

## NOTE

Check the eight digit number stamped on the transmission case just above the side door. If the third digit is "9," then the transmission was built for Japan only. If the digit is "0," then it was built for all countries except Japan. See the instructions which follow if servicing a Japanese transmission. For all other transmissions, see Section 7.6 MAINSHAFT/COUNTERSHAFT.

## DISASSEMBLY

## NOTES

- Perform all steps if completely overhauling the transmission assembly.
  - Perform steps 1-11 and 17-18 if replacing only the countershaft or one or more countershaft gears.
  - Perform steps 1-5 and 12-18 if replacing only the mainshaft or one or more mainshaft gears.
  - Perform steps 1-6, 12, and 17-18 if replacing only the side door bearings.
1. Position the side door assembly on a bench with the shafts pointing straight up, the mainshaft on the left hand side. The mainshaft is the longer of the two shafts. See Figure D-3.
  2. Slide off the mainshaft 2nd gear (spur).

## NOTE

To facilitate reassembly, label each gear as it is removed. See Figure D-1.

3. Obtain the TRANSMISSION SHAFT RETAINING RING PLIERS, Part No. J-5586.

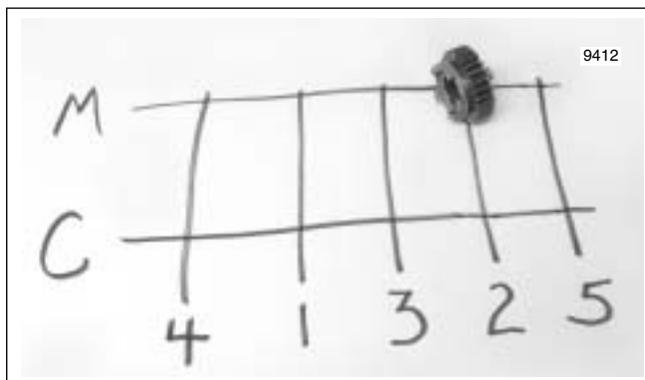


Figure D-1. Note Gear Location During Disassembly

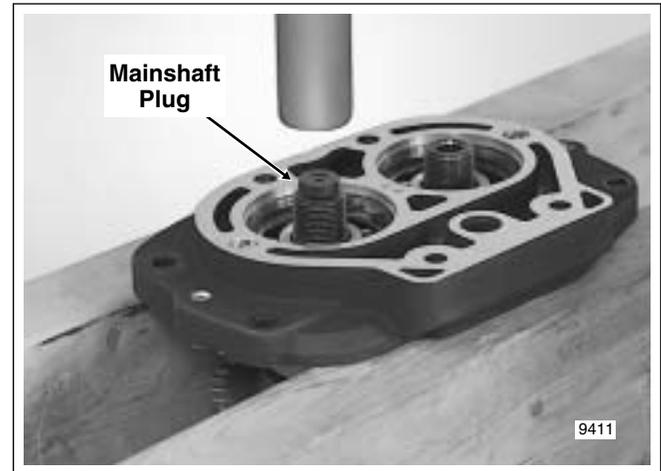


Figure D-2. Press Out Countershaft

**WARNING**

Wear safety glasses or goggles when removing or installing retaining rings. Retaining rings can slip from the pliers and could be propelled with enough force to cause serious eye injury. (00312a)

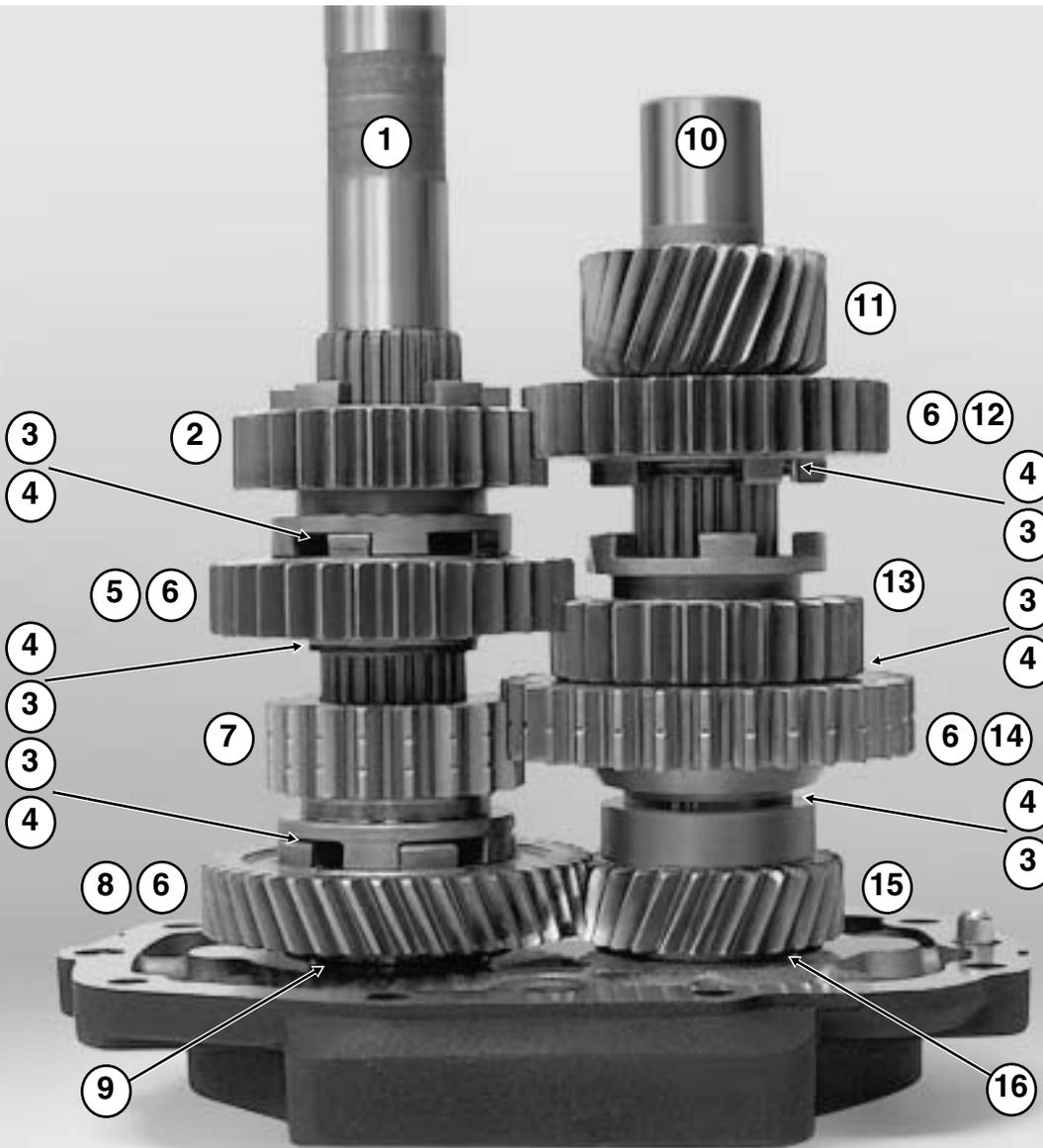
4. Locate retaining ring just above the mainshaft 3rd gear (spur). Move the retaining ring up approximately 3/8 inch (9.5 mm) towards the free end of the shaft. Turn side door assembly upside down and verify that mainshaft 3rd gear is still partially engaged with countershaft 3rd gear.

**CAUTION**

Failure to move the retaining ring on the mainshaft can cause countershaft 1st gear to contact mainshaft 3rd gear when the countershaft is pressed out. On the other hand, if the retaining ring is moved too far, loss of engagement between mainshaft 3rd gear and countershaft 3rd gear can result in hard contact between these two gears. Any hard contact can result in gear tooth damage.

5. With the outboard side up, rest side door on parallel blocks under ram of arbor press. Be sure that assembly is flat and does not rest on dowel on inboard side.
6. Center countershaft under ram. Install mainshaft plug into hole at end of countershaft. Slowly apply pressure until countershaft is free. See Figure D-2. Remove mainshaft plug.

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|-----------------------|------------------|
| 1. Mainshaft          | 9. Gold Spacer   |
| 2. 2nd Gear           | 10. Countershaft |
| 3. Retaining Ring     | 11. 5th Gear     |
| 4. Thrust Washer      | 12. 2nd Gear     |
| 5. 3rd Gear           | 13. 3rd Gear     |
| 6. Split Cage Bearing | 14. 1st Gear     |
| 7. 1st Gear           | 15. 4th Gear     |
| 8. 4th Gear           | 16. Blue Spacer  |

Figure D-3. Fully Assembled Side Door

7. Slide blue spacer and countershaft 4th gear (helical) off threaded end of countershaft.
8. Secure countershaft in a vise with the threaded end top-side. Be sure to install a pair of aluminum or brass jaw inserts in vise to avoid parts damage. See [Figure D-4](#).

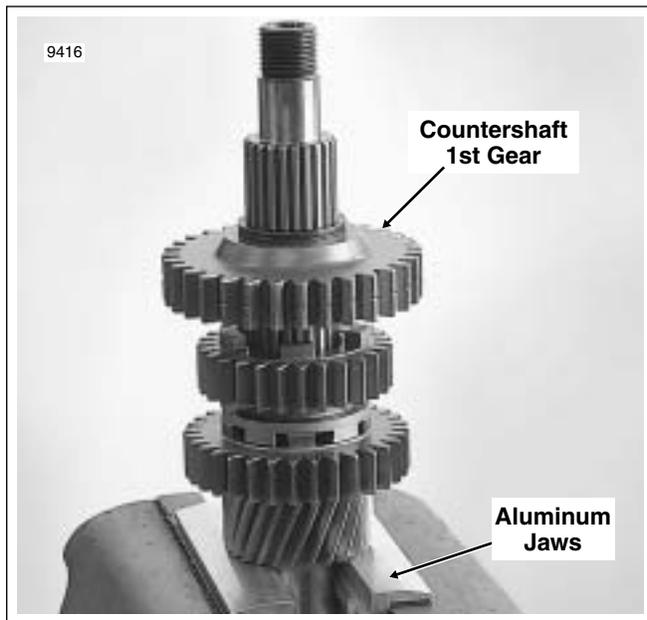


Figure D-4. Disassemble/Assemble Countershaft

9. Remove retaining ring just above the countershaft 1st gear (spur with single row of indents on teeth). Remove thrust washer and countershaft 1st gear. Gently pull apart the split cage bearing and remove. Remove second thrust washer.
10. Remove retaining ring above the countershaft 3rd gear (spur). Remove countershaft 3rd gear.
11. Remove retaining ring just above the countershaft 2nd gear (spur). Remove thrust washer and countershaft 2nd gear. Gently pull apart the split cage bearing and remove.
12. Center mainshaft under ram of arbor press. Install mainshaft plug into hole at end of mainshaft. Slowly apply pressure until mainshaft is free. Remove mainshaft plug.
13. Slide gold spacer, mainshaft 4th gear (helical), split cage bearing and thrust washer off end of mainshaft.
14. Secure the mainshaft in a vise with the longer splined end at the top. Be sure to install a pair of aluminum or brass jaw inserts in vise to avoid parts damage. See Figure D-5.
15. Remove retaining ring above the mainshaft 1st gear (spur with double row of indents on teeth). Remove mainshaft 1st gear.
16. Remove retaining ring just above the mainshaft 3rd gear (spur). Remove the thrust washer and mainshaft 3rd gear. Gently pull apart the split cage bearing and remove. Remove the second thrust washer. Remove the last retaining ring, which was moved out of the groove before the countershaft was pressed out.

## WARNING

Wear safety glasses or goggles when removing or installing retaining rings. Retaining rings can slip from the pliers and could be propelled with enough force to cause serious eye injury. (00312a)

17. Set the side door on a bench with the outboard side up. Remove retaining ring from the bearing bore. Always use the correct retaining ring pliers and verify that the tips of the pliers are not damaged or excessively worn.

## NOTE

Depending upon whether one or both shafts were removed, replace one or both side door bearings. Always replace the bearing if the shaft was pressed out.

18. Turn side door over so that the inboard side is up and place on flat plate under ram of arbor press. Apply pressure to outer race to press bearing from bore.

## CLEANING AND INSPECTION

1. Clean all parts in cleaning solvent and blow dry with compressed air.
2. Check gear teeth for damage. Replace the gears if they are pitted, scored, rounded, cracked or chipped.
3. Inspect the engaging dogs on the gears. Replace the gears if the dogs are rounded, battered or chipped.
4. Inspect the side door bearings. Bearings must rotate freely without drag. Replace the bearings if pitted, grooved, or if the shafts were removed.

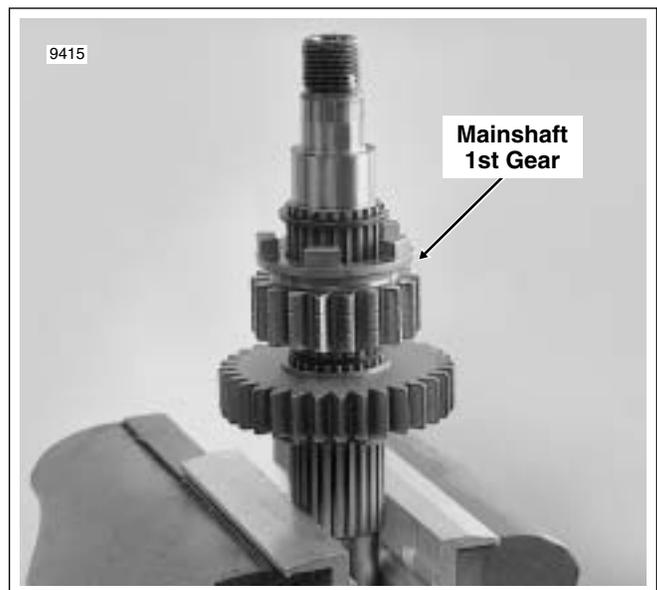


Figure D-5. Disassemble/Assemble Mainshaft

## ASSEMBLY

### NOTES

- Perform all steps if the transmission assembly was completely overhauled.
- Perform steps 1-5 and 12-24 if only the countershaft or one or more countershaft gears were replaced.
- Perform steps 1-11 and 20-24 if only the mainshaft or one or more mainshaft gears were replaced.
- Perform steps 1-4, 11, and 18-24 if only the side door bearings were replaced.

1. With the outboard side up, place side door on flat plate under ram of arbor press.

### NOTE

Note the two drill points between the bearing bores on the side door. See [Figure D-7](#). Two drill points indicate that the side door must be fitted with the new style 12mm wide bearings. Installation of the old style 14mm wide bearings would cover the retaining ring grooves.

2. Position **new** bearing over bore with the number stamp topside.
3. Applying pressure to outer race, press bearing into bore until firm contact is made with the counterbore.

### WARNING

**Wear safety glasses or goggles when removing or installing retaining rings. Retaining rings can slip from the pliers and could be propelled with enough force to cause serious eye injury. (00312a)**

4. With the flat side in towards the bearing (beveled side out), install **new** retaining ring in bearing bore. Always use the correct retaining ring pliers and verify that the tips of the pliers are not damaged or excessively worn.

### NOTE

Depending upon the level of disassembly, replace one or both side door bearings. Always replace the bearing if the shaft was pressed out.

5. Obtain the TRANSMISSION SHAFT RETAINING RING PLIERS, Part No. J-5586.

### WARNING

**Always use new retaining rings when assembling the mainshaft and countershaft. Reusing retaining rings can cause the transmission to become “locked” during motorcycle operation, a situation which could result in death or serious injury.**



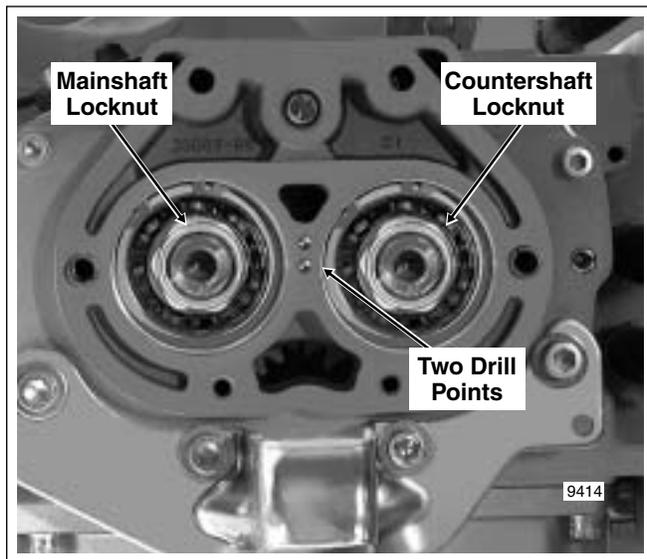
**Figure D-6. Press In Countershaft**

6. Secure the mainshaft in a vise with the longer splined end at the top. Be sure to install a pair of aluminum or brass jaw inserts in vise to avoid parts damage.
7. Install **new** retaining ring approximately 3/8 inch (9.5 mm) below the bottom retaining ring groove.
8. Slide thrust washer down mainshaft until it contacts retaining ring. Lightly coat split cage bearing with oil and install in race just above thrust washer. Install mainshaft 3rd gear (spur) with the shifter dogs down. Install second thrust washer. Install **new** retaining ring in groove just above the bearing race.
9. With the fork groove up, slide mainshaft 1st gear (spur with double row of indents on teeth) down mainshaft until it contacts retaining ring. Install **new** retaining ring in groove above the gear. See [Figure D-5](#).

### CAUTION

**Verify that the mainshaft 1st gear has the double row of indents on teeth. Using a gear with a single row of indents will result in transmission damage.**

10. Slide thrust washer down the mainshaft until it contacts the retaining ring. Lightly coat the split cage bearing (double roller) with oil and install in race above the thrust washer. Install mainshaft 4th gear (helical) over the bearing with the shifter dogs down. Install gold spacer.
11. With the inboard side up, place side door on flat plate under ram of arbor press. Holding mainshaft assembly together, remove from vise and position over bearing bore in side door. Install mainshaft plug into hole at end of mainshaft. Supporting inner race of bearing, press mainshaft into bearing bore. Remove mainshaft plug.



**Figure D-7. Install Mainshaft/Countershaft Locknuts**

12. Secure the countershaft in a vise with the threaded end topside. Be sure to install a pair of aluminum or brass jaw inserts in vise to avoid parts damage.
13. Lightly coat split cage bearing with oil and install in race next to the countershaft 5th gear.
14. Install countershaft 2nd gear (spur) over the bearing with the shifter dogs up. Install thrust washer and **new** retaining ring.
15. Install countershaft 3rd gear (spur) with the fork groove down. Install **new** retaining ring in groove above the gear.
16. Slide the thrust washer down the countershaft until it contacts the retaining ring. Lightly coat the split cage bearing with oil and install in the race just above the thrust washer. Install countershaft 1st gear (spur with single row of indents on teeth) with the taper up. Install second thrust washer and **new** retaining ring. See [Figure D-4](#).
17. Install countershaft 4th gear (helical) with the sleeve down. Install blue spacer with the taper up.
18. With the inboard side up, place side door on flat plate under ram of arbor press. Support inner race of bearing.
19. Holding countershaft assembly together, remove from vise. Raising mainshaft 3rd gear until it contacts partially installed retaining ring, position countershaft over bearing bore. Verify that taper on blue spacer is facing towards the bearing.
20. Place mainshaft plug at end of countershaft. Be sure that mainshaft and countershaft gears mesh and that assembly is square. Press countershaft into bearing bore. Remove mainshaft plug. See [Figure D-6](#).

21. Return side door assembly to bench. Position with the shafts pointing straight up, the mainshaft on the left hand side.
22. Move partially installed retaining ring into groove just above the mainshaft 3rd gear.
23. Install mainshaft 2nd gear (spur) with the fork groove down.  
The final assembly appears as shown in [Figure D-3](#).
24. Install spacer and locknut on the threaded end of each shaft and tighten the nuts until finger tight. See [Figure D-7](#).

**NOTE**

*For final tightening of the locknuts and installation of the side door, see [Section 7.6 MAINSHAFT/COUNTERSHAFT, INSTALLATION](#).*

# NOTES

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