

SECTION : 308-03 Manual Transmission — TR6060

VEHICLE APPLICATION : 2008.0 Falcon

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SPECIFICATIONS

General Specifications

Gear Ratios

	XR6 Sedan I6 Ute and XR6 Ute	All Turbo and V8 (including FPV F6,GT)
First	3.358	2.976
Second	2.066	1.783
Third	1.349	1.302
Fourth	1.000	1.000
Fifth	0.709	0.709
Sixth	0.567	0.554
Reverse	3.276	2.903

Lubricant and Sealant Specifications

Description	Specification
Premium Long-Life Grease, XG-1-C, K or T	ESA-M1C75-B
Threadlock and Sealer E0AZ-19554-AA	WSKM2G351-A5
Black Non-Acid Cure Silicone Rubber E7TZ-19562-A	ESL-M4G273-A
Pipe Sealant with Teflon® D8AZ-19554-A	ESR-M18P7-A
Preload	
Input/output shaft end-float	0.0 mm - 0.05 mm (0 - 0.002in)
Countershaft cluster gear end-float	0.0 mm - 0.13 mm (0 - 0.005in)
Fluid	
DEXRON III® (ATF) Transmission Fluid XT-2-QDX	DEXRON III®
Capacity - 6 cyl	3.85 litres
- 8 cyl	
Synchronizer	
Synchronizer blocking ring to conical face runout on forward gears	0.38 mm (0.015in)
Synchronizer blocking ring to conical face runout on Reverse gear	0.75 mm (0.030in)



SPECIFICATIONS (Continued)

Torque Specifications

Description	Nm
Clutch housing-to-engine bolts I6 Upper (M12)	60
Clutch housing-to-engine bolts I6 Lower (M10)	40
Clutch housing-to-engine bolts V8 (M10)	50
Clutch housing-to-front adaptor bolts (M10)	35
Transmission main case-to-front adapter housing bolts (M10)	47
Extension housing-to-main case bolts (M10)	49
Crossmember-to-frame bolts (M10)	47
Crossmember-to-transmission isolator bolts (M8)	58
Transmission isolator-to-transmission bolts (M8)	17
Gearshift boot lower to floor nuts	10
Lower gearshift lever nut	35
Upper gearshift lever nut & bolt	35
Shift detent	27
Guide plate bolts	16
Shift lever guide bolts	31
Reverse lockout solenoid bolt	18
Drain plug	27
Reversing lamp switch	27
Fill plug (Note: this should not need to be removed at any time)	27
Reverse idler shaft bracket bolts	12
Shift detent cover (top cover) bolts	15
Adapter plate plug	27
CSC Mounting Bolts	12



DESCRIPTION AND OPERATION

NOTES, CAUTIONS & WARNINGS

Appropriate service methods and proper repair procedure are essential for the safe, reliable operation of all motor vehicles as well as the personal safety of the individual doing the work.


This Manual provides general directions for accomplishing service and repair work with tested, effective techniques. Following them will help assure reliability.


There are numerous variations in procedures, techniques, tools and parts for servicing vehicles, as well as in the skill of the individual doing the work.


This Manual cannot possibly anticipate all such variations and provide advice or cautions as to each. Accordingly, anyone who departs from the instructions provided in this Manual must first establish that he compromises neither his personal safety nor the vehicle integrity by his choice of methods, tools or parts.


As you read through the procedures, you will come across NOTES, CAUTIONS, and WARNINGS. Each one is there for a specific purpose. NOTES give you added information that will help you to complete a particular procedure. CAUTIONS are given to prevent you from making an error that could damage the vehicle. WARNINGS remind you to be especially careful in those areas where carelessness can cause personal injury. The following list contains some general WARNING that you should follow when you work on a vehicle.


 **WARNING:** Always wear safety glasses for eye protection.


 **WARNING:** Use safety stands whenever a procedure requires you to be under the vehicle with the vehicle jacked up.


 **WARNING:** Be sure that the ignition switch is always in the OFF position, unless otherwise required by the procedure.


 **WARNING:** Set the parking brake when working on the vehicle. It should be in REVERSE (engine OFF) or NEUTRAL (engine ON) unless instructed otherwise for a specific operation. Place wood blocks (4"X4" or larger) to the front and rear surfaces of the tyres to provide further restraint from inadvertent vehicle movement.


 **WARNING:** Operate the engine only in a well-ventilated area to avoid the danger of carbon monoxide.


 **WARNING:** Keep yourself and your clothing away from the moving parts, when the engine is running, especially the fan and drive belts.

 **WARNING:** To prevent serious burns, avoid contact with hot metal parts such as the radiator, exhaust manifold tail pipe, catalytic converter and muffler. Do not smoke while working on the vehicle.

 **WARNING:** To avoid injury, always remove rings, watches, loose hanging jewelry, and loose clothing before beginning to work on a vehicle. Tie long hair securely behind the head.

 **WARNING:** Keep hands and other objects clear of the radiator fan blades, Electric cooling fans can start to operate at any time by an increase in under hood temperatures, even though the ignition is in the OFF position. Therefore, care should be taken to ensure that the electric cooling fan is completely disconnected when working under the hood.

 **WARNING:** Disconnect the negative battery ground cable before using any electric welding equipment.

 **WARNING:** Ford Motor Company does not endorse the use of air tools for maintenance of this manual transmission. The photographs in this chapter were supplied by the transmission manufacturer and are for demonstration purposes only.



DESCRIPTION AND OPERATION (Continued)

DESCRIPTION AND OPERATION (Continued)

ITEM	QTY.	DESCRIPTION	ITEM	QTY.	DESCRIPTION
1	2	MAGNET	43	1	BEARING TAPERED ROLLER CUP
2	4	DOWELL PIN	44	1	BEARING TAPERED ROLLER CONE
3	2	BEARING LINEAL-RAIL SELECT	45	1	REVERSE GEAR BEARING NEEDLE
4	1	ROLL PIN	46	1	6th. GEAR BEARING NEEDLE
5	1	5th. GEAR BEARING NEEDLE	47	1	REVERSE IDLER GEAR BEARING ROLLER
6	2	PIN - VENT DOWEL	48	5	SNAP RING
7	2	DRAIN & FILLER PLUG	49	1	SOLENOID REVERSE, SNAP RING
8	1	CONNECTOR VENT BODY	50	1	SNAP RING
9	2	2nd. & 3rd. GEAR BEARING NEEDLE	51	1	SNAP RING
10	1	BRG TAPERED ROLLER M.S. CONE	52	1	SNAP RING
11	1	BRG TAPERED ROLLER M.S. CUP	53	1	5th. & 6th. RING RETAINER
12	1	BRG TAPERED ROLLER M.D. CUP	54	1	RETUR REVERSE SPRING.
13	1	BRG TAPERED ROLLER M.D. CONE	55	27	BOLT, CLUTCH HOUSING
14	1	5th. RETAINING SINCRO SNAP RING.	56	2	SHIFT GUIDE PLATE, BOLT
15	1	3rd. HUB SNAP RING	57	2	INTERLOCK, BOLT
16	1	SNAP RING	58	2	CSC BOLT
17	1	SWITCH BACKUP	59	2	WASHER, THRUST
18	1	REVERSE LOCKOUT O'RING	60	2	SPACER, WASHER
19	1	HEAD LOCK BOLT M8X20 HEX	61	8	1st.- 2nd., 3rd.-4th., 5th.-6th.& REV. FORK PAD
20	8	BOLT	62	1	SHIFT FORK, PAD
21	4	ROLL PIN	63	1	SHIFT SELECTOR ASS'Y
22	A/R	BEARING SHIM SELECTIVE C.S.	64	1	REAR LEVER OFFSET
23	1	CONE BEARING CLUSTER GEAR	65	1	SHIFT DETENT ASS'Y
24	1	RACE BEARING CLUSTER GEAR	66	1	REVERSE GEAR DRIVEN
25	1	SELECTOR ARM BUSHING	67	1	REVERSE GEAR, SNAP RING
26	1	INTERLOCK	68	1	BOLT
27	1	SEAL OIL SHIPMENT	69	1	WASHER
28	A/R	BEARING SHIM SELECTIVE M.S.	70	1	OIL SEAL MAIN SHAFT
29	1	SELECTOR SHAFT PIN	71	1	RETAINER BEARING, SEAL OIL
30	1	2nd. BEARING SPACER	72	1	CLIP
31	1	REVERSE IDLER, SHAFT	73	1	CLIP SWITCH ASSEMBLY
32	1	REVERSE IDLER, GEAR	74	1	CONCENTRIC SLAVE CYLINDER
33	1	BODY SHIFT SELECTOR	75	1	BRACKET
34	1	LEVER-OFFSET REAR	76	2	BUSHING ROLLER DETENT
35	1	REVERSE BIAS BUSHING	77	1	SPRING SHIFT DETENT
36	1	REVERSE RAIL SHIFT SPACER	78	1	ROLLER DETENT
37	3	TOP SHIFT RAIL, BUSHING	79	1	ROLLER DETENT BOLT
38	1	EXTENSION BUSHING	80	2	CLIP
39	1	1st. GEAR BEARING NEEDLE	81	1	REVERSE CAM
40	1	REVERSE GEAR BEARING NEEDLE	82	1	COVER
41	1	6th. GEAR BEARING NEEDLE	83	1	WASHER, THRUST
42	1	REVERSE IDLER GEAR BEARING ROLLER	84	1	CASE, TRANSMISSION
			85	2	BUSHING SHIFTER REVERSE



DESCRIPTION AND OPERATION (Continued)

ITEM	QTY.	DESCRIPTION
86	1	SPLIT WASHER SNAP RING
87	2	1st. SPLIT WASHER
88	2	TRIPPLE CONE SYSTEM 89MM (1ST-2ND)
89	3	5th.-6th. & REVERSE DOUBLE CONE SYST.
90	6	5th.-6th. & REVERSE STRUT
91	1	RAIL REVERSE SHIFT
92	3	BOLT-SHOULDER, REV IDLER SHAFT BRAC.
93	1	REVERSE GEAR ASS'Y
94	1	BRACKET, REVERSE IDLER SHAFT
95	2	5th.-6th. & REVERSE SYNCHRONIZE ASS'Y
96	1	1st.- 2nd. SYNCHRO HUB (OPTIONAL)
97	2	SPLIT WASHER
98	1	SPLIT WASHER SNAP RING
99	1	3rd. & 4th. GEAR SHIFT FORK
100	1	5th.- 6th. REV SYNCHRO HUB
101	1	INSERT RETAINER
102	1	5th. & 6th. SHIFT FORK
103	1	REVERSE SHIFT FORK
104	2	3rd. - 4th. DOUBLE CONE SYSTEM 89MM
105	1	1st. GEAR SPEED ASS'Y
106	1	5th. & 6th. LEVER SHIFT
107	1	5th. & 6th. LEVER W/BUSHING ASS'Y
108	1	SOLENOID REVERSE LOCKOUT
109	2	1st.-2nd. & 3rd.-4th. SYNCHRONIZER ASS'Y
110	2	1st.-2nd. & 3rd.-4th. SYNCHRONIZER SLEEVE
110	2	1st.-2nd. & 3rd.-4th. SYNCHRO. SLEEVE
111	2	5th.- 6th., & REVERSE SYNCHRO. SLEEVE
112	2	1st.-2nd. & 3rd.-4th. SYNCHRONIZER HUB
113	1	5th. & 6th. RAIL SHIFT
114	1	SOLENOID REVERSE SPRING
115	1	BEARING
116	1	PLATE DETENT & GUIDE
117	6	1st.- 2nd. & 3rd.- 4th. STRUT
118	1	ASSEMBLY CONTROL LEVER & HOUSING
119	1	1st. & 2nd. GEAR SHIFT FORK
120	1	3rd. SPACER BEARING

ITEM	QTY.	DESCRIPTION
121	1	5th. SPACER BEARING
122	1	6th. SPACER BEARING
123	1	HOUSING REVERSE LOCKOUT
124	1	REVERSE SHIFT BIAS PLUNGER
125	1	REVERSE BIAS PLUNGER ASS'Y
126	1	REVERSE LOCKOUT ASS'Y
127	1	OFFSET LEVER
110	2	1st.-2nd. & 3rd.-4th. SYNCHRO. SLEEVE
111	2	5th.- 6th., & REVERSE SYNCHRO. SLEEVE
112	2	1st.-2nd. & 3rd.-4th. SYNCHRONIZER HUB
113	1	5th. & 6th. RAIL SHIFT
114	1	SOLENOID REVERSE SPRING
115	1	BEARING
116	1	PLATE DETENT & GUIDE
117	6	1st.- 2nd. & 3rd.- 4th. STRUT
118	1	ASSEMBLY CONTROL LEVER & HOUSING
119	1	1st. & 2nd. GEAR SHIFT FORK
120	1	3rd. SPACER BEARING
121	1	5th. SPACER BEARING
122	1	6th. SPACER BEARING
123	1	HOUSING REVERSE LOCKOUT
124	1	REVERSE SHIFT BIAS PLUNGER
125	1	REVERSE BIAS PLUNGER ASS'Y
126	1	REVERSE LOCKOUT ASS'Y
127	1	OFFSET LEVER
130	1	PLUG EXPANSIVE
131	1	COUNTER SHAFT
132	1	CLUTCH HOUSING
133	1	CLUTCH LINE ASSY
134	1	SUB-EXTENSION ASS'Y
135	1	EXTENSION
136	1	EXTENSION ASS'Y
137	1	FRONT ADAPTER ASSEMBLY
138	1	FRONT ADAPTER
139	1	INPUT, SHAFT
140	1	MAIN SHAFT
141	1	2nd. SPEED GEAR ASS'Y
142	1	3rd. GEAR SPEED ASS'Y
143	1	5th. SPEED GEAR MAIN SHAFT
144	1	5th. SPEED GEAR ASS'Y C.S.
145	1	6th. SPEED GEAR ASS'Y C.S.
146	1	6th. SPEED GEAR MAIN SHAFT
147	1	SHAFT-TOP SHIFTER
148	1	BALL



DESCRIPTION AND OPERATION (Continued)

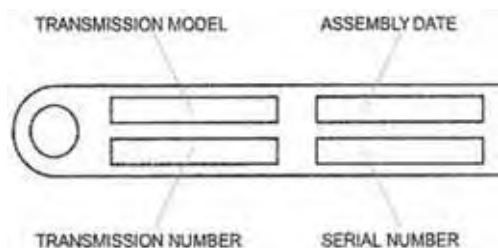
ITEM	QTY.	DESCRIPTION
149	1	SENSOR BOLT.
150	1	SENSOR SPEEDOMETER
151	1	SPEEDOMETER GEAR
152	1	CLIP
153	1	ASSY PIPE

Specifications

The transmissions series TR-6060 have six forward speeds and one reverse, of advanced design that offers to you, the most efficient relation of capacity of partorsion-weight, that any other transmissions of 6 speeds within its rank.

IMPORTANT

All **TREMEC** transmissions **TR-6060** are identified by the model and serial number, and date. This information is stamped on the transmission identification tag and affixed to the case.



MODEL GEAR RATIOS							
TR-6060	1st.	2nd.	3rd.	4th.	5th.	6th.	REV.
TUET6840	2.976	1.783	1.302	1	0.709	0.554	2.903
TUET6844	2.976	1.783	1.302	1	0.709	0.554	2.903
TUET7270	3.356	2.066	1.349	1	0.709	0.567	3.276
TUET7650	3.356	2.066	1.349	1	0.709	0.567	3.276

Proper lubrication procedures are the key to a good all around maintenance Program. If the oil is not doing its job, or if the oil level is ignored, all the maintenance procedures in the world are not going to keep the transmission running or assure long transmission life.

TREMEC Transmissions are designed so that the internal parts operate in an oil circulating bath by the motion of the gears and shafts.

Thus, all parts are amply lubricated if these procedures are closely followed:

- Maintain oil level. Inspect regularly.
- Change oil regularly.
- Use the correct grade and type of oil.
- Buy from a reputable dealer.



DESCRIPTION AND OPERATION (Continued)

OIL SPECIFICATIONS			
MODEL TRANSMISSION	API SPECIFICATION	TREMEC SPECIFICATION	OIL CAPACITY
TR-6060	Dexron III	1300-244-006	3.85 Lt.

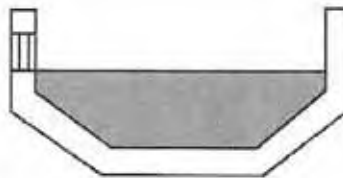
CHANGE AND INSPECTION OF THE LUBRICANT

Use oil 1300-244-006 specification. Additives and friction modifiers are not recommended for use in transmission TR-6060.

PROPER OIL LEVEL

Make sure oil is level with the filler opening. Because you can reach oil with your finger does not mean oil is at proper level.

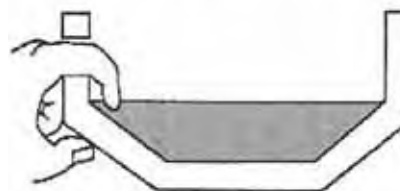
PROPER OIL LEVEL



DRAINING OIL

Drain transmission while oil is warm. To drain oil remove the drain plug at case bottom. Clean the drain plug before re-installing.

IMPROPER OIL LEVEL



OIL CHANGE AND REFILLING

Clean case around filler plug and remove plug from case side. Fill the transmission to the level of the filler opening. The exact amount of oil depends on the transmission inclination and model. Do not over fill this causes oil to be forced out of the case and cause a deficient lubrication. When adding oil, types and brands of oil should not be mixed because of possible incompatibility.

TORQUE RECOMMENDATIONS

Correct torque application is important to assure long transmission life. Over or under tightening of fasteners can result in a loose installation and, in many instances, can eventually cause damage to the transmission. Use a torque wrench to obtain recommended torque ratings. Do not torque capscrews dry. Apply teflon to threads of all capscrews before installing definitive.

TORQUE RECOMMENDATIONS			
QTY	DESCRIPTION	TORQUE	
		Nm	Lbs/Ft
1	SHIFT DETENT ASS'Y (M20X 1.5 6g THD)	34-37	25-35
1	ROLLER DETENT BOLT	19-24	14-17
1	SENSOR BOLT	15-20	11-15
1	BACK UP LIGHT SWITCH	20-34	15-25
2	CSC BOLT	6-12	4-9
2	FILL / DRAIN PLUG	20-34	15-25
2	SHIFT GUIDE PLATE BOLT	16-27	12-20



DESCRIPTION AND OPERATION (Continued)

TORQUE RECOMENDATIONS			
QTY	DESCRIPTION	TORQUE	
		Nm	Lbs/Ft
2	INTERLOCK BOLT	20-34	15-25
3	BRACKET RE. IDLER BOLT (COAT WITH LOCTITE # 242)	26-34	19-25
8	CONTROL LEVER AND HOUSING ASS'Y	15-24	11-17
8	EXTENSION BOLT ASS'Y	43-54	32-40
8	CLUTCH HOUSING ASS'Y	43-54	32-40
11	PLATE ADAPTER ASS'Y	30-40	22-30

END PLAY GEAR		
GEAR	(In)	(mm)
1st.	0.004 – 0.023	0.584 – 0.102
2nd.	0.004 – 0.027	0.686 – 0.102
3rd.	0.004 – 0.022	0.559 – 0.102
5th.	0.004 – 0.030	0.762 – 0.102
6th.	0.004 – 0.028	0.711 – 0.102
REV.	0.004 – 0.031	0.787 – 0.102
IDLER	0.008 – 0.023	0.584 – 0.223
INPUT SHAFT	0.0005 – 0.0035	0.013 – 0.089
COUNTER SHAFT	0.0005 – 0.0035	0.013 – 0.089

PREVENTIVE MAINTENANCE**CLUTCH HOUSING MOUNTING**

a) Check all capscrews of clutch housing flange for looseness.

LUBRICANT

- a) Change at specified service intervals.
 b) Use only the types and grades as recommended. See LUBRICATION.

FILLER AND DRAIN PLUGS

a) Remove plug filler and check level of lubricant at specified intervals. Tighten filler and drain plugs securely.

UNIVERSAL JOINT COMPANION FLAGE OR YOKE NUT

Check for tightness. Tighten to recommended torque rating.

MAINSHAFT REAR BEARING COVER

Check oil seal for wear.

CAPSCREW

a) Check all capscrew, especially those turret, the clutch housing and cover rear, for looseness which can cause oil leakage.

See TORQUE RECOMMENDATIONS.

GEAR SHIFT LEVER

a) Check for looseness and free play in housing.

GEAR SHIFT LEVER HOUSING ASSEMBLY

- a) Remove the gear shift housing assembly from transmission.
 b) Check gear shift lever bottom end for wear of slots. Also check finger assembly for wear.

SPLINES ON OUTPUT SHAFT

Check for wear from movement and chucking action of the universal joint companion flange or yoke.

PRECAUTIONS

It is assumed in the detailed assembly instructions that the lubricant has been drained from the transmission, the necessary linkage disconnected and the transmission has been removed from vehicle chassis.

Removal of the gear shift lever housing assembly is included in the detailed instructions (Disassembly and Reassembly-Shifting Controls); however, this assembly must be detached from shift bar housing before transmission can be removed.

Follow closely each procedure in the detailed instructions, making use of the text, illustrations, and photographs provided.

BEARINGS

Carefully wash and relubricate all reuseable bearing as removed and protectively wrapped until ready for use. Remove bearings planned to be reused with pullers designed for this purpose.

ASSEMBLIES

When disassembling the various assemblies, such as the mainshaft, countershafts, and shift bar housing, lay all parts on a clean bench in the same orden as removed. This procedure simplifies reassembly and reduces the possibility of losing parts.

SNAP RINGS

Remove snap rings with pliers designed for this purpose. Snap rings removed in this manner can be reused, if they are not sprung or loose.

CLEANLINESS

Provide a clean place to work. It is important that no dirt or foreign material enters the unit during repairs. Dirt is an abrasive and can damage bearings. It is always good practice to clean the outside of the unit before starting the planned disassembly.



DESCRIPTION AND OPERATION (Continued)

WHEN USING TOOLS TO MOVE PARTS

Always apply force to shafts, housings, etc, with restraint. Movement of some parts is restricted. Never apply force to the part being driven after it stops solidly. The use of soft hammers, bar, and mauls for all disassembly work is recommended.

INSPECTION LIST

Before reassembling the transmission, check each part carefully for abnormal or excessive wear and damage to determine reuse or replacement. When replacement is necessary, use only genuine **TREMEC** Transmission parts to assure continued performance and extended life from your unit.

Since the cost of a new part is generally a small fraction of the total cost of downtime and labor, avoid reusing a questionable part which could lead to additional repairs and expense soon after reassembly. To aid in determining the reuse or replacement of any transmission part, consideration should also be given to the unit's history, mileage, application, etc.

Recommended inspection procedures are provided in the following check list.

BEARINGS

1. Wash all bearings in clean solvent. Check balls, rollers, and raceways for pitting, discoloration, and spalled areas. Replace bearings that are pitted, discolored, spalled, or damaged during disassembly.
2. Lubricate bearings that are not pitted, discolored, or spalled and check for axial and radial clearances.
3. Replace bearings with excessive clearances.
4. Check bearing fit. Bearing inner races should be tight to shaft; outer races slightly loose in case bore. If bearing spins freely in bore, case should be replaced.

GEARS

1. Check gear teeth for frosting and pitting. Frosting of gear teeth faces present no threat of transmission failure. Often in continued operation of the unit, frosted gears "heal" and do not progress to the pitting stage. In most cases, gears with light to moderate pitted teeth have considerable gear life remaining and can be reused, but gears with advanced stage pitting should be replaced.
2. Check for gears with clutching teeth abnormally worn, tapered, or reduced in length from clashing in shifting. Replace gear found in any of these conditions.
3. Check axial clearance of gear. Where excessive clearance is found, check gear snap ring, split washer, clutch hub, and gear hub for excessive wear. The sides of the splines replace the specific shaft affected.

SPLINES

1. Check splines on all shafts for abnormal wear if sliding clutch gears, companion flange, or clutch hub have worn into.

WASHERS

1. Check surfaces of all washers. Washers scored or reduced in thickness should be replaced.

REVERSE IDLER GEAR ASSEMBLIES

1. Check for excessive wear from action of roller bearing.

ASSEMBLIES CONTROL TURRET

1. When disassembled the turret, check turret, revise si hay desgaste en el extremo bajo de la palanca, en el conjunto del dedo accionador de los cambios, reemplace la parte con desgaste excesivo.

BEARING CUP

1. Check si las tazas tienen desgaste, reemplace las tazas que estén dañadas.

OIL SEALS

1. Check oil in input shaft and rear bearing cover. If sealing action of lip has been destroyed, replace seal.

SYNCHRONIZER ASSEMBLY

1. Check synchronizer for burrs, uneven and excessive wear at contact surface, and metal particles.
2. Check blocker insert for excessive wear or looseness.
3. Check synchronizer contact surfaces on the synchronizer rings for wear.

Make sure that case interiors and housings are clean. It is important that dirt and other foreign materials are kept out of the transmission during reassembly. Dirt is an abrasive and can damage polished surfaces of bearing and washers. Use certain precautions, as listed below, during reassembly.

GASKET ELIMINATOR

Use gasket eliminator in all the transmission, the omission of any bead of silicone rubber to the sealing surface, can cause result in oil leakage Use only products approved by TREMEC.

CAPSCREWS

To prevent oil leakage and loosening, use teflón sealant thread all capscrews. For recommended torque ratings, see

TORQUE RECOMMENDATIONS. ASSEMBLY

See the illustrations provided in the detailed disassembly instructions as a guide to reassembly.



DESCRIPTION AND OPERATION (Continued)**INITIAL LUBRICATION**

Coat all thrust washers, synchronizer, and bearings with transmission lubricant during reassembly to prevent damage during initial start up.

AXIAL CLEARANCES

Maintain original axial clearances for mainshaft gears. See specification axial clearances.

BEARINGS

Using a sleeve type driver that contacts the bearing inner race prevents damage to the rollers and cage.

SHIMS

Use shims new, until obtaining end play specified, the recorded end play measurements, select and install the appropriate shims to achieve the proper end play.

IMPORTANT:

See the appropriate illustrated parts list (specified by model series) to ensure that proper parts are used during reassembly of the transmission.



DIAGNOSIS AND TESTING

TROUBLESHOOTING CHART

Problem	Possible Cause	Remedy
Will not shift (control lever moves)	Control lever assembly broken or damaged.	Replace control lever and housing assembly.
	Damaged offset lever, shift plate, or selector arm, loose/damaged rail bushings/bearings. Broken roll pins in offset levers of selector arm.	Remove extension or adapter and case cover. Check for damaged parts. Replace damaged parts.
Hard Shift or control lever will not move into gear	Clutch not releasing	Adjust or replace clutch
	Improper or low transmission lubricant	Add or drain and replace with proper lubricant. See appropriate procedure in this section.
	Shifter Rail Binding	Remove extension and case to check that shift rails move freely and detent operates normally. Remove and replace damaged parts
	Binding of sliding synchronizers or gears.	Remove extension and case to check that synchronizers and gears slide freely on shafts. Remove and replace damaged parts.
	Insufficient countershaft or mainshaft end play (ie. Pre-load)	Disassemble and check. Replace worn or damaged parts. Re-shim if necessary
	Improper type or incorrect level of transmission lubricant	Add or drain and replace with proper lubricant
	If reverse only, seized back-up switch.	Remove and check back-up switch. Replace if seized or defective.
	Worn or damaged flywheel pilot bearing	Replace pilot bearing.
	Clutch housing misaligned	Align clutch housing to within 0.254mm (0.010 inch) TIR on face and in bore.
	Reverse Lockout solenoid faulty.	Check solenoid function-replace.
Gears clash when shifting	Engine idle speed too high	Adjust idle speed to specifications
	Clutch damaged or out of adjustment	Adjust or replace clutch
	Bent shift forks or worn fork pads	Disassemble and check. Replace damaged parts
	Damaged synchronizer	Disassemble and check for damaged synchronizer parts. Replace damaged parts.
	Insufficient countershaft or mainshaft end play (ie. Pre-load)	Disassemble and check. Replace worn or damaged parts. Re-shim if necessary
	Improper type or incorrect level of transmission lubricant	Add or drain and replace with proper lubricant
	Pilot bearing between input shaft and output shaft binding.	Disassemble and check bearing rollers, input shaft ID and output shaft OD. Replace damaged parts.




DIAGNOSIS AND TESTING (Continued)

Problem	Possible Cause	Remedy
	Clutch housing misaligned	Align clutch housing to within 0.254mm (0.010 inch) TIR on face and in bore.
	Damaged gears	Disassemble and check for gear damage. Replace damaged gears.
	Worn or damaged flywheel pilot bearing	Replace pilot bearing.
Transmission jumps out of gear	Synchronizer damaged or excessively worn.	Disassemble and check for worn or damaged synchronizer parts. Replace damaged parts.
	Blocking ring damaged, worn index slots or friction surfaces worn or damaged	Disassemble and check blocking ring for wear or damage. Replace worn or damaged parts.
	Excessive countershaft end play	Disassemble and check. Replace worn or damaged parts. Re-shim if necessary
	Shifting fork loose on shift rail; worn or damaged fork or fork pads	Disassemble and check for wear or damage. Replace worn or damaged parts
Transmission locked in one gear	Fork or offset lever loose on shift rail	Remove extension and case to check for loose parts on shift rail. Replace roll pin(s). If still loose, replace shift rail and/or attached parts as required
	Worn or damaged forks, offset lever, shift rail, broken roll pins in offset levers.	Remove extension or adapter and case cover. Check for wear or damage. Check reverse fork and 5/6 fork for missing snap ring(s). Replace damaged parts
	Worn or damaged synchroniser	Disassemble and check for worn or damaged synchroniser parts. Replace worn or damaged parts.
	Worn or damaged gears	Disassemble and check for worn or damaged gears. Replace worn or damaged gears.
Transmission noise NOTE: Make sure noise is coming from transmission and not clutch release bearing, rear axle or other components	Improper type or incorrect level of transmission lubricant	Add or drain and replace with proper lubricant
	Loose bolts or other attaching parts	Make sure all attaching parts are torqued to specification.
	Improper flywheel housing to engine crankshaft alignment.	Check alignment and correct if necessary. See relevant section in this manual.
	Noisy transmission bearings	Disassemble and check bearings, bearing rollers and parts in and on which they operate for wear or damage. Replace worn or damaged parts.







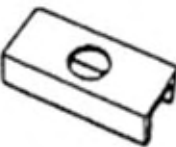


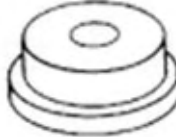
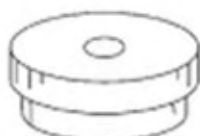


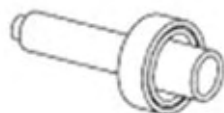
DIAGNOSIS AND TESTING (Continued)

Problem	Possible Cause	Remedy
	Noisy gears	Disassemble and check for worn or damaged gears. Replace worn or damaged gears.
Transmission leakage	Leakage from other components	Verify transmission leakage. Thoroughly clean all exposed surfaces, then check for leaks.
	Vent or breather incorrectly routed or clogged	Remove vent tube and clean or replace, clear vent elbow.
	Too much or improper lubricant	Remove reverse lamp switch to check for excess, or drain and replace with measured fill.
	Loose bolts at sealing faces	Torque bolts to specifications
	Improperly applied sealant	Separate and thoroughly clean leaking surfaces. Reapply sealant. Replace parts and torque bolts to specifications
	Worn or damaged oil seal	Replace oil seal
	Shifter base loose	Replace shifter assembly
High effort to shift from 5/6 gate to reverse gate	Reverse lockout assembly or solenoid malfunction	Check lockout assembly function. Check solenoid. Replace parts as required.
Jump out of gear (Reverse)	Reverse lockout assembly or solenoid malfunction	Check lockout assembly function.
	High side effort on 4 to 5 shift overriding reverse lockout assembly allowing high speed shift attempt into reverse gate	Disassemble transmission and replace reverse gear/synchroniser assembly damaged parts.

Special Tool(s)		Special Tool(s)	
	Holding Fixture, Transmission 307-003 (T57L-500-B)		2 or 3 Jaw Puller 205-D027 (D80L-1013-A)
ST1135-A		ST1134-A	
	Puller, Bearing 205-D064 (D84L-1123-A)		Remover, Mainshaft Bearing 308-058 (T77J-7025-H)
ST1368-A		ST1305-A	



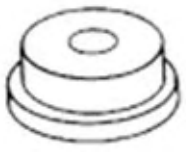
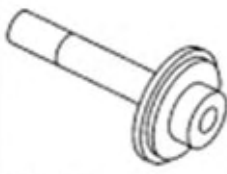
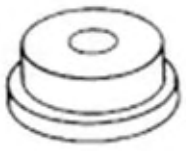





DIAGNOSIS AND TESTING (Continued)

Special Tool(s)		Special Tool(s)	
 ST2163-A	Remover/Installer, Bearing Tube 308-025 (T75L-7025-C)	 ST1255-A	Adapter for 303-224 (Handle) 205-153 (T80T-4000-W)
 ST1304-A	Removal Screw, Bearing Tube 308-092 (T84T-7025-B)	 ST2231-A	Installer, Output Shaft Rear Bearing 308-401
 ST1254-A	Plate, Bearing/Oil Seal 205-090 (T75L-1165-B)	 ST1308-A	Installer, Drive Pinion Bearing Cone 205-004 (T53L-4621-B)
 ST1308-A	Installer, Drive Pinion Bearing Cone 205-011 (T57L-4621-B)	 ST1555-A	Installer Bearing Cup 204-039 (T77F-1217-B)
 ST2451-A	Adapter Set, Step Plate 205-DS011 (D80L-630-A)	 ST2335-A	Adapter for 303-224 (Handle) 205-153 (T80T-4000-W)
 ST1144-A	Universal Puller Set 303-DS005 (D80L-100-A)	 ST2199-A	Installer Transmission Extension Housing Oil Seal 308-277 (T94P-7657-A)



DIAGNOSIS AND TESTING (Continued)

Special Tool(s)		Special Tool(s)	
 ST2335-A	Handle 205-D055 (D81L-4000-A)	 SST2338-A	Replacer/Adapter 308-239 (T96P-7025-A)
 ST1555-A	Installer Bearing Cup 204-039 (T77F-1217-B)	 ST1513-A	Installer, Axle Shaft Oil Seal 205-123 (T78P-1177-A)
 ST1555-A	Installer Bearing Cup 204-080 (T83P-1104-AH1)		
 ST2245-A	Installer Rear Axle Oil Seal 205-155 (T80T-4000-Y)		
 SST1214-A	Dial Indicator Gauge with Holding Fixture 100-002 (TOOL-4201-C) or equivalent		
 SST1303-A	Remover/Installer, Bearing Tube 308-024 (T75L-7025-B)		



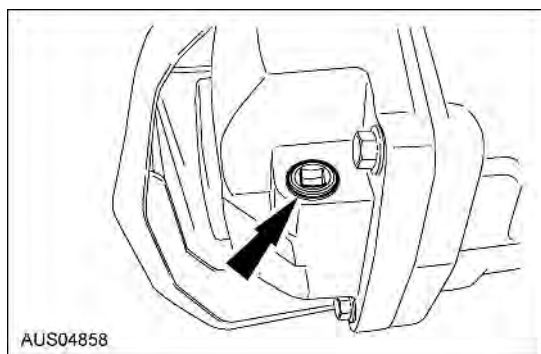
GENERAL PROCEDURES

Transmission Draining and Filling

Material

Item	Specification
DEXRON III® (ATF) Transmission Fluid XT-2-QDX	DEXRON III®

1. Remove the drain plug and drain the transmission.
 - " Position a suitable drain pan under the transmission.

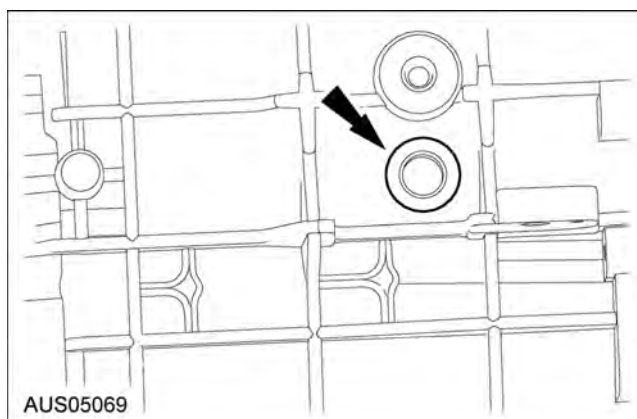
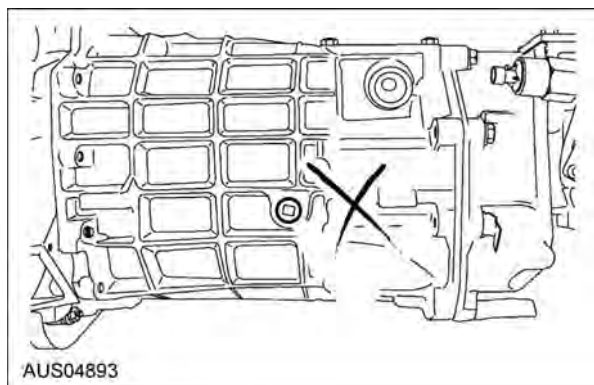


2. Clean and install the drain plug.

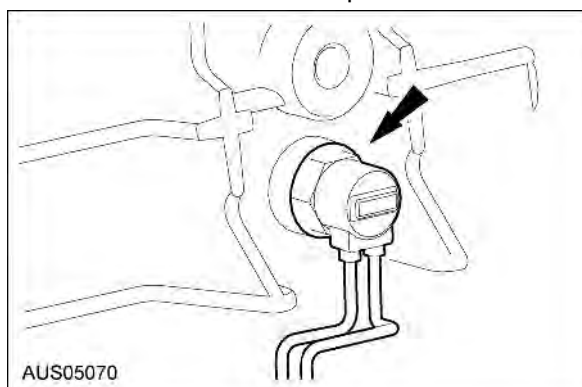
⚠ WARNING: Do not remove filler plug, transmission is filled through reverse lamp switch hole on driver's side of case.

⚠ WARNING: The reverse lamp switch is very close to the exhaust system and catalytic converter. These systems operate at very high temperatures, take care not to burn yourself.

NOTE: Before removing, clean the area around the filler plug.



3. Remove the reverse lamp switch.



4. Using an oil suction gun or suitable equipment, fill the transmission with the correct quantity of the specified fluid.

NOTE: That when correctly filled the oil level WILL NOT come up to the reverse switch hole. The fill must be measured.

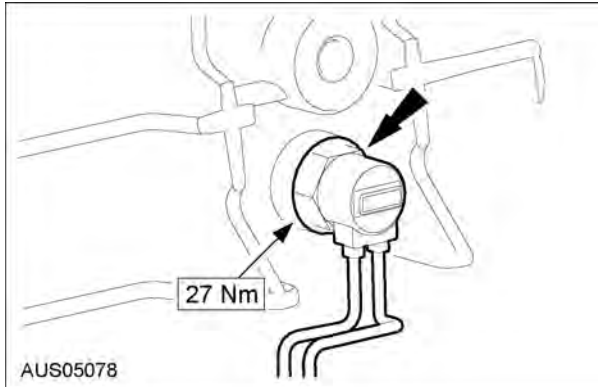
As an APPROXIMATE guide only, the oil level should be about 25mm under the reverse switch hole for I-6 and about 50mm under for V-8.

- V8 Transmission Capacity is 3.85L
- I6 Transmission Capacity is 4.85L



GENERAL PROCEDURES (Continued)

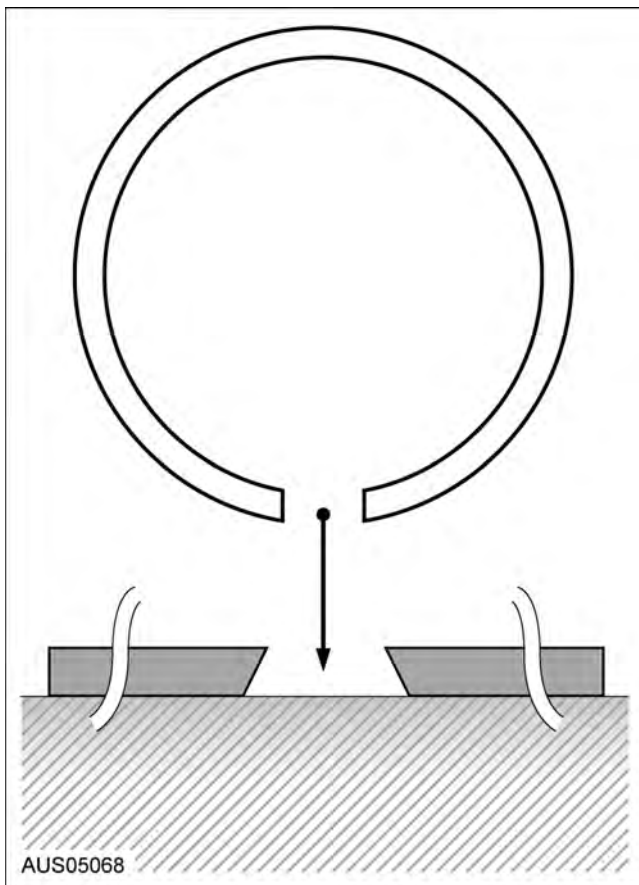
5. Install Reverse Lamp switch.



Snap Ring

NOTE: Always use new snap rings.

NOTE: Ensure all snap rings tips are installed facing outside so they can be easily removed during servicing.



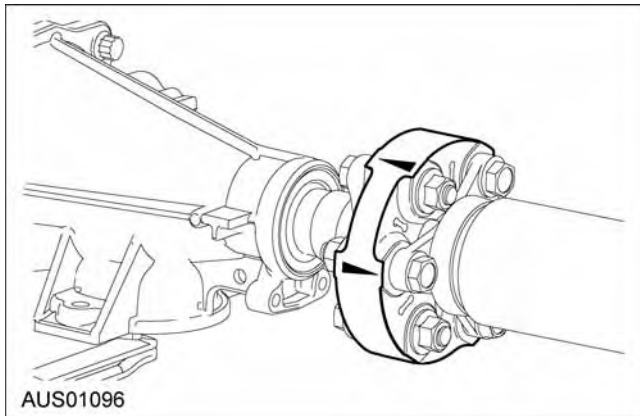
REMOVAL

Transmission

Removal

1. Remove gearshift lever and boot as described earlier in this section.
2. With the vehicle in NEUTRAL, raise and support the vehicle. For additional information, refer to Section 100-02.
3. Remove the dual converter H-pipe (V8). For additional information, refer to Section 309-00.
4. Mark the driveshaft to the rear axle companion flange and the location of any balance weights so that they may be installed in the same relative position.
Disconnect the shaft at the centre bearing mount, by detaching the centre bearing bracket from the vehicle floor (retain any spacers) and detach the rear CV joint from the diff pinion companion flange, by undoing the bolts. Slide the driveshaft backwards, until the slip yoke slides off the output shaft. Install a dust cover on the extension housing seal replacer into the extension housing to prevent lubricant leakage.

NOTE: Automatic shown, Manual similar.

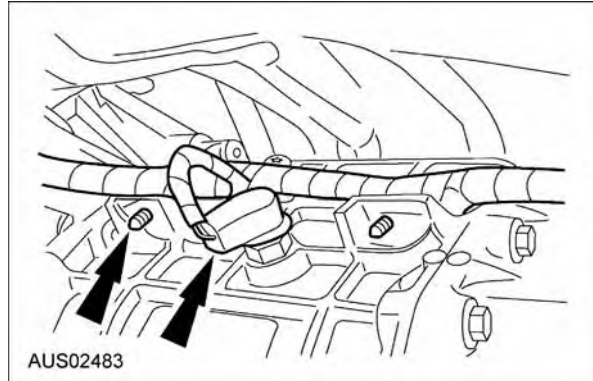


WARNING: Failure to match marks when re assembling the driveshaft may induce driveline vibration.

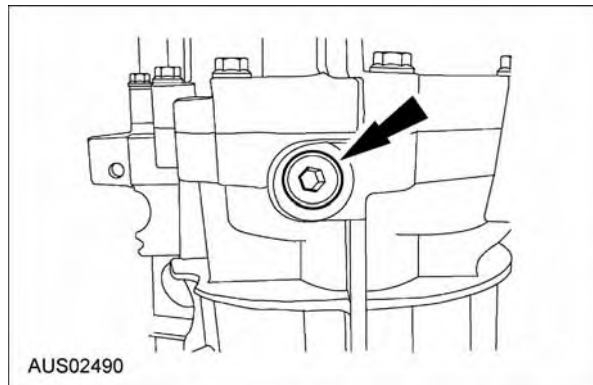
NOTE: Before disassembly, mark the mating points on the CV flange, companion flange, nut and balance weights (if fitted). Re-assemble with matching points matched, and all mating hardware and weights in original locations.

5. Bleed the clutch system according to the general procedure set out in section 308-02.
6. Disconnect the CSC hydraulic clutch line from the firewall, retain the metal wire clip.

7. Disconnect the reversing lamp switch and reverse lockout solenoid electrical connectors. Disconnect the wiring harness from the transmission. On I6 Ute vehicles without ABS, also disconnect the speedo output connector from the transmission.



8. Remove the starter motor. For additional information, refer to Section 303-06. Ensure battery is disconnected prior to removal.
9. If transmission disassembly is necessary, drain the transmission fluid.

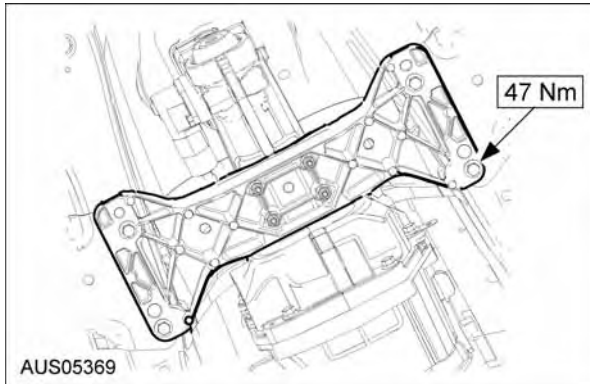


10. Position a transmission jack and support the transmission.

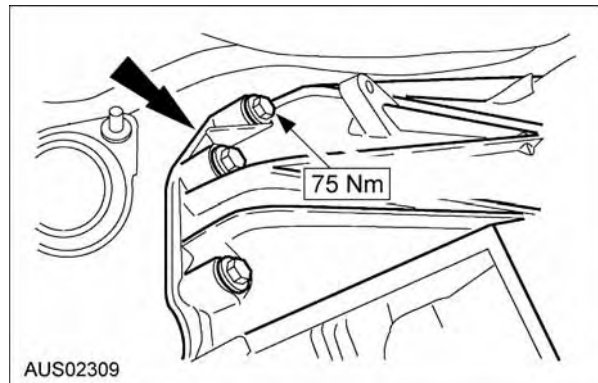


REMOVAL (Continued)

11. Remove the four bolts holding the crossmember to the vehicle floor and the two bolts holding the isolator to the transmission (not shown) and then remove the transmission crossmember assy.



NOTE: Removal of transmission from vehicle is easier if the front of the engine is jacked up carefully to tilt the transmission down at the rear.



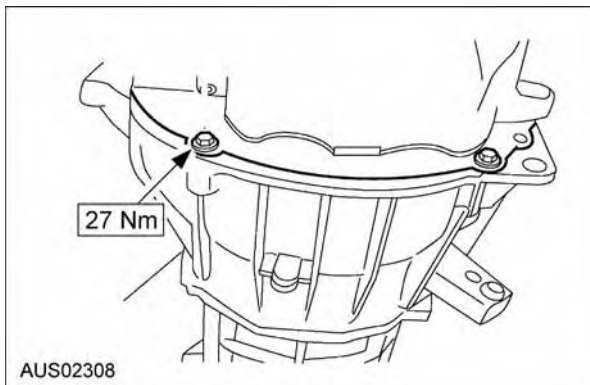
12. Lower the transmission jack until the rear of the engine rests against the bulk head.

NOTE: The engine must be tilted down at the transmission end before removing the flywheel housing-to-engine bolts. Raise the vehicle's bonnet before tilting the engine or else the bonnet may be damaged. The engine can be tilted by either:

- jacking up the front end or
- using a harness to pull down the rear of the motor.

13. Remove the transmission clutch housing to engine bolts.

NOTE: V-8 Shown



14. Move the transmission rearward until the input shaft clears the pressure plate housing, then lower the jack and remove the transmission.

NOTE: The transmission can be removed from the engine by removing the transmission front adaptor to clutch housing bolts and leaving the clutch housing in place on the engine. However, the hydraulic line needs to be unclipped from the top of the clutch housing on I-6 if this method is used. On both I-6 and V-8, care must be taken not to bend or damage the hydraulic line.



DISASSEMBLY

Disassembly

DISASSEMBLY TRANSMISSION

1. Place the transmission on a work bench, remove the drain plug and drain the transmission, position a suitable drain pan under the transmission, remove the reverse lamp switch.



2. Clean the transmission exterior with solvent and dry with compressed air. During disassembly, clean all components with solvent and dry with compressed air.

⚠ WARNING: Make sure protective eye wear is in place.



3. Remove the vent hose
NOTE: I6 shown, V8 similar.



4. Remove 11 bolts, leaving two opposing bolts in. Rotate the transmission to a vertical position, then remove the remaining two bolts.



5. Remove two CSC mounting bolts.
NOTE: I6 shown, V8 similar.



6. Turn out the four bolts and remove as shown



⚠ WARNING: Ford Motor Company does not endorse the use of air tools for maintenance of this manual transmission. The photographs in this chapter were supplied by the transmission manufacturer and are for demonstration purposes only.



DISASSEMBLY (Continued)

7. Remove the control turret assembly, as indicated.



8. Using a 5/32-inch drift and hammer, drive the roll pin downward, then remove the rear offset shift lever. Drive the roll pin from the shift lever and discard.



9. Remove the 8 bolts, from extension, as shown.



10. Using a flat-blade screwdriver, separate the extension housing, then remove the gearshift offset lever from the transmission case.



11. Remove the assembly extension housing, as shown.



12. Remove the seal oil shipment, as shown.



DISASSEMBLY (Continued)

13. Using a snap ring plier, remove the gear sensor speedometer snap ring, as indicated. Always wear safety glasses to protect your eyes when servicing transmissions.



14. remove the sensor speedometer, as shown.



15. Using a magnet, remove the ball, as indicated.



16. Using a snap ring plier, remove the second snap ring, as shown.



17. Remove the upper spacer, as indicated.



18. Remove the roller bearing, and the lower spacer, as shown.



DISASSEMBLY (Continued)

19. Remove and discard the reverse gear snap ring, as indicated



22. Remove the reverse gear needle bearing, as shown.



20. Remove the thrust washer, as shown.



23. Remove the reverse gear synchronizer inner cone, as indicated.



21. Remove the reverse gear. Inspect the reverse gear for wear or damage. Install new gear as necessary.



24. Remove the reverse gear synchronizer intermediate cone, as shown.



DISASSEMBLY (Continued)

25. Remove the reverse gear blocking ring, as indicated.



26. Using a snap ring plier, remove the snap ring of the synchronizer assembly, as shown



27. Using a snap ring pliers, remove and discard the snap ring of the rail and fork assembly, as indicated.



28. Remove the rail & fork and synchronizer assembly. Inspect the synchronizer, check for worn, nicked or broken teeth. Install a new synchronizer as necessary.



29. Remove the snap ring of split washer, as indicated



30. Remove the split washer, as shown



DISASSEMBLY (Continued)

31. Using a snap ring pliers, remove and discard the snap ring of the reverse gear, as indicated.



32. Using the special tools, remove the reverse gear, as shown.



33. Using a snap ring pliers, remove and discard the snap ring of the 5th. gear, as indicated.



34. Remove the spacer ring of the 5th. gear, as shown.



35. Remove the 5th. gear, as indicated



36. Remove 5th. gear needle bearing, as shown



DISASSEMBLY (Continued)

37. Remove the spacer ring of the 5th. gear, as indicated.



38. Remove the 5th. gear synchronizer inner cone, as shown.



39. Remove the 5th. gear synchronizer intermediate cone, as indicated.



40. Remove the 5th. gear synchronizer blocking ring, as shown.



41. Using a snap ring pliers, remove and discard the snap ring of the synchronizer, as indicated



42. With a snap ring pliers, remove the snap ring of the shift rail, as shown



DISASSEMBLY (Continued)

43. Remove the fifth gear, as indicated.



44. remove the 5th. & 6th. Synchronizer and fork ass'y, as shown.



45. Remove the 6th. gear synchronizer blocking ring, as indicated.



46. Remove the gear synchronizer intermediate cone, as shown.



47. Remove the 6th. gear synchronizer inner cone, as indicated



48. Remove the sixth gear, as shown



DISASSEMBLY (Continued)

49. Remove the 6th. gear needle bearing, as indicated.



50. Remove the 6th. gear spacer, as shown.



51. Remove the 6th. gear thrust washer, as indicated.



52. Using a 1/4" socket, remove the (4) bolts, as shown.



53. Using a 4.0 mm (5/32 inch) drift and hammer, drive the roll pin downward, as indicated



54. Remove the shift lever guide bolts (2), as shown



DISASSEMBLY (Continued)

55. Remove eleven of the adapter to transmission case bolts, as indicated.



56. Remove the transmission case and front offset lever, as shown.



57. Remove the fifth/sixth and reverse shift rail assembly, as indicated.



58. Using a 1/4" socket, remove the bolt from interlock, as shown.



59. Remove the spring shift detent and roller detent, as indicated.



60. Lift up the main shaft, then remove the countershaft, as shown.



DISASSEMBLY (Continued)

61. Remove the main shaft and shift rail as an assembly, separate the shift rail assembly from the main shaft on the work bench.



62. Remove shift rail as an assembly, as shown.



DISASSEMBLY (Continued)

1. With a snap ring pliers, remove and discard the snap ring third speed, as indicated.



2. Remove the 3rd & 4th speed synchronizer. Inspect the synchronizer, check for worn nicked or broken teeth. Install a new synchronizer as necessary.



3. Remove the 3rd. gear synchronizer blocking ring, as indicated



4. Remove the 3rd. gear synchronizer intermediate cone, as shown



5. Remove the 3rd. gear synchronizer inner cone, as indicated.



6. Remove the 3rd. gear, as shown.



7. Remove the 3rd. gear spacer, as indicated.



DISASSEMBLY (Continued)

8. Remove the 3rd. gear needle bearing, as shown.



9. Using the special tool and a press, remove first gear, the output shaft rear bearing and the fifth driven gear, as indicated.



10. Remove the first gear and bearing, as shown. Inspect the gear and bearing for wear or damage. Install a new if is necessary.



11. Remove the 1st. gear needle bearing, as indicated



12. Remove the 1st. gear synchronizer inner cone, as shown.



13. Remove the 1st. gear synchronizer intermediate cone, as indicated.



DISASSEMBLY (Continued)

14. Remove the 1st. gear synchronizer blocking ring, as shown.



17. Remove the 1st. and 2nd. synchronizer, as indicated.



15. Remove the snap ring of split washer, as indicated.



18. Remove the 2nd. gear synchronizer blocking ring, as shown.



16. Remove the split washer, as shown.



19. Remove the 2nd. gear synchronizer intermediate cone, as indicated.



DISASSEMBLY (Continued)

20. Remove the 2nd. gear synchronizer inner cone, as shown.



21. Remove the second gear, as indicated.



22. Remove the spacer, as shown.



23. Remove the 2nd. gear needle bearing, as indicated.

**DISASSEMBLY COUNTERSHAFT**

1. Using the special tool and a press, remove and discard the countershaft rear bearing, as indicated.



2. Using the special tool and a press, remove the countershaft front bearing, as shown.

**DISASSEMBLY ADAPTER PLATE**

1. Remove the synchronizer blocking ring, as indicated.



DISASSEMBLY (Continued)

2. Remove the synchronizer intermediate cone, as shown.



3. Remove the synchronizer inner cone, as indicated.



4. Remove the input shaft, as shown.



5. Remove the counter shaft bearing cup, as indicated. Inspect the cup for wear or damage. Install a new cup and bearing as necessary.



6. Remove the counter shaft bearing shim, as shown. Inspect the cup bore for wear, scratches or grooves. Install a new transmission adapter plate as necessary.



7. Remove the input shaft bearing cup, as indicated. Inspect the cup for wear or damage. Install a new cup and bearing as necessary.



DISASSEMBLY (Continued)

8. Remove the input shaft bearing shim, as shown. Inspect the cup bore for wear, scratches or grooves. Install a new transmission adapter plate as necessary.



9. Remove and discard the input shaft seal, as indicated.

**DISASSEMBLY EXTENSION**

1. Remove the three bolts (3), as indicated.



2. Remove the reverse idler shaft bracket, as shown.



3. Remove the reverse idler gear, as indicated.



4. Remove the reverse idler gear needle bearing, as shown.



5. Remove the reverse idler gear shaft, as indicated.



DISASSEMBLY (Continued)

6. With a snap ring pliers, remove the snap ring of the extension, as shown.



7. Remove the main shaft bearing cup, as indicated. Inspect the cup for wear or damage. Install a new cup and bearing as necessary.



8. Remove the snap ring of the countershaft and bearing extension, as shown.



9. Remove the countershaft extension bearing includes the fluid funnel, as indicated.



10. Remove and discard the extension housing seal, as shown. If the housing is cracked, install a new housing. If the sealing surface has nicks or scratches, use a soft stone or crocus cloth to remove.



ASSEMBLY

Assembly Extension

1. If previously removed, install the extension seal with the proper seal driver, as indicated.



2. Install the countershaft extension bearing, as shown.



3. Using a snap ring pliers, install the snap ring, as indicated.



4. Install the main shaft bearing cup, as shown.



5. With a snap ring pliers, install the snap ring, as indicated.



6. Install the reverse idler shaft, as shown.



7. Install the reverse idler gear needle bearing, as indicated.



ASSEMBLY (Continued)

8. Install the reverse idler gear, as shown.



9. Install the reverse idler shaft bracket, as indicated.



10. Install the three bolts (3), as shown.



11. If previously removed, install the input shaft seal with the proper seal driver, as indicated.



12. Lubricate all components with transmission fluid during assembly. If a new front input shaft bearing or countershaft bearing was installed, install new bearing cup, do not install the shims at this time.



13. If a new front countershaft bearing was installed, install new bearing cup, as indicated.



14. Install the input shaft, as shown.



15. Install the synchronizer inner cone, as indicated.



ASSEMBLY (Continued)

16. Install the synchronizer intermediate cone, as shown.



17. Install the synchronizer blocking ring, as indicated.



18. Install the bearing of countershaft, as shown.



Assembly Transmission

1. Install the 2nd. gear needle bearing, as indicated.



2. Install the spacer, as shown.



3. Install the second gear, as indicated.



4. Install the 2nd. gear synchronizer inner cone, as shown.



5. Install the 2nd. gear synchronizer intermediate cone, as indicated.



ASSEMBLY (Continued)

6. Install the 2nd. gear synchronizer blocking ring, as shown.



10. Install the 1st. gear synchronizer blocking ring, as shown.



7. Install the 1st. and 2nd. synchronizer, as indicated.



11. Install the 1st. gear synchronizer intermediate cone, as indicated.



8. Install the split washer, as shown.



12. Install the 1st. gear synchronizer inner cone, as shown.



9. Install the snap ring of split washer, as indicated.



ASSEMBLY (Continued)

13. Install the 1st. gear needle bearing, as indicated.



17. Install the 3rd. gear spacer, as indicated.



14. Install the first gear, as shown.



18. Install the 3rd. gear, as shown.



15. Use a special tool or a press to install the bearing and 5th. gear, as indicated.



19. Install the 3rd. gear synchronizer inner cone, as indicated



16. Rotate the main shaft and install the 3rd. gear needle bearing, as shown.



20. Install the 3rd . gear synchronizer intermediate cone, as shown.



ASSEMBLY (Continued)

21. Install the 3rd . gear synchronizer blocking ring, as indicated.



22. Install the 3rd & 4th. speed synchronizer, as shown.



23. With a snap ring pliers, Install the snap ring third speed, as indicated.



24. Install shift rail as an assembly, as shown.



25. Install the main shaft and shift rail as an assembly, as indicated



26. Lift the mainshaft upward, tilt the countershaft and install, as shown.



27. Install temporarily the transmission case and front offset lever, as indicated.



ASSEMBLY (Continued)

28. Rotate the transmission to horizontal position.
Install eleven bolts of the adapter to transmission case bolts, as shown.



29. Rotate the input shaft/main shaft to seat the bearing, using the special tools, measure the input shaft/main shaft end play by applying an upward load on the input shaft.



30. Using the special tools, measure the countershaft gear end play by pushing upward on the countershaft. Record the measurement.



31. Using the recorded end play measurements, select and install the appropriate shims to achieve the specified end play. Install the front input shaft bearing cup and the front doubt exists about the corrected end play measurement.



32. Lubricate the bearing cup with transmission fluid, as shown.



33. Using the recorded end play measurements, select and install the appropriate shims to achieve the specified end play. Install the front input shaft bearing cup and the front doubt exists about the corrected end play measurement, as indicated.



ASSEMBLY (Continued)

34. Lubricate the bearing cup with transmission fluid, as shown.



35. Install the input shaft, as indicated.



36. Install the main shaft and shift rail as an assembly, on to the input shaft and the adapter plate, as shown.



37. Lift the mainshaft upward, tilt the countershaft and install, as indicated.



38. Install the fifth/sixth and reverse shift rail assembly, as shown.



39. Install the spring shift detent and roller detent, as indicated.



ASSEMBLY (Continued)

40. Using a 1/4" socket, install the bolt from interlock, apply threadlock and sealer to the threads of the bolts, as shown.



43. Rotate the transmission to horizontal position. Install eleven bolts of the adapter to transmission case bolts, as indicated.



41. Clean the mating surfaces of the transmission main case and the transmission plate. Apply a bead of silicone rubber to the sealing surface on the adapter plate, as indicated.



44. Using a 4.0mm (5/32 inch) drift and hammer, install the roll pin, as shown.



42. Install the transmission case and front offset lever, as shown.



45. Using a 1/4" socket, install the (4) bolts, as indicated.



ASSEMBLY (Continued)

46. Install the shift lever guide bolts (2), as shown.



47. Install the 6th. gear thrust washer, as indicated.



48. Install the 6th. gear spacer, as shown.



49. Install the 6th. gear needle bearing, as indicated.



50. Install the sixth gear, as shown.



51. Install the 6th. gear synchronizer inner cone, as indicated.



52. Install the 6th. gear synchronizer intermediate cone, as shown.



53. Install the 6th. gear synchronizer blocking ring cone, as indicated.



ASSEMBLY (Continued)

54. Install the 5th. & 6th. synchronizer and fork ass'y, as shown.



58. Install the 5th. gear synchronizer blocking ring cone, as shown



55. Install the fifth gear, as indicated.



59. Install the 5th. gear synchronizer intermediate cone, as indicated.



56. With a snap ring pliers, install the snap ring of the shift rail, as shown



60. Install the 5th. gear synchronizer inner cone, as shown.



57. Using a snap ring pliers, install the snap ring of the synchronizer, as indicated.



61. Install the spacer ring of the 5th. gear, as indicated.



ASSEMBLY (Continued)

62. Install 5th. gear needle bearing, as shown



63. Install the 5th. gear, as indicated.



64. Install the spacer ring of the 5th. gear, as shown



65. Using snap ring pliers, install the snap ring of the 5th. gear, as indicated.



66. Using the special tools, install the reverse gear, as shown.



67. With a snap ring pliers, Install the snap ring of the reverse gear, as indicated.



68. Install the split washer, as shown



69. Install the snap ring of split washer, as indicated.



ASSEMBLY (Continued)

70. Install the rail & fork and synchronizer assembly, as shown



74. Install the reverse gear synchronizer intermediate cone, as shown



71. Using a snap ring pliers, install the snap ring of the rail and fork assembly, as indicated.



75. Install the reverse gear synchronizer inner cone, as indicated.



72. With a snap ring pliers, install the snap ring of the synchronizer assembly, as shown.



76. Install reverse gear needle bearing, as shown



73. Install the reverse gear blocking ring, as indicated.



77. Install the reverse gear, as indicated.



ASSEMBLY (Continued)

78. Install the thrust washer, as shown.



79. Install the second snap ring, as indicated.



80. Install the bearing, as shown



81. Install the spacer, as indicated.



82. Using snap ring pliers, install the first snap ring, as shown



83. Using a magnet, install the ball, as indicated.



84. Install the sensor speedometer, as shown.



85. Using snap ring pliers, install the gear sensor speedometer snap ring, as indicated.



ASSEMBLY (Continued)

86. Clean the mating surfaces of the transmission main case and the extension housing. Apply a bead of silicone rubber to the sealing surface of the transmission case, as indicated.



87. Install the extension assembly, as indicated.



88. Install the (8) bolts and tighten to the recommended torque, as shown.



89. Using a 5/32-inch drift and hammer, install the off set lever pin, as indicated.



90. Clean the mating surfaces of the extension case. Apply a bead of silicone rubber to the sealing surface of the extension case, as shown.



91. Install the control turret assembly, as indicated

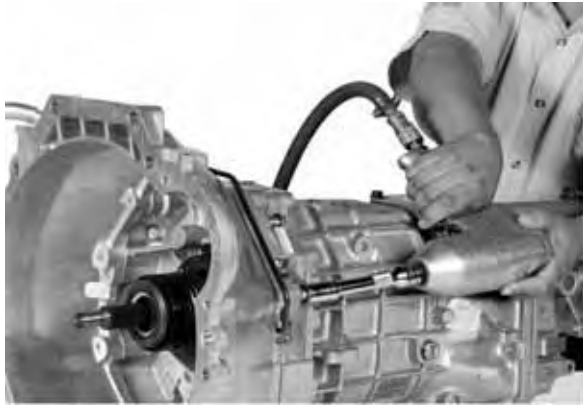


92. Install the four bolts and tighten to the recommended torque, as shown.



ASSEMBLY (Continued)

93. Install the 11 bolts of clutch, as shown.



94. Install the vent hose, as indicated.



95. Check and as necessary, fill the transmission with transmission fluid. The total fill capacity is 3.85L (8.1 pt), as shown



INSTALLATION

Transmission

NOTE: Before installing the transmission, the input shaft splines must be cleaned and VERY LIGHTLY lubricated. Remove all excess lubricant, only a thin film should remain. Use Motorcraft Premium Long-Life Grease XG-1-C or XG-1-K or equivalent meeting Ford specification ESA-M1C75-B.

Installation

1. To install, reverse the removal procedure. For additional information, refer to Transmission in this section.
 - Check, and as necessary, fill the transmission with transmission fluid. The total fill capacity is 3.85L (8.1 pt) for V8 and 4.85 ltr (10.4 pt) for I6.
2. Apply sealant to the reverse switch and drain plug threads and install the switch and plug.
 - Use pipe sealant with Teflon®.

