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# INTRODUCTION

## CONVERSION CHART

Conversion Units			Multiply By:
<b>Length Calculations</b>			
Inches (in)	to	Millimeters (mm)	25.40
Inches (in)	to	Centimeters (cm)	2.540
Feet (ft)	to	Centimeters (cm)	30.48
Feet (ft)	to	Meters (m)	0.3048
Yards (yd)	to	Centimeters (cm)	91.44
Yards (yd)	to	Meters (m)	0.9144
Miles	to	Kilometers (km)	1.609
Millimeters (mm)	to	Inches (in)	0.03937
Centimeters (cm)	to	Inches (in)	0.3937
Centimeters (cm)	to	Feet (ft)	0.0328
Centimeters (cm)	to	Yards (yd)	0.0109
Meters (m)	to	Feet (ft)	3.281
Meters (m)	to	Yards (yd)	1.094
Kilometers (km)	to	Miles	0.6214
<b>Area Calculations</b>			
Square Inches (sq-in)	to	Square Millimeters (sq-mm)	645.2
Square Inches (sq-in)	to	Square Centimeters (sq-cm)	6.452
Square Feet (sq-ft)	to	Square Centimeters (sq-cm)	929.0
Square Feet (sq-ft)	to	Square Meters (sq-m)	0.0929
Square Yards (sq-yd)	to	Square Meters (sq-m)	0.8361
Square Miles (sq-miles)	to	Square Kilometers (sq-km)	2.590
Square Millimeters (sq-mm)	to	Square Inches (sq-in)	0.00155
Square Centimeters (sq-cm)	to	Square Inches (sq-in)	0.155
Square Centimeters (sq-cm)	to	Square Feet (sq-ft)	0.001076
Square Meters (sq-m)	to	Square Feet (sq-ft)	10.76
Square Meters (sq-m)	to	Square Yards (sq-yd)	1.196
Square Kilometers (sq-km)	to	Square Miles (sq-miles)	0.3861
<b>Volume Calculations</b>			
Cubic Inches (cu-in)	to	Cubic Centimeters (cu-cm)	16.387
Cubic Inches (cu-in)	to	Liters (L)	0.01639
Quarts (qt)	to	Liters (L)	0.9464
Gallons (gal)	to	Liters (L)	3.7854
Cubic Yards (cu-yd)	to	Cubic Meters (cu-m)	0.7646
Cubic Centimeters (cu-cm)	to	Cubic Inches (cu-in)	0.06102
Liters (L)	to	Cubic Inches (cu-in)	61.024
Liters (L)	to	Quarts (qt)	1.0567
Liters (L)	to	Gallons (gal)	0.2642
Cubic Meters (cu-m)	to	Cubic Yards (cu-yd)	1.308

# VISUAL IDENTIFICATION

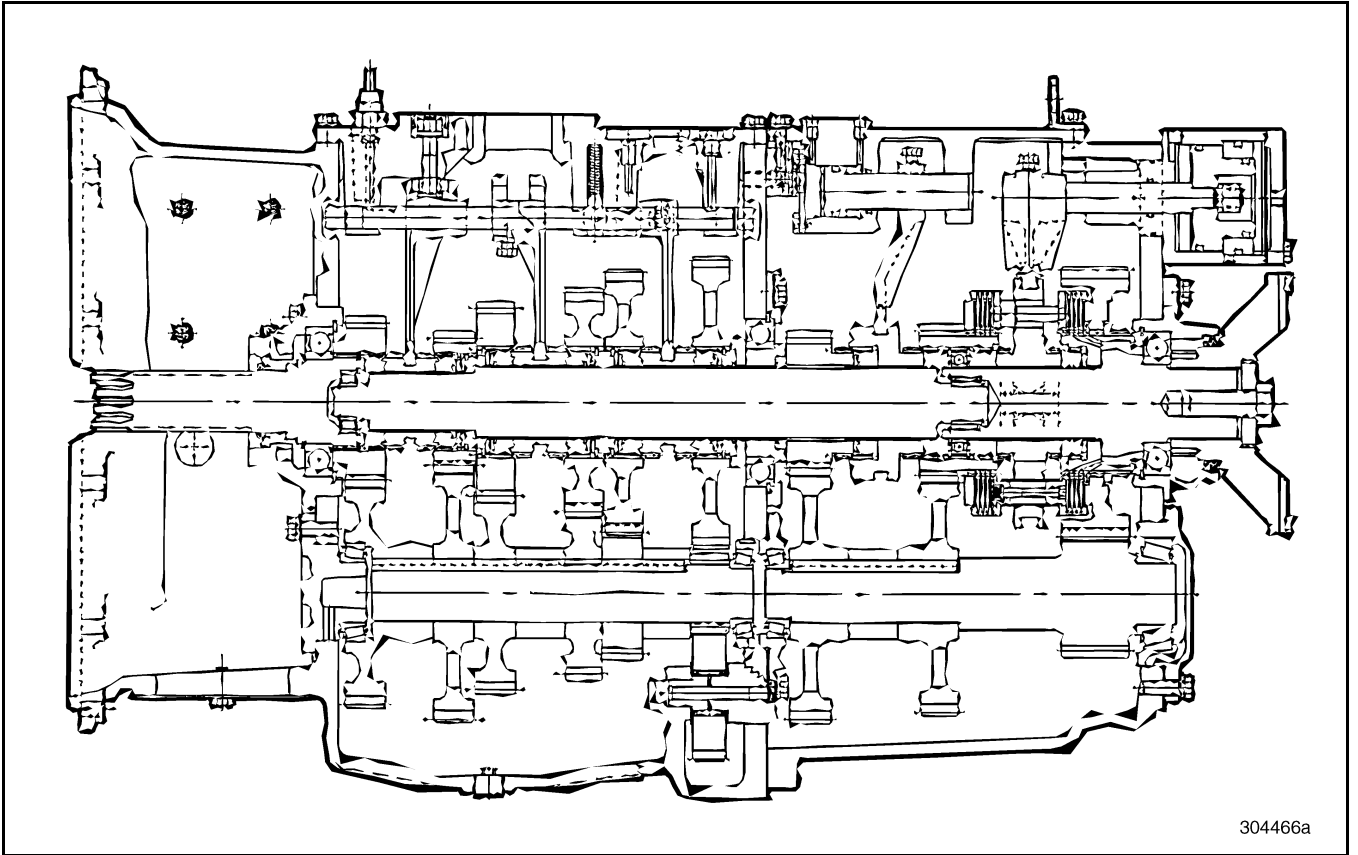
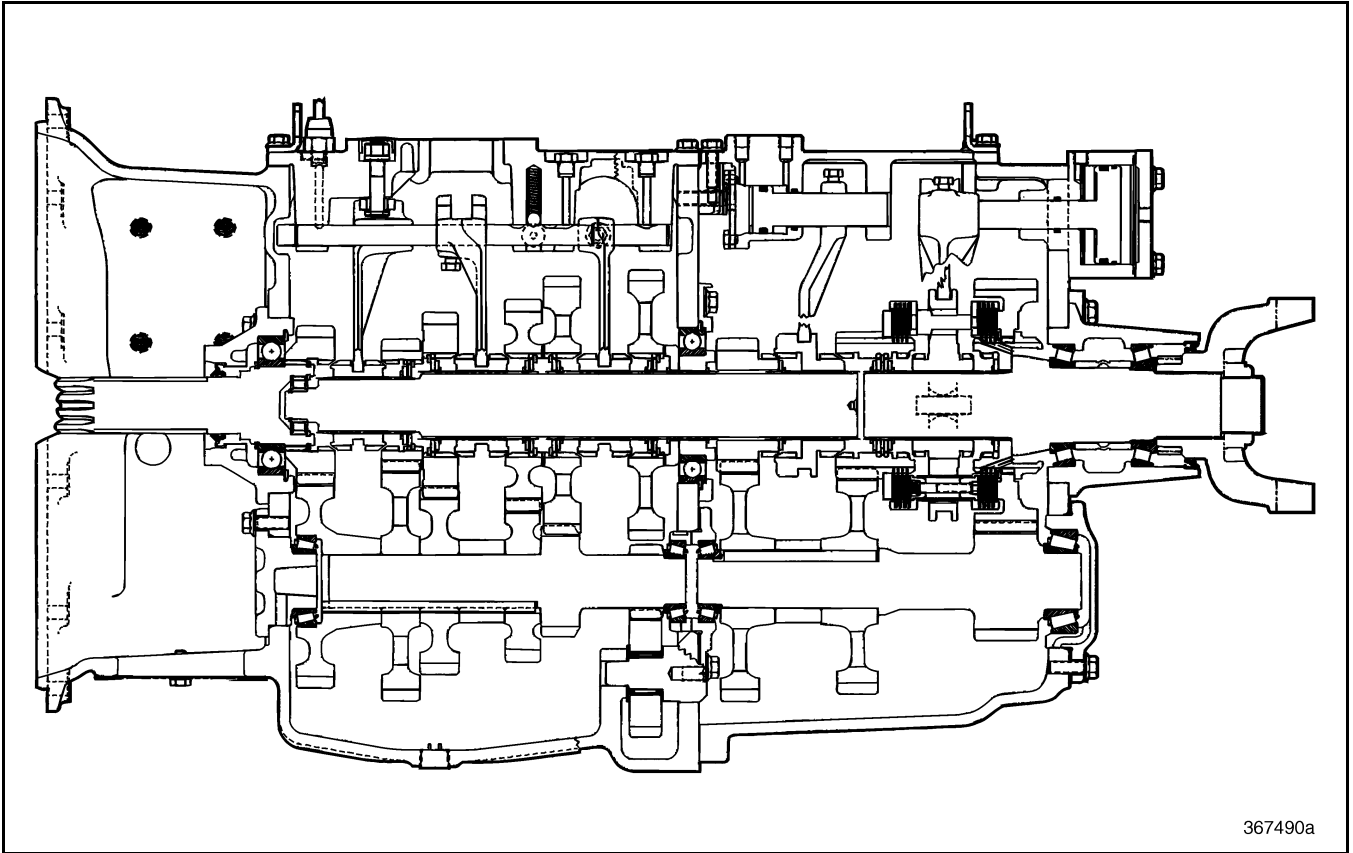


Figure 3 — Cutaway View of T313/T318 Transmission

# VISUAL IDENTIFICATION



367490a

Figure 7 — Cutaway View of T313LR21/T318LR21 Transmission

Transmission model not shown:

- T31321/T31821

# DESCRIPTION AND OPERATION

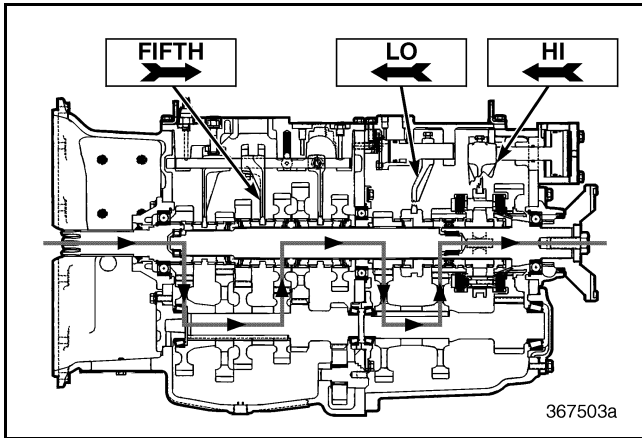


Figure 19 — Fifth Speed (Lo Split, Hi Range)

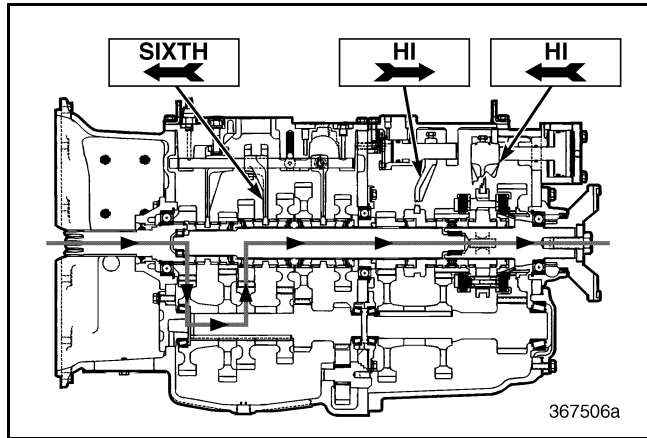


Figure 22 — Sixth Speed (Hi Split, Hi Range)

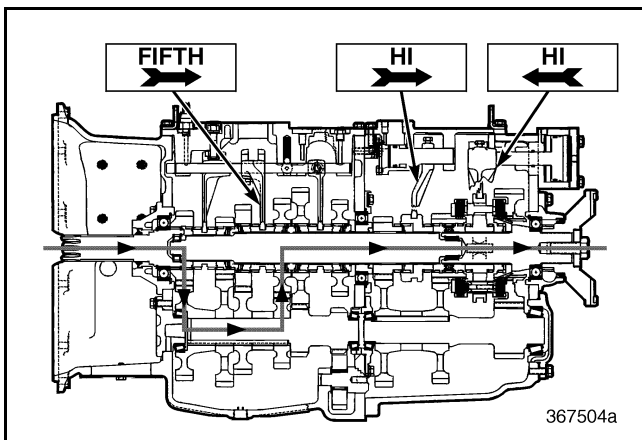


Figure 20 — Fifth Speed (Hi Split, Hi Range)

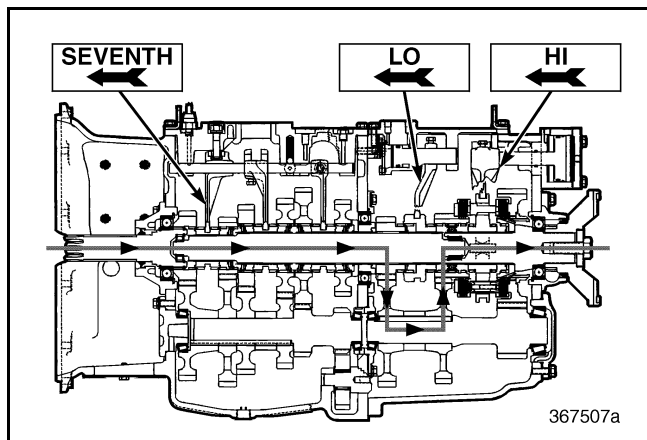


Figure 23 — Seventh Speed (Lo Split, Hi Range)

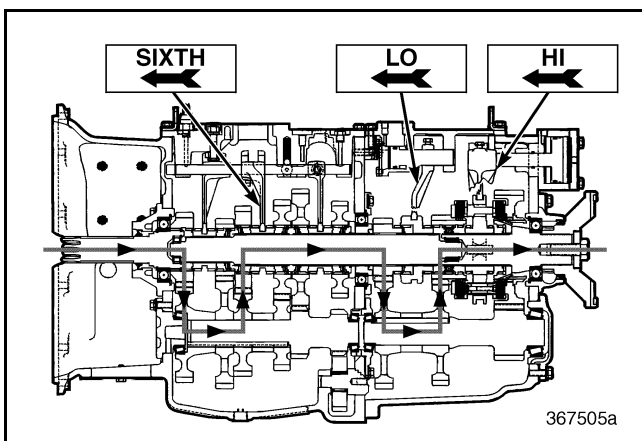


Figure 21 — Sixth Speed (Lo Split, Hi Range)

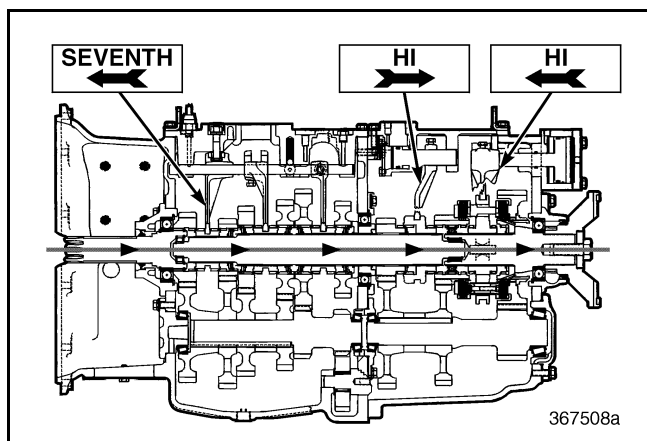
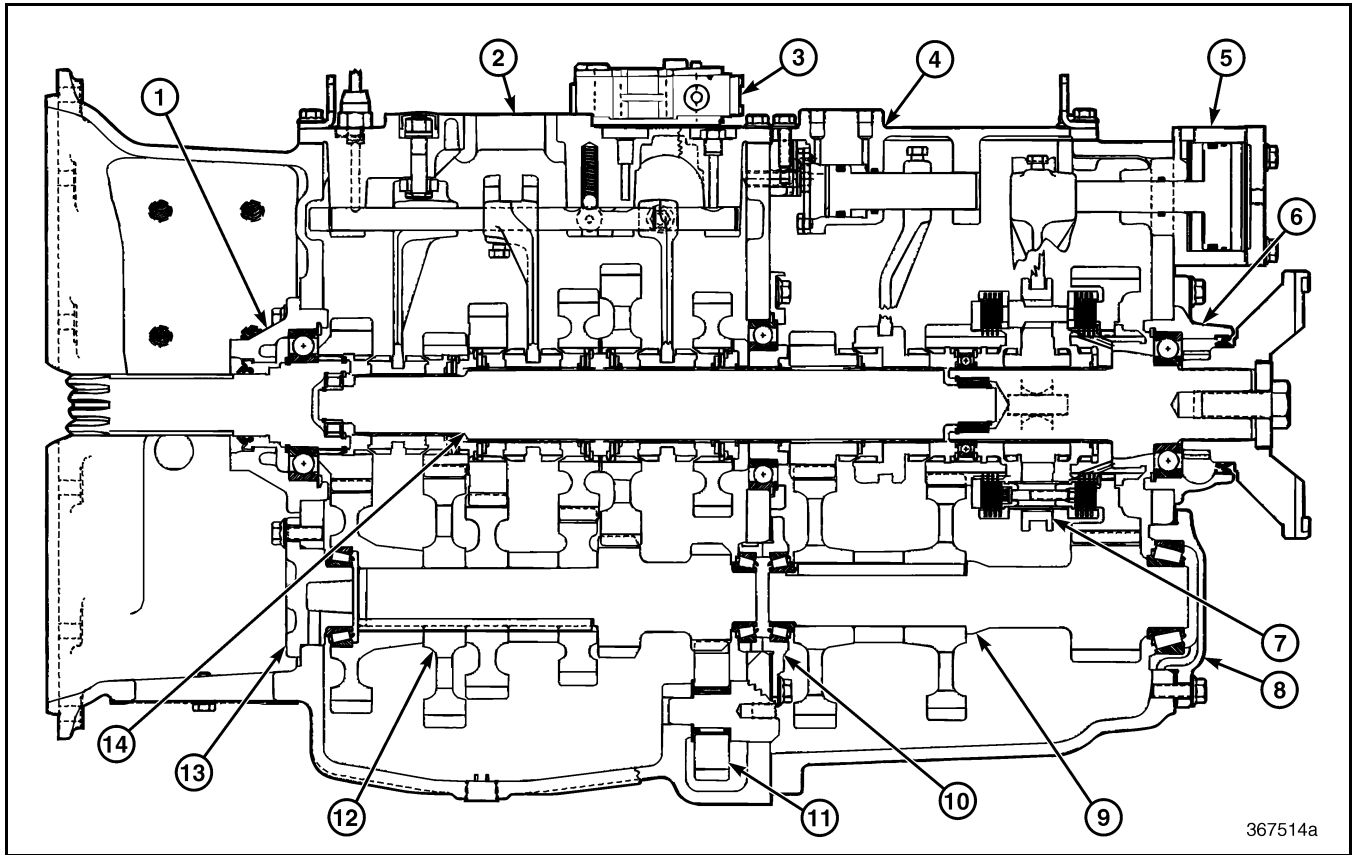


Figure 24 — Seventh Speed (Hi Split, Hi Range)

# COMPONENT LOCATOR



**Figure 51 — Major Component Locations for T313L/T318L Transmission**

1. Main Drive Pinion Assembly	6. Rear Mainshaft Bearing Cover	11. Reverse Idler Gear
2. Main Case Shift Cover Assembly	7. Synchronizer Assembly	12. Front Countershaft Assembly
3. Range Shift Valve	8. Rear Countershaft Bearing Cover	13. Front Countershaft Front Bearing Cover
4. Rear Case Shift Cover (Splitter) Assembly	9. Rear Countershaft Assembly	14. Front Mainshaft Assembly
5. Range Shift Cylinder	10. Front Countershaft Rear Bearing Cover	

# REPAIR INSTRUCTIONS

10. Remove the main case shift cover assembly and cover gasket.

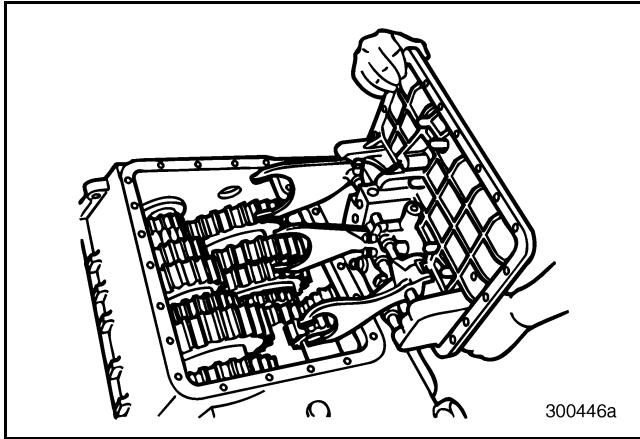


Figure 66 — Removing Main Case Shift Cover

11. Remove the rear case shift cover capscrews.

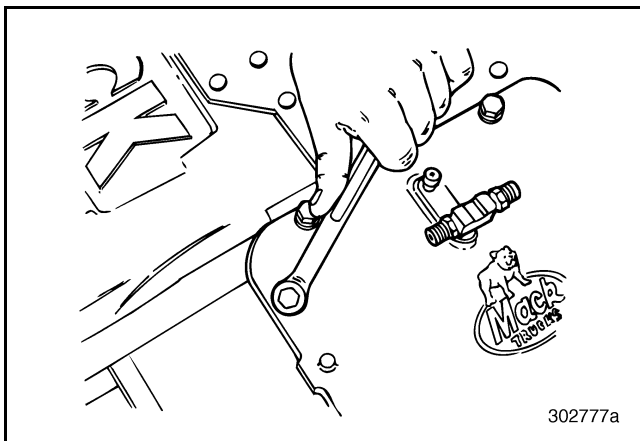


Figure 67 — Removing Rear Case Shift Cover Capscrews

12. Remove the rear case shift cover and gasket.

## SERVICE HINT

To remove the drive yoke nut (extended output shaft) or yoke (or flange), clamp plate bolt and clamp plate (conventional output shaft), place at least two gears in both the main case and the rear case into engagement. This is done to lock the transmission gearing and prevent it from rotating while removing the yoke bolt or nut.

13. Reach through the rear case top opening and verify that both the splitter sliding clutch and the synchronizer assembly sliding clutch are engaged.

14. Reach into the main case top opening and move at least two sliding clutches into engagement. This locks two different gears to the mainshaft and prevents the gears and shaft of the transmission from rotating.

15. Remove the drive yoke nut from the extended output shaft.

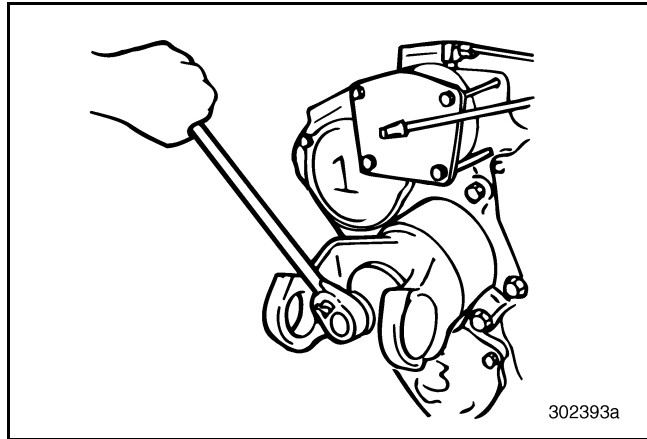


Figure 68 — Removing Drive Yoke Nut (T313L21/T318L21 Shown)

16. Remove the drive yoke or drive flange capscrew and clamp plate from the conventional output shaft.

## NOTE

Effective June 2007, drive yoke clamp plate capscrews were changed to a Scotch-Grip™ torque retention method. DO NOT reuse these fasteners, as they are one-time use only.

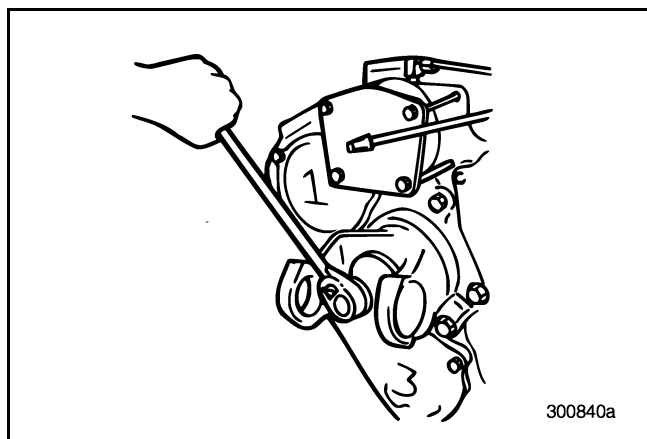


Figure 69 — Removing Clamp Plate and Capscrew (T313L/T318L Shown)



# REPAIR INSTRUCTIONS

46. Remove the compound Lo-split gear snap ring using snap ring plier set J 34629 or suitable, internal-toothed thrust washer and Lo-split gear from the mainshaft.

## SERVICE HINT

To help in removing the compound Lo-split gear snap ring, use a pry bar to lift the front mainshaft slightly during removal. This allows more clearance and frees the snap ring from the snap ring groove.

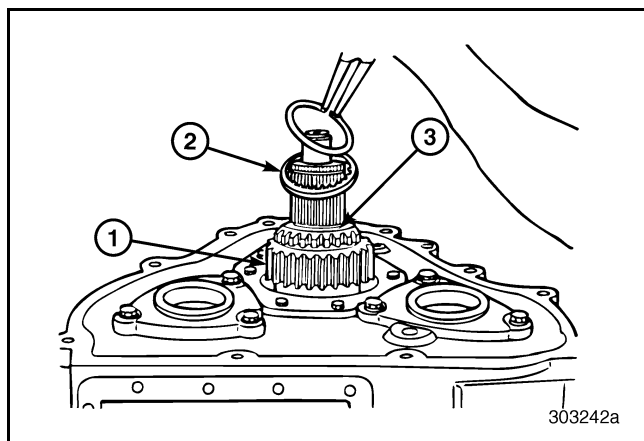


Figure 99 — Removing Snap Ring, Thrust Washer and Lo-Split Gear (T313L/T318L Shown)

- |                                   |                     |
|-----------------------------------|---------------------|
| 1. Lo-Split Gear                  | 3. Snap Ring Groove |
| 2. Internal-Toothed Thrust Washer |                     |

## NOTE

If not already done, mark the front countershaft rear bearing covers so they can be installed in the same position during reassembly.

47. Remove the No. 2 (upper right) front countershaft rear bearing cover capscrews.
48. Using jackscrews, remove the No. 2 (upper right) front countershaft rear bearing cover.

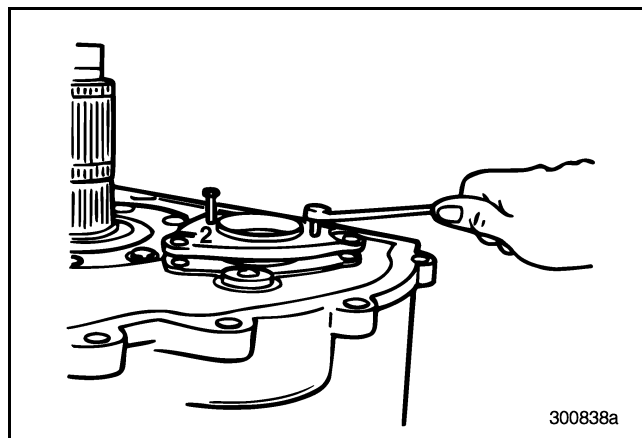


Figure 100 — Removing No. 2 Front Countershaft Rear Bearing Cover (T313L/T318L Shown)

49. Remove the capscrews from the front of the mainshaft rear bearing cover. Then remove the cover.

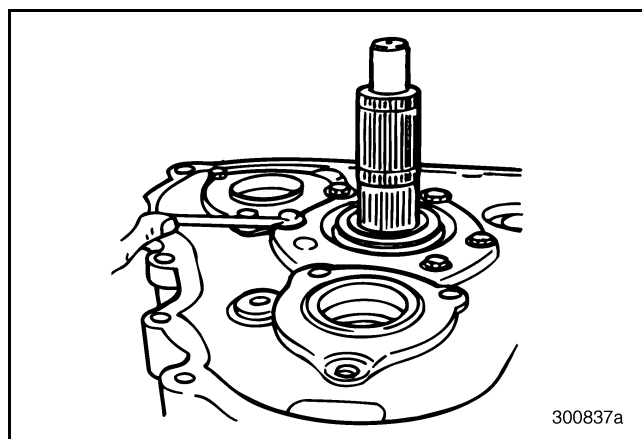
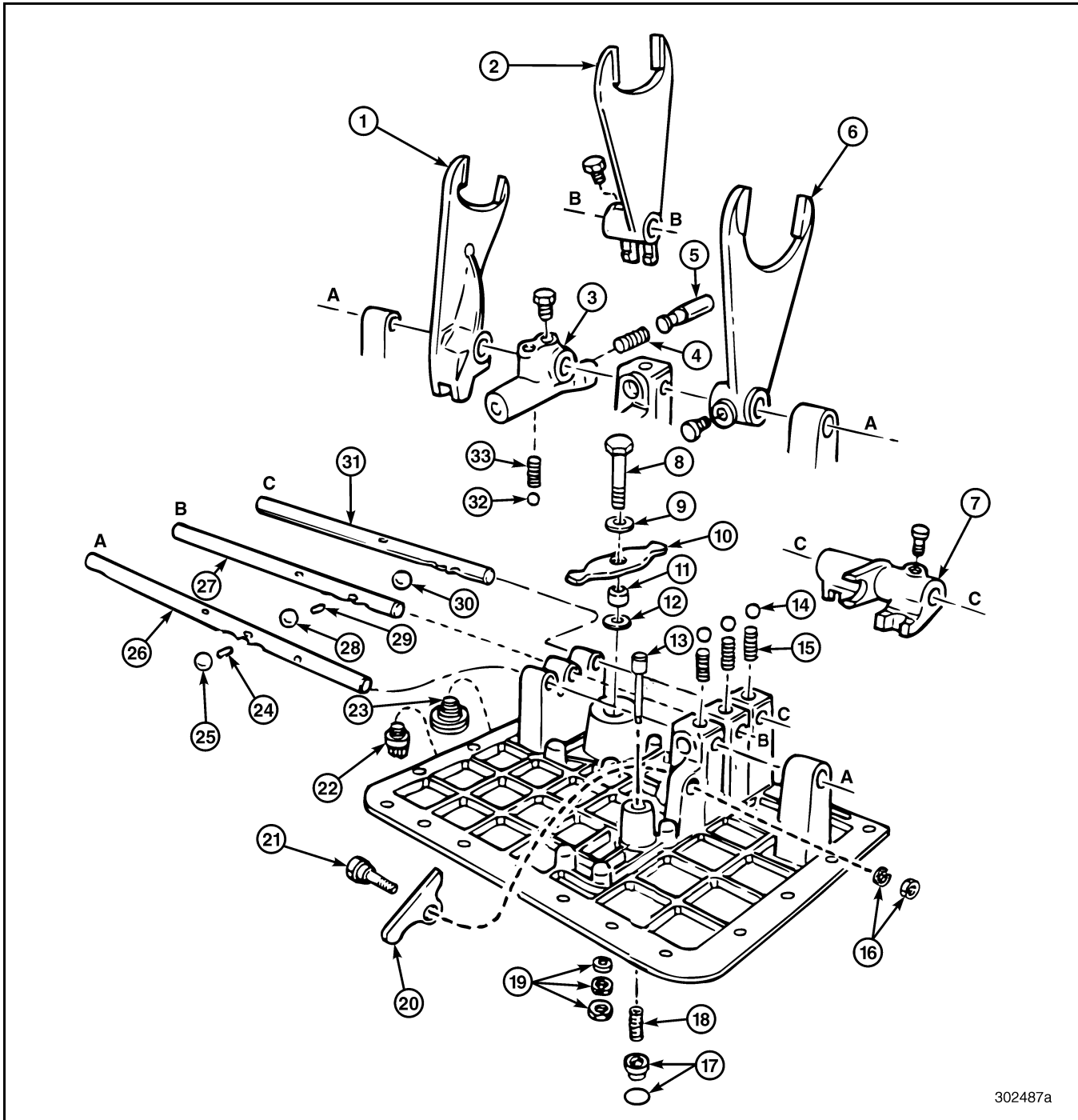


Figure 101 — Removing Mainshaft Rear Bearing Cover Capscrews (T313L/T318L Shown)

# REPAIR INSTRUCTIONS



302487a

Figure 128 — Exploded View of Main Case Shift Cover

1. Third/Fourth Shift Fork	12. Washer	23. Breather
2. First/Second Shift Fork	13. Interlock Pin	24. Interlock Pin
3. Lo/Reverse Shifter	14. Poppet Ball	25. Interlock Ball
4. Shifter Body Spring (Interlock)	15. Poppet Ball Spring	26. Lo/Reverse Shift Rail
5. Shifter Body Plunger (Interlock)	16. Interlock Rocker Hardware	27. First/Second Shift Rail
6. Lo/Reverse Shift Fork	17. Interlock Sleeve and O-Ring	28. Interlock Ball
7. Third/Fourth Shifter	18. Interlock Spring	29. Interlock Pin
8. Third/Fourth Rocker Pin	19. Third/Fourth Rocker Pin Hardware	30. Interlock Ball
9. Washer	20. Interlock Rocker	31. Third/Fourth Shift Rail
10. Third/Fourth Rocker Arm	21. Interlock Rocker Bolt	32. Lo/Reverse Shifter Ball
11. Bushing	22. Pipe Plug	33. Lo/Reverse Shifter Spring

# REPAIR INSTRUCTIONS

26. Remove the reverse light switch rod.

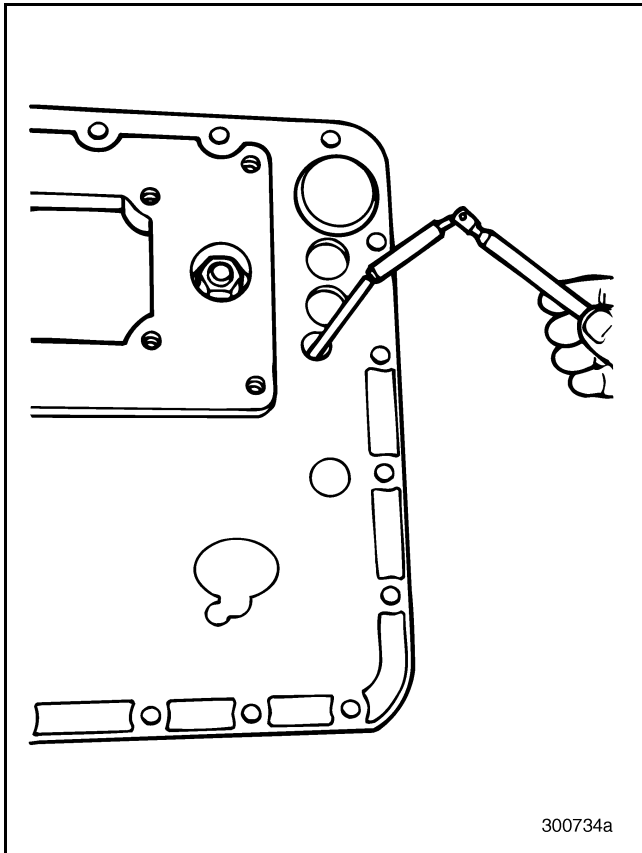


Figure 154 — Removing Reverse Light Switch Rod

27. Remove the nut and washers from the third/fourth rocker pin.

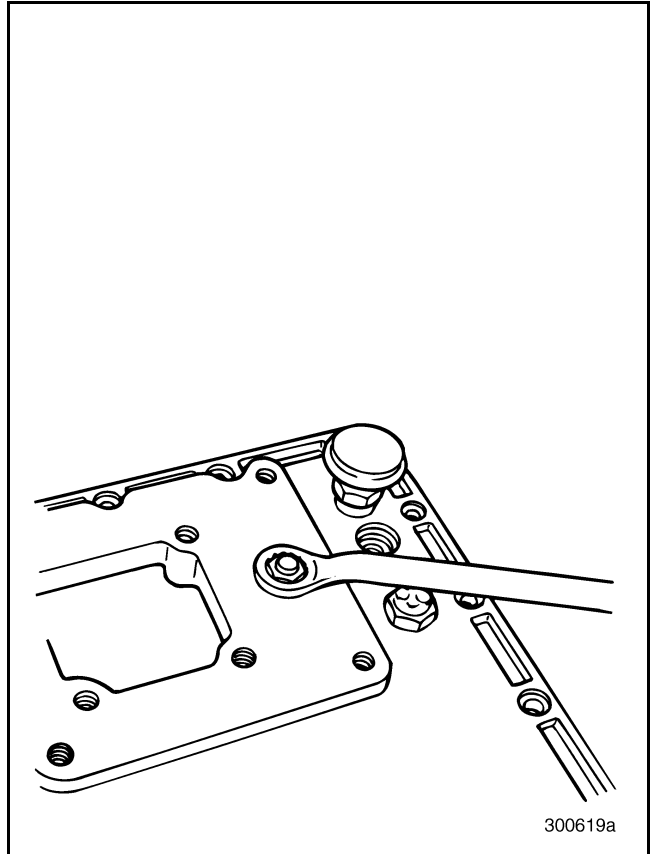


Figure 155 — Loosening Third/Fourth Rocker Pin Nut

# REPAIR INSTRUCTIONS

4. Remove the wiper ring from the piston groove.

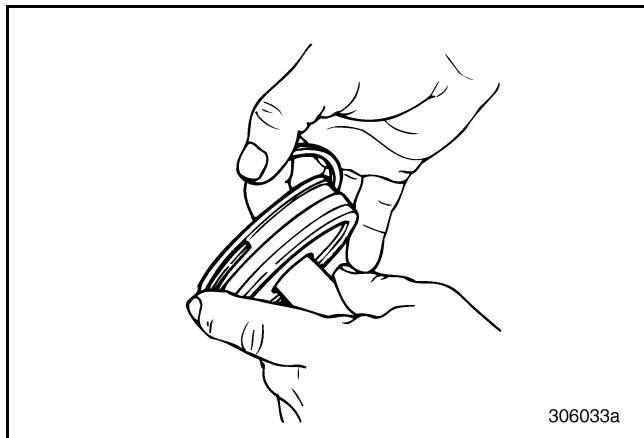


Figure 183 — Removing Wiper Ring from Piston Groove

5. Using a small screwdriver, remove the Teflon® seal and O-ring expander from the second piston groove.

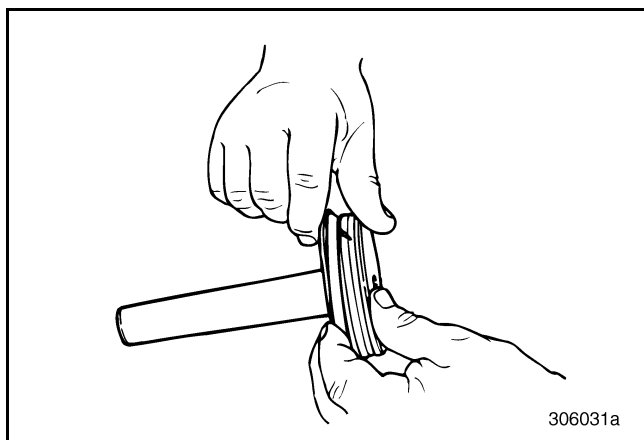


Figure 184 — Removing Teflon® Seal and O-Ring from Piston Grooves

## Range Shift Valve

[324]

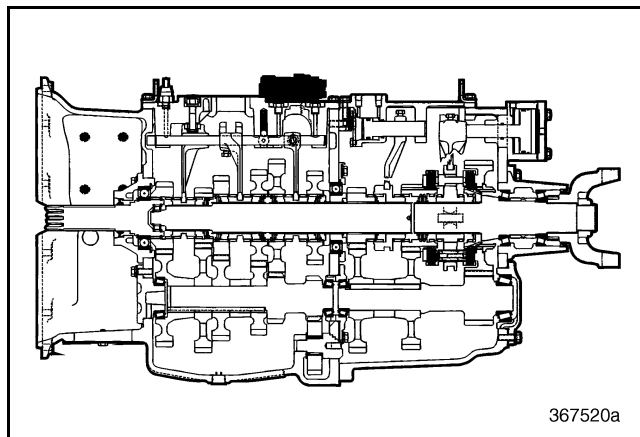


Figure 185 — Range Shift Valve Component Locator (T313L21/T318L21 Shown)

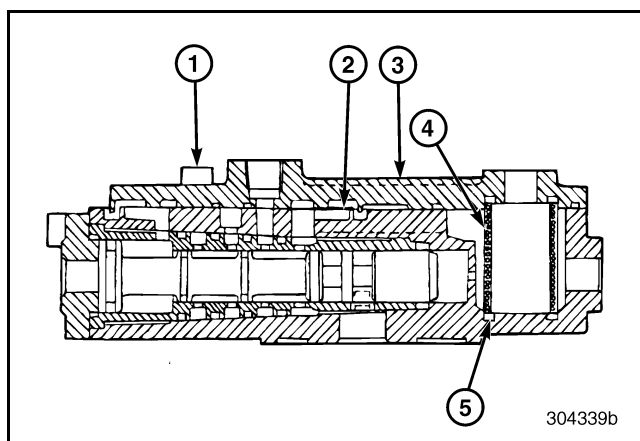


Figure 186 — Cutaway View of Range Shift Valve Assembly

- |                   |                           |
|-------------------|---------------------------|
| 1. 4 mm Screw     | 4. Sintered Bronze Filter |
| 2. Top Cover Seal | 5. Silicone Rubber O-Ring |
| 3. Top Cover      |                           |

# REPAIR INSTRUCTIONS

5. Remove the internal- and external-toothed thrust washers from inside the Lo-speed gear.

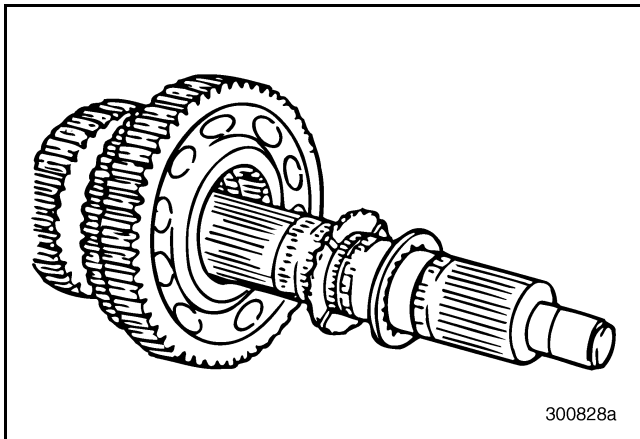


Figure 209 — Removing Internal-Toothed and External-Toothed Thrust Washers (T313L/T318L Shown)

6. Slide Lo-speed gear from mainshaft.

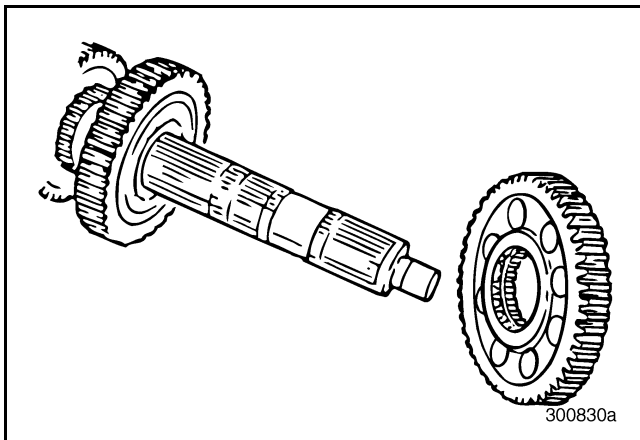


Figure 210 — Removing Lo-Speed Gear (T313L/T318L Shown)

7. Using suitable snap ring pliers, remove the snap ring from the outside groove, inside the Lo-speed gear.

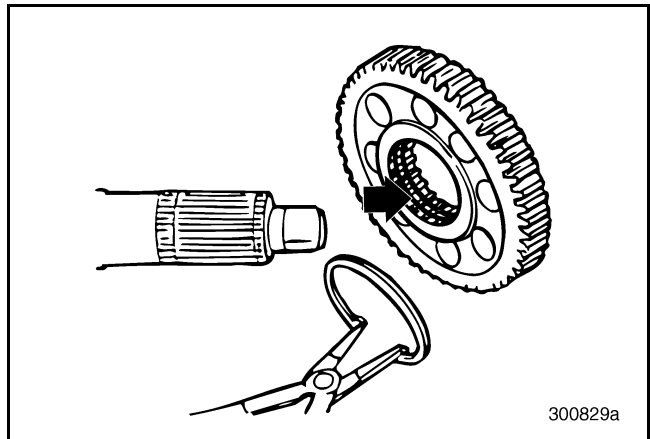


Figure 211 — Removing Snap Ring from Inside Lo Gear (T313L/T318L Shown)

8. Remove the first (fifth) speed gear from the mainshaft. Slide the gear straight off the rear end of the shaft.

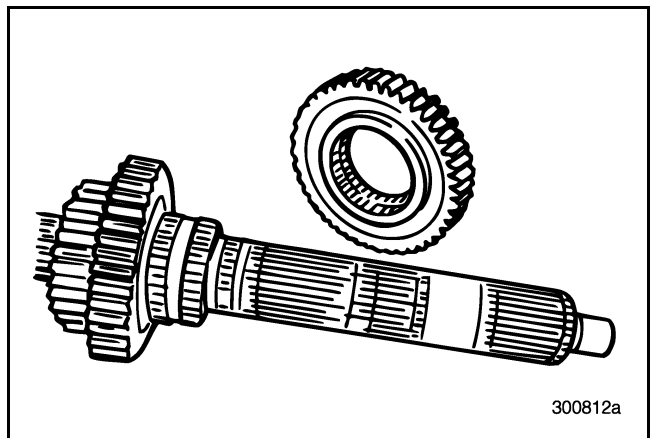


Figure 212 — Removing First Speed Gear from Mainshaft (T313L/T318L Shown)



# REPAIR INSTRUCTIONS

2. Press the rear countershaft Hi-range/Hi-split gear onto the rear countershaft. Place the gear onto the shaft, with the protruding hub facing the front of the shaft.

## NOTE

During all pressing operations involving a key and keyway, watch the key to make sure that no material is shaved off as each gear is being pressed on. This material can collect between the gears and prevent proper seating.

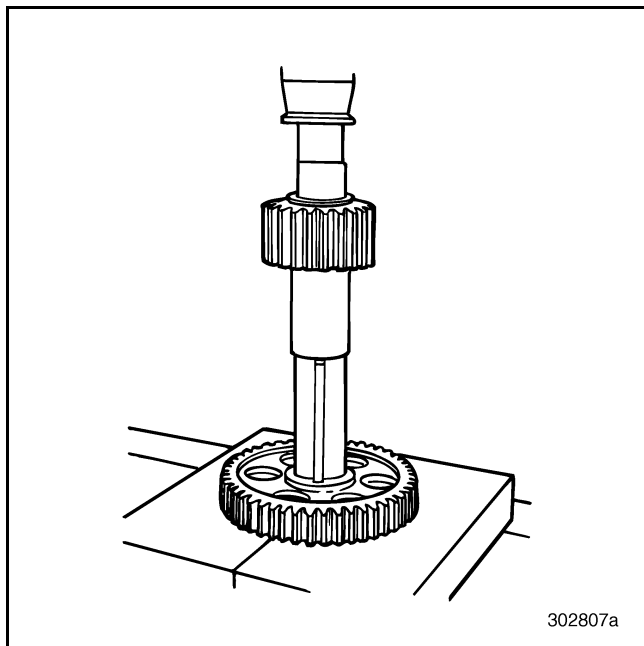


Figure 315 — Pressing on Hi-Range/Hi-Split Gear

3. Install the spacer onto the shaft.

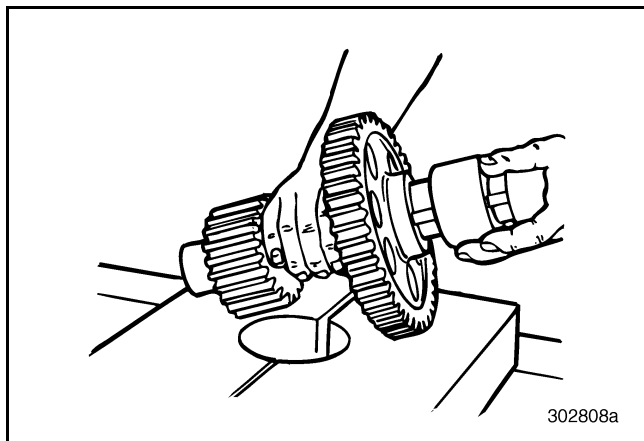


Figure 316 — Installing Spacer

4. Press the rear countershaft Lo-split gear onto the shaft. Position the gear so that the protruding hub faces the rear of the shaft.

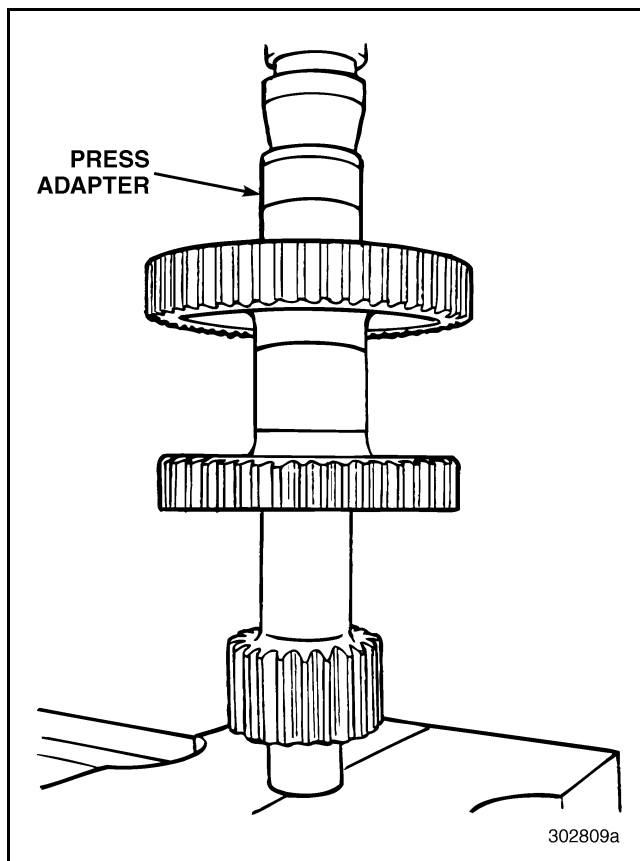


Figure 317 — Pressing on Lo-Split Gear