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TRANSMISSION IDENTIFICATION

Basic Information

This manual is for the M5R1 and M5R2 transmission. We have combined these into one book as they are basically the same transmission. Both transmissions are 5-speeds and can be either rear wheel drive or four wheel drive units. They are aluminum transmissions with aluminum top covers. Both units are also referred to as the M50D or the Toyokoygo.

M5R1

The M5R1 is found in the following vehicles:

- 1988-1994 Ford Aerostar Van, 3.0L
- 1988 Ford Bronco II, 2.3L
- 1988-1990 Ford Bronco II, 2.9L
- 1991-2001 Ford Explorer, 4.0L
- 1991-2000 Ford Explorer Sport and Sport Trac, 4.0L
- 1988-On Ford Ranger, 2.3L
- 1991-On Ford Ranger, 2.5L
- 1988-1992 Ford Ranger, 2.9L
- 1991-On Ford Ranger, 3.0L
- 1990-On Ford Ranger, 4.0L
- 1993-2003 Mazda B2300, 2.3L
- 1988-2001 Mazda B2500, 2.5L
- 1994-On Mazda B3000, 3.0L
- 1994-On Mazda B4000, 4.0L
- 1991-1994 Mazda Navajo, 4.0L

NOTE: The 2001 and later models may have three piece synchronizer rings at 2nd gear.

Casting Numbers: E87A, E97A, F07A, F17A, etc.

The non-updated unit has 36 splines on the 5th-reverse slider and the updated unit has 30 splines on this slider.

M5R2

The M5R2 is found in the following vehicles:

- 1988-1989 E Series Van, 4.9L, 5.0L, 5.8L
- 1997-1999 F Series Truck, P Series Van, Full Size Bronco, 4.2L
- 1988-1997 F Series Truck, P Series Van, Full Size Bronco, 4.9L
- 1997-1999 F Series Truck, P Series Van, Full Size Bronco, 4.6L
- 1988-1997 F Series Truck, P Series Van, Full Size Bronco, 5.0L, 5.8L

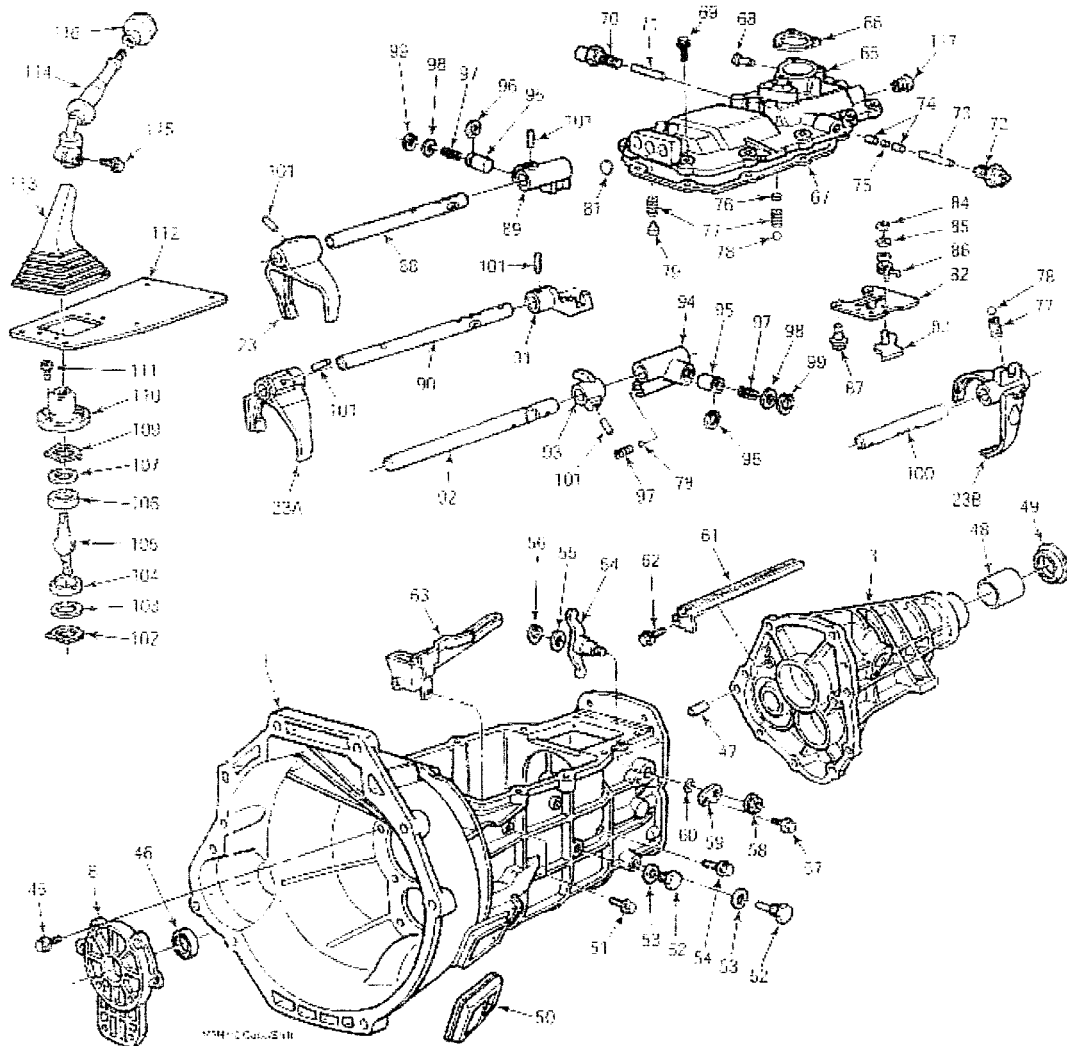
2000 and later models may have a three piece synchronizer ring at 2nd gear

Casting Number: E8TA, E9TA, F0TA, etc.

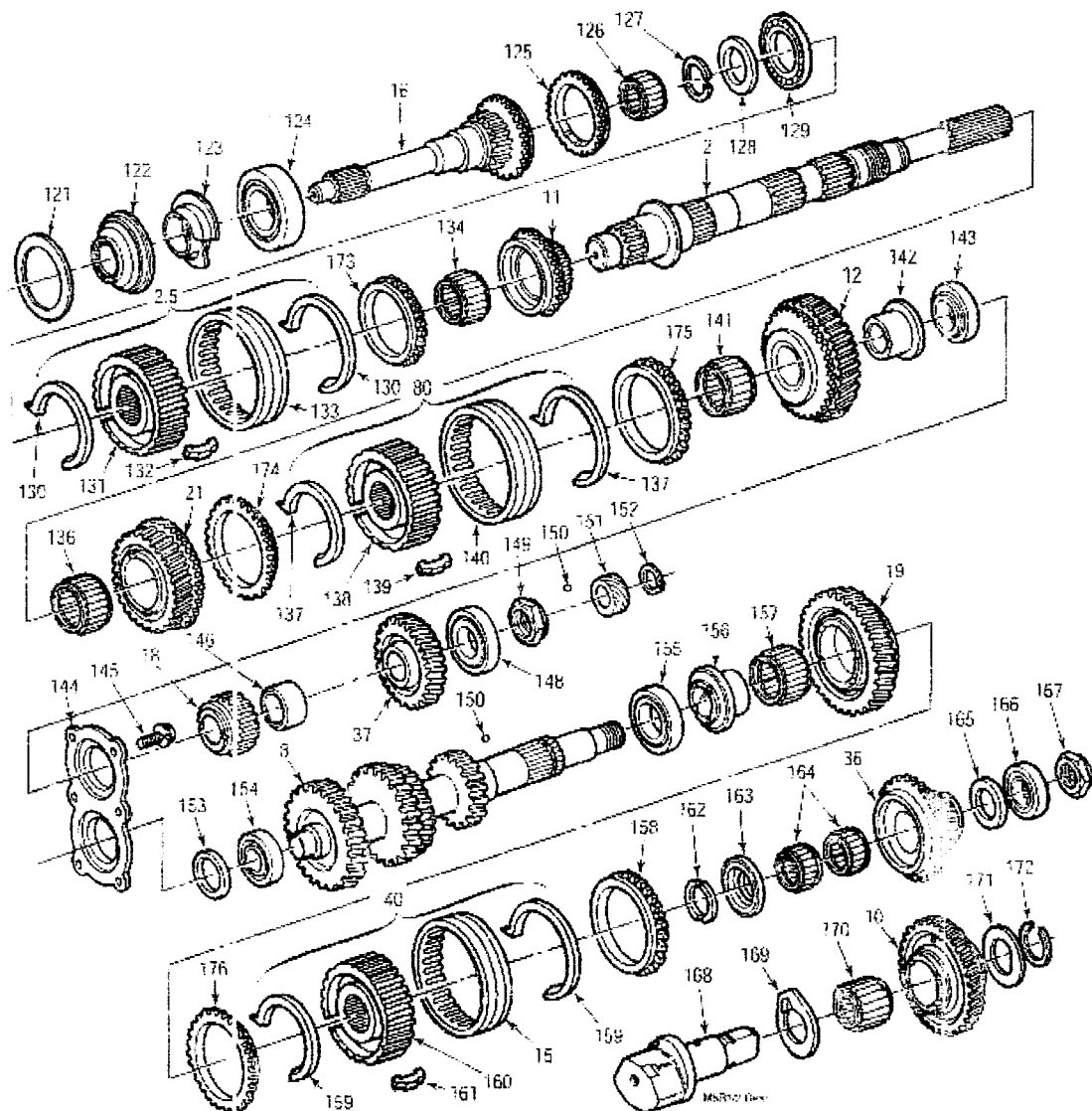
The non-updated unit has 42 splines on the 5th-reverse slider and the updated unit has 33 splines on this slider.

SCHEMATIC

M5R1 / M5R2 CASE & FORK



M5R1 / M5R2 GEAR



PARTS LIST

- #1 Case
- #2 Mainshaft
- #2.5 3rd/4th Gear Synchronizer Assembly
- #3 Tail Housing
- #6 Front Bearing Retainer
- #8 Countershaft (Cluster Gear)
- #10 Reverse Idler Gear
- #11 3rd Gear
- #12 1st Gear
- #15 5th/Reverse Gear Slider
- #16 Input Shaft
- #18 Mainshaft 5th Gear
- #19 Countershaft 5th Gear
- #21 2nd Gear
- #23 1st/2nd Gear Shift Fork
- #23A 3rd/4th Gear Shift Fork
- #23B 5th/Reverse Gear Shift Fork
- #36 Reverse Gear
- #37 Mainshaft Reverse Gear
- #40 5th/Reverse Gear Synchronizer Assembly
- #46 Front Seal
- #47 Dowell
- #48 Tail Housing Bushing
- #49 Rear Seal
- #57 5th/Reverse Gear Shift Arm Retainer Bolt

- #58 Lock Nut
- #59 Retainer
- #60 "O" Ring
- #63 Oil Trough
- #65 Top Cover
- #66 Shifter Gasket
- #67 Top Cover Gasket
- #68 Top Cover Pin
- #70 Backup Light Switch
- #73 Actuating Pin—Backup Light
- #75 Interlock Pin
- #76 Spacer
- #77 Detent Springs
- #78 Detent Ball
- #79 Detent
- #80 1st/2nd Gear Synchronizer Assembly
- #81 Top Cover Plug (Front)
- #82 Shifter Plate
- #83 Reverse Lock Out
- #87 Shouldered Bolt
- #88 1st/2nd Gear Fork Shift Rail
- #89 1st/2nd Shifter
- #90 3rd/4th Gear Fork Shift Rail
- #91 3rd/4th Shifter
- #92 5th/Reverse Gear Fork Shift Rail
- #93 Reverse Shifter
- #95 Reverse Detent Plunger
- #97 Reverse Detent Spring

- #98 Washer—Retainer for Spring
- #99 Retainer—Snap Ring
- #100 5th/Reverse Shift Rail
- #101 Roll Pin
- #102 Shifter Stub Spacer
- #103 Shifter Stub Spacer
- #104 Shifter Seat
- #105 Shifter Stub
- #106 Shifter Seat
- #107 Shifter Stub Spacer
- #109 Shifter Stub Spacer
- #110 Shift Stick Rubber
- #111 Shift Boot Bolts
- #112 Plate (normally inside car)
- #113 Shifter Boot
- #114 Shifter Assembly
- #115 Pinch Bolt (normally a stud w/nut)
- #116 Shifter Knob
- #117 Top Cover Plugs, (Rear)
- #121 Input Shim
- #122 Baffle Seal
- #123 Input Slinger
- #124 Input Shaft Bearing
- #125 4th Gear Synchronizer Ring
- #126 Input Pocket Bearing
- #127 3rd/4th Gear Synchronizer Assembly Snap Ring
- #129 Thrust Bearing
- #130 3rd/4th Gear Synchronizer Assembly Energizer Spring (2 needed)

- #131 3rd/4th Synchronizer Hub
- #132 3rd/4th Gear Synchronizer Assembly Shift Keys (3 needed)
- #133 3rd/4th Gear Synchronizer Slider
- #134 3rd Gear Needle Bearing
- #136 2nd Gear Needle Bearing
- #137 1st/2nd Gear Synchronizer Assembly Energizer Spring (2 needed)
- #138 1st/2nd Gear Synchronizer Hub
- #139 1st/2nd Gear Synchronizer Assembly Shift Keys (3 needed)
- #140 1st/2nd Gear Synchronizer Slider
- #141 1st Gear Needle Bearing
- #142 1st Gear Inner Race
- #143 Mainshaft Bearing
- #144 Rear Retainer Plate
- #145 Rear Bearing Retainer Bolt
- #148 Rear Mainshaft Bearing
- #149 Mainshaft Nut
- #150 Ball for 5th Gear Inner Race
- #151 Speedometer Gear
- #152 Speedometer Gear Snap Ring
- #153 Spacer
- #154 Front Countershaft Bearing
- #155 Middle Countershaft Bearing
- #156 5th Gear Inner Race
- #157 5th Gear Needle Bearing
- #158 Reverse Synchronizer Ring
- #159 5th/Reverse Synchronizer Assembly Energizer Spring (2 needed)
- #160 5th/Reverse Synchronizer Hub
- #161 5th/Reverse Synchronizer Assembly Shift Keys (3 needed)

- #162 Split Retainer Ring
- #164 Reverse Gear Needle Bearing
- #165 Spacer
- #166 Rear Countershaft Bearing
- #167 Countershaft Nut
- #168 Reverse Idler Support
- #169 Washer
- #170 Reverse Idler Gear Needle Bearing
- #171 Washer
- #172 Snap Ring
- #173 3rd Gear Synchronizer Ring
- #174 2nd Gear Synchronizer Ring
- #175 1st Gear Synchronizer Ring
- #176 5th Gear Synchronizer Ring

Ordering Notes

When ordering a casing be sure that you check the case and be ready to give the sales person any numbers that are actually cast into the case. Also, know the engine size of the vehicle that your transmission is in and whether the starter bolts onto the driver or passenger side of the transmission (standing in front of the bell housing and looking back to the tail of the transmission).

Be sure that you know whether or not your transmission is updated or non-updated when you are ordering parts related to 5th or reverse gear. The easiest way to do this is to count the splines that are on the inside of your slider.

The Input and Countershaft (Cluster Gear) on the M5R1 are mated. That is you use a 16 with an 8 and a 16A with a 8A. The easiest way to make sure that you get the right matched pair is to count 3rd gear on the Countershaft, it will either be 32 teeth or 34 teeth. Third gear is the second to the largest gear on the shaft. A mismatch of these parts will result in a transmission that binds up when you try to turn the shaft.

The Input on the M5R2 is determined by the year of the vehicle. If you are in doubt measure the overall length of the shaft. The shaft will either be 11 inches or it will be 11 3/8 inches in length.

ALWAYS on the M5R1 and M5R2 if you have damage to the teeth on your Input Shaft or the Input Shaft has been hot DO NOT replace the Input without replacing the Countershaft (Cluster).

If the damage to the Input is on the pocket and all teeth are intact and have not been subjected to a lot of heat you may not need to replace the Countershaft (Cluster) but you will probably need to replace the Mainshaft as a pocket bearing that spins will more than likely eat up the tip of the Mainshaft as well as the inside pocket of the Input.

Above all—be accurate with your tooth counts AND trust the person that you are ordering parts from. They may ask more questions than you have answers for but they are only trying to make sure that you receive the right parts the first time that they send them to you. They also have a great deal of knowledge about what other parts may need to be replaced to keep you from having trouble in the future.

Tools List

Ford part numbered tools are recommended by the manufacturer and have been given within the tear down and reassembly text, where known. Alternative tools are given for use in case recommended tools are not available.

- Extension Housing Seal Remover (Ford Part #T74P-77248-A)
- Set of Sockets
- Hammer
- Chisel
- Countershaft Locknut Staking Tool (Ford Part #T77J-7025-F)
- Mainshaft Locknut Wrench (Ford Part #T88T-7025-A)
- Remover/Replacer Tube Tool (Ford Part #T75L-7025-B)
- Wrench
- Forcing Screw Tool (Ford Part #T84T-7025-B)
- Bearing Puller Tool (Ford Part #T77J-7025-H)
- Puller Ring Tool (Ford Part #T77J-7025-J)
- Drift
- Bearing Collets Sleeve for 3.5 inch bearing collets (Ford Part #T75L-7025-G)
- Remover/Replacer Tube Tool (Ford Part #T85T-7025-A)
- TOD Forcing Screw Tool (Ford Part #T84T-7025-B)
- Gear Remover Collets Tool (Ford Part #T88T-7061-A)
- Gear Removal Collets (Ford Part #T88T-7025-J)
- Remover/Replacer Tube (Ford Part #T77J-7025-B)
- Front Cover Seal Installer (Ford Part #T77J-7025-G)
- Depth Micrometer (Ford Part #D82L-4201-C)
- Gear Installing Spacer Tool (Ford Part #T88T-7025-F)
- Shaft Adapter Tool (Ford Part #T75L-7025-P)
- Shaft Adapter Screw Tool (Ford Part #T75L-7025-K)

- Remover/Replacer Tube Tool (Ford Part #T75L-7025-A) - 4x4 models
- Gear Installing Spacer Tool (Ford Part #T88F-7025-F) - 2wd models
- Gear Installing Spacer Tool (Ford Part #T88T-7025-G) - 2wd models
- Feeler Gauge
- Channel Lock
- Scribe
- Magnet

Tear Down

1. Put the transmission in a suitable place, such as a workbench, for tear down.
2. Remove the drain plug, on the bottom left side, and get out as much of the fluid as possible. (fig 52)

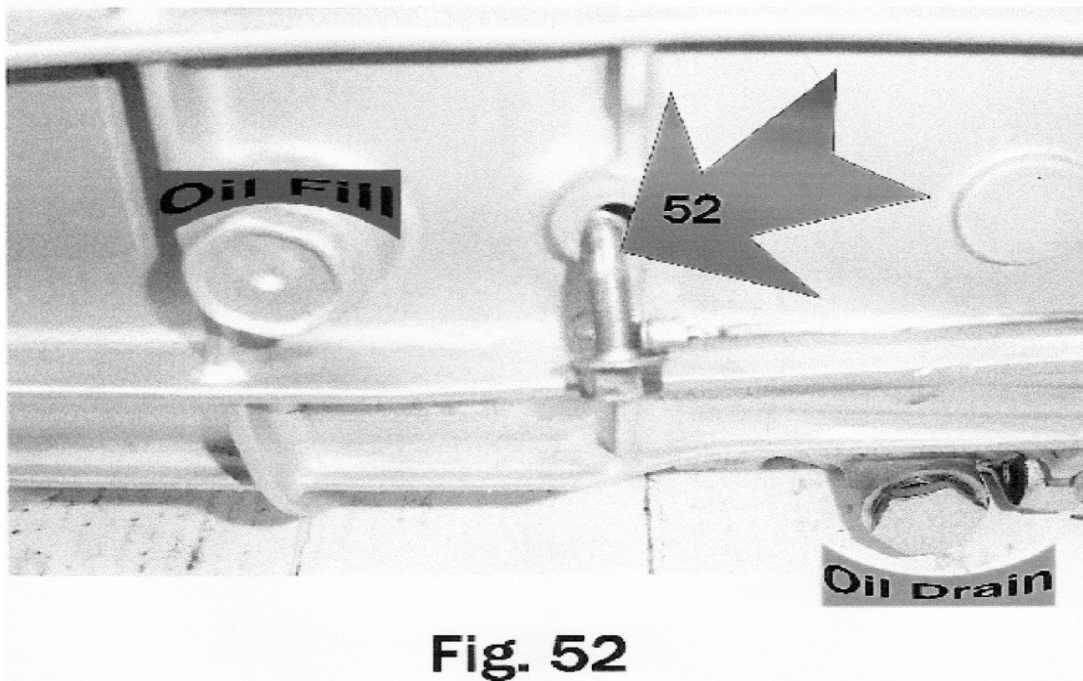
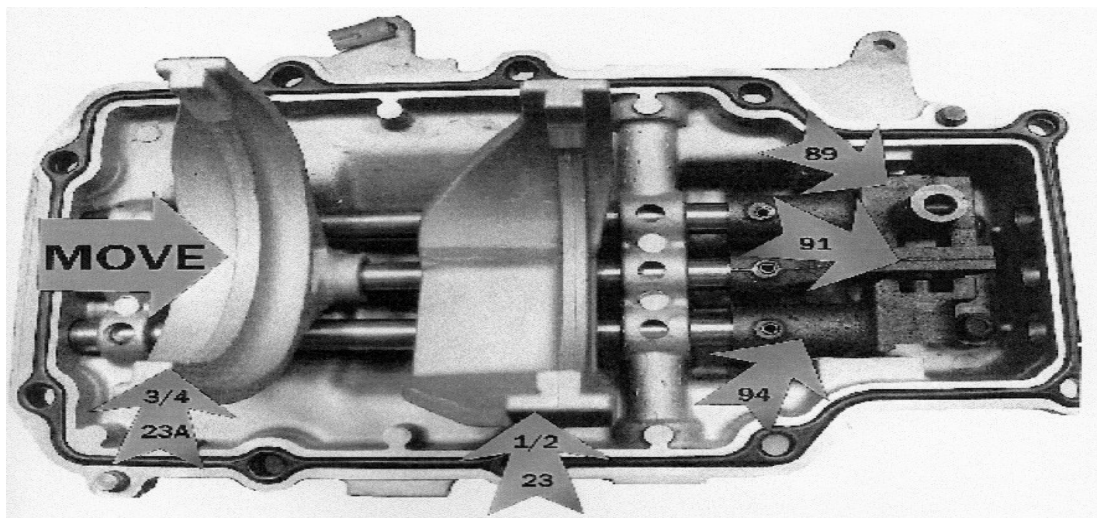


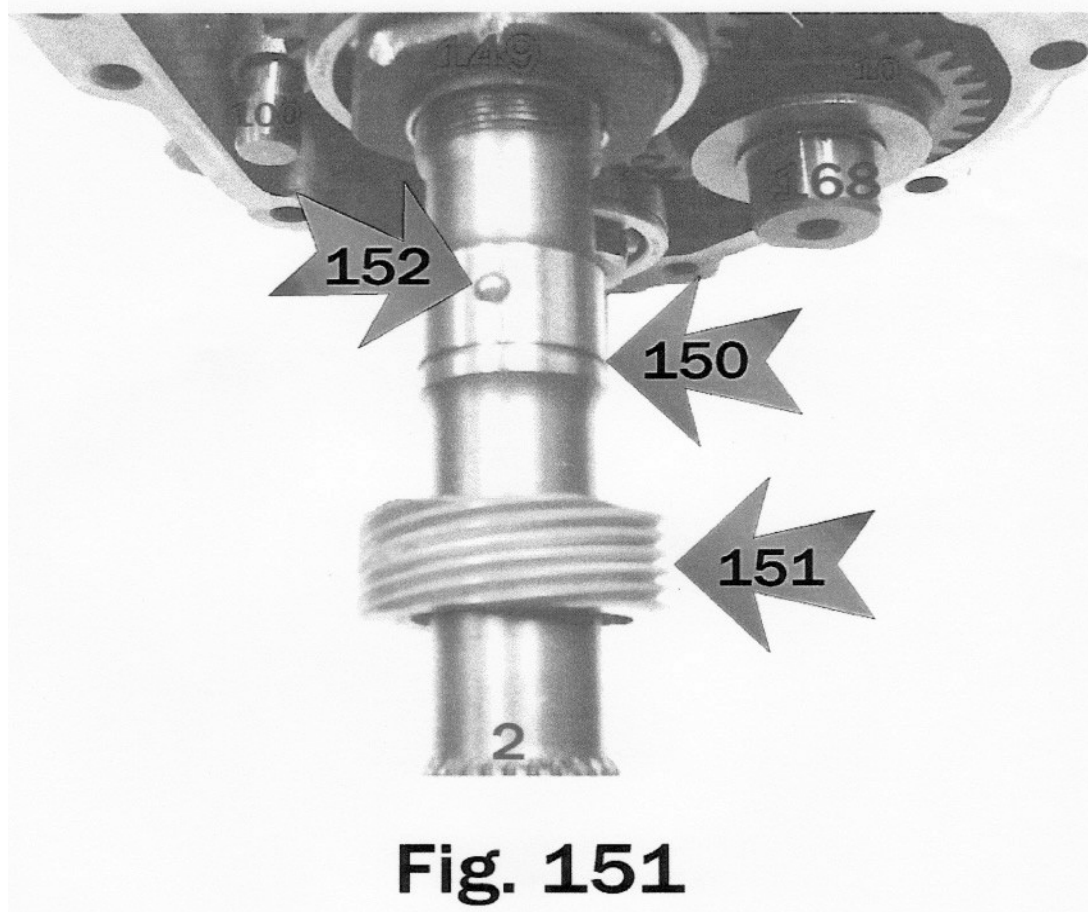
Fig. 52

3. Remove the top cover. (If the shifter is still on remove it before taking off the top cover).
4. Once you have the top cover off you can inspect the forks (#23 and #23A). Wear will occur where the fork enters the slider. Make note of which forks will need to be replaced during reassembly. (fig 23)



5. Remove the bolts from the rear of the case so that you can take off the extension housing (#3). The extension housing is sometimes a little bit tight and difficult to get off. Be careful not to damage the sealing surfaces on the case or the extension housing during the removal process.

6. Remove the speedometer gear (#151). There may be a rubber ring behind the speedometer gear that will slide off. The speedometer gear comes off with a snap ring (#152) and check ball (#150), these keep it from spinning on the shaft. Note the condition of the gear. Any wear on the teeth or across the face of the gear would indicate that it needs to be replaced. (NOTE: Teeth are counted around like a clock and not across the face.) (fig 151)



7. Reach through the top cover opening and move the two visible sliders (#140 and #133) to the rear of the case. This will put the transmission in 1st and 3rd gear. (fig 133,140)

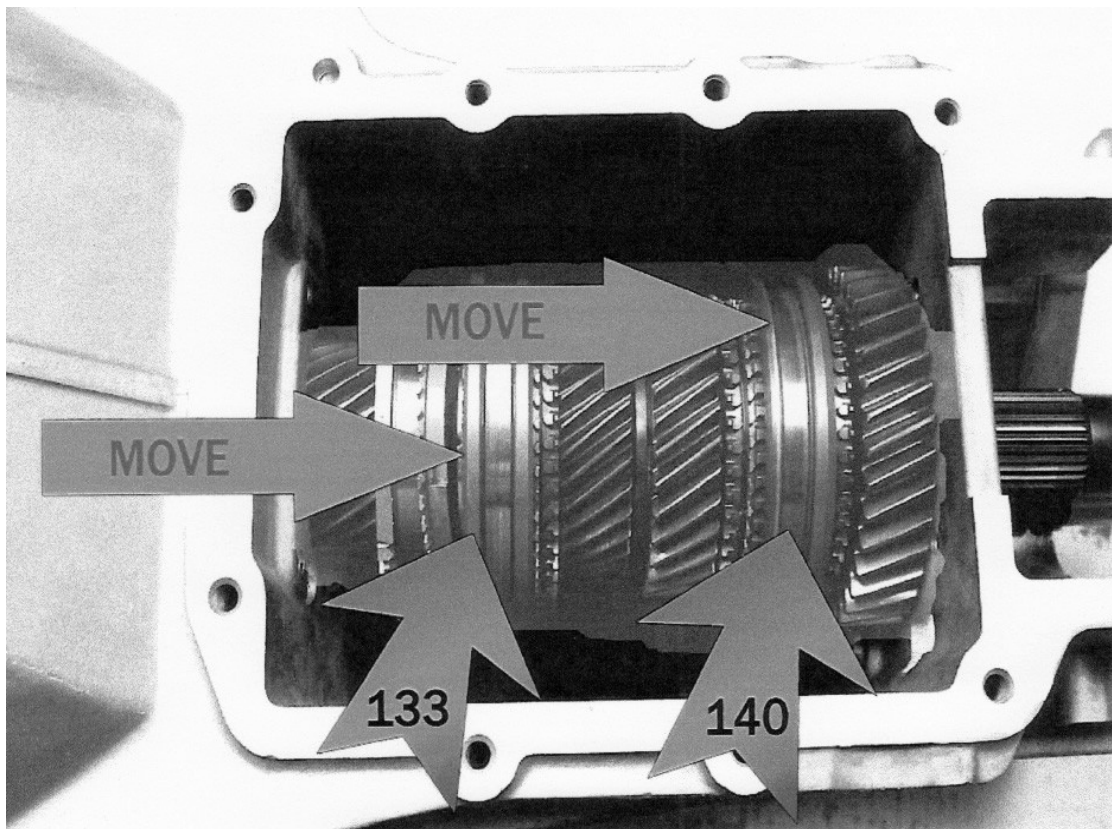
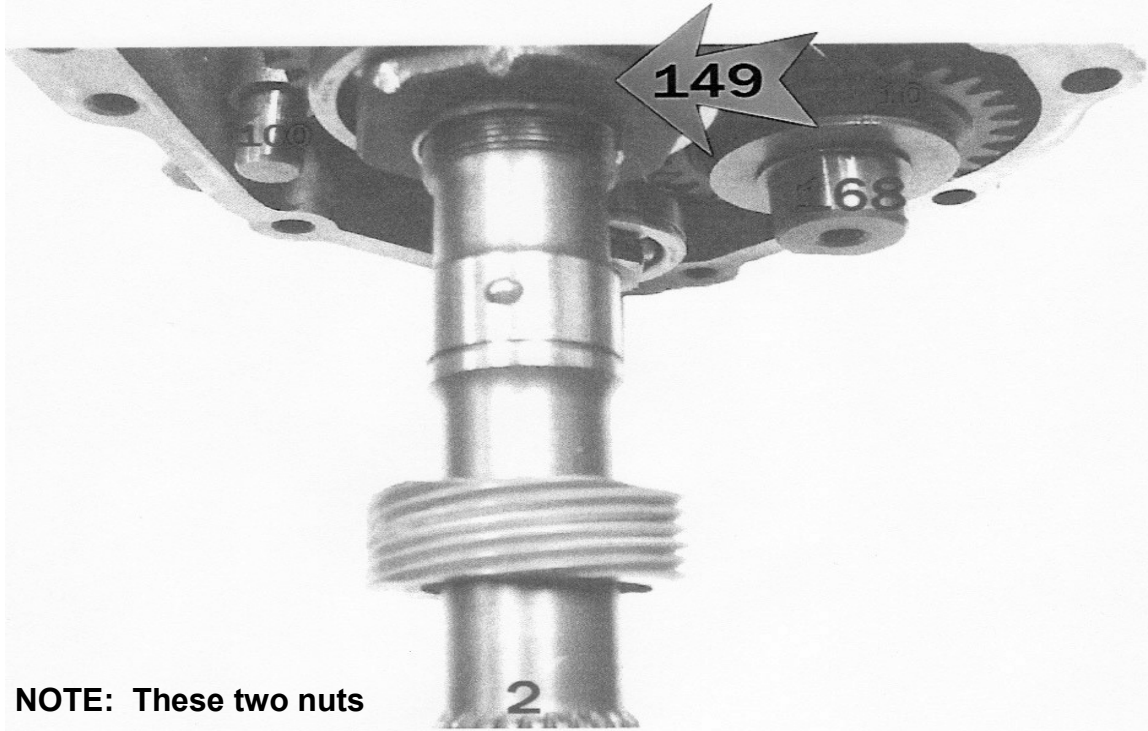


Fig. 133,140

8. Release the stake on the nut with a punch or a staking tool (Countershaft Locknut Staking Tool Ford Part #T77J-7025-F). Remove the big nut on the mainshaft (#149). You can use a fabricated socket (manufacturer calls for: Mainshaft Locknut Wrench Ford Part #T88T-7025-A and Remover/Replacer Tube Tool Ford Part #T76L-7025-B) that fits or you can knock it loose with a hammer and chisel. Once it is loose you can take it the rest of the way off with either channel locks or pliers.

9. Release the stake on the nut with a punch or a staking tool (Countershaft Locknut Staking Tool Ford Part #T77J-7025-F). Remove the countershaft (cluster) nut from the bottom shaft. The nut can be removed with a 32mm socket. (fig 149)



NOTE: These two nuts should be replaced.

Fig. 149

10. The bearing (#166) and washer (#165) should now come off of the counter-shaft (cluster) (#8) (Remover/Replacer Tube Tool Ford Part #T75L-7025-B, TOD Forcing Screw Tool Ford Part #T84T-7025-B, bearing puller tool Ford Part #T77J-7025-H, and puller ring tool Ford Part #T77J-7025-J).

11. Place a drift behind the mainshaft reverse gear (#37) and knock it off. The rear mainshaft bearing (#148) and gear will come off at the same time.

12. On the right rear of the case is a 17mm headed bolt. Remove the bolt so that the reverse idler gear (#10) can be removed. (fig 17mm)

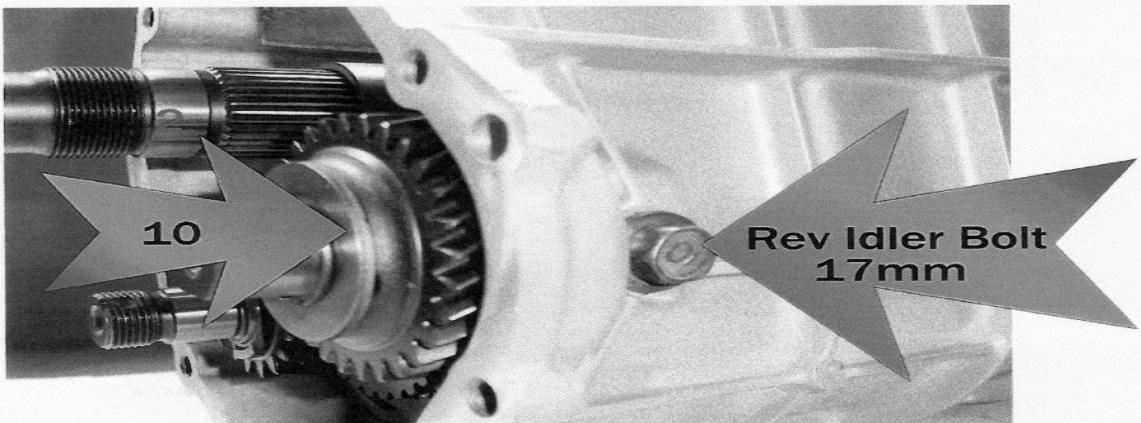


Fig. 17mm