INTRODUCTION

How to use this manual

To assist in the use of this manual the section title is given at the top and the relevant sub-section is given at the bottom of each page.

This manual contains procedures for overhaul of the LT230Q transfer box. For all other information regarding adjustments and removal of oil seals, consult the Repair Manual for the model concerned.

This manual is divided into 3 sections:
- Description and Operation,
- Overhaul and
- Data, Torque & Tools.

To assist filing of revised information, each sub-section is numbered from page 1.

Individual items are to be overhauled in the sequence in which they appear in the Manual. Items numbered in the illustrations are referred to in the text.

Overhaul operations include reference to Service Tool numbers and the associated illustration depicts the tool. Where usage is not obvious the tool is shown in use. Operations also include reference to wear limits, relevant data, torque figures, specialist information and useful assembly details.

WARNINGS, CAUTIONS and Notes have the following meanings:

WARNING: Procedures which must be followed precisely to avoid the possibility of injury.

CAUTION: Calls attention to procedures which must be followed to avoid damage to components.

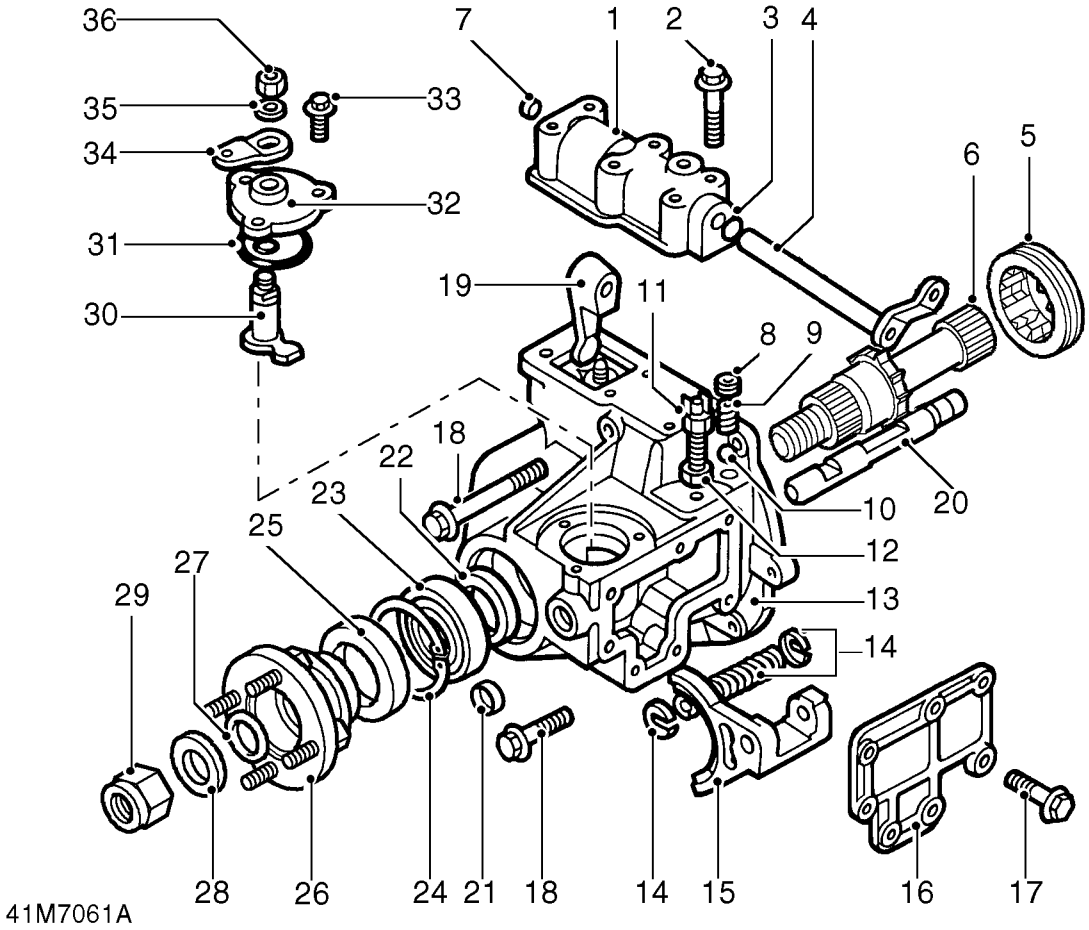
NOTE: Gives helpful information.

References

Operations covered in this manual do not include reference to testing the vehicle after repair. It is essential that work is inspected and tested after completion and if necessary a road test of the vehicle is carried out particularly where safety related items are concerned

Dimensions

The dimensions quoted are to design engineering specification with Service limits where applicable.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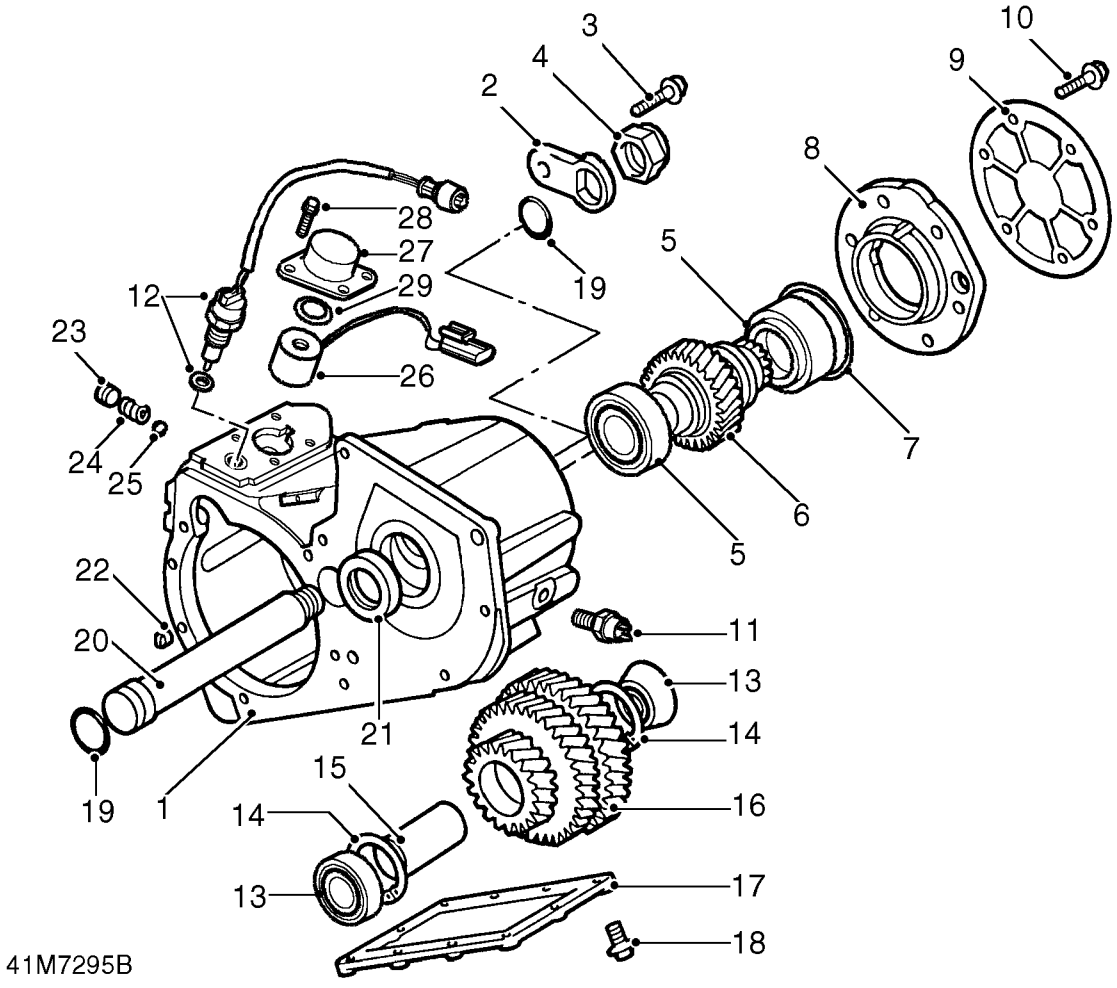
FRONT OUTPUT HOUSING COMPONENTS

1. High/low cross shaft housing
2. Bolt - high/low cross shaft housing
3. 'O' ring
4. High/low cross shaft and lever
5. Dog clutch
6. Front output shaft
7. Hollow plug
8. Detent plug - differential lock
9. Detent spring - differential lock
10. Detent ball - differential lock
11. Differential lock warning lamp switch
12. Locknut
13. Front output housing
14. Spring and clips - differential lock
15. Differential lock selector fork
16. Cover plate
17. Bolt - cover plate
18. Bolt - front output housing
19. High/low selector finger
20. Differential lock selector shaft
21. Plug
22. Bearing spacer
23. Output shaft bearing
24. Circlip
25. Oil seal
26. Output shaft flange and mud shield
27. Felt washer
28. Steel washer
29. Self-locking nut
30. Differential lock selector finger and shaft
31. 'O' rings
32. Differential lock selector housing
33. Bolt - housing
34. Selector lever
35. Washer
36. Self-locking nut

DIFFERENTIAL COMPONENTS

1. Retaining ring
2. Differential carrier - rear half
3. Low range gear
4. High/low hub
5. High/low selector sleeve
6. High/low selector shaft
7. High/low selector fork
8. Setscrew - high/low selector fork
9. High range gear
10. High range gear bush
11. Differential rear bearing
12. Bearing outer track
13. Bearing retaining nut
14. Dished thrust washers
15. Planet gears
16. Cross shafts
17. Sun gears
18. Selective thrust washers
19. Differential carrier - front half
20. Bolt - differential carriers
21. Differential front bearing
22. Bearing outer track
23. Selective shim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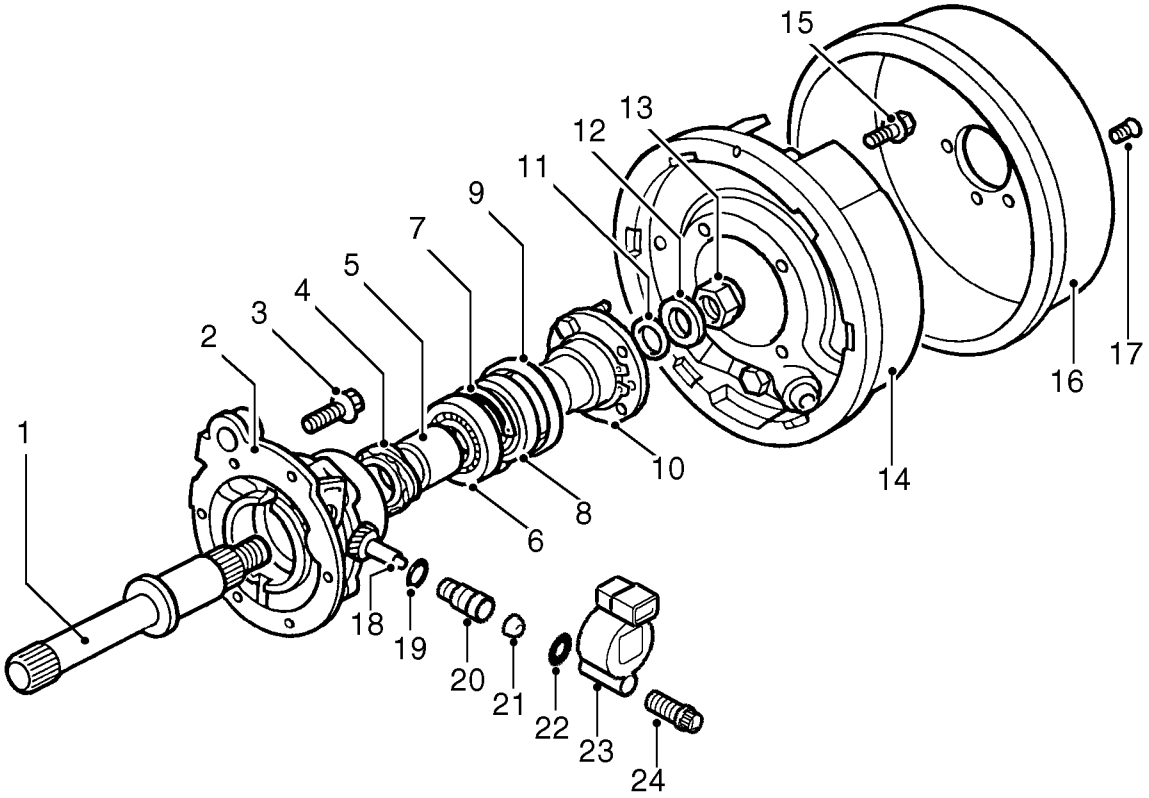

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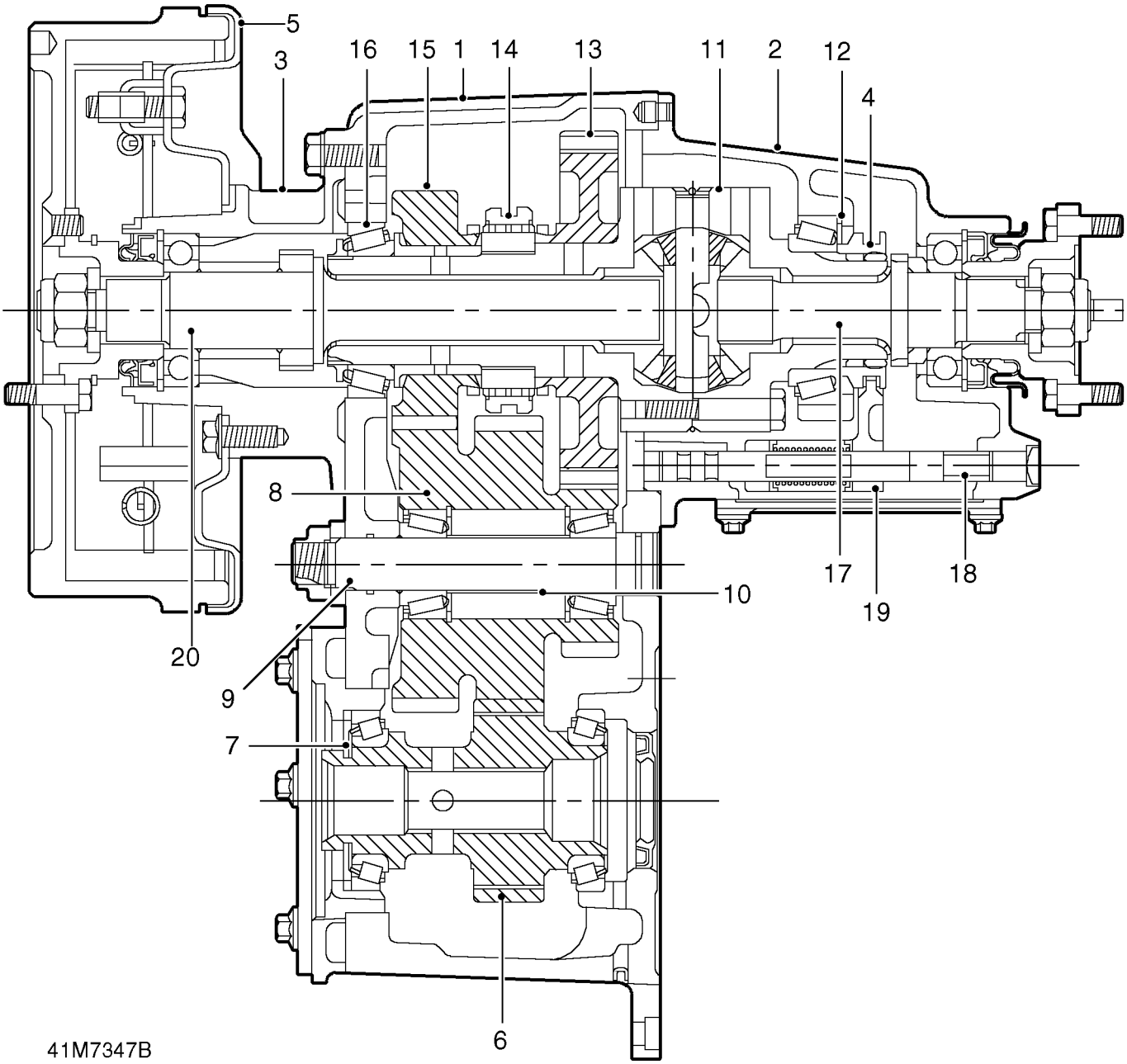
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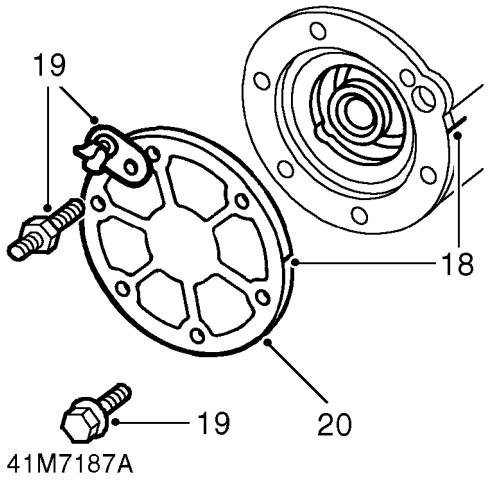
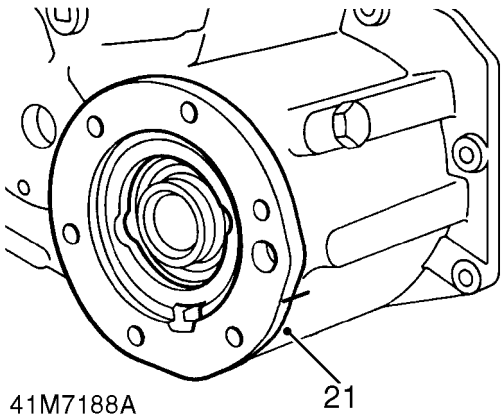


NOTE: Discovery cover plate illustrated.

18. Make suitable alignment marks between cover plate/power take-off cover, mainshaft input gear bearing housing and main casing.

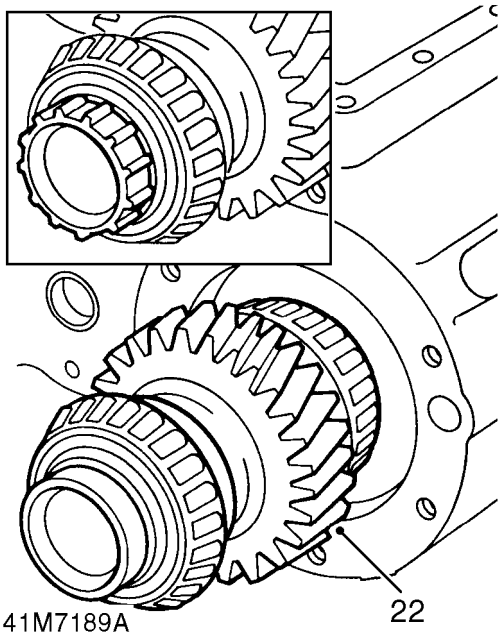
19. Noting fitted position of stud nut and harness/speedometer cable clip, remove 5 bolts and stud nut securing cover plate/ power take-off cover, recover clip.

20. Remove cover plate/power take-off cover.



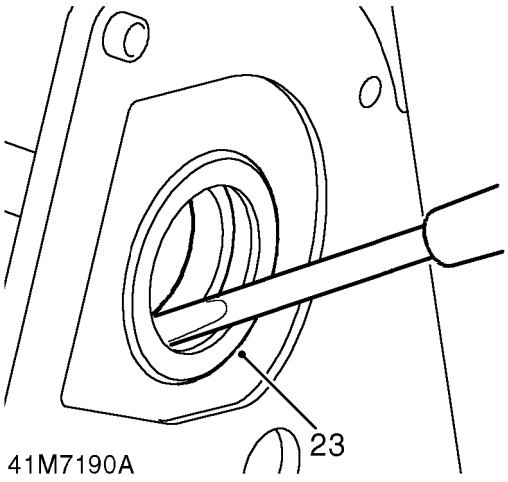
21. Remove mainshaft input gear bearing housing.

CAUTION: Do not remove mainshaft input gear bearing track at this stage.



22. Remove mainshaft input gear together with taper roller bearings.

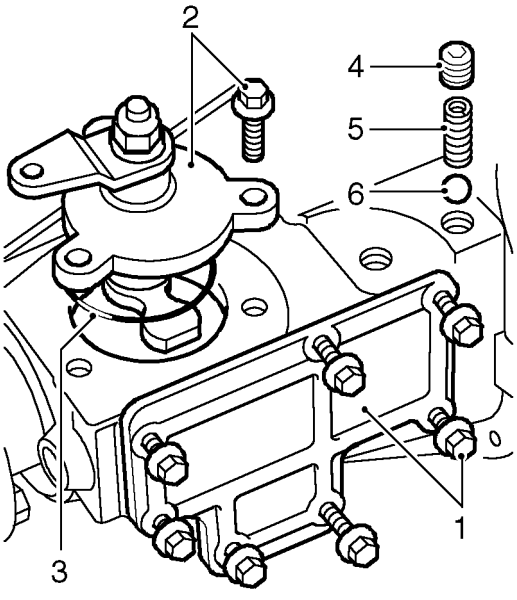
NOTE: Input gear fitted to Defender transfer boxes has an additional dog tooth gear - see inset on illustration.



23. Remove and discard mainshaft oil seal from main casing.

CAUTION: Do not remove mainshaft input gear bearing track at this stage.

Front output housing



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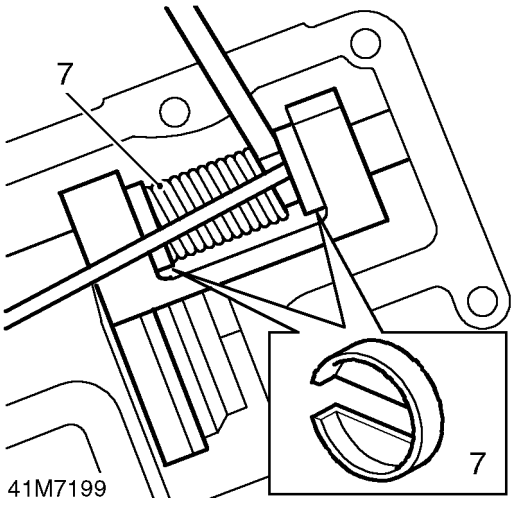
1. Remove 7 bolts securing differential lock selector side cover, remove cover.
2. Remove 3 bolts securing differential lock selector housing, remove housing and selector as an assembly.
3. Remove and discard 'O' ring from selector housing.
4. Remove plug securing differential lock detent spring and ball.
5. Remove detent spring.
6. Remove ball using a stick magnet.

CAUTION: Suitably identify plug, detent spring and ball to their fitted positions, do not interchange with high/low selector shaft detent components.



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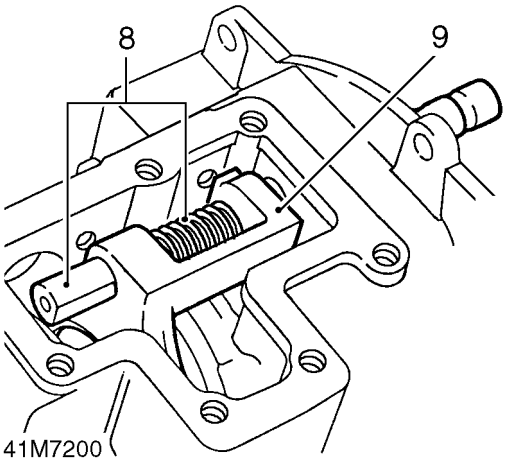
7. Compress differential lock selector fork spring and remove retaining clip from each end of spring.



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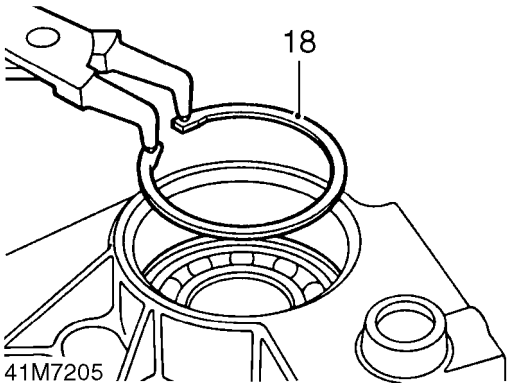
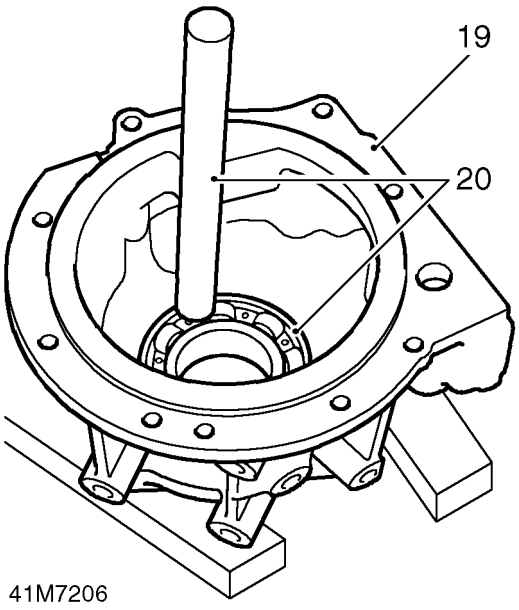
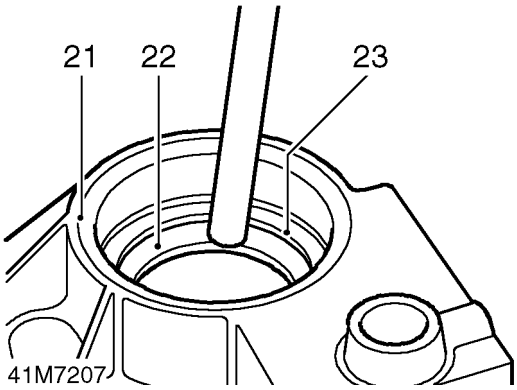
8. Withdraw differential lock selector shaft from front output housing, recover spring.
9. Remove differential lock selector fork.



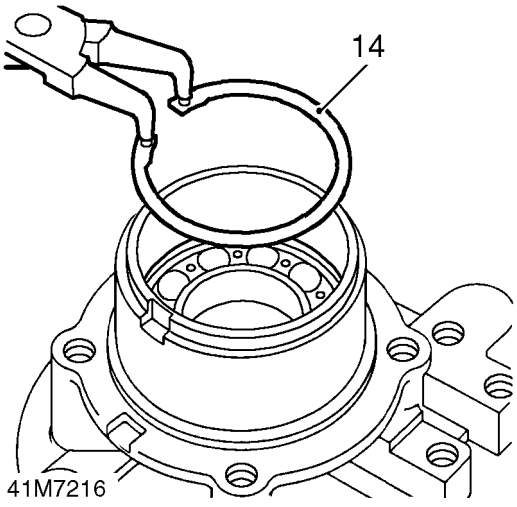
18. Using suitable circlip pliers, remove and discard circlip retaining output shaft bearing.



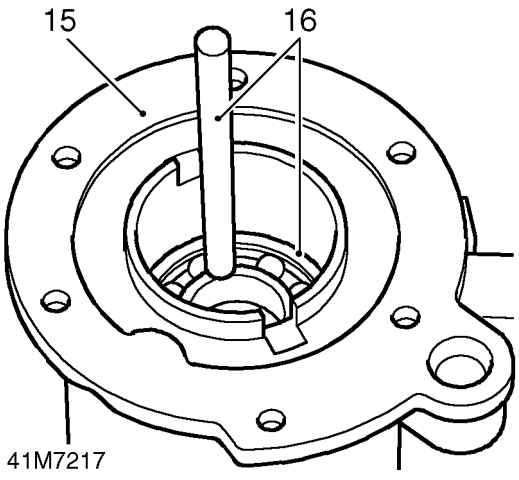
19. Support front output housing on suitable blocks of wood.
20. Using a soft metal drift, drive output shaft bearing out of housing; discard bearing.



21. Invert front output housing.
22. Using a soft metal drift, drive differential bearing track out of housing, discard bearing track.
23. Remove selective shim.

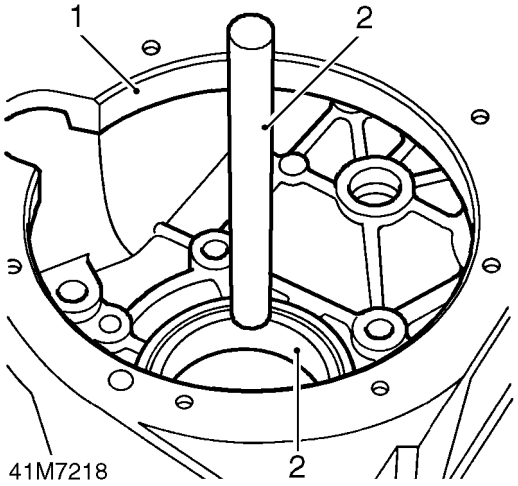


14. Using suitable circlip pliers, remove and discard circlip retaining output shaft bearing.

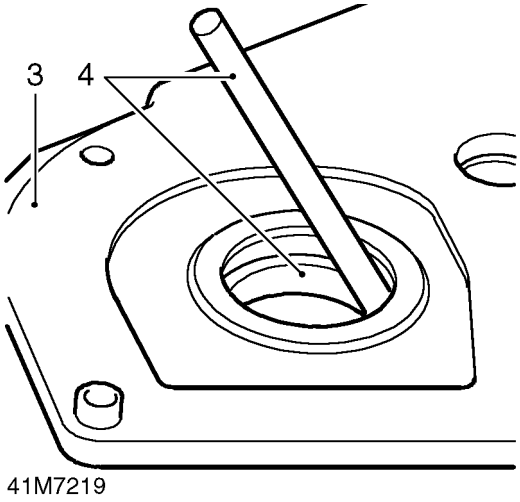


15. Support rear output housing on suitable blocks of wood.
16. Using a soft metal drift, drive output shaft bearing out of housing; discard bearing.

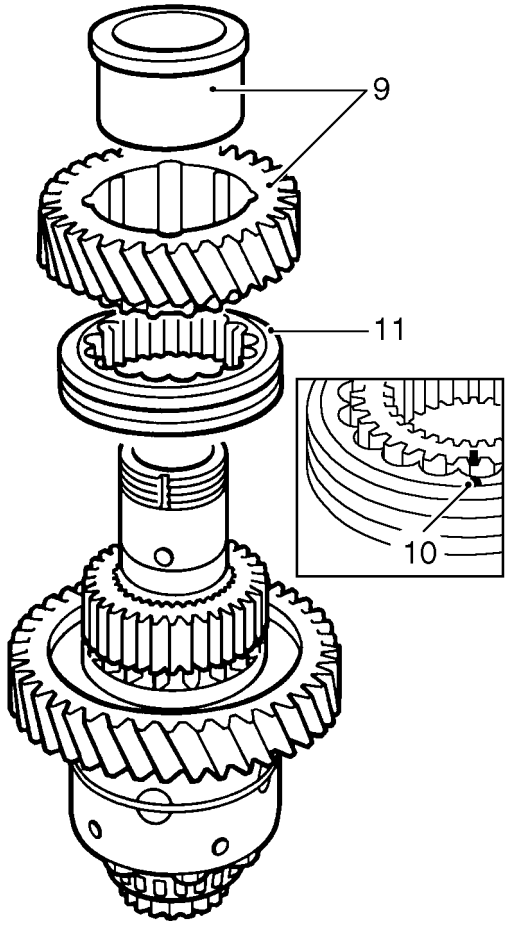
Main casing



1. Support main casing on suitable blocks of wood.
2. Using a soft metal drift, drive differential rear bearing track out of main casing; discard bearing track.



3. Invert main casing.
4. Using a soft metal drift, drive mainshaft input gear bearing track out of main casing; discard bearing track.



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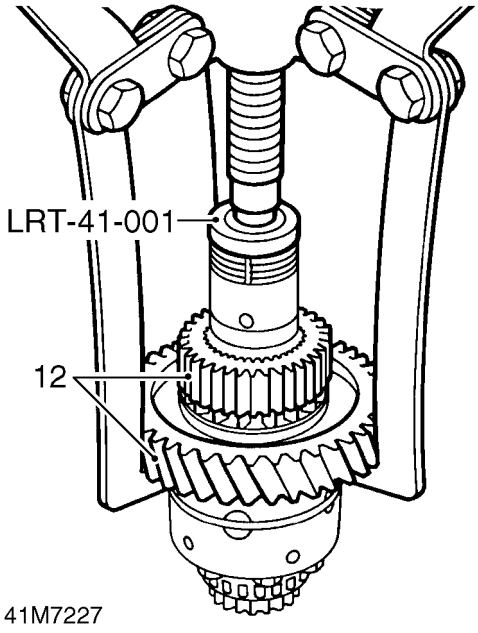
9. Remove high range gear and bush taking care not to disturb high/low selector sleeve.
10. Make suitable alignment marks between high/low selector sleeve and hub.
11. Remove high/low selector sleeve.



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12. Using a suitable puller and thrust button, part of tool **LRT-41-001,** remove high/low hub and low range gear.

Mainshaft input gear

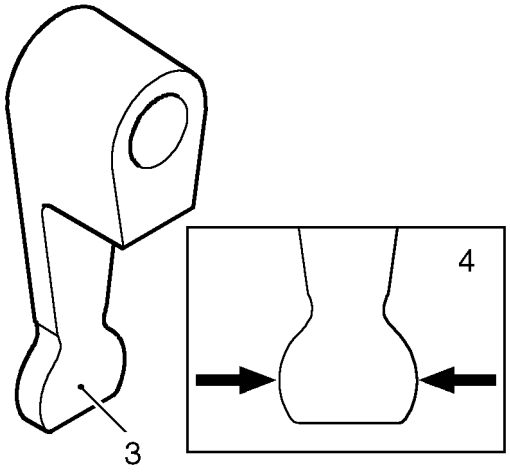
1. Check gear teeth for cracks, chipping and uneven wear.
2. Check that cross drillings in shaft are clear.

Defender only

3. Check that ends of dog teeth are not 'rounded-off' or chipped.

High/low cross shaft and housing

1. Check mating surfaces of cross shaft and drilling in housing for wear.
2. Check core plug in housing for signs of leakage or corrosion, apply Loctite 326 to replacement plug.



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3. Check high/low selector finger for wear.
4. Measure across widest portion of finger: Finger width = 15.90 to 15.95 mm (0.625 to 0.627 in)

14. Check figure obtained against specified load to turn figure:
    Used gears = 0.45 kg (1.0 lb)
    New gears = 1.72 kg (3.8 lb)

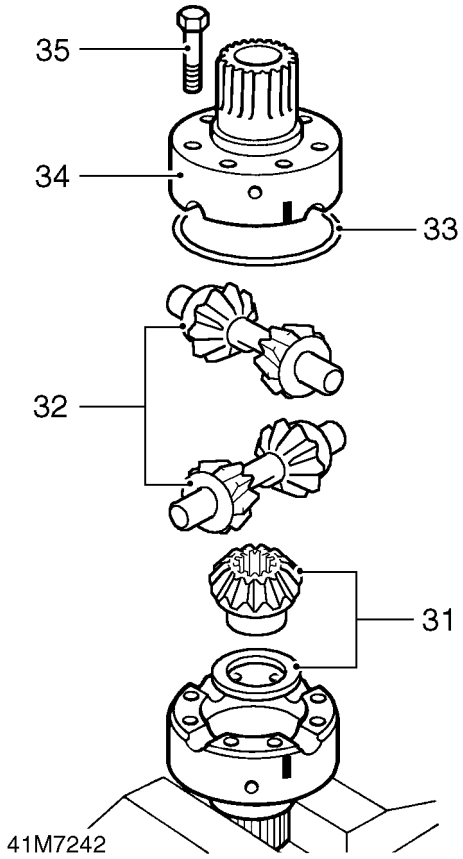
15. If load to turn figure is below that specified, proceed as follows.
16. Remove front output shaft together with brake drum.
17. Remove 8 bolts securing front half differential carrier.
18. Remove front half differential carrier.
19. Remove front half carrier sun gear and thrust washer.
20. Select a thicker thrust washer from the range available.

NOTE: 5 thicknesses of thrust washers are available rising in increments of 0.10 mm (0.004 in) from 1.05 to 1.45 mm (0.04 to 0.06 in).

21. Position selected thrust washer and sun gear in front half carrier.
22. Fit front half carrier to rear ensuring that alignment marks are together.
23. Fit bolts and tighten by diagonal selection to 60 Nm (44 lbf.ft).
24. Fit front output shaft and brake drum and repeat load to turn check.
25. Repeat above procedures as necessary until load to turn figure is as specified; record final figure obtained.
26. Remove brake drum from front output shaft, remove output shaft.
27. Remove bolts securing front half carrier.
28. Remove front half carrier, remove sun gear and thrust washer.

CAUTION: Keep selected thrust washer with sun gear.

29. Remove retaining ring.
30. Remove planet gears and cross shafts.



31. Fit a 1.05 mm (0.04 in) thick thrust washer to rear half carrier sun gear, position gear in rear half carrier.
32. Fit planet gears, cross shafts and dished thrust washers in rear half carrier.

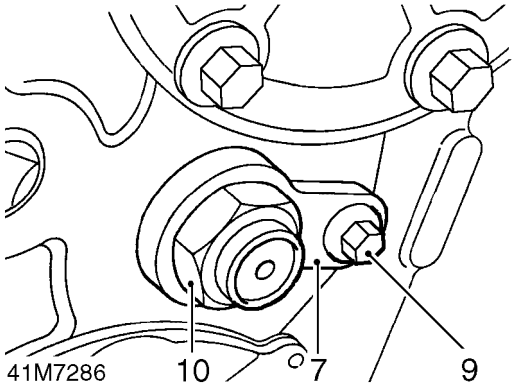
CAUTION: Ensure that planet gears are fitted to their respective cross-shafts and cross-shafts are fitted in their correct location in half carrier.

33. Fit retaining ring.
34. Fit front half carrier to rear ensuring that alignment marks are together.

CAUTION: Do not fit sun gear and thrust washer into front half carrier.

35. Fit bolts and tighten by diagonal selection to 60 Nm (44 lbf.ft).

6. Remove wire from around intermediate gears.



7. Rotate intermediate shaft until retaining plate can be located on flat on shaft.
8. Apply Loctite 290 to threads of retaining plate bolt.
9. Fit bolt and tighten to 25 Nm (18 lbf.ft).
10. Fit a new intermediate shaft nut.
11. Tighten intermediate shaft nut in small stages until all end-float is just removed from intermediate gears.

CAUTION: Check end-float of intermediate gears between each stage, do not continue tightening nut after end-float is removed. Do not stake nut at this stage.

12. Set intermediate gear bearing pre-load - *See Intermediate gear bearing pre-load.*

Intermediate gear bearing pre-load

1. Select neutral.
2. Screw a suitable bolt into tapped hole in end of tool **LRT-41-005.**

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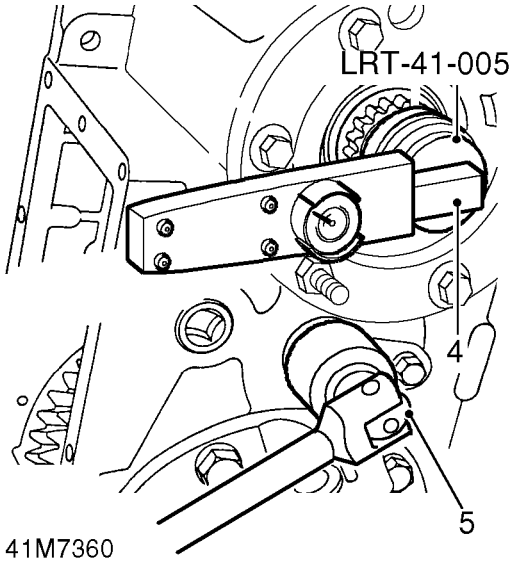

3. Insert tool **LRT-41-005** in end of mainshaft.
4. Using a suitable torque meter on tool **LRT-41-005,** check and record torque to turn mainshaft input gears.
5. Tighten the intermediate shaft nut in small stages checking the torque to turn the gears until the mainshaft input gear torque to turn figure recorded in operation 4 has increased by 1.25 Nm (10 lbf.in).

CAUTION: Take great care not to overtighten nut as this will cause excessive bearing pre-load. If torque to turn figure is inadvertently exceeded, a new collapsible spacer must be fitted.