

<h1>Warner T-18 Four-Speed Transmission</h1>		<h2>SECTION 16-23</h2>	
APPLIES TO F-150 — F-350 (4x2) (4x4) AND BRONCO			
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DESCRIPTION

The four-speed Model T-18 transmission, (Fig. 1), is equipped with a center, floor-mounted gear shift lever.

The first and reverse gears are spur gears and the second, third and fourth speed gears are helical cut and are synchronized for ease in shifting.

The input shaft is supported by a ball bearing (Fig. 2), which is pressed onto the shaft and into the transmission case.

The front end of the output shaft is supported by a pilot bearing installed in the input shaft. The rear end of the output shaft is supported by a ball bearing which is pressed onto the shaft and into the transmission case. The bearing and shaft are retained in the case by a snap ring. The rear oil seal, speedometer gear, and rear bushing are contained in the extension housing, which is bolted to the rear of the case on F-150—F-350 (4x2) only.

DIAGNOSIS AND TESTING

Refer to Section 16-10, General Manual Transmission Service, for Diagnosis and Testing Procedures.

REMOVAL AND INSTALLATION

Transmission

F-150—F-350 (4X2)

Removal

1. Remove the floor mat, the body floor pan cover, the gearshift lever shift ball and boot as an assembly. Remove the isolator pad.
2. Raise the vehicle and position safety stands. Position a transmission jack under the transmission, and disconnect the speedometer cable.
3. Disconnect the back-up lamp switch located at the rear of the gear shift housing cover (Fig. 1).
4. Disconnect the drive shaft or coupling shaft and clutch linkage from the transmission and wire it to one side.
5. Remove the transmission attaching bolts.

6. Move the transmission to the rear until the input shaft clears the clutch housing. Lower the transmission.

Installation

1. Place the transmission on a transmission jack, install guide studs in the clutch housing and raise the transmission until the input shaft splines are aligned with the clutch disc splines. The clutch release bearing and hub must be properly positioned in the release lever fork.
2. Slide the transmission forward on the guide studs until it is in position on the clutch housing. Install the attaching bolts and tighten them to 48-67 N·m (35-50 ft-lb). Remove the guide studs and install the two lower attaching bolts.
3. Connect the speedometer cable and driven gear and clutch linkage.
4. Install the bolts attaching the front U-joint of the coupling shaft to the transmission output shaft flange. Tighten the bolts and nuts to specifications as listed in the specifications of Section 15-60, Driveshaft—Single Type U-Joint.
5. Connect the back-up lamp switch.
6. Install the shift lever, boot and shift ball as an assembly and lubricate the spherical ball seat with Multi-Purpose Long-Life Lubricant C1AZ-19590-B (ESA-M1C75-B) or equivalent.
7. Install the isolator pad. Install the floor pan cover and floor mat.

F-150—F-350 (4X4) BRONCO

Removal

1. Open door and cover seat.
2. Remove the four screws holding the floor mat.
3. Remove the eleven screws holding the access cover to the floor pan. Place the shift lever in the reverse position and remove the cover.
4. Remove the insulator and dust cover.
5. Remove the transfer case shift lever, shift ball and boot as an assembly.

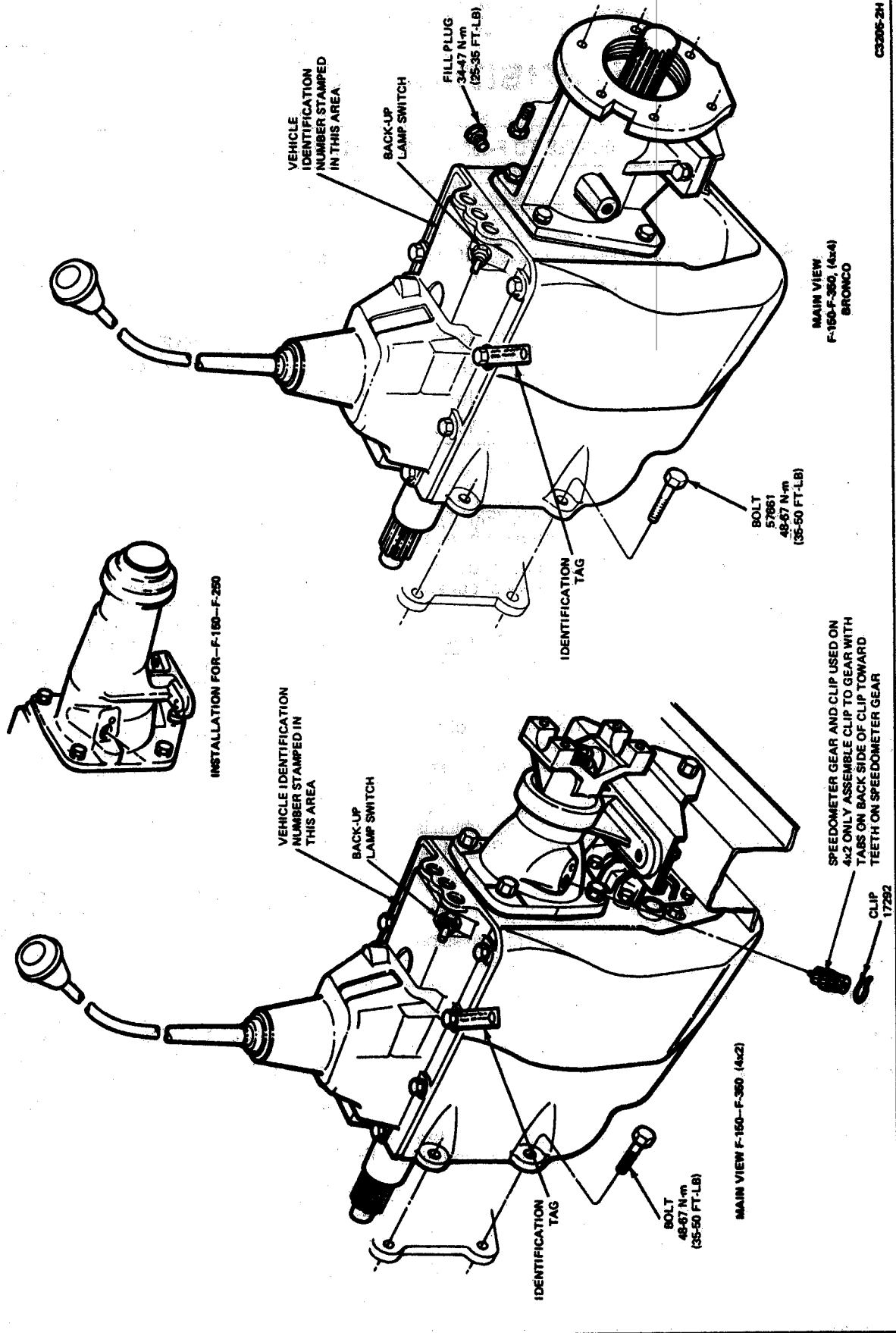


FIG. 1 Warner T-18 Four-Speed Transmission

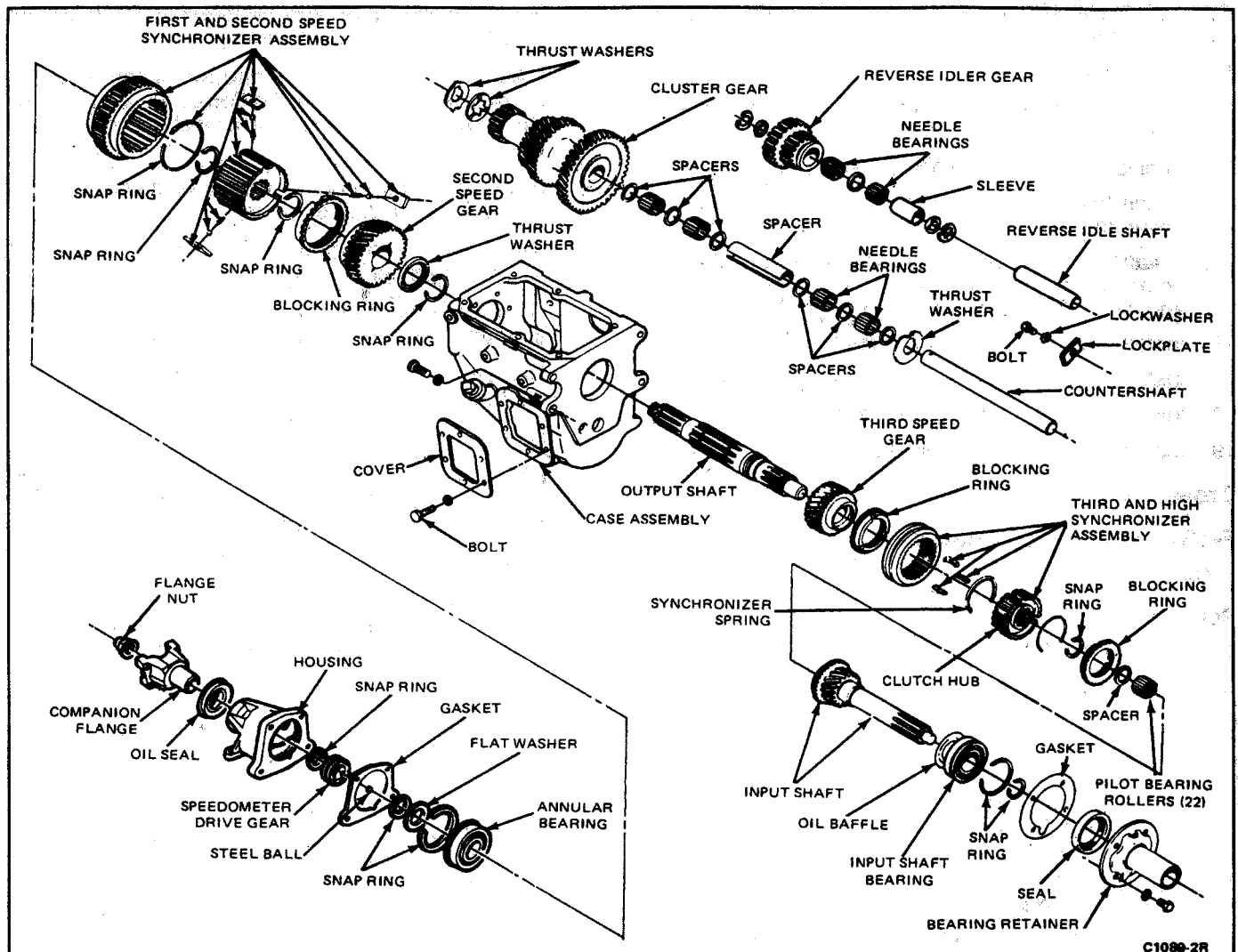


FIG. 2 Typical Warner Four-Speed Transmission

6. Remove transmission shift lever, shift ball and boot as an assembly.
7. Raise the vehicle on a hoist.
8. Remove the drain plug and drain the transmission.
9. Disconnect the rear driveshaft from the transfer case and wire it out of the way.
10. Disconnect the front driveshaft from the transfer case and wire it out of the way.
11. Remove the retainer ring that holds the shift link in place and remove the shift link from transfer case.
12. Remove the speedometer cable from the transfer case.
13. Position a transmission jack under the transfer case. Remove the six bolts holding the transfer case to the transmission and lower the transfer case from the vehicle.
14. Remove the eight bolts that hold the rear support bracket to the transmission.
15. Position a transmission jack under the transmission and remove the rear support bracket and brace.
16. Remove the four bolts that hold the transmission to the bell housing.
17. Remove the transmission from the vehicle.

Installation

1. Place the transmission on a transmission jack and install it in the vehicle installing two guide studs in the bell housing top holes, to guide the transmission into position.
2. Install the two lower bolts. Remove the guide studs and install the upper bolts.
3. Place the rear support bracket in position and install the eight retaining bolts.
4. Install the two bolts at the rear support insulator bracket. Remove the transmission jack.
5. Position the transfer case on the transmission jack and install the six retaining bolts and gasket. Position the transfer case on the transmission and tighten the bolts as listed in the appropriate transfer case section.
6. Install the transfer case shift link and retainer ring.
7. Position and install the speedometer cable.
8. Remove wire and connect front driveshaft.
9. Remove wire and connect rear driveshaft.
10. Fill transfer case with Motorcraft XT-2-QDX, DEXRON®, automatic transmission fluid or equivalent and fill the manual transmission with Standard Transmission Lubricant (SAE 80W),

D8DZ-19C547-A (ESP-M2C83-C) lubricant or equivalent.

11. Lower vehicle.
12. Remove fabricated dirt shield and prepare gasket area.
13. Position gasket and shift cover.
14. Install two pilot bolts, then install remaining shift cover retaining bolts.
15. Install transfer case shift lever, shift ball and boot as an assembly and transmission shift lever, shift ball and boot as an assembly.
16. Install dust cover and insulator.
17. Install access cover to floor pan screws.
18. Install the four floor mat screws.
19. Install the four boot area screws.

Cross Member

F-150—F-350 and Bronco

Refer to Fig. 3.

Removal

1. Raise vehicle on hoist.

2. Remove skid plate, if so equipped. Remove heat shield from catalytic converter.
- CAUTION: Use extreme caution when working in the area of the catalytic converter because of the extremely high temperatures generated by the converter.**
3. Remove two nuts connecting upper gusset to frame on both sides of the frame.
 4. Remove nut and bolt assembly connecting gusset to crossmember. Remove gusset on left side.
 5. Remove bolts holding transmission to transmission support plate on crossmember (4x4).
 6. Remove bolts attaching transmission to insulator (4x2).
 7. Raise transmission with a transmission jack.
 8. Remove the nut and bolt assemblies connecting the support plate to crossmember. Remove support plate. Remove right gusset (4x4).
 9. Remove nuts attaching insulator to crossmember. Remove insulator. Remove right gusset (4x2).
 10. Remove nut and bolt assemblies connecting crossmember to frame. Remove crossmember.

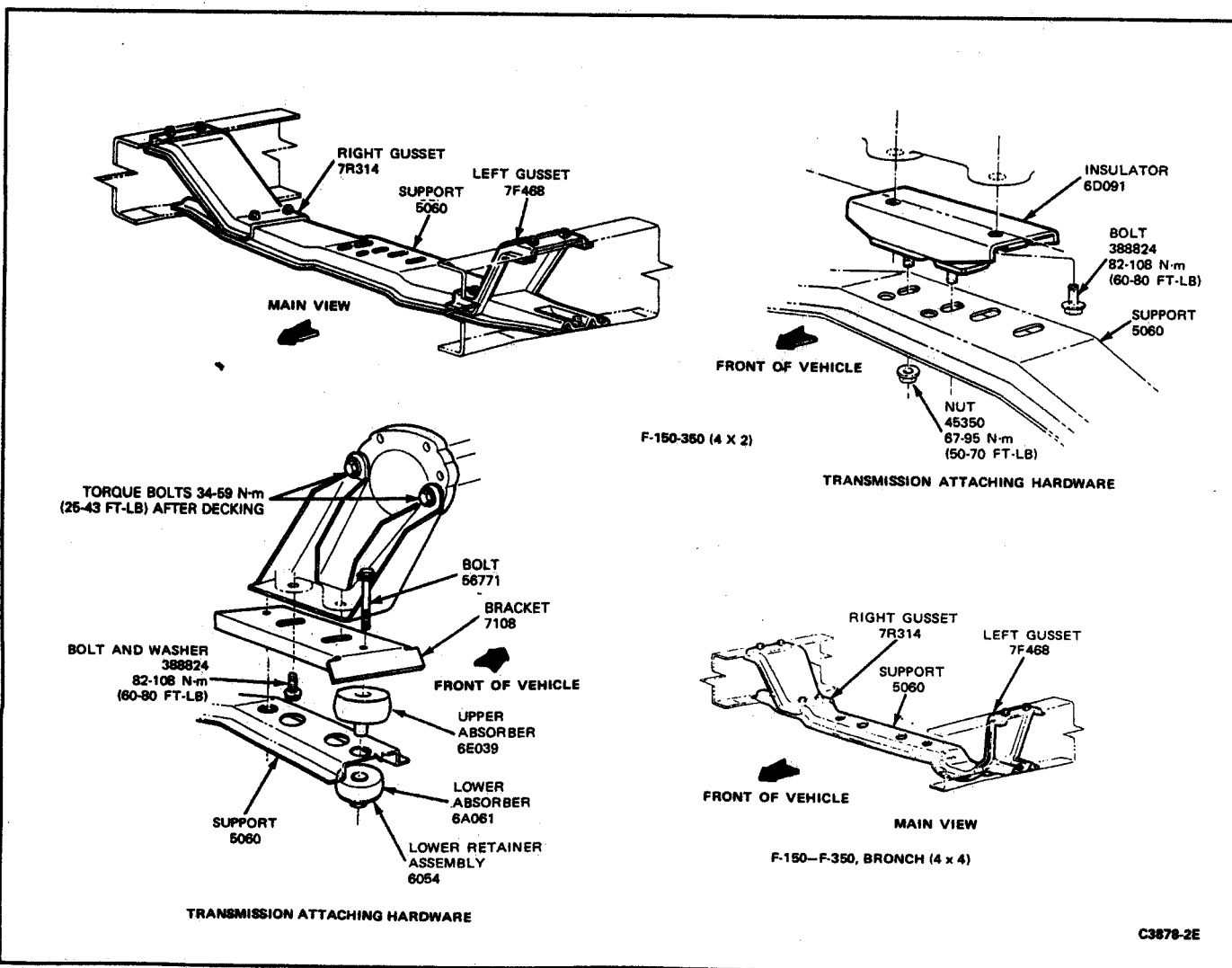


FIG. 3 Crossmember Installation-F-150—F-350, Bronco

Installation

1. Install crossmember and transmission support plate, and position right and left gussets on bolts in frame (4x4).
2. Install crossmember and insulator and position right and left gussets on bolts to frame (4x2).
3. Install nuts on upper gusset to frame bolts and tighten to specification.
4. Install crossmember to frame nut and bolt assembly and tighten to specification.
5. Install nut and bolt assembly connecting gusset to crossmember and tighten to specification.
6. Install nut and bolt assemblies connecting transmission support plate to crossmember and tighten to specification (4x4).
7. Install nuts connecting insulator to crossmember and tighten to specifications (4x2).
8. Lower the transmission.
9. Install bolts connecting transmission support plate to transmission and tighten to specification.
10. Install bolts connecting insulator to transmission and tighten to specifications (4x2).
11. Install skid plate, if so equipped. Install heat shield over catalytic converter. Tighten all nuts and bolts to specification.
12. Lower vehicle.

Shift Lever

NOTE: Remove the shift ball only if the shift ball, boot or lever is to be replaced. If either the ball, boot or lever is not being replaced, remove the ball, boot and lever as an assembly.

Removal

1. Remove the plastic insert from the shift ball. Warm the ball with a heat gun to 60°-82°C (140°-±80°F) knock the ball off the lever with a block of wood and a hammer, taking care not to damage the finish on the shift lever.
2. Remove the rubber boot and floor pan cover.
3. Shift the unit into second gear, remove the lock pin and remove the shift lever from the shifter housing.

Installation

1. Install the shift lever in the shifter housing, making sure that the slot in the lever aligns with the tab in the housing. Install the lock pin.
2. Install the rubber boot and floor pan cover.
3. Warm the ball with a heat gun to 60°-82°C (140°-180°F) and tap the ball on the lever with a 7/16 inch socket and mallet. Install the plastic shift pattern insert.

DISASSEMBLY AND ASSEMBLY

Refer to Fig. 2.

Disassembly

1. Position the transmission assembly in a suitable holding fixture, (Fig. 4). Drain the transmission and shift the unit into second gear before removing the housing assembly.
2. Lock the transmission in two gears; then, remove the U-joint flange and oil seal.

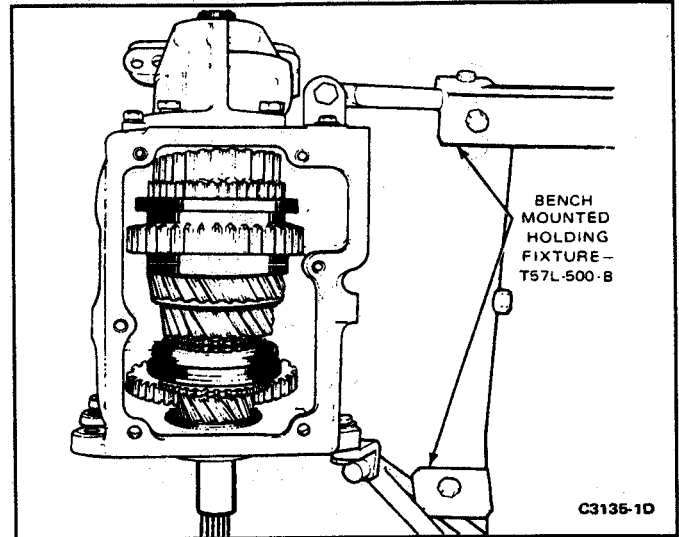


FIG. 4 Transmission in Holding Fixture

3. Remove the speedometer driven gear and bearing assembly.
4. Remove the output shaft bearing retainer (or extension housing).
5. Remove the speedometer drive gear snap ring retainer. Slide the speedometer drive gear off the output shaft.
6. Remove the output shaft bearing snap ring retainers from the output shaft and from the bearing, (Fig. 5). Remove bearing spacer.
7. Install tool, T75L-7025-B, F, H and T84T-7025-B on the output shaft and over the output shaft bearing (Fig. 6). Remove the output shaft bearing.
8. Remove the input shaft bearing retainer. Remove the input shaft bearing snap ring from the input shaft and from the bearing, (Fig. 7).
9. Install tool on the input shaft and over the input shaft bearing. Remove the input shaft bearing.
10. Remove the output shaft assembly from the case (Fig. 8).

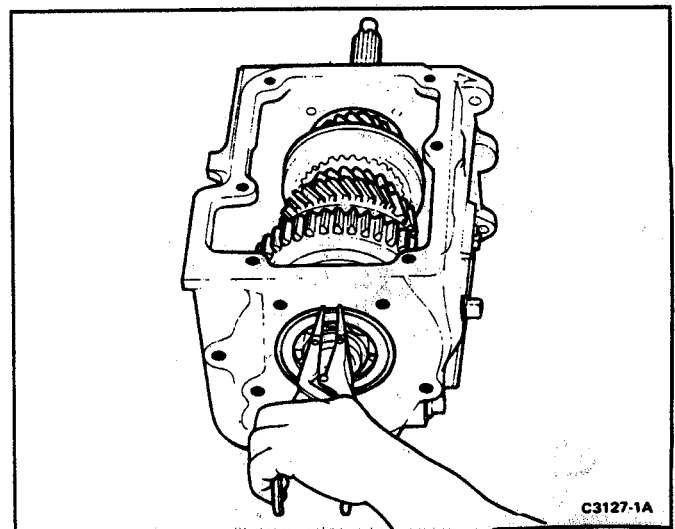


FIG. 5 Removing Output Shaft Bearing Snap Ring

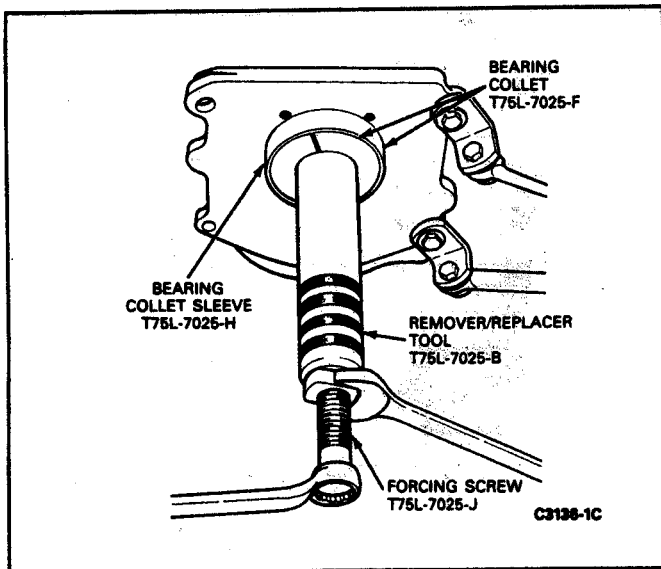


FIG. 6 Removing Output Shaft Bearing

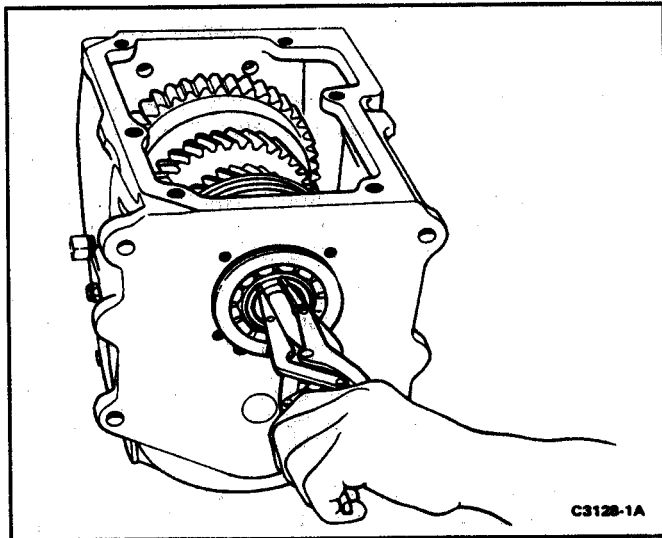


FIG. 7 Removing Input Shaft Bearing Snap Ring

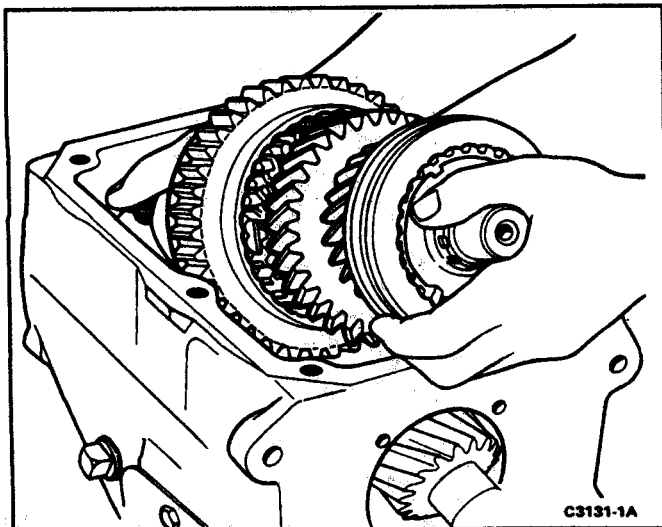


FIG. 8 Removing Output Shaft Assembly

11. Remove the input shaft assembly from the case (Fig. 9). Do not lose the 22 pilot bearing rollers from the inner end of the shaft.
12. Remove the reverse idler gear shaft and the countershaft retainer from the end of the transmission case (Fig. 10).
13. Remove the reverse idler gear shaft, using the tools, T50T-100-A and T50T-7140-C, as shown in Fig. 11.
14. Remove the reverse idler gear from the case.

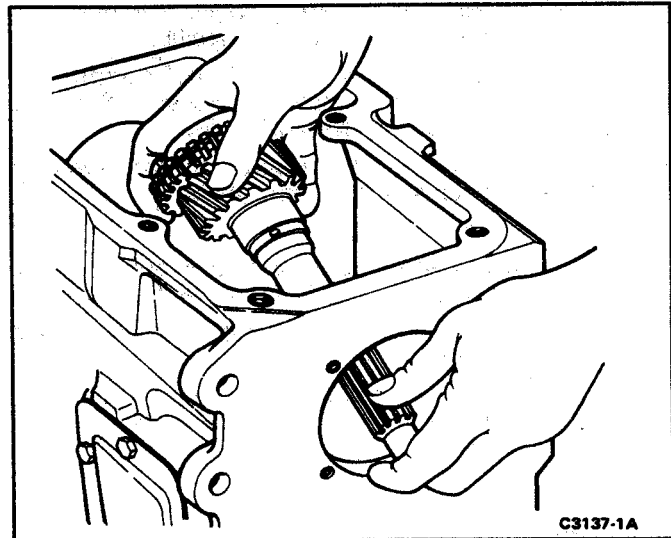


FIG. 9 Removing Input Shaft Assembly

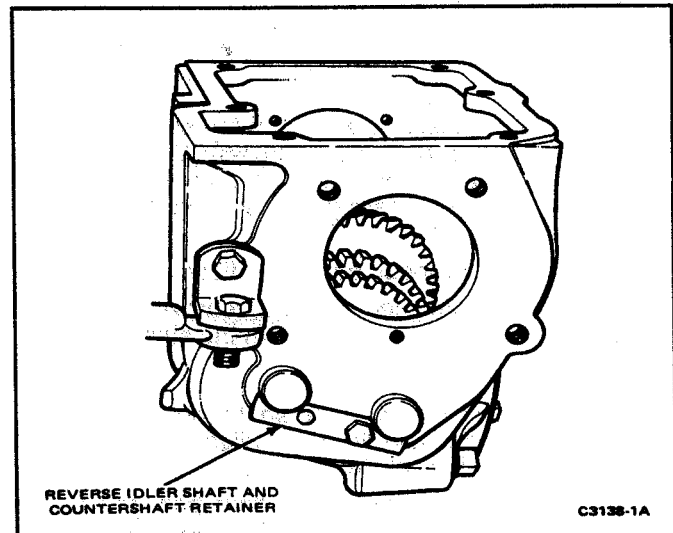


FIG. 10 Reverse Idler Gear Shaft and Countershaft Retainer

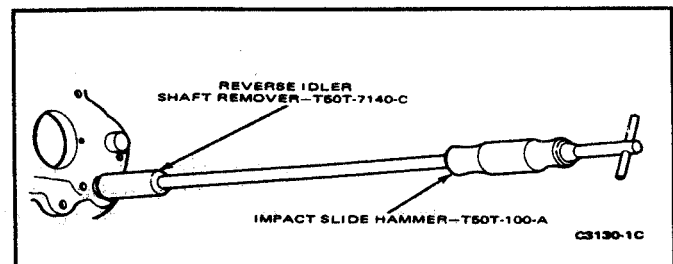


FIG. 11 Removing Reverse Idler Gear Shaft

15. Remove the countershaft with the same tools used to remove the reverse idler gear shaft.
16. Install a suitable dummy shaft tool in the countershaft. Remove the countershaft gear assembly from the case. Guide the countershaft assembly (with the dummy shaft tool installed) out of the case so that the roller bearings and spacers that remain in the countershaft are not lost.

Assembly

NOTE: If a bearing isn't used, be sure that a protector is used over the 3-4 synchronizer to prevent jamming the 4th blocking ring onto the cone seat.

1. Coat all parts, especially the bearings, with specified transmission lubricant to prevent scoring when the transmission is first put into operation.
2. Position the countershaft gear assembly thrust washers in the transmission case.
3. Position the countershaft gear assembly (with dummy shaft tool installed) in the transmission case. **Use care so that no roller bearings are lost, and so that the thrust washers are not moved out of position.**
4. Carefully, drive out the countershaft gear assembly dummy shaft by installing the countershaft from the rear of the transmission case. **Position the slot in the rear of the countershaft so that it can be engaged by the shaft retainer.**
5. Position the reverse idler gear assembly in the transmission case, and install the reverse idler gear shaft. **Position the slot in the rear of the shaft so that it can be engaged by the shaft retainer.**
6. Install the countershaft and reverse idler gear shaft retainer.
7. Load the 22 pilot bearing rollers in the inner end of the input shaft (use petroleum jelly to keep the pilot bearings in position). Position the input shaft assembly in the transmission case and install the blocking ring on the input shaft.
8. Install the output shaft assembly in the transmission case. **Use care so that the pilot bearing rollers are not permitted to drop out of the input shaft.**
9. Install a dummy bearing (Tool T75L-7025-Q) on the transmission input shaft. This tool is necessary to keep the input and output shafts in alignment when installing the output shaft bearing.
10. Assemble the locating snap ring to the outer race of the output shaft bearing in the groove provided.
11. Install the output shaft bearing using the tools, T75L-7025-B, L as shown in Fig. 12.
12. Install the flatwasher against the rearward face of the output shaft bearing. (The properly installed washer will be external to the main body of the transmission.)
13. Install a snap ring at the rearward surface of the washer in the output shaft groove provided.
14. Remove the dummy bearing from the input shaft.
15. Install the input shaft bearing using the tools, T75L-7025-B, K, R, S as shown in Fig. 13 and install the snap ring. Use the thickest select fit snap rings which will fit on the bearing.

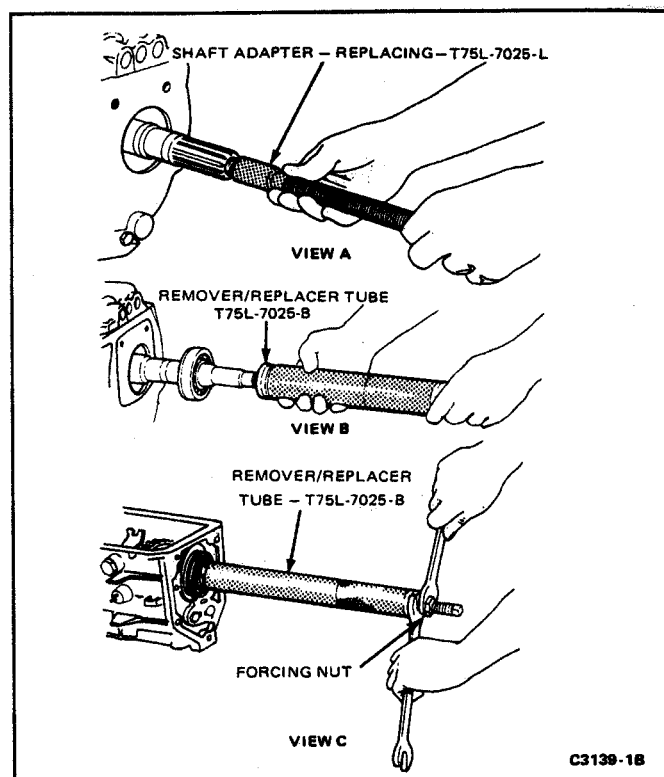


FIG. 12 Installing Output Shaft Bearing

16. Install the input shaft bearing spacer and retainer gasket and retainer. Tighten the bolts to specification.
17. Position the speedometer drive gear (and spacer, if used) on the output shaft over lock ball and install the speedometer drive gear retaining snap ring.
18. Using a new gasket install the output shaft bearing retainer (or extension housing). Tighten the bolts to specification.
19. Lubricate the extension housing bushing and seal and the U-joint flange with Multi-Purpose Long-Life Lubricant, C1AZ-19590-B (ESA-M1C75-B) or equivalent.
20. Install the U-joint flange. Lock the transmission in two gears and tighten the retaining nut to specifications.
21. Install the gear shift housing assembly (with Standard Transmission Lubricant (SAE 80W), and unit shifted into second gear) on the transmission and tighten the cover bolts to specification.
22. Fill the transmission to the proper level with Standard Transmission Lubricant (SAE 80W) D8DZ-19C547-A (ESP-MC83C) or equivalent. Add 1/4 liter (1/2 pint) of lubricant through the speedometer cable hole in the rear transmission extension housing.

Sub-Assemblies

Output Shaft

Refer to Fig. 2

Disassembly

1. Remove the third- and high-speed synchronizer hub snap ring from the output shaft, and slide the third- and high-speed synchronizer assembly and the third-speed gear off the shaft.

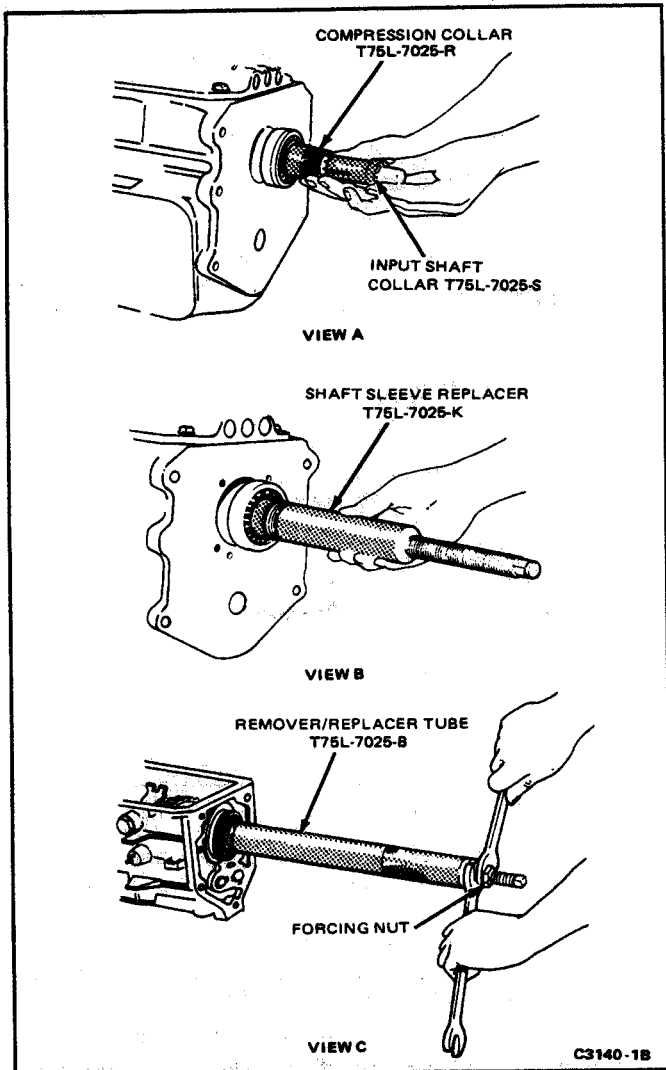


FIG. 13 Installing Input Shaft Bearing

2. Remove the synchronizer sleeve and the inserts from the hub.
3. Before removing the two snap rings from the ends of the hub, check the end play of the second speed gear. There should be 0.127-0.609mm (0.005 to 0.024 inch) of end play.
4. Slide the low and second speed gear off the hub. Be careful not to lose any of the balls, springs, or plates nor the anti-rattle spring and ball (Figs. 14 and 15).
5. Remove the snap ring from behind the synchronizer hub. Pull synchronizer hub from the shaft. Remove the blocking ring.
6. Remove the snap ring from behind the second speed gear and remove the gear and thrust washer from the output shaft (Fig. 16).

Assembly

1. Place output shaft with threaded end up in a soft-jawed vise.
2. Place an output shaft snap ring in the third groove from the threaded end of shaft. Place the recessed side of second speed gear thrust washer over snap ring.

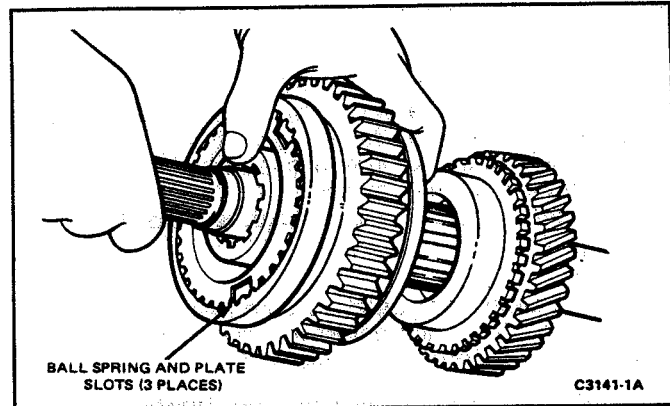


FIG. 14 Removing Second Gear Synchronizer—Assembly

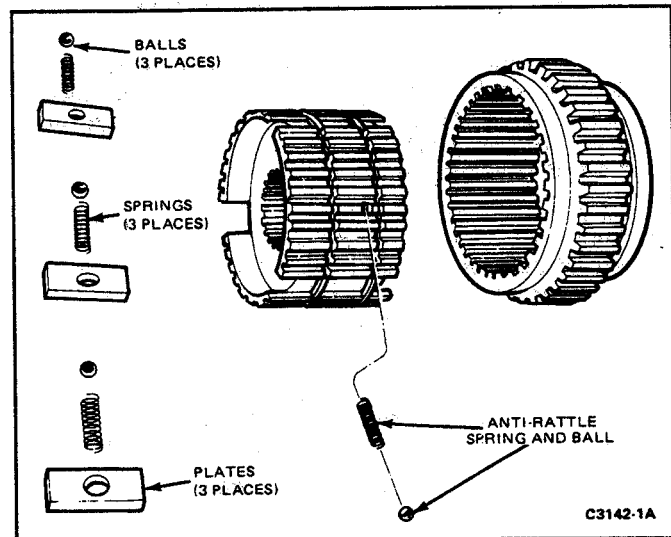


FIG. 15 Second Speed Synchronizer—Disassembled

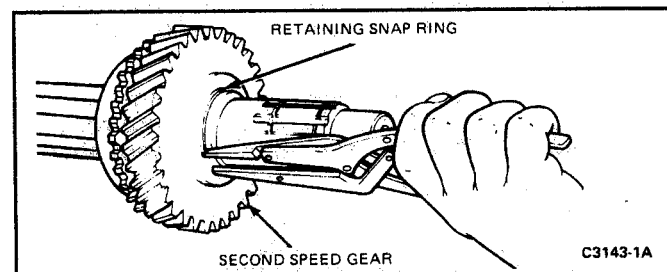


FIG. 16 Removing Second Speed Gear Retaining Snap Ring

3. Place second speed gear against washer and assemble snap ring in groove behind gear.
4. Place blocking ring on second speed gear.
5. Assemble the second speed synchronizer assembly over the splines of main shaft, aligning the three blocking ring cut-outs with shifting plates. The low and second gear shift fork groove should be located to rear of transmission.
6. Place a snap ring in the main shaft groove behind clutch hub.
7. Turn output shaft over and assemble third speed gear against output shaft shoulder.
8. Place blocking ring on third speed gear.

9. Assemble third and high synchronizer assembly over output shaft splines. Align the three blocking ring slots with shifting plates and position the end of the hub which has the long chamfer to the front of the transmission.
10. Place snap ring in output shaft groove in front of third and high synchronizer assembly.
11. Assemble spacer on output shaft.

Countershaft Gear

Refer to Fig. 2.

Disassembly

Remove the dummy shaft, bearing rollers, bearing spacers, and the center spacer from the countershaft gear.

Assembly

1. Slide the long bearing spacer (Fig. 2) into the countershaft gear bore, and insert the dummy shaft in the spacer.
2. Apply a film of petroleum jelly to the countershaft gear bore and install one of the bearing spacers. Position the 22 bearing rollers in the gear bore.
3. Place a spacer in the gear bore.
4. Hold a large thrust washer against the end of the countershaft gear to prevent the rollers from dropping out, and turn the assembly over. Install bearing spacer, 22 rollers and a spacer.

Reverse Idler Gear

Disassembly

Replace the reverse idler gear if the gear or roller bearing is badly worn or if the teeth are chipped or burred. Replace the reverse idler gear shaft if it is excessively worn or scored.

Gear Shift Housing

Refer to Fig. 19.

Disassembly

1. Remove the floor mat or carpet, rubber boot cover and floor pan cover. Remove front seat assembly if necessary.
2. Remove the foam weather pad from the gear shift housing.
3. Shift the unit into second gear and remove the gear shift lever from the transmission. Then, disconnect the back-up lamp switch from the connector and remove the back-up lamp switch from the rear of the gear shift housing.
4. Remove the shift housing tower from the transmission (Fig. 17).

NOTE: After the shift housing tower is removed, inspect all internal transmission components for damage, chips and/or foreign material within the transmission case assembly.

5. Remove the three expansion plugs from the forward end of the shift housing (Fig. 18). Using a pin punch, remove the three lock pins from the shift forks and the three lock (roll) pins from the gear shifter shaft gates.
6. Tap the shifter shaft(s) out of the housing (forward) while holding a shop towel over the poppet ball(s),

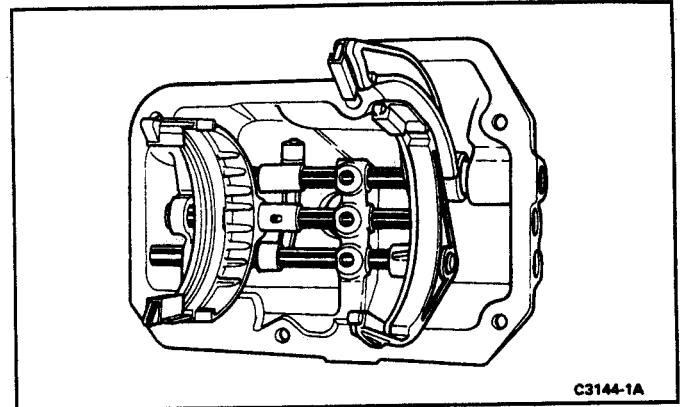


FIG. 17 Shift Housing Removed—Second Gear Position

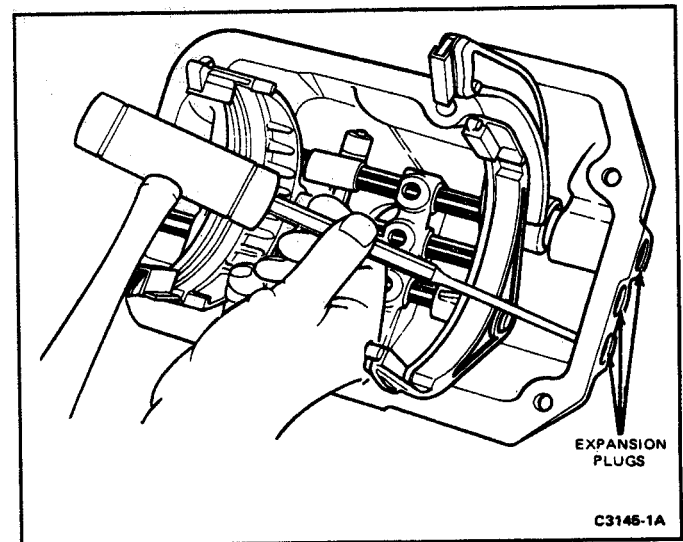


FIG. 18 Removing Expansion Plugs from Shift Housing

(Fig. 19), and spring hole(s) in the housing to prevent loss of spring(s) and/or poppet ball(s).

7. Remove the interlock pin from the middle shift rail (Fig. 19).
8. Remove the shift forks and shift gates.
9. Remove the poppet balls and springs from the housing. Then, remove the interlock plungers from the housing.

Assembly

1. Install the spring and plunger in the reverse gate, press the plunger through the gate and fasten it in place with the clip, if the reverse gate assembly has been disassembled.
2. Place the poppet spring and ball in the reverse shifter shaft hole in the gear shift housing. Insert the shaft part way into the housing. Install the reverse shift fork on the shaft (reverse shifter) then, press down on the poppet ball and spring with a long thin drift and position the reverse shifter ball notch so that it does not slide over the ball.
3. Slide the reverse gate onto the shaft (long end forward), and drive the shaft into the housing until the ball snaps into the groove of the shaft. Install the lock pin that fastens the gate to the shaft.
4. Insert the two interlocking plungers in the pockets between the shifter shaft holes. Place the poppet

spring and ball in the low-and-second shifter shaft hole. Press down on the poppet ball and spring with a long thin drift and insert the shifter shaft part way into the housing.

5. Slide the low-and-second shifter shaft gate onto the shaft, and install the low-and-second shifter fork on the shaft so that the off-set of the fork is toward the rear of the housing. Push the shaft all the way into the housing until the poppet ball snaps into the shaft groove. Then, install the lock pins that fastens the fork and gate to the shaft.
6. Insert the three-four shifter shaft through the center rear hole of the housing. Then, insert the interlock pin into the interlock pin hole in the shifter shaft.
NOTE: Apply a daub of petroleum jelly to hold the pin in position.
7. Apply a coating of petroleum jelly to the interlock plungers and insert them into their respective holes in the housing.
8. Place the poppet spring and ball in the center shifter shaft hole in the housing. Press down on the poppet ball with a long thin drift, and carefully push the shifter shaft into the housing over poppet ball and spring.
9. Position the third-fourth shift gate onto the shifter shaft. The spring loaded-ball tang should be installed facing rear of transmission.

NOTE: It is extremely important that the shift gate be installed on the shifter shaft with the long flat "tang" end of the gate area facing forward of the gear shift housing. To insure proper installation, measure the two flat "tang" of the shift gate, note the longer dimension 18.25mm (23/32 inch) and

apply a daub of bright paint. This tang should be installed facing forward on the shifter shaft.

10. Position the three-four shifter fork on the shifter shaft so that the lockpin hole in the shifter fork is toward the rear of the housing. Push the shifter shaft into the housing until the poppet ball seats into the second detent (neutral). Install the lock pins attaching the shifter fork and shifter gate to the shifter rail.
NOTE: Install the shifter gate lock pin so that the pin is flush with the bottom of the notch in the shifter gate.
11. Install new expansion plugs in front and rear of transmission housing.
12. Shift the gear shift housing into the "second gear" position. Shift the transmission gears into the "second gear" position. Install the back-up lamp switch and connect the wiring. Then, place the transmission gear shift housing onto the transmission.
13. Apply Pipe Sealant with Teflon D8AZ-19554-A (ESG-M4G194-A and ESR-M18P7-A) or equivalent to the six shift gear housing-to-transmission case attaching bolts. Tighten the bolts to 24-27 N·m (17-20 ft-lb).
14. Position the foam weather pad on the gear shift housing. Install the gear shift lever. Install cab floor pan cover, rubber boot and floor mat or carpet. Install front seat.
15. Fill transmission with Standard Transmission Lubricant (SAE 80W), D8AZ-19C547-A (ESP-M2C83-C) or equivalent, ADD 1/4 liter (1/2 pint) of lubricant through the speedometer cable hole in the rear transmission retainer.

SPECIFICATIONS

SPECIAL SERVICE TOOLS

Number	Description	Application
T50T-100-A	Impact Slide Hammer — 2-1/2 Lbs.	Universal
T57L-500-B	Bench Mounted Holding Fixture	Universal
T00L-1175-AC	Seal Remover	Universal — Use with Slide Hammer
T75L-4201-A	Clutch Housing Alignment Adapter	Use for Right Angle Measurements
T75L-4201-B	Clutch Housing Alignment Adapter	Universal
D78P-4201-B	Dial Indicator with Base	Universal
T00L-4201-C	Dial Indicator with Bracketry	Universal
T75L-6392-A	Clutch Housing Alignment Tool	Universal
D79L-7000-A	Retaining Ring Pliers	Universal
T72J-7025	Mainshaft Bearing Cone Replacer	0.921 Inch Inside Diameter
T71P-7025-A	Output Shaft Bearing Replacer	1.063 Inch Inside Diameter
T75L-7025-B	Remover/Replacer Tube	Warner T-18 Transmission — Output Shaft Bearings
T75L-7025-F	Bearing Collet	Warner T-18 Transmission
T75L-7025-H	Bearing Collet Sleeve	Warner T-18 Transmission
T84T-7025-B	Forcing Screw	Universal — Use with Remover/Replacer Tube
T75L-7025-K	Shaft Sleeve Replacer	Use with Compression Collar and Input Shaft Collet
T75L-7025-L	Shaft Adapter — Replacing	Use with Remover/Replacer Tube
T77L-7025-L	Manual Transmission Bearing Set	Universal
T75L-7025-Q	Dummy Bearing	Warner T-18 Transmission
T75L-7025-R	Compression Collar	Warner T-18 — Use with Shaft Sleeve Replacer and Input Shaft
T75L-7025-S	Impact Shaft Collet	Warner T-18 — Use with Shaft Sleeve Replacer and Compression Collar
T50T-7140-C	Reverse Idler Shaft Remover	Use with Slide Hammer

CC4862-2C

APPROXIMATE REFILL CAPACITY — WARNER T-18

Transmission Type and Make	Approximate Capacity		
	U.S. (Pints)	Imperial (Pints)	Liters
Warner T-18 Four-Speed (D8DZ-19C547-A [ESP-M2C83-C] or equivalent)	7.0	5.5	3.3

CC3593-2D

TORQUE SPECIFICATIONS — WARNER T18 — TRANSMISSION

Description	Size	Torque Limits	
		(ft-lbs)	N-m
Back-Up Light Switch	9/16-18	15-25	20-47
Clutch Housing to Transmission Mounting Bolts	7/16-14	35-50	47-67
Case Cover	3/8-16	25-35	34-47
Countershaft Rear Retainer	3/8-16	25-35	34-47
Drain Plug	3/4-14	25-40	34-54
Filler Plug	3/4-14	25-40	34-54
Output Shaft Flange Nut	3/4-20	75-110	102-149
Mainshaft Rear Retainer	3/8-16	25-35	34-47
	1/2-13	40-50	54-67
P.T.O. Cover Bolt	3/8-16	25-35	34-47
Reverse Idler Shaft/Countershaft Locking Bolt	3/8-16	25-35	34-47
Front Bearing Retainer to Case	5/16-18	10-15	14-20
Clutch Housing to Engine Block	7/16-14	40-50	54-67

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