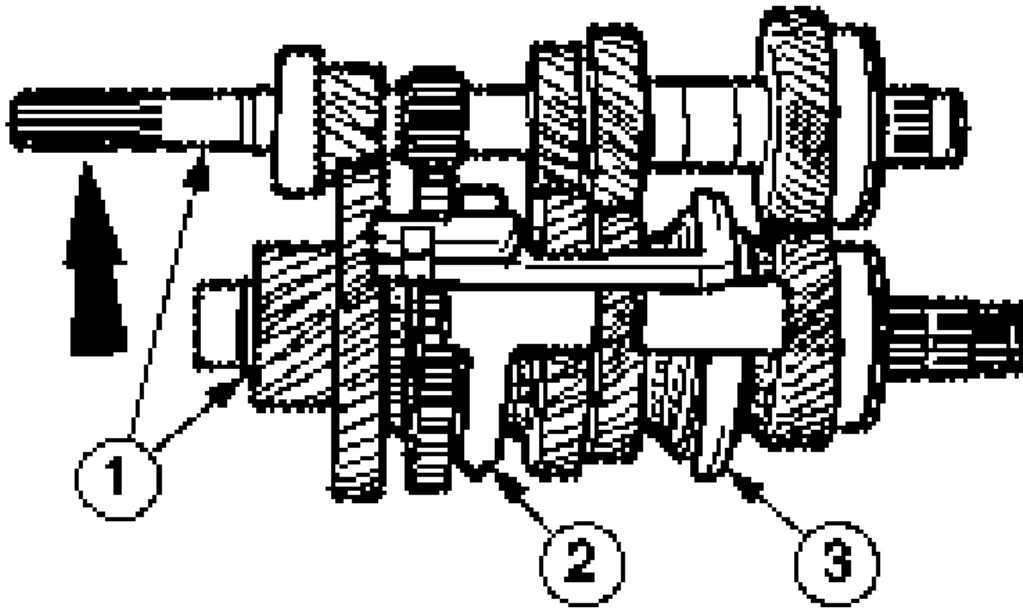
NOTE: Installation position for the reverse gear idler.



G03854628

Fig. 147: Installing Reverse Gear Idler, Differential And Permanent Magnet
Courtesy of FORD MOTOR CO.

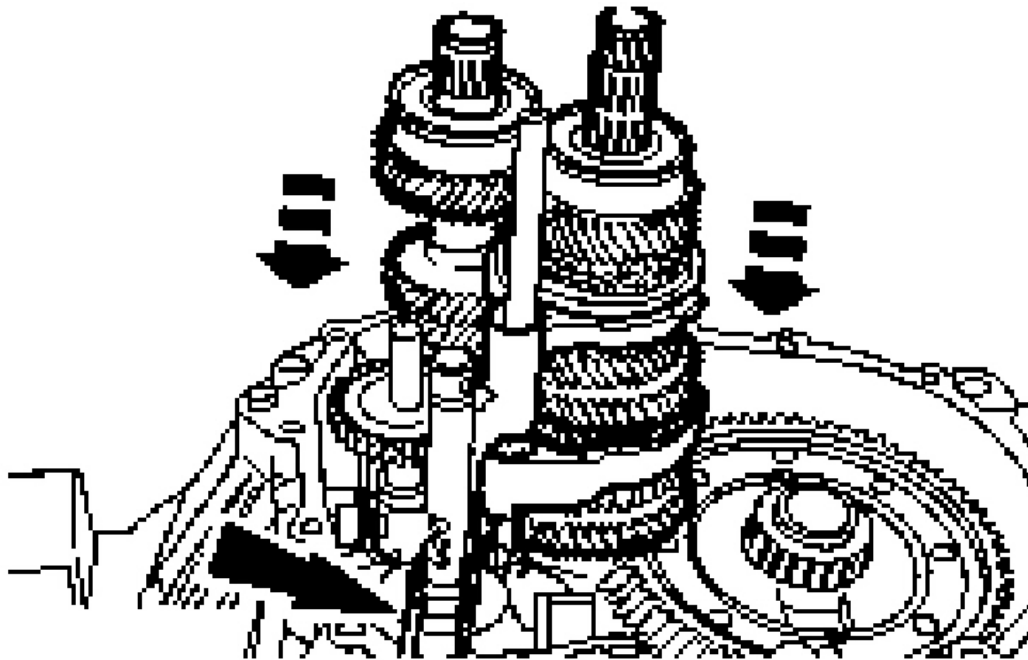
8. Install the reverse gear idler, the differential and the permanent magnet.
 1. Reverse gear idler
 2. Differential
 3. Permanent magnet
9. Prepare the input and the output shaft for installation.
 1. Engage the input shaft and the output shaft.
 2. Position the first and second gear selector fork.
 3. Position the third and fourth gear selector fork.



G03854629

Fig. 148: Positioning Third And Fourth Gear Selector Fork
Courtesy of FORD MOTOR CO.

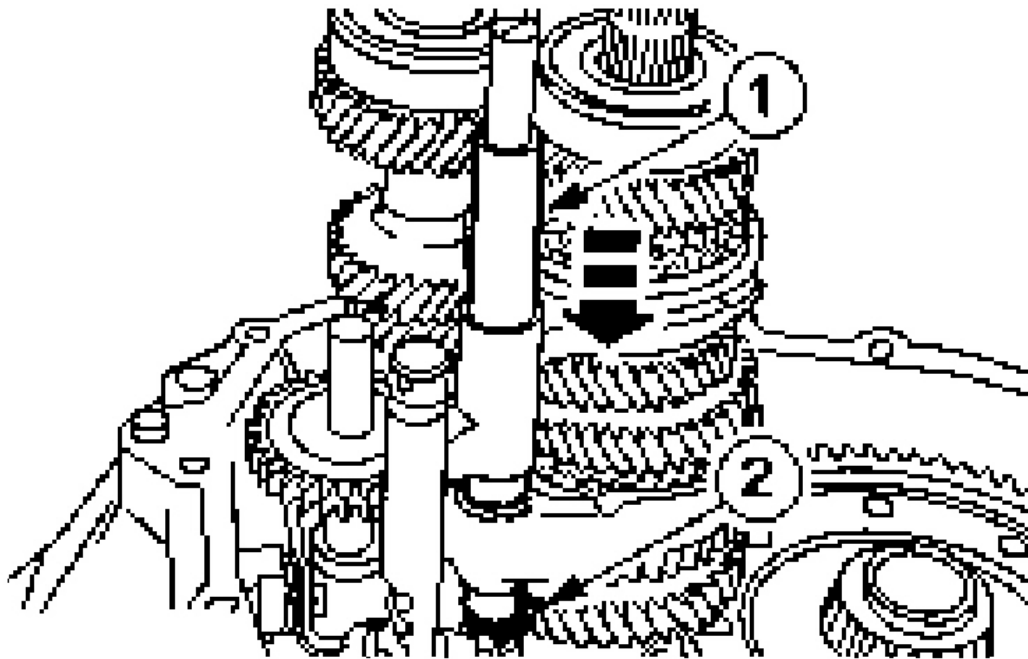
10. Install the input shaft and the output shaft.
 - Install a rubber band to the selector shaft to aid assembly.
 - Insert the input shaft to a depth of approximately 50 mm and swivel it slightly to the side.
 - Insert the output shaft to the level of the input shaft and engage the gearwheels.
 - Position the input shaft and the output shaft.



G03854630

Fig. 149: Installing Input Shaft And Output Shaft
Courtesy of FORD MOTOR CO.

NOTE: Install a new snap ring.

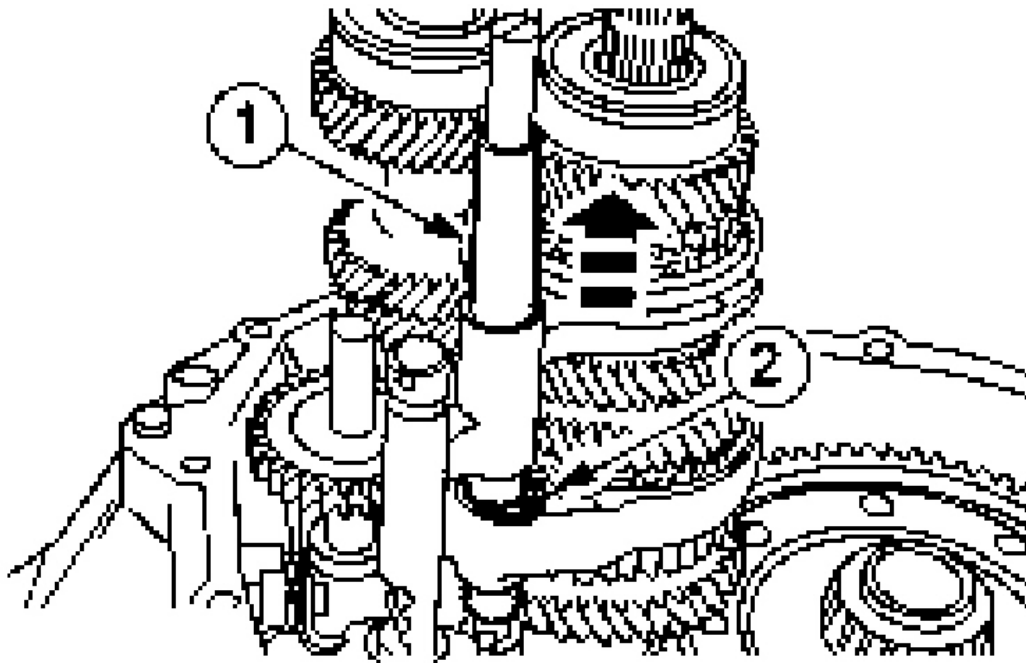


G03854631

Fig. 150: Installing Selector Shaft Guide Sleeve
Courtesy of FORD MOTOR CO.

11. Install the selector shaft guide sleeve.
 1. Push in the guide sleeve.
 2. Install the lower snap ring.

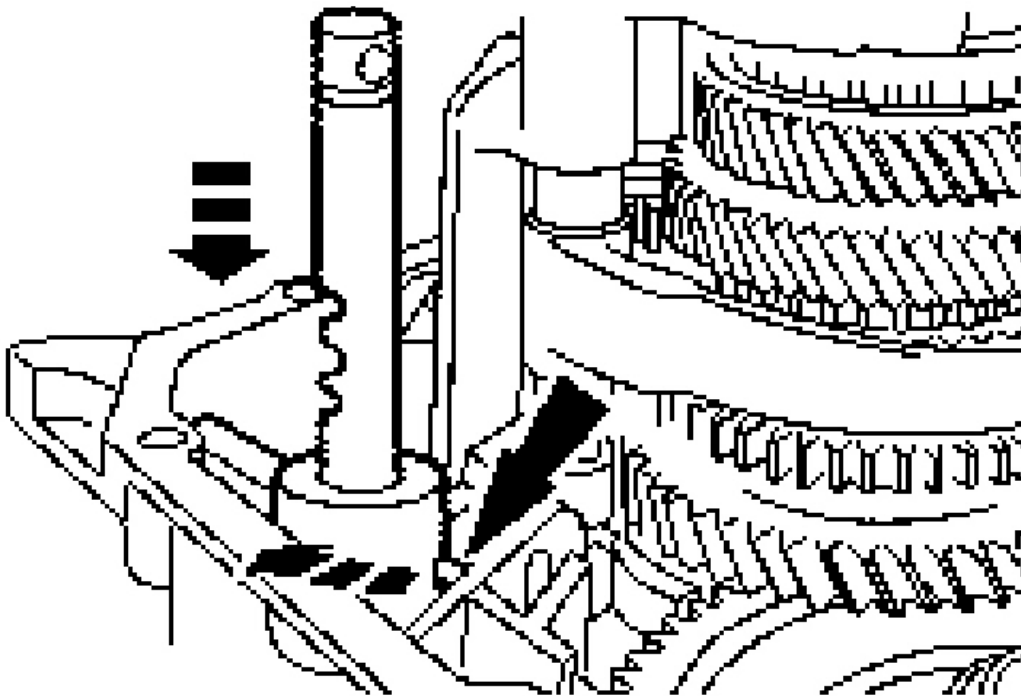
NOTE: **Install a new snap ring.**



G03854632

Fig. 151: Installing Upper Snap Ring
Courtesy of FORD MOTOR CO.

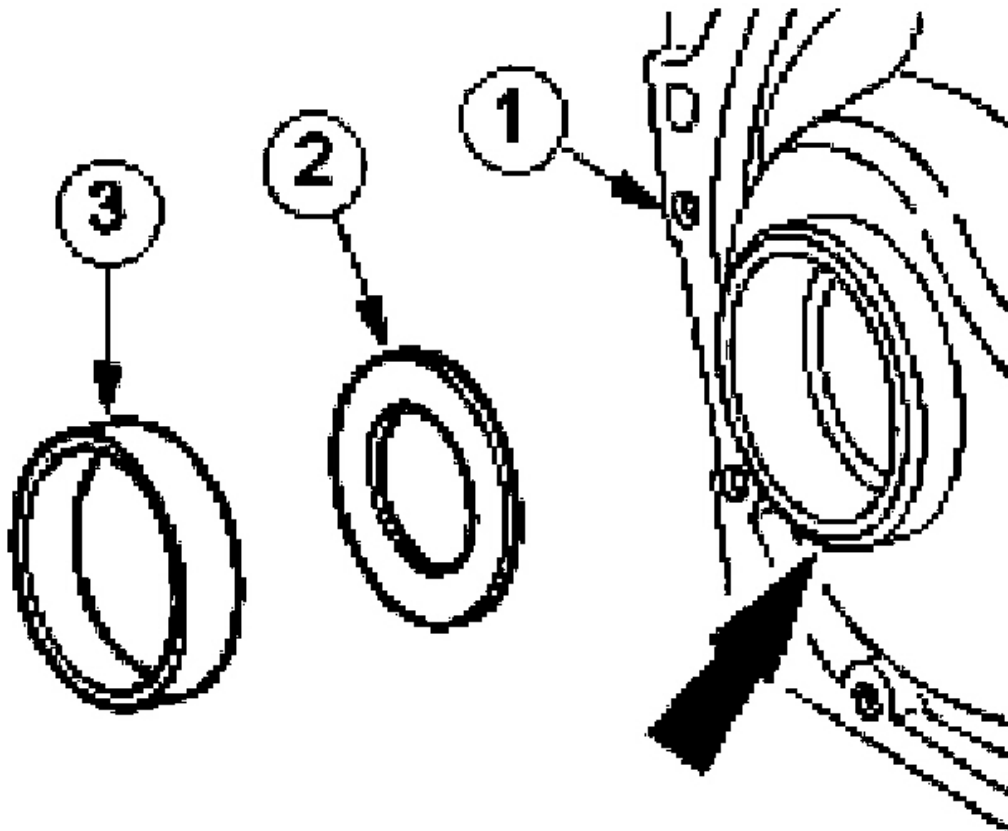
12. Install the selector shaft guide sleeve upper snap ring.
 1. Pull up the guide sleeve.
 2. Install the upper snap ring.
13. Move the inner gearshift linkage to fifth gear.
 - Turn the selector shaft clockwise until the reverse and fifth gear passage is reached, then press downwards.



G03854633

Fig. 152: Turning Selector Shaft
Courtesy of FORD MOTOR CO.

14. Install the measuring shim and secure with a blow from a punch.
 1. Transaxle housing
 2. Measuring shim (3.8 mm thick)
 3. Bearing cone



G03854634

Fig. 153: Installing Shim
Courtesy of FORD MOTOR CO.

NOTE: Thoroughly clean the mating face.

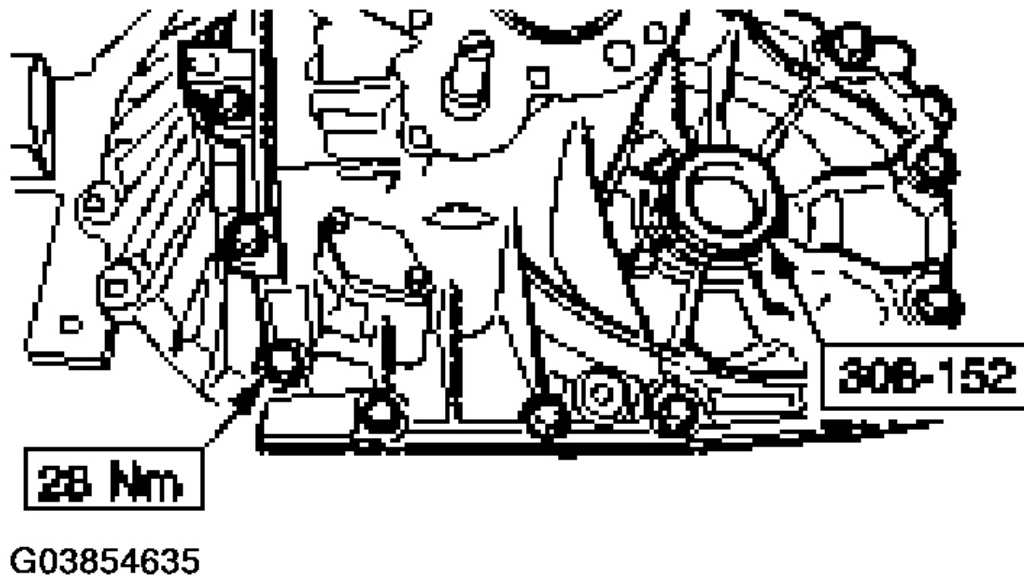
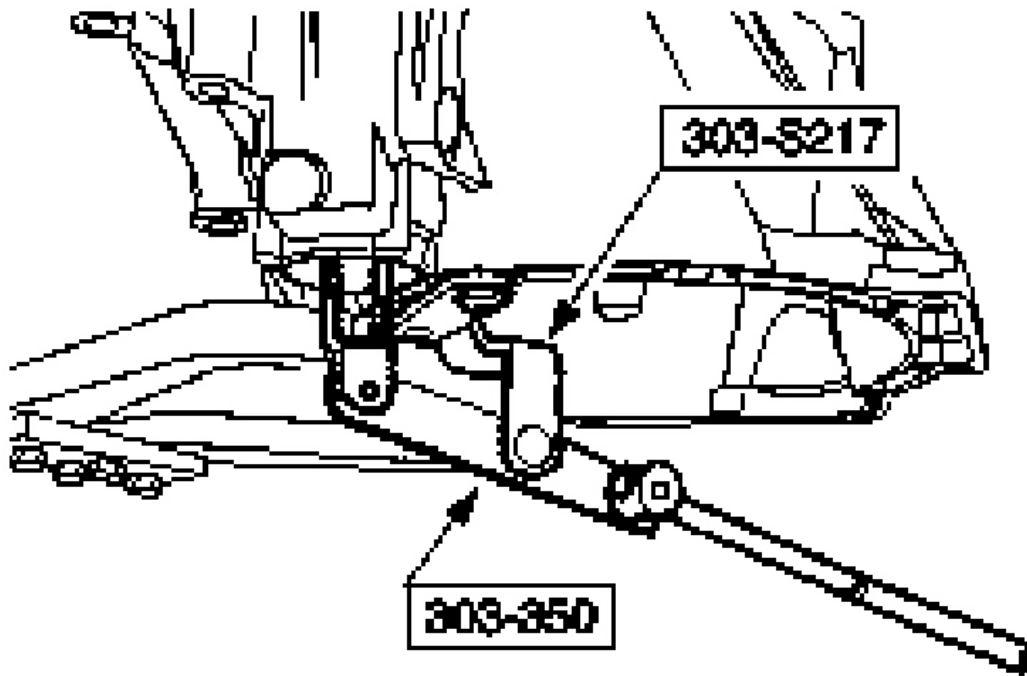


Fig. 154: Assembling Transaxle Housing
Courtesy of FORD MOTOR CO.

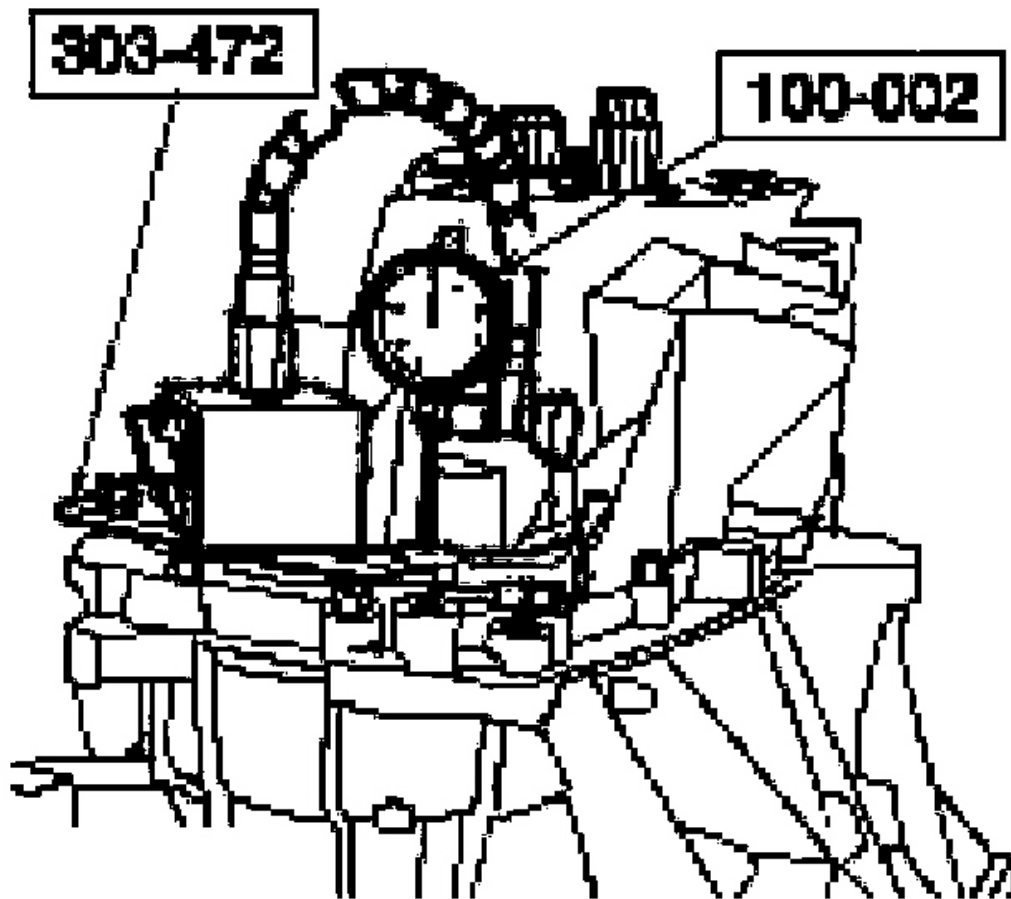
15. Using the special tool, assemble the transaxle housing.
16. Install the special tools.
 - Remove the special tool 308-152.



G03854636

Fig. 155: Removing Special Tool 308-152
Courtesy of FORD MOTOR CO.

17. Prepare the differential for measuring.
 - Turn the differential at least ten times to settle the bearings.
 - Install the special tools and "zero" the dial indicator.



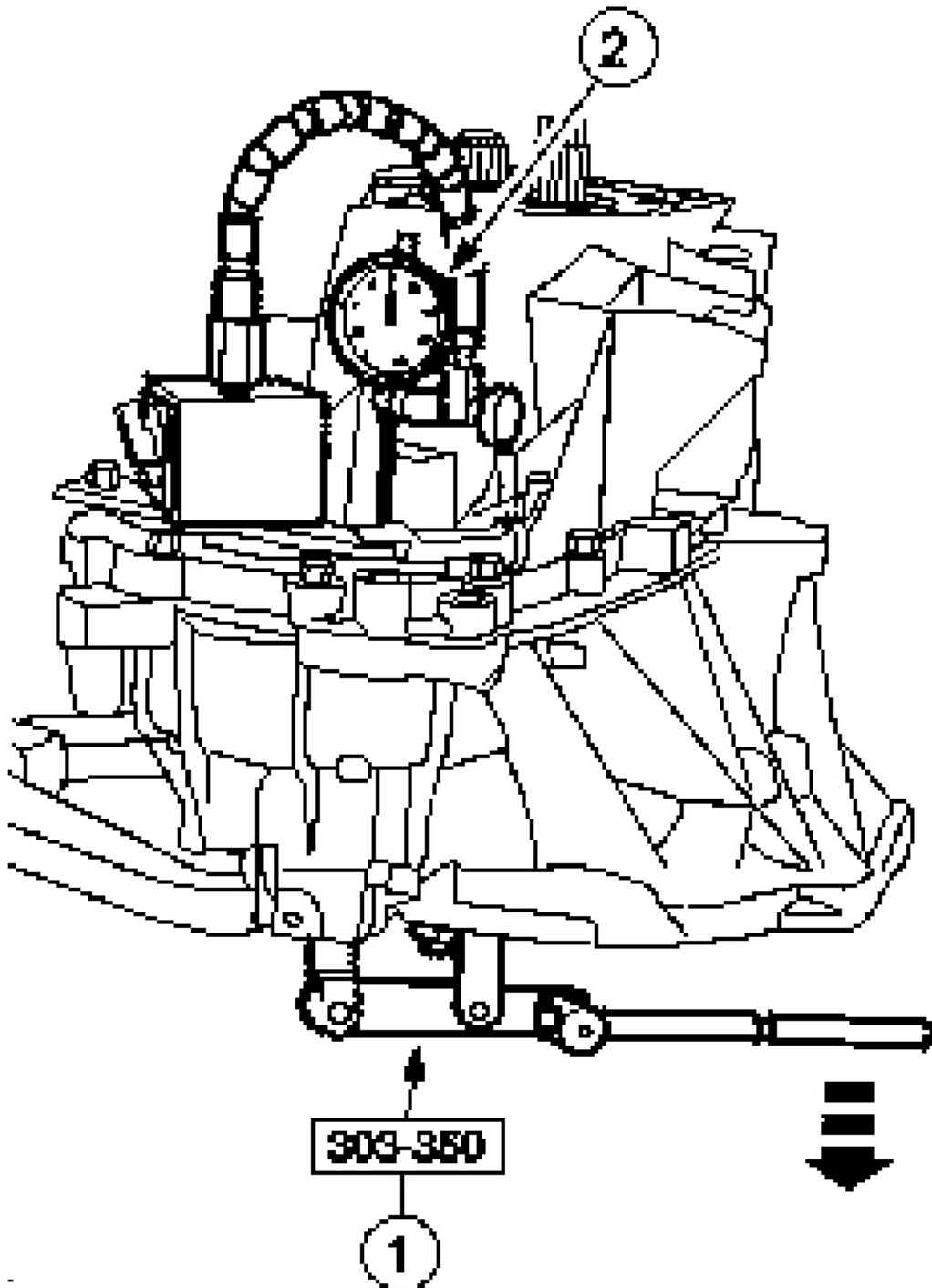
G03854637

Fig. 156: Installing Special Tools And Dial Indicator
Courtesy of FORD MOTOR CO.

NOTE: Carry out the previous steps three times and calculate the average measurement.

2002 Ford Focus LX

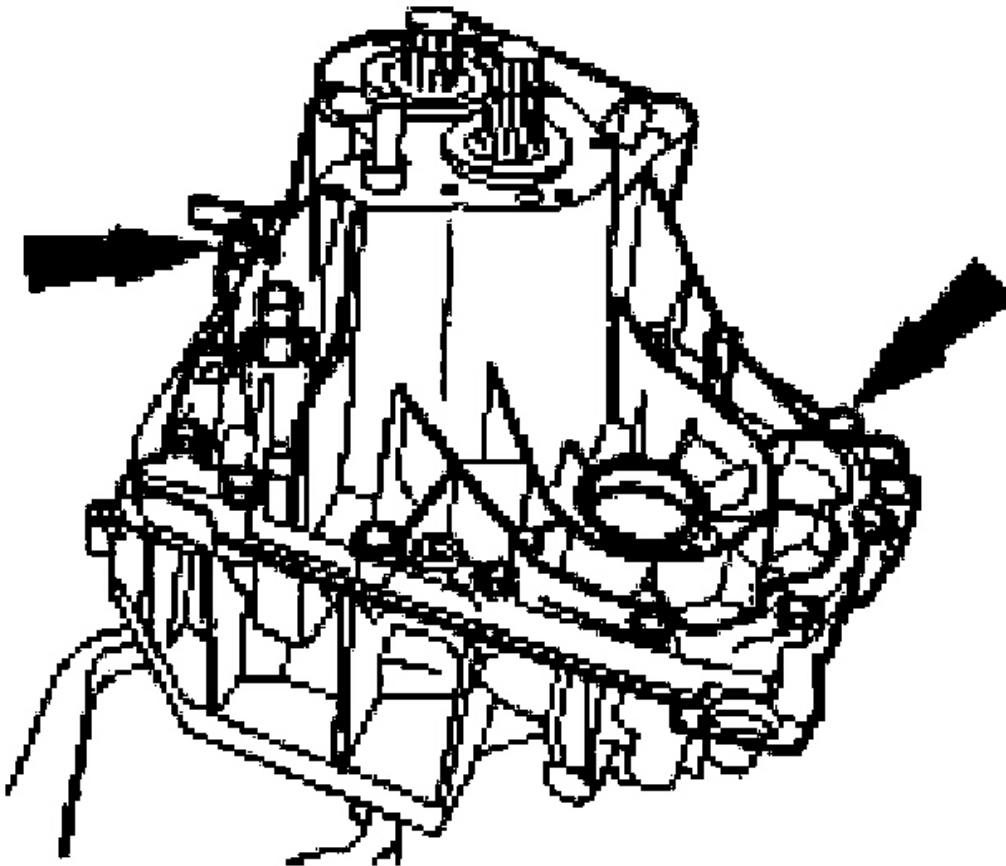
2002 TRANSMISSION Manual Transaxle - Vehicles With iB5/Manual Transaxle - Focus



G03854638

Fig. 157: Measuring Differential End Float
Courtesy of FORD MOTOR CO.

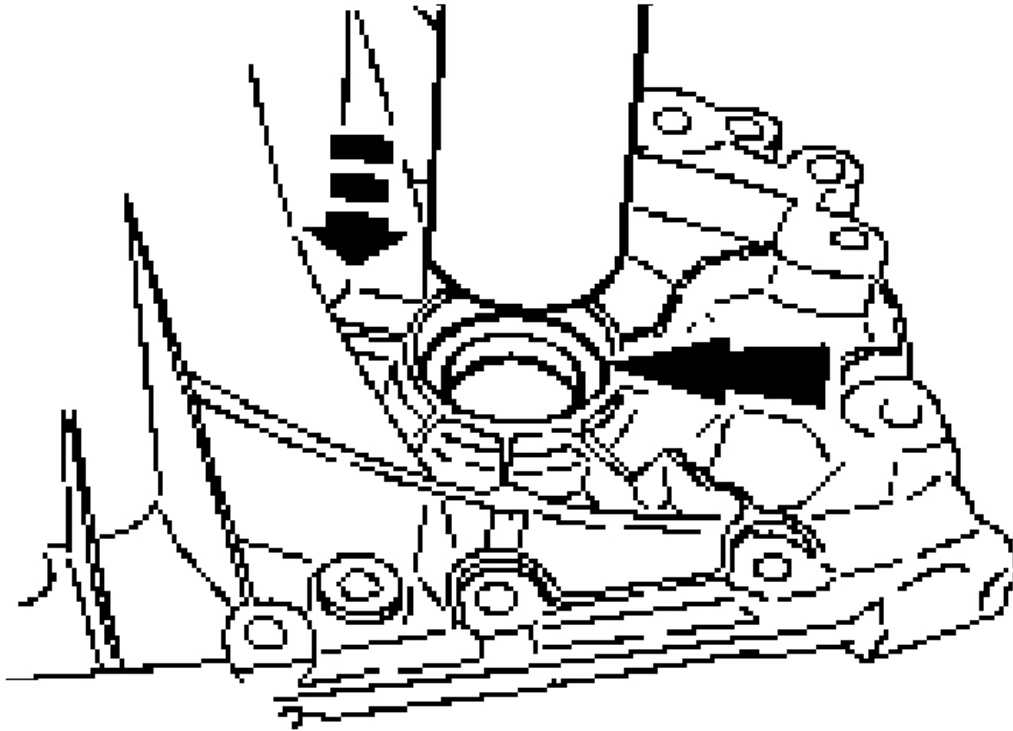
18. Measure the differential end float.
 1. Using the special tools, raise the differential.
 2. Read off the measurement.
 - Example:
 - measurement: 0.73 mm
 - measurement: 0.74 mm
 - measurement: 0.72 mm
 - $\text{Average} = 0.73 \text{ mm} + 0.74 \text{ mm} + 0.72 \text{ mm} / 3 = 0.73 \text{ mm}$.
 - The washer thickness to be determined should be rounded down to 0.05 mm and below, and rounded up from 0.06 mm and above.
 - The adjusting shims are available from 0.1 mm to 1.1 mm in steps of 0.1 mm.
19. Determine the adjusting shim to be installed (example).
 - Thickness of adjusting shim =
 - Measuring shims (3.80 mm) +
 - Average value (0.73 mm) +
 - Bearing preload (0.14 mm) -
 - Thickness of the Belleville washers (4.42 mm) =
 - $3.80 \text{ mm} + 0.73 \text{ mm} + 0.14 \text{ mm} - 4.42 \text{ mm} = 0.25 \text{ mm}$.
 - The thickness of the adjusting shim should be 0.25 mm, which is rounded down to 0.20 mm.
20. Separate the transmission housing sections.
 - Remove the special tools.



G03854639

Fig. 158: Separating Transmission Housing Sections
Courtesy of FORD MOTOR CO.

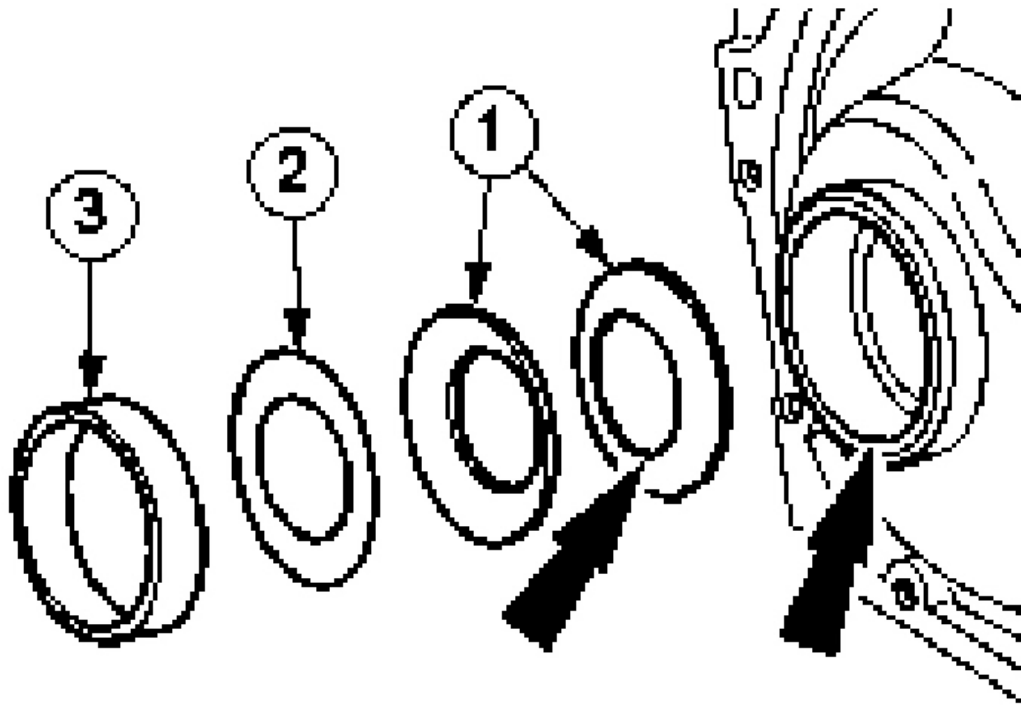
21. Remove the bearing cone and measuring shim.



G03854640

Fig. 159: Removing Bearing Cone And Measuring Shim
Courtesy of FORD MOTOR CO.

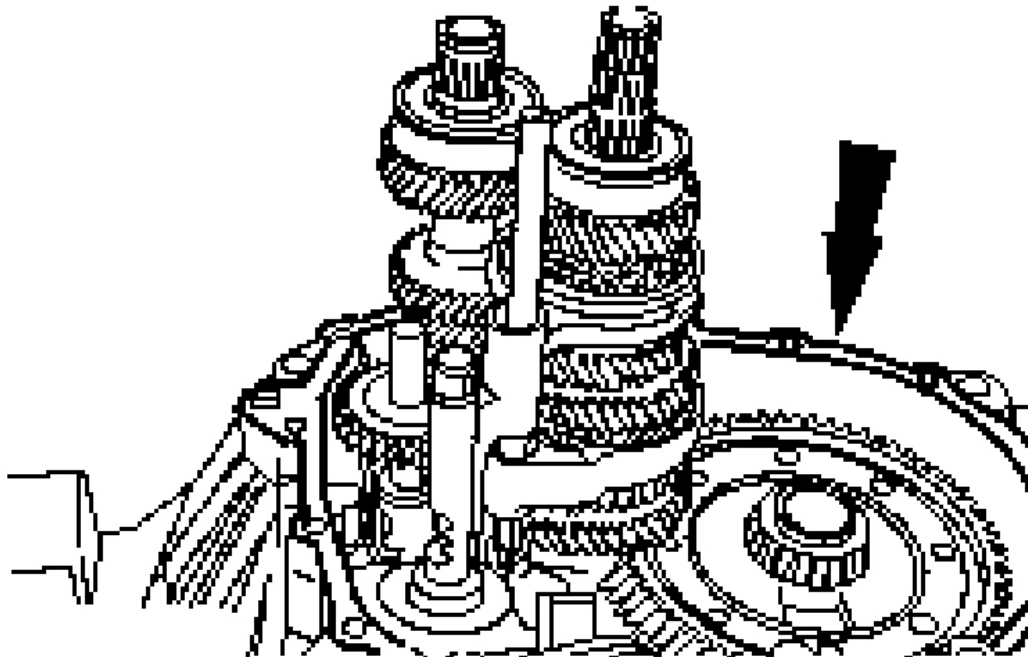
NOTE: The inner diameters of the Belleville washers are touching.



G03854641

Fig. 160: Installing Adjusting Shim
Courtesy of FORD MOTOR CO.

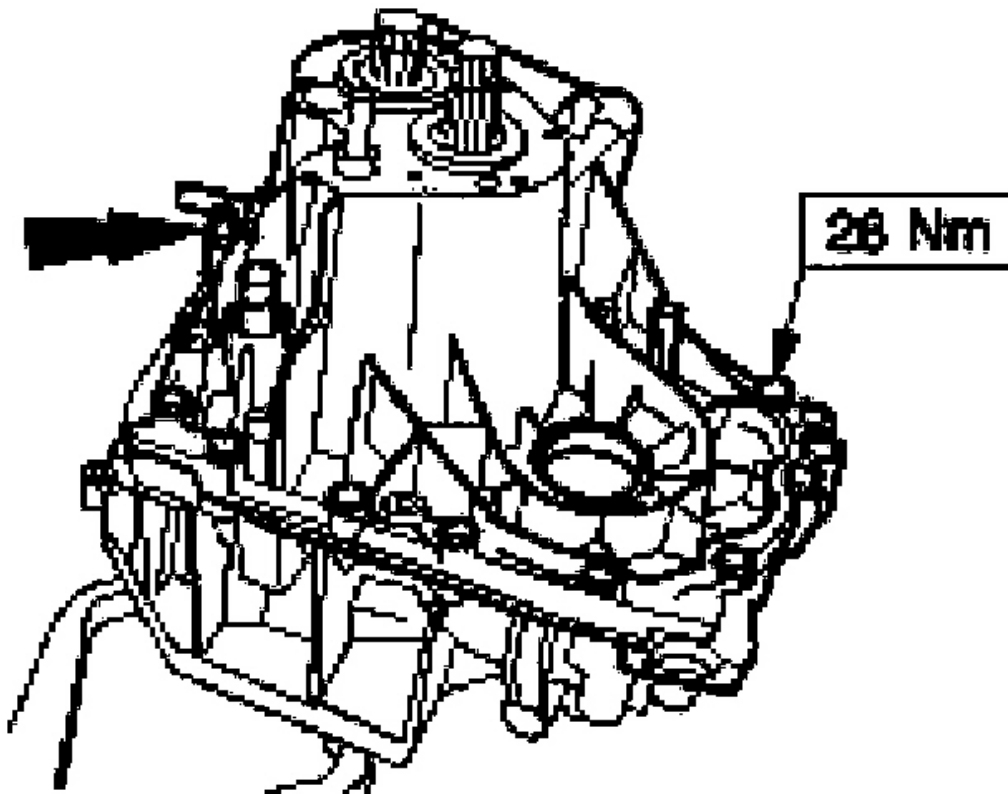
22. Install the adjusting shim determined and secure with a blow from a punch.
 1. Belleville washers.
 2. Appropriate adjusting shim.
 3. Install the bearing cone and secure it with a punch mark on the edge of the housing.
23. Apply Sealant transaxle housing to the transaxle housing evenly.



G03854642

Fig. 161: Applying Sealant
Courtesy of FORD MOTOR CO.

NOTE: Tighten the stud connections to 33 Nm.



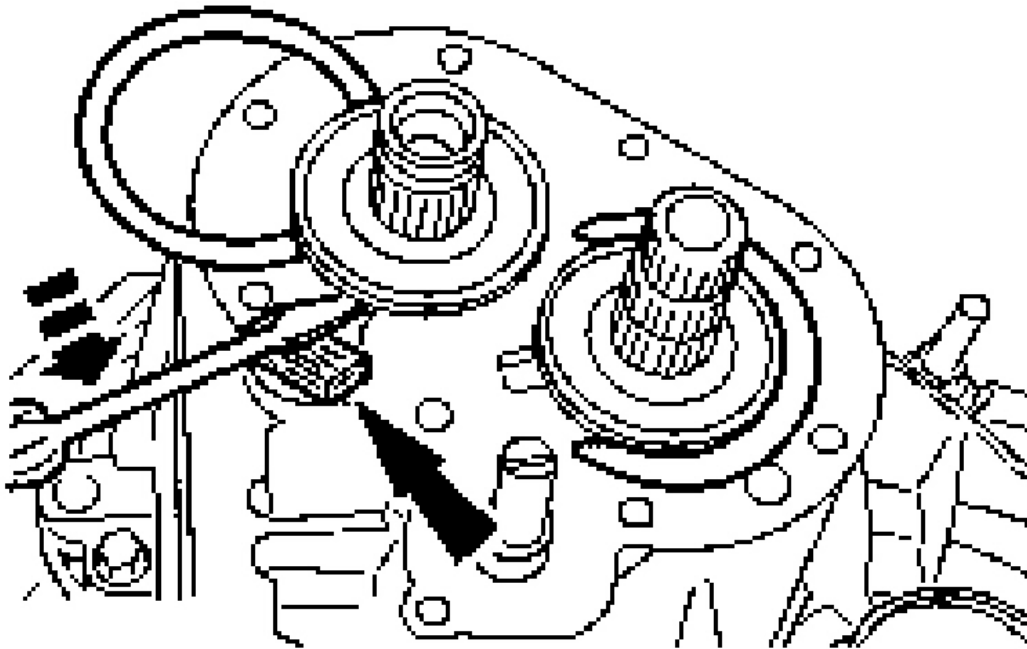
G03854643

Fig. 162: Assembling Transaxle Housing
Courtesy of FORD MOTOR CO.

24. Assemble the transaxle housing and tighten the bolts evenly.

NOTE: Use a wooden block.

NOTE: Install new snap rings.

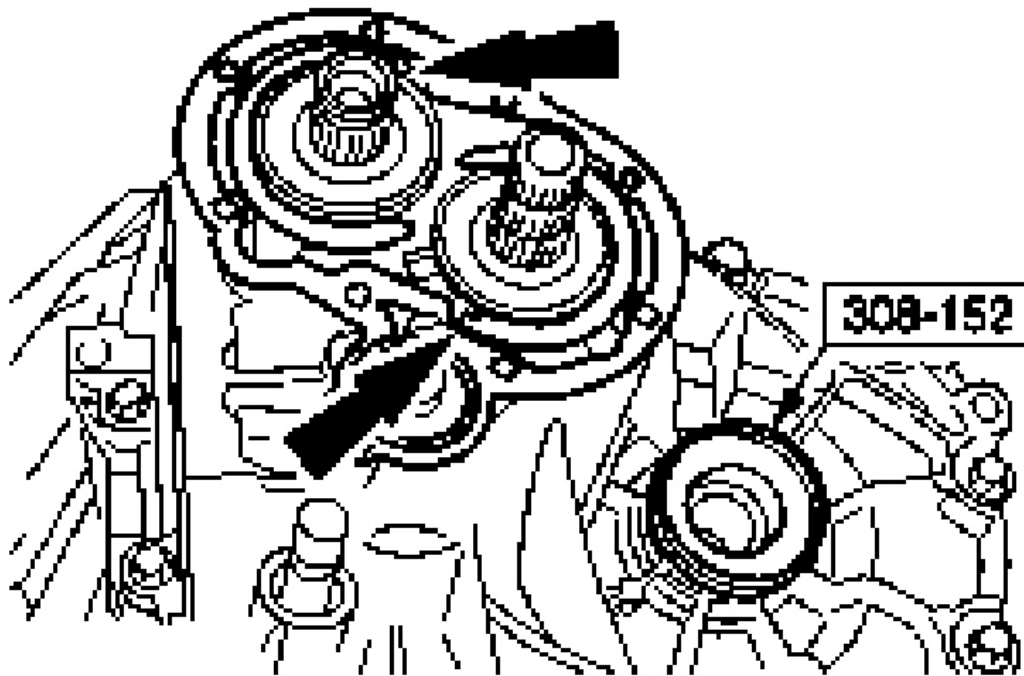


G03854644

Fig. 163: Installing Snap Rings
Courtesy of FORD MOTOR CO.

25. Install the input shaft and the output shaft snap rings.

NOTE: Turn the snap rings so that they are located in the cut-outs in the gasket.

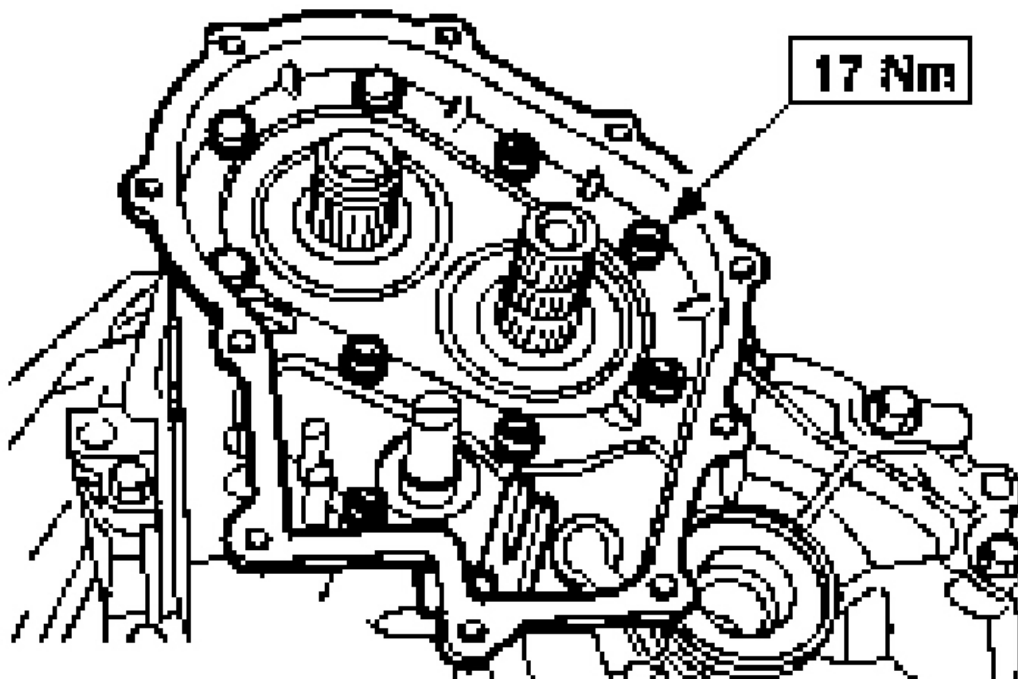


G03854645

Fig. 164: Installing Special Tools
Courtesy of FORD MOTOR CO.

26. Install the gasket.
 - Install the special tools.

NOTE: **Install new retaining bolts.**



G03854646

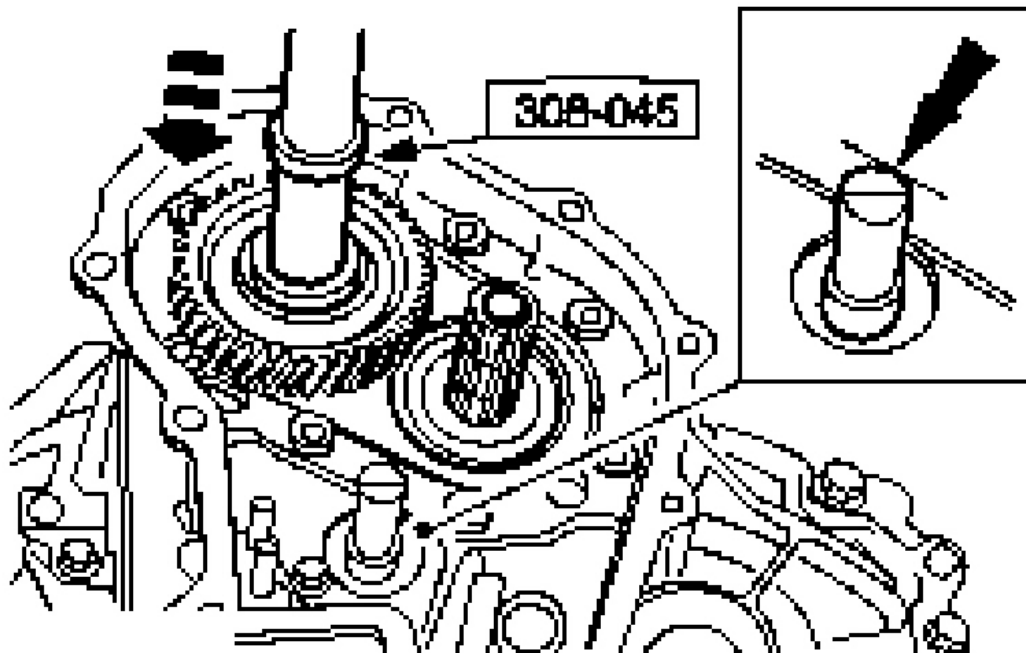
Fig. 165: Installing Bolts
Courtesy of FORD MOTOR CO.

27. Install the fifth gear housing.

CAUTION: Remove the transaxle from the special tool 307-003 and carry out the following step on a press.

NOTE: Install an anti twist stop for the selector rod.

NOTE: The transaxle housing must not rest on the press table. Support the input shaft clutch splines on the press.

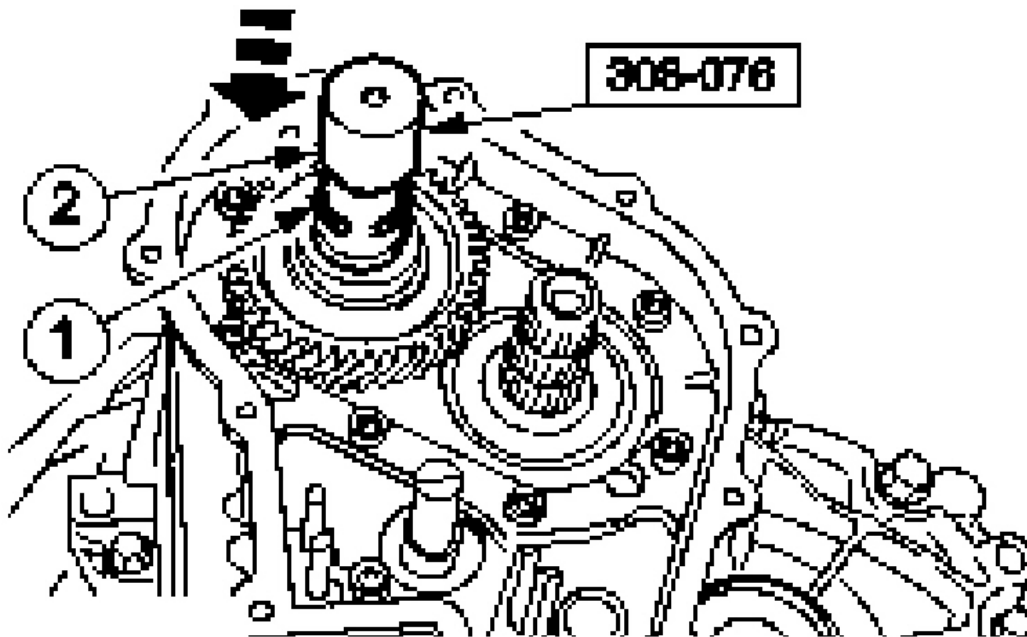


G03854647

Fig. 166: Installing Fifth Gear Wheel Onto Input Shaft
Courtesy of FORD MOTOR CO.

28. Using the special tool and a press, install the fifth gear wheel onto the input shaft.
- Install the transaxle to special tool 307-003.

CAUTION: Select the new snap ring with a minimum of clearance.
Refer to SPECIFICATIONS .

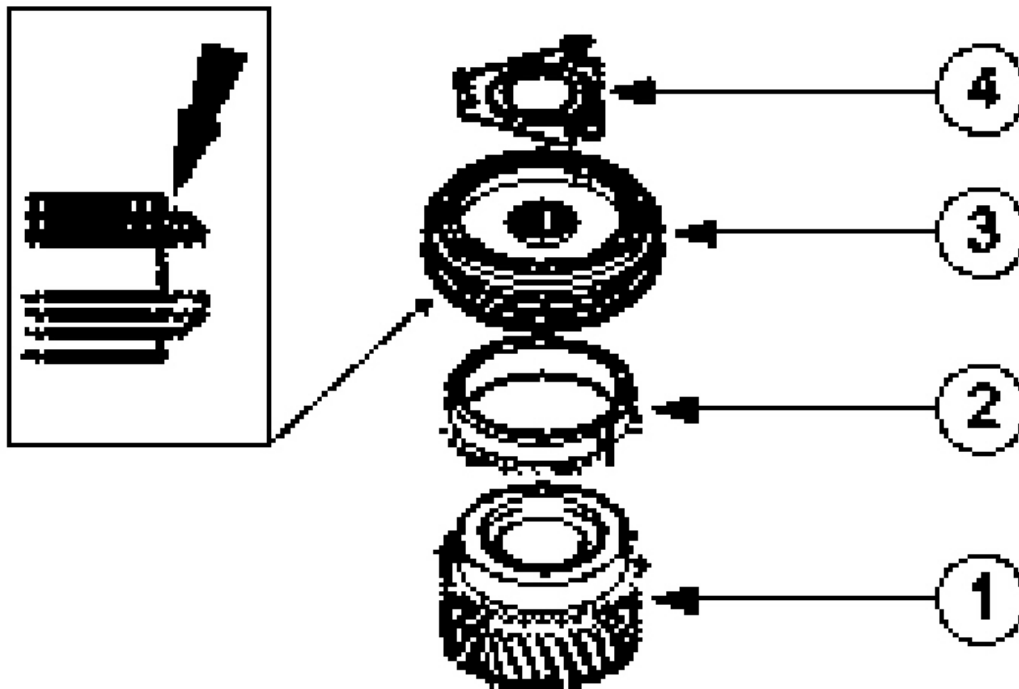


G03854648

Fig. 167: Installing Fifth Gear Wheel Snap Ring
Courtesy of FORD MOTOR CO.

29. Using the special tool, install the fifth gear wheel snap ring.
 1. Install the snap ring onto the special tool.
 2. Install the special tool and push on the snap ring.

NOTE: **Identification of gear synchronizer installation position.**



G03854649

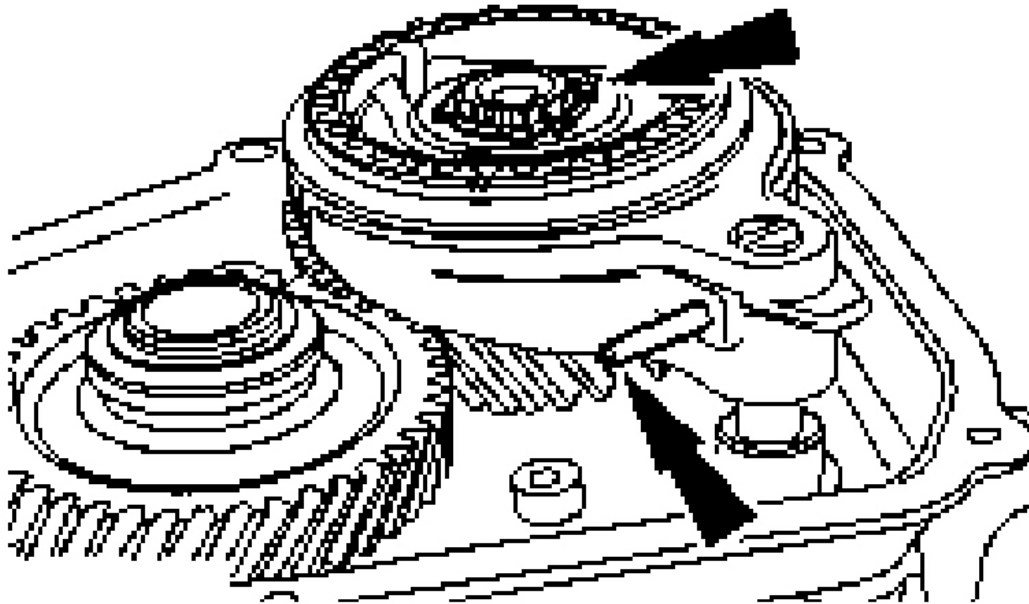
Fig. 168: Assembling Fifth Gear Synchronizer Unit
Courtesy of FORD MOTOR CO.

30. Assemble the fifth gear synchronizer unit.

1. Gear wheel (fifth gear).
2. Synchronizer ring.
3. Gear synchronizer.
4. Retaining plate.

NOTE: **Install a new retaining bolt.**

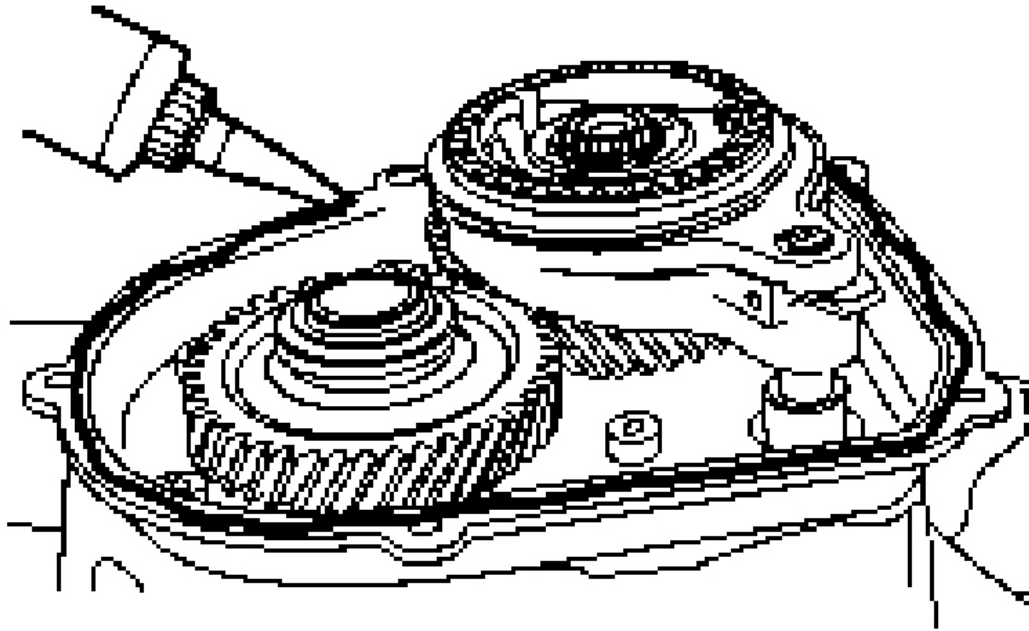
NOTE: **Install a new retaining ring.**



G03854650

Fig. 169: Installing Fifth Gear Synchronizer Unit With Selector Fork
Courtesy of FORD MOTOR CO.

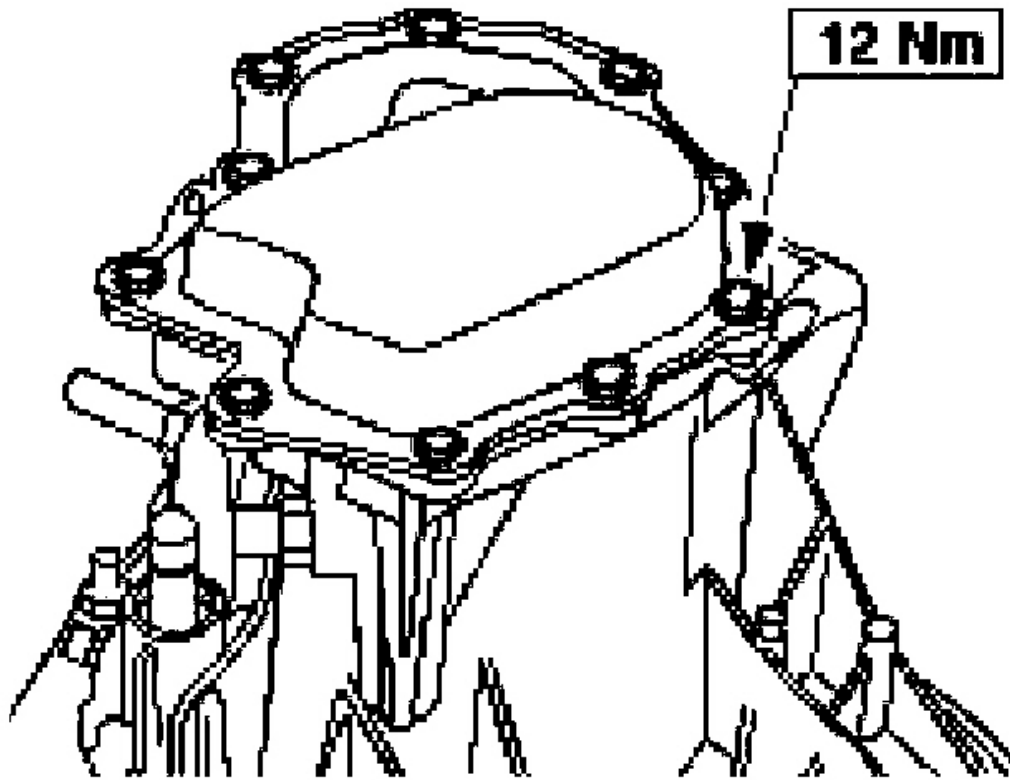
31. Install the fifth gear synchronizer unit with selector fork.
 - Install the securing bolt.
 - Install a new retaining ring.
32. Apply End cap sealer evenly to the end cap.



G03854651

Fig. 170: Applying End Cap Sealer
Courtesy of FORD MOTOR CO.

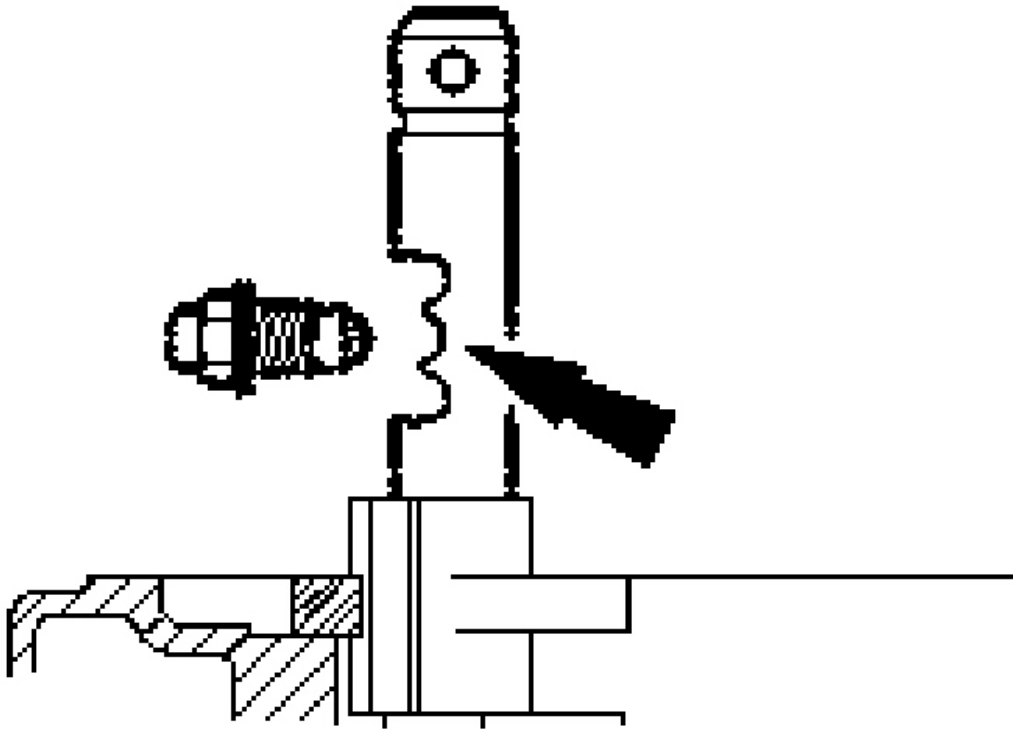
33. Install the fifth gear cover.



G03854652

Fig. 171: Installing Fifth Gear Cover
Courtesy of FORD MOTOR CO.

NOTE: Only perform the INSTALLATION in neutral.

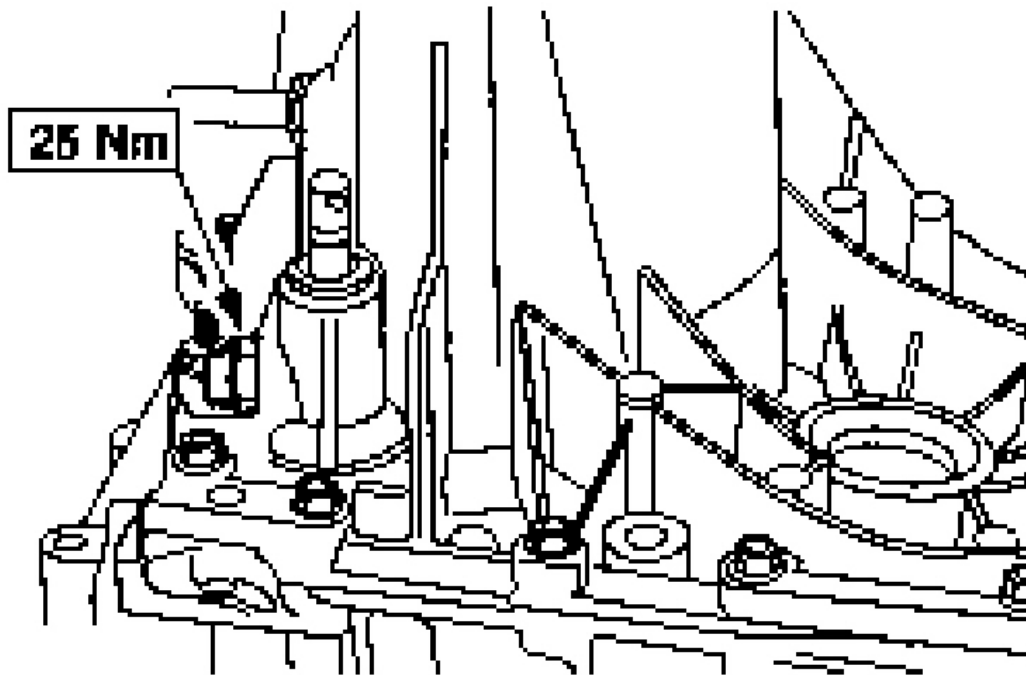


G03854653

Fig. 172: Identifying Installation Position For Selector Shaft Interlock
Courtesy of FORD MOTOR CO.

34. Installation position for selector shaft interlock.

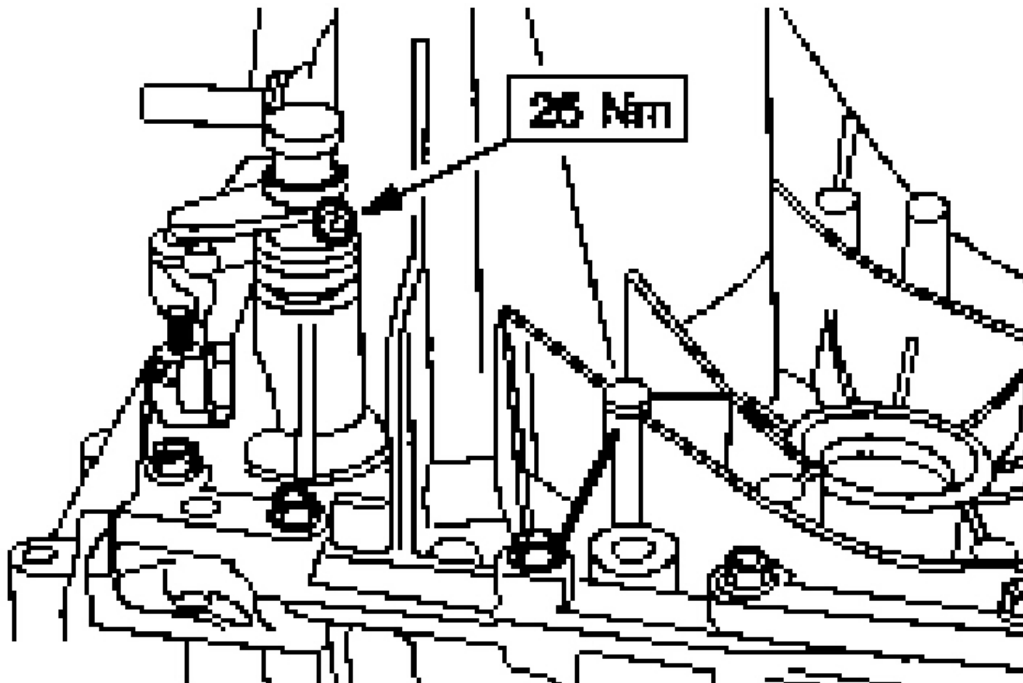
NOTE: Only perform the **INSTALLATION** in neutral.



G03854654

Fig. 173: Installing Selector Interlock Mechanisms
Courtesy of FORD MOTOR CO.

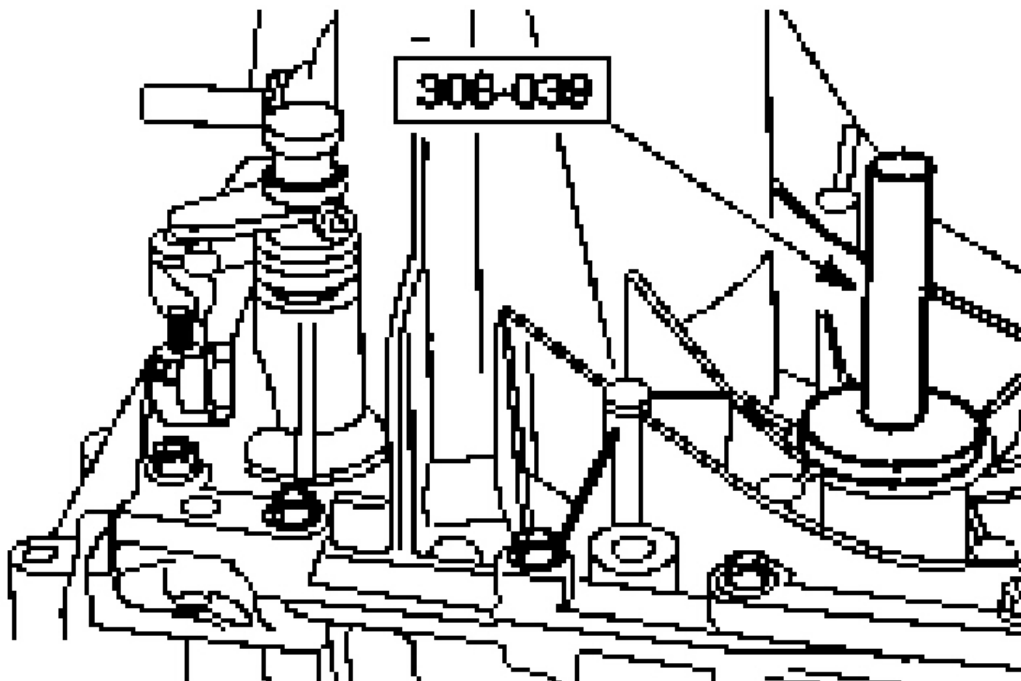
35. Install the selector interlock mechanisms.
 - Apply Universal sealant (Hylomar) to the thread.
36. Install the lever.
 - Install the gaiter.



G03854655

Fig. 174: Installing Gaiter
Courtesy of FORD MOTOR CO.

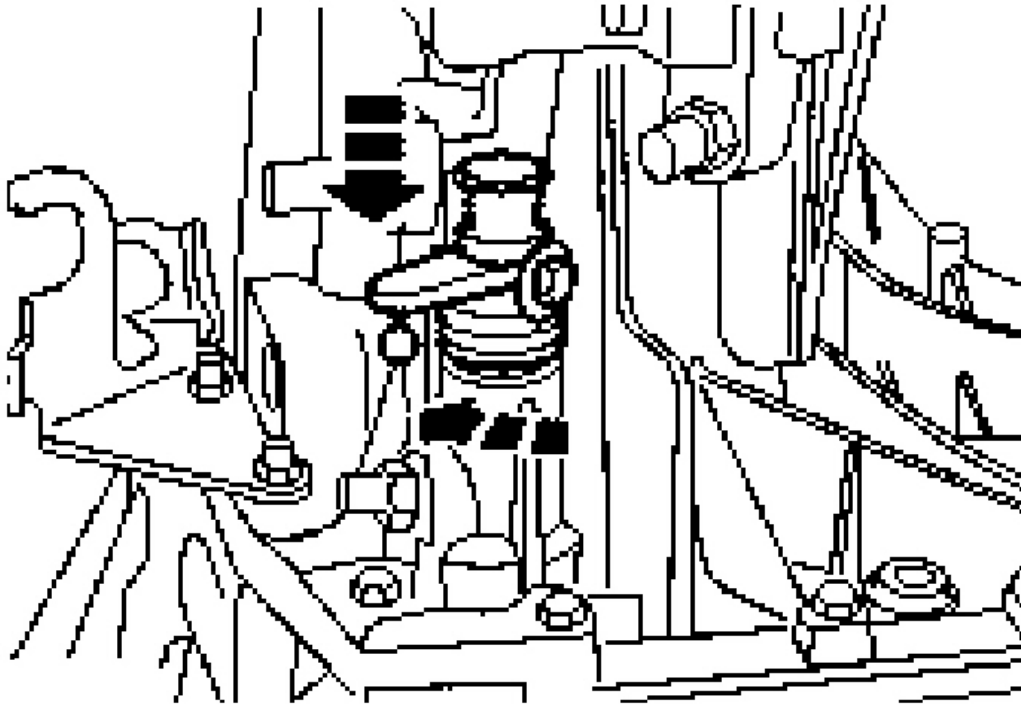
37. Using the special tool, install the input shaft oil seal until it engages audibly.



G03854656

Fig. 175: Installing Input Shaft Oil Seal
Courtesy of FORD MOTOR CO.

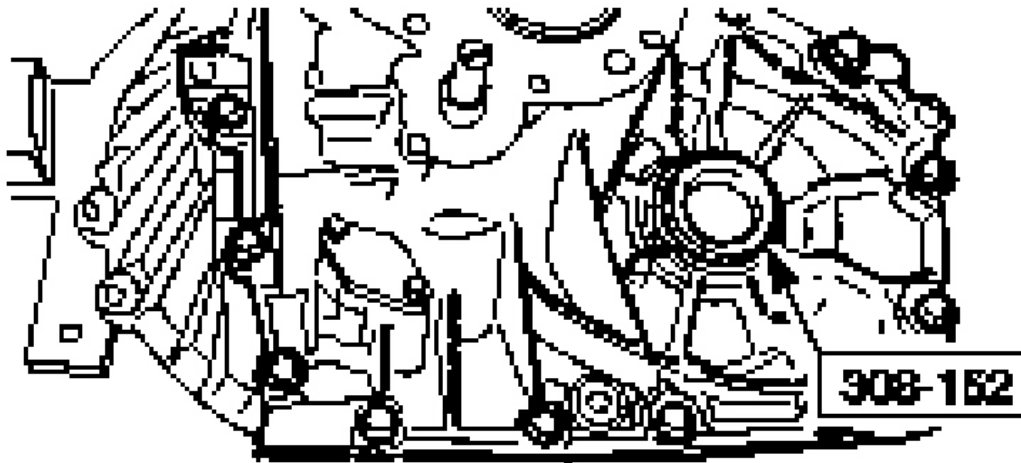
38. Engage fifth gear.
 - Turn the selector shaft clockwise as far as possible and press it in.



G03854657

Fig. 176: Turning Selector Shaft
Courtesy of FORD MOTOR CO.

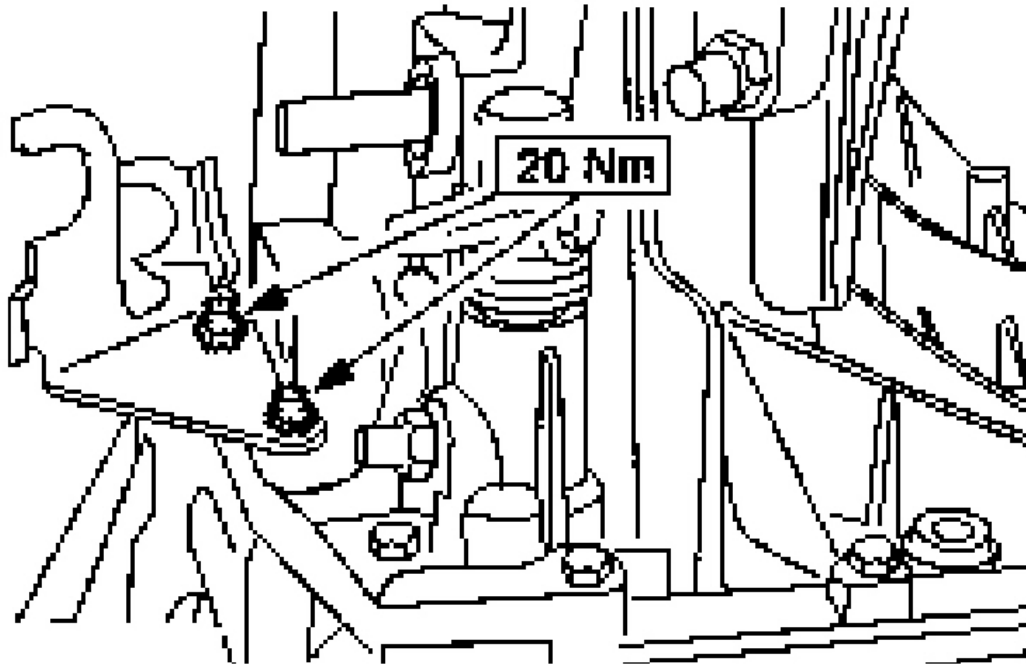
39. Install the special tools.



G03854658

Fig. 177: Installing Special Tools
Courtesy of FORD MOTOR CO.

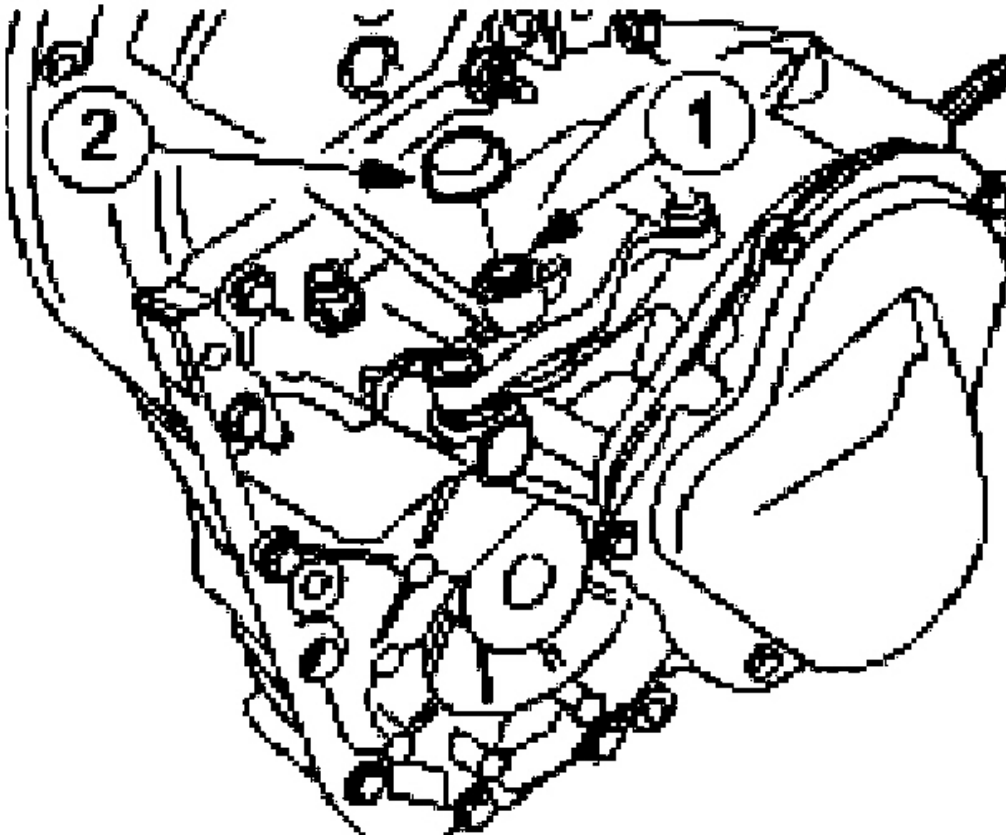
40. Install the selector cable bracket.



G03854659

Fig. 178: Installing Selector Cable Bracket
Courtesy of FORD MOTOR CO.

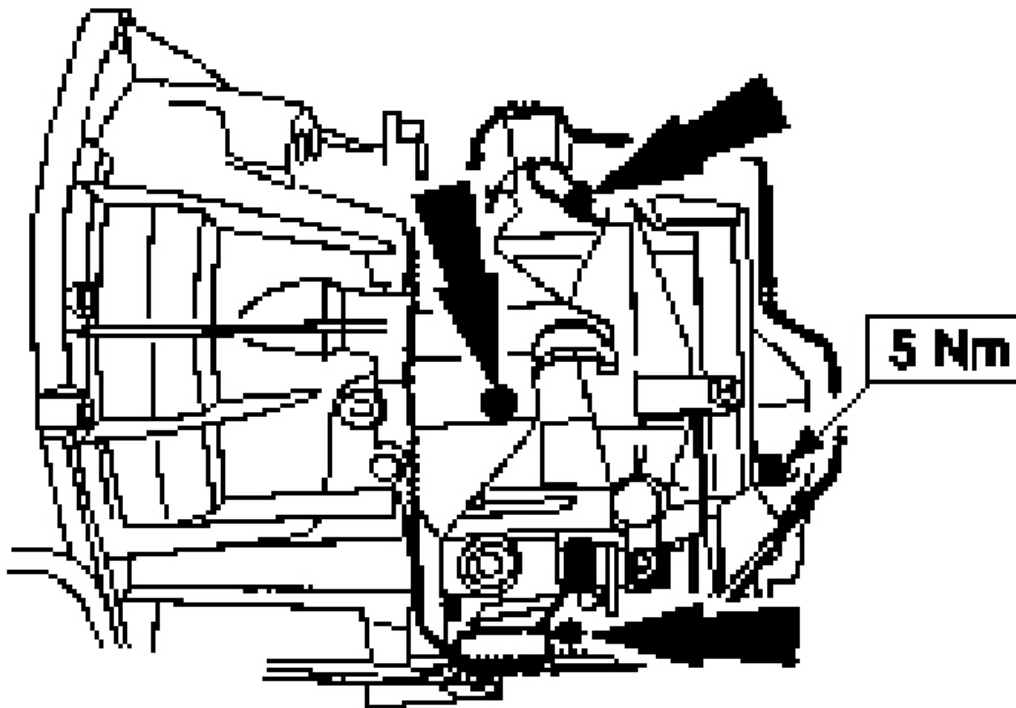
NOTE: Install a new snap ring.



G03854660

Fig. 179: Installing Selector Lever
Courtesy of FORD MOTOR CO.

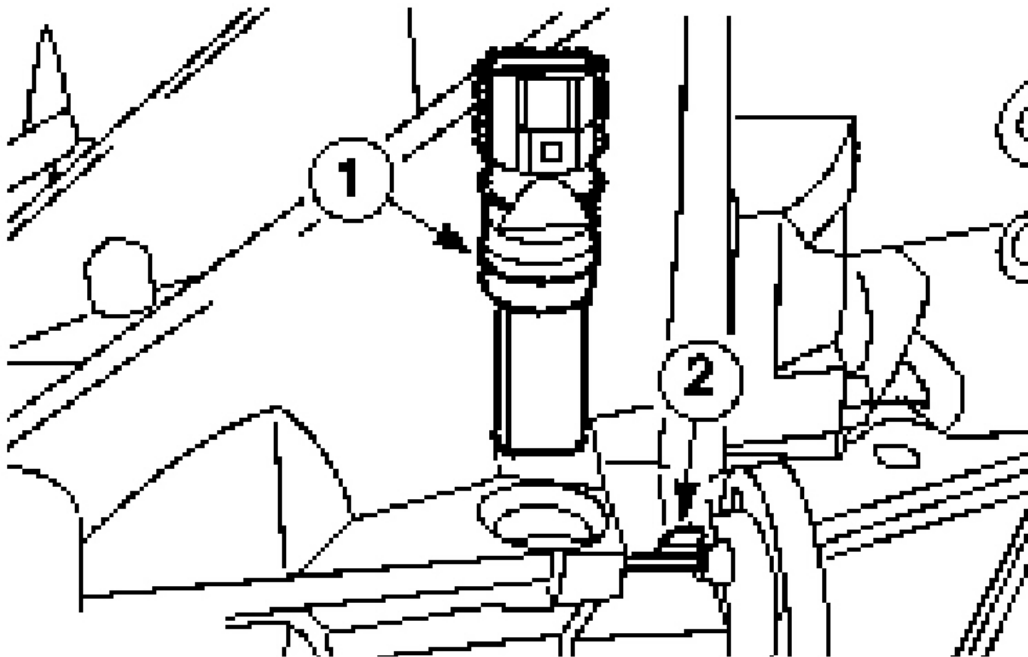
41. Install the selector lever.
 1. Install the snap ring.
 2. Install the protective cap.
42. Install the shift cable cover.



G03854661

Fig. 180: Installing Shift Cable Cover
Courtesy of FORD MOTOR CO.

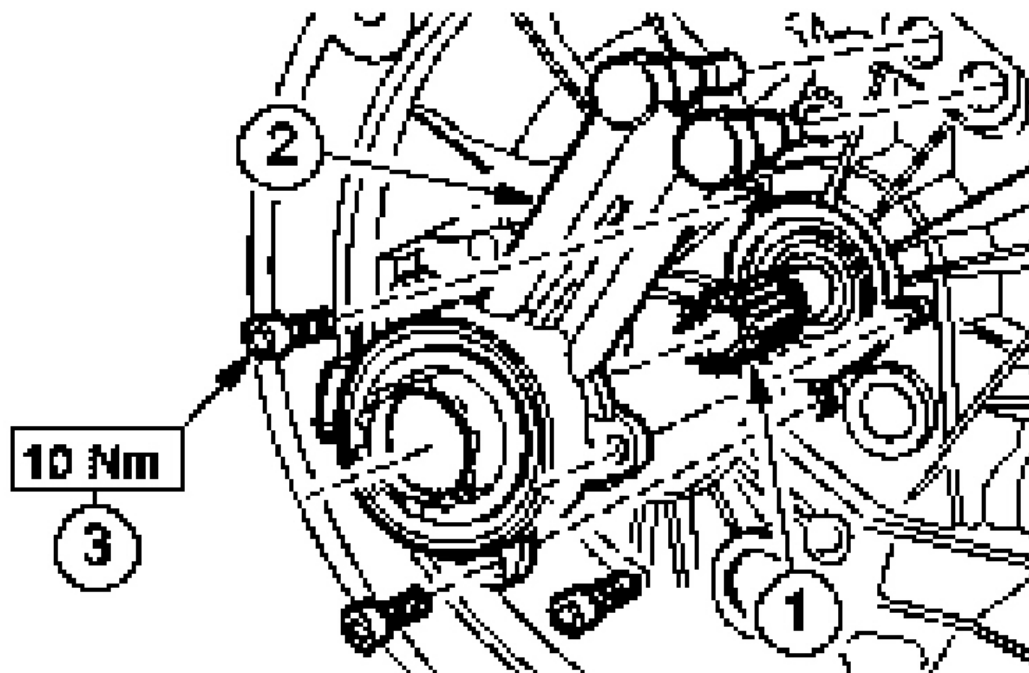
43. Install the vehicle speed sensor (VSS).
 1. Connect the VSS.
 2. Install the retaining pin.



G03854662

Fig. 181: Installing Vehicle Speed Sensor
Courtesy of FORD MOTOR CO.

44. Install the input shaft oil seal and the clutch slave cylinder.
 1. Position the input shaft oil seal.
 2. Position the clutch slave cylinder.
 3. Tighten the bolts evenly.



G03854663

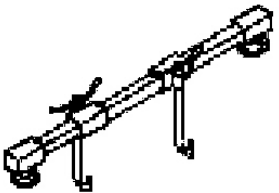
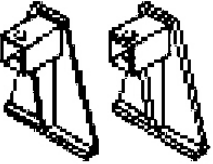
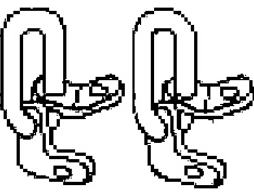
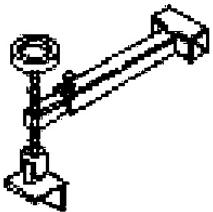
Fig. 182: Installing Input Shaft Oil Seal
Courtesy of FORD MOTOR CO.

45. Remove the transaxle from the stand.

INSTALLATION

TRANSAXLE

Special Tool(s)

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

G03854664

Fig. 183: Identifying Special Tools
Courtesy of FORD MOTOR CO.

Material

MATERIAL REFERENCE

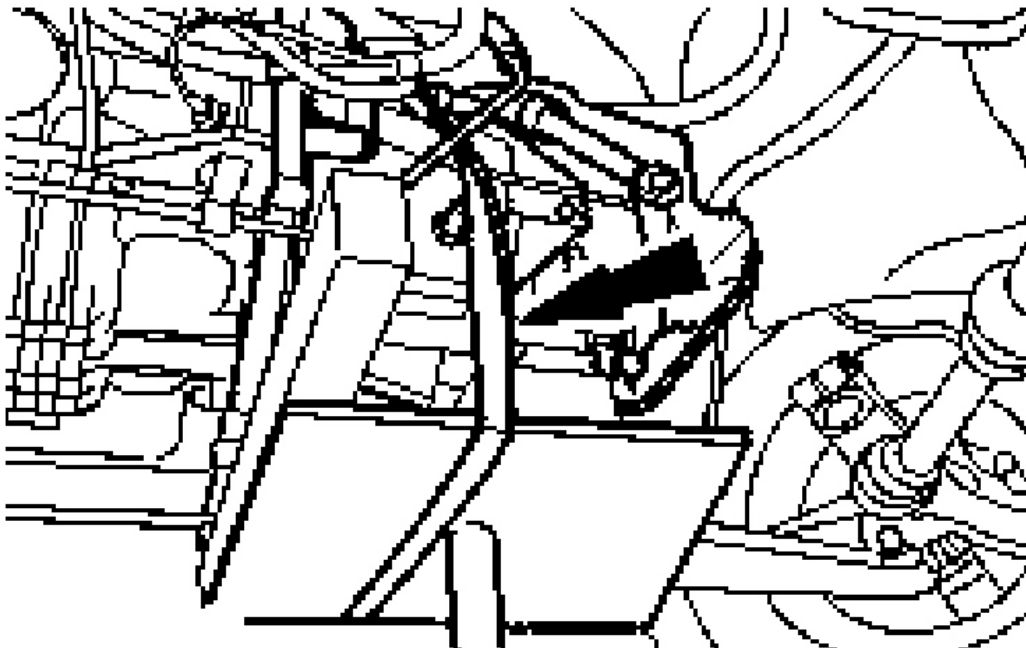
Manual transmission fluid	WSD-M2C200-C
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Installation

1. General note.

- Only use new self-locking nuts.

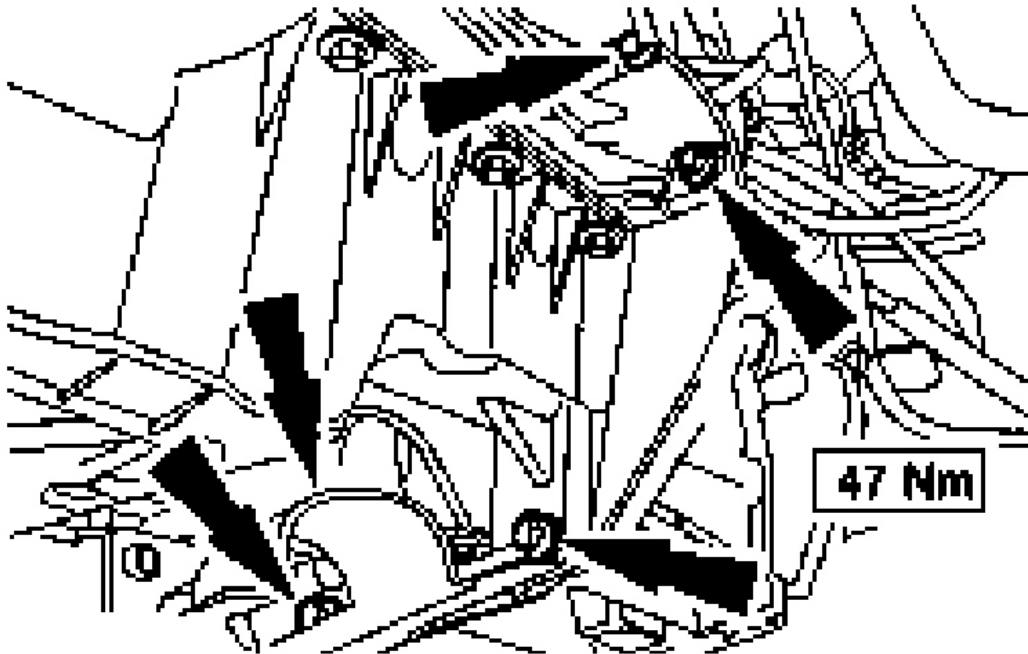
CAUTION: Make sure that the two locating tubes are installed.



G03854665

Fig. 184: Securing Transmission Using Retaining Strap
Courtesy of FORD MOTOR CO.

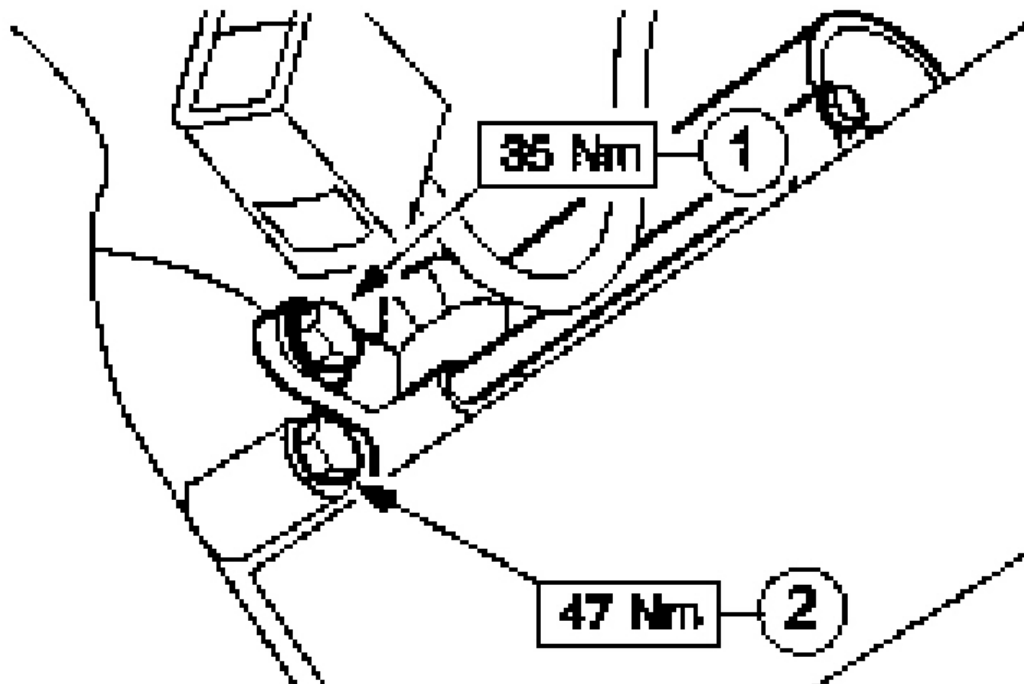
2. Secure the transmission using a retaining strap and move into installation position using a transmission jack.
3. Tighten the flange bolts and install the catalytic converter bracket.



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Fig. 185: Installing Catalytic Converter Bracket
Courtesy of FORD MOTOR CO.

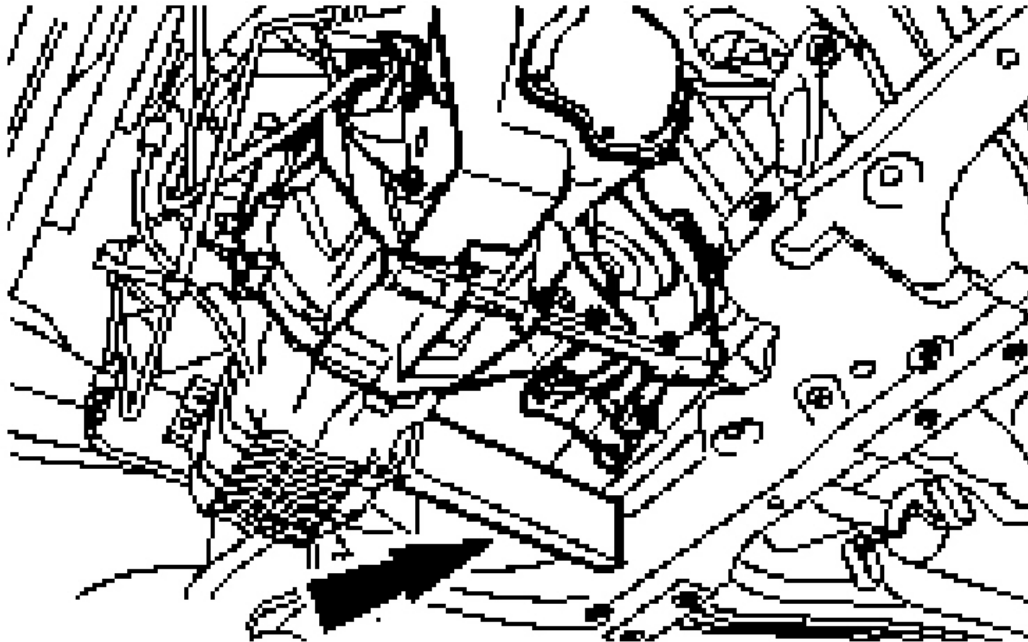
4. Install the starter motor and tighten the flange bolts.
 1. Starter motor bolt.
 2. Flange bolt.



G03854667

Fig. 186: Installing Starter Motor
Courtesy of FORD MOTOR CO.

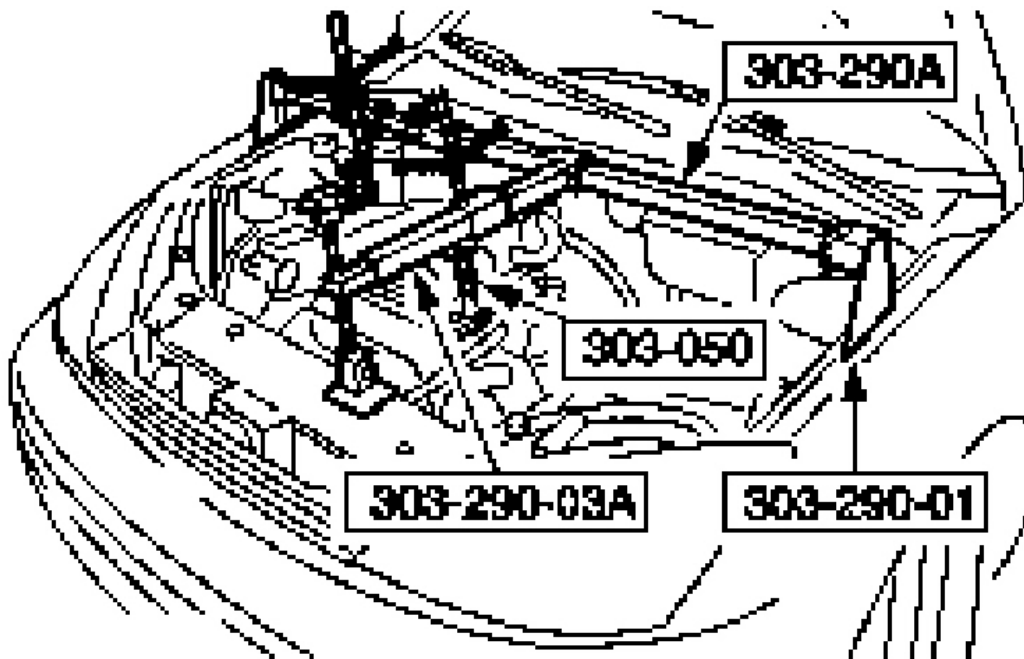
5. Remove the wooden block.



G03854668

Fig. 187: Removing Wooden Block
Courtesy of FORD MOTOR CO.

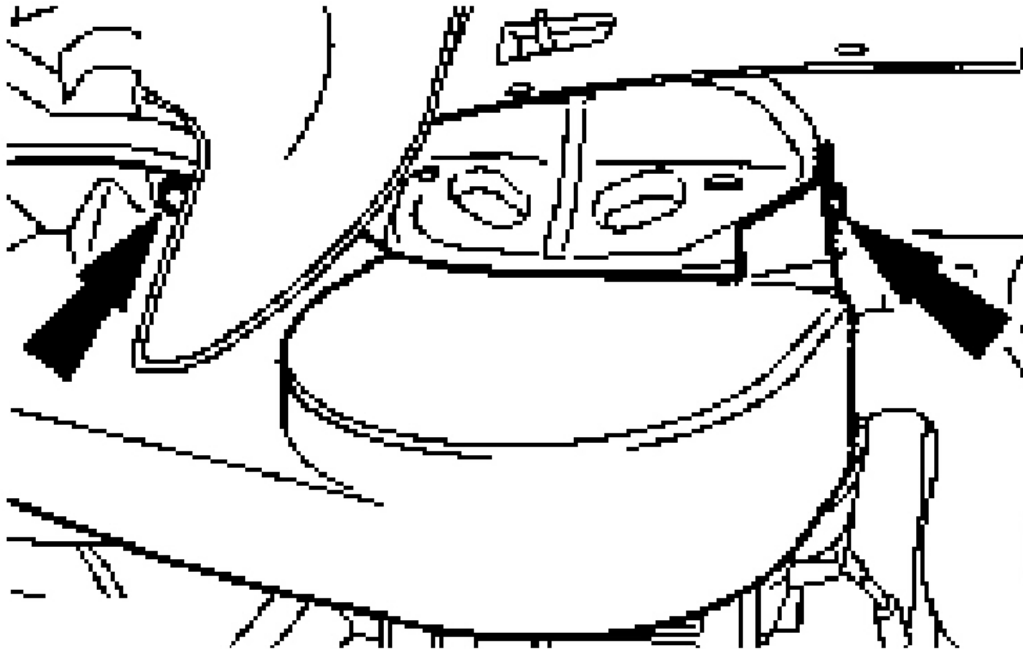
6. Lower the vehicle.
7. Using the special tools, raise the engine and transaxle compartment.



G03854669

Fig. 188: Raising Engine And Transaxle Compartment
Courtesy of FORD MOTOR CO.

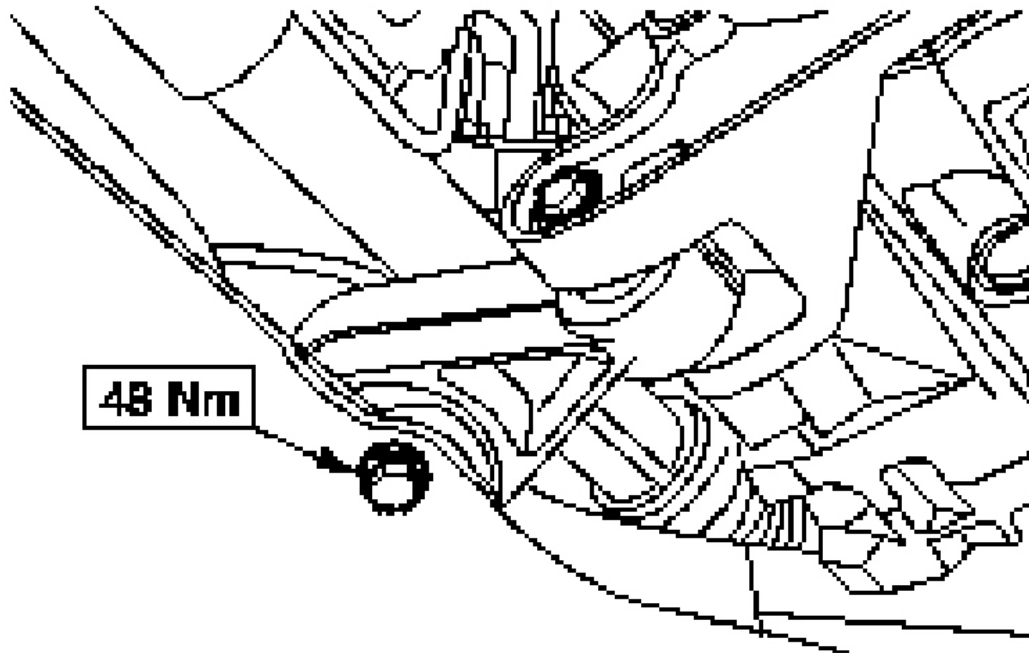
8. Raise and support the vehicle.
9. Install the drive belt cover.



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Fig. 189: Installing Drive Belt Cover
Courtesy of FORD MOTOR CO.

10. Install the roll restrictor.



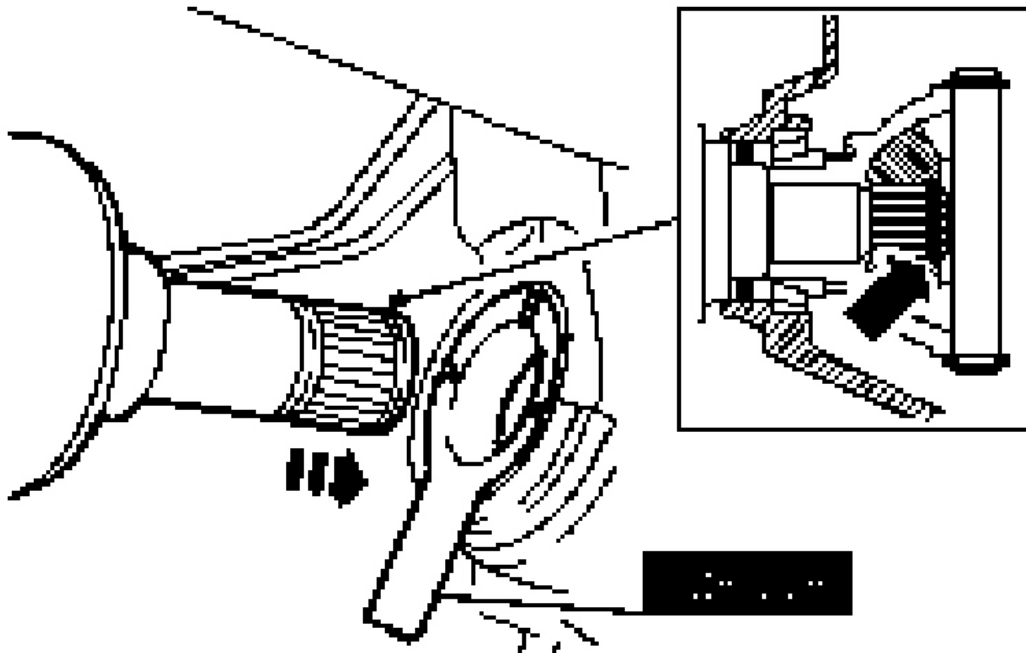
G03854671

Fig. 190: Installing Roll Restrictor
Courtesy of FORD MOTOR CO.

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

CAUTION: Use the installation sleeve (supplied with every new oil seal) to protect the oil seal when inserting the front halfshaft.

NOTE: Make sure the retaining ring is securely in place.

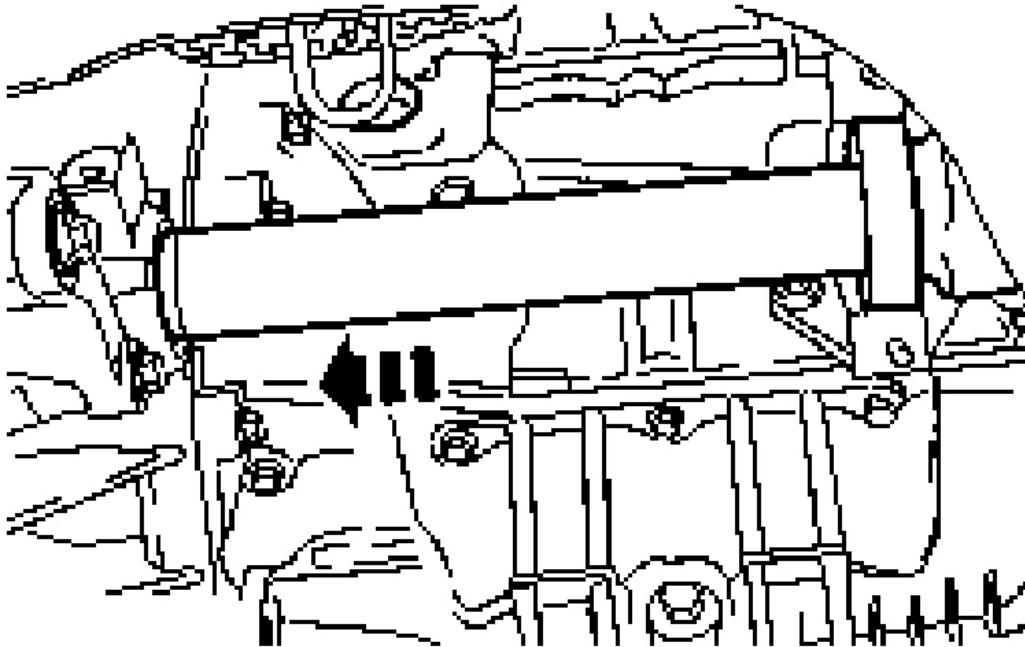


G03854672

Fig. 191: Installing Left-Hand Front Halfshaft
Courtesy of FORD MOTOR CO.

11. Install the left-hand front halfshaft in the transaxle together with a new retaining ring.

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

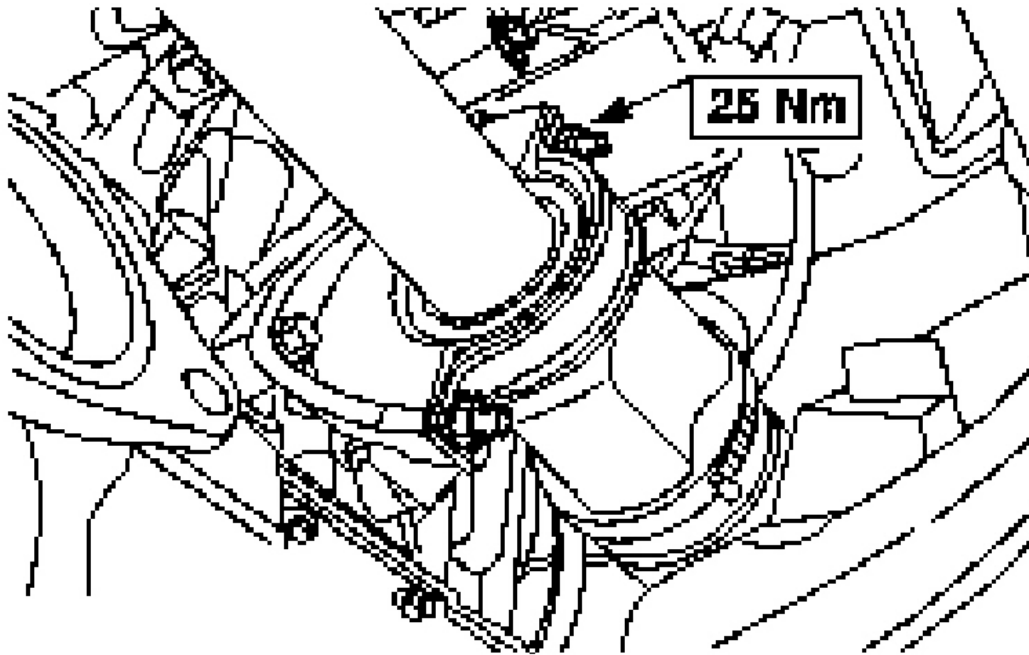


G03854673

Fig. 192: Inserting Right-Hand Front Halfshaft Into Transaxle
Courtesy of FORD MOTOR CO.

12. Insert the right-hand front halfshaft into the transaxle.

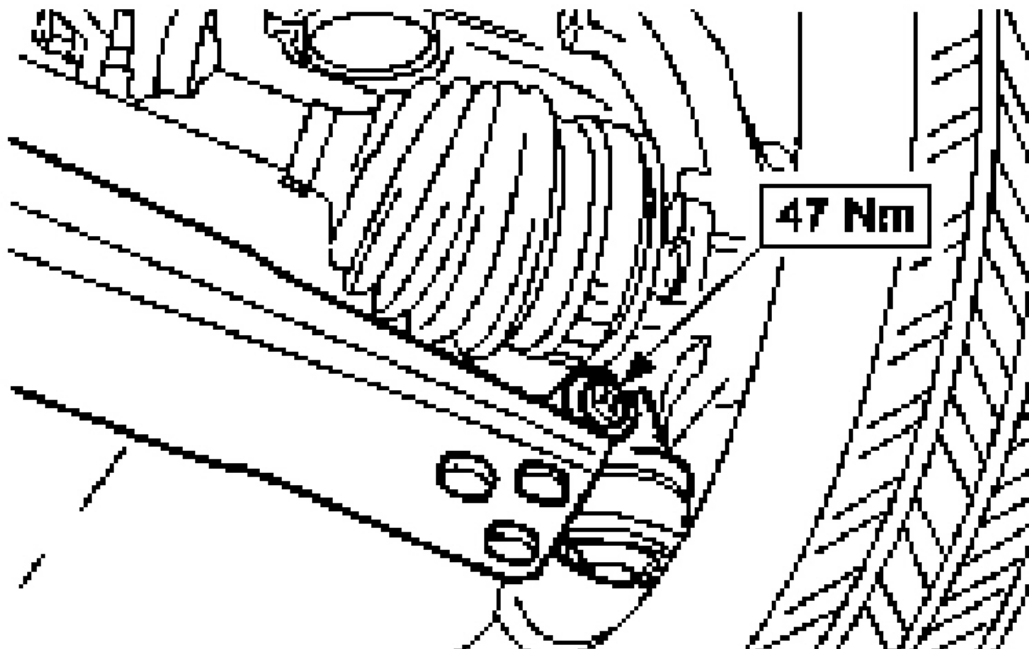
NOTE: Install a new mounting bracket and new nuts.



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Fig. 193: Installing Mounting Bracket
Courtesy of FORD MOTOR CO.

13. Install mounting bracket for center bearing on right-hand front halfshaft.
14. Install lower suspension arm ball joint on both sides.

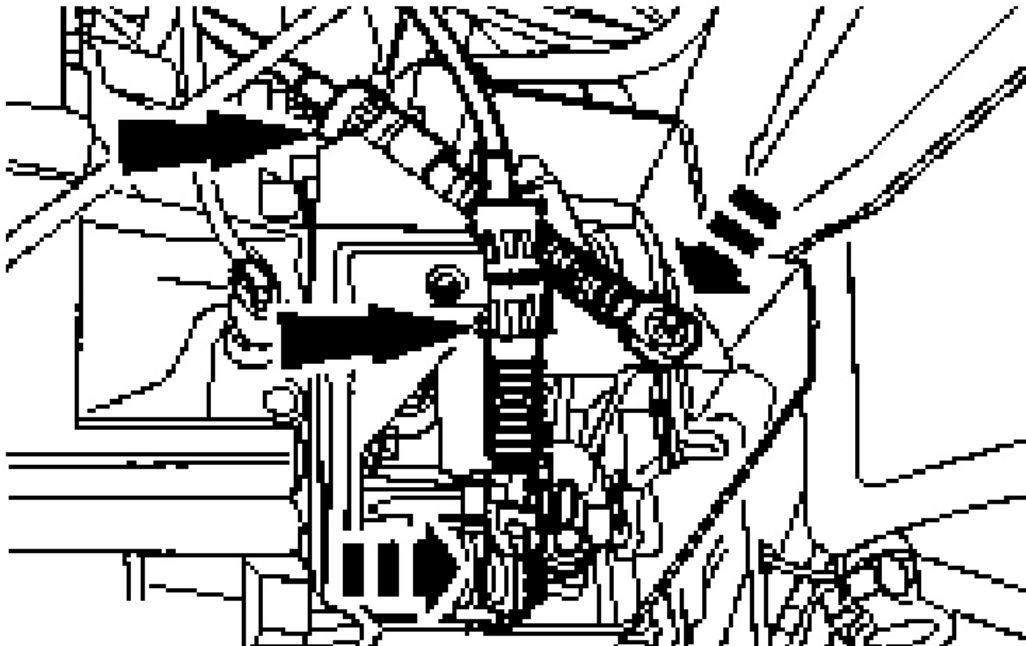


G03854675

Fig. 194: Installing Lower Suspension Arm Ball Joint
Courtesy of FORD MOTOR CO.

15. Install the shift and selector cable.

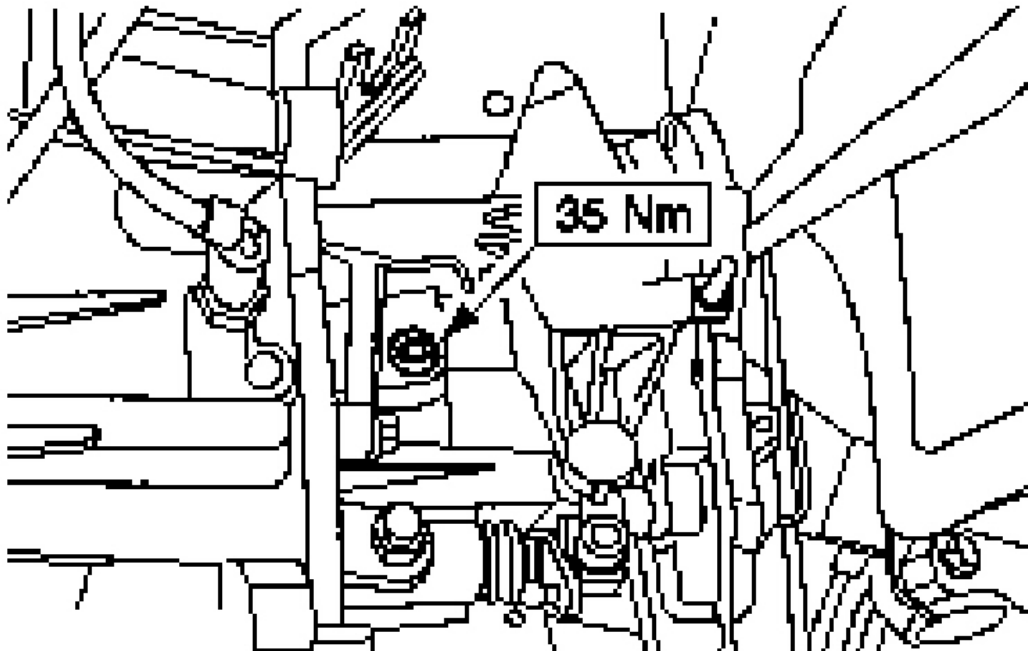
- Install the shift and selector cable endfittings to the shift and selector lever.
- Install the shift and selector cable to the bracket by turning the lower part of abutment clockwise and the upper part counter clockwise.



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Fig. 195: Installing Shift And Selector Cable
Courtesy of FORD MOTOR CO.

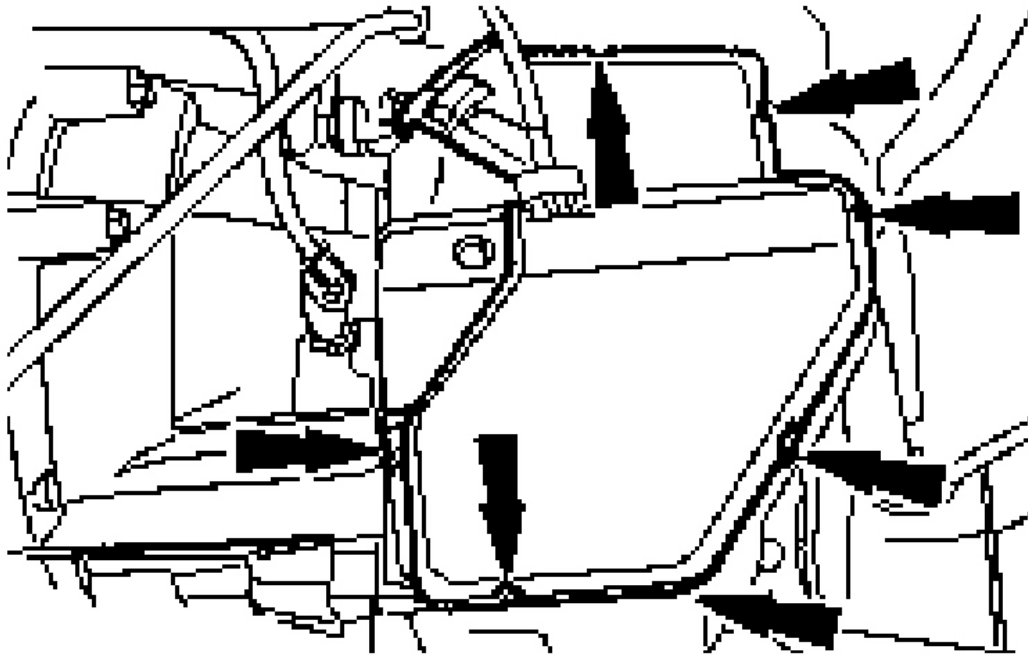
16. Top up the transaxle with manual transmission fluid until fluid level is 5 to 10 mm below the lower edge of the check hole.



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Fig. 196: Identifying Check Hole
Courtesy of FORD MOTOR CO.

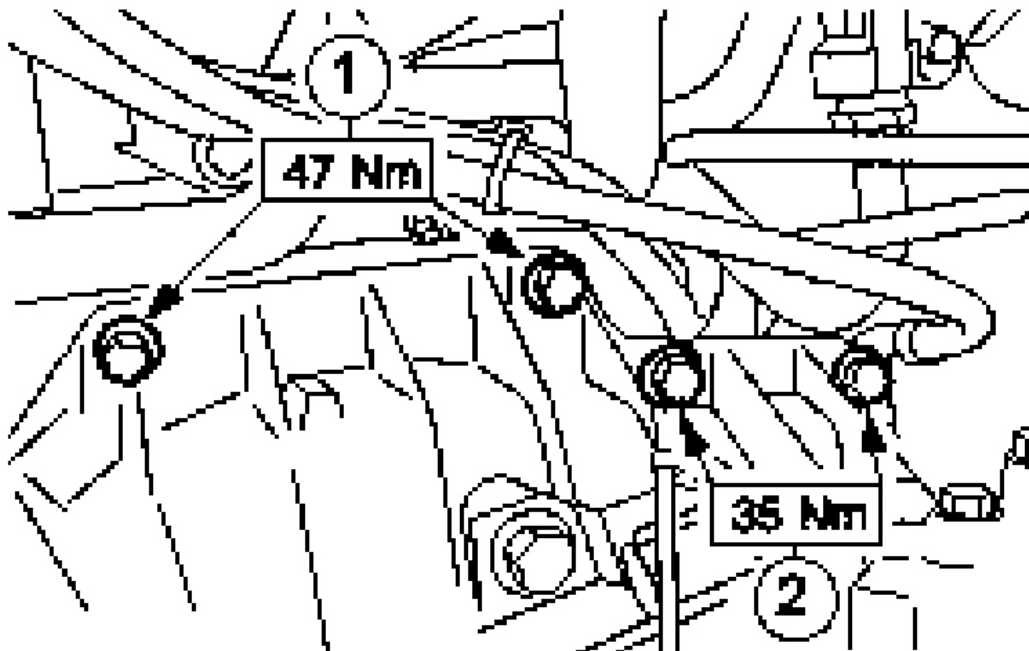
17. Close the cover on the shift and selector cable.



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Fig. 197: Closing Cover On Shift And Selector Cable
Courtesy of FORD MOTOR CO.

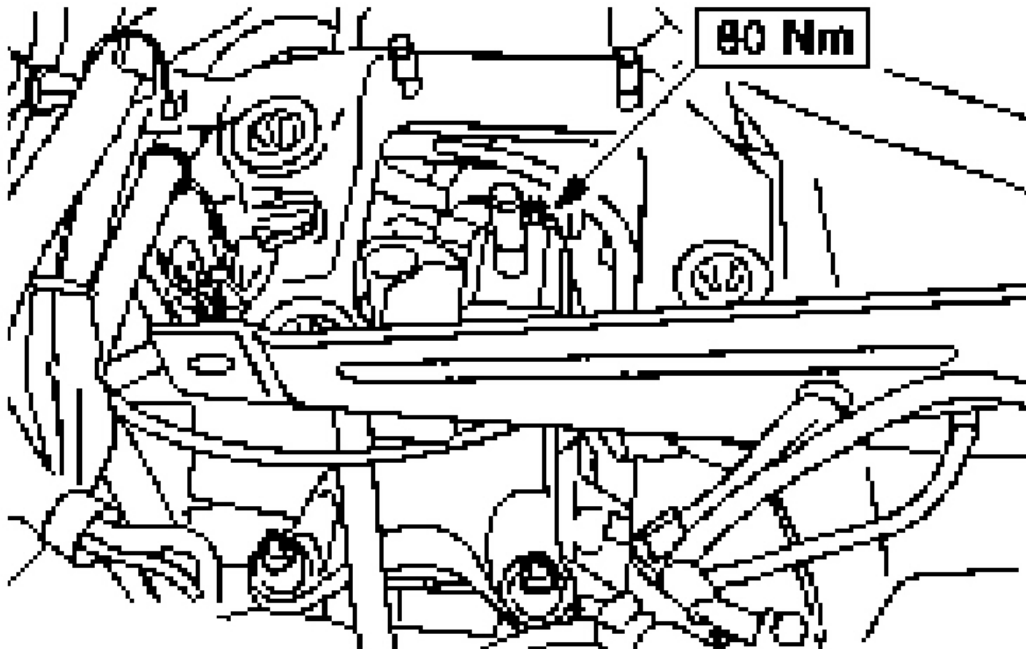
18. Install the catalytic converter assembly.
19. Tighten the upper flange bolts and starter motor bolts.
 1. Flange bolts.
 2. Starter motor bolts and ground lead.



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Fig. 198: Tightening Upper Flange Bolts
Courtesy of FORD MOTOR CO.

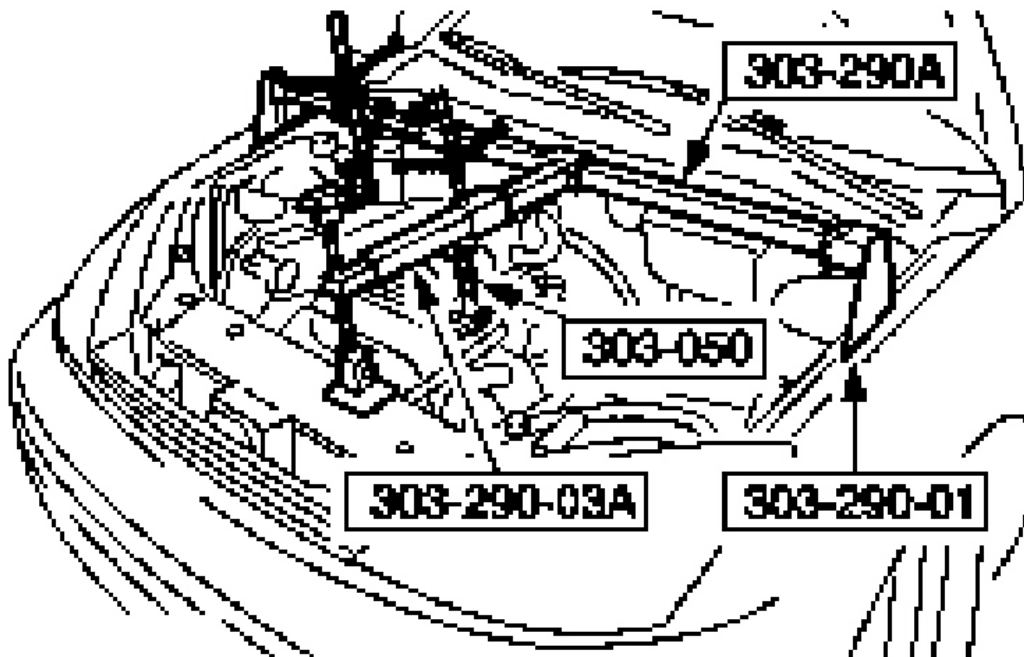
20. Install the rear engine mounting bracket.



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Fig. 199: Installing Rear Engine Mounting Bracket
Courtesy of FORD MOTOR CO.

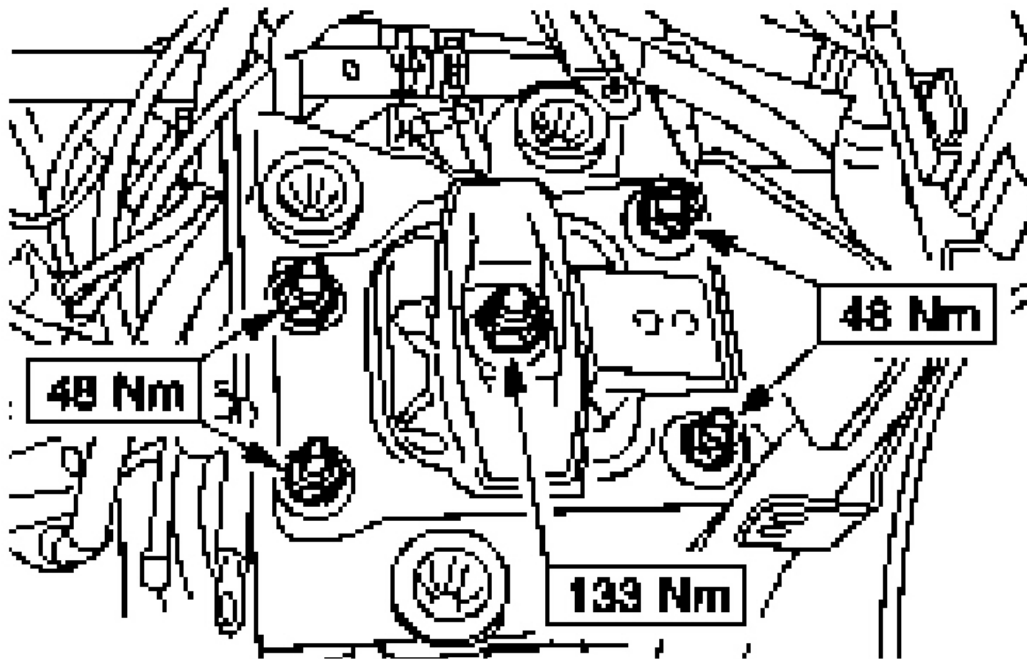
21. Using the special tool, raise the engine and transaxle until it becomes possible to install the rear engine mounting.



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Fig. 200: Raising Engine And Transaxle Until
Courtesy of FORD MOTOR CO.

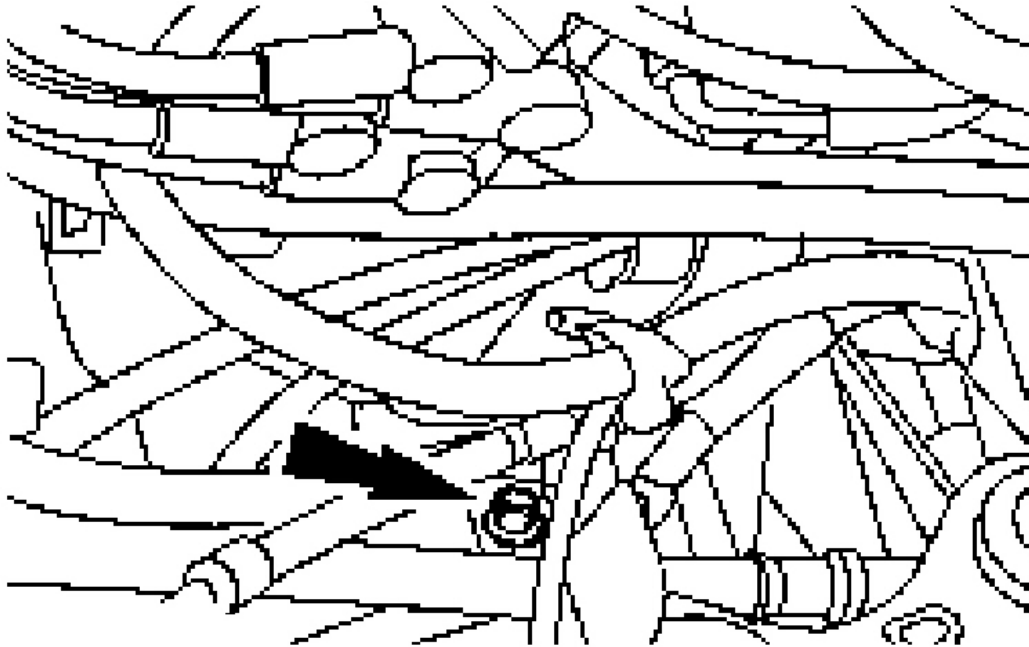
22. Install the rear engine mounting.



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Fig. 201: Installing Rear Engine Mounting
Courtesy of FORD MOTOR CO.

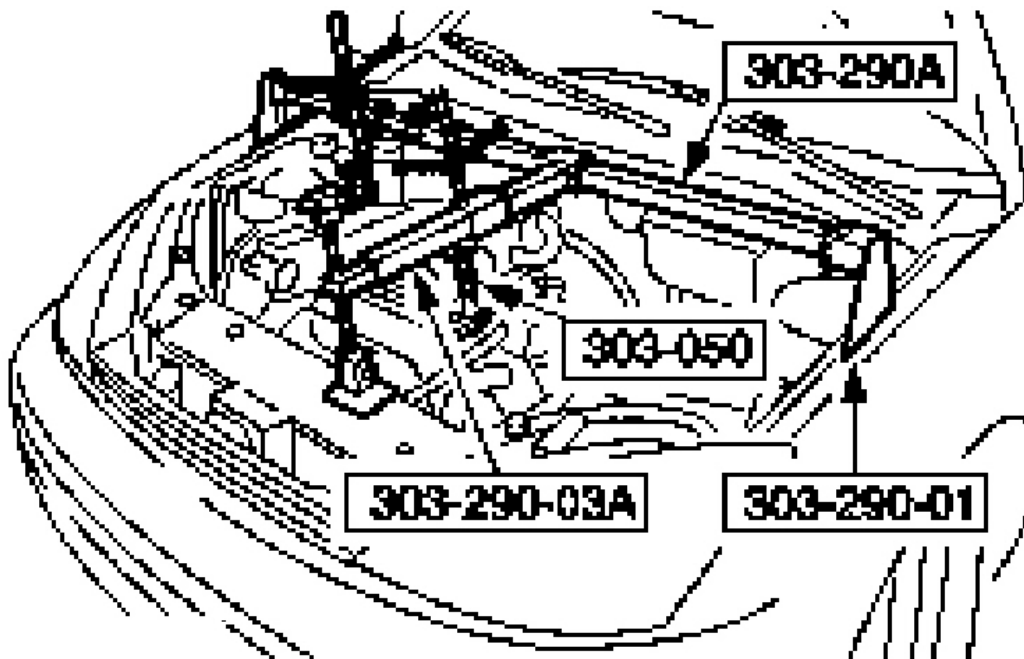
23. Install the shift cable bracket mounting retainer.



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Fig. 202: Installing Shift Cable Bracket Mounting Retainer
Courtesy of FORD MOTOR CO.

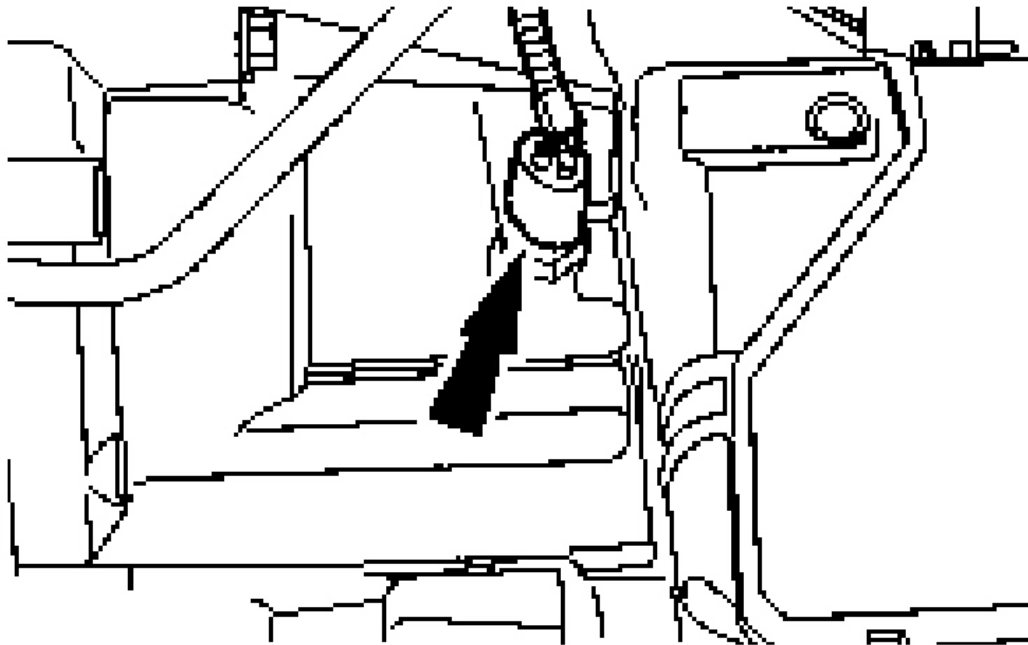
24. Remove the special tools.



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

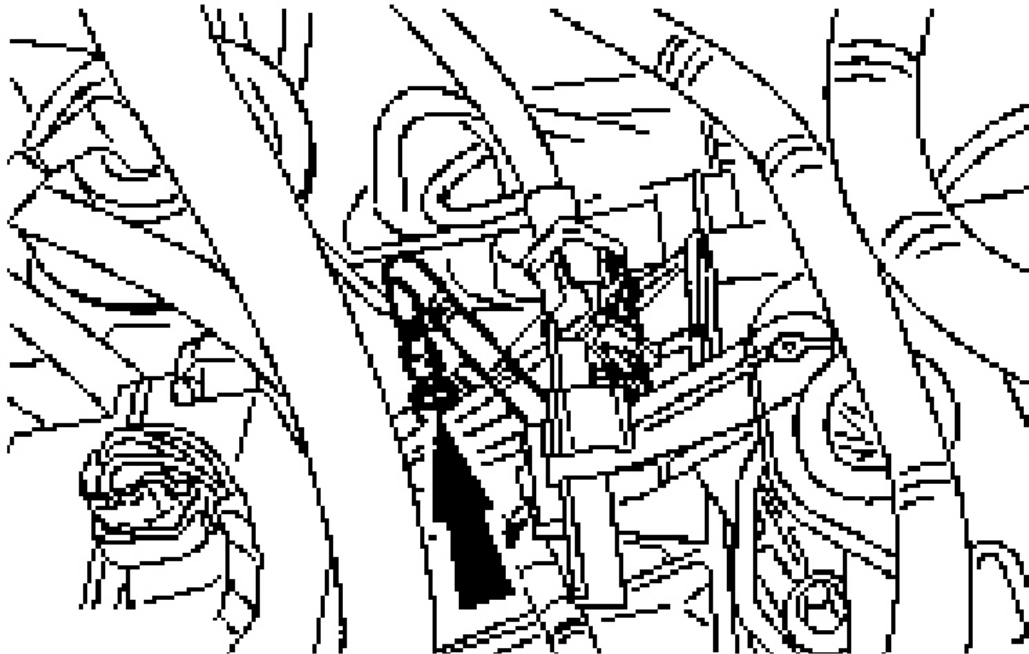
25. Connect the reversing light switch connector.



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Fig. 204: Connecting Reversing Light Switch Connector
Courtesy of FORD MOTOR CO.

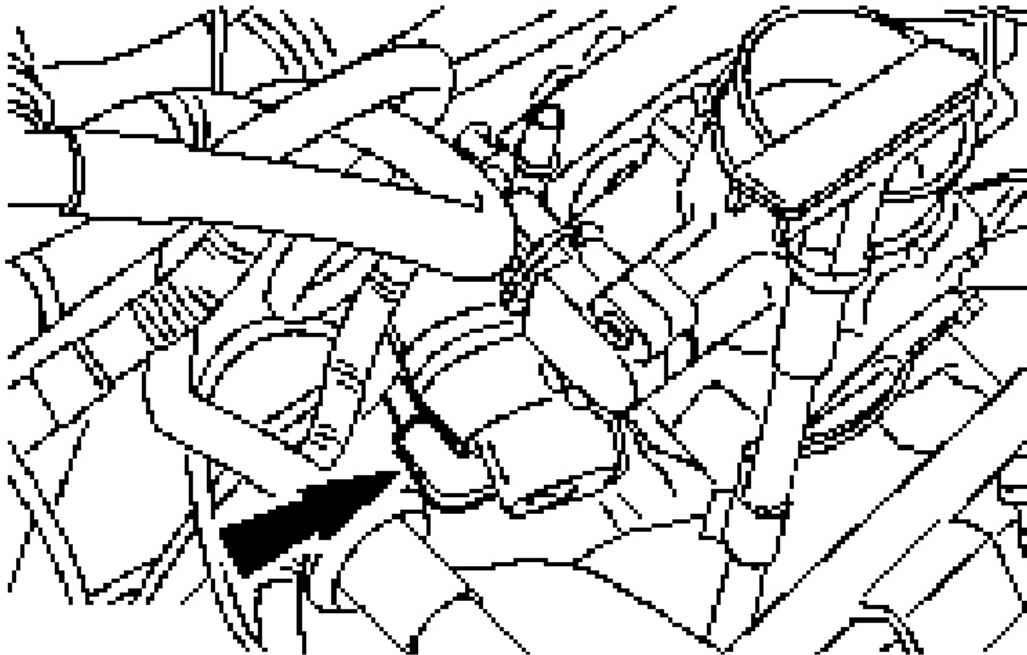
26. Connect the vehicle speed sensor (VSS) connector.



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Fig. 205: Connecting Vehicle Speed Sensor Connector
Courtesy of FORD MOTOR CO.

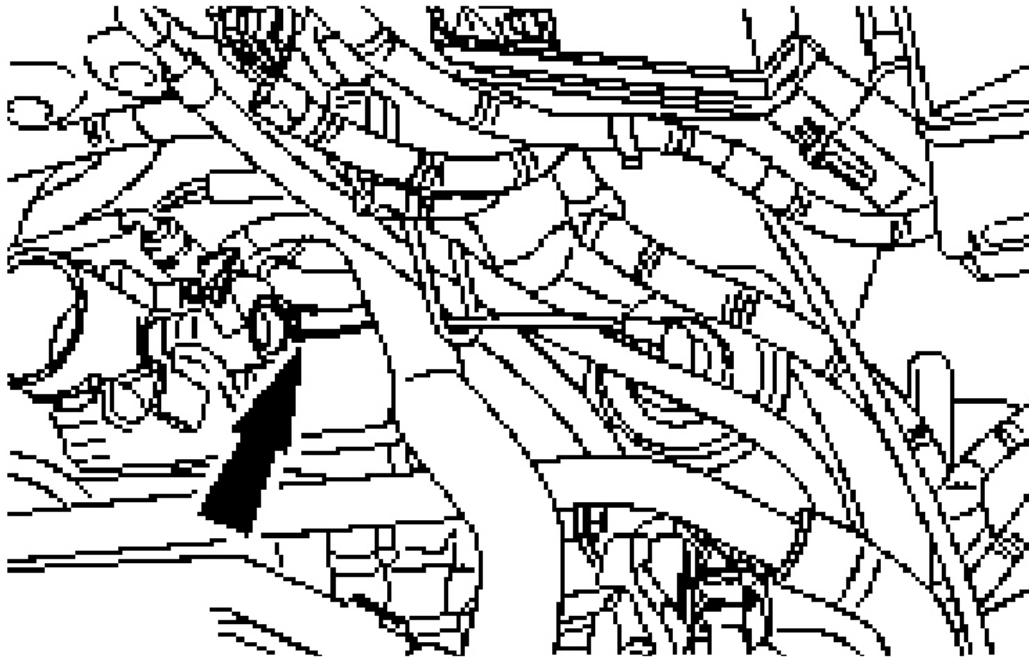
27. Connect the vacuum hoses.



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Fig. 206: Connecting Vacuum Hoses
Courtesy of FORD MOTOR CO.

28. Connect the brake servo vacuum hose.

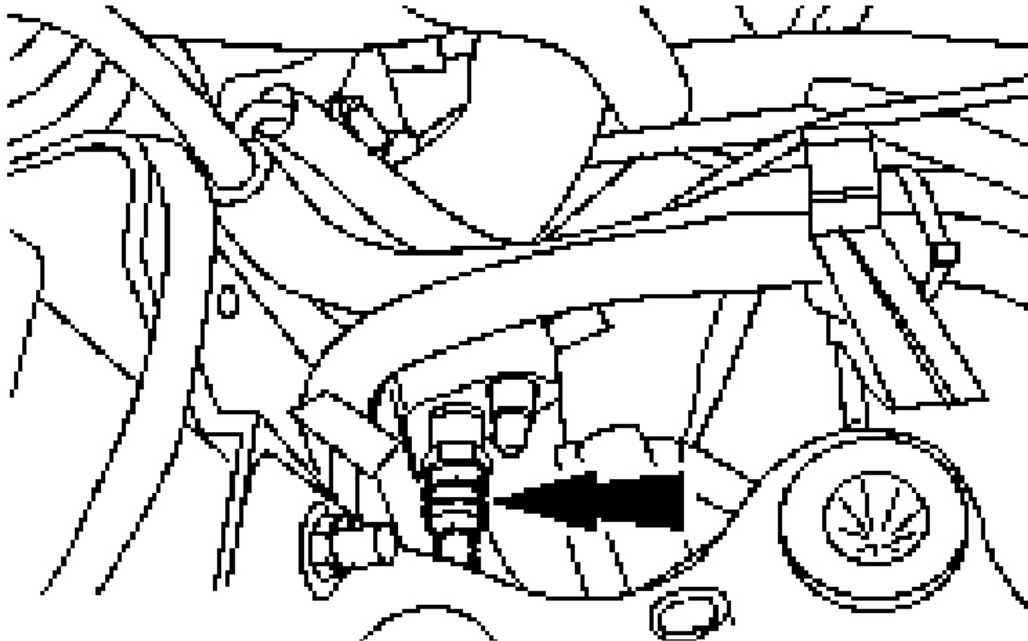


G03854688

Fig. 207: Connecting Brake Servo Vacuum Hose
Courtesy of FORD MOTOR CO.

WARNING: Escaping brake fluid. Do not allow brake fluid to come into contact with the skin or the eyes. If brake fluid does come into contact with the skin or the eyes, rinse the affected areas with water immediately. Failure to follow these instructions may result in personal injury.

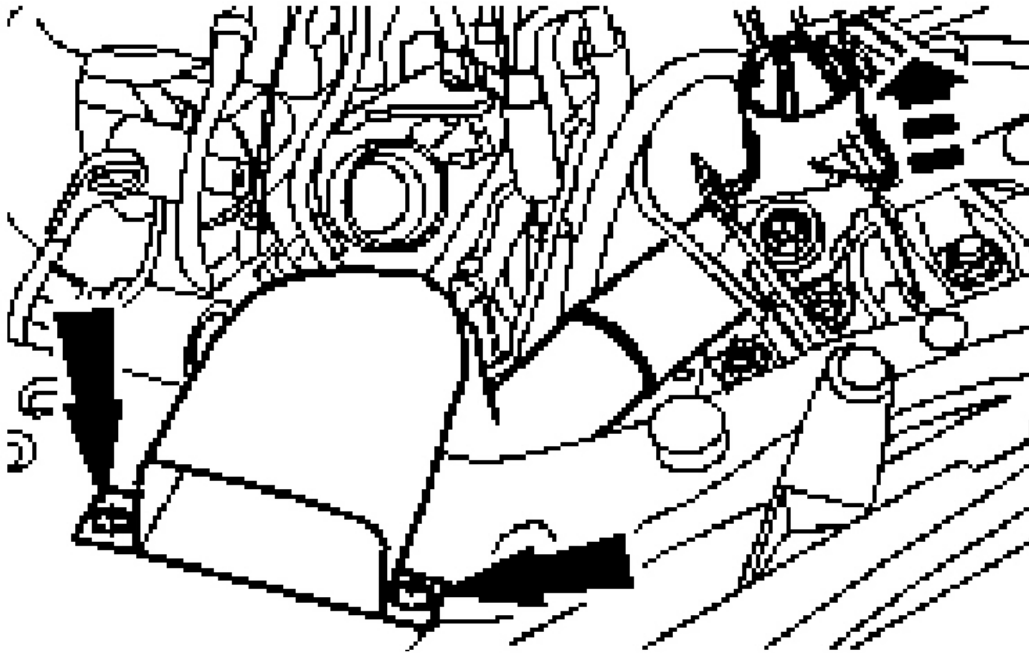
CAUTION: If brake fluid is spilt on the paintwork, the affected area must be immediately washed down with cold water.



G03854689

Fig. 208: Installing Clutch Slave Cylinder High-Pressure Line
Courtesy of FORD MOTOR CO.

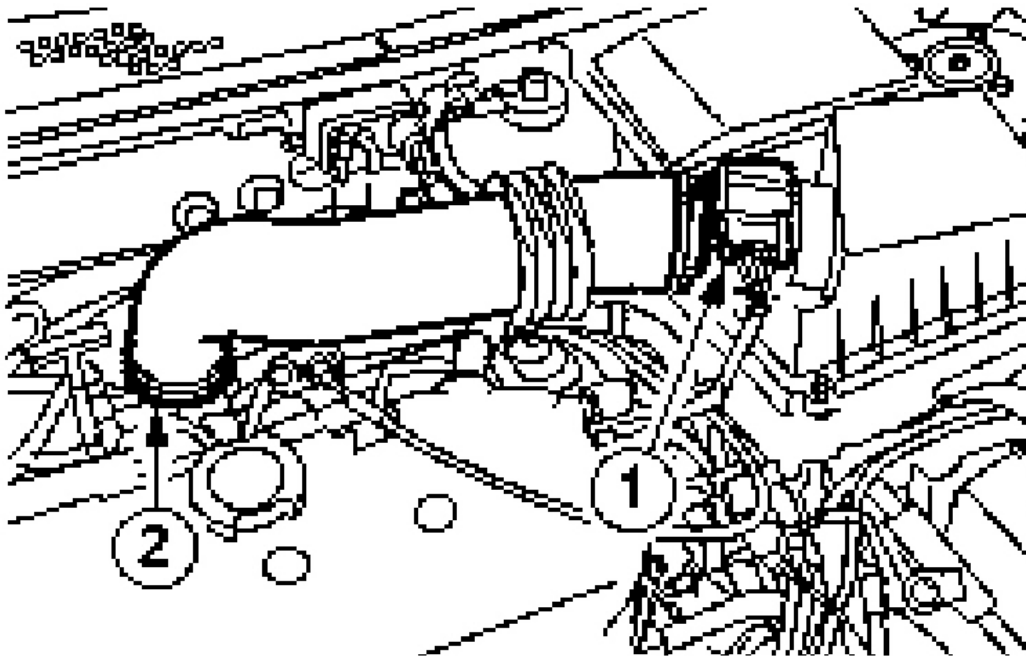
29. Install the clutch slave cylinder high-pressure line.
 - Insert the clutch slave cylinder high-pressure line in the bracket.
30. Bleed the clutch hydraulic system. Refer to **MANUAL TRANSMISSION/TRANSAXLE AND CLUTCH - GENERAL INFORMATION** .
31. Install the intake pipe.



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Fig. 209: Installing Intake Pipe
Courtesy of FORD MOTOR CO.

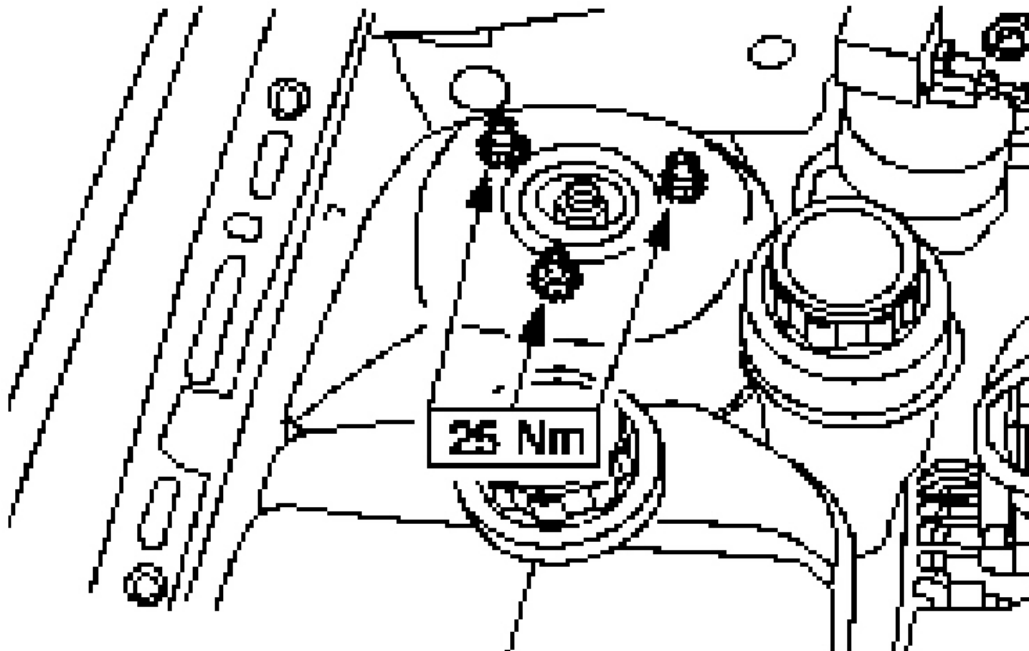
32. Install the air cleaner.
 1. Connect the plug of the MAF sensor.
 2. Connect the intake pipe.



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Fig. 210: Installing Air Cleaner
Courtesy of FORD MOTOR CO.

33. Install the battery tray.
34. Tighten the strut and spring assembly top mount nuts on both sides.



G03854692

Fig. 211: Tightening Strut
Courtesy of FORD MOTOR CO.

35. Adjust the gearshift mechanism. Refer to **MANUAL TRANSMISSION/TRANSAXLE AND CLUTCH - GENERAL INFORMATION** .

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.

36. Finishing operations:
- Carry out a road test to enable the powertrain control module (PCM) to collect data.
 - Check the routing of the vacuum hoses and wiring and secure them with cable ties.
 - Check fluid levels after the road test and correct as necessary.
 - Check the engine and cooling system for leaks (visual inspection).