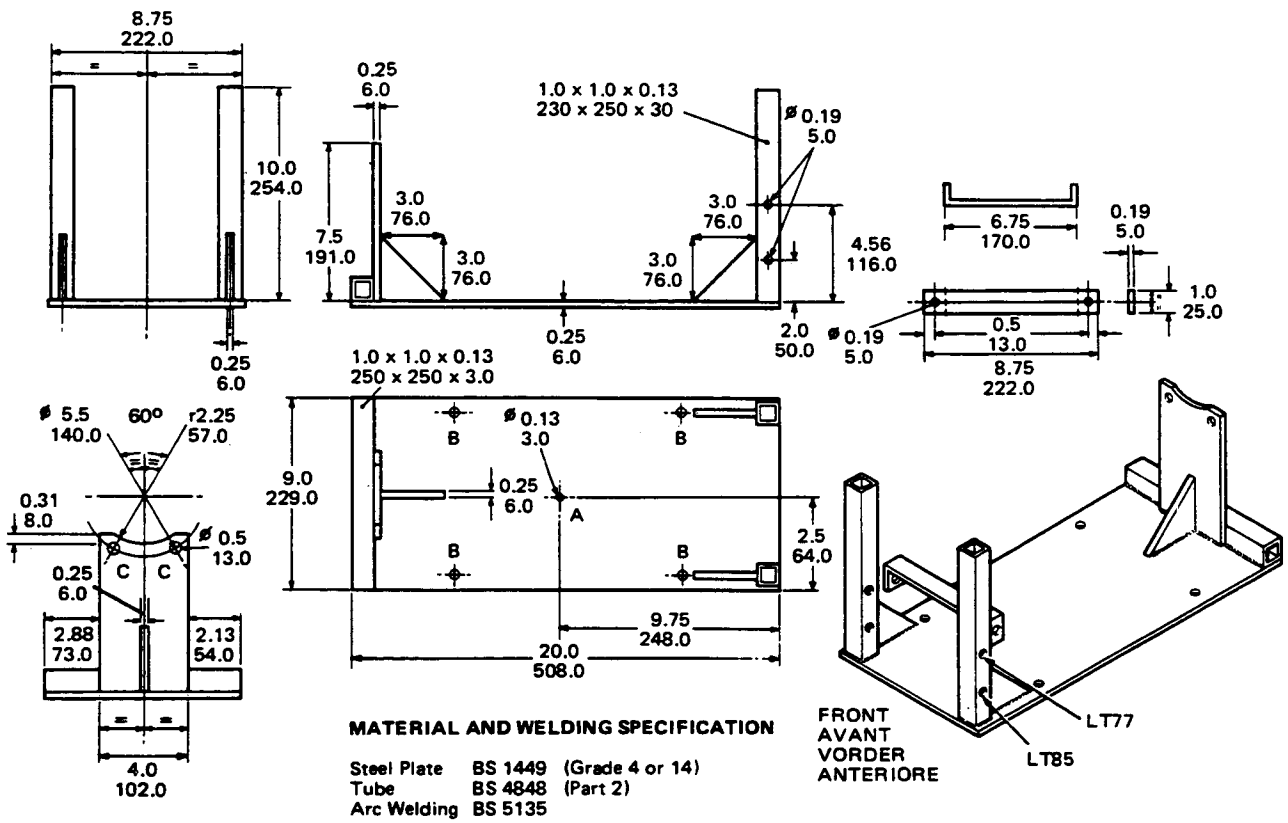
LT77 FIVE SPEED GEARBOX AND LT230T TRANSFER BOX

1. Install the vehicle on a ramp and disconnect the battery.
2. Remove both main and transfer gear lever knobs.
3. Remove the cubby box liner, disconnect the window lift switches and release the handbrake inner cable from the handbrake lever. Release the console fixings and withdraw the console from the vehicle.
4. Remove the noise insulation pad to gain access to the gaiter. Release the four screws and drill out all the pop-rivets securing the gaiter to the top of the gearbox.
5. Disconnect the reverse light electrical leads and pull the leads through the tunnel aperture.
6. Remove the lower lock nut from the high/low operating rod.
7. Remove the spring clip from the clevis pin securing the differential lock lever to the high/low gear change housing.
8. Remove the two pan head screws securing the gear change housing top cover. Raise the cover to give access to one of the gear change housing to extension case securing bolts located by the reverse plunger assembly, and remove the bolt.
9. Remove the three remaining gear change housing to extension case securing bolts, remove the housing complete with transfer gear housing and gaiter.
10. Remove the nut securing the outer handbrake cable to the top of the tunnel and feed the inner and outer cable through its aperture to the underside of the vehicle.
11. Remove the nuts and bolts securing the fan cowl to the radiator. Move the cowling away from the radiator and hang it loosely around the fan blade assembly.
12. Release the transmission breather pipes, speedometer cable, and starter motor harness from the clips at the rear of the engine.
13. **Fuel injection models**—Disconnect the airflow meter to plenum chamber air intake hose.
14. Raise the ramp.
15. Remove the eight nuts and bolts securing the chassis cross member and using a suitable means of spreading the chassis, remove the cross member.
16. Place a suitable container under the transmission, remove the three drain plugs, allow the oil to drain and refit the plugs. Clean filter on the extension housing plug before refitting.
17. Remove the intermediate exhaust pipe and silencer section as follows:
    (a) Release the connection to the front pipe assembly at the flanges.
    (b) Release the connection to the rear section at the flange immediately behind the silencer.
    (c) Remove the 'U' bolt retaining the pipe to the bracket attached to the transfer box.
18. Mark the drive flanges for reassembly and disconnect the front propeller shaft from the transfer box.
19. Similarly, disconnect the rear propeller shaft.
20. Disconnect the speedometer cable from the rear of the transfer box.
21. Remove the two bolts and withdraw the clutch slave cylinder from the bell housing.



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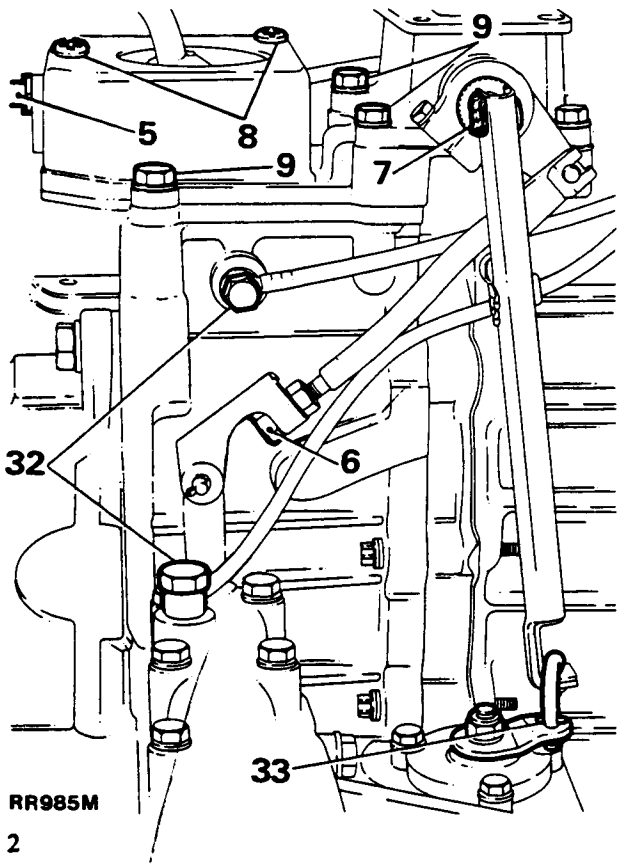
22. Manufacture a cradle to the dimensions given in the drawing and attach it to a transmission hoist. To achieve balance of the transmission unit when mounted on the transmission hoist, it is essential that point A is situated over the centre of the lifting hoist ram. Drill fixing holes B to suit hoist table. Secure the transmission unit to the lifting bracket at point C, by means of the lower bolts retaining the transfer gearbox rear cover.
23. Remove the bottom two bolts from the transfer box rear cover and use them to attach the rear end of the cradle to the transfer box. Ensure that the tube in the centre of the cradle locates over the extension housing drain plug.
24. Raise the hoist just enough to take the weight of the transmission.
25. Remove the three nuts and bolts securing the transfer box LH and RH mounting brackets to the chassis.
26. Remove the nuts retaining the brackets to the mounting rubbers and remove the brackets.
27. Lower the hoist sufficiently to allow the differential lock electrical leads to be disconnected from the transfer-box.
28. Support the engine under the sump with a jack, placing timber between the jack pad and sump.
29. Remove the bolts from the bell housing.
30. Withdraw the transmission whilst ensuring all connections to the engine and chassis are released.

Separating the transfer box from gearbox

31. Remove the transmission assembly from the hoist and cradle and install it safely on a bench.



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32. Remove the clip and withdraw the clevis pin securing the cross-over lever at the pivot point. Release the breather pipes from the clips at the pivot point.
NOTE: note the position of the breather pipes for re-assembly.
33. Disconnect the connecting link from the differential lock lever.
34. Place a sling round the transfer box and attach to a hoist.
35. Remove the two nuts and four bolts retaining the transfer box to the extension housing and withdraw the transfer box.

Assembling transfer box to main gearbox

36. Stand the gearbox vertically on the bell housing face on two pieces of wood to prevent damage to the primary pinnion which protrudes beyond the bell housing face. Lower the transfer gearbox onto the main gearbox, care should be taken to prevent any damage to seals. Secure the transfer gearbox to the main gearbox and tighten all bolts to the specified torque.
37. Refit the differential lock connecting link.
38. Refit the breather pipes and crossover lever.

Fitting main gearbox and transfer box to engine

39. Fit the cradle to the transmission hoist and the transmission to the cradle as described in instruction 23. Smear Hylomar on bell housing face mating with engine.
40. Locate the gear change housing temporarily on the gearbox and select any gear in the main gearbox to facilitate entry of the primary shaft, after selection remove the housing from the gearbox.
41. Position and raise the hoist to line up with the engine, feed the handbrake cable through the aperture in the tunnel, ensure that any pipes or electrical leads do not become trapped.
42. Secure the engine with seven of the eight bell housing bolts noting that the third bolt up on the left hand side is fitted with a harness clip.
43. Fit the differential lock indicator electrical leads to the transfer box.
44. Check that there are no obstructions and raise the transmission hoist until the gearbox mounting points are in line with the chassis fixing points.
45. Fit the transfer box LH and RH mounting brackets but only partially tighten the securing nuts and bolts.
46. Loosely fit the rubber mounting nuts and lower the transmission onto the mountings. Fully tighten all the securing nuts and bolts.
47. Remove the supporting jack from under the engine sump.
48. Remove the two bolts securing the cradle to the transfer box and remove the cradle and hoist.
49. Refit the two bolts using Loctite 290 on the threads and note that the LH bolt holds a clip for the speedometer cable.
50. Fit the slave cylinder using Hylosil on the gasket and tighten the two bolts evenly to the specified torque.
51. Connect the speedometer cable.

52. Check that the three drain plugs are tight and remove the main gearbox and transfer box filler level plugs. Fill the main gearbox with approximately 1,76 litres (3 pints) of a recommended oil or until it begins to run out of the filler level hole. Fit and tighten the filler plug. Similarly remove the transfer filler level plug and inject approximately 2,6 litres (4.5 pints) of recommended oil or until it runs out of the filler hole. Apply Hylosil to the threads and fit the plug and wipe away any surplus oil.
53. Line up the marks and fit the front and rear propeller shafts to the transfer box.
54. Fit the exhaust system, and evenly tighten the flange nuts and bolts. Fit the 'U' bolt and secure to the bracket.
55. Fit the bottom cover on the front of the gearbox and tighten the bolts to the specified torque.
56. Expand the chassis and fit the cross-member and secure in position with the eight bolts, lower the ramp.
57. Fit a NEW gasket to the top of the gearbox and refit the gear change housing. Coat the securing bolts with Hylomar PL32 or Loctite 290 and fit the bolts, tighten to the specified torque.
58. Reconnect the high/low operating rod and secure in position with the single lock nut.
59. Reconnect the differential lock lever to the transfer lever selector shaft, fit a NEW spring clip.
60. Refit the gear change housing top cover, apply Hylomar PL32 or loctite 290 to the forward screw tighten screws to the specified torque.
61. Re-connect the electrical leads to the reverse light switch.
62. Secure the gaiter in position using self tapping screws or pop rivets and position the insulation pad.
63. Refit the centre console, reconnect the handbrake cable using a NEW split pin. Secure the outer cable to the top of the tunnel.
64. Connect the electrical plugs to the window lift switches and refit the cubby box liner.
65. Refit the main and transfer gearbox knobs.
66. Refit the radiator cowl and reconnect the battery.
67. Re-clip the transmission breather pipes, speedometer cable and starter motor harness to the rear of the engine.
68. **Fuel Injection models**—Re-connect the plenum chamber to airflow meter air intake hose.

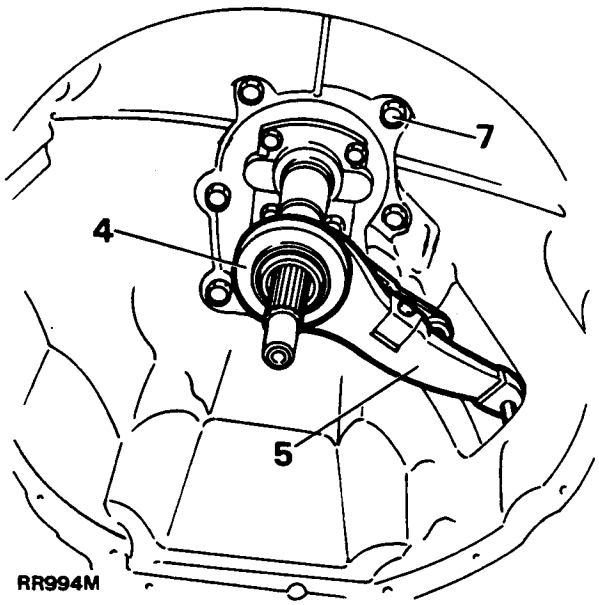
OVERHAUL LT77 FIVE SPEED GEARBOX

Service Tools:

18G705—Bearing remover
18G705-1A—Adaptor for mainshaft
18G705-5—Adaptor for layshaft
18G1400—Remover for synchromesh hub and gear cluster
18G1400-1—Adaptor mainshaft fifth gear
MS47—Hand press
18G47BA—Adaptor, layshaft bearing remover
18G47BAX—Conversion kit
18G284—Impulse extractor
18G284AAH—Adaptor for input shaft pilot bearing track
18G1422—Mainshaft rear oil seal replacer
18G1431—Mainshaft fifth gear and oil seal collar replacer

Dismantle

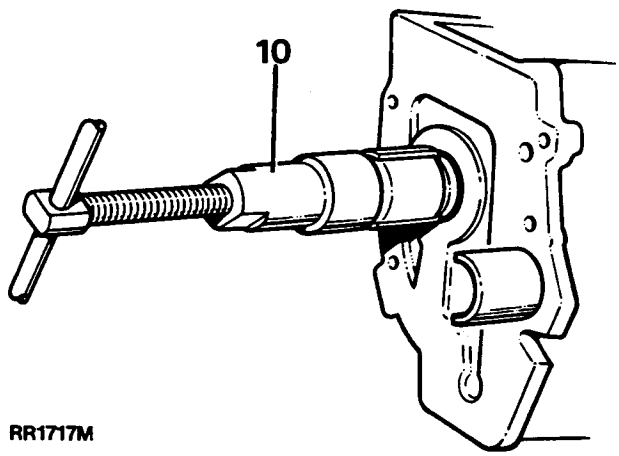
1. Place gearbox on a bench with the transfer gearbox removed, ensuring the oil is first drained.
2. Thoroughly clean the exterior of the gearbox case.
3. Remove the clutch release bearing carrier clip.
4. Remove the clutch release bearing.
5. Release the single bolt and remove the spring clip from the clutch release lever. Pull the lever off the clutch release pivot.
6. Remove the clutch release pivot and single bolt retaining the clutch release bearing guide. Withdraw the guide from the input shaft.



7. Remove the six bolts and washers securing the bell housing.

GEAR HOUSING

8. Carefully ease the bell housing off the dowels and withdraw it from the gearbox.
9. Remove the circlip which retains the mainshaft oil seal collar located at the rear of the gearbox.



10. Using tools 18G705 and 18G705-1A remove the oil seal collar.

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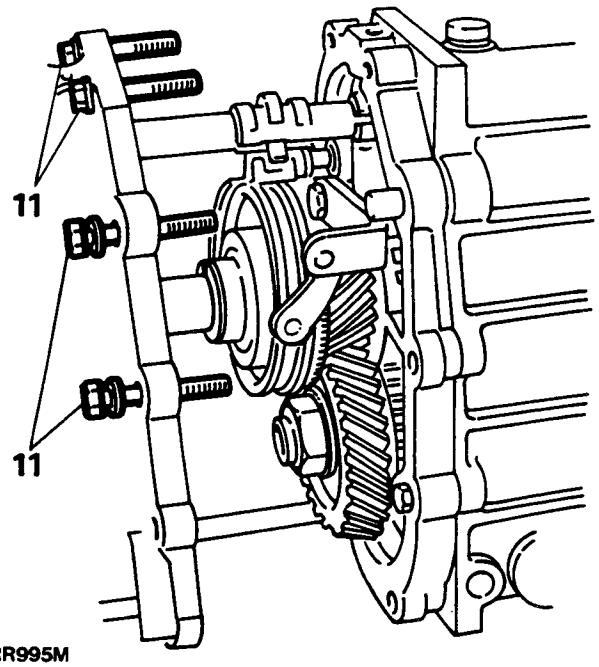

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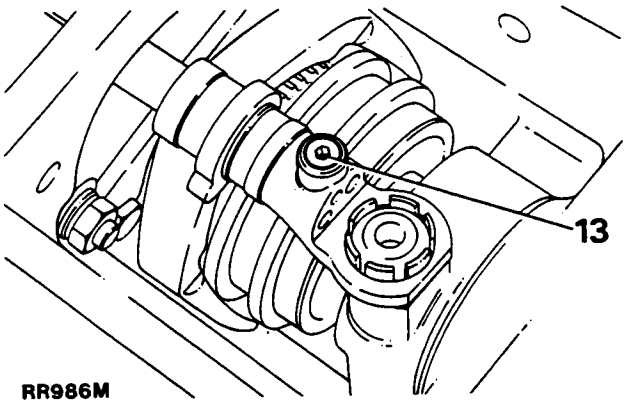
11. Remove the ten bolts and spring washers securing the fifth gear extension case to the gearcase; withdraw the extension case and discard the gasket.
12. Fit two dummy bolts (8 × 35 mm) to the casing to retain the centre plate to the main case.
13. Select first or third gear and remove the grub screw securing the selector yoke to the selector shaft, manoeuvre the yoke and withdraw it from the shaft.



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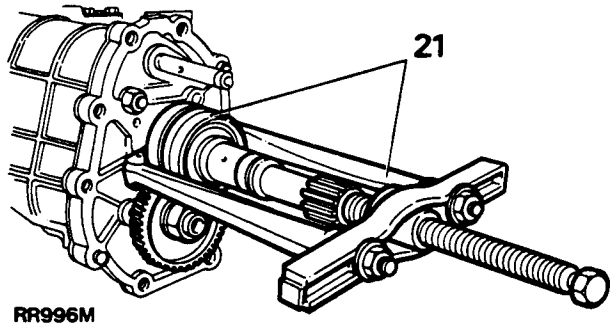
14. Remove the oil seal collar 'O' ring from the mainshaft.
15. Withdraw the oil pump drive shaft.
16. Remove the two circlips retaining the 5th selector fork to its bracket and remove the fork and pads.
17. Withdraw the fifth gear selector spool.
18. Remove the two bolts and spring washers and withdraw the fifth gear selector fork and bracket.
19. Engage reverse gear by turning selector rail anti-clockwise and pulling rearwards. Move the fifth speed synchro hub into mesh with the fifth gear. De-stake the retaining nut securing the fifth gear layshaft and remove nut. Select neutral by pushing selector rail inwards and turning clockwise; and return fifth speed synchro hub to its out of mesh position.



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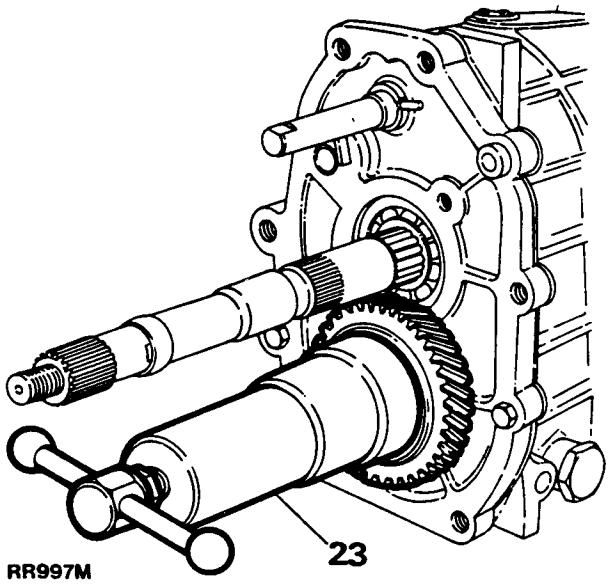
20. Release the circlip retaining the fifth gear synchromesh assembly to the mainshaft.
21. Using tools 18G1400-1 and 18G1400 withdraw the selective washer, fifth gear synchromesh hub and cone, fifth gear (driven) and spacer from the mainshaft.
22. Remove the split roller bearing assembly from the mainshaft.
23. Using tools 18G705 and 18G705-1A remove the layshaft fifth gear.



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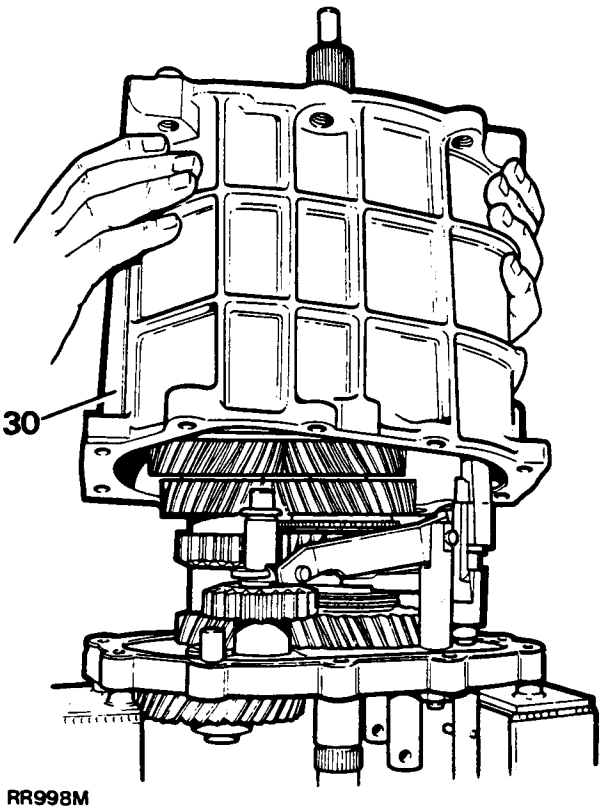
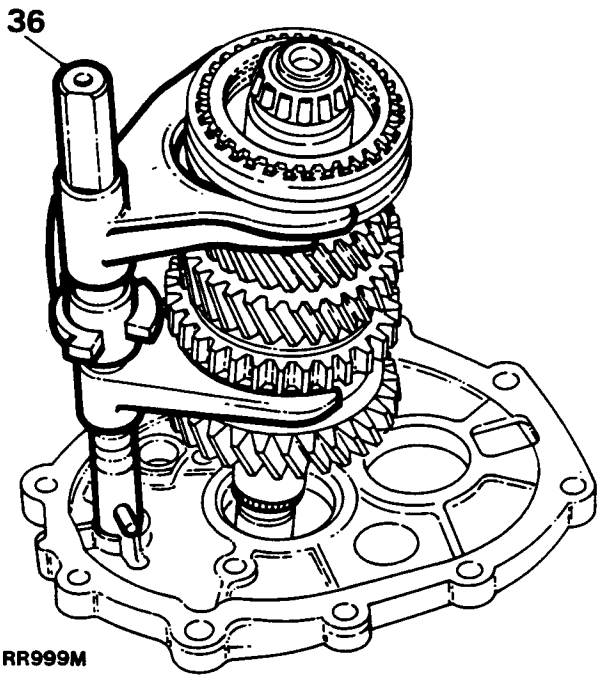
24. Fit suitable guide studs (measuring 8 × 60 mm) to the main gearbox case.
25. Locate the gearbox to a suitable stand.
26. Remove the six bolts and spring washers from the front cover, withdraw the cover and discard the gasket.
27. Remove the input shaft and layshaft selective washers from the gearcase.
28. Remove the two bolts and washers securing the locating boss for the selector shaft front spool, withdraw the locating boss.

29. Withdraw the selector plug, spring and detent ball from the centre plate.



RR998M

30. Remove the dummy bolts and carefully lift the gearcase, leaving the centre plate and gear assemblies in position. Discard gasket.
31. Insert two slave bolts and nuts to retain the centre plate to the stand; and remove the circlip, pivot pin, reverse lever and slipper pad.
32. Slide the reverse shaft rearwards and lift off the thrust washer, reverse gear and reverse gear spacer.
33. Lift off the layshaft cluster.
34. Remove the input shaft and fourth gear synchromesh cone.
35. Rotate the fifth gear selector shaft clockwise (viewed from above) to align the fifth gear selector pin with the slot in the centre plate.
36. Remove the mainshaft and selector fork assemblies from the centre plate together.
37. Detach the selector fork assembly from the mainshaft gear cluster.
38. Remove the slave bolts from the centre plate and lift the centre plate clear of the stand.



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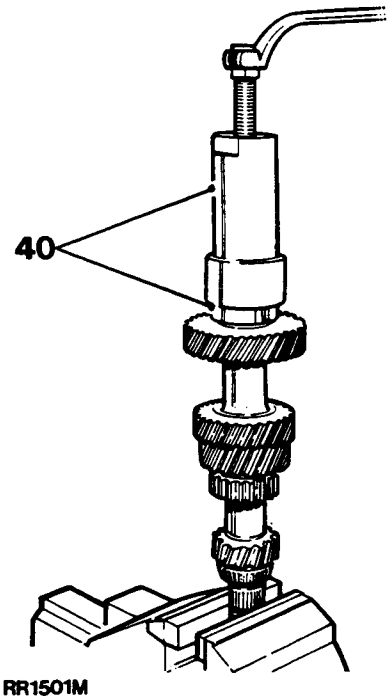
Front cover

39. Remove and discard the oil seal from the front cover. Do not fit a new oil seal at this stage.

Layshaft

40. Using press 18G705 and tool 18G705-5 remove the layshaft bearings.



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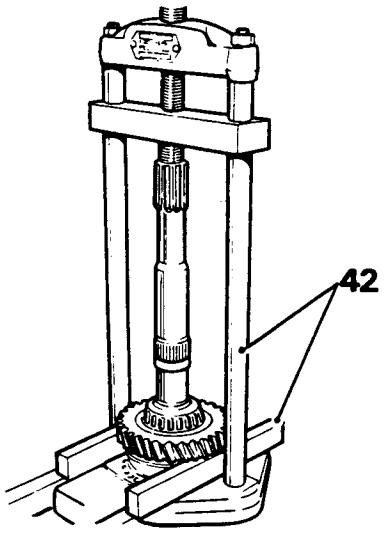
Mainshaft

41. Remove the centre bearing circlip
42. Using press MS47 and any suitable metal bars, remove the centre bearing, first gear bush, first gear and needle bearings and first gear synchromesh cone.



RR1502M

43. If a difficulty is experienced in removing the first and second gear synchromesh hub, locate underneath the second gear with a suitable tool; and extract the complete synchromesh hub and second gear assemblies using a suitable press.
44. Turn the mainshaft through 180° and using press MS47 and extension, with a support underneath the third speed gear, press the mainshaft through the pilot bearing spacer, third and fourth synchromesh hub, third gear synchromesh cone, third gear and third gear needle roller bearing.

First and second gear synchromesh assemblies

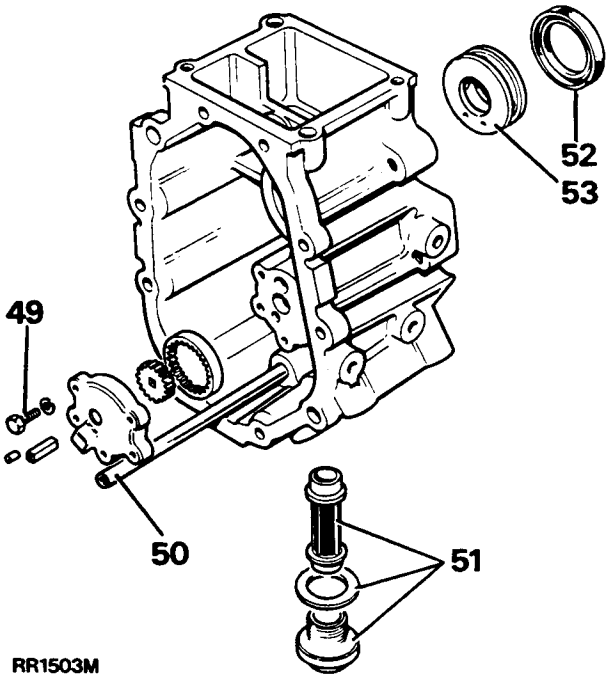
45. Mark the hub and sleeve to aid reassembly and remove the slipper springs from the front and rear of the first and second gear synchromesh assemblies.
46. Withdraw the slippers and hub from the sleeve.

Third and fourth gear synchromesh assemblies

47. Mark the hub and sleeve to aid reassembly and remove the slipper springs from the front and rear of the assembly.
48. Withdraw the slippers and hub from the sleeve.

Extension case

49. Remove the three oil pump housing bolts, spring washers and oil pump gears and housing.
50. Do not withdraw oil pick-up pipe.
51. Remove the plug, washer and filter.
52. Invert casing and extract the oil seal.
53. Press out the ferrobestos bush from the casing.



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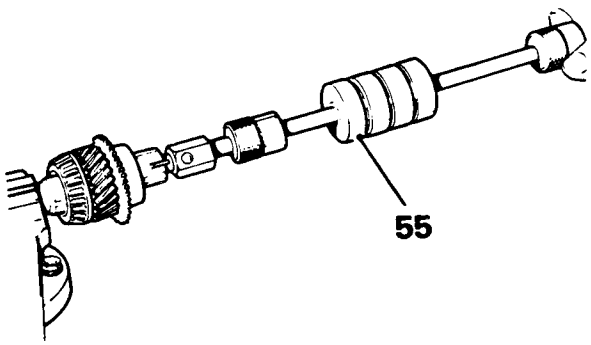
Input shaft

54. Using tools MS47 and 18G47BA, remove the input shaft bearing.
55. With the aid of tools 18G284AAH and 18G284, extract the pilot bearing track.



RR1504M

Reverse idler gear

56. Remove the circlip from the reverse idler gear.
57. Having noted their positions, remove both needle roller bearings and remaining circlip from the gear.

Fifth gear synchromesh assembly

58. Mark the hub and sleeve to aid reassembly and lever the backing plate off the fifth gear synchromesh assembly.
59. Remove the slipper springs from the front and rear of the assembly.
60. Release the slippers and slide the hub from the sleeve.

Centre plate

61. Remove the layshaft and mainshaft bearing tracks from the centre plate and reverse pivot post.

Main gearbox casing

62. Remove the mainshaft and layshaft bearing tracks from the main casing.
63. Remove the plastic oil trough from the front of the casing.

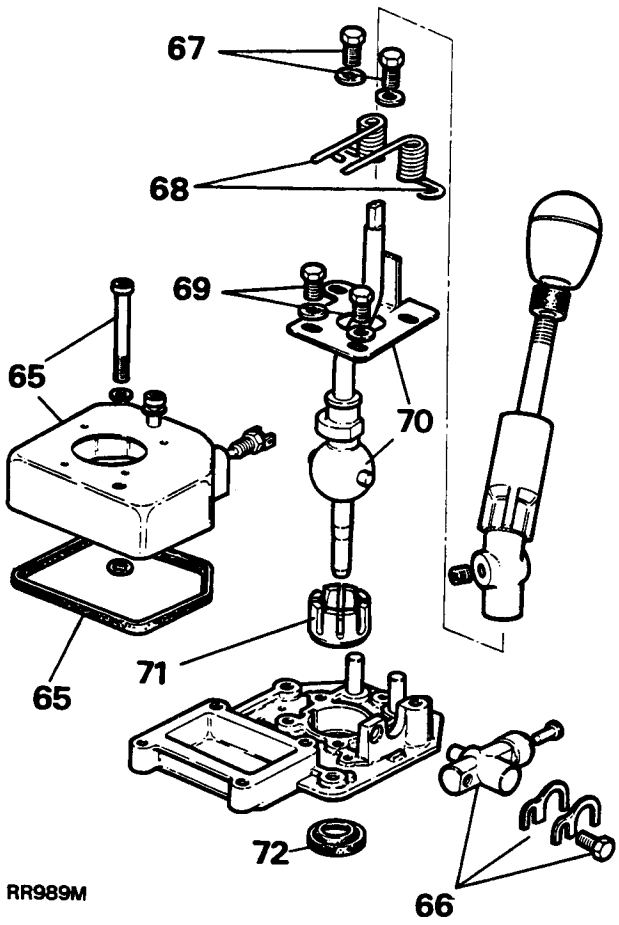
Selector rail

64. The selector rail is supplied complete with first and second selector fork, pin and fifth speed selector pin. If it is required to replace the first and second selector fork on its own, press out the fifth speed gear selector pin and remove the first and second selector fork from the selector rail.

Gear change housing

NOTE: The upper and lower gear levers are loctited together. If difficulty is experienced in separating these two components, a complete new assembly should be fitted.

65. Raise the gear lever top cover as far as the gaiter and upper gear lever will permit to gain access to the lower gear lever fixings.
66. Release the single bolt with plain washer securing the reverse plunger to the gear change housing, withdraw the plunger and shims if fitted
67. Remove the two bolts and washers anchoring the bias springs.
68. Release the springs from the register at the gear lever and remove them from the dowels.
69. Remove the remaining two bolts securing the bias adjustment plate to the housing.
70. Remove the lower gear lever and bias plate from the housing.
71. Remove the railko bush from the lower gear lever.
72. Prise the seal from the bottom of the gear change housing.



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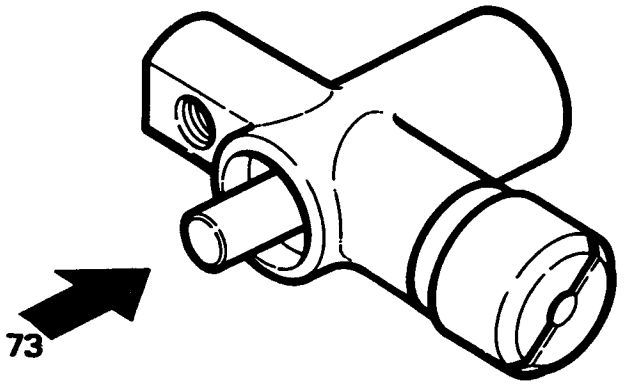
Reverse gear plunger assembly

NOTE: The plunger assembly is not a serviceable item. To check that the unit is operating correctly proceed as follows.

73. Apply a load of between 50 to 60 kg (110 to 130 lb) to the plunger nose. If the plunger is operational within these limits the unit is satisfactory. If the plunger operates outside the limits renew the plunger assembly.



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Cleaning and inspection

74. Clean gearcase thoroughly using a suitable solvent. Inspect case for cracks, stripped threads in the various bolt holes, and machined mating surfaces for burrs, nicks or any condition that would render the gearcase unfit for further service. If threads are stripped, install Helicoil, or equivalent inserts.
75. Inspect all gear teeth for chipped or broken teeth, or showing signs of excessive wear. Inspect all spline teeth on the synchromesh assemblies. If there is evidence of chipping or excessive wear, install new parts on reassembly. Check all slippers and slipper springs for wear or breakage. Replace with new parts if necessary.
76. Inspect all circlip grooves for burred edges. If rough or burred, remove condition carefully using a fine file.
77. Ensure all oil outlets are clear of sludge or contamination especially the mainshaft oil ways. Clean with compressed air observing the necessary safety requirements.
78. During the rebuild operation, it is recommended that new roller and needle bearings are fitted.

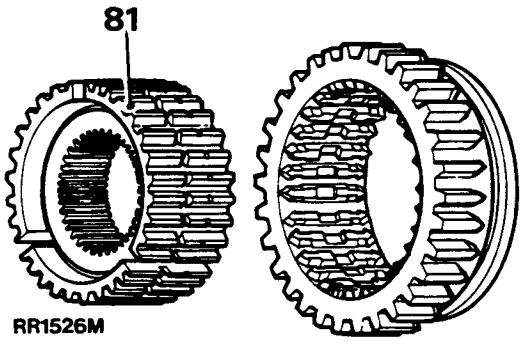
ASSEMBLY

Layshaft

79. Using tools MS47 and a suitable tube, fit new bearing cones to the layshaft.

Synchromesh assemblies

80. With the outer sleeve held, a push-through load applied to the outer face of the synchromesh hub should register 8,2 to 10 kgf m (18 to 22 lbf ft) to overcome the spring detent in either direction.
81. Assemble the first and second synchromesh assembly by locating the shorter splined face towards the second gear.



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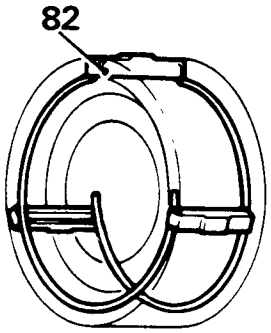
82. Refit the slippers and locate the slipper springs to each side of the assembly, ensuring that the hooked ends of both slipper springs are located in the same slipper; but running in opposite directions and finishing against the other two slippers.



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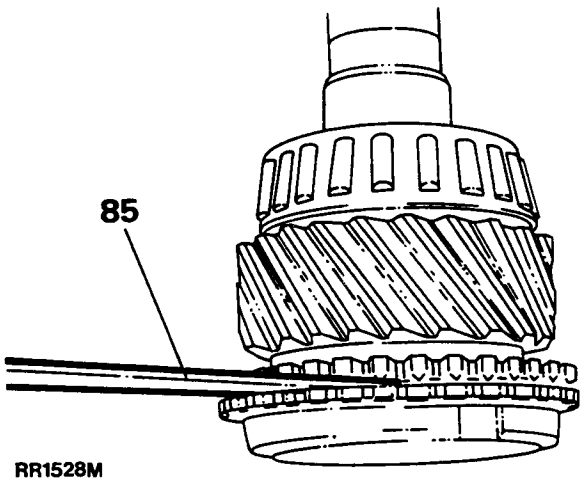
83. Assemble the third and fourth synchromesh assembly and ensure the hooked ends are located in the same slipper; and run in opposing directions and finally locate against the other two slippers.
84. Assemble the fifth synchromesh hub assembly again ensuring the hooked ends of the springs are located in the same slipper, but running in opposite directions. Fit the backplate onto the rear of the synchromesh hub assembly. Ensure the tag on the backplate locates in the slot on the hub.
85. Check the wear between all the synchromesh cones and gears by pushing the cone against the gear and measuring the gap between the gear and cone. The minimum clearance is 0,64 mm (0.025 in). If this clearance is not met, fit new synchromesh cones.



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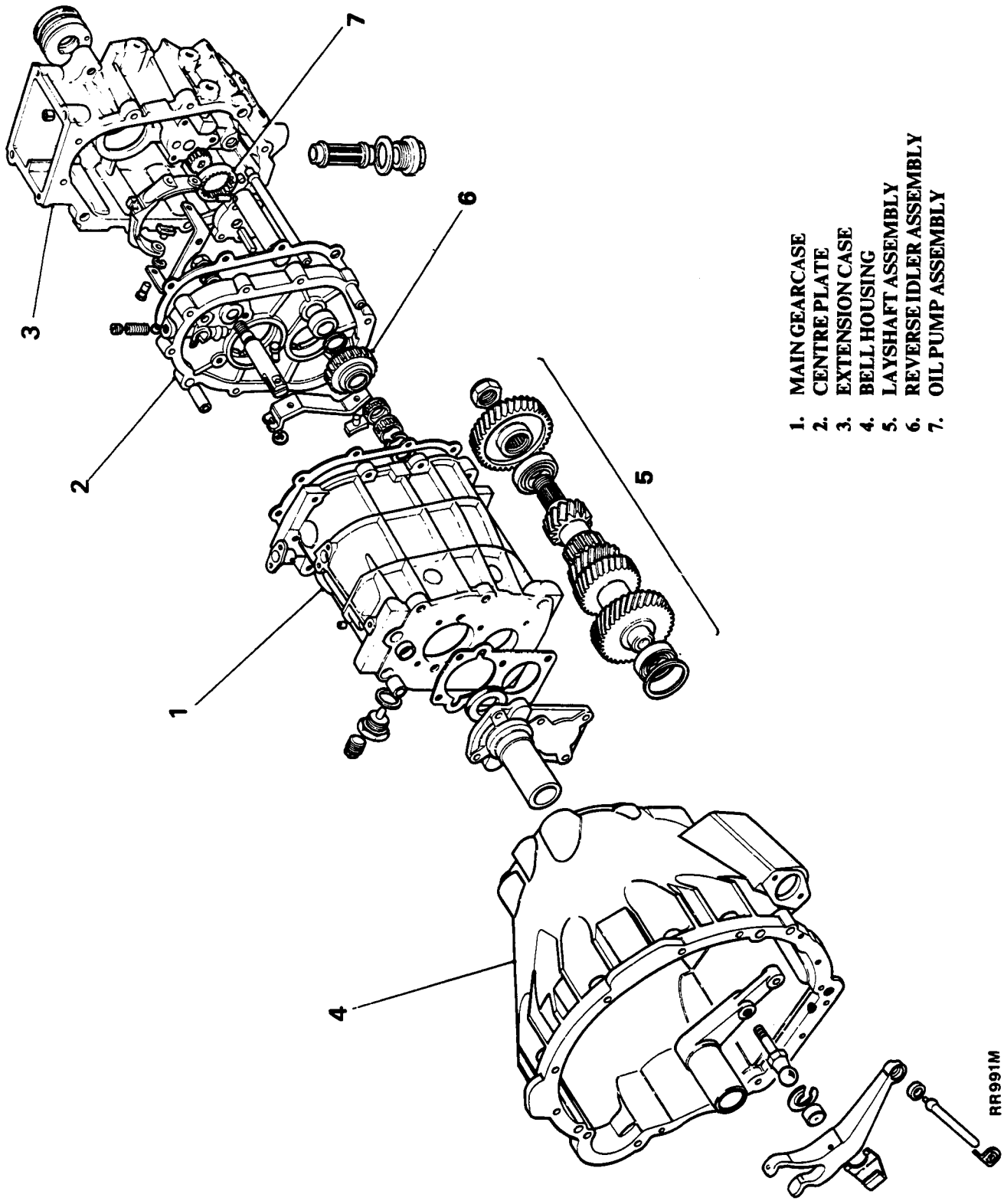
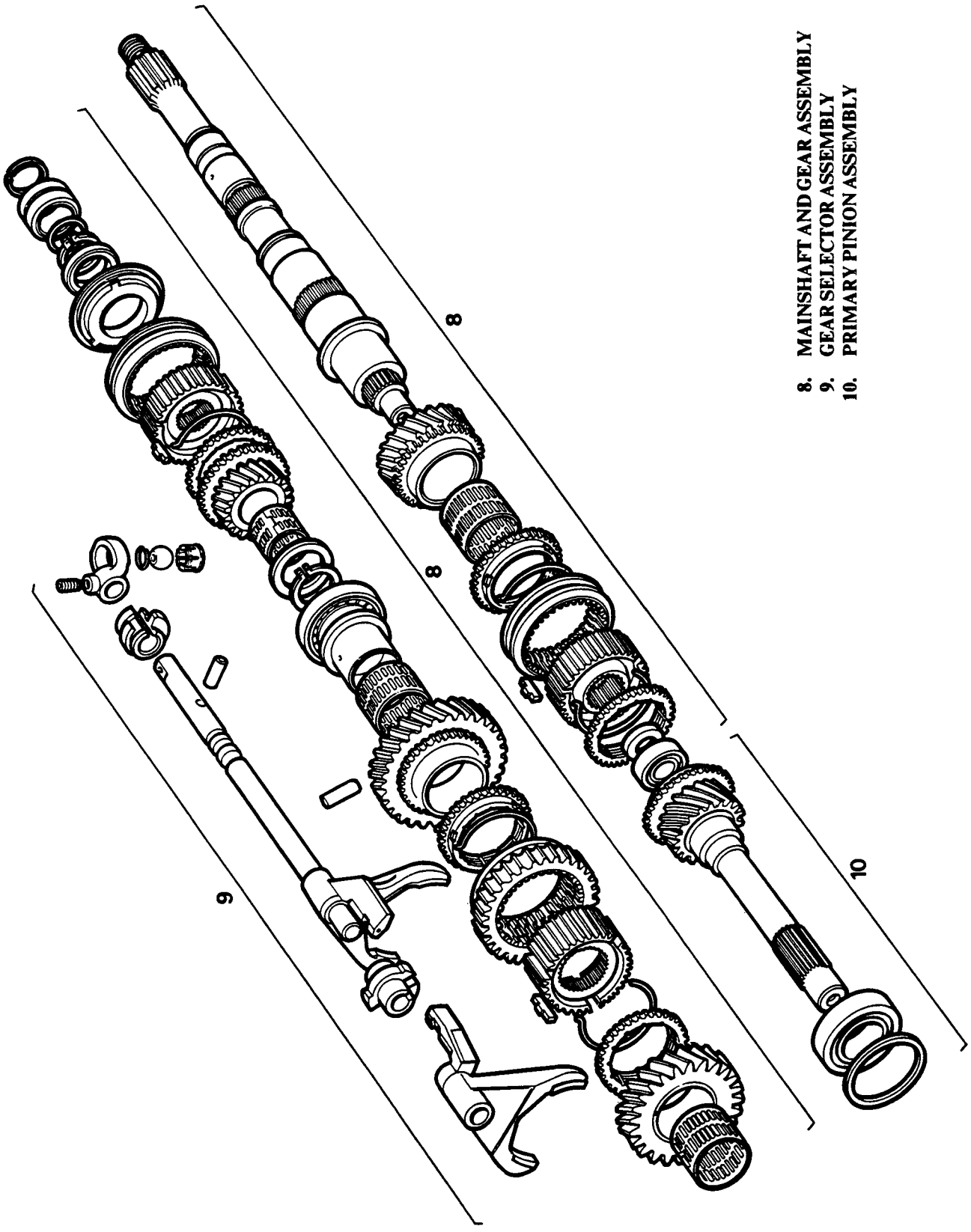
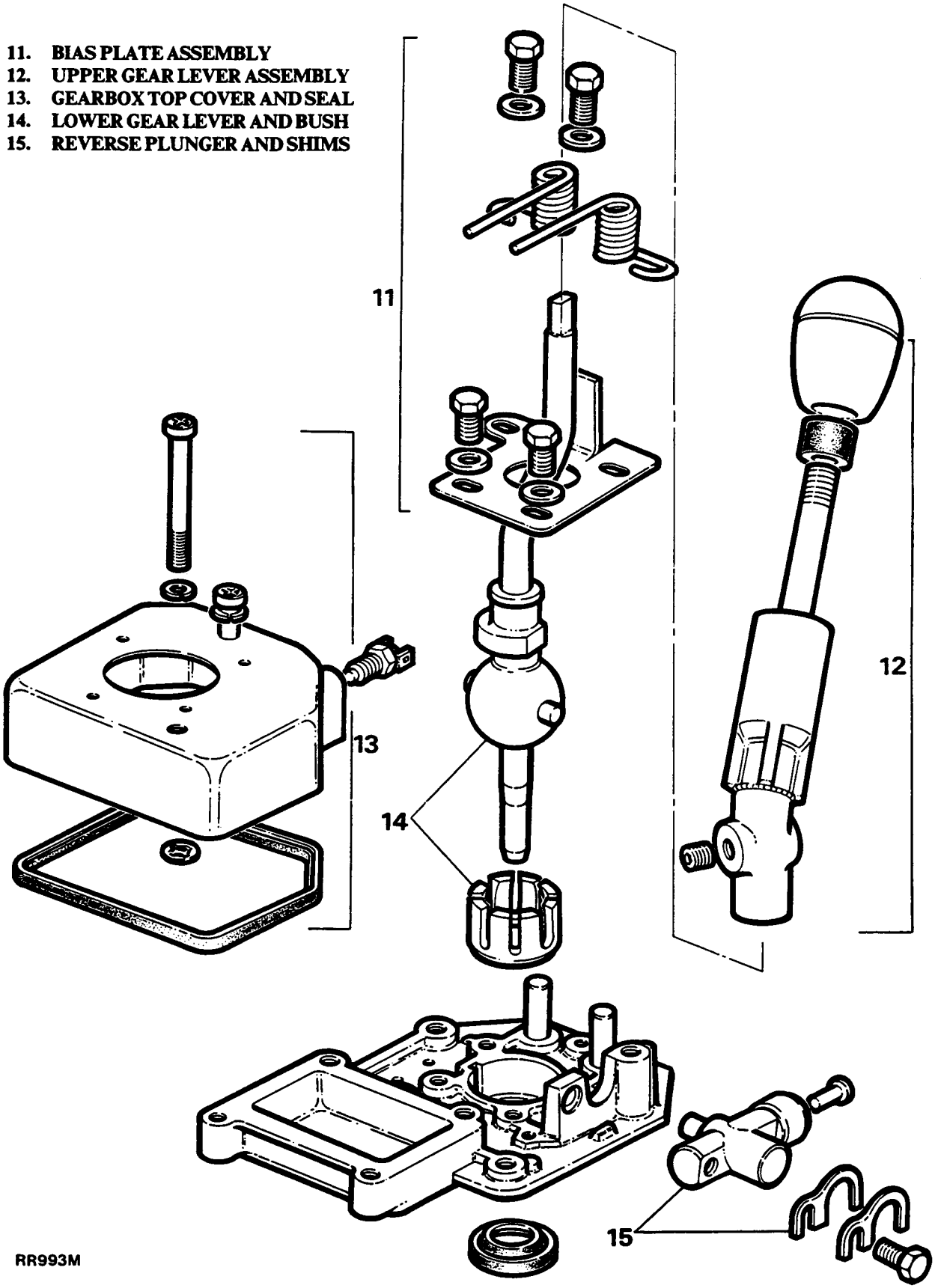

1. MAIN GEARCASE
2. CENTRE PLATE
3. EXTENSION CASE
4. BELL HOUSING
5. LAYSHAFT ASSEMBLY
6. REVERSE IDLER ASSEMBLY
7. OIL PUMP ASSEMBLY
RR991M



8. MAINSHAFT AND GEAR ASSEMBLY
9. GEAR SELECTOR ASSEMBLY
10. PRIMARY PINION ASSEMBLY

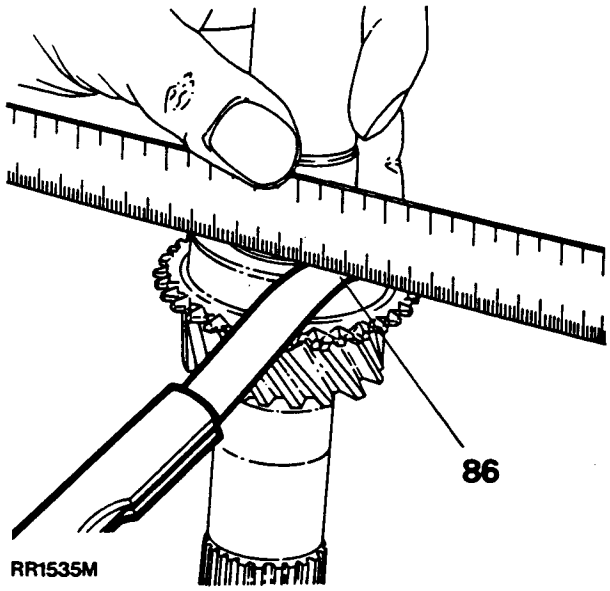
RR992M

11. BIAS PLATE ASSEMBLY
12. UPPER GEAR LEVER ASSEMBLY
13. GEARBOX TOP COVER AND SEAL
14. LOWER GEAR LEVER AND BUSH
15. REVERSE PLUNGER AND SHIMS



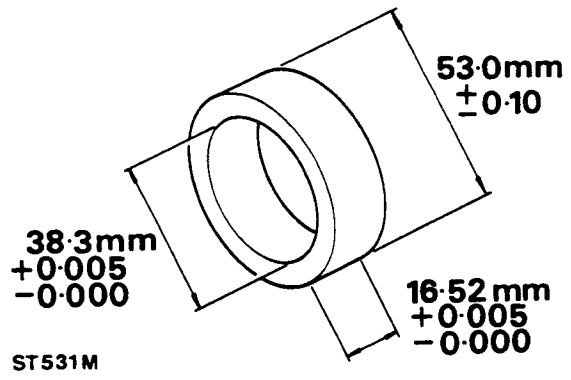
Fifth gear end-float

86. Fit the washer and fifth gear to the mainshaft, place a straight edge on the shoulder and using feeler gauges check the end-float between gear and shoulder. End float should not be in excess of 0,25 mm (0.010 in) maximum.
87. If end float is outside limit inspect the washer and gear faces for wear.

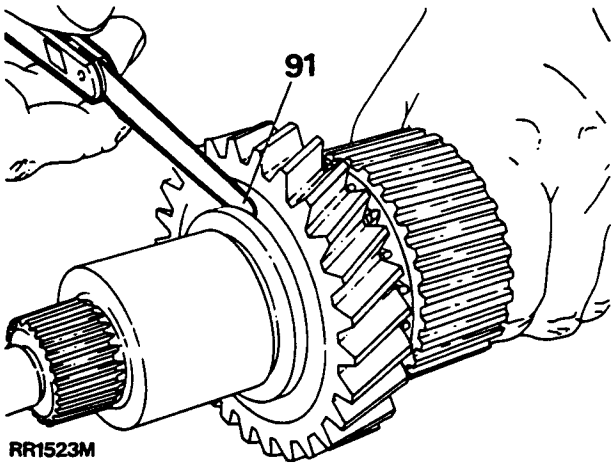


First gear bush end-float

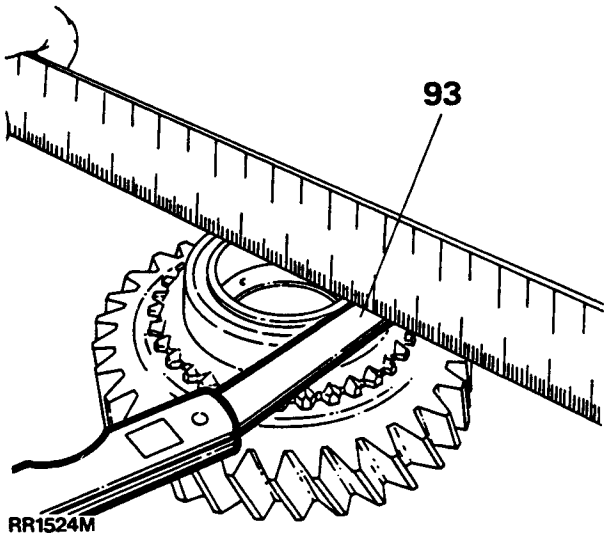
88. Manufacture a spacer to the dimensions provided in the illustration, this will represent a slave bearing.



89. Lubricate the second gear needle bearing with a light oil and fit the bearing, second gear and synchromesh cone to the mainshaft. It should be noted that the second gear synchromesh cone has larger slipper slots than the other synchromesh cones.
90. Fit the first and second synchromesh hub assembly with the selector fork groove to the rear of the mainshaft.
91. Holding the synchromesh hub firmly in position check the second gear end-float, between the gear and flange on the mainshaft, end-float should not be in excess of 0,25 mm (0.010 in) maximum. If end float is outside limits inspect the flange and gear faces for wear.



92. Fit the first gear bush to the first gear, place the gear and bush on a spacer so that the gear is sitting firmly on the shoulder of the bush.
93. Place a straight-edge across the bush and measure the clearance between bush and gear, this should not be in excess of 0,25 mm (0.010 in) maximum.

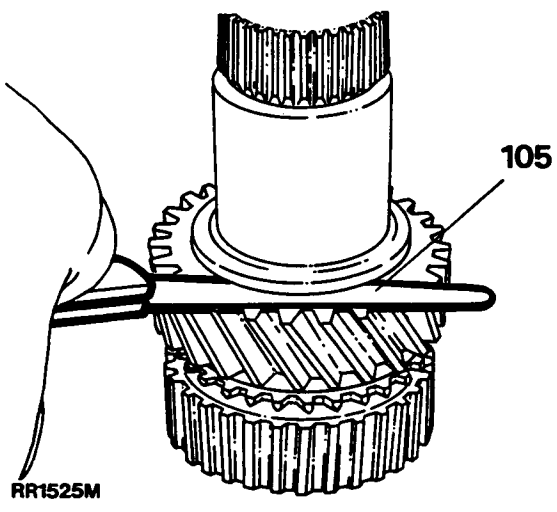


94. If the clearance is in excess of the maximum permissible limit, renew the bush. If after renewing the bush of a similar type, the end-float is still not within limit, inspect gear faces for wear.
95. Fit the first gear bush and slave bearing spacer and a new circlip to the mainshaft. When fitting the circlip, care must be taken to ensure it is not opened (stretched) beyond the minimum necessary to pass over the shaft.

96. Press the slave bearing spacer back against the circlip to allow the bush maximum end-float. Measure the clearance between the rear of the first gear bush and front face of the slave bearing spacer with a feeler gauge. The clearance should be within 0,05 mm (0.002 in) maximum. The first gear bush is available with collars of different thickness. Select a bush with a collar to give the required end-float. The bush must be free to rotate easily with the required end-float.
97. Remove the circlip, slave bearing spacer and first gear bush from the mainshaft.
98. First gear bushes are available in the following sizes:

Part No.	Thickness (mm)
FRC5243	40,16–40,21
FRC5244	40,21–40,26
FRC5245	40,26–40,31
FRC5246	40,31–40,36
FRC5247	40,36–40,41

99. Having selected a suitable first gear bush, lubricate the needle bearing and fit to the first gear.
100. Fit the selected bush to the first gear and place first gear synchromesh cone, followed by the first gear assembly to the mainshaft.
101. Using tools MS47, 18G47BA and 18G47BA-X refit the centre bearing and circlip to the mainshaft. After fitting the circlip, ensure the bearing, gear and circlip are in their rearmost position on the mainshaft, this can be achieved by placing two bars under the 1st gear and using press MS47 carefully press the assembly rearwards on the mainshaft.
102. Invert the mainshaft, lubricate the third gear needle roller bearing with light oil, fit to the front end of the mainshaft.
103. Fit the third gear to the mainshaft; and locate the third gear synchromesh cone to the third gear.
104. Fit the third/fourth synchromesh assembly (with the longer boss of the synchromesh hub to the front of the gearbox) to the mainshaft.



105. Holding the synchromesh assembly firmly in position, check third gear end-float between the gear face and mainshaft flange. The end-float should not be in excess of 0,25 mm (0.010 in) maximum.
If end float is outside specified limit check flange and gear faces for wear.
106. Fit the spacer and bearing to the front of the mainshaft.

Input shaft

107. Using tool MS47 and any suitable tube, refit a new pilot bearing track to the input shaft.
108. Fit the input shaft bearing using tools MS47, 18G47BA and 18G47BA-X.

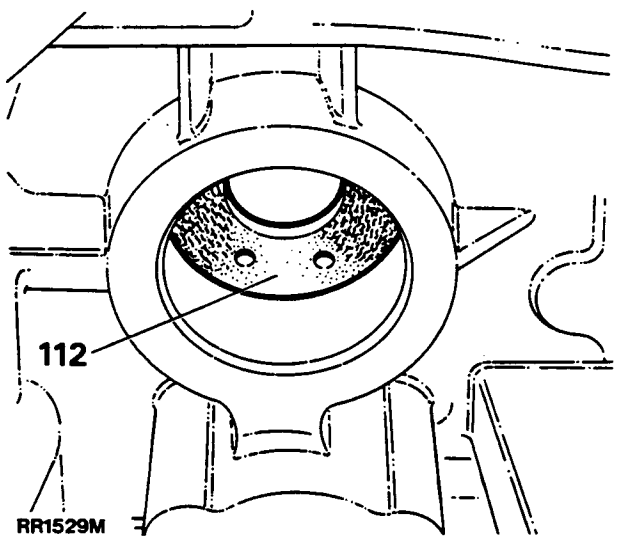
Reverse gear and shaft

109. Fit a new circlip to the rear of the reverse idler gear, ensuring that the circlip is not stretched beyond the minimum necessary to pass over the shaft.
110. Lubricate with light oil and fit both needle roller bearings. Fit the shorter needle bearing to the rear of the reverse idler gear.
111. Fit a new circlip to the front of the reverse idler gear.

Extension case

112. Using a suitable press, fit a new ferrobestos bush to the case, ensuring the two drain holes are towards the bottom of the case.

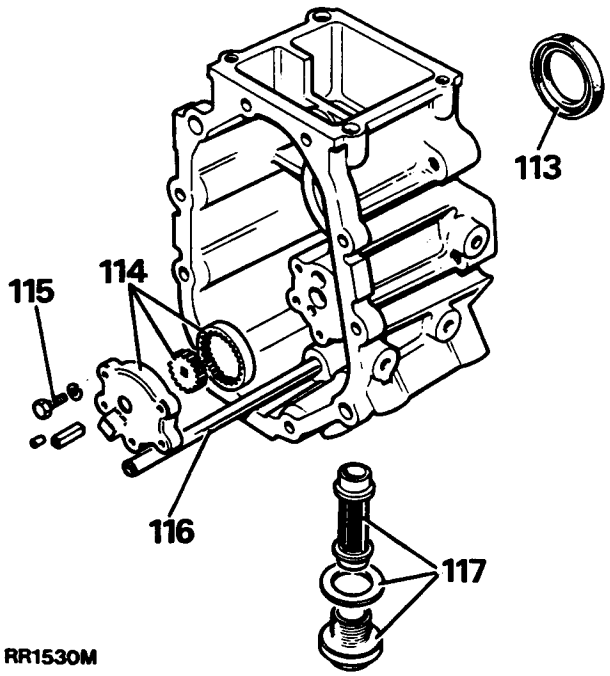
NOTE: If a new extension case is fitted, it is essential that a grub screw is securely fitted in the main oilway located in the rear of the case.



Continued

113. With the aid of tool 18G1422, fit a new oil seal to the rear of the extension case. Ensure the seal lips are towards the ferrobestos bush. Lubricate the seal lips with a suitable SAE 140 oil.
114. Assemble and fit the fibre oil pump gears to the oil pump cover, whilst ensuring the centre rotor squared drive faces the layshaft.

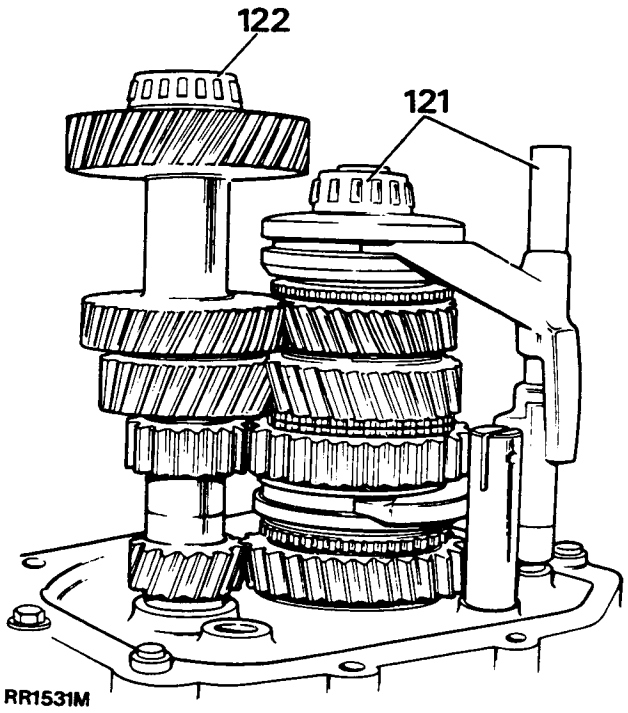
115. Fit the three bolts and spring washers to secure the oil pump cover; and tighten to the specified torque.
116. Ensure that the oil pick-up pipe is free of contamination or blockage.
117. Fit a new oil filter, fibre gasket and tighten plug to the specified torque.



RR1530M

Centre plate

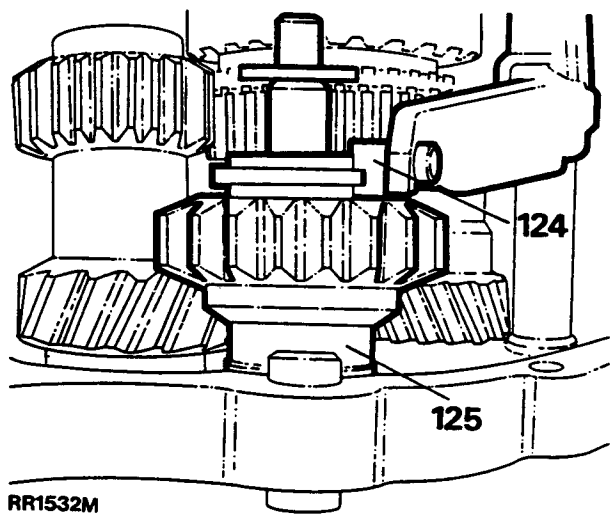
118. Fit the centre plate to a suitable stand and secure with two slave bolts.
119. Place the new mainshaft and layshaft bearing tracks to the centre plate.
120. Lightly lubricate the selector shaft with a light oil.
121. Take the selector shaft complete with the first and second selector fork, front spool and third and fourth selector fork; engage both selector forks in their respective synchromesh sleeves on the mainshaft, simultaneously engage the selector shaft and mainshaft assemblies in the centre plate, whilst rotating the fifth gear selector pin to align with the slot in the centre plate.
122. Fit the layshaft to the centre plate.



RR1531M

123. Rotate the selector shaft and spool to enable the reverse crossover lever forks to correctly align to the selector pin. Reposition the selector shaft and locate the lever into the slot of the reverse gear pivot shaft. Insert pivot pin and fit a new circlip, ensuring that it is not opened beyond the minimum necessary to pass over the shaft.

124. Fit the slipper pad to the reverse lever. If a new reverse lever pivot shaft has been fitted, it will be necessary to ascertain that its radial location is consistent with the reverse pad slipper engagement/clearance. The radial location is determined during initial assembly.

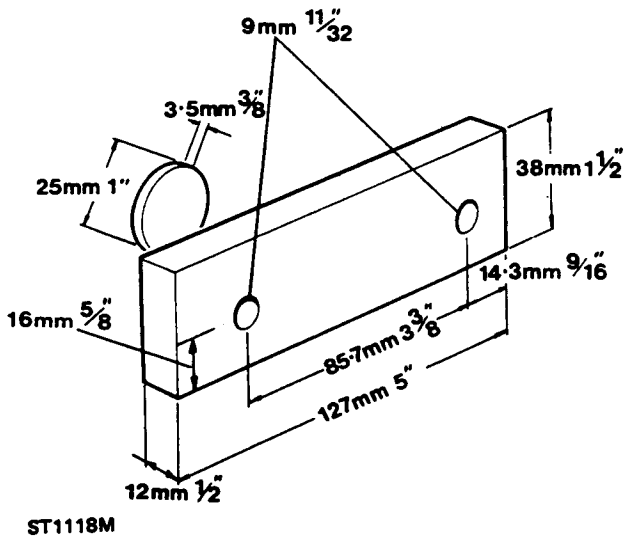


RR1532M

125. Fit the reverse gear spacer and reverse gear assembly, locating the slipper pad lip to the reverse gear groove. Engage the reverse gear shaft from the underside of the centre plate, ensuring the roll pin is aligned with the slot in the centre plate casing.
126. Prior to assembly lubricate the detent ball and spring with light oil, and fit to the top of centre plate. Smear Hylomar PL32 or Loctite 290 to the plug threads and screw the plug flush with the case. Stake the plug to prevent rotation using a suitable centre punch. Release the slave bolts.
127. Locate the fourth gear synchromesh cone to the third/fourth synchromesh assembly.
128. Fit the input shaft to the mainshaft.
129. Fit the reverse gear thrust washer to the reverse gear shaft.
130. Fit a new gasket to the centre plate.

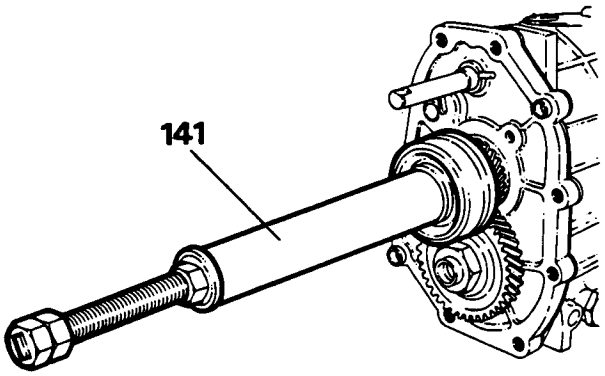
Main gearbox casing

131. Insert a new plastic oil trough to the back of the main gearbox casing, ensuring the open trough faces the top of the case.
132. Carefully lower the gearcase into position over the gear assemblies. DO NOT USE FORCE. This operation can be assisted by the use of two 8 × 100 mm guide studs. Ensure the centre plate dowels and selector shaft are engaged in their respective locations.
133. Fit the layshaft and input shaft bearing outer tracks.
134. Using 8 × 35 mm slave bolts and plain washers to prevent damaging the rear face of the centre plate, evenly draw the gearcase into position on the plate.
135. Fit the locating shaft front spool to the top of the gearcase using Hylomar PL32 to seal between the spool and gearcase. Smear Loctite 290 or Hylomar PL32 to the bolt threads, tighten bolts and spring washers to the specified torque.
136. Manufacture a layshaft support plate and plain washer to the dimensions provided in the illustration.



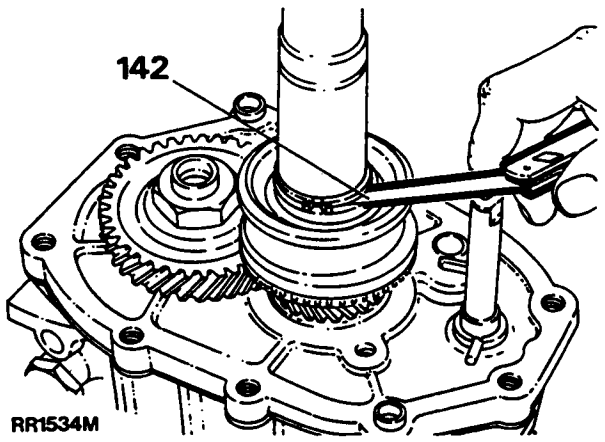
ST1118M

137. The layshaft support plate is fitted using two 8 × 25 mm bolts and washers to the front of the gearbox, with the plain washer situated between the support plate and layshaft. The plate also retains the input shaft bearing outer track.
138. Using a suitable press, fit the fifth gear to the layshaft, fit a new 22 mm stake nut and tighten sufficiently to retain.
139. Locate assembly horizontally in a vice or suitable jig.
140. Fit the fifth speed washer, roller bearing, gear and cone to the mainshaft.
141. Press fit fifth gear synchromesh hub assembly using tool 18G1431. Fit a dummy spacer with an oversize bore to ascertain the correct spacer to provide the specified clearance on the fifth gear. When the correct spacer has been determined, fit the spacer to the mainshaft and secure in position with a new circlip.



RR1533M

142. Measure the clearance between the front spacer and circlip, which should be between 0,055 and 0,005 mm, (0.002–0.0002 in) maximum. Select the appropriate spacer to provide the aforementioned clearance.



RR1534M

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Part No.	Thickness (mm)	Part No.	Thickness (mm)
FRC5284	5,10	FRC5294	5,40
FRC5286	5,16	FRC5296	5,46
FRC5288	5,22	FRC5298	5,52
FRC5290	5,28	FRC5300	5,58
FRC5292	5,34	FRC5302	5,64

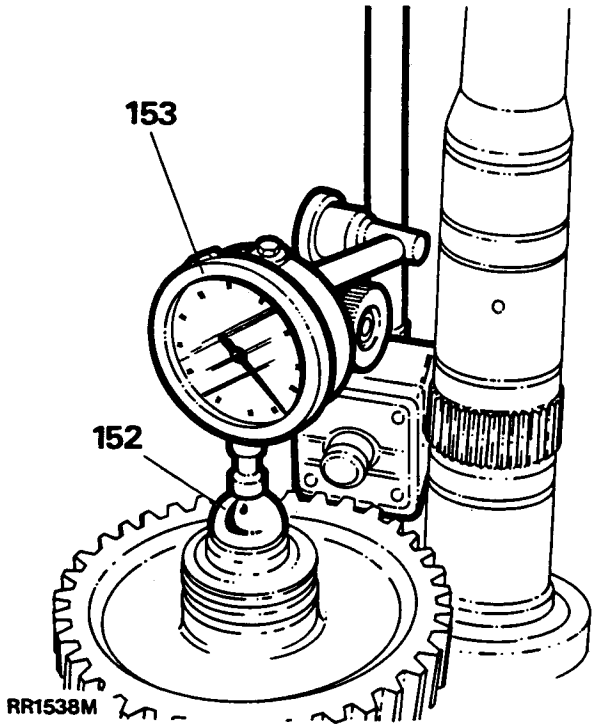
143. Fit the correct selective spacer and new circlip.

Mainshaft and layshaft end-float

144. Measure and adjust the mainshaft and layshaft end-float as necessary. Remove the layshaft support plate from the front of the gearbox.

Part No.	Thickness (mm)	Part No.	Thickness (mm)
FRC4327	1,51	FRC4349	2,17
FRC4329	1,57	FRC4351	2,23
FRC4331	1,63	FRC4353	2,29
FRC4333	1,69	FRC4355	2,35
FRC4335	1,75	FRC4357	2,41
FRC4337	1,81	FRC4359	2,47
FRC4339	1,87	FRC4361	2,53
FRC4341	1,93	FRC4363	2,59
FRC4343	1,99	FRC4365	2,65
FRC4345	2,05	FRC4367	2,71
FRC4347	2,11	FRC4369	2,77

145. When ascertaining the mainshaft end-float care must be taken when checking the dial gauge readings to ensure that the end-float only, as distinct from side movement, is recorded. To overcome the difficulty in differentiating between end-float and side movement, wrap approximately ten turns of masking tape around the plain portion of the input shaft below the splines. Ascertain that the rise and fall of the input shaft is not restricted by the tape.
146. Place a mainshaft and layshaft spacer of nominal thickness 1,02 mm on the mainshaft and layshaft bearing tracks, fit the front cover and gasket, tighten bolts and spring washers to the specified torque.
147. Invert the gearbox on the stand. Rotate the mainshaft to correctly seat the bearing.
148. Place a suitable ball bearing in the mainshaft centre and mount the dial gauge on the gearcase with the stylus resting on the ball bearing centre. Zero the gauge.
149. Check the end-float by a 'push-pull' action to the mainshaft. The required mainshaft end-float measurement should be between 0,01 to 0,06 mm (0.0004 to 0.002 in) maximum with no preload.
150. Select the appropriate spacer to give the specified end float.
151. Rotate the layshaft to correctly seat the bearing.
152. Place a suitable ball bearing in the layshaft centre and mount the dial gauge on the gearcase, with the stylus resting on the ball bearing centre. Zero the gauge.



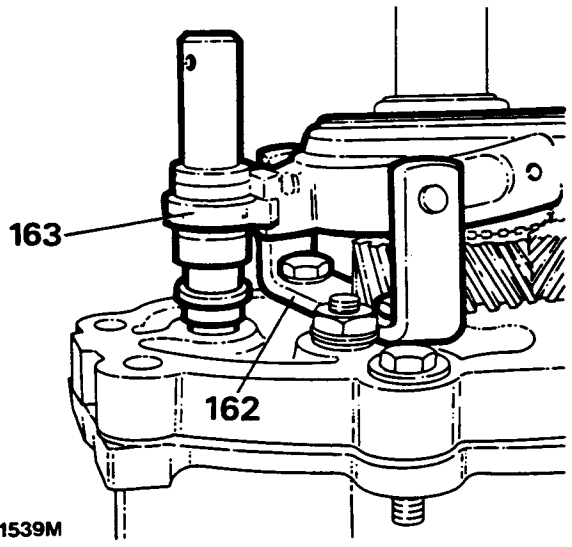
153. With the aid of levers approximately 23 cm long; to prevent component damage, check the end-float by a gentle 'push-lift' action to the layshaft. The required layshaft setting is:
0,025 mm end-float
0,025 mm preload.
Spacer thickness required equals; nominal thickness of spacer, plus end-float obtained. Remove the gauge and ball bearing.
154. Remove the front cover. Having ascertained the mainshaft and layshaft end-float, fit the mainshaft and layshaft spacers of the appropriate thickness to the mainshaft and layshaft bearing tracks. Selective spacers are available in a range of sizes to meet the aforementioned clearance limits.

Part No.	Thickness (mm)	Part No.	Thickness (mm)
TKC4633	1,69	TKC4649	2,17
TKC4635	1,75	TKC4651	2,23
TKC4637	1,81	TKC4653	2,29
TKC4639	1,87	TKC4655	2,35
TKC4641	1,93	TKC4657	2,41
TKC4643	1,99	TKC4659	2,47
TKC4645	2,05	TKC4661	2,53
TKC4647	2,11	TKC4663	2,59

155. Fit a new oil seal to the front cover, ensuring the seal lips face towards the gearbox. Lubricate the seal lips with SAE 140 gear oil.
156. Mask the splines with masking tape to protect the oil seal, refit the front cover and remove the spline masking tape.
157. Refit the bolts and spring washers having used Hylomar PL32 or Loctite 290 on the bolt threads. Tighten to the specified torque.
158. Remove gearbox from the stand and place suitably supported on the bench.
159. Remove the guide studs fitted to the centre plate.
160. Select reverse gear by turning the selector rail anti-clockwise and pulling rearwards. Move the fifth speed synchromesh hub into mesh with the fifth gear.
161. Tighten the staked nut onto the fifth gear layshaft to the specified torque. Stake the nut with a suitable punch to secure. Select neutral by pushing selector rail inwards and turning clockwise, thereby returning the fifth speed synchromesh hub to its out of mesh position.

Fifth gear selector fork assembly

162. Fit the fifth selector fork bracket to the centre plate with the bolts and spring washers and tighten to the specified torque.
163. Fit the fifth gear spool to the selector shaft. It should be noted that the longer shoulder of the spool is fitted towards the front of the gearbox.
164. Fit the bronze pads to the 5th gear selector fork (retain with vaseline), engage, the fork with the spool, bracket and synchromesh sleeve, insert the two dowel pins and secure in position with the two circlips.



RR1539M

165. Fit the selector yoke to the selector shaft and secure in position with a NEW 10 mm grub screw.

NOTE: The NEW grub screw is encapsulated with loctite during manufacture.

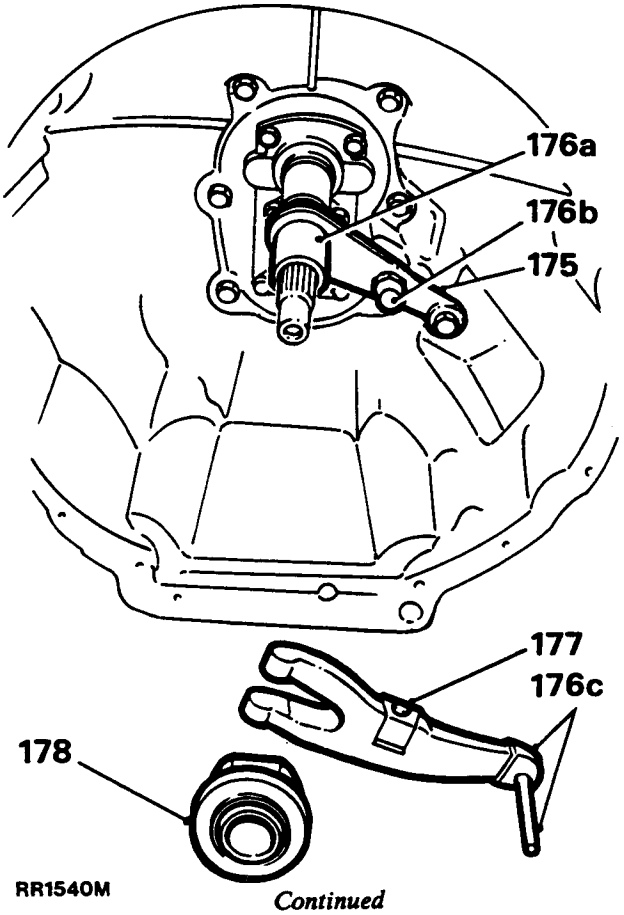
166. Remove the six dummy bolts securing the centre plate to the main casing.
167. Position the gearbox assembly horizontally and fit the oil pump shaft to the pump.

Extension case

168. Fit a new gasket to the centre plate.
169. Rotate the oil pump shaft to align with the layshaft.
170. Carefully fit the extension case ensuring that the oil pump shaft engages the layshaft.
171. Fit the extension case bolts and spring washers; tighten to specified torque.
172. Cover the mainshaft splines with masking tape and fit a new oil seal collar 'O' ring. Remove the masking tape.
173. Using tool 18G1431 fit a NEW oil seal collar to the mainshaft, ensuring the collar is NOT pushed too far on the shaft, fit only with sufficient clearance to allow the circlip to engage in its groove.

Bell housing

174. Locate the bell housing to the dowels and fit the two long bolts (12 × 45 mm) with spring and plain washers to the dowel positions. The remaining four bolts (12 × 30 mm) are fitted with spring washers only. Tighten to the specified torque.
175. Slide the release bearing guide over the input shaft, and secure in position with the single bolt and clutch release pivot, tighten to the specified torque.



RR1540M

Continued

176. Prior to assembly, lubricate the following items with a thin film of molybdenum disulphide grease.
   (a) Clutch release lever fulcrum pivot socket.
   (b) The outer diameter of the release bearing guide.
   (c) Ball ends of the clutch operating push rod.
177. Locate the clutch release bearing lever on the pivot ball and secure in position with the spring clip, tighten the clip securing bolt to the specified torque.
178. Slide the clutch release bearing over the bearing guide and locate the NEW nylon clutch release lever clip onto the bearing.

Gear change housing

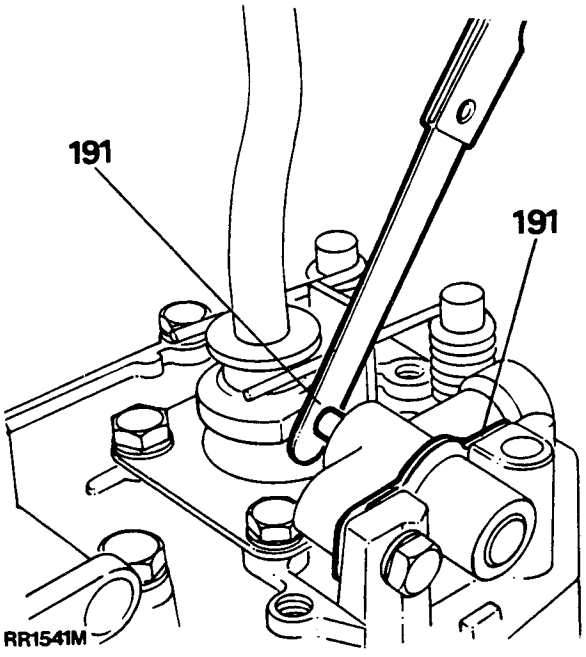
179. Fit a new seal to the bottom of the housing, lips of the seal uppermost.
180. Lightly grease the lower gear lever ball with Shell Alvania R3 and fit the railko bush.
181. Fit the assembly to the housing locating the two pegs on the ball in the recesses of the ball seat.
182. Locate the bias adjustment plate, coat two of the retaining bolts with Hymolar PL32 or Loctite 290 and fit them forward of the gear lever. Do not tighten the bolts at this stage.
183. Inspect the bias springs for condition, renew if necessary. Fit the springs onto the posts, coat the remaining two bolts with Hylomar PG32 or Loctite 290 and fit to the housing to secure the springs in position. Do not tighten the bolts at this stage.
184. Carefully lever the free end of the springs around the rear of the gear lever until they are retained by the stop on the adjustment plate.
185. Fit a NEW gasket to the top of the gearbox.
186. Fit the housing to the gearbox and secure in position with two bolts (diagonally opposite).

Bias adjustment plate setting

187. Select fourth gear and load the gear lever fully to the right hand side of the gearbox.
188. Tighten the four bolts to the specified torque.
189. Select all forward and reverse gears to ensure that gear selection is not inhibited after final tightening of the adjustment plate.

Reverse plunger assembly setting

190. Fit the assembly to the housing and secure in position with the single bolt and washer.
191. Select first gear. Using feeler gauges, check the gap between the reverse plunger nose and the side of the gear lever. The required setting should be 0,6 to 0,85 mm (0.024 to 0.034 in) clearance.
   Adjust the gap by adding or removing the shims behind the plunger assembly.



192. Remove the gear change housing from the gearbox.
193. Fit a new fibre washer to the oil drain plug, fit the plug to the gearbox and tighten to the specified torque.
194. Refill the gearbox with the correct quantity and grade of oil as specified in the 'Recommended Lubricants' section.
195. Refit the gearbox oil level plug, and tighten to the specified torque.
196. Refit the gearbox to the vehicle.
197. Refit the gear change housing to the gearbox after the gearbox has been installed in the vehicle.

LT 230T TRANSFER BOX

The following operations can be carried out with the gearbox in the vehicle. For ease of working, the vehicle should be raised on a ramp or placed over a pit.

RENEW SPEEDOMETER DRIVE PINION

1. Disconnect the battery.
2. Raise the vehicle on a ramp.
3. Remove the speedometer drive clamp and nut and withdraw the cable.
4. Prise out the drive pinion assembly.
5. Push in a new assembly and fit the speedometer cable and secure with the clamp and nut.

RENEW REAR OUTPUT SHAFT OIL SEAL

Special tool:
18G1422

1. Disconnect the battery for safety.
2. Disconnect the rear propshaft from the output flange.
3. Remove the brake drum retaining screws and withdraw the drum.
4. Remove the four back plate bolts that also retain the oil catcher and remove the brake back plate and catcher.

   NOTE: An hexagonal type socket should be used for these bolts.

5. Remove the output shaft nut, steel washer, felt washer and withdraw the flange.
6. Using the slot provided, lever off the dust cover.
7. Prise out the output shaft oil seal(s).
8. Using special tool 18G1422 fit the double-lipped oil seal, open side inwards, with the seal in contact with the bearing circlip, taking care not to touch the seal lips.
9. Fit the dust cover.
10. Lubricate the surface of the flange which runs in the seal and carefully fit the flange.

    NOTE: To renew the flange bolts first remove the circlip before fitting the flange.

11. Secure the flange with the nut and washer and tighten to the specified torque.
12. Fit the oil catcher to the back plate using silicone rubber sealant and secure with the two back plate bolts (with plain washers).
13. Fit the brake drum and retain with the two screws.
14. Reconnect the propeller shaft.

RENEW FRONT OUTPUT SHAFT OIL SEAL

Special tool:
18G1422

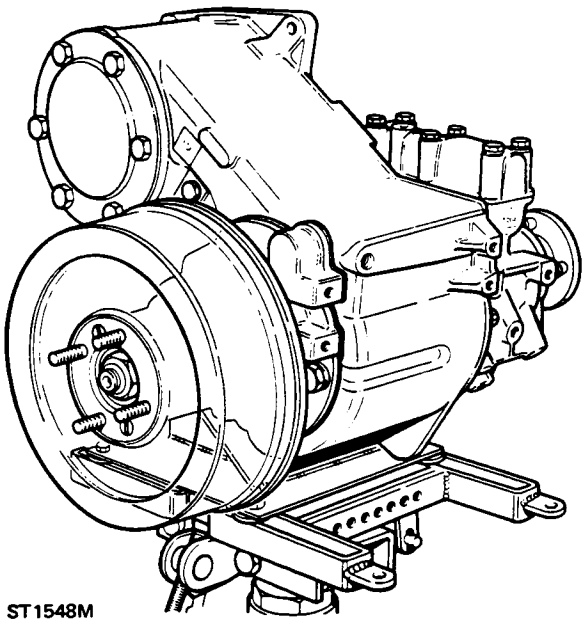
1. Disconnect the front propeller shaft from the flange and move to one side.
2. Remove the output shaft nut, steel washer, felt washer and withdraw the flange.
3. Remove the oil seal shield.
4. Prise out the oil seal(s).
5. Using special oil seal replacer tool 18G1422 fit the double-lipped oil seal, open side inwards, with the seal in contact with the bearing circlip, taking care not to touch the seal lip.
6. Lubricate the running surface of the flange and fit it together with the oil seal shield.
7. Secure the flange with the nut and washer and tighten to the specified torque.
8. Refit the propeller shaft.

REMOVE LT230T TRANSFER GEARBOX

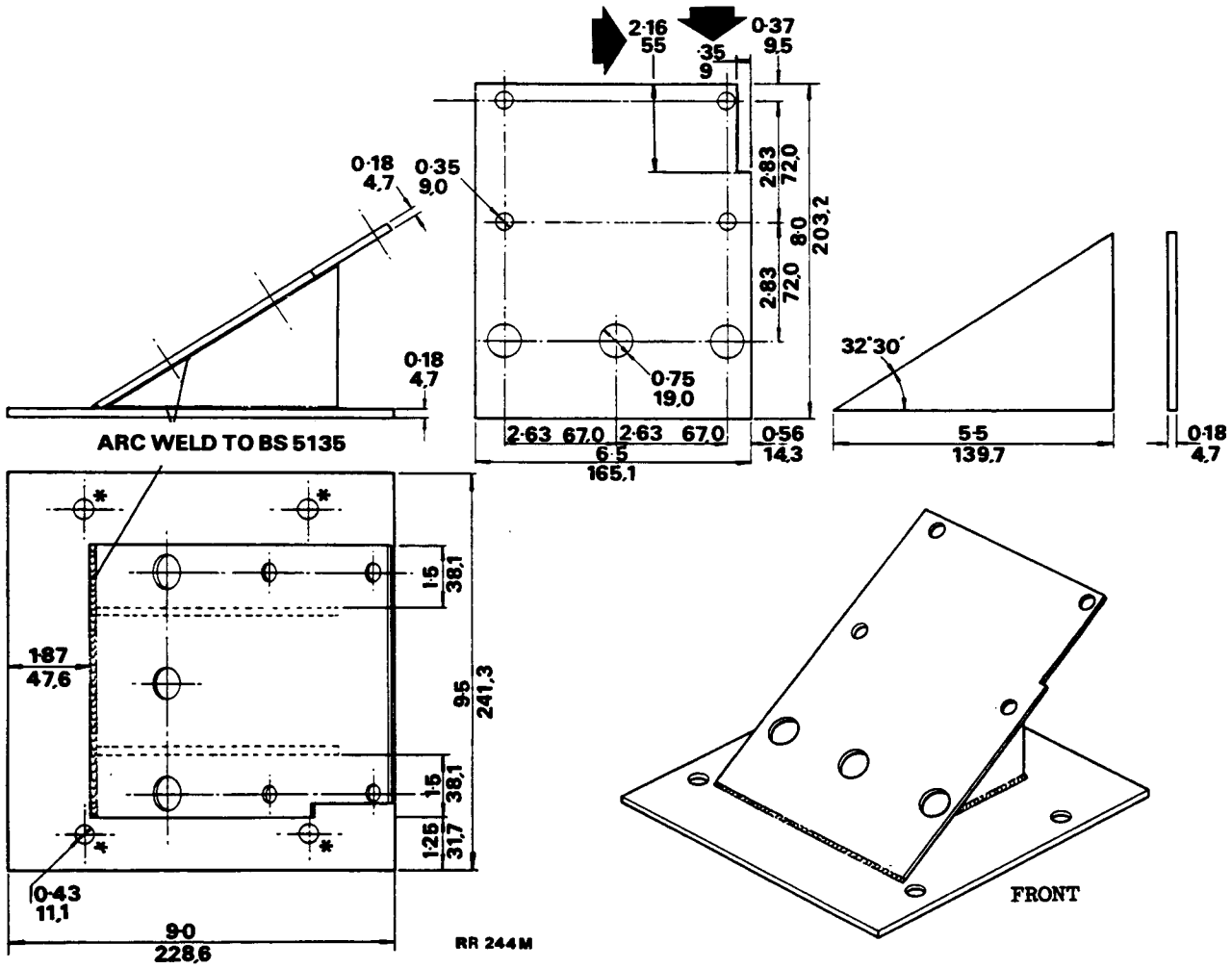
Special tool: 18G 1425—Guide studs (3)
Also, locally manufactured adaptor plate, see below

Adaptor plate for removing transfer gearbox

The transfer gearbox should be removed from underneath the vehicle, using a hydraulic hoist. An adaptor plate for locating the transfer gearbox onto the hoist can be manufactured locally to the drawing below. If a similar adaptor plate was made for the LT230R transfer gearbox, it can be modified to suit both the LT230R and LT230T gearboxes by making the modifications shown by the large arrows.



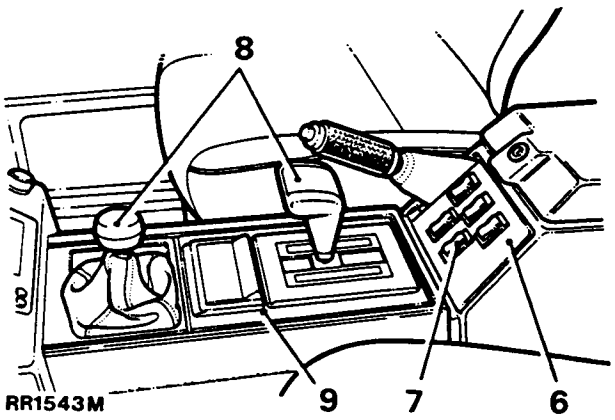
ST1548M



Material: Steel plate BS 1449 Grade 4 or 14.
Holes marked thus * to be drilled to fit hoist being used.

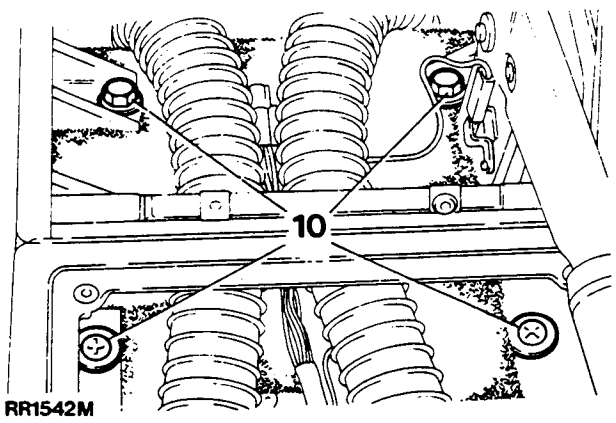
Removing

1. Install the vehicle on a hydraulic ramp.
2. Open the bonnet.
3. Disconnect the battery.
4. **Fuel Injection models** only—release the airflow meter to plenum chamber hose.
   Carburetter models only—Remove the air intake elbows and withdraw the air cleaner from its location.
5. Remove the four screws securing the cubby box liner to the cubby box and lift out the liner.
6. Carefully prise the window lift, switch panel away from the front of the cubby box.
7. Identify each switch connection for reassembly, disconnect the plugs and remove the switch panel.
8. Remove the main and transfer gearbox knobs.
9. Carefully prise the centre panel out of the floor mounted console and remove it from the vehicle.



Automatic version illustrated

10. Release the two bolts and two screws securing the console assembly to the gearbox tunnel.

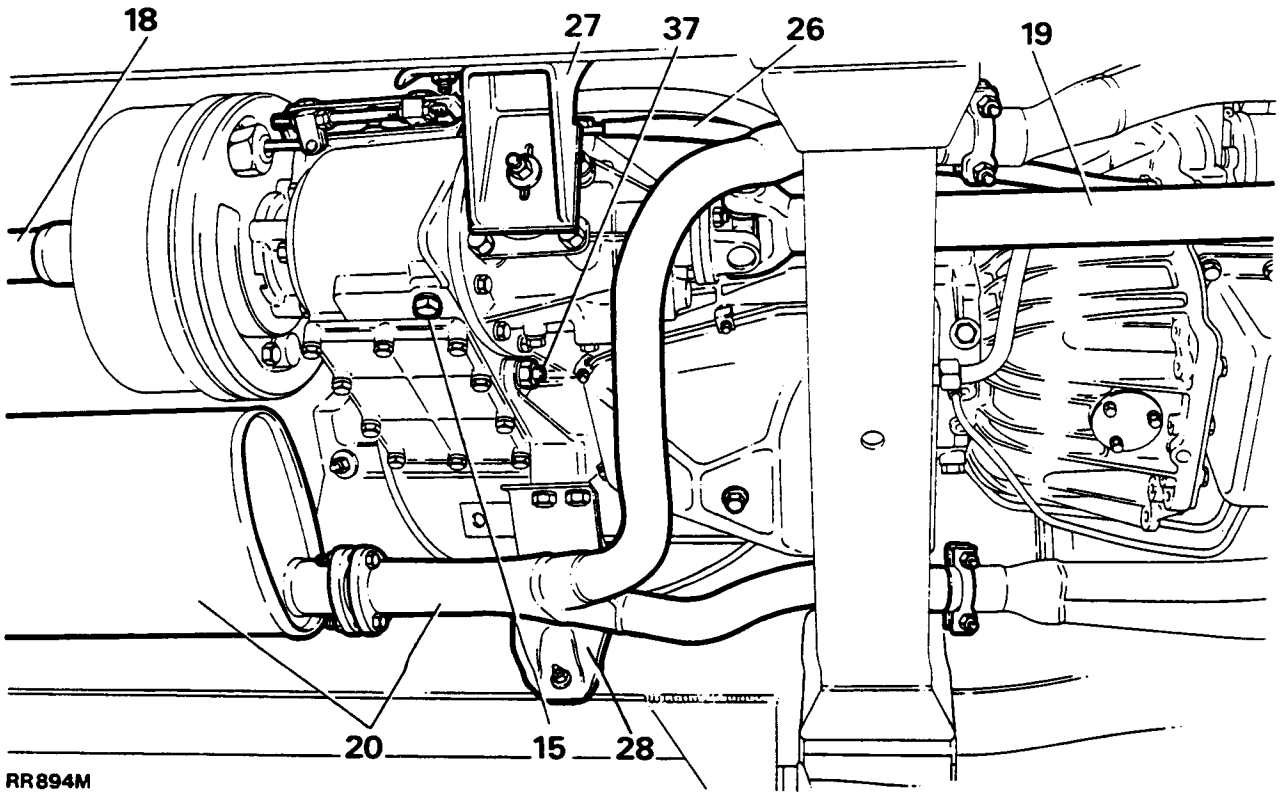


11. Release the handbrake and remove the split pin, clevis pin and washer securing the handbrake cable to the hand brake lever.
12. Carefully manoeuvre the assembly away from the radio housing and remove it from the vehicle.
13. Release the large nut retaining the handbrake outer cable to the top of the gearbox tunnel.
14. Remove the nut and feed the cable through the hole to the underside of the vehicle.

NOTE: The illustration for the following removal instructions is located at top of the following page.

15. Raise the vehicle on the ramp and drain the transfer gearbox.
16. Release the nut and clamp securing the speedometer cable to the rear of the transfer box, withdraw the cable from the speedometer drive pinnion.
17. Release the cable from the clip at the side of the gearbox.
18. Release the four nuts and bolts securing the rear propeller shaft to the rear output flange and tie the shaft to one side.
19. Remove the four nuts and bolts securing the front propeller shaft to the front output flange and tie the shaft to one side.
20. Release the nuts and bolts securing the front down pipe to the front silencer.
21. Release the nut at the rear tailpipe bracket, disconnect the silencer from the down pipe, and tie the rear tail pipe and silencer to one side.
22. Manufacture an adaptor plate in accordance with the drawing, to attach to the gearbox hoist and transfer box to facilitate removal (RR244M).
23. Place four, 30 mm (1.250 in) long spacers between the top of the hoist and the adaptor plate at the securing points and secure the adaptor plate to the hoist.
24. Remove the four central bolts from the transfer box bottom cover, move the hoist into position and secure the adaptor plate to the transfer box.
25. Adjust the hoist to take the weight of the transfer box.
26. Remove the tie bar from the transfer gearbox.
27. Remove the rear left-hand side mounting bracket to chassis nuts and bolts.
28. Remove the right-hand side mounting bracket to chassis nuts and bolts.
29. Remove right-hand side mounting bracket to flexible mounting, rubber retaining nut and place bracket aside.
30. Lower the hoist until the rear brake drum clears the rear passenger footwell.
31. Remove the split pin and washers securing the differential lock lever to the connecting rod, and disconnect the lever from the rod.
32. Disconnect the electrical leads from the differential lock switch.
33. Remove the breather pipe from the top of the transfer gearbox.
34. Select low range transfer box gear position.
35. Release the high/low rod lower lock nut and remove the rod from the yoke.

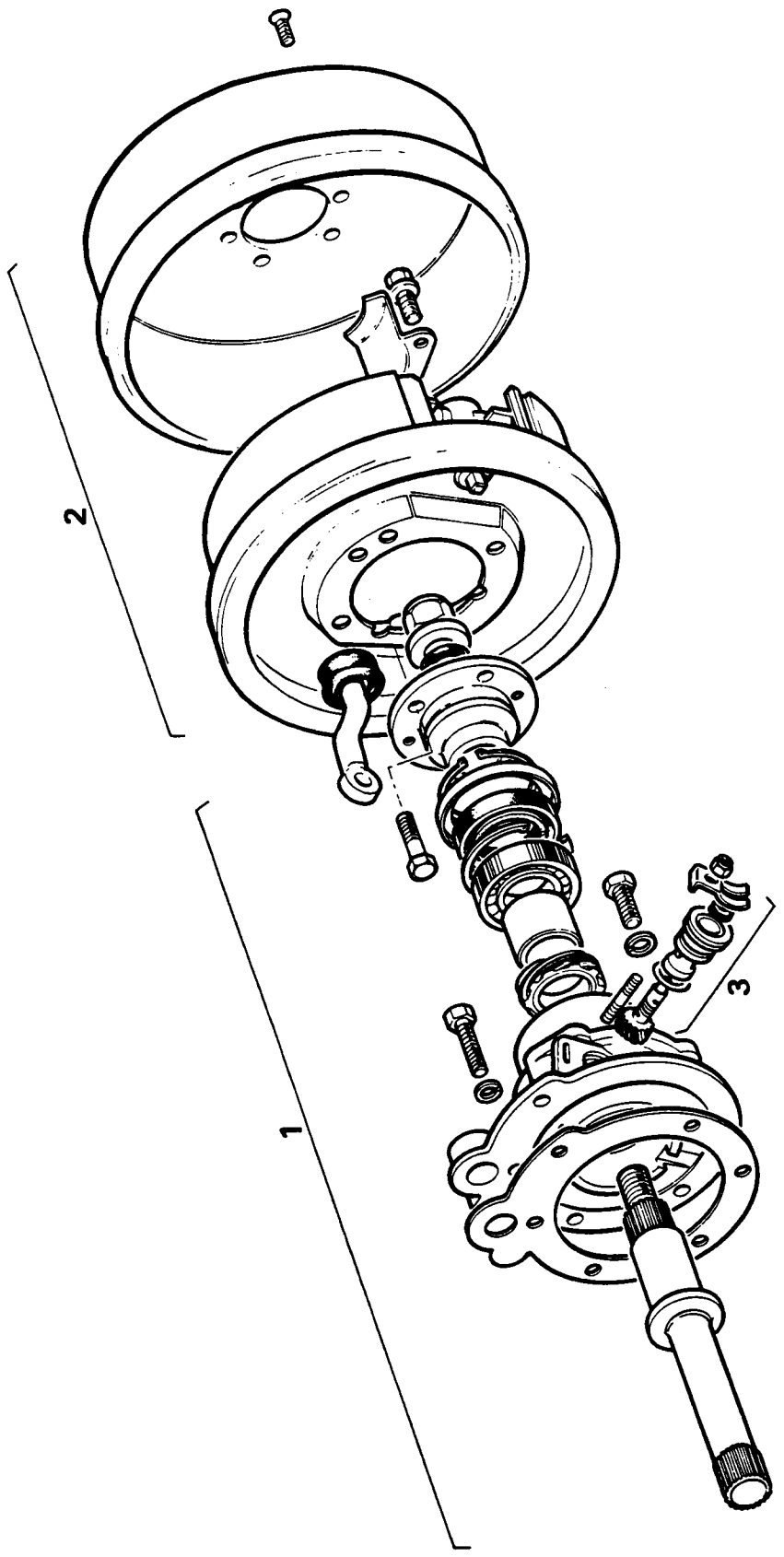
Continued



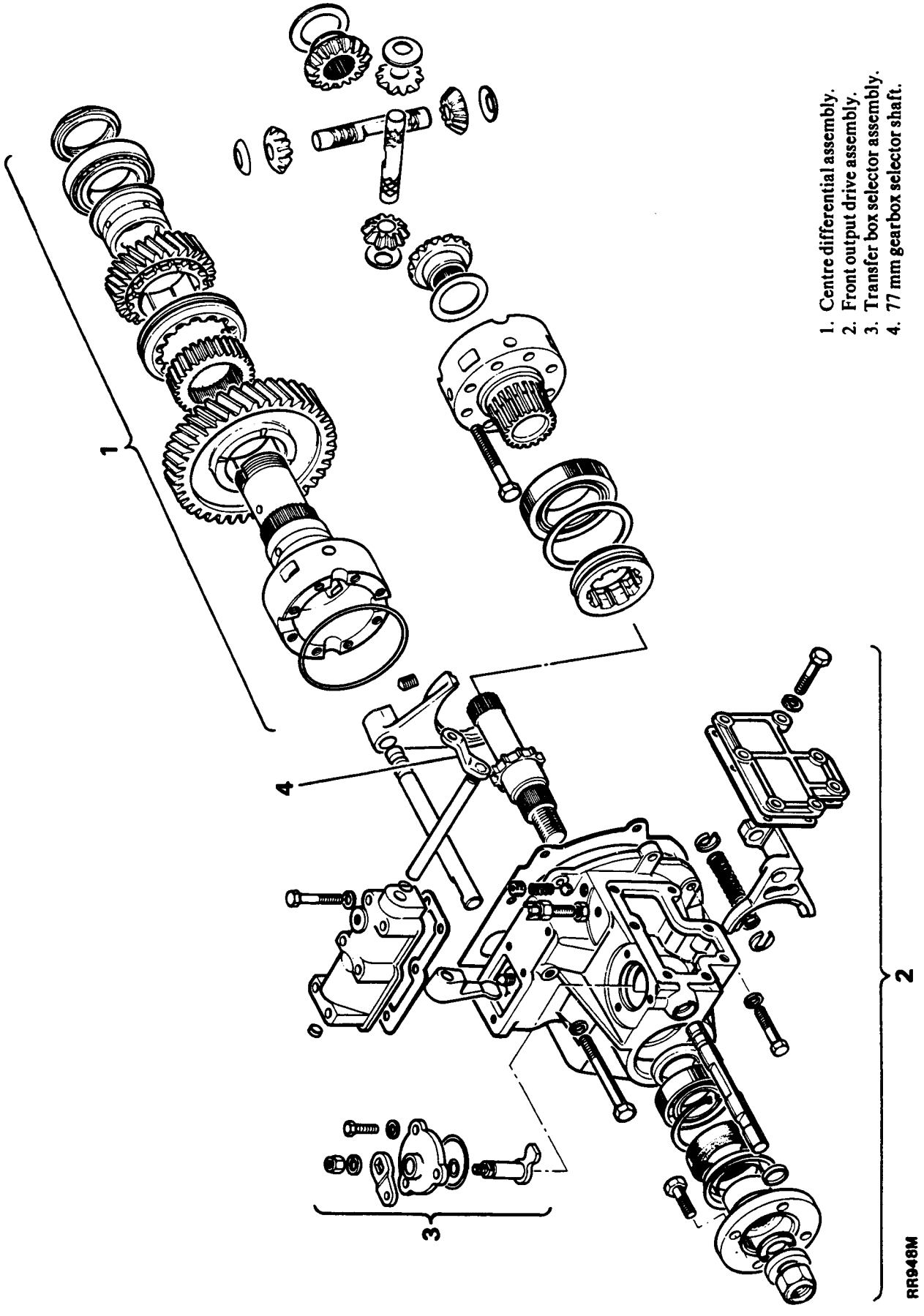
36. Place a suitable wooden block between the main gearbox and chassis cross-member, then lower the hoist until the gearbox contacts the wooden block.
37. Remove the upper and lower bolts securing the transfer box to the main gearbox.
38. Fit three guide studs to the gearbox 18G 1425 and manoeuvre the gearbox rearwards to detach it from the main gearbox.

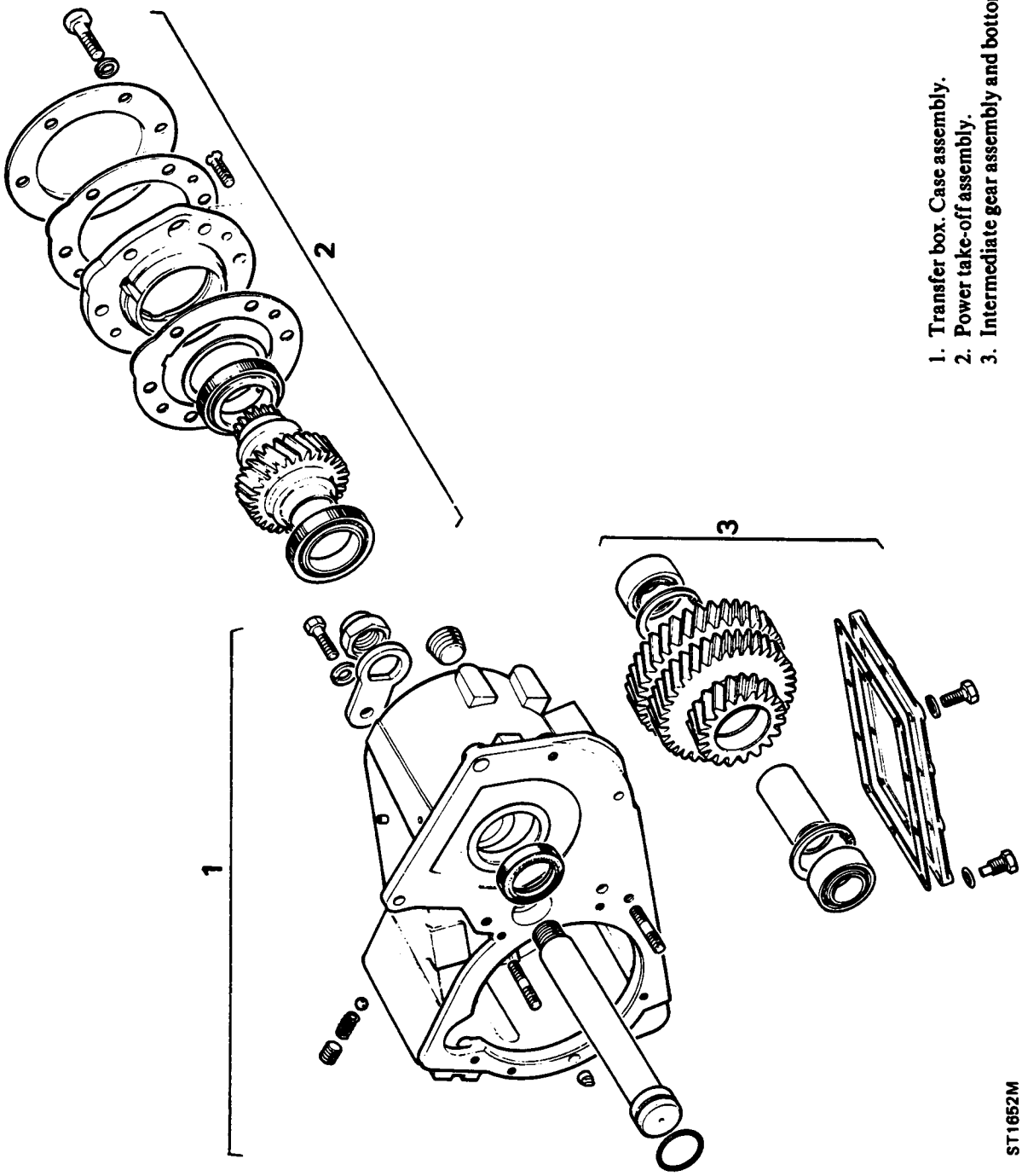
Refitting

39. Make sure that the joint faces of the transfer box and main gearbox extension case are clean and that the three guide studs, 18G 1425, are fitted to the extension case.
40. Lubricate the oil seal in the joint face of transfer box, secure the transfer box to the adaptor plate on the lifting hoist and raise the hoist until the transfer box can be located over the guide studs.
41. Remove the guide studs and secure the transfer box to the main gearbox extension case. Tighten the nuts and bolts to the correct torque.
42. Complete the refitting procedure by reversing the removal sequence, noting the following important points.
43. After removing the lifting hoist and adaptor plate from the transfer box, clean the threads of the four bolts for the transfer box bottom cover, coat them with Loctite 290, and fit them together with spring washers. Tighten to the correct torque.
44. Refill the transfer box with the correct grade oil to the oil level plug hole.
45. Check, and if necessary top-up the oil level in the main gearbox. Use the correct grade oil.
46. Check the operation of the handbrake and adjust as necessary.



1. Rear output drive assembly.
2. Transmission brake drum assembly.
3. Speedo housing assembly.


1. Centre differential assembly.
2. Front output drive assembly.
3. Transfer box selector assembly.
4. 77 mm gearbox selector shaft.
1
2
3
4
RR948M



1. Transfer box. Case assembly.
2. Power take-off assembly.
3. Intermediate gear assembly and bottom cover.

LT230T TRANSFER GEARBOX OVERHAUL

Service Tools:
18G47-7—Input gear cluster bearing cones remover/replacer
18G47BB-1—Adaptor centre differential bearing remover
18G47BB-3—Adaptor centre differential bearing remover button
18G257—Circlip pliers
18G1205—Prop flange wrench
18G1271—Oil seal remover
18G1422—Mainshaft rear oil seal replacer
18G1423—Adaptor/socket centre differential stake nut remover/replacer
18G1424—Centre differential bearing replacer
MS47—Hand press
MS550—Bearing and oil seal replacer handle
LST47-1—Adaptor centre differential bearing remover
LST104—Intermediate gear dummy shaft
LST105—Input gear mandrel
LST550-4—Intermediate gear bearing replacer

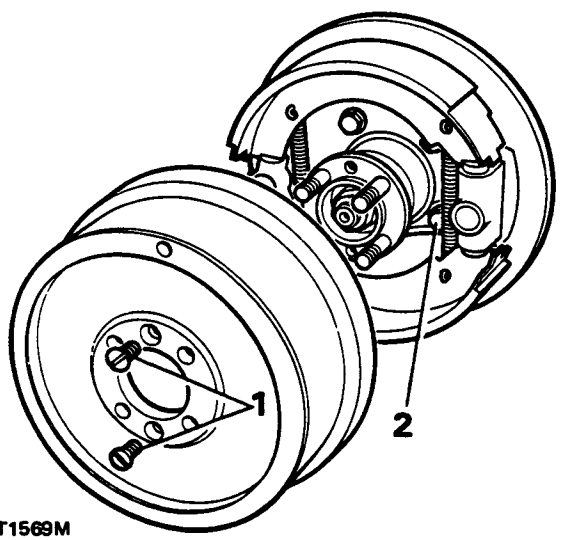
TRANSFER BOX DATA

Front bevel gear end-float	0,025 to 0,075 mm (0.001 to 0.003 in)
Rear bevel gear end-float	0,025 to 0,075 mm (0.001 to 0.003 in)
Rear output housing clearance	1,00 mm (0.039 in)
High range gear end-float	0,05 to 0,15 mm (0.002 to 0.006 in)
Front differential bearing pre-load	1.36 to 4.53 kg (3 to 10 lb)
Input gear bearing pre-load	2.26 to 6.80 kg (5 to 15 lb)
Intermediate shaft bearing pre-load	1.81 to 4.53 kg (4 to 10 lb)

Transmission brake removal

1. Remove two countersunk screws and withdraw brake drum.
2. Remove four bolts securing the brake back-plate; the two bottom fixings retain the oil catcher.

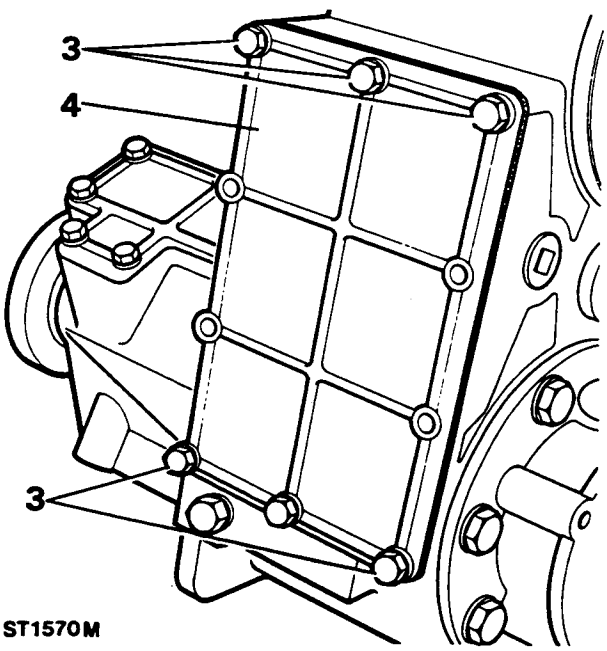
NOTE: An hexagonal type socket should be used for these bolts.



ST1569M

Bottom cover removal

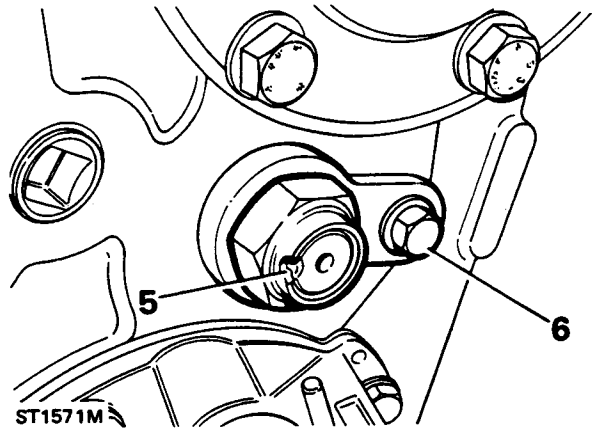
3. Remove the six bolts and washers retaining the bottom cover.
4. Remove the gasket and bottom cover.



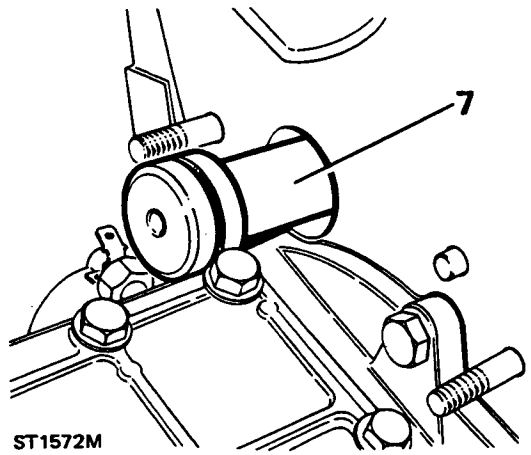
ST1570M

Intermediate shaft and gear cluster removal

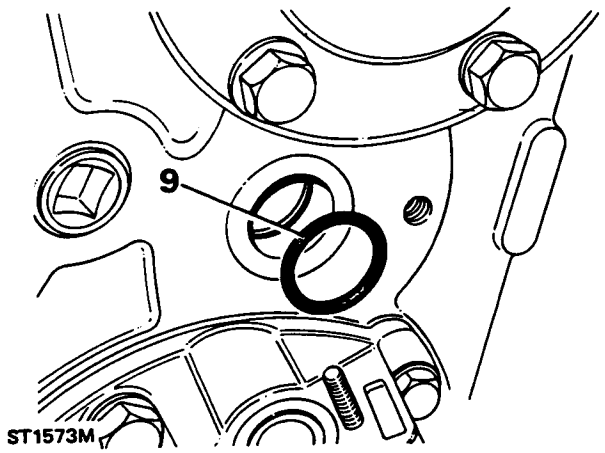
5. Release stake nut from recess in intermediate shaft and remove stake nut and discard.
6. Unscrew the single bolt and remove anti-rotation plate at the rear face of the transfer box.



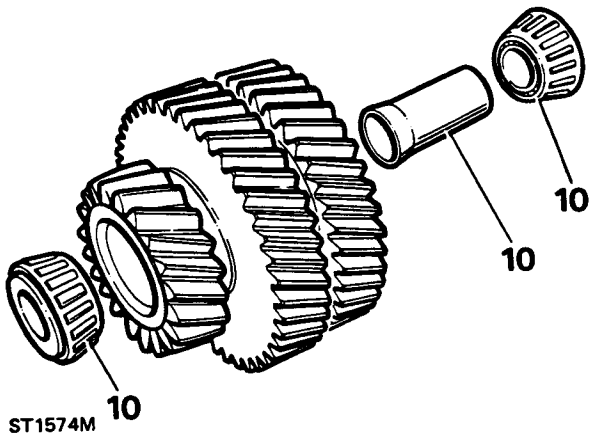
7. Tap the intermediate gear shaft from the transfer box.



8. Lift out the intermediate gear cluster and bearing assembly.
9. Remove the 'O' rings from the intermediate gear shaft and from inside the transfer box.

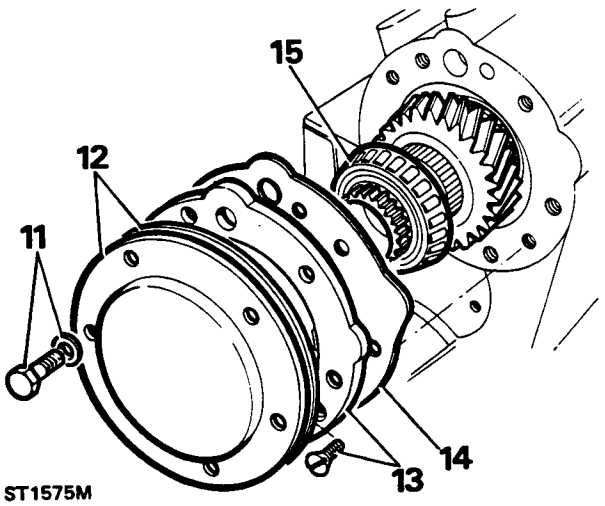


10. Remove taper roller bearings and bearing spacer from the intermediate gear cluster assembly.



Power take-off cover removal

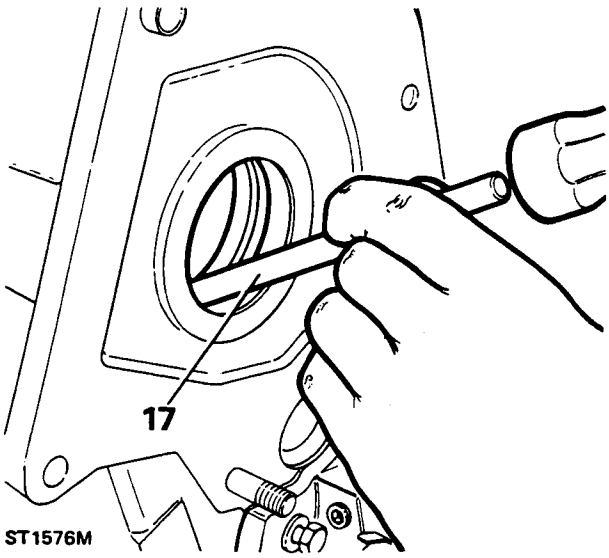
11. Remove six bolts and washers retaining the take-off cover and speedo cable clips.
12. Remove the gasket and cover.



Input gear removal

13. Remove the two countersunk screws and detach the main shaft bearing housing.
14. Remove the gasket.
15. Withdraw the input gear assembly.
16. Prise out and discard the oil seal at the front of the transfer box casing using service tool 18G 1271.
17. Drift out the input gear front bearing track.

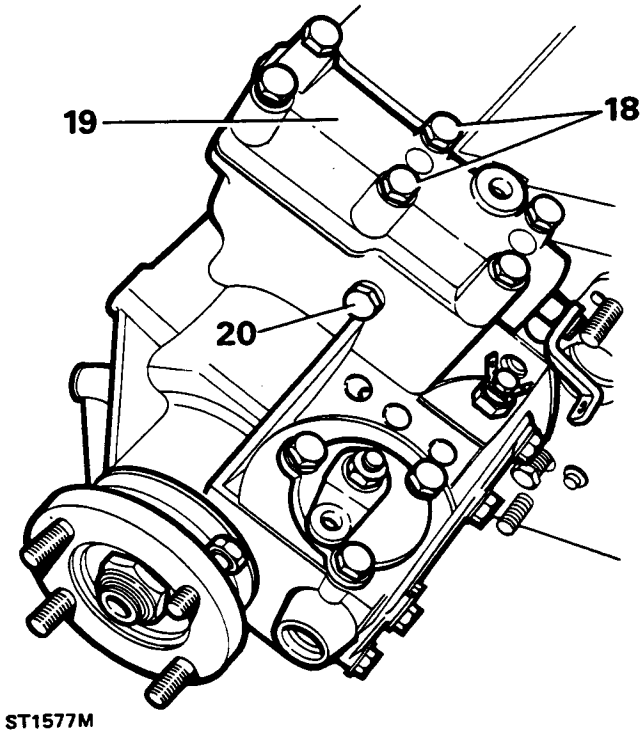
Continued



ST1576M

High/low cross-shaft housing removal

18. Remove the six bolts and washers retaining the cross-shaft housing and earth lead.
19. Remove the gasket and cross-shaft housing.



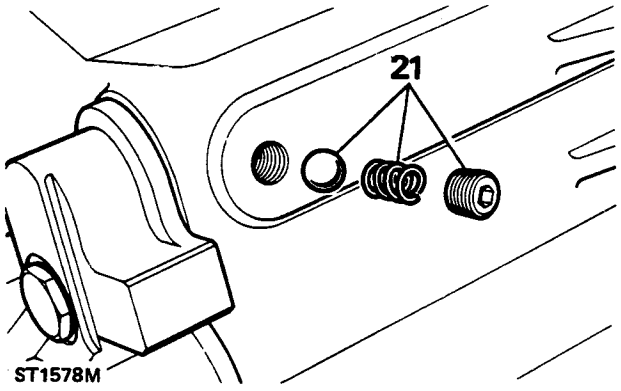
ST1577M

Front output housing removal

20. Remove the eight bolts and washers and detach the output housing from the transfer box casing, taking care not to mislay the dowel.

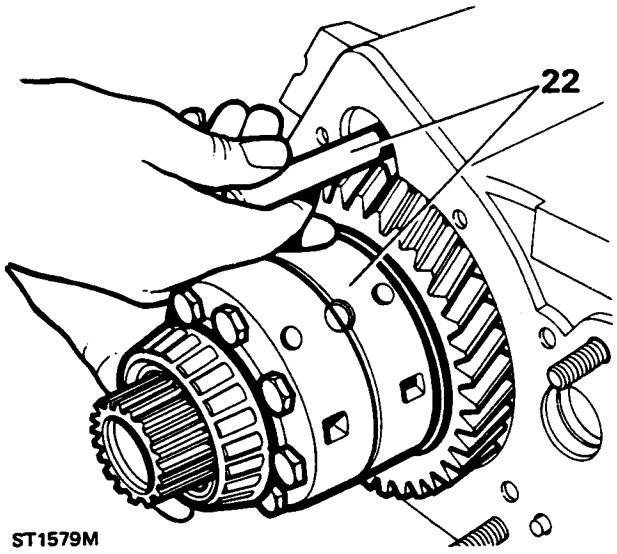
Centre differential removal

21. Remove high/low selector shaft detent plug, spring and retrieve the ball with a suitable magnet.



ST1578M

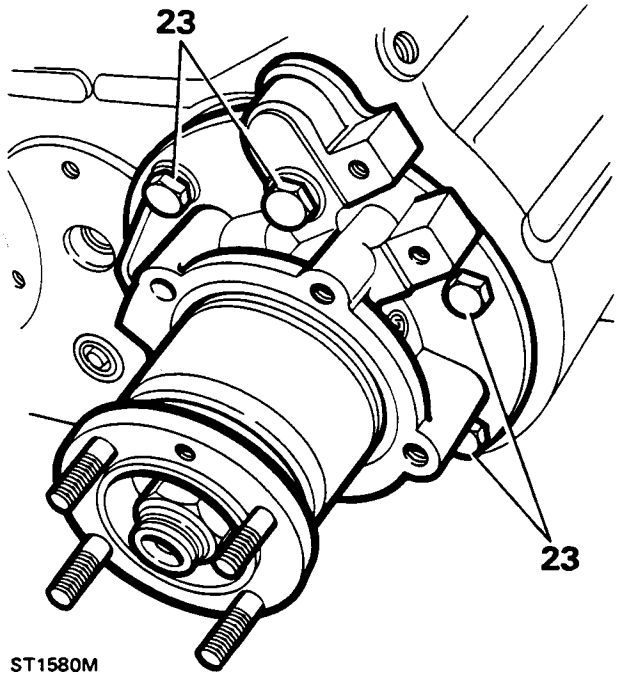
22. Withdraw the centre differential and selector shaft/fork assembly.



ST1579M

Rear output housing removal

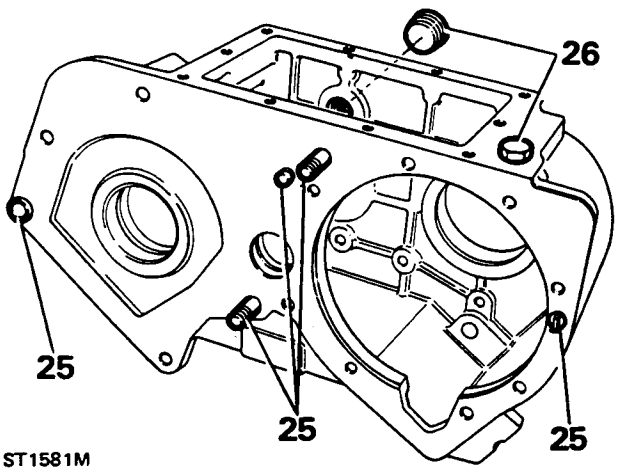
23. Remove six bolts and washers and detach the rear output housing and shaft assembly from the transfer casing.
24. Remove the gasket.



ST1580M

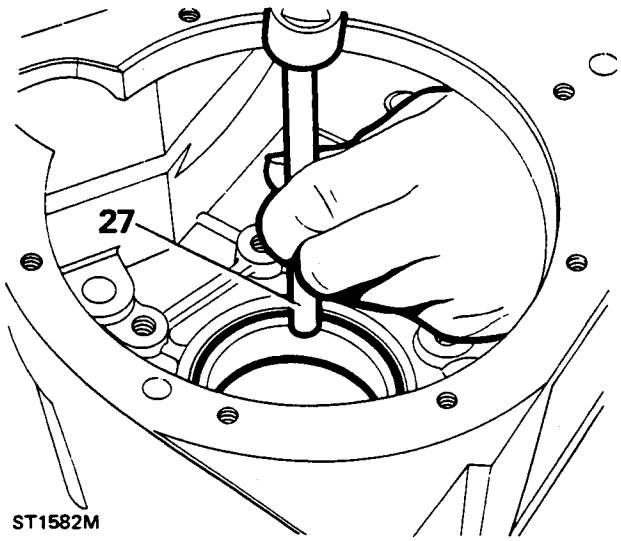
Transfer case overhaul—dismantling

25. Remove the studs and dowels.
26. Remove the magnetic drain plug and filler/level plug.



ST1581M

27. Drift out differential rear bearing track.
28. Clean all areas of the transfer casing ensuring all traces of 'Loctite' are removed from faces and threads.



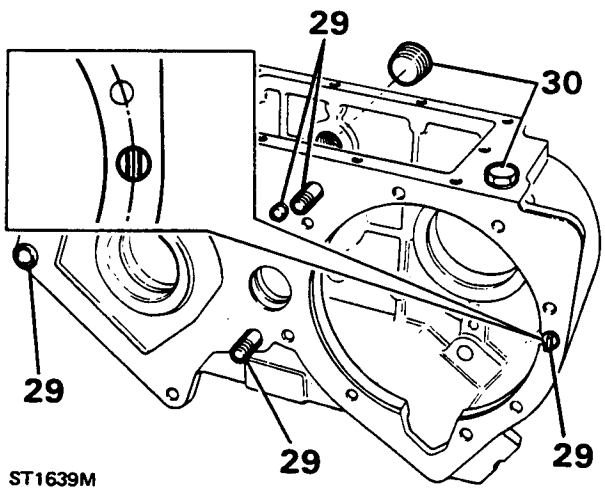
ST1582M

Transfer case overhaul—reassembling

29. Fit studs and dowels to front face of the transfer casing.

NOTE: The position of the radial dowel blade is set in line with the circle which is formed by the front output housing fixing holes.

30. Refit magnetic drain plug with new copper washer and tighten to the specified torque, loosely fit the filler/level plug.



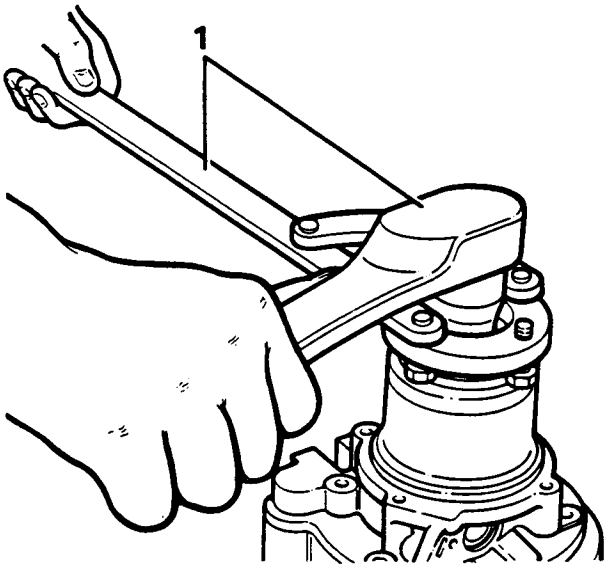
ST1639M

Continued

Rear output housing overhaul—dismantling

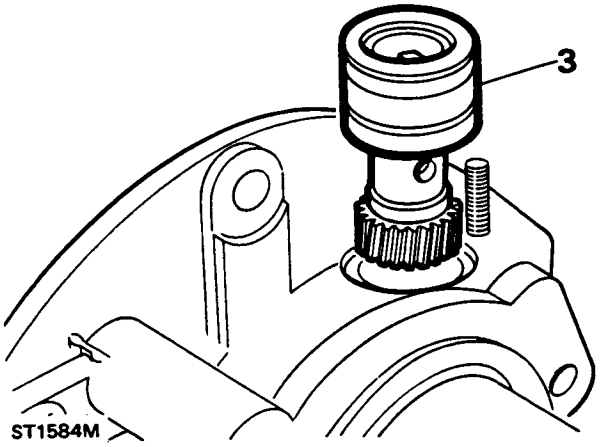
1. Using flange wrench 18G1205 and socket spanner, remove the flange nut, steel and felt washers. Ensure flange bolts are fully engaged in the wrench.
2. Remove output flange with circlips attached. If necessary, use a two-legged puller.

NOTE: The circlip need only be released if the flange bolts are to be renewed.



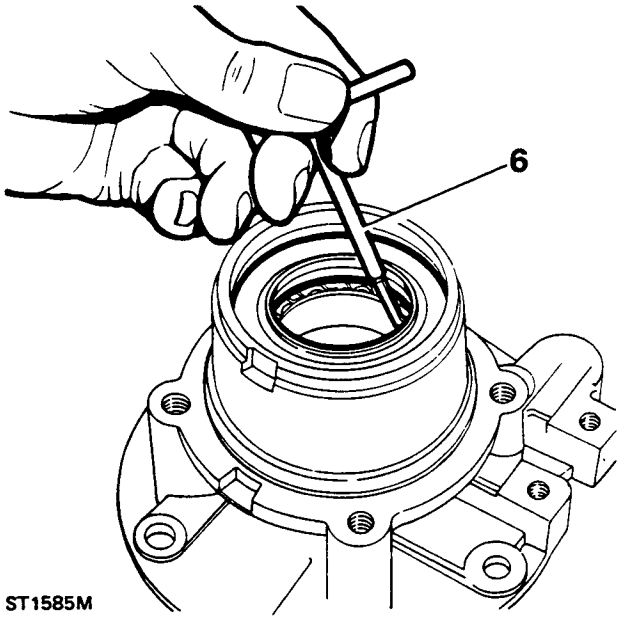
ST1583M

3. Remove speedo-drive housing. This can be prised out with a screwdriver.



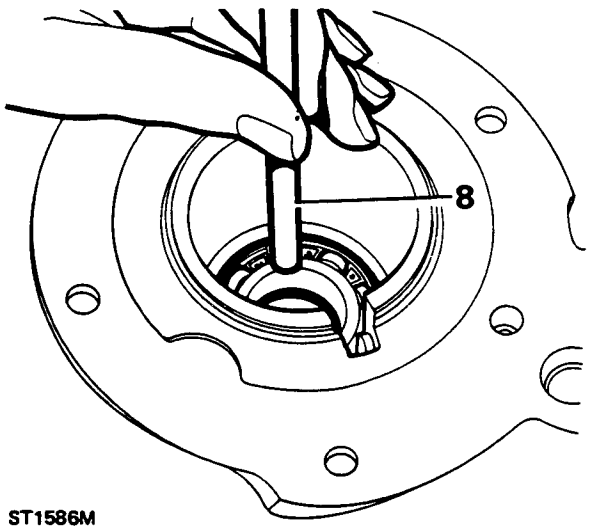
ST1584M

4. Remove housing from the vice and drift out the output shaft, by striking the flange end of the shaft.
5. Carefully prise off the oil catch ring using a screwdriver in the slot provided.
6. Prise out and discard the seal from the output housing using tool 18G 1271.



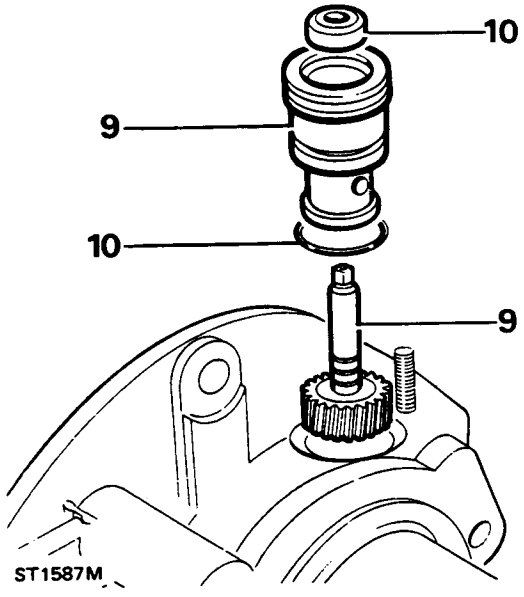
ST1585M

7. Using circlip pliers 18G257, remove the circlip retaining the bearing.
8. Drift out the bearing from the rear of the housing.

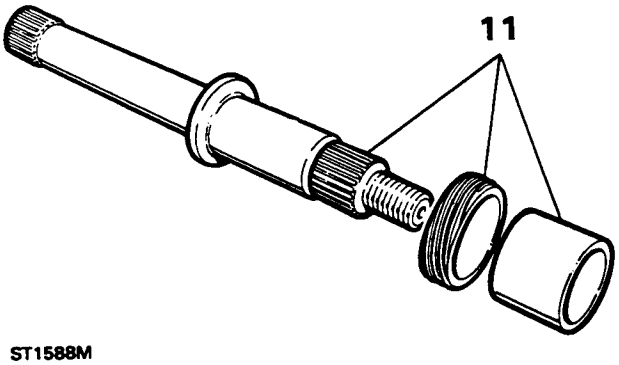


ST1586M

9. Remove speedometer gear (driven) from its housing.
10. Remove the 'O' ring and oil seal and discard.

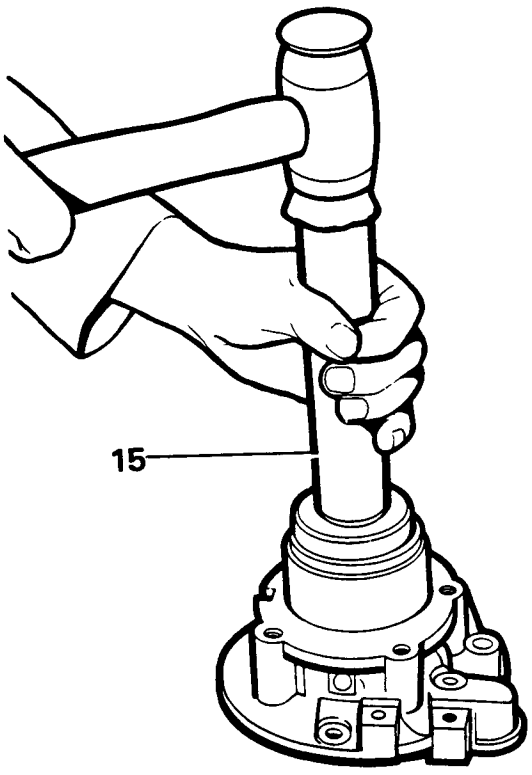


11. Slide off spacer and speedometer drive gear from output shaft.
12. Clean all parts, renew the 'O' ring, oil seals, felt seal and flange nut. Examine all other parts for wear or damage and renew, if necessary.

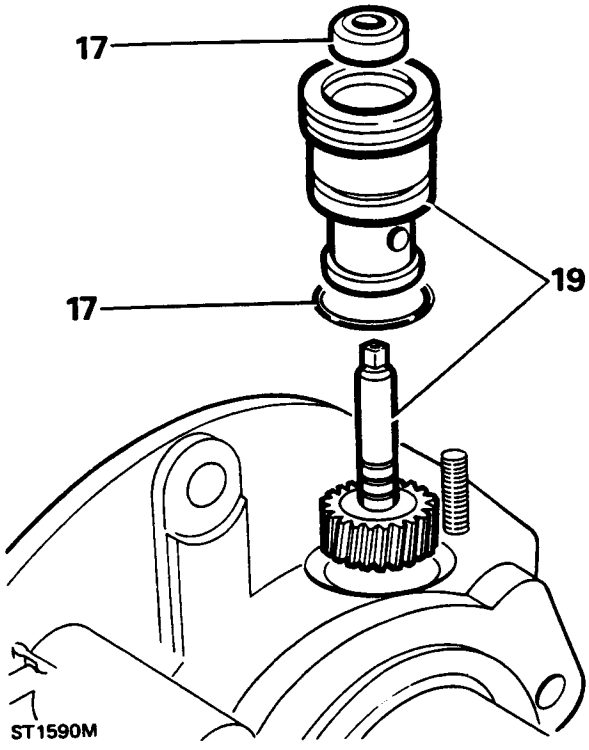


Reassembling

13. Press output bearing into the housing. Do not use excessive force. To facilitate fitting the bearing, heat the output housing case. (This is not to exceed 100°C.)
14. Retain bearing with circlip, using circlip pliers 18G257.
15. Fit new seal (open side inwards) using tool 18G1422. The seal should just make contact with the bearing circlip.
16. Carefully charge the lips of the seal with clean grease and refit oil catch ring on to output housing.

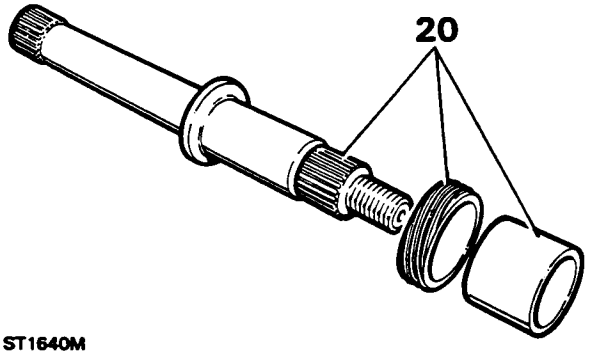


17. Fit the 'O' ring and oil seal (open side inwards) to speedometer housing.
18. Lubricate the 'O' ring and seal with oil.
19. Locate speedometer gear (driven) in housing and press into position.

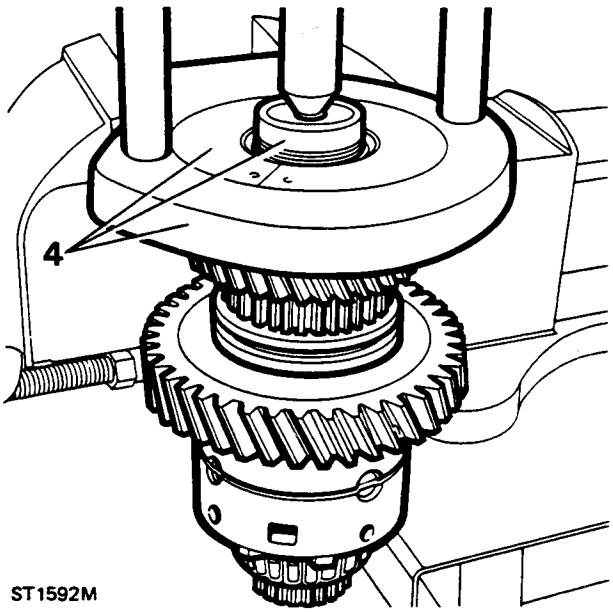


Continued

20. Slide drive gear and spacer on to the output shaft.
21. Locate output shaft into the bearing in the housing and drift into position.
22. Locate speedometer gear (driven) housing assembly into the output housing and press in until flush with the housing face.



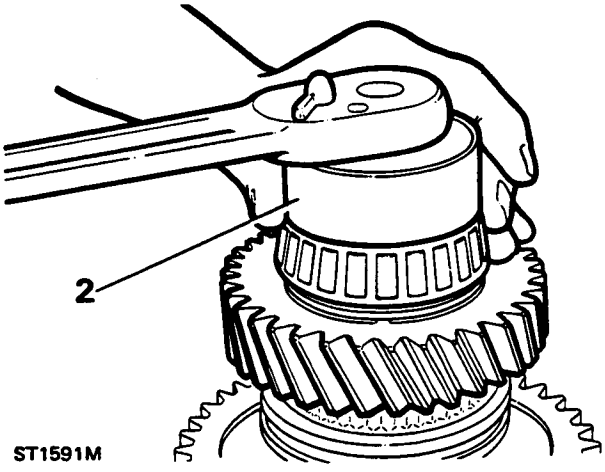
ST1640M



ST1592M

Centre differential unit overhaul—dismantling

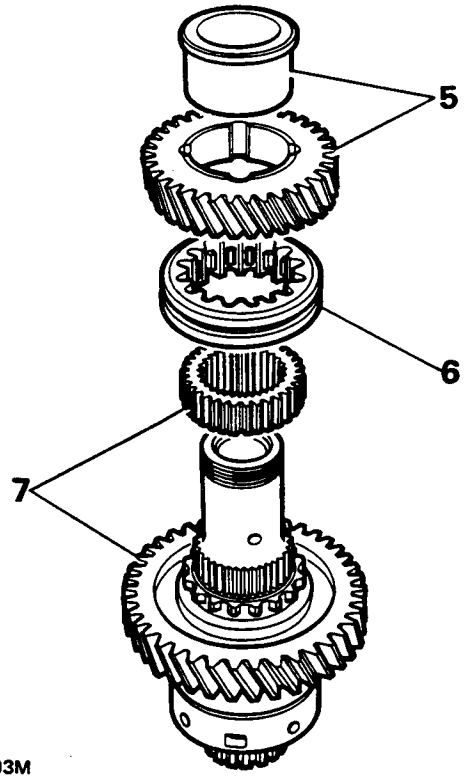
1. Secure centre differential unit to a vice fitted with soft jaws, and release stake nut from recess.
2. Remove stake nut using tool 18G1423 and suitable socket wrench.
3. Remove the differential unit from the vice.



ST1591M

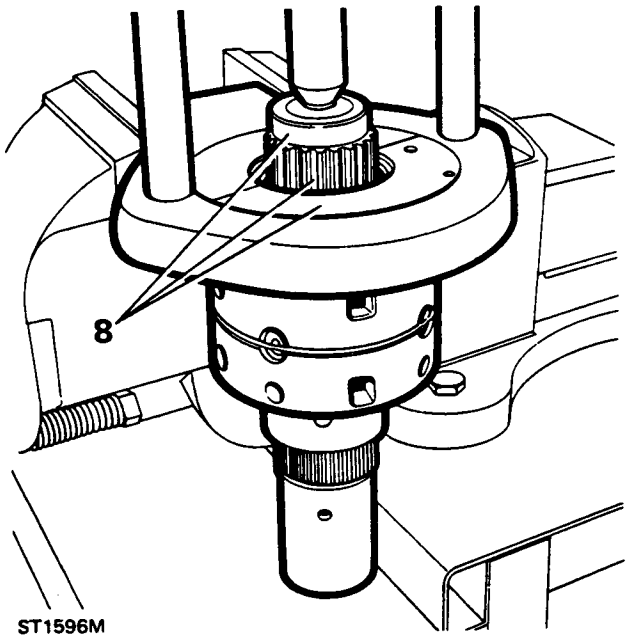
4. Secure hand press MS47 in vice with collars 18G47BB and using button 1847BB/3 remove the rear taper bearing and collars.

5. Remove the high range gear and bush, taking care not to disturb the high/low sleeve.
6. Mark the relationship of the high/low sleeve to the hub and then remove the sleeve.
7. Using a suitable press behind the low range gear carefully remove the high/low hub and low range gear.

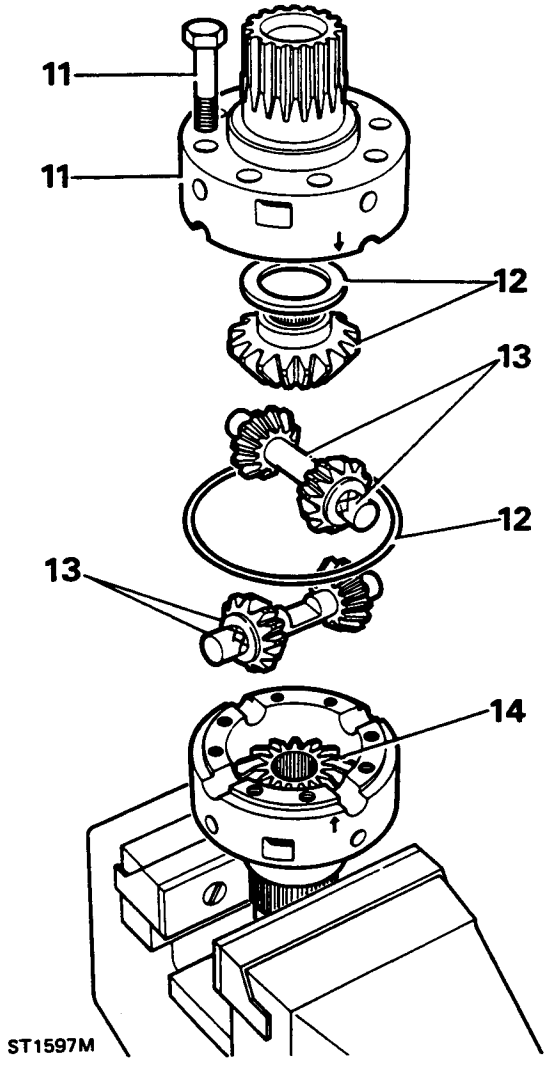


ST1593M

8. Substituting collar LST47-1 remove front taper roller bearing.
9. Remove hand press from the vice.
10. Using soft jaws secure the differential unit in the vice by gripping the hub splines.



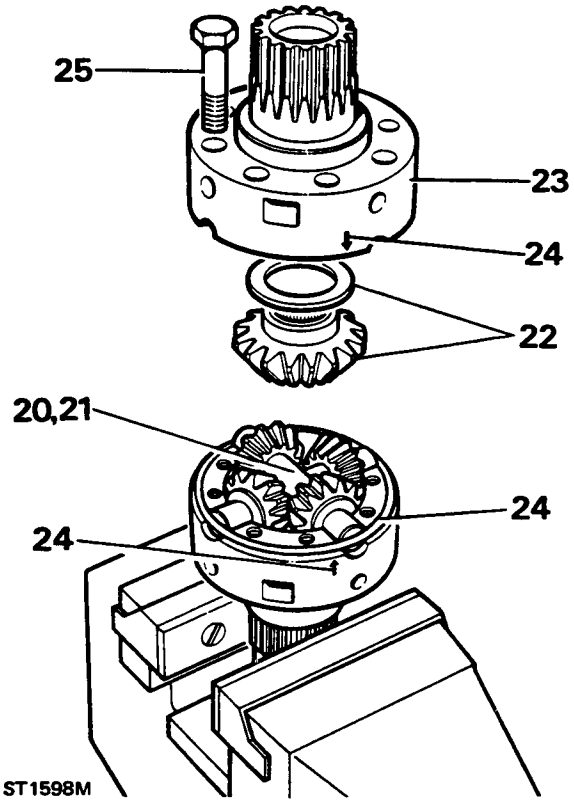
11. Remove the eight retaining bolts and lift off the front part of the differential unit.
12. Release the retaining ring and remove front upper bevel gear and thrust washer.
13. Remove the pinion gears and dished washers along with the cross shafts.
14. Remove the rear lower bevel gear and thrust washer from the rear part of the differential unit.
15. Remove the rear differential unit from the vice and clean all components; examine for wear or damage and renew if necessary.



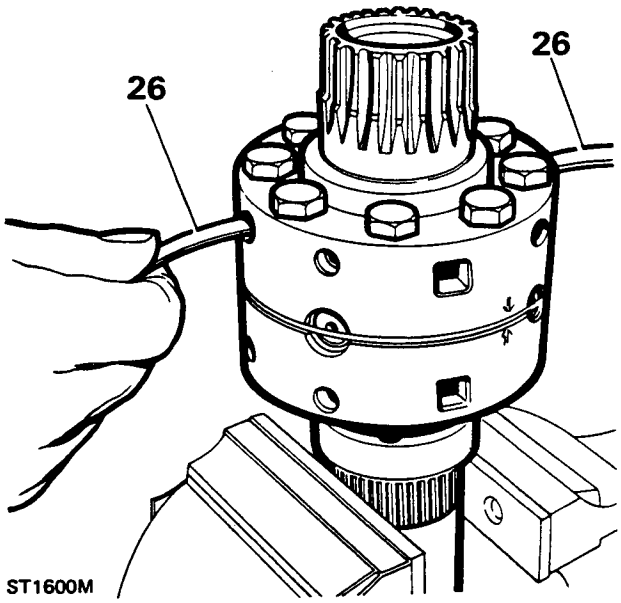
16. Clean all components; examine for wear or damage and renew if necessary.
17. Using soft jaws secure the rear differential unit in the vice by gripping the hub splines.
18. Ensure that all differential components are dry to assist in checking end-float.
19. Using a micrometer, measure one of the bevel gear thrust washers and note the thickness.

Continued

20. Fit the thrust washer and bevel gear to the rear lower differential unit.
21. Assemble both pinion assemblies and dished washers on to their respective shafts and fit to the rear differential unit.
22. Measure the front upper bevel gear thrust washer and note the thickness.
23. Fit the thrust washer and bevel gear to the front unit.
24. Refit the retaining ring and front differential unit, aligning the two engraved arrows marked on both halves of the unit.
25. Fit four bolts equi-spaced and torque to the correct figure.

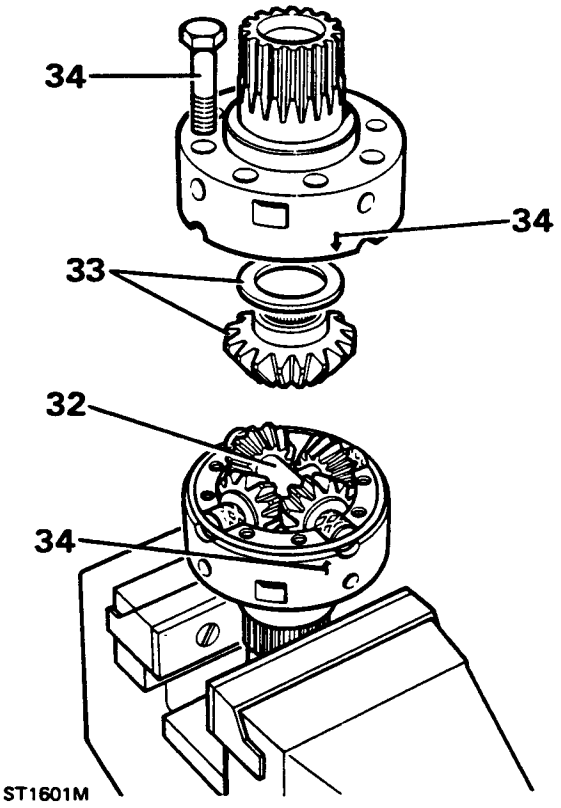


26. Measure the front bevel gear end-float with feeler gauges through the slots provided in the front differential unit. The end-float must be 0,025 to 0,075 mm (0.001 to 0.003 in) maximum. When measuring use two sets of feeler gauges, one on each side of the front differential unit. This will give a true reading of the end-float.
27. Invert the differential unit and repeat operation 26 for the rear bevel gear end-float.
28. Invert the differential unit and secure in vice and remove the four bolts and lift off the front differential unit.
29. Remove the retaining ring, bevel gear and the washer and both pinion assemblies.
30. Select the correct thrust washers required for final assembly.



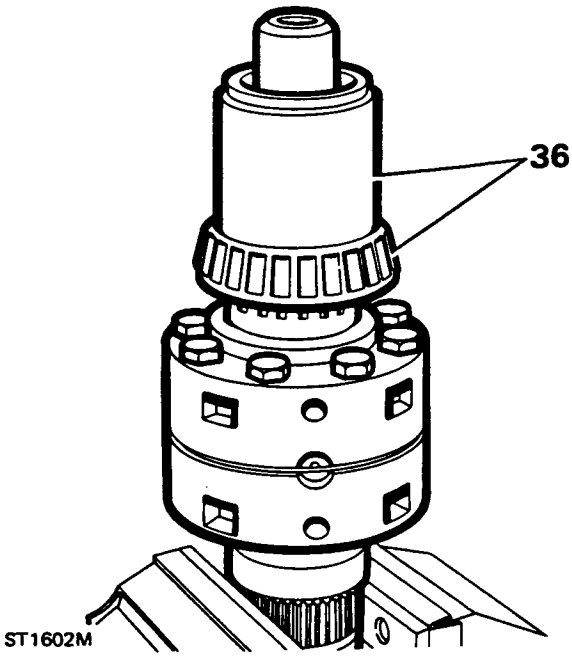
Reassembling

31. Fit the selected thrust washer and bevel gear into the rear lower differential unit.
32. Assemble both pinion assemblies and dished washers on to their respective shafts and fit the rear differential unit. Secure the assemblies with the retaining ring.
33. Lubricate all the components.
34. Fit the selected thrust washer and bevel gear into the front upper differential unit.

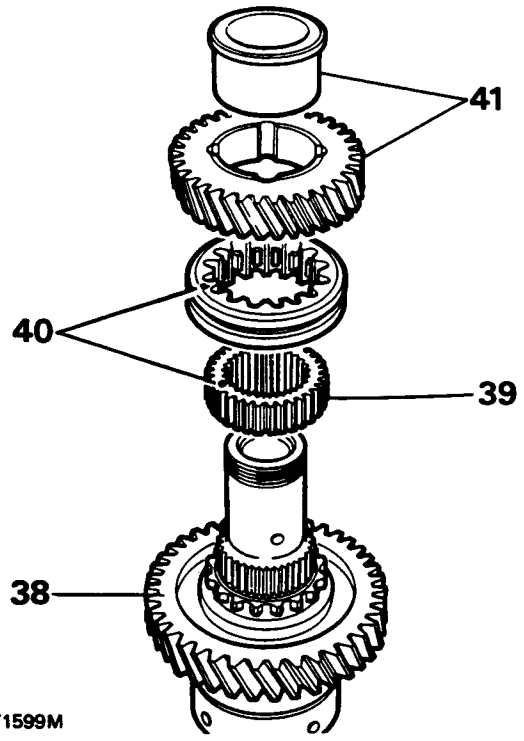


35. Align both units as previously described and secure with the eight bolts to the specified torque.
36. Finally check that the differential gears rotate freely. Locate the front differential bearing onto the front, upper differential shaft and press into position using larger end of tool 18G1424 as shown.
37. Invert the differential unit and secure in the vice.

NOTE: During the following sequences all parts should be lubricated as they are fitted.

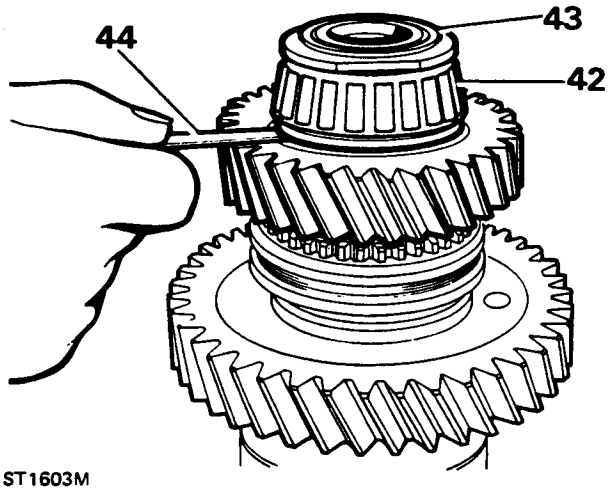


38. Fit the low range gear, with its dog teeth uppermost to the differential assembly.
39. Press the high/low hub on to the differential splines.
40. Slide the high/low selector sleeve on to the high/low hub ensuring that the alignment marks are opposite each other.
41. Fit the bush into the high range gear so that the flange is fitted on the opposite side of the gear to the dog teeth. Slide the bushed gear on to the differential assembly with the dog teeth down.



42. Locate the rear differential bearing on to the hub and press it into position using the smaller end of tool 18G1424.
43. Fit the stake nut and tighten to the specified torque using tool 18G1423.
44. Check the end float of the high and low range gears 0,05 to 0,15 mm (0.002 to 0.005 in).

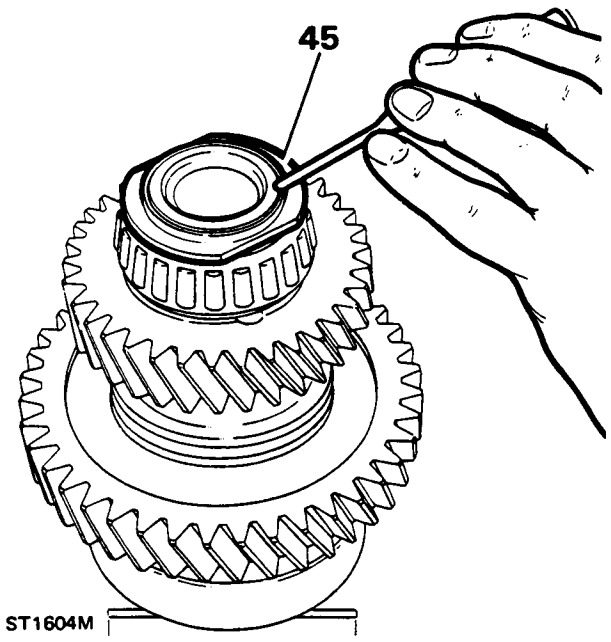
NOTE: If the clearances vary from those specified in the data, the assembly must be rebuilt using the relevant new parts.



Continued

45. Peen the stake nut collar by carefully forming the collar of the nut into the slot as illustrated.

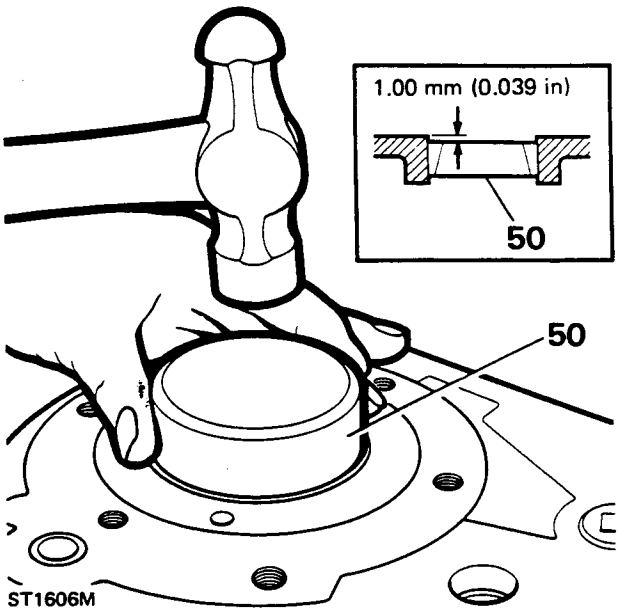
CAUTION: A round nose tool must be used for this operation to avoid splitting the collar of the nut.



ST1604M

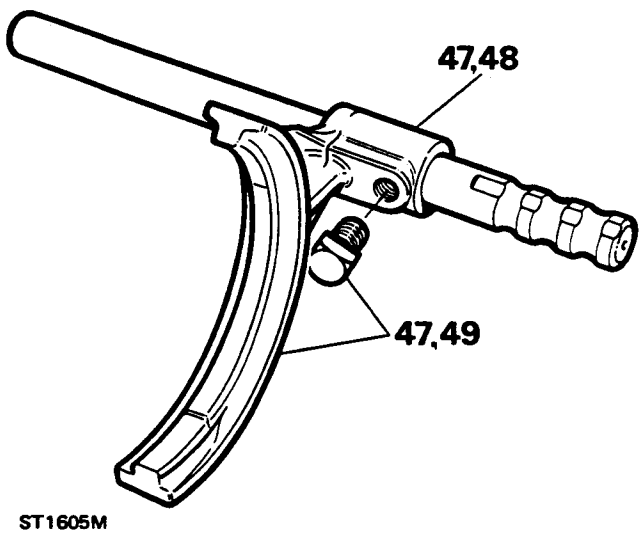
Centre differential rear bearing track

50. Fit the differential rear bearing track 1,00 mm (0.039 in) below the outer face of casing using a suitable tool as shown.



ST1606M

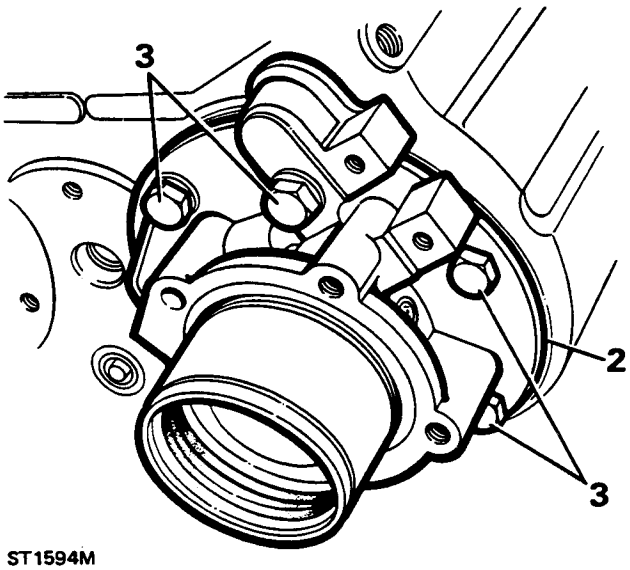
46. Clean and check high/low selector fork assembly for wear and renew if necessary.
47. To renew the selector fork remove the square set screw and slide the fork from the shaft.
48. Fit the new selector fork with its boss towards the three detent grooves. Align the tapped hole in the fork boss with the indent in the shaft nearest to the detent grooves.
49. Apply Loctite 290 to the set screw threads and fit the set screw and tighten to the specified torque.



ST1605M

Rear output housing—refit

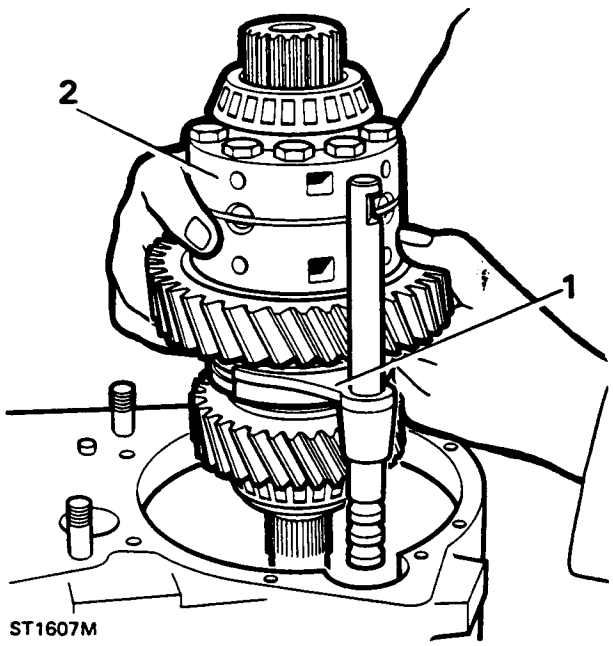
1. Grease output housing gasket and position on to the rear face of the transfer box casing.
2. Fit output housing and ensure clearance of 100 mm (0.039 in) between housing face and gasket.
3. Fit the six output housing bolts with Loctite 290 on the threads, with washers and tighten evenly to the correct torque, which will pull the rear bearing into position.



ST1594M

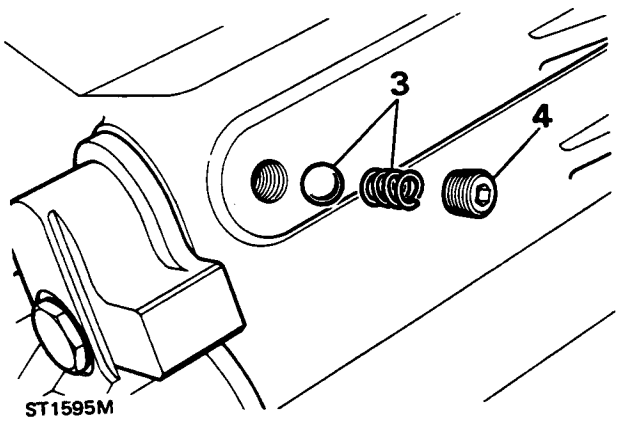
Centre differential unit refit

1. Fit the selector fork/shaft assembly to the high/low selector sleeve on the differential assembly, with detent groove to the rear of the differential assembly.
2. Locate the differential assembly complete with selector fork into the transfer box casing. It may be necessary to rotate the output shaft to ease fitment, and engage selector shaft into its hole.



ST1607M

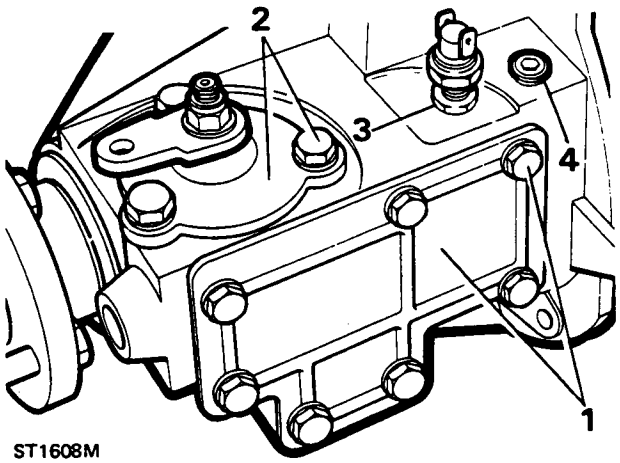
3. Fit selector shaft ball and spring through the side of the transfer box casing.
4. Apply Loctite 290 to detent plug; fit and locate, by screwing gently fully home and then unscrewing two turns.



ST1595M

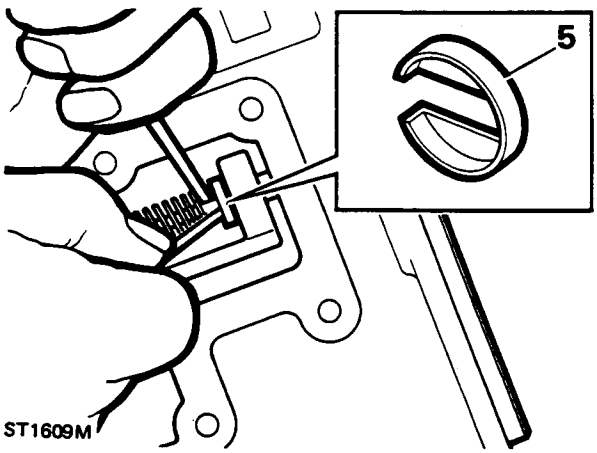
Front output housing overhaul—dismantling

1. Unscrew seven retaining bolts and washers and remove the differential lock selector side cover and gasket.
2. Unscrew three retaining bolts and washers and lift the differential lock finger housing and actuator assembly from the front output housing.
3. Slacken the locknut and unscrew the differential lock warning light switch.
4. Remove selector shaft detent plug, spring and ball using a suitable magnet.



ST1608M

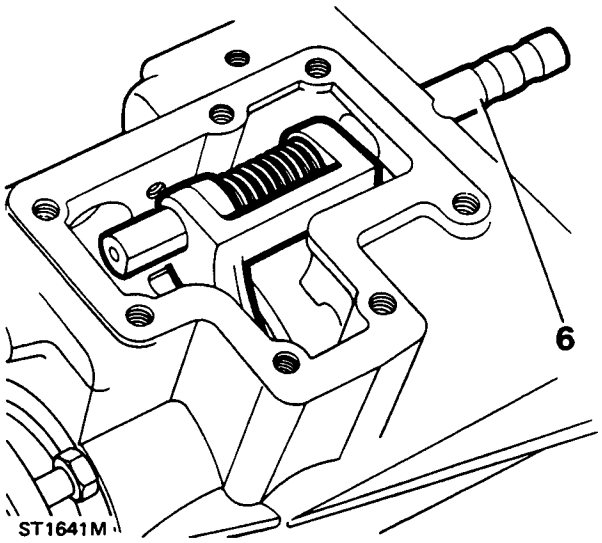
5. Compress the selector fork spring and remove the two spring retaining caps.



ST1609M

Continued

6. Withdraw the selector shaft from the rear of the output housing.
7. Remove the selector fork and spring through the side cover aperture.
8. Remove lock-up sleeve from the rear of the output housing.



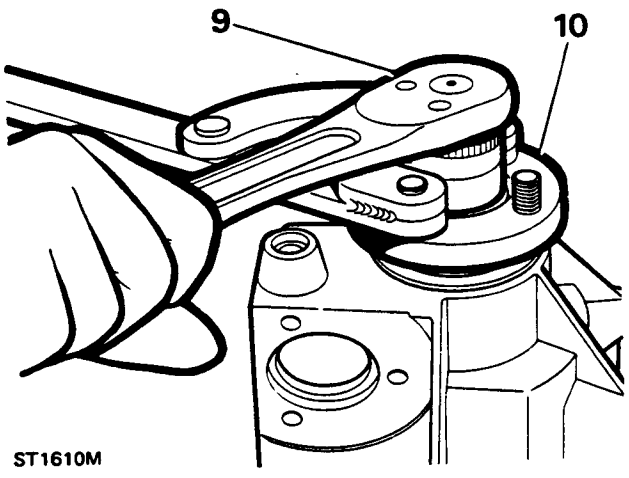
9. Using flange wrench 18G1205 and socket wrench, remove the flange nut, steel and felt washers.

NOTE: Ensure that flange bolts are fully engaged in the wrench.

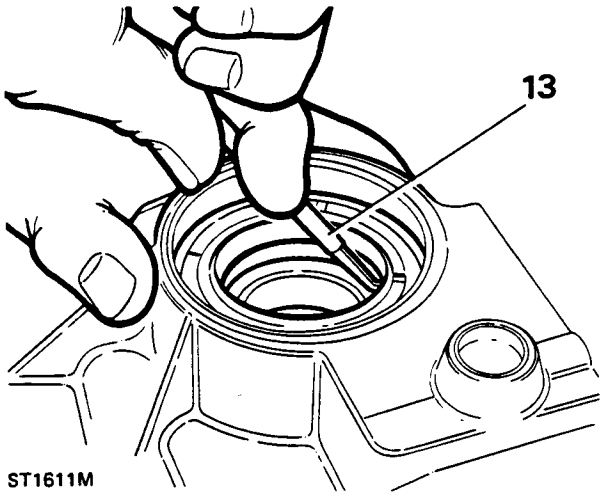
10. Remove the output flange with oil seal shield.

NOTE: These parts need not be separated unless the flange bolts are to be renewed.

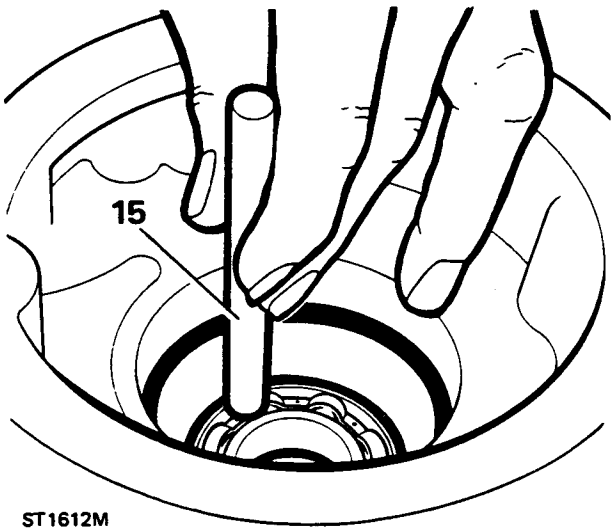
11. Drift output shaft rearwards from housing using a soft headed mallet.
12. Slide off the collar from the output shaft.



13. Prise out and discard oil seal from output housing using service tool 18G1271.
14. Remove circlip with circlip pliers 18G257.

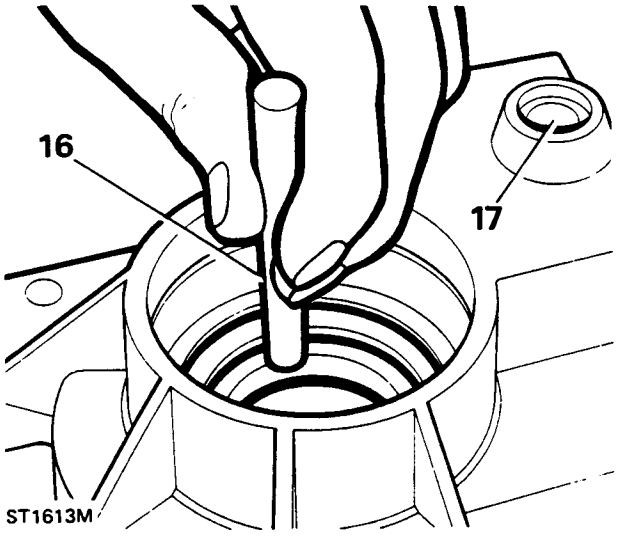


15. Invert housing and drift out bearing from inside the case as shown.



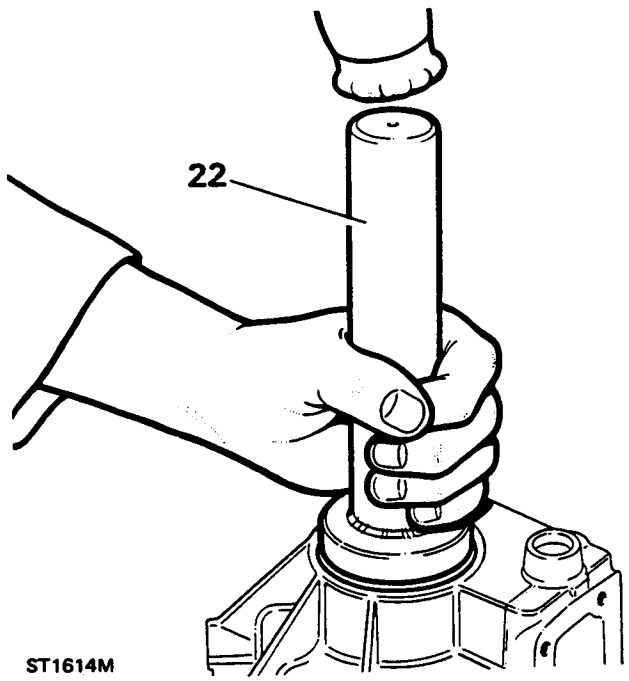
16. Drift out centre differential front taper roller bearing track and shim.
17. Drift out selector shaft cup plug from housing.
18. Clean all components ensuring all traces of 'Loctite' are removed from faces and threads.
19. Examine components for wear or damage and renew if necessary.

NOTE: Renew oil seal and felt seal and flange nut.



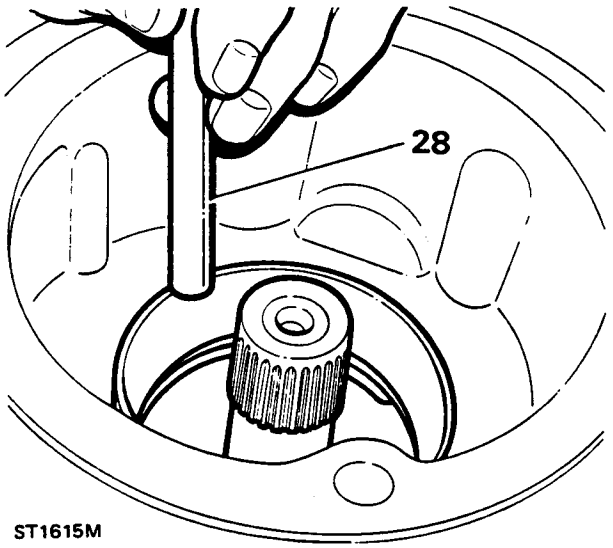
Reassembling

20. Press the bearing into the housing; do not use excessive force. To facilitate fitting the bearing, heat the front output housing. (This is not to exceed 100°C).
21. Using circlip pliers 18G257, fit the bearing retaining clips.
22. Fit a new oil seal (open side inwards) using replacer tool 18G1422, until the seal just makes contact with the circlip.
23. Carefully charge the lips of the seal with clean grease.
24. Slide collar on to the output shaft, with its chamfered edge towards the dog teeth.
25. Fit the output shaft through the bearing and drift home.

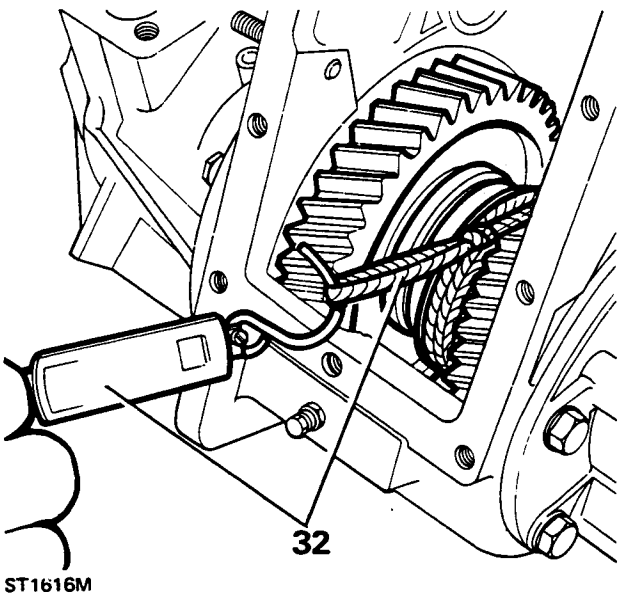


Adjusting front differential bearing pre-load

26. Measure original differential front bearing track shim.
27. Refit original shim into input housing.
28. Drift differential front bearing track into the housing.



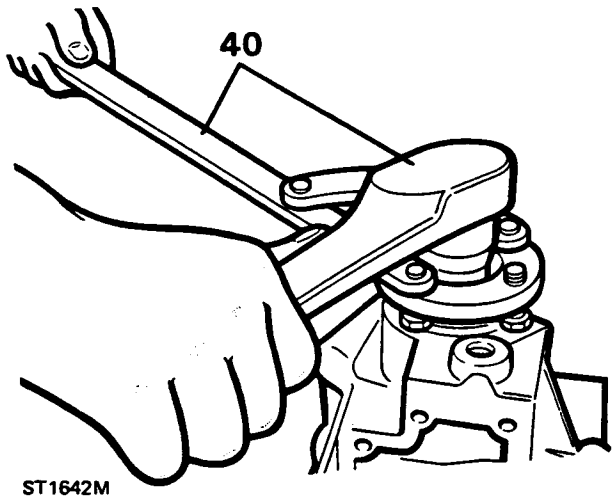
29. Grease and fit new gasket and locate the front output housing on the transfer box casing.
30. Secure housing with the eight retaining bolts and washers, the upper middle bolt being longer than the rest. Do not tighten the bolts at this stage.
31. Engage high or low gear.
32. Check the rolling resistance of the differential using a spring balance and a length of string wound around the exposed splines of the high/low hub.



Continued

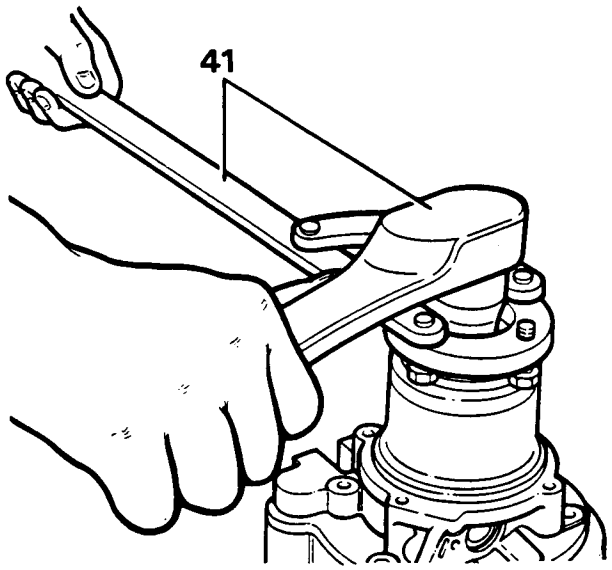
33. With the correct shim fitted the load to turn should be 1,36 kg to 4,53 kg (3 lb to 10lb). This applies to new or used bearings. (New bearings will register at the top end and used bearings will register at the low end.
34. If the reading is in excess of the above measurements, remove the front output housing assembly from the transfer box casing.
35. Using a suitable extractor, withdraw the centre differential bearing track and change the shim for one of a suitable thickness. (A thinner shim will reduce the rolling resistance).
36. Fit the new shim and drift the differential bearing track back into its housing until fully home.
37. Having obtained the load to turn, prop-up the transfer box casing on the bench with the front face uppermost.
38. Apply Loctite 290 to the threads of the housing retaining bolts and fit the eight bolts and washers into the front output housing and secure to transfer box casing.
39. Fit front output flange, felt washers, steel washers and flange nut.
40. Using flange wrench 18G1205 and torque wrench, pull the output shaft up to the correct position. Check that the oil seal shield does not foul the housing.

NOTE: Ensure that the flange bolts are fully engaged in the wrench.



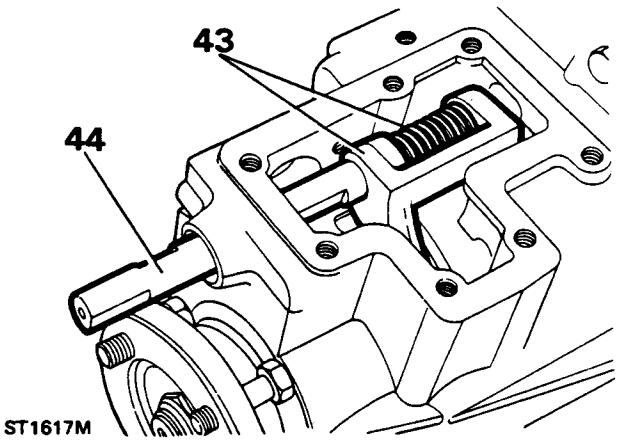
ST1642M

41. Repeat the above operation for the rear output flange.



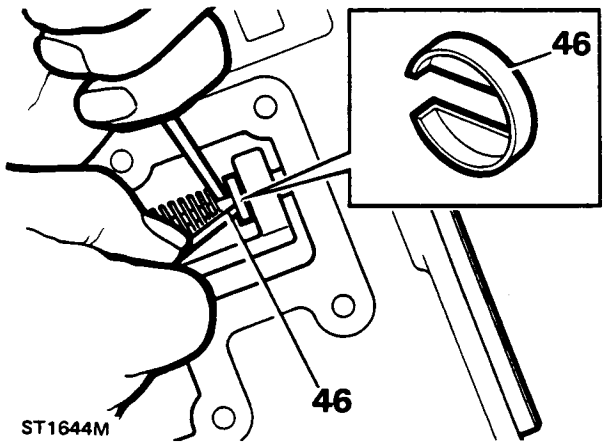
ST1643M

42. Compress the selector shaft spring and fit to the selector fork.
43. Locate selector fork through front output housing side cover aperture, ensuring that the fork engages in the groove of the lock-up sleeve.
44. Fit selector shaft through the aperture in the front of the output housing and pass it through the selector fork lugs and spring into the rear part of the housing.
45. Rotate the selector shaft until the two flats for the spring retaining caps are at right angles to the side cover plate face.

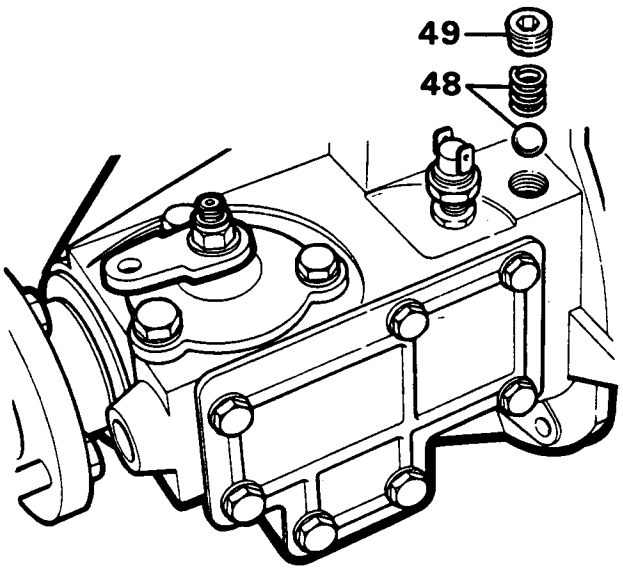


ST1617M

46. Compress the spring between the fork lugs and slide the retaining caps on to the shaft ensuring the spring is captured with the 'cupped' side of the caps.
47. Drift selector shaft seal cup into position.



48. Fit selector shaft detent ball and spring in the tapped hole on top of the output housing.
49. Apply Loctite 290 to detent plug threads. Screw detent plug gently home and then unscrew two turns.

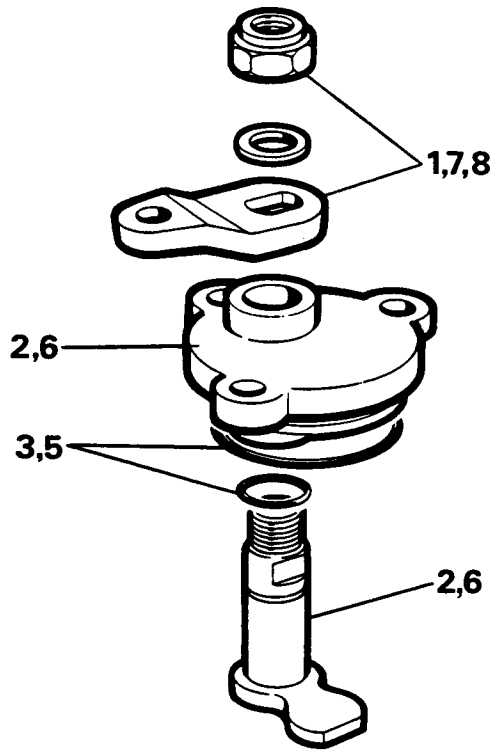


Differential lock finger housing overhaul—dismantling

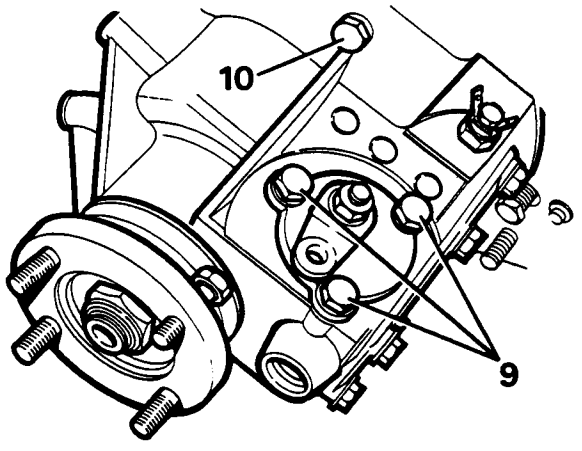
1. Unscrew and discard the 'nyloc' nut and remove the operating lever and washer.
2. Remove the pivot shaft from lock finger housing.
3. Remove the 'O' rings from the pivot shaft and housing and discard.
4. Clean all components; examine for wear or damage and renew if necessary.

Reassembling

5. Fit new 'O' rings on to pivot shaft and lock finger housing and lubricate with oil.
6. Locate the pivot shaft in the housing.
7. Fit the differential lock lever over the pivot shaft so that the lever will face forward to the bend upwards. This lever is then in the correct operating position.
8. Retain the lever with a plain washer and new 'nyloc' nut.



9. Fit the differential lock finger housing into its seating on the front output housing, ensuring that the selector finger is located in the flat of the selector shaft.
10. Apply Loctite 290 to the bolt threads and retain the lock finger housing with the three bolts and washers to the specified torque.



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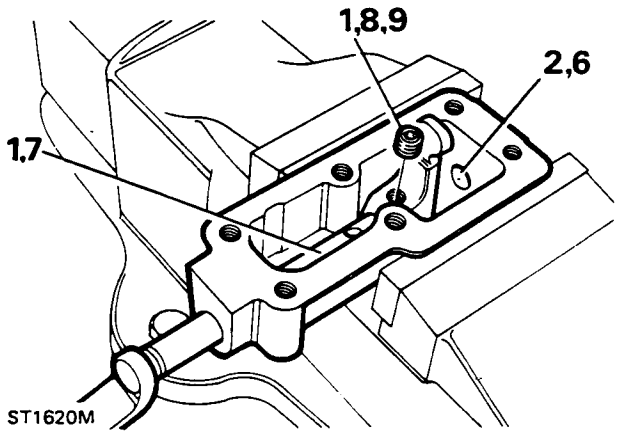
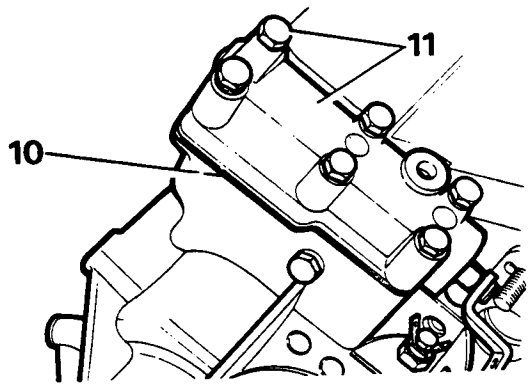
High/low cross-shaft housing overhaul

1. Remove the selector finger grub screw and withdraw the cross-shaft from the cross-shaft housing and remove the selector finger.
2. Remove the 'O' ring from the cross-shaft.
3. Drift out selector housing cup plug if necessary.
4. Clean all the components and check for damage or wear, replace if necessary.
5. Apply sealant to a new cup plug and fit so that the cup is just below the chamfer for the cross-shaft bore.
6. Fit new 'O' ring to cross-shaft.
7. Lubricate the shaft and insert into the cross-shaft housing.
8. Fit selector finger ensuring that it aligns with the recess in the cross-shaft.
9. Apply Loctite 290 to the grub screw and secure the selector finger to the cross-shaft and fully tighten to the specified torque.



ST1620M

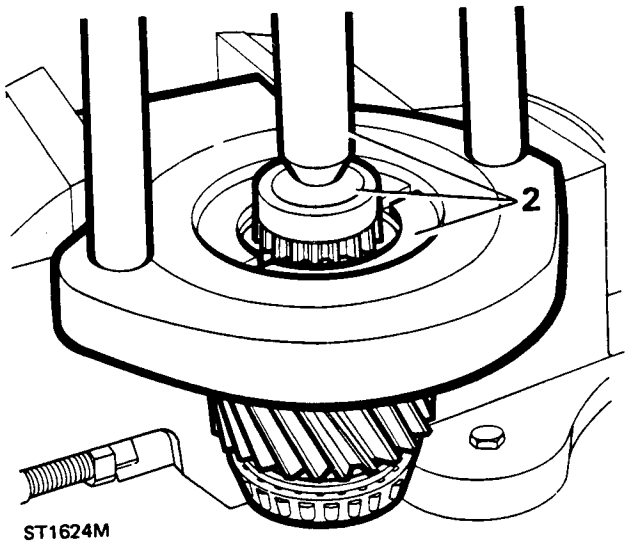
10. Grease and fit the high/low selector housing gasket on the front output housing.
11. Fit high/low cross-shaft housing, ensuring that the selector finger locates in the slot of the selector shaft, and secure with six bolts and washers to the specified torque.



ST1646M

Input gear overhaul—dismantling

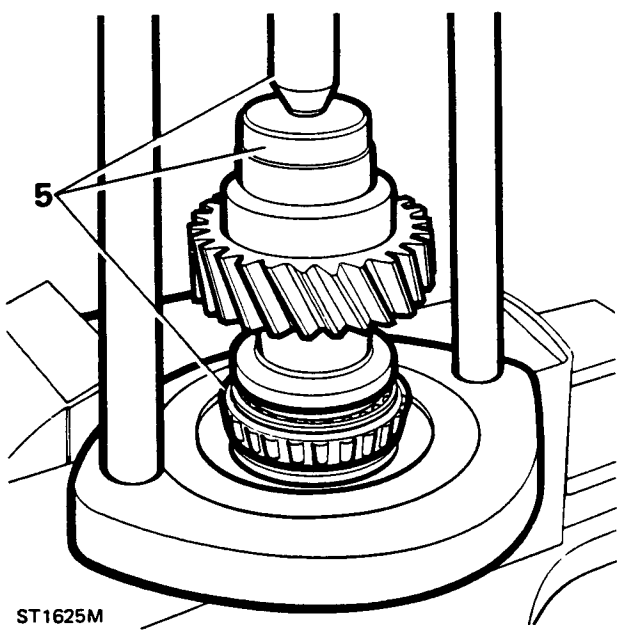
1. Clean the input gear assembly and examine for wear or damage. Remove the bearings only if they are to be renewed.
2. Secure hand press MS47 in the vice and using collars 18G47-7 and button 18G47-BB/3, remove rear taper roller bearing from input gear assembly.
3. Invert input gear assembly in hand press and remove front taper roller bearing.
4. Clean input gear.



ST1624M

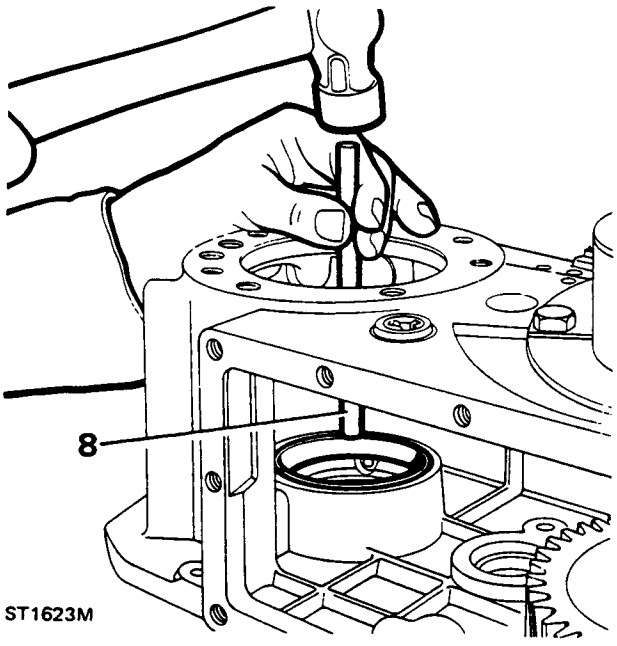
Reassembling

5. Position rear taper roller bearing on input gear and using hand press MS47 and collars 18G47-7 press the bearing fully home.
6. Invert input gear and fit the front taper roller bearing using the press and collars.

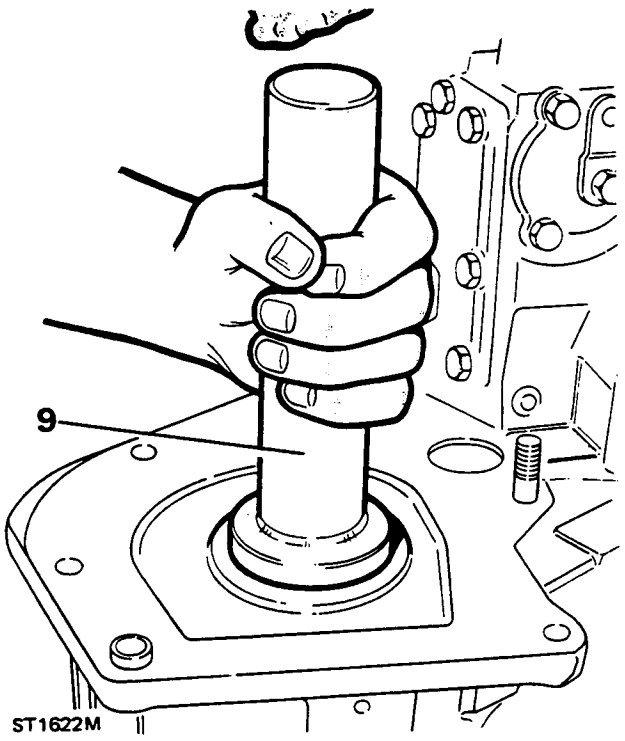


ST1625M

7. Prop up the transfer box casing on the bench with the rear face uppermost.
8. Drift in the front taper bearing track.



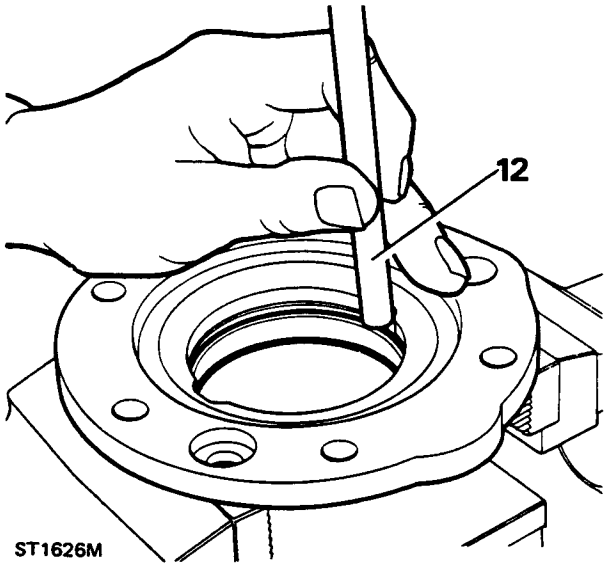
9. Reposition transfer box casing so the front face is uppermost and fit oil seal (open side inwards) using replacer tool 18G1422.



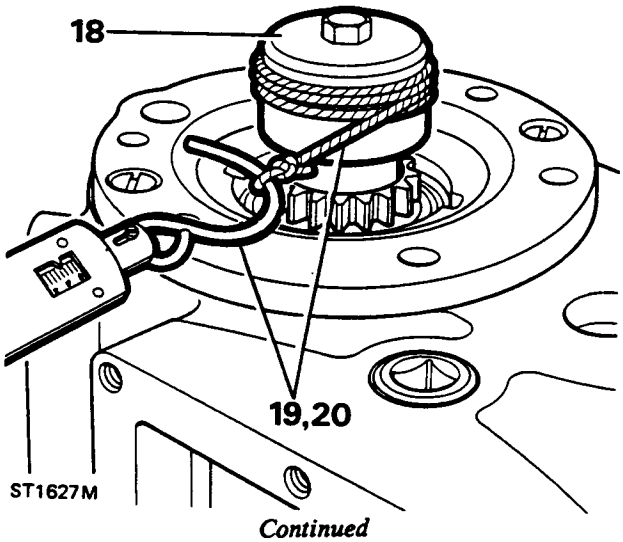
10. Lubricate both bearings with clean oil.
11. Fit the input gear assembly into the transfer box casing with the dog teeth uppermost.

Checking input gear bearing pre-load

12. Secure bearing support plate in the vice. Drift out input gear bearing track, and remove shim.



13. Clean bearing support plate and shim. Measure original shim and note its thickness.
14. Fit the original shim to the support plate.
15. Locate the bearing track in the support plate and press fully home.
16. Apply grease to the gasket and fit on to the transfer box casing.
17. Fit the bearing support plate on to the transfer box casing and secure with the six bolts, but do not tighten.
18. Fit the service tool LST105 to input gear and engage the spline.
19. Tie a length of string to the split pin and fit it to the service tool as shown.
20. Attach a spring balance to the string and carefully tension the spring until a load to turn the input gear is obtained. A pull of 2,26 kg to 6,80 kg (5 lb to 15 lb) is required.
21. If the reading obtained is outside the above limits, the original shim must be changed.

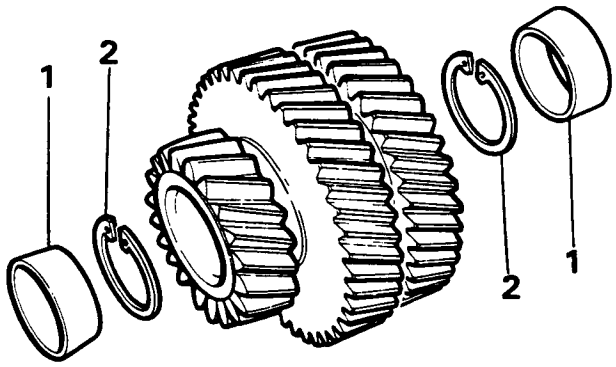


Continued

22. Remove the spring balance, string and service tool.
23. Remove the six bolts and the bearing support plate.
24. Drift out the input gear bearing track from the support plate and discard original shim.
25. Select the correct size shim to obtain a load to turn of 2,26 kg to 6,80 kg (5 lb to 15 lb).
26. Fit shim to support plate, locate bearing track and press home.
27. Fit bearing support plate and secure to transfer box casing with the six bolts (do not tighten).
28. Repeat the rolling resistance check as previously described, and note the value obtained.

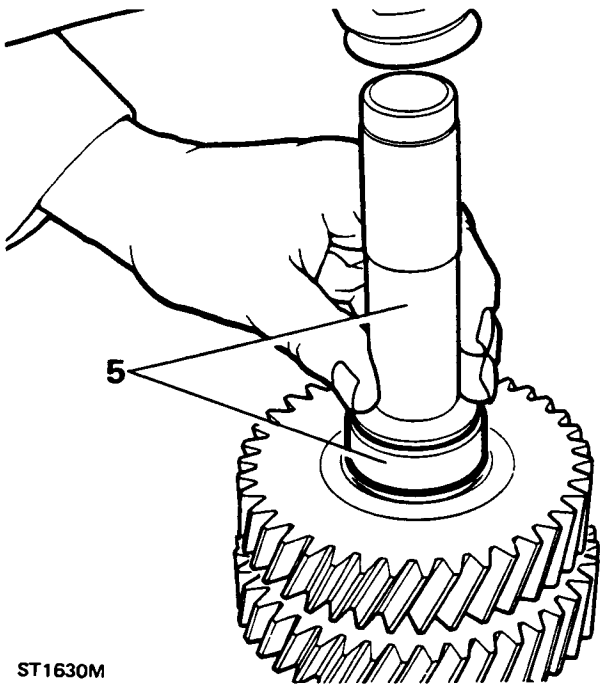
Intermediate gear assembly overhaul

1. Drift out intermediate gear bearing tracks.
2. Remove circlips.



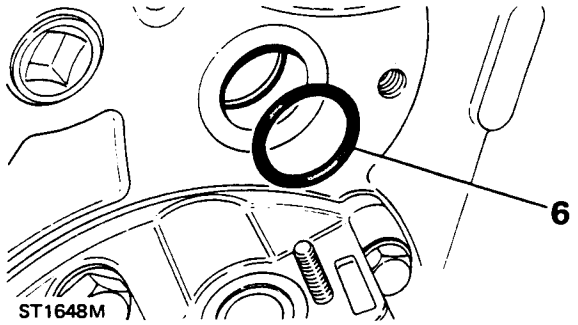
ST1628M

3. Clean all intermediate gear components and lock plate. Check for damage or wear and replace as necessary.
4. Fit new circlips into the intermediate gear cluster.
5. Using tools LST550-4 and MS550 fit bearing tracks into the intermediate gear cluster.



ST1630M

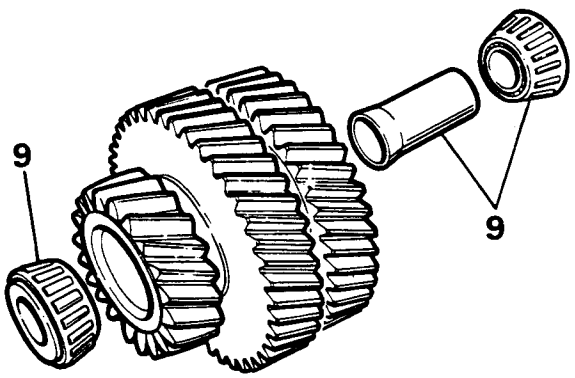
6. Fit the 'O' rings to the intermediate shaft and into the intermediate shaft bore at the front of the transfer box casing.



ST1648M

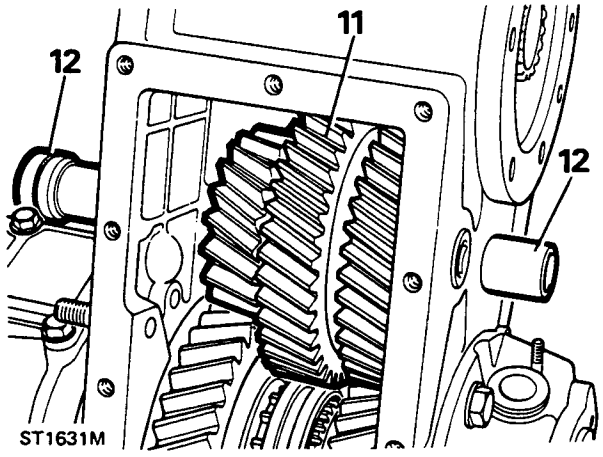
Intermediate gear reassembly

7. Check for damage to the intermediate shaft thread and if necessary clean up with a fine file or stone.
8. Lubricate the taper roller bearings and intermediate gear shaft.
9. Insert new bearing spacer to gear assembly, followed by the taper roller bearings.

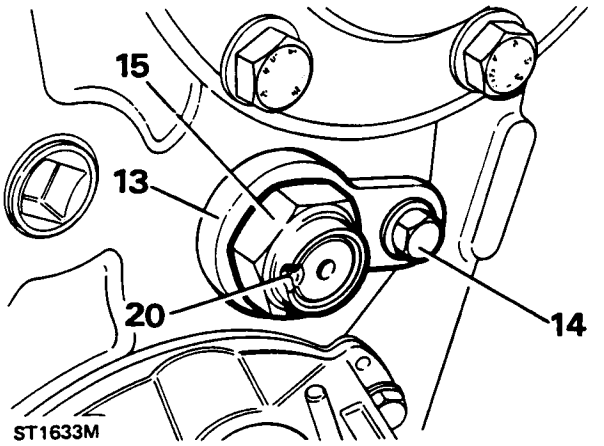


ST1649M

10. Fit dummy shaft LST104 into the intermediate gear cluster.
11. Locate the gear assembly into the transfer box casing from the bottom cover aperture.
12. Insert intermediate shaft from the front of the transfer box casing, pushing the dummy shaft right through as shown and remove. (Making sure that the intermediate gear cluster meshes with the input gear and high range and low range gears.)



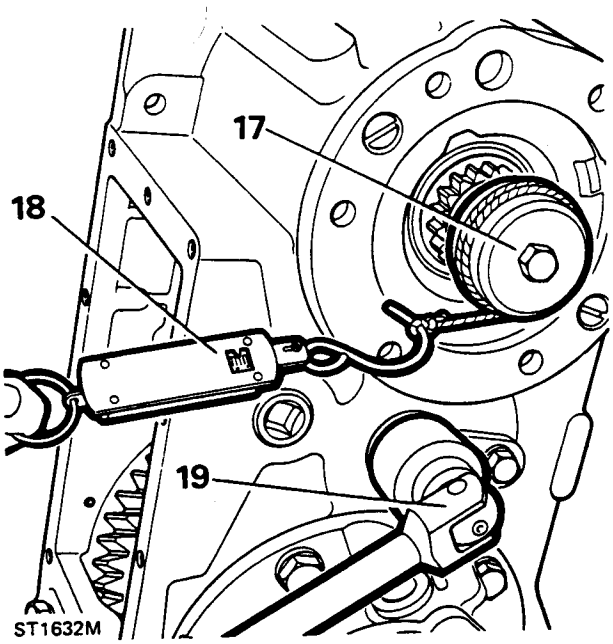
13. Turn the intermediate shaft to allow fitting of retaining plate.
14. Fit retaining plate and secure with retaining bolt and washer.
15. Fit the intermediate gear shaft retaining stake nut.



Adjusting intermediate gear torque-to-turn

16. Select neutral.
17. Fit service tool LST105 to input gear and engage spline.
18. Tie a length of string to a split pin and fit to the service tool as shown. Attach the spring balance to the string.
19. To obtain the correct figures and to collapse the spacer within the intermediate gear cluster, tighten the intermediate shaft nut until the load-to-turn has increased by 3,7 kg (7 lb) ± 1,63 kg (± 3 lb) on that noted when checking input shaft load-to-turn. The torque to tighten the remaining nut will be approximately 203 Nm (150 lb ft).
20. Peel the stake nut by carefully forming the collar of the nut into the intermediate shaft recess, as illustrated.

CAUTION: A round nose tool must be used for this operation to avoid splitting the collar of the nut.



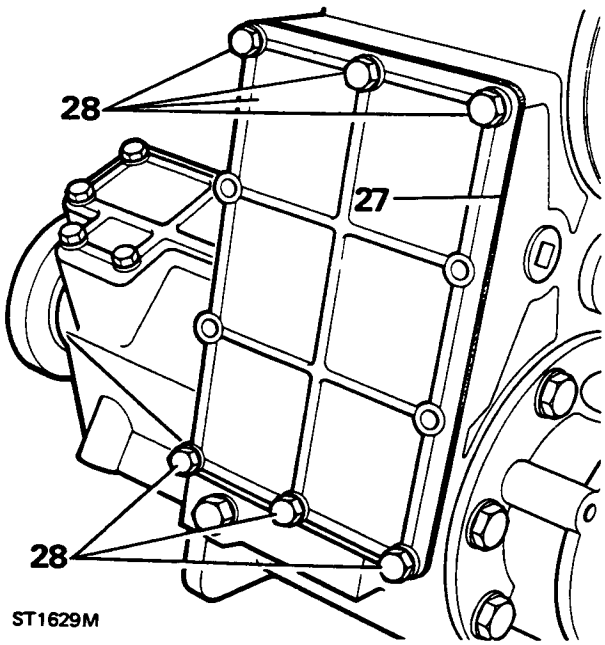
Power take-off cover—reassemble

21. Clean power take-off cover and gasket face.
22. Fit the two countersunk screws and tighten.
23. Remove the six bolts from the bearing support plate.
24. Apply sealant to the cover plate gasket and fit it to the bearing support plate.
25. Apply Loctite 290 to bolt threads and secure the power take-off cover with the six bolts and washers.

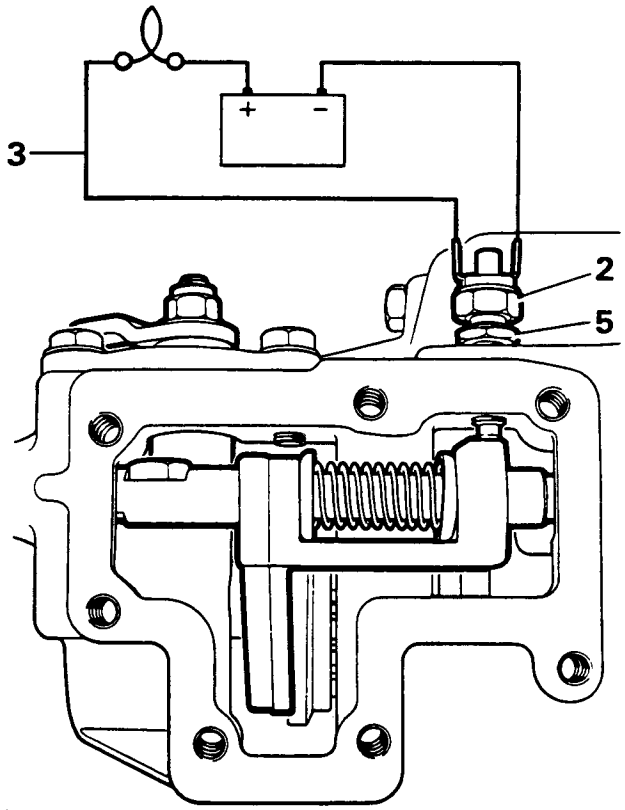
Continued

Bottom cover—reassemble

26. Clean bottom cover and gasket face.
27. Apply sealant to cover gasket and fit to transfer box casing.
28. Apply Loctite 290 to bolt threads and secure the bottom cover with six bolts and washers.



ST1629M



ST1634M

Transmission brake—reassemble

1. Clean brake backplate and oil catcher and apply sealant to the catcher joint face.
2. Locate brake backplate on the rear output housing with the brake operating lever on the right side of the transfer box casing.
3. Secure the backplate (including the oil catcher) with the four special bolts and tighten using a hexagonal socket to the specified torque.
4. Clean and fit brake drum and secure with two countersunk screws.

Differential lock switch adjustment

1. Select differential locked position by moving the lock taper towards the right side of the transfer box casing.
2. Apply sealant to the differential lock warning light switch and fit to the top of the front output housing.
3. Connect a test lamp circuit to the differential lock switch.
4. Screw in the lock switch until the bulb is illuminated.
5. Turn in the switch another half a turn and tighten with the locknut against the housing.

6. Disconnect the battery and move the differential lock lever to the left to disengage differential lock.
7. Clean the front output housing side cover.
8. Grease and fit side cover gasket.
9. Apply Loctite 290 to bolt threads, fit side cover and secure with seven bolts and washers.