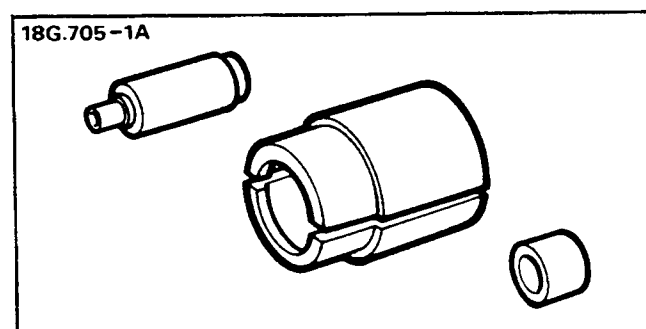
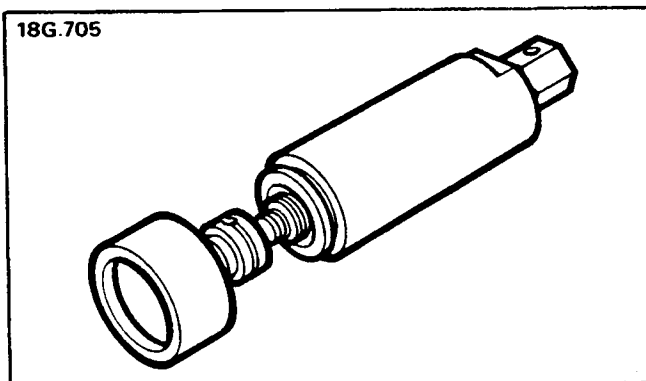
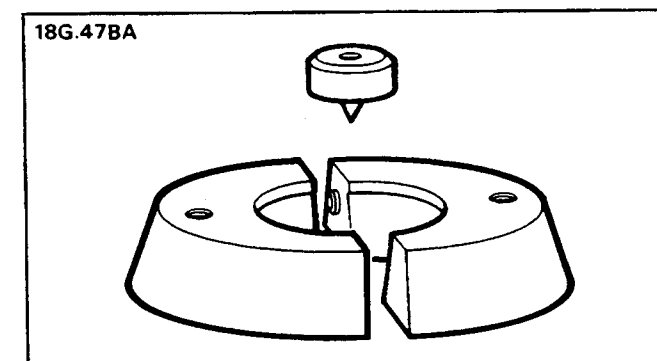
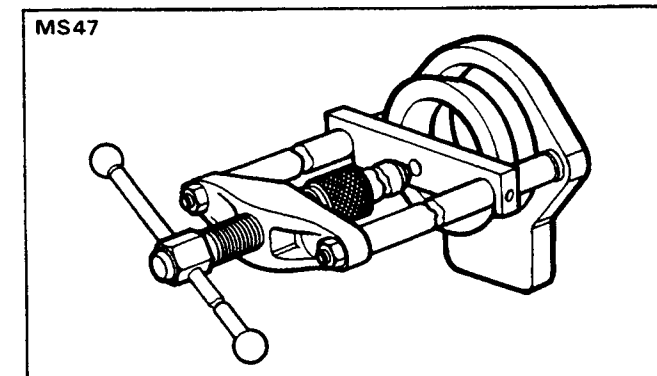
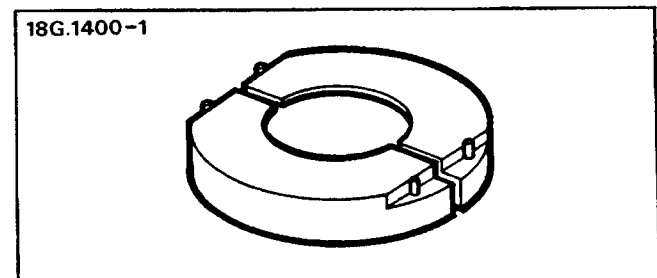
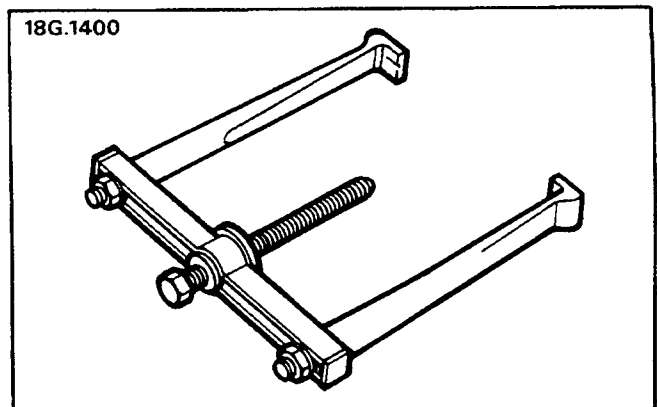
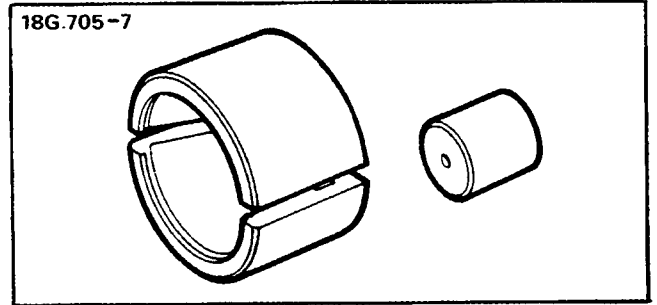


DISMANTLE, OVERHAUL AND ASSEMBLE.

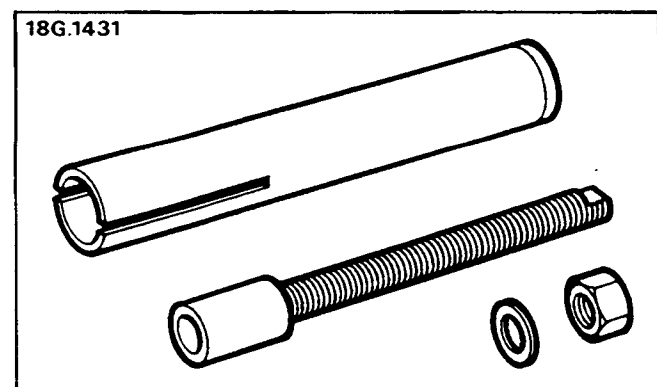
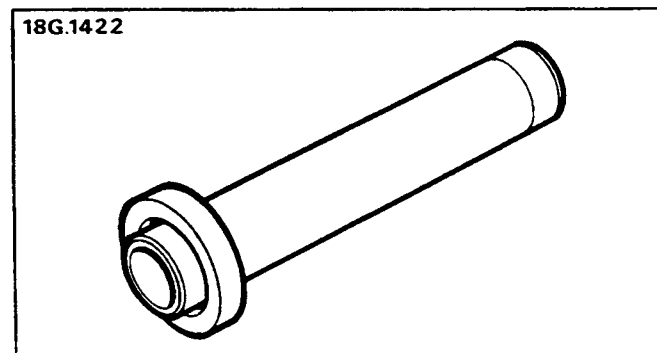
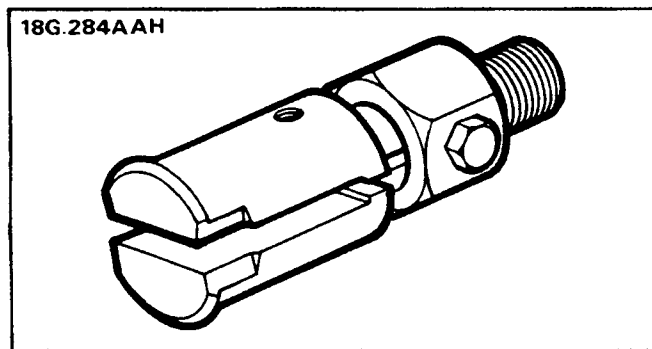
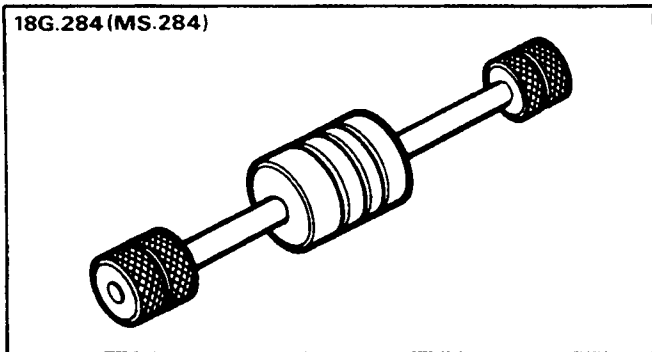
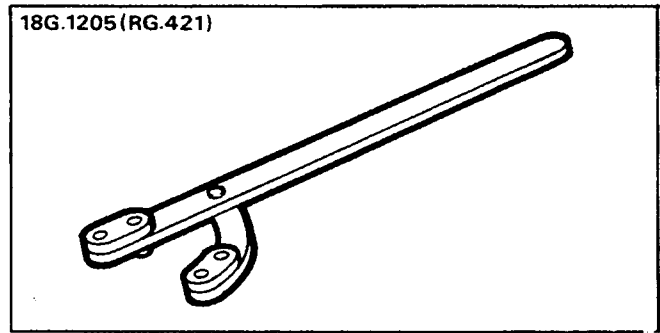
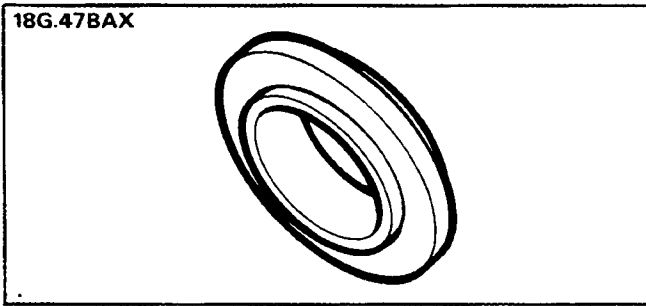
Service tools.

18G 705	Puller, bearing remover.
18G 705-1A	Adaptor for mainshaft oil seal track and layshaft fifth gear.
18G 705-7	Adaptor for layshaft bearings.
18G 1400	Remover synchromesh hub and gear cluster.
18G 1400-1	Adaptor mainshaft fifth gear.
MS 47	Hand press.
18G 47-BA	Adaptor input shaft bearing.
18G 47-BAX	Conversion kit.
18G 284	Impulse extractor.
18G 284-AAH	Adaptor for input shaft pilot bearing track.
18G 1422	Mainshaft rear oil seal replacer.
18G 1431	Mainshaft fifth gear and oil seal collar replacer.
18G 1205	Flange holder.

NOTE: Where the use of special tools is specified, only these tools should be used to avoid the possibility of personal injury and or damage to components.



ST2317M

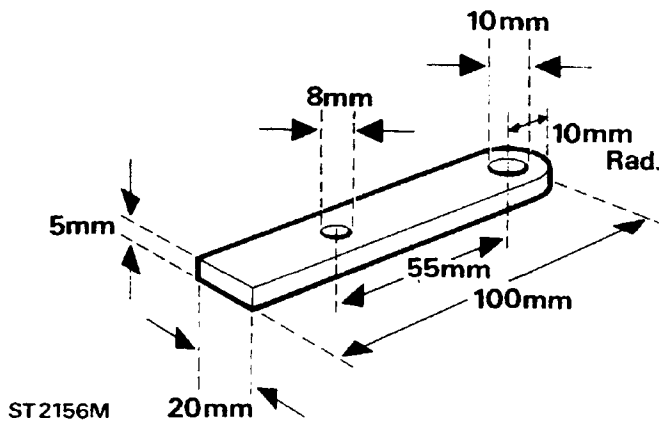


ST2318M

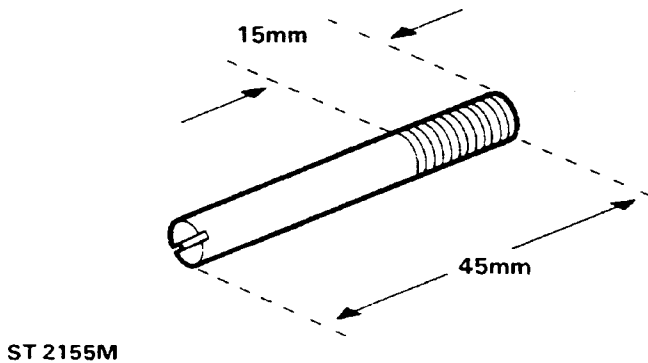
Locally manufactured tools.

In addition to the special service tools, the following tools can be locally made to assist the dismantling and assembly of the gearbox. The following overhaul procedure is based upon the assumption that these tools are available.

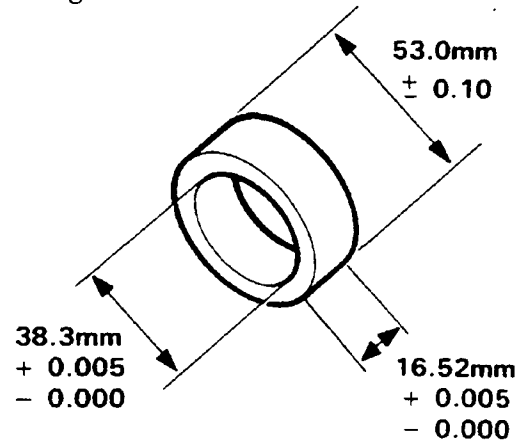
Tool "A". Dual purpose tool. Reverse shaft retainer to prevent the shaft falling out when the gearbox is inverted. Also, a layshaft fifth gear retainer to hold the fifth gear whilst releasing or tightening the retaining stake nut. Use 5mm mild steel to manufacture the tool. When using the tool for the layshaft nut, a suitable spacer is required 20mm diameter 23mm long, with an 8mm diameter clearance hole.



Tool "B" Four pilot studs with an 8mm thread for locating in the four counter sunk blind holes in the workstand.

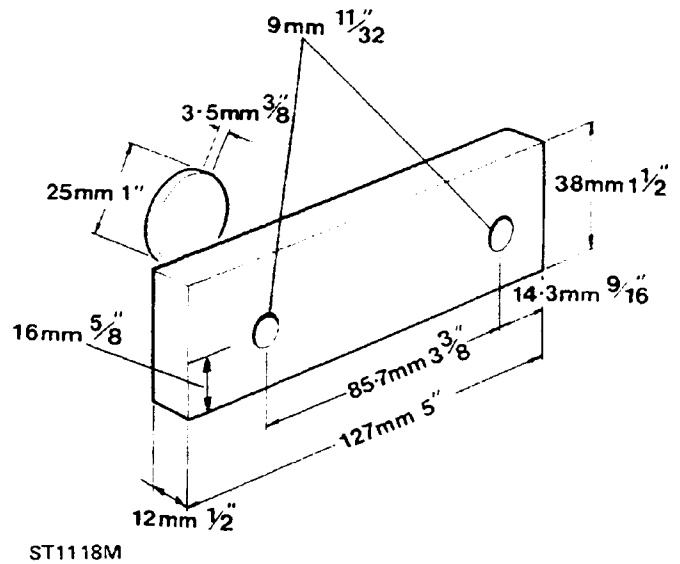


Tool "C" Mild steel dummy centre bearing for the selection of first gear bush.

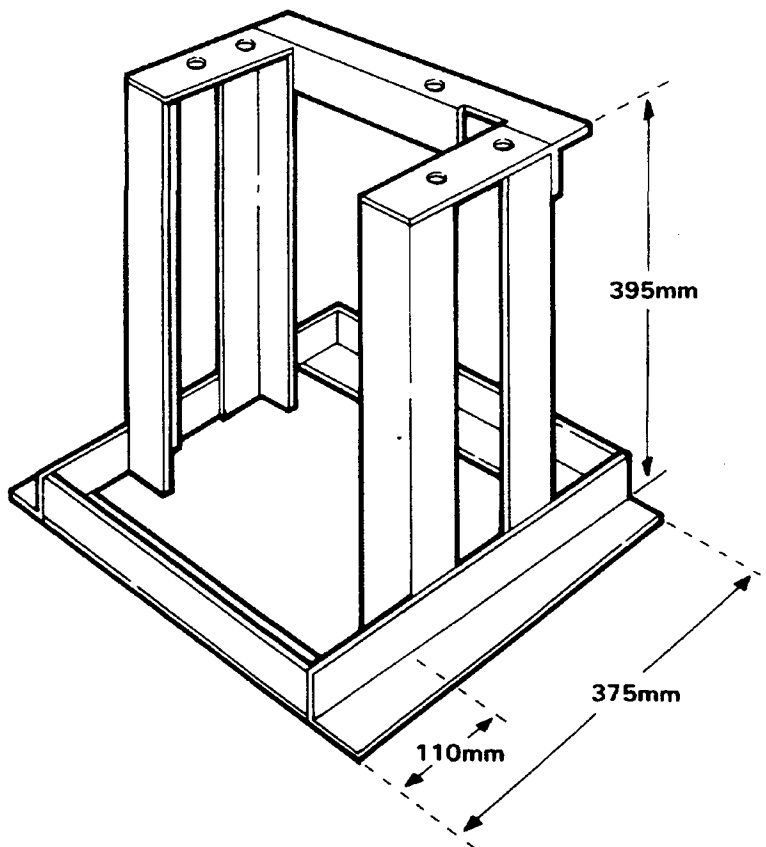
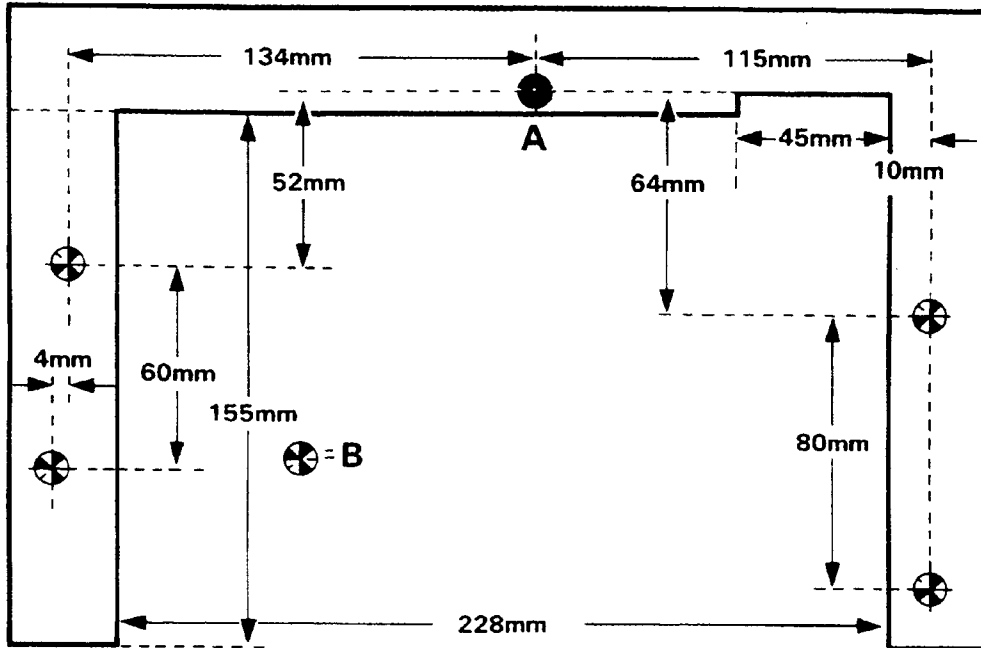


ST2154M

Tool "D" Layshaft support plate is fitted with two 8 x 25 mm bolts and washers to the front of the gearbox case. It also support the input shaft bearing outer track.



Tool "E" Workstand for securely locating the gearbox during overhaul. Manufacture from 30 mm x 30 mm angle iron. The single hole marked "A" should be drilled through the material with a 10mm drill. The four counter sunk blind holes marked "B" should also be made with a 10mm drill, but must not be drilled through the material.



ST 2153M

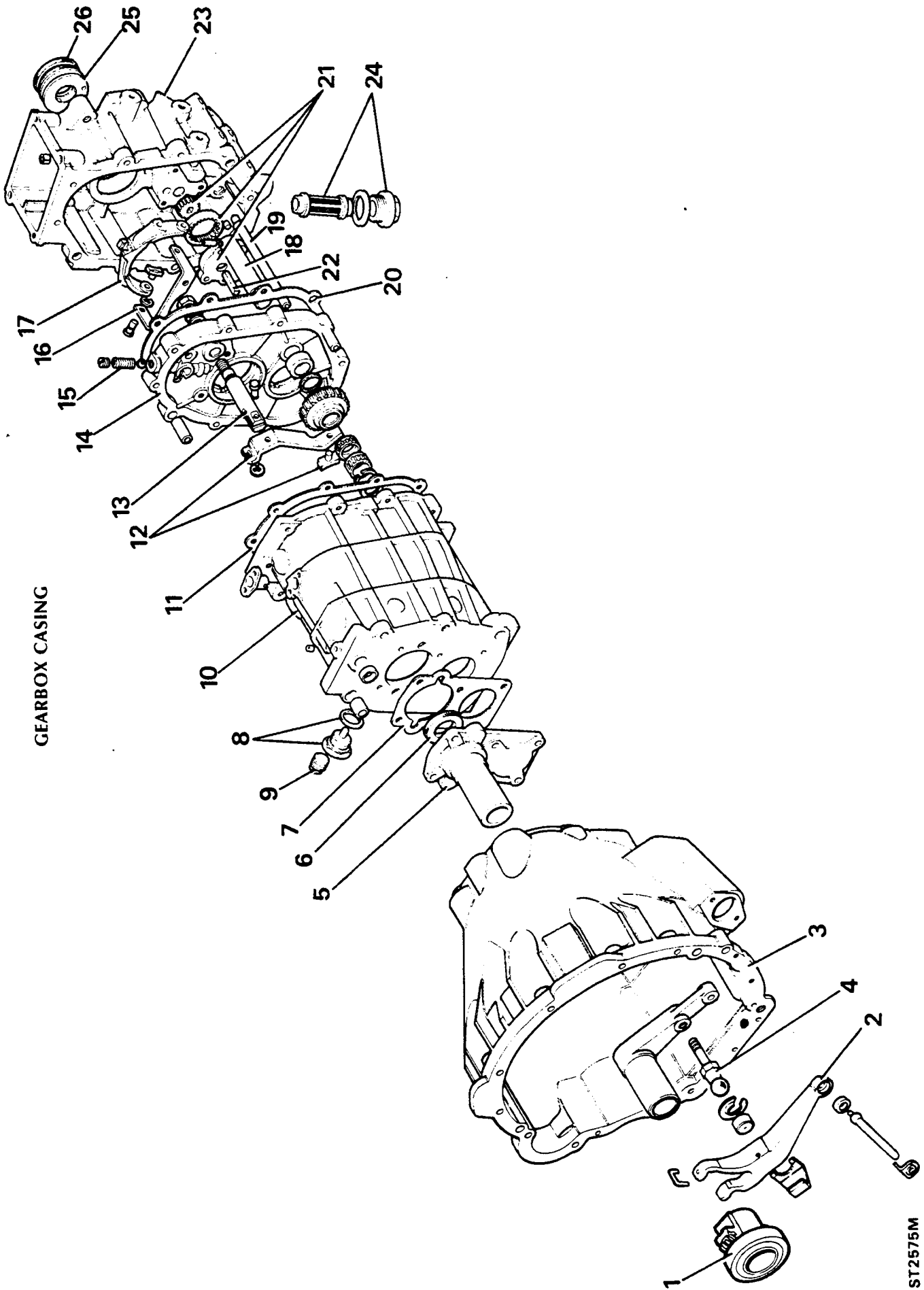
DATA

Reverse lever and slipper pad clearance	0,725 mm (0.35 in)
Reverse gear plunger operating load	45 to 55 kg (100 to 120 lb)
Synchromesh assemblies push through load	8,2 to 10 kgf (18 to 22 lb.ft)
Clearance between baulk rings and gears	0,38 mm (0.015 in)
Fifth gear end float	0,020 mm (0.008 in)
Third gear end float	0,020 mm (0.008 in)
Second gear end float	0,020 mm (0.008 in)
First gear bush end float	0.7 mm (0.003 in)
First gear end float	0,20 mm (0.008 in)
Fifth gear synchromesh end float	0,005 to 0,055 mm (0.0002 to 0.002 in)
Reverse gear plunger clearance	0,6 to 0,85 mm (0.024 to 0.034 in)

TORQUE FIGURES

	Nm	lb.ft
Bottom cover to clutch housing	7 - 10	5 - 7
Oil pump body to extension case	7 - 10	5 - 7
Clip to clutch release lever	7 - 10	5 - 7
Attachment plate to gearcase	7 - 10	5 - 7
Extension case to gearcase	22 - 28	16 - 21
Pivot - clutch lever to bell housing	22 - 28	16 - 21
Guide clutch release sleeve	22 - 28	16 - 21
Slave cylinder to clutch housing	22 - 28	16 - 21
Front cover to gearcase	22 - 28	16 - 21
5th support bracket	22 - 28	16 - 21
Clutch housing to gearbox	65 - 80	48 - 59
Oil drain plug	47 - 54	35 - 40
Oil filter plug	65 - 80	48 - 59
Breather	14 - 16	10 - 12
Oil level plug	25 - 35	19 - 26
Upper gear lever to lower gear lever	22 - 28	16 - 21
Upper gear lever to lower gear lever - pinch bolt	22 - 28	16 - 21
5th layshift gear retaining nut	204 - 231	150 - 170
Attachment plate to gear change housing	7 - 10	5 - 7
Gear change housing to extension case	22 - 28	16 - 21
Plunger housing to gear change housing	22 - 28	16 - 21
Adjustment plate to gear change housing	22 - 28	16 - 21
Cover to gear change housing	7 - 10	5 - 7
Bell housing to cylinder block bolts	36 - 45	27 - 33
Yoke to selector shaft	22 - 28	16 - 21

GEARBOX CASING



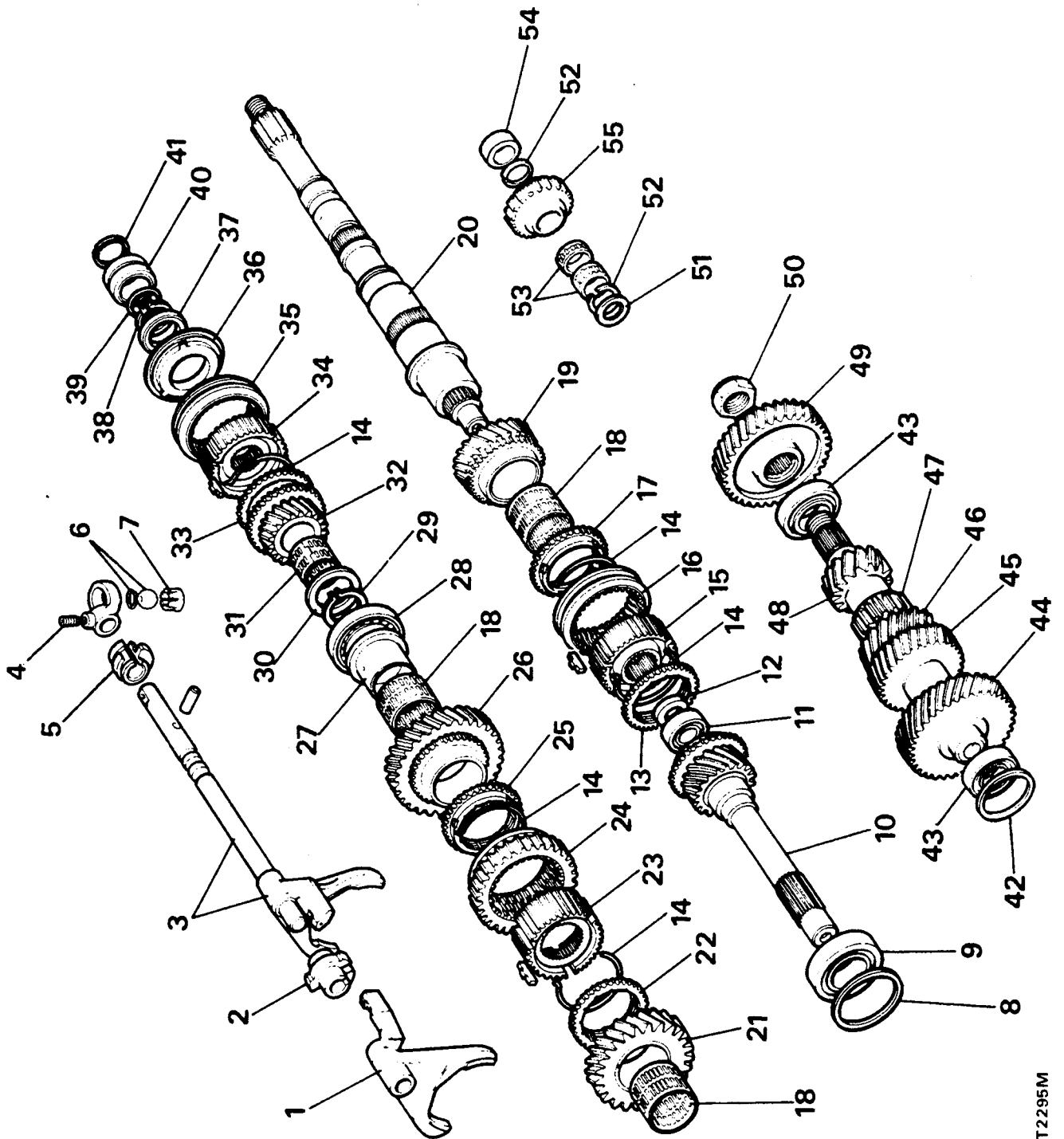
ST2575M

GEARBOX CASINGS

1. Clutch release bearing
2. Clutch release lever
3. Bell housing
4. Clutch release lever pivot post
5. Front cover
6. Front cover oil seal
7. Front cover gasket
8. Oil drain plug and washer
9. Oil level plug
10. Gearbox main casing
11. Gasket
12. Reverse lever and slipper
13. Reverse lever pivot post
14. Centre plate
15. Selector plug and detent ball
16. Fifth gear selector bracket
17. Fifth gear selector fork
18. Reverse gear shaft
19. Oil pick up pipe
20. Gasket
21. Oil pump gears and cover
22. Oil pump drive shaft
23. Fifth gear extension housing
24. Fifth gear extension housing drain plug and filter
25. Ferrobestos bush
26. Oil seal

NOTE: Items 1, 2, 3 and 4 above are V8 engine only.

GEARS AND SHAFTS



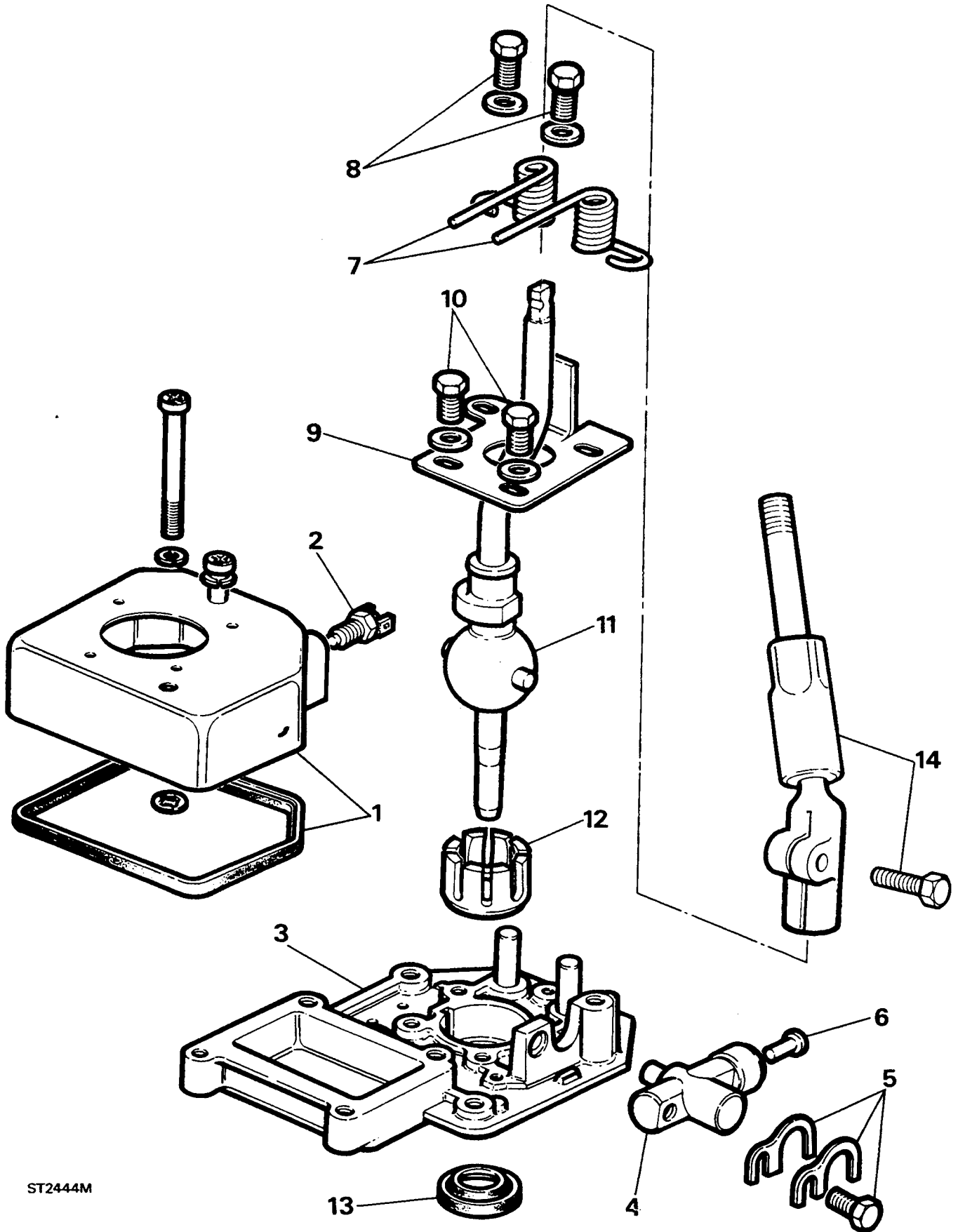
ST2295M

GEARS AND SHAFTS

1. Third-fourth selector fork
2. Interlock spool
3. First-second fork and selector rail assembly
4. selector yoke
5. Fifth gear spool
6. Ball and retaining ring
7. Nylon seating
8. Selective shim
9. Taper bearing
10. Input shaft
11. Spigot bearing
12. Thrust washer
13. Baulk ring fourth gear
14. retaining spring clips
15. Third-fourth synchromesh inner member
16. Third-fourth synchromesh outer member
17. Baulk ring third gear
18. Needle roller bearing
19. Third gear
20. Mainshaft
21. Second gear
22. Second gear baulk ring
23. First-second synchromesh inner member
24. First-second synchromesh outer member
25. Baulk ring first gear
26. First gear
27. First gear bush
28. Taper centre bearing
29. Retaining circlip
30. Thrust washer
31. Split roller bearing
32. Fifth gear mainshaft
33. Fifth gear baulk ring
34. Fifth gear synchromesh inner member
35. Fifth gear synchromesh outer member
36. Retainer plate
37. Selective washer
38. Circlip
39. "O" ring
40. Retaining collar
41. Snap ring
42. Selective shim
43. Taper bearings
44. Layshaft cluster input gear
45. Layshaft third gear
46. Layshaft second gear
47. Layshaft reverse gear
48. Layshaft first gear
49. Layshaft fifth gear
50. Layshaft fifth gear stake nut
51. Thrust washer
52. Snap rings
53. Needle roller bearings
54. Spacer
55. Reverse idler gear

NOTE: for reverse gear shaft see "gearbox casings" item 18.

GEAR CHANGE HOUSING ASSEMBLY



ST2444M

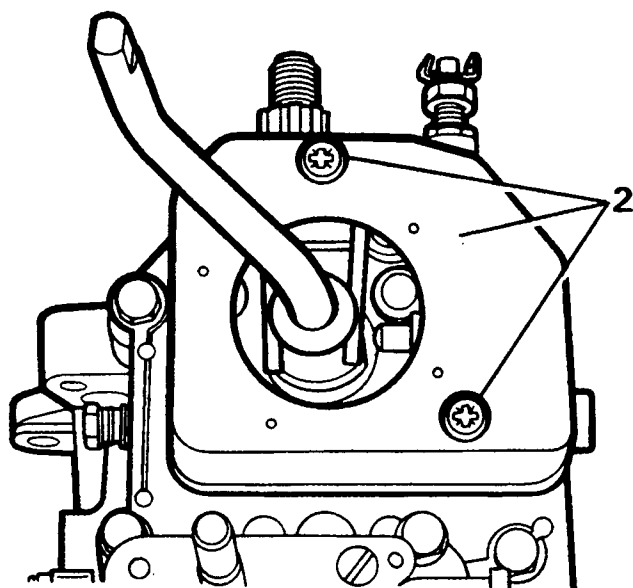
KEY TO GEAR CHANGE HOUSING ASSEMBLY

1. Gear change housing cover and gasket
2. Reverse lamp switch
3. Gear change housing
4. Reverse gear plunger
5. Reverse gear plunger shims and bolt
6. Reverse lamp plunger
7. Bias springs
8. Bias spring retaining bolts
9. Bias adjustment plate
10. Bias adjustment plate bolts
11. Lower gear lever
12. Railko bush
13. Lower gear lever housing oil seal
14. Upper gear lever pinch bolt

DISMANTLE

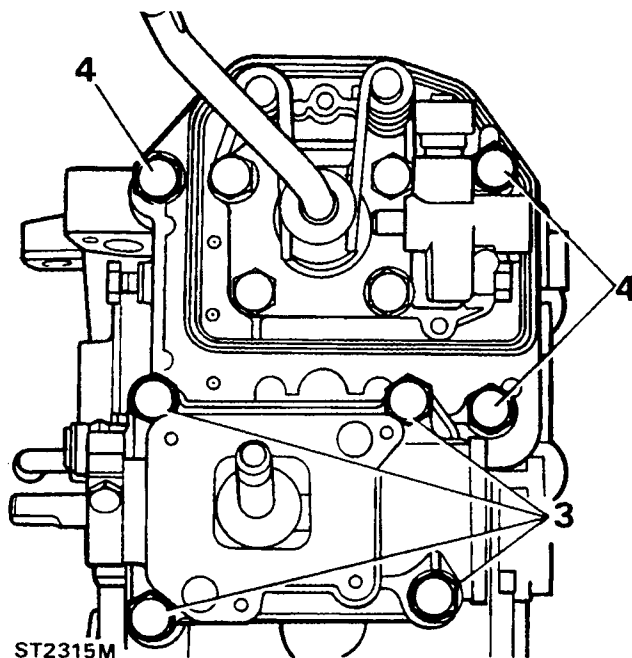
Gear change housings.

1. Separate the transfer gearbox from the main gearbox if this has not already been done. Check that the oil has been drained and clean the exterior of the gearbox. Install the gearbox on a bench and ensure that it is safely supported.
2. Remove the two cross headed screws and lift-off the gear change housing cover to gain access to the housing retaining bolts.



ST2314M

3. If the transfer gear change housing has not already been removed, withdraw the four bolts and remove the assembly.
4. To remove the gear change housing, release the remaining three bolts and lift the housing from the fifth gear extension casing.



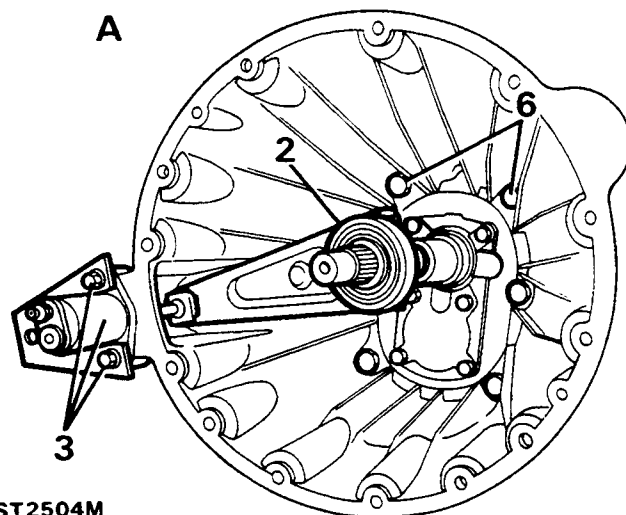
ST2315M

Bell housing assembly.

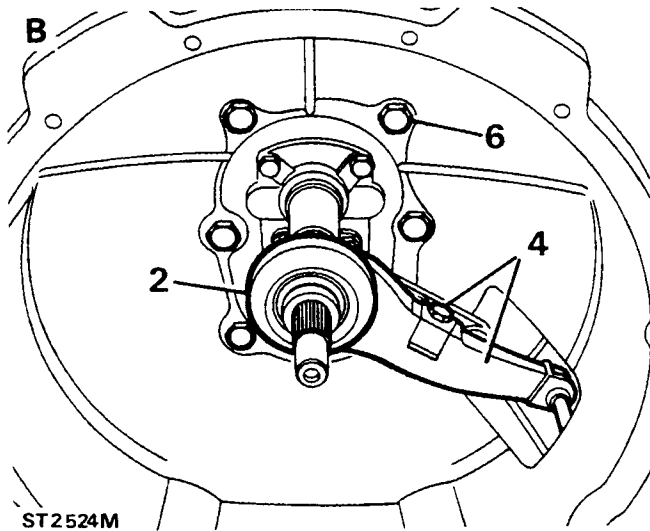
1. Remove the clutch release bearing plastic retaining staple, if still in position. The staple is only used on assembly to hold the bearing in position while fitting the gearbox to the engine. It may fall out or become dislodged during service without detriment.
2. Withdraw the clutch release bearing.
3. Release the two bolts and withdraw the slave cylinder if required for overhaul.
4. Remove the the screw and spring clip from the release lever and remove the lever. (V8 engine only.)

Illustration A - Diesel engine.

Illustration B - V8 engine.



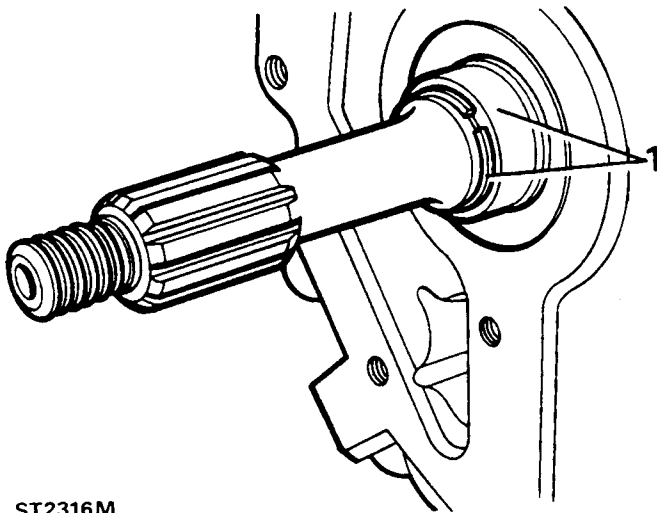
ST2504M



5. Remove the "C" clip from the pivot post.
6. Remove the six bolts securing the bell housing to the gearbox and carefully ease the bell housing off the two dowel tubes and the steady bracket off the input shaft.
7. Remove the dowel tubes and secure the gearbox with one nut and bolt to the manufactured workstand tool "E", with the fifth gear extension housing uppermost.

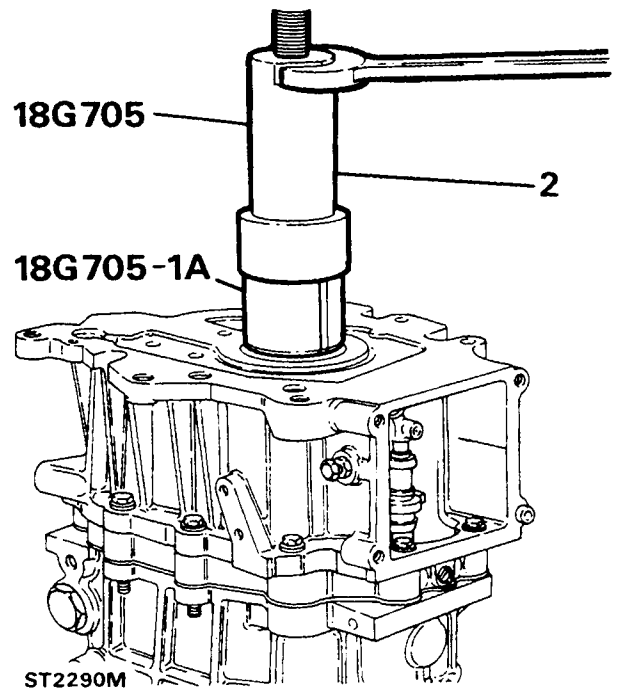
Extension housing.

1. Remove the snap ring retaining the mainshaft oil seal collar located at the rear of the gearbox.

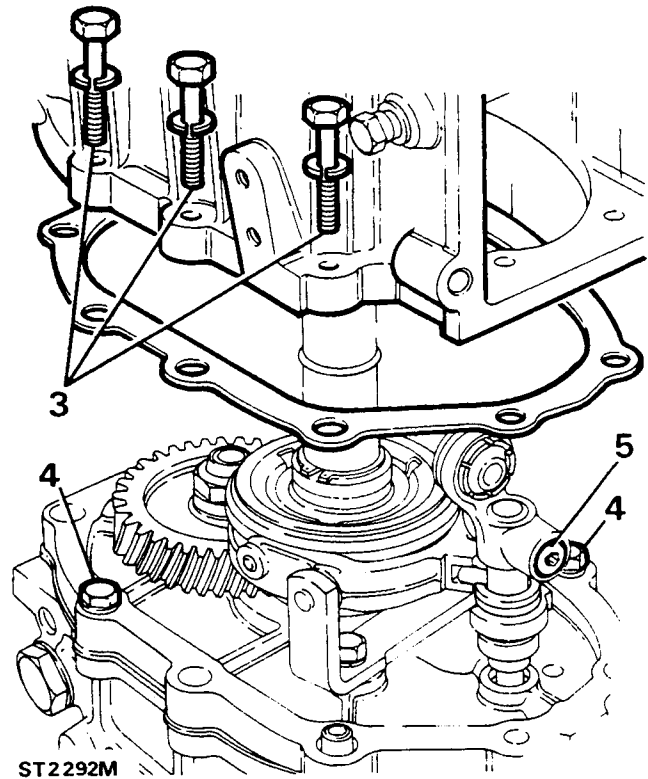


ST2316M

2. Using service tools 18G 705 and 18G 705-1A withdraw the oil seal collar.



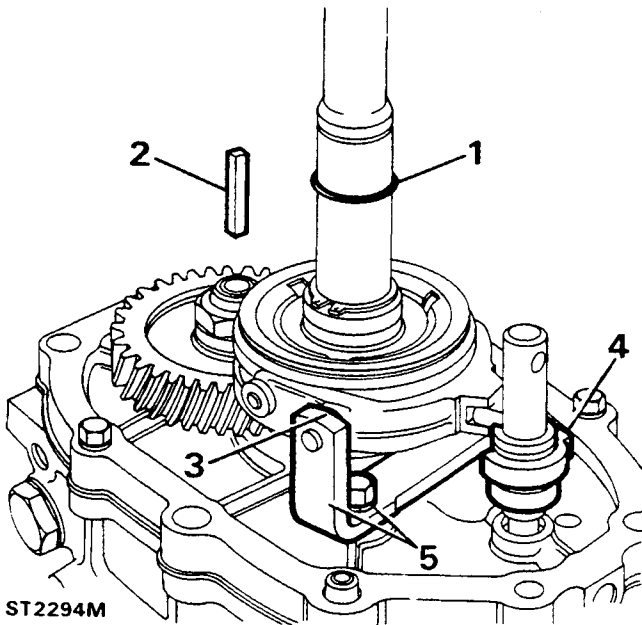
3. Remove the ten bolts and spring washers securing the fifth gear extension housing to the gear case whilst ensuring that the centre plate does not separate from the gear case.
4. Temporarily fit two 8 x 35 mm bolts to retain the centre plate to the gear case.
5. Slacken the socket headed screw and remove the selector yoke from the selector shaft.



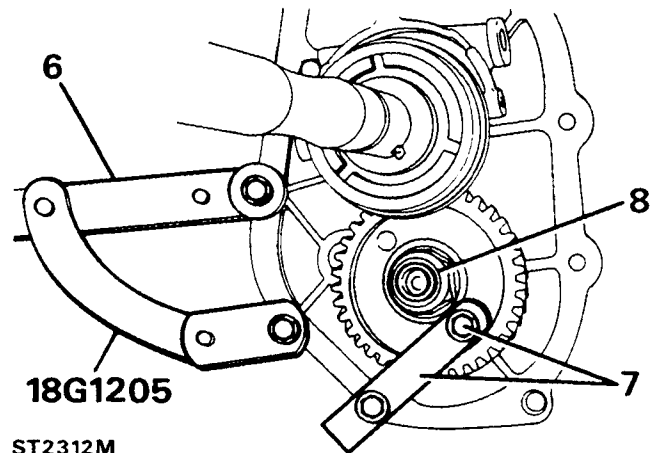
ST2292M

Fifth gear.

1. Remove and discard the the oil seal collar "O" ring from the mainshaft.
2. Withdraw the oil pump drive shaft if it was not removed with the extension housing.
3. Remove the two "E" clips from the fifth gear selector fork pivot pins which retain the selector fork to the bracket. Remove the pins, fork and pads.
4. Slide the fifth gear selector spool from the selector shaft.
5. Remove the two bolts to release the selector fork bracket from the centre plate.

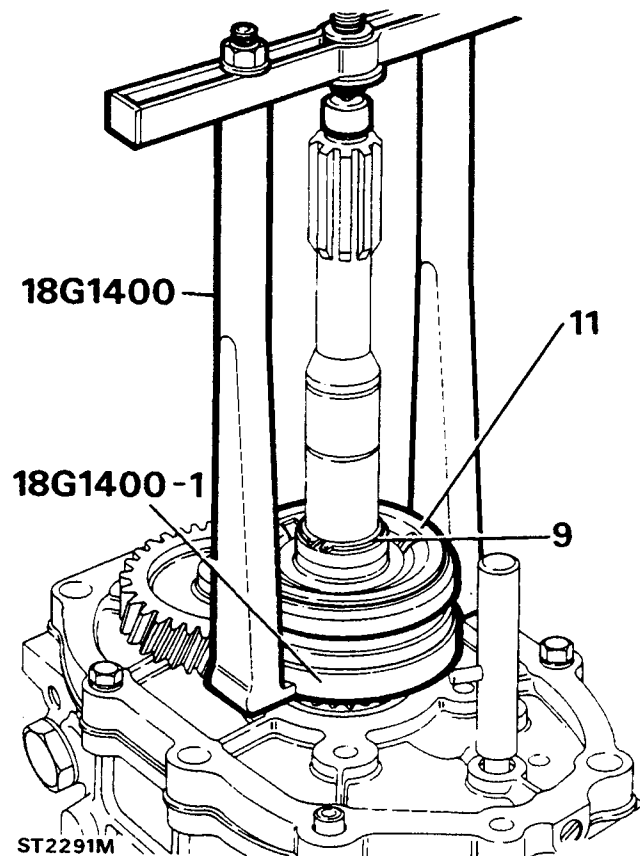


6. Locate the flange holder Tool 18G 1205 in holes on the left hand side of the gear case.
7. To restrain the fifth gear, bolt the manufactured tool "A" and the spacer to the gear case, and insert a suitable length of bar, or a 10 mm bolt through the pierced hole in the gear.
8. De-stake and remove the layshaft fifth gear nut.



ST2312M

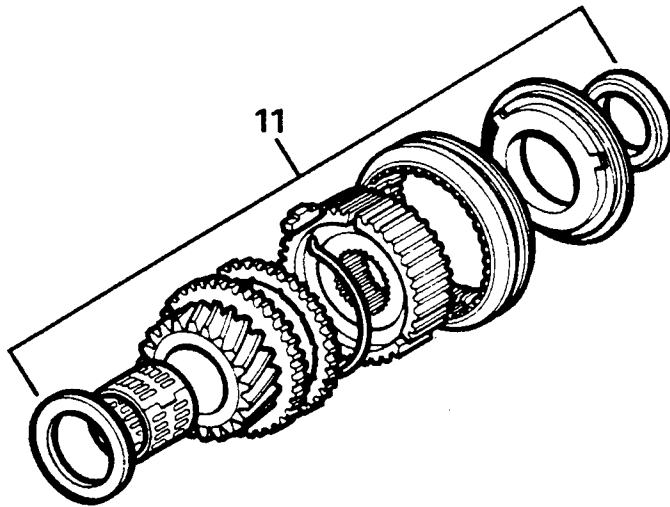
9. Remove the circlip retaining the fifth gear synchromesh assembly to the mainshaft.
10. Assemble special tools 18G 1400-1 and 18G 1400 as illustrated ensuring that the feet of the puller locate in the two cut-outs in 18G 1400-1. The feet must also fit between the pins to prevent the puller slipping.



ST2291M

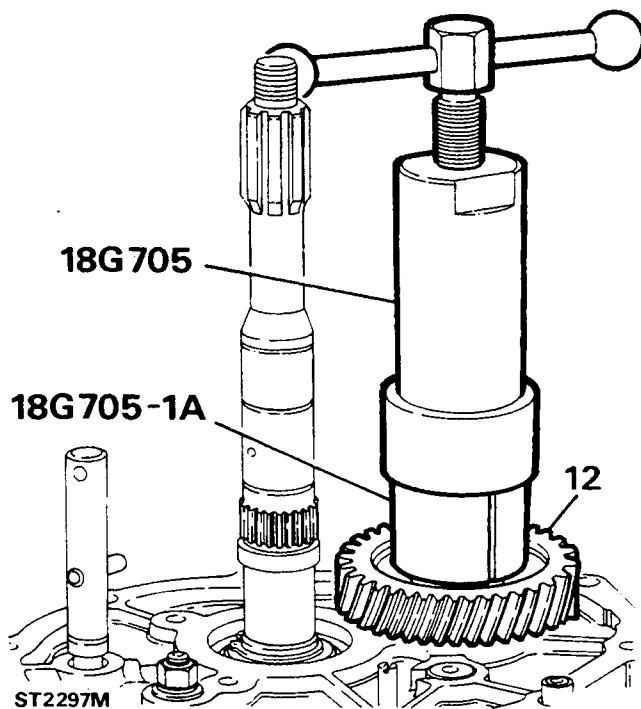
NOTE: On later type gearboxes with the wider fifth gear, the collets 18G1400-1 cannot be used. The gear is removed using 18G1400 only.

11. Withdraw the selective washer, synchromesh hub and baulk ring, fifth gear, spacer and split needle roller bearing from the mainshaft.



ST2296M

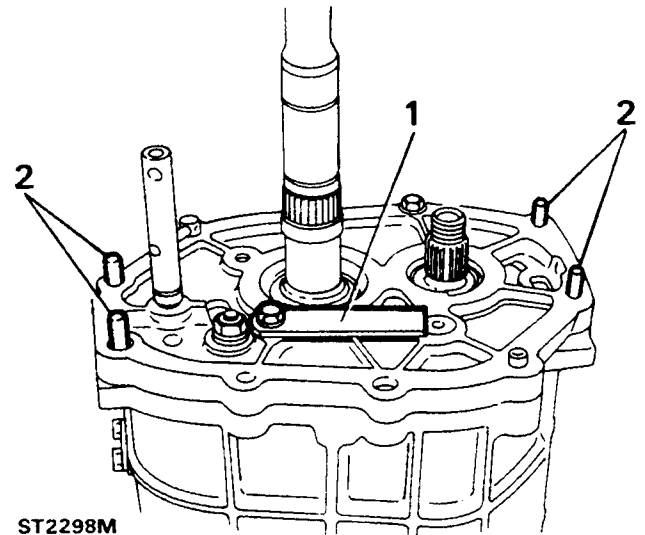
12. To finally remove the layshaft fifth gear, use special tools 18G 705 and 18G 705-1A and withdraw the gear.



ST2297M

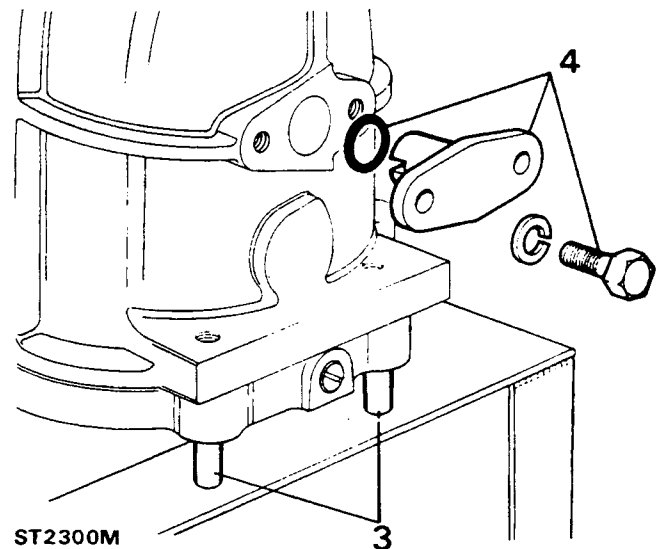
Main gear case.

1. To prevent the reverse shaft falling out, secure the reverse shaft retainer, manufactured tool "A" to the centre plate with one of the fifth gear selector fork bracket bolts.
2. Fit the four guide studs, manufactured tool "B", to the main gear case.



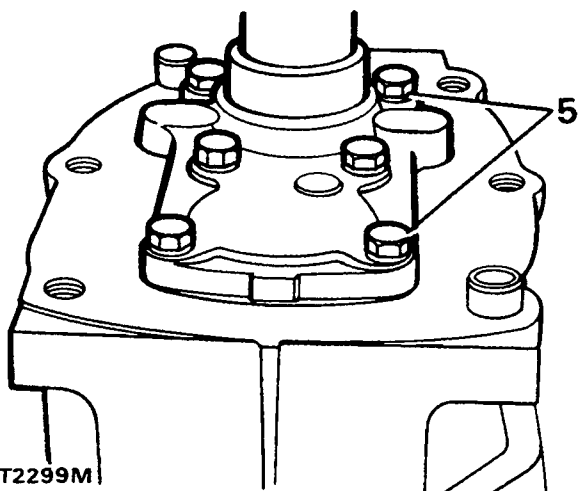
ST2298M

3. Release the gear case from the workstand, invert the gearbox and locate the guide studs in the holes in the workstand.
4. Remove the two bolts and withdraw the selector shaft front spool retainer together with the "O" ring.



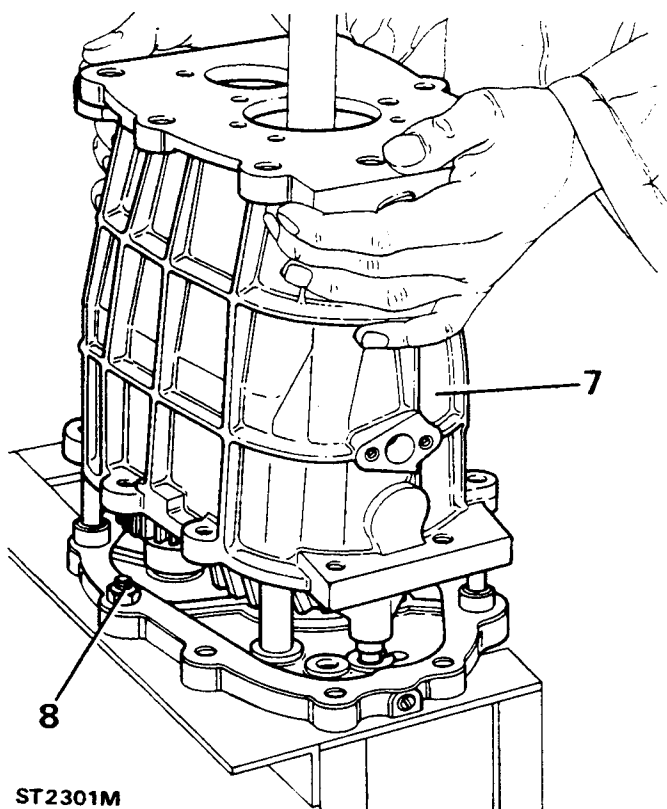
ST2300M

5. Remove the six bolts and lift-off the front cover and gasket.
6. Retrieve the input and layshaft selective washers from the gear case, beneath the front cover.



ST2299M

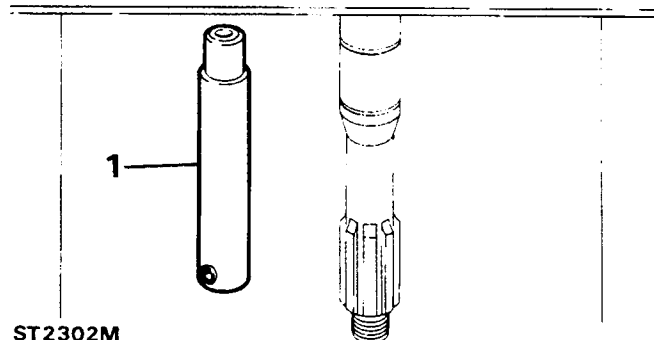
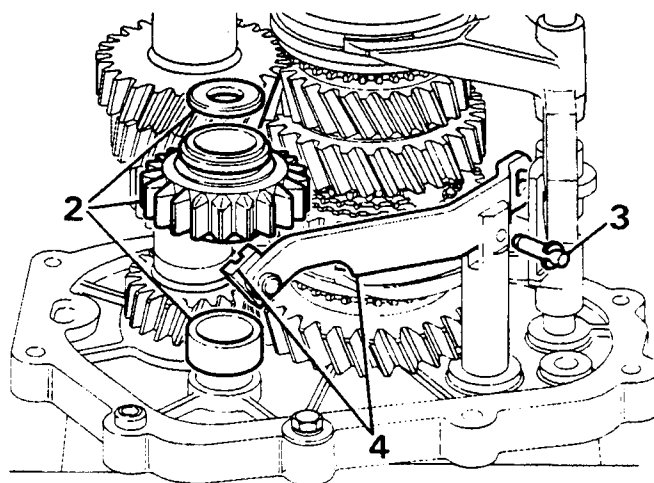
7. Remove the bolts securing the gear case to the centre plate and with care lift the gear case leaving the centre plate and gear assemblies in position. If necessary, tap the gear case with a hide mallet to separate it from the centre plate. Remove and discard the gasket.
8. Now secure the centre plate to the workstand with a nut and bolt.



ST2301M

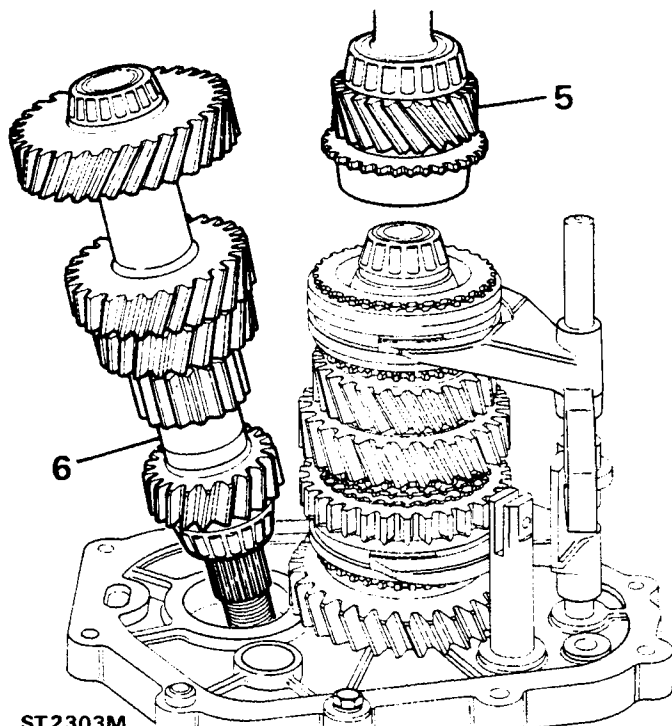
Reverse shaft, layshaft and mainshaft.

1. Remove the reverse shaft retainer (tool "A") and push the shaft downwards and withdraw it from below the centre plate.
2. Lift-off the thrust washer, reverse gear and spacer from the centre plate.
3. Without removing the "E" clip, remove the reverse gear lever.
4. Remove the reverse lever and slipper pad.



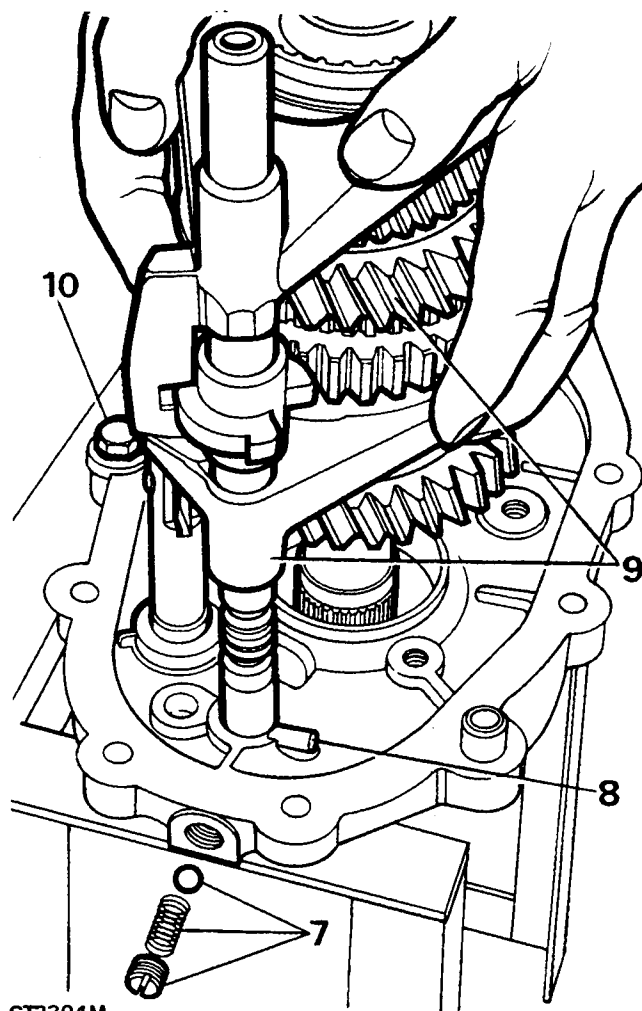
ST2302M

5. Lift-off the input shaft and fourth gear baulk ring.
6. Remove the layshaft cluster by tilting it away from the mainshaft while, at the same time, lifting the mainshaft enough to clear the layshaft bearing.



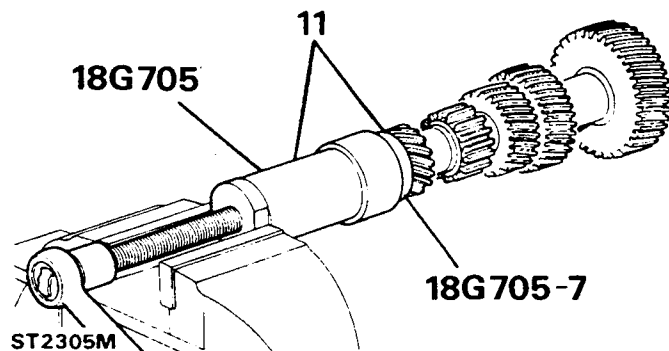
ST2303M

7. Unscrew the selector plug from the centre plate and remove the spring and detent ball.
8. Rotate the fifth gear selector shaft anti-clockwise to align the fifth gear selector pin with the slot in the centre plate.
9. Grasp the mainshaft gears and selector forks with both hands and lift the assembly from the centre plate.
10. Remove the selector fork assembly from the mainshaft gear cluster and release the centre plate from the workstand.



ST2304M

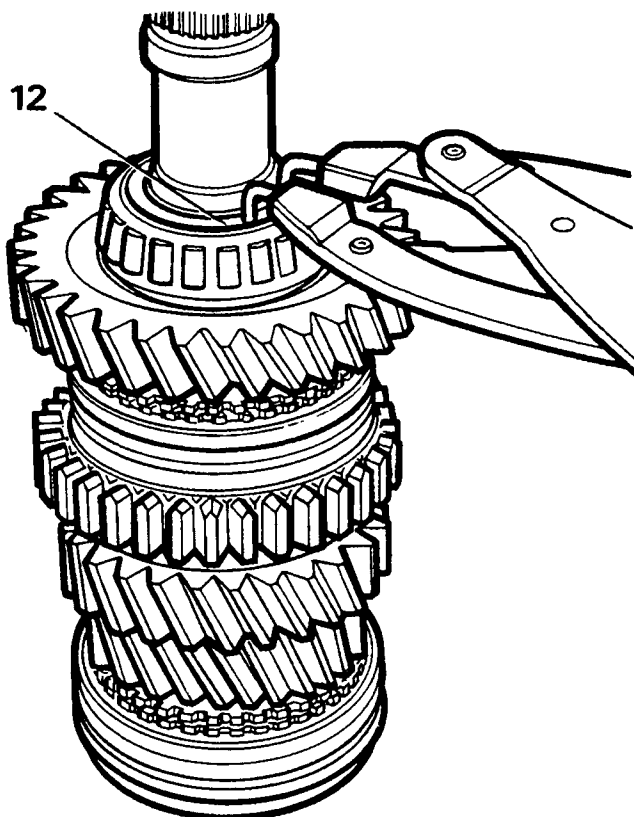
11. Secure the main extractor tool 18G 705 in a vice and using collets 18 705-7, withdraw the layshaft bearings.



ST2305M

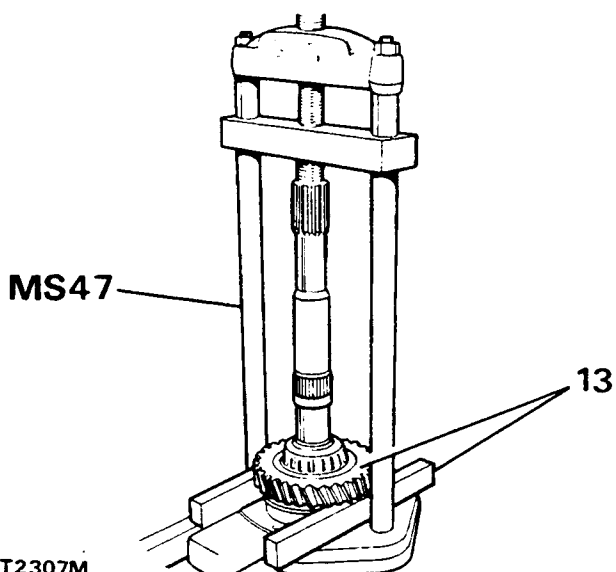
Dismantle mainshaft.

12. Secure the mainshaft in a vertical position with the centre taper bearing uppermost and remove the circlip.



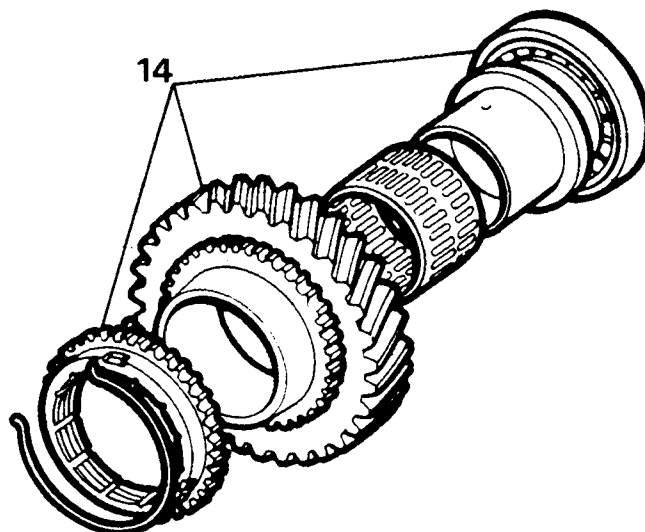
ST2306M

13. Secure press MS 47 firmly in a vice and install the mainshaft with two steel bars supporting the first gear.



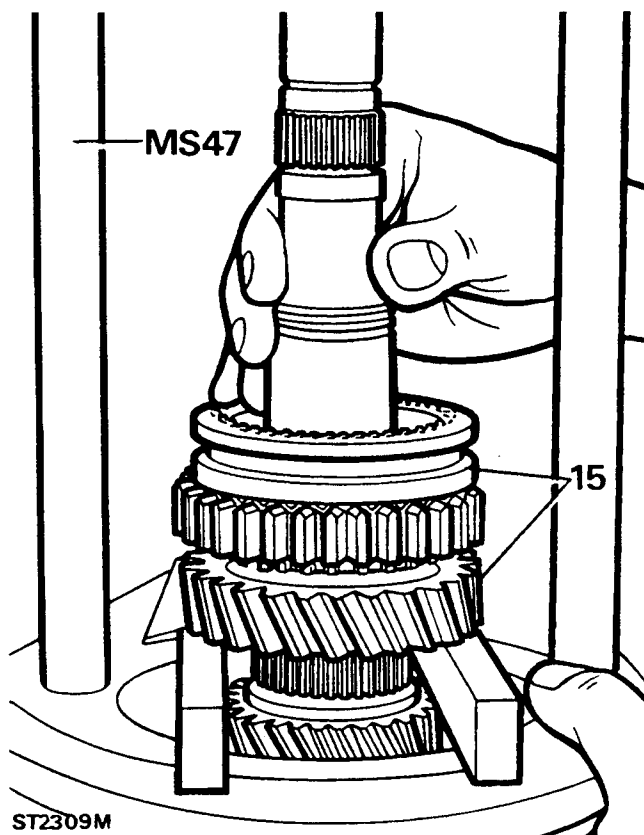
ST2307M

14. Operate the press and remove the centre bearing, first gear bush, first gear, needle bearings and first gear baulk ring.

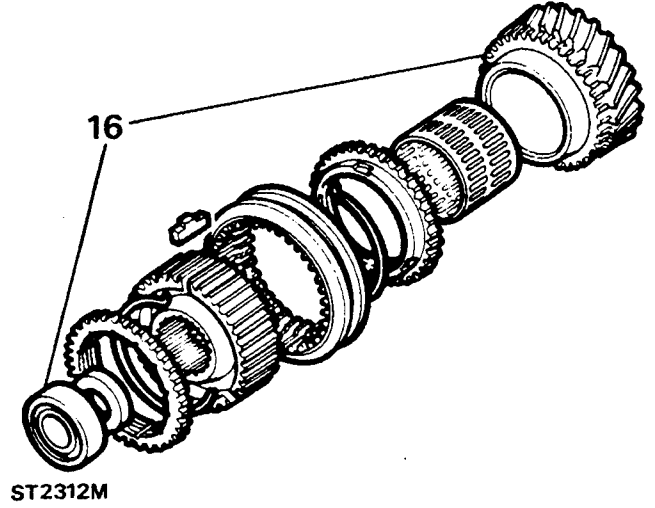
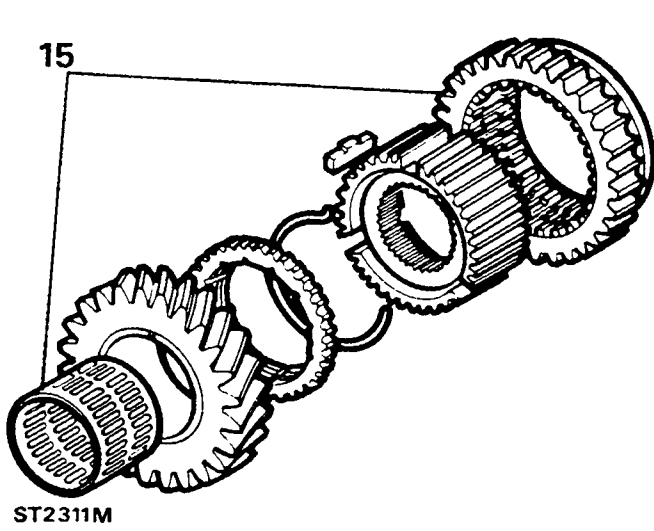


ST2308M

15. Whilst the second gear synchromesh may slide off easily, if difficulty is experienced, support the second gear with the two steel bars under press MS 47. Operate the press to remove the first-second synchromesh unit, second gear, baulk ring, and needle bearings.



ST2309M



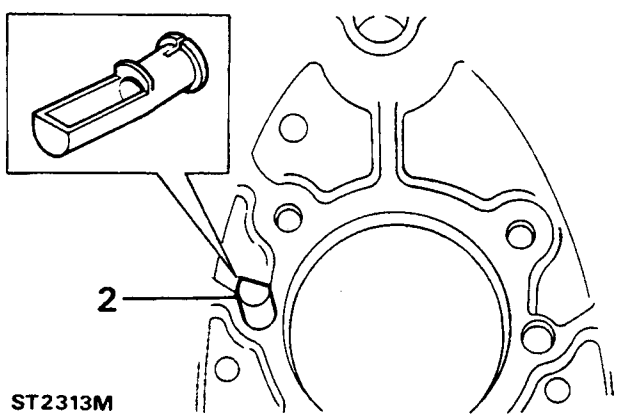
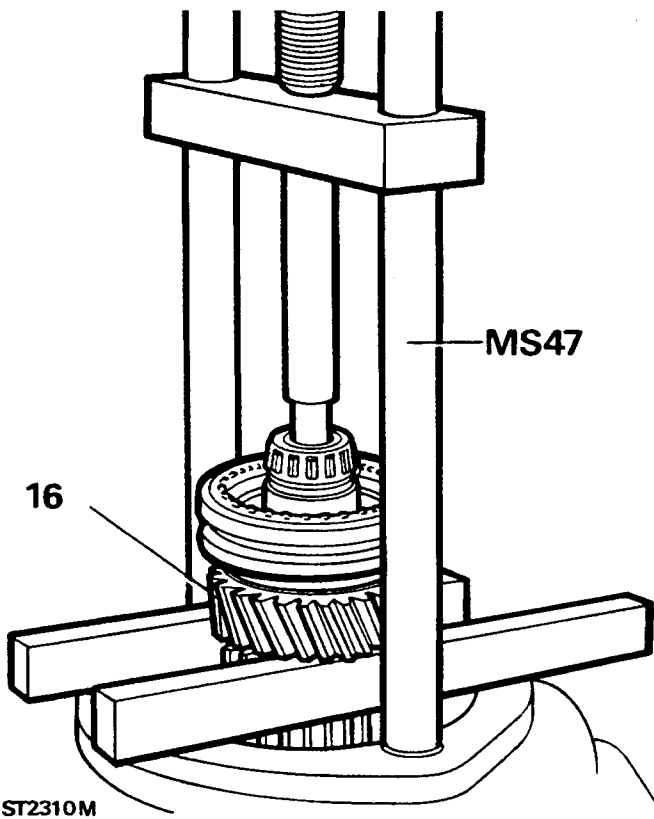
16. To remove the remaining components, turn the mainshaft over and insert a suitable extension between the pressure bar of MS 47 and the mainshaft. Support third gear with the bars and press the mainshaft from the pilot bearing spacer, third and fourth synchromesh unit, third gear baulk ring, third gear and the needle bearings.

EXAMINE AND PREPARE FOR ASSEMBLY

Degrease and clean all components before inspection and assembly. All gaskets and seals should be discarded and it is also recommended that the bearings are renewed.

Main gearbox casing.

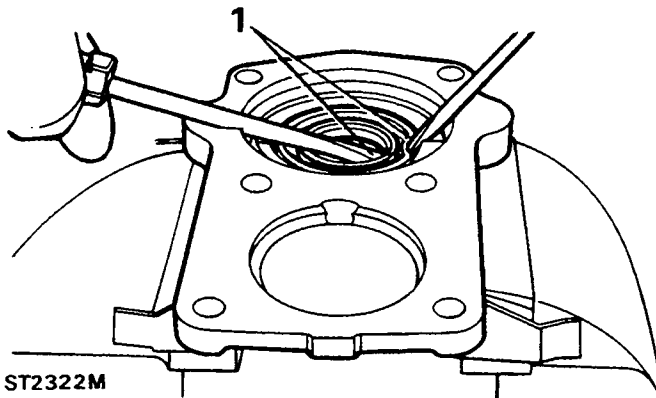
1. Remove the mainshaft and layshaft bearing tracks.
2. Remove the plastic oil trough from the front inside of the casing.



3. Clean and degrease the casing with a suitable solvent. Inspect the case for cracks, damage and stripped threads and any condition that would render the case unfit for further service. Stripped threads can be repaired using Helicoil, or a suitable equivalent.
4. Insert a new plastic scoop inside the casing with the scoop side towards the top of the casing.

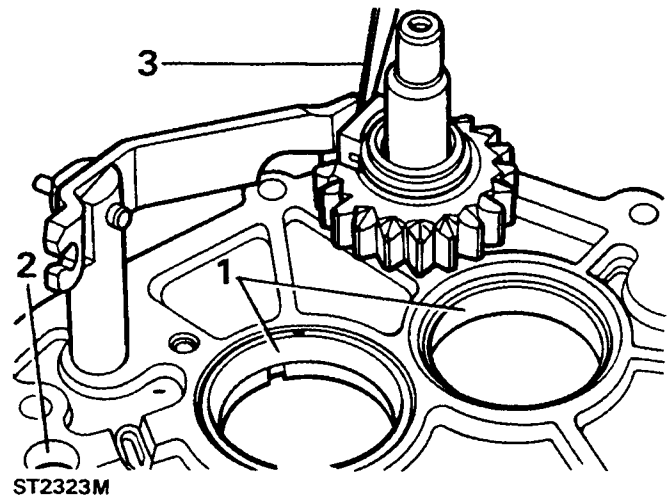
Front cover.

1. Carefully prise the oil seal from the cover. To avoid damage to the seal housing, insert a thin screw driver blade between the seal and housing and another beneath the seal and lever-out the seal. Do not at this stage fit a new seal.



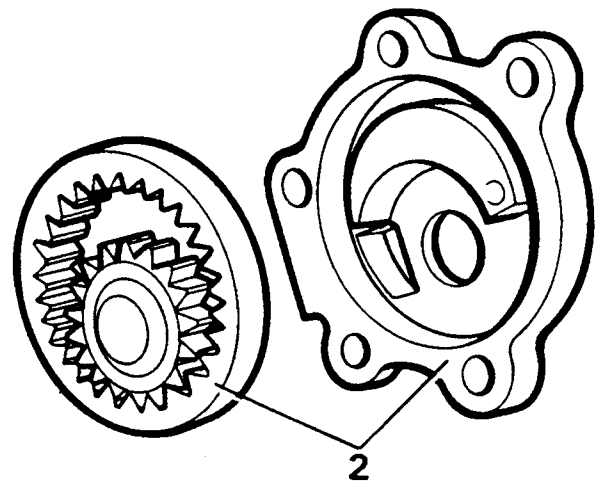
Centre plate.

1. Remove the mainshaft and layshaft bearing tracks from the centre plate.
2. Inspect the plate for damage and check the selector rail bore for wear.
3. Check the security and position of the pivot post by temporarily fitting the reverse shaft, reverse gear and lever. Using a feeler gauge, check that the clearance between the slipper pad and lever is not in excess of 0.20 mm (0.008 in).



Extension case.

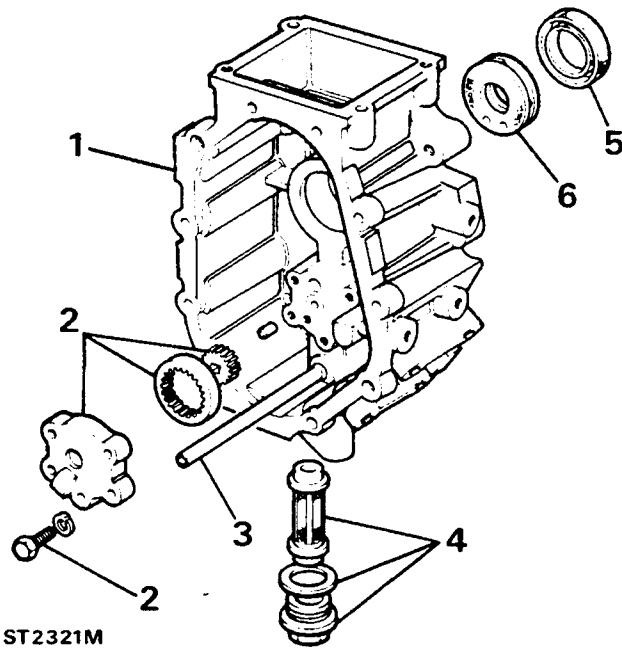
1. Examine the extension case for obvious damage to threads and machined faces.
2. Remove the oil pump cover housing three securing bolts to release the oil pump gears. Inspect the gears and housing and renew if necessary.



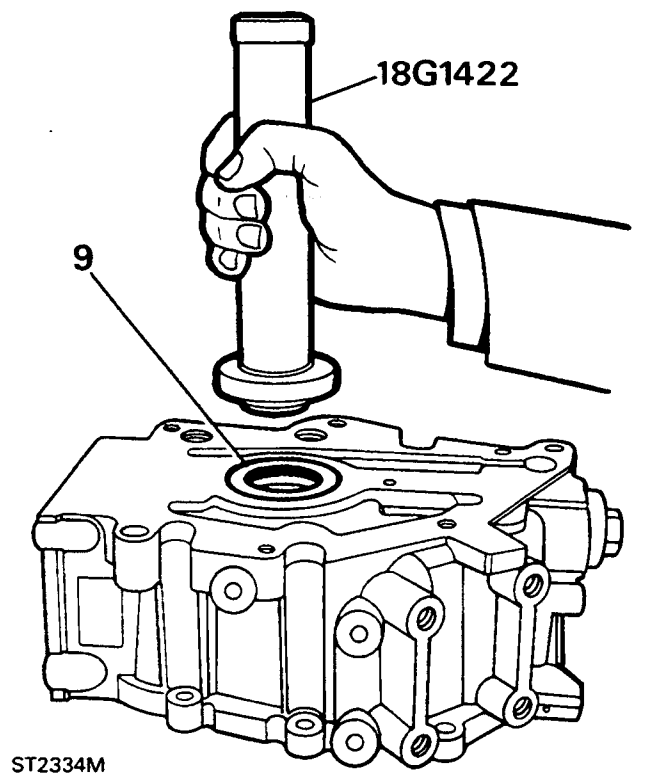
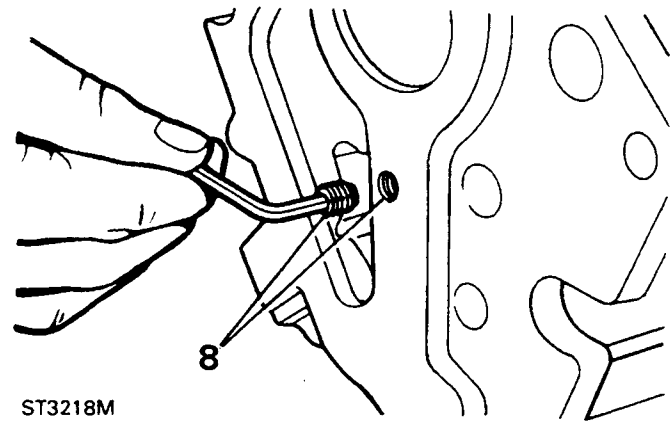
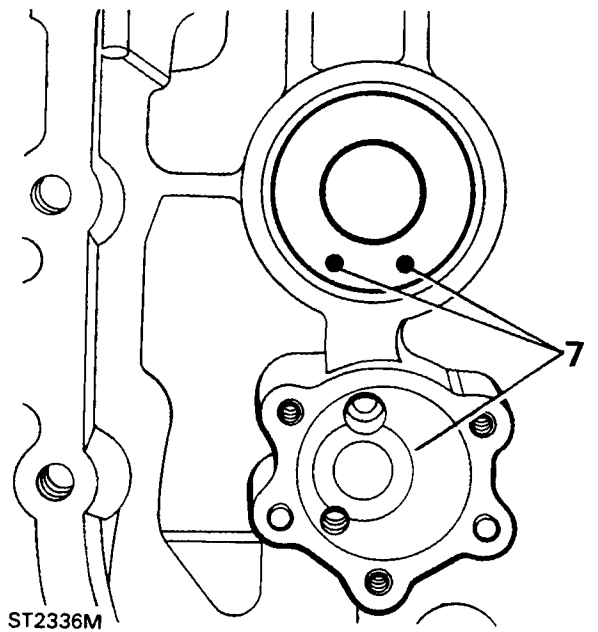
3. Do not remove the oil pick-up pipe but ensure that it is clean and not blocked.
4. Remove the housing drain plug, fibre washer and filter. Clean and examine the filter and renew if split. Discard the washer and fit a replacement.
5. Extract and discard the oil seal.

6. Press-out and examine the ferrobestos bush behind the oil seal. Ideally, the bush should renewed whatever its condition but if the original must be cleaned and refitted take heed of the following warning.

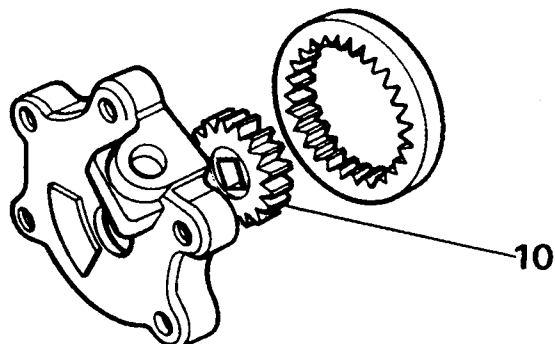
WARNING: The ferrobestos bush contains abestos. DO NOT use an air line if the bush is being cleaned since abestos dust is dangerous to your health. Use methylated spirit or denatured alcholol to clean asbestos components.



7. Press a new or the original ferrobestos bush fully into position ensuring that the two drain holes are towards the oil pump. If this precaution is not followed oil will build-up behind the oil seal and may cause an oil leak.
8. If a new extension housing is being fitted, it is vital that the grub screw from the old housing is transfered to the new housing main oilway located at the rear of the housing. Threads should first be coated with Loctite.
9. Fit a new oil seal to the rear of the housing with the lip side towards the ferrosbestos bush. To ensure the seal is fitted squarely, use special tool 18G 1422. After fitting, lubricate the seal lips with an SAE 140 oil.

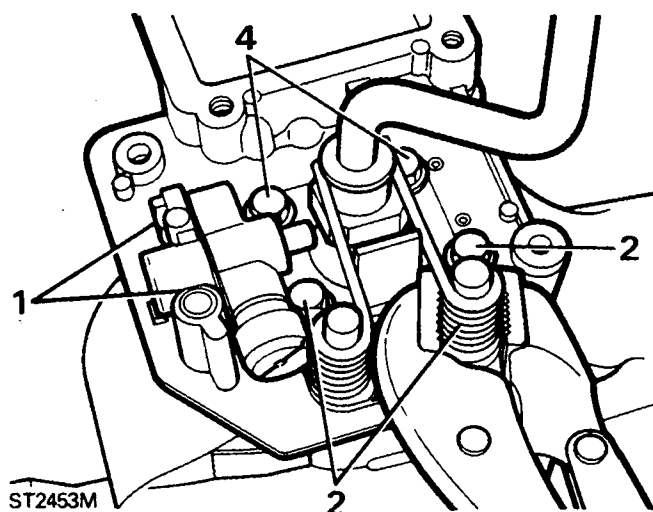


10. Assemble the oil pump gears to the cover housing noting that the square drive of the centre gear must face towards the layshaft. Locate the cover over the two dowels and secure the assembly with the three bolts to the extension housing and tighten to the correct torque.



ST2324M

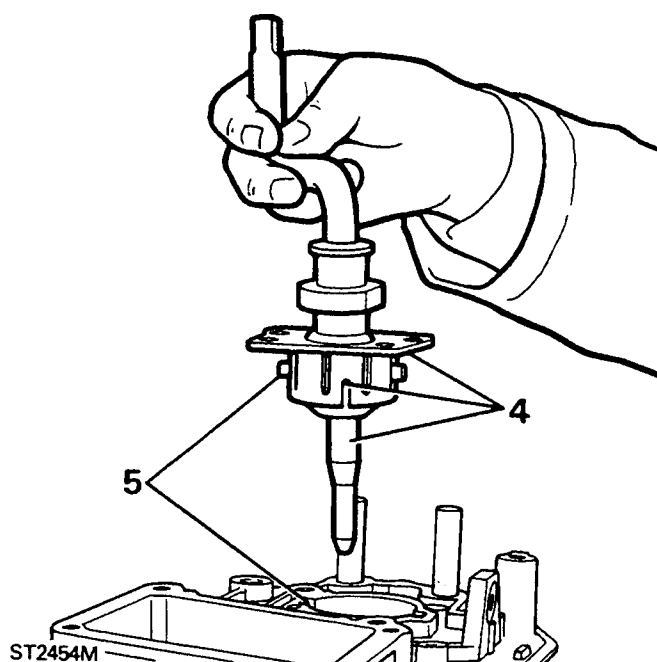
11. Fit the oil filter, drain plug and a new sealing washer and tighten to the correct torque.



5. Check that the cross-pin location slots in the housing are not worn likewise the cross-pin and the lower gear lever. Examine the housing for cracks and damage.

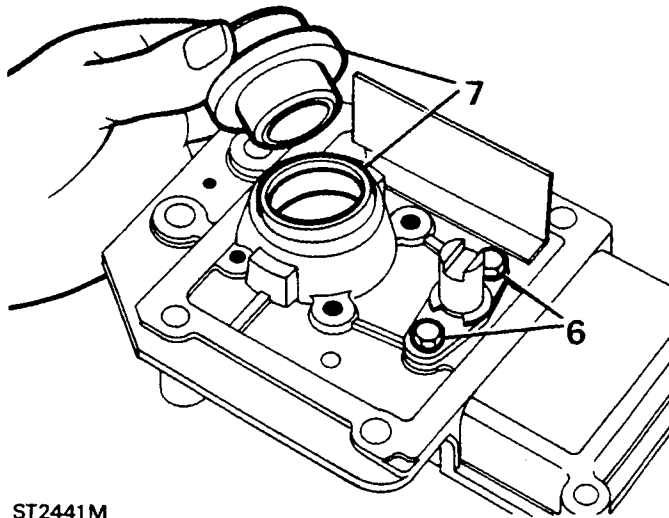
Gear change housing.

1. Release the single bolt and remove the reverse plunger together with shims from the gear change housing.
2. Now remove the two bolts securing the bias springs but before doing so, restrain each spring, in turn, with a pair of grips whilst the bolts are being removed. The springs are very strong and if this precaution is not taken personal injury could result.
3. Remove the two springs from the housing posts and gear lever.
4. Remove the two remaining bolts securing the bias adjustment plate from the housing and withdraw the lower gear lever, plate and the railko bush.



6. Turn the housing over and check the security of the spool guide bolts.

- Also prise out the old oil seal and using a suitable replacer such as 18G 47-7 press in a new seal, lip side leading.

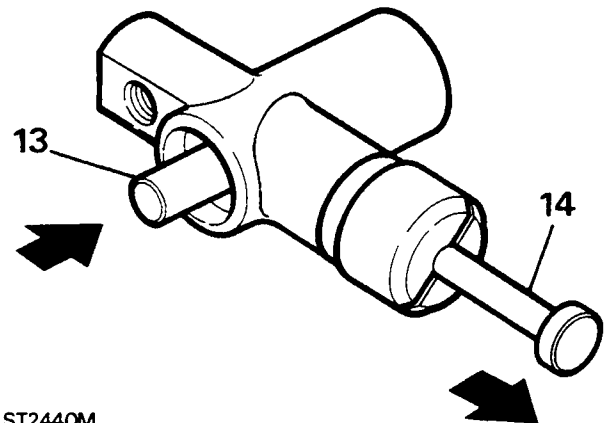


ST2441M

- Examine the bias springs and renew if distorted or weak.
- Lightly grease the lower gear lever ball with Shell Alvina R3 and fit a new railko bush.
- Insert the lower gear lever into the housing locating the cross-pins in the slots.
- Fit the adjustment plate noting that it can only be fitted one way. Coat the threads of the two shortest bolts with Hylomar PL 32 or Loctite 290 and fit them, with washers, forward of the gear lever. Tighten the bolts sufficiently to prevent the plate moving while the springs are being fitted.
- Fit the bias springs to the posts and locate the long end against the gear lever. Coat the threads of the spring retaining bolts with one of the above sealants. Again, using grips, compress the springs to enable the bolts and washers to be fitted. Leave the four bolts slack at this stage.

Reverse gear plunger.

- The plunger is only available as a complete assembly. Carry out the following test to check that it is working properly. Apply a load of between 45 and 55 kg (100 and 120 lb.) to the plunger nose. The plunger is satisfactory if it functions within these limits.
- At the same time that the above test is being made, check that the reverse switch plunger operates in the direction of the arrow as the reverse gear plunger is depressed.

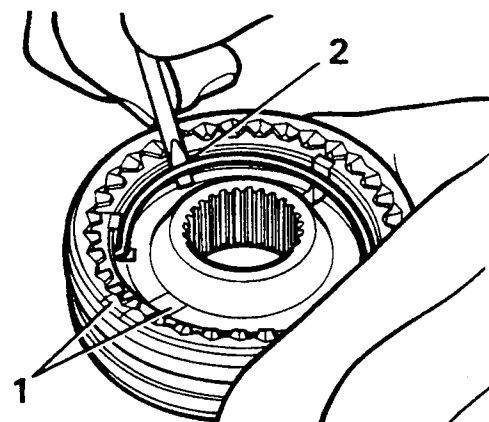


ST2440M

Synchromesh assemblies.

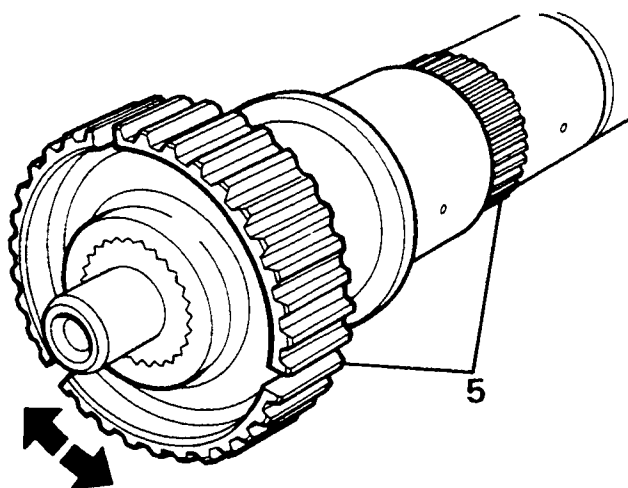
Except for the fifth gear synchromesh assembly which has a retainer plate, the dismantling procedure is the same for all units.

- Mark the relationship of the synchromesh inner and outer members to assist assembly. Lever the retainer plate off the fifth gear synchromesh assembly.
- Prise the retaining spring clip from from both sides of each synchromesh assembly.

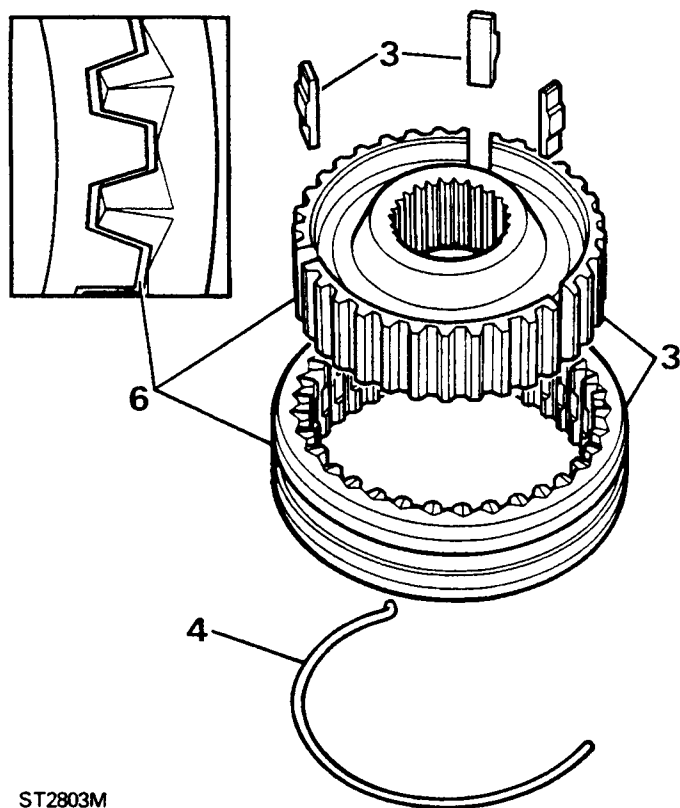


ST2445M

3. Remove the slippers and slide the inner member from the sleeve.
4. Examine the springs and slippers for damage and wear and discard all unsatisfactory parts.
5. Check the fit of each synchronesh inner member on the splines of the mainshaft. Hold the inner member and attempt to turn the mainshaft to check that no radial movement is present.



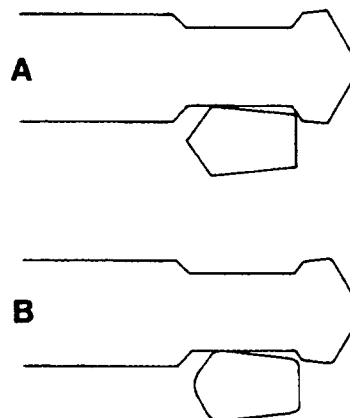
ST2469M



ST2803M

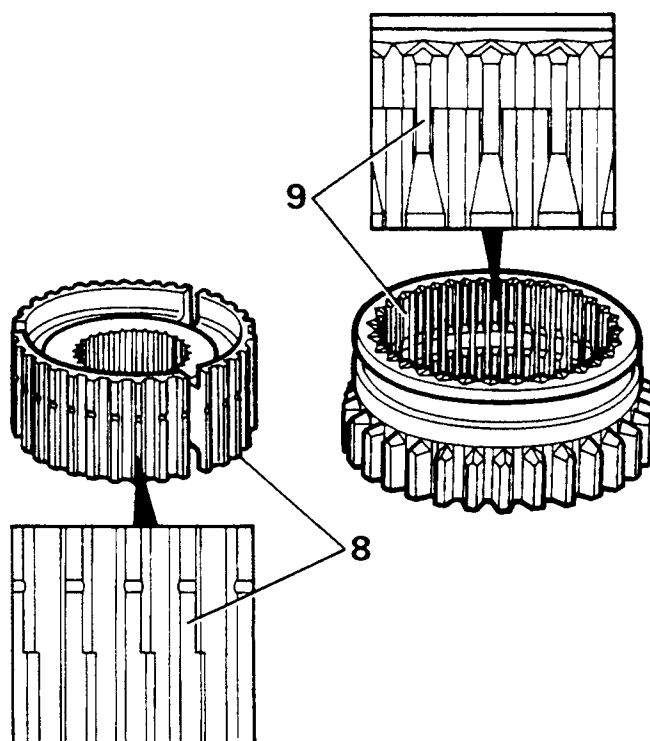
Note that the above illustrations show the third-fourth synchronesh assembly.

6. Carefully examine the inner and outer member splines for wear on the third-fourth synchronesh.
7. Inspect the dog teeth on the first, second, third and fifth gears and the fourth gear on the input shaft. Illustration A shows a tooth in good condition where the corners are sharp. Example B shows the rounded corners of a worn tooth.



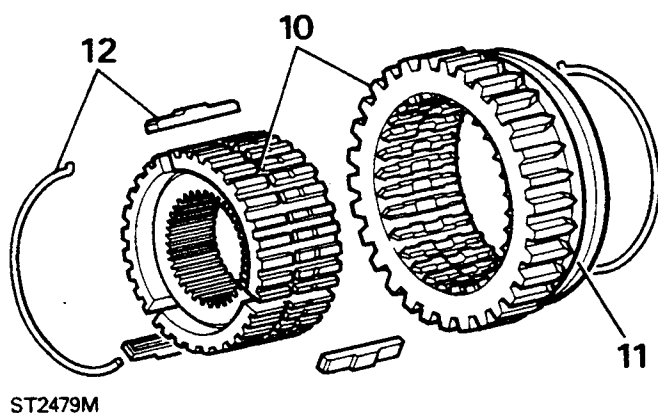
ST2449M

8. Examine the step in each of the outer splines of the first-second synchronesh inner member. Since the step is part of the gear locking system, it is important that the outer edge of the step is sharp and not rounded.

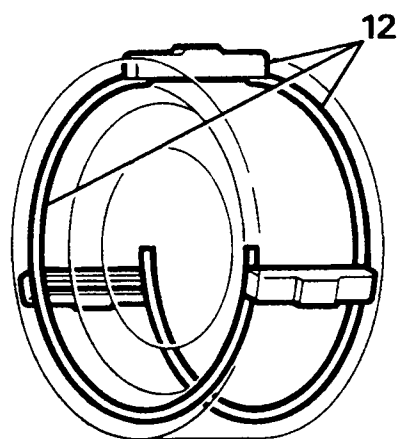


ST2473M

9. Check also that the step on both sides of each of the internal splines of the outer member are likewise sharp and not worn and rounded. Note that this applies only to the splines on the selector groove side of the member.
10. The radial groove encircling the inner member round the narrowest part of the splines is for ensuring that the inner and outer members are assembled correctly. Insert the inner member into outer with the radial groove towards the gear teeth on the outer member.
11. Note that the selector fork groove in the outer member is towards first gear and the rear of the gearbox.
12. Fit the slippers, open side inwards, into the slots and secure with the two springs one each side of the assembly. It is important that the hooked end of both springs locate in the same slipper but that the free end of the springs should run in opposite directions and rest against the other two slippers.



ST2479M

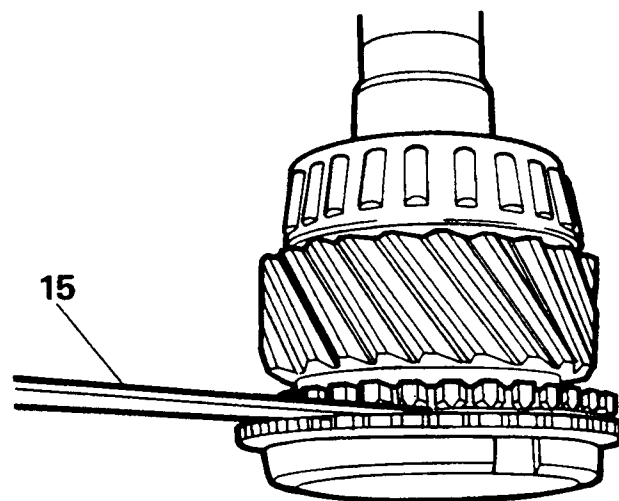


ST2467M

13. Assemble the components of the third-fourth synchromesh lining up the marks made on the inner and outer members when dismantled. Fit the slippers and secure with the springs ensuring that the hooked end locate in the same slipper and that the free ends run in opposite directions and make contact with the remaining slippers, as instruction 12.
14. In the same manner assemble the fifth gear synchromesh components as in instruction 13 above. In addition, fit the backplate to the rear of the assembly making sure that the tag on the backplate locates in the slot in the inner member.

NOTE: With the outer member supported, a push through load applied to the outer face of the synchromesh inner member should register 8,2 to 10 kgf m (18 to 22 lbf ft.) to overcome the spring detent in both directions.

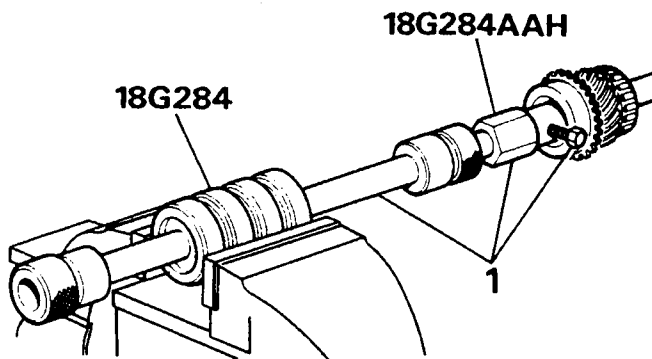
15. Check the clearance between all the baulk rings and gears by pressing the baulk ring against the gear and measuring the gap between the baulk ring and gear. The minimum clearance should be 0,38 mm (0.015 in).



ST3220M

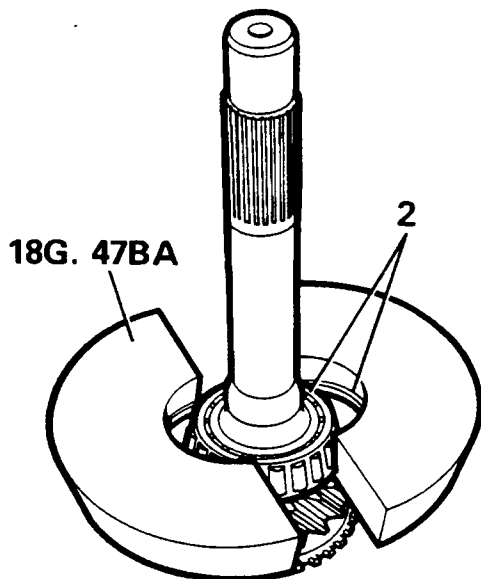
Input shaft.

1. Examine the input shaft for wear and damage and if necessary polish the oil seal track with fine emery cloth. If the shaft is satisfactory and only the bearings require renewal proceed as follows. Secure the service tool 18G 284 impulse extractor in a vice and attach to it service tool 18G- 284AAH. Assemble the jaws of the tool behind the track, adjust with the screw and extract the spigot bearing track.

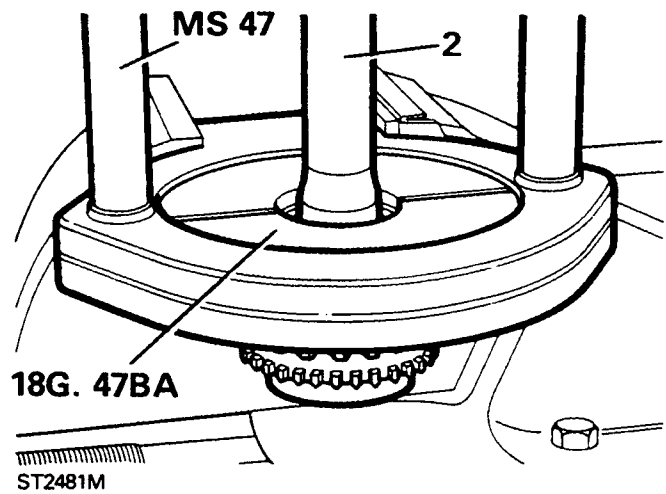


ST2443M

2. To remove the input shaft taper bearing, use service tool 18G 47BA and assemble it under press MS 47, as shown, so that the bearing is supported by the lip inside the tool. Using the protective button, press the shaft from the bearing.

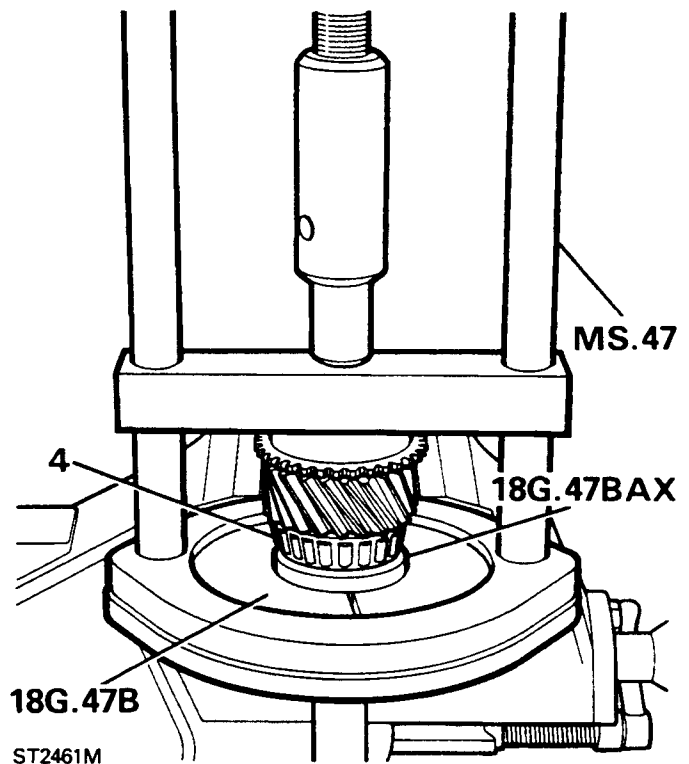


ST2480M



ST2481M

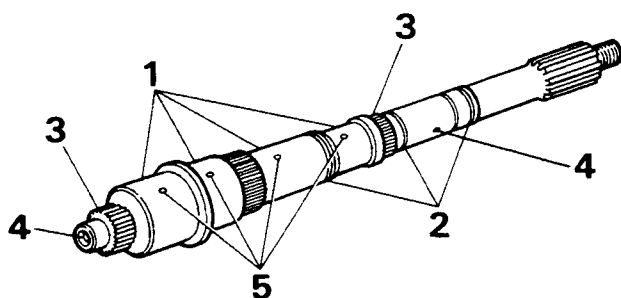
3. To fit a new spigot bearing track, support the shaft under press MS 47 and using a suitable adaptor lubricate and press the track squarely into the shaft.
4. Fit the input shaft taper bearing using press MS 47 with 18G 47BA and adaptor 18G 47BAX supporting the bearing with the smallest diameter towards the bearing. Lubricate and press the shaft slowly and squarely on to the bearing.



ST2461M

Mainshaft.

1. Examine the roller bearing journals for wear and scores.
2. Check the condition of the three circlip grooves.
3. Inspect all the mainshaft splines for wear and damage particularly if it was noticed that any of the synchromesh units were a loose fit when dismantling.
4. Use an air line to check that the main feed from the pump is clear also the feed to the spigot bearing.
5. Also, check that the four oil feed holes to the roller bearings and gears are clear and finally, ensure that the roll pin pressed into each of these oil holes, to restrict oil flow, is fitted well below the surface of the journal.



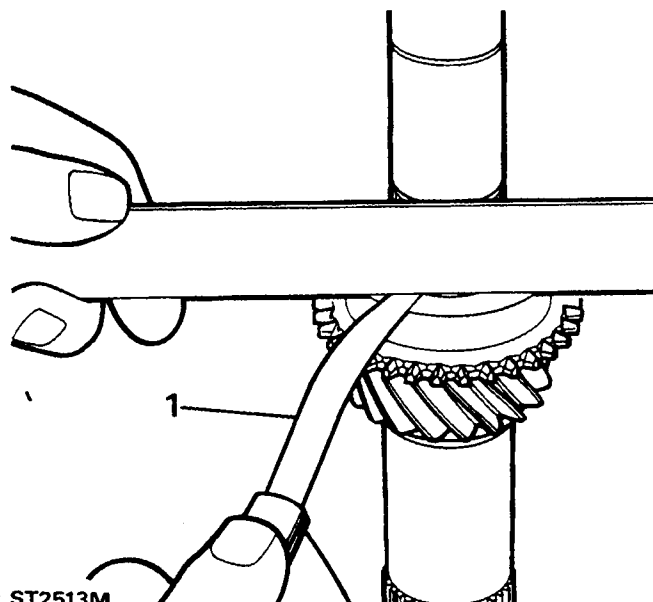
ST2446M

Mainshaft end float checks.

The numbers in brackets in the following checks refer to the items in the key and illustration of "Gears and shafts".

Fifth gear.

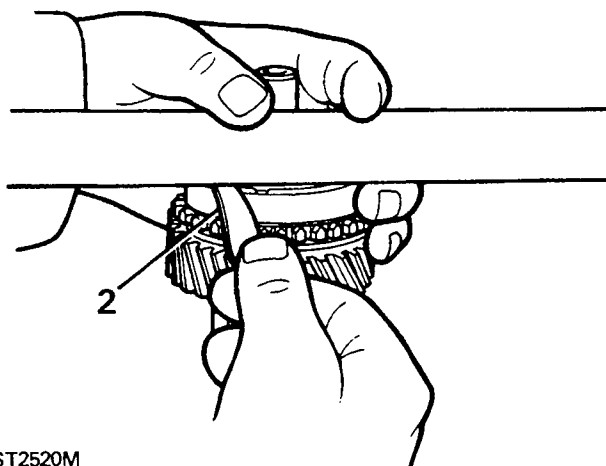
1. Fit the thrust washer (30) split roller bearing (31) and fifth gear (32) to the mainshaft. Place a straight edge across the mainshaft shoulder and measure the clearance between the straight edge and gear with a feeler gauge. The clearance, which is the end float, should not be in excess of 0,20 mm (0.008 in.).



ST2513M

Third gear.

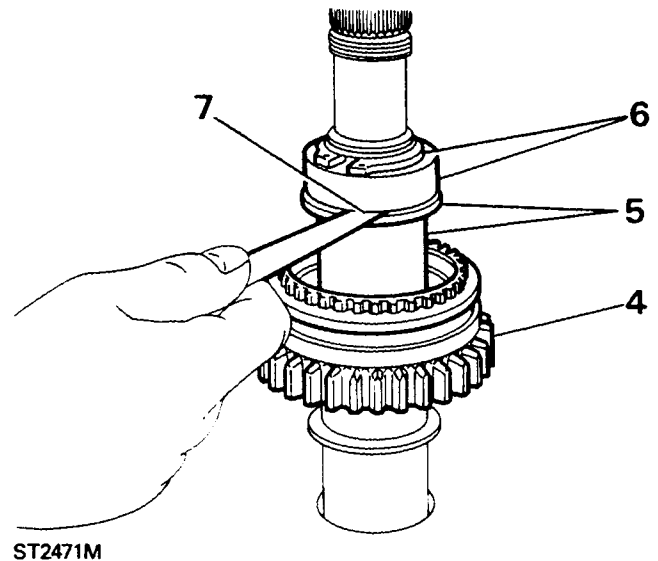
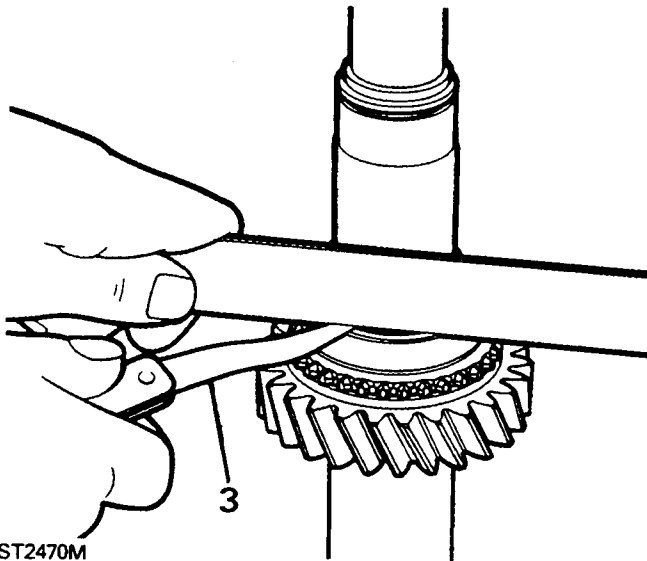
2. Fit the third gear (19) and the roller bearing (18) to the mainshaft. Place a straight edge across the shoulder and measure the clearance, with a feeler gauge, between the straight edge and gear. The end float should not be more than 0,20 mm (0.008 in.).



ST2520M

Second gear.

3. Lubricate and fit the needle roller bearing (18) and second gear (21) and place a straight edge across the mainshaft shoulder. With a feeler gauge, check the clearance between the straight edge and gear. The end float must not exceed 0,20 mm (0.008 in.).



ST2471M

Part number

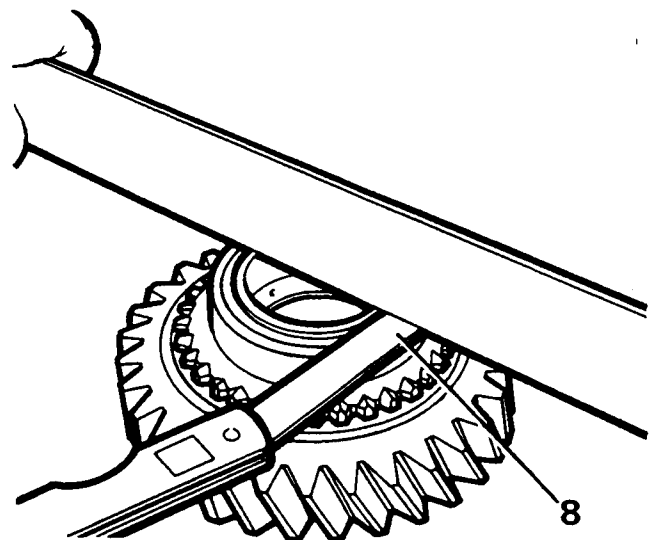
Part number	Length (mm)
FRC 5243	40,16 - 40,21
FRC 5244	40,21 - 40,26
FRC 5245	40,26 - 40,31
FRC 5246	40,31 - 40,36
FRC 5247	40,36 - 40,41

First gear bush end float.

4. Fit the first and second gear synchromesh inner and outer members (23, 24) with the selector groove towards the rear of the mainshaft.
5. Fit the first gear bush (27) with the flange towards the rear of the mainshaft.
6. Next, fit the locally manufactured dummy bearing tool "C" and secure with a new circlip. Take care not to open the circlip more than is necessary to pass over the shaft.
7. Press the dummy bearing against the circlip and with a feeler gauge, measure the clearance between the flange of the first gear bush and the dummy bush. The correct clearance should not be more than 0,75 mm (0.003 in.) and should be free to rotate easily. If the clearance is not correct replacement bushes of different flange thicknesses are available, as detailed below, and one should be selected to give the required end float.

First gear end float.

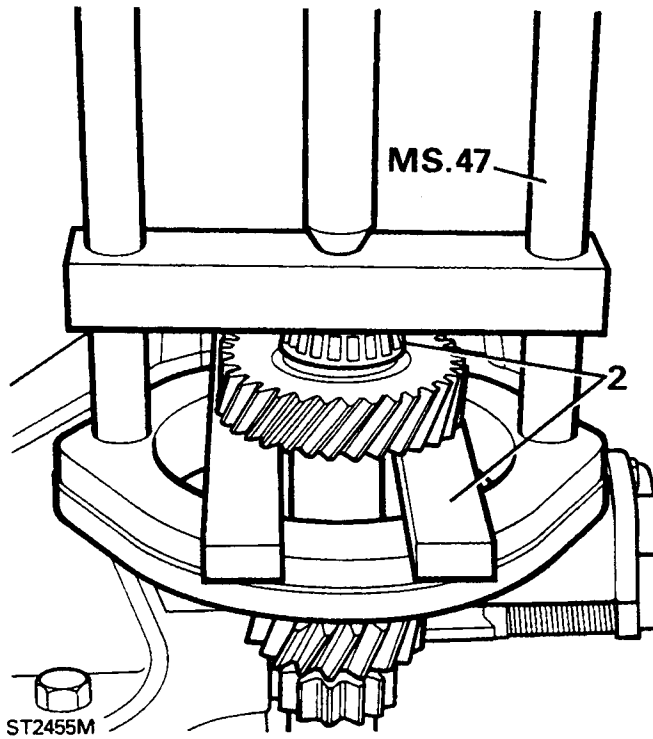
8. It is not necessary to fit the first gear to the mainshaft to check the end float. Assemble the roller bearing (18) and gear (26) to the bush (27) and place the assembly on a flat clean surface with the bush flange downwards. Place a straight edge across the bush and with a feeler gauge, measure the clearance between the gear and straight edge. The end-float should not be greater than 0,20 mm (0.008 in.).



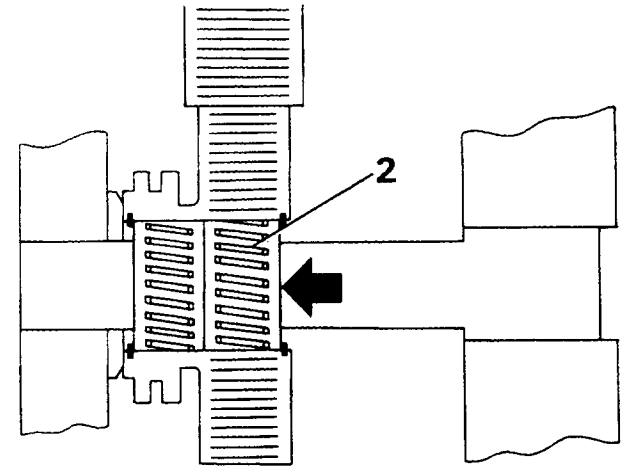
ST2472M

Layshaft

1. Examine the layshaft for wear, damaged or broken teeth and renew if necessary.
2. If the shaft is serviceable fit new bearings. Using press MS 47 support the layshaft with suitable bars and press the bearings squarely on to the shaft.



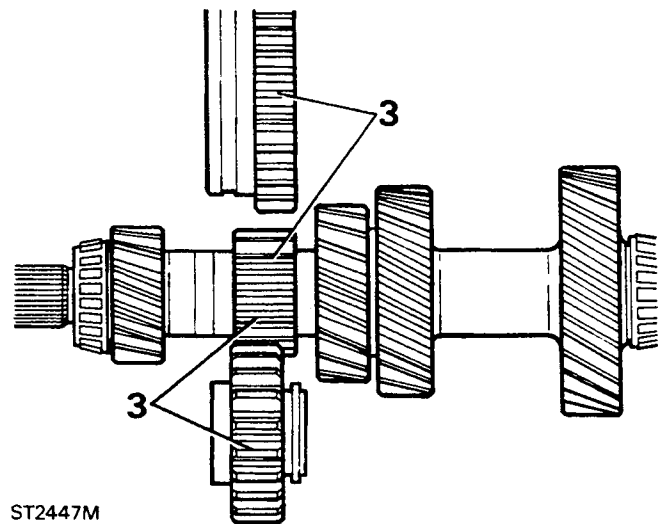
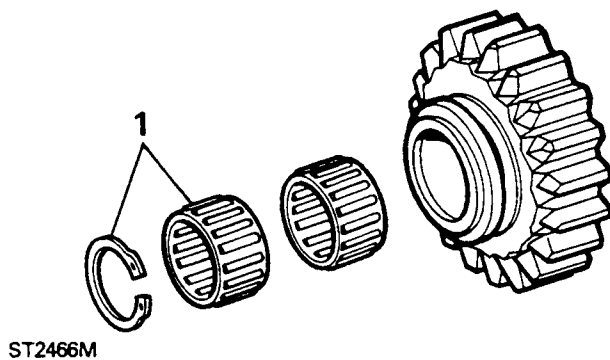
2. It should be noted that the needle bearing cage is twisted during manufacture. The twist causes the gear to be tilted on the shaft and at the same time forces the gear towards the front of the gearbox into engagement where it runs against the thrust washer. The bearings must be renewed if the gear jumps out of engagement, or if the bearings show visible signs of wear. The bearings, which can be fitted either way round, should first be lubricated before fitting. Secure with a new circlip.



3. Check the condition of the reverse idler gear and its mating teeth on the layshaft and synchromesh outer member.

Reverse gear and shaft.

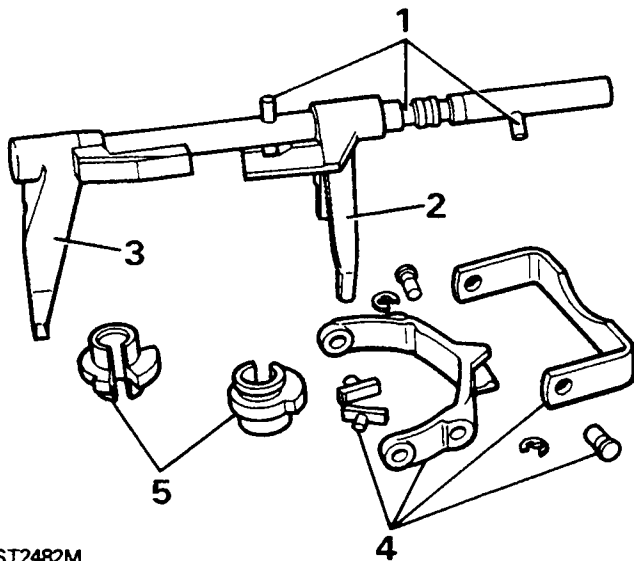
1. Remove the circlip from the reverse idler gear and remove both needle roller bearings. It is not necessary to remove both circlips.



4. Examine the reverse shaft for wear, scores and pitting and renew if necessary.

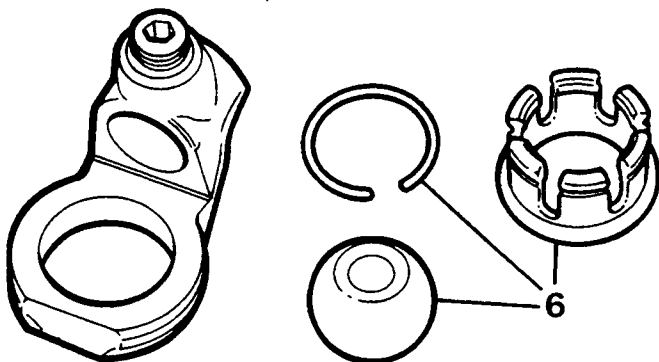
Selectors.

1. Check the condition of the selector rail and that the pins are not worn or loose.
2. Also examine the first-second selector fork for wear, cracks and damage. Note that the selector rail and fork is only supplied as a complete assembly so if the pins are worn or loose or the fork is unsatisfactory renew the complete unit.
3. Examine the third-fourth selector fork for damage and wear.
4. Examine the fifth gear selector bracket and fork together with the pads and pivot pins.
5. Check also the first-second, third- fourth and reverse gear interlock spool and the fifth gear spool for wear and damage.



ST2482M

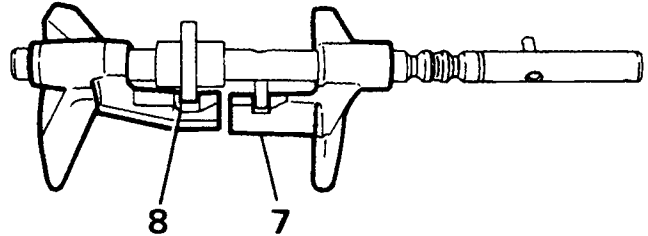
6. Remove the snap ring and inspect the selector yoke assembly components and renew any worn or damaged parts.



ST2514M

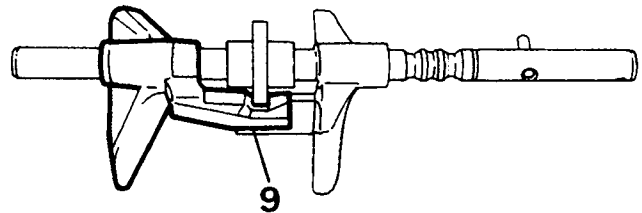
Assembling selectors.

7. Place the first-second selector fork and shaft assembly on a flat surface and locate the selector pin in the jaw of the fork.
8. Fit the interlock spool and the third-fourth selector fork and engage the spool in the jaw of the fork.



ST2488M

9. Slide the spool and fork towards the first-second selector until the slot in the spool locates over the selector pin while the spool remains engaged in the third-fourth selector fork jaw. Put the assembly aside ready for fitment at the appropriate stage.



ST2487M

The fitting of the fifth gear selector components is described at a later stage in the assembly of the gearbox.

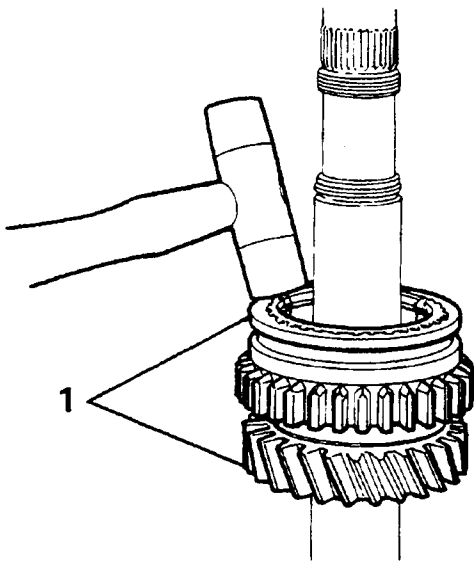
ASSEMBLE

Mainshaft rear end assembly.

Note that figures in brackets relate to the items in the illustration and key of "Gears and shafts" to assist identification of the components for assembly.

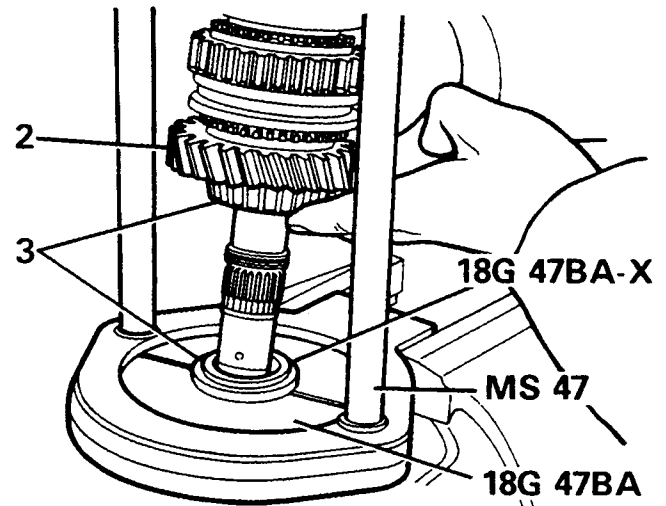
Lubricate the needle roller bearings before assembly.

1. Fit the second gear (21) and needle roller bearing to the mainshaft followed by the baulk ring (22) and first-second synchromesh assembly (23, 24). The synchromesh unit may require gently tapping on to the splines with a plastic hammer.



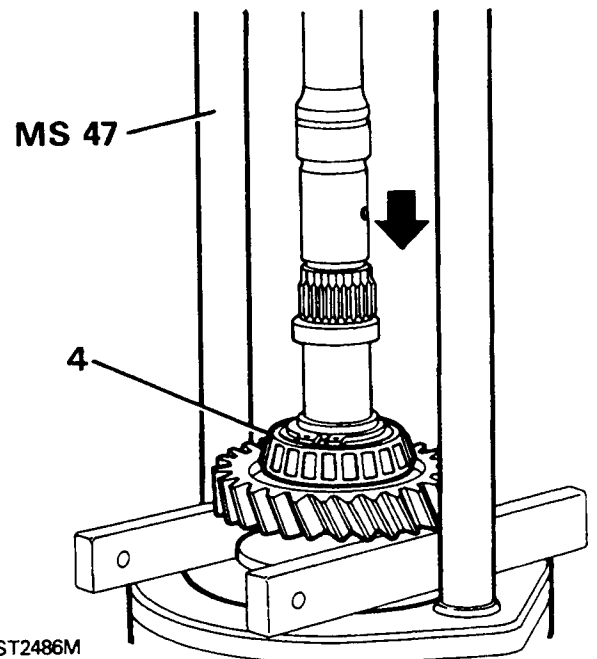
R2507M

2. Fit the first gear baulk ring (25), first gear (26), needle roller bearing and first gear selected bush (27) to the mainshaft.
3. Fit the center bearing (28) using special service press MS47, collets 18G 47BA and adaptor 18G 47BA-X. Note that the larger diameter of the adaptor must locate in the bearing cage. Ensure that the slots in the baulk ring align with the synchromesh slipper blocks when pressing the shaft on to the bearing. Note that the following illustration shows the bearing having been started on the shaft and being lowered into position on the adaptor prior to the shaft and gear assembly being pressed on to the bearing.



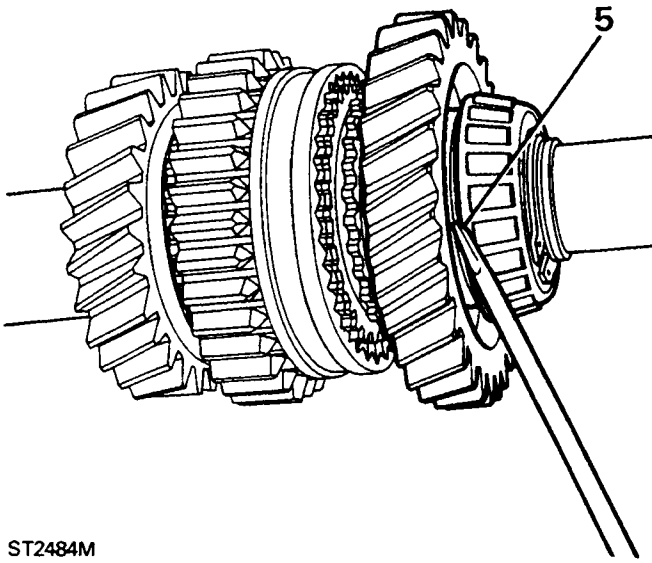
ST2485M

4. Secure the assembly with a new circlip. Since the bearing is a very tight fit on the mainshaft, it is probable it will have clamped the first gear bush preventing it from turning as it should. To allow the bush to turn and to maintain the required bush end float the bearing must be pressed back against the circlip. This can be achieved by supporting first gear on two bars under press MS47 and pressing the shaft so that the bearing is forced against the circlip sufficiently to allow the bush to turn.



ST2486M

- To check if the bush is free, attempt to turn it by the flange with a screw driver blade between the gear and bearing.



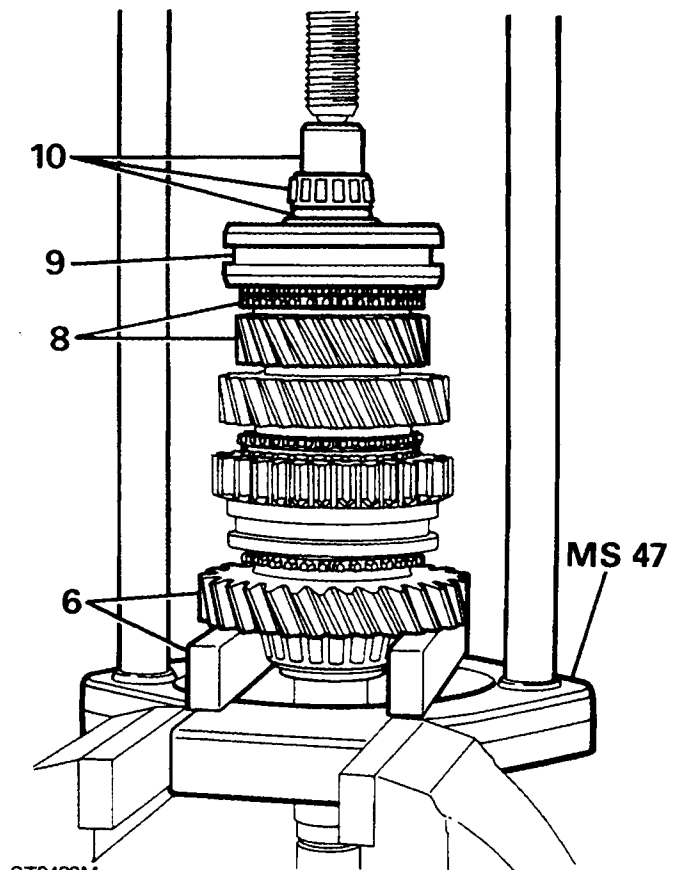
ST2484M

Mainshaft front-end assembly.

- Invert the mainshaft and support it on bars under first gear beneath press MS47.

CAUTION: It is vital that the mainshaft assembly is indeed supported under first gear to ensure that the position of the first gear bush is not altered and clamped when the spigot bearing is pressed on to the shaft.

- Fit the needle roller bearing (18).
- Fit the third gear (19) and the baulk ring (17), flat side towards the gear.
- Fit the third-fourth synchromesh assembly (15,16) with the raised centre boss of the inner member towards the spigot bearing journal. Ensure that the baulk ring locates correctly.
- Fit the thrust washer (12) and using a suitable sleeve press the spigot bearing (11) squarely on to the shaft.

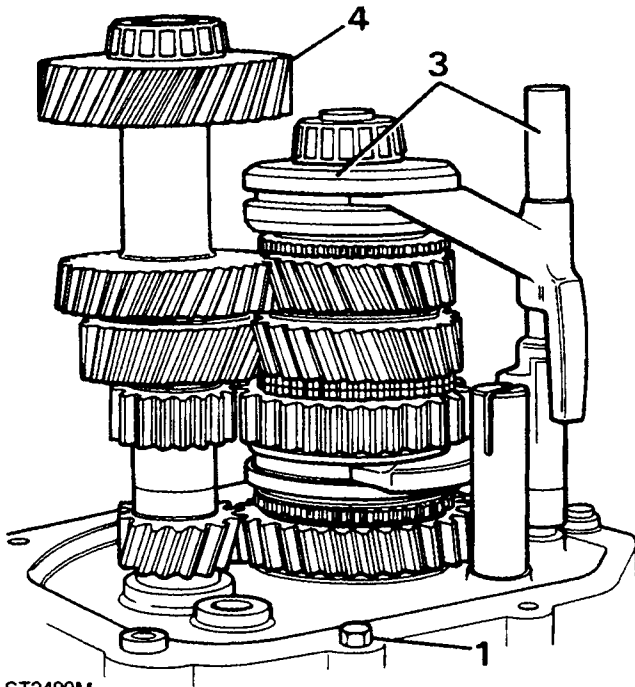


ST2489M

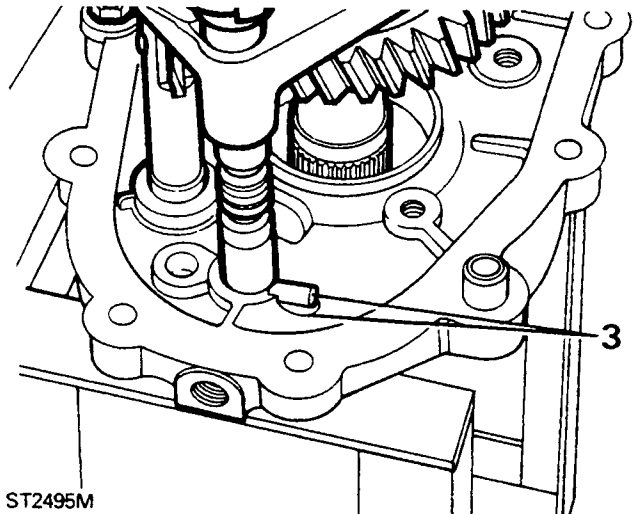
Fitting gears to centre plate.

Lubricate all components with light oil before fitting.

- Secure the centre plate to the workstand with a bolt and nut and fit the mainshaft and layshaft bearing tracks.
- Check that both synchromesh units are in neutral and fit the selector shaft assembly to the mainshaft engaging the selector forks in their respective synchromesh outer members.
- Fit the mainshaft and selector assembly to the centre plate whilst rotating the selector shaft to align the fifth gear selector pin with the slot in the centre plate to allow the shaft to pass through.
- Fit the layshaft to the centre plate while lifting the mainshaft assembly enough to clear the rear layshaft bearing.



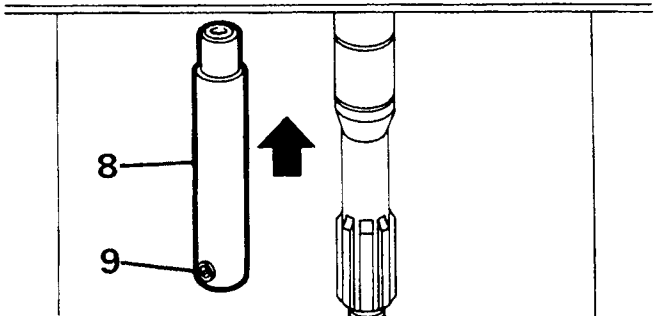
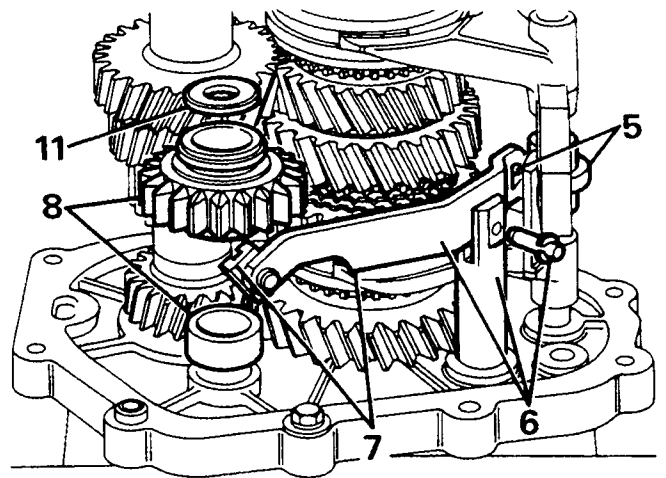
ST2490M



ST2495M

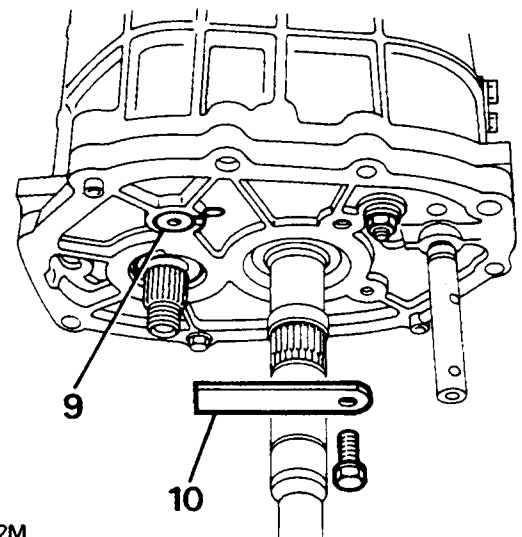
5. Turn the selector shaft and interlock spool to enable the forked end of the reverse lever to engage over the flange of the spool.
6. Insert the reverse lever into the slot in the reverse lever pivot post and secure the lever with the pivot pin and spring clip.
7. Fit the slipper pad to the reverse lever.
8. partially insert the reverse gear shaft from underneath the centre plate and fit the reverse gear spacer and reverse gear, flanged side uppermost, on the shaft.

9. Engage the slipper on the reverse gear flange and push the reverse shaft up to its final position ensuring that the roll pin engages in the slot in the centre plate.



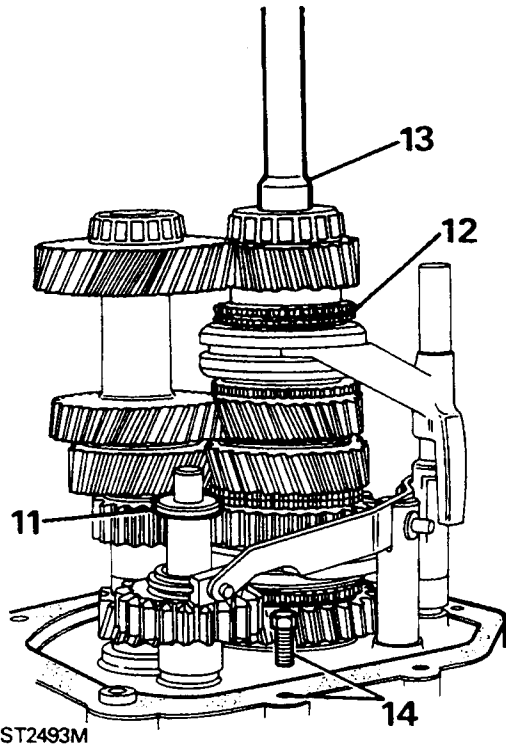
ST2491M

10. Whilst holding the reverse shaft to prevent it falling, secure it with the manufactured tool "A".



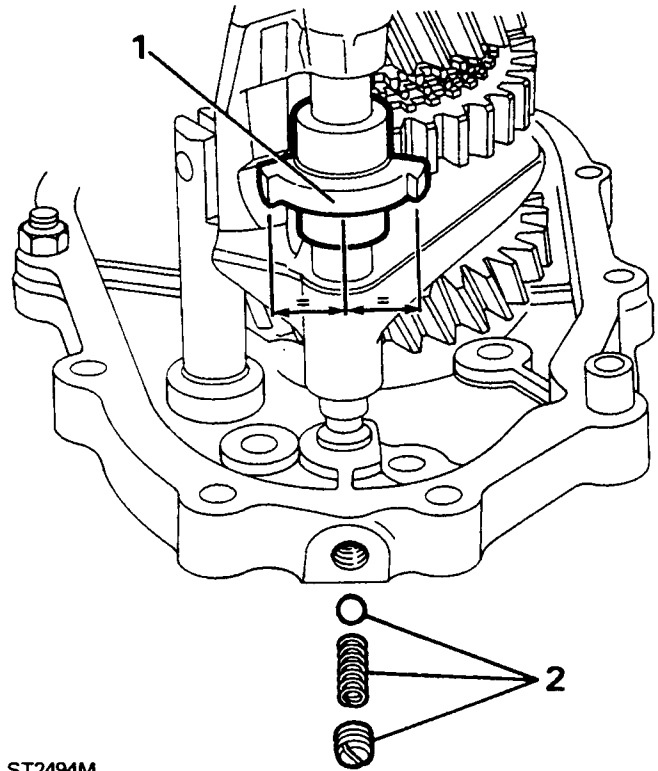
ST2492M

11. Fit the reverse gear thrust washer to the reverse shaft.
12. Fit and engage the fourth gear baulk ring (13) to the third-fourth synchromesh assembly.
13. Lubricate the spigot bearing and fit the input shaft.
14. Remove the nut and bolt securing the centre plate to the workstand and fit a new gasket.

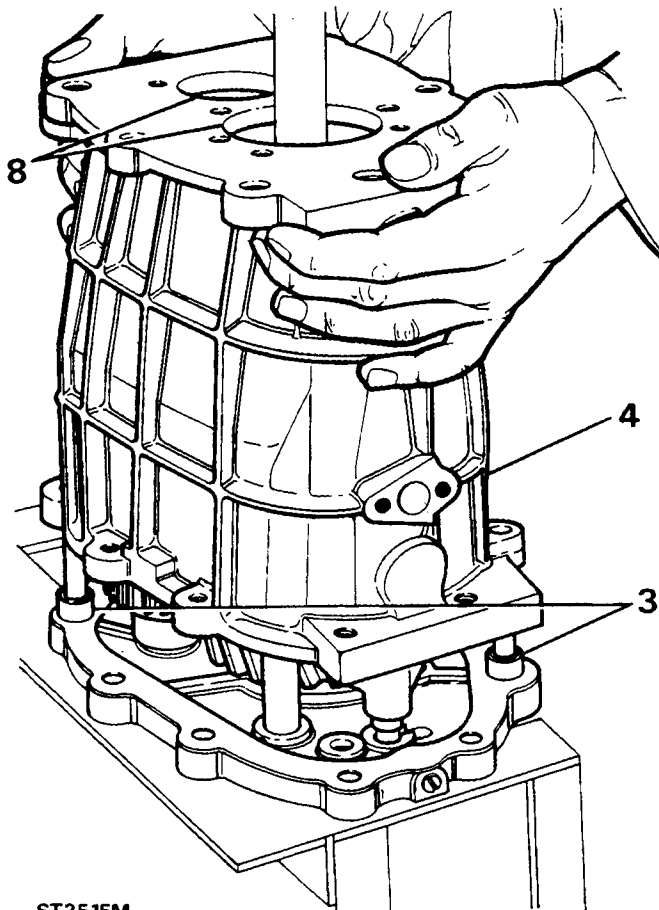


Fitting main gearbox casing.

1. If necessary, turn the selector shaft and spool so that they are in the neutral position.
2. Lubricate and fit the detent ball and spring and secure with the plug tightening fully to ensure that the selector shaft does not move when the gear case is fitted.

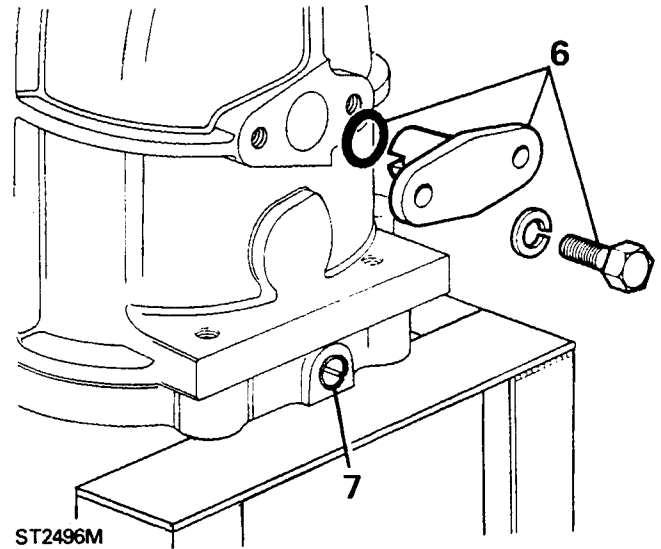


3. Fit two guide studs to the casing, one each side. Also check that the oil scoop is fitted and in the correct position.
4. Without using any force, carefully lower the gearcase into position over the gear assemblies. Ensure that the centre plate dowels and selector shaft are properly engaged in their locations.
5. Secure the centre plate and gearcase assembly, again, to the workstand with two 8 x 35 mm bolts. Use plain washers under the nuts to prevent damage to the rear face of the centre plate.



ST2515M

6. Lubricate and fit the interlock spool retainer with a new "O" ring and apply Hylomar PL 32 on the joint face and on the threads of the two retaining bolts. **Do not use force when fitting the spool retainer.** Provided the spool has not been disturbed the retainer will slide easily in to position. If the selector shaft has been moved or rotated it will be necessary to remove the gearcase and rectify to enable the retainer to be fitted. Fit the bolts with spring washers and tighten to the correct torque.
7. Remove the detent plug, smear the threads with Loctite 290 or Hylomar PL 32 and screw in until flush with the case. Stake the plug with a suitable punch to prevent it rotating.
8. Fit the layshaft and input shaft outer bearing tracks.

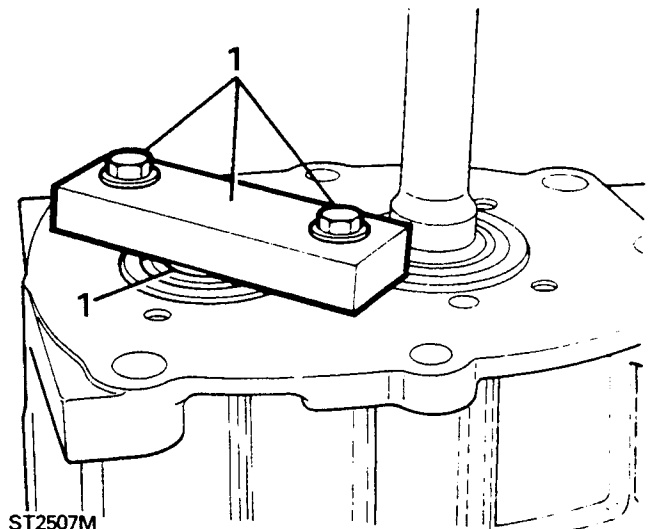


ST2496M

Fitting fifth gear.

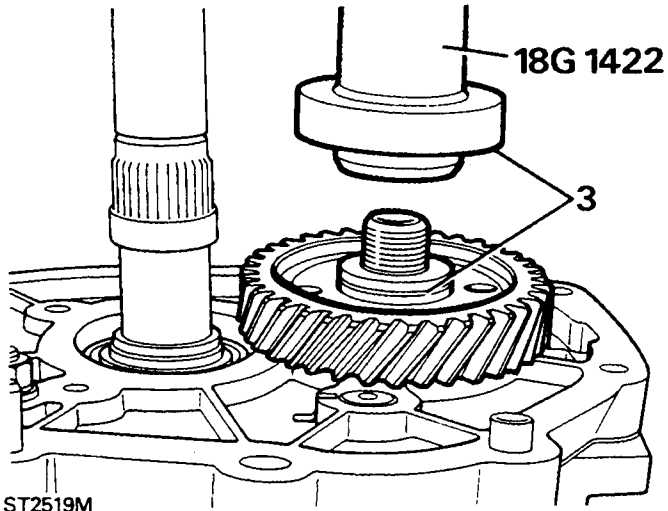
CAUTION: Since the fifth gear is a tight fit on the layshaft, it is important that when pressing the gear on to the layshaft the force must not be transferred to the layshaft front bearing. To prevent this happening it is recommended that Tool D is locally manufactured to the dimensions given.

1. Secure the locally manufactured layshaft support plate, tool D, to the front of the gearbox with two 8 x 25 mm bolts and washers with the 3.5 mm thick disc inserted between the plate and layshaft. Note that the plate also retains the input shaft bearing outer track.

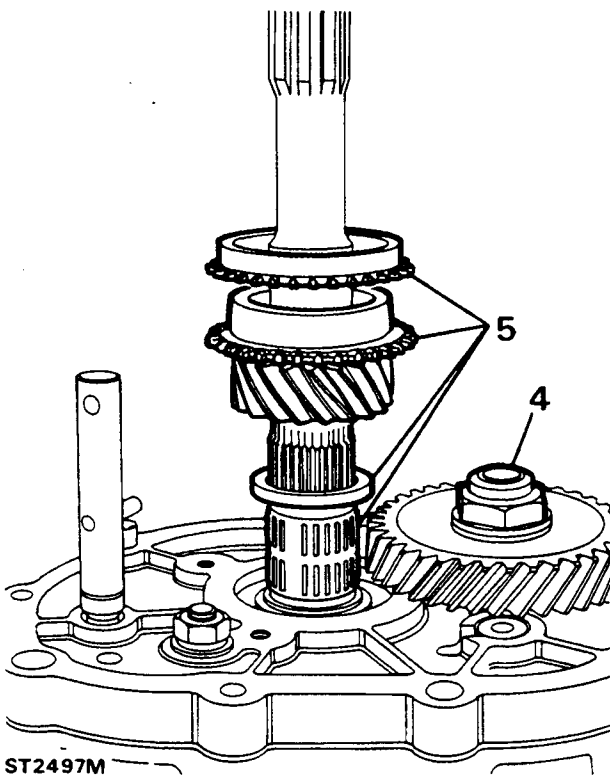


ST2507M

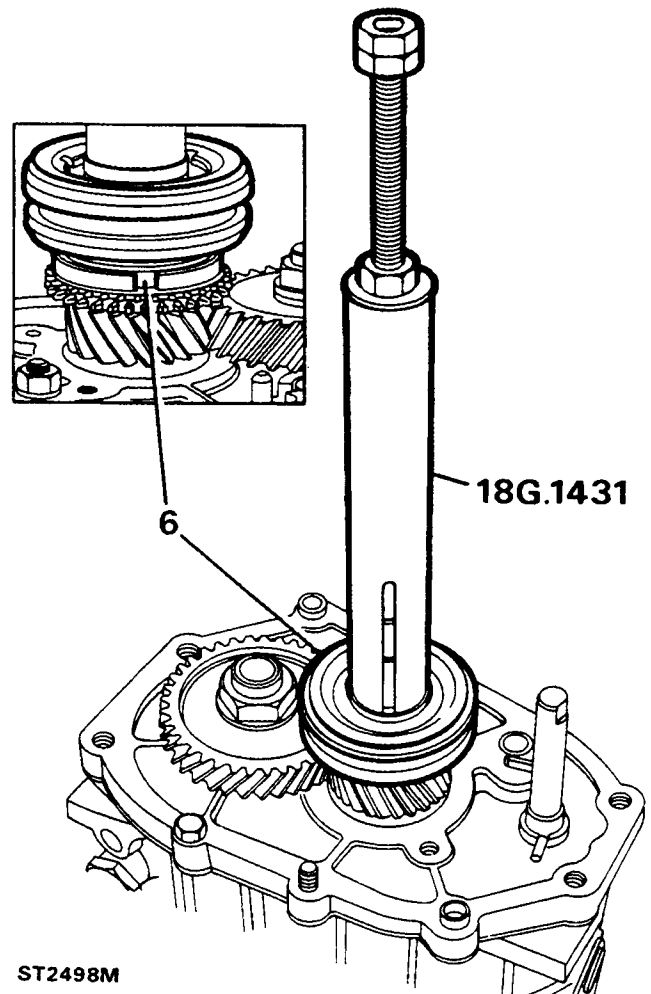
2. Release the assembly from the workstand, invert and secure it again to the workstand with rear of the gearbox uppermost. Remove the reverse shaft retainer plate.
3. With the annular extraction groove uppermost, press or drive the fifth gear on to the layshaft, with service tool 18G 1422.



4. Fit a new 22 mm stake nut to the layshaft but do not tighten at this stage.
5. Assemble the fifth speed thrust washer, roller bearing, fifth gear and baulk ring to the mainshaft.



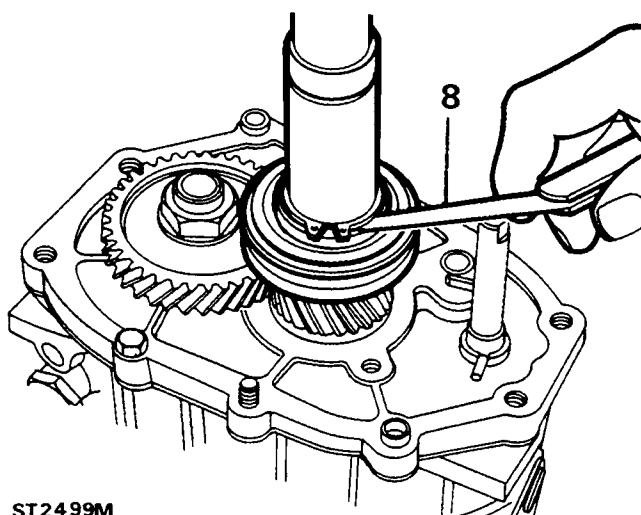
6. Press the fifth gear synchromesh inner and outer members and retainer plate on to the mainshaft using service tool 18G 1431. Before pressing the synchromesh fully home, ensure that the slipper pads locate in the three slots in the baulk ring.



7. Since only limited movement of the synchromesh inner member on the mainshaft splines is permissible a range of selective washers is available for fitment between the inner member and retaining circlip as listed on the following page.

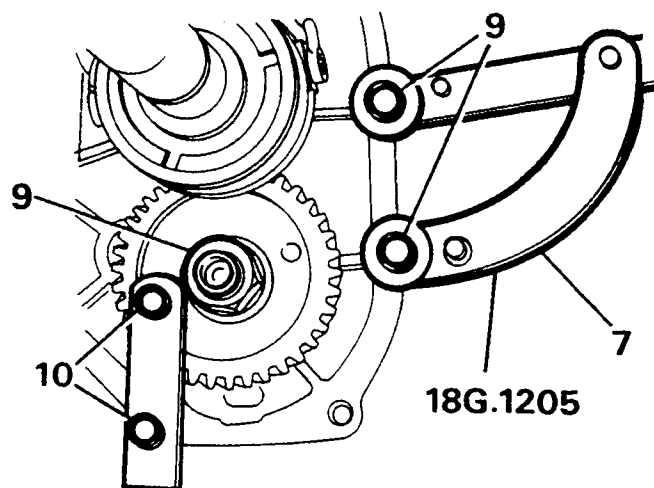
Part number	Thickness(mm)
FRC 5284	5,10
FRC 5286	5,16
FRC 5288	5,22
FRC 5290	5,28
FRC 5292	5,34
FRC 5294	5,40
FRC 5296	5,46
FRC 5298	5,52
FRC 5300	5,58
FRC 5302	5,64

8. Start by fitting the thinnest washer and secure with a new circlip. Measure, with a feeler gauge, the clearance between the circlip and washer. The maximum permitted clearance is 0,005 mm to 0,055 mm (0.0002 to 0.002 in.). Continue selection until the clearance is correct.



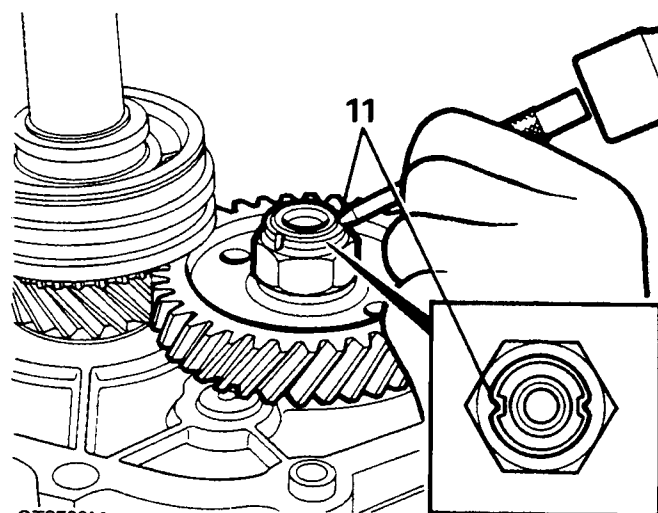
ST2499M

9. At this stage the layshaft gear stake nut must be tightened to the correct torque. The practice of locking gears to provide a restraint to tighten the nut is not acceptable in view of the high torque figure necessary. The following method must therefore be adopted to avoid damage to the gears. Secure the flange holder service tool 18G 1205 to the gearcase.
10. To restrain the fifth gear, secure one end of manufactured tool "A" to the gear and the other to the gear case. Using a suitable torque wrench, tighten the stake nut to the correct torque.



ST2500M

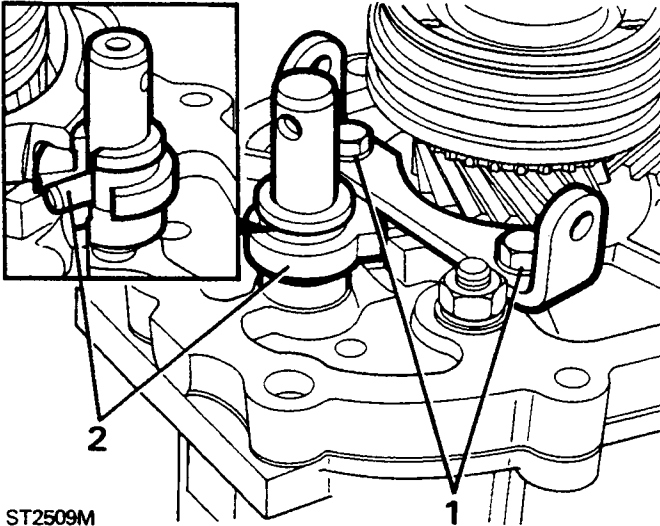
11. Using a round nose punch, neatly and with care, form the collar into the layshaft slots.



ST2508M

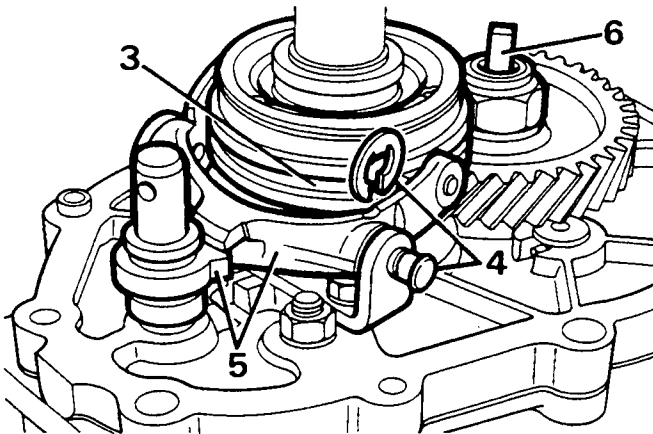
Fifth gear selector fork assembly.

1. Fit the fifth gear selector fork bracket to the centre plate with the two bolts and spring washers and tighten to the correct torque.
2. Fit the fifth gear spool, long end towards the centre plate, over the selector shaft and peg.



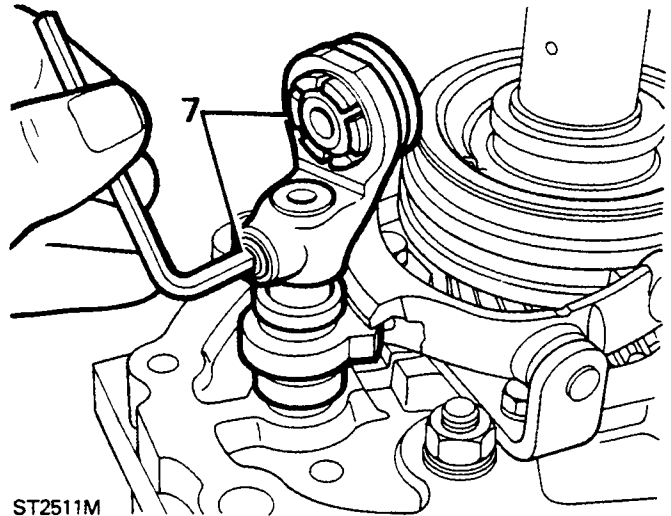
ST2509M

3. Fit the bronze pads to the selector fork and if necessary hold in position with Vaseline.
4. Assemble the selector fork to the synchromesh outer member groove and attach it to the bracket with the two pins. Before securing the with the "E" clips, cover, with cloth, all the holes into the main casing to prevent an "E" clip accidentally falling into the casing.
5. Engage the tongue of the spool in the selector fork groove.



ST2510M

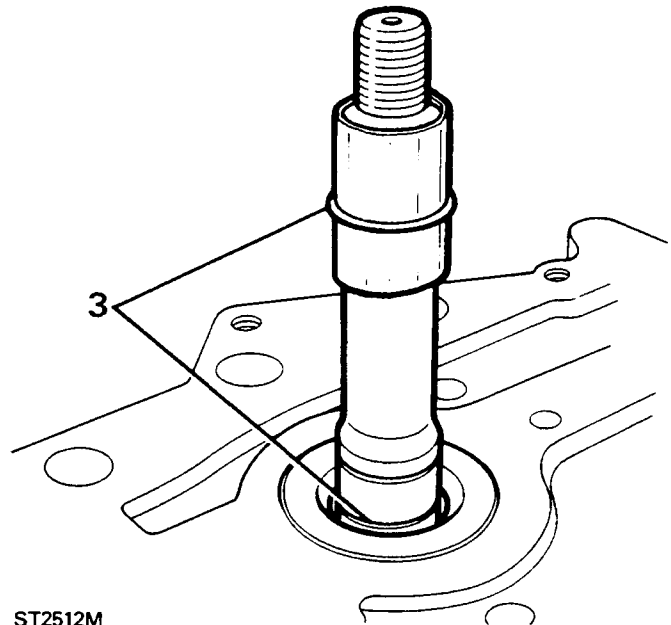
6. Fit the oil pump drive shaft to the layshaft.
7. Secure the selector yoke to the selector shaft with a new 10 mm Loctite encapsulated grub screw and tighten with an Allen key.



ST2511M

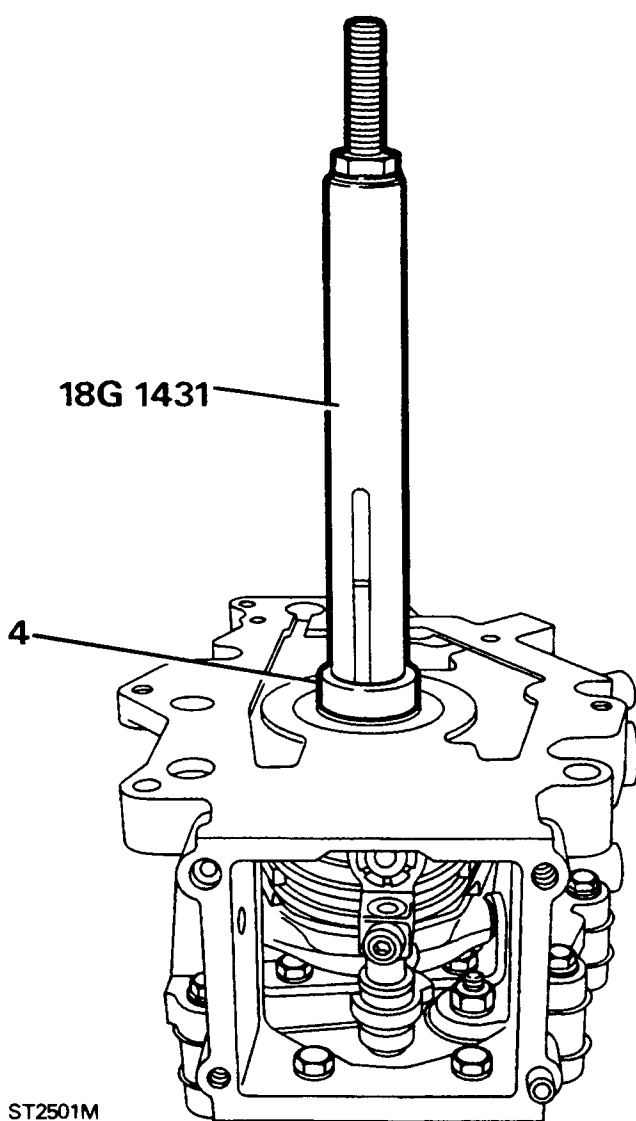
Extension case.

1. Remove the two bolts securing the centre plate and place a new gasket on the joint face.



ST2512M

2. Carefully lower the extension case with the oil pick-up pipe into position on the centre plate. If it does not locate correctly, first time, do not use force but remove the case and re-align the oil pump and drive shaft. Refit the case, remove the guide studs and secure the case with the bolts and tighten evenly to the correct torque.
3. Cover the mainshaft splines with smooth tape and fit a new "O" ring oil seal to the mainshaft groove. Remove the protective tape.
4. Fit a new oil seal collar to the mainshaft using service tool 18G 1431. The slot in the tool is so that it can be seen when the collar has been pushed on to the shaft sufficiently to enable the retaining snap ring to be fitted to the groove.

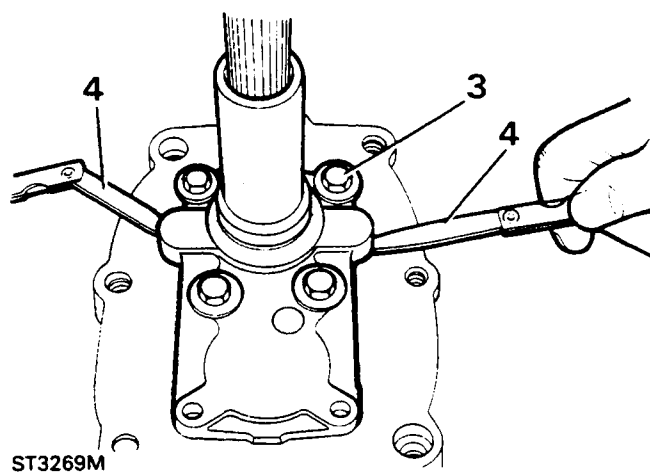


Input-mainshaft bearing adjustment.

1. Turn the gearbox over and secure it to the workstand. Remove the layshaft support plate and packing disc.

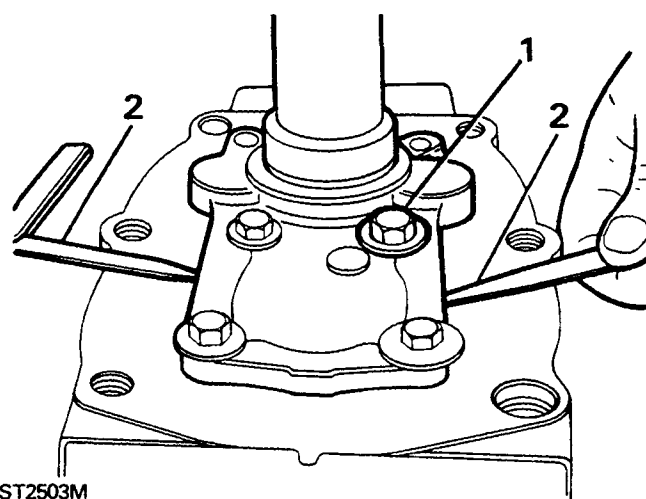
NOTE: Correct shimming of the input shaft bearing is important to ensure that the mainshaft assembly has the design intended end float and that the taper bearings are not pre-loaded.

2. Measure and note the thickness of a new front cover gasket.
3. Place the original shim washer on the mainshaft bearing and secure the cover, without the gasket, with the four bolts and spring washers, finger tight only, which surround the input shaft. Do not fit the layshaft shim washer at this stage.
4. Measure the clearance between the front cover and gearcase with two sets of feeler gauges on opposite sides of the cover as illustrated. If necessary, change the selective washer to obtain a clearance of 0,035 mm to 0,085 mm (0.001 to 0.003 ins.) less than the thickness of the gasket. This will ensure that when the gasket and cover is fitted and secured to the correct torque, the input shaft and therefore the mainshaft assembly and bearings will have no pre-load and not more than 0,06 mm (0.0025 in.) end float.
5. Remove the front cover and keep the selective washer and gasket safely for the final assembly of the cover when the following layshaft bearing adjustment is completed.



Mainshaft selective washers.

Part number	Thickness (mm)
FRC 4327	1,51
FRC 4329	1,57
FRC 4331	1,63
FRC 4333	1,69
FRC 4335	1,75
FRC 4337	1,81
FRC 4339	1,87
FRC 4341	1,93
FRC 4343	1,99
FRC 4345	2,05
FRC 4347	2,11
FRC 4349	2,17
FRC 4351	2,23
FRC 4353	2,29
FRC 4355	2,35
FRC 4357	2,41
FRC 4359	2,47
FRC 4361	2,53
FRC 4363	2,59
FRC 4365	2,65
FRC 4367	2,67
FRC 4369	2,77

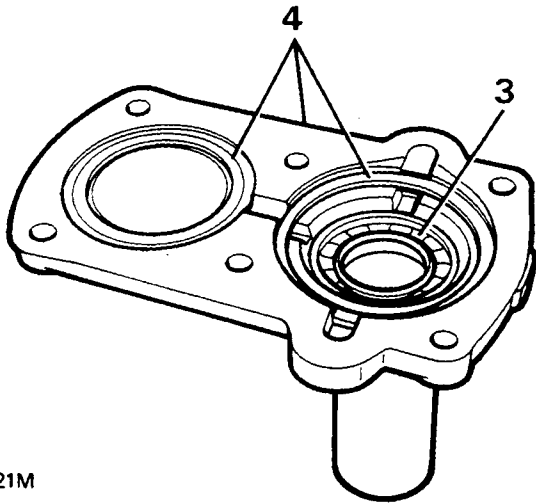
**Layshaft selective washers.**

Part number	Thickness (mm)
FTC 0262	1,36
FTC 0264	1,42
FTC 0266	1,48
FTC 0268	1,54
FTC 0270	1,60
FTC 0272	1,66
FTC 0274	1,72
FTC 0276	1,78
FTC 0278	1,84
FTC 0280	1,90
FTC 0282	1,96
FTC 0284	2,02
FTC 0286	2,08
FTC 0288	2,14
FTC 0290	2,20
FTC 0292	2,26
FTC 0294	2,32
FTC 0296	2,38

Layshaft bearing adjustment.

1. Place the original selective washer on the layshaft bearing and fit the front cover without a gasket. Secure the cover with the four bolts and plain washers finger tight only. Ensure that the the washer locates correctly in the front cover register.
2. Measure the clearance, with two sets of feeler gauges, between the cover and gearcase. Select a shim washer that will provide a clearance equal to the thickness of the gasket that was selected and measured when calculating the adjustment of the input and mainshaft bearing. This will ensure that the layshaft bearings have no end float and not more than 0,025 mm (0.001 in.) pre-load once the gasket and cover is fitted and the bolts tightened to the correct torque.

3. Remove the front cover and layshaft selective washer. Drive or press in a new oil seal to the front cover. Ensure that the seal lips face towards the gearcase and that the garter spring is in position.
4. Fit the mainshaft and layshaft selected washers to the front cover and retain in position with petroleum jelly. Also, fit a new cover gasket and hold with petroleum jelly.



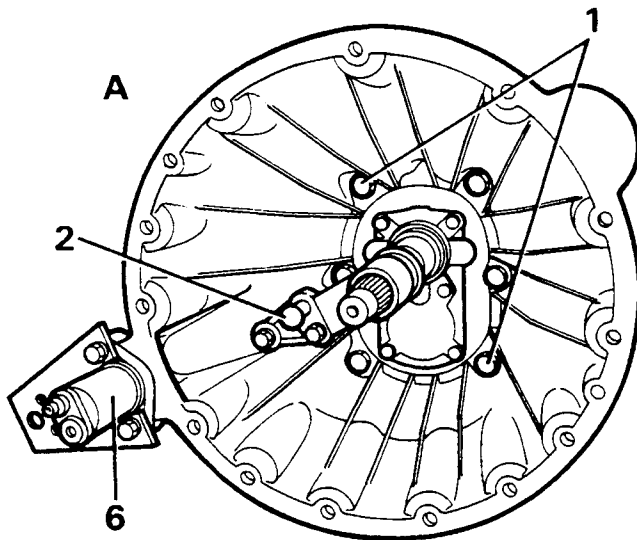
ST2521M

5. Wrap smooth tape round the input shaft splines to protect the new oil seal. Apply Hylomar PL 32 to the threads of the six bolts and secure the cover tightening the bolts and spring washers evenly to the correct torque.

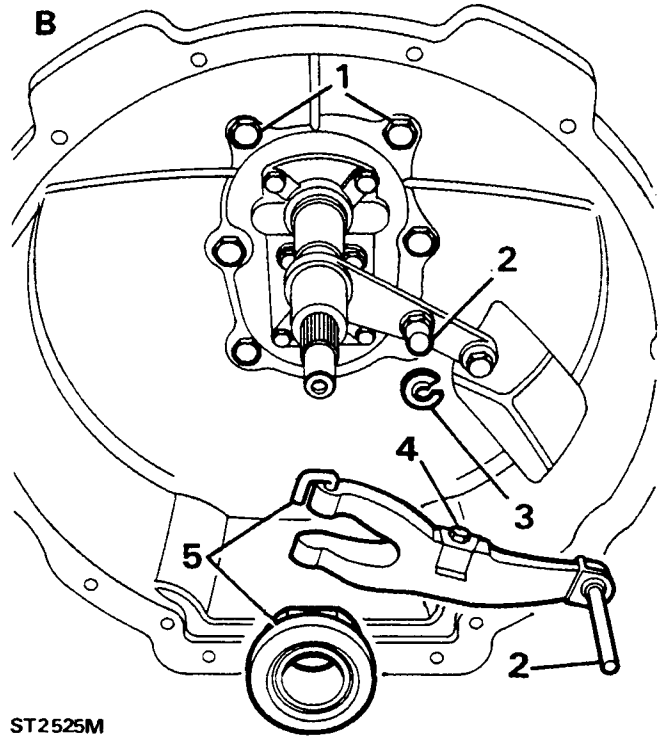
Fitting bell housing.

1. Fit the two dowels to the rear face of the gearcase and locate the bell housing over the dowels. Fit the two 12 x 45mm long bolts with plain and spring washers to the dowel positions. The remaining 12 x 30mm bolts are fitted with spring washers only. Tighten the bolts evenly to the correct torque.

Illustration A - Diesel engine.
Illustration B - V8 engine.

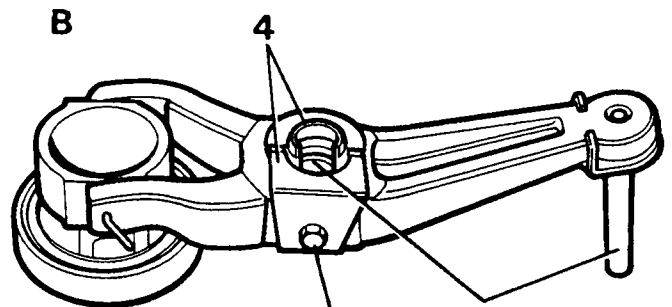


ST2522M

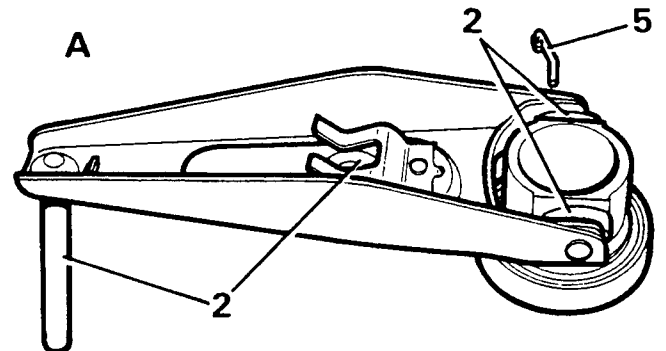


ST2525M

2. Apply molybdenum disulphide grease to the pivot post, locating socket in release lever and ball end of the clutch operating push rod also the slippers on Diesel engine. Do not lubricate the bearing guide.



ST2523M



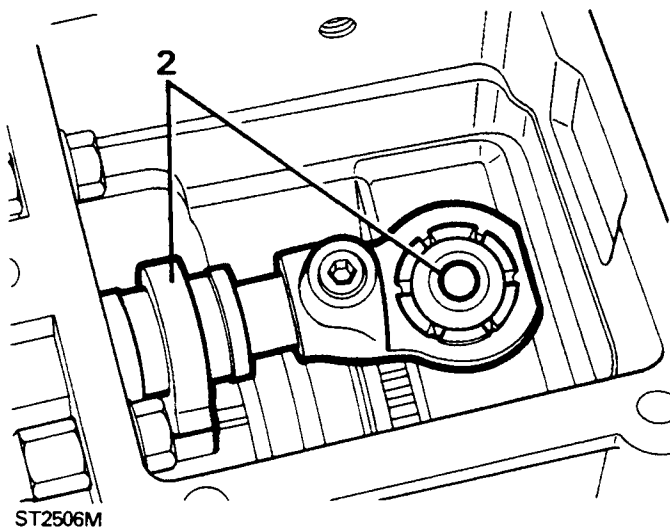
ST2565M

3. Fit the "C" shaped washer to the pivot post (V8 only).

4. Secure the spring clip to the release lever and fit the lever to the pivot post. Position the spring clip behind the "C" washer and tighten the screw (V8 only).
5. Fit the release bearing and secure with a plastic staple.
6. If removed, fit the slave cylinder locating the operating rod in the cylinder.

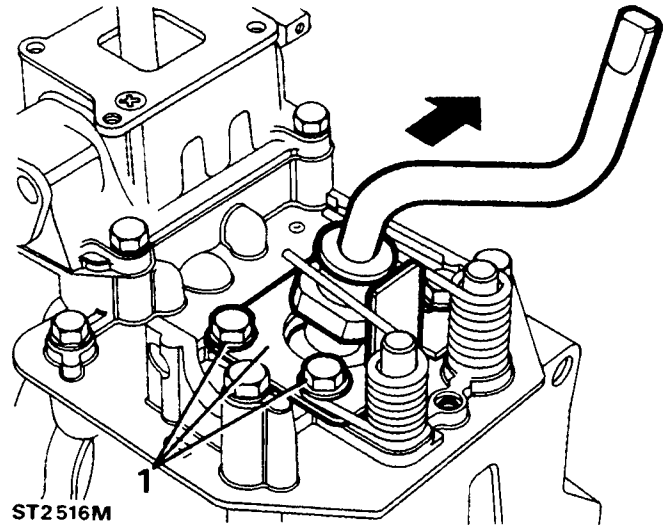
Gear change housing.

1. Remove the gearbox from the workstand and place on a bench in a safe and secure manner.
2. Using a new gasket, fit the gear change assembly to the extension housing. Ensure that the lower end of the gear lever engages in the hole through ball of the yoke. Also the spool retainer must locate over the fifth gear spool. Fit and tighten the retaining bolts evenly to the correct torque.



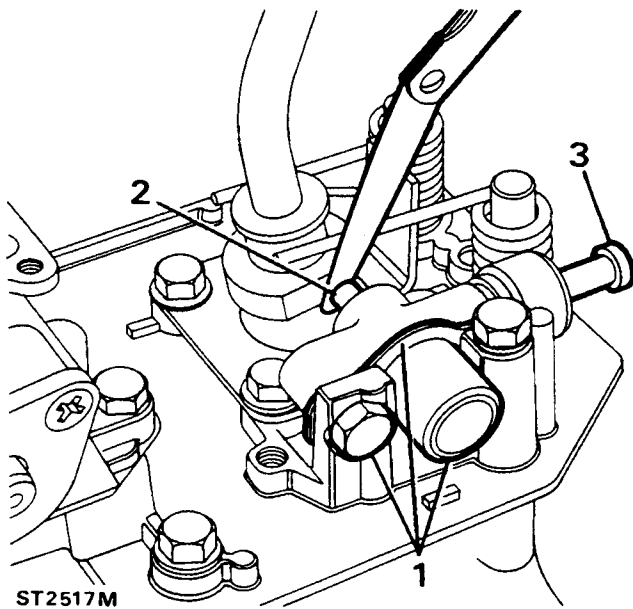
Bias adjustment plate setting.

1. Check that the bias adjustment plate retaining bolts are slack and the plate is free to slide. Select fourth gear and move the gear lever fully to the right.
2. Tighten the adjustment plate securing bolts evenly to the correct torque.
3. Check that the adjustment is correct by selecting third and then fourth gear.



Setting reverse gear plunger.

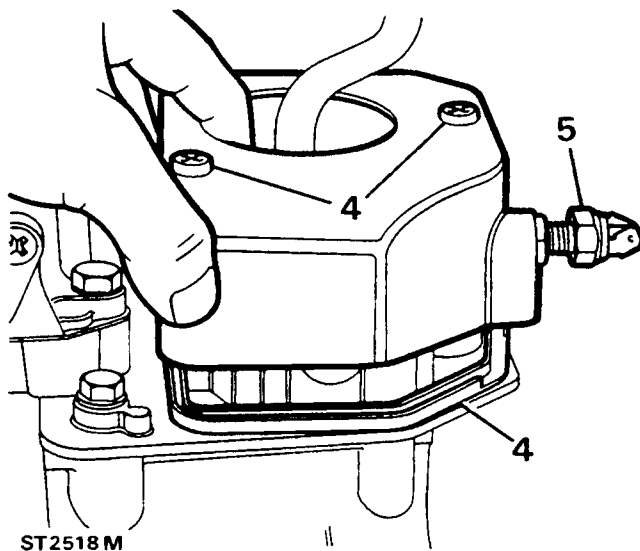
1. If not already fitted, secure the plunger assembly and original shims to the gear change housing with the single bolt and washer and tighten to the correct torque.
2. Select first gear and with feeler gauges measure the clearance between the reverse plunger and the flat on the side of the gear change lever. The clearance should be 0,6 mm to 0,85 mm (0.024 in. to 0.034 in.). Adjust the clearance by adding or removing shims as necessary.
3. Fit the reverse lamp switch operating plunger to the reverse plunger assembly.



4. Place a new sealing rubber in position on the gear change housing and secure the cover with the two screws.
5. Fit and adjust the reverse lamp switch, see Section 86.

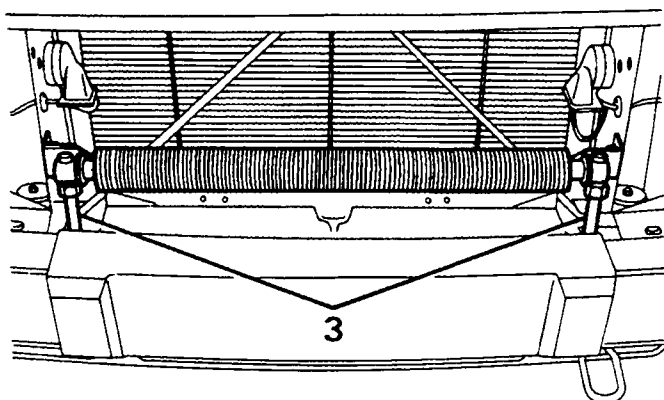
Lubrication.

1. Check the tightness of the gearbox and transfer housing drain plugs. Move the gearbox to a level position and remove the filler level plug. Inject 2.20 litres (3.90 imperial pints) of a recommended oil from a sealed container into the gearbox and tighten the plug. Wipe-away surplus oil.
2. Assemble the transfer gearbox to the main gearbox and fit the complete assembly to the vehicle.
3. Before running the vehicle, it should be moved to level ground, the filler level plug removed and if necessary, inject sufficient of the same above recommended oil until it just begins to run from the level hole. Refit the plug, tighten to the correct torque and wipe-away surplus oil.
4. At the same time, check the transfer gearbox oil level and top-up, if necessary, with a recommended oil from a sealed container.



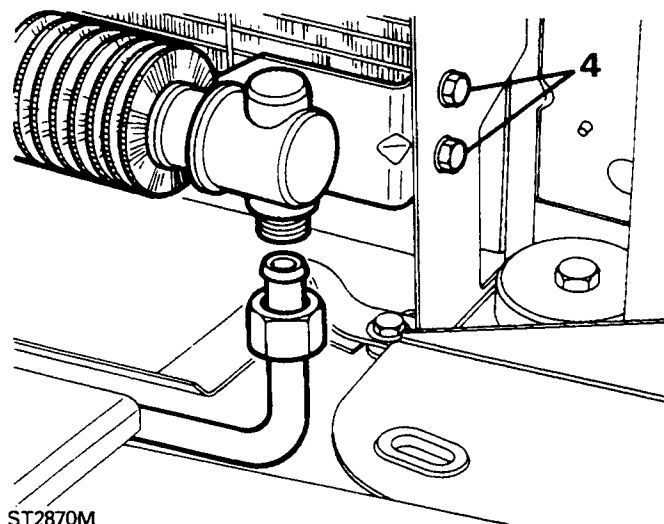
GEARBOX OIL COOLER V8i engines only**Remove**

1. Disconnect the battery negative lead.
2. Remove the radiator grill. See section 76.
3. Disconnect the inlet and outlet pipes from the oil cooler. Cover, not plug, the end of both pipes to prevent entry of dirt.



ST2869M

4. Remove the four bolts, two each end of the oil cooler, and remove the oil cooler from the vehicle.



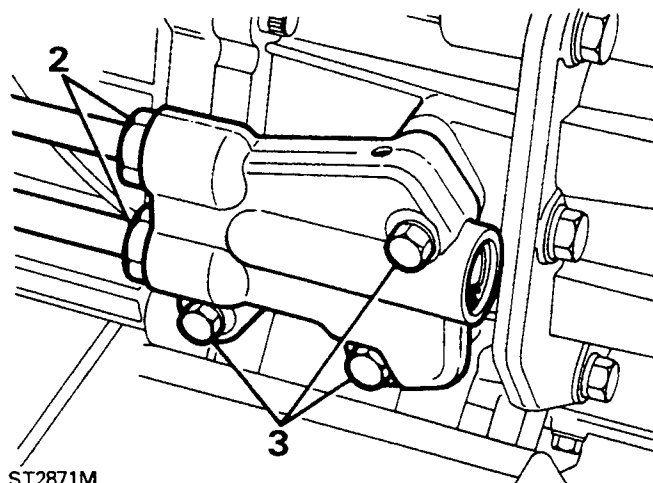
ST2870M

Fitting

5. Reverse instructions 1 to 4 and reconnect the battery. Run the engine for two to three minutes at 3000 r.p.m. with the clutch engaged so that the gearbox shafts will rotate. Stop the engine and while waiting a few minutes for the oil to settle, check for oil leaks, then check the oil level. Top-up if required with the correct grade of recommended gearbox oil.

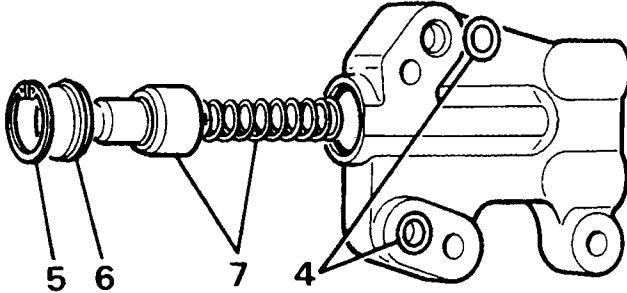
GEARBOX THERMOSTAT HOUSING**Renewing oil seals and thermostat.**

1. Disconnect the negative lead from the battery.
2. Working beneath the vehicle, clean the area around the thermostat housing and disconnect the inlet and outlet pipes from the housing. Cover, not plug, the end of both pipes to prevent entry of dirt.
3. Remove the three bolts and withdraw the thermostat housing from the gearbox. Note the position of the different length bolts.



ST2871M

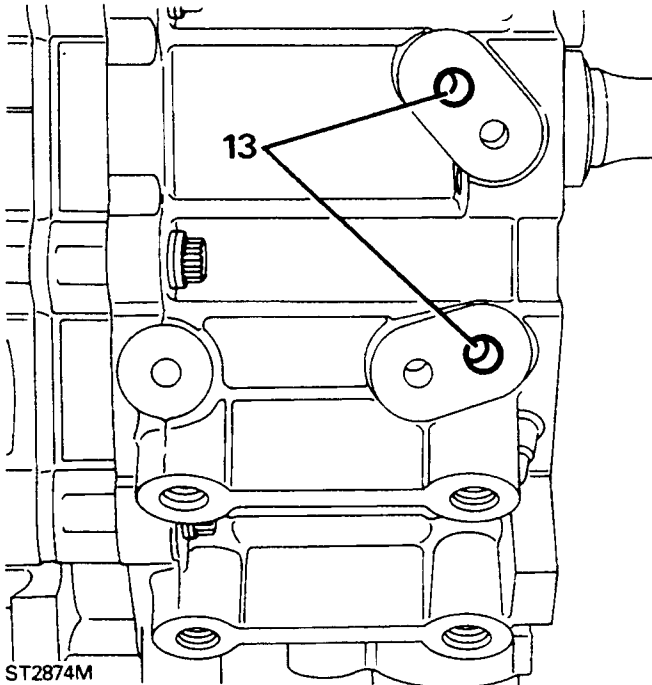
4. Remove the two "O" ring seals.
5. Remove the circlip.
6. Tap the outer face of the housing to dislodge the end cover and "O" ring seal.
7. Withdraw the thermostat and spring.
8. Clean and degrease the housing.



ST2873M

Refitting

9. Insert the spring and thermostat in the housing.
10. Fit the end cover with a new "O" ring seal.
11. Secure the assembly with the circlip ensuring that it locates properly in the groove.
12. Fit new "O" rings to the thermostat housing.
13. Clean the gearbox mating face and check that the two oil-ways are clear and free from dirt and grease.

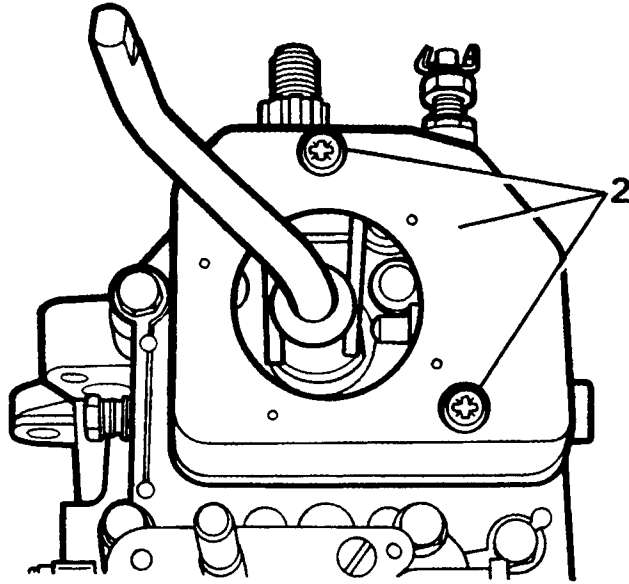


ST2874M

14. Secure the assembly to the gearbox and evenly tighten the three retaining bolts.
15. Connect the inlet and outlet pipes to the housing.
16. Reconnect the battery and run the engine for two to three minutes at 3000 r.p.m. with the clutch engaged so that the gearbox shafts rotate. Stop the engine and while waiting a few minutes for the oil to settle, check for oil leaks, then, check the oil level. Top-up, if necessary, with the correct grade of recommended gearbox oil.

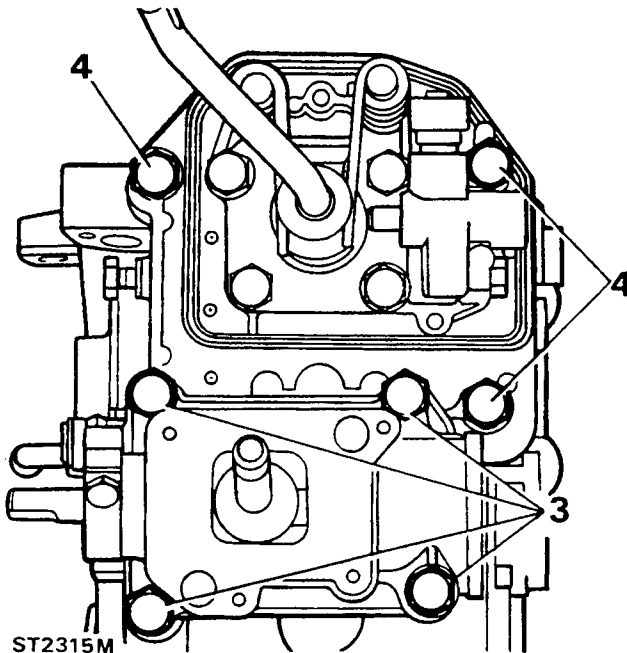
GEAR CHANGE HOUSINGS

1. Separate main gearbox from transfer box, remove bell housing, drain oil, and clean exterior.
2. Remove gear change housing cover.



ST2314M

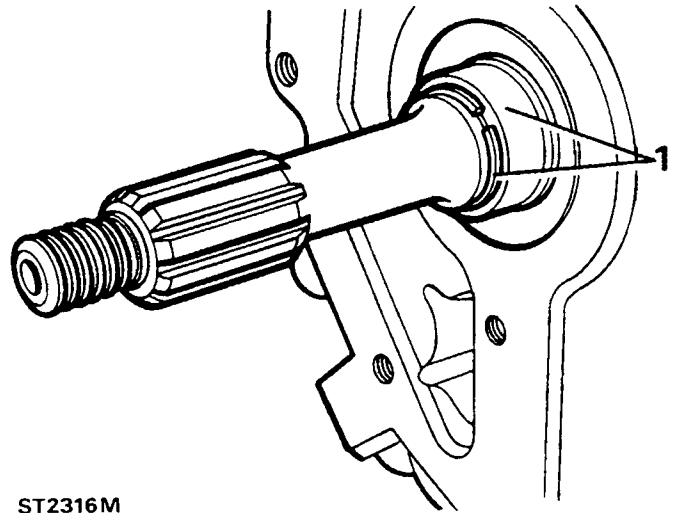
3. Remove transfer gear change housing.
4. Remove main gear change housing.



ST2315M

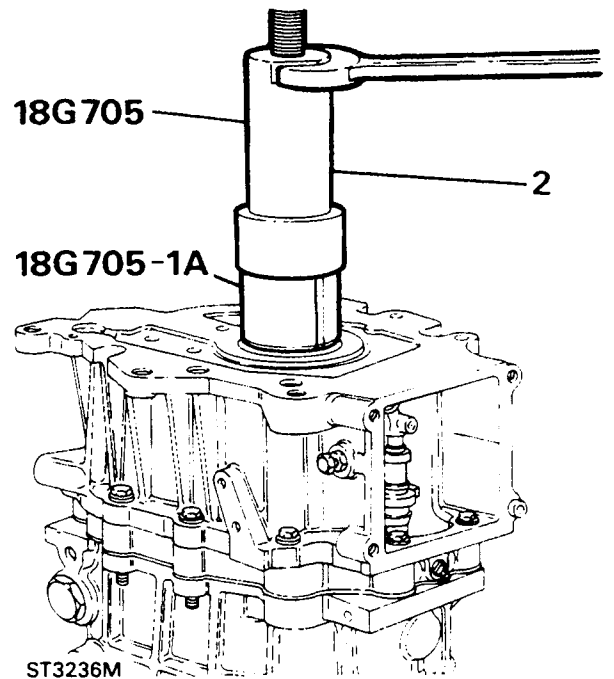
Extension housing

1. Remove snap ring retaining oil seal collar.



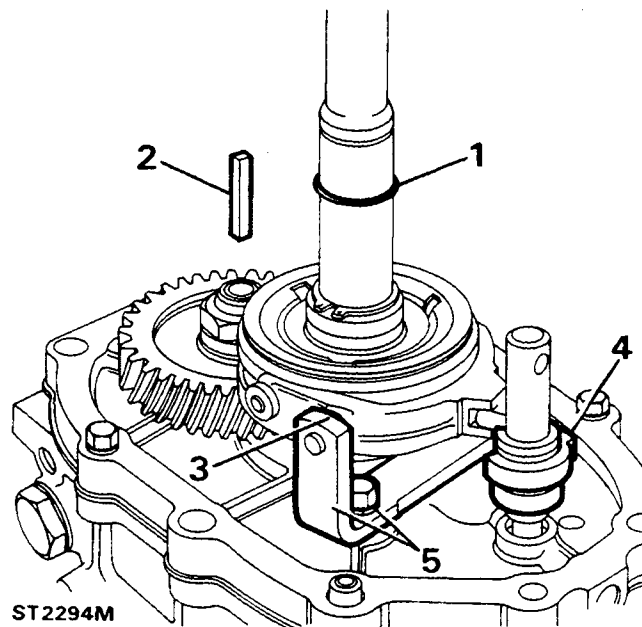
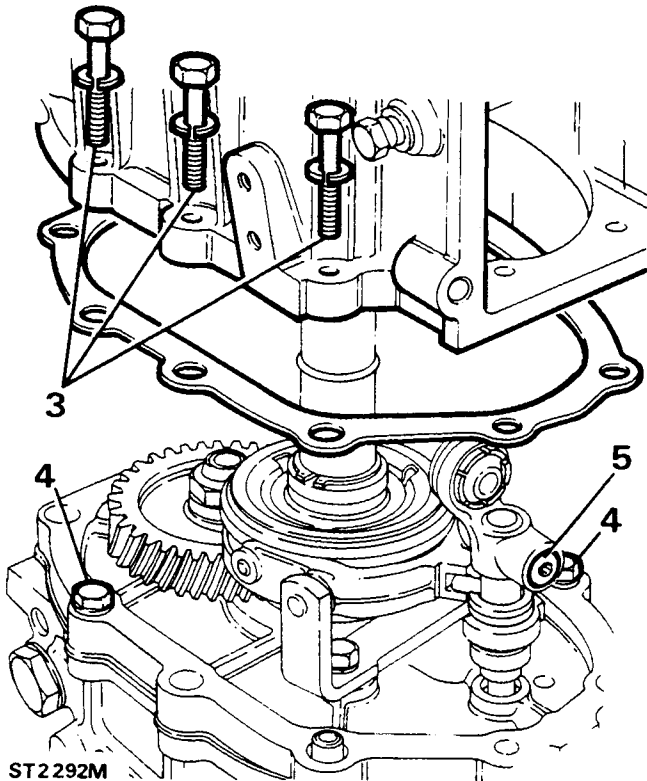
ST2316M

2. Using service tools 18G 705 and 18G 705-1A withdraw oil seal collar.

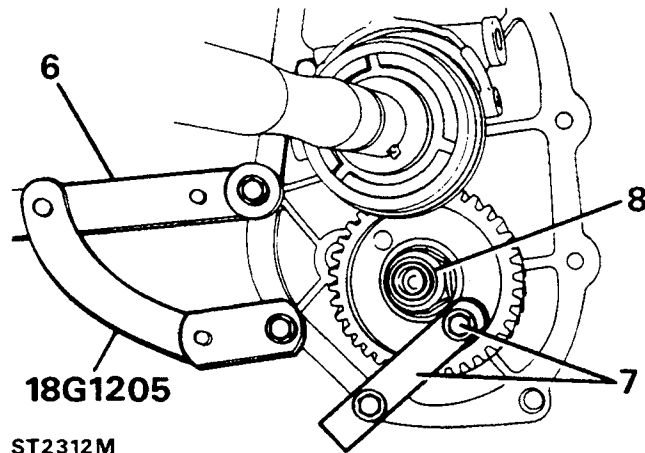


ST3236M

3. Remove fifth gear extension housing.
4. Secure centre plate to gearcase with two 8 x 35mm bolts.
5. Remove selector yoke from selector shaft.



6. Locate flange holder tool 18G 1205.
7. Fit manufactured tool "A" and spacer to restrain layshaft fifth gear.
8. De-stake and remove fifth gear nut.

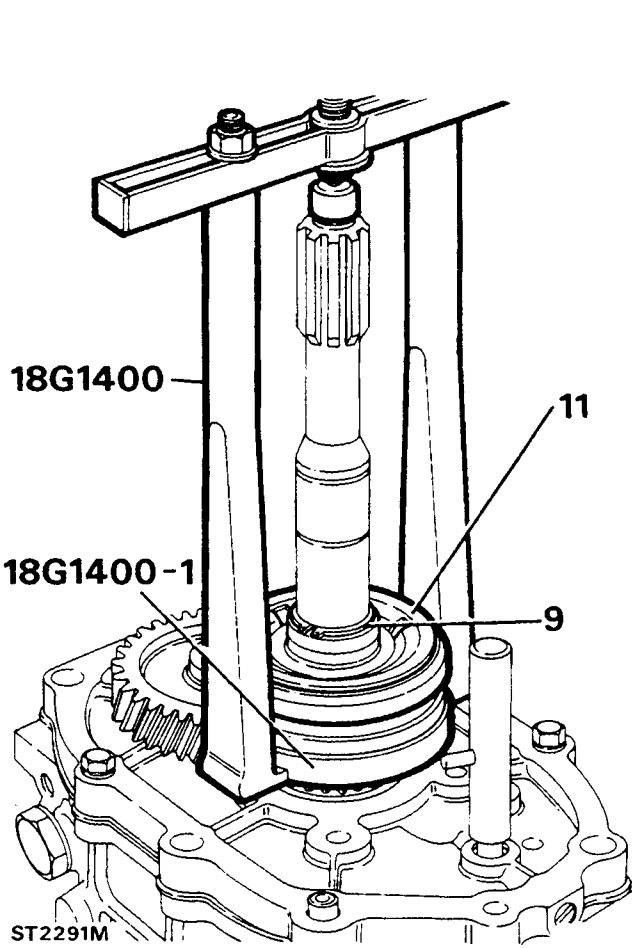


Mainshaft and layshaft fifth gears.

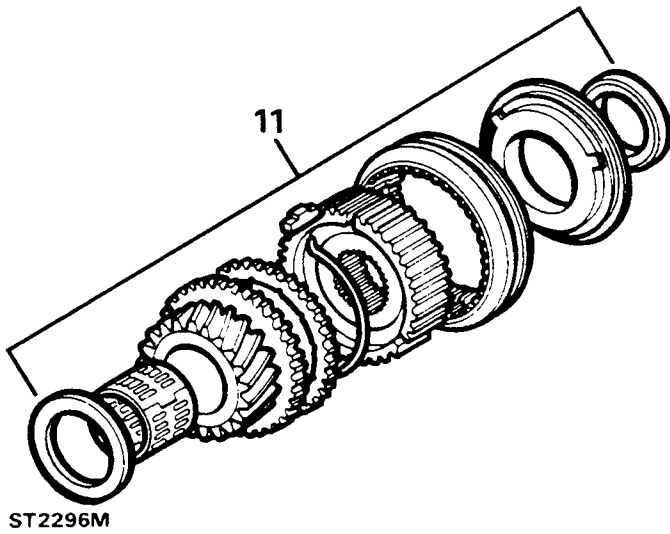
1. Remove mainshaft "O" ring.
2. Remove oil pump drive shaft.
3. Remove "E" clips from selector fork.
4. Remove fifth gear selector spool.
5. Remove selector fork bracket.

9. Remove circlip retaining mainshaft fifth gear synchronesh.
10. Fit special tool 18G 1400-1 and 18G 1400 as illustrated.

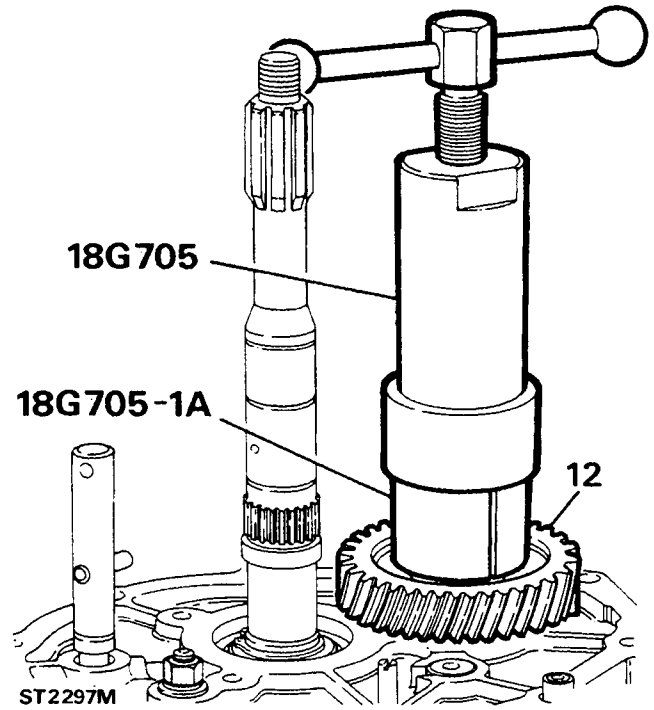
CAUTION: Ensure the puller feet locate in the two cut-outs in 18G 1400-1 and between the pins.



11. Remove fifth gear synchromesh.

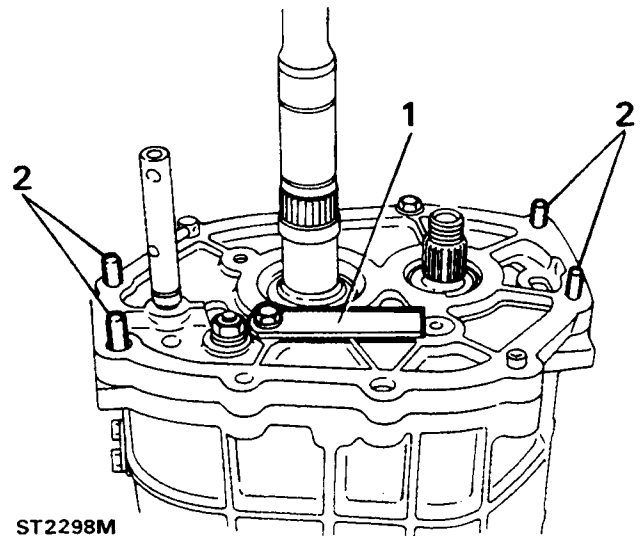


12. Remove layshaft fifth gear using special tools 18G 705 and 18G 705-1A.

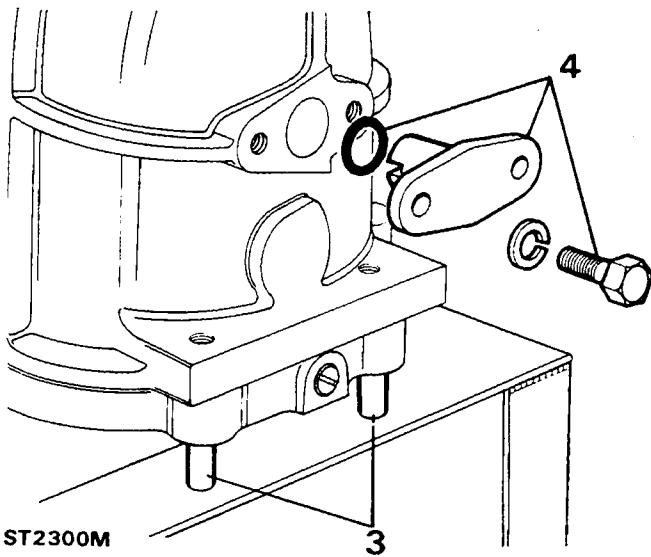


Main gear case.

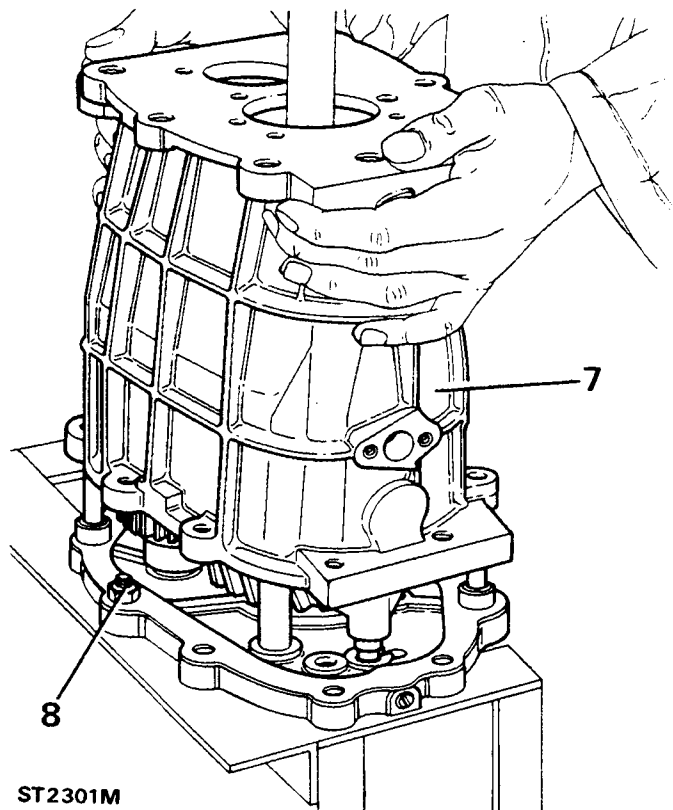
1. Secure reverse shaft retainer, manufactured tool "A", to centre plate.
2. Fit studs, manufactured tool "B" to gear case.



3. Invert gear case and locate studs in workstand holes.
4. Remove selector shaft spool retainer.

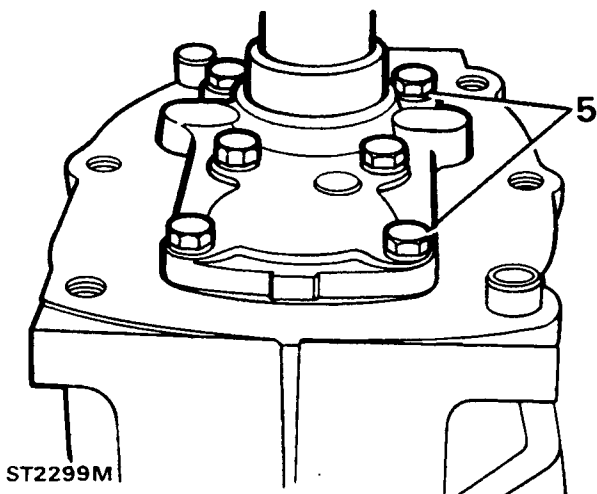


5. Remove front cover and gasket.
6. Retrieve selective washers.

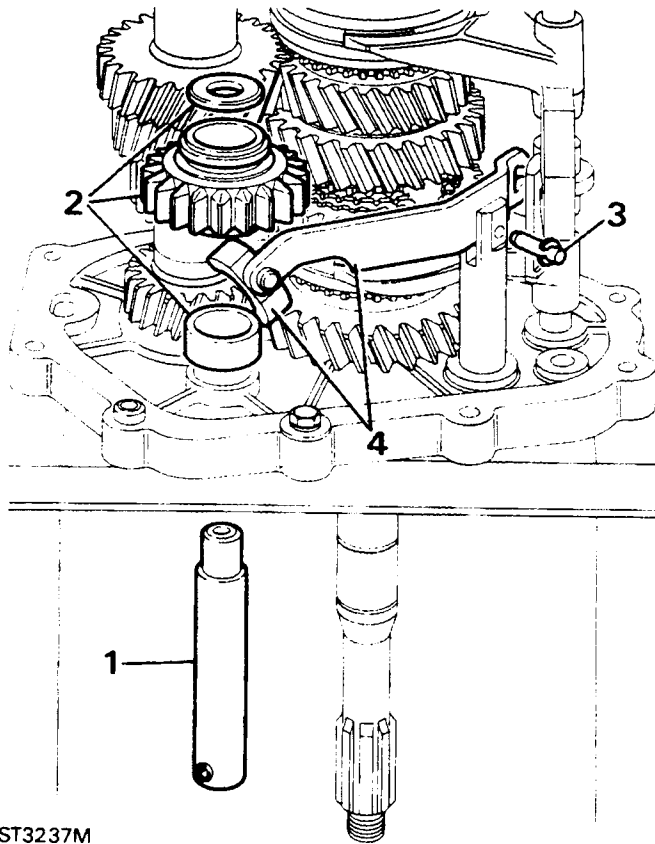


REVERSE SHAFT, LAYSHAFT AND MAINSHAFT

1. Remove retainer (tool "A") and reverse shaft.
2. Remove thrust washer, reverse gear and spacer.
3. Remove reverse lever pin with "E" clip attached.
4. Remove lever and slipper pad.

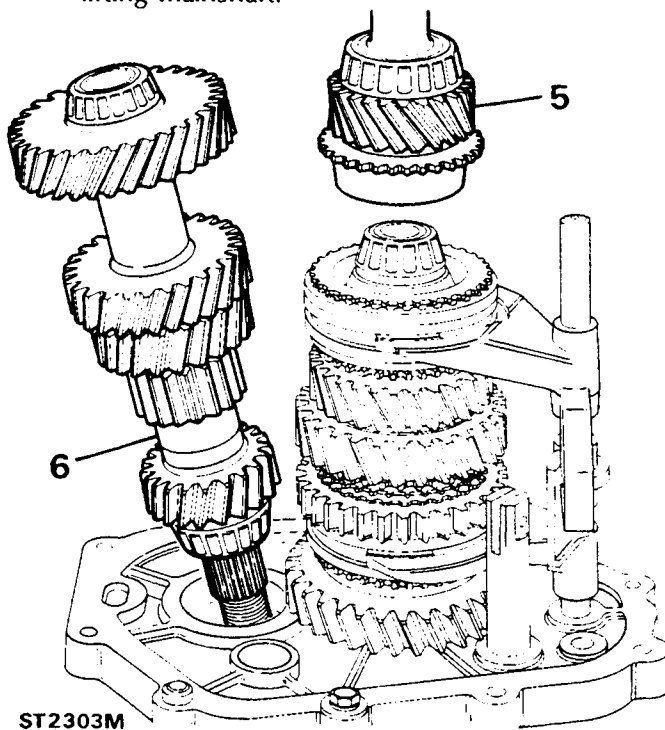


7. Remove bolts and lift-off gear case.
8. Secure centre plate with nut and bolt.



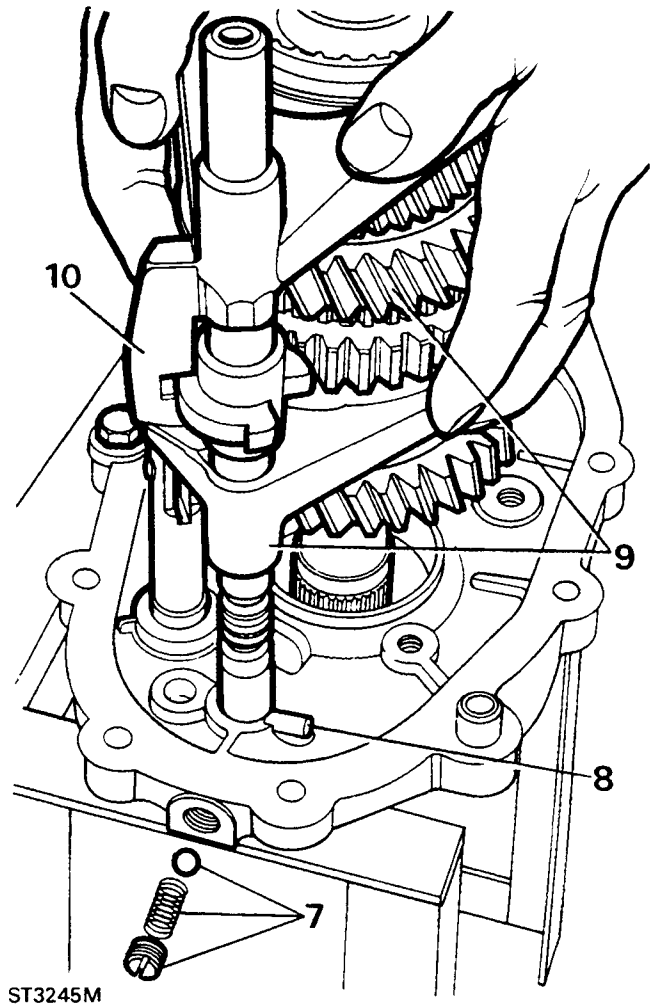
ST3237M

5. Remove input shaft and fourth gear baulk ring.
6. Remove layshaft by tilting, as illustrated and lifting mainshaft.



ST2303M

7. Unscrew plug and remove spring and outboard detent ball.
8. Align fifth gear selector pin with centre plate slot.
9. Remove mainshaft, gears, selectors and forks.
10. Remove selector fork assembly from gears.

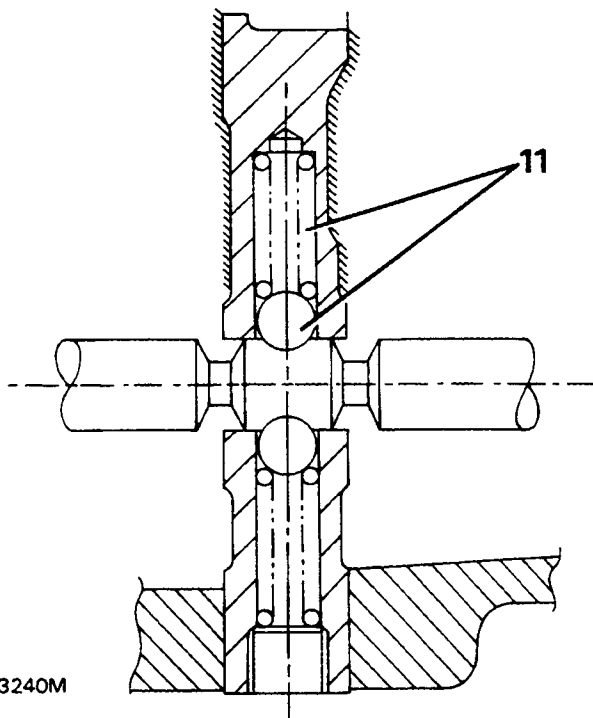


ST3245M

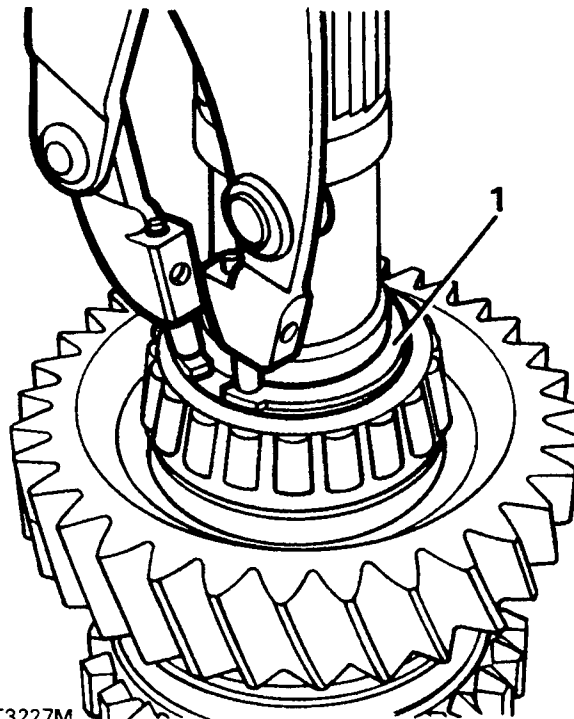
11. Collect inboard detent ball and spring from centre plate.

DISMANTLE MAINSHAFT

1. Remove circlip retaining first gear assembly.

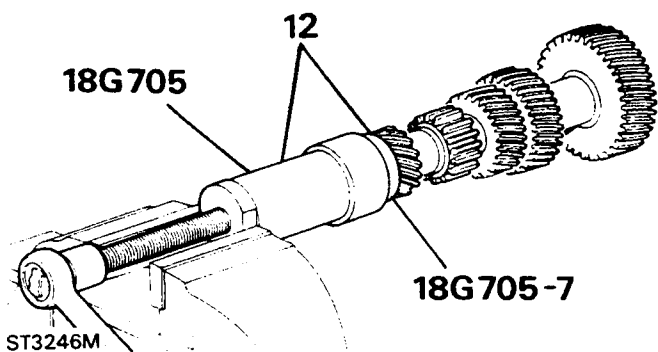


ST3240M



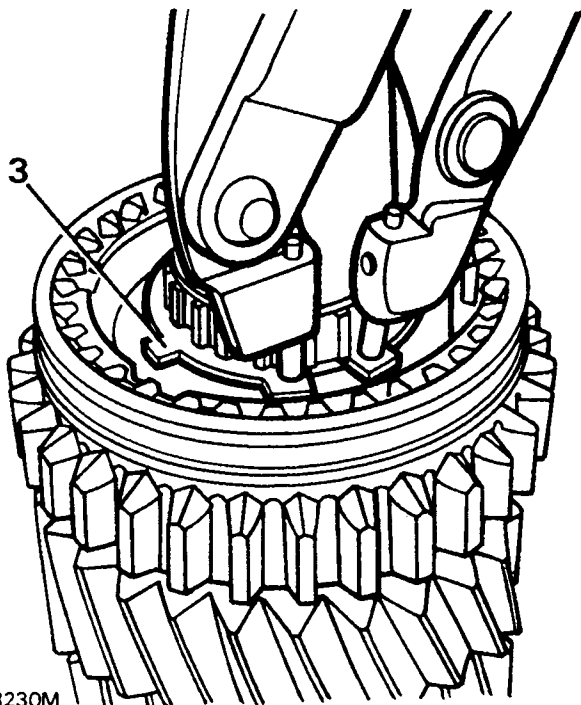
ST3227M

12. Using extractor tool 18G 705 and collets 18G 705-7, withdraw layshaft bearings.

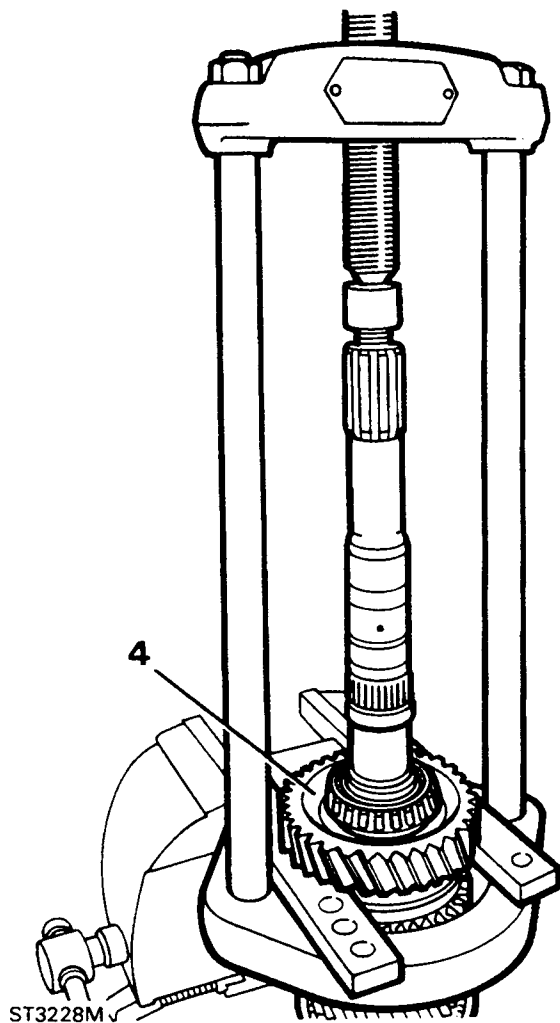
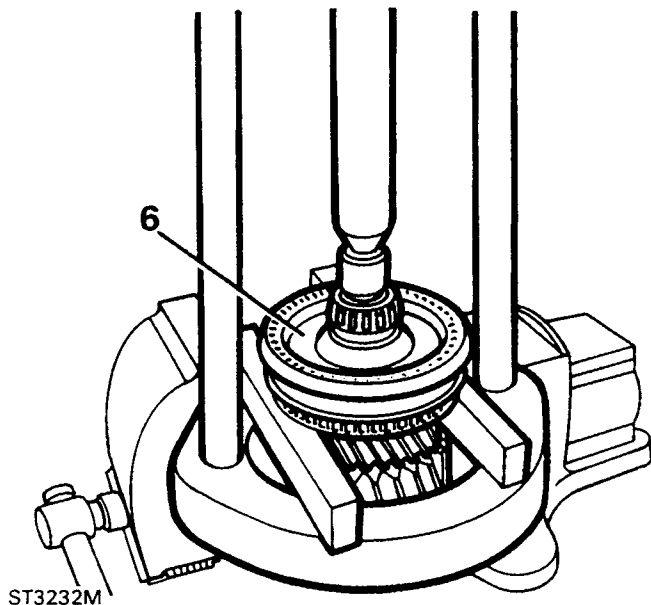


ST3246M

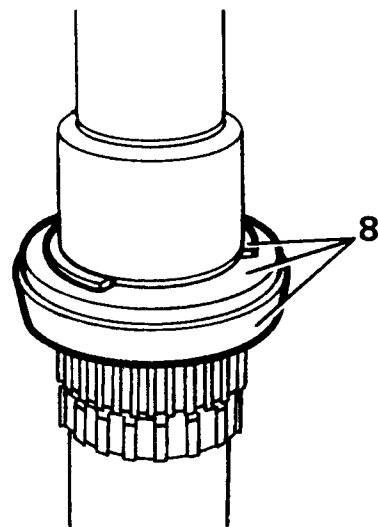
2. Remove taper bearing, bush, needle bearing, first gear spacer, cone, inner and outer baulk rings.
3. Remove circlip to release first and second gear synchromesh assembly.



4. With MS 47 press first gear assembly from mainshaft.
5. Remove first and second synchromesh baulk rings.
6. Using MS 47 and support bars under 2nd gear, press off pilot bearing, third, fourth synchromesh second and third gear assembly.



7. Remove washer, third, fourth synchromesh, third gear baulk ring, split needle rollers, bush, needle bearing and second gear.
8. Remove snap ring, spacer, second gear cone and circlip.

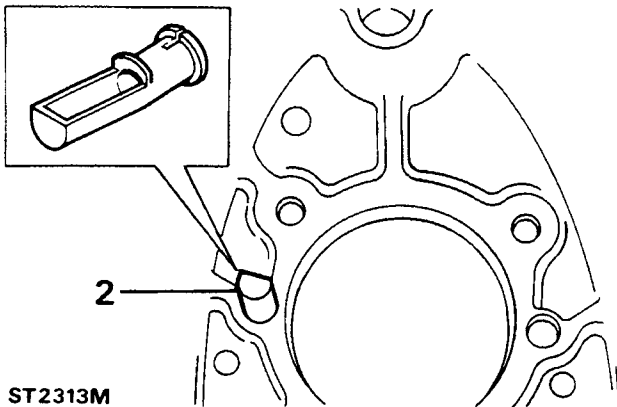


GEARBOX CASINGS AND OIL PUMP

Degrease and clean all components and discard gaskets and seals.

Gearbox casing

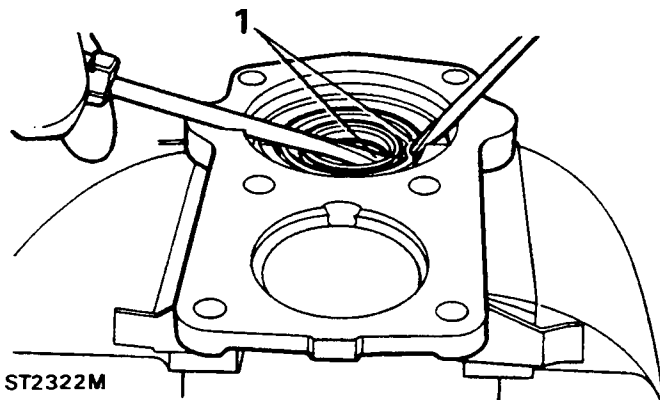
1. Remove mainshaft and layshaft bearing tracks.
2. Remove plastic scoop from inside the casing.



3. Inspect case for damage, cracks and stripped threads.
4. Fit a new scoop with scoop side towards top of casing.

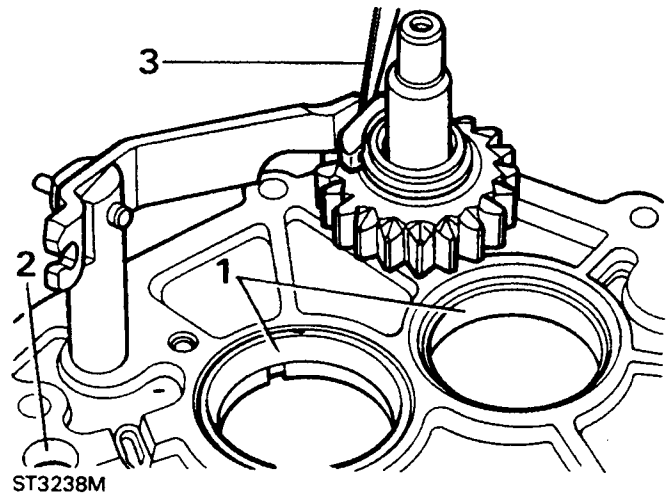
Front cover

1. Remove oil seal from cover. Do not fit a new seal at this stage.



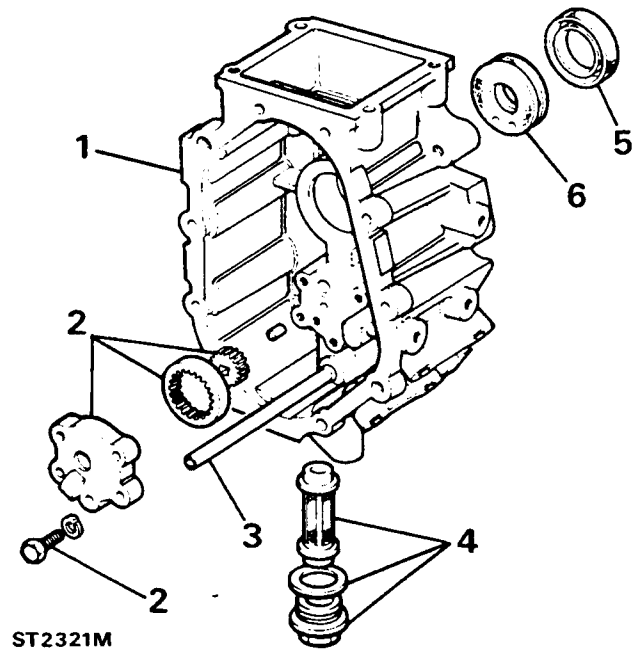
Centre plate

1. Remove bearing tracks.
2. Inspect for damage and selector rail bore for wear.
3. Temporally fit reverse shaft gear and lever and check clearance between slipper and lever does not exceed 0,20 mm (0.008 in).



Extension case

1. Examine for damage to threads and machined faces.
2. Remove oil pump cover, inspect gears and housing and renew if required.

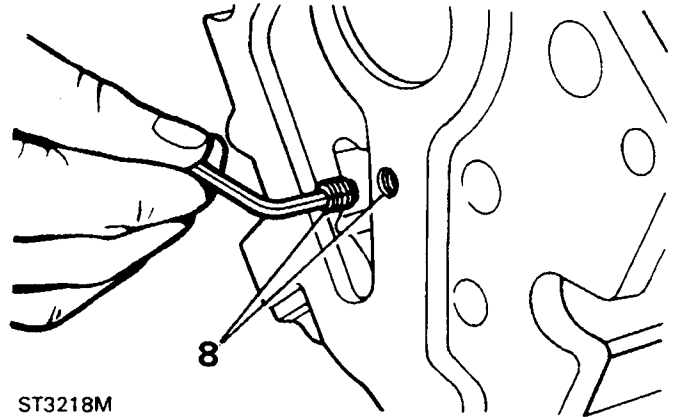


3. Check oil pick up pipe for obstruction but do not remove.
4. Remove drain plug assembly. Clean and renew filter and washers if necessary.
5. Renew oil seal.
6. Renew Ferrobestos bush.

WARNING: This bush contains abestos. Do not attempt to clean it. Poisonous substances.

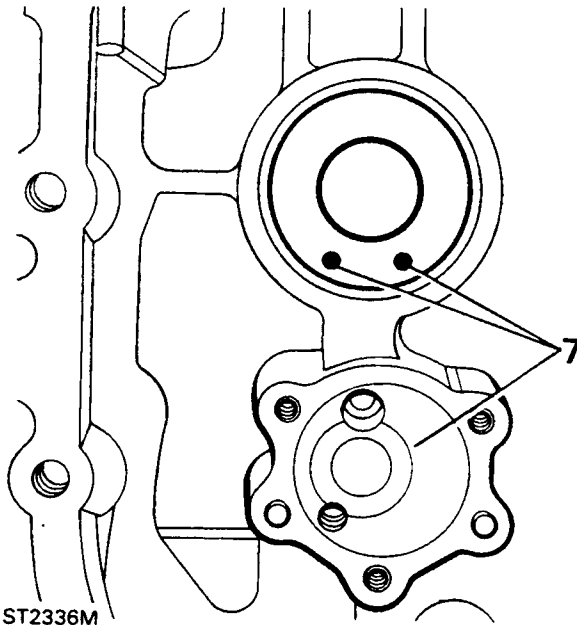
7. Fit new bush with drain holes towards bottom of casing.

CAUTION: If drain holes are not positioned correctly oil may build up behind oil seal and cause a leak.



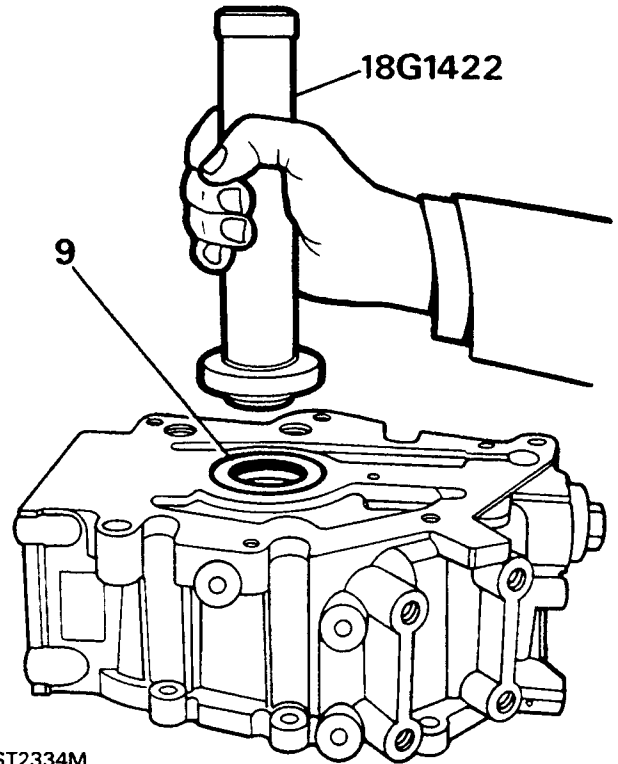
ST23218M

9. Fit oil seal to housing, lip side leading, using 18G 1422. Apply SAE 40 oil to lip.



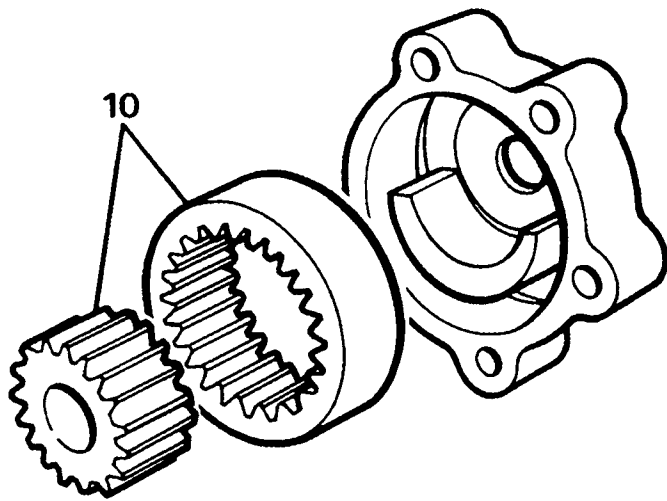
ST2336M

8. If extension housing is being renewed transfer grub screw to new housing. Apply Loctite to threads.



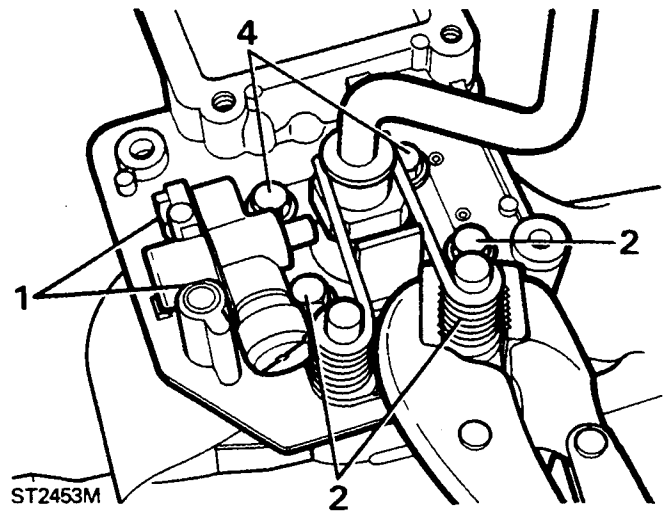
ST2334M

10. Assemble gears to oil pump and fit cover.



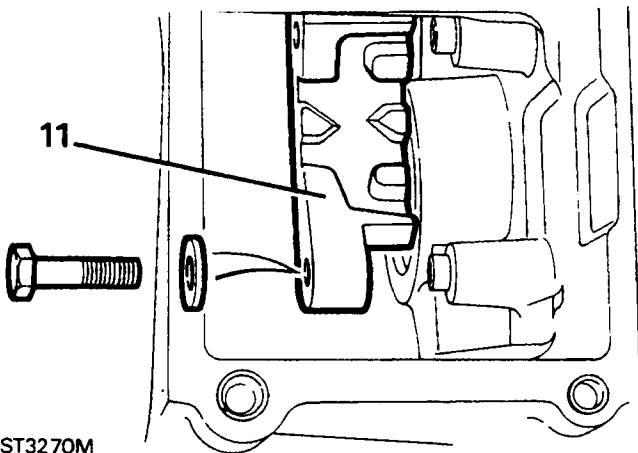
ST3254M

11. Examine gate plate and renew if worn or damaged.



ST2453M

5. Check for wear in cross pin slots in housing and wear in lower gear lever.



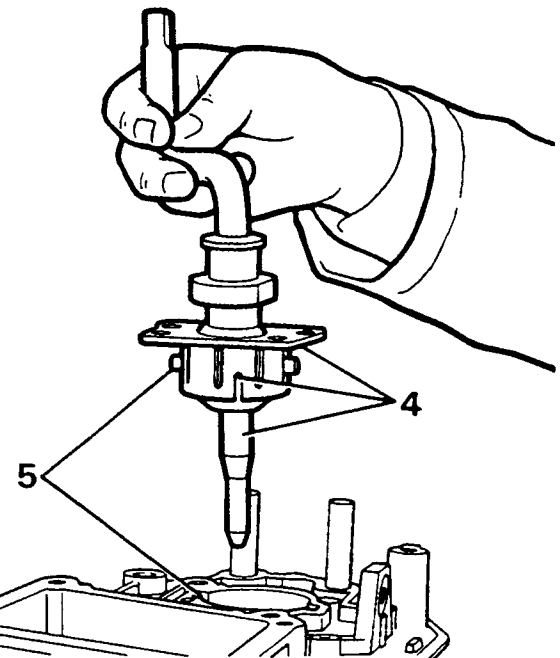
ST3270M

GEAR CHANGE HOUSING

1. Remove reverse plunger and retain shims.
2. Remove bolts retaining bias springs.

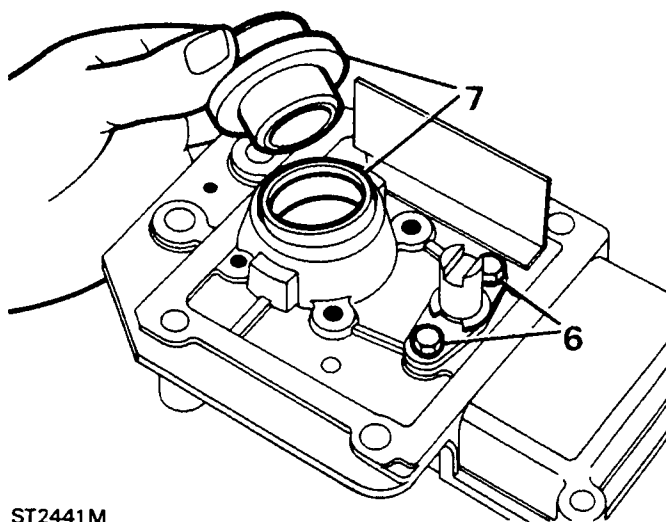
WARNING: To avoid personal injury, restrain each spring in turn with a pair of grips while the bolts are being removed.

3. Remove the two springs.
4. Remove remaining bolts to release lower gear lever assembly.



ST2454M

6. Turn housing over and check security of spool guide bolts.
7. Remove oil seal and fit a replacement, lip side leading.



ST2441M

8. Examine bias springs and renew if weak or distorted.
9. Grease lower gear lever ball with Shell Alvina R3 and fit new Railko bush.
10. Fit gear lever to housing.
11. Fit adjustment plate.

NOTE: Apply Hylomar PL 32 or Loctite 290 to threads of two short bolts and fit them forward of the gear lever. Tighten bolts to prevent plate moving while springs are being fitted.

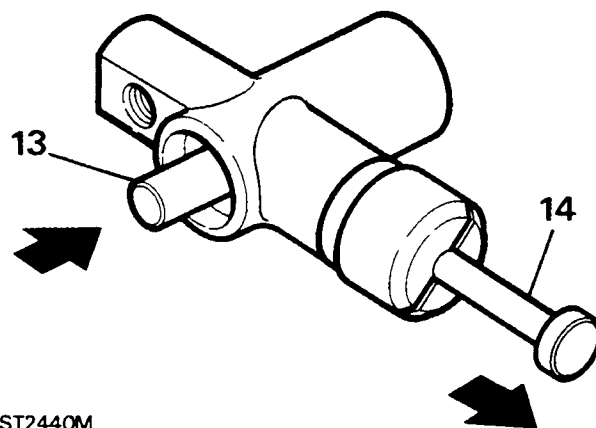
12. Fit bias springs locating long end against gear lever.

NOTE: Apply above sealant to threads of spring retaining bolts. Use grips to compress springs to enable bolts to be fitted.

13. Examine and test reverse gear plunger.

NOTE: Apply a load of 45 to 55 kg (100 to 120 lb) to plunger nose. If it functions within these limits it is satisfactory. The plunger is only available as a complete assembly.

14. Check that the reverse switch plunger operates when reverse plunger is depressed.



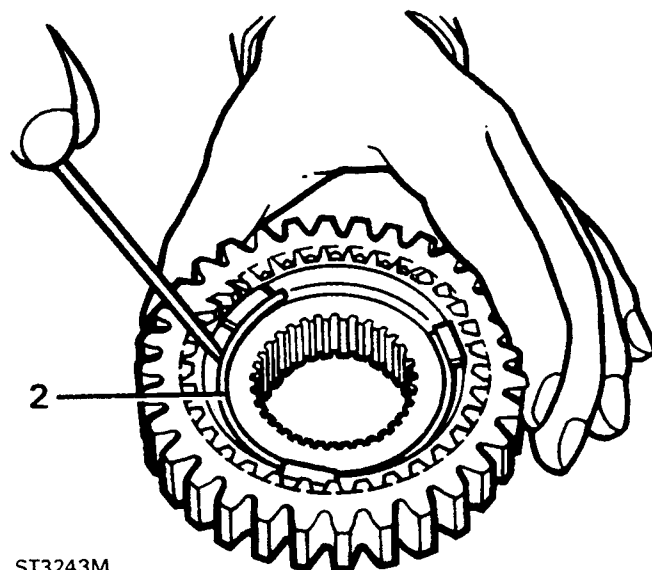
ST2440M

SYNCHROMESH ASSEMBLIES

Third-fourth and fifth gear synchromesh.

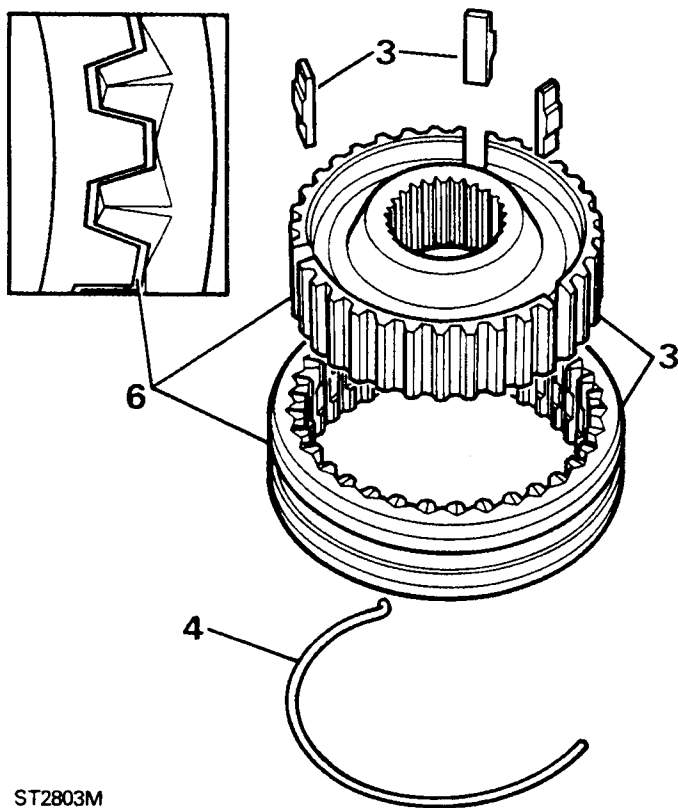
NOTE: the above assemblies are the same except that fifth gear synchromesh has a retainer plate.

1. Mark relationship of inner and outer members.
2. Remove wire clip from both sides of assembly.



ST3243M

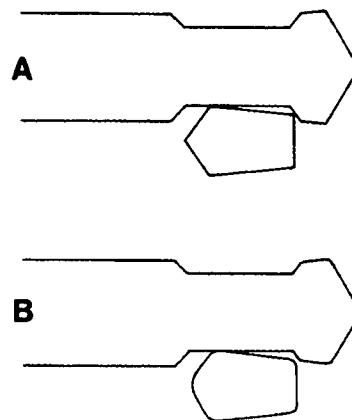
3. Remove slippers and separate the two members.
4. Examine all parts for damage and wear including wire clips for tension.
5. Check no radial movement exists between inner members and mainshaft splines. (except fifth gear synchromesh).
6. Examine inner and outer splines for wear.



ST2803M

7. Examine the dog teeth on all gears for wear and damage.

NOTE: example "A" shows a tooth in good condition. Example "B" shows the rounded corners of a worn tooth.

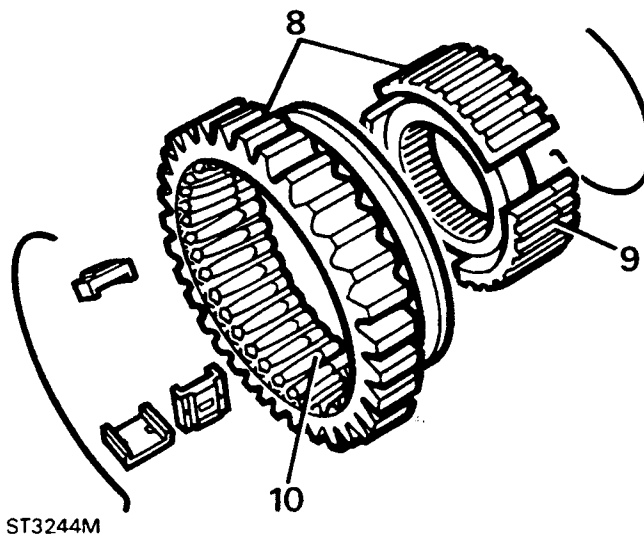


ST2449M

First-second synchromesh

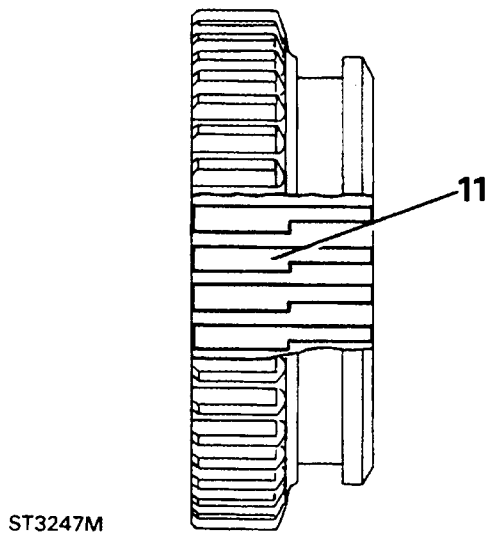
8. Repeat instructions 1 to 6 for third-fourth synchromesh.
9. Examine step in each of outer splines.
10. Check that the step on both sides of the internal splines are sharp not rounded.

NOTE: this applies only to splines on selector groove side of member.



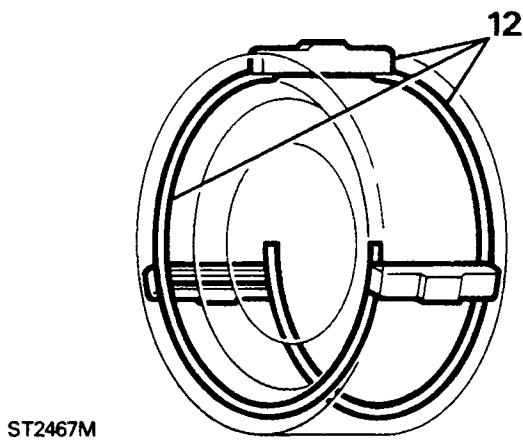
ST3244M

11. Fit inner member to outer so that the wide splines of inner member are under the spur gear teeth.



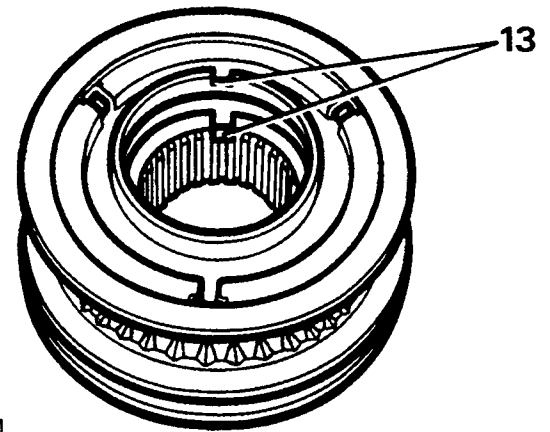
12. Fit the slippers and secure with a spring each side of the synchromesh.

NOTE: The hooked end of each spring must locate in the same slipper with the free ends running in opposite directions and resting against the remaining slippers.



13. Assemble third-fourth and fifth gear synchromesh components as in instruction 12.

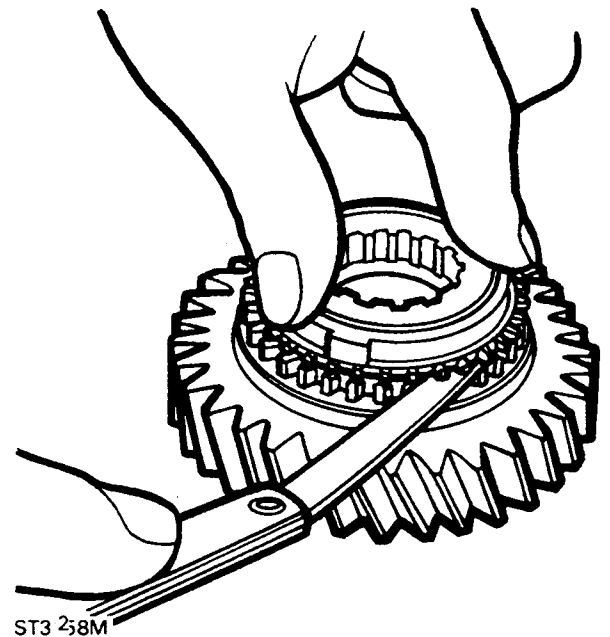
NOTE: The back plate for fifth gear is fitted to the rear of the assembly with the single tag locating in a slot in the inner member.



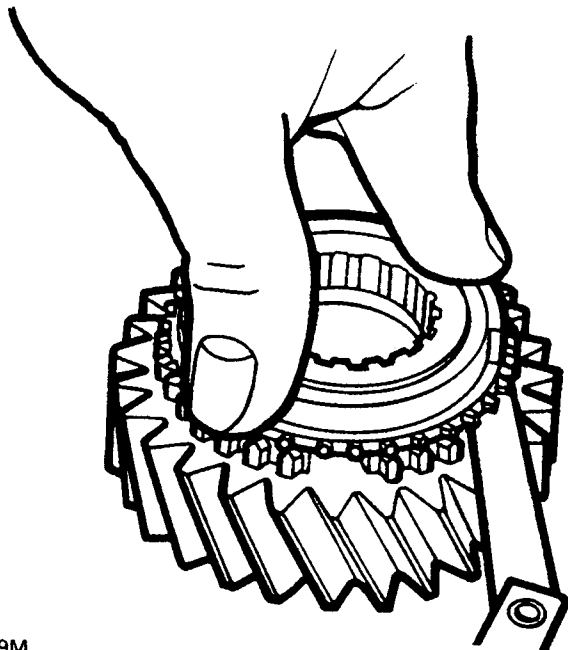
CHECKING BAULK RING CLEARANCES

Check clearance of all baulk rings and gears by pressing the baulk ring against the gear and measuring the gap. The minimum clearance should be 0,38mm (0.015in).

First gear

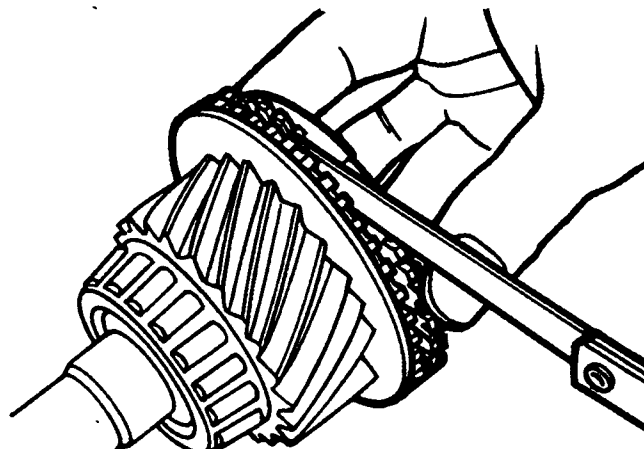


Second gear



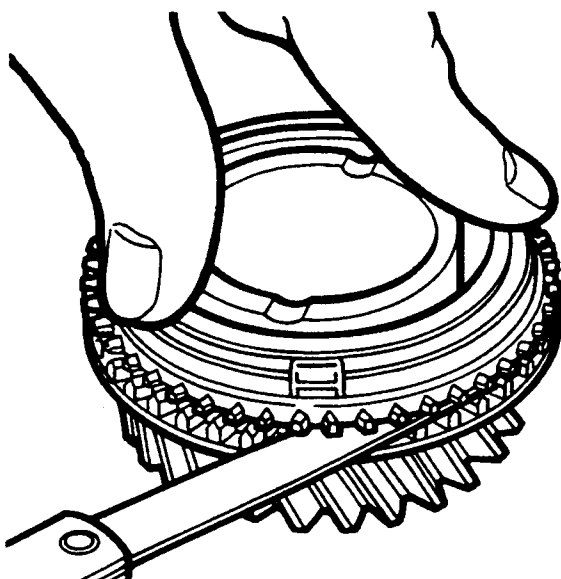
ST3259M

Fourth gear



ST3226M

Third gear



ST3260M

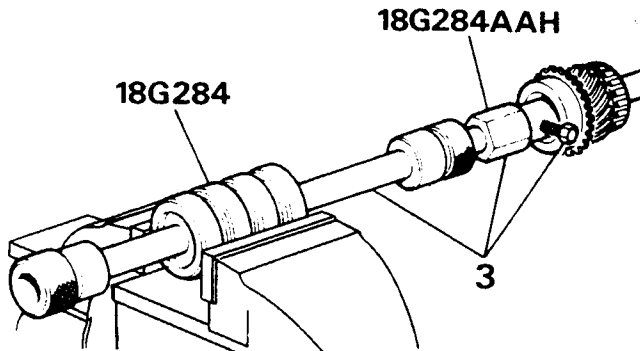
Fifth gear



ST3261M

INPUT SHAFT

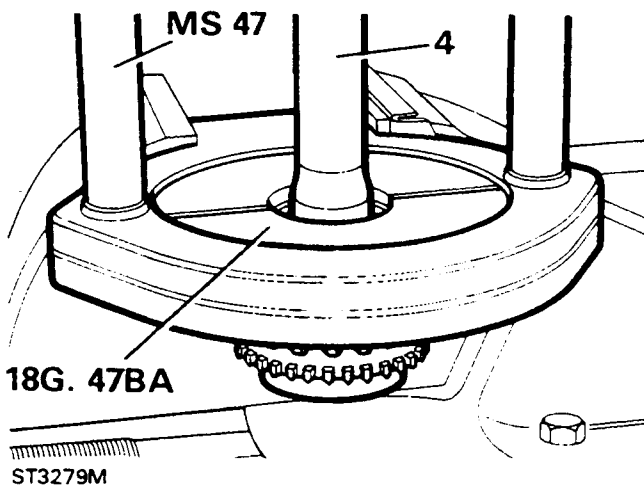
1. Examine the gear and dog teeth for wear and damage.
2. Polish oil seal track if necessary.
3. Using 18G 284 AAH and 18G 284 remove pilot bearing track.



ST3278M

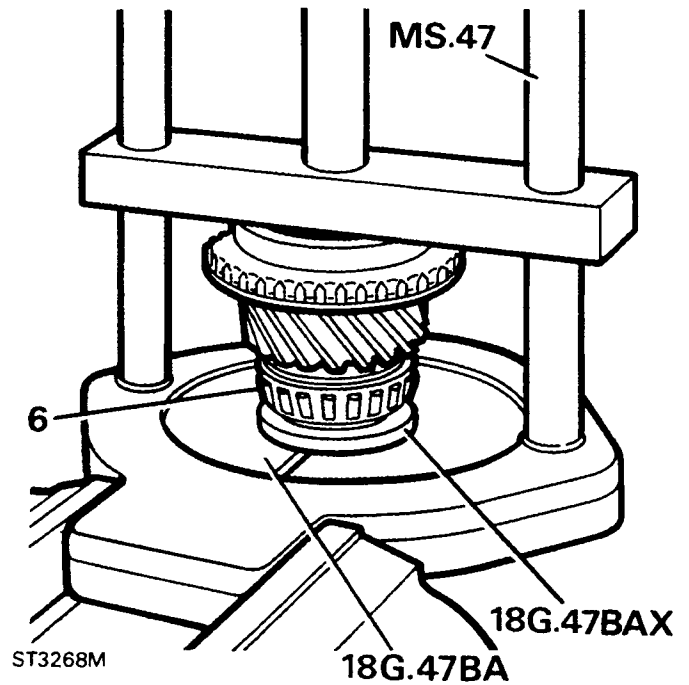
4. Using 18G 47BA and MS 47 remove taper bearing.

NOTE: ensure that the bearing is supported by the lip inside 18G 47 BA.



ST3279M

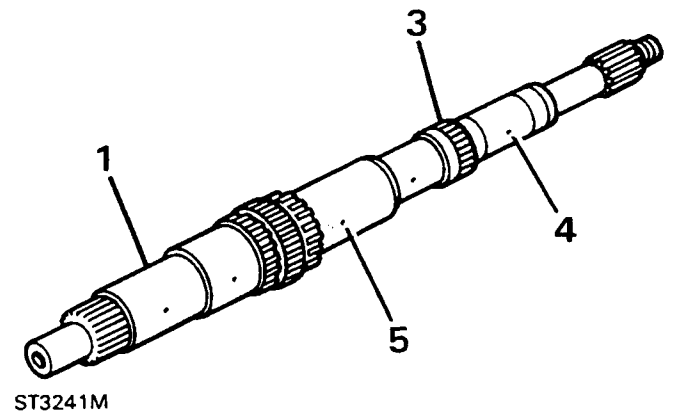
5. Support the shaft under MS 47 and press in a new track.
6. Using Press MS 47, Collets 18G 47B and adaptor 18G 47 BAX fit a new taper bearing.



ST3268M

MAINSHAFT

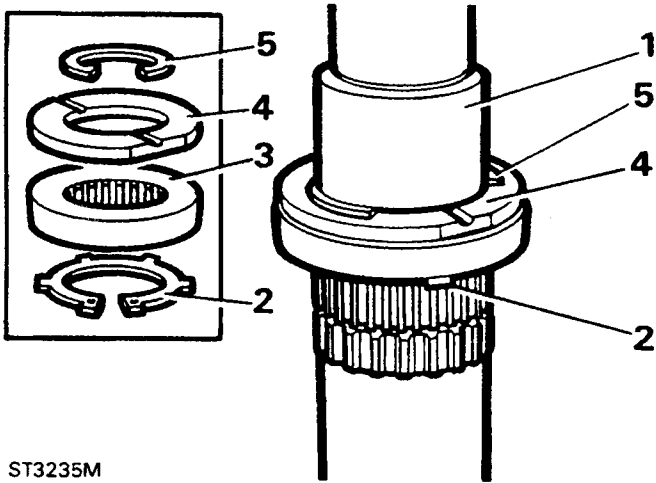
1. Examine bearing journals for wear and scores.
2. Check condition of circlip grooves.
3. Examine splines for wear and damage.
4. Use an air line to check that the main oil feed from the pump is clear and feed to spigot bearing.
5. Check oil feed holes to roller bearings are clear.



ST3241M

MAINSHAFT GEAR END FLOAT CHECKS

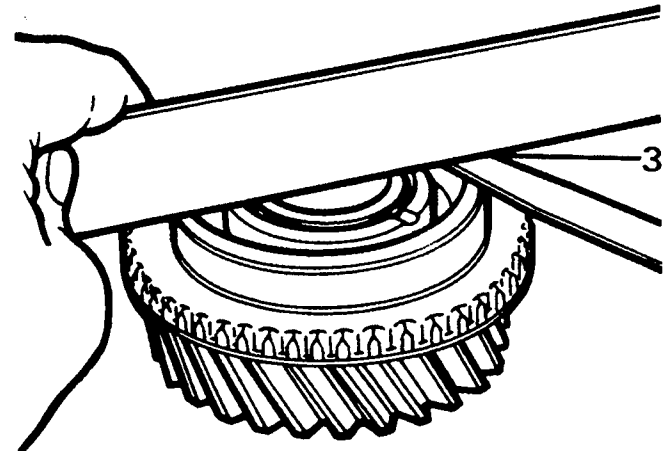
1. Hold mainshaft in vice front end downwards.
2. Fit front circlip for first-second synchronesh.
3. Fit second gear cone.
4. Fit spacer.
5. Fit snap ring.



ST3235M

Third gear end-float.

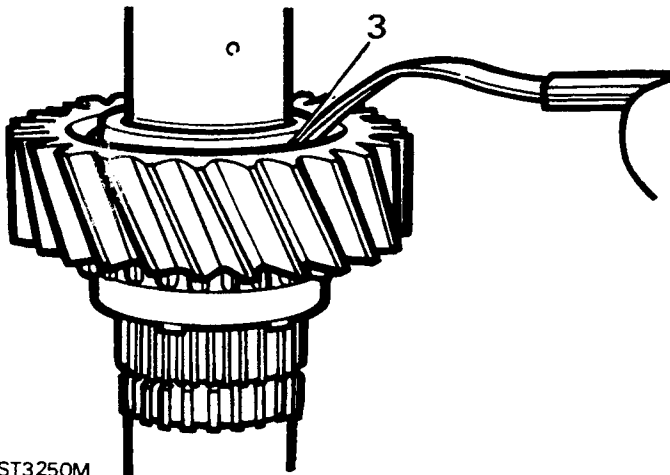
1. Fit needle roller to third gear.
2. fit third gear bush to third gear.
3. Place gear on flat surface, bush flange downwards, and with a straight edge across gear check clearance between straight edge and gear. Not to exceed 0,20 (0.008in).



ST3251M

Second gear end-float.

1. Fit needle roller and second gear.
2. Fit third gear bush.

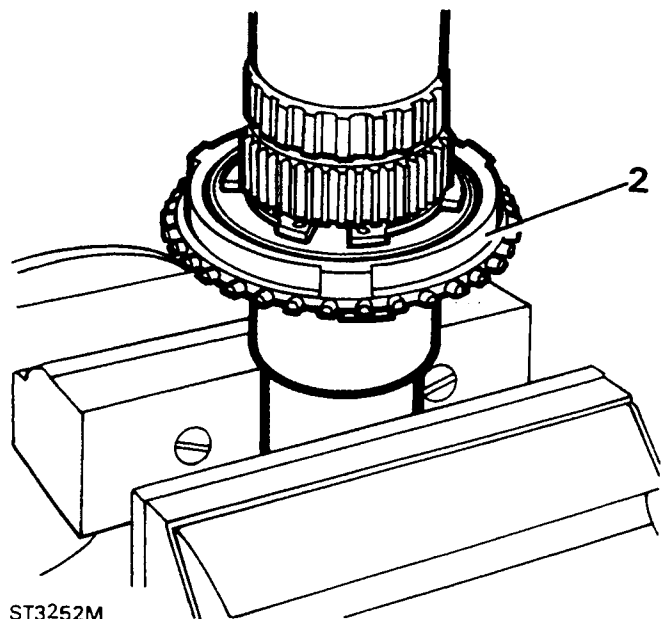


ST3250M

3. Check clearance between second gear and bush flange. Not to exceed 0,20 (0.008in).
4. Remove above components.

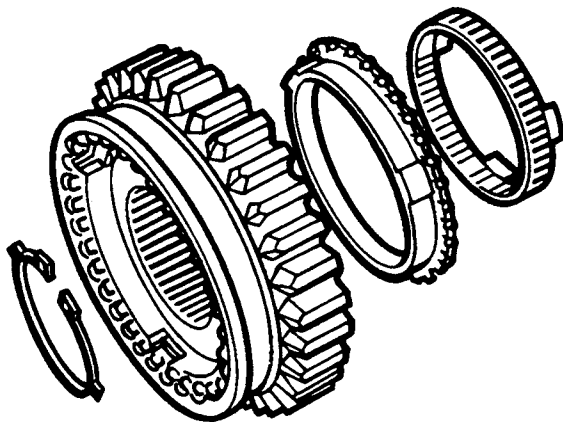
First gear bush end-float.

1. Invert mainshaft rear end uppermost.
2. Fit inner and outer second gear baulk rings.



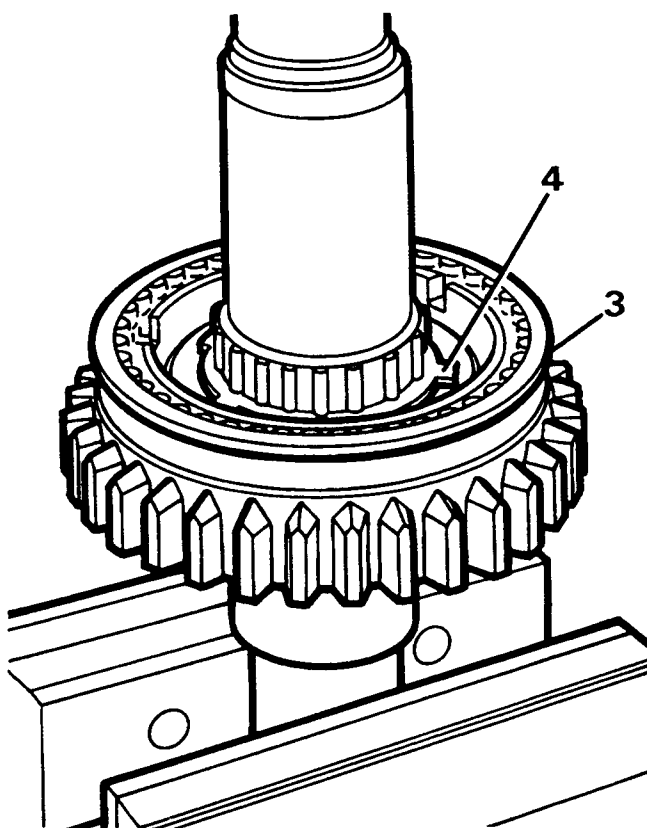
ST3252M

3. Fit first-second synchromesh hub, fork groove uppermost.
4. Fit circlip.



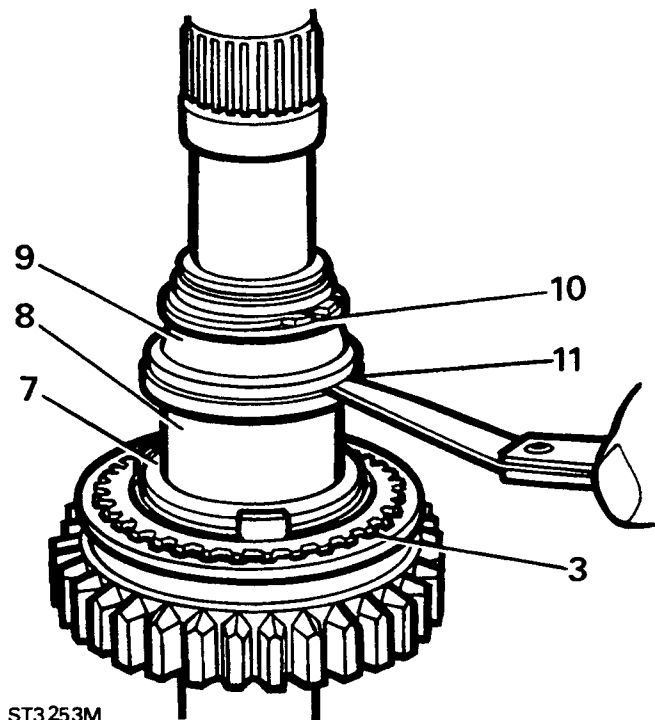
ST3231M

First-second synchromesh assembly



ST3257M

5. Fit first gear inner and outer baulk ring.
6. Fit cone.
7. Fit spacer.
8. Fit first gear bush.
9. Fit dummy bearing.
10. Fit circlip.
11. Check clearance between dummy bearing and bush. Not to exceed 0,075mm (0.003in).
12. Remove circlip, dummy bearing and bush.



ST3253M

Selective first gear bush

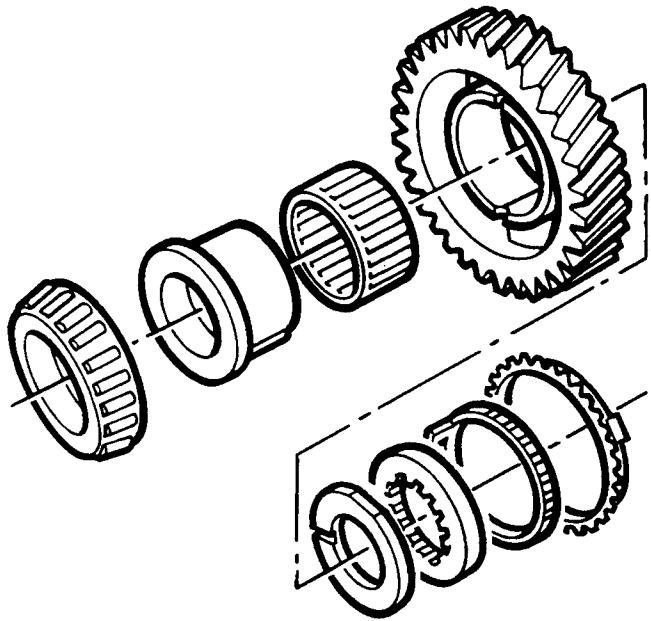
Part Number	Thickness (mm)
FTC2005	30,905/30,955
FTC2006	30,955/31,005
FTC2007	31,005/31,055
FTC2008	31,055/31,105
FTC2009	31,105/31,155

Check first gear to bush end-float.

1. Fit roller bearing and bush to first gear.
2. Place bush flange side downwards on a raised block on a flat surface.

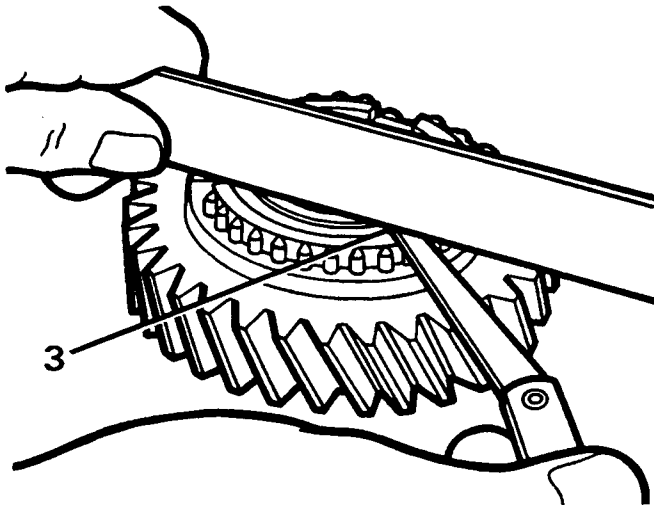
NOTE: The block should be approximately the same diameter as the bush flange so that the gear is suspended and does not rest on the flat surface.

3. Place straight edge across gear and check clearance between gear and straight edge. Not to exceed 0,20mm (0.008in).

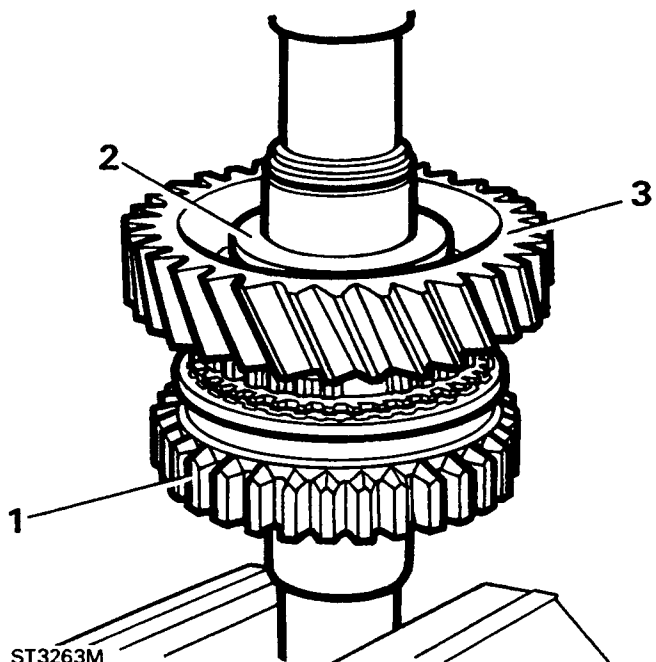


ST3229M

First gear assembly



ST3255M

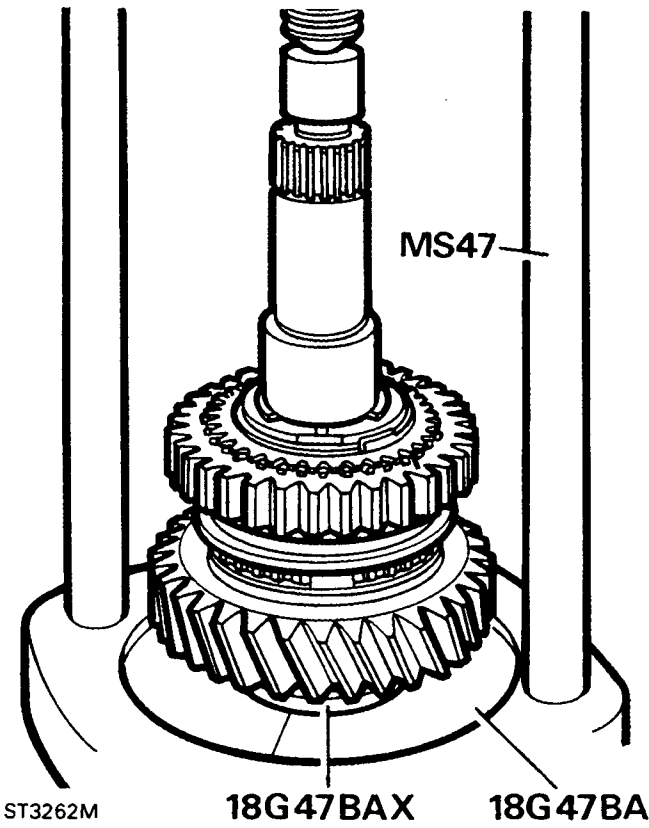


ST3263M

ASSEMBLING MAINSHAFT

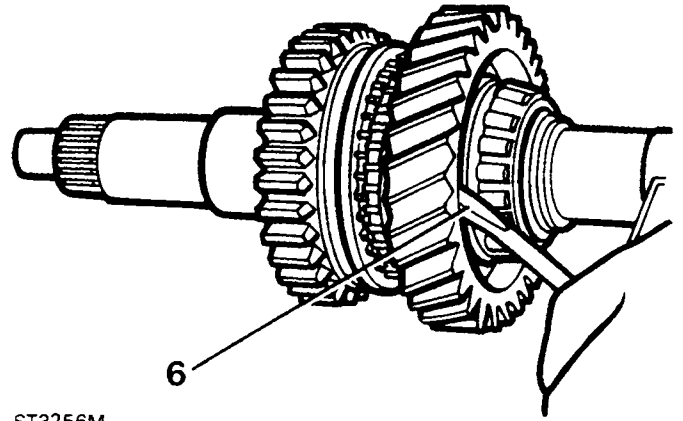
1. With the first-second synchromesh hub and spacer in position, assemble the rear end of the shaft.
2. Fit the roller bearing and bush to first gear.
3. Fit first gear to mainshaft.

4. Fit the taper bearing to mainshaft using MS 47, collets 18G 47 BA and adaptor 18G 47 BAX.



NOTE: Instruction 5 is necessary since it is probable that when pressing on the bearing it will have clamped the first gear bush preventing it from turning.

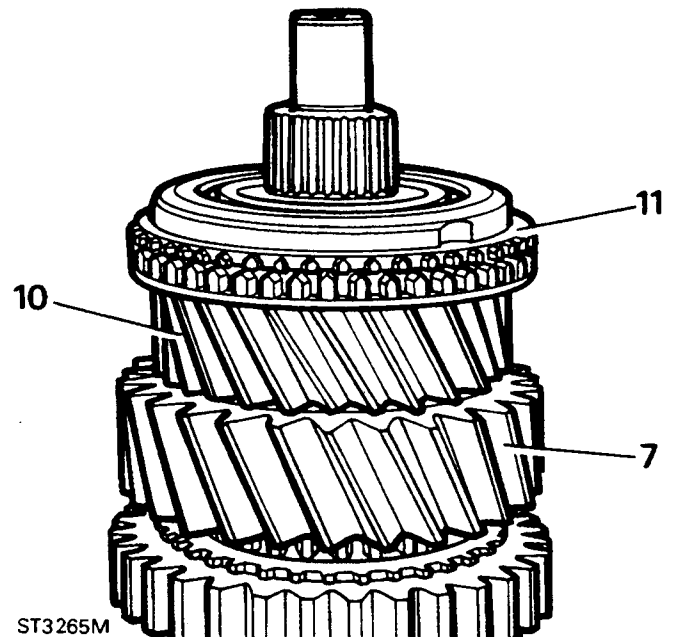
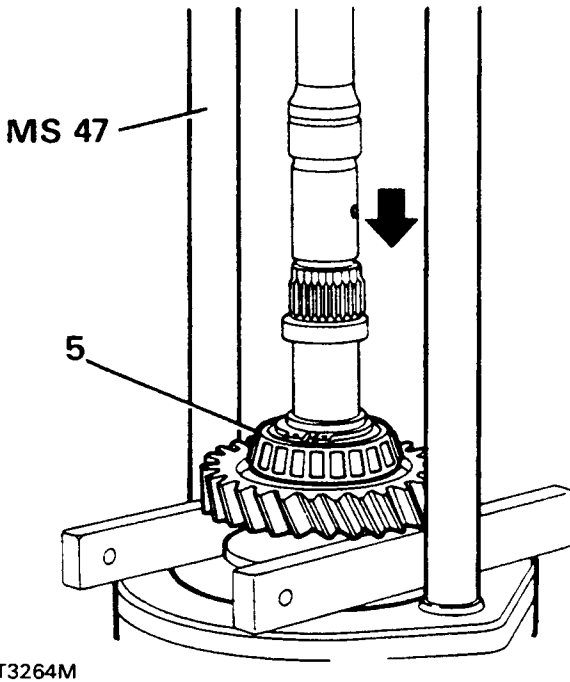
6. Reposition mainshaft in vice and using a screw driver blade check that the first gear bush is free to turn.

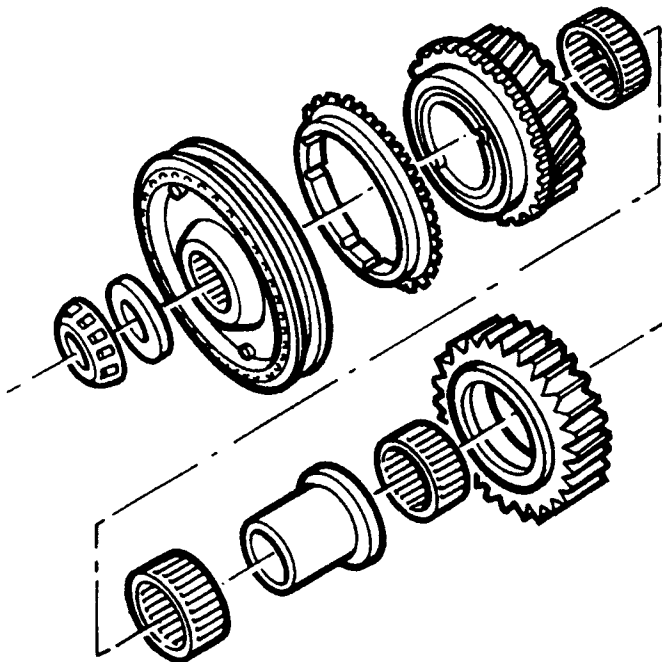


CAUTION: Ensure that the slots in the baulk ring align with the synchromesh slippers while pressing on the bearing.

5. Invert mainshaft and press assembly back against circlip.

7. Position mainshaft in vice, rear end downwards and fit second gear needle roller, and second gear.
8. Fit third gear bush.
9. Fit third gear needle rollers.
10. Fit third gear.
11. Fit third gear baulk ring.

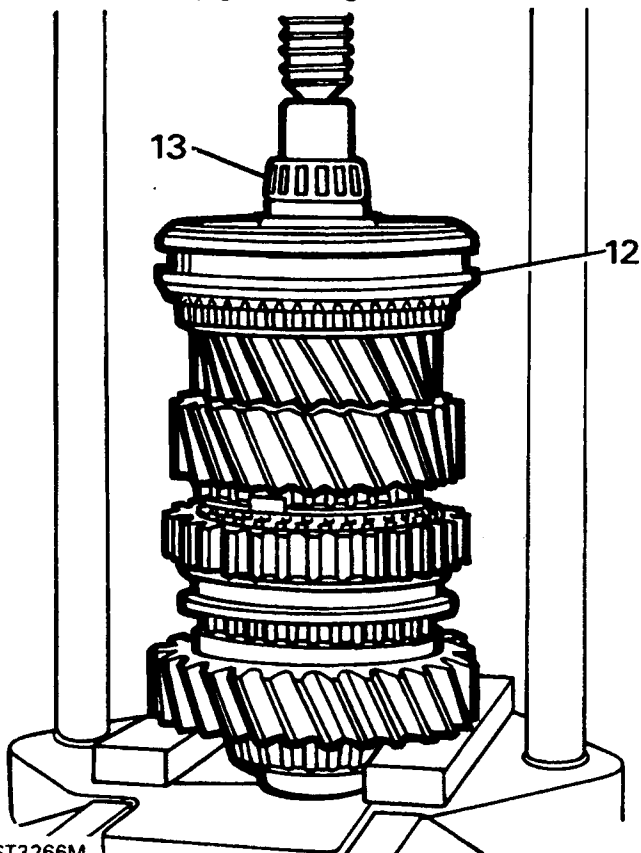




ST3233M

Third-fourth synchromesh assembly

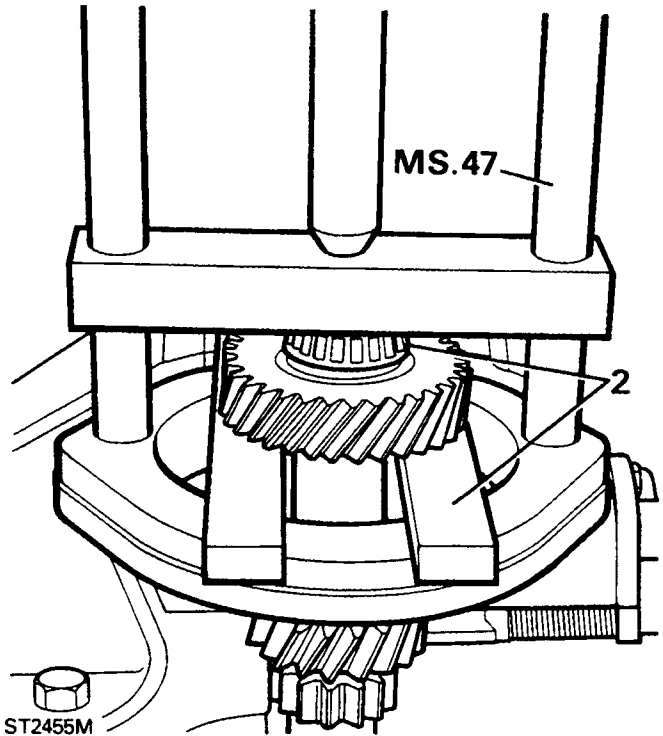
12. Fit third-fourth gear synchromesh hub.
13. Using MS 47 with supports under first gear, press the spigot bearing on to shaft.



ST3266M

LAYSHAFT

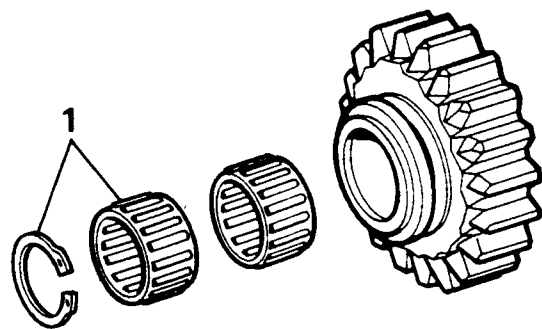
1. Examine the layshaft for wear and damage.
2. Press bearings on to layshaft using MS 47 and supporting bars.



ST2455M

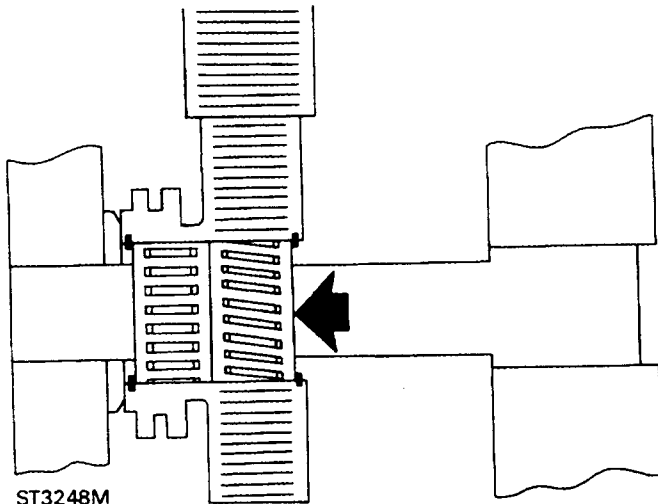
REVERSE GEAR AND SHAFT

1. Remove one circlip from the idler gear and remove bearings.



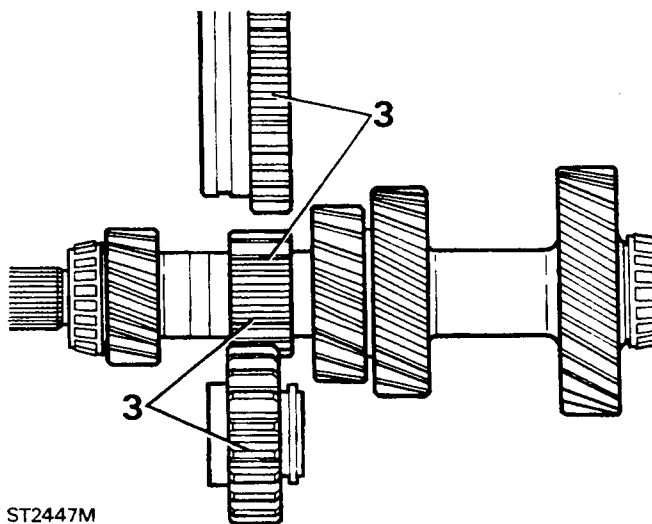
ST2466M

NOTE: One bearing cage is twisted in manufacture. The twist causes the gear to tilt on the shaft forcing the gear into engagement. Renew bearings if worn or if the gear jumps out of engagement.



ST3248M

2. Fit the bearings either way round and secure with the circlip.
3. Check condition of idler gear and mating teeth on layshaft and synchromesh outer member.



ST2447M

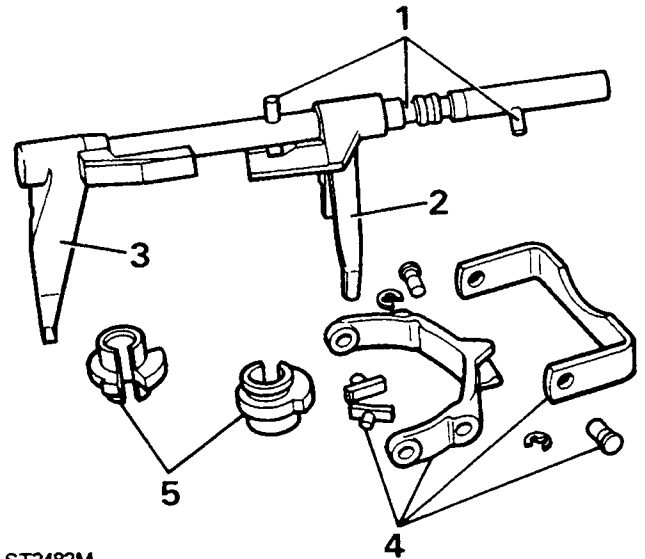
4. Examine idler shaft for wear, scores and pitting.

SELECTORS

1. Examine selector rail and pins for wear and damage.
2. Examine first-second selector fork for wear cracks and damage.

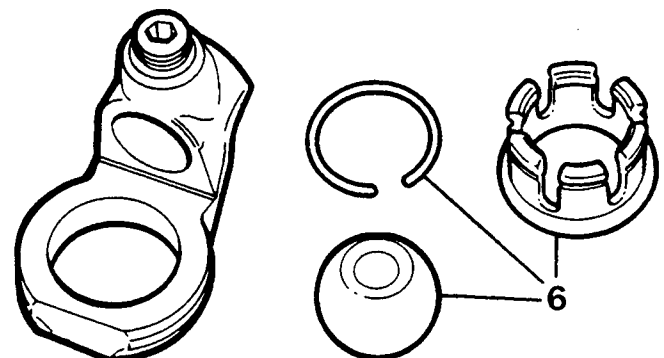
NOTE: The the selector rail and fork is only supplied as a complete assembly.

3. Examine third-fourth selector fork for wear, cracks and damage.
4. Examine fifth gear selector fork, pads and pivot pins.
5. Examine interlock spools for wear and damage.



ST2482M

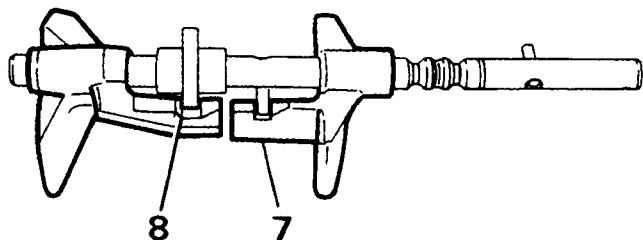
6. Remove snap ring and examine selector yoke assembly.



ST2514M

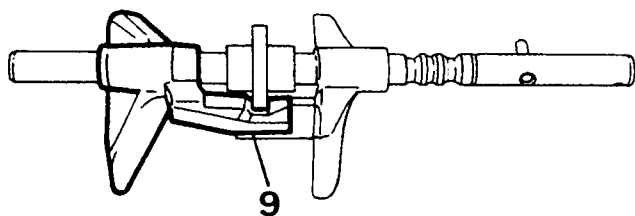
Assembling selectors.

7. Rest first-second fork and shaft assembly on bench and locate pin in jaw of fork.
8. Fit interlock spool and third-fourth fork and engage spool in jaw of fork.



ST2488M

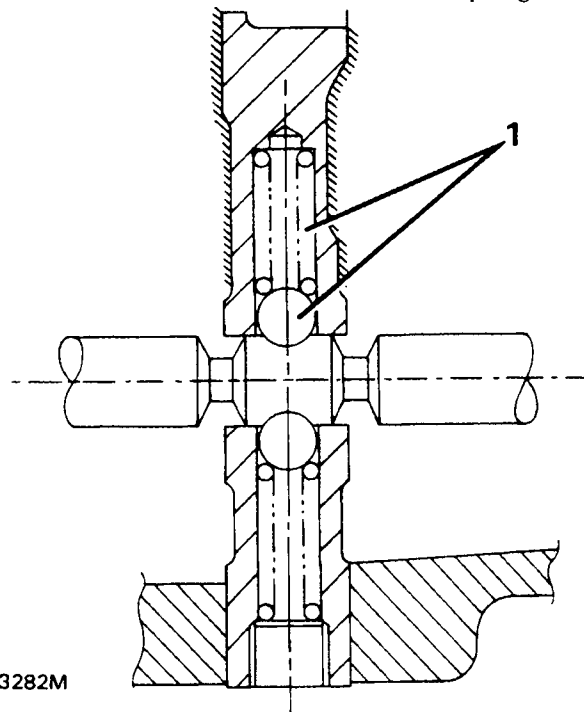
9. Slide spool and fork towards first-second selector until slot in spool locates over pin keeping the spool engaged in third-fourth fork jaw.



ST2487M

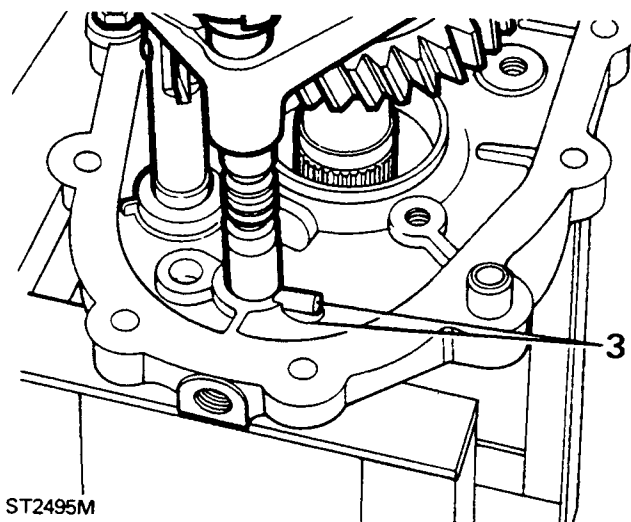
ASSEMBLING GEARBOX SHAFTS TO CENTRE PLATE**Fitting gears to centre plate**

1. Secure centre plate to workstand, fit bearing tracks and inboard detent ball and spring.



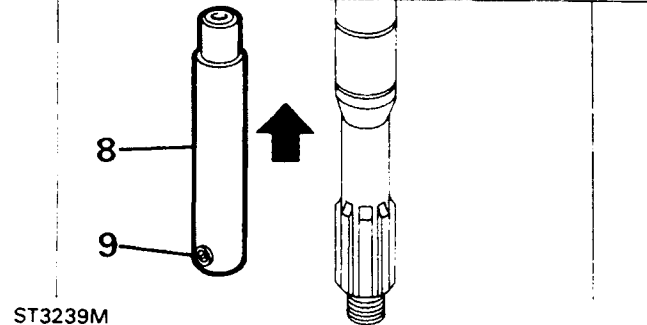
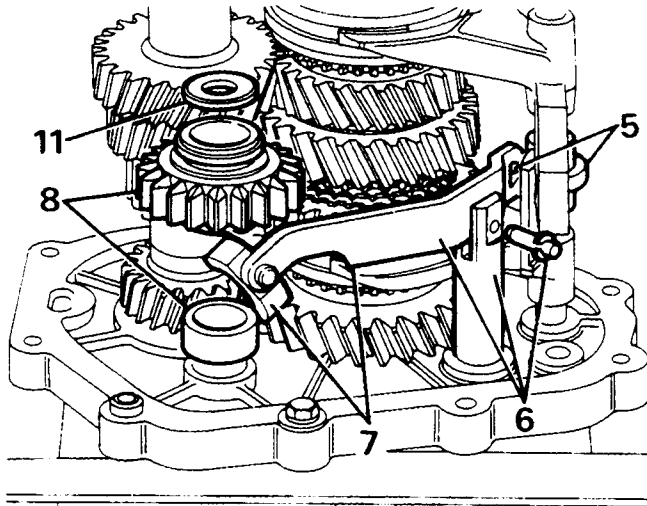
ST3282M

2. Check both synchromesh units are in neutral and fit selector shaft assembly.
3. Fit mainshaft and selectors to centre plate and align pin with slot in plate.



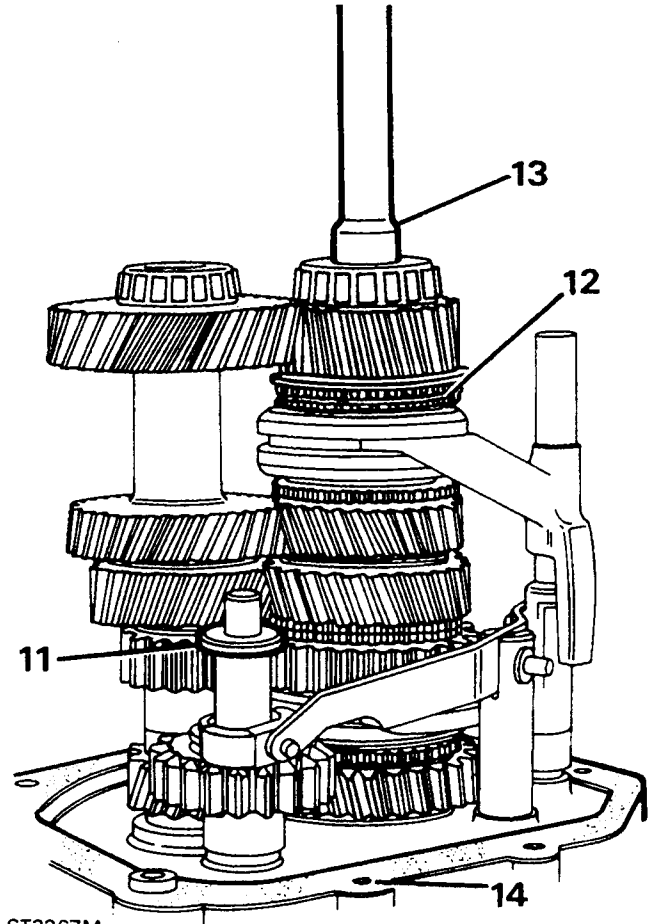
ST2495M

4. Fit layshaft While lifting mainshaft to clear layshaft rear bearing.
5. Turn selector shaft and interlock spool to allow reverse lever to engage spool flange.
6. Fit reverse lever to pivot post and secure with pin and circlip.
7. Fit slipper pad to lever.
8. Fit reverse gear shaft, spacer and gear.
9. Fit slipper to reverse gear and ensure roll pin in shaft engages in slot in centre plate.

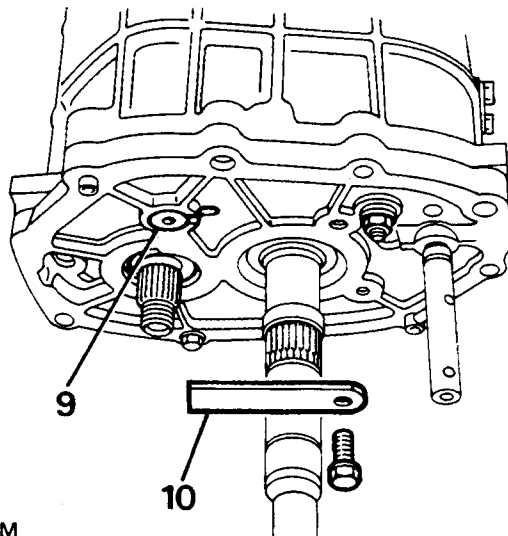


ST3239M

10. Secure reverse shaft with manufactured tool "A".
11. Fit reverse gear thrust washer to shaft.
12. Fit fourth gear baulk ring.
13. Lubricate spigot bearing and fit input shaft.
14. Remove centre plate workstand bolt and fit gasket.



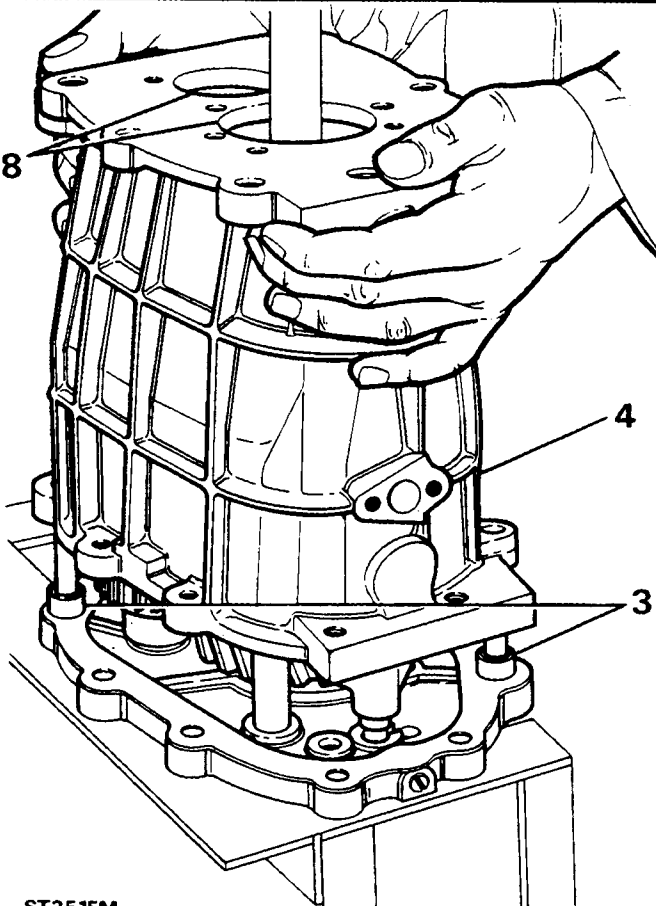
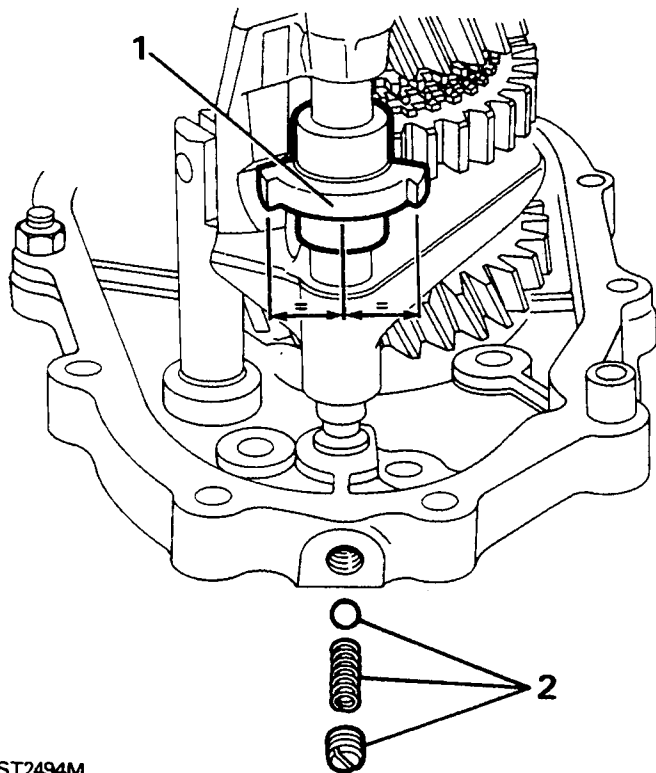
ST3267M



ST2492M

FITTING GEARBOX CASING

1. Turn selector shaft and spool to neutral position.
2. Fit out-board detent ball and spring and secure with plug.



ST2515M

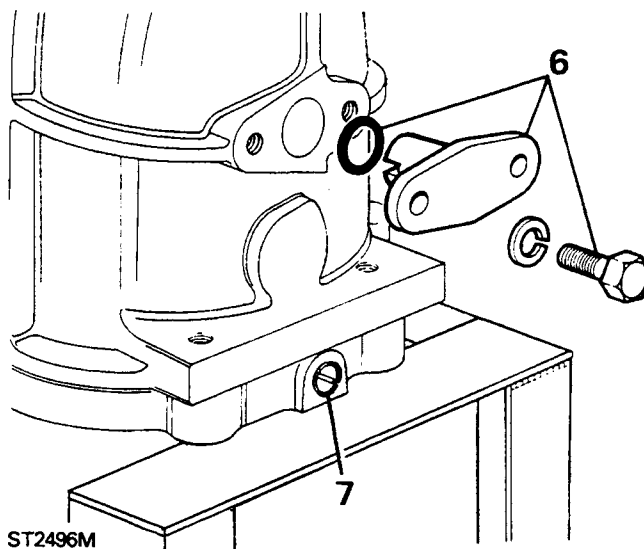
CAUTION: Do not use force to fit retainer. Provided the spool has not been disturbed the retainer will slide into position. If not, remove the gear case and reposition spool or shaft.

3. Fit guide studs to casing and check oil scoop is correctly fitted.
4. Without using force, fit gearcase.

NOTE: Ensure that the centre plate dowels and selector shaft are properly located.

5. Secure centre plate and gearcase to workstand with two 8 x 35mm bolts.
6. Apply PL 32 to joint face and bolt threads and fit spool retainer.

7. Remove detent plug, apply Loctite 290 or Hylomar PL 32 to thread, refit and stake.
8. Fit layshaft and input shaft bearing tracks.

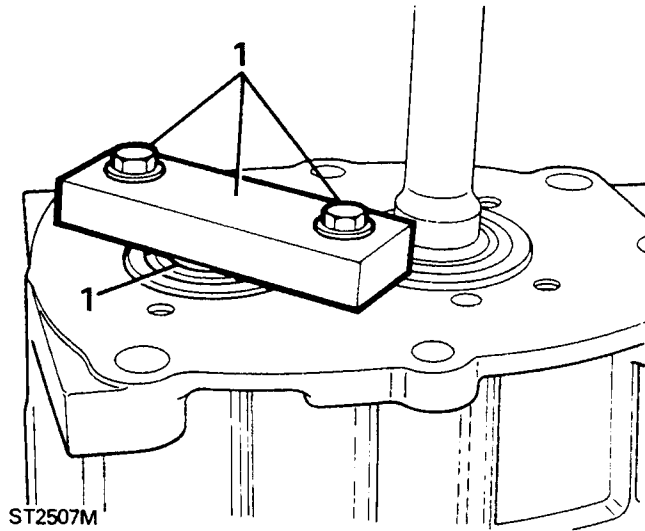


ST2496M

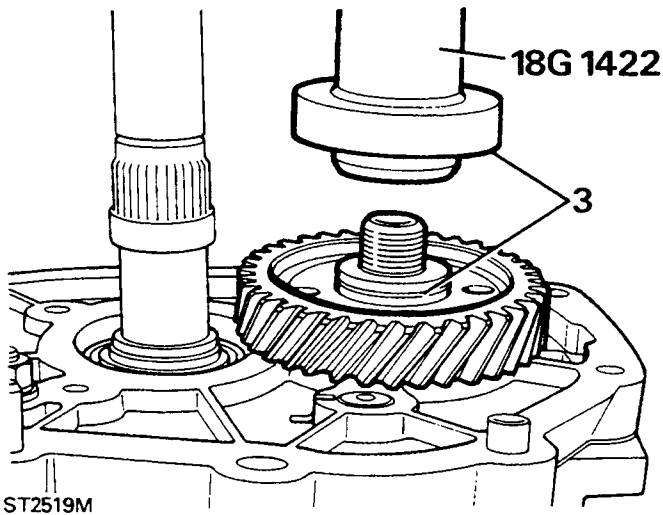
FITTING FIFTH GEAR

CAUTION: Since the fifth gear is a tight fit on the layshaft, the force, when pressing the gear, must not be transferred to the layshaft front bearing. Tool "D" and packing disc should be made to the dimensions given to absorb the force. The plate also retains the input shaft bearing outer track.

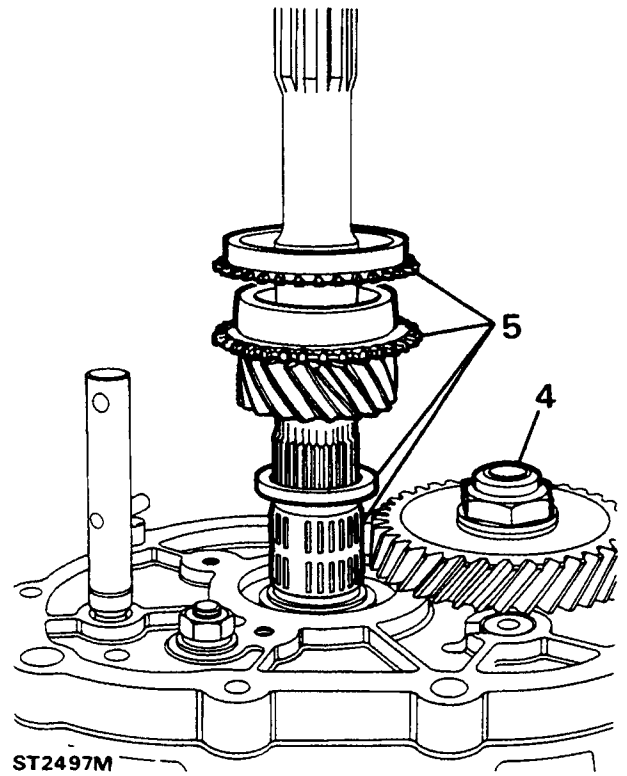
1. Secure the plate with two 8x25mm bolts. Insert disc between plate and layshaft.



2. Release and invert gearbox and remove reverse shaft retainer plate.
3. With the extraction groove uppermost, drive fifth gear on to layshaft using 18G 1422.

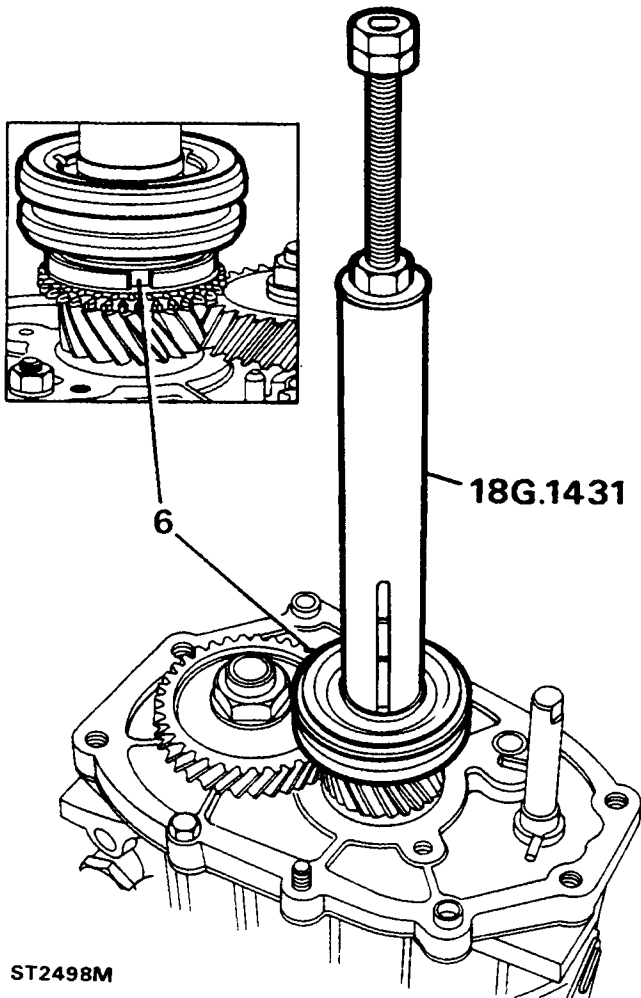


4. Fit a new stake nut but do not tighten.
5. Fit fifth gear assembly to mainshaft.



6. Press fifth gear synchromesh assembly to mainshaft using 18G 1431.

CAUTION: Before pressing the assembly fully home, ensure that the slipper pads locate in the baulk ring slots.

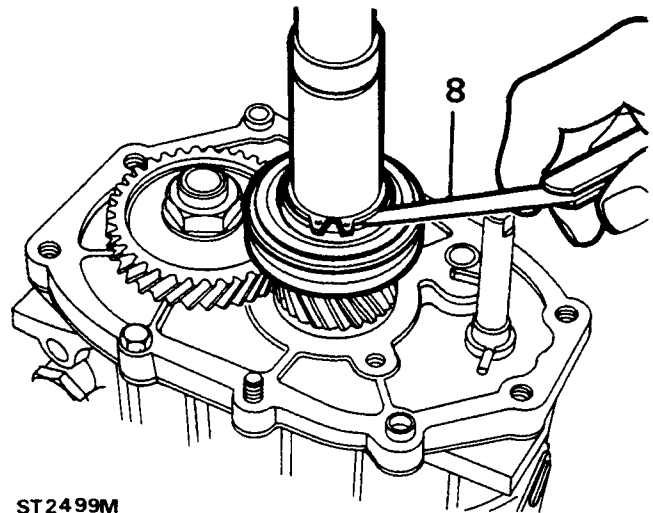


ST2498M

NOTE: Only limited movement of the synchromesh inner member on the main-shaft is permissible. The maximum clearance is 0,005mm to 0,055mm (0.0002in to 0.002in and to achieve this the following selective washers are available.

Part number	Thickness
FRC 5284	5,10
FRC 5286	5,16
FRC 5288	5,22
FRC 5290	5,58
FRC 5292	5,34
FRC 5294	5,40
FRC 5296	5,46
FRC 5298	5,52
FRC 5300	5,58
FRC 5302	5,64

7. Fit the thinnest washer and secure with circlip.
8. Measure clearance between circlip and washer.

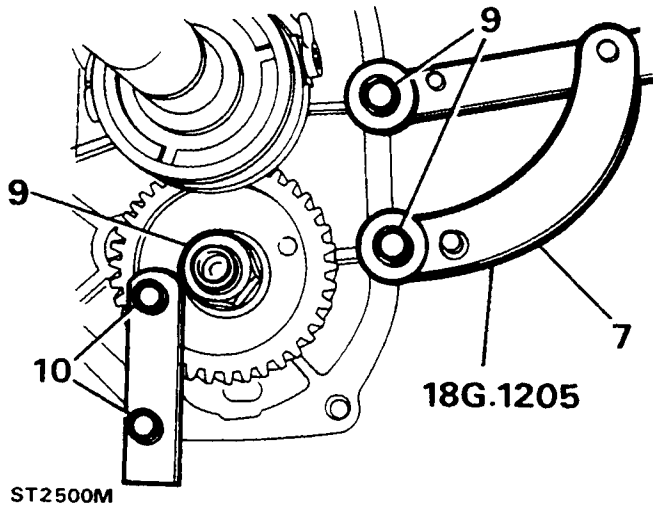


ST2499M

9. Tighten layshaft stake nut using 18G 1205.

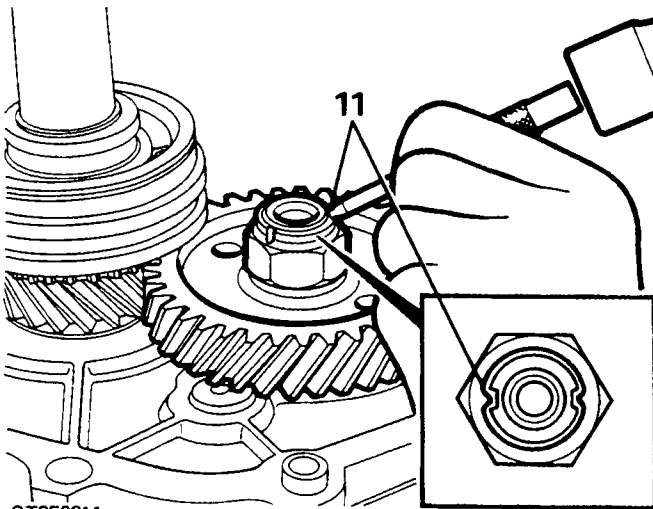
CAUTION: The practice of locking gears to provide a restraint to tighten the nut is not acceptable due to high torque figure required.

10. Secure tool "A" to gear and gear case and using a suitable torque wrench tighten the nut to the correct torque.



ST2500M

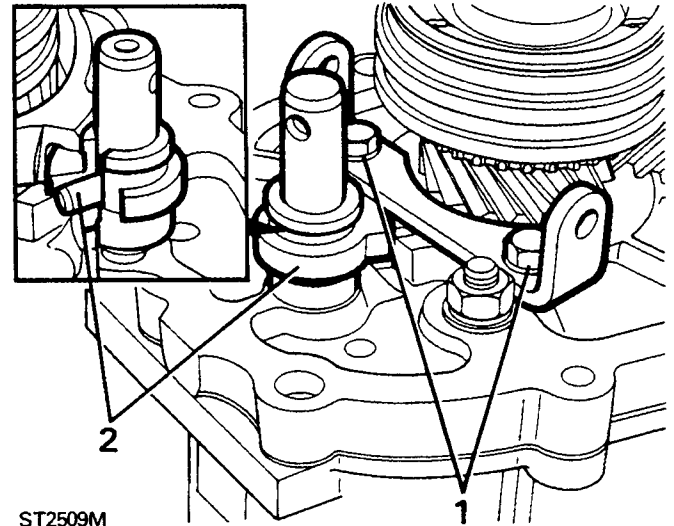
11. Using a round nose punch, form the collar into the layshaft slots.



ST2508M

FIFTH GEAR SELECTOR FORK ASSEMBLY

1. Fit fifth gear selector fork bracket.
2. Fit the fifth gear spool long end towards centre plate.

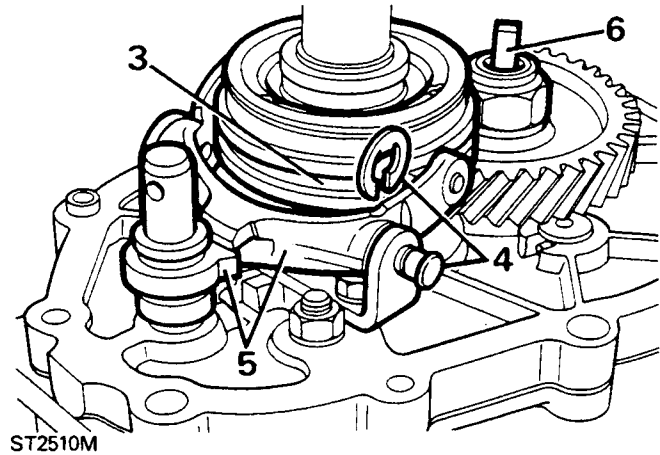


ST2509M

3. Fit slippers to selector fork.
4. Fit fork to synchromesh and secure with pins and "E" clips.

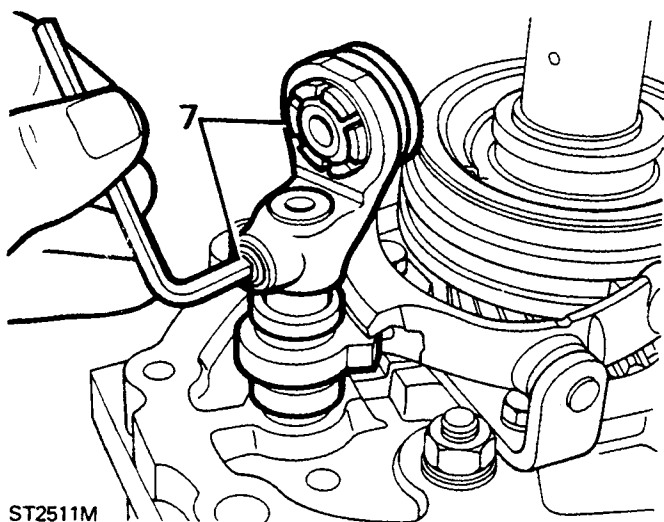
NOTE: Before fitting pins and clips cover holes in centre plate to prevent them falling into casing.

5. Engage tongue of spool in selector fork.
6. Fit oil pump drive to layshaft.



ST2510M

7. Fit yoke to selector shaft and secure with a new Loctite encapsulated grub screw.



ST2511M

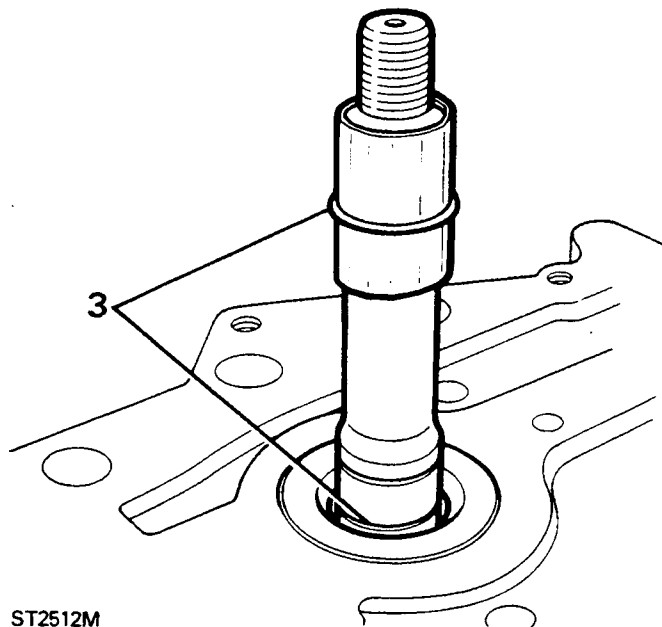
EXTENSION CASE

1. Release centre plate from workstand and fit gasket on joint face.
2. Fit extension case while aligning oil pick-up pipe. Remove guide studs and secure to main case.

NOTE: Do not use force, if necessary remove case and re-align oil pump drive if case does not fit first time.

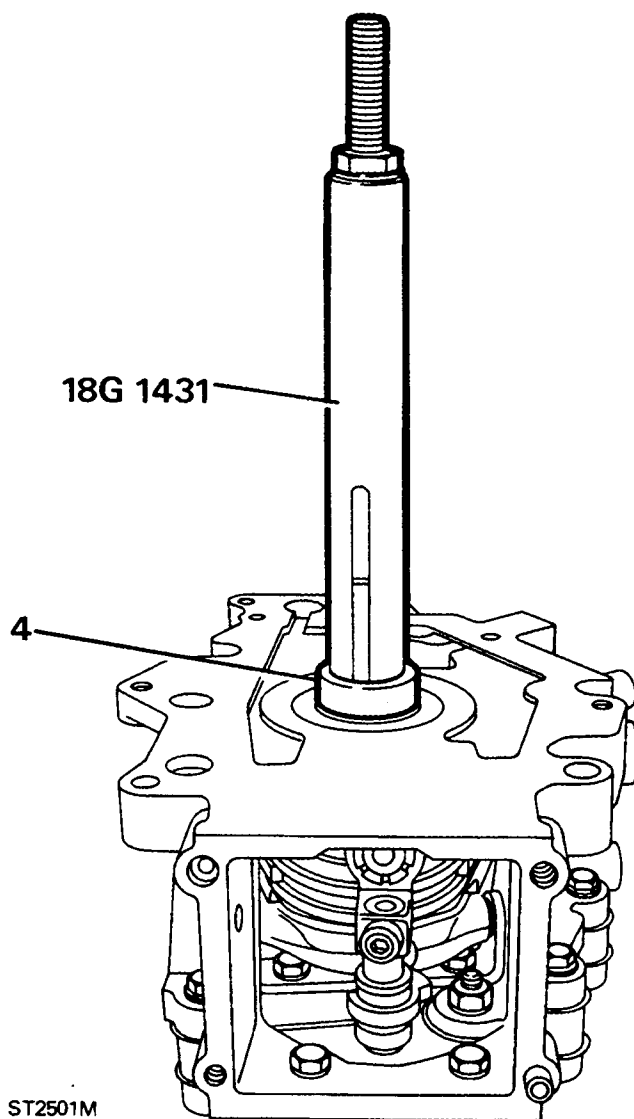
CAUTION: To protect "O" ring while fitting, cover mainshaft splines with smooth tape.

3. Fit "O" ring to mainshaft groove.



ST2512M

4. Fit "O" ring collar to mainshaft using 18C 1431.



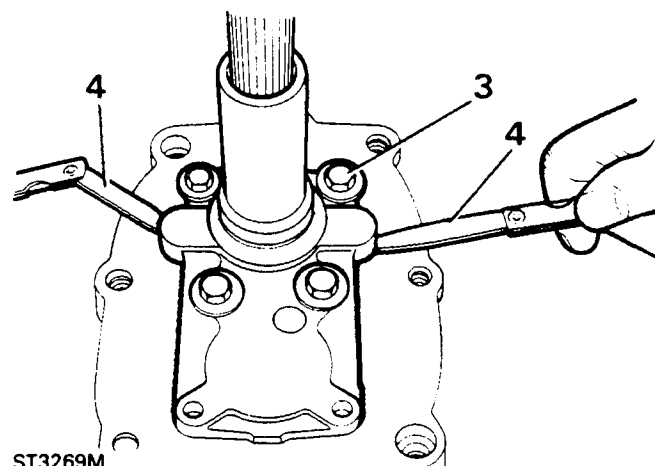
ST2501M

Input-Mainshaft bearing adjustment.

1. Turn gearbox over with input shaft uppermost. Remove layshaft support plate.

NOTE: Correct shimming of the input shaft bearing is vital to ensure that the mainshaft assembly has the design intended end float, and the bearings are not pre-loaded.

2. Measure the thickness of a new front cover gasket.
3. Place the original shim on mainshaft bearing and finger tighten the bolts.
4. Measure the clearance between front cover and gearcase with two feeler gauges.



ST3269M

5. If required, change the selective washer to provide a clearance of 0,35mm to 0,085mm (0.001 to 0.003ins) less than the gasket thickness.

NOTE: This will ensure that when the gasket and cover is fitted to the correct torque, the input and mainshaft bearings will have no pre-load and not more than 0,06mm (0.0025in) end float.

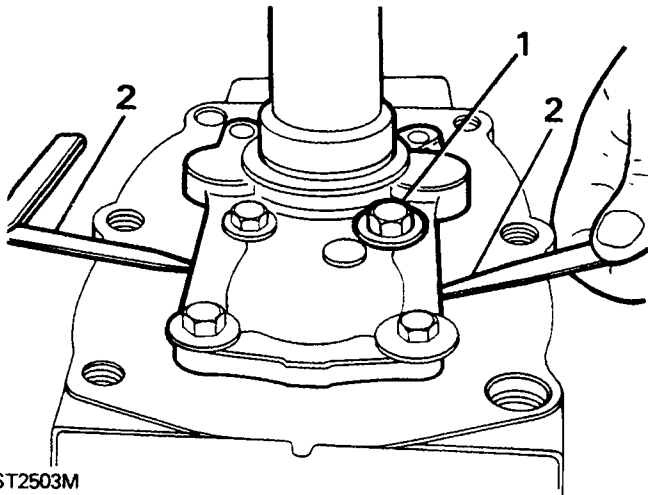
6. Remove front cover and keep gasket and selective washer together.

Mainshaft selective washers

Part number	Thickness(mm)
FRC 4327	1,51
FRC 4329	1,57
FRC 4331	1,63
FRC 4333	1,69
FRC 4335	1,75
FRC 4337	1,81
FRC 4339	1,87
FRC 4341	1,93
FRC 4343	1,99
FRC 4345	2,05
FRC 4347	2,11
FRC 4349	2,17
FRC 4351	2,23
FRC 4353	2,29
FRC 4355	2,35
FRC 4357	2,41
FRC 4359	2,47
FRC 4361	2,53
FRC 4363	2,59
FRC 4365	2,65
FRC 4367	2,67
FRC 4369	2,77

LAYSHAFT BEARING ADJUSTMENT

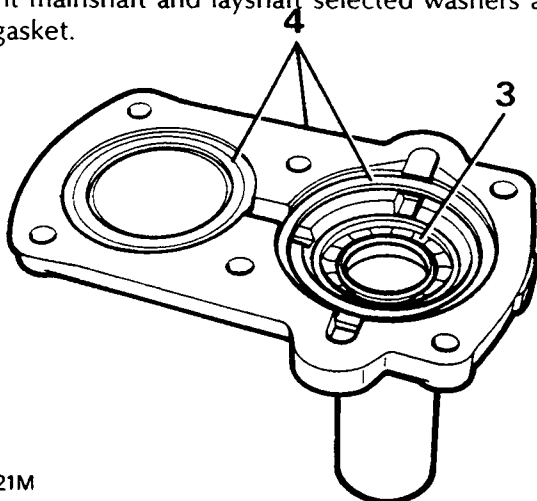
1. Place original selective washer on layshaft bearing, fit front cover without gasket, and finger tighten bolts.
2. Measure clearance, with two feeler gauges, between cover and gearcase. Select a shim that will provide a clearance equal to the thickness of the gasket that was selected and measured when calculating the adjustment of the input and mainshaft bearing.



ST2503M

NOTE: This will ensure zero layshaft bearing end float and not more than 0,025mm (0.001in) pre-load once the cover and gasket are fitted and bolts correctly torqued.

3. Remove cover and selected washer and fit new oil seal, lip towards gearcase.
4. Fit mainshaft and layshaft selected washers and gasket.



ST2521M

5. Wrap protective tape round input shaft splines.
6. Apply Hylomar PL 32 to bolt threads and secure cover.

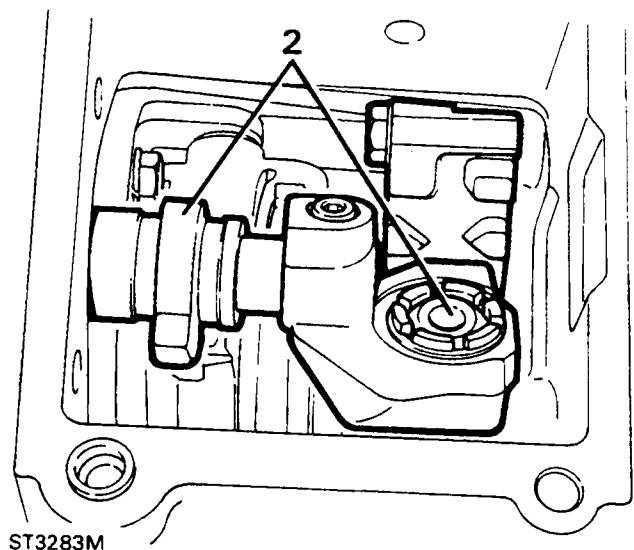
Layshaft selective washers.

Part number	Thickness(mm)
FTC 0262	1,36
FTC 0264	1,42
FTC 0266	1,48
FTC 0268	1,54
FTC 0270	1,60
FTC 0272	1,66
FTC 0274	1,72
FTC 0276	1,78
FTC 0278	1,84
FTC 0280	1,90
FTC 0282	1,96
FTC 0284	2,02
FTC 0286	2,08
FTC 0288	2,14
FTC 0290	2,20
FTC 0292	2,26
FTC 0294	2,32
FTC 0296	2,38

GEAR CHANGE HOUSING

1. Remove gearbox from workstand and place on bench.
2. Fit gasket and gear change assembly to extension housing.

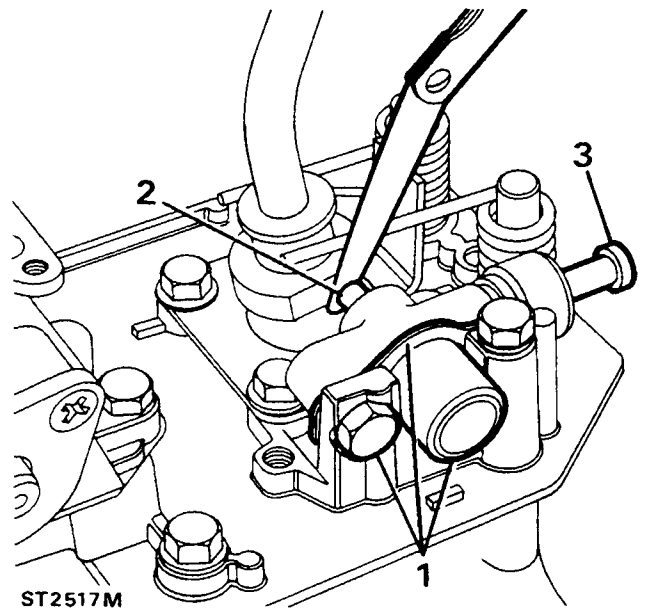
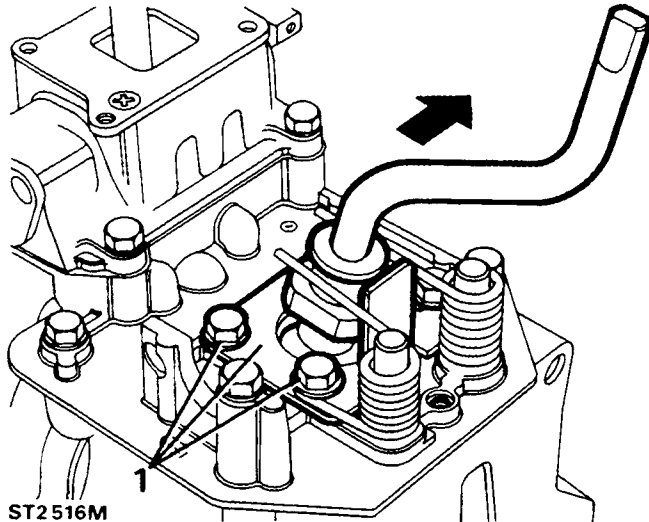
NOTE: Ensure that the gear lever pin passes through the centre of the yoke and engages in the gate plate. Also, the spool retainer must locate over the fifth gear spool.



ST3283M

Bias adjustment plate setting.

1. Slacken bias adjustment plate bolts. Select fourth gear and move lever fully to right.
2. Tighten adjustment plate bolts.
3. Check adjustment is correct by selecting third gear then fourth.



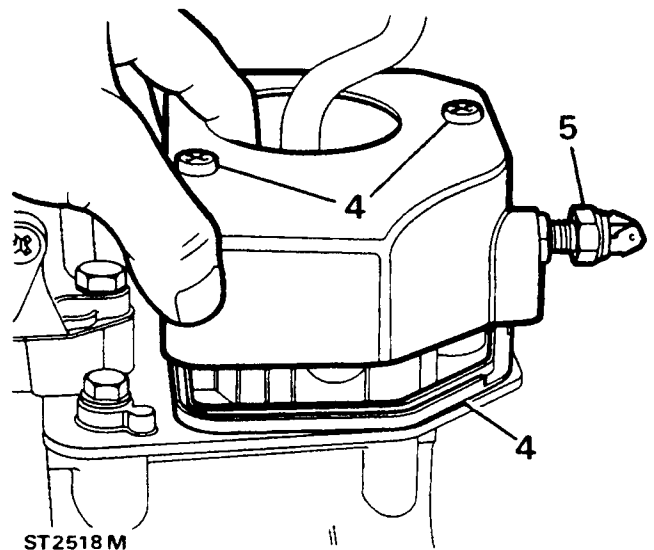
4. Fit sealing rubber to gear change housing and fit cover.
5. Fit and adjust reverse lamp switch.
6. Fit bell housing.

Setting reverse gear plunger.

1. Fit plunger and original shims to gear change housing.
2. Select first gear and measure clearance between reverse plunger and flat on side of gear lever.

NOTE: The clearance should be 0,6mm to 0,85mm (0.024in to 0.034in). Adjust by adding or removing shims.

3. Fit reverse lamp switch plunger.



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DATA

Reverse lever and slipper pad clearance	0,725 mm
Reverse gear plunger operating load	45 to 55 kg
Synchromesh assemblies push through load	8,2 to 10 kgf
Clearance between baulk rings and gears	0,38 mm
Fifth gear end float	0,020 mm
Third gear end float	0,020 mm
Second gear end float	0,020 mm
First gear bush end float	0.7 mm
First gear end float	0,20 mm
Fifth gear synchromesh end float	0,005 to 0,055 mm
Reverse gear plunger clearance	0,6 to 0.85 mm (0.024 to 0.034 in)

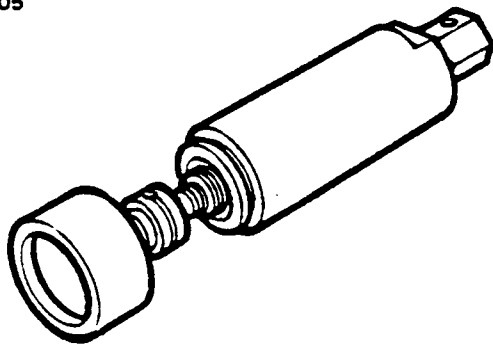
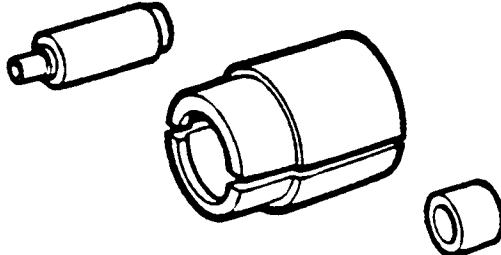
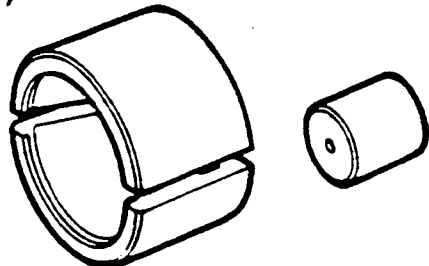
TORQUE VALUES

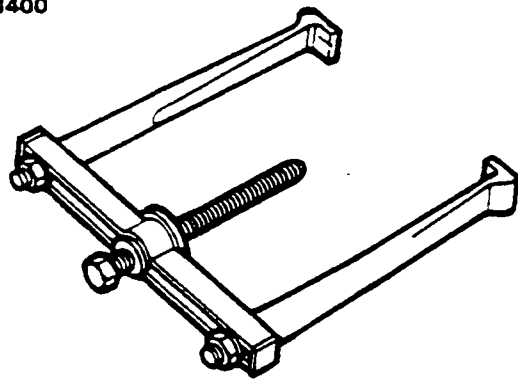
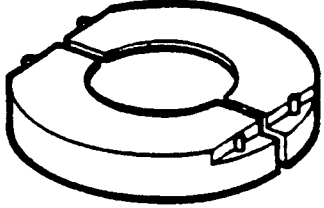
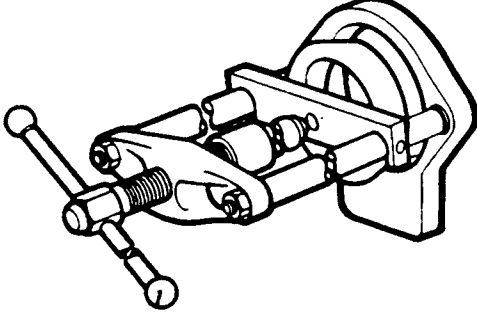
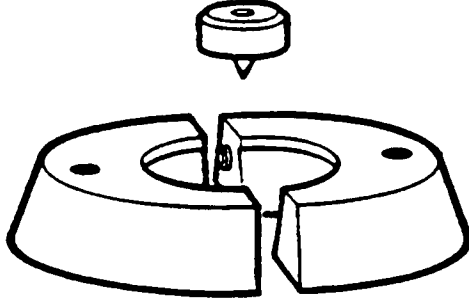
NOTE: Torque wrenches should be regularly checked for accuracy to ensure that all fixings are tightened to the correct torque.

	Nm
Bottom cover to clutch housing	7 - 10
Oil pump to extension case	7 - 10
Clip, clutch release lever	7 - 10
Spool retainer to gearcase	7 - 10
Extension case to gearcase	22 - 28
Pivot, clutch lever to bell housing	22 - 28
Guide, clutch release sleeve	22 - 28
Slave cylinder to bell housing	22 - 28
Front cover to gearcase	22 - 28
Fifth gear support bracket	22 - 28
Bell housing to gearbox	65 - 80
Oil drain plug	47 - 54
Oil filter plug	65 - 80
Breather	14 - 16
Oil level plug	25 - 35
Gear lever extension to lower lever	22 - 28
Fifth gear layshaft stake nut	204 - 231
Gear change housing to extension case	22 - 28
Reverse plunger to gear change housing	22 - 28
Adjustment plate to gear change housing	22 - 28
Cover to gear change housing	7 - 10
Bell housing to cylinder block	36 - 45
Yoke to selector shaft	22 - 28
Reverse lever pivot post nut	22 - 28
Plug detent ball and spring	22 - 28

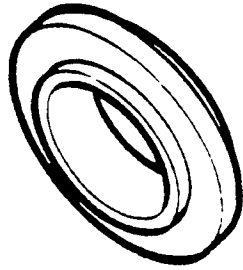
SERVICE TOOLS

NOTE: Where the use of special tools is specified, only these tools should be used to avoid the possibility of personal injury and or damage to components.

<p>18G.705</p>  <p>18G 705 Puller, bearing remover</p>
<p>18G.705-1A</p>  <p>18G 705-1A Adaptor for mainshaft oil seal track and layshaft fifth gear</p>
<p>18G.705-7</p>  <p>18G 705-7 Adaptor for layshaft bearings</p>

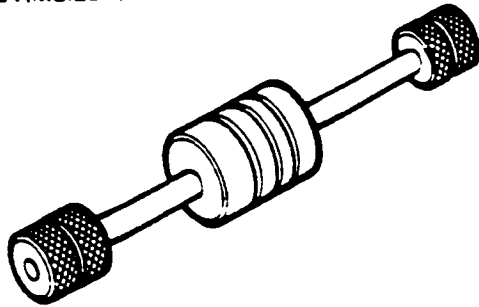
<p>18G.1400</p>  <p>18G 1400 Remover synchromesh hub and gear cluster</p>
<p>18G.1400-1</p>  <p>18G 1400-1 Adaptor mainshaft fifth gear</p>
<p>MS47</p>  <p>MS 47 Hand press</p>
<p>18G.478A</p>  <p>18G 478A Adaptor input shaft bearing</p>

18G.47BAX

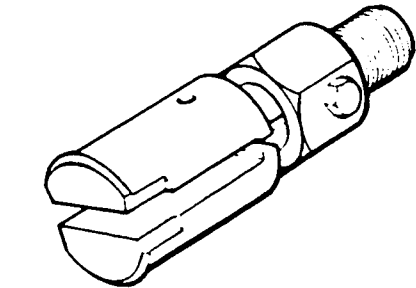


18G 47BAX Conversion kit

18G.284 (MS.284)



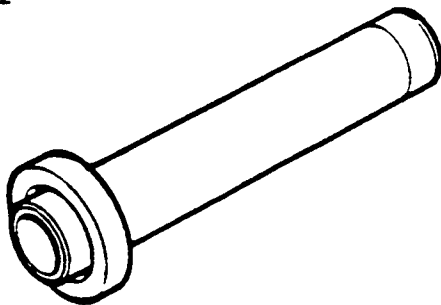
18G 284 Impulse extractor



18G284AAH

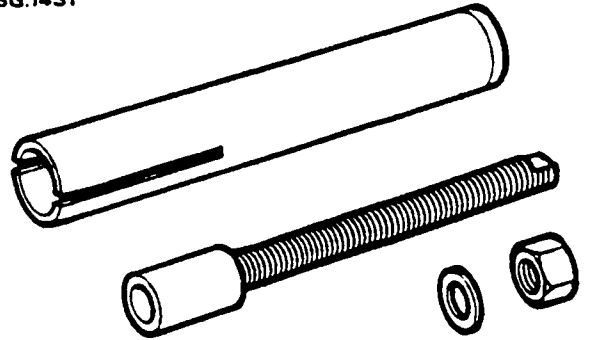
18G 284AAH Adaptor for input shaft pilot bearing track

18G.1422



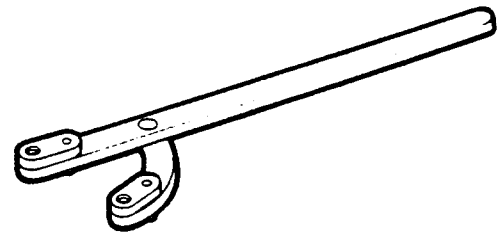
18G 1422 Mainshaft rear oil seal replacer

18G.1431



18G 1431 Mainshaft rear oil seal replacer

18G1205

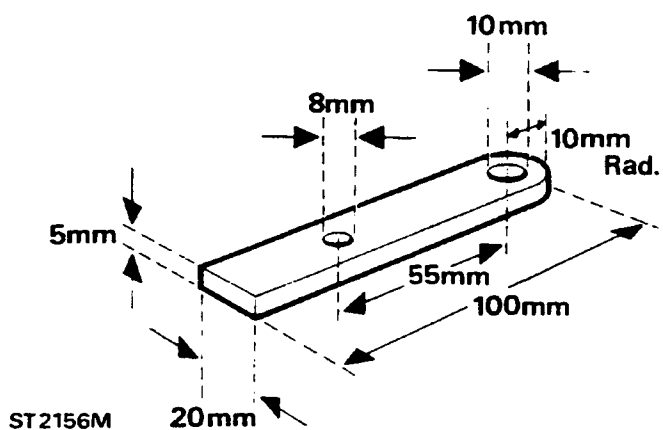


18G 1205 Flange holder

LOCALLY MANUFACTURED TOOLS

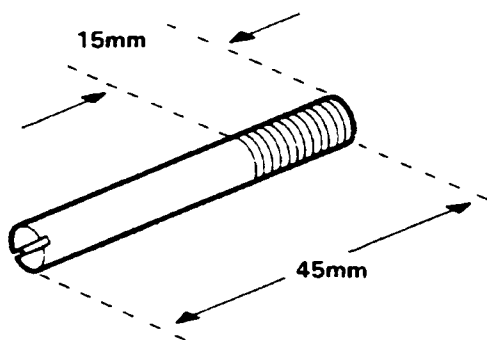
In addition to the special service tools, the following tools can be locally made to assist the dismantling and assembly of the gearbox. The following overhaul procedure is based upon the assumption that these tools are available.

Tool 'A'. Dual purpose tool. Reverse shaft retainer to prevent the shaft falling out when the gearbox is inverted. Also, a layshaft fifth gear retainer to hold the fifth gear whilst releasing stake nut. Use 5mm mild steel to manufacture the tool. When using the tool for the layshaft nut, a suitable spacer is required 20mm diameter 23mm long, with an 8mm diameter clearance hole.



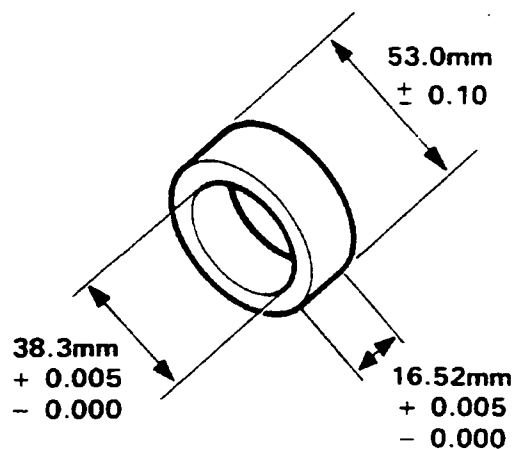
ST2156M

Tool 'B'. Four pilot studs with an 8mm thread for locating in the four counter sunk blind holes in the workstand.



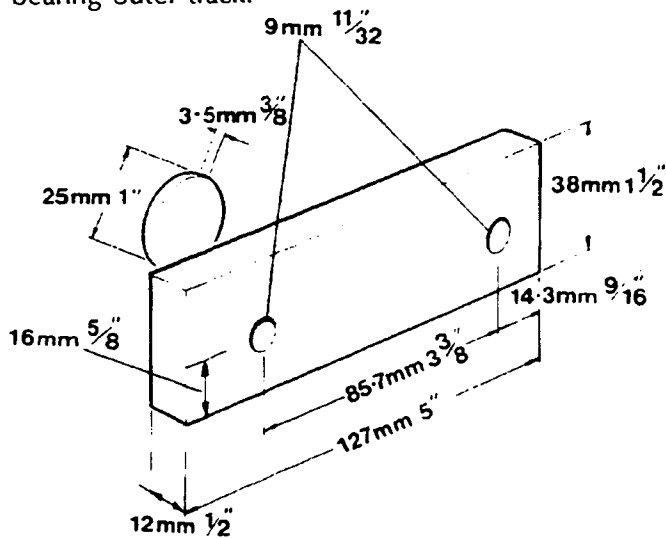
ST 2155M

Tool 'C'. Mild steel dummy centre bearing for the selection of first gear bush.



ST2154M

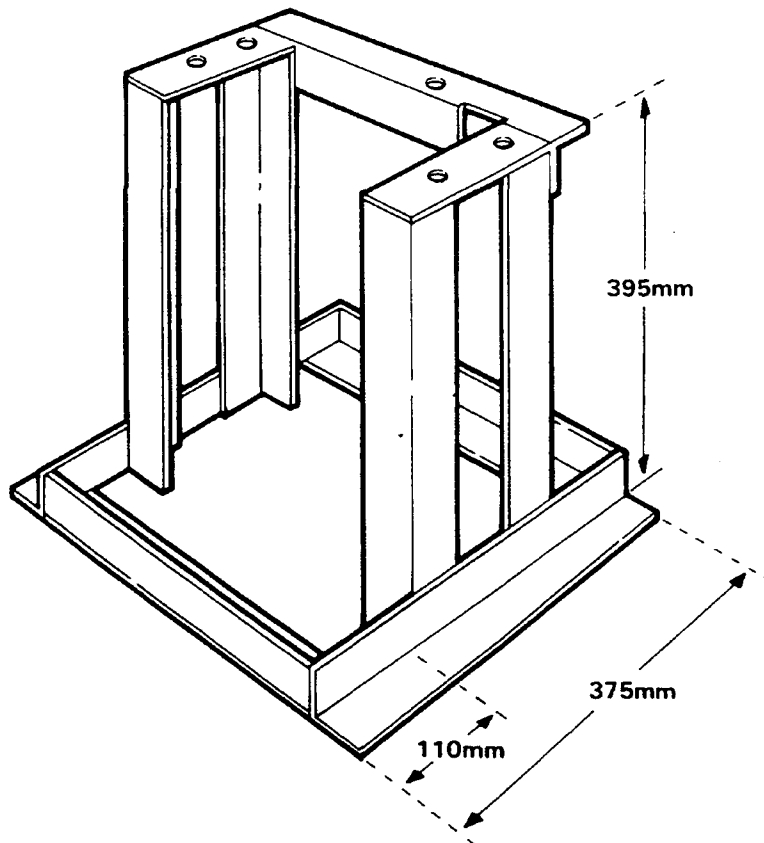
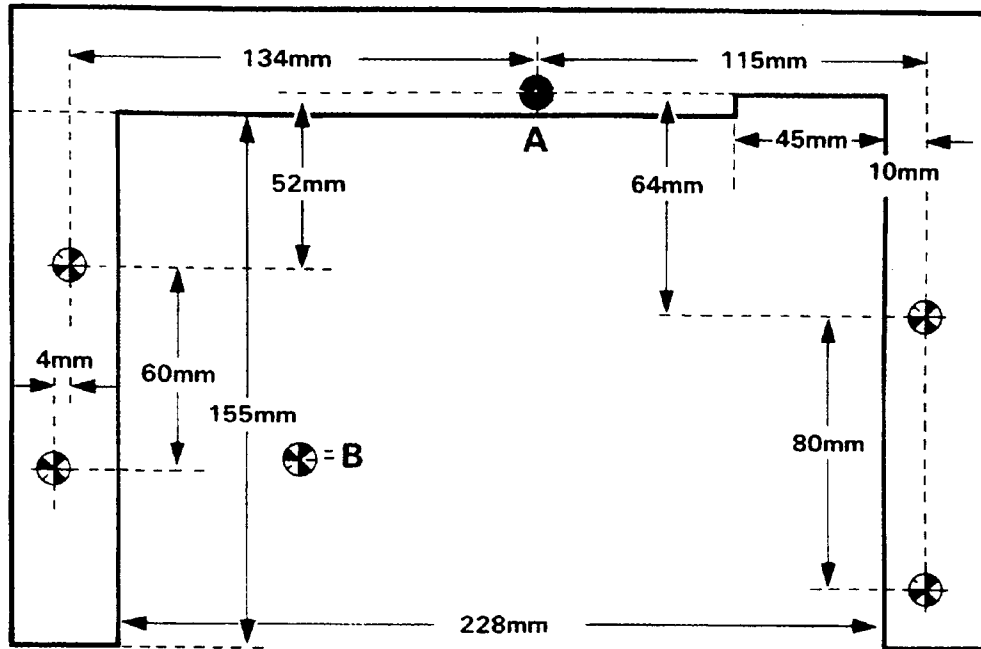
Tool 'D'. Layshaft support plate is fitted with two 8 x 25mm bolts and washers to the front of the gearbox case. It also supports the input shaft bearing outer track.



ST1118M

Tool 'E'. Workstand for securely locating the gearbox during overhaul. Manufacture from 30mm x 30mm angle iron. The single hole marked 'A' should be drilled through the material with a 10mm drill.

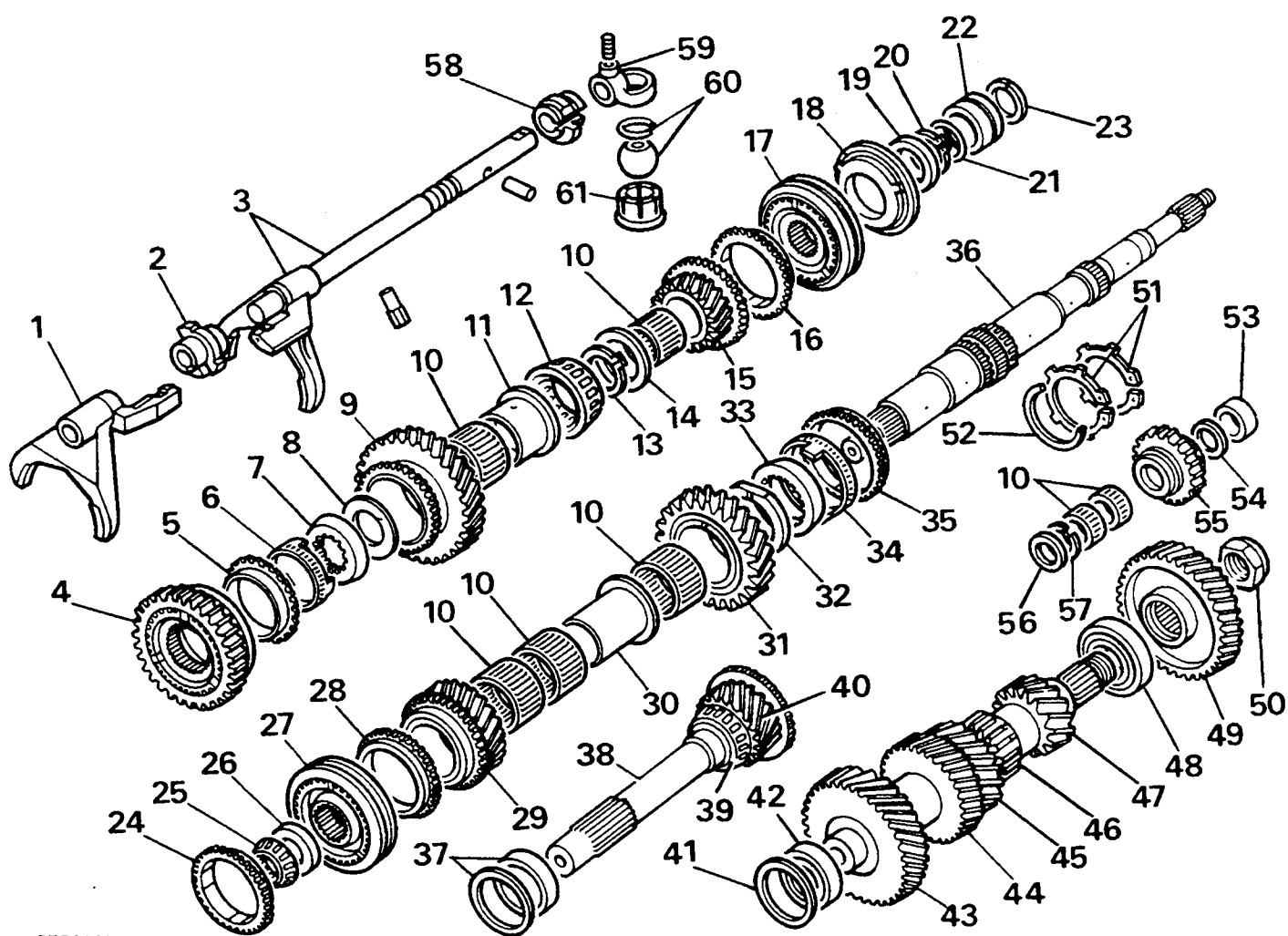
The four counter sunk blind holes marked 'B' should also be made with a 10mm drill, but must not be drilled through the material.



ST2153M

GEARS AND SHAFTS

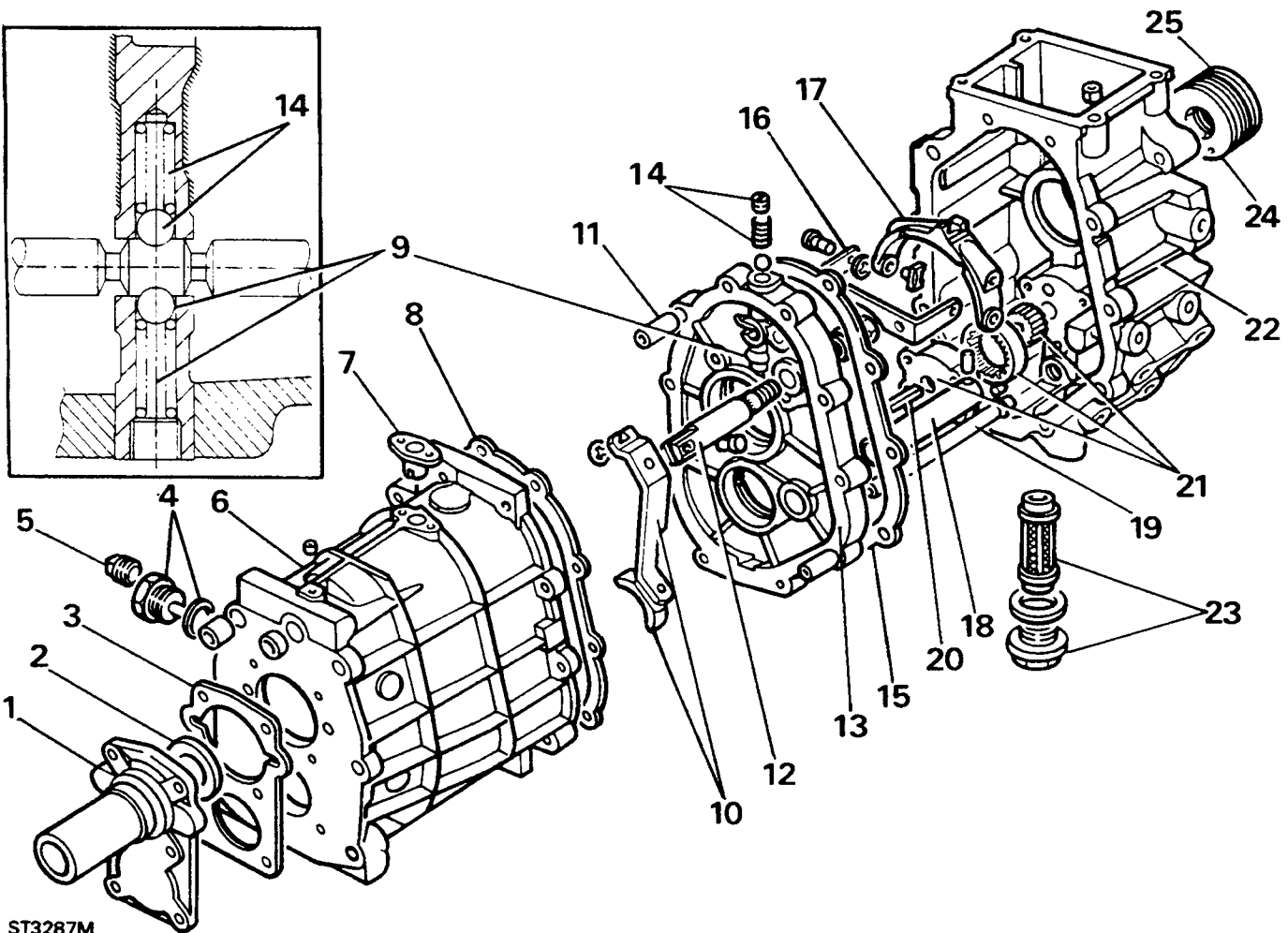
1. Third - fourth selector fork.
2. Interlock spool.
3. First - second fork and selector rail assembly.
4. First - second synchronesh.
5. First gear synchronesh outer baulk ring.
6. First gear synchronesh inner baulk ring.
7. Cone.
8. Thrust washer.
9. First gear.
10. Needle roller bearings.
11. First gear selective bush.
12. Centre taper roller bearing.
13. Circlip.
14. Thrust washer.
15. Fifth gear.
16. Fifth gear baulk ring.
17. Fifth gear synchronesh.
18. Fifth gear synchronesh back plate.
19. Fifth gear synchronesh selective washer.
20. Circlip.
21. "O" ring.
22. Oil seal collar.
23. Snap ring.
24. Fourth gear baulk ring.
25. Pilot taper bearing.
26. Spacer.
27. Third - fourth synchronesh.
28. Third gear baulk ring.
29. Third gear.
30. Third gear bush.
31. Second gear.
32. Thrust washer.
33. Cone.
34. Second gear synchronesh inner baulk ring.
35. Second gear synchronesh outer baulk ring.
36. Mainshaft.
37. Input shaft bearing track and selective washer.
38. Input shaft.
39. Input shaft taper bearing.
40. Fourth gear.
41. Selective shim.
42. Taper bearing.
43. Layshaft fourth gear.
44. Layshaft third gear.
45. Layshaft second gear.
46. Layshaft reverse gear.
47. Layshaft first gear.
48. Taper bearing.
49. Layshaft fifth gear.
50. Layshaft fifth gear retaining stake nut.
51. Circlips retaining first gear and first-second gear synchronesh.
52. Snap ring retaining second gear cone and spacer.
53. Spacer.
54. Snap ring.
55. Reverse idler gear.
56. Thrust washer.
57. Snap ring.
58. Fifth gear spool.
59. Gear change lever yoke.
60. Gear change ball and retaining ring.
61. Gear change Nylon seating.



ST3280M

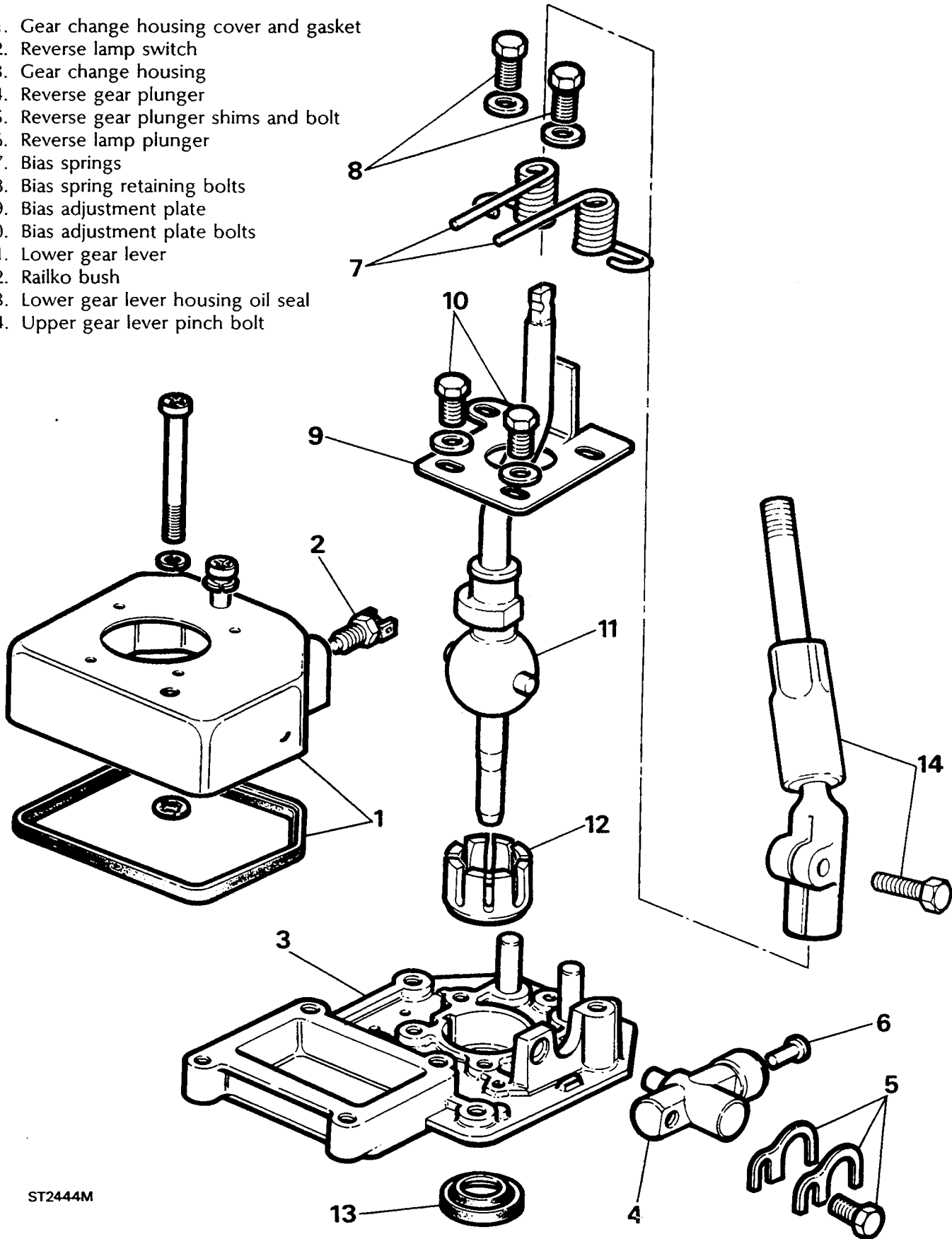
GEARBOX CASING

1. Front cover.
2. Front cover oil seal.
3. Front cover gasket.
4. Oil drain plug and washer.
5. Oil level plug.
6. Gearbox main casing.
7. Spool retainer.
8. Gasket.
9. Inboard detent ball and spring.
10. Reverse lever and slipper.
11. Locating dowels - centre plate to maincase.
12. Reverse lever pivot post.
13. Centre plate.
14. Selector plug, detent ball and spring.
15. Gasket.
16. Fifth gear selector bracket.
17. Fifth gear selector fork.
18. Reverse gear shaft.
19. Oil pick-up pipe.
20. Oil pump drive shaft.
21. Oil pump gears and cover.
22. Fifth gear extension housing.
23. Fifth gear extension housing drain plug and filter.
24. Ferrobestos bush.
25. Oil seal.



KEY TO GEAR CHANGE HOUSING ASSEMBLY

1. Gear change housing cover and gasket
2. Reverse lamp switch
3. Gear change housing
4. Reverse gear plunger
5. Reverse gear plunger shims and bolt
6. Reverse lamp plunger
7. Bias springs
8. Bias spring retaining bolts
9. Bias adjustment plate
10. Bias adjustment plate bolts
11. Lower gear lever
12. Railko bush
13. Lower gear lever housing oil seal
14. Upper gear lever pinch bolt



ST2444M