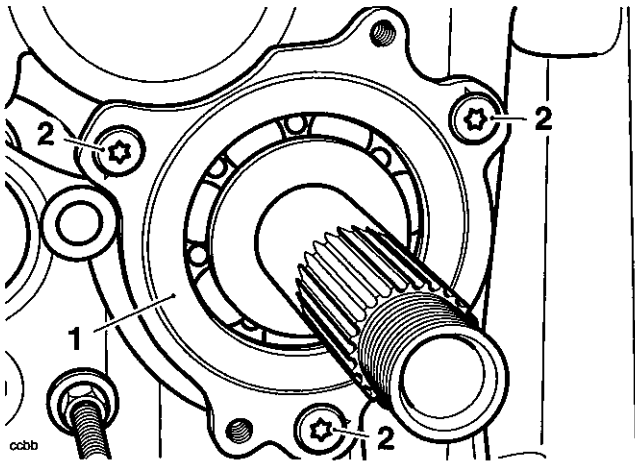
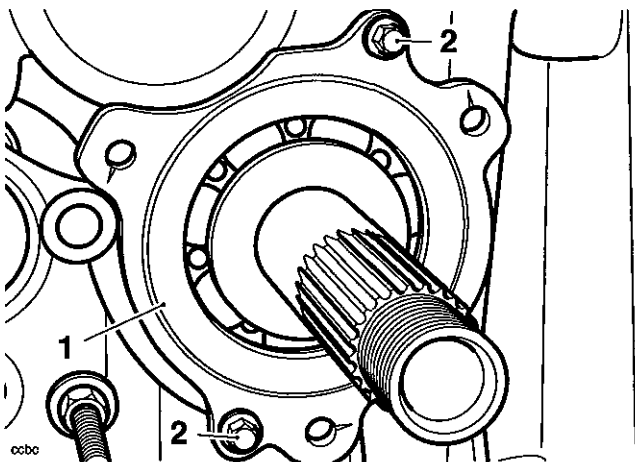


- Release the three Torx fixings securing the input shaft bearing housing to the upper crankcase.



- Input shaft bearing housing
- Torx fixings

- Insert two M6 bolts into the two threaded holes at the periphery of the bearing housing. Evenly and progressively tighten both bolts to draw the bearing housing from the crankcase.



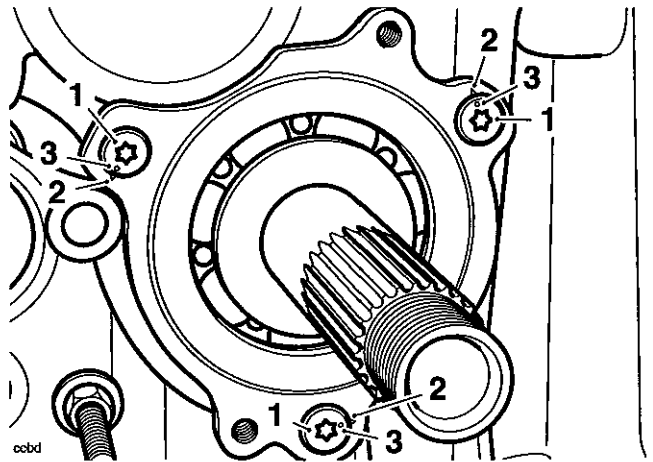
- M6 bolts
- Bearing housing

- With the bearing housing released, withdraw the input shaft through the aperture for the bearing housing.

Installation

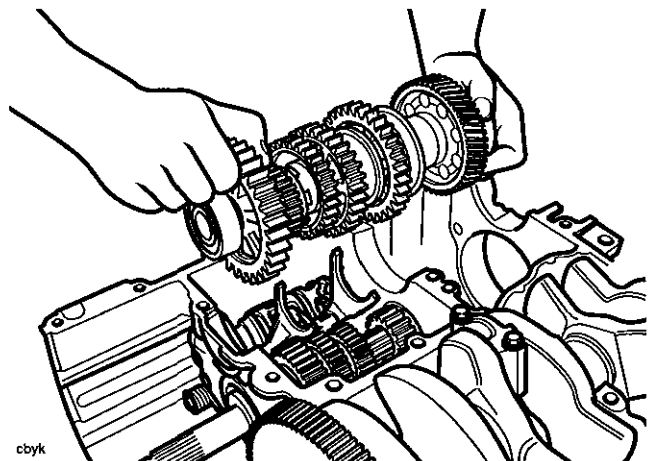
- Locate the input shaft to the upper crankcase, installing it through the aperture for the bearing housing.
- Fit the bearing housing into the aperture, by hand, as deeply as possible.
- Using the old Torx fixings, draw the bearing housing into the upper crankcase until fully home. Remove and discard the Torx fixings.

- Fit new Torx fixings to the bearing housing. Tighten them to **12 Nm**.
- Using a small punch, stake the Torx heads to the corresponding notches in the upper crankcase.



- Torx fixings
- Notches
- Stake marks

- Refit the selectors and shaft as described on page 8.9.
- Refit the output shaft to the crankcase ensuring the snap-ring on the outside of the inner bearing locates in their corresponding groove in the crankcase.

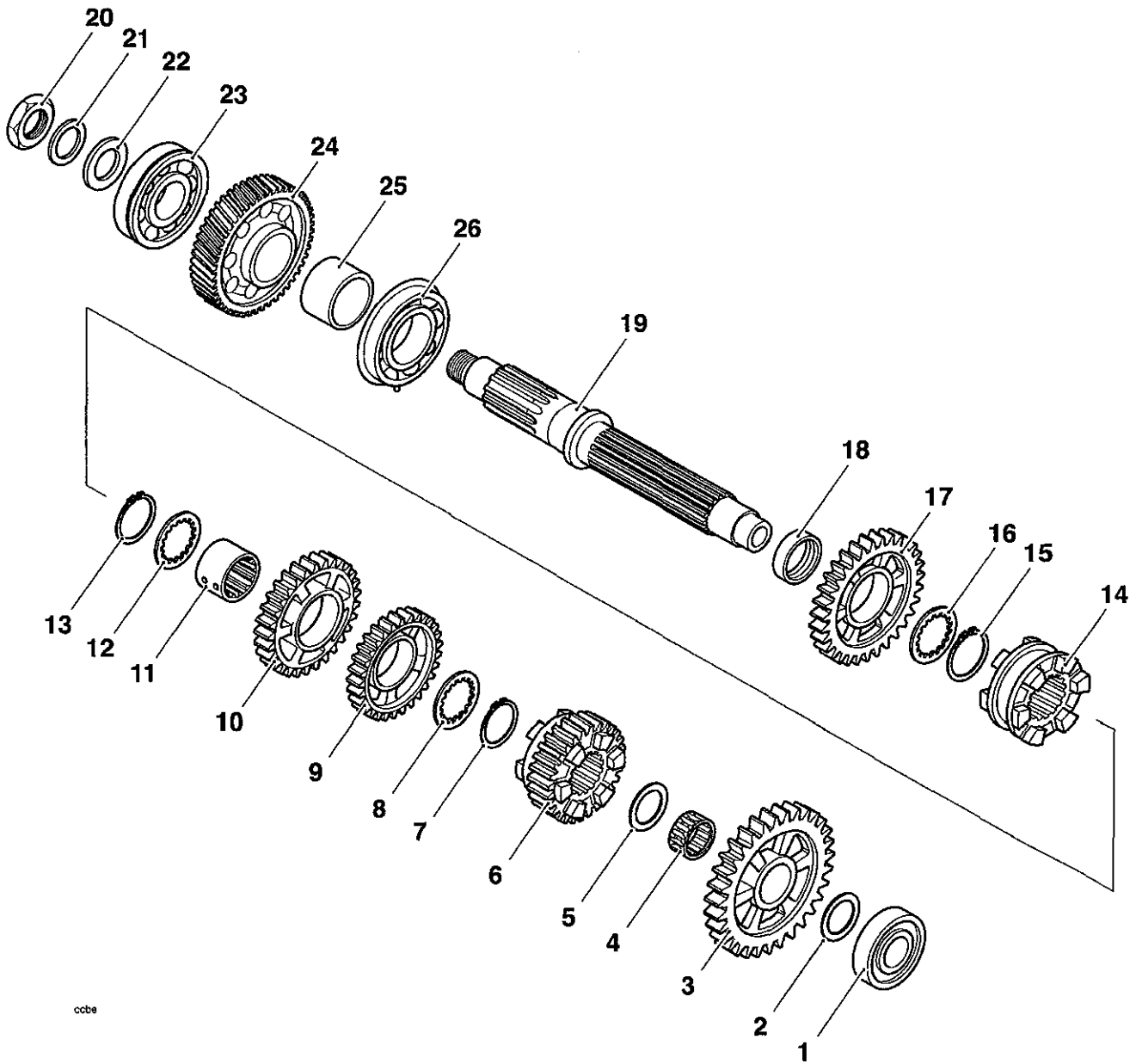


Installing the Output Shaft

- Assemble the crankcases as described on page 5.9.
- Refit the engine to the frame as described on page 10.5.

Transmission

Output Shaft



- 1. Ball bearing
- 2. Thrust washer
- 3. First gear
- 4. Needle roller bearing
- 5. Thrust washer
- 6. Fifth gear
- 7. Circlip
- 8. Thrust washer
- 9. Fourth gear
- 10. Third gear
- 11. Splined bush
- 12. Thrust washer
- 13. Circlip

- 14. Dog ring
- 15. Circlip
- 16. Thrust washer
- 17. Second gear
- 18. Second gear bush
- 19. Output shaft
- 20. Nut
- 21. 'C' washer
- 22. Flat washer
- 23. Ball bearing
- 24. Output gear
- 25. Spacer
- 26. Ball bearing

Disassembly

Note:

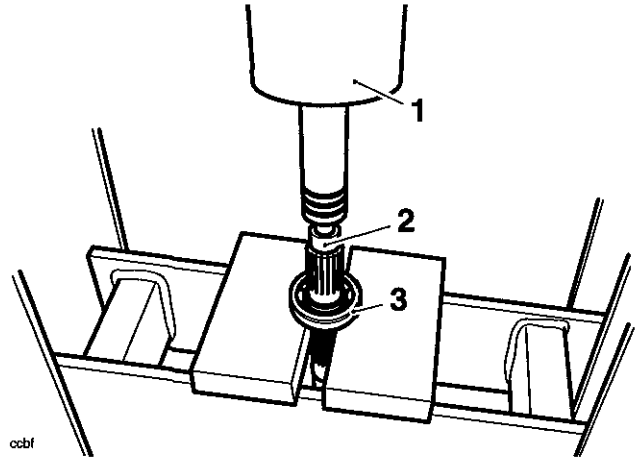
- All numbers given within brackets in the procedure below, refer directly to the numbered items in the above diagram.

Make a note or mark the orientation of all parts prior to removal.

1. Remove the ball bearing (1) and washer (2).
2. Remove first gear (3) and its needle roller bearing (4).
3. Remove the first gear thrust washer (5).
4. Remove fifth gear (6), revealing a circlip (7) that secures fourth and third gears.
5. Remove the circlip (7).
6. Slide off the thrust washer (8) from in front of fourth gear (9), then slide off fourth gear.
7. Slide off third gear (10), the splined third/fourth gear bush (11) and the thrust washer (12).
8. Remove the circlip (13) from in front of the splined dog ring (14).
9. Slide off the splined dog ring (14).
10. Remove the circlip (15) from in front of second gear (17).
11. Slide off the second gear thrust washer (16), then second gear (17) and its bush (18).
12. Working now from the other end of the shaft, remove the large nut (20) Bellville washer (21) and flat washer (22).
13. Slide off the ball bearing (23), output gear (24) and spacer (25).

Never wear loose clothing, which could become trapped in the press and cause crushing injury to the hand, arms or other parts of the anatomy.

14. Place the shaft (19) in a press with the threaded end of the shaft facing the press ram. Support the centre bearing (26) on press bars.



1. Press
2. Output shaft
3. Centre bearing

15. Press the shaft through the bearing.

Inspection

1. Examine all gears, bearings and bushes and thrust washers for damage, distortion, chipped teeth and wear beyond the service limits. Replace all suspect components and always use new circlips to assemble the shaft.

Warning

When using a press, always wear overalls, eye face and hand protection. Objects such as bearings frequently break-up under load and the debris caused during break-up may cause damage and injury to unprotected parts of the body.

Transmission

Assembly

Note:

- Lubricate each gear, thrust washer and bush with clean engine oil during assembly.

Note:

- The circlips used on the output shaft have a flat side and an angled side. Illustrations throughout the assembly text indicate which orientation of each circlip is correct.



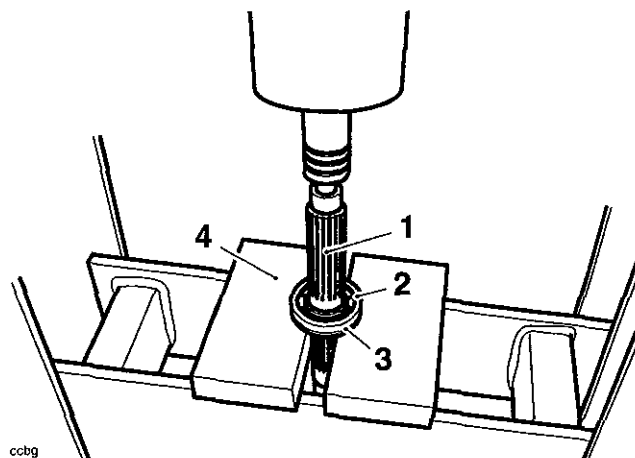
Caution

Bushes with oil holes must always be **MISALIGNED** with the corresponding oil holes in the output shaft. Reduced oil pressure and gear lubrication may result from alignment of the oil holes, which would cause premature wear of engine and transmission components.



Warning

When using a press, always wear overalls, eye face and hand protection. Objects such as bearings frequently break-up under load and the debris caused during break-up may cause damage and injury to unprotected parts of the body. Never wear loose clothing, which could become trapped in the press and cause crushing injury to the hand, arms or other parts of the anatomy.

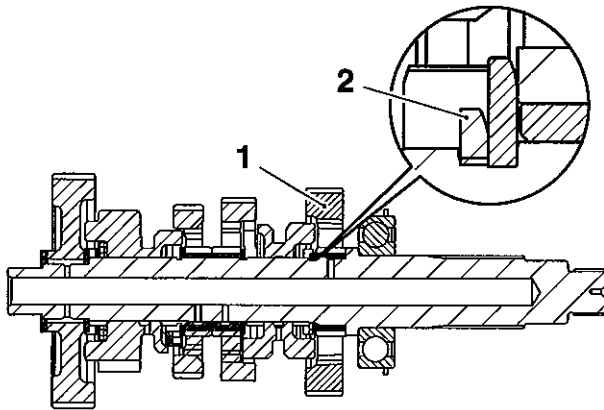


1. Output shaft
2. Bearing
3. Circlip groove
4. Press bars

2. Locate the output shaft (19) to the bearing, with the threaded end pointing through the bearing (i.e. away from the press).
3. Press the output shaft through the bearing until the shoulder in the centre of the shaft contacts the bearing face.
4. Fit the spacer (25) to the shaft, then slide on the output gear (24).
5. Fit the bearing (24) to the shaft and retain with the flat washer (22), Bellville washer (21) and nut (20). Tighten the nut to **145 Nm**.
6. Working from the other end of the shaft, slide on the second gear bush (18).

1. Place the centre output shaft bearing (26) on press bars, ensuring that the press bars support the inner race of the bearing and the circlip groove on the outer race is nearest to the press bars.

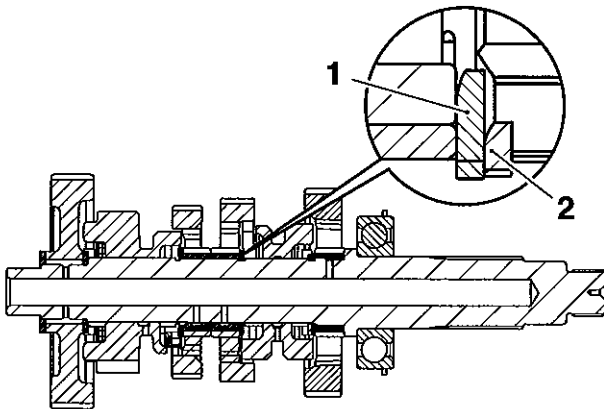
7. Fit second gear (17) and thrust washer (16).
8. Fit a new circlip (15), orientating the circlip as shown below.



ccbh

1. Second gear
2. Circlip

9. Fit the splined dog ring (14) to the shaft.
10. Retain the dog ring with a new circlip (13), orientating the circlip as shown below.

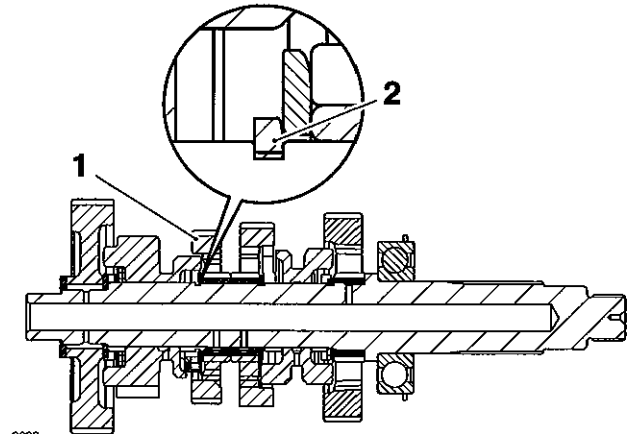


ccbi

1. Dog ring
2. Circlip

11. Fit the thrust washer (12) and splined bush (11).
12. Slide third and fourth gears (10 and 9) onto the splined bush.

13. Fit the thrust washer (8), then a new circlip (7), orientating the circlip as shown below.



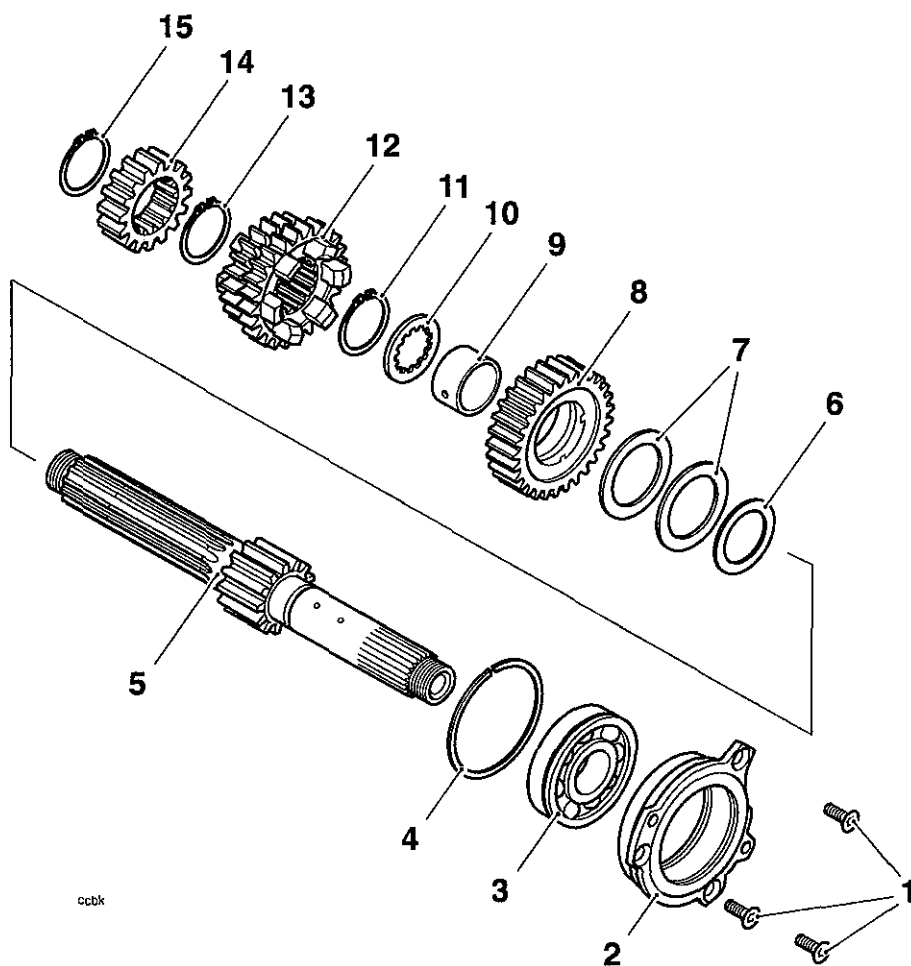
cccc

1. Third/fourth gear
2. Circlip

14. Fit fifth gear (6) to the shaft, followed by the thrust washer (5).
15. To complete assembly of the output shaft, fit the needle roller bearing (4), first gear (3), thrust washer (2) and bearing (1).

Transmission

Input Shaft



- 1. Torx screws
- 2. Bearing retainer plate
- 3. Ball bearing
- 4. Retaining ring
- 5. Input shaft
- 6. Thrust washer
- 7. Belleville washers

- 8. Fifth gear
- 9. Fifth gear bush
- 10. Thrust washer
- 11. Circlip
- 12. Third/fourth gear
- 13. Circlip
- 14. Second gear
- 15. Circlip

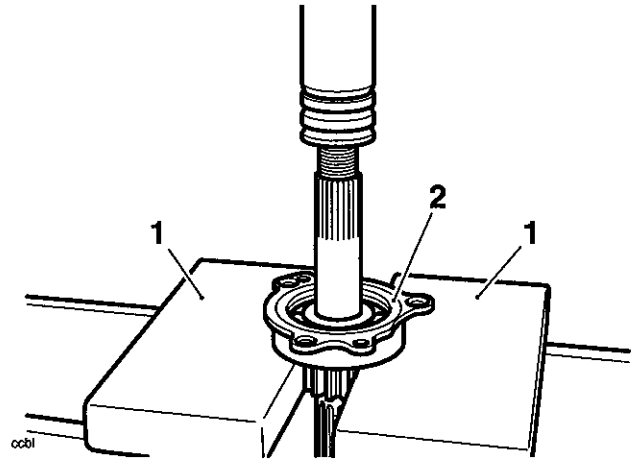
Disassembly

1. Remove the circlip (15) from in front of second gear (14).
2. Remove second gear (14).
3. Remove the circlip (13) from in front of third/fourth gear (12).
4. Remove third/fourth gear (12).
5. Remove the circlip (11) from in front of fifth gear (8).
6. Remove the thrust washer (10), fifth gear (8) and the fifth gear bush (9).
7. Note (or mark) the orientation of the two Belleville washers (7), then remove them from the shaft.
8. Remove the thrust washer (6).

Note:

- Unless the bearing at the clutch end of the input shaft is damaged or worn, it is not normally necessary to remove it from the shaft. The bearing is pressed onto the shaft and is also pressed into its housing and retained by a snap-ring. The bearing and housing are removed from the shaft together and are then separated.

9. Support the bearing and housing on press bars, then press the shaft through the bearing and housing as shown below.



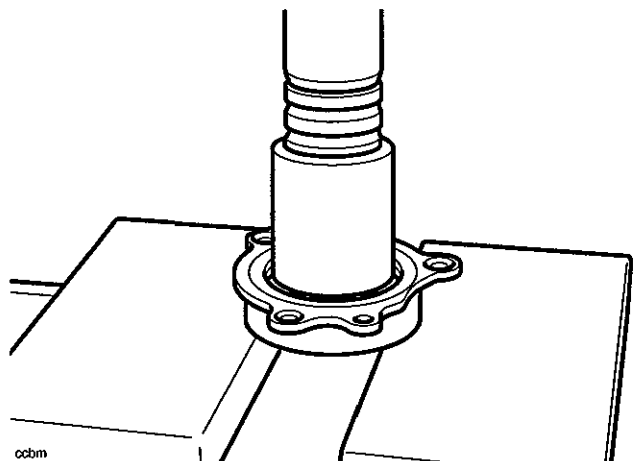
1. Press bars
2. Bearing/housing

10. Remove the snap-ring from the bearing housing.

Caution

When pressing the bearing out of the housing, never support the housing on its peripheral lugs, as they will break under the loads imparted by the press. Always support the housing on its outer circumference ensuring the maximum arc of that circumference is supported.

11. Support the outer circumference of the bearing housing on press bars, then press the bearing through the housing.



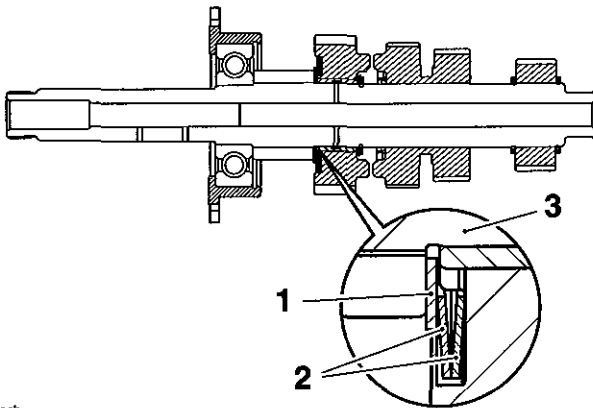
Pressing out the bearing

Warning

When using a press, always wear overalls, eye face and hand protection. Objects such as bearings frequently break-up under load and the debris caused during break-up may cause damage and injury to unprotected parts of the body.

Never wear loose clothing, which could become trapped in the press and cause crushing injury to the hand, arms or other parts of the anatomy.

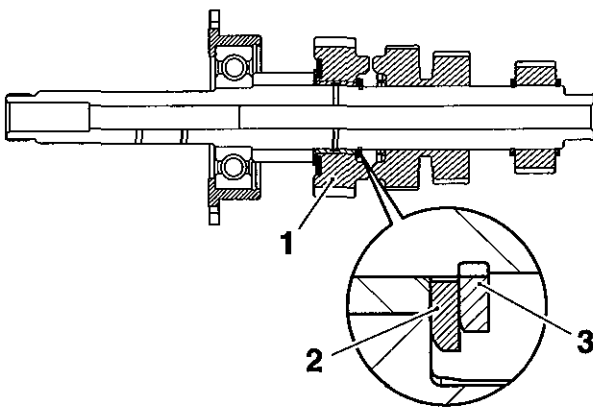
6. Fit the bush (9).
7. Fit the Belleville washers (7) over the bush, arranging them as shown below.



cccb

1. Thrust washer
2. Belleville washers
3. Bush

8. Fit fifth gear (8) and the fifth gear thrust washer (10).
9. Retain the assembly with a new circlip (11), orientating the circlip as shown below.

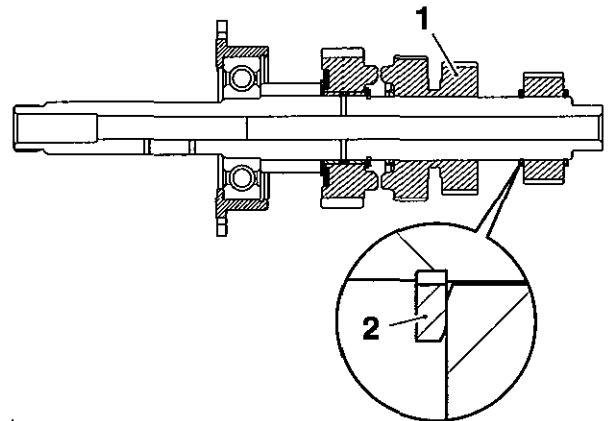


ccbp

1. Fifth gear
2. Fifth gear thrust washer
3. Circlip

10. Fit the third/fourth gear (12) to the shaft.

11. Retain third/fourth gear with a new circlip (13), orientating the circlip as shown below.

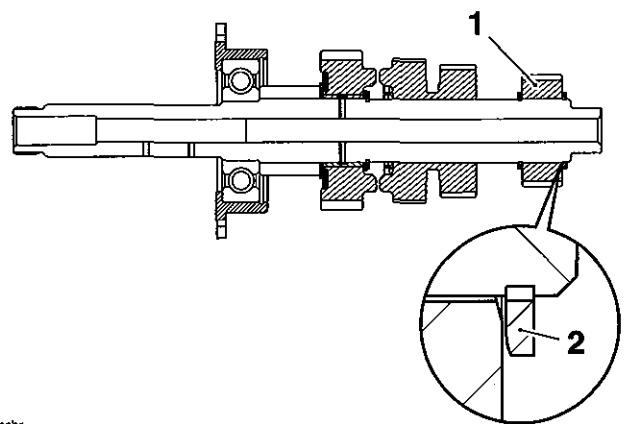


ccbq

1. Third/fourth gear
2. Circlip

12. Slide on second gear (14).

13. Retain second gear with a new circlip (13), orientating the circlip as shown below.



ccbr

1. Second gear
2. Circlip