

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus

2005 TRANSMISSION**Automatic Transaxle/Transmission - Focus****SPECIFICATIONS****GENERAL SPECIFICATIONS****GENERAL SPECIFICATIONS**

Item	Specification
MERCON® V Automatic Transmission Fluid XT-5-QM	MERCON® V
Metal Surface Cleaner	F4AZ-19A536-RA (WSE-M5B392-A)
Motorcraft TA-29	WSS-M4G-323-A3
Thread Sealer	WSK-M2G-350-A2
Multi-Purpose Grease	ESA-M1C45-A

CAPACITIES**CAPACITIES SPECIFICATIONS**

Refill Capacities - Liters	Quarts
Transaxle dry fill capacity 6.7	7

DIRECT CLUTCH HUB SHIM SELECTION CHART**CLUTCH HUB SHIM THICKNESS SPECIFICATION**

Description	Part Number	Shim Thickness mm (in)
Overall transaxle end play clearance mm (in): 0.25-0.50 (0.0098-0.0196)	-	0.25-0.50 (0.0098-0.0196)
-	XS4P-7G262-AB	1.775-1.825 (0.0698-0.0718)
-	XS4P-7G262-BB	1.975-2.025 (0.0777-0.0797)
-	XS4P-7G262-CB	2.175-2.225 (0.0856-0.0875)
-	XS4P-7G262-DB	2.375-2.425 (0.0935-0.0954)
-	XS4P-7G262-EB	2.575-2.625 (0.1013-0.1033)

TRANSFER SHAFT SHIM SELECTION CHART**TRANSFER SHAFT SHIM THICKNESS SPECIFICATION**

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Tool Reading mm	Part Number	Shim Thickness mm (in)
OVER 0.34-0.39	XS4P-7H367-AB	0.48-0.52 (0.0188-0.0204)
OVER 0.39-0.44	XS4P-7H367-BB	0.53-0.57 (0.0208-0.0224)
OVER 0.44-0.49	XS4P-7H367-CB	0.58-0.62 (0.0228-0.0244)
OVER 0.49-0.54	XS4P-7H367-DB	0.63-0.67 (0.0248-0.0263)
OVER 0.54-0.59	XS4P-7H367-EB	0.68-0.72 (0.0267-0.0283)
OVER 0.59-0.64	XS4P-7H367-FB	0.73-0.77 (0.0287-0.0303)
OVER 0.64-0.69	XS4P-7H367-GB	0.78-0.82 (0.0307-0.0322)
OVER 0.69-0.74	XS4P-7H367-HB	0.83-0.87 (0.0326-0.0342)
OVER 0.74-0.79	XS4P-7H367-JB	0.88-0.92 (0.0346-0.0362)
OVER 0.79-0.84	XS4P-7H367-KB	0.93-0.97 (0.0366-0.0381)
OVER 0.84-0.89	XS4P-7H367-LB	0.98-1.02 (0.0385-0.0401)
OVER 0.89-0.94	XS4P-7H367-MB	1.03-1.07 (0.0405-0.0421)
OVER 0.94-0.99	XS4P-7H367-NB	1.08-1.12 (0.0425-0.0440)
OVER 0.99-1.04	XS4P-7H367-PB	1.13-1.17 (0.0444-0.0460)
OVER 1.04-1.09	XS4P-7H367-RB	1.18-1.22 (0.0464-0.0480)
OVER 1.09-1.14	XS4P-7H367-SB	1.23-1.27 (0.0484-0.0500)
OVER 1.14-1.19	XS4P-7H367-TB	1.28-1.32 (0.0503-0.0519)

DIFFERENTIAL SHAFT SHIM SELECTION CHART**DIFFERENTIAL SHAFT SHIM THICKNESS SPECIFICATION**

Tool Reading mm	Part Number	Shim Thickness mm (in)
OVER 0.28-0.33	XS4P-7F119-AB	0.48-0.52 (0.0188-0.0204)
OVER 0.33-0.38	XS4P-7F119-BB	0.53-0.57 (0.0208-0.0224)
OVER 0.38-0.43	XS4P-7F119-CB	0.58-0.62 (0.0228-0.0244)
OVER 0.43-0.48	XS4P-7F119-DB	0.63-0.67 (0.0248-0.0263)
OVER 0.48-0.53	XS4P-7F119-EB	0.68-0.72 (0.0267-0.0283)
OVER 0.53-0.58	XS4P-7F119-FB	0.73-0.77 (0.0287-0.0303)
OVER 0.58-0.63	XS4P-7F119-GB	0.78-0.82 (0.0307-0.0322)
OVER 0.63-0.68	XS4P-7F119-HB	0.83-0.87 (0.0326-0.0342)
OVER 0.68-0.73	XS4P-7F119-JB	0.88-0.92 (0.0346-0.0362)
OVER 0.73-0.78	XS4P-7F119-KB	0.93-0.97 (0.0366-0.0381)
OVER 0.78-0.83	XS4P-7F119-LB	0.98-1.02 (0.0385-0.0401)
OVER 0.83-0.88	XS4P-7F119-MB	1.03-1.07 (0.0405-0.0421)
OVER 0.88-0.93	XS4P-7F119-NB	1.08-1.12 (0.0425-0.0440)

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OVER 0.93-0.98	XS4P-7F119-PB	1.13-1.17 (0.0444-0.0460)
OVER 0.98-1.03	XS4P-7F119-RB	1.18-1.22 (0.0464-0.0480)
OVER 1.03-1.08	XS4P-7F119-SB	1.23-1.27 (0.0484-0.0500)
OVER 1.08-1.13	XS4P-7F119-TB	1.28-1.32 (0.0503-0.0519)
OVER 1.13-1.18	XS4P-7F119-UB	1.33-1.37 (0.0523-0.0539)
OVER 1.18-1.23	XS4P-7F119-VB	1.38-1.42 (0.0543-0.0559)
OVER 1.23-1.28	XS4P-7F119-XB	1.43-1.47 (0.0562-0.0578)
OVER 1.28-1.33	XS4P-7F119-YB	1.48-1.52 (0.0582-0.0598)
OVER 1.33-1.38	XS4P-7F119-ZB	1.53-1.57 (0.0602-0.0618)

SOLENOID OPERATION CHART - CONVERTER ENGAGED**SOLENOID OPERATION CHART - CONVERTER ENGAGED**

Base Gearshift Selector Position	PCM Commanded Gear	4F27E Solenoid States - Converter Engaged					
		SSA	SSB	SSC	SSD	SSE	PCA
D	2	Off	On	On	Off	On	-
-	3	Off	On	On	Off	Off	-
-	4	On	On	On	Off	Off	-

SOLENOID OPERATION CHART - CONVERTER DISENGAGED**SOLENOID OPERATION CHART - CONVERTER DISENGAGED**

Base Gearshift Selector Position	PCM Commanded Gear	4F27E Solenoid States - Converter Engaged					
		SSA	SSB	SSC	SSD	SSE	PCA
P/N	P/N	On	Off	Not fed	Not fed	Not fed	-
R	R	Off	Off	Not fed	Off	Not fed	-
D	1	Off	Off	Off	On	On	-
-	1 (M)	On	On	Off	Off	On	-
-	2	Off	Off	Off	Off	On	-
-	3	Off	Off	Off	Off	Off	-
-	4	On	Off	On	Off	Off	-

CLUTCH PLATE USAGE AND CLEARANCE SPECIFICATION CHART

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CLUTCH PLATE USAGE AND CLEARANCE SPECIFICATION CHART

Clutch	Steel Plates	Friction Plates	Clearance mm (in)	Selective Snap Ring Part Numbers	Selective Snap Ring Thickness mm (in)
Forward	4	4	1.5-1.8 (0.0590- 0.0708)	-	1.15-1.25 (0.0452- 0.0492)
Forward	4	4	1.5-1.8 (0.0590- 0.0708)	-	1.35-1.45 (0.0531- 0.0570)
Forward	4	4	1.5-1.8 (0.0590- 0.0708)	-	1.55-1.65 (0.0610- 0.0649)
Forward	4	4	1.5-1.8 (0.0590- 0.0708)	-	1.75-1.85 (0.0688- 0.0728)
Forward	4	4	1.5-1.8 (0.0590- 0.0708)	-	1.95-2.05 (0.0767- 0.0807)
Forward	4	4	1.5-1.8 (0.0590- 0.0708)	-	2.15-2.25 (0.0846- 0.0885)
Direct	3	3	1.0-1.3 (0.0393- 0.0511)	-	1.15-1.25 (0.0452- 0.0492)
Direct	3	3	1.0-1.3 (0.0393- 0.0511)	-	1.35-1.45 (0.0531- 0.0570)
Direct	3	3	1.0-1.3 (0.0393- 0.0511)	-	1.55-1.65 (0.0610- 0.0649)
Direct	3	3	1.0-1.3 (0.0393- 0.0511)	-	1.75-1.85 (0.0688- 0.0728)
Direct	3	3	1.0-1.3 (0.0393- 0.0511)	-	1.95-2.05 (0.0767- 0.0807)
Direct	3	3	1.0-1.3	-	2.15-2.25

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			(0.0393-0.0511)		(0.0846-0.0885)
Reverse	2	2	1.0-1.3 (0.0393-0.0511)	-	1.15-1.25 (0.0452-0.0492)
Reverse	2	2	1.0-1.3 (0.0393-0.0511)	-	1.35-1.45 (0.0531-0.0570)
Reverse	2	2	1.0-1.3 (0.0393-0.0511)	-	1.55-1.65 (0.0610-0.0649)
Reverse	2	2	1.0-1.3 (0.0393-0.0511)	-	1.75-1.85 (0.0688-0.0728)
Reverse	2	2	1.0-1.3 (0.0393-0.0511)	-	1.95-2.05 (0.0767-0.0807)
Reverse	2	2	1.0-1.3 (0.0393-0.0511)	-	2.15-2.25 (0.0846-0.0885)
Low/Reverse	5	5	2.2-2.5 (0.0866-0.0984)	-	1.75-1.85 (0.0688-0.0728)
Low/Reverse	5	5	2.2-2.5 (0.0866-0.0984)	-	1.95-2.05 (0.0767-0.0807)
Low/Reverse	5	5	2.2-2.5 (0.0866-0.0984)	-	2.15-2.25 (0.0846-0.0885)
Low/Reverse	5	5	2.2-2.5 (0.0866-0.0984)	-	2.35-2.45 (0.0925-0.0964)
Low/Reverse	5	5	2.2-2.5 (0.0866-0.0984)	-	2.55-2.65 (0.1003-0.1043)
Low/Reverse	5	5	2.2-2.5 (0.0866-0.0984)	-	2.75-2.85 (0.1082-0.1122)
Low/Reverse	5	5	2.2-2.5	-	2.95-3.05

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			(0.0866-0.0984)		(0.1161-0.1200)
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INTERMEDIATE/OVERDRIVE BAND BOLT CHART

INTERMEDIATE/OVERDRIVE BAND BOLT CHART

Bolt Length	Ford Part Number	Bolt Head Number
39.0 mm	-	7
38.5 mm	-	6
38.0 mm	-	5
37.5 mm	-	4
37.0 mm	-	3
36.5 mm	-	2
36.0 mm	-	1

REFERENCE: BAND/CLUTCH APPLICATION CHART

CLUTCH APPLICATION REFERENCE

Gear	Forward Clutch	Direct Clutch	Reverse Clutch	Intermediate/Overdrive Band	Low Reverse Clutch	Low One-Way Clutch
P	-	-	-	-	-	-
R	-	-	X	-	X	-
N	-	-	-	-	-	-
4th	-	X	-	X	-	-
3rd	X	X	-	-	-	-
2nd	X	-	-	X	-	-
1st	X	-	-	-	-	X
1st (Manual)	X	-	-	-	X	X

LINE PRESSURE CHART

LINE PRESSURE REFERENCE

Trans.	Range	Idle (kPa)	Idle (psi)	Stall (kPa)	Stall (psi)
4F27E	P, N	345-450	50-65	1,240-1,450	180-210
4F27E	R	450-585	65-85	1,930-2,310	280-335

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4F27E	D, 2, 1	345-450	50-65	1,240-1,450	180-210
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STALL SPEED CHART

STALL SPEED REFERENCE

Engine	RPM
All	2,200-2,700

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Description	Nm	lb-ft	lb-in
Converter housing-to-transaxle case bolts and stud	22	16	-
Final drive input gear bearing retainer nut rotational torque	0.6-0.9	-	5.3-7.9
Final drive input gear bearing retainer nut pre-torque	400-450	256-332	-
Intermediate/overdrive band anchor bolt	45	33	-
Intermediate/overdrive band servo cover bolts	13	10	-
Transmission fluid cooler lines	25	18	-
Main control valve body bolts	9	-	80
Main control wire harness ground bolt	10	-	89
Manual control lever bolt	22	16	-
Parking pawl cover bolts	13	10	-
Pump bolts	22	16	-
Pump case bolts	13	10	-
Shifter assembly bolt	13	10	-

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Solenoid body bolts	9	-	80
Transaxle end cover bolts	22	16	-
Transaxle fluid pan bolts	10.5	-	95
Transmission range (TR) sensor bolts	10	-	89
Turbine shaft speed (TSS) sensor bolt	10	-	89
Output shaft speed (OSS) sensor bolt	10	-	89
Engine/transaxle flange bolts, stud	48	35	-
Engine/transaxle flange stud nut	35	26	-
Torque converter-to-engine drive plate bolts	37	27	-
Oil filler pipe bolt	9	-	80
Starter motor bolts	35	26	-
Rear engine mounting bracket	80	59	-
Rear engine mounting (four nuts)	48	35	-
Rear engine mounting center nut	133	98	-
RH front drive halfshaft center bearing cap nuts	25	18	-
Lower suspension arm bolt	50	37	-
Tie-rod end nut	47	35	-
RH engine support insulator bolts	48	35	-
Exhaust pipe flange bolts	47	35	-
Suspension strut nuts	48	35	-

DESCRIPTION AND OPERATION

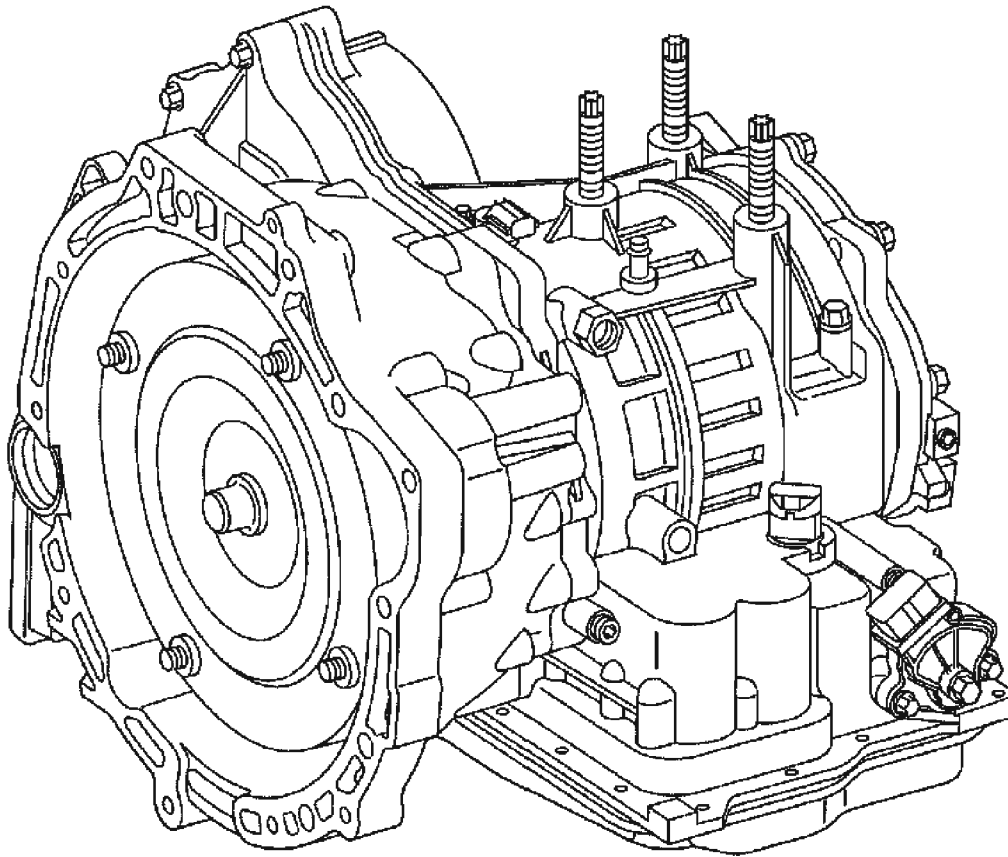
TRANSAXLE DESCRIPTION

The automatic transmission used in the vehicle is a new development.

It is a fully automatic, electronically controlled four-speed transmission designed for front-wheel drive vehicles.

Its abbreviated designation 4F27E means:

- 4 - four-speed transmission
- F - front-wheel drive
- 27 - originally designed for maximum input torque after torque converter: 365 Nm (270 lb-ft)
- E - fully electronic control



ELE0008127

Fig. 1: Identifying Automatic Transmission Description
Courtesy of FORD MOTOR CO.

The individual ratios are achieved through two planetary gear sets, connected one behind the other.

The individual components of the planetary gear sets are driven or held by means of three

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multi-plate clutches, a multi-plate brake, a brake band and a roller one-way clutch.

The torque is transmitted to the final drive assembly through an intermediate gear stage.

MERCON® V is the fluid specified for the 4F27E transmission. The fluid is changed as directed by the Scheduled Maintenance Guide that is supplied with the vehicle.

The manual selector lever gives the driver a choice of P, R, N, 1, 2 and D.

In drive range "D" it is also possible to operate an O/D switch on the manual selector lever to prevent the transmission from shifting into fourth gear. The default gear for this transmission is third gear.

To minimize fuel consumption, the torque converter lock-up clutch is closed by the PCM in 3rd and 4th gears depending on the throttle position and vehicle speed.

The transmission has electronic synchronous shift control (ESSC), which guarantees extremely smooth gear shifting over the entire life of the transmission.

A hydraulic emergency operating program maintains limited operation in the event of failure of important electrical components.

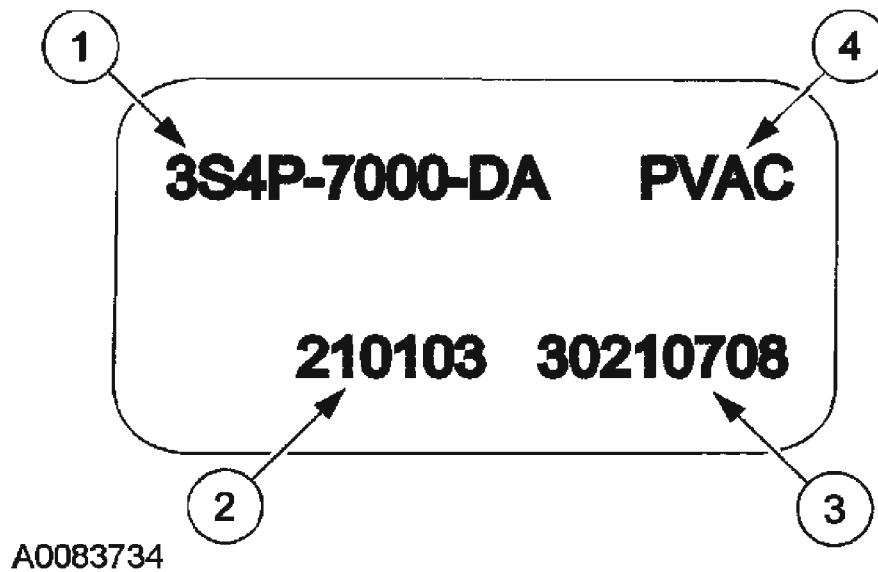
The transmission can be tested using FDS2000, NGS or WDS through the data link connector (DLC) in the passenger compartment.

GEAR RATIO REFERENCE

Gear Ratio (Typical shown, ratios are model dependent)	
1st	2.816:1
2nd	1.498:1
3rd	1.000:1
4th	0.726:1
Reverse	2.649:1

Identification tags

When servicing the automatic transaxle, refer to the identification tag located on the case.

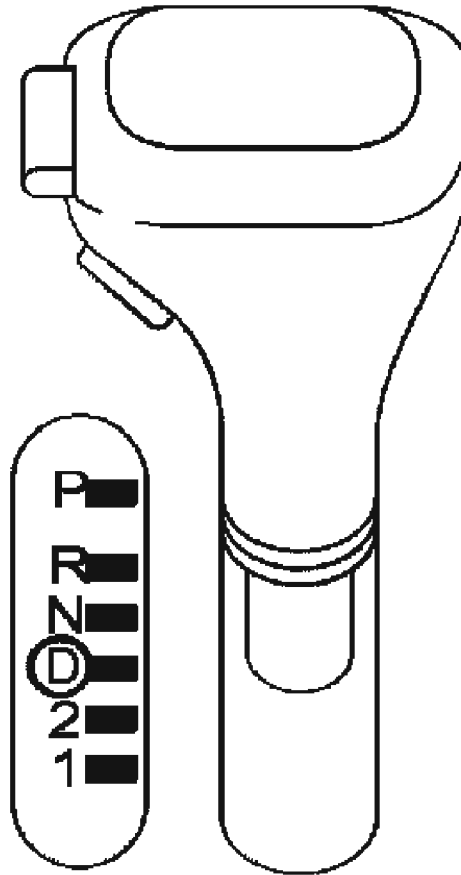


Item	Part Number	Description
1	—	Transmission assembly part number
2	—	Sample build date code (DDMMYY)
3	—	Sample Julian build date and build number (YDDDXXX)
4	—	Service model code

Fig. 2: Locating Identification Tag Location
Courtesy of FORD MOTOR CO.

Range selection

The transaxle range selector has six positions: P, R, N, D, 2, 1.



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Fig. 3: Positioning Transaxle Range Selector
Courtesy of FORD MOTOR CO.

Manual selector lever position "P"

In manual selector lever position "P" no gear is selected. The parking pawl is engaged manually by the manual selector lever cable and the shift shaft.

For safety reasons, always apply the parking brake whenever the vehicle is parked.

Manual selector lever position "R"

In manual selector lever position "R" reverse gear is selected. REVERSE allows the vehicle to be operated in a rearward direction, at a reduced gear ratio.

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Manual selector lever position "N"

In manual selector lever position "N" no gear is selected. The driveline is not locked, so the wheels are free to rotate.

The vehicle may be started in NEUTRAL.

Manual selector lever position "D"

In manual selector lever position "D" and when the O/D switch is not pressed, the transmission control allows all the gears to be selected. When the O/D switch is pressed, shifting into fourth gear is prevented or the transmission shifts down to third gear.

Manual selector lever position "1"

In manual selector lever position "1" only first gear is selected. In addition to the first gear one-way clutch, the transmission control closes the reverse gear brake to produce engine braking effect in overrun.

If the manual selector lever is moved to position "1" at an excessive vehicle speed for first gear, the transmission control only allows the downshift to take place when the corresponding vehicle speed has been reached.

Manual selector lever position "2"

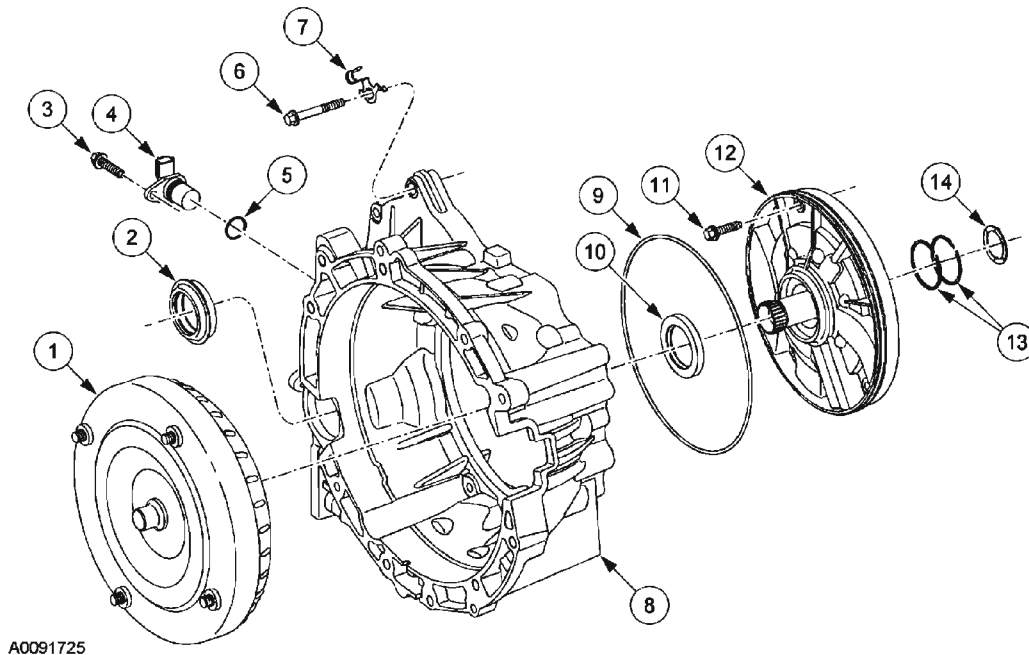
In manual selector lever position "2" only second gear is selected. The transmission control does not allow shifting into first gear.

If the manual selector lever is moved to position "2" at an excessive vehicle speed for second gear, the transmission control only allows the downshift to take place when the corresponding vehicle speed has been reached.

Converter Housing with Converter Assembly and Fluid Pump Assembly

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Item	Part Number	Description
1	7902	Converter assembly
2	1177	Seal assembly — differential
3	—	Output shaft speed sensor bolt
4	7H103	Output shaft speed (OSS) sensor
5	W706315-S300	O-ring—OSS sensor
6	—	Bolt—converter housing
7	—	Retainer—fluid tube
8	7005	Converter housing

Item	Part Number	Description
9	7A248	Seal — fluid pump
10	7A248	Seal assembly — fluid pump
11	—	Bolt—fluid pump
12	7A103	Fluid pump assembly
13	7D019	Seal — forward clutch cylinder
14	7H042	Washer — fluid pump support thrust

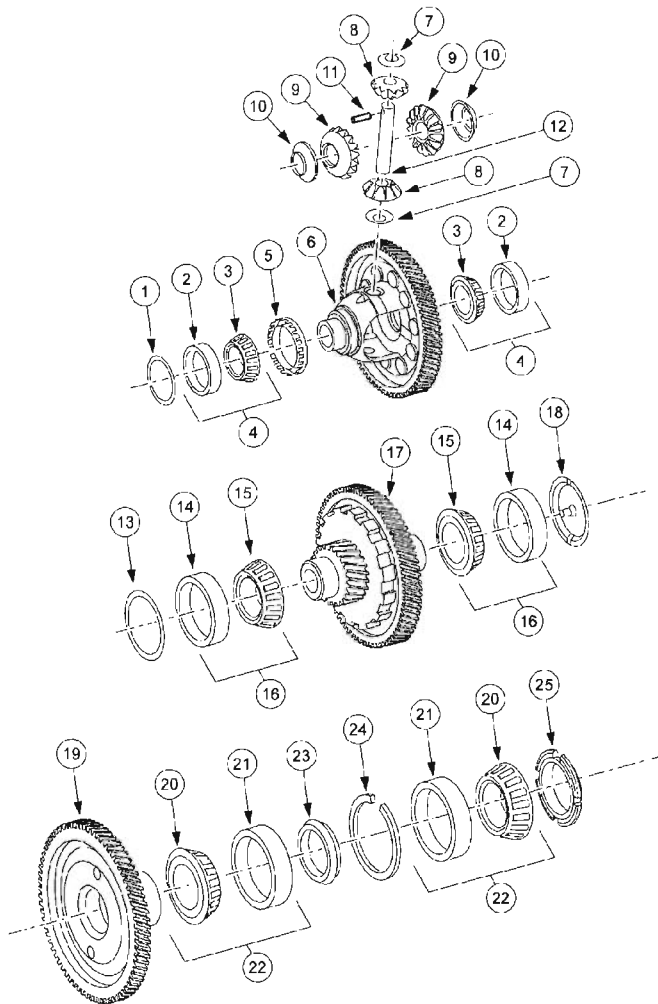
Fig. 4: Exploded View Of Converter Housing With Converter Assembly And Fluid Pump Assembly Component
Courtesy of FORD MOTOR CO.

Forward Clutch

Differential Assembly and Final Drive Input

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Item	Part Number	Description
1	4067	Shim — differential bearing
2	4222	Cup — differential bearing
3	4221	Cone and roller assembly
4	4221	Bearing assembly
5	7H150	Wheel — output shaft speed sensor
6	7F465	Differential and gear assembly — transaxle
7	4230	Pinion thrust washer (2)
8	4215	Differential pinion gear (2)
9	4236	Differential side gear (2)
10	4228	Side gear thrust washer (2)
11	4241	Pin
12	4211	Differential pinion shaft
13	7H367	Shim — transfer shaft roller bearing

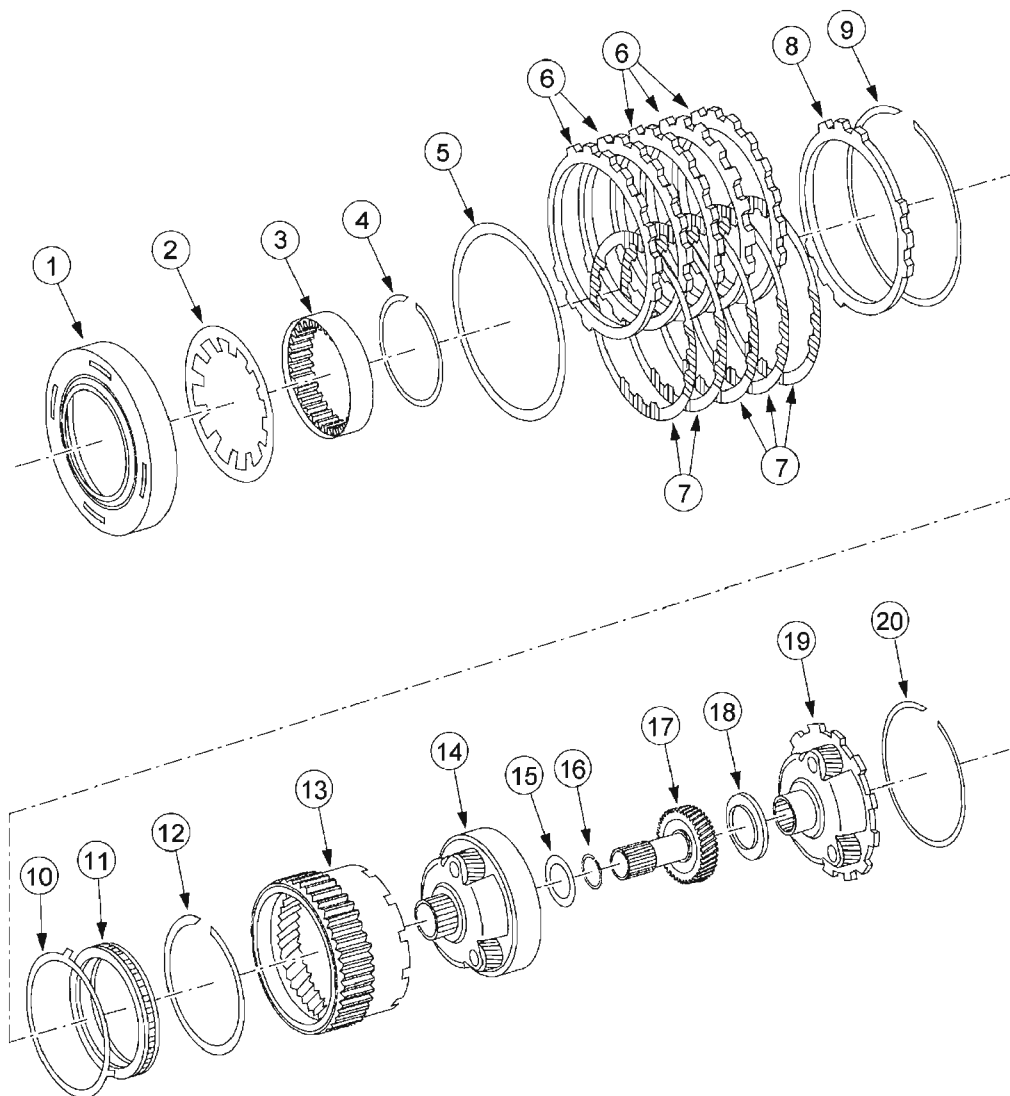
Item	Part Number	Description
14	7H344	Cup-transfer shaft roller
15	7170	Cone and roller assembly
16	7H338	Bearing assembly — transfer shaft (2)
17	7H348	Transfer shaft gear assembly
18	7L267	Funnel — transfer shaft
19	7F342	Gear — final drive input
20	7M102	Cone and roller assembly
21	7C236	Bearing cup
22	7F403	Bearing assembly (2)
23	71L369	Spacer
24	7H106	Retainer ring
25	7B364	Nut

Fig. 5: Exploded View Of Differential Assembly And Final Drive Input Component
Courtesy of FORD MOTOR CO.

Clutches and Planet Gears

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Item	Part Number	Description
1	7A262	Piston — low/reverse clutch
2	7B070	Spring — low/reverse clutch return
3	7D171	Race — low one-way clutch (OWC)— inner
4	7D483	Retaining ring — low OWC
5	7B070	Spring — low/reverse clutch wave
6	7B442	Steel plate — low/reverse clutch separator (5)
7	7B164	Friction plate assembly — low/reverse clutch (5)
8	7B066	Pressure plate — low/reverse clutch
9	7D483	Retaining ring — low/reverse clutch plate (selective)

Item	Part Number	Description
10	7H199	Retainer — low gear OWC
11	7A089	OWC assembly — low
12	7D483	Retaining ring
13	7D392	Front ring gear
14	7A398	Gear assembly — front planet
15	7H375	Bearing assembly — front planet carrier thrust
16	7H362	Snap ring
17	7A399	Front planet sun gear assembly
18	7H337	Bearing assembly — front sun gear thrust
19	7D006	Gear assembly — rear planet
20	7H361	Snap ring

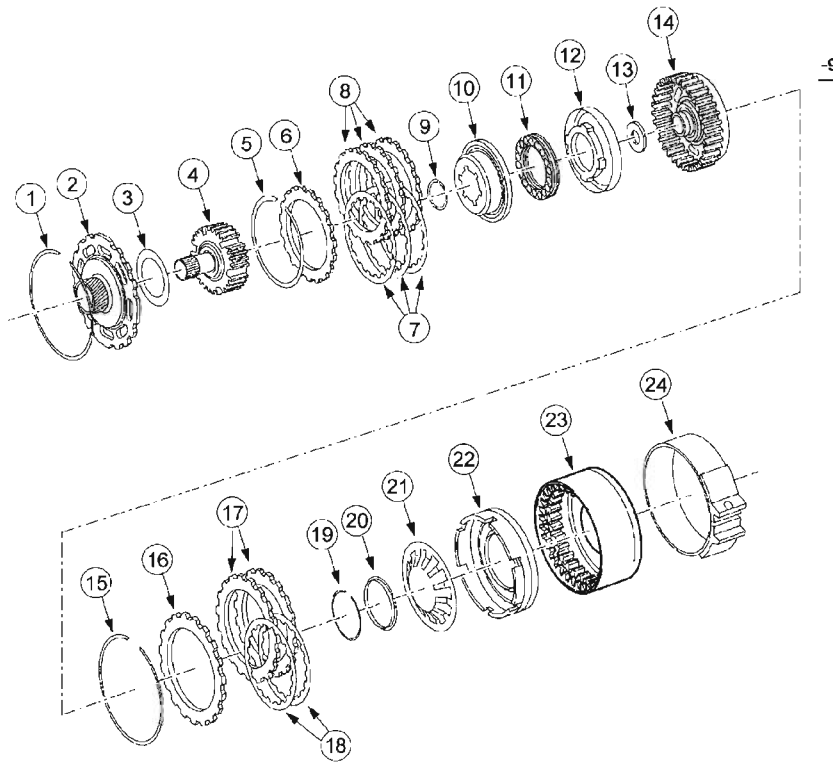
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Fig. 6: Exploded View Of Clutches And Planet Gears Component
Courtesy of FORD MOTOR CO.

Clutches and Band

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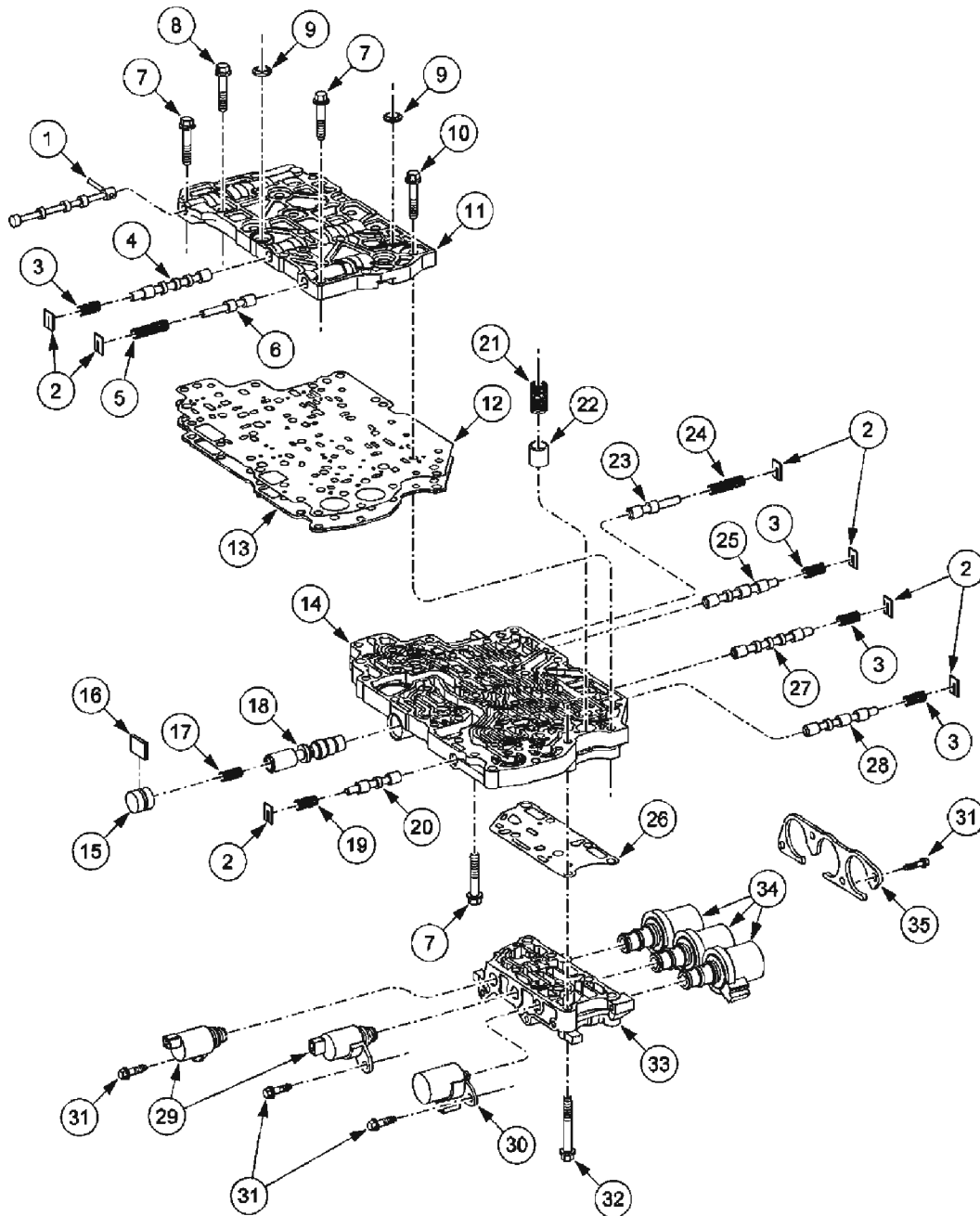
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Item	Part Number	Description
1	7D483	Retaining ring — reverse clutch
2	7A019	Rear sun gear assembly
3	7C041	Thrust bearing assembly — rear sun gear
4	7H351	Direct clutch hub assembly
5	7D483	Retaining ring
6	7B066	Pressure plate forward/direct clutch (1 each)
7	7B164	Friction plate assembly — forward/direct clutch (forward 4, direct 3)
8	7B442	Steel plate — direct clutch (DC)(3)
9	7H363	Snap ring — DC balanced piston
10	7H359	Direct clutch balanced piston
11	7F235	Piston return spring assembly — forward/direct clutch

Item	Part Number	Description
12	7A262	Piston assembly — direct clutch
13	7H335	Thrust bearing assembly — direct clutch
14	7F283	Cylinder assembly — direct clutch
15	7D483	Retaining ring — reverse clutch (selective)
16	7B066	Pressure plate — reverse clutch
17	7B442	Steel plate — reverse clutch (2)
18	7B164	Friction plate assembly — reverse clutch (2)
19	7H075	Spring retainer ring — reverse clutch
20	7D406	Spring retainer — reverse clutch
21	7B070	Piston return spring — reverse clutch
22	7D402	Piston assembly — reverse clutch
23	7D044	Drum assembly — intermediate and overdrive
24	7D034	Band assembly — intermediate and overdrive

Fig. 7: Exploded View Of Clutches And Band Component
Courtesy of FORD MOTOR CO.

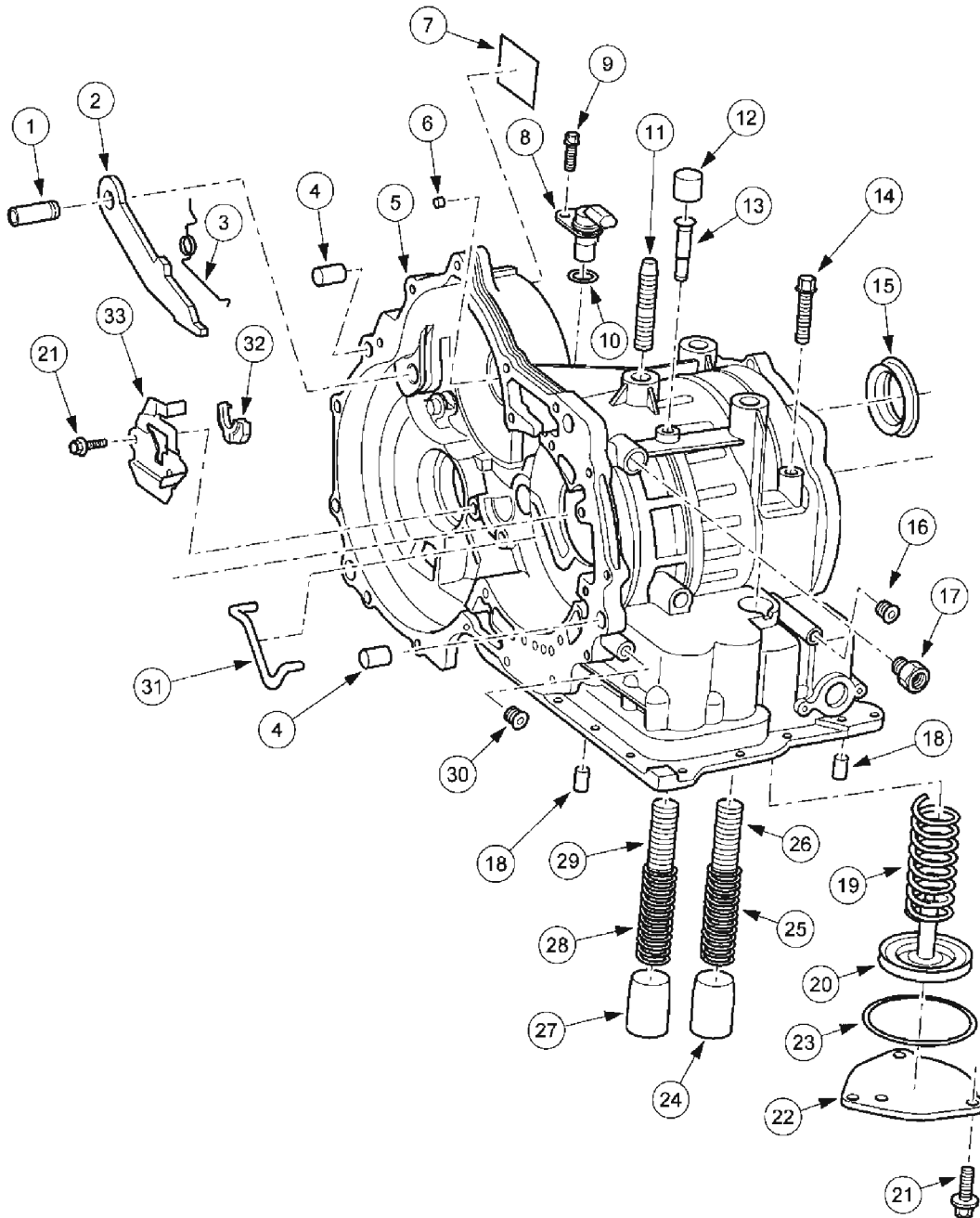
Main Control Assembly



AD091724

Fig. 8: Exploded View Of Main Control Assembly Component (1 Of 2)
 Courtesy of FORD MOTOR CO.

Case Assembly



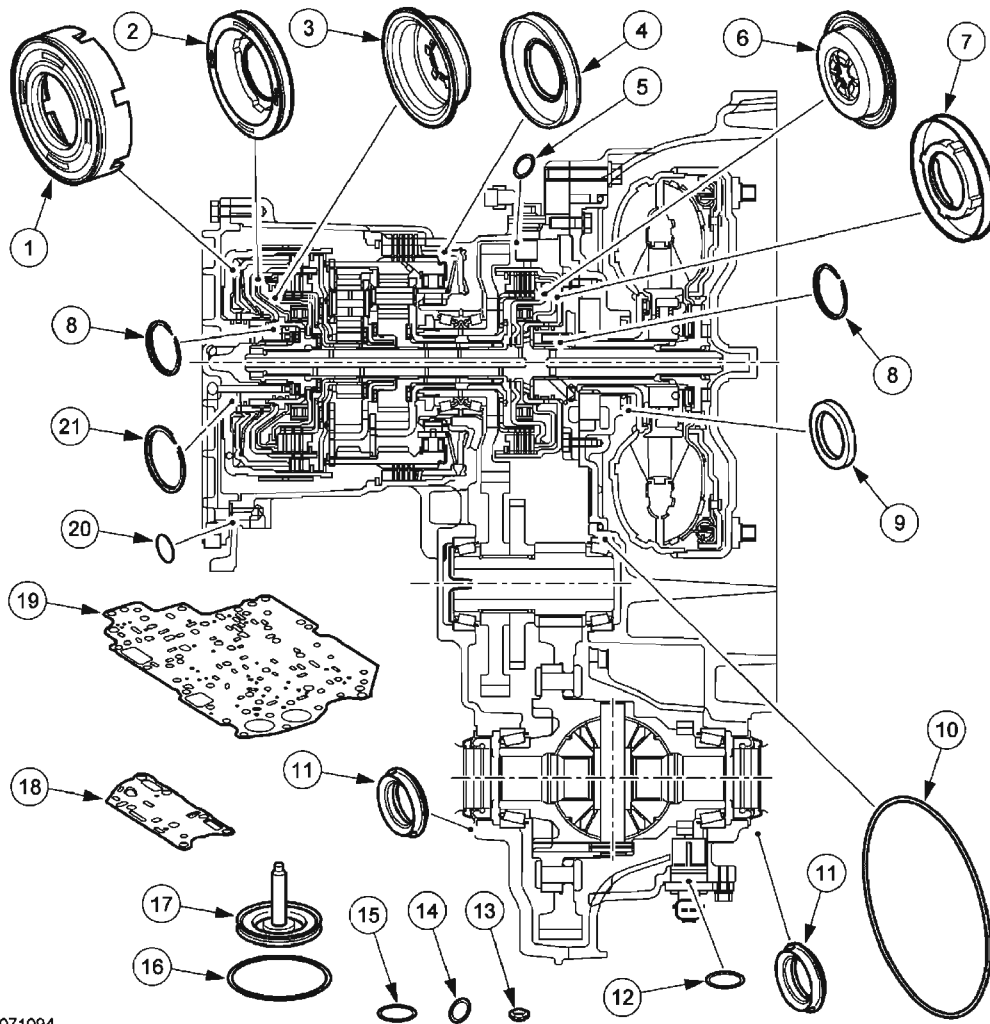
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Fig. 9: Exploded View Of Automatic Transaxle Case Assembly Component (1 Of 2)
 Courtesy of FORD MOTOR CO.

Seals, Rings and Gaskets

2005 Ford Focus ZX4 S

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A0071094

Item	Part Number	Description
1	7D402	Piston assembly — reverse clutch
2	7A262	Piston assembly — direct clutch
3	7H359	Piston — direct clutch balance
4	7A262	Piston — low/reverse clutch
5	W706316-S300	O-ring — turbine shaft speed (TSS)
6	7H360	Piston — forward clutch balance
7	7A262	Piston assembly — forward clutch
8	7D019	Seal — forward and direct clutch cylinder (4)
9	7A248	Seal assembly — fluid pump
10	7A248	Seal — fluid pump
11	1177	Seal assembly — differential

Item	Part Number	Description
12	W706315-S300	O-ring — output shaft speed (OSS) sensor
13	7N266	Seal — valve body (2)
14	7B498	Seal — manual shaft — fluid (2)
15	7Z302	Seal — fluid filter
16	7D024	Seal — overdrive servo cover
17	7D021	Piston and seal assembly — intermediate and overdrive servo
18	7Z490	Gasket — solenoid body
19	7C155	Gasket — control valve body (1)
20	7R284	Seal — case cover (2)
21	7D020	Seal — reverse clutch cylinder (2)

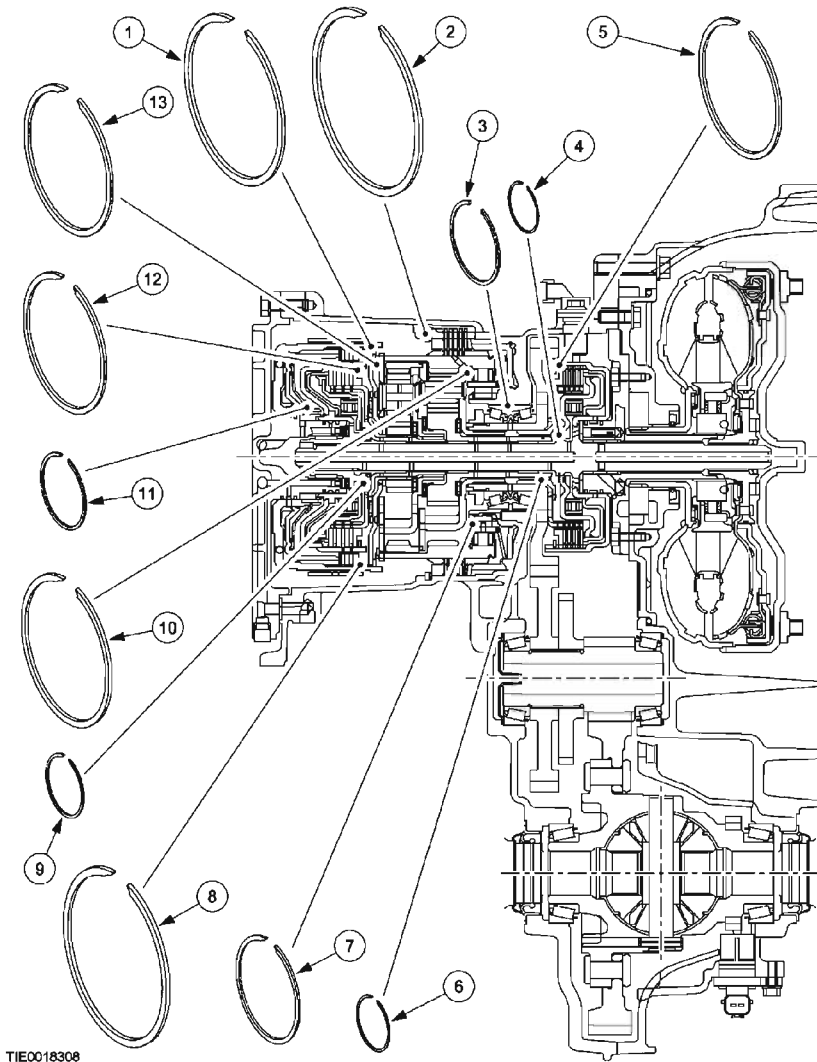
2005 Ford Focus ZX4 S
2005 TRANSMISSION Automatic Transaxle/Transmission - Focus

Fig. 10: Identifying Seals, Rings And Gaskets
Courtesy of FORD MOTOR CO.

Snap Rings

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



TIE0018308

Item	Part Number	Description
1	7D483	Ring — reverse clutch retaining
2	7D483	Ring — low/reverse clutch plate retaining (select fit)
3	7H106	Ring — final drive retainer
4	7H365	Ring — forward clutch balance piston
5	7D483	Ring — forward/direct clutch plate retaining (select fit)
6	7D483	Snap ring — front sun gear
7	7D483	Ring — low one-way clutch (OWC) retaining

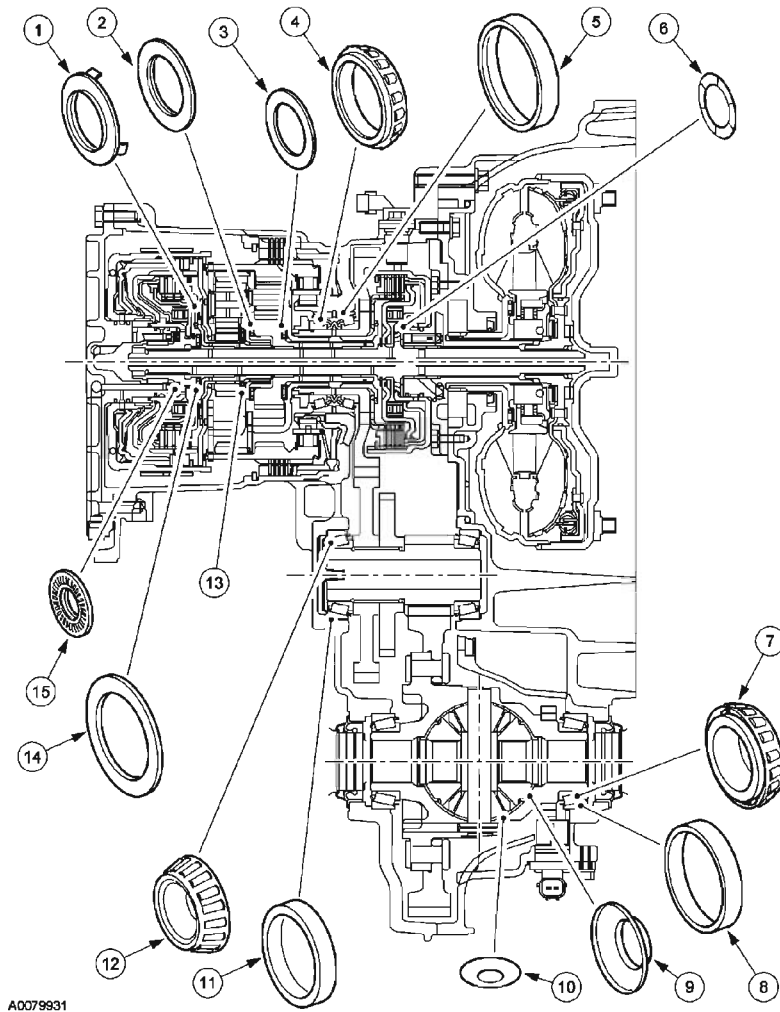
Item	Part Number	Description
8	7D483	Ring — reverse clutch retaining (select fit)
9	7H363	Snap ring — Direct clutch (DC) balance piston
10	7D483	Ring — forward/direct clutch planet retaining
11	7H075	Ring — reverse clutch spring retaining
12	7D483	Ring — forward/direct clutch plate retaining (select fit)
13	7H361	Snap ring — rear planet assembly

Fig. 11: Locating Snap Rings Location
Courtesy of FORD MOTOR CO.

Bearings, Bushings and Thrust Washers

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



A0079931

Item	Part Number	Description
1	7C041	Bearing assembly — rear sun gear thrust No. 3
2	7H337	Bearing assembly — front sun gear thrust No. 5
3	7H375	Bearing assembly — front planet carrier thrust No. 6
4	7M102	Cone and roller assembly — input shaft bearing (2)
5	7C236	Cup — input shaft bearing (2)
6	7H042	Washer — fluid pump support thrust
7	4221	Cone and roller assembly — differential bearing (2)
8	4222	Cup — differential bearing (2)

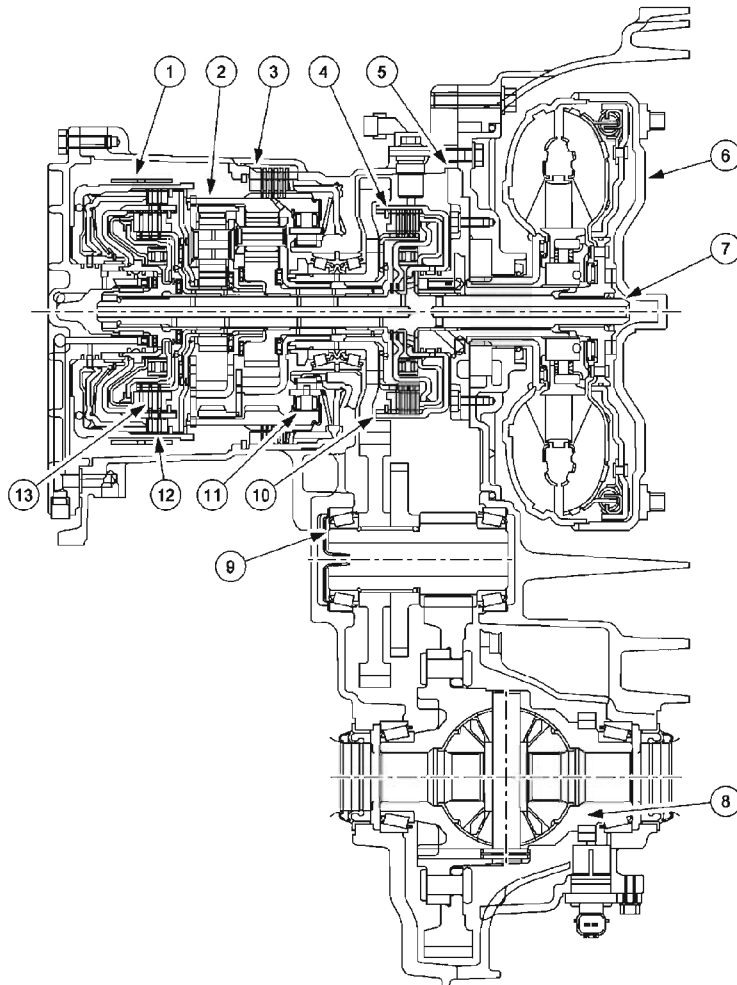
Item	Part Number	Description
9	4228	Washer — front axle differential side (2)
10	4230	Washer — front axle differential bearing thrust (2)
11	7H344	Cup — transfer shaft roller bearing (2)
12	7170	Cone and roller assembly — transfer shaft (2)
13	—	Bearing assembly — rear planet carrier thrust No. 4
14	7H335	Bearing assembly — rear sun gear thrust No. 2
15	7D234	Bearing assembly — direct clutch cylinder thrust No. 1

Fig. 12: Identifying Bearings, Bushings And Thrust Washers Component
Courtesy of FORD MOTOR CO.

Overview of Construction and Function

2005 Ford Focus ZX4 S

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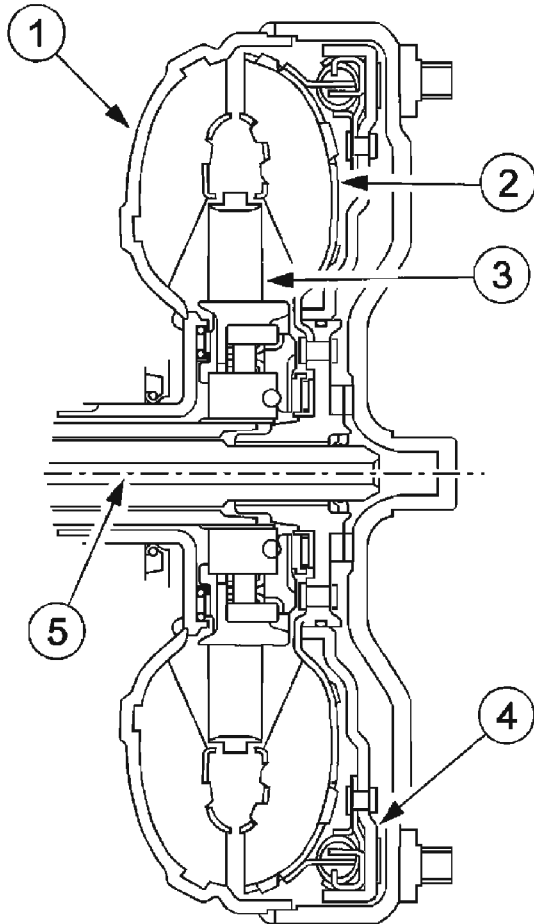


TIE0018312

Item	Part Number	Description
1	—	Intermediate/overdrive band
2	—	Front ring gear planetary gear sets
3	—	Low/reverse clutch
4	—	Forward clutch
5	—	Fluid pump and stator support
6	—	Torque converter
7	—	Transmission input shaft
8	—	Differential
9	—	Transfer shaft assembly
10	—	Final drive input gear
11	—	Low one-way clutch
12	—	Reverse clutch
13	—	Direct clutch

Fig. 13: Identifying Overview Of Construction And Function
Courtesy of FORD MOTOR CO.

Torque Converter and Torque Converter Lock-up Clutch



ELE0008101

Item	Part Number	Description
1	—	Converter housing and impeller
2	—	Turbine
3	—	Stator
4	—	Torque converter lock-up clutch
5	—	Transmission input shaft

Fig. 14: Locating Torque Converter And Torque Converter Lock-Up Clutch Component Location

Courtesy of FORD MOTOR CO.

The torque converter transmits engine torque hydraulically to the transmission input shaft.

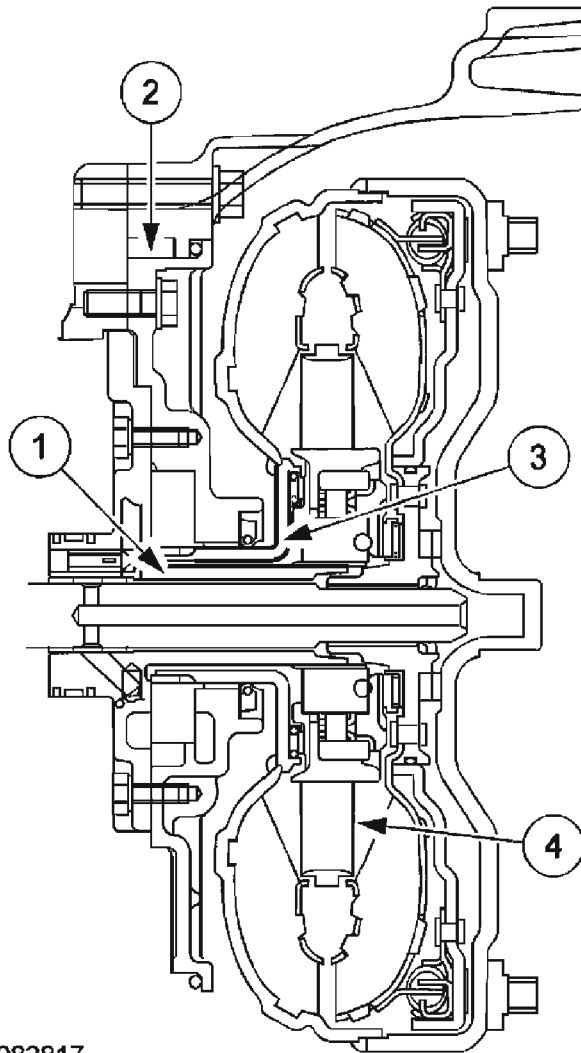
The stator boosts the torque to the input shaft (approximately 85% difference in speed between the impeller and the turbine).

The stator is made of synthetic resin to reduce weight.

To increase the efficiency of the automatic transmission, the torque converter has an apply clutch. When the torque converter lock-up clutch is closed, the torque is transmitted directly from the crankshaft through the torque converter housing to the transmission input shaft.

The torque converter clutch is applied hydraulically by the PCM by means of the solenoid valves in the valve body in third and fourth gears. Apply is dependent on the throttle position, vehicle speed and manual selector lever position.

Fluid Pump and Stator Support



A0083817

Item	Part Number	Description
1	—	Stator support
2	—	Fluid pump
3	—	Converter impeller hub
4	—	Stator

Fig. 15: Identifying Fluid Pump And Stator Support Operation
Courtesy of FORD MOTOR CO.

The fluid pump is a crescent gear pump and is driven directly from the crankshaft by means of

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drivers on the converter impeller hub. The fluid pump is bolted to the transmission housing.

The stator support is part of the fluid pump. Splines on the support locate and hold the converter stator.

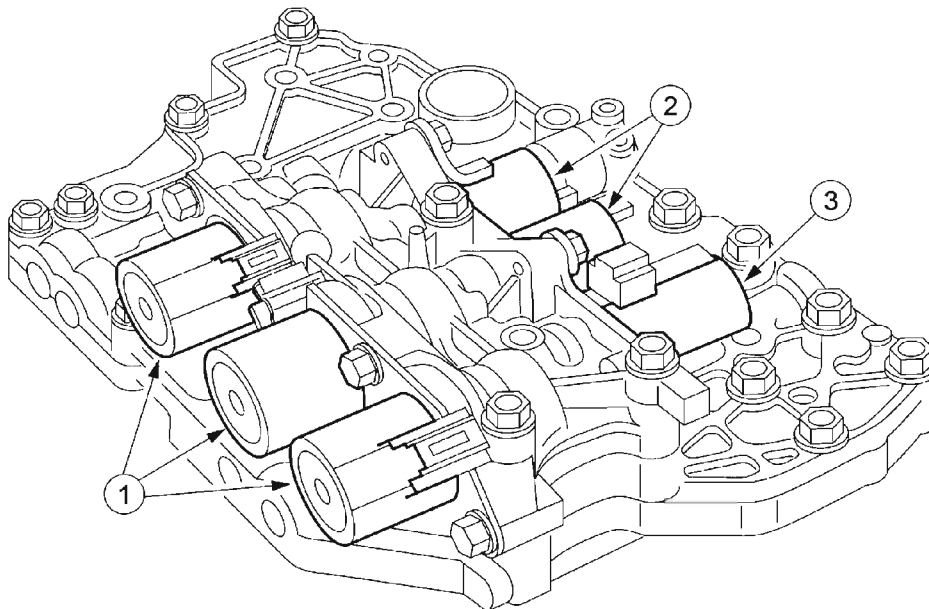
Planetary gear sets

The individual gears are shifted by means of two planetary gear sets, connected one behind the other.

Clutches and bands

The individual ratios are selected by means of four multi-plate clutches, a brake band and a roller one-way clutch.

The components are controlled by the PCM through pulse width modulation (PWM) solenoid valves.



ELE0008103

Item	Part Number	Description
1	7G484	Pulse width modulation (PWM) solenoid valves
2	7H148	Shift solenoid (on/off) valves
3	7G353	Main regulating valve variable force solenoid (VFS)

Fig. 16: Identifying Valve Body Component
Courtesy of FORD MOTOR CO.

The valve body contains six solenoid valves:

- Three PWM solenoid valves (pulse width modulation solenoid valves,
- Two shift solenoid (on/off) valves,
- One main regulating valve (variable force solenoid).

The individual clutches and bands are supplied pressure from the PWM solenoid valves and the shift solenoid (on/off) valves and thus the gears are shifted.

The PWM solenoid valves allow direct actuation of the clutches and bands to ensure extremely smooth gear shifting through precise pressure regulation.

The shift solenoid (on/off) valves switch the hydraulic path to the clutches and bands, reducing the number of required modulating valves.

The main regulating valve (variable force solenoid) ensures that sufficient hydraulic pressure is available in all operating conditions.

PWM solenoid valves 1-3

PWM solenoid valves 1, 2 and 3 control the pressure to the bands and clutches.

Shift solenoid (on/off) valves 1 and 2

The shift solenoid (on/off) valves switch the different oil passages in the valve body to direct the pressure to the individual clutches and bands.

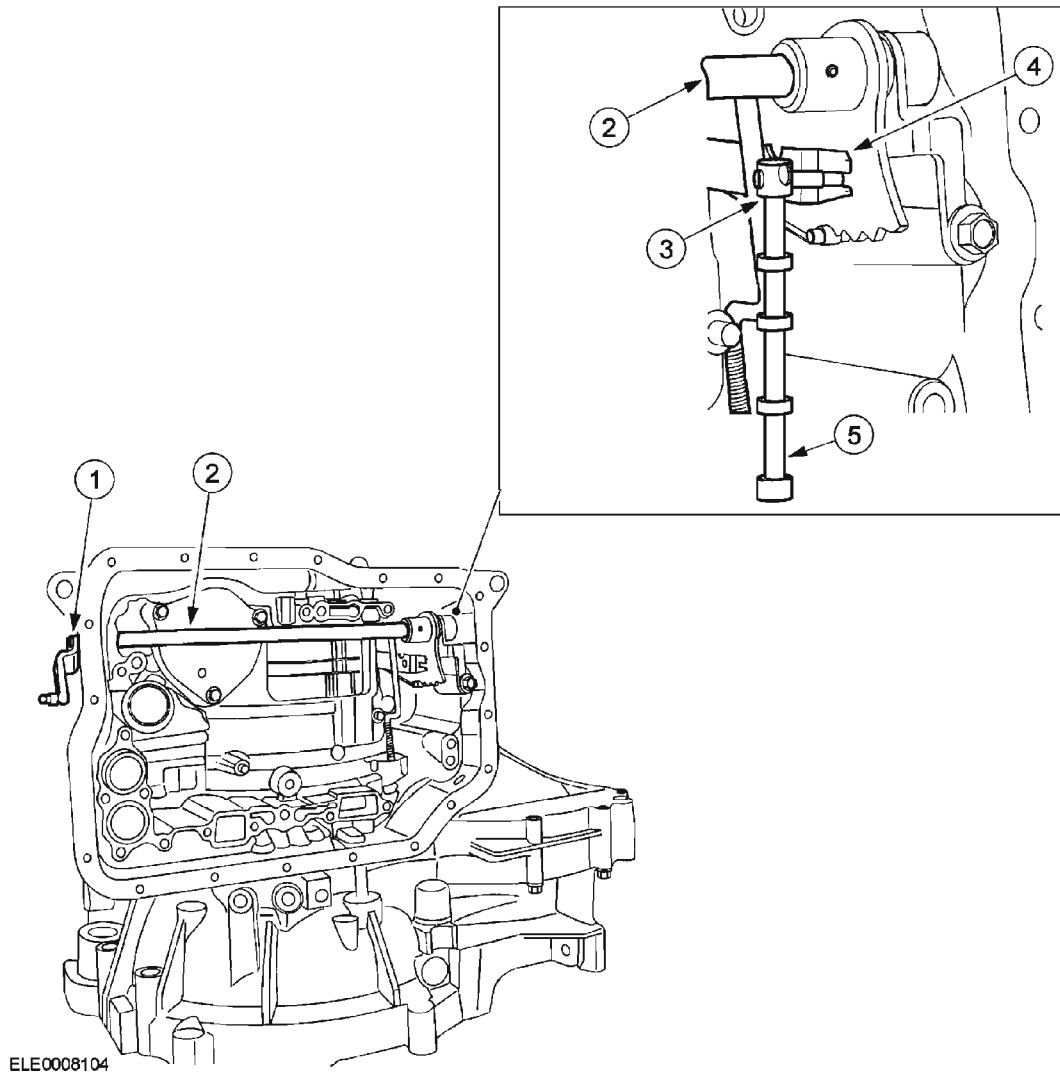
The use of the shift solenoid valves are needed for direct actuation of the individual clutches and bands.

Main regulating valve

The main regulating valve (variable force solenoid) controls the required main line pressure for the individual transmission ranges.

The main line pressure is controlled dependent on the current engine load.

Internal Shift Mechanism



Item	Part Number	Description
1	7A256	Lever on manual shaft
2	7C493	Manual shaft
3	—	Parking pawl engaging lever
4	7E160	Lever and bracket control assembly
5	—	Manual valve (in valve body which is not shown)

Fig. 17: Identifying Internal Shift Mechanism Component
 Courtesy of FORD MOTOR CO.

The shift lever is secured on a square on the manual shaft. Axial movement of the selector lever cable is changed into rotation of the manual shaft.

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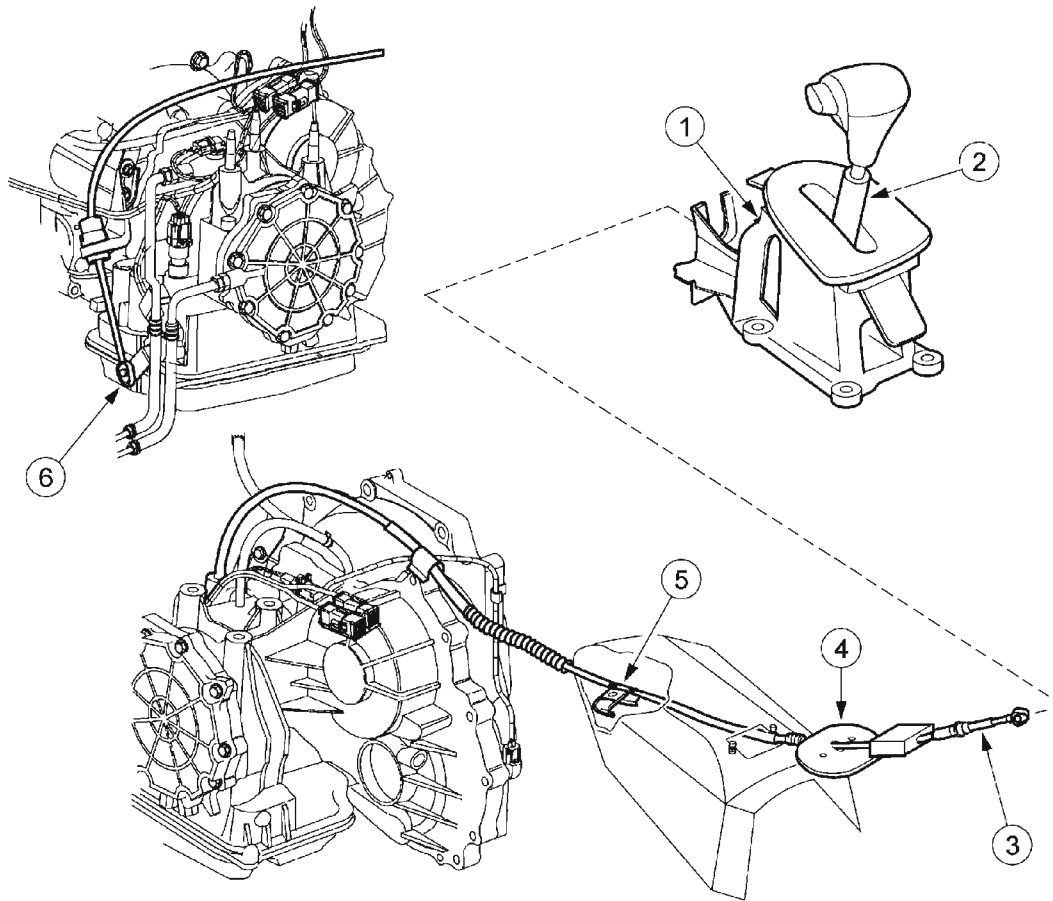
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In the transmission, the manual shaft operates the parking pawl engaging lever and the actuating lever of the manual valve.

The manual valve, a valve operated entirely manually, is moved by means of the manual valve actuating lever in the valve body.

The manual valve guarantees the functions during hydraulic emergency operation.

External Shift Mechanism



ELE0008105

Item	Part Number	Description
1	—	Selector lever assembly
2	—	Selector lever
3	—	Selector lever cable
4	—	Lead-through
5	—	Clip
6	—	Lever on shift shaft

Fig. 18: Identifying External Shift Mechanism Component
 Courtesy of FORD MOTOR CO.

The transmission end of the manual selector lever cable is attached to a ball on the lever on the manual shaft.

The cable abutments are secured to the transmission housing, and then to the bracket of the

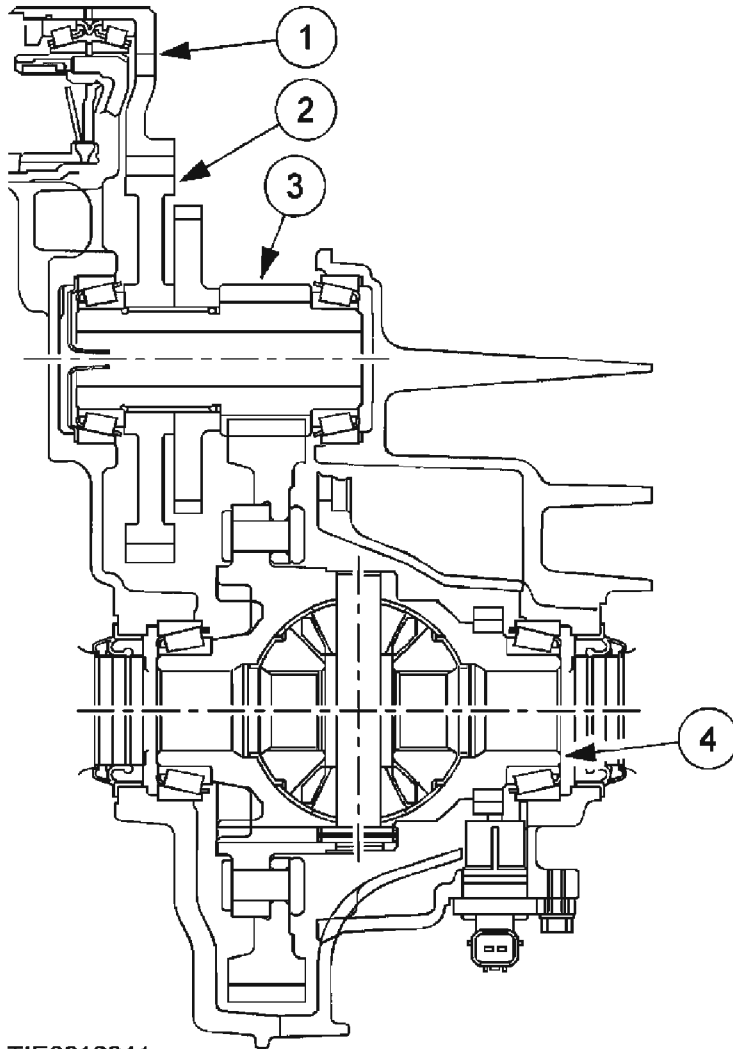
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manual selector lever.

The adjuster for the manual selector lever cable is located at the transmission side of the sheath.

At the manual selector lever end the cable is clipped onto a ball.

Intermediate Gear Stage and Final Drive Assembly



TIE0018311

Item	Part Number	Description
1	—	Final drive input gear
2	—	Transfer shaft input gear
3	—	Transfer shaft output gear
4	—	Differential

Fig. 19: Identifying Intermediate Gear Stage And Final Drive Assembly Component
Courtesy of FORD MOTOR CO.

The final drive input gear is splined to the planet carrier of the front planetary gear set and

drives the transfer shaft input gear of the intermediate gear stage.

The transfer shaft output gear of the intermediate gear stage drives the final drive assembly.

The torque is transmitted to the halfshafts through the final drive assembly.

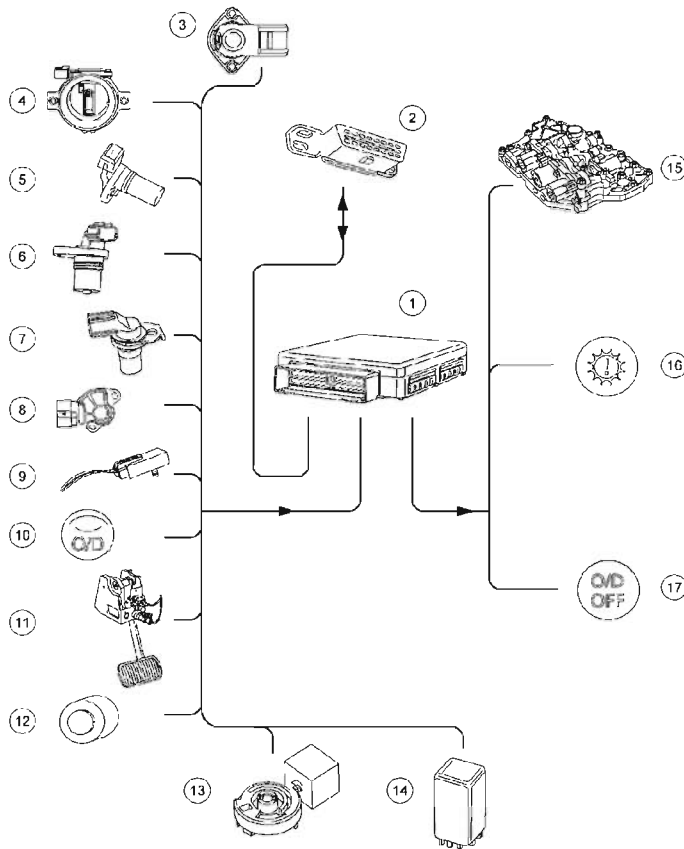
The differential offsets differences in speed of rotation of the halfshafts.

The intermediate gear stage is designed so that the final drive ratio can be adapted to requirements when the automatic transmission is used in conjunction with different engines.

Overview Transmission Control

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TIEC026*24

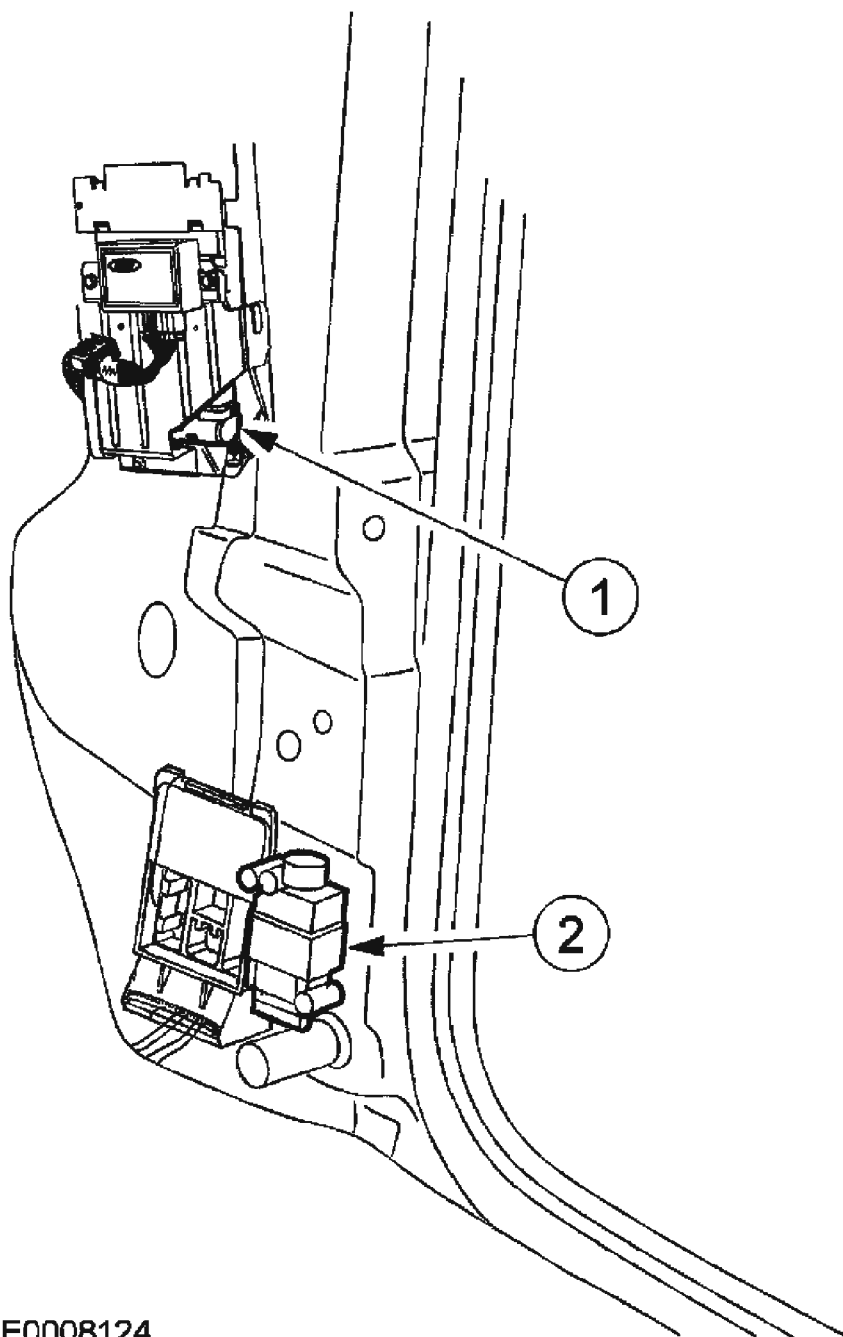
Item	Part Number	Description
1	—	HEC-V PCM
2	—	Data link connector (DLC)
3	—	Throttle position (TP) sensor
4	—	Mass airflow (MAF) and intake air temperature (IAT) sensors
5	—	Crankshaft position (CKP) sensor
6	—	Output shaft speed (OSS) sensor
7	—	Turbine shaft speed (TSS) sensor
8	—	Transmission range (TR) sensor
9	—	Transmission fluid temperature (TFT) sensor
10	—	Overdrive (O/D) switch
11	—	Stoptamp switch
12	—	Selector lever shift lock solenoid
13	—	Ignition key lock solenoid
14	—	Air conditioning relay
15	—	Solenoid valves in the valve body
16	—	Powertrain warning indicator in instrument cluster
17	—	O/D indicator in instrument cluster

Fig. 20: Overview Transmission Control Component
Courtesy of FORD MOTOR CO.

Powertrain Control Module (PCM)

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ELE0008124

Item	Part Number	Description
1	—	EEC-V PCM
2	—	Inertia fuel shutoff (IFS)

Fig. 21: Identifying Powertrain Control Module (PCM) Component
Courtesy of FORD MOTOR CO.

The PCM is located under the trim panel on the right-hand A-pillar.

On vehicles with automatic transmissions, the EEC-V PCM controls the transmission in addition to the engine management system. In this case, a module with 104 pins is used.

The PCM evaluates the incoming signals from the individual sensors and actuates the solenoid valves in the valve body of the transmission directly according to the operating state.

Diagnostic checks can be carried out on the transmission through the data link connector (DLC) above the central junction box (CJB).

Emergency operating program

If correct gear shifting can no longer be guaranteed due to failure of certain signals, the PCM changes to an emergency operating program.

The driver is informed of the operation of the emergency operating program by the illumination of the powertrain warning indicator in the instrument cluster.

Continued motoring is guaranteed in the following limited conditions:

- Maximum main line pressure.
- 3rd gear in manual selector lever positions "D", "2" and "1" without the torque converter lock-up clutch.
- Reverse gear in manual selector lever position "R".

Electronic Synchronous Shift Control (ESSC)**Control of Shift Operations**

During a shift operation certain elements are released while others are actuated. Ideally, this process takes place simultaneously (synchronously) to avoid jerky gear shifting.

The time for the shift operation should remain within the time limits provided.

When the shift operation is controlled conventionally, the pressure buildup and reduction at the shift elements are set and defined for ideal conditions (synchronous shifting).

As there is no way of influencing the control in the event of different levels of wear in the shift

elements, when the transmission has been used for a fairly high mileage it is possible that the pressure buildup and reduction may no longer be synchronous.

The result or premature pressure reduction at the element to be switched off is an unwanted rise in the turbine shaft speed as the element to be switched on cannot transmit the input torque.

The result of delayed pressure reduction at the element to be switched off is an unwanted decrease in the turbine shaft speed as both shift elements transmit the input torque. In the process the torque is transmitted to the transmission housing through internal locking.

In both cases a jerk will be felt during the shift operation.

In addition, wear in the shift elements leads to a lengthening of the shift operation. Therefore, shifting takes longer when the transmission has accumulated a higher mileage.

Control of Shift Operations With ESSC

In the automatic transmission, electronic synchronous shift control (ESSC) is used.

ESSC monitors the shift operations and is able to adapt to the wear in the shift elements over the life of the transmission.

This is possible since the shift elements are actuated by modulating valves.

The system monitors the shift time whether the shift operation is synchronous.

If the PCM detects a deviation from the stored values for the shift time and synchronization of the shift operation, the pressure buildup or reduction is adapted accordingly.

Throttle position (TP) sensor

The TP sensor is located on the throttle body.

It supplies the PCM with information about the position of the throttle plate.

It also detects the speed of actuation of the throttle plate.

The PCM uses the signals for the following functions among other things:

- To determine the shift timing,
- To control the main line pressure,
- To control the torque converter lock-up clutch,

- For kickdown.

In case of absence of the TP signal the engine control uses the signals of the MAF and IAT sensors as a substitute signal. The main line pressure is increased and hard shifts may occur.

Mass air flow (MAF) and intake air temperature (IAT) sensor

The MAF sensor is located between the air cleaner housing and the air intake hose leading to the throttle housing.

The IAT sensor is incorporated in the housing of the MAF sensor.

The MAF sensor in conjunction with the IAT sensor provides the PCM with the primary load signal.

The PCM uses the signals for the following functions among other things:

- To control the shift operations,
- To control the main line pressure.

If the MAF sensor fails, the signal of the TP sensor is used as a substitute.

Crankshaft position (CKP) sensor

The CKP sensor is located on the engine/transmission flange.

The CKP sensor is an inductive sensor which provides the PCM with information about the engine speed and position of the crankshaft.

The signal is used for the following functions among other things:

- To control the torque converter lock-up clutch,
- To check the torque converter slip,
- To control the main line pressure.

No substitute signal is available for the CKP sensor. If the signal is not present, the engine stops.

Turbine shaft speed (TSS) sensor

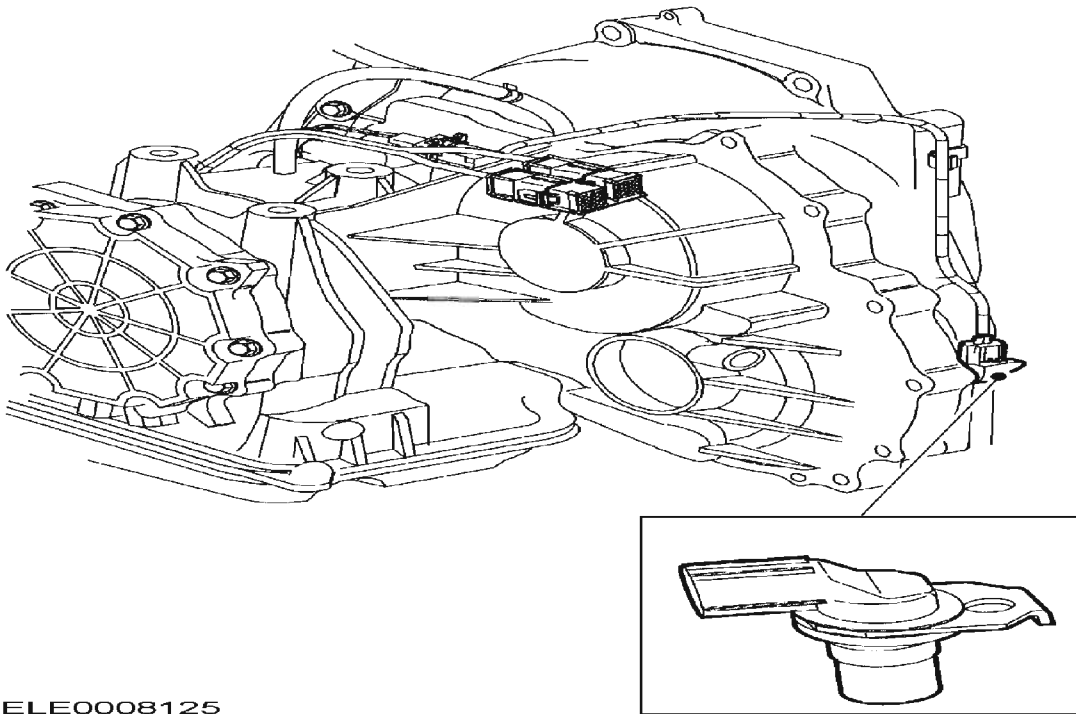
The TSS sensor is located in the transmission housing over the transmission input shaft.

The TSS sensor is an inductive sensor which senses the speed of rotation of the transmission input shaft.

The signal is used for the following functions:

- To control the shift operations,
- To control the torque converter clutch,
- To check the torque converter slip.

If the TSS sensor fails, the signal of the output shaft speed (OSS) sensor is used as a substitute signal.



ELE0008125

Fig. 22: Identifying Output Shaft Speed (OSS) Sensor
Courtesy of FORD MOTOR CO.

The OSS sensor is located in the transmission housing above the rotor in the differential.

The OSS sensor is an inductive sensor which detects the vehicle speed by means of a rotor on the differential.

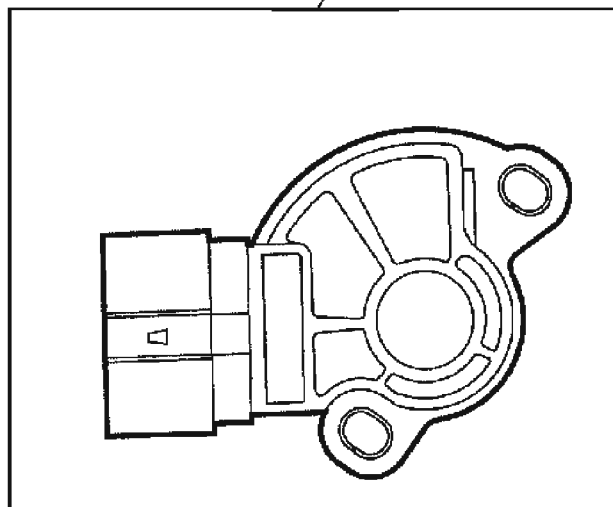
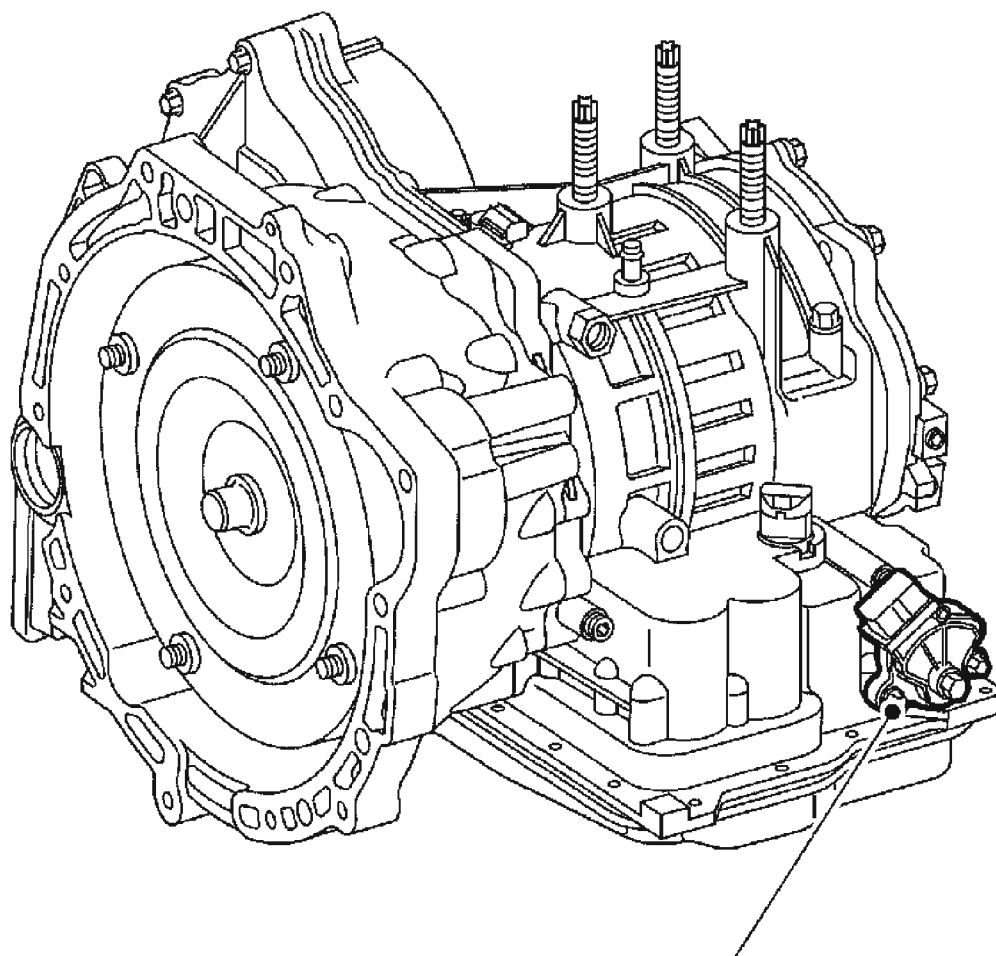
The signal is used for the following functions among other things:

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- To determine the shift timing,
- To supply the vehicle speed input signal for the PCM.

If the OSS sensor fails, the signal of the TSS sensor is used as a substitute signal.



ELE0008126

Fig. 23: Identifying Transmission Range (TR) Sensor

Courtesy of FORD MOTOR CO.

The TR sensor is located on the manual shaft on the transmission housing.

When the manual shaft is moved by means of the manual selector lever cable, an engagement pin in the inner ring of the TR sensor moves through the different positions. The signals are transmitted to the PCM, the reversing lamps and the starter inhibitor relay.

NOTE: Correct operation of the TR sensor is only guaranteed when the manual selector lever cable is adjusted correctly.

The signals of the TR sensor are used for the following functions:

- To recognize the manual selector lever position,
- To actuate the starter inhibitor relay,
- To actuate the reversing lamps,

No substitute signal is available for the TR sensor.

If the connection is cut, the vehicle cannot be started.

Stoplamp switch

The brake pedal position (BPP) switch is mounted on the brake pedal bracket.

It switches the stoplights on and tells the EEC-V PCM when the brakes are applied.

The signal of the stoplamp switch is used by the PCM for the following functions:

- To release the torque converter lock-up clutch when the brake pedal is depressed,
- To switch off the manual selector lever shift lock when the brake pedal is depressed in "P".

No substitute signal is available for the BPP switch.

If the connection to the BPP switch is cut, the manual selector lever cannot be moved out of "P".

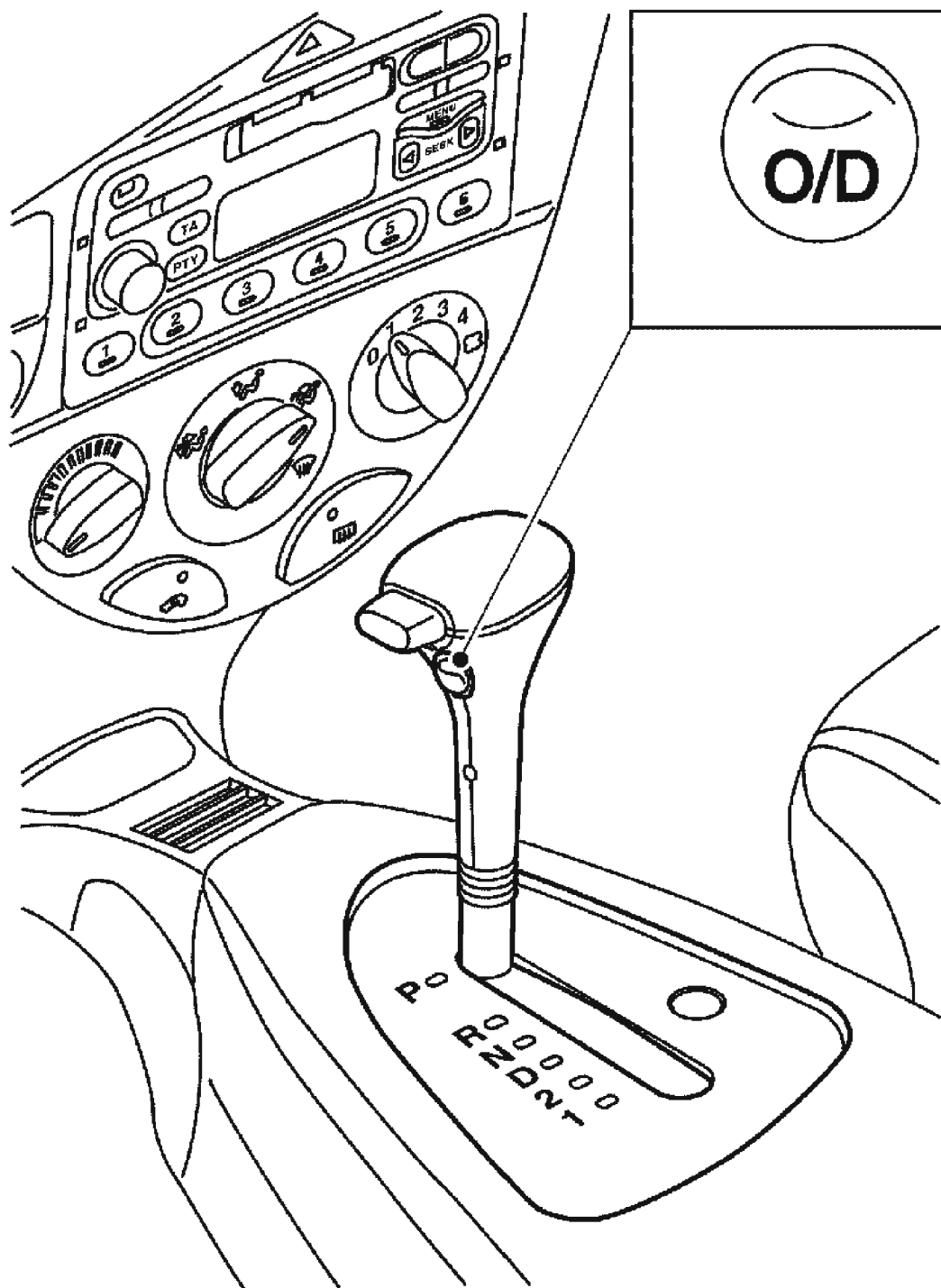
Transmission fluid temperature (TFT) sensor

The TFT sensor is located on the internal wiring harness to the solenoid valves in the fluid pan.

It is a resistor and measures the transmission fluid temperature.

The transmission fluid temperature is used by the PCM for the following functions:

- Applying the torque converter clutch is not permitted until the transmission fluid reaches a certain temperature,
- Engagement of fourth gear is prevented in extreme sub-zero temperatures until the normal operating temperature is reached,
- If the transmission fluid temperature is excessive, a pre-set fixed shift curve is selected and the torque converter lock-up clutch is closed in "2", "3" and "4"; of the transmission warning indicator is activated. No substitute signal is available for the TFT sensor.



ELE0008128

Fig. 24: Identifying Overdrive (O/D) Switch

Courtesy of FORD MOTOR CO.

The O/D switch transmits a signal to the PCM to select or suppress fourth gear in manual selector lever position "D".

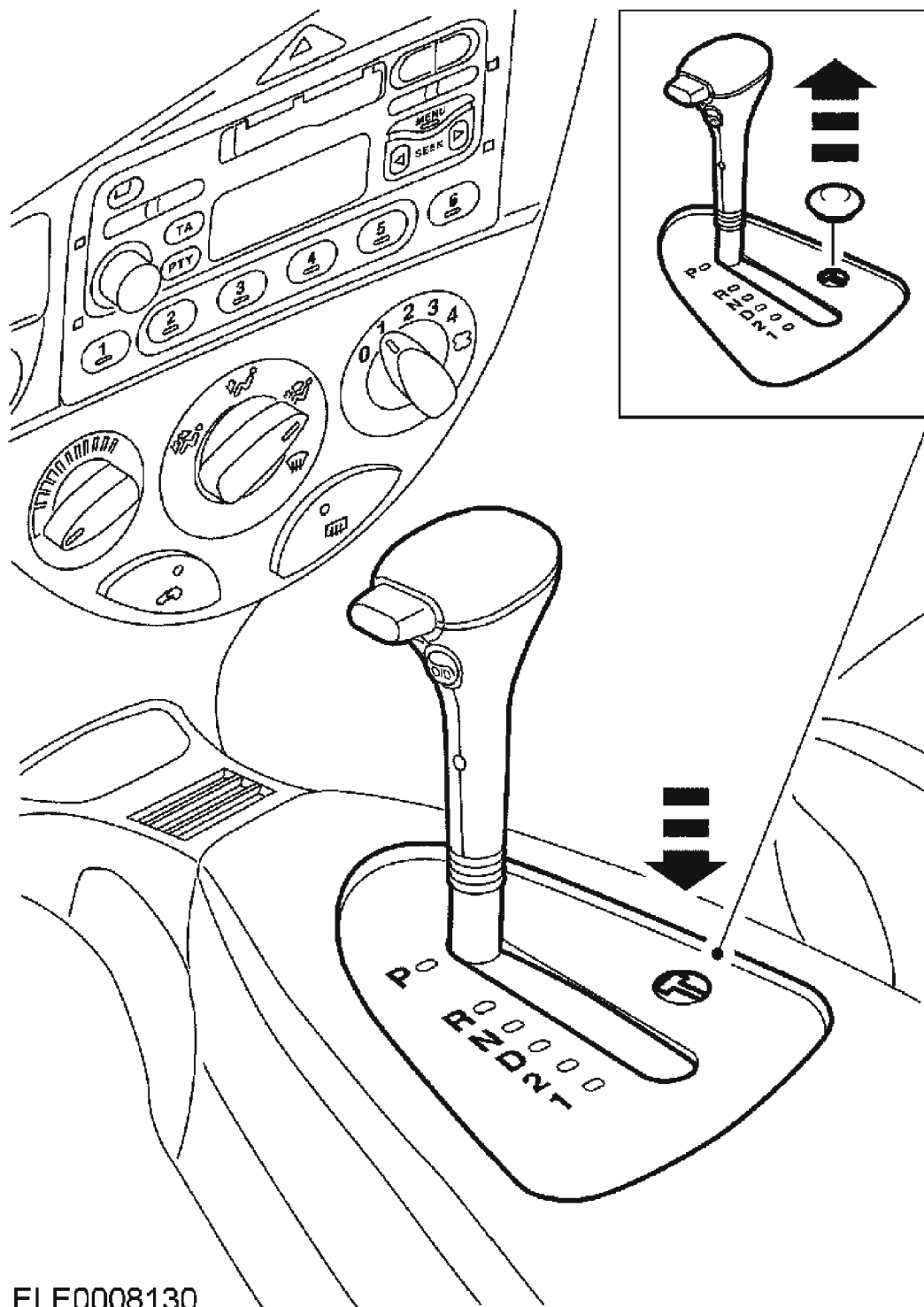
The signal of the O/D switch is used for the following functions:

- As an input signal to convey the driver's intent to the PCM.
- To display the driver's intent with the O/D indicator in the instrument cluster.

No substitute signal is available for the O/D switch. If it should fail, it is always possible to shift into fourth gear in manual selector lever position "D".

When the ignition is switched on, the manual selector lever shift lock solenoid is actuated by depressing the brake (signal from the stoplamp switch). This retracts the locking pin so that the manual selector lever can be moved out of position "P".

Substitute Function



ELE0008130

Fig. 25: Identifying Positioning Substitute Function

Courtesy of FORD MOTOR CO.

If the brake signal should fail due to a malfunction, manual unlocking is possible.

For this, the cover of the release mechanism must be removed and a suitable object (ignition key) pressed into the opening until the manual selector lever can be moved out of position "P".

NOTE: If "P" is selected again, the manual selector lever is locked again.

Air conditioning

If the PCM registers a kickdown signal (WOT, throttle plate opened 95%), the air conditioning is switched off for a maximum of 15 seconds.

Starter inhibitor relay

The relay prevents the engine starting in manual selector lever positions "R", "D", "2" and "1".

The relay obtains the information about the position of the selector lever directly from the TR sensor.

Ignition key lock solenoid

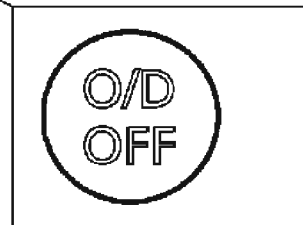
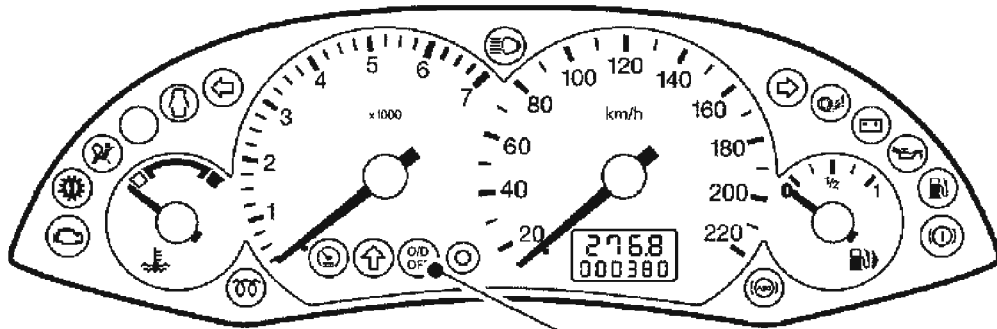
The solenoid is incorporated in the ignition lock. In manual selector lever position "P" the ground connection to the solenoid is cut. The locking pin does not engage in the ignition lock.

In all the other manual selector lever positions, the ground connection to the solenoid is closed and the locking pin engages in the ignition lock.

When the manual selector lever is not in position "P", removal of the ignition key is prevented.

O/D indicator

The O/D indicator is located in the instrument cluster and is colored green.



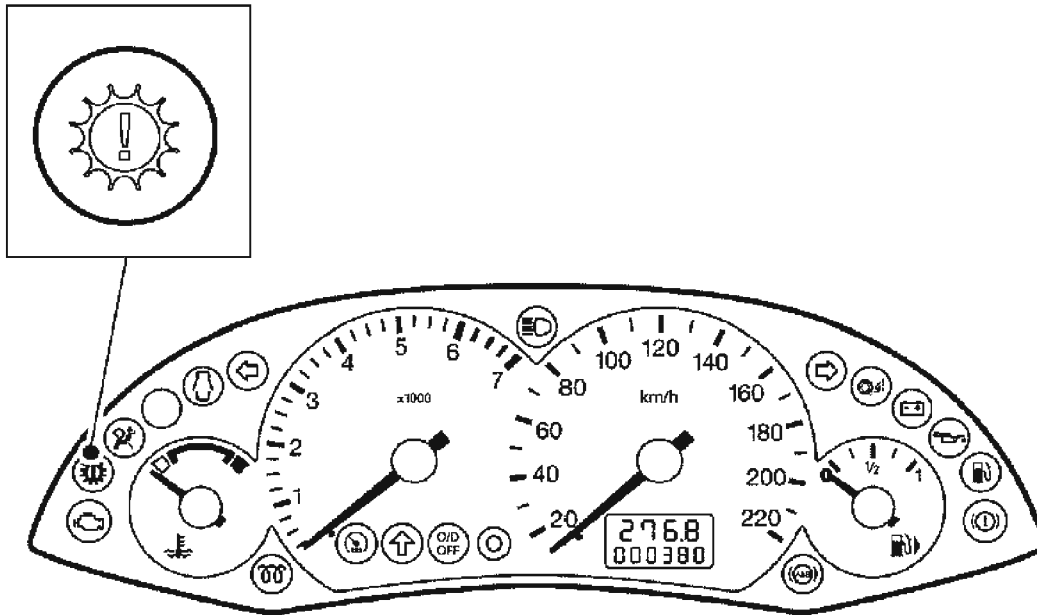
ELE0008131

Fig. 26: Identifying Instrument Cluster O/D Indicator
Courtesy of FORD MOTOR CO.

It tells the driver that shifting into 4th gear is prevented by the transmission control.

Powertrain warning indicator

The powertrain warning indicator is located in the instrument cluster and is colored orange.



ELE0008132

Fig. 27: Identifying Powertrain Warning Indicator
Courtesy of FORD MOTOR CO.

It lights to tell the driver that the transmission control has switched to the emergency operating program or that the transmission fluid temperature is too high.

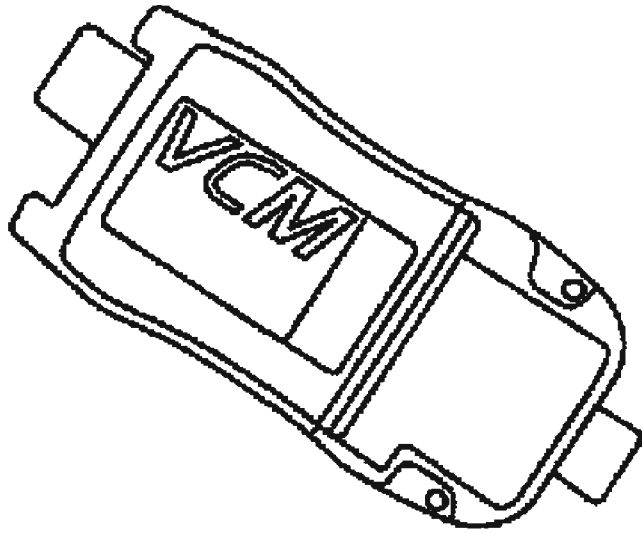
DIAGNOSIS AND TESTING

DIAGNOSTIC STRATEGY

Special Tool(s)

SPECIAL TOOL SPECIFICATION

	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool
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ST2834-A

Troubleshooting an electronically-controlled automatic transaxle is simplified by using the proven method of diagnosis. One of the most important things to remember is that there is a definite procedure to follow.

NOTE: **Do not take any shortcuts or assume that critical checks or adjustments have already been made.**

Follow the procedures as written to avoid missing critical components or steps.

To correctly diagnose a concern have the following publications available:

- **INTRODUCTION -- GASOLINE MODELS** .
- TSBs
- **SYSTEM WIRING DIAGRAMS** .

These publications provide the necessary information when diagnosing transaxle concerns.

Use the Diagnostic Flow Chart as a guide and follow the steps as indicated.

- Know and understand the customers concern.
- Verify the concern by operating the vehicle.
- Check the fluid levels and condition.
- Check for non-factory add-on items.
- Check shift linkages for correct adjustment.
- Check TSBs regarding the concern.

Diagnostics

- Carry out on-board diagnostic procedures key on engine off (KOEO) and key on engine running (KOER).
- Record all diagnostic trouble codes (DTCs).
- Repair all non-transaxle codes first.
- Repair all transaxle codes second.
- Erase all continuous codes and attempt to repeat them.
- Repair all continuous codes.
- If only pass codes are obtained, proceed to the Diagnosis by Symptom Index for further information and diagnosis.

Follow the diagnostic sequence to diagnose and repair the concern the first time.

DIAGNOSTIC FLOW CHART

DIAGNOSTIC FLOW CHART

Test	Result	Action
<ul style="list-style-type: none">• Know and understand the customer concerns.• Check the fluid level and condition.• Verify the concern by operating the vehicle.• Check for non-factory installed items and verify correct installation.• Check the shift linkage adjustments.	Yes	<ul style="list-style-type: none">• Repair all hard Diagnostic Trouble Codes. Follow the pinpoint tests. See <u>INTRODUCTION - GASOLINE</u> article first, then this article.

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<ul style="list-style-type: none"> • Check TSBs and OASIS messages for vehicle concerns. • Carry out quick test both KOER and KOEO. • Record all codes. <p>1) Did you record any Diagnostic Trouble Codes?</p>	No	<ul style="list-style-type: none"> • Refer to <u>DIAGNOSIS BY SYMPTOM</u>, then GO to Step 5.
<p>2) Are any continuous test memory codes present?</p>	<p>Yes</p> <p>No</p>	<ul style="list-style-type: none"> • Clear codes and carry out drive cycle test. <p>GO to Step 4.</p>
<p>3) Did the continuous test memory codes reappear?</p>	<p>Yes</p> <p>No</p>	<ul style="list-style-type: none"> • Repair all continuous test memory codes. Follow the pinpoint tests. See <u>INTRODUCTION - GASOLINE</u> article then this article, then GO to Step 4. <p>GO to Step 4.</p>
<p>4) Is the concern repaired?</p>	<p>Yes</p> <p>No</p>	<ul style="list-style-type: none"> • Carry out the final quick test to verify that no Diagnostic Trouble Codes are present. Clear memory codes. Return vehicle to customer. <p>Refer to <u>DIAGNOSIS BY SYMPTOM</u>.</p>
<p>5) Are there any electrical concerns?</p>	<p>Yes</p> <p>No</p>	<ul style="list-style-type: none"> • Install the diagnostic tool and carry out output state control test, then GO to Step 6. • Refer to the hydraulic and mechanical routine to diagnose and repair the concern, then GO to Step 7.

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6) Was the transaxle concern corrected when the diagnostic tool was installed?	Yes	<ul style="list-style-type: none">• See INTRODUCTION - GASOLINE article , intermittent fault diagnosis and use the diagnostic tool to diagnose cause of concern in the processor, vehicle harness or external inputs (sensors or switches).• Refer to the hydraulic and mechanical routine to diagnose the concern, then GO to Step 7.
	No	
7) Is the concern repaired?	Yes	<ul style="list-style-type: none">• Carry out the final quick test to verify that no diagnostic trouble codes are present. Clear memory codes. Return the vehicle to the customer.• Get assistance from Technical Hotline.
	No	

PRELIMINARY INSPECTION

The following items must be checked prior to beginning the diagnostic procedures:

Know and Understand the Concern

In order to correctly diagnose a concern, first understand the customer complaint or condition. Customer contact may be necessary in order to begin to verify the concern. Understand the conditions as to when the concern occurs, for example:

- Hot or cold vehicle temperature
- Hot or cold ambient temperature
- Vehicle driving conditions
- Vehicle loaded/unloaded

After understanding when and how the concern occurs, proceed to verify the concern.

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Verification of Condition

This article provides information that must be used in both determining the actual cause of customer concerns and executing the appropriate procedures.

The following procedures must be used when verifying customer concerns for the engine.

Determine Customer Concern

NOTE: Some transaxle conditions can cause engine concerns. The torque converter clutch not disengaging will stall the engine.

Determine customer concerns relative to vehicle use and dependent driving conditions, paying attention to the following items:

- Hot or cold vehicle operating temperature
- Hot or cold ambient temperatures
- Type of terrain
- Vehicle loaded/unloaded
- City/highway driving
- Upshift
- Downshift
- Coasting
- Engagement
- Noise/vibration - check for dependencies, either RPM dependent, vehicle speed dependent, shift dependent, gear dependent, range dependent or temperature dependent.

Check Fluid Level

Under normal conditions, there is no requirement to check the transaxle fluid level. However, if the transaxle is not functioning correctly, the transaxle may slip, shift slowly or there may be some sign of fluid leakage, the fluid level should be checked.

CAUTION: The vehicle should not be driven if the fluid level is below the bottom line on the fluid level indicator and the ambient temperature is above 10°C (50°F).

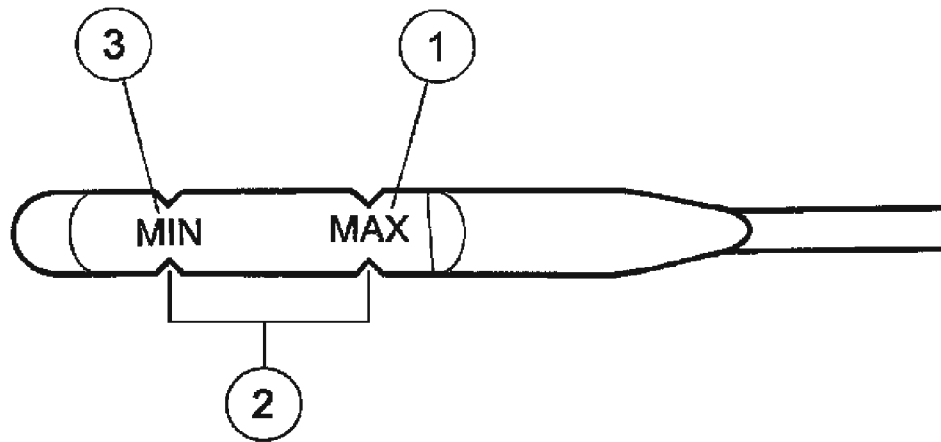
NOTE: Automatic transmission fluid expands when warmed. To obtain an accurate fluid level check, drive the vehicle until normal operating

temperature is reached, approximately 30 km (20 miles).

NOTE: If the vehicle has been operated for an extended period at high speeds, in city traffic, during hot weather or while pulling a trailer the vehicle should be turned OFF for approximately 30 minutes to allow the fluid to cool before checking.

NOTE: Incorrect fluid level may affect the transaxle operation and could result in transaxle damage. To correctly check and add fluid to the transaxle, refer to PRELIMINARY INSPECTION.

1. Drive the vehicle 30 km (20 miles) or until the vehicle reaches normal operating temperature.
2. Park the vehicle on a level surface and engage the parking brake.
3. With your foot on the brake, start the engine and move the range selector lever through all the gear ranges. Allow sufficient time for each gear to engage.
4. Place the range selector in "P" PARK and leave the engine running.
5. Remove the fluid level indicator and wipe it clean with a lint free cloth.
6. Install the fluid level indicator, making sure that it is fully seated in the filler tube.
7. Remove the fluid level indicator. The fluid should be within the designated areas.



N0034490

Item	Part Number	Description
1	—	Maximum fluid level
2	—	Normal operating fluid level range 50°C-60°C (122°F-140°F)
3	—	Minimum fluid level

Fig. 28: Identifying Fluid Level Gauge
 Courtesy of FORD MOTOR CO.

High Fluid Level

A fluid level that is too high may cause the fluid to become aerated due to the churning action of the rotating internal parts. This will cause erratic control pressure, foaming, loss of fluid from the vent tube and possible transaxle damage. If an overfill reading is indicated, adjust fluid to correct level.

Low Fluid Level

A low fluid level could result in poor transaxle engagement, slipping or damage. This could also indicate a leak in one of the transaxle seals or gaskets.

Adding Fluid

CAUTION: The use of any other type of transaxle fluid than specified could result in transaxle damage.

If fluid needs to be added, add fluid in 0.25L (1/2 pint) increments through the oil filler tube. Do not overfill the fluid. For fluid type, refer to **SPECIFICATION**.

Check The Fluid Condition

1. Check the fluid level. Refer to **PRELIMINARY INSPECTION**.
2. Observe the color and the odor. The color under normal circumstances should be reddish, not brown or black.
3. Allow the fluid to drip onto a facial tissue and examine the stain.
4. If evidence of solid material is found, the transaxle fluid pan should be removed for further inspection.
5. If fluid contamination or transaxle failure is confirmed by the sediment in the bottom of the transaxle fluid pan, the transaxle must be disassembled and completely cleaned.
6. Carry out diagnostic checks and adjustments. Refer to **DIAGNOSIS BY SYMPTOM**.

ROAD TESTING VEHICLE

NOTE: Always drive the vehicle in a safe manner according to driving conditions and obey all traffic laws.

The Shift Point Road Test and Torque Converter Clutch Operation Test provide diagnostic information on transaxle shift controls and torque converter operation.

SHIFT POINT ROAD TEST

This test verifies that the shift control system is operating correctly.

1. Bring engine and transaxle up to normal operating temperature.
2. Operate the vehicle with the selector lever in the D position (overdrive switch ON).
3. Apply minimum throttle and observe the speeds at which upshift occurs and torque converter engages. Refer to the following **SHIFT SPEEDS CHART** for the appropriate final drive ratio. (Also refer to the **SPECIFICATIONS** .)
4. Stop the vehicle. Select the D position (overdrive switch OFF). Repeat Step 3. The transaxle will make all upshifts, except 3rd to 4th, and torque converter clutch apply should occur above 80 km/h (50 mph).

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5. Press the accelerator pedal to the floor, wide open throttle (WOT). The transaxle should shift from 3rd to 2nd, or 3rd to 1st, depending on vehicle speed, and torque converter clutch should release.
6. With vehicle speed above 48 km/h (30 mph), move the transaxle range selector lever from D position to 1st position and release the accelerator pedal. The transaxle should immediately downshift to 2nd gear. When vehicle speed drops below 32 km/h (20 mph), the transaxle should downshift into 1st gear.
7. If transaxle fails to upshift/downshift or torque converter clutch does not apply/release, refer to **DIAGNOSIS BY SYMPTOM** for possible causes.

Shift Speeds Chart

SHIFT SPEEDS REFERENCE

Throttle Position	Shift	Final Drive Ratio 3.733:1	
Closed	4-3	35-19 km/h	22-12 mph
	3-2	19-3 km/h	12-2 mph
	2-1	19-3 km/h	12-2 mph
Minimum monitor	1-2	12-28 km/h	8-18 mph
PID TP	2-3	27-43 km/h	17-27 mph
Volt = 1.25	3-4	43-59 km/h	27-37 mph
Wide Open	1-2	51-68 km/h	32-42 mph
	2-3	106-122 km/h	66-76 mph
	3-4	148-164 km/h	92-102 mph

TORQUE CONVERTER DIAGNOSIS

Prior to installing a new torque converter, all diagnostic procedures must be followed. This is to prevent the unnecessary installation of new or remanufactured torque converters. Only after a complete diagnostic evaluation can the decision be made to install a new torque converter.

Begin with the normal diagnostic procedures as follows:

1. Preliminary Inspection.
2. Know and Understand the Customer Concern.
3. Verify the Concern - Carry out the **TORQUE CONVERTER OPERATIONS TEST**.
4. Carry out Diagnostic Procedures.
 - Run **ON-BOARD DIAGNOSTICS WITH SCAN TOOL**.

- Repair all non-transaxle related DTCs first.
- Repair all transaxle DTCs.
- Rerun on-board diagnostic to verify repair.
- Carry out the **LINE PRESSURE TEST**.
- Carry out the **STALL SPEED TEST**.
- Carry out the **DIAGNOSIS BY SYMPTOM**.
 - Use the index to locate the appropriate routine that best describes the symptom(s). The routine will list all possible components that may cause or contribute to the symptom. Check each component listed; diagnose and repair as necessary before installing a new torque converter.

Torque Converter Operations Test

This test verifies that the torque converter clutch control system and the torque converter are operating correctly.

1. Carry out the Quick Test. Refer to **ON-BOARD DIAGNOSTICS WITH SCAN TOOL**. Check for DTCs. Refer to **DIAGNOSTIC TROUBLE CODE (DTC) CHARTS**.
2. Connect a tachometer to the engine.
3. Bring the engine to normal operating temperature by driving the vehicle at highway speeds for approximately 15 minutes in O/D position.
4. After normal operating temperature is reached, maintain a constant vehicle speed of about 80 km/h (50 mph) and tap the brake pedal with the left foot.
5. The engine RPM should increase when brake pedal is tapped, and decrease about 5 seconds after pedal is released. If this does not occur, refer to **TORQUE CONVERTER OPERATION CONCERNS: ALWAYS APPLIED/STALLS VEHICLE**.
6. If the vehicle stalls in O/D or manual 2 at idle with vehicle at a stop, move the position selector lever to manual 1 position. If the vehicle stalls, refer to **TORQUE CONVERTER OPERATION CONCERNS: ALWAYS APPLIED/STALLS VEHICLE**. Repair as necessary. If the vehicle does not stall in O/D position, refer to **DIAGNOSIS BY SYMPTOM**.

VISUAL INSPECTION

This inspection will identify modifications or additions to the vehicle operating system that may affect diagnosis. Inspect the vehicle for non-Ford factory add-on devices such as:

- Electronic add-on items:
 - Air conditioning

- Generator (alternator)
- Engine turbo
- Cellular telephone
- Cruise control
- CB radio
- Linear booster
- Backup alarm signal
- Computer
- Vehicle modification:

These items, if not installed correctly, will affect the powertrain control module (PCM), or transaxle function. Pay particular attention to add-on wiring splices in the PCM harness or transaxle wiring harness, abnormal tire size, or axle ratio changes.

- Leaks; refer to **LEAKAGE INSPECTION**.
- Correct linkage adjustments; refer to **AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS** .

Shift Linkage Check

Check shift linkage adjustment by matching the detents in the transaxle range selector lever with those in the transaxle. If they match, the error is in the indicator. Do not adjust the shift linkage.

Hydraulic leakage at the manual control valve can cause delay in engagements and slipping while operating if the linkage is not correctly adjusted. Refer to **AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS** for shift linkage adjustment.

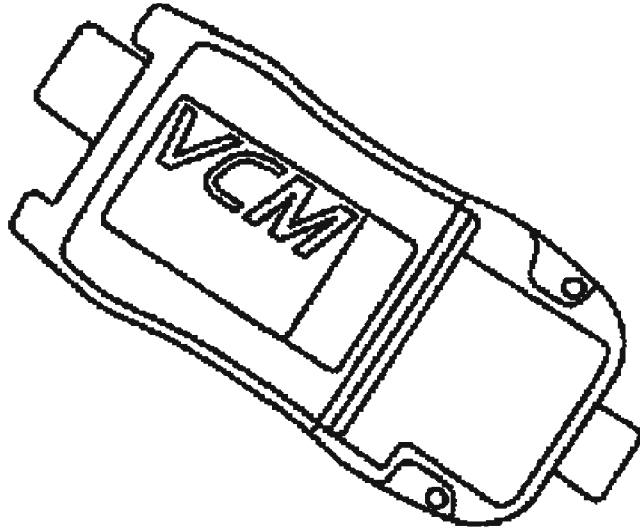
Check TSBs

Refer to all TSB messages which pertain to the transaxle concern and follow the procedure as outlined.

Carry Out On-Board Diagnostics (KOEO, KOER)

After a road test, with the vehicle warm and before disconnecting any connectors, carry out the Quick Test using scan tool. See **INTRODUCTION - GASOLINE** article for diagnosis and testing of the powertrain control system.

DIAGNOSTICS

Special Tool(s)**SPECIAL TOOL SPECIFICATION****ST2834-A**

Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool

Diagnosing an electronically controlled automatic transaxle is simplified using the following procedures. It is important to remember that there is a definite procedure to follow. Do not take short cuts or assume that critical checks or adjustments have already been made. Follow the procedures as written to avoid missing critical components or steps. By following the diagnostic sequence, the technician will be able to diagnose and repair the concern the first time.

On-Board Diagnostics with Scan Tool

NOTE: For detailed instruction and other diagnostic methods using the scan tool, See INTRODUCTION - GASOLINE article .

These quick tests should be used to diagnose the powertrain control module (PCM) and should be carried out in order.

- Quick Test 1.0 - Visual Inspection
- Quick Test 2.0 - Set Up
- Quick Test 3.0 - Key ON, Engine OFF

- Quick Test 4.0 - Continuous Memory
- Quick Test 5.0 - Key ON, Engine RUN
- Special Test Mode
 - Wiggle Test Mode
 - Output Test Mode
- PCM Reset Mode
- Clearing DTCs
- OBD II Drive Cycle
- Other Scan Tool Features

For further information on other diagnostic testing features using the scan tool, See **INTRODUCTION - GASOLINE** article . Other diagnostic methods include the following:

- Parameter Identification (PID) Access Mode
- Freeze Frame Data Access Mode
- Oxygen Sensor Monitor Mode

OUTPUT STATE CONTROL (OSC) MODE

Output state control (OSC) allows the technician to take control of certain parameters to function the transaxle. For example, OSC allows the technician to shift the transaxle only when commanding a gear change. If the technician commands 1st gear in OSC, the transaxle will remain in 1st gear until the technician commands the next gear. For another example, the technician can command a shift solenoid to turn ON or OFF when carrying out an electrical circuit check. OSC has 2 modes of operation for transaxle, the BENCH mode and the DRIVE mode. Each mode/parameter has a unique set of vehicle operating requirements that the technician must meet before being allowed to operate OSC.

NOTE: To operate OSC, the transmission range (TR) sensor and the vehicle speed sensor (VSS) must be operational. No diagnostic trouble codes (DTCs) related to the TR sensor or the VSS can be present.

NOTE: Technician should carry out a key off before initiating any OSC activities in order to clear any previously learned failure mode effects management (FMEM) actions from the vehicle memory.

- The vehicle requirements MUST BE MET when SENDING the OSC value. Refer to vehicle requirements for each individual test.

- If the vehicle requirements are NOT MET when SENDING the OSC value, an ERROR MESSAGE will appear. When the ERROR MESSAGE is received, OSC is aborted and must be restarted.
- If, AFTER SENDING an OSC value, the vehicle requirements are no longer met, the PCM will cancel the OSC value and NO ERROR message will appear. Once the vehicle requirements are met again, the PCM will automatically SEND the previous OSC value without any additional actions required by the technician.
- The OSC value XXX may be sent anytime to cancel OSC.

Output State Control (OSC) Procedures

- Carry out visual inspection and vehicle preparation as necessary.
- Select "Vehicle and Engine Selection" menu.
- Select appropriate vehicle and engine.
- Select "Diagnostic Data Link."
- Select "Powertrain Control Module."
- Select "Diagnostic Test Mode."
- Select "KOEO On-Demand Self Test and KOER On-Demand Self Tests."
- Carry out test and record DTCs.
- Repair all non-transaxle DTCs.
- Repair all VSS and TR sensor DTCs.
- Make sure that VSS/TR sensors are functional.
- Select "Active Command Modes."
- Select "Output State Control."
- Select "Trans-Bench Mode or Trans-Drive Mode."

OSC - Transaxle Bench Modes

The following Transaxle BENCH modes may be used as necessary during diagnostics.

SSA, SSB in Bench Mode

The BENCH mode allows the technician to carry out electrical circuit checks on the following components:

- SSA - Activates SSA OFF or ON.
- SSB - Activates SSB OFF or ON.

OSC "SSA/B" BENCH mode operates ONLY when:

- VSS and TR sensor are operational.
- No VSS and TR sensor DTCs.
- Transaxle range selector lever in P.
- Key ON.
- Engine OFF.

OSC Command Values:

- OFF - turns solenoid OFF.
- ON - turns solenoid ON.
- XXX - cancels OSC sent value.
- SEND - sends the values to PCM.

BENCH mode procedure for SSA, SSB:

Follow operating instructions from the scan tool menu screen:

- Select "Output State Control."
- Select "Trans-Bench Mode."
- Select "PIDs" to be monitored.
- Monitor all selected PIDs during test.
- Select "Parameters - SSA, SSB (SS1, SS2)."
- Select "ON" to turn solenoid ON.
- Press "SEND" to send command.
- Select "OFF" to turn solenoid OFF.
- Press "SEND" to send command.
- Select "XXX" to cancel at any time.
- Press "SEND."

SSC, SSD and SSE in Bench Mode

The BENCH mode is also used to test the functionality of pulse width modulated solenoids of the transaxle. During Bench Mode, the SSC/D/E solenoids can ramp in increments of 25% from 0% to 100% duty cycle and 100% to 0% duty cycle.

The OSC functions for the parameters SSC/D/E allow the technician to choose the following

options:

- SSC - Activates SSC to selected values.
- SSD - Activates SSD to selected values.
- SSE - Activates SSE to selected values.
- 00 - sets SSC/D/E duty cycle to 00%.
- 25 - sets SSC/D/E duty cycle to 25%.
- 50 - sets SSC/D/E duty cycle to 50%.
- 75 - sets SSC/D/E duty cycle to 75%.
- 100 - sets SSC/D/E duty cycle to 100%.

OSC "SSC/D/E" BENCH mode operates ONLY when:

- VSS and TR sensor are operational.
- No VSS and TR sensor DTCs.
- Transaxle range selector level in P.
- Key ON.
- Engine ON.
- Engine speed at least 1,500 RPM.
- Pressure gauge installed (optional).

OSC Command Values:

- 00 - sets SSC/D/E duty cycle to 00%.
- 25 - sets SSC/D/E duty cycle to 25%.
- 50 - sets SSC/D/E duty cycle to 50%.
- 75 - sets SSC/D/E duty cycle to 75%.
- 100 - sets SSC/D/E duty cycle to 100%.
- XXX - cancels OSC value sent.
- SEND - sends the values to PCM.

BENCH mode procedure for SSC, SSD and SSE

Follow operating instructions from the scan tool menu screen:

- Select "Output State Control."
- Select "Trans-Bench Mode."

- Select "PIDS" to be monitored.
- Monitor all selected PIDs during test.
- Select "Parameters - SSC, SSD, SSE."
- Select Value "0-100 percent."
- Press "SEND" to send command.
- Select "XXX" to cancel at any time.
- Press "SEND" to send command.

PCA in Bench Mode

NOTE: PCA, EPC and VFS all refer to the solenoids. PCA is preferred for this transmission because the scan tool display PCA.

The BENCH mode procedure for SSC, SSD and SSE is also used to test the functionality of the transaxle electronic pressure control. During BENCH mode, the PCA solenoid can ramp in increments of 20 psi from 50 psi to 150 psi and 150 psi to 50 psi.

NOTE: PCA pressure represents transaxle line pressure. The technician should measure PCA pressure using the line pressure tap.

The OSC function for the parameter PCA allows the technician to choose the following options:

- EPC - Activates PCA to selected values.
- 50 - sets PCA pressure to 50 psi.
- 70 - sets PCA pressure to 70 psi.
- 90 - sets PCA pressure to 90 psi.
- 110 - sets PCA pressure to 110 psi.
- 130 - sets PCA pressure to 130 psi.
- 150 - sets PCA pressure to 150 psi.

OCS "PCA" BENCH mode should ONLY be operated to check PRESSURE FUNCTIONALITY using an installed pressure gauge when:

- VSS and digital TR sensor are operational.
- No VSS and digital TR sensor are operational.
- Key ON.
- Engine ON.

- Engine speed at least 1,500 RPM.

OSC "PCA" BENCH mode should ONLY be operated to compete PCA SOLENOID CIRCUIT PINPOINT TESTS when:

VSS and digital TR sensor are operational.

No VSS and digital TR sensor DTCs.

Transmission range selector lever in P.

Key ON.

Engine ON.

OSC Command Values:

- 50 - sets PCA pressure to 50 psi.
- 70 - sets PCA pressure to 70 psi.
- 90 - sets PCA pressure to 90 psi.
- 110 - sets PCA pressure to 110 psi.
- 130 - sets PCA pressure to 130 psi.
- 150 - sets PCA pressure to 150 psi.
- XXX - cancels OSC sent value.
- SEND - sends the values to PCM.

BENCH mode Procedure for PCA:

Follow operating instructions from the scan tool menu screen:

- Select "Output State Control."
- Select "Trans-Bench Mode."
- Select "PIDs" to be monitored.
- Monitor all selected PIDs during test.
- Select "Parameters - PCA."
- Select Value "50 - 150 psi."
- Press "SEND" to send command.
- Select "XXX" to cancel at any time.
- Press "SEND" to send the command.

The DRIVE mode allows control of 3 transaxle parameters. Each mode/parameter has a unique set of vehicle operating requirements that the technician must meet before being allowed to operate OSC. The recommended procedure, when using the DRIVE mode, is to control one parameter at a time.

The DRIVE mode allows the technician to carry out the following functions on the transaxle:

- GEAR - allows upshifts or downshifts.
- TCC - engages or disengages the torque converter clutch.
- FIRM_SFT - commands a higher control pressure during upshift only.

Electronic Pressure Control solenoid A (EPC) for this transaxle cannot directly be controlled during DRIVE mode testing. Pressures may be raised during an upshift via the firm shift control function (FIRM_SFT).

GEAR in Drive Mode

This OSC function is used to test the transaxle shift functions.

NOTE: When the technician commands 1st gear during OSC mode, engine braking is automatically activated for 1st gear. Be aware that normal transaxle operation does not use engine braking in 1st gear.

The OSC function for the GEAR parameter allows the technician to choose the following options:

- 1 - PCM selects 1st gear.
- 2 - PCM selects 2nd gear.
- 3 - PCM selects 3rd gear.
- 4 - PCM selects 4th gear.

OSC "GEAR" mode operates ONLY when:

- VSS and TR sensor are operational.
- No VSS and TR sensor DTCs.
- Engine "ON."
- Transaxle range selector lever in O/D.
- Vehicle speed is greater than 3 km/h (2 mph).
- Gear selected is equal to or below maximum gear available (PID "GEARTOP").

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- Torque converter clutch must be commanded OFF (PID "TCC"-0 percent or OFF).
- Maximum vehicle speed for downshift into 1st gear is 40 km/h (25 mph).
- Maximum vehicle speed for downshift into 2nd gear is 97 km/h (60 mph).
- Maximum vehicle speed for downshift into 3rd gear is 204 km/h (127 mph).
- Minimum vehicle speed for an upshift to 4th gear is 32 km/h (20 mph).

OSC Command Values:

- 1 - PCM selects 1st gear.
- 2 - PCM selects 2nd gear.
- 3 - PCM selects 3rd gear.
- 4 - PCM selects 4th gear.
- XXX - cancels OSC sent value.
- SEND - sends the values to PCM.

Drive Mode Procedure for GEAR

NOTE: The OSC GEAR mode is not allowed when the torque converter clutch is commanded ON. The normal transmission strategy may command the torque converter clutch to engage in 3rd gear when using OSC gear. If this occurs, the OSC gear will be cancelled and the PCM will command the normal shift schedule. Therefore, it is advisable to use the OSC "TCC" to command the torque converter clutch OFF before using OSC gear. Refer to TCC IN DRIVE MODE.

Follow operating instructions from the scan tool menu screen:

- Select "Output State Control."
- Select "Trans-Drive Mode."
- Select "PIDs" to be monitored.
- Monitor all selected PIDs during test.
- Select "Parameters - GEAR."
- Select Value "1-4."
- Press "SEND" to send command.
- Re-Select Value "1-4."
- Press "SEND" to send command.
- Select "XXX" to cancel at any time.

- Press "SEND" to send command.

TCC in Drive Mode

This OSC function is used to test whether the torque converter clutch is engaging and disengaging correctly.

CAUTION: Technicians should maintain an engine speed of at least 1,500 RPM during torque converter engagement testing. Failure to maintain at least 1,500 RPM can produce severe vehicle lugging and vibrations depending upon driving/vehicle loading conditions. During output state control testing, the TCC could oscillate between engaged and disengaged mode if engine speed requirements are not followed.

The OSC function for the TCC parameter allows the technician to choose the following:

- TCC - activates TCC OFF and ON.
- ON - turns TCC ON.
- OFF - turns TCC OFF.

OSC "TCC OFF" DRIVE mode operates ONLY when:

- VSS and TR sensors are operational.
- No VSS and TR sensor DTCs present.
- Engine ON.
- Transaxle range selector lever in O/D.
- Vehicle speed is greater than 3 km/h (2 mph).
- No transaxle gear shifts are in progress.

OSC "TCC ON" DRIVE mode operates ONLY when:

- VSS and TR sensors are operational.
- No VSS and TR sensor DTCs present.
- Engine "ON".
- Transaxle range selector lever in O/D.
- Vehicle speed is greater than 3 km/h (2 mph).
- Transaxle in second or higher gear.

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- TFT is between 16°C and 133°C (60°F and 270°F).
- Brake is "OFF" when vehicle speed is below 20 mph.
- Engine speed at least 1,500 RPM.
- Speed ratio across the converter (PID "TCCRAT") is between 0.70 and 1.05.
- No transaxle gear shifts are in progress.

OSC Command Values

- OFF - Turns TCC OFF.
- ON - Turns TCC ON.
- XXX - Cancels OSC value sent.
- SEND - Sends the values to PCM.

DRIVE Mode Procedure for TCC

Follow operating instructions from the scan tool menu screen:

- Select "Output State Control."
- Select "Trans - Drive Mode."
- Select "PIDs" to be monitored.
- Monitor all selected PIDs during test.
- Select "Parameters - TCC."
- Select "ON" to turn TCC ON.
- Press "SEND" to send command.
- Select "OFF" to turn TCC OFF.
- Press "SEND" to send command.
- Select "XXX" to cancel at any time.
- Press "SEND" to send command.

FIRM_SFT in Drive Mode

This OSC function is used to raise pressure during an upshift to determine whether the pressure control system is functioning correctly. Firmer shifts indicate that the pressure control system works at higher pressure. The best test for isolating pressure control system problems is to carry out the EPC solenoid test in BENCH mode using a hydraulic pressure gauge.

The OSC functions for the parameter FIRM_SFT allows the technician to choose the following options:

- FIRM_SFT - Activates the firm shift channel.
- ON - sets control pressure high for all upshifts (determined by the PCM).
- OFF - sets control pressure to normal for all upshifts (determined by the PCM).

OSC "FIRM_SFT" DRIVE mode operates ONLY when:

- VSS and TR sensor are operational.
- No VSS and TR sensor DTCs present.
- Transaxle range selector lever in O/D.
- Engine "ON."
- Key "ON."
- Vehicle speed greater than 2 mph.
- TCC cannot be forced ON using NGS OSC mode (PID "OSCTCC" not equal to ON)

OSC Command Values

- ON - sets control pressure high for all upshifts (determined by the PCM)
- OFF - sets control pressure to normal for all upshifts (determined by the PCM)
- XXX - cancel OSC for FIRM_SFT
- SEND - sends the values to the PCM

DRIVE mode procedure for FIRM_SFT

Follow operating instructions from the scan tool menu screen:

- Select "Output State Control."
- Select "Trans - Drive Mode."
- Select "PIDs" to be monitored.
- Monitor all selected PIDs during test.
- Select "Parameters - FIRM_SFT."
- Select "ON" to turn Firm Shift Mode ON.
- Select "SEND" to send command.
- Select "OFF" to turn Firm Shift Mode OFF.
- Select "SEND" to send command.
- Select "XXX" to cancel at any time.
- Select "SEND" to send command.

TRANSAXLE DRIVE CYCLE TEST

- NOTE:** Always drive the vehicle in a safe manner according to driving conditions and obey all traffic laws.
- NOTE:** The Transaxle Drive Cycle Test must be followed exactly. Transaxle failure must occur 4 times consecutively for shift error DTC code to be set, and 5 times consecutively for continuous torque converter clutch code to set.
- NOTE:** When carrying out the Transaxle Drive Cycle Test, refer to the Solenoid Application Chart for correct solenoid operation.

After carrying out the Quick Test, use the Transaxle Drive Cycle Test for checking continuous codes.

1. Record and then erase Quick Test codes.
2. Warm engine to normal operating temperature.
3. Make sure transaxle fluid level is correct.
4. With transaxle in O/D position, moderately accelerate from stop to 80 km/h (50 mph). This allows the transaxle to shift into 4th gear. Hold speed and throttle open steady for a minimum of 15 seconds.

NOTE: PCA, EPC and VFS all refer to the solenoids. PCA is preferred for this transmission because the scan tool displays PCA.

5. With transaxle in 4th gear and maintaining steady speed and throttle opening, lightly apply and release brake to operate stop lamps. Then hold speed and throttle steady for a minimum of 5 seconds.
6. Brake to a stop and remain stopped for a minimum of 20 seconds.
7. Repeat Steps 4 through 6 at least 5 times.
8. Carry out Quick Test and record continuous DTCs.

After On-Board Diagnostics

- NOTE:** The vehicle wiring harness, powertrain control module and non-transaxle sensors may affect transaxle operations. Repair these concerns first.

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After the on-board diagnostic procedures are completed, repair all DTCs.

Begin with non-transaxle related DTCs, then repair any transaxle related DTCs. Refer to **DIAGNOSTIC TROUBLE CODE (DTC) CHARTS** for information on condition and symptoms. This chart will be helpful in diagnosing internal transaxle concerns and external non-transaxle inputs. The pinpoint tests are used in diagnosing transaxle electrical concerns. Make sure that the vehicle wiring harness and the PCM are diagnosed as well. The **INTRODUCTION -- GASOLINE MODELS** article will aid in diagnosing non-transaxle electronic components.

Before Pinpoint Tests

NOTE: Before entering pinpoint tests, check the powertrain control module wiring harness for correct connections, bent or broken pins, corrosion, loose wires, correct routing, correct seals and their condition. Check the PCM, sensors and actuators for damage. See **INTRODUCTION - GASOLINE** article .

NOTE: If a concern still exists after electrical diagnosis, refer to **DIAGNOSIS BY SYMPTOM**.

If DTCs appear while carrying out the on-board diagnostics, refer to **DIAGNOSTIC TROUBLE CODE (DTC) CHARTS** for the appropriate repair procedure. Prior to entering pinpoint tests, refer to any TSB messages for transaxle concerns.

DIAGNOSTIC TROUBLE CODE (DTC) CHARTS

Diagnostic Trouble Code Chart

TROUBLESHOOTING CHART

Five Digit DTC	Component	Description	Condition	Symptom	Action
P0705	TR Sensor	TR Circuit Failure	TR circuits, indicating an invalid pattern in TR_D. Condition caused by a short to	Increase in control pressure (harsh shifts). Defaults to D for an invalid position. MIL on.	Inspect the taillamp ground c GO to <u>PINPOINT TEST</u>

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			ground or an open in P/N, D, R, 2 or 1 circuits. Open in the taillamp ground circuit. This DTC can be set by an incorrectly adjusted TR sensor.		
P0712	TFT	157°C (315°F) Indicated TFT Sensor Circuit Grounded	Voltage drop across TFT sensor too low for scale set for temperature 157°C (315°F).	Possible firm shift feel.	GO to <u>PINPOINT TEST</u>
P0713	TFT	-40°C (-40°F) Indicated TFT Sensor Circuit Open	Voltage drop across TFT sensor too high for scale set temperature - 40°C (-40°F).	Possible firm shift feel.	GO to <u>PINPOINT TEST</u>
P0715	TSS	Insufficient Input From Turbine Shaft Speed Sensor	PCM detected a loss of TSS signal during operation.	Harsh shifts, no torque converter clutch activation, and harsh engagement.	GO to <u>PINPOINT TEST</u>
P0717	TSS	Turbine Shaft Speed Sensor Signal Intermittent	PCM detected a loss of TSS signal during operation.	Harsh shifts, no torque converter clutch activation, and harsh	GO to <u>PINPOINT TEST</u>

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				engagement.	
P0718	TSS	TSS Sensor Signal Erratic	PCM has detected an erratic TSS signal.	Harsh shifts, no torque converter clutch activation, and harsh engagement.	GO to <u>PINPOINT TEST</u>
P0720	OSS	Insufficient Input From OSS Sensor	PCM detected a loss of OSS signal during operation.	Harsh shift, possible abnormal shift schedule.	GO to <u>PINPOINT TEST</u>
P0721	OSS	OSS Sensor Signal Noisy	PCM has detected an erratic OSS signal.	Harsh shift, abnormal shift schedule.	GO to <u>PINPOINT TEST</u>
P0722	OSS	OSS Sensor Signal Intermittent	PCM has detected an intermittent OSS signal.	Harsh shift, abnormal shift schedule.	GO to <u>PINPOINT TEST</u>
P0731	SSA, SSB, SSC or Internal Parts	1st Gear Error	No 1st gear.	Incorrect gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material). Engine RPM could be higher or lower than	Refer to Solenoid On/Off Cl GO to <u>PINPOINT TEST</u>

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				expected.	
P0732	SSA, SSB, SSC or Internal Parts	2nd Gear Error	No 2nd gear.	Incorrect gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material). Engine RPM could be higher or lower than expected.	Refer to Solenoid On/Off Cl GO to <u>PINPOINT TEST</u>
P0733	SSA, SSB, SSC or Internal Parts	3rd Gear Error	No 3rd gear.	Incorrect gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material). Engine RPM could be	Refer to Solenoid On/Off Cl GO to <u>PINPOINT TEST</u>

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				higher or lower than expected.	
P0734	SSA, SSB, SSC or Internal Parts	4th Gear Error	No 4th gear.	Incorrect gear selection depending on failure or mode and manual lever position. Shift errors may also be due to other internal transmission concerns (stuck valves, damaged friction material). Engine RPM could be higher or lower than expected.	Refer to Solenoid On/Off Cl GO to <u>PINPOINT TEST</u>
P0741	TCC	TCC Slippage Detected	The PCM picked up an excessive amount of TCC slippage during normal vehicle operation.	TCC slippage/erratic or no torque converter clutch operation.	Refer to <u>DIAGNOSIS B SYMPTOM.</u>
P0750	SSA	SSA Solenoid Circuit Failure	SSA circuit failed to provide voltage drop across solenoid. Circuit open or shorted or	No reverse gear (short) or no 4th gear (open). MIL on.	GO to <u>PINPOINT TEST</u>

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			PCM driver failure during on-board diagnostic.		
P0751	SSA	SSA Functional Failure (Stuck Off)	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present, MIL on.	Refer to <u>DIAGNOSIS B SYMPTOM.</u>
P0752	SSA	SSA Functional Failure (Stuck On)	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present, MIL on.	Refer to <u>DIAGNOSIS B SYMPTOM.</u>
P0753	SSA	SSA Solenoid Circuit Failure	SSA circuit failed to provide voltage drop across solenoid. Circuit open or shorted or PCM driver failure during on-board diagnostic.	No reverse gear (short) or no 4th gear (open). MIL off.	GO to <u>PINPOINT TEST</u>
P0755	SSB	SSB Solenoid Circuit Failure	SSB circuit fails to provide voltage drop across solenoid. Circuit open or shorted or PCM driver failure during on-board diagnostic.	Not all gears present. No converter clutch apply in 3rd and 4th gears.	GO to <u>PINPOINT TEST</u>
P0756	SSB	SSB Functional Failure (Stuck OFF)	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present. No converter clutch apply in	Refer to <u>DIAGNOSIS B SYMPTOM.</u>

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				3rd and 4th gears.	
P0757	SSB	SSB Functional Failure (Stuck ON)	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present. No converter clutch apply in 3rd and 4th gears.	Refer to <u>DIAGNOSIS B SYMPTOM.</u>
P0758	SSB	SSB Solenoid Circuit Failure	SSB circuit fails to provide voltage drop across solenoid. Circuit open or shorted or PCM driver failure during on-board diagnostic.	Not all gears present. No converter clutch apply in 3rd and 4th gears. MIL off.	GO to <u>PINPOINT TEST</u>
P0760	SSC	SSC Solenoid Circuit Failure	SSC circuit fails to provide voltage drop across solenoid. Circuit open or shorted or PCM driver failure during on-board diagnostic.	Not all gears present.	GO to <u>PINPOINT TEST</u>
P0761	SSC	SSC Functional Failure (Stuck OFF)	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	GO to <u>PINPOINT TEST</u>
P0762	SSC	SSC Functional Failure (Stuck ON)	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	GO to <u>PINPOINT TEST</u>

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P0763	SSC	SSC Solenoid Circuit Failure	SSC circuit fails to provide voltage drop across solenoid. Circuit open or shorted or PCM driver failure during on-board diagnostic.	Not all gears present. MIL off.	GO to <u>PINPOINT TEST</u>
P0765	SSD	SSD Solenoid Circuit Failure	SSD circuit fails to provide voltage drop across solenoid. Circuit open, shorted or PCM driver circuit failure during on-board diagnostics.	Not all gears present. MIL on.	GO to <u>PINPOINT TEST</u>
P0766	SSD	SSD Functional Failure (Stuck OFF)	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	GO to <u>PINPOINT TEST</u>
P0767	SSD	SSD Functional Failure (Stuck ON)	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	GO to <u>PINPOINT TEST</u>
P0768	SSD	SSD Solenoid Circuit Failure	SSD circuit fails to provide voltage drop across solenoid. Circuit open,	Not all gears present. MIL off.	GO to <u>PINPOINT TEST</u>

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			shorted or PCM driver circuit failure during on-board diagnostics.		
P0770	SSE	SSE Solenoid Circuit Failure	SSE circuit failed to provide voltage drop across solenoid. Circuit open. Shorted or PCM driver circuit failed during on-board diagnostics.	Not all gears present. MIL on.	GO to <u>PINPOINT TEST</u>
P0771	SSE	SSE Functional Failure (Stuck OFF)	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	GO to <u>PINPOINT TEST</u>
P0772	SSE	SSE Functional Failure (Stuck ON)	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present.	GO to <u>PINPOINT TEST</u>
P0773	SSE	SSE Solenoid Circuit Failure	SSE circuit failed to provide voltage drop across solenoid. Circuit open. Shorted or PCM driver circuit failed during on-board diagnostics.	Not all gears present. MIL off.	GO to <u>PINPOINT TEST</u>

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P0960	EPC	EPC Solenoid Circuit Open	Voltage through EPC solenoid is checked. Error is noted if tolerance is exceeded.	Open circuit-causes maximum EPC pressure, harsh engagements and shifts.	GO to <u>PINPOINT TEST</u>
P0962	EPC	EPC Solenoid Circuit Failure, Shorted Circuit to Ground	Voltage through EPC solenoid is checked. An error will be noted if tolerance is exceeded.	Short circuit causes maximum EPC pressure, harsh engagement and shifts.	GO to <u>PINPOINT TEST</u>
P0963	EPC	EPC Solenoid Circuit Failure, Shorted Circuit to Power	Voltage through EPC solenoid is checked. An error will be noted if tolerance is exceeded.	Short circuit causes maximum EPC pressure, harsh engagement and shifts.	GO to <u>PINPOINT TEST</u>
P0972	SSA	SSA Functional Failure (Stuck OFF)	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present, MIL off.	Refer to <u>DIAGNOSIS B SYMPTOM.</u>
P0975	SSB	SSB Functional Failure (Stuck OFF)	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present. No converter clutch apply in 3rd and 4th gears. MIL off.	Refer to <u>DIAGNOSIS B SYMPTOM.</u>
P0978	SSC	SSC Functional Failure (Stuck OFF)	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present. MIL off.	GO to <u>PINPOINT TEST</u>
P0981	SSD	SSD Functional Failure (Stuck OFF)	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present. MIL off.	GO to <u>PINPOINT TEST</u>

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		OFF)	shift solenoid.		
P0984	SSE	SSE Functional Failure (Stuck OFF)	Mechanical or hydraulic failure of the shift solenoid.	Not all gears present. MIL off.	GO to <u>PINPOINT TEST</u>
P1700	-	Undetermined Failure	Transmission failed to NEUTRAL.	Transmission functional failure.	When this code is shown in conjunction with other codes, first repair the other codes, then retest. If this code reappears, go to <u>DIAGNOSIS BY SYMPTOM</u>
P1702	TR Sensor	TR Circuit Failure	TR circuits indicating an invalid pattern in TR_D. Condition caused by a short to ground or an open in P/N, D, R, 2 or 1 circuit. Open in the taillamp ground circuit. This DTC can be set by an incorrectly adjusted TR sensor.	Increase in control pressure (harsh shifts). Defaults to D for an invalid position. MIL off.	Inspect the taillamp ground circuit.
P1705	TR Sensor	TR Not in PARK or NEUTRAL During KOE0/KOER	KOE0/KOER not run in PARK or NEUTRAL; or TR circuit failure.	Harsh shifts or engagements.	GO to <u>PINPOINT TEST</u> Rerun KOE0/KOER in PARK or NEUTRAL.
P1710	TFT	Stuck in Midrange	PCM never detects a change in fluid	Occasional hard shifts.	GO to <u>PINPOINT TEST</u>

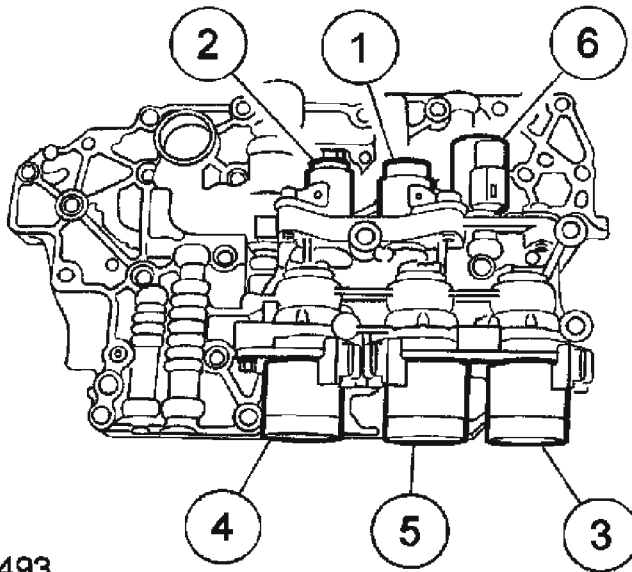
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			temperature.		
P1711	TFT	TFT Out of On-Board Diagnostic Range	Transmission not at operating temperature during on-board diagnostic.	DTC set-vehicle cold or overheated.	Warm or cool vehicle to normal operating temperature. GC <u>PINPOINT TEST B.</u>
P1713	TFT	No Change in TFT - Low Range	PCM has detected no TFT change at low range during operation.	Incorrect TCC engagement schedule, harsh engagement, harsh shifts.	GO to <u>PINPOINT TEST</u>
P1718	TFT	No Change in TFT - High Range	PCM has detected no TFT change at high range during operation.	Incorrect TCC engagement schedule, harsh engagement, harsh shifts.	GO to <u>PINPOINT TEST</u>
P1780	TCS	TCS Input Incorrect for Selected Position	TCS voltage incorrect.	No overdrive cancel when lever is moved.	Rerun on-board diagnostic cycle switch. For additional information, refer to <u>AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROL</u>
P1783	TFT	Transmission Overtemp Condition Indicated	Transmission fluid temperature exceeded 135°C (275°F).	Increase in control pressure.	GO to <u>PINPOINT TEST</u>

TRANSAXLE CONNECTOR LAYOUTS

Transaxle Solenoid Location



N0034493

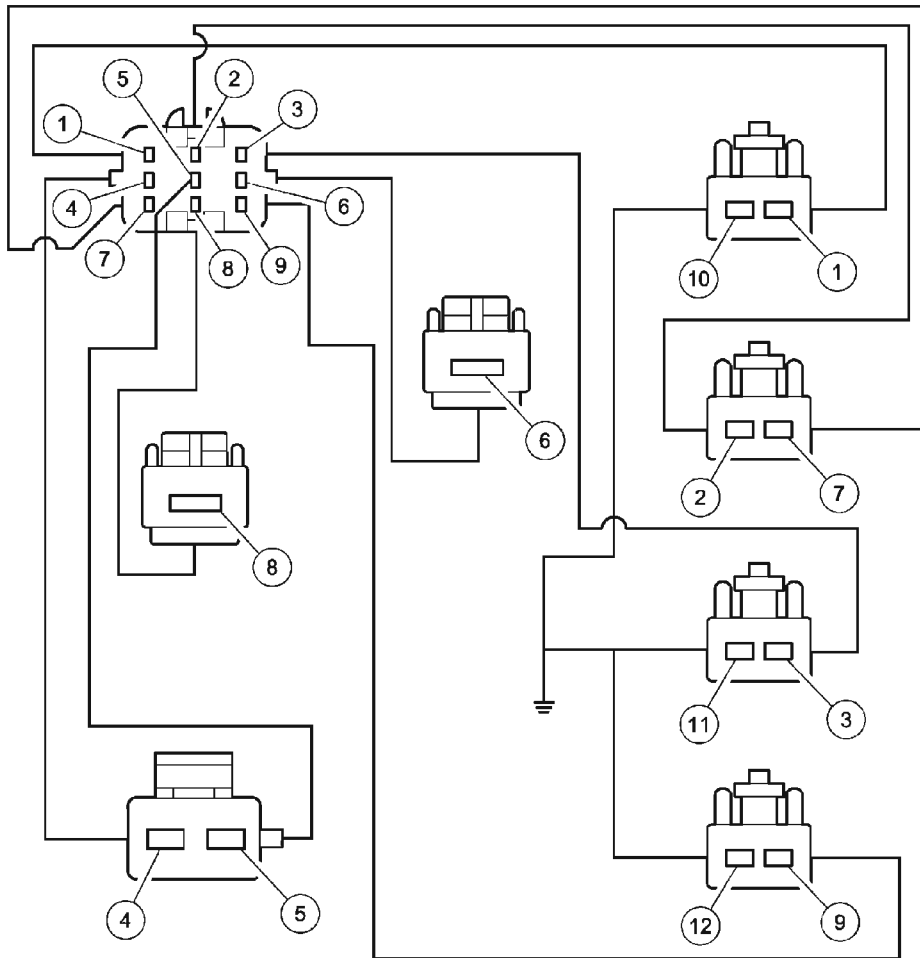
Item	Description
1	SSA
2	SSB
3	SSC
4	SSD
5	SSE
6	PCA

Fig. 29: Identifying Transaxle Solenoid Component Location
Courtesy of FORD MOTOR CO.

Transaxle Internal Harness Connectors

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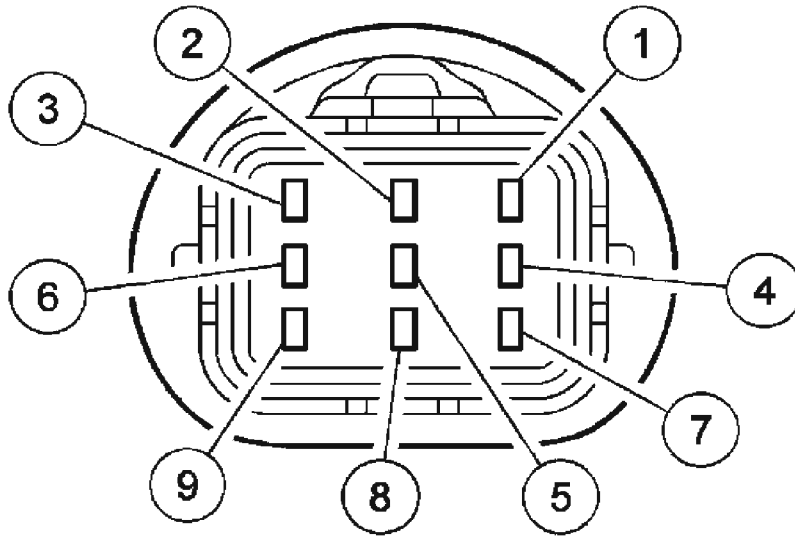
N0034494

Pin	Circuit Function	Connector Color
1	SSE	Green
2	PCA	Black
3	SSC	White
4	TFT SIGRTN	Black
5	TFT	Black
6	SSA	White

Pin	Circuit Function	Connector Color
7	PCA	Black
8	SSB	Black
9	SSD	Blue
10	SSE GROUND	Green
11	SSC GROUND	White
12	SSD GROUND	Blue

Fig. 30: Transaxle Internal Harness Connectors Terminal Relationship Diagram
Courtesy of FORD MOTOR CO.

Transaxle Vehicle Harness Connector



N0034495

Pin Number	225 Pin PCM	Circuit Function
1	34	SSE
2	9	PCA
3	44	SSC
4	41	TFT signal return
5	29	TFT
6	42	SSA
7	11	PCA
8	43	SSB
9	46	SSD

Fig. 31: Identifying Transaxle Vehicle Harness Connector Terminal

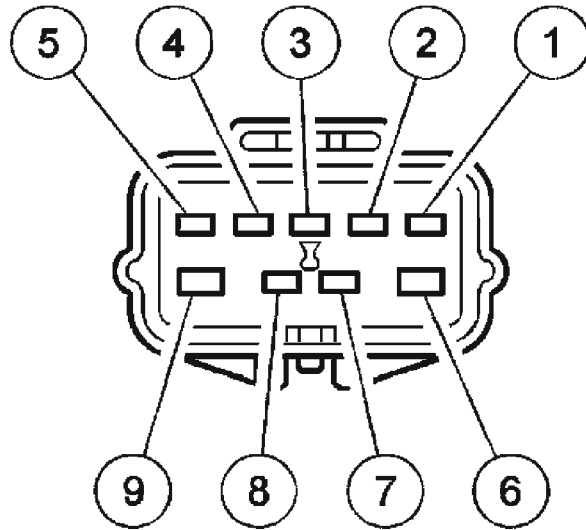
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Courtesy of FORD MOTOR CO.

Transmission Range (TR) Sensor Vehicle Harness Connector

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N0034496

Pin Number	225 Pin PCM	Circuit Function
1	1	VPWR
2	19	DRIVE position
3	12	1ST position
4	27	REVERSE position
5	16	PARK position
6	6	Starting system
7	28	2ND position
8	16	NEUTRAL position
9	9	Starting system

Fig. 32: Identifying Transmission Range (TR) Sensor Vehicle Harness Connector Terminal

Courtesy of FORD MOTOR CO.

Output Shaft Speed Sensor (OSS) Vehicle Harness Connector

Turbine Shaft Speed (TSS) Sensor Vehicle Harness Connector

Transmission Range (TR) Sensor Diagnosis Chart

TRANSMISSION RANGE (TR) SENSOR DIAGNOSIS CHART

Selector Position	TR Sensor Pins Component Side	Expected Value
PARK	1 and 2, 3 and 4	Less than 5 ohms
REVERSE	3 and 5	Less than 5 ohms
NEUTRAL	1 and 2, 3 and 6	Less than 5 ohms
DRIVE	3 and 7	Less than 5 ohms
2	3 and 8	Less than 5 ohms
1	3 and 9	Less than 5 ohms

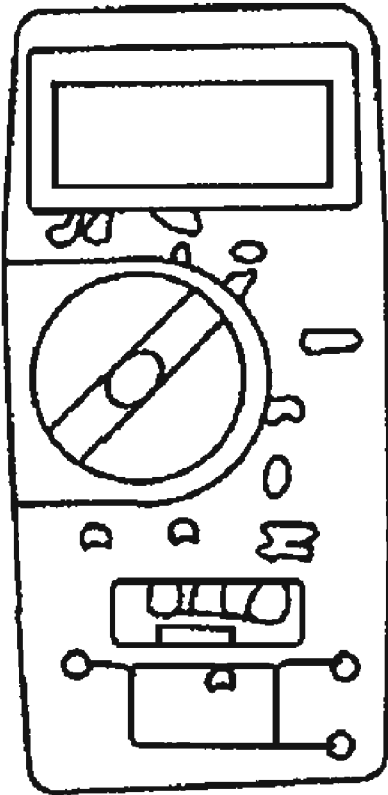
PINPOINT TESTS - OSC EQUIPPED VEHICLE

SPECIAL TOOL SPECIFICATION

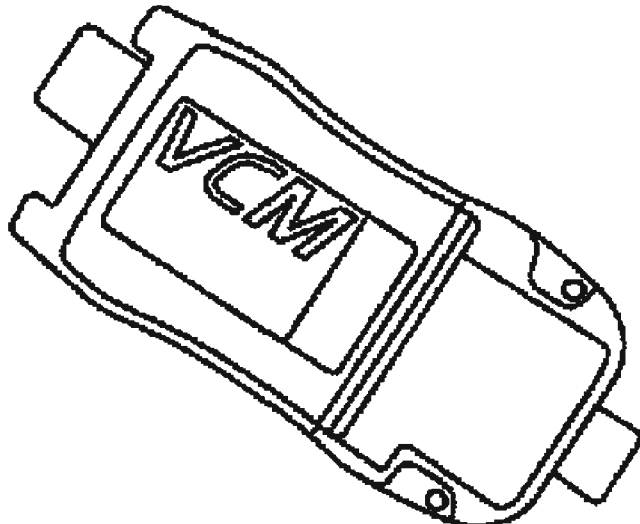
	73 III Automotive Meter 105-R0057 or equivalent
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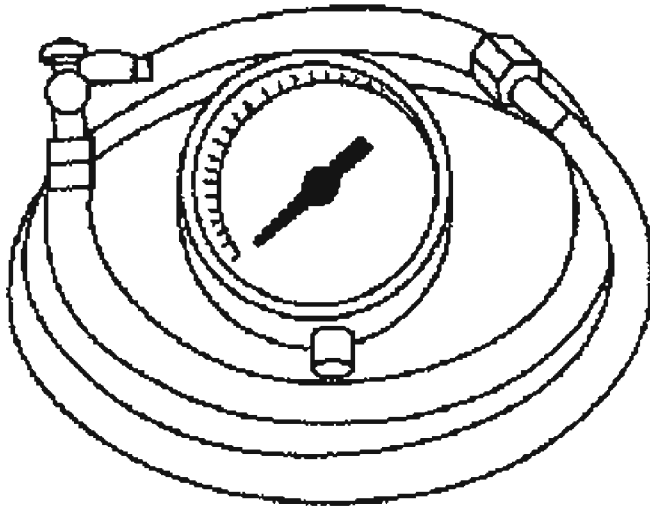
ST1137-A



Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool

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ST1565-A

Pressure Gauge Assembly 307-004
(T57L-77820-A)

Any time an electrical connector or solenoid body is disconnected, inspect the connector for terminal condition, corrosion and contamination. Also inspect the connector seal for damage. Clean, repair or install new as necessary.

Shift Solenoid Pre-Diagnosis

Use the shift solenoid operation chart when carrying out Pinpoint Test A. For additional information, Refer to **SPECIFICATIONS**.

Solenoid Operation Chart - Converter Disengaged

SOLENOID OPERATION CHART

Base Gearshift Selector Position	PCM Commanded Gear	Shift Solenoid A (on/off)	Shift Solenoid B (on/off)	Shift Solenoid C (PWM)	Shift Solenoid D (PWM)	Shift Solenoid E (PWM)

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P/N	P/N	On	Off	Off	Off	Off
R	R	Off	Off	Off	Off	Off
D	1	Off	Off	Off	On	On
	1(M)	On	On	Off	Off	On
	2	Off	Off	Off	Off	On
	3	Off	Off	Off	Off	Off
	4	On	Off	On	Off	Off

With a on/off solenoid, OFF = No Hydraulic Flow.

With a PWM solenoid, OFF = Full Hydraulic Flow.

Solenoid Operation Chart - Converter Engaged

SOLENOID OPERATION CHART

Base Gearshift Selector Position	PCM Commanded D Gear	Shift Solenoid A (on/off)	Shift Solenoid B (on/off)	Shift Solenoid C (PWM)	Shift Solenoid D (PWM)	Shift Solenoid E (PWM)
D	3	Off	On	On	Off	Off
	4	On	On	On	Off	Off

With a on/off solenoid, OFF = No Hydraulic Flow.

With a PWM solenoid, OFF = Full Hydraulic Flow.

Pinpoint Tests

PINPOINT TEST A: SHIFT AND TORQUE CONVERTER CLUTCH SOLENOIDS (ONLY)

NOTE: Refer to the Transaxle Vehicle Harness Connector illustration preceding these pinpoint tests.

NOTE: Refer to the Transaxle Internal Harness Diagram illustration preceding these pinpoint tests.

NOTE: Read and record all DTCs. All TR sensor and OSS DTCs must be repaired before entering Output State Control (OSC).

A1 ELECTRONIC DIAGNOSTICS SET UP

- Key in OFF position.

- Shift selector lever to position P.
- Make sure the transaxle harness connector is fully seated, terminals are fully engaged in connector and in good condition before proceeding.
- Connect the scan tool.
- Key in ON position.
- Enter the following diagnostic mode on the scan tool: Diagnostic Data Link.
- Enter the following diagnostic mode on the scan tool: PCM.
- Enter the following diagnostic mode on the scan tool: Active Command Modes.
- Enter the following diagnostic mode on the scan tool: Output State Control (OSC).
- Enter the following diagnostic mode on the scan tool: Trans-Bench Mode.
- **Does vehicle enter Trans-Bench Mode?**
 - Yes** : REMAIN in Trans-Bench Mode. GO to A2.
 - No** : REPEAT procedure to enter Trans-Bench Mode. If vehicle did not enter Trans-Bench Mode, See **INTRODUCTION - GASOLINE** article for diagnosis of PCM.

A2 WIGGLE TEST

- Remain in Trans-Bench Mode.
- Select PIDs to be monitored:
 - SSA.
 - SSB.
 - SSC.
 - SSD.
 - SSE.
- Select "ON" to turn suspect solenoid on.
- Press "SEND".
- Wiggle all wiring and connectors to the transaxle. Monitor the Solenoid State for changes.
- Select "OFF" to turn solenoid off.
- Press "SEND".
- **Does the suspect solenoid(s) fault state change?**
 - Yes** : REPAIR the circuit. TEST the system for normal operation.
 - No** : GO to A3.

A3 CHECK SOLENOID FUNCTION

- Turn each solenoid ON and OFF.

- **Does the solenoid turn ON and OFF when commanded and can solenoid activation be heard?**

Yes : GO to A4.

No : GO to A5.

A4 OSC TRANS-DRIVE TEST (GEAR OR TCC)

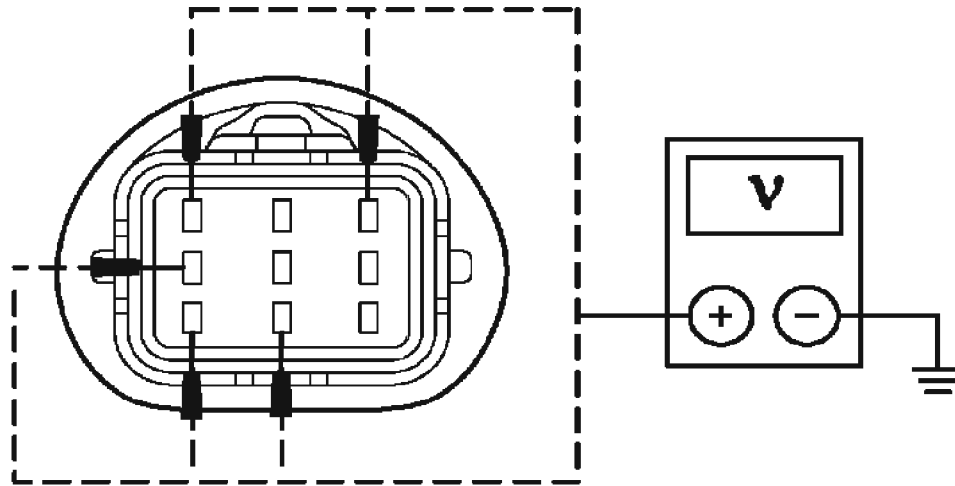
- Carry out OSC Trans-Drive Mode.
- Select GEAR for Shift Solenoids or follow procedures for GEAR as listed.
- Select TCC for Torque Converter Clutch. Follow procedures of **TCC IN DRIVE MODE** as listed.
- **Does the transaxle upshift and downshift or torque converter engage/disengage when commanded?**

Yes : CLEAR all DTCs. Road test to verify if concern is still present. If concern is still present, REFER to **DIAGNOSIS BY SYMPTOM** to diagnose shift or torque converter concern.

No : GO to A5.

A5 CHECK FOR BATTERY VOLTAGE

- Disconnect: Transaxle Vehicle Harness Connector.
- Visually inspect all wires and connectors for damage.
- Measure the voltage between transaxle vehicle harness connector, harness side, and ground as follows:
 - SSA - Pin 6.
 - SSB - Pin 8.
 - SSC - Pin 3.
 - SSD - Pin 9.
 - SSE - Pin 1.



E0011589

Fig. 33: Measuring Voltage Between Transaxle Vehicle Harness Connector, Harness Side And Ground
Courtesy of FORD MOTOR CO.

- **Is voltage present?**

Yes : GO to A7.

No : GO to A6.

A6 CHECK FOR SHORTS TO GROUND

- Key in OFF position.
- Measure the resistance between transaxle vehicle harness connector, harness side, and ground as follows:
 - SSA - Pin 6.
 - SSB - Pin 8.
 - SSC - Pin 3.
 - SSD - Pin 9.
 - SSE - Pin 1.

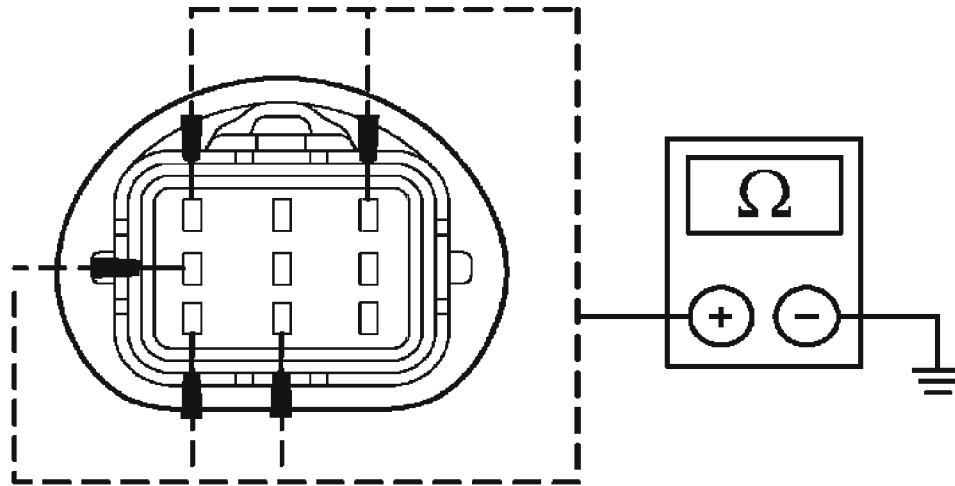
**E0014439**

Fig. 34: Measuring Resistance Between Transaxle Vehicle Harness Connector, Harness Side And Ground
Courtesy of FORD MOTOR CO.

- **Is the resistance greater than 10,000 ohms?**

Yes : GO to A8.

No : REPAIR the circuit in question. TEST the system for normal operation.

A7 CHECK FOR SHORT TO BATTERY VOLTAGE

- Disconnect: PCM Connector.
- Key in ON position.
- Measure the voltage between transaxle vehicle harness connector, harness side, and ground as follows:
 - SSA - Pin 6.
 - SSB - Pin 8.
 - SSC - Pin 3.
 - SSD - Pin 9.
 - SSE - Pin 1.

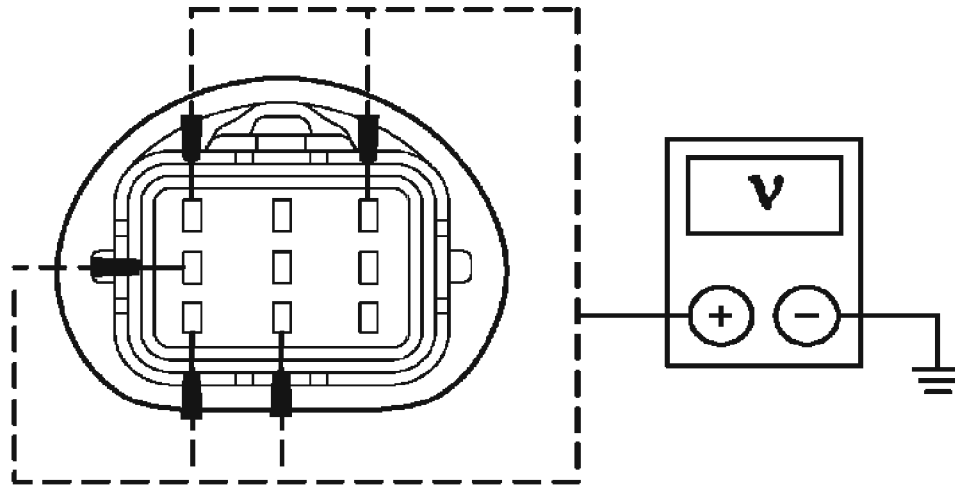
**E0011589**

Fig. 35: Measuring Voltage Between Transaxle Vehicle Harness Connector, Harness Side And Ground
Courtesy of FORD MOTOR CO.

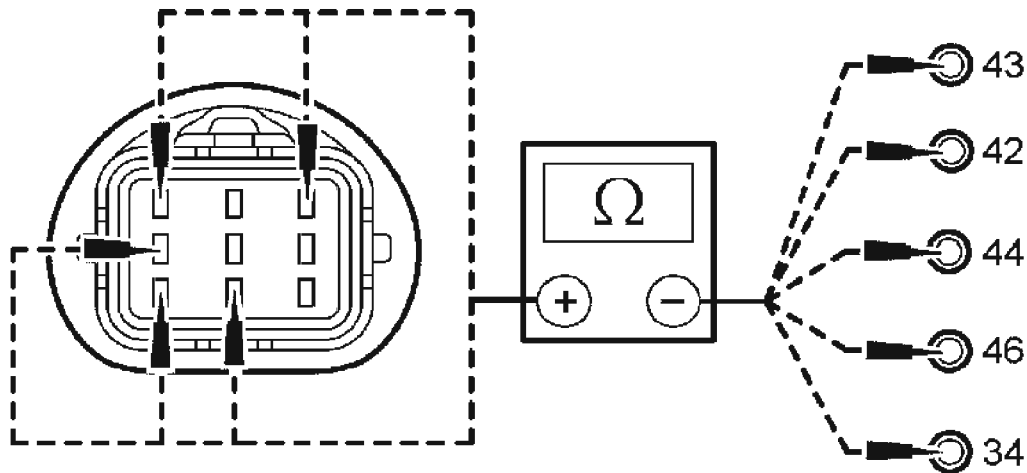
- **Is voltage present?**

Yes : REPAIR the circuit in question. TEST the system for normal operation.

No : INSTALL a new PCM. TEST the system for normal operation.

A8 CHECK FOR OPENS

- Disconnect: Powertrain Control Module.
- Measure the resistance between PCM connector pins, harness side, and transaxle vehicle harness connector pins, harness side, for the suspected solenoid as follows:
 - SSA - EEC-V 225-pin breakout box pin 42 - transaxle connector pin 6.
 - SSB - EEC-V 225-pin breakout box pin 43 - transaxle connector pin 8.
 - SSC - EEC-V 225-pin breakout box pin 44 - transaxle connector pin 3.
 - SSD - EEC-V 225-pin breakout box pin 46 - transaxle connector pin 9.
 - SSE - EEC-V 225-pin breakout box pin 34 - transaxle connector pin 1.



A0084980

Fig. 36: Measuring Resistance Between PCM Connector Pins, Harness Side, And Transaxle Vehicle Harness Connector Pins, Harness Side, For Suspected Solenoid

Courtesy of FORD MOTOR CO.

- Is the resistance less than 5 ohms?

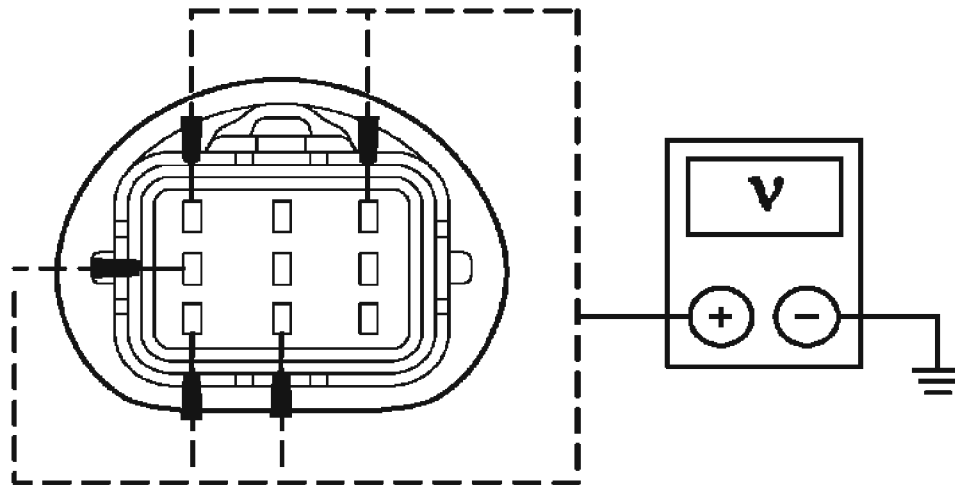
Yes : GO to A9.

No : REPAIR the circuit in question. TEST the system for normal operation.

A9 ELECTRICAL SIGNAL CHECK

- Connect: PCM Connector.
- Key in ON position.
- Measure the voltage between transaxle vehicle harness connector, harness side, and ground for the suspected solenoid as follows:
 - SSA - Pin 6.
 - SSB - Pin 8.
 - SSC - Pin 3.
 - SSD - Pin 9.
 - SSE - Pin 1.

- Enter the following diagnostic mode on the scan tool: Trans - Bench Mode.
- Select Parameter SSA, SSB, SSC, SSD or SSE.
- Select "ON".
- Press "SEND".
- Measure the voltage while cycling the solenoid ON and OFF.
- Select "OFF", press "SEND".



E0011589

Fig. 37: Measuring Voltage Between Transaxle Vehicle Harness Connector, Harness Side And Ground For Suspected Solenoid
Courtesy of FORD MOTOR CO.

- **Does the voltage change?**

Yes : GO to A10.

No : INSTALL a new PCM. TEST the system for normal operation.

A10 CHECK SOLENOID RESISTANCE

- Measure the resistance between solenoid pin and solenoid body component side for suspected solenoid as follows:
 - SSA - Pin 6 and Body - 10.9-26.2 ohms.
 - SSB - Pin 8 and Body - 10.9-26.2 ohms.
 - SSC - Pin 3 and Body - 1.0-4.2 ohms.

- SSD - Pin 9 and Body - 1.0-4.2 ohms.
- SSE - Pin 1 and Body - 1.0-4.2 ohms.

- **Is the resistance within specification?**

Yes : If SSA or SSB is suspected, GO to A12.

If SSC, SSD or SSE is suspected, GO to A11.

No : INSTALL a new SSA, SSB, SSC, SSD or SSE. TEST the system for normal operation.

A11 CHECK SSC, SSD, SSE FOR SHORT TO GROUND

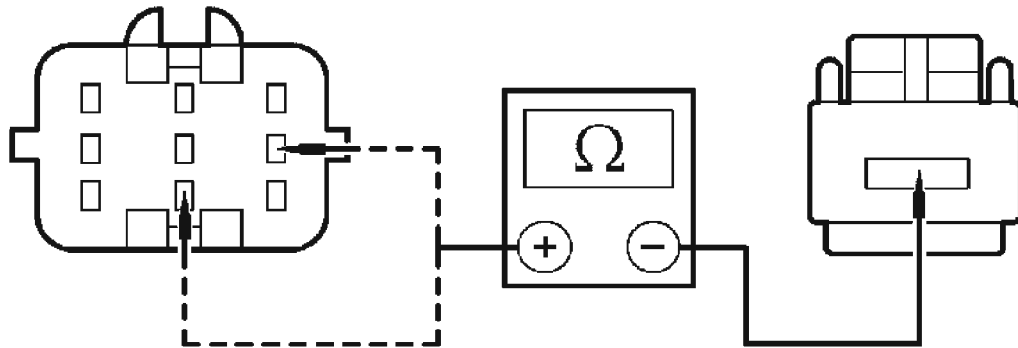
- Measure the resistance between suspected solenoid pin 1, component side and solenoid body.
- **Is the resistance less than 5 ohms?**

Yes : INSTALL a new SSC, SSD or SSE. TEST the system for normal operation.

No : GO to A12.

A12 CHECK THE TRANSAXLE INTERNAL HARNESS FOR OPEN

- Measure the resistance between transaxle internal harness connector pins and suspected solenoid connectors as follows:
 - SSA - Between transaxle internal harness connector pin 6 and transaxle internal harness solenoid connector pin 6.
 - SSB - Between transaxle internal harness connector pin 8 and transaxle internal harness solenoid connector pin 8.



TIE0018554

Fig. 38: Measuring Resistance Between Transaxle Internal Harness Connector Pins And Suspected Solenoid Connectors
Courtesy of FORD MOTOR CO.

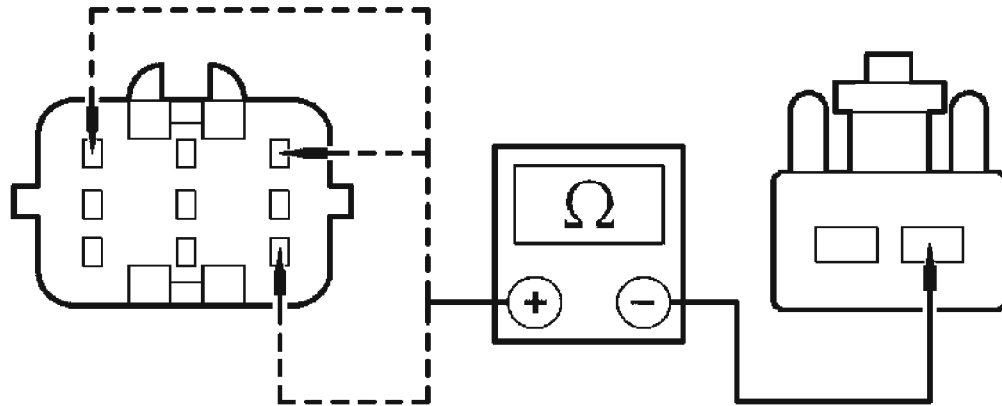
- **Is the resistance less than 5 ohms?**

Yes : GO to A13.

No : INSTALL a new transaxle internal harness. TEST the system for normal operation.

A13 CHECK THE TRANSAXLE INTERNAL HARNESS FOR OPEN

- Measure the resistance between transaxle internal harness connector pins and suspected solenoid connectors as follows:
 - SSC - Between transaxle internal harness connector pin 3 and transaxle harness solenoid connector pin 3.
 - SSD - Between transaxle internal harness connector pin 9 and transaxle internal harness solenoid connector pin 9.
 - SSE - Between transaxle internal harness connector pin 1 and transaxle internal harness solenoid connector pin 1.



TIE0018555

Fig. 39: Measuring Resistance Between Transaxle Internal Harness Connector Pins And Suspected Solenoid Connectors
Courtesy of FORD MOTOR CO.

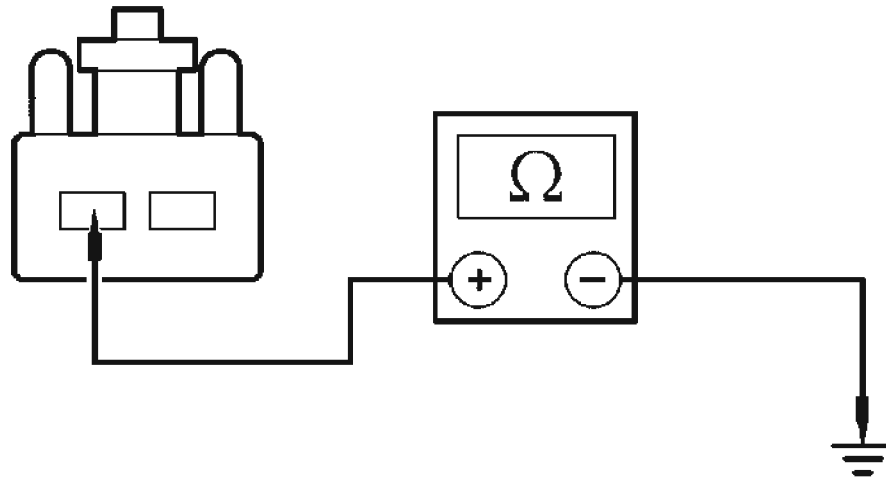
- Is the resistance less than 5 ohms?

Yes : GO to A14.

No : INSTALL a new transaxle internal harness. TEST the system for normal operation.

A14 CHECK THE TRANSAXLE INTERNAL HARNESS GROUND CIRCUIT

- Measure the resistance between transaxle internal harness connector pins and ground eye hook as follows:
 - SSC - Between transaxle internal harness solenoid connector pin 11 and ground eye hook.
 - SSD - Between transaxle internal harness solenoid connector pin 12 and ground eye hook.
 - SSE - Between transaxle internal harness solenoid connector pin 10 and ground eye hook.



TIE0018556

Fig. 40: Measuring Resistance Between Transaxle Internal Harness Connector Pins And Ground Eye Hook
Courtesy of FORD MOTOR CO.

- **Is the resistance less than 5 ohms?**

Yes : INSTALL a new PCM. TEST the system for normal operation.

No : INSTALL a new transaxle internal harness. TEST the system for normal operation.

PINPOINT TEST B: TRANSMISSION FLUID TEMPERATURE (TFT) SENSOR

NOTE: Refer to the Transaxle Vehicle Harness Connector illustration preceding these pinpoint tests.

NOTE: Refer to the Transaxle Internal Harness Diagram illustration preceding these pinpoint tests.

B1 ELECTRONIC DIAGNOSTIC SET UP

- Key in OFF position.
- Shift selector lever to position P.

- Check to make sure the transaxle harness connector is fully seated, terminals are fully engaged in connector and in good condition before proceeding.
- Connect the scan tool.
- Key in ON position.
- Select Diagnostic Data Link.
- Select PCM.
- Select PID/Data Monitor and Record.
- Enter the following diagnostic mode on the scan tool: PIDs; TFT, TFTV.
- **Does the vehicle enter PID/Data Monitor and Record?**

Yes : REMAIN in PID/Data Control. GO to B2.

No : REPEAT procedure to enter PID. If vehicle did not enter PID, See **INTRODUCTION - GASOLINE** article for diagnosis of PCM.

B2 WARM-UP/COOL-DOWN CYCLE VERIFICATION

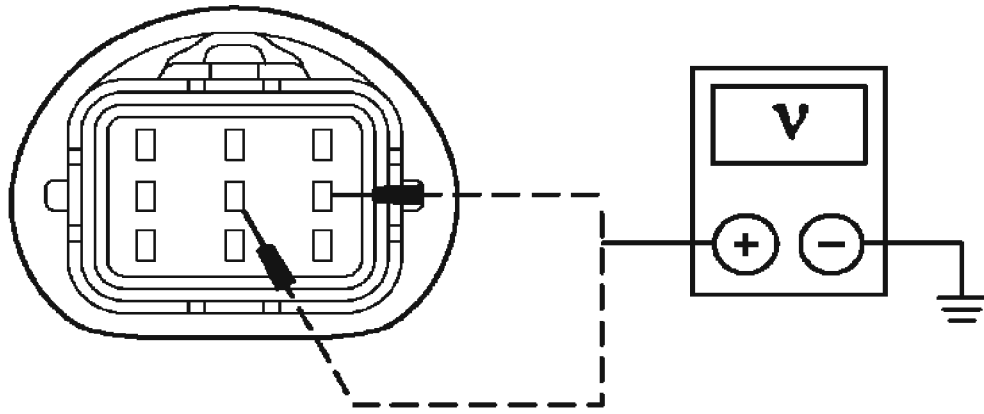
- While monitoring the TFT PIDs, carry out the following test: If transaxle is cold, run transaxle to warm it up. If transaxle is warm, allow transaxle to cool down.
- **Do the TFT PIDs increase as the transaxle is warmed up or decrease as the transaxle is cooled or does the TFT or TFTV drop in and out of range?**

Yes : If the TFT PIDs increase as the transaxle is warmed or decrease as the transaxle is cooled, CLEAR all DTCs. Road test to verify if concern is still present. If concern is still present, REFER to **DIAGNOSIS BY SYMPTOM**, to diagnose transaxle overheating. If the TFT drops in and out of range, INSPECT for intermittent concern in the internal/external harness, sensor or connector.

No : GO to B3.

B3 CHECK POWERTRAIN CONTROL MODULE AND VEHICLE HARNESS FOR POWER

- Disconnect: Transaxle Vehicle Harness Connector.
- Visually inspect all wires and connectors for damage.
- Measure the voltage between transaxle vehicle harness connector pin 5, harness side and ground; and between transaxle vehicle harness connector pin 4, harness side and ground.



E0011591

Fig. 41: Checking Powertrain Control Module And Vehicle Harness For Power
Courtesy of FORD MOTOR CO.

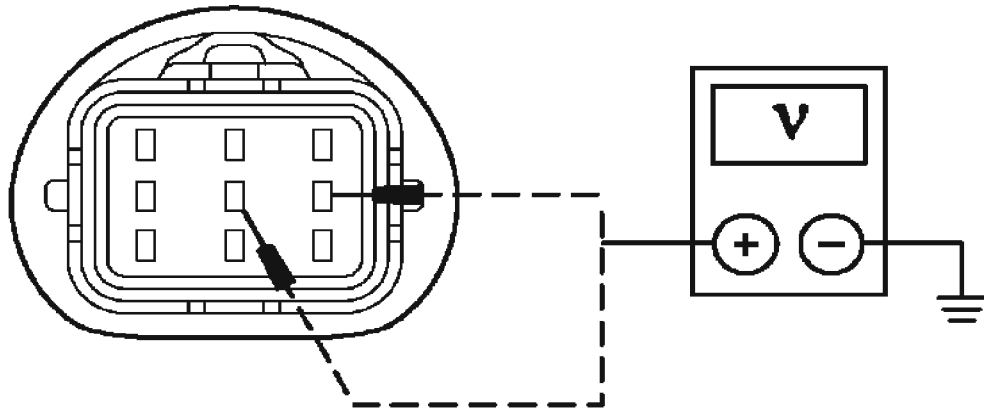
- **Is voltage present?**

Yes : GO to B4.

No : GO to B5.

B4 CHECK VEHICLE HARNESS FOR SHORT TO POWER

- Disconnect: PCM Connector.
- Measure the voltage between transaxle vehicle harness connector pin 5, harness side and ground; and between transaxle vehicle harness connector pin 4, harness side and ground.



E0011591

Fig. 42: Checking Vehicle Harness For Short To Power
 Courtesy of FORD MOTOR CO.

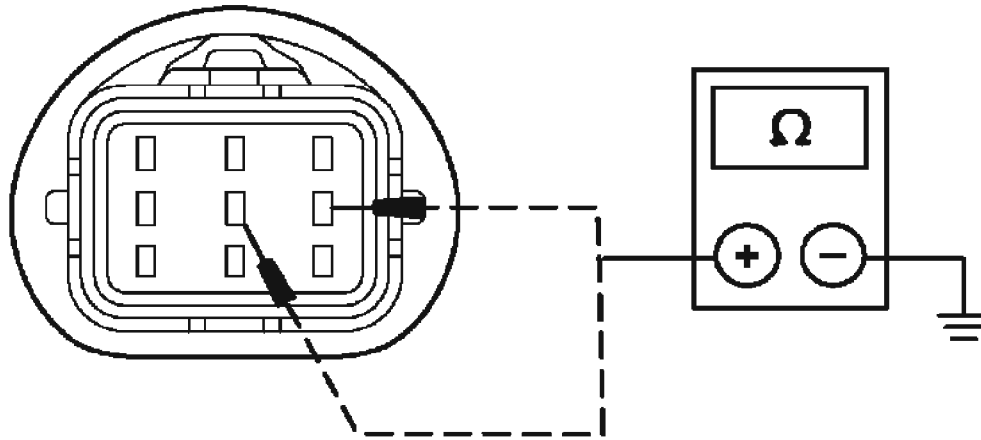
- **Is voltage present?**

Yes : REPAIR the circuit. TEST the system for normal operation.

No : INSTALL a new PCM. TEST the system for normal operation.

B5 CHECK POWERTRAIN CONTROL MODULE AND VEHICLE HARNESS FOR GROUND

- Connect: PCM Connector.
- Measure the resistance between transaxle vehicle harness connector pin 5, harness side and ground; and between transaxle vehicle harness connector pin 4, harness side and ground.



E0011592

Fig. 43: Checking Powertrain Control Module And Vehicle Harness For Ground

Courtesy of FORD MOTOR CO.

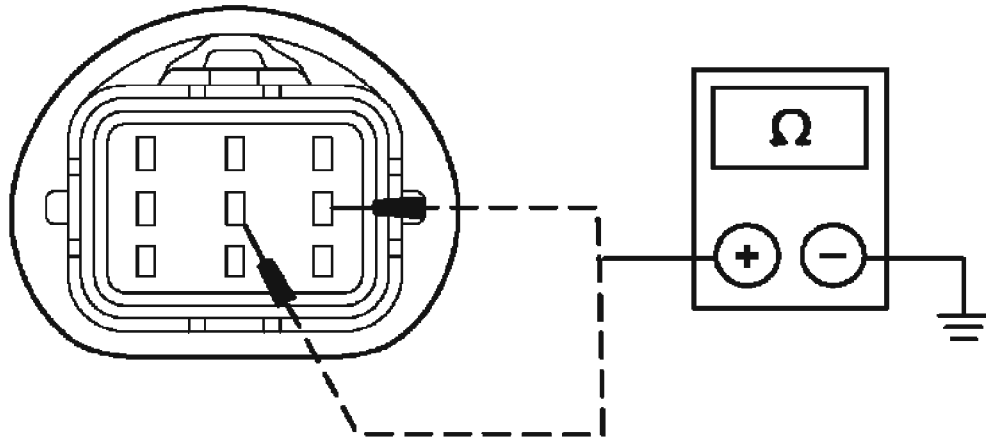
- Is the resistance greater than 10,000 ohms?

Yes : GO to B7.

No : GO to B6.

B6 CHECK VEHICLE HARNESS FOR SHORT TO GROUND

- Disconnect: PCM Connector.
- Measure the resistance between transaxle vehicle harness connector pin 5, harness side and ground; and between transaxle vehicle harness connector pin 4, harness side and ground.



E0011592

Fig. 44: Checking Vehicle Harness For Short To Ground
Courtesy of FORD MOTOR CO.

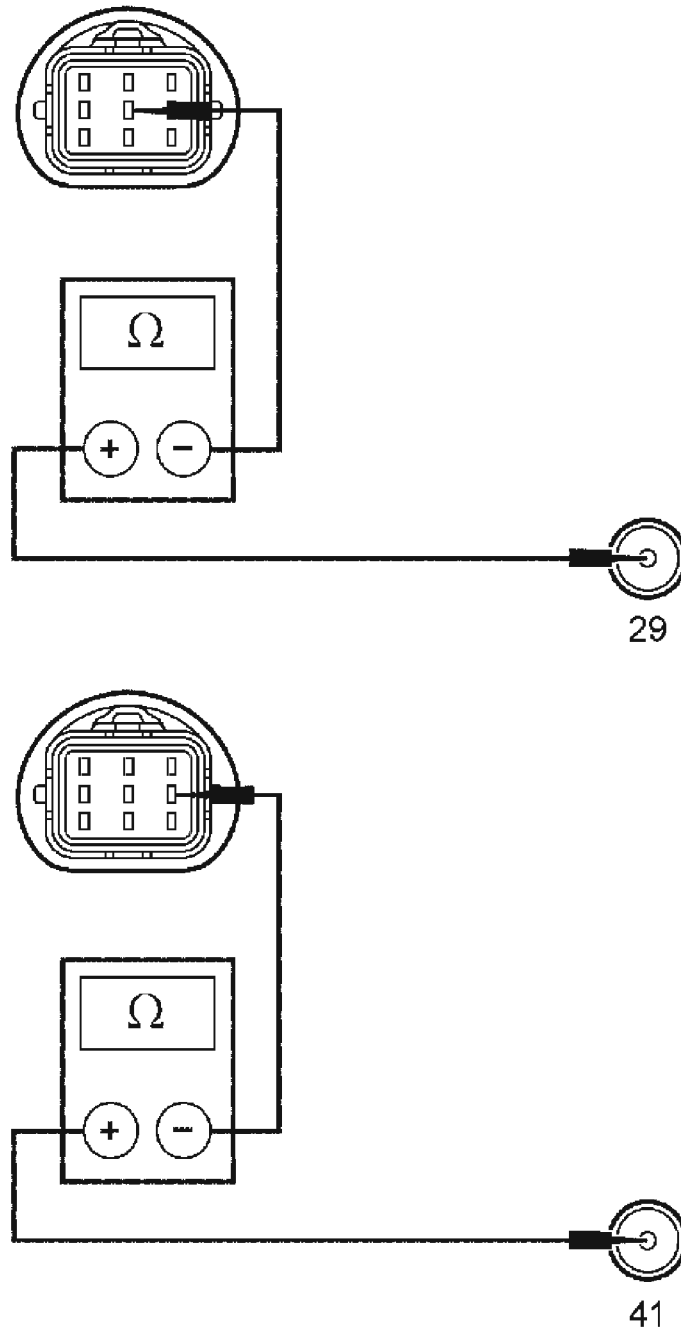
- **Is the resistance greater than 10,000 ohms?**

Yes : INSTALL a new PCM. TEST the system for normal operation.

No : REPAIR the circuit. TEST the system for normal operation.

B7 CHECK VEHICLE HARNESS FOR OPEN

- Measure the resistance between transaxle vehicle harness connector pin 5, harness side and EEC-V 225-pin breakout box pin 29, harness side; and between transaxle vehicle harness connector pin 4, harness side and EEC-V 225-pin breakout box pin 41, harness side.



A0084979

Fig. 45: Checking Vehicle Harness For Open
Courtesy of FORD MOTOR CO.

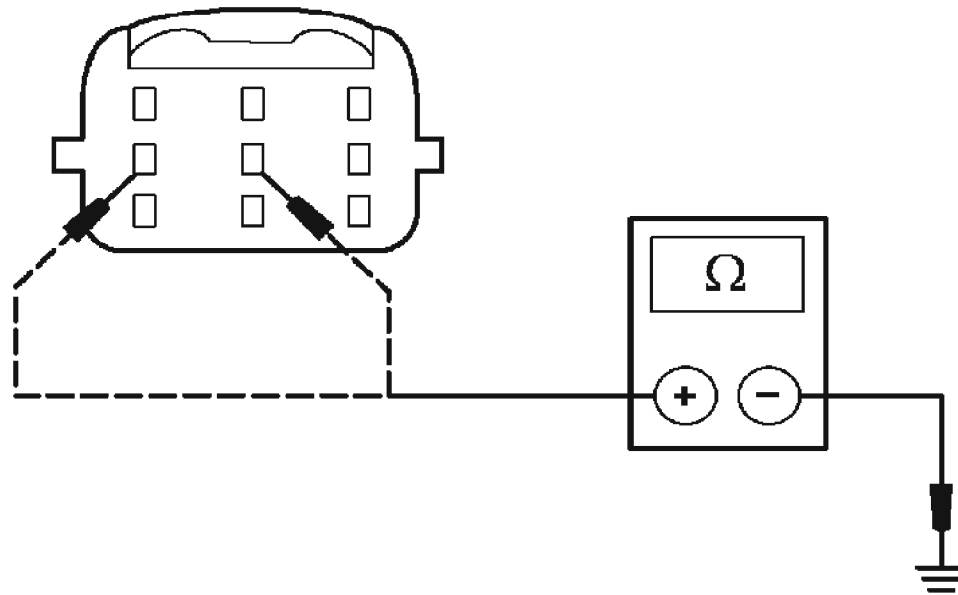
- Is the resistance less than 5 ohms?

Yes : GO to B8.

No : REPAIR the circuit. TEST the system for normal operation.

B8 CHECK THE TRANSAXLE INTERNAL HARNESS FOR SHORT TO GROUND

- Measure the resistance between transaxle vehicle harness connector pin 5 (component side, transaxle internal harness), and ground; and between transaxle vehicle harness connector pin 4 (component side, transaxle internal harness), and ground.



E0011608

Fig. 46: Checking Transaxle Internal Harness For Short To Ground
Courtesy of FORD MOTOR CO.

- **Is the resistance greater than 10,000 ohms?**

Yes : GO to B9.

No : INSTALL a new transaxle internal harness. TEST the system for normal operation.

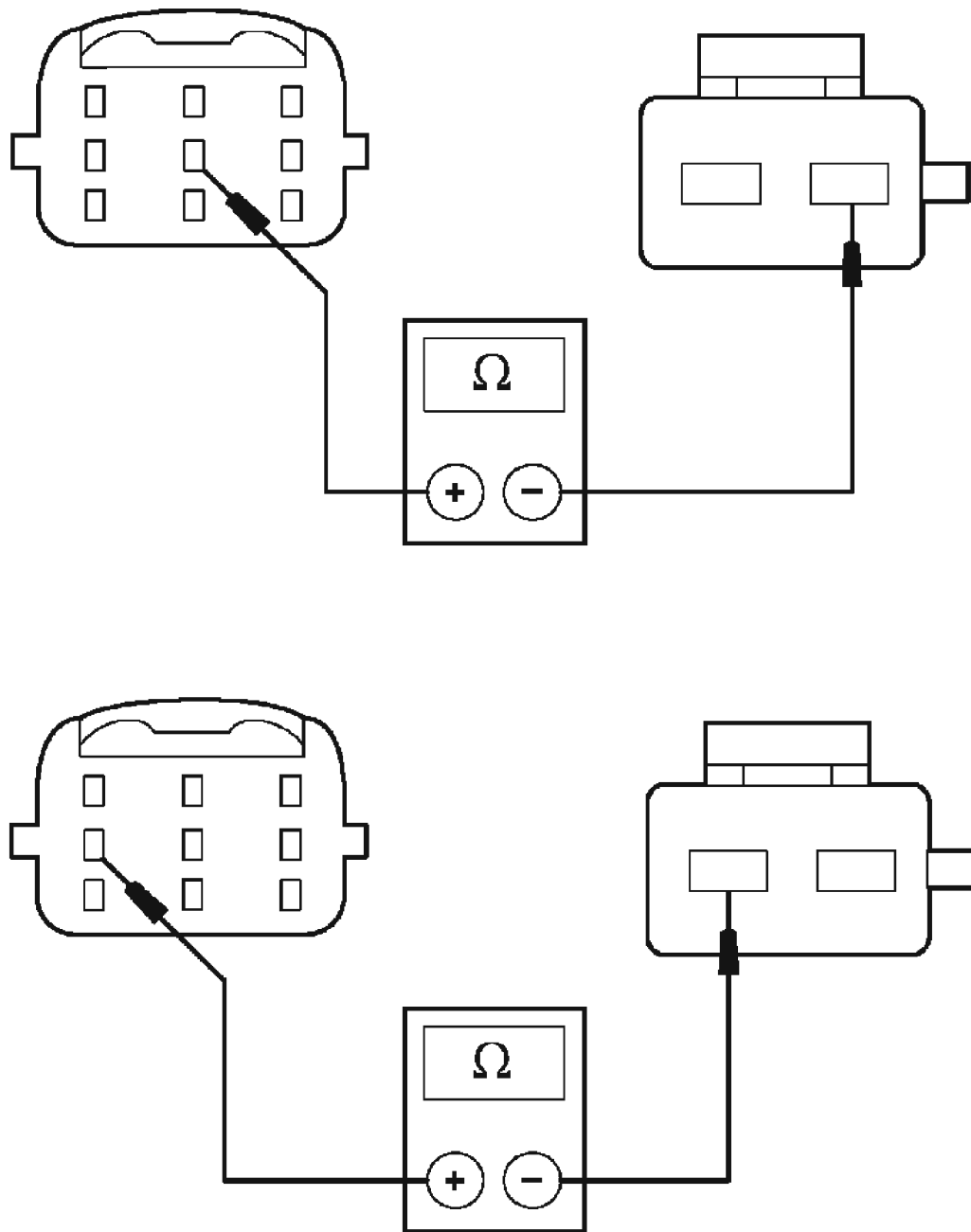
B9 CHECK THE TRANSAXLE INTERNAL HARNESS FOR AN OPEN

- Measure the resistance between transaxle vehicle harness connector pin 5 (component side, transaxle internal harness), and transmission fluid temperature

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2005 TRANSMISSION Automatic Transaxle/Transmission - Focus

sensor internal harness connector pin 5; and between transaxle vehicle harness connector pin 4 (component side, transaxle internal harness), and transmission fluid temperature sensor internal harness connector pin 4.



E0011605

Fig. 47: Checking Transaxle Internal Harness For An Open
Courtesy of FORD MOTOR CO.

- **Is the resistance less than 5 ohms?**

Yes : GO to B10.

No : INSTALL a new transaxle internal harness. TEST the system for normal operation.

B10 CHECK RESISTANCE OF TFT SENSOR

- Measure the resistance between transaxle vehicle harness connector pin 5 (component side, transaxle internal harness), and transaxle vehicle harness connector pin 4 (component side, transaxle internal harness).
- Record the resistance.
- Resistance should be approximately in the following ranges:
 - -20°C (-4°F) - 236-317 K ohms.
 - 0°C (32°F) - 83.2-107 K ohms.
 - 20°C (68°F) - 33.5-41.2 K ohms.
 - 40°C (104°F) - 14.6-17.6 K ohms.
 - 60°C (140°F) - 7.08-8.01 K ohms.
 - 80°C (176°F) - 3.61-4.06 K ohms.
 - 100°C (212°F) - 1.96-2.20 K ohms.
 - 120°C (248°F) - 1.13-1.25 K ohms.
 - 130°C (266°F) - 0.87-0.96 K ohms.
- **Is the resistance in the range?**

Yes : REFER to **DIAGNOSIS BY SYMPTOM** to diagnose an overheating concern.

No : INSTALL a new TFT sensor. TEST the system for normal operation.

PINPOINT TEST C: TRANSMISSION RANGE (TR) SENSOR

NOTE: Refer to the Transmission Range (TR) Sensor Connector illustration preceding these pinpoint tests.

NOTE: Refer to the Transmission Range (TR) Sensor Diagnosis Chart preceding these pinpoint tests.

NOTE: DTC code P0705 may also be set from an open ground in the taillamp circuit. Check and repair taillamp circuit as necessary.

C1 VERIFY TR SENSOR ALIGNMENT

- Using a scan tool, view the TR_D PID to determine if an internal fault is present in

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the transmission range (TR) sensor.

TR_D PID CHART

Range Selection	PID Code
PARK or NEUTRAL	0000
REVERSE	1000
DRIVE	0100
Manual 2	0010
Manual 1	0001

- If an electrical issue exists in the TR sensor electrical circuit, 2 or more binary positions will show 1's.

EXAMPLE OF BINARY POSITION REFERENCE

Range Selection	PID Code	Result
REVERSE or DRIVE	1100 (REVERSE and DRIVE input detected)	High probability of a tail lamp ground concern. Clean grounds.
DRIVE or Manual 1	0101 (DRIVE and MANUAL 1 input detected)	High probability of internal arcing inside the TR sensor.

- Verify TR sensor alignment.
- **Is the TR sensor correctly aligned?**

Yes : GO to C2.

No : ADJUST the TR sensor. TEST the system for normal operation.

C2 VERIFY SHIFT CABLE/LINKAGE ADJUSTMENT

- Verify that the shift cable/linkage is correctly adjusted. REFER to **AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS** .
- **Is the shift cable/linkage correctly adjusted?**

Yes : GO to C3.

No : ADJUST the shift cable/linkage REFER to **AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS** . TEST the system for normal operation.

C3 CHECK POWER SUPPLY TRANSAXLE CIRCUIT FOR AN OPEN

- Disconnect: TR Sensor Connector.
- Key in ON position.

- Measure the voltage between TR sensor connector pin 1, harness side and ground.

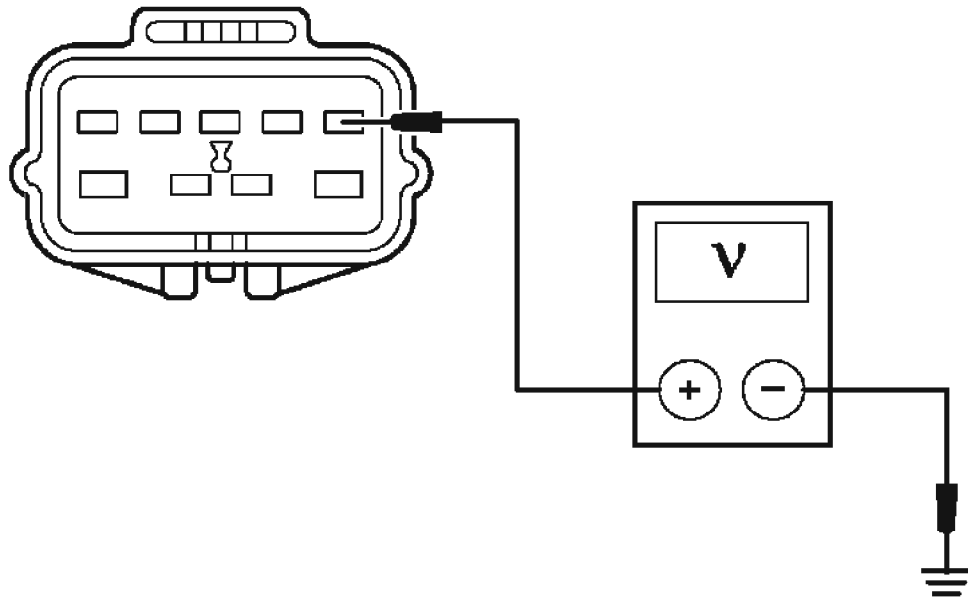
**E0014257**

Fig. 48: Measuring Voltage Between TR Sensor Connector Pin 1, Harness Side And Ground

Courtesy of FORD MOTOR CO.

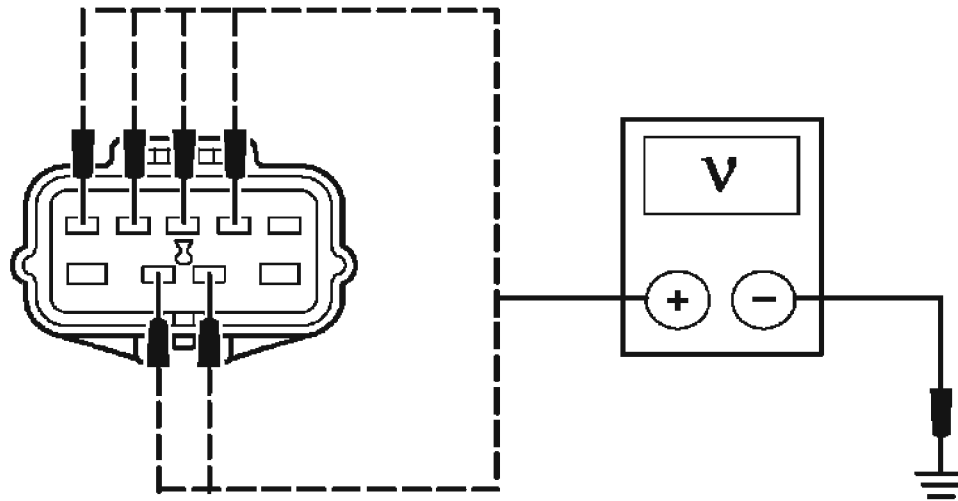
- **Is the voltage greater than 10 volts?**

Yes : GO to C4.

No : REPAIR power supply circuit 15 (GN/OG). TEST the system for normal operation.

C4 CHECK TR SENSOR CIRCUITRY FOR SHORT TO POWER

- Select PARK.
- Key in ON position.
- Measure the voltage between TR sensor connector pins 2, 3, 4, 5, 7 and 8 harness side and ground.



E0011597

Fig. 49: Measuring Voltage Between TR Sensor Connector Pins 2, 3, 4, 5, 7 And 8 Harness Side And Ground
 Courtesy of FORD MOTOR CO.

- Is voltage present?

Yes : GO to C5.

No : GO to C7.

C5 CHECK PCM FOR SHORT TO POWER

- Key in OFF position.
- Disconnect: PCM Connector.
- Key in ON position.
- Measure the voltage between TR sensor connector pins 2, 3, 4, 5, 7 and 8 harness side and ground.

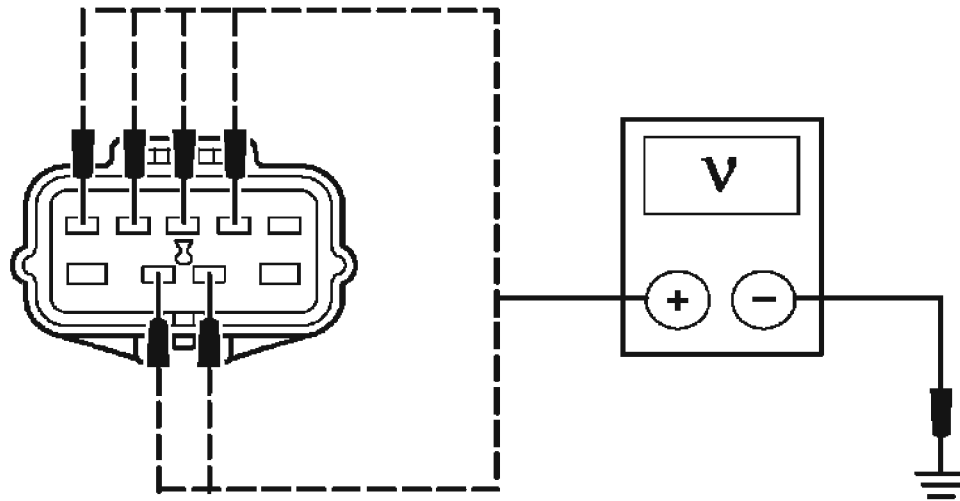
**E0011597**

Fig. 50: Measuring Voltage Between TR Sensor Connector Pins 2, 3, 4, 5, 7 And 8 Harness Side And Ground
Courtesy of FORD MOTOR CO.

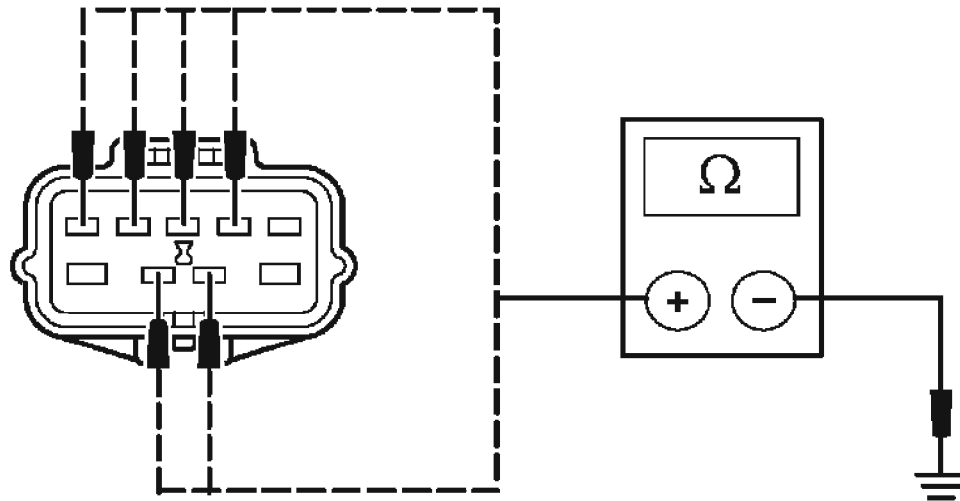
- **Is voltage present?**

Yes : REPAIR the circuit in question. TEST the system for normal operation.

No : INSTALL a new PCM. TEST the system for normal operation.

C6 CHECK VEHICLE HARNESS FOR SHORT TO GROUND

- Key in OFF position.
- Disconnect: PCM Connector.
- Disconnect: Fuse F2.40 (10A).
- Measure the resistance between TR sensor connector pins 2, 3, 4, 5, 7 and 8 harness side and ground.



E0011598

Fig. 51: Measuring Resistance Between TR Sensor Connector Pins 2, 3, 4, 5, 7 And 8 Harness Side And Ground
 Courtesy of FORD MOTOR CO.

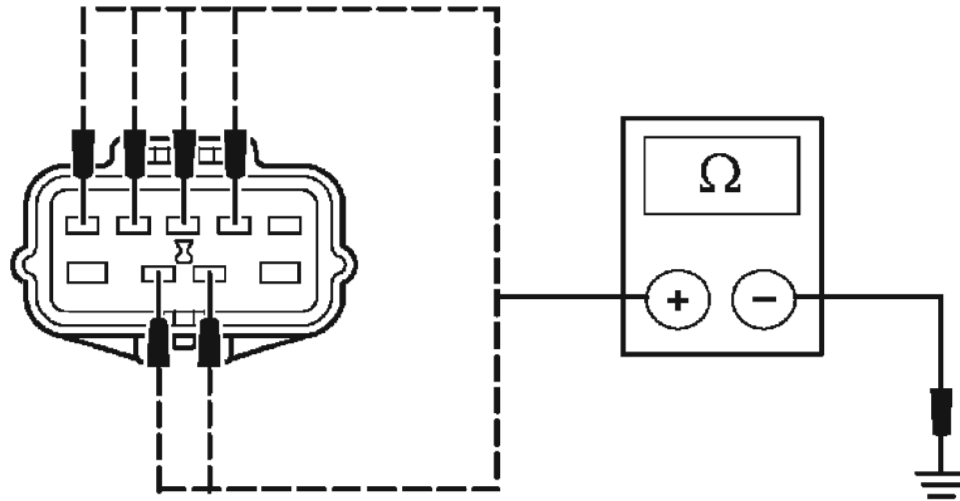
- Is the resistance greater than 10,000 ohms?

Yes : INSTALL a new PCM. TEST the system for normal operation.

No : REPAIR the circuit in question. TEST the system for normal operation.

C7 CHECK TR SENSOR CIRCUITRY FOR SHORT TO GROUND

- Key in OFF position.
- Connect: PCM Connector.
- Disconnect: Fuse F2.40 (10A).
- Measure the resistance between TR sensor connector pins 2, 3, 4, 5, 7 and 8 harness side and ground.



E0011598

Fig. 52: Measuring Resistance Between TR Sensor Connector Pins 2, 3, 4, 5, 7 And 8 Harness Side And Ground
 Courtesy of FORD MOTOR CO.

- Is the resistance greater than 10,000 ohms?

Yes : GO to C8.

No : GO to C6.

C8 CHECK THE TR SENSOR RESISTANCE

- Connect: Fuse F2.40 (10A).
- Measure the resistance between TR sensor connector pins, component side, as follows:
 - PARK position, TR sensor pins 6 and 5, 8 and 9 less than 5 ohms.
 - REVERSE position, TR sensor pins 1 and 4 less than 5 ohms.
 - NEUTRAL position, TR sensor pins 1 and 8 less than 5 ohms.
 - DRIVE position, TR sensor pins 1 and 2 less than 5 ohms.
 - Position, TR sensor pins 1 and 7 less than 5 ohms.
 - Position, TR sensor pins 1 and 3 less than 5 ohms.

- Are the resistances within the expected values?

Yes : INSTALL a new PCM. TEST the system for normal operation.

No : INSTALL a new TR sensor. TEST the system for normal operation.

PINPOINT TEST D: ELECTRONIC PRESSURE CONTROL SOLENOID (PCA)

NOTE: **Refer to the Transaxle Vehicle Harness Connector illustration preceding these pinpoint tests.**

NOTE: **Read and record all DTCs. All TR sensor and OSS DTCs must be repaired before entering Output State Control (OSC).**

D1 ELECTRONIC DIAGNOSTICS SET UP

- Key in OFF position.
- Shift selector lever to position "P".
- Check to make sure the transaxle harness connector is fully seated, terminals are fully engaged in the connector and in good condition before proceeding.
- Install 300 psi pressure gauge into line tap.
- Connect the scan tool.
- Key in START position.
- Start and run the engine.
- Enter the following diagnostic mode on the scan tool: Diagnostic Data Link.
- Enter the following diagnostic mode on the scan tool: PCM.
- Enter the following diagnostic mode on the scan tool: Active Command Modes.
- Enter the following diagnostic mode on the scan tool: Output State Control (OSC).
- Enter the following diagnostic mode on the scan tool: Trans-Bench Mode.
- **Does the vehicle enter the Trans-Bench Mode?**

Yes : REMAIN in Trans-Bench Mode. GO to D2.

No : REPEAT procedure to ENTER Trans-Bench Mode. If vehicle did not enter OSC, See **INTRODUCTION - GASOLINE** article for diagnosis of PCM.

D2 SOLENOID FUNCTIONAL TEST

- Monitor pressure gauge.
- Enter the following diagnostic mode on the scan tool: Parameter; PCA.
- Select PCA
- Increase engine speed above 1,500 RPM.
- Select value: 50, 70, 90, 110, 130 or 150 psi.
- Press "SEND".

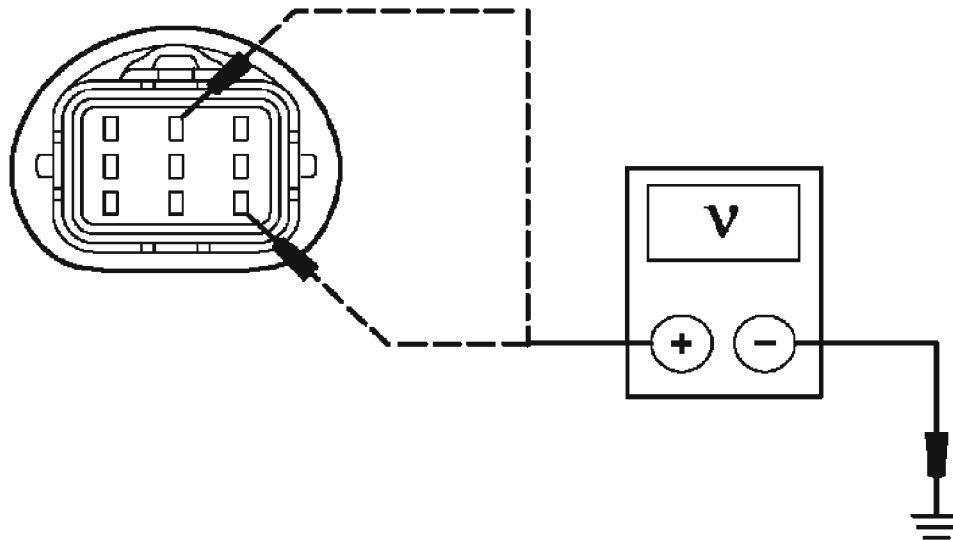
- Select another value "50-150 psi".
- Press "SEND".
- Enter the following diagnostic mode on the scan tool: XXX.
- Press "SEND".
- **Does the pressure reading match the commanded pressure?**

Yes : CLEAR DTCs. TEST the system for normal operation.

No : GO to D3.

D3 CHECK VEHICLE HARNESS AND POWERTRAIN CONTROL MODULE FOR SHORT TO POWER

- Key in OFF position.
- Disconnect: Transaxle Vehicle Harness Connector.
- Visually inspect all wires and connectors for damage.
- Key in ON position.
- Measure the voltage between transaxle vehicle harness connector pin 7, harness side and ground; and between transaxle vehicle harness connector pin 2, harness side and ground.



E0011601

Fig. 53: Checking Vehicle Harness And Powertrain Control Module For Short To Power

Courtesy of FORD MOTOR CO.

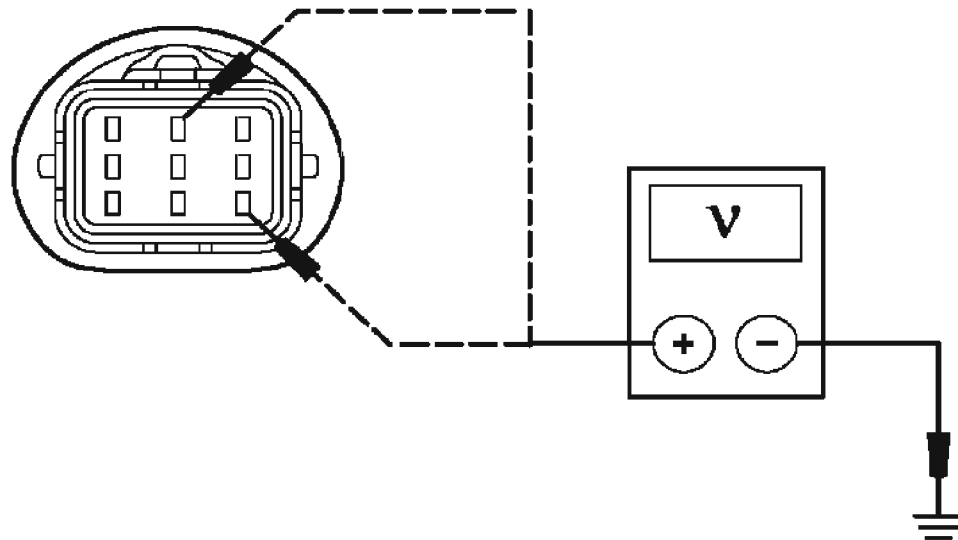
- **Is voltage present?**

Yes : GO to D4.

No : GO to D5.

D4 CHECK VEHICLE HARNESS FOR SHORT TO POWER

- Key in OFF position.
- Disconnect: PCM Connector.
- Key in ON position.
- Measure the voltage between transaxle vehicle harness connector pin 7, harness side and ground; and between transaxle vehicle harness connector pin 2, harness side and ground.



E0011601

Fig. 54: Checking Vehicle Harness For Short To Power

Courtesy of FORD MOTOR CO.

- **Is voltage present?**

Yes : REPAIR the circuit. TEST the system for normal operation.

No : INSTALL a new PCM. TEST the system for normal operation.

D5 CHECK ELECTRICAL SIGNAL

- Measure the voltage between transaxle vehicle harness connector pin 7, harness side and transaxle vehicle harness connector pin 2, harness side.
- Activate solenoids (ON and OFF) while monitoring the voltage reading.
- Enter the following diagnostic mode on the scan tool: Trans-Bench Mode.
- Enter the following diagnostic mode on the scan tool: Parameter; PCA.
- Select a value "50-150 psi".
- Press "SEND".
- Select another value "50-150 psi".
- Press "SEND".
- Enter the following diagnostic mode on the scan tool: XXX.
- Press "SEND".

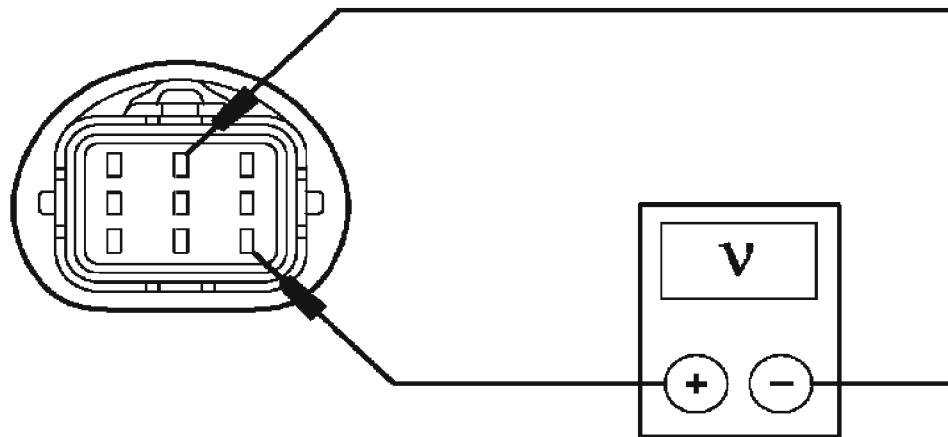
**E0011602**

Fig. 55: Measuring Voltage Between Transaxle Vehicle Harness Connector Pin 7 And 2, Harness Side

Courtesy of FORD MOTOR CO.

- **Does the voltage change?**
Yes : GO to D6.
No : CHECK for open or short circuit in harness or PCM.

D6 CHECK THE TRANSAXLE INTERNAL HARNESS FOR SHORT TO GROUND

- Key in OFF position.
- Disconnect: PCA Solenoid Electrical Connector.
- Measure the resistance between transaxle vehicle harness connector pin 2 (component side, transaxle internal harness), and ground; and between transaxle vehicle harness connector pin 7 (component side, transaxle internal harness), and ground.

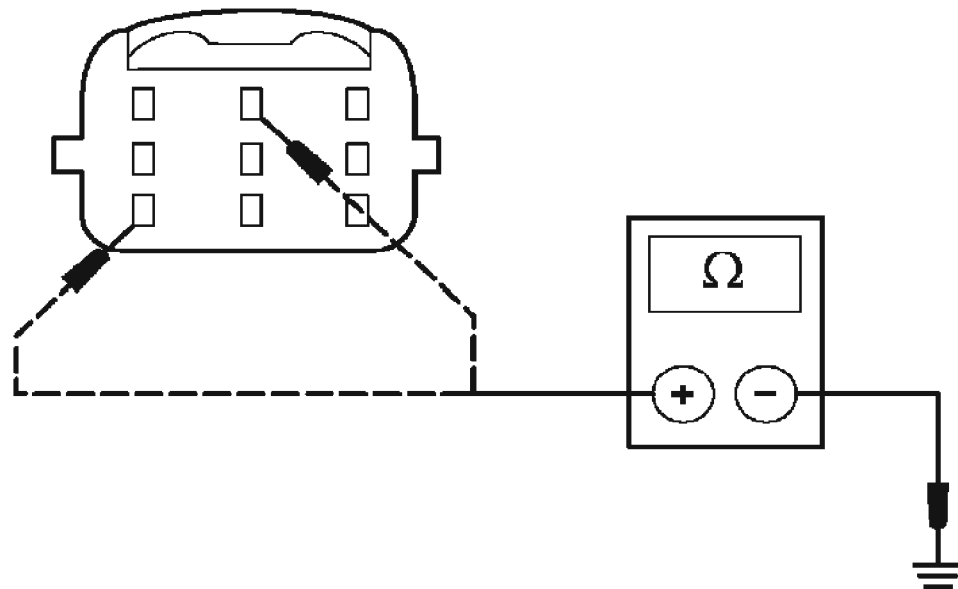
**E0011606**

Fig. 56: Checking Transaxle Internal Harness For Short To Ground
Courtesy of FORD MOTOR CO.

- Is the resistance greater than 10,000 ohms?
Yes : GO to D7.
No : INSTALL a new transaxle internal harness. TEST the system for normal operation.

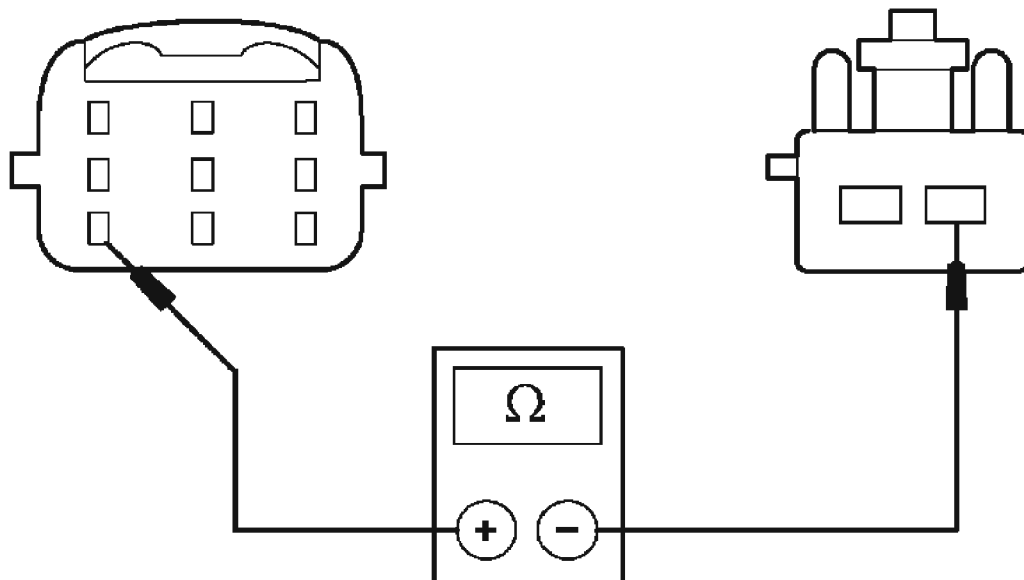
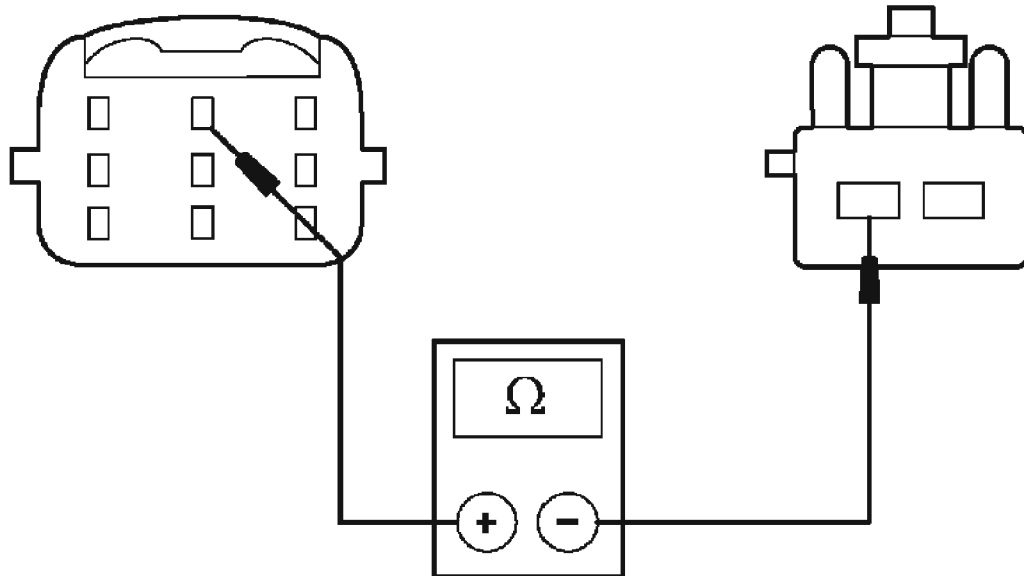
D7 CHECK THE TRANSAXLE INTERNAL HARNESS FOR AN OPEN

- Measure the resistance between transaxle vehicle harness connector pin 2 (component side, transaxle internal harness), and transaxle internal harness connector

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2005 TRANSMISSION Automatic Transaxle/Transmission - Focus

pin 2; and between transaxle vehicle harness connector pin 7 (component side, transaxle internal harness), and transaxle internal harness connector pin 7.



E0011607

Fig. 57: Checking Transaxle Internal Harness For An Open
Courtesy of FORD MOTOR CO.

- **Is the resistance less than 5 ohms?**

Yes : GO to D8.

No : INSTALL a new transaxle internal harness. TEST the system for normal operation.

D8 CHECK SOLENOID RESISTANCE AT SOLENOID

- Key in OFF position.
- Measure and record the resistance between PCA solenoid pins.
- **Is the resistance between 2.4 and 7.3 ohms?**

Yes : GO to D9.

No : INSTALL a new PCA solenoid. TEST the system for normal operation.

D9 CHECK SOLENOID FOR SHORT TO GROUND

- Measure and record the resistance between the PCA solenoid and the solenoid body.
- **Is the resistance greater than 10,000 ohms?**

Yes : REFER to **DIAGNOSIS BY SYMPTOM** for diagnosis of pressure concerns. TEST the system for normal operation.

No : INSTALL a new PCA solenoid. TEST the system for normal operation.

PINPOINT TEST E: TURBINE SHAFT SPEED (TSS) SENSOR AND OUTPUT SHAFT SPEED (OSS) SENSOR

NOTE: **Refer to the turbine shaft speed (TSS) sensor and output shaft speed (OSS) sensor connector illustrations preceding these pinpoint tests.**

E1 ELECTRONIC DIAGNOSTICS SET UP

- Check to make sure the transaxle harness connectors are fully seated, terminals are fully engaged in the connector and in good condition before proceeding.
- Connect the scan tool.
- Key in ON position.
- Enter the following diagnostic mode on the scan tool: Diagnostic Data Link.
- Enter the following diagnostic mode on the scan tool: PCM.
- Select Trans Priority.
- Select PID/Data Monitor and Record.
- Select the following PIDs: TSS or OSS.

- **Does vehicle enter PID/Data Monitor and Record?**

Yes : REMAIN in PID/Data. GO to E2.

No : REPEAT procedure to ENTER PID. If vehicle did not enter PID, See **INTRODUCTION - GASOLINE** article for diagnosis of PCM.

E2 DRIVE CYCLE TEST

- While monitoring the appropriate sensor PID, drive the vehicle so that the transaxle upshifts and downshifts through all gears.
- **Does the TSS or OSS Speed PID increase and decrease with engine and vehicle speed?**

Yes : GO to E3.

No : If the TSS or OSS Speed PID does not increase and decrease with engine and vehicle speed, INSPECT for open or short in vehicle harness STGT, sensor, a PCM concern or internal hardware concern. GO to E4.

E3 DRIVE CYCLE TEST ERRATIC

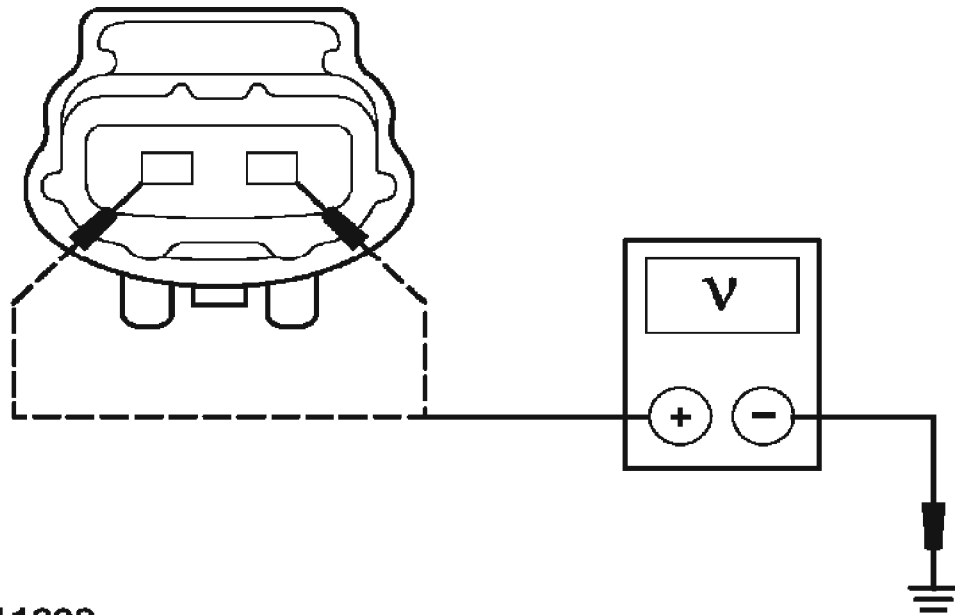
- While monitoring the appropriate sensor PID, drive the vehicle so that the transaxle upshifts and downshifts through all gears.
- **Is the TSS or OSS Speed PID signal erratic (drop to zero or near zero and return to normal operation)?**

Yes : If the sensor signal is erratic, INSPECT for intermittent concern in the harness, sensor or connector. GO to E4.

No : CLEAR all DTCs. Rerun OBD.

E4 CHECK POWERTRAIN CONTROL MODULE AND HARNESS FOR POWER

- Key in OFF position.
- Disconnect: TSS Sensor Connector.
- Disconnect: OSS Sensor Connector.
- Key in ON position.
- For TSS, measure the voltage between TSS sensor connector pin 1, harness side and ground; and between TSS sensor connector pin 2, harness side and ground.
- For OSS, measure the voltage between OSS connector pin 1, harness side and ground; and between OSS connector pin 2, harness side and ground.



E0011603

Fig. 58: Checking Powertrain Control Module And Harness For Power
Courtesy of FORD MOTOR CO.

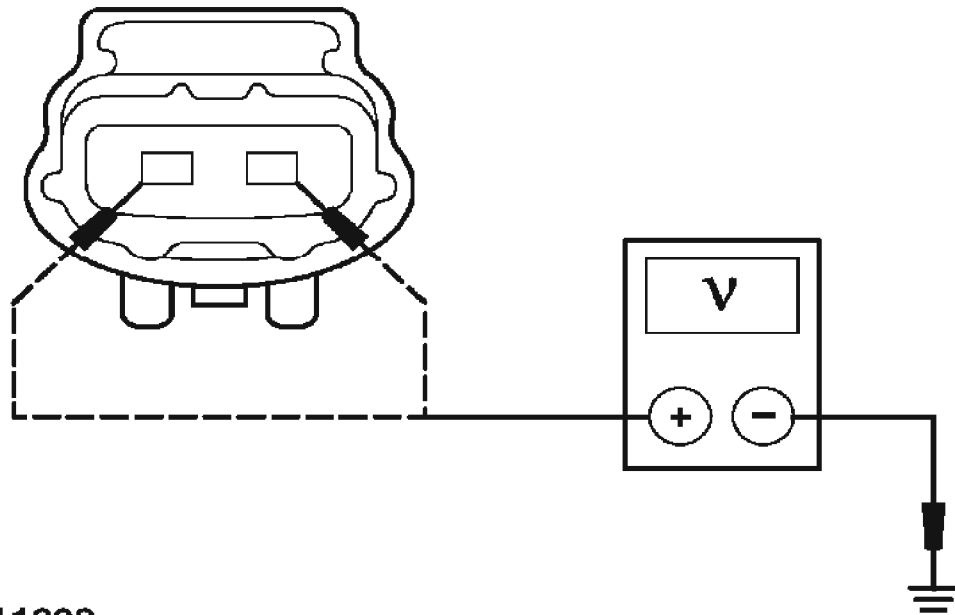
- **Is there any voltage?**

Yes : GO to E5.

No : GO to E6.

E5 CHECK HARNESS FOR SHORT TO POWER

- Key in OFF position.
- Disconnect: PCM Connector.
- Key in ON position.
- For TSS, measure the voltage between TSS sensor connector pin 1, harness side and ground; and between TSS sensor connector pin 2, harness side and ground.
- For OSS, measure the voltage between OSS connector pin 1, harness side and ground; and between OSS connector pin 2, harness side and ground.



E0011603

Fig. 59: Checking Harness For Short To Power
Courtesy of FORD MOTOR CO.

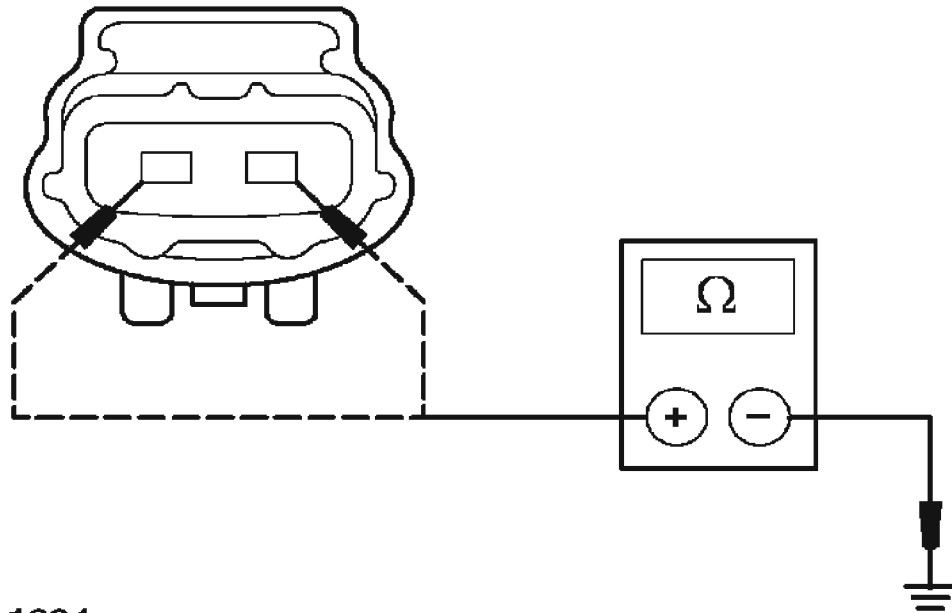
- **Is there any voltage?**

Yes : REPAIR the circuit in question. TEST the system for normal operation.

No : INSTALL a new PCM. TEST the system for normal operation.

E6 CHECK POWERTRAIN CONTROL MODULE AND HARNESS FOR GROUND

- Key in OFF position.
- Connect: PCM C415.
- For TSS, measure the resistance between TSS sensor connector pin 1, harness side and ground; and between TSS sensor connector pin 2, harness side and ground.
- For OSS, measure the resistance between OSS connector pin 1, harness side and ground; and between OSS connector pin 2, harness side and ground.



E0011604

Fig. 60: Checking Powertrain Control Module And Harness For Ground
Courtesy of FORD MOTOR CO.

- Is the resistance greater than 10,000 ohms?

Yes : GO to E8.

No : GO to E7.

E7 CHECK HARNESS FOR SHORT TO GROUND

- Key in OFF position.
- Disconnect: PCM Connector.
- For TSS, measure the resistance between TSS sensor connector pin 1, harness side and ground; and between TSS sensor connector pin 2, harness side and ground.
- For OSS, measure the resistance between OSS connector pin 1, harness side and ground; and between OSS connector pin 2, harness side and ground.

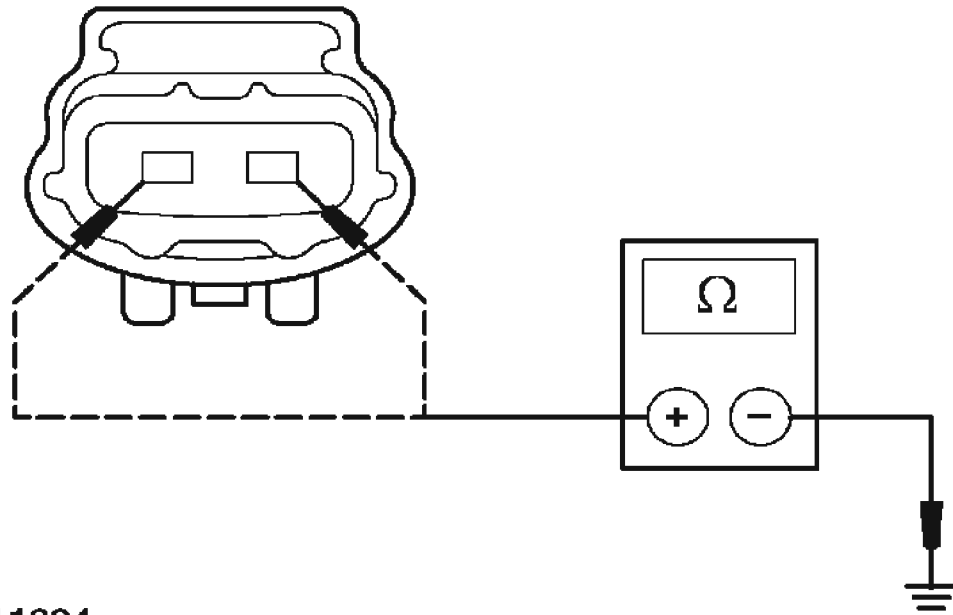
**E0011604**

Fig. 61: Checking Harness For Short To Ground
Courtesy of FORD MOTOR CO.

- **Is the resistance greater than 10,000 ohms?**

Yes : INSTALL a new PCM. TEST the system for normal operation.

No : REPAIR the circuit in question. TEST the system for normal operation.

E8 CHECK RESISTANCE OF TSS OR OSS SENSOR

- For TSS sensor, measure the resistance between TSS sensor connector pin 1, component side and TSS sensor connector pin 2, component side.
- For OSS, measure the resistance between OSS connector pin 1, component side and OSS connector pin 2, component side.
- Record the resistance. Resistance should be as follows:
 - OSS 675-775 ohms at -20°C (-4°F).
 - OSS 800-920 ohms at 21 °C (70°F).
 - OSS 1210-1390 ohms at 160°C (302°F).
 - TSS 273-333 ohms at -20°C (-4°F).
 - TSS 330-390 ohms at 21 °C (70°F).
 - TSS 487-601 ohms at 160°C (302°F).

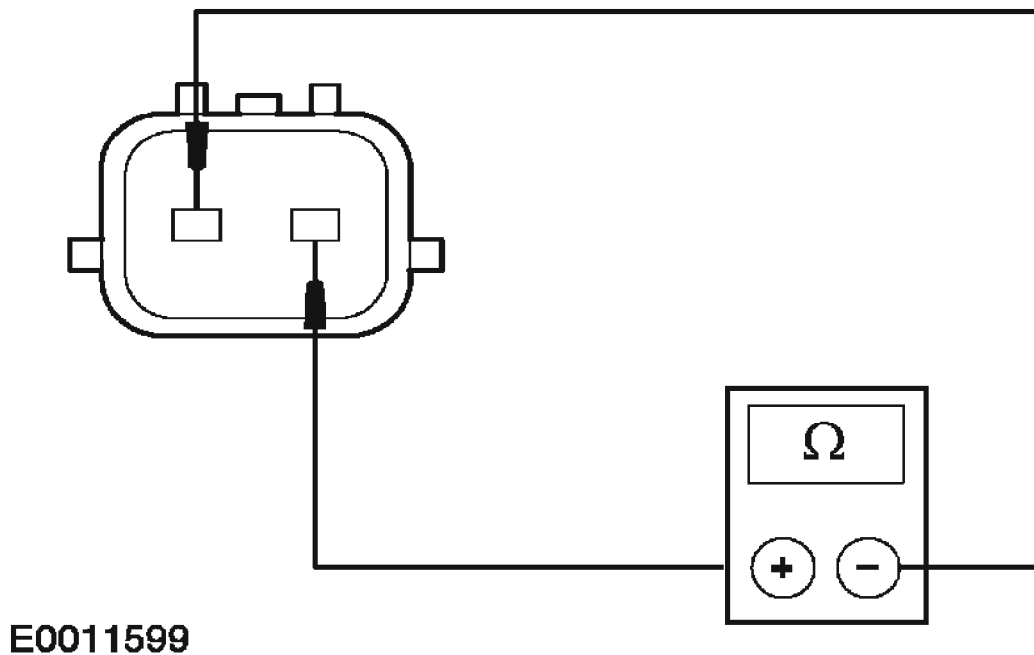


Fig. 62: Checking Resistance Of TSS Or OSS Sensor
Courtesy of FORD MOTOR CO.

- **Is the resistance within specification for the appropriate sensor?**

Yes : GO to E9.

No : INSTALL a new sensor. TEST the system for normal operation.

E9 CHECK SENSORS FOR SHORT TO GROUND

- For TSS sensor, measure the resistance between TSS sensor connector pin 1, component side and ground.
- For OSS, measure the resistance between OSS connector pin 1, component side and ground.

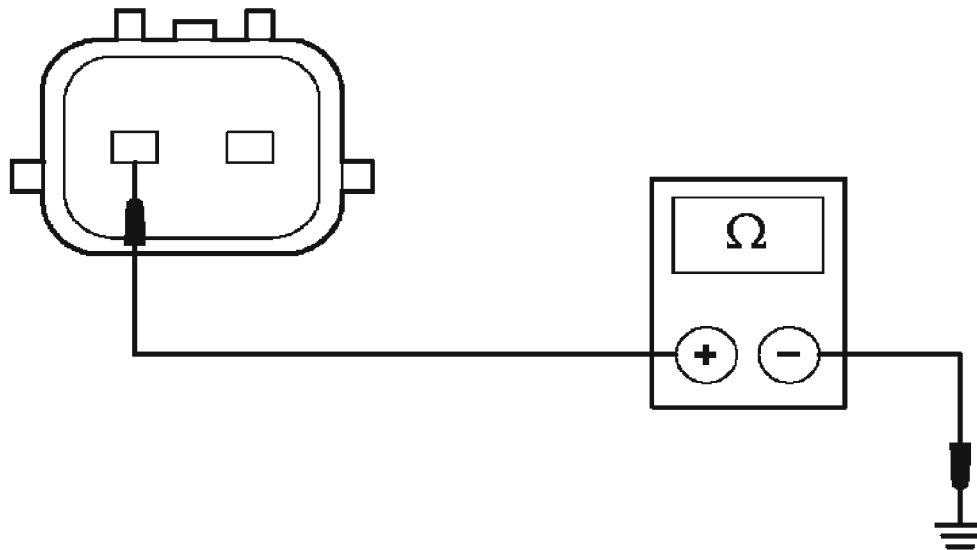
**E0011600**

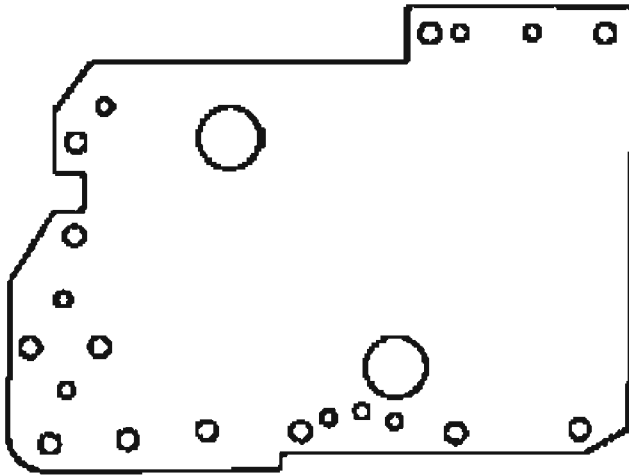
Fig. 63: Checking Sensors For Short To Ground
Courtesy of FORD MOTOR CO.

- **Is the resistance greater than 10,000 ohms?**
Yes : INSTALL a new TSS sensor or OSS. TEST the system for normal operation.
No : REFER to **DIAGNOSIS BY SYMPTOM**, for diagnosis of shift or torque converter concerns.

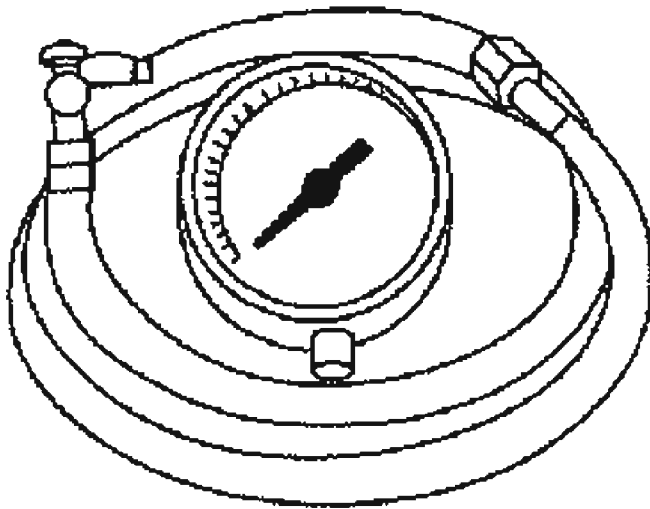
SPECIAL TESTING PROCEDURES

SPECIAL TOOL SPECIFICATION

	Air Test Plate and Gasket 307-412
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ST2755A



ST1565-A

Hydraulic Pressure Gauge 307-132
(17-014)

portion of the transaxle.

Engine Idle Speed Check

See **INTRODUCTION - GASOLINE** article for diagnosis and testing of the engine idle speed.

Line Pressure Test

CAUTION: Carry out the Line Pressure Test prior to carrying out the Stall Speed Test. If line pressure is low at stall, do not carry out the Stall Speed Test or further transaxle damage will occur. Do not maintain wide open throttle in any gear range for more than 5 seconds.

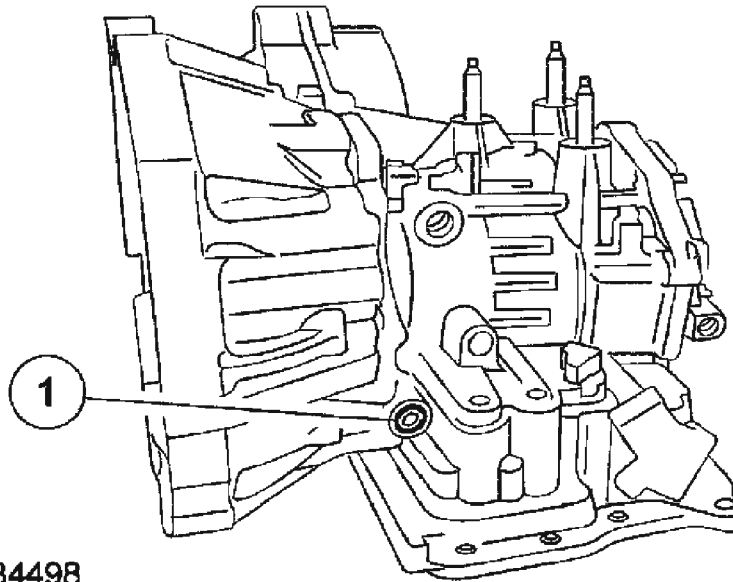
NOTE: Certain sensor failures may cause high PC, FMEM (Failure Mode Effect Management) actions. Make sure that self-test and electrical repairs have been carried out, or test results may be incorrect.

This test verifies that the line pressure is within specifications.

1. Connect pressure gauge to the line pressure tap.
2. Start engine and check line pressures. Refer to the following **LINE PRESSURE CHART** to determine if line pressure is within specifications.
3. If line pressure is not within specification, refer to **LINE PRESSURE DIAGNOSIS CHART** for line pressure concern causes.

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Item	Part Number	Description
1	W701515-S309	Line pressure tap

Fig. 64: Identifying Line Pressure Tap
Courtesy of FORD MOTOR CO.

LINE PRESSURE CHART

Trans.	Range	Idle		Stall	
4F27E	P, N	345-450 kPa	50-65 psi	1,240-1,450 kPa	180-210 psi
	R	450-585 kPa	65-85 psi	1,930-2,310 kPa	280-335 psi
	D, 2, 1	345-450 kPa	50-65 psi	1,240-1,450 kPa	180-210 psi

LINE PRESSURE DIAGNOSIS CHART

Test Results	Possible Source
Low pressure in all ranges	Worn pump.
Low pressure in all ranges	Fluid leaking from pump, main control valve

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	body or transaxle case.
Low pressure in all ranges	Pressure control solenoid inoperative.
Low pressure in all ranges	Solenoid regulating valve sticking.
Low pressure in D, 2, 1 only	Fluid leaking from forward clutch hydraulic circuit.
Low pressure in 2	Fluid leaking from intermediate/overdrive band hydraulic circuit.
Low pressure in 1, R only	Fluid leaking from low/reverse clutch hydraulic circuit.
Low in R only	Fluid leaking from reverse clutch hydraulic circuit.
High pressure in all ranges	Pressure control solenoid inoperative or open wire harness.
High pressure in all ranges	Pressure regulator valve sticking.
High pressure in all ranges	PCM inoperative.

Stall Speed Test

This test checks operation of the following items:

- Torque converter clutch
- Forward clutch
- Low one way clutch assembly
- Engine performance

WARNING: Apply the parking brake firmly while carrying out each stall test.

CAUTION: Always carry out the Line Pressure Test procedures prior to carrying out the Stall Speed Test. If line pressure is low at stall, do not carry out the Stall Speed Test or further transaxle damage will occur.

NOTE: The Stall Speed Test should be carried out with the engine and transaxle at normal operating temperatures.

1. Connect tachometer to the engine.

CAUTION: After testing each of the following ranges D, 2, 1 and R, move the selector lever to N (NEUTRAL) and run the engine at 1,000 RPM for about 15 seconds to allow the torque converter to cool before testing the next range.

CAUTION: Do not maintain wide open throttle in any range for more than 5 seconds.

CAUTION: If the engine RPM recorded by the tachometer exceeds maximum specified RPM, release the accelerator pedal immediately. Clutch or band slippage is indicated.

NOTE: Prolonged use of this procedure may set Diagnostic Trouble Code P0712, P1783. After carrying out Stall Speed Test, run OBD Test and clear DTCs from memory.

2. Press accelerator pedal to floor (WOT) in each range. Record RPM reached in each range. Stall speeds should be as follows:

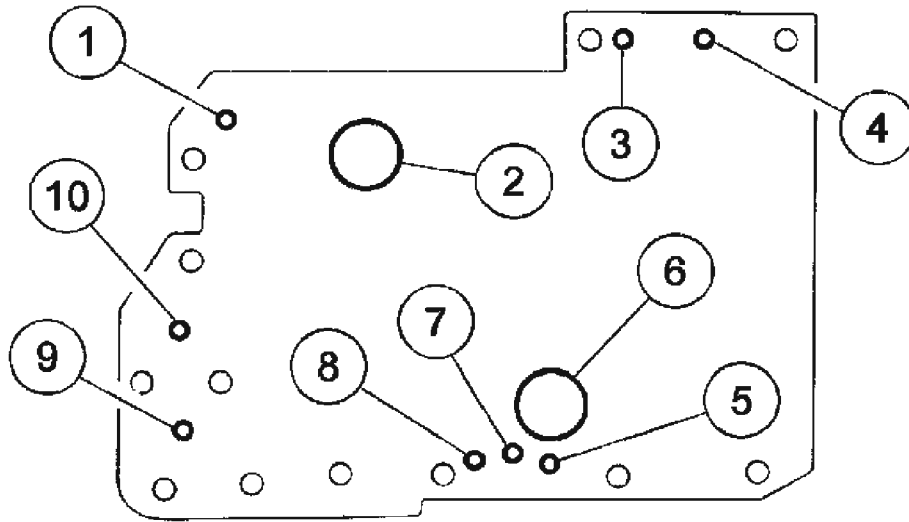
STALL SPEED CHART

Engine	RPM
All	2,200-2,700

3. If stall speeds were too high, refer to the following **STALL SPEED DIAGNOSIS CHART**. If stall speeds were too low, first check the engine idle speed. If engine idle is OK, remove torque converter and check the torque converter one-way clutch for slippage.

STALL SPEED DIAGNOSIS CHART

Transaxle Range Selector Lever Position	Possible Cause
Above specification in D, 2 and 1	Forward clutch slipping.
Above specification in 2	Intermediate/overdrive band slipping.
Above specification in 1 and R	Low/reverse clutch slipping.
Above specification in R	Reverse clutch slipping.
Above specification in R	Carry out road test to determine whether problem is in low/reverse clutch.
Above specification in R	Low/reverse clutch is defective.



N0034499

Item	Part Number	Description
1	—	Servo release
2	—	Servo apply
3	—	Direct clutch apply
4	—	Reverse clutch apply
5	—	Torque converter bypass
6	—	Low/reverse clutch
7	—	Torque converter charge
8	—	Forward clutch apply
9	—	Servo accumulator apply
10	—	Forward servo accumulator apply

Fig. 65: Identifying Testing Transaxle Air Pressure Plate
 Courtesy of FORD MOTOR CO.

A no-drive condition can exist even with correct transaxle fluid pressure because of inoperative clutches or bands. An erratic shift can be located through a series of checks by substituting air pressure for fluid pressure to determine the location of the failure.

Follow the procedure to determine the location of the inoperative clutch or band by introducing air pressure into the various test plate passages.

NOTE: Use only dry, regulated 3 bar maximum air pressure.

Apply air to the appropriate passage(s). A dull thud should be felt or heard or movement should be observed when the component applies. There should be no hissing sound when the component is fully applied.

1. Drain transaxle fluid and remove the transaxle fluid pan.
2. Remove the main control valve body. Refer to **MAIN CONTROLS**.
3. Install the transmission test plate and gasket. Use the transmission fluid pan bolts to hold the test plate down. Tighten the bolts to 10 Nm (89 lb-in).
4. Apply air to the appropriate clutch port (refer to the diagram). A dull thud may be heard or movement felt when the component is applied or released. If clutch seals or check balls are leaking, a hissing sound may be heard.

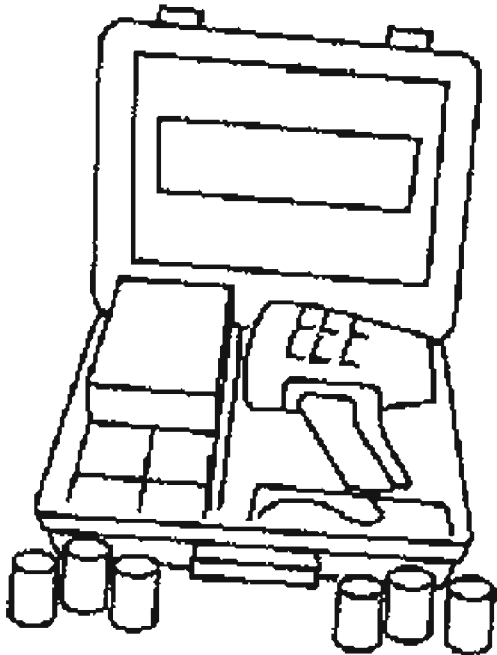
If test results indicate that the servos do not operate, disassemble, clean and inspect them to locate the source of the concern.

If air pressure applied to the clutch passages fails to operate a clutch, or operates another clutch simultaneously, disassemble and use air pressure to check the fluid passages in the center support and clutches to detect obstructions.

LEAKAGE INSPECTION

SPECIAL TOOL SPECIFICATION

	100W/12 volt DC UV Lamp 164-R0751
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ST1300-A

CAUTION: Do not try to stop the fluid leak by increasing the torque beyond specifications. This may cause damage to the case threads.

Check the fluid filler tube at the transaxle case. If leakage is found here, install a new plug.

Check fluid tubes and fittings between the transaxle and the cooler for looseness, wear or damage. If leakage cannot be stopped by tightening a fluid tube nut, install new parts.

If the leak continues, install a new cooler line fitting and tighten to specification. The same procedure should be followed for fluid leaks between the cooler and the cooler line fittings. Refer to TRANSAXLE/TRANSMISSION COOLING .

The cooler can be further checked for leaks. Refer to TRANSAXLE/TRANSMISSION COOLING .

If leakage is found at the transaxle range selector lever, install a new seal.

If leakage is found at the transaxle harness connector, install a new O-ring.

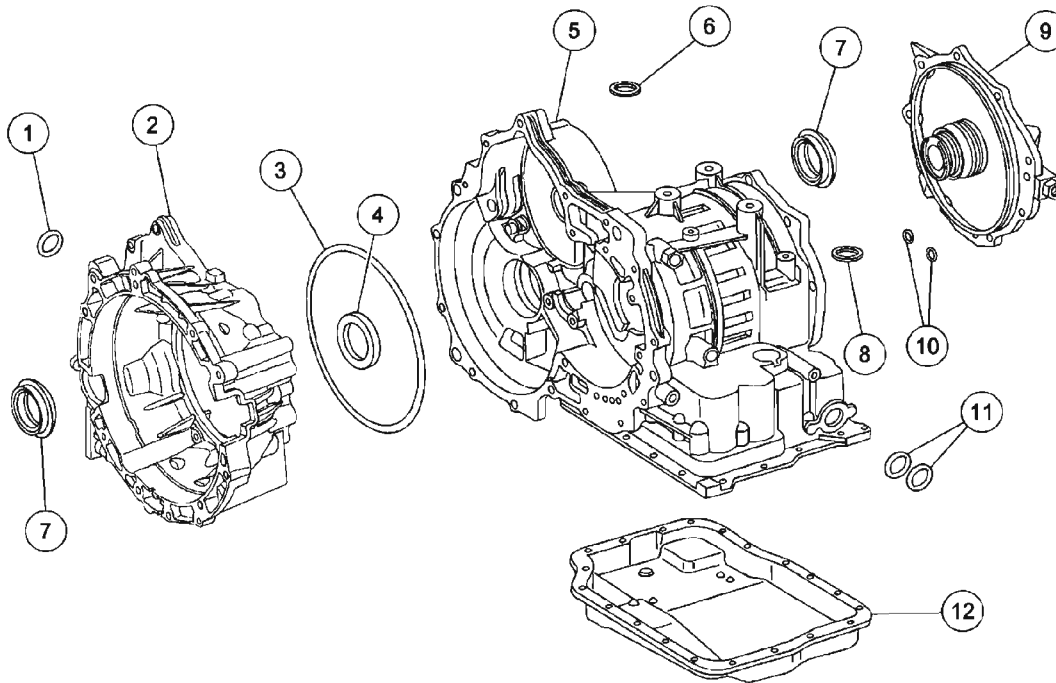
The transaxle has the following parts to prevent external fluid leakage:

- Sealer
- Lip-type seals
- O-ring seals
- Seal rings
- Seal grommets
- Thread sealant
- Pan fluid

External Sealing

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N0034500

Item	Part Number	Description
1	W706315-S300	O-ring — Output shaft speed (OSS) sensor
2	—	Converter housing (sealant-to-case)
3	7A248	Seal — Fluid pump
4	7A248	Seal — Pump fluid
5	—	Case (sealant-to-converter housing)
6	W706316-S300	O-ring — Turbine shaft speed (TSS) sensor
7	1177	Seal assembly — Differential
8	—	O-ring — Bulkhead wiring connector
9	7222	Cover assembly — End (sealant-to-case)
10	7R284	Seals — Case cover (2 end cover-to-case)
11	7B498	Seals — Manual shaft — Fluid (2 required)
12	—	Pan — Fluid (sealant-to-case)

Fig. 66: Exploded View Of External Sealing
Courtesy of FORD MOTOR CO.

Fluid Leakage in Torque Converter Area

In diagnosing and correcting fluid leaks in the pump support and gear and torque converter area, use the following procedures to locate the exact cause of the leakage. Leakage between the transaxle and engine, as evidenced by fluid around the torque converter housing, may have several sources. By careful observation it is possible, in many instances, to pinpoint the source of leakage before removing the transaxle from the vehicle. The paths which the fluid takes to reach the bottom of the torque converter housing are shown in the illustration. The 5 steps following correspond with the numbers in the illustration.

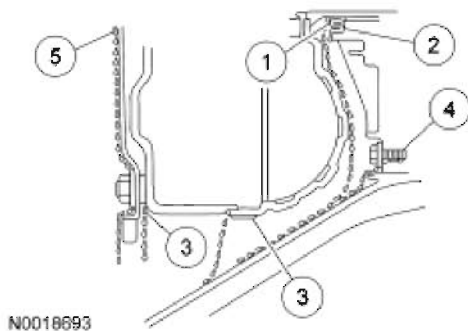


Fig. 67: Identifying Torque Converter Fluid Leakage Area
Courtesy of FORD MOTOR CO.

1. Fluid leaking by the pump seal lip will tend to move along the impeller hub and onto the back of the impeller housing. Except in the case of a total seal failure, fluid leakage by the lip of the seal will be deposited on the inside of the torque converter housing only, near the outside diameter of the housing. Fluid from the vent assembly may move along the impeller hub and onto the back of the impeller housing. Fluid from a converter hub weld leak will move along a path on the inside of the converter housing.
2. Fluid leakage by the outside diameter of the pump seal and pump body will follow the same path that leaks by the inside diameter of the pump seal follow. Fluid from a converter hub weld leak will move along a path on the inside of the converter housing.
3. Fluid leakage from the converter drain plug, (model-dependent) converter seal weld or converter-to-flexplate stud weld will appear at the outside diameter of the torque converter on the back face of the flexplate, and in the converter housing only near the flexplate. Fluid leaks from the torque converter will leave a ring of fluid around the inside of the torque converter housing.
4. Fluid that leaks by a pump-to-case screw or pump gasket will be deposited on the inside of the torque converter housing only. Fluid will not be deposited on the back of the torque converter.

NOTE: White facial tissue paper may aid in determining the color (red

is transaxle fluid) and source of the leaking fluid.

5. Engine oil leaks are sometimes incorrectly diagnosed as transaxle pump gasket leaks. The following areas of possible leakage should also be checked to determine if engine oil leakage is causing the concern.
 - a. Leakage at the valve cover gasket may allow oil to flow over the torque converter housing or seep down between the torque converter housing and cylinder block causing oil to be present in or at the bottom of the torque converter housing.
 - b. Oil galley plug leaks will allow oil to flow down the rear face of the cylinder block to the bottom of the torque converter housing.
 - c. Leakage at the crankshaft rear oil seal will work back to the flexplate, and then into the torque converter housing.

Leak Check Test

1. Original factory fill fluid is dyed red to aid in determining if leakage is from the engine or transaxle. The red color should assist in pinpointing the leak.
2. Clean off any fluid from the top and bottom of the torque converter housing, the case and the rear face of the engine and oil pan. Clean the torque converter area by washing with a suitable nonflammable solvent and blow dry with compressed air.
3. Wash out the torque converter housing, and the front of the flexplate. The torque converter housing may be washed out using cleaning solvent and a squirt-type oil can. Blow all washed areas dry with compressed air.
4. Start and run the engine until the transaxle reaches its normal operating temperature. Observe the back of the cylinder block and the top of the torque converter housing for evidence of fluid leakage. Raise the vehicle on a hoist; refer to **JACKING AND LIFTING** and run the engine at fast idle, then at engine idle, occasionally shifting to the D and R positions to increase pressure within the transaxle. Observe the front of the flexplate, back of the cylinder block (in as far as possible), and inside the torque converter housing and front of the case. Run the engine until fluid leakage is evident and the probable source of leakage can be determined.

Leak Check Test With Black Light

Fluid soluble aniline or fluorescent dyes premixed at the rate of 2.5ml (1/2 teaspoon) of dye powder to 0.24L (1/2 pint) of automatic transaxle fluid have proven helpful in locating the source of fluid leakage. Such dyes may be used to determine whether an engine fluid or transaxle fluid leak is present. An ultraviolet light must be used to detect the fluorescent dye solution.

TRANSMISSION FLUID COOLER

CAUTION: Whenever the transaxle has been disassembled to install new parts, clean and backflush the transaxle fluid cooler tubes and install a new transaxle fluid cooler.

NOTE: Cleaning and backflushing the transaxle fluid cooling system along with normal cleaning and inspection procedures as outlined in this article during disassembly and reassembly will keep contamination from reentering the transaxle and causing a repeat repair.

When internal wear or damage has occurred in the transaxle, metal particles, clutch plate material, or band material may have been carried into the torque converter and transaxle fluid cooler. These contaminants are a major cause of recurring transaxle troubles and must be removed from the system before the transaxle is put back in use.

Transaxle Fluid Cooler Flow Test

Refer to **TRANSAXLE/TRANSMISSION COOLING** .

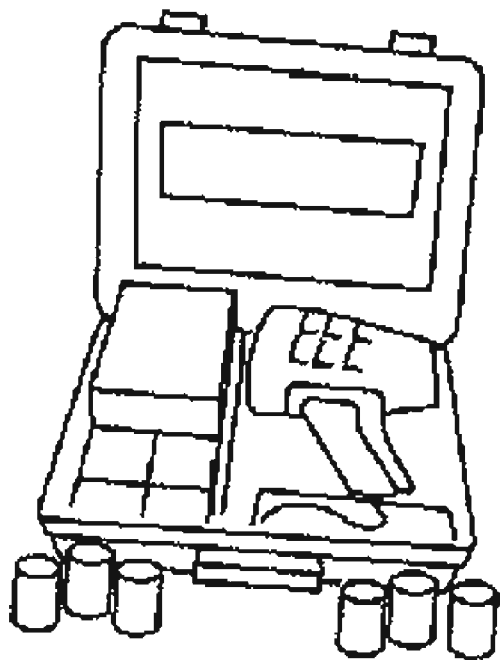
Transaxle Fluid Cooler Tube Replacement

Refer to **TRANSAXLE/TRANSMISSION COOLING** .

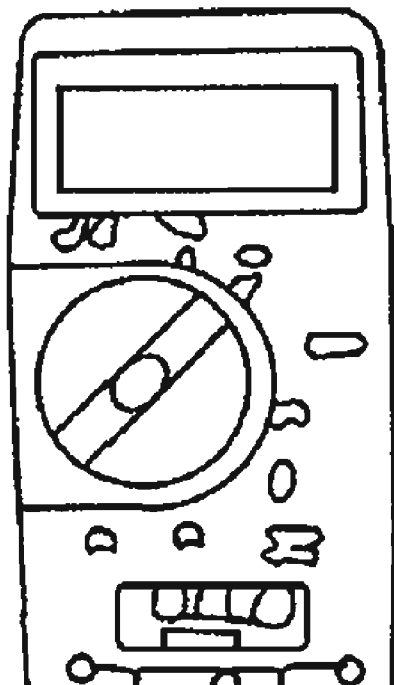
DIAGNOSIS BY SYMPTOM

SPECIAL TOOL SPECIFICATIONS

	100W/12 Volt DC UV Lamp 164-R0751
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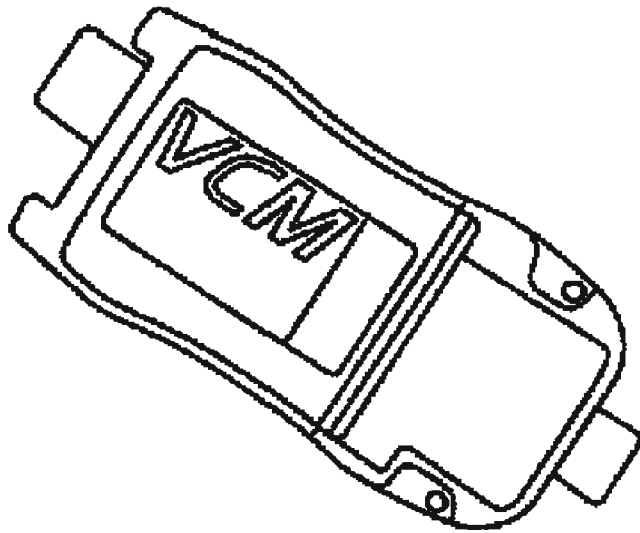
ST1300-A



73III Automotive Meter 105-R0057 or equivalent

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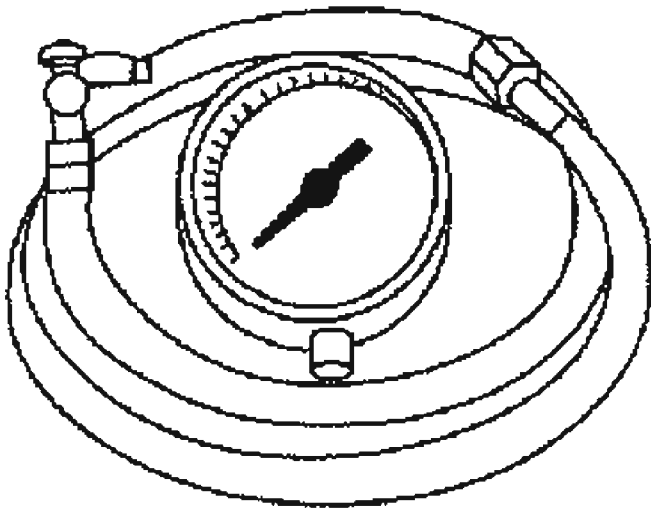
2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



ST2834-A

Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool

Pressure Gauge 307-004 (T57L-77820-A)



ST1565-A

The Diagnosis by Symptom Index gives the technician diagnostic information, direction and suggest possible components, using a symptom as a starting point.

The Diagnosis by Symptom Index is divided into 2 categories: Electrical Routines, indicated by 200 series numbers; and Hydraulic/Mechanical Routines, indicated by 300 series numbers. The Electrical Routines list the possible electrical components that could cause or contribute to the symptom described. The Hydraulic/Mechanical Routines list the possible hydraulic or mechanical components that could cause or contribute to the symptom described.

Diagnosis by Symptom Chart Directions

1. Using the Symptom Index, select the Concern/Symptom that best describes the condition.
2. Refer to the routine indicated in the Diagnosis by Symptom Index.
3. Always begin diagnosis of a symptom with:
 1. Preliminary inspections.
 2. Verifications of condition.
 3. Checking the fluid levels.

NOTE: Not all concerns and conditions with electrical components will set a diagnostic trouble code (DTC). Be aware that the

components listed may still be the cause. Verify correct function of these components prior to proceeding to the Hydraulic/Mechanical Routines list.

4. Begin with the Electrical Routine, if indicated. Follow the reference or action statements. Always carry out the on-board diagnostic tests as necessary. Never skip steps. If the concern is still present after electrical diagnosis, then proceed to the Hydraulic/Mechanical Routines list.
5. The Hydraulic/Mechanical Routines list possible hydraulic or mechanical components that could cause the concern. These components are listed in the removal sequence and by most probable cause. All components listed must be inspected to make sure of correct repair.

Diagnosis by Symptom Index

DIAGNOSIS BY SYMPTOM INDEX

Title	Routines	
	Electrical ⁽¹⁾	Hydraulic/Mechanical
Engagement Concerns		
• No forward in O/D only	201A	301A
• No forward in O/D only (all positions)	201B	301B
• No reverses only	202	302
• Harsh reverse only	203	303
• Harsh reverse only	204A	304A
• Harsh manual 1st gear only	204B	304B
• Delayed/soft reverse only	205	305
• Delayed/soft forward only	206	306
• No forward and no reverse	207	307
• Harsh forward and harsh reverse	208	308
• Delayed forward and delayed reverse	209	309
Shift Concerns		
• Some/all shifts missing	210	310

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• Timing concern: early concern (some/all)	211	311
• Timing concern: erratic/hunting (some/all)	212	312
• Feel concerns: soft/slipping (some/all)	213	313
• Feel concerns: harsh (some/all)	214	314
• No 1st gear in drive, engages in a higher gear	215	315
• No 1st gear in manual 1st	216	316
• No manual 2nd gear	217	317
Torque Converter Clutch Operation Concerns		
• Does not apply	240	340
• Always applied/stalls vehicle	241	341
• Cycling/shudder/chatter	242	342
Other Concerns		
• Shift lever efforts high	251	351
• External leaks	252	352
• Vehicle driveability concerns	253	353
• Noise/vibration - forward or reverse	254	354
• Engine will not crank	255	355
• No park range	256	356
• Overheating	257	357
• No engine braking in manual 1st	259	359
• Fluid venting or foaming	261	361
• Slips/chatters in manual 1st gear	263	363
	264	364

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- | | | |
|-------------------------------------|-----|-----|
| • Slips/chatters in manual 2nd gear | | |
| • Slips/chatters in 3rd gear | 282 | 382 |
| • No engine braking in all gears | 283 | 383 |

(1) Carry out electrical routines first.

Diagnostic Routines

Engagement Concern: No Forward in O/D ONLY

ENGAGEMENT CONCERN: NO FORWARD IN O/D ONLY

Possible Component	Reference/Action
201A - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">Powertrain control module (PCM), vehicle wiring harness, shift solenoid (SSC) (off = low).	<ul style="list-style-type: none">Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM.GO to <u>PINPOINT TEST A</u>.Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
301A - HYDRAULIC/MECHANICAL ROUTINE	
Fluid <ul style="list-style-type: none">Incorrect levelCondition	<ul style="list-style-type: none">Adjust fluid to the correct level. Refer to <u>PRELIMINARY INSPECTION</u>.Carry out the Fluid Condition Check. Refer to <u>PRELIMINARY INSPECTION</u>.
Forward Clutch Assembly <ul style="list-style-type: none">Seals, piston damagedCheck balance dam.Friction elements damaged or worn.	<ul style="list-style-type: none">Inspect for damage. Repair as necessary.Inspect for damage. Repair as necessary.Inspect for damage. Repair as

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<ul style="list-style-type: none">• Return springs damaged.	<p>necessary.</p> <ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
Servo <ul style="list-style-type: none">• Seals (piston and cover) damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
Band <ul style="list-style-type: none">• Band damaged.• Servo worn or damaged.• Not adjusted correctly.• Anchor bolt damaged or worn.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Adjust correctly• Inspect for damage. Repair as necessary.
Case <ul style="list-style-type: none">• Damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.

Engagement Concern: No Forward ONLY (All Positions)

ENGAGEMENT CONCERN: NO FORWARD ONLY (ALL POSITIONS)

Possible Component	Reference/Action
201B - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harness, SSC, SSD, and SSE.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.• GO to PINPOINT TEST A.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
301B - HYDRAULIC/MECHANICAL ROUTINE	
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair

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<ul style="list-style-type: none">• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<p>as necessary.</p> <ul style="list-style-type: none">• Disassemble and clean.• If damaged or parts are missing install new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Forward Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
Forward Planetary Assembly <ul style="list-style-type: none">• Planetary damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
Low One-Way Clutch <ul style="list-style-type: none">• Worn, damaged or assembled incorrectly.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.

Engagement Concern: No Reverse

ENGAGEMENT CONCERN: NO REVERSE

Possible Component	Reference/Action
202 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harness, SSC, SSD and SSE.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.• GO to PINPOINT TEST A and GO to PINPOINT TEST D.

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- Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

302 - HYDRAULIC/MECHANICAL ROUTINE

Main Control

- Bolts not tightened to specification.
- Separator plate damaged.
- Contamination.
- Valves/springs damaged, misassembled, missing, stuck, or bore damaged.
- Tighten to specifications.
- Inspect for damage. If damaged, repair as necessary.
- Disassemble and clean.
- If damaged or parts are missing, install new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

Low/Reverse Clutch Assembly

- Seals, piston damaged.
- Friction elements damaged or worn.
- Return springs damaged.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.

Reverse Clutch Assembly

- Seals, piston damaged.
- Check balance dam.
- Friction elements damaged or worn.
- Return springs damaged.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.

Engagement Concern: Harsh Reverse ONLY

ENGAGEMENT CONCERN: HARSH REVERSE ONLY

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Possible Component	Reference/Action
203 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harness, SSD.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.• GO to PINPOINT TEST A.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
303 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">• High pressures.	<ul style="list-style-type: none">• Check pressure at line tap.• Carry out the Line Pressure Test. Refer to SPECIAL TESTING PROCEDURES.
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">• Tighten to specification.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Low/Reverse Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.

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Reverse Clutch Assembly

- | | |
|---|---|
| <ul style="list-style-type: none">• Seals, piston damaged.• Check balance dam.• Friction elements damaged or worn.• Return spring damaged. | <ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary. |
|---|---|

Engagement Concern: Harsh Forward ONLY

ENGAGEMENT CONCERN: HARSH FORWARD ONLY

Possible Component	Reference/Action
204A - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harness and SSC.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.• GO to PINPOINT TEST A.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
304A - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">• High pressures.	<ul style="list-style-type: none">• Check pressure at line tap. Refer to SPECIAL TESTING PROCEDURES.
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• Valves/springs damaged, misassembled, missing, stuck, or

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damaged.	damaged.
Forward Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.

Engagement Concern: Harsh Forward ONLY**ENGAGEMENT CONCERN: HARSH FORWARD ONLY**

Possible Component	Reference/Action
204B - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harness, turbine shaft speed (TSS) sensor.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.• GO to PINPOINT TEST E.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
304B - HYDRAULIC/MECHANICAL ROUTINE	
No Hydraulic/Mechanical Concerns.	

Engagement Concern: Delayed/Soft Reverse ONLY**ENGAGEMENT CONCERN: DELAYED/SOFT REVERSE ONLY**

Possible Component	Reference/Action
205 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harness, SSD, PCA.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.• GO to PINPOINT TEST A.

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	<ul style="list-style-type: none">• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
305 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">• Low pressures.	<ul style="list-style-type: none">• Check pressure at line tap.• Carry out Line Pressure Test. Refer to <u>SPECIAL TESTING PROCEDURES</u>.
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Low/Reverse Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.

Engagement Concern: Delayed/Soft Forward**ENGAGEMENT CONCERN: DELAYED/SOFT FORWARD**

Possible Component	Reference/Action
206 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harness, SSC,	<ul style="list-style-type: none">• Carry out on-board diagnostic tests.

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PCA.

See **INTRODUCTION - GASOLINE** article for diagnosis and testing of the PCM.

- GO to **PINPOINT TEST A**.
- Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

306 - HYDRAULIC/MECHANICAL ROUTINE

Incorrect Pressures

- Low pressures.

- Check pressure at line tap.
- Carry out Line Pressure Test. Refer to **SPECIAL TESTING PROCEDURES**.

Main Control

- Bolts not tightened to specification.
- Separator plate damaged.
- Contamination.
- Valves/springs damaged, misassembled, missing, stuck, or bore damaged.

- Tighten to specifications.
- Inspect for damage. If damaged, repair as necessary.
- Disassemble and clean.
- If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

Forward Clutch Assembly

- Seals, piston damaged.
- Friction elements damaged or worn.
- Return springs damaged.

- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.

Engagement Concerns: No Forward and No Reverse

ENGAGEMENT CONCERNS: NO FORWARD AND NO REVERSE

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Possible Component	Reference/Action
207 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM and vehicle wiring harnesses (no electrical activity equals 3rd gear default).	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
307 - HYDRAULIC/MECHANICAL ROUTINE	
Fluid <ul style="list-style-type: none">• Incorrect level.• Condition.	<ul style="list-style-type: none">• Adjust to correct level. Refer to <u>PRELIMINARY INSPECTION</u>.• Carry out Fluid Condition Check. Refer to <u>PRELIMINARY INSPECTION</u>.
Shift Cable/Transmission Range (TR) Sensor <ul style="list-style-type: none">• Cable system or TR sensor damaged, misaligned.	<ul style="list-style-type: none">• Inspect and repair as required. For shift cable information, refer to <u>AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS</u> . For TR sensor information, refer to <u>TRANSMISSION RANGE (TR) SENSOR</u>.
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Turbine Shaft	

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<ul style="list-style-type: none">• Damaged.	<ul style="list-style-type: none">• Inspect for damage. If damaged, repair as necessary.
Fluid Pump Assembly <ul style="list-style-type: none">• Bolts not tightened to specification.• Gasket damaged.• Porosity, cross leaks, plugged hole.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Inspect for damage. Repair as necessary.
Rear Planetary Assembly <ul style="list-style-type: none">• Planetary damaged.	<ul style="list-style-type: none">• Inspect for damage. If damaged, repair as necessary.
Forward Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
Forward Planetary Assembly <ul style="list-style-type: none">• Planetary damaged.	<ul style="list-style-type: none">• Inspect for damage. If damaged, repair as necessary.
Final Drive Gearset and Differential <ul style="list-style-type: none">• Damaged.	<ul style="list-style-type: none">• Inspect for damage. If damaged, repair as necessary.
Torque Converter <ul style="list-style-type: none">• Damaged flexplate or adapter plate.• Damaged impeller hub.• Damaged turbine hub.	<ul style="list-style-type: none">• Inspect for damage. Carry out Torque Converter checks, refer to <u>TORQUE CONVERTER CONTAMINATION INSPECTION</u>. Repair as necessary.• Inspect for damage. Repair as necessary.
Low One-way Clutch <ul style="list-style-type: none">• Worn, damaged or assembled incorrectly.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.

Engagement Concerns: Harsh Forward and Reverse

ENGAGEMENT CONCERNS: HARSH FORWARD AND REVERSE

Possible Component	Reference/Action

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208 - ELECTRICAL ROUTINE

Powertrain Control System

- PCM, vehicle wiring harnesses, TR sensor, transmission fluid temperature (TFT) sensor, SSC, and SSD.
- Carry out on-board diagnostic tests. See **INTRODUCTION - GASOLINE** article for diagnosis and testing of the PCM.
- GO to **PINPOINT TEST A**, GO to **PINPOINT TEST B** and GO to **PINPOINT TEST C**.
- Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

308 - HYDRAULIC/MECHANICAL ROUTINE

Fluid

- Incorrect level.
- Condition.
- Adjust to correct level. Refer to **PRELIMINARY INSPECTION**.
- Carry out Fluid Condition Check. Refer to **PRELIMINARY INSPECTION**.

Incorrect Pressures

- High pressures.
- Check pressure at line tap.
- Carry out Line Pressure Test. Refer to **SPECIAL TESTING PROCEDURES**.

Main Control

- Bolts not tightened to specification.
- Separator plate damaged.
- Contamination.
- Valves/springs damaged, misassembled, missing, stuck, or bore damaged.
- Tighten to specifications.
- Inspect for damage. If damaged, repair as necessary.
- Disassemble and clean.
- If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

Forward Clutch Assembly

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<ul style="list-style-type: none">• Seals, piston damaged.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
Reverse and Low/Reverse Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.• One-way clutch	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.

Engagement Concerns: Delayed/Soft Forward and Reverse

ENGAGEMENT CONCERNS: DELAYED/SOFT FORWARD AND REVERSE

Possible Component	Reference/Action
209 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, TR sensor, TFT sensor SSC and SSD.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM.• GO to <u>PINPOINT TEST A</u>, GO to <u>PINPOINT TEST B</u> and GO to <u>PINPOINT TEST C</u>.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
309 - HYDRAULIC/MECHANICAL ROUTINE	

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Fluid <ul style="list-style-type: none">• Incorrect level.• Condition.	<ul style="list-style-type: none">• Adjust to correct level. Refer to <u>PRELIMINARY INSPECTION</u>.• Carry out Fluid Condition Check. Refer to <u>PRELIMINARY INSPECTION</u>.
Incorrect Pressures <ul style="list-style-type: none">• High Pressures	<ul style="list-style-type: none">• Check pressure at line tap.• Carry out Line Pressure Test. Refer <u>SPECIAL TESTING PROCEDURES</u>.
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Fluid Pump Assembly <ul style="list-style-type: none">• Bolts not tightened to specification.• Gasket damaged.• Porosity, cross leaks, plugged hole.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Inspect for damage. Repair as necessary.

Shift Concerns: Some/All Shifts Missing (AUTOMATIC MODE ONLY)

COMPONENT REFERENCE

Possible Component	Reference/Action
210 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, TR	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See

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sensor, intake manifold air temperature (IAT) sensor, vehicle speed sensor (VSS) input, SSA, SSB, SSC, SSD SSE and pressure control solenoid (PCA).

INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.

- GO to **PINPOINT TEST A**, GO to **PINPOINT TEST C**, GO to **PINPOINT TEST D** and GO to **PINPOINT TEST E**.
- Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

310 - HYDRAULIC/MECHANICAL ROUTINE

Some Shifts Missing ONLY

- If only some of the shifts are missing, determine which shift(s) is missing.
- Refer to the following routine(s) for further No Shift Concerns:
- No 1-2 Shift, Routine 220/320
- No 2-3 Shift, Routine 221/321
- No 3-4 Shift, Routine 222/322
- No 4-3 Shift, Routine 223/323
- No 3-2 Shift, Routine 224/324
- No 2-1 Shift, Routine 225/325

Fluid

- Incorrect level.
- Condition.

- Adjust to correct level. Refer to **PRELIMINARY INSPECTION**.
- Carry out Fluid Condition Check. Refer to **PRELIMINARY INSPECTION**.

Shift Cable/TR Sensor

- Cable system or TR sensor damaged, misaligned.

- Inspect and repair as required. For shift cable information, refer to **AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS** . For TR sensor information, refer to **TRANSMISSION RANGE (TR) SENSOR**.

Incorrect Pressures

- High/low pressures.

- Check pressure at line tap.

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	<ul style="list-style-type: none">• Carry out Line Pressure Test. refer to <u>SPECIAL TESTING PROCEDURES.</u>
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Fluid Pump Assembly <ul style="list-style-type: none">• Bolts not tightened to specification.• Gasket damaged.• Porosity, cross leaks, plugged hole.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Inspect for damage. Repair as necessary.
Direct Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
Forward Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
One-way Clutch <ul style="list-style-type: none">• Worn, damaged or assembled incorrectly.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
Servo <ul style="list-style-type: none">• Servo retaining ring damaged	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.

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Shift Concerns: Timing Concerns - Early/Late

SHIFT CONCERNS: TIMING CONCERNS - EARLY/LATE

Possible Component	Reference/Action
211 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, VSS, TSS sensor SSA, SSB, SSC, SSD, SSE and VFS.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM and TSS sensor.• GO to <u>PINPOINT TEST E</u>.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
311 - HYDRAULIC/MECHANICAL ROUTINE	
Some Shifts Early/Late ONLY	<ul style="list-style-type: none">• If only some of the shifts are early/late, determine which shift(s) is early/late.• Refer to the following routine(s) for further Early/Late Shift Concerns:• Soft/Slipping 1-2 Shift, Routine 226/326• Soft/Slipping 2-3 Shift, Routine 227/327• Soft/Slipping 3-4 Shift, Routine 228/328• Soft/Slipping 4-3 Shift, Routine 229/329• Soft/Slipping 3-2 Shift, Routine 230/330• Soft/Slipping 2-1 Shift, Routine 231/331
Fluid <ul style="list-style-type: none">• Incorrect level.• Condition.	<ul style="list-style-type: none">• Adjust to correct level. refer to <u>PRELIMINARY INSPECTION</u>.• Carry out Fluid Condition Check. Refer to <u>PRELIMINARY INSPECTION</u>.

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Main Control

- | | |
|--|---|
| <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged. | <ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage. |
|--|---|

Servo

- | | |
|---|---|
| <ul style="list-style-type: none">• Servo retaining ring damaged.• Seals (piston and cover) damaged. | <ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary. |
|---|---|

Band

- | | |
|---|---|
| <ul style="list-style-type: none">• Band damaged.• Servo worn or damaged.• Not adjusted correctly.• Anchor bolt damaged or worn. | <ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Adjust correctly• Inspect for damage. Repair as necessary. |
|---|---|

Shift Concerns: Timing Concerns - Erratic/Hunting

SHIFT CONCERNS: TIMING CONCERNS - ERRATIC/HUNTING

Possible Component	Reference/Action
212 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, VSS, IAT sensor.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM and TSS sensor. C

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- GO to **PINPOINT TEST E**. Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

312 - HYDRAULIC/MECHANICAL ROUTINE

Fluid

- Incorrect level.
 - Condition.
- Adjust to correct level. refer to **PRELIMINARY INSPECTION**.
 - Carry out Fluid Condition Check. Refer to **PRELIMINARY INSPECTION**.

Main Control

- Bolts not tightened to specification.
 - Separator plate damaged.
 - Contamination.
 - Valves/springs damaged, misassembled, missing, stuck, or bore damaged.
- Tighten to specifications.
 - Inspect for damage. If damaged, repair as necessary.
 - Disassemble and clean.
 - If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

Further Diagnosis

- For further diagnosis of timing issues, refer to Reference/Actions.
- Refer to the following routine(s) for specific shift diagnosis:
 - No. 1-2 Shift see Routine 220/330
 - No. 2-3 Shift see Routine 221/331
 - No. 3-4 Shift see Routine 222/332
 - No. 4-3 Shift see Routine 223/323
 - No. 3-2 Shift see Routine 224/324
 - No. 2-1 Shift see Routine 225/325
 - Soft/Slip 1-2 Shift see Routine 226/326
 - Soft/Slip 2-3 Shift see Routine 227/327
 - Soft/Slip 3-4 Shift see Routine 228/328

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- Soft/Slip 4-3 Shift see Routine 229/329
- Soft/Slip 3-2 Shift see Routine 230/330
- Soft/Slip 2-1 Shift see Routine 231/331
- Harsh 1-2 Shift see Routine 232/332
- Harsh 2-3 Shift see Routine 233/333
- Harsh 3-4 Shift see Routine 224/334
- Harsh 4-3 Shift see Routine 235/335
- Harsh 3-2 Shift see Routine 236/336
- Harsh 2-1 Shift see Routine 237/337

Shift Concerns: Feel - Soft/Slipping

SHIFT CONCERNS: FEEL - SOFT/SLIPPING

Possible Component	Reference/Action
213 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, TFT sensor, IAT sensor, VSS input SSA, SSB, SSC, SSD, SSE, VFS and PCA.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM, IAT sensor and VSS.• GO to PINPOINT TEST A, GO to PINPOINT TEST B, GO to PINPOINT TEST D and GO to PINPOINT TEST E.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
313 - HYDRAULIC/MECHANICAL ROUTINE	
Some Shifts Soft/Slipping ONLY	<ul style="list-style-type: none">• If only some of the shifts are soft/slipping, determine which shift(s) is soft/slipping.• Refer to the following routine(s) for further Soft/Slipping Shift Concerns:• Soft/Slipping 1-2 Shift, Routine 226/326

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	<ul style="list-style-type: none">• Soft/Slipping 2-3 Shift, Routine 227/327• Soft/Slipping 3-4 Shift, Routine 228/328• Soft/Slipping 4-3 Shift, Routine 229/329• Soft/Slipping 3-2 Shift, Routine 230/330• Soft/Slipping 2-1 Shift, Routine 231/331
Fluid <ul style="list-style-type: none">• Incorrect level.• Condition.	<ul style="list-style-type: none">• Adjust to correct level. refer to <u>PRELIMINARY INSPECTION.</u>• Carry out <u>CHECK THE FLUID CONDITION.</u>
Incorrect Pressures <ul style="list-style-type: none">• High/low pressures.	<ul style="list-style-type: none">• Check pressure at line tap. Carry out <u>LINE PRESSURE TEST.</u>
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Fluid Pump Assembly <ul style="list-style-type: none">• Bolts not tightened to specification.• Gasket damaged.• Porosity, cross leaks, plugged hole.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Inspect for damage. Repair as

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	necessary.
Intermediate Servo <ul style="list-style-type: none">• Servo retaining ring damaged.• Seals (piston and cover) damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
Intermediate Band <ul style="list-style-type: none">• Band damaged.• Servo worn or damaged.• Not adjusted correctly.• Anchor bolt damaged or worn.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Adjust correctly• Inspect for damage. Repair as necessary.
Direct Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
Forward Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
Case <ul style="list-style-type: none">• Damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.

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Shift Concerns: Feel - Harsh (Some/All)

SHIFT CONCERNS: FEEL - HARSH (SOME/ALL)

Possible Component	Reference/Action
214 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">PCM, vehicle wiring harnesses, TR sensor, TFT sensor, IAT sensor, VSS input, SSA, SSB, SSC, SSD, SSE and PCA.	<ul style="list-style-type: none">Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM, IAT sensor and VSS.GO to PINPOINT TEST A, GO to PINPOINT TEST B, GO to PINPOINT TEST C, GO to PINPOINT TEST D and GO to PINPOINT TEST E.Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
314 - HYDRAULIC/MECHANICAL ROUTINE	
Some Shifts Harsh ONLY	<ul style="list-style-type: none">If only some of the shifts are harsh, determine which shift(s) is harsh.Refer to the following routine(s) for further Harsh Shift Concerns:<ul style="list-style-type: none">Harsh 1-2 Shift, Routine 232/332Harsh 2-3 Shift, Routine 233/333Harsh 3-4 Shift, Routine 234/334Harsh 4-3 Shift, Routine 235/335Harsh 3-2 Shift, Routine 236/336Harsh 2-1 Shift, Routine 237/337
Incorrect Pressures <ul style="list-style-type: none">High/low pressures.	<ul style="list-style-type: none">Check pressure at line tap.Carry out LINE PRESSURE TEST.
Main Control <ul style="list-style-type: none">Bolts not tightened to specification.Separator plate damaged.	<ul style="list-style-type: none">Tighten to specifications.Inspect for damage. If damaged, repair

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<ul style="list-style-type: none">• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<p>as necessary.</p> <ul style="list-style-type: none">• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Input Shaft <ul style="list-style-type: none">• Damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
Servo <ul style="list-style-type: none">• Servo retaining ring damaged.• Seals (piston and cover) damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
Band <ul style="list-style-type: none">• Band damaged.• Servo worn or damaged.• Not adjusted correctly.• Anchor bolt damaged or worn.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Adjust correctly• Inspect for damage. Repair as necessary.
Forward Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
Final Drive Gears and Differential	

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<ul style="list-style-type: none">• Damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
Case <ul style="list-style-type: none">• Damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.

Shift Concerns: No 1st Gear in Drive, Engages In Higher Gear

SHIFT CONCERNS: NO 1ST GEAR IN DRIVE, ENGAGES IN HIGHER GEAR

Possible Component	Reference/Action
215 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, TR sensor and SSC.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM.• GO to <u>PINPOINT TEST A</u> and GO to <u>PINPOINT TEST C</u>.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
315 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">• High/low pressures.	<ul style="list-style-type: none">• Check pressure at line tap.• Refer to the <u>REFERENCE: BAND/CLUTCH APPLICATION CHART</u> to determine which gears are on. Follow the diagnostic routines to repair the missing gears.
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If

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damaged.	misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Low One-Way Clutch <ul style="list-style-type: none">Worn, damaged or assembled incorrectly.	<ul style="list-style-type: none">Inspect for damage. Repair as necessary.

Shift Concerns: No 1st Gear in Manual 1st

SHIFT CONCERNS: NO 1ST GEAR IN MANUAL 1ST

Possible Component	Reference/Action
216 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">PCM and vehicle wiring harnesses.	<ul style="list-style-type: none">Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
316 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">High/low pressures.	<ul style="list-style-type: none">Check pressure at line tap.Refer to the REFERENCE: BAND/CLUTCH APPLICATION CHART to determine which gears are on. Follow the diagnostic routines to repair the missing gears.
Main Control <ul style="list-style-type: none">Bolts not tightened to specification.Separator plate damaged.Contamination.Valves/springs damaged, misassembled, missing, stuck, or bore	<ul style="list-style-type: none">Tighten to specifications.Inspect for damage. If damaged, repair as necessary.Disassemble and clean.If damaged or parts are missing, install a new main control assembly. If

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damaged.	misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Low/Reverse Clutch Assembly <ul style="list-style-type: none">• Seals.• Friction plates.• Return spring.	<ul style="list-style-type: none">• Inspect for damage. If damaged, repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
OD Planetary Assembly <ul style="list-style-type: none">• Planetary damaged.	<ul style="list-style-type: none">• Inspect for damage. If damaged, repair as necessary.

Shift Concerns: No Manual 2nd Gear

SHIFT CONCERNS: NO MANUAL 2ND GEAR

Possible Component	Reference/Action
217 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses and SSD.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.• GO to PINPOINT TEST A.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
317 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">• High/low pressures.	<ul style="list-style-type: none">• Check pressure at line tap.• Carry out LINE PRESSURE TEST.
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.	<ul style="list-style-type: none">• Tighten to specifications.

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<ul style="list-style-type: none">• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Servo <ul style="list-style-type: none">• Servo retaining ring damaged.• Seals (piston and cover) damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
Band <ul style="list-style-type: none">• Band damaged.• Servo worn or damaged.• Not adjusted correctly.• Anchor bolt damaged or worn.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Adjust correctly• Inspect for damage. Repair as necessary.
Low/Direct One-Way Clutch <ul style="list-style-type: none">• Worn, damaged or assembled incorrectly.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.

Shift Concern: No 1-2 Shift

SHIFT CONCERN: NO 1-2 SHIFT

Possible Component	Reference/Action
220 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, VSS, TR sensor, TSS sensor and SSD.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the

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PCM, IAT sensor and VSS.

- GO to **PINPOINT TEST A**, GO to **PINPOINT TEST C** and GO to **PINPOINT TEST E**.
- Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

320 - HYDRAULIC/MECHANICAL ROUTINE

Fluid

- Incorrect level.
- Adjust to correct level. refer to **PRELIMINARY INSPECTION**.

Incorrect Pressures

- High/low pressures.
- Check pressure at line tap.
- Carry out **LINE PRESSURE TEST**.

Main Control

- Bolts not tightened to specification.
- Separator plate damaged.
- Contamination.
- Valves/springs damaged, misassembled, missing, stuck, or bore damaged.
- Tighten to specifications.
- Inspect for damage. If damaged, repair as necessary.
- Disassemble and clean.
- If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

Servo

- Seals (piston and cover) damaged.
- Inspect for damage. Repair as necessary.

Band

- Band damaged.
- Servo worn or damaged.
- Not adjusted correctly.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Adjust correctly

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<ul style="list-style-type: none">• Anchor bolt damaged or worn.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
OD Planetary Assembly <ul style="list-style-type: none">• Planetary damaged.	<ul style="list-style-type: none">• Inspect for damage. If damaged, repair as necessary.
Forward Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.

Shift Concern: No 2-3 Shift

SHIFT CONCERN: NO 2-3 SHIFT

Possible Component	Reference/Action
221 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, TR sensor, VSS, SSD and SSE.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM.• GO to <u>PINPOINT TEST A</u>, GO to <u>PINPOINT TEST C</u> and GO to <u>PINPOINT TEST E</u>.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
321 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">• High/low pressures.	<ul style="list-style-type: none">• Check pressure at line tap.• Carry out <u>LINE PRESSURE TEST</u>.
Main Control	

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<ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Servo <ul style="list-style-type: none">• Seals.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
Forward Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
Intermediate Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.

Shift Concern: No 3-4 Shift

SHIFT CONCERN: NO 3-4 SHIFT

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Possible Component	Reference/Action
222 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, TR sensor, VSS, SSC and SSA.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.• GO to PINPOINT TEST A, GO to PINPOINT TEST C and GO to PINPOINT TEST E.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
322 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">• High/low pressures.	<ul style="list-style-type: none">• Check pressure at line tap.• Carry out LINE PRESSURE TEST.
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Forward Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Check balance dam.• Friction elements damaged or worn.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.

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<ul style="list-style-type: none">Return springs damaged.	<ul style="list-style-type: none">Inspect for damage. Repair as necessary.
Servo <ul style="list-style-type: none">Band.	<ul style="list-style-type: none">Inspect for damage. Repair as necessary.

Shift Concern: No 4-3 Shift

SHIFT CONCERN: NO 4-3 SHIFT

Possible Component	Reference/Action
223 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">PCM, vehicle wiring harnesses, TR sensor, VSS, SSA, and SSC.	<ul style="list-style-type: none">Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.GO to PINPOINT TEST A, GO to PINPOINT TEST C and GO to PINPOINT TEST E.Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
323 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">High/low pressures.	<ul style="list-style-type: none">Check pressure at line tap.Carry out LINE PRESSURE TEST.
Main Control <ul style="list-style-type: none">Bolts not tightened to specification.Separator plate damaged.Contamination.Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">Tighten to specifications.Inspect for damage. If damaged, repair as necessary.Disassemble and clean.If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish

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	and may result in further main control or transaxle damage.
Forward Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
Servo <ul style="list-style-type: none">• Seal.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.

Shift Concern: No 3-2 Shift

SHIFT CONCERN: NO 3-2 SHIFT

Possible Component	Reference/Action
224 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, TR sensor, VSS and SSE.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.• GO to PINPOINT TEST A, GO to PINPOINT TEST C and GO to PINPOINT TEST E.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
324 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">• High/low pressures.	<ul style="list-style-type: none">• Check pressure at line tap.• Carry out LINE PRESSURE TEST.
Main Control	

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<ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Servo <ul style="list-style-type: none">• Seals (piston and cover) damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
Band <ul style="list-style-type: none">• Band damaged.• Servo worn or damaged.• Not adjusted correctly.• Anchor bolt damaged or worn.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Adjust correctly• Inspect for damage. Repair as necessary.
Direct Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.

Shift Concern: No 2-1 Shift

SHIFT CONCERN: NO 2-1 SHIFT

Possible Component	Reference/Action
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225 - ELECTRICAL ROUTINE

Powertrain Control System

- PCM, vehicle wiring harnesses, TR sensor, VSS and SSD.
- Carry out on-board diagnostic tests. See **INTRODUCTION - GASOLINE** article for diagnosis and testing of the PCM.
- GO to **PINPOINT TEST A**, GO to **PINPOINT TEST C** and GO to **PINPOINT TEST E**.
- Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test

325 - HYDRAULIC/MECHANICAL ROUTINE

Incorrect Pressures

- High/low pressures.
- Check pressure at line tap.
- Carry out **LINE PRESSURE TEST**.

Main Control

- Bolts not tightened to specification.
- Separator plate damaged.
- Contamination.
- Valves/springs damaged, misassembled, missing, stuck, or bore damaged.
- Tighten to specifications.
- Inspect for damage. If damaged, repair as necessary.
- Disassemble and clean.
- If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

One-way Clutch

- Damaged.
- Inspect for damage. Repair as necessary.

Band

- Damaged.
- Inspect for damage. Repair as necessary.

SHIFT CONCERN: SOFT/SLIPPING 1-2

Possible Component	Reference/Action
226 - ELECTRICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none"> PCM, vehicle wiring harnesses, TSS sensor, VSS, TFT sensor and SSD. 	<ul style="list-style-type: none"> Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM, IAT sensor and VSS. GO to <u>PINPOINT TEST A</u>, GO to <u>PINPOINT TEST B</u> and GO to <u>PINPOINT TEST E</u>. Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
326 - HYDRAULIC/MECHANICAL ROUTINE	
Fluid <ul style="list-style-type: none"> Incorrect level. Condition. 	<ul style="list-style-type: none"> Adjust to correct level. refer to <u>PRELIMINARY INSPECTION</u>. Carry out <u>CHECK THE FLUID CONDITION</u>.
Incorrect Pressures <ul style="list-style-type: none"> High/low pressures. 	<ul style="list-style-type: none"> Check pressure at line tap. Carry out <u>LINE PRESSURE TEST</u>.
Main Control <ul style="list-style-type: none"> Bolts not tightened to specification. Separator plate damaged. Contamination. Valves/springs damaged, misassembled, missing, stuck, or bore damaged. 	<ul style="list-style-type: none"> Tighten to specifications. Inspect for damage. If damaged, repair as necessary. Disassemble and clean. If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Servo	

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<ul style="list-style-type: none">• Seals (piston and cover) damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
Band <ul style="list-style-type: none">• Band damaged.• Servo worn or damaged.• Not adjusted correctly.• Anchor bolt damaged or worn.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Adjust correctly• Inspect for damage. Repair as necessary.

Shift Concern: Soft/Slipping 2-3

SHIFT CONCERN: SOFT/SLIPPING 2-3

Possible Component	Reference/Action
227 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, TSS sensor, TFT sensor, and SSE.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.• GO to PINPOINT TEST A, GO to PINPOINT TEST B and GO to PINPOINT TEST E.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
327 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">• High/low pressures.	<ul style="list-style-type: none">• Check pressure at line tap.• Carry out LINE PRESSURE TEST.
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.

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<ul style="list-style-type: none">Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Servo <ul style="list-style-type: none">Seals (piston and cover) damaged.	<ul style="list-style-type: none">Inspect for damage. Repair as necessary.
Band <ul style="list-style-type: none">Band damaged.Servo worn or damaged.Not adjusted correctly.Anchor bolt damaged or worn.	<ul style="list-style-type: none">Inspect for damage. Repair as necessary.Inspect for damage. Repair as necessary.Adjust correctlyInspect for damage. Repair as necessary.
Direct Clutch Assembly <ul style="list-style-type: none">Seals, piston damaged.Check balance dam.Friction elements damaged or worn.Return springs damaged.	<ul style="list-style-type: none">Inspect for damage. Repair as necessary.Inspect for damage. Repair as necessary.Inspect for damage. Repair as necessary.Inspect for damage. Repair as necessary.

Shift Concern: Soft/Slipping 3-4

SHIFT CONCERN: SOFT/SLIPPING 3-4

Possible Component	Reference/Action
228 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">PCM, SSA, SSC, vehicle wiring harnesses and TFT sensor.	<ul style="list-style-type: none">Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE

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article for diagnosis and testing of the PCM.

- GO to **PINPOINT TEST B**.
- Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

328 - HYDRAULIC/MECHANICAL ROUTINE

Incorrect Pressures

- High/low pressures.
- Check pressure at line tap.
- Carry out **LINE PRESSURE TEST**.

Main Control

- Bolts not tightened to specification.
- Separator plate damaged.
- Contamination.
- Valves/springs damaged, misassembled, missing, stuck, or bore damaged.
- Tighten to specifications.
- Inspect for damage. If damaged, repair as necessary.
- Disassemble and clean.
- If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

Forward Clutch Assembly

- Seals, piston damaged.
- Check balance dam.
- Friction elements damaged or worn.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.

Servo

- Seals (piston and cover) damaged.
- Inspect for damage. Repair as necessary.

Band

- Band damaged.
- Inspect for damage. Repair as necessary.

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- | | |
|---|---|
| <ul style="list-style-type: none">• Servo worn or damaged.• Not adjusted correctly.• Anchor bolt damaged or worn. | <ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Adjust correctly.• Inspect for damage. Repair as necessary. |
|---|---|

Shift Concern: Soft/Slipping 4-3

SHIFT CONCERN: SOFT/SLIPPING 4-3

Possible Component	Reference/Action
229 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, TFT sensor, SSA and SSC.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.• GO to PINPOINT TEST A and GO to PINPOINT TEST B.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
329 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">• High/low pressures.	<ul style="list-style-type: none">• Check pressure at line tap.• Carry out LINE PRESSURE TEST. Follow pressure diagnosis and repair as required.
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves.

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	This will remove the anodized finish and may result in further main control or transaxle damage.
Forward Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
<ul style="list-style-type: none">• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
Servo <ul style="list-style-type: none">• Seals, piston damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.

Shift Concern: Soft/Slipping 3-2

SHIFT CONCERN: SOFT/SLIPPING 3-2

Possible Component	Reference/Action
230 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, TFT sensor and SSE.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.• GO to PINPOINT TEST A and GO to PINPOINT TEST B.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
330 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">• High/low pressures.• Carry out LINE PRESSURE TEST.	<ul style="list-style-type: none">• Check pressure at line tap.
Main Control	

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<ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Servo <ul style="list-style-type: none">• Seals (piston and cover) damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
Band <ul style="list-style-type: none">• Band damaged.• Servo worn or damaged.• Not adjusted correctly.• Anchor bolt damaged or worn.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Adjust correctly• Inspect for damage. Repair as necessary.

Shift Concern: Soft/Slipping 2-1

SHIFT CONCERN: SOFT/SLIPPING 2-1

Possible Component	Reference/Action
231 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, SSD, VSS, TSS, TR sensor, vehicle wiring harnesses and TFT sensor.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.• Carry out Pinpoint Tests. Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

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331 - HYDRAULIC/MECHANICAL ROUTINE

Incorrect Pressures

- High/low pressures.
- Check pressure at line tap.
- Carry out **LINE PRESSURE TEST**.

Main Control

- Bolts not tightened to specification.
- Separator plate damaged.
- Contamination.
- Valves/springs damaged, misassembled, missing, stuck, or bore damaged.
- Tighten to specifications.
- Inspect for damage. If damaged, repair as necessary.
- Disassemble and clean.
- If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

Servo

- Seals (piston and cover) damaged.
- Inspect for damage. Repair as necessary.

Band

- Band damaged.
- Servo worn or damaged.
- Not adjusted correctly.
- Anchor bolt damaged or worn.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Adjust correctly.
- Inspect for damage. Repair as necessary.

Shift Concern: Harsh 1-2 Shift

SHIFT CONCERN: HARSH 1-2 SHIFT

Possible Component	Reference/Action
232 - ELECTRICAL ROUTINE	
Powertrain Control System	
<ul style="list-style-type: none">• PCM, vehicle wiring harnesses, TSS sensor, TR sensor, TFT sensor and	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE

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SSD.

article for diagnosis and testing of the PCM.

- GO to **PINPOINT TEST A**, GO to **PINPOINT TEST B**, GO to **PINPOINT TEST C** and GO to **PINPOINT TEST E**.
- Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

332 - HYDRAULIC/MECHANICAL ROUTINE

Incorrect Pressures

- High/low pressures.

- Check pressure at line tap.
- Carry out **LINE PRESSURE TEST**.

Main Control

- Bolts not tightened to specification.
- Separator plate damaged.
- Contamination.
- Valves/springs damaged, misassembled, missing, stuck, or bore damaged.

- Tighten to specifications.
- Inspect for damage. If damaged, repair as necessary.
- Disassemble and clean.
- If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

Servo

- Seals (piston and cover) damaged.

- Inspect for damage. Repair as necessary.

Band

- Band damaged.
- Servo worn or damaged.
- Not adjusted correctly.
- Anchor bolt damaged or worn.

- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Adjust correctly.
- Inspect for damage. Repair as

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necessary.

Shift Concern: Harsh 2-3 Shift

SHIFT CONCERN: HARSH 2-3 SHIFT

Possible Component	Reference/Action
233 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">PCM, vehicle wiring harnesses, TSS sensor, TR sensor, TFT sensor and SSE.	<ul style="list-style-type: none">Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.GO to PINPOINT TEST A, GO to PINPOINT TEST B, GO to PINPOINT TEST C and GO to PINPOINT TEST E.Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
333 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">High/low pressures.	<ul style="list-style-type: none">Check pressure at line tap.Carry out LINE PRESSURE TEST.
Main Control <ul style="list-style-type: none">Bolts not tightened to specification.Separator plate damaged.Contamination.Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">Tighten to specifications.Inspect for damage. If damaged, repair as necessary.Disassemble and clean.If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Direct Clutch Assembly	

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<ul style="list-style-type: none">• Seals, piston damaged.• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
Servo <ul style="list-style-type: none">• Seals (piston and cover) damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
Band <ul style="list-style-type: none">• Band damaged.• Servo worn or damaged.• Not adjusted correctly.• Anchor bolt damaged or worn.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Adjust correctly• Inspect for damage. Repair as necessary.

Shift Concern: Harsh 3-4 Shift

SHIFT CONCERN: HARSH 3-4 SHIFT

Possible Component	Reference/Action
234 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, TR sensor, TFT sensor, SSA and SSC.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.• GO to PINPOINT TEST A, GO to PINPOINT TEST B and GO to PINPOINT TEST C.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

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334 - HYDRAULIC/MECHANICAL ROUTINE

Incorrect Pressures

- High/low pressures.
- Check pressure at line tap.
- Carry out **LINE PRESSURE TEST**. Follow pressure diagnosis and repair as required.

Main Control

- Bolts not tightened to specification.
- Separator plate damaged.
- Contamination.
- Valves/springs damaged, misassembled, missing, stuck, or bore damaged.
- Tighten to specifications.
- Inspect for damage. If damaged, repair as necessary.
- Disassemble and clean.
- If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

Direct Clutch Assembly

- Seals, piston damaged.
- Check balance dam.
- Friction elements damaged or worn.
- Return springs damaged.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.

Forward Clutch Assembly

- Seals, piston damaged.
- Check balance dam.
- Friction elements damaged or worn.
- Return springs damaged.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as

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necessary.

Shift Concern: Harsh 4-3 Shift

SHIFT CONCERN: HARSH 4-3 SHIFT

Possible Component	Reference/Action
235 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">PCM, vehicle wiring harnesses, TR sensor, TFT sensor, SSA and SSC.	<ul style="list-style-type: none">Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM.GO to <u>PINPOINT TEST A</u>, GO to <u>PINPOINT TEST B</u> and GO to <u>PINPOINT TEST C</u>.Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
335 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">High/low pressures.	<ul style="list-style-type: none">Check pressure at line tap.Carry out <u>LINE PRESSURE TEST</u>.
Main Control <ul style="list-style-type: none">Bolts not tightened to specification.Separator plate damaged.Contamination.Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">Tighten to specifications.Inspect for damage. If damaged, repair as necessary.Disassemble and clean.If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Forward Clutch Assembly <ul style="list-style-type: none">Seals, piston damaged.	<ul style="list-style-type: none">Inspect for damage. Repair as

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<ul style="list-style-type: none">• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.	<p>necessary.</p> <ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.
Servo <ul style="list-style-type: none">• Seals (piston and cover) damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
Band <ul style="list-style-type: none">• Band damaged.• Servo worn or damaged.• Not adjusted correctly.• Anchor bolt damaged or worn.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Adjust correctly.• Inspect for damage. Repair as necessary.

Shift Concern: Harsh 3-2 Shift

SHIFT CONCERN: HARSH 3-2 SHIFT

Possible Component	Reference/Action
236 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, TSS sensor, TR sensor, TFT sensor and SSE.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.• GO to <u>PINPOINT TEST A</u>, GO to <u>PINPOINT TEST B</u>, GO to <u>PINPOINT TEST C</u> and GO to <u>PINPOINT TEST E</u>.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

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336 - HYDRAULIC/MECHANICAL ROUTINE

Incorrect Pressures

- High/low pressures.
- Check pressure at line tap.
- Carry out **LINE PRESSURE TEST**.

- Bolts not tightened to specification.
- Separator plate damaged.
- Contamination.
- Valves/springs damaged, misassembled, missing, stuck, or bore damaged.
- Tighten to specifications.
- Inspect for damage. If damaged, repair as necessary.
- Disassemble and clean.
- If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

Servo

- Seals (piston and cover) damaged.
- Inspect for damage. Repair as necessary.

Band

- Band damaged.
- Servo worn or damaged.
- Not adjusted correctly.
- Anchor bolt damaged or worn.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Adjust correctly
- Inspect for damage. Repair as necessary.

Direct Clutch Assembly

- Seals, piston damaged.
- Check balance dam.
- Friction elements damaged or worn.
- Return springs damaged.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.

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Shift Concern: Harsh 2-1 Shift

SHIFT CONCERN: HARSH 2-1 SHIFT

Possible Component	Reference/Action
237 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, TSS sensor, TR sensor, TFT sensor, VFS and SSD.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See INTRODUCTION - GASOLINE article for diagnosis and testing of the PCM.• GO to PINPOINT TEST A, GO to PINPOINT TEST B, GO to PINPOINT TEST C and GO to PINPOINT TEST E.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
337 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">• High/low pressures.	<ul style="list-style-type: none">• Check pressure at line tap.• Carry out LINE PRESSURE TEST.
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
One-way Clutch <ul style="list-style-type: none">• Worn, damaged or assembled incorrectly.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
Servo	

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<ul style="list-style-type: none">• Seals (piston and cover) damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
Band <ul style="list-style-type: none">• Band damaged.• Servo worn or damaged.• Not adjusted correctly.• Anchor bolt damaged or worn.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Adjust correctly.• Inspect for damage. Repair as necessary.

Torque Converter Clutch Operation Concerns: Does Not Apply

TORQUE CONVERTER CLUTCH OPERATION CONCERNS: DOES NOT APPLY

Possible Component	Reference/Action
240 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, TFT sensor, SSB and SSC.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM.• GO to <u>PINPOINT TEST A</u> and GO to <u>PINPOINT TEST B</u>.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
340 - HYDRAULIC/MECHANICAL ROUTINE	
Incorrect Pressures <ul style="list-style-type: none">• High/low pressures.	<ul style="list-style-type: none">• Check pressure at line tap.• Carry out <u>LINE PRESSURE TEST</u>.
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.

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<ul style="list-style-type: none">Valves/springs damaged, misassembled, missing, stuck, or bore damaged.	<ul style="list-style-type: none">If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Fluid Pump Assembly <ul style="list-style-type: none">Bolts not tightened to specification.Gasket damaged.Porosity, cross leaks, plugged hole.	<ul style="list-style-type: none">Tighten to specifications.Inspect for damage. If damaged, repair as necessary.Inspect for damage. If damaged, repair as necessary.
Torque Converter Assembly <ul style="list-style-type: none">Torque converter internal failure preventing engagement, piston application.	<ul style="list-style-type: none">Remove transaxle. Inspect for damage. Carry out torque converter checks, refer to <u>TORQUE CONVERTER CONTAMINATION INSPECTION</u>.If torque converter fails to pass the checks or is damaged, install a new or remanufactured torque converter.

Torque Converter Operation Concerns: Always Applied/Stalls Vehicle

TORQUE CONVERTER OPERATION CONCERNS: ALWAYS APPLIED/STALLS VEHICLE

Possible Component	Reference/Action
241 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">PCM, vehicle wiring harnesses, SSC and SSB.	<ul style="list-style-type: none">Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM.GO to <u>PINPOINT TEST A</u>.Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

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341 - HYDRAULIC/MECHANICAL ROUTINE

Main Control

- | | |
|--|---|
| <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged, misassembled, missing, stuck, or bore damaged. | <ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage. |
|--|---|

Low One-Way Clutch

- | | |
|---|--|
| <ul style="list-style-type: none">• Worn, damaged or assembled incorrectly. | <ul style="list-style-type: none">• Inspect for damage. Repair as necessary. |
|---|--|

Torque Converter Assembly

- | | |
|--|--|
| <ul style="list-style-type: none">• Torque converter internal failure preventing engagement, piston application. | <ul style="list-style-type: none">• Remove transaxle. Inspect for damage. Carry out torque converter checks, refer to <u>TORQUE CONVERTER CONTAMINATION INSPECTION</u>.• If torque converter fails to pass the checks or is damaged, install a new or remanufactured torque converter. |
|--|--|

Torque Converter Clutch Concerns: Cycling/Shudder/Chatter

TORQUE CONVERTER CLUTCH CONCERNS: CYCLING/SHUDDER/CHATTER

Possible Component	Reference/Action
242 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, SSB and SSC.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM.• GO to <u>PINPOINT TEST A</u>.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

342 - HYDRAULIC/MECHANICAL ROUTINE**Fluid**

- | | |
|--|---|
| <ul style="list-style-type: none"> • Condition. • Contaminated • Dirty fluid • Contaminated torque converter | <ul style="list-style-type: none"> • Carry out <u>CHECK THE FLUID CONDITION</u>. • If contaminated, locate source of contamination. If burnt, inspect mechanical bands and clutches. Repair as necessary. • Change the transaxle fluid. Carry out drain and refill. Refer to <u>TRANSAXLE - 2.0L</u>. Carry out fluid cooler cleaning. refer to <u>TRANSAXLE/TRANSMISSION COOLING</u> . • Clean torque converter, carry out torque flushing. refer to <u>TORQUE CONVERTER CONTAMINATION INSPECTION</u> as listed. |
|--|---|

Main Control

- | | |
|---|--|
| <ul style="list-style-type: none"> • Bolts not tightened to specification. • Separator plate damaged. • Contamination. • Valves/springs damaged, misassembled, missing, stuck, or bore damaged. | <ul style="list-style-type: none"> • Tighten to specifications. • Inspect for damage. If damaged, repair as necessary. • Disassemble and clean. • If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage. |
|---|--|

Torque Converter Assembly

- | | |
|--|---|
| <ul style="list-style-type: none"> • Torque converter internal failure preventing engagement, piston application. | <ul style="list-style-type: none"> • Remove transaxle. Inspect for damage. Carry out torque converter checks, refer to procedures in this article. If torque converter fails to pass the checks or is damaged, install a new or remanufactured torque converter. |
|--|---|

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Other Concerns: Shift Lever Efforts High

OTHER CONCERNS: SHIFT LEVER EFFORTS HIGH

Possible Component	Reference/Action
251 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• TR sensor.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM.• GO to <u>PINPOINT TEST C</u>.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
351 - HYDRAULIC/MECHANICAL ROUTINE	
Shift Cable/TR Sensor <ul style="list-style-type: none">• Cable system or TR sensor damaged, misaligned.	<ul style="list-style-type: none">• Inspect and repair as required. For shift cable information. Refer to <u>AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS</u> .• Inspect and repair as required. For TR information, refer to <u>TRANSMISSION RANGE (TR) SENSOR</u>.
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.	<ul style="list-style-type: none">• Tighten to specifications.
Case <ul style="list-style-type: none">• Manual control lever assembly damage, manual valve inner lever pin bent, manual valve inner lever damaged, spring rod damaged.• Manual valve lever shaft retaining pin damaged.	<ul style="list-style-type: none">• Inspect for damage. If damaged, repair as necessary.• Inspect for damage. If damaged, repair as necessary.

Other Concerns: External Leaks

OTHER CONCERNS: EXTERNAL LEAKS

Possible Component	Reference/Action
252 - ELECTRICAL ROUTINE	

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Powertrain Control System

- VSS, TSS sensor and TR sensor transmission wiring harness.
- Inspect for leakage. If areas around sensor show signs of leakage, install a new sensor O-ring. If area behind TR sensor shows signs of leakage, install a new manual lever shaft seal.

352 - HYDRAULIC/MECHANICAL ROUTINE

Fluid

- Incorrect level.
- Adjust to correct level. refer to **PRELIMINARY INSPECTION**.

Case

- Damaged.
- Inspect for damage. If damaged, repair as necessary.

Seal/Gaskets

- Leakage at gaskets, seals, etc.
- Check for fluid leaks in the torque converter area. refer to **LEAKAGE INSPECTION** for potential leak locations.
- Remove all traces of lubricant on exposed surfaces of the transaxle. Check the vent for free breathing. Operate the vehicle at normal temperatures and carry out Leak Check Test procedures. Repair as necessary.

Other Concerns: Poor Vehicle Performance

OTHER CONCERNS: POOR VEHICLE PERFORMANCE

Possible Component	Reference/Action
253 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, VSS, TSS sensor, TFT sensor, TR sensor, SSA, SSB, SSC, SSD, SSE and PCA.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM.• GO to <u>PINPOINT TEST A</u>, GO to <u>PINPOINT TEST B</u>, GO to <u>PINPOINT TEST C</u>, GO to

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PINPOINT TEST D and GO to
PINPOINT TEST E.

- Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

353 - HYDRAULIC/MECHANICAL ROUTINE**Fluid**

- Incorrect level.

- Adjust to correct level. refer to
PRELIMINARY INSPECTION.

Input Shaft

- Damaged.

- Inspect for damage. Repair as necessary.

Forward Clutch Assembly

- Seals, piston damaged.
- Check balance dam.
- Friction elements damaged or worn.
- Return springs damaged.

- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.
- Inspect for damage. Repair as necessary.

Torque Converter Assembly

- Torque converter one-way clutch slipping.
- Incorrect torque converter used in rebuild.

- Carry out **TORQUE CONVERTER CONTAMINATION INSPECTION** checks.
- If the one-way clutch fails the check, install a new or remanufactured torque converter.
- Inspect for correct torque converter assembly. If not correct, install the correct torque converter for this application.

Other Concerns: Noise/Vibration - Forward or Reverse**OTHER CONCERNS: NOISE/VIBRATION - FORWARD OR REVERSE**

Possible Component	Reference/Action
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254 - ELECTRICAL ROUTINE

Powertrain Control System

- PCM, vehicle wiring harnesses, SSA, SSB, SSC, SSD, SSE and PCA.
- Carry out on-board diagnostic tests. See **INTRODUCTION - GASOLINE** article for diagnosis and testing of the PCM.
- GO to **PINPOINT TEST A.**
- Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

354 - HYDRAULIC/MECHANICAL ROUTINE

Fluid Pump Assembly

- Bolts not tightened to specification.
- Gasket damaged.
- Porosity, cross leaks, plugged hole.
- Tighten to specifications.
- Inspect for damage. If damaged, repair as necessary.
- Inspect for damage. If damaged, repair as necessary.

Flex Plate or Adapter Plate

- Damaged.
- Adapter plate not aligned correctly.
- Inspect for damage. Repair as necessary.
- Remove the transaxle. Align the adapter plate.

Other Concerns: Engine Will Not Crank

OTHER CONCERNS: ENGINE WILL NOT CRANK

Possible Component	Reference/Action
255 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses and TR sensor.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM.• GO to <u>PINPOINT TEST C.</u>• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
355 - HYDRAULIC/MECHANICAL ROUTINE	

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Shift Cable/TR Sensor

- Cable system or TR sensor damaged, misaligned.
- Inspect and repair as required. For shift cable information, refer to **AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS** .
- Inspect and repair as required. For TR sensor information, refer to **TRANSMISSION RANGE (TR) SENSOR**.

Flex Plate or Adapter Plate

- Damaged.
- Inspect for damage. Repair as necessary.

Other Concerns: No Park Range

OTHER CONCERNS: NO PARK RANGE

Possible Component	Reference/Action
256 - ELECTRICAL ROUTINE	
Powertrain Control System	No electrical concerns.
356 - HYDRAULIC/MECHANICAL ROUTINE	
Shift Cable/TR Sensor <ul style="list-style-type: none">• Cable system or TR sensor damaged, misaligned.	<ul style="list-style-type: none">• Inspect and repair as required. For shift cable information, refer to <u>AUTOMATIC TRANSAXLE/TRANSMISSION EXTERNAL CONTROLS</u> .• Inspect and repair as required. For TR sensor information, refer to <u>TRANSMISSION RANGE (TR) SENSOR</u>.
Case <ul style="list-style-type: none">• Manual control lever assembly damage, manual valve inner lever pin bent, manual valve inner lever damaged, spring rod damaged.• Manual valve lever shaft retaining pin damaged.	<ul style="list-style-type: none">• Inspect for damage. If damaged, repair as necessary.• Inspect for damage. If damaged, repair as necessary.

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Park System

- | | |
|--|---|
| <ul style="list-style-type: none">• Park gear, abutment, abutment plate, parking pawl return spring, park or guide plate, parking actuating rod, parking pawl shaft, manual lever detent spring damaged or misassembled.• External linkages/brackets damaged. | <ul style="list-style-type: none">• Inspect for damage. If damaged, repair as necessary.• Inspect for damage. If damaged, repair as necessary. |
|--|---|

Other Concerns: Overheating

OTHER CONCERNS: OVERHEATING

Possible Component	Reference/Action
257 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses, TFT sensor and SSB.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM.• GO to PINPOINT TEST A and GO to PINPOINT TEST B.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
357 - HYDRAULIC/MECHANICAL ROUTINE	
Fluid <ul style="list-style-type: none">• Incorrect level.	<ul style="list-style-type: none">• Adjust to correct level. refer to <u>PRELIMINARY INSPECTION</u>.
Incorrect Pressures <ul style="list-style-type: none">• High/low pressures.	<ul style="list-style-type: none">• Check pressure at line tap. Carry out <u>LINE PRESSURE TEST</u>.
Main Control <ul style="list-style-type: none">• Bolts not tightened to specification.• Separator plate damaged.• Contamination.• Valves/springs damaged,	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Disassemble and clean.• If damaged or parts are missing, install a

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misassembled, missing, stuck, or bore damaged.	new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.
Fluid Pump Assembly <ul style="list-style-type: none">• Bolts not tightened to specification.• Gasket damaged.• Porosity, cross leaks, plugged hole.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Inspect for damage. If damaged, repair as necessary.
Case <ul style="list-style-type: none">• Case vent damaged. Torque Converter Assembly <ul style="list-style-type: none">• Torque converter internal failure preventing engagement, piston application.	<ul style="list-style-type: none">• Inspect for damage. If damaged, repair as necessary.• Remove transaxle. Inspect for damage. Carry out torque converter checks, refer to <u>TORQUE CONVERTER CONTAMINATION INSPECTION</u>. If torque converter fails to pass the checks or is damaged, install a new or remanufactured torque converter.
Other <ul style="list-style-type: none">• Restriction in the transaxle cooling system.• Excessive trailer tow load.• Poor engine driveability	<ul style="list-style-type: none">• Refer to <u>TRANSAXLE/TRANSMISSION COOLING</u> for information and diagnosis of cooling issues.• Refer to the owner's manual for specifications on trailer towing.• Check engine driveability. Refer to <u>ENGINE SYSTEM-GENERAL INFORMATION</u> .

Other Concerns: No Engine Braking in Manual 1

OTHER CONCERNS: NO ENGINE BRAKING IN MANUAL 1

Possible Component	Reference/Action

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259 - ELECTRICAL ROUTINE

Powertrain Control System

- PCM, vehicle wiring harnesses and SSD.
- Carry out on-board diagnostic tests. See **INTRODUCTION - GASOLINE** article for diagnosis and testing of the PCM.
- GO to **PINPOINT TEST A.**
- Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

359 - HYDRAULIC/MECHANICAL ROUTINE

Fluid

- Incorrect level.
- Adjust to correct level. refer to **PRELIMINARY INSPECTION.**

Incorrect Pressures

- High/low pressures.
- Check pressure at line tap. Carry out Line Pressure Test. refer to **SPECIAL TESTING PROCEDURES.**

Fluid Pump Assembly

- Bolts not tightened to specification.
- Gasket damaged.
- Porosity, cross leaks, plugged hole.
- Tighten to specifications.
- Inspect for damage. If damaged, repair as necessary.
- Inspect for damage. If damaged, repair as necessary.

Low/Reverse Clutch Assembly

- Seals, piston damaged.
- Check balance dam.
- Friction elements damaged or worn.
- Return spring damaged.
- Inspect for damage. Repair as necessary.
- Inspect for damage. If damaged, repair as necessary.
- Inspect for damage. If damaged, repair as necessary.
- Inspect for damage. If damaged, repair as necessary.

Other Concerns: Fluid Venting or Foaming

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OTHER CONCERNS: FLUID VENTING OR FOAMING

Possible Component	Reference/Action
261 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• No electrical concerns.	
361 - HYDRAULIC/MECHANICAL ROUTINE	
Fluid <ul style="list-style-type: none">• Incorrect level.• Condition.	<ul style="list-style-type: none">• Adjust to correct level. refer to <u>PRELIMINARY INSPECTION.</u>• Carry out Fluid Condition Check. refer to <u>PRELIMINARY INSPECTION.</u>
Fluid Pump Assembly <ul style="list-style-type: none">• Bolts not tightened to specification.• Gasket damaged.• Porosity, cross leaks, plugged hole.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Inspect for damage. If damaged, repair as necessary.
Case <ul style="list-style-type: none">• Cap not seated• Case vent damaged.	<ul style="list-style-type: none">• Instal the vent cap past the second stop.• Inspect for damage. If damaged, repair as necessary.
Other <ul style="list-style-type: none">• Transaxle overheating.• Water in transaxle• Vent cap	<ul style="list-style-type: none">• Refer to routine 257/357.• Inspect the transmission fluid level indicator handle and seal. Install a new indicator if damage is indicated.• Inspect for foreign material in cap, clean as necessary

Other Concerns: Slips/Chatters in 1st Gear

OTHER CONCERNS: SLIPS/CHATTERS IN 1ST GEAR

Possible Component	Reference/Action
263 - ELECTRICAL ROUTINE	
Powertrain Control System	

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- PCM, vehicle wiring harnesses and SSC.

- Carry out on-board diagnostic tests. See **INTRODUCTION - GASOLINE** article for diagnosis and testing of the PCM.
- GO to **PINPOINT TEST A**.
- Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.

363 - HYDRAULIC/MECHANICAL ROUTINE

Fluid

- Incorrect level.
- Condition.

- Adjust to correct level. refer to **PRELIMINARY INSPECTION**.
- Carry out **CHECK THE FLUID CONDITION**.

Incorrect Pressures

- High/low pressures.

- Check pressure at line tap.
- Carry out **LINE PRESSURE TEST**.

Main Control

- Bolts not tightened to specification.
- Separator plate damaged.
- Contamination.
- Valves/springs damaged, misassembled, missing, stuck, or bore damaged.

- Tighten to specifications.
- Inspect for damage. If damaged, repair as necessary.
- Disassemble and clean.
- If damaged or parts are missing, install a new main control assembly. If misassembled, reassemble correctly. DO NOT stone, file or sand valves. This will remove the anodized finish and may result in further main control or transaxle damage.

Fluid Pump Assembly

- Bolts not tightened to specification.
- Gasket damaged.
- Porosity, cross leaks, plugged hole.

- Tighten to specifications.
- Inspect for damage. If damaged, repair as necessary.
- Inspect for damage. If damaged, repair as necessary.

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Forward Clutch Assembly

- Seals, piston damaged.
 - Check balance dam.
 - Friction elements damaged or worn.
 - Return springs damaged.
- Inspect for damage. Repair as necessary.
 - Inspect for damage. If damaged, repair as necessary.
 - Inspect for damage. If damaged, repair as necessary.
 - Inspect for damage. If damaged, repair as necessary.

Low One-Way Clutch

- Worn, damaged or assembled incorrectly.
- Inspect for damage. Repair as necessary.

Other Concerns: Slips/Chatters in 2nd Gear

OTHER CONCERNS: SLIPS/CHATTERS IN 2ND GEAR

Possible Component	Reference/Action
264 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses and SSD.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM.• GO to <u>PINPOINT TEST A.</u>• Clear the DTCs, road test and rerun on-board diagnostic test.
364 - HYDRAULIC/MECHANICAL ROUTINE	
Fluid <ul style="list-style-type: none">• Incorrect level.• Condition.	<ul style="list-style-type: none">• Adjust to correct level. refer to <u>PRELIMINARY INSPECTION.</u>• Carry out <u>CHECK THE FLUID CONDITION.</u>
Incorrect Pressures <ul style="list-style-type: none">• High/low pressures.	<ul style="list-style-type: none">• Check pressure at line tap.• Carry out <u>LINE PRESSURE TEST.</u>
Fluid Pump Assembly	

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<ul style="list-style-type: none">• Bolts not tightened to specification.• Gasket damaged.• Porosity, cross leaks, plugged hole.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Inspect for damage. If damaged, repair as necessary.
Servo <ul style="list-style-type: none">• Seals (piston and cover) damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.
Band <ul style="list-style-type: none">• Band damaged.• Servo worn or damaged.• Not adjusted correctly.• Anchor bolt damaged or worn.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. If damaged, repair as necessary.• Adjust correctly.• Inspect for damage. If damaged, repair as necessary.
OD Planetary Assembly <ul style="list-style-type: none">• Planetary damaged.	<ul style="list-style-type: none">• Inspect for damage. If damaged, repair as necessary.
Forward Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. If damaged, repair as necessary.• Inspect for damage. If damaged, repair as necessary.• Inspect for damage. If damaged, repair as necessary.

Other Concerns: Slips/Chatters in 3rd Gear

OTHER CONCERNS: SLIPS/CHATTERS IN 3RD GEAR

Possible Component	Reference/Action
282 - ELECTRICAL ROUTINE	
Powertrain Control System	No electrical concerns.

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382 - HYDRAULIC/MECHANICAL ROUTINE

Fluid <ul style="list-style-type: none">• Incorrect level.• Condition.	<ul style="list-style-type: none">• Adjust to correct level. refer to <u>PRELIMINARY INSPECTION</u>.• Carry out <u>CHECK THE FLUID CONDITION</u>.
Incorrect Pressures <ul style="list-style-type: none">• High/low pressures.	<ul style="list-style-type: none">• Check pressure at line tap.• Carry out <u>LINE PRESSURE TEST</u>.
Fluid Pump Assembly <ul style="list-style-type: none">• Bolts not tightened to specification.• Gasket damaged.• Porosity, cross leaks, plugged hole.	<ul style="list-style-type: none">• Tighten to specifications.• Inspect for damage. If damaged, repair as necessary.• Inspect for damage. If damaged, repair as necessary.
Forward Clutch Assembly <ul style="list-style-type: none">• Seals, piston damaged.• Check balance dam.• Friction elements damaged or worn.• Return springs damaged.	<ul style="list-style-type: none">• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.• Inspect for damage. Repair as necessary.

Other Concerns: No Engine Braking in ALL Gears**OTHER CONCERNS: NO ENGINE BRAKING IN ALL GEARS**

Possible Component	Reference/Action
283 - ELECTRICAL ROUTINE	
Powertrain Control System <ul style="list-style-type: none">• PCM, vehicle wiring harnesses and SSD.	<ul style="list-style-type: none">• Carry out on-board diagnostic tests. See <u>INTRODUCTION - GASOLINE</u> article for diagnosis and testing of the PCM.

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	<ul style="list-style-type: none">• GO to PINPOINT TEST A.• Repair as required. Clear the DTCs, road test and rerun on-board diagnostic test.
383 - HYDRAULIC/MECHANICAL ROUTINE	
No Hydraulic/Mechanical concerns.	

GENERAL PROCEDURES

TRANSMISSION FLUID DRAIN AND REFILL - 2.0L DURATEC

MATERIAL SPECIFICATION

Item	Specification
Automatic Transmission Fluid XT-5-QM	MERCON® V

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING AND LIFTING** .
2. Disconnect the return hose from the transmission fluid cooler.
 1. Push the connector fitting into the cooler line.
 2. Press the yellow release button.
 3. Pull the connector fitting off the cooler line.

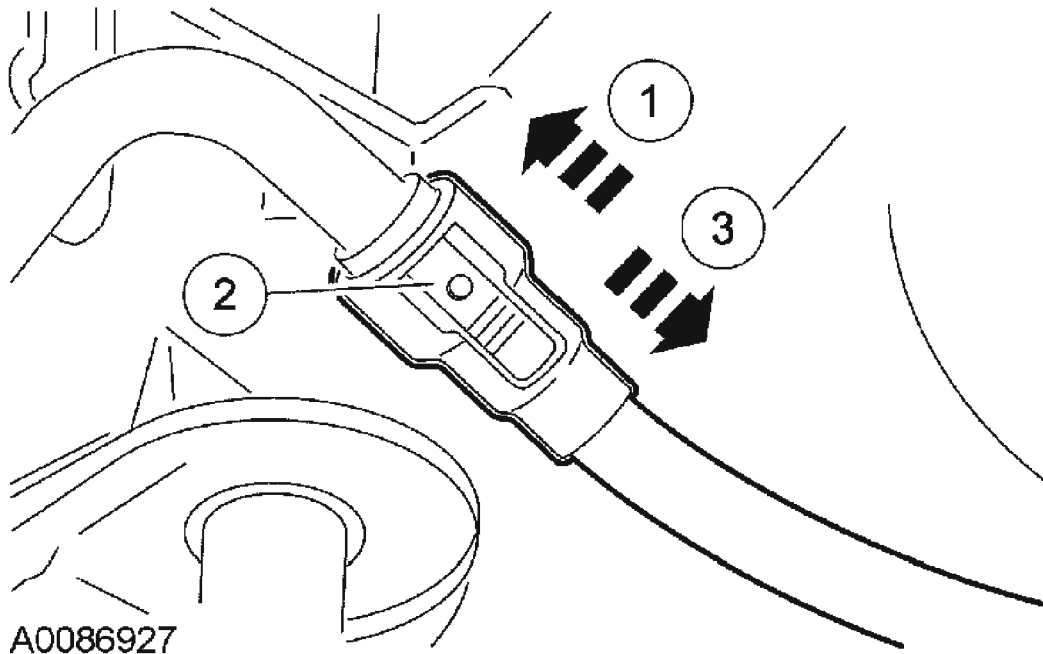


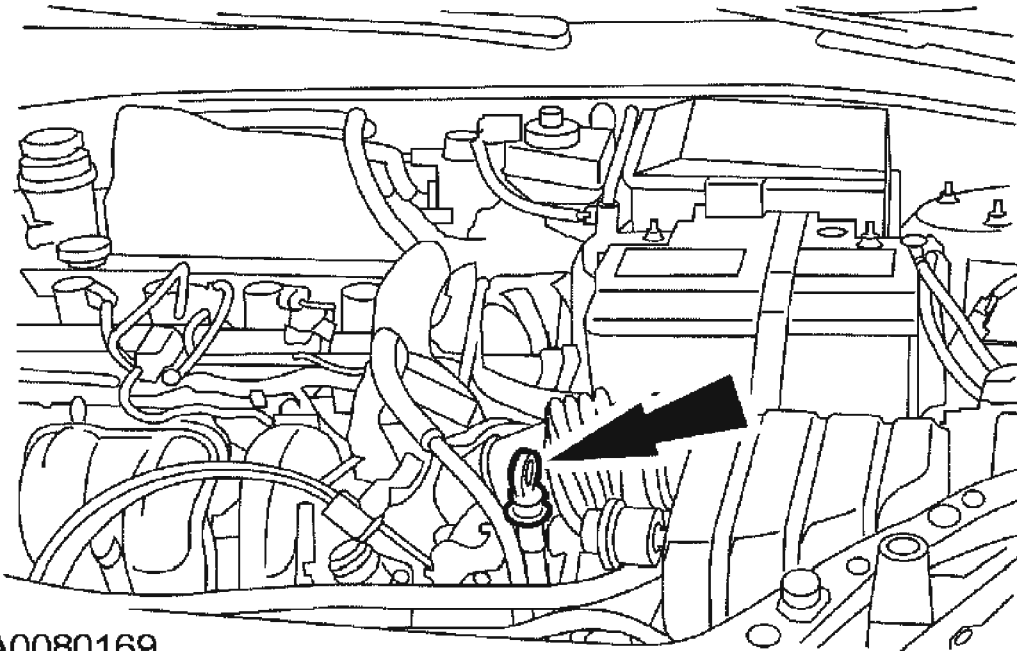
Fig. 68: Disconnecting Return Hose From Transmission Fluid Cooler
Courtesy of FORD MOTOR CO.

3. Attach a length of suitable drain hose to the transmission fluid cooler return tube.
4. Lower the vehicle.
5. Insert the drain hose into a calibrated 10 liter (10.5 quarts) container.

CAUTION: To prevent damage to the transaxle, do not run the engine above idle.

NOTE: If the fluid return rate is less than 0.95 liters (1.0 quart) in 30 seconds, or if the return hose pulsates, check for restrictions at the pump, cooler or cooler lines.

6. Run the engine at idle and pump out 3 liters (3.17 quarts) of automatic transmission fluid.
7. Switch OFF the engine.
8. Remove the fluid level indicator from the fluid level indicator tube.



A0080169

Fig. 69: Identifying Fluid Level Indicator
Courtesy of FORD MOTOR CO.

9. Add 3 liters of automatic transmission fluid to the transaxle.

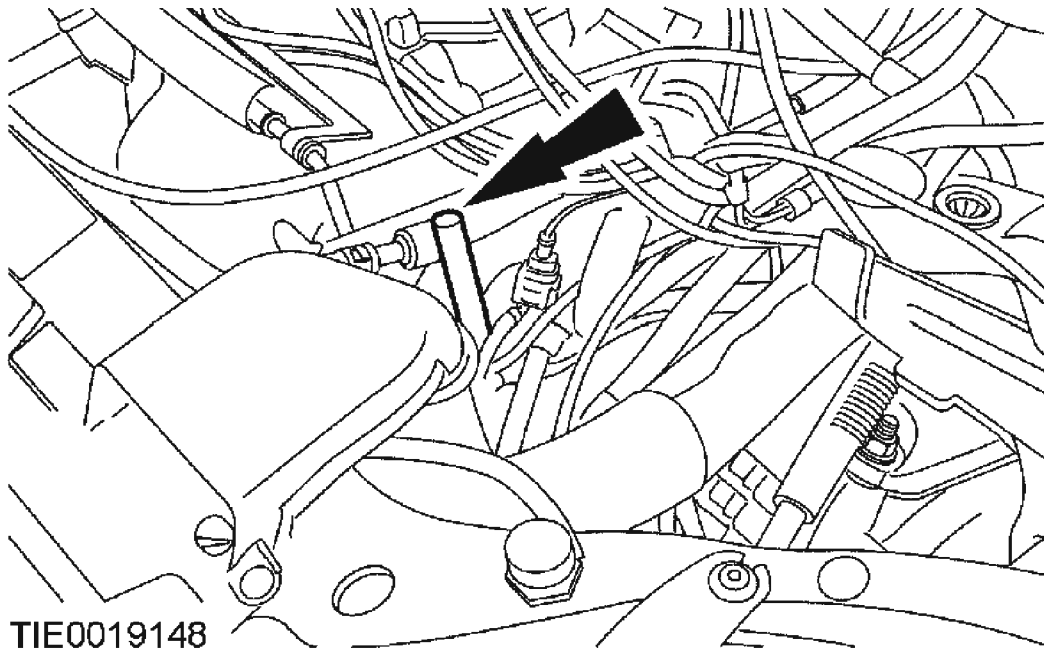


Fig. 70: Identifying Fluid Level Indicator Tube
Courtesy of FORD MOTOR CO.

CAUTION: To prevent damage to the transaxle, do not run the engine above idle.

NOTE: If the fluid return rate is less than 0.95 liters in 30 seconds, or if the return hose pulsates, check for restrictions at the pump, cooler or cooler lines.

10. Run the engine at idle and pump out 3 liters (3.17 quarts) of automatic transmission fluid.
11. Switch OFF the engine.
12. Add 3 liters (3.17 quarts) of automatic transmission fluid to the transaxle.

CAUTION: To prevent damage to the transaxle, do not run the engine above idle.

13. Run the engine at idle and pump out 3 liters (3.17 quarts) of automatic transmission fluid.
14. Switch OFF the engine.

15. Raise the vehicle.
16. Remove the length of suitable drain hose from the transmission fluid return hose.
17. Connect the return hose to the transmission fluid cooler.

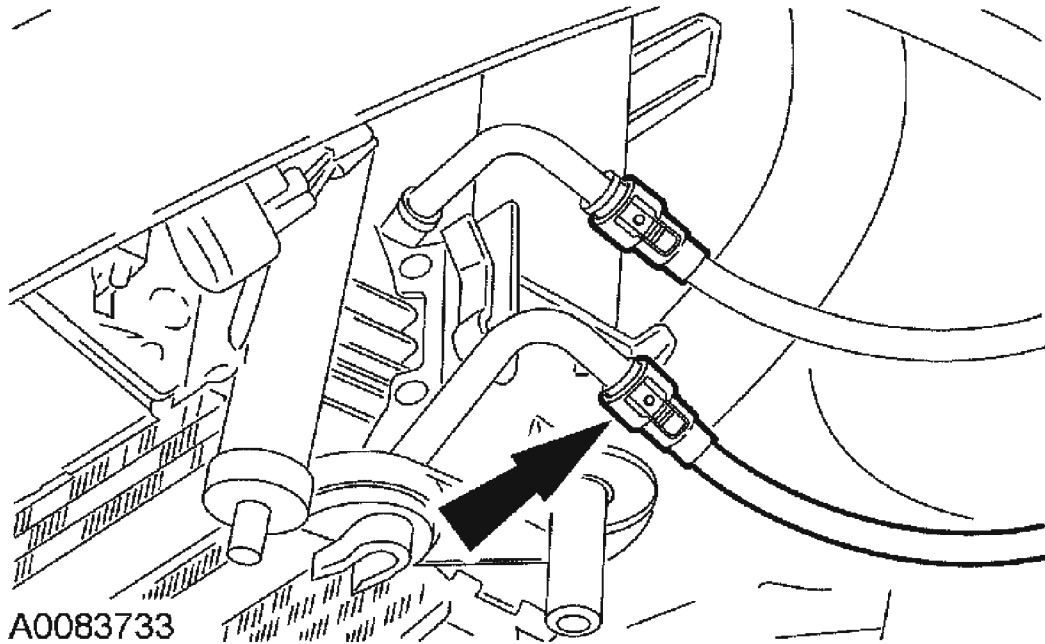


Fig. 71: Connecting Return Hose To Transmission Fluid Cooler
Courtesy of FORD MOTOR CO.

18. Lower the vehicle.
19. Add 3 liters (3.17 quarts) of automatic transmission fluid to the transaxle.

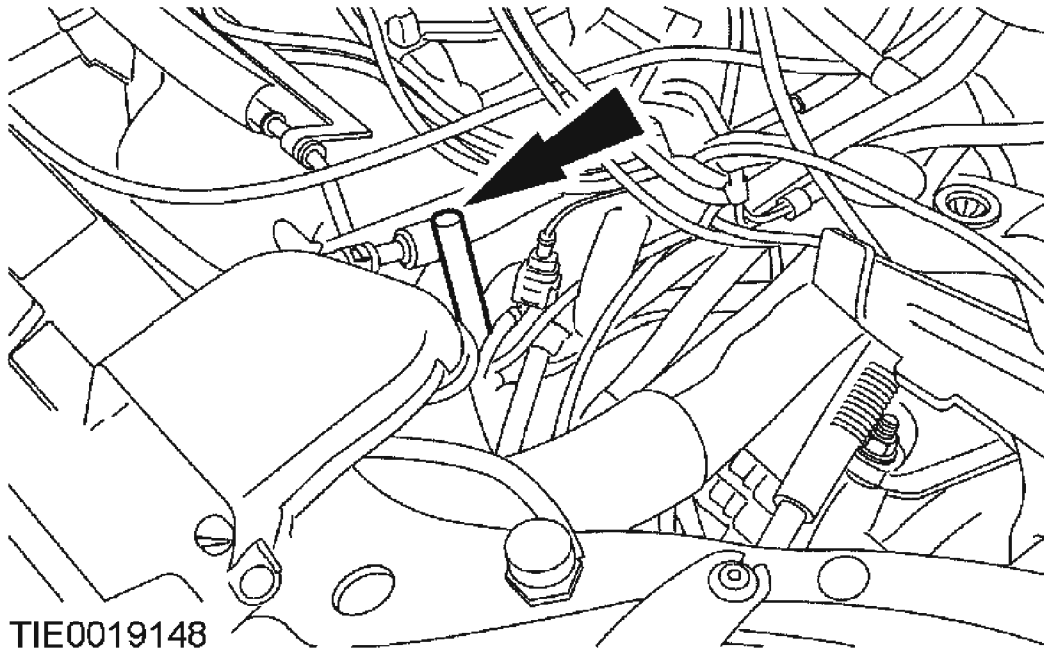
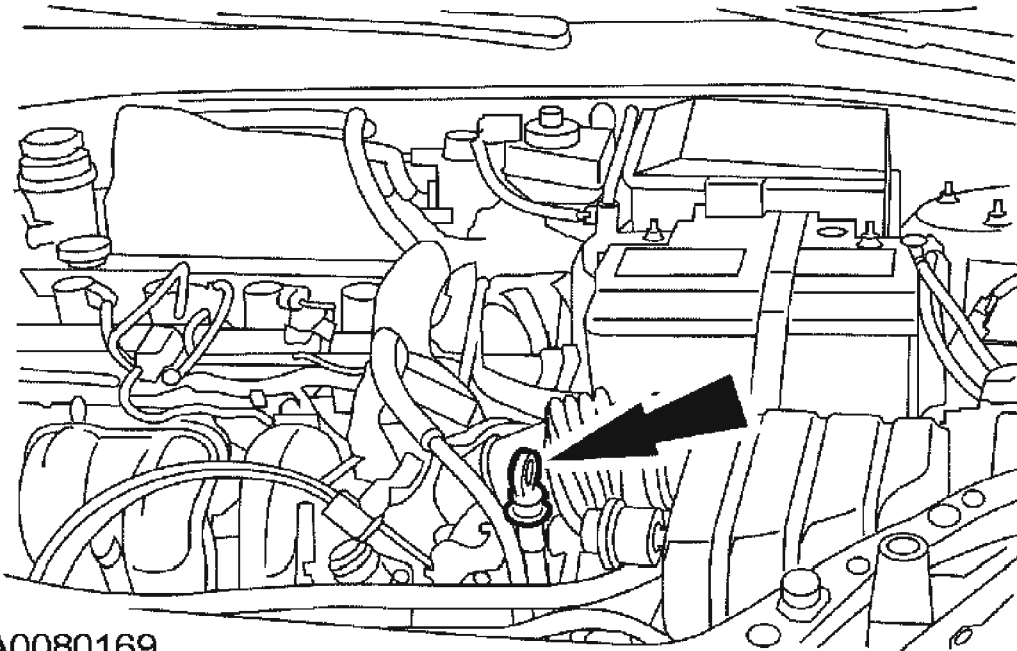


Fig. 72: Identifying Fluid Level Indicator Tube
Courtesy of FORD MOTOR CO.

20. Install the fluid level indicator to the fluid level indicator tube.



A0080169

Fig. 73: Installing Fluid Level Indicator To Fluid Level Indicator Tube
Courtesy of FORD MOTOR CO.

CAUTION: To prevent damage to the transaxle, do not run the engine above idle.

21. Run the engine.
22. Check the automatic transmission fluid level and fill if necessary.

TORQUE CONVERTER

1. A new or remanufactured torque converter must be installed if one or more of the following statements is true:
 - A torque converter malfunction has been determined based on complete diagnostic procedures.
 - Converter stud or studs, impeller hub or bushing are damaged.
 - Discoloration (due to overheating).
 - Evidence of transmission assembly or fluid contamination due to the following transmission or converter failure Modes:

- Major metallic failure.
- Multiple clutches or clutch plate failures.
- Sufficient component wear which results in metallic contamination.
- Internal torque converter contamination present. For additional information, refer to **TORQUE CONVERTER CONTAMINATION INSPECTION**.

TORQUE CONVERTER CONTAMINATION INSPECTION

CAUTION: Do not use water-based cleaners or mineral spirits to clean or flush the torque converter or transmission damage will occur. Use only clean automatic transmission fluid designated for the transmission and converter being serviced.

1. If a new or remanufactured torque converter is not being installed, the following steps must be completed.
2. With the torque converter on a bench, pour a small amount of transmission fluid from the torque converter onto an absorbent white tissue or through a paper filter and examine the fluid.
3. Observe the color and odor of the fluid. The fluid should be red, not brown or black. Odor may indicate an overheating condition such as clutch disc or band failure.
4. Examine the stain on the tissue for evidence of particles (spec. of any kind). Examine the fluid level indicator for signs of antifreeze (gum or varnish). If particles are present in the fluid or there is evidence of engine coolant or water, a new torque converter must be installed.
5. If there are no particles or contamination present, drain the remainder of the transmission fluid from the torque converter.
6. Add 1.9 liter (2 qt.) of clean automatic transmission fluid into the converter and agitate by hand.
7. Thoroughly drain the fluid.

IN-VEHICLE REPAIR

FLUID PAN, GASKET AND FILTER

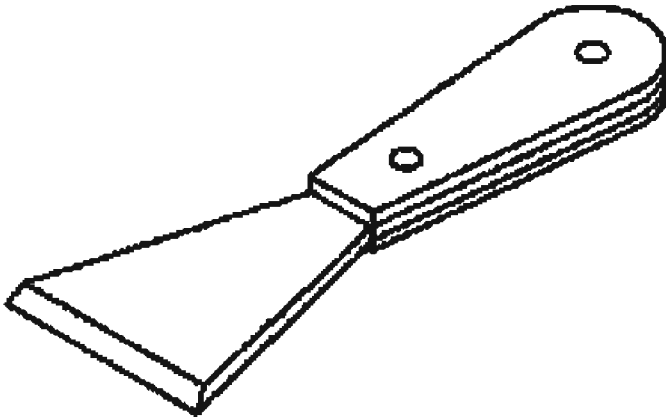
Special Tool(s)

SPECIAL TOOL SPECIFICATION

	Separator, Oil Pan 303-428 (21-179)
--	-------------------------------------

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



21179

Material

MATERIAL SPECIFICATION

Item	Specification
Metal Surface Cleaner	WSE-M5B-392-A
Loctite 5699	WSS-M4G-323-A8
Automatic Transmission Fluid XT-5-QM	MERCON® V

Removal

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

NOTE: Position a suitable drain pan under the fluid pan.

NOTE: The fluid pan is filled with automatic transmission fluid and can not be drained before removing.

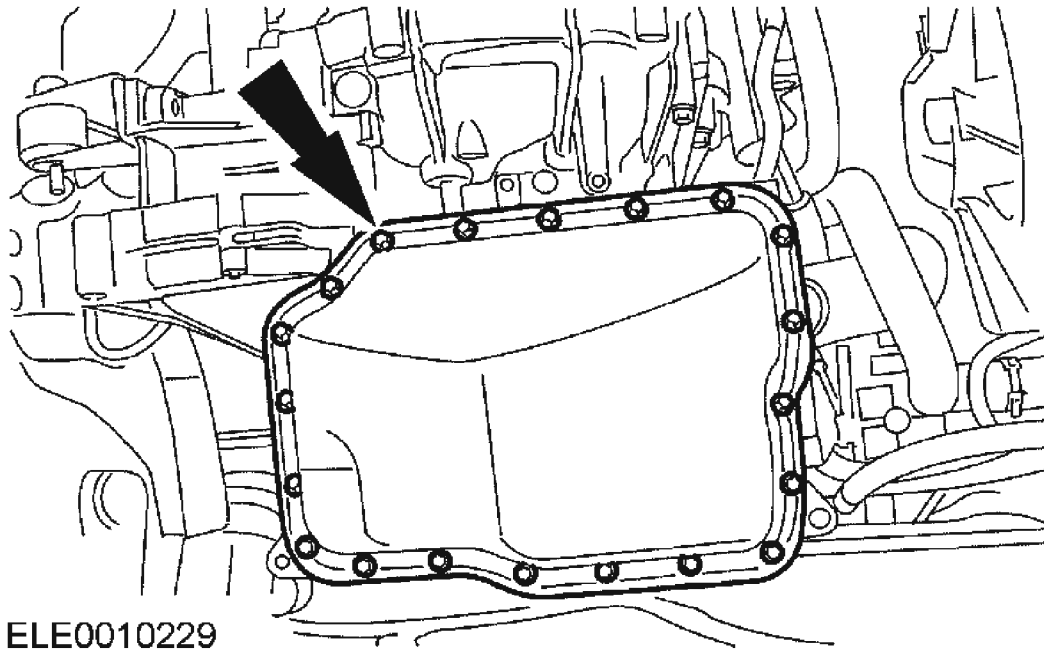


Fig. 74: Removing Transaxle Fluid Pan
Courtesy of FORD MOTOR CO.

2. Remove the transaxle fluid pan.
 - Remove the bolts.
 - Using the special tool, separate the bead of sealer.
3. Clean the silicone from the transaxle fluid pan and transaxle case surfaces thoroughly with metal surface cleaner or equivalent meeting Ford specification.

Installation

1. Apply a bead one and a half millimeters thick of Loctite 5699 or equivalent meeting Ford specification to the transaxle fluid pan.

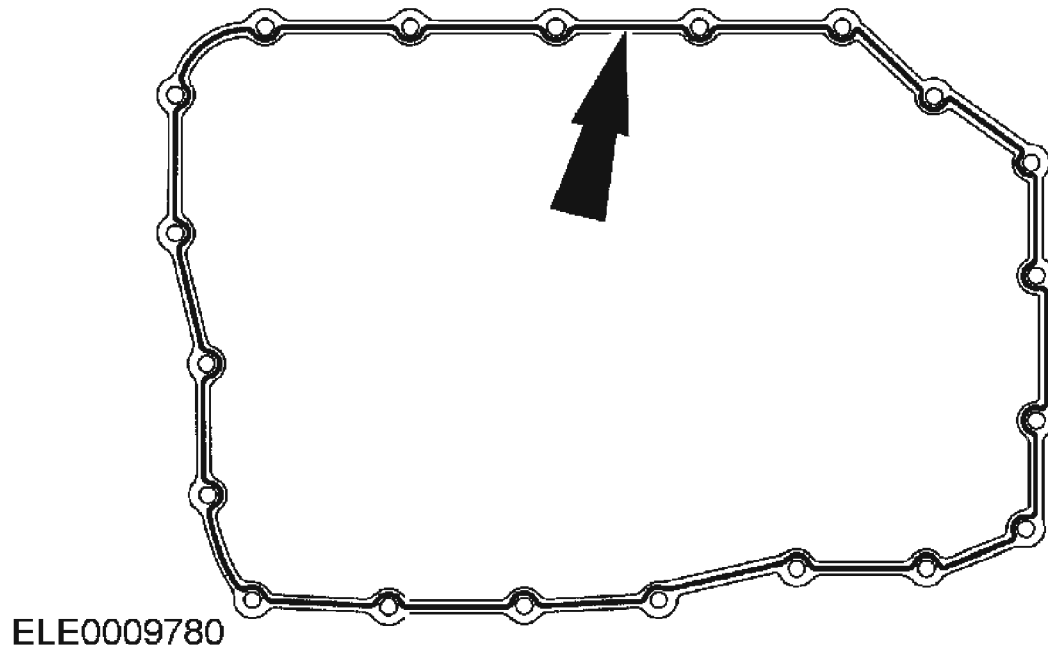


Fig. 75: Applying Bead Of Loctite 5699 Or Equivalent To Transaxle Fluid Pan
Courtesy of FORD MOTOR CO.

2. Install the transaxle fluid pan.

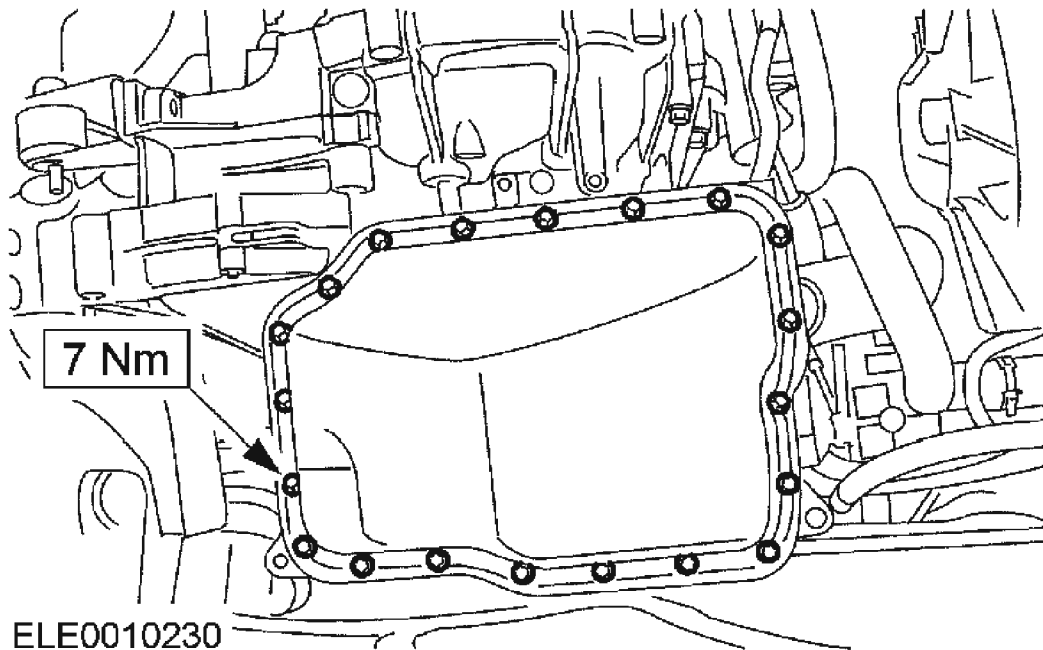


Fig. 76: Installing Transaxle Fluid Pan
Courtesy of FORD MOTOR CO.

3. Lower the vehicle.
4. Fill the transaxle with new automatic transmission fluid meeting Ford specification. For additional information, refer to **SPECIFICATIONS**.

MAIN CONTROLS

Material

MATERIAL SPECIFICATION

Item	Specification
MERCON® V Automatic Transmission Fluid XT-5-QM (or XT-5-QMC) (US); CXT-5-LM12 (Canada)	MERCON® V

Removal

1. Remove the fluid pan. For additional information, refer to **FLUID PAN, GASKET AND FILTER**.

2. Disconnect the transmission fluid temperature (TFT) sensor electrical connector.

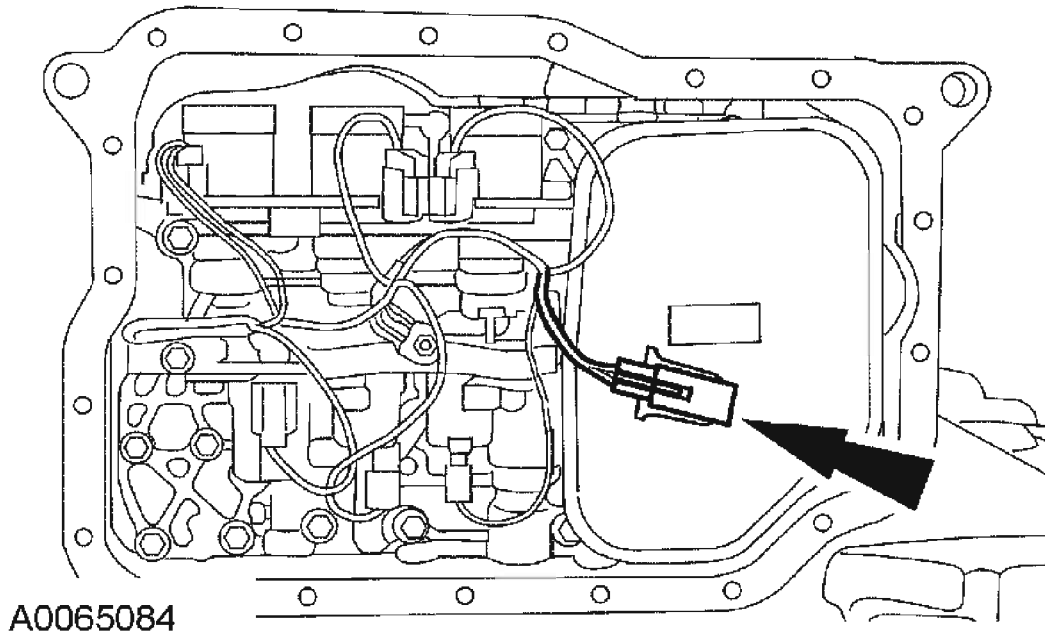


Fig. 77: Disconnecting Transmission Fluid Temperature (TFT) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

3. Remove the fluid filter.

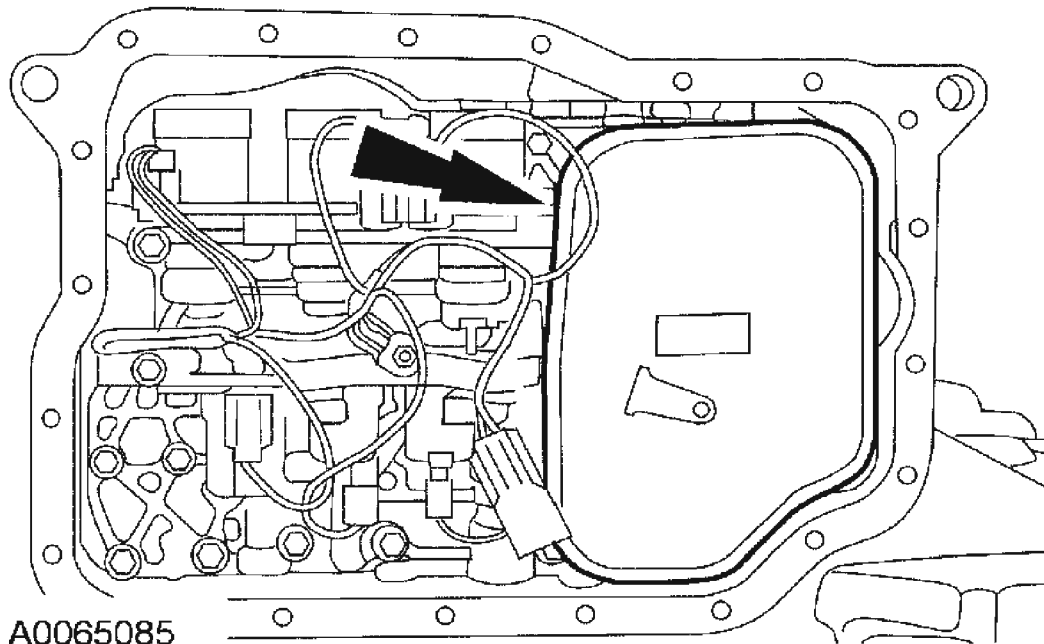


Fig. 78: Removing Fluid Filter
Courtesy of FORD MOTOR CO.

NOTE: It is necessary to note the location of the main control wire harness connectors so they can be connected in the same positions. Connector color letters are cast into the solenoid body.

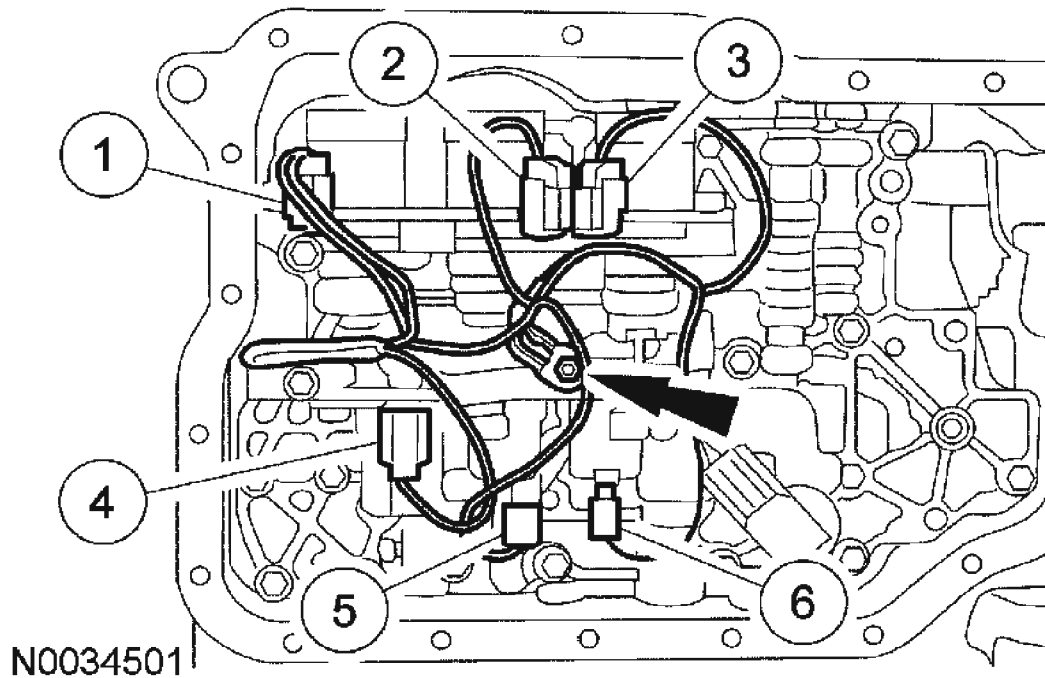


Fig. 79: Disconnecting Electrical Connectors, Removing Main Control Wiring Harness And Ground Wire Bolt
Courtesy of FORD MOTOR CO.

4. Remove the ground wire bolt. Disconnect the electrical connectors and remove the main control wiring harness.
 1. Solenoid SSC; Color N (Neutral/White).
 2. Solenoid SSE; Color G (Green).
 3. Solenoid SSD; Color L (Blue).
 4. Solenoid EPC; Color B (Black).
 5. Solenoid SSA; Color N (Neutral).
 6. Solenoid SSB; Color B (Black).

NOTE: **Note the locations of the 2 long bolts.**

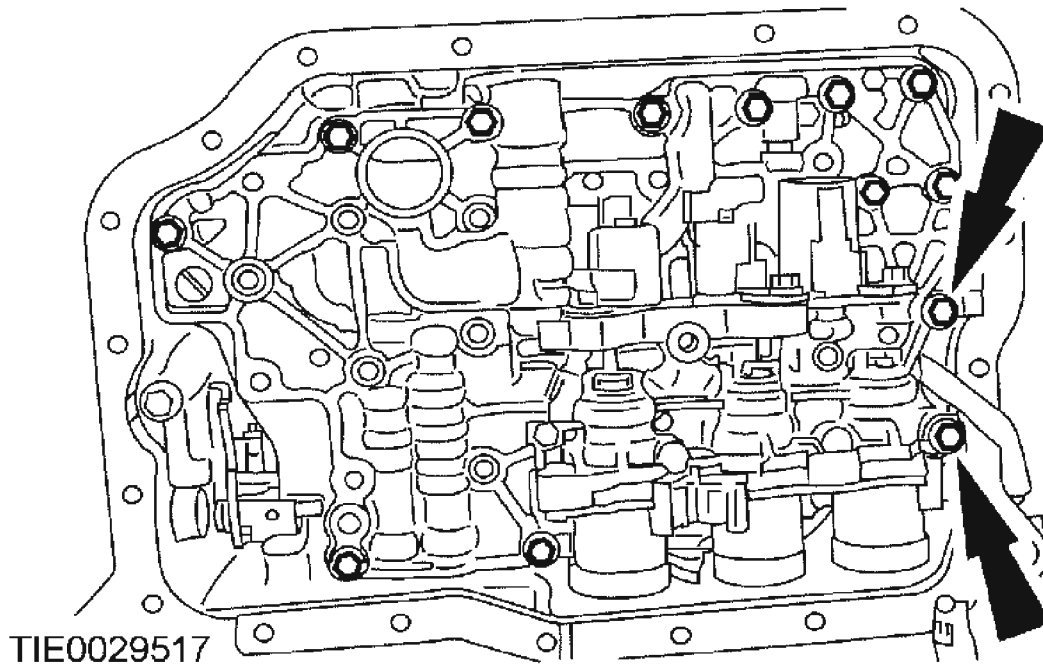


Fig. 80: Removing Main Control Valve Body And Accumulators
Courtesy of FORD MOTOR CO.

5. Remove the main control valve body and accumulators.

- NOTE:** Each accumulator is equipped with 2 springs. All 4 springs are different sizes.
- NOTE:** Note the size and location of the accumulator springs to aid assembly.
- NOTE:** Note the shape of each piston and the piston bore from which the piston was removed. The shape and size will vary depending on application. The piston must be installed in its correct bore during assembly.

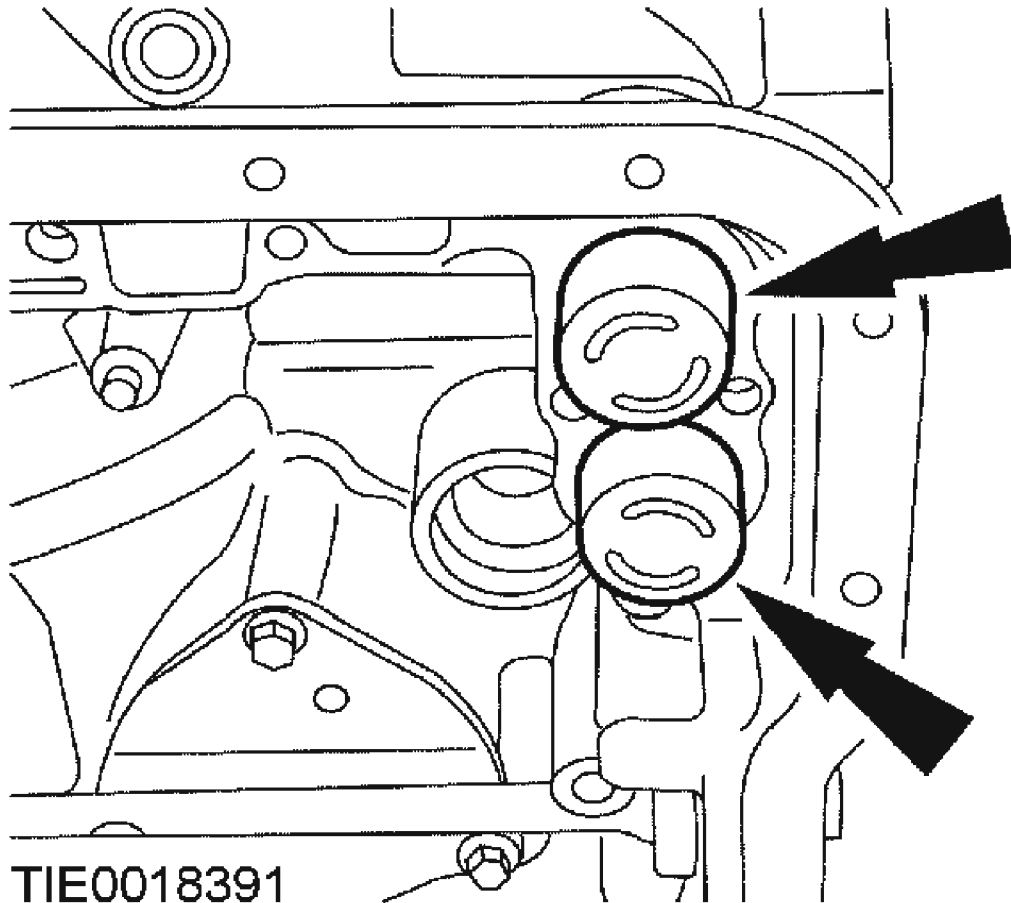


Fig. 81: Removing Accumulator Pistons And Springs
Courtesy of FORD MOTOR CO.

6. Remove the accumulator pistons and springs.

Installation

NOTE: The thin longer springs are for the neutral and drive accumulator.

NOTE: Accumulator bore and pistons are matched by depth; some pistons may have steps. Install the pistons in the same bore as removed.

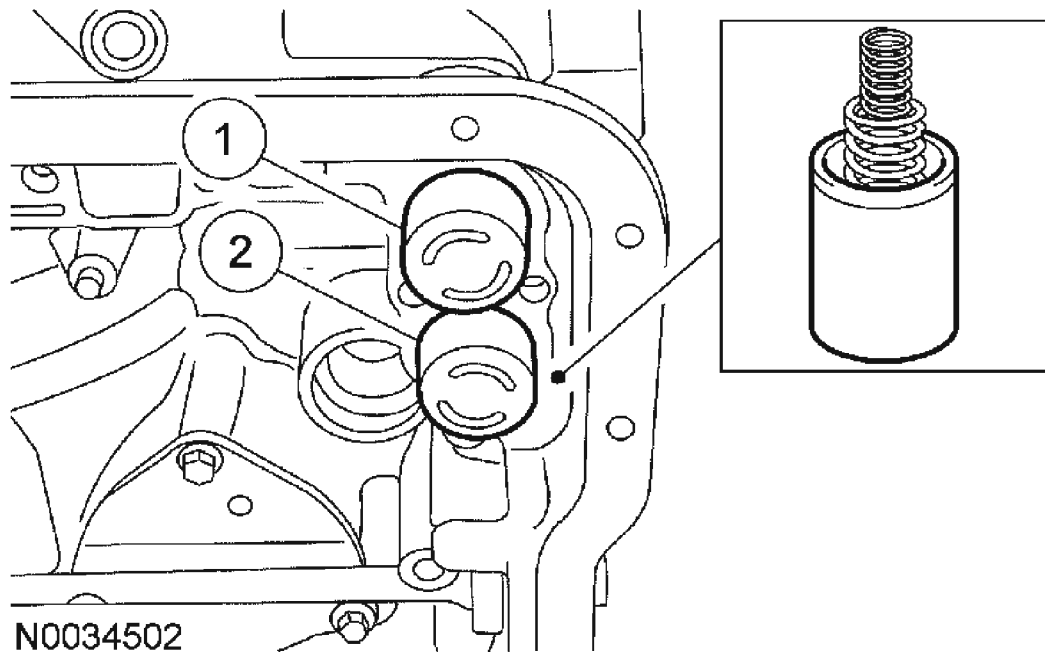


Fig. 82: Installing Accumulator Pistons And Springs
Courtesy of FORD MOTOR CO.

1. Install the accumulator pistons and springs.
 1. Accumulator 1 and 2.
 2. Accumulator N and D.

CAUTION: Make sure that the manual valve is in the manual control valve shift lever.

NOTE: Do not fully tighten the main control valve bolts at this stage.

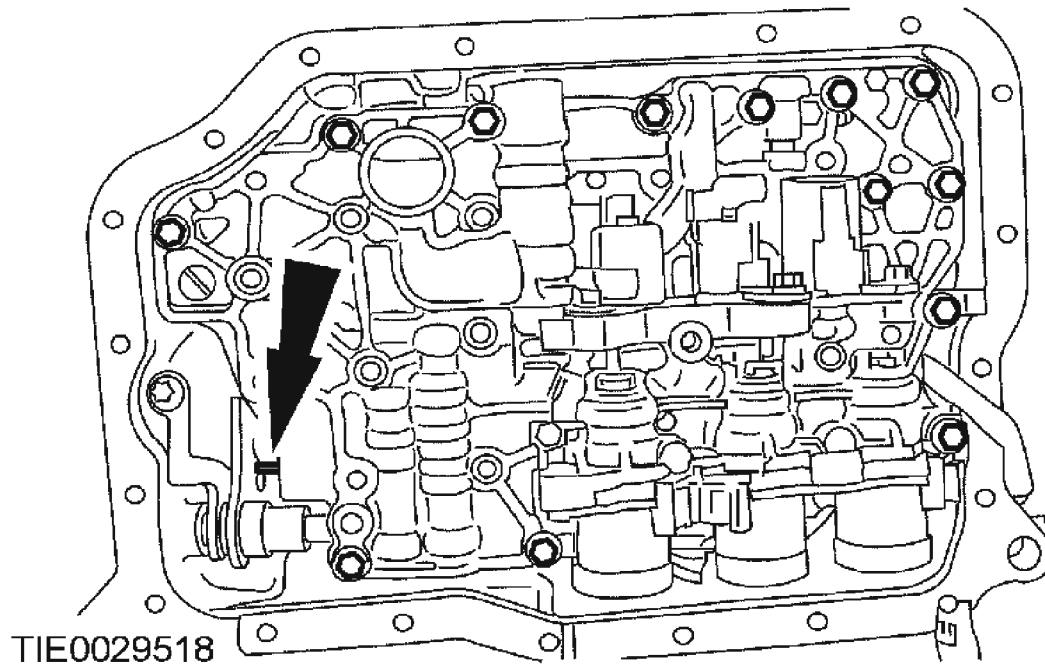


Fig. 83: Installing Main Control Valve Body
Courtesy of FORD MOTOR CO.

2. Install the main control valve body.
3. Tighten the main control valve body retaining bolts.
 - Tighten the bolts in the sequence shown.
 - Tighten to 9 Nm (80 lb-in).

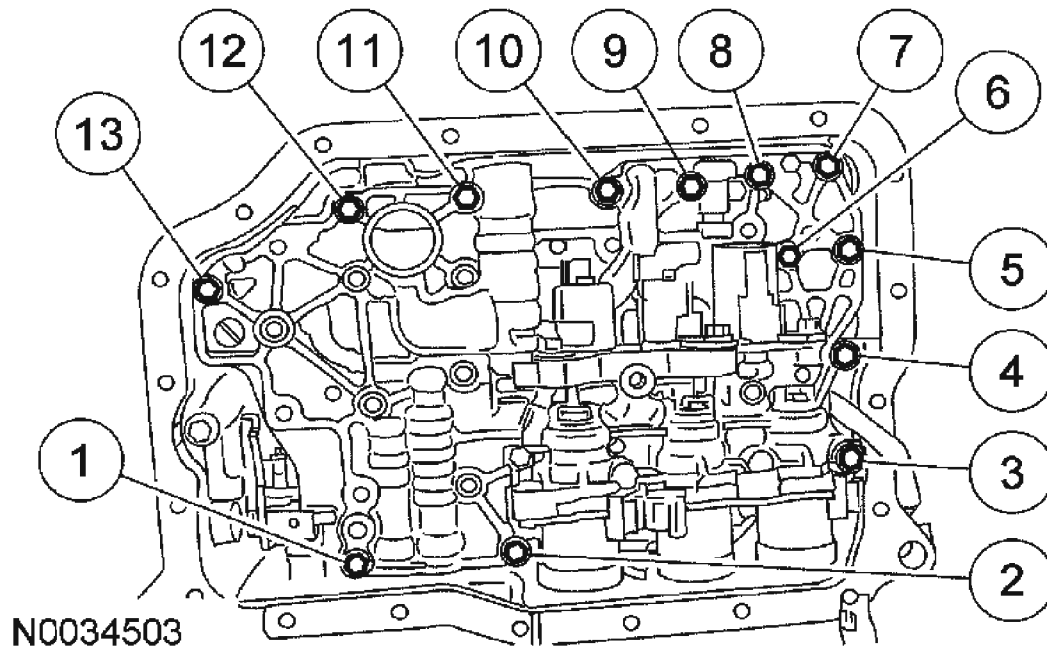


Fig. 84: Tightening Main Control Valve Body Retaining Bolts
Courtesy of FORD MOTOR CO.

NOTE: It is necessary to connect the electrical connectors in the same positions as noted in disassembly. Connector color letters are cast into the solenoid body.

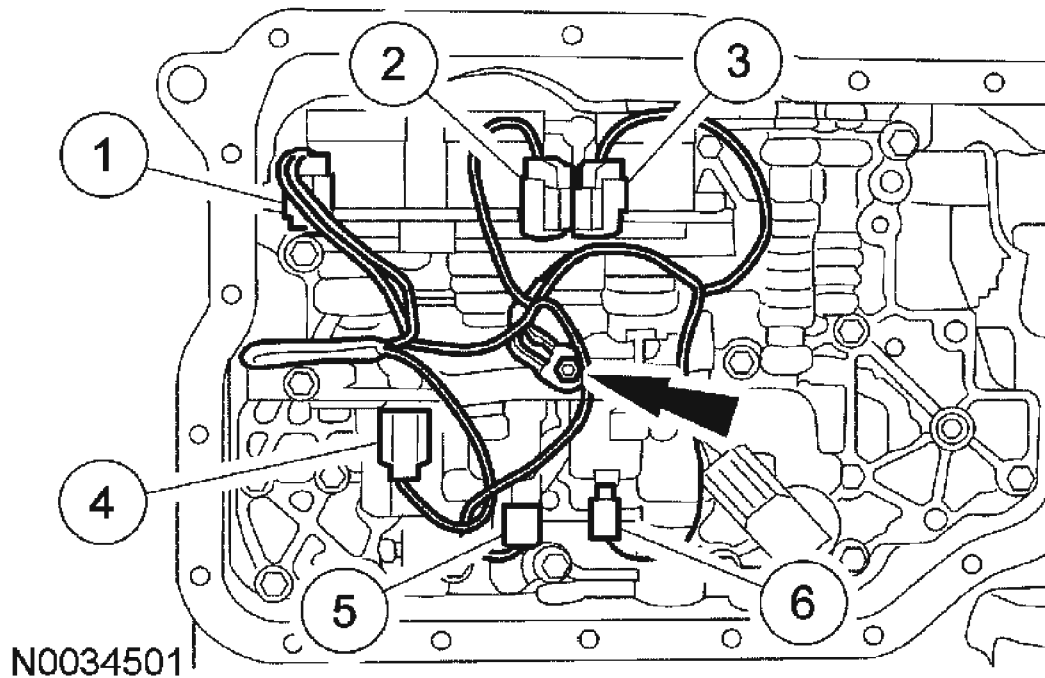


Fig. 85: Installing Main Control Valve Wiring Harness, Connecting Electrical Connectors And Installing Ground Wire Bolt
Courtesy of FORD MOTOR CO.

4. Install the main control valve wiring harness, connect the electrical connectors and install the ground wire bolt.
 1. Solenoid SSC; Color N (Neutral/White).
 2. Solenoid SSE; Color G (Green).
 3. Solenoid SSD; Color L (Blue).
 4. Solenoid EPC; Color B (Black).
 5. Solenoid SSA; Color N (Neutral).
 6. Solenoid SSB; Color B (Black).
 - Tighten to 10 Nm (89 lb-in).
5. Install the fluid filter.

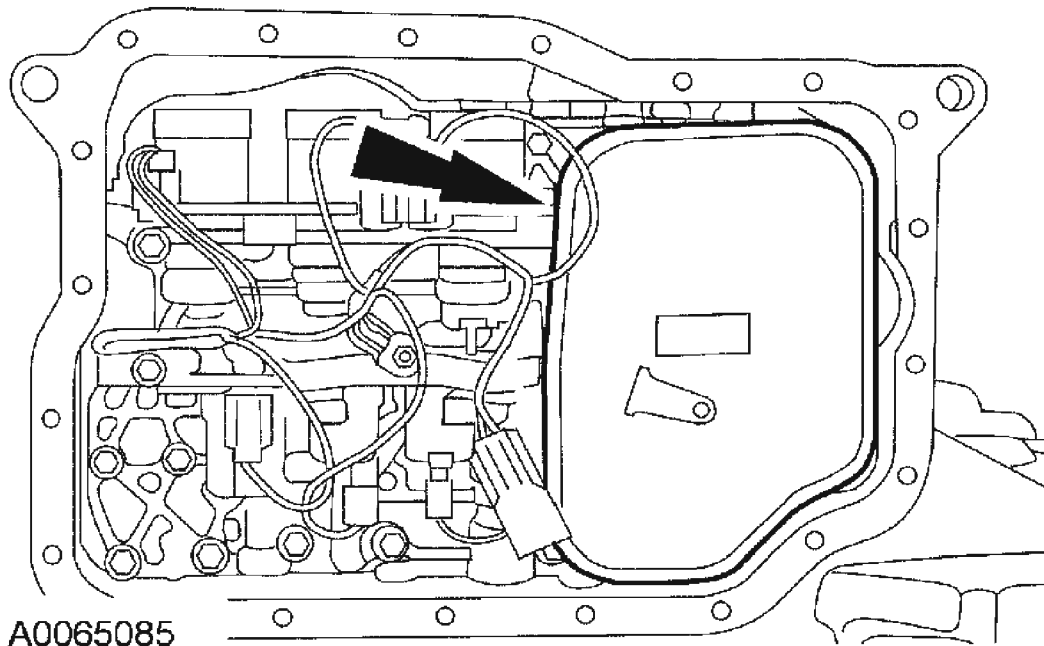


Fig. 86: Installing Fluid Filter
Courtesy of FORD MOTOR CO.

6. Connect the TFT sensor electrical connector.

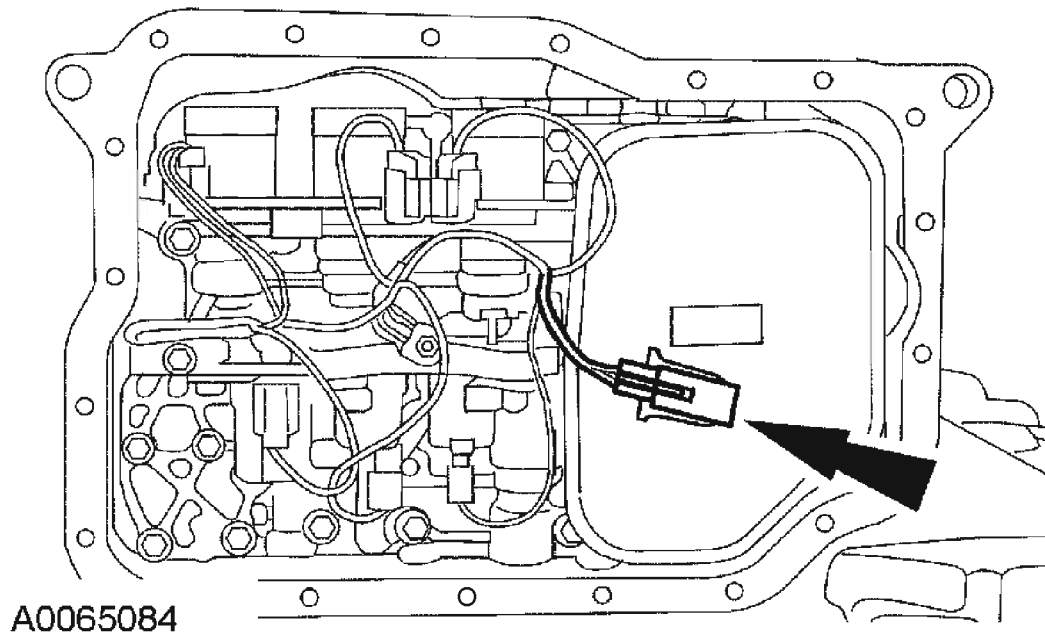


Fig. 87: Connecting TFT Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

7. Install the fluid pan. For additional information, refer to **FLUID PAN, GASKET AND FILTER**.

TURBINE SHAFT SPEED (TSS) SENSOR

Material

MATERIAL SPECIFICATION

Item	Specification
Thread Sealer	ESR-M18P7-A

Removal

1. Remove the battery tray. For additional information, refer to **BATTERY, MOUNTING AND CABLES**.
2. Remove the air cleaner assembly.
 1. Disconnect the crankcase ventilation hose.
 2. Disconnect the air cleaner outlet hose.

3. Remove the bolts and pull out the air cleaner resonator.

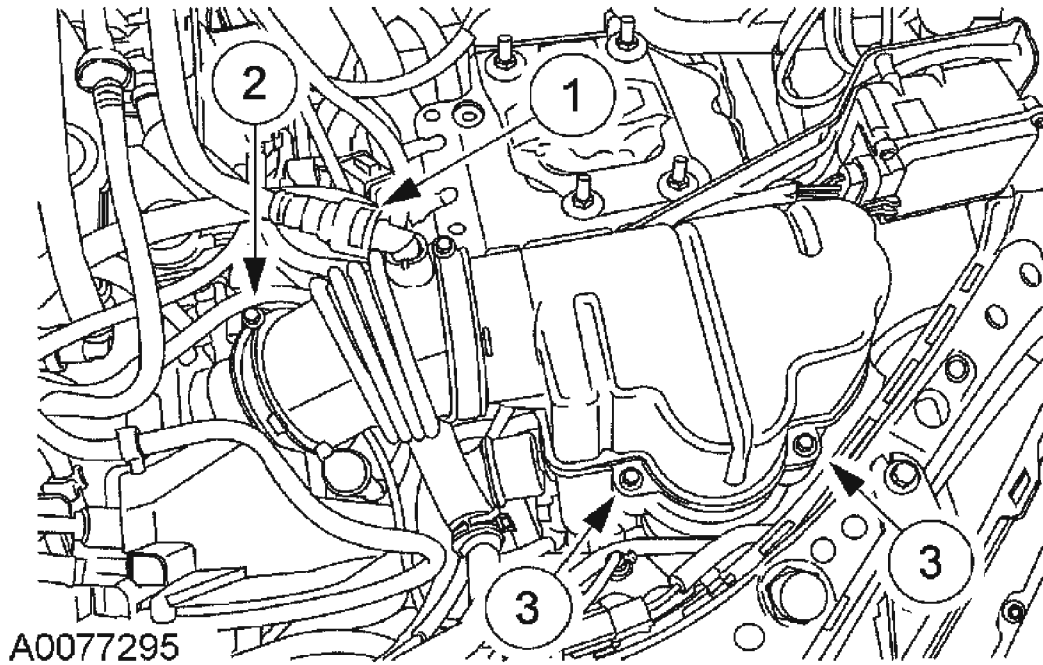


Fig. 88: Removing Air Cleaner Assembly
Courtesy of FORD MOTOR CO.

NOTE: The resonator is plugged into the bracket.

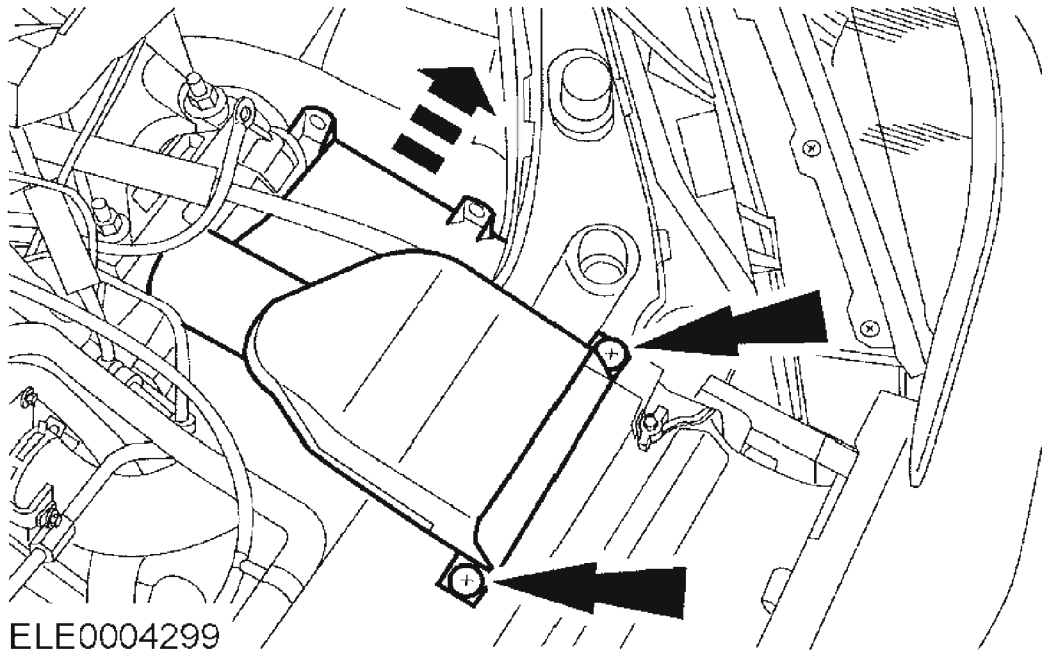


Fig. 89: Removing Air Cleaner Intake Hose
Courtesy of FORD MOTOR CO.

3. Remove the air cleaner intake hose with the resonator.
4. Disconnect the turbine shaft speed (TSS) sensor electrical connector.

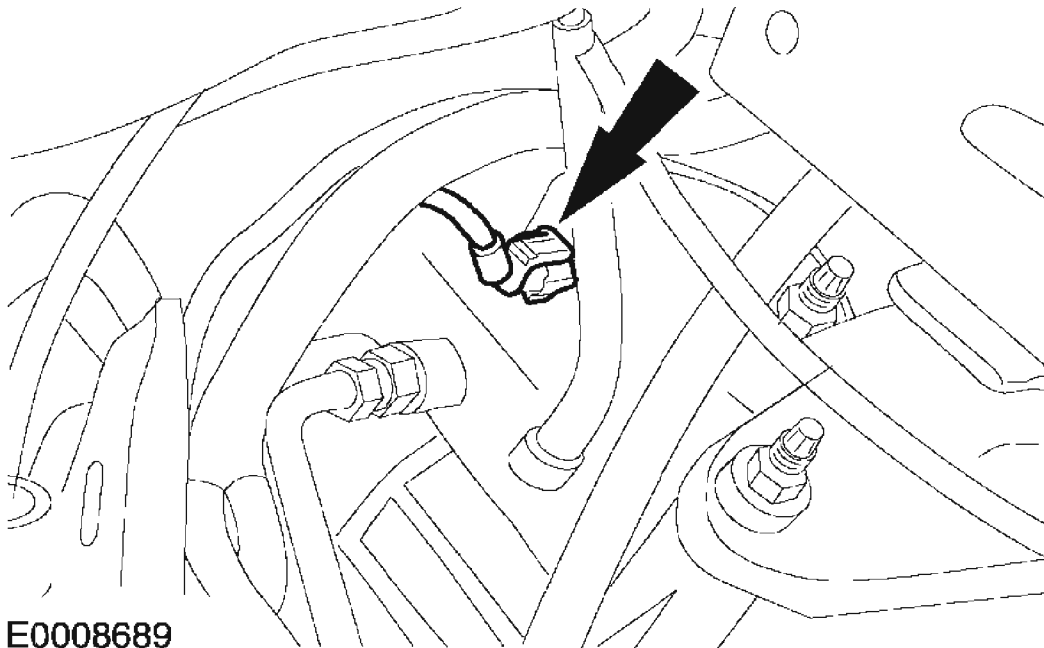


Fig. 90: Disconnecting Turbine Shaft Speed (TSS) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

5. Remove the TSS sensor.
 - Check the TSS sensor bore.
 - Check the O-ring seal for nicks or cuts and install a new O-ring if necessary.

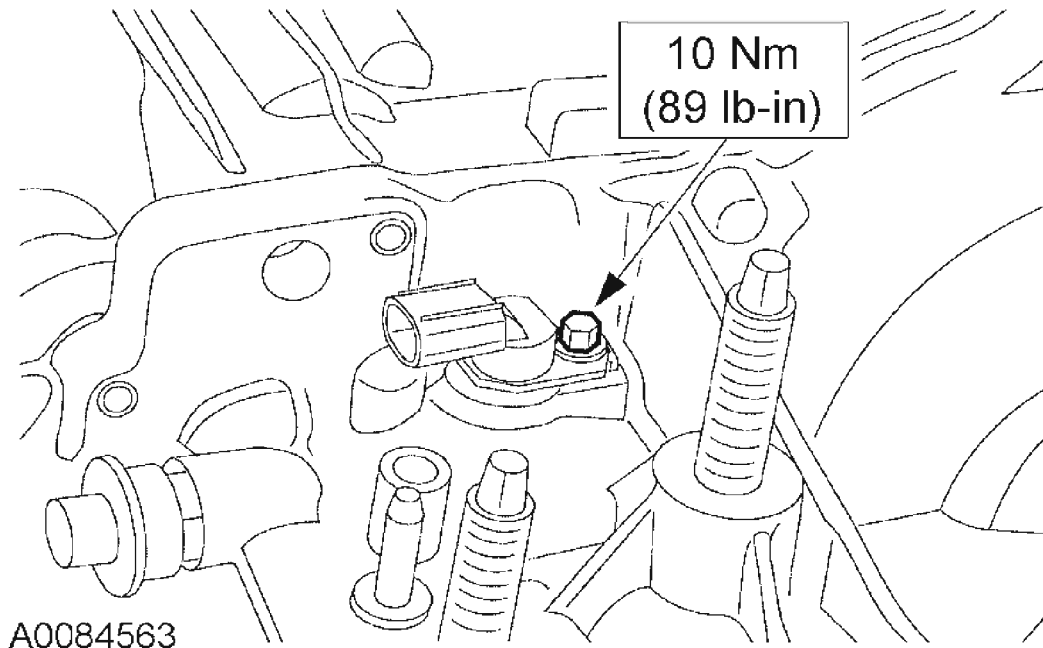


Fig. 91: Removing TSS Sensor
Courtesy of FORD MOTOR CO.

Installation

All vehicles

NOTE: Apply a light coat of petroleum jelly to the O-ring seal before installation.

NOTE: Apply thread sealer to the bolt.

1. To install, reverse the removal procedure.

Vehicles with front and rear power windows

2. Initialize the door window motors. For additional information, refer to **GLASS, FRAMES AND MECHANISMS** .

OUTPUT SHAFT SPEED (OSS) SENSOR

Material

MATERIAL SPECIFICATION

Item	Specification
Automatic Transmission Fluid XT-5-QM	MERCON® V

Removal

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING AND LIFTING** .
2. Place a drain pan beneath the output shaft speed (OSS) sensor.
3. Remove the OSS sensor.
 - Disconnect the electrical connector.
 - Remove the bolt.
 - Inspect the OSS bore.

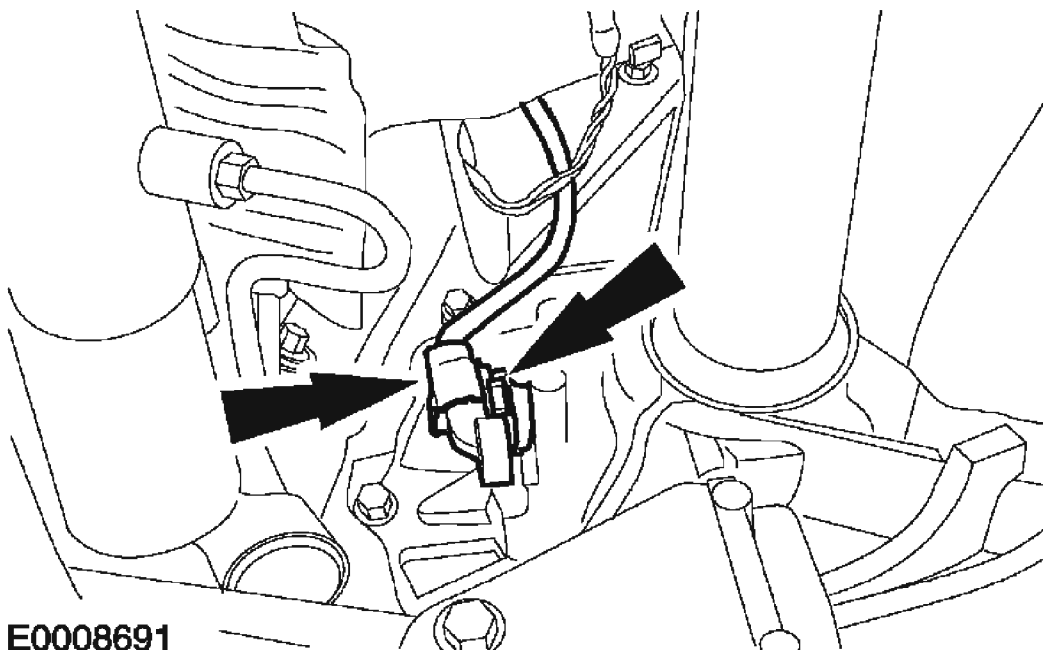
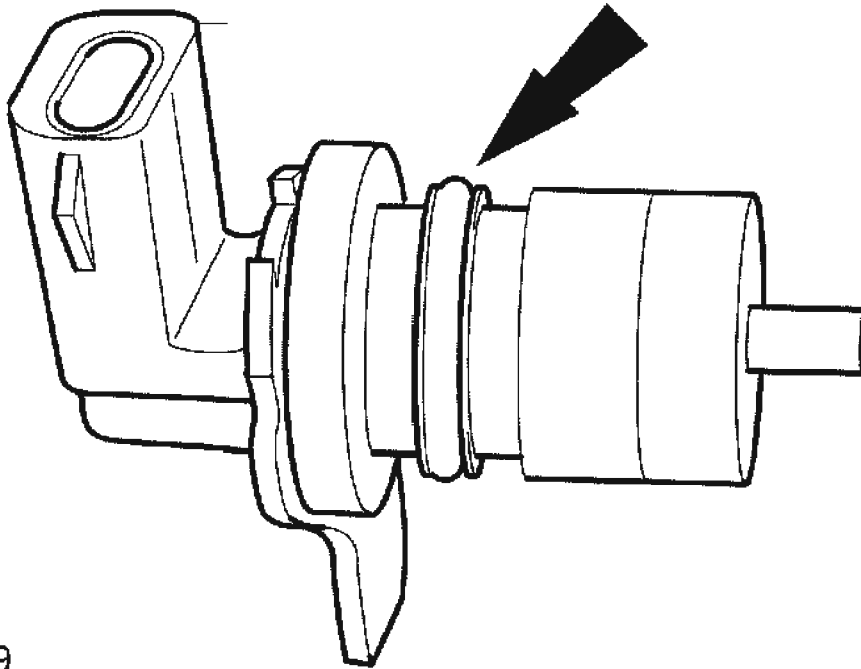


Fig. 92: Removing OSS Sensor
Courtesy of FORD MOTOR CO.

4. Inspect the O-ring seal for nicks or cuts; install a new O-ring if necessary.



A0065519

Fig. 93: Inspecting O-Ring Seal For Nicks Or Cuts
Courtesy of FORD MOTOR CO.

Installation

NOTE: Apply a light coat of petroleum jelly to the O-ring before installation.

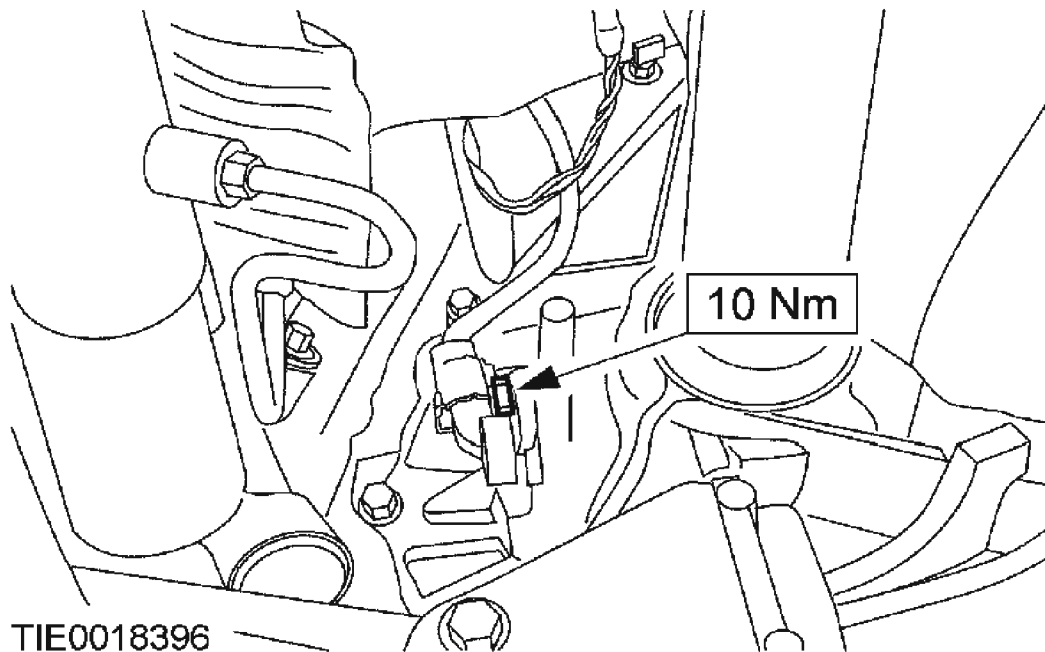


Fig. 94: Installing OSS Sensor
Courtesy of FORD MOTOR CO.

1. Install the OSS sensor.
 - Connect the electrical connector.
2. Lower vehicle.
3. Check the transmission fluid level and add automatic transmission fluid as necessary.



ELE0008136

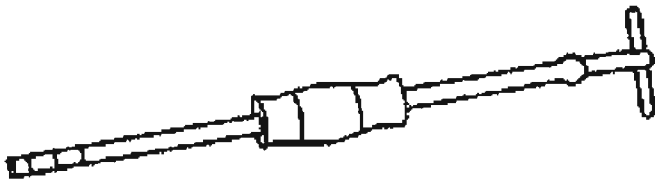
Fig. 95: Checking Transmission Fluid Level
Courtesy of FORD MOTOR CO.

4. Start the engine and move the transaxle range selector lever through all gear positions.

HALF SHAFT SEAL LH

Special Tool(s)

SPECIAL TOOL SPECIFICATION

**ST1185-A**

Slide Hammer 100-001 (T50T-100-A)

Adaptor for 303-224 (Handle) 205-

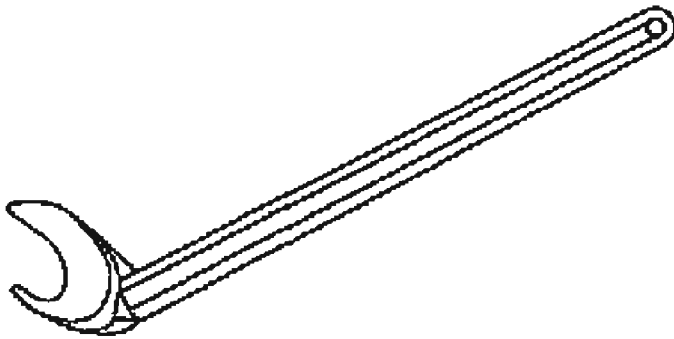
2005 Ford Focus ZX4 S

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153 (T80T-4000-W)

ST1255-A



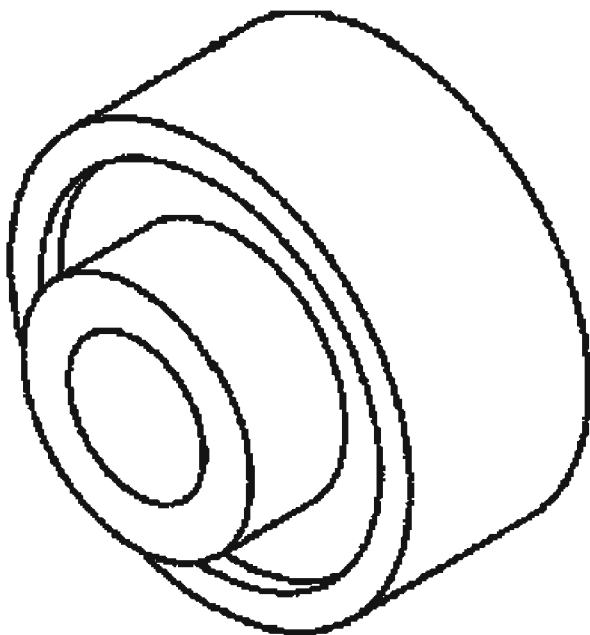
Remover, Halfshaft 205-241 (T86P-3541-A)

ST1582-A

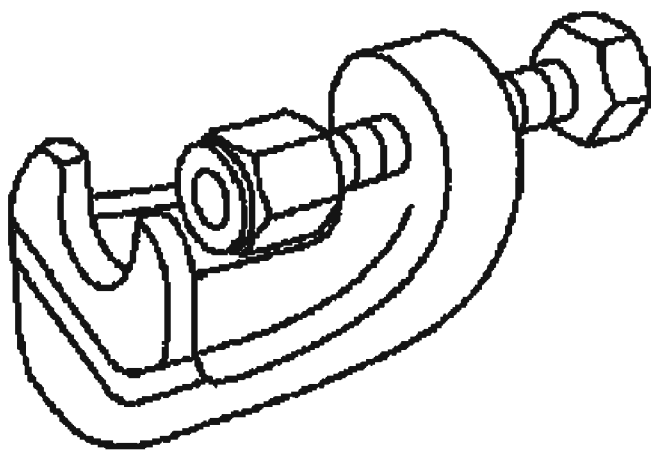
Installer, Axle Oil Seal 205-259 (T87P-3254-A)

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14040



Remover, Tie-Rod End 211-001
(TOOL-3290-D)

ST1106-A

Removal

1. Loosen the strut and spring assembly top mount nuts by five turns.

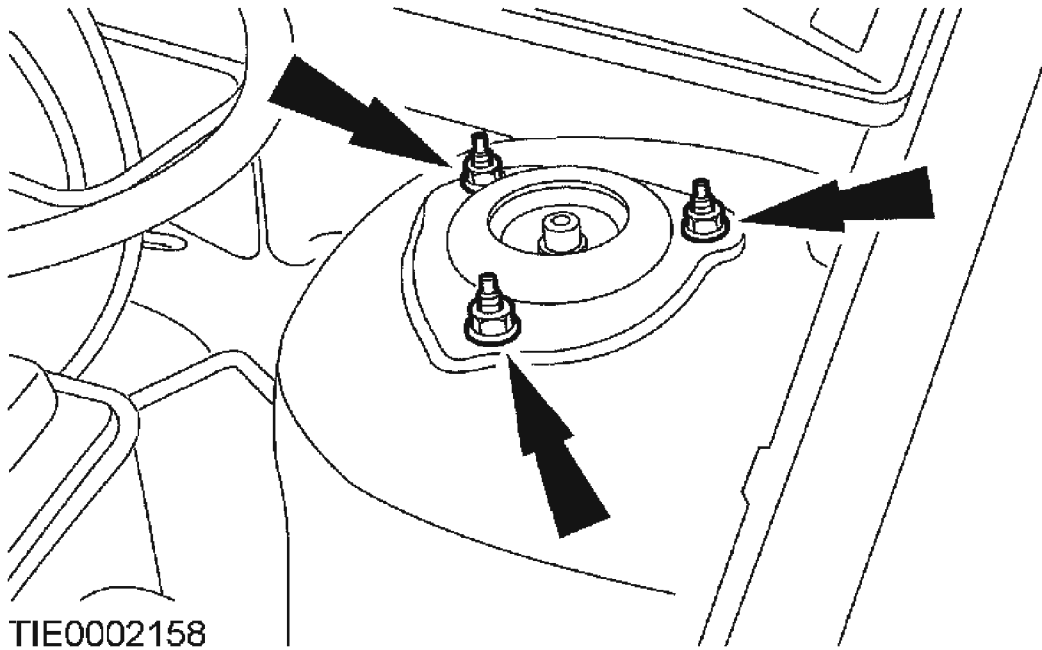
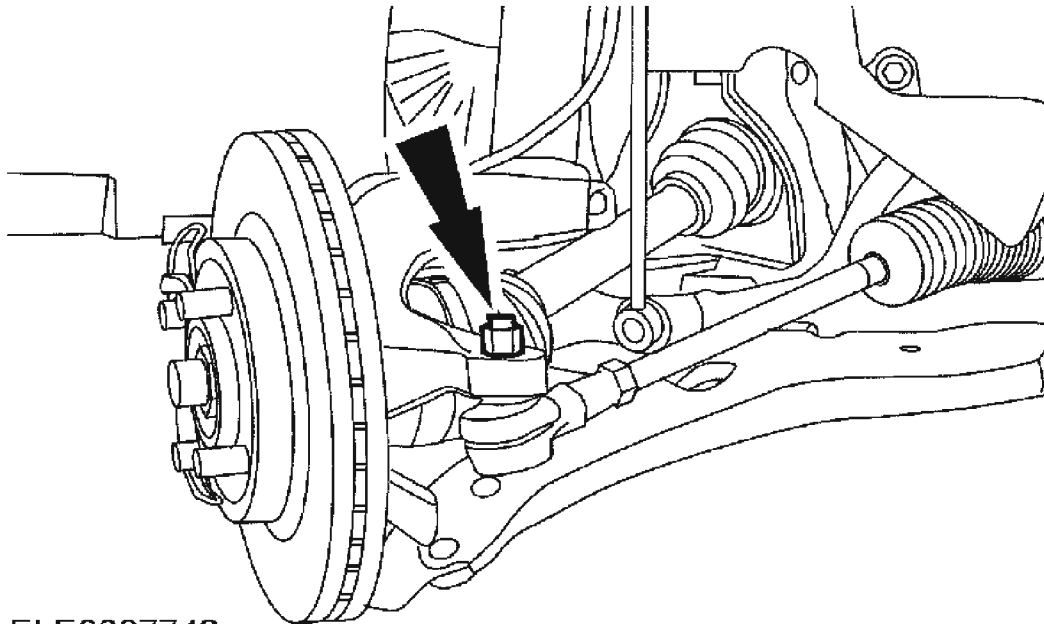


Fig. 96: Loosening Strut And Spring Assembly Top Mount Nuts
Courtesy of FORD MOTOR CO.

2. Remove the wheel and tire. For additional information, refer to **WHEELS AND TIRES** .

CAUTION: Leave the tie-rod-end retaining nut in place to protect the ball joint stud.



ELE0007748

Fig. 97: Loosening Tie-Rod End Retaining Nut
Courtesy of FORD MOTOR CO.

3. Loosen the tie-rod end retaining nut.

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

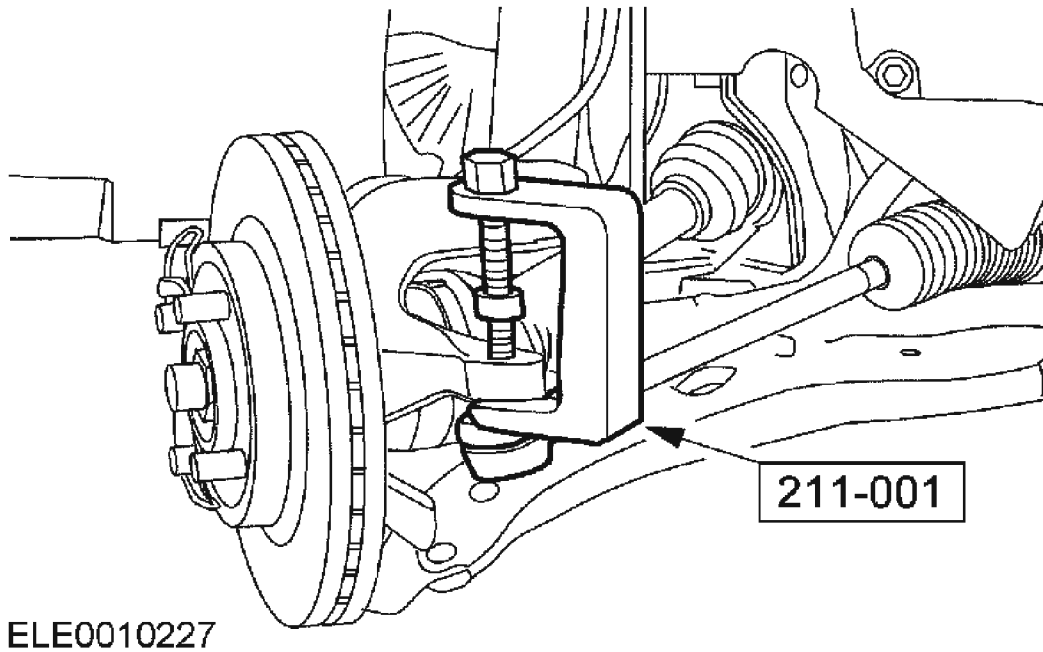


Fig. 98: Removing Tie-Rod From Wheel Knuckle Using Special Tool
Courtesy of FORD MOTOR CO.

4. Using the special tool, detach the tie-rod from the wheel knuckle.
 - Remove and discard the retaining nut.
5. Detach the lower arm from the wheel knuckle.

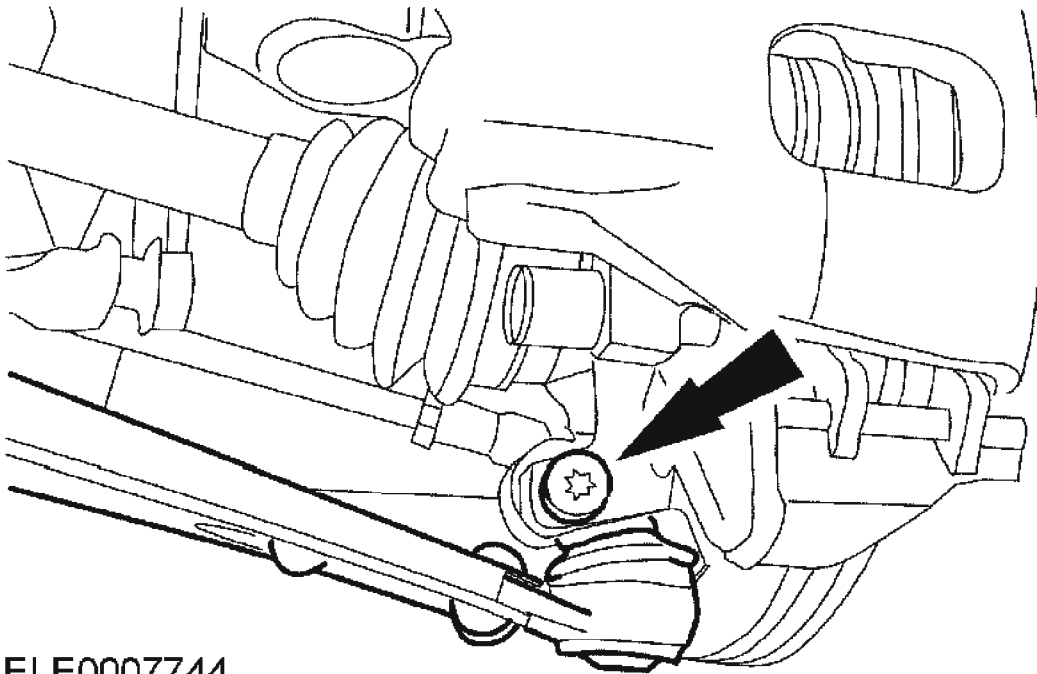


Fig. 99: Removing Lower Arm From Wheel Knuckle
Courtesy of FORD MOTOR CO.

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

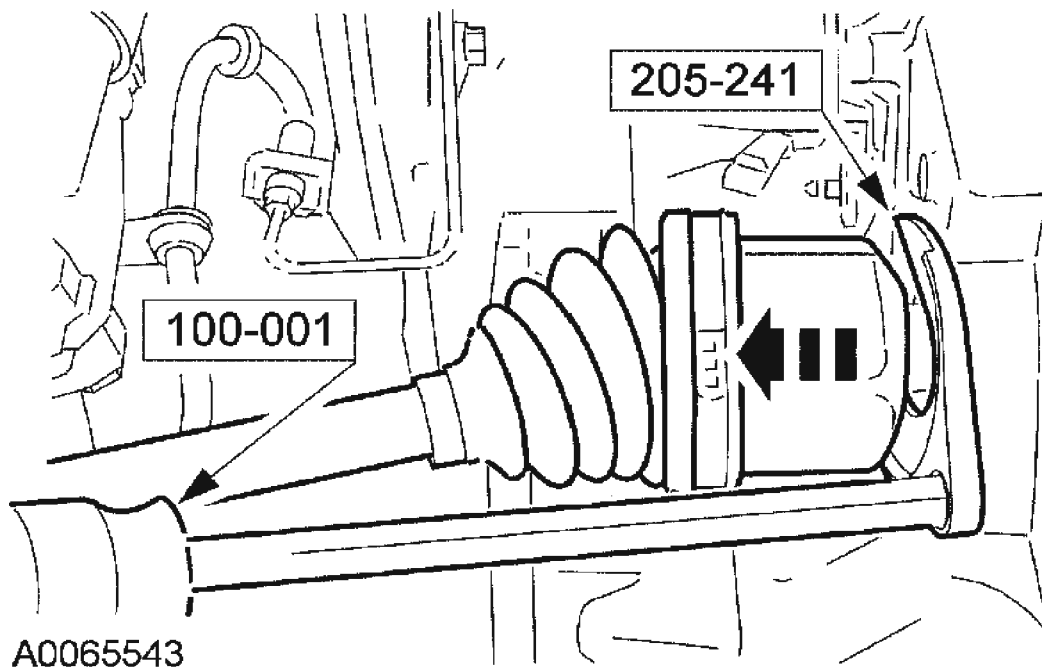


Fig. 100: Removing Halfshaft From Transaxle Using Special Tool
Courtesy of FORD MOTOR CO.

6. Using the special tools, detach the halfshaft from the transaxle.
 - Allow the oil to drain into a suitable container.
7. Remove the halfshaft seal.

Installation

1. Using the special tools, install the halfshaft seal.

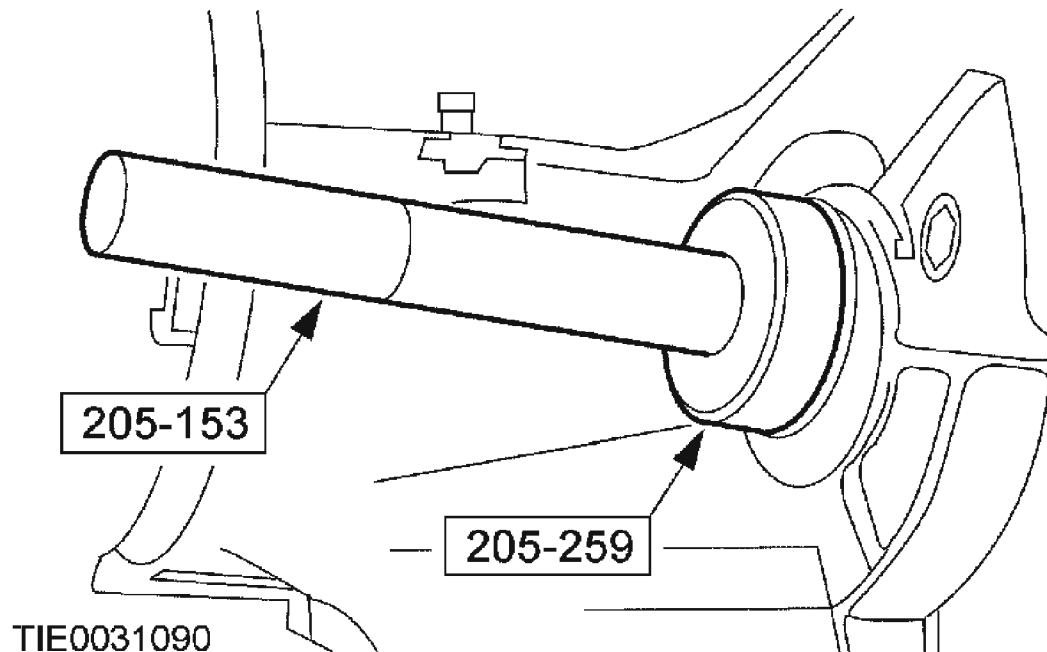


Fig. 101: Installing Halfshaft Seal Using Special Tool
Courtesy of FORD MOTOR CO.

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

CAUTION: Do not damage the halfshaft seal.

CAUTION: Make sure the snap ring is correctly seated.

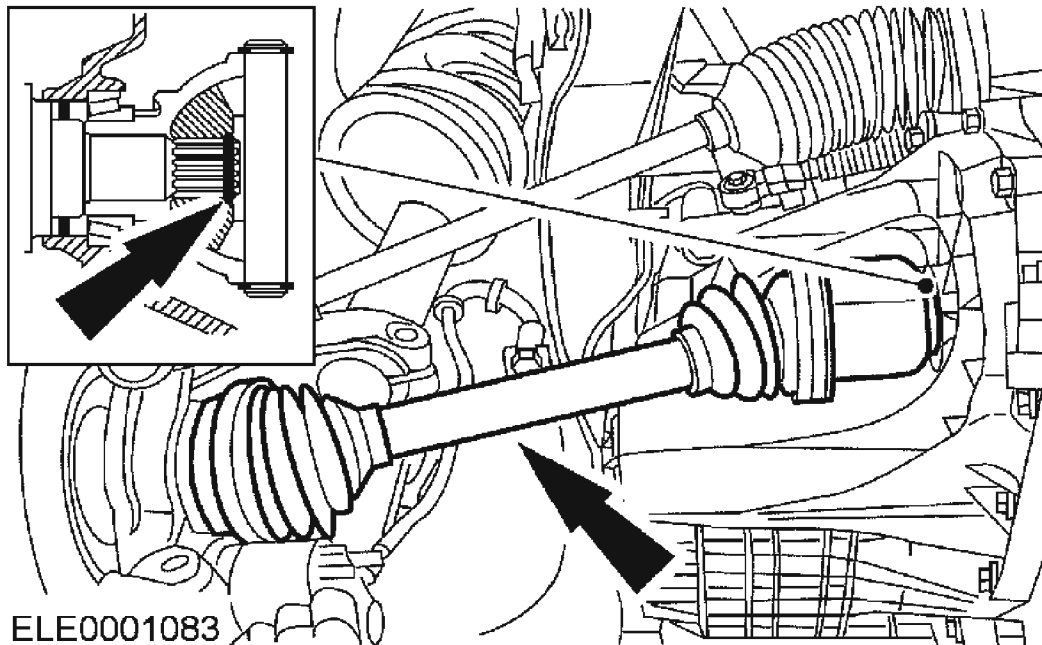
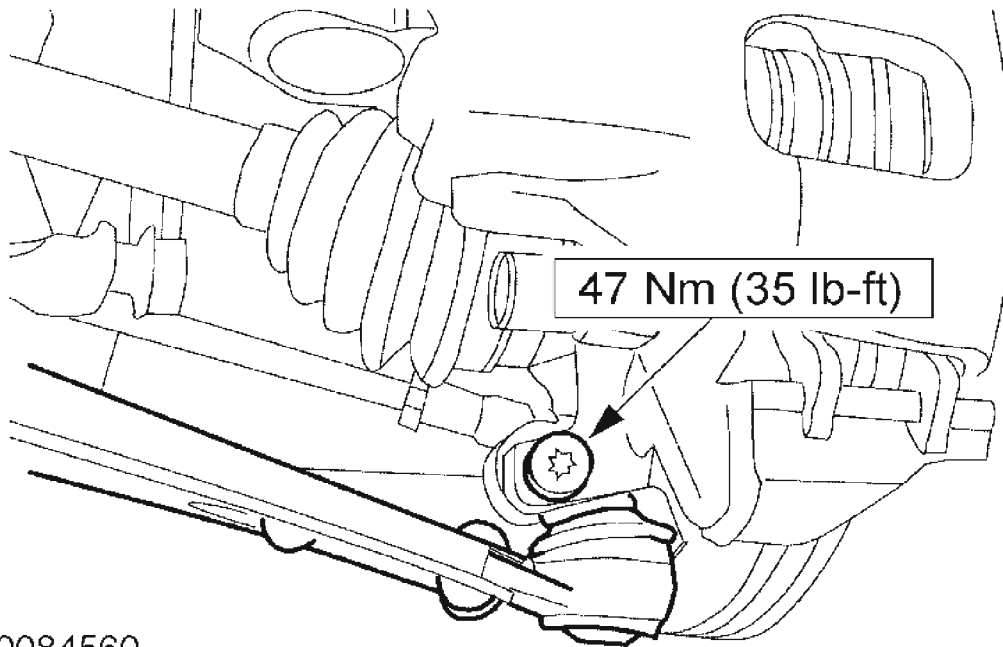


Fig. 102: Attaching Halfshaft To Transaxle
Courtesy of FORD MOTOR CO.

2. Attach the halfshaft to the transaxle.
3. Attach the lower arm to the wheel knuckle.



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Fig. 103: Installing Lower Arm To Wheel Knuckle
Courtesy of FORD MOTOR CO.

CAUTION: Install a new tie-rod end retaining nut. Failure to follow this instruction may result in personal injury.

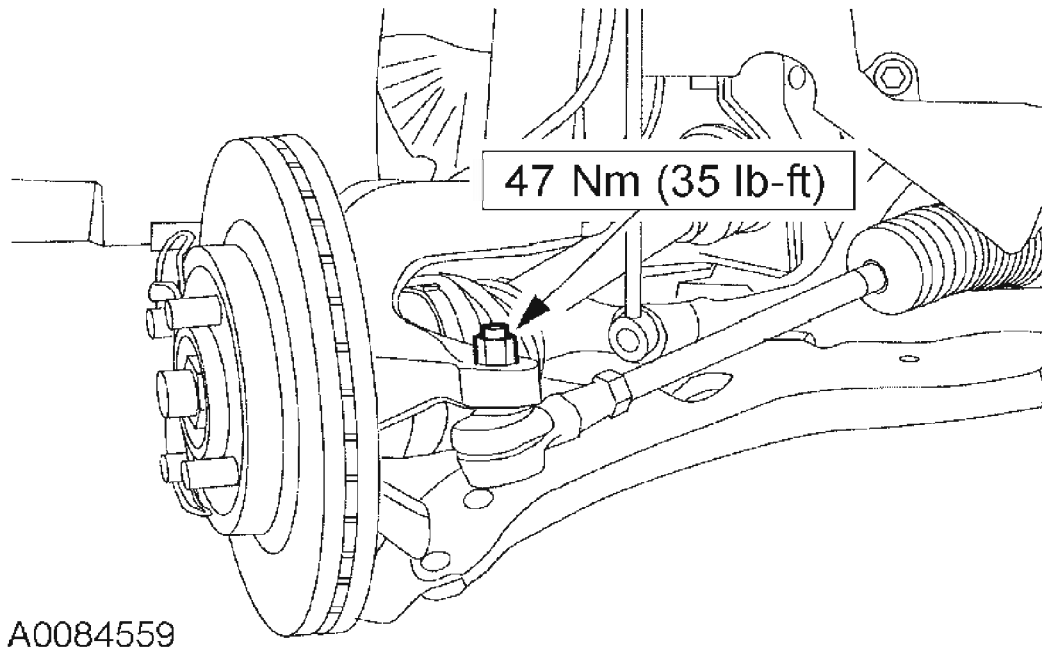


Fig. 104: Attaching Tie-Rod End To Wheel Knuckle
Courtesy of FORD MOTOR CO.

4. Attach the tie-rod end to the wheel knuckle.
5. Install the wheel and tire. For additional information, refer to **WHEELS AND TIRES** .
6. Tighten the strut and spring assembly top mount nuts.

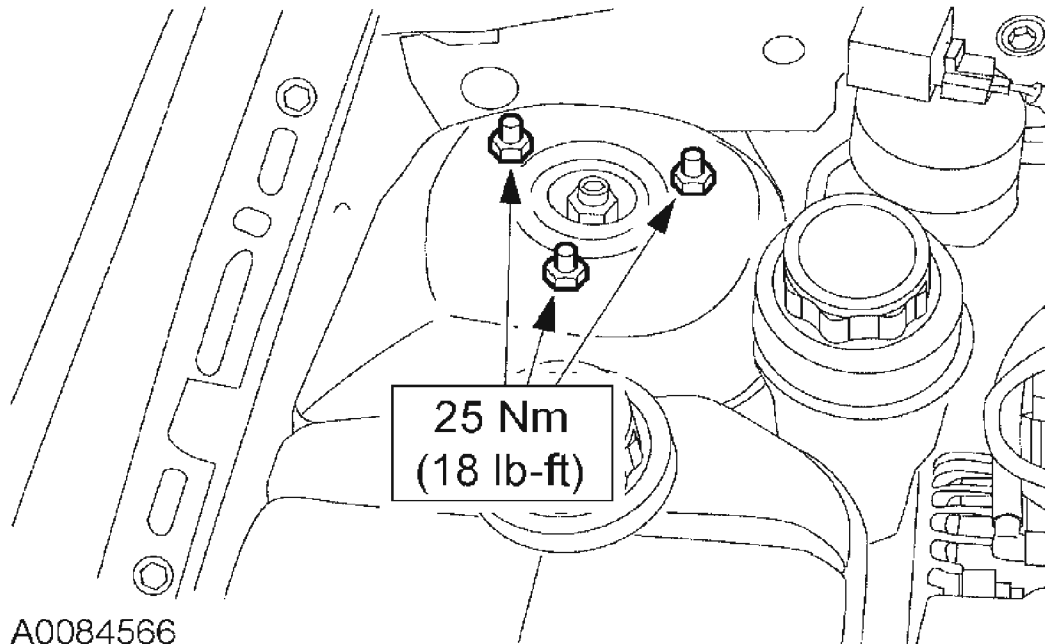


Fig. 105: Tightening Strut And Spring Assembly Top Mount Nuts
Courtesy of FORD MOTOR CO.

7. Check the transmission fluid level and top off with automatic transmission fluid, if necessary.

HALFSHAFT SEAL RH

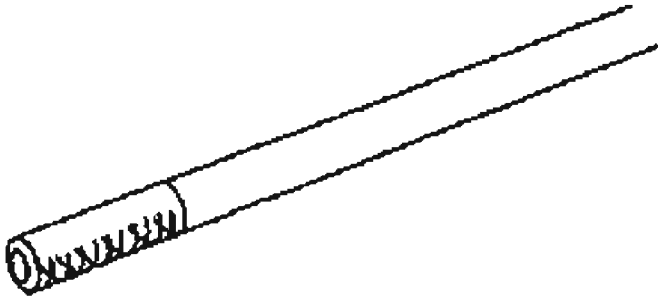
Special Tool(s)

SPECIAL TOOL SPECIFICATION

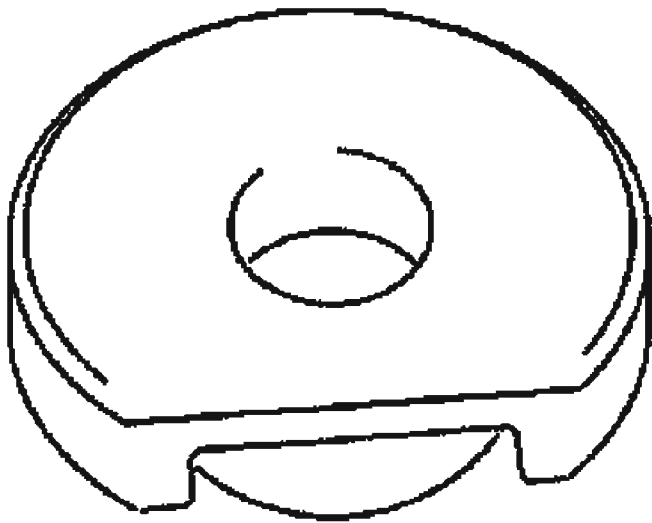
Adapter for 303-224 (Handle) 205-153 (T80T-4000-W)

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



ST2751-A



ST2936-A

Installer, Output Shaft Seal 307-572

Removal

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

JACKING AND LIFTING .

2. Loosen the strut and spring assembly top mount nuts by five turns.

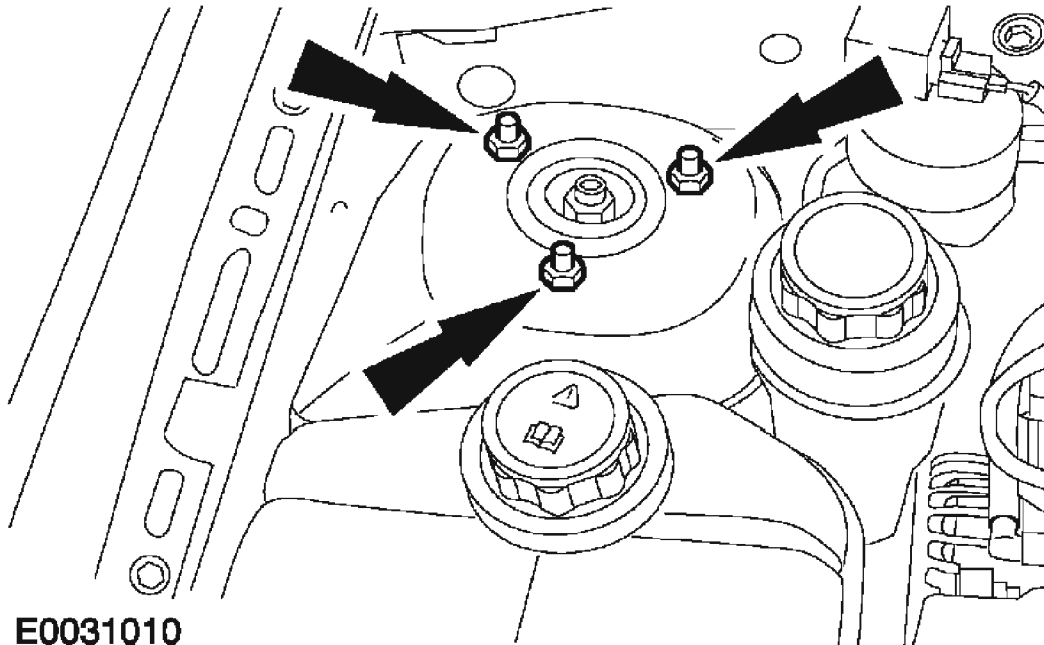


Fig. 106: Loosening Strut And Spring Assembly Top Mount Nuts
Courtesy of FORD MOTOR CO.

3. Detach the lower arm from the wheel knuckle.

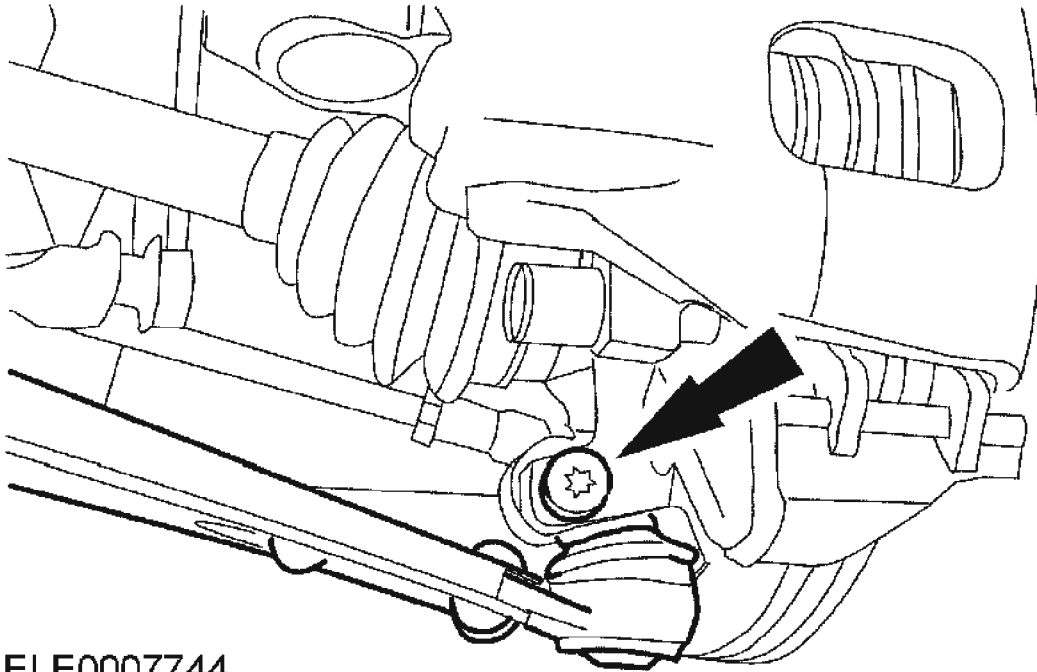


Fig. 107: Detaching Lower Arm From Wheel Knuckle
Courtesy of FORD MOTOR CO.

4. Remove and discard the center bearing cap and locknuts.

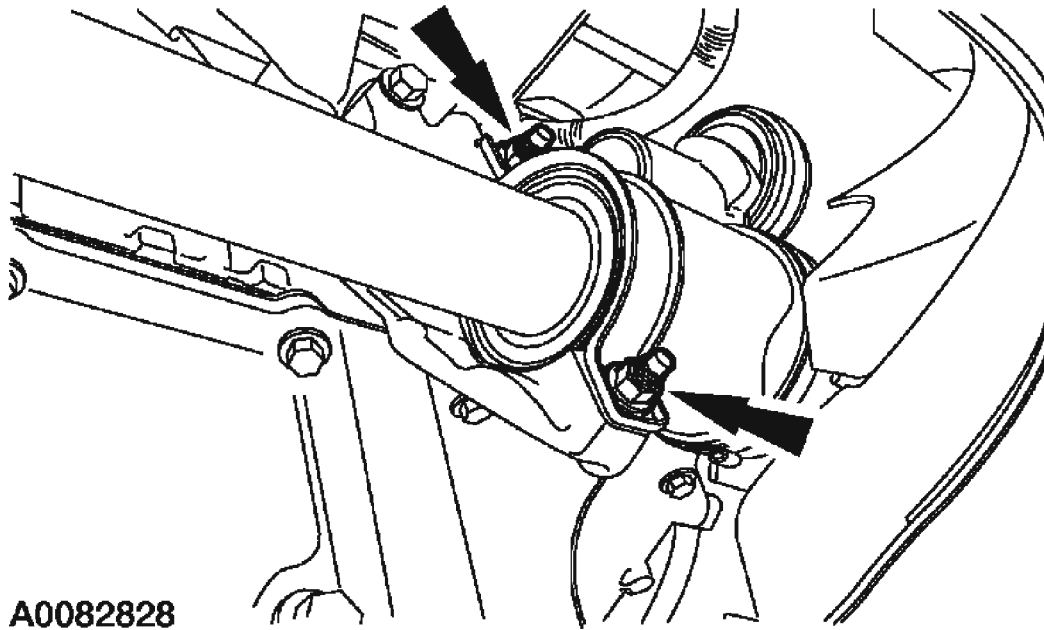


Fig. 108: Removing And Discarding Center Bearing Cap And Locknuts
Courtesy of FORD MOTOR CO.

5. Detach the halfshaft from the transaxle and secure it to one side.
 - Allow the oil to drain into a suitable container.

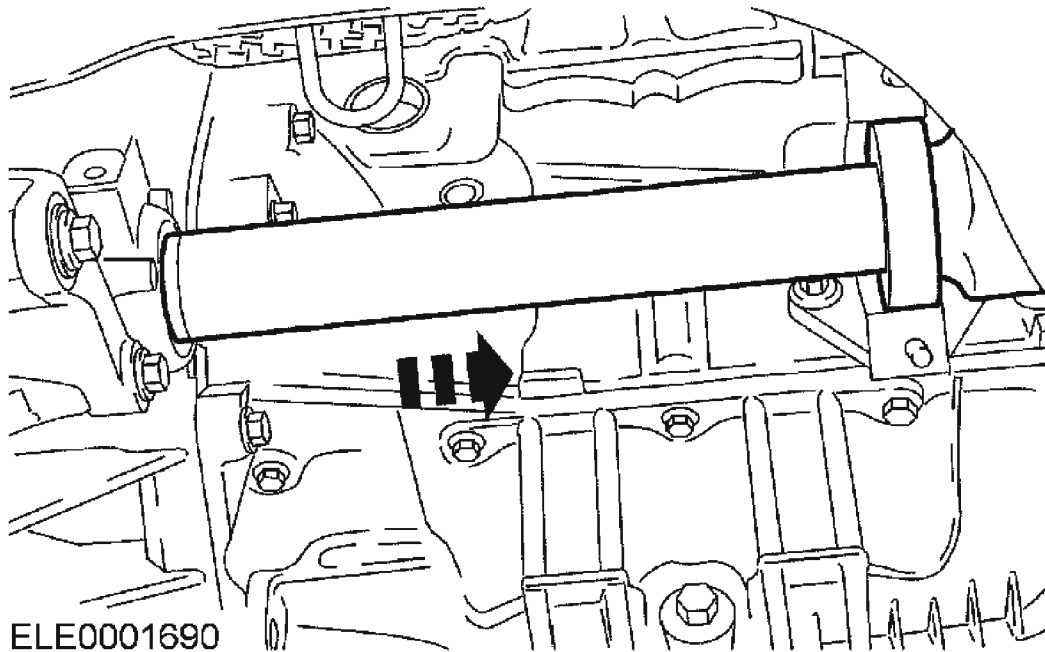


Fig. 109: Detaching Halfshaft From Transaxle And Securing It To One Side
Courtesy of FORD MOTOR CO.

6. Remove the halfshaft seal.

Installation

1. Using the special tools, install the halfshaft seal.

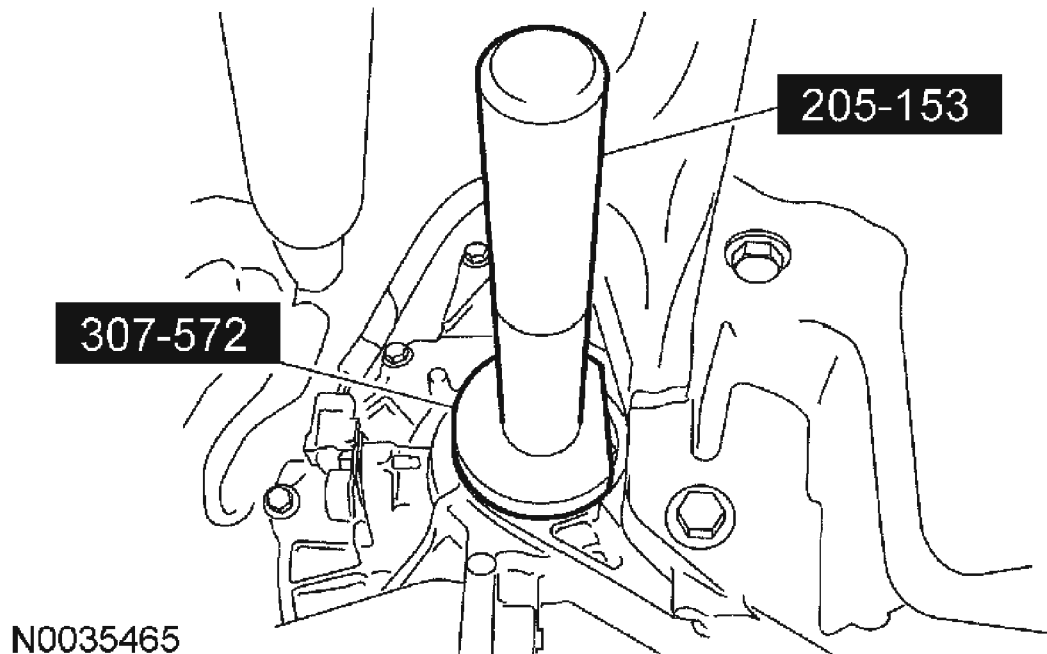


Fig. 110: Using Special Tools To Install Halfshaft Seal
Courtesy of FORD MOTOR CO.

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

CAUTION: Do not damage the halfshaft seal.

NOTE: Install a new halfshaft bearing cap and locknuts.

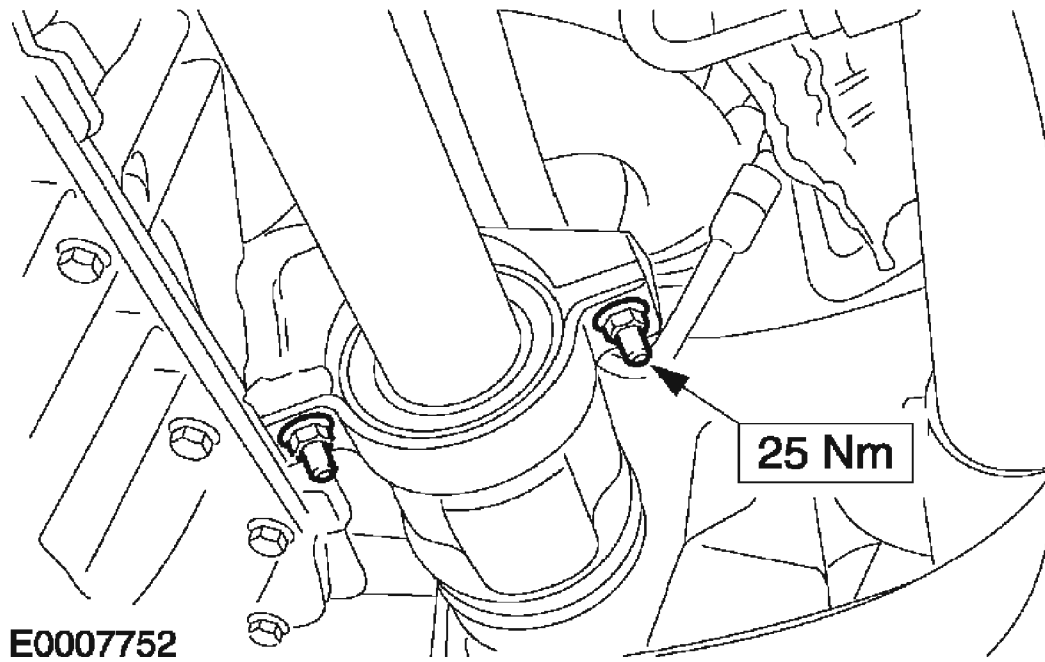
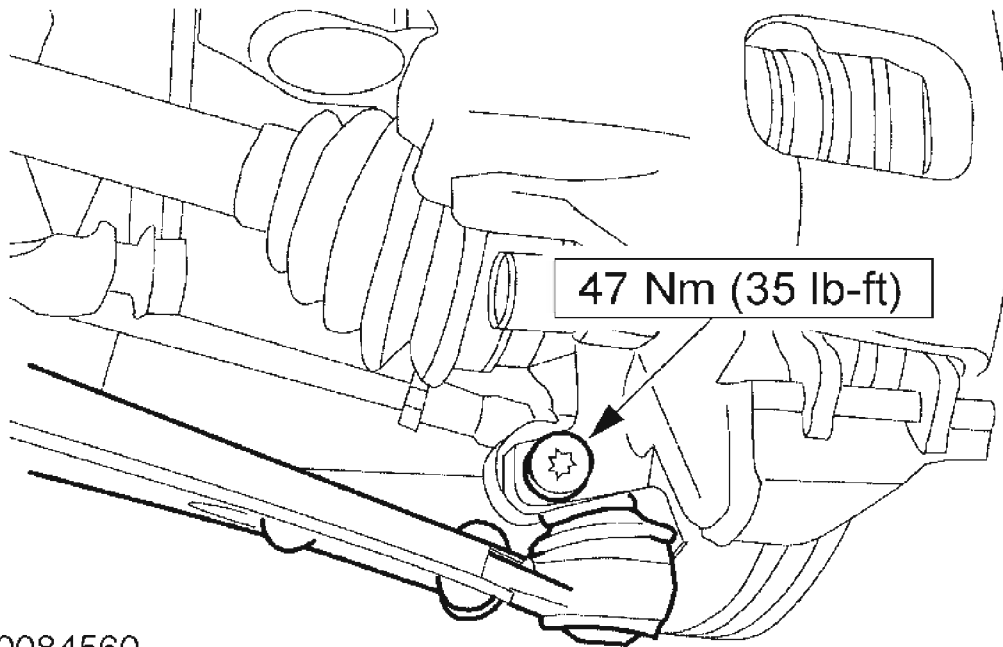


Fig. 111: Installing Center Bearing Cap And Locknuts
Courtesy of FORD MOTOR CO.

2. Attach the halfshaft to the transaxle.
 - Install the center bearing cap and locknuts.
3. Attach the lower arm to the wheel knuckle (left-hand side shown).



A0084560

Fig. 112: Attaching Lower Arm To Wheel Knuckle (Left-Hand Side Shown)
Courtesy of FORD MOTOR CO.

4. Tighten the strut and spring assembly top mount nuts.

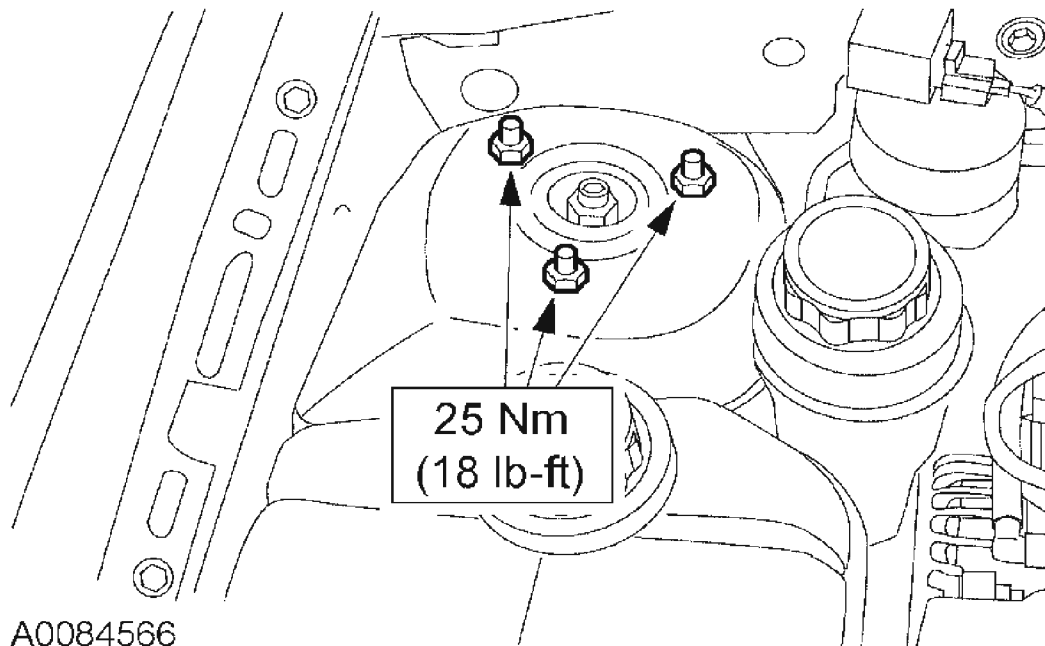


Fig. 113: Tightening Wheel And Tire Strut And Spring Assembly
Courtesy of FORD MOTOR CO.

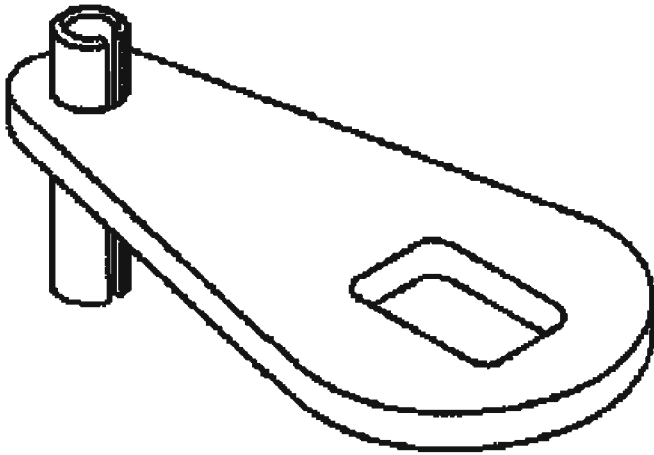
5. Check the transmission fluid level and top off with automatic transmission fluid, if necessary.

TRANSMISSION RANGE (TR) SENSOR

Special Tool(s)

SPECIAL TOOL SPECIFICATION

Alignment Tool, Transmission Range Sensor 307-415



307-415

Removal

1. Disconnect the transmission range (TR) sensor electrical connector and the selector lever cable.

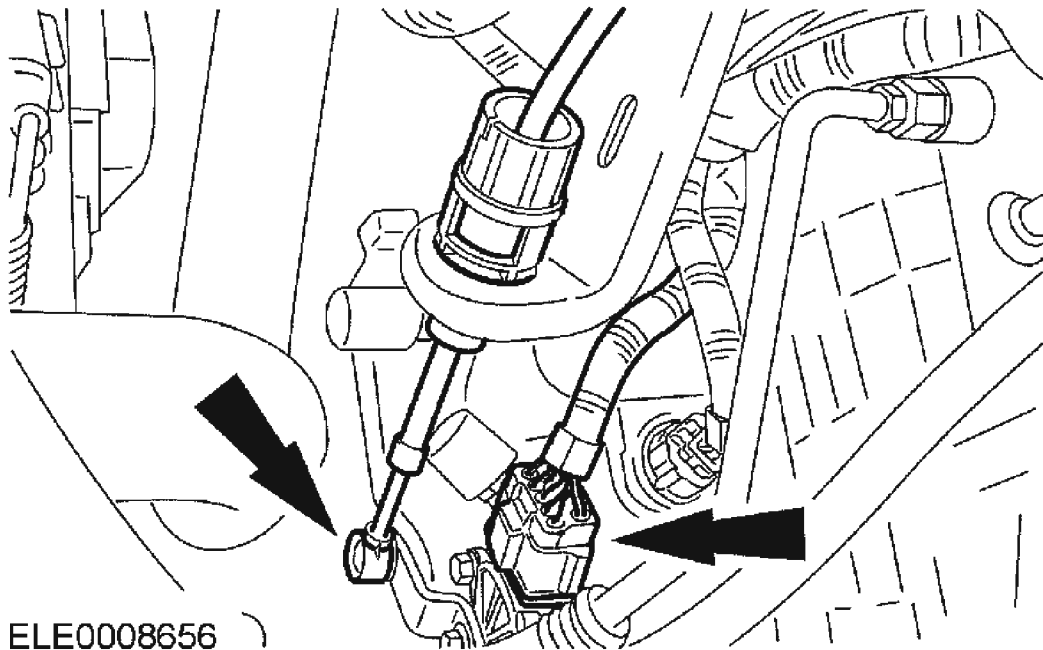


Fig. 114: Disconnecting Transmission Range (TR) Sensor Electrical Connector And Selector Lever Cable

Courtesy of FORD MOTOR CO.

NOTE: Failure to hold the shift lever while loosening or tightening the manual shaft lever will transmit rotational torque to the TR switch and shift mechanism.

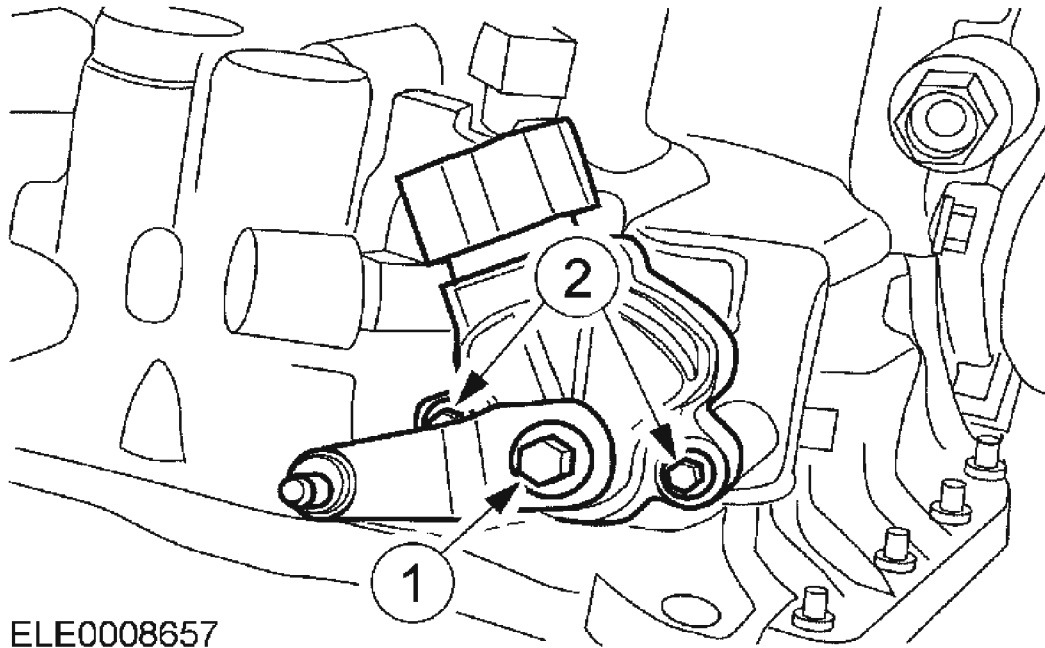


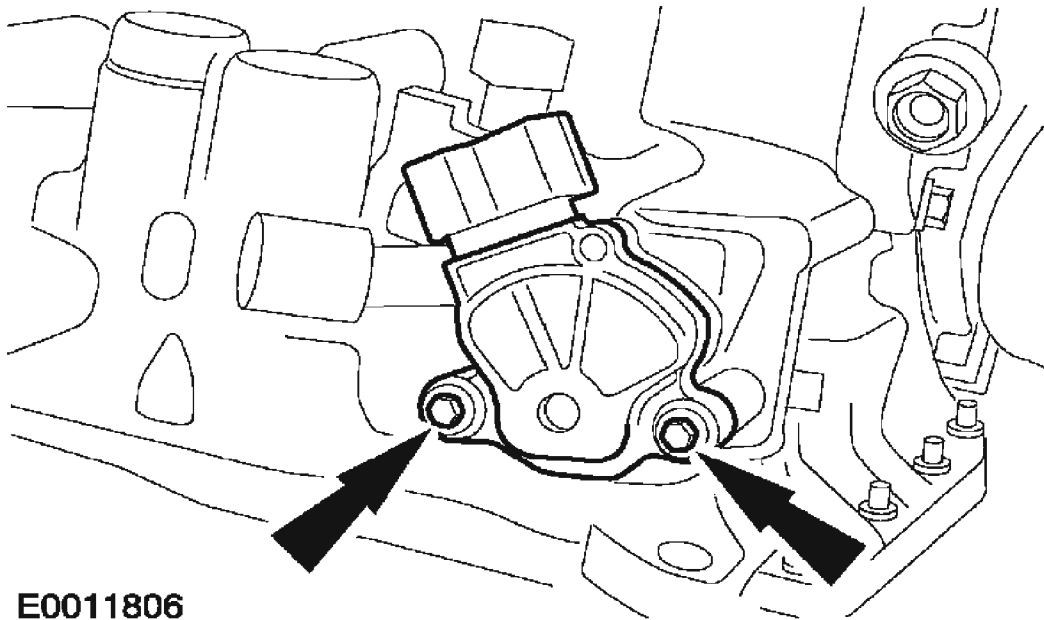
Fig. 115: Removing TR Sensor (Automatic Transaxle Shown Removed For Clarity)
Courtesy of FORD MOTOR CO.

2. Remove the TR sensor (automatic transaxle shown removed for clarity).
 1. Remove the manual control lever.
 2. Remove the bolts.

Installation

NOTE: Failure to hold the shift lever while loosening or tightening the manual shaft lever will transmit rotational torque to the TR switch and shift mechanism.

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



E0011806

Fig. 116: Installing TR Sensor (Automatic Transaxle Shown Removed For Clarity)
Courtesy of FORD MOTOR CO.

1. Install the TR sensor (automatic transaxle shown removed for clarity).
2. Using the special tool, align the TR sensor and tighten the bolts.

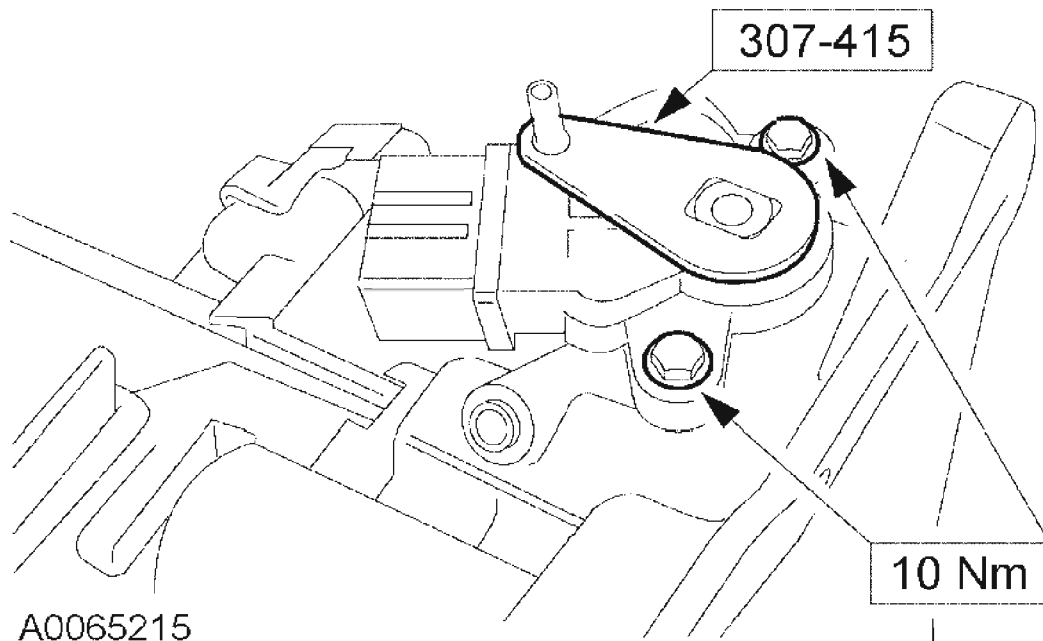


Fig. 117: Aligning TR Sensor And Tightening Bolts Using Special Tool
Courtesy of FORD MOTOR CO.

CAUTION: Do not use air tools on this bolt. Hold the manual control lever while tightening the manual control lever bolt, failure to the manual control lever shaft could occur.

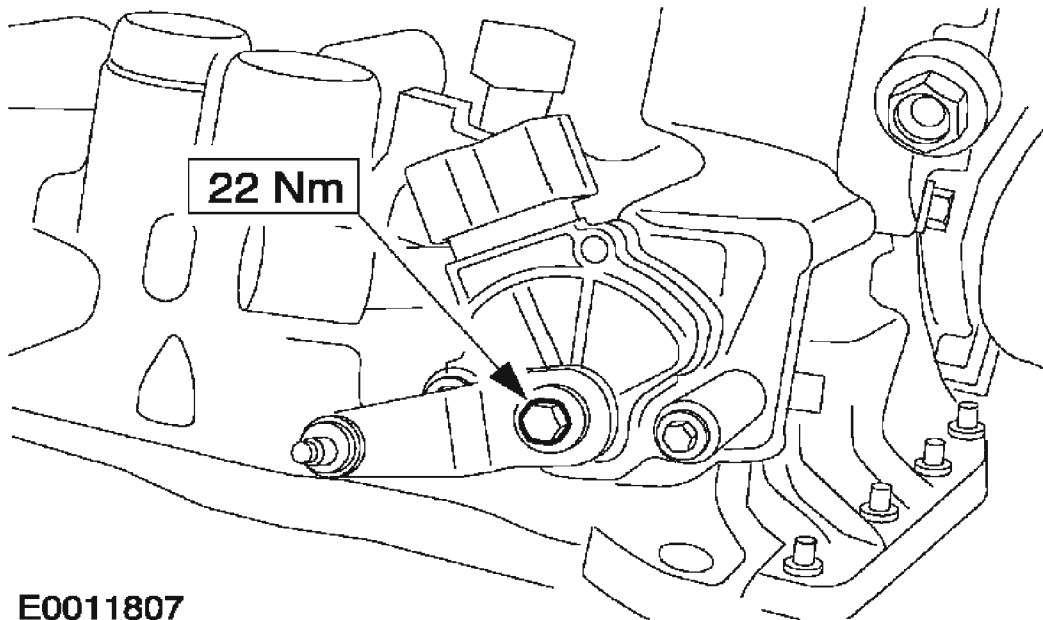
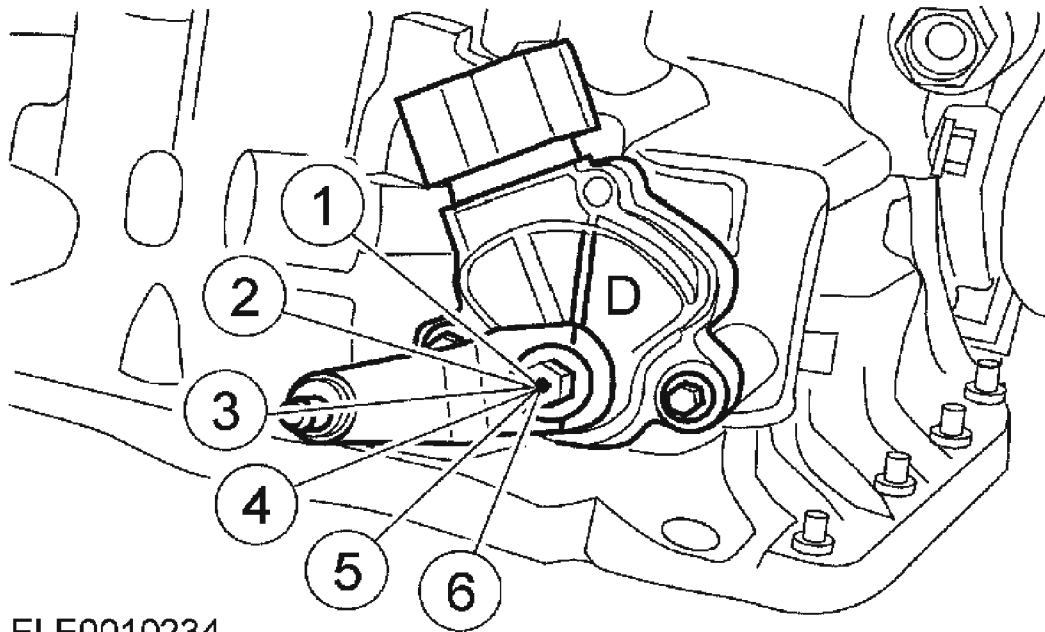


Fig. 118: Installing Manual Control Lever
Courtesy of FORD MOTOR CO.

3. Install the manual control lever.

CAUTION: Check the manual control lever is in position "3" same as "D" position.



ELE0010234

Fig. 119: Identifying Marks On Manual Control Lever Line Up With The Marks On TR Sensor

Courtesy of FORD MOTOR CO.

4. Adjust the manual control lever to TR sensor "D" position.
 1. "1" Low 1
 2. "2" Low 2
 3. "D" Drive
 4. "N" Neutral
 5. "R" Reverse
 6. "P" Park
 - When in position "D" the marks on the manual control lever line up with the marks on the TR Sensor.
5. Connect the selector lever cable and the TR sensor electrical connector.

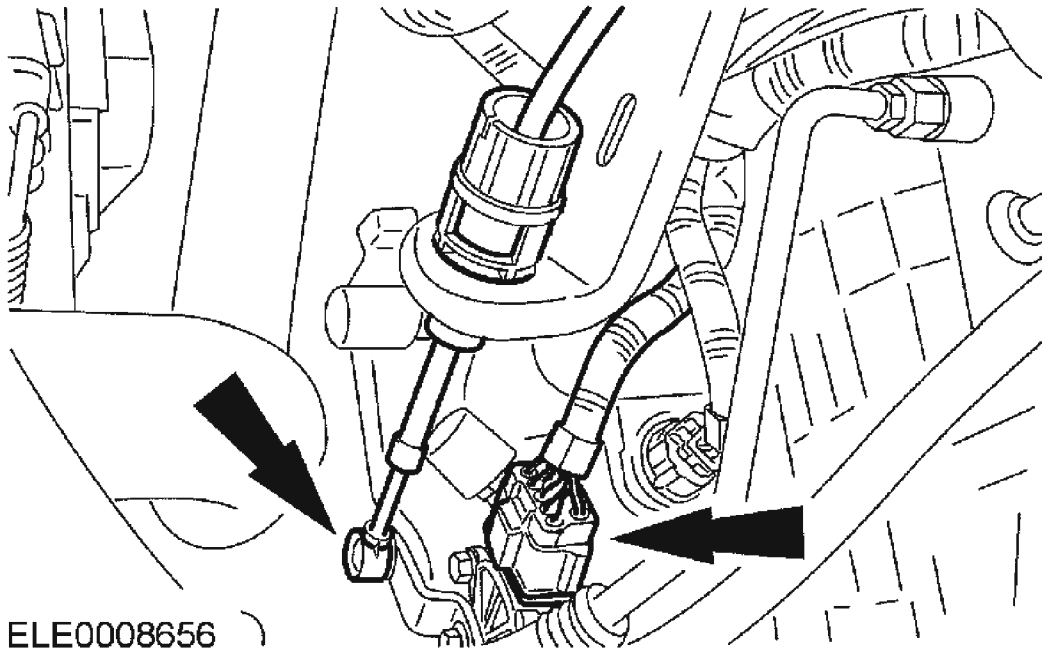


Fig. 120: Connecting Selector Lever Cable And TR Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

REMOVAL

TRANSAXLE - 2.0L

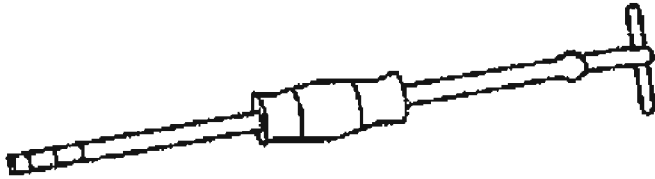
Special Tool(s)

SPECIAL TOOL SPECIFICATION

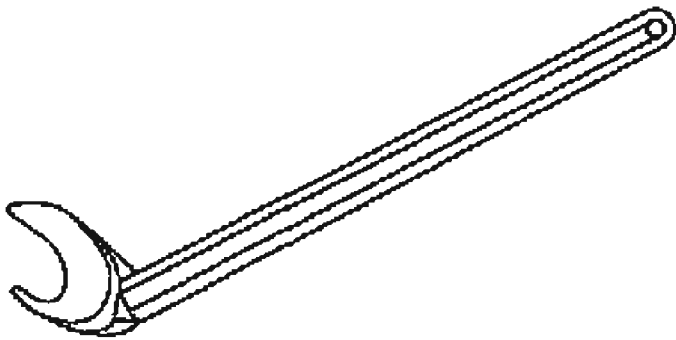
	Slide Hammer 100-001 (T50T-100-A)
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2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



ST1185-A



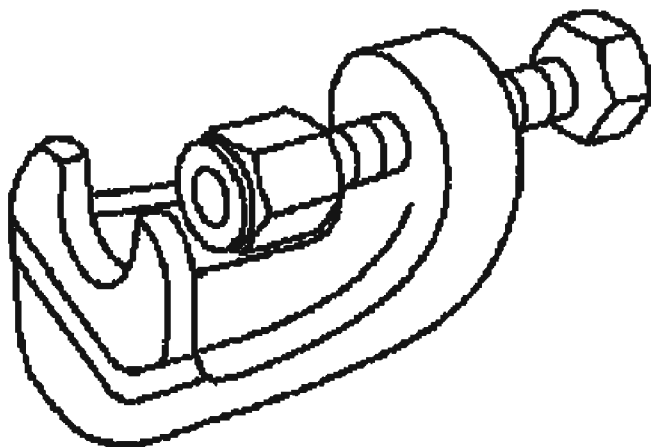
ST1582-A

Remover, Halfshaft 205-241 (T86P-3541-A)

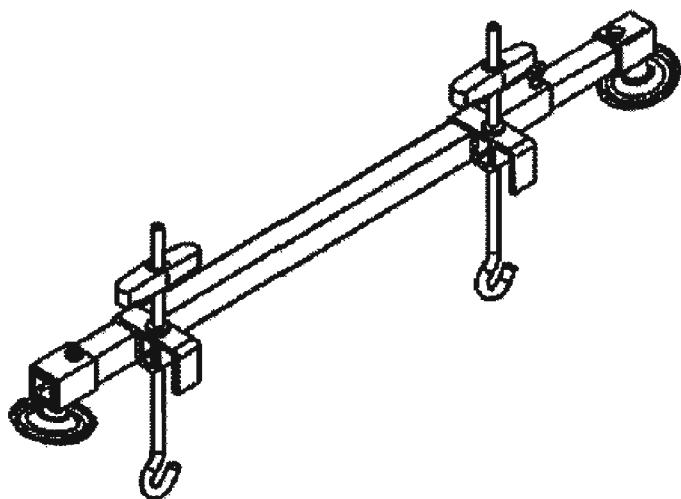
Remover, Tie-Rod End 211-001 (TOOL-3290-D)

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



ST1106-A



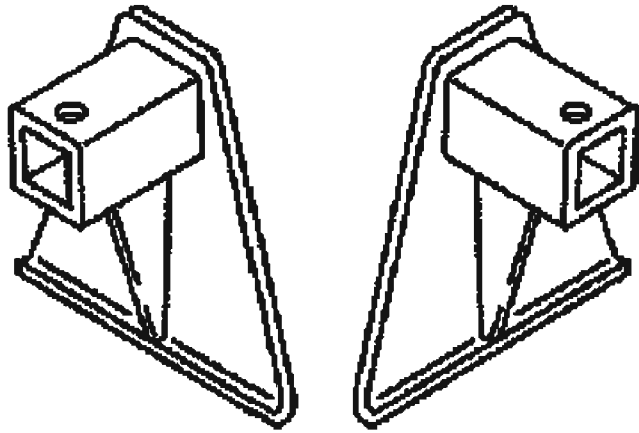
ST2363-A

Support Bar, Engine 303-290-A

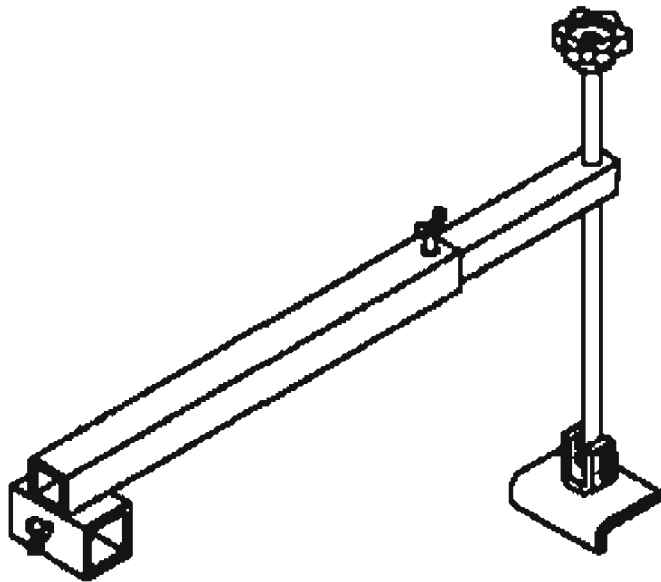
Adapter for 303-290A 303-290-01

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



ST2378-A



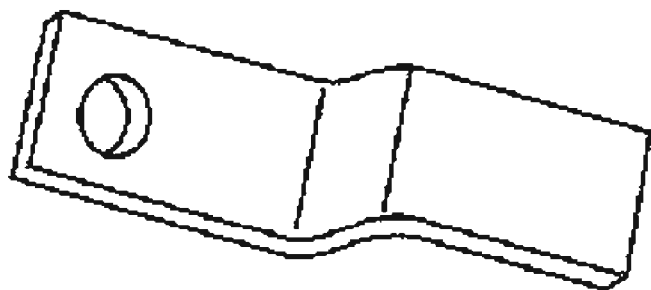
ST2379-A

Adapter for 303-290A (Support Leg)
303-290-03A

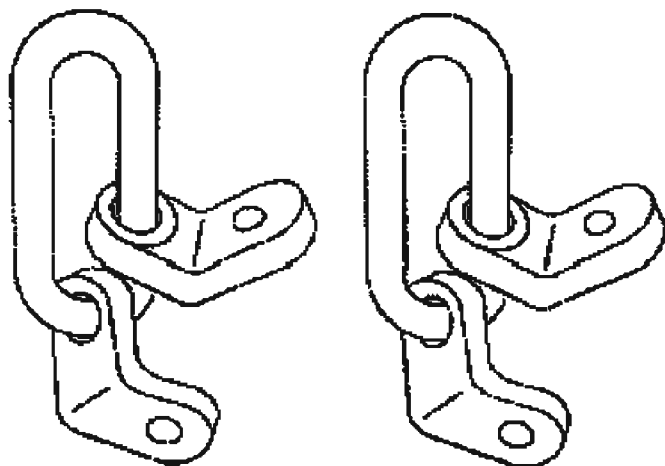
Retainer, Torque Converter 307-346
(T97T-7902-A)

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



ST1636-A



ST2793-A

Lifting Bracket, Engine 303-050
(T70P-6000)

Removal

1. Remove the battery tray.

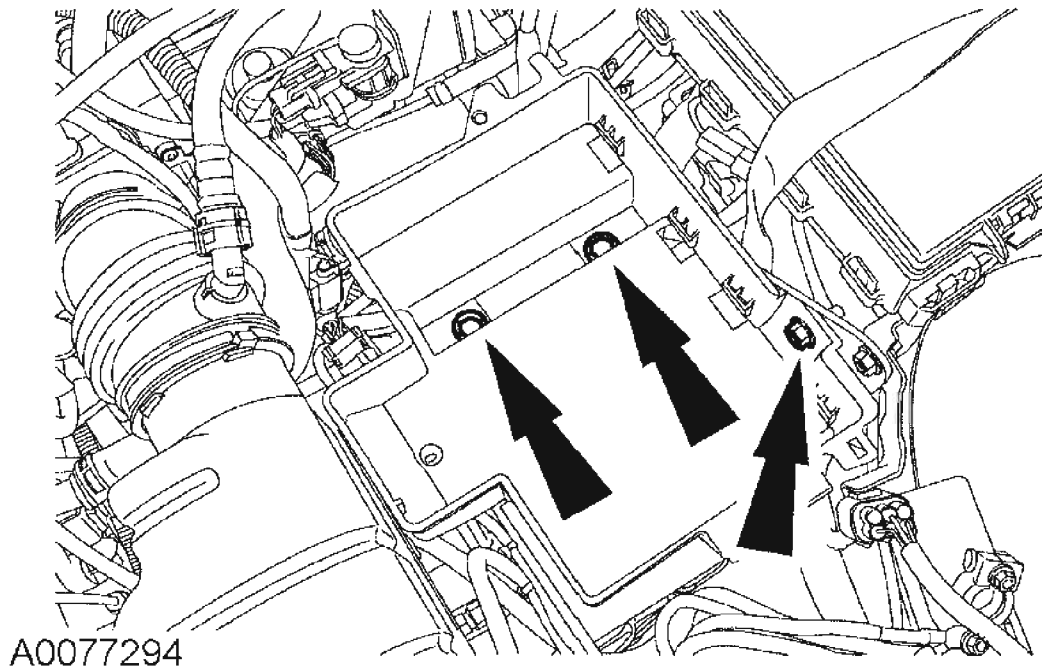


Fig. 121: Removing Battery Tray
Courtesy of FORD MOTOR CO.

2. Remove the air cleaner resonator.
 1. Disconnect the crankcase ventilation hose.
 2. Disconnect the air cleaner outlet hose.
 3. Remove the bolts and pull out the air cleaner resonator.

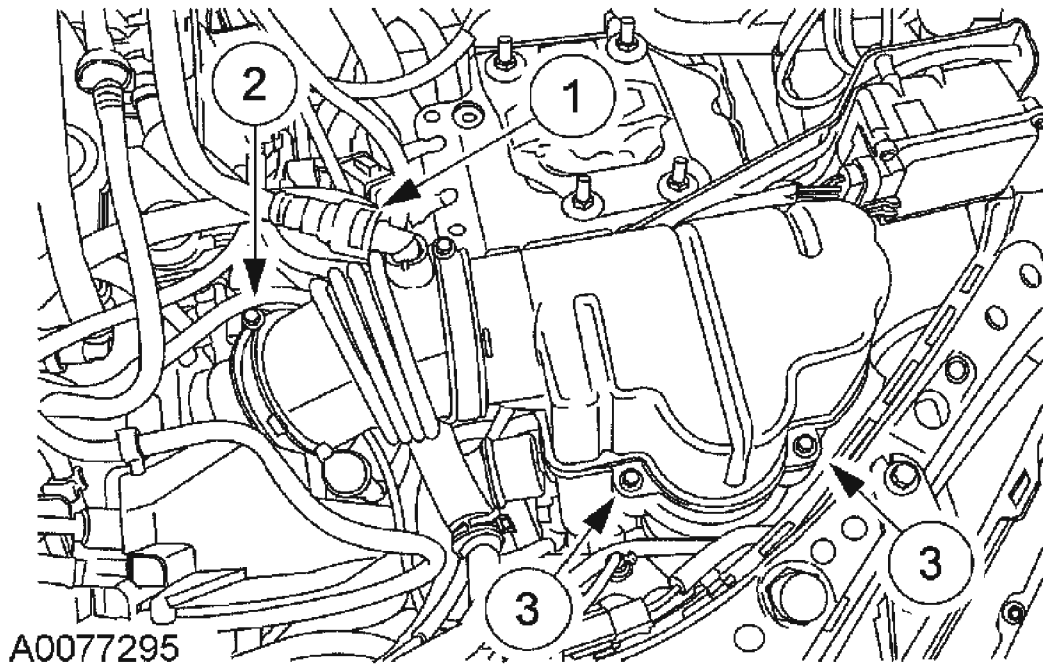


Fig. 122: Removing Air Cleaner Resonator
Courtesy of FORD MOTOR CO.

3. Loosen the LH strut and spring assembly top mount nuts by four turns.

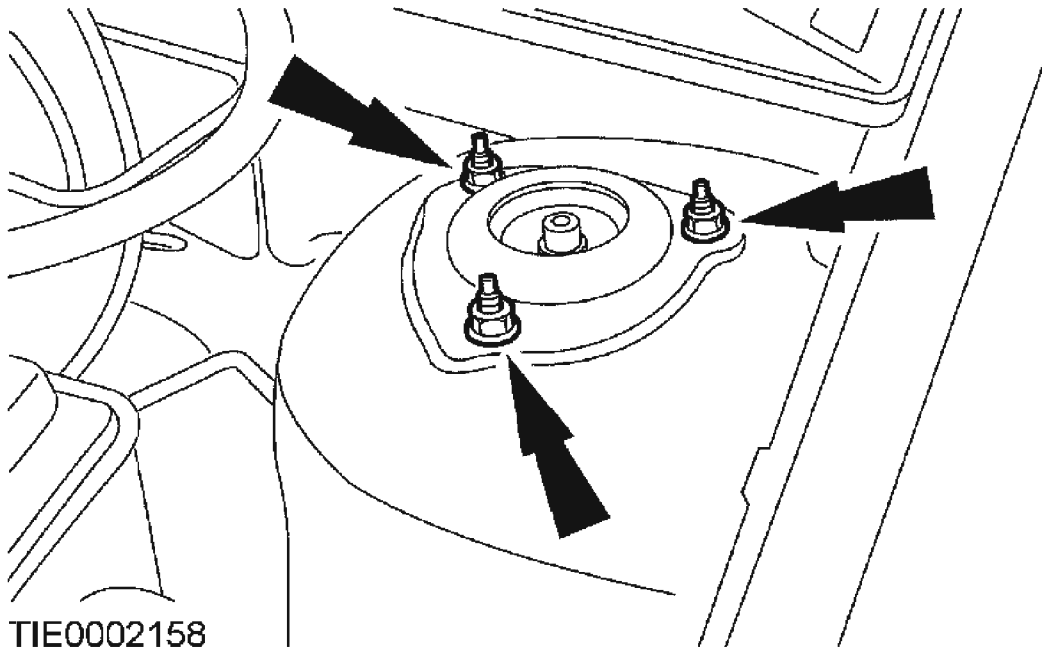


Fig. 123: Loosening LH Strut And Spring Assembly Top Mount Nuts By Four Turns
Courtesy of FORD MOTOR CO.

4. Disconnect the electrical connectors.
 1. Transmission range (TR) sensor electrical connector.
 2. Transaxle solenoid electrical connector.

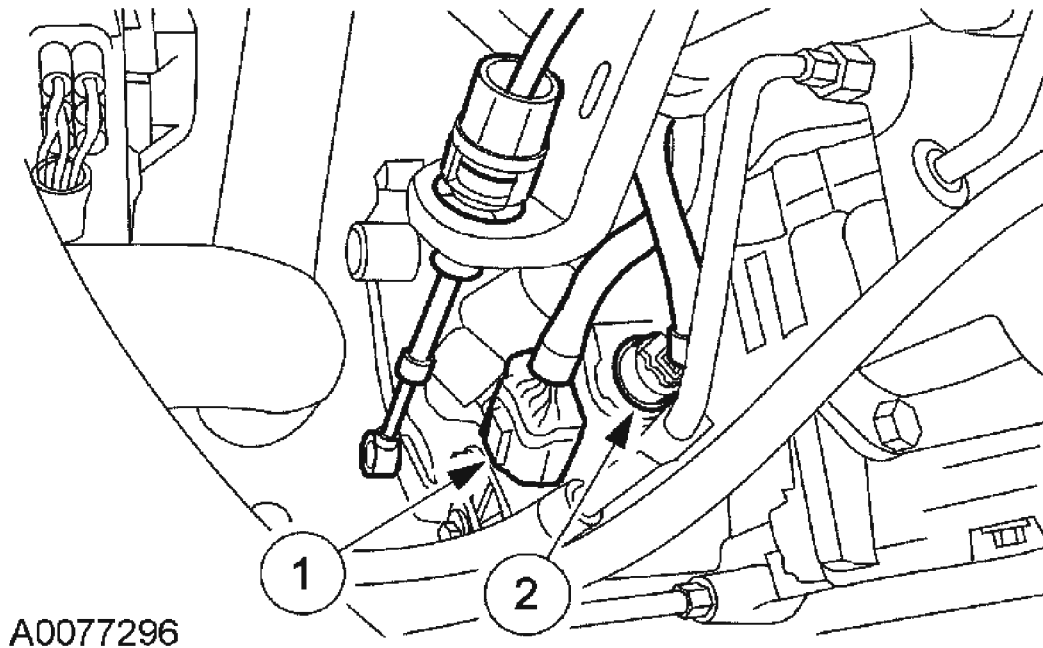


Fig. 124: Disconnecting Electrical Connectors
Courtesy of FORD MOTOR CO.

5. Disconnect the turbine shaft speed (TSS) sensor electrical connector.

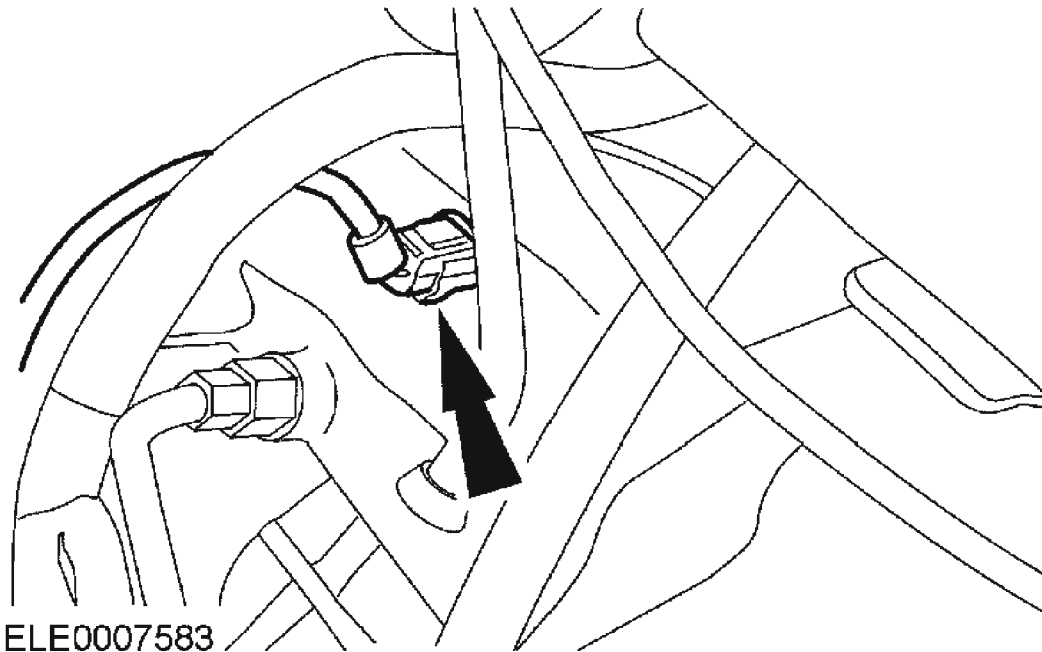


Fig. 125: Disconnecting Turbine Shaft Speed (TSS) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

6. Remove the nut from the electrical connector bracket.

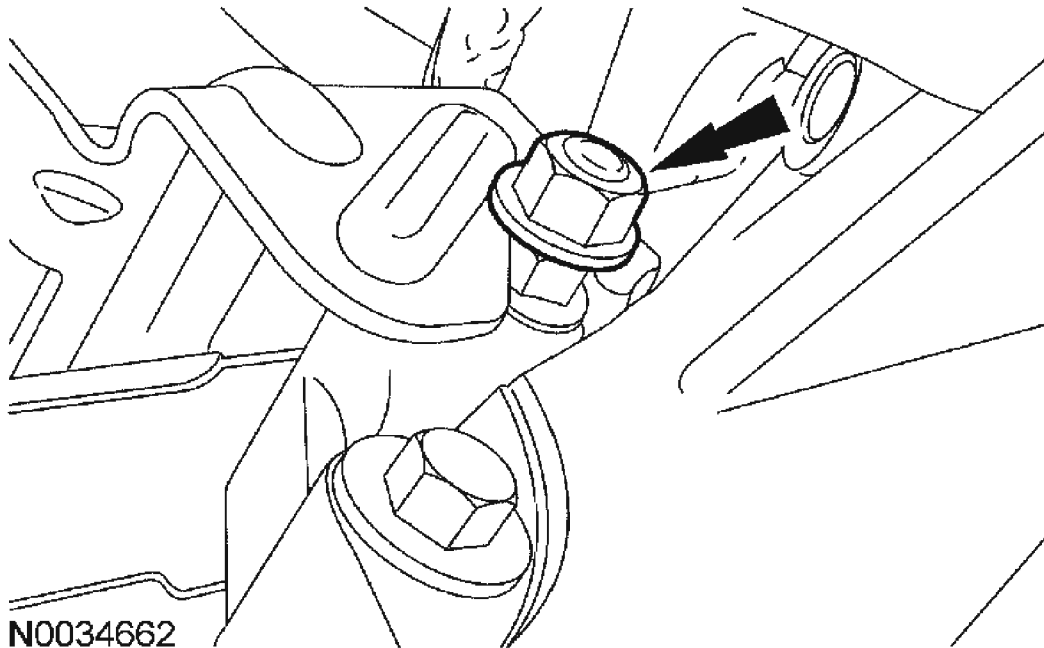


Fig. 126: Removing Nut From Electrical Connector Bracket
Courtesy of FORD MOTOR CO.

7. Remove the nut and position the electrical connector bracket aside.

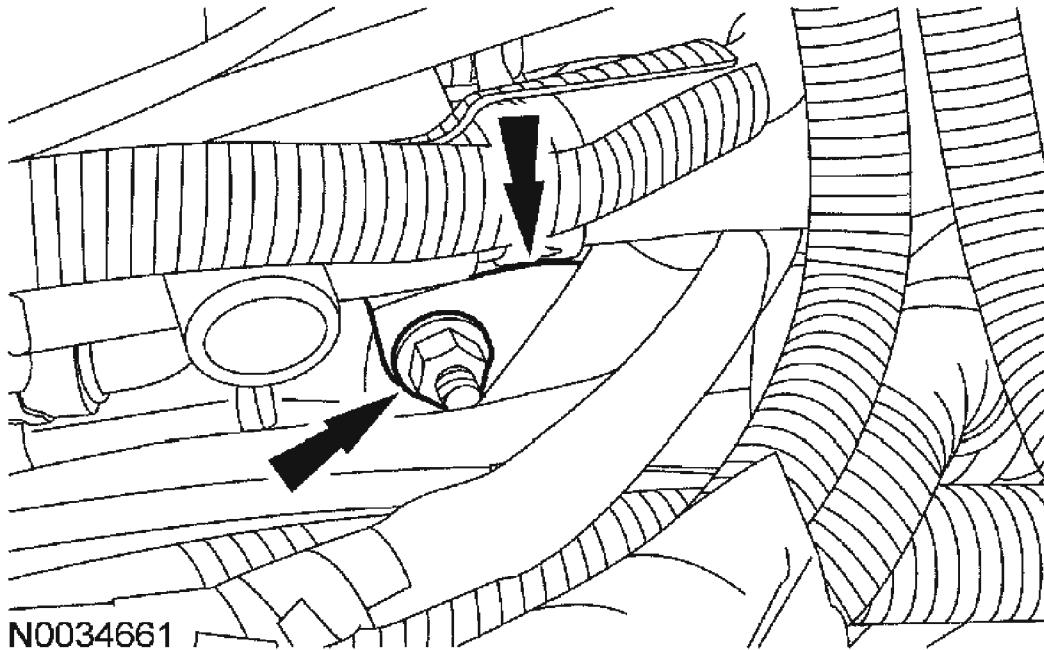


Fig. 127: Positioning Electrical Connector Bracket Aside Nuts
Courtesy of FORD MOTOR CO.

8. Remove the upper center converter housing bolts.

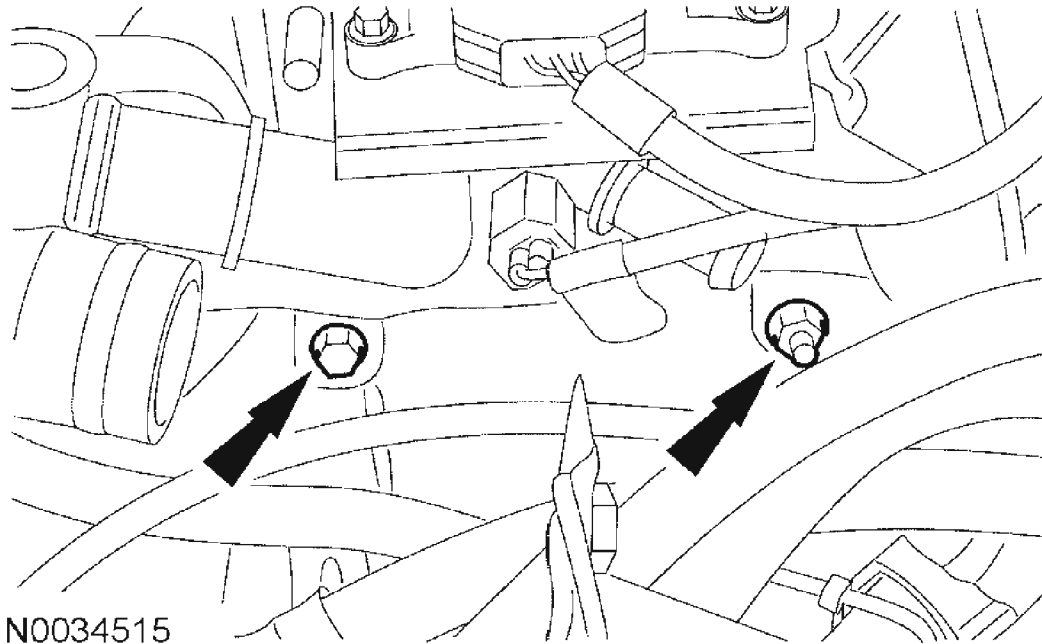


Fig. 128: Removing Upper Center Converter Housing Bolts
Courtesy of FORD MOTOR CO.

9. Using the special tool, secure the engine.

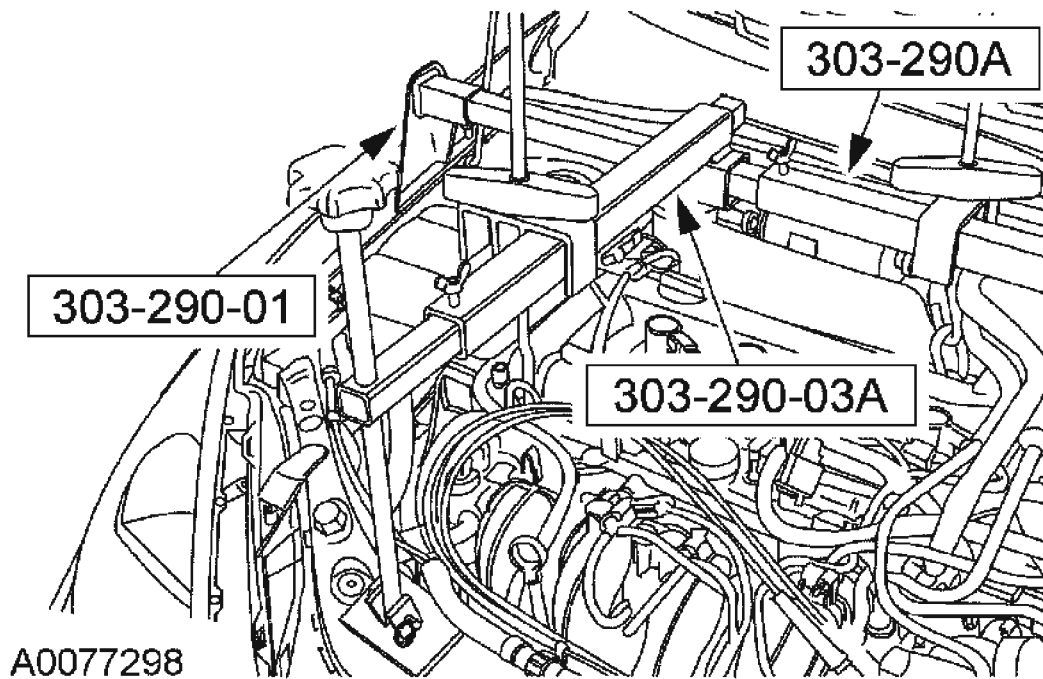


Fig. 129: Using Special Tool To Secure The Engine
Courtesy of FORD MOTOR CO.

10. Remove the fluid filler tube and shift cable bracket bolts.

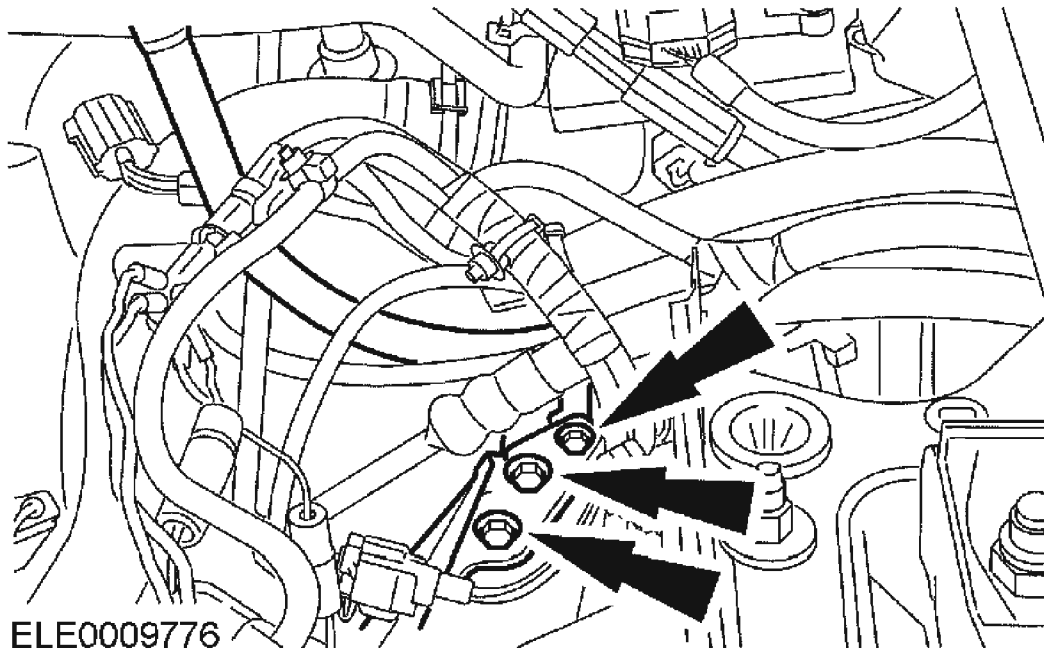


Fig. 130: Removing Fluid Filler Tube And Shift Cable Bracket Bolts
Courtesy of FORD MOTOR CO.

11. Remove the nut and bracket from the starter stud.

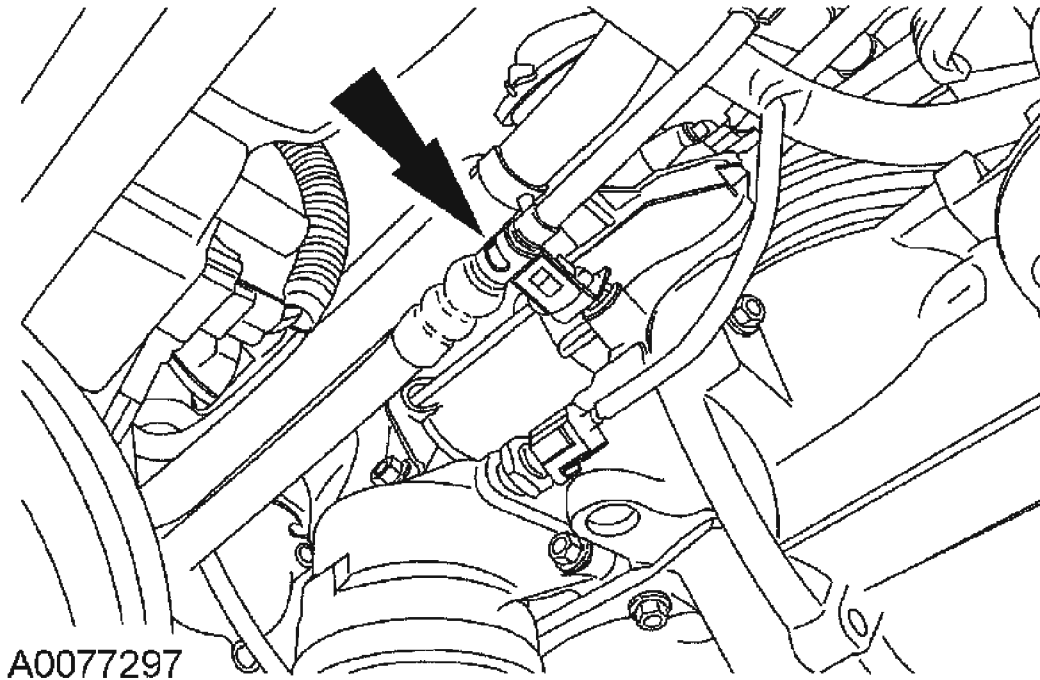


Fig. 131: Removing Nut And Bracket From Starter Stud
Courtesy of FORD MOTOR CO.

12. Remove the starter nuts, then disconnect the wiring from the starter.

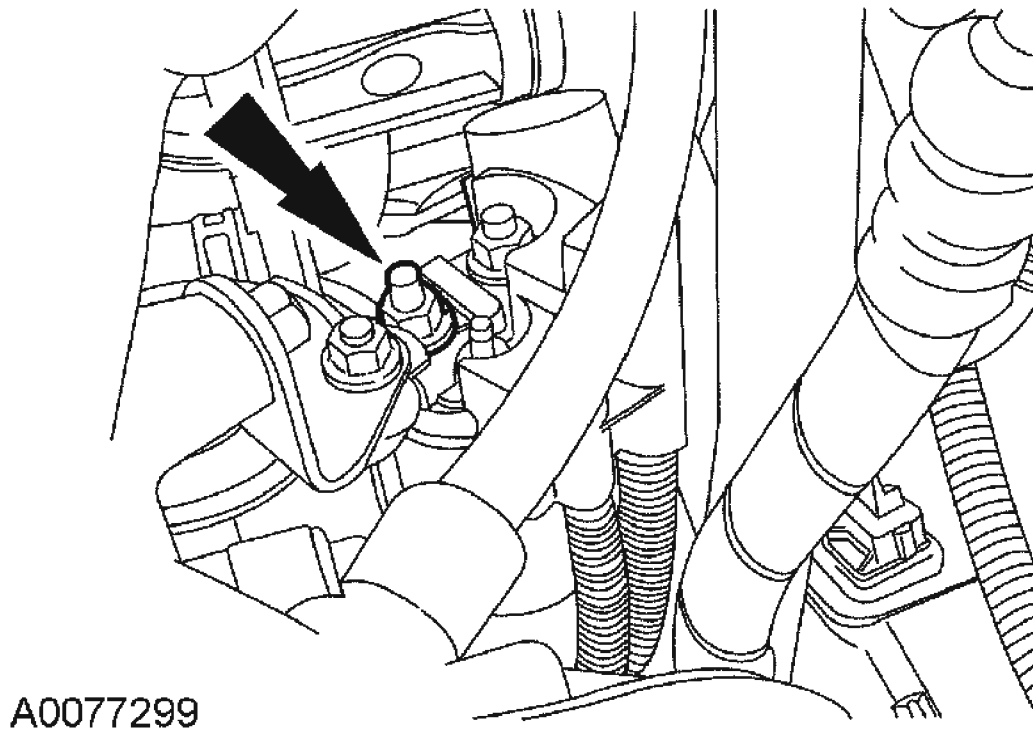


Fig. 132: Removing Starter Nuts And Disconnecting Wiring From Starter
Courtesy of FORD MOTOR CO.

NOTE: Unplug the oil sending unit to remove the starter from its location.

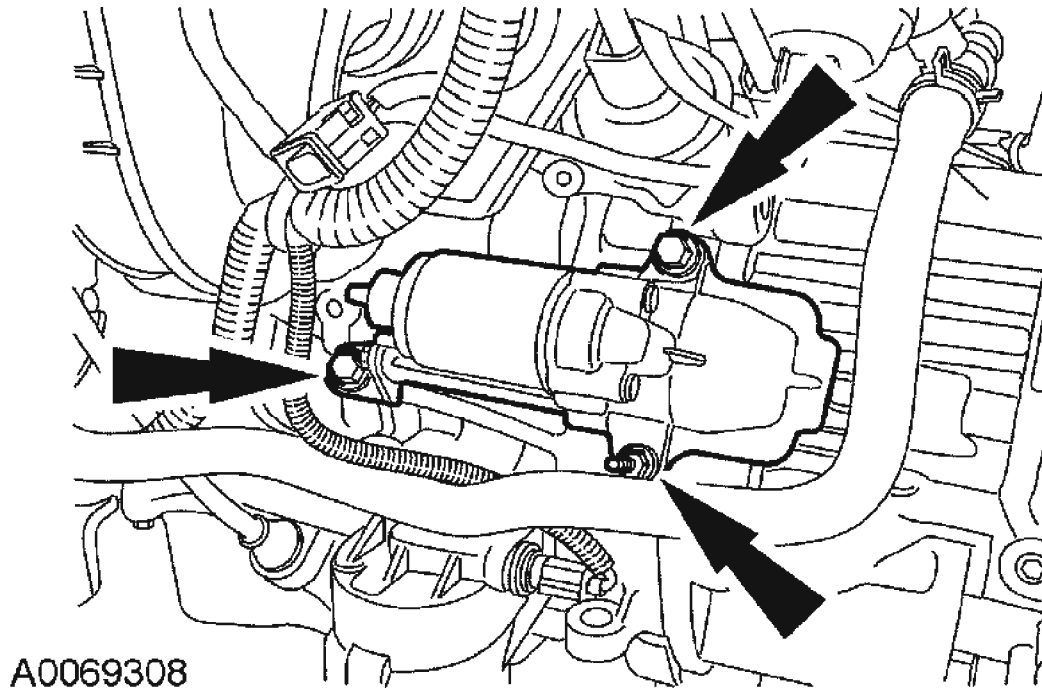


Fig. 133: Removing Three Starter Bolts And Starter
Courtesy of FORD MOTOR CO.

13. Remove the three starter bolts and starter.
14. Remove the starter isolator.

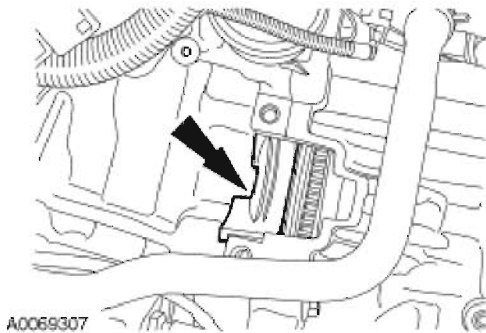


Fig. 134: Identifying Starter Motor Isolator
Courtesy of FORD MOTOR CO.

15. Remove the engine right-hand support insulator.
 1. Remove the insulator bolt and nut.

2. Remove the insulator bolt.

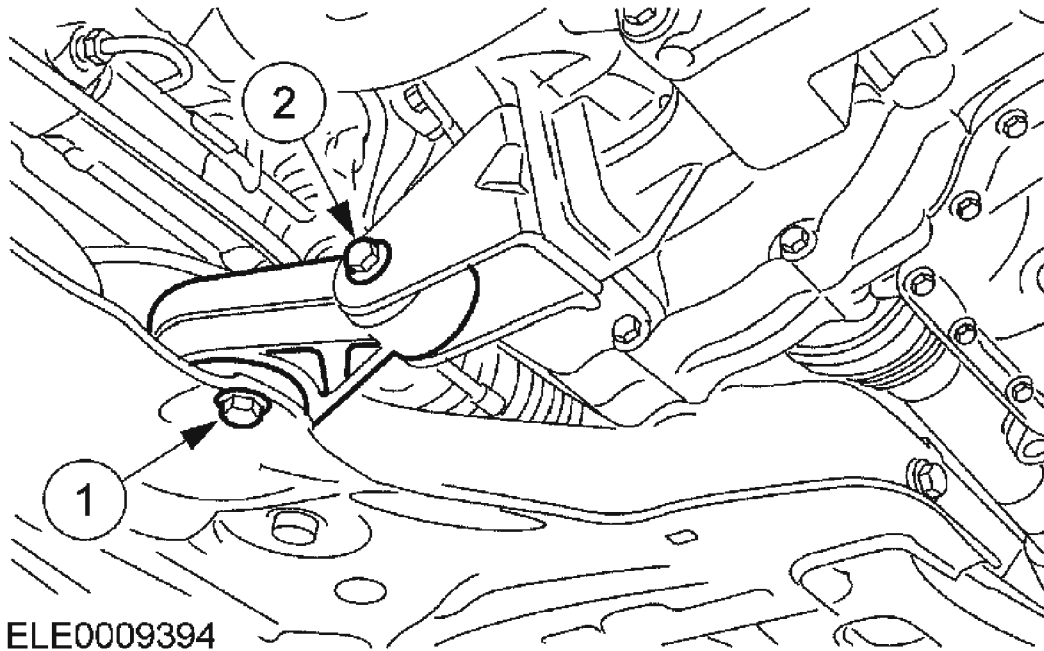


Fig. 135: Removing Engine Right-Hand Support Insulator
Courtesy of FORD MOTOR CO.

16. Disconnect the LH stabilizer bar at the strut.

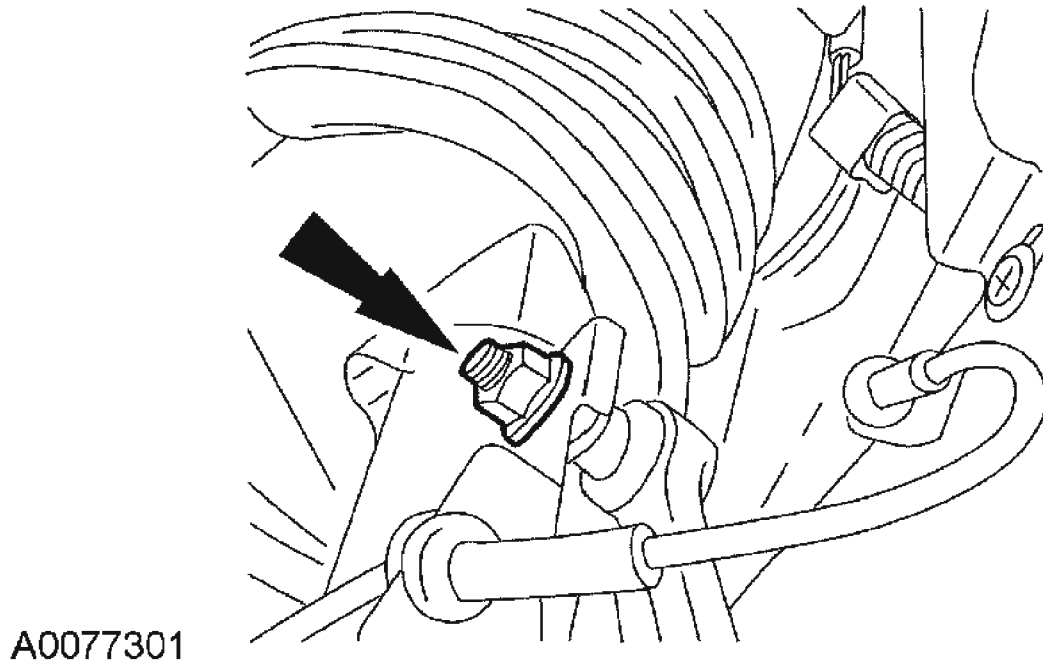
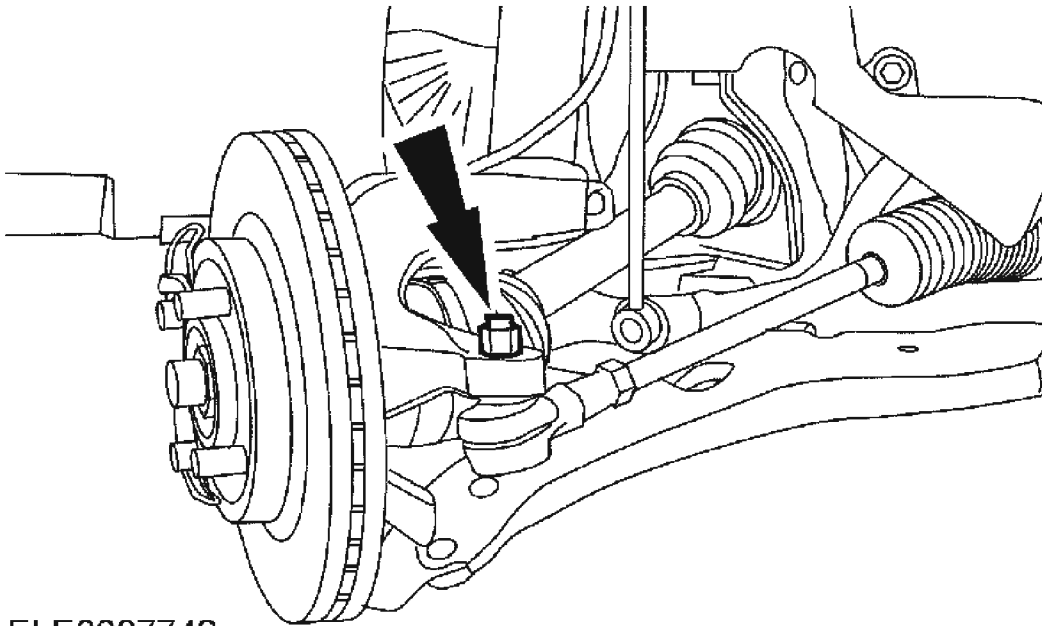


Fig. 136: Disconnecting LH Stabilizer Bar At Strut
Courtesy of FORD MOTOR CO.

17. Remove the LH tie-rod end nut.



ELE0007748

Fig. 137: Removing LH Tie-Rod End Nut
Courtesy of FORD MOTOR CO.

18. Remove the RH tie-rod end nut.

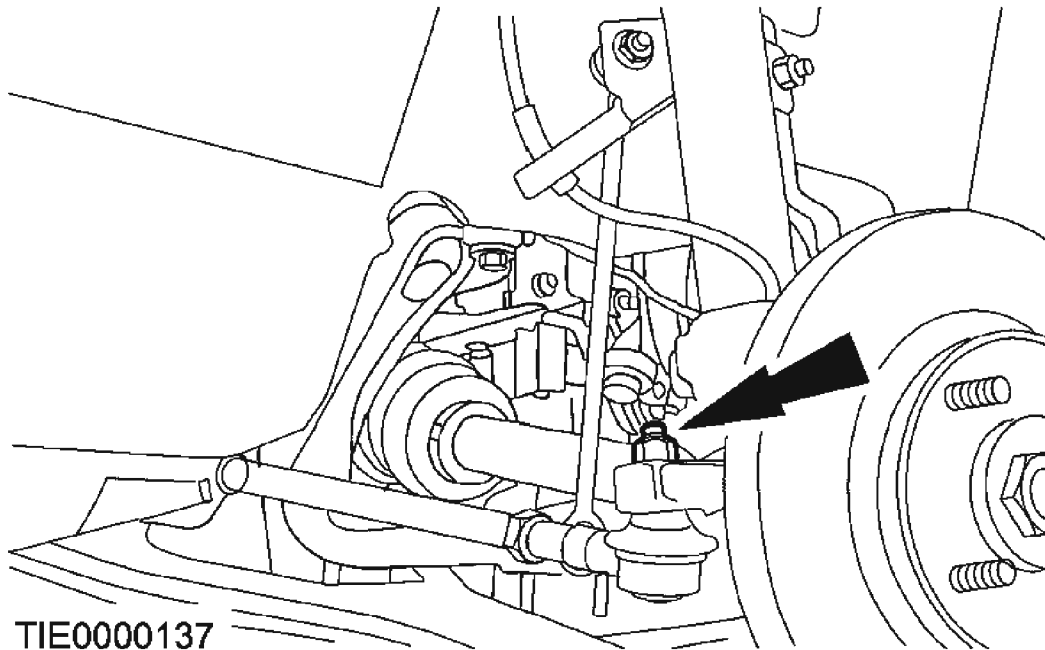


Fig. 138: Removing RH Tie-Rod End Nut
Courtesy of FORD MOTOR CO.

19. Using the special tool, disconnect both of the tie-rods from the knuckles.

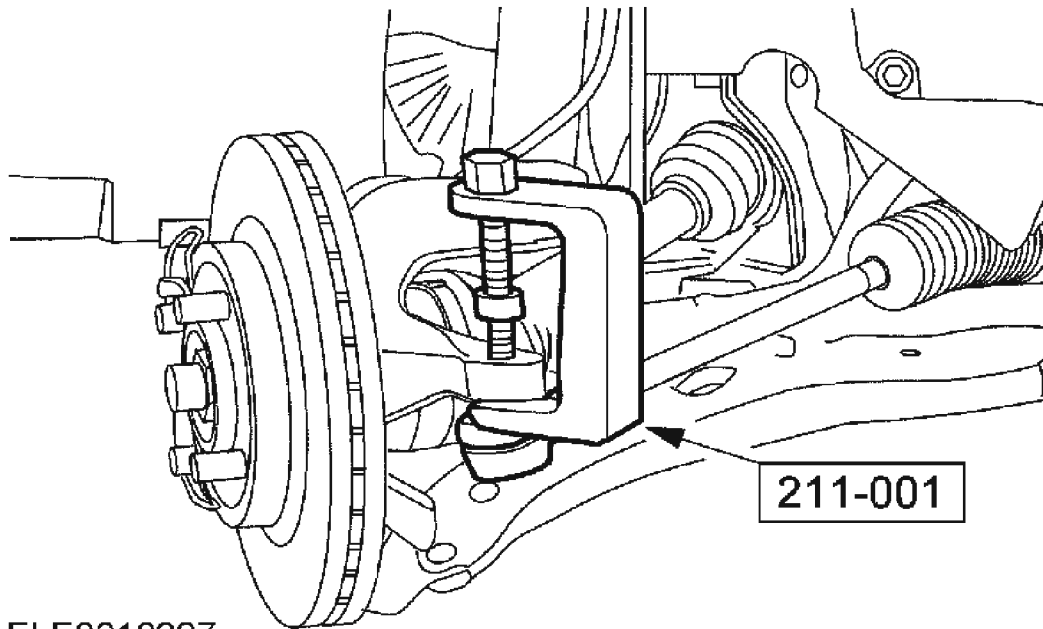
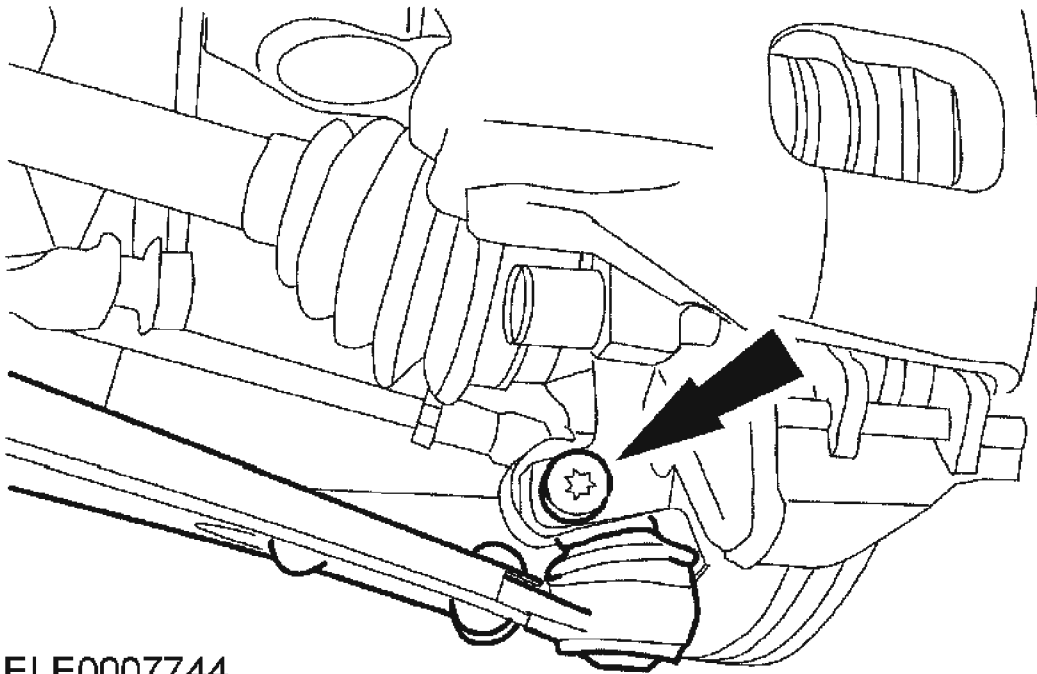


Fig. 139: Disconnecting Both Of Tie-Rods From Knuckles Using Special Tool
Courtesy of FORD MOTOR CO.

20. Disconnect both of the lower control arms from the knuckles.



ELE0007744

Fig. 140: Disconnecting Both Of Lower Control Arms From Knuckles
Courtesy of FORD MOTOR CO.

21. Remove the mounting bracket nuts, then remove the bracket from the halfshaft intermediate bearing.

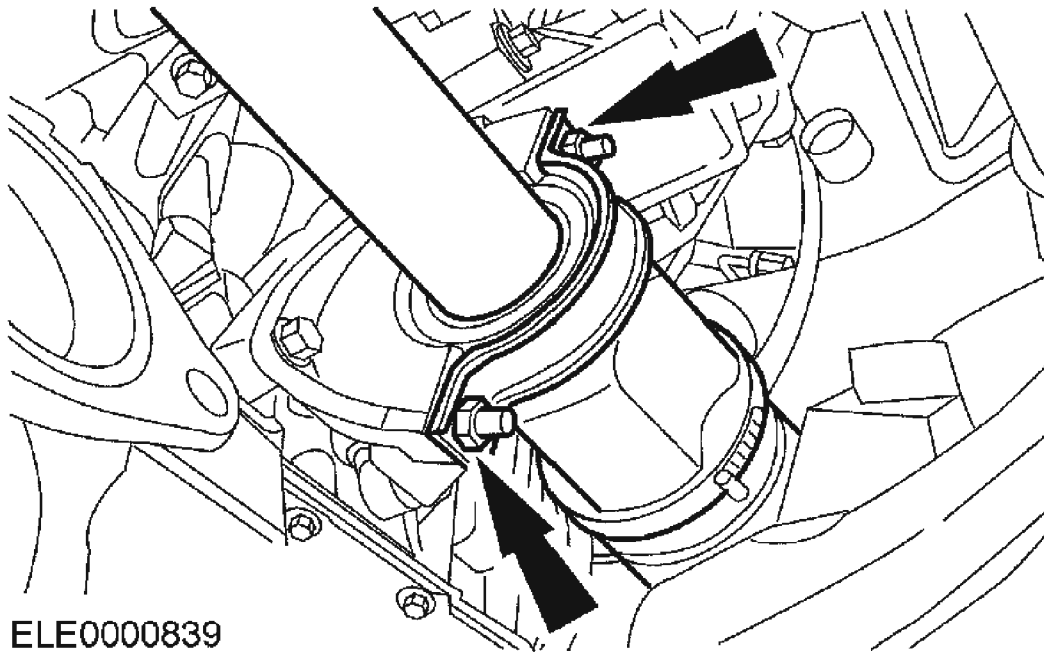


Fig. 141: Removing Mounting Bracket Nuts Then Bracket From Halfshaft Intermediate Bearing
Courtesy of FORD MOTOR CO.

22. Remove the RH front drive halfshaft. Position it aside and support the halfshaft with mechanics wire.

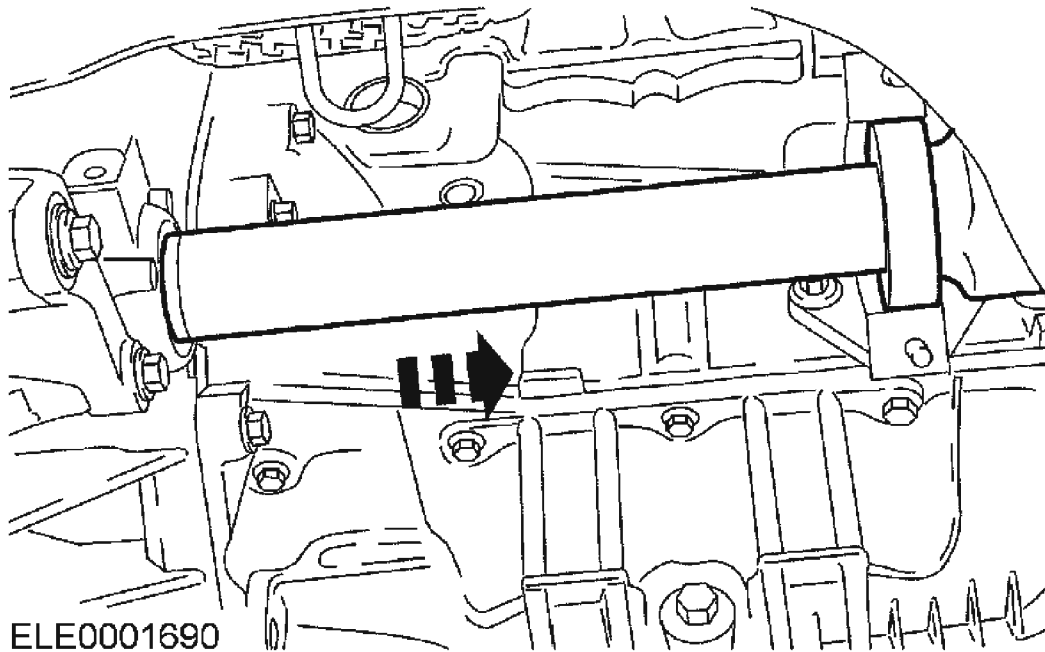


Fig. 142: Removing RH Front Drive Halfshaft
Courtesy of FORD MOTOR CO.

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

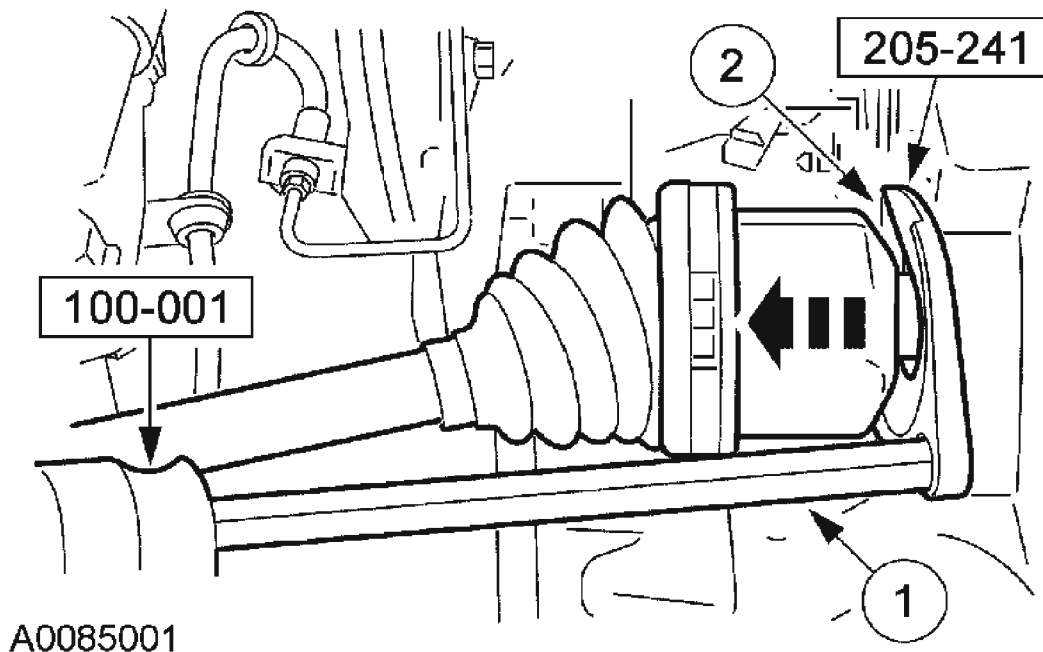


Fig. 143: Removing LH Front Drive Halfshaft From Transaxle
Courtesy of FORD MOTOR CO.

23. Remove the LH front drive halfshaft from the transaxle.
 1. Using the special tool, remove the halfshaft from the transaxle.
 2. Install a plug into the transaxle opening.
24. Disconnect the output shaft speed (OSS) sensor electrical connector.

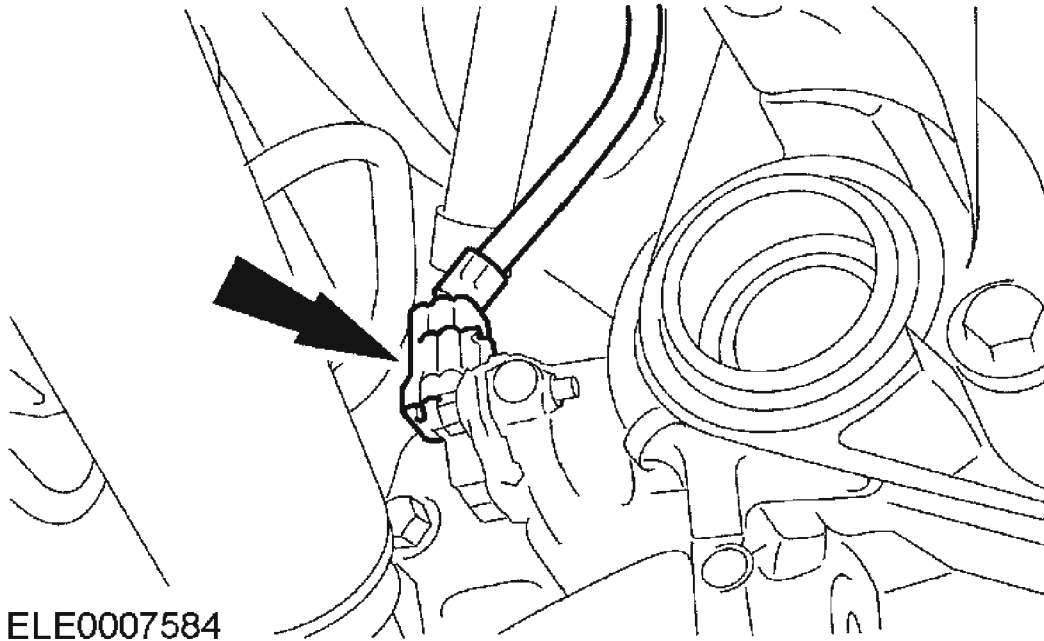


Fig. 144: Disconnecting Output Shaft Speed (OSS) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

25. Unbolt the shift cable clip.

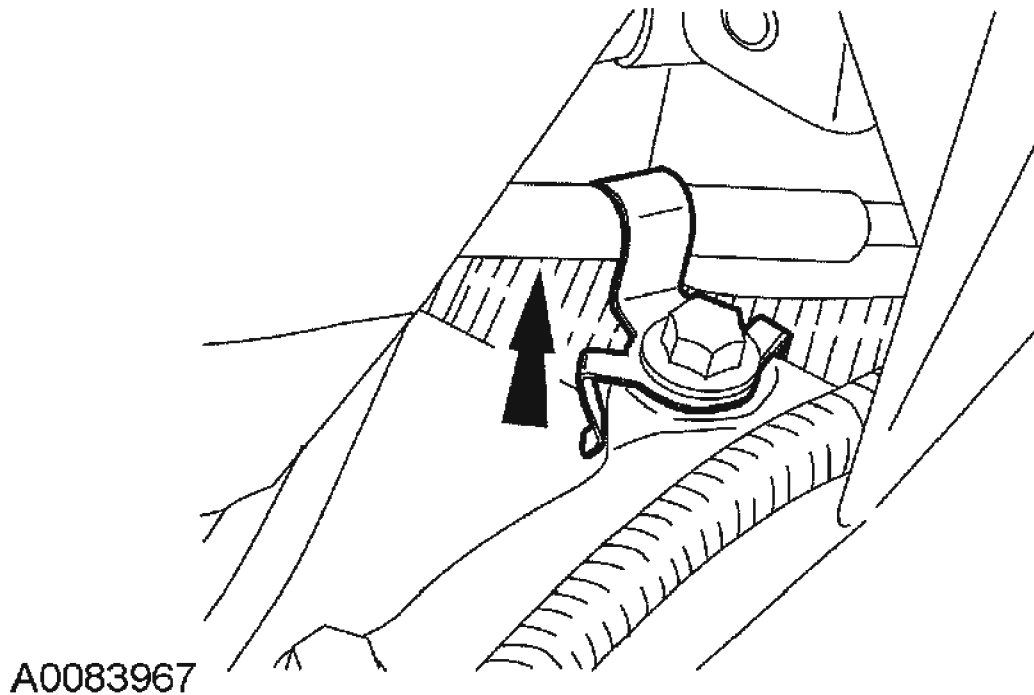


Fig. 145: Unbolting Shift Cable Clip
Courtesy of FORD MOTOR CO.

26. Disconnect the transmission fluid cooler lines from the transaxle.
 1. Slide the connector fitting into the cooler line.
 2. Press the yellow release button.
 3. Pull the connector fitting from the cooler line.

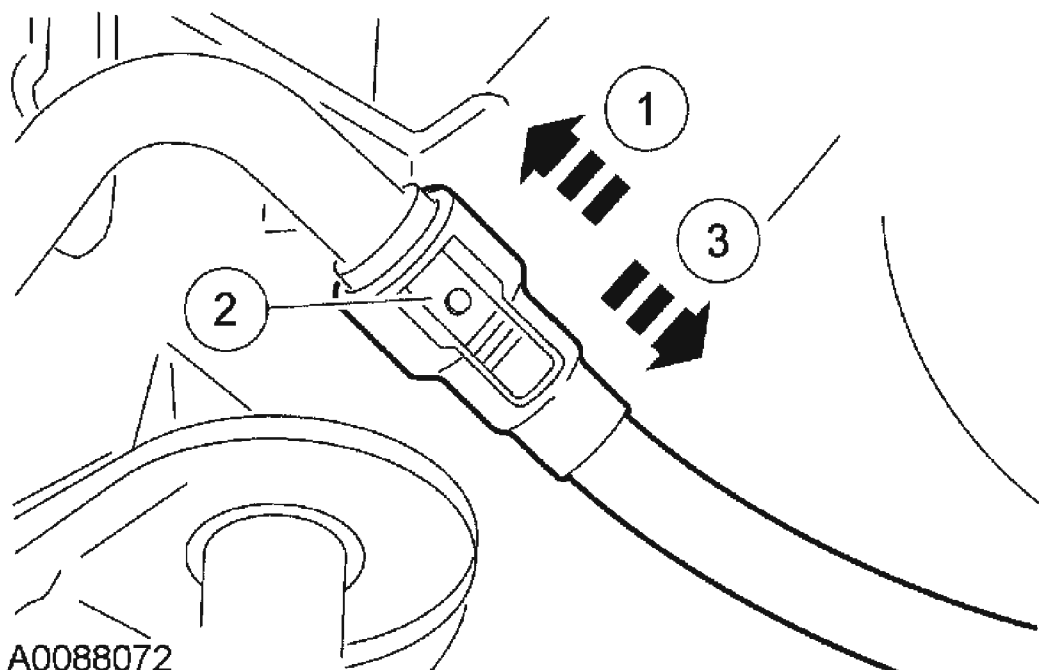
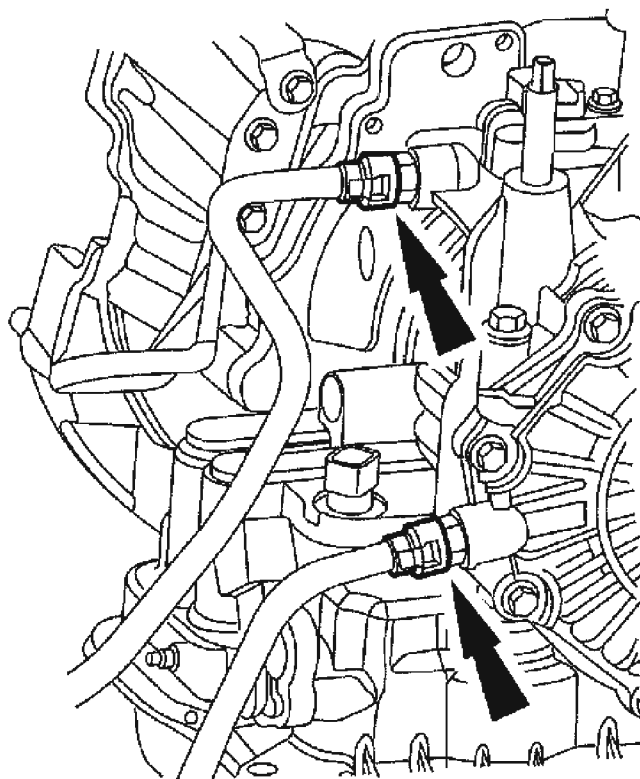


Fig. 146: Disconnecting transmission fluid cooler lines from the transaxle

Courtesy of FORD MOTOR CO.

27. Disconnect the shift cable from the manual control lever.

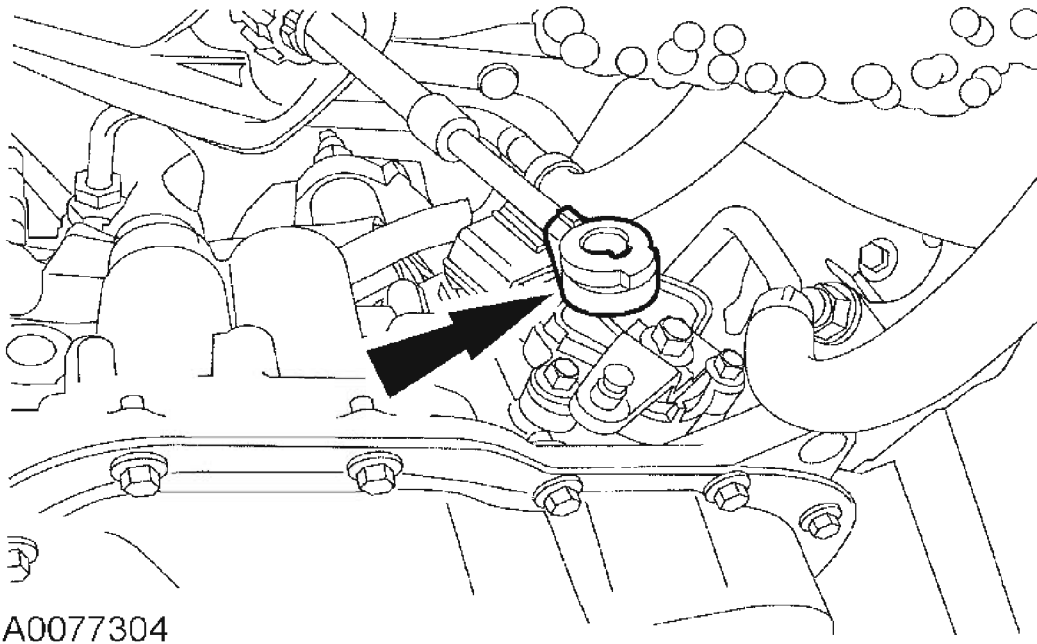


Fig. 147: Disconnecting Shift Cable From Manual Control Lever
Courtesy of FORD MOTOR CO.

CAUTION: Only rotate the engine in a clockwise direction or engine damage will occur.

NOTE: Mark one stud and the flexplate for assembly reference.

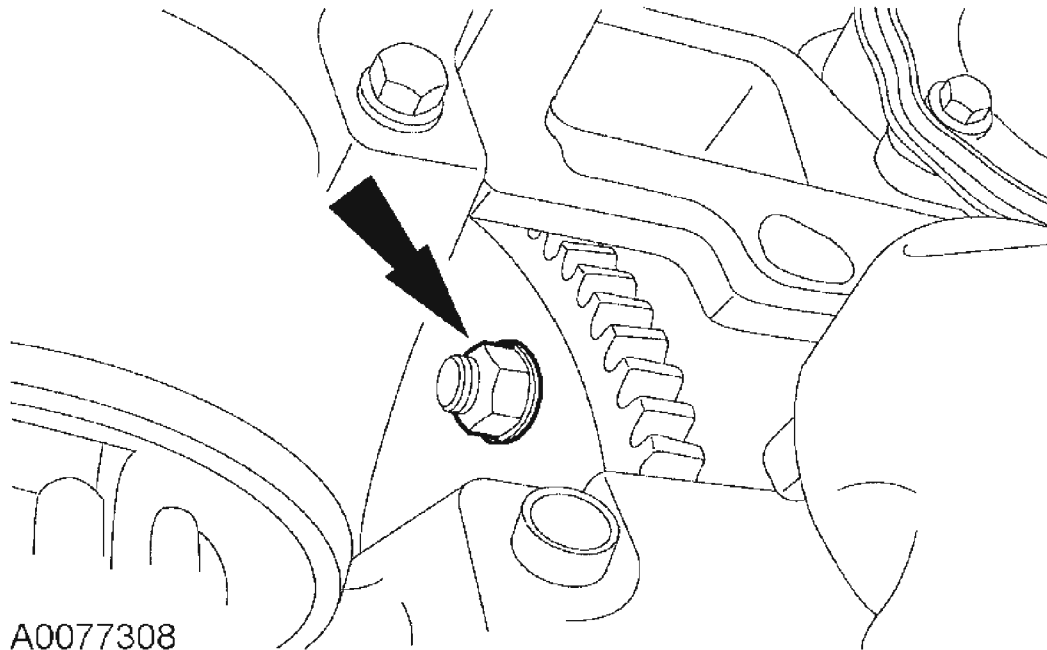


Fig. 148: Removing Crankshaft Nuts
Courtesy of FORD MOTOR CO.

28. Remove the plastic shield. Rotate the crankshaft to gain access to the converter nuts, then remove the four nuts.
29. Remove the engine rear mount nuts and remove the rear mount.

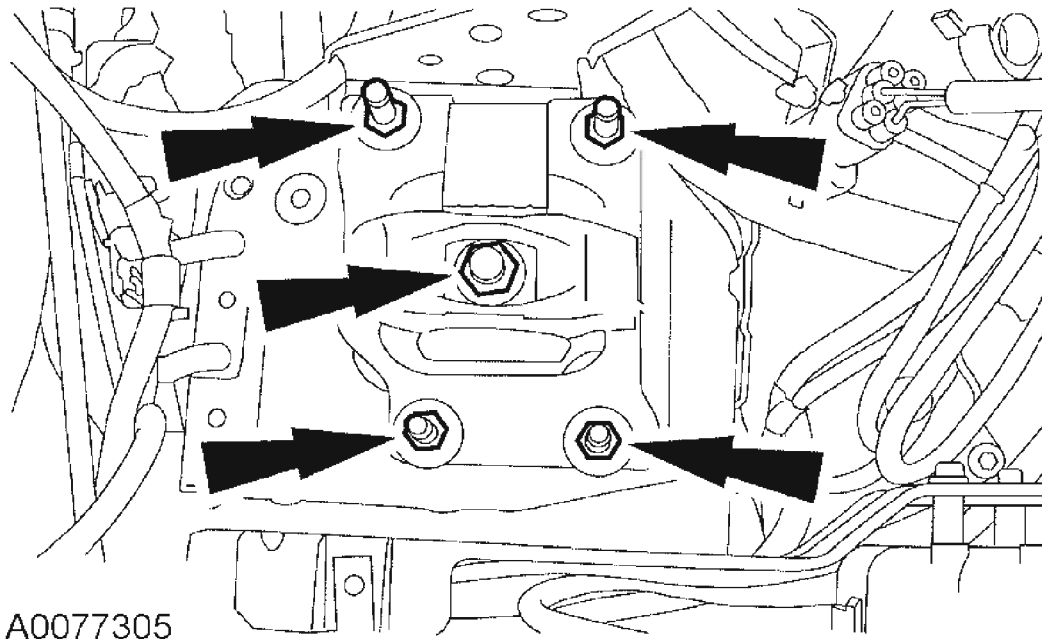


Fig. 149: Removing Engine Rear Mount Nuts
Courtesy of FORD MOTOR CO.

30. Using the engine support bar, lower the engine and transaxle assembly slightly.
31. Remove the engine rear mount bracket nuts and remove the bracket.

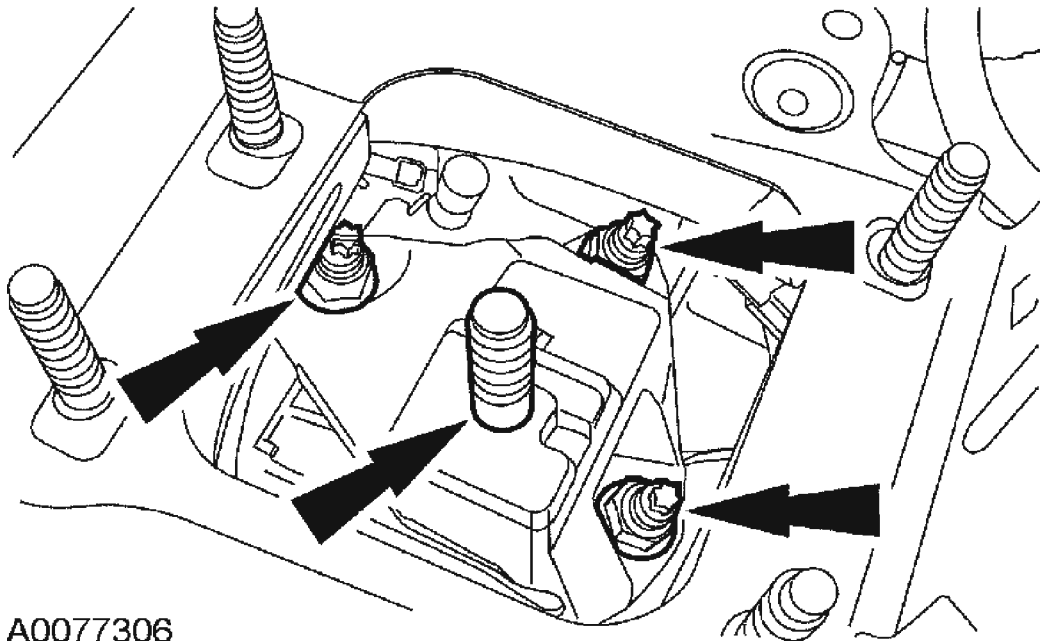


Fig. 150: Removing Engine Rear Mount Bracket Nuts
Courtesy of FORD MOTOR CO.

32. Remove the fluid filler tube.
 - Remove the bolt at the base and pull out the tube and position it aside.
33. Secure the transaxle with a high-lift jack using a safety strap.

NOTE: **The location of the different length bolts for installation.**

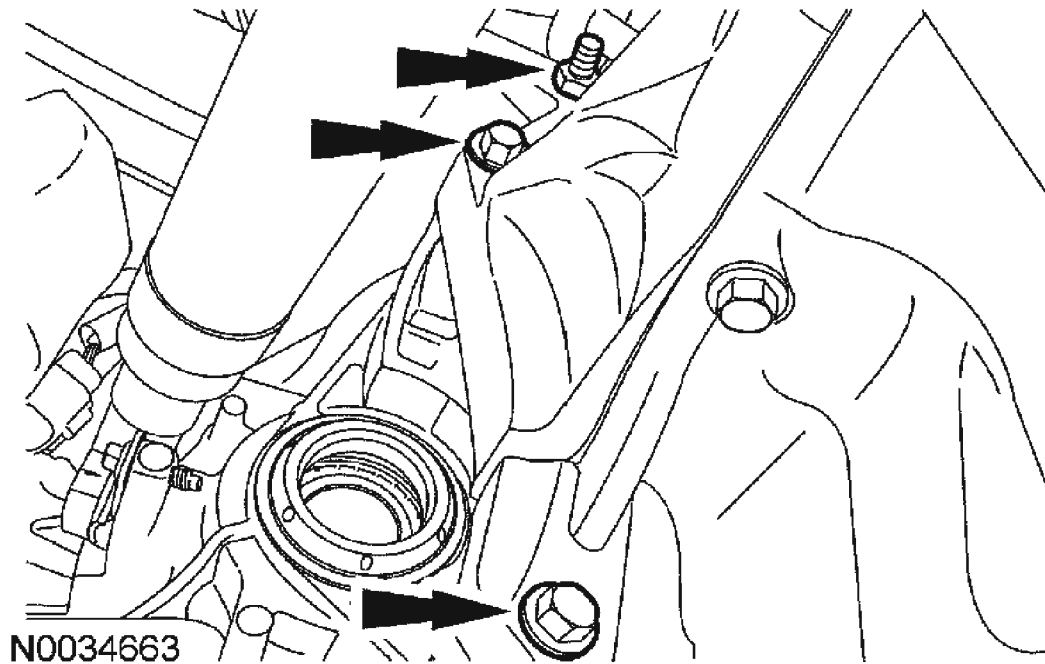


Fig. 151: Removing Converter Housing Bolts (3)
Courtesy of FORD MOTOR CO.

34. Remove the 3 converter housing bolts.
35. Remove the 5 converter housing bolts.

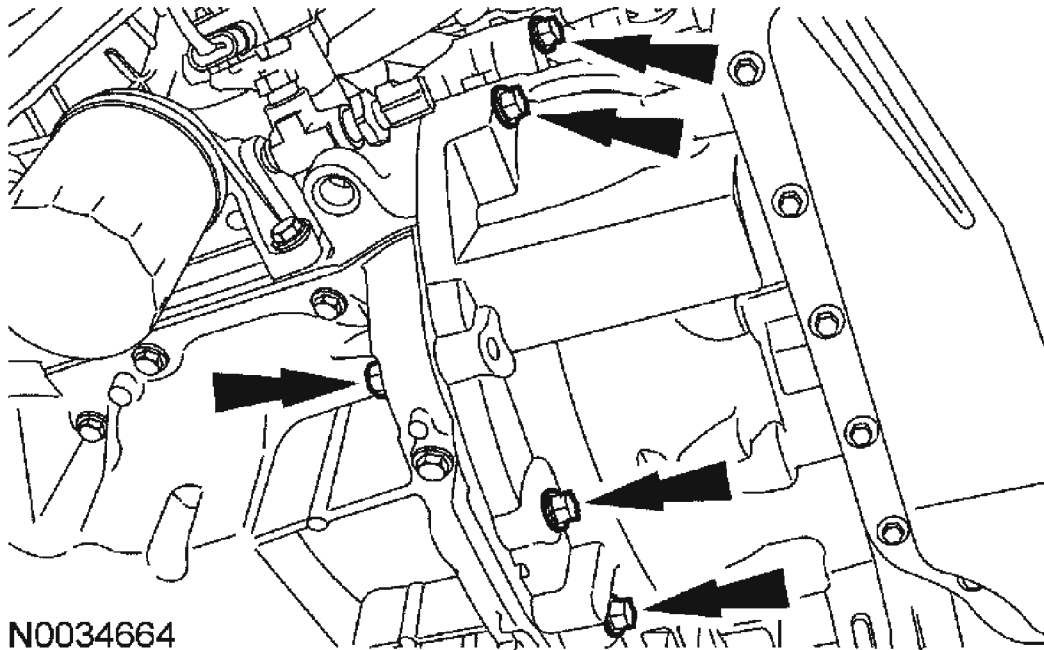


Fig. 152: Removing Converter Housing Bolts (5)
Courtesy of FORD MOTOR CO.

36. Separate the transaxle from the engine and lower the transaxle.
37. Install the special tool, to prevent damage to the torque converter.

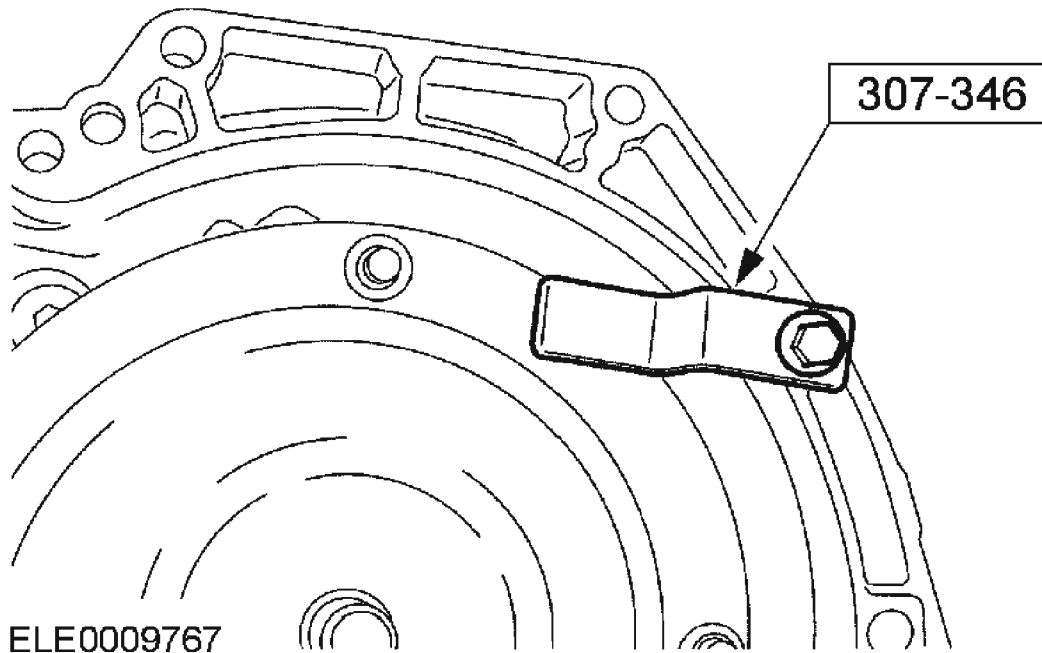


Fig. 153: Installing Special Tool To Torque Converter
 Courtesy of FORD MOTOR CO.

DISASSEMBLY

TRANSAXLE

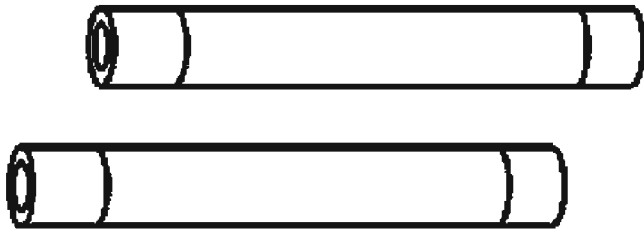
Special Tool(s)

SPECIAL TOOL SPECIFICATION

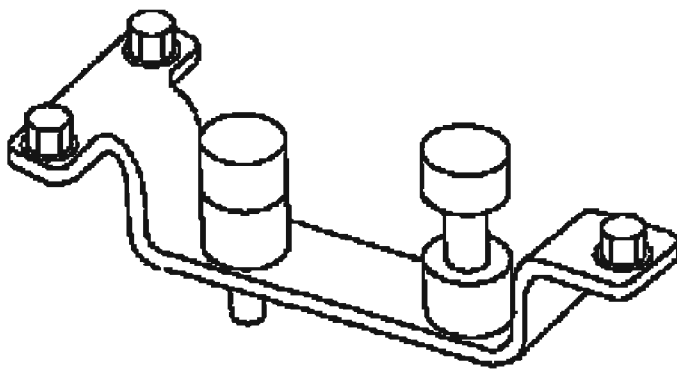
	Handle, Torque Converter 307-091 (T81P-7902-C)
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2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



ST1631-A



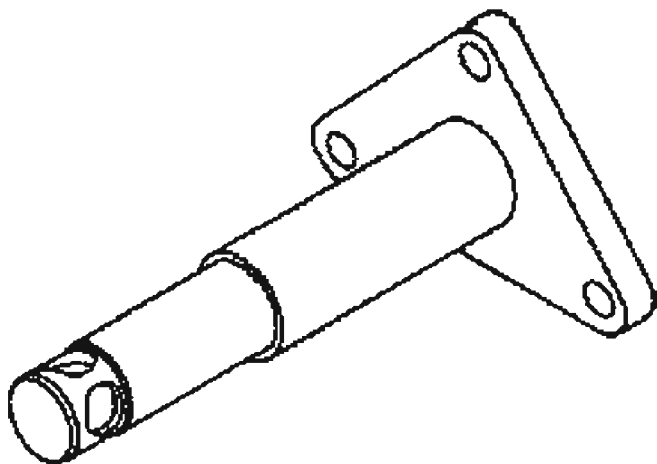
ST2756A

Holding Tool, Final Drive Input Gear
307-413

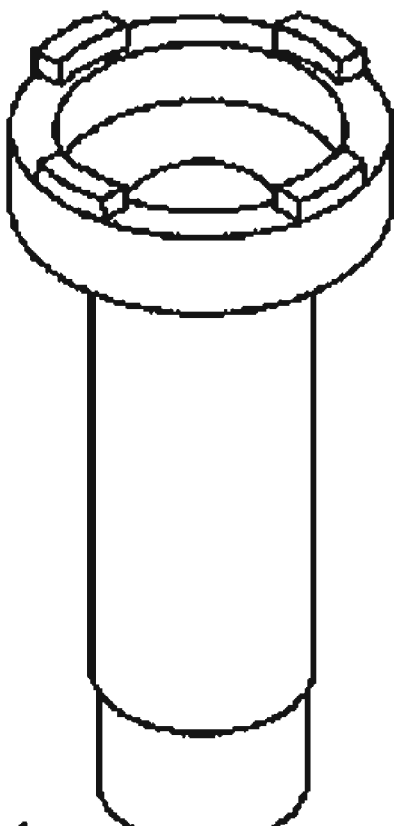
Mounting Bracket, Transmission 307-
410

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



307-410

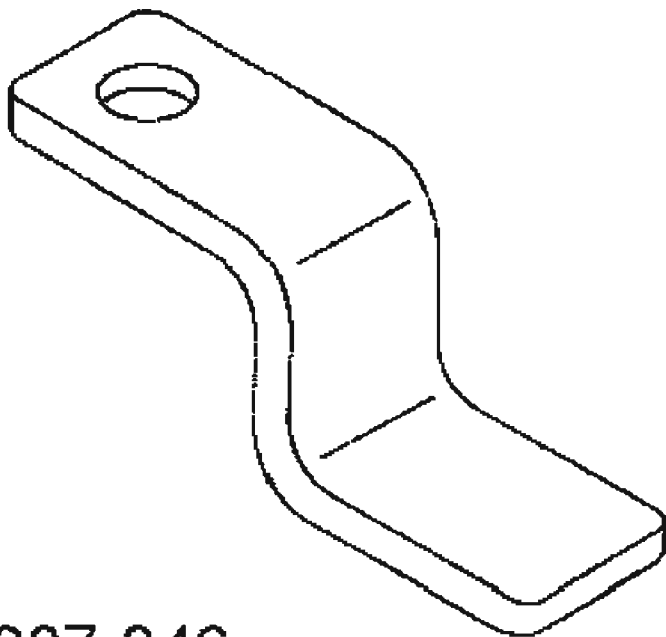


Socket, Final Drive Input Nut 307-414

307-414

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



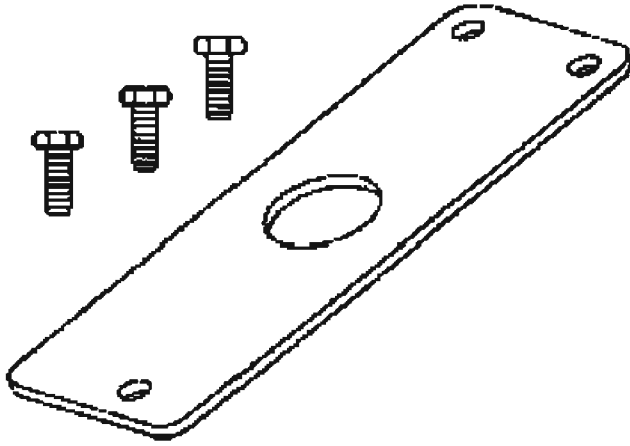
307-346

Retainer, Torque Converter 307-346
(T94T-7902-A)

Wrench Guide Plate 307-420

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



307-420

Material

MATERIAL SPECIFICATION

Item	Specification
Automatic Transmission Fluid XT-5-QM	MERCON® V
Metal Surface Cleaner F4AZ-19A536-RA	WSE-M5B392-A

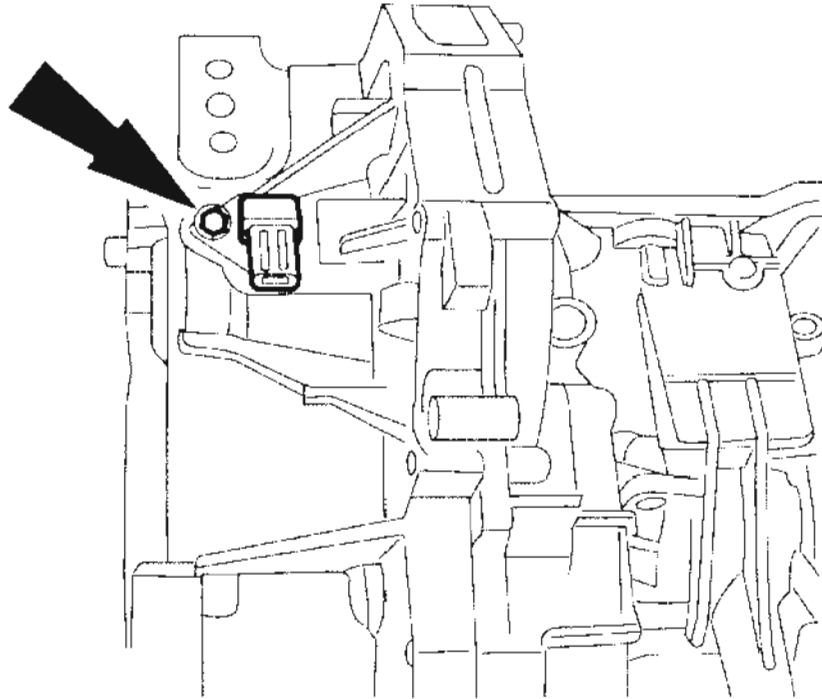
Disassembly

CAUTION: If, during repair work, abrasive particles are found in the transaxle fluid (particles from the clutch or metal chips or foreign material), the transaxle must be disassembled completely and thoroughly cleaned. Also, clean the fluid pipes, fluid cooler and torque converter carefully. In the case of extreme soiling of the fluid pipes, install a new fluid cooler and torque converter.

NOTE: In case of clutch abrasion, rinse the torque converter with clean automatic transmission fluid.

1. Inspect the transaxle during disassembly.

2. Remove the output shaft speed (OSS) sensor.
 1. Remove the bolt.
 2. Remove the OSS.



A0065200

Fig. 154: Removing Output Shaft Speed (OSS) Sensor
Courtesy of FORD MOTOR CO.

3. Remove the turbine shaft speed (TSS) sensor.

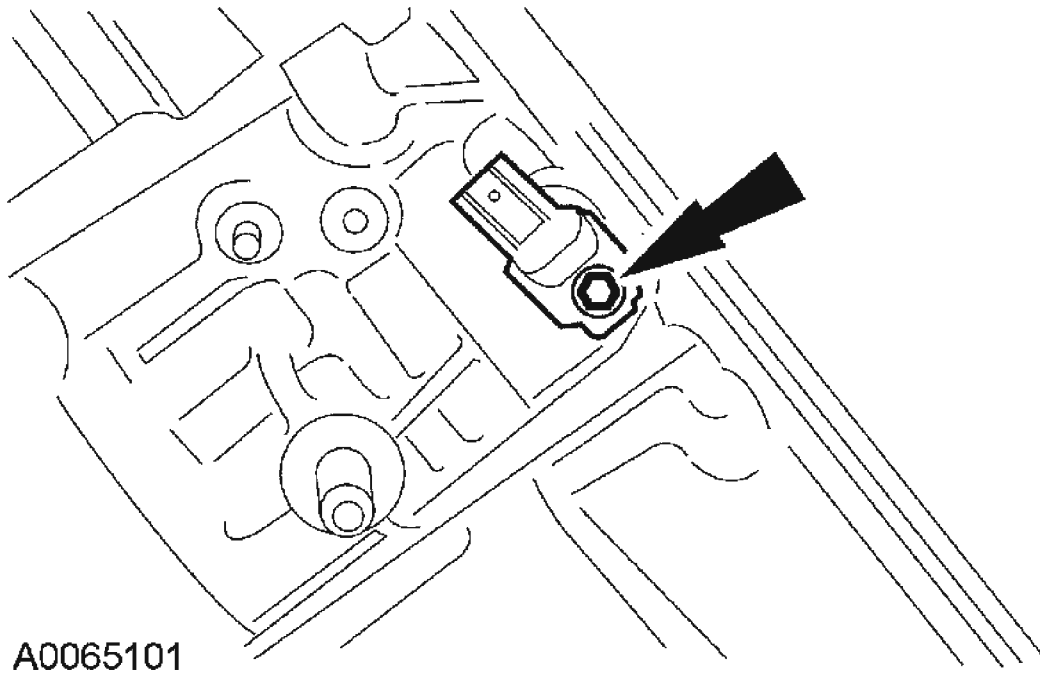
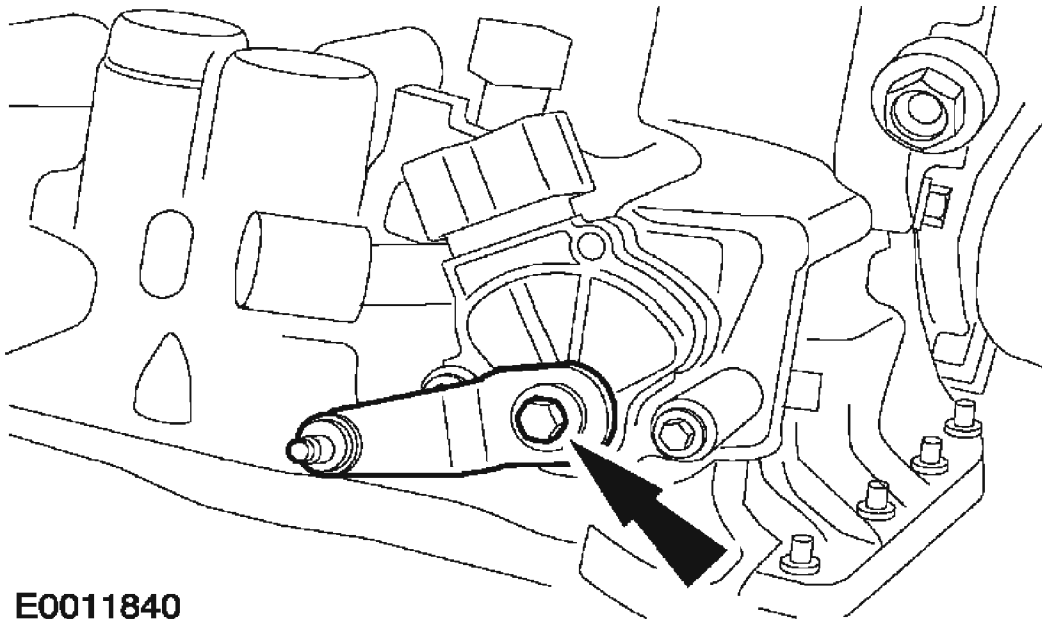


Fig. 155: Removing Turbine Shaft Speed (TSS) Sensor
Courtesy of FORD MOTOR CO.

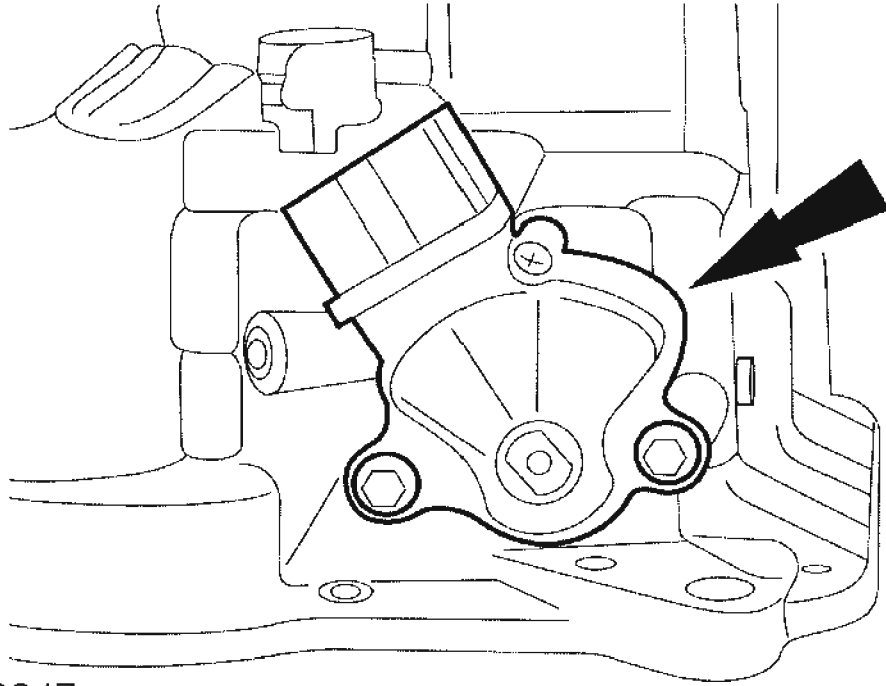
CAUTION: Do not use air tools.



E0011840

Fig. 156: Removing Manual Control Lever
Courtesy of FORD MOTOR CO.

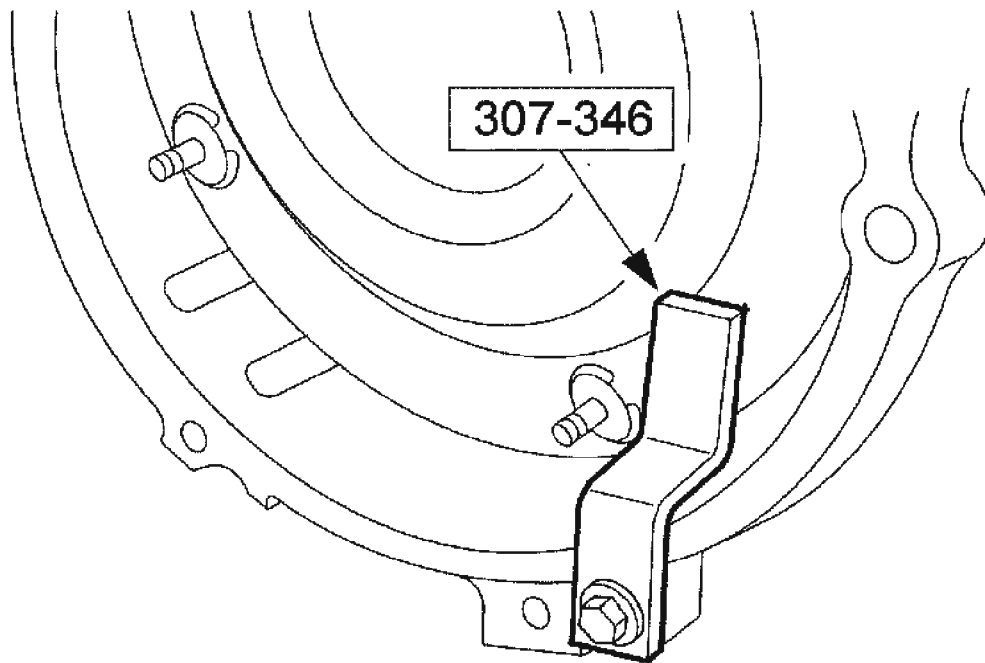
4. While holding the lever, remove the manual control lever.
5. Remove the transmission range (TR) sensor.



TIE0018847

Fig. 157: Removing Transmission Range (TR) Sensor
Courtesy of FORD MOTOR CO.

6. Remove the special tool.



A0065170

Fig. 158: Removing Special Tool To Torque Converter
Courtesy of FORD MOTOR CO.

CAUTION: Do not tilt the torque converter when removing it, to prevent damaging the torque converter hub.

NOTE: The torque converter is filled with fluid. Drain into a suitable container.

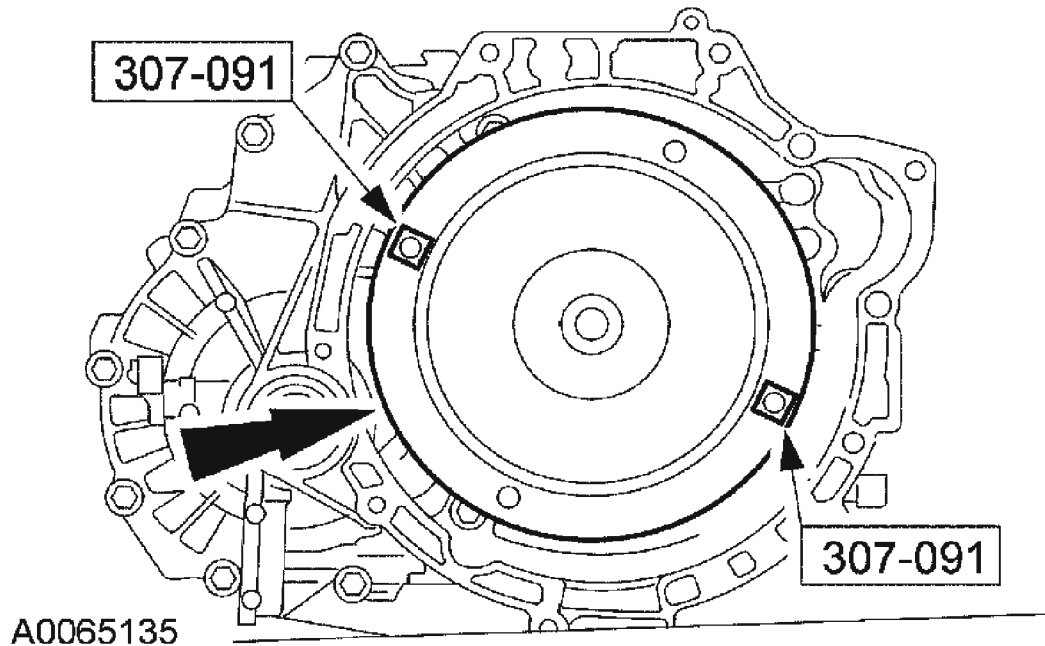


Fig. 159: Removing Torque Converter Using Special Tool
Courtesy of FORD MOTOR CO.

7. Using the special tool, remove the torque converter.
8. Using the special tool, mount the transaxle to a bench.

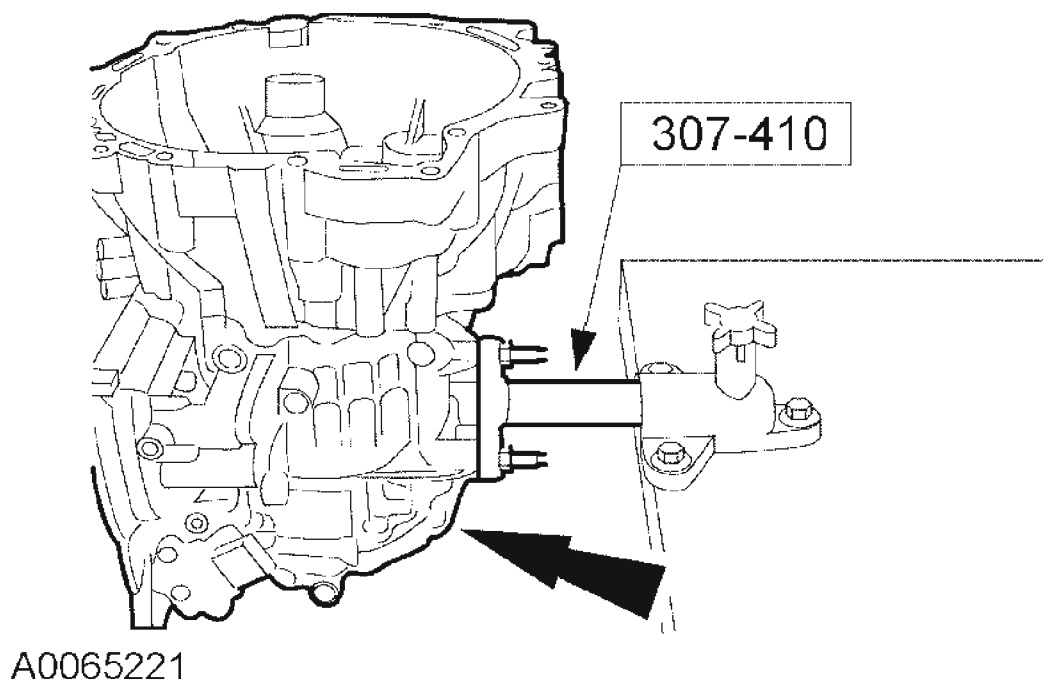


Fig. 160: Mounting Transaxle To Bench Using Special Tool
Courtesy of FORD MOTOR CO.

9. Remove the bolts.

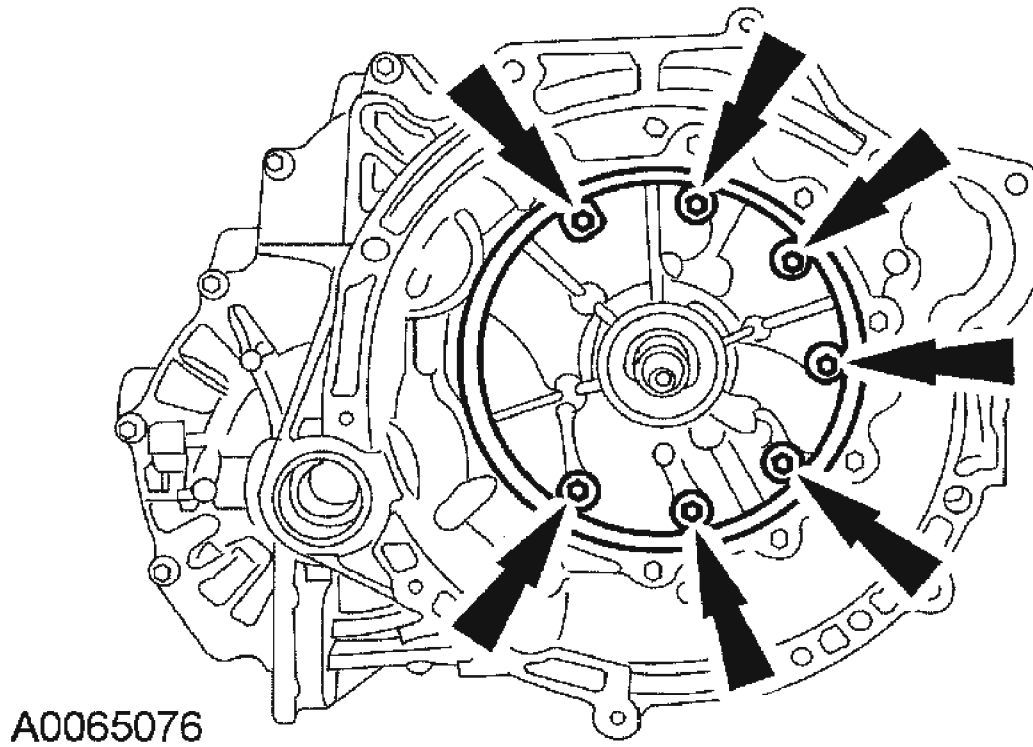


Fig. 161: Removing Transaxle Bolts
Courtesy of FORD MOTOR CO.

10. Using the two 10 mm bolts, remove the fluid pump.

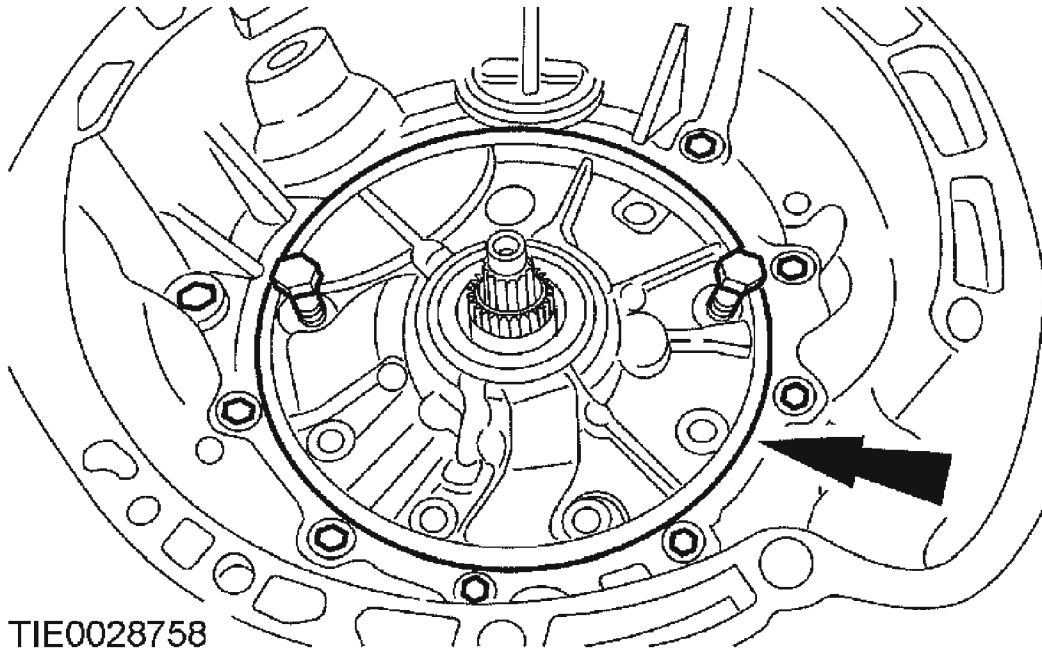
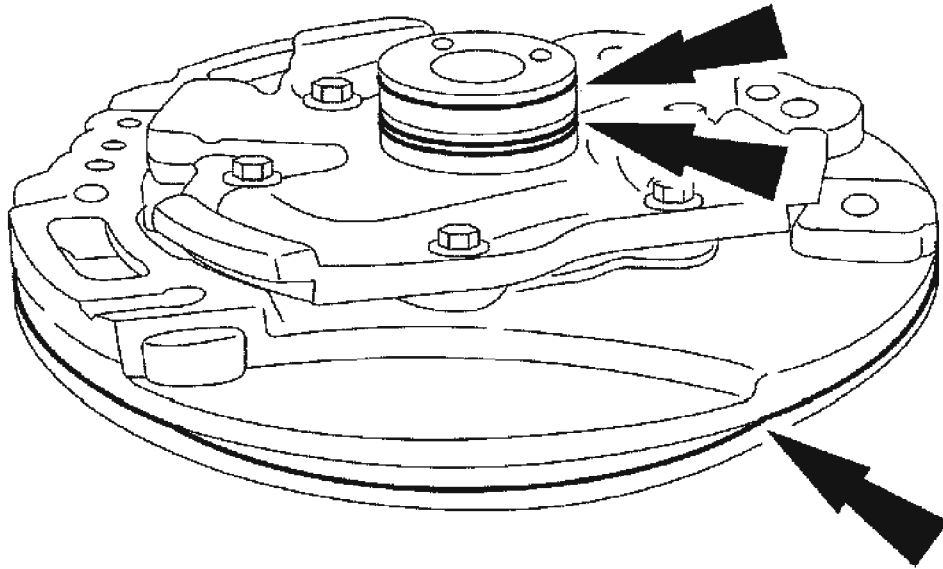


Fig. 162: Using Two 10 mm Bolts To Remove Fluid Pump
Courtesy of FORD MOTOR CO.

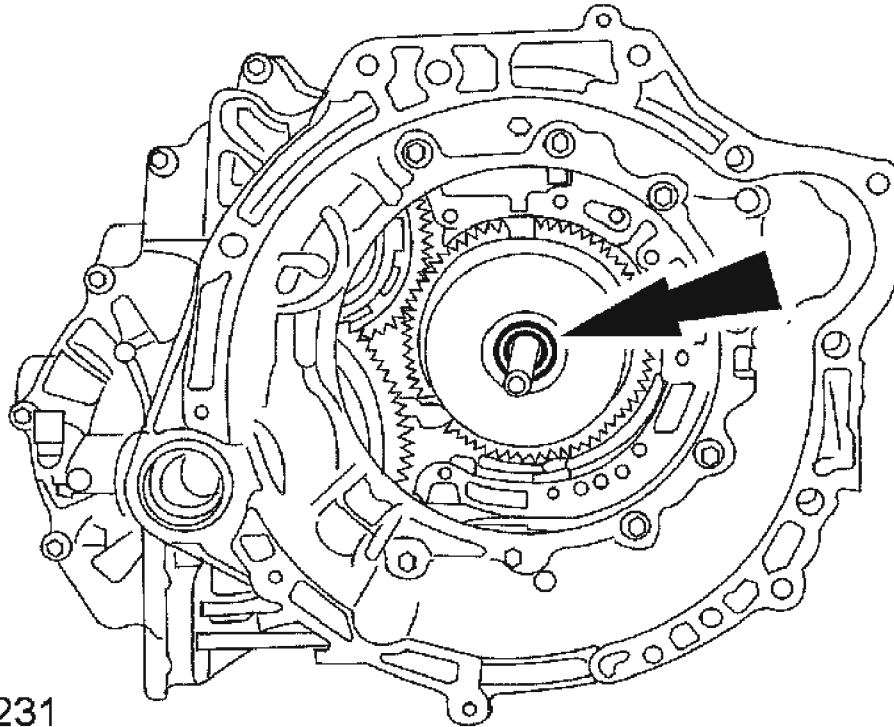
11. Remove the fluid pump seals.



A0065153

Fig. 163: Removing Fluid Pump Seals
Courtesy of FORD MOTOR CO.

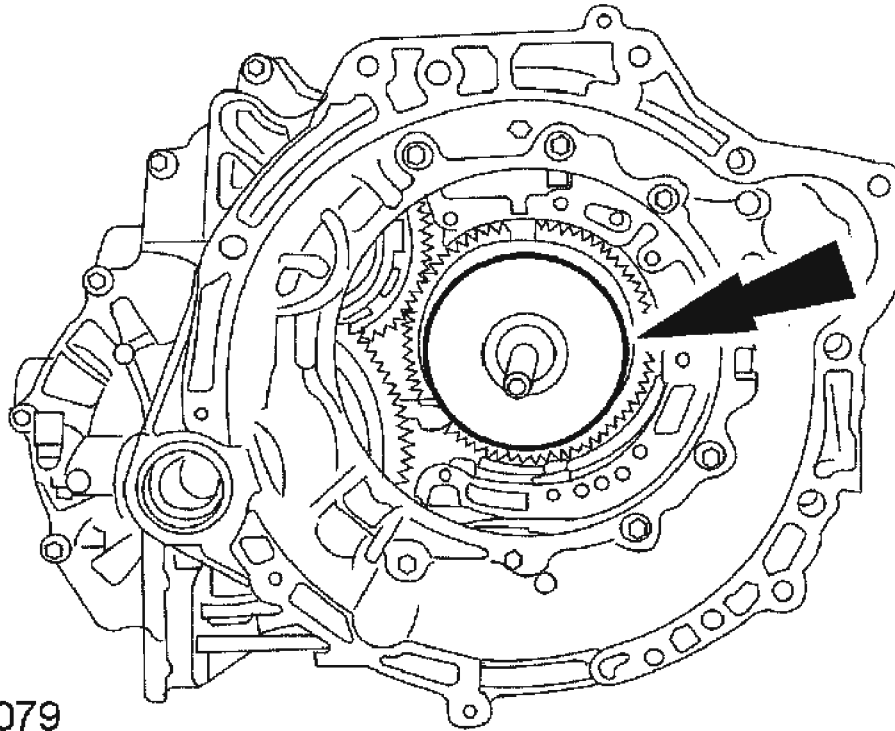
12. Remove the forward clutch thrust washer.



A0065231

Fig. 164: Removing Forward Clutch Thrust Washer
Courtesy of FORD MOTOR CO.

13. Remove the forward clutch assembly.



A0065079

Fig. 165: Removing Forward Clutch Assembly
Courtesy of FORD MOTOR CO.

NOTE: Small levers will aid in the removal of the forward clutch hub.

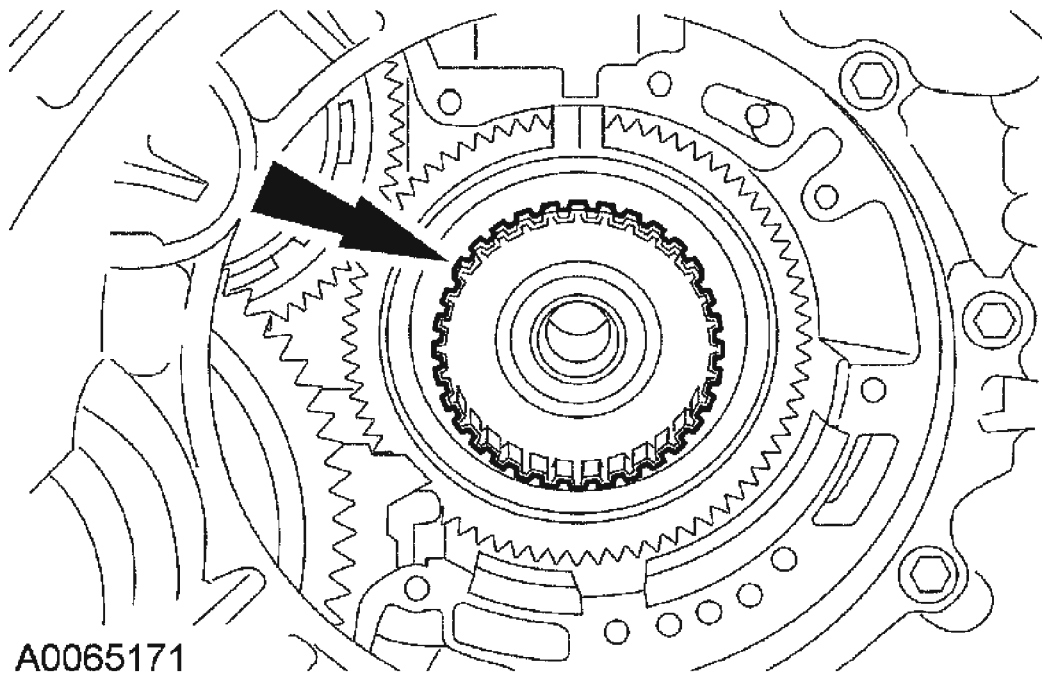


Fig. 166: Removing Forward Clutch Hub
Courtesy of FORD MOTOR CO.

14. Remove the forward clutch hub.
15. Rotate the transaxle 180 degrees.
16. Remove the end cover.

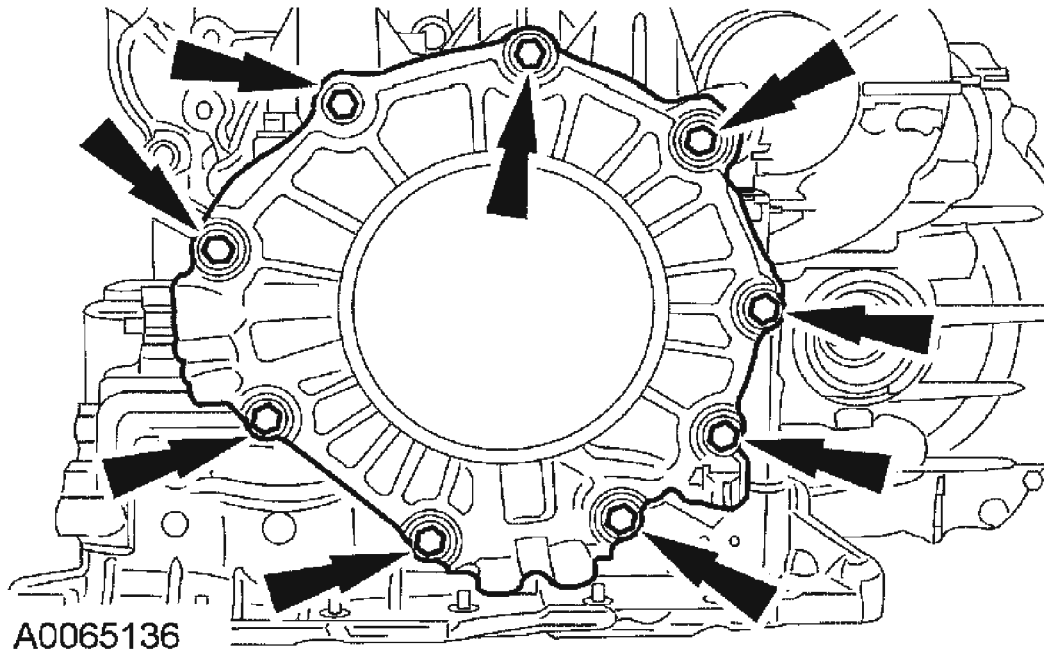
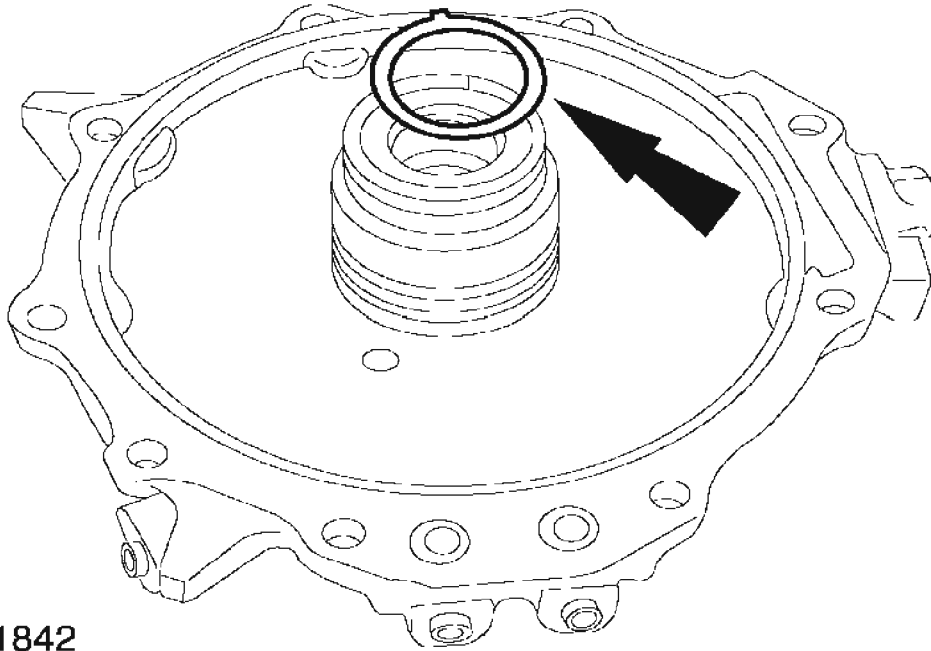


Fig. 167: Removing End Cover
Courtesy of FORD MOTOR CO.

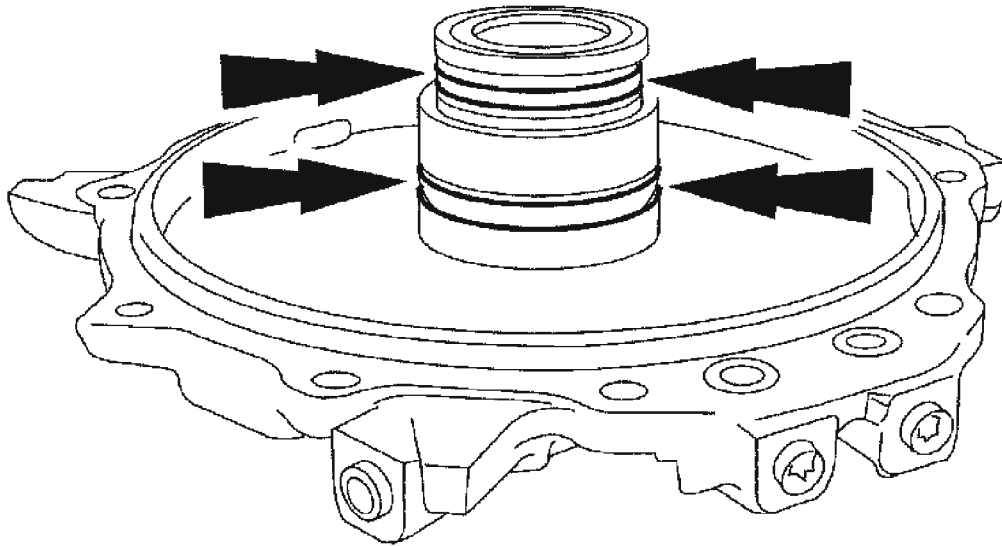
17. Clean the silicone from the end cover and transaxle case surfaces thoroughly with metal surface cleaner.
18. Remove the direct clutch hub bearing shim.



E0011842

Fig. 168: Removing Direct Clutch Hub Bearing Shim
Courtesy of FORD MOTOR CO.

19. Remove the end cover seals.



A0065151

Fig. 169: Removing End Cover Seals
Courtesy of FORD MOTOR CO.

20. Remove the end cover to case seals.

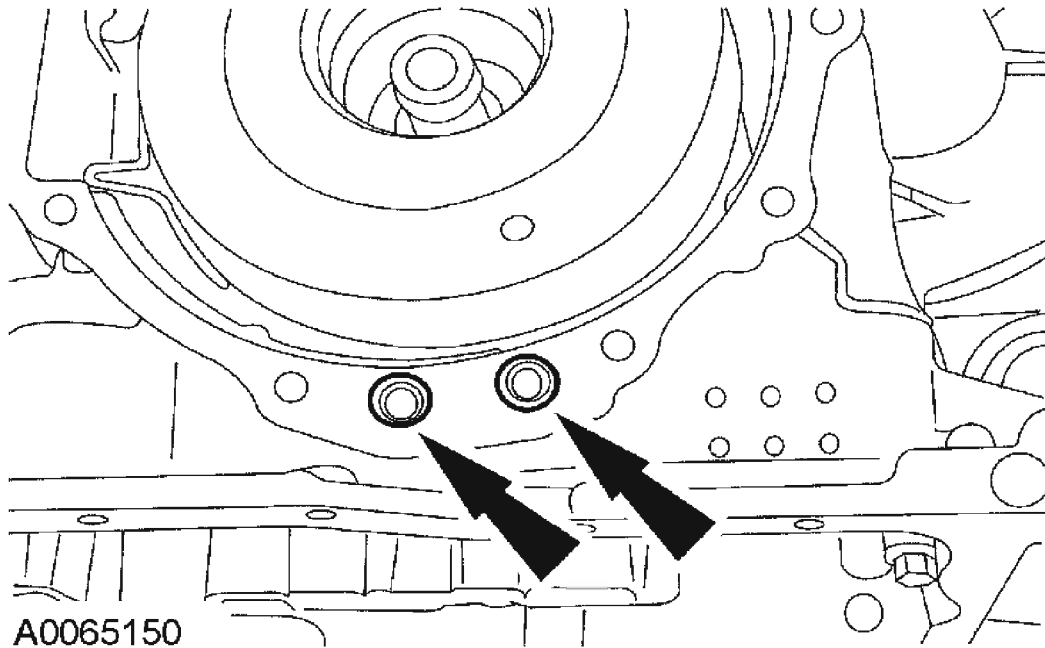


Fig. 170: Removing End Cover To Case Seals
Courtesy of FORD MOTOR CO.

21. Remove the direct clutch cylinder thrust bearing.

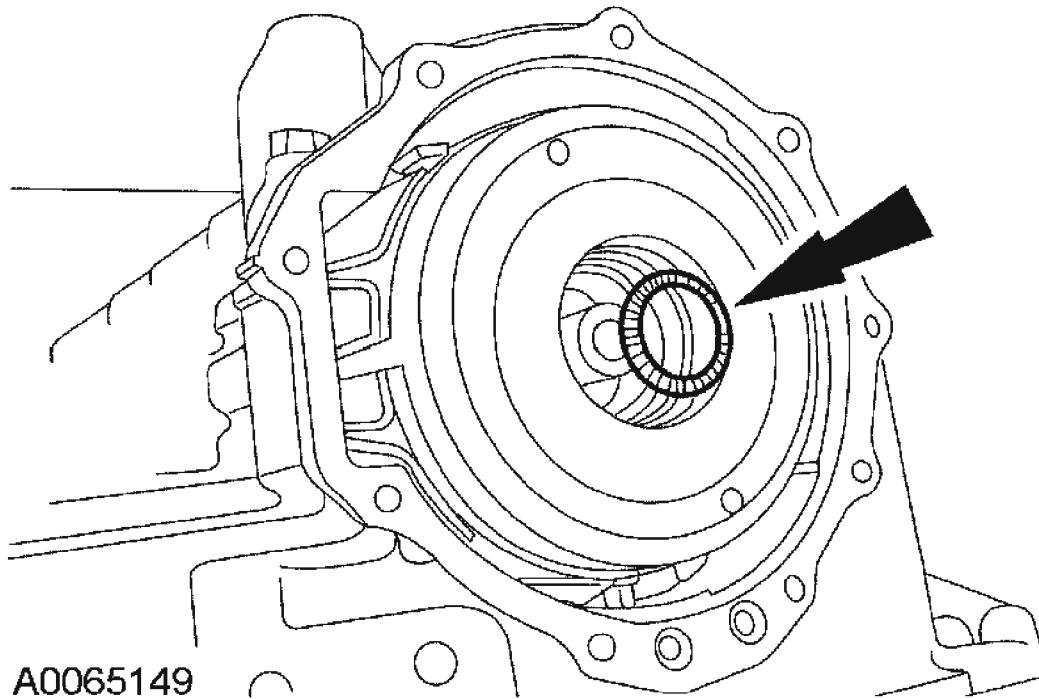


Fig. 171: Removing Direct Clutch Cylinder Thrust Bearing
Courtesy of FORD MOTOR CO.

22. Remove the intermediate/overdrive band anchor bolt.

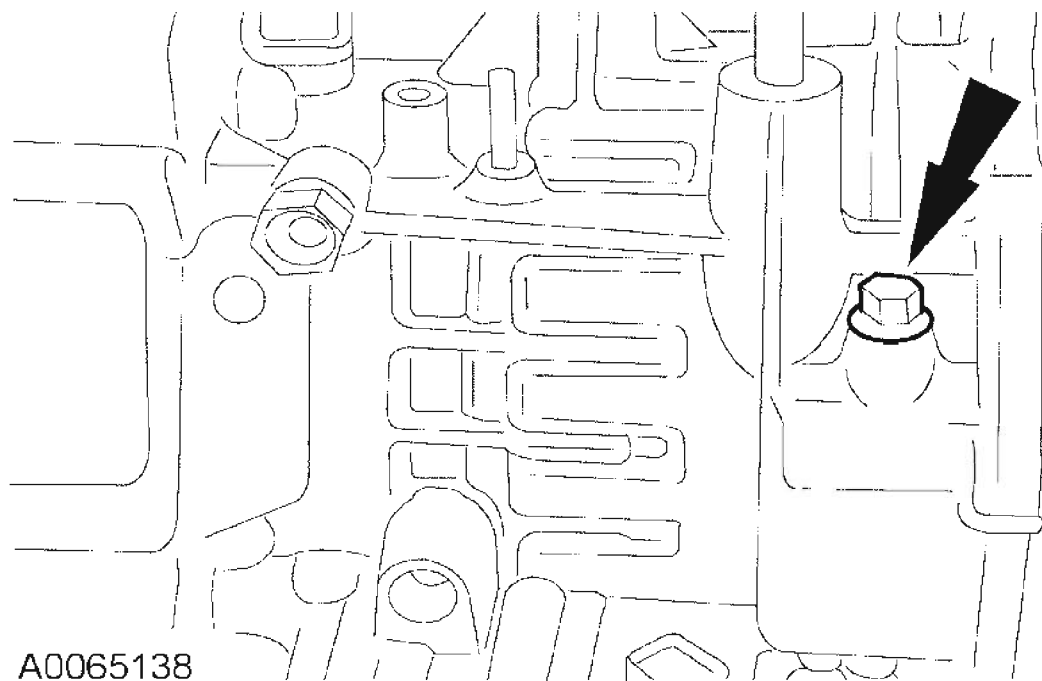
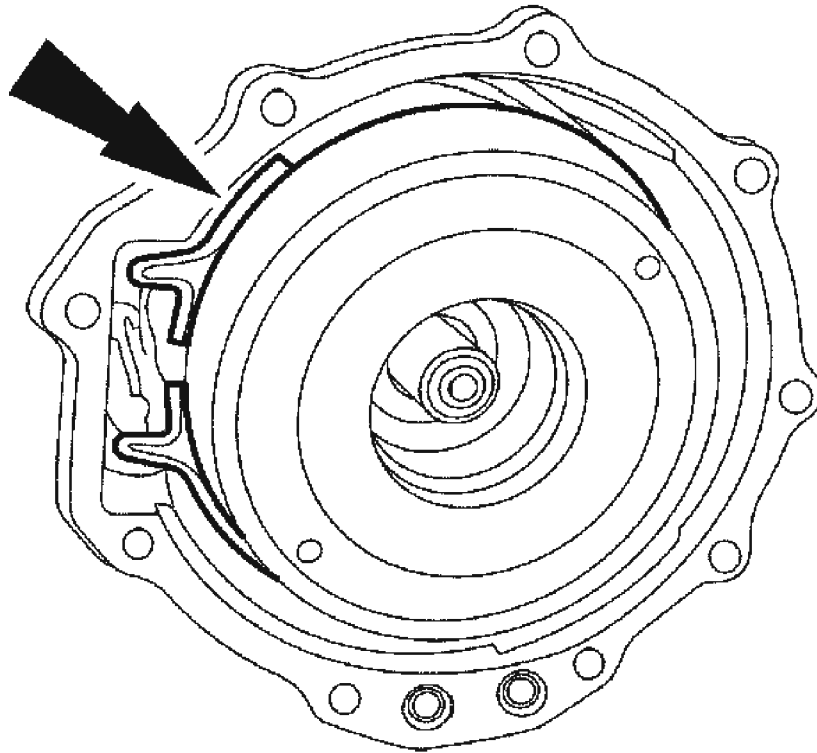


Fig. 172: Removing Intermediate/Overdrive Band Anchor Bolt
Courtesy of FORD MOTOR CO.

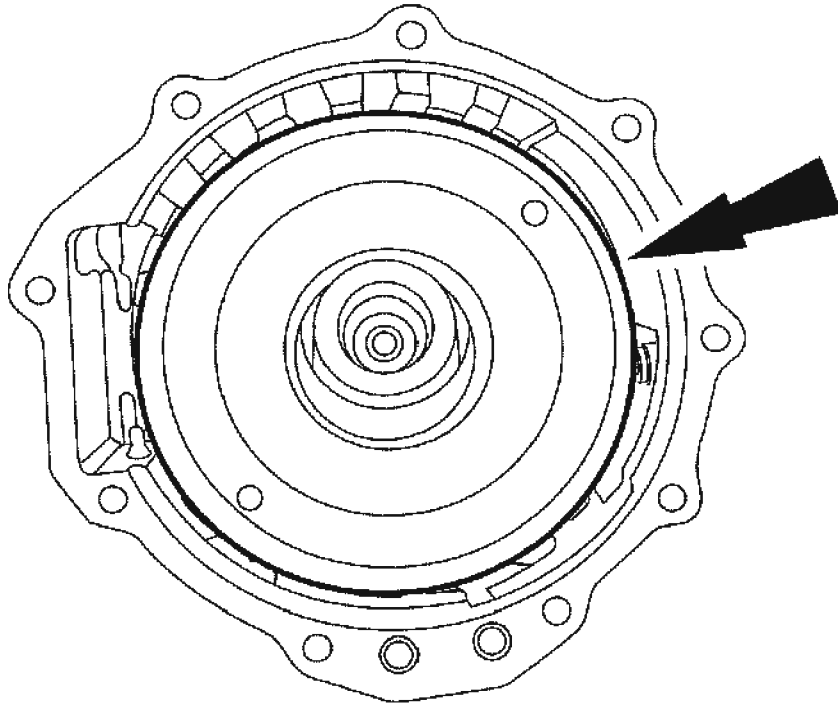
23. Remove the intermediate/overdrive band.



A0065139

Fig. 173: Removing Intermediate/Overdrive Band
Courtesy of FORD MOTOR CO.

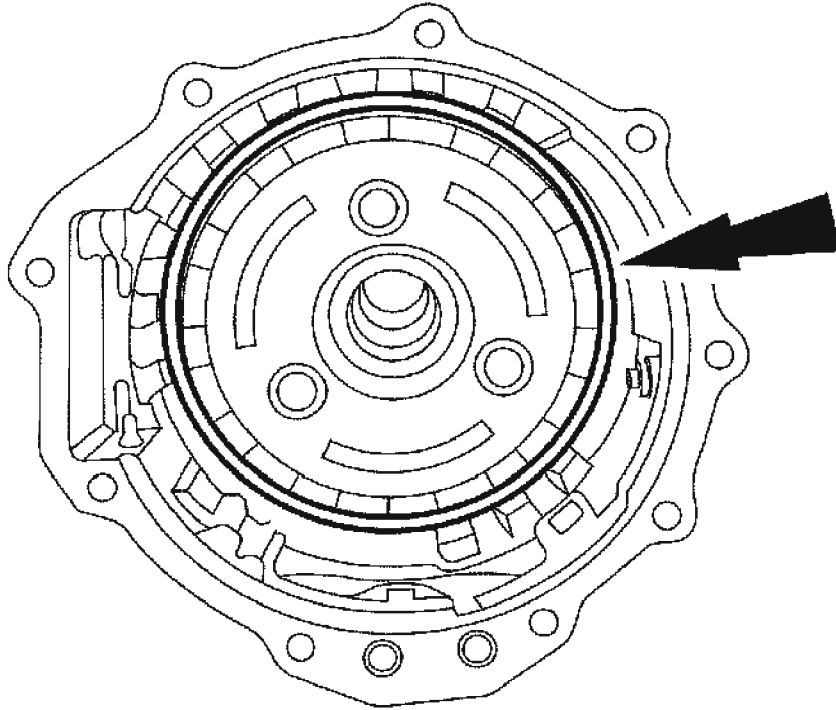
24. Remove the intermediate/overdrive drum assembly.



A0065075

Fig. 174: Removing Intermediate/Overdrive Drum Assembly
Courtesy of FORD MOTOR CO.

25. Remove the planet gear assembly.



A0065078

Fig. 175: Removing Planet Gear Assembly
Courtesy of FORD MOTOR CO.

26. Remove the low/reverse clutch plate retaining ring.

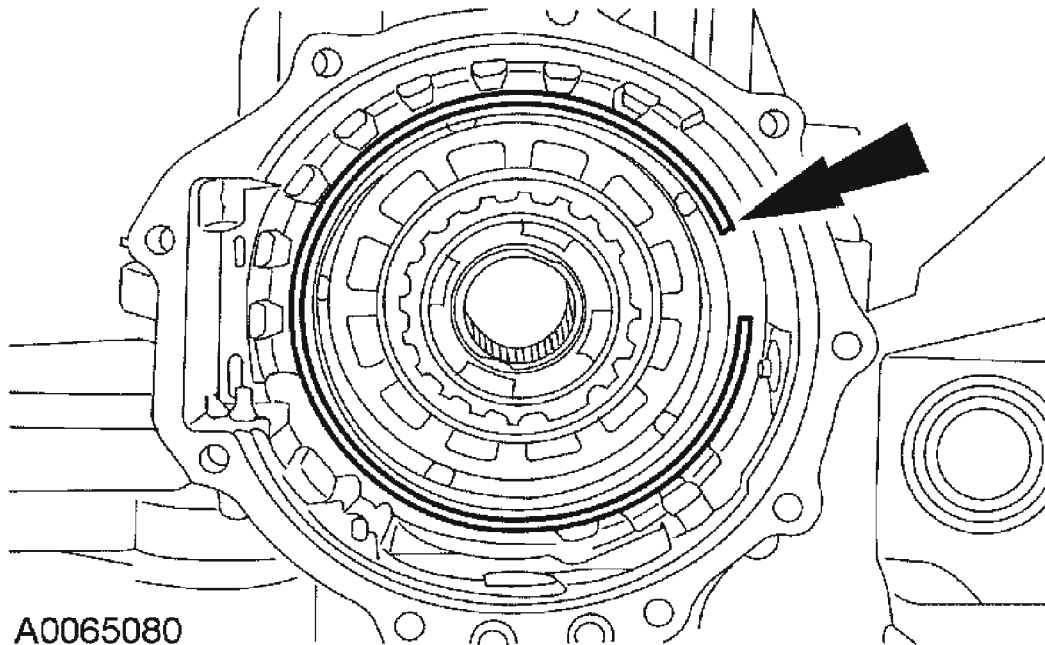
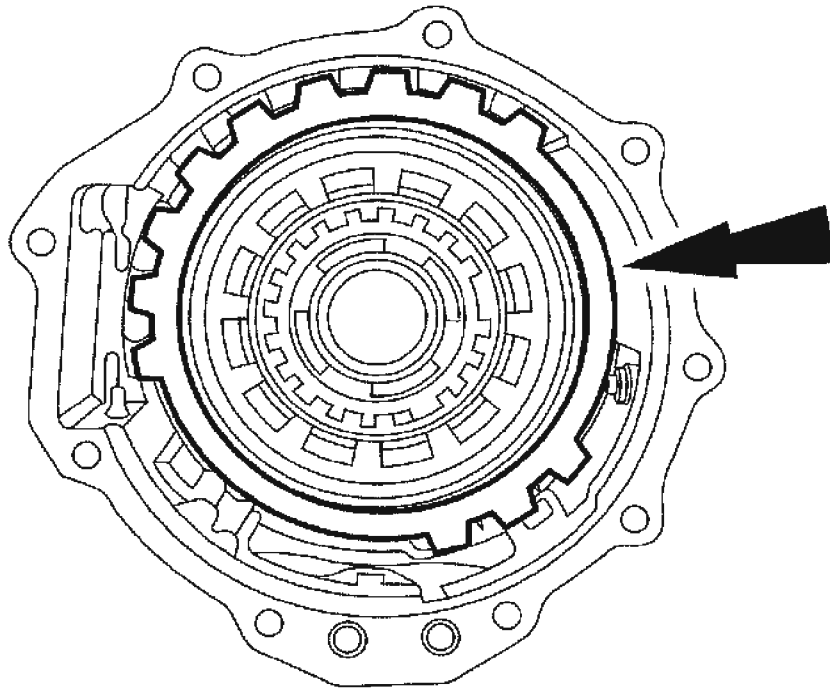


Fig. 176: Removing Low/Reverse Clutch Plate Retaining Ring
Courtesy of FORD MOTOR CO.

27. Remove the low/reverse clutch plates, pressure plate and bevel ring.



A0065081

Fig. 177: Removing Low/Reverse Clutch Plates, Pressure Plate And Bevel Ring
Courtesy of FORD MOTOR CO.

28. Remove the low one-way clutch retaining ring.

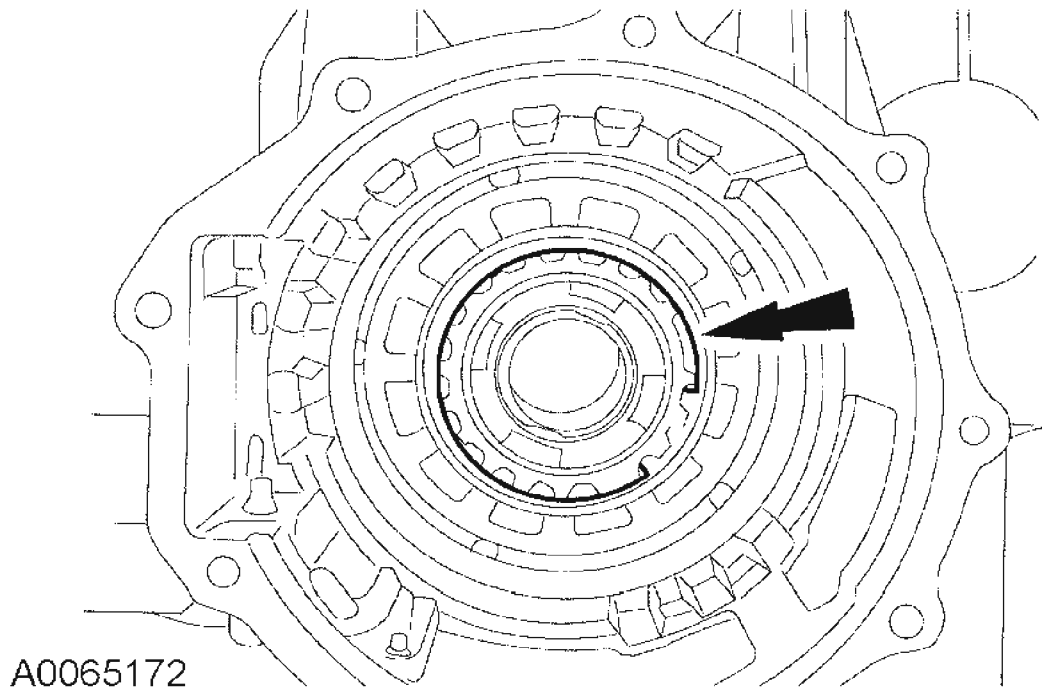
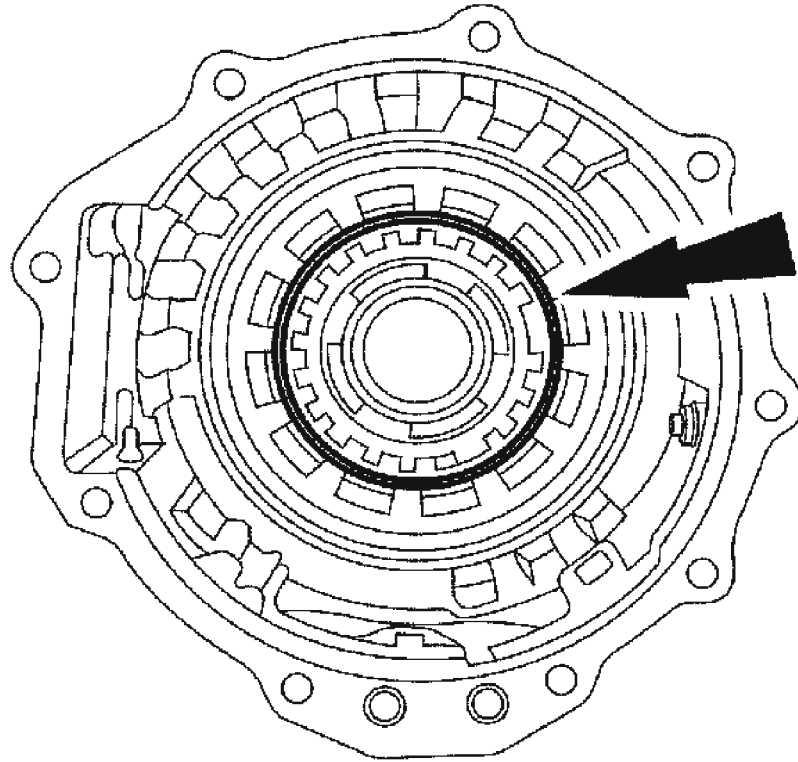


Fig. 178: Removing Low One-Way Clutch Retaining Ring
Courtesy of FORD MOTOR CO.

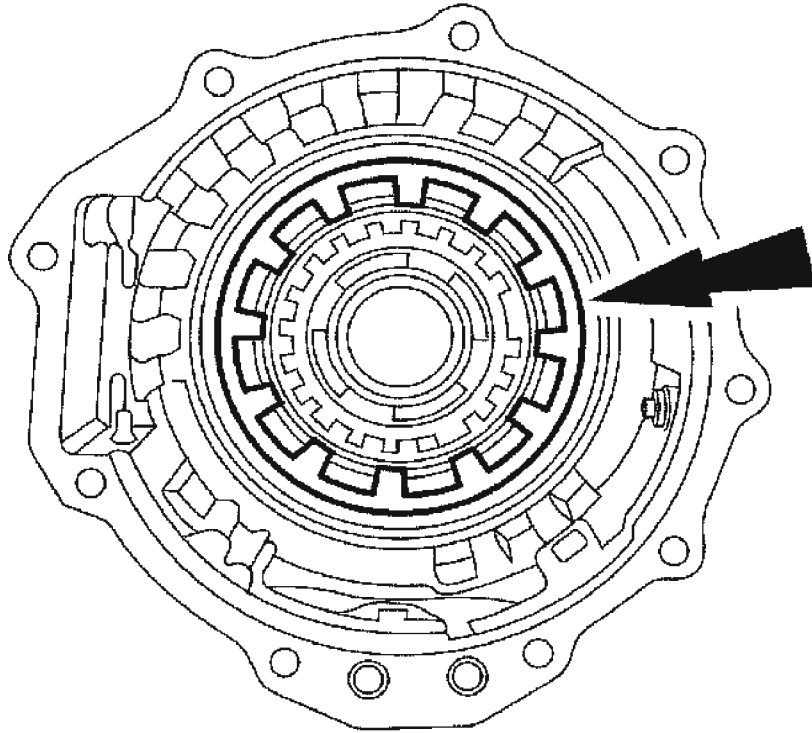
29. Remove the low one-way clutch inner race.



A0065173

Fig. 179: Removing Low One-Way Clutch Inner Race
Courtesy of FORD MOTOR CO.

30. Remove the low/reverse clutch return spring.



A0065174

Fig. 180: Removing Low/Reverse Clutch Return Spring
Courtesy of FORD MOTOR CO.

31. Remove the low/reverse clutch piston.

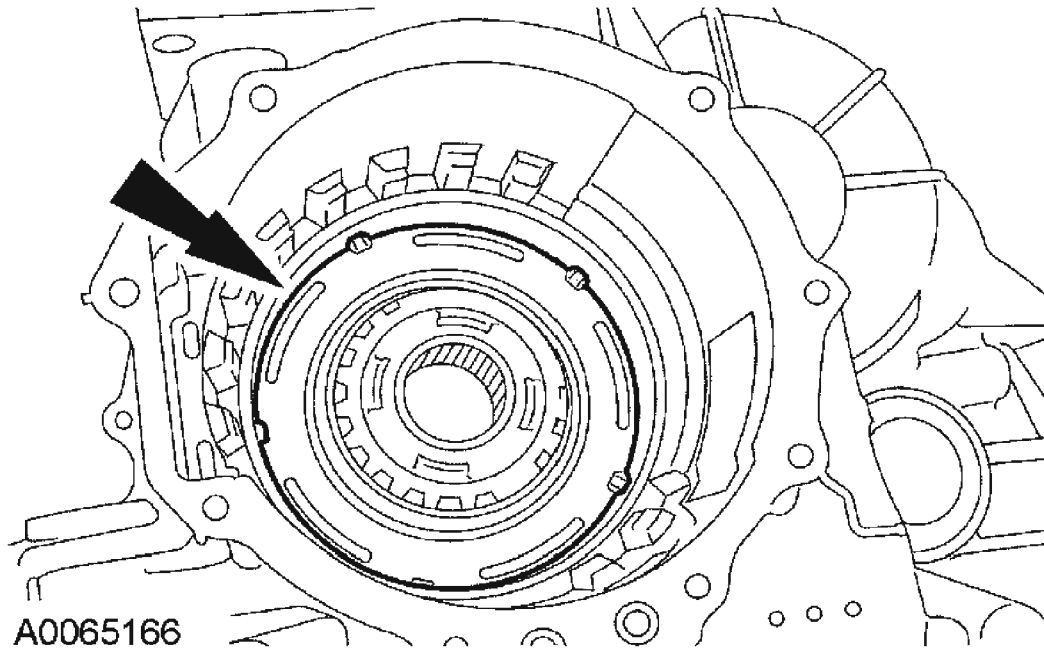
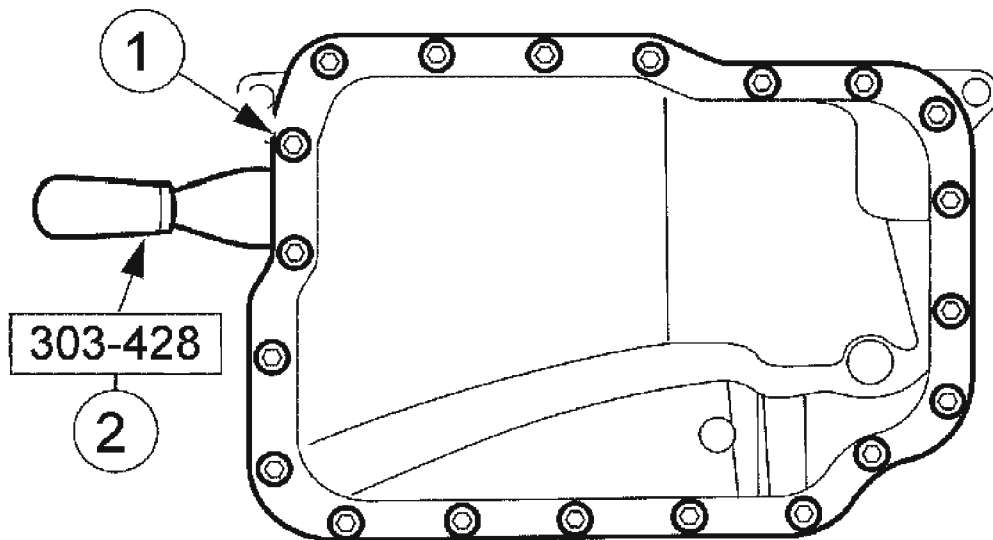


Fig. 181: Removing Low/Reverse Clutch Piston
Courtesy of FORD MOTOR CO.

32. Using the special tool, remove the transaxle fluid pan.
 1. Remove the bolts.
 2. Using the special tool, remove the transaxle fluid pan.



A0065082

Fig. 182: Removing Transaxle Fluid Pan Using Special Tool
Courtesy of FORD MOTOR CO.

33. Clean the silicone from the transaxle fluid pan and transaxle case surfaces thoroughly with metal surface cleaner.
34. Disconnect the transmission fluid temperature (TFT) sensor.

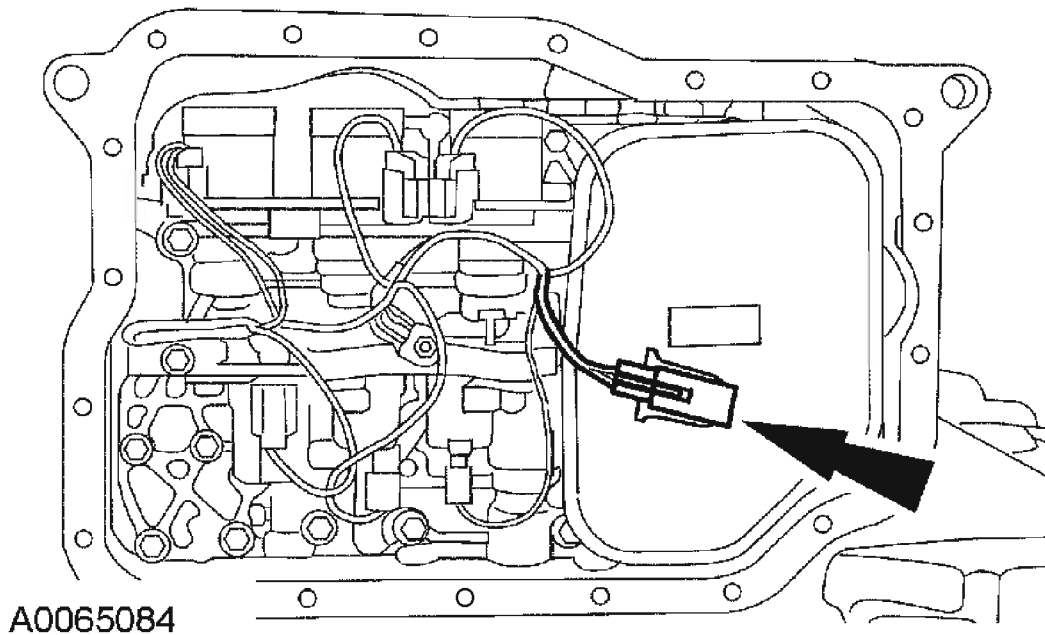


Fig. 183: Disconnecting Transmission Fluid Temperature (TFT) Sensor
Courtesy of FORD MOTOR CO.

35. Remove the fluid filter.

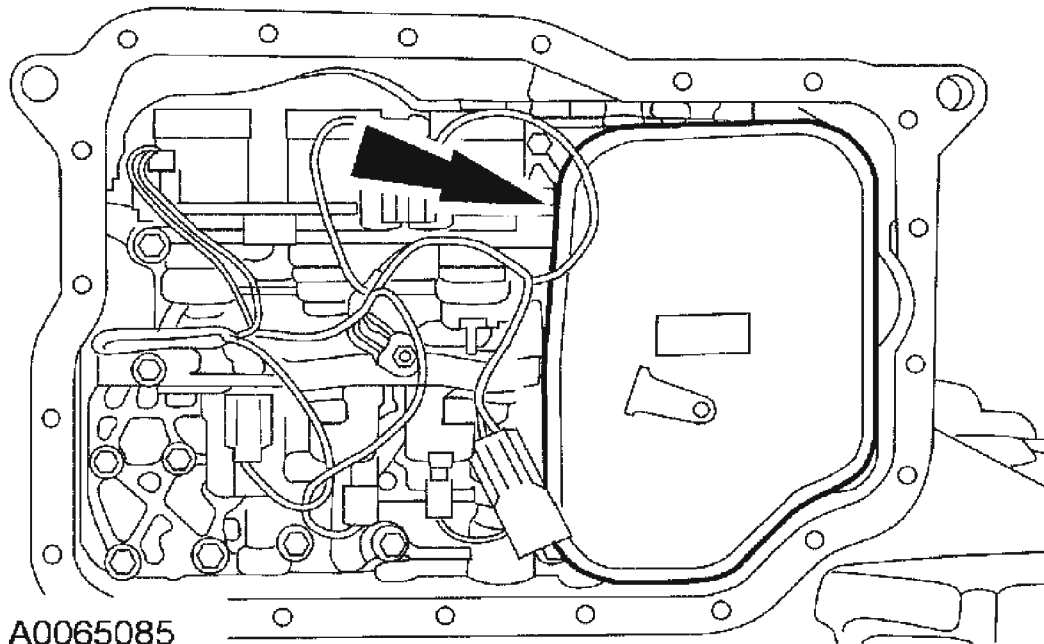


Fig. 184: Removing Fluid Filter
Courtesy of FORD MOTOR CO.

NOTE: It is necessary to note the location of the main control wire harness connectors so they can be connected in the same positions. Connector color letters are cast into the solenoid body.

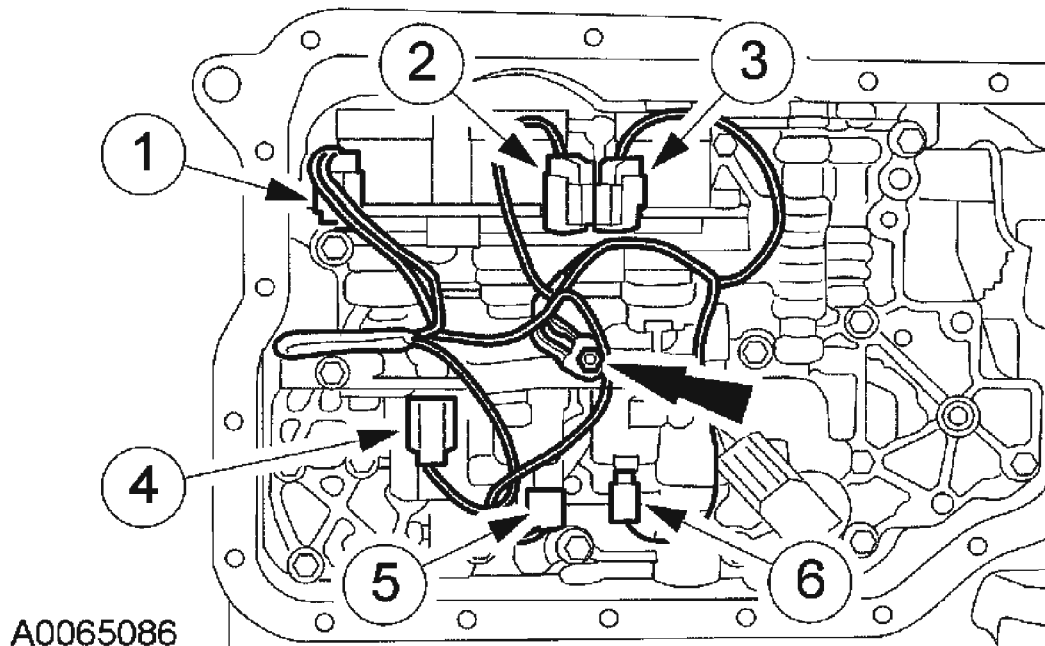


Fig. 185: Removing Ground Wire Bolt, Disconnecting Electrical Connectors And Removing Wire Harness
Courtesy of FORD MOTOR CO.

36. Remove the ground wire bolt, disconnect the electrical connectors and remove the wire harness.
1. Solenoid SSC; Color N (Neutral).
 2. Solenoid SSE; Color G (Green).
 3. Solenoid SSD; Color L (Blue).
 4. Solenoid EPC; Color B (Black).
 5. Solenoid SSA; Color N (Neutral).
 6. Solenoid SSB; Color B (Black).

NOTE: Note the locations of the longer bolts.

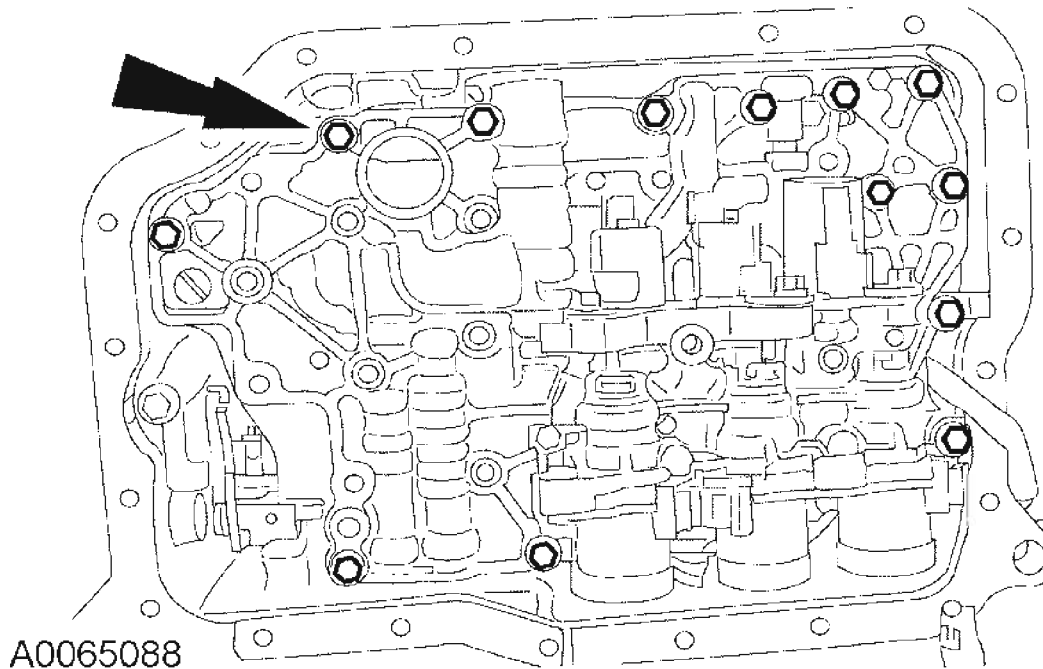


Fig. 186: Removing 13 Main Control Valve Body Bolts
Courtesy of FORD MOTOR CO.

37. Remove the 13 main control valve body bolts.

NOTE: **Squeeze the tabs on the side of the electrical connector.**

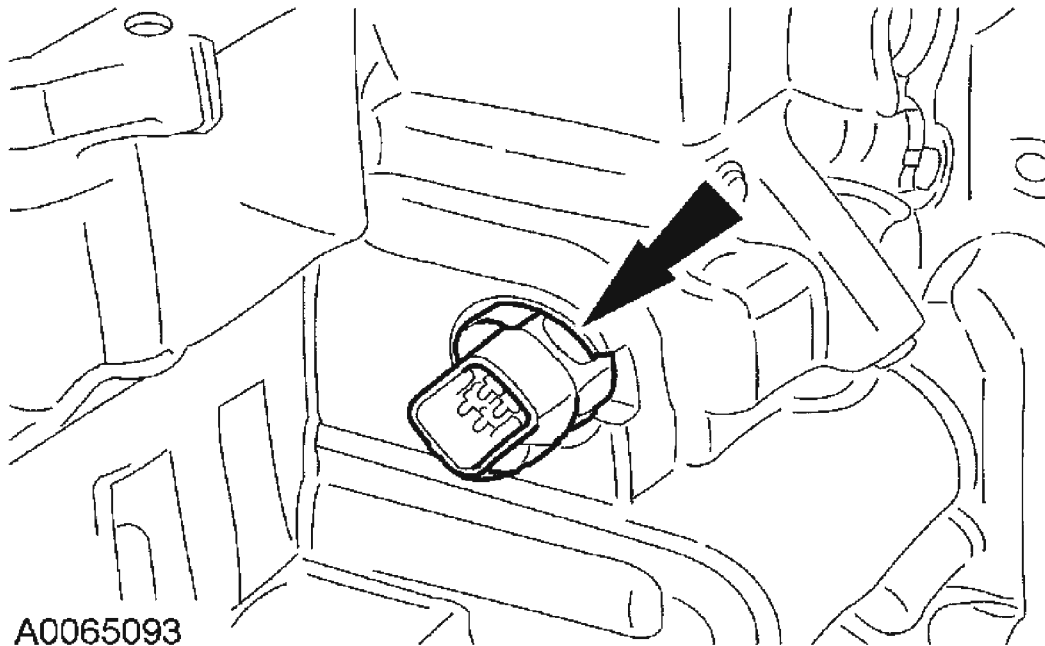


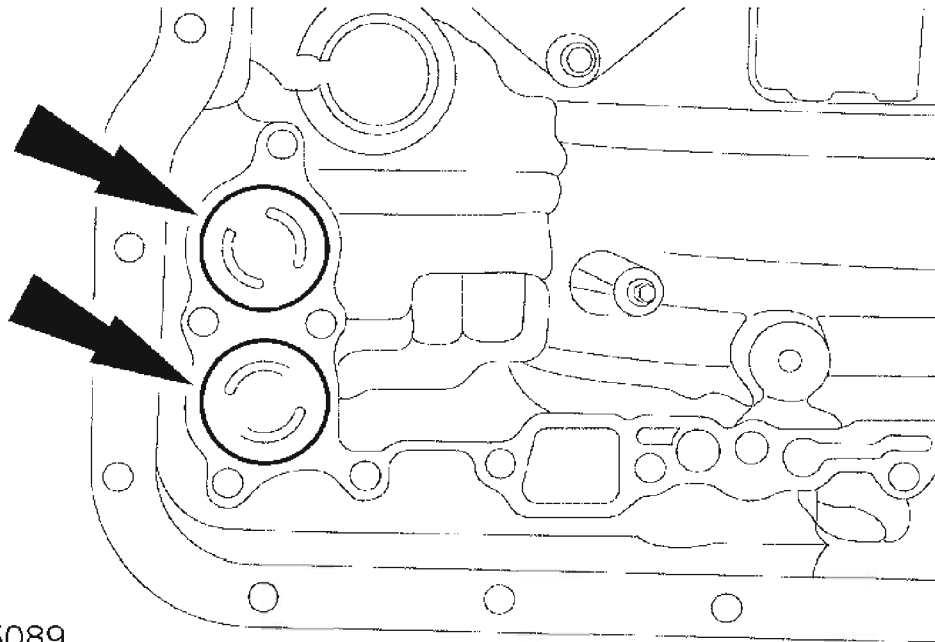
Fig. 187: Removing Transaxle Internal Harness Electrical Connector
Courtesy of FORD MOTOR CO.

38. Remove the transaxle internal harness electrical connector.

NOTE: Each accumulator has two springs. All four springs are different sizes.

NOTE: Note the size and location of the accumulator springs to aid assembly.

NOTE: Accumulator bore and pistons are a match as to depth, some piston may have steps. Install new pistons in the same bore as removed.



A0065089

Fig. 188: Removing Accumulator Pistons And Springs
Courtesy of FORD MOTOR CO.

39. Remove the accumulator pistons and springs.
40. Remove the manual lever shaft roll pin.

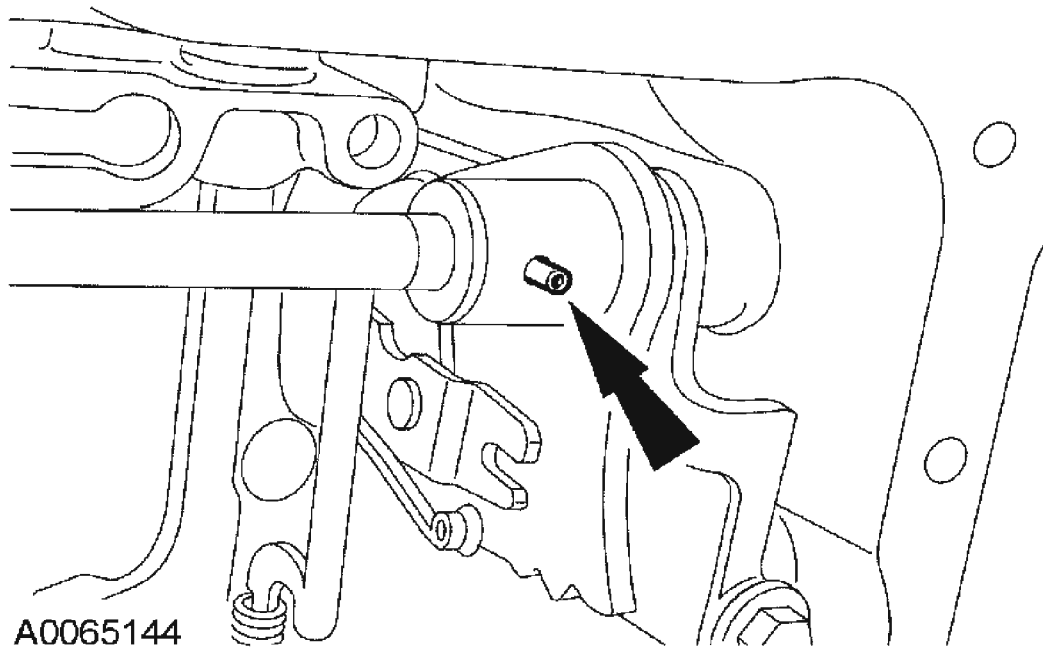


Fig. 189: Removing Manual Lever Shaft Roll Pin
Courtesy of FORD MOTOR CO.

41. Remove the manual lever shaft.

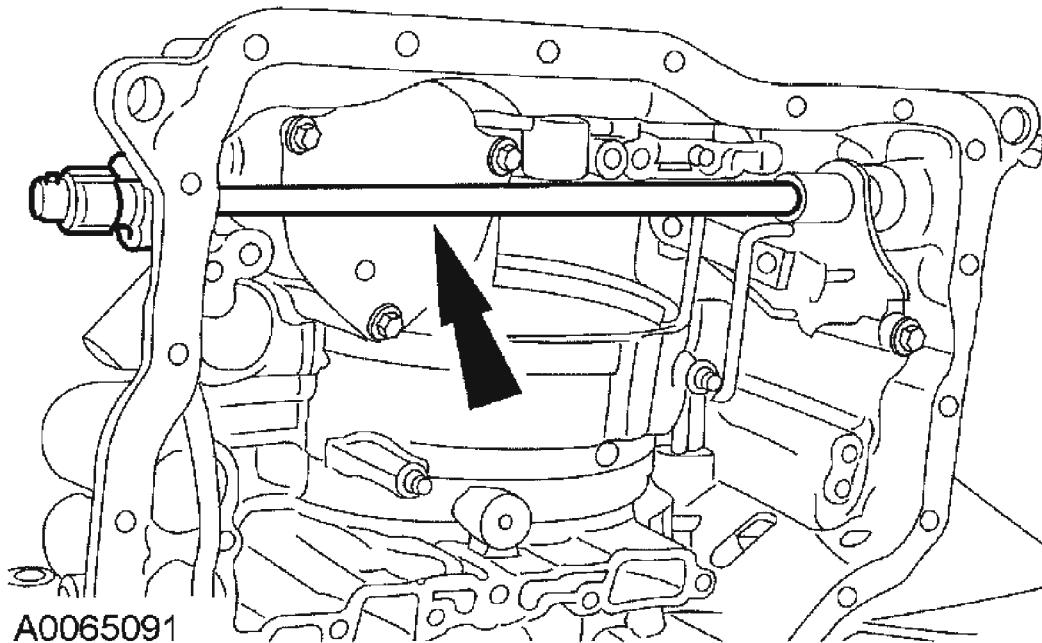


Fig. 190: Removing Manual Lever Shaft
Courtesy of FORD MOTOR CO.

42. Remove the O-ring seals from the manual lever shaft.



A0065143

Fig. 191: Removing O-Ring Seals From Manual Lever Shaft
Courtesy of FORD MOTOR CO.

43. Remove the control lever assembly.

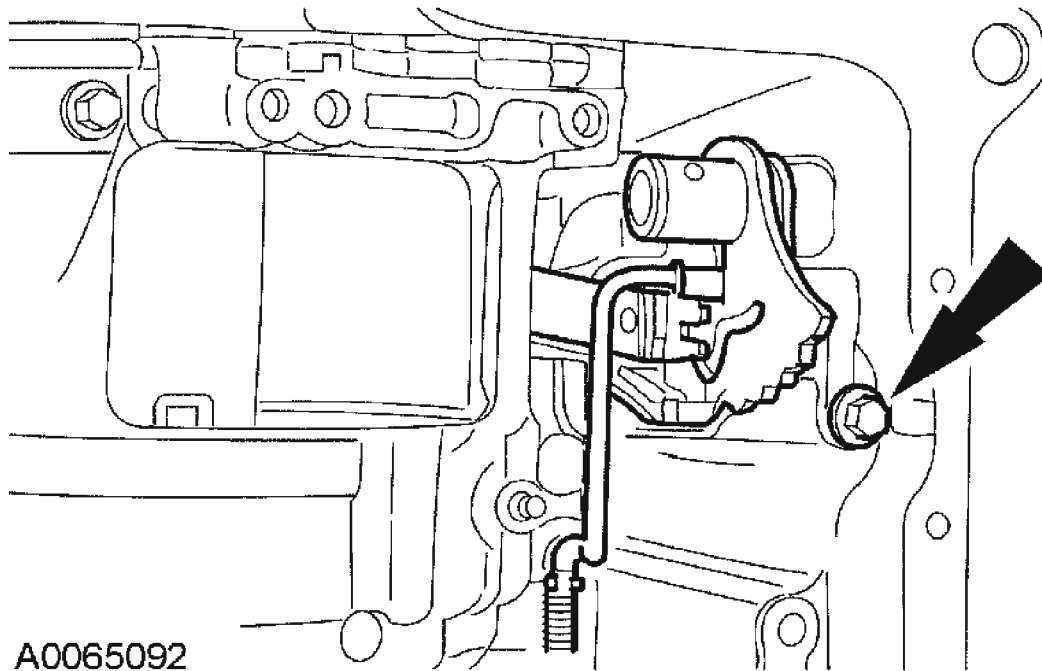


Fig. 192: Removing Control Lever Assembly
Courtesy of FORD MOTOR CO.

CAUTION: The intermediate/overdrive band servo cover plate is spring loaded. The bolts should be removed evenly until plate is unloaded, then remove the bolts.

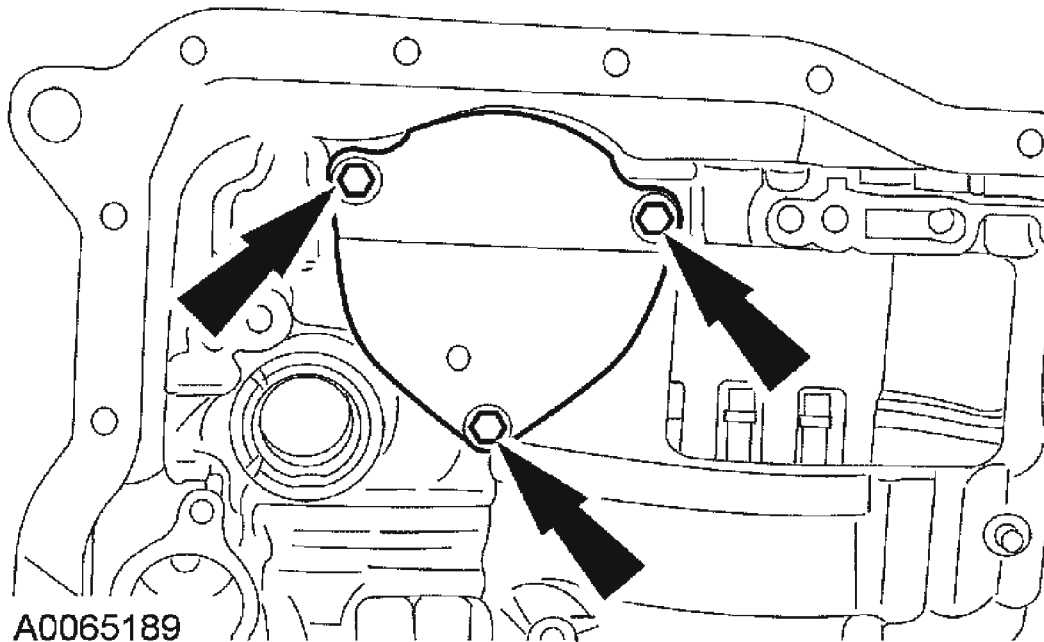


Fig. 193: Removing Three Intermediate/Overdrive Piston Servo Cover Bolts And Servo Cover

Courtesy of FORD MOTOR CO.

44. Remove the three intermediate/overdrive piston servo cover bolts and the servo cover.
45. Remove the O-ring seal.

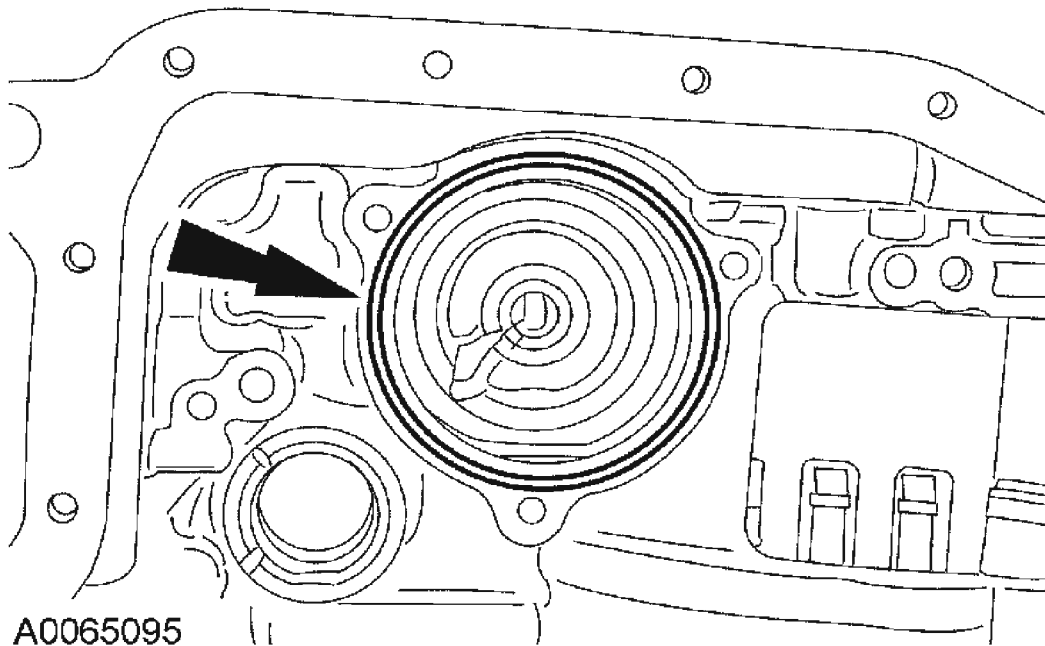


Fig. 194: Removing O-Ring Seal
Courtesy of FORD MOTOR CO.

46. Remove the intermediate/overdrive servo piston.

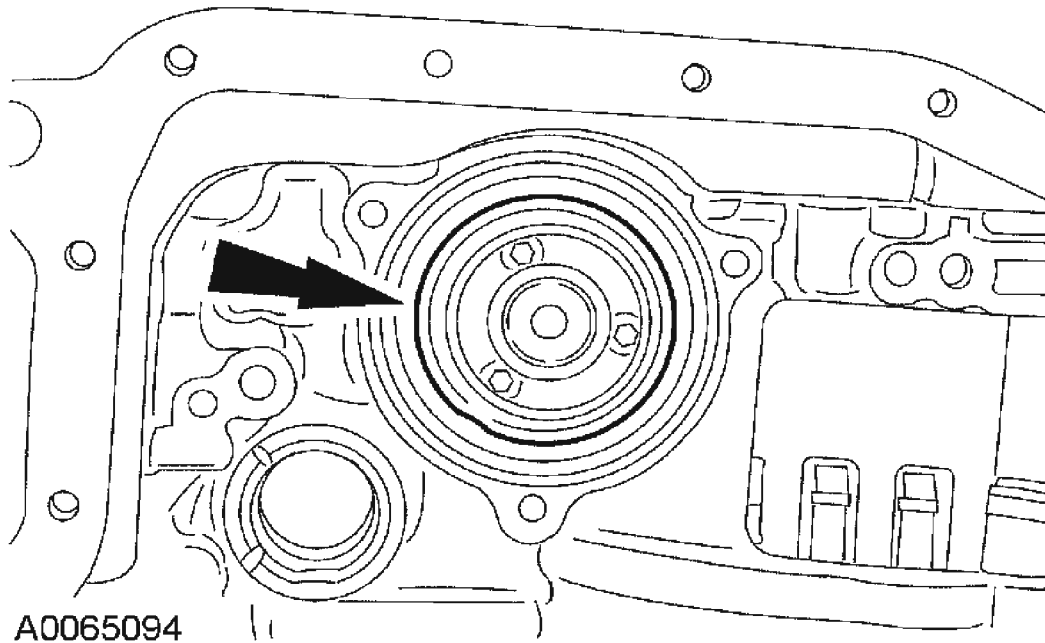


Fig. 195: Removing Intermediate/Overdrive Servo Piston
Courtesy of FORD MOTOR CO.

47. Remove the intermediate/overdrive servo piston return spring.

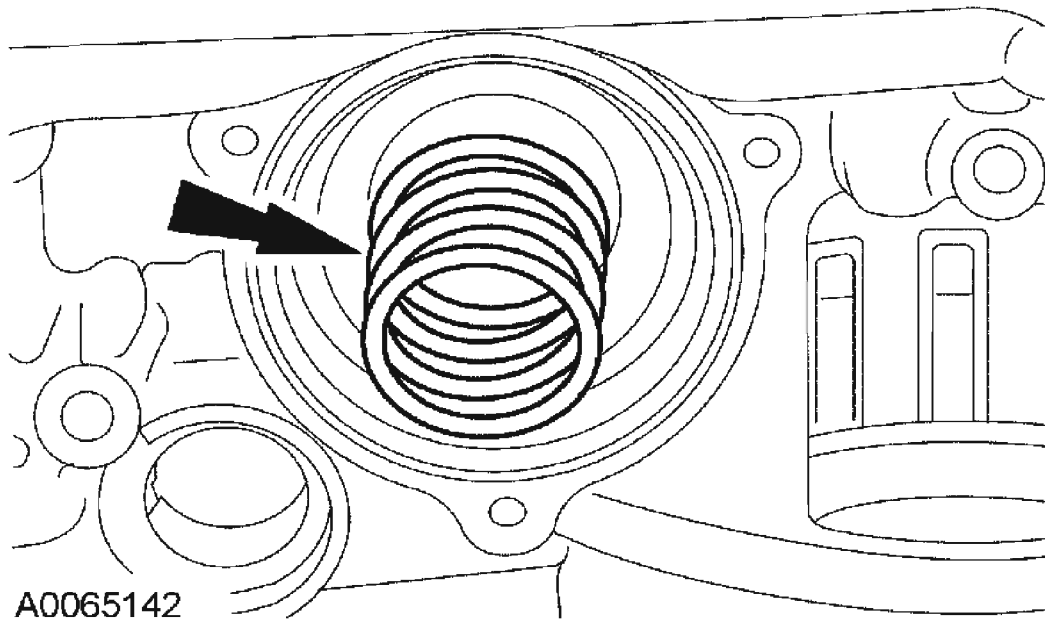


Fig. 196: Removing Intermediate/Overdrive Servo Piston Return Spring
Courtesy of FORD MOTOR CO.

48. Rotate the transaxle 180 degrees.
49. Remove the bolts and separate the converter housing from the transaxle case.

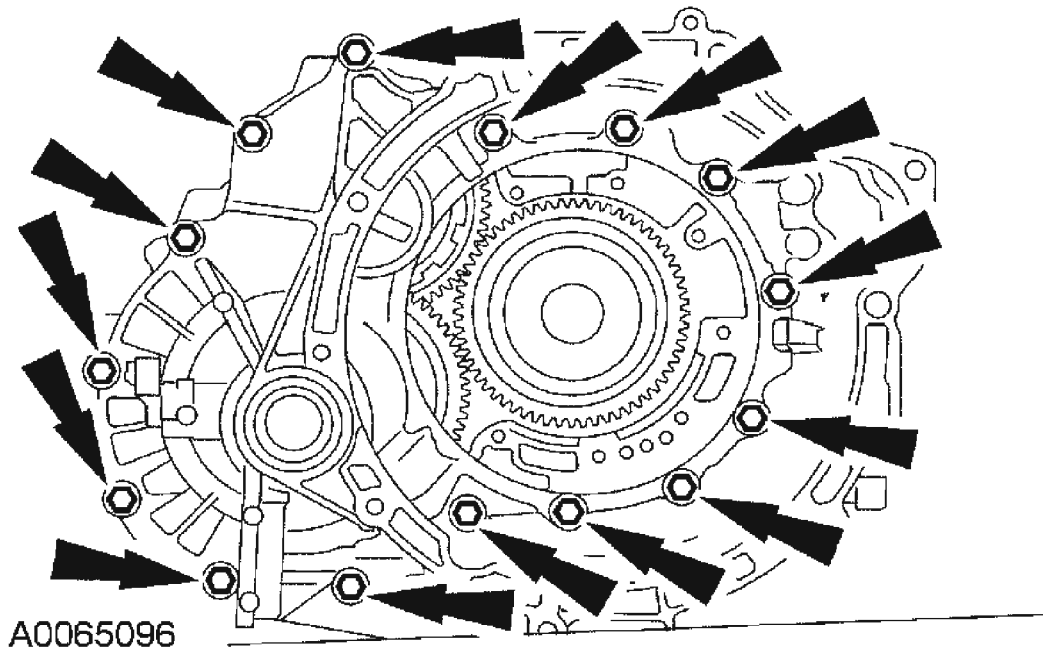


Fig. 197: Removing Bolts And Separate Converter Housing From Transaxle Case
Courtesy of FORD MOTOR CO.

50. Remove the differential assembly.

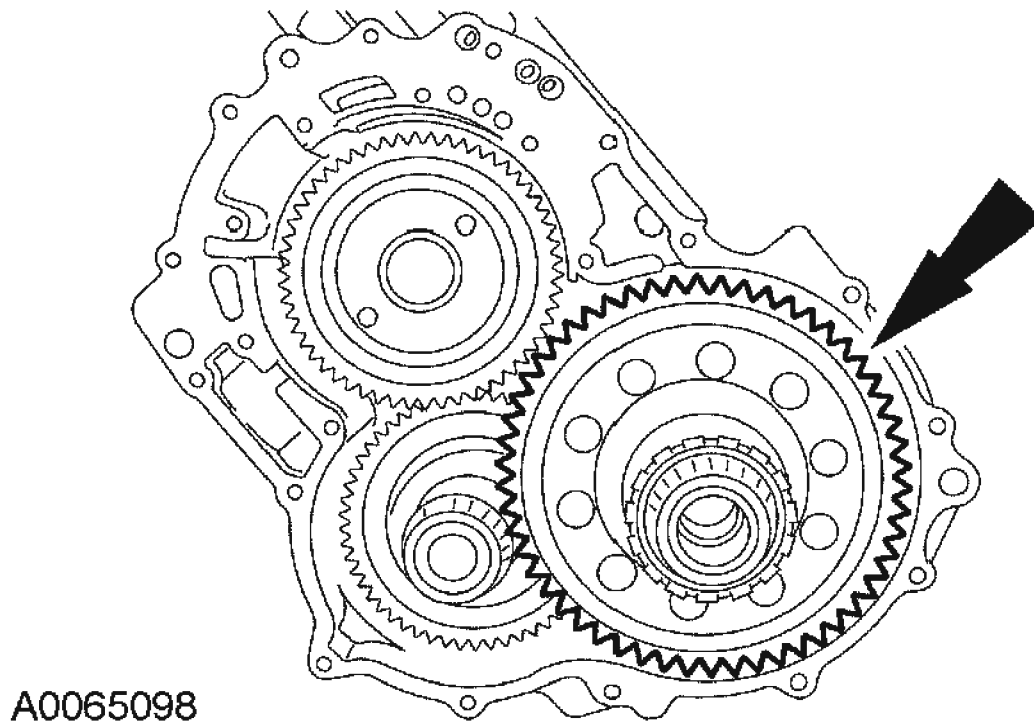
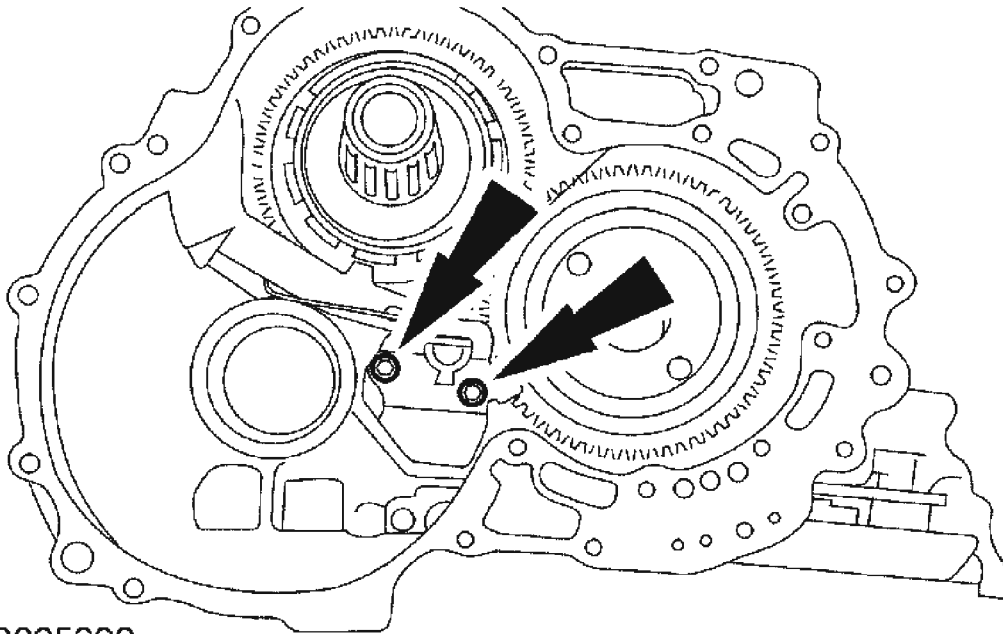


Fig. 198: Removing Differential Assembly
Courtesy of FORD MOTOR CO.

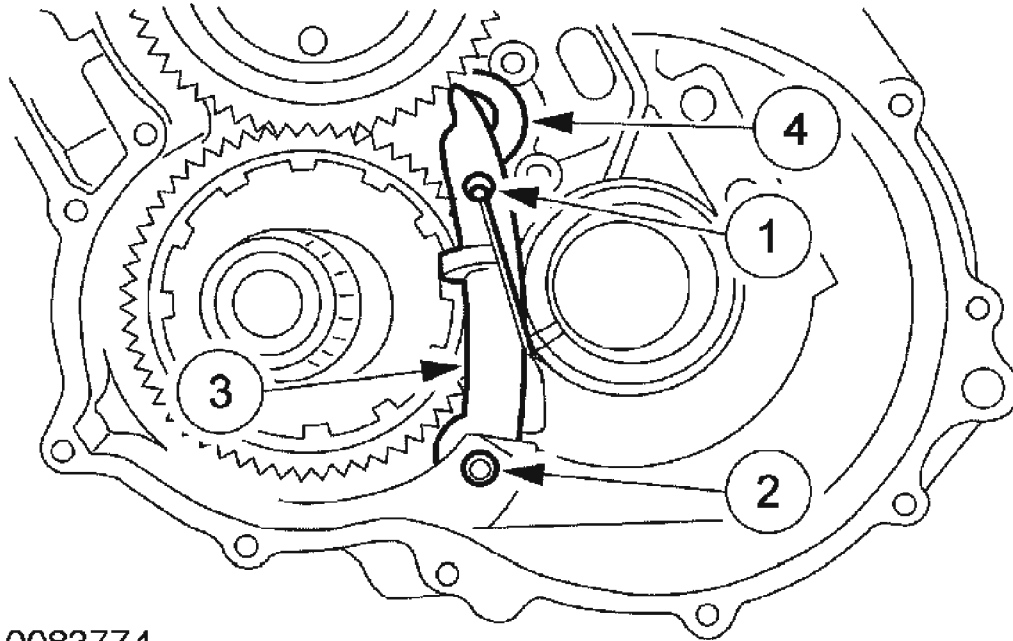
51. Remove the parking pawl assembly cover.
 - Remove the bolts and the parking pawl assembly cover.



A0065232

Fig. 199: Removing Bolts And Parking Pawl Assembly Cover
Courtesy of FORD MOTOR CO.

52. Remove the parking pawl abutment.
 1. Unclip the spring.
 2. Remove the pin.
 3. Remove the lever.
 4. Remove the parking pawl abutment.



A0083774

Fig. 200: Removing Parking Pawl Abutment
Courtesy of FORD MOTOR CO.

53. Remove the spring.

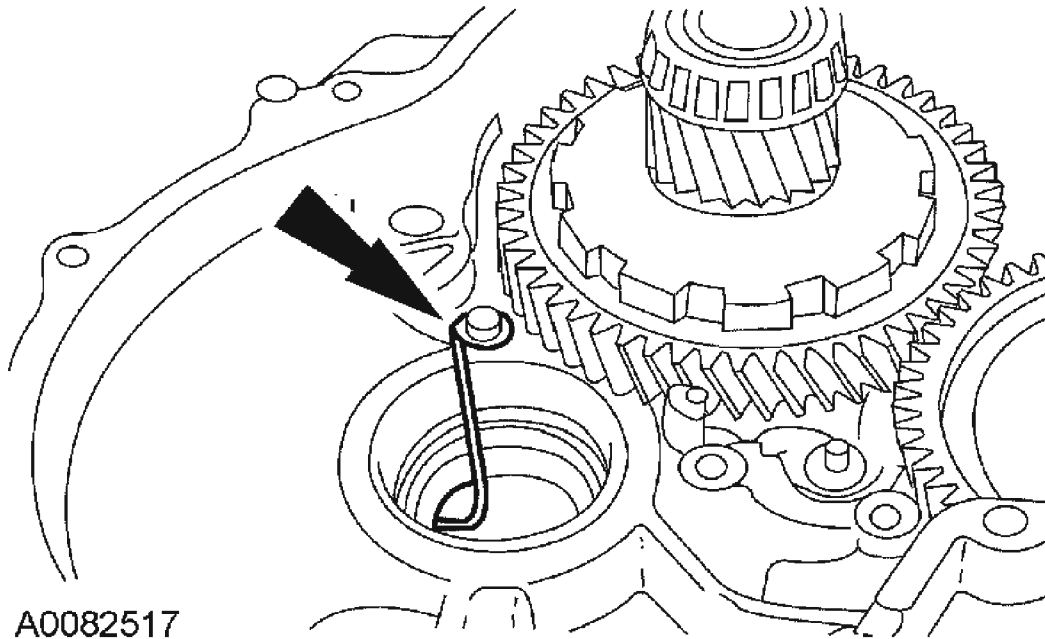
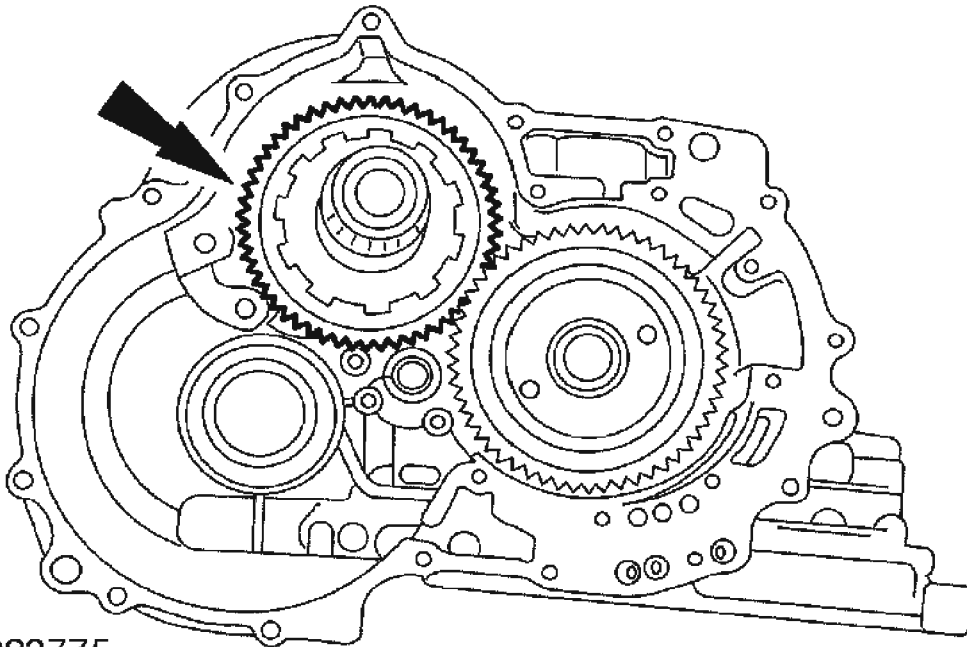


Fig. 201: Removing Spring
Courtesy of FORD MOTOR CO.

54. Remove the transfer shaft gears.



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Fig. 202: Removing Transfer Shaft Gears
Courtesy of FORD MOTOR CO.

55. Using the special tool, lock the final drive input gear.

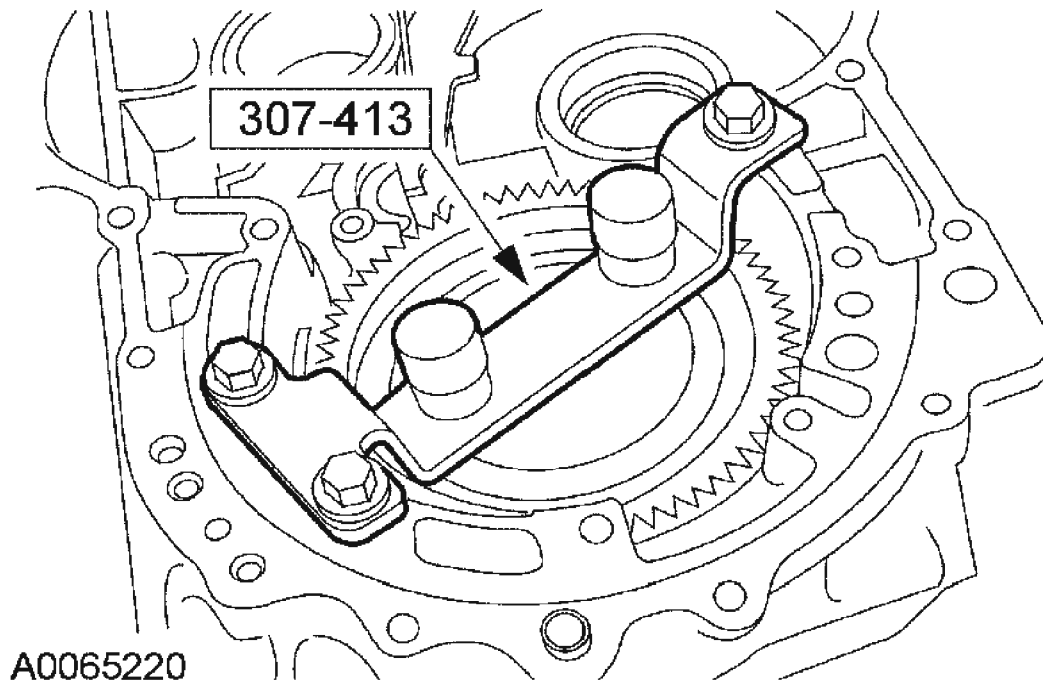


Fig. 203: Using Special Tool To Lock Final Drive Input Gear
Courtesy of FORD MOTOR CO.

56. Rotate the transaxle 180 degrees.

NOTE: Release the locking sleeve away from the final drive input gear bearing retainer nut.

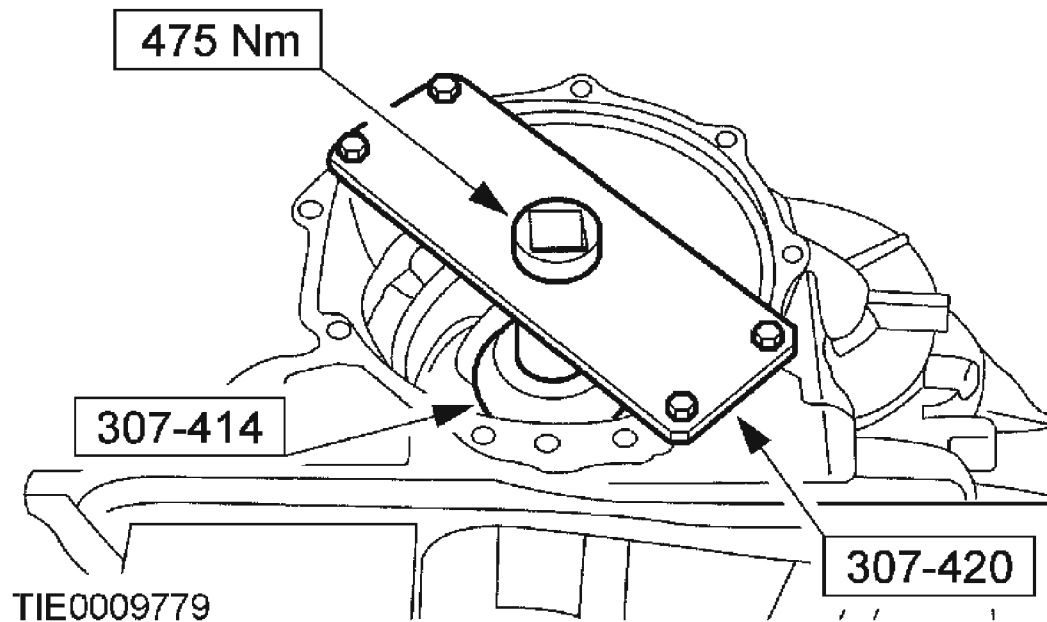


Fig. 204: Removing Final Drive Input Gear Bearing Retainer Nut Using Special Tool
Courtesy of FORD MOTOR CO.

57. Using the special tools, remove the final drive input gear bearing retainer nut.
58. Remove the special tools.
59. Rotate the transaxle 180 degrees.
60. Remove the special tool.

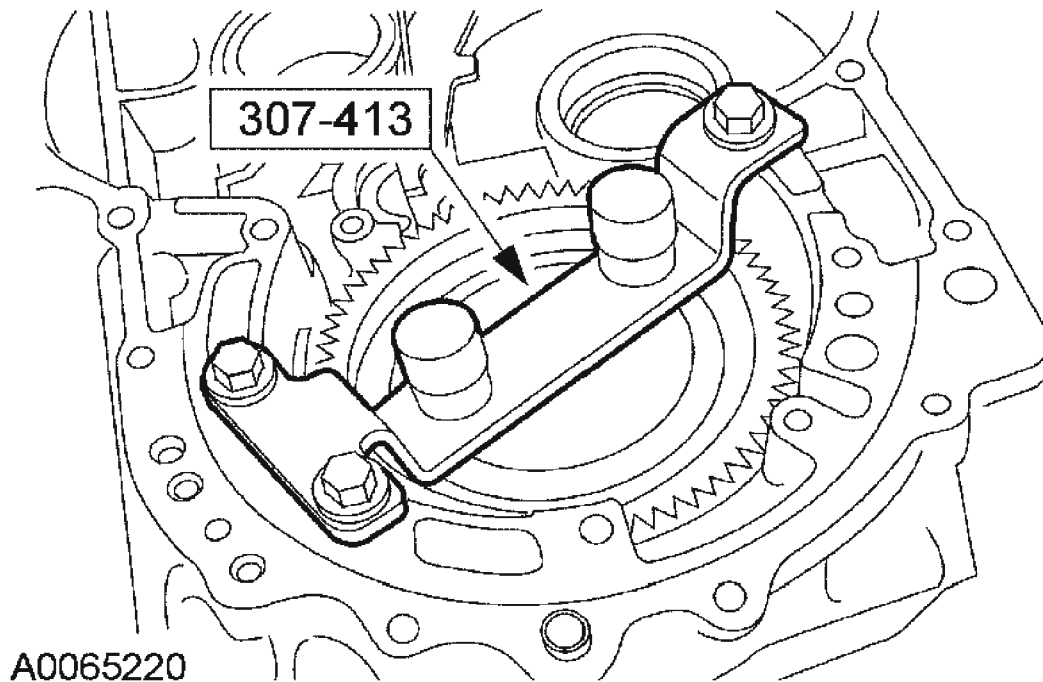


Fig. 205: Removing Special Tools From Final Drive Input
Courtesy of FORD MOTOR CO.

CAUTION: Hold the final drive input gear while removing the bearing to prevent it from falling out of the transaxle case.

61. Rotate the transaxle 180 degrees.
62. Remove the final drive input gear bearing by lightly tapping on the end of the gear.

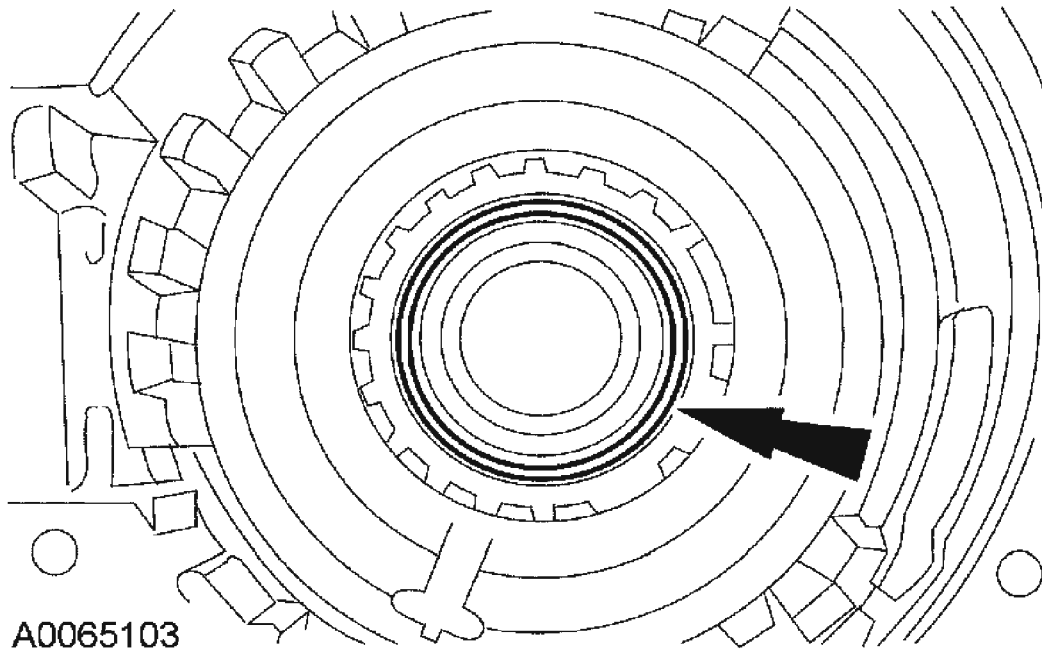
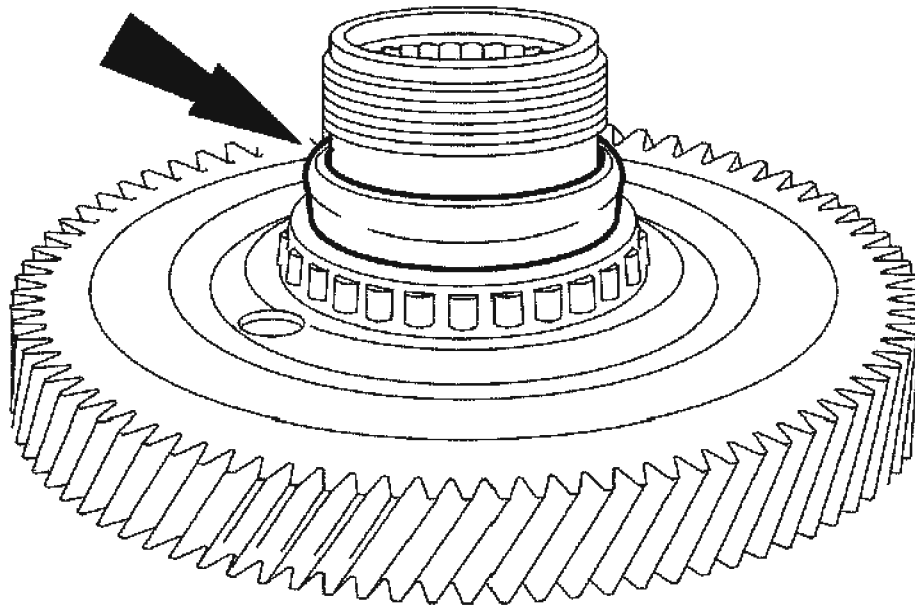


Fig. 206: Removing Final Drive Input Gear Bearing
Courtesy of FORD MOTOR CO.

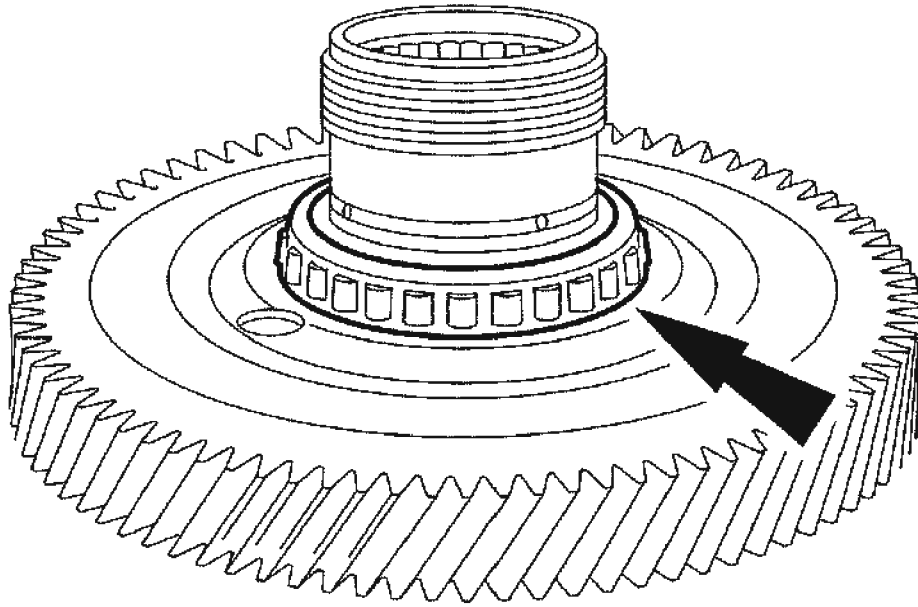
63. Remove and discard the collapsible spacer.



A0065191

Fig. 207: Removing Collapsible Spacer
Courtesy of FORD MOTOR CO.

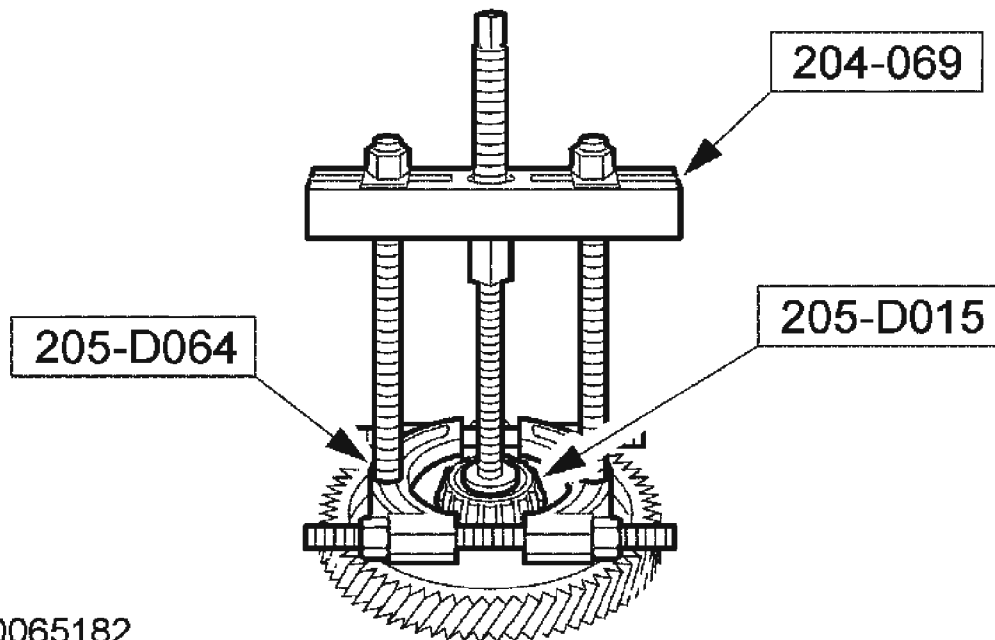
WARNING: Wear eye protection when working with the chisel as the cutting operation may produce splinters. Failure to follow this instruction may result in personal injury.



A0065190

Fig. 208: Removing Final Drive Input Gear Bearing Using Special Tool
Courtesy of FORD MOTOR CO.

64. Using a suitable chisel, remove the final drive input gear bearing.
65. Using the special tools, remove the final drive input gear bearing inner race.



A0065182

Fig. 209: Removing Final Drive Input Gear Bearing Inner Race Using Special Tool
Courtesy of FORD MOTOR CO.

66. Clean the converter housing and transaxle case surfaces thoroughly with metal surface cleaner.

DISASSEMBLY AND ASSEMBLY OF SUBASSEMBLIES

FINAL DRIVE CARRIER AND DIFFERENTIAL ASSEMBLY

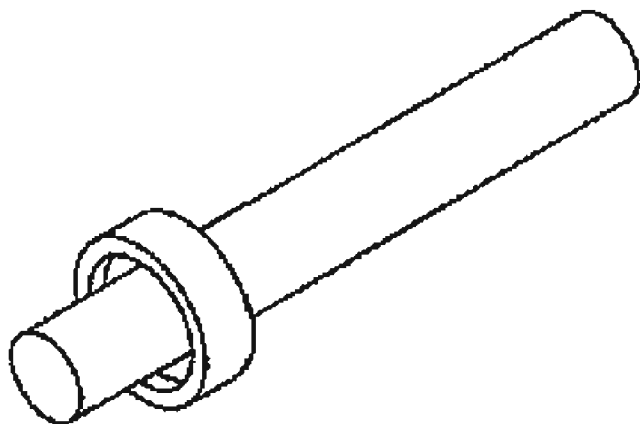
Special Tool(s)

SPECIAL TOOL SPECIFICATION

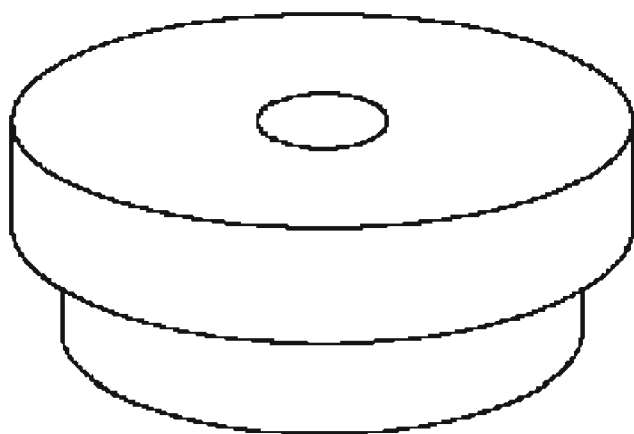
Installer Differential Bearing 205-062
(15-025A)

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



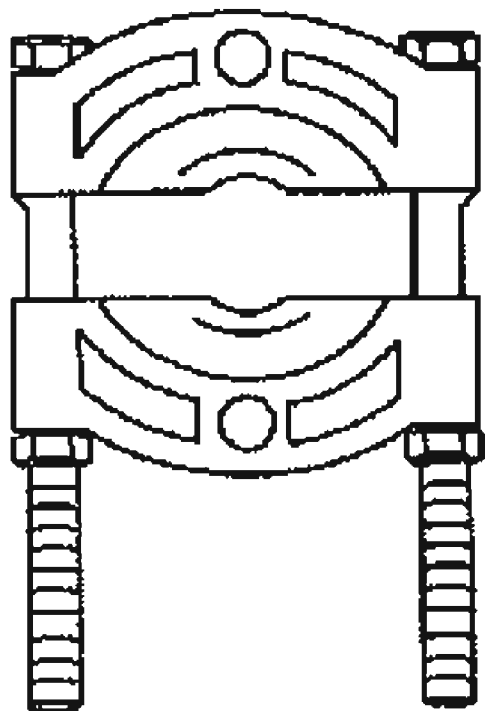
15025A



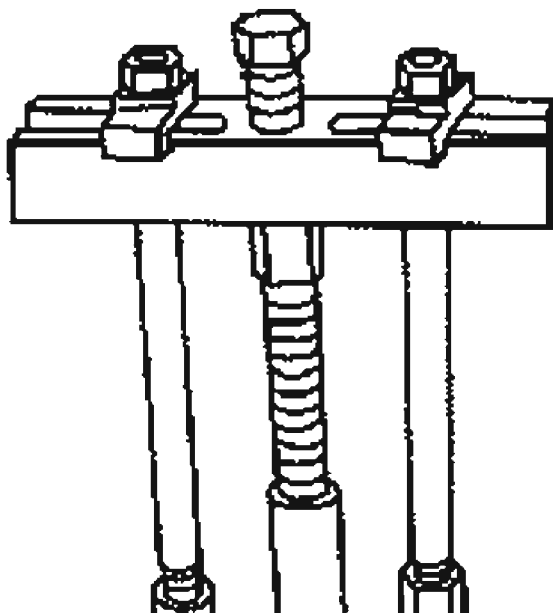
ST2762A

Step Plate 205-D015 (T80L-630-4)

Bearing Puller 205-D064 (D84L-1123-A)



ST2785-A



Remover/Installer, Front Wheel Hub
204-069 (T81P-1104-C)

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus

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Material

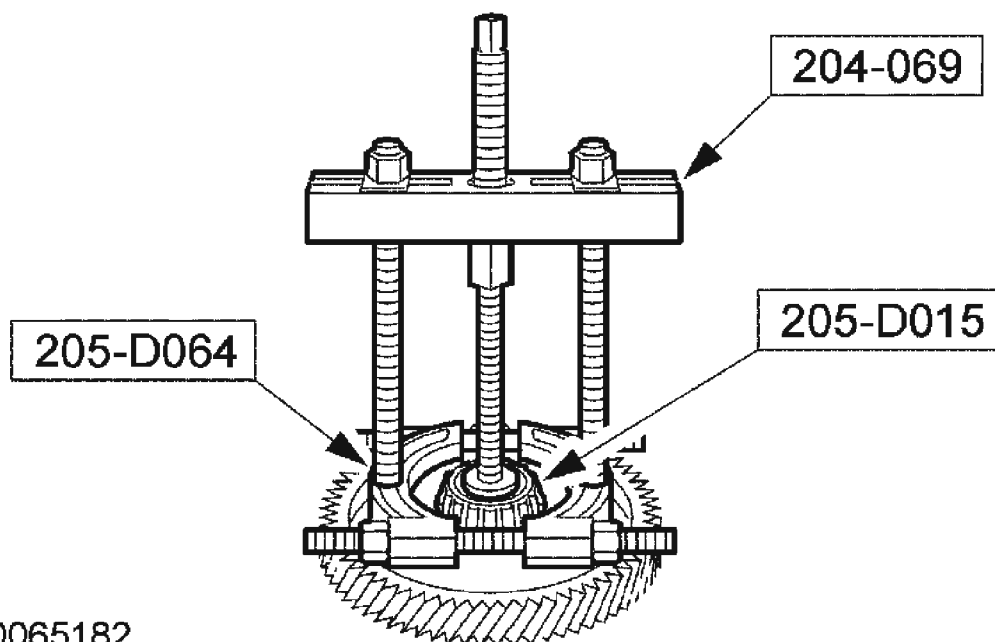
MATERIAL SPECIFICATION

Item	Specification
Automatic Transmission Fluid XT-5-QM	MERCON® V

Disassembly

NOTE: Left-hand side shown, right-hand side similar.

NOTE: Do not damage the speed sensor wheel.



A0065182

Fig. 210: Removing Differential Case Bearings Using Special Tools
Courtesy of FORD MOTOR CO.

1. Using the special tools, remove the differential case bearings.

NOTE: The roll pin cannot be driven through the housing.

NOTE: Note the location of the indent left by the flag on the roll pin.

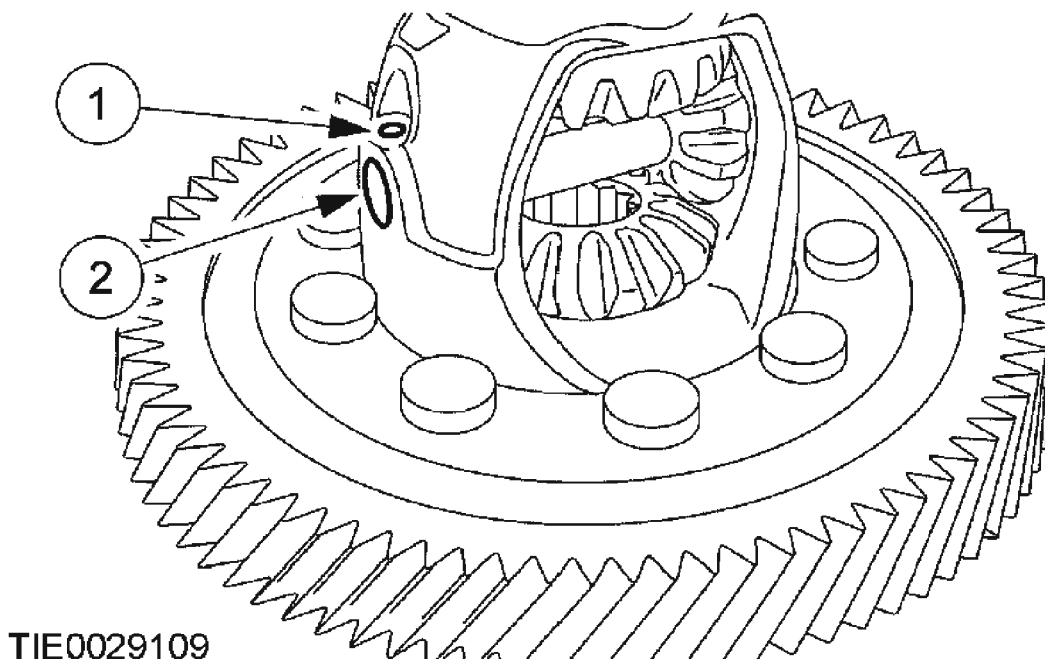
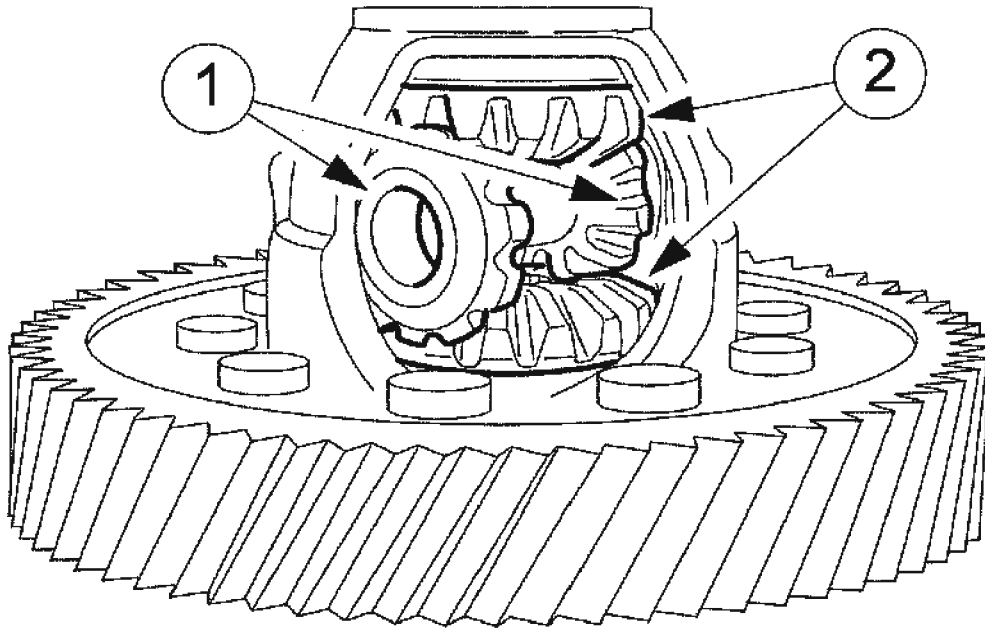


Fig. 211: Removing Differential Pinion Shaft
Courtesy of FORD MOTOR CO.

2. Remove the differential pinion shaft.
 1. Remove and discard the roll pin.
 2. Remove the pinion shaft.
3. Remove the differential side gears.
 1. Rotate the differential pinion gears 90 degrees and remove the differential pinion gears with the thrust washers.
 2. Remove the differential side gears with the thrust washers.



A0065194

Fig. 212: Removing Differential Side Gears
Courtesy of FORD MOTOR CO.

4. Clean all parts thoroughly in clean solvent and blow dry with moisture-free regulated compressed air.
5. Inspect the differential parts of damage and wear.
 - Pinion gear teeth and bores
 - Side gear teeth and five splines
 - Thrust washers
 - Differential pinion shaft
 - Differential case bearing and surfaces

Assembly

1. Lubricate the gears and thrust washers with clean automatic transmission fluid.

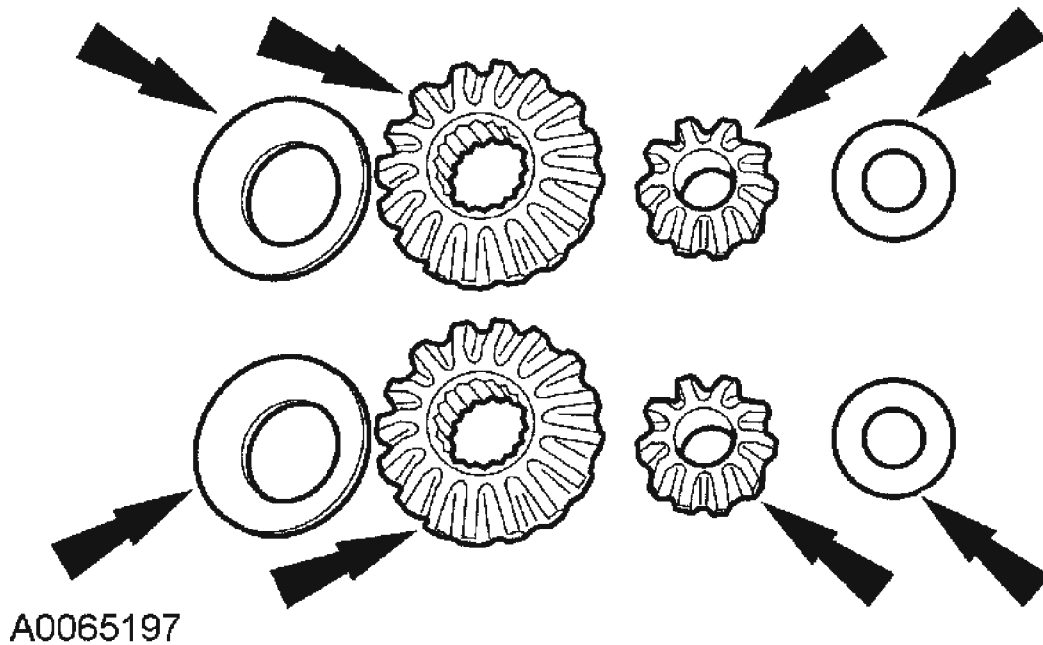
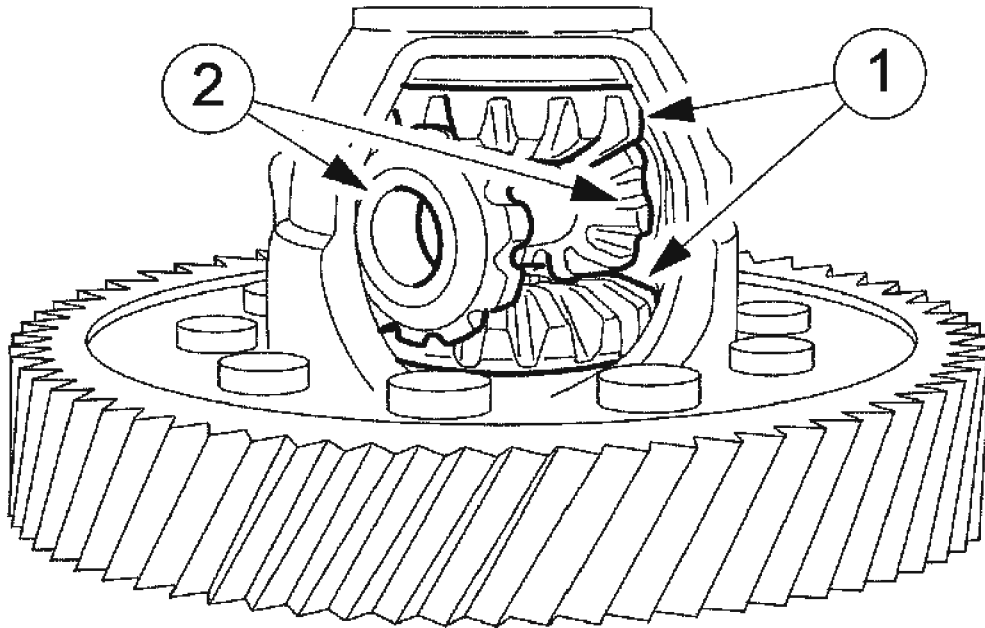


Fig. 213: Lubricating Gears And Thrust Washers With Clean Automatic Transmission Fluid

Courtesy of FORD MOTOR CO.

2. Install the different pinion gears and thrust washers.
 1. Install the differential side gears and thrust washers.
 2. Install the differential pinion gears and thrust washers by rotating 90 degrees.



A0065195

Fig. 214: Installing Differential Pinion Gears And Thrust Washers
Courtesy of FORD MOTOR CO.

NOTE: Install a new roll pin.

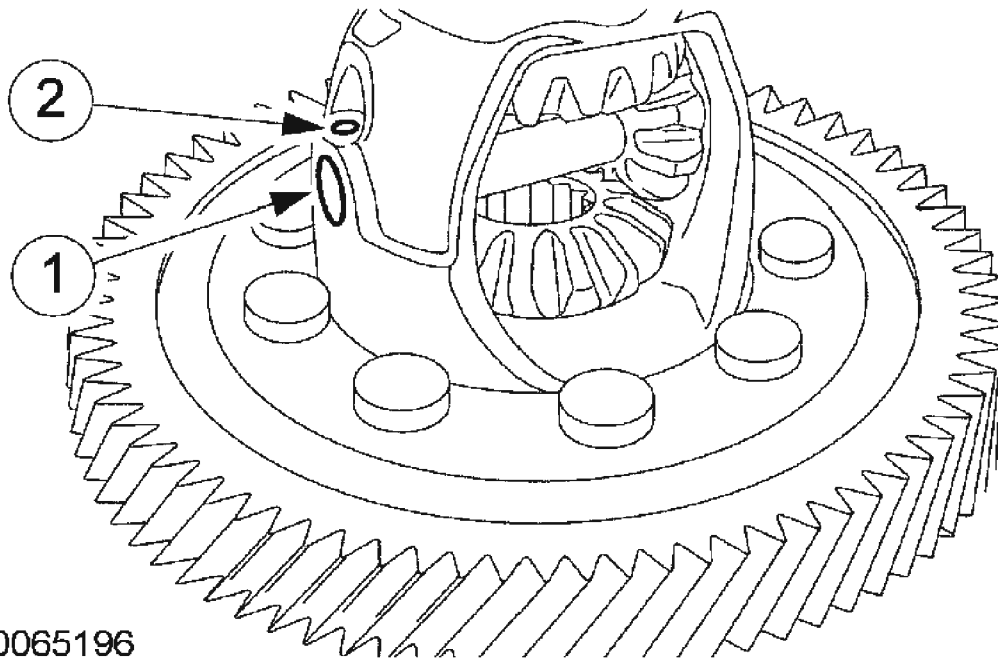


Fig. 215: Installing Differential Pinion Shaft
Courtesy of FORD MOTOR CO.

3. Install the differential pinion shaft.
 1. Install the pinion shaft.
 2. Install the roll pin.

NOTE: Left-hand side shown, right-hand side similar.

4. Using the special tool, install the differential case bearings.

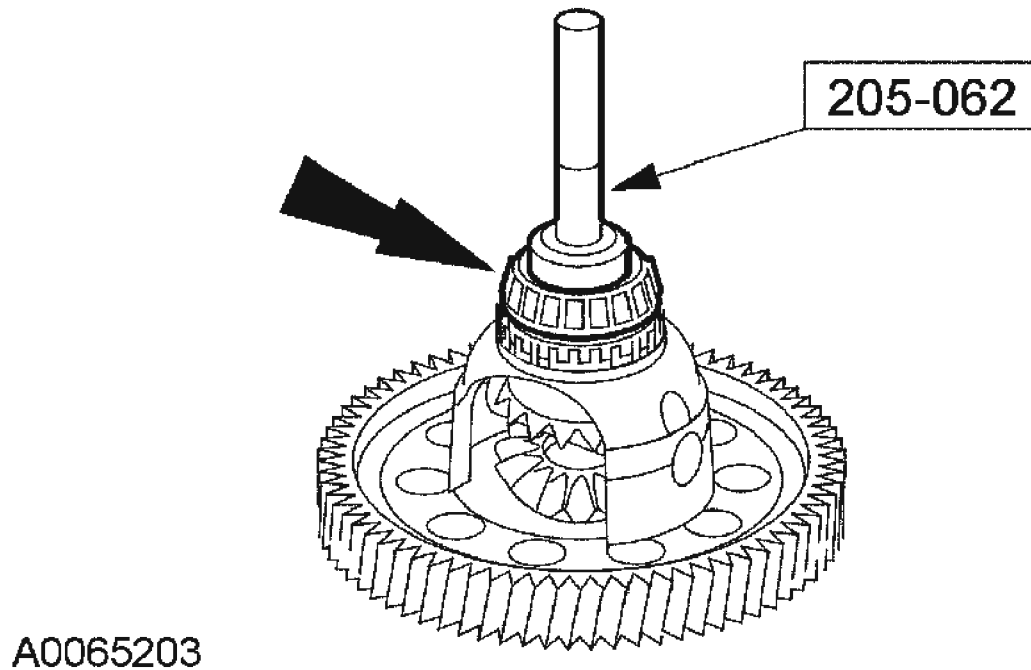


Fig. 216: Installing Differential Case Bearings Using Special Tool
Courtesy of FORD MOTOR CO.

PUMP ASSEMBLY

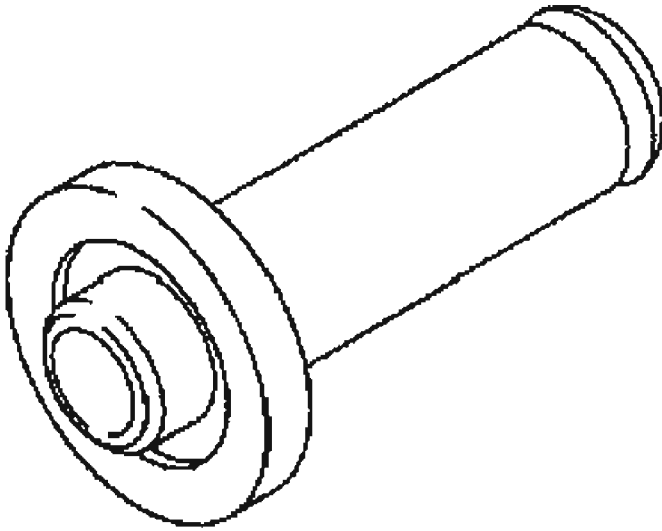
Special Tool(s)

SPECIAL TOOL SPECIFICATION

Installer, Drive Pinion Oil Seal 205-115 (15058)

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



15058

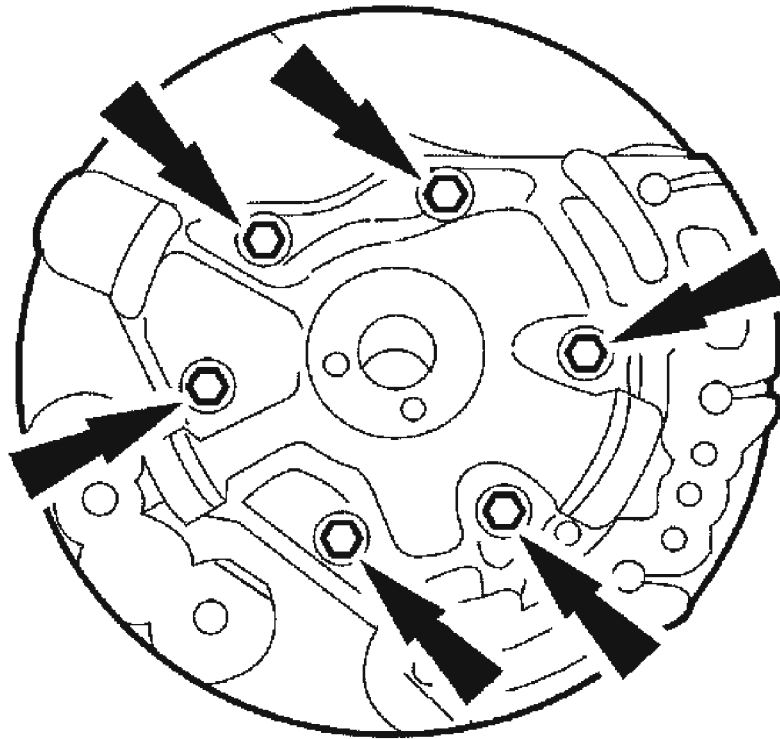
Material

MATERIAL SPECIFICATION

Item	Specification
Automatic Transmission Fluid XT-5-QM	MERCON® V

Disassembly

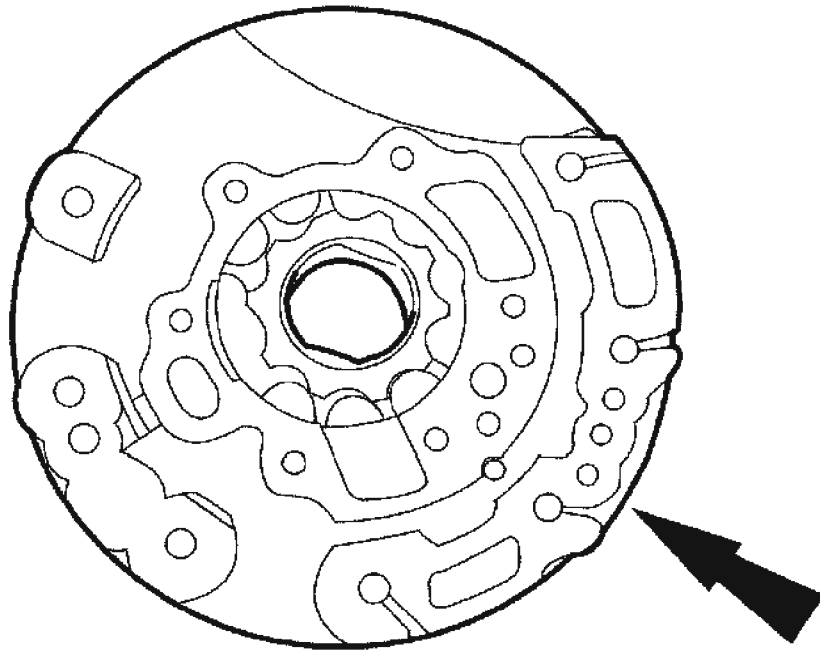
1. Remove the top portion of the pump.



A0065104

Fig. 217: Removing Top Portion Of Pump Bolts
Courtesy of FORD MOTOR CO.

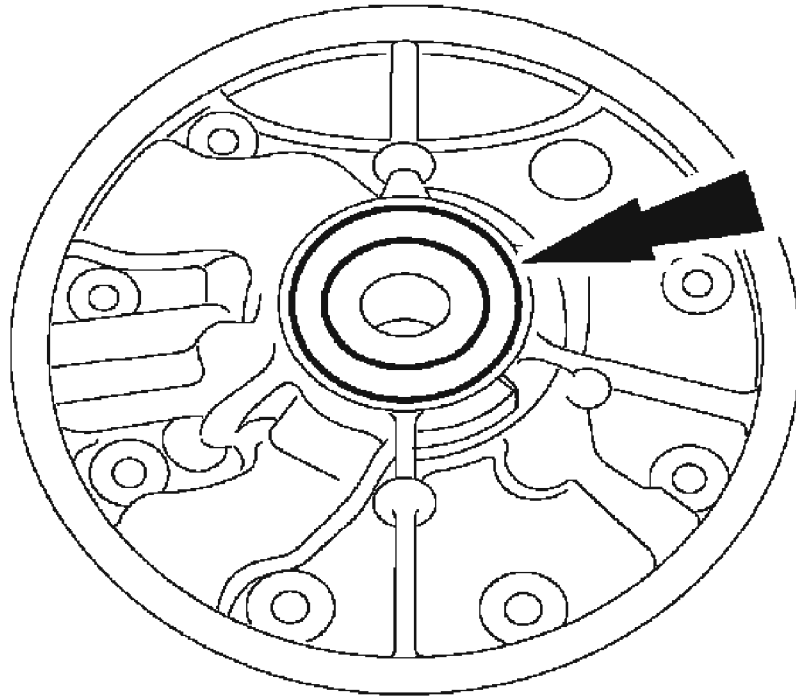
2. Inspect the lower portion of the pump and gear pocket for nicks, scratches, gouges or wear.



A0065106

Fig. 218: Inspecting Lower Portion Of Pump And Gear Pocket For Nicks, Scratches, Gouges Or Wear
Courtesy of FORD MOTOR CO.

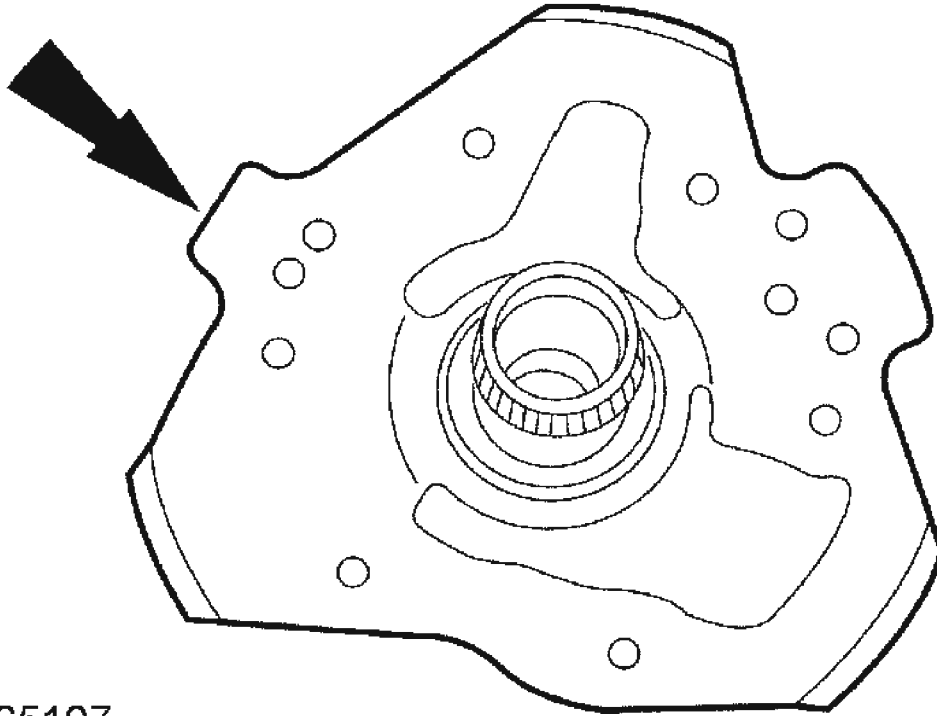
3. Remove the pump seal.



E0011841

Fig. 219: Removing Pump Seal
Courtesy of FORD MOTOR CO.

4. Inspect the upper portion of the pump for nicks, scratches or gouges.



A0065107

Fig. 220: Inspecting Upper Portion Of Pump For Nicks, Scratches Or Gouges
Courtesy of FORD MOTOR CO.

5. Inspect the pump gears of nicks, scratches or gouges.

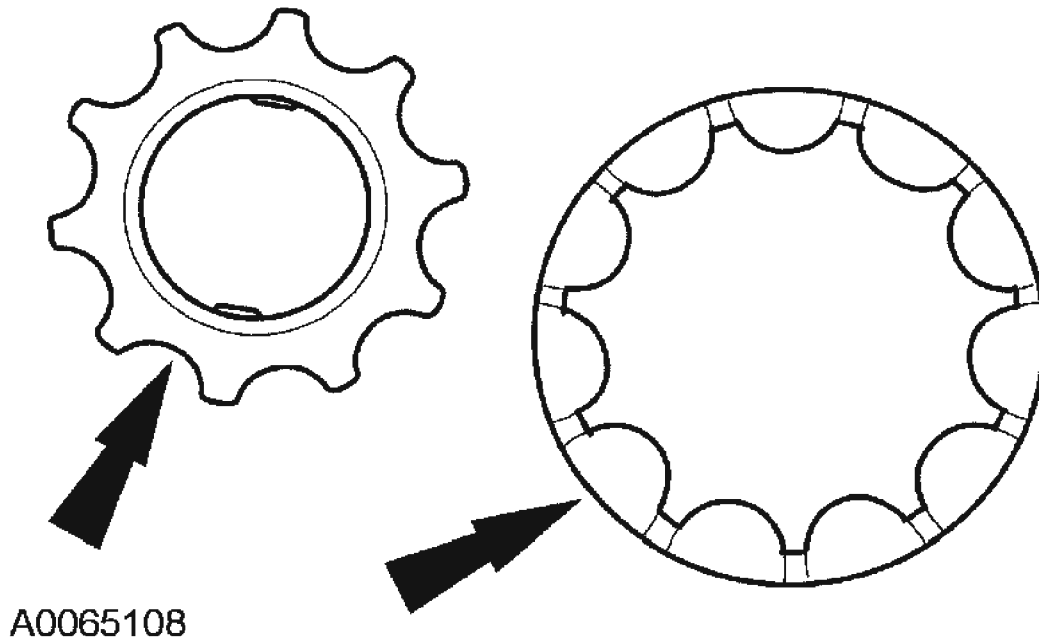


Fig. 221: Inspecting Pump Gears Of Nicks, Scratches Or Gouges
Courtesy of FORD MOTOR CO.

Assembly

- NOTE:** The smaller gear has a recess on both sides.
- NOTE:** The smaller recess must face away from the torque converter seal.
- NOTE:** The larger recess, with the beveled edge, must face toward the torque converter.

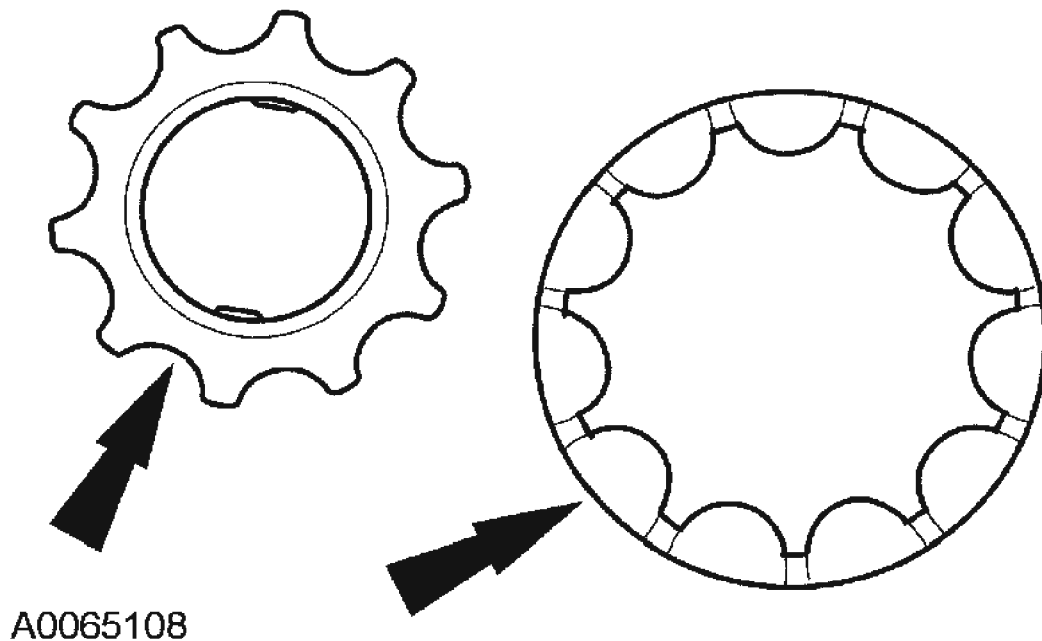
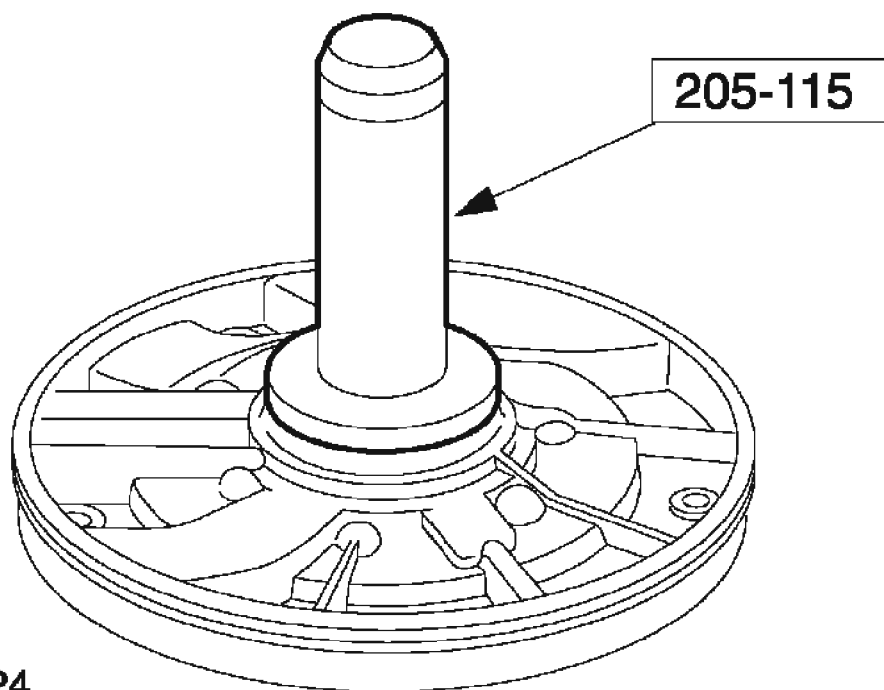


Fig. 222: Lubricating Gears And Thrust Washers With Clean Automatic Transmission Fluid

Courtesy of FORD MOTOR CO.

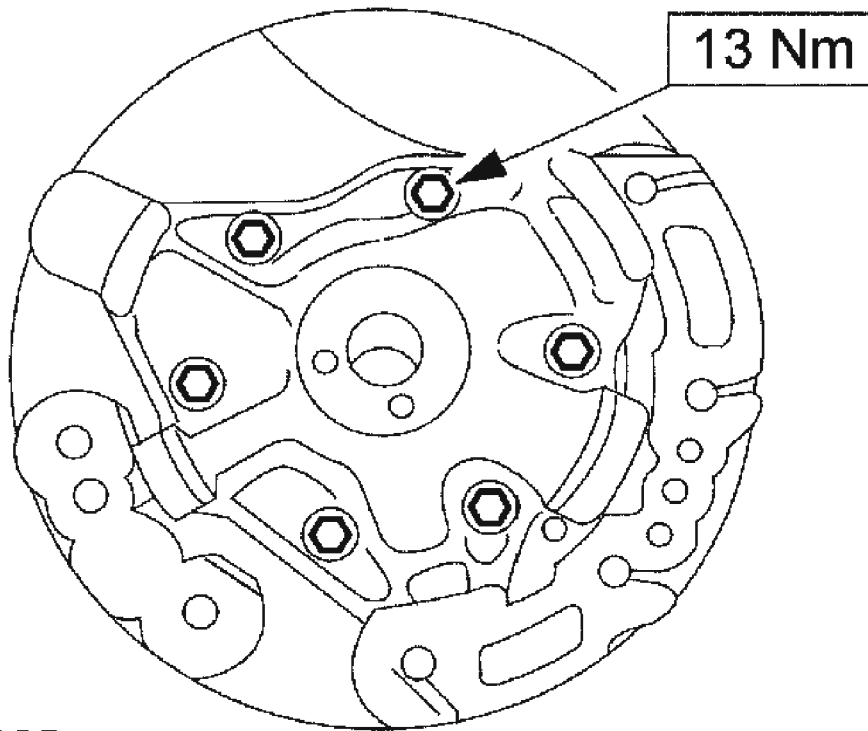
1. Lubricate the gears and thrust washers with clean automatic transmission fluid.
2. Using the special tool, install the pump seal.
 - Lubricate the gears and thrust washers with automatic transmission fluid.



E0012424

Fig. 223: Installing Pump Seal Using Special Tool
Courtesy of FORD MOTOR CO.

3. Install the top portion of the pump.



A0065105

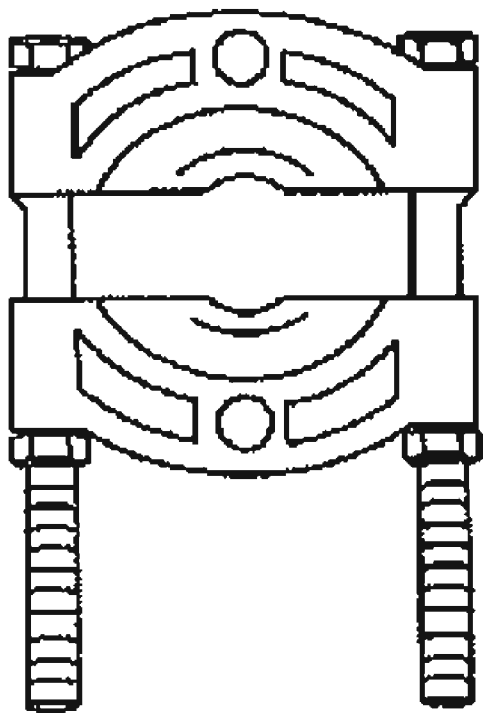
Fig. 224: Installing Top Portion Of Pump
Courtesy of FORD MOTOR CO.

TRANSFER SHAFT

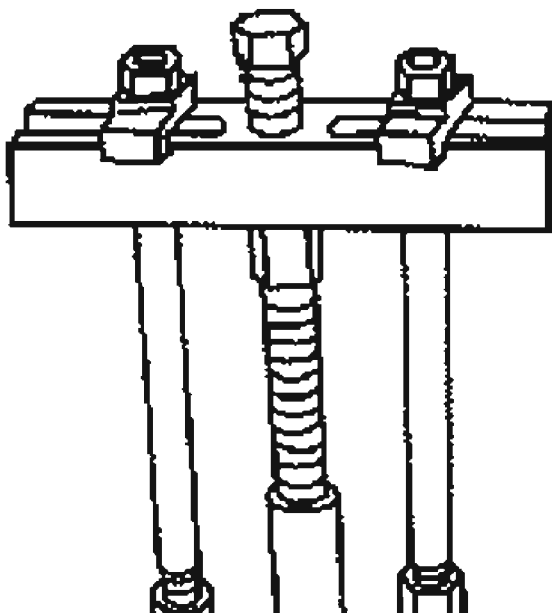
Special Tool(s)

SPECIAL TOOL SPECIFICATION

Bearing Puller 205-D064 (D84L-1123-A)



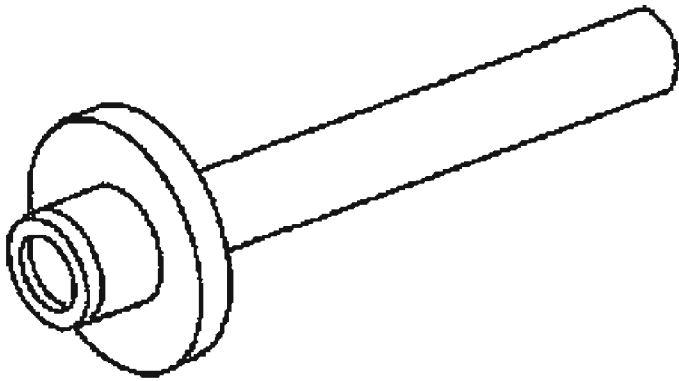
ST2785-A



Front Hub Tool 204-069 (T81P-1104-C)

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



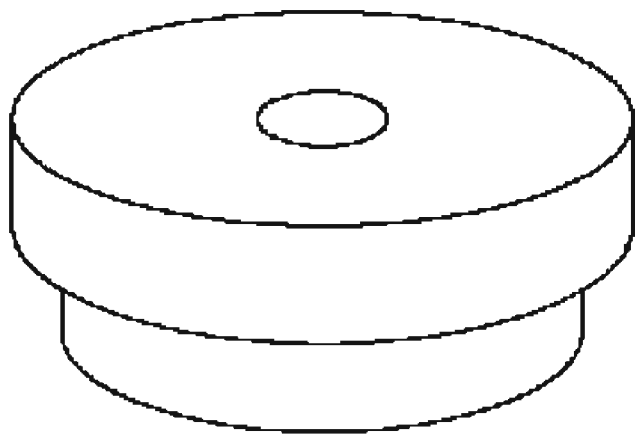
ST2125-A

Shaft Rear Bearing Replacer 303-551
(T96P-6A333-CH)

Step Plate 205-D015 (D80L-630-4)

2005 Ford Focus ZX4 S

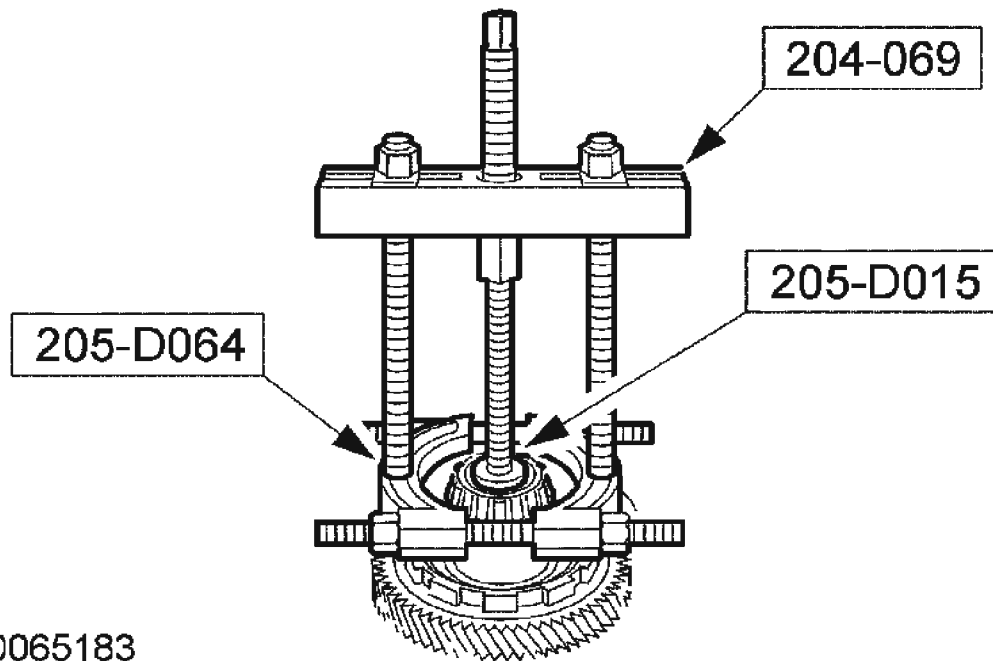
2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



ST2762A

Disassembly

1. Using the special tools, remove the right-hand side transfer shaft gear bearing.



A0065183

Fig. 225: Removing Right-Hand Side Transfer Shaft Gear Bearing Using Special Tools

Courtesy of FORD MOTOR CO.

2. Using the special tool and a press, remove the left-hand side transfer shaft gear bearing while separating the gears.

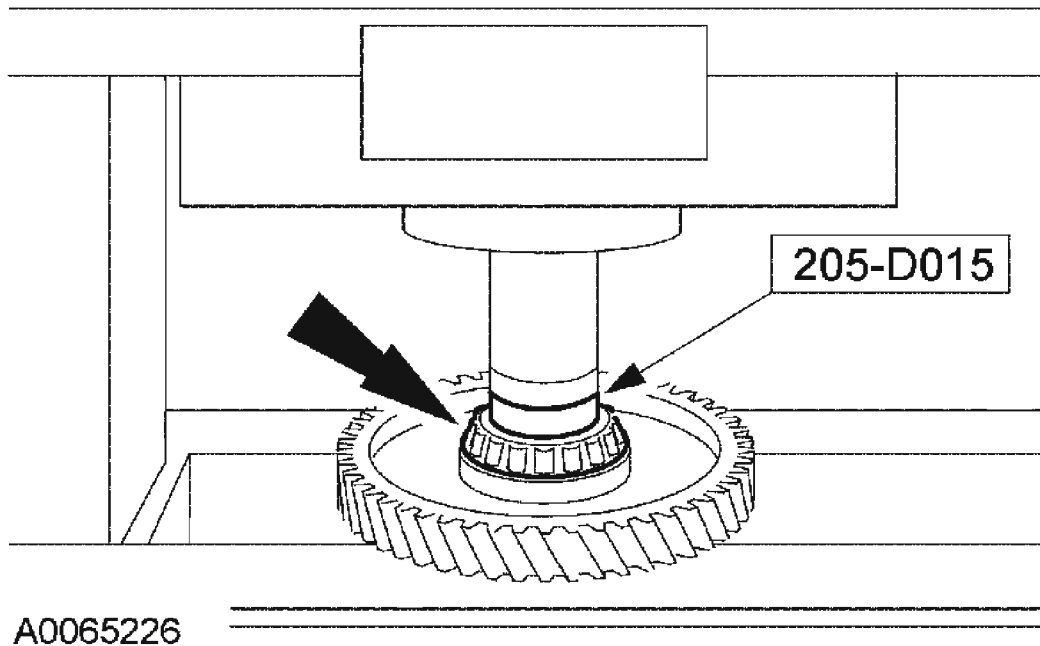


Fig. 226: Removing Left-Hand Side Transfer Shaft Gear Bearing Using Special Tool And Press

Courtesy of FORD MOTOR CO.

Assembly

1. Using the special tool, install the right-hand side transfer shaft gear and park gear assembly.

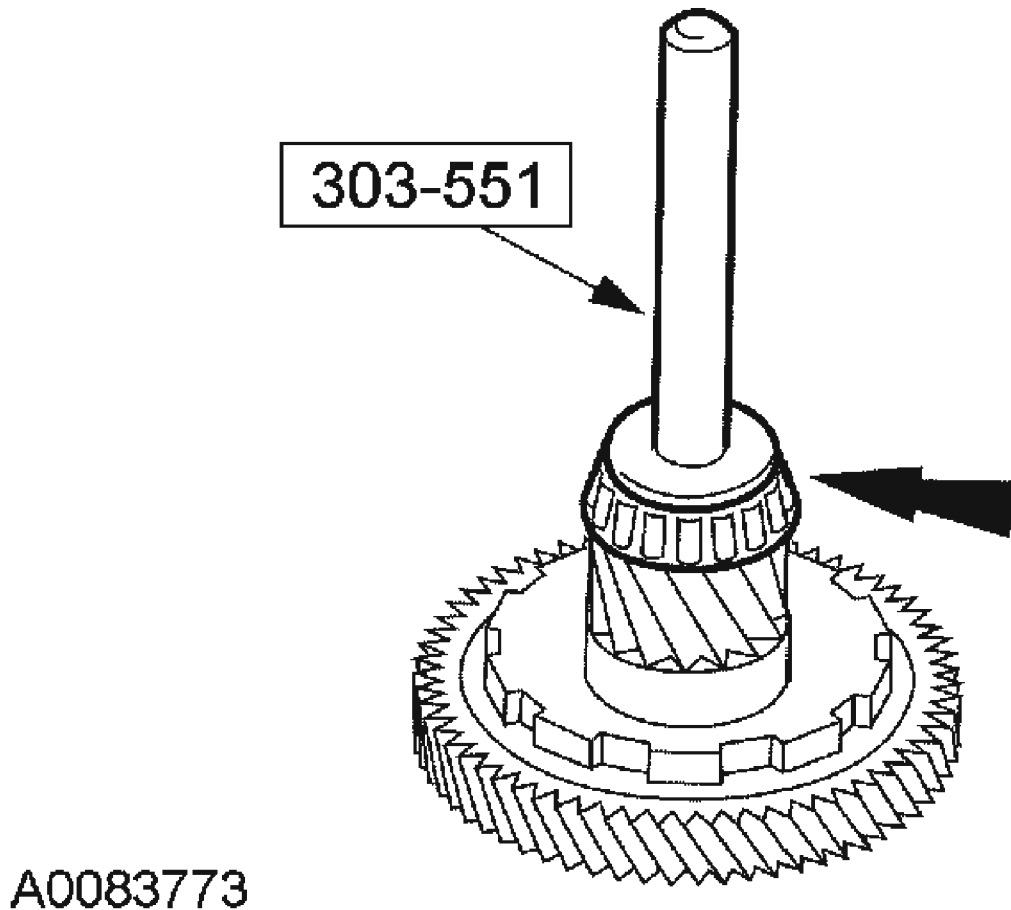
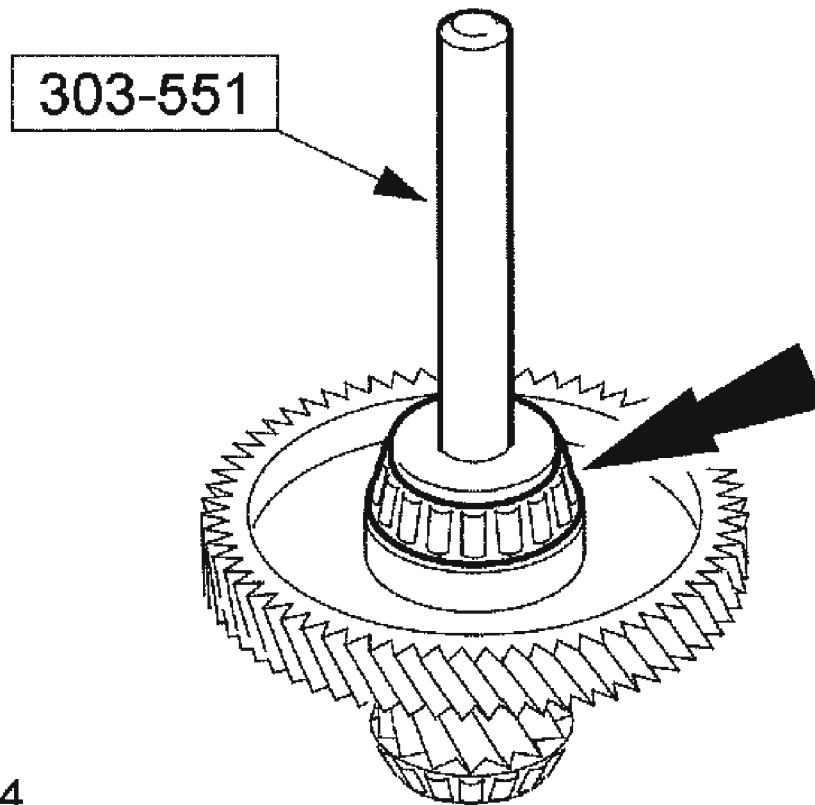


Fig. 227: Installing Right-Hand Side Transfer Shaft Gear And Park Gear Assembly Using Special Tool
Courtesy of FORD MOTOR CO.

2. Using the special tool, assemble the gears and install the left-hand side transfer shaft gear bearing.



A0065184

Fig. 228: Installing Left-Hand Side Transfer Shaft Gear Bearing Using Special Tool
Courtesy of FORD MOTOR CO.

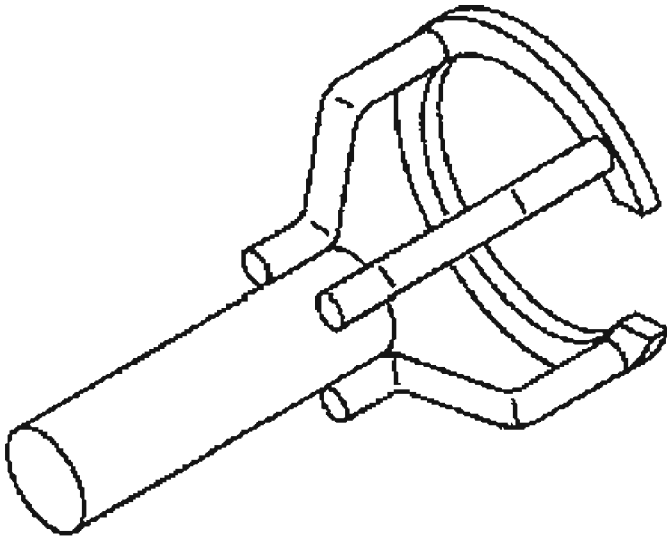
FORWARD CLUTCH

SPECIAL TOOL SPECIFICATION

Compressor, Spring Washer 307-209

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



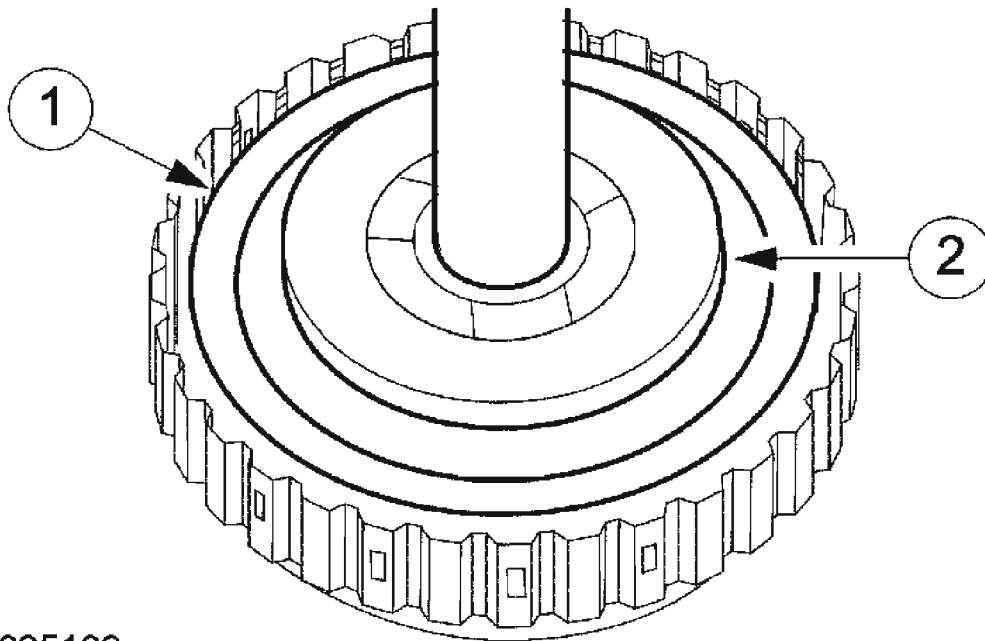
17040

MATERIAL SPECIFICATION

Item	Specification
Automatic Transmission Fluid XT-5-QM	MERCON® V

Disassembly

1. Remove the forward clutch pressure, friction and steel plates.
 1. Remove the retaining ring.
 2. Remove the plates.



A0065109

Fig. 229: Removing Forward Clutch Pressure, Friction And Steel Plates
Courtesy of FORD MOTOR CO.

2. Using the special tool, install the forward clutch assembly in a suitable press.

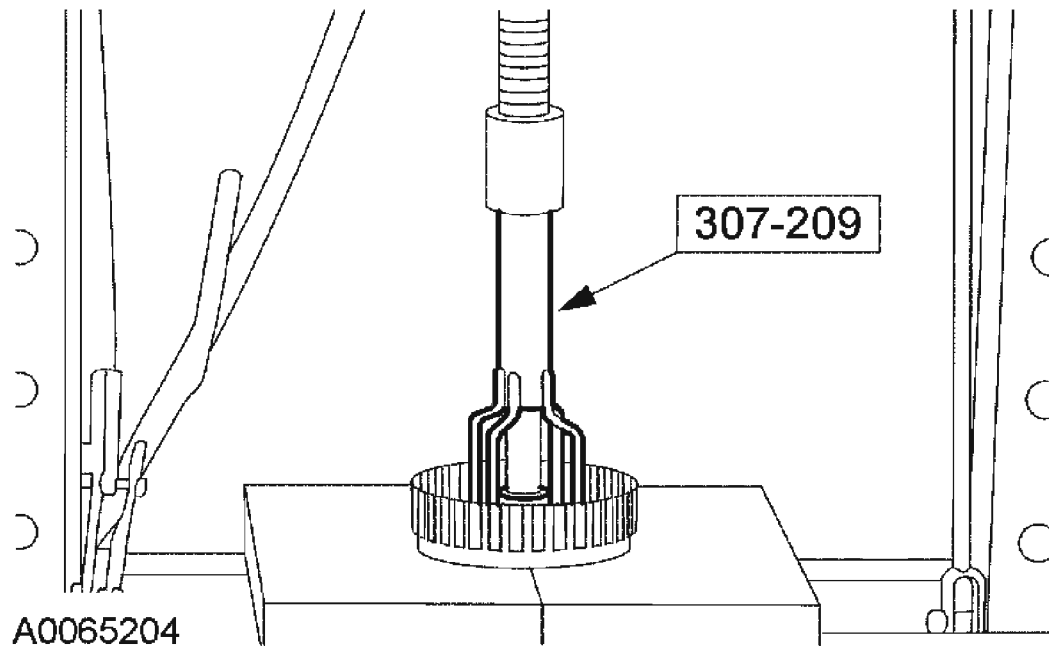


Fig. 230: Installing Forward Clutch Assembly In A Suitable Press Using Special Tool
Courtesy of FORD MOTOR CO.

3. Using the special tool, remove the forward clutch balance piston snap ring.

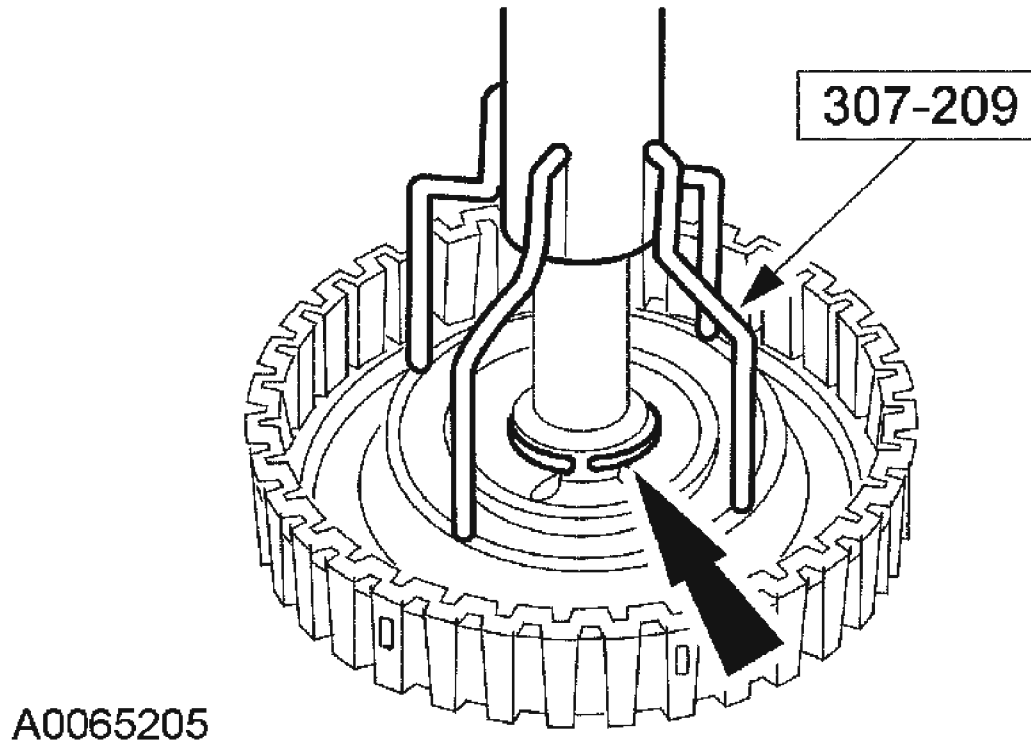
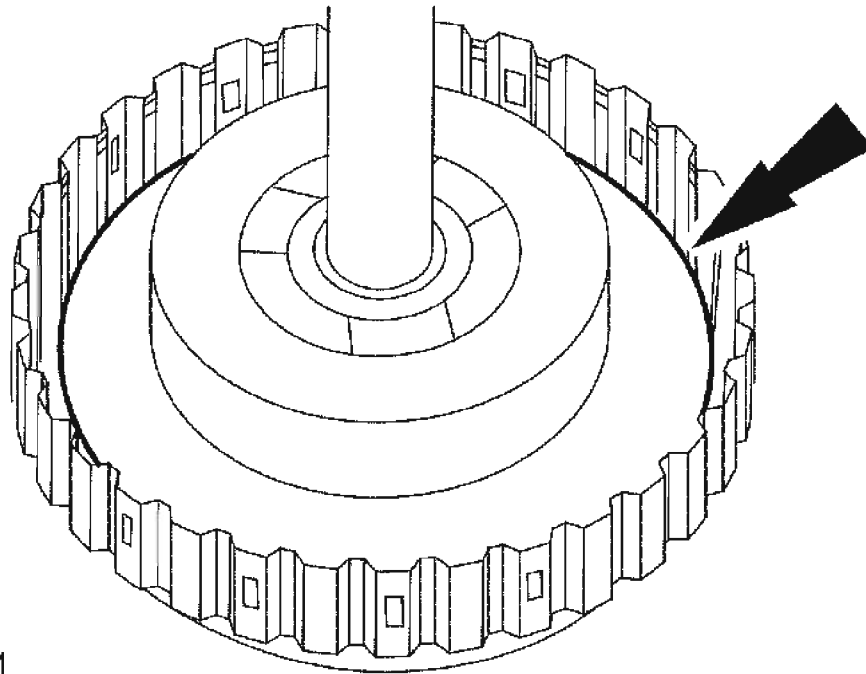


Fig. 231: Removing Forward Clutch Balance Piston Snap Ring Using Special Tool
Courtesy of FORD MOTOR CO.

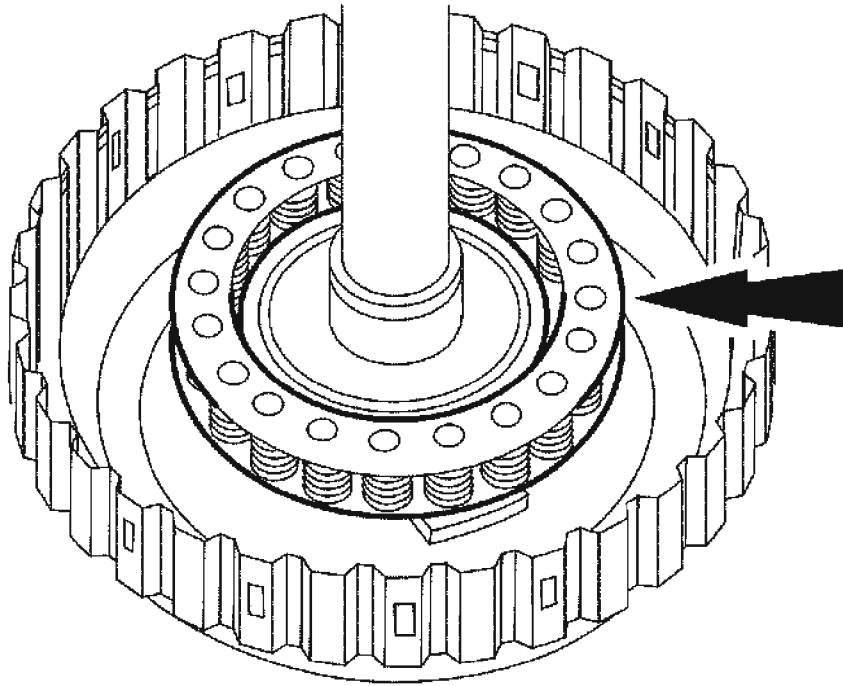
CAUTION: If damage is found to the forward clutch balance piston seals, install a new balance piston.



A0065111

Fig. 232: Removing And Inspecting Forward Clutch Balance Piston
Courtesy of FORD MOTOR CO.

4. Remove and inspect the forward clutch balance piston.
5. Remove the forward piston return spring.

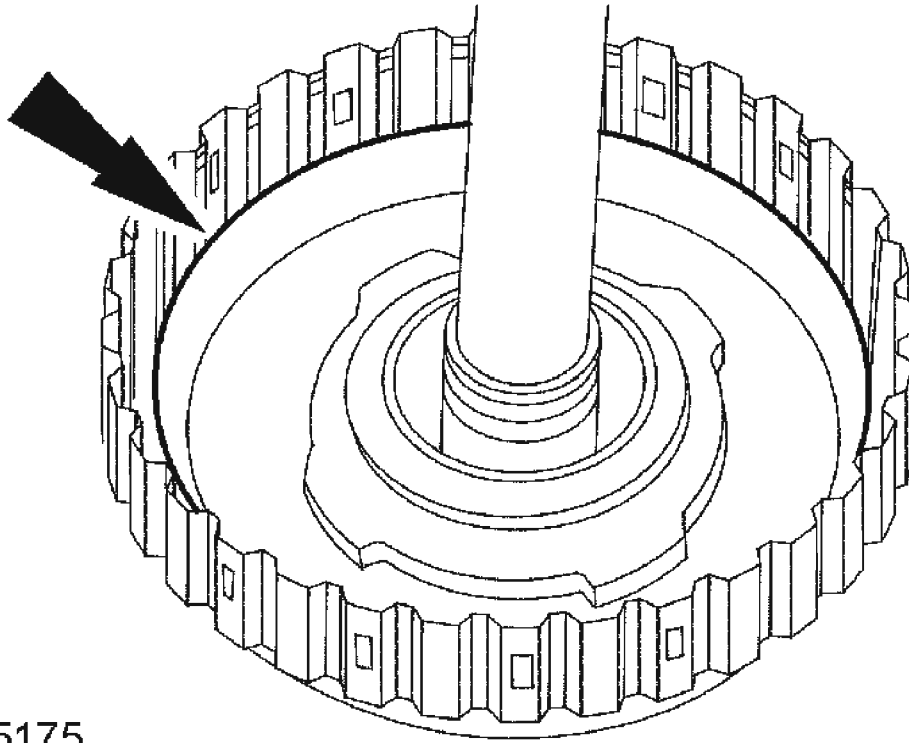


A0065121

Fig. 233: Removing Forward Piston Return Spring
Courtesy of FORD MOTOR CO.

CAUTION: If damage is found to the forward clutch piston seals, install a new forward clutch piston.

6. Remove the forward clutch piston assembly.

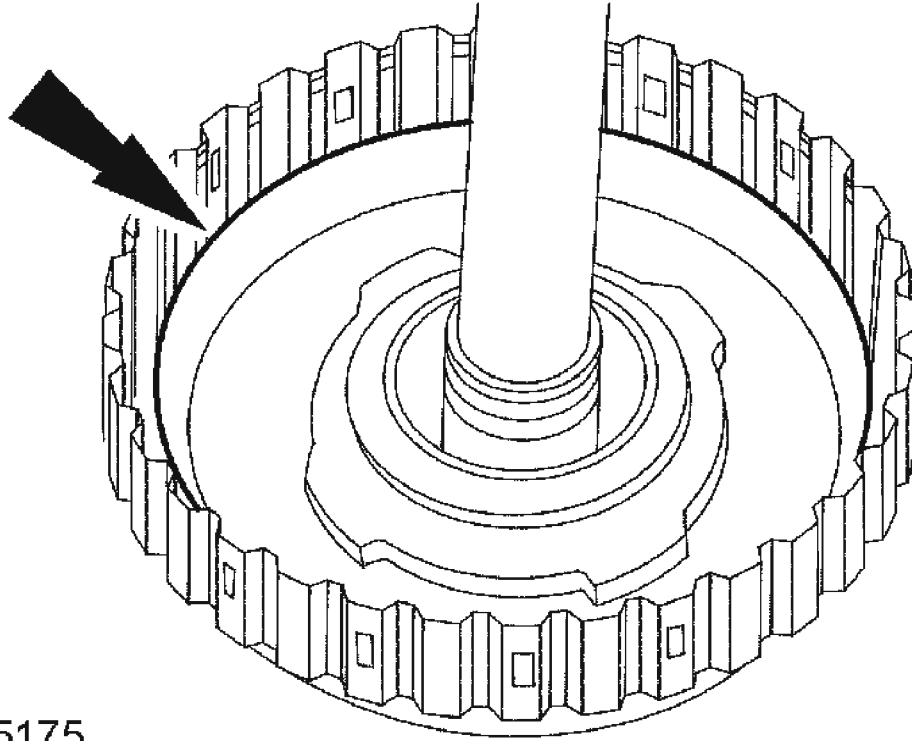


A0065175

Fig. 234: Removing Forward Clutch Piston Assembly
Courtesy of FORD MOTOR CO.

Assembly

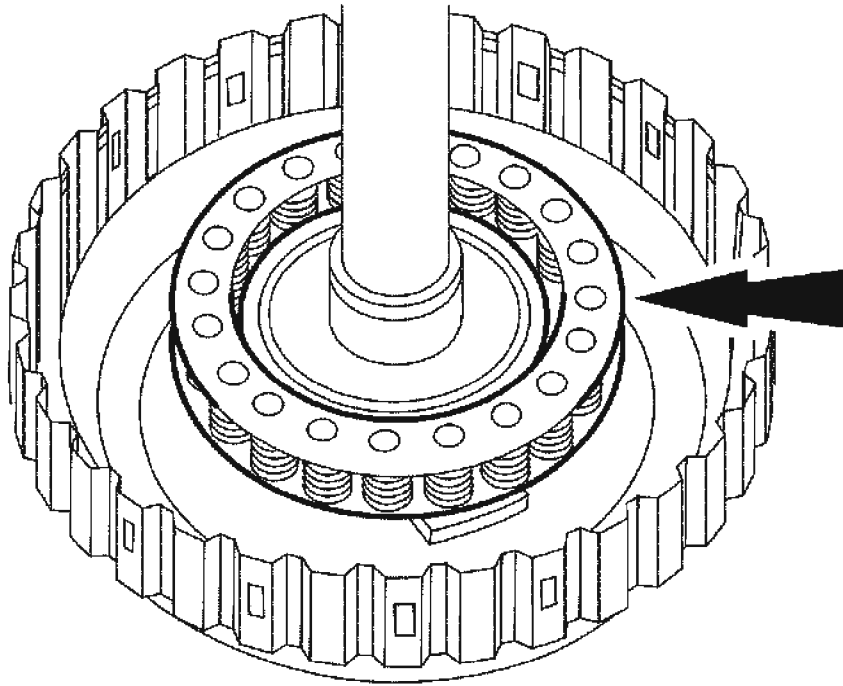
1. Soak the internal spline clutch plates in clean automatic transmission fluid for 15 minutes before assembly.
2. Inspect the forward clutch piston bore surfaces for nicks or scratches. Install a new balance piston if necessary.
3. Lubricate and install the forward clutch piston assembly.



A0065175

Fig. 235: Installing Forward Clutch Piston Assembly
Courtesy of FORD MOTOR CO.

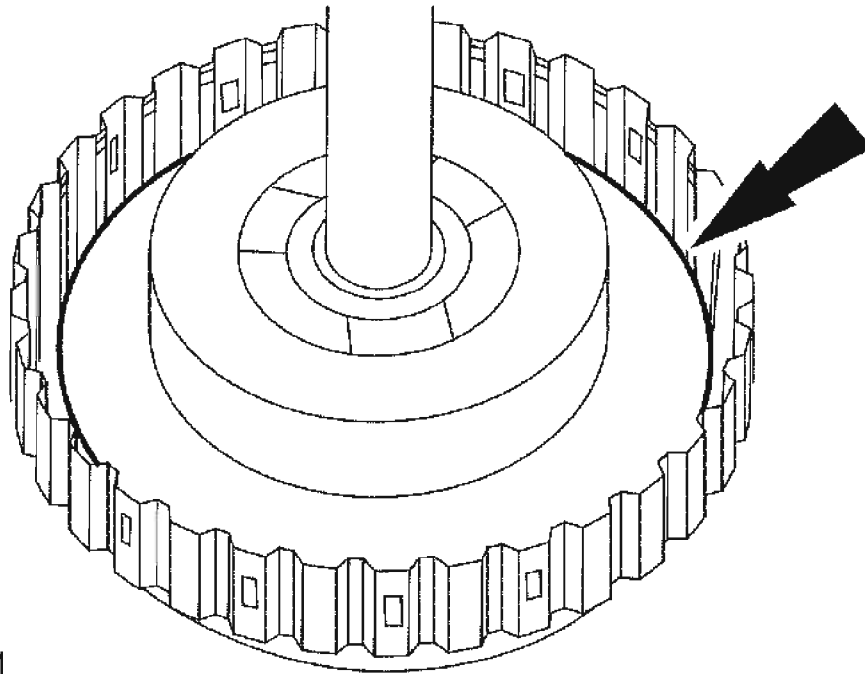
4. Install the forward piston return spring.



A0065121

Fig. 236: Installing Forward Piston Return Spring
Courtesy of FORD MOTOR CO.

5. Lubricate and install the forward clutch balance piston.



A0065111

Fig. 237: Installing Forward Clutch Balance Piston
Courtesy of FORD MOTOR CO.

6. Using the special tool, install the forward clutch assembly in a suitable press.

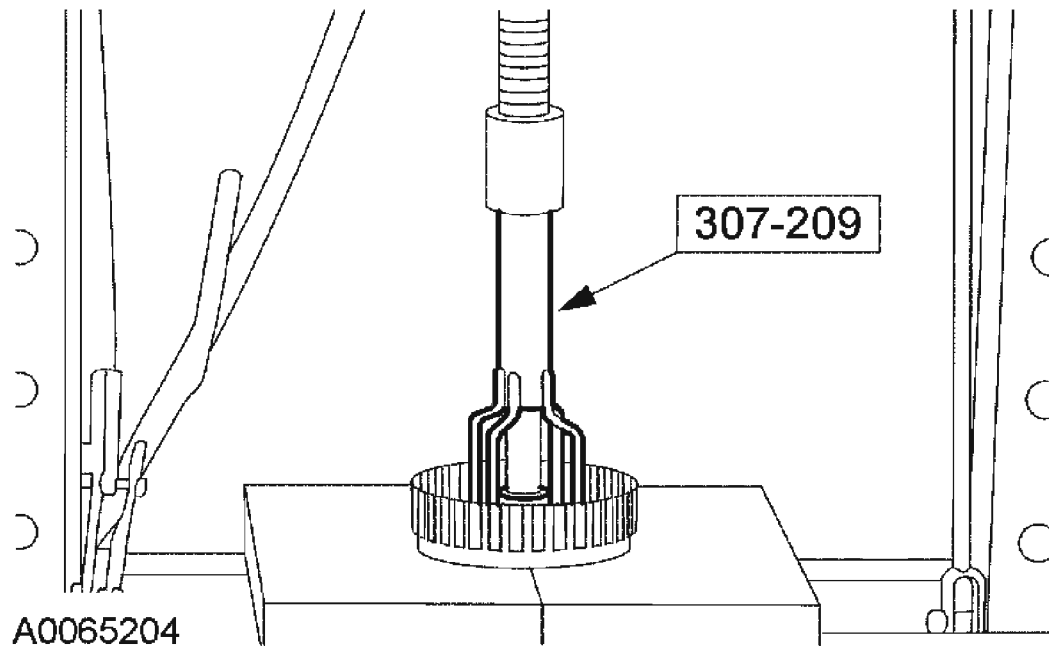
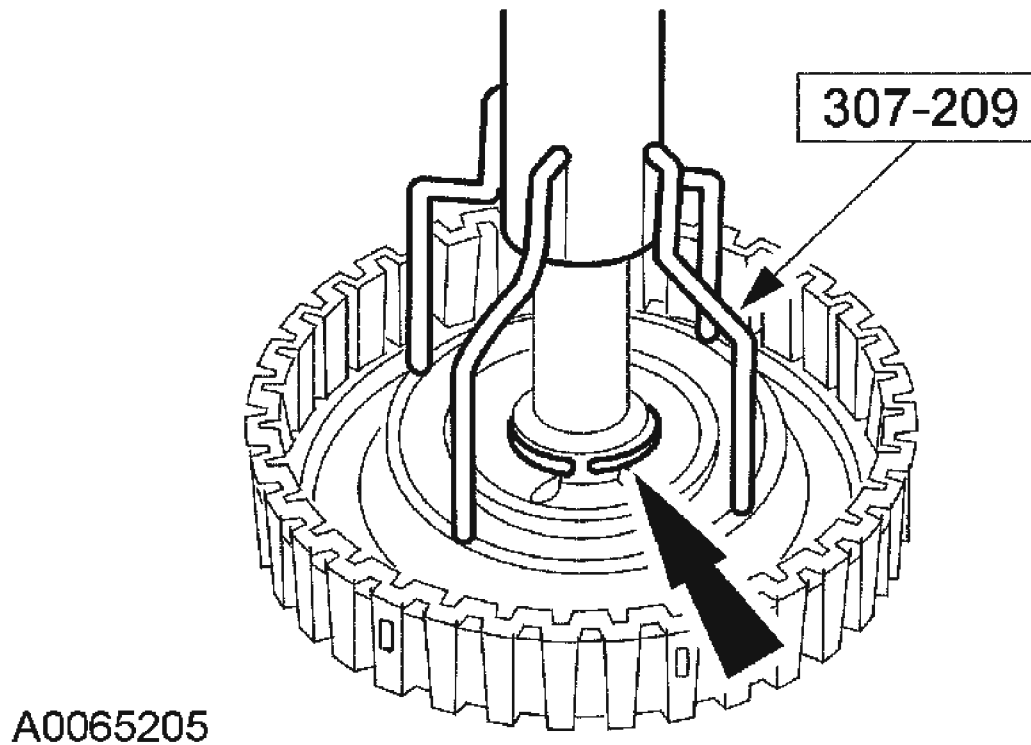


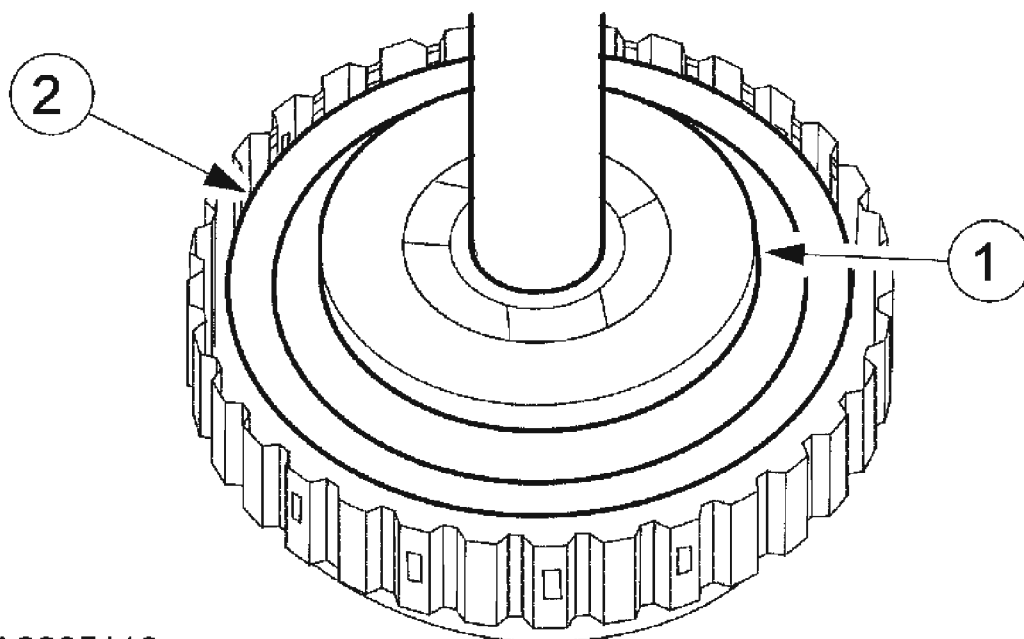
Fig. 238: Installing Forward Clutch Assembly Suitable Press Using Special Tool
Courtesy of FORD MOTOR CO.

7. Using the special tool, install the forward clutch balance piston snap ring.



**Fig. 239: Installing Forward Clutch Balance Piston Snap Ring Using Special Tool
Courtesy of FORD MOTOR CO.**

8. Install the forward clutch pressure, friction and steel plates.
 1. Install the plates.
 2. Install the retaining ring.
 - Check the clearance. For additional information, refer to **SPECIFICATION**.



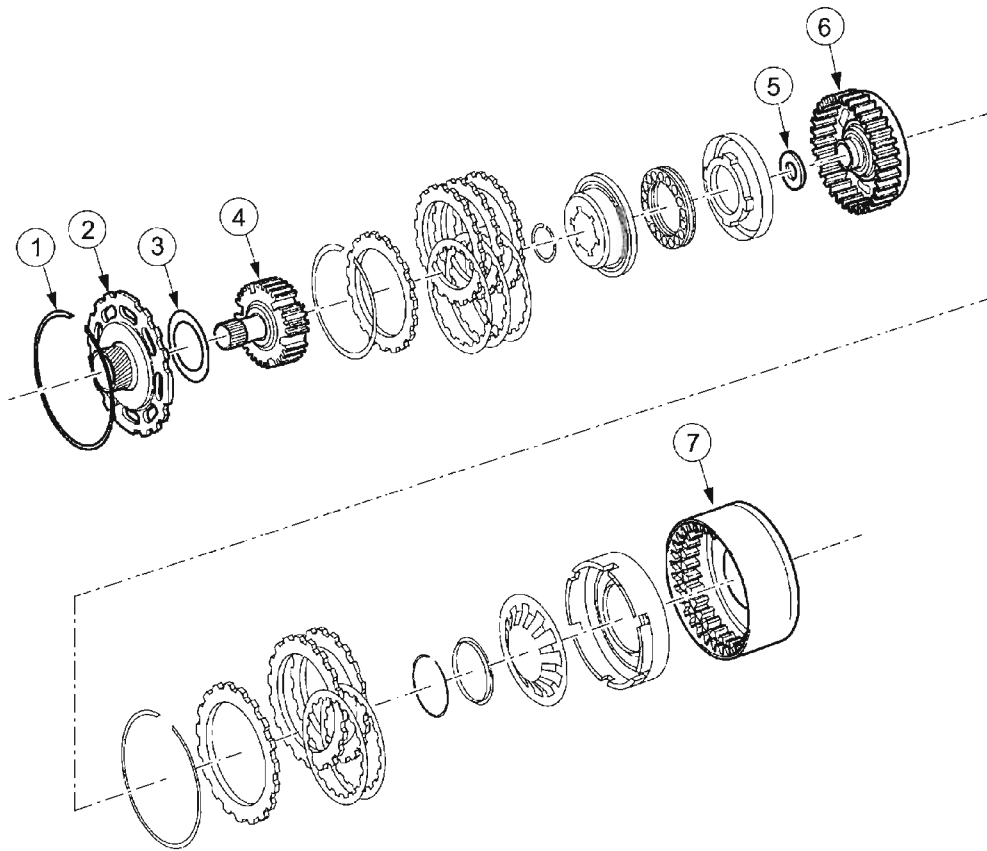
A0065110

Fig. 240: Installing Forward Clutch Pressure, Friction And Steel Plates
Courtesy of FORD MOTOR CO.

DIRECT AND REVERSE CLUTCH ASSEMBLY

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



A0079949

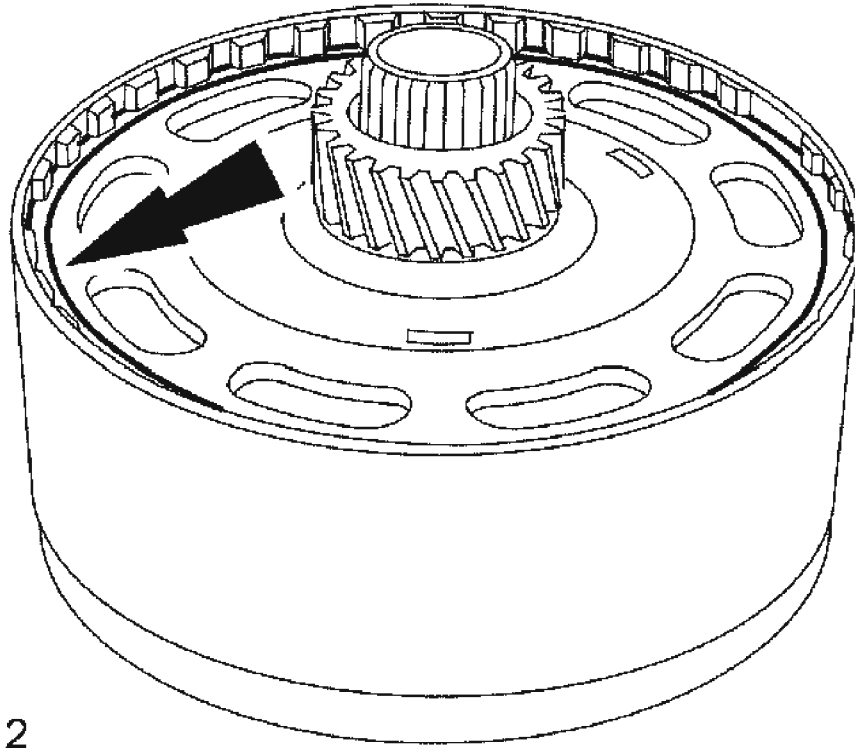
Item	Part Number	Description
1	—	Snap ring
2	—	Rear sun gear assembly
3	—	Thrust bearing assembly
4	—	Direct clutch hub assembly

Item	Part Number	Description
5	—	Direct clutch thrust bearing
6	—	Direct clutch cylinder assembly
7	—	Intermediate and overdrive band assembly

Fig. 241: Exploded View Of Direct And Reverse Clutch Assembly
Courtesy of FORD MOTOR CO.

Disassembly

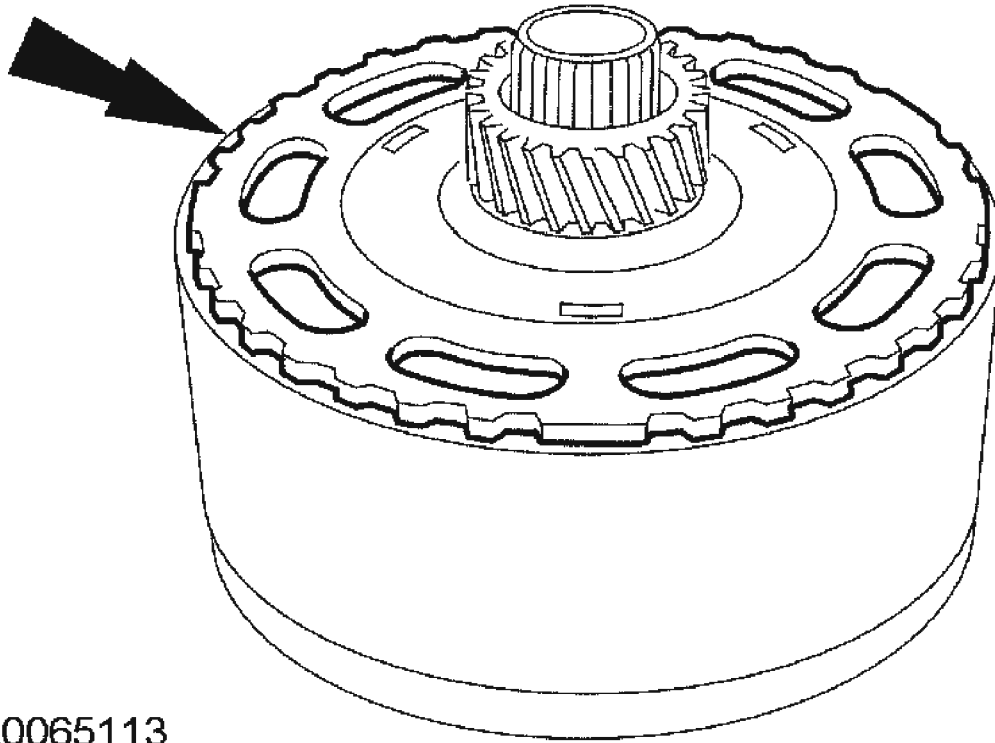
1. Remove the reverse drum snap ring.



A0065112

Fig. 242: Removing Reverse Drum Snap Ring
Courtesy of FORD MOTOR CO.

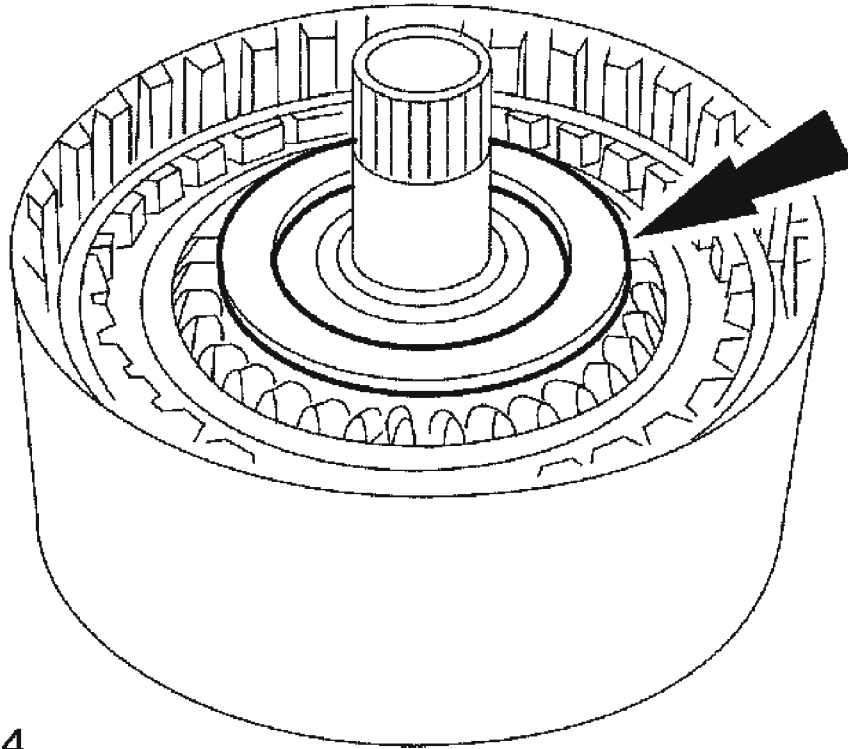
2. Remove the sun gear.



A0065113

Fig. 243: Removing Sun Gear
Courtesy of FORD MOTOR CO.

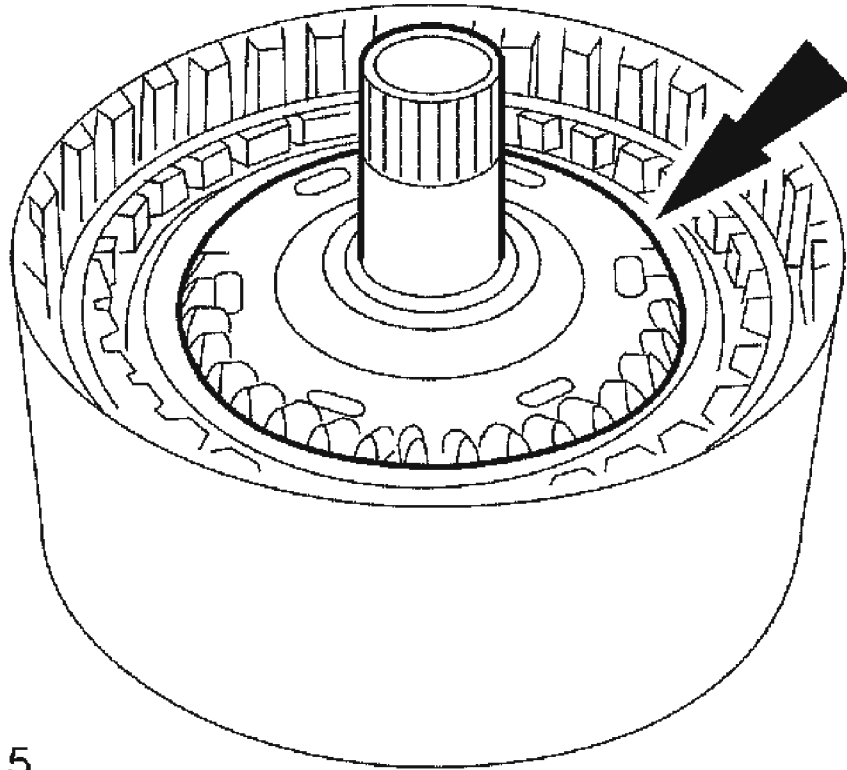
3. Remove the sun gear thrust bearing.



A0065114

Fig. 244: Removing Sun Gear Thrust Bearing
Courtesy of FORD MOTOR CO.

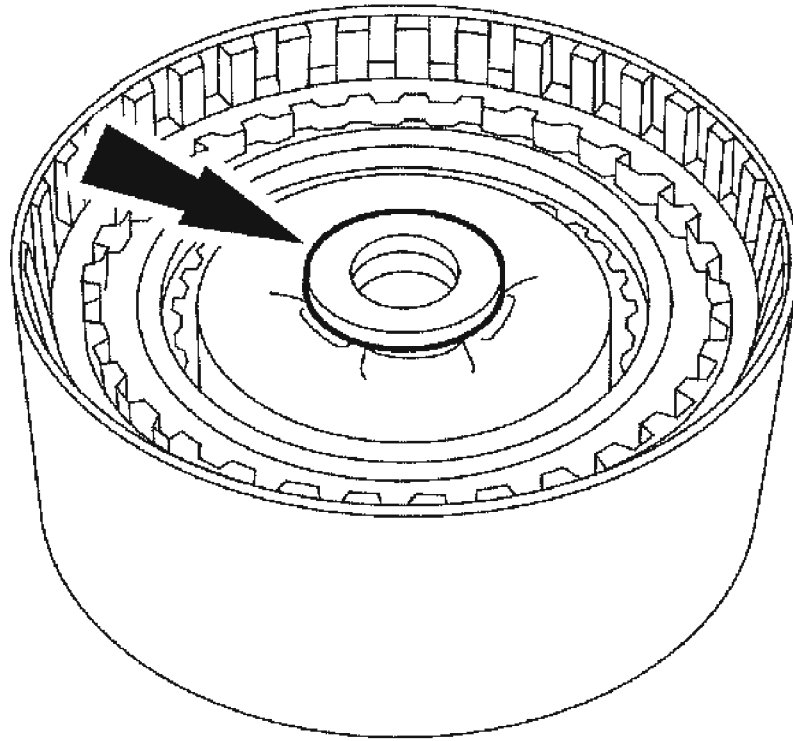
4. Remove the direct clutch hub.



A0065115

Fig. 245: Removing Direct Clutch Hub
Courtesy of FORD MOTOR CO.

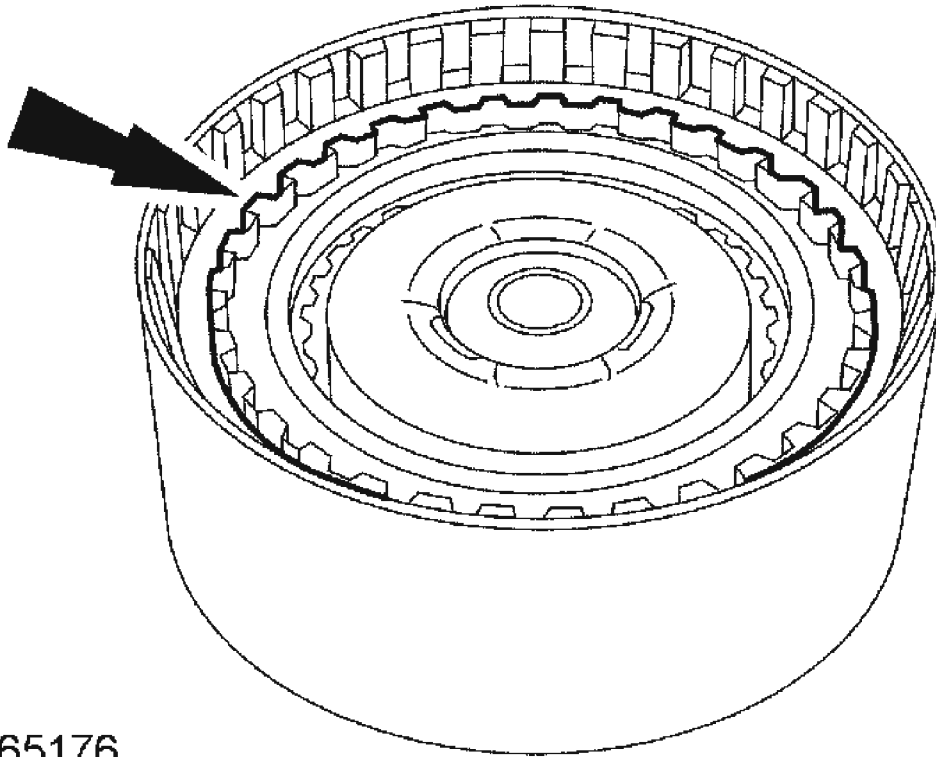
5. Remove the direct clutch thrust bearing.



A0065116

Fig. 246: Removing Direct Clutch Thrust Bearing
Courtesy of FORD MOTOR CO.

6. Remove the direct clutch assembly.



A0065176

Fig. 247: Removing Direct Clutch Assembly
Courtesy of FORD MOTOR CO.

Assembly

1. To assemble, reverse the disassembly procedure.

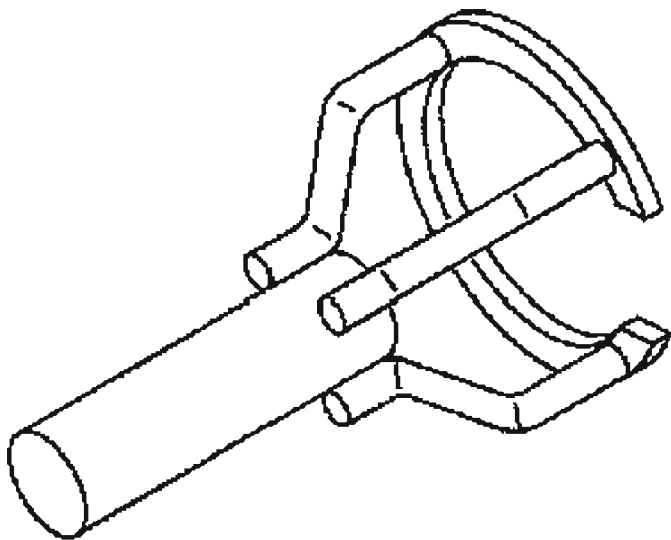
DIRECT CLUTCH

SPECIAL TOOL SPECIFICATION

	Compressor, Spring Washer 307-209
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2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



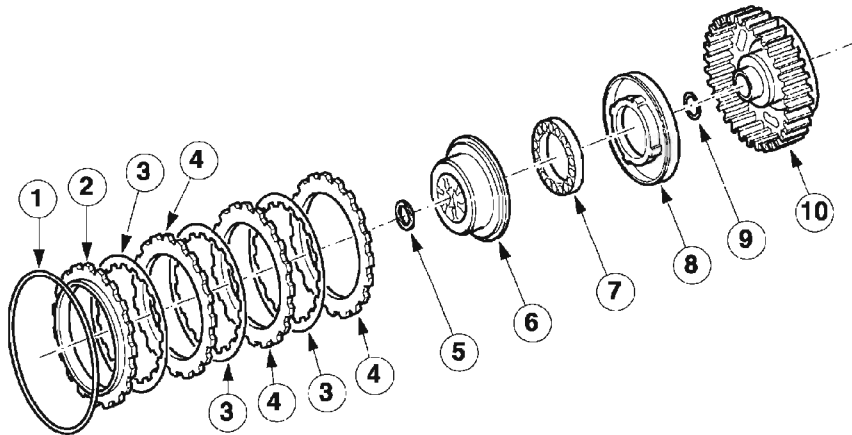
17040

MATERIAL SPECIFICATION

Item	Specification
Automatic Transmission Fluid XT-5-QM	MERCON® V

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



E0011725

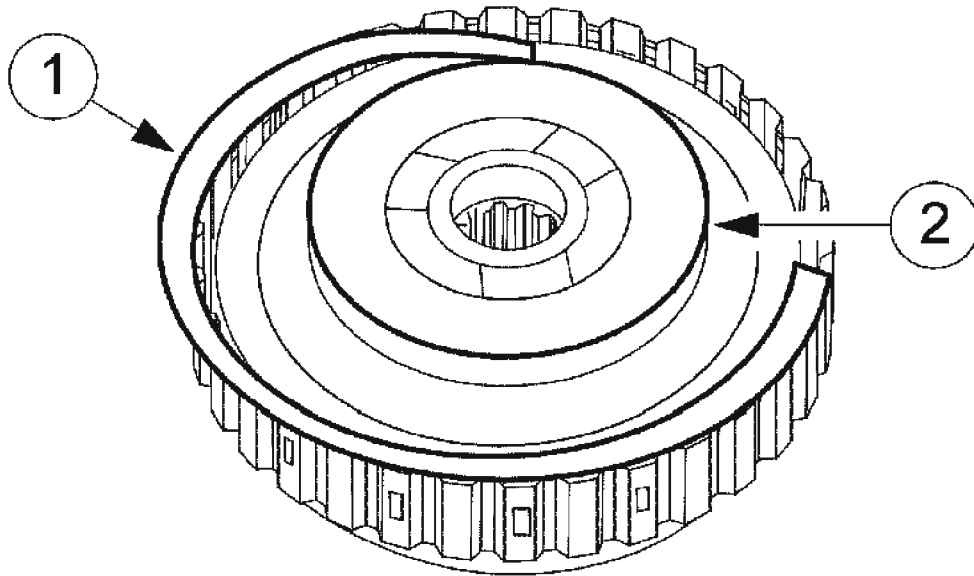
Item	Part Number	Description
1	—	Retaining ring
2	—	Direct clutch pressure plate
3	—	Friction plates
4	—	Steel plates — forward clutch separator
5	—	Selective snap ring

Item	Part Number	Description
6	—	Direct clutch balance piston
7	—	Direct clutch return spring
8	—	Direct clutch piston
9	—	Bearing — direct clutch thrust
10	—	Cylinder assembly — direct clutch

Fig. 248: Exploded View Of Direct Clutch
Courtesy of FORD MOTOR CO.

Disassembly

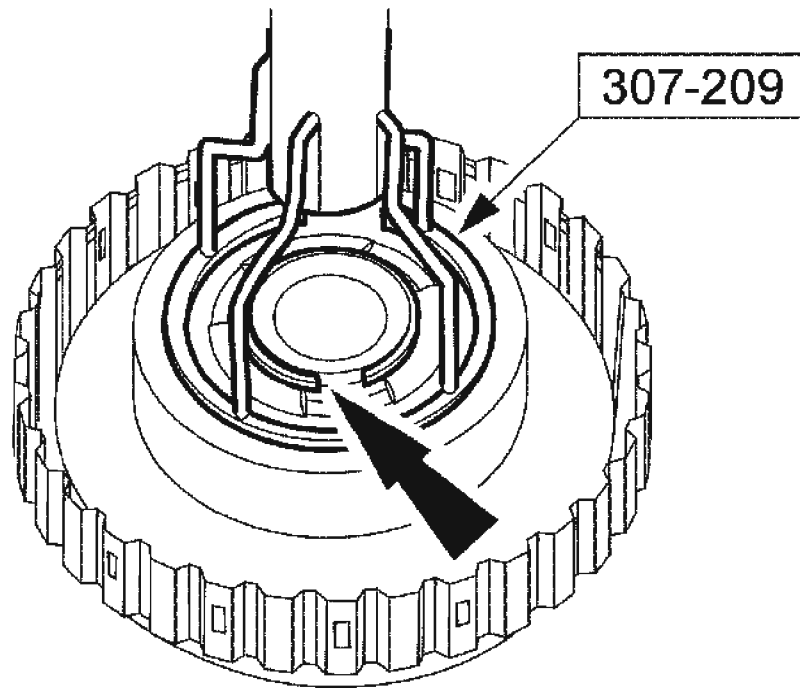
1. Remove the direct clutch pressure, friction and steel plates.
 1. Remove the retaining ring.
 2. Remove the plates.



A0065117

Fig. 249: Removing Direct Clutch Pressure, Friction And Steel Plates
Courtesy of FORD MOTOR CO.

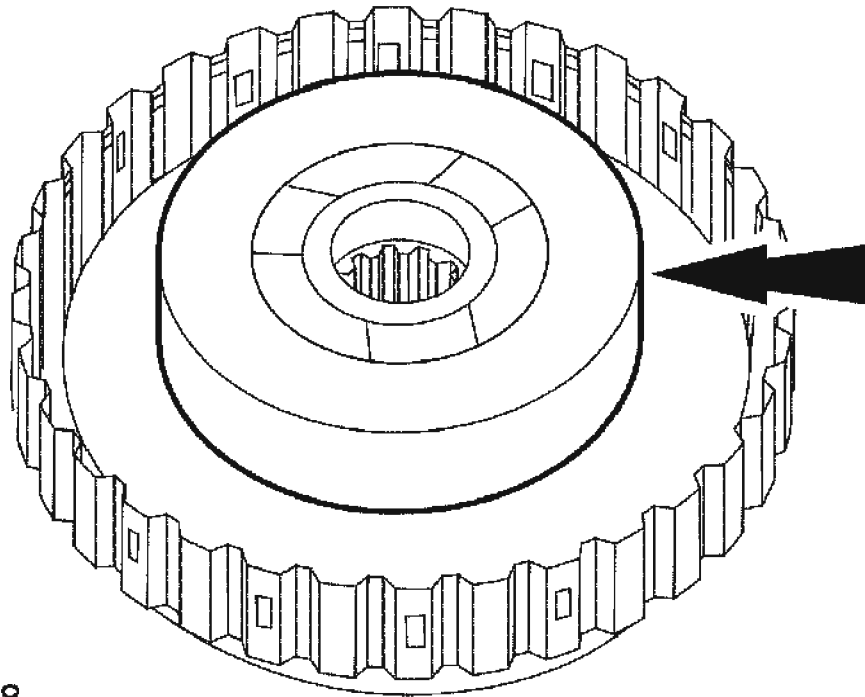
2. Using the special tool, remove the selective snap ring.



A0065230

Fig. 250: Removing Selective Snap Ring Using Special Tool
Courtesy of FORD MOTOR CO.

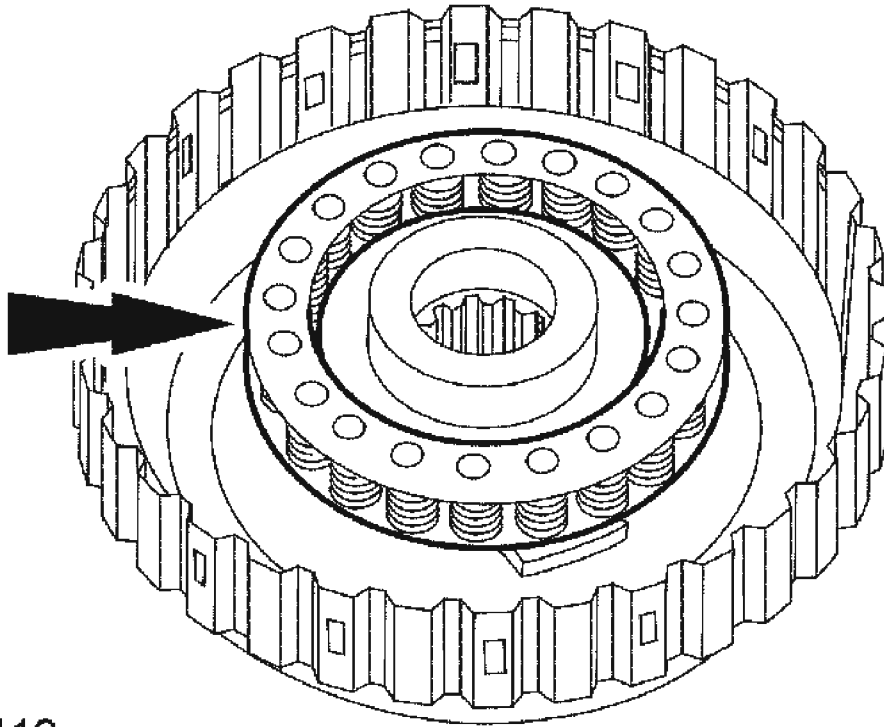
3. Remove the direct clutch balance piston.



A0065118

Fig. 251: Removing Direct Clutch Balance Piston
Courtesy of FORD MOTOR CO.

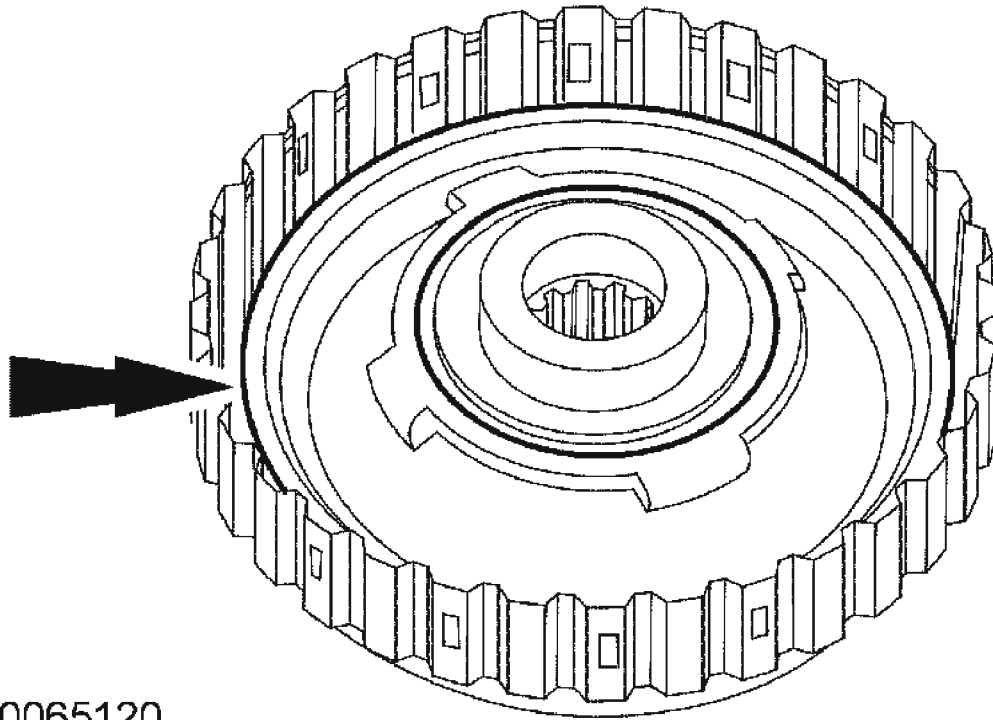
4. Remove the direct clutch return spring.



A0065119

Fig. 252: Removing Direct Clutch Return Spring
Courtesy of FORD MOTOR CO.

CAUTION: If damage is found on the direct clutch piston seals, install a new direct clutch piston.



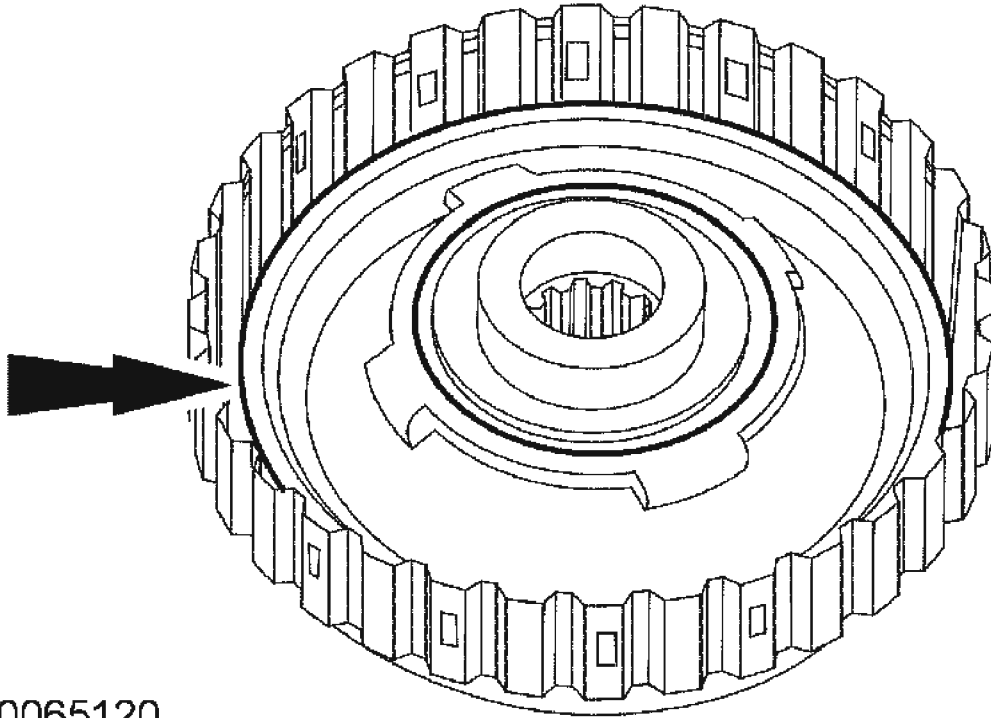
A0065120

Fig. 253: Inspecting Direct Clutch Piston
Courtesy of FORD MOTOR CO.

5. Remove and inspect the direct clutch piston.

Assembly

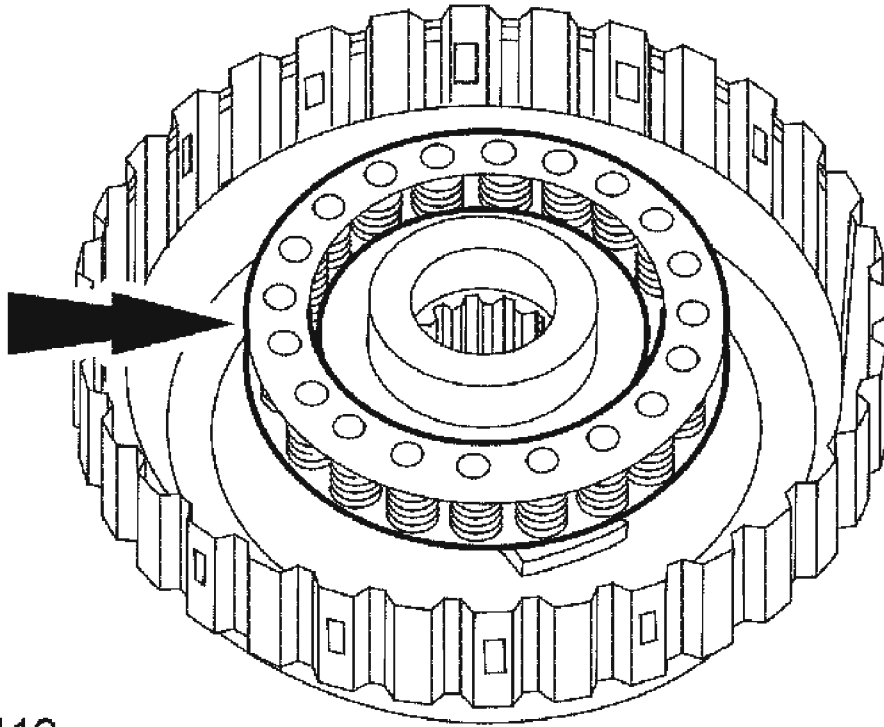
1. Soak the internal spline clutch plates in clean automatic transmission fluid for 15 minutes before assembly.
2. Inspect the direct clutch piston bore surfaces for nicks or scratches. Install a new direct clutch piston if necessary.
3. Lubricate and install the direct clutch piston.



A0065120

Fig. 254: Installing Direct Clutch Piston
Courtesy of FORD MOTOR CO.

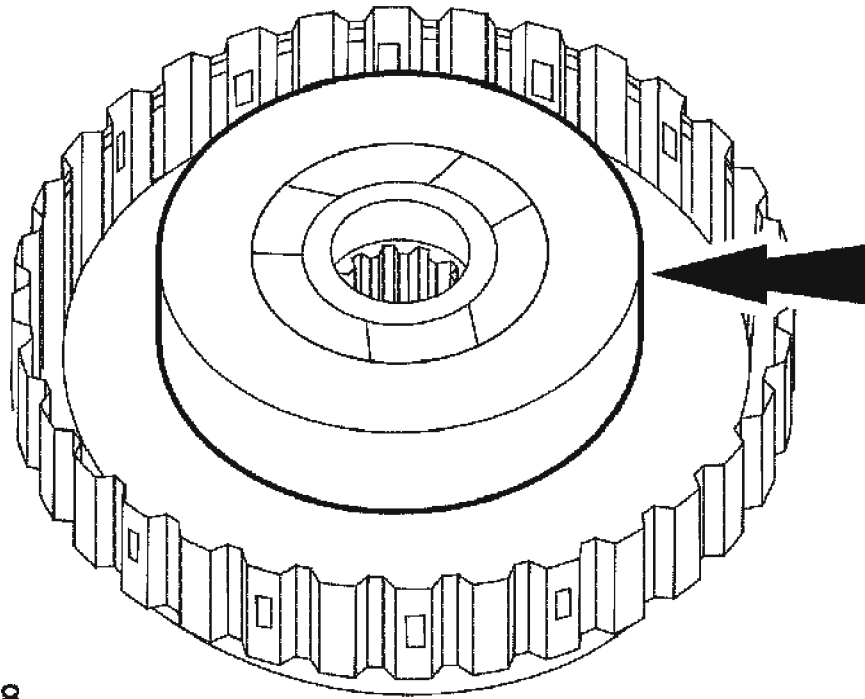
4. Install the direct clutch return spring.



A0065119

Fig. 255: Installing Direct Clutch Return Spring
Courtesy of FORD MOTOR CO.

5. Install the direct clutch balance piston.



A0065118

Fig. 256: Installing Direct Clutch Balance Piston
Courtesy of FORD MOTOR CO.

6. Using the special tool, install the selective snap ring.

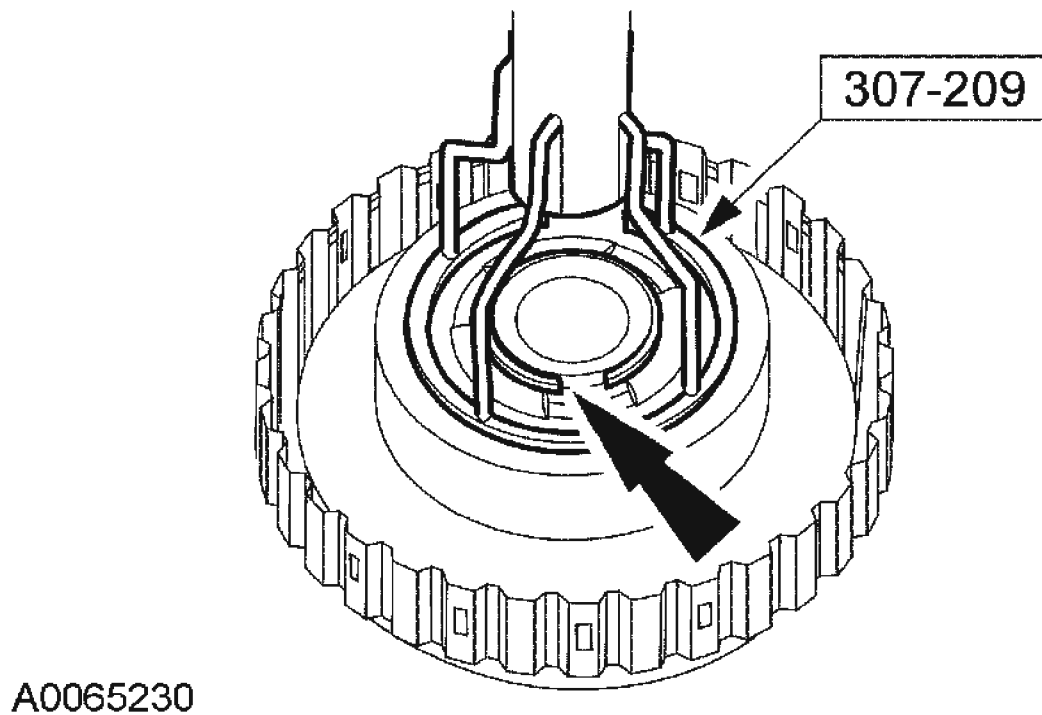
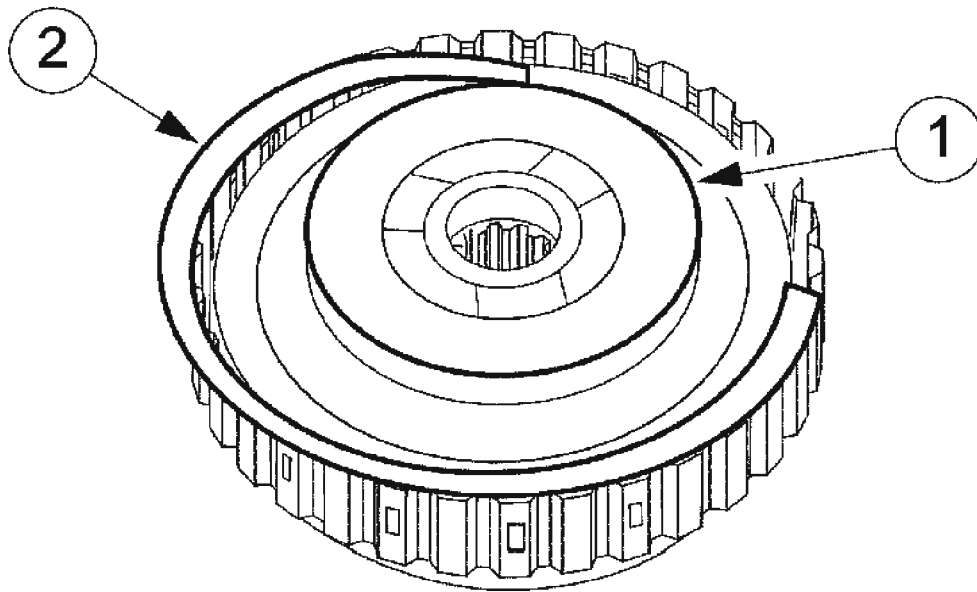


Fig. 257: Installing Selective Snap Ring Using Special Tool
Courtesy of FORD MOTOR CO.

7. Install the direct clutch pressure, friction and steel plates.
 1. Install the plates.
 2. Install the retaining ring.
 - Check the clearance. For additional information, refer to **SPECIFICATION**.



A0065165

Fig. 258: Installing Direct Clutch Pressure, Friction And Steel Plates
Courtesy of FORD MOTOR CO.

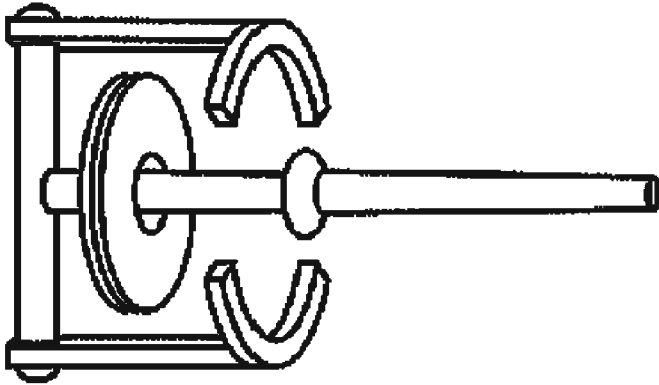
REVERSE CLUTCH

SPECIAL TOOL SPECIFICATION

Compressor, Clutch Spring 307-015
(T65L-77515-A)

2005 Ford Focus ZX4 S

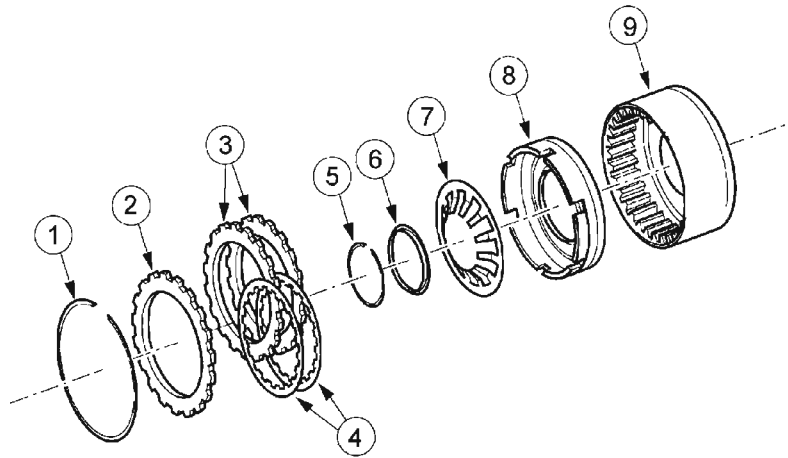
2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



ST1190-A

MATERIAL SPECIFICATION

Item	Specification
Automatic Transmission Fluid XT-5-QM	MERCON® V



ELE0022381

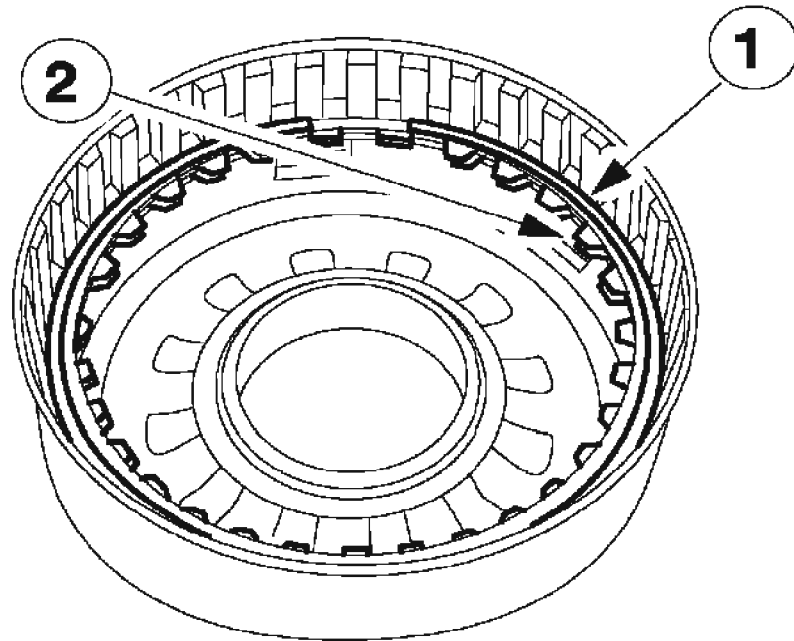
Item	Part Number	Description
1	7D483	Retaining ring
2	7B066	Pressure plate
3	7B442	Steel plate
4	7B164	Friction plate assembly
5	7H075	Spring retainer ring

Item	Part Number	Description
6	7D406	Spring retainer
7	7B070	Piston return spring
8	7B402	Piston assembly
9	7D044	Intermediate and overdrive drum assembly

Fig. 259: Exploded View Of Reverse Clutch
Courtesy of FORD MOTOR CO.

Disassembly

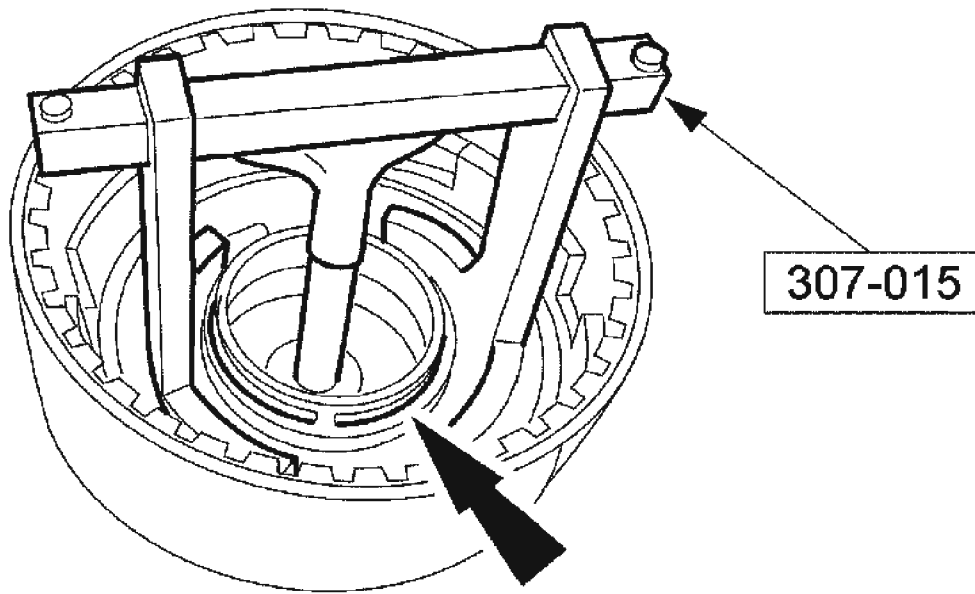
1. Remove the reverse clutch pressure, friction and steel plates.
 1. Remove the retaining ring.
 2. Remove the plates.



E0011763

Fig. 260: Removing Reverse Clutch Pressure, Friction And Steel Plates
Courtesy of FORD MOTOR CO.

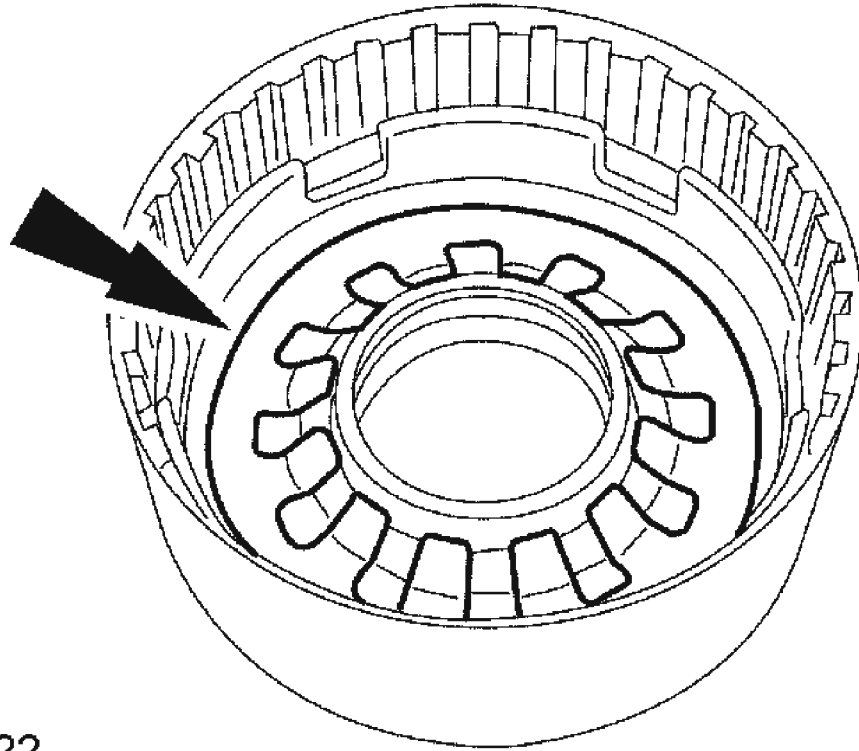
2. Using the special tool, remove the reverse clutch piston return spring retainer ring and retainer.



A0065206

Fig. 261: Removing Reverse Clutch Piston Return Spring Retainer Ring And Retainer Using Special Tool
Courtesy of FORD MOTOR CO.

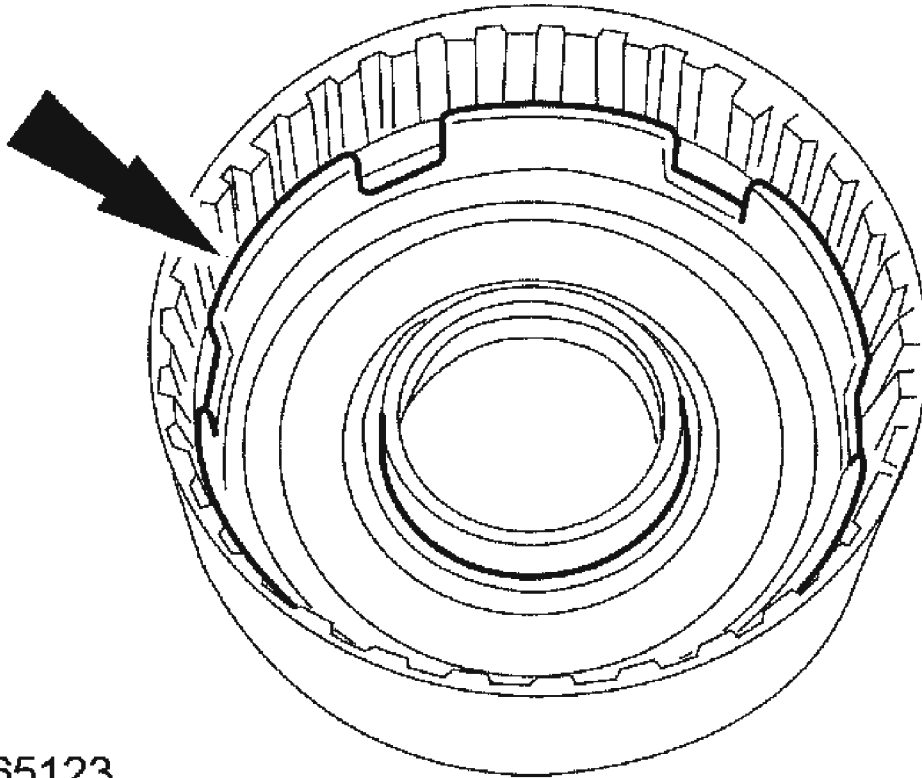
3. Remove the reverse clutch piston return spring.



A0065122

Fig. 262: Removing Reverse Clutch Piston Return Spring
Courtesy of FORD MOTOR CO.

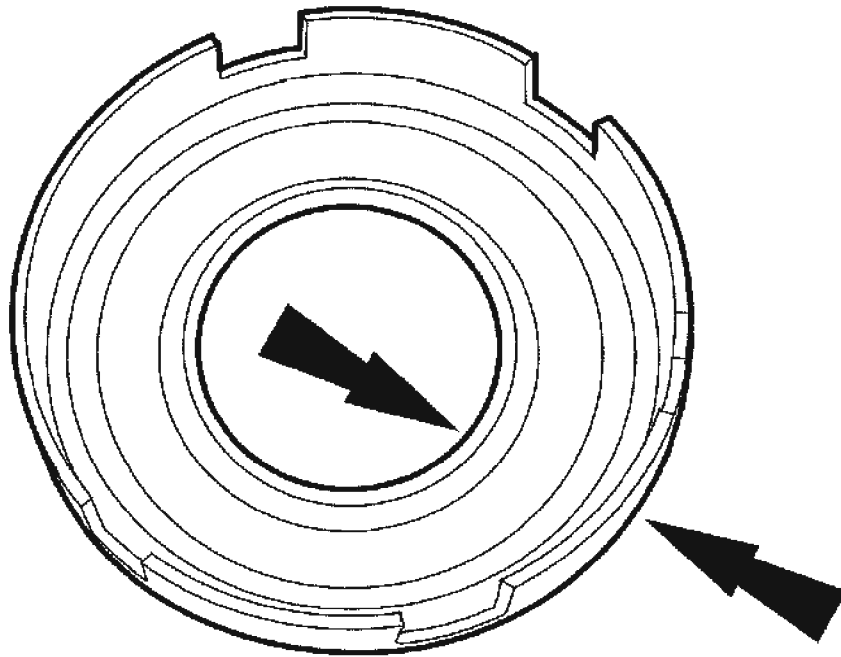
4. Remove the reverse clutch piston assembly.



A0065123

Fig. 263: Removing Reverse Clutch Piston Assembly
Courtesy of FORD MOTOR CO.

CAUTION: If damage is found to the reverse clutch piston seals,
install a new reverse clutch piston.



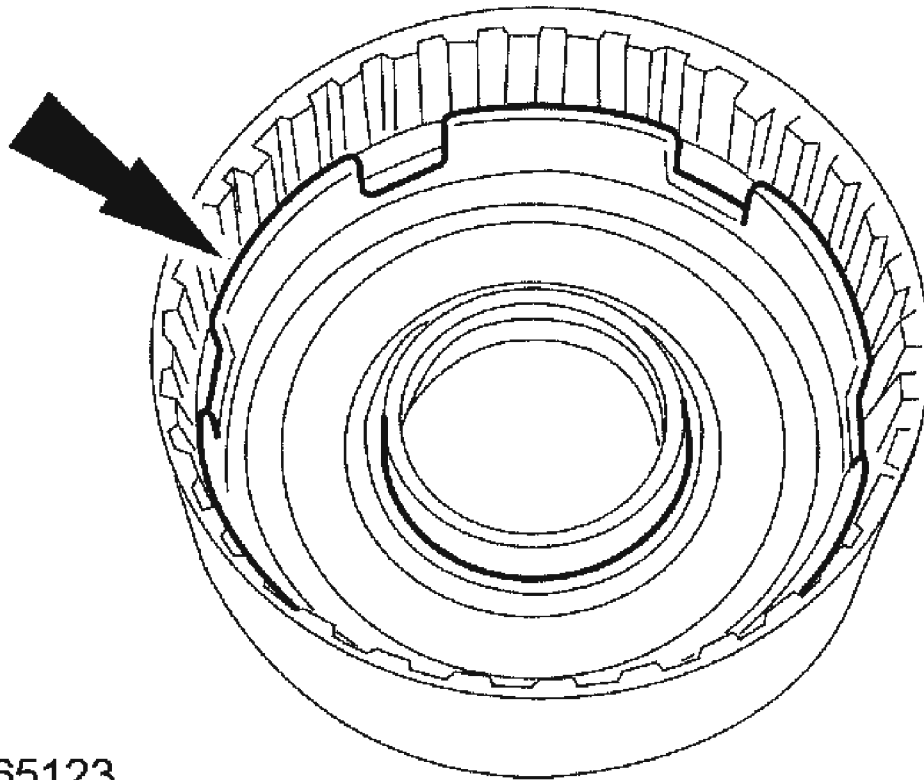
A0065124

Fig. 264: Installing Seal Bore In Drum, Inner And Outer Seals
Courtesy of FORD MOTOR CO.

5. Inspect the seal bore in drum, inner and outer seals.

Assembly

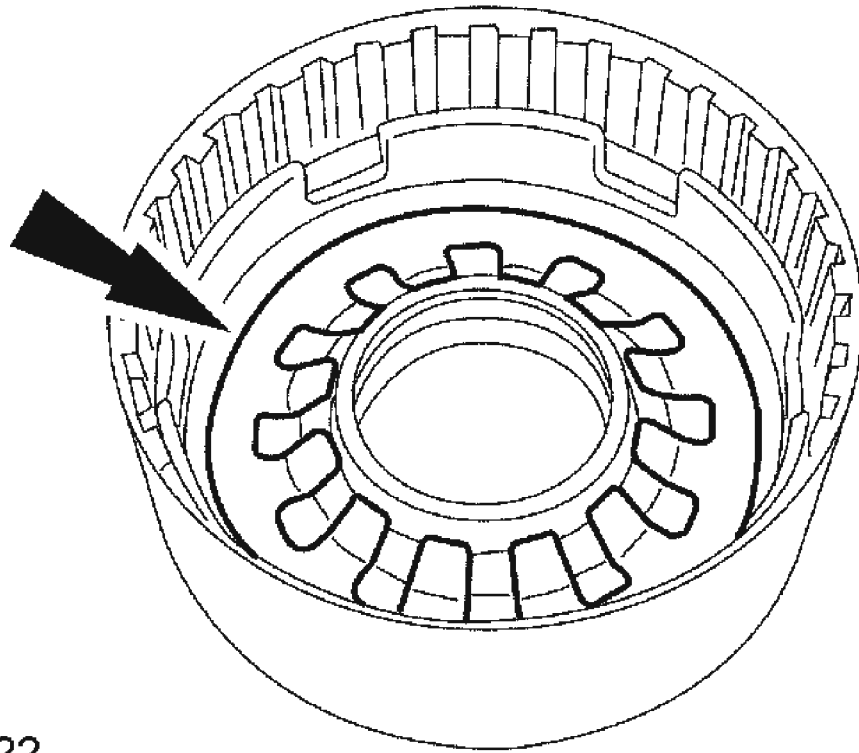
1. Soak the internal spline clutch plates in clean automatic transmission fluid for 15 minutes before assembly.
2. Lubricate and install the reverse clutch piston assembly.



A0065123

Fig. 265: Installing Reverse Clutch Piston Assembly
Courtesy of FORD MOTOR CO.

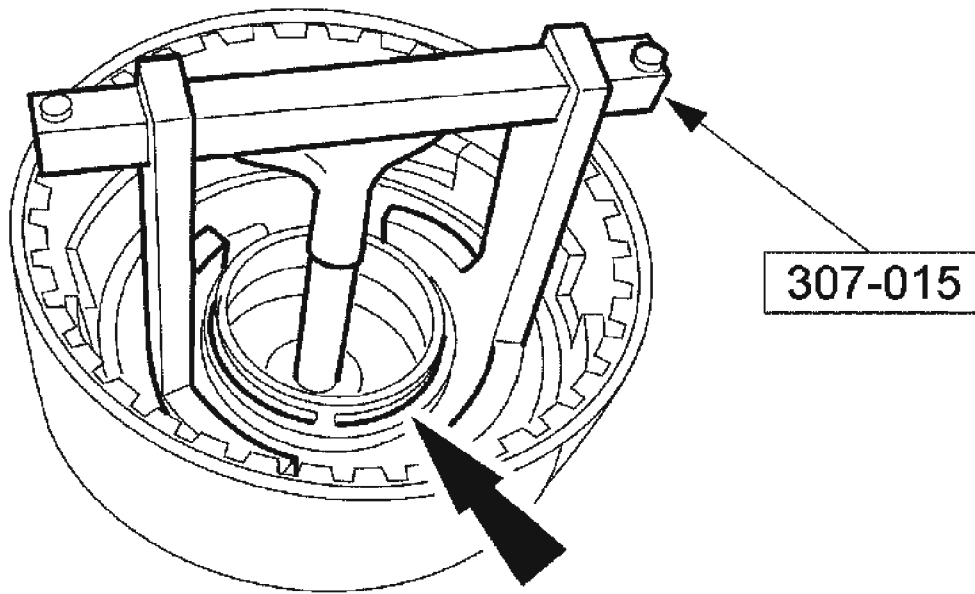
3. Install the reverse clutch piston return spring.



A0065122

Fig. 266: Installing Reverse Clutch Piston Return Spring
Courtesy of FORD MOTOR CO.

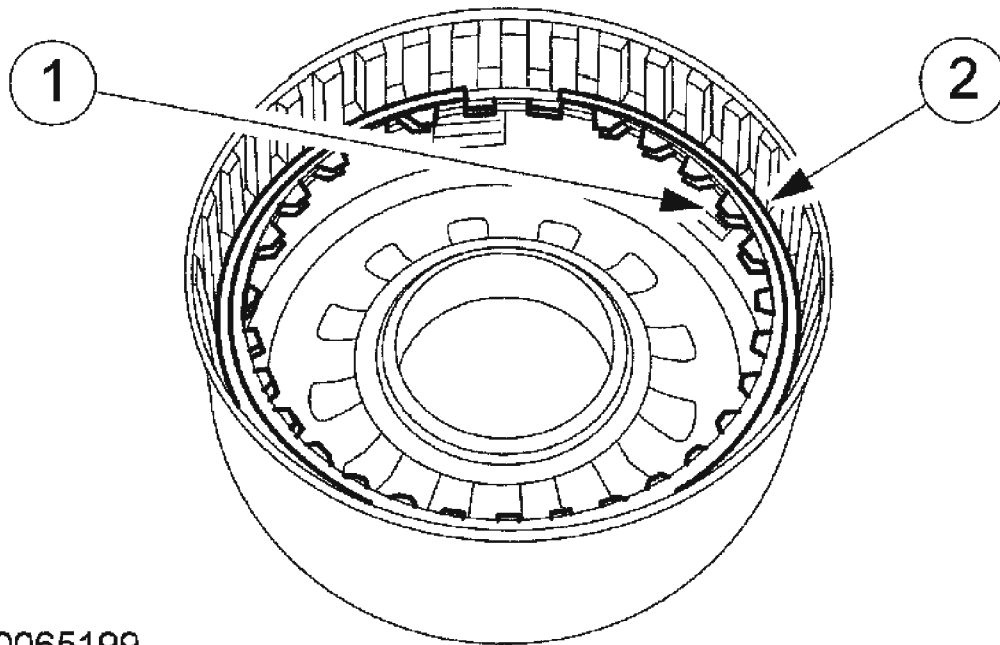
4. Using the special tool, install the reverse clutch piston return spring retainer and retainer ring.



A0065206

Fig. 267: Installing Reverse Clutch Piston Return Spring Retainer And Retainer Ring Using Special Tool
Courtesy of FORD MOTOR CO.

5. Install the reverse clutch pressure, friction and steel plates.
 1. Install the plates.
 2. Install the retaining ring.
 - Check the clearance. For additional information, refer to **SPECIFICATIONS**.



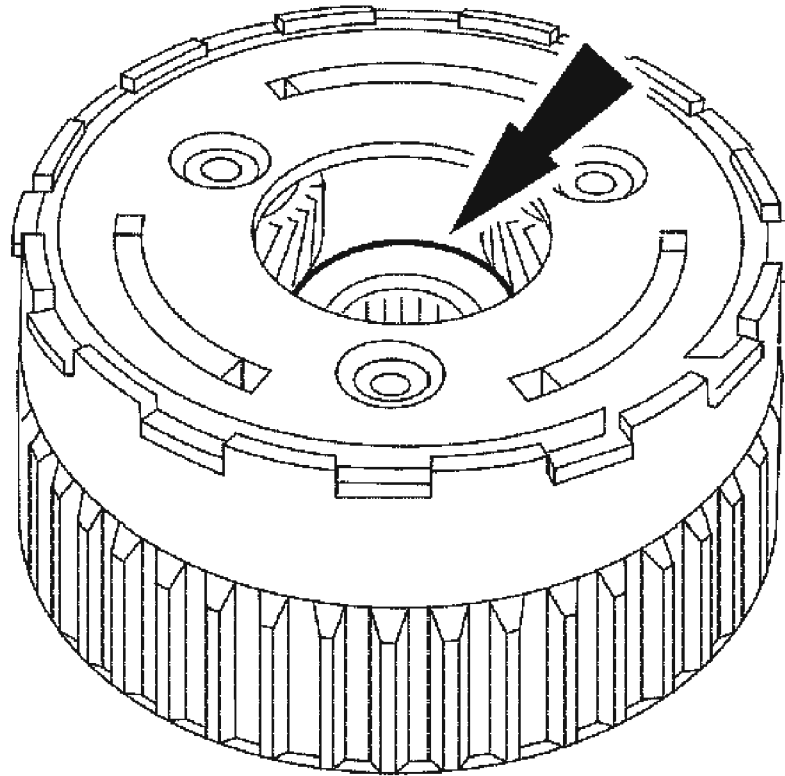
A0065199

Fig. 268: Installing Reverse Clutch Pressure, Friction And Steel Plates
Courtesy of FORD MOTOR CO.

PLANETARY ASSEMBLY

Disassembly

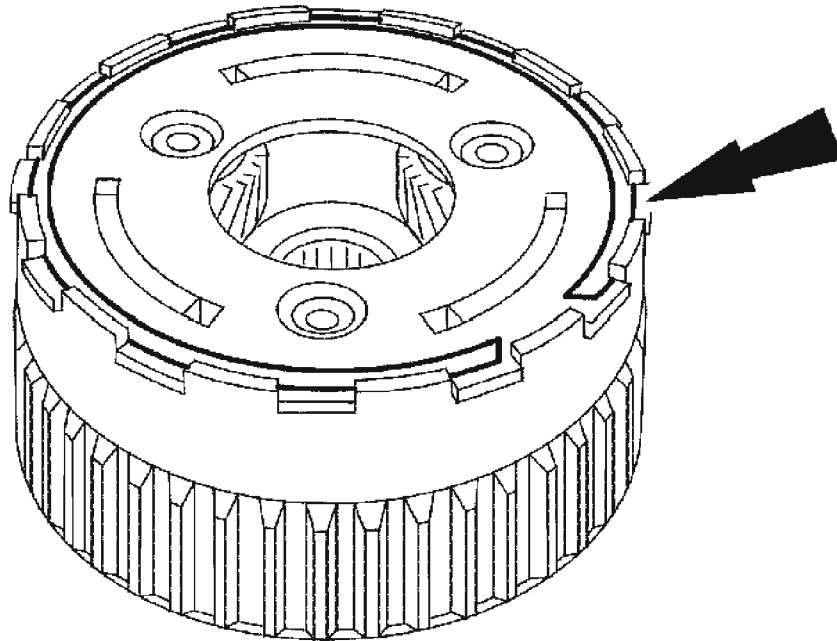
1. Inspect the planet internal bearing for damage.



A0065234

Fig. 269: Inspecting Planet Internal Bearing For Damage
Courtesy of FORD MOTOR CO.

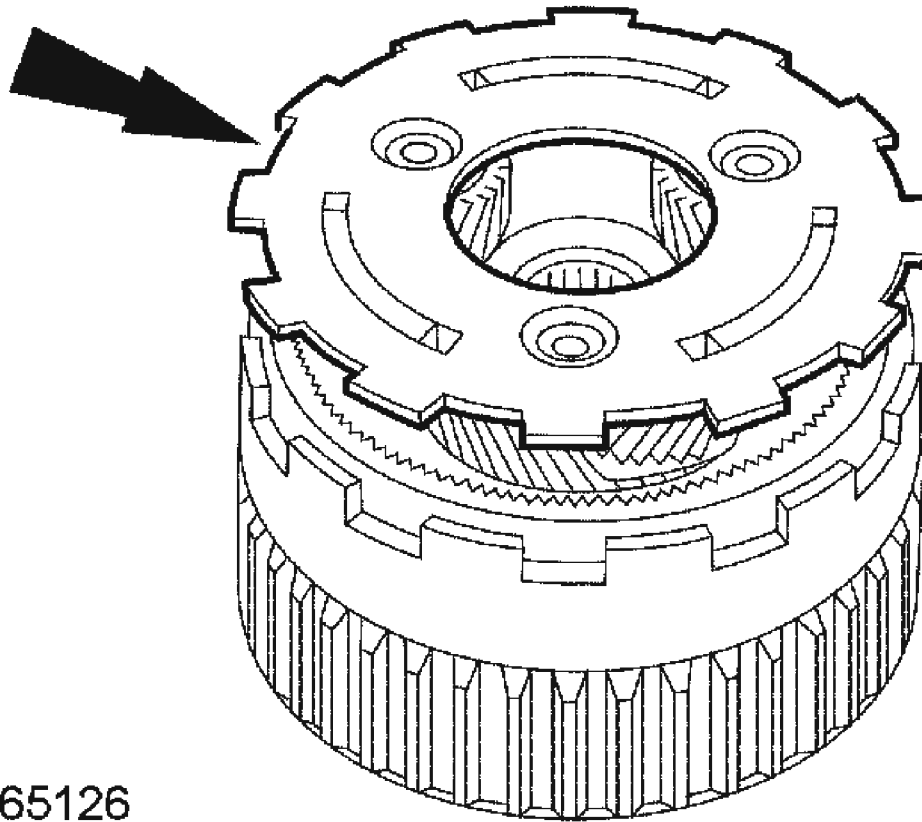
2. Remove the snap ring.



A0065125

Fig. 270: Removing Snap Ring
Courtesy of FORD MOTOR CO.

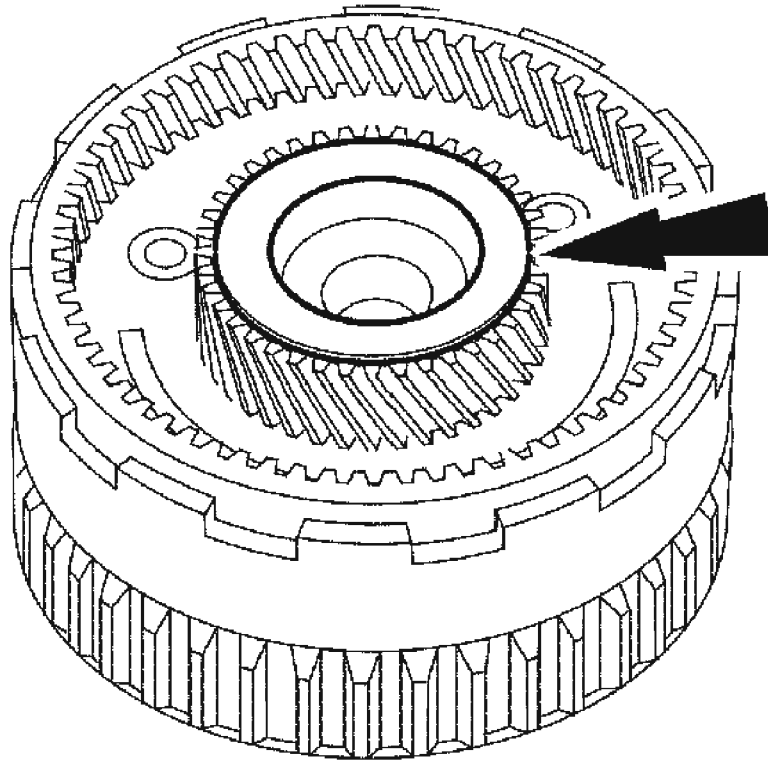
3. Remove the rear planet assembly.



A0065126

Fig. 271: Removing Rear Planet Assembly
Courtesy of FORD MOTOR CO.

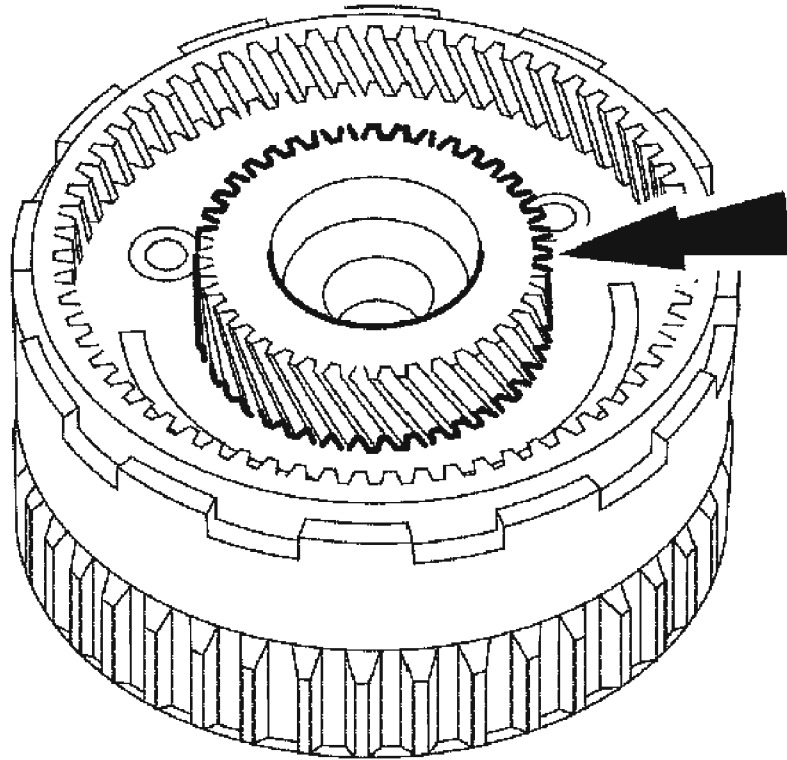
4. Remove the thrust bearing.



A0065127

Fig. 272: Removing Thrust Bearing
Courtesy of FORD MOTOR CO.

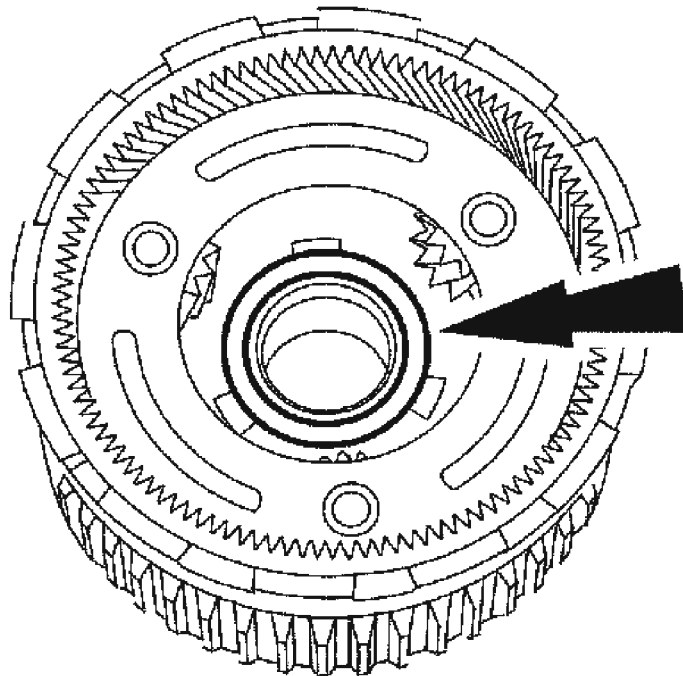
5. Remove the forward planet sun gear.



A0065128

Fig. 273: Removing Forward Planet Sun Gear
Courtesy of FORD MOTOR CO.

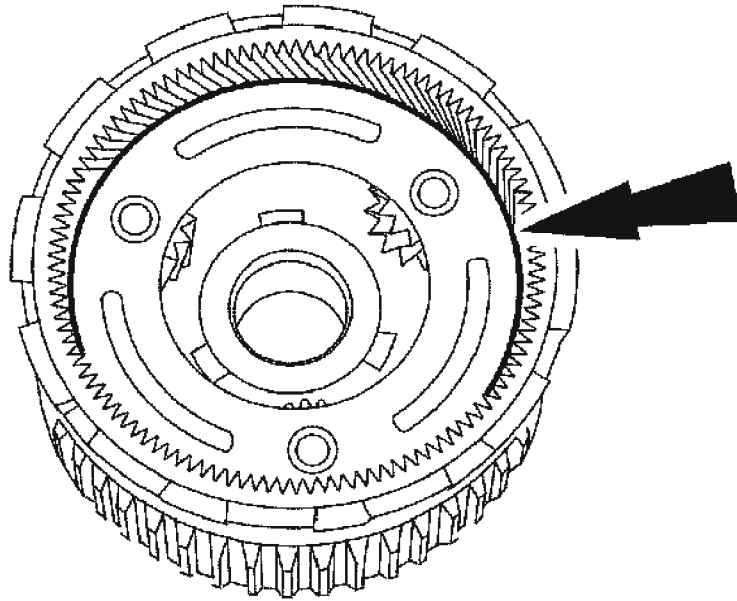
6. Remove the thrust bearing.



A0065129

Fig. 274: Removing Thrust Bearing
Courtesy of FORD MOTOR CO.

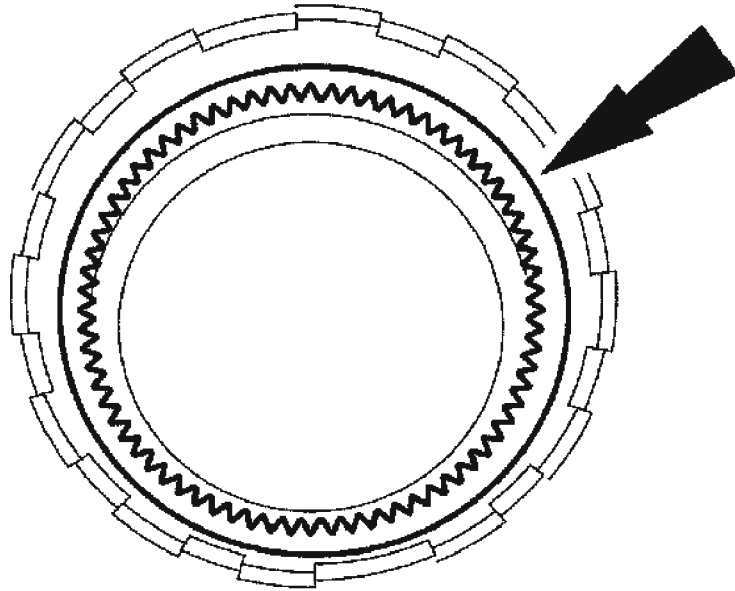
7. Remove the forward planet assembly.



A0065130

Fig. 275: Removing Forward Planet Assembly
Courtesy of FORD MOTOR CO.

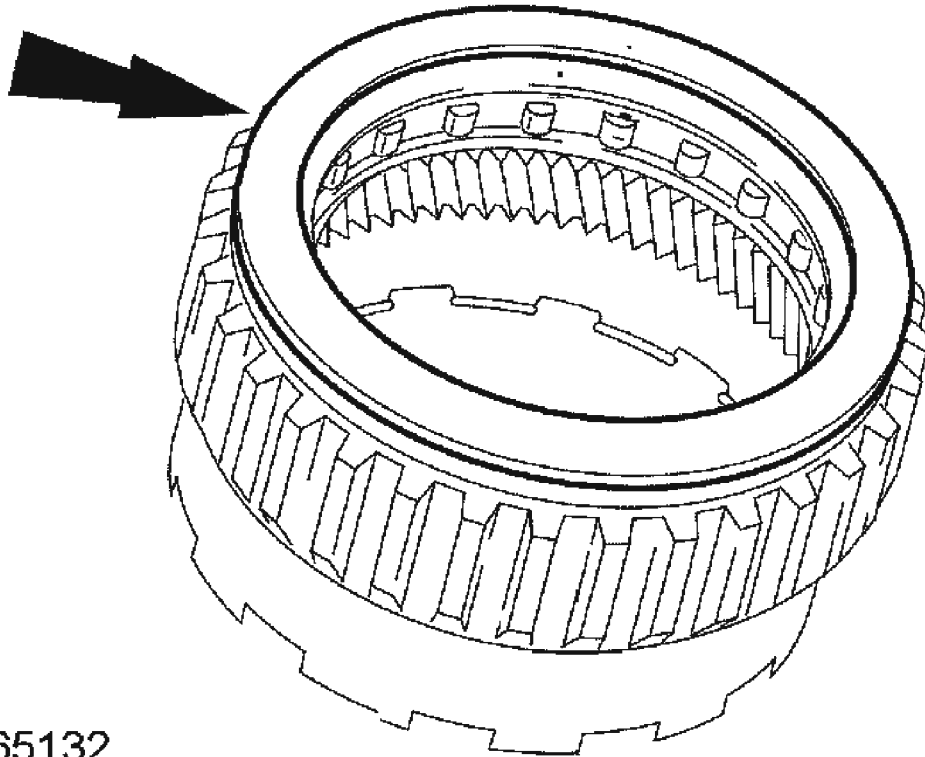
8. Inspect the low and reverse ring gear.



A0065131

Fig. 276: Inspecting Low And Reverse Ring Gear
Courtesy of FORD MOTOR CO.

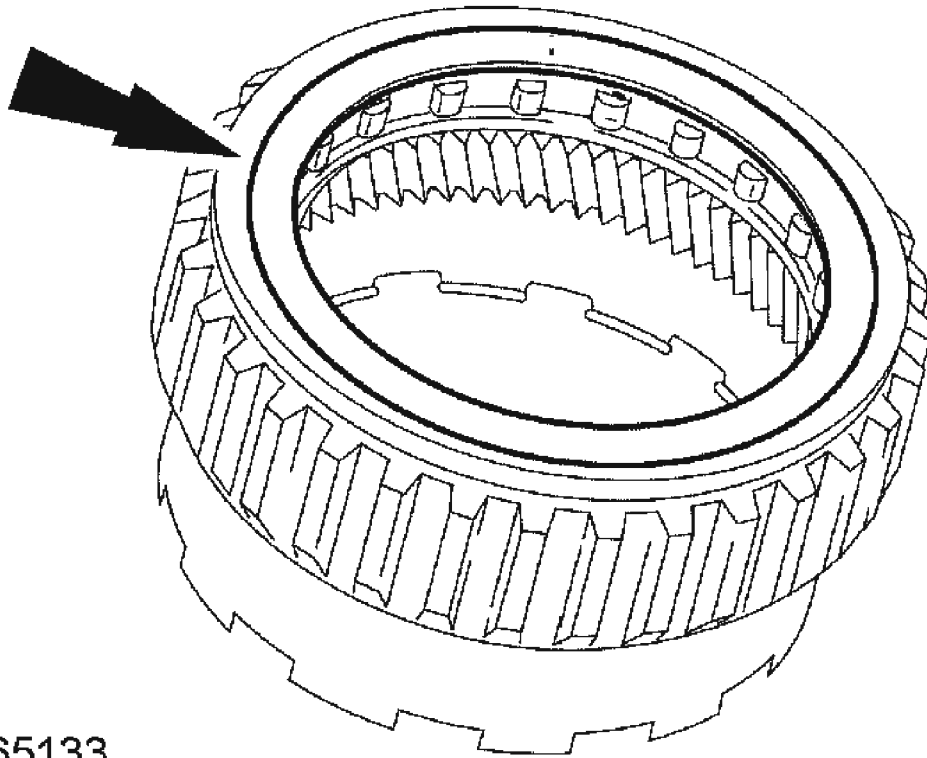
9. Remove the top retainer of the one-way clutch.



A0065132

Fig. 277: Removing Top Retainer Of One-Way Clutch
Courtesy of FORD MOTOR CO.

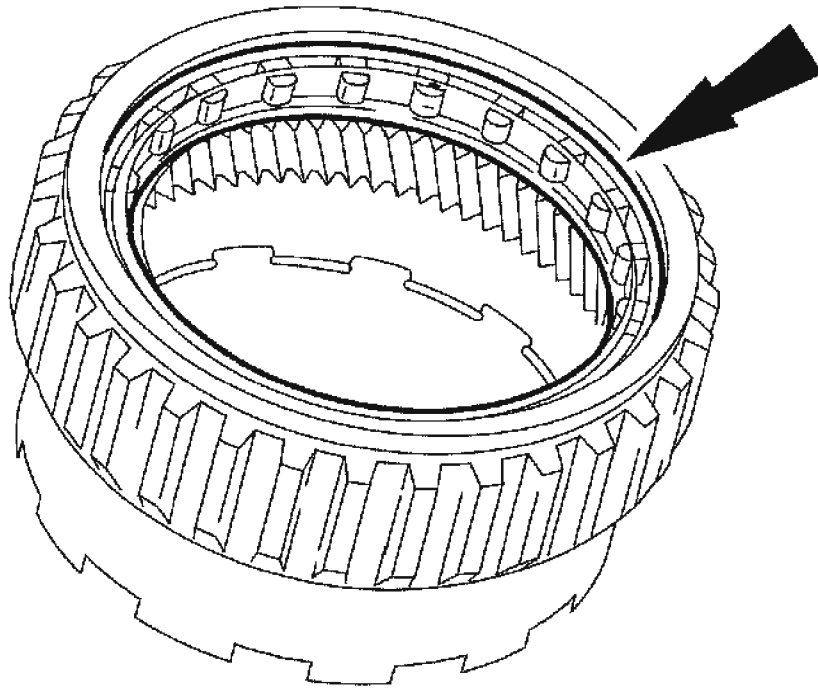
10. Remove the top one-way clutch ring.



A0065133

Fig. 278: Removing Top One-Way Clutch Ring
Courtesy of FORD MOTOR CO.

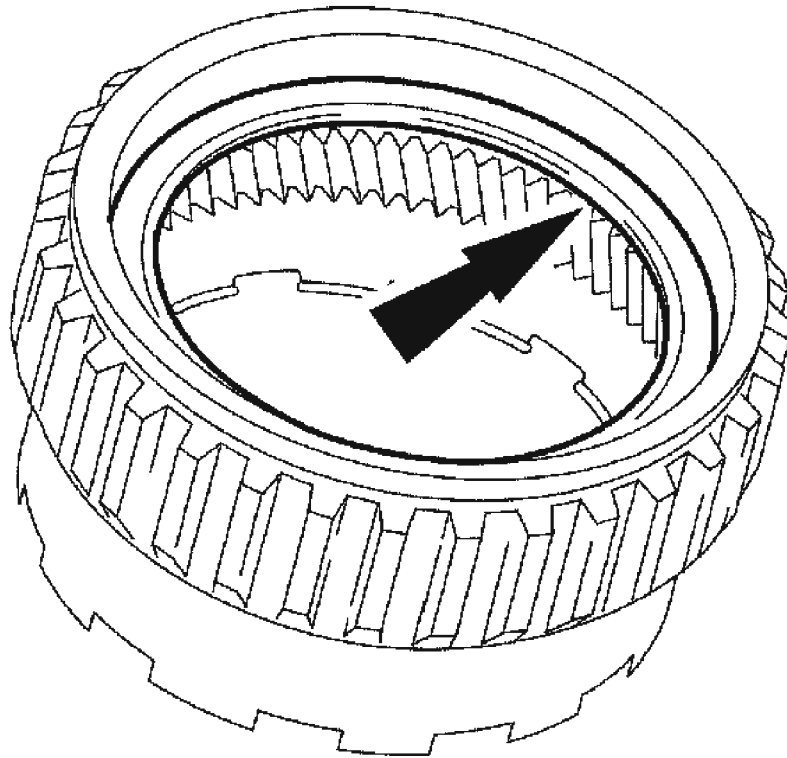
11. Remove the low one-way clutch assembly.



A0065134

Fig. 279: Removing Low One-Way Clutch Assembly
Courtesy of FORD MOTOR CO.

12. Remove the lower one-way ring.

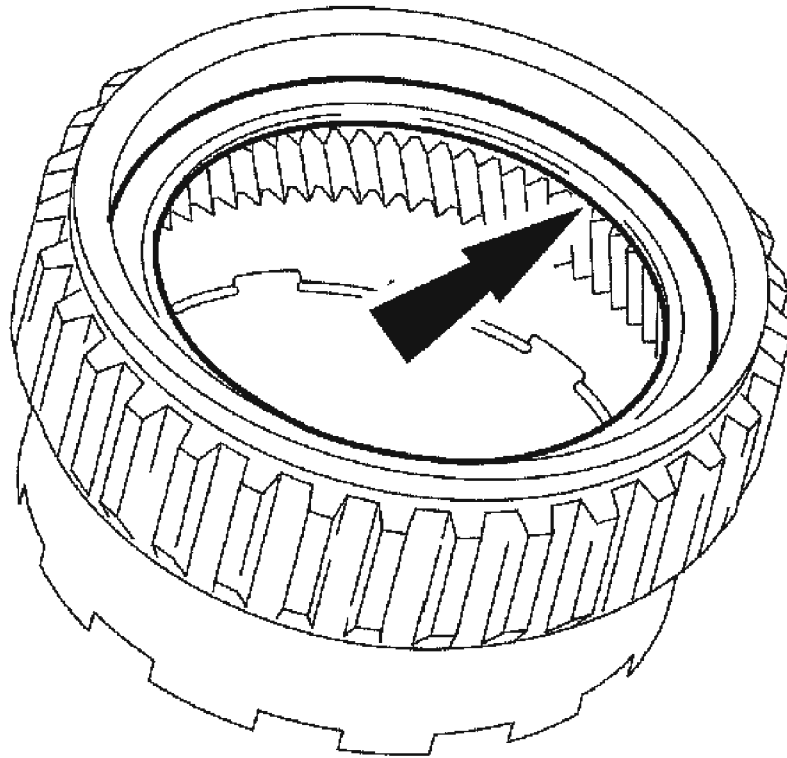


A0065140

Fig. 280: Removing Lower One-Way Ring
Courtesy of FORD MOTOR CO.

Assembly

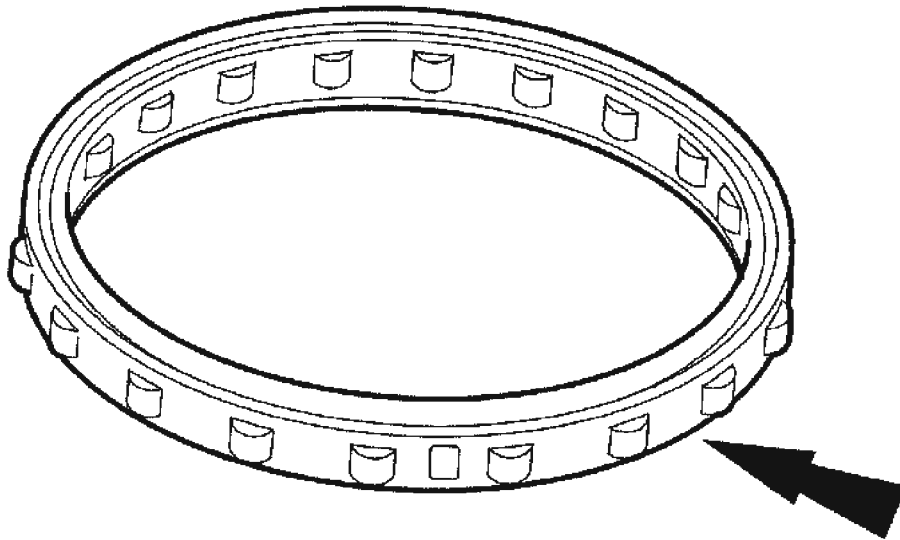
1. Install the lower one-way ring.



A0065140

Fig. 281: Installing Lower One-Way Ring
Courtesy of FORD MOTOR CO.

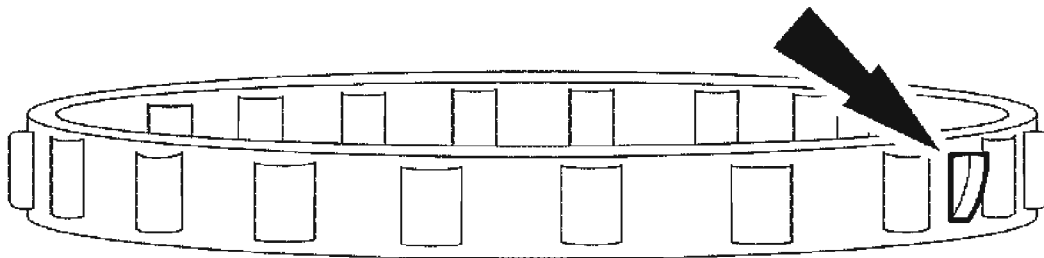
2. Inspect the rollers and the springs of the one-way clutch.



A0065141

Fig. 282: Inspecting Rollers And Springs Of One-Way Clutch
Courtesy of FORD MOTOR CO.

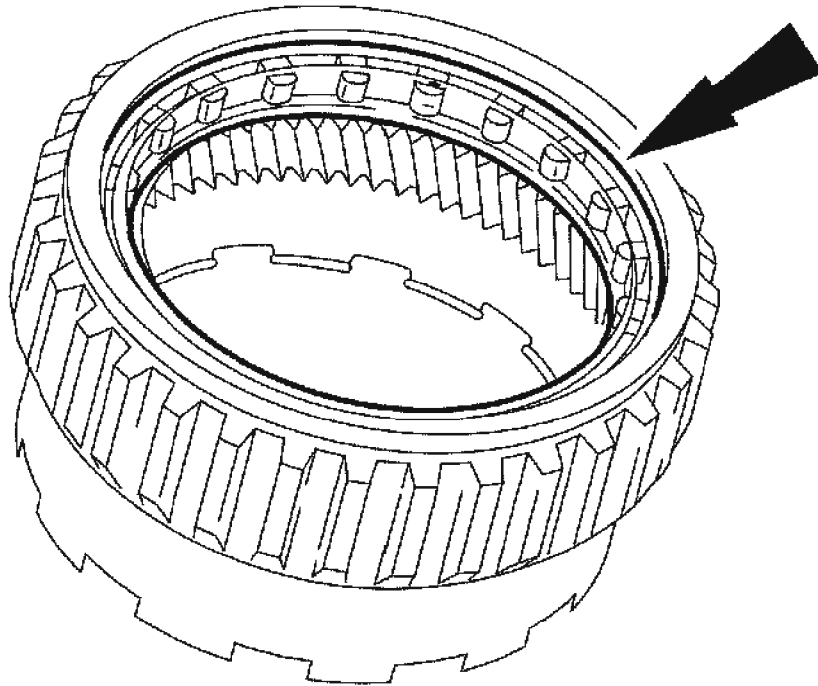
3. Make sure the low one-way clutch is installed with the tab pointing in the direction as shown.



A0065210

Fig. 283: Identifying Low One-Way Clutch Is Installed With The Tab Pointing Out
Courtesy of FORD MOTOR CO.

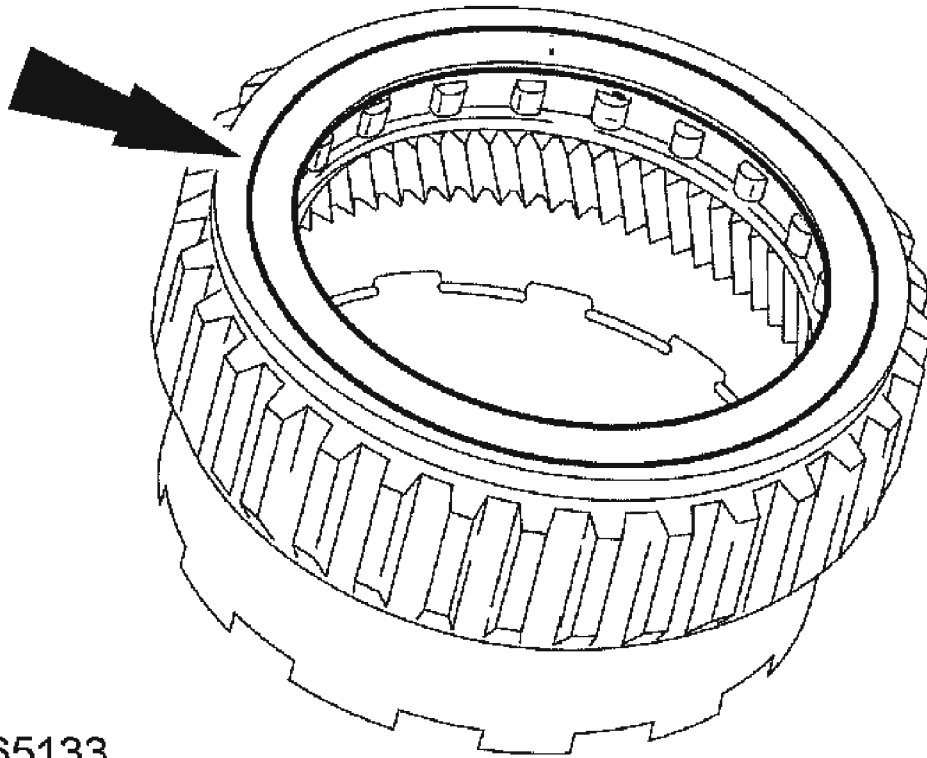
4. Install the low one-way clutch.



A0065134

Fig. 284: Installing Low One-Way Clutch
Courtesy of FORD MOTOR CO.

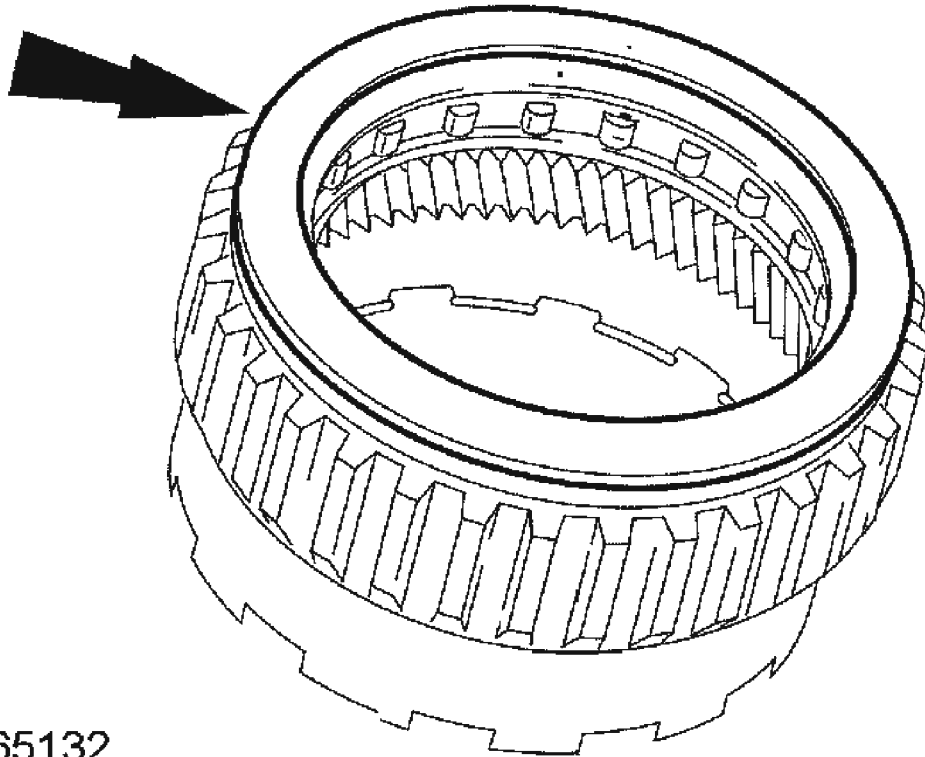
5. Install the top one-way clutch ring.



A0065133

Fig. 285: Installing Top One-Way Clutch Ring
Courtesy of FORD MOTOR CO.

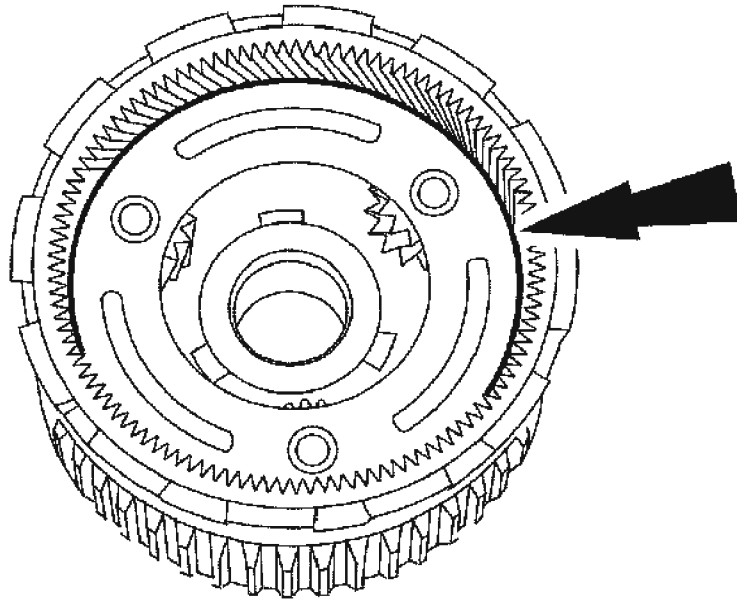
6. Install the top retainer of the one-way clutch.



A0065132

Fig. 286: Installing Top Retainer Of One-Way Clutch
Courtesy of FORD MOTOR CO.

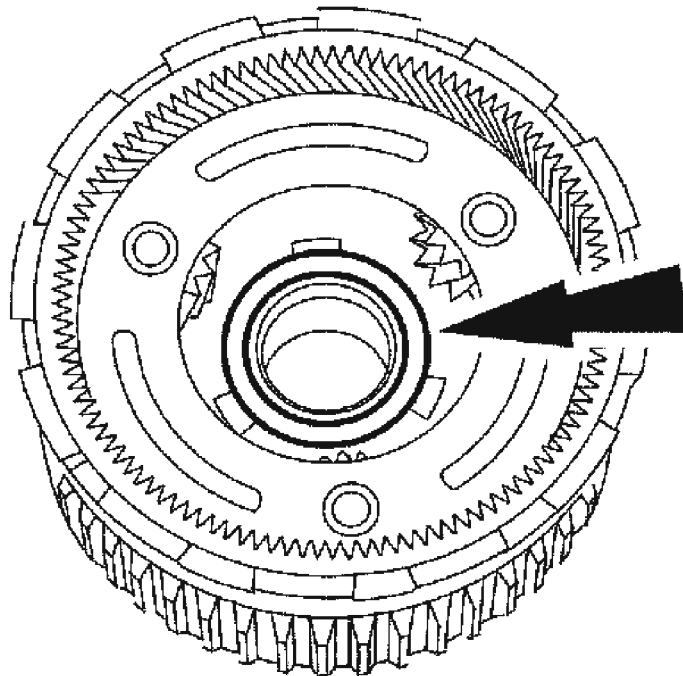
7. Install the forward planet assembly.



A0065130

Fig. 287: Installing Forward Planet Assembly
Courtesy of FORD MOTOR CO.

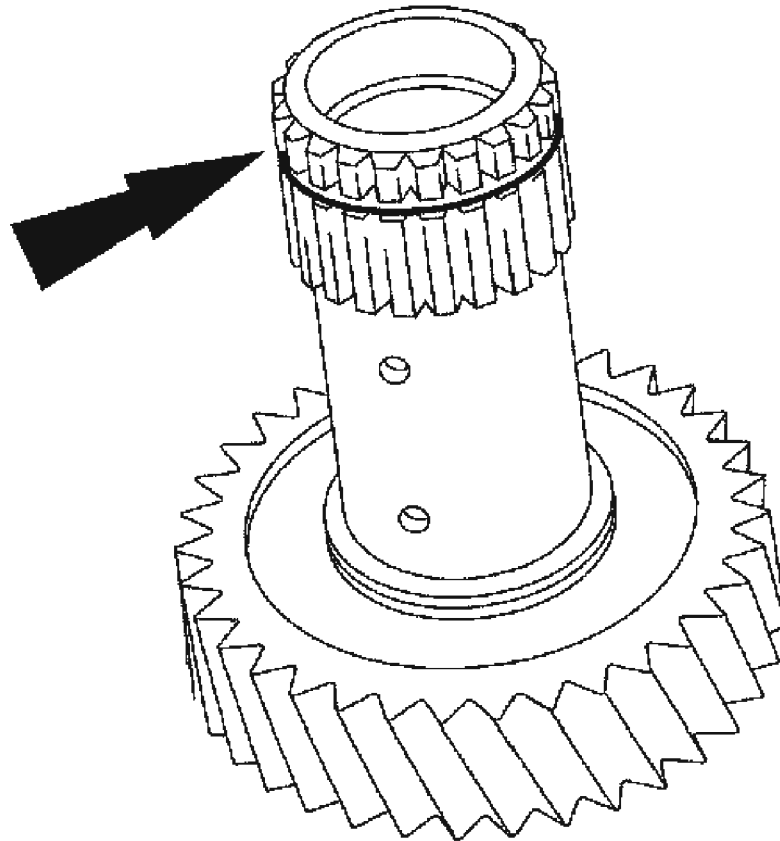
8. Install the thrust bearing.



A0065129

Fig. 288: Installing Thrust Bearing
Courtesy of FORD MOTOR CO.

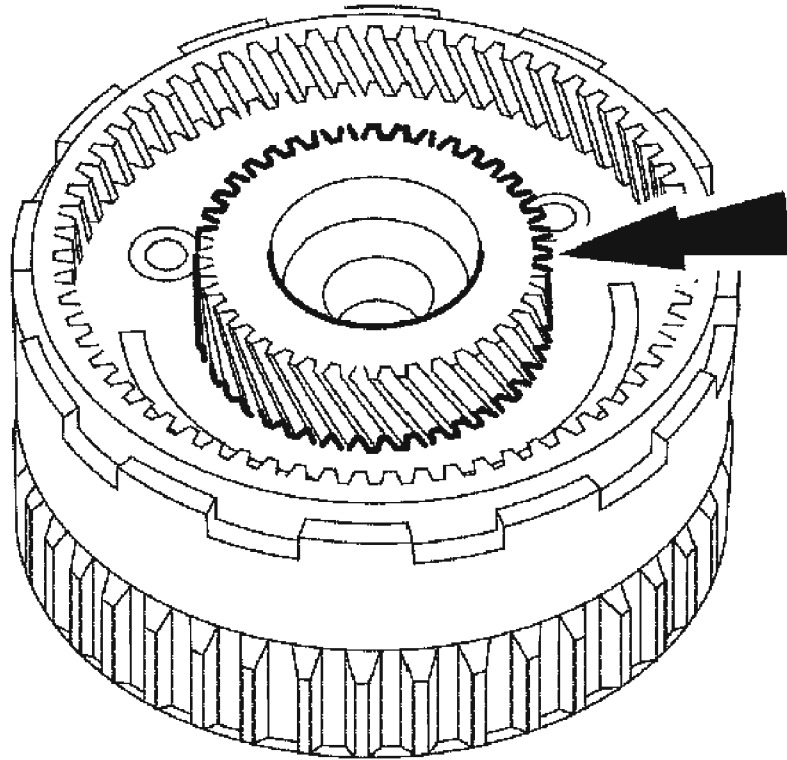
9. Inspect the front sun gear retaining ring.



A0065177

Fig. 289: Inspecting Front Sun Gear Retaining Ring
Courtesy of FORD MOTOR CO.

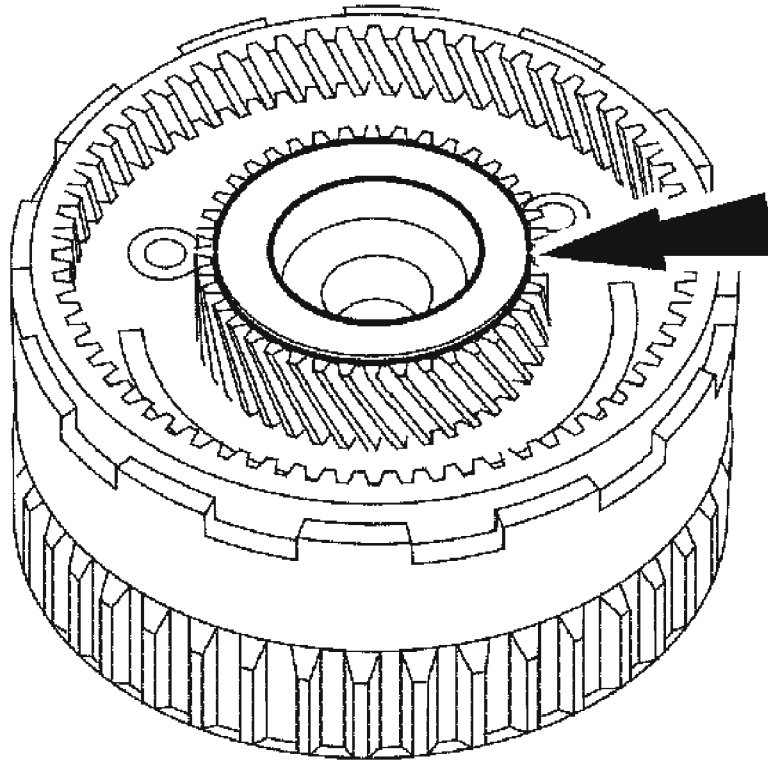
10. Install the forward planet sun gear.



A0065128

Fig. 290: Installing Forward Planet Sun Gear
Courtesy of FORD MOTOR CO.

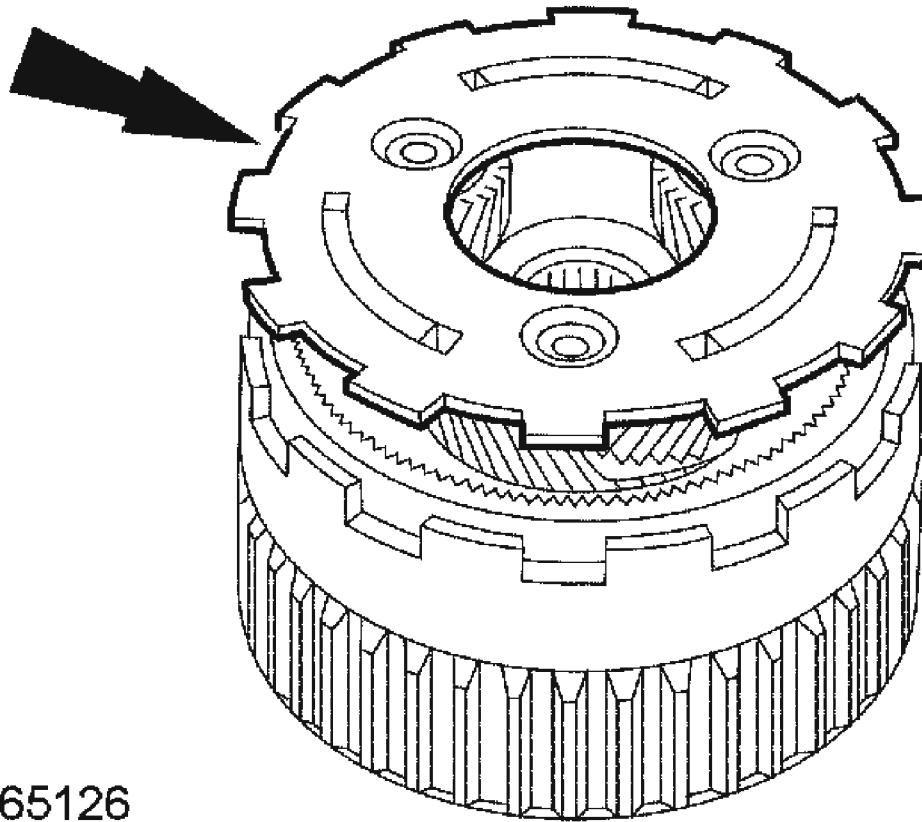
11. Install the thrust bearing.



A0065127

Fig. 291: Installing Thrust Bearing
Courtesy of FORD MOTOR CO.

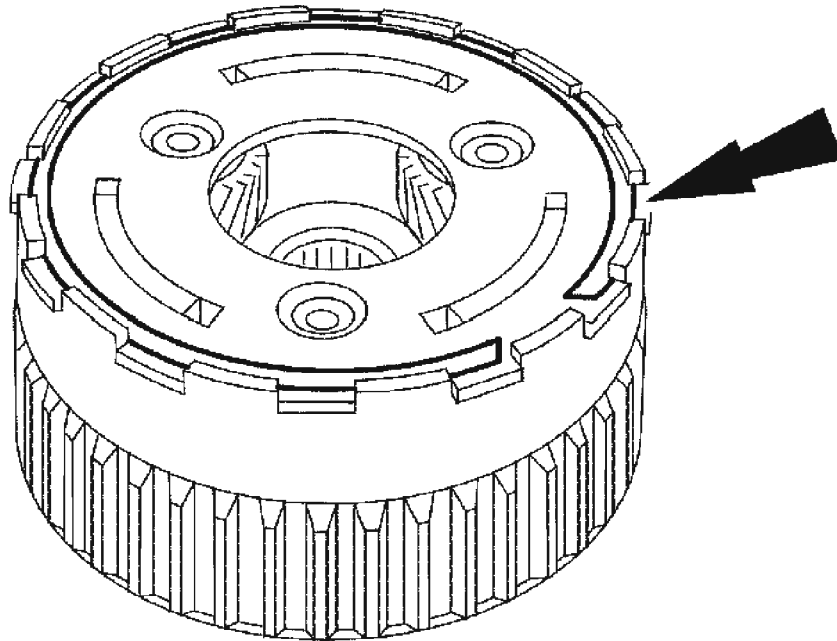
12. Install the rear planet assembly.



A0065126

Fig. 292: Installing Rear Planet Assembly
Courtesy of FORD MOTOR CO.

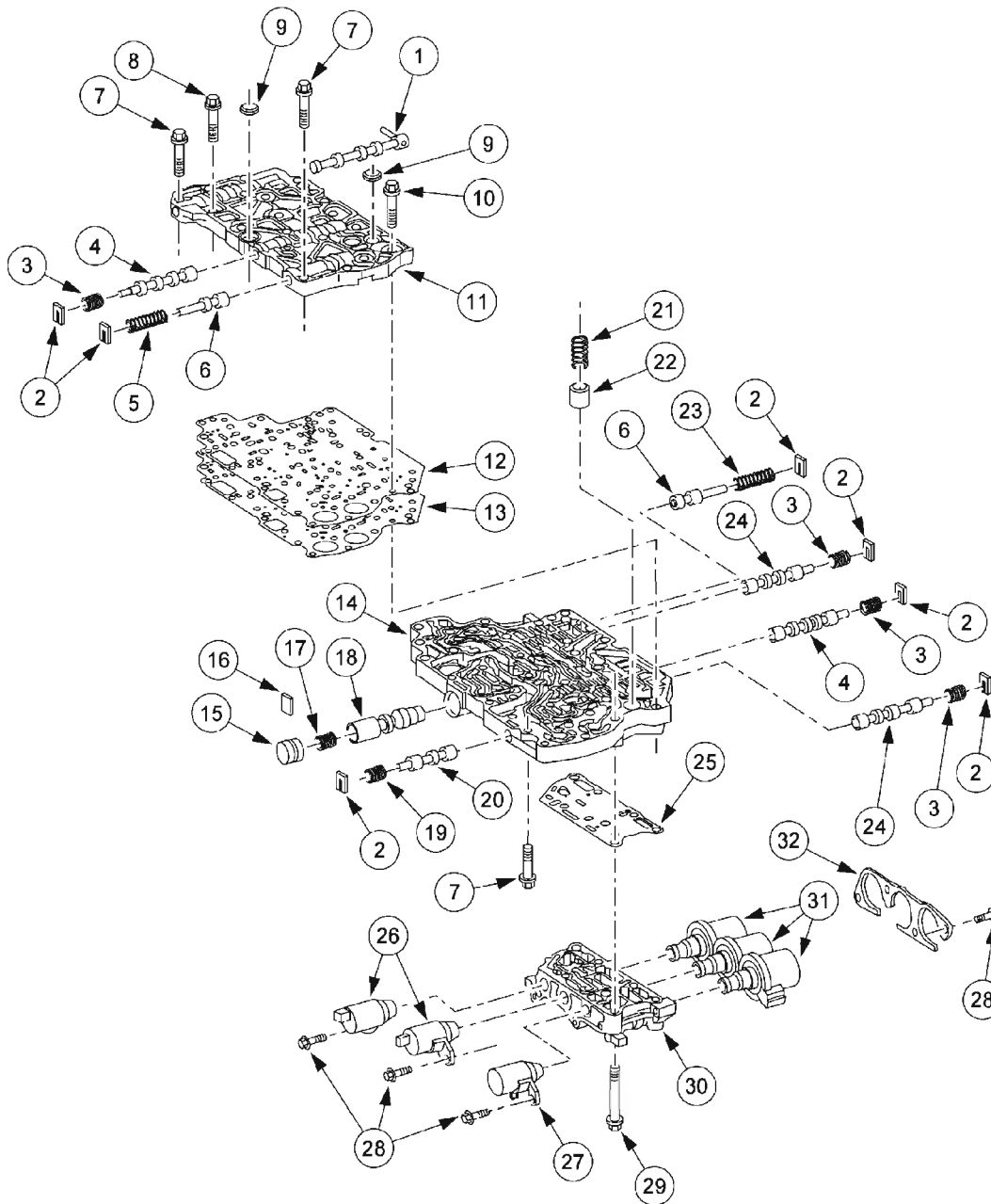
13. Install the snap ring.



A0065125

Fig. 293: Installing Snap Ring
Courtesy of FORD MOTOR CO.

MAIN CONTROL VALVE BODY

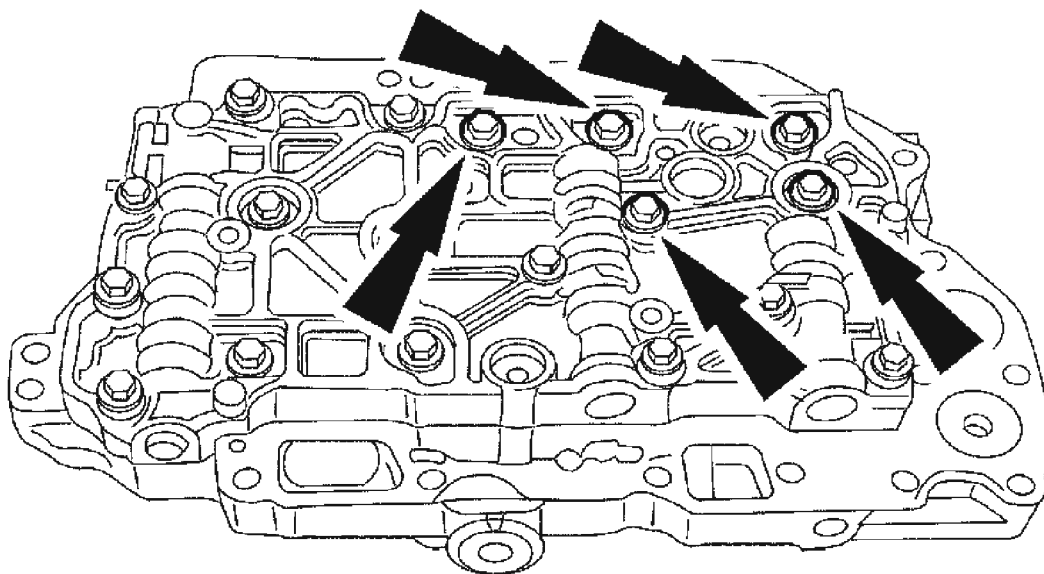


TIE0018307

Fig. 294: Exploded View Of Main Control Valve Body (1 Of 2)
 Courtesy of FORD MOTOR CO.

Disassembly

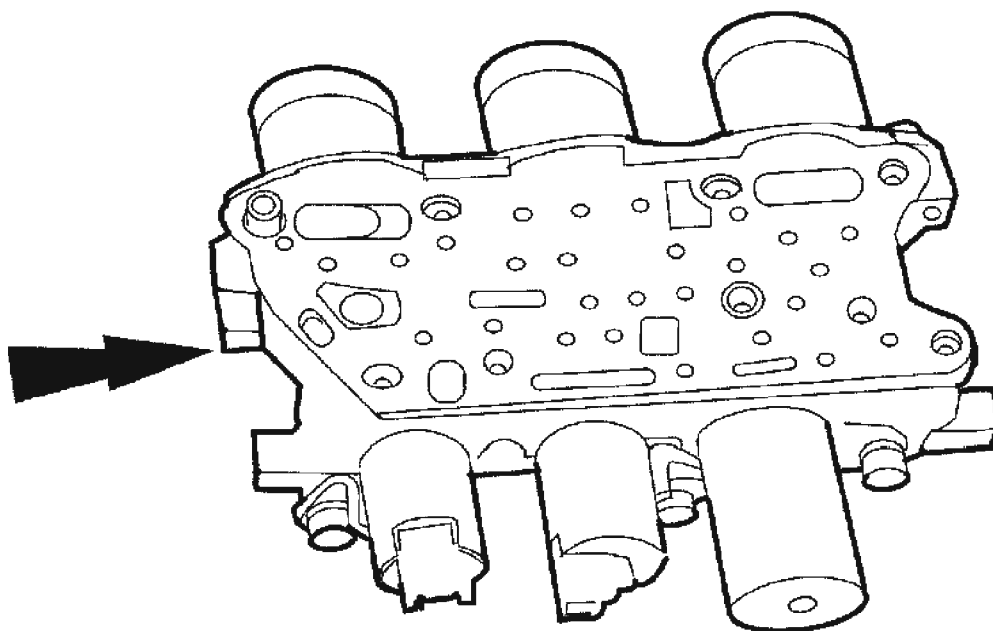
1. Remove the solenoid body bolts and the solenoid body.



A0065159

Fig. 295: Removing Solenoid Body Bolts
Courtesy of FORD MOTOR CO.

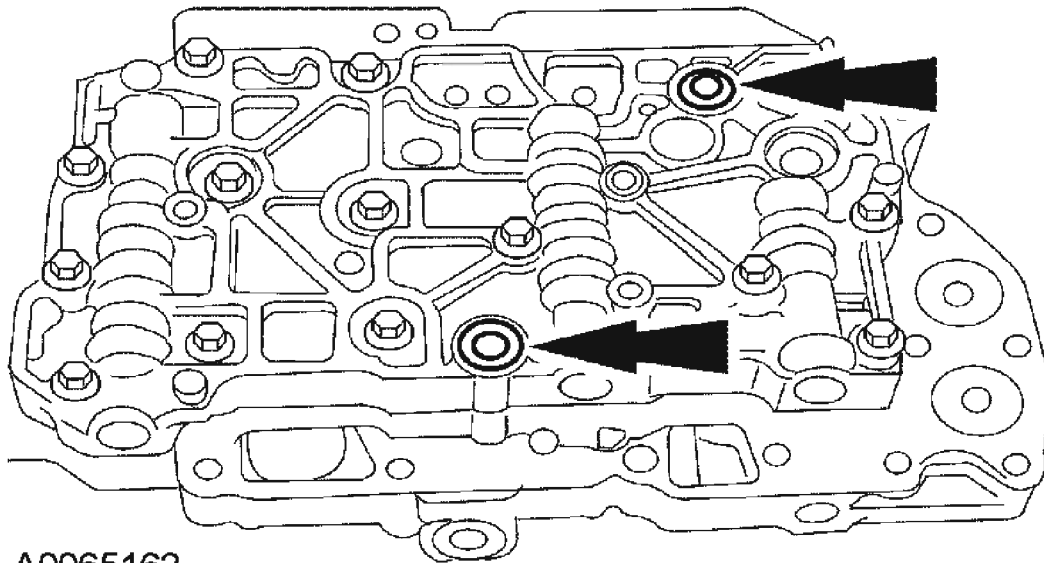
2. Remove and discard the solenoid body gaskets.



A0065161

Fig. 296: Removing Solenoid Body Gaskets
Courtesy of FORD MOTOR CO.

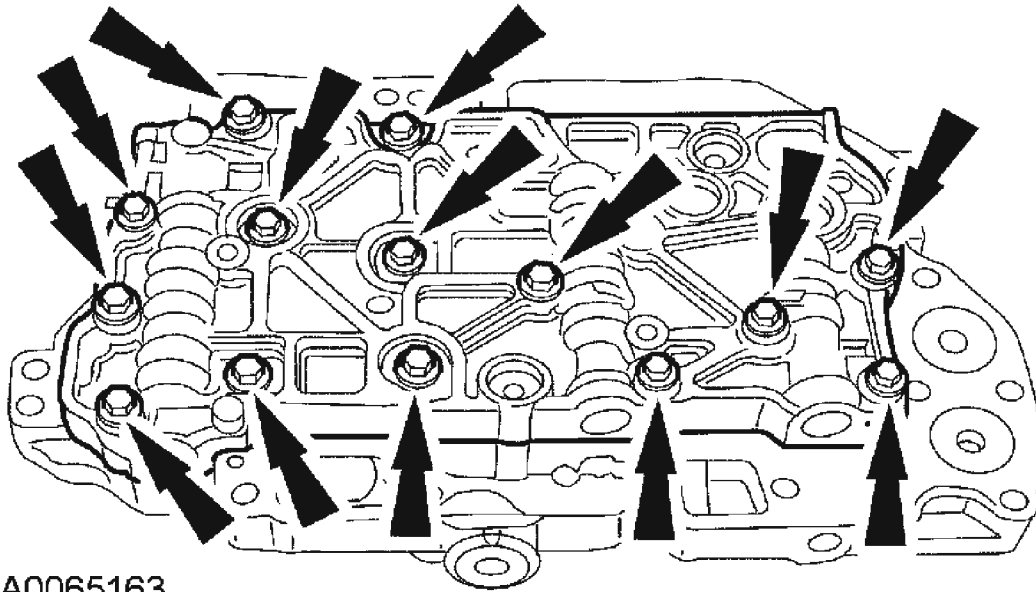
3. Remove and discard the seals.



A0065162

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

4. Disassemble the main control valve body.

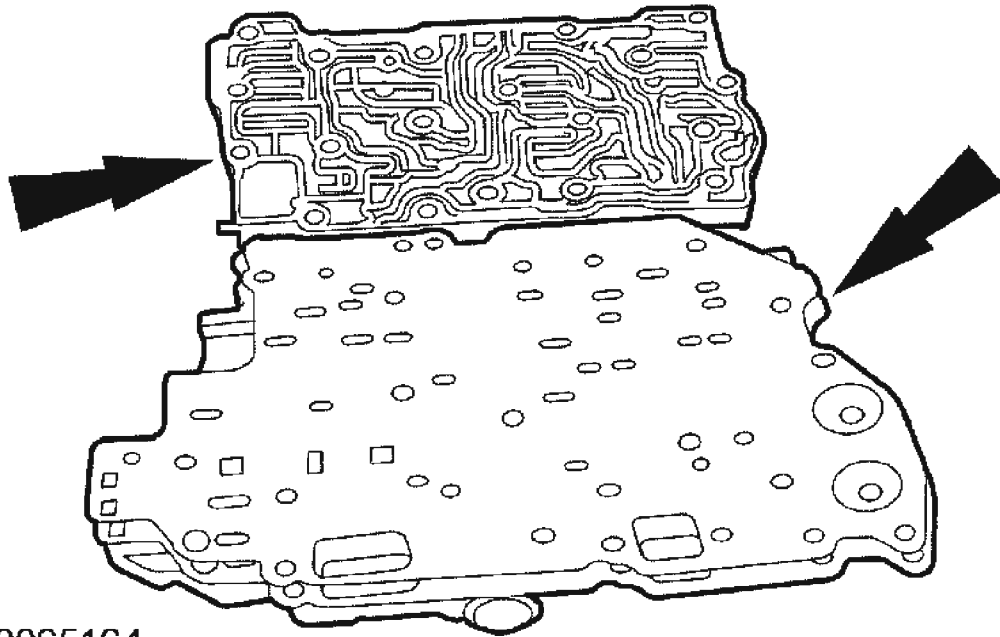


A0065163

Fig. 298: Disassembling Main Control Valve Body
Courtesy of FORD MOTOR CO.

Assembly

- NOTE:** The top side of the separator plate has a bonded gasket.
- NOTE:** The separator gasket goes on the bottom side.
- NOTE:** Inspect the main control valve body.

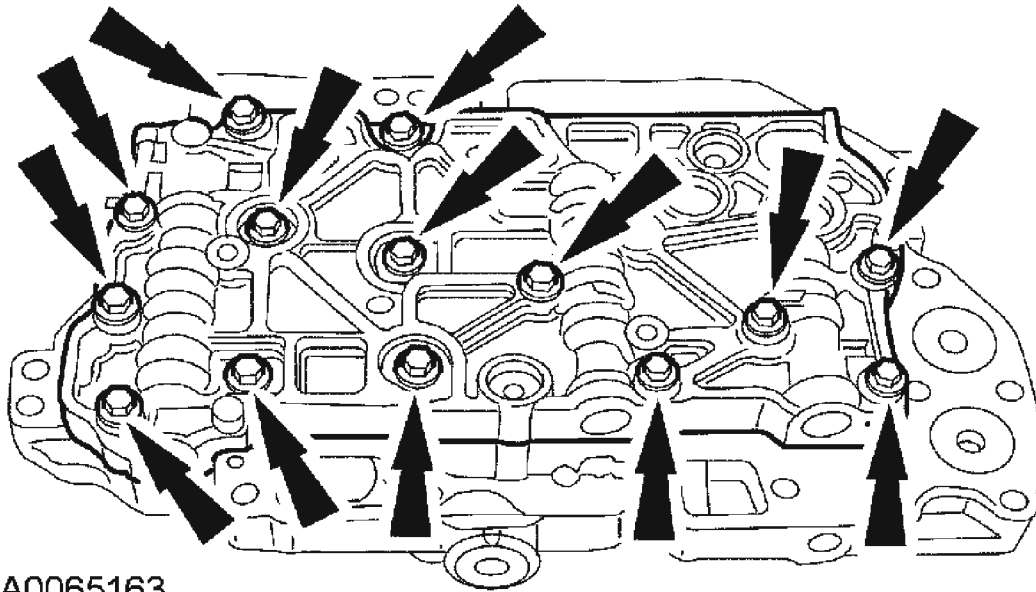


A0065164

Fig. 299: Installing Control Valve Body Plate Assembly And Separator Gaskets
Courtesy of FORD MOTOR CO.

1. Installing new control valve body plate assembly and separator gaskets.

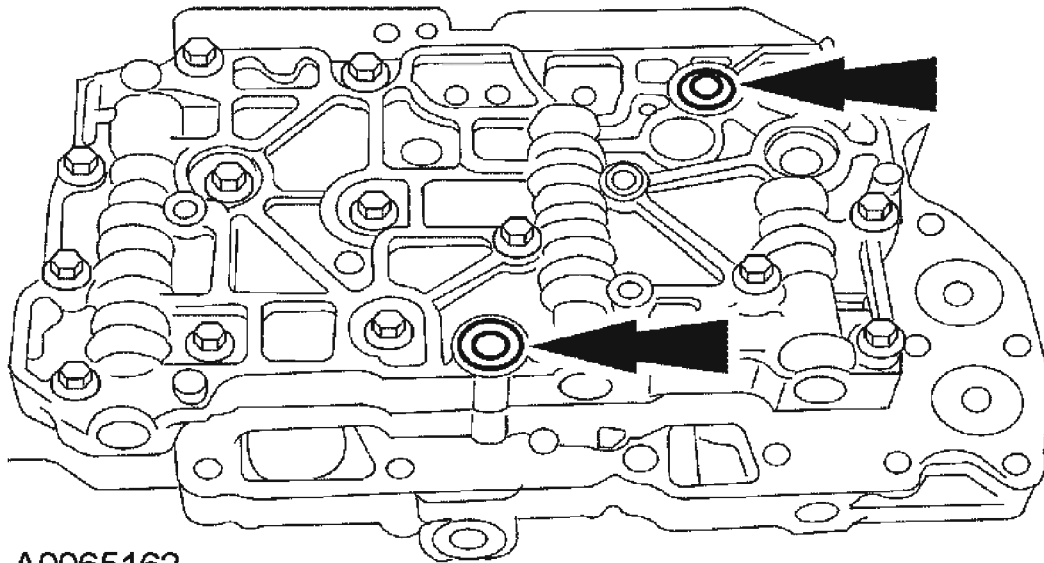
NOTE: **Do not fully tighten the bolts at this stage.**



A0065163

Fig. 300: Assembling Main Control Valve Body
Courtesy of FORD MOTOR CO.

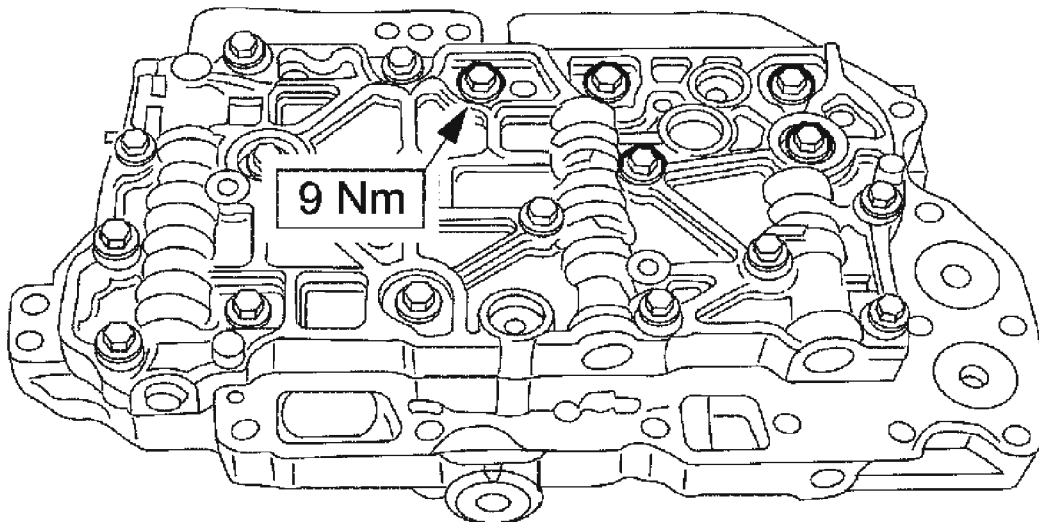
2. Assemble the main control valve body.
3. Install the seals.



A0065162

Fig. 301: Installing Seals
Courtesy of FORD MOTOR CO.

4. Tighten the solenoid body bolts.



A0065160

Fig. 302: Tightening Solenoid Body Bolts
Courtesy of FORD MOTOR CO.

5. Tighten the remaining bolts in the sequence shown.

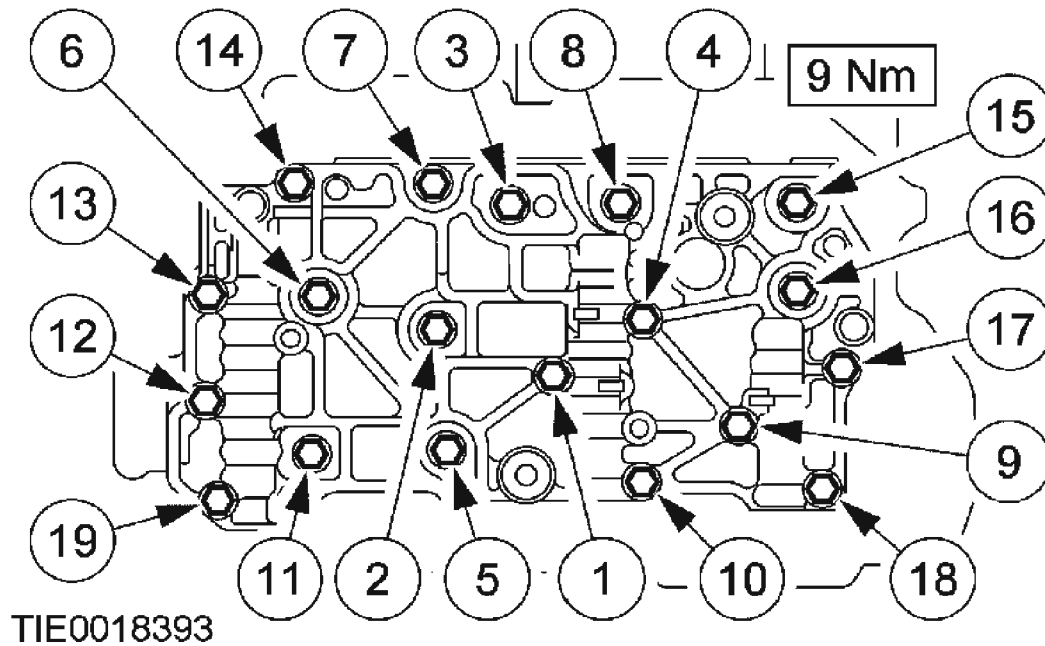


Fig. 303: Tightening Solenoid Body Bolts Sequence
Courtesy of FORD MOTOR CO.

TRANSAXLE CASE

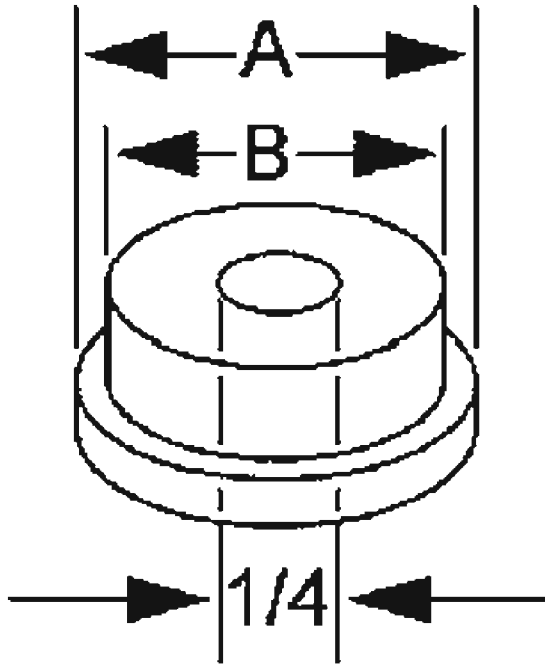
Special Tool(s)

SPECIAL TOOL SPECIFICATION

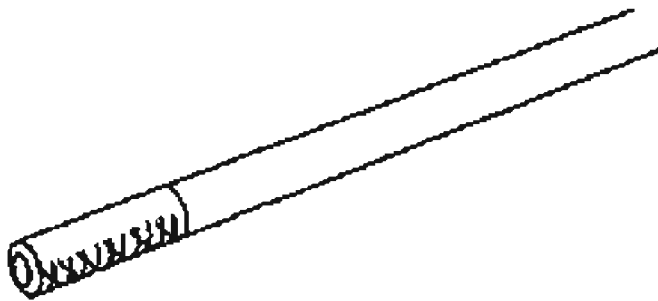
	Installer, Differential Bearing Cup 205-118 (T77F-4222-A)
--	--

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



T77F-4222-A



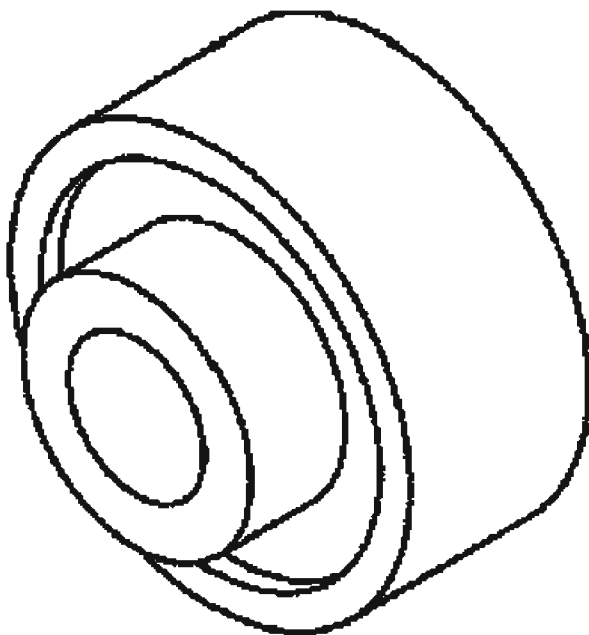
ST2751-A

Adapter for 309-224 (Handle) 205-153
(T80T-4000-W)

Installer, Axle Oil Seal 205-259

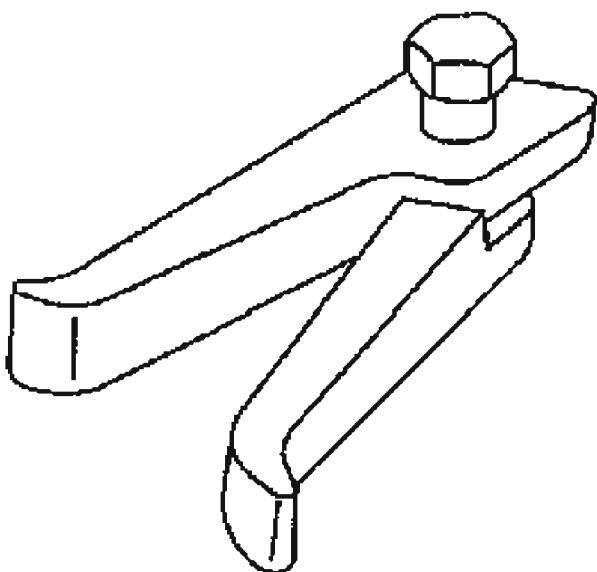
2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



14040

(T87P-3254-A)

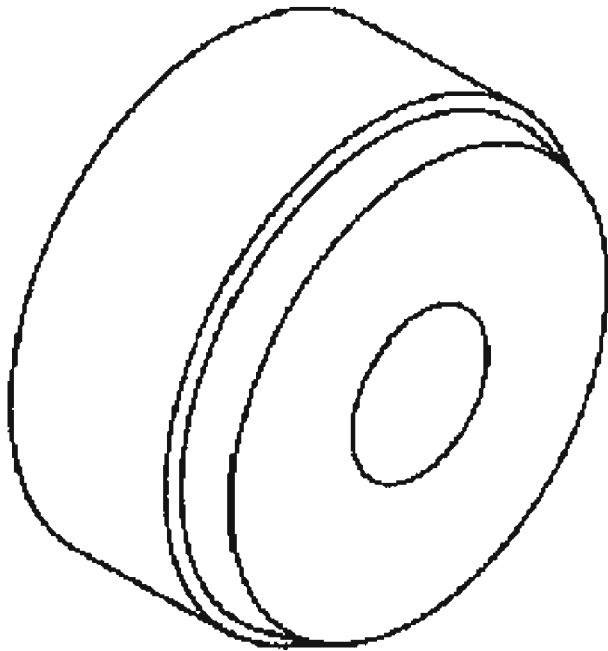


307-163

Remover, Stator Case Bearing 307-163 (T86P-70043-A)

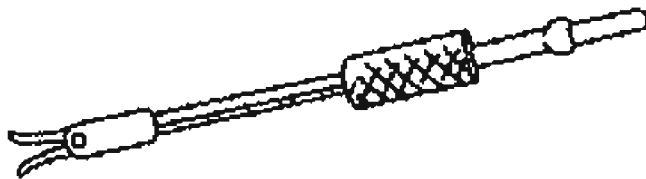
2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



307-418

Installer, Transfer Gear Bearing Cup
307-418



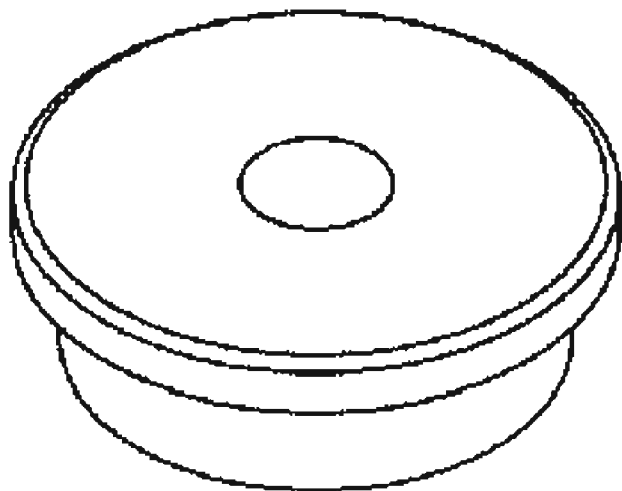
ST2791-A

Remover, Pilot Bearing 308-001 (T58-
L-101-B)

Installer, Differential Bearing Cup
308-163 (T88C-77000-FH) Replacer,
Transfer Gear Bearing Cup 307-418

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



308-163

Disassembly

1. Remove the halfshaft seals (left-hand side shown).

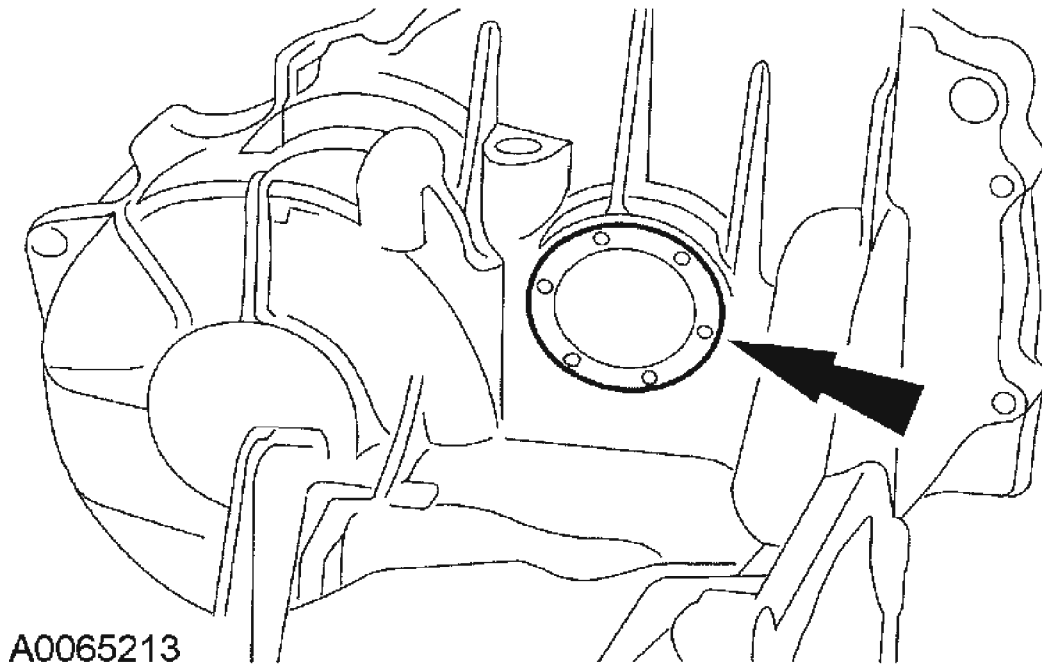


Fig. 304: Removing Halfshaft Seals (Left-Hand Side Shown)
Courtesy of FORD MOTOR CO.

2. Using the special tools, remove the differential case bearing cups (left-hand side shown).

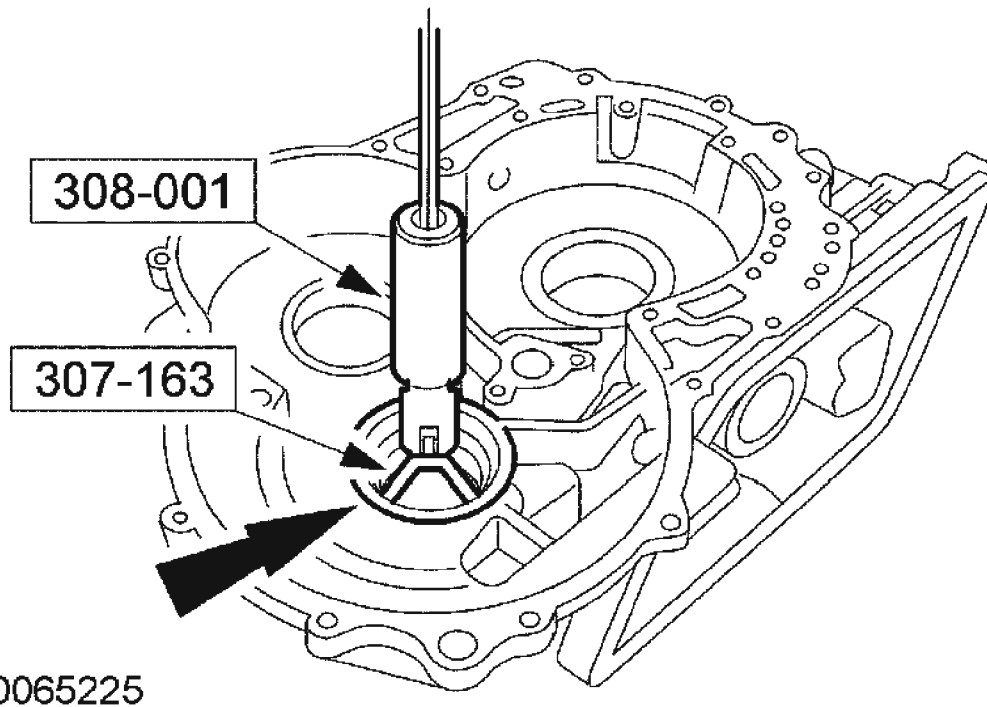
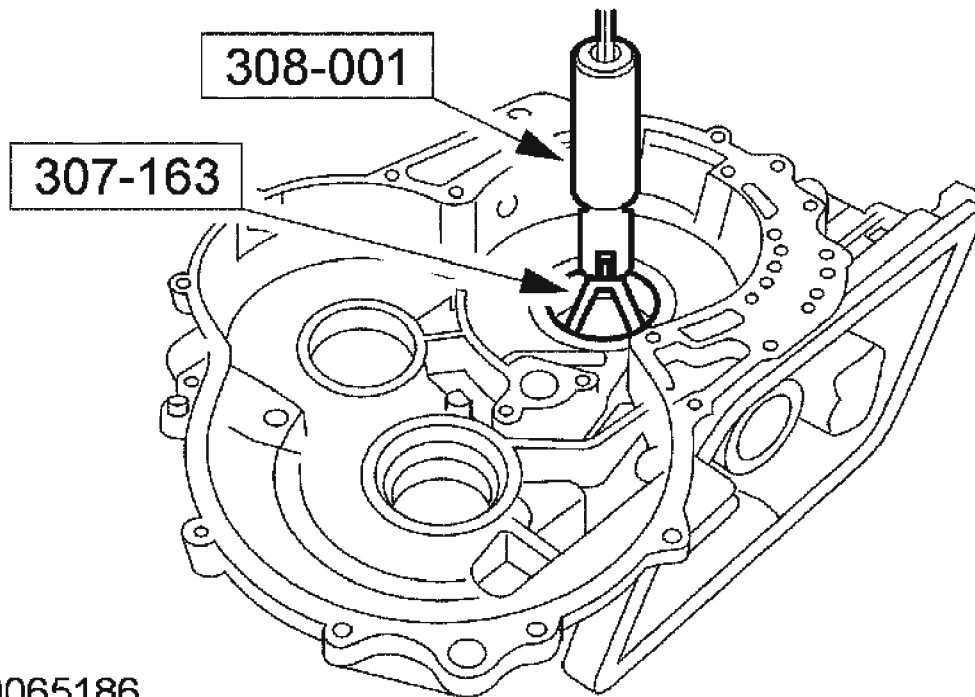


Fig. 305: Removing Differential Case Bearing Cups Using Special Tool
Courtesy of FORD MOTOR CO.

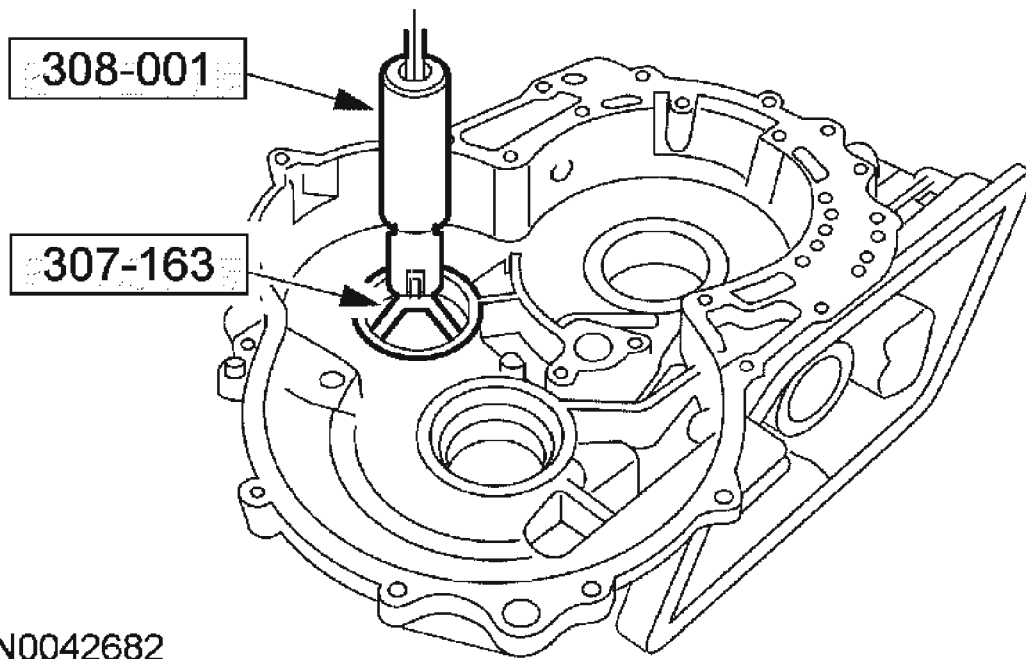
3. Using the special tools, remove the final drive input gear bearing cup.



A0065186

Fig. 306: Removing Final Drive Input Gear Bearing Cup Using Special Tool
Courtesy of FORD MOTOR CO.

CAUTION: Use care when removing the differential bearing cup not to damage the funnel. Install new funnel if damaged.



N0042682

Fig. 307: Removing Transfer Shaft Gear Bearing Cups Using Special Tool (Left-Hand Side)

Courtesy of FORD MOTOR CO.

4. Using the special tool, remove the transfer shaft gear bearing cups (left-hand side shown).

NOTE: Note the location of the bleed hole in the funnel in relation to the bottom of the case.

NOTE: Inspect the bleed hole for foreign material.

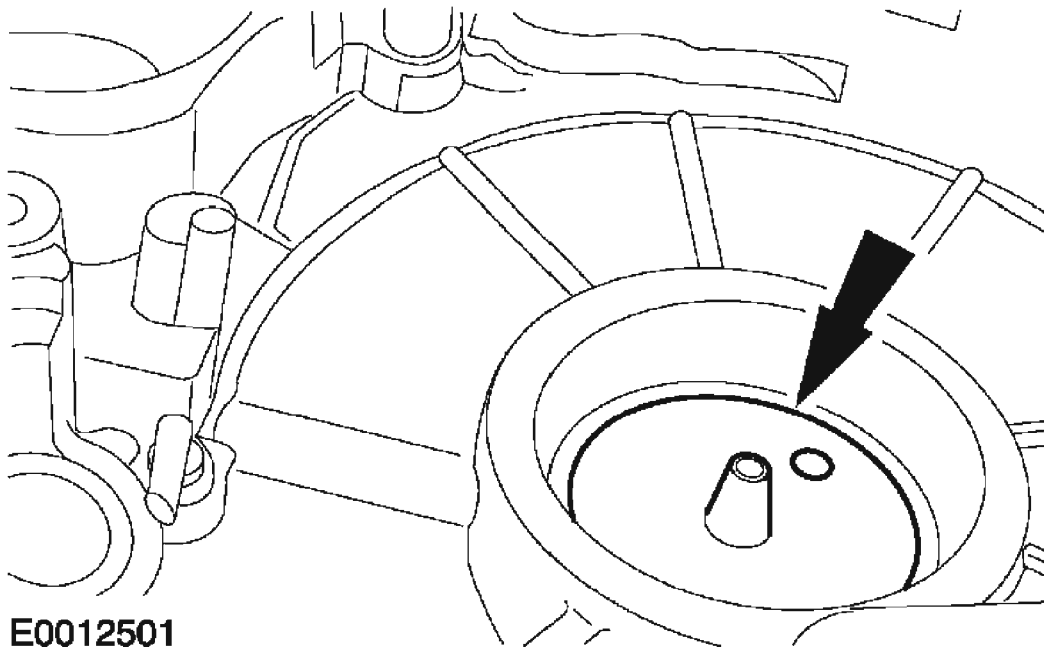


Fig. 308: Removing Funnel
Courtesy of FORD MOTOR CO.

5. Remove the funnel.
6. Rotate the transaxle 180 degrees.
7. Using the special tools, remove the final drive input gear bearing cup.

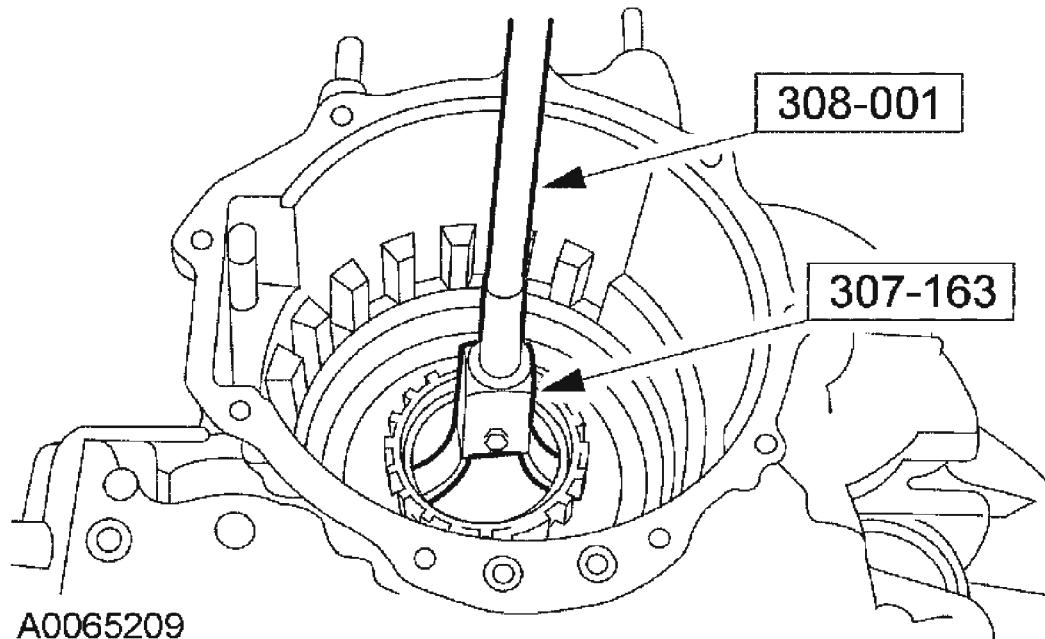


Fig. 309: Removing Final Drive Input Gear Bearing Cup Using Special Tool
Courtesy of FORD MOTOR CO.

Assembly

NOTE: The converter housing side bearing cups for the transfer shaft bearing and differential case bearing will be installed during the assembly of the transaxle.

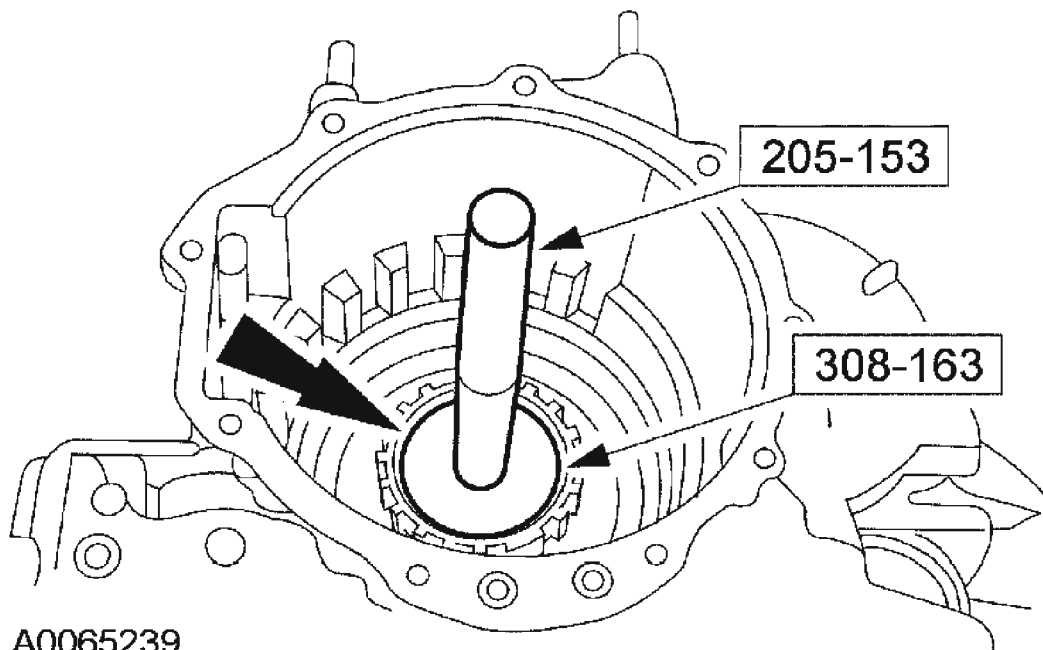


Fig. 310: Installing Final Drive Input Gear Bearing Cup Using Special Tool
Courtesy of FORD MOTOR CO.

1. Using the special tools, install the final drive input gear bearing cup.
2. Rotate the transaxle 180 degrees.

NOTE: **Note the location of the bleed hole**

NOTE: **Inspect the bleed hole for foreign material.**

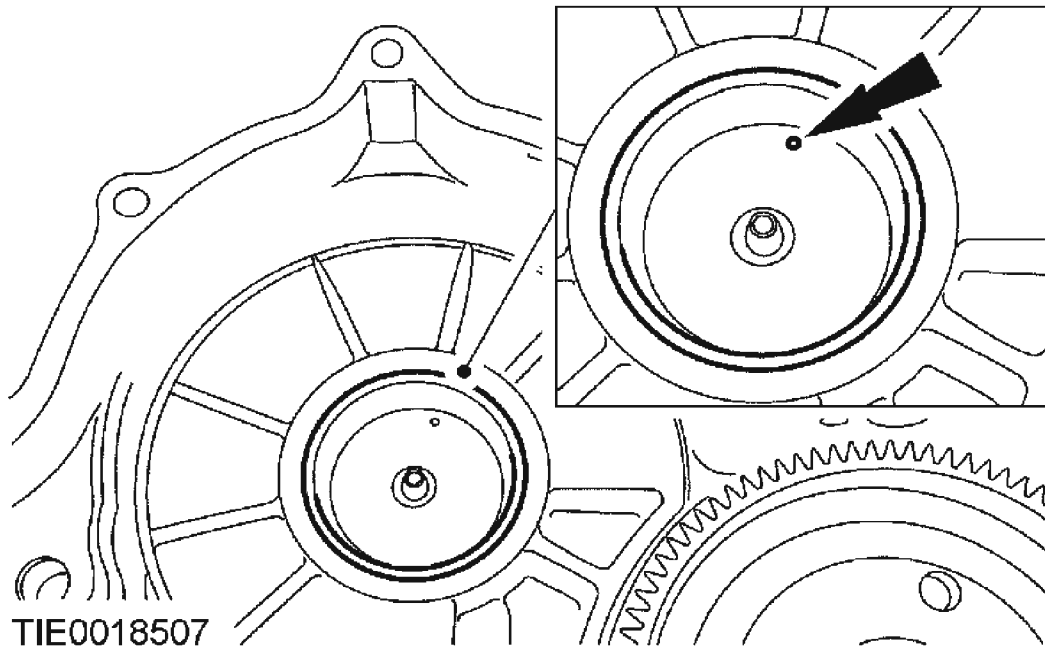
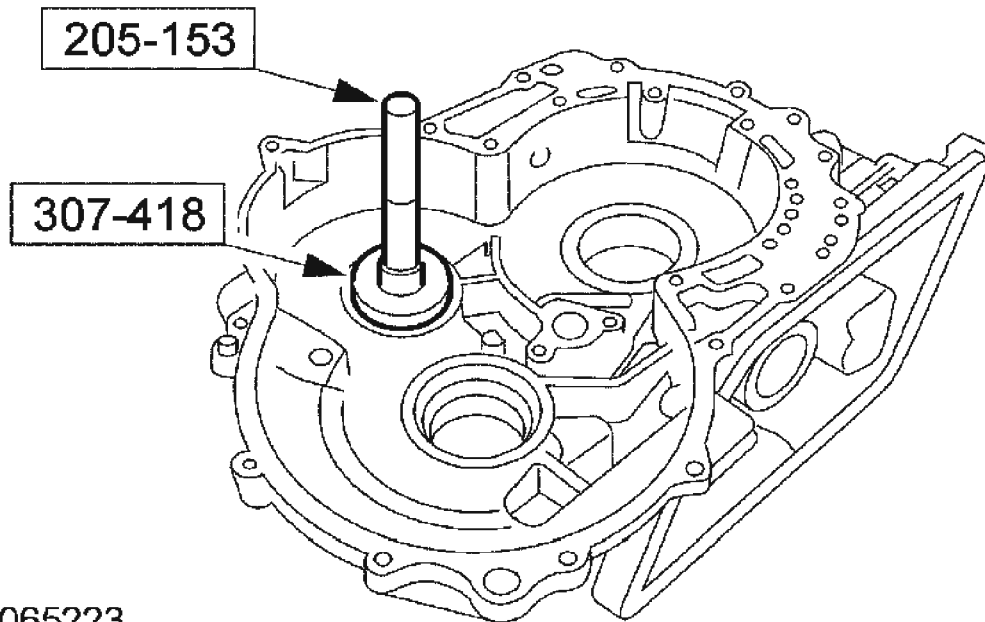


Fig. 311: Installing Funnel
Courtesy of FORD MOTOR CO.

3. Install the funnel.
4. Using the special tools, install the left-hand side transfer shaft gear bearing cup.

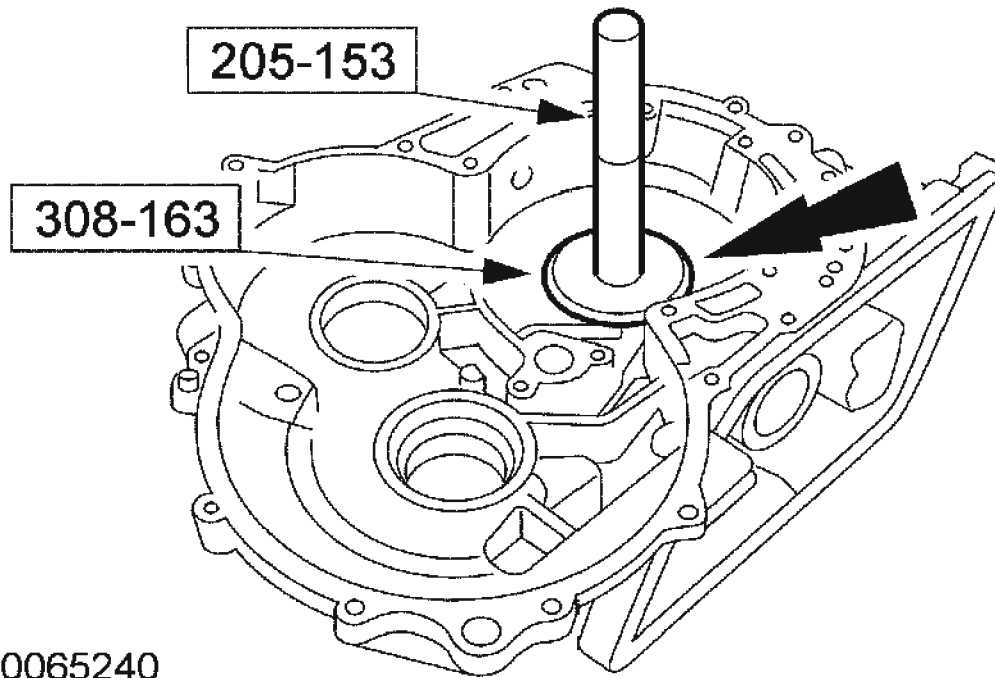


A0065223

Fig. 312: Installing Left-Hand Side Transfer Shaft Gear Bearing Cup Using Special Tool

Courtesy of FORD MOTOR CO.

5. Using the special tools, install the final drive input gear bearing cup (left-hand side shown).



A0065240

Fig. 313: Installing Final Drive Input Gear Bearing Cup Using Special Tool (Left-Hand Side)

Courtesy of FORD MOTOR CO.

6. Using the special tools, install the left-hand side differential case bearing cup.

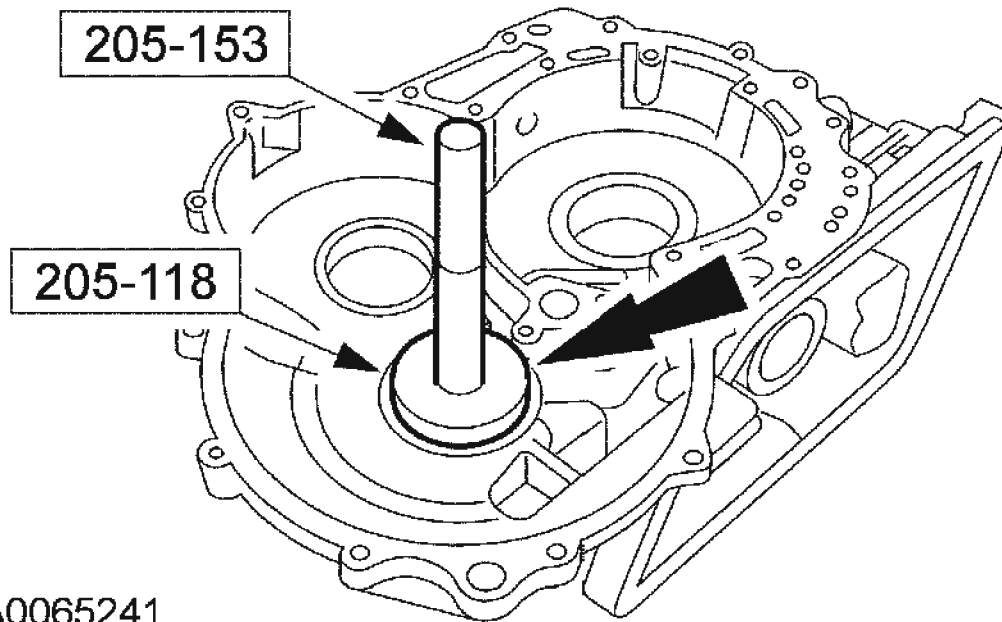


Fig. 314: Installing Left-Hand Side Differential Case Bearing Cup Using Special Tool
Courtesy of FORD MOTOR CO.

7. Using the special tools, install the half shaft seals (left-hand side shown).

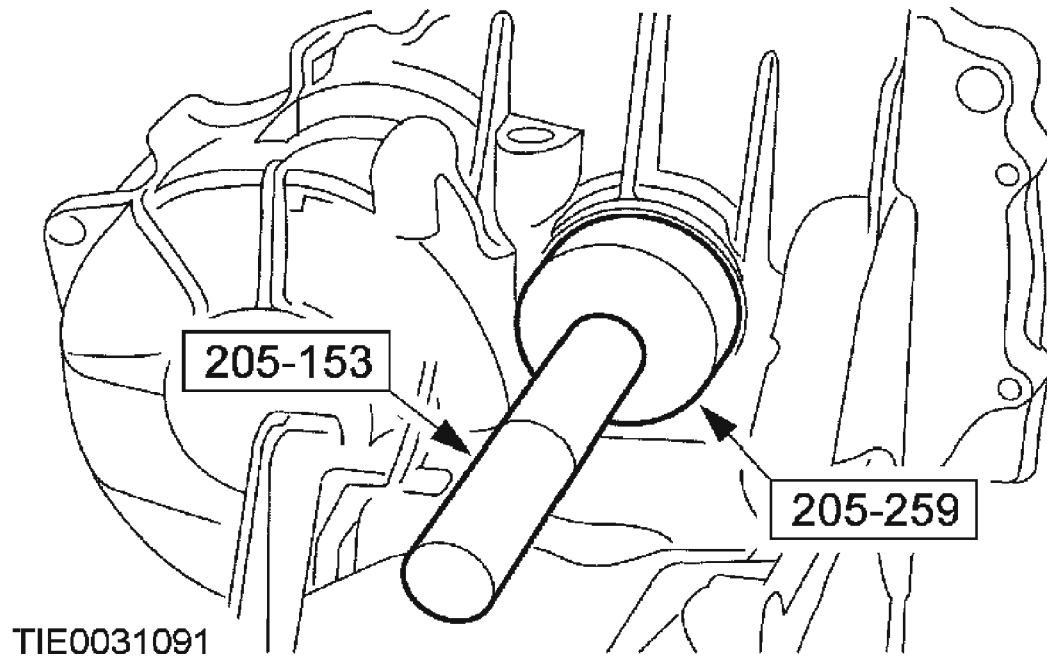


Fig. 315: Installing Half Shaft Seals Using Special Tool (Left-Hand)
 Courtesy of FORD MOTOR CO.

ASSEMBLY

TRANSAXLE

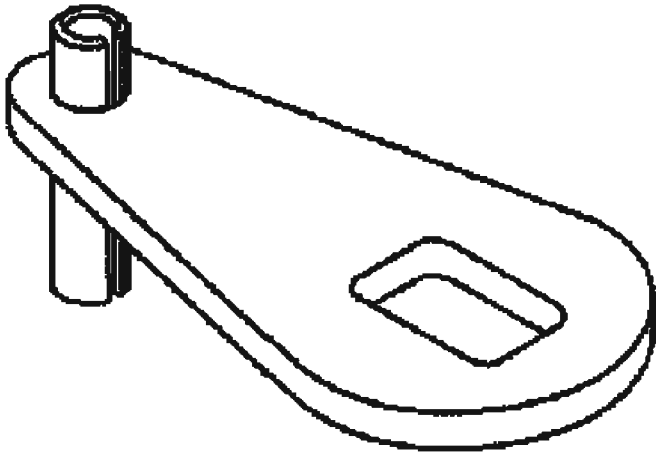
Special Tool(s)

SPECIAL TOOL SPECIFICATION

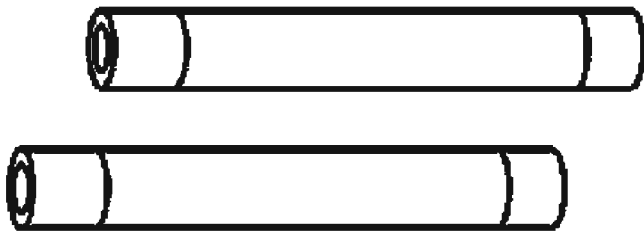
Alignment Tool, Transmission Range
 Sensor 307-415

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



307-415



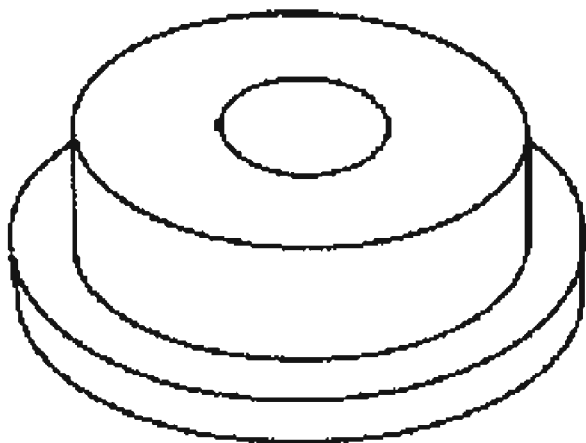
ST1631-A

Handle, Torque Converter 307-091
(T81P-7902-C)

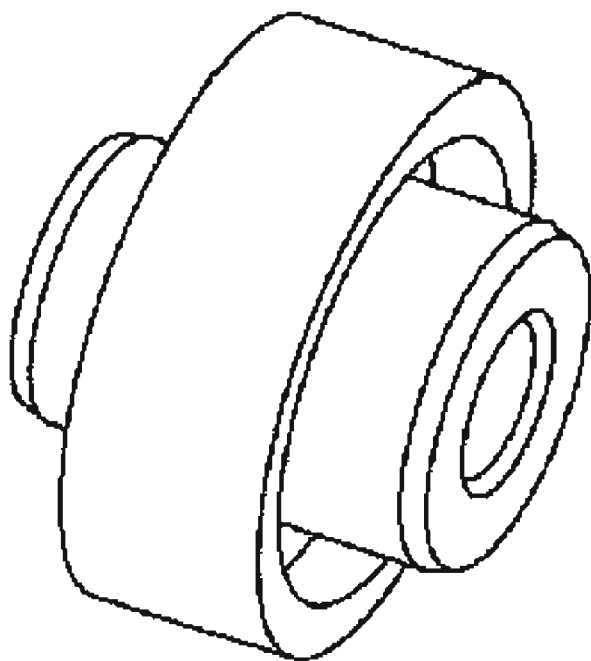
Installer, Differential Bearing Cup
205-118 (T77F-4222-A)

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



ST2350-A

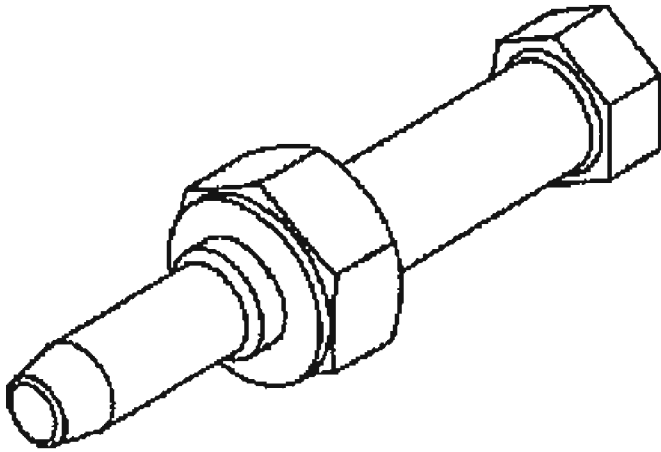


307-256

Installer, Differential Fluid Seal 307-256 (T92P-77000-FH)

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



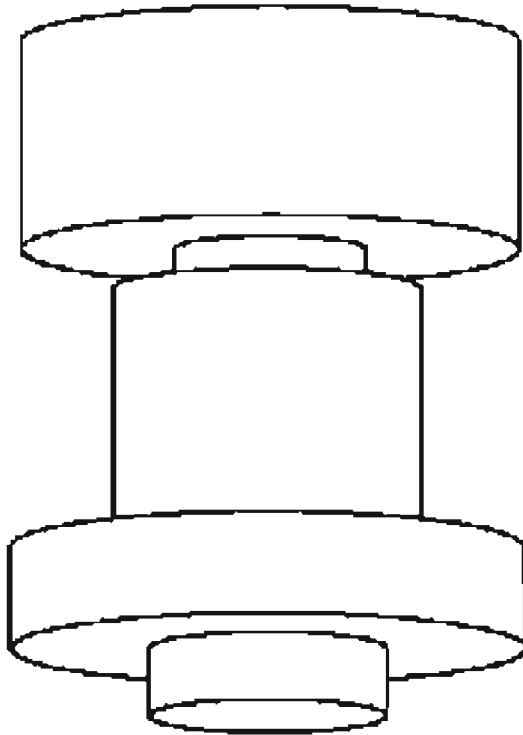
307-416

Select Gauge, Transmission Band 307-416

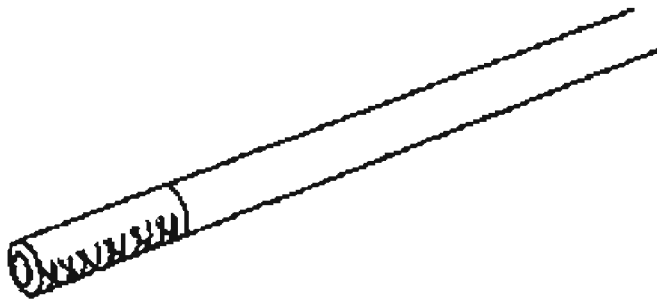
Shim Gauge, Differential/Transfer Gear Bearing 307-417

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



ST2757A

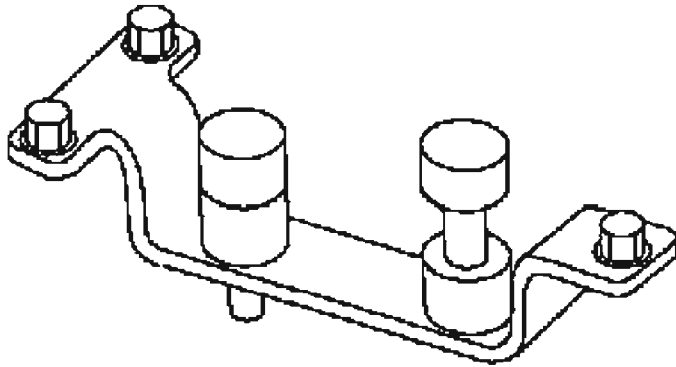


ST2751-A

Adapter for 303-224 (Handle) 205-153
(T80T-4000-W)

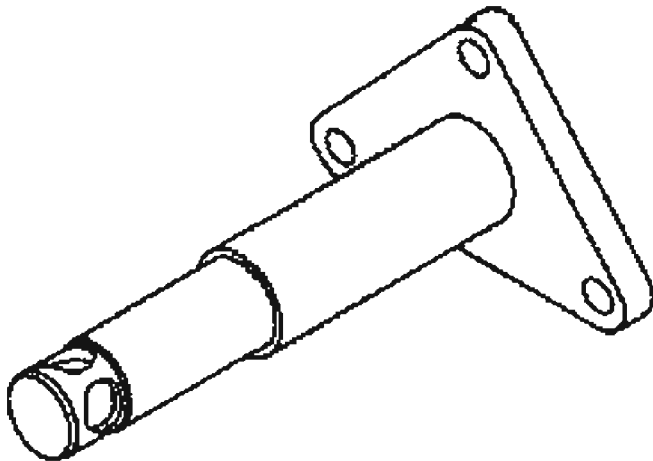
2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



ST2756A

Holding Tool, Final Drive Input Gear
307-413



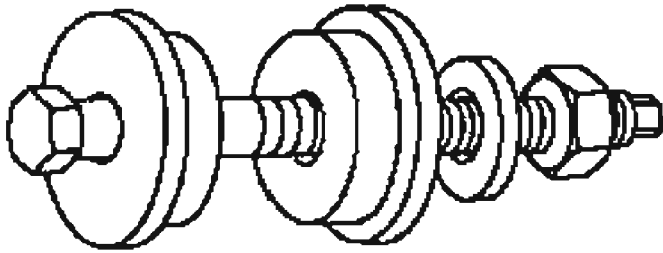
307-410

Mounting Bracket, Transmission 307-
410

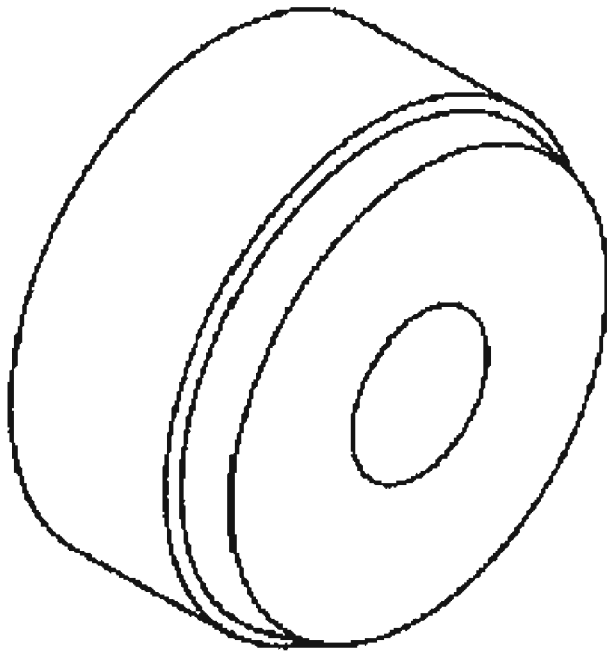
Installer, Drive Pinion Bearing Cup
205-024 (T67P-4616-A)

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



ST1361-A



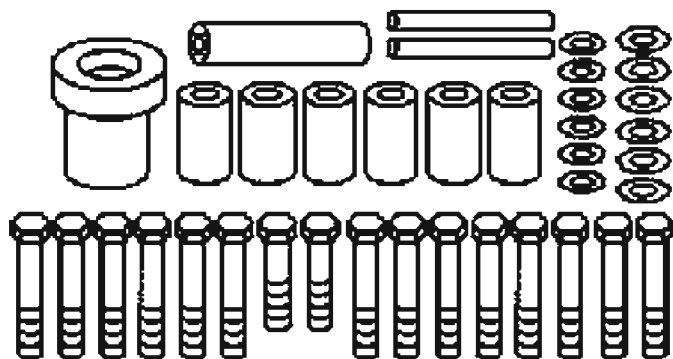
307-418

Installer, Transfer Gear Bearing Cup
307-418

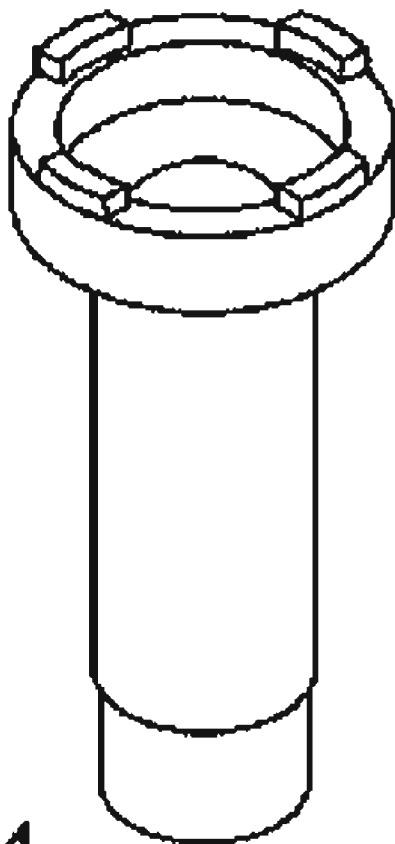
Shim Selection Set 308-164 (T88C-
77000-JF)

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



308-164

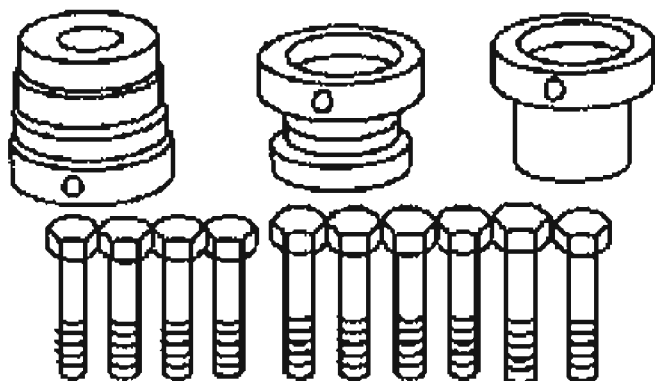


307-414

Socket, Final Drive Input Nut 307-414

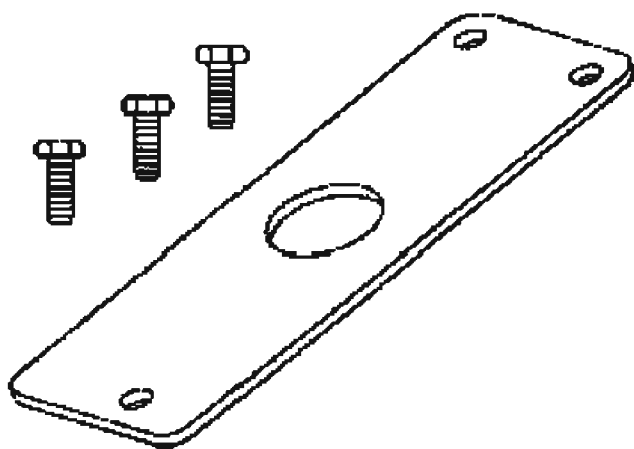
2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



ST1564-A

Shim Selection Set 308-161 (T88C-77000-C)



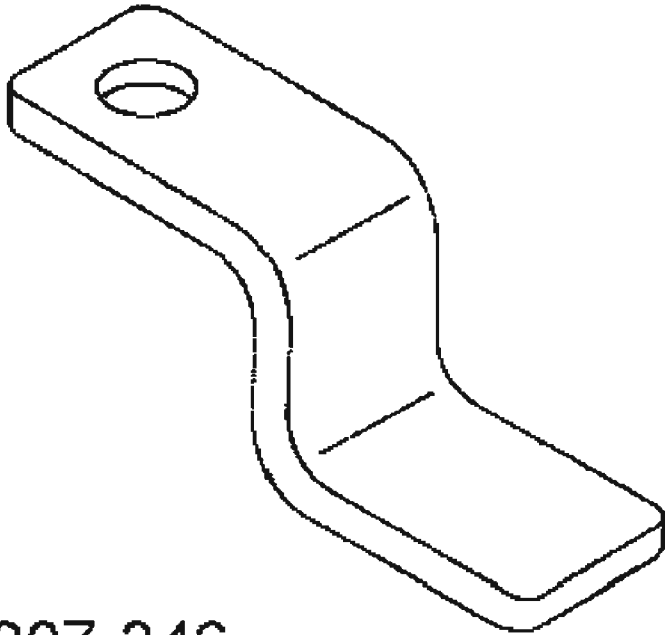
307-420

Wrench Guide Plate 307-420

Retainer, Torque Converter 307-346
(T97T-7902-A)

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



307-346

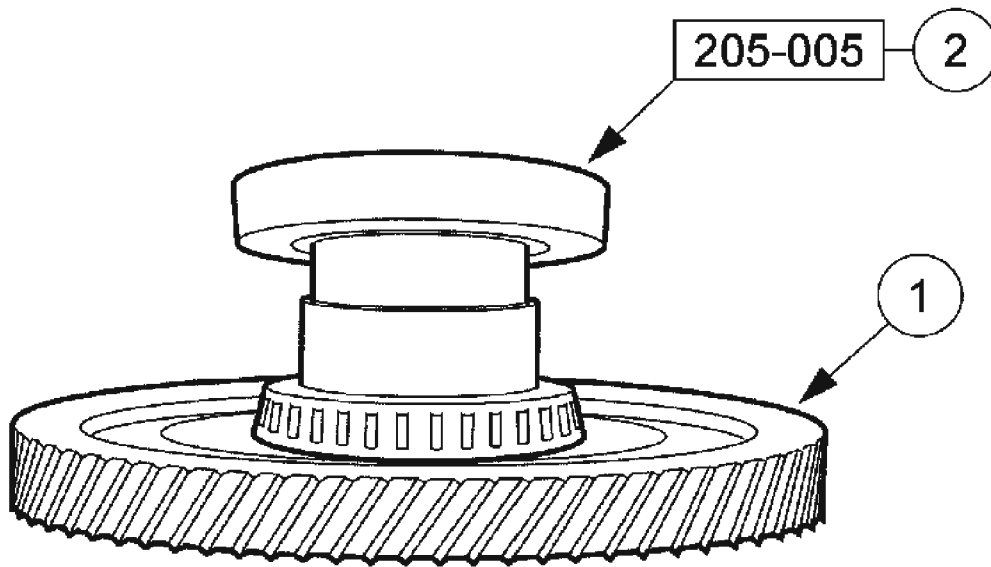
Material

MATERIAL SPECIFICATION

Item	Specification
Motorcraft TA-29	WSS-M4G-323-A3
Thread Sealer	WSK-M2G350-A2

Assembly

1. Using the special tool, install the final drive input gear bearing.
 1. Install the final drive input gear bearing.
 2. Install the special tool.



TIE0009688

Fig. 316: Installing Final Drive Input Gear Bearing Using Special Tool
Courtesy of FORD MOTOR CO.

2. Using an arbor press and the special tools, seat the final drive input gear bearing.

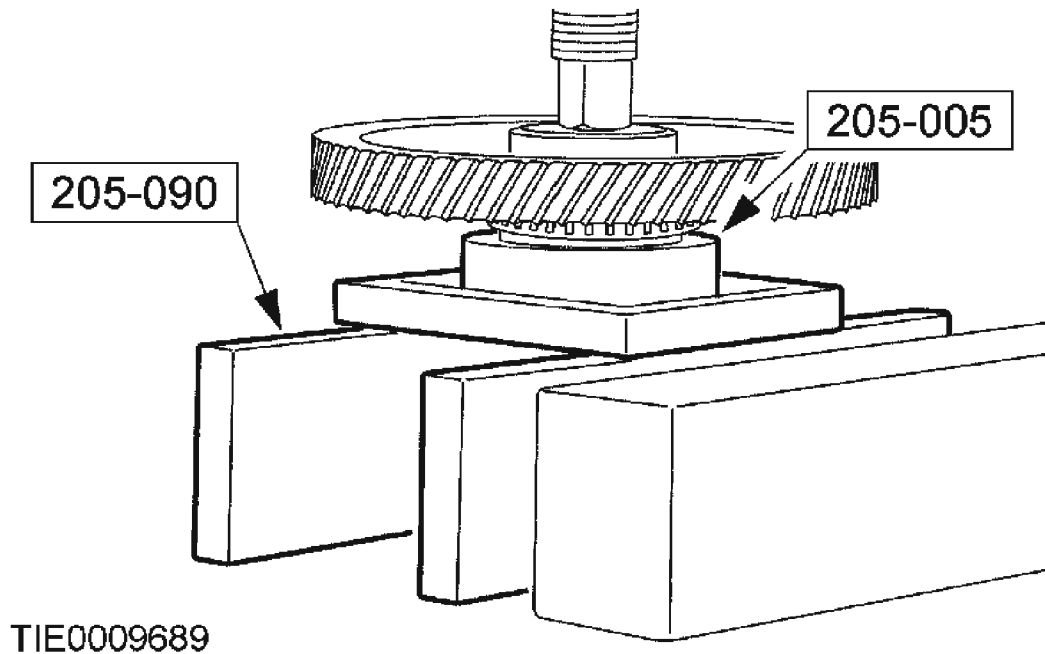
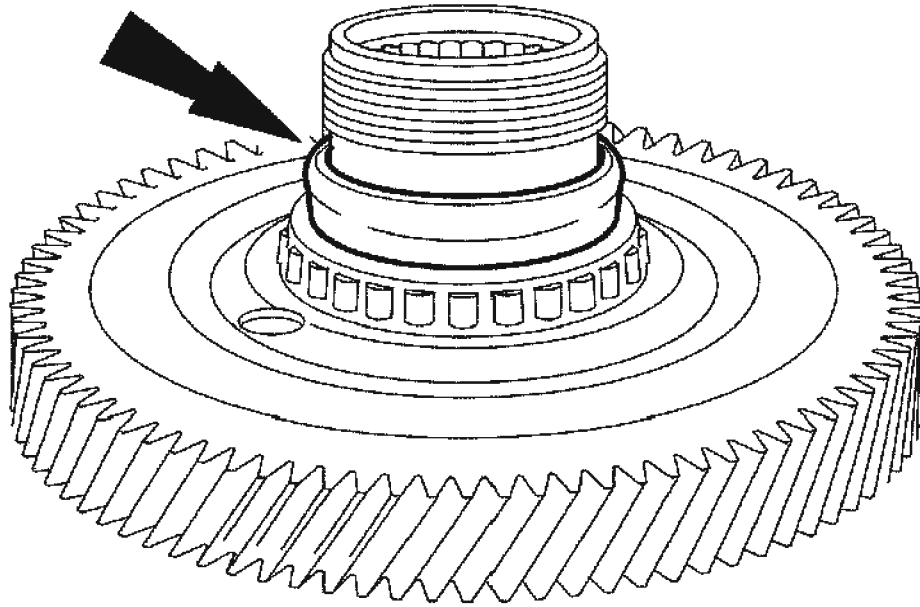


Fig. 317: Using Arbor Press And Special Tools To Seat Final Drive Input Gear Bearing

Courtesy of FORD MOTOR CO.

3. Install a new collapsible spacer.



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Fig. 318: Installing Collapsible Spacer
Courtesy of FORD MOTOR CO.

4. Using the special tool, position the final drive input gear.

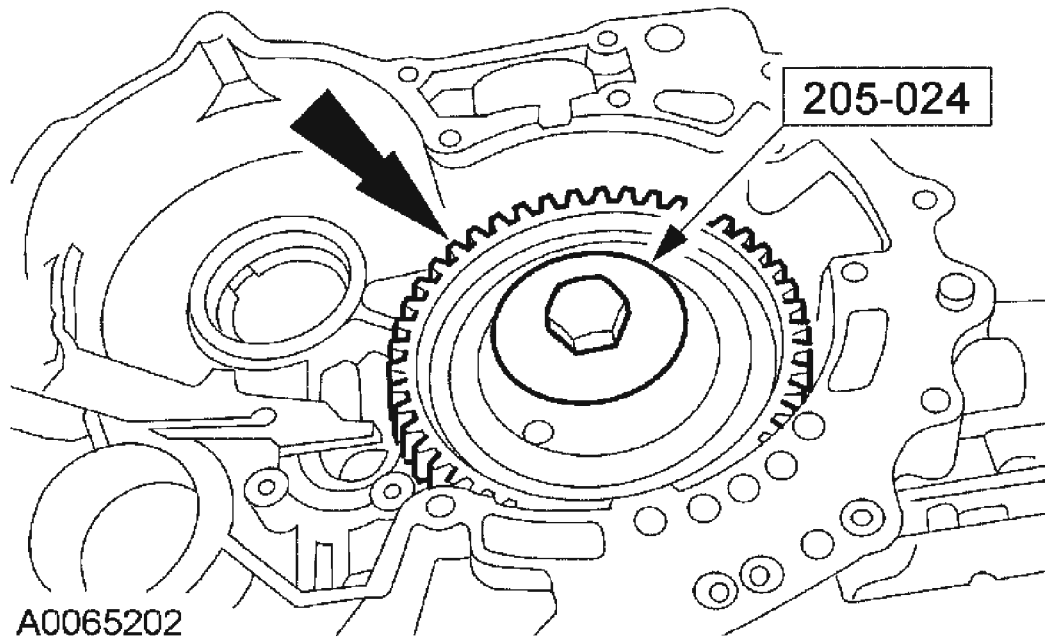


Fig. 319: Positioning Final Drive Input Gear Using Special Tool
Courtesy of FORD MOTOR CO.

CAUTION: Hold the final drive input gear while installing the final drive input gear bearing to prevent it from falling out of the transaxle case.

5. Rotate the transaxle 180 degrees.
6. Using the special tools, install the final drive input gear bearing.

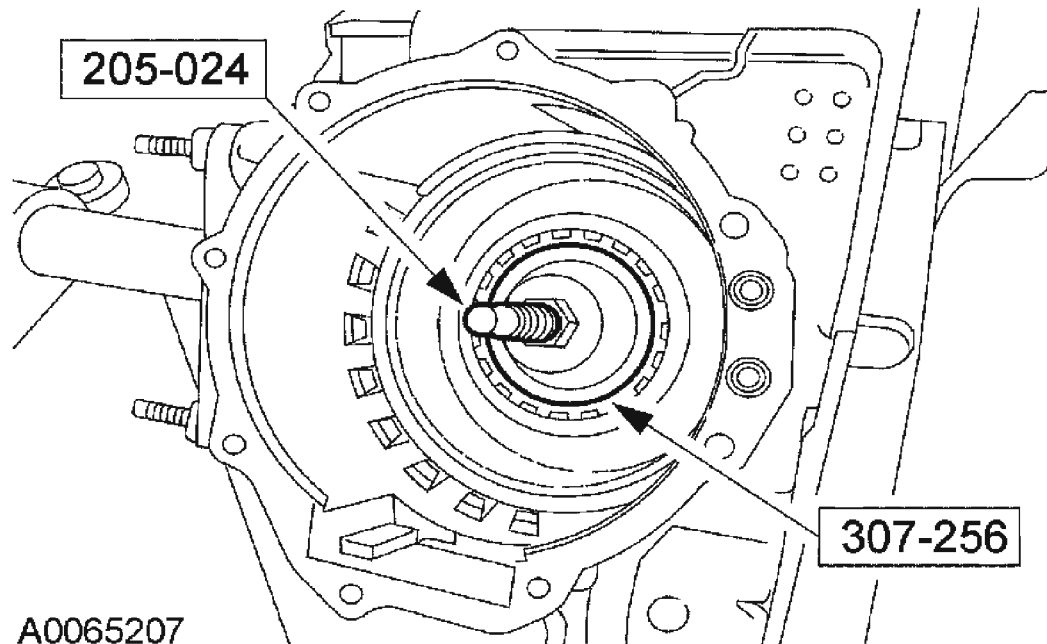


Fig. 320: Installing Final Drive Input Gear Bearing Using Special Tool
Courtesy of FORD MOTOR CO.

7. Rotate the transaxle 180 degrees.
8. Using the special tool, lock the final drive input gear.

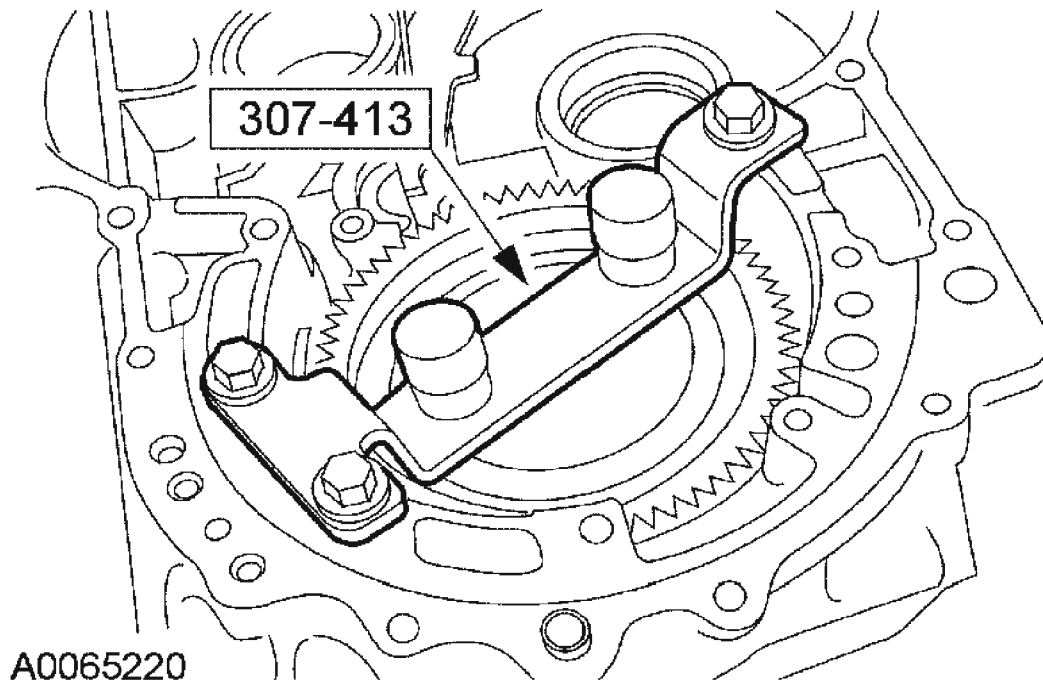


Fig. 321: Locking Final Drive Input Gear Using Special Tool
Courtesy of FORD MOTOR CO.

9. Rotate the transaxle 180 degrees.

NOTE: A high tightening torque specification between 400-450 Nm (295-332 lb-ft) is necessary to crush the collapsible spacer for correct bearing preload.

NOTE: If the preload is too high, a new collapsible spacer must be installed.

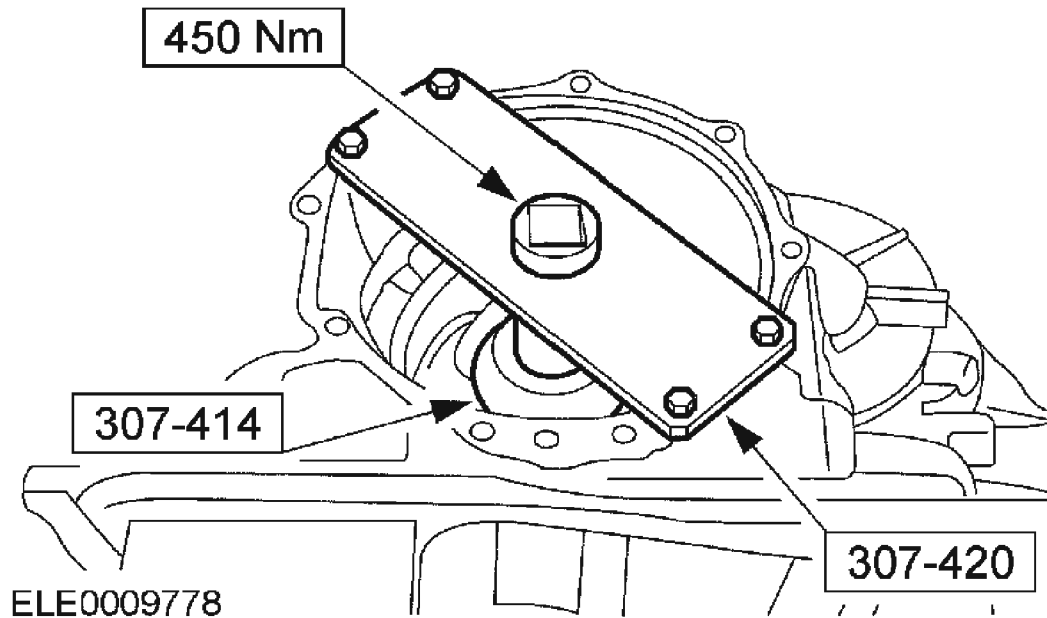


Fig. 322: Tightening Nut Using Special Tool
Courtesy of FORD MOTOR CO.

10. Using the special tools, tighten the nut to achieve the preload specification.
11. Rotate the transaxle 180 degrees.

NOTE: Make sure that the final drive rotates.

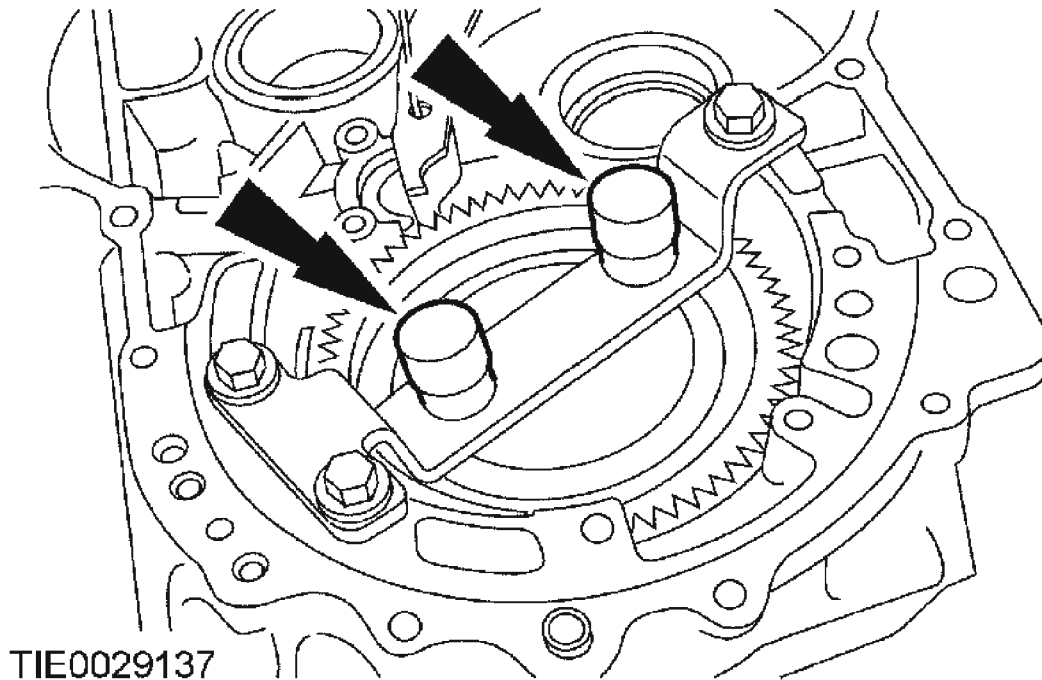


Fig. 323: Unlocking Special Tool
Courtesy of FORD MOTOR CO.

12. Unlock the special tool.
13. Rotate the transaxle 180 degrees.

CAUTION: Make sure the bearing preload is within specification.

NOTE: Rotate the gear 10 times to make sure that the bearings are correctly seated.

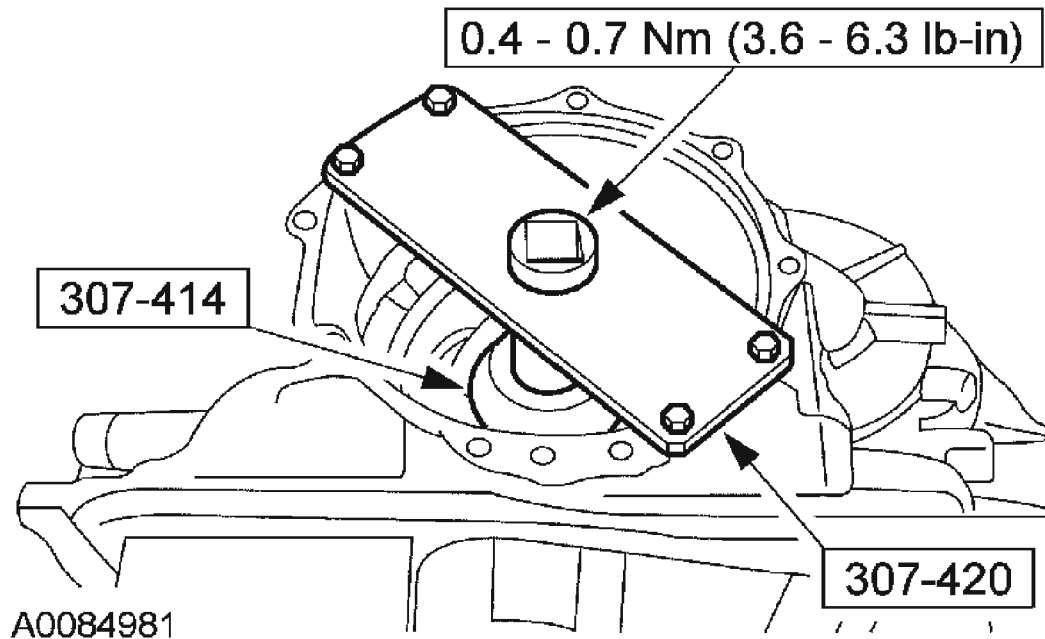


Fig. 324: Measuring Rotating Torque Using Special Tool
Courtesy of FORD MOTOR CO.

14. Using the special tools, measure the rotating torque.
15. After achieving the correct torque, remove the special tools and stake the nut to prevent movement.

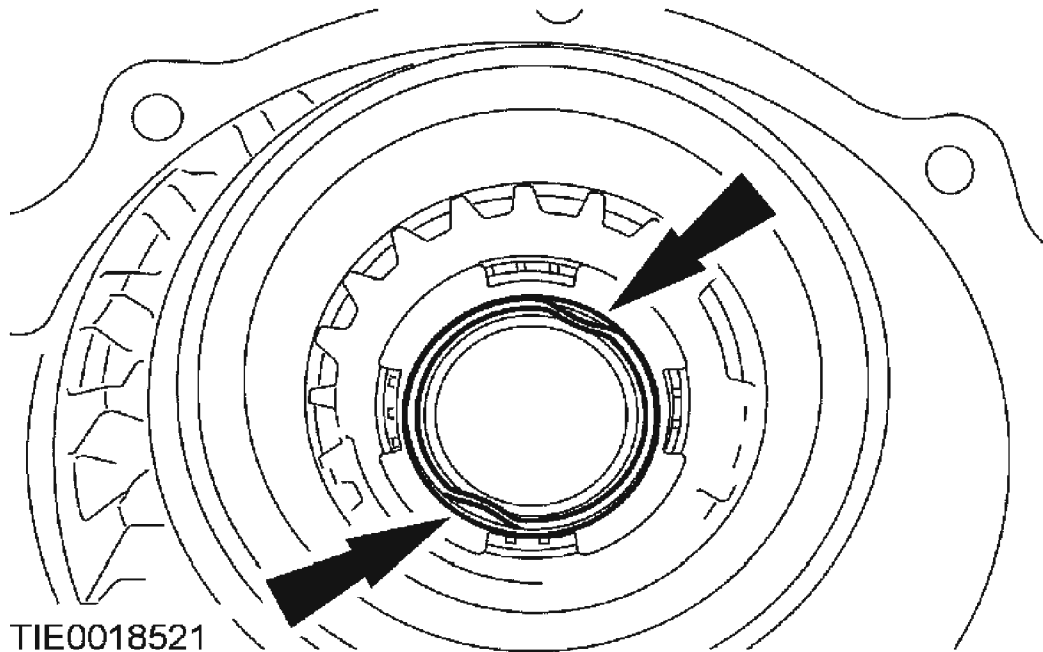


Fig. 325: Removing Special Tools And Staking Nut To Prevent Movement
Courtesy of FORD MOTOR CO.

16. Rotate the transaxle 180 degrees.
17. Position the transfer shaft gears in the transaxle case.

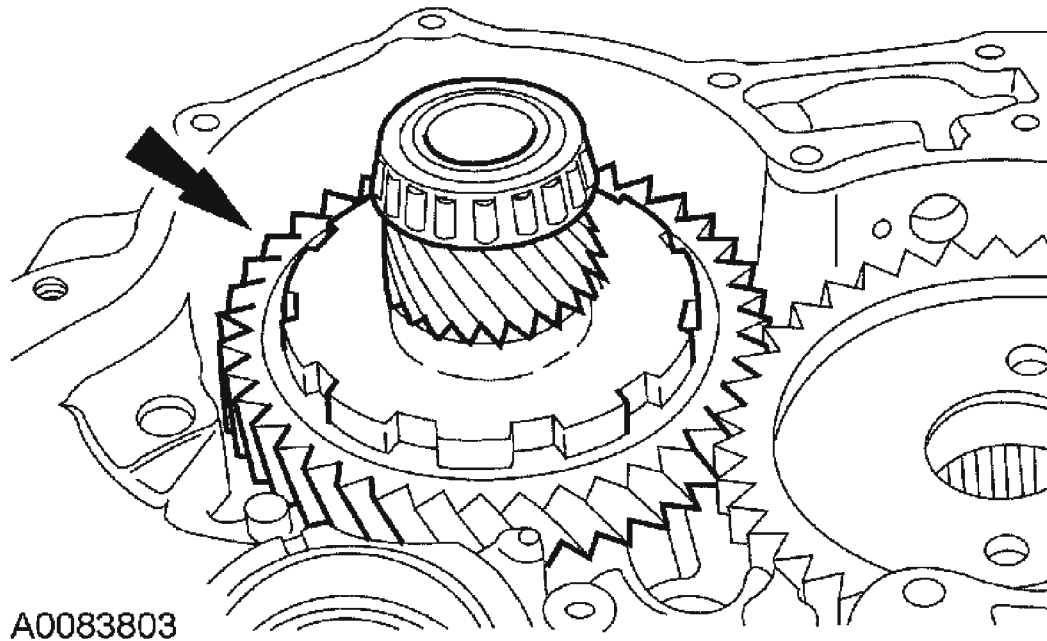


Fig. 326: Positioning Transfer Shaft Gears In Transaxle Case
Courtesy of FORD MOTOR CO.

18. Install the parking pawl return spring.

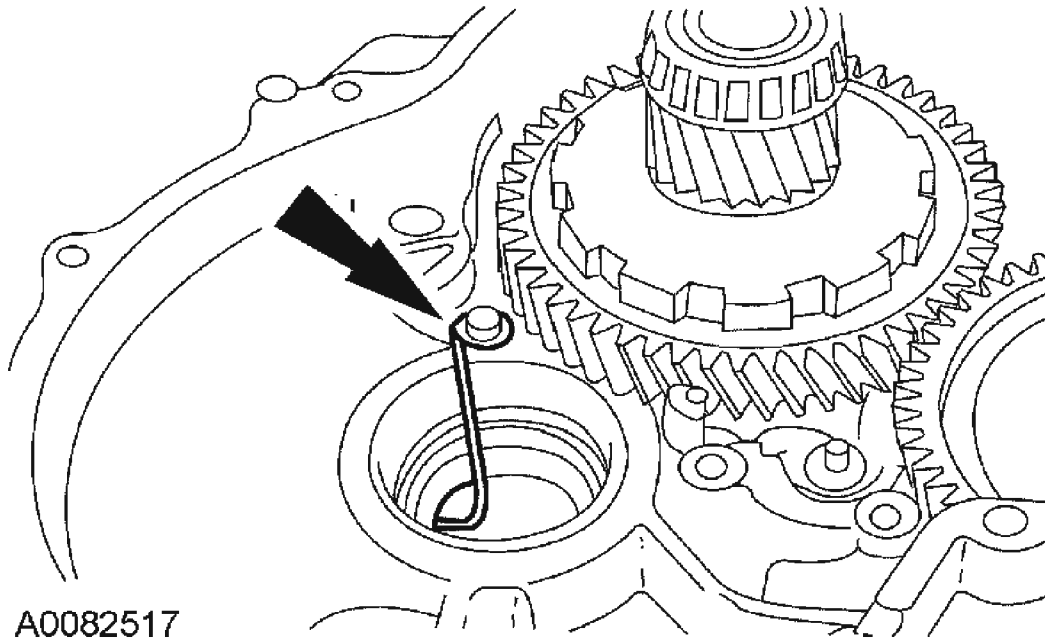


Fig. 327: Installing Parking Pawl Return Spring
Courtesy of FORD MOTOR CO.

19. Connect the spring.
 1. Install the parking pawl abutment.
 2. Install the lever.
 3. Install the pin.
 4. Connect the spring.

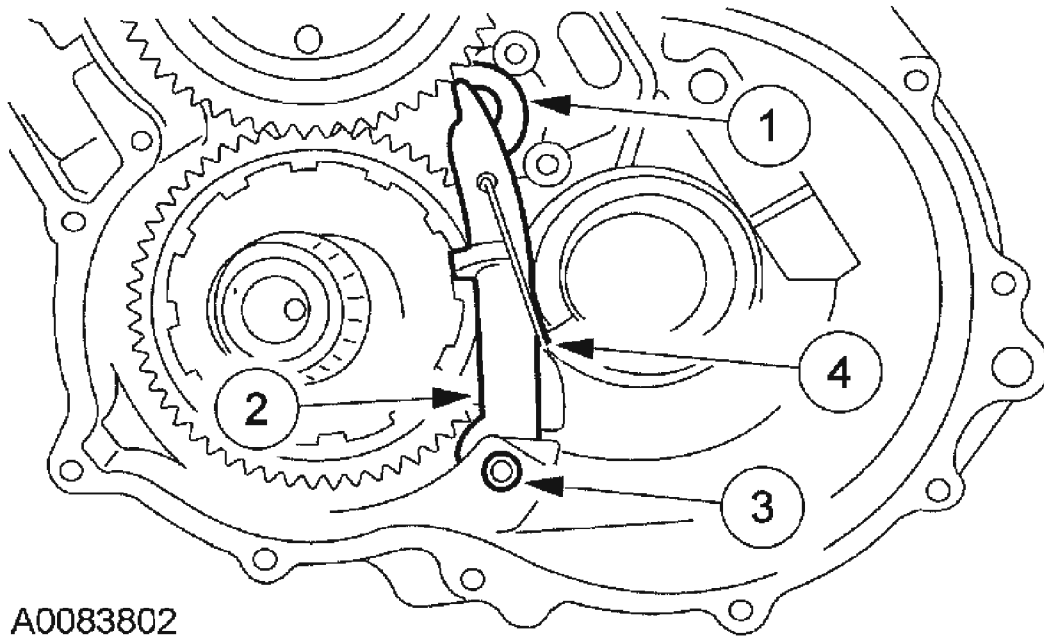


Fig. 328: Connecting Spring
Courtesy of FORD MOTOR CO.

20. Install the parking pawl assembly cover and bolts.

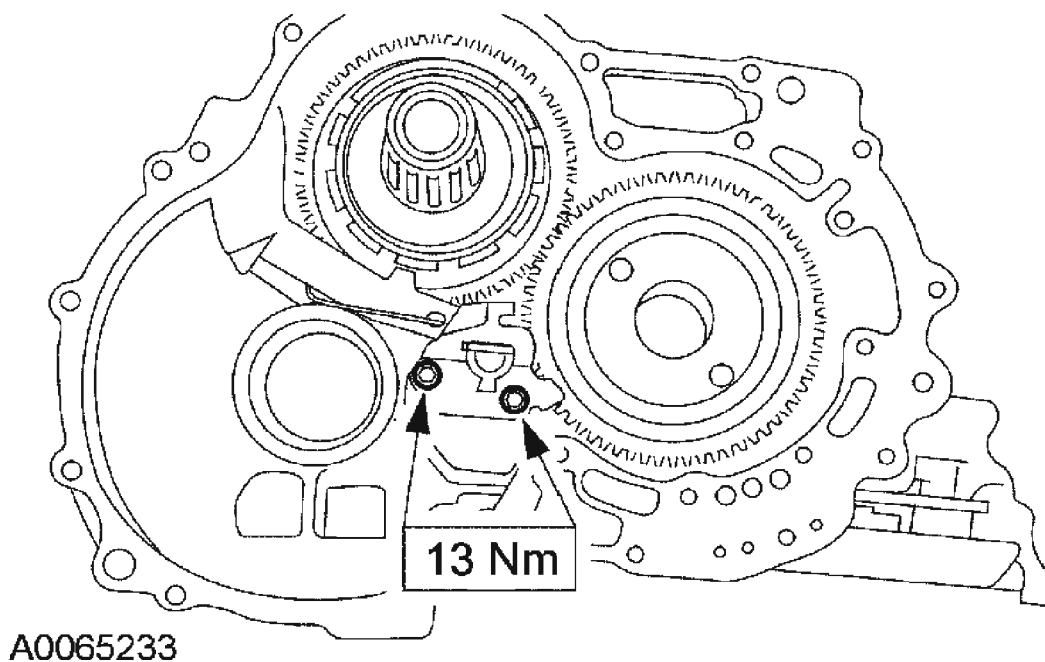


Fig. 329: Installing Parking Pawl Assembly Cover And Bolts
Courtesy of FORD MOTOR CO.

21. Install the differential case assembly.

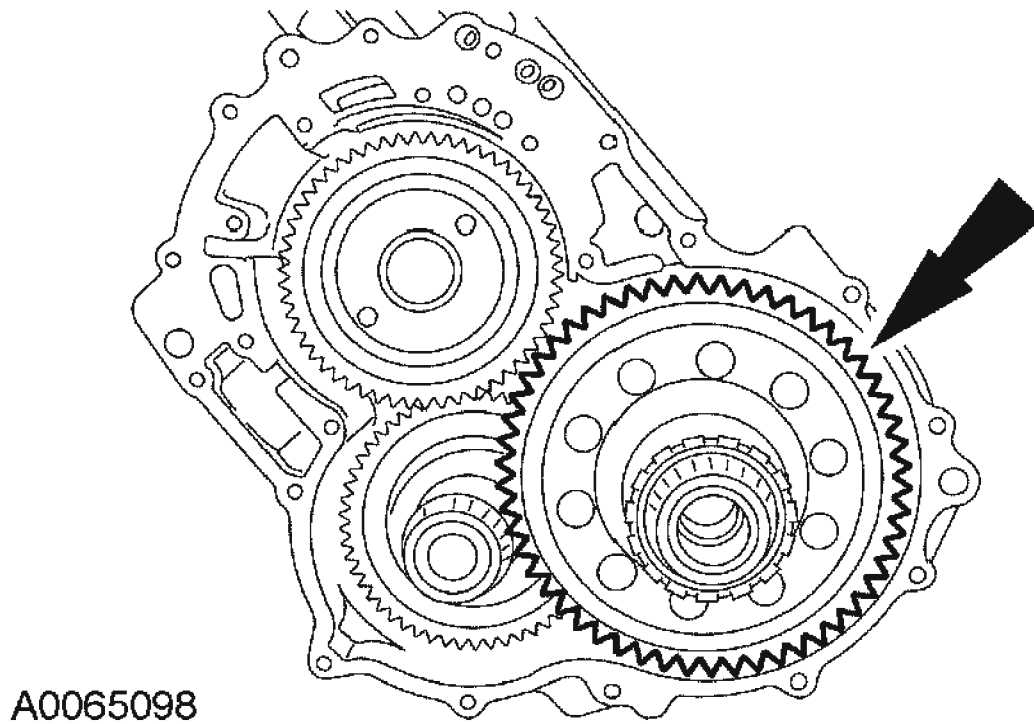
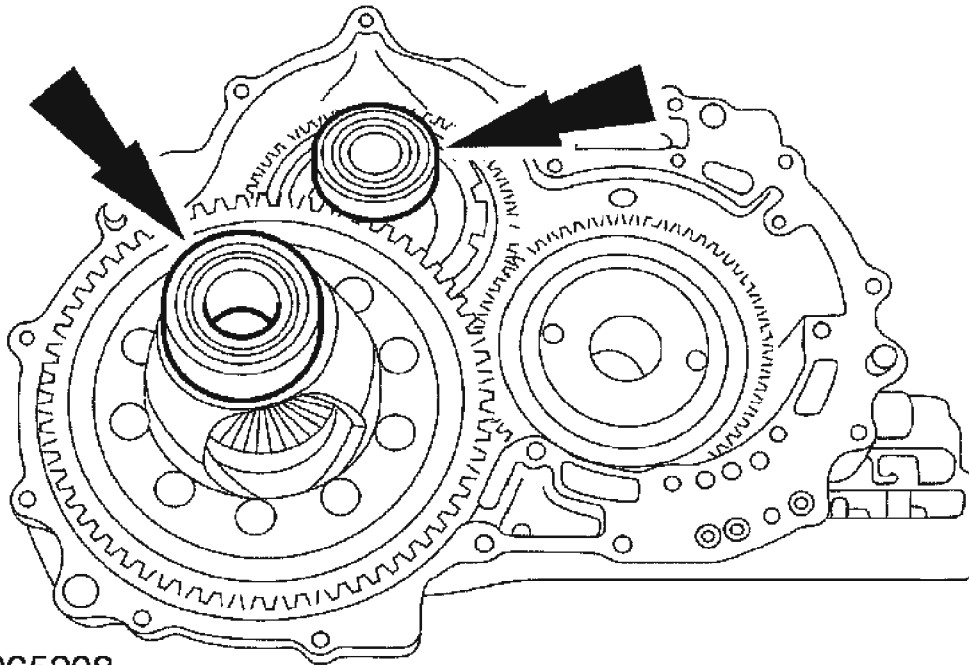


Fig. 330: Installing Differential Case Assembly
Courtesy of FORD MOTOR CO.

22. Position the bearing cups.



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Fig. 331: Positioning Bearing Cups
Courtesy of FORD MOTOR CO.

23. Install the special tools.

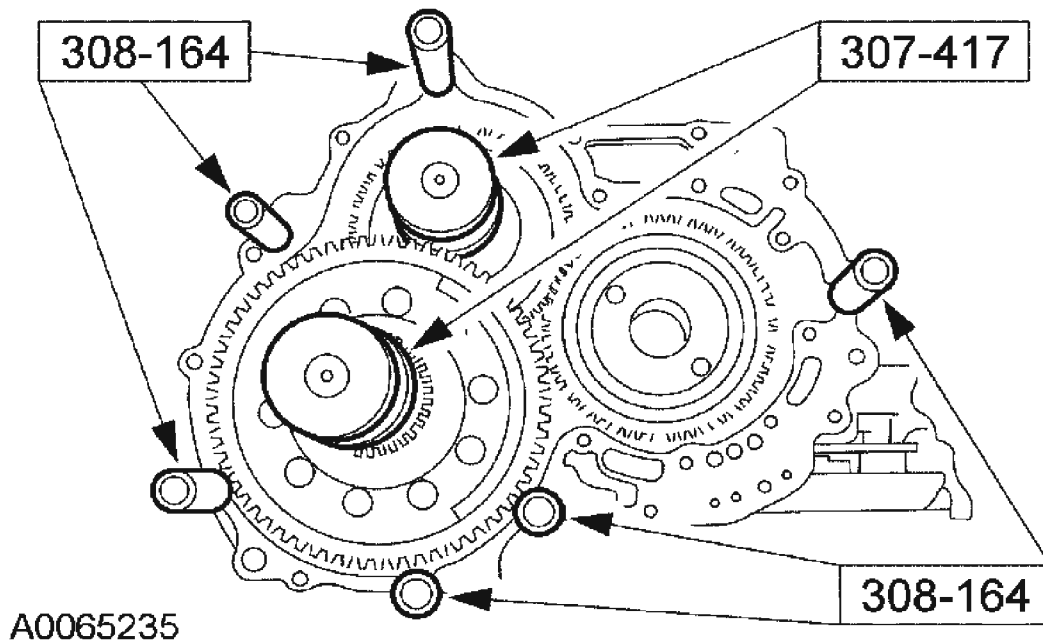


Fig. 332: Installing Special Tools To Bearing Cups
Courtesy of FORD MOTOR CO.

CAUTION: Do not use the bolts from special service kit 308-164 they will not work. Use only the bolts from the special service kit 308-161.

NOTE: The converter housing cover must be installed evenly or an incorrect reading will result.

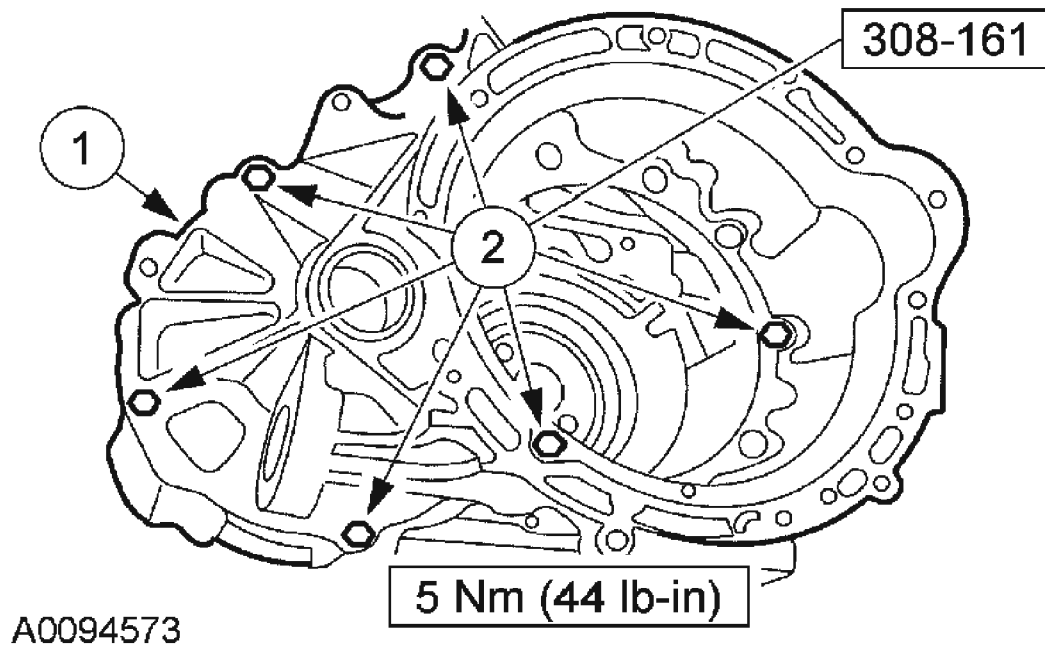


Fig. 333: Assembling Transaxle For End Play Measurement Using Special Tools
Courtesy of FORD MOTOR CO.

24. Using the special tools, assemble the transaxle for end play measurement.
 1. Position the converter housing.
 2. Install the special tool bolts and seat the case cover flat.
25. Remove the converter housing.
 1. Remove bolts.
 2. Remove the converter housing.

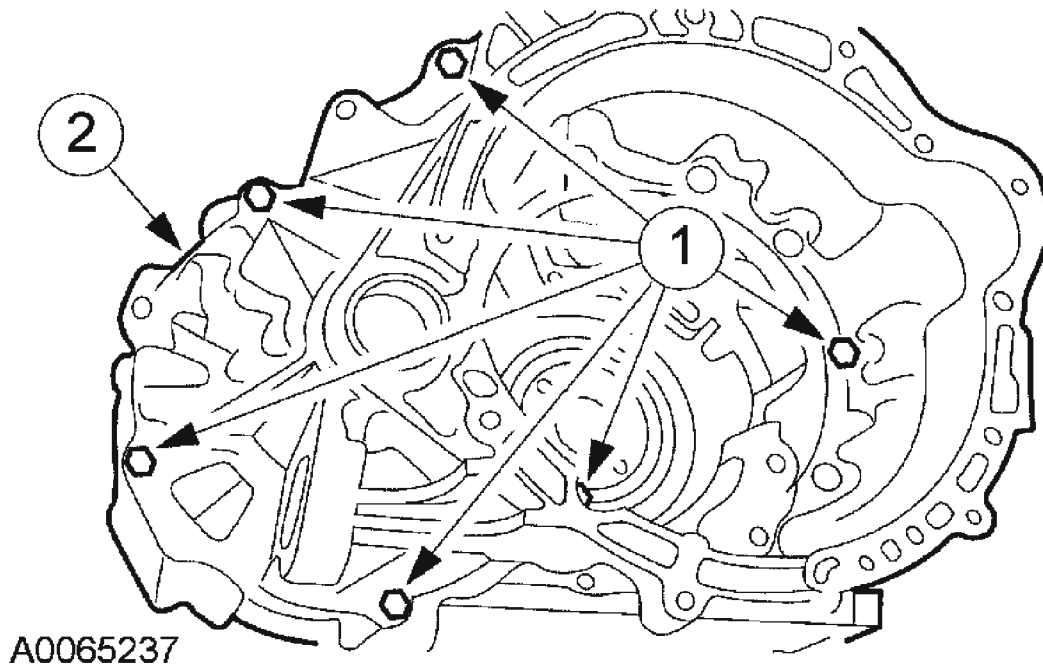


Fig. 334: Removing Converter Housing
Courtesy of FORD MOTOR CO.

26. Remove the special tools.

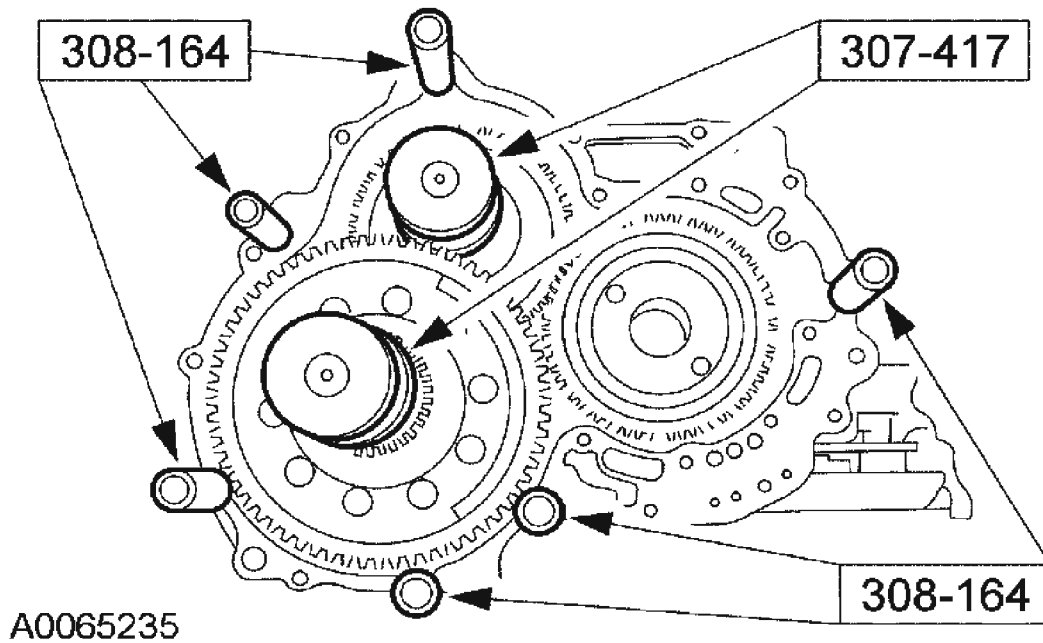
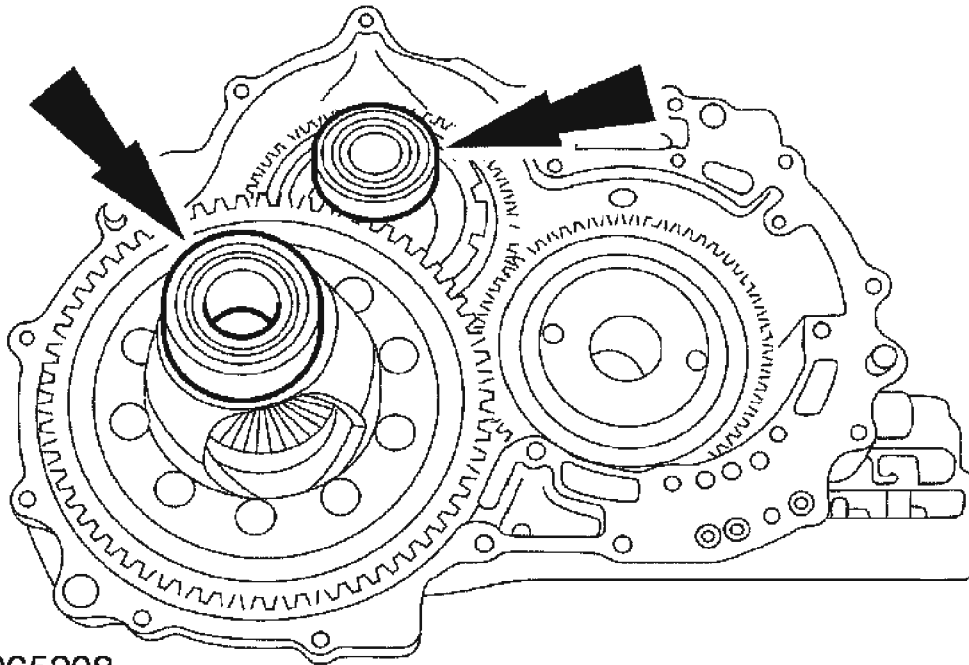


Fig. 335: Removing Special Tools
Courtesy of FORD MOTOR CO.

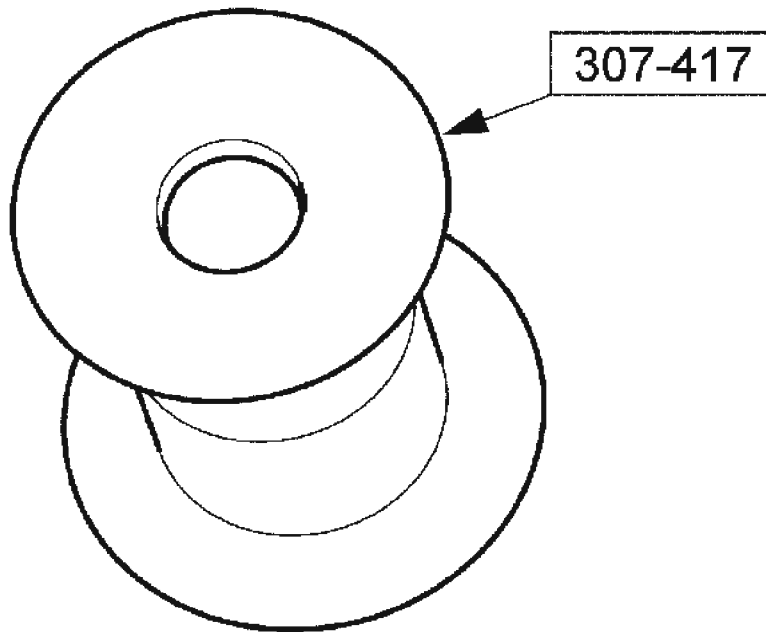
27. Remove the bearing cups.



A0065208

Fig. 336: Removing Bearing Cups
Courtesy of FORD MOTOR CO.

NOTE: If the plunger is above the contact surface, the reading will be incorrect.

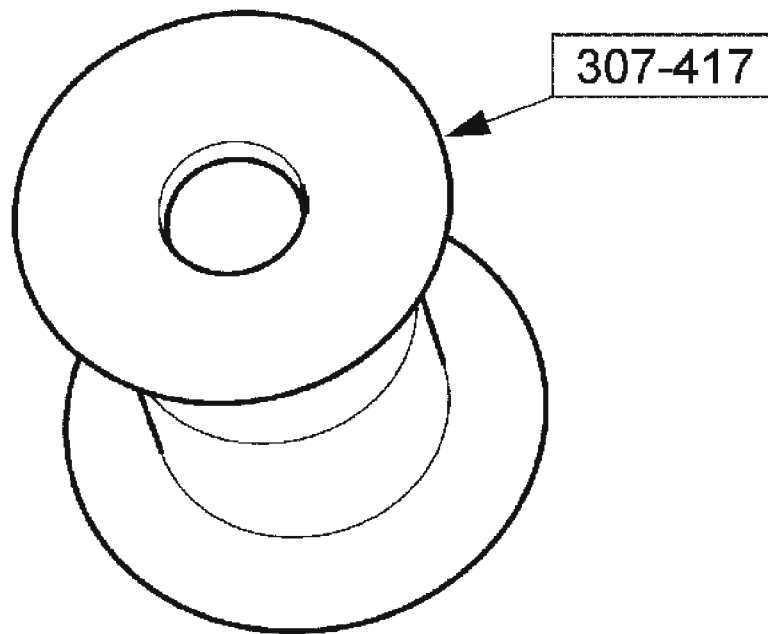


A0065222

Fig. 337: Identifying Special Tool (1 Of 2)
Courtesy of FORD MOTOR CO.

28. To determine the correct transfer shaft shim, measure the depth of the plunger on the special tool and select the correct transfer shaft shim. For additional information, refer to **SPECIFICATIONS**.

NOTE: **If the plunger is above the contact surface, the reading will be incorrect.**



A0065222

Fig. 338: Identifying Special Tool (2 Of 2)
Courtesy of FORD MOTOR CO.

29. To determine the correct differential shaft shim, measure the depth of the plunger on the special tool and select the correct differential shaft shim. For additional information, refer to **SPECIFICATIONS**.
30. Using the special tool, install the correct transfer shaft shim and bearing cup in to the converter housing.

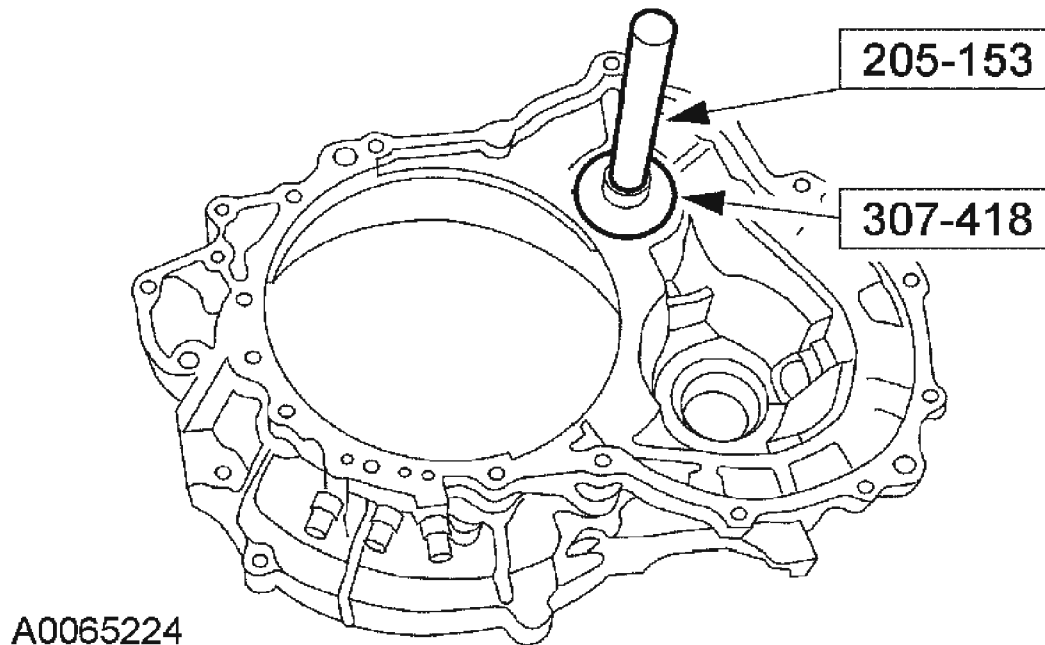


Fig. 339: Installing Transfer Shaft Shim And Bearing Cup In To Converter Housing Using Special Tool
Courtesy of FORD MOTOR CO.

31. Using the special tool, install the correct differential shaft shim and differential case bearing cup into the converter housing.

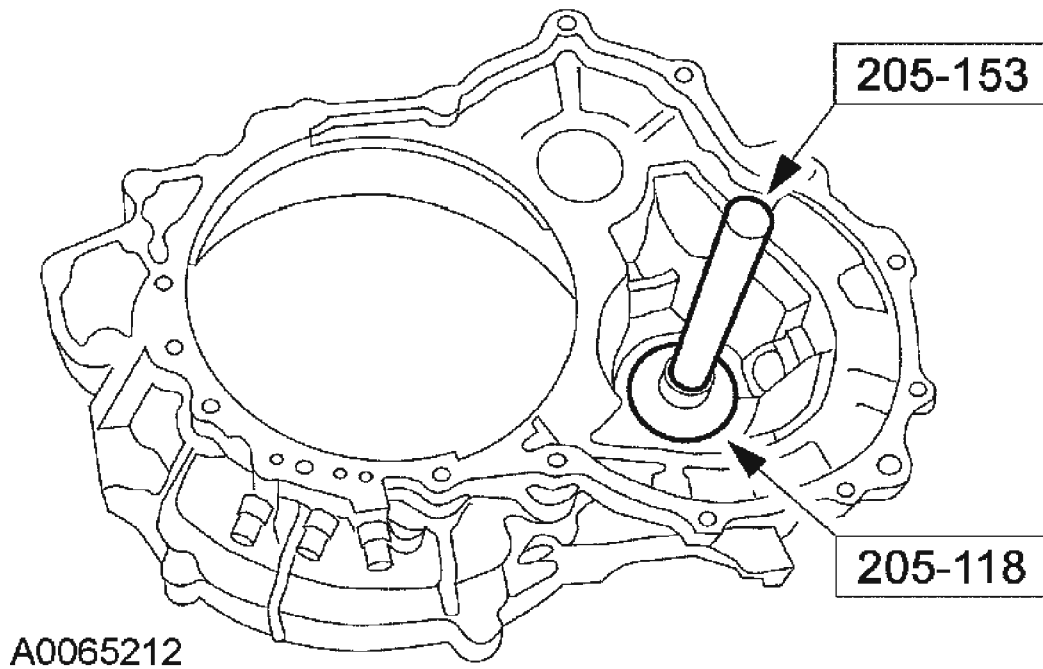
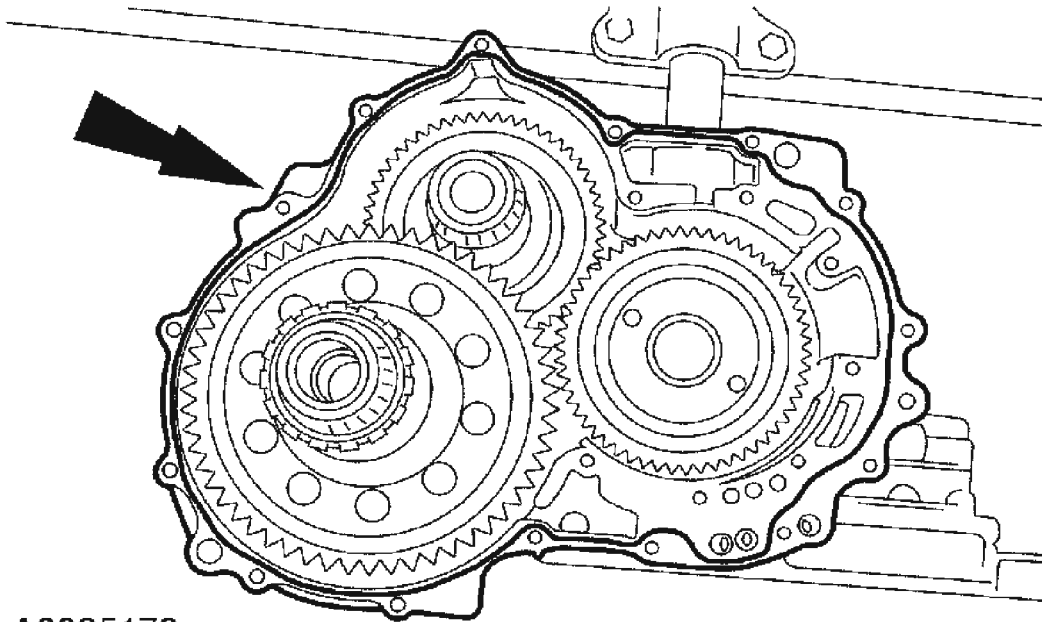


Fig. 340: Installing Differential Case Bearing Cup Into Converter Housing Using Special Tool
Courtesy of FORD MOTOR CO.

32. Apply a one millimeter thick bead of Loctite 5699.



A0065179

Fig. 341: Applying One Millimeter Thick Bead Of Loctite
Courtesy of FORD MOTOR CO.

33. Position the converter housing on the transaxle case and install the bolts.

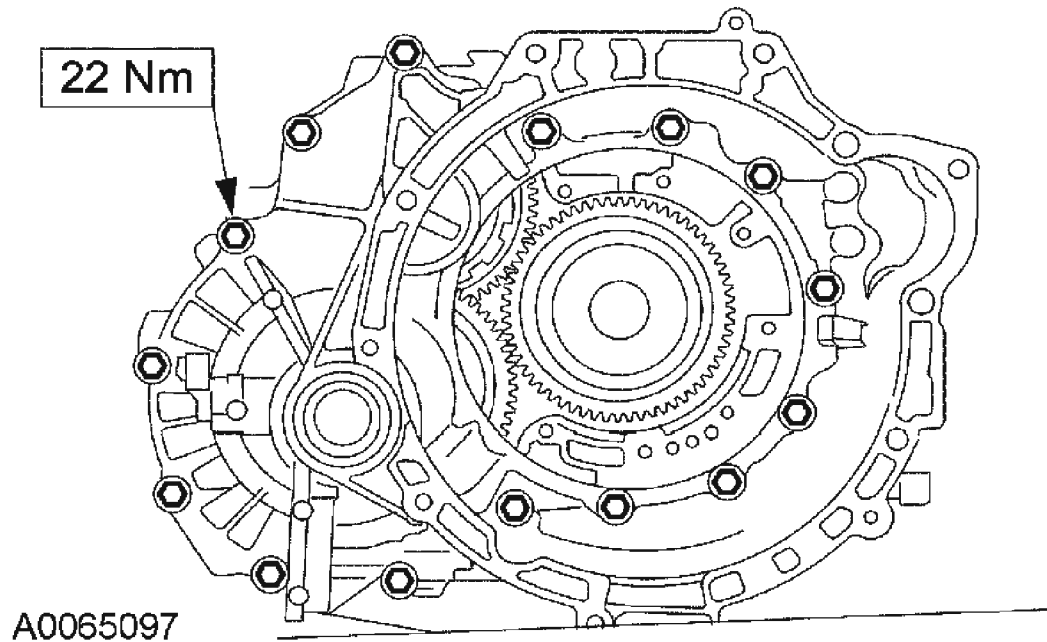


Fig. 342: Positioning Converter Housing On Transaxle Case And Installing Bolts
Courtesy of FORD MOTOR CO.

34. Install the intermediate/overdrive band servo piston return spring.

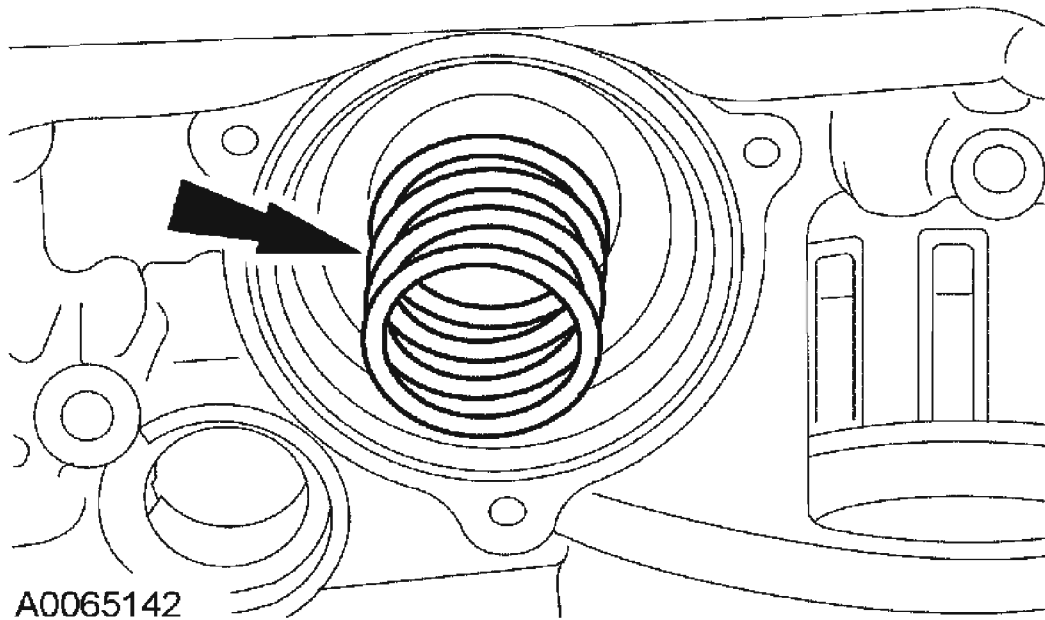


Fig. 343: Installing Intermediate/Overdrive Band Servo Piston Return Spring
Courtesy of FORD MOTOR CO.

35. Install the intermediate/overdrive servo piston.

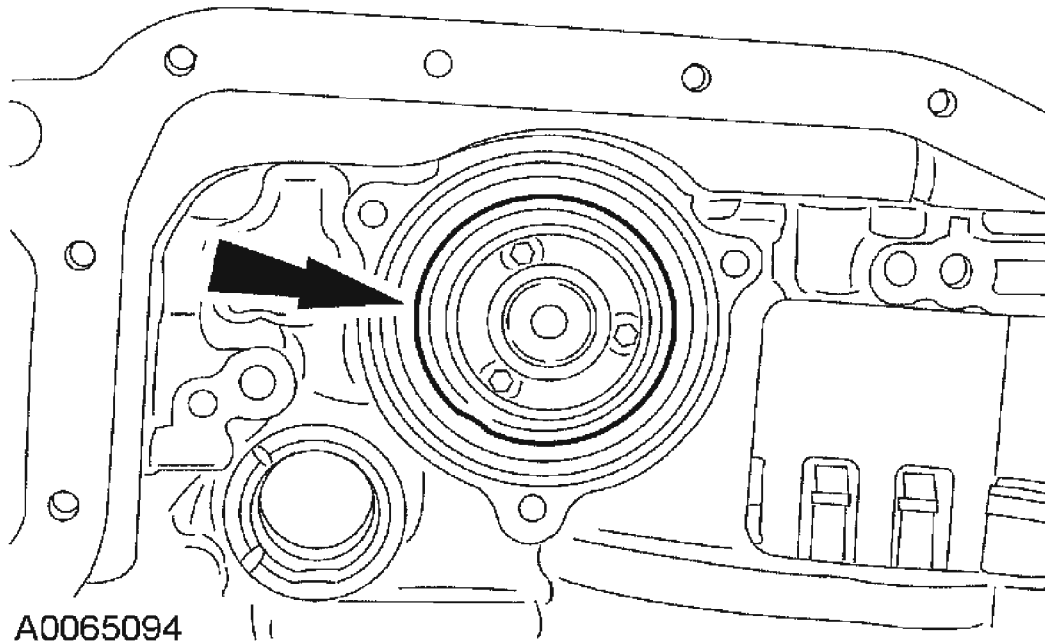


Fig. 344: Installing Intermediate/Overdrive Servo Piston
Courtesy of FORD MOTOR CO.

36. Install the O-ring seal.

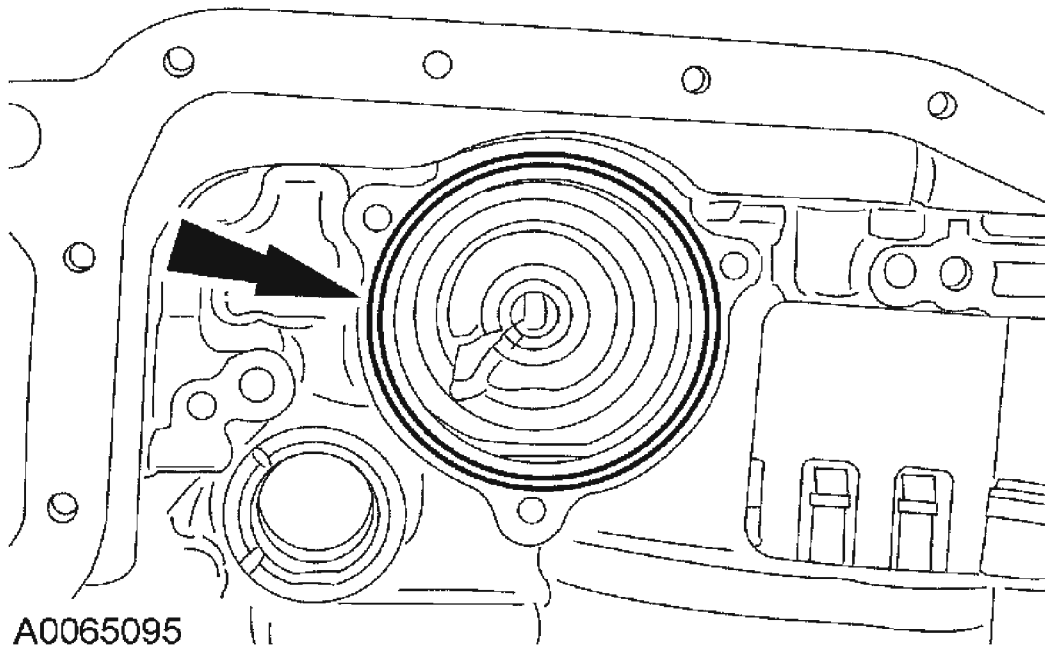


Fig. 345: Installing O-Ring Seal
Courtesy of FORD MOTOR CO.

NOTE: The three bolts must be loosely installed, then tightened in sequence to compress the intermediate/overdrive spring evenly.

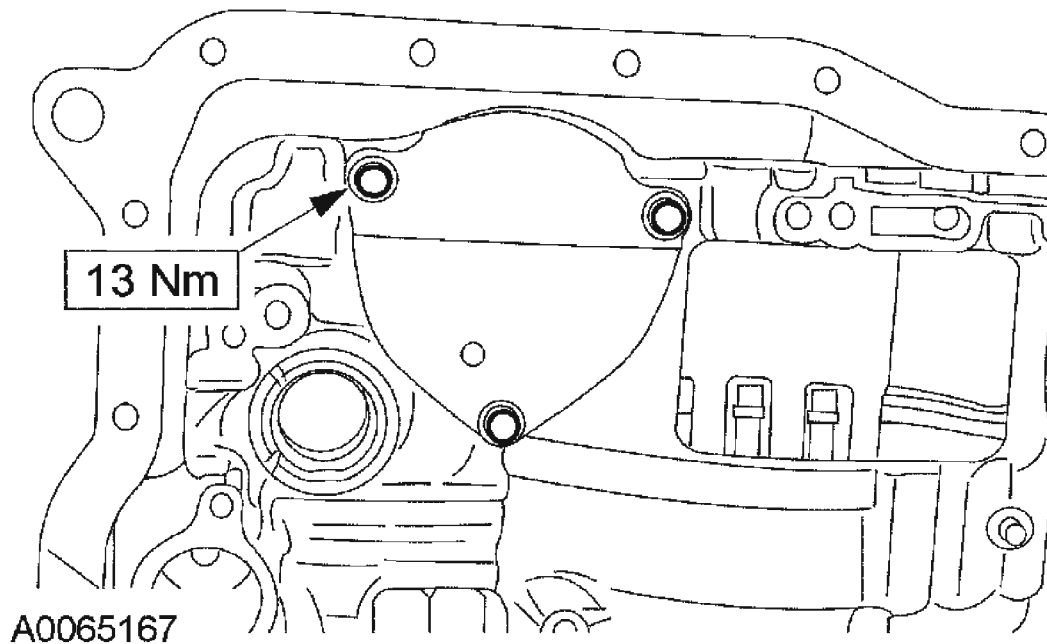


Fig. 346: Installing Intermediate/Overdrive Band Servo Piston Cover
Courtesy of FORD MOTOR CO.

37. Install the intermediate/overdrive band servo piston cover.
38. Install the shifter assembly and bolt.

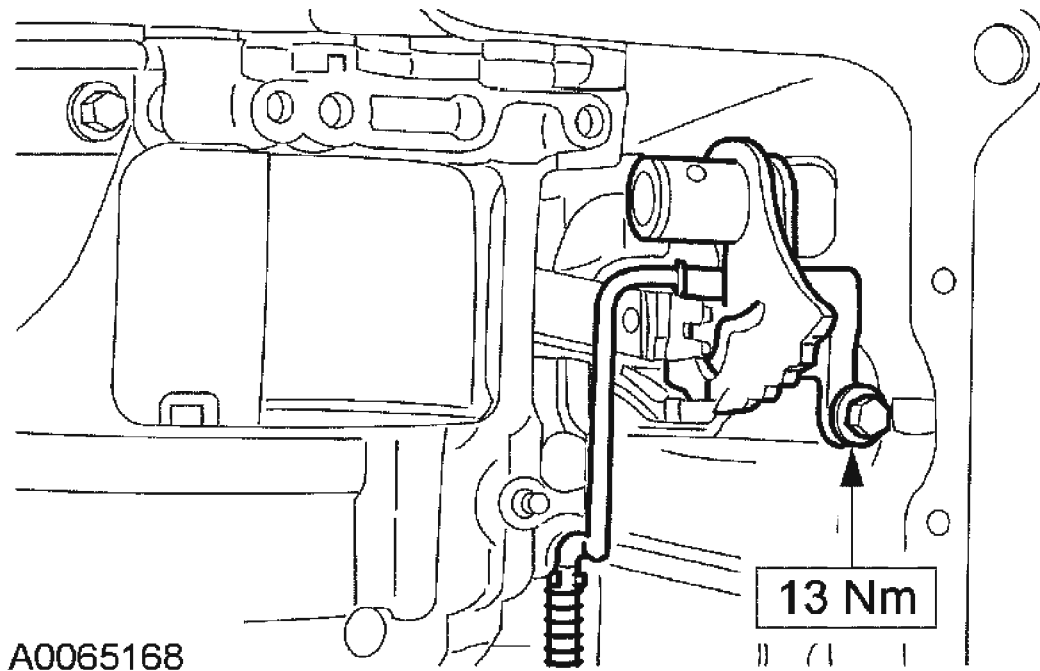


Fig. 347: Installing Shifter Assembly And Bolt
Courtesy of FORD MOTOR CO.

NOTE: Lubricate the O-ring prior to assembly.



A0065143

Fig. 348: Installing New O-Rings On Manual Lever Shaft
Courtesy of FORD MOTOR CO.

39. Install the new O-rings on the manual lever shaft.
40. Install the manual lever shaft.

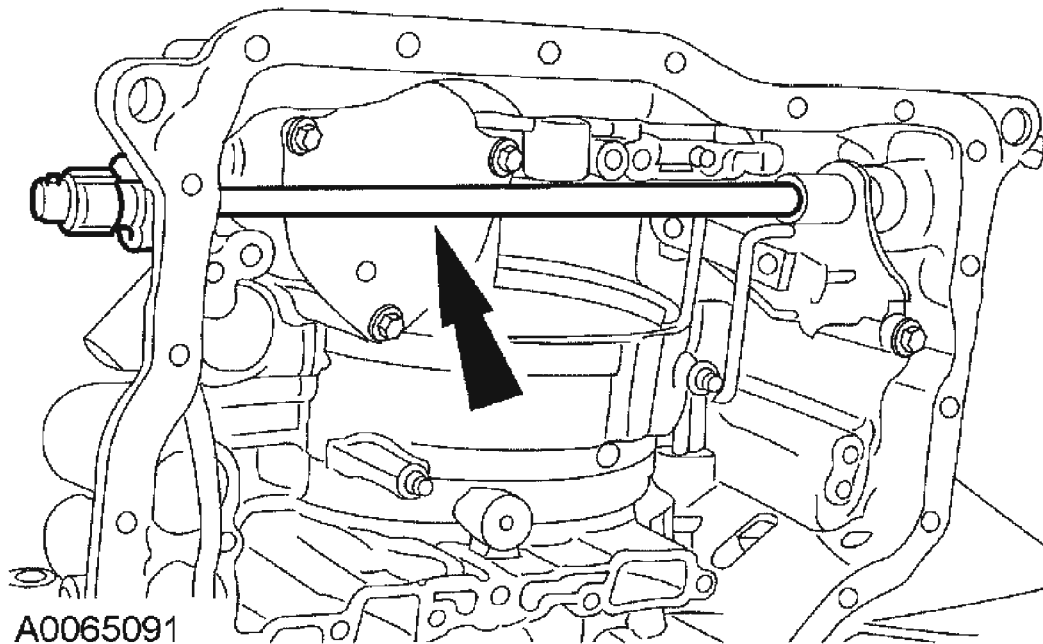


Fig. 349: Installing Manual Lever Shaft
Courtesy of FORD MOTOR CO.

NOTE: The roll pin does not need to sit flush with the shifter assembly.

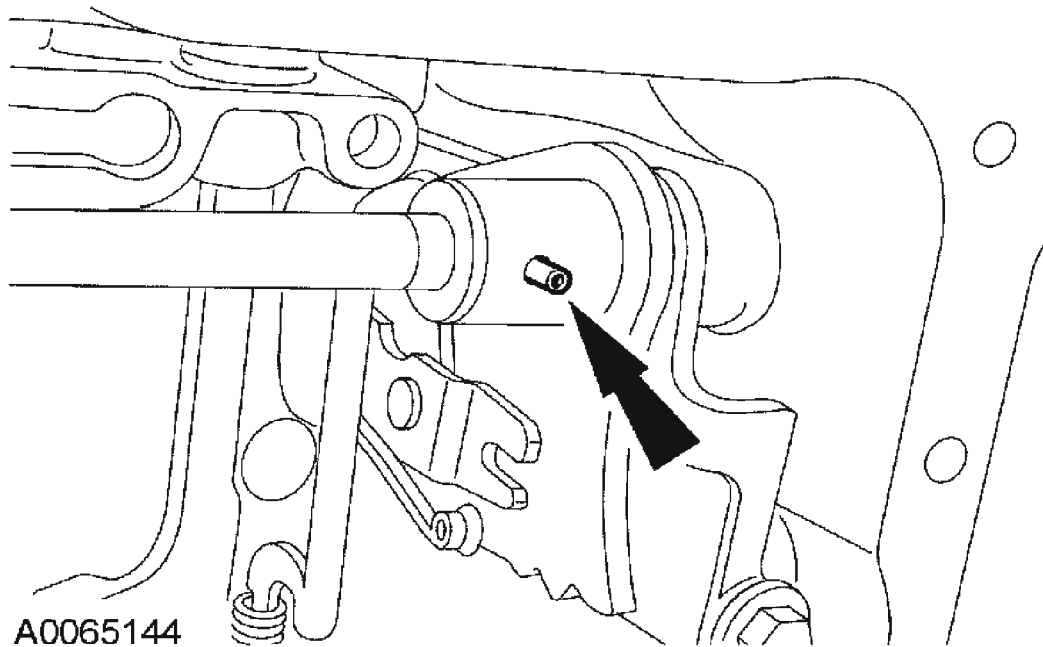


Fig. 350: Installing New Manual Lever Shaft Roll Pin
Courtesy of FORD MOTOR CO.

41. Install a new manual lever shaft roll pin.
42. Loosely install the transmission range (TR) sensor.

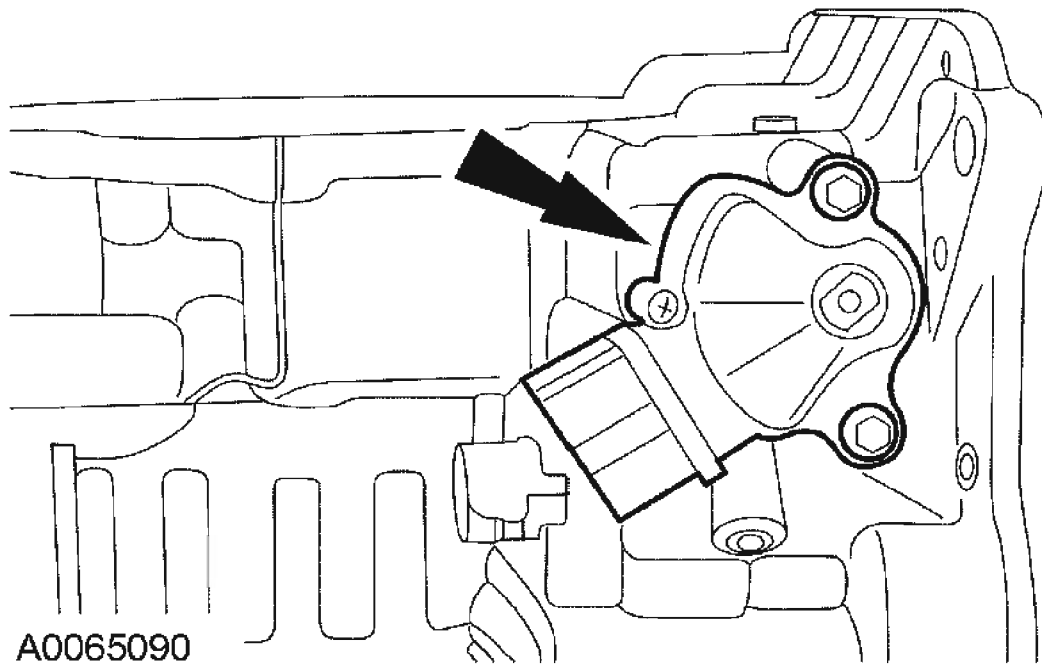
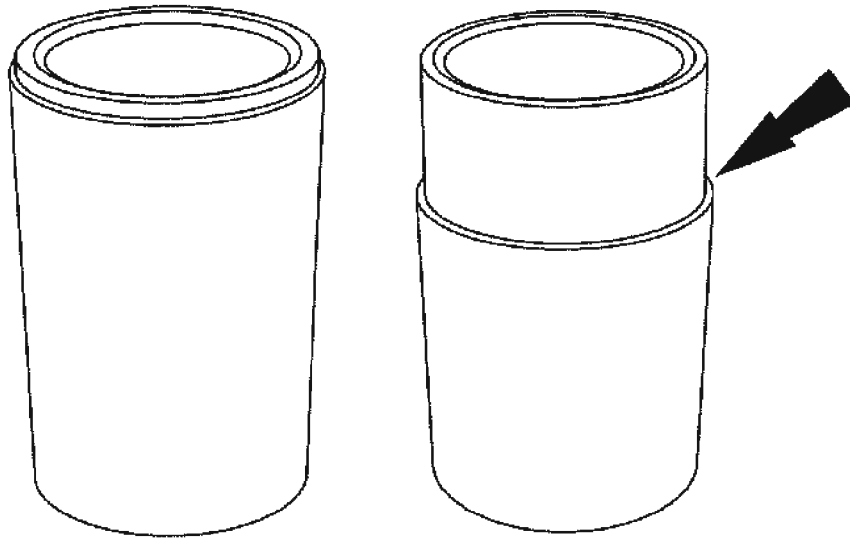


Fig. 351: Installing Transmission Range (TR) Sensor
Courtesy of FORD MOTOR CO.

43. Check accumulator bores and pistons for steps and install the accumulator pistons in their respective bores.



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Fig. 352: Checking Accumulator Pistons For Steps
Courtesy of FORD MOTOR CO.

NOTE: The neutral drive accumulator springs are thinner than the 1-2 accumulator springs.

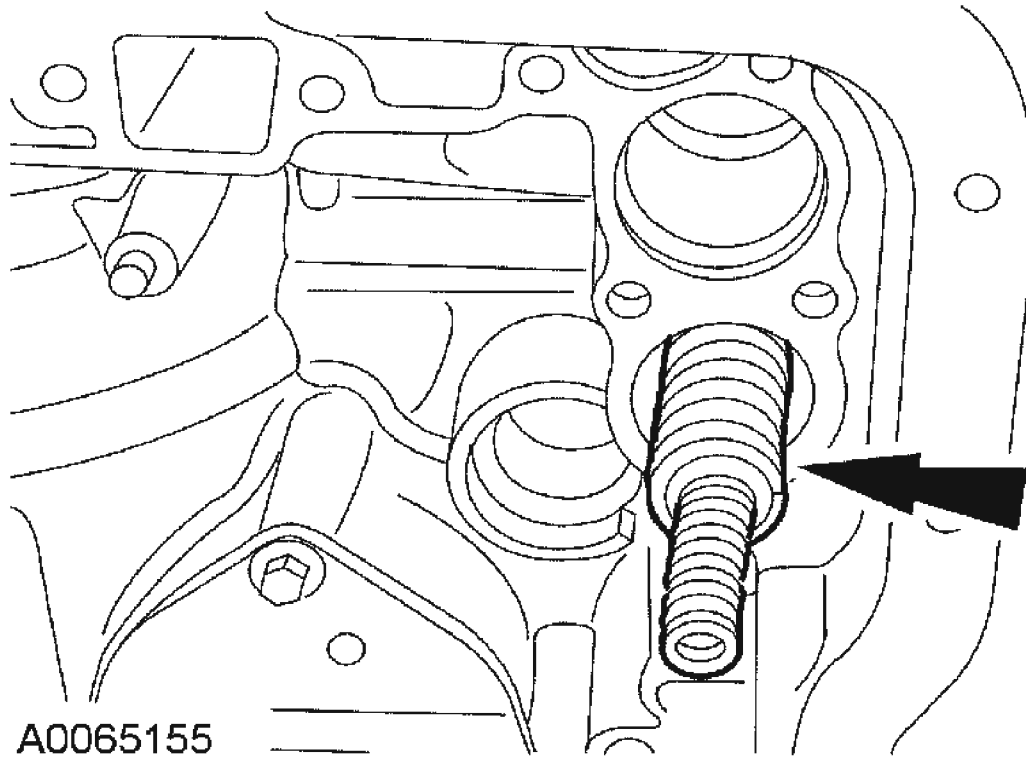


Fig. 353: Installing Thinner And Longer Neutral Drive Accumulator Springs
Courtesy of FORD MOTOR CO.

44. Install the thinner and longer neutral drive accumulator springs.
45. Install the neutral drive accumulator piston.

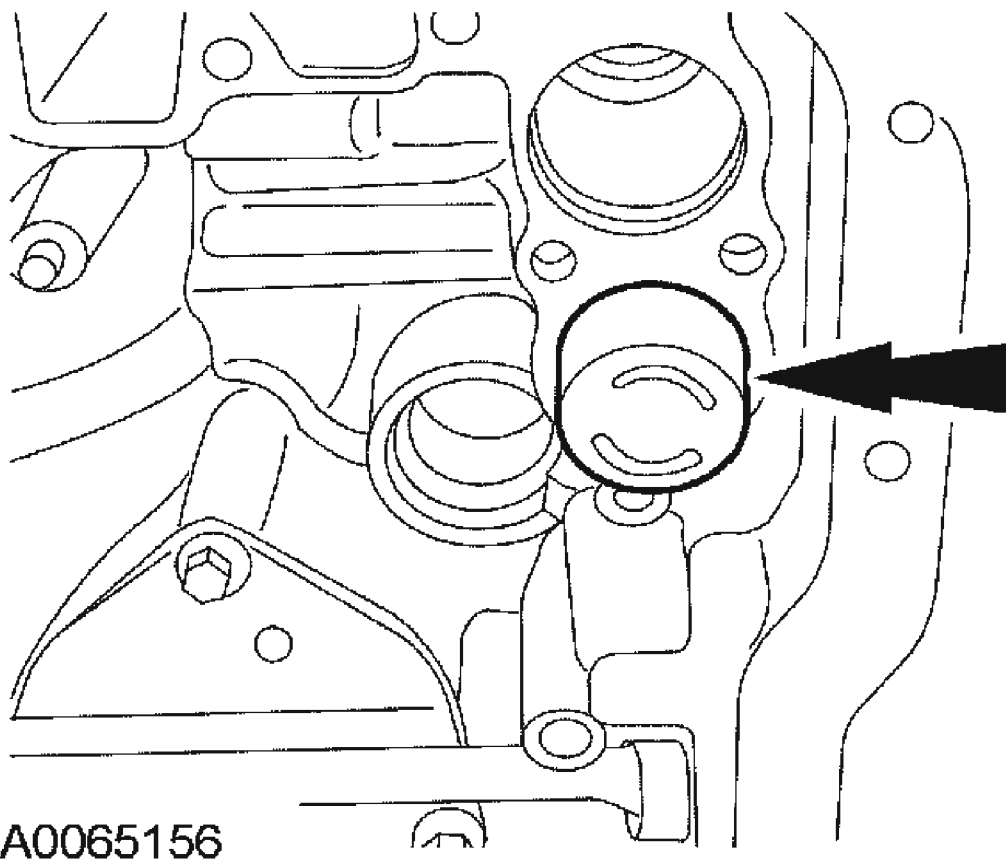


Fig. 354: Installing Neutral Drive Accumulator Piston
Courtesy of FORD MOTOR CO.

46. Install the 1-2 accumulator springs.

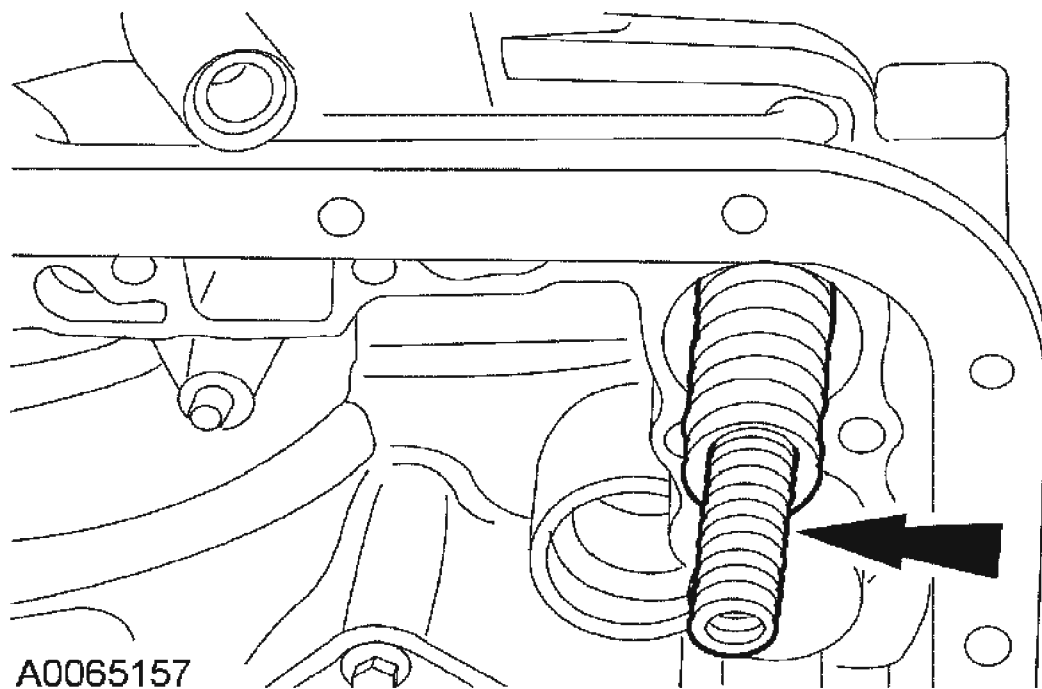


Fig. 355: Installing 1-2 Accumulator Springs
Courtesy of FORD MOTOR CO.

47. Install the 1-2 accumulator piston.

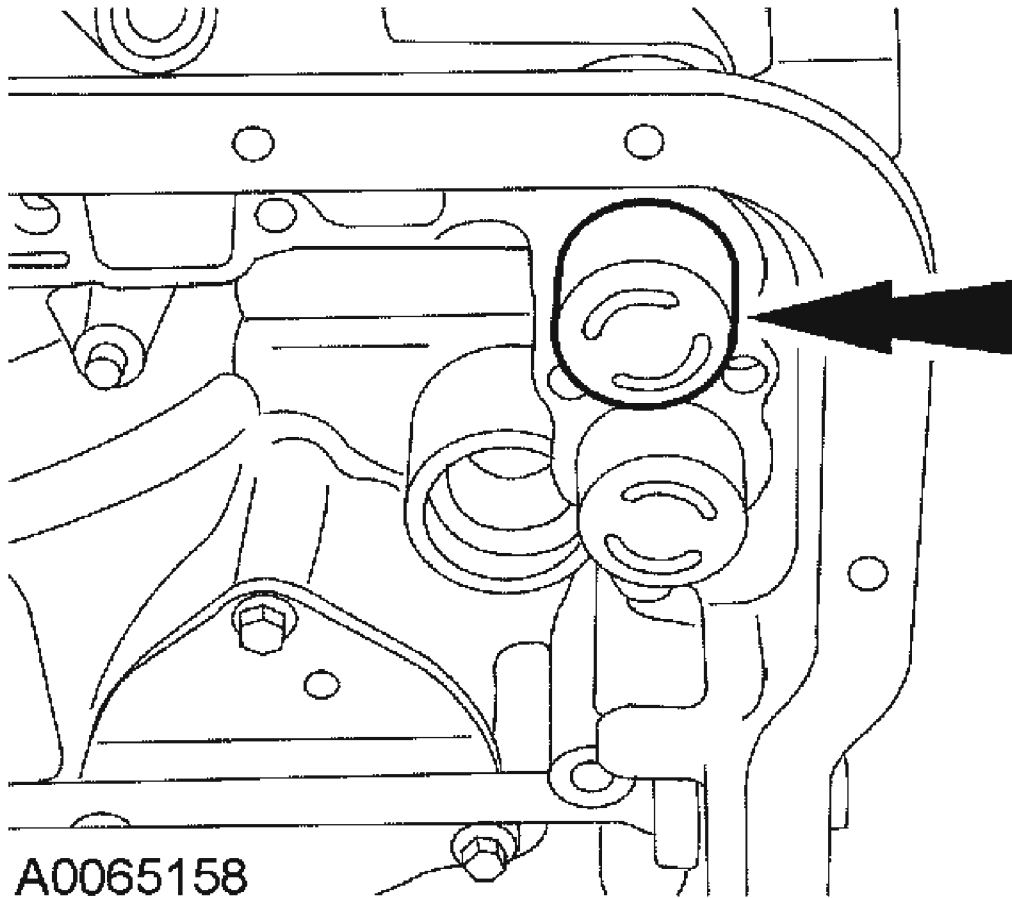


Fig. 356: Installing 1-2 Accumulator Piston
Courtesy of FORD MOTOR CO.

48. Inspect the seals. Lubricate and install the transaxle internal harness electrical connector.

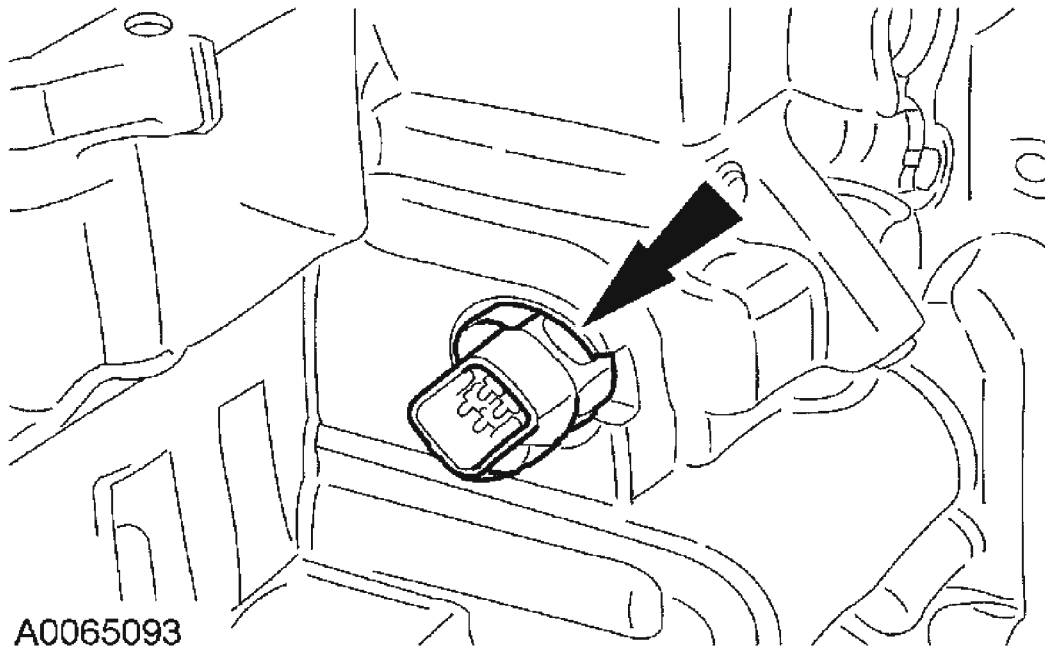


Fig. 357: Installing Transaxle Internal Harness Electrical Connector
Courtesy of FORD MOTOR CO.

NOTE: Make sure that the manual valve is in the manual control valve shift lever.

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

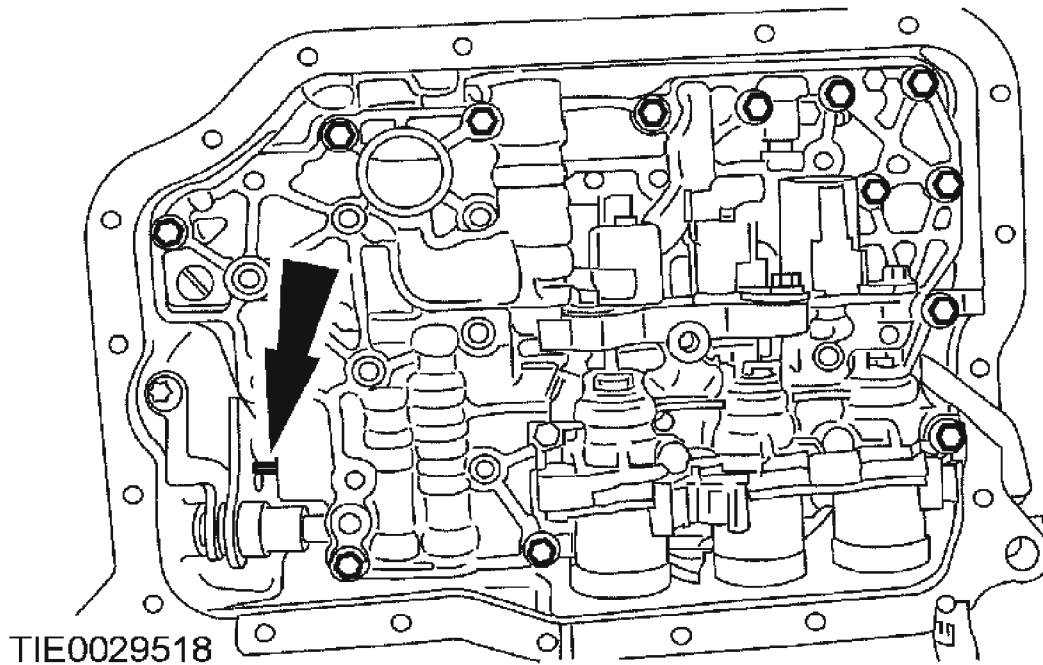


Fig. 358: Installing Main Control Valve Body
Courtesy of FORD MOTOR CO.

49. Install the main control valve body.
50. Tighten the main control valve body retaining bolts.
 - Tighten the bolts in the sequence shown.

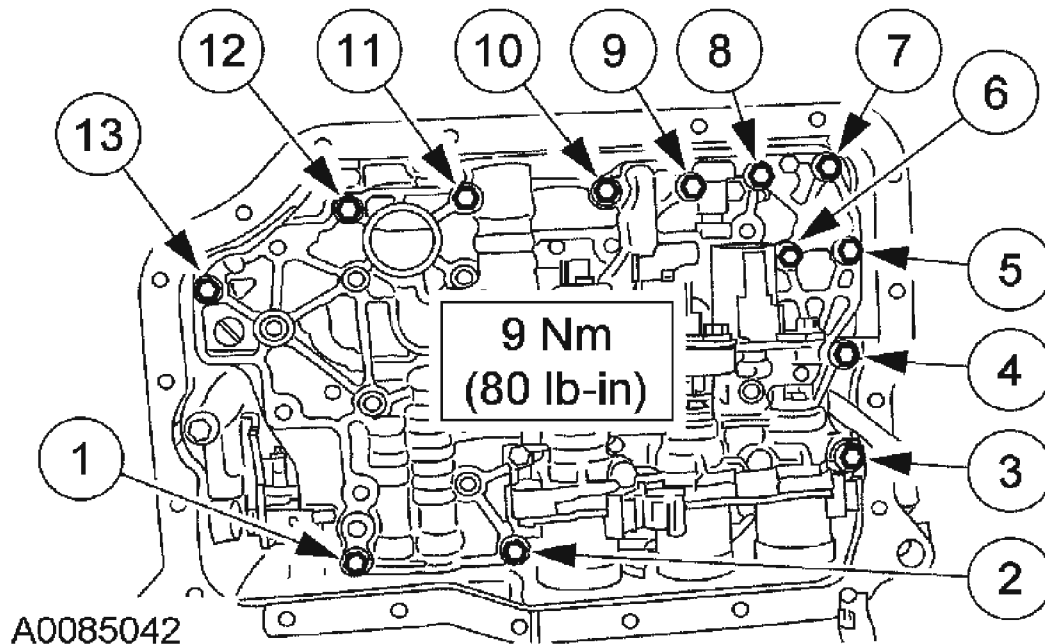


Fig. 359: Identifying Main Control Valve Body Retaining Bolts Tightening Sequence
Courtesy of FORD MOTOR CO.

NOTE: It is necessary to connect the connectors in the same positions as noted in disassembly. Connector color letters are cast in the solenoid body.

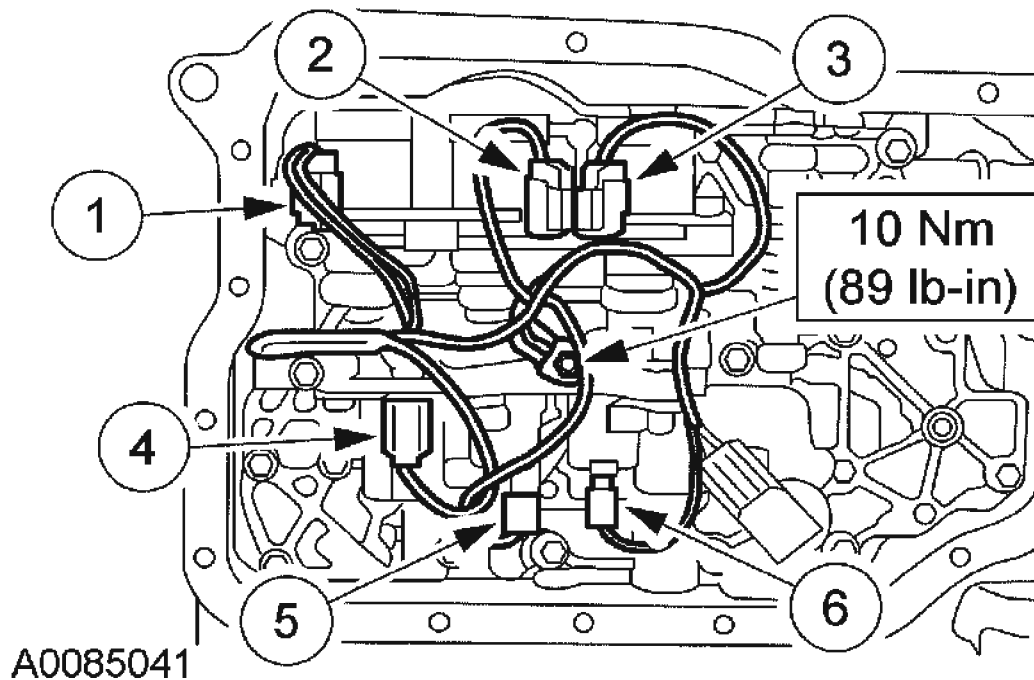


Fig. 360: Installing Main Control Wiring Harness, Connecting Electrical Connectors And Installing Ground Wire Bolt
Courtesy of FORD MOTOR CO.

51. Install the main control wiring harness, connect the electrical connectors and install the ground wire bolt.
 1. Solenoid SSC; Color N (Neutral/White).
 2. Solenoid SSE; Color G (Green).
 3. Solenoid SSD; Color L (Blue).
 4. Solenoid EPC; Color B (Black).
 5. Solenoid SSA; Color N (Neutral).
 6. Solenoid SSB; Color B (Black).
52. Install the fluid filter.

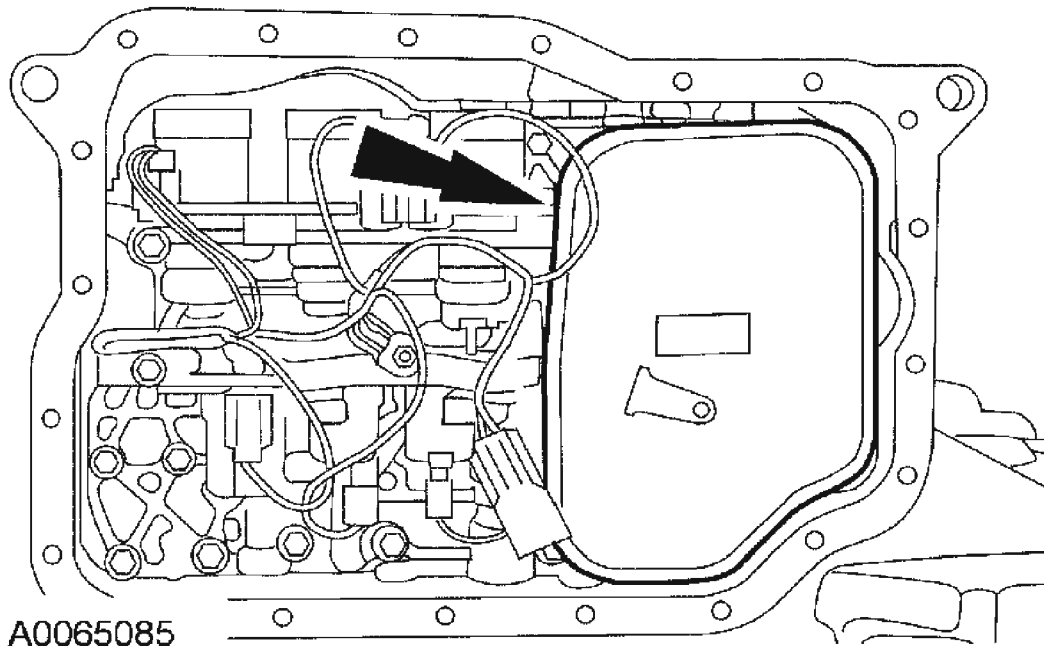


Fig. 361: Installing Fluid Filter
Courtesy of FORD MOTOR CO.

53. Connect the transmission fluid temperature (TFT) sensor.

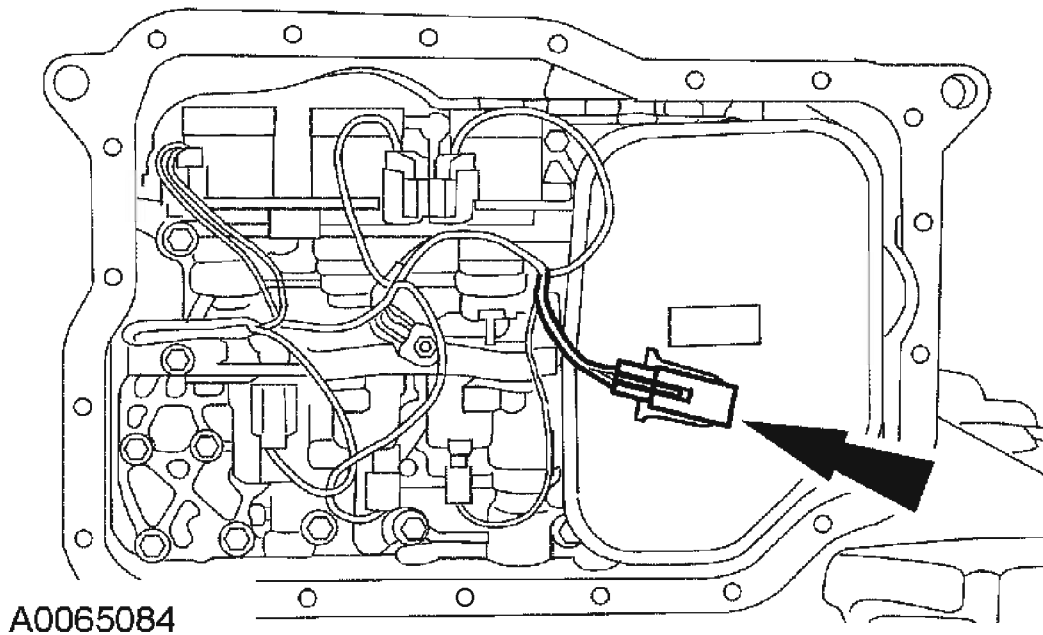


Fig. 362: Connecting Transmission Fluid Temperature (TFT) Sensor
Courtesy of FORD MOTOR CO.

54. Apply a bead 1.5 mm diameter of Motorcraft TA-29 to the transaxle fluid pan.

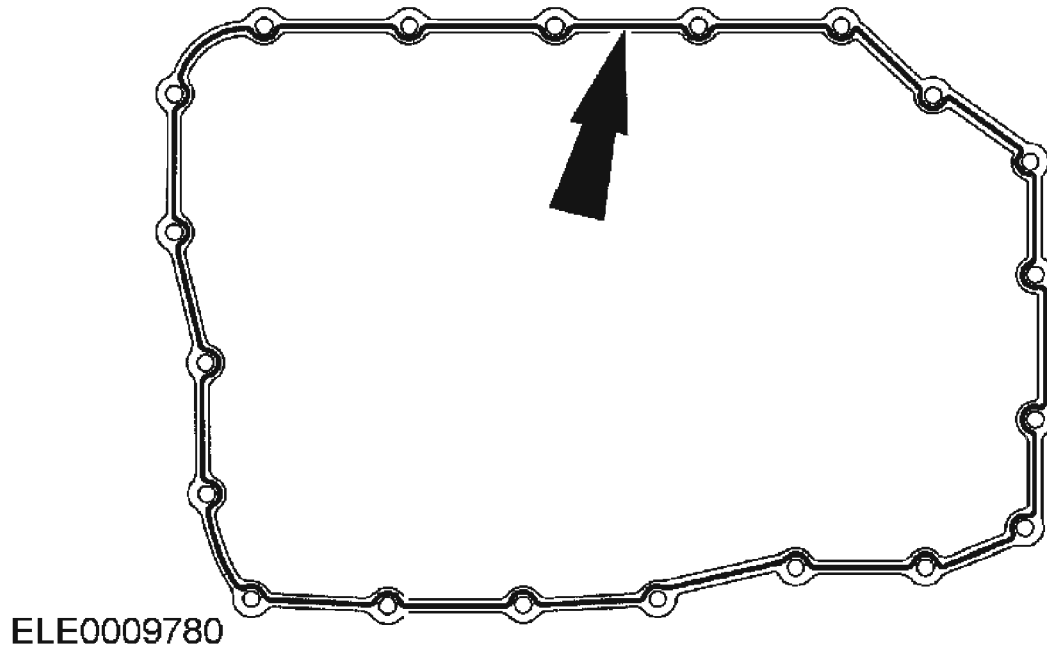
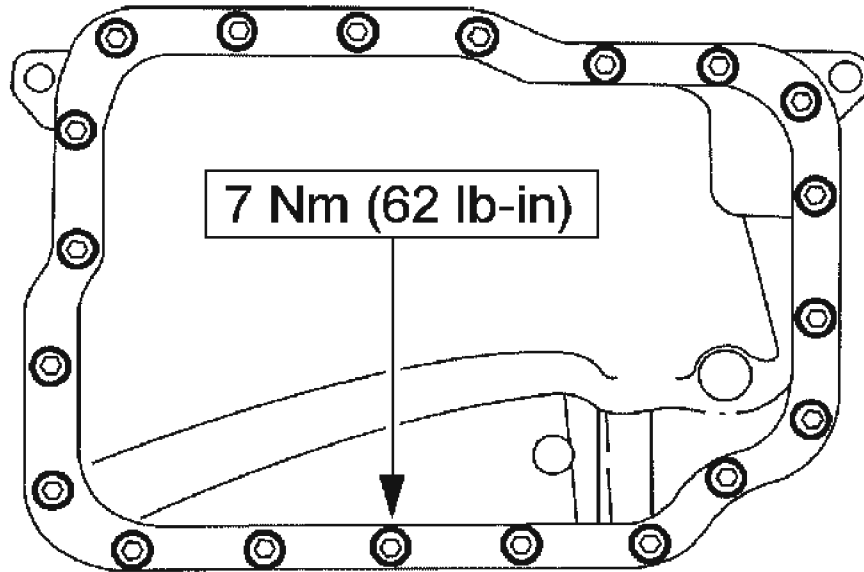


Fig. 363: Applying Bead 1.5 mm Diameter Of Motorcraft TA-29 To Transaxle Fluid Pan

Courtesy of FORD MOTOR CO.

55. Install the transaxle fluid pan.



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Fig. 364: Installing Transaxle Fluid Pan Bolts
Courtesy of FORD MOTOR CO.

56. Rotate the transaxle 180 degrees.
57. Install the low/reverse clutch piston.

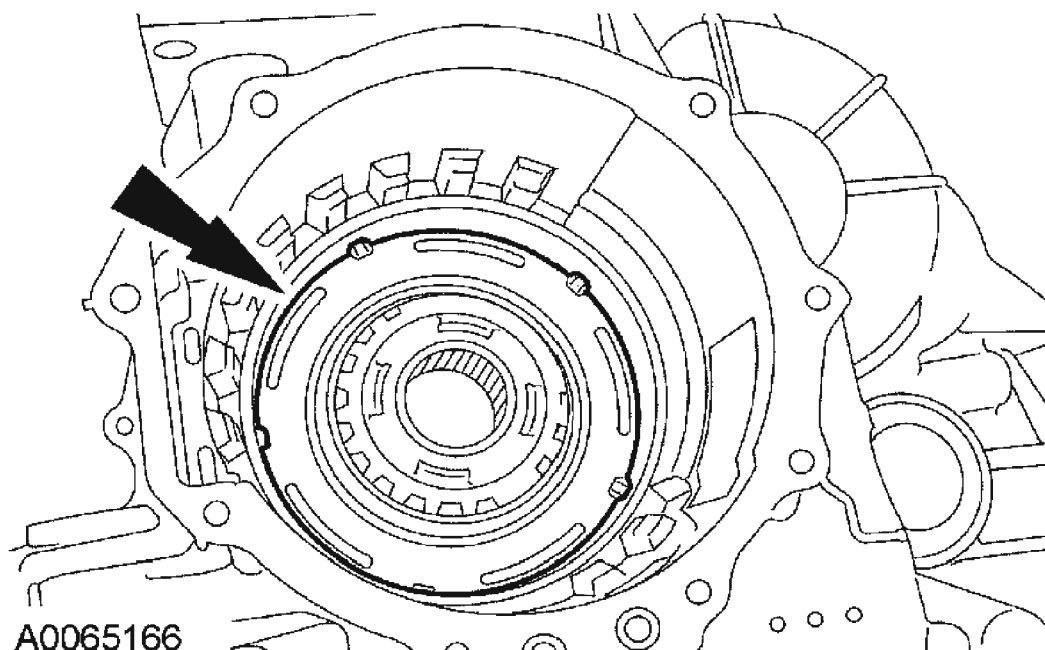
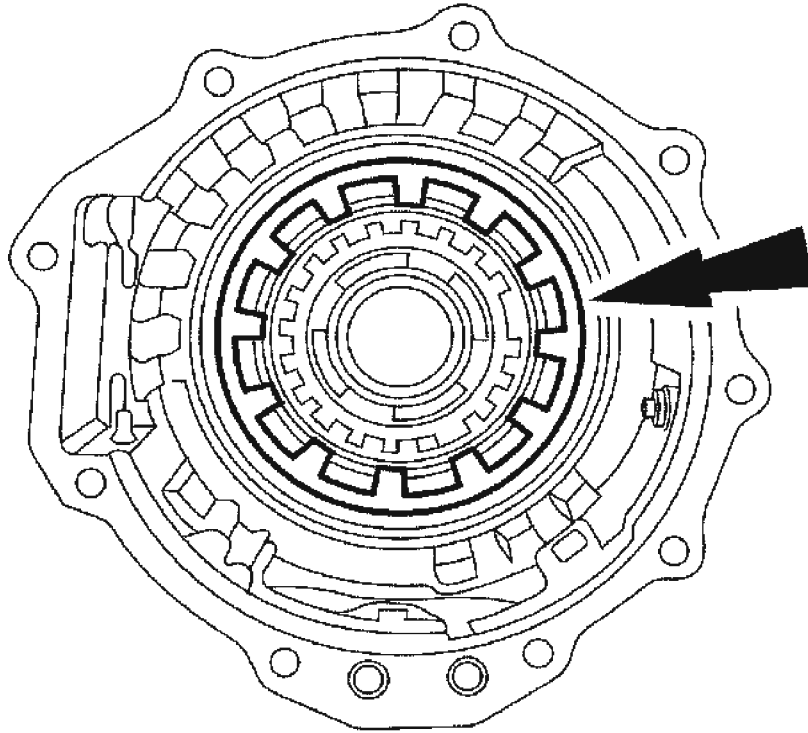


Fig. 365: Installing Low/Reverse Clutch Piston
Courtesy of FORD MOTOR CO.

58. Install the low/reverse clutch return spring.



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Fig. 366: Installing Low/Reverse Clutch Return Spring
Courtesy of FORD MOTOR CO.

59. Install the bevel ring with the outer edge of the beveled ring up towards the top of the case.

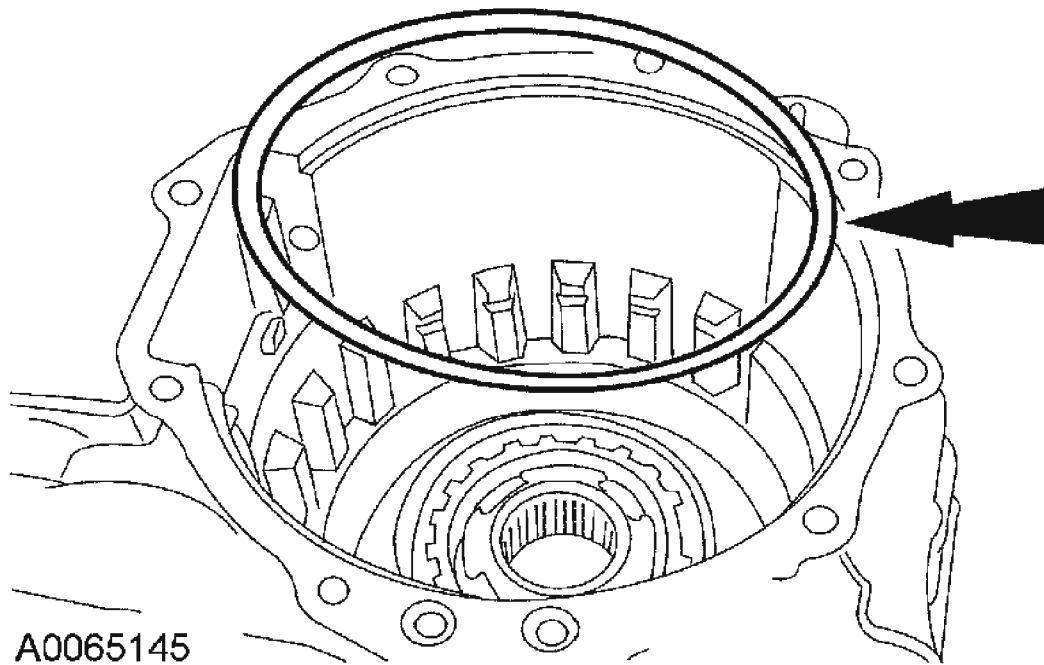


Fig. 367: Installing Bevel Ring With Outer Edge Of Beveled Ring Up Towards Top Of Case

Courtesy of FORD MOTOR CO.

60. Inspect the position of the bevel ring.
 1. Make sure the low/reverse clutch piston is seated.
 2. Make sure the bevel ring is installed with the inside edge facing down.

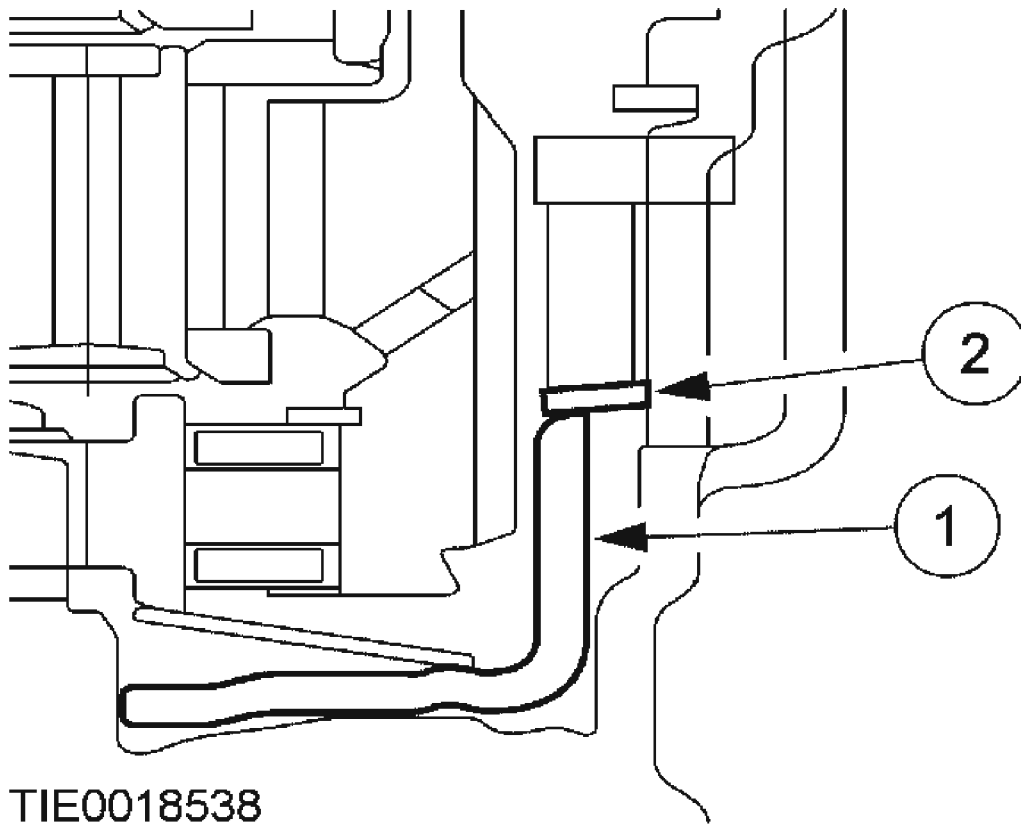
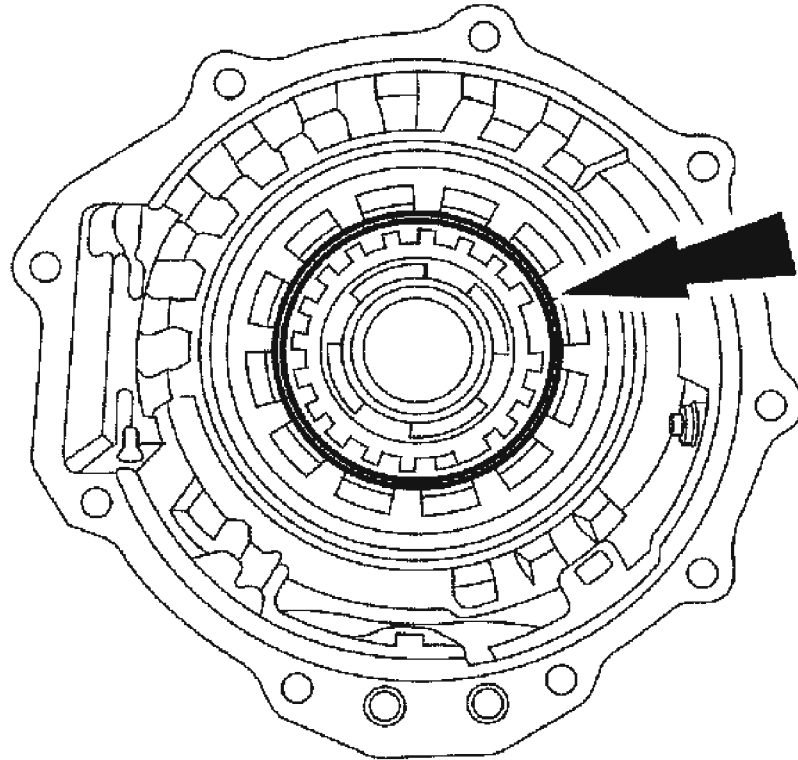


Fig. 368: Inspecting Position Of Bevel Ring
Courtesy of FORD MOTOR CO.

61. Install the low one-way clutch inner race.



A0065173

Fig. 369: Installing Low One-Way Clutch Inner Race
Courtesy of FORD MOTOR CO.

NOTE: The opening of the retaining ring must be at the ten o'clock position.

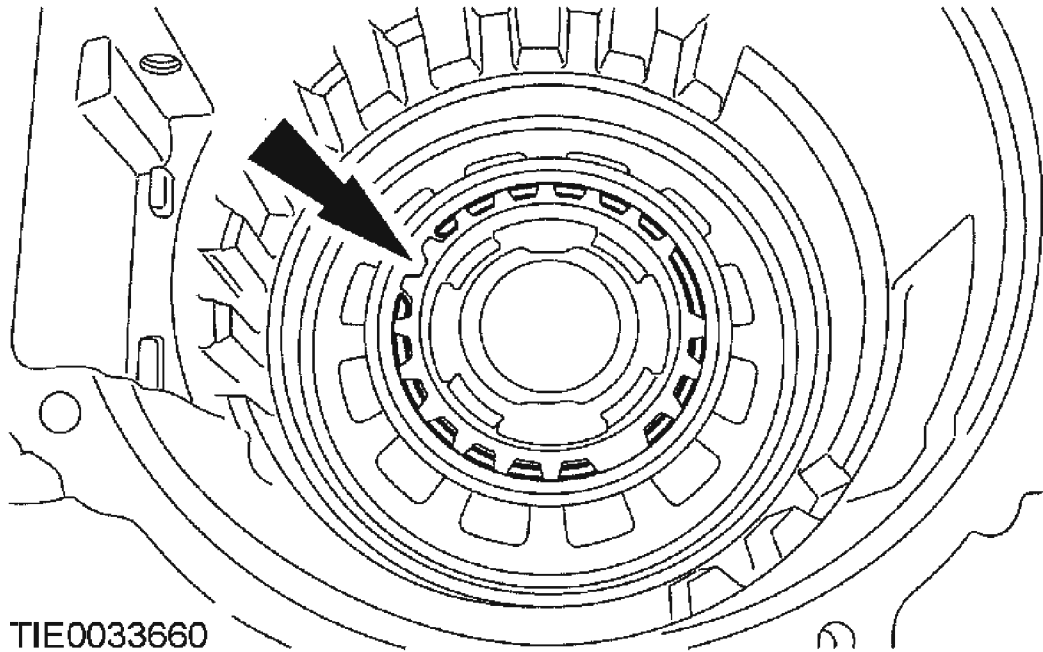
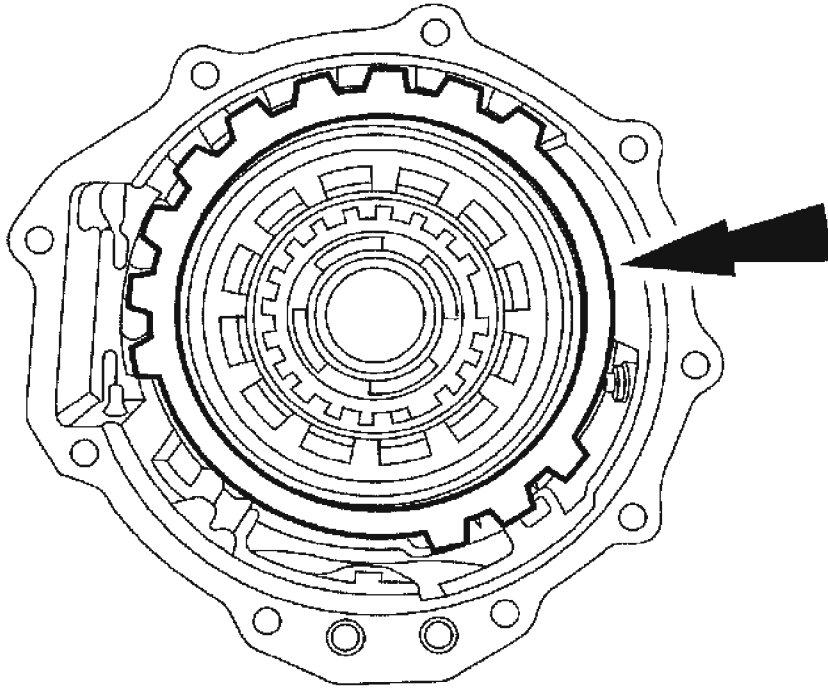


Fig. 370: Installing Low One-Way Clutch Retaining Ring
Courtesy of FORD MOTOR CO.

62. Install the low one-way clutch retaining ring.
63. Install the low/reverse plates and pressure plate.



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Fig. 371: Installing Low/Reverse Plates And Pressure Plate
Courtesy of FORD MOTOR CO.

64. Install the low reverse clutch plate selective retaining ring.
 - Check the clutch clearance.

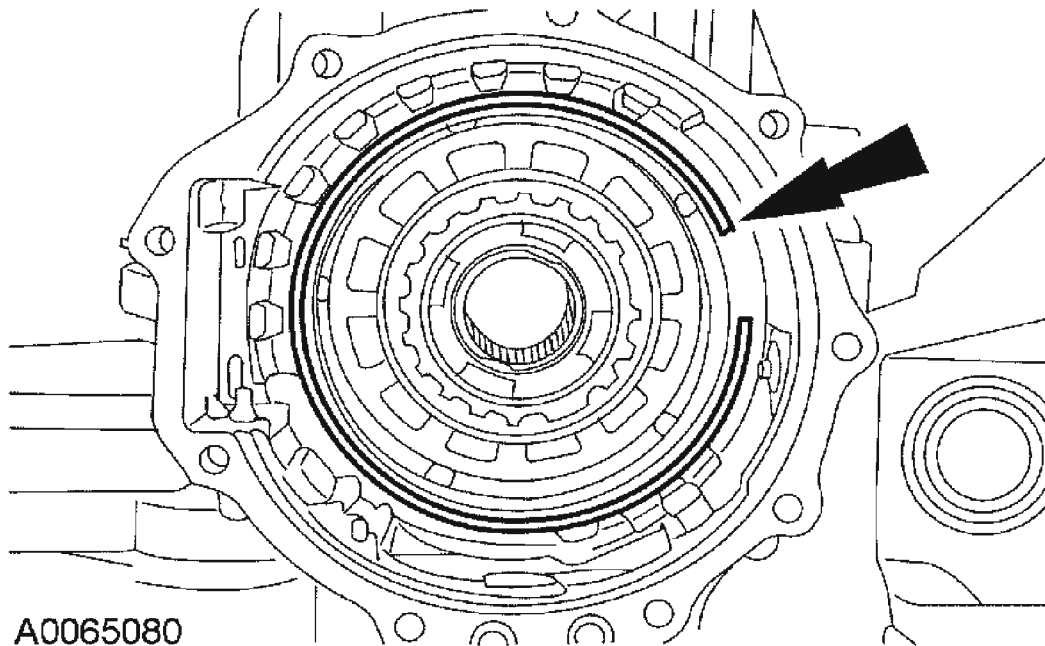


Fig. 372: Installing Low Reverse Clutch Plate Selective Retaining Ring
Courtesy of FORD MOTOR CO.

NOTE: Make sure that the snap ring is installed before installing the planet assembly.

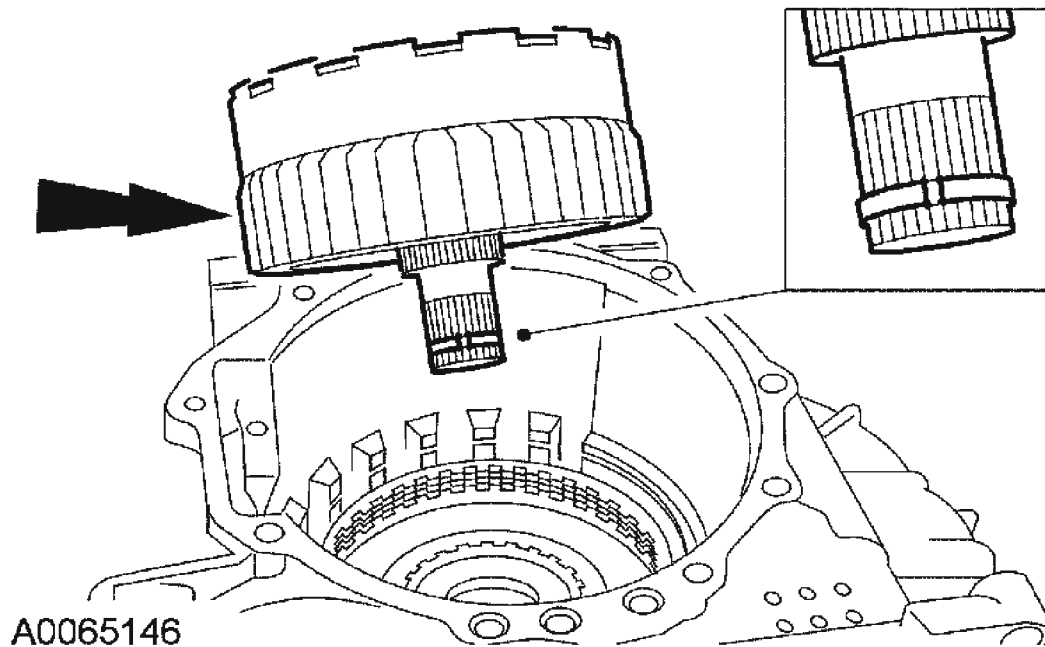


Fig. 373: Installing Planet Assembly
Courtesy of FORD MOTOR CO.

65. Install the planet assembly.

CAUTION: The edge of the planet assembly must fit flush with the transaxle case.

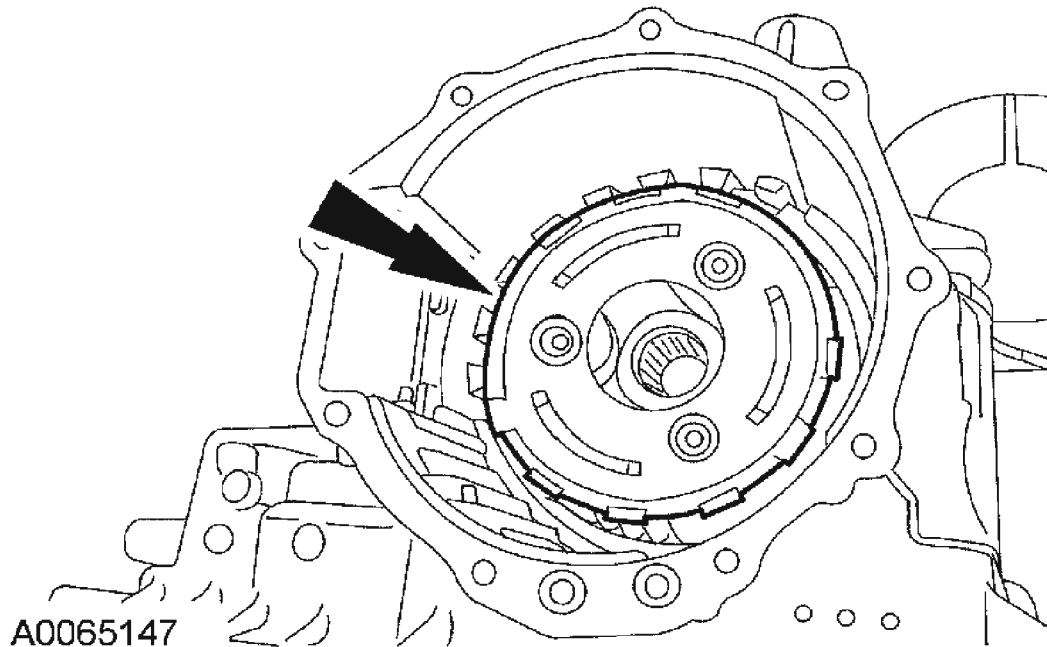


Fig. 374: Inspecting Planet Assembly Installation
Courtesy of FORD MOTOR CO.

66. Inspect the planet assembly installation.

CAUTION: The planet assembly must only rotate counterclockwise.

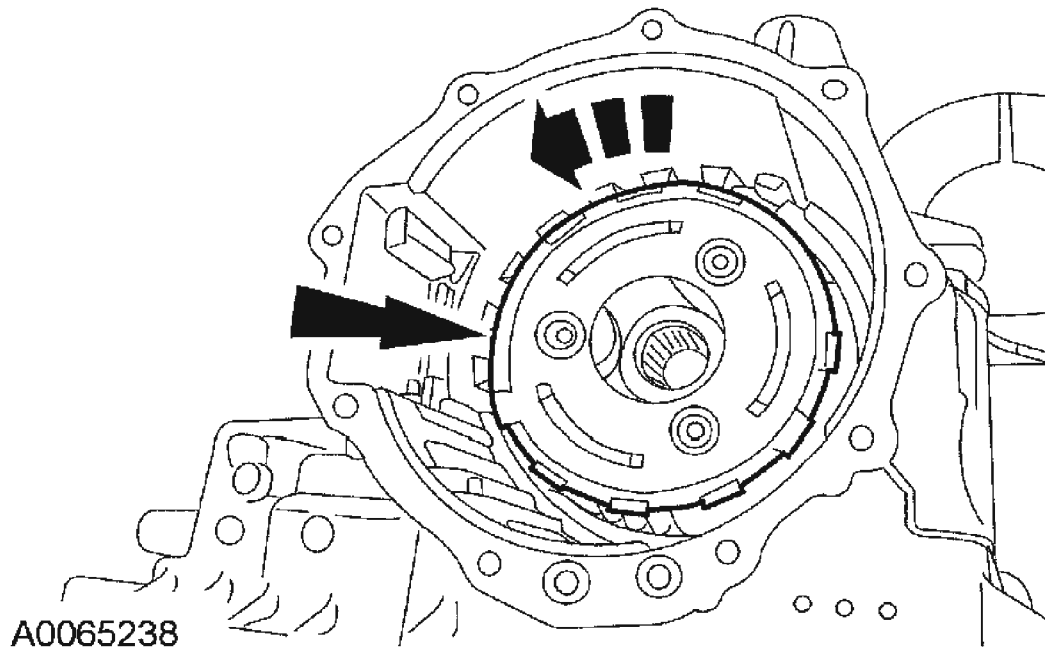


Fig. 375: Identifying One Way Clutch Is Correctly Installed
Courtesy of FORD MOTOR CO.

67. Check to make sure that the one way clutch is correctly installed.
 - Rotate the planet assembly clockwise and counterclockwise.
68. Install the intermediate/overdrive drum assembly.

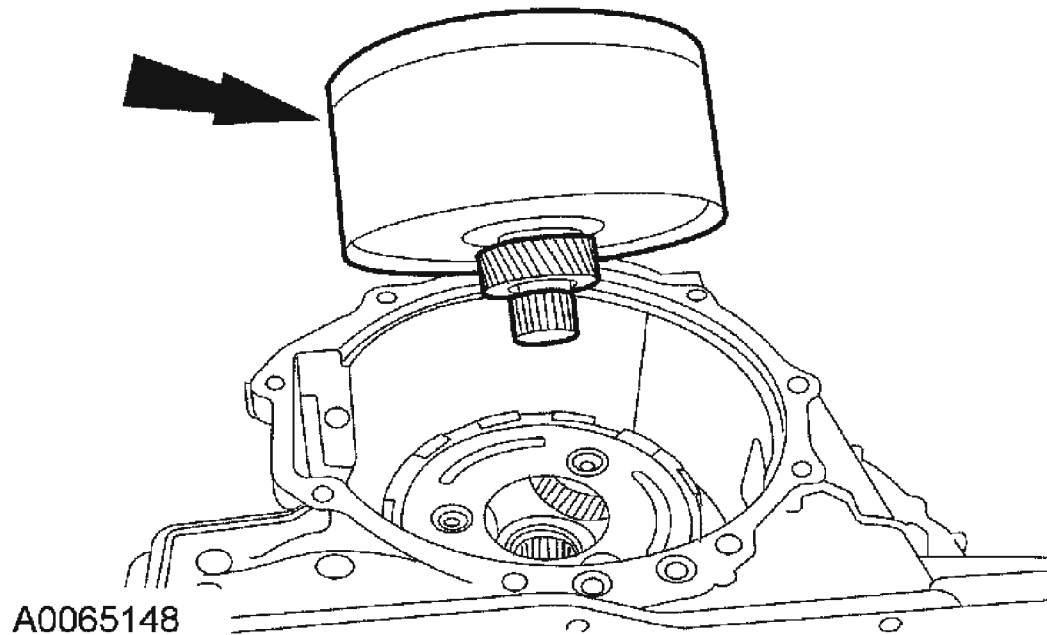
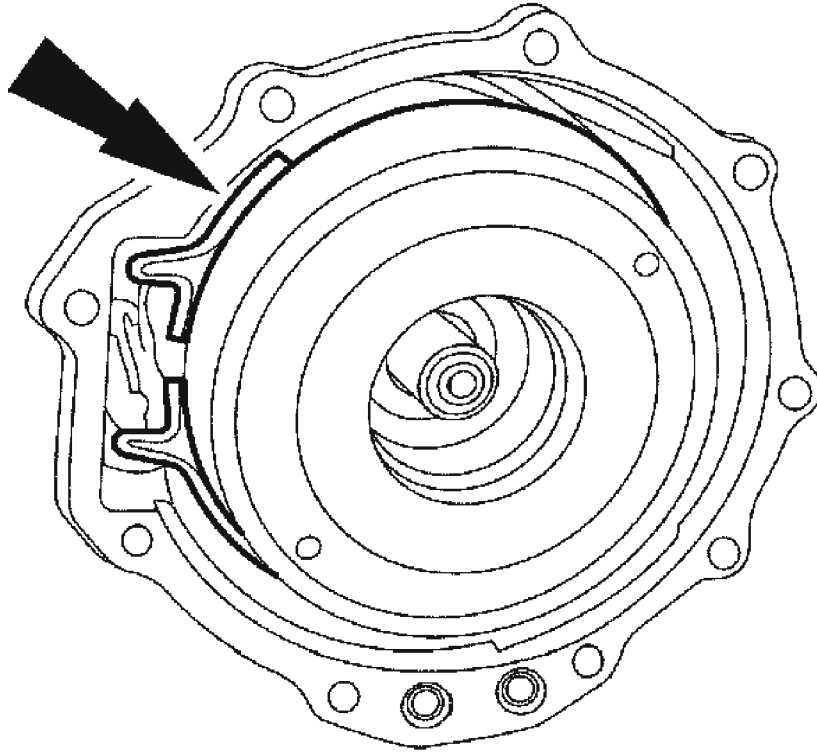


Fig. 376: Installing Intermediate/Overdrive Drum Assembly
Courtesy of FORD MOTOR CO.

69. Install the intermediate/overdrive band.



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Fig. 377: Installing Intermediate/Overdrive Band
Courtesy of FORD MOTOR CO.

70. Install the direct clutch cylinder thrust bearing with the rollers facing up.

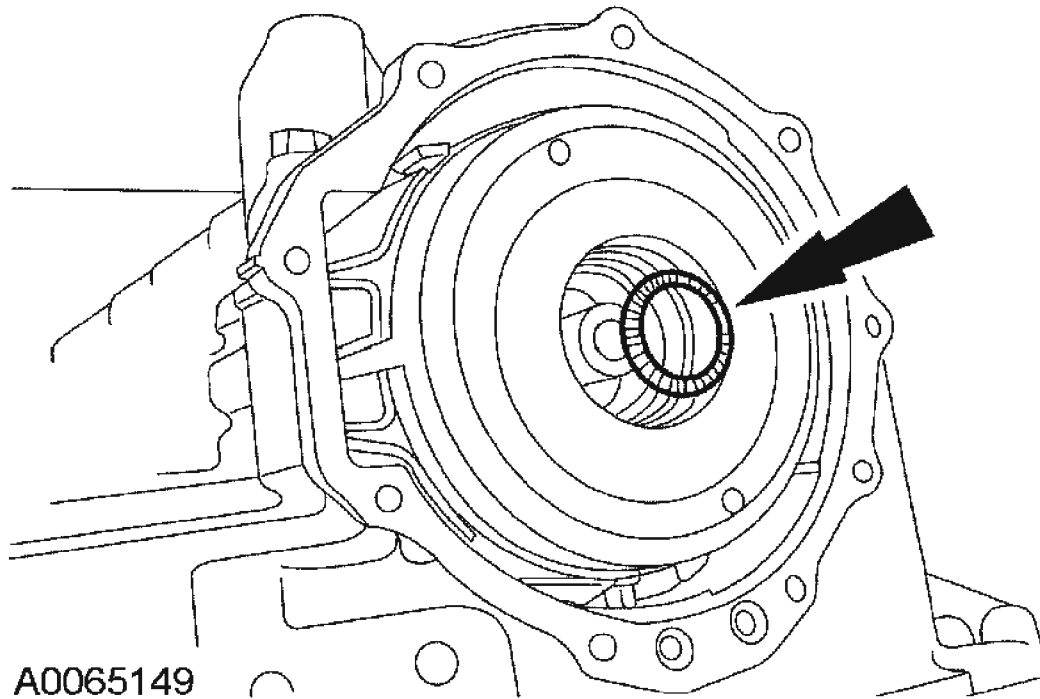


Fig. 378: Installing Direct Clutch Cylinder Thrust Bearing
Courtesy of FORD MOTOR CO.

71. Install new end cover-to-case seals.

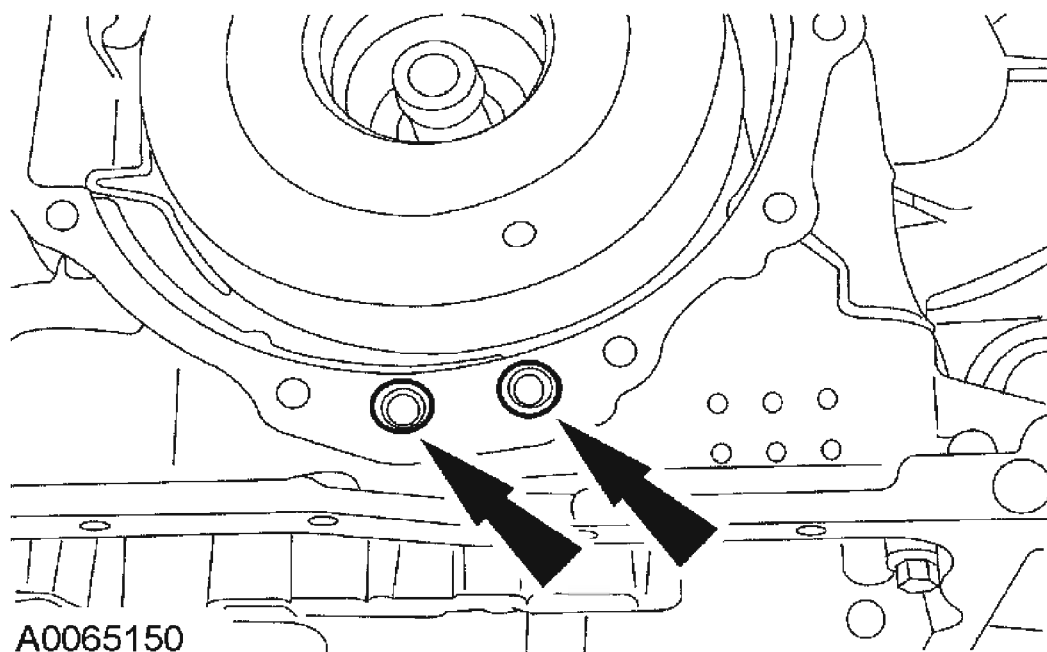
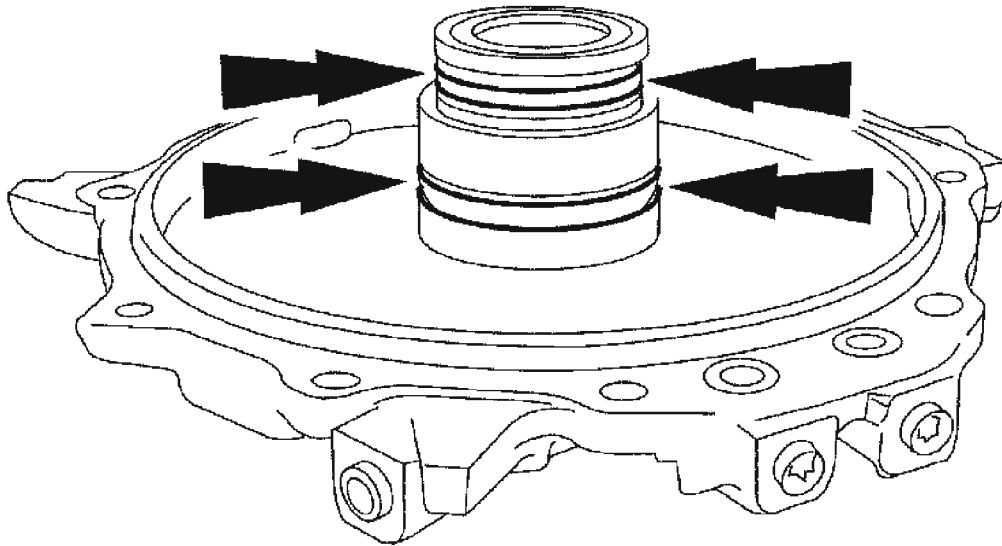


Fig. 379: Installing New End Cover-To-Case Seals
Courtesy of FORD MOTOR CO.

72. Install new end cover seals.



A0065151

Fig. 380: Installing New End Cover Seals
Courtesy of FORD MOTOR CO.

73. Install the direct clutch hub bearing shim and an additional shim to increase the total shim thickness to specification shown or greater.

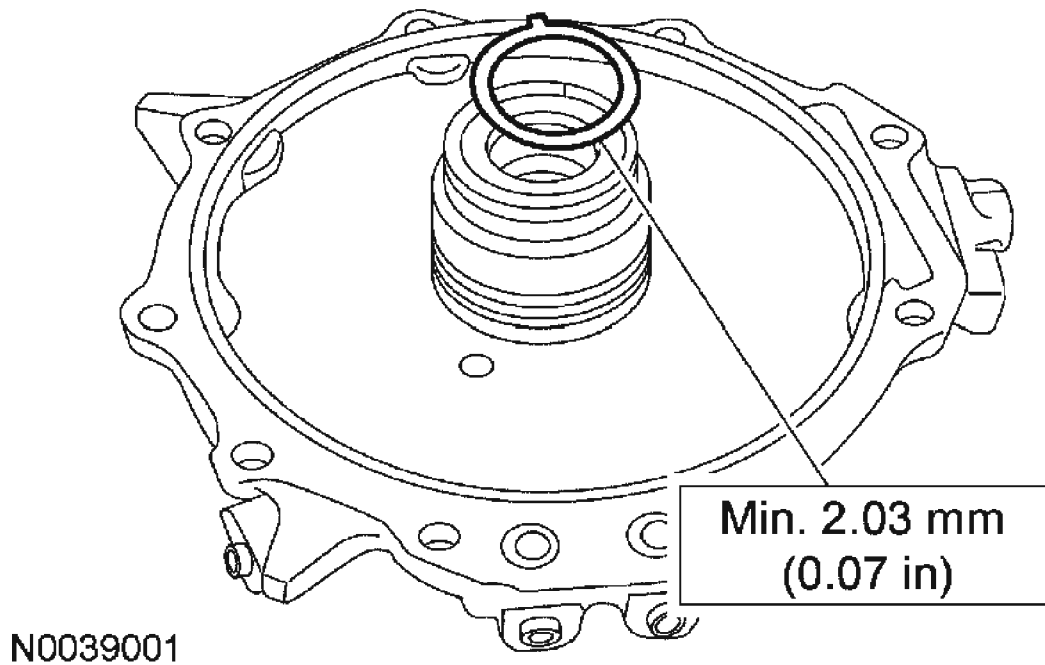


Fig. 381: Installing Direct Clutch Hub Bearing Shim And An Additional Shim
Courtesy of FORD MOTOR CO.

74. Measure the gap between the transaxle end cover and the transaxle assembly.
 1. Position the transaxle end cover on the transaxle assembly.
 2. Measure the gap between the transaxle end cover and the transaxle assembly.

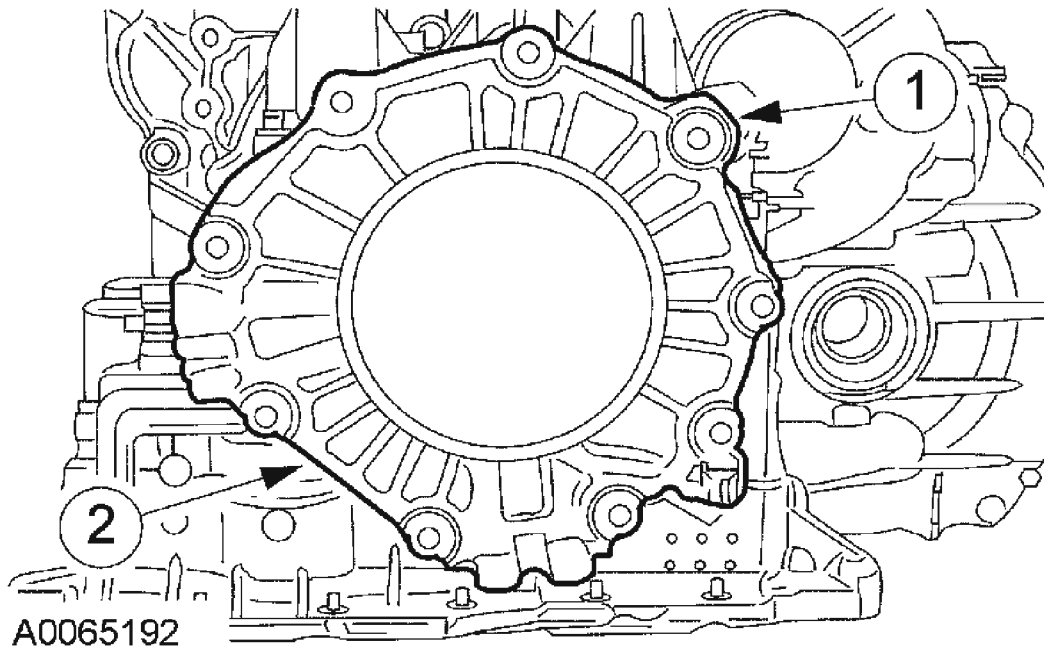


Fig. 382: Measuring Gap Between Transaxle End Cover And Transaxle Assembly
Courtesy of FORD MOTOR CO.

75. Remove the transaxle end cover.

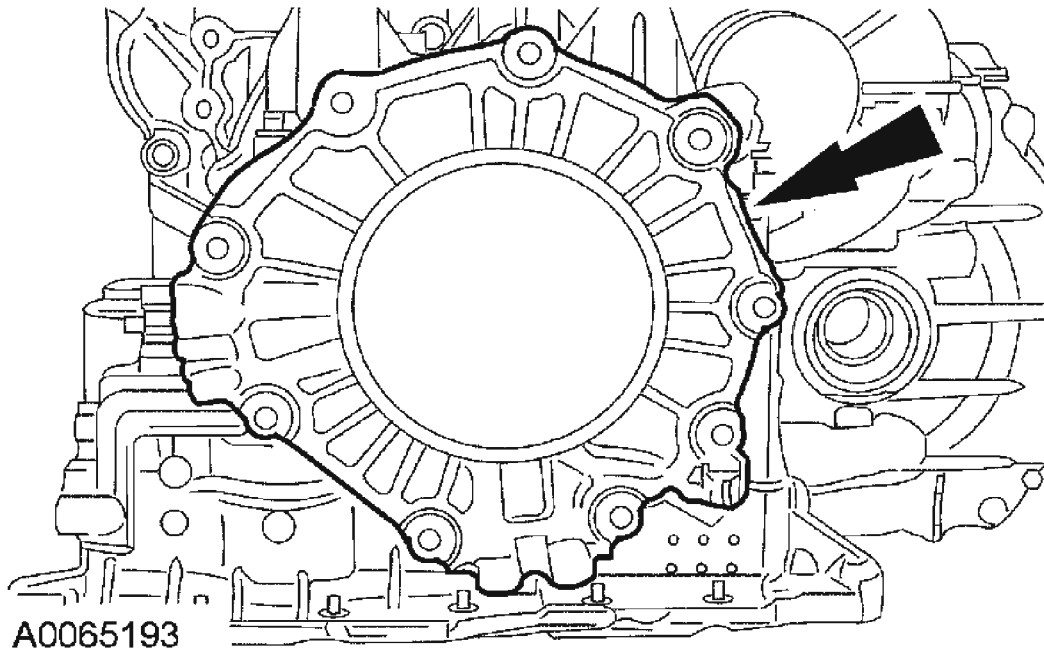


Fig. 383: Removing Transaxle End Cover
Courtesy of FORD MOTOR CO.

NOTE: The clearance for the direct clutch bearing shim is 0.05-0.50 mm (0.002-0.020 in).

NOTE: The correct shim thickness is between minimum and maximum.

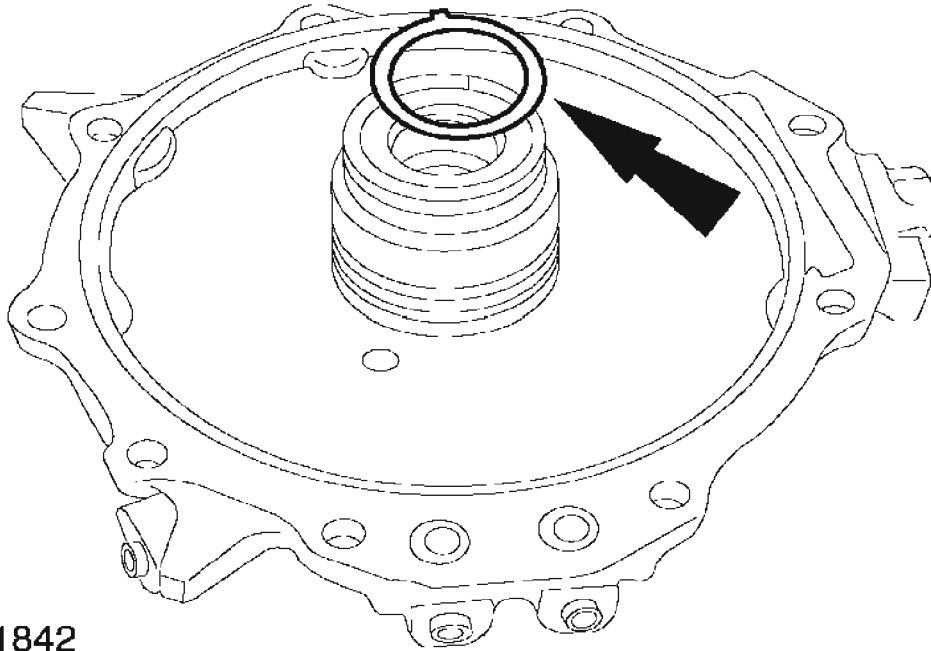
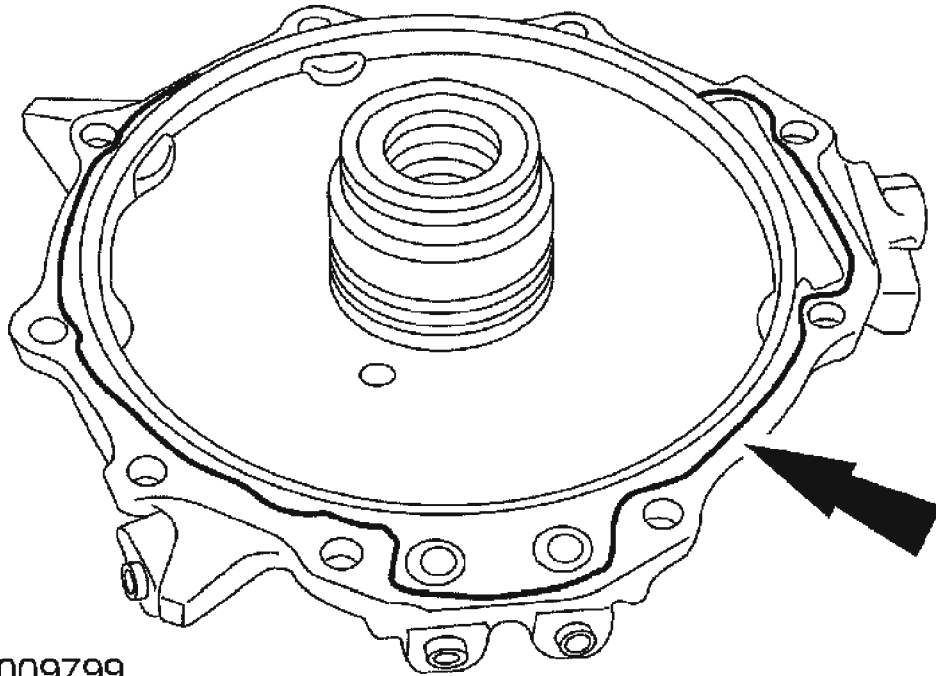


Fig. 384: Installing Correct Direct Clutch Hub Bearing Shim
Courtesy of FORD MOTOR CO.

76. Choose and install the correct direct clutch hub bearing shim:
- Line 1: total amount of shim thickness used during transaxle end cover mock up.
 - Line 2: measure the gap between transaxle end cover and transaxle case.
 - Line 3: subtract Line 2 from Line 1 to obtain the actual clearance.
 - Line 4: subtract 0.05 mm (0.002 in) from Line 3 for maximum shim thickness.
 - Subtract 0.50 mm (0.020 in) from line 3 for the minimum thickness shim.

CAUTION: Applying too much sealer in the area of the fluid return holes may cause the fluid return holes to become blocked and cause a transmission failure.



ELE0009799

Fig. 385: Applying Bead Of Sealer To Transaxle End Cover
Courtesy of FORD MOTOR CO.

77. Apply a 1 mm (0.04 in) bead of sealer to the transaxle end cover.
78. Install the transaxle end cover.

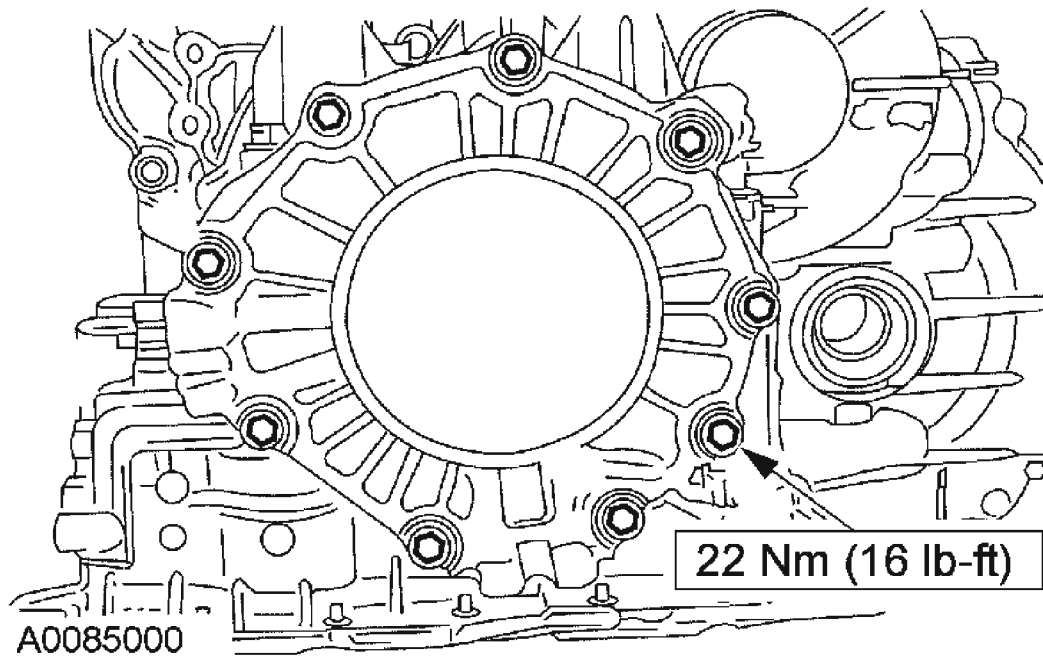
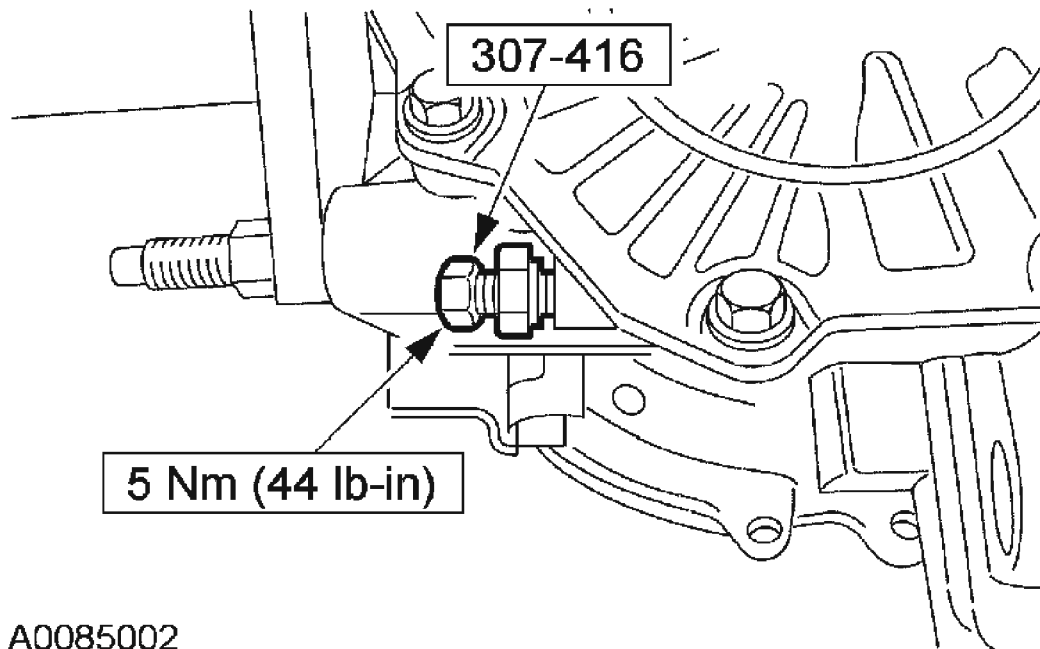


Fig. 386: Installing Transaxle End Cover
Courtesy of FORD MOTOR CO.

79. Using the special tool, collapse the intermediate/overdrive band to specification, then back out three and a half turns.

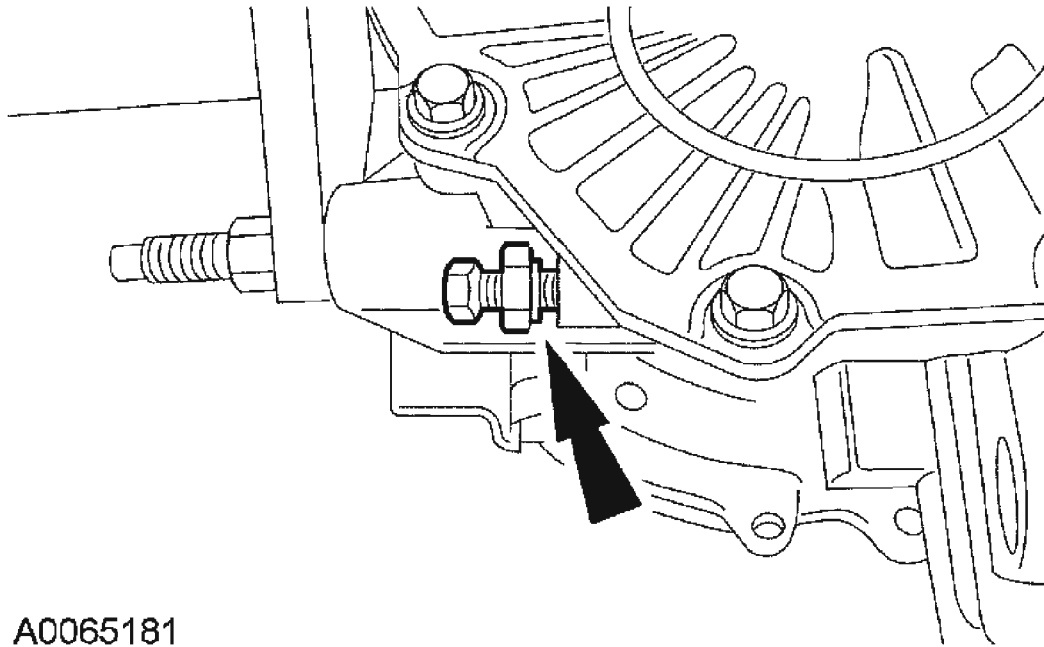


A0085002

Fig. 387: Collapsing Intermediate/Overdrive Band To Specification Using Special Tool

Courtesy of FORD MOTOR CO.

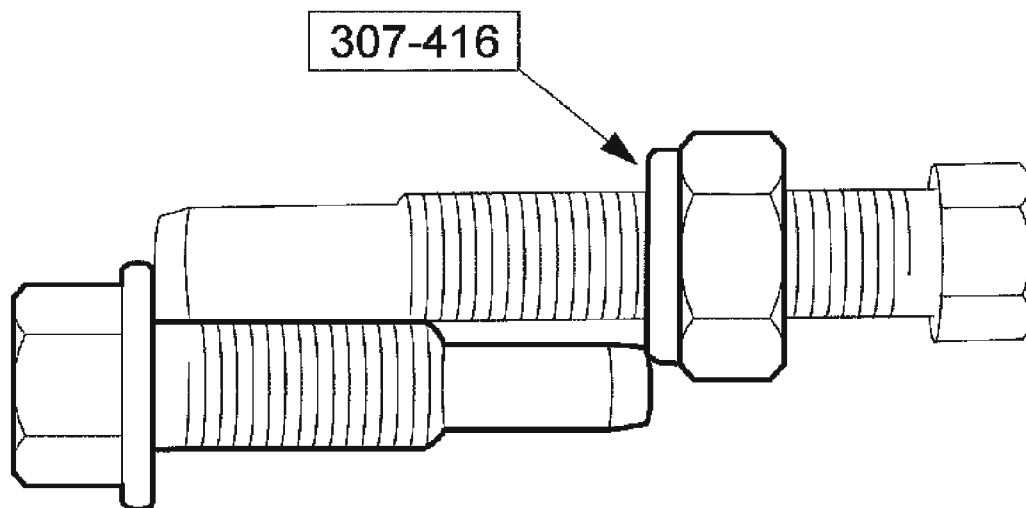
80. Holding the special tool, lightly seat the nut against the transaxle case, then remove the special tool without changing the relationship of the nut on the bolt.



A0065181

Fig. 388: Seating Nut Against Transaxle Case
Courtesy of FORD MOTOR CO.

81. Using the special tool, select an intermediate/overdrive band bolt that measures from the end of the bolt to the face of the nut as shown.



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Fig. 389: Measuring From End Of Bolt To Face Of Nut
Courtesy of FORD MOTOR CO.

NOTE: Apply thread sealer to the bolt.

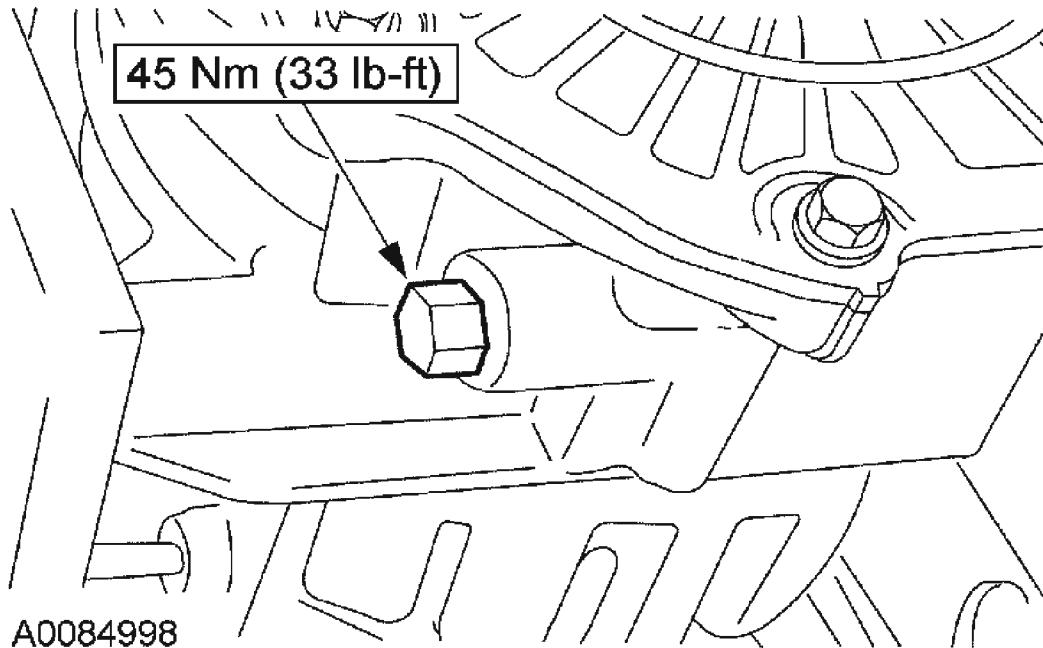


Fig. 390: Installing Intermediate/Overdrive Band Anchor Bolt
Courtesy of FORD MOTOR CO.

82. Install the intermediate/overdrive band anchor bolt.
83. Rotate the transaxle 180 degrees.
84. Install the forward clutch hub.

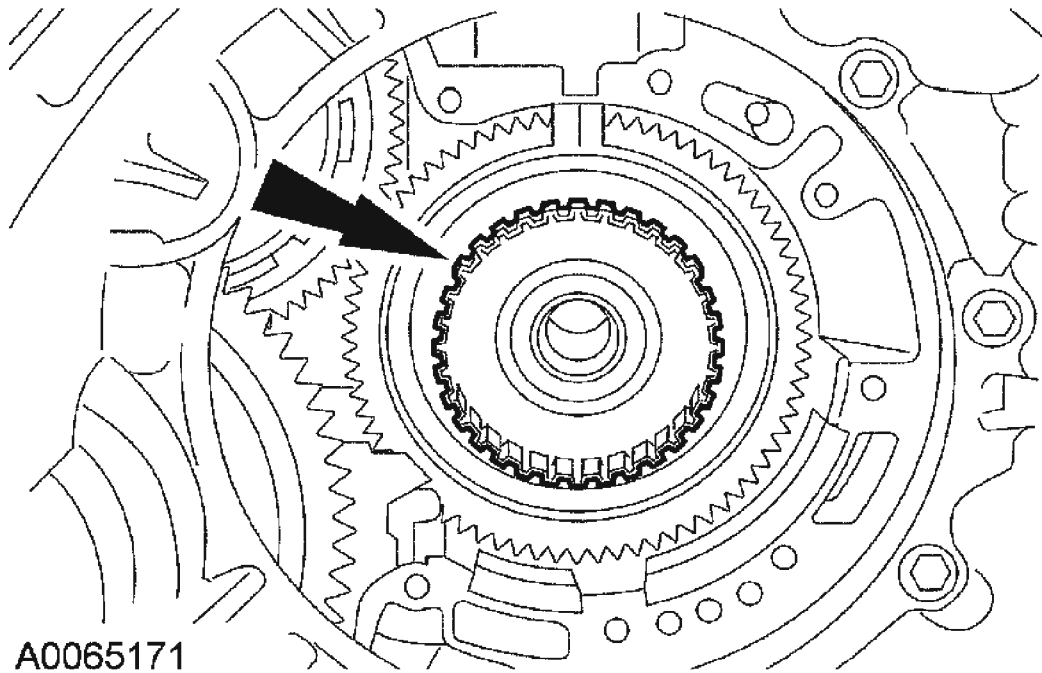
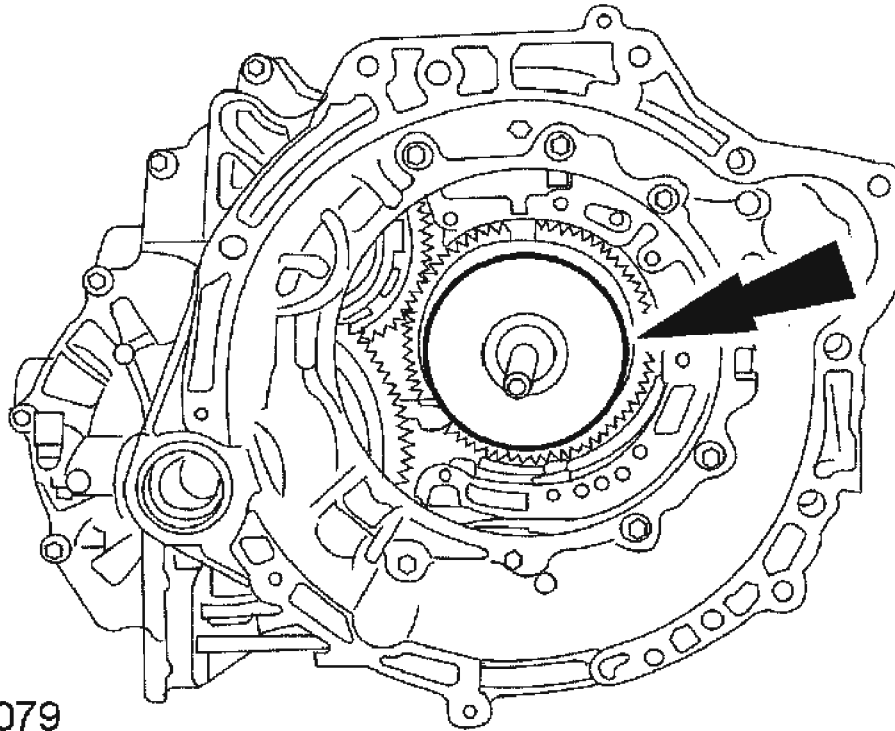


Fig. 391: Installing Forward Clutch Hub
Courtesy of FORD MOTOR CO.

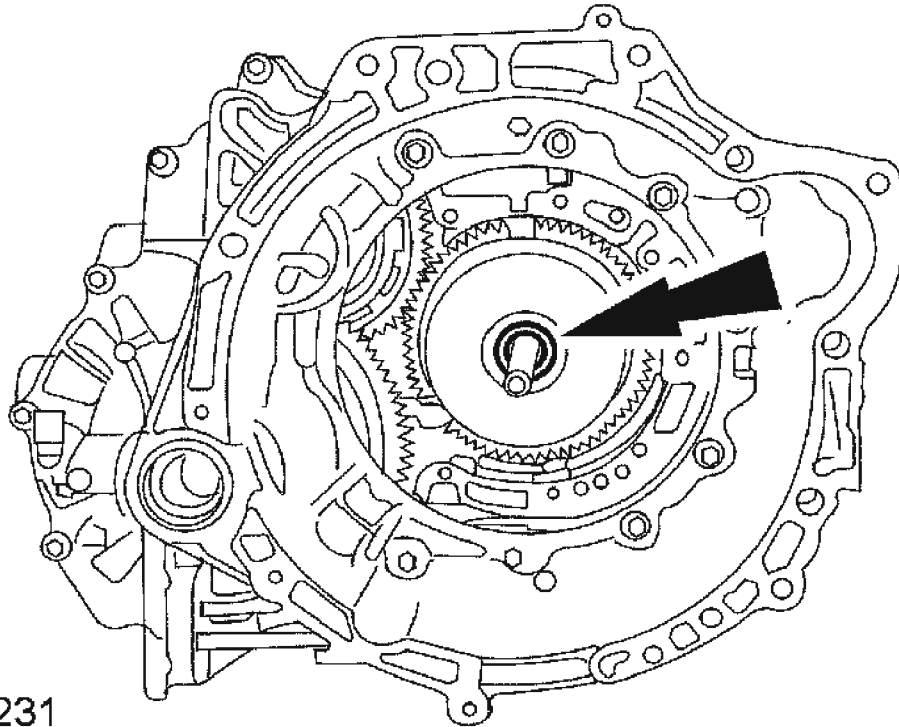
85. Install the forward clutch assembly.



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Fig. 392: Installing Forward Clutch Assembly
Courtesy of FORD MOTOR CO.

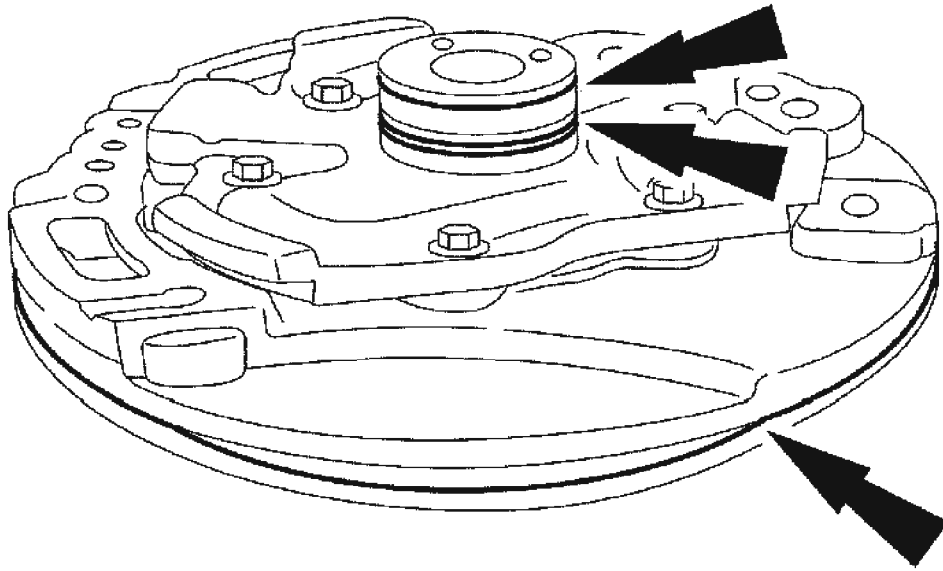
86. Install the forward clutch thrust washer.



A0065231

Fig. 393: Installing Forward Clutch Thrust Washer
Courtesy of FORD MOTOR CO.

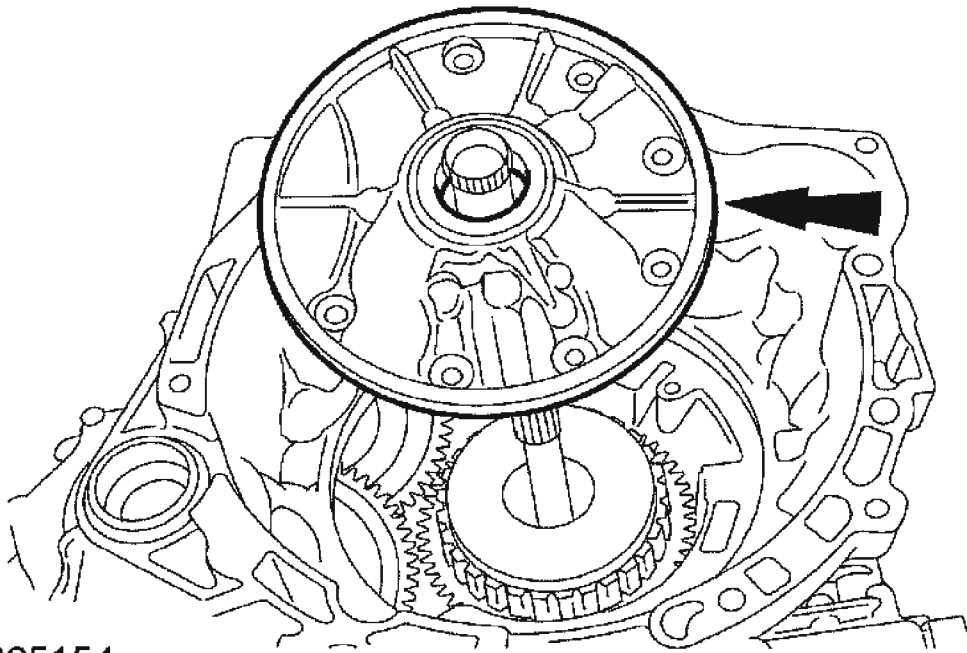
87. Lubricate and install new fluid pump seals.



A0065153

Fig. 394: Installing Fluid Pump Seals
Courtesy of FORD MOTOR CO.

88. Install the fluid pump (do not force the pump down at this time).



A0065154

Fig. 395: Installing Fluid Pump
Courtesy of FORD MOTOR CO.

89. Install the fluid pump bolts.
 - Use the bolts to seat the fluid pump.
 - Tighten bolts in an alternating sequence.

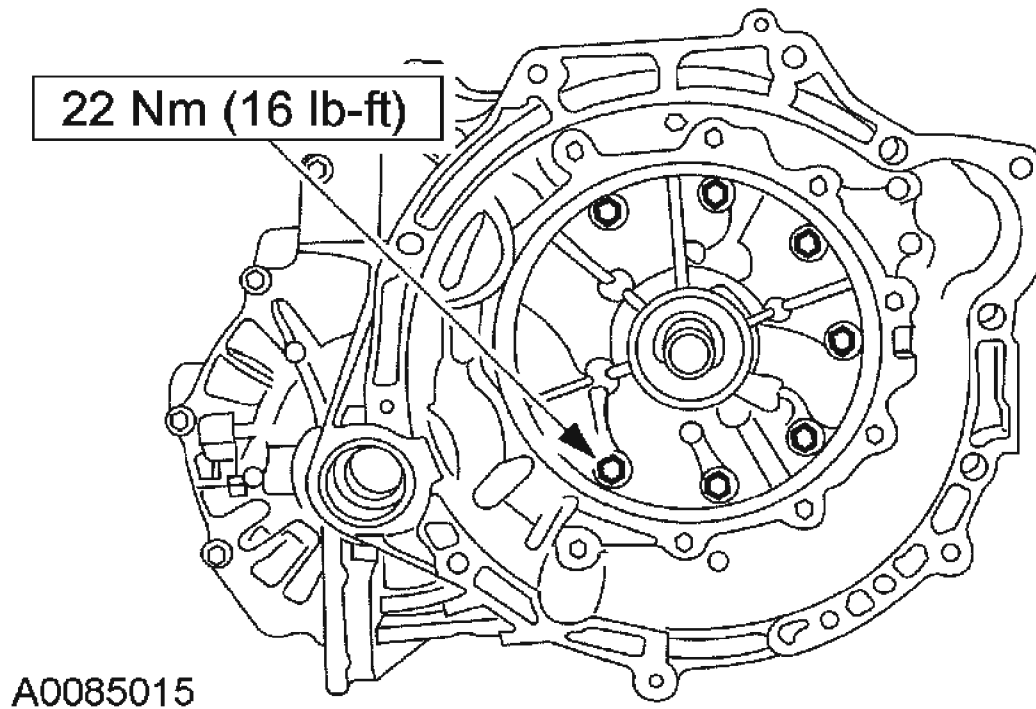


Fig. 396: Tightening Fluid Pump Bolts In An Alternating Sequence
Courtesy of FORD MOTOR CO.

90. Install the output shaft speed (OSS) sensor.

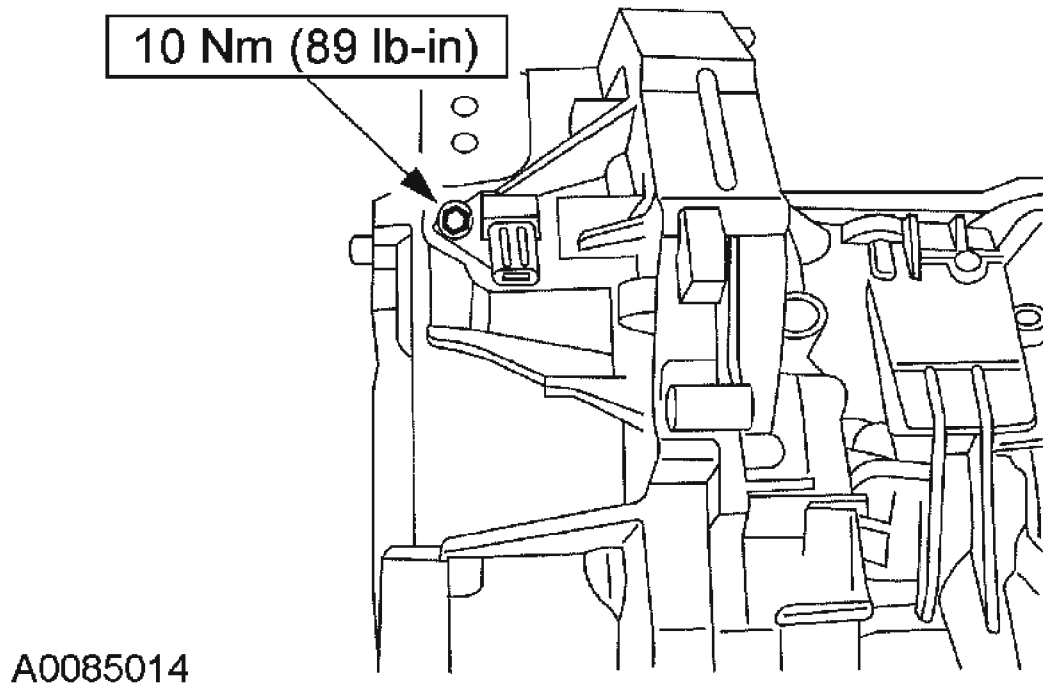


Fig. 397: Tightening Output Shaft Speed (OSS) Sensor Bolts
Courtesy of FORD MOTOR CO.

NOTE: Apply thread sealer to the bolt.

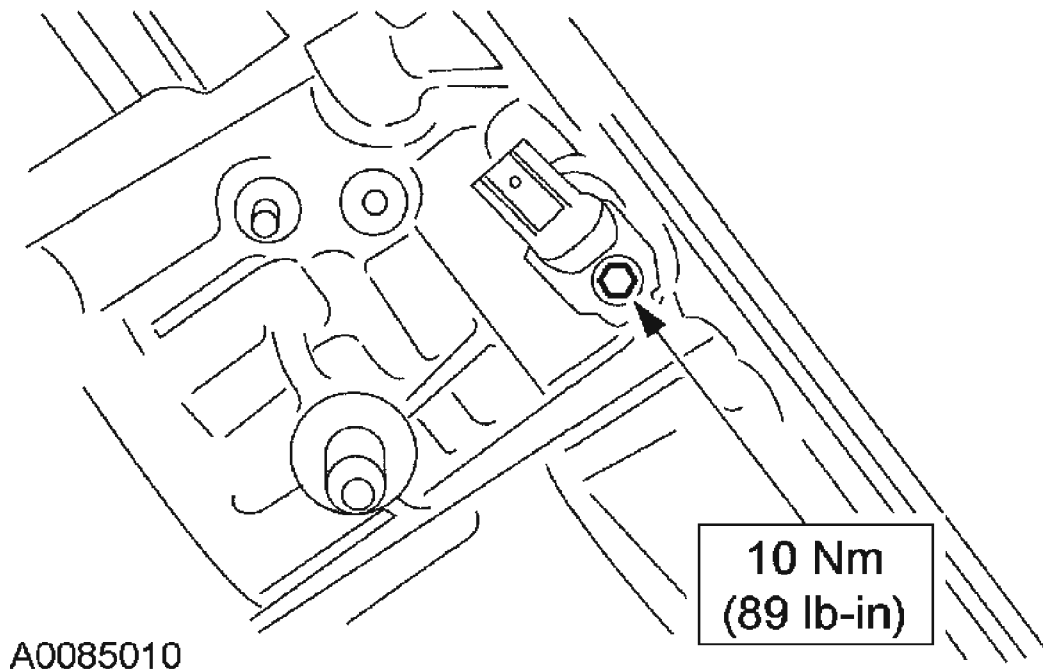


Fig. 398: Installing Turbine Shaft Speed (TSS) Sensor
Courtesy of FORD MOTOR CO.

91. Install the turbine shaft speed (TSS) sensor.
92. Using the special tool, align the TR sensor and tighten the bolts.

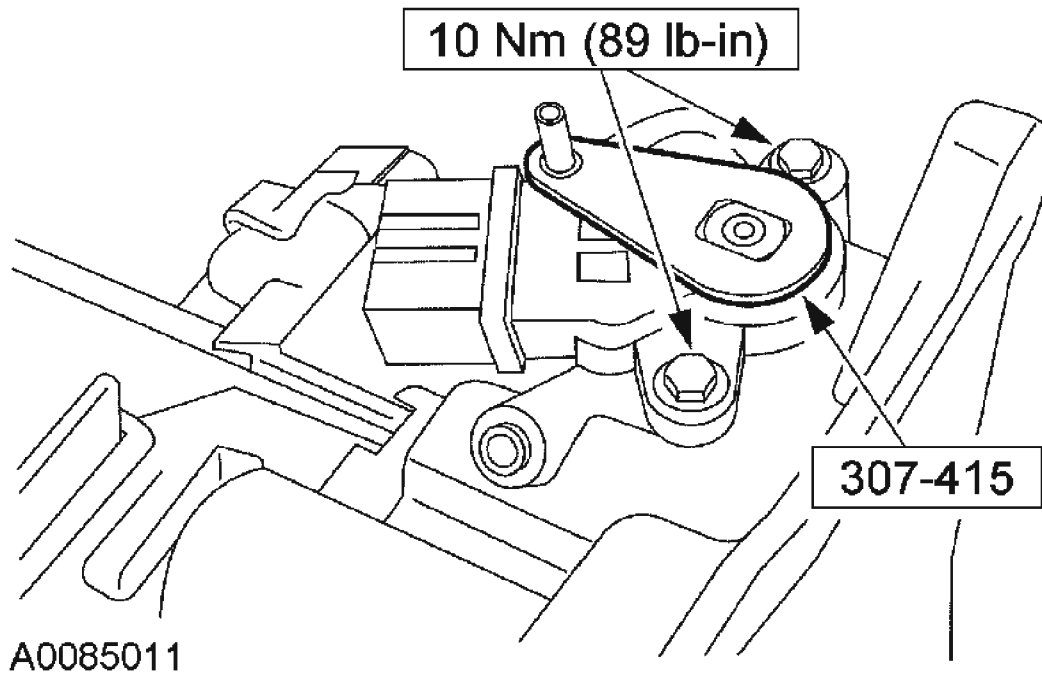


Fig. 399: Aligning TR Sensor And Tightening Bolts Using Special Tool
Courtesy of FORD MOTOR CO.

CAUTION: Do not use air tools on this bolt. Hold the manual control lever while tightening the manual control lever bolt.

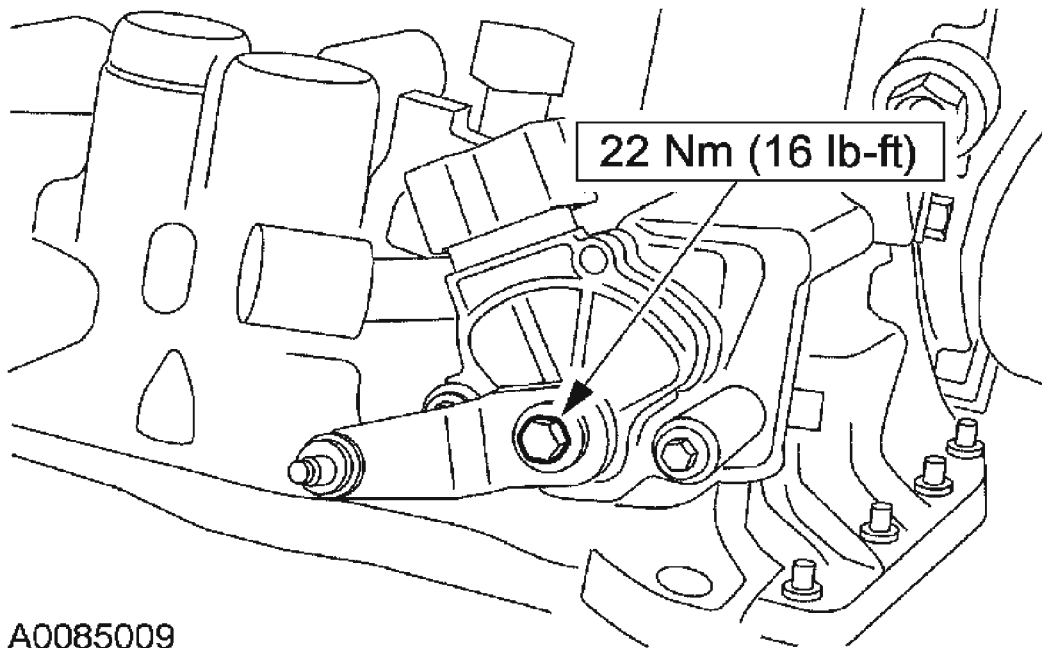


Fig. 400: Installing Manual Control Lever Bolt
Courtesy of FORD MOTOR CO.

93. Install the manual control lever.
94. Install the torque converter.

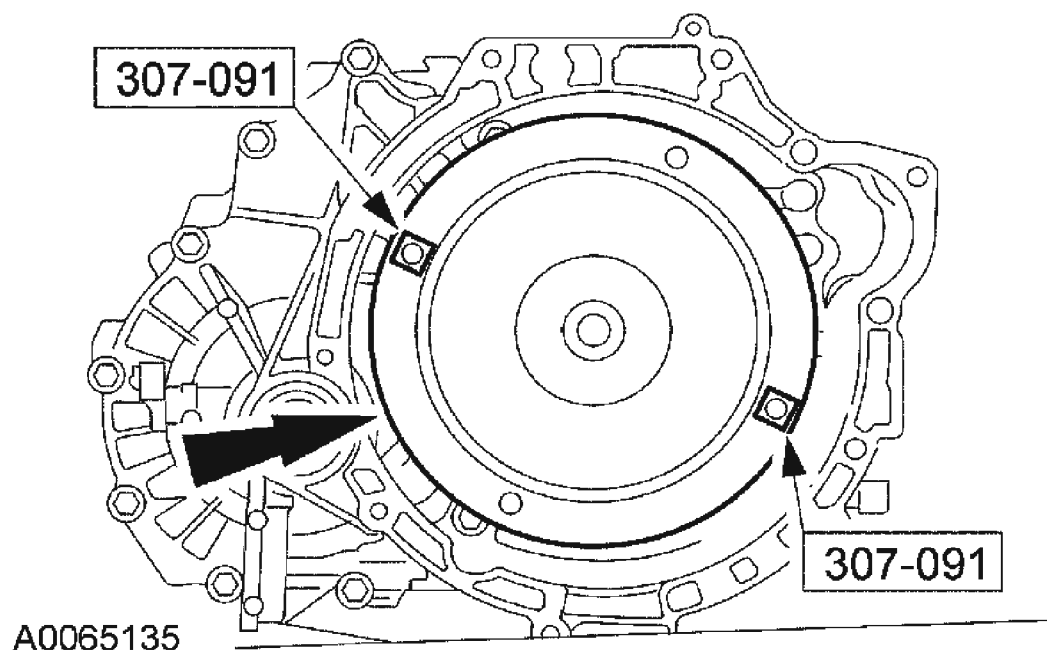
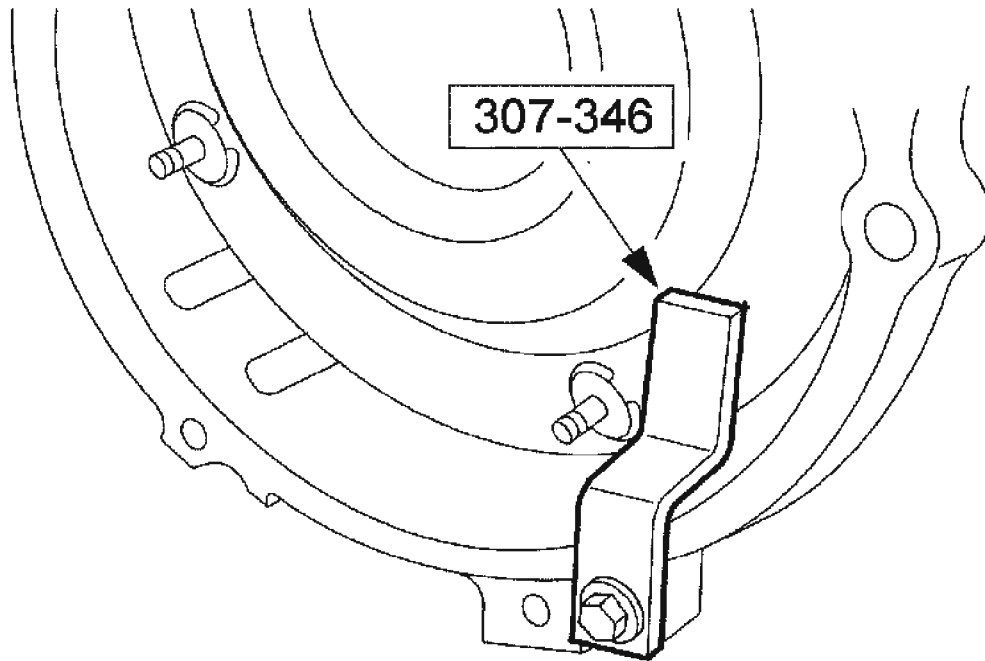


Fig. 401: Installing Torque Converter Using Special Tool
Courtesy of FORD MOTOR CO.

95. Using the special tool, secure the torque converter.



A0065170

Fig. 402: Installing Torque Converter Using Special Tool
Courtesy of FORD MOTOR CO.

INSTALLATION

TRANSAXLE - 2.0L DURATEC

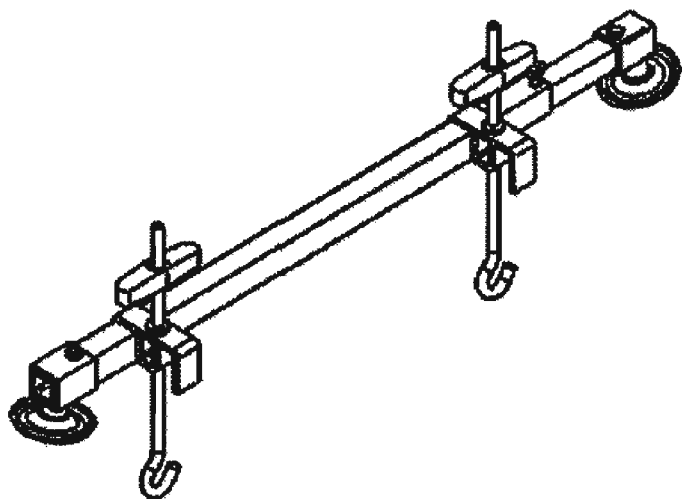
Special Tool(s)

SPECIAL TOOL SPECIFICATION

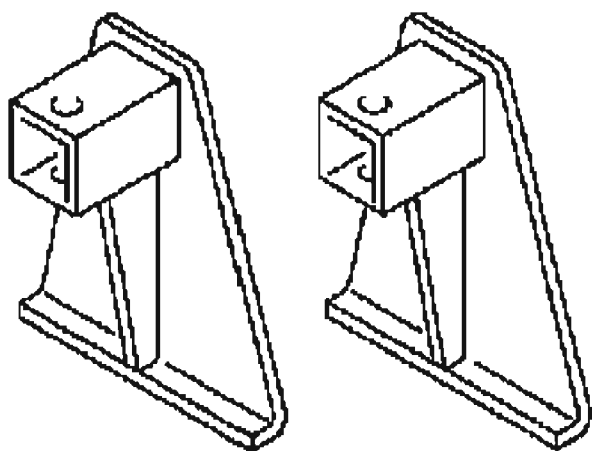
	Support Bar, Engine 303-290A
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2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



ST2363-A



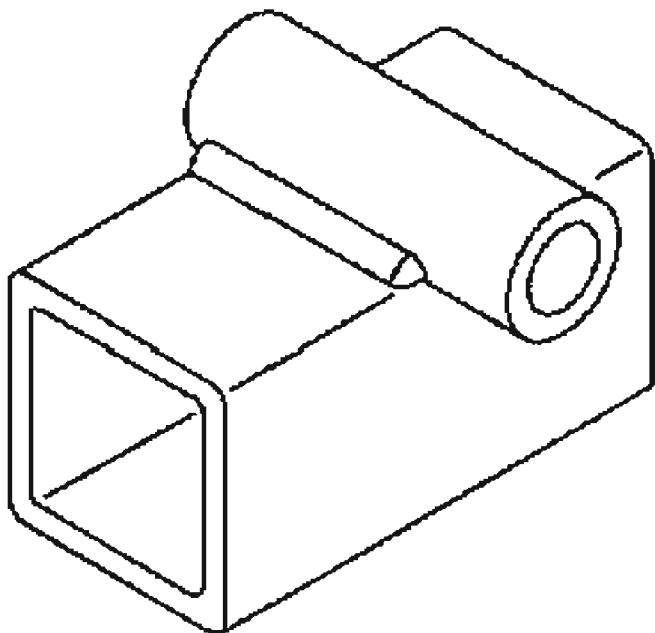
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Adapter for 303-290A 303-290-01

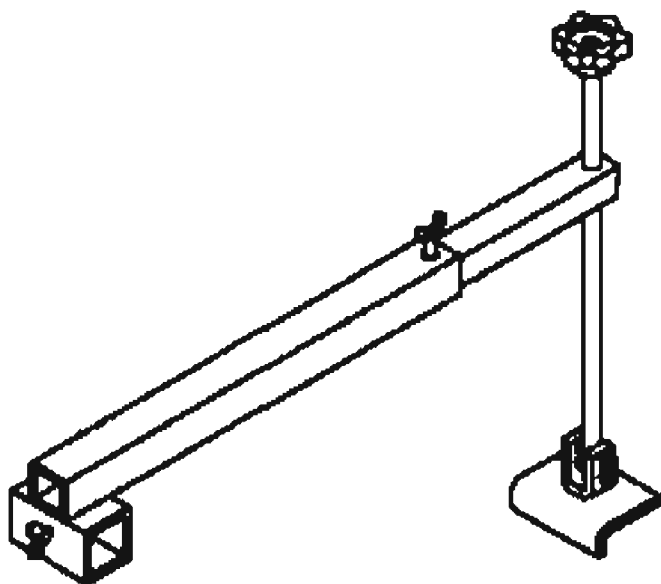
Adapter for 303-290A 303-290-02

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



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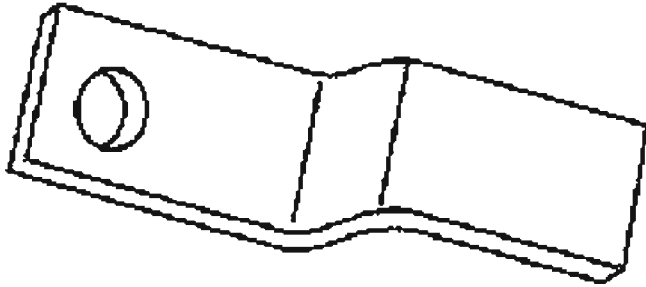


ST2379-A

Adapter for 303-290A (Support Leg)
303-290-03A

2005 Ford Focus ZX4 S

2005 TRANSMISSION Automatic Transaxle/Transmission - Focus



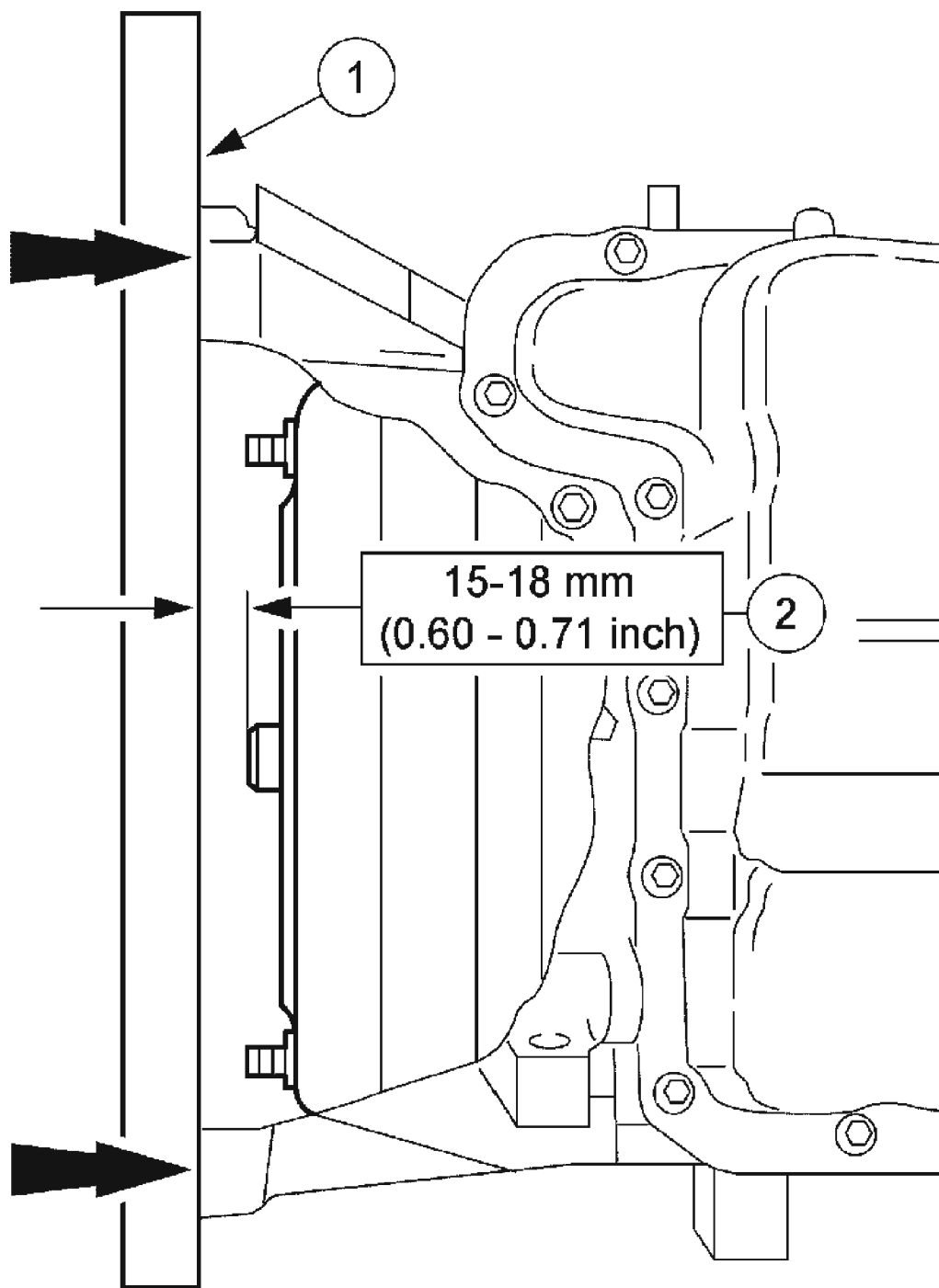
ST1636-A

Retainer, Torque Converter 307-346
(T97T-7902-A)

Installation

1. Make sure that the torque converter is installed correctly.

NOTE: Lubricate the torque converter pilot hub with multi-purpose grease.



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Fig. 403: Checking Installation Depth Of Torque Converter

Courtesy of FORD MOTOR CO.

2. Check the installation depth of the torque converter.
 1. Lay a steel straightedge on the automatic transaxle flange.
 2. Check the installation depth between the transaxle flange and the torque converter centering spigot for the correct clearance.
3. Remove the special tool.

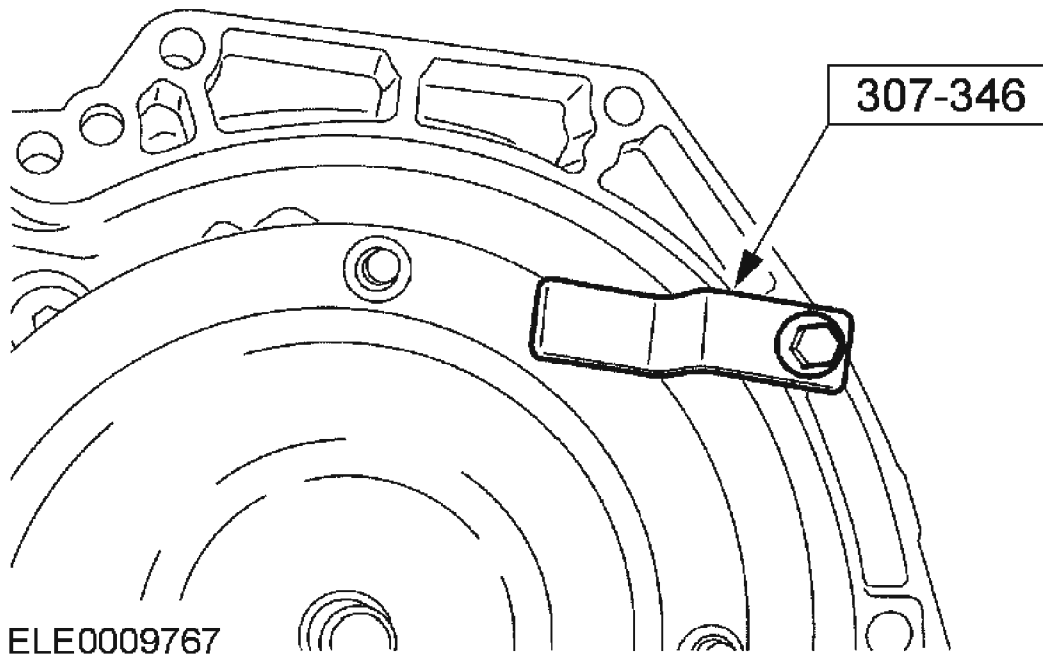


Fig. 404: Removing Special Tool From Torque Converter
Courtesy of FORD MOTOR CO.

4. Using a high-lift jack, secure the transaxle using a safety strap.

NOTE: Make sure that the dowel pins are installed in the engine block prior to installing the transaxle.

5. Move the transaxle into position.

NOTE: The location of the different length bolts.

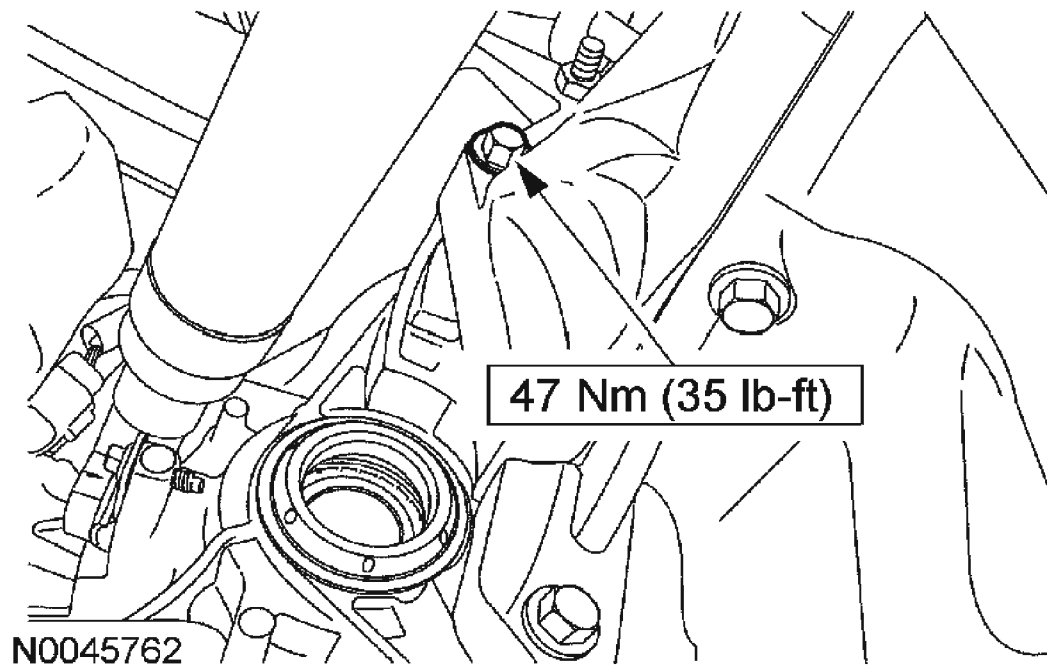


Fig. 405: Installing Converter Housing Bolts (3)
Courtesy of FORD MOTOR CO.

6. Install the 3 converter housing bolts.
7. Install the 5 converter housing bolts.

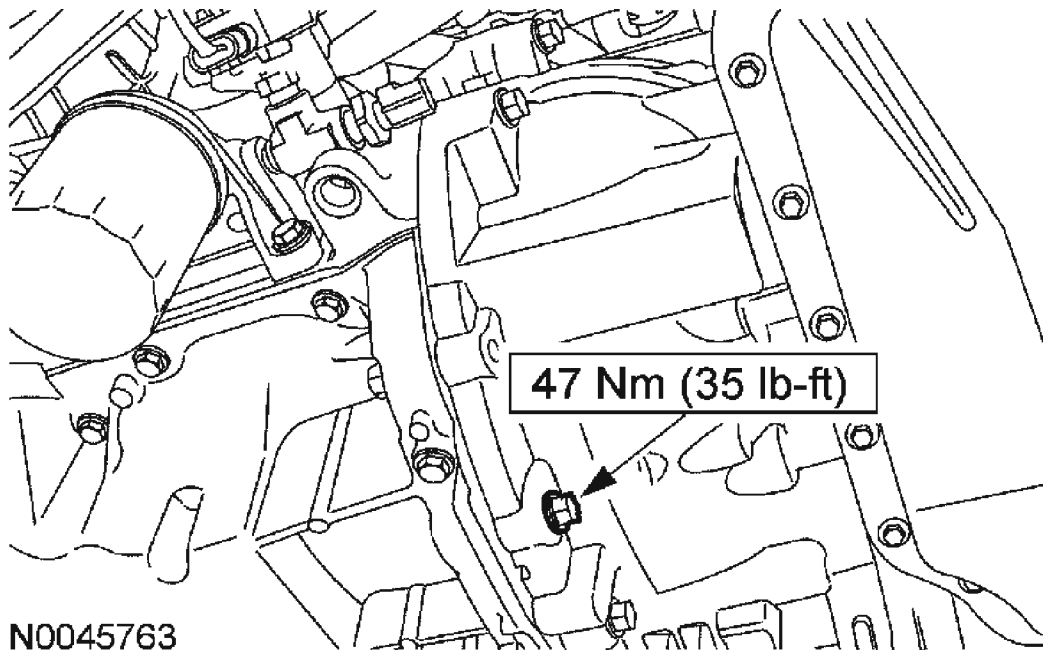


Fig. 406: Installing Converter Housing Bolts (5)
Courtesy of FORD MOTOR CO.

CAUTION: Only rotate the engine in a clockwise direction or engine damage will occur.

NOTE: Only install new self-locking nuts.

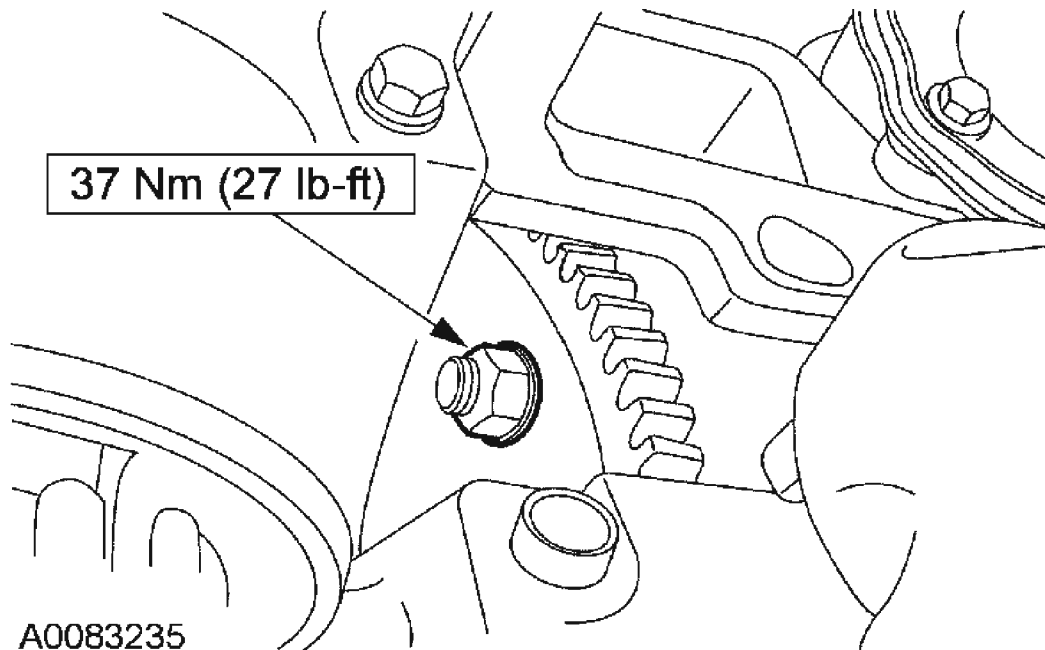


Fig. 407: Installing Torque Converter To Flexplate
Courtesy of FORD MOTOR CO.

8. Using the four nuts, install the torque converter to the flexplate.
9. Remove the safety strap from the transaxle.
10. Install the fluid filler tube.

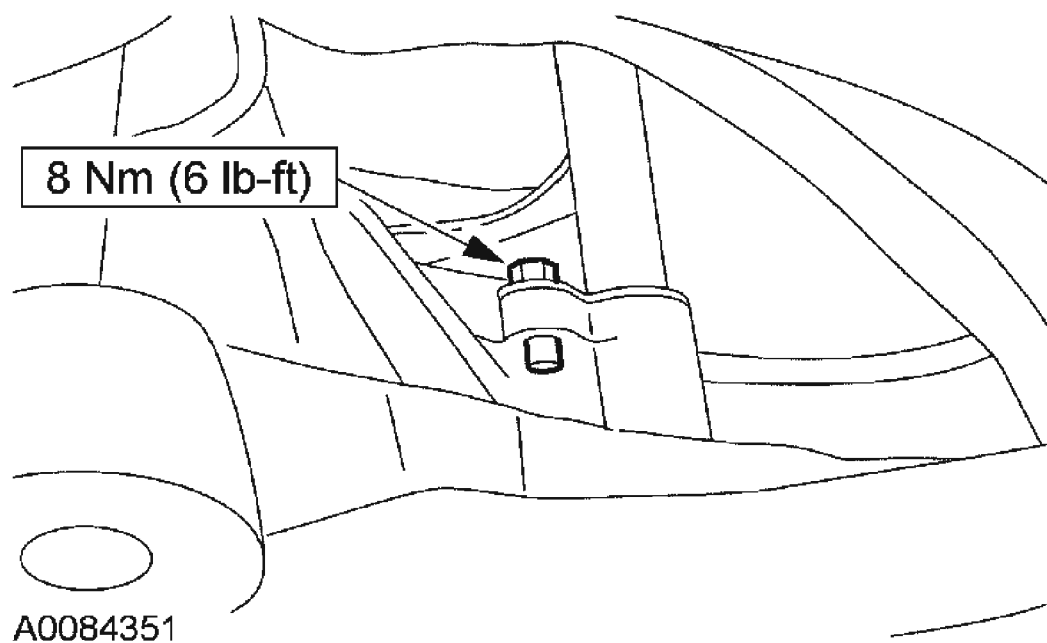


Fig. 408: Installing Fluid Filler Tube Bolts
Courtesy of FORD MOTOR CO.

11. Install the engine rear mount bracket.

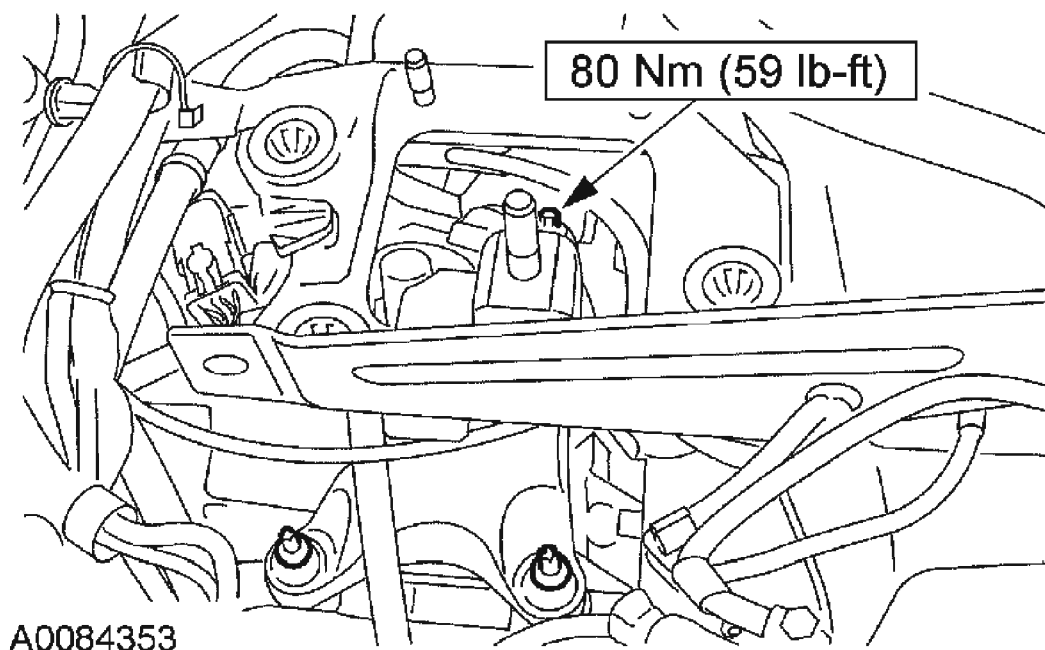


Fig. 409: Installing Engine Rear Mount Bracket
Courtesy of FORD MOTOR CO.

12. Install the engine rear mount.

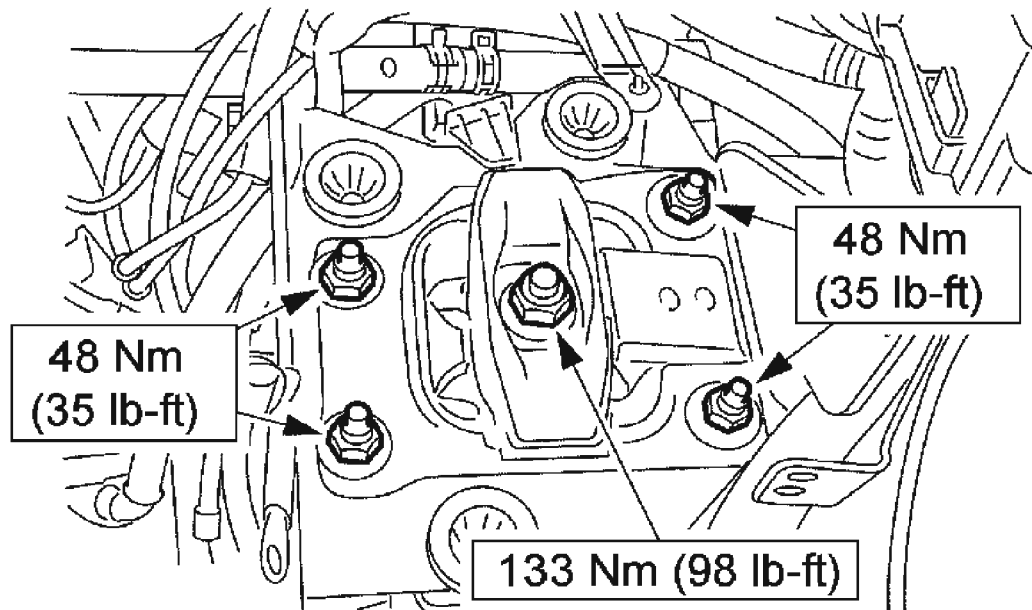
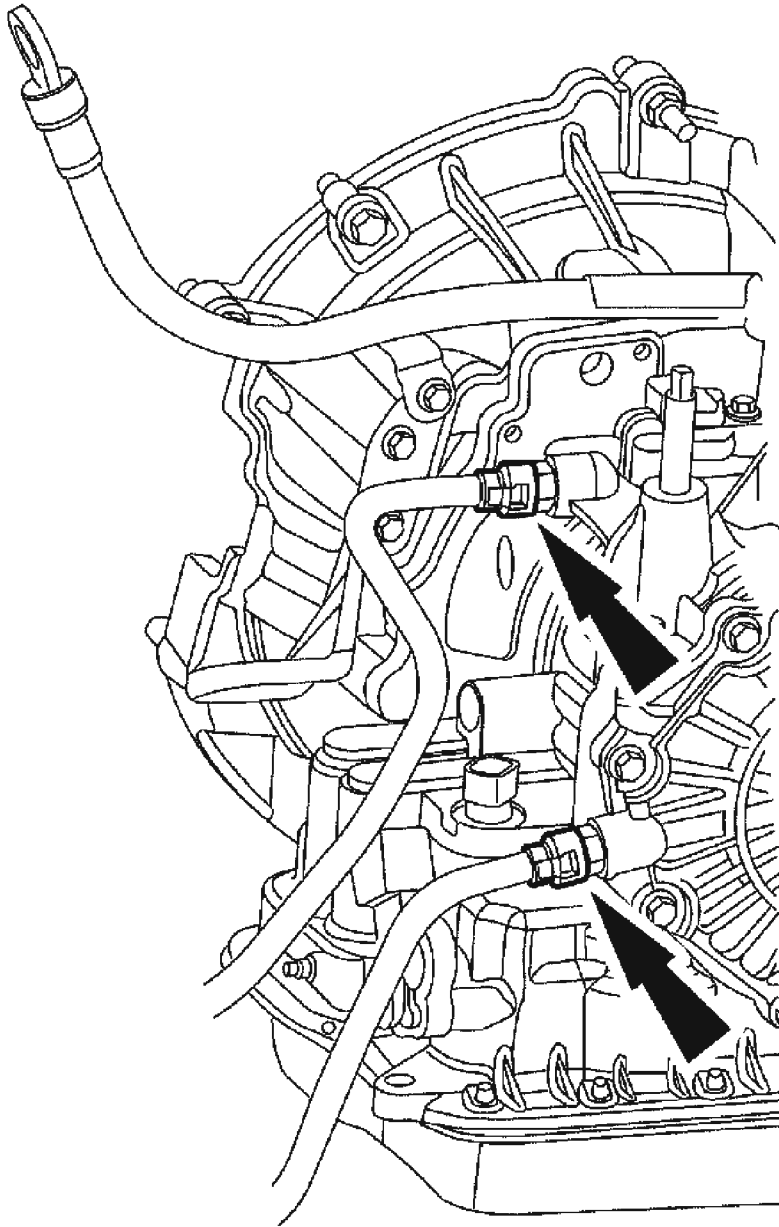


Fig. 410: Tightening Engine Rear Mount Bolts
Courtesy of FORD MOTOR CO.

13. Install the fluid cooler tubes.



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Fig. 411: Installing Fluid Cooler Tubes
Courtesy of FORD MOTOR CO.

14. Connect the output speed (OSS) sensor electrical connector.

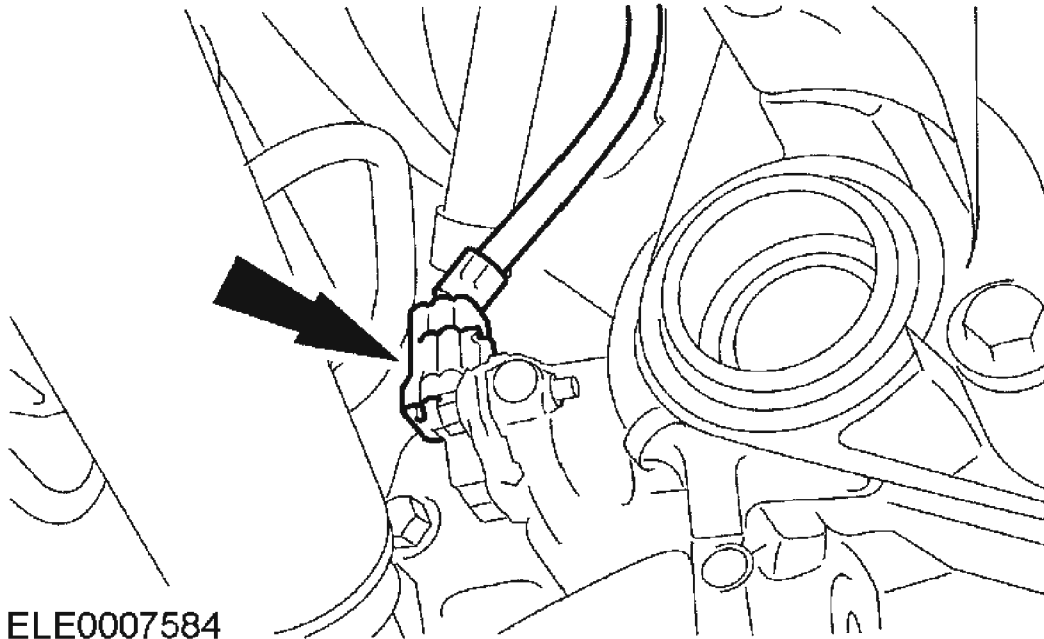


Fig. 412: Connecting Output Speed (OSS) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

NOTE: Install a new snap ring.

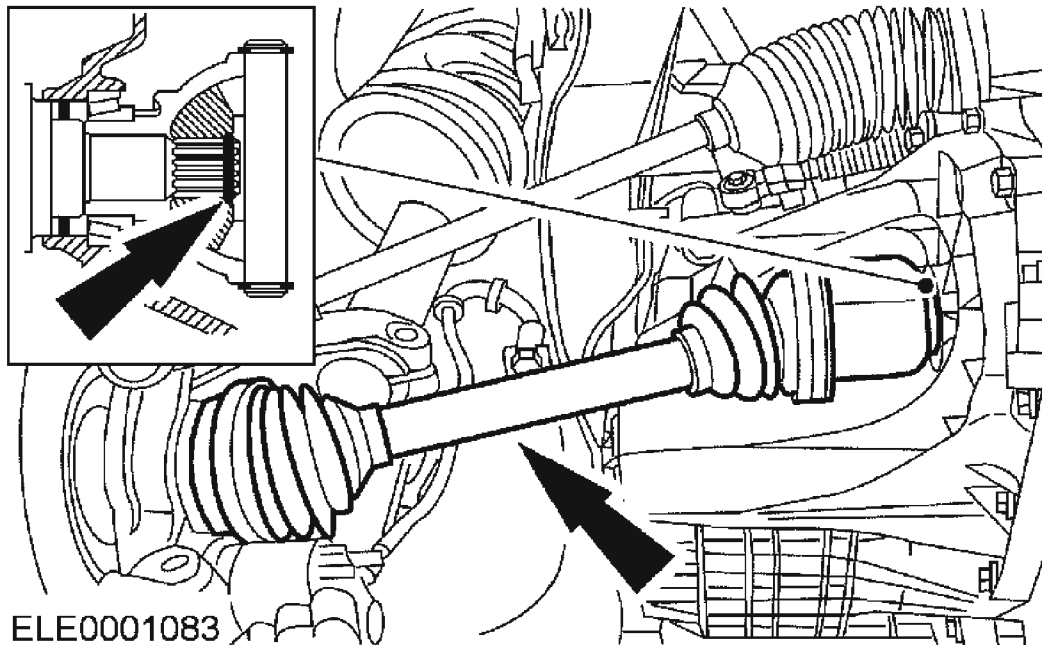


Fig. 413: Installing LH Front Drive Halfshaft
Courtesy of FORD MOTOR CO.

15. Install the LH front drive halfshaft.

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

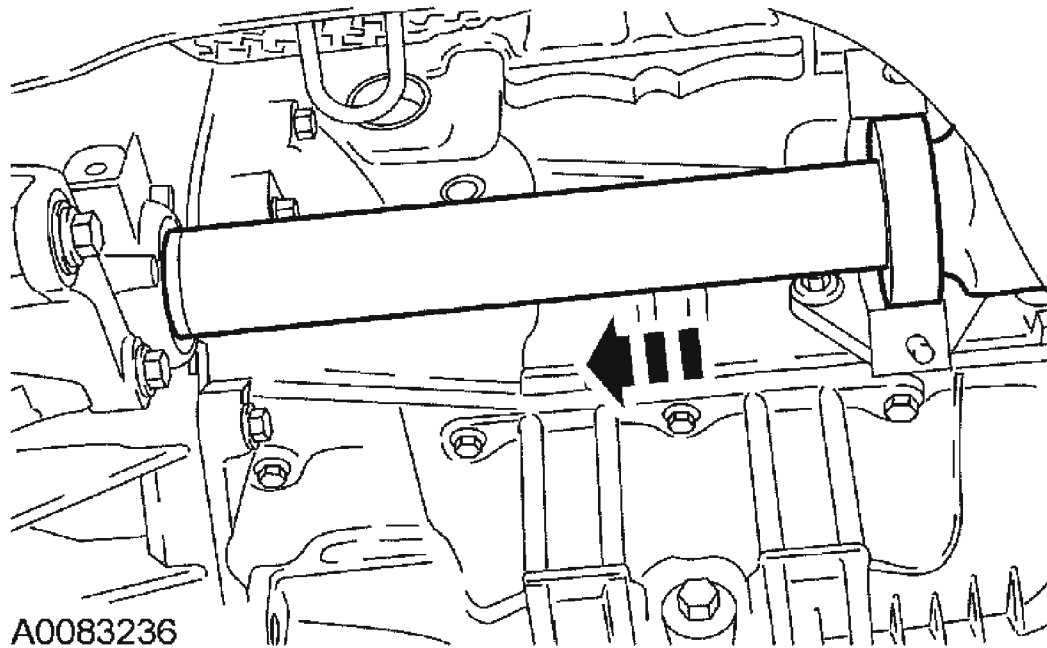


Fig. 414: Installing RH Front Halfshaft Together With Intermediate Shaft
Courtesy of FORD MOTOR CO.

16. Install the RH front halfshaft together with the intermediate shaft.
17. Install the mounting bracket for the front drive halfshaft intermediate bearing.

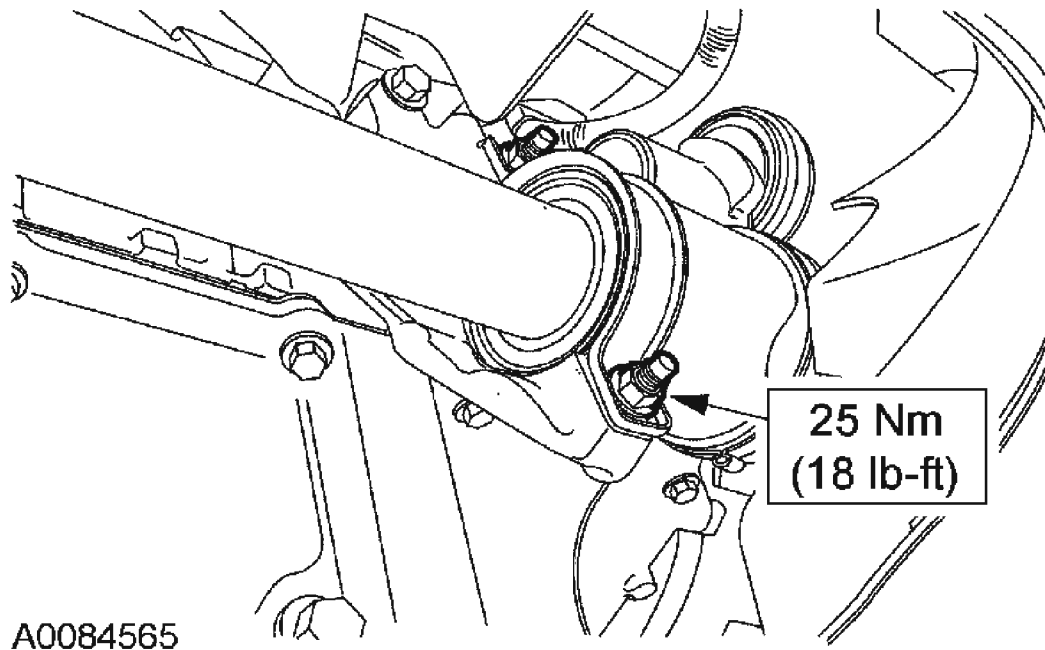


Fig. 415: Installing Mounting Bracket For Front Drive Halfshaft Intermediate Bearing

Courtesy of FORD MOTOR CO.

18. Install both of the lower control arms to the knuckles.
 1. Connect the suspension arm ball joint.
 2. Install the bolt.

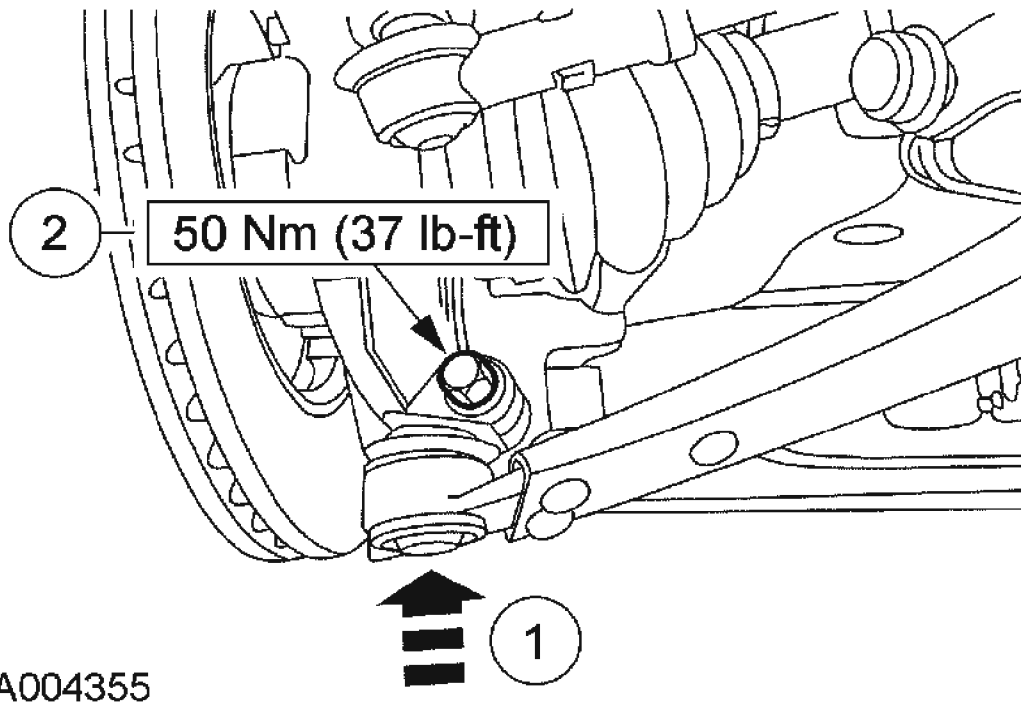


Fig. 416: Installing Both Of Lower Control Arms To Knuckles
Courtesy of FORD MOTOR CO.

19. Install both of the tie-rod ends to the knuckles.

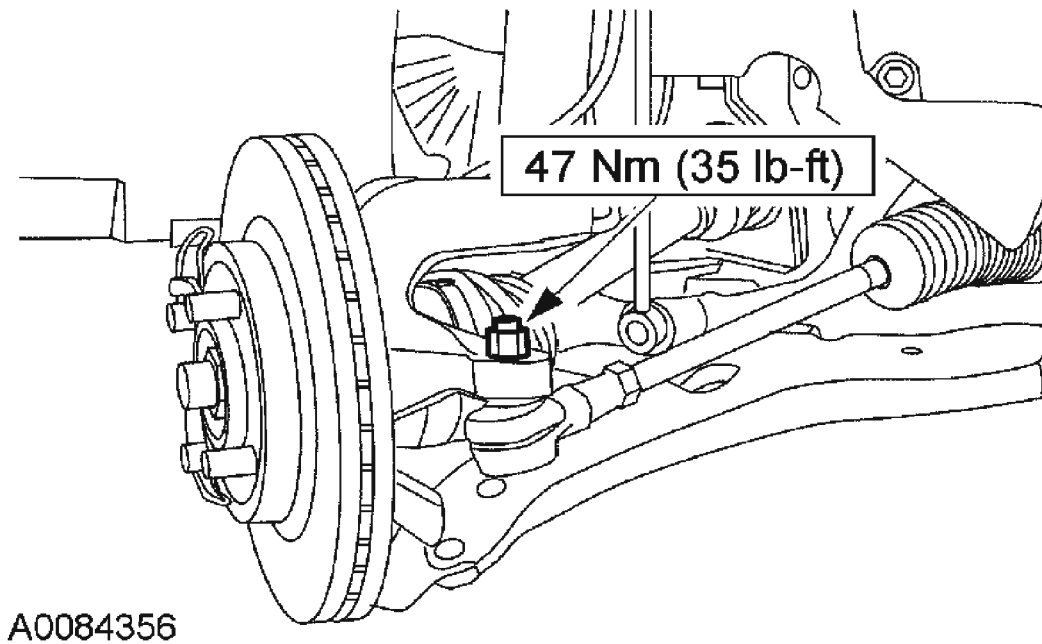


Fig. 417: Installing Both Of Tie-Rod Ends To Knuckles
Courtesy of FORD MOTOR CO.

20. Connect the stabilizer bar at the strut.

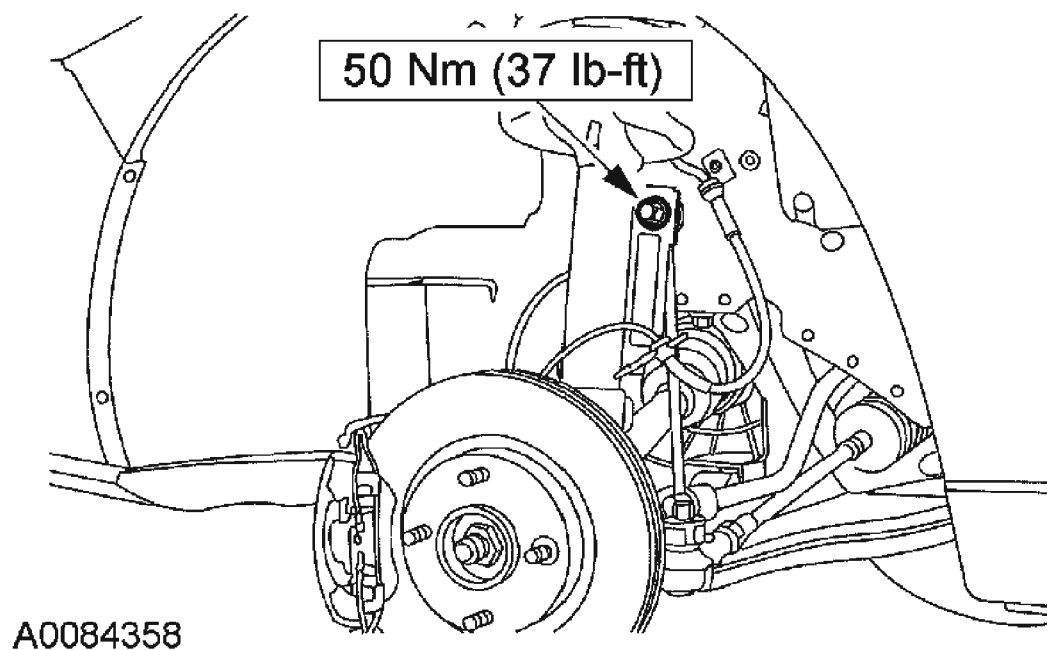
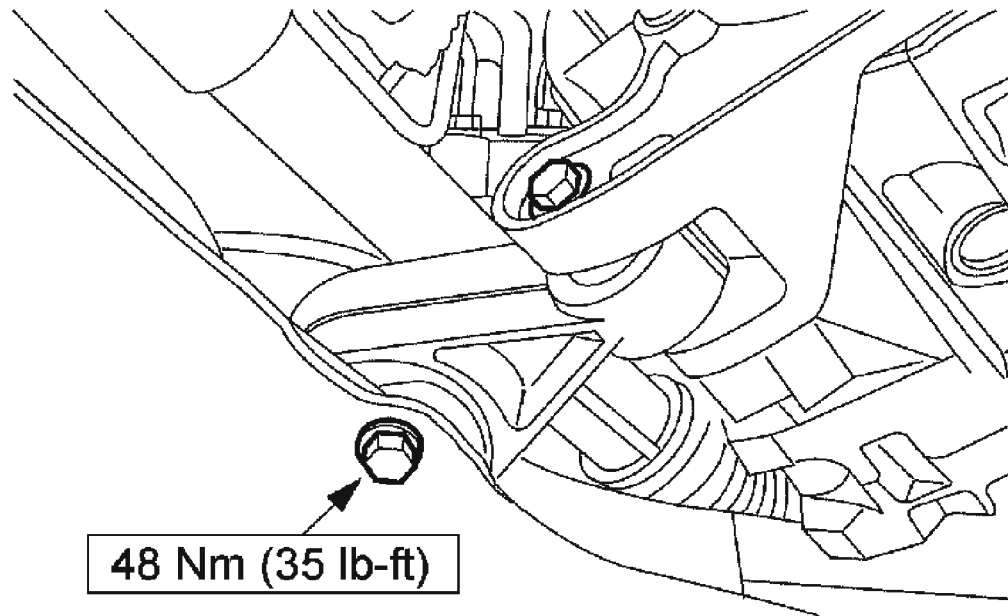


Fig. 418: Connecting Stabilizer Bar At Strut
Courtesy of FORD MOTOR CO.

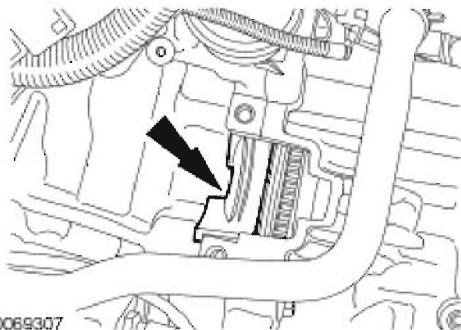
21. Install the engine RH support insulator.



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Fig. 419: Installing Engine RH Support Insulator
Courtesy of FORD MOTOR CO.

22. Install the starter isolator.



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Fig. 420: Identifying Starter Motor Isolator
Courtesy of FORD MOTOR CO.

23. Install the starter motor and insert the three bolts.

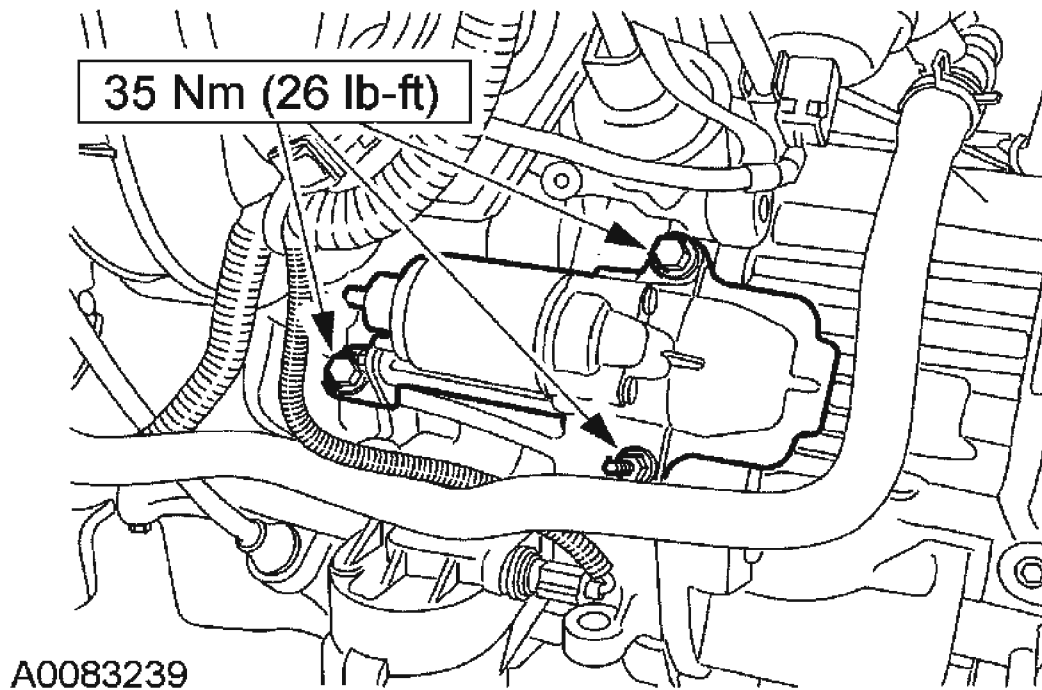


Fig. 421: Installing Starter Motor And Inserting Three Bolts
Courtesy of FORD MOTOR CO.

24. Connect the starter motor electrical connectors.

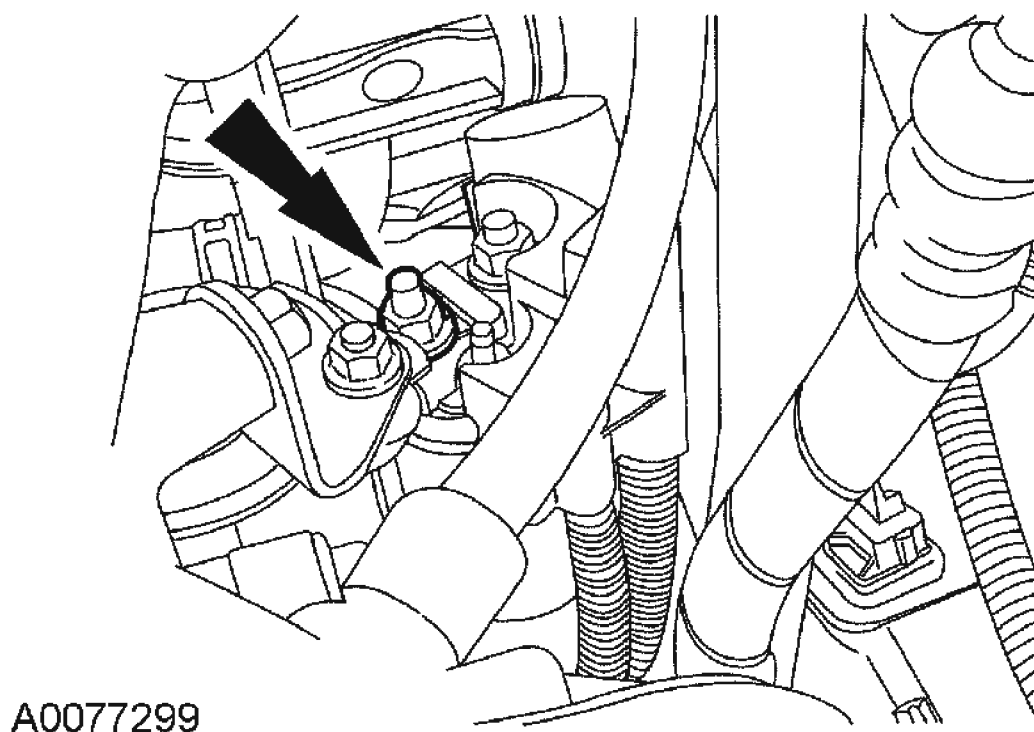


Fig. 422: Connecting Starter Motor Electrical Connectors
Courtesy of FORD MOTOR CO.

25. Connect the bracket to the starter stud.

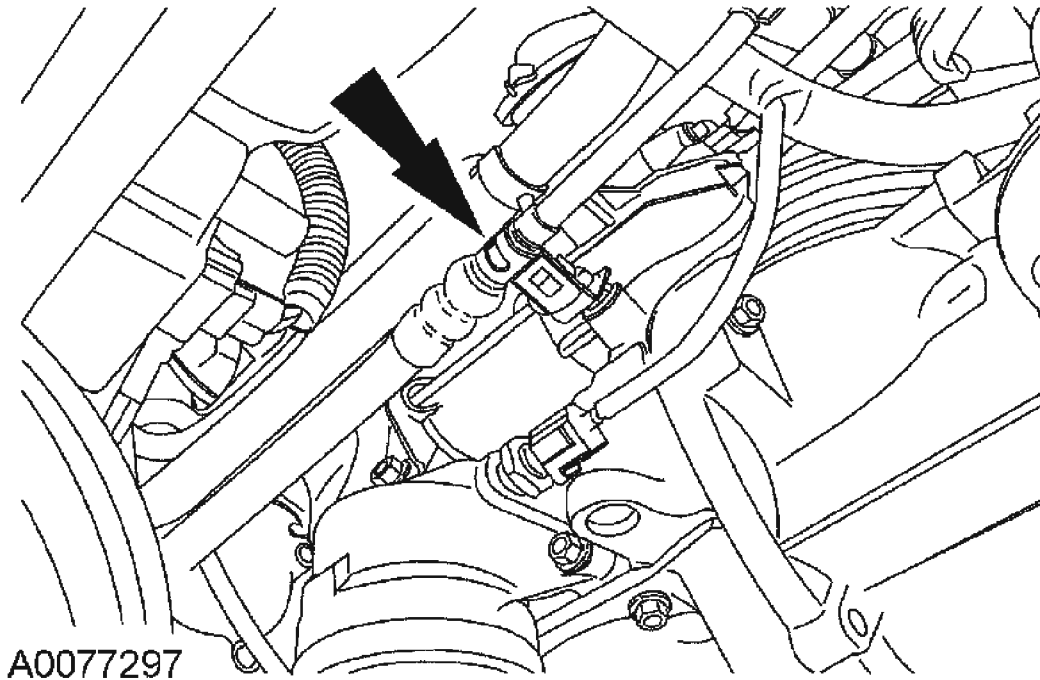


Fig. 423: Connecting Bracket To Starter Stud
Courtesy of FORD MOTOR CO.

26. Install the fluid filler tube and shift cable bracket bolts.

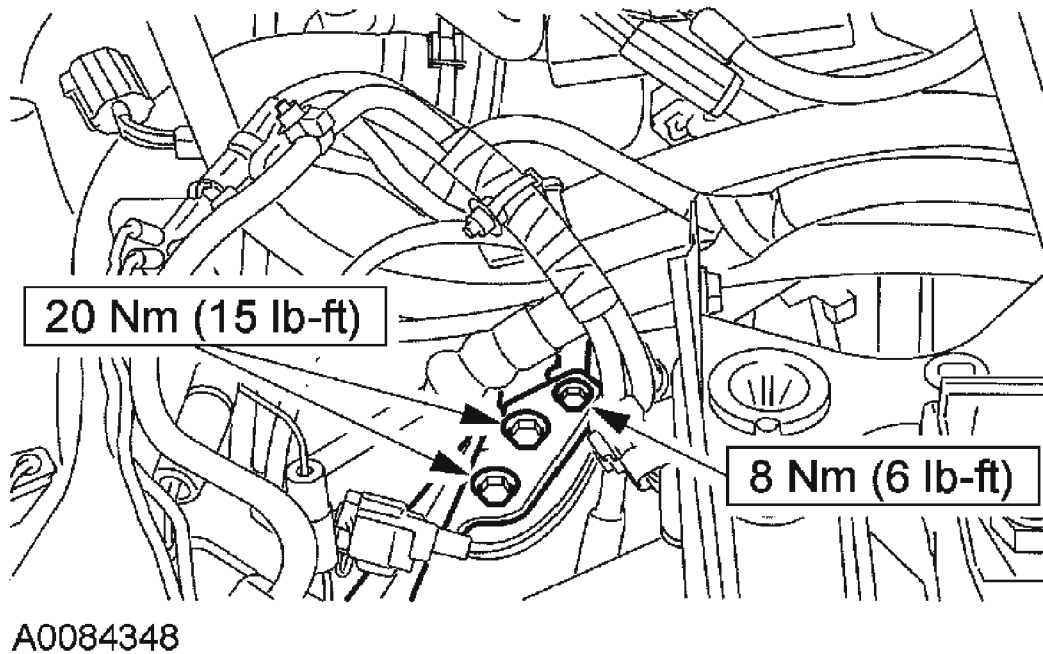


Fig. 424: Installing Fluid Filler Tube And Shift Cable Bracket Bolts
Courtesy of FORD MOTOR CO.

NOTE: The location of the different length bolts.

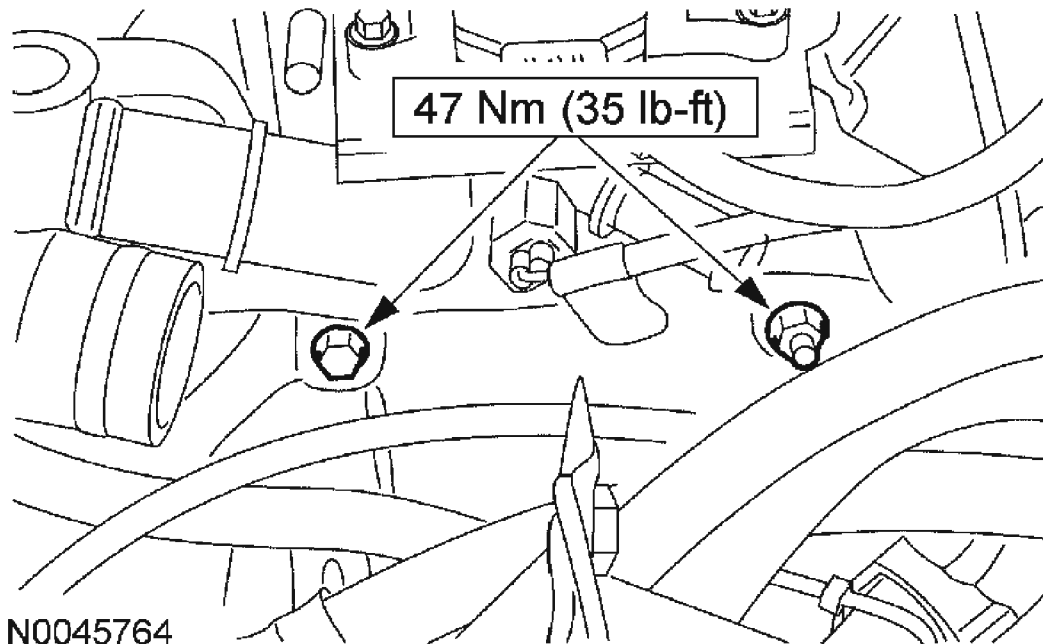


Fig. 425: Installing Upper Center Converter Housing Bolts
Courtesy of FORD MOTOR CO.

27. Install the upper center converter housing bolts.
28. Position the electrical connector bracket and install the nut.

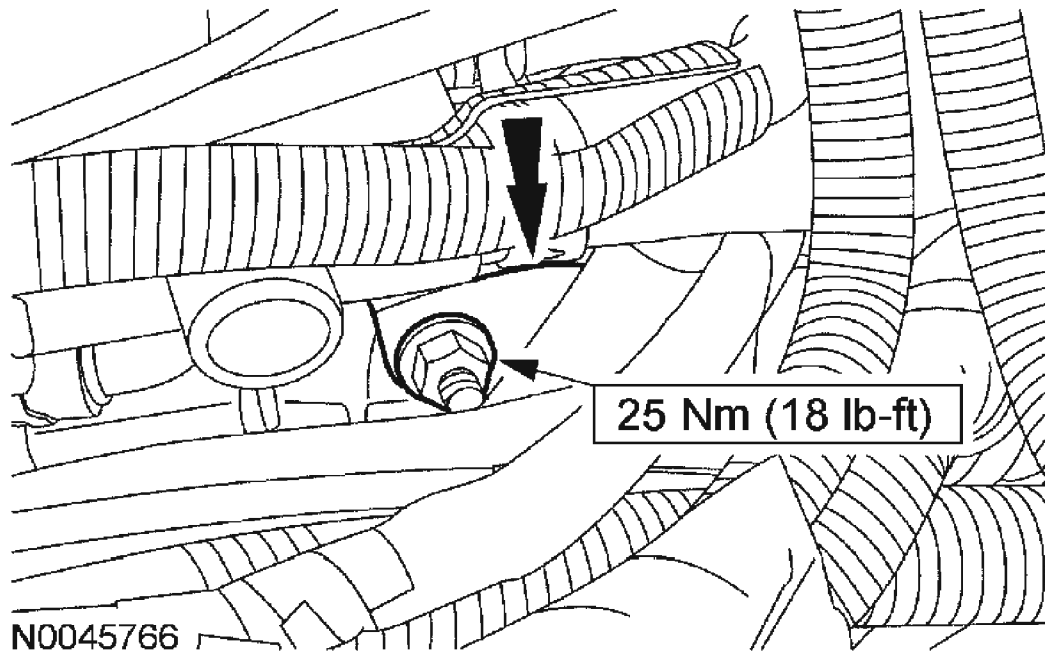


Fig. 426: Positioning Electrical Connector Bracket And Installing Nut
Courtesy of FORD MOTOR CO.

29. Install the electrical connector bracket nut.

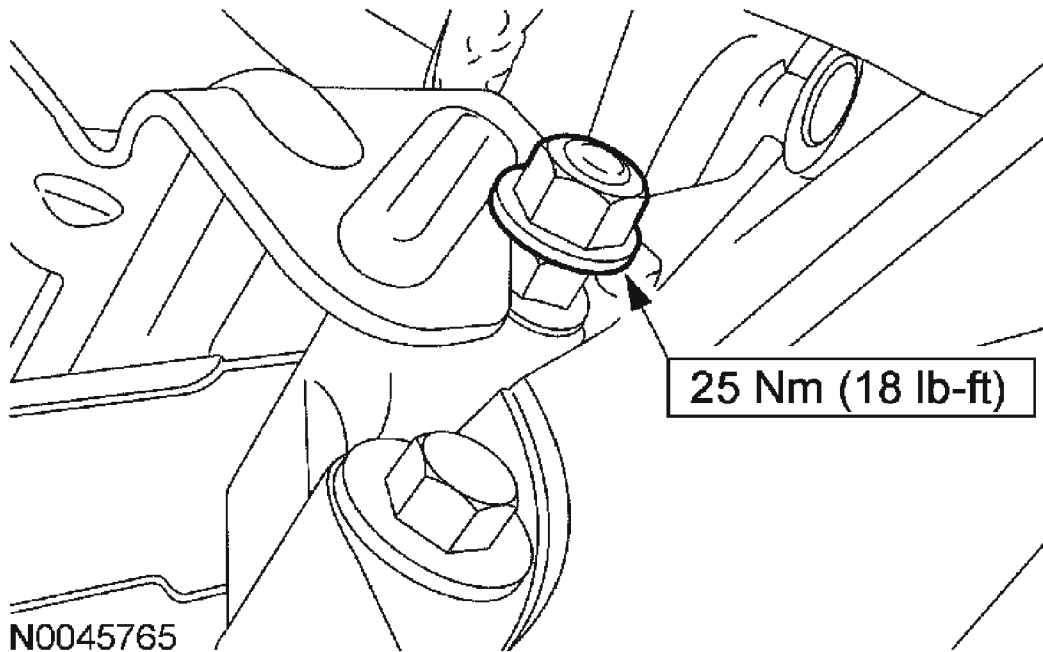


Fig. 427: Installing Electrical Connector Bracket Nut
Courtesy of FORD MOTOR CO.

30. Install the shift cable into the clip.

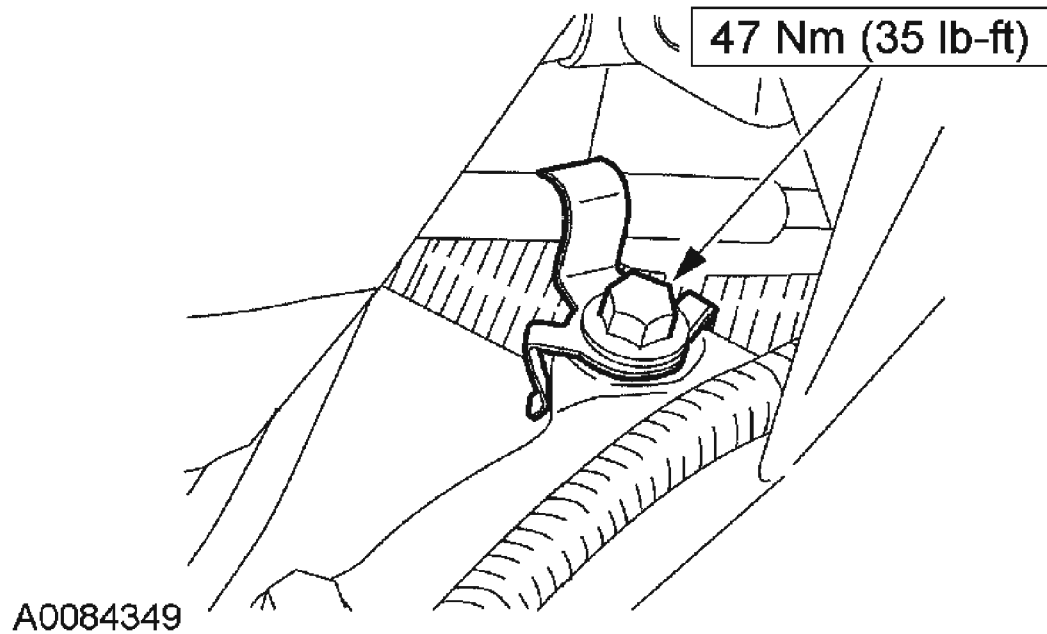
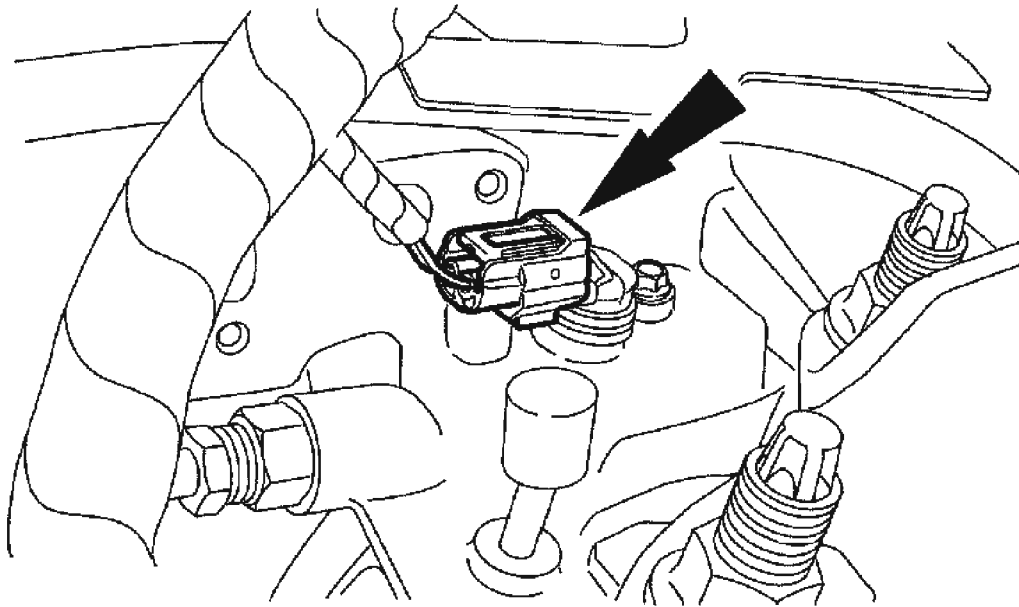


Fig. 428: Installing Shift Cable Into Clip
Courtesy of FORD MOTOR CO.

31. Connect the turbine shaft speed (TSS) sensor electrical connector.



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Fig. 429: Connecting Turbine Shaft Speed (TSS) Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

NOTE: The TR connector seal is a high compression type and requires a "press to click" installation for a weatherproof seal.

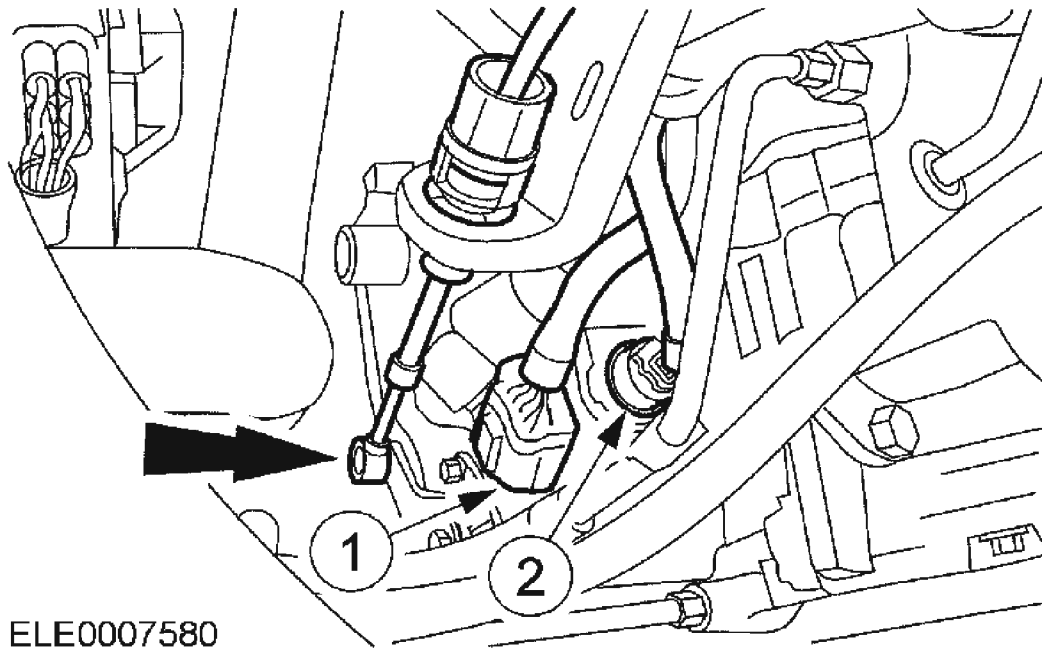


Fig. 430: Installing Transmission Range (TR) Sensor And Transaxle Solenoid Electrical Connector

Courtesy of FORD MOTOR CO.

32. Connect the electrical connectors and install the selector lever cable to the automatic transaxle selector lever.
 1. Transmission range (TR) sensor.
 2. Transaxle solenoid electrical connector.
33. Using the engine support bar, raise the engine and transaxle assembly slightly.
34. Tighten the LH strut and spring assembly top mount nuts.

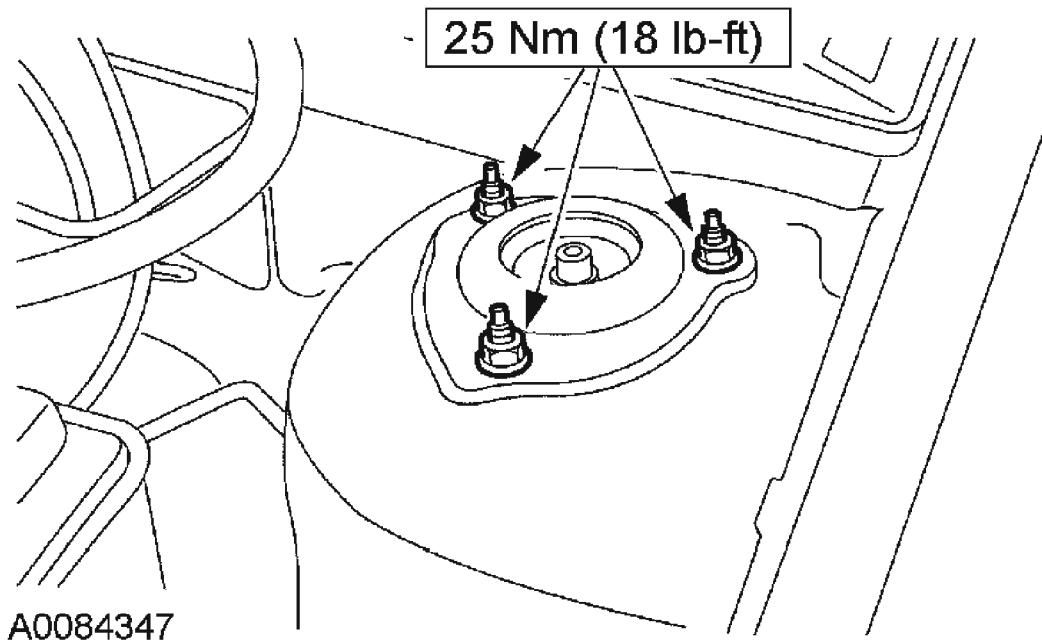


Fig. 431: Tightening LH Strut And Spring Assembly Top Mount Nuts
Courtesy of FORD MOTOR CO.

35. Install the air cleaner resonator.
 1. Install the resonator and nuts.
 2. Connect the air cleaner outlet hose.
 3. Connect the crankcase ventilation hose.

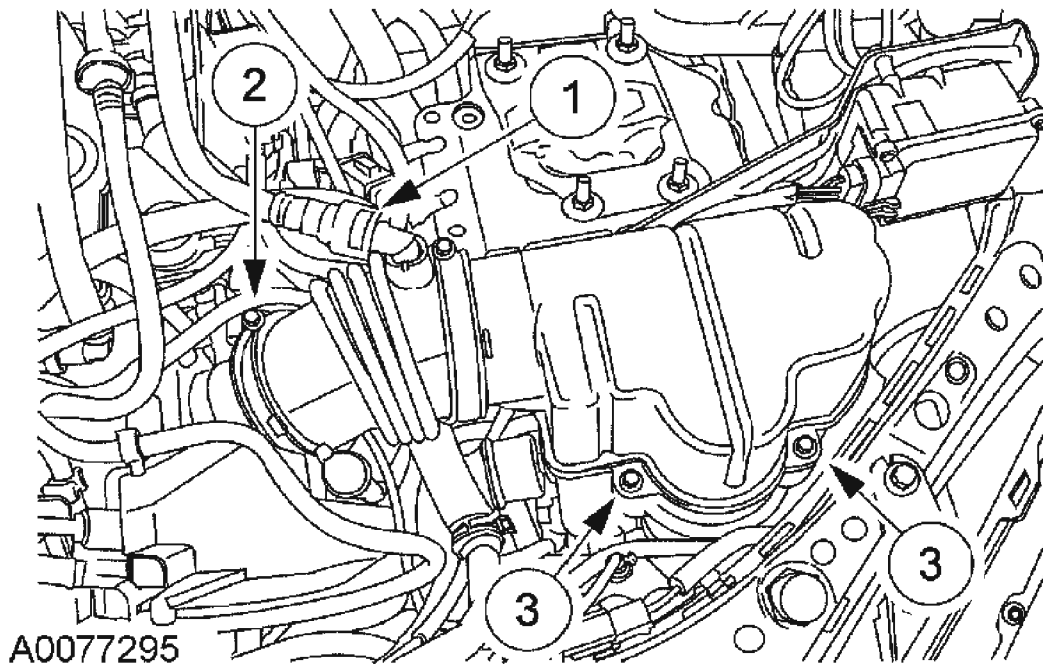


Fig. 432: Installing Air Cleaner Resonator
Courtesy of FORD MOTOR CO.

NOTE: When the battery has been disconnected and reconnected, some abnormal drive symptoms may occur while the vehicle relearns its adaptive strategy. The vehicle may need to be driven to relearn the strategy.

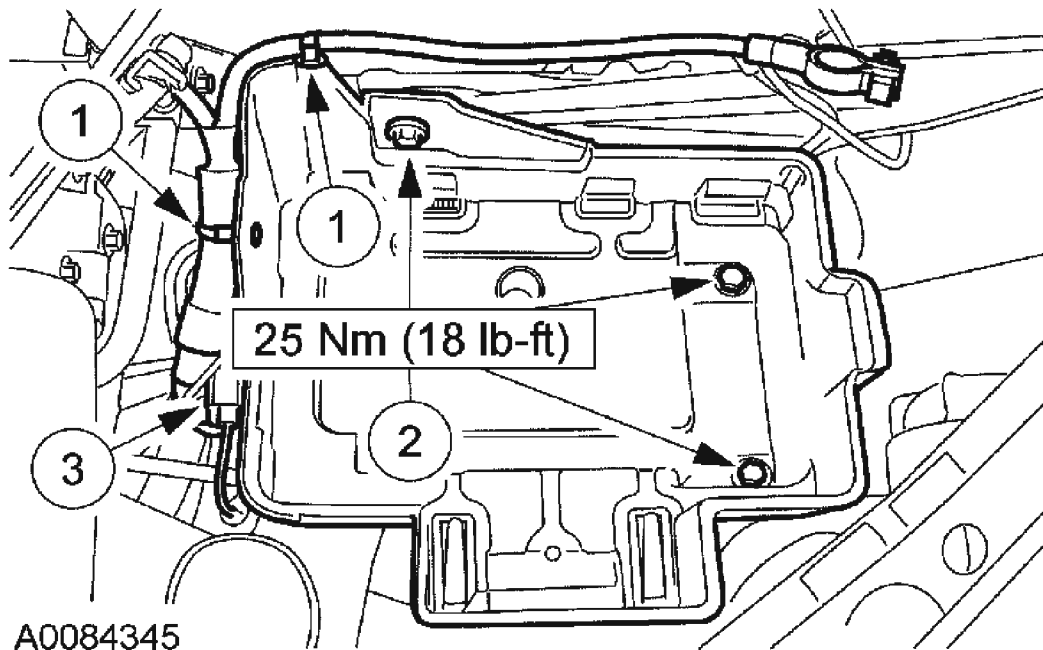


Fig. 433: Installing Battery Tray
Courtesy of FORD MOTOR CO.

36. Install the battery tray and battery. For additional information, refer to **BATTERY, MOUNTING AND CABLES**.
37. Fill the transaxle with clean automatic transmission fluid.