

REMOVE LT85/LT230T MAIN GEARBOX AND TRANSFER BOX

Cradle for removing gearbox

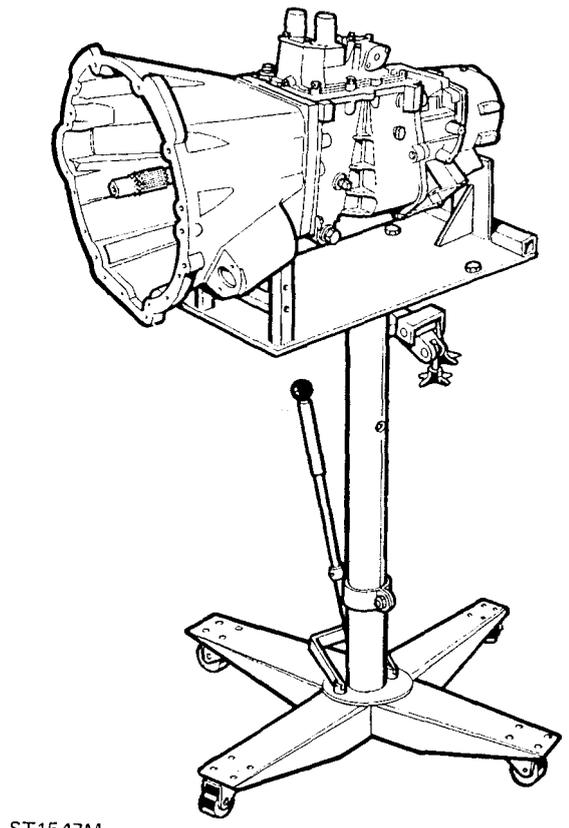
The gearbox should be removed from underneath the vehicle, using a hydraulic hoist, as illustrated; a cradle for locating the gearbox on to the hoist can be manufactured to the drawing below. If a similar cradle was made for the LT77 gearbox, it can be modified to suit both the LT77 and LT85 gearboxes by making the modifications shown by the large arrows.

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.

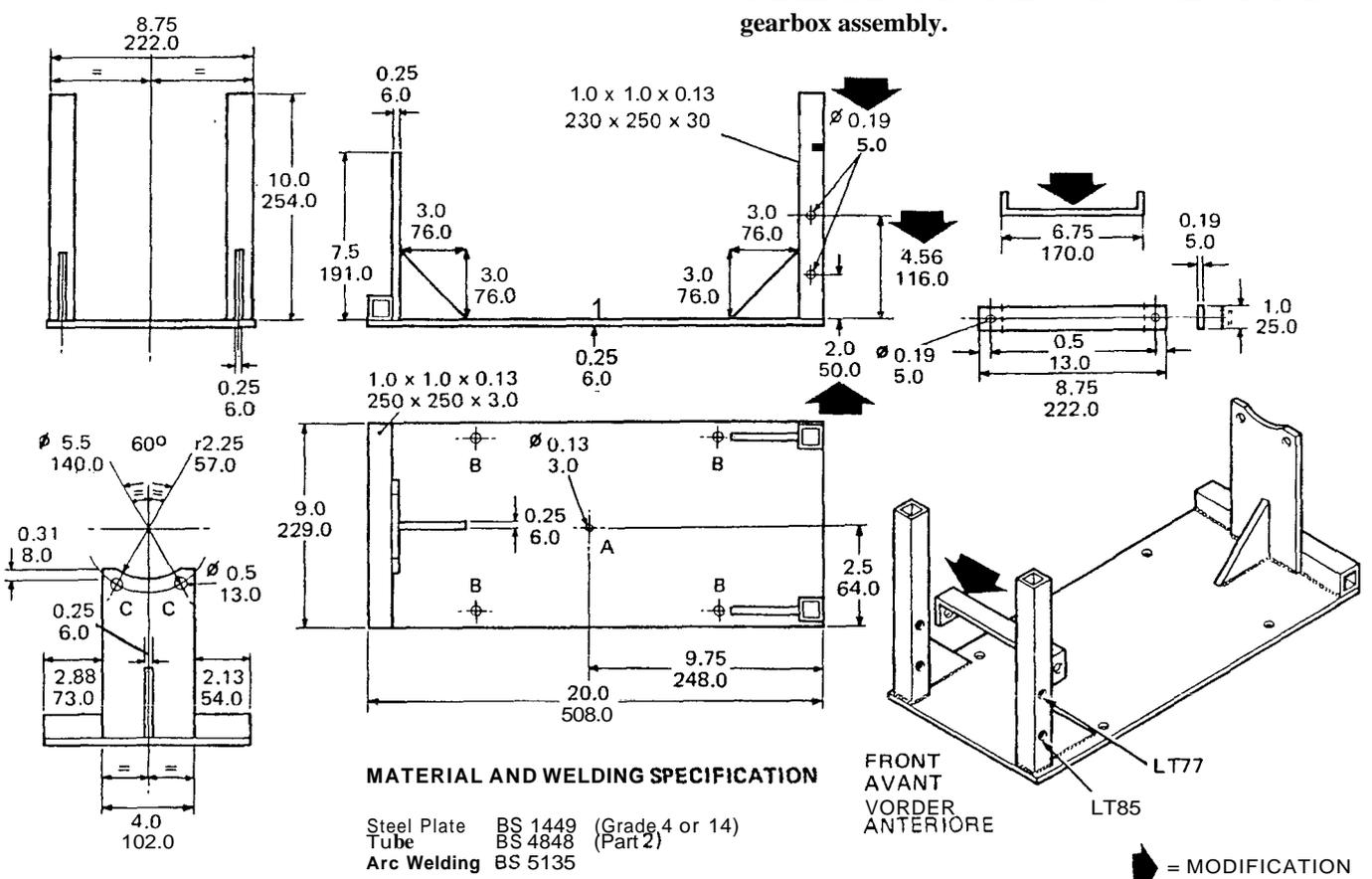
Refer to the Removal instructions for the LT77 gearbox page 1. The method for removing the LT85/LT230T gearbox assembly is similar, except for the following.

1. It is not necessary to remove the engine fan cowl.
2. Remove the air cleaner.
3. Remove the high/low selector housing from the transfer box.
4. Use the cradle and hydraulic hoist already described, to remove the gearbox.

NOTE: It may be necessary to remove the transmission brake drum to allow removal of the gearbox assembly.



ST1547M



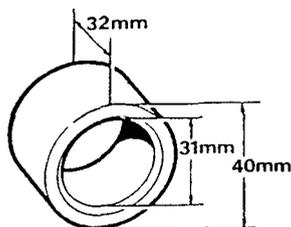
OVERHAUL LT85 FIVE SPEED GEARBOX

— Ninetyand One Ten **V8** models

Service Tools:

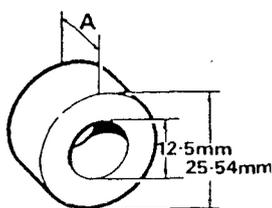
- 18G 1294** — Guidestuds
- 18G 1400** — Two legged puller
- 18G 1431** — Replacer, mainshaft bearings
- MS 284** — Slide hammer
- MS 550** — Driver handle
- LST 101** — Gauge, first gear end float
- LST 102** — Remover-Replacer, mainshaft rear oil seal
- LST 284-1** — Adaptor-Remover, reverse idler shaft
- LST 550-I** — Adaptor-Remover-Replacer, layshaft front bearing roller
- LST 550-2** — Adaptor-Remover-Replacer, layshaft rear bearing outer track
- LST 550-3** — Adaptor-Remover-Replacer, mainshaft front and rear bearing
- LST 1431-1** — Remover-Replacer, front plate and mainshaft

In addition to the above Service Tools, the following five items should be manufactured locally to facilitate dismantling and reassembly of the gearbox.



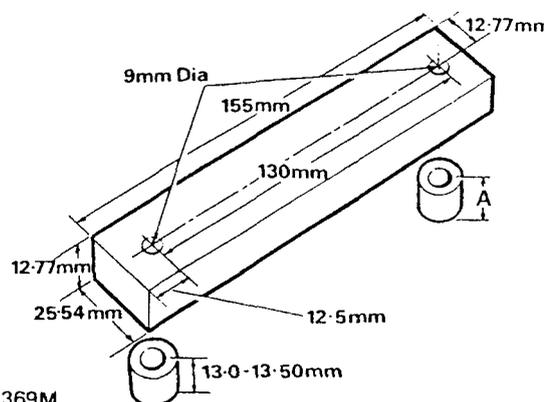
ST1476M

Spacer for retaining layshaft rear bearing



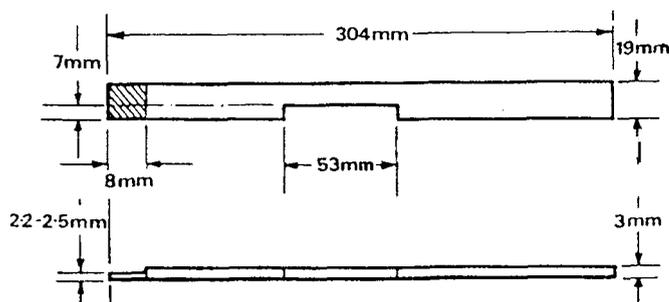
ST1475M

Spacers for retaining front bearing plate. Two required.
A — This dimension must be more than 12 mm.



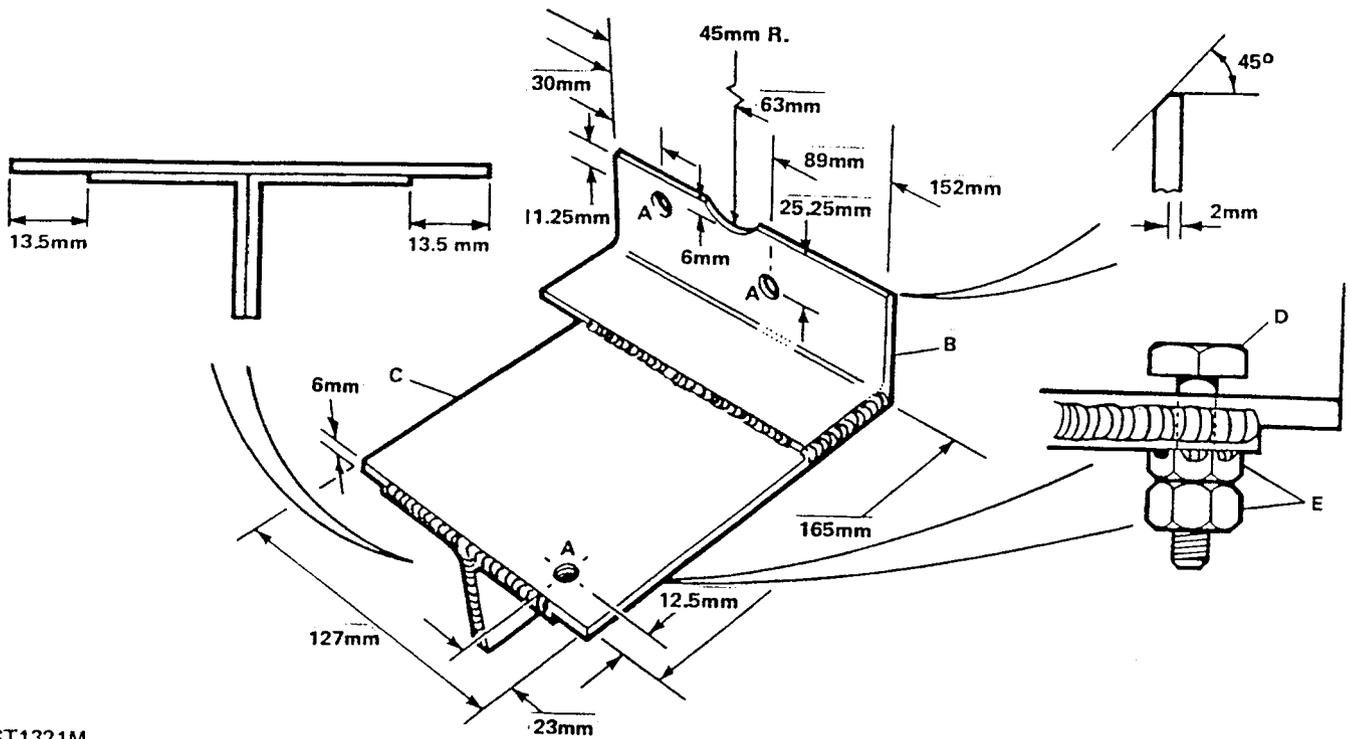
ST1369M

Selector detent spring retaining tool and spacers.
A — Spacers can be made **up** from washers



ST1371M

Gauge for reverse cross-over lever adjustment.



ST1321M

Stand for securing the gearbox in a vice

- A. 11 mm diameter holes
- B. Make from 50 mm x 6 mm steel angle
- C. Make from 6 mm steel plate
- D. 10mm diameter bolt with hexagonal head
- E. 10 mm nuts

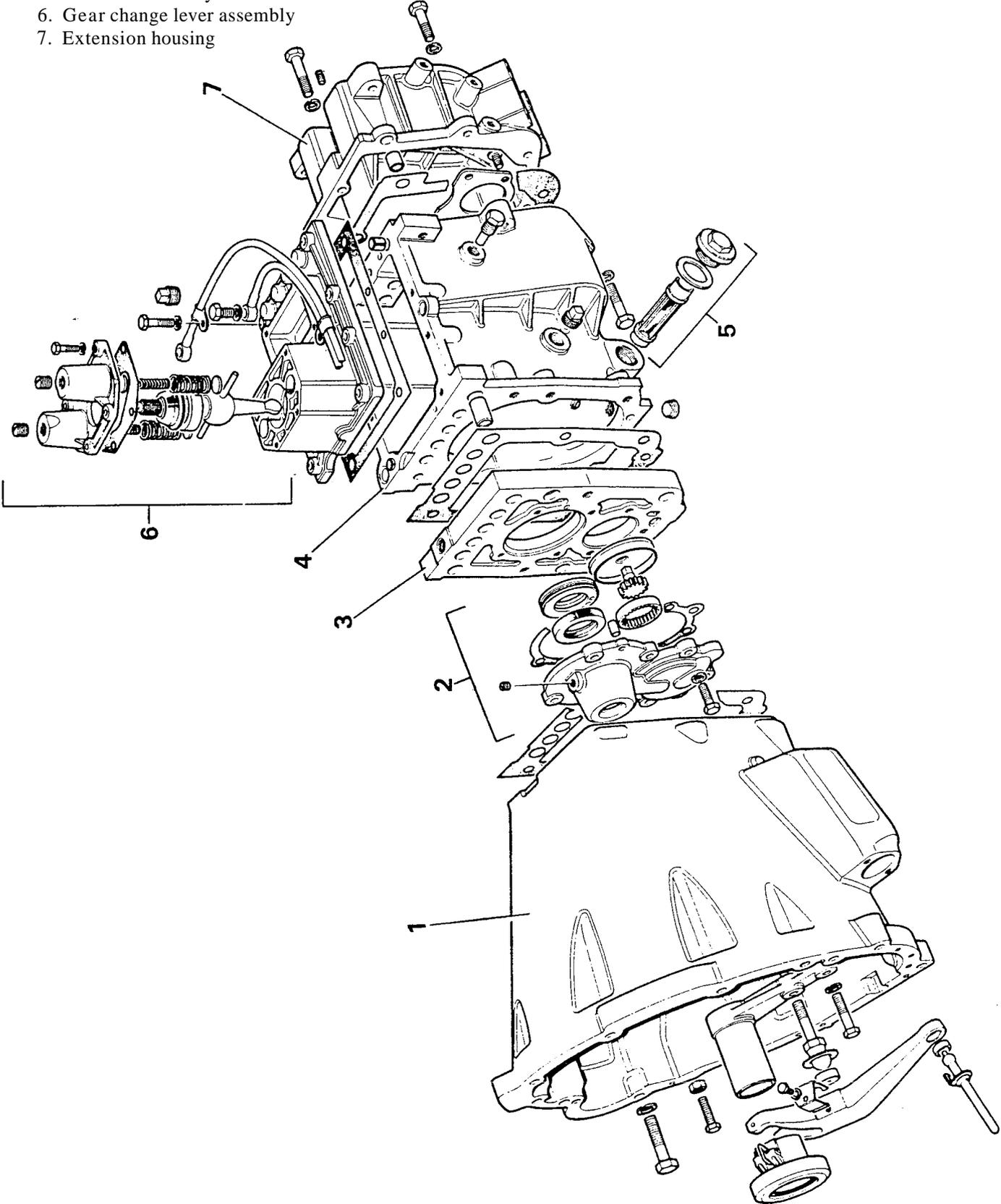
MATERIAL AND WELDING SPECIFICATION

Steel Plate BS 1449 (Grade 4 or 14)

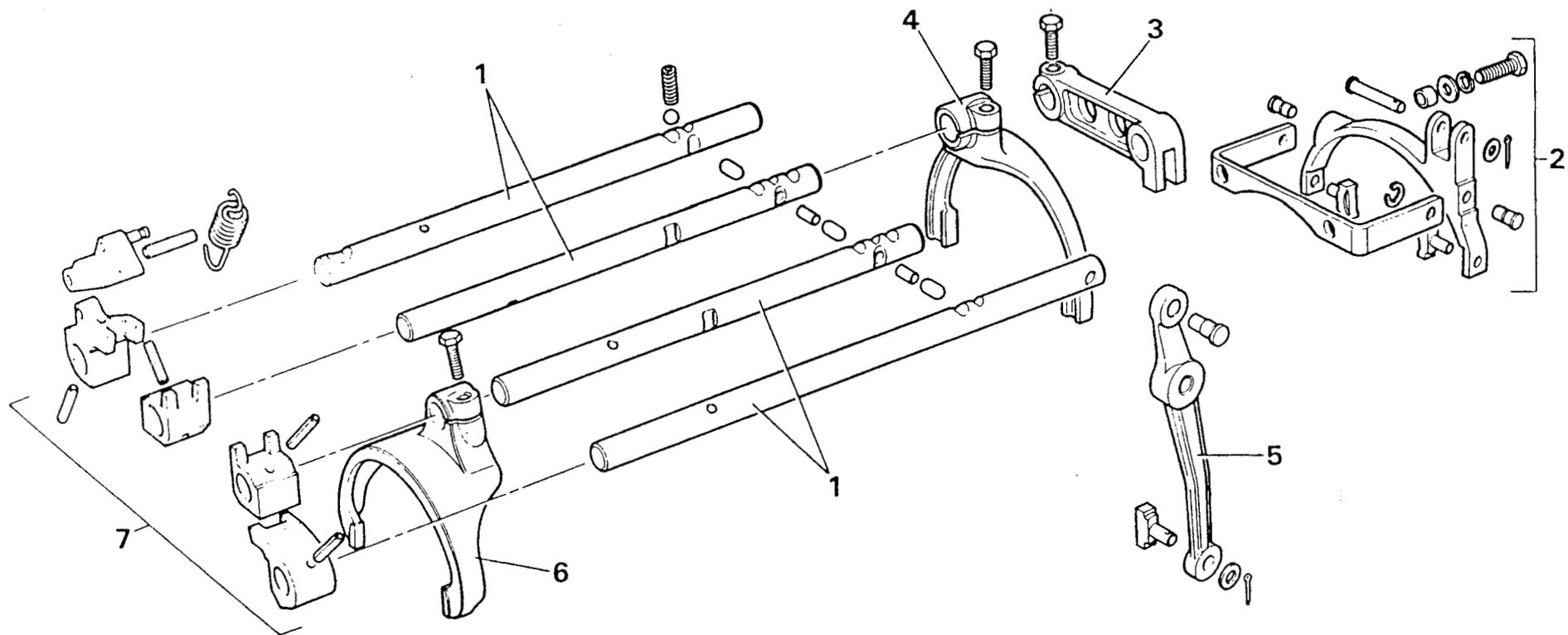
Arc Welding BS 5135

GEAR CASINGS

- 1. Bell housing and clutch release assembly
- 2. Oil pump assembly
- 3. Front bearing plate
- 4. Main gear case
- 5. Oil filter assembly
- 6. Gear change lever assembly
- 7. Extension housing

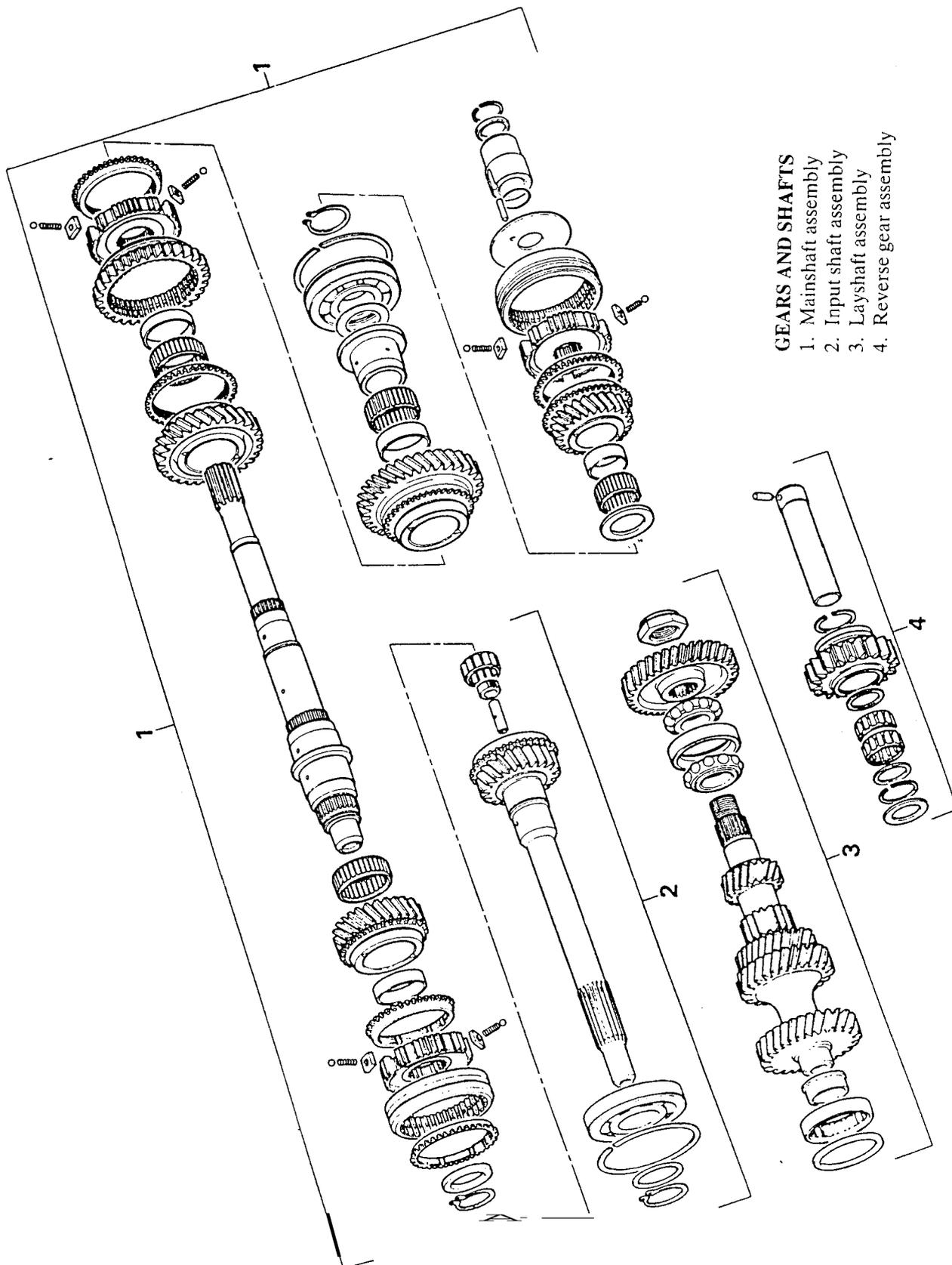


ST1319M



GEAR SELECTORS

1. Selector rails
2. Selector **fork** assembly for 5th gear
3. Selector arm for reverse gear
4. Selector fork for 1st and 2nd gear
5. Reverse gear cross-over lever assembly
6. Selector **fork** for 3rd and 4th gear
7. Selector jaws



GEARS AND SHAFTS
1. Mainshaft assembly
2. Input shaft assembly
3. Layshaft assembly
4. Reverse gear assembly

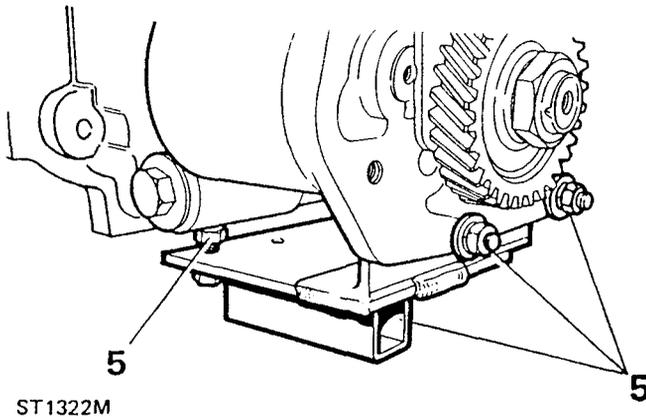
ST1320M

GEARBOX DATA

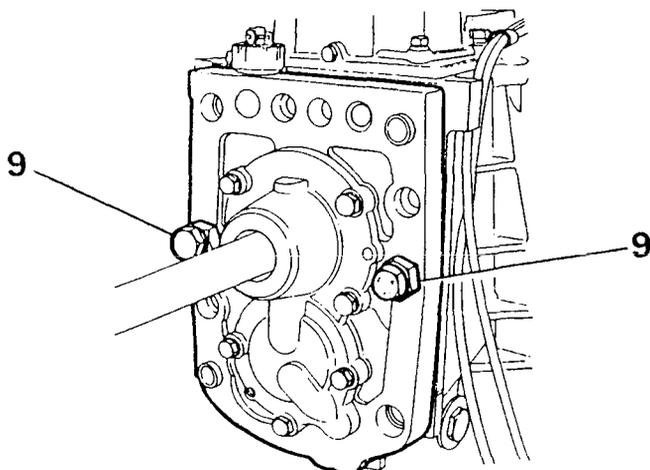
Mainshaft first speed gear running clearance	0,075 mm maximum
Mainshaft third speed gear running clearance	0,075 mm maximum
Mainshaft fifth speed gear running clearance	0,075 mm maximum
Input shaft bearing running clearance	0,075 mm maximum

DISMANTLING

1. Ensure gearbox oil has been completely drained.
2. Position gearbox on bench and support with suitable wooden block.
3. Remove four bolts and detach L.H. gearbox mounting bracket.
4. Remove extension housing and gasket.
5. Fit manufactured stand to gearbox and secure with two bolts, nuts, spring and plain washers. Adjust bolt under filter housing as necessary.

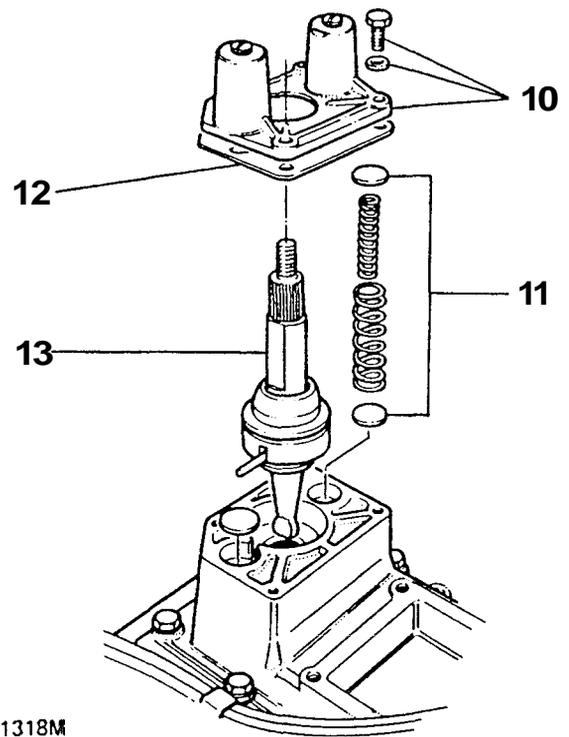


6. With assistance, fit gearbox and stand into a suitable vice and firmly secure.
7. Remove six bolts and washers and lift bell housing, complete with clutch release lever, sleeve and thrust bearing, from gearbox.
8. Remove bell housing gasket.
9. Fit two bell housing fixing bolts, with spacers to front bearing plate.



Bias spring housing and gear lever

10. Remove four bolts and spring washers and lift bias spring housing from gearbox.
11. Remove bias springs and shims. Care should be taken when removing lower shims to avoid them slipping under gear lever pivot bar and into gearbox.
12. Remove bias spring housing gasket.
13. Remove gear lever, complete with gaiter and nylon cup.

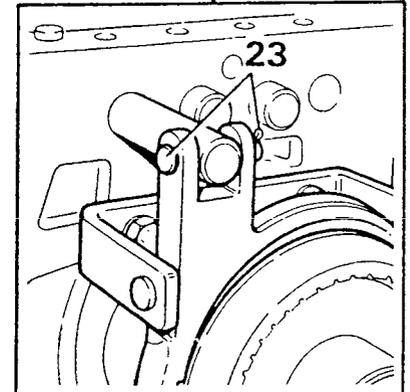
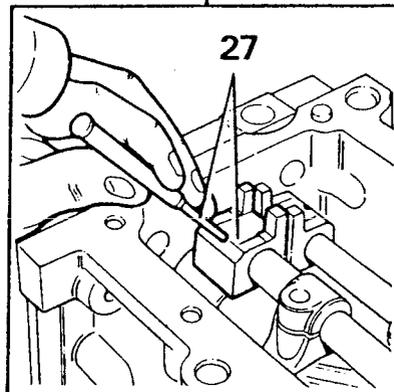
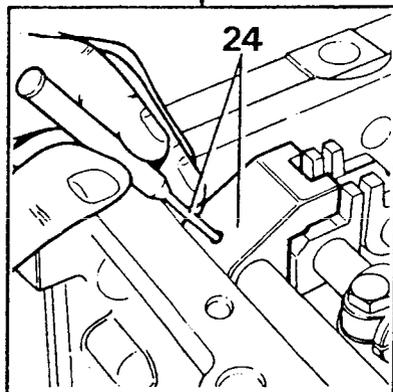
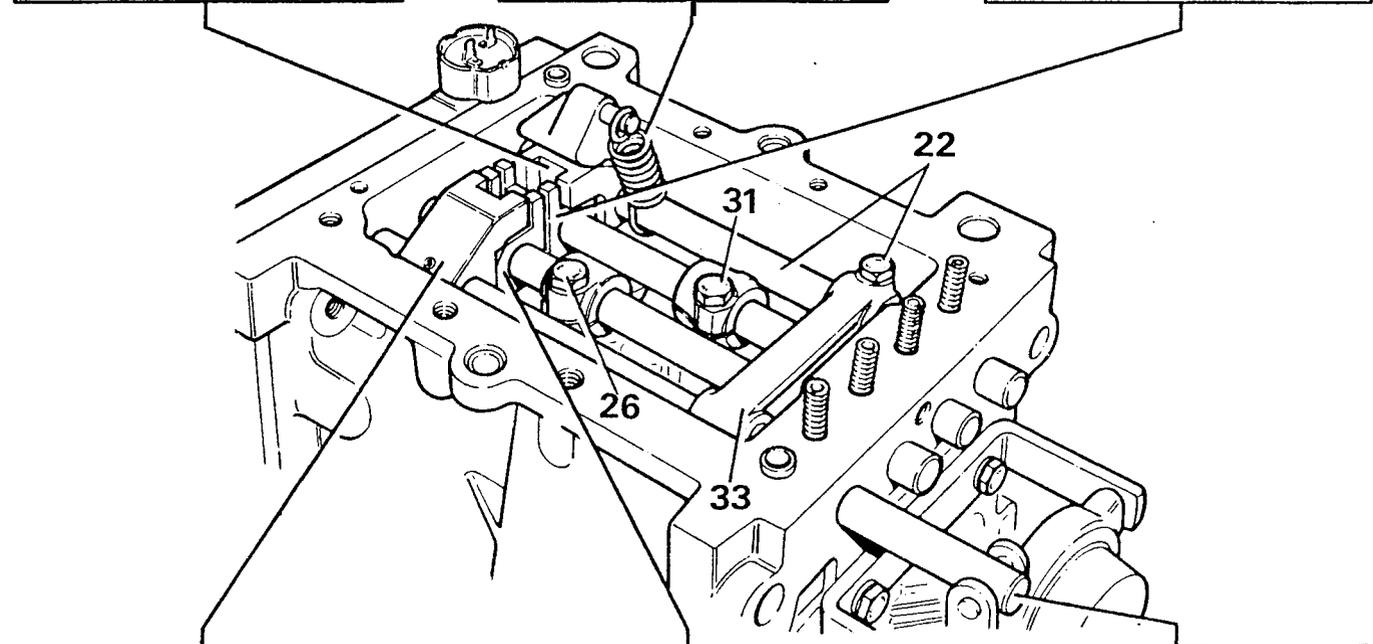
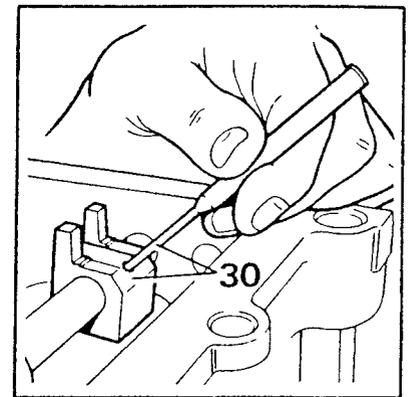
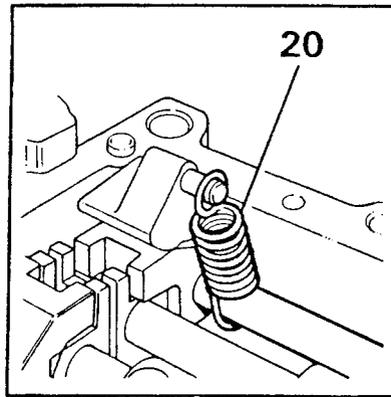
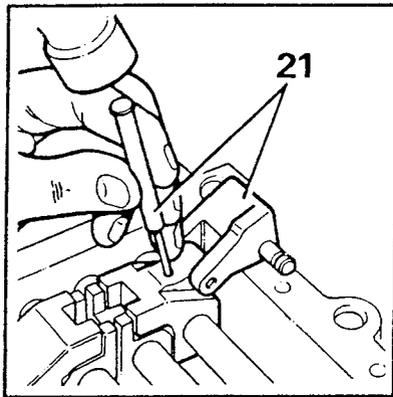


Gearbox top cover

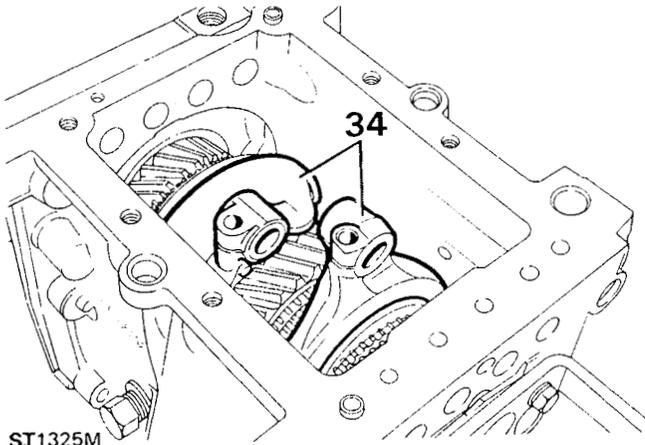
14. Remove reverse light switch, if fitted.
15. Remove breather pipe banjo union fixing bolt.
16. Remove eight bolts and spring washers and lift top cover and breather pipes from gearbox.
17. Remove detent springs.
18. Remove top cover gasket.

Selector rails and forks

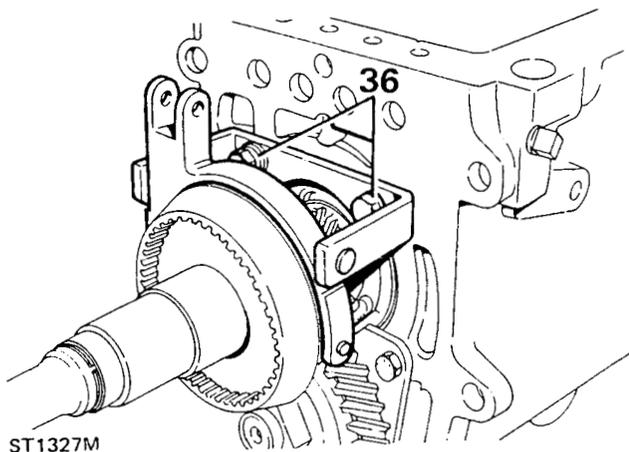
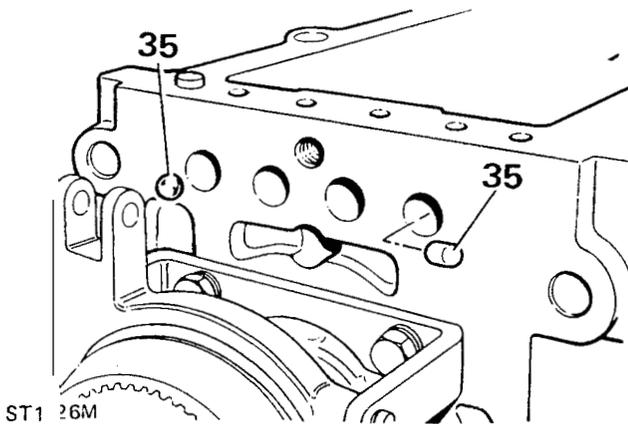
19. Using a suitable magnet withdraw the selector rail detent balls from drillings in gearbox. If detent balls are tight leave operation until after selector rails have been withdrawn, when the detent balls can be pushed down into the selector rail bore, then removed.
20. Release reverse gate spring from knock-over lever and remove from reverse gear rail.
21. Raise knock-over lever and tap down reverse jaw roll-pin until jaw is free on rail.
22. Remove clamp bolt from reverse cross-over lever and withdraw reverse selector rail and jaw from gearbox.
23. Remove split pin washer and clevis pin securing 5th gear selector rail to selector fork and bracket assembly.
24. Push selector rail forwards and tap down 5th gear jaw roll pin until jaw is free on rail.
25. Withdraw 5th gear selector rail and jaw from gearbox.
26. Remove clamp bolt from 3rd/4th selector fork and move selector rail forward.



27. Tap down 3rd/4th jaw roll pin until jaw is free on selector rail.
28. Withdraw 3rd/4th selector rail and jaw.
29. Remove interlock from 3rd/4th selector rail.
30. Tap down 1st/2nd jaw roll pin until jaw is free on selector rail.
31. Remove clamp bolt from 1st/2nd selector fork and withdraw 1st/2nd selector rail and jaw.
32. Remove interlock from 1st/2nd selector rail.
33. Lift reverse cross-over lever from gearbox.
34. Remove 1st/2nd and 3rd/4th selector forks.



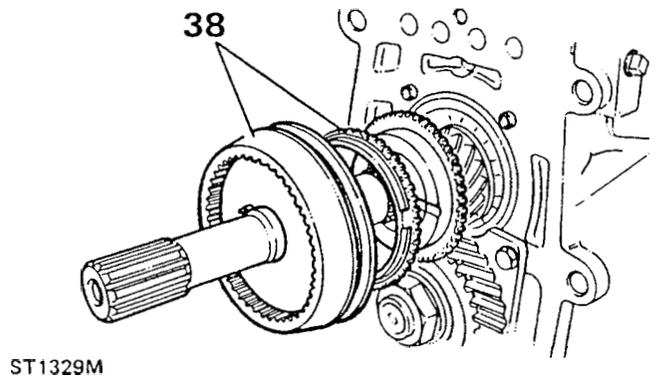
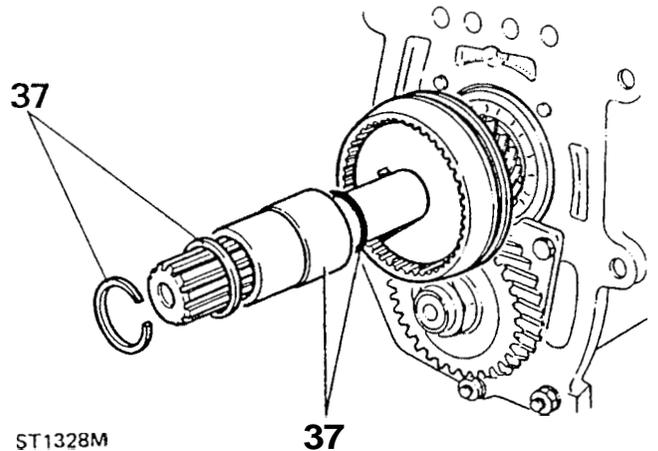
35. Remove interlock plungers and also detent balls if not removed in operation 19.



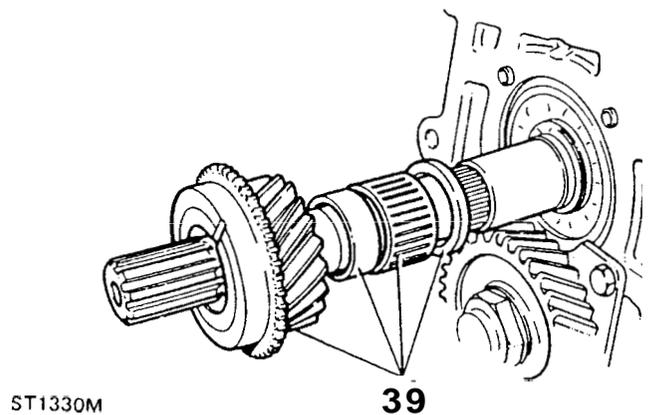
36. Remove two bolts, spring washers and plain washers securing 5th gear fork and bracket assembly to gearbox. Do not displace selector fork slipper pads when removing fork.

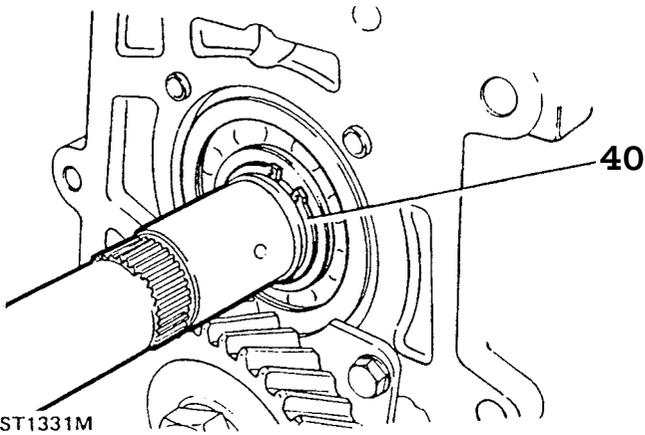
Reverse idler shaft, mainshaft and layshaft

37. Remove circlip, selective washer, oil seal collar and 'O' ring from mainshaft.



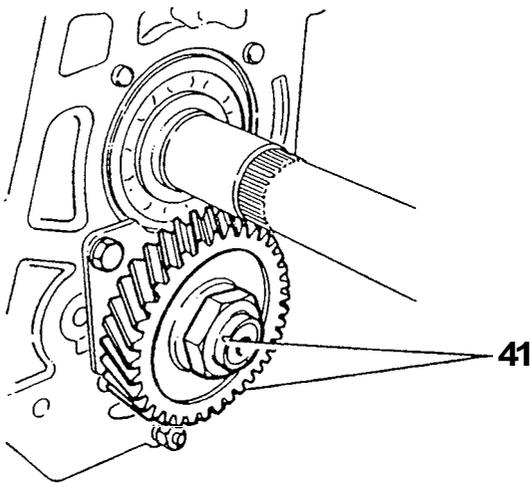
38. Remove 5th gear synchro hub and baulk ring.
39. Remove 5th gear, spacer, needle roller bearing and thrust washer.



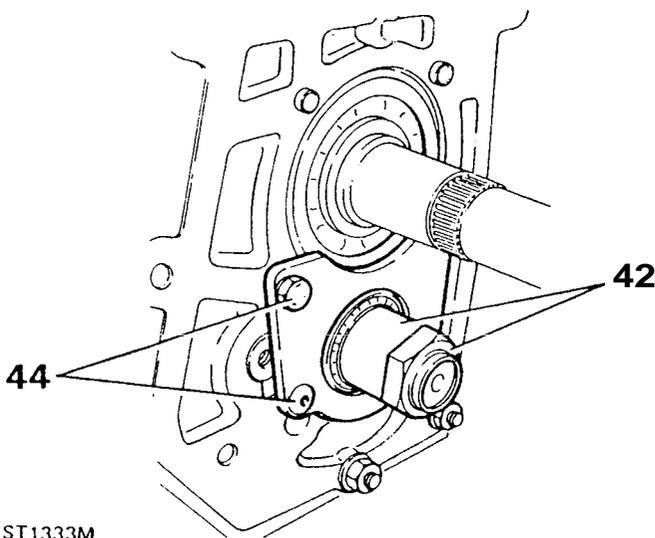


- 40. Remove mainshaft rear bearing circlip.
- 41. Release stake nut collar from recess in layshaft, remove stake nut and 5th gear from layshaft.

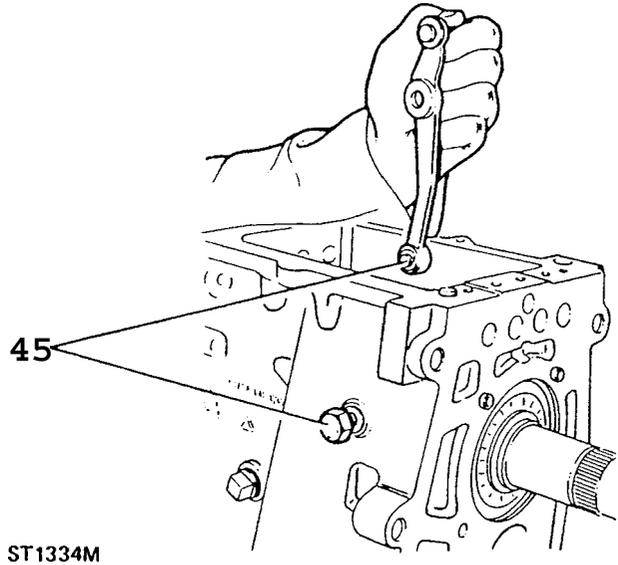
NOTE: To facilitate this operation lock gearbox by engaging both 1st and 4th gears.



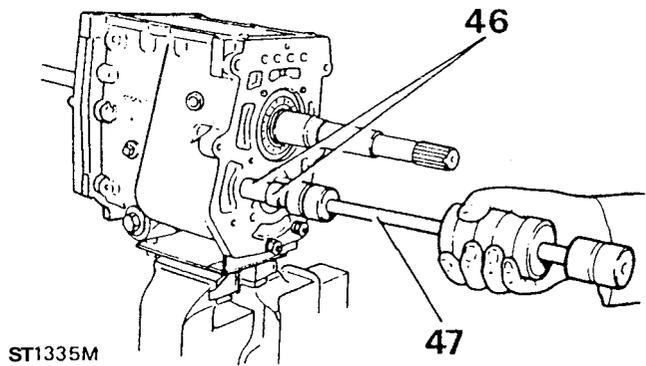
- 42. Fit manufactured spacer to layshaft to retain rear bearing and secure in position with stake nut finger-tight only



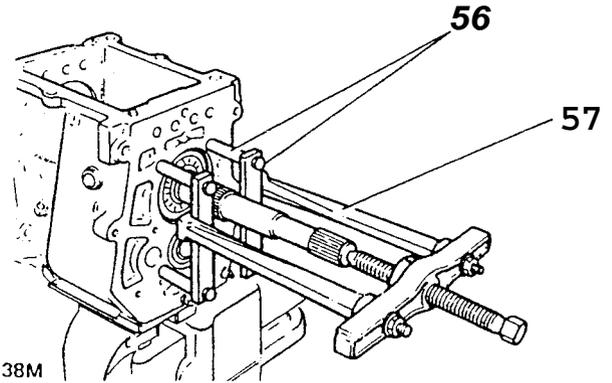
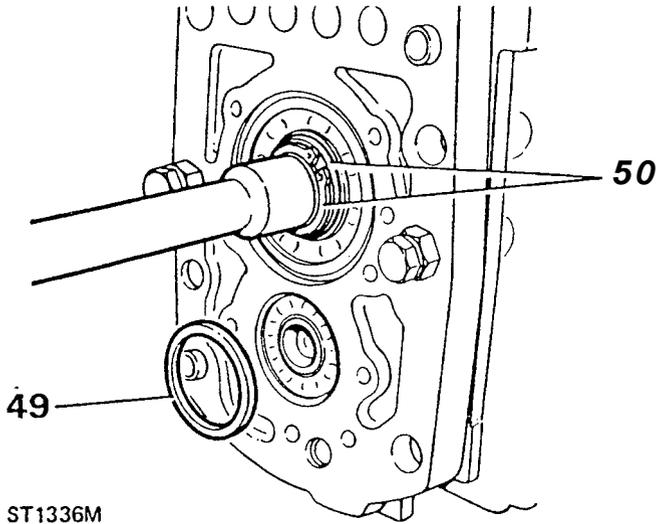
- 43. Disengage 1st and 4th gears.
- 44. Remove two socket head set screws and two bolts with spring washers and remove reverse shaft and layshaft bearing track retaining plate.
- 45. Remove reverse lever pivot bolt and lift reverse lever from gearbox.



- 46. Fit extractor adaptor Tool No. LST 284-1 to reverse idler shaft.
- 47. Fit slide hammer Tool No. MS 284 to adaptor and withdraw reverse idler shaft from gearbox. Reverse idler gear and thrust washer will drop into bottom of gearbox.
- 48. Remove seven bolts and spring washers and withdraw front cover and gasket from front bearing plate.



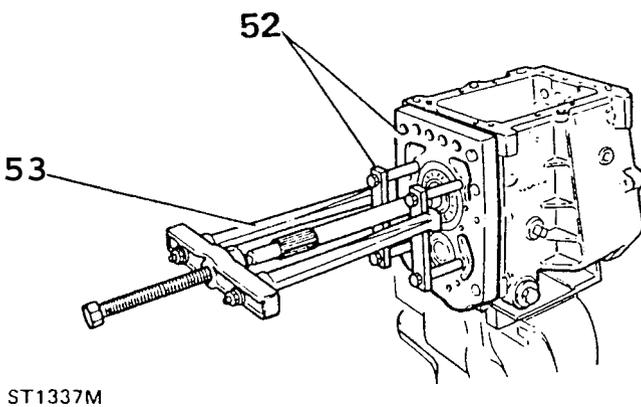
- 49. Remove layshaft front bearing spacer.
- 50. Remove input shaft bearing circlip and selective washer.
- 51. Remove bolts and spacers retaining front bearing plate to gearbox.



- 58. Extract mainshaft from rear bearing. To facilitate operation assistance will be needed to support mainshaft and layshaft.
- 59. Tap layshaft forwards and remove rear bearing race.
- 60. Withdraw mainshaft and layshaft assemblies.
- 61. Remove reverse idler gear and thrust washer from gearbox.

- 52. Fit plates and spacers of Tool No. LST 1431-1 to front bearing plate with 90 mm bolts.
- 53. Locate two legged puller Tool No. 18G 1400 as shown and remove front bearing plate from input shaft and gearbox.

NOTE: Centre bolt and legs of puller must be aligned squarely with input shaft.

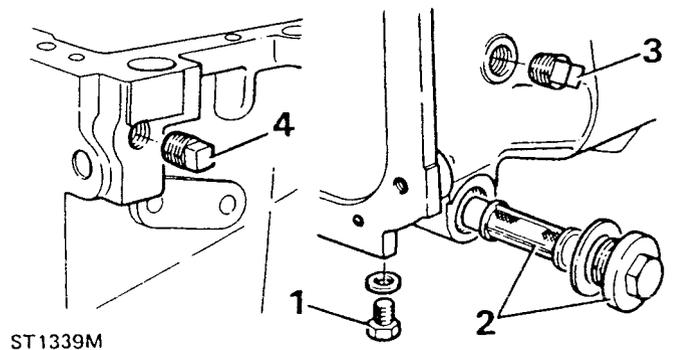


- 54. Remove bearing plate gasket.
- 55. Remove stake nut and spacer from layshaft.
- 56. Fit plates and spacers of Tool No. LST 1431-1 to rear of gearbox with 95 mm bolts in top locations and 90 mm bolts in lower.
- 57. Locate two legged puller Tool No. 18G 1400, again ensuring centre bolt and legs of puller are aligned squarely.

OVERHAUL

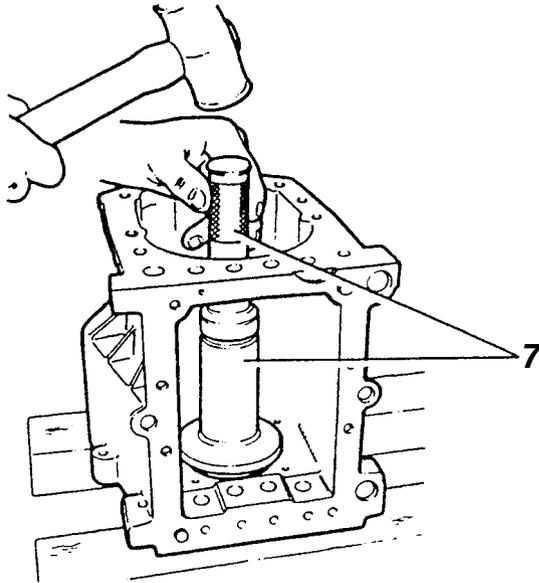
Main gearbox case

- 1. Remove drain plug.
- 2. Remove retaining plug and oil filter.
- 3. Remove filler/level plug.
- 4. Remove interlock cross drilling plug.



- 5. Remove top cover location dowels and 5th gear fork bracket dowels, if necessary.
- 6. Remove gearbox stand.

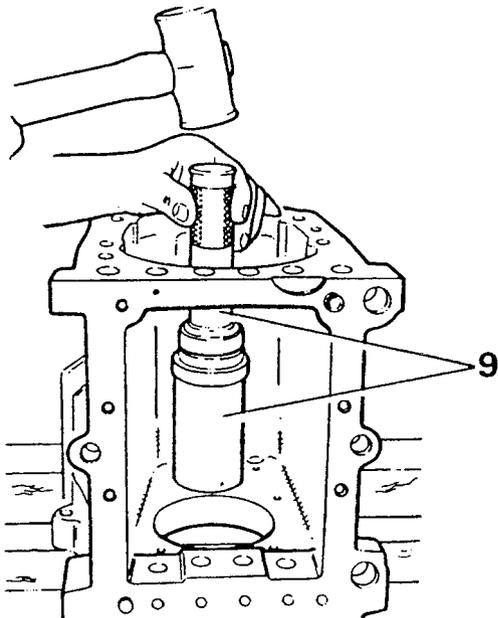
7. Position gearbox on suitable wooden blocks and remove mainshaft rear bearing using Tool Nos. LST 550-3 and MS 550.



ST1340M

8. Remove rear bearing circlip and clean.
9. Using Tool Nos. LST 550-2 and MS 550 remove layshaft rear bearing outer track.

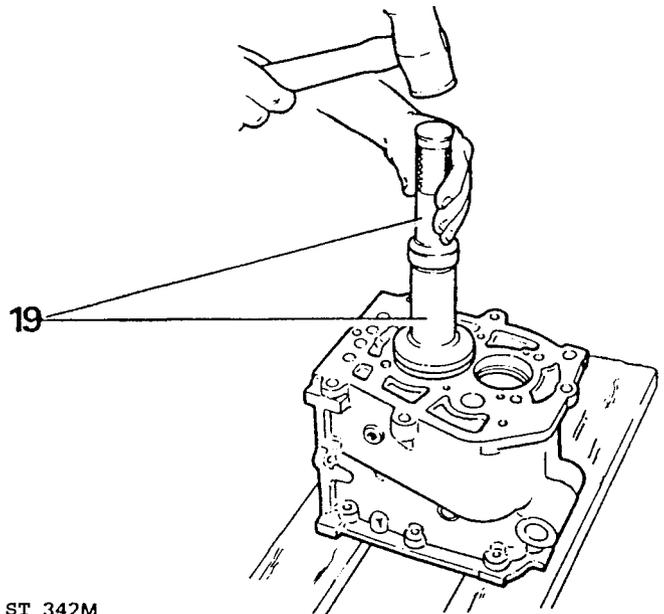
NOTE: Use rounded end of tool.



ST1341M

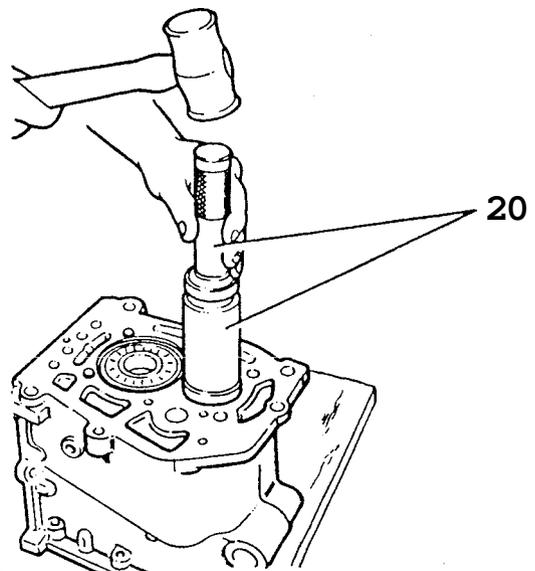
10. Clean gearbox caseasket faces, interior and exterior and inspect for cracks and obvious signs of damage etc.
11. Clean magnetic drain-plug, oil filter retaining plug, level/filler plug and oil filter.

12. Clean mainshaft and layshaft bearing seatings.
13. Clean reverse gear idler shaft seating, drain plug, and level/filler plug tappings.
14. Using an air line blow out filter plug tapping and oil-way, detent and interlock seatings.
15. Clean top cover face and 5th gear fork bracket dowels.
16. Heat gearbox case to facilitate fitting of mainshaft rear bearing and layshaft bearing track.
17. Fit circlip to mainshaft rear bearing.
18. Position rear bearing in gearbox seating.
19. Using Tool Nos. LST 550-3 and MS 550 tap rear bearing into position.



ST 342M

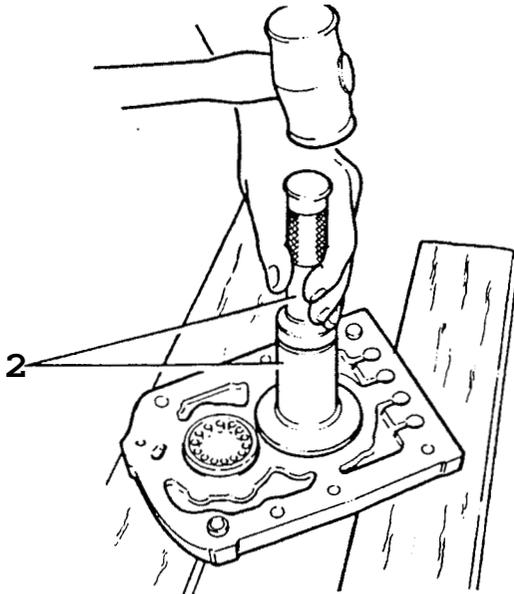
20. With gearbox still warm fit layshaft rear bearing outer track using Tool Nos. LST 550-2 and MS 550.
21. Refit interlock drilling plug.
22. Refit level/filler plug — do not tighten at this stage.
23. Refit oil filter and retaining plug using new copper washer.
24. Refit magnetic drain plug and new copper washer.



ST1343M

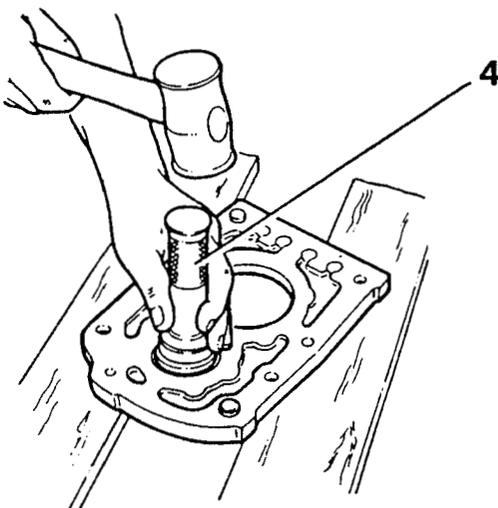
Front bearing plate

1. Support front bearing plate on suitable wooden blocks as shown.
2. Using Tool Nos. LST 550-3 and MS 550 remove input shaft bearing.



ST1344M

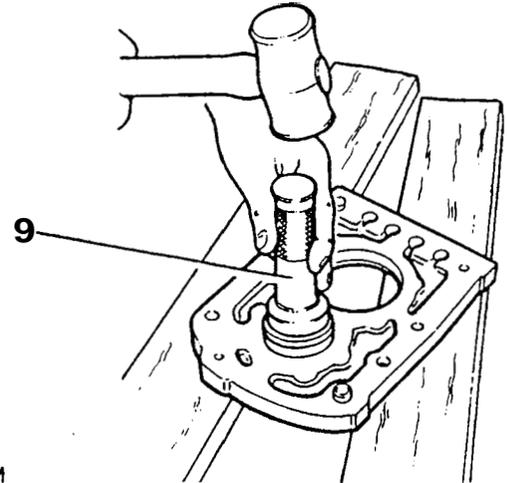
3. Remove circlip from bearing.
4. Remove layshaft front bearing from bearing plate using Tool No. LST 550-1.



ST1345M

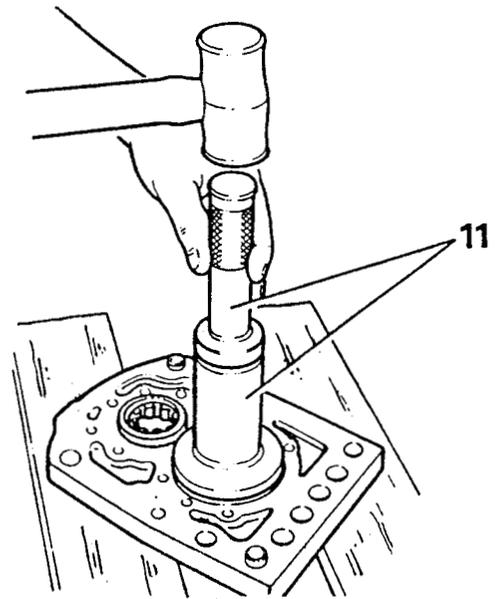
5. If necessary, replace bearing plate dowels.
6. Clean bearing plate, gasket forces and input shaft and layshaft bearing seatings.
7. Using an air line blow out oil-way in bearing plate.
8. Heat front bearing plate to facilitate refitting of input shaft and layshaft bearings.

9. Using Tool No. 550-1 fit layshaft bearing, with 6,5-7 mm of bearing protruding from front of bearing plate. This allows easier assembly of the layshaft and mainshaft at a later stage.



ST1347M

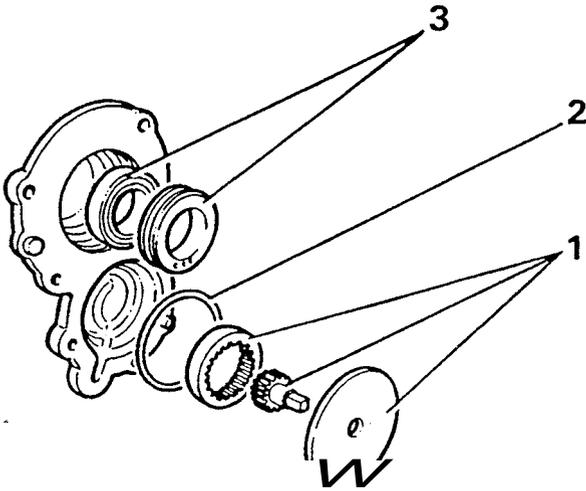
10. Fit circlip to input shaft bearing.
11. With the front bearing plate still warm fit input shaft bearing, using Tool Nos. LST 550-3 and MS 550.



ST1346M

Front cover and oil pump

1. Remove cover plate, drive gear and impellor gear.
2. Remove cover plate 'O' ring.
3. Position wooden blocks under front cover and remove oil feed ring and oil seal.

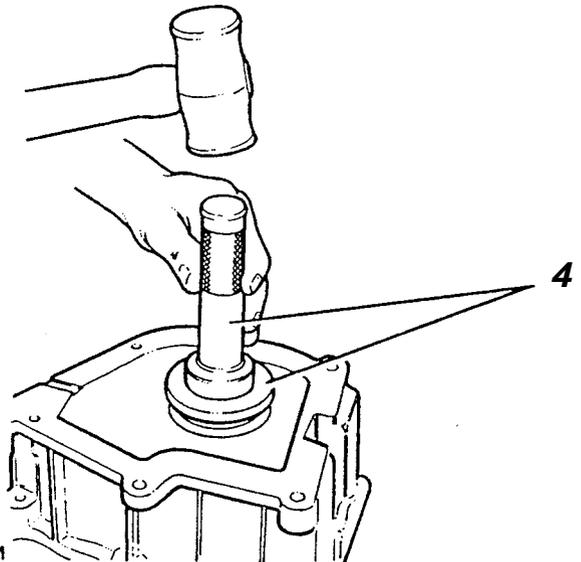


ST1348M

4. Clean all front cover components.
5. Lubricate lip of new oil seal and position in front cover seating with close side downwards.
6. Fully seat oil seal in position using suitable tube.
7. Fit oil feed ring, ensuring the three holes of the feed ring are at the bottom and the centre hole is aligned with the mating oil pump feed drilling in the front cover.
8. Fully seat feed ring in position using suitable tube.
9. Fit cover plate 'O' ring, lubricate and fit impellor gear, and drive gear.
10. Fit cover plate, ensuring chamfer of centre hole is facing towards oil pump.

Gearbox extension housing

1. Remove rear oil seal from extension housing using suitable drift.
2. If necessary, replace extension housing dowels.
3. Clean gasket faces and interior and exterior surfaces.
4. Using Tool No. LST 102 fit new oil seal to extension housing.



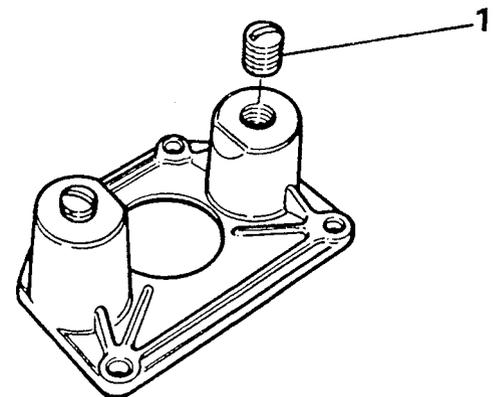
ST1349M

Top Cover

1. Clean top cover gasket faces and interior and exterior surfaces.
2. Remove top filler plug, clean, apply sealant and refit plug.

Bias spring housing and lower gear lever

1. Fit housing to vice and remove bias spring adjusting screws

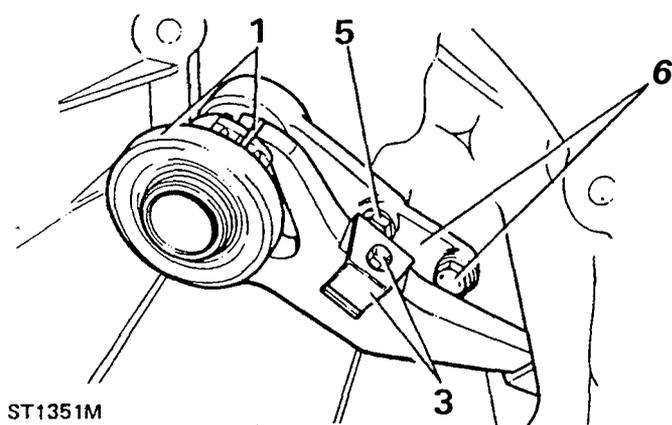


ST1350M

2. Clean lower gear lever and nylon cup.
3. Clean housing, adjusting screws, bias spring bores, springs and shims.
4. Refit bias spring screws — two turns only at this stage.

Bell housing

1. Remove clip retaining thrust bearing carrier to clutch operating lever fork.
2. Withdraw thrust bearing and carrier assembly from sleeve.
3. Remove bolt and spring washer securing operating lever pivot clip to lever. Remove pivot clip.
4. Remove operating lever and pivot slotted washer.
5. Remove operating lever pivot.
6. Unscrew single bolt and remove bearing sleeve from bell housing.



ST1351M

7. Remove bearing sleeve dowels, if necessary.
8. Clean bell housing interior, exterior and mating faces.
9. Apply grease to lever pivot and inner face of bearing carrier.
10. Reassemble in reverse order.

Input shaft

1. Remove 4th gear baulk ring and needle roller bearing.
2. Clean all components, ensuring oil-way on input shaft is blown through with air line.
3. Clean input bearing circlip and selective washer.

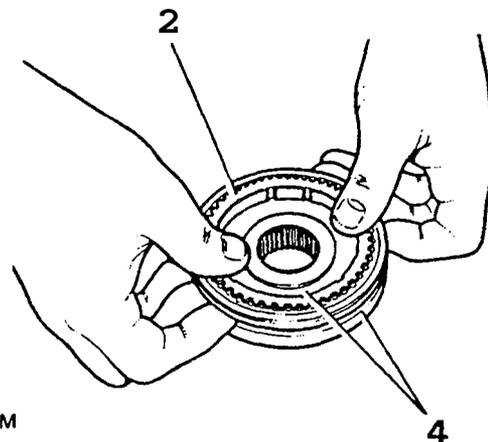
Mainshaft

1. Remove shim and 1st gear bush.
2. Remove 1st gear, needle roller bearing and bearing spacer.
3. Remove 1st gear baulk ring, 1st/2nd gear synchro assembly and 2nd gear.
4. Remove 2nd gear baulk ring, 2nd gear, needle roller spacer and needle roller bearing.
5. Fit mainshaft into vice and remove circlip retaining 3rd/4th synchro hub and gear assembly.
6. Remove selective washer, 3rd/4th synchro assembly and baulk ring.
7. Remove 3rd gear, needle roller spacer and needle roller bearing.
8. Remove oil seal from front of mainshaft.
9. Clean mainshaft, and all mainshaft components and check for obvious wear. Ensure oil-ways in mainshaft are blown through with air line.

1st/2nd synchro assembly

Before dismantling

1. Before dismantling, mark relationship of synchro hub to sleeve.
2. Fit synchro baulk rings.
3. Place synchro assembly and baulk rings into a plastic bag to ensure none of the components are lost during next operation.
4. Press sleeve from hub.

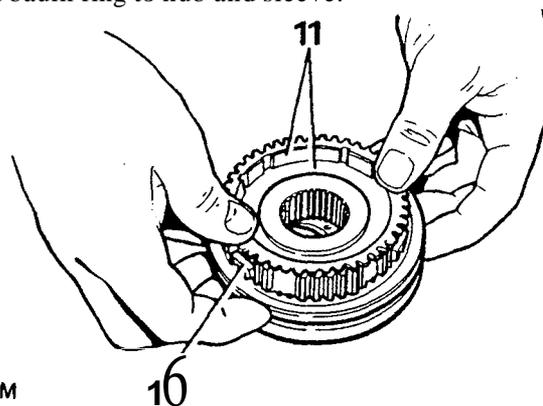


ST1352M

5. Retrieve synchro balls, springs and slipper pads and remove baulk ring.
6. Clean all synchro assembly components.

NOTE: Before reassembling the synchro assembly, carry out the checks for 3rd and 2nd gear end floats, as described in the following paragraphs under the heading 'Mainshaft and gear train'.

7. Fit synchro hub to sleeve ensuring the alignment marks match up.
8. Place hub and sleeve over suitable block.
9. With hub resting on block adjust height of hub sufficiently to fit springs.
10. Locate slipper pads, fit springs and press balls down to be retained by synchro sleeve.
11. Fit baulk ring to hub and sleeve.



ST1477M

12. Invert synchro assembly, carefully, and fit second baulk ring.
13. Press synchro sleeve over hub to locate balls in position.
14. Remove baulk rings.

3rd/4th synchro assembly

1. Repeat operation as for 1st/2nd synchro assembly (omitting the gear end float checks).

NOTE: When reassembling 3rd/4th synchro the large chamfer on synchro sleeve faces the small boss on the hub,

5th gear synchro assembly

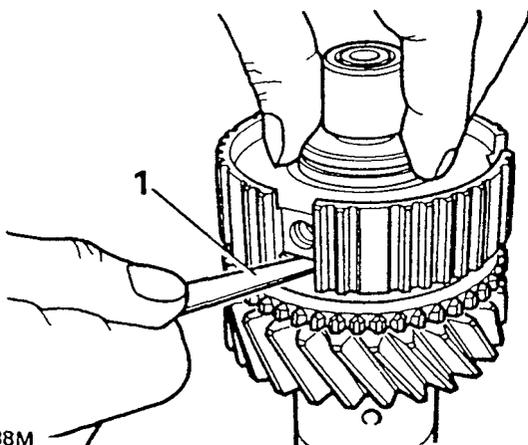
- I. Repeat operation as for 1st/2nd synchro assembly.

NOTE: When reassembling 5th gear synchro the chamfer on the hub faces to the rear.

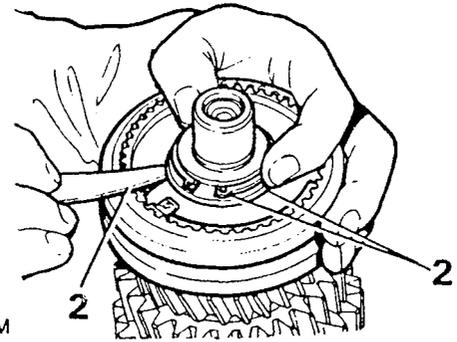
Mainshaft and gear train

3rd gear end float

1. Locate the main shaft in a vertical position as shown. Fit 3rd gear and needle roller bearing to the shaft and replace the 3rd/4th synchro inner member. Press down on the synchro inner member and check the gear running clearance with a feeler gauge, as shown. A clearance in excess of 0,19 mm (.008 in) indicates that the thrust laces are worn and may be the cause of gear noise or transmission back lash. New or little worn components will usually have a clearance of between 0,075 mm and 0,125 mm (.003 in to .005 in).



ST1538M



ST1354M

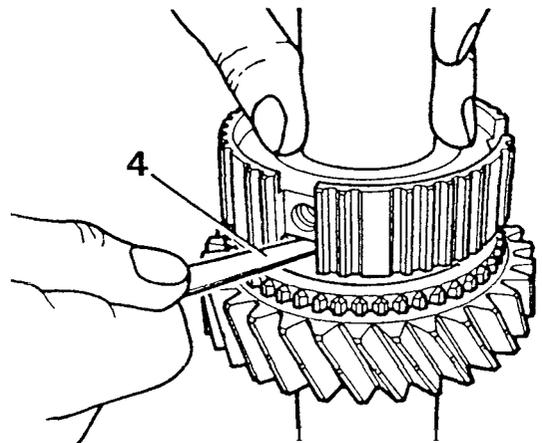
Next fit the original selective washer and retain with the circlip. Check the clearance between the washer and the synchro hub which must not exceed 0,075 mm (.003 in). The condition is ideal when the selective washer can be *just* turned by hand, i.e. minimum end float. Finally secure components with a new circlip.

Oil seal

3. Renew oil seal in the front of the main shaft at this stage then invert the shaft ready for assembly of the rear end.

2nd gear end float

4. Fit 2nd gear needle roller bearing, spacer, 2nd gear and synchromesh inner member with the selector groove towards the rear as shown. Press down on the synchro inner member and check 2nd gear end float tolerance which is identical to 3rd gear previously described.



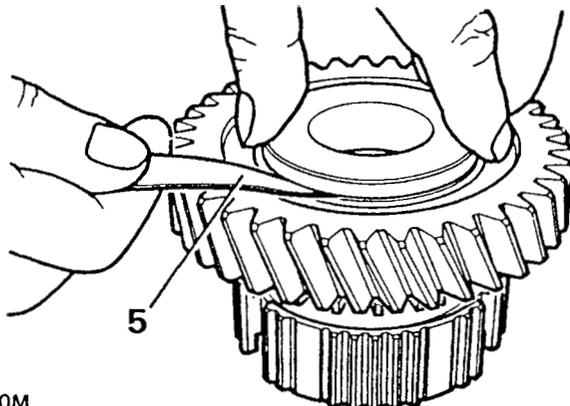
ST1539M

3rd/4th synchro end float

2. Maintain the mainshaft in a vertical position as shown. Fit 3rd gear needle roller bearing, spacer, 3rd gear, baulk ring and synchromesh with the large area thrust face towards 3rd gear and the chamfer on the outer member towards the front.

1st gear to bush end float

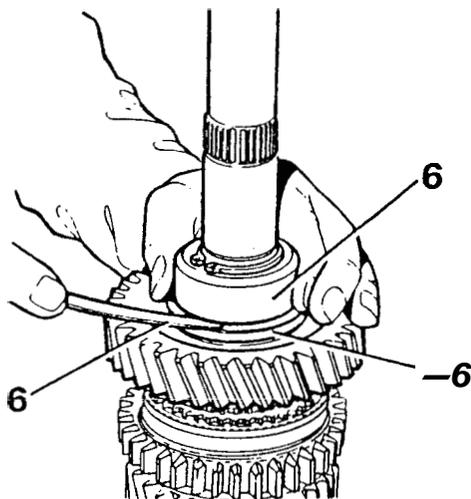
- To carry out 1st gear check, it is not necessary to assemble the components on to the mainshaft. Assemble 1st gear on to the bush and using a suitable straight edge or flat plate (the oil pump back plate is ideal) check the end float of 1st gear on the bush as shown. The tolerance is identical to 3rd and 2nd gear end floats.



ST1540M

1st/2nd synchromesh end float

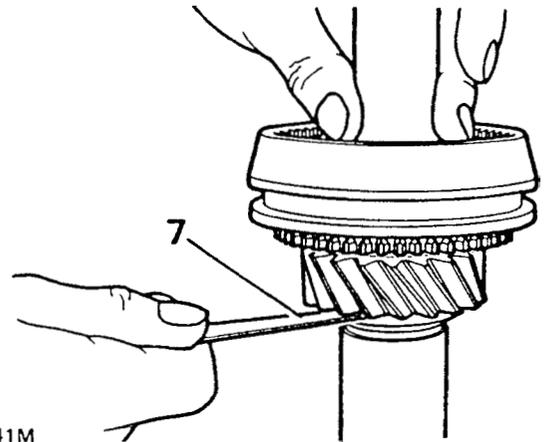
- Next fit the 1st gear baulk ring, 1st gear bush and gear, original selective washer, dummy bearing LST 101 and circlip onto the shaft, then check the end float as shown. Choose a suitable selective shim washer to obtain the correct tolerance which is identical with 3rd/4th synchromesh, i.e. minimum to 0,075 mm (.003 in).



ST1353M

5th gear end float

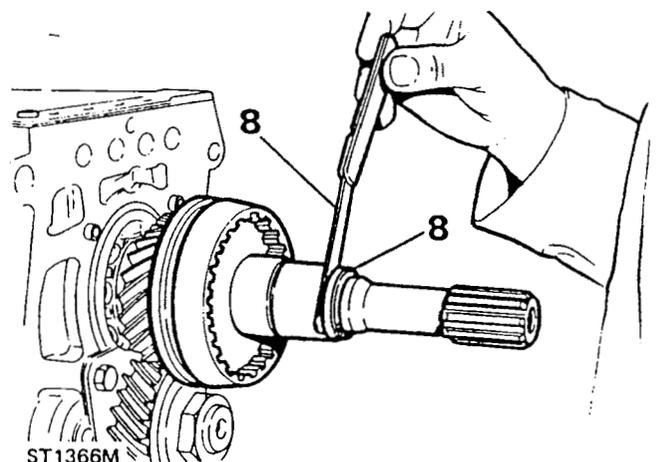
- Fit 5th gear thrust washer, 5th gear, needle bearing and spacer followed by synchromesh unit but leaving out the baulk ring at this stage. Press down on the synchro inner member and check the gear end float as shown; this tolerance, again is identical to 3rd gear.



ST1541M

5th gear synchro end float

- Fit the 5th gear synchromesh backing plate, seal collar, original selective shim washer and circlip. Then check the clearance as shown; select a suitable shim washer to minimise the clearance. This adjustment is identical to the 1st/2nd and 3rd/4th synchromesh units. With all the mainshaft adjustments correct, remove the 5th gear components ready for assembly.



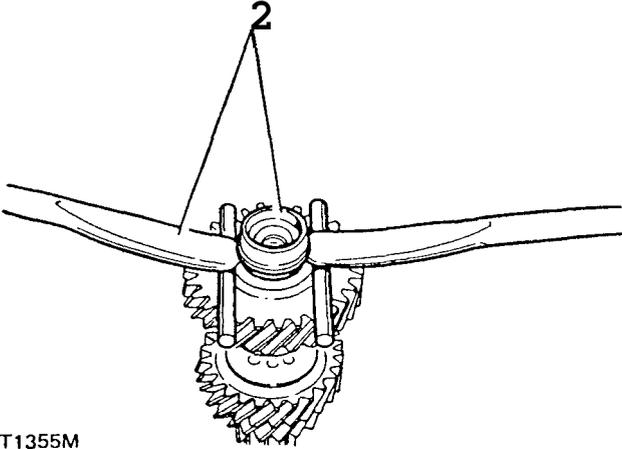
ST1366M

5th gear selector fork and bracket assembly

- Remove slipper pads from selector fork and check for wear.
- If necessary, remove circlips and remove selector fork pivot pins.
- Clean all components and refit in reverse order.

Layshaft

1. Remove layshaft rear bearing inner race.
2. Fit layshaft to vice and lever off front bearing inner track.



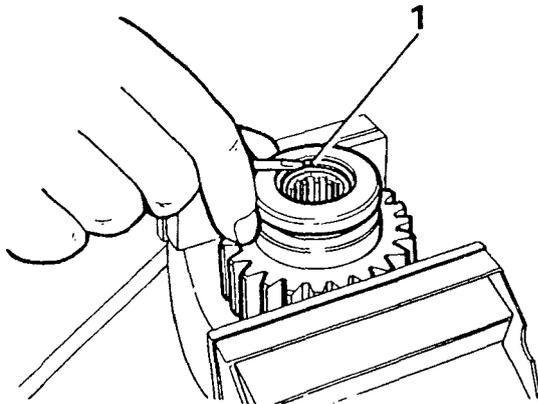
ST1355M

3. Clean layshaft, bearings and tracks and check for wear.
4. Fit layshaft front bearing track.
5. Fit rear bearing race to layshaft, ensuring the identification numbers etc., of the bearing are facing forwards.

NOTE: Inner tracks are offset and the bearings must be fitted with narrow shoulders together.

Reverse idler gear assembly, shaft and lever

- 1 Secure reverse gear in vice and remove circlip retaining bearings

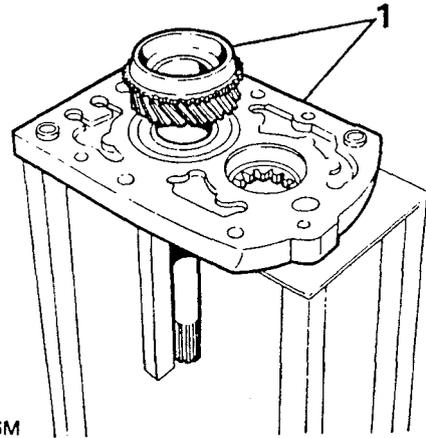


ST1359M

2. Remove upper thrust washer, two needle roller bearings and lower thrust washer.
3. Invert reverse gear and remove second circlip.
4. If necessary, remove split pin and withdraw slipper pads and washer from reverse gear lever.
5. Press out reverse lever cross link operating pin, if necessary.
6. Clean all components and check for wear.
7. Lubricate needle roller bearings and reassemble reverse idler gear assembly and lever in reverse order.

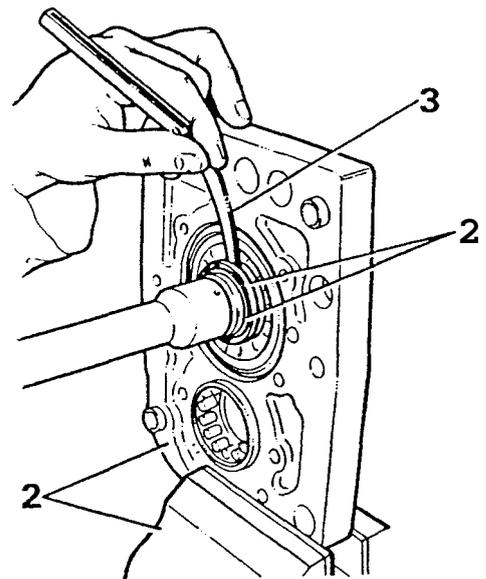
REASSEMBLING GEARBOX**Input shaft, mainshaft and layshaft**

1. Position front bearing plate on suitable stand and fit input shaft into bearing.



ST1356M

2. Secure bearing plate in vice, fit original selective washer and retain with circlip.
3. Measure the clearance between washer and input shaft bearing. If a measurement in excess of 0,075 mm is obtained remove circlip and washer.

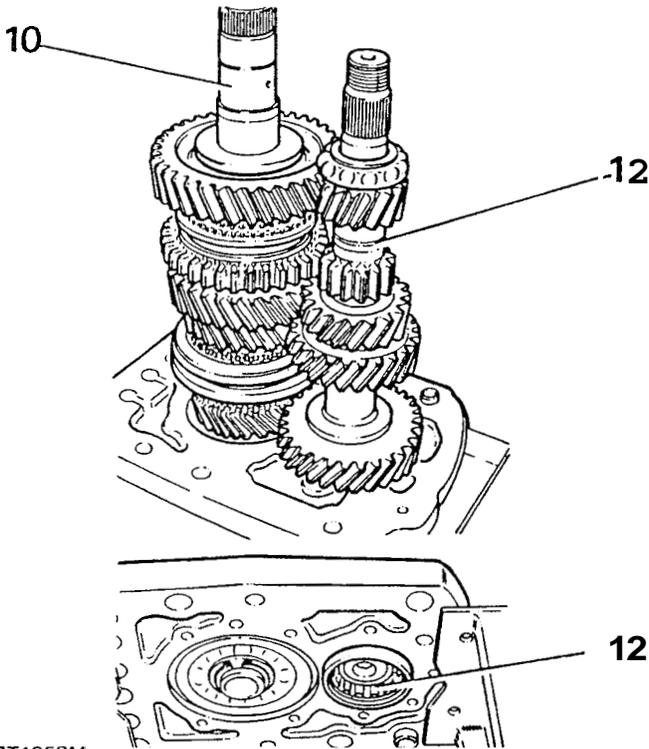


ST1357M

4. Select and measure new washer to take up the excessive running clearance.
5. Fit new selective washer and retain with circlip.
6. Recheck to ensure a running clearance of 0,075 mm is obtained between washer and bearing.
7. Position front bearing plate on suitable stand.
8. Lubricate mainshaft pilot bearing and fit to input shaft.
9. Fit 4th gear baulk ring to input shaft.

10. Lower mainshaft assembly into input shaft at the same time rotating to engage baulk ring slots and lugs.
11. Engage 3rd gear.
12. Fit layshaft assembly to front bearing plate and mesh with mainshaft.

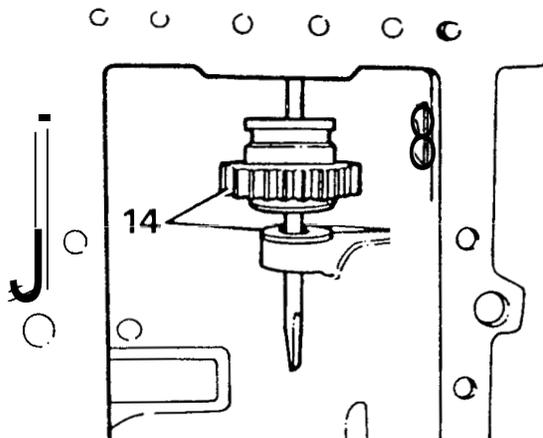
NOTE: Take care to ensure that the front layshaft bearing rollers are not put out of alignment, then return 3rd/4th synchro hub to neutral.



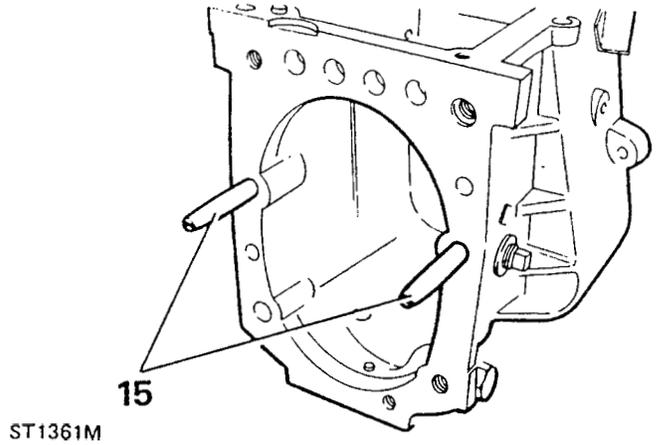
13. Remove the rear bearing circlip and dummy bearing.

Reverse gear

14. Fit thrust washer to reverse gear, chamfer towards gear, locate gear in gearbox case, and retain temporarily in position with a screwdriver, or similar implement.

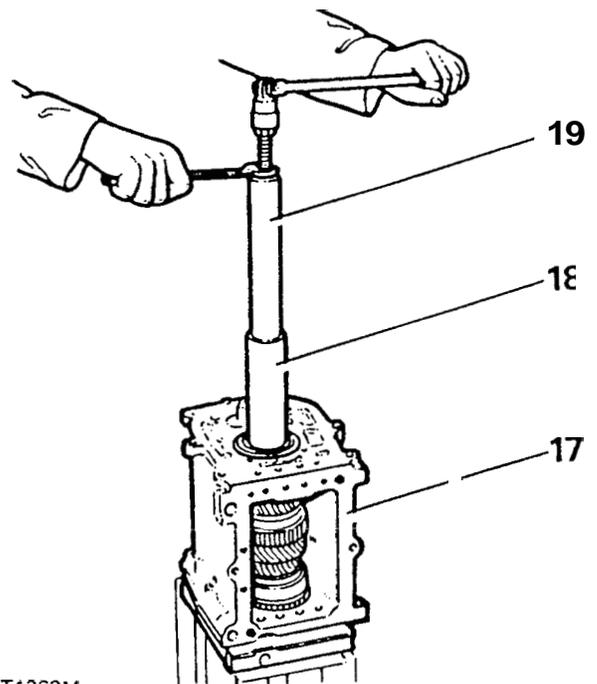


15. Fit guide studs 18G 1294 to gearbox.

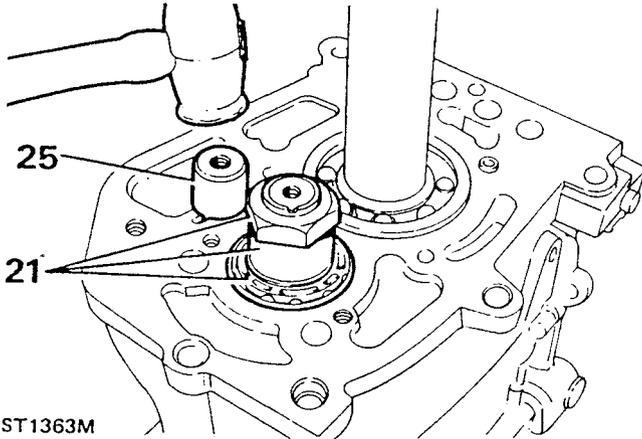


Gearbox case and reverse shaft

16. Fit new gasket on front bearing plate.
17. Lower gearbox case over mainshaft/layshaft assemblies using guide studs to locate front bearing plate.
18. Fit tube, Tool No. LST 1431-1 over mainshaft and locate on rear bearing.
19. Fit Tool No. 18G 1431 over mainshaft and locate on other tool.
20. With assistance, to prevent gearbox and mainshaft rotation, and using above tools, pull gearbox to front bearing plate.

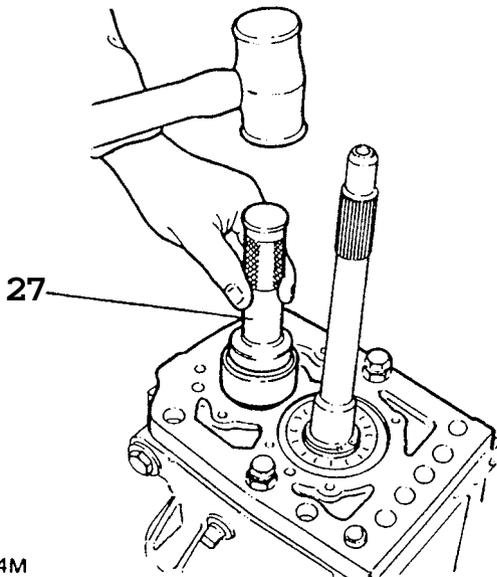


21. Fit layshaft rear bearing (identification numbers to rear) dummy spacer, and retain temporarily with layshaft nut.
22. Remove guide studs 18G 1294.
23. Temporarily fit two bell housing bolts with spacers, to secure front bearing plate to gearbox.
24. Remove Tool Nos. 18G 1431 and LST 1431-1 and then check that the mainshaft is engaged through bearing sufficiently to fit mainshaft bearing circlip.
25. Remove screwdriver from reverse shaft location and fit reverse shaft.



ST1363M

26. Invert gearbox and fit spacer to layshaft front bearing.
27. Using Tool Nos. LST 550-1 and MS 550 locate layshaft front bearing to final position.



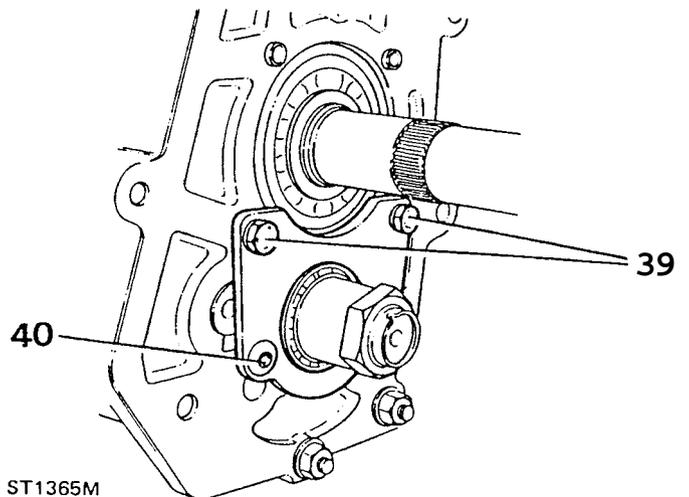
ST1364M

28. Temporarily remove layshaft bearing spacer.
29. Refit gearbox stand (manufactured tool) to underside of gearbox and secure with two bolts, nuts, spring and plain washers. Adjust bolt under filter housing as necessary.
30. Secure gearbox stand in vice.
31. Check that 4th gear baulk ring and all other baulk rings are free.
32. Fit layshaft front bearing spacer.
33. Fit new gasket to front cover.
34. Tape input shaft splines, to prevent damage to front cover oil seal in next operation.

35. Ensure oil pump drive aligns with the square seating in the layshaft and fit front cover to front bearing plate and secure with seven bolts and spring washers.
36. Remove tape from input shaft splines.

Reverse lever, reverse shaft/bearing retaining plate

37. Fit reverse lever to reverse gear.
38. Apply Loctite Stud and Bearing Fit (270) to pivot bolt threads, fit bolt in gearbox and locate in reverse lever pivot boss.
39. Position reverse shaft, layshaft bearing track retaining plate and secure top of plate with two bolts and spring washers.



ST1365M

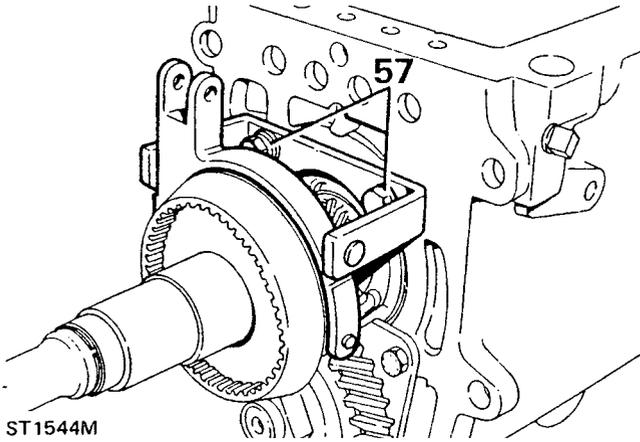
40. Apply Loctite Stud and Bearing Fit (270) to socket head set screws and secure bottom of retaining plate.

5th gear, layshaft and mainshaft

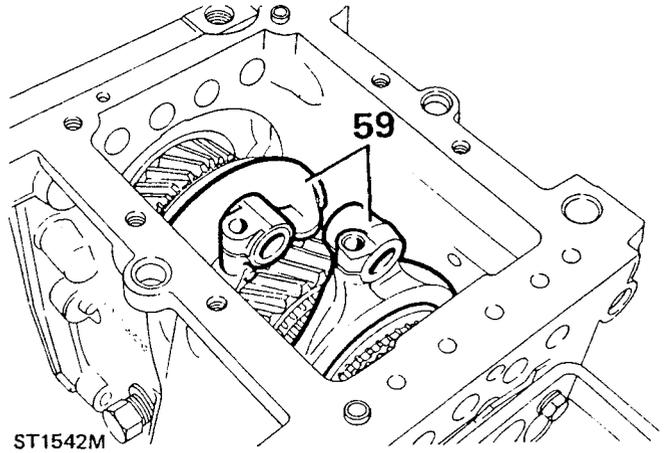
41. Remove nut from layshaft and remove dummy spacer.
42. Fit 5th gear to layshaft with large boss to the rear.
43. Rotate layshaft to give access to stake slot.
44. To facilitate next operation, lock gearbox by engaging 1st and 4th gears.
45. Fit a new 5th gear retaining nut and tighten to the specified torque.
46. Stake retaining nut collar into recess in layshaft.
47. Return 1st and 4th synchros to neutral.
48. Fit mainshaft rear bearing circlip.
49. Fit thrust washer.
50. Lubricate needle roller bearings and fit to mainshaft followed by spacer and 5th gear.
51. Fit 5th gear synchro cone and synchro hub assembly.
52. Tape mainshaft splines and fit 'O' ring to its seating on mainshaft.
53. Fit oil seal collar and locate in peg on hub backing plate.
54. Fit the washer selected during the 5th gear end float check and retain with circlip.
55. Remove tape.

Selector rails and forks

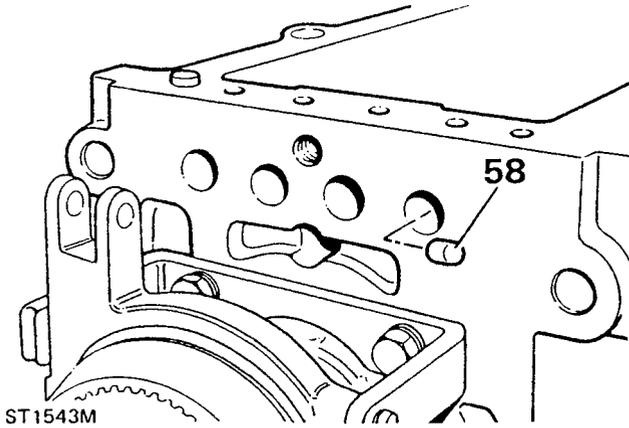
- 56. Locate 5th gear fork and bracket on to synchro hub and gearbox dowels.
- 57. Secure fork bracket to gearbox with two bolts, plain washers and spring washers.



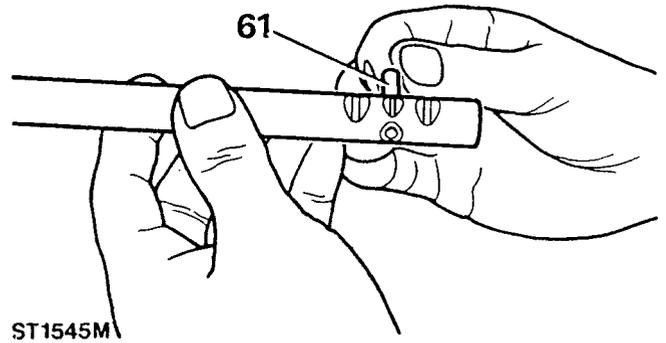
- 59. Fit 1st/2nd and 3rd/4th selector forks.



- 58. Fit selector rail interlock plungers into the cross-drilling in the gearbox case.



- 60. Fit reverse cross-over lever.
- 61. Insert interlock into 1st/2nd selector rail.



62. Push 1st/2nd selector rail through gearbox seating and locate in reverse cross-over lever and selector fork; do not tighten fork clamp bolt.

NOTE: 1st/2nd fork clamp bolt is not a set bolt.

63. Fit 1st/2nd selector jaw to rail and align for roll pin.

64. Using suitable drift, tap in roll pin to secure jaw and rail.

65. Repeat operation for 3rd/4th selector rail and jaw.

66. Push 5th gear selector rail through gearbox seating and locate in reverse cross-over lever.

67. Fit 5th gear selector jaw to rail, align for roll pin.

68. Locate selector rail into 5th gear selector fork and secure with clevis pin, washer, and split pin.

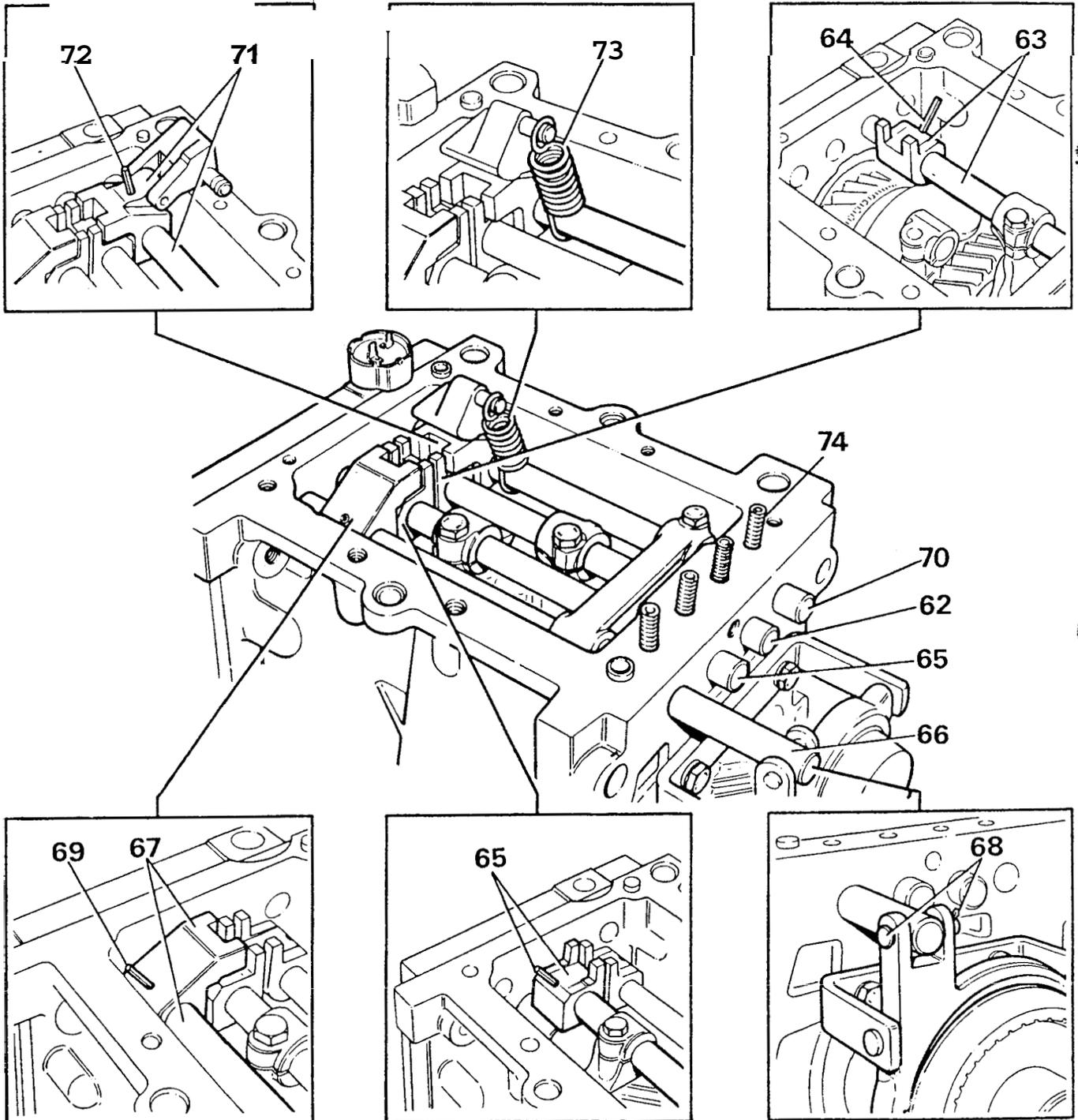
69. Fit roll pin and secure selector rail and jaw.

70. Push reverse selector rail through gearbox seating and locate in reverse cross-over. Do not lighten lever clamp bolt.

71. Fit jaw to rail and align for roll pin.

72. Using a suitable drift, fit roll pin to secure selector rail and jaw.

NOTE: The roll pin must be inserted sufficiently to be flush with the underside face of the selector jaw.

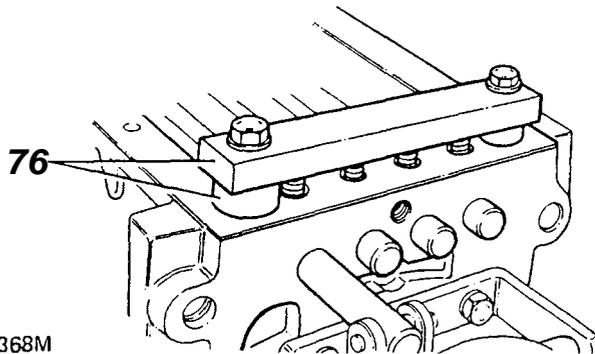


ST1367M

- 73. Fit reverse gate spring to selector rail and knock-over lever.
- 74. Fit detent balls and springs.

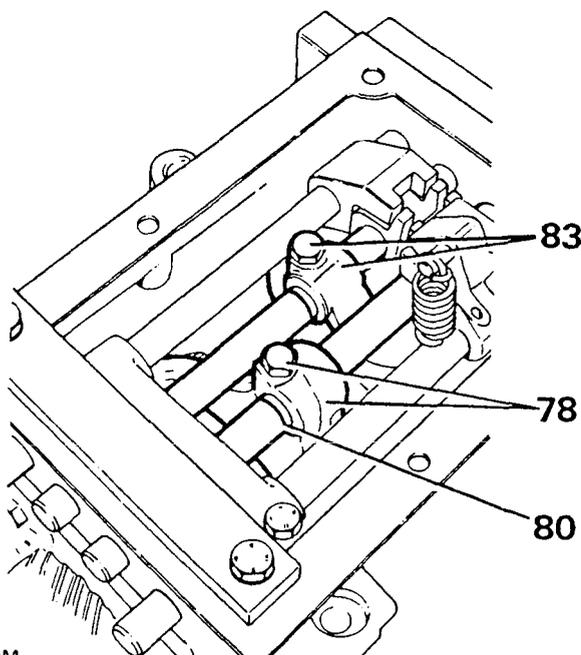
Selector fork adjustment

- 75. Fit top cover gasket.
- 76. Secure detent spring retaining tool and spacers to gearbox using two 8 x 50 mm bolts and plain washers.



ST1368M

- 77. Tighten bolts and compress detent springs until retaining plate contacts the two spacers.
- 78. Ensure that 1st/2nd selector rail and synchro sleeve arc in neutral position. Tighten clamp bolt sufficiently to eliminate any rock in the selector fork and move selector fork rearwards.
- 79. Scribe a pencil line on rail at rear of fork yoke.
- 80. Move fork forwards on rail and scribe line on rail at rear of fork yoke.
- 81. Scribe a line midway between the other lines on the selector shaft.
- 82. Move selector fork to centre line and tighten clamp bolt.
- 83. Repeat operation for 3rd/4th selector fork and rail.

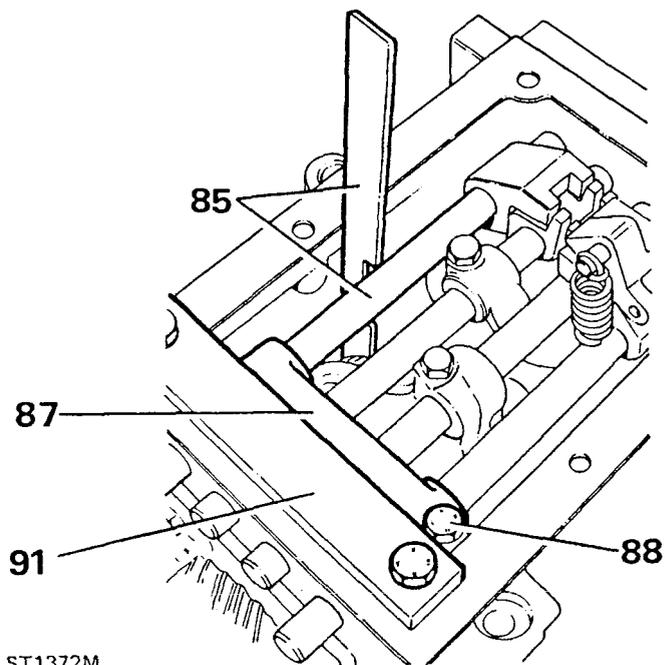


ST1370M

Reverse cross-over lever adjustment

The purpose of the following adjustment is to ensure that when 1st gear is selected the outer member of the 1st/2nd synchro member is not also engaged with the reverse idler.

- 84. Move reverse gear thrust washer fully forward.
- 85. Fit gauge (manufactured tool) to selector shaft.
- 86. Move rail rearwards and select reverse gear.
- 87. Move cross-over lever rearwards to lightly nip gauge between reverse gear and thrust washer.
- 88. Tighten reverse cross-over lever clamp bolt and return rail to neutral. Remove gauge.
- 89. Move 1st/2nd rail rearwards and select first gear. Ensure a minimum clearance of 1,0 mm has been obtained between reverse gear idler and reverse gear on 1st/2nd synchro sleeve. If there is not enough clearance, readjust the reverse cross-over lever.
- 90. Return 1st/2nd rail back to neutral.
- 91. Remove detent spring retaining tool and spacers.



ST1372M

Gearbox top cover

- 92. Fit top cover and locate over detent springs.
- 93. Position breather pipe, locate retaining clips and secure top cover and breather pipe clips with eight bolts and spring washers.
- 94. Fit breather pipe banjo union and fibre washers.
- 95. Fit reverse light switch.
- 96. Place clean rag in top cover to prevent entry of dirt etc.

Bell housing

- 97. Remove bolts and spacers securing front bearing plate to gearbox.
- 98. Fit new bell housing gasket.
- 99. Locate bell housing squarely on dowels and secure housing and front bearing plate to gearbox with six bolts and spring washers.

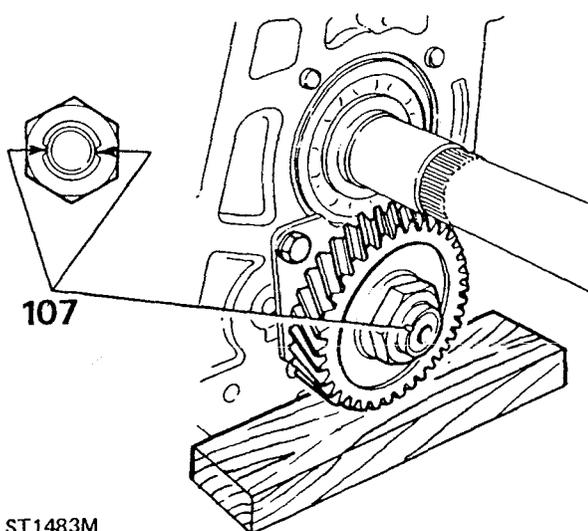
Lower gear lever/bias spring housing

- 100. Remove rag from gearbox top cover.
- 101. Lubricate gear lever ball and lower yoke.
- 102. Fit lower gear lever, nylon cup and grommet.
- 103. Fit new gasket to housing.
- 104. Grease bias springs.
- 105. Carefully fit shims and bias springs, followed by spring housing and secure with four set screws, and spring washers.
- 106. Remove gearbox assembly from vice and detach stand.

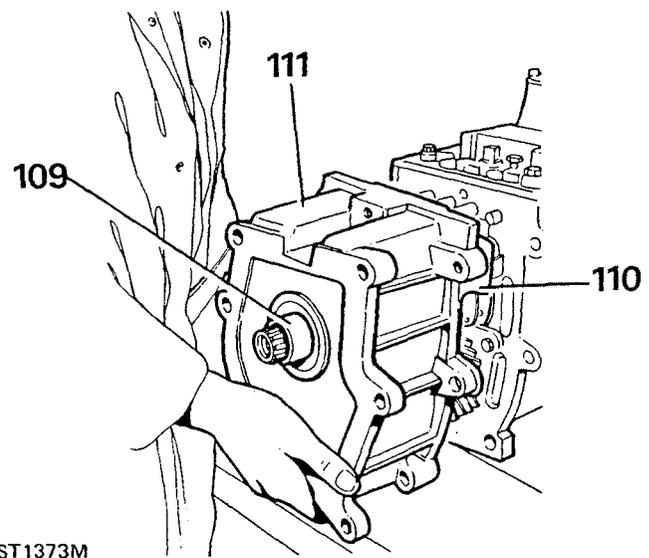
Gearbox extension housing

- 107. The special nut retaining the 5th gear to the layshaft must be secured in position, by carefully forming the collar of the nut into the layshaft slots, as illustrated.

CAUTION: A round nose tool must be used for this operation to avoid splitting the collar of the nut. Also, the 5th laygear should be supported by a wooden block when the nut is being deformed, to prevent damage to the bearings adjacent to the gear.

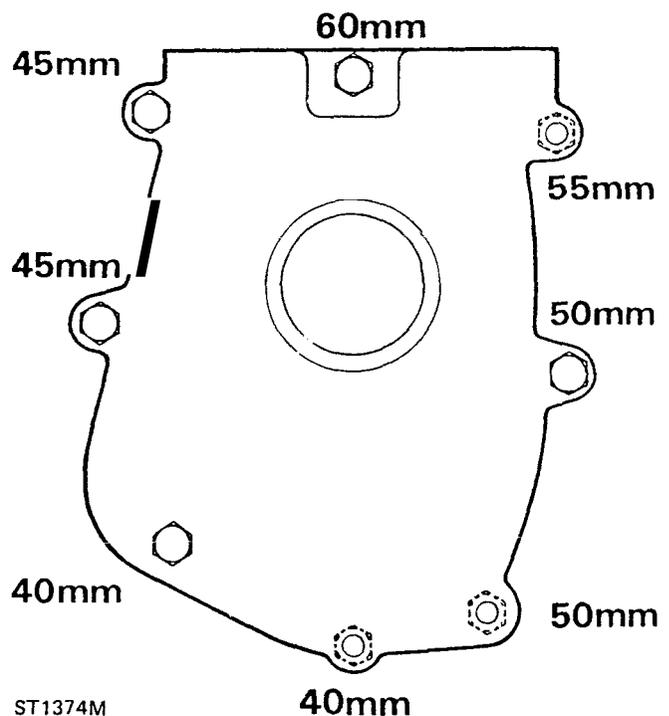


- 108. Support underside of gearbox with wooden block.
- 109. Lubricate oil seal protection sleeve Tool No. LST 102 and fit to oil seal from inside extension housing.
- 110. Fit new gasket to extension housing.
- 111. Carefully manoeuvre extension housing over mainshaft and position squarely on dowels.



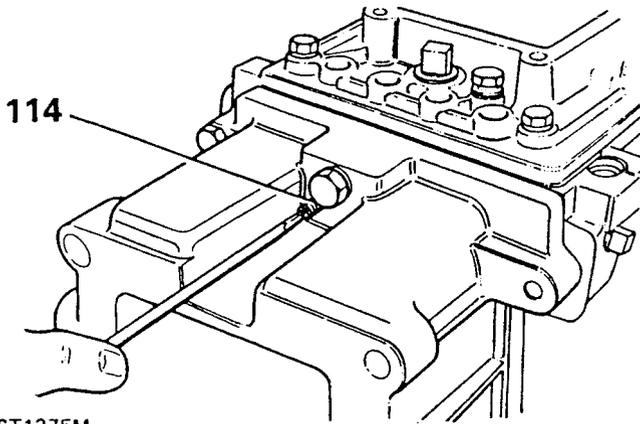
- 112. Remove oil seal protection sleeve.
- 113. Secure extension housing to gearbox with eight bolts, spring washers and single nut.

NOTE: Illustration shows correct bolt lengths and their locations in extension housing.



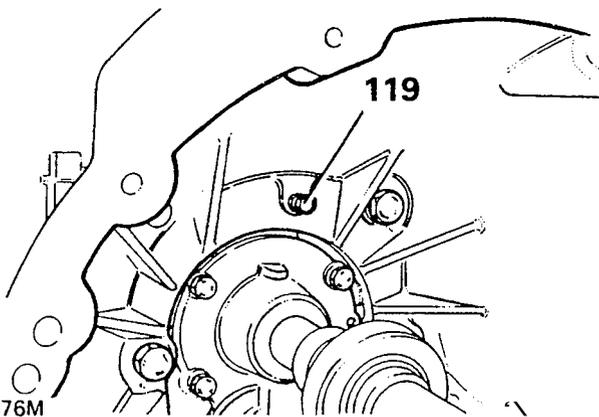
3rd/4th gear selector rail adjustment

114. Slacken 3rd/4th stop screw in extension housing.



ST1375M

- 115. Select 3rd gear.
- 116. Tighten stop screw until it makes contact with 3rd/4th selector rail.
- 117. Turn back stop screw one turn. Retighten locknut.
- 118. Return gear lever to neutral.
- 119. Slacken locknut on 3rd/4th stop bolt inside bell housing.

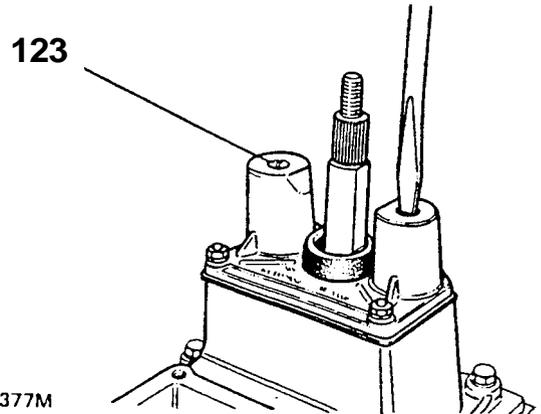


ST1376M

- 120. Unscrew stop bolt.
- 121. Select 4th gear and screw in stop bolt until contact is made with 3rd/4th selector shaft.
- 122. Turn back stop bolt one turn and retighten locknut.
Return gear lever to neutral.

Bias spring adjustment

123. Apply Loctite Stud and Bearing Fit (270) to bias springs screws and tighten up until screw heads are flush with top face of bias spring housing.



ST1377M

Gearbox mounting

124. Refit mounting to extension housing and secure with four bolts.